## **Ingersoll Rand** ARO<sup>®</sup> Products for Industrial Supply

AOD Diaphragm Pumps / 1

Piston/Lubrication Pumps / 22

Pneumatic Valves / 31

Pneumatic Cylinders / 95

Air Motors / 139

Industrial Tools / 171

Industrial Chain Hoists / 231

Air System Components / **249** 







# NDUSTRIAL PRODUCTIVITY SOLUTIONS

Ingersollfa

Proven Source. Proven Solution.

With a history dating back to the US Civil War era, Ingersoll-Rand Company has been a leader in providing pneumatic solutions. From air compressors to air accessories, Ingersoll-Rand continues to manufacture world-class products today.

These products represent arguably the broadest industrial product offering from any one manufacturer in the world.

Ingersoll-Rand... **Proven Source.** Proven Solution.



276-4658 | WWW.AROZONE.CO

### **Table of Contents**

### **ARO FLUID HANDLING PUMPS**

Introduction and Product Overview 1
Diaphragm Pumps1
1/4 Inch Ports9
1/2-Inch Ports
1-Inch Ports
1-1/2 Inch Ports15
2-Inch Ports
Fuel Transfer Pumps
Drum Pumps
Piston Pumps
N-Series Piston Pumps22
Thunder Series Lubrication Pumps 25
Control Handles
5 Year Fluid Handling Warranty Information 29

### **ARO PNEUMATIC VALVES**

Introduction and Product Overview 31
Sierra Series 15 Valves
Sierra Series 18 Valves
MaxAir 2-Way Valves
MaxAir Series Valves
Alpha Series Valves
CAT Series Valves
50 Series Valves
Premair Valves
E Series Valves
K Series Valves
H Series Valves
200 Series Valves

### **ARO PNEUMATIC CYLINDERS**

Introduction and Product Overview 95
Silverair Cylinders
Economair Cylinders
Provenair Cylinders 119
Cylinder Repair Kits
Rod Alignment Cylinders
Cylinder General Warnings and
5 Year Warranty Information

### **ARO AIR MOTORS**

Introduction and Product Overview . 1	39
.10 HP, 0000 Series Motors	140
.25 HP, 000 Series Motors	142

### Table of Contents Continued

.50 HP to .60 HP, 0 Series Motors 144
.65 HP to .90 HP, 2200 Series Motors 148
1.9 HP to 2.0 HP, 44 Series Motors 154
Milling and Sawing Motor Information 156
000-Series Milling Motors
O-Series Milling Motors
2200 Series Milling Motors
44 Series Milling Motors
Accessories and Reversible
Motor Installation
Air Motor Warranty Information

### **ARO INDUSTRIAL TOOLS**

### **INDUSTRIAL CHAIN HOISTS**

Introduction and Product Overview . 231
7740B Series Chain Hoist
7700 and 7790 Series Chain Hoists 235
7700 Series Roller Chain Hoists 238
Hoist Trolleys and Accessories
Ordering Guide and Performance Data 244
Dimension Information
Hoist Warranty Information

### **ARO AIR SYSTEM COMPONENTS**

### Table of Contents Continued

Point-of-Purchase Display Packaging 320
Flow Data for Filters, Regulators,
Lubricators
Polycarbonate Compatibility Data
Air System Components Warranty
Information
Model Index



### Fluid Handling

- Diaphragm Pumps
- Piston Pumps
- Control Handles

### Notes



### *ARO®* Diaphragm Pumps



### ARO, Owner of the "Unstallable" Air Valve Design

As relevant today as the day it came to market, ARO is still the sole owner of the technology and the title: *Unstallable*. ARO uses no magnets, springs, re-set buttons, or other secondary actuators to insure pump shifting - only air.

### Figure A.

ARO's patented "unbalanced" major air valve has constant air pressure applied to its small end. This assures that the pump resets. Competitive designs lose their signal during every shift, making them vulnerable to stalling.



### Figure B.

To reverse the valve, air pressure is supplied to the larger end of the valve, allowing the valve to shift - note that constant air pressure continues to be applied to the small end.

### *ARO®* Diaphragm Pumps



### The Ice Age Is Over.

Following closely on the heels of pump stall-out is the infamous freezing problem inherent in most diaphragm pumps. At ARO, the ice age has been over since the introduction of our unique, enlarged "Quick Dump™" patented air exhaust valve, which diverts air exhaust from critical, ice-prone passages. Available on the ARO 2" (Ball & Flap) and 3" models.

### Figure A.

When the main valve opens and pressurizes the diaphragm air chamber, the Quick Dump operates like a normal air passage and admits air into the diaphragm's air chamber.



### Figure B.

When the main air valve is ready to exhaust, the Quick Dump diverts all of the cold/wet exhaust air coming from the diaphragm air chamber away from the main air valve, avoiding ice formation in the critical valve passages.

## For Safety, Reliability and Ease of Assembly: Bolted Is Better



ARO Diaphragm Pumps feature bolted construction to avoid the proven problems created by clampband type pump fasteners. These include material spills and leaks, bolt loosening and breakage due to poor joint integrity, and difficult reassembly.

### An Air Valve that Forgives and Forgets



ARO's major air valve requires no added lubrication and the "wiping" action of the seals makes it extremely forgiving of contaminated compressed air supplies.



### Lost Air Is No Bargain

If your diaphragm pumps are not ARO Diaphragm Pumps, chances are their air valves are blowing out perfectly good air to atmosphere, at no small expense. And this is not intermittent. This is whenever and wherever these pumps are operating.



Competitive Pump Design Kilowatts Wasted Kilowatts

> The close fitting air valve designs used on competitive pumps allow air to by-pass continually - wasting air - even when not pumping!



ARO's Bryan, Ohio facility, where our diaphragm pumps are manufactured, is registered by Underwriters Laboratories Inc. to ISO 9001 Quality Standards.



ARO Diaphragm Pumps are backed by a generous 5-year warranty on materials and workmanship for your purchasing peace of mind.



ARO's Pump design and manufacturing operations have demonstrated compliance with the quality process, health and safety, technical file and multi-lingual standards set forth by the FEM (Federation Europeene de la Manutention) for the European Union (Communitie Economique).



## *ARO®* Diaphragm Pumps

Design Features



### Ideal For Abrasion And Solids Handling

Because it does not use rotating, sliding seals, like rotary/centrifugal pumps, more process engineers look to ARO diaphragm pumps for handling tough abrasion applications.

### From Top to Bottom, ARO's "Flap" Valve Pump is Your Best High Solids - Handling Choice

The ARO 2" Flap Valve Pump uses a top-suction porting design. Top suction porting is ideal for pumping abrasives and large particles because it uses gravity to assist in draining solids from the pump. Conventional high-solids pump designs use bottom suction; forcing the pump to fight (and lose against) gravity, allowing sediment and solids to accumulate , ultimately "packing out" the pump. See page 19.

### Bolted Construction For Safe Reliability and Ease of Assembly:

All ARO diaphragm pumps use bolted construction that process professionals demand. And, ARO Non Metallic Diaphragm Pumps utilize fasteners that are constructed of 300 series stainless steel for maximum chemical resistance.

**Bolted is Safer** - bolted construction reduces the risk of spills, environmental contamination and the attendant, mandatory reports to regulatory agencies that spills can create.

Bolted is Reliable - Bolted construction withstands the heavy loading that diaphragm pumps are subjected to, without concerns of breakage or loosening.

**Bolted is Easier to Assemble** - ARO's bolted design allows for easy positioning and alignment of parts during reassembly. This is a significant advantage over band-clamp style pump fasteners, which are difficult to align and hold together during reassembly.

**Bolted is Less Expensive** - ARO's design uses standard bolts which cost significantly less to replace. Non standard fastening devices (such as band clamps) are considered "wear parts" and are more expensive to replace.

### ARO's Patented "Unbalanced" Air Valve

ARO's "Unbalanced" air valve design makes this, and all of ARO's Diaphragm Pumps "Unstallable". Because the unbalanced valve cannot settle in a neutral position when the pump is shut down, it can't become stuck, requiring the operator to hammer on the pump in order to start pumping again.

- Eliminates Shifting/Freezing Problems
- Does Not Require Lubrication

- Uses Significantly Less Power Than Competition
- Forgiving In Dirty Air

### "Unstallable" Air Motor Design Expanded: Introducing Simul-Shift™

ARO Diaphragm Pumps are known throughout industry as "The Unstallables", thanks in large part to their patented "unbalanced" air valve design, which eliminates air valve stalling, sticking and centering. With the new 2" and 3" pumps, Quick Dump and Simul-Shift™ valve technology. Simul-Shift's unique design applies constant air pressure to both the pilot and major shift valves to further enhance pump performance and significantly reduce pulsation.

### "Quick-Dump™" Anti-Freeze Valve Design

ARO's "Quick-Dump" exhaust valve, eliminates air motor icing, the second most prevalent problem with conventional air motor designs by diverting cold wet exhaust air away from the critical air valve passages. Incorporated in the new 2" and 3" pumps, Quick Dump and Simul Shift have removed the Diaphragm Pump's stall-out stumbling block, it is, by far, the most energy efficient air valve on the market. Quick Dump will help reduce your energy costs. **Note:** Quick-Dump is incorporated in 2" and 3" models.

### **Broad Material Selection**

ARO offers a wide selection of materials, allowing your choice of the best possible wetted and non-wetted materials suited to your application.

### **Positive Priming Provides Instant Start-Ups**

Check valves are located close to the diaphragm chambers, ensuring a positive prime first time every time.

### **ARO**® **Diaphragm Pumps**

### **Model Overview**

	1/4" Ports Non-Metallic	1/2" Ports Non-Metallic	1/2" Ports Metallic	1" Ports Non-Metallic
MODEL	1/4" (Non-Met.)	1/2" (Non-Met.)	1/2" (Met.)	1" (Non-Met.)
Maximum Flow GPM (LPM)	4.6 (17.4)	13 (49)	13 (49)	47 (178)
Maximum Discharge Pressure PSI (BAR)	100 (6.8)	100 (6.8)	100 (6.8)	120 (8.3)
Fluid Ports Inlet/Outlet (BSP Available)	3/8" (F) - In 1/4" (F) - Out (No BSP)	1/2" (F) - In/Out (No BSP)	1/2" (F) - In/Out (No BSP)	1" ANSI Flange 1" NPT Threaded
Materials of Construction	Polypropylene Groundable Acetal Kynar® (PVDF)	Polypropylene Groundable Acetal Kynar® (PVDF)	Stainless Steel Aluminum	Polypropylene Kynar® (PVDF)
Pump * Weight Lbs. (Kg.)	4.1 (1.85) Poly 4.6 (2.10) Acetal 9.5 (4.3) Kynar® (PVDF)	8.8 (4.0) Acetal 7.2 (3.3) Poly 9.5 (4.3) Kynar® (PVDF)	14.6(6.6)SST 8.4(3.8)Alum	*20.3 (9.2) Poly *28.5 (12.9) Kynar® (PVDF)
Maximum Solids Inches (mm)	Clean Fluids	3/32 (2.4)	3/32 (2.4)	1/8 (3.2)
Best Selling Models (BSP Available)	PD02P-APS-PTA PD02P-APS-PTT PD02P-ADS-DTT PD02P-AKS-KTT	66605J-388 66605J-3EB 66605J-344 66605H-244 66605K-444 66605H-2A4	PD05P-ASS-SAA PD05P-ASS-STT PD05P-AAS-STT PD05P-AAS-PGG	6661AF-3EB-C 6661AF-344-C 6661BF-344-C 6661AG-444-C 6661BG-444-C
Recommended Filter/ Regulator	P29122-600 (Filter/Regulator)	P29122-600 (Filter/Regulator)	P29122-600 (Filter/Regulator)	P29221-610 (Filter/Regulator)
Air Line Kit	66073-1	66073-1	66073-1	66073-2
See Page	9	11	10	13

\* Weights listed are for aluminum air motor models

"Teflon® is a registered trademark of Dupont Company, Santoprene® is a registered

trademark of Monsanto Company, licensed to Advanced Elastomer Systems, L.P."

## *ARO*<sup>®</sup> Diaphragm Pumps

### **Model Overview**

1" Ports Metallic	1-1/2" Ports Non-Metallic	1-1/2" Ports Metallic	2" Ports Non-Metallic	2" Ports Metallic
1" (Met.)	1-1/2" (Non-Met.)	1-1/2" (Met.)	2" (Non-Met.)	2" (Met.)
35 (133)	90 (340)	90 (340)	145 (548)	135 (511)
120 (8.3)	120 (8.3)	120 (8.3)	120 (8.3)	120 (8.3)
1" (F) - In/Out	1-1/2" Flange Ansi	1-1/2" (F)	2" ANSI Flange	2" (F)
Aluminum Stainless Steel Cast Iron	Polypropylene Kynar® (PVDF)	Aluminum Stainless Steel Cast Iron	Polypropylene Kynar® (PVDF)	Aluminum Stainless Steel Cast Iron
*19 (8.6) Alum *36 (16.3) S. S. *31 (14.1) Cast Iron	*62 (28) Poly *92 (42) Kynar® (PVDF)	*51 (23.1) Alum *79 (35.8) Cast Iron 84(38.1) S. S.	*62 (28) Poly *92 (42) Kynar® (PVDF)	*46 (20.9) Alum *92 (41.6) Cast Iron 89 (40.3) S. S.
1/8 (3.2)	1/4 (6.4)	1/4 (6.4)	1/4 (6.4)	1/4 (6.4)
666100-322-C 666100-344-C 666101-344-C 666101-3EB-C 666111-244-C 666112-8EB-C	6661T3-3EB-C 6661T3-344-C 6661U3-344-C 6661U4-444-C	666150-3EB-C 666150-322-C 666150-344-C 666152-3EB-C 666151-344-C 666151-3EB-C 666151-3EB-C 666161-244-C	6662A3-3EB-C 6662A3-344-C 6662B3-344-C 6662B4-444-C	666200-3EB-C 666200-322-C 666200-344-C 666202-3EB-C 666201-344-C 666201-3EB-C 666211-244-C
P29221-610 (Filter/Regulator)	P29241-610 (Filter/Regulator)	P29241-610 (Filter/Regulator)	P29241-610 (Filter/Regulator)	P29241-610 (Filter/Regulator)
66073-2	66084-1	66084-1	66084-1	66084-1
14	15	16	17	18

\* weights listed are for aluminum air motor models

### ARO<sup>®</sup> Specialty & Piston Pumps



"Teflon<sup>®</sup> is a registered trademark of Dupont Company, Santoprene<sup>®</sup> is a registered trademark of Monsanto Company, licensed to Advanced Elastomer Systems, L.P."

### Diaphragm Pumps 1/4-Inch Ports Non-Metallic

### PERFORMANCE CURVES **Performance Specifications** PD02P-XXS-XTX 1/4" NON-METALLIC DIAPHRAGM PUMP FEET SI AIR CONSUMPTION IN SCFM RATIO: 1:1 300 Performance based on wate MAXIMUM G.P.M. (LPM): 4.6 (17.4) 250 **DISPLACEMENT GALLONS** 10 100 PSI (Liters) PER CYCLE: .014 (.053) IS4 200 HEAD (231 FT = AIR INLET: 1/4" NPTF (f) 7 TO PSI NPSH FLUID INLET: 3/8" NPTF (f) 150 DISCHARGE FLUID OUTLET: 1/4" NPTF (f) 100 40 PS MAX. OPERATING PRESSURE PSI (bar): 100 (6.8) OTAL 2 SUSPENDED SOLIDS MAX. DIA. IN. (mm): Clean Fluid Only 50 WEIGHT - LBS. (KGS): 4.1 (1.85)Poly, 4.6 (2.10) Acetal, 9.5 (4.3) Kynar® (PVDF) 2 CAPACITY IN U.S. GALLONS PER MINUTE MAX. DRY SUCTION LIFT: 20 ft. **ETERS** BAR AIR CONSUMPTION IN LITERS / SEC **Dimensional Data** 100 END VIEWS Performance based on water at ambient temperature. 1-5/32" (30 mm) 1/4 - 18 NPTF OUTLET 11/16" (17 mm) 1/4 - 18 NPTF AIR INLET RGE HEAD 1/4 - 18 NPTF OUTLET 6.9 BAR 60 NPSH, FOTAL DISCH $\bigcirc$ 4.8 BAR 4-13/32" 4-17/32" Control of (115 mm) (112 mm) 0 2.8 BAR 20 1-3/8" 1-9/32' (35 mm) (32 mm) 3/8 - 18 NPTF INLET 8 12 FLOW RATE (LITERS / MIN) 3/8 - 18 NPTF INLET 1/4 - 18 NPTF EXHAUST 1-5/32" (30 mm 4-3/4" (121 mm) 5/16" (8 mm) SLOT 11/16" (17 mm) 5-1/2" (140 mm) SIDE VIEW Accessories 7-17/32" (191 mm) **Recommended Filter/Regulator** (See Page 264) **ARO**<sup>°</sup> 5-5/8" Filter / Regulator: P29122-600 (143 mm) P29122-600 6-1/2" (165 mm) 7-9/32" (185 mm)

Ordering Best Selling Models | PD02P-APS-PTA, PD02P-APS-PTT, PD02P-ADS-DTT, PD02P-AKS-KTT

	PD02	<u>P</u> -	X	<u>XX</u> - <u>XX</u>	X	
	Base Model 1/4" Pump			Hardware	Disk Cl	heck/Diaphragm Description
	Center Section Polypropylene			S Stain. Steel	TA TG TT	Teflon/Santoprene Teflon/Nitrile Teflon/Teflon
Port	Description				Seat M	aterial
A	NPT Single Inlet/Single Outlet	Wet End	1		Code	Description
D	NPT Single Inlet/Dual Outlet	Code	Des	scription	D	Acetal
Е	NPT Inlet/Single Outlet	D	Ace	etal	Р	Polypropylene
Н	NPT Dual Inlet/Dual Outlet	Р	Pol	ypropylene	Κ	Kynar (PVDF)
		K	Kyr	nar (PVDF)		

### Diaphragm Pumps 1/2-Inch Ports Metallic

### **Performance Specifications**

•	
RATIO:	1:1
MAXIMUM G.P.M. (LPM):	13 (49)
DISPLACEMENT GALLONS	
(Liters) PER CYCLE:	.040 (.15)
AIR INLET:	1/4"-18 NPTF (f)
FLUID INLET:	1/2"-14 NPTF (f)
FLUID OUTLET:	1/2"-14 NPTF (f)
MAX. OPERATING PRESSURE PSI (bar):	100 psi (6.8 bar)
SUSPENDED SOLIDS MAX. DIA. IN. (mm):	3/32" (2.4mm)
WEIGHT - LBS. (Kg):	14.6 lbs (6.6 kgs)SST, 8.4 lbs (3.8 kgs) Alum
MAX DRY SUCTION LIFT:	10 ft. (Teflon fitted)

### **Dimensional Data**







### Accessories

Recommended Filter/Regulator (See Page 264)

Filter / Regulator: P29122-600



Ordering Best Selling Models | PD05-ASS-SAA, PD05P-ASS-STT, PD05P-ASS-STT, PD05P-AAS-PGG

	PD05 Base Model	P -	<b>A)</b>	(S - X)	Ball Cl	neck/Diaphragm
	1/2 Fullip			Fillin Stoo	Code	Description
	Center Section			5 518111. 5166	AA	Santoprene/Santoprene
	Polypropylene	_			GG	Nitrile/Nitrile
Devi					Π	Teflon/Teflon
Port	Description				Seat M	aterial
Code		Wet End			Code	Description
A	INPT Single Inlet/Single Outlet	Code	Des	cription	F	Aluminum
		S	316	St. Steel	s	300 Series
		F	Alu	minum	5	

### Diaphragm Pumps 1/2-Inch Ports Non-Metallic

### **Performance Specifications**

RATIO:	1:1
MAXIMUM G.P.M. (LPM):	13 (49) Ball 10 (37.9) Duckbill Check
DISPLACEMENT GALLONS	
(Liters) PER CYCLE:	.04 (.15) Ball .032 (.12) Duckbill Check
AIR INLET:	1/4"-18 NPTF (f)
FLUID INLET:	1/2"-14 NPTF (f)
FLUID OUTLET:	1/2"-14 NPTF (f)
MAX. OPERATING PRESSURE PSI (bar):	100 (6.9)
SUSPENDED SOLIDS MAX. DIA. IN. (mm):	3/32-inch (2.4) Duckbill Check- Fibers
WEIGHT - LBS. (Kg):	7.2 (3.3) Polypropylene
	9.5 (4.3) Kynar® (PVDF)
MAX. DRY SUCTION LIFT:	10 ft. (Teflon fitted)











### Accessories

Recommended Filter/Regulator (See Page 264)

Filter / Regulator: P29122-600



Ordering Best Selling Models | 66605J-388, 66605J-3EB, 66605J-344, 66605K-444

5	<u>6660 5X</u>	<u>- X</u>	XX		All hardware is 300
Bas	se Model			Disk Cl	heck/Diaphragm
1/2" Pump		Check Valve Seats		Code	Description
Air Motor		Code	Description	22	Nitrile/Nitrile
Polypropylene		2	Stainless Steel	33	Viton/Viton
Wetted Davids		3	Polypropylene	44	Teflon/Teflon
Codo	Description	4	Kvnar (PVDF)	88	Polyurethane/Polyurethane
	Description	N	Duckhill	EB	Santoprene/Santoprene
J //*		Ū	Buonom	D2	Nitrile/Nitrile (Duckbill Only)
K"	Kynar (PVDF)			A4	Stainless/Teflon
3	Polypropylene				
7	Kynar (PVDF)				

All hardware is 300 Series Stainless Steel.

### Diaphragm Pumps 1/2-Inch Ports Non-Metallic Groundable

### **Performance Specifications**

RATIO:	1:1
MAXIMUM G.P.M. (LPM):	13 (49)
DISPLACEMENT GALLONS (Liters) PER CYCLE:	.04 (.15)
AIR INLET:	1/4"-18 NPTF (f)
FLUID INLET:	1/2"-14 NPTF (f)
FLUID OUTLET:	1/2"-14 NPTF (f)
MAX. OPERATING PRESSURE PSI (bar):	100 (6.9)
SUSPENDED SOLIDS MAX. DIA. IN. (mm):	3/32-inch (2.3)
WEIGHT - LBS. (Kg):	8.8 (4.0) Acetal
MAX. DRY SUCTION LIFT:	10 ft. (Teflon fitted)

Dimensional Data See 1/2-inch (ports) non-metallic pump dimensional and flow data on page 11.

### Independent Laboratory Test Results

### UNRESTRICTED FLOW TESTS 27 KV Filter / Regulator: P29122-600 This test involved readings taken 18-22 KV with a electro-static field strength meter during free-flow operation of the three pumps. Readings were taken at each pump's metallic clamps and fasteners, GROUND P29122-600 traditional electro-static "hot-ARO spots." TIME 300 11K 11K 9K 7K 5K 3K 1K 250-9K 7K 5K 3K 1K 200-VOLTS VOLTS VOLTS 150-100-ARO 50· ARO 20 20-0 PAINT THINNER (HIGH CONDUCTANCE) DIESEL FUEL (MODERATE CONDUCTANCE) ENAMEL PAINT (LOW CONDUCTANCE)

An independent lab test showed that the ARO Groundable pump, pumping materials such as paint thinner, diesel fuel and enamel paint under high flow conditions, accumulated a maximum of .0032 millijoules of energy. The report concluded that energies of this magnitude are not sufficient to ignite flammable vapors. Reported minimum ignition energies of several flammable fluids are as follows:

Methyl Ethyl Ketone: 0.53 millijoules Isopropyl Alcohol: 0.65 millijoules

Acetone: 1.15 millijoules Hydrogen: 0.02 millijoules

Ordering Best Selling Models | 66605H-2A4, 66605H-244



\* A groundable pump is defined as one which is not able to accumulate a charge of sufficient energy to ignite flammable vapors. Be sure that every component in your system is properly grounded.

### **Model Overview**

ARO® Groundable Diaphragm Pump is constructed from a patented material blend that serves to route electrostatic buildup to a single bleed-off point, ensuring safe operation. This exclusive body composition also provides superior compatibility with harsh industrial solvents and other volatile materials.

### Accessories

**Recommended Filter/Regulator** (See Page 264)

## Diaphragm Pumps 1-Inch Ports Non-Metallic

### **Performance Specifications**

			_	6661XX-XXX-C 1" NON-METALLIC DIAPHRAGM PUMP
RATIO:	1:1	ы. т	125	5 15 20 30 40 45 AIR CONSU
MAXIMUM G.P.M. (LPM):	47 (178)	E		Performance at ambient ter
DISPLACEMENT GALLONS (Liters) PER CYCLE:	.170 (.64)	250  S41 = 200	100	130 PSU
AIR INLET:	1/4" NPTF (f)	D (2.31 I	75	
FLUID INLET:	ANSI Class 150, 1" Pipe Flange	43H 150-		10 PS
FLUID OUTLET:	ANSI Class 150, 1" Pipe Flange	ISCHAR	50 ·	100
MAX. OPERATING PRESSURE PSI (bar):	120 (8.3)	OTAL D	25	
SUSPENDED SOLIDS MAX. DIA. IN. (mm):	1/8-inch (3.2)	⊢ 50 <del></del> —		
WEIGHT - LBS. (Kg):	20.3 (9.2) Polypropylene 28.5 (12.9) Kynar <sup>®</sup> (PVDF) For Cast Iron center section models, add 8.5 lbs (3.81 kg.)	METERS	BAR 0	0         10         20         30         40           CAPACITY IN U.S. GALLONS PER MINUTE           5.8.12         16.20.22         AIR CONSUMPTION
MAX. DRY SUCTION LIFT:	15 ft. (Rubber fitted)	100		Performance at ambient te



PERFORMANCE CURVES

### **Dimensional Data**



### Accessories

Recommended Filter/Regulator (See Page 286)

Filter / Regulator: P29221-610 67078 - Polypropylene Flange Kit 1" NPT (F)



P29221-610

Ordering Best Selling Models | 6661AF-3EB-C, 6661AF-344-C, 6661BF-344-C, 6661AG-444-C, 6661BG-444-C

	<u>6661</u> )	X	- )	<u>(XX</u>		All hardware is
	Base Model 1" Pump		Check	Make Saata	Ball Ch	eck/Diaphragm Description
Wetted	Air Motor Code Description A Aluminum B Cast Iron Parts	<u> </u>	Code 3 4 8	Description Polypropylene Kynar (PVDF) Stainless Steel (400, hardened)	22 33 44 EB	Nitrile/Nitrile Viton/Viton Teflon/Teflon Santoprene/Santoprene
<u>Code</u> 3 4 F G	Description Polypropylene Flange Kynar (PVDF) Flange Polypropylene Flange Kynar (PVDF) Flange	J K L N	Polyp Kynai Polyp Kynai	propylene, N.P.T. r (PVDF), N.P.T. propylene, B.S.P. r (PVDF), B.S.P.		

hardware is 300 Series Stainless Steel.

## Diaphragm Pumps 1-Inch Ports Metallic

### **Performance Specifications**



PERFORMANCE CURVES

Ordering Best Selling Models | 666100-322-C, 666101-344-C, 666111-244-C, 666101-3EB-C, 666100-344-C, 666112-8EB-C

			<u>    6661   X</u>	<u>X - X</u>	<u>XXX</u> - C		
			Base Model			Ball Ch	eck/Diaphragm
			1" Pump	Check	Valve Seats	Code	Description
Air Mo	tor			Code	Description	22	Nitrile/Nitrile
Code	Description			1	Aluminum	33	Viton/Viton
0	Aluminum			2	316 Stainless Steel	44	Teflon/Teflon
1	Cast Iron			3	Polypropylene	EB A4	Santoprene/Santoprene Stainless/Teflon
2	BSP Aluminum	Wetted	Parts	4	Kvnar (PVDF)		
3	BSP Cast Iron	Code	Description	- 5	Carbon Steel		
		0	Aluminum	0			
		1	316 Stainless Steel	0	400 33 (400 hardened)		
		2	Cast Iron		(100, nardonod)		
		Α	BSP Aluminum				
14		В	BSP Cast Iron				
14		C	Cast Iron w/SS Hardware				

## Diaphragm Pumps 1 1/2-Inch Ports Non-Metallic

### **Performance Specifications**

**Dimensional Data** 

11-9/16"

(294 mm)

ARC

9" (229 mm)

10-1/32" (255 mm)

AIR EXHAUST THREAD 3/4" N.P.T.

24-1/2" (622 mm)

RATIO:	1:1	6661XX-XXX-C 1-1/2" NON-METALLIC DIAPHRAGM PUMP
MAXIMUM G.P.M. (LPM):	100 (379)	
DISPLACEMENT GALLONS (Liters) PER CYCLE:	.72 (2.7)	
AIR INLET:	1/2" NPTF (f)	₩ 200
FLUID INLET:	ANSI Class 150, 1-1/2" Pipe Flange	
FLUID OUTLET:	ANSI Class 150, 1-1/2" Pipe Flange	
MAX. OPERATING PRESSURE PSI (bar):	120 (8.3)	
SUSPENDED SOLIDS MAX. DIA. IN. (mm):	1/4-inch (6.4)	<sup>10</sup> 50 25
WEIGHT - LBS. (Kg):	62 (28) Polypropylene 92 (42) Kynar <sup>®</sup> (PVDF) For Cast Iron center section add 23 lbs. (10.4 kg)	0 0 0 30 60 90 120 CAPACITY IN U.S. GALLONS PER MINUTE
MAX. DRY SUCTION LIFT:	14 ft. (Rubber fitted)	100 10 10 10 10 10 10 10 10 10 10 10 10

19-23/32" (501 mm)

Ø

Ø

ARO'

0

14-15/16

(379 mm)



PERFORMANCE CURVES

1-1/2" A.N.S.I. Flange

AIR INLET 1/2 - 14 N.P.T.F.

3-7/8" B.C. (98 mm)

### Accessories

Recommended Filter/Regulator (See Page 286)

Filter / Regulator: P29241-610 67079 - Polypropylene Flange Kit 1-1/2" NPT (F)



Ordering Best Selling Models | 6661T3-3EB-C, 6661U3-344-C, 6661T3-344-C, 6661U4-444-C

18-1/16" (459 mm)

3-9/32"

(83 mm)

All har	dware is 300 Series Sta	ainless Steel.	6661	XX	-	<u>XXX</u> - C		
			Base Model				Ball Ch	eck/Diaphragm
			1 1/2" Pump		Chec	k Valve Seats	Code	Description
Air Mo	tor				Code	Description	22	Nitrile/Nitrile
Code	Description				3	Polypropylene	33	Viton/Viton
Т	Aluminum				4	Kvnar (PVDF)	44	Teflon/Teflon
U	Cast Iron				8	400 SS	EB	Santoprene/Santoprene
Wetted Parts		Parts			(400, hardened	)		
		Code	Description			( ;	/	
		3	Polypropylene					
		4	Kynar (PVDF)					

## Diaphragm Pumps 1 1/2-Inch Ports Metallic

### **Performance Specifications**

•	
RATIO:	1:1
MAXIMUM G.P.M. (LPM):	90 (340)
DISPLACEMENT GALLONS (Liters) PER CYCLE:	.73 (2.76)
AIR INLET:	1/2" NPTF (f)
FLUID INLET:	1-1/2" NPTF (f) or 1-1/2" BSP (f)
FLUID OUTLET:	1-1/2" NPTF (f) or 1-1/2" BSP (f)
MAX. OPERATING PRESSURE PSI (bar):	120 (8.3)
SUSPENDED SOLIDS MAX. DIA. IN. (mm):	1/4-inch (6.4)
WEIGHT - LBS. (Kg):	51 (23.1) Aluminum 84 (38.1) Stainless Steel 79 (35.8) Cast Iron For Cast Iron center section models, add 23 lbs. (10.4 kg.)
MAX. DRY SUCTION LIFT:	19 ft. (Rubber fitted)



PERFORMANCE CURVES 6661XX-XXX-C 1-1/2" METALLIC DIAPHRAGM PUMP

100 120 14

AIR CONSUMPTION IN SCFM

NPSH

25

20

100

Performance based on wat at ambient temperature

81

AIR CONSUMPTION IN LITERS / SEC

Performance based on v at ambient temperature.

S

10

75

50 2

120 PSI

40 PSI

20

20

40

CAPACITY IN U.S. GALLONS PER MINUTE

50 60 70

60

100 PSI

70 PSI

FEET

DISCHARGE HEAD

TOTAL DISCHAF

METERS BAR

100

Ordering Best Selling Models | 666150-3EB-C, 666150-322-C, 666150-344-C, 666152-3EB-C, 666151-344-C, 666161-244-C

			<u>6661 X</u>	X -	<u>XXX</u> - C		
			Base Model			Ball Ch	eck/Diaphragm
			1 1/2" Pump	Chec	k Valve Seats	Code	Description
Air Mo	tor			Code	Description	22	Nitrile/Nitrile
Code	Description			1	Aluminum	33	Viton/Viton
5	Aluminum			2	316 Stainless Steel	44	Teflon/Teflon
6	Cast Iron			3	Polypropylene	EB	Santoprene/Santoprene
7	BSP Aluminum	Wetted	Parts	4	Kynar (PVDF)	A4	Stainless/Teflon
8	BSP Cast Iron	Code	Description	- Q	/00.55		
		0	Aluminum	U	(Hardened)		
		1	316 Stainless Steel		(		
		2	Cast Iron				
		Α	Aluminum w/SS Hardware				
16		В	316 SS w/SS Hardware				
		C	Cast Iron w/SS Hardware				

### Diaphragm Pumps 2-Inch Ports Non-Metallic

### **Performance Specifications**

RATIO:	1:1
MAXIMUM G.P.M. (LPM):	145 (548)
DISPLACEMENT GALLONS (Liters) PER CYCLE:	.72 (2.7)
AIR INLET:	1/2" NPTF (f)
FLUID INLET:	ANSI Class 150, 2" Pipe Flange
FLUID OUTLET:	ANSI Class 150, 2" Pipe Flange
MAX. OPERATING PRESSURE PSI (bar):	120 (8.3)
SUSPENDED SOLIDS MAX. DIA. IN. (mm):	1/4-inch (6.4)
WEIGHT - LBS. (Kg):	62 (28) Polypropylene, 92 (42) Kynar <sup>®</sup> (PVDF) For Cast Iron center section models, add 23 lbs. (10.4 kg.)
MAX. DRY SUCTION LIFT:	14 ft. (Rubber fitted)

### **Dimensional Data**





### Accessories

120

20

0 0

Recommended Filter-Regulator (See Page 286)

240 360 FLOW RATE (LITERS / MIN)

Filter / Regulator: P29241-610

67080 - Polypropylene Flange Kit 2" NPT (F)



480

600

Ordering Best Selling Models | 6662A3-3EB-C, 6662B3-344-C, 6662A3-344-C. 6662B4-444-C

All ha	rdware is 300 Series	Stainless Stee	. <u>6</u> 6	<u>562 X</u>	X -	<u>XXX</u> - C		
			Base M	odel			Ball Ch	eck/Diaphragm
			2" Pum	p	Chec	k Valve Seats	Code	Description
Air Mo	tor				Code	Description	22	Nitrile/Nitrile
Code	Description				3	Polypropylene	33	Viton/Viton
Α	Aluminum				4	Kvnar (PVDF)	44	Teflon/Teflon
В	Cast Iron				8	400 SS	EB	Santoprene/Santoprene
	Wetted Parts				(Hardened)			
		Code	Description		-			
		3	Polypropylene					
		4	Kynar (PVDF)					

### Diaphragm Pumps 2-Inch Ports Metallic

### **Performance Specifications**

MAXIMUM G PM (I PM)	135 (511)
FLUID INLET:	2" F
FLUID OUTLET:	2" F
MAX. OPERATING PRESSURE PSI (bar):	120 (8.3)
SUSPENDED SOLIDS MAX. DIA. IN. (mm):	1/4-inch (6.4)
WEIGHT - LBS. (Kg):	46 (20.9) Aluminum 92 (41.6) Cast Iron 89 (40.3) Stainless Steel
MAX. DRY SUCTION LIFT:	19 ft. (Rubber fitted)

### **Dimensional Data**





### 90 (6.2) ٩h LEI 80 (5.5) RE 70 (4.8) AIR INL 60 (4.1) 50 (3.5) nimensional Vata 40 (2.8) AIR INLET 30 (2.1) 40 PSI 20 (1.4) 12 10 (.7) 20 30 40 50 60 70 80 90 100 110 120 130 140 (76) (114) (152) (190) (228) (266) (304) (341) (380) (416) (454) (492) (530) â 10 (38)

PERFORMANCE CURVES 6662XX-XXX-C 2" METALLIC DIAPHRAGM PUMP

WATER DELIVERY — GALLONS PER MINUTE (litres per minute) (WITH INLET SUBMERGED BELOW FLUID LEVEL)

### Accessories

100 (6.9)

### Recommended Filter/Regulator (See Page 286)

Filter / Regulator: P29241-610



P29241-610

### Ordering

			<u>6662 XX</u>	- <u>X</u>	<u>(X</u> - C		
			Base Model 2" Pump			Ball Ch Code	neck/Diaphragm Description
Air Mot	tor			Check	Valve Seats	22	Nitrile
Code	Description			Code	Description	33	Viton
0 1 2 3	Aluminum Cast Iron BSP Aluminum BSP Cast Iron	Wetted Code 0 1 2 A B	Parts Description Aluminum Stainless Steel Cast Iron Alu w/SS Hardware SS w/SS Hardware	1 2 3 4 5 8	Aluminum Stainless Steel Polypropylene Kynar (PVDF) Carbon Steel SS (400 Hardened)	44 62 EB	Teflon Acetal/Nitrile Santoprene
		C	CI w/SS Hardware	Warning: A	luminum is not compatible	with Halogena	ated Hydrocarbon Solvents

### Specialty Diaphragm Pumps Fuel Transfer Pumps

### **Performance Specifications**

	1 Inch	1-1/2 Inch	2 Inch
RATIO:	1:1	1:1	1:1
MAX. G.P.M. (Liters):	29 (110)	75 (284)	75 (284)
AIR INLET:	1/4" NPT	1/2" NPT	1/2" NPT
PORT SIZE:	1" NPT	1-1/2" NPT	2" NPT
MAX. OP. PRESSURE PSI (bar):	50 (3.40)	50 (3.4)	50 (3.4)
PASS SOLIDS MAX.DIA. IN. (mm):	1/8" (3.2)	1/4" (6.4)	1/4" (6.4)
WEIGHT LBS. (Kgs.):	19 (8.6)	51 (23.1)	54 (24.5)

### **Dimensional Data**

See pg. 14 for 1" Metallic Pump dimensional data. See pg. 16 for 1-1/2" Metallic Pump dimensional data. The dimensions for the 1-1/2" Metallic Pump are the same for the 2" U.L. Fuel Pump.

### U.L. Listed Fuel Transfer Pumps

These ARO Diaphragm Pumps have been designed specifically for dispensing petroleum-based fuel. These pumps meet UL-79 specification, code and are compatible with:

- GASOLINE
   AVIATION FUEL
- DIESEL FUEL FUEL OIL
- KEROSENE
   UNLEADED FUEL

Used for high-volume transfer, bulk-unloading or fueling applications. To meet UL-79 specification, a 50 PSI pressure relief valve opens and bleeds off excess pressure. The relief valve can be plumbed to return the bleed-off fuel to the storage container.

### Ordering

MODEL	FLUID INLET/OUTLET PORT SIZE	SEAT	BALL	DIAPHRAGM
<b>ALUMINUM CONSTRUCTION</b>	l			
Unleaded 650717-C	1" NPT	Kynar PVDF	Acetal	Viton®
Unleaded 650718-C	1-1/2" NPT	Kynar PVDF	Acetal	Viton
Unleaded 650719-C	2" NPT	Kvnar PVDF	Acetal	Viton

Viton Diaphragms are recommended for use with unleaded fuels.



1-inch



1-1/2 -inch

### Accessories

Recommended Filter/Regulator (See Page 286)

1" Diaphragm Pump Filter / Regulator: P29221-610 1-1/2" / 2" Diaphragm Pump Filter / Regulator: P29241-610



P29241-610

### **Pump Features**

- **Choose from Aluminum, Stainless Steel or Polypropylene Body Construction** ARO Drum Pumps are available in three body materials for optimum fluid compatibility.
- **11 GPM Flow Capability** Drum Pumps offer plenty of capacity to satisfy a broad range of transfer application volume demands.
- **Stall-Free Operation** ARO Diaphragm Drum Pumps feature a patented "unbalanced" air valve design that avoids stall-out, even under low air-inlet pressures
- **Bolted Construction** Unlike traditional band-clamp style pumps, ARO Diaphragm Drum Pumps utilize bolted fasteners for leak-tight integrity.
- 5-Year Warranty

### **Pump Packages**

- **Package Components Factory-Matched** ARO Drum Pump package components (adapters, siphon tubes, etc.) contain pre-specified, matching materials of construction for complete fluid compatibility.
- Choose from Basic to Complete Drum Pump Packages can be ordered in 3 styles:
- Basic: Pump, Bung Adapter, Air Safety Shut-Off, Siphon Tube, Weather Seal and base
- Complete/Transfer: Basic Pump plus Fluid Hose or Fluid Hose with Non-Drip Nozzle
- **Complete/Dispensing**: Basic Pump plus Foot Valve, Hose and Dispensing Nozzle

### Accessories

Tailor your own Drum Pump package with any of these accessories:

- Hoses 1/2" ID hose comes with factory installed cam coupler on one end to attach to pump. Other end comes either bare or with a preassembled fitting for dispense nozzle. Hose materials available are: Nitrile, EPDM, Vinyl or Nylon.
- **Tank Adapters** For bulk tank applications, tank adapter kit comes complete with all necessary hardware and works like a bulk head fitting.
- **Foot Valves** For quick priming. Foot valves are available in either stainless steel or polypropylene.
- Drum Adapter Kits 55-gallon bung adapter kits come complete with base, weather seal, threaded adapter, siphon tube and stainless fasteners. Choose from polypropylene, stainless steel or aluminum construction.

### **Ordering Information**

Basic Packages (Each package includes Pump, Bung Adapter, Air Shut-off, Siphon Tube, Weather Seal and Base)

Model	Body Material	Seat Material	Bal/Diaphragm Material	Fluid Service
DA005-PPUU-2-A	Polypropylene	Polypropylene	Polyurethane	Water/Oil
DA005-PPNN-2-A	Polypropylene	Polypropylene	Nitrile	Water/Oil
DA005-PPTT-2-A	Polypropylene	Polypropylene	Teflon®	Mild Acid
DA005-SSTT-2-A	Stainless Steel	Stainless Steel	Teflon®	Solvent
DA005-ASTT-2-A	Aluminum	Stainless Steel	Teflon®	Solvent
DA005-APNN-2-A	Aluminum	Polypropylene	Nitrile	Oil

Complete/Transfer Packages (Each package contains Basic Package plus Cam Coupler, 10-Feet of Fluid Hose or 10-Feet of Fluid Hose with Non-Drip Nozzle.)

Model	Body Material	Seat Material	Ball/Diaphragm Material	Hose Material	Non-Drip Nozzle	Fluid Service
DA005-PPUU-2-C	Polypropylene	Polypropylene	Polyurethane	Vinyl	No	Water/Oil
DA005-PPNN-2-N	Polypropylene	Polypropylene	Nitrile	Nitrile	No	Water/Oil
DA005-PPNN-B-M	Polypropylene	Polypropylene	Nitrile	Nitrile	Yes	Oil
DA005-APNN-2-0	Aluminum	Polypropylene	Nitrile	Nitrile	No	Oil
DA005-APNN-B-P	Aluminum	Polypropylene	Nitrile	Nitrile	Yes	Oil



- Quick, Convenient Drum Changeout
- Choose from Basic to Complete
   Pump Packages
- 5-Year Warranty
- Broad Assortment of Accessories
- Package Components Factory-Matched for Optimum Compatibility

### **Ordering Information**

**Complete/Dispensing Packages** (Each package contains Basic Package Plus Foot Valve Assembly, 10' Hose, Cam Coupler and Dispensing Nozzle.)

Model	Body Material	Seat Material	Ball/Diaphragm Material	Hose Material	Dispense Fixture	Fluid Services
DA005-PPNN-B-J	Polypropylene	Polypropylene	Nitrile	Nitrile	Bibb w/ Trigger	Water/Oil
DA005-APNN-B-D	Aluminum	Polypropylene	Nitrile	N/A	Oil Tapper	Oil
DA005-APNN-B-L	Aluminum	Polypropylene	Nitrile	Nitrile	Bibb w/ Trigger	Water/Oil

### 55-Gallon Drum Bung Adapter Kits

(Kit contains Base, Bung Adapter, Bung Seal, Siphon Tube, Weather Seal and Hardware)

•		-		,				
Model	Base Material	Tube Material	Weather Seal	Base Seal				
67231	Polypropylene	Polypropylene	UHMW PE	Viton				
67231-6	Aluminum	Stainless Steel	Viton	Viton				
67231-7	Stainless Steel	Stainless Steel	Viton	Viton				
N								

Note: Fasteners are 300 Series Stainless Steel

Bulk Tank Adapter Kit (Kit contains Base, Threaded Adapter, and Hardware)

67234 Polypropylene / Viton O-Ring Seal

67234-7 Stainless Steel (300 Series) / Viton O-Ring Seal

Note: Fasteners are 300 Series Stainless Steel

**Foot Valves** (Recommended for use with dispensing nozzle. Assembly includes Housing, Ball Check & O-Ring)

637336 Polypropylene w/Viton O-Ring & Ball use with 67231

637337 Stainless Steel w/Viton O-Ring & Ball use with 67231-6, or 67231-7

Fluid Hose (1/2" ID Hose comes in 10-feet lengths and with Cam Coupler)

Model	Material	Pump Used With	Fittings End/End	Dispensing Nozzle Used w/ (Order Separately)
621517-10	Nitrile	Polypropylene	Cam/Bare	N/A
621516-10	Nitrile	Polypropylene	Cam/Brass 1/4-18 NPT Male	635129
621523-10	Nitrile	Polypropylene	Cam/Non-Drip Nozzle	Included
621515-10	EPDM	Polypropylene	Cam/Bare	N/A
621519-10	Vinyl	Polypropylene	Cam/Bare	N/A
621514-10	EPDM	Polypropylene	Cam / 1" NPT	95199
622514-10	Nylon	Polypropylene	1/2" NPT / 1/2" NPT 316 Stainless Steel	
621518-10	Nitrile	Aluminum	Cam/Bare	N/A
621520-10	Nitrile	Aluminum	Cam/Brass 1/4-18 NPTF	635129
621524-10	Nitrile	Aluminum	Cam/Non-Drip Nozzle	Included

Note: Hose requires 95189 to adapt to 1/2" port

### Fluid Dispensing Nozzles

Model	Description
95199	<b>Composite Nozzle</b> - High flow nozzle works like gasoline nozzle. Features tough composite (polypropylene) construction for caustic service.
95200	<b>Swivel</b> - 1" M X 1" FNPT Polypropylene hose swivel attaches between hose an dispensing nozzle and allows operator to rotate freely. Use with 95199.
95183	<b>Oil Tapper</b> - Easy-pull tapper attaches directly to pump outlet port and provides even flow dispensing. Aluminum construction for oil service.
77617-Z	<b>Oil Tapper Fitting</b> - Plated carbon steel 1/2-14 NPTF X 3/8-18 NPTF -1. Used to attach 95183 Oil Tapper to 1/2" Aluminum pump
635129	<b>Bibb with Trigger</b> - 1/4" NPTF inlet, zinc die casting with brass and nitrile seals for water or oil service. Radiator type bibb has 1/4" fluid inlet and non-drip tip.
Pump 0	utlet Adapter
95189	Composite Fitting - 1/2" Male NPT x MaleCam adapter (Polypropylene)
95190	Aluminum Fitting - 1/2" Male NPT x MaleCam adapter (Aluminum)

### **Drum Adapter Kit**





### **Foot Valve** 637336



Hose, Swivel & Dispensing Nozzle 621514-10, 95200, 95199



### Hose & Dispensing Bibb







### **Features**

- Patented ARO<sup>®</sup> Stall-Free, Ice-Free Air Motor Design: Your guarantee of trouble-free pump operation. The N Series air motor also contains fewer parts and requires absolutely no mechanical assist devices such as trip rods or push pins.
- Higher Flows- The new 2:1 N-Series pump features higher flows (4.3 GPM/ 16.3 lpm vs. 4.0 GPM /15.1 lpm max.) than its predecessor.
- Over 10 Million Cycles: In field tests under rigorous, real-world working conditions, the new N-Series 2:1 pumps have turned over more than 10-million cycles-and are still running!
- Smooth, Low Pulse Flow: The 2:1 pumps cycle rate delivers a smoother flow with less pulse, making it ideal for handling sensitive materials.
- Broad Application\*: The new N's can pump higher viscosity materials-making them ideal for a wide variety of fluids including:
  - Coatings
  - Adhesives
  - Resins
  - □ Solvents
  - Chemicals
  - Laguers
  - □ Sealants
- Choose Your Pump Type: Stub (wall-mountable) or 55-Gallon
- Choose Your Packings:
  - Upper: Ryton-Filled Teflon<sup>®</sup>, UHMW-PE or Polyurethane
     Lower: Teflon, UHMW-PE
- New Packing Design Delivers Long Life: The 2:1 N Series upper and lower packings feature a new packing design that has proven to last 3-times longer than prior designs in working field tests.
- Excellent for Moisture/Air Sensitive Materials: Including inert blanket applications using ports supplied on outlet body and optional bung adaptor.
- Divorced Design Tie Rods: Provide easier, faster service while preventing air motor contamination.
- 5-Year Warranty: Peace of Mind

\* Consult factory for questions pertaining to specific applications

### **Ordering Information**

NM2202X - X1 - X31

Model —

A-Carbon Steel

Type

1-Stub 4-55-Gallon Packings (Upper/Lower) 7-Ryton-Filled Teflon/Teflon C-UHMW-PE/UHMW-PE J-Polyurethane/UHMW-PE NM2202A-11-X31 Carbon Steel Stub Model



C28123-600



65986-1 (55 Gal.)

### Piston Pumps N-Series Pumps

### **Performance Specifications**

•	
AIR INLET PRESSURE RANGE	30-150 psi. (2-10.3 bar)
FLUID PRESSURE RANGE	70-350 psi. (4.8-24.2. bar)
MAX. REC'D CYCLES/MINUTE	120
DISPLACEMENT IN. <sup>3</sup> (CM <sup>3</sup> ) PER CYCLE	8.3
CYCLES PER GALLON	27.9
FLOW @ 60 CYCLES PER MINUTE	2.15 gpm (8.14 lpm)
NOISE LEVEL @ 100 PSI	80 db(A)
AIR MOTOR	637377
MOTOR REPAIR KIT	66098
MOTOR DIAMETER	2" (5.08 cm)
STROKE	3" (7.62)
AIR INLET	(Female)1/4 -18 NPTF
LOWER PUMP REPAIR KIT	637378-X31(Carb. Steel)
MATERIAL INLET	Stub: (Female) 1 1/2 NPTF
	55-Gallon: Immersed
MATERIAL OUTLET	(Female) 3/4 NPTF
MAX. WORKING FLOW RATE	4.3 gpm (16.3 lpm)
VOLUME / CYCLE	4.59 Oz. (135.6 ml)

### **Dimensional Data**



NM2202A-11-X31	34-3/16" (868)	20-1/16" (508.8)	17.5 (7.9)
NM2202A-41-X31	47-7/8" (1214.8)	33-11/16" (855.6)	19.6 (8.9)



### **Materials of Construction**

Model	Body	Cycles Per Gal.	Cubic Inches Per Cycle	Plunger Packing Material (Code) See Chart Below	Ratio	Maximum Per Minute Gallons (Liters)	Fluid Inlet/ Outlet In. (NPT)	Air Inlet In. (NPT)	Container Size
3" Air Motor									
NM2304A-11-311 2-Ball	Carbon Steel	28	8.2 (130cm3)	С	4:1	4.2 (15.8)	1-1/4/ 3/4	1/4	Stub (Wall Mount)
NM2304A-41-311 2-Ball	Carbon Steel	28	8.2 (130cm3)	С	4:1	4.2 (15.8)	1-1/4/ 3/4	1/4	55-Gallon (205 Liters)

\* GPM is measured at 120 cycles per minute

Code	Packing Description	Plunger Description
С	UHMW-PE Upper/Lower	Carbon Steel on CS pumps

NOTE: All models include 2" Bung Adapter

### **N-Series Pumps**

- **Reliable** The new N-Series features a stall-free, ice-free air motor design contained in a rugged housing that will withstand most working environments.
- Fewer parts ARO's N-Series air motor pumps are constructed with 50% fewer parts than the majority of comparable pumps. Install the new N-Series and see for yourself how fewer parts translate into fewer headaches when it comes to service or routine maintenance.
- No mechanical assist The "N's" patented valving design uses no trip rods or push pins to break.
- **Minimum number of tools, no special tools** If you can find a standard wrench you can service this pump.
- No air motor lubrication required under normal use.
- Noise levels within industry standards Only 85 db's.
- A longer stroke for longer life ARO's N-Series air motor stroke is a full 3/4" longer than its predecessor. A longer stroke translates into fewer cycles, fewer cycles mean a longer pump and air motor life.
- **The right lower pump packings** N-Series features ultra-tough UHMW-PE, for the ultimate in pump-to-process compatibility.

### For Low-Medium Viscosity Prep and Assembly Fluids



NM2304A-41-311 4:1 Ratio NM2304A-11-311 4:1 Ratio

- Light Adhesives
- Sound Deadeners
- Underbody Anti-Rust
- Sealers
- E-Coat

### A Pump with Striking Design and Powerful Performance.

This is what the lubrication professional wants, and with *Thunder*, this is what the lubrication professional gets. From *the* pump maker that knows the lube business better than anyone: *ARO*.

- **Reliable** Thunder features a stall-free, ice-free air motor design (patents applied for) contained in a rugged housing that will withstand most working environments.
- **The Right Price** Through advanced designed technology, Thunder rolls through manufacturing faster than any pump on the market. With speed comes economy which we're rolling on to you.
- **Fewer parts** Thunder pumps are constructed with 50% fewer parts than the majority of comparable pumps. Install Thunder and see for yourself how fewer parts translate into fewer headaches when it comes to service or routine maintenance.
- **No mechanical assists** Thunder's valving design (patents applied for) uses no trip rods or push pins to break.
- **Minimum number of tools, no special tools** If you can find a standard wrench you can service Thunder.
- **In-Line Service** You can service Thunder right where it stands; avoiding the costly tear-down/removal/replacement cycle that most pumps require.
- Thunder's design improves flow, reduces pulsation and extends service life.
- All pumps come equipped with a 2" bung adapter, standard.
- All weather pumping Thanks to its unique bung adapter design, by adding an optional seal kit, P/N# 67088-X, Thunder can be used outdoors or in, with complete confidence, making it perfect for lube rig installation.
- Noise levels within industry standards This is *one* form of thunder that's quiet: 2" 80 db's., 3" 85 db's.
- Lube free air motor
- Two models 3:1 ratio and 5:1 ratio.







**Pump In-Line Service** 





... allows you to replace all dynamic service kit items (no additional wrenches required for 3:1)...

. . . and put Thunder back in service in a matter of minutes.

### Motor Oil, Gear Oil, Transmission Fluid

Basic Pumps 3:1 ratio, 2" diameter air motor (3"-stroke)

Model	Max. Flow Max. GPM	Free Flow Max. GPM	Air Inlet NPT(F)	Fi Inlet/ NP	uid Outlet T(F)	Container Size
LM2203A-11-B (-12-B=BSP thread)	6	9	1/4"	3/4	1/2	Stub
LM2203A-31-B (-32-B=BSP thread)	6	9	1/4"	3/4	1/2	16-Gallon
LM2203A-41-B (-42-B=BSP thread)	6	9	1/4"	3/4	1/2	55-Gallon
LM2203A-51-B (-52-B=BSP thread)	6	9	1/4"	3/4	1/2	275-Gallon

150 psi maximum air inlet pressure

Each pump includes Bung Adapter #67145-3-B (Non-weather tight)

Note: for weather tight Bung Adapter order 67088-3. Includes 67145-3 bung adapter or 67088 seal kit.

### Basic Pumps 5:1 ratio, 3" diameter air motor (3"-stroke)

Model	Max. Flow Max. GPM	Free Flow Max. GPM	Air Inlet NPT(F)	Flu Inlet/C NPT	id Dutlet '(F)	Container Size
LM2305A-11 (-12=BSP thread)	6	9	1/4"	1-1/2	1/2	Stub
LM2305A-31 (-32=BSP thread)	6	9	1/4"	1-1/2	1/2	16-Gallon
LM2305A-41 (-42=BSP thread)	6	9	1/4"	1-1/2	1/2	55-Gallon
LM2305A-51 (-52=BSP thread)	6	9	1/4"	1-1/2	1/2	275-Gallon

Each pump includes Bung Adapter #67145-4-B (Non-weather tight)

Note: for weather tight Bung Adapter order 67088-4. Includes 67145-3 bung adapter or 67088 seal kit.

### **Thunder Pump Packages**

3:1 ratio, gear oil, 2" diameter air motor

Model	Package Description
LP2100-1	16 Gal. PORTABLE GEAR OIL PACKAGE – Includes LM2203A-31-B Basic Pump, 635190-1 Meter (Pint), 635391-1 Control Handle, 640058-2 Dolly, 94421 Drum Cover, 623501-6 Material Hose (6"). 67085 Ball check valve included.
LP2100-2	Same as LP211-1 except 635190-3 Meter (Liter)

5:1 ratio, gear oil, 3" diameter air motor

Model	Package Description
LP3100-1	16 Gal. PORTABLE GEAR OIL PACKAGE - Includes LM2305A-31 Basic Pump,
	635190-1 Meter (Pint), 635391-1 (Flex) Control Handle, 640058-2 Dolly, 94421 Drum Cover and 623501-6 Material Hose (6").
LP3100-2	Same as LP3100-1 except 635190-3 Meter (Liter)

### **Extra Drum Covers**

### Thunder Packages

Come complete with drum covers. For additional covers order by model numbers shown.





94420 5-Gallon

94421 16-Gallon

94422

55-Gallon

### Extra Follower Plates Thunder Packages

Come complete with a follower plate. To order extra plates refer to the model number/size below.



640095-2-B

35 - Pound Pail





640165 120 - Pound Drum

640015-1 400 - Pound Drum



### Grease

Basic Pumps 50:1, 2" diameter air motor (3" stroke)

Model	Working Flow Lbs. Per Min.	Free Flow Lbs. Per Min.	Air Inlet NPT(F)	Fluid Outlet NPT(F)	Container Size
LM2250-21-E (-22=BSP thread)	2 lbs.	9.0 lbs.	1/4"	3/8	35-lbs.
LM2250-31-E (-32=BSP thread)	2 lbs.	9.0 lbs.	1/4"	3/8	120-lbs.
LM2250-41-E (-42=BSP thread)	2 lbs.	9.0 lbs.	1/4"	3/8	400-lbs.
LM2250-61-E (-62=BSP thread)	2 lbs.	9.0 lbs.	1/4"	3/8	60-lbs.

Note: For weather tight applications order 67088.

### Basic Pumps 50:1, 3" diameter air motor (3" stroke)

Model	Working Flow Lbs. Per Min.	Free Flow Lbs. Per Min.	Air Inlet NPT(F)	Fluid Outlet NPT(F)	Container Size
LM2350-21-B (-22-B=BSP thread)	4 lbs.	7.5 lbs.	1/4"	3/8	35-lbs.
LM2350-61-B	4 lbs.	7.5 lbs.	1/4"	3/8	60-lbs.
LM2350-31-B (-32-B=BSP thread)	4 lbs.	7.5 lbs.	1/4"	3/8	120-lbs.
LM2350-41-B (-42-B=BSP thread)	4 lbs.	7.5 lbs.	1/4"	3/8	400-lbs.

150 psi maximum air inlet pressure

Note: For weather tight applications order 67088.

### **Thunder Pump Packages**

50:1 ratio, grease, 2" diameter air motor

Model	Package Description
LP2001-1-B	35-Ib. GREASE PACKAGE – Includes LM2250-21-B Pump, 94420 Drum Cover, with 94334 Handle, 640095-2-B Follower Plate.
LP2002-1-B	35-Ib. GREASE PACKAGE – Same contents as LP2001-1-B package, also includes 76493 Adapter, 624201-10 Material Hose (10'), 636077 Z-Swivel and 636111 Standard Gun.
LP2003-1-B	120-Ib. GREASE PACKAGE – Includes LM2250-31-B Pump, 94421 Drum Cover 640165 Follower Plate.
LP2004-1-B	120-Ib. GREASE PACKAGE – Same contents as LP2003-1-B package, also includes 76493 Adapter, 624201-10 Material Hose (10'), 636077 Z-Swivel and 636111 Standard Gun.
LP2006-1-B	120-Ib. GREASE PACKAGE – Same contents as LP2004-1-B, except includes 640058-2 Dolly

Important: The 50:1 ratio grease packages listed above have a maximum air inlet pressure of 150 psi.

Model	Package Description
LP3001-1	35-Ib. GREASE PACKAGE – Includes LM2350E-21-B Pump, 94420 Drum Cover, with 94334 Handle, 640095-2-B Follower Plate, also includes 624201-10 Material Hose (10'), 636077 Z-Swivel, 76493 Adapter, and 636103 Booster Gun.
LP3002-1	120-lb. GREASE PACKAGE – Includes LM2350E-31-B Pump, 94421 Drum Cover, 640165 Follower Plate, 624401-4 Material Hose (4') and 622201-3 Air Line Hose (3').
LP3003-1	120-Ib. GREASE PACKAGE – Includes LM2350E-31-B Pump, 94421 Drum Cover, 624201-10 Material Hose (10'), 636077 Z-Swivel, 640057 Dolly, 636103 Booster Gun, 640165 Follower Plate, and 76493 Adapter.
LP3004-1	120-Ib. GREASE PACKAGE – Same contents as LP3003-1, less 636103 Booster Gun with 636111 Standard Gun and 640058-2 Dolly.
LP3005-1	400-lb. GREASE PACKAGE – Includes LM2350E-41-B Pump, 94422 Drum Cover, 624401-10 Material Hose (4'), 622201-3 Air Line Hose (3'). Order Follower Plate 640015-1 when required.
LP3007-1	60-Ib. GREASE PACKAGE – Includes LM2350E-61-B Pump, 71740-1 Drum with Cover and Tie Down Brackets, Portable Hand Cart, 636111 Control Handle and 624401-4 Material Hose (4').





LP3001-1 (3" Air Motor) LP2002-1 (2" Air Motor)

LP3003-1 (3" Air Motor) LP2006-1 (2" Air Motor)

Containers and Air Connectors shown NOT included Except LP3007-1 (Includes Container).



4542

Important: The 50:1 ratio grease packages listed above have a maximum air inlet pressure of 150 psi.

### Fluid Control Handles, Non-Metered



Model	Description	Max. Working Pressure PSI (Ibs.)	Fluid Inlet NPT (F)	Fluid Outlet
Motor Oil, Gear Oil, Transmission Fluid (high-volume)				
635193	Has flexible rubber hose with non drip nozzle. Use with 1:1 and 3:1 pumps.	600 (41)	3/4	—
635395-2	Has flexible rubber hose with non drip nozzle. Use with 5:1 and 9:1 pumps.	900 (41)	3/4	—
Motor Oil, Gear Oil, Transmission Fluid (standard-volume)				
635392	Has flexible rubber hose, built-in swivel and filter, and non-drip nozzle	1,000 (69)	1/2	Nondrip tip
635399	Has flexible rubber hose, built-in swivel, and right-angle non-drip nozzle.	1,000 (69)	1/2	Nondrip tip
Water, Anti-freeze				
635129	Radiator bibb	300 (21)	1/4	Nondrip tip



### High Pressure Grease Control Handle

Model	Description	Max. Working Pressure PSI (lbs.)	Fluid Inlet NPT (F)	Fluid Outlet
636103	High pressure booster handle delivers line pressure for normal lubrication.	7,500 (517)	1/8 (M)	Hydraulic
	Trigger booster feature delivers 12,000 psi (828 bar) to break loose tougher		or 3/8 (F)	Coupler
	fittings. Includes curved nozzle with hydraulic coupler, inlet material filter and			
	manual pressure vent for easy disconnection.			

Warning: Do not use with whip hose!



### Swivel

636077	Easy-turn swivel provides operator mobility when using fluid control handles.	
	Do not install swivels in systems where they will be subjected to fluid pressures higher than their ratings.	
## **Five Year Product Warranty**

The ARO Pumps, in this catalog are backed up by our famous 5-year warranty, as a measure of the confidence we place in the quality of these products. A confidence that you can share.

#### **FIVE-YEAR WARRANTY**

IR/ARO warrants to the original use purchaser of IR/ARO manufactured pumps that IR/ARO will repair or replace, free of charges, including return shipping costs within the Continental United States of America, any such product which under normal use and service proves defective in material or workmanship, as determined by IR/ARO Inspection, within FIVE YEARS from date of shipment from IR/ARO, provided the claimed defective product, or part thereof, is promptly returned to the IR/ARO factory or IR/ARO authorized warranty repair center with transportation prepaid.

This warranty does not cover failure of parts or components due to normal wear or damage, which in the judgment of IR/ARO, arises from misuse, abrasion, corrosion, negligence, accident, substitution of non-IR/ARO parts, faulty installation or tampering.

If IR/ARO Inspection discloses no defect in material or workmanship, repair or replacement and return will be made at customary charges.

This warranty covers IR/ARO manufactured products shipped on or after July 4, 1988.

Equipment not covered by IR/ARO warranty: accessories or components of equipment sold by IR/ARO that are not manufactured by IR/ARO (such as switches, hoses, gasoline engines, etc.) are subject to the warranty, if any, of their manufacturer. IR/ARO will provide the purchaser with reasonable assistance in making such claims.

The foregoing warranty supersedes, voids and is in lieu of all or any other warranties, express or implied, and no warranty or merchantability or fitness for particular purpose is intended or made. IR/ARO's sole obligation and the original use purchaser's sole remedy is as stated above and in no event shall IR/ARO be liable for any special, direct, indirect, incidental, consequential or other damages, or expenses of any nature including, without limitation, loss of profits or production time incurred by the original use purchaser or any other party.

## Notes







## **Pneumatic Valves**

- Sierra Series
- MaxAir Series
- Alpha Series
- CAT Series
- **50** Series
- PremAir Series
- E Series
- K Series
- H Series
- 200 Series
- 100 Series
- 400/460 Series
- Circuitry Valves

## Notes



#### **Sierra Series**

Compact 2-position, 4-way valves that are lightweight, yet durable. 15mm or 18mm wide. Body ported or sub-base mounted. Single and double solenoids available. M5 (10-32) and 1/8" ports.

SIERRA

MaxAir Series 4-way air solenoid, pilot and hand lever valves feature excellent flow in a compact, lightweight package.



High flow, 2-and-3-position, 4-way valves that are compact in size with many features. The family includes: Body Threaded, Stacking, Bar Manifold and Assembled Manifold. Single and double solenoids, or pilot actuators are available. 1/8", 1/4" and 3/8" ports.

## **Cat Series**

Small, 3-way solenoid valves. Perfect for small bore, single acting cylinders and electric to air interfacing applications. Body ported for stand alone applications, stacking or base manifold. Available as normally open or normally closed. 1/8" and 1/4" ports.

#### 50 Series

3-way and 4-way body ported valves. Six manual, mechanical and pilot actuator styles available. 1/8" ports.

## **E-Series**

3-way and 4-way body ported valves. Nine manual, mechanical, pilot and solenoid actuator styles available. 1/4" ports.

## **K-Series**

Manual, Pilot and Solenoid, heavy duty 4-way valves. Available as body threaded or bottom ported for stand alone sub-base. Seven actuator styles available. Manual: 3/8" and 1/2" ports. Solenoid and Pilots: 3/8", 1/2", 3/4" and 1" ports.

#### **H-Series**

High flow 3-and-4-way function Poppet valves. Available in solenoid, pilot and bleed actuators. 1/4", 3/8" and 1/2" ports.



**ALPHA**<sup>™</sup>











## **Circuitry Valves**

- 100 Series 3-way N.C., miniature limit valves.
- 200 Series 3-way limit valve-ideal for sensing devices such as cylinders, slides and gates.
- 400 Series Heavy duty 3-way limit valves, 4 actuator arms available.
- 460 Series 3-way palm button valves.
- The 200, 400 and 460 are multipurpose valves, plumb N.O., N.C., diverter, and selector.
- In line and right angle flow controls, in line needle and check valves.



200 Series Valve



460 Series Valve

## **Specials**

- Quick exhaust valves for enhancing cylinder speed.
- One shot pulse valve to convert continuous air supply to a momentary output.
- Shuttle valves operate as a check when two inlets are required.
- Micro switch converts pneumatic signal into an electric signal.
- Exhaust mufflers, exhaust speed controls, breather vents.

#### **Pneumatic Logic Controls**

• Two-hand anti-tie-down unit for monitoring operators hands during work cycle.



**Quick Exhaust Valve** 



**Exhaust Muffler** 



2-Hand Anti-Tie Down

#### At Last. A Miniature Valve with Maximum Range.

#### **Body-Ported:**

- 2-position single and double solenoid models.
- Two wiring options: Lead Wire and Plug-In.
- Available in 120V AC, 24V DC or 12V DC.
- Standard (2-, 4-, 6-, 8-,10-, 12-, and 16 stations) 1/8" NPT (F).

#### **One-Touch Manual Valve Override (Standard)**

Mechanical valve override is nonlocking spring return push with tool.

#### Wiring and Voltage Options

Lead-Wire Style: Valve lead wires come stripped and preattached to the coil (NEMA 4). Plug-In Style: Valves come with CSN Connector for quick, clean wire connect and disconnect. Plug-in lead wires come stripped standard. (NEMA 2). All models are available in either 120V AC, 24V DC. 12V DC Available on plug in only.

#### **Manifold Options**

Manifolds are available in 2, 4, 6, 8, 10, 12 and 16station configurations. Sierra manifolds are available with 1/8" NPT(F) ports. Sierra Valves and Manifolds are sold separately.



Superior flow capacity, an unrivaled array of "real-world" design features and options, a valve body that is both ultra-compact and lightweight—yet exceptionally durable—this is Sierra 15, the miniature valve with the maximum range.

#### **Ultra-Compact Valve Design**

At only 15 mm wide, Sierra 15 is the one compact valve that's going to fit your valve location requirements – with room to spare.

#### **Durable Body Construction**

Sierra's body features bar stock aluminum construction, producing a light weight, yet durable valve.



## **Performance Specifications**

Pressure Range:	22 to 115 PSI (0.8 M pa)
Shift Pressures:	22 PSI Single or Double-Solenoid
Flow:	9 SCFM, .25 Cv
Operating Medium:	Compressed Air
Lubrication:	None Required
Cycle Rate:	120 Cycles Per Minute
Temperature Rating:	0° to 122°F (-17° to 50°C)
Signal Response Time:	14 ms
Rated Voltage:	120V AC, 24V DC and 12V DC
Current Ratings:	120V AC = 16 mA in-rush; 11 mA holding 12V DC & 24V DC = 67 mA
Power Consumption:	2.1/1.8 VA 1.9 W





Double Solenoid (Plug-In Model)

## Ordering



**NOTE:** Low Profile Manifolds are for use with Body Ported Valves only. One gasket and two screws are provided per station.

#### **Replacement Coils**

Part Number	Description	Part Number	Description
119892-33	120 VAC Plug-In Wire	119893-33	120 VAC Lead Wire
119892-39	24 VDC Plug-In Wire	119893-39	24 VDC Lead Wire
119892-38	12 VDC Plug-In Wire		





119892-XX

119893-XX

## **Dimensional Data**

Single and Double-Solenoid Body Ported Valves





Low Profile Manifold Dimensions





No. of Stations	" <b>A</b> "
2	2.323 (59)
4	3.661 (91)
6	5.000 (127)
8	6.339 (161)
10	7.678 (195)
12	9.017 (229)
14	10.356 (263)
16	11.695 (297)

1



## Sierra® 18 (1/8" Ports) 4-Way, Compact Air Valves

#### 18mm Wide Body and 1/8" Ports Fill The Bill Between Mini and Medium Flow Valves

Larger than its 15mm Sierra<sup>®</sup> counterpart yet smaller than the Alpha<sup>®</sup> valve, the Sierra 18 is the perfect fit for valve applications that require a compact. 4-way valve with plenty of options and features. The new Sierra 18 valves are equally ideal where fast signal response (18ms avg.) with moderate flow (.5 Cv, 3-position, .7 Cv 2-position) is required.

#### **3-Position Spool Function Provides Wider Application** Flexibility:

Sierra 18 offers three distinct, 3-position spool configurations for a wide variety of applications:

- All ports blocked in center
- Cylinder ports open to exhaust in center, supply blocked
- Cylinder ports pressurized in center, exhaust ports blocked

#### Choose Between Body-Threaded or Manifold – Mounted:

The Sierra 18 is a body - threaded valve that can be directly plumbed or manifold - mounted. Where there's a need for multiple valves in tight spots, especially in machine design operations, the Sierra 18 is the compact valve with complete flexibility and delivery.



#### Solenoid Coils and Connectors Provide Quick, Clean Connections:

Coils are Class F rated for 100% duty cycle applications at 122° F (50° C). AC or DC coils can be interchanged on the same solenoid stem. Each Solenoid connector acts as its own junction box, with molded connectors and gaskets to protect electrical connections. Design meets NEMA-4 classifications.

## (Standard):

Sierra 18 contains a mechanical valve override that can be tool-adjusted to a locking (push 'n twist) position or nonlocking function.

**16-Station Configurations.** 

## **Performance Specifications**

Pressure Range:	115 PSI (7.8 bar)
Shift Pressure:	22 PSI
Flow:	30 SCFM .7 Cv (2-Position Valves)
	21 SCFM .5 Cv (3-Position Valves)
Operating Medium:	Compressed Air
Cycle Rate:	120 Cycles Per Minute
Temp. Rating:	0° to 122° F ( -17° to 50° C)
Lubrication:	None Required
Signal Response TIme:	17ms (AC), 22s (DC)

Rated	Power Consumption		Curren	t Draw
voitage	in-rusn	Holaing	in-rusn	Holaing
120 VAC	3.1 VA	2.2 VA	26 mA	18 mA
12 VDC	1.9 W	1.9 W	154 mA	154 mA
24 VDC	2.0 W	2.0 W	854 mA	85 mA



A - Three Position Spring Centered (Cylinder Ports Pressurized)

#### **Manifold & Blanking Plate**

Model	Description
SML81N-02	2-Station Manifold
SML81N-04	4-Station Manifold
SML81N-06	6-Station Manifold
SML81N-08	8-Station Manifold
SML81N-10	10-Station Manifold
SML81N-12	12-Station Manifold
SML81N-16	16-Station Manifold
114155	Blanking Plate



Connector	&	Coil

μημερισι α ι	5011	
Model	Description	
CHL6-012	12 VDC molded cable connector w/indicator light, 39" leads	
CHL6-024	24 VDC molded cable connector w/ indicator light, 39" leads	
CHL6-120	120 VAC molded cable connector w/ indicator light, 39" leads	
CHW6	16 mm molded cable connector, 39" leads	CHI 6-120
CSL6-012	12 VDC strain relief connector w/ indicator light	01120 120
CSL6-024	24 VDC strain relief connector, w/ indicator light	1
CSL6-120	120 VAC strain relief connector, w/ indicator light	
CSN6	16 mm, strain relief connector	Dest 1
114153-33	120 VAC, lead wire coil	
114153-38	12 VDC, lead wire coil	CHW6
114153-39	24 VDC, lead wire coil	
114138-33	120 VAC, standard coil	
114138-38	12 VDC, standard coil	
114138-39	24 VDC, standard coil	





## **Dimensional Data**





	A	В
2-Station	2.24	1.85
4-Station	3.74	3.35
6-Station	5.24	4.84
8-Station	6.73	6.34
10-Station	8.23	7.84
12-Station	9.72	9.33
16-Station	11.22	10.83
	•	



## MaxAir Brass Solenoid/Pilot Acting Valves

# 

## 2-Way Solenoid/Pilot Acting Valves

- Valves are internally piloted, normally closed and excellent for high flow applications.
- Die-cast brass body, stainless steel stem and buna-n diaphragm provide excellent durability.
- Suitable for use with water, air, lightweight oil, and liquid gas.
- Available in 12 VDC, 24 VDC, AND 120 VAC coils.



TB03EB-XXX-X Port Size: 3/8" NPT Orifice: 13 mm, 33/64" Cv: 4.5, SCFM: 126 Pressure Range: 10-150 PSI



#### TB04EB-XXX-X

Port Size: 1/2" NPT Orifice: 13 mm, 33/64" Cv: 4.5, SCFM: 126 Pressure Range: 10-150 PSI



TB06HB-XXX-X Port Size: 3/4" NPT Orifice: 25 mm, 1" Cv: 12, SCFM: 336 Pressure Range: 10-150 PSI TB08HB-XXX-X Port size: 1" NPT Orifice: 25 mm, 1" Cv: 12, SCFM: 336 Pressure Range: 10-150 PSI



TB12JB-XXX-X Port Size: 1 1/4" NPT Orifice: 38 mm, 1 1/2" Cv: 22, SCFM: 615 Pressure Range: 10-150 PSI TB14JB-XXX-X

Port size: 1 1/2" NPT Orifice: 38 mm, 1 1/2" Cv: 22, SCFM: 615 Pressure Range: 10-150 PSI

## **Technical Data**

Temperature Range: 0 - 180 F Duty Cycle: 100 % Power consumption: 22 VA Response Time: 50 ms

## **Ordering Information**

Replace XXX-X with voltage needed 000-N = No Coil 012-D = 12 VDC 024-D = 24 VDC 024-A = 24 VAC 120-A = 120 VAC

NOTE:

All valves are shown with a CSN-30 connector. Connector is to be ordered separately. See page 88 for ordering information.

## MaxAir Brass Direct Acting Solenoid Valves

# 

## 2-Way Direct Acting Solenoid Valves

- Valves are direct acting normally closed for fast response and are excellent for low operating pressure applications.
- Die-cast brass body, stainless steel stem and buna-n diaphragm provide excellent durability.
- Suitable for use with water, air, lightweight oil, liquid gases and vacuum.
- Available with 12 VDC, 24 VDC, AND 120 VAC coils.

TB011B-XXX-X

Port Size: 1/8" NPT Orifice: 1.2 mm, 3/64" Cv: 0.1, SCFM: 3 Pressure Range: AC = 120 PSI DC = 100 PSI



## TB022B-XXX-X

Port Size: 1/4" NPT Orifice: 2.3 mm, 3/32" Cv: 0.18, SCFM: 5 Pressure Range: AC = 120 PSI DC = 100 PSI



## TB034B-XXX-X

Port Size: 3/8" NPT Orifice: 8.0 mm, 5/16" Cv: 1.0, SCFM: 28 Pressure Range: AC = 140 PSI DC = 100 PSI



## TB035B-XXX-X

Port Size: 3/8" NPT **TB045B-XXX-X** Port Size: 1/2" NPT Orifice: 13 mm, 33/64" Cv: 4.5, SCFM: 126 Pressure Range: AC = 120 PSI DC = 100 PSI



## TB066B-XXX-X

Port Size: 3/4" NPT Orifice: 20 mm, 25/32" Cv: 8.6, SCFM: 240 Pressure Range: AC = 120 PSI DC = 85 PSI



## **TB087B-XXX-X**

Port Size: 1" NPT Orifice: 25 mm, 1" Cv: 11, SCFM: 308 Pressure Range: AC = 100 PSI DC = 70 PSI

## Technical Data

Temperature Range: 0 - 180 F Duty Cycle: 100 % Power consumption: 22 VA Response Time: 30 ms

## **Ordering Information**

Replace XXX-X with voltage needed 000-N = No Coil 012-D = 12 VDC 024-D = 24 VDC 024-A = 24 VAC 120-A = 120 VAC (Viton Seals Available, Consult Factory)

NOTE: All valves are shown with a CSN (1/8" & 1/4" ports) or CSN-30 (3/8" & larger) connector. Connector is to be ordered separately. See page 7 for ordering information.

# 

- Rugged aluminum body is lightweight and durable.
- Valves are available with roller cam, cam stem, push button, or selector, with spring return.
- Ideal for sensing the position and controlling moving devices such as cylinders, slides and gates.
- 1/4" 3-way valves can be plumbed to perform as normally passing, normally non-passing, or selector. 1/8" 3-way can only be used as normally non-passing.
- Stock the basic cam stem valve and a selection of actuators to meet most application needs.

## 3-Way, 1/8"



echnical Data	
Port size:	1/8" NPT
Pressure Range:	0-150 PSI
Temperature Range:	32-160° F (0-71 C)
Media:	Compressed Air
Flow:	Cv=.2, 8 scfm

3-Way, 1/4"





M252HS-10

## **Technical Data** 1/4" NPT Port size:

Pressure Range:	0-150 PSI
Temperature Range:	32-160° F (0-71 C)
Media:	Compressed Air
Flow:	Cv=.7, 26 scfm

## 4-Way, 1/4"



M212CS

**M212RS** 

M212HS-10

Technical Data	
Port size:	1/4" NPT
Pressure Range:	0-150 PSI
Temperature Range:	32-160° F (0-71 C)
Media:	Compressed Air
Flow:	Cv=.7, 26 scfm

## **MaxAir**













Ordering Information | 3-Way, 1/8" NPT

#### **Complete Models Basic Valves**

-		
	M291HS-17	3-Way, Standard Palm Button, Spring Return (Green)
	M291HS-10	3-Way, Standard Palm Button, Spring Return (Red)
	M291HS-15	3-Way, Palm Button w/Detent, Spring Return
	M291HS-11	3-Way, Palm without Guard, Spring Return
	M291HS-13	3-Way, Palm w/Guard, Spring Return
	M291LS-10	3-Way, Standard Selector, Manual
	M291LS-11	3-Way, Long Knob Selector, Manual
	M291RS	3-Way, Roller Lever, Spring Return
	M291CS	Basic Valve, 3-Way, Cam Stem, Spring Return
	M291LS-10-2	3-Way, Two Valve Kit (Both valves actuate at same time)

Actuators Only	
114597-10	Standard Palm Button Actuator (Red)
114597-11	Palm Button without Guard (Red)
114597-13	Palm Button w/Guard (Red)
114597-15	Palm Button w/Detent (e-stop) (Red)
114598-10	Standard Knob (Black)
114598-11	Long Knob (Black)
114599	Roller Lever
114597-17	Standard Palm Button Actuator (Green)







M252LS-10



## Ordering Information | 3-way. 1/4" NPT

#### **Complete Models**

••••••••••••••••••••••••••••••••••••••	
M252HS-17	3-Way, Standard Palm Button, Spring Return (Green)
M252HS-10	3-Way, Standard Palm Button, Spring Return (Red)
M252HS-15	3-Way, Palm Button w/Detent
M252HS-11	3-Way, Palm without Guard, Spring Return
M252HS-13	3-Way, Palm w/Guard, Spring Return
M252LS-10	3-Way, Standard Selector
M252LS-11	3-Way, Long Knob Selector
M252RS	3-Way, Roller Lever, Spring Return
M252CS	Basic Valve, 3-Way, Cam Stem, Spring Return

## **Actuators Only**

114597-10	Standard Palm Button Actuator (Red)
114597-11	Palm Button without Guard (Red)
114597-13	Palm Button w/Guard (Red)
114597-15	Palm Button w/Detent (e-stop) (Red)
114598-10	Standard Knob (Black)
114598-11	Long Knob (Black)
114599	Roller Lever
114597-17	Standard Palm Button Actuator (Green)



M212HS-15





M212HS-13



M212LS-11

Ordering Information | 4-Way, 1/4" NPT

## **Complete Models**

M212HS-17	4-Way, Standard Palm Button, Spring Return (Green)
M212HS-10	4-Way, Standard Palm Button, Spring Return (Red)
M212HS-15	4-Way, Palm Button w/Detent, Spring Return
M212HS-11	4-Way, Palm without Guard, Spring Return
M212HS-13	4-Way, Palm w/Guard, Spring Return
M212LS-10	4-Way, Standard Selector
M212LS-11	4-Way, Long Knob Selector
M212RS	4-Way, Roller Lever, Spring Return
M212CS	Basic Valve, 4-Way, Cam Stem, Spring Return

## **Actuators Only**

114597-10	Standard Palm Button Actuator (Red)
114597-11	Palm Button without Guard (Red)
114597-13	Palm Button w/Guard (Red)
114597-15	Palm Button w/Detent (e-stop) (Red)
114598-10	Standard Knob (Black)
114598-11	Long Knob (Black)
114599	Roller Lever
114597-17	Standard Palm Button Actuator (Green)

## 4-Way Air Solenoid & Pilot Valves 1/4", 3/8" & 1/2" NPT Ports

- Ideal for packaging, material handling and air motor applications
- Ideal for double acting pneumatic cylinders
- Compact size with excellent flow capacity
- · Single and double solenoid or pilot models
- Three voltages available 120 VAC, 12 and 24 VDC
- · Lightweight aluminum bodies and Buna-N seals are standard



- Manifold mounting available, blanking plates provided for future expansion
- Max/Air valves use Alpha style 22mm coil
- 1/4" = 26 mm Body Size
- 3/8" = 30 mm Body Size
- 1/2" = 34 mm Body Size

#### **3-Position Spool Function Provides** Wider Application Flexibility:

MaxAir offers 3-position spool configuration with all ports blocked in center.

## Solenoid Coils and Connectors Provide Quick, Clean Connections:

Coils are Class F rated for 100% duty cycle applications at 122° F ( 50° C) . AC or DC coils can be interchanged on the same solenoid stem. Each Solenoid connector





#### **One - Touch Manual Override (Standard):**

MaxAir contains a mechanical valve override that can be adjusted to a locking (push 'n twist) position or non-locking function.

## Orderina

	<u>M</u> - X	X X	
Valve Type*	Body Style	Port Size	
2=2 Position	1=4 Way	<b>2</b> =1/4" NPT	
3=3 Position	Side Ported	<b>3</b> =3/8" NPT	
All Ports Blocked		<b>4</b> =1/2" NPT	
Spring Centered	I (Sol. & Pilot Only)		

\* Model number ends here on pilot activated valves.

acts as its own junction box, with molded connectors and gaskets to protect electrical connections. Design meets NEMA-4 classifications.

## **Choose Between Body-Threaded or Manifold - Mounted:**

MaxAir is a body - threaded valve that can be directly plumbed or manifold - mounted. Where there's a need for multiple valves in tight spots, especially in machine design operations. Manifolds Available in 2, 4, 6, 8, 10, and 12 Station Configurations.

- <u>X X</u> * -	XXX	- <u>X</u> -	C
Actuator/Return	Coil Voltage	Coil Options	
SS=Single Solenoid/Spring	012=12 VDC	A=AC	_
SD=Double Solenoid	024=24VDC	<b>D</b> =DC	
<b>PS</b> =Pilot / Spring*	<b>120</b> =120VAC		
PD=Pilot / Double*			

## Performance Specifications

Cv (Solenoid) (Pilot)	1/4 = .70, 3/8 = 1.65, 1/2 = 4.32	Minimum Shift Pres.	2 position single pilot, single solenoid, spring return - 45 PSI
Port Size NPT	1/4", 3/8", 1/2"		2 position double pilot - 45 PSI
Operating Medium	Non-Lubricated or Lubricated Air		2 position double solenoid-20 PSI
Pres. Range (Solenoid)	45 - 115 PSI		3 position double solenoid, double pilot, spring centered - 45 PSI
Pres. Range (Pilot)	45 - 140 PSI		
Duty Cycle	100%		
Temp, Range	15° to 122° F (-10° to 50° C)		

## Ordering

## Manifold

No. of Stations	1/4" NPT Ports	3/8" NPT Ports	1/2" NPT Ports
2	M26M02-02	M30M03-02	M34M04-02
4	M26M02-04	M30M03-04	M34M04-04
6	M26M02-06	M30M03-06	M34M04-06
8	M26M02-08	M30M03-08	M34M04-08
10	M26M02-10	M30M03-10	M34M04-10
12	M26M02-12	M30M03-12	M34M04-12



Manifold Kits Kits include: manifold, seals and valve attaching hardware

#### **Blanking Plate Kit**

-	
M26MB	Fits 1/4" (26 mm) manifolds
M30MB	Fits 3/8" (30 mm) manifolds
M34MB	Fits 1/2" (34 mm) manifolds

# 

22mm Connector			
Model	Description		
CHW	Straight connector with cable (36") located on top	сни	
CBW	Straight connector with cable (36") located on back	сви	
CHL-XXX	Straight connector (36") with indicator light located on back.	CHL-XXX	
CSN	Strain relief, without indicator light or cable.	1	
CSL-XXX	Strain relief, with indicator light located on the back.	CSN, CSL-XXX	
CDN	1/2" conduit without light or lead wire	ab	
CDW	1/2" conduit without light, 18" lead wire		
CDL-XXX	1/2" conduit with light, 18" lead wire	CDN, CDW CDL-XXXX	

#### Voltage (-XXX)

012 = 12 VDC/VAC

024 = 24 VDC/VAC

120 = 120 VDC/VAC

## 3-Way & 4-Way Hand Lever Valves 1/4" & 3/8" NPT Ports

- Light weight aluminum bodies and Buna-N seals are standard
- Ideal for packaging, material handling and air motor applications.
- Hand levers available with lever parallel or perpendicular to valve body.
- Parallel lever can be manifold mounted.
- 1/4" perpendicular hand lever valves can be panel mounted.

## **Performance Specifications**

CV (Lever)	1/4" = .70, 3/8" = 1.14
Operating Medium	Non-lubricated or lubricated air
Pressure Range	20 -140 PSI
Temperature Range	15° to 122°F (-10° to 50°C)
Port Size NPT	1/4", 3/8", 1/2"
Filtration	40 micron recommended

## Ordering

Model	Description		
Levers Perpendic	Levers Perpendicular to Body		
M212LM	1/4", 4-Way, 2-Position, Lever/Manual		
M212LS	1/4", 4-Way, 2-Position, Lever/Spring		
M213LS	3/8", 4-Way, 2-Position, Lever/Spring		
M213LM	3/8", 4-Way, 2-Position, Lever/Manual		
M252LM	1/4", 3-Way, 2-Position, Lever/Manual		
M252LS	1/4", 3-Way, 2-Position, Lever/Spring		
Levers Parallel t	o Body		
M212LM-R	1/4", 4-Way, 2-Position, Lever/Manual		
M212LS-R	1/4", 4-Way, 2-Position, Lever/Spring		

## **Replacement Accessories**

Model	Description
114420	Black Knob
114421	Red Knob
114418	Boot for 1/4" Valve
114419	Boot for 3/8" Valve





**Perpendicular Levers** 



Parallel Levers



Panel Mounting is standard on 1/4" NPT Perpenducular Valves

## 4-Way, 3-Position Rotary Lever Valves 1/4" & 3/8" 1/2" NPT Ports

- . Light weight aluminum bodies and Buna-N seals are standard
- Ideal for packaging, material handling and air motor applications.
- Rotary lever valve is a 3-position, all ports blocked, manual return.

## **Performance Specifications**

CV (Rotary Lever)	1/4" = 1.25, 3/8" = 2.0, 1/2" = 2.4
Operating Medium	Non-lubricated or lubricated air
Pressure Range	20 -140 PSI
Temperature Range	15° to 122°F (-10° to 50°C)
Port Size NPT	1/4", 3/8", 1/2"
Filtration	40 micron recommended

## Ordering

Model	Description
Rotary Hand	Lever
M512LR	1/4", 4-Way, 3-Position, Manual
M513LR	3/8", 4-Way, 3-Position, Manual
M514LR	1/2", 4-Way, 3-Position, Manual



4-Way 3-Position (Rotary Hand)



**MAX**Air

4.803

## **Features**

## 3-Way & 4-Way Foot Pedal Valves

- · Rugged aluminum alloy housing and pedal provide excellent durability and are light weight.
- Valves are available with a mechanical detent or as spring return.
- · Mechanical detent 3-way and 4-way valves have a guard for applications where accidental actuation may result in injury or damage.
- · Guard is safety yellow composite construction.

## **Performance Specifications**

Port Size:	1/4" NPT
Pressure Range:	30-150 PSI
Temperature Range:	32° to 160°F (0° to 71°C)
Media	Compressed Air

## Ordering

Model	Description
M252FS	3-Way, Spring Return, No Guard
M212FS	4-Way, Spring Return, No Guard
M252TM	3-Way, Mechanical Detent, With Guard
M212TM	4-Way, Mechanical Detent, With Guard
114417	Guard only
M252TS	3-Way, Spring Return, With Guard
M212TS	4-Way, Spring Return, With Guard
114645	Clip (Foot Pedal)



(87.5mm

3.45

**Foot Pedal Valve** Show with Guard



## **Pneumatic Valves MaxAir - Dimensional Data**

## **Dimensional Data**











# 

## **Dimensional Data**

-.728

3.445

1.024

1.024

4,508



728

3.445

1,024

4,508

47

#### Solenoid



M312SD





M213SD M313SD





M2145D M314SD

Pilot





M212PD

M312PD





M213PD M313PD



M214PD M314PD

6.024 Two Position / 7.795 Three Position-

4-Way Hand Lever (Parallel)









## Pneumatic Valves Alpha

## Features

#### **Body Ported Valves**

Compact, space saving design. Perfect for stand alone and remote valve applications. Ports have ISO identification. Sizes include 1/8", 1/4" and 3/8" NPT.

#### "Thin" Manifold Valves

Thin, 1" width means more valves in less space. Faster assembly than stacking style valves. 2, 4, 6, 8, and 10 station manifolds are available. Use optional blanking plates for odd-numbered stations. Junction box raceways are available. 1/8" and 1/4" (NPT) models, with 3/8" supply or exhaust ports. Speed install directly into manifold, cutting set-up time.



**ALPHA**"

controls

#### **Stacking Valves**

The lowest cost method of ganging valves, because it eliminates the manifold. Flip out design. Loosen the end plate cap screws to swing the valve up and out. No need to disassemble entire stack to replace one valve. Bodies stack on 1" centers. Circuits can be designed and mounted in a compact area. When stacked, ALPHA becomes a 4-way, 4-ported valve. 3/8" common end plate ports with 1/8" or 1/4" working ports in the valve body. Junction Box Raceways are available.



#### Versatile Design

- Available in Body Ported, Subbase, Stacking and "Thin" configurations.
- Alpha can be ordered as a two-position or three-position valve.
- 5-Year Warranty.
- Valve Body, End Plate & Manifold material is zinc.

#### Superb Performance

- ALPHA's bonded, precision ground spool resists wear & provides excellent shift response.
- Large air passages result in high flow characteristics. Listings detail Cv factor and maximum flow rates.

#### **Numerous Control Options**

- Control the valve one of five ways: Solenoid/Spring, Solenoid/Solenoid, Solenoid/Pilot, Pilot/Spring or Pilot/Pilot.
- Standard external solenoid supply allows operation for vacuum service and low pressure applications.
- Coils are UL and CSA Listed (Files: UL #MH13513; CSA #LR51090).

## **Performance Specifications**

Pressure Range:	Vacuum to 150 psi (10.2 bar)	Flow:	
Operating Medium:	Compressed Air or inert gas	Body Ported	2-position 1/8" Ports = .9 Cv, 30 SCFM
Lubrication:	None Required		2-position 1/4" Ports = 1.5 Cv, 50 SCFM
Filtration:	40 Micron recommended		2-position 3/8" Ports = 1.7 Cv, 61 SCFM
Cycle Rate:	600 Cycles Per Minute		3-position 1/8" Ports = .8 Cv, 27 SCFM
Temperature Rating:	0° to 180°F (-17° to 82°C)		3-position 1/4" Ports = 1.4 Cv, 45 SCFM
Shift Pressures:	50 psi (3.4 bar) 2-Position Single		3-position 3/8" Ports = 1.7 Cv, 61 SCFM
	Solenoid or Single Pilot, Spring Return.	Stacking Valves:	2-position 1/8" Ports = 1.32 Cv, 43 SCFM
	20 psi (1.4 bar) 2-position double pilot		2-position 1/4" Ports = 1.9 Cv, 63 SCFM
	or double solenoid.		2-position 3/8" Ports = 1.2 Cv, 39 SCFM
	60 psi (4.0 bar) 3-Position Double Solenoid or		3-position 1/8" Ports = 1.7 Cv, 57 SCFM
	Double Pilot, Spring Centered.	"Thin" Valves:	1/8" Ports = .6 Cv, 25 SCFM
Signal Response Time:	Double Pilot Actuator: 14 ms		1/4" Ports = 1.2 Cv, 39 SCFM
	Double Solenoid: 20 ms		
	Single Pilot (Pilot On) 19 ms		
	Single Pilot (Pilot Off) 26 ms		
	Single Solenoid (Energized) 22 ms		
	Single Solenoid (De-energized) 27 ms		

## **Pneumatic Valves** Alpha

•	
()rd	erina
Ulu	ciniy

## **ALPHA<sup>™</sup>**

#### XX - XXX - X - C Х Х

#### Alpha Series

#### Valve, Spool Type

- Code Description
  - 4 2-Position, Viton
  - 8 3-Position, Viton (3 & 8 are Spring Centered, all ports blocked in neutral. Available only with PD or SD Actuators)
  - 9 3-Position, Viton (Spring Centered, inlet ports blocked (cylinder ports open) in neutral. Available only with PD or SD Actuators)

#### **Valve Body Styles**

#### Code Description

- 4-Way, Body Ported Valves 1
- 2 4-Way, Stacking Valves
- 3 4-Way, Alpha Thin Valves Order Alpha Thin Manifolds & Speed

#### **Current Type** Description Code AC DC A D

#### **Coil Voltage**

Leave Blank if ordering Pilot Valves			
Code	Description	Code	Description
012 024	12V AC/DC 24V AC/DC	120	120V AC

## Actuator/Return\*

- **Code Description** \*PS Pilot/Spring
- \*PD Pilot/Pilot
- SS Solenoid/Spring SD Solenoid/Solenoid
- SP Solenoid/Pilot

\*Numbering ends here if a non-solenoid (PS or PD) valve is being selected.

## Port Size

#### Code Description

- 1/8" NPTF (#1 & #2 used on Body Ported 1
- 2 or on Stacking Valves) 1/4" NPTF
- 3 3/8" NPTF (#3 used on Body Ported Valves)
- 9 NONE (#9 used on Subbase or Alpha Thin Valves)

## **Ordering Examples**

#### Body Ported Valve: A412SS-120-A-C

- "4" 2-Position Valve, Viton Spool
- "1" 4-Way Body Ported Valve
- "2" 1/4" NPTF Ports
- **"SS**" Actuator-Solenoid, Return-Spring
- "120-A" 120 Volt Coil. AC Current "**C**" Connector

## "Thin" Valve & Manifold: A449PS

- "4" 2-Position Valve, Viton Spool
- "4" 4-Way Alpha "Thin" Valve
- "9" 9 No NPTF Ports
- "**PS**" Actuator-Pilot, Return-Spring

#### "Thin" Manifold: 118605-4

- "11860X-X" Basic Manifold
- "5" 1/4" NPT Ports
- "-4" 4-Stations



4-Way, 2-Position



4-Way, 3-Position, all ports blocked in neutral **119306** External Supply Conversion Kit, Use when supply pressure is under 50 PSI or vacuum is used.



## Accessories

#### **End Plates and Isolator Plates**

- MKN One MKN Kit is required to stack 1-to-6 Valves without Isolator Plates. Each contains 2 End Plates, 2 Cap Screws and 1 Gasket.
- MKP One MKP Kit is required to stack 7-to-12 Valves without Isolator Plates, or 1-to-12 Valves with an Isolator Plate. Each contains 2 End Plates, 2 Cap Screws and 1 Gasket.
- PTN Isolator Plate. Blocks Supply and Exhaust Ports. Gasket Included.
- PEN Isolator Plate. Blocks Exhaust Ports. Gasket Included.
- PPN Isolator Plate. Blocks Supply Ports. Gasket Included.



Typical Stacking Valve Assembly

**ALPHA**<sup>™</sup>

#### **Mounting Brackets**

Kits include both Brackets and hardware to mount valve stacks to the brackets.

**116807** Long L - 7" long

116808 Short L - 3.75" long

116809 Tall Z - 6" high

117987 Short Z - 3" high



116808 Short L



## **Dimensional Data**

**Mounting Brackets** 



"L" Brackets #116807 & 116808



"Z" Brackets #116809 & 117987

## **Accessories**

Breather Vent, External Supply Plug Kit 116464 Solenoid Breather Vent 10-32 Thread Size.

119306 External Solenoid Supply Plug Kit

Changes ALPHA valves from internal to external solenoid air source.

- Step #1: Remove all air supply sources, remove sealing plug. Figure 1.
- Install separator plug by threading plug into valve body Step #2: with a flat-head screwdriver. See Figure 2.
- Step #3: Connect the external pilot air supply to the valve with an 1/8" NPT connector.



**ALPHA**<sup>™</sup>

## Alpha "Thin" Valves

#### Alpha Thin Manifolds

11860X - X Port Size Code Description 4 1/8" NPT 5 1/4" NPT 10 Station 10



11860X-X ALPHA Thin **Manifold Stack** 

#### **Alpha Thin Speed Controls**

Control speed directly from the manifold. Kits allow you to control only the cylinder direction needed.

- **119230** Kit controls Port 2 exhausting to Port 3.
- **119231** Kit controls Port 4 exhausting to Port 5.
- 118618 Includes both 119230 and 119231 control kits.
- **118612** Station blanking kit.



118618 Speed Control Kit

Number of Stations		
Code Description		
2	2 Station	
4	4 Station	
6	6 Station	
8	8 Station	
10	10 Station	

## **Dimensional Data**

1/8" & 1/4" Body Ported Valves





3 31/32 (100.8) 2 15/16 (74.6) ←1 15/32 (37.3) Δ Mounting Hole for No 10 Screw, 3PL **ALPHA**<sup>™</sup>

Dimensions given in Inches and (Millimeters)



0

- 2

## 3/8" Body Ported Valves







## **Stacking Valves**





## **Dimensional Data**

**ALPHA**<sup>™</sup>



Subbase Valves with 1/8" or 1/4" Cylinder Ports



Dimensions given in Inches and (Millimeters)

Subbase Valves with 3/8" or 1/2" Cylinder Ports





Thin Manifolds with 3/8" or 1/4" Cylinder Ports





No. of Stations	A
2	3.57
4	5.57
6	7.57
8	9.57
10	11.57

#### **Valve Performance Features**

- CAT Series Valves are available as single station units, bar manifold or assembled as a stack.
- CAT Series valves are suitable for air or inert gas.
- Plugging the exhaust port allows single station valves to be plumbed as 2way valves.
- CAT Series valves are available with a variety of coil options. See Pg. 56.
- Class F coils are rated for 100% duty cycle.

## **CAT Series Valve Features and Benefits**

- Quick change coil can be easily interchanged or replaced. Simply remove the top nut, slide off the coil and replace it with a new coil.
- The coil accepts DIN-style connectors, or automotive spade type connections. This helps reduce installation time and provides a secure electrical hook-up. See page 56.
- When mounted individually, the coil can be rotated to face one of four ways. As a stack, the coils can be mounted in two directions.
- Coils are UL-listed and comply with CSA standards. UL file #MH13513, CSA File #LR51090. NEMA 4 option available.





High Flow Cat Valve

## **Performance Specifications**

-			
Pressure Range: 0 to 150 PSI (10.4 bar)			
Temperature Rating:	0° to 122°F (-17° to 50°C)		
Flow:			
1/8" Individual, Bar Manif	old and Stacking Valves:		
CAT33P: Cv = .062 (2.2 SC	CFM), Seat Orifice .051, Stem .070		
CAT33S: Cv = .048 (1.8 SCFM), Seat Orifice .051, Stem .070			
CAT44P: Cv = .056 (2.0 SCFM), Seat Orifice .039, Stem .051			
CATXXB: Cv = .062 (2.2 SCFM), Seat Orifice .051, Stem .070			
Operating Medium:	Compressed Air		
Response Time:	5 - 9 ms		



Performance Data, Ordering Menus and Dimensional Data for High-Flow CAT Valves are found on page 57-58.

## Ordering

1/8" Individual & Stacking Valves

Model Number:	Port Size	Valve Function	Body Style
CAT33P-XXX-X-C	1/8"	Non-Passing	Ported
CAT33S-XXX-X	1/8"	Non-Passing	Stackable
CAT44P-XXX-X-C	1/8"	Passing	Ported

- Coil Options

Code	Voltage	Current
012-D	12 Volt	DC
024-D	24 Volt	DC
120-A	120 Volt	AC





To stack CAT Series valves, tie-rod

/3

CAT Series Valve Stack and116345-X Stacking Kit mounting kits are required. Order kits separately from the menu below.

#### **Stacking Tie-Rod Kits**

116345-2	2Valve Stack
116345-3	3 Valve Stack
116345-4	4 Valve Stack
116345-5	5 Valve Stack
116345-6	6 Valve Stack
116345-3 116345-4 116345-5 116345-6	3 Valve Stack 4 Valve Stack 5 Valve Stack 6 Valve Stack

Tie-Rod Kits include tie rods, nuts, o-rings and a plug.

## **Dimensional Data**

Dimensions given in Inches and (Millimeters)

CAT44P Body Ported, Normally Passing



CAT33P Body Ported Normally Non-Passing



CAT33S Stacking Normally Non Passing



#### Cat Valve Bar Manifold

ARO's Cat Valve Bar is the fast, preassembled path to compact valve manifold installation. Factory built and tested, the Cat Valve Bar arrives ready to "plumb, plug'n play".

- Factory assembled complete, saves time and money.
- Valve overrides are standard.
- Coils are UL and CSA listed (Files: UL #MH13513; CSA #LR51090).
- Suitable for air or inert gas.

## 1/4" High Flow Cat Valves

High-flow Cats have the performance perks that made the CAT valve famous, plus increased flow capacity that enhances your actuator application options.

- Increased flow.
- Slightly enlarged base and 30 mm coil allows high-flow 1/4" porting without compromising compact size.
- One of the highest air flows available in a direct-acting, compact Valve.
- Powerful enough to drive cylinders, pumps, other components.
- Includes all of the Cat series features/benefits: quick-change coils, rotatable coils, compact size and good shift response.
- Using the 119698-X tie-rod kit, up to seven high-flow Cat valves can be stacked together. See page 58.





Six-Station Bar Manifold Cat Series Valves. Maximum ten (10) stations available.



High-Flow Cat Valve has all the perks of other CAT valves, with flow of .2 Cv (6.9 SCFM)

## **Performance Specifications**

Pressure Range:	0 to 150 PSI
Temperature Rating:	0° to 122° F
Operating Medium:	Compressed Air
High-Flow Valves:	CAT66P: Cv = .2 (6.9 SCFM)
	CAT77S: Cv = .2 (6.9 SCFM)
	CAT88P: Cv = .2 (6.9 SCFM)

## Ordering

**Cat Valve Bar Manifold** 

C A T <u>)</u>	<u>X X</u> B - <u>)</u>	<u> </u>					
No. of	Stations	Coil Opt	tions				
02	10	Code	Voltage	Current	Code	Voltage	Current
03	11	012-A	12 Volt	AC	120-A	120 Volt	AC
04	12	012-D	12 Volt	DC	120-D	120 Volt	DC
05	12	024-A	24 Volt	AC			
00	14	024-D	24 Volt	DC			
00	14						
07	15						
08	16						
09							
07 08 09	15 16						

#### **High Flow Cat Valve**

Model Number:	Port Size	Valve Function	Body Style
CAT66P-XXX-X*-C	1/4"	Normally Closed	Ported
CAT77S-XXX-X*-C	1/4"	Normally Closed	Stacking
CAT88P-XXX-X*-C	1/4"	Normally Open	Ported

-	– * Coil V	Voltage
	012-D	12 Volt
	120-A	120 Volt
	024-D	24 Volt

Connector	
CDW-30	30-mm connector with wire.
CSN-30	30-mm connector, strain relief.
CHW-30	30-mm connector, molded cable.
119690-XX	Coil information.

## **Dimensional Data**





58



œ

## **High Flow Cat Valve**

1.287



3.547



Ports

1.000

•

1.250 ----

Accessories

High-Flow Tie-Rod Kits



#### 50 Series 3-Way & 4-Way Valves

- Numerous Styles and Options. 3-Way or 4-Way Configurations.
- Six Actuator Styles. Hand Lever Palm Button Roller Cam

Cam Stem Pilot Manual Bleed

- · Compact Size provides greater design flexibility.
- Perfect for low to moderate flow applications requiring manual or mechanical valve operation.





#### **Comprehensive Valve Design**

#### **1. Aluminum Body**

50 Series Valves feature an extruded aluminum body for less porosity, greater durability and lighter weight.

#### 2. Body Threaded Ports

Port threads are 1/8" NPTF

#### 3. Buna N Seals

The standard spool seals are Buna N. For high temperature applications, Viton seals are available. Consult the factory for ordering information.

#### 4. Sturdy Valve Spools

Spools are steel on mechanical and manually actuated valves. Pilot and bleed actuator valves feature aluminum spools.







Pilot



**Manual Bleed** 

## Ordering



For 22, 32 or 41 Actuators

## **Performance Specifications**

Pressure Range:	20-150 PSI Max.	
	50-150 PSI Max. (Manual Bleed Actuator)	
Flow:	16 SCFM	
Cv Factor:	.43 Cv	
Temperature Rating:	-10° to 180°F (-23° to 82°C)	
Minimum Pilot Pressure:	30 PSI (2.1 Bar) Pilot Return	
	60 PSI (4.2 Bar) Pilot Actuator/Spring Return Valves	
Lubrication:	Valves use O-ring seals. For maximum performance and life	
	expectancy, standard air line lubrication should be used.	


5040-05

1" (25.4) (

Steel

Roller

L

11

→ < <sup>7/32</sup> (5.6)

Ŧ

4 7/32

(107.2)

1 1/2->

(38.1)

# **Pneumatic Valves 50 Series - Dimensional Data**

### **Dimensional Data** Dimensions given in Inches and (Millimeters)

#### **Cam Stem Valves**



Series Valves

#### **Pilot Valves**



#### **Manual Bleed Valves**





#### 3-Way Valves

- Quick Response
- Direct Acting/Single Solenoid
- Non-Locking Manual Override
- Continuous Duty Coil
- 1/8" NPT

Model

114807 CSN-MICRO

P251SS-012-D P251SS-012-E

P251SS-024-D P251SS-024-E

P251SS-120-A P251SS-120-B

P261SS-012-D P261SS-012-E

P261SS-024-D

P261SS-024-E

P261SS-120-A P261SS-120-B

P211SS-012-D

P211SS-012-E P211SS-024-D

P211SS-024-E

P211SS-120-A P211SS-120-B

P211SC-012-D

P211SC-012-E

P211SC-024-D

P211SC-024-E

P211SC-120-A

P211SC-120-B

P221SS-012-D

P221SS-012-E

P221SS-024-D

P221SS-024-E

P221SS-120-A

P221SS-120-B

P221SC-012-D

P221SC-012-E

P221SC-024-D

P221SC-024-E

P221SC-120-A P221SC-120-B

P114400 114806

- 2-Position/Spring Return
- Can be used as a Diverter or Selector Valve

### **Ordering Information:**

Description

#### 4-Way Valves

- Quick Response
- Can be used in a variety of 2-, 3-, and 4-Way functions
- Direct Acting/Single Solenoid
- Non-Locking Manual Override
- Continuous duty Coil
- 1/8" NPT
- 2-Position/Spring Return
- Optional Built-In
- . Dual Flow Controls

END PLATE FOR 3-WAY OR 4-WAY VALVE STACK MOUNTING BRACKET FOR INLINE VALVES

ISOLATOR PLUG KIT FOR STACKING VALVES

3-WAY BODY PORTED, LEAD WIRE, 12 DC

3-WAY BODY PORTED, PLUG-IN, 12 DC 3-WAY BODY PORTED, LEAD WIRE, 24 DC

3-WAY BODY PORTED, PLUG-IN, 24 DC 3-WAY BODY PORTED, LEAD WIRE, 120 AC

3-WAY BODY PORTED, PLUG-IN, 120 AC

3-WAY STACKING, LEAD WIRE, 12 DC

3-WAY STACKING, LEAD WIRE, 24 DC

3-WAY STACKING, PLUG-IN, 12 DC

3-WAY STACKING, PLUG-IN, 24 DC 3-WAY STACKING, LEAD WIRE, 120 AC

3-WAY STACKING, PLUG-IN, 120 AC 4-WAY BODY PORTED, LEAD WIRE, 12 DC

4-WAY BODY PORTED, PLUG-IN, 12 DC

4-WAY BODY PORTED, PLUG-IN, 24 DC 4-WAY BODY PORTED, LEAD WIRE, 120 AC

4-WAY BODY PORTED, PLUG-IN, 120 AC

4-WAY STACKING, LEAD WIRE, 12 DC

4-WAY STACKING, LEAD WIRE, 24 DC

4-WAY STACKING, LEAD WIRE, 120 AC

4-WAY STACKING, PLUG-IN, 12 DC

4-WAY STACKING, PLUG-IN, 24 DC

4-WAY STACKING, PLUG-IN, 120 AC

4-WAY BODY PORTED W/SPEED CONTROL, LEAD WIRE, 12 DC

4-WAY BODY PORTED W/SPEED CONTROL, LEAD WIRE, 24 DC

4-WAY BODY PORTED W/SPEED CONTROL, LEAD WIRE, 120 AC

4-WAY BODY PORTED W/SPEED CONTROL, PLUG-IN, 12 DC

4-WAY BODY PORTED W/SPEED CONTROL, PLUG-IN, 24 DC

4-WAY BODY PORTED W/SPEED CONTROL, PLUG-IN, 120 AC

4-WAY STACKING W/SPEED CONTROL, LEAD WIRE, 12 DC

4-WAY STACKING W/SPEED CONTROL, LEAD WIRE, 24 DC

4-WAY STACKING W/SPEED CONTROL, PLUG-IN, 12 DC

4-WAY STACKING W/SPEED CONTROL, PLUG-IN, 24 DC 4-WAY STACKING W/SPEED CONTROL, LEAD WIRE, 120 AC

4-WAY STACKING W/SPEED CONTROL, PLUG-IN, 120 AC

**CSN-MICRO** Connector

Type C. Order separately.

114807 Isolator Plug Kit

Kit consists of two plugs. Plugs can be used on stacking valves to convert

to a valve stack.

4-ways to 3-ways, or 3-ways to 2-ways. Also can be used to provide multiple pressures

Plug-in DIN type connector

conforms to Industrial Micro

4-WAY BODY PORTED, LEAD WIRE, 24 DC

CONNECTOR, STRAIN RELIEF



3-Way Body Ported





4-Way Body Ported

4-Way Body Ported with Speed Controls



3-Way and 4-Way Stacking Valves



114806 Mounting Bracket



P114400 End Plate Kit



**CSN-MICRO** Connector

#### 114806 Mounting Bracket

Kit is designed for use with both 3-Way and 4-Way valves. Kit consists of a bracket, two #6-32 screws, and two nuts.

#### P114400 End Plate Kit

Kit consists of two end plates, two o-rings, and two bolts. One kit required for each valve stack. Can be used for 3-Way or 4-Way valves, or any combination of valves.

### **Performance Specifications:**

**Dimensional Information** 

**3-Way Body Ported** 

ര

- I/8-27 NPSF 3 PLACES

 $\bigcirc$ 

0

r

- .48

Port Size-NPT	1/8" NPT
Media	Air or Inert Gas
Operating Pressure	3-Way, 0 to 125 PSI 4-Way, Vac to 125 PSI
Ambient Temperature Range	32 to 125 F (0 to 50 C)
Cv Factor	.144
Coil Rated Voltage	120VAC (50/60Hz); 12, 24 VDC
Allowable Voltage Fluctuation	+ or - 10% of Rated Voltage
Coil Insulation Type Class B Rated, 100% Duty	
Power Consumption	DC 4.5 Watts
Electrical Entry	24" Lead Wire (22 AWG) Plug-In DIN Connector (Industrial Micro Type C)
Manual Override	Yes, Top of Coil, Non-Locking
Materials	Seals; Buna-N, Coil: Acetal Body; Aluminum, Brass and Stainless
Response Time (On/Off)	.012/.010 (DC), .012/.020 (AC) Sec.
Max. Cycle Rate	2700 (DC), 1875 (AC)
SCFM @ 100 PSIG	>10
Leak Rate (Max. Allowed)	4cc/Min. @ 100 PSIG
Lubrication	None Required, Factory Pre-Lubed
Weight	3-Way; .26 lbs (116g) 4-Way: .28 lbs. (128g)

0

I Q I

+

.38 -

1.78

.62

- 1.32 -

Ó

.87

.10-\_ .66

1 Ŕ

.28 T

2,40

### 4-Way Body Ported







 $\bigcirc$  $\bigcirc$ 



- 1.32

Б

.34



.87

64

#### 3-Way & 4-Way Valves

**Several Styles and Options** 

3-Way or 4-Way Configurations. 2-and 3-position configurations.

#### Numerous Actuator Styles

ManualMechanicalHand LeverCam StemPalm ButtonRoller CamPedalTreadle

<u>Electric</u> Single Solenoid Double Solenoid

<u>Pneumatic</u> Pilot Bleed

#### **Many Performance Features**

- Buna-N spool seals are standard. Viton seals are available for high temperature applications. Consult the factory for ordering information.
- The E Series Valve has a low profile. An extruded aluminum body provides excellent durability and lighter weight.
- An External Solenoid Supply Port allows service in low pressure applications. This requires a #116153 plug Kit. See Page 65 for operation and ordering information.

#### **Solenoid Override**

- Manual locking override is standard on solenoid models. Turn override to operate.
- Solenoid override is a convenient means to set-up and trouble shoot circuits. Air pressure at the solenoid exhaust will also override the solenoid.

#### Coils

• Coils are UL and CSA Listed (Files: UL #MH13513; CSA #LR51090).

### **Performance Specifications**

	•			
	Pressure Ranges	Min. Pilot Press		
	Manual Actuators PSI (Bar) PSI (Bar)			
	Manual, Spring, and Spring Centered Returns:	20-150 (1.4-10.2)	30 (2)	
_	Mechanical Actuators			
	Manual, Spring, and Spring Centered Returns:	20-150 (1.4-10.2)	30 (2)	
_	Electric Actuators			
	Spring Return	30-150 (2-10.2)		
	Spring Centered Return	35-150 (2.4-10.2)		
	Solenoid Return	20-150 (1.4-10.2)		
	Pneumatic Actuators			
	Pilot/Spring Return	20-150 (1.4-10.2)	30 (2)	
	Pilot/Spring Centered	20-150 (1.4-10.2)	35 (2.4)	
	Pilot/Pilot Return	20-150 (1.4-10.2)	15 (1)	
	Bleed/Spring Return	20-150 (1.4-10.2)		
	Bleed/Bleed	20-150 (1.4-10.2)		
	Flow:	26 SCFM		
	Cv Factor:	.70 Cv		
	Temperature Ratings:	-10° to 180° F (-23° to 82° C)		
	Weight:	Solenoid Valves 1.8 to 3.4 oz. (.82 to 1.5 g)		
		Non-Solenoid Valves .7 to 1.3 oz	(.32 to .6 g)	
	Lubrication:	Valves use O-ring seals. For maxi	mum performance and life	
		expectancy, standard air line lubrication should be used.		







Palm Button





Treadle



Cam Stem



Solenoids





# Pneumatic Valves E Series

Order	ing <u>E</u> X	<u>X 2 X</u>	<u>(</u> - <u>XX</u>	<u>x</u> - <u>x</u> -c <b>E</b>	Ser	ies Valves		
E Serie	es Valves			Current Type				
Valve	Туре			Code Descript	tion			
Code	Description			A AC		-		
1	2 Position Detent			D DC				
2	2 Position			Required only on Sole	noid Valves.	-		
3	3 Position Spring Centered							
5	3 Position Detent			Coil Voltage				
	(3 & 5, all ports blocked)		L	Code Description				
6	3 Position Detent (inlet port	S		012  12V (AC  or  DC)				
	blocked, cylinder ports open	1)		024 24V (AC or DC)				
7	3 Position Spring Centered	,		120 120V (AC or DC)				
	(6 & 7, inlet ports blocked,			Required only when				
	cylinder ports open)			ordering Solenoid Valves.				
	Body Style		Actuator	/ Return	Actuato	r / Return		
	Code Description		Code	Actuator/Return	Code	Actuator/Return		
	1 4 Way Side Porte	d	BD	Bleed Double	LM	Hand Lever/Manual		
	4* 4 Way Bottom Po	rted	BS	Bleed/Spring	LP	Hand Lever/Pilot		
	5 3 Way Side Porte	d	CS	Cam Stem/Spring	LS	Hand Lever/Spring		
	*Solenoid and Pilot Models of	nly.	US	Cam Stem/Spring, 1/4" Spool	PD	Pilot/Double		
	Port Siz	e		travel, 3-way valve only.	PS	Pilot/Spring		
		Description	RS	Roller Cam/Spring	SD	Double Solenoid		
			HM	Palm/Manual	SN	Solenoid/Spring-N.O.		
			HP	Palm/Pilot	SS	Solenoid/Spring		
3-Wa	ay 4-Way, 2-Position	4 2	HS	Palm/Spring	FS	Pedal/Spring		
		<b>∏ ∱ Ì</b> Ì	WM	Palm w/o Button/Manual	TM	Treadle/Manual		
	$\frac{1}{3} \bigvee / 1 \qquad \qquad$	$ \Psi/T _{T} \Psi$	WP	Palm w/o Button/Pilot	TS	Treadle/Spring		
4-Way, 3-P	osition all 4-Way, 3-Position inlet ports	4-Way, 2-Position Bleed	WS	Palm w/o Button/Spring				
ports bl	biockea, cylinaer ports open	vaive	Numberi	ng ends here if a Non-Solenoid Valve	is being se	lected.		

## Accessories

### **Palm Buttons**

For use with	<i>WM, WP</i> or <i>WS</i> Actuators.
13111	Plastic, Black
119243	Metal, Plain
119244	Metal, Red
119245	Metal, Green

#### **Foot Pedal Guards**

MP3651-7 Plastic, Red

Recommended for applications where accidental actuation may result in damage or injury. Model 20965-1 is designed to comply with ANSI No. B11.1-1971 specifications and OSHA regulations.

20965-1	Pedal Guard with Flapper
20965-2	Pedal Guard without Flapper





# **Pneumatic Valves E Series - Dimensional Data**

**Dimensional Data** Dimensions given in Inches and (Millimeters)

**E** Series Valves

**Basic 3-Way Valve** 





Basic 4-Way Valve



### Hand Lever Valves

3 7/8" (98.4) 3 Way Valves





4 Way Valves

4 Way Valves









E212FS

Pedal

3 Way Valves





# **Pneumatic Valves E Series - Dimensional Data**





### **Pilot Valves**





3 Way Valves







4 Way Valves





# **Pneumatic Valves E Series - Dimensional Data**

### **Dimensional Data**

Dimensions given in Inches and (Millimeters)

#### **Treadle Valves**





4 Way Valves



Series Valves

#### **Bleed Valves**







#### **Solenoid Valves**





#### 3 Way Valves

. (177.8)



E252SN-XXX-X E252SS-XXX-X

#### 4 Way Valves







#### Styles and Options.

5-Port, 4-Way, 2 and 3-position directional control valves.

#### Seven Actuator Styles.

Manual
Hand Lever
Pedal
Treadle
Dolm Dutton

Electric Pneumatic Single Solenoid **Double Solenoid** 

Pilot Bleed

Palm Button

K-Series valves are available with either threaded side ports, on a subplate containing all ports, or on a subplate with the exhaust in the valve body.









Pedal



Treadle



Solenoids



Pilot



### **Comprehensive Valve Design**

### 1. Aluminum Body

Sand cast aluminum body provides a rugged, reliable valve.

### 2. Buna N Seals

Standard seals are Buna N, for extended valve life. Viton seals are available for high temperature applications. Consult factory for ordering information.

### 3. Sturdy Spools

K-Series valves have an aluminum spool. This slides in a hard anodized Teflon non-stick aluminum sleeve (3/8" or 1/2" models) The sleeves are brass on 3/4" or 1" models.

### 4. Standard Solenoid Override Feature

3/8" and 1/2" models only.

### 5. External Solenoid

External Solenoid supply port enables valve operation for vacuum service or low pressure operations. For proper supply connection, consult factory. (Remove end cap and rotate gasket 90° for remote solenoid supply.)



20965-X Foot Pedal Guards, for use with Pedal Style valves.

#### **Performance Specifications Pressure Ranges**

			Min. Pilot Press	
		PSI (Bar)	PSI (Bar)	
Manual Actuators	Manual, Spring, and Pilot	0-150 (0-10.4)	20 (1.4)	
Mechanical Actuators	Manual, Spring, and Pilot	0-150 (0-10.4)	20 (1.4)	
Electric Actuators	ctric Actuators Spring Return		-	
	Spring Centered Return	60-150 (4.1-10.4)	-	
	Solenoid Return	20-150 (1.4-10.4)	-	
Pneumatic Actuators	Pilot/Spring Return	0-150 (0-10.4)	50 (3.5)	
	Pilot/Spring Centered	0-150 (0-10.4)	60 (4.1)	
	Pilot/Pilot Return	50-150 (3.5-10.4)	20 (1.4)	
	Bleed/Spring Return	50-150 (3.5-10.4)	-	
	Bleed/Bleed	20-150 (1.4-10.4)	-	
Flow & Cv Factor				
	Port Size	Flow	Cv Factor	
	3/8"	83 SCFM	2.30	
	1/2"	90 SCFM	2.57	
	3/4"	270 SCFM	7.54	
1"		280 SCFM	7.80	
Temperature Ratings	-10° to 180° F (-23° to 82° C)			
Lubrication	Valves use O-ring seals. For maximum performance and life expectancy.			
	standard air line lubrication should be used.			

### Ordering

#### Sub Plate

	Valve Body Style			
Port Size	"3" Bottom Ported, Exhaust in Subplate	"4" Bottom Ported, Exhaust in Valve		
3/8"	116737	37013		
1/2"	37112	116738		

# **Dimensional Data**

### Sub Plates (3/8" & 1/2" Ports)

Dimensions given in Inches and (Millimeters)



Θ

3 7/16 (87.3)

5 5/8 (142.9)

- 4 (101.6)

7 (177.8)

### **Pilot & Bleed Valves**

1 3/16 (46.0)

2 1/2 (63.5)

11/16

(17.5)

1

(25.4)

1 1/4

(31.8)

2

(50.8)

3/4 (19.1)

1 1/2 (38.1)



(27.0) 1

(25.4)



#### **Palm Valves**



H213HS



(95.3)

Mtg. Hole 9/32 (7.1) 13/32 (10.3)



1/4-20 NPTF

4 11/16

(119.1) 3 7/16 (87.3)

17/64

(618)

### **Dimensional Data**

Dimensions given in Inches and (Millimeters)



#### Hand Lever



Top Dimension = 3/8" & 1/2" Ports Bottom Dimensions = 3/4 & 1" Ports

#### Pedal



Treadle



#### Solenoid

#### **Double Solenoid**





Single Solenoid



Top Dimension = 3/8" & 1/2" Ports Bottom Dimensions = 3/4 & 1" Ports

- H-Series Valves feature high-flow and fast response.
- Numerous Styles and Options.
- 3-Way and 4-Way 2-position Poppet Valves
- Several Actuator Styles.
- Override is not available with "H" Series Valves

EI	e	C	tı	ʻİ	C
_	_	_	_	_	_

3-Way Single Solenoid 4-Way Single Solenoid 4-Way Double Solenoid Pneumatic 3-Way Pilot 4-Way Pilot 4-Way Pilot Bleed 4-Way Manual Bleed





3-Way Pilot



3-Way Solenoid



4-Way Solenoid



Manual Bleed



**Pilot Bleed** 



4-Way Pilot



#### **Comprehensive Valve Design**

#### **1. Durable Valve Body**

Valve body is die-cast Zinc, with a zinc chromate coating for added corrosion resistance in harsh environments.

#### 2. Superior Performance

Large, unrestricted air passages produce high flow and fast response times.

### 3. Superior Design

3-Way valves feature a single poppet. 4-Way valves (as shown) have two simultaneously driven poppets to provide the 4-way function.

# Pneumatic Valves H Series



# **Performance Specifications**

#### Valve Performance Data 3-Way Valves

Actuator	Return	Pressure Range PSI (bar)	Minimum Pilot Press PSI (bar)
Pilot	Spring	30-150 (2.1-10.4)	30 (2.1)
Solenoid	Spring	30-150 (2.1-10.4)	-

#### 4-Way Valves

Actuator	Return	Pressure Range PSI (bar)	Minimum Pilot Press PSI (bar)
Pilot	Internal Pilot	20-150 (1.4-10.4)	20 (1.4)
Solenoid	Internal Bleed or Solenoid	25-135 (1.7-9.3)	-

...

....

#### **3-Way Valve Flow SCFM**

<i></i>								
Port	Side	Cv	Bottom	Cv				
Size	Ported	Factor	Ported	Factor				
1/4"	55	1.51	27	0.71				
3/8"	81	2.27	58	1.62				
1/2"	85	2.40	-	-				

#### 4-Way Valve Flow SCFM

Port	Side	Cv
Size	Ported	Factor
1/4"	50	1.40
3/8"	88	2.38
1/2"	100	2.80

#### Response Time @ 100 PSI 3-Way Valves

Energized	De-energized
N.O 23 ms	20 ms
N.C 22 ms	26 ms

4-way valves				
Energized	De-energized			
44 ms	27 ms			

### **Dimensional Data**





Series Valves

#### **4-Way Basic Valves**



### **Dimensional Data**

Dimensions given in Inches and (Millimeters)

H Series Valves

### **Pilot Valves**







### **Bleed Valves**

#### 4-Way Manual Bleed





4-Way Pilot Bleed





### **Solenoid Valves**

#### 4-Way Double Solenoid



**3-Way Single Solenoid** 



H25XSS-XXX-X H28XSS-XXX-X



4-Way Single Solenoid



- 200-Series valves can be plumbed to perform as normally passing, normally non passing, selector or any 2-way function.
- Ideal for sensing the position of moving devices such as cylinders, slides or gates.
- Mounting holes are standard 1" electrical centers

### • Numerous Actuator Styles:

#### Mechanical

Short Roller Lever
Long Roller Lever
One-Way, Short Lever
One Way, Long Lever
Pin Plunger

Short Ball Roller Long Ball Roller Straight Plunger Roller Plunger Cross-Roller Plunger Plain Lever Fingertip Lever Centering Toggle Retained Toggle Panel Button

Manual





### **Comprehensive Valve Design**

#### 1. Durable Valve Body.

Body is die cast zinc for high wear resistance. Valve also features a stainless steel, Teflon coated spool, with Viton O-ring seals and Buna-N static seals.

#### 2. Two Plumbing Options.

Available with 1/8" NPTF ports, or instant tube fittings for use with 5/32" (4mm) nylon tubing.

#### 3. Numerous Actuator Styles.

Five manual, ten mechanical and one pilot actuators to choose from. Eight can be panel mounted.

## **Performance Specifications**

Pressure Range:		30 to 150 PSIG (2.1 to 10.4 bar)				
Flow & Cv Factor:		1	1/8" Ports: 7.5 SCFM Cv = .195			
Temperatur	e Range:	3	32 to 160 F (0 to 71 C)			
Actuating F	orce:					
Actuator	Force Oz.(I	N)	Stroke In (mm)	Travel In (mm)		
200	20 (5.56)		.195 (4.95)	.055 (1.40)		
201	20 (5.56)		.289 (7.34)	.086 (2.18)		
202	36 (10.0)		.086 (2.18)	.024 (0.61)		
203	21 (5.84)		.160 (4.06)	.040 (1.02)		
204	34 (9.45) 23 (6.39) 57 (15.9)		.089 (2.26)	.027 (.69)		
205			.164 (4.17)	.043 (1.09)		
209			.069 (1.57)	.015 (.38)		
212	57 (15.9)		.069 (1.57)	.015 (.38)		
213	57 (15.9)		.069 (1.57)	.015 (.38)		
214	57 (15.9)		.062 (1.57)	.089 (2.26)		
215	57 (15.9)		.062 (1.57)	.089 (2.26)		
216	57 (15.9)		.062 (1.57)	.089 (2.26)		
222	24 (6.67)		70°	-		
223	24 (6.67)		70°	-		
224	57 (15.9)		.062 (1.57)	.025 (3.18)		



2



Non-Passing



206 consist of a 212-C and

# 206-C Minimum Pilot Pressure PSIG (bar)

Supply Pressure	25 (1.7)	50 (3.4)	75 (5.1)	100 (6.9)	125 (8.6)	150 (10.4)
Piped IN – N.N.P.	11.5 (.8)	12.0 (.8)	12.5 (.9)	13.0 (.9)	13.5 (.9)	14.0 (1.0)
Piped IN – N.P.	14.5 (1.0)	17.0 (1.2)	19.5 (1.3)	22.0 (1.5)	24.5 (1.7)	27.0 (1.9)

212-2 Valve



#### **Miniature Control Valves**

- Ball Poppet valve provides fast response.
- · Slotted Mounting holes for easy placement & adjustment.
- 100 Series Mini Valves are non-passing, non-lube limit valves.
- 33% glass reinforced polyester body is strong, lightweight & corrosion resistant.
- Available with #10-32 threaded ports. Ports are on one side for ease of plumbing & maintenance.
- Seals are Buna-N, Stainless Steel Spring, Brass Plunger & Delrin Roller.





**Series Valves** 

105-2-A

103-2-A



Performance Specifications   Pressure Range: 0 to 150 PSIG (0 to 10.4 bar)		Ordering			
		Model #: Port Size Actuat		Actuator Type	Normally
Temperature Range:	-10° to 180° F (-23° to 82° C)	103-A	#10-32 Thread	Roller Lever	Non-Passing
Flow & Cv Factor:	3.4 SCFM at 100 PSIG (7 bar)	105-A	#10-32 Thread	90° Roller Lever	
	input 85 PSI (5.8 har) output $Cv = 09$	109-A	#10-32 Thread	Straight Plunger	

.63

(16)

0

Ο

Travel Operation:		
Straight Plunger:		
.03125" (.8mm) to actuate		
.109375" (2.8mm) total		
Levers:		
.0625" (1.6mm) to actuate		
.21875" (5.5mm) total		

.15

(3.8)

ţ

1

1.35

(34.3)

.185

(4.7)

125

t

.125

.170 Dia.

(12



# 100 Series Dimensional Data

Dimensions given in Inches and (Millimeters)



## **Features**

#### MaxAir 3-Way & 4-Way, 1/8" Manual & Mechanical Valves

← (17.8) -

.94

(23.9) 1.5

1 .56 (38.1)

• Rugged aluminum alloy body is lightweight and durable.

421

1.02 (25.9)

1.2 (30.5)

- Valves are available with roller cam, toggle or push button with spring return.
- Ideal for sensing the position of moving devices such as cylinders, slides and gates.
- 3-way valves can be plumbed to perform as normally passing, normally non-passing, or selector.



### **Performance Specifications**

	-
Port size:	1/8" NPT
Pressure Range:	0-150 PSI
Temp. Range:	32-160 F (0-71 C)
Media:	Compressed Air
Flow:	3-Way = 7 scfm
	4-Way = 9 scfm
	4-Way = 9 scfm

# Ordering

Madal Ma	Description
WODEL NO.	Description
M251RS	3-Way, Roller, Spring Return
M251LS	3-Way, Toggle
M251HS	3-Way, Push button, Spring Return
M211RS	4-Way, Roller, Spring Return
M211LS	4-Way, Toggle
M211HS	4-Way, Push Button, Spring

Note: Interchanges with Humphrey 31 and 41 Series and replaces Clippard Miniature MJV

### **3-Way Limit Valves**

- Plumb 400 Series valves as normally passing, normally non-passing, selector or any 2-way valve function.
- Ports available with 1/8" NPTF threads.
- Four actuator options: Nylon Roller, Steel Roller, Rod Lever or Adjustable Roller Lever. Actuators must be ordered separately. See menu below.
- Operating head may be adjusted to any of four positions.
- Outer case protects working parts from dirt.



400-A



Series

# **Performance Specifications**

Pressure Range:	30 to 150 PSIG (2.1 to 10.4 bar)
Flow & Cv Factor:	1/8" Ports: 7.5 SCFM Cv = .195
Temperature Range:	32 to 160 F (0 to 71 C)
Actuating Force:	(lbs.)
447	1.6
448	1.6
449	0.5
450	0.8
Cv = .104	
Actuating Torque:	2.4 in. lbs.

### Normally Passing Normally Non-Passing

# Ordering

Valves:		Actuators	S:
1/8" Ports	Valve Action	Code	Description
400-A	One Way, Clockwise	447	Nylon Roller
401-A	One Way, Counterclockwise	448	Steel Roller
402-A	Clockwise & Counterclockwise	449	Rod Lever
		450	Adjustable Roller

### **Palm Button Control Valves**

- Plumb each to perform as normally passing, normally non-passing, selector or any 2-way valve function.
- Ports available with 1/8" NPTF threads.
- 2 1/2" Buttons (63.5mm) are available in four colors. If needed, order 20975 guard separately.





460-X



461-X with 20975 Guard

# **Performance Specifications**

Pressure Range:	30 to 150 PSIG (2.1 to 10.4 bar)	
Flow & Cv Factor:	1/8" Ports: 7.5 SCFM Cv = .195	$\mathbf{\psi}_{T}$
Temperature Range:	32 to 160 F (0 to 71 C)	
Actuating Force:	3 lbs.	
		$ \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \end{bmatrix}$

Yellow

-4

# Ordering

		46 <u>X</u> -X		
<u>Port Si</u>	ze		Button	Color
Code	Description		Code	Description
0	1/8" NPT		-1	Black
			-2	Red
			-3	Green

Accessories					
20975 Button Guard					
*20973-1	Black Button				
*20973-2 Red Button					
*20973-3 Green Button					
*20973-4 Yellow Button					
* Tolerance ring 20972 must					
be ordered	with accessory				

buttons.

#### **Dimensional Data** <u>Series</u> Dimensions given in Inches and (Millimeters) **Series** 400 Series 3/4 Dia. x 9/32 Nylon (19.1) x (7.1) ↔ Rest Position Max. travel approx 45° Max. travel approx 45° Travel to fully shift approx 25° Travel to fully shift approx 25° 3/4 Dia. x 9/32 Nylon (19.1) x (7.1) 3/4 Dia. x 91/4 Steel (19.1) x (6.4) 5 1/8 (130.2) 1 3/16 (30.2) Min. 3 (76.2) Max. 5/16 1 1/2 (38.1) (7.9) .201" dia. С Travel to open ports approx 10° Travel to open ports approx 10° Τ Φ D 1 3/4 ≜ (19.1) ᡟ 5/16 (7.9) Dia. Hole 1/2 (12.7) 5/16 (7.9) 3 27/32 (97.6) ₹ Dia. Hole (25.4) ↓ . 1 3/16 Ο (30.2) 0 ο 19/64 (7.5) → 1 5/32 4 (29.4) ${\color{red} \leftarrow}^{1\;3\!/\!4}_{(44.5)} {\color{red} \rightarrow}$ 2 9/16 (65.1) 460 Series 2 1/4 (57.2) Dia 5/64 (2.0) Stroke 1/2 (12.7) 5/32 (4.0) Dia 1/4 (6.4) 17/32 (13.5) Dia. 35/64 (13.9) 2 13/32 ¢ φ (61.1) 1 13/64 , 3/8 (9.5) Dia Holes (2) Button Removal Access Hole460 w/20975 Guard only. (30.6) Q ⊾ ¥ O 0 0 Ø 1 15/32 (37.3) → 0 .201 Dia Holes



۵ 5/8 (15.9) Ø 0 1 1/4 0 (31.8) 3/4 k 9 (19.1 Panel Mtg. Drilling Layout Max. Panel Thickness 3/16" (4.8)

#### **Quick Exhaust Valves**

- Provides quick dump of exhaust at cylinder.
- Eliminates need for large diameter piping or selector valves.
- Die cast aluminum body.

#### **Single Pulse Relay Valve**

- · Converts continuous inlet supply to a momentary pressure pulse.
- Ideal where input signal remains pressurized, but output must go "off" after performing its task.
- Locate PR10 as close to pilot port of valve as possible.



EV30-/



## **Dimensional Data**

Dimensions given in Inches and (Millimeters)

# Quick Exhaust Valves



Α	В	C
1 7/16 (36.5)	1 23/32 (43.7)	1 1/2 (38.1)
2 1/8 (54.0)	2 7/32 (56.4)	2 1/1 (52.4)
2 1/8 (54.0)	2 7/32 (56.4)	2 1/1 (52.4)
3 1/8 (79.4)	3 1/2 (88.9)	4 1/32 (102.4)
3 1/8 (79.4)	3 1/2 (88.9)	4 1/32 (102.4)

#### **Single Pulse Relay Valve**





### **Performance Specifications/Ordering**

#### **Quick Exhaust Valves**

Model Number	iniet Port	Cyl. Port	Exh Port	Pres Range PSI (bar)
EV 125	1/8"	1/8"	1/4"	1-125 (.07-8.6)
EV 250	1/4	1/4	3/8	1-125 (.07-8.6)
EV 375	3/8	3/8	3/8	1-125 (.07-8.6)
EV 30-A	1/2	1/2	3/4	5-125 (.35-8.6)
EV 35-A	3/4	3/4	3/4	5-125 (.35-8.6)

#### **Single Pulse Relay Valve**

Supply PSIG Press. (bar)	Pulse Duration	Reset Time
50 (3.5)	125ms	300 ms
75 (5.2)	110ms	300 ms
100 (6.9)	105ms	300 ms
125 (8.6)	100ms	300 ms

#### **Breather Vents**

- Use on valves and single acting cylinders to prevent dirt from entering ports open to atmosphere. Other uses are for vacuum relief or pressure equalization on gear boxes, reservoirs & air tanks.
- 40 micron filtration. Selection based on thread size.

#### Muffler

- Use on valve exhaust ports.
- · Sintered bronze construction. Air muffler and exhaust diffuser.
- 40 micron nominal filtration; sound deadening qualities with low pressure drop.
- · Brass Body

#### **Speed Controls**

- · Controls air flow on exhaust ports of air valves.
- · Change cylinder operating speed by adjusting screw. Secure with lock nut.

#### **Shuttle Valves**

- Allows one of two input sources to get the output. Prevents either input from exhausting at other input source.
- Check ball moves from inlet with the greatest pressure and against the port having the least pressure. Minimum pressure difference of 10 PSIG (.7 bar) is necessary to effect shuttle change. 200 PSIG (13.8 bar) maximum.

### **Dimensional Data** Dimensions given in Inches and (Millimeters)

#### **Shuttle Valves**





## Performance Specifications/Ordering

#### **Breather Vents**

Model Number	Port Size	Length In. (mm)	Hex
20311-1	1/8"	7/16 (11.1)	7/16
20311-2	1/4"	5/8 (15.9)	9/16
20311-3	3/8"	3/4 (19.1)	11/16
20311-4	1/2"	7/8 (22.2)	7/8
20311-6	3/4"	1 (25.4)	1-1/16
20311-8	1"	1-5/16 (33.3)	1-5/16

#### Muffler

Model Number	Port Size	Length In. (mm)	Hex
116464	10-32	23/32 (18.2)	5/16
20312-1	1/8"	1 1/8 (28.6)	7/16
20312-2	1/4"	1 3/8 (34.9)	9/16
20312-3	3/8"	1 1/2 (38.1)	11/16
20312-4	1/2"	1 7/8 (47.6)	7/8
20312-6	3/4"	2 1/4 (57.2)	11/16
20312-8	1"	1 7/8 (73.0)	1 5/16

### Speed Controls

Model Number	Port Size	Length Closed	Length Open In. (mm)	
20313-1	1/8"	1 3/8 (34.9)	2 (50.8)	
20313-2	1/4"	1 9/16 (39.7)	2 3/16 (55.6)	
20313-3	3/8"	1 7/8 (47.6)	2 13/16 (71.4)	
20313-4	1/2"	2 1/4 (57.2)	3 5/16 (84.1)	
20313-6	3/4"	2 3/4 (69.9)	3 13/16 (96.8)	
20313-8	1"	3 1/4 (82.6)	4 5/8 (117.5)	

#### **Shuttle Valves**

Model Number	Inlet Ports	Outlet
SV10-C	1/8"	1/8"
SV20-C	1/4"	1/4"

20311-X



20312-X



20313-X



SV10-C



SV20-C

- 360° swivel eases tube alignment. Preapplied thread sealant eliminates Teflon taping.
- · Choose threaded or instant tube fitting inlets; slotted or knob flow adjustment.
- Sturdy components include nickel-plated brass body, black anodized aluminum swivel, Buna-N seals and a stainless steel spring.
- Ready for installation on all ARO and competitive cylinders.
- Consult factory for BSP size models.

### Ordering



	Slotted Adjust				Knob A	Adjust		
11	19307-XXX	119	9309-XXX	1	19308-XXX	11	9310-XXX	
Male D	x Female thd escription	Male De	thd x fitting scription	Mal	e x Female thd Description	Male De	thd x fitting escription	
XXX	Male x Female	XXX	Male x Tubing	XXX	Male x Female	XXX	Male x Tubing	
103	10-32x10-32	103	10-32 x 5/32"	125	1/8" x 1/8" NPT	120	1/8" x 5/32"	
125	1/8" x 1/8" NPT	120	1/8" x 5/32"	250	1/4" x 1/4" NPT	125	1/8" x 1/4"	
250	1/4" x 1/4" NPT	125	1/8" x 1/4"	375	3/8"x 3/8" NPT	250	1/4" x 1/4"	
375	3/8" x 3/8" NPT	250	1/4" x 1/4"	500	1/2" x 1/2" NPT	255	1/4" x 3/8"	
500	1/2" x 1/2" NPT	255	1/4" x 3/8"		-	375	3/8" x 3/8"	
		375	3/8" x 3/8"		-		-	

# **Performance Specifications**









Dimensional Data







SLOTTED ADJUST





E	 + (	Þ
		- <sup>D</sup>

		PORT SIZE "A" & "B"	"C" inches (mm)	"D" inches (mm)	"E" inches (mm)	"F" inches (mm)	"G" inches (mm)	"H" inches (mm)	" " inches (mm)	"J" inches (mm)	"K" inches (mm)	
	SLOTTED ADJUST	10/32	5/16 (8)	1/8 (3.2)	27/64 (11)	53/64 (21)	27/64 (11)	11/32 (9)	7/16 (11)	37/64 (14.7)	53/64 (21.1)	
		1/8	1/2 (13)	0 0	25/32 (19.8)	1-17/64 (32)	19/32 (15)	19/32 (15)	33/64 (13)	47/64 (18.5)	1-3/64 (26.7)	
		1/4	43/64 (17)	0 0	1-1/64 (25.8)	1-39/64 (41)	3/4 (19)	3/4 (19)	23/32 (18)	7/8 (22.5)	1-19/64 (32.9)	
		3/8	7/8 (22)	0 0	1-9/64 (29)	1-27/32 (47)	29/32 (23)	29/32 (23)	29/32 (23)	1-1/8 (28.5)	1-39/64 41	
		1/2	1-1/16 (27)	0 0	1-27/64 (36)	2-9/32 (58)	1-7/64 (28)	1-7/64 (28)	63/64 (25)	1-7/32 (31)	1-53/64 (46.3)	
	DJUST	1/8	33/64 (13)	0 0	25/32 (19.8)	1-7/8 (47.5)	19/32 (15)	19/32 (15)	33/64 (13)	47/64 (18.5)	1-3/64 (26.7)	
		1/4	43/64 (17)	0 0	1-1/64 (25.8)	2-9/32 (58)	3/4 (19)	3/4 (19)	45/64 (18)	57/64 (22.5)	1-19/64 (32.9)	
	NOB A	3/8	7/8 (22)	0 0	1-9/64 (29)	2-37/64 (65.5)	29/32 (23)	29/32 (23)	29/32 (23)	1-1/8 (28.5)	1-39/64 (41)	
	Y	1/2	1-1/16 (27)	0 0	1-27/64 (36)	3-5/32 (80)	1-7/64 (28)	1-7/64 (28)	63/64 (25)	1-7/32 (31)	1-53/64 (46.3)	

KNOB ADJUST



### In-Line, Composite

- Four Stage, tapered needle design provides infinite control settings.
- · Composite body is tough and corrosion resistant.
- · Color-coded micrometer & calibrated adjustment knob provide instant reference points for repeat settings. Press red locking ring down prevents adjustment. Tamper resistant wire supplied in package.
- Units are threaded for easy remote panel mounting. Order panel nuts below.
- Needle Valve is available with stainless steel needle & inserts. Order 104104-NS2.

## Ordering



Valve Type		Port S	ize			Lock		
Code	Description	Code	Description	Code	Description	Danal		
С	Check Valve	01	1/8-27 NPTF	04	1/2-14 NPTF	<u>Failti</u> Mounting Nuto		
F	Flow Control	02	1/4-18 NPTF	06	3/4-14 NPTF	MOUNTING NULS		
N	Needle Valve	03	3/8-18 NPTF	* S2	1/4-18 NPTF Stainless Steel inserts & stem	104096		

\* Available on needle valve only.

### **Performance Specifications**

Operating Pressure:	200 PSI (13.8 bar)
Operating Temperature:	0° - 200°F (-18° - 93°C)
Flow:	100 PSI Inlet







**Dimensional Data** 

Tamper Resistant Lock Rina

Check

C01

Locked

Flow

Needle

Unlocked

Port

Size

1/8" & 1/4"

3/8", 1/2" & 3/4"





MODE	L PORT*	A B C * inches inches		; Ies	D inches	E inches	F inches	
	NPT(F)	(mm)	(mm)	Min.	Max.	(mm)	(mm)	(mm)
01	1/8-27	15/16	1-11/32	2-33/64	2-53/64	15/16	1-29/32	1-20
		(23.8)	(34.1)	(63.9)	(71.6)	(23.8)	(48.4)	UNEF-2A
02	1/4-18	15/16	1-11/32	2-33/64	2-53/64	15/16	1-29/32	1-20
		(23.8)	(34.1)	(63.9)	(71.6)	(23.8)	(48.4)	UNEF-2A
03	3/8-18	1-5/16	1-11/16	3-23/64	3-55/64	1-5/16	2-27/32	1-3/16-18
		(33.3)	(42.9)	(85.3)	(97.8)	(33.3)	(72.2)	UNEF-2A
04	1/2-14	1-5/16	1-11/16	3-23/64	3-55/64	1-5/16	2-27/32	1-3/16-18
		(33.3)	(42.9)	(85.3)	(97.8)	(33.3)	(72.2)	UNEF-2A
06	3/4-14	1-9/16	2	3-43/64	4-11/64	1-9/16	3	1-3/16-18
		(39.7)	(50.8)	(93.3)	(105.7)	(39.7)	(76.2)	UNEF-2A





### **3-Way Sleeve Valve**

- · Provides low-cost on-off control of single-acting spring return cylinders.
- · Use in both ports of double-acting cylinders to isolate from circuit.

# Ordering

### **3-Way Sleeve Valve**

Max. Press: Temp Range: 200 PSI (13.8 bar) -25° - 200°F (-32° - 93°C)

Model Number	Port Size	10 PSI Pressure 100 PSI	e Drop (SCFM) 80 PSI
600-1	1/8"	16	14.5
600-2	1/4"	40	36
600-3	3/8"	65	59
600-4	1/2"	140	127

# **Solenoid Accessories**

# **Features**

### Coils

- Coils are Class F rated for 100% duty cycle (311°F/155°C) applications.
- AC and DC coils are interchangeable on the same solenoid stem.
- Low "inrush" and "holding" current keeps heat rise to a minimum. This maximizes coil life and reduces power consumption.











Code / Voltage

-31 = 12V AC

-33 = 120V AC

-35 = 240V AC

-37 = 5V DC

119378-XX







-38 = 24V AC or 12V DC

(22mm Coils only)

Code / Voltage

-39 = 24V DC

119416 Side exhaust coil nut.

### Connectors

- · Protect electrical connections from humidity and moisture. Meet NEMA 4 classifications
- · Each is it's own junction box, eliminating need to wire solenoid to another box.



115046-XX



115064-XX













119690-XX







**CHW-30** 



### Ordering

#### Coils

(Replace XX on model number with coil voltage required.)

115046-XX Cable Coil (NEMA 4, 22mm)

10' AWG UL-listed elastomer cable. No solenoid connector needed.

#### 115064-XX Low Watt Coil (DC only) (NEMA 4, 22mm)

Low DIN coil. DC only, for use with 3-prong connectors. 5, 12 & 24V DC only. Used only on valves ordered as low wattage.

116218-XX Standard Coil CSA & UL-listed (NEMA 4, 22mm)

AC or DC DIN coil for use with 3-prong connectors.

#### 116647-XX Coil with Molded Leads CSA & UL-listed (NEMA 4, 22mm)

AC or DC lead wire coil with 18" molded leads. No solenoid connector needed.

#### 118154-XX 1/2" Conduit (NEMA 4, 22mm)

1/2" Conduit coil connects directly to metal housing on the coil. Coil has 18" long 18-gauge heavy-duty wire. Available in -33 & -39 voltage only.

#### \*119378-XX Oversize (NEMA 4, 30mm)

AC or DC DIN coil for use with solenoid connector. Available in -33, -38 & -39 voltage only. For Alpha, E, K, H, Genesis, & 1/8" Cat Valves. (not for HF Cat)

#### \*119690-XX Oversize (NEMA 4, 30 mm)

High Flow Cat Valve and 2-way Valve coil. Available in -33, -35, -37, -38 & -39 voltages

\* NOTE: -38 option is 12 VDC only on 30mm coils. 24 VAC is not available.

# **Performance Specifications**

#### Coils

#### **Voltage Operating Ranges**

5 1 5	5	
Coil Voltage	Operating F	lange +10%
Ratings	AC	DC
5	-	4.5-5.5
2	11-13	11-13
24	22-26	22-26
120	108-132	108-132
240	216-264	-
380	342-418	-
22 mm Coil	Current (Amps)	Watts
5 DC	0.97	4.9
12 DC	0.38	4.8
24 DC	0.20	4.8
120 DC	0.04	4.8
5, 12, 24 DC	Low Watt	0.91
30 mm Coil	Current (Amps)	Watts
12 DC	-	15
24 DC	-	15

#### Connectors

#### 22-mm Connectors:

(Replace XXX with voltage & type from chart below)

	CHW	Straight connector with cable (36") located on top.					
	CBW	Straight connector with cable (36") located on back.					
	CHL-XXX	Straight connector (36") with indicator light located on back.					
	CSN	Strain Relief, without indicator light or cable.					
	CSL-XXX	Strain Relief with indicator light located on back.					
	CDN	1/2" Conduit without lights or lead wires.					
	CDW	1/2" Conduit without lights, 18" lead wires.					
	CDL-XXX	1/2" Conduit with light and 18" lead wires.					
	<u>30-mm Connectors:</u>						
Use with High Flow Cat and intrinsically safe Genesis Valves							
	CDW-30	Connector with wire.					
	CSN-30	Connector, strain relief.					

CHW-30 Connector, molded cable.

#### Voltage (-XXX)

<b>005</b> = 5V DC	<b>120</b> = 120V AC
<b>012</b> = 12V AC/DC	<b>240</b> = 240V AC/DC
<b>024</b> = 24V AC/DC	

Coil	50/6	0 Hz	50/60 Hz			
Voltage	Current	(Amps)	Volt-Ar	nps,		
Rating	Inrush	Holding	Inrush	Holding		
12AC	.70/.63	.50/.42	8.4/7.5	6.0/5.0		
24AC	.46/.40	.36/.27	11.0/9.4	8.4/6.5		
120AC	.09/.08	.07/.05	11.0/9.4	8.4/6.5		
240AC	.05/.04	.04/.03	11.0/9.4	8.4/6.5		
380AC	.03/.026	.024/.019	11.4/9.9	9.1/6.9		
30 mm Coil Voltage Ratings						
24AC	-	-	23	20		
120AC	-	-	23	20		

- Ideal for machines where position of operator's hands must be monitored.
- Actuate and hold both air valve buttons concurrently to maintain an output air signal. If either push button is released, the output air signal is exhausted, indicating the operator's hands are no longer in position.
- Operating Pressures: 50-125 PSI (3.5-8.6 bar). Designed to comply with OSHA regulations.

Warning: These provide only the anti-tie down logic function and are not stroke limiting devices. On machines with full revolution clutches and/or where repeat cycles can occur, approved safety and/or single stroke devices must be used in conjunction with the anti-tie down units.









#### 59809

- Green push buttons located on opposite ends of a single enclosure. External supply and output to machine is made by 5/32" (4mm) instant tube fittings.
- · Comes assembled with all internal connections ready to install on machine.

#### 59003-842

- Unassembled package.
- Includes 59191 anti-tie-down block, two 461-3 palm buttons with 20975 guards, 10 feet of 5/32" tubing and fittings for 59191.
- · Customer can custom fit components to machine.

### Valve/Cylinder Manifold

- Mount any Alpha subbase valve to any NFPA cylinder
- Obtain maximum cylinder response and speeds
- Provides "clean" valve mounting method
- Mounts at cap or head end of cylinder
- Operates any NFPA Cylinder up to 2-1/2" bore
- Any stroke length (Minimum 3")



# **Dimensional Data**



# Ordering

Alpha Valves							
Valve Model	Kit Number						
All 2-Position, Spring Return, Urethane	118597-2						
All 2-Position, Pilot or Solenoid Return, Urethane	118597-12						
All 2-Position, Spring Return, Viton	118598-4						
All 2-Position, Pilot or Solenoid Return, Viton	118598-14						
3-Position, Closed, Urethane	118597-3						
3-Position, Open, Urethane	118597-7						
3-Position, Closed, Viton	118598-8						
3-Position, Open, Viton	118598-9						

#### **Genesis Valves**

# GXXX XX - XXX - X

Plug-0	n Valves		Plug-In Valves			
Code	Rebuild Kit	Gasket Kit	Code	Rebuild Kit	Gasket Kit	
GN12	118820-3	118824	GP12	118820-1	118823	
GN13	118822-3	118824	GP13	118822-1	118823	
GN14	118820-4	118824	GP14	118820-2	118823	
GN17	118821-3	118824	GP17	118821-1	118823	
GN18	118822-4	118824	GP18	118822-2	118823	
GN19	118821-4	118824	GP19	118821-2	118823	

Rebuild Kit selection is determined by the first four model numbers. [GX1X] XX-XXX-X (The positions within the brackets)

#### **Sierra Valves**

Model Number	Repair Kit		- 1110 1
All Sierra Model 15	MQ3620	50-Series Valves	
M812SS-XXX-X	RKM812-SS	Model Number	Repair Kit
M812SD-XXX-X	RKM812-SD	All Models	7000
M813SD-XXX-X	RKM813-SD		

#### **MaxAir Valves**

Model	Repair Kit
M212LM	RKM212-LM
M212LS	RKM212-LS
M212PD	RKM212-PD
M212PS	RKM212-PS
M212SD-XXX-X	RKM212-SD
M212SS-XXX-X	RKM212-SS
M213LM	RKM213-LM
M213LS	RKM213-LS
M213PD	RKM213-PD
M213PS	RKM213-PS
M213SD-XXX-X	RKM213-SD
M213SS-XXX-X	RKM213-SS
M214-PD	RKM214-PD
M214PS	RKM214-PS
M214SD-XXX-X	RKM214-SD
M214SS-XXX-X	RKM214-SS
M2X2FM	114645
M2X2TM	114645
M312PD	KRM312-PD
M312SD-XXX-X	RKM312-SD
M313PD	RKM313-PD
M313SD-XXX-X	RKM313-SD
M314PD	RKM314-PD
M314SD-XXX-X	RKM314-SD

#### **Genesis Pressure Regulators**

Model	Rebuild Kit	Press Adj. Kit
118573-X2	119213	119212-30
118573-X3	119213	119212-60
118573-X4	119213	119212-120

#### **E-Series Valves**

Model	Repair Kit	Model	Repair Kit	Model	Repair Kit	Model	Repair Kit	Model	Repair Kit
E112HM	116772	E212JD	116702	E252BD	116773	E252LP	116772	E512LM	116772
E112LM	116772	E212KD-XXX-X	116702	E252BS	116772	E252LS	116772	E612LM	116772
E112PD	116773	E212KS-XXX-X	116702	E252CA	116772	E252PA	116772	E712SD-XXX-X	116773
E152HM	116772	E212LA	116772	E252CS	116772	E252PD	116773	-	-
E152LM	116772	E212LM	116772	E252CP	116772	E252PE	116772	Solenoid Oper	ator
E152PD	116773	E212LP	116772	E252FA	116772	E252PS	116772	E212KD-XXX-X	116575
E212BS	116772	E212LS	116772	E252FP	116772	E252RA	116772	E212KS-XXX-X	116573
E212BD	116773	E212PA	116772	E252FS	116772	E252RP	116772	E212SA-XXX-X	116573
E212CA	116772	E212PD	116773	E252GA	116772	E252RS	116772	E212SP-XXX-X	116573
E212CS	116772	E212PE	116772	E252GS	116772	E252SA-XXX-X	116772	E212SD-XXX-X	116575
E212CP	116772	E212PS	116772	E252HA	116772	E252SN-XXX-X	116772	E212SS-XXX-X	116573
E212FA	116772	E212RA	116772	E252HM	116772	E252SP-XXX-X	116773	E252KS-XXX-X	116573
E212FP	116772	E212RP	116772	E252HP	116772	E252SS-XXX-X	116772	E252SA-XXX-X	116573
E212FS	116772	E212RS	116772	E252HS	116772	E252TM	116772	E252SN-XXX-X	116573
E212HA	116772	E212SA-XXX-X	116772	E252JS	116702	E252UA	116772	E252SP-XXX-X	116573
E212HM	116772	E212SD-XXX-X	116773	E252JD	116702	E252US	116772	E252SS-XXX-X	116573
E212HP	116772	E212SP-XXX-X	116773	E252KS-XXX-X	116702	E312LS	116773	E312SD-XXX-X	116575
E212HS	116772	E212SS-XXX-X	116772	E252LA	116772	E312PD	116773	E712SD-XXX-X	116575
E212JS	116702	E212TM	116772	E252LM	116772	E312TS	116773	-	-

### Ordering H-Series

Repair Kit	Model	Repair Kit	Model	Repair Kit	Model	Repair Kit
7103	H214PD	7103	H243SD-XXX-X	7103	SOLENOID OPERA	TOR
7103	H214SA-XXX-X	7103	H252PS	7102	H212SA-XXX-X	116572
7103	H214SD-XXX-X	7103	H252SS-XXX-X	7102	H212SD-XXX-X	116574
7103	H242BD	7103	H253PS	7102	H213SA-XXX-X	116572
7103	H242PA	7103	H253SS-XXX-X	7102	H213SD-XXX-X	116574
7103	H242PD	7103	H254PS	7102	H214SA-XXX-X	116572
7103	H242SA-XXX-X	7103	H254SS-XXX-X	7102	H214SD-XXX-X	116574
7103	H242SD-XXX-X	7103	H282PS	7102	H242SA-XXX-X	116572
7103	H243BD	7103	H282SS-XXX-X	7102	H242SD-XXX-X	116574
7103	H243PA	7103	H283PS	7102	H243SA-XXX-X	116572
7103	H243PD	7103	H283SS-XXX-X	7102	H243SD-XXX-X	116574
7103	H243SA-XXX-X	7103	-	-	H252SS-XXX-X	116572
					H253SS-XXX-X	116572
					H254SS-XXX-X	116572
					H282SS-XXX-X	116572
	Repair Kit   7103	Repair KitModel7103H214PD7103H214SA-XXX-X7103H214SD-XXX-X7103H242BD7103H242PA7103H242PD7103H242SA-XXX-X7103H242SD-XXX-X7103H242SD-XXX-X7103H243BD7103H243BD7103H243PA7103H243PA7103H243PA7103H243SA-XXX-X	Repair KitModelRepair Kit7103H214PD71037103H214SA-XXX-X71037103H214SD-XXX-X71037103H242BD71037103H242PA71037103H242PD71037103H242SD-XXX-X71037103H242SD-XXX-X71037103H242SD-XXX-X71037103H243BD71037103H243PA71037103H243PA71037103H243PA71037103H243PA71037103H243SA-XXX-X71037103H243SA-XXX-X7103	Repair KitModelRepair KitModel7103H214PD7103H243SD-XXX-X7103H214SA-XXX-X7103H252PS7103H214SD-XXX-X7103H252SS-XXX-X7103H242BD7103H253PS7103H242PA7103H253PS7103H242PD7103H254PS7103H242DD7103H254PS7103H242DD7103H254SS-XXX-X7103H242DD7103H254SS-XXX-X7103H242DD7103H282PS7103H243DD7103H282SS-XXX-X7103H243PD7103H283PS7103H243PD7103H283SS-XXX-X7103H243PD7103H283SS-XXX-X7103H243PD7103H283SS-XXX-X7103H243PD7103H283SS-XXX-X7103H243PD7103H283SS-XXX-X7103H243SA-XXX-X7103-	Repair Kit Model Repair Kit Model Repair Kit   7103 H214PD 7103 H243SD-XXX-X 7103   7103 H214SA-XXX-X 7103 H252PS 7102   7103 H214SD-XXX-X 7103 H252PS 7102   7103 H214SD-XXX-X 7103 H252SS-XXX-X 7102   7103 H242BD 7103 H253PS 7102   7103 H242PA 7103 H253SS-XXX-X 7102   7103 H242PD 7103 H254PS 7102   7103 H242PD 7103 H254SS-XXX-X 7102   7103 H242SD-XXX-X 7103 H254SS-XXX-X 7102   7103 H242SD-XXX-X 7103 H282PS 7102   7103 H243BD 7103 H282PS 7102   7103 H243BD 7103 H283PS 7102   7103 H243PA 7103 H283SS-XXX-X 7102   7103 H243PD 7103 H283SS-XXX-	Repair Kit Model Repair Kit Model Repair Kit Model   7103 H214PD 7103 H243SD-XXX-X 7103 SOLENOID OPERA   7103 H214SA-XXX-X 7103 H252PS 7102 H212SA-XXX-X   7103 H214SD-XXX-X 7103 H252SS-XXX-X 7102 H212SD-XXX-X   7103 H242BD 7103 H253PS 7102 H213SA-XXX-X   7103 H242PA 7103 H253SS-XXX-X 7102 H213SD-XXX-X   7103 H242PA 7103 H253SS-XXX-X 7102 H213SD-XXX-X   7103 H242PD 7103 H253SS-XXX-X 7102 H214SD-XXX-X   7103 H242PD 7103 H254SS 7102 H214SD-XXX-X   7103 H242SD-XXX-X 7103 H264SS-XXX-X 7102 H214SD-XXX-X   7103 H242SD-XXX-X 7103 H282PS 7102 H242SD-XXX-X   7103 H243BD 7103 H283SS-XXX-X 7102 H243SD-XXX-X

**K-Series** 

Model	Repair Kit	Model	<b>Repair Kit</b>	Model	Repair Kit	Model	Repair Kit	Model	Repair Kit	Model	Repair Kit
K213BS	7006	K233PD	7006	K244BD	7006	K334TS	7006	K713TS	7006	SOLENOID OPERA	TOR CONT.
K213FP	7006	K233PS	7006	K244BS	7006	K336PD	7010	K714LS	7006	K234SD-XXX-X	116578
K213FS	7006	K233RS	7008	K244FP	7006	K336SD-XXX-X	7010	K714PD	7006	K234SS-XXX-X	116578
K213HS	7006	K233SD-XXX-X	7006	K244FS	7006	K338PD	7010	K714SD-XXX-X	7006	K236SD-XXX-X	116579
K213LM	7006	K233SS-XXX-X	7006	K244LM	7006	K338SD-XXX-X	7010	K714TS	7006	K236SS-XXX-X	116579
K213LS	7006	K233TM	7006	K244LS	7006	K343LS	7006	K716PD	7010	K238SD-XXX-X	116579
K213PD	7006	K234BD	7006	K244PD	7006	K343PD	7006	K716SD-XXX-X	7010	K238SS-XXX-X	116579
K213PS	7006	K234BS	7006	K244PS	7006	K343SD-XXX-X	7006	K718PD	7010	K243SD-XXX-X	116578
K213RS	7008	K234FP	7006	K244RS	7008	K343TS	7006	K718SD-XXX-X	7010	K243SS-XXX-X	116578
K213SD-XXX-X	7006	K234FS	7006	K244SD-XXX-X	7006	K344LS	7006	K733PD	7006	K244SD-XXX-X	116578
K213SS-XXX-X	7006	K234LM	7006	K244SS-XXX-X	7006	K344PD	7006	K733LS	7006	K244SS-XXX-X	116578
K213TM	7006	K234LS	7006	K244TM	7006	K344SD-XXX-X	7006	K733SD-XXX-X	7006	K246SD-XXX-X	116579
K214BS	7006	K234PD	7006	K246BD	7010	K344TS	7006	K733TS	7006	K246SS-XXX-X	116579
K214BD	7006	K234PS	7006	K246BS	7010	K346PD	7010	K734PD	7006	K248SD-XXX-X	116579
K214FP	7006	K234RS	7008	K246PD	7010	K346SD-XXX-X	7010	K734LS	7006	K248SS-XXX-X	116579
K214FS	7006	K234SD-XXX-X	7006	K246PS	7010	K348PD	7010	K734SD-XXX-X	7006	K313SD-XXX-X	116578
K214LM	7006	K234SS-XXX-X	7006	K246RS	7012	K348SD-XXX-X	7010	K734TS	7006	K314SD-XXX-X	116578
K214LS	7006	K234TM	7006	K246SD-XXX-X	7010	K513LM	7007	K736PD	7010	K316SD-XXX-X	116579
K214PS	7006	K236BD	7010	K246SS-XXX-X	7010	K513TM	7007	K736SD-XXX-X	7010	K318SD-XXX-X	116579
K214PD	7006	K236BS	7010	K248BD	7010	K514LM	7007	K738PD	7010	K333SD-XXX-X	116578
K214RS	7008	K236PD	7010	K248BS	7010	K514TM	7007	K738SD-XXX-X	7010	K334SD-XXX-X	116578
K214SD-XXX-X	7006	K236PS	7010	K248PD	7010	K533LM	7007	K743LS	7006	K336SD-XXX-X	116579
K214SS-XXX-X	7006	K236RS	7012	K248PS	7010	K533TM	7007	K743SD-XXX-X	7006	K338SD-XXX-X	116579
K214TM	7006	K236SD-XXX-X	7010	K248RS	7012	K534LM	7007	K743TS	7006	K343SD-XXX-X	116578
K216BD	7010	K236SS-XXX-X	7010	K248SD-XXX-X	7010	K534TM	7007	K744LS	7006	K344SD-XXX-X	116578
K216BS	7010	K238BS	7010	K248SS-XXX-X	7010	K543LM	7007	K744PD	7006	K346SD-XXX-X	116579
K216PD	7010	K238BD	7010	K313LS	7006	K543TM	7007	K744SD-XXX-X	7006	K348SD-XXX-X	116579
K216PS	7010	K238PD	7010	K313PD	7006	K544LM	7007	K744TS	7006	K713SD-XXX-X	116578
K216RS	7012	K238PS	7010	K313TS	7006	K544TM	7007	K746PD	7010	K714SD-XXX-X	116578
K216SD-XXX-X	7010	K238RS	7012	K314LS	7006	K613LM	7007	K746SD-XXX-X	7010	K716SD-XXX-X	116579
K216SS-XXX-X	7010	K238SD-XXX-X	7010	K314PD	7006	K613TM	7007	K748PD	7010	K728SD-XXX-X	116579
K218BD	7010	K238SS-XXX-X	7010	K314SD-XXX-X	7006	K614LM	7007	K748SD-XXX-X	7010	K733SD-XXX-X	116578
K218BS	7010	K243BD	7006	K314TS	7006	K614TM	7007			K734SD-XXX-X	116578
K218PD	7010	K243BS	7006	K316PD	7010	K633LM	7007	SOLENOID OPE	RATOR	K736SD-XXX-X	116579
K218PS	7010	K243FP	7006	K316SD-XXX-X	7010	K633TM	7007	K213SD-XXX-X	116578	K738SD-XXX-X	116579
K218RS	7012	K243FS	7006	K318PD	7010	K634LM	7007	K213SS-XXX-X	116578	K743SD-XXX-X	116578
K218SD-XXX-X	7010	K243LM	7006	K318SD-XXX-X	7010	K634TM	7007	K214SD-XXX-X	116578	K744SD-XXX-X	116578
K218SS-XXX-X	7010	K243LS	7006	K333LS	7006	K643LM	7007	K214SS-XXX-X	116578	K746SD-XXX-X	116579
K233BD	7006	K243PD	7006	K333PD	7006	K643TM	7007	K216SD-XXX-X	116579	K748SD-XXX-X	116579
K233BS	7006	K243PS	7006	K333SD-XXX-X	7006	K644LM	7007	K216SS-XXX-X	116579		
K233FP	7006	K243RS	7008	K333TS	7006	K644TM	7007	K218SD-XXX-X	116579		
K233FS	7006	K243SD-XXX-X	7006	K334LS	7006	K713LS	7006	K218SS-XXX-X	116579		
K233LM	7006	K243SS-XXX-X	7006	K334PD	7006	K713PD	7006	K233SD-XXX-X	116578		
K233LS	7006	K243TM	7006	K334SD-XXX-X	7006	K713SD-XXX-X	7006	K233SS-XXX-X	116578		

### **Five Year Product Warranty**

The ARO Valves, in this catalog are backed up by our famous 5-year warranty, as a measure of the confidence we place in the quality of these products. A confidence that you can share.

#### **FIVE-YEAR WARRANTY**

IR/ARO warrants to the original use purchaser of IR/ARO manufactured valves that IR/ARO will repair or replace, free of charges, including return shipping costs within the Continental United States of America, any such product which under normal use and service proves defective in material or workmanship, as determined by IR/ARO Inspection, within FIVE YEARS from date of shipment from IR/ARO, provided the claimed defective product, or part thereof, is promptly returned to the IR/ARO factory or IR/ARO authorized warranty repair center with transportation prepaid.

This warranty does not cover failure of parts or components due to normal wear or damage, which in the judgment of IR/ARO, arises from misuse, abrasion, corrosion, negligence, accident, substitution of non-IR/ARO parts, faulty installation or tampering.

If IR/ARO Inspection discloses no defect in material or workmanship, repair or replacement and return will be made at customary charges.

This warranty covers IR/ARO manufactured products shipped on or after July 4, 1988.

Equipment not covered by IR/ARO warranty: accessories or components of equipment sold by IR/ARO that are not manufactured by IR/ARO (such as switches, hoses, gasoline engines, etc.) are subject to the warranty, if any, of their manufacturer. IR/ARO will provide the purchaser with reasonable assistance in making such claims.

The foregoing warranty supersedes, voids and is in lieu of all or any other warranties, express or implied, and no warranty or merchantability or fitness for particular purpose is intended or made. IR/ARO's sole obligation and the original use purchaser's sole remedy is as stated above and in no event shall IR/ARO be liable for any special, direct, indirect, incidental, consequential or other damages, or expenses of any nature including, without limitation, loss of profits or production time incurred by the original use purchaser or any other party.





# Pneumatic Cylinders and Accessories

- Silverair
- Economair
- Provenair

# Notes


### **Developing Specifications**

#### **Calculating the Proper Bore Size**

A cylinder's bore size determines the force it will produce at a given supply pressure. The weight of the load or the clamping force required will largely determine the force requirements of the cylinder, and hence, the bore size required. But before determining the appropriate bore size you must compensate for air pressure drop, packing friction and load variations using the following computation:

# A) Compensating for Pressure Drop – Decrease the line pressure value by 15 p.s.i. This compensates for pressure drop in the system.

Operating pressure (psig) = Line pressure (psig) less 15 (psig pressure drop)

**Example:** If the line pressure is 95 (psig), subtract 15 (psig) to obtain 80 (psig) operating pressure (for sizing purposes).



This illustration shows a pressure loss of 15 PSI through the airlines and points out friction factors, both of which must be compensated for.

B) Compensating for Packing Friction – Before you begin selecting a cylinder you already know the weight of the load you must move or the clamping force you must apply. Multiply this force or load value by 1.25. This compensates for packing friction and load variations. (If speed is of concern for your application, multiply the force value by 2.0.)

Force required (in pounds) = 1.25 x load (or required clamping force)

Example: If cylinder must move 100 pound load, multiplying 100 pounds by 1.25 = 125 pounds force required.

Now, at the top of the chart on the next page, find the column with the operating pressure calculated in "A" above (in this example, 80 psig). Go down that column until you find the force requirement calculated in "B", above (or the next higher value). Note that the force values in bold type represent the extend force while those in standard type represent retract force (retract force is lower because the rod reduces the effective piston area). Choose the appropriate value, then go to the Cylinder Bore column to find the bore requirements for your application.

Now that you know the cylinder bore size that will produce the force required for your application, go to page 97 to determine rod size requirements.

#### Air consumption for each cylinder bore size can be found in the chart below.

#### **Cylinder Air Consumption**

To calculate the air consumption of a cylinder, multiply the total inches of stroke (extend plus retract) by the cycles per minute times the SCFM factor from the chart below. To find the SCFM factor, find your gauge pressure in the left hand column. Next, find your cylinder bore size in the chart. Where the two intersect, read down to fhe SCFM factor at the bottom of the chart.





Given equal pressure on both sides of a piston, the surface area on the extend side will provide greater force.

# **Pneumatic Cylinders**

### **Bore Selection Sizes**

EFFECTIVE PISTON AREA X OPERATING PRESSURE = FORCE

CYLINDER Bore (Inches)	ROD Diameter (inches)	EFFECTIVE PISTON AREA (SQ. IN.)	20	40	60	0PE 70	RATING PF 80	RESSURE (I 90	PSI) 100	110	125	150	200
SELECTING	BORE SIZE						FORCE	OR LOA	D VALUE				
7/16		.15	3	6	9	10	12	13	15	16	18	22	30
	3/16	.123	2.5	4.9	7,4	8.6	9.8	11	12.3	13.5	15.4	18.5	24.6
1/2		.196	4	8	12	14	16	18	20	22	25	29	39
	3/16	.169	3	7	10	12	14	15	17	19	21	25	34
	1/4	.147	3	6	9	10	12	13	15	16	18	22	29
9/16		.25	5	10	15	17	20	22	25	27	31	37	50
	3/16	.23	4.5	8.9	13.4	15.6	17.8	20	22	29.5	27.9	33.5	44.6
3/4		.442	9	18	27	31	35	40	44	49	55	66	88
	1/4	.393	8	16	24	28	31	35	39	43	49	59	79
7/8		.604	12	24	36	42	48	54	60	66	75	90	120
	1/4	.553	11	22	33	38	44	49	55	60	69	82	110
1-1/16		.890	18	36	53	62	71	80	89	98	111	134	178
	5/16	.810	16	32	49	57	65	73	81	89	101	122	162
1-1/8		.994	20	40	60	70	80	89	99	109	124	149	199
	5/16	.917	18	37	55	64	73	83	92	101	115	138	183
	3/8	.884	18	35	53	62	71	80	88	97	110	133	177
1-1/4		1.227	25	49	74	88	98	110	123	135	153	184	245
	7/16	1.077	22	43	65	75	86	97	108	118	135	162	215
1-1/2		1.767	35	71	106	124	141	159	177	194	221	265	353
	7/16	1.617	32	65	97	113	129	146	162	178	202	243	323
	1/2	1.571	31	63	94	110	126	141	157	173	196	236	314
	5/8	1.460	29	58	88	102	117	131	146	161	183	219	292
	1	1.325	27	53	80	93	106	119	133	146	166	199	265
1-3/4		2.405	48	96	144	168	192	216	240	265	301	361	481
	1/2	2.209	44	88	133	155	177	199	221	243	276	331	442
2		3.142	63	126	189	220	251	283	314	346	393	471	628
	5/8	2.835	57	113	170	198	227	255	284	312	354	425	567
	1	2.700	54	108	162	189	216	243	270	297	338	405	540
2-1/2		4.910	98	196	295	344	393	442	491	540	614	737	982
	5/8	4.602	92	184	276	322	368	414	460	506	575	690	920
	3/4	4.470	89	179	268	313	358	402	447	492	559	671	894
	1	4.123	82	165	247	289	330	371	412	454	515	618	825
3		7.069	141	283	424	495	566	636	707	778	884	1060	1414
	3/4	6.6268	133	265	398	464	530	596	663	729	828	994	1325
3-1/4		8.296	166	332	498	581	664	747	830	913	1037	1244	1659
	1	7.510	150	300	451	526	601	676	751	826	939	1127	1502
	1-3/8	6.810	136	272	409	477	545	613	681	749	851	1021	1362
4		12.566	251	503	754	880	1005	1131	1257	1382	1571	1885	2513
	1	11.781	236	471	707	825	942	1060	1178	1296	1473	1767	2356
	13/8	11.081	222	443	665	776	886	997	1108	1219	1385	1662	2216
5		19.635	393	785	1178	1374	1571	1767	1964	2160	2454	2945	3927
	1	18.850	377	754	1131	1320	1508	1697	1885	2074	2356	2828	3770
_	1-3/8	18.150	363	726	1089	1271	1452	1634	1815	1996	2269	2723	3630
6		28.274	565	1131	1696	1979	2262	2545	2827	3110	3534	4241	5655
	1-3/8	16.789	536	1072	1607	1875	2143	2411	2679	2947	3349	4018	5358
	13/4	25.870	517	1035	1552	1811	2070	2328	2587	2846	3234	3881	5174
8		50.260	1005	2010	3016	3518	4021	4523	5026	5529	6283	7539	10052
	1-3/8	48.770	975	1951	2926	3414	3902	4489	4877	5365	6096	7316	9754
	1-3/4	47.820	956	1913	2869	3347	3826	4304	4782	5260	5978	7173	9564
10		78.54	1571	3142	4712	5497	6283	7068	7854	8639	9818	11781	15708
	1-3/4	76.14	1523	3046	4568	5330	6091	6853	7614	8375	9518	11421	15228

VALUES IN BOLD TYPE REPRESENT EXTEND FORCE. Other values represent retract force (piston area, less area of piston rod). Check series order information for available rod diameters in each series.

### **Rod Diameter**

- A) use the stroke factor table to find the proper multiplier based on the mounting configuration and rod end connection used.
- B) Multiply your required working stroke length by the factor you found from the stroke factor table in Step A. Note: if you require a rod or thread extension in your application (Longer than standard) add the extra length(s) to your required working stroke length and then multiply by the stroke factor found in Step A, the result of this arithmetic is the "L" Value.
- C) Use the piston rod diameter/ stop length chart to complete your cylinder specification. Find the approximate "L" value (determined in Steps A & B) on the left side of the chart. At the bottom of the chart, find the force (thrust) required for your cylinder. Reference the bore selection sizes table on the previous page to determine bore size, rod diameter or force at various PSI. Find the intersection of the "L" value (Horizontal) line with the force in pounds (Vertical) line. The intersection should be on, or tothe-left of the diagonal (rod diameter) line. The diagonal (rod diameter) line indicates the correct piston rod diameter for your application. Note: If your "L" value-force lines intersect above, or to-the-right of a diagonal line, find a cylinder with the next larger piston rod diameter to avoid premature cylinder wear or failure.

	CYLINDER RIG	IDLY MOUNTED	CYLINDER PIVOT MOUNTED						
ROD END CONNECTION	L-MOUNTS, SIDE- TAPPED SIDE END LUGS	FRONT OR REAR FLANGE MOUNTING NUTS	FRONT- MOUNTED TRUNNION	CENTER- MOUNTED TRUNNION	CLEVIS EYE. OR REAR-MOUNTED TRUNNION				
FIXED AND RIGIDLY GUIDED	0.50	0.50	N/A	N/A	N/A				
PIVOTED AND RIGIDLY GUIDED	0.71	0.71	1.00	1.50	2.00				
SUPPORTED, NOT RIGIDLY GUIDED	1.00	1.00	N/A	N/A	N/A				

Note: Remember, long ,slim piston rods may buckle when subjected to a heavy push load.



Note: When a stop tube is needed, a minimum 2" length is required on all Economair cylinders with Lip packings, and in 4", 5", 6" and 8" Provenair cylinders.

#### **Stop Tube Requirements**

#### Available in Economair & Provenair Only

Occasionally, an application will require a stop tube Stop tube length is determined by "L" value. If your "L" value (from Step B) is 40 or greater, find the correct stop tube length for your cylinder on the right side of the piston rod diameter/stop length chart. The recommended stop-tube length is shown above the "L" value line.

- Note: If "L" value is 39, no stop tube is required. If "L" value is 40-49, a 1" stop tube is recommended.
  - If "L" value is 50-59, a 2" stop tube is recommended, etc.

STROKE FACTOR

# **Pneumatic Cylinders**

### **Options**

Additional options required will help determine which cylinder series will be selected:

Stainless steel piston rods are beneficial in corrosive environments. Stainless steel rods are standard on Micro-Air and Silverair Series. Stainless Steel rods are options on Economair and Provenair Series.

**Cylinder cushions** are designed to reduce the shock experienced at the end of the stroke by reducing piston speed the last fraction of an inch of stroke. Cylinder cushions are available in Economair and Provenair Series, only.

Packing shape and material affect cylinder performance:

- **O-Ring packings** are good, general purpose packings, but they require more breakaway force than other packing shapes.
- **O-Ring Low Friction** packings provide the effective sealing characteristics of Buna N with the low friction characteristics of Teflon<sup>®</sup>. This design is effective where the cylinder must operate at low pressures.
- **U-Cup packings** offer low breakaway friction and better sealing characteristics at low pressure than O-Ring packings. U-cups are wear compensating seals; they offer longer wear life than O-rings.
- U-Cup Self Lube ("Slippery Seals") packings are ideal in applications where air line lubrication cannot be used. This packing design helps reduce cylinder "chatter" in low pressure applications and it offers the same sealing characteristics as Buna N.

### **Packing Characteristics**

	Material	Sealing Characteristics	Friction Characteristics	Temperature Tolerance	Availability
O-RING	Teflon over Buna N O-Ring Seal	Good	Medium	0° to 180° F	Economair
0-RING	Buna N	Good	High	0° to 180° F	Micro-Air, Economair
O-RING	Viton®	Good	High	Up to 300° F	Micro-Air, Economair
U-CUP-SELF-LUBE					
("Slippery Seals")	Nitrile	Very Good	Low	0° to 180° F	Economair, Provenair
U-CUP	Buna N	Very Good	Medium	0° to 180° F	Economair, Provenair
U-CUP	Viton	Very Good	Medium	Up to 300° F	Economair, Provenair

Note: When applying rod cylinders, there must be no side load or bending stress at any point along the rod. Applications which induce side load and/or bending stress will damage packings, bushings, piston barrels, piston rods and cushion bosses. When metal parts are damaged, seal and packing replacement is an inadequate repair. The elastomers will quickly become damaged. Inspect and replace all worn or damaged parts when rebuilding cylinders.

Teflon® and Viton® are registered trademarks of the E.I. DuPont Company.

# Series 23, 24 & 28 Economair $\ensuremath{\mathbb{R}}$ Cylinders (1-1/8" thru 4" bore)

Economair Cylinders, round line repairable cylinders, are designed for medium to heavy-duty use in a wide range of applications. Available in 1-1/8 to 4-inch bore sizes. Operate on air pressure to 200 PSI, generating thrusts from 25 to 2,513 pounds. Available as double-acting, with optional cushions, magnetic pistons or double rod ends. O-ring seals are standard. U-cup or low friction seals are optional. A variety of mounts are available to meet a wide range of application requirements. For more information, see pages 113 through 118.

# Series AN & SN Provenair® Cylinders (1-1/2" thru 10" bore)

Provenair Cylinders are NFPA interchangeable square head cylinders designed for rugged use. Available in 1-1/2 to 10-inch bore sizes. They operate on air pressure up to 250 PSI, generating thrusts up to 3,141 pounds. They are available as double-acting, with optional cushions, magnetic pistons and/or with double rod ends. A broad selection of NFPA standard mounts makes them dimensionally interchangeable with other NFPA cylinders. For more information, see pages 119 through 133.





#### Series S

Silverair round cylinders are designed for application in OEM and MRO applications where a disposable, light duty cylinder is preferred. Prelubed, they're suitable for operations without externally applied lubrication. Constructed of stainless steel and aluminum, they stand up to the attack of corrosive environments.

- Silverair cylinders feature stainless steel (Series 304) barrels. Drawn and polished internal diameters have superior lube-holding characteristics for a low friction surface that gives smooth performance and outstanding cycle life.
- Piston rods are centerless ground and polished Series 303 stainless steel, providing smooth rod movement.
- Lightweight aluminum heads feature full flow ports for maximum air flow and smooth response.
- · Piston rod threads are roll formed to provide superior strength and durability.
- U-cup design on piston seals provides continuous cylinder barrel contact, minimizes blow-by and offers longer seal life than O-ring piston seals.
- The oil-permeated bronze rod bushing is precision ball sized for reduced friction and increased cylinder life.
- Return springs on single-acting cylinders are made from a high tensile alloy for exceptional performance and long service life.
- Silverair cylinders are prelubricated, so they're ideal in applications where external lubrication can't be supplied.



### **Performance Specifications**

Bore Sizes:	1/2", 3/4", 1-1/16", 1-1/4", 1-1/2", 2" and 2-1/2"
Air Pressure:	to 200 p.s.i. (14 bar)
Operating Temperature Range:	-40° to 160° F (18° to 82° C)
Maximum Output Force:	982 pounds (2-1/2-inch bore cylinder)
Viton Seals Models:	For high heat applications. Consult factory.

Range of mounting styles and attachable mounts/accessories covers wide range of application requirements.

Magnetic pistons available for use with Hall Effect or Reed Switches.

### Ordering

See following page.

### Ordering

		з. D	ashes		Signino	an.	
	SXXX-	Х	Χ	Χ	Х-	XXX	
SERIES		T	T	T	T		
S Stainl	ess Steel						
CYLINE	DER TYPE					STROKE LENGTH	
S Single	e Acting, Spring Return (Not available on 25 bore size)					WHOLE INCHES	FRACTIONS
<b>D</b> Doub	le Acting					00 = 0 in	0 = None
R Single	e Acting, Spring Extend (Not available on 25 bore size)					01 = 1 in	1 = 1/8 in
H Single	e Acting, Hex Rod (Non-rotating rod)					02 = 2 in	2 = 1/4 in
	(Spring return only)Not available on 14,17,20					03 = 3 in	3 = 3/8 in
	or 25 bore sizes)					04 = 4  in	4 = 1/2 in
						05 = 5 in	5 = 5/8 in
	BORE SIZE					06 = 6 in	6 = 3/4 in
	<b>05</b> 1/2 in					10 = 10  in	7 = 7/8 in
	<b>07</b> 3/4 in.					etc.	
	<b>11</b> 1-1/16 in.					For recommended maxing	num stroke lengths
	<b>14</b> 1-1/4 in. (Not available on type SH)					per type, see pages 109	through 110.
	<b>15</b> 1-1/2 in.					(1/2" Increments, 1/2"	' through 6")
	17 1-3/4 in. (Not available on type SH)					,	0,
	20 2 in. (Not available on type SH)						
	<b>25</b> 2-1/2 In. (Not available on type SS, SR of SH)				W	EARSTRIP (Note B)	
	MOUNTING STYLE				4	None (standard)	
	<b>B</b> Block Mount (Available on 05, 07, 11 and 15 hore size only)				W	Wearstrip	
	(Not available on type SH)						
	D Double Rod End (Double Acting Only)					NC	
	Nose Mount						
	P Universal Mount (Pivot or Double End)				B BU	na N	
	Silverair attachable mounts must be ordered senarately.	_			V VIU		
	See page xx.						
					MAGN	ET/ BUMPERS (Note A)	
Note A:	Bumpers				4 No	Bumpers, no magnet	
	Not available with magnetic piston option.				B Bur	npers	
	Standard on double rod ends.			I	M Mag	gnetic Piston (Not available in	1/2"
	Do not affect external dimensions.				bor	e or for single-acting cylinder	s).
				i	For swit	tch information, see page 111	
Note B:	wearstrip is standard on double-acting nose mount, universal mount and						

block front mount of 5" or more of stroke. Also on single acting, spring extend cylinders with 3" or more of stroke. Not available on 1/2" bore

cylinders.

Note: Highlighted selections denote most popular models.

### Ordering

Series S (Mounting Kits)

1/2	3/4	1-1/16	CYLINDER BO 1-1/4	RE (INCHES) 1-1/2	1-3/4	2	2-1/2
L-MOUNT (Sing Order Mounting N	<b>le Acting)</b> Jut below.						
118108-05	118108-07	118108-11	118108-14	118108-14	118108-17	118108-20	118108-25
L-MOUNT (Doul Order Mounting N	b <b>le Acting)</b> Jut below.						
118108-50	118108-11	118108-11	118108-14	118108-14	118108-17	118108-20	118108-25
<b>MOUNTING NUT</b> 118109-05	(Single Acting*) 118109-07	118109-11	118109-14	118109-14	118109-17	118109-20	118109-25
<b>MOUNTING NUT</b> 118109-50	<b>(Double Acting)</b> 118109-11	118109-11	118109-14	118109-14	118109-17	118109-20	118109-25
<b>PIVOT BRACKET</b> 117523-05	(Pivot Pin Included) 117523-07	<b>d)</b> 117523-07	117523-14	117523-15	117523-15	117523-20	117523-20
ROD CLEVIS (Pin 117555-05	<b>vot Pin Included)</b> 117555-07	117555-11	117555-14	117555-14	117555-17	117555-17	117555-17
PIVOT PINS (Sta	andard Equipment)						
118119-05 <b>Retainer</b>	118119-07	118119-07	118119-14	118119-15	118119-15	118119-20	-
118592-05	118592-05	118592-05	118592-05	118592-15	118592-15	118592-15	-
Uptional Press Fi 118121-05	118121-07	118121-07	118121-14	118121-15	118121-15	-	-

 FOR DOUBLE END MOUNTING OF SINGLE-ACTING CYLINDERS, ORDER THE FOLLOWING:

 1/2-inch bore
 One 118108-05 L-Mount and one 118109-05 Nut for rear mounting thread. One 118108-50 L-Mount and one 118109-50 Nut for front mounting thread.

 3/4-inch bore
 Two 118108-07 L-Mounts, one 118109-07 Nut for rear mounting thread and one 118109-11 Nut for front mounting thread.

NOTE: Silverair accessories are bright zinc plated steel.



Mounting Nut

**Block Front Mount** 

Series S (Mounting Kit)

	CYLINDER BORE (INCHES)									
	1,	/2	3,	/4	1-1/16	1-1/4	1-1/2	1-3/4	2	2-1/2
Dim	Single	Double	Single	Double	All		All	All		
Ref	Acting	Acting	Acting	Acting	Types	Types	Types	Types	Types	Types
L-Mount	Bracket									
А	.31	.31	.44	.56	.56	.75	.75	.94	1.00	1.00
В	.19	.19	.19	.27	.27	.28	.28	.34.34	.34	
С	.62	.62	.75	1.00	1.00	1.50	1.50	1.50	1.62	1.62
D	1.00	1.00	1.25	1.50	1.50	1.89	1.89	2.25	2.25	2.88
E	.37	.37	.40	.56	.56	.75	.75	.88	1.00	1.25
F	.38	.44	.50	.63	.63	.76	.76	1.04	1.38	1.50
G	.56°	.56°	.45°	.45°	.45°	.49°	.49°	.52°	.60°	.63°
Н	.57	.57	.69	.81	.81	1.00	1.00	1.25	1.50	1.75
J	1.38	1.38	1.63	1.88	1.88	2.50	2.50	3.00	3.00	3.75
Mounting	Nut									
А	.56	.68	.75	.93	.93	1.12	1.12	1.50	1.85	2.06
В	.22	.25	.31	.37	.37	.42	.42	.56	.50	.50
С	3/8-24	7/16-20	1/2-20	5/8-18	5/8-18	3/4-16	3/4-16	1-14	1-1/4-12	1-3/8-12





Mounting Nut

CYLINDER BORE (INCHES)								
Dim Ref	1/2 All Types	3/4 All Types	1-1/16 All Types	1-1/4 All Types	1-1/2 All Types	1-3/4 All Types	2 All Types	2-1/2 All Types
Pivot Bracke	t							
А	.20	.26	.26	.32	.39	.39	.45	.45
В	.52	.65	.65	.77	.96	.96	1.20	1.20
С	.43	.75	.75	.75	1.00	1.00	1.00	1.00
D	.54	.87	.87	.94	1.25	1.25	1.43	1.43
E	.22	.31	.31	.31	.38	.38	.38	.38
F	.16	.26	.26	.26	.38	.38	.38	.38
G	.50°	.53°	.53°	.53°	.52°	.52°	.48°	.48°
Н	.64	.87	.87	1.06	1.37	1.37	1.68	1.68
J	.75	1.19	1.19	1.25	1.63	1.63	1.81	1.81
Rod Clevis								
А	.38	.50	.50	.75	.75	.75	.75	.75
В	.19	.25	.25	.38	.38	.38	.38	.38
С	.75	.94	.94	1.30	1.30	1.30	1.30	1.30
D	.38	.50	.50	.75	.75	.75	.75	.75
E	10-32	1/4-28	5/16-24	7/16-20	7/16-20	1/2-20	1/2-20	1/2-20
F	.19	.25	.25	.38	.38	.38	.38	.38
G	.94	1.20	1.20	1.70	1.70	1.70	1.70	1.70
Н	.12	.16	.16	.25	.25	.31	.31	.31
Pivot Pin								
As supplied	with Pivot Br	acket:						
А	.69	.81	.81	.94	1.13	1.13	1.44	1.44
В	.15	.25	.25	.25	.37	.37	.37	.37
For press fit	into pivot ho	le:		•				
А	.50	.75	.75	.87	1.12	1.12	-	-
В	.15	.24	.24	.24	.37	.37	-	-
С	.17	.26	.26	.26	.39	.39	-	-



Pivot Bracket









### **Performance Specifications**

#### Series S (Spring Return, Nose Mount)

Model SSXX-N4B4-XXX - (Max. Stroke - 4 inches)						
Bore sizes:	1/2", 3/4", 1-1/16", 1-1/4", 1-1/2" 1-3/4", 2"					
Hex Mounting Nut:	Standard (except on 2-inch models).					
Options:	Wearstrip (except on 1/2-inch bore), bumper, Viton					
Accessories:	L-mount, rod clevis					
Notes:	No rod bushing on 1/2-inch models - front head is hard anodized.					

Model SHXX-N4B4-XXX - (Max. Stroke - 4 inches)						
Nonrotating						
Bore sizes:	1/2", 3/4", 1-1/16", 1-1/2"					
Hex Mounting Nut:	Standard					
Options:	Wearstrip (except on 1/2-inch bore),					
Accessories:	L-mount, rod clevis					
Notes:	No rod bushing - front head is hard anodized.					

#### Series S (Spring Return, Universal Mount)

Model SSXX-P4B4-2	Model SSXX-P4B4-XXX - (Max. Stroke - 4 inches)						
Bore sizes:	1/2", 3/4", 1-1/16", 1-1/4", 1-1/2" 1-3/4", 2"						
Options:	Wearstrip (except on 1/2-inch bore), bumper, Viton						
Accessories:	Pivot bracket, rod clevis, L-mount, mounting nut. Order mounting nuts as required.						
Notes:	No rod bushing on 1/2-inch models - front head is hard anodized.						

Model SHXX-P4B4-XXX - (Max. Stroke - 4 inches)					
Nonrotating					
Bore sizes:	1/2", 3/4", 1-1/16", 1-1/2"				
Options:	Wearstrip (except on 1/2-inch bore), bumper, Viton				
Accessories:	Pivot bracket, rod clevis, L-mount, mounting nut. Order mounting nuts as required.				
Notes:	No rod bushing - front head is hard anodized.				

### **Dimensional Data**

### Series S (Spring Return, Nose Mount)



### Series S (Spring Return, Universal Mount)



#### **Spring Forces**

Bore Size	Spring Fo Normal	rce (lbs.) Actuated
1/2"	1	2
3/4"	1.5	5
1-1/16"	4	8
1-1/4"	7	14
1-1/2"	6	12
1-3/4"	12	24
2"	15	30

Series	s S							
Nim	Cylinder CYLINDER BORE (INCHES)							
Code	Description	1/2	3/4	1-1/16	1-1/4	1-1/2	1-3/4	2
Single	Acting							
А	SSXX-N4B4-XXX	1.81	2.00	2.56	3.41	3.19	3.85	4.17
А	SHXX-N4B4-XXX	2.06	2.25	2.68	-	3.44	-	-
А	SSXX-P4B4-XXX	2.50	3.06	3.44	4.50	4.25	5.41	5.54
А	SHXX-P4B4-XXX	2.75	3.31	3.56	_	4.50	-	-
AS	SSXX-N4B4-XXX	1.88	1.69	1.56	1.81	1.69	2.00	2.00
AS	SHXX-N4B4-XXX	1.88	1.69	1.56	-	1.69	-	-
AS	SSXX-P4B4-XXX	1.88	1.69	1.56	1.81	1.69	2.00	2.00
AS	SHXXP4B4-XXX	1.88	1.69	1.56	-	1.69	-	-
BB	SSXX-N4B4-XXX	.31	.44	.50	.62	.62	.75	.81
BB	SHXX-N4B4-XXX	.31	.44	.50	-	.62	-	-
BB	SSXX-P4B4-XXX	.31	.44	.50	.62	.62	.75	.81
BB	SHXXP4B4-XXX	.31	.44	.50	-	.62	.75	.81
CC	SSXX-XXXX-XXX	.50	.50	.62	1.00	1.00	1.19	-
CC	SHXX-XXXX-XXX	.75	.75	.75	-	1.25	-	-
DD	All Types	.04	.07	.07	.07	.07	.09	.12
EP	All Types	.42	.66	.62	.91	.81	.98	1.00
FA	All Types	.50	.50	.50	.50	.75	.88	.88
FF	SSXX-X4B4-XXX	4.50	2.77	3.16	4.14	3.88	4.91	5.11
GG	All Types	.375	.500	.625	.750	.750	1.03	1.375
HH	All Types	10-32	1/4-28	5/16-24	7/16-20	7/16-20	1/2-20	1/2-20
JA	SSXX-N4B4-XXX	7/16-20	5/8-18	5/8-18	3/4-16	3/4-16	1-14	1-1/4-12
JA	SHXX-N4B4-XXX	3/8-24	5/8-18	5/8-18	-	3/4-16	-	-
JJ	All Types	3/8-24	1/2-20	5/8-18	3/4-16	3/4-16	1-14	1-1/4-12
KK	Wrench Flat	None	None	.25	.38	.38	.44	.50
LL	All Types	10-32	1/8	1/8	1/8	1/8	1/4	1/4
MM	All Types	.56	.81	1.12	1.31	1.55	1.81	2.07
NN	Standard Rod	.187	.250	.312	.437	.437	.500	.625
NN	Hex Flats	.187	.250	.375	-	.437	-	-
PP	All Types	.25	.34	.34	.41	.50	.50	.57
QM	All Types	.37	.62	.87	.87	.82	1.25	1.25
QQ	All Types	.31	.38	.38	.50	.62	.62	.75
RR	All Types	.16	.25	.25	.25	.38	.38	.38
RT	All Types	.12	.16	.25	.18	.25	.25	.31

### **Performance Specifications**

#### Series S (Spring Extend, Nose Mount)

Model SRXX-N4B4-	XXX - (Max. Stroke - 4 inches)
Bore sizes:	1/2", 3/4", 1-1/16", 1-1/4", 1-1/2" 1-3/4", 2"
Hex Mounting Nut:	Standard
Options:	Bumper, Viton
Accessories:	Rod clevis, L-mount
Wearstrip:	Not available on 1/2-inch bore. Standard with 3 inches of stroke, or more (optional on shorter strokes).
Notes:	No rod bushing on 1/2-inch models - front head is hard anodized.

#### Series S (Spring Extend, Universal Mount)

Madel ODVV D4D4 VVV

Model SRXX-P4B4-	XXX - (Max. Stroke - 4 inches)
Bore sizes:	1/2", 3/4", 1-1/16", 1-1/4", 1-1/2" 1-3/4", 2"
Options:	Bumper, Viton
Accessories:	Pivot bracket, rod clevis, L-mount, mounting nut.
Wearstrip:	Not available on 1/2-inch bore. Standard with 3 inches of stroke, or more (optional on shorter strokes).
Notes:	No rod bushing on 1/2-inch models - front head is hard anodized.

#### Series S (Block Front Mount - Spring Extend or Spring Return)

Model SSXX-B4B4-2	XXX - (Max. Stroke - 4 inches) (Spring Return)
Bore sizes:	1/2", 3/4", 1-1/16"
Options:	Wearstrip (except on 1/2-inch bore), bumper, Viton
Accessories:	Rod clevis
Notes:	No rod bushing on 1/2-inch models - front head is hard anodized. Head is hard anodized.

### **Dimensional Data**

#### Series S (Spring Extend, Nose Mount)







(Max. Stroke - 4 inc	(Max. Stroke - 4 inches)					
Bore sizes:	1/2", 3/4", 1-1/16"					
Options: Accessories:	Bumper, Viton Rod clevis					
Wearstrip:	Not available on 1/2-inch bore. Standard with 3 inches of stroke, or more (optional on shorter strokes).					
Notes:	No rod bushing on 1/2-inch models - front head is hard anodized.					

#### **Spring Forces**

Bore Size	Spring Fo Normal	rce (Ibs.) Actuated
1/2"	1	2
3/4"	1.5	5
1-1/16"	4	8
1-1/4"	7	14
1-1/2"	6	12
1-3/4"	12	24
2"	15	30

 TT - Two thru holes drilled and counterbored on port side for cap screw size listed.
 TW - Above thru holes tapped on opposite side for additional mounting option.

Mounting hole locations for 1/2-inch models.

Series	s S							
Dim	Culinder			CYLINDER	BORE (IN	CHES)		
Code	Description	1/2	3/4	1-1/16	1-1/4	1-1/2	1-3/4	2
Sinale	Acting	.,_	0, 0					
A	SRXX-N4R4-XXX	2 42	2 78	3 28	4 25	4 00	5.03	5 11
A	SBXX-P4B4-XXX	3.12	3.84	4 15	5.33	5.06	6.59	6 48
A	SSXX-B4B4-XXX	2 42	3.34	4 28	_	5.00	-	_
A	SBXX-B4B4-XXX	2.42	3.34	4.28	_	5.18	_	_
A	SSRXX-N4B4-XXX	1.44	2.69	2.56	2.81	2.69	3.00	3.00
AS	SBXX-P4B4-XXX	1 44	2 69	2.56	2.81	2 69	3.00	3 00
AS	SSXX-B4B4-XXX	1.88	1.69	1.56	_	1.69	-	_
AS	SBXX-B4B4-XXX	2.88	2.69	2.56	_	2.69	_	_
BB	All Types	.41	.50	.50	.62	.62	.75	.81
BC	Bolt Circle Dia.	.75	1.00	1.25	_	1.75	_	_
BT	Threaded Hole	8-32(2)	10-32(2)	10-32(2)	_	1/4-20	_	_
CC	SRXX-N4B4-XXX	.50	.50	.62	1.00	1.00	1.19	1.25
CC	SRXX-P4B4-XXX	.50	.50	.62	1.00	1.00	1.19	1.25
CC	SRXX-B4B4-XXX	.50	1.06	1.12	_	1.50	_	_
CC	SSXX-B4B4-XXX	.50	1.06	1.12	_	1.50	_	_
DD	Block Front Mount	.06	.09	.09	_	.12	_	_
DD	All Others	.04	.07	.07	.07	.07	.09	.12
E	Block Front Mount	.75	1.00	1.25	_	1.75	_	_
EE	All Types	.37	.48	.52	.69	.62	.72	.69
EP	SRXX-P4B4-XXX	.42	.66	.62	.91	.81	.98	1.00
FA	Block Front	.50	.75	.75	-	1.25	-	-
FA	All Others	.50	.50	.50	.50	.75	.88	.88
FF	SRXX-P4B4-XXX	5.76	3.55	3.87	4.97	4.69	6.09	6.05
FM	Block Front Mount	.31	.48	.72	_	1.00	_	_
GG	Block Front Mount	.437	.625	.750	_	1.00	-	-
GG	SRXX-XXXX-XXX	.437	.625	.625	.750	.750	1.03	1.375
HH	All Types	10-32	1/4-28	5/16-24	7/16-20	7/16-20	1/2-20	1/2-20
JA	SRXX-P4B4-XXX	7/16-20	5/8-18	5/8-18	3/4-16	3/4-16	1-14	1-1/4-12
JJ	All Types	7/16-20	5/8-18	5/8-18	3/4-16	3/4-16	1-14	1-1/4-12
KK	Wrench Flat	None	None	.25	.38	.38	.44	.50
LL	Block Front Mount	10-32	1/8	1/8	1/8	1/4	-	_
LL	All Others	10-32	1/8	1/8	1/8	1/8	1/4	1/4
MM	All Types	.62	.88	1.12	1.31	1.55	1.81	2.07
NN	All Types	.187	.250	.312	.437	.437	.500	.625
PM	Block Front Mount	.44	.51	.54	-	.66	-	_
PP	SRXX-P4B4-XXX	.25	.34	.34	.41	.50	.50	.57
QM	All Types	.37	.62	.87	.87	.82	1.25	1.25
QQ	SRXX-P4B4-XXX	.31	.38	.38	.50	.62	.62	.75
RR	SRXX-P4B4-XXX	.16	.25	.25	.25	.38	.38	.38
RT	All Types	.12	.16	.25	.18	.25	.25	.31
TN	Block Front Mount	.44	.62	.81	-	1.12	-	-
TT	Block Front Mount	8-32	10-32	10-32	-	1/4-20	-	-
TW	Block Front Mount	-	1/4-20	1/4-20	-	5/16-18	-	-

### **Performance Specifications**

#### Series S (Nose Mount)

Model SDXX-N4B4-	XXX - (Max. Stroke - 12 inches)
Bore sizes:	1/2", 3/4", 1-1/16", 1-1/4", 1-1/2" 1-3/4", 2", 2-1/2"
Hex Mounting Nut:	Standard (Except on 2 and 2-1/2"-inch models).
Options:	Bumper, Viton, Internal Magnet
Accessories:	Rod clevis, L-mount
Wearstrip:	Not available on 1/2-inch bore. Standard with 5 inches of stroke, or more (optional on shorter strokes).
Notes:	No rod bushing on 1/2-inch models - front head is hard anodized.

### **Dimensional Data**

### Series S (Nose Mount)



#### Series S (Universal Mount)

Model SDXX-P4B4-XXX - (Max. Stroke - 12 inches)					
Bore sizes:	1/2", 3/4", 1-1/16", 1-1/4", 1-1/2" 1-3/4", 2", 2-1/2"				
Options:	Bumper, Viton, Internal Magnet				
Accessories:	Pivot bracket, rod clevis, L-mount, mounting nut.				
Wearstrip:	Not available on 1/2-inch bore. Standard with 5 inches of stroke, or more (optional on shorter strokes).				
Notes:	No rod bushing on 1/2-inch models - front head is hard anodized.				

#### Series S (Universal Mount)



Dim	Cvlinder	CYLINDER BORE (INCHES)							
Code	Description	1/2	3/4	1-1/16	1-1/4	1-1/2	1-3/4	2	2-1/2
Double A	cting								
А	SDXX-N4B4-XXX	2.62	3.47	3.75	4.75	4.44	5.57	5.56	5.56
А	SDXX-P4B4-XXX	3.31	4.54	4.62	5.83	5.50	7.13	6.93	6.93
AS	All Types	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
BB	All Types	.41	.50	.50	.62	.62	.75	.81	.81
CC	All Types	.50	.50	.62	1.00	1.00	1.19	1.25	1.25
DD	All Types	.04	.07	.07	.07	.07	.09	.12	.12
EE	All Types	.37	.48	.52	.69	.62	.72	.69	.69
EP	SDXX-P4B4-XXX	.42	.66	.62	.91	.81	.98	1.0	1.0
FA	All Types	.50	.50	.50	.75	.75	.88	.88	.88
FF	SDXX-P4B4-XXX	6.12	4.25	4.34	5.47	5.12	6.63	6.50	6.50
GG	All Types	.437	.625	.625	.750	.750	1.030	1.50	1.50
HH	All Types	10-32	1/4-28	5/16-24	7/16-20	7/16-20	1/2-20	1/2-20	1/2-20
JJ	All Types	7/16-20	5/8-18	5/8-18	3/4-16	3/4-16	1-14	1-1/4-12	1-3/8-12
KK	All Types	None	None	.25	.38	.38	.44	.50	.50
LL	All Types	10-32	1/8	1/8	1/8	1/8	1/4	1/4	1/4
MM	All Types	.62	.88	1.12	1.31	1.55	1.81	2.07	2.62
NN	All Types	.187	.250	.312	.437	.437	.500	.625	.625
PP	SDXX-P4B4-XXX	.25	.34	.34	.41	.50	.50	.57	.57
QM	SDXX-N4B4-XXX	.37	.62	.87	.87	.87	1.25	1.25	1.75
QQ	SDXX-P4B4-XXX	.31	.38	.38	.50	.62	.62	.75	.75
RR	SDXX-P4B4-XXX	.16	.25	.25	.25	.38	.38	.38	.38
RT	SDXX-N4B4-XXX	.12	.16	.25	.18	.25	.25	.31	.31

### **Performance Specifications**

#### Series S (Double Rod End, Double End Mount)

Model SDXX-D4B4-XXX - (Max. Stroke - 12 inches)						
Bore sizes:	1/2", 3/4", 1-1/16", 1-1/4", 1-1/2" 1-3/4", 2", 2-1/2"					
Hex Mounting Nut:	Standard (Except on 2 and 2-1/2"-inch models) and bumpers.					
Options:	Viton, wearstrip.					
Accessories:	L-mount, rod clevis, mounting nut (2, 2-1/2-inch models)					
Notes:	No rod bushing on 1/2-inch models - heads are hard anodized.					

#### Series S (Block Front Mount)

Model SDXX-B4B4-XXX - (Max. Stroke - 12 inches)				
Bore sizes:	1/2", 3/4", 1-1/16"			
Options:	Wearstrip, Bumpers, Viton, Internal Magnet			
Accessories:	Rod clevis			
Wearstrip:	Not available on 1/2-inch bore. Standard with 5 inches of stroke, or more (optional on shorter strokes).			
Notes:	No rod bushing on 1/2-inch models - front head is hard anodized.inch Wearstrip not available on 1/2-inch bore. Wearstrip is standard with 5 inches of stroke, or more (optional on shorter strokes).			

### **Dimensional Data**

#### Series S (Double Rod End, Double End Mount)



#### Series S (Block Front Mount)



- \* TT Two thru holes drilled and counterbored on port side for cap screw size listed.
- \*\* TW Above thru holes tapped on opposite side for additional mounting option.
- † Mounting hole locations for 1/2-inch models.

Series S

Dim	Cylinder			CYLI	NDER BOF	RE (INCHE	S)		
Code	Description	1/2	3/4	1-1/16	1-1/4	1-1/2	1-3/4	2	2-1/2
Double A	Double Acting								
А	SDXX-D4B4-XXX	3.88	5.03	5.32	6.83	6.63	8.57	8.31	8.31
А	Block Front Mount	2.62	4.03	4.75	-	5.44	-	-	-
AS	Block Front Mount	1.00	1.00	1.00	-	1.00	-	-	-
AS	SDXX-D4B4-XXX	.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00
BB	SDXX-D4B4-XXX	.41	.50	.50	.62	.62	.75	.81	.81
BC	Bolt Circle Dia.	.75	1.00	1.25	-	1.75	-	-	-
BT	Threaded Hole	8-32	10-32	10-32	-	1/4-20	-	-	-
CC	Block Front Mount	.50	1.06	1.12	-	1.50	-	-	-
CC	SDXX-D4B4-XXX	.50	.50	.62	1.00	1.00	1.19	1.25	1.25
DD	Block Front Mount	.06	.09	.09	-	.12	-	-	-
DD	SDXX-D4B4-XXX	.04	.07	.07	.07	.07	.09	.12	.12
Е	Block Front Mount	.75	1.00	1.25	-	1.75	-	-	-
EE	SDXX-D4B4-XXX	.37	.48	.52	.69	.62	.72	.69	.69
FA	Block Front Mount	.50	.75	.75	-	1.25	-	-	-
FA	SDXX-D4B4-XXX	.50	.50	.50	.75	.75	.88	.88	.88
FF	SDXX-D4B4-XXX	2.07	3.03	3.07	3.58	3.39	4.69	4.19	4.19
FM	Block Front Mount	.31	.48	.72	-	1.00	-	-	-
GG	Block Front Mount	.437	.625	.750	-	1.00	-	-	-
GG	SDXX-D4B4-XXX	.437	.625	.625	.750	.750	1.030	1.50	1.50
HH	All Types	10-32	1/4-28	5/16-24	7/16-20	7/16-20	1/2-20	1/2-20	1/2-20
JJ	SDXX-D4B4-XXX	7/16-20	5/8-18	5/8-18	3/4-16	3/4-16	1-14	1-1/4-12	1-3/8-12
KK	All Types	None	None	.25	.38	.38	.44	.50	.50
LL	All Types	10-32	1/8	1/8	1/8	1/8	1/4	1/4	1/4
MM	SDXX-D4B4-XXX	.62	.88	1.12	1.31	1.55	1.81	2.07	2.62
NN	All Types	.187	.250	.312	.437	.437	.500	.625	.625
PM	Block Front Mount	.44	.51	.54	-	.66	-	-	-
QM	Block Front Mount	.37	.62	.87	-	.87		-	-
RT	Block Front Mount	.12	.16	.25	-	.25	-	-	_
TN	Block Front Mount	.44	.62	.81	-	1.12	-	-	-
TT	Block Front Mount	8-32	10-32	10-32	-	1/4-20	-	-	-
TW	Block Front Mount	-	1/4-20	1/4-20	-	5/16-18	-	-	-

#### Series S (Hall Effect Switches)

Hall Effect Sensors are typically used in conjunction with computers, programmable controllers or other solid state devices to sense and process cylinder rod proximity. The solid state circuitry in this sinking switch (NPN) provides clean, fast output without "bounce." The 300 mW power capability restricts its use to low power loads. One switch kit fits all Silverair cylinders for reduced and simplified inventory. 3/8 inch effective area per switch. For two switches, a minimum of 1-inch stroke is recommended.



#### Series S (Reed Switches)

Epoxy encapsulated reed switches are ideal for harsh environments. One switch kit fits all Silverair cylinders for reduced and simplified inventory. 50 watt reed is common in all sensors. Model 117045-300 lights up during reed engagement in low voltage applications. Model 117045-500 lights up over wide voltage range. Model 117045-100 is a basic sensor with no LED.

### **Performance Specifications**

#### Series S (Hall Effect Switches)

Input Voltage:	5 to 24 VDC
Input Current:	25 mA maximum
Output Voltage Drop:	0.4 VDC maximum
Output Current:	330 mA maximum
Power Dissipation:	300 mW maximum
Temperature Range:	-20° to 185°F (-29° to 85°C)

#### Series S (Reed Switches)

Contacts:	Normally open
Contact Rating:	50 W maximum
Switching Current:	1 A maximum
Initial Contact Resistance:	1 Ohm
Minimum Break Down Voltage:	225 VDC, 275 VAC
Temperature Range:	-40° to 200°F (-40° to 93°C)

### Ordering

#### Series S (Hall Effect Switches)

Model No.	Description
118123-100	w/LED, 5-24 VDC, 24 inch leads (includes 118124 Mounting Kit)
118123-200	w/LED, 5-24 VDC, 144 inch leads (includes 118124 Mounting Kit)

#### Series S (Reed Switches)

One 118124 Mounting Kit is included with each Seed Switch

Model No.	Description
117045-100	No LED, 120 VAC or 200 VDC max., 24 inch leads
117045-200	No LED, 120 VAC or 200 VDC max., 144 inch leads
117045-300	w/LED, 5-24 VAC/DC max., 24 inch leads
117045-400	w/LED, 5-24 VAC/DC max., 144 inch leads
117045-500	w/LED, 120 VAC or 200 VDC max., 24 inch leads
117045-600	w/LED, 120 VAC or 200 VDC max., 144 inch leads

#### Series S (Stainless Steel Volumn Chambers)

Volume chambers are used wherever there is the need to accumulate or store a volume of air or vacuum, such as a time delay in a circuit.

- Stainless steel body and aluminum endcaps offer excellent corrosion resistance in adverse environments.
- Available in lengths up to 24 inches, at 1/8-inch increments, providing a capability to meet very specific pneumatic accumulator applications.



### **Performance Specifications**

Operating Pressures:	0 - 200 PSIG (14 bar)
Temperatures Ranges:	-40° to 160°F, ambient (-40° to 71°C)
Operation:	Compressed air or with vacuum

### Ordering

Cylinder Bore (Inches)							
Reference	3/4	3/4 1-1/16 1-́1/2 2					
А	1.91	2.18	2.26	2.81			
MM	.81	1.11	1.55	2.07			
QQ	.62	.88	.88	1.25			
RT	.16	.25	.25	.32			
PORT	.125	.125	.125	.25			

Volumn (ci)	Cylinder Bore (Inches) 3/4 1-1/16 1-1/2 2				
Add per 1.0 inch of length	.44	.89	1.77	3.14	
Basic Volume (add to total)	.41	.92	1.80	4.44	

11811 <u>X</u> - <u>X X X</u>

BO	RF	SI7F	
50			

- 5 3/4 inch
- 6 1-1/16 inch
- 7 1-1/2 inch
- 8 2 inch

|--|

#### (1" Increments, 1" through 4")

WHOLE INCHES	FRACTIONS
00 = 0 in	0 = None
01 = 1 in	1 = 1/8 in
02 = 2 in	2 = 1/4 in
03 = 3 in	3 = 3/8 in
04 = 4 in	4 = 1/2 in
05 = 5 in	5 = 5/8 in
06 = 6 in	6 = 3/4 in
10 = 10 in	7 = 7/8 in
etc.	
- Under 1" etrelie un	00 and freation

• Under 1" stroke, use 00 and fraction designation.

Example: 1/2" stroke = 004

Note: Highlighted selections denotes most popular models.

#### Series 23, 24, & 28

Economair round cylinders are medium to heavy-duty units that can be installed anywhere that a repairable cylinder is desired. Prelubed, they're suitable for operation without externally applied lubrication. Unique endcap retention design provides a concentric assembly, resulting in a service life superior to tie rod cylinder construction.

- Cylinder heads are high tensile strength aluminum alloy, retained by a feed ring wire, a simple design that eliminates excess cylinder weight and bulk.
- The barrel I.D. is hard-coated aluminum with a Rockwell C60 hardness. A finish of 16 microinches or better insures low friction and smooth operation.
- Piston rod is ground and polished, hard-chrome plated steel for minimum friction and maximum packing life. Optional 303 stainless steel is excellent for corrosion resistance and washdown applications (303 stainless steel is standard on 1-1/8-inch bore cylinders).
- Adjustable cushions provide excellent control of cylinder deceleration. Full range adjustability (except fixed cushions on 1-1/8-inch bore).
- High grade, self-lubricating bronze rod bearing reduces friction and promotes smooth operation.
- Piston seal selection insures job-matched performance Buna N O-ring, Low Friction U-cup and self-lubricating packings available.
- Wear compensating rod wiper protects internal seals and parts from dirt, grit and debris.
- NPTF dry seal pipe threads on ports.
- Optional self-lubricating U-cup seals reduce drag and promote extra cylinder life.
- Cylinder is repairable so instead of buying complete new units, repair kits can be used.

### **Performance Specifications**

Bore Sizes:	1-1/8", 1-1/2", 2", 2-1/2", 3" and 4"					
Maximum Output Force:	2,513 pounds (4-inch bore).					
Air Pressure:	To 200 p.s.i. (14 bar).					
	May be operated hydraulically (200 p.s.i., nonshock).					
Operating Temperature Range:	0° to 180° F (-18° to 82° C).					
Seals:	Viton seals available for high heat applications. Consult factory.					
Notes:	Wide range of mounting styles and attachable mounting hardware/ accessories allows cylinders to be applied in nearly any pneumatic application.					



U-cup and Magnetic Piston Options



## Pneumatic Cylinders **Economair**®

Orde	ering	Include dashes ( - ).	The dashe	s are signi	ficant.		
Serie	s 23, 24, & 28	<u>2X</u> <u>XX</u> -	X X	<u>X9</u> -	<b>XXX</b> (1"	Increments, 1 I 1/2", 2 1/2" ;	I" through 10" plus and 3 1/2")
<b>SERI</b> 23 24 28	ES NO. Noncushioned Cushioned, Both Ends Magnetic Piston, Cushion NOTE: 1-1/8 inch bore not availa BORE S 18 15 20 25 30 40	ed Both Ends uble <b>SIZE</b> 1-1/8 in 1-1/2 in 2 in 2 -1/2 in 3 in 4 in			STROKE LENG WHOLE INCHE 00 = 0 in 01 = 1 in 02 = 2 in 03 = 3 in 04 = 4 in 05 = 5 in 06 = 6 in $\diamondsuit$ $\diamondsuit$ to to 99 99 in	TH S FR/ 0 = 1 = 2 = 3 = 4 = 5 = 6 = 7 =	ACTIONS = 0 in = 1/8 in = 1/4 in = 3/8 in = 1/2 in = 5/8 in = 3/4 in = 7/8 in
	<b>CYLINDER TYPE</b>			OPTIO	NS		
	<ol> <li>Double Acting, F</li> <li>Double Acting, I</li> <li>Double Acting, I</li> <li>NOTE: Not Available</li> </ol>	Rear Tang No Rear Tang Double Rod e in Series 28		09 89	Standard Rod 303 Stainless Stee	I Rod —	Standard on 1-1/8" bore cylinder.
Note:	<i>Economair mounts m</i> <i>separately, see below</i> Highlighted selections denote m	i <b>ust be ordered</b> w. ost popular models.		0 0-Ri 2 0-Ri 3 0-Ri 4 Lip, 1 5 Lip, 2	ng, Nitrile ng, Low Friction ng, Viton	Not available	in Series 28 These packings add one inch to cylinder length. Viton not available in Series 28

6 Lip, Viton

d to

Mounts

		Cylin	der Bore (I	nches)		
	1-1/8	1-1/2	2 `	2-1/2	3	4
L-Mount (2 qty.)	20533	20534	20534	20535	20535	20536
Flange Mount	20537	20538	20538	20539	20539	20540
Clevis Bracket	20546	20547	20547	20548	20548	20549
Mounting Nut (2 qty.)	20529	20530	20530	20531	20531	20532
Trunnion	20524	20556	20557	20558	20559	20560
Alum. Rod Clevis	-	20542	20543	20544	20544	20545
Steel Rod Clevis	20541	115906	115907	115908	115908	115909









L-Mount

**Mounting Nut** 

Note: Order cylinder, rod clevis and clevis bracket separately. Every Economair Cylinder includes rod nut. Trunnion Mount does not include pillow block.

## Switches (Specifications / Ordering)

### Switch

Model Number	119581-1	119581-2	119581-3	119582-1 119582-2 119582-3			119583-1	119583-2	119583-3	
Lead Length/Type	1m bare	3m bare	Plug	1m bare 3m bare Plug			1m bare	3m bare	Plug	
Lead Color	Black				Grey			Black		
Switch Type	REED			Type REED PNP(SOURCING)		NPN (SINKING)				
Input Voltage	100 VDC, 125 VAC Max.			100 VDC, 125 VAC Max. 10 - 30 VDC			5 - 30 VDC			
	-			-			5 - 100mA @ 5V			
Operating Current	300mA (150mA Inductive)			7 - 100mA @ 12V			10 - 200mA @ 12V			
	-			– 14 - 200mA @ 24V			4V	20 - 200mA @ 24V		
Detecting Distance	2.5 mm			Distance 2.5 mm 1.5 mm			1.5 mm			
Detecting Width	-			3.0 mm			3.0 mm			
Response Time	1 mSec. Min.			-			-			
LED Function		18mA Min.			1mA Min.			1mA Min.		



<b>Switch Mounting Brackets</b>						
Bore	Model Number					
1-1/8"	119897-18					
1-1/2"	119897-15					
2"	119897-20					
2-1/2"	119897-25					
3"	119897-30					
1"	110807-/10					

Note: Order bracket and switch separately.

## **Pneumatic Cylinders Economair® - Dimensional Data**

### **Dimensional Data**

#### Series 23, 24, & 28

	Cylinder Bore (Inches)						
Reference	1-1/8	1-1/2	2	2-1/2	3	4	
Rod dia.	0.38	0.50	0.63	0.75	0.75	1.00	
А	1.625	3.00	3.00	4.00	4.00	5.00	
В	1.281	1.50	1.50	2.00	2.00	2.625	
С	1.0	1.688	1.688	2.25	2.25	3.00	
D-dia*	.250	.250	.250	.375	.375	.438	
E	.250	.313	.313	.375	.375	.438	
F	.625	.906	.906	1.219	1.219	1.469	
G	.375	.500	.500	.625	.625	.750	
Н	1.00	1.531	1.531	2.094	2.094	2.531	
J	.750	1.00	1.00	1.25	1.25	1.188	
K	.375	.469	.469	.781	.781	.781	
L-HEX	1.0625	1.438	1.438	2.0625	2.0625	2.50	
M-dia.	1.25	1.75	1.75	2.438	2.438	2.938	
N	2.00	2.50	2.50	3.375	3.375	4.00	
Р	2.50	3.25	3.25	4.50	4.50	5.188	
Q	.688	.594	.594	.719	.719	.844	
R	1.219	1.750	1.750	2.375	2.375	3.00	
S	.313	.313	.313	.375	.375	.438	
Т	2.250	3.00	3.00	4.00	4.00	5.00	
U	1.75	2.25	2.25	3.00	3.00	3.75	
V	1.75	2.25	2.25	2.688	2.688	3.375	
W	1.406	1.75	1.75	2.0625	2.0625	2.625	
Х	.750	1.00	1.00	1.25	1.25	1.50	
Y-dia.*	.250	.3125	.3125	.438	.4375	.625	
Z	.656	.688	.688	.875	.875	1.063	
ZZ	.3125	.375	.375	.500	.500	.625	
TA	3.125	4.125	4.125	5.375	5.625	7.125	
TB	2.250	3.00	3.00	3.75	4.25	5.50	
TC-dia.	.438	.500	.500	.750	.750	.750	
TD	2.00	2.625	3.125	4.00	4.500	5.750	
TE	.875	1.125	1.375	1.875	2.125	2.688	
TF	.750	1.250	1.250	1.50	1.50	1.50	
TG-dia.*	.250	.3125	.3125	.4375	.4375	.500	
TH-Thd.	3/8-16	1/2-13	5/8-11	3/4-10	3/4-10	1-8	
TK	-	2.0625	2.0625	2.50	2.50	3.250	
TL	-	.875	.875	1.00	1.00	1.325	
TM	-	1.0625	1.0625	1.438	1.438	1.938	
TN	-	1.813	1.00	1.813	1.813	1.50	

\*Bolt or pin diameter



Steel Rod Clevis



**Aluminum Rod Clevis** 











**Clevis Bracket** 



Mounting Nut



Trunnion

Series 23, 24, & 28 (Double Acting with Tang)



AA = Double acting with O-ring or low friction packing. LP = Double acting with U cup packing.

#### (Double Acting, No Tang)





AA = Double acting with O-ring or low friction packing. LP = Double acting with U cup packing.

#### (Double Acting, Double Ended)



(Switch Bracket)



## **Pneumatic Cylinders Economair® - Dimensional Data**

### **Dimensional Data**

UCIICS LU, LT, & LU
---------------------

Dimensioal		Cylinder Bore (Inches)					
Reference		1-1/8	1-1/2	2	2-1/2	3	4
Rod Diameter		.38	.50	.63	.75	.75	1.00
Stroke Factor	AA*	2.031	2.625	2.625	2.875	2.875	4.00
Stroke Factor	LP**	3.031	3.625	3.625	3.875	3.875	5.00
	BB	.750	1.00	1.00	1.250	1.250	1.250
	CB	1.750	2.438	2.438	2.938	2.938	3.500
	CC	1.00	1.438	1.438	1.688	1.688	2.250
	DD	.125	.219	.219	.344	.344	.406
	EE	.422	.516	.516	.563	.563	.813
	FA	.781	1.156	1.156	1.375	1.375	1.750
	FFs	.875	1.250	1.250	1.50	1.50	1.875
(± .00	)2) GG	.748	1.057	1.057	1.432	1.432	1.777
(UNC-2	A) HH	3/8-16	1/2-13	5/8-11	3/4-10	3/4-10	1-8
	JJ	3/4-16	1-1/16-18	1-1/16-18	1-3/8-12	1-3/8-12	1-3/4-12
		UNF-2A	UNEF-2A	UNEF-2A	UNF-2A	UNF-2A	UN-2A
	KK	.313	.500	.500	.500	.500	.500
(NP	TF) LL	1/8-27	1/4-18	1/4-18	3/8-18	3/8-18	1/2-14
	MM	1.375	1.750	2.250	2.750	3.250	4.250
	NN	.313	.406	.500	.625	.625	.875
	00	3.594	4.688	4.688	5.688	5.688	7.063
	PP	.688	.875	.875	1.375	1.375	1.438
	QQ	.375	.500	.500	.625	.625	.750
(R/	AD.) R	.016	.016	.016	.094	.094	.094
	RR	.250	.313	.313	.438	.438	.500
	RT	-	.172	-	.438	.438	.438
	SS	.969	1.25	1.25	2.00	2.00	2.188
	TT	-	.438	.438	.438	.438	.438
	UU	-	.500	.500	.500	.625	.625

\* Double acting with O-ring or low friction packing

\*\* Double acting with U-cup packing

FF shows total thread, including run out.

#### Provenair®...

### The Most Flexible Cylinder for New or Retrofit Designs

Your best creations are only as good as their parts. Ensure performance to your customer's expectations by including ARO Provenair Cylinders in your original specifications. They are precision built using the latest extrusion technologies and feature a profiled barrel that is not only good looking, but eliminates cumbersome and dirt-catching tie rods. At the same time, the profiled barrel provides superior strength compared to traditional tie rod constructed cylinders. Provenair end caps, mounts, and rod end accessories - even our position sensor brackets, are protected against corrosion. To maximize cycle life, every Provenair has a factory-installed Teflon® wearband on the piston. A "Floating" rod bushing provides smooth strokes and maximized wear; reduced galling compared to bronze bushings.

Maintenance and repair of ARO Provenair Cylinders is very simple and fast. The rod bushing is retained by a stainless steel spiro retaining ring and is easily removed with a small screwdriver. The retaining ring slides off the rod along with the bushing and its captive seals. There are no small

screws to lose on the floor or under your machine, and no seals to fall inside the cylinder. Replacement of the reciprocating assembly and its seals is equally simple and, unlike tie rod cylinders, you needn't worry about equalizing torque on the Provenair tie bolts!

Provenair is flexible, you can change it to fit most of your application requirements. Factory installed mounts save you time, but you may easily change your Provenair Cylinder mount with an ARO



mounting kit. If you require an oversized rod diameter, Provenair converts easily right on your machine! Simply specify the piston rod diameter, thread style, and material (chrome steel or stainless steel) when ordering the replacement reciprocating assembly; order a rod bushing for the new piston rod diameter and you're ready to install. Your original Provenair now needs a magnetic piston? Order a magnet and easily install it and you can select from three types of attachable position sensors.

- Tie bolt construction eliminates rod binding and tie rod torque problems. (Series AN and TN, up to 4" bore)
- Series SN all stainless steel cylinders are corrosion resistant and have tie rods.
- Rugged thick walled tubes resist denting.
- NFPA repairable and interchangeable.
- 15 NFPA mounting styles.
- Factory lubricated grease that won't wash out.
- Optional 303 S.S. piston rods provide corrosion resistance. (STD. Series SN and TN)
- Optional oversized rods available to provide extra column strength. (Series AN and SN)
- Optional slippery seals enhance smooth operation and are self-lubricating. (STD. Series TN)
- Available in 1-1/2", 2", 2-1/2", 3-1/4" and 4" bore sizes with extruded barrel (as shown). (Series AN and TN)
- Larger bore sizes 5", 6", 8" and 10" bores have prestressed steel tie rods. (Series AN)
- Series SN, all stainless steel cylinders available in 1-1/2, 2, 2-1/2, 3-1/4, 4, 5, 6 and 8" bores.
- SN series cylinders have S.S. tie rods.
- Operates on air pressure up to 250 p.s.i.
- Output forces up to 19,635 lbs. (10" bore at 250 p.s.i.).
- Std. operating temp: 0° to 185°(F), -18° to 82° (C).
- Rotated ports are optional.
- Viton seals for high heat applications (up to 300° F, 149° C)

### **Performance Specifications**

1/2", 2", 2-1/2", 3-1/4", 4", 5", 6", 8" and 10"
Buna-N, Viton or Slippery (Aluminum alloy piston with lip-type seals)
Profiled Extrusion (5", 6", 8" and 10" have tie rods.) (Patented)
"Floating" Rod bushings for low friction, superior wear and side load resistance
Metal Jacketed
Chrome plated ground and polished high tensile steel
Optional Piston Magnet
Double Rod End
303 S.S. Piston Rods
Studded male rods for 50% stronger threads than cold rolled thread rod ends
adie
1/2", 2", 2-1/2", 3-1/4", 4", 5", 6", and 8"
Bronze
Teflon®
303/304 – End caps, tie rods, piston rods, mounts (barrel is 316)
15 NFPA
Optional adjustable cushions
Piston Magnet
Viton Seals (Wiper Teflon)
Double rod ends

"GripRidge" gives a better bracket fastening surface. Brackets and switches stay-put.



Lightweight aluminum body resists dents.



#### Ordering Stainless Steel NFPA Series SN (1-1/2' thru 8" Bore) Include dashes ( - ). Dashes are significant. NOTE: All SN Series Cylinders have tie rods. S Х Х XXX Ν Х Х Х Х Х STROKE **ACTUATORS** Inches Stainless Steel actuators begin with S Tens 0-9 Ones SERIES (NFPA) Fractions 0-9 All Provenair Cylinders are Series N 0 = 0 in 1/8 in 1 = TYPE 2 = 1/4 in 3/8 in 3 = Double Acting, Single Rod A 4 = 1/2 in B Double Acting, Double Rod Note: Not available in 8" bore. 5 = 5/8 in 3/4 in 6 = 7 = 7/8 in **BORE SIZE** Note: 0 1- 1/2" W 3-1/4" 6 6" Maximum stroke 99 7/8", for longer strokes S 2" 4" 8 8" 4 consult factory. Stroke T. 2-1/2" 5 5" lengths 20" and longer may require stop tubes. see page 97. **ROD DIAMETER** K 5/8" Note: Available in 1-1/2", 2" and 2-1/2" bores only. Note: Available in 2", 2-1/2", 3-1/4", 4" and 5" bores only. Μ 1" MOUNT Note: Available in 3-1/4", 4", 5", 6" and 8" bores only. Ρ 1 3/8" 1 3/4" Note: Available in 6" and 8" bores only. Q (8" Bore ME3, ME4) (Mounts must be factory installed.) A MS1 M MT2 P MT1 B MS4\*\* **ROD STYLE C** MP1\*\* Q MX1 S.S., Standard Male (KK1) S.S., Full Male (CC) G J **F** MF1/ME3\*\* T MX2 H S.S., Intermediate Male K S.S., Female (KK1) H MF2/ME4\*\* U MX3 (KK<sub>2</sub>) L S.S., No Threads K MP4\* X No Mount \* 1 1/2" - 6" Bore Only \*\* 1 1/2" - 4" Bore Only SEALS B Buna-N Buna-N + Magnetic Piston G Note: Teflon Wiper Std. PORT LOCATION Viton + Magnetic Piston V Viton н Slippery J Slippery + Magnetic Piston S (MS4 mounts: Port locations other than "A", call factory. Trunnion mounts: ports "A" or "C" only. **CUSHIONS A** H1, C1 (Std.) **F** H2, C1 X No Cushions Cushion Head End (Rod End) Н **B** H1, C2 G H2, C2 B **Cushion Both Ends** C **Cushion Cap End C** H1, C3 H H2, C3 **D** H1, C4 J H2, C4 Determine port

NOTE: S.S. Cylinders are made to order, contact factory for lead time.



3

### Attachable Mounting Kits for Series AN

#### Series AN (1-1/2" Thru 4" Bore)

#### Mounting Kits with Long Screws

Mount styles B (MS4) and X (No mounts) use mounting kits with long screws to attach through cap into barrel of cylinders.

	1 1/2"	2"	2 1/2"	3 1/4"	4"
MS7 Side End Lugs (Steel)	119618	119619	119620	119621	119622
MF1 Rect. Flange (Steel)	119633	119634	119635	119636	119637
MF2 Rect. Flange (Steel)	119646	119647	119648	119649	119650
MP2 HD Clevis (Iron) *	119623	119624	119625	119626	119627
MP4 HD Eye (Iron)	119628	119629	119630	119631	119632
MS2 Side Lugs (Alum.)	119638	119639	119640	119641	119642
MP1 Fixed Clevis (Alum.) *	119796	119797	119798	119799	119800



#### **Mounting Kits with Short Screws**

Mount styles 1 (FMB), 2 (FMC) and 3 (FMH) use mounting kits with short screws to attach to female sleeve bolts.

	1 1/2"	2"	2 1/2"	3 1/4"	4"
MS7 Side End Lugs (Steel)	115277	115278	115279	115280	115281
MP2 HD Clevis (Steel) *	118696	118697	118698	118699	118700
MP4 HD Eye (Steel)	118701	118702	118703	118704	118705
MF1, MF2 Flange (Steel)	115282	115283	115284	115285	115286
MP1 Fixed Clevis (Alum.) *	115477	115478		115480	115481
MP2 Det. Clevis (Alum.) *	115287	115288	115289	115290	115291
MP4 Det. Clevis (Alum) *	115292	115293	115294	115295	115296
MT1 Head Trunnion (Alum.)	116357	116358			116361
MT2 Head Trunnion (Alum.)	116357	116358			116361



Above kits Include all necessary hardware to complete mounting to Provenair cylinders. AN Series only. \*Pivot pin included in kit. (Kits not available for 5",6",8", or 10" Bores) (Kits not available for SN Models)

MX1, 2 or 3 Tie Rod Extensions	117822-1	117822-2	117822-2	117822-3	117822-3
MX1 requires two tie rod extensio	n bolt kits (foui	r extension studs	per kit). Extension	bolts can only	y be used in female
retaining bolt mounts: Use mounts	s 1, 2, 3 or con	tact factory for co	onversion kits.		

**Factory Installed Mounts** 



Note: Not all mounts are available on stainless steel models.

### **Position Sensors (Switches)**

#### **Reed Switches**

Switch is normally open, load can be attached to BROWN or BLUE lead. The BROWN lead is the higher potential side of the switch. In a magnetic field, the two reeds are brought into contact to "make" the circuit. Reed switches have black, 'two wire' leads.





#### Switch Mounting Brackets

Bore	Model Number
1-1/2"	119584
2", 2-1/2"	119585
3-1/4" & 4"	119586

**Note:** Operating temperature is 14 - 140° F and the environmental rating is IEC IP 67 in all three switch types. Std. Red LED requires min 18 mA.

### **Switch Specifications**

Model Number	119581-1	119581-2	119581-3	119582-1	119582-2	119582-3	119583-1	119583-2	119583-3		
Lead Length/Type	1m bare	3m bare	Plug	1m bare	3m bare	Plug	1m bare	3m bare	Plug		
Lead Color		Black		Grey			Black				
Switch Type	REED			PNP(SOURCING)			NPN (SINKING)				
Input Voltage	100 VDC, 125 VAC Max.				10 - 30 VDC			5 - 30 VDC			
	-			-			5 - 100mA @ 5V				
Operating Current	300mA (150mA Inductive)			7 - 100mA @ 12V			10 - 200mA @ 12V				
	_			14 - 200mA @ 24V			20 - 200mA @ 24V				
Detecting Distance	2.5 mm			m 1.5 mm			1.5 mm				
Detecting Width	-			3.0 mm			3.0 mm				
Response Time	1 mSec. Min.			-			-				
LED Function	n 18mA Min. 1mA Min. 1mA Min.										

#### Hall Effect Switches

It is important to note that Hall Effect switches must always have current through them to work. In a magnetic field, the semiconductor generates a voltage across the sense leads. Removing the magnetic field returns the switch to its normally open state. Hall effect switches have 'three wire' leads. Black leads are sinking (NPN). Grey leads are sourcing (PNP). Load is controller.



There are two types of Hall Effect switches. Each is connected differently. Check your PLC for the input method used. Sinking (NPN) will sink current to ground. Sourcing (PNP) will provide current from the +VDC.

### Ordering

#### Tanks & Reservoirs (1-1/2" thru 4" Bore)

Two Provenair tank styles provide unique capabilities for your applications.

Style A, air-over-oil tanks provide the smooth control hydraulic systems are known for, without the expense, using shop air.

Style T reservoirs provide a supply of air near the point of use, allowing your system to use a smaller compressor or smaller system supply lines.



#### Sight glass available in Style A only



Air/Oil Tank 250 P.S.I.



Air Reservoir

### **Mounting Data**

Series AN, SN (1-1/2" Thru 10" Bore) Factory Installed Mounts



Note: Mounts H & F 8" and 10" bore cylinders use oversized end cap as shown (ME3 or ME4). A steel rectangular flange plate is used for all MF1 or MF2 (1 1/2 thru 6" bore).

Note: Not all mounts are available on stainless steel models (Series SN)

### **Pneumatic Cylinders Provenair® - Dimensional Data**

### **Dimensional Data**

#### Series AN, SN (Rod End)

Rod End Dimensions for 1-1/2" - 10" Bore Sizes

	Cylinder Bore (Inches)									
	1-1/2, 2, 2-1/2	2, 2-1/2	3-1/4, 4	3-1/4, 4	5	5, 6, 8	6, 8, 10			
Rod Diameter (Inches)	5/8	1	1	1-3/8	1	1-3/8	1-3/4			
KK1 THD. ( M OR F)	7/16" -20	3/4"-16	3/4"-16	1"-14	3/4"-16	1"-14	1-1/4"-12			
KK2 THD. (MALE)	1/2"-20	7/8"-14	7/8"-14	1-1/4"-12	7/8"-14	1-1/4"-12	1-1/2"-12			
CC (MALE)	5/8"-18	1"-14	1"-14	1-3/8"-12	1"-14	1-3/8"-12	1-3/4"-12			
A	.75	1.13	1.13	1.63	1.13	1.63	2.00			
В	1.13	1.50	1.50	1.50	1.50	2.00	2.38			
С	.38	.62	.48	.60	.50	.63	.75			
D	.50	.88	.88	.81	.81	1.13	1.50			
F	.325	.325	.625	.625	.625	.625	.625			
MM	.625	1.00	1.00	1.00	1.00	1.375	1.75			
V	.62	.75	.89	1.02	.25	.38	.38 *			
	-	_	-	-	-	-	* (.50 on10")			

Selection of oversize piston rod affects the following dimensions: ZB, ZC, ZD, ZE, ZF, ZL, ZM, XC, XD, XE, XG, XJ, XS, XT, V, W, WF, C, V, LA. See rod end dimensions.



Series AN, TN Bore Sizes 1-1/2", 2", 2-1/2", 3-1/4", 4"

P + Stroke EE NPTF

SN + Stroke

ZB + Stroke



XT

G

LD + Stroke

MOUNT B

KK1 Thread

NA

NT Thread

TK Depth

BC

NT Thread

TK Depth

МM

B Î







Side Lug MS2

Rect. Flange – Head-MF1, Cap-MF2 MOUNT F & H (1 1/2' - 4" BORE ONLY)



Series AN, SN (1-1/2" Thru 4" Bore w/standard rod)

	Cylinder Bore (Inches)									
	1-1/2	2	2-1/2 <sup>`</sup>	<b>3</b> -1/4	4					
В	1.13	1.13	1.13	1.50	1.50					
BC	2.02	2.60	3.10	3.90	4.70					
E	2.00	2.50	3.00	3.75	4.50					
EE	3/8-18	3/8-18	3/8-18	1/2-14	1/2-14					
F	.38	.38	.38	.63	.63					
FB	.31	.38	.38	.44	.44					
G	1.44	1.44	1.44	1.69	1.69					
J	.94	.94	.94	1.19	1.19					
KK1 (thread)	7/16-20	7/16-20	7/16-20	3/4-16	3/4-16					
LB	3.62	3.62	3.75	4.25	4.25					
LD	4.12	4.12	4.25	4.75	4.75					
MM (rod dia.)	5/8	5/8	5/8	1.00	1.00					
NA	.59	.59	.59	.97	.97					
NT	1/4-20	5/16-18	3/8-16	1/2-13	1/2-13					
Р	2.25	2.25	2.38	2.62	2.62					
PA	2.75	2.75	2.88	3.12	3.12					
R	1.43	1.84	2.19	2.76	3.32					
RC	.41	.538	.41	.599	.44					
RT	1/4-28	5/16-24	5/16-24	3/8-24	3/8-24					
SB	.38	.38	.38	.50	.50					
SN	2.25	2.25	2.38	2.63	2.63					
SS	2.88	2.88	3.00	3.25	3.25					
ST	.56	.69	.81	1.00	1.19					
SX	.34	.34	.34	.47	.47					
SY1	1.34	1.53	1.53	2.13	2.19					
SY2	.94	1.13	1.13	1.50	1.56					
TF	2.75	3.38	3.88	4.69	5.44					
ТК	.38	.43	.69	.75	.75					
TN	.63	.88	1.25	1.50	2.06					
TS	2.75	3.25	3.75	4.75	5.50					
UF	3.38	4.13	4.63	5.50	6.25					
US	3.50	3.69	4.50	5.75	6.5					
UT	4.00	4.50	5.00	5.75	6.50					
W	.62	.62	.62	.75	.75					
WF*	1.00	1.00	1.00	1.38	1.38					
XG*	1,75	1.75	1.75	2.25	2.25					
XJ*	4,12	4.12	4.25	5.00	5.00					
XS*	1.38	1.38	1.38	1.88	1.88					
XT*	1.94	1.94	1.94	2.44	2.44					
Y*	1,94	1.94	1.94	2.44	2.44					
ZB*	4,63	4.63	4.75	5.63	5.63					
 7F*	5.00	5.00	5.12	6.25	6.25					
71 *	5.12	5.12	5.25	6.12	6.12					
 7M*	6 15	6 15	6.27	7.52	7.52					

MEETING THE STANDARDS. ARO Provenair Cylinders meet NFPA standards. Use valves that meet the highest standards – ARO

Alpha and Genesis Valves. Alpha valves are available in body ported and sub-base configurations. Genesis valves are available in sub-base configuration only and have convenient "plug-into-the-base" electronics.

\* Oversize piston rod option affects these dimensions. See rod end dimensions.

### **Pneumatic Cylinders Provenair® - Dimensional Data**

#### **Dimensional Data** Е (Female retaining Series AN, SN (1-1/2" Thru 10" Bore w/standard rod) bolts either end) **MOUNTS 1,2,3,4** ZE + Stroke - XE + Stroke EE RT Thread RC Depth ZB + Stroke → 843 ZD + Stroke MR 843 844 FT WL WĹ CD R ET FO EQ SE + Stroke . EB, 4 Pl. LR Side End Lugs MS7 FI → EW MOUNT L Μ XD + Stroke **Detachable Eye MP4** MOUNTK XA + Stroke Ο Ο 846 64.0 AB 1 HOLE (6) AH ZC + Stroke Ţ AO < < AL .188 SA + Stroke **Angle Mount MS1** Μ XC + Stroke CB CW **MOUNT A Fixed Clevis MP1** MOUNT C BB BB ZD + Stroke -0 MR DD 642 81.6 R θ ⊜ ..... Ć ZB + Stroke R F FI **Tie Rod Mounts** CE М CW **MX1 Extended Both Ends MX3 Extended Head End** XD + Stroke MOUNT Q, T & U **Detachable Clevis MP2**

MOUNT D (AN Series only)

#### **Dimensional Data** Series AN (1-1/2" Thru 4" Bore w/standard rod)

Cylinder Bore (Inches)						ider Bore (Inches) Cylinder Bore (Inches)							C	/linder B	ore (Inch	ies)		ļ
	1-1/2	2	2-1/2	3-1/4	4		1-1/2	2	2-1/2	3-1/4	4		1-1/2	2	2-1/2	3-1/4	4	
AB	.38	.38	.38	.50	.50	EQ	.25	.31	.31	.38	.38	SE	5.50	5.88	6.25	6.63	6.88	
AH	1.18	1.44	1.62	1.94	2.25	ET	.56	.69	.81	1.00	1.19	W*	.62	.62	.62	.75	.75	
AL	1.00	1.00	1.00	1.25	1.25	EW	.75	.75	.75	1.25	1.25	WL	.14	.33	.45	.13	.25	
AO	.38	.38	.38	.50	.50	F	.38	.38	.38	.63	.63	XA	5.62	5.62	5.75	6.88	6.88	
BB	1.00	1.13	1.13	1.38	1.38	KK1 (Thread)	7/16-20	7/16-20	7/16-20	3/4-16	3/4-16	XC*	5.38	5.38	5.50	6.88	6.88	
CB	.75	.75	.75	1.25	1.25	FL	1-1/8	1-1/8	1-1/8	1-7/8	1-7/8	XD*	5.75	5.75	5.88	7.50	7.50	
CD	.50	.50	.50	.75	.75	L	3/4	3/4	3/4	1-1/4	1-1/4	XE*	5.38	5.56	5.81	6.50	6.63	
CW	.50	.50	.50	.63	.63	LR	3/4	3/4	3/4	1-1/4	1-1/4	ZB*	4.63	4.63	4.75	5.63	5.63	
DD	1/4-28	5/16-24	5/16-24	3/8-24	3/8-24	Μ	5/8	5/8	5/8	7/8	7/8	ZC*	5.84	5.88	6.00	7.63	7.63	
Е	2.00	2.50	3.00	3.75	4.50	MR	.47	.50	.50	.75	.75	ZD*	6.22	6.25	6.38	8.25	8.25	
EB	.28	.34	.34	.38	.38	R	1.43	1.84	2.19	2.76	3.32	ZE*	5.63	5.84	6.13	6.88	7.00	
EE (NPTF)	3/8-18	3/8-18	3/8-18	1/2-14	1/2-14	S	1.25	1.75	2.25	2.75	3.50	* Overs	ize piston	rod optior	n affects th	iese dime	nsions.	Ī
EL	.75	.94	1.06	.88	1.00	SA	6.00	6.00	6.12	7.38	7.38							



Cylinder Bore (Inches)										
	1 1/2"	2 & 2 1/2"	3 1/4" & 4"							
B1	.51	.60	.80							
B2	1.50	1.77	2.45							
B3	.26	.26	.33							

### **Useable Volume Finder**



**Typical Air Oil Circuit** 

#### Useable Volume Finder

	Bore	Style A	Style T
Q	1-1/2"	1.33	1.77
S	2"	2.36	3.14
Т	2-1/2"	3.68	4.91
W	3-1/4"	6.22	8.29
4	4"	9.42	12.56

#### Style T or A

Derive required circuit volume (V) in Cu. In. Divide (V) by factor from chart above to determine stroke (enter stroke value into model number).

Find unit length by adding stroke to dimension A from tank dimension table.

### **Tank Dimensions**



#### **Tank Dimensions**

	BORE	Α	J	TN	Ε	EE NPTF				
Q	1-1/2"	2.005	0.94	0.63	2	3/8-18				
S	2"	2.005	0.94	0.88	2.5	3/8-18				
Т	2-1/2"	2.005	0.94	1.25	3	3/8-18				
W	3-1/4"	2.505	1.19	1.50	3.75	1/2-14				
4	4"	2.505	1.19	2.06	4.5	1/2-14				
### **Dimensional Data**

Series AN, SN (5",6",8" and 10" Bore)



Tie Rods Extended, Head End MX3

BB

.

– FH

### **Dimensional Data**

**Provenair Mounts** 

Series	AN,	SN	(5",	6",	8",	&	10"	Bore)
--------	-----	----	------	-----	-----	---	-----	-------

			CYLIND	ER BORE (IN	BORE (INCHES)			
	5	5	6	6	8	8	10	
ROD	1	1-3/8	1-3/8	1-3/4	1-3/8	1-3/4	1-3/4	
A	1.13	1.63	1.63	2.00	1.63	2.00	2.00	
AA	5.18	5.18	6.90	6.90	9.1	9.1	11.2	
AB	.69	.69	.81	.81	.81	.81	-	
AH	2.88	2.88	3.25	3.25	4.25	4.25	-	
AL	1.38	1.38	1.38	1.38	1.81	1.81	-	
AO	.63	.63	.63	.63	.69	.69	-	
AT	.19	.19	.19	.19	.25	.25	-	
В	1.50	2.00	2.00	2.38	2.00	2.38	2.38	
BB	1.81	1.81	1.81	1.81	2.31	2.31	2.69	
С	.50	.63	.63	.75	.63	.75	.75	
СВ	1.25	1.25	1.50	1.50	1.50	1.50	2.00	
CD	.75	.75	1.00	1.00	1.00	1.00	1.38	
CW	.63	.63	.75	.75	.75	.75	1.00	
D	.81	1.13	1.13	1.50	1.13	1.50	1.50	
	1/2"-20	1/2"-20	1/2"-20	1/2"-20	5/8"-18	5/8"-18	3/4"-16	
F	5.50	5.50	6.50	6.50	8.50	8.50	10.63	
EE(NPTE)	1/2	1/2	3/4	3/4	3/4	3/4	1 00	
F	63	63	63	75	63	75	63	
FR	.00	.00	.00	.75	.00. 60	60	.00	
	.00	.50	.50	.50	.05	.03	.01	
	.03	.00	.75	.75	_	_	.03	
FL	2.10	2.13	2.20	2.20	2.00	2.00		
G	1.70	1.70	2.00	2.00	2.00	2.00	2.20	
J	1.20	1.20	1.50	1.50	1.50	1.50	2.00	
K	.44	.44	.50	.50	.63	.63	.69	
KK1 THREAD	3/4-16	1-14	1-14	1-1/4-12	2 1-14	1-1/4-12	2 1-1/4-12	
L	1.25	1.25	1.50	1.50	1.50	1.50	2.13	
LB	4.25	4.25	5.00	5.00	5.13	5.13	6.38	
LD	4.75	4.75	5.50	5.50	5.63	5.63	6.63	
Μ	.88	.88	1.00	1.00	1.00	1.00	1.38	
MM	1	1-3/8	1-3/8	1-3/4	1-3/8	1-3/4	1-3/4	
NT	5/8"-11	5/8"-11	3/4"-10	3/4"-10	3/4"-10	3/4"-10	1-8	
Р	2.63	2.63	3.00	3.00	3.13	3.13	4.31	
R	4.10	4.10	4.88	4.88	7.57	7.57	7.92	
RM	2.63	3.38	3.38	3.50	3.38	3.50	3.50	
S	4.25	4.25	5.25	5.25	7.13	7.13	7.13	
SA	7.63	7.63	8.50	8.50	8.75	8.75	-	
SN	2.88	2.88	3.13	3.13	3.25	3.25	4.13	
TD	1.00	1.00	1.38	1.38	1.38	1.38	-	
TF	6.63	6.63	7.63	7.63	7.57*	7.57*	_	
TK	1.00	1.00	1.13	1.13	1.13	1.13	1.50	
TL	1.00	1.00	1.38	1.38	1.38	1.38	-	
TN	2.69	2.69	3.25	3.25	4.50	4.50	5.50	
UF	7.63	7.63	8.63	8.63	_	_	_	
UT	7.50	7.50	9.25	9.25	11.25	11.25	_	
V	.25	.38	.38	.38	.38	.38	.50	
Ŵ	.75	1.00	.88	1.13	1.63	1.88	1.88	
XA	7.00	7 25	8.00	8 25	8.56	8.81	_	
XC	6.88	7 13	8 13	8.38	8 25	8.50	10.38	
XD	7 75	8 00	8.88	9.13	-	-	-	
XG	2.25	2.50	2.62	2.00	2 62	2 88	_	
XU XI	5.00	5.05	2.03	6.10	2.00	6.25		
ΛJ VT	0.00	0.20	0.00	0.13	0.00	0.20	_ 0 10	
XI V	2.01	2.00	2.01	0.00	2.01	0.00	3.13	
1 70	2.44	2.44	2.00	2.00	2.ŏŏ	2.00	3.00	
ZB	0.00	0.31	7.13	7.38	7.38	7.03	8.94	
	b.50	b./5	7.38	7.63	b./5	7.00	8.25	
ZM	7.75	8.25	8.75	9.25	8.88	9.38	10.63	



Cap Rectangular Flange MF2







\* R Dimension on 8" bore.

### **Accessories**

### Series AN (5/8" thru 1-3/4" Rod) Socket Head Rod Studs

	5/8 Stud Thread Part Number	ROD DIAMETEI 1 Stud Thread Part Number	R (INCHES) 1-3/8 Stud Thread Part Number	1-3/4
KK1	7/16"-20 x 3/4"	3/4"-16 x 1-1/8"	1"-14 x 1-1/8"	_
	117812-101	117812-201	117812-301	
KK1 (2 x length)	7/16"-20 x 1-1/2"	3/4"-16 x 2-1/4"	1"-14 x 2-1/4"	-
	117812-121	117812-221	117812-321	
KK2 (1st oversize)	1/2"-20 x 3/4"	7/8"-14 x 1-1/8"	1-1/4"-12 x 1-5/8"	-
	117812-102	117812-202	117812-302	
CC Full (2nd oversize)	5/8"-18 x 3/4"	1"-14 x 1-1/8"	1-3/8"-12 x 1-5/8"	-
	117812-103	117812-203	117812-303	

	Rod Thread						
	7/16-20	3/4-16	1-14	1-1/4-12			
ROD CLEVIS KIT (includes pin)	116183	116046	116049	116052			
ROD EYE KIT	116184	116047	116050	116053			
CLEVIS PIN	115299	115300	-	-			
PIVOT PIN	-	-	116048	116051			
Mating parts to rod end accesso	ries and mount	ing brackets					
Clevis Bracket (Iron)	-	117206-5	117206-6	-			
Eye Bracket (Iron)	-	117205-5	117205-6	-			







**Use for Both Pins** 







\* These accessory brackets attach to mating cylinder mounts. See Cylinder Mounting Dimensions on page 129.

## **Dimensional Data**

Rod Eye, Rod Cle	evis and Pin			
А	.75	1.13	1.63	2.00
CA	1.50	2.06	2.81	3.44
CB	.75	1.25	1.50	2.00
CD	.50	.75	1.00	1.38
CD1	.44	.75	-	-
CE	1.50	2.38	3.13	4.13
CH	1.00	1.25	1.50	2.00
CW	.50	.63	.75	1.00
ER	.72	1.06	1.00	1.38
HP	.156	.156	-	-
KK1	7/16-20	3/4-16	1-14	1 1/4-12
L	.75	1.25	1.50	2.13
LH	2.25	3.13	3.75	5.00
LP	2.1	2.75	3.25	4.50
Mating parts to	rod end accessorie	es and mounting	j brackets	
BA	-	2.56	3.25	-
CB	-	1.25	1.50	-
CD	-	.75	1.00	-
CW	-	.63	.75	-
DD DIA.	-	.53	.66	-
DD TAP	-	1/2-20	5/8-18	-
E	-	3.50	4.50	-
F	-	.63	.75	-
FL	-	1.88	2.25	-
Μ	-	.75	1.00	-

### Ordering

Repair Kits (Single Rod End Rod Bushings)

		Cylinder Bore Size (Inches)							
	1-1/2	2	2	2-1/2	2-1/2	3-1/4	3-1/4	4	4
Rod Diameter	5/8	5/8	1	5/8	1	1	1-3/8	1	1-3/8
Series AN Bushing	119454	119455	119456	119455	119456	119457	119458	119457	119458
Series SN Bronze Bushing	114171	114171	114172	114171	114172	114172	114173	114172	114173

		Cylinder Bore Size (Inches)							
		5	5	6	6	8	8	10	10
Rod Diameter	-	1	1-3/8	1-3/8	1-3/4	1-3/8	1-3/4	1-3/4	2
Series AN Bushing	-	115074	115075	115075	115076	115075	115076	115076	114130
Series SN Bronze Bushing	_	114172	114173	114172	114173	114173	114174	114174	114175

Order two kits for double rod end cylinders.

### Micro-Air Series 01 (Seal Kits)

Bore Size	1/2	3/4	1-1/8	
	7150	7151	7152	



	Not Used	Not Used
Cylinder Model Number <u>S</u> <u>A</u> <u>N</u>	<u> </u>	$\mathbf{\underline{(}} \mathbf{X} \mathbf{X} - \mathbf{X} \mathbf{X} \mathbf{X}$
Repair Kit Model Number Figure 1   S K   R K		
To order a repair kit, use the model number from the cylinder label. Provenair repair kits start with the letters "RKN", "SKN" or "TKN" and appear in the first three positions. Using the numbers from the cylinder label, construct the remainder of the Repair Kit or number as directed below.		
Repair Kit Designators		
S or R and K for Repair Kit, N for Provenair. Type		
Double-Acting Single Rod = A Double Acting Double Rod = B Bore Size		
1 1/2 Q 2" S 2 1/2"T 3 1/4"W 4" 4 5" 5 6" 6 8" 8 10" Y Rod Diameter		
5/8" K 1" M 1-3/8" P 1 3/4" Q 2" S		
Rod Style Not Used Penlacement Seals		
Buna-N B Buna-N + Mag. Pist. G (Use B)		
Viton V Viton + Mag. Pist. H (Use V) Self-Lube S Self-Lube Slipperv + Mag. Pist. J (Use S)		
Replacement Cushion Seals (All Seal Kits Use "B")		
No Cushion SealsXCushions Both EndsBCushion CapCCushion HeadH	EXAMPLE REPAIR KIT MODEL Supplies all Viton seals for a s	: <b>RKNAWM-VB</b> ingle rod end, 3 1/4" bore,
Port Location Not Used, Mounts Not Used, Stroke Not Used	1" diameter piston rod cylin wearband and Viton cushion se	nder. Kit includes Teflon eals for both ends
	Not Used	Not Used
Cylinder Model Number		( x x – x x x
Reciprocating Assembly No.	$\begin{array}{c c} \mathbf{X} & \mathbf{X} & \mathbf{X} \\ \mathbf{X} & \mathbf{X} & \mathbf{X} \\ \mathbf{X} & \mathbf{X} & \mathbf{X} \\ \mathbf{X} & \mathbf{X} \\ \mathbf{X} & \mathbf{X} \\ \mathbf{X} & \mathbf{X} \\ $	k – X X X
Reciprocating Assembly designators	$-\top$ $\top$ $\top$ $\top$ $\top$	Stroke
Туре		To order a reciprocating
Double-Acting Single Rod = A Double Acting Double Rod = B Bore Size		assembly, use the model number from the cylinder
1 1/2 Q 2" S2 1/2" T 3 1/4" W 4" 4 5" 5 6" 6 8" 8 10"	" <b>Y</b>	assemblies start with the
		letters "RAN", "RSN" or
5/8 K 1 M 1-3/8 P 1-3/4 U 2 S Rod Style		"RIN" and appear in the first three positions. Using the
A Chrome, Std Male (KK1) B Chrome, Intermed. Male (KK2) C Chrome, Full Male (CC) D Chrome, Female (KK1) F Chrome, No Threads K S.S., Standard Male (KK1) S.S., Intermediate Male (KK2) S.S., Full Male (CC) S.S., Female (KK1) K S.S., Female (KK1) S.S., No Threads		numbers from the cylinder label, construct the remainder of the reciprocating assembly number as directed at left.
Replacement Cushioned or Non Cushioned		
No Cushion Seals X Cushions Both Ends B Cushion Cap C Cushion Head H	EXA R J	MPLE RECIPROCATING Assembly Model: A N A S K - A H - 1 2 0
Port Location Not Used, Mounts Not Used	liamatar abrama rad VV1 threads	a suchian based and 10"

### **Features**

- Slide applications no longer require costly precision cylinder machining for mounting fixed or rigid guide.
- Friction due to misalignment is eliminated, increasing cylinder efficiency.
- An angular error of 2° and 1/16 inch lateral misalignment on push and pull stroke is compensated.
- · Cylinder and component wear is reduced, providing increased reliability.
- Field alignment problems are rectified.
- All components are heat treated for improved corrosion resistance, wear resistance, and fatigue properties.





### Ordering

Counter	Dimensions								Max. Pull
Number	А	В	C	D	Е	F	G	н	(Pounds)
118683	3/8-16	.875	1.25	.25	.625	.313	.313	.75	5,000
118684	7/16-20	1.25	2.00	.50	.75	.625	.50	1.00	10,000
118685	1/2-20	1.25	2.00	.50	.75	.625	.50	1.00	14,000
118686	1/2-13	1.25	2.00	.50	.75	.625	.50	1.00	14,000
118687	5/8-18	1.25	2.00	.50	.75	.625	.50	1.00	19,000
118688	3/4-16	1.75	2.31	.50	1.125	.97	.813	1.50	34,000
118689	3/4-10	1.75	2.31	.50	1.125	.97	.813	1.50	34,000
118690	7/8-14	1.75	2.31	.50	1.125	.97	.813	1.50	39,000
118691	1-14	2.50	2.94	.50	1.625	1.375	1.16	2.25	64,000
118692	1-8	2.50	2.94	.50	1.625	1.375	1.16	2.25	64,000
118693	1-1/4-12	2.50	2.94	.50	1.625	1.375	1.16	2.25	78,000
118694	1-3/8-12	2.50	2.94	.50	1.625	1.375	1.16	2.25	78,000
118695	1-1/2-12	3.25	4.375	.812	2.25	1.375	1.50	3.00	134,000

### **Dimensional Data**



### Warnings

#### Harmful Compressor Oils & Other Materials

Some oils used in air compressors contain chemicals harmful to Buna-N seals, if not adequately filtered at the compressor. The most common of these oils, in addition to other harmful material, are listed below.

COMPRESSOR OILS

Sears Regular Motor Oil

Sinclair Oil "Lily White"

Tenneco Anderol No. 495

Phrano

Skydrol

Pvdraul AC

(Polyurethane)

#### **COMPRESSOR OILS**

Cellulube No. 150 & 220 Haskel No. 568-023 Hougton & Co. Oil No. 1120, No. 1130, No. 1055

Houtosafe 1000 Kano Kroil Keyston Penetrating Oil No. 2 & No. 500 Oils

Marvel Mystery Oil

#### Air & Lubrication Requirement

**AIR PRESSURE:** Limited to 200 psig (14 bar) FILTRATION: 40 Micron. Proper moisture removal and filtration of contaminates will promote good service life and operation. Install an air regulator to control the operating pressure, insure smooth operation and conserve energy.

**LUBRICATION:** All valve components have been lubricated at the factory and can be operated without additional air line lubrication. Minimal lubrication may extend the life of the valve. 50 Series, E-Series and K-Series Valves use o-ring seals. For maximum performance and life expectancy, standard air line lubrication should be used. If air line cylinders or other air line devices, used in conjunction with ARO valve, require lubrication, be sure the lubricating oils used are compatible with the valve seals and are of sufficient viscosity to assure adequate lubrication. ARO recommends an oil lubricant with a viscosity of 100-200 SUS at 100° F and an airline point above 200° F. **NOTICE:** The use of compound oils containing graphite filters, extremely low viscosities an other non-fluid lubricants is not recommended. RECOMMENDED: ARO 29665 air line lubricator oil is available in one quart containers.

**OTHER MATERIALS** 

Garlock No. 98403 (Polyurethane)

Stillman No. SR513-70 (Neoprene)

Parco No. 3106 (Neoprene)

Some Loctite Compounds

Stillman No. SR269-75

#### Warning

The following are hazards or unsafe practices which could result in severe personal injury, death or substantial property damage. Heed the following. Use safeguards. Insure that provisions are made to prevent the valve from being accidentally operated (actuated.) **Hazardous Air Pressure.** Shut off, disconnect and relieve any trapped air pressure from system before performing service or maintenance. **Hazardous Voltage.** Do not attempt any service without disconnecting all electrical supply sources.

with cylinders.

**CAUTION:** Compounded oils

containing graphite and fillers

are not recommended for use

# **NOTICE:** Genesis Series Valves must be grounded.

Do not use the valve as a safety device or to operate or control the operation of full revolution clutch systems or brake systems on power presses or similar equipment. These valves are not intended for such applications. Do not subject the valve to any condition that exceeds the limits set forth in the specifications for a particular valve model. Keep all hoses, electrical wiring, fittings and connections in good working condition. Damaged air pressure hoses, electrical wiring, or connections, could cause accidental valve operation (actuation). Only allow gualified technicians to install or maintain the valve system. It is necessary to have a through understanding of the operation and application of all valves being used in a particular system and how they interact with the other components of the system.

General	Information
---------	-------------

To obtain information or to receive technical literature for specific valves: contact ARO Customer Service at (800) 495-0276 or contact your nearest ARO distributor. Selected parts are provided in kit form. The ARO Parts List/Service Instructions contain Repair Kit information and complete Service Parts information and are available upon request. Order Manuals as shown. The following Operator's Manuals are available.

#### Operator's Manual Part Number ALPHA SERIES 119999-015 CAT SERIES 119999-036 E SERIES 119999-034 **GENESIS SERIES** 119999-021 **H SERIES** 119999-037 **K SERIES** 119999-035 **50 SERIES** 119999-045

### **Five Year Product Warranty**

The ARO Cylinders, in this catalog are backed up by our famous 5-year warranty, as a measure of the confidence we place in the quality of these products. A confidence that you can share.

#### **FIVE-YEAR WARRANTY**

IR/ARO warrants to the original use purchaser of IR/ARO manufactured cylinders that IR/ARO will repair or replace, free of charges, including return shipping costs within the Continental United States of America, any such product which under normal use and service proves defective in material or workmanship, as determined by IR/ARO Inspection, within FIVE YEARS from date of shipment from IR/ARO, provided the claimed defective product, or part thereof, is promptly returned to the IR/ARO factory or IR/ARO authorized warranty repair center with transportation prepaid.

This warranty does not cover failure of parts or components due to normal wear or damage, which in the judgment of IR/ARO, arises from misuse, abrasion, corrosion, negligence, accident, substitution of non-IR/ARO parts, faulty installation or tampering.

If IR/ARO Inspection discloses no defect in material or workmanship, repair or replacement and return will be made at customary charges.

This warranty covers IR/ARO manufactured products shipped on or after July 4, 1988.

Equipment not covered by IR/ARO warranty: accessories or components of equipment sold by IR/ARO that are not manufactured by IR/ARO (such as switches, hoses, gasoline engines, etc.) are subject to the warranty, if any, of their manufacturer. IR/ARO will provide the purchaser with reasonable assistance in making such claims.

The foregoing warranty supersedes, voids and is in lieu of all or any other warranties, express or implied, and no warranty or merchantability or fitness for particular purpose is intended or made. IR/ARO's sole obligation and the original use purchaser's sole remedy is as stated above and in no event shall IR/ARO be liable for any special, direct, indirect, incidental, consequential or other damages, or expenses of any nature including, without limitation, loss of profits or production time incurred by the original use purchaser or any other party.



# **Air Motors**

- 0000 Series Motors
- 000 Series Motors
- O Series Motors
- 2200 Series Motors
- 44 Series Motors

# Notes



## Air Motors ARO Rotary-Vane Pneumatic Power Motors

ARO rotary-vane pneumatic power motors are designed to be used in a fixed position and remotely controlled. They provide all the safety, convenience and reliability of portable handheld air tools. In proportion to their power output they are small and light, and can be installed in confined spaces which cannot accept conventional electric motors. They allow positive control at adjustable speeds. They are free from spark hazard and will not burn out from overloading. An overloaded motor will stall, but will return to normal operation when the overload condition is removed.

**OPTIMUM DESIGN**. Rotary-vane air motors produce high power-to-weight performance with a minimum number of moving parts. All rotors are ball-bearing mounted at each end.

**CLOSED PLANETARY GEARING.** Common to all motors, with needle bearing support on all planet gears. Planet cages have ball bearings at each end (except 0000-Series) to withstand moderate end thrust and radial load. The closed planetary gearing system provides vibration-free power and long service life.

**LOW MAINTENANCE.** Precision machining, all-steel construction, ball bearings and needle bearings at support points give trouble-free performance. For minimum maintenance it is also essential that motors be operated with clean, dry, lubricated air that systematic gear lubrication be maintained. Convenient flush-type grease fittings provide lubrication for rotating parts.

**EASY, CONVENIENT AIR CONNECTIONS.** Inlet ports are provided at side and rear to facilitate connecting of air hose to motor in confined spaces.

**REVERSIBLE MOTORS.** These operate equally well in either direction. They can be reversed on a continued-cycling basis without damage.

**QUICK RESPONSE.** Air motors come up to full speed within half a revolution under a no-load condition. When selecting air motors for applications requiring start-stop cycling, reversing of connected loads, or a combination of the two, use starting-torque values to determine the correct size of the air motor needed for the application. Under favorable operating conditions, starting torque is generally 75% of stall torque.

# EXAMPLES OF CONSTANT-TORQUE APPLICATIONS:

Tumbling barrels Parts feeders Shuttle racks Rotary pumps Cross-hole indexing Index tables Feed rollers WIDE SELECTION OF SPEEDS AND TORQUES. ARO offers the widest selection of speeds, torques and spindles in the industry. See chart below for horsepower and speed range of each series. If you need a large quantity of motors and cannot find necessary specifications in these listings, ask us about the possibility of a standard motor with design modifications. Specify horsepower output required, torque to be developed at load or stall depending upon the application, speed required at peak horsepower or load torque, air pressure available, and CFM available.

#### ROTARY-VANE POWER MOTOR PERFORMANCE. There are

two basic types of rotary-vane power motor applications.

1. Operation of motor at constant speed and torque.

2. Operation where torque increases to a stall condition. In the first instance, load speed performance and load torque are listed at rated peak horsepower, based on an air inlet pressure of 90 p.s.i. (6.2 bar gauge). At its peak horsepower point, the motor operates at peak efficiency. This is the point at which the motor should be operated on continuous-run drive applications. Reduction of air inlet pressure allows infinite control of speed and torque. Power performance curves on specific models can be provided upon request. Air regulation below 50 p.s.i. (3.4 bar gauge) will affect consistent starting of air motors under constant load conditions. Generally, if a pressure of less than 50 p.s.i. is required to secure desired performance, the most suitable motor would be one with a lower spindle speed horsepower, or both.

In the second instance, steadily increasing torque applications are those in which the motor has inherent advantages. The motor may be stalled repeatedly without overheating or damage to the spindle. When the load condition exceeds the torque potential of the motor, the unit will stall. After the overload condition is removed, the motor will return to normal operation.

**Note:** Sudden, slam-type stalling should be avoided. Applications of this kind, which are beyond the expected normal performance of pneumatic power motors, will damage the power train due to the dynamic shock loads imposed.

# EXAMPLES OF STEADILY INCREASING TORQUE APPLICATIONS:

Raising and lowering dies in punch presses. Rotating worm gears to compress paper or steel in a shearing press.

Opening and closing lathe chucks.

Opening and closing mold clamps.

Assembling nuts and bolts as a single-spindle or multiplespindle nutsetter.

SERIES	Speed Range R.P.M.	Torque Range Ib. ft.	SERIES	Speed R.P.M.	Torque Range Ib. ft.
0000	1,000-25,000	.10-1.80	2200	250-18,000	1.0-55.0
000	550-20,000	.18-8.20	2200-44 Gearing	35-800	13.00-150.00**
0	475-19,000	.52-24.0	44	275-14,000	2.20-124.0
0-2200 Gearing	40-5,300	1.70-60.0*			

\*Max. torque recommended for planetary gear system on these models requires shear key with 60 lb. ft. shear strength.

\*\*Max. torque recommended for planetary gear system on these models requires shear key with 150 lb. ft. shear strength.



		R.F FREE	P.M. LOAD SPEED	STA	toi Ll	RQUE OUT @MAX	'PUT (. H.P.	AI Consui @free	R MPTION SPEED	SOUND LEVEL @FREE SPEED	WEI	GHT	GEAR
MODEL	SPINDLE	SPEED	@MAX. H.P.	lb. ft.	Nm	lb. ft.	Nm	SCFM	L/s	dB(A)	bs.	kg.	REDUCTION
FORWARE	ROTATION1	0 H.P.											
8610-A	3/8" Keyed	1,000	500	1.8	2.4	1.05	1.4	9.5	4.5	80	90	.40	Double
8611-A	3/8" Keyed	5,000	2,500	.42	.6	.21	.3	9.5	4.5	80	80	.36	Single
8616-A	3/8"-24 Th'd.	1,000	500	1.8	2.4	1.05	1.4	9.5	4.5	80	.90	.40	Double
8617-A	3/8"-24 Th'd.	5,000	2,500	.42	.6	.21	.3	9.5	4.5	80	.80	.36	Single
8618-A	3/8"-24 Th'd.	25,000	13,000	.10	.1	.04	.05	9.5	4.5	80	.80	.36	Single
REVERSIE	BLE10 H.P.												
8613-A	3/8" Keyed	1,000	500	1.8	2.6	1.05	1.4	11.5	5.4	80*	.90	.40	Double
8614-A	3/8" Keyed	5,000	2,500	.42	.6	.21	.3	11.5	5.4	80*	.80	.36	Single

\*Requires installation for reversible motors - shown on page 168.

#### STANDARD EQUIPMENT

Steel motor housing, flush-type grease fittings at rotation points for gear and bearing lubrication, exhaust manifold rotatable within 360°, and muffler.

#### **MOUNTING ACCESSORIES**

41058 Flange Bracket 41057 Foot Bracket



# OPTIONS FOR MOTORS WITH THREADED SPINDLES

- 30384-5 3/8" (9.5 mm) Male Square-Drive Adapter.
- 30384-9 1/2" (12.7 mm) Male Square-Drive Adapter.
- 30712 1/4" (6.4 mm) Female Hex Ball-Lock Adapter for screwdriver bits.
- 47340 1/4" (6.4 mm) Capacity Drill Chuck.

## Air Motors Dimensions – 0000-Series Power Motors & Mounts





		D D			TOR		DIIT						
		FREE	LOAD SPEE	D ST/	ALL	@MA)	(. H.P.	@FREE	SPEED	@FREE SPEED	WE	GHT	GEAR
MODEL	SPINDLE	SPEED	@MAX. H.I	P. Ib. ft.	Nm	lb. ft.	Nm	SCFM	L/s	dB(A)	lbs.	kg.	REDUCTION
FORWARD	ROTATION2	5 H.P.											
7538-B	3/8" Keyed	550	325	8.2	11.1	4.0	5.4	18.1	8.5	75	1.82	.82	Double
7539-B	3/8" Keyed	900	550	5.0	6.7	2.4	3.2	18.1	8.5	75	1.82	.82	Double
7540-B	3/8" Keyed	2,700	1,600	1.75	2,3	.82	1.1	18.1	8.5	75	1.52	.68	Single
7541-B	3/8" Keyed	4,500	2,700	1.05	1.4	.49	.66	18.1	8.5	75	1.52	.68	Single
7542-C	3/8" Keyed	20,000	12,000	.22	.3	.11	.14	18.1	8.5	75	1.52	.68	Single
7533-В	3/8"-24 Th'd.	550	325	8.2	11.1	4.0	5.4	18.1	8.5	75	1.82	.82	Double
7534-B	3/8"-24 Th'd.	900	550	5.0	6.7	2.4	3.2	18.1	8.5	75	1.82	.82	Double
7535-C	3/8"-24 Th'd	2,700	1,600	1.75	2,3	.82	1.1	18.1	8.5	75	1.52	.68	Single
7536-B	3/8"-24 Th'd.	4,500	2,700	1.05	1.4	.49	.66	18.1	8.5	75	1.52	.68	Single
7537-C	3/8"-24 Th'd.	20,000	12,000	.22	.3	11	14	18.1	8.5	75	1.52	.68	Single
REVERSIE	BLE25 H.P.												
7543-B	3/8" Keyed	550	300	7.80	10.6	4.37	5.9	20.0	9.4	75*	1.82	.82	Double
7544-B	3/8" Keyed	900	550	4.75	6.4	2.62	3.5	20.0	9.4	75*	1.82	.82	Double
7545-B	3/8" Keyed	2,700	1,500	1.60	2.2	.87	1.1	20.0	9.4	75*	1.52	.68	Single
7546-B	3/8" Keyed	4,500	2,400	.98	1.3	.55	.7	20.0	9.4	75*	1.52	.68	Single
7547-C	3/8" Keyed	20,000	11,000	.22	.3	.12	.16	20.0	9.4	75*	1.52	.68	Single

\*Requires installation for reversible motors - shown on page 168.

#### STANDARD EQUIPMENT

Steel motor housing, flush-type grease fittings at rotation points for gear and bearing lubrication, exhaust manifold and muffler.

#### MOUNTING ACCESSORIES



# OPTIONS FOR MOTORS WITH THREADED SPINDLES

- 30384-5 3/8" (9.5 mm) Male Square-Drive Adapter.
- 30384-9 1/2" (12.7 mm) Male Square-Drive Adapter.
- 30712 1/4" (6.4 mm) Female Hex Ball-Lock Adapter for screwdriver bits.
- 47340 1/4" (6.4 mm) Capacity Drill Chuck.
- 42420 3/8" (9.5 mm) Arbor for rubber friction drive wheels up to 1" (25.4 mm) wide.

37898

## Air Motors Dimensions – 000-Series Power Motors & Mounts







## Air Motors O-Series Power Motors with O-Series Gearing



		D D M			TO	RQUE			AIR				
		R.P	.м.			001	PUT	CONSL	JMPTION	SOUND LEVEL			
		FREE	LOAD SPEED	ST/	ALL	@MA)	(. H.P.	@FRE	E SPEED	@FREE SPEED	WE	GHT	GEAR
MODEL	SPINDLE	SPEED	@MAX. H.P.	lb. ft.	Nm	lb. ft.	Nm	SCFM	L/s	dB(A)	bs.	kg.	REDUCTION
FORWARD	ROTATION60	) H.P.											
8230-1A	3/8" Keyed	19,000	9,800	.70	.9	.32	.4	41	19.3	80	2.45	1.10	Single
8230-2A	3/8" Keyed	5,700	2,900	2.5	2.9	1.10	1.5	41	19.3	80	2.45	1.10	Single
8230-3A	3/8" Keyed	3,500	1,750	3.50	4.7	1.80	2.4	41	19.3	80	2.45	1.10	Single
8230-4A	3/8" Keyed	2,800	1,400	4.50	6.1	2.20	3.0	41	19.3	80	2.45	1.10	Single
8230-5A	3/8" Keyed	1,650	840	7.50	10.2	3.80	5.1	41	19.3	80	2.98	1.34	Double
8230-6A	3/8" Keyed	1,000	500	12.00	16.3	6.20	8.4	41	19.3	80	2.98	1.34	Double
8230-7A	3/8" Keyed	800	390	14.80	20.0	8.00	10.8	41	19.3	80	2.98	1.34	Double
8230-8A	3/8" Keyed	600	315	19.60	26.5	10.00	13.5	41	19.3	80	2.98	1.34	Double
8230-9A	3/8" Keyed	500	250	24.00	32.5	12.50	16.9	41	19.3	80	2.98	1.34	Double
8229-1A	3/8"-24 Th'd.	19,000	9,800	.70	.9	.32	.4	41	19.3	80	2.45	1.10	Single
8229-2A	3/8" 24 Th'd	5,700	2,900	2.15	2.9	1.10	1.5	41	19.3	80	2.45	1.10	Single
8229-3A	3/8"-24 Th'd.	3,500	1,750	3.50	4.7	1.80	2.4	41	19.3	80	2.45	1.10	Single
8229-4A	3/8"-24 Th'd.	2,800	1,400	4.50	6.1	2.20	3.0	41	19.3	80	2.45	1.10	Single
8229-5A	3/8"-24 Th'd.	1,650	840	7.50	10.2	3.80	5.1	41	19.3	80	2.98	1.34	Double
8229-6A	3/8"-24 Th'd.	1,000	500	12.00	16.3	6.20	8.4	41	19.3	80	2.98	1.34	Double
8229-7A	3/8"-24 Th'd.	800	390	14.80	20.0	8.00	10.8	41	19.3	80	2.98	1.34	Double
8229-8A	3/8"-24 Th'd.	600	315	19.60	26.5	10.00	13.5	41	19.3	80	2.98	1.34	Double
8229-9A	3/8"-24 Th'd.	500	250	24.00	32.5	12.50	16.9	41	19.3	80	2.98	1.34	Double
REVERSIB	LE50 H.P.												
8231-1B	3/8" Keyed	18,000	9,200	.52	.7	.28	.4	32	15.1	80*	2.45	1.10	Single
8231-2B	3/8" Keyed	5,300	2,600	1.70	2.3	1.00	1.3	32	15.1	80*	2.45	1.10	Single
8231-3B	3/8" Keyed	3,200	1,550	2.90	3.9	1.70	2.3	32	15.1	80*	2.45	1.10	Single
8231-4B	3/8" Keyed	2,600	1,300	3.50	4.7	2.00	2.7	32	15.1	80*	2.45	1.10	Single
8231-5B	3/8" Keyed	1,500	780	5.90	8.0	3.50	4.7	32	15.1	80*	2.98	1.34	Double
8231-6B	3/8" Keyed	950	480	9.50	12.9	5.50	7.4	32	15.1	80*	2.98	1.34	Double
8231-7B	3/8" Keyed	750	380	11.80	16.0	7.00	9.5	32	15.1	80*	2.98	1.34	Double
8231-8B	3/8" Keyed	5/5	290	15.50	21.0	9.00	12.2	32	15.1	80*	2.98	1.34	Double
8231-9B	3/8" Keyea	475	240	19.40	26.2	11.00	14.9	32	15.1	80*	2.98	1.34	Double

\*Requires installation for reversible motors - shown on page 168.

#### STANDARD EQUIPMENT

Steel motor housing, flush-type grease fittings at rotation points for gear and bearing lubrication, exhaust manifold rotatable within 360°, and muffler.

#### **MOUNTING ACCESSORIES**

37896 Flange Bracket 37897 Foot Bracket



# OPTIONS FOR MOTORS WITH THREADED SPINDLES

30384-5 3/8" (9.5 mm) Male Square-Drive Adapter. 30384-9 1/2" (12.7 mm) Male Square-Drive Adapter. 30712 1/4" (6.4 mm) Female Hex Ball-Lock Adapter for screwdriver bits.

- 47341 5/16" (7.9 mm) Capacity Drill Chuck.
- 42420 3/8" (9.5 mm) Arbor for rubber friction drive wheels up to 1" (25.4 mm) wide.

## **Air Motors Dimensions – O-Series Power Motors & Mounts**





(REF)

#### 37896 FLANGE MOUNTING BRACKET

Scale	А	В	с	D
Inches	.865 .885	2.042 2.082	1.021 1.041	13/16
mm	21.97 22.48	51.89 52.88	25.93 26.44	20.64
Scale	F	F	н	1
Scale	E	F	н	I
<b>Scale</b> Inches	E .380 .400	<b>F</b> .177 .197	<b>H</b> 2-9/16	l 1-5/8





#### 37897 FOOT MOUNTING BRACKET

Scale	Α	В	с	D	E	F	G
Inches	.865 .885	1.865 1.885	1.740 1.760	1-7/8	7/32 9/32	.177 .197	.380 .400
mm	21.97 22.48	47.37 47.88	44.20 44.70	47.63	5.56 7.14	4.50 5.00	9.65 10.16
Scale	н	1	J	L	м	N	0
<b>Scale</b> Inches	H 2-11/16	l 1-5/8	J .271 .291	L 1.302 1.322	M .927 .947	N 1.052 1.072	<b>O</b> .521 .541

## Air Motors O-Series Power Motors with 2200 Series Gearing



					TOF	RQUE		Al	R				
		R.	P.M.				PUT	CONSUM	<b>IPTION</b>	SOUND LEVEL			
MODEL		FREE		D STA		Uh ft	Nm	@FREE	SPEED		WEI	GHT	GEAR
MODEL	SPINDLE	SPEED	@MAX. H.P	. ID. Π.	NM	10.11.	NIII	SCFM	L/S	QR(A)	IDS.	ĸg.	REDUCTION
FORWARD R	DTATION6	60 H.P.											
8226-6A	1/2" Keyed	700	350	17.20	23.3	9.00	12.2	40.5	19.1	80	4.25	1.91	Double
8226-7A	1/2" Keyed	450	225	26.00	35.2	13.70	18.6	40.5	19.1	80	4.25	1.91	Double
8226-8A	1/2" Keyed	375	185	32.00	43.4	17.00	23.0	40.5	19.1	80	4.25	1.91	Double
8226-10A	1/2" Keyed	170	87	**60.00	88.1	36.00	48.8	40.5	19.1	80	5.56	2.50	Triple
8226-11A**	1/2" Keyed	110	57	**60.00	134.1	55.00	74.5	40.5	19.1	80	5.56	2.50	Triple
8226-12A**	1/2" Keyed	90	45	**60.00	165.3	**60.00	94.8	40.5	19.1	80	5.56	2.50	Triple
8226-13A**	1/2" Keyed	60	30	**60.00	249.3	**60.00	139.6	40.5	19.1	80	5.56	2.50	Triple
8226-14A**	1/2" Keyed	50	25	**60.00	306.2	**60.00	169.4	40.5	19.1	80	5.56	2.50	Triple
REVERSIBLE	50 H.P.												
8228-2B	1/2" Keyed	3,200	1,550	2.90	3.9	1.70	2.3	30	14	80*	4.25	1.91	Double
8228-3B	1/2" Keyed	2,600	1,300	3.50	4.7	2.00	2.7	30	14	80*	4.25	1.91	Double
8228-5B	1/2" Keyed	800	420	11.20	15.2	6.30	8.5	30	14	80*	4.25	1.91	Double
8228-6B	1/2" Keyed	650	330	13.80	18.7	8.00	10.8	30	14	80*	4.25	1.91	Double
8228-7B	1/2" Keyed	425	220	20.00	27.1	12.00	16.3	30	14	80*	4.25	1.91	Double
8228-8B	1/2" Keyed	350	185	25.00	33.9	14.00	19.0	30	14	80*	4.25	1.91	Double
8228-9B	1/2" Keyed	200	105	45.00	61.0	25.00	33.9	30	14	80*	5.56	2.50	Triple
8228-10B	1/2" Keyed	160	80	55.00	74.5	33.00	44.7	30	14	80*	5.56	2.50	Triple
8228-11B**	1/2" Keyed	100	54	**60.00	81.3	48.00	65.0	30	14	80*	5.56	2.50	Triple
8228-12B**	1/2" Keyed	85	43	**60.00	81.3	**60.00	81.3	30	14	80*	5.56	2.50	Iriple
8228-13B**	1/2" Keyed	50	28	**60.00	81.3	**60.00	81.3	30	14	80*	5.56	2.50	Triple
8228-14B**	1/2" Keyed	40	22	**60.00	81.3	**60.00	81.3	30	14	80*	5.56	2.50	Iriple

\*Requires installation for reversible motors - shown on page 168.

\*\*NOTE: Maximum torque recommended for planetary gear system on these models requires shear key with 60 ft./lbs. shear strength.

#### STANDARD EQUIPMENT

Steel motor housing, flush-type grease fittings at rotation points for gear and bearing lubrication, exhaust manifold rotatable within 360°, and muffler.

# NO-COST OPTIONS FURNISHED WHEN SPECIFIED ON ORIGINAL ORDER

1/2" - 20 Male Threaded Spindle on forward-rotation models.

#### MOUNTING ACCESSORY

37895-1 Flange Bracket Provision for flange mounting is standard on all models.



### Air Motors Dimensions – 0/2200-Series Power Motors & Mounts



#### **REVERSIBLE ROTATION, TRIPLE REDUCTION SHOWN**

	DIMENSION	Α
Gear Reduction	Series 8226	Series 8228
Double	8-11/16 221 mm	8-9/16 217 mm
Triple	10-1/2 267 mm	10-3/8 264 mm



### AIR INLETS, SINGLE-DIRECTION MOTORS

Scale	В	с	D	Е	F	G	н	L	м	Ν
Inches	2-11/16	1.7490 1.7495	.774 .818	.4990 .4995	1.604 1.655	.125 .126	.299 .309	1/4 NPTF	1.432 1.442	10-24 UNC-2B
mm	68	44.42 44.44	19.66 20.78	12.67 12.69	40.74 42.04	3.18 3.20	7.72 7.98	Air Inlet	36.37 36.63	Thread

Scale	ο	Р	Q	R	s	T - Forward Rotation	T Reversible	U	v	w	x
Inches	7/8	.098 .164	2	2	4-7/8	3-13/32	3-9/32	1-1/16	1-13/16	1	3-7/16
mm	22	2.49 4.17	51	51	124	86	83	27	46	25	87





. 193 - .213 (4.90 - 5.41 mm) DIA. THRU C'BORE .365 - .385 (9.27 - 9.78 mm) DIA. DEPTH SHOWN - 4 HOLES

.193 - .213 (4.90 - 5.41 mm) DIA. THRU C'BORE .365 - .385 (9.27 - 9.78 mm) DIA. X .193 - .213 DEEP (FOR Y154-51 SCREWS)



#### 37895-1 FOOT MOUNTING BRACKET

Scale	Α	В	С	D	E	F	G	н
Inches	.865 .886	2.115 2.135	1.843 1.875	2.421 2.453	.281 .343	.177 .197	.958 .978	3-1/8
mm	21.97 22.48	53.72 54.23	46.81 47.63	61.49 62.31	7.14 8.71	4.50 5.00	24.33 24.84	79.38
Scale	I	J	L	М	N	0	R	S
<b>Scale</b> Inches	1 2	J .333 .353	L 1.427 1.447	M .833 .853	N 1.240 1.260	<b>O</b> .615 .635	R 1.750 1.751	S .640 .687



		R.P.N FREE LO	/I. AD SPEED	STAI	TOR	QUE OUTF @MA>	PUT (. H.P.	AI CONSUN @FREE	R MPTION SPEED	SOUND LEVEL @FREE SPEED	WE	GHT	GEAR
MODEL	SPINDLE	SPEED @	MAX. H.P.	lb. ft.	Nm	lb. ft.	Nm	SCFM	L/s	dB(A)	lbs.	kg.	REDUCTION
FORWARD	ROTATION85	5 H.P.											
7800-B	1/2" Keyed	18,000	9,000	1.00	1.4	.50	.68	41.7	19.7	78	4.24	1.91	Single
7801-B	1/2" Keyed	4,600	2,400	4.00	5.5	1.86	2.5	41.7	19.7	78	4.24	1.91	Single
7802-B	1/2" Keyed	2,500	1,300	7.50	10.3	3.43	4.7	41.7	19.7	78	4.24	1.91	Single
7803-B	1/2" Keyed	1,200	600	16.00	21.9	7.44	10.2	41.7	19.7	78	5.17	2.33	Double
7804-B	1/2" Keyed	650	320	30.00	41.2	13.95	19.1	41.7	19.7	78	5.17	2.33	Double
7805-B	1/2" Keyed	350	170	55.00	75.5	26.25	36.0	41.7	19.7	78	5.17	2.33	Double
7812-B	1/2"-20 Th'd.	350	170	55.00	75.5	26.25	36.0	41.7	19.7	78	5.17	2.33	Double
7813-B	1/2"-20 Th'd.	650	320	30.00	41.2	13.95	19.1	41.7	19.7	78	5.17	2.33	Double
7814-B	1/2"-20 Th'd.	18,000	9,000	1.00	1.4	.50	.68	41.7	19.7	78	4.24	1.91	Single
7815-B	1/2"-20 Th'd.	1,200	600	16.00	21.9	7.44	10.2	41.7	19.7	78	5.17	2.33	Double
7816-B	1/2"-20 Th'd.	4,600	2,400	4.00	5.5	1.86	2.5	41.7	19.7	78	4.24	1.91	Single
7817-B	1/2"-20 Th'd.	2,500	1,300	7.50	10.3	3.43	4.7	41.7	19.7	78	4.24	1.91	Single
REVERSIBL	.E70 H.P.	•				•	•		•	•		•	
7806-B	1/2" Keyed	13,500	7,000	1.00	1.4	.52	.71	37.3	17.6	85*	4.24	1.91	Single
7807-В	1/2" Keyed	3,400	1,800	4.00	5.5	2.04	2.8	37.3	17.6	85*	4.24	1.91	Single
7808-B	1/2" Keyed	1,800	1,000	7.40	10.2	3.67	5.0	37.3	17.6	85*	4.24	1.91	Single
7809-B	1/2" Keyed	850	450	15.50	21.3	8.16	11.2	37.3	17.6	85*	5.17	2.33	Double
7810-B	1/2" Keyed	450	240	29.00	39.8	15.30	21.0	37.3	17.6	85*	5.17	2.33	Double
7811-B	1/2" Keyed	250	130	54.00	74.0	28.20	38.7	37.3	17.6	85*	5.17	2.33	Double

\*Requires installation for reversible motors - shown on page 168.

#### STANDARD EQUIPMENT

Steel motor housing, flush-type grease fittings at rotation points for gear and bearing lubrication, exhaust manifold rotatable within 360°, and muffler.



#### OPTIONS FOR FORWARD-ROTATION MODELS WITH THREADED SPINDLES

- 40768 1/2" (12.7 mm) Male Square-Drive Adapter.
- 31651 1/2" (12.7 mm) I.D. Female Stirring Rod Adapter, 3/8" - 24 Thd.
- 33907 3/8" (9.5 mm) cap. Drill Chuck.
- 30018 1/2" (12.7 mm) cap. Drill Chuck.

## Air Motors Dimensions – 2200-Series power Motos & Mounts

Scale

Inches

mm

F

.177

.197

4 50

5.00

Н

3

76.20

J

1/16

1.59

1-15/16

49.21

κ

3/8

9.53

Scale

Inches

mm

П

1-7/8

47.63

J

.334

354

8 84

8.99



## Air Motors 2200-Series Power Motors with Bolt-On Gearing



		<b>D</b> D M			TOR	QUE		Α	R				
		R.P.N	AD ODEED	CTAI	•		PUT	CONSU	MPTION	SOUND LEVEL	WE	ОЦТ	OFAD
MODEL	SPINDI F	SPEED @	MAX H P	SIAL Ih ft	.L Nm	lb. ft.	Nm	SCEM	SPEED I/e	dB(A)	WEI Ihs	ka ka	
FORWARD	ROTATION - 8	5 H P									1001		REDOCTION
7800-1B	1/2" Kovod	18,000	0.000	1.00	1.4	50	68	41.7	10.7	79	4 24	1 91	Single
7801-1B	1/2" Keyed	4 600	2 400	1.00	5.5	1.86	2.5	41.7	19.7	78	4.24	1.91	Single
7802-1B	1/2" Keved	2,500	1,300	7.50	10.3	3,43	4.7	41.7	19.7	78	4.24	1.91	Single
7803-1B	1/2" Keyed	1,200	600	16.00	21.9	7.44	10.2	41.7	19.7	78	5.17	2.33	Double
7804-1B	1/2" Keyed	650	320	30.00	41.2	13.95	19.1	41.7	19.7	78	5.17	2.33	Double
7805-1B	1/2" Keyed	350	170	55.00	75.5	26.25	36.0	41.7	19.7	78	5.17	2.33	Double
7812-1B	1/2"-20 Th'd.	350	170	55.00	75.5	26.25	36.0	41.7	19.7	78	5,17	2.33	Double
7813-1B	1/2"-20 Th'd.	650	320	30.00	41.2	13.95	19.1	41.7	19.7	78	5.17	2.33	Double
7814-1B	1/2"-20 Th'd.	18,000	9,000	1.00	1.4	.50	.68	41.7	19.7	78	4.24	1.91	Single
7815-1B	1/2"-20 Th'd.	1,200	600	16.00	21.9	7.44	10.2	41.7	19.7	78	5.17	2.33	Double
7816-1B	1/2"-20 Th'd.	4,600	2,400	4.00	5.5	1.86	2.5	41.7	19.7	78	4.24	1.91	Single
7817-1B	1/2"-20 Th'd.	2,500	1,300	7.50	10.3	3.43	4.7	41.7	19.7	78	4.24	1.91	Single
REVERSIBL	E70 H.P.												
7806-1B	1/2" Keyed	13,500	7,000	1.00	1.4	.52	.71	37.3	17.6	85*	4.36	1.96	Single
7807-1B	1/2" Keyed	3,400	1,800	4.00	5.5	2.04	2.8	37.3	17.6	85*	4.36	1.96	Single
7808-1B	1/2" Keyed	1,800	1,000	7.40	10.2	3.67	5.0	37.3	17.6	85*	4.36	1.96	Single
7809-1B	1/2" Keyed	850	450	15.50	21.3	8.16	11.2	37.3	17.6	85*	5.67	2.55	Double
7810-1B	1/2" Keyed	450	240	29.00	39.8	15.30	21.0	37.3	17.6	85*	5.67	2.55	Double
7811-1B	1/2" Keyed	250	130	54.00	74.0	28.20	38.7	37.3	17.6	85*	5.67	2.55	Double

\*Requires installation for reversible motors - shown on page 168.

#### STANDARD EQUIPMENT

Steel motor housing, flush-type grease fittings at rotation points for gear and bearing lubrication, exhaust manifold rotatable within 360°, and muffler.

#### MOUNTING ACCESSORY

#### 37895-1 Foot Bracket

Provisions for flange mounting is standard on all models.



#### **OPTIONS FOR FORWARD-ROTATION** MODELS WITH THREADED SPINDLES

- 40768 1/2" (12.7 mm) Male Square-Drive Adapter.
- 31651 1/2" (12.7 mm) I.D. Female Stirring Rod Adapter.
- 33907 3/8" (9.5 mm) cap. Drill Chuck.
- 30018 1/2" (12.7 mm) cap. Drill Chuck.

37895-1

### Air Motors Dimensions – 2200-Series Power Motors & Mounts



.353

8.46 8.97

mm

50 80

1.447

36 25

36.75

.853

21 16

21.67

1.260

31 50

32.00

.635

15.62

16.13

1.751

44 45

44.48

687

16 26

17.45

### Air Motors 2200-Series Power Motors with 44-Series Gearing



		R FREE	.P.M. LOAD SPEE	D STA	TOR LL	QUE OUTF @MAX	PUT (. H.P.	A Consu @free	IR MPTION SPEED	SOUND LEV @FREE SPE	'EL ED WE	IGHT	GEAR
MODEL	SPINDLE	SPEED	@MAX. H.	P. Ib. ft.	Nm	lb. ft.	Nm	SCFM	L/s	dB(A)	lbs.	kg.	REDUCTION
FORWARD	ROTATION	90 H.P.											
8276-1A	7/8" Keyed	700	350	27.0	37.0	13.5	18.5	41.6	19.6	78	10.10	4.55	2
8276-2A	7/8" Keyed	350	180	50.0	68.0	26.0	36.0	41.6	19.6	78	10.10	4.55	2
8276-3A	7/8" Keyed	300	150	60.0	82.0	32.0	43.0	41.6	19.6	78	14.50	6.52	3
8276-4A	7/8" Keyed	160	90	105.0	143.0	53.0	72.0	41.6	19.6	78	14.50	6.52	3
8276-5A**	7/8" Keyed	100	50	**150.0	206.0	95.0	130.0	41.6	19.6	78	14.50	6.52	3
8276-6A**	7/8" Keyed	50	25	**150.0	206.0	**150.0	206.0	41.6	19.6	78	14.50	6.52	3
REVERSIBI	.E65 H.P.												
8274-A	7/8" Keyed	800	450	13.0	18.0	7.6	10.5	35.0	16.5	83*	10.10	4.55	2
8274-1A	7/8" Keyed	475	250	23.0	32.0	14.0	19.0	35.0	16.5	83*	10.10	4.55	2
8274-2A	7/8" Keyed	250	130	43.0	59.0	26.0	36.0	35.0	16.5	83*	10.10	4.55	2
8274-3A	7/8" Keyed	200	110	52.0	71.0	31.0	42.0	35.0	16.5	83*	14.50	6.52	3
8274-4A	7/8" Keyed	120	60	91.0	125.0	57.0	78.0	35.0	16.5	83*	14.50	6.52	3
8274-5A**	7/8" Keyed	65	35	**150.0	206.0	98.0	134.0	35.0	16.5	83*	14.50	6,52	3
8274-6A**	7/8" Keyed	35	18	**150.0	206.0	**150.0	206.0	35.0	16.5	83*	14.50	6.52	3

\*Requires installation for reversible motors - shown on page 168.

\*\*NOTE: Maximum torque recommended for planetary gear system requires shear key with 150 ft./lbs. shear strength.

#### STANDARD EQUIPMENT

Steel motor housing, flush-type grease fittings at rotation points for gear and bearing lubrication, exhaust manifold rotatable within 360°, and muffler.

#### MOUNTING ACCESSORY

37892-1 Foot Bracket NOTE: Gear housing has precision pilot diameter and four mounting holes (5/16" - 24) for flange mounting.



37892-1

#### **OPTIONS FOR SPECIFIED MODELS**

- 41784 3/4" (19.1 mm) Male Square-Drive Adapter for 7/8" (22.23 mm) keyed spindle.
- 41512 Throttle & Bracket Assembly for forward-rotation nutsetters. See page 168.
- 41512-1 Throttle & Bracket Assembly for reversible nutsetters. Includes two 41511 throttles and two 43982-1 Quick-Dump Exhaust Valves. See page 168.

### Air Motors **Dimensions – 2200/44-Series Power Motors & Mounts**







.318 - .338 (8.08 - 8.59 mm) DIA. THRU C'BORE .615 - .635 (15.62 - 16.13 mm) DIA. .302 - .322 (7.67 - 8.18 mm) DEEP 4 - HOLES



.318 - .338 (8.08 - 8.59 mm) DIA. THRU C'BORE .615 - .635 (15.63 - 16.13 mm) DIA. DEPTH SHOWN - 4 HOLES

#### 37892-1 FOOT MOUNTING BRACKET

Scale	Α	В	С	D	E	F	G	н
Inches	1.490 1.510	3.115 3.135	3.781 3.843	3.968 4.062	.437 .562	.240 .260	.671 .718	4.812 4.937
mm	37.85 38.35	79.12 79.63	96.04 97.61	100.79 103.17	11.10 14.27	6.10 6.60	17.04 18.24	122.22 125.40
Scale		J	L	м	N	0	R	S
Scale Inches	<b>1</b> 3-1/2	J .490 .510	L 2.240 2.260	M 2.365 2.385	N 2.490 2.510	<b>O</b> 1.240 1.260	R 2.999 3.000	S .240 .260



				TORQUE			AIR						
		R	.P.M.	CTAI			UT		MPTION	SOUND LEVEL	WE	CUT	GEAD
MODEL	SPINDLE	SPEED	@MAX. H.P.	Ib. ft.	.∟ Nm	Ib. ft.	Nm	SCFM	L/s	dB(A)	Ibs.	ka.	REDUCTION
FORWARD ROTATION - 2.0 H.P.													
8200-A	7/8" Keyed	275	140	124.00	168.0	75.00	101.6	95.0	44.8	80	18.24	8.20	Double
8201-A	7/8" Keyed	500	255	70.50	95.5	41.00	55.5	95.0	44.8	80	18.24	8.20	Double
8202-A	7/8" Keyed	900	445	40.50	54.9	24.00	32.5	95.0	44.8	80	18.24	8.20	Double
8204-A	7/8" Keyed	3,500	1,740	10.20	13.8	6.00	8.1	95.0	44.8	80	13.82	5.21	Single
8205-A	7/8" Keyed	14,000	7,000	2.85	3.9	1.50	2.0	95.0	44.8	80	13.82	5.21	Single
REVERSIB	LE - 1.9 H.P.												
8206-A	7/8" Keyed	275	150	105.00	142.3	66.5	90.1	93.5	44.1	95*	18.24	8.20	Double
8207-A	7/8" Keyed	500	250	60.00	81.3	39.9	54.1	93.5	44.1	95*	18.24	8.20	Double
8208-A	7/8" Keyed	900	450	35.00	47.4	22.2	30.1	93.5	44.1	95*	18.24	8.20	Double
8209-A	7/8" Keyed	2,000	1,000	15.0	20.3	9.97	13.5	93.5	44.1	95*	13.82	5.21	Single
8210-A	7/8" Keyed	3,500	1,800	8.5	11.5	5.54	7.5	93.5	44.1	95*	13.82	5.21	Single
8211-A	7/8" Keyed	14,000	7,000	2.2	3.0	1.43	1.9	93.5	44.1	95*	13.82	5.21	Single

\*Requires installation for reversible motors - shown on page 168.

#### STANDARD EQUIPMENT

Steel motor housing, flush-type grease fittings at rotation points for gear and bearing lubrication, exhaust manifold rotatable within 360°, and muffler.

#### **MOUNTING ACCESSORY**

37892-1 Foot Bracket

NOTE: Gear housing has precision pilot diameter and four mounting holes (5/16"- 24) for flange mounting.



#### **OPTIONS FOR SPECIFIED MODELS**

- 41784 3/4" (19.1 mm) Male Square-Drive Adapter for 7/8" (22.23 mm) keyed spindle.
- 41512 Throttle & Bracket Assembly for forward-rotation nutsetters. See page 168.
- 41512-1 Throttle & Bracket Assembly for reversible nutsetters. Includes two 41511 throttles and two 43982-1 Quick-Dump Exhaust Valves. See page 168.

## **Air Motors Dimensions – 44-Series Power Motors & Mounts**



### **REVERSIBLE ROTATION, DOUBLE REDUCTION SHOWN**

	Models		Gear Reduction	Dimension A
8203-A	8204-A	8205-A	Single	11-17/64
8209-A	8210-A	8211-A		286 mm
8206-A	8207-A	8208-A	Double	14-1/16
8200-A	8201-A	8202-A		373 mm

Scale	в	с		)	E	F	G	н	L	м	N
Inches	4.090 4.110	2.9 2.9	96 98	369 374	.8743 .8748	2.483 2.559	.1872 .1875	.528 .531	3/8 NPTF	2.498 2.502	5/16-24 UNF-2B
mm	103.89 104.39	76.1 76.1	0 9 5 9	37 50	22.21 22.22	63.07 65.00	4.75 4.76	13.41 13.49	Air Inlet	63.45 63.55	Thread
01		~	0		-	0	_				X
Scale		0	Q		K	5	l		V	W	*
Inches	2.	-1/2	3		3-3/16	5-3/16	5	1-7/16	2-27/32	2	5-7/16
mm		63	76		81	132	127	36	72	51	138









.318 - .338 (8.08 - 8.59 mm) DIA. THRU C'BORE. 615 - .635 (15.26 - 16.13 mm) DIA. DEPTH SHOWN - 4 HOLES

#### 37892-1 FOOT MOUNTING BRACKET

Scale	Α	В	С	D	E	F	G	Н
Inches	1.490 1.510	3.115 3.135	3.781 3.843	3.968 4.062	.437 .562	.240 .260	.671 .718	4.812 4.937
mm	37.85 38.35	79.12 79.63	96.04 97.61	100.79 103.17	11.10 14.27	6.10 6.60	17.04 18.24	122.22 125.40
Scale	I	J	L	М	N	0	R	S
<b>Scale</b> Inches	l 3-1/2	J .490 .510	L 2.240 2.260	M 2.365 2.385	N 2.490 2.510	<b>O</b> 1.240 1.260	R 2.999 3.000	S .240 .260

## Air Motors Rotary-Vane Pneumatic Milling & Sawing Motors



ARO milling and sawing motors have been used on such diverse applications as milling screw slots in molded fiberglass and straddle milling a 3/4" hex shape on round bar stock. For cost reduction in secondary machining, it is feasible to install a mill motor on the cross-slide of a machine to mill or spotface a slot or diameter on the outside diameter of a workpiece. ARO's mill motor range covers the majority of primary and secondary machining applications.

Industrial milling cutters are available in a wide variety of kinds, sizes and shapes for specific applications. Certain basic types are normally used with ARO milling motors.

- 1. END MILLS. These are designed for milling slots, keyways and pockets where arbor-type cutters cannot be applied. The cutting edges, as the name implies, are at the end of the mill rather than on the circumference.
- 2. SHELL END MILLS. Similar in application to standard end mills, except that they are mounted to an arbor and used whenever the diameter of a standard end mill is too small for the application.
- 3. WOODRUFF KEYSLOT CUTTERS. Used for cutting keyslots in arbors or shafts for standard Woodruff keys. Available in arbor-type or shank-type.
- 4. PLAIN METAL-SLITTING SAWS. These cutters are designed with teeth around the entire circumference. Sides are concave to provide clearance in cutoff operations and for slotting heads of screws and shafts.
- 5. SIDE MILLING CUTTERS. Used for milling plain and flat surfaces.

Proper motor selection should be governed by the fact that motor load speed, or the point at which peak horsepower is reached, occurs at approximately one-half the catalogued free speed. Feed rate should be controlled to load the motor to peak horsepower for maximum efficiency. The load-speed column on each catalog page should be used for motor selection. Feed rate and cutting speed will determine the amount of horsepower required for a specific application.

Three factors determine correct milling motor selection:

- 1. Horsepower-Formula given below.
- 2. RPM-Refer to chart for correct speed according to type of material.
- 3. Feed rate on face mills, or per-tooth rate on slotting, side mills or end mills.

#### FORMULA FOR MODEL SELECTION

 $HP = \frac{\text{Width of cut } x \text{ depth of cut } x \text{ feed rate per min.}}{\text{K Factor}}$ 

F, feed rate = f, feed per tooth x t, number of teeth x n, RPM of cutter. Alternately, see reference chart.

 $RPM = \frac{4 \text{ x SFM or surface feet per minute}}{D, \text{ diameter of cutter in inches}}$ 

### **K Factors for Common Materials**

Material	к	Material	к	Material	к	Material	к
Magnesium Aluminum Copper	4.0 4.0 2.0	Cast Iron Ferritic Bearlitic	1.5	To 400 To 500 Stainlass Steel	.5 .4	220,000-260,000 p.s.i. 260,000-300,000 p.s.i.	.4 .3
Brass Bronze Malleable Iron	2.5 2.0 1.0	Chilled Steel To 150	1.0	Free Machining Other High-Tensile Alloys	1.0 .6	High Temperature Alloys Nickel Base Cobalt Base	.4
		То 300	.8	180,000-220,000 p.s.i.	.5	Austenitic	.4

### **REFERENCE CHART**

			Feed Per Minute	Feed F	Per Tooth				Feed Per Minute	Feed Pe	r Tooth
Work Material	Hardness BHN	Speed R.P.M.	Face Mills	Slotting & Side Mills	End Mills	Work Material	Hardness BHN	Speed R.P.M.	Face Mills	Slotting & Side Mills	End Mills
Free Mach- ining Steels, Plain Carbon Steels, Alloy Steels, Series 400 & 500 Stainless	150 200 250 300 350	500-900 450-800 400-700 350-600 300-450	.010014 .010014 .008010 .008010 .006008	.008010 .008010 .006008 .006008 .004006	.002004 .002004 .001003 .001003 .001003	Magnesium Alloys Aluminum Alloys	– Low Silicon High Silicon	900-1600 1200-1800 900-1200	.012018 .012018 .008012	.010014 .010014 .008010	.003005 .003006 .003005
Series 200- 300 Stain- less Sheets	150-250	250-450	.006010	.006008	.001003	Titanium Pure	100-275	250-350	.004006	.004006	.002003
Hot Work Tool Steels	150-250 200-250	350-450 250-350	.010012 .008010	.006010 .005008	.001003 .001002	Copper Alloys	20-70 RB 60-100 RB	900-1300 800-1000	.012016 .008012	.008012 .007010	.003004 .002004
Cold Work Tool Steels	200-250	250-350	.007010	.005008	.001003	Brass & Bronze	To 200	600-900	.010012	.008010	.003004
High- Manganese Steel	170-220	100-200	.007010	.005008	.002003	Zinc Alloys	Cast	800-1100	.006009	.005008	.002003
Gray Cast Iron	110-220 220-320	300-400 125-250	.012016 .008012	.008012 .006010	.002004 .002003	Man- ganese	140-220	150-200	.005008	.004006	.002004
Nodular Iron	140-250 250-400	325-450 225-300	.012016 .008012	.008012 .006010	.002004 .002003	Thermo- plastics	_	500-1100	.006010	.005008	.003005
Malleable Iron	110-220 200-280	250-350 200-300	.012016 .008012	.008012 .006010	.002004 .002003	Thermo- setting Plastics	_	500-1100	.006010	.005008	.003005

# Air Motors 000-Series Forward-Rotation Milling Motors,1/4" Capacity



MODEL FORWARD I	SPINDLE ROTATION - (	R FREE SPEED 0.25 H.P	.P.M. LOAD SPEED @MAX. H.P.	ST/ Ib. ft.	TORQ ALL Nm	UE OUTP @MAX. Ib. ft.	UT H.P. Nm	A Consu @free Scfm	ir Mption Speed L/s	SOUND LEVE @FREE SPEEI dB(A)	L ) WEI Ibs.	GHT kg.	GEAR REDUCTION
7533-2-B	1/4"	550	325	8.2	10.6	4.0	5.1	18.1	8.5	75	2.07	.93	Double
7534-2-B	Maximum	900	550	5.0	6.4	2.4	3.2	18.1	8.5	75	2.07	.93	Double
7535-2-C	Collet	2,700	1,600	1.75	2.2	.82	1.1	18.1	8.5	75	1.77	.80	Single
7536-2-B	Capacity	4,500	2,700	1.05	1.3	.49	.6	18.1	8.5	75	1.77	.80	Single
7537-2-C	,	20,000	12,000	.22	.30	.11	.1	18.1	8.5	75	1.77	.80	Single

#### STANDARD EQUIPMENT

Steel motor housing. flush-type grease fittings at rotation points for gear and bearing lubrication, exhaust manifold rotatable within 360°, muffler, integral collet spindle with 31812-8 1/4" capacity collet for end mills and Woodruff key slot cutters, duplex bearing on drive spindle for maximum radial support.

#### NO COST OPTION

Another size collet insert may be substituted for the standard 1/4" capacity insert. Specify collet insert 31812-() in the desired size from the chart below.

### **MOUNTING ACCESSORIES**

41563 Flange Bracket 45088 Foot Bracket



41563 FLANGE MOUNTING BRACKET



45088 FOOT MOUNTING BRACKET

Collet		Minimum	Capacity	Maximum	Capacity
Insert No.	Size	Inches	mm	Inches	mm
31812-1	3/64"	1/64"	.40	3/64"	1.19
31812-2	5/64"	3/64"	1.19	5/64"	1.98
31812-3	3/32"	1/16"	1.59	3/32"	2.38
31812-4	1/8"	3/32"	2,38	1/8"	3,18
31812-5	5/32"	1/8"	3.18	5/32"	3.97
31812-6	3/16"	5/32"	3.97	3/16"	4.76
31812-7	7/32"	3/16"	4.76	7/32"	5.56
31812-8	1/4"	7/32"	5.56	1/4"	6.35

Approx. Tooling Penetration - 1 1/8" (28.6mm)

# Air Motors **Dimensions – 000-Series Milling Motors & Mounts**



Models	Gear Reduction	Dimension A
7535-2-C, 7536-2-B 7537-2-C	Single	5-15/16 151 mm
7533-2-B, 7534-2-B	Double	7 178 mm

Scale	В	С	D	F	L	ο	R
Inches	1-3/8	1.311 1.312	.870 .890	15/16 (Approx <b>.</b> )	1/8 NPTF	1-1/8	1-5/8
mm	35	33.30 33.32	22.10 22.61	24 (Approx.)	Air Inlet	28	41

Scale	S	т	U	v	w	x
Inches	4-9/16	2-15/32	31/32	1-3/8	1	2-11/16
mm	116	63	25	35	25	68







45088 FOOT MOUNTING BRACKET



#### **41563 FLANGE MOUNTING BRACKET**

Scale	Α	В	С	D	Е	F	Scale	Α	В	С	D	Е	F	G	н		J
Inches	1 <u>.</u> 312 1.314	2.745 2.755	1.370 1.380	1.240 1.260	.490 .510	.146 .166	Inches	1.312 1.313	2.749 2.751	3-1/4	3-11/16	.609 .640	.296 .328	.87 .97	54 3	3	.343 .375
mm	33.32 33.38	69.72 69.98	34.80 35.05	31.50 32.00	12.45 12.95	3.71 4.22	mm	33.32 33.35	69.82 69.88	82.55	93.66	15.47 16.26	7.52 8.33	22.23 23.80	101.6	) 76 <u>.</u> 20	8.71 9.53
Scale	G	н	1	•	J	к	Scale	к	м	N	0	7		u	v	w	x
Scale	<b>G</b>	H	l 2_0	/16	J	K 1	Scale	K	M	N	0	5 1	40 -	U	<b>V</b>	W	X
<b>Scale</b> Inches	<b>G</b> 1/64 3/64	H 3-3/8	l 3 2-9	/16	J 1/4	<b>К</b> 1	Scale Inches	<b>K</b> 1.542 1.582	M 1.995 2.005	N 1.995 2.005	0 5 .99 5 1.00	۲ 5 .1 5 .1	40 <sup>-</sup> 56 2	U 1.984 2.015	V .985 1.015	W .499 .500	X .173 .198

### Air Motors O-Series Forward-Rotation Milling Motors



MODEL	SPINDLE	R.P.I FREE LO SPEED @	M. DAD SPEED PMAX. H.P.	) ST/ Ib. ft.	TOR ALL Nm	QUE OUTPL @MAX. Ib. ft.	JT H.P. Nm	A CONSU @FREE SCFM	ir Mption Speed L/s	SOUND LEVEL @FREE SPEED dB(A)	WE Ibs.	IGHT kg.	GEAR REDUCTION
FORWARD	ROTATION	60 H.P.											
8232-1		19,000	9,800	.70	.9	.32	.4	41.0	19.4	80	2.87	1.29	Single
8232-2	1/4"	5,700	2,900	2.15	2.9	1.10	1.5	41.0	19.4	80	2.87	1.29	Single
8232-3	Maximum	3,500	1,750	3.50	4.7	1.80	2.4	41.0	19.4	80	2.87	1.29	Single
8232-4	Collet	2,800	1,400	4.50	6.1	2.20	3.0	41.0	19.4	80	2.87	1.29	Single
8232-5	Capacity	1,650	840	7.50	10.2	3.80	5.1	41.0	19.4	80	3.62	1.63	Double
8232-6		1,000	500	12.00	16.3	6.20	8.4	41.0	19.4	80	3.62	1.63	Double
8232-7		800	390	14.80	20.0	8.00	10.8	41.0	19.4	80	3.62	1.63	Double

#### STANDARD EQUIPMENT

Steel motor housing, flush-type grease fittings at rotation points for gear and bearing lubrication, exhaust manifold rotatable within 360°, muffler, integral collet spindle with 31812-8 1/4" capacity collet for end mills and Woodruff key slot cutters, duplex bearing on drive spindle for maximum radial support.

#### **NO COST OPTION**

Another size collet insert may be substituted for the standard 1/4" capacity insert. Specify collet insert 31812-() in the desired size from the chart below.

#### **MOUNTING ACCESSORIES**

45057 Foot Bracket 41561 Flange Bracket



45057 FOOT MOUNTING BRACKET



41561 FLANGE MOUNTING BRACKET

Collet		Minimum	Capacity	Maximum Capacity		
Insert No.	Size	Inches	mm	Inches	mm	
31812-1	3/64"	1/64"	.40	3/64"	1,19	
31812-2	5/64"	3/64"	1,19	5/64"	1.98	
31812-3	3/32"	1/16"	1.59	3/32"	2.38	
31812-4	1/8"	3/32"	2,38	1/8"	3,18	
31812-5	5/32"	1/8"	3,18	5/32"	3.97	
31812-6	3/16"	5/32"	3.97	3/16"	4.76	
31812-7	7/32"	3/16"	4.76	7/32"	5.56	
31812-8	1/4"	7/32"	5 56	1/4"	6 35	

Approx. Tooling Penetration - 1 1/4" (31.8mm)

## Air Motors **Dimensions – O-Series Milling Motors & Mounts**



#### FORWARD ROTATION, DOUBLE REDUCTION SHOWN

Models	Gear Reduction	Dimension A
8232-()	Single	6-7/8 175 mm
0202 ( )	Double	8-3/16 208 mm

Scale	В	с	D	F	L	о	R
Inches	1-3/4	1.740 1.739	1-5/32	15/16 (Approx.)	1/4 NPTF	7/8	2
mm	44	44.20 44.17	29	24 (Approx.)	Air Inlet	22	51

G

Ö.

Scale	S	т	U	v	w	x
Inches	4-7/8	3-13/32	1-1/16	1-13/16	1	3-7/16
mm	124	86	27	46	25	87





Scale	Α	В		С	D		Е		F
Inches	1.741 1.740	2.745 2.755		1.370 1.380	1.24 1.26	0	.49 .51	0	.146 .166
mm	44.22 44.20	69.72 69.98	3 3	4.80 5.05	31.50 32.00	) )	12.45 12.95	5	3.71 4.22
Scale	G	н		1			J		К
Inches	1/64 3/64	3-3/8		2-9,	/16		1/4		1
mm	0.40 1.19	85.73		65.	09		6.35	2	5.40



#### 45057 FOOT MOUNTING BRACKET

Scale	Α	В	с	D	E	F	(	à	н	]	J
Inches	1.741 1.740	2.749 2.751	3-9/16	3-3/4	.609 .640	.29 .32	6 1 28	"	4-3/8	3-3/4	.296 .328
mm	44.22 44.20	69.82 69.88	90.49	95.25	15.47 16.26	7.52 8.33	2 25 3	.40	111.1:	3 95.25	7.52 8.33
Scale	к	М	N	0	1	F	U		۷	w	х
Inches	2.343	1.995	5 1.99	5.9	95 .1	09	1.984		.985	.499	.173
	2.406	2.005	5 2.00	5 1.0	05 .1	40	2.015	-	1.015	.500	.198

## Air Motors 2200-Series Forward - Rotation Milling Motors



MODEL FORWARD	SPINDLE ROTATION8	R.P.I FREE LO SPEED @ 35 H.P.	M. DAD SPEED MAX. H.P.	ST/ Ib. ft.	TORQ ALL Nm	UE OUTPI @MAX. Ib. ft.	JT H.P. Nm	A CONSU @FREE SCFM	IR MPTION SPEED L/s	SOUND LEVEL @FREE SPEED dB(A)	WE Ibs.	IGHT kg.	GEAR REDUCTION
7800-2B	2 /01	18,000	9,000	1.00	1.4	.50	.68	41.7	19.7	78	4.89	2.20	Single
7801-2B	3/8	4,600	2,400	4.00	5.5	1.86	2.5	41.7	19.7	78	4.89	2.20	Single
7802-2B		2,500	1,300	7.50	10.3	3.43	4.7	41.7	19.7	78	4.89	2.20	Single
7803-2B	Collei	1,200	600	16.00	21.9	7.44	10.2	41.7	19.7	78	6.39	2.86	Double
7804-2B	Capacity	650	320	30.00	41.2	13.95	19.1	41.7	19.7	78	6.39	2.86	Double

#### STANDARD EQUIPMENT

Steel motor housing, flush-type grease fittings at rotation points for gear and bearing lubrication, exhaust manifold rotatable within 360°, muffler, integral collet spindle with 32968-9 3/8" capacity for end mills and Woodruff key slot cutters, duplex bearing support on drive spindle to provide maximum radial support.

#### **NO COST OPTION**

Another size collet insert may be substituted for the standard 3/8" capacity insert. Specify collet insert 32968-() in the desired size from the chart below.

#### **MOUNTING ACCESSORIES**

45058 Foot Bracket 41559 Flange Bracket



45058 FOOT MOUNTING BRACKET



41559 FLANGE MOUNTING BRACKET

Collet		Minimum	Capacity	Maximum	Capacity
Insert No.	Size	Inches	mm	Inches	mm
32968-1	1/8"	3/32"	2.38	1/8"	3.18
32968-2	5/32"	1/8"	3.18	5/32"	3.97
32968-3	3/16"	5/32"	3.97	3/16"	4.76
32968-4	7/32"	3/16"	4.76	7/32"	5.56
32968-5	1/4"	7/32"	5.56	1/4"	6.35
32968-6	9/32"	1/4"	6.35	9/32"	7.14
32968-7	5/16"	9/32"	7.14	5/16"	7.94
32968-8	11/32"	5/16"	7.94	11/32"	8.73
32968-9	3/8"	11/32"	8.73	3/8"	9.53

### COLLET SLEEVES

Approx. Tooling Penetration - 2" (51 mm)

# Air Motors Dimensions – 2200-Series Milling Motors & Mounts



### FORWARD ROTATION, DOUBLE REDUCTION SHOWN

Models	Gear Reduction	Dimension A
7800-2B, 7801-2B, 7802-2B	Single	8-11/32 212 mm
7803-2B, 7804-2B, 7805-2B	Double	10-1/16 255 mm

Scale	В	С	D	F	L	0
Inches	2	2.001 2.000	1.422 1.452	1-5/32 (Approx.)	1/4 NPTF	7/8
mm	51	50.80 50.83	36.12 36.88	29 (Approx.)	Air Inlet	22

Scale	Р	s	т	U	v	w	x
Inches	.097 .157	4-7/8	3-1/2	1-1/16	1-13/16	1-3/8	3-1/2
mm	2.46 3.99	124	89	27	46	35	89





45058 FOOT MOUNTING BRACKET

#### 41559 FLANGE MOUNTING BRACKET

Scale	Α	В	с	D	E	F	Scale	А	В	С	D	E	F	G	H	I	J
nches	2.000 2.002	2.990 3.010	1.490 1.510	1.365 1.385	.661 .681	.177 .197	Inches	2.000 2.001	2.749 2.751	3-9/16	3-3/4	.609 .640	.290 .328	6 1' 8	' 4-3/8	3 3-3/4	.296 .328
mm	50.80 50.85	75.95 76.45	37.85 38.35	34.67 35.18	16.79 17.30	4.50 5.00	mm	50.80 50.83	69.82 69.88	90.49	95.25	15.47 16.26	7.52 8.33	25.	40 111.1	3 95.25	7.52 8.33
Scale	G	н	Ī		J	К	Scale	к	М	Ν	0	٦	Г	U	v	w	х
Inches	1/64 3/64	3-5/8	8 2-	7/8	5/16	1	Inches	2.343 2.406	1.995 2.005	1.995 2.005	99 1.00	95 .1 05 .1	09 40	1.984 2.015	.985 1.015	.499 .500	.173 .198

# Air Motors 2200-Series Forward-Rotation Side Mount Milling Motors



MODEL FORWARD I	SPINDLE ROTATION{	R.P. FREE LO SPEED @ 35 H.P.	M. DAD SPEED PMAX. H.P.	ST/ Ib. ft.	TORQUE OUTPUT STALL @MAX. H.P. Ib. ff. Nm Ib. ff. Nm			A Consu @free Scfm	ir Mption Speed L/s	SOUND LEVEI @FREE SPEED dB(A)	WE Ibs.	IGHT kg.	GEAR REDUCTION
7800-4B	3/8"	18,000	9,000	1.00	1.4	.50	.68	41.7	19.7	78	4.89	2.20	Single
7801-4B	Maximum	4,600	2,400	4.00	5.5	1.86	2.5	41.7	19.7	78	4.89	2.20	Single
7802-4B	Collet	2,500	1,300	7.50	10.3	3.43	4.7	41.7	19.7	78	4.89	2.20	Single
7803-4B	Capacity	1,200	600	16.00	21.9	7.44	10.2	41.7	19.7	78	6.39	2.86	Double
7805-4B	capacity	350	170	55.00	75.5	26.25	36.0	41.7	19.7	78	6.39	2.86	Double
												-	

#### STANDARD EQUIPMENT

Square-drive gearing with 4 tapped holes for close-quarter mounting. Other standard equipment same as for motors on page 162.

#### **OPTIONAL ACCESSORIES**

For other collet sleeves, filter-regulator-lubricator and recommended air hose, see listing on page 162.

# **2200-Series Forward-Rotation Straddle Milling Motors**



					TORQUE				IR				
		R.P.M. FREE LOAD SPEED		D STALL		OUTPUT @MAX. H.P.		CONSUMPTION @FREE SPEED		ION SOUND LEVEL		IGHT	GEAR
MODEL	SPINDLE	SPEED @	MAX. H.P.	lb. ft.	Nm	lb. ft.	Nm	SCFM	L/s	dB(A)	bs.	kg.	REDUCTION
FORWARD	FORWARD ROTATION85 H.P.												
7801-3B	7/16"-20	4,600	2,400	4.00	5.5	1.86	2.5	41.7	19.7	78	4.89	2.20	Single
7803-3B	UNF-3A	1,200	600	16.00	21.9	7.44	10.2	41.7	19.7	78	6.39	2.86	Double
7804-3B	Threaded,	650	320	30.00	41.2	13.95	19,1	41.7	19.7	78	6.39	2.86	Double
7805-3B	Plus 1/8" Sq.	350	170	55.00	75.5	26.25	36.0	41.7	19.7	78	6.39	2.86	Double
	Key Drive												

#### STANDARD EQUIPMENT

Keyed and threaded spindle for shell end mills, metal-slitting saws and side-mill cutters, duplex bearing on drive spindle to provide maximum radial support. Also steel motor housing, flush-type grease fittings, exhaust manifold and muffler. **NOTE: Key not furnished.** 

#### **OPTIONAL ACCESSORIES**

For mounting bracket and recommended hose, see listing on page 162.
## *Air Motors* **Dimensions – 2200-Series Forward-Rotation Side Mount Milling Motors**



	Models		Gear Reduction	Dimension	A
7800 <b>-</b> 4B	7801 <b>-</b> 4B	7802 <b>-</b> 4B	Single	8-3/8	213 mm
7803 <b>-</b> 4B	7804 <b>-</b> 4B	7805 <b>-</b> 4B	Double	10-3/16	259 mm

Scale	В	с	D	F	L	Ν	о	Р	s
Inches	2	2.115 2.135	1.422 1.452	1-5/32 (Approx.)	1/4 NPTF	1/4-28 UNF-2B	7/8	.097 .157	4-7/8
mm	51	53.72 54.23	36.12 36.88	29 (Approx.)	Air Inlet	Thread 3/8" Deep	22	2.46 3.99	124
Scale	т	U	v	w	x	A-A	B-B	C-C	D-D
Scale	т	U	v	w	x	A-A	B-B	C-C	D-D
<b>Scale</b> Inches	<b>T</b> 3-1/2	<b>U</b> 1-1/16	<b>V</b> 1-13/16	<b>W</b> 1-3/8	<b>X</b> 3-9/16	<b>A-A</b> .213 .223	<b>B-B</b> 1.000 1.005	<b>C-C</b> .807 .817	<b>D-D</b> 1.62 1.63
Scale Inches mm	T 3-1/2 89	U 1-1/16 27	V 1-13/16 46	W 1-3/8 35	X 3-9/16 90	A-A .213 .223 5.41	<b>B-B</b> 1.000 1.005 25.40	<b>C-C</b> .807 .817 20.50	<b>D-D</b> 1.62 1.63 41.15

# **Dimensions – 2200-Series Forward-Rotation Straddle Milling Motors**





## FORWARD ROTATION, DOUBLE REDUCTION SHOWN

			Models	Re	Gear duction	Dime	nsion A		
		7800	-3B 7801-3B	7802-3B §	Single	9-1/2	241 mm		
		7803	-3B 7804-3B	7805-3B C	Double	11 <b>-</b> 9/32	286 mm		
Scale	В	с	D	E		F	I	J	L
Inches	2	2.000 2.001	1.422 1.452	.6240 .6245		1.932 1.942	7/16-20 UNF-3A	.552 .557	1/4 NPTF
mm	51	50.80 50.83	36.12 36.88	15.85 15.86	40 49	0.07 9.33	Thread	14.02 14.53	Air Inlet
Scale	0	Р	S	т		U	v	w	x
Inches	7/8	.270 .380	4-7/8	3-1/2	1	-1/16	1-13/16	1-3/8	3-1/2
mm	22	6.86 9.65	124	89		27	46	35	89

۱۸/

**▲** 0 ▼

## *Air Motors* 44-Series Forward-Rotation Milling Motors



		R.F FREE	P.M. LOAD SPEED	ST	TOR( ALL	QUE OUTP @MAX	PUT H.P.	A Consu @free	ir Mption Speed	SOUND LEVEL @FREE SPEED	WEI	GHT	GEAR
MODEL	SPINDLE	SPEED	@MAX. H.P.	lb. ft.	. Nm	lb. ft.	Nm	SCFM	L/s	dB(A)	lbs.	kg.	REDUCTION
FORWARD R	OTATION - 2	2.0 H.P.											
8200-4A-()		275	140	124.00	168.0	75.00	101.6	95.0	44.8	80	18.24	8.20	Double
8201-4A-()	3/4"	500	255	70.50	95.5	41.00	55.5	95.0	44.8	80	18.24	8.20	Double
8202-4A-()	Maximum	900	445	40.50	54.9	24.00	32.5	95.0	44.8	80	18.24	8.20	Double
8203-4A-()	Collet	2,000	1,050	18.00	24.4	10.00	13.5	95.0	44.8	80	13.82	5.21	Single
8204-4A-()	Cupucity	3,500	1,740	10.20	13.8	6.00	8.1	95.0	44.8	80	13.82	5.21	Single
8205-4A-()		14,000	7,000	2.85	3.9	1.50	2.0	95.0	44.8	80	13.82	5.21	Single

#### STANDARD EQUIPMENT

Steel motor housing, flush-type grease fittings at rotation points for gear and bearing lubrication, exhaust manifold rotatable within 360°, muffler, integral collet spindle with 35264-17 3/4" capacity for end mills and Woodruff key slot cutters, duplex bearing on drive spindle for maximum radial support.

#### **NO-COST OPTIONS**

Another size collet insert may be substituted for the standard 3/4" capacity insert. Specify collet insert 35264-() in the desired size from the chart below.

### MOUNTING ACCESSORIES

45090 Foot Bracket 41557 Flange Bracket



Collet	Dash		Minimum	Capacity	Maximum Capacity		Collet	Dash		Minimum Capacity		Maximum Capacity	
Insert No.	No.	Size	Inches	mm	Inches	mm	Insert No.	No.	Size	Inches	mm	Inches	mm
35264-1	-A	1/4"	.2187	5.56	.2500	6.35	35264-10	-K	17/32"	.5000	12.70	.5312	13.49
35264-2	-B	9/32"	.2500	6.35	.2812	7.14	35264-11	-L	9/16"	.5312	13.49	.5625	14.29
35264-3	-C	5/16"	.2812	7.14	.3125	7.94	35264-12	-M	19/32"	.5625	14.29	.5937	15.08
35264-4	-D	11/32"	.3125	7.94	.3437	8.73	35264-13	-N	5/8"	.5937	15.08	.6250	15.88
35264-5	-E	3/8"	.3437	8.73	.3750	9.53	35264-14	-P	21/32"	.6250	15.88	.6562	16.67
35264-6	-F	13/32"	.3750	9.53	.4062	10.32	35264-15	-Q	11/16"	.6562	16.67	.6875	17.46
35264-7	-G	7/16"	.4062	10.32	.4375	11.11	35264-16	-R	23/32"	.6875	17.46	.7187	18.26
35264-8	-H	15/32"	.4375	11.11	.4687	11.91	35264-17	-S	3/4"	.7187	18.26	.7500	19.05
35264-9	-J	1/2"	.4687	11.91	.5000	12.70							

Approx. Tooling Penetration - 2 7/16" (62 mm)

## **Air Motors Dimensions – 44-Series Milling Motors & Mounts**



## FORWARD ROTATION, DOUBLE REDUCTION SHOWN

	Models		Gear Reduction	Dimension A
8203-4A	8204 <b>-</b> 4A	8205 <b>-</b> 4A	Single	11-11/16 297 mm
8200-4A	8201-4A	8202-4A	Double	14-1/2 368 mm

Scale	В	с	D	F	L	м	Ν	0	Р
Inches	4.090 4.110	2.996 2.998	.302 .322	1-15 (App	5/16 3/8 rox.) NPTF	3.498 3.502	5/16-24 UNF-2B	2-1/2	.335 .364
mm	103.89 104.39	76.10 76.15	7.67 8.18	4 (App	9 Air rox.) Inlet	86.56 88.95	Thread	63	8.51 9.25
Scale	Q	R	S	т	U	v	w	x	
Inches	3	3-3/16	5-3/16	5	1-7/16	2-27/32	2	5-7/16	1
mm	76	81	132	127	36	72	51	138	1



45090 FOOT	MOUNTING	BRACKET
------------	----------	---------

Scale	Α	В	С	D
Inches	1.927 1.947	5.745 5.755	2.870 2.880	2-1/4
mm	48.95 49.45	145.92 146.18	72.90 73.15	57.15
Scale	E	F	н	I
<b>Scale</b> Inches	E .708 .728	<b>F</b> .365 .385	H 7-1/4	<b>I</b> 4-1/2

Scale	Α	В	D	E	F	G	н	0	J	м
Inches	1.927 1.947	3.124 3.126	4	.468 531	.296 328	.67 70	1 5-1. 3	/8 4	.546	1.995
mm	55.12 60.20	79.35 79.40	101.6	11.89 13.49	7.52 8.33	17.04 17.78	130.	18 101.0	5 13.87 14.68	50.67 50.93
		1								l
Scale	N	0	R	s	-	ſ	U	v	w	х
Inches	1.995	.995	2.99	9.83	3.	046	2.609	.985	.499	.173
	2.005	1.005	3.00	0.85	3.	078	2.640	1.015	.500	.198
mm	50.67	25.27	76.17	21.16	1.	17 6	66.27	25.02	12.674	4.39
	50 02	25 52	76.20	21.67	- I - I - I	20 0	37.06	25 78	12 700	5 02

## Air Motors Accessories-Installation of Reversible Models



- 1. 41512 Throttle & Bracket Assembly for forwardrotation nutsetting. See motors on pages 152 and 154.
- 2. 41512-1 Throttle & Bracket Assembly for reversible nutsetting. Has 2 throttle levers and 2 quick-dump exhaust valves. See motors on pages 152 and 154.
- **3.** 42420 3/8" (9.53 mm) diameter Arbor for friction-drive wheels up to 1" (25.40 mm) diameter. See motors on pages 152 and 154.

Valve	Port Size, N.P.T.F.							
No.	Inlet	Cyl.	Exhaust					
-1	1/8	1/4	1/4					
-2	1/4	1/4	3/8					
-3	3/8	3/8	3/8					
-5	3/4	3/4	3/4					

- **4.** Series 43982 Quick-Exhaust Valves for reversible motors.
- 41784 Square-Drive Adapter. Has 3/4" (19.05 mm) male square drive and fits 7/8" (22.23 mm), length 4-9/16", keyed spindle. See motors on pages 152 and 154.
- 30712 Hex Ball Lock Adapter. 3/8"-24 mounting thread, 1/4" (6.35 mm) hex drive size. See motors on pages 150, 152 and 154.
- 7. Square-Drive Adapter.

Part No.	Mtg. Thd.	Drive Size
30384-5	3/8" 24	3/8"
30384-9	3/8"-24	1/2"
40768	1/2"-20	1/2"

## **RECOMMENDED INSTALLATION FOR REVERSIBLE MODELS**



On reversible air motors there are two exhausts. The primary exhaust exhausts air out through the manifold and muffler as in the forward rotation motors. Depending on which direction the motor is running, the opposite inlet port becomes the secondary exhaust and must be opened to atmosphere. A four-way valve, 3-position, spring centered is recommended for all reversible air motors. An exhaust muffler must be threaded into the exhaust port of each valve to comply with the second level regulations as outlined in the Occupational Safety and Health Act of 1970.



## Filters

For Motors	Part No.	NPT Size	Flow Rate scfm	Bowl Cap. oz.	Height in.	Width in.	Depth in.
Series 0000, 000	F25111-200	1/8"	28	2.87	7.00	2.60	2.60
Series 0, 2200	F25221-400	1/4"	54	2.87	7.00	2.60	2.60
Series 44	F25231-400	3/8"	100	2.87	7.00	2.60	2.6

## Regulators



For Motors	Part No.	NPT Size	Flow Rate scfm	Adj. Pressure Range psi	Height in.	Width in.	Depth in.
Series 0000	R27111-100	1/8"	13	0 - 200	4.75	2.60	2.60
Series 000 * Use 1/4" Regulator	R27221-600	1/4"	100	0 - 200	4.75	2.60	2.60
Series 0, 2200	R27221-600	1/4"	100	0 - 200	4.75	2.60	2.60
Series 44	R27231-600	3/8"	130	0 - 200	4.75	2.60	2.60



## Lubricators

For Motors	Part No.	NPT Size	Flow Rate scfm	Bowl Cap. oz.	Height in.	Width in.	Depth in.
Series 0000, 000	L26111-100	1/8"	41	6.00	7.70	2.60	2.60
Series 0, 2200	L26221-100	1/4"	75	6.00	7.70	2.60	2.60
Series 44	L26231-100	3/8"	100	6.00	7.70	2.60	2.60

## Combination FRL's (Filter/Regulator/Lubricator)

For Motors	Part No.	NPT Size	Flow Rate scfm	Adj. Pressure Range psi	Bowl Capacity oz.	Height in.	Width in.	Depth in.
Series 0000	P29112-100	1/8"	13	0 - 125	Filter = 2.87 Lubricator = 6.00	8.25	9.43	4.00
Series 000 * Use 1/4" FRL	C28221-800	1/4"	54	0 - 125	Filter = 2.87 Lubricator = 6.00	8.25	9.43	4.00
Series 0, 2200	C28221-800	1/4"	54	0 - 125	Filter = 2.87 Lubricator = 6.00	8.25	9.43	4.00
Series 44	C28231-800	3/8"	100	0 - 125	Filter = 2.87 Lubricator = 6.00	8.25	9.43	4.00



## **AIR MOTOR LIMITED WARRANTY**

Ingersoll-Rand Company (I-R) warrants to the original user its air motors (Motors) to be free of defects in material and workmanship for a period of one year from the date of purchase. I-R will repair, without cost, any Motor found to be defective, including parts and labor charges, or at its option, will replace such Motors or refund the purchase price less a reasonable allowance for depreciation, in exchange for the Motor. Repairs or replacements are warranted for the remainder of the original warranty period.

If any Motor proves defective within its original one year warranty period, it should be returned to any Authorized Power Tool Service Distributor, transportation prepaid with proof of purchase or warranty card.

This warranty does not apply to Motors which I-R has determined to have been misused or abused, improperly maintained by the user, or where the malfunction or defect can be attributed to the use of non-genuine I-R repair parts.

I-R MAKES NO OTHER WARRANTY, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED TO THE DURATION OF THE EXPRESSED WARRANTY PERIOD AS SET FORTH ABOVE. I-R'S MAXIMUM LIABILITY IS LIMITED TO THE PURCHASE PRICE OF THE MOTOR AND IN NO EVENT SHALL I-R BE LIABLE FOR ANY CONSEQUENTIAL, INDIRECT, INCIDENTAL, OR SPECIAL DAMAGES OF ANY NATURE ARISING FROM THE SALE OR USE OF THE MOTOR, WHETHER IN CONTRACT, TORT, OR OTHERWISE.

NOTE: Some states do not allow limitations on incidental or consequential damages or how long an implied warranty lasts so that the above limitations may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which may vary from state to state.





# **Industrial Tools**

- Screwdrivers and Nutsetters
- Drills and Tappers
- Random Orbital Sanders
- Die Grinders
- Special Purpose Tools

# Notes



The relentless drive for improved process quality is constantly changing and advancing the requirements of assembly functions. Intense global competition and the rise of ergonomics have brought about a sharper focus on workplace productivity and the performance of every element. With one of the most extensive lines in the industry, ARO can deliver expert consultation and superior solutions in assembly tools.



ARO Series 20/50 drills combine power and speed with operator comfort.

The ARO Series 20 and 50 screwdrivers, nutsetters, and drills feature high efficiency air motors in compact configurations with ergonomically-correct handle designs. Their lightweight, balanced construction promotes proper working positions, helping to reduce operator fatigue and other negative effects. To match the requirements of any task, ARO offers a complete selection of pistol-grip, straight and 90° angle models — plus 45° angle drills — to allow for appropriate hand/arm positioning relative to the fastening angle.

For assembly tasks involving threaded fasteners, the ARO Series 20 and 50 screwdrivers and nutsetters offer unbeatable torque capability with fast automatic shut-off features. They deliver repeatable torque accuracy time after time, independent of individual operator — and variable joint — characteristics. To increase operator productivity, ARO offers several trigger options on assembly tools push-to-start, lever permit, trigger permit, trigger start, and quick-reverse trigger.

The ARO Series 20 and 50 drills offer the most comprehensive selection of speeds available. A wide variety of spindle options and menu-driven selection systems allow you to customize tools for specific application requirements.

The ARO Model 7672-A18 Woodworking Screwdriver — one of our most popular models — is designed specifically for jobs that require wood screw fastening. Developed to deliver speed and power, the "Woodriver" provides quick, smooth rundown in even the toughest hardwoods. And, it's equipped with value-added features that give you more tooling for your investment.

To meet the needs of the operators who use them, ARO is dedicated to producing tools that provide a comfortable work environment. By developing smaller, lighter, and quieter products, the ARO designs offer higher levels of comfort, safety, and reliability.



The ARO "Woodriver" is an economical solution for wood screw fastening requirements.



### **Screwdriver Selection**

When selecting a production screwdriver, it is important to take into account the following considerations:

#### A Type of Joint:

First, consider the type of joint you will be working with. Since joints vary according to the type of screw and fastening involved, you should always verify the type of screw and material you'll be working with.

#### **B** Torque Requirements:

Next, you should take into account the amount of torque needed for your production requirements. Screwdriver type, length, and the type of steel it's made of all effect torque requirements.

#### C Clutch Options:

Finally, production screwdrivers come with four different clutch options. Selection of the proper clutch depends on the type of joints, screws used, and torque required in production.

Use these easy steps to determine which ARO production screwdriver best meets your specific production requirements.

## A - Types of Joints

When choosing a production screwdriver, always take the type of joint and screws you'll be working with into account. This information will also help you determine torque and clutch requirements.

#### **Fastening Applications**

Clutch Options	Free-Running Sudden-Stop	Soft Pull-Up	Self-Tapping in Thick Material	Sheet Metal Screws	Lock Nuts	Wood Screws
Automatic Shutoff	Excellent for all size screws.		Not suitable if tapping torque exceeds stripping torque or clutch setting.	Good for all size screws.	Excellent for all size screws.	
Adjustable Ball	Good for all size screws where close torque control is not required.	Good for most screws where close torque control is not required. Slow on large screws with long heavy pull-up.	Good for most screws. With proper operator technique can be used where tapping torque exceeds stripping torque. Slow on large screws.	Good for most screws. With proper operator technique can be used where tapping torque exceeds stripping torque.	Good for most screws where close torque control is not required.	Good for all size screws.
Positive		Good for small to medium size screws. Requires considerable operator pressure on large screws.	Good for most screws where stripping torque is considerably higher than tapping torque. Excellent in non-uniform or misaligned material.	Good for all size screws where stripping torque is considerably higher than tapping torque. Excellent when sheets are frequently misaligned.	Fair for all size screws.	Excellent for all size screws.
Direct Drive		Good for large and medium size screws. Must be adjusted to run rather slowly for small screws.	Not recommended unless stripping torque is considerably higher than tapping torque.	Not recommended unless stripping torque is considerably higher than tapping torque.	Good for large and medium screws. Must be adjusted to run rather slowly for small screws.	Excellent for large and medium screws. Must be adjusted to run rather slowly for small screws.

## B - Screw Torque Guide<sup>1</sup>

Screw	Low C	arbon	18	-8			Silie	con	Alum	inum	31	6		
Size	Ste	eel	Stair	iless	Bra	ISS	Bro	nze	2024	1-T4	Stain	lless	Moi	nel
	inlb	Nm	inlb	Nm	inIb	Nm	inIb	Nm	inIb	Nm	inIb	Nm	inlb	Nm
2-56	2.2	.25	2.5	.28	2.0	.23	2.3	.26	1.4	.16	2.6	.29	2.5	.28
2-64	2.7	.31	3.0	.34	2.5	.28	2.8	.32	1.7	.19	3.2	.26	3.1	.35
3-48	3.5	.40	3.9	.44	3.2	.36	3.6	.41	2.1	.24	4.0	.45	4.0	.45
3-56	4.0	.45	4.4	.50	3.6	.41	4.1	.46	2.4	.27	4.6	.52	4.5	.51
4-40	4.7	.53	5.2	.59	4.3	.49	4.8	.54	2.9	.33	5.5	.62	5.3	.60
4-48	5.9	.67	6.6	.75	5.4	.61	6.1	.69	3.6	.41	6.9	.78	6.7	.76
5-40	6.9	.78	7.7	.87	6.3	.71	7.1	.80	4.2	.48	8.1	.92	7.8	.88
5-44	8.5	.96	9.4	1.06	7.7	.87	8.7	.98	5.1	.58	9.8	1.11	9.6	1.09
6-32	8.7	.98	9.6	1.09	7.9	.89	8.9	1.01	5.3	.60	10.1	1.14	9.8	1.11
6-40	10.9	1.23	12.1	1.37	9.9	1.12	11.2	1.27	6.6	.75	12.7	1.44	12.3	1.39
8-32	17.8	2.01	19.8	2.24	16.2	1.83	18.4	2.08	10.8	1.22	20.7	2.34	20.2	2.28
8-36	19.8	2.24	22.0	2.49	18.2	2.01	20.4	2.31	12.0	1.36	23.0	2.60	22.4	2.53
10-24	20.9	2.35	22.8	2.58	18.6	2.10	21.2	2.40	13.8	1.59	23.8	2.69	25.9	2.93
10-32	29.7	3.36	31.7	3.58	25.9	2.93	29.3	3.31	19.2	2.17	33.1	3.74	34.9	3.94
1/4-20	65.0	7.35	75.2	8.50	61.5	6.95	68.8	7.77	45.6	5.15	78.8	8.90	85.3	9.64
1/4-28	90.0	10.20	90.0	10.20	77.0	8.70	87.0	9.83	57.0	6.44	99.0	11.20	106.0	12.00
5/16-18	129.0	14.60	132.0	14.90	107.0	12.10	123.0	13.90	80.0	9.04	138.0	15.60	149.0	16.80
5/16-24	139.0	15.70	142.0	16.10	116.0	13.10	131.0	14.80	86.0	9.72	147.0	16.60	160.0	18.10

(1) Screw types and materials affect the amount of torque needed for a given production job. Use this table to determine your specific needs. Source: "Fasteners" published by Industrial Fasteners Institute.

## **C** - Clutch Selection



 $\mbox{Direct Drive}-\mbox{Good}$  for non-precision fastening in wood, aluminum, and soft draw applications. Torque output is determined only by the stall torque of the motor at a given air pressure.



**Positive Clutch** – Good general purpose clutch for soft draw applications in wood and aluminum. Allows motor to run without bit turning until pressure is applied to the spindle to engage jaws. Clutch with angle jaws ratchets as fastener resistance overcomes operator pressure on the driver. Torque output is determined by the force applied by the operator and the ratchet time. Clutch with 90° jaws acts as a direct drive when jaws are engaged and stalls motor as fastener resistance builds.

Adjustable Ball Clutch – Excellent general purpose clutch; provides good torque control for most assembly line applications. Allows motor to run without bit turning until pressure is applied to the spindle to engage the 90° jaws. As fastener resistance overcomes spring force, balls are displaced which causes the clutch to ratchet. Torque output is determined by adjusting the clutch spring force.



**Automatic Shut-Off Clutch** – Best clutch for all threaded fasteners and where controlled fastening is required. Motor is actuated and bit rotates when pressure is applied to the spindle which opens the throttle. When pre-set torque is achieved, the throttle is automatically closed and the tool stops. Torque output is determined by adjusting the clutch spring force.

Check your torque requirements and the types of materials and screw being used to determine which clutch best suits your needs.

## Screwdrivers and Nutsetters **Torque Conversion Table**

### **Torque Conversion Table**

inIb	s	ft-lbs		Nm	inlbs		ft-lbs		Nm	inlbs		ft-lbs		Nm	inlbs		ft-lbs		Nm
1	_	.08	_	.11	27	-	2.25	-	3.05	54	_	4.50	-	6.10	80	-	6.66	-	9.04
2	-	.17	-	.23	28	-	2.33	-	3.16	55	-	4.58	-	6.21	81	-	6.75	-	9.15
3	-	.25	-	.34	29	-	2.42	-	3.28	56	-	4.68	-	6.33	82	-	6.83	-	9.27
4	_	.33	_	.45	30	_	2.50	_	3.39	57	_	4.75	_	6.44	83	_	6.92	_	9.38
5	-	.42	-	.57	31	-	2.58	_	3.50	58	_	4.83	-	6.55	84	-	7.00	-	9.49
6	-	.50	-	.68	32	-	2.67	_	3.62	59	_	4.92	-	6.67	85	-	7.08	-	9.61
7	-	.58	-	.80	33	-	2.75	_	3.73	60	-	5.00	-	6.78	86	-	7.16	-	9.72
8	-	.66	-	.90	34	-	2.83	-	3.84	61	-	5.08	-	6.89	87	-	7.25	-	9.83
9	-	.75	-	1.02	36	-	3.00	-	4.07	62	-	5.16	-	7.01	88	-	7.33	-	9.94
10	-	.83	-	1.13	37	-	3.08	-	4.18	63	-	5.25	-	7.12	89	-	7.42	-	10.06
11	-	.92	-	1.24	38	-	3.16	-	4.29	64	-	5.33	-	7.23	90	-	7.50	-	10.17
12	-	1.00	-	1.35	39	-	3.25	_	4.41	65	_	5.42	-	7.35	91	-	7.58	-	10.28
13	-	1.08	-	1.47	40	-	3.33	-	4.52	66	-	5.50	-	7.46	92	-	7.66	-	10.40
14	-	1.16	-	1.58	41	-	3.42	-	4.63	67	-	5.58	-	7.57	93	-	7.75	-	10.51
15	-	1.25	-	1.70	42	-	3.50	-	4.75	68	-	5.66	-	7.68	94	-	7.83	-	10.62
16	-	1.33	-	1.81	43	-	3.58	-	4.86	69	-	5.75	-	7.80	95	-	7.92	-	10.74
17	—	1.42	_	1.92	44	_	3.66	-	4.97	70	_	5.83	-	7.91	96	-	8.00	-	10.85
18	-	1.50	-	2.03	45	-	3.75	-	5.09	71	-	5.92	-	8.02	97	-	8.08	-	10.96
19	—	1.58	_	2.15	46	_	3.83	-	5.20	72	_	6.00	-	8.14	98	-	8.16	-	11.07
20	-	1.66	_	2.26	47	_	3.92	-	5.31	73	_	6.08	-	8.25	99	-	8.25	-	11.19
21	-	1.75	-	2.37	48	-	4.00	-	5.42	74	-	6.14	-	8.36	100	-	8.33	-	11.30
22	-	1.83	-	2.49	49	_	4.08	-	5.54	75	_	6.25	-	8.48	108	-	9.00	-	12.20
23	—	1.92	_	2.60	50	_	4.16	-	5.65	76	_	6.33	—	8.59	120	_	10.00	_	13.50
24	-	2.00	-	2.71	51	-	4.25	-	5.76	77	-	6.42	-	8.70	132	-	11.00	-	14.90
25	-	2.08	-	2.83	52	-	4.33	-	5.88	78	-	6.50	-	8.81	-	-	-	-	-
26	-	2.16	-	2.94	53	_	4.42	-	5.99	79	-	6.58	-	8.93	-	-	-	_	-

Inch Pounds x 0.113 = Newton Meters

Newton Meters x 8.849 = Inch Pounds

Foot Pounds x 1.356 = Newton Meters

Newton Meters x 0.737 = Foot Pounds

## **Model Identification Guide**

Example: SA024C-26-Q



## Torque Output: 3 to 100 in.-lbs (0.34 to 11.3 Nm)

## **Ordering Information**

Tools are equipped with a Quick-Change Assembly (-Q Drive Option) as standard. To order a tool equipped with a (FINDER) option, specify the following option:

#### • Standard Length Finder.

Change the "-Q" in the model number to "-F" and specify one of the FINDER KITS listed in the chart below.

Note: Apex Magnetic Bit Holder (40259), and Magna Magnetic Bit Holder (36585) may be ordered separatley.

#### Example: SQ024C-9-A Drive Option.

Finder Kit	Scre Flat head	ew Size Round head	Bit to Use Order Separately
46343-1	1	2	F164
46343-2	2	3	F1645
46343-3	3	4	XF165
46343-4	4	5	XF166
46343-5	5	6	XF167
46343-6	6	8	XF168
46343-8	8	10	XF169
46343-10	10	12	XF1610

*Note: Tools ordered with the* **Finder Option** *will not accommodate the "-Q", options. Consult factory.* 





Quick-Change Assembly (Q)

Standard Length Finder (F)

## **QRT Screwdrivers**

#### 800 to 2600 RPM

- Exclusive ARO Quick-Reverse Touchtrol<sup>™</sup> trigger enables instant, singlehand control of spindle rotation and speed.
- Ideal for applications in which reversing or fastener realignment occurs frequently.
- Ergonomically-correct handle design and well-balanced construction provide comfortable handling and reduce operator fatigue.
- Wide selection of speeds and torque outputs ensures the proper tool for the assembly conditions.

#### Standard Equipment

- 1/4" Hex Bit Holder
- Quick-Change Chuck on Direct Drive Models
- Quick-Change Assembly on Series 20 and 50 Models



#### Automatic Shut-Off Screwdrivers

	Free		Tor	que Ranç	e-Soft Dra	aw		To	ool	Spir	ndle	Тс	ool	(	@ Free	Speed
Model No.	Speed	Spr	ing	Spr	ing	Spr	ng	Ler	ıgth	Off	set	We	ight	Air C	onsp.	Sound Level
	rpm	inlbs	Nm	inlbs	Nm	inlbs	Nm	in.	mm	in.	mm	lbs	kg	cfm	L/s	dB(A)
Series 20		Bro	wn	Gre	en	Re	d									
Trigger Permit <sup>1</sup>																
SQ024C-26-Q	2,600	-	-	-	-	3-10	.34-1.1	7.1	180	.75	19	1.9	.8	15	7	79
SQ024C-15-Q	1,500	-	-	8-20	.9-2.3	3 10	.34-1.1	7.5	191	.75	19	2.0	.9	15	7	79
SQ024C-9-Q	900	10-30	1.1-3.4	8-20	9-2.3	3-10	.34-1.1	7.5	191	.75	19	2.0	.9	15	7	79
SQ024C-8-Q	800	12-40	1.4-4.5	10-26	1.1-2.9	4-13	.50-1.5	7.5	191	.75	19	2.0	.9	15	7	79
Series 50		Yel	low	Bro	wn	Gre	en									
Trigger Permit <sup>1</sup>																
SQ054C-24-Q	2,400	-	-	-	-	15-40	1.7-4.5	8.3	211	.94	24	3.0	1.3	25	12	78
SQ054C-16-Q	1,600	-	-	25-60	2.8-6.8	15-40	1.7-4.5	8.8	224	.94	24	3.2	1.4	25	12	78
SQ054C-10-Q	1,000	35-80	4.0-9.0	25-60	2.8-6.8	15-40	1.7-4.5	8.8	224	.94	24	3.2	1.4	25	12	78
SQ054C-8-Q	800	35-100	4.0-11.3	25-60	2.8-6.8	15-40	1.7-4.5	8.8	224	.94	24	3.2	1.4	25	12	78
	_															

Air Inlet – 1/4" NPTF

Recommended Air Pressure – 90 PSI (6.2 bar)

Recommended Hose Size – <sup>5</sup>/16" (8mm) I.D.

Note: The torque values shown for a given model indicate the clutch spring(s) included with the tool. The torque value in bold type indicates the standard spring equipped in the clutch.

(1) Series 20 and 50 QRT Screwdrivers feature a push-to-start throttle mechanism with a trigger permit for forward rotation. The reverse trigger position provides instant full-power reverse criation

## Torque Output: 15 to 110 in.-Ibs (1.7 to 12.5 Nm)

## **Performance Tip:**

Check the tolerance in your work pieces. Misaligned parts may lead to a loss of power and torque. Be sure to check the dimensions and alignment of any pre-drilled or punched holes, as well as the dimensions of the screws being used.



	Free	Clutch	Sta	all	Torque	Range	T	ool	Spi	ndle	To	ol		@ Free	Speed
Model No.	Speed	Гуре	Torc	que	Soft D	Iraw	Ler	igth	. 01	fset	We	ight	Air C	ionsp.	Sound Level
	rpm		inIbs	Nm	inIbs	Nm	in.	mm	in.	mm	lbs	kg	cfm	L/s	dB(A)
000 Series															
8684-BPR-D	2300	Direct Drive	15	1.7	-	-	4.8	123	.8	20	1.3	.6	23	10.8	82
8683-BPR-D	750	Direct Drive	50	5.7	-	-	6.0	152	.8	20	1.6	.7	17	8.0	82
8684-BPR-P	2300	Positive	15 <sup>2</sup>	1.7	-	-	6.3	160	.8	20	1.7	.8	23	10.8	82
8683-BPR-P	750	Positive	50 <sup>2</sup>	5.7	-	-	7.1	179	.8	20	2.0	.9	17	8.0	82
8684-BPR- <sup>(1)</sup>	2300	Adj. Ball	-	_	3–16	.3–1.8	7.0	178	.8	20	1.8	.8	23	10.8	82
8683-BPR- <sup>(1)</sup>	750	Adj. Ball	-	-	3–20	.3–2.3	8.1	206	.8	20	2.1	.9	17	8.0	82
0 Series															•
8521-BPR-D	2100	Direct Drive	45	5.1	-	-	6.8	173	.9	23	2.2	1.0	27	12.7	82
8515-BPR-D	1500	Direct Drive	50	5.7	-	-	8.2	208	.9	23	2.8	1.3	27	12.7	82
8509-BPR-D	900	Direct Drive	80	9.1	-	-	8.2	208	.9	23	2.8	1.3	26	12.2	82
8506-BPR-D	600	Direct Drive	110	12.5	-	-	8.2	208	.9	23	2.8	1.3	24	11.3	82
8521-APR-P	2100	Positive	45 <sup>2</sup>	5.1	-	-	6.8	173	.9	23	2.2	1.0	27	12.7	82
8515-APR-P	1500	Positive	50 <sup>2</sup>	5.7	-	-	8.2	208	.9	23	2.9	1.3	27	12.7	82
8509-APR-P	900	Positive	80 <sup>2</sup>	9.1	-	-	8.2	208	.9	23	2.9	1.3	26	12.2	82
8506-APR-P	600	Positive	110 <sup>2</sup>	12.5	-	-	8.2	208	.9	23	2.9	1.3	24	11.3	82
8521-APR-A	2100	Adj. Ball	-	-	8–40	.9–4.5	7.5	190	.9	23	2.5	1.1	27	12.7	82
8515-APR-A	1500	Adj. Ball	-	-	8–45	.9–5.1	7.5	190	.9	23	2.5	1.1	27	12.7	82
8509-APR-A	900	Adj. Ball	-	_	8–50	.9–5.7	8.9	226	.9	23	3.1	1.4	26	12.2	82
8506-APB-A	600	Adi, Ball	-	_	8-70	.9-7.9	8.9	226	.9	23	3.1	1.4	24	11.3	82

• Most popular model. Air Inlet – 1/4" NPTF

Recommended Air Pressure – 90 PSI (6.2 bar) Recommended Hose Size – <sup>5</sup>/16" (8mm) I.D.

(1) Add -A for internal adjustment clutch or -F for external clutch adjustment.

(2) Controlled by operator technique.

Note: The torque values shown for a given model indicate the clutch spring(s) included with the tool.

## Torque Output: 3 to 100 in.-lbs (.34 to 11.3 Nm)





#### **Reversible Pistol Grip Screwdrivers**

	Free	Torque Range-Soft Dra		aw		То	ol	Spin	dle	To	ol		@ Free	Speed		
Model No.	Speed	Spi	ring	Spr	ing	Spr	ing	Len	gth	Offs	set	We	ight	Air C	onsp.	Sound Level
	rpm	inlbs	Nm	inIbs	Nm	inlbs	Nm	ın.	mm	ın.	mm	lbs	kg	cfm	L/S	dB(A)
Series 20		Bro	wn	Gre	en	Re	d									
Push-to-Start	, ,					1										
AG024A-26-Q	2,600	-	-	-	-	3-10	.34-1.1	7.875	200	0.662	17	1.76	0.78	15	7	76
AG024A-15-Q	1,500	-	-	8-20	.9-2.3	3-10	.34-1.1	8.250	210	0.662	17	1.86	0.85	15	7	76
AG024A-9-Q	900	10-30	1.1-3.4	8-20	.9-2.3	3-10	.34-1.1	8.250	210	0.662	17	1.86	0.85	15	7	76
AG024A-8-Q	800	12-40	1.4-4.5	10-26	1.1-2.9	4-13	.5-1.5	8.250	210	0.662	17	1.86	0.85	15	7	76
Trigger Start																
AG027A-26-Q	2,600	-	-	-	-	3-10	.34-1.1	7.875	200	0.662	17	1.76	0.78	15	7	76
AG027A-15-Q	1,500	-	-	8 - 20	.9-2.3	3-10	.34-1.1	8.250	210	0.662	17	1.86	0.85	15	7	76
AG027A-9-Q	900	10-30	1.1-3.4	8 - 20	.9-2.3	3-10	.34-1.1	8.250	210	0.662	17	1.86	0.85	15	7	76
AG027A-8-Q	800	12-40	1.4-4.5	10 - 26	1.1-2.9	4-13	.5-1.5	8.250	210	0.662	17	1.86	0.85	15	7	76
Trigger Permit																
AG028A-26-Q	2,600	-	-	-	-	3-10	.34-1.1	7.875	200	0.662	17	1.76	0.78	15	7	76
AG028A-15-Q	1,500	-	-	8-20	.9-2.3	3-10	.34-1.1	8.250	210	0.662	17	1.86	0.85	15	7	76
AG028A-9-Q	900	10-30	1.1-3.4	8-20	.9-2.3	3-10	.34-1.1	8.250	210	0.662	17	1.86	0.85	15	7	76
AG028A-8-Q	800	12-40	1.4-4.5	10-26	1.1-2.9	4-13	.5-1.5	8.250	210	0.662	17	1.86	0.85	15	7	76
Series 50		Yel	low	Bro	wn	Gre	en									
Push-to-Start																
AG054A-24-Q	2,400	-	-	-	-	15-40	1.7-4.5	8.375	212	0.865	22	2.70	1.20	25	12	80
AG054A-16-Q	1,600	-	-	25-60	2.8-6.8	15-40	1.7-4.5	8.875	225	0.865	22	2.90	1.29	25	12	80
AG054A-10-Q	1,000	35-80	4.0-9.0	25-60	2.8-6.8	15-40	1.7-4.5	8.875	225	0.865	22	2.90	1.29	25	12	80
AG054A-8-Q	800	35-100	4.0-11.3	25-60	2.8-6.8	15-40	1.7-4.5	8.875	225	0.865	22	2.90	1.29	25	12	80
Trigger Start																
AG057A-24-Q	2,400	-	-	-	-	15-40	1.7-4.5	8.375	212	0.865	22	2.70	1.20	25	12	80
AG057A-16-Q	1,600	-	-	25-60	2.8-6.8	15-40	1.7-4.5	8.875	225	0.865	22	2.90	1.29	25	12	80
AG057A-10-Q	1,000	35-80	4.0-9.0	25-60	2.8-6.8	15-40	1.7-4.5	8.875	225	0.865	22	2.90	1.29	25	12	80
AG057A-8-Q	800	35-100	4.0-11.3	25-60	2.8-6.8	15-40	1.7-4.5	8.875	225	0.865	22	2.90	1.29	25	12	80
Trigger Permit																
AG058A-24-Q	2,400	-	-	-	-	15-40	1.7-4.5	8.375	212	0.865	22	2.70	1.20	25	12	80
AG058A-16-Q	1,600	-	-	25-60	2.8-6.8	15-40	1.7-4.5	8.875	225	0.865	22	2.90	1.29	25	12	80
AG058A-10-Q	1,000	35-80	4.0-9.0	25-60	2.8-6.8	15-40	1.7-4.5	8.875	225	0.865	22	2.90	1.29	25	12	80
AG058A-8-Q	800	35-100	4.0-11.3	25-60	2.8-6.8	15-40	1.7-4.5	8.875	225	0.865	22	2.90	1.29	25	12	80

• Most popular model. Air Inlet – 1/4" NPTF

•

Recommended Air Pressure – 90 PSI (6.2 bar) Recommended Hose Size – 5/16" (8mm) I.D.

Note: The torque values shown for a given model indicate the clutch spring(s) included with the tool. Torque value in bold type indicates the standard spring equipped in the clutch.

## Torque Output: 3 to 100 in.-Ibs (.34 to 11.3 Nm)

## **Ordering Information**

Tools are equipped with a Quick-Change Assembly (-Q Drive Option) as standard. To order a tool equipped with a (FINDER) option, specify the following option at no extra cost:

#### • Standard Length Finder.

Change the "- $\bar{Q}$ " in the model number to "-F" and specify one of the FINDER KITS listed in the chart at right.

Note: Apex Magnetic Bit Holder (40259), and Magna Magnetic Bit Holder (36585) may be ordered separatley.

Example: AS028A-15-F with 46343-4. Order bit separately.



Quick-Change Assembly (Q)

Standard Length Finder (F)

Finder	Scre	ew Size	Bit to Use
Kit	Flat head	Round head	Order Separately
46343-1	1	2	F164
46343-2	2	3	F1645
46343-3	3	4	XF165
46343-4	4	5	XF166
46343-5	5	6	XF167
46343-6	6	8	XF168
46343-8	8	10	XF169
46343-10	10	12	XF1610

Note: Tools ordered with the Finder Option will not accommodate the "-Q", option. Consult factory.



#### **Reversible In-Line Screwdrivers**

		Free		Tor	que Ranç	je-Soft Dra	aw		To	ol	Spir	ndle	Тс	ol	(	Free	Speed
	Model No.	Speed	Spr	ring	Spi	ring	Spri	ng	Len	gth	Off	set	We	ight	Air C	onsp.	Sound Level
		rpm	inlbs	Nm	inlbs	Nm	inlbs	Nm	in.	mm	in.	mm	lbs	kg	cfm	L/s	dB(A)
	Series 20		Bro	wn	G	reen	R	ed									
	Push-to-Start																
	SA024C-26-Q	2,600	-	-	-	-	3-10	.34-1.1	8.25	210	0.6	15	1.20	0.5	15	7	76
•	SA024C-15-Q	1,500	-	-	8-20	.9-2.3	3-10	.34-1.1	8.625	219	0.6	15	1.30	0.6	15	7	76
•	SA024C-9-Q	900	10-30	1.1-3.4	8-20	.9-2.3	3-10	.34-1.1	8.625	219	0.6	15	1.30	0.6	15	7	76
	SA024C-8-Q	800	12-40	1.4-4.5	10-26	1.1-2.9	4-13	.5-1.5	8.625	219	0.6	15	1.30	0.6	15	7	76
	Lever Permit																
	AS028A-26-Q	2,600	-	-	-	-	3-10	.34-1.1	9.062	230	0.6	15.2	1.40	0.63	15	7	73.6
	AS028A-15-Q	1,500	-	-	8-20	.9-2.3	3-10	.34-1.1	9.473	240	0.6	15.2	1.50	0.68	15	7	73.6
	AS028A-9-Q	900	10-30	1.1-3.4	8-20	.9-2.3	3-10	.34-1.1	9.473	240	0.6	15.2	1.50	0.68	15	7	73.6
	AS028A-8-Q	800	12-40	1.4-4.5	10-26	1.1-2.9	4-13	.5-1.5	9.473	240	0.6	15.2	1.50	0.68	15	7	73.6
_	Series 50		Yel	low	B	rown	Gr	een									
_	Push-to-Start																
	SA054C-25-Q	2,500	-	-	-	-	15-40	1.7-4.5	9.75	248	0.865	22	2.60	1.2	25	12	80
•	SA054C-17-Q	1,700	-	-	25-60	2.8-6.8	15-40	1.7-4.5	10.25	260	0.865	22	2.80	1.3	25	12	80
•	SA054C-10-Q	1,000	35-80	4.0-9.0	25-60	2.8-6.8	15-40	1.7-4.5	10.25	260	0.865	22	2.80	1.3	25	12	80
•	SA054C-8-Q	800	35-100	4.0-11.3	25-60	2.8-6.8	15-40	1.7-4.5	10.25	260	0.865	22	2.80	1.3	25	12	80
_	Lever Permit																
	AS058A-25-Q	2,500	-	-	-	-	15-40	1.7-4.5	10.437	265	0.865	22	2.80	1.26	25	12	75.8
	AS058A-17-Q	1,700	-	-	25-60	2.8-6.8	15-40	1.7-4.5	10.937	278	0.865	22	3.00	1.36	25	12	75.8
•	AS058A-10-Q	1,000	35-80	4.0-9.0	25-60	2.8-6.8	15-40	1.7-4.5	10.937	278	0.865	22	3.00	1.36	25	12	75.8
	AS058A-8-Q	800	35-100	4.0-11.3	25-60	2.8-6.8	15-40	1.7-4.5	10.937	278	0.865	22	3.00	1.36	25	12	75.8

• Most popular model.

Air Inlet – 1/4" NPTF

Recommended Air Pressure – 90 PSI (6.2 bar) Recommended Hose Size – <sup>5</sup>/16" (8mm) I.D.

Note: The torque values shown for a given model indicate the clutch spring(s) included with the tool. Torque value in bold type indicates the standard spring equipped in the clutch.

## Torque Output: 3 to 130 in.-Ibs (.30 to 14.7 Nm)

## **Ordering Information**

Specify the Base Model Number for the tool with the desired free speed and torque range from the charts below. Add the appropriate Dash No. / Letter to indicate one of the following Drive Options:

• <sup>1</sup>/4" Square Drive.

Add "-1" to the end of the base model number. Not available on Models AR058A-6H-( ).

• <sup>3</sup>/8" Square Drive.

Add "-2" to the end of the base model number. Not available on Models AR028A-()L-().

- 1/4" Female Hex Bit Holder. Add "-H" to the end of the base model number.
- Standard Length Finder. Add "-F" to the end of the base model number and Not available on Models AR028A-()L-().
- Example: AR028A-48L-1

#### Right Angle Heads available:

- "L" Light Duty (aircraft head)
- "R" Regular Duty
- "H" Heavy Duty



#### **Reversible Right Angle Screwdrivers and Nutsetters**

	Free		Tor	rque Rang	ge-Soft Dra	aw		To	ol	Spir	ndle	То	ol	(	@ Free	Speed
Model No.	Speed	Spr	ring	Spi	ring	Spri	ing	Len	gth	0ff	set	Wei	ght	Air C	onsp.	Sound Level
	rpm	inlbs	Nm	inIbs	Nm	inIbs	Nm	in.	mm	in.	mm	lbs	kg	cfm	L/s	dB(A)
Series 20		Bro	wn	G	reen	R	ed									
Lever Throttle																
AR028A-48L-()	4,800	-	-	-	-	3-7	.3080	12.9	328	0.33	8.3	2.20	1.0	15	7	76
AR028A-25L-()	2,500	-	-	-	-	5-10	.60-1.1	12.9	328	0.33	8.3	2.20	1.0	15	7	76
AR028A-14L-()	1,425	_	-	8-20	.9-2.3	5-10	.60-1.1	13.3	338	0.33	8.3	2.30	1.0	15	7	76
AR028A-9L-()	875	10-30	1.1-3.4	8-20	.9-2.3	5-10	.60-1.1	13.3	338	0.33	8.3	2.30	1.0	15	7	76
AR028A-17R-()	1,750	-	-	-	-	7-16	.80-1.8	11.9	302	0.58	14.8	2.21	1.0	15	7	76
AR028A-10R-()	1,000	-	-	10-26	1.1-2.9	7-16	.80-1.8	11.9	302	0.58	14.8	2.30	1.0	15	7	76
AR028A-5R-()	500	15-40	1.7-4.5	10-26	1.1-2.9	7-16	.80-1.8	12.4	315	0.58	14.8	2.30	1.0	15	7	76
Series 50		Yel	low	В	rown	Gr	een									
Lever Throttle				-		-										
AR058A-24R-()	2,400	-	-	-	-	20-40	2.2-4.5	13.5	343	0.58	14.7	3.60	1.6	25	12	80
AR058A-16R-()	1,650	-	-	-	-	25-58	2.8-6.5	13.5	343	0.58	14.7	3.60	1.6	25	12	80
AR058A-9R-()	950	-	-	25-90	2.8-10.2	25-58	2.8-6.5	14.0	356	0.58	14.7	3.80	1.7	25	12	80
AR058A-6H-()	600	35-130	4.0-14.7	23-81	2.6-9.2	23-52	2.6 -5.9	14.2	360	0.65	16.5	4.00	1.8	25	12	80

Air Inlet – 1/4" NPTF

Recommended Air Pressure - 90 PSI (6.2 bar)

Recommended Hose Size  $-\frac{5}{16}$ " (8mm) I.D.

Note: The torque values shown for a given model indicate the clutch spring(s) included with the tool. The torque value in bold type indicates the standard spring equipped in the clutch.

## Torque Output: 4 to 100 in.-lbs (.5 to 11.3 Nm)



SG023B-15-Q

#### SG053B-17-Q

#### **Reversible Pistol Grip Screwdrivers**

	Model No.	Free Speed	Spr	Tor ing	que Ranç Spi	je-Soft Dra ing	aw Spri	ing	To Ler	ool 1gth	Spi Of	ndle fset	To We	ool ight	ہ Air C	@ Free onsp.	Speed Sound Level
		rpm	inIbs	Nm	inlbs	Nm	inlbs	Nm	in.	mm	in.	mm	lbs	kg	cfm	L/s	dB(A)
	Series 20		Blu	ue	Ye	ellow		-									
	Trigger Start																
	SG023B-26-Q	2,600	-	-	4-12	.5-1.4	-	-	6.6	169	.66	17	1.7	.8	15	7	76
•	SG023B-15-Q	1,500	-	-	4-20	.5-2.3	-	-	7.0	178	.66	17	1.8	.8	15	7	76
	SG023B-9-Q	900	20-30	2.3-3.4	4-20	.5-2.3	-	_	7.0	178	.66	17	1.8	.8	15	7	76
	Series 50		Gra	ay	E	Blue	Ye	llow									
	Trigger Start																
	SG053B-25-Q	2,500	-	-	-	-	10-40	1.1-4.5	8.9	226	.80	21	2.9	1.4	25	12	78
	SG053B-17-Q	1,700	-	-	15-60	1.7-6.8	10-40	1.1-4.5	9.4	238	.80	21	3.1	1.5	25	12	78
	SG053B-10-Q	1,000	_	-	15-80	1.7-9.0	10-40	1.1-4.5	9.4	238	.80	21	3.1	1.5	25	12	78
	SG053B-8-Q*	800	45-100	5.1-11.3	15-80	1.7-9.0	10-40	1.1-4.5	9.4	238	.80	21	3.1	1.5	25	12	78

• Most popular model.

Air Inlet – <sup>1</sup>/4" NPTF Recommended Air Pressure – 90 PSI (6.2 bar)

Recommended Hose Size – <sup>5</sup>/16" (8mm)

Note: The torque values shown for a given model indicate the clutch spring(s) included with the tool. The torque value in bold type indicates the standard spring equipped in the clutch.

Torque Output: 4 to 100 in.-Ibs (.5 to 11.3 Nm)



SA023B-9-Q

SL023B-15-Q

SL053B-17-Q

#### **Reversible In-Line Screwdrivers**

		Free		Tor	que Rang	je-Soft Dr	aw		Тс	ol	Spir	ndle	Тс	ol	(	@ Free	Speed
	Model No.	Speed	Spi	ring	Spr	ring	Spri	ing	Len	igth	Off	set	We	ght	Air C	onsp.	Sound Level
		rpm	inlbs	Nm	inIbs	Nm	inIbs	Nm	in.	mm	in.	mm	lbs	kg	cfm	L/s	dB(A)
	Series 20		BI	ue	Ye	ellow		-									
	Push-to-Start																
	SA023B-26-Q	2,600	-	-	4-12	.5-1.4	-	-	8.2	208	.60	15	1.2	.5	15	7	76
•	SA023B-15-Q	1,500	-	-	4-20	.5-2.3	-	-	8.5	217	.60	15	1.3	.6	15	7	76
•	SA023B-9-Q	900	20-30	2.3-3.4	4-20	.5-2.3	-	_	8.5	217	.60	15	1.3	.6	15	7	76
	Lever Throttle																
-	SL023B-26-Q	2,600	-	-	4-12	.5-1.4	-	-	8.2	208	.60	15	1.2	.5	15	7	76
•	SL023B-15-Q	1,500	-	-	4-20	.5-2.3	-	-	8.5	217	.60	15	1.3	.6	15	7	76
•	SL023B-9-Q	900	20-30	2.3-3.4	4-20	.5-2.3	-	-	8.5	217	.60	15	1.3	.6	15	7	76
	Series 50		Gr	ay	E	Blue	Ye	llow									
	Push-to-Start																
	SA053B-25-Q	2,500	-	-	-	-	10-40	1.1-4.5	10.4	264	.80	21	2.6	1.2	25	12	78
	SA053B-17-Q	1,700	-	-	15-60	1.7-6.8	10-40	1.1-4.5	10.9	277	.80	21	2.8	1.3	25	12	78
	SA053B-10-Q	1,000	-	-	15-80	1.7-9.0	10-40	1.1-4.5	10.9	277	.80	21	2.8	1.3	25	12	78
	SA053B-8-Q	800	45-100	5.1-11.3	15-80	1.7-9.0	10-40	1.1-4.5	10.9	277	.80	21	2.8	1.3	25	12	78
	Lever Throttle																
	SL053B-25-Q	2,500	-	-	-	-	10-40	1.1-4.5	10.4	264	.80	21	2.9	1.4	25	12	78
•	SL053B-17-Q	1,700	-	-	15-60	1.7-6.8	10-40	1.1-4.5	10.9	277	.80	21	3.1	1.5	25	12	78
•	SL053B-10-Q	1,000	-	-	15-80	1.7-9.0	10-40	1.1-4.5	10.9	277	.80	21	3.1	1.5	25	12	78
•	SL053B-8-Q	800	45-100	5.1-11.3	15-80	1.7-9.0	10-40	1.1-4.5	10.9	277	.80	21	3.1	1.5	25	12	78

• Most popular model. Air Inlet – 1/4" NPTF

Recommended Air Pressure – 90 PSI (6.2 bar)

Recommended Hose Size  $= 5/c^{\circ}$  (8mm) Note: The torque values shown for a given model indicate the clutch spring(s) included with the tool. The torque value in bold type indicates the standard spring equipped in the clutch.

## Torque Output: 2 to 135 in.-Ibs (.2 to 15.3 Nm)

## **Ordering Information**

#### Right Angle Nutsetters -

Specify the Base Model Number of the desired tool and add either a "-1" for a  $^{1}\!/_4$ " Square Drive or "-2" for a  $^{3}\!/_8$ " Square Drive. "-1" Not available on Series 50 R/A Nutsetters

#### Right Angle Screwdrivers –

Specify the Base Model Number of the desired tool and add the appropriate Dash No. / Letter to indicate one of the following Drive Options.

- 1/4" Square Drive Assembly.
   Add "-1" to the end of the base model number. "-1" Not available on Series 50 R/A Screwdrivers
- 1/4" Female Hex Bit Holder. Add "-H" to the end of the base model number.
- Standard Length Finder. Add "-F" to the end of the base model number and specify one of the Finder Kits listed in the chart at right.

Note: Finder option is not available on SR023B-( )L-( ).

#### Example: SR023B-25L-H

- Right Angle Heads available:
- "L" Light Duty (aircraft head)
- "R" Regular Duty
- "H" Heavy Duty

Finder	Scre	w Size	Bit to Use
Kit	Flat head	Round head	Order Separately
46343-1	1	2	F164
46343-2	2	3	F1645
46343-3	3	4	XF165
46343-4	4	5	XF166
46343-5	5	6	XF167
46343-6	6	8	XF168
46343-8	8	10	XF169
46343-10	10	12	XF1610

Note: Tools ordered with the Finder Option will not accommodate the "-Q", options. Consult factory.



SR023B-17R-I

#### **Reversible Right Angle Screwdrivers**

	Free		Tor	que Rang	je-Soft Dra	w		To	ol	Spii	ndle	To	ool	(	Free	Speed
Model No.	Speed	Spr	ing	Spi	ring	Spri	ng	Len	igth	Off	set	We	ight	Air C	onsp.	Sound Level
	rpm	inlbs	Nm	inIbs	Nm	inIbs	Nm	in.	mm	in.	mm	lbs	kg	cfm	L/s	dB(A)
Series 20		Gra	ay	E	Blue	Ye	llow									
SR023B-48L-()	4,800	-	_	-	-	2-5	.26	12.9	328	0.33	8.3	2.1	0.95	15	7	76
SR023B-25L-()	2,500	-	-	-	-	4-10	.4-1.1	12.9	328	0.33	8.3	2.1	0.95	15	7	76
SR023B-14L-()	1,000	-	-	-	-	4-17	.4-1.9	13.3	338	0.33	8.3	2.2	1.00	15	7	76
SR023B-9L-()	900	-	-	-	-	6-23	.7-2.6	13.3	338	0.33	8.3	2.2	1.00	15	7	76
SR023B-17R-()	1,750	-	-	-	_	7-16	.8-1.8	11.9	302	0.58	14.8	2.2	1.00	15	7	76
SR023B-10R-()	1,000	-	-	-	-	10-26	1.1-2.9	11.9	302	0.58	14.8	2.3	1.00	15	7	76
SR023B-5R-()	500	-	_	25-40	2.8-4.5	10-26	1.1-2.9	12.4	315	0.58	14.8	2.3	1.00	15	7	76
Series 50																
SR053B-16R-()	1,650	-	-	-	-	25-58	2.8-6.5	13.5	343	0.58	14.7	3.6	1.60	25	12	80
SR053B-9R-()	950	-	-	25-90	2.8-10.2	25-58	2.8-6.5	14.0	356	0.58	14.7	3.8	1.70	25	12	80
SR053B-11H-()	1,150	-	_	20-70	2.2-7.9	-	-	14.2	360	0.65	16.5	4.0	1.80	25	12	80
SR053B-8H-()	800	-	-	25-100	2.8-11.3	-	-	14.2	360	0.65	16.5	4.0	1.80	25	12	80
SR053B-6H-()	500	40-135	4.5-15.3	25-100	2.8-11.3	_	-	14.2	360	0.65	16.5	4.0	1.80	25	12	80

Air Inlet – 1/4" NPTF

Recommended Air Pressure – 90 PSI (6.2 bar)

Recommended Hose Size – 5/16" (8mm)

Note: The torque values shown for a given model indicate the clutch spring(s) included with the tool. The torque value in bold type indicates the standard spring equipped in the clutch.

## Screwdrivers and Nutsetters **Adjustable Ball Clutch Tools**

Torque Output: 2 to 135 in.-Ibs (.2 to 15.3 Nm)





NR023B-10R-1

NR053B-9R-2

#### **Reversible Right Angle Nutsetters**

	Free		Tor	que Ranç	je-Soft Dra	aw		Тс	ol	Spi	ndle	Т	ool	(	@ Free	Speed
Model No.	Speed	Spr	ing	Spi	ring	Spr	ing	Len	gth	Off	set	We	ight	Air C	onsp.	Sound Level
	rpm	inlbs	Nm	inlbs	Nm	inIbs	Nm	in.	mm	in.	mm	lbs	kg	cfm	L/s	dB(A)
Series 20		Gr	ay	E	Blue	Ye	llow									
NR023B-17R-()	1,750	-	-	-	-	7-16	.8-1.8	11.9	302	0.58	14.8	2.2	1.00	15	7	76
NR023B-10R-()	1,000	-	-	-	-	10-26	1.1-2.9	11.9	302	0.38	14.8	2.3	1.00	15	7	76
NR023B-5R-()	500	-	-	25-40	2.8-4.5	10-26	1.1-2.9	12.4	315	0.58	14.8	2.3	1.00	15	7	76
Series 50																
NR053B-16R-()	1,650	-	-	-	-	25-58	2.8-6.5	13.5	343	0.58	14.7	3.6	1.60	25	12	80
NR053B-9R-()	950	-	-	25-90	2.8-10.2	25-58	2.8-6.5	14.0	356	0.58	14.7	3.8	1.70	25	12	80
NR053B-11H-()	1,150	-	-	20-70	2.2-7.9	-	-	14.2	360	0.65	16.5	4.0	1.80	25	12	80
NR053B-8H-()	800	-	-	25-100	2.8-11.3	-	-	14.2	360	0.65	16.5	4.0	1.80	25	12	80
NR053B-6H-()	500	40-135	4.5-15.3	25-100	2.8-11.3	-	_	14.2	360	0.65	16.5	4.0	1.80	25	12	80

Air Inlet – 1/4" NPTF

Recommended Air Pressure – 90 PSI (6.2 bar)

Recommended Hose Size – 5/16" (8mm)

Note: The torque values shown for a given model indicate the clutch spring(s) included with the tool. The torque value in bold type indicates the standard spring equipped in the clutch.

Torque Output: 12 to 120 in.-Ibs (1.4 to 13.6 Nm)





SG022B-15-Q

#### **Reversible Pistol Grip Screwdrivers**

	Model No. with	Model No. with	Free Speed	Sta Torc	ll <sup>1</sup> lue	T Lei	ool ngth	Spi Of	ndle fset	To We	ool ight	Air Co	@ Free onsp.	Speed Sound Level
	Angle Jaws	90 <sup>0</sup> Jaws	rpm	inIbs	Nm	in.	mm	in.	mm	lbs	kg	cfm	L/s	dB(A)
	Series 20													
	SG022B-26-Q	SG029B-26-Q	2,600	12	1.4	5.1	131	.66	17	1.5	.7	15	7	76
•	SG022B-15-Q	SG029B-15-Q	1,500	25	2.8	5.5	140	.66	17	1.6	.7	15	7	76
	SG022B-9-Q	SG029B-9-Q	900	38	4.3	5.5	140	.66	17	1.6	.7	15	7	76
	Series 50							-						
	SG052B-25-Q	SG059B-25-Q	2,500	45	4.0	7.2	182	.8	21	2.4	1.1	25	12	78
•	SG052B-17-Q	SG059B-17-Q	1,700	65	7.3	7.6	194	.8	21	2.6	1.2	25	12	78
•	SG052B-10-Q	SG059B-10-Q	1,000	90	10.2	7.6	194	.8	21	2.6	1.2	25	12	78
	SG052B-8-Q	SG059B-8-Q	800	120	13.6	7.6	194	.8	21	2.6	1.2	25	12	78

• Most popular model. Air Inlet – 1/4" NPTF

Recommended Air Pressure – 90 PSI (6.2 bar) Recommended Hose Size – <sup>5</sup>/<sub>16</sub>" (8mm)

(1) Operator technique controls final torque input on models with angle clutch jaws.

Torque Output: 12 to 120 in.-Ibs (1.4 to 13.6 Nm)







#### **Reversible In-Line Screwdrivers**

Model No. with	Model No. with	Free Speed	Sta Torc	ll <sup>1</sup> iue	T Le	ool nath	Spi Of	indle fset	To We	ool iaht	Air Co	@ Free onsp.	Speed Sound Level
Angle Jaws	90 <sup>0</sup> Jaws	rpm	inlbs	Nm	in.	mm	in.	mm	lbs	kg	cfm	L/s	dB(A)
Series 20													
SL022B-26-Q	SL029B-26-Q	2,600	12	1.4	6.7	169	.6	15	1.0	.5	15	7	76
SL022B-15-Q	SL029B-15-Q	1,500	25	2.8	7.0	178	.6	15	1.1	.5	15	7	76
SL022B-9-Q	SL029B-9-Q	900	38	4.3	7.0	178	.6	15	1.1	.5	15	7	76
Series 50	•												
SL052B-25-Q	SL059B-25-Q	2,500	45	4.0	8.6	219	.8	21	2.4	1.1	25	12	78
SL052B-17-Q	SL059B-17-Q	1,700	65	7.3	9.1	232	.8	21	2.6	1.2	25	12	78
SL052B-10-Q	SL059B-10-Q	1,000	90	10.2	9.1	232	.8	21	2.6	1.2	25	12	78
SL052B-8-Q	SL059B-8-Q	800	120	13.6	9.1	232	.8	21	2.6	1.2	25	12	78

Air Inlet – 1/4" NPTF

Recommended Air Pressure – 90 PSI (6.2 bar) Recommended Hose Size –  $\frac{5}{16}$ " (8mm)

(1) Operator technique controls final torque input on models with angle clutch jaws.

#### More Power... Lower Maintenance Cost

- Positive clutch design transfers more power to the screw head.
- Front and rear clutch jaws are interchangeable, low-cost parts.



#### **Reversible Woodworking Screwdriver**

Model	Free Speed	Stall To	orque	Tool L	ength	Spindle	Offset	Tool V	/eight	Bit Holder Hex	Air Inlet NPT	Air Consp. @ Free Speed
No.	rpm	inIbs.	Nm	in.	mm	in.	mm	lbs	kg	in.	in.	cfm
7672-A18	1,800	6.2	8.4	6.6	169	0.86	22	2.6	1.2	1/4	1/4	27

Most popular model. Air Inlet – <sup>1</sup>/4" NPTF Recommended Air Pressure – 90 PSI (6.2 bar) Recommended Hose Size – <sup>5</sup>/1e" (8mm)

## Torque Output: 12 to 120 in.-lbs (1.4 to 13.6 Nm)

Tools are equipped with a Quick-Change Assembly (-Q Drive Option) as standard. To order a tool equipped with a (FINDER) option, specify the following option at no extra cost:

• Standard Length Finder.

Change the "-Q" in the model number to "-F" and specify one of the FINDER KITS listed in the chart at right.

Note: Apex Magnetic Bit Holder (40259), and Magna Magnetic Bit Holder (36585) may be ordered separatley.

Example: SG021B-15-F with 46343-4. Order bit separately.





Quick-Change Assembly (Q)

Standard Length Finder (F)

Finder Kit	Scre Flat head	ew Size Round head	Bit to Use Order Separately
46343-1	1	2	F164
46343-2	2	3	F1645
46343-3	3	4	XF165
46343-4	4	5	XF166
46343-5	5	6	XF167
46343-6	6	8	XF168
46343-8	8	10	XF169
46343-10	10	12	XF1610

Note: Tools ordered with the Finder Option will not accommodate the "-Q", options. Consult factory.

#### **Reversible Pistol Grip Screwdrivers**

	Model No.	Free Speed	Sta Torq	ll ue	T Lei	ool ngth	Spir Off	ndle set	To Wei	ool ght	Air C	@ Fre onsp.	e Speed Sound Level
		rpm	inlbs	Nm	in.	mm	in.	mm	lbs	kg	cfm	L/s	dB(A)
	Series 20												
•	SG021B-26-Q	2,600	12	1.4	4.6	118	.66	17	1.3	.6	15	7	76
•	SG021B-15-Q	1,500	25	2.8	5.0	128	.66	17	1.4	.6	15	7	76
•	SG021B-9-Q	900	38	4.3	5.0	128	.66	17	1.4	.6	15	7	76
	Series 50												
	SG051B-25-Q	2,500	45	4.0	6.9	175	.8	21	2.2	1.0	25	12	78
•	SG051B-17-Q	1,700	65	7.3	7.4	187	.8	21	2.4	1.1	25	12	78
	SG051B-10-Q	1,000	90	10.2	7.4	187	.8	21	2.4	1.1	25	12	78
•	SG051B-8-Q	800	120	13.6	7.4	187	.8	21	2.4	1.1	25	12	78





#### **Reversible In-Line Screwdrivers**

Recommended Air Pressure – 90 PSI (6.2 bar) Recommended Hose Size – <sup>5</sup>/16" (8mm)

• Most popular model. Air Inlet – 1/4" NPTF

Model No.	Free Speed	Sta Torq	ll ue	T Lei	ool ngth	Spir Off	ndle set	T Wei	ool ght	Air C	@ Fre onsp.	e Speed Sound Level
	rpm	inlbs	Nm	in.	mm	in.	mm	lbs	kg	cfm	L/s	dB(A)
Series 20												
SL021B-26-Q	2,600	12	1.4	6.2	157	.6	15	.9	.4	15	7	76
SL021B-15-Q	1,500	25	2.8	6.5	167	.6	15	1.0	.5	15	7	76
SL021B-9-Q	900	38	4.3	6.5	167	.6	15	1.0	.5	15	7	76
Series 50												
SL051B-25-Q	2,500	45	4.0	8.1	206	.8	21	2.2	1.0	25	12	78
SL051B-17-Q	1,700	65	7.3	8.9	225	.8	21	2.4	1.1	25	12	78
SL051B-10-Q	1,000	90	10.2	8.9	225	.8	21	2.4	1.1	25	12	78
SL051B-8-Q	800	120	13.6	8.9	225	.8	21	2.4	1.1	25	12	78



SL021B-15-Q



• Most popular model.

Air Inlet – <sup>1</sup>/4" NPTF Recommended Air Pressure – 90 PSI (6.2 bar)

Recommended Hose Size – <sup>5</sup>/16" (8mm)

SL051B-17-Q

## Torque Output: 5.5 to 150 in.-lbs (.6 to 17 Nm)

## **Ordering Information**

#### Right Angle Nutsetters -

Specify the Base Model Number of the desired tool and add either a "-1" for a  $^{1}/_4$ " Square Drive or "-2" for a  $^{3}/_8$ " Square Drive. "-1" not available on SR021B-5R and Series 50 R/A Nutsetters.

#### Right Angle Screwdrivers -

Specify the Base Model Number of the desired tool and add the appropriate Dash No. / Letter to indicate one of the following Drive Options.

- "-1" Not available on SR021B-5R and Series 50 R/A Screwdrivers
- 1/4" Square Drive Assembly.
- Add "-1" to the end of the base model number. • 1/4" Female Hex Bit Holder. Add "-H" to the end of the base model number.
- Standard Length Finder. Add "-F" to the end of the base model number and specify one of the Finder Kits.

Note: Finder option is not available on SR021B-( )L-( ).

## Example: SR021B-25L-H

Right Angle Heads available:

- "L" Light Duty (aircraft head)1
- "R" Regular Duty
- "H" Heavy Duty

(1) Square drive not available

#### **Reversible Right-Angle Screwdrivers**

Model No.	Free Speed	Sta Torq	ıll Iue	To Ler	ool 1gth	Spir Off	ıdle set	To Wei	ool ght	Air C	@ Fre consp.	e Speed Sound Level
	rpm	inIbs	s Nm	in.	mm	in.	mm	lbs	kg	cfm	L/s	dB(A)
Series 20												
SR021B-48L-()	4,800	5.5	.6	10.3	262	0.33	8.3	1.50	0.70	15	7	76
SR021B-25L-()	2,500	11	1.2	10.3	262	0.33	8.3	1.50	0.70	15	7	76
SR021B-14L-()	1,400	18	2.0	10.7	272	0.33	8.3	1.60	0.75	15	7	76
SR021B-33R-()	3,300	8	.9	9.5	241	0.58	14.8	1.65	0.75	15	7	76
SR021B-17R-()	1,750	17	1.9	9.5	241	0.58	14.8	1.65	0.75	15	7	76
SR021B-10R-()	1,000	27	3.0	9.9	252	0.58	14.8	1.75	0.80	15	7	76
SR021B-5R-()	500	53	6.0	9.9	252	0.58	14.8	1.75	0.80	15	7	76
Series 50												
SR051B-24R-()	2,400	41	4.6	10.7	272	0.58	14.7	2.60	1.20	25	12	80
SR051B-16R-()	1,600	62	7.0	10.7	272	0.58	14.7	2.60	1.20	25	12	80
SR051B-11H-()	1,150	80	9.0	11.3	287	0.65	16.5	3.00	1.40	25	12	80
SR051B-8H-()	800	120	13.5	11.3	287	0.65	16.5	3.00	1.40	25	12	80
SR051B-6H-()	600	150	17.0	11.3	287	0.65	16.5	3.00	1.40	25	12	80

SR051B-24R-H

SR021B-25L-H

Air Inlet – <sup>1</sup>/4" NPTF

Recommended Air Pressure – 90 PSI (6.2 bar)

Recommended Hose Size - 5/16" (8mm)

## Torque Output: 5.5 to 150 in.-lbs (.6 to 17 Nm)

## **Ordering Information**

#### Right Angle Nutsetters -

Specify the Base Model Number of the desired tool and add either a "-1" for a 1/4" Square Drive or "-2" for a 3/8" Square Drive.

"-1" Not available on NR021B-5R and Series 50 R/A Nutsetters

#### Right Angle Screwdrivers -

Specify the Base Model Number of the desired tool and add the appropriate Dash No. / Letter to indicate one of the following Drive Options.

• 1/4" Square Drive Assembly. Add "-1" to the end of the base model number.

"-1" Not available on NR021B-5R and Series 50 R/A Screwdrivers • <sup>1</sup>/<sub>4</sub>" Female Hex Bit Holder.

- Add "-H" to the end of the base model number.
- Standard Length Finder. Add "-F" to the end of the base model number and specify one of the Finder Kits.

Example: NR021B-10R-1

#### **Right Angle Heads available:**

"R" – Regular Duty "H" – Heavy Duty



#### **Reversible Right-Angle Nutsetters**

Model No.	Free Speed	Sta Torq in ₋lbs	ll ue Nm	To Ler	ool 1gth	Spir Off	ndle set	To Wei	ool ght	Air C	@ Fre onsp.	e Speed Sound Level
Series 20	трш	111105						105	ĸy	CIIII	L/3	ub(A)
NR021B-33R-()	3,300	8	.9	9.5	241	0.58	14.8	1.78	0.81	15	7	76
NR021B-17R-()	1,750	17	1.9	9.5	241	0.58	14.8	1.78	0.81	15	7	76
NR021B-10R-()	1,000	27	3.0	9.9	252	0.38	14.8	1.90	0.86	15	7	76
NR021B-5R-()	500	53	6.0	9.9	252	0.38	14.8	1.90	0.86	15	7	76
Series 50												
NR051B-24R-()	2,400	41	4.6	10.7	272	0.58	14.7	2.65	1.20	25	12	80
NR051B-16R-()	1,600	62	7.0	10.7	272	0.58	14.7	2.65	1.20	25	12	80
NR051B-11H-()	1,150	80	9.0	14.2	360	0.65	16.5	4.00	1.80	25	12	80
NR051B-8H-()	800	120	13.5	14.2	360	0.65	16.5	4.00	1.80	25	12	80
NR051B-6H-()	600	150	17.0	14.2	360	0.65	16.5	4.00	1.80	25	12	80

Air Inlet – 1/4" NPTF

Recommended Air Pressure - 90 PSI (6.2 bar)

Recommended Hose Size - 5/16" (8mm)

## Torque Output: 17 to 62 in.-lbs (1.9 to 7.0 Nm)

#### Series 20 / 50 Reversible Right-Angle Screwdrivers 1000 to 1750 RPM

The SRB models are the latest additions to the extensive line of ARO assembly tools. They combine the convenience of pushbutton reverse control with the superior performance standards established by the ARO Series 20 and 50 tools. All six models are right angle, direct drive configurations, with torque output determined by the stall torque of the motor at a given air pressure. The SRB models are perfect for light assembly applications involving limited access spaces in furniture and sheet metal production. Simple functional design and top quality production help insure long service life.

Contact your local ARO distributor or representative for complete details.

- Pushbutton reverse for one-handed operation.
- Direct drive, 1000 1750 RPM range.
- 17 62 in.lbs. torque range.
- (-H models utilize insert bit spindles)
- (-P models utilize power bit spindles)



#### SRB Reversible Right-Angle Screwdrivers

	Free	Sta		Тс	ol	Spi	ndle	То	ol	Ang	gle		@ Free S	Speed
Model No.	Speed	Torq	ue	We	ight	0f	fset	Len	gth	Heig	ght	Air Co	onsp.	Sound Level
	rpm	inIbs	Nm	lbs	kg	in.	mm	in.	mm	in.	mm	cfm	L/s	dB(A)
Series 20														
SRB21A-10-H	1,000	30	3.4	1.8	0.8	.54	13.7	9.77	248	1.46	37	15	7	74
SRB21A-10-P	1,000	30	3.4	1.8	0.8	.54	13.7	9.77	248	1.80	46	15	7	74
SRB21A-17-H	1,750	17	1.9	1.7	0.8	.54	13.7	9.47	240	1.46	37	15	7	74
SRB21A-17-P	1,750	17	1.9	1.7	0.8	.54	13.7	9.47	240	1.80	46	15	7	74
Series 50														
SRB51A-16-H	1,600	62	7.0	2.8	1.3	.54	13.7	10.77	274	1.46	37	25	12	76
SRB51A-16-P	1,600	62	7.0	2.8	1.3	.54	13.7	10.77	274	1.80	46	25	12	76

Air Inlet – 1/4" NPTF

Recommended Air Pressure – 90 PSI (6.2 bar)

Recommended Hose Size – 5/16" (8mm)

## Torque Output: 2 to 24 ft-lbs (3.0 to 33 Nm)

### Series 50 Right-Angle Nutsetter

#### 400 to 2,400 RPM

- Complete selection of speeds, torque outputs, and drive spindles in both shutoff and stall models ensures the most efficient, cost-effective tool for the fastening application.
- Torque control shutoff models deliver precise, consistent torque output and effectively minimize reaction torque transmitted to the operator.
- Small angle head height enables easy access to tight areas, reducing assembly time and minimizing costly dedicated tooling.
- Protective vinyl boot on the angle housing helps prevent marring the product's finish during assembly.
- Lightweight construction and compact size make for easy handling and control over extended periods of time.
- Superior angle bevel gears give excellent service life.
- Full-circle positioning of the angle head relative to the throttle allows a tool to be set up for a specific fastener location.

Tool	Sq. Drives	(Dash No.)
Free Speed	3/8" (-2)	1/2" (-3)
400	•	•
600	•	•
800	•	•
1,000	•	•
1,600	•	-
2,400	•	-

 Indicates the speeds on which a particular option is available.



#### Series 50 Right-Angle Nutsetters

	Free		Stall 1	Forque		To	ol	An	gle	Spir	ndle	То	ol		@ Free	speed
Model No.	Speed	@ 50	PSI	@ 90	PSI	Len	gth	Hei	ight	0ff	set	Wei	ight	Air Co	onsp.	Sound Level
	rpm	ft-lbs	Nm	ft-lbs	Nm	in.	mm	in.	mm	in.	mm	lbs	kg	cfm	L/s	dB(A)
<b>Reversible Stall</b>																
NA051A-24-()	2,400	2.4	3.2	3.8	5.2	10.2	259	1.4	36	.56	14	2.8	1.3	25	12	80
NA051A-16-()	1,600	3.5	4.7	7.0	11.0	10.2	259	1.4	36	.56	14	2.8	1.3	25	12	80
NA051A-10-()	1,000	6.0	9.0	11.0	15.0	10.7	272	1.4	36	.64	16	3.1	1.4	25	12	80
NA051A-8-()	800	8.0	11.0	13.0	18.0	10.8	274	1.7	43	.64	16	3.3	1.5	25	12	80
NA051A-6-()	600	10.0	14.0	16.0	22.0	10.8	274	1.7	43	.64	16	3.3	1.5	25	12	80
NA051A-4-()	400	14.0	19.0	24.0	33.0	10.8	274	1.7	43	.64	16	3.3	1.5	25	12	80
<b>Reversible Auto Sh</b>	ut-Off															
NA054A-24-()	2,400	2.0	3.0	3.2	4.0	12.3	312	1.4	36	.56	14	3.5	1.6	25	12	80
NA054A-16-()	1,600	3.0	4.0	5.5	7.5	12.3	312	1.4	36	.56	14	3.5	1.6	25	12	80
NA054A-10-()	1,000	5.0	7.0	9.0	12.0	12.8	325	1.4	36	.64	16	3.7	1.7	25	12	80
NA054A-8-()	800	7.0	9.5	11.0	15.0	12.9	328	1.7	43	.64	16	3.9	1.8	25	12	80
NA054A-6-()	600	8.0	11.0	13.0	18.0	12.9	328	1.7	43	.64	16	3.9	1.8	25	12	80
NA054A-4-()	400	11.0	15.0	21.0	28.0	12.9	328	1.7	43	.64	16	3.9	1.8	25	12	80

Air Inlet – 1/4" NPTF

Recommended Air Pressure – 90 PSI (6.2 bar)

Recommended Hose Size – 5/16" (8mm)

Refer to chart at top right for square drive options.

## **Features and Benefits**

- · Recommended for most hand screwdrivers, wrenches, or power tools
- Ideal for testing output torque of assembly tools in the calibration lab, repair crib, or on the production line
- Six different languages (English, French, German, Italian, Spanish, Swedish) standard on all units
- · Nine units of measurement for compatibility with global standards
- Charger is equipped with different adaptors to make it easy to use in most of the world
- Four operation modes: Peak, Click, Impulse and Track modes
- High/Pass/Low LED's
- Auto and manual reset function
- Data transfer function to a PC or Printer via the RS232 port
- Diagnostics keep track of past and future calibration dates and current software release
- 8 hours of battery time under normal use
- Auto power down timer keeps unit charged longer
- Quick-Clamp mounts integrated into housing
- Quick-Disconnect plate available for convenient mounting structure
- Certificate of calibration to National Institute of Standards and Technology (NIST) included with every unit



		Torque	e Range						
Model	Minimum		Maximum		Accuracy	Weight		Dimensions	
	inIbs	Nm	inIbs	Nm	FSD	lbs	kg	in.	mm
ETT-1-US	0.88	0.1	8.8	1	0.5%	5.0	2.7	9 <sup>1</sup> /4 x 8 <sup>1</sup> /4 x 2 <sup>3</sup> /4	213 x 238 x 70
ETT-4-US	3.50	0.4	35.0	4	0.5%	5.0	2.7	9 <sup>1</sup> /4 x 8 <sup>1</sup> /4 x 2 <sup>3</sup> /4	213 x 238 x 70
ETT-12-US	10.60	1.2	106	12	0.5%	5.0	2.7	9 <sup>1</sup> /4 x 8 <sup>1</sup> /4 x 2 <sup>3</sup> /4	213 x 238 x 70
ETT-30-US	26.50	3.0	265	30	0.5%	5.0	2.7	9¼ x 8¼ x 2¾	213 x 238 x 70

#### **ETA Unit includes:**

Model No.	Item
ETT-1/ETT-4/ETT-12/ETT-30	Torque Analyzer
ETT-BC-US/ETT-BC-UK/ETT-BC-EU	Battery Charger
ETT-RA	Rundown Adaptor
ETT-CASE	Carrying Case
ETT-P7574	Operating Manual
ETA2-99	Certificate of Calibration

#### **Available Accessories:**

Model No.	Item
ETA2-P925	Printer Connector Cable
ETT-QD	Quick-Disconnect Plate
ETA2-PC99	PC Connector (RS232)

## Screwdrivers and Nutsetters Screwdriver Clutches, Bits and Finders

#### **Positive Clutch Options**

Tool Series	Bit Holder Driven Jaw Number	Drive Jaw Number	Clutch Housing Number
000 QRT's	<sup>1</sup> /4" Female Hex with 25° Jaws – 37022 <sup>1</sup>	25° Jaw Assy. – 370181	with finder adapter $-37024$ or with guide $-37026^{1}$
Models	<sup>1</sup> /4" Female Hex with 90° Jaws – 36518	90° Jaw Assy. – 37020	with finder adapter – 37024 or with guide – 37026
8683, 8684	<sup>1</sup> /4" Sq. Drive with 25° Jaws – 38814-3	37018	37026-1
	<sup>1</sup> /4" Sq. Drive with 90° Jaws – 38814-4	37020	37026-1
0 QRT's	<sup>1</sup> /4" Female Hex with 25° Jaws – 37021 <sup>1</sup>	25° Jaw Assy. – 37017	with finder adapter – 37023 or with guide – $37025^{1}$
Models	<sup>1</sup> /4" Female Hex with 90° Jaws – 36322	90° Jaw Assy. – 37019	with finder adapter – 37023 or with guide – 37025
8506, 8509,	<sup>3</sup> /8" Sq. Drive with 25° Jaws – 38815-3	37017	37025-1
8515, 8521	<sup>3</sup> /8" Sq. Drive with 90° Jaws – 38815-4	37019	37025-1

(1) Standard on positive clutch models.

#### Adjustable Ball Clutch Options

Tool Series	Bit Holder Driven Jaw Number	Clutch Number	Clutch Housing Number
000 QRT's	<sup>1</sup> /4" Female Hex – 36518 <sup>1</sup>	with Standard Spring Internal Adj. – 36511 <sup>1</sup>	with finder adapter – $45630$ or with guide – $45630^{1}$
	<sup>3</sup> /8" Sq. Drive – 38814-4	or with Heavy-Duty Spring, Internal Adj. – 36511-1	45630
0 QRT's	<sup>1</sup> /4" Female Hex – 36322 <sup>1</sup>	with Standard Spring – 36310 <sup>1</sup>	with finder adapter – $36786$ or with guide – $36788^{1}$
	<sup>3</sup> /8" Sq. Drive – 38815-4	or with Heavy-Duty Spring – 36310-2	36788-1
		or with Light-Duty Spring – 36310-2	

(1) Standard on adjustable ball clutch models.

## Screwdrivers and Nutsetters Bits and Finders



#### <sup>1</sup>/4" Hex Shank Bladed Bits and Standard Finders

			Finder N	umber for	
Screw Flat Head	Size No. Round Head	1 <sup>15</sup> / <sub>16</sub> " (49mm) Length Bits	Series 20 & 50 Screwdrivers <sup>1</sup>	3 <sup>1</sup> /2" (89mm) Length Bits	Series 20 & 50 Screwdrivers <sup>1</sup>
1	2	F164	46343-1	F164	46344-1
2	3	F1645	46343-2	F1645	46344-2
3	4	XF165	46343-3	XF165	46344-3
4	5	XF166	46343-4	XF166	46344-4
5	6	XF167	46343-5	XF167	46344-5
6	8	XF168	46343-6	XF168	46344-6
8	10	XF169	46343-8	XF169	46344-8
10	12	XF1610	46343-10	XF1610	46344-10
12	14	XE16	46343-12	XE16	46344-12

#### <sup>1</sup>/<sub>4</sub>" Hex Shank Allen Head Drivers

Hex Size in.	1 <sup>15</sup> / <sub>16</sub> " (49mm) Length Bits	Adapter/Guide No. Series 20 & 50 Screwdrivers <sup>1</sup>
<sup>3</sup> /32	HX133	46884(-1)
1/8	HX134	46884(-1)
<sup>5</sup> /32	HX135	46884(-1)
<sup>3</sup> /16	HX136	46884(-1)
7/32	HX137	46884(-1)
1/4	HX138	46884(-1)
9/64	HX1345	46884(-1)

 (1) 46884 for use with direct drive and automatic shut-off clutches.
 46884-1 for use with adjustable ball and positive

clutches.

(1) Includes 46325 Finder Spring.



#### <sup>1</sup>/4" Hex Shank Phillips Bits

Screw Point Size	1 <sup>15/</sup> 16" (49mm) Length Bits	2 <sup>3</sup> /4" (70mm) Length Bits	Adapter/Guide No. Series 20 & 50 Screwdrivers <sup>1</sup>
1	XP161	XP221	46884(-1)
2	XP162	XP222	46884(-1)
3	XP163	XP223	46884(-1)

(1) 46884 for use with direct drive and automatic shut-off clutches. 46884-1 for use with adjustable ball and positive clutches.



#### <sup>1</sup>/4" Hex Shank Integral Bit and Finder

		Adapter/	Guide No.				
Screv Flat Head	v Size No. 1 Round Head	3 <sup>23</sup> / <sub>32</sub> " (94mm) Length Bits	Series 20 & 50 Screwdrivers <sup>1</sup>				
5	6	XR306	46884(-1) <sup>1</sup>				
6	8	XR308	46884(-1) <sup>1</sup>				
8	10	XR3010	46884(-1) <sup>1</sup>				
10	12	XR3012	46884(-1) <sup>1</sup>				

(1) 46884 for use with direct drive and automatic shut-off clutches. 46884-1 for use with adjustable ball and positive clutches.



#### <sup>1</sup>/4" Hex Shank Reed and Prince Bits

		Adapter/Guide No.
Screw	1 <sup>15</sup> /16" (49mm)	Series 20 & 50
Point Size	Lengh Bits	Screwdrivers <sup>1</sup>
1	XP161	46884(-1)

 (1) 46884 for use with direct drive and automatic shut-off clutches.
 46884-1 for use with adjustable ball and positive

clutches.



So Drive Adapters for 5/16" So Bit Inserts<sup>1</sup>

	oq. Dit moorto
Sq. Drive	Sq. Drive
Mounting Size	Size
in.	in.
<sup>3</sup> /8	<sup>5</sup> /16
	Sq. Drive Mounting Size in. <sup>3</sup> /8

(1) 46884, 46885, 46886 for use with direct drive and automatic shut-off clutches. 46884-1, 46885-1, 46886-1 for use with adjustable

ball and positive clutches.



<sup>1</sup>/4" Hex Shank Pozidriv Bits

Screw Point Size	1 <sup>15</sup> / <sub>16</sub> " (49mm) Length Bits	Adapter/Guide No. Series 20 & 50 Screwdrivers <sup>1</sup>
1	XP161	46884(-1)
2	XP162	46884(-1)
3	XP163	46884(-1)

 46884 for use with direct drive and automatic shut-off clutches.
 46884-1 for use with adjustable ball and positive

46884-1 Ior clutches.



#### <sup>1</sup>/<sub>4</sub>" Hex Bit Inserts

Screw Point Size	Phillips 1" (25mm) Length Bits	Pozidriv 1" (25mm) Length Bits
1	XPB07	XPZB071
2	XPB07	XPZB072
3	XPB073	XPZB073



<sup>1</sup>/4" Hex Shank Bit Holders

Apex Mag. Bit	l enath	Adapter/Guide No.
Holder No.	Length	Screwdrivers
40259	2 <sup>31</sup> /32" (75mm)	46885(-1)

# **Drills and Tappers**



## Model Identification Guide Series 20/50

## **Drill Selection**

Making sure you have the right tool for the right job is essential for effective drilling with consistent quality. Selecting a portable air drill involves two primary considerations:

- 1 The material and hardness.
- 2 The size of the hole to be drilled.

In general, a smaller, high-speed drill is most appropriate for smaller holes and softer materials, such as wood or aluminum. For larger holes and harder materials, a more powerful tool with slower speeds is required to prevent stalling and bit damage.

#### Getting The Most From Your Drill:

To maximize your drill's output, you must use the right accessories. Always keep in mind that the force you apply on the drill will affect how fast the tool drills.

The more you push down, the slower the tool will work. The most you ever want your drill to slow down is 25 to 50 percent of its free speed, so be aware of the amount of pressure you are applying.



## **Recommended Cutting Speed Range – RPM**

This chart lists the recommended surface speeds for popular materials with suggested spindle speeds for various hole sizes. These recommendations are intended only as a guide for determining appropriate drill size and speed. Proper tool selection for a specific application must also take into account the operator,

the type of bit used, the amount of compressed air available, as well as other factors. Where there is a choice between ARO Series 20 and 50 drills of about the same speed, final selection is made by preference of a smaller, lighter drill, or a more powerful model to maintain speed under load.

				1	Hole Di	ameter			
		<sup>1</sup> /16"	<sup>1</sup> /8"	<sup>3</sup> /16"	<sup>1</sup> /4"	<sup>5</sup> /16"	<sup>3</sup> /8"	<sup>7</sup> /16"	<sup>1</sup> /2"
Material	S.F.M. <sup>1</sup>	1.5 mm	3 mm	5 mm	6 mm	8 mm	9.5 mm	11 mm	13 mm
Steel Alloy (300-400 Brinnel)	20-30	1250-1800	600-900	400-600	300-450	250-350	200-300	175-250	150-225
Stainless Steel / Cast Iron (hard)	30-40	1800-2500	900-1200	600-800	450-600	350-500	300-400	250-350	225-300
Steel Forgings	40-50	2500-3100	1200-1500	800-1000	600-750	500-600	400-500	350-425	300-400
Tool Steel (Annealed .90-1.20 Carbon)	50-60	3100-3700	1500-1800	1000-1200	750-900	600-700	500-600	425-525	400-450
Steel (.4050 Carbon)	70-80	4300-5000	2100-2500	1400-1600	1050-1200	850-1000	700-800	600-700	525-600
Cast Iron (medhard)	70-100	4300-6000	2100-3000	1400-2000	1000-1500	850-1200	700-1000	600-900	500-800
Bronze, High-Tensile Strength	70-150	4300-9000	2100-4500	1400-3000	1000-2300	850-1800	700-1530	600-1300	500-1200
Malleable Iron	80-90	5000-5500	2500-2800	1600-1800	1200-1400	950-1100	800-900	700-800	600-700
Mild Steel (.2030 Carbon)	80-110	5000-6700	2500-3400	1600-2300	1200-1700	950-1350	800-1150	700-1000	600-850
Cast Iron (soft) / Plastic	100-150	6000-9000	3000-4500	2000-3000	1500-2300	1200-1800	1000-1530	900-1300	800-1200
Aluminum / Brass / Bronze	200-300	12000-18000	6000-9000	4000-6000	3000-4500	2400-3700	2000-3000	1700-2600	1500-2300
Magnesium	250-400	15500-25000	7500-12000	5000-12000	3800-6100	3000-4900	2500-4000	2200-3500	1900-3000
Fiberglass / Wood	300-400	18000-25000	9000-12000	6000-8200	4600-6100	3700-4900	3000-4000	2600-3500	2300-3000

Note: Actual drilling or cutting rpm will be approximately 75% of the rated free speed of a tool. (1) SFM - Surface feet per minute

Torque Output: 0.2 to 29 ft-lbs (0.3 to 39 Nm) Power: 0.25 hp / 0.55 hp (0.34 / 0.73 kW)





#### **Pistol Grip Drills**

	Non Free Stall			Free	ee Stall		Spin	dle					Spindle	@ Free Speed				
	Reversible Models	Speed rpm	Torq ft-lbs	ue Nm	Reversible Models	Speed rpm	Torq ft-lbs	ue Nm	Offs in.	set mm	Ler in.	ngth mm	Wei Ibs	ght kg	Thread Male	Air Co cfm	onsp. L/s	dB(A)
	Series 20																	
-	DG021B-220-()	22,000	0.2	0.3	DG022B-170-()	17,000	0.2	0.3	0.66	17	5.7	146	1.5	0.7	<sup>3</sup> /8"-24	15	7	76
•	DG021B-64-()	6,400	0.7	1.0	DG022B-50-()	5,000	0.6	0.8	0.66	17	5.7	146	1.5	0.7	<sup>3</sup> /8"-24	15	7	76
•	DG021B-33-()	3,300	1.3	2.0	• DG022B-26-()	2,600	1.2	1.6	0.66	17	5.7	146	1.5	0.7	<sup>3</sup> /8"-24	15	7	76
•	DG021B-19-()	1,900	2.3	3.0	DG022B-15-()	1,500	2.1	2.8	0.66	17	6.1	155	1.6	0.7	<sup>3</sup> /8"-24	15	7	76
	DG021B-10-()	1,000	4.5	6.0	• DG022B-8-()	800	4.1	5.5	0.66	17	6.1	155	1.6	0.7	<sup>3</sup> /8"-24	15	7	76
	DG021B-5-()	500	8.9	12.0	DG022B-4-()	400	8.0	11.0	0.66	17	6.1	155	1.6	0.7	<sup>3</sup> /8"-24	15	7	76
	Series 50																	
	DG051B-180-()	18,000	0.7	1.0	DG052B-170-()	17,000	0.6	0.8	0.9	22	6.8	171	2.3	1.1	<sup>3</sup> /8"-24	25	12	78
	DG051B-52-()	5,200	2.4	3.0	DG052B-50-()	5,000	2.0	2.7	0.9	22	6.8	171	2.3	1.1	<sup>3</sup> /8"-24	25	12	78
•	DG051B-33-()	3,300	3.5	5.0	• DG052B-30-()	3,000	2.8	3.8	0.9	22	6.8	171	2.3	1.1	<sup>3</sup> /8"-24	25	12	78
	DG051B-27-()	2.700	4.1	5.5	DG052B-25-()	2,500	3.3	4.8	0.9	22	6.8	171	2.3	1.1	<sup>3</sup> /8"-24	25	12	78
•	DG051B-15-()	1,500	8.0	11.0	• DG052B-15-()	1,500	6.4	8.7	0.9	22	7.5	189	2.7	1.2	<sup>3</sup> /8"-24	25	12	78
•	DG051B-11-()	1,100	9.5	13.0	• DG052B-10-()	1,000	7.6	10.0	0.9	22	7.5	189	2.7	1.2	<sup>3</sup> /8"-24	25	12	78
	DG051B-6-()	600	17.0	23.0	• DG052B-6-()	600	14.0	19.0	0.9	22	7.5	189	2.7	1.2	<sup>3</sup> /8"-24	25	12	78
•	DG051B-4-()	400	29.0	39.0	DG052B-4-()	400	23.0	31.0	0.9	22	7.5	189	2.7	1.2	<sup>3</sup> /8"-24	25	12	78

Most popular model. Air Inlet – <sup>1</sup>/4" NPTF Recommended Air Pressure – 90 PSI (6.2 bar) Recommended Hose Size – <sup>5</sup>/16" (8 mm) I.D.

### **Ordering Information**

Specify the Base Model Number having the desired speed from the specification chart above. Add the appropriate Dash Letter to indicate the desired spindle option from the chart below.

#### Example: DG021B-19-A

#### **Spindle Options**

	Series 20 Models Free Speed											Series 50 Models Free Speed									
Dash	Spindle	Non-Reversible	500	1000	1900	3300	6400	22000	400	600	1100	1500	2700	3300	5200	18000					
Letter	Option	Reversible	400	800	1500	2600	5000	17000	400	600	1000	1500	2500	3000	5000	17000					
Α	1/4" (6 mm) Ca	ıp. Chuck	•	•	•	•	٠	•	•	•	•	•	•	•	•	•					
В	<sup>3</sup> /8" (9 mm) Ca	ip. Chuck	•	•	•	NR	NR	NR	•	•	•	•	•	•	•	NR					
L <sup>1</sup>	<sup>3</sup> /8" (9 mm) Ca	p. Keyless Chuck	NR	•	•	NR	NR	NR	NR	NR	•	•	•	•	•	NR					
Р	<sup>3</sup> /8" - 24 Male	Thread	•	•	•	•	٠	•	•	•	•	•	•	•	•	•					

• Indicates the model speeds on which a particular spindle option is available. NR indicates that the spindle option is not recommended for a particular speed tool.

(1) Note: Keyless Chuck is only available on reversible models.

Torque Output: 0.2 to 29 ft-lbs (0.3 to 39 Nm) Power: 0.25 hp / 0.55 hp (0.34 / 0.73 kW)



DL021B-19-A



DL051B-33-B

#### Straight / Lever Throttle Drills

	Non Reversible Models	Free Speed rpm	Sta Torq ft-lbs	ll ue Nm	Reversible Models	Free Speed rpm	Stal Torq ft-lbs	l ue Nm	Spir Off in.	Spindle Offset in. mm		pindle Offset Lenı ı. mm in.		ngth mm	Weight Ibs kg		Spindle Thread Male	@ Air Co cfm	Pree onsp. L/s	Speed Sound Level dB(A)
	Series 20																			
	DL021B-220-()	22,000	0.2	0.3	-	-	-	-	0.6	15	7.2	182	1.0	0.5	<sup>3</sup> /8"-24	15	7	76		
•	DL021B-64-()	6,400	0.7	1.0	-	-	-	-	0.6	15	7.2	182	1.0	0.5	<sup>3</sup> /8"-24	15	7	76		
•	DL021B-33-()	3,300	1.3	2.0	DL022B-26-()	2,600	1.2	1.6	0.6	15	7.2	182	1.0	0.5	<sup>3</sup> /8"-24	15	7	76		
•	DL021B-19-()	1,900	2.3	3.0	DL022B-15-()	1,500	2.1	2.8	0.6	15	7.5	191	1.1	0.5	<sup>3</sup> /8"-24	15	7	76		
•	DL021B-10-()	1,000	4.5	6.0	DL022B-8-()	800	4.1	5.5	0.6	15	7.5	191	1.1	0.5	<sup>3</sup> /8"-24	15	7	76		
	DL021B-5-()	500	8.9	12.0	DL022B-4-()	400	8.0	11.0	0.6	15	7.5	191	1.1	0.5	<sup>3</sup> /8"-24	15	7	76		
	Series 50																			
•	DL051B-180-()	18,000	0.7	1.0	-	-	-	-	0.9	22	8.6	218	2.2	1.0	<sup>3</sup> /8"-24	25	12	78		
•	DL051B-52-()	5,200	2.4	3.0	-	-	-	-	0.9	22	8.6	218	2.2	1.0	<sup>3</sup> /8"-24	25	12	78		
•	DL051B-33-()	3,300	3.5	5.0	DL052B-30-()	3,000	2.8	3.8	0.9	22	8.6	218	2.2	1.0	<sup>3</sup> /8"-24	25	12	78		
	DL051B-27-()	2,700	4.1	5.5	DL052B-25-()	2,500	3.3	4.8	0.9	22	8.6	218	2.2	1.1	<sup>3</sup> /8"-24	25	12	78		
	DL051B-15-()	1,500	8.0	11.0	DL052B-15-()	1,500	6.4	8.7	0.9	22	9.3	236	2.5	1.1	<sup>3</sup> /8"-24	25	12	78		
	DL051B-11-()	1,100	9.5	13.0	DL052B-10-()	1,000	7.6	10.0	0.9	22	9.3	236	2.5	1.1	<sup>3</sup> /8"-24	25	12	78		
	DL051B-6-()	600	17.0	23.0	DL052B-6-()	600	14.0	19.0	0.9	22	9.3	236	2.5	1.1	<sup>3</sup> /8"-24	25	12	78		
•	DL051B-4-()	400	29.0	39.0	DL052B-4-()1	400	23.0	31.0	0.9	22	9.3	236	2.5	1.1	<sup>3</sup> /8"-24	25	12	78		

• Most popular model.

Air Inlet – <sup>1</sup>/4" NPTF Recommended Air Pressure – 90 PSI (6.2 bar) Recommended Hose Size – <sup>5</sup>/16" (8 mm) I.D.

### **Ordering Information**

Specify the Base Model Number having the desired speed from the specification chart above. Add the appropriate Dash Letter to indicate the desired spindle option from the chart below.

#### Example: DL051B-33-B

#### **Spindle Options**

				Se	eries 20	Models F	ree Spe	ed	Series 50 Models Free Speed										
Dash	Spindle	Non-Reversible	500	1000	1900	3300	6400	22000	400	600	1100	1500	2700	3300	5200	18000			
Letter	Option	Reversible	400	800	1500	2600			400	600	1000	1500	2500	3000					
А	<sup>1</sup> /4" (6 mm) Ca	ap. Chuck	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
В	<sup>3</sup> /8" (9 mm) Ca	ap. Chuck	•	•	•	NR	NR	NR	•	•	•	•	•	•	•	NR			
Р	<sup>3</sup> /8" – 24 Male	e Thread	•	•	•	•	•	•	•	•	•	•	•	•	•	•			

Indicates the model speeds on which a particular spindle option is available. NR indicates that the spindle option is not recommended for a particular speed tool.

## Torque Output: 0.3 to 24 ft-lbs (0.4 to 33 Nm) Power: 0.25 hp / 0.55 hp (0.34 / 0.73 kW)



#### **Right-Angle Drills**

	Non- Reversible	Free Speed	Sta	all We	Spir	idle set	Ai w/Ct	ngle He	ad Heigh	its ollet	To	00l	To Wei	0l aht	Air Inlet	Q Air Co	Free	e Speed Sound Level
	Models	rpm	ft-lbs	Nm	in.	mm	in.	mm	in.	mm	in.	mm	lbs	kg	Female	cfm	L/s	dB(A)
	Series 20																	
	DR021B-170-()	17,000	0.3	0.4	0.6	15	3.5	89	1.625	41.3	8.7	221	1.5	0.7	<sup>1</sup> /4" NPT	15	7	78
	DR021B-50-()	5,000	1.0	1.3	0.6	15	3.5	89	1.625	41.3	8.7	221	1.5	0.7	<sup>1</sup> /4" NPT	15	7	78
•	DR021B-26-()	2,600	1.9	2.6	0.6	15	3.5	89	1.625	41.3	8.7	221	1.5	0.7	<sup>1</sup> /4" NPT	15	7	78
	DR021B-15-()	1,500	3.4	4.6	0.6	15	3.5	89	1.625	41.3	9.1	231	1.6	0.75	<sup>1</sup> /4" NPT	15	7	78
	DR021B-7-()	700	6.6	8.9	0.6	15	3.5	89	1.625	41.3	9.1	231	1.6	0.75	<sup>1</sup> /4" NPT	15	7	78
	Series 50																	
	DR051B-125-()	12,500	0.8	1.1	0.6	15	3.5	89	1.625	41.3	9.8	249	2.5	1.1	<sup>1</sup> /4" NPT	25	12	78
	DR051B-36-()	3,600	2.9	4.0	0.6	15	3.5	89	1.625	41.3	9.8	249	2.5	1.1	<sup>1</sup> /4" NPT	25	12	78
	DR051B-28-()	2,800	3.7	5.0	0.6	15	3.5	89	1.625	41.3	9.8	249	2.5	1.1	<sup>1</sup> /4" NPT	25	12	78
	DR051B-19-()	1,900	5.5	7.5	0.6	15	3.5	89	1.625	41.3	9.8	249	2.5	1.1	<sup>1</sup> /4" NPT	25	12	78
	DR051B-11-()	1,100	9.8	13.0	0.6	15	3.5	89	1.625	41.3	10.4	263	2.8	1.2	<sup>1</sup> /4" NPT	25	12	78
	DR051B-7-()	700	16.0	22.0	0.6	15	3.5	89	1.625	41.3	10.4	263	2.8	1.2	<sup>1</sup> /4" NPT	25	12	78
	DR051B-4-()	400	24.0	33.0	0.6	15	3.5	89	1.625	41.3	10.4	263	2.8	1.2	<sup>1</sup> /4" NPT	25	12	78

• Most popular model. Air Inlet – 1/4" NPTF Recommended Air Pressure – 90 PSI (6.2 bar) Recommended Hose Size – 5/16" (8 mm) I.D.

## **Ordering Information**

Specify the Base Model Number having the desired speed from the specification chart above. Add the appropriate Dash Letter to indicate the desired spindle option from the chart below.

#### Example: DR021B-26-A

#### **Spindle Options**

Dash	Spindle	Se	ries 20	Models	Free Spe	eed	Series 50 Models Free Speed										
Letter	Option	700	1500	2600	5000	17000	400	1100	1900	2800	3600	12500	3000				
А	1/4" (6 mm) Chuck	•	•	•	•	•	•	•	•	•	•	•	•				
В	<sup>3</sup> /8" (9 mm) Chuck	-	-	-	-	-	•	•	•	•	•						
С	<sup>3</sup> /16" (4.8 mm) Collet <sup>1</sup>	٠	•	•	•	-	—	-	-	-	-	-	-				
Р	<sup>3</sup> /8" – 24 Male Thread	•	•	•	•	•	•	•	•	•	•	•	•				
Т	1/4"-28 Female Thread	٠	•	•	•	•	NR	•	•	•	•	•	-				

• Indicates the model speeds on which a particular spindle option is available.

(1) Collet has a <sup>9</sup>/<sub>32</sub> – 40 male thread. Other size collets may be substituted for standard. See Collet 43497-() below.

#### Series 43497-() One Piece Collets

Si	ze	Dash Size		Size Dash		Dash Size		Dash	Si	Size		Dash Size D		Dash Size D		Dash	Size		Dash	Size		Dash	Size		Dash	
No.	mm	No.	No.	mm	No.	No.	mm	No.	No.	mm	No.	No.	mm	No.	No.	mm	No.	No.	mm	No.	No.	mm	No.	No.	mm	No.
7	5.1	-7	14	4.6	-14	21	4.0	-21	28	3.5	-28	35	2.7	-35	42	2.3	-42	49	1.85	-49	56	1.18	-56	<sup>3</sup> /32	2.4	-163
8	5.0	-8	15	4.5	-15	22	3.9	-22	29	3.4	-29	36	2.7	-36	43	2.2	-43	50	1.77	-50	57	1.09	-57	<sup>7</sup> /64	2.77	-164
9	4.9	-9	16	4.4	-16	23	3.9	-23	30	3.2	-30	37	2.6	-37	44	2.1	-44	51	1.7	-51	58	1.06	-58	<sup>1</sup> /8	3.1	-165
10	4.9	-10	17	4.3	-17	24	3.8	-24	31	3.0	-31	38	2.5	-38	45	2.0	-45	52	1.6	-52	59	1.0	-59	<sup>9</sup> /64	3.6	-166
11	4.8	-11	18	4.3	-18	25	3.7	-25	32	2.9	-32	39	2.5	-39	46	2.0	-46	53	1.5	-53	60	1.0	-60	<sup>5</sup> /32	3.9	-167
12	4.8	-12	19	4.3	-19	26	3.7	-26	33	2.8	-33	40	2.4	-40	47	1.99	-47	54	1.39	-54	<sup>1</sup> /16	1.58	-161	<sup>11</sup> /64	4.3	-168
13	4.7	-13	20	4.0	-20	27	3.6	-27	34	2.8	-34	41	2.4	-41	48	1.9	-48	55	1.9	-55	<sup>5</sup> /64	1.98	-162	<sup>3</sup> /16	4.76	-169

## Torque Output: 0.7 to 3.8 ft-lbs (0.9 to 5.2 Nm) Power: 0.25 hp / 0.55 hp (0.34 / 0.73 kW)



**Aircraft Drills** 

Non- Reversible	Free Stall Speed Torque		l Spindle ue Offset		Ai w/Co	ngle He	ad Heig w/Fem	Heights v/Female Thd		ol ath	To Wei	0l aht	Air Inlet	Ø Air Co	Free Free	Speed Sound Level	
Models	rpm	ft-lbs	Nm	in.	mm	in.	mm	in.	mm	in.	mm	lbs	kg	Female	cfm	L/s	dB(A)
Series 20 with 9	0 <sup>0</sup> Angle																
DR023B-73-()	7,300	0.7	0.9	0.325	8.3	1.4	36	1.1	28	9.5	241	1.4	0.6	<sup>1</sup> /4" NPT	15	7	78
DR023B-37-()	3,700	1.3	1.8	0.325	8.3	1.4	36	1.1	28	9.5	241	1.4	0.6	<sup>1</sup> /4" NPT	15	7	78
• DR023B-21-()	2,100	2.4	3.2	0.325	8.3	1.4	36	1.1	28	10.0	254	1.5	0.7	<sup>1</sup> /4" NPT	15	7	78
• DR023B-11-()	1,100	4.6	6.2	0.325	8.3	1.4	36	1.1	28	10.0	254	1.6	0.7	<sup>1</sup> /4" NPT	15	7	78
DR023B-5-()	500	8.9	12.0	0.325	8.3	1.4	36	1.1	28	10.0	254	1.5	0.7	<sup>1</sup> /4" NPT	15	7	78
Series 20 with 4	5 <sup>0</sup> Angle																
DA023B-37-()	3,700	1.3	1.8	0.325	8.3	1.7	44	1.6	41	9.9	251	1.4	0.6	<sup>1</sup> /4" NPT	15	7	78
DA023B-21-()	2,100	2.4	3.2	0.325	8.3	1.7	44	1.6	41	10.4	264	1.5	0.7	<sup>1</sup> /4" NPT	15	7	78
DA023B-11-()	1,100	4.6	6.2	0.325	8.3	1.7	44	1.6	41	10.4	264	1.5	0.7	<sup>1</sup> /4" NPT	15	7	78
DA023B-5-()	500	8.9	12.0	0.325	8.3	1.7	44	1.6	41	10.4	264	1.5	0.7	<sup>1</sup> /4" NPT	15	7	78
Series 50 with 9	0 <sup>0</sup> Angle																
DR053B-52-()	5,200	2.0	2.7	0.325	8.3	1.4	36	1.1	28	10.8	274	2.4	1.1	<sup>1</sup> /4" NPT	25	12	78
DR053B-41-()	4,100	2.5	3.4	0.325	8.3	1.4	36	1.1	28	10.8	274	2.4	1.1	<sup>1</sup> /4" NPT	25	12	78
DR053B-27-()	2,700	3.8	5.2	0.325	8.3	1.4	36	1.1	28	10.8	274	2.4	1.1	<sup>1</sup> /4" NPT	25	12	78
Series 50 with 4	5 <sup>0</sup> Angle																
DA053B-52-()	5,200	2.0	2.7	0.325	8.3	2.0	50	1.9	48	11.2	285	2.4	1.1	<sup>1</sup> /4" NPT	25	12	78
DA053B-41-()	4,100	2.5	3.4	0.325	8.3	2.0	50	1.9	48	11.2	285	2.4	1.1	1/4" NPT	25	12	78
DA053B-27-()	2,700	3.8	5.2	0.325	8.3	2.0	50	1.9	48	11.2	285	2.4	1.1	1/4" NPT	25	12	78

Most popular model. Air Inlet – <sup>1</sup>/<sub>4</sub>" NPTF Recommended Air Pressure – 90 PSI (6.2 bar) Recommended Hose Size – <sup>5</sup>/<sub>1</sub>6" (8 mm) I.D.

## **Ordering Information**

Specify the Base Model Number having the desired speed from the specification chart above. Add the appropriate Dash Letter to indicate the desired spindle option from the chart below.

EXAMPLE: DR023B-21-D

#### **Spindle Options**

Dash	Spindle	Se	ries 20	Models	eed	Series 50 Models Free Speed						
Letter	Option	500	1100	2100	3700	7300	2700	4100	5200			
С	<sup>3</sup> /16" (4.8 mm) Collet <sup>1</sup>	•	•	٠	•	•	•	•	•			
D	10-32 Female Thd	•	•	•	•	•	•	•	•			
<b>E</b> <sup>2</sup>	<sup>5</sup> /16" – 24 Female Thd	•	•	•	•	•	•	•	•			
Т	<sup>1</sup> /4"-28 Female Thd	•	•	•	•	•	•	•	•			

• Indicates the model speeds on which a particular spindle option is available.

Collet has a <sup>9</sup>/<sub>22</sub> - 40 male thread. Other size collets may be substituted for standard. See Collet 43497-() below.
 Not available DAO Series 20 and 50

#### Series 43497-() One Piece Collets

S	ze	Dash Size		Size Dash		Size Dash		Dash Si		h Size		Dash Size		Dash	Si	ze	Dash	S	ize	Dash	S	ize	Dash	S	ize	Dash	Si	ze	Dash	Si	ze	Dash
No.	mm	No.	No.	mm	No.	No.	mm	No.	No.	mm	No.	No.	mm	No.	No.	mm	No.	No.	mm	No.	No.	mm	No.	No.	mm	No.						
7	5.1	-7	14	4.6	-14	21	4.0	-21	28	3.5	-28	35	2.7	-35	42	2.3	-42	49	1.85	-49	56	1.18	-56	<sup>3</sup> /32	2.4	-163						
8	5.0	-8	15	4.5	-15	22	3.9	-22	29	3.4	-29	36	2.7	-36	43	2.2	-43	50	1.77	-50	57	1.09	-57	<sup>7</sup> /64	2.77	-164						
9	4.9	-9	16	4.4	-16	23	3.9	-23	30	3.2	-30	37	2.6	-37	44	2.1	-44	51	1.7	-51	58	1.06	-58	<sup>1</sup> /8	3.1	-165						
10	4.9	-10	17	4.3	-17	24	3.8	-24	31	3.0	-31	38	2.5	-38	45	2.0	-45	52	1.6	-52	59	1.0	-59	<sup>9</sup> /64	3.6	-166						
11	4.8	-11	18	4.3	-18	25	3.7	-25	32	2.9	-32	39	2.5	-39	46	2.0	-46	53	1.5	-53	60	1.0	-60	<sup>5</sup> /32	3.9	-167						
12	4.8	-12	19	4.3	-19	26	3.7	-26	33	2.8	-33	40	2.4	-40	47	1.99	-47	54	1.39	-54	<sup>1</sup> /16	1.58	-161	<sup>11</sup> /64	4.3	-168						
13	4.7	-13	20	4.0	-20	27	3.6	-27	34	2.8	-34	41	2.4	-41	48	1.9	-48	55	1.9	-55	<sup>5</sup> /64	1.98	-162	<sup>3</sup> /16	4.76	-169						
# Torque Output: 1.0 to 54.5 ft-lbs (1.3 to 74.0 Nm)

# **Standard Equipment**

- Chuck
- Suspension Bail on 78XX-E Models
- Side Handle on 600 and 325 rpm, 78XX-E Models

# **Pistol Grip and Inline Drills** 325 to 18,000 rpm / 0.7 hp (0.5 kW) Capacity: <sup>1</sup>/2" (12 mm) Chuck

- Excellent for production-line drilling of large diameter holes in farm implement and heavy equipment.
  Choice of pistol grip and lever styles.
- Dight Angle Drille

# **Right-Angle Drills**

400 to 2,000 rpm / 0.85 hp (0.6 kW) Capacity: <sup>1</sup>/2" (12 mm) Chuck Head Height w/Chuck: 4.6" (117 mm)

 Designed for drilling holes in limited access areas in sheet metal and woodworking applications.



7831-B

# **Production Drills**

	Model	Speed	Sta	ndard	Sta	all	Spindle	Spi	ndle	To	ol ath	To	0l aht	( Air Cr	Free	Speed	Standard
	No.	rpm	in.	mm	ft-lbs	Nm	Male	in.	mm	in.	mm	lbs	kg	cfm	L/s	dB(A)	Part No.
	Pistol																
-	7845-E	4,500	<sup>3</sup> /8	9	4.0	5.4	<sup>1</sup> /2" - 20	1.0	25	8.3	210	3.9	1.8	31	14	88	33907
•	7846-E	2,400	<sup>3</sup> /8	9	7.5	10.0	<sup>1</sup> /2" - 20	1.0	25	8.3	210	3.9	1.8	31	14	88	33907
	7847-E	1,100	1/2	9	16.0	22.0	<sup>1</sup> /2" - 20	1.0	25	10.5	267	5.4	2.4	31	14	88	30018
•	7848-E	600	1/2	12	29.5	40.0	<sup>1</sup> /2" - 20	1.0	25	10.5	267	5.4	2.4	31	14	88	30018
•	7849-E	350	1/2	12	54.5	74.0	<sup>1</sup> /2" - 20	1.0	25	10.5	267	5.4	2.4	31	14	88	30018
	Lever																
-	7850-E	18,000	<sup>3</sup> /8	9	1.0	1.3	<sup>1</sup> /2" - 20	.9	24	9.6	244	3.2	1.5	31	14	88	33907
	7851-E	4,500	<sup>3</sup> /8	9	4.0	5.4	<sup>1</sup> /2" - 20	.9	24	9.6	244	3.2	1.5	31	14	88	33907
	7852-E	2,400	<sup>3</sup> /8	9	7.5	10.0	<sup>1</sup> /2" - 20	.9	24	9.6	244	3.2	1.5	31	14	88	33907
	7853-E	1,100	<sup>3</sup> /8	9	16.0	22.0	<sup>1</sup> /2" - 20	.9	24	11.8	299	4.7	2.1	31	14	88	30016
	7854-E	600	<sup>3</sup> /8	9	29.5	40.0	<sup>1</sup> /2" - 20	.9	24	11.8	299	4.7	2.1	31	14	88	30016
	7855-E	325	<sup>3</sup> /8	9	54.5	74.0	<sup>1</sup> /2" - 20	.9	24	11.8	299	4.7	2.1	31	14	88	30016
	Right Angle																
	7832-B	2,000	<sup>3</sup> /8	9	10.0	13.0	<sup>3</sup> /8" - 24	.9	24	14.3	363	6.0	2.7	31	14	82	47341
•	7831-B	900	<sup>3</sup> /8	9	20.0	27.0	<sup>1</sup> /2" - 20	.9	24	16.0	406	7.5	3.4	31	14	82	30016
	7830-B	400	1/2	12	44.0	60.0	<sup>1</sup> /2" - 20	.9	24	16.0	406	7.5	3.4	31	14	82	30018

Most popular model. Air Inlet – <sup>1</sup>/<sub>4</sub>" NPTF Recommended Air Pressure – 90 PSI (6.2 bar) Recommended Hose Size – <sup>5</sup>/<sub>16</sub>" (8 mm) I.D.

# No Cost Options (Order "With" Option)

For Models	Part No.	Description	Substitute for Standard
All 78XX-E	33906	1/4" Chuck	Chuck
All 78XX-E	33907	<sup>5</sup> /16" Chuck	Chuck
All 78XX-E	30016	<sup>3</sup> /8" Chuck	Chuck
All 78XX-E	30018	<sup>1</sup> /2" Chuck	Chuck

# Torque Output: 4.0 to 8.3 ft-lbs (5.4 to 11.3 Nm)

# **Standard Equipment**

- · Suspension Bail
- 33500-3 Drive Spindle
- Choice of 33628-() Collet

# **Flat-Angle Drills**

1,450 to 3,300 rpm / 0.4 hp (.3 kW)

- Capacity: 1/4" (6 mm)
- · Excellent for drilling smaller diameter holes for airframe builders and metal fab shops.
- · Flat angle allows reach into limited access areas.

# **Flat-Angle Drills**



	Model	Speed	Standard Collet	Throttle	Stall Torque	Std. Spindle Thread	To Len	ool hath	Angle H w/o	lead Height Collet	T We	ool iaht	Air C	@ Free onsp.	e Speed Sound Level	Standard Spindle
	No.	rpm	Cap.	Style	ft-lbs Nr	n Female	in.	mm	in.	mm	lbs	kg	cfm	L/s	dB(A)	Part No.
,	7441-D	3,300	Specify	Lever	4.0 5.	4 <sup>1</sup> /4"-28	10.6	269	.7	17	2.9	1.3	24	11	86	33500-3
	7439-D	2,500	Specify	Lever	3.0 4.	1 <sup>1</sup> /4"-28	10.6	269	.7	17	2.9	1.3	24	11	86	33500-3
	7438-D	1,450	Specify	Lever	8.3 11	.3 <sup>1</sup> /4"-28	11.9	302	.7	17	3.5	1.6	24	11	86	33500-3

Most popular model. Air Inlet – 1/4" NPTF Recommended Air Pressure – 90 PSI (6.2 bar) Recommended Hose Size – 5/16" (8 mm) I.D.

# No Cost Options (Order "With" Option)

Drive Spindle No.	Female Thread Size	For Use With
33500-5	<sup>1</sup> /4"-24	Threaded Bits
43494	<sup>9</sup> / <sub>32</sub> "-40	43497-() Collet1

(1) Choice of 43497-() Collet when flat angle is ordered with 43494 Spindle.

# **Drive Spindles**

The drive spindle of every flat-angle drill is an internal threaded gear. Three drive spindles are available so that various attachments can be used. The drive spindle is easily inserted into the angle head by removing the bottom plate.

# Chuck Adapter 33662<sup>2</sup>

Use with 33500-3 Drive Spindle. Has 1/4"-28 male thread and #0 taper for use with:

Dash

No.

-64

-65

-66

-67

-68

\_

\_

\_

7/32

 $^{1}/_{4}$ 

F

\_

\_

\_

Drill Chuck 30442, 5/32" Cap. (4 mm).

Drill Chuck is at extra cost.

(2) May be substituted for choice of collet when ordered with 33500-3 Drive Spindle.



33662



33628



43497



# Series 43497-() One Piece Collets. Non-Precicion

Series 33628-() One Piece Collets, Non-Precicion

Use with 43494 Drive Spindle. Collet has  $\frac{9}{32}$ " - 40 male thread. Overall length  $-\frac{1}{2}$ " (13 mm).

Drill Size	Dash No.	Drill Size	Dash No.	Drill Size	Dash No.	Drill Size	Dash No.	Drill Size	Dash No.	Drill Size	Dash No.	Drill Size	Dash No.	Drill Size	Dash No.	Drill Size	Dash No.
7	-7	14	-14	21	-21	28	-28	35	-35	42	-42	49	-49	56	-56	<sup>3</sup> /32	-163
8	-8	15	-15	22	-22	29	-29	36	-36	43	-43	50	-50	57	-57	<sup>7</sup> /64	-164
9	-9	16	-16	23	-23	30	-30	37	-37	44	-44	51	-51	58	-58	<sup>1</sup> /8	-165
10	-10	17	-17	24	-24	31	-31	38	-38	45	-45	52	-52	59	-59	<sup>9</sup> /64	-166
11	-11	18	-18	25	-25	32	-32	39	-39	46	-46	53	-53	60	-60	<sup>5</sup> /32	-167
12	-12	19	-19	26	-26	33	-33	40	-40	47	-47	54	-54	<sup>1</sup> /16	-161	<sup>11</sup> /64	-168
13	-13	20	-20	27	-27	34	-34	41	-41	48	-48	55	-55	<sup>5</sup> /64	-162	<sup>3</sup> /16	-169

Torque Output: 2.5 to 23.0 ft-lbs (3.4 to 31.2 Nm)

# **Standard Equipment**

Chuck

# **Pistol Grip Drills**

575 to 5,300 rpm / .7 hp (.5 kW) 950 to 3,800 rpm / .5 hp (.4 kW) Capacity: <sup>1</sup>/4" (6 mm) and <sup>3</sup>/8" (9.5 mm)

• Model DG055A-() and 8426-() drills are excellent general purpose tools.



#### **Pistol Drills**

r lotor Brillo																
Madal	Quand	Sta	ndard	Sta	all	Spindle	Spi	ndle	T	ool	То	ol	( 1 : 0	Free	Speed	Standard
model	Speed	Chuc	ж сар.	Ioro	que	Inread	UT	iset	Lei	igth	wei	gnt	AIL C	onsp. ;	Sound Level	Списк
No.	rpm	in.	mm	ft-lbs	Nm	Male	in.	mm	in.	mm	lbs	kg	cfm	L/s	dB(A)	Part No.
Pistol																
DG055A-38-F	3,800	<sup>5</sup> /16	8	2.5	3.4	<sup>3</sup> /8"-24	0.9	23	7.0	177	2.4	1.1	19	9.0	83	-
DG055A-21-B	2,100	<sup>3</sup> /8	10	4.5	6.1	<sup>3</sup> /8"-24	0.9	23	7.3	184	2.5	1.1	19	9.0	83	-
DG055A-10-L	950	1/2	13	10.0	13.6	<sup>3</sup> /8"-24	0.9	23	8.3	212	3.1	1.4	19	9.0	83	-
8426-2	5,300	<sup>3</sup> /8	9	3.7	5.0	<sup>3</sup> /8"-24	1.1	27	7.3	85	3.3	1.5	33	15.6	86	47341
8426-3	3,250	<sup>3</sup> /8	9	6.0	8.1	<sup>3</sup> /8"-24	1.1	27	7.3	185	3.3	1.5	33	15.6	86	47341
8426-4	2,600	<sup>3</sup> /8	9	7.4	10.0	<sup>3</sup> /8"-24	1.1	27	7.3	185	3.3	1.5	33	15.6	86	47341
8426-5	1,550	<sup>3</sup> /8	9	11.5	15.6	<sup>3</sup> /8"-24	1.1	27	9.0	229	3.8	1.7	33	15.6	86	30896
8426-6	950	<sup>3</sup> /8	9	19.5	26.4	<sup>3</sup> /8"-24	1.1	27	9.0	229	3.8	1.7	33	15.6	86	30896
8426-7	575	<sup>3</sup> /8	9	23.0	31.2	<sup>3</sup> /8"-24	1.1	27	9.0	229	3.8	1.7	33	15.6	86	30896
8525-C	2500	1/4	6	3.6	4.9	<sup>3</sup> /8"-24	0.9	22	6.0	153	2.7	1.2	26	12.3	84	41084
8526-C	4500	1/4	6	3.6	4.9	<sup>3</sup> /8"-24	0.9	22	6.0	153	2.7	1.2	26	12.3	84	41084

Air Inlet  $-\frac{1}{4}$ " NPTF Recommended Air Pressure -90 PSI (6.2 bar) Recommended Hose Size  $-\frac{5}{16}$ " (8 mm) I.D.



#### **Quick Reverse Tappers (QRT)**

Model	Sneed	Standard Chuck	Sta Toro	all me	Spindle Thread	Spi Of	ndle fset	To Ler	)0l hath	To Wei	0l aht	» Air C	@ Free	Speed Sound Level	Standard Chuck
No.	rpm	Capacity	inIbs	Nm	Male	in.	mm	in.	mm	lbs	kg	cfm	L/s	dB(A)	Part No.
Pistol															
8506-ATA	600	NO. 0 - <sup>1</sup> /4"	110	12.5	<sup>3</sup> /8"-24	0.9	23	8.2	208	2.7	1.2	24	11.3	82	31427
8506-ATB	600	NO. 10 - <sup>5</sup> /16"	110	12.5	<sup>3</sup> /8"-24	0.9	23	8.2	208	2.7	1.2	24	11.3	82	31432
8506-ATC	600	<sup>5</sup> /16" - <sup>5</sup> /8"	110	12.5	<sup>3</sup> /8"-24	0.9	23	8.2	208	2.7	1.2	24	11.3	82	32060
8509-ATA	900	NO. 0 - <sup>1</sup> /4"	80	9.1	<sup>3</sup> /8"-24	0.9	23	8.2	208	2.7	1.2	26	12.2	82	31427
8509-ATB	900	NO. 10 - <sup>5</sup> /16"	80	9.1	<sup>3</sup> /8"-24	0.9	23	8.2	208	2.7	1.2	26	12.2	82	31432
8509-ATC	900	<sup>5</sup> /16" - <sup>5</sup> /8"	80	9.1	<sup>3</sup> /8"-24	0.9	23	8.2	208	2.7	1.2	26	12.2	82	32060
8506-ADB	600	<sup>3</sup> /8"	110	12.5	<sup>3</sup> /8"-24	0.9	23	8.0	203	2.9	1.3	24	11.3	82	47341
8506-ADK	600	<sup>1</sup> /2"	110	12.5	<sup>3</sup> /8"-24	0.9	23	8.0	203	2.9	1.3	24	11.3	82	34518
8509-ADB	900	<sup>3</sup> /8"	80	9.1	<sup>3</sup> /8"-24	0.9	23	8.0	203	2.9	1.3	26	12.2	82	47341
8509-ADK	900	1/2"	80	9.1	<sup>3</sup> /8"-24	0.9	23	8.0	203	2.9	1.3	26	12.2	82	34518

Air Inlet – 1/4" NPTF Recommended Air Pressure – 90 PSI (6.2 bar) Recommended Hose Size – 5/16" (8 mm) I.D.

# **Standard Equipment**

- Tapping Chuck
- Necessary Wrenches
- 48932 Dead Handle w/8426 6 & 7.

# **Push-Pull Tapper**

550 rpm / .45 hp (0.3 kW) Capacity: <sup>5</sup>/8" (15 mm) Tap Chuck

• Designed for thread-chasing applications in metal fab shops after painting and cleanup operations.

# **Push-Pull Tapper**



Model No.	Free Speed rpm	Sta Chuc in.	ndard :k Cap. mm	St Tor ft-Ibs	all que Nm	Spi Of in.	indle fset mm	Spi Le in.	indle ngth mm	To Wei Ibs	ool ight kg	Air C cfm	@ Fre consp. L/s	ee Speed Sound Level dB(A)	Standard Chuck Part No.
Pistol															
7429-D	550	<sup>5</sup> /16	7	19	25.8	1.3	34	12	305	3.9	1.8	27	13	85	31432

• Most popular model. Air Inlet – 1/4" NPTF Recommended Air Pressure – 90 PSI (6.2 bar) Recommended Hose Size – 5/16" (8 mm) I.D.

# **Optional Accessories**

For Models	Part No.	Description
7429-D	44360-()	Piped Exhaust Assembly

# No Cost Options (Order "With" Option)

For Models	Part No.	Description	Substitute for Standard
7429-D	31427	Tapping Chuck	Chuck
7429-D	32060	Tapping Chuck	Chuck



# **Keyed Drill Chucks**

Сара	acity	Thread		
in.	mm	Female	Chuck No.	Key No.
<sup>5</sup> /32	4	No. 0 Taper	30442	30442-K
1/4	6	No. 1 Taper	36953	30209-K
1/4	6	<sup>3</sup> /8"- 24	31330	31330-K
1/4	6	<sup>3</sup> /8"-24	41084	41084-K
1/4	6	<sup>3</sup> /8"- 24	47340	30209-K
1/4	6	<sup>1</sup> /2"-20	33906	30209-K
<sup>3</sup> /8	9	<sup>3</sup> /8"-24	30896	30896-K
<sup>3</sup> /8	9	<sup>3</sup> /8"-24	47341	30510-K
<sup>3</sup> /8	9	<sup>1</sup> /2"-20	30016	30016-K
<sup>3</sup> /8	9	<sup>1</sup> /2"-20	33907	30510-K
1/2	13	<sup>3</sup> /8"-24	34518	30016-K
1/2	13	<sup>1</sup> /2"-20	30018	30016-K



JULI COL	iets				
	Сар	acity		Collet 3/8'-24	Chuck
in.	to	in.	mm	Female	Insert No.
<sup>3</sup> /32	to	<sup>1</sup> /8	3	32984-1	32968-1
1/8	to	<sup>5</sup> /32	3	32984-2	32968-2
<sup>5</sup> /32	to	<sup>3</sup> /16	4	32984-3	32968-3
<sup>3</sup> /16	to	<sup>7</sup> /32	5	32984-4	32968-4
7/32	to	1/4	6	32984-5	32968-5
1/4	to	<sup>9</sup> /32	7	32984-6	32968-6
<sup>9</sup> /32	to	<sup>5</sup> /16	7	32984-7	32968-7
<sup>5</sup> /16	to	<sup>11</sup> /32	8	32984-8	32968-8
11/32	to	3/8	9	32984-9	32968-9

Note: Collet insert is included with Collet.

Note: Key is included with Chuck.

**Quick-Change Chucks** 

# 0))-

Hex Drive Cap. in.	Mounting Thread Female	Chuck No.
<sup>1</sup> /4"	<sup>3</sup> /8"-24	30712
<sup>7</sup> /16"	<sup>1</sup> /2"-20	31367

Chu	icks		
Capa to	acty in.	mm	Chuck No.
to	1/4	0 to 6	31427
to	<sup>5</sup> /16	7	31432
to	<sup>5</sup> /8	7 to 15	32060 <sup>1</sup>
	Capa to to to to	Chucks       Capacty       to      1/4       to      5/16       to      5/8	Chucks         mm           to         in.         mm           to         1/4         0 to 6           to         5/16         7           to         5/8         7 to 15

(1) Includes 32064 Adapter.



Drive Spindle	Mounting Thread Female	Adapter No.
1/2"-20 (male)	<sup>3</sup> /8"-24	30629
1/2"-20 (male)	<sup>1</sup> /2"-20	40847
<sup>3</sup> /8" sq.	<sup>3</sup> /8"-24	30384-5
<sup>1</sup> /2" sq.	<sup>3</sup> /8"-24	30384-9
<sup>1</sup> /2" sq.	<sup>1</sup> /2"-20	40768



The originator of random orbital finishing has just raised the standards of performance. ARO has applied the latest in ergonomic design and advanced materials technology to refine its Classic Line of random orbital sanders...and to introduce a completely new range: the Elite Series.

The ARO line of random orbital finishing tools is now the most comprehensive in the industry, providing a choice of traditional aluminum housings...or the ultimate in lightweight, composite packaging and efficient performance. Both the Classic Line and Elite Series incorporate new moisture-resistant composite rotors, fully machined counterweights, and larger counterweight bearings for superior reliability. Both continue the ARO advantage of operating with totally dry air power for a cleaner work environment. Now you can choose from four configurations, based on design, size, and vacuum orientation.

#### Jet Vac Composite Sanders

High efficiency integral vacuum, with hose and double bag.

**Classic Line Aluminum "Mini" Sanders** 

Non-Vac, Vac-Ready, and Venturi-Vac

#### **Classic Line Aluminum Standard Size Sanders**

Non-Vac, Vac-Ready and Venturi-Vac

All ARO random orbital sanders are backed by an exclusive two-year warranty, twice the coverage offered on competitive products. And ARO teams these tools with a complete line of premium-quality sanding pads and accessories, for a total package of sanding solutions. Read on, and discover all of the details on the innovative new Elite Series, as well as the ARO Classic Line. Your ARO representative or distributor will help you achieve high-performance finishing for your application.

# **Finishing Tools Elite Random Orbital Sanders**

As the name suggests, the new ARO Elite Series represents the best in random orbital sander design and performance. More power, speed, and durability than ever before. Better vacuum efficiency. And a new standard of operator comfort. However, the most important things may just be what ARO has taken away. There's less weight and less noise than ever before. Your operators will feel the difference in the superb handling. Your customers will see the difference in their superb finishes. The Elite Series is the new definition of leadership from the people who originated random orbital sanding.



# Lightweight:

The one-piece precision-molded composite housing provides unmatched strength and durability...and helps reduce overall weight to 1.83 lbs. for less operator fatigue over extended periods, contributing to greater productivity.

# Quiet:

New materials and internal refinements have cut sound pressure to just 78 dBa, for a more pleasant work environment.

# Improved Vacum Action

The Elite Series vacuum-ready models extract dust and particulates through and around the pad...and then directly up and out a dedicated port, keeping foreign matter away from the motor. The vacuum sanding pad features a unique "petal" design and large 1/2-inch diameter holes for greater efficiency. The clear, unobstructed path ensures that virtually all dust is instantly channeled away from

the work. Special shroud material protects the work surface from marring, while enhancing vacuum characteristics. Elite Series vacuum-ready models connect easily to portable or central vacuum systems with new lighter, more flexible hoses that permit better maneuverability.



Another unique Elite Series feature: all non-

vacuum models can be easily converted to vacuum-ready status with the simple addition of a vacuum adapter and vacuum sanding pad.

# Perfect Fit for all Hands

With the ARO Elite Series, one sander fits all. Three sizes of soft, color-keyed rubber grip rings fit securely around the top of the housing, and allow a custom match to operator hand size.

The grip rings are easily interchangeable, provide a comfortable, non-slip surface for control, and insulate further against vibration and cold. Grip rings are available as accessories according to individual customer needs.

# **Efficient:**

ARO has developed new ways to extract maximum power from the air motor, achieving true 12,000 rpm performance.

All ARO Elite Series sanders are built by skilled technicians at our Southern Pines, North Carolina plant.

# **Reduced Vibration**

Inside the motor housing, ARO developed a fully machined counterweight that balances the power of the high-efficiency air motor and significantly reduces vibration. The counterweight bearing has been

enlarged to provide twice the life. In addition, ongoing testing confirms that the ARO weight-matched sanding pad and counterbalance combination delivers unsurpassed smoothness.

On the outside, the Elite Series composite housing --- with its ability to insulate and absorb energy ---- further reduces the effects of vibration transmitted to the operator.





For small hands

# Non-Vacuum and Vacuum Ready

ARO Elite Series sanders are available in five non-vacuum model variations, with 3.5-inch. or 6-inch pads, and duck or vinyl pad faces. The non-vac versions can subsequently be converted to vacuum status with the simple addition of an available vacuum adapter, a petal pad, and a change in shroud if desired.



For applications requiring dust-free operation, choose from five models of Elite Series vacuum-ready sanders, for use with central or portable vacuum systems. Select short shrouds for maximum workpiece visibility, or long shrouds for maximum dust evacuation. The improved ARO vacuum hose is now 65 percent lighter than previous versions, for better operator convenience.



# 

# Jet Vac

ARO has created a unique new addition to theElite Series of random orbital sanders- one that sets a new performance standard for self generated vacuum sanding. The new Jet Vac™ System delivers twice the vacuum power of the nearest competitor and uses an exclusive disposable dust bag enclosed in a protective cover. This "double bagging" system provides a cleaner work environment, and promotes the proper disposal of collected particulates for maximum total effect.



49979

# **Jet Vac System Detail**



# Performance Data

- Maximum free speed: 12,000 rpm
- Power: 0.20 hp
- Air consumption: 15.8 scfm
- Sound pressure: 78 dBa
- Weight: 1.83 lbs.
- Power/weight: 0.109 hp/lb.
- Power/air consumption: 0.013 hp/scfm
- Shroud efficiency: 33.0 scfm
- Overall height: 3.60 in.
- Overall width: 3.96 in.
- Overall length: 6.0 in.
- Plus dramatically reduced vibration for superior operator comfort!

# Finishing Tools 5" & 6" Diameter Random Orbital Sanders

The ARO Elite Series offers one-piece precision molded composite housing with soft, color-keyed grip rings that meet operator hand sizes. Available in non-vac. central vac and Jet Vac System; .20 hp, 16 scfm at 12,000 free-speed rpm. Available in both 3/16" and 3/32" orbits.

# 5 & 6" Non-Vac

# RS25B-PSV-1 & RS26B-PSV-1 RS25B-PSV-2 & RS26B-PSV-2

- •3/16" dia. orbit (PSV-1) 3/32" dia. orbit (PSV-2)
- •Non-vacuum model can be
- converted to vac . Short shroud for maximum
- workpiece visibility • Ships with 49878 / 49879
- Ships with 430707 43070 low profile 3/8" premium pad Weight: 1.83lb. / 0.83 kg. (5") 1.92 lb. / 0.87 kg. (6")

# 5 & 6" Central Vac

# RS25B-CLV-1 & RS26B-CLV-1 RS25B-CLV-2 & RS26B-CLV-2

- •3/16" dia. orbit (CLV-1); 3/32" dia. orbit (CLV-2)
- Central vacuum minimizes particulates and dust in work area
- Long shroud for maximum dust evacuation (short shroud available on CSV models)
- Ships with 49096-1 / 49099-1
- low profile 3/8" premium pad • Weight: 1.92 lb. / 0.87 kg.

# 5 & 6" Jet Vac

# RS25B-VLV-1 & RS26B-VLV-1 RS25B-VLV-2 & RS26B-VLV-2

- •3/16" dia. orbit (VLV-1); 3/32" dia. orbit (VLV-2)
- Jet Vac System for the most powerful
- and effective, selfgenerated
- vacuuming
- Long shroud for maximum dust evacuation
- Ships with 49096-1 / 49099-1 low profile 3/8" premium pad



# 5 & 6" Non-Vac

- 8446-B5C-V & 8446-B6C-V Central vacuum minimizes particulates and dust in work area Short shroud for maximum
- workpiece visibility • Ships with 49878 / 49879 low profile 3/8" premium pad
- Weight: 2.3 lb. / 1.0 kg.

#### 8446-B5K-V & 8446-B6K-V

• Long handle • Weight: 2.6 lb. / 1.2 kg.



# 5 & 6" Central Vac

# 8447-E5T-V & 8447-E6T-V

- · Central vacuum minimizes particulates and dust in work area · Short shroud for maximum
- workpiece visibility • Ships with 49096-1 / 49099-1 low profile 3/8" premium pad
- •Weight: 2.4 lb. / 1.1 kg.



# 5 & 6" Jet Vac 8457-B5T-V & 8457-B6T-V

- Jet Vac System for the most powerful and effective, self-generated vacuuming
- · Short shroud for maximum
- workpiece visibility
- Ships with 49096-1 /
- 49099-1 low profile
- 3/8" premium pad
- •Weight: 2.4 lb. / 1.1 kg.



Model Selection	Pad Type	Shroud	Composite .2 HP 3/16" Dia. Orbit	Composite .2 HP 3/32" Dia. Orbit	Aluminum .3 HP 3/16" Dia. Orb
5" Diameter, 5/16"-24 Spindle			Elite	Elite	Classic
Non-Vac	Vinyl	Short	RS25B-PSV-1	RS25B-PSV-2	8446-B5C-V
Non-Vac - Long Handle	Vinyl	Short	long handle sold sep.	long handle sold sep.	8446-B5K-V
Central Vac	Vinyl	Short	RS25B-CSV-1	RS25B-CSV-2	8447-E5T-V
	Vinyl	Long	RS25B-CLV-1	RS25B-CLV-2	NA
Jet Vac	Vinyl	Short	NA	NA	8457-B5T-V
	Vinyl	Long	RS25B-CLV-1	RS25B-CLV-2	NA
6" Diameter, 5/16"-24 Spindle			Elite	Elite	Classic
Non-Vac - Short Shroud	Vinyl	Short	RS26B-PSV-1	RS26B-PSV-2	8446-B6C-V
Non-Vac - Short Shroud/Long Handle	Vinyl	Short	long handle sold sep.	long handle sold sep.	8446-B6K-V
Central Vac	Vinyl	Short	RS26B-CSV-1	RS26B-CSV-2	8447-E6T-V
	Vinyl	Long	RS26B-CLV-1	RS26B-CLV-2	NA
Jet Vac	Vinyl	Short	NA	NA	8457-B6T-V
	Vinyl	Long	RS25B-VLV-1	RS25B-VLV-2	NA

Patented

**Double Bag** 

System

3.5" Non-Vac	3.5" Central Vac	3.5" Jet Vac
RS23B-PLV-1 & RS23B-PLV-2 •Composite .2 HP for power and comfort •3/16' dia. orbit (PLV-1); 3/32" dia. orbit (PLV-2) •12,000 free-speed rpm •Non-vacuum model can be converted to vac •Long shroud for maximum dust evacuation •Ships with 04334009 low profile 3/8" premium pad •Weight: 1.77 lb. / 0.80 kg.	RS23B-CLV-1 & RS23B-CLV-2 • Composite .2 HP for power and comfort • 3/16" dia. orbit (CLV-1); 3/32" dia. orbit (CLV-2) • 12,000 free-speed rpm • Central vacuum minimizes particulates and dust in work area • Long shroud for maximum dust evacuation • Ships with 04334009 low profile 3/8" premium pad • Weight: 1.77 lb. / 0.80 kg.	RS23B-VLV-1 & RS23B-VLV-2 • Composite .2 HP for power and comfort • 3/16" dia. orbit (VLV-1); 3/32" dia. orbit (VLV-2) • 12,000 free speed rpm • Jet Vac high-efficiency integral vacuum, with hose and double bag • Long shroud for maximum dust evacuation • Ships with 04334009 low profile 3/8" premium pad • Weight: 1.86 lb. / 0.84 kg.

Model Selection	Pad Type	Shroud	Composite .2 HP 3/16" Dia. Orbit	Composite .2 HP 3/32" Dia. Orbit
3.5" Diameter			Elite	Elite
Non-Vac	Vinyl	Long	RS23B-PLV-1	RS23B-PLV-2
Central Vac	Vinyl	Long	RS23B-CLV-1	RS23B-CLV-2
Jet Vac	Vinyl	Long	RS23B-VLV-1	RS23B-VLV-2

# Proudly Supporting Members of...

By supporting members of the Kitchen Cabinet Manufacturers Association (KCMA) and the American Furniture Manufacturers Association (AFMA), ARO endorses the professional goals and objectives that provide for improved standards of quality, integrity and safety in woodworking. These members and associations play a key role in providing information, education, statistics, legislative news and expertise on issues that are critical to the industry. Through its participation, Ingersoll-Rand demonstrates a commitment to promoting growth of the woodworking industry, while providing for the safety and improved quality of life for its members' employees and customers.

# Finishing Tools 3.5", 5" & 6" Diameter Sanding Pads

ARO premium sanding pads feature a riveted hub and your choice of 3/8" or 5/8" thick polyurethane foam pads for increased stability and smooth, swirl-free operation. The embossed vinyl, hook & loop, or canvas facing is

permanently molded to the polyurethane to create a durable surface. This surface offers maximum adhesion and easy removal of either PSA style or hook & loop abrasives.

49878 - 5" pad	49094 - 5" pad	49096-1 - 5" pad	49877 - 5" pad
49879 - 6" pad	49097 - 6" pad	49099-1 - 6" pad	49880 - 6" pad
49095 - 5" pad	49693 - 5° pad	46860 - 5" pad	46866 - 5" pad
49098 - 6" pad	49694 - 6° pad	46861 - 6" pad	46867 - 6" pad

		Low Pr	ofile 3/8" Premiu	m		High Profi	le 5/8" Premium
Pad Selection	Flat Vinyl Face	Flat Vinyl Face w/ Diamond Pattern	Vinal Face Petal Pattern	Flat Canvas "Duck" Face on Vinyl Pad	Hook & Loop	Flat Vinyl Face	Flat Canvas "Duck" Face on Vinyl Pad
3.5" Diameter Sanding Pads							
Non-Vacuum		04334009					
5" Diameter Sanding Pads							
Vacuum			49096-1		49693		
Non-Vacuum	49878	49094		49095		46860	46866
6" Diameter Sanding Pads							
Vacuum			49099-1		49694		
Non-Vacuum	49879	49097		49098		46861	46867

Air Inlet: 1/4" NPT Female / Recommended Air Pressure 90 PSI (6.2 bar)



# **Orbital Sanders**

.3 HP (.2 kW)

# Capacity: 3 2/3" x 9" Paper Size

- · Compact size and light weight are ideal for sanding restricted areas or vertical surfaces.
- Low vibration and palm grip provide comfortable operation and minimize operator fatigue.
- Quick-change clamps enable fast, easy paper changes.

# Standard Equiment

· Sanding Back-Up Pad



Model	No.				Free				Air Cor	ısp. @	Sound Level @	
Palm	Long	Thic	kness	Pad	Speed	Exhaust	Orbi	t Dia.	Free S	Speed	Free Speed	Weight
Grip	Handle	in.	mm	Material	rpm	Location	in.	mm	cfm	L/s	dBA	Part No.
With Cusion G	rip Sleeve											
8448-A1C	8448-A1K	<sup>5</sup> /16	8	Felt	8000	Rear	.2	5.1	20	9	81	44570
8448-A3C	8448-A3K	1/2	13	Sponge Rubber	8000	Rear	.2	5.1	20	9	81	44571

· Most popular models

Description	Tool I in.	Height mm	Tool V Ibs	Veight kg
Palm Grip	3.8	98	3.5	1.6
Long Handle	3.8	98	3.8	1.7

## **Optional Accessories**

For Model	Part No.	Description
8448	44360-()	Piped Exhaust Assembly

Air Inlet: 1/4" NPT Female

Recommended Air Pressure: 90 PSI (6.2 bar) Recommended Hose Size: <sup>5</sup>/16" (8mm) I.D.

ARO offers a complete line of service kits and specialty tools designed to extend the life of your random orbital sander, and provide easy maintenance and service.









## Jet Vac Conversion Kits

Convert to the Jet Vac System for the most powerful and effective, self-generated vacuuming. **49977** for 5" Elite models **49978** for 6" Elite models

#### Pad Wrenches

Use to remove sanding pad. Included with every tool.

**30131** for Classic non-vacuum models **30131-2** for all Classic vacuum and all Elite models

**Spanner Wrenches** Use to remove the lock ring securing the motor assembly.

44548 for Classic models 48869 for Elite models

# Piped Exhaust Assembly

Channels exhausted air away from the immediate work area and reduces operating sound levels. When ordering, indicate hose length desired (in feet) in place of "#."

44360-(#) for all models

# "Elite" Counter Balance Assembly

Economically upgrade existing 'A' Series to 'B' or improve uptime and reduce service time with easy to install assemblies. Counterbalance comes completely assembled with both bearing and spindle for easy installation.

Sander	Counter Balance
Model	Assembly
3.5" 3/32	80093313
3.5" 3/16	80093008
5" 3/32	80092885
5" 3/16	80090244
6" 3/32	80090301
6" 3/16	80092810













# **Vertical Orbital Sanders**

Compact size and lightweight, ideal for sanding restricted areas or vertical surfaces. Quick-change clamps enable fast, easy paper changes.

8448-A1C palm grip, felt pad 8448-A1K long handle, felt pad 8448-A3C palm grip, sponge rubber pad 8448-A3K long handle, sponge rubber pad

# **Grip Rings**

Three sizes of soft, color-keyed rubber grip rings that fit securely around top of Elite Series housing, and allow a custom match to operator hand size.

 small, grey medium, black large, blue **49840** Kit of 3

# Vacuum Adapters

Go from non-vac to vac-ready.

49802 Elite Series 49692 Classic Line

# Vacuum Hoses

44546-(#) hose assembly equipped with necessary adapters. When ordering, indicate hose length desired (in feet) in place of "#."
49600 6' (1.8m) hose equipped with molded 1" I.D. cuffs at each end.
49982 Jet Vac hose

# **Dust Collection Bags**

**48275-1** dust collection bag Jet Vac bag cover disposable bag (20 qty) disposable bag (250 qty)

Long Handle Kit Convert any Elite Series short handle model to a long handle.

4120-EXT (for Elite models only)

# **Motor Service Kits**

Contains vanes, bearings, oil, snap ring and throttle spring. **49837** for Elite models **49846** for Classic models

# **Industry Leading Vacuum Action**

The ARO Elite Series patented vacuum system extracts dust and particles through and around the pad... and then directly up and out a dedicated port, keeping foreign matter away from the motor. The vacuum sanding pad features a unique "petal" design and large 1/2-inch diameter holes for greater efficiency. The clear, unobstructed path ensures that virtually all dust is instantly channeled away from the work. Special shroud material protects the work surface from marring, while enhancing vacuum characteristics. Elite Series vacuum-ready models

connect easily to portable or central vacuum systems with the lighter, more flexible hoses that permit better maneuverability.

Another unique feature: all non-vacuum models can be easily converted to vacuum-ready status with the simple addition of a vacuum adapter and vacuum sanding pad.



"Patented" Vacuum Action Provides Industry Leading Dust Removal

# Rated Power: 20,000 to 85,000 rpm / 0.1 hp (.08 kW)

# **Standard Equipment**

- Collet with Insert
- Collet Wrenches
- 6'-long x <sup>7</sup>/<sub>32</sub>" ID (1.8 m x 6 mm) Air Hose and 18"-long Exhaust Overhose on Models GH011A-600-().
- 7'-long x  $^{3}\!/_{16}$  ID (2.1 m x 4.8 mm) Air Hose on Models 7978-( ), 7980-( ), and 7114-E.
- 39830 Cartridge Air Filter on Models 7980-() and 7114-E.

# **Turbine Grinders**

# 85,000 RPM / .1 hp (.08 kW)

# Capacity: 1/8" Carbide Bur 3/8" Mounted Stone

• Ideal high-speed tools for final cleaning / polishing of dies.

# **Pencil Grinders**

# 60,000 RPM / .1 hp (.08 kW)

# Capacity: 1/4" Carbide Bur Grinder 1/4" Mounted Stone

- Excellent for intricate grinding applications, including mold finishing, deburring, cleaning and polishing.
- Trim, comfortable design enables excellent control.
- Choice of rear exhaust or front exhaust models.

# **Die Grinders**

# 20,000 RPM / .1 hp (.08 kW)

# Capacity: 1/4" Carbide Bur 1/2" Mounted Stone

• Ideal for mold finishing, light deburring and flash removal.



# **Classic Line Die Grinders**

	Model No.	Free Speed	Throttle Style	Std Si	Collet ize	Exhaust Location	Spindle Thread	Spi Ofi	ndle fset	T Lei	ool ngth	To We	ool ight	ہ Air C	@ Free onsp.	e Speed Sound Level	Std Collet Insert
		rpm		in.	mm		Male	in.	mm	in.	mm	0Z	kg	cfm	L/s	dB(A)	Part No.
	7980-2	85,000	Lever	<sup>1</sup> /8	3	Front	N/A	.6	14	5.6	143	14	.40	9	4.3	84	31812-4
•	7980-A	85,000	Twist	<sup>1</sup> /8	3	Front	N/A	.6	14	5.6	143	14	.40	9	4.3	84	31812-4
•	7978	60,000	Slide	<sup>1</sup> /8	—	Front	N/A	.4	9	5.6	143	5.5	.15	6	2.8	80	46119-2
•	GH011A-600-1	60,000	Twist	<sup>1</sup> /8	—	Rear	N/A	.34	9	5.3	136	2.6	.07	7	3.3	77	47568-1
•	7114-E	20,000	Lever	<sup>1</sup> /8	3	Front	N/A	.5	12	6	152	13	.37	6	2.8	79	31812-4

• Most popular model Hose Inlet – <sup>1</sup>/<sup>8</sup>" NPTF Recommended Air Pressure – 90 PSI (6.2 bar)

# **Optional Collet Inserts**

For Models	Part No.	Description
7980 & 7114-E	31812-()	Collet Insert
7978	46119-()	Collet Insert
GH011A	47568-()	Collet Insert



Part No. 39830 Cartridge Air Filter

# Rated Power: 4,500 rpm / 0.7 hp (0.5 kW)

# **Standard Equipment**

- Arbor Adapter on Wire Brush Tools
- Collet and Insert on Rotary File Tools
- Collet or Adaptor Wrenches
- · Flanges and Nuts

# **Wire Brush Tools**

4,500 RPM / .7 hp (.5 kW)

- Excellent tools for fast surface cleaning for weld and paint preparation.
- Optional lock-off throttle lever shown.

# **Rotary File Tools**

- 4,500 RPM / .7 hp (.5 kW)
- Designed for heavier deburring in metal fab shops.
- Built-in speed regulator.
- Optional lock-off throttle lever shown.





**Classic Line Extension Grinders** 

Model No.	Free Speed rpm	Throttle Style	Std Arbor/ Collet Size in. mm <sup>1</sup>	Exhaust Location	Spindle Thread Male	Spir Off in.	ndle set mm	To Ler in.	ool 1gth mm	To Wei Ibs	ol ght kg	, Air C cfm	@ Free onsp. L/s	Speed Sound Level dB(A)	Std Arbor Adpt Collet Insert Part No.
Wire Bush Tools	;														
8067-E1	4,500	Lever	<sup>3</sup> /8 –	Rear	<sup>3</sup> /8-24	.9	24	12.9	329	3.7	1.7	32	15.1	88	36934
7874-E1	4,500	Lever	<sup>3</sup> /8 —	Rear	<sup>3</sup> /8-24	.9	24	10.1	257	3.0	1.4	32	15.1	88	36934
Rotary File Tools	S														
8067-E2	4,500	Lever	1/4 -	Rear	<sup>3</sup> /8-24	.9	24	12.9	329	3.7	1.7	32	15.1	88	41750-3
7874-E2	4,500	Lever	<sup>1</sup> /4 —	Rear	<sup>3</sup> /8-24	.9	24	10.1	257	3.0	1.4	32	15.1	88	41750-3

For metric size collet inserts, see 41750-(). Air Inlet – <sup>1</sup>/4" NPTF Recommended Air Pressure – 90 PSI (6.2 bar) Recommended Hose Size – <sup>5</sup>/16" (8 mm) I.D.

# **Optional Collet Inserts**

For Models	Part No.	Description	Substituted for Standard
All	41750-()	Collet Insert	Collet Insert
All	33226-()	Erickson Collet	Collet
All	45779	Lock-Off Lever	Lever



The ARO MARXAL marking pen can be used on all types of material for fast, convenient identification.

ARO has built a reputation on customer-oriented problem solving. A big factor is the continuing commitment to meet unique customer needs with Special Purpose Tools.

Special Purpose Tools are regular production models that fill applications outside of assembly and finishing roles. For example, the popular MARXAL<sup>™</sup> marking pen can be used to scribe glass for cutting or to mark welds and other surfaces for identification. ARO electrode dressers extend the life and improve the performance of welding equipment. They eliminate the need to remove and recondition or replace electrodes by dressing them in position, in seconds. Once dressed, the electrode is restored to the proper shape for producing uniform, high quality results with reduced energy consumption. ARO offers the most complete line of electrode dressers, cutters, holders, and adapters in the industry. ARO also offers chisel and needle scaling hammers for removing weld flux, rust, or heavier material.

When unusual applications create the need for tailor-made solutions, ARO responds as well . . . through the Custom Tools department. ARO Custom Tools are modified versions of standard products that meet highly specialized assembly or finishing requirements. Some examples include laminate trimmers, short or small diameter pad orbital/random orbital sanders, extended buffing tools. Your ARO distributor or representative can provide more details on Custom Tools capabilities and existing designs.

After the Special Purpose Tools section, you'll find information on ARO general accessories, such as the exclusive Air Transfer Bail, service kits, grips and flanges, and more.

# Special Purpose Tools Marxal Marking Pen Peening & Scaling Hammer

# MARXAL<sup>™</sup> Marking Pen

- Comfortable, easy-to-use tool for marking products or tooling for identification.
- A popular tool for marking welds for identification.
- Can be used to scribe a line on glass for cutting.
- Choice of fine, medium or coarse marking point.

# **Standard Equipment**

- Medium Point
- 6' X 1/8" (1.8m X 3.2mm) Air Hose

# 8315

# **Marxal Marking Pen**

Model	Throttle	Strokes per	Standard	Exhaust	Tool L	.ength	Tool V	Veight	Air Consup. @	Free Speed	Standard
No.	Туре	Minute	Point Type	Location	in.	mm	lbs	kg	cfm	L/s	Point Part No.
8315	Twist	36,000	Medium	Front	6.4	163	4.8	.13	1.5	.7	39862-2
-											

Most Popular Model Hose Inlet – 1/4" NPTM Recommended Air Pressure – 90 PSI (6.2 bar)

# No Cost Options (Order "with" Options)

For Models	Part No.	Description	Substituted for Standard
8315	39862-1	Fine point	Medium point
8315	39862-3	Coarse point	Medium point

# **Peening and Scaling Hammer**

Furnished complete as illustrated with:

- <sup>1</sup>/<sub>4</sub>" female N.P.F.T air inlet
- Alloy-Steel hammer tip

# Peening and Scaling Hammer

Model No.	ThrottleType	Blows per Min.	Head Height	Tool Weight
7002	Button	5,000	2 <sup>1</sup> /2"	10 <sup>1</sup> /2 oz
Recommende	d Hose Size – <sup>5</sup> /16"			



# Laminate Trimmer

# 20,000 rpm /0.5 hp (.34 kW)

- Excellent tool for fast, accurate trimming of plastic laminates.
- May be operated in either the vertical or horizontal plane.

# **Standard Equipment**

- Collet
- Collet Wrenches



# Laminate Trimmer

	Free		Star	ndard							Air Con	sump @	Sound Level @	Standard
Model	Speed	Throttle	Colle	et Size	Exhaust	Tool	Height	Tool Width	Tool \	Neight	Free	Speed	Free Speed	Collet
No.	rpm	Style	in.	mm	Location	in.	mm	in. mm	lbs	kg	cfm	L/s	dBA	Part No.
8120	20,000	Lever	1/4	6	Front	7.8	198	2.5 64	1.9	.86	27	13	84	33226-8

• Air Inlet – 1/4" NPTF Recommended Air Pressure – 90 PSI (6.2 bar) Recommended Hose Size – 3/8" (10 mm) i.D.

# No Cost Options (Order "with" Options)

For Models	Part No.	Description	Substituted for Standard
8120	33226-()	Erickson Collet	Erickson Collet

# The Economical Solution to Dressing Worn Electrode Tips.

# Dressing Electrodes vs. New Tips

Worn electrode tips produce either poor welds or no welds at all, limiting both quality and productivity. Two possible solutions to worn tips are to (1) replace them with new, or (2) recondition existing tips on either a lathe, drill press, or with a portable ARO Electrode Dresser.

Replacing tips is a costly and time consuming alternative. Reconditioning tips on standard machine shop equipment, although providing uniformly dressed electrodes, cuts valuable production time. Reconditioning worn tips with an ARO Electrode Dresser, however, is a convenient, economical solution that minimizes downtime.



#### Dressing Electrodes with ARO's Portable Electrode Dresser

Reconditioning with an ARO pneumatic Electrode Dresser is a quick, easy, and accurate method of dressing worn electrodes. Downtime is virtually eliminated because each electrode is automatically dressed in seconds with precision, without removing the tip from the machine.

Once dressed, the electrode has a perfectly shaped tip for producing uniform, quality welds. Furthermore, a properly shaped electrode top reduces energy consumption during the welding process and greatly extends electrode life.

#### **ARO Portable Electrode Dressers**

ARO offers two models of electrode dressers in several speed options. Both models accept a wide variety of blade and solid-type cutters to accurately dress electrodes from  $5/_{16}$ " to  $1^{1}/_{2}$ " diameter. They are lightweight and easy to operate, requiring no special training for the operator.

The "22" Series Electrode Dresser is the most popular model and provides adequate power to dress most electrode tips. For larger electrodes where a lot of material must be removed during the dressing operation, the "2200" Series Electrode Dresser is recommended. Three speed options are available in the "2200" Series, with the lower speeds providing more dressing power at a slower material removal rate.

To reduce production downtime, increase electrode tip life, reduce energy consumption, and maintain quality welds, recondition your worn electrode tips with an ARO Portable Electrode Dresser.

## 22 Series

Model		Electrode	Recommended						
No.	rpm	Capacity	Air Inlet	Hose Size	Weight				
7165-B	1500	<sup>5</sup> /16" D to 1 <sup>1</sup> /2" D	<sup>1</sup> /4" NPT(F)	<sup>5</sup> /16" I.D.	3.5 lbs				

Optional Accessories: Cutter blades and adapters. Order separate.



# 2200 Series

Model		Electrode	Recommended						
No.	rpm	Capacity	Air Inlet	Hose Size	Weight				
8038-E	250	<sup>5</sup> /16" D to 1 <sup>1</sup> /2" D	<sup>1</sup> /4" NPT(F)	<sup>5</sup> /16" I.D.	5.5 lbs				
8039-E	450	<sup>5</sup> /16" D to 1 <sup>1</sup> /2" D	<sup>1</sup> /4" NPT(F)	<sup>5</sup> /16" I.D.	5.5 lbs				
8040-E	1000	<sup>5</sup> /16" D to 1 <sup>1</sup> /2" D	1/4" NPT(F)	<sup>5</sup> /16" I.D.	4.6 lbs				

Optional Accessories: Cutter blades and adapters. Order separate.



# **Electrode Tip Cutters and Cutter Accessories**

In addition to portable electrode dressers, ARO also offers a wide selection of both blade and solid-type cutters, as well as cutter holders, extensions and trimmers to accommodate a variety of electrode tips and welding machine setups. See the illustration below for the various cutter mounting options.

Both blade and solid cutters are available for flush or extended mounting on ARO Electrode Dressers. Flush style cutters allow access in confined areas, requiring a minimum clearance of only  ${}^{3}/{}^{4}$ " between welding faces. Extended style cutters are ideal where the center-to-center distance between electrodes is less than 1", as is the case in many multiple-point and short-stroke stationary welders, but require a minimum clearance of  $1{}^{1}/{}^{2}$ " between welding faces. A 1" extension adapter is also available to mount either flush or extended style cutters. For electrodes that have become "mushroomed" with extensive use, preventing a cutter from completely dressing the entire tip, trimmer-type blade holders are available.

# **Blade vs. Solid-Type Cutters**

Blade-type cutters produce the most accurate reconditioned tip since they are honed to the exact profile of the electrode tip and float in a guide that automatically centers the blade on the electrode. They are more economical than solid cutters in that they are lower priced and easily factory resharpened. Recom-mended for use on straight electrodes and at higher operating speeds.

Solid-type cutters are of a rugged, one-piece construction, with a series of permanent cutting edges shaped to the electrode tip's contour. Their cutting action is much faster than the blade-type's, thus, minimizing the time of the actual dressing operation. Limitations of the solid cutter, however, include their high cost and the difficulty of resharpening the cutting edges. Recommend-ed for use on tapered electrodes and at lower operating speeds.



# **How To Order Electrode Cutters**

To order electrode cutters, locate the diameter electrode to be dressed on pages 89-92, the type of cutter desired (solid or blade), and the electrode tip contour. The electrode tip profiles are drawn to scale, so they can be used as a convenient reference when exact contour measurements are not known. The chart directly below each profile shows the cutter, holder, adapter (where required) to be used for the 22 and 2200 Series Electrode Dressers. Cutter numbers in regular type are flush style; those in italics are extended style. Holders and/or adapters where required must be ordered separately.

Note: Consult factory about cutters for electrode tips not shown here.

# Cutter / Holder / Adapter Arrangements





# Solid-Type - 0.482 Dia. (12.2 mm)

Series	Cutter	Adapter	Cutter	Adapter	Cutter	Adapter	Cutter
22	32530	-	32529	-	32528	-	-
2200	32530	38083	32529	38083	32528	38083	40856









## Blade-Type - 0.482 Dia. (12.2 mm)

Series	Cutter	Adapter	Cutter	Holder	Adapter
22	32509	_	32452	38409	-
2200	32509	38083	32452	38409	38083





## Solid-Type - 0.490 Dia. (12.4 mm)

	•	•	
Series	Cutter	Adapter	Cutter
22	32528	-	_
2200	32528	38083	40856





# Blade-Type - 0.482 Dia. (12.2 mm)

Series	Cutter	Adapter
22	38406	-
2200	38406	38083



# Solid-Type - 0.500 Dia. (12.7 mm)

Series	Cutter	Adapter	Cutter	Adapter	Cutter	Adapter	Cutter
22	32530	-	32529	-	32528	_	-
2200	32530	38083	32529	38083	32528	38083	40856
	30°, **	3/16	300		30°		
32530	)	32529		32528		40856	

# Blade-Type - 0.500 Dia. (12.7 mm)

Series	Cutter	Holder	Adapter
22	32283	32288	-
2200	32283	32288	38083



Series	Cutter
2200	40856

Solid-Type - 0.588 Dia. (14.9 mm)

40856

# Solid-Type - 0.625 Dia. (15.9 mm)

Series	Cutter	Adapter	Cutter	Adapter	Cutter	Adapter
22	40278	_	32530	_	32528	_
2200	40278	38083	32530	38083	32528	38083
	1/4 F R 7/32		11/8			
4	0278		32530		32528	

# Solid-Type - 0.625 Dia. (15.9 mm) Continued



# Blade-Type - 0.625 Dia. (15.9 mm)



# Blade-Type - 0.625 Dia. (15.9 mm) Continued

Series	Cutter	Adapter	Cutter	Holder	Adapter
22	32510	-	33090	32282-2	-
2200	32510	38083	33090	32282-2	38083





# Blade-Type - 0.625 Dia. (15.9 mm) Continued

Series	Cutter	Holder	Adapter	Cutter	Holder	Adapter
22	40907	32282-2	-	32491	32282-2	-
2200	40907	32282-2	38083	32491	32282-2	38083
		R 8.000 R 1/32			2.500	

40907



# Blade-Type - 0.625 Dia. (15.9 mm) Continued

Series	Cutter	Holder	Adapter
22	38408	-	_
2200	32447	32282-2	38083
2200	38408	_	38083





# Adapters

To permit "2200" Series tools, which normally drive 1.125" O.D. cutters and holders, to utilize all .875" O.D. cutters and holders.



Use when a .875 0.D. holder or cutter is required in an extended position from the tool. 38083 adapter is required for use on "2200" Series tools.





# Tune-Up / Service kits

ARO Service Kits are available for the most popular ARO Air Tools and are a convenient, economical way to keep your ARO tools operating at peak performance. Each kit contains all the necessary replacement parts to properly perform preventative maintenance on a particular model tool. All parts are individually wrapped and identified, and packaged in an easy-to-store carton with a service manual, parts list, oil and grease. To order, locate the particular model or series ARO Air tool in the chart and specify the appropriate kit number.

Tool Models / Series	Service Kit
7015-11, 8212-1B, 8213-1B Die Grinder	39001
8525-C thru 8527-C Drill and Screwdriver	39929
7149-C, 7153-C, 7235-C and 7236-C Die Grinder	40102-1
7014-E & 7015-E Die Grinders	41800
8506, 8509, 8515 & 8521 w/Adjustable Clutch QRT Screwdrivers	42114
8506, 8509, 8515 & 8521 w/Direct Drive QRT Screwdrivers	42122-2
8506, 8509, 8515 & 8521 w/Positive Clutch QRT Screwdrivers	42341
8318 Right-Angle Grinder	44367
8316 Scaling Hammer	44694
8317 Right-Angle Grinder	45780
Series 20 "B" and "C" Model Screwdrivers	46992
Series 20 "C" Model QRT Screwdrivers	48817-1
Series 20 Right-Angle Screwdrivers	48803-1
Series 20 "B" Model Drills	47755
Series 20 Right-Angle Drills	48446-1
Series 50 "B" and "C" Model Screwdrivers	47353-1
Series 50 "C" Model QRT Screwdriver	48818-1
Series 50 Right-Angle Screwdrivers	48804-1
Series 50 "B" Model Drills	47756
Series 50 Right-Angle Drills	48447-1
Series 50 Nutsetters	47407
Series 80 Nutsetters	47369
8448-A1(), 8448-A3() Orbital Sander	48248-1
8446-B(), 8447-D() and 8457-A() Random Orbital Sanders	48249-1
8416, 8417 and 8418 Mini Random Orbital Sanders	48894
RS2 Elite Sanders (also 8416, 8417, 8418 classic line	
mini sanders built after 12/1/93)	49837
8446-B, 8447-E and 8457-B Random Orbital Sanders	
produced after 12/1/93	49846

The ARO Air Transfer Bail (ATB) is a revolutionary way to improve both the ergonomics and productivity of many assembly operations in which pistol grip fastening tools are used. By directing the air supply from the top of the tool instead of underneath through the handle, there's no dangling air hose to get in the way. The ARO ATB also promotes proper tool handling practices. And since it's designed for use with ARO Automatic Shut-off Screwdrivers, your operators benefit from the ergonomically-correct handle designs and minimum exposure to torque reaction to further reduce strain on the wrist.

Available for use on all ARO Series 20 & 50 pistol grip push-to-start auto shutoff screwdrivers only.

- 48994 for all Series 20 Models AG024A-().
- 48995 for all Series 50 Models AG054A-().

Specify the required kit number for the appropriate series / model tool from the chart below.

# **Ordering Information**

ARO Air Transfer Bail Kits are available for all ARO Series 20 and 50 pistol grip push-to-start auto shutoff screwdrivers. Specify the required kit number for the appropriate series / model tool from the chart below.

Tool Series	Tool Model	Free Speed	Torque Range Soft Draw		Air Transfer Bail Kit
		rpm	inIbs	Nm	
20	AG024A-26-Q	2,600	3-10	0.34-1.1	48994
20	AG024A-15-Q	1,500	3-20	0.34-2.3	48994
20	AG024A-9-Q	900	3-30	0.34-3.4	48994
20	AG024A-8-Q	800	4-40	0.5-4.5	48994
50	AG054A-24-Q	2,400	15-40	1.7-4.5	48995
50	AG054A-16-Q	1,600	15-60	1.7-6.8	48995
50	AG054A-10-Q	1,000	15-80	1.7-9.0	48995
50	AG054A-8-Q	800	15-100	1.7-11.3	48995





# Industrial Tools Accessories

# Improve operator comfort and productivity!





 Use on Series 50 with No. 46467 ring gear.
 Use on Series 41 with No. 48904 ring gear. See side notes.



46328



The Hose Reel Balancers are a convenient combination of a tool balancer and an air supply. There's no need for a separate suspension balancer and yoke. Hose tension is easily adjustable to match the weight of the tool used.

- BHR15 11/2 31/3 lbs load capacity, 41/4 ft. of lift
- BHR25  $2^{5}/_{8} 5^{1}/_{2}$  lbs load capacity,  $4^{1}/_{4}$  ft. of lift

# **Suspension Bails**

Bails are used to position tools above the immediate work area within easy reach of the operators. They are effective in minimizing the physical effort and time required to handle tools.

- 47795 for Series 20 pistol grip and right angle models.
- 46472 for Series 50 pistol grip and right angle models. Not with ASOs and some ball clutch tools.
- 46328 for Series 20 and 50 in-line model (included as standard equipment with each tool).
- 48934 for IR Series 41 and ARO ASO pistol grip tool and some ball clutch tools.

# **Balancers**

Balancers can be used to suspend a tool from a workstation jib arm or from an overhead fixture. An external adjustment permits matching the extension to the weight of the tool, virtually eliminating the weight of the tool from the operator to reduce fatigue.

- 8375-2, 2 lbs (.9 kg) capacity, equipped with 5 ft. of cable.
- 8375-4, 4 lbs (1.5 kg) capacity, equipped with 5 ft. cable.
- 7472, 5 lbs (2.3 kg) capacity, equipped with 8 ft. cable.

# **Custom Covers**

The ARO Custom Cover Tool Wraps are yet another ergonomic advantage of ARO Tool and Hoist Products. Made of a unique engineered foam material, Custom Covers have been proven effective in minimizing the effects of tool vibration. The textured finish and insulating properties provide a comfortable, warm-to-the-touch grip surface, requiring less gripping force, for improved handling and less fatigue. And unlike many other tool wraps, ARO Custom Covers contain no mercury, eliminating concerns about possible worker exposure and environmental issues over proper disposal. They're die cut for a perfect fit and are available for many of the most popular ARO air tools.

# **Features and Benefits**

- Effective vibration damping
- Comfortable, non-slip grip surface
- Die cut for perfect fit
- Also available in sheet form
- No-mess self-adhesive backing

# **Ordering Information**

ARO Custom Cover Kits are available for the following ARO air tools. See chart below.

Tool Model	Description	Kit No.
DG021B-()-()	Series 20 P.G. Drill	
DG022B-()-()	Series 20 P.G. Drill	49040-13
DG051B-()-()	Series 50 P.G. Drill	
DG052B-()-()	Series 50 P.G. Drill	
SG021B-()-()	Series 20 P.G. Screwdriver	
SG022B-()-()	Series 20 P.G. Screwdriver	
SG023B-()-()	Series 20 P.G. Screwdriver	
SG029B-()-()	Series 20 P.G. Screwdriver	
SG051B-()-()	Series 50 P.G. Screwdriver	
SG052B-()-()	Series 50 P.G. Screwdriver	
SG053B-()-()	Series 50 P.G. Screwdriver	49040-13
SG059B-()-()	Series 50 P.G. Screwdriver	
AG024A-()-()	Series 20 P.G. Screwdriver	
AG027A-()-()	Series 20 P.G. Screwdriver	
AG028A-()-()	Series 20 P.G. Screwdriver	
AG054A-()-()	Series 50 P.G. Screwdriver	
AG057A-()-()	Series 50 P.G. Screwdriver	
AG058A-()-()	Series 50 P.G. Screwdriver	
-	Other Tool Models	49040-18 <sup>1</sup>

(1) Kit includes one (1) 5<sup>1</sup>/2" x 8<sup>1</sup>/2" sheet of wrap material and seam tape which can be cut to fit a variety of power tools.





**Grips and Flanges** 

Rubber grip and plastic bio-grip provide a more comfortable surface to hold. Bio-grip and bio-mechanical flange reduce the amount of gripping pressure required to hold a tool when applying downward force.

- 47618 Bio-Grip for all Series 20 in-line models.
- 47822 Bio-Mechanical Flange for all Series 50 in-line models.
- 49040-13 Custom Cover™ Tool Wrap for all Series 20 & 50 pistol grip models.

Note: Grips and Flanges cannot be used on models with Skinsulate™. Consult factory.



46831 Side Handle

# **Side Handle**

Using a Side Handle on a straight/lever throttle screwdriver or drill reduces the amount of pressure required to grip a tool when applying downward force. On a pistol grip tool it enables the operator to apply added pressure to the screwdriver or drill bit and maintain proper wrist positioning. It also helps to effectively minimize the strain on the wrist from reaction torque, especially in higher torque applications.

- 46831 Side Handle for all Series 50 models. Note: Recommended for use on all Series 50 auto shutoff and adjustable clutch screwdrivers. No extra cost when ordered with tool.
- 48931 Side Handle for IR Series 41



# **Swivel Fitting**

An ARO Swivel Fitting reduces the amount of effort and strain often required to maneuver a tool by minimizing the "drag" caused by the air hose. Air flow can also be regulated from 0 to 25 cfm by the external adjustment knob.

Swivel	Thread Size	Weight	Recommended Air Flow	Pressure Range
ASA 1/4	<sup>1</sup> /4" NPT	3 oz.	Up to 25 cfm	0-150 psi
ASA <sup>3</sup> /8	<sup>3</sup> /8" NPT	3 oz.	Up to 25 cfm	0-150 psi

# **Piped Exhaust Assemblies**

An ARO Piped Exhaust System is an effective method to help keep dirt and oil contaminants out of the work area while reducing operating sound levels. Each system comes complete with air inlet and exhaust hoses, all necessary fittings and adapters, and a muffler.

Piped	Tool Model / Series	
Exhaust No.	Used On	Length
44360-()	Model 7014 & 7015 Grinders	
	Model 8317 & 8318 Grinders	(1)
	Model 8299 Screwdrivers & Nutsetters	
	Models 7456 & 7453 Nutsetters for all	
	random orbital sanders	
44361-()	Models 8506, 8509, 8515, 8521	(1)
	QRT Screwdrivers	
44561-()	Models 7840, 7843 Grinders	
	Models 7874, 8067 Grinders	
	Models 7939, 7944, 7945 Sanders	(1)
	Models 784X, 785X Drills	
	Models 785X, 786X, 788X, 789X Screwdrivers	
	Model 8038, 8039, 8040 Electrode Dressers	

(1) Add dash number to Piped Exhaust No. to indicate the desired length in feet.



# **Overhose Assemblies**

An ARO Overhose Assembly is a simple, economical means to deflect tool exhaust away from the immediate work area. It reduces operating sound levels and helps keep dirt and oil out of the immediate work area.

Overhose <sup>1</sup>	Tool Model / Series	Standar	d Length
No.	Used On	ft	m
46373 <sup>2</sup>	Series 20 Straight Screwdrivers & Drills	2	0.6
46490 <sup>2</sup>	Series 20 Pistol Grip Screwdrivers & Drills	2	0.6
-	All Series 50 Screwdrivers & Drills	-	-

 (1) Add dash number to Overhose No. to indicate the desired length in feet.
 (2) Use 46513 Clamp to secure 46373 hose and use 46477 Clamp to secure 46490 hose to straight tools. Order separately.



# 

Always wear eye protection when operating or performing maintenance on this tool.



# 

Always wear hearing protection when operating this tool.



# 

Always turn off the air supply and disconnect the air supply hose before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool.



WARNING Air powered tools can vibrate in use. Vibration, repetitive motions or uncomfortable positions may be harmful to your hands and arms. Stop using any tool if discomfort, tingling feeling or pain occurs. Seek medical advice before resuming use.



# **WARNING** Do not carry the tool by the hose.



Do not use damaged, frayed or deteriorated air hoses and fittings.



# 

Keep body stance balanced and firm. Do not overreach when operating this tool.



# A WARNING

Operate at 90 psig (6.2 bar / 620 kPa) maximum air pressure.

# Note: Always read the operators' manual before using any air tool.

# In General...

- Always install, operate, inspect and maintain tools in accordance with American National Standards Institute Safety Code for Portable Air Tools (ANSI B186.1).
- Always use clean dry air at 90 psig (6.2 bar/620 kPa) maximum air pressure at the inlet. Higher pressure may result in hazardous situations, including excessive speed, rupture, or incorrect output torque or force.
- Air powered tools can vibrate in use. Vibration, repetitive motions or uncomfortable positions may be harmful to your hands and arms. Stop using any tool if discomfort, tingling feeling or pain occurs. Seek medical advice before resuming use.
- Always turn off the air supply and disconnect the air supply hose before installing, removing or adjusting any accessory on a tool, or before performing any maintenance on a tool.
- Keep hands, loose clothing, long hair and jewelry away from working end of tool.
- Keep body stance balanced and firm. Do not overreach when operating tool. Anticipate and be alert for sudden changes in motion, reaction torgues, or forces during start up and operation.
- Tool and/or accessories may briefly continue their motion after throttle is released.
- Do not lubricate tools with flammable or volatile liquids such as kerosene, diesel, or jet fuel. Use only recommended lubricants.
- Do not remove any labels. Replace any damaged label.
- Use accessories recommended by ARO Tool Products.

# When Using Grinders...

- Do not use tools if actual free speed exceeds the nameplate rpm.
- Tachometer to make certain its actual speed at 90 psig (6.2 bar/620 kPa) does not exceed the rpm stamped or printed on the name plate. Grinders in use on the job must be similarly checked at least once each shift.
- Always use the ARO wheel guard furnished with the grinder. Failure to do so could result in injury.
- Do not use a grinder without the recommended wheel guard. Do not use any wheel for which the operating speed listed on the blotter is lower than the actual free speed of the grinder.
- Inspect all grinding wheels for chips or cracks prior to mounting. Do not use a wheel that is chipped or cracked or otherwise damaged. Do not use a wheel that has been soaked in water or any other liquid.
- Make certain the grinding wheel properly fits the arbor. The wheel should not fit too snugly or too loosely. Plain hole wheels should have about 0.007" (0.17mm) maximum diametral clearance. Do not use reducing bushings to adapt a wheel to any arbor unless such bushings are supplied by or recommended by the wheel manufacturer.
- After mounting a new wheel, hold the grinder under a steel workbench or inside a casting and run it for at least 60 seconds. Make certain no one is within the operating plane of the grinding wheel. If the wheel is defective, improperly mounted or the wrong size and speed, this is the time it will usually fail.
- When starting a cold wheel, apply it to the work slowly until the wheel gradually warms up. Make smooth contact with the work, and avoid any bumping action or excessive pressure.
- Always replace a damaged, bent or severely worn wheel guard. Do not use a wheel guard that has been subjected to a wheel failure.
- Make certain the wheel flanges are at least <sup>1</sup>/<sub>3</sub> the diameter of the grinding wheel, free of nicks and burrs and sharp edges. Always use the wheel flanges furnished by the manufacturer; never use a makeshift flange or a plain washer.
- Guard opening must face away from operator. Bottom of wheel must not project beyond guard.
- Always use a wheel blotter between each wheel flange and the wheel. The blotters must be at least as large in diameter as the wheel flanges.
- Do not attempt to disassemble the controller. The controller is available only as a unit and is guaranteed for the life of the tool if it is not abused.

# **Warranty Information**

ARO provides three different product warranties. Each warranty is designed to give you the maximum coverage and protection for your ARO products. Check the warranty card(s) provided with your ARO tool(s) for the appropriate warranty information.

The following information outlines the three basic warranties provided by ARO and the products they cover.

#### **One-Year Warranty**

Products Covered: All products (except automatic shutoff tools-see below)

#### Two-Year Warranty

Products Covered: Random Orbital Sanders.

#### Warranty Statement

ARO Tool Products warrants the original user of the Product (Tool) to be free of defects in material and workmanship for a period of (one year, two years) from the date of purchase. ARO will repair, without cost, any Tool found to be defective, including parts and labor charges, or at its option, will replace such Tools or refund the purchase price less a reasonable allowance for depreciation in exchange for the Tool. Repairs or replacements are warranted for the remainder of the original warranty period.

If this Tool proves defective within its original (one year, two years) warranty period, it should be returned to any Authorized ARO Tool Distributor, transportation prepaid with proof of purchase or warranty card.

This warranty does not apply to Tools which ARO has determined to have been misused or abused, improperly maintained by the user, or where the malfunction or defect can be attributed to the use of non-genuine ARO repair parts.

ARO makes no other warranty, and ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED TO THE DURATION OF THE EXPRESSED WARRANTY PERIOD AS SET FORTH ABOVE. ARO's maximum liability is limited to the purchase price of the Tool and in no event shall ARO be liable for any consequential, indirect incidental, or special damages of any nature arising from the sale or use of the Tool, whether in contract, tort, or otherwise.

Note: Some states do not allow limitations on incidental or consequential damages or how long an implied warranty lasts so that the above limitations may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which may vary from state to state.

#### **One/Five-Year Warranty**

Products Covered: One Year — "20" and "50" series automatic shutoff tools.

Five Year — "20" and "50" series automatic shutoff clutch.

#### Warranty Statement

ARO Tool Products warrants the original user of any ARO Series 20 and 50 automatic shutoff screwdriver and nutsetter, (Tool), to be free of defects in material and workmanship for a period of one year from the date of purchase, and with respect to the automatic shutoff clutch contained therein, five years from date of purchase. ARO will repair, without cost, any Tool found to be defective, including parts and labor charges, or at its option, will replace such Tools or refund the purchase price less a reasonable allowance for depreciation in exchange for the Tool. Repairs or replacements are warranted for the remainder of the original warranty period.

If this Tool proves defective within its original warranty period, it should be returned to any Authorized ARO Tool Distributor, transportation prepaid with proof of purchase or warranty card.

This warranty does not apply to Tools which ARO has determined to have been misused or abused, improperly maintained by the user, or where the malfunction or defect can be attributed to the use of non-genuine ARO repair parts.

ARO makes no other warranty, and ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED TO THE DURATION OF THE EXPRESSED WARRANTY PERIOD AS SET FORTH ABOVE. ARO's maximum liability is limited to the purchase price of the Tool and in no event shall ARO be liable for any consequential, indirect incidental, or special damages of any nature arising from the sale or use of the Tool, whether in contract, tort, or otherwise.

Note: Some states do not allow limitations on incidental or consequential damages or how long an implied warranty lasts so that the above limitations may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which may vary from state to state.

Remember, to ensure that your ARO tool products are fully protected by our power tool warranties, registration cards must be filled out entirely at time of purchase and returned to ARO Tool Products.





# Industrial Chain Hoists

- 7740 B Series
- 7700 and 7790 Series

ARO® INDUSTRIAL PRODUCTS

# Notes



# Industrial Chain Hoists ARO Industrial Chain Hoists



# A Legacy of Innovation

For over half a century, ARO has been recognized as a leader in the design and manufacture of high-quality industrial tools and equipment. Striving to deliver superior performing products through a combination of technology and innovation, ARO has continued to define state-of-the-art.

With a history of consumer-driven service, ARO has been solving the material handling needs for a variety of production and maintenance industries. Their commitment to quality, dependability, and performance is what has kept ARO at the forefront of an ever-changing workplace.

ARO offers the most popular range of versatile rotary-vane air hoists available. Continually making advancements in technology, materials, and design, ARO has outpaced competitive manufacturers with inherent advantages that make these rotary-vane air hoists the performance leaders.

Looking for an innovative alternative to traditional electric and piston powered air hoists, ARO was the first manufacturer to develop and introduce the rotary-vane air hoist. With fewer moving parts and a longer operating life, these air-powered hoists are more cost-effective to maintain and service than traditional hoists.

While other manufacturers have tried to imitate the design and performance of the ARO rotary-vane air hoist, none have been able to match ARO's quality, dependability and craftsmanship.

Manufactured to provide the high speeds, continuous duty, and spotting requirements demanded by automotive assembly, furniture manufacturers, foundries, food processing, aerospace and plating operations, ARO hoists have become the preferred hoist in the transportation industry. Today, ARO hoists can be found in hundreds of automobile, truck, and component plants worldwide.

Whatever the application or environment – hot, dirty, wet, explosive – ARO hoists have been designed and built to match almost any industrial need.

All ARO hoists meet ASME B30.16 Industry Standards.

# **Quality and Performance**

# AR0 7700 & 7790 Series Hoists

ARO hoists can be equipped with a variety of optional features that can be matched to the specifications of almost any job. ARO hoist's long operating life, cost-effective service and maintenance, and dependable performance are supported by a host of standard features.

## **Rotary-Vane Air Motors**

These powerful, self-cooling rotary motors keep ARO hoists at peak performance in high temperature situations. And, because they are airpowered, they further reduce the chance of causing sparks in a volatile environment.

# **Complete Operator Control**

Pressure pendant or pull chain puts complete control of the hoist in the operator's hands. Hoist responds immediately to operator's "inching" commands.

# **External Brake Adjustment**

Easily customizes the "sensitivity" of the hoist to the load range for any application. This results in ease-of-operation with better spotting, feathering and overall control.

# Fast, Efficient Load Handling

Rotary-vane air motors and efficient gearing combine to deliver one of the fastest lift speeds available. Gear ratios have been calculated to yield the lowest possible air consumption.

# Job-Matched Performance

Numerous options allow ARO hoists to be matched to specific application requirements – link or roller load chains, hook types, manual and power trolleys, pull chain or pendant control, standard and spark resistant, and 300 lbs - 2 ton capacities.

#### **Clean and Quiet**

For applications and environments that require clean air, exhaust can be piped away. Two-stage filtration system removes foreign matter from air supplies so that motors can operate at peak performance with longer operating lives.

#### **Easy Installation**

Lightweight and convenient, ARO hoists are easier to install than any other model. Even in small, confined areas, they can be installed and removed with minimal effort. **Air Motor and Gearing** Provides faster lift speeds with low air consumption.

# **Durable Construction**

Cast housing with heavygauge brake cap protects working parts. Quiet Operation

Dual internal muffler pads reduce exhaust noise. Piped-away exhaust kits available.

Brake Adjustment

Easily adjusted to meet specific load ranges.

# Lift/Descent Adjustment

Operating speeds can be safely set to match desired rates.

**Compact and Lightweight** 

For ease-of-installation, even in small, confined areas.

**Pendent and Pull-Chain Control** Puts complete control in operator's hands.
# Industrial Chain Hoists ARO Industrial Chain Hoists



# **Choosing the Right Hoist**

Material handling needs differ from application to application. ARO offers numerous hoist types with a range of options that can be matched to meet your specific application requirements. When the time comes to select the appropriate hoist for your needs, you should consider the following criteria.

#### Maximum Load

The first consideration when choosing a hoist is the maximum load the hoist will need to accommodate. ARO hoists have weight ratings that range from 300 lbs to 2 tons. The second consideration is hoist speed. The speed of a hoist is dependent on the corresponding cycle time of the task to be performed – lift, transport, lower, return, start again.

#### Installation Requirements

ARO hoists, whether hook or trolley configured, can be mounted on several beam configurations. Compact for low headroom requirements, ARO Hoists can be mounted in areas where others can't.

#### Air Supply

To ensure maximum operating performance, ARO rotary-vane air hoists require air supplies that continually provide clean, lubricated air at sufficient pressure and volume. The ARO 7740B requires 90 psig at 28 scfm, while all other ARO hoists require 90 psig at 65-70 scfm.

#### **Control Method**

ARO rotary-vane air hoists control lift and descent by admitting proportional amounts of air to the motor by way of a spool valve. ARO offers two control systems:

- Pendant Control systems use a 3-hose pilot pressure/bleed system to open and throttle the spool valve.
- Pull Chain systems operate in the same manner using operator-controlled pull chains attached to a control arm to open and close the spool valve.

#### **Ordering Hoists**

- Use the "Performance Data" Chart to identify desired hoist characteristics starting with "Load Capacity."
- Starting with identification of the base model, use the "Ordering Guide" to select the appropriate hoist product.
- Hoist options type of chain, suspension, control type should correspond with selected hoist.

"Lift" options indicate the maximum amount of lift or lowering (in feet) the hoist needs to perform. (Note: a hoist may need to "lower" an item farther than it needs to "lift" it).
 Length of control, either pendant or pull chain, should correspond with the approximate distance between the operator and hoist (usually 4 feet less than the length of "lift").

# The 7740B air chain hoist has been engineered for production and utility applications for loads up to 300 lbs.

Incredibly light, compact and portable, these hoists have been designed so that they can be moved between workstations to perform various lift operations. Requiring only 28 scfm of air flow, the 7740B will operate from compressors as small as 3 horsepower.

7740B Series hoists come complete with 10 feet of standard lift and 6 feet of pull chain control. (Longer lifts can be specified)

#### **Durable and Dependable**

The 7740B hoist features a cool-running rotary-vane air motor.

#### Safety and Confidence

A self-adjusting spring applied brake holds loads securely – even if a power or air-supply failure occurs. Also standard is the adjustable emergency limit stop preventing possible damage to the load or injury to the operator if the operator fails to release the lift command.

#### **Full Control**

Pull Chain control on the 7740B provides the operator with total control and the ability to "inch" loads into place with confidence. The combination of cool-running, rotary-vane performance and easy-to-use controls helps to increase operator productivity.

#### **Features**

- Light weight and compact design for ease of movement to different work locations.
- Rotary vane air motor.
- Self-adjusting brake holds load securely.
- · May be operated between 60 and 100 psi.
- Pull chain control provides accurate spotting control.
- Standard lift is 10 feet; additional lifts are available.
- Standard pull chain length is 6 feet or 4 feet less than lift.
- Steel snap hooks.
- Hook or eye bolt mounted available.

### **Options**

- Manual trolley
- Bullard hooks
- Chain bucket

### 7740B Series Specifications

Description	7740B
Rated capacity (lbs)	300
Control type	Pull chain
Suspension	Hook or eyebolt
Falls of chain	1
Lifting speed w/rated load variable from 1 tofpm	16
Lowering speed w/rated load variable from 1 tofpm	17
Air pressure (psi)	90
Air consumption at max rated load scfm	28
Air inlet size, (in.)	1/4 NPT
Recommended hose size (in.)	<sup>3</sup> /8 I.D.
Chain basket: See chain basket chart in accessories	-
Load chain size, link (Dia./Pitch)	.157/.471
Weight of hoist (lbs)	15.25



#### 7700 Series: 275 - 2200 lb Capacity

7700 Series Link Chain hoists have been designed specifically for heavy-duty industrial applications where loads vary between 275 lbs and 2200 lbs. Simple, rugged, and reliable, these hoists are constructed with few moving parts, for easy repairs and less down time.

7700 Series hoists come complete with 10 feet of standard lift and either 6 feet of pendant control or 6 feet of pull chain control.

### **Features**

- Exceptional slow-speed control provides superior spotting characteristics and ability to confidently "inch" loads into position.
- Ideal for high duty cycles and when operating loads are near maximum capacity.
- Powerful, self-cooling rotary motors keep ARO hoists at peak performance in high temperature situations.
- Pendant or pull chain control responds immediately to operator's commands.
- Brake control easily adjusts to meet specific load ranges.
- Motor and gearing provides faster lift speeds with low air consumption.
- Compared to roller chain, link chain lasts longer, handles heavier loads, and is better for high duty cycles.

# **Options**

#### Suspension

7700 and 7790 Series hoists are available with a variety of suspension options, hook types, manual and power trolleys to meet the needs of any operation. For added operator safety, power trolley traverse speeds are set to gradually increase and decrease to ensure safe load control with minimal load sway.

#### Control

ARO hoists are available with two easy-to-use control options – pressure pendant or pull chain control. Both systems provide the operator with total hoist control and the ability to confidently inch loads into place. Pendant controls, when ordered with power trolley systems, control both hoist operation and trolley movement.

### 7700 Series Specifications

Description	7770E	7718E	7756E	7776E		
Rated capacity (lbs)	275	550	1100	2200		
Control type	Pull chain/Pendent	Pull chain/Pendent	Pull chain/Pendent	Pull chain/Pendent		
Suspension	Hook/Trolley adapter	Hook/Trolley adapter	Hook/Trolley adapter	Hook/Trolley adapter		
Falls of chain	1	1	1	2		
Lifting speed w/rated load variable from 1 tofpm	20-110	28-82	14-41	7-21		
Lowering speed w/rated load variable from 1 tofpm	140-275	120-224	60-112	30-56		
Air pressure (psi)	90	90	90	90		
Air consumption at max rated load (scfm)	65-70	65-70	65-70	65-70		
Air inlet size, with 180 <sup>0</sup> swivel (in.)	<sup>1</sup> /2 NPTF	<sup>1</sup> /2 NPTF	<sup>1</sup> / <sub>2</sub> NPTF	<sup>1</sup> /2 NPTF		
Recommended hose size (in.)	<sup>1</sup> /2 I.D.	1/2 I.D.	<sup>1</sup> /2 I.D.	<sup>1</sup> /2 I.D.		
Chain basket: See chain basket chart in accessories	Canvas/Metal	Canvas/Metal	Canvas/Metal	Canvas/Metal		
Load chain size, link (Dia./Pitch)	.250/.750	.250/.750	.250/.750	.250/.750		
Weight of hoist (lbs)	-	-	-	-		
w/Pull chain	36	36	36	48		
w/Pendent	41	41	41	53		
Power Trolley Performance Data						
Beam type	Tapered/Flat track	Tapered/Flat track	Tapered/Flat track	Tapered/Flat track		
Minimum-maximum beam height (in.)	8-12	8-12	8-12	8-12		
Standard minimum-maximum beam width (in.)	31/4-6	31/4-6	31/4-6	31/4-6		
Minimum turning radius (ft)	3 <sup>1</sup> /2	3 <sup>1</sup> /2	3 <sup>1</sup> /2	31/2		
Traverse speed (ft/min)	70	70	70	70		
System weight (lbs)	94	94	94	106		



#### 7790 Series: 2200 and 4400 lb Capacity

7790 Series Link Chain hoists are ARO's most powerful units. The larger motor and increased horsepower provide greater operational speeds and productivity in the one ton single-fall and two ton double-fall ranges. A key advantage of single-fall operation is that both longer lifts and chain storage become easier to manage. Built with the same high-quality construction as the 7700 Series, these hoists also require fewer repairs with less down time.

7790 Series hoists come complete with 10 feet of standard lift and 6 feet of pendant or pull chain control.

### **Features**

- Larger motor and gearing provides increased horsepower for faster lift speeds.
- Larger link chain <sup>5</sup>/16" diameter compared to <sup>1</sup>/4" diameter on 7700 hoists, accommodates larger loads with longer chain life.
- Headroom advantage in one ton capacities:
  - 2  $^{13}\!/_{16}$  " advantage over hook mounted 7700 models.
  - 6 <sup>13</sup>/<sub>16</sub>" advantage over manual trolley 7700 models.
  - 4 <sup>1</sup>/<sub>2</sub>" advantage over power trolley 7700 models.
- Pull chain or pendant control provides superior spotting characteristics and the ability to confidently "inch" loads into position.

# **Options**

#### Spark Resistant

Because of their operating characteristics, air hoists are generally considered spark resistant. Standard 7700 and 7790 Series hoists come with steel snaphooks and load chain and are regarded as safe for Division 2 applications. Spark resistant models offer even more protection in the form of stainless steel link load chain and bronze snap-hooks, and are the only ARO hoists suitable for Division 1 applications. ARO offers a variety of hoist options and accessories. Refer to the accessories page for additional information.

### 7790 Series Specifications

-		
Description	7790A	7792A
Rated capacity (lbs)	2200	4400
Control type	Pull chain/Pendent	Pull chain/Pendent
Suspension	Hook/Trolley adapter	Hook/Trolley adapter
Falls of chain	1	2
Lifting speed w/rated load variable from 1 tofpm	4-26	0-12
Lowering speed w/rated load variable from 1 tofpm	5-44	4-24
Air pressure (psi)	90	90
Air consumption at max rated load (scfm)	65-70	65-70
Air inlet size, with 180 <sup>0</sup> swivel (in.)	<sup>1</sup> / <sub>2</sub> NPTF	<sup>1</sup> /2 NPTF
Recommended hose size (in.)	<sup>1</sup> / <sub>2</sub> I.D.	<sup>1</sup> / <sub>2</sub> I.D.
Chain basket: See chain basket chart in accessories	Canvas/Metal	Canvas/Meta
Load chain size, link (Dia./Pitch)	.312/.858	.312/.858
Weight of hoist (lbs)		
w/Pull chain	57	76
w/Pendent	62	81
Power Trolley Performance Data		
Beam type	Tapered/Flat track	Tapered/Flat track
Minimum-maximum beam height (in.)	8-12	8-12
Standard minimum-maximum beam width (in.)	3 <sup>1</sup> /4-6	31/4-6
Minimum turning radius (ft)	3 <sup>1</sup> /2	3 <sup>1</sup> /2
Traverse speed (ft/min)	70	70
System weight (lbs)	110	129



#### 7700 Series: 400 – 1500 lb Capacity 7790 Series: 1500 – 3000 lb Capacity

7700 and 7790 Series Spark Resistant Hoists are designed for Division 1 applications where, under normal operating conditions, the atmosphere contains hazardous concentrations of flammable gases, dust, or other materials.

Specifically engineered for continuous heavy-duty industrial applications – between 400 lbs and 1500 lbs – ARO 7700 Series Spark Resistant Hoists are available with bronze top hook or trolley adapter suspension.

7700 and 7790 Series Spark Resistant Hoists come complete with 10 feet of standard lift and either 6 feet of pendant control or 6 feet of pull chain control.

# **Spark Resistant Features**

- Stainless steel load chain and solid bronze hooks to prevent accidental sparking.
- Pendant control handles, when ordered, are covered with an industrial-grade vinyl grip. Pull chain controls come standard with zinc-plated pull chain.
- Hoist capacities are reduced and speed adjustments are locked into place to
  maximize chain life.
- Trolley models are supplied with bronze wheels.

### **Division 1 & 2 Applications**

The following definitions may be used as a guide. The actual Division distinction for each application must be determined by your local inspecting authority of the fire underwriters.

#### Division 1 (Spark-Resistant air hoists are required)

Atmospheres containing hazardous concentrations of flammable gases, dusts, or fibers, continuously, frequently or periodically, under normal operating conditions.

#### Division 2 (Standard air hoists are required)

Atmospheres, normally non-hazardous, in which a hazardous concentration of flammable gases, dusts, or fibers, occurs when a container or handling system fails, or the ventilating system which normally keeps the concentration non-hazardous fails.



### 7700 and 7790 Spark Resistant Series Specifications

Description	7712EL	7714EL	7796AL	7798AL	7799AL
Rated capacity (lbs)	500	1500	1500	2400	3000
Control type	Pull chain	Pull chain	Pull chain/Pendent	Pull chain/Pendent	Pull chain/Pendent
Suspension	-	-	Hook/Trolley adapter	-	-
Falls of chain	1	2	1	2	2
Lifting speed w/rated load variable from 1 tofpm	16	13	8	4.6	3.5
Lowering speed w/rated load variable from 1 tofpm	70	16	16	12	7
Air pressure (psi)	-	-	90	-	_
Air consumption at max rated load (scfm)	65-70	65-70	65-70	65-70	65-70
Air inlet size, with 180 <sup>0</sup> swivel (in.)	-	-	<sup>1</sup> /2 NPTF	-	-
Recommended hose size (in.)	-	-	<sup>1</sup> /2 I.D.	-	-
Chain basket: See chain basket chart in accessories	Canvas	Canvas	Canvas	Canvas	Canvas
Load chain size, link (Dia./Pitch)	.250/.750	.250/.750	.312/.858	.250/.750	.250/.750
Weight of hoist (lbs)	-	-	-	-	_
w/Pull chain	36	48	57	76	76
w/Pendent	41	41	62	81	81

### 7700 Series: 400 - 1600 lb Capacity

7700 Series Roller Chain hoists have been designed specifically for heavy-duty industrial applications where loads vary between 400 lbs and 1600 lbs. Roller chain is not recommended for operations with high duty cycles or side loading requirements. Simple, rugged, and reliable, these hoists are constructed with few moving parts, for easy repairs and less down time. Load capacities for 7700 Series hoists with roller chain have been reduced due to dynamic load-limiting chain characteristics.

7700 Series hoists come complete with 10 feet of standard lift and either 6 feet of pendant control or 6 feet of pull chain control.

# 7700 Roller Chain Features:

- Exceptional slow-speed control provides superior spotting characteristics and the ability to confidently "inch" loads into position.
- Powerful, self-cooling rotary motors keep ARO hoists at peak performance in high temperature situations.
- Motor and gearing provide fast lift speeds and low air consumption.
- Responsive controls pendant or pull chain react immediately to operator's commands.
- Roller chain hoists make ideal drive motors with a continuous loop of roller chain. ARO "hoist rated" roller chain size: 0.400"/0.625" (diameter/pitch).

#### 7700 Roller Chain Series Specifications

Description	7720E	7708E	7732E
Rated capacity (lbs)	400	800	2200
Control type	Pull chain/Pendent	Pull chain/Pendent	Pull chain/Pendent
Suspension	Hook/Trolley adapter	Hook/Trolley adapter	Hook/Trolley adapter
Falls of chain	1	1	2
Lifting speed <sup>1</sup>	48-100	24-50	12-25
Lowering speed <sup>1</sup>	56-202	28-101	14-51
Air pressure (psi)	90	90	90
Air consumption at max rated load (scfm)	65-70	65-70	65-70
Air inlet size, with 180 <sup>0</sup> swivel (in.)	<sup>1</sup> /2 NPTF	<sup>1</sup> /2 NPTF	<sup>1</sup> /2 NPTF
Recommended hose size (in.)	<sup>1</sup> /2 I.D.	<sup>1</sup> /2 I.D.	<sup>1</sup> /2 I.D.
Chain basket: See chart in accessories	Metal	Metal	Metal
Load chain size, link (Dia./Pitch)	.400/.625	.400/.625	.400/.625
Weight of hoist (lbs)	-	-	-
w/Pull chain	36	36	48
w/Pendent	41	41	53
Power Trolley Performance Data			
Beam type	Tapered/Flat track	Tapered/Flat track	Tapered/Flat track
Minimum-maximum beam height (in.)	8-12	8-12	8-12
Std minimum-maximum beam width (in.)	31/4-6	31/4-6	3 <sup>1</sup> /4-6
Minimum turning radius (ft)	31/2	3 <sup>1</sup> /2	3 <sup>1</sup> /2
Traverse speed (ft/min)	70	70	70
System weight (lbs)	94	94	106

(1) w/rated load variable from 1 to...fpm



# Trolleys

All hoists ordered with a trolley using the model code will mount directly to the trolley supplied. All trolleys can be ordered separately by specifying model required according to hoist and beam configurations. See flange width adjustment chart below for trolley type used and flange width compatibilities. See individual charts for complete model numbers.





**TIR Series Trolley** 

SP Series Trolley

#### Flange Width Adjustment Chart

			Fla	x in.	Min. Curve Radius	
Hoist Base Model	Hoist Capacity (lbs)	Trolley Supplied	"A"	"B"	"D"	in.
Plain Trolley (Suspension Code	s DA, DB, DC and DD ex	cept 7740B)				
7740B	300	SP Series	Single	e adjustment of 1.97 -	- 8.00 36	-
7712EL	550	PT Series	2.66 - 4.66	2.66 - 8.00	NA	36
7714EL	1500	PT Series	3.00 - 5.25	3.00 - 8.00	NA	36
7796AL, 7798AL, 7799AL	1500, 2400, 3000	TIR Series	3.25 - 6.00	NA	6.01 – 12.00	42
7712ER, 7714ER	400, 800	PT Series	2.66 - 4.66	2.66 - 8.00	NA	36
Hand Chain Geared Trolley (Sus	spension Codes FXXA A	ND FXXD)				
All 7700 and 7790 models	All	TIR Series	3.25 - 6.00	NA	6.01 – 12.00	42
Powered Trolley (Suspension Codes HA AND HD)						
All 7700 and 7790 models	All	TIR Series	3.25 - 6.00	NA	6.01 – 12.00	42

#### Hoist/Trolley Compatability Chart for 7700 and 7790 Series Hoists

Hoist Base Model	Plain Hook-On	Plain Rigid	Geared Hook-On	Geared Rigid	Motorized
PT Series Trolley					
Standard, for use with:					
7770E	PT005A	PT005A <sup>(1)</sup>	N/A	N/A	N/A
7718E, 7720E	PT005A	PT005A <sup>(1)</sup>	N/A	N/A	N/A
7756E, 7708E	PT005A	PT005A <sup>(1)</sup>	N/A	N/A	N/A
7776E, 7732E	PT010A	PT010A <sup>(1)</sup>	N/A	N/A	N/A
7790A	PT010A	Uses TIR	N/A	N/A	N/A
7792A	PT020A	Uses TIR	N/A	N/A	N/A
Spark Resistant, for use with:					
7712EL, 7712ER	PT005A-SB	PT005A-SB <sup>(1)</sup>	N/A	N/A	N/A
7714EL, 7714ER	PT005A-SB	PT005A-SB <sup>(1)</sup>	N/A	N/A	N/A
7796AL	PT010A-SB	Uses TIR	N/A	N/A	N/A
7798AL, 7799AL	PT020A-SB	Uses TIR	N/A	N/A	N/A
TIR Series Trolleys					
Standard, for use with:					
7770E	TIR6600S-P00AH	TIR6600S-P00AE	TIR6600S-G08AH	TIR6600S-G08AE	TIR6600S-307AE
7718E, 7720E	TIR6600S-P00AH	TIR6600S-P00AE	TIR6600S-G08AH	TIR6600S-G08AE	TIR6600S-307AE
7756E, 7708E	TIR6600S-P00AH	TIR6600S-P00AE	TIR6600S-G08AH	TIR6600S-G08AE	TIR6600S-307AE
7776E, 7732E	TIR6600S-P00AH	TIR6600S-P00AE	TIR6600S-G08AH	TIR6600S-G08AE	TIR6600S-307AE
7790A	TIR6600S-P00AH	TIR6600S-P00AA	TIR6600S-G08AH	TIR6600S-G08AA	TIR6600S-307AA
7792A	TIR6600S-P00AH	TIR6600S-P00AA	TIR6600S-G08AH	TIR6600S-G08AA	TIR6600S-307AA
Spark Resistant, for use with:					
7712EL, 7712ER	TIR6600B-P00AH	TIR6600B-P00AE	TIR6600B-G08AH	TIR6600B-G08AE	TIR6600S-307AE
7714EL, 7714ER	TIR6600B-P00AH	TIR6600B-P00AE	TIR6600B-G08AH	TIR6600B-G08AE	TIR6600S-307AE
7796EL	TIR6600B-P00AH	TIR6600B-P00AA	TIR6600B-G08AH	TIR6600B-G08AE	TIR6600S-307AA
7798EL	TIR6600B-P00AH	TIR6600B-P00AA	TIR6600B-G08AH	TIR6600B-G08AE	TIR6600S-307AA
7798AL	TIR6600B-P00AH	TIR6600B-P00AA	TIR6600B-G08AH	TIR6600B-G08AA	TIR6600S-307AA

Trolley part numbers in bold indicate the trolley supplied when ordered with an Air Hoist, using the model number suspension codes:

Plain Rigid = DA or DB, DC and DD; Geared Rigid = FXXA or FXXD; Motorized = HA or HD.

(1) PT Series Trolleys require Trolley Adapter Kits for Plain Rigid Mount, see Trolley Adapters on next page.

### TIR Flange and Adapters Kits

Flange Kits	Flange Width (in.)	Part No.
Standard	3.25 - 6.00	49558
Wide	6.01 - 12.00	49559
Adapter Kits	Option Code	Part No.
Hook-on	Н	TIR-426
90° Trolley Adapter <sup>(1)</sup>	_	43111

(1) Used to mount any 7790 Series hoist parallel to suspension beam. Increases headroom dimension by 1.625 inches).

### PT Trolley Adapters – Stationary

Comes with any 7700 Series hoist ordered as a trolley suspended model. Adapter can be ordered separately to convert existing hook suspended 7700 Series hoists for stationary mounting to a PT Series Trolley. Order 47717 (shown) for 1/4 and 1/2 ton models, 47716 for 1 ton models. Spacer kits are required, refer to the price list for details.





# Load Chain

ARO hoists are offered with several different load chains. Standard hoists come complete with steel load chains (link or roller). Spark resistant hoists come with stainless steel link load chain.

- Chain Length: 7700 Series (1/4, 1/2 ton), 7790 Series (1 ton), 7740B Length of lift desired + 1 foot = Load chain length
- Chain Length: 7700 Series (1 ton), 7790 Series (2 ton) 2 x Length of lift desired + 2 feet = Load chain length



Hoist Used On	Capacity Ibs	Chain Part No.	Chain Size Dia./Pitch	Weight Ibs/ft	Feet in Package
Zink Plated Link					
7740B Series	300	44523	.157/.471	.25	250
7700 Series	275, 550, 1100, 2200	37708	.250/.750	.58	250
7790 Series	2200 & 4400	42988	.312/.858	.88	250
Steel Roller					
7740B Series	300	44010	.200/.375	.21	320
7700 Series	400, 800	33364	.400/.625	1.30	320
7700 Series	1600	34332	.400 / .625	1.30	320
Stainless Steel Link					
7700 Series	500, 1500	39489	.250/.750	.62	250
7790 Series	1500, 2400, 3000	43095	.312/.858	.94	250

# **Hose Carrier Trolley**

Easily tracks along same beam that hoist is mounted on. Keeps air hose suspended and out of operator's way. Use one for each 8 feet of hose length.

Part No.	Max Hose O.D. in.	Min/Max Beam Height (in.)	Min/Max Beam Flange Width (in.)
7703	1 <sup>1</sup> /4	3-10	2 <sup>3</sup> /8 - 5
D10-8888	-	-	5 - 8 <sup>3</sup> /4

# **Restraining Cable**

For use as an added safety precaution in hoist suspension. Cable inserts through hole in hoist housing and around I-beam or other structure capable of safely supporting hoist and hoist load weight. Order based upon hoist used.

Hoist Used On	Part No.	Cable Dia. (in.)	Cable Length (ft)
7700 Series	43231	1/4	2
7790 Series	43059	<sup>5</sup> /16	31/2



# **Chain Baskets**

Catches and stores load chain as load is lifted. Mounts directly to side of hoist. Order based upon load chain length and hoist being used. Load chain length on 1 ton 7700 Series hoists and 2 ton 7790 Series hoists is twice the lift distance.







Load Chain	Link Chain (Metal Basket)		Link Chain (Canvas Basket <sup>(1)</sup> )			Roller Chain (N	/letal Basket)
Max Lineal Feet	7700	7790	7740B	7700	7790	7740B	7700
10	-	49800 - 10	_	_	43441 – 1	-	37654
12	-	-	44120	-	-	44595	-
16	37653 – 16	-	-	-	-	-	37655
20	-	49800 – 20	-	43554 – 1	43441 – 2	-	-
30	-	49800 - 30	-	-	-	-	-
32	37653 – 32	-	-	43554 – 2	-	-	-
40	-	49800 - 40	-	-	43554 – 3	-	37656
56	37653 – 64	-	-	-	-	-	-
60	-	49800 - 60	-	-	-	-	-
64	-	-	-	43554 – 3	-	-	-
80	37653 - 80	49800 - 80	-	-	-	-	-
86	37653 –100	49800 – 100	-	-	-	-	-

(1) Canvas Baskets are made of specially treated oil resistant material.

# Exhausts

#### Piped Exhaust<sup>(1)</sup>

Allows exhaust to be piped to a remote area. This is particularly desirable for applications in food processing, chemicals, and processes where atmospheric purity must be maintained.

How to order: specify as option in Ordering Guide.

#### 20308-4 Exhaust Muffler

Threads into exhaust port to minimize sound level. Can be used on 7700 and 7790 Series hoists ordered with piped exhaust option. (1) Hose not included. Exhaust port is <sup>1</sup>/2" NPTF.

#### For Field Conversion

- All 7700 Series hoists may be converted to a piped-away exhaust by ordering 46098-1 Head Assembly.
- All 7790 Series hoists (except power trolley models) may be converted to a piped-away exhaust by ordering 43029 Piped Exhaust Adapter.



# **Hoist Controls**

To convert from pull chain to pendant control: Either nylon braid (standard) or steel braid control hose is available. Steel braid hose is recommended to resist heat or abrasion. Specify the model shown, inserting the pendant length in feet for the \*. Maximum 20 feet.

To convert from pendant control to pull chain: Specify 40004-\*, where the \* is pull chain length desired. Also required are two 34026 valve caps; two Y325-116 0-rings; two 38966 springs and one Y227-3 pipe plug per hoist.

Hoist Used On	Model	Type of Control	Standard Length ft
All 7700E Series	46094-*	Pendant – nylon braid hose	6
All 7700E Series	46369-*	Pendant – steel braid hose	6
All 7790 Series	43106-*	Pendant – nylon braid hose	6
All 7790 Series	46364-*	Pendant – steel braid hose	6
All 7700 & 7790 Series	40004-*	Pull Chain	5



### Hooks

ARO offers three different hook configurations designed to meet the needs of any material handling application. All hooks must be ordered separately by specifying model required according to hoist and beam configurations.

#### Steel Snap-Hooks

Steel snap-hooks have a spring-loaded latch to prevent a lifting eye from popping out of the hook while the load is "grounded." This style of self-closing hooks is the most popular as they are easy and inexpensive to replace.

#### **Bullard Hooks**

Ideal for rough, high-speed repetitive applications, these hooks employ a swinging gate latch. Far superior in strength to snap-hooks, the gate latch locks into place to minimize any chance of the "end effector" or "below-the-hook" attachment from leaving the hook.

#### Self-Closing Latch Hooks

Self-closing latch hooks have the benefits of both spring-loaded snap hooks and Bullard hooks by combining a spring-loaded latch with the strength and durability of the heavier gage Bullard gate.



45707

		Hooks for Link Chain					Hooks for Roller Chain			
Hoist Series	Capacity	Upper	Hook	Lower	Hook	Upper	Hook	Lower	Hook	
	(lbs)	Hook	Opening (in.)	Hook	Opening (in.)	Hook	Opening (in.)	Hook	Opening (in.)	
Steel Snap Hooks										
7740B Series	300	44061	<sup>29</sup> /32	44061	<sup>29</sup> /32	44061	<sup>29</sup> /32	44061	<sup>29</sup> /32	
7700 Series 1/8, 1/4 & 1/2 ton	275/550/1100	34921	1 <sup>1</sup> /8	35014	1	34921	1 <sup>1</sup> /8	33381-1	1	
7700 Series 1/4 ton Spark Res.	500	35113	1 <sup>1</sup> /8	46565	1	35113	1 <sup>1</sup> /8	34655-1	1	
7700 Series 1 ton	2200	34921	1 <sup>1</sup> /8	45707 <sup>(1)</sup>	1 <sup>1</sup> /8	34921	1 <sup>1</sup> /8	45708 <sup>(1)</sup>	1 <sup>1</sup> /8	
7700 Series 1/2 ton Spark Res.	1000	N/A	-	N/A	-	35113	1 <sup>1</sup> /8	45710 <sup>(1)</sup>	1 <sup>1</sup> /8	
7700 Series <sup>3</sup> / <sub>4</sub> ton Spark Res.	1500	35113	1 <sup>1</sup> /8	45709 <sup>(1)</sup>	1 <sup>1</sup> /8	N/A	-	N/A	-	
7790 Series 1 ton	2200	43002	1 <sup>1</sup> /8	43000	1 <sup>1</sup> /8	N/A	-	N/A	-	
7790 Series <sup>3</sup> / <sub>4</sub> ton Spark Res.	1500	43097	1 <sup>1</sup> /8	43110	1	N/A	-	N/A	-	
7790 Series 2 ton	4400	43049	1 <sup>1</sup> /4	43048(1)	1 <sup>1</sup> /4	N/A	-	N/A	-	
7790 Series 1 ton Spark Res.	2400	43096	1 <sup>1</sup> /4	43101	1 <sup>1</sup> /4	N/A	-	N/A	-	
7790 Series 1 <sup>1</sup> / <sub>2</sub> ton Spark Res.	3000	43096	1 <sup>1</sup> /4	43101	1 <sup>1</sup> /4	N/A	-	N/A	-	
Bullard Hooks										
7740B Series	300	44109	1 <sup>1</sup> /32	44109	1 <sup>1</sup> /32	44109	1 <sup>1</sup> /32	44109	1 <sup>1</sup> /32	
7700 Series 1/4 & 1/2 ton	550/1100	35203	<b>1</b> <sup>3</sup> /16	35206	1 <sup>1</sup> /16	35203	1 <sup>3</sup> /16	35205	1 <sup>1</sup> /16	
7700 Series 1 ton	2200	35203	1 <sup>3</sup> /16	45934 <sup>(1)</sup>	1 <sup>3</sup> /16	35203	1 <sup>3</sup> /16	45935 <sup>(1)</sup>	1 <sup>3</sup> /16	
7790 Series 1 ton	2200	43458	1 <sup>3</sup> /16	43456	1 <sup>3</sup> /16	N/A	-	N/A	-	
7790 Series 2 ton	4400	43459	1 <sup>7</sup> /16	43460*	1 <sup>7</sup> /16	N/A	-	N/A	-	
Self-Closing Latch Hooks										
7700 Series <sup>1</sup> /8, <sup>1</sup> /4 & <sup>1</sup> /2 ton	275/550/1100	N/A	_	42799	1 <sup>1</sup> /2	N/A	-	N/A	—	

(1) Includes Sheave Block

#### Air Hose



N12-12B

Vinyl Grip

47469





Filter-Lubricator



C21-04-000

Filter-Regulator-Lubricator



C21-04-FGK0-20

### **Maintenance Items**

#### Service Kits

Each kit contains the necessary replacement parts normally required during a preventative maintenance service procedure. Kits provide an easy method for parts inventory.

Hoist used On	Kit Description	Kit No.
All 7700-E Series	Hoist Motor Only	41329-1
7700E Series – Roller Chain	Sprocket and Guide	41335
7700E Series – Link Chain	Pocket Wheel and Guide	41336
All 7790A Series	Hoist Motor Only	41619-1
7790 Series – Link Chain	Pocket Wheel and Guide	41759



#### 33541 Brake Spring Spreader

Designed to aid in the removing of brake spring during maintenance procedure.



#### Lubricants

These approved lubricants are suggested for either routine preventative maintenance procedures or for total hoist overhaul.

Model no.	Amount	Product Description	Where Used
29665	1 qt. (.9 L)	Detergent free spindle oil with viscosity of 155-165 S.U.S. at 100°F and	In airline lubricator to provide lubrication to hoist air motor.
		aniline point of 217°F.	
33153	5 lb (2.3 kg)	"EP" (extreme pressure) bearing and gear grease,	Pocket wheel, hoist gears,
		NLGI No. 1 with viscosity of 750 S.U.S. at 100°F.	sheave block.
40164	1 qt. (.9 L)	Gear oil	All 7790 Series hoist gearing.
36460	4 oz. (118 ml)	Stringy lubricant for rubber seals.	All "O" rings.
Lubri-Link Green	16 oz. spray bottle	Triple protection, USDA approved	Load chain.
		lubricant. Extreme pressure formula.	Wherever penetrating,
LLG-5	5 gallon bulk container	and corrosion inhibitors, penetrating oils.	lubricating oils are used.







40164



36460



Lubri-Link Green

### How to Order a Hoist

Specify complete model number as shown. This model code includes: Base Model - Control Option, Upper Suspension, Lift - Lower Suspension, Control Length, and Options.

#### Example: 7712EL-3HA20-R16U

Base Model - Link Chain Models	Control Option	Upper Suspension	Lift - (ft)	Lower Hook	Control Length (ft)	Options
<b>Zinc Plated Steel Link Chain</b> 7740B = 300 lbs 7770E = 275 lbs 7718E = 550 lbs 7756E = 1100 lbs 7776E = 2200 lbs 7790A = 2200 lbs	$\begin{array}{ll} 0 &= \text{No Controls} \\ 1 &= \text{Pull Chain} \\ 2 &= \text{Pendent Control}^{(1)} \\ \textbf{3} &= 2 \ \text{Motor Pendent}^{(1)} \\ 4 &= 3 \ \text{Motor Pendent}^{(1)} \end{array}$	$\begin{array}{llllllllllllllllllllllllllllllllllll$	10 = Standard XXX = Specify length	C = Steel Snap Hook G = Self Latching Hook <sup>(1)</sup> K = Bullard Hook, manual closing <sup>(3)</sup> <b>R</b> = Bronze Snap Hook <sup>(1)</sup>	6 = Standard XXX = Specify length	P = Piped Away Exhaust Kit <sup>(4)</sup> S = Steel Container <sup>(3)(5)</sup> <b>U</b> = Canvas Basket
7792A       = 4400 lbs         Spark Resistant       Stainless Steel Link Chain         7712EL       = 550 lbs         7714EL       = 1500 lbs         7796AL       = 1500 lbs         7798AL       = 2400 lbs         7790AL       = 3000 lbs         Steel Roller Chain       7720E         7708E       = 800 lbs         7732F       = 1600 lbs		FixID = Hand Geared Trolley D       HA = Powered Trolley A Fig <sup>(1)</sup> HD = Powered Trolley D Fig <sup>(1)</sup> K = Bullard Hook, manual c       R = Bronze Snap Hook <sup>(1)(2)</sup>	FIG <sup>(7)</sup> ) ) closing	Notes: (1) Not available of (2) Standard on sj (3) Not available of (4) Not available of (5) Roller chain ba	on 7740B park resistant models on spark resistant model on 7790 models with pov asket uses same letter cr	s wered trolleys ode

# How to Order a PT Series Trolley Separately

Specify a complete trolley model by including the A, or -8, beam flange width code desired. Use a dash "-" to separate the desired S•COR•E option and ADD the prices shown to the completed base model.

#### Example: PT010A-EN

Series	Capacity	Flange Width -	S•COR•E
PT = Plain Trolley	005 = 1100  lbs	A = Standard width	EN = Electroless nickel plate on all trolley components (005 and 010 capacities only)
	010 = 2200 lbs	-8 = First increment oversize	EP = Electroless nickel plate wheels and hanger shaft only (005 and 010 capacities only)
	020 = 4400 lbs	Note:	SB = Solid bronze wheels and electroless nickel plate hanger shaft
		See Specifications chart on previous page for actual flange v	<i>i</i> idth

# How to Order a TIR Series Trolley Separately

#### Example: TIR6600S-307AA

Series	Capacity	Standard or S•COR•E -	Туре
TIR	6600 = 6600 lbs	S = Standard cast iron	P = Plain trolley
		wheels	G = Hand chain gear driven
		B = Solid bronze wheels for	0 = Vane motor, air driven,
		S•COB•F features	no nendent

- no pendent 2 = Vane motor, air driven, 1 motor pendent
- $\boldsymbol{3} =$ Vane motor, air driven, 2 motor pendent
- 4 = Vane motor, air driven, 3 motor pendent

#### Chain or Pendent Length (ft)

07 = 7 ft (standard for pendent)

- 08 = 8 ft (standard for hand chain) D = Fits 6.01 12.00
- XX = Specify length in feet
- 00 = No pendent or hand chain
- Flange Width Suspension Type

A = Fits 3.25 - 6.00

- A = 7790 suspension
- (no lug required)
- E = 7700 rigid lug adapter
- H = Hook-on adapter

# *Industrial Chain Hoists* **Performance Data**

pressure pig         Up         Down         Up         Down         Min         Max         Min         <	Onerating	1							١٥	ad													
pilo         Max         Min         Min         Max         Min         Max </th <th>Pressure</th> <th>9 Ur</th> <th>)</th> <th>Dov</th> <th>wn</th> <th>Ur</th> <th>)</th> <th>Dov</th> <th>vn</th> <th>uu Up</th> <th>1</th> <th>Dov</th> <th>wn</th> <th>Un</th> <th>)</th> <th>Dov</th> <th>wn</th>	Pressure	9 Ur	)	Dov	wn	Ur	)	Dov	vn	uu Up	1	Dov	wn	Un	)	Dov	wn						
TADE Service in the construction of	psig	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min						
0         10         -         0         -         0         -         0         -         0         -         0         -         0         -         0         -         0         -         0         -         0         -         0         -         10         -         110         -         1150         -         110         -         1150         -         1130         -         1158         -           10         10.7         -         11.0         -         11.50         -         11.00         -         11.50         -         11.80         11.80         11.80         11.80         11.80         11.80         11.80         11.80         11.80         11.80	7740B Se	eries Hoist	ts – 300	Ib Capaci	ty																		
0         1.0         -         0         -         0         -         0         -         0         -         0         -         0         -         0         -         0         -         0         -         10.6         10.6			0	bs			100	) lbs			200	) lbs			300	lbs							
60         16.9         -         13.4         -         15.0         -         12.5         -         15.6         -         15.6         -         15.6         -         15.6         -         15.6         -         15.6         -         15.6         -         15.6         -         15.6         -         15.6         -         15.6         -         15.6         -         15.6         -         15.6         -         15.6         -         15.6         -         15.6         -         15.6         -         15.7         -         15.6         -         15.7         -         15.6         -         15.7         -         15.6         -         15.7         1         15.7         -         15.8         -         15.7         -         15.7         -         15.8         -         15.8         -         15.7         -         15.7         -         15.8         -         15.8         -         15.8         -         15.8         -         15.8         -         15.8         -         15.8         -         15.8         -         15.8         -         15.8         -         15.8         15.8         15.8         15.8 <td>0</td> <td>1.0</td> <td>-</td> <td>0</td> <td>_</td> <td>0</td> <td>_</td> <td>0</td> <td>-</td> <td>0</td> <td>-</td> <td>0</td> <td>-</td> <td>0</td> <td>-</td> <td>0</td> <td>_</td>	0	1.0	-	0	_	0	_	0	-	0	-	0	-	0	-	0	_						
70     17.4     -     13.9     -     16.2     -     14.8     15.0     -     15.0     -     13.0     -     15.8     -       90     18.7     -     14.4     -     18.5     -     16.0     -     16.0     -     15.0     17.0     15.0     15.0     15.0	60	16.9	-	13.0	-	15.4	-	14.1		14.1	-	15.0	-	12.5	-	15.6	-						
80         18,5         -         14,4         -         18,2         -         16,0         16,0         16,0         16,0         16,0         16,0         16,0         16,0         16,0         16,0         16,0         16,0         16,0         16,0         16,0         16,0         16,0         16,0 <th16,0< th="">         16,0         16,0</th16,0<>	70	17.4	-	13.9	-	16.2	-	14.8		15.0	-	15.0	-	13.0	-	15.8	-						
90     18.7     -     18.5     -     18.7     -     18.6     -     18.7     -     18.6     -     18.7     -     18.6     -     18.7     -     18.6     -     18.7     1     0     0     0     0     0     18.7 <td>80</td> <td>18.5</td> <td>-</td> <td>14.1</td> <td>-</td> <td>17.4</td> <td>-</td> <td>15.2</td> <td></td> <td>16.0</td> <td>-</td> <td>15.0</td> <td>-</td> <td>14.8</td> <td>-</td> <td>16.2</td> <td>-</td>	80	18.5	-	14.1	-	17.4	-	15.2		16.0	-	15.0	-	14.8	-	16.2	-						
100         20.0         -         15.0         -         15.8         17.9         -         16.2         -         17.1         -         17.1         -         17.1         -         17.1         -         17.1         -         17.1         -         17.1         -         17.1         -         17.1         -         17.1         -         17.1         -         17.1         -         17.1         -         17.1         -         17.1         0         0         0         0         0         0         23.0         17.1         17.1         0         0         23.6         17.1	90	18.7	-	14.1	-	18.5	-	16.0		17.1	-	16.0	-	15.6	-	16.9	-						
Non Capacity       Sol b       Sol b       Sol b       Sol b       Sol b       Sol b         0       b       Sol b       Sol b       Sol b       Sol b         0       0       Sol b       Sol b       Sol b       Sol b       Sol b         0       Sol b	100	20.0	-	15.0	-	19.1	-	15.8		17.9	-	16.9	-	16.2	-	17.1	-						
Image         Image <t< th=""><th>7700 Ser</th><th>ies Hoists</th><th>- 1/4 to</th><th>n Capacity</th><th>1</th><th></th><th></th><th></th><th></th><th></th><th>100</th><th>N 11</th><th></th><th></th><th></th><th></th><th></th></t<>	7700 Ser	ies Hoists	- 1/4 to	n Capacity	1						100	N 11											
0         0         0         200         0         200         0         200         0         2.30         0         0         0         238         238         230         0         0         0         238         132           70         160         75         166         42         100         50         186         50         72         32         212         105         54         12         230         136           80         172         81         170         40         112         66         184         48         88         40         208         60         70         22         230         136           100         192         91         176         36         130         68         182         44         110         52         18         54         92         38         214         150           700         57         1         82         0         0         118         93         26         32         11         107         64         117         78           0         0         0         74         89         56         22         19         23	0	0	100	IDS	00	0	300		100	0	400		000	0	550	IDS	000						
000     153     1     100     42     000     42     100     50     12     230     230     230     230     230     12     214     100     54     152     134     156       80     172     81     170     40     112     56     186     50     72     32     212     105     54     12     234     156       90     184     89     177     40     112     56     184     48     88     40     202     56     82     28     214     120       100     192     91     176     36     122     64     182     46     100     48     202     56     82     28     214     156       TOO Series Hoits - V to Tozouto     TOO Series Hoits - V to Tozouto       TOO     74     69     0     0     101     98     0     0     126     124     0     0     149     144       60     57     31     82     18     56     28     92     24     101     105     55     27     6     117     78       80     67     37     82     18     56     <	0	155	71	98	90	0	10	202	190	50	0	234	230	0	0	208	200						
100       100       120       100       30       112       50       120       32       120       100       12       120       140       130	00 70	100	71	166	42	100	4Z	100	50	30 70	20	214	120	50	10	230	162						
000       112       01       110       40       100       40       100       40       100       40       100       100       100       102       230       100 </td <td>80</td> <td>170</td> <td>7.5 Q.1</td> <td>170</td> <td>42</td> <td>112</td> <td>56</td> <td>100</td> <td>18</td> <td>20</td> <td>32</td> <td>212</td> <td>60</td> <td>70</td> <td>22</td> <td>234</td> <td>136</td>	80	170	7.5 Q.1	170	42	112	56	100	18	20	32	212	60	70	22	234	136						
00       104       0.3       1174       3.6       11.0       10.2       47.0       10.0       40.0       52       13.0       68       18.2       44       110       52       18.0       10.2       54       92       38       21.4       56.0         TOO Series Hoists - 1/2 to Capacity       solution 10.52       18.0       100       54       92       38       21.4       56.0       57       31       82       20       43.3       21       93       26       32       11       107       64       15       0       149       144         60       57       31       82       20       43.3       21       93       26       32       11       107       64       15       0       118       91       78         70       66       34       82       19       50       25       39       16       105       52       27       6       117       78         90       72       40       82       17       76       72       50       24       10       25       160       28       41       11       12       60       10       22       10 <td>00</td> <td>18/</td> <td>80</td> <td>174</td> <td>36</td> <td>100</td> <td>64</td> <td>182</td> <td>40</td> <td>100</td> <td>40</td> <td>200</td> <td>56</td> <td>82</td> <td>22</td> <td>200</td> <td>120</td>	00	18/	80	174	36	100	64	182	40	100	40	200	56	82	22	200	120						
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	100	192	91	174	36	130	68	182	40	110	52	198	54	92	38	214	56						
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	7700 Ser	ies Hoists	- 1/2 to	1 Capacity	 I	100	00	102		110	02	100	01	52	00	211	00						
$\begin{array}{c c c c c c c c c c c c c c c c c c c $			400	lbs	,		600	lbs			800	) lbs			110	) lbs							
	0	0	0	74	69	0	0	101	98	0	0	126	124	0	0	149	144						
70     62     34     82     19     50     25     93     25     39     16     105     52     27     6     117     78       80     67     37     82     18     56     28     92     24     44     20     104     30     35     11     115     68       90     72     40     82     18     61     32     91     23     50     26     99     26     46     19     107     28       700 s     7     41     82     17     65     34     91     22     56     26     99     26     46     19     107     28       700 s     7     65     34     91     22     56     26     99     26     46     17     78       800 b     TOO     160     6     26     26     26     26     27     37     37     37     37     37     37     37     37     37     37     37 <th 3"3<="" colspan="6" td=""><td>60</td><td>57</td><td>31</td><td>82</td><td>20</td><td>43</td><td>21</td><td>93</td><td>26</td><td>32</td><td>11</td><td>107</td><td>64</td><td>15</td><td>0</td><td>118</td><td>91</td></th>	<td>60</td> <td>57</td> <td>31</td> <td>82</td> <td>20</td> <td>43</td> <td>21</td> <td>93</td> <td>26</td> <td>32</td> <td>11</td> <td>107</td> <td>64</td> <td>15</td> <td>0</td> <td>118</td> <td>91</td>						60	57	31	82	20	43	21	93	26	32	11	107	64	15	0	118	91
80       67       37       82       18       56       28       92       24       44       20       104       30       35       11       115       68         90       72       40       82       18       61       32       91       23       50       24       101       28       41       14       112       60         100       75       41       82       17       65       34       91       22       56       24       101       28       46       19       10       28         7700 Serves Hors - I tor Carcity        70       31       73       35       0       0       51       49       0       0       63       62       0       0       75       72         60       29       16       41       10       22       11       47       13       20       8       53       26       14       3       59       39         80       34       19       41       9       31       16       46       12       22       10       52       15       18       6       38       34         90       36 </td <td>70</td> <td>62</td> <td>34</td> <td>82</td> <td>19</td> <td>50</td> <td>25</td> <td>93</td> <td>25</td> <td>39</td> <td>16</td> <td>105</td> <td>52</td> <td>27</td> <td>6</td> <td>117</td> <td>78</td>	70	62	34	82	19	50	25	93	25	39	16	105	52	27	6	117	78						
90       72       40       82       18       61       32       91       23       50       24       101       28       41       14       112       60         100       75       41       82       17       65       34       91       22       56       26       99       26       46       19       107       28         770       70       100       0       37       35       0       0       51       49       0       0       63       62       0       0       75       72         60       29       16       41       10       22       11       47       13       16       6       54       32       8       0       59       46         70       31       17       41       10       25       13       47       13       20       8       53       26       14       3       59       39         80       34       19       41       9       33       17       46       12       25       15       18       6       58       34         90       36       20       2       29       0	80	67	37	82	18	56	28	92	24	44	20	104	30	35	11	115	68						
100     75     41     82     17     65     34     91     22     56     26     99     26     46     19     107     28       770 series Hoise - 1 ton Capacity       80/bs     100     50     120/bs     160/bs     50     0     772       60     0     0     37     35     0     0     51     49     0     0     63     62     0     0     75     72       60     29     16     41     10     22     11     47     13     16     6     54     32     8     0     59     46       70     31     17     41     9     22     13     47     13     20     8     53     26     14     3     59     39       80     34     19     41     9     28     17     46     11     28     13     50     13     23     10     54     14       90     36     20     41     9     33     17     46     11     28     13     50     13     23     10     54     14       790     8     2     6     0     2 <t< td=""><td>90</td><td>72</td><td>40</td><td>82</td><td>18</td><td>61</td><td>32</td><td>91</td><td>23</td><td>50</td><td>24</td><td>101</td><td>28</td><td>41</td><td>14</td><td>112</td><td>60</td></t<>	90	72	40	82	18	61	32	91	23	50	24	101	28	41	14	112	60						
7700 Series Hoists - 1 ton Capacity         10         160         160         160         160         15         160         15         160         15         160         15         160         15         160         15         160         15         160         16 <th cols<="" td=""><td>100</td><td>75</td><td>41</td><td>82</td><td>17</td><td>65</td><td>34</td><td>91</td><td>22</td><td>56</td><td>26</td><td>99</td><td>26</td><td>46</td><td>19</td><td>107</td><td>28</td></th>	<td>100</td> <td>75</td> <td>41</td> <td>82</td> <td>17</td> <td>65</td> <td>34</td> <td>91</td> <td>22</td> <td>56</td> <td>26</td> <td>99</td> <td>26</td> <td>46</td> <td>19</td> <td>107</td> <td>28</td>	100	75	41	82	17	65	34	91	22	56	26	99	26	46	19	107	28					
No         1200 lbs         1200 lbs         1600 lbs         2200 lbs           0         0         0         37<35         0         0         51<49         0         63<62         0         0         75         72           60         29         16         41         10         22         11         47         13         20         8         53         26         14         3         59         39           80         34         19         41         9         28         14         46         12         22         10         52         15         18         6         58         34           90         36         20         41         9         33         17         46         12         25         12         51         14         21         7         56         30           100         38         21         41         9         33         17         46         11         28         13         50         13         23         10         54         14           700         80         5         26         0         22         0         36         3	7700 Ser	ies Hoists	- 1 ton	Capacity																			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			800	lbs		1200 lbs			1600 lbs				2200 lbs										
b0       29       16       41       10       22       11       47       13       16       6       54       32       8       0       59       46         70       31       17       41       10       25       13       47       13       20       8       53       26       14       3       59       39         80       34       19       41       9       28       14       46       12       22       10       52       15       18       6       58       34         90       36       20       41       9       33       17       46       11       28       13       50       13       23       10       54       34         reprise set set set set set set set set set s	0	0	0	37	35	0	0	51	49	0	0	63	62	0	0	75	/2						
103117411023134713206332614339393980341941928144612221052151865834903620419311646122512511421756307790 Series + 1 to - capacity10038214193317461128135013231054147790 Series + 1 to - capacity1000191900292900383880050506028526022036317039412042770316350275383230415190435903783703374003374142964449038103703694003374142964447003810370369400337414296444<	60 70	29	10	41	10	22	10	47	13	16	0	54	32	8 14	0	59	46						
00       34       19       41       9       20       14       46       12       22       10       52       13       16       6       53       34         90       36       20       41       9       33       16       46       12       25       12       51       14       21       7       56       30         100       38       21       41       9       33       17       46       11       28       13       50       13       23       10       54       14         7790 Series Increate       100 Day       19       19       0       0       29       29       0       0       38       38       0       0       50       50         60       28       5       26       0       22       0       36       3       17       0       39       4       12       0       42       7         70       31       6       35       0       27       5       38       3       23       0       41       5       19       0       43       5         90       37       8       37       0	70	24	10	41	10	20	10	47	10	20	0	50	20	14	5	59	39						
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	00	34 26	19	41	9	20	14	40	12	22	10	51	10	10	0	00 56	20						
100       101       111       100       101       100       101       100       101       100       101	100	38	20	41	9	33	17	40	11	28	12	50	14	23	10	54	14						
BOD lbs         1200 lbs         1600 lbs         2200 lbs         2200 lbs           0         0         0         19         19         0         0         29         29         0         0         38         38         0         0         50         50           60         28         5         26         0         22         0         36         3         17         0         39         4         12         0         42         7           70         31         6         35         0         27         5         38         3         23         0         41         5         19         0         43         5           80         34         7         36         0         30         6         39         4         27         4         41         4         26         4         44         5           90         37         8         37         0         33         7         40         0         33         7         41         4         29         6         44         4           7700         38         10         37         0         36 <td< td=""><td>7790 Seri</td><td>ies Hoists</td><td>– 1 ton</td><td>Capacity</td><td>0</td><td>00</td><td></td><td>10</td><td></td><td>20</td><td>10</td><td>00</td><td>10</td><td>20</td><td>10</td><td>01</td><td></td></td<>	7790 Seri	ies Hoists	– 1 ton	Capacity	0	00		10		20	10	00	10	20	10	01							
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			800	lbs			120	0 lbs			160	0 lbs			220	) lbs							
60       28       5       26       0       22       0       36       3       17       0       39       4       12       0       42       7         70       31       6       35       0       27       5       38       3       23       0       41       5       19       0       43       5         80       34       7       36       0       30       6       39       4       27       4       41       5       23       0       43       5         90       37       8       37       0       33       7       40       0       30       6       41       4       26       4       44       5         100       38       10       37       0       36       9       40       0       33       7       41       4       29       6       44       4         7790 Serier       Envise       Envise       Envise       Envise       Envise       Envise       Envise       Envise         0       0       6       6       0       0       12       12       0       18       18       0 <t< td=""><td>0</td><td>0</td><td>0</td><td>19</td><td>19</td><td>0</td><td>0</td><td>29</td><td>29</td><td>0</td><td>0</td><td>38</td><td>38</td><td>0</td><td>0</td><td>50</td><td>50</td></t<>	0	0	0	19	19	0	0	29	29	0	0	38	38	0	0	50	50						
70       31       6       35       0       27       5       38       3       23       0       41       5       19       0       43       5         80       34       7       36       0       30       6       39       4       27       4       41       5       23       0       43       5         90       37       8       37       0       33       7       40       0       30       6       41       4       26       4       44       5         100       38       10       37       0       36       9       40       0       33       7       41       4       29       6       44       4         790 Serie       5       5       5       5       5       5       5       5       6       44       4         700       6       6       0       0       12       12       0       0       18       18       0       0       25       25       25         60       16       5       17       2       12       0       18       18       0       0       23       13	60	28	5	26	0	22	0	36	3	17	0	39	4	12	0	42	7						
80       34       7       36       0       30       6       39       4       27       4       41       5       23       0       43       5         90       37       8       37       0       33       7       40       0       30       6       41       4       26       4       44       5         100       38       10       37       0       36       9       40       0       33       7       41       4       26       4       44       5         100       38       10       37       0       36       9       40       0       33       7       41       4       26       4       44       5         100       38       10       37       0       36       9       40       0       33       7       41       4       29       6       44       4         7790 Server       S	70	31	6	35	0	27	5	38	3	23	0	41	5	19	0	43	5						
90       37       8       37       0       33       7       40       0       30       6       41       4       26       4       44       5         100       38       10       37       0       36       9       40       0       33       7       41       4       26       4       44       5         100       33       7       41       4       29       6       44       4         7       41       4       29       6       44       4         7       41       4       29       6       44       4         7       41       4       29       6       44       4         7       41       43       6         7       7       7       7         6       0       18       18       6       4400       6         6       12       0        6	80	34	7	36	0	30	6	39	4	27	4	41	5	23	0	43	5						
100       38       10       37       0       36       9       40       0       33       7       41       4       29       6       44       4 <b>7790 Set Holds - 2 to Capacity 100 100 33</b> 7 <b>41</b> 4       29       6       44       4 <b>7790 Set BOD Ubs 400 400 4400 0 0 10 4400 5 0 0 10 4400 4400 4400 10 13 14 4400 4400 4400 4400 4400 4400 4400 4400 4400 4400 4400 4400 4400 4400 4400 4400 4400 4400</b>	90	37	8	37	0	33	7	40	0	30	6	41	4	26	4	44	5						
7790 Series Hoists - 2 ton Capacity         100       100       6       6       0       0       12       12       0       0       18       18       0       0       25       25         60       16       5       17       2       12       0       0       18       18       0       0       25       25         60       16       5       17       2       12       0       18       2       9       0       21       3       6       0       23       13         70       18       6       18       2       14       3       19       3       12       0       22       3       8       0       24       12         80       19       6       18       2       16       4       20       3       12       0       22       3       12       0       24       12         80       19       6       19       2       17       5       20       3       14       0       22       3       12       0       24       4         90       20       6       19       2       18	100	38	10	37	0	36	9	40	0	33	7	41	4	29	6	44	4						
1000 lbs     2000 lbs     3000 lbs     4400 lbs       0     0     0     6     6     0     0     12     12     0     0     18     18     0     0     25     25       60     16     5     17     2     12     0     18     2     9     0     21     3     6     0     23     13       70     18     6     18     2     14     3     19     3     12     0     22     3     8     0     24     12       80     19     6     18     2     16     4     20     3     12     0     22     3     12     0     24     12       80     19     6     18     2     17     5     20     3     14     0     22     3     12     0     24     4       100     21     7     19     2     18     6     21     3     15     4     22     3     12     0     24     4	7790 Ser	ies Hoists	– 2 ton	Capacity																			
0       0       0       0       0       12       12       0       0       18       18       0       0       25       25         60       16       5       17       2       12       0       18       21       3       6       0       23       13         70       18       6       18       2       14       3       19       3       12       0       22       3       8       0       24       12         80       19       6       18       2       16       4       20       3       12       0       22       3       8       0       24       12         80       19       6       18       2       16       4       20       3       12       0       22       3       12       0       24       8         90       20       6       19       2       17       5       20       3       14       0       22       3       12       0       24       4         100       21       7       19       2       18       6       21       3       15       4       22		0	100	U lbs		0	200	0 lbs	10	0	300	0 lbs	10		4400	) lbs	05						
00       10       5       17       2       12       0       18       2       9       0       21       3       6       0       23       13         70       18       6       18       2       14       3       19       3       12       0       22       3       8       0       24       12         80       19       6       18       2       16       4       20       3       12       0       22       3       12       0       24       8         90       20       6       19       2       17       5       20       3       14       0       22       3       12       0       24       4         100       21       7       19       2       18       6       21       3       15       4       22       3       12       0       24       4	0	0	U	6 17	6	10	0	12	12	0	0	18	18	0	0	25	25						
10       10       0       18       2       14       3       19       3       12       0       22       3       8       0       24       12         80       19       6       18       2       16       4       20       3       12       0       22       3       12       0       24       8         90       20       6       19       2       17       5       20       3       14       0       22       3       12       0       24       4         100       21       7       19       2       18       6       21       3       15       4       22       3       12       0       24       4	0U 70	10	5	1/	2	12	0	18	2	9	0	21	3	0	0	23	13						
90       20       6       19       2       16       4       20       3       12       0       22       3       12       0       24       8         90       20       6       19       2       17       5       20       3       14       0       22       3       12       0       24       4         100       21       7       19       2       18       6       21       3       15       4       22       3       12       0       24       4	70	10	0	10	2	14	3	19	<u>ও</u>	10	0	22	3	0 10	0	24	12						
100 21 7 10 2 18 6 21 2 15 4 22 3 12 0 24 4	00	20	6	10	2	17	4	20	3	1/	0	22	3	12	0	24	0						
	100	20	7	19	2	18	6	20	3	15	4	22	3	13	0	24	6						

Note: "Max." and "Min." values relate to speed in feet (ft) at various inlet pressures. Air consumption for 7740B = 12 scfm. All others = 65-70 scfm.

### 7700 Series Air Chain Hoists

Typical headroom dimensions (A) are indicated in dimensional drawings.



Capacity (ft)	В	C	В	C	В	С
Link Type						
20	21	7 <sup>3</sup> /4	21 <sup>1</sup> /2	7 <sup>3</sup> /4	20 <sup>3</sup> /16	7 <sup>3</sup> /4
32	25 <sup>1</sup> /2	7 <sup>3</sup> /4	26	7 <sup>3</sup> /4	24 <sup>11</sup> /16	7 <sup>3</sup> /4
56	31 <sup>1</sup> /2	7 <sup>3</sup> /4	32	7 <sup>3</sup> /4	30 <sup>11</sup> /16	7 <sup>3</sup> /4
Roller Type						
10	25 <sup>7</sup> /16	11 <sup>3</sup> /16	25 <sup>15</sup> /16	<b>11</b> <sup>3</sup> /16	24 <sup>7</sup> /8	<b>11</b> <sup>3</sup> /16
16	29 <sup>1</sup> /4	14 <sup>7</sup> /16	29 <sup>3</sup> /4	14 <sup>7</sup> /16	28 <sup>11</sup> /16	<b>1</b> 4 <sup>7</sup> /16
40	39 <sup>15</sup> /16	20 <sup>9</sup> /16	40 <sup>7</sup> /16	20 <sup>9</sup> /16	39 <sup>3</sup> /8	20 <sup>9</sup> /16

### 7790 Series Air Chain Hoists

Typical headroom dimensions (A) are indicated in dimensional drawings.



#### Note:

(1) Dimension "A" for the 7790 Series 1 ton hoist increases  $1^{1/4}$  inch and  $1^{1/2}$  inch for the 2 ton for each Bullard hook used.

### 7740B Series Air Chain Hoist

Typical headroom dimensions (A) are indicated in dimensional drawings.

#### **Hook Mounted**



**Trolley Mounted** 



# Industrial Chain Hoists Warranty



#### Warranty

Ingersoll-Rand Company (I-R) warrants to the original user its ARO manufactured Pneumatic Chain Hoists (Products) to be free of defects in material and workmanship for a period of one year from the date of purchase. ARO will repair, without cost, any Product found to be defective, including parts and labor charges, or at its option, will replace such Products or refund the purchase price less a reasonable allowance for depreciation, in exchange for the Product. Repairs or replacements are warranted for the remainder of the original warranty period.

If any Product proves defective within its original warranty period, it should be returned to any ARO Authorized Service Repair Center, transportation prepaid, with proof of purchase or warranty card.

This warranty does not apply to Products which ARO has determined to have been misused or abused, improperly maintained by the user, or where the malfunction or defect can be attributed to the use of non-genuine ARO parts.

I-R makes no other warranty, and all implied warranties including any warranty of merchantability or fitness for a particular purpose are limited to the duration of the expressed warranty period as set forth above. I-R's maximum liability is limited to the purchase price of the Product and in no event shall I-R be liable for any consequential, indirect, incidental, or special damages of any nature rising from the sale or use of the Product, whether based on contract, tort, or otherwise.

This warranty gives you specific legal rights and you may also have other rights which may vary from state to state.

Note: Some states do not allow limitations on incidental or consequential damages or how long an implied warranty lasts so the above limitations may not apply to you.





#### WARNING

This equipment is not to be used for lifting, supporting, or transporting people, or lifting or supporting loads over people.



# Notes







# Air Systems Components

- Filter-Regulator-Lubricator
- Safety Blow Guns
- Balancers
- Guages
- Airline Lubrication

# Notes



# **Air Systems Components Filters, Regulators and Lubricators - Overview**



Air Preparation Ingersoll-Rand ARO brand FRL's are a costeffective solution to increasing the life of your pneumatic equipment. FRL's are compact to save space and privde more design flexibility than larger drying systems. With common outlets, they will save space, setup time, and piping costs while extending the life of pneumatic equipment.

### Modular Design

The key advantages a modular FRL offers is mounting flexibility. Modular clamps allow line removal of individual units without disturbing the inlet piping. Each component has threaded ports to allow use of pipe nipples and modular configurations to meet piping needs. T-Type wall mounting brackets provide excellent wall to unit clearance for filter bowl removal and regulator adjustment.

### Safety

Safety is always important and IR/ARO provides Lockout valves designed to be attached to the inlet of the FRL system. Lockout valves meet OSHA regulations which require protection from unexpected start-up of a machine during service or maintenance.

# Air Systems Components Industrial Applications

This illustration represents typical plant-wide applications for ARO Air Systems Components. In addition to these industrial applications. ARO Air Systems Components can be used wherever compressed air is utilized, including automotive service stations and construction.



Page numbers are shown with each product as a handy quick reference.



### **Features**

#### ARO Has The Right Combination . . . Air preparation units for peak performance & longer service life.

Proper conditioning of compressed air is essential to ensure maximum performance and service life from pneumatic power tools and equipment. The small initial investment for installation of air preparation units in an air line system will pay long-term dividends in increased productivity, consistent quality and decreased maintenance costs. ARO offers an extensive line of air line filters, regulators and lubricators, including individual units, piggybacks and combos, to meet your exact air preparation requirements.

### Filters

ARO compressed air filters are designed to remove airborne solid and liquid contaminant's which may plug small orifices and hinder performance, or cause excessive wear and premature equipment failure. Several filter elements are offered, including models with coalescing elements for removal of oil aerosols and particles down to .3 micron.

- Pipe Sizes from 1/8" thru 2" NPT
- Flows to 1300 SCFM (198 dm3/s)
- Maximum Inlet Pressures to 250 PSIG (17 bar)

#### Regulators

ARO air line regulators provide controlled, consistent air pressure as required for specific pneumatic equipment connected to the air system. Standard relieving-type regulators are offered in a variety of adjustable pressure ranges, with convenient spring options for easy conversion should requirements change. Non-relieving models are also offered for applications where the venting of downstream overpressure is undesirable. A Miniature Series regulator is available for fluid applications.

- Pipe Sizes from 1/8" thru 2" NPT
- Flows to 440 SCFM (208 dm3/s)
- Maximum Inlet Pressures to 300 PSIG (21 bar)

#### Lubricators

ARO fog-type lubricators help ensure that pneumatic devices receive the required lubrication to maintain operating performance, reduce wear and prolong service life. They are designed to provide the correct amount of oil required for most general applications in a pneumatic system, delivering a constant ratio of oil to CFM. Precise oil feed adjustment allows the proper oil delivery rate. Lubricators should be installed close to the downstream application to ensure effective distribution of oil to the pneumatic components.

- Pipe Sizes from 1/8" thru 1-1/2" NPT
- Flows to 220 SCFM (104 dm3/s)
- Maximum Inlet Pressures to 250 PSIG (17 bar)

### **ARO F-R-L Product Selection Chart**

Flow-SCFM (dm3/s)											
NPT Port Series	Fi Size	lter STD.	Coal	Regulator	Piggy- Back	Lubricator	Pressure Range in Reg. PSIG (bar)				
Miniature	1/8"	28 (13)	15 (6)	13 (6)	12 (6)	41 (19)	0-125 (0-8.6)				
	1/4"	38 (18)	17 (8)	13 (6)	12 (6)	60 (28)	0-125 (0-8.6)				
Module/	1/4"	54 (25)	40 (19)	100 (47)	93 (44)	75 (35)	0-200 (0-13.8)				
Air 2000	3/8"	100 (47)	51 (24)	135 (61)	135 (64)	100 (47)	0-200 (0-13.8)				
	1/2"	122 (58)	53 (25)	140 (71)	140 (66)	110 (52)	0-200 (0-13.8)				
Heavy-Duty	1/2"	82 (39)	-	256 (121)	-	65 (31)	0-250 (0-17)				
	3/4"	87 (41)	-	287 (135)	-	75 (35)	0-250 (0-17)				
	1"	88 (42)	-	293 (138)	-	75 (35)	0-250 (0-17)				
Super-Duty	3/4"	345 (163)	50 (24)	180 (85)	-	150 (71)	160 (75.5)				
	1"	345 (163)	150 (71)	200 (94)	-	300 (141)	275 (129.8)				
	1-1⁄4"	445 (210)	150 (71)	440 (207)	-	300 (141)	275 (129.8)				
	1-1/2"	445 (210)	300 (141)	440 (207)	-	300 (141)	275 (129.8)				
	2"	1300 (613)	300 (141)	1000 (472)	-	-	-				





ARO Module/Air 1000 Series Pages 254 thru 271



ARO Module/ Air 2000® Series Pages 272 thru 292



Pages 293 thru 299



ARO Super-Duty Series Pages 300 thru 306

When selecting an FRL or individual filter, regulator and lubricator units, the air consumption of the tools or equipment to be serviced should be correlated with the flow capacity of the FRL. **ARO Filters, Regulators and Lubricators are designed to flow in excess of that indicated in the maximum recommended flow table shown below.** This table gives recommended flows for pipe sizes at listed pressures and should be used as a guide in sizing piping and equipment for compressed air systems.

. . .

waximum Recommended Air Flow (scim)
thru A.N.S.I. Standard Weight Schedule 40 Pipe.
Applied

- . . . . .

Applie	ll ro			Iominal	Standar	d Dina S	izo _ In	rhae			
PSIG	1/8	1/4	3/8	1/2	3/4	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1-1/4	1-1/2	2	2-1/2	3
5	0.5	1.2	2.7	4.9	6.6	13	27	40	80	135	240
10	0.8	1.7	3.9	7.7	11.0	21	44	64	125	200	370
20	1.3	3.0	6.6	13.0	18.5	35	75	110	215	350	600
40	2.5	5.5	12.0	23.0	34.0	62	135	200	385	640	1100
60	3.5	8.0	18.0	34.0	50.0	93	195	290	560	900	1600
80	4.7	10.5	23.0	44.0	65.0	120	255	380	720	1200	2100
100	5.8	13.0	29.0	54.0	80.0	150	315	470	900	1450	2600
150	8.6	20.0	41.0	80.0	115	220	460	680	1350	2200	3900
200	11.5	26.0	58.0	108.0	155.0	290	620	910	1750	2800	5000
250	14.5	33.0	73.0	135.0	200	370	770	1150	2200	3500	6100

The flow values in the chart above are based upon a pressure drop ( $\blacktriangle$ P) as set forth in the following schedule:

Pressure Drop ( $\blacktriangle$ P) per 100 ft. of Pipe	Pipe Size - Inches
10% of Applied Pressure	1/8, 1/4, 3/8, 1/2
5% of Applied Pressure	3/4, 1, 1-1/4, 1-1/2, 2, 2-1/2, 3

### Installation

The filter, regulator and lubricator should be installed in the order shown in the illustration below. If a coalescing filter is required, it should be installed downstream from a standard filter. Individual take-off lines to the FRL and air tool or equipment should be from the top of the compressed air line. Make sure that air flow markings are followed for proper flow direction through the FRL units.

To trap and expel water, sludge and other contaminants which may collect on the bottom of the air line, a drip leg drain should be used. Drip leg drains should be installed at low points in the piping system and at the far end of the distribution system.



# Air Systems Components The New "Mod 1000" Modular Air Treatment in a Miniature Package!

### Where's YOUR Module/Air 1000 Zone?

- Packaging
- Robotics
- Food/Beverage
- Woodworking
- Printing/Textile
- Material Handling
- Medical/Dental
- Car Wash
- Animation
- Laundry

#### High tech appearance

enhances the overall look of any machine or fixture.

### Units have threaded ports

in the housing allowing the user to mix pipe nipples and modular configurations to meet application requirements.

### Totally Modular design permits

removal of unit(s) from line. This allows for quick easy repair and reduced downtime.



#### Safety lock-out valve

meets OSHA regulation 1910.147 which requires protection from unexpected start-up of a machine during service or maintenance.

Modular clamp connects any two units together in a modular format. (Screws are combination phillips and slotted head type)



Filter-Regulator "Piggyback"



Standard Filter & Coalescing Filter Provides 99.9% contaminant removal



Regulator Flexibility Mount regulator up or down

### T-type wall mounting bracket

provides a rugged wall mount with excellent wall to unit clearance for installing connections.



#### Lubricator -

0

ARO OLL -DAMP

A WARNING

Screwdriver adjustment slot has an optional tamper resistant cap which prevents unauthorized adjustment of oil delivery.

# Quick change bowl

1/4 turn bayonet attachment. For safety, bowl cannot be removed when pressurized.



To Remove To Attach

Bowl options provide the user with a bowl to fit any application.





Nylon Composite

Poly bowl w/bowl guard



Self-Locking non-rising regulator knob allows easy one hand adjustment. Pull down to adjust, push up to lock.

Safety Lock-out Valve Protection from unexpected start-up



**Manifold Block** Provides additional circuit design





### **Features**

### Modular Clamp Kit

One clamp kit is required to connect any two units or accessories together in the modular format. Kit includes: two clamps, one o-ring and screws. To assemble, simply put the o-ring and clamp between the units and tighten screws for a secure seal.

### **T-Type Wall Mounting Brackets**

These brackets provide easy wall mounting. They are excellent for mounting a single unit or multiple units which are in the modular arrangement. T-type mount gives good wall to unit clearance for installing fittings and other connections. Kit includes a bracket, clamp, two screws and o-ring.

### Modular Manifold Kit

The manifold block is an excellent way to provide circuit design flexibility. Manifold has two 1/8" NPT ports which allow for clean regulated air to be sent to signal or run other equipment. Kit includes: manifold only. Order 104263 clamp kits as needed.

# Ordering

Model No.	Description
104263	Clamp Kit
	(fits all port sizes)







#### Threads are NPT.

Model No.	Description
104254-1	1/8" Manifold Kit
104254-2	1/4" Manifold Kit





### Lockout, 3-Way Shut-off Valve

Meets OSHA regulation 1910.147. This lockout valve provides a safety lock-out to prevent accidental machine start-up. When slider valve is shifted into the lock-out position, inlet air is blocked and downstream air is exhausted to atmosphere. Unit has threaded ports for plumbing directly to an air line or can be mounted in the modular arrangement. Order 104263 Clamp kits as needed.



CLOSEC





### **Features**

### 1/8" and 1/4" Port Sizes

ARO<sup>®</sup> Module/Air 1000 Series filters are designed to separate condensed water, rust, scale and other debris from the air lines which may cause wear and premature failure of air tools, valves, cylinders, air motors and other air driven equipment. Filter units should be installed upstream of the regulator or lubricator to protect them from contamination. These filters are ideal for OEM and MRO applications.

- Glass reinforced, composite bodies with threaded brass inserts are light weight, corrosion resistant and have no paint to chip. Combination units can be pipe nippled or clamped together in a modular configuration.
- Bowl guard has full length slots for easy visual checking of liquid. A composite bowl is also available.
- Warning and technical information is printed in English, Spanish, French and German on all bowl units.
- A quick-change bowl with bayonet attachment and line-up arrow heads provides easy bowl removal and filter element replacement.
- Air inlet arrow is molded into base.
- 20 micron filter element is standard. 5 micron element available at no extra charge.
- Standard and automatic drain available.
- Bowl has external 1/8" NPT male thread, for piping away moisture.





Manual Drain Automatic Drain

# **Dimensional Data**

#### Dimensions in Inches (mm)





# **Performance Specifications**

Materials of Construction	
Body:	Glass Reinforced, Composite Nylon
Bowl:	Polycarbonate w/ Bowl Guard Standard
Bowl Guard:	Composite with Sight Windows
Seals:	Buna-N
Drain:	Push Type
Filter Element:	Porous Polypropylene

Operating Conditions	
Temperature Range:	0° to 125° F (-18° to 52° C)
Max. Inlet Pressure:	Polycarbonate Bowl – 150 PSIG (10.4 bar)
	Composite Bowl – 150 PSIG (10.4 bar)
Sump Capacity:	.60 oz. (18 ml)
Flow:	Air flow is at 90 PSIG (6.2 bar) inlet and 5 PSIG
	(0.4 bar) pressure drop
	1/8" = 28 scfm (13 dm3/s)
	1/4" = 38 scfm (18 dm3/s)



From the chart below select the model number associated with port size, bowl and drain option required. If other options are needed, use menu below the chart to select the proper model number. For BSP threads, consult factory.

Note: Not all menu combinations are valid. See price book to verify.

Port		Bowl	Filter	Manual Push Drain			Automatic Drain		
Size NPT	Flow scfm	Sıze oz. (ml)	Element (Micron)	Weight lbs. (kg.)	Composite Bowl	Polycarbonate Bowl w/Guard	Composite Bowl Polycarbonate Bowl w/guard		
Standard	Filters								
1/8"	28	1.10 (33)	20	1.48 (.68)	F25111-220	F25111-200	F25111-221	F25111-201	
1/4"	38	1.10 (33)	20	1.46 (.66)	F25121-220	F25121-200	F25121-221	F25121-201	
Coalescing Filters									
1/8"	15	1.10 (33)		1.48 (.68)	F25111-320	F25111-300	F25111-321	F25111-301	
1/4"	17	1.10 (33)		1.46 (.66)	F25121-320	F25121-300	F25121-321	F25121-301	

Basic Model No.	Port Size NPT
F25111-XXX	1/8" with Brass Insert
F25121-XXX	1/4" with Brass Insert
F25131-XXX	1/8" Molded Threads (No Inserts)
F25141-XXX	1/4" Molded Threads (No Inserts)
	Drain Option
	0 - Manual Push Drain
	1 - Automatic Drain

#### **Bowl Option**

Polycarbonate w/guard

Composite Nylon

0 -

2 -



#### **Filter Element**

2 -20 micron

- 3 .01 micron Coalescing
- 5 micron 4 -

### **Coalescing Filters**

These high efficiency filters are designed for applications where the delivered air must be free of oil and fine particles. For applications in paint spraying. Instrumentation controls, and other compressed air applications. Use in conjunction with an upstream filter. See example at right. Filter units should also be installed upstream of the regulator or lubricator to protect them from contamination. These filters are ideal for OEM and MRO applications.

### Accessories



Kit Includes: Screws and O-ring





T-Bracket, Clamp, Screws and O-ring

Kit Includes:

T-Type Wall Mount Bracket Kit



Standard Filter

Coalescing Filter

Standard Filter

Model No.	Description
104264	Automatic Drain
29660-2	20 Micron Filter Element
29660-1	5 Micron Filter Element
29586	.01 Micron Filter Element (Coalescing)
104259	Composite Bayonet Bowl
104258	Polycarbonate Bowl w/Guard
104257	Service Kit

### **Features**

### 1/8" and 1/4" Port Sizes

ARO® Module/Air 1000 Series regulators are designed to provide quick response and accurate pressure regulation over a wide range of applications. Two gauge ports allow for more versatility in mounting and usage of the unit. Three spring options provide highrange low-range pressure capabilities.

- · Glass reinforced, composite bodies with threaded brass inserts are light weight, corrosion resistant and have no paint to chip. Combination units can be pipe nippled or clamped together in a modular configuration.
- Non-rising, self locking adjustment knob cannot be vibrated loose. Increase/decrease arrows on the knob allows easy adjustment.
- Regulator can be mounted either up or down, increasing user flexibility.
- · Regulator offers in-line repairability. Diaphragm can be replaced without removing unit from line.
- Regulator can be wall or panel mounted up to 3/16" thickness. Hole diameter is 1-3/16".
- A tamper-resistant knob is available.
- · Order regulator with or without gauge.

# **Performance Specifications**

Materials of Construct	tion
Body:	Glass Reinforced Composite
Seals:	Buna-N
Diaphragm:	Buna-N
Valve Spring:	Stainless Steel
Spring Housing:	Glass Filled Nylon
Cap and Knob:	High Impact ABS
Gauge Port:	1/8" NPT

### **Operating Conditions**

Temperature Range:	0° to 125° F (-18° to 52° C)
Max. Inlet Pressure:	250 PSIG (17 bar)
Flow:	Air flow is at 100 PSIG (6.9 bar) inlet and 90 PSIG (6.2 bar) outlet $1/8" = 13 \operatorname{scfm} (6 \operatorname{dm}^3/s)$ $1/4" = 13 \operatorname{scfm} (6 \operatorname{dm}^3/s)$

CAUTION: Outlet pressure adjustment ranges are not minimum or maximum outlet pressure limits. Regulators can be adjusted to zero PSIG secondary pressure and, generally, to pressures in excess of those specified. The use of these regulators to control pressures outside of the specified ranges is not recommended.





Relieving Non-Relieving

# **Dimensional Data**

Dimensions in Inches (mm)



# Ordering

From the chart below select the model number associated with port size, pressure range, relieving and control option required. If other options are needed, use menu below the chart to select the proper model number. For BSP threads, consult factory.



Note: Not all menu combinations are valid. See price book to verify.

Port					Relieving Type F	Regula	tors	
Size F NPT s	low cfm	Wei Ibs. (	ght 'kg.)	Without 5-125 PSIG	Gauge 0-50 PSIG		With 0 5-125 PSIG	Gauge 0-50 PSIG
1/8"	13	1.38 (	(.63)	R27111-100	R27111-200		R27111-600	R27111-700
1/4"	13	1.34 (	(.61)	R27121-100	R27121-200		R27121-600	R27121-700
<b>Basi</b> R27 <sup>-</sup> R27 <sup>-</sup> R27 <sup>-</sup>	i <b>c Moc</b> 111-XX 121-XX 131-XX	lel No. «X «X «X	<b>Port</b> 1/8" v 1/4" v 1/8" I	<b>Size NPT</b> with Brass Insert with Brass Insert Molded Thread (No I	Insert)			
<u>R27</u> ·	141-XX		1/4"   Contro 0 - 3 - Reliev 0 - F 2 - N	Molded Thread (No I ol Option Standard Knob Tamper Resistant ving Option Relieving Non-Relieving	Insert)	Secondary Pressure	100 90 80 70 550 40 30 20 10 0	
Pressure R 1 - 5-125 ( 2 - 0-50 (0	ange   (.4 - 8. ) - 3.5) 0 - 1)	PSIG (bar 6) No gau ) No gauge	ge e				— 35 PSIG —— 45	Air Flow (SCFI 5 PSIG 60 PSIC

- 6 5-125 (.4-8.6) w/gauge 0-150 lb. (#100095-160)
- 7 0-50 (0-.35) w/gauge 0-60 lb. (#29863)

### Accessories



Kit Includes: Two Clamps, Screws

Kit Includes:

T-Bracket, Clamp,

Screws, and O-Rings

104263 Clamp Kit



and O-Rings



100095-160



Description

Model No.

# Air Systems Components Module/Air 1000 Lubricator Units

## **Features**

### 1/8" and 1/4" Port Sizes

ARO<sup>®</sup> Module/Air 1000 Series lubricator features an adjustment needle on top of the transparent sight dome with finer threads and improved tolerances between the needle and seat. This allows for easy drip rate adjustment. The required amount of lubrication can be efficiently delivered for longer life of tools, cylinders, valves, pumps, air motors and other air operated equipment. Light weight, non-detergent oils, like ARO pneumatic lubricating oil (part number 29665) is recommended.

- The oil adjustment feature has a tamper-resistant plug (104027) which helps prevent unauthorized adjustment of oil.
- Transparent sight dome has 360° Visibility.
- Bayonet bowl provides easy removal to allow quick oil refill.
- Glass reinforced, composite bodies with threaded brass inserts are light weight, corrosion resistant and have no paint to chip. Combination units can be pipe nippled or clamped together in a modular configuration.



# Dimensional Data

#### Dimensions in Inches (mm)



# **Performance Specifications**

Materials of Construction				
Body:	Glass Reinforced Bodies			
Bowl:	Polycarbonate w/Bowl Guard Standard			
Bowl Guard:	Composite with Sight Windows			
Seals:	Buna-N			
Sight Dome:	Nylon			

<b>Operating Condition</b>	S
Temperature Range:	0° to 125° F (-18° to 52° C)
Max. Inlet Pressure:	Polycarbonate Bowl – 150 PSIG (10.4 bar) Composite Bowl – 150 PSIG (10.4 bar)
Oil Capacity:	1.10 oz. (33 ml)
Flow:	Air flow is at 90 PSIG (6.2 bar)
	ninet and 5 PSIG (0.4 Dat)
	1/8'' = 41  sctm (91  dm3/s)
	1/4" = 60 scfm (28 dm3/s)

# Ordering

From the chart below select the model number associated with port size, and bowl option required. If other options are needed, use menu below the chart to select the proper model number. For BSP threads, consult factory.



Note: Not all menu combinations are valid. Call Customer Service to verify.

Port Size NPT	Flow scfm	Bowl Size Oz. (ml)	Weight Ibs. (kg.)	Composite Bowl	Poly Bowl w/Guard	
1/8"	41	1.10 (33)	1.50(.68)	L26111-120	L26111-100	
1/4"	60	1.10 (33)	1.44 (.65)	L26121-120	L26121-100	





Accessories



Kit Includes: Two Clamps, Screws and O-Rings

104263 Clamp Kit



Kit Includes:

T-Bracket, Clamp, Screws, and O-Rings

104262 T-Type Wall Mount Bracket Kit

Model No.	Description
29665	Lubricating Oil (1 quart)
104260	Polycarbonate Bowl w/Guard
104261	Composite Bowl
104027	Tamper-Resistant Plug
104226	Sight Dome Repair Kit
104181	Service Kit

# Air Systems Components Module/Air 1000 Filter-Regulator "Piggyback"

### **Features**

### 1/8" and 1/4" Port Sizes

ARO<sup>®</sup> Module/Air 1000 Series "Piggyback" units are compact to save space, giving more design flexibility. These units have one common inlet/outlet for both the filter and regulator. This saves on space, set-up time and piping costs.

- Glass reinforced, composite bodies with threaded brass inserts are light weight, corrosion resistant and have no paint to chip. Combination units can be pipe nippled or clamped together in a modular configuration.
- Non-rising, self locking adjustment knob cannot be vibrated loose.
- Increase/decrease arrows on the knob allows easy adjustment.
- Regulator offers in-line repairability. Diaphragm can be replaced without removing unit from line.
- · Bayonet bowl attachment with line-up arrow heads provides easy filter element removal. Arrow heads assure user of locked position.
- · Standard and automatic drains available.
- Bowl has external 1/8" NPT thread, for piping away moisture.
- Polycarbonate bowl with guard or composite corrosion resistant bowl available.
- Air inlet arrow is molded into housing for easy air line hookup.

# **Performance Specifications**

Materials of Construc	
Body:	Glass Reinforced Bodies
Bowl:	Polycarbonate w/Bowl Guard Standard
Bowl Guard:	Composite w/Sight
	Windows
Composite Bowl:	Nylon
Seals:	Buna-N
Drain:	Push Type
Filter Element:	Porous Polypropylene
Diaphragm:	Buna-N
Spring Housing:	Glass Filled Nylon
Valve Spring:	Stainless Steel
Operating Conditions	
Operating Conditions Temperature Range:	0° to 125° F
Operating Conditions Temperature Range:	0° to 125° F (-18° to 52° C)
Operating Conditions Temperature Range: Max. Inlet Pressure:	0° to 125° F (-18° to 52° C) Poly Bowl – 150 PSIG
Operating Conditions Temperature Range: Max. Inlet Pressure:	0° to 125° F (-18° to 52° C) Poly Bowl – 150 PSIG (10.4 bar)
Operating Conditions Temperature Range: Max. Inlet Pressure:	0° to 125° F (-18° to 52° C) Poly Bowl – 150 PSIG (10.4 bar) Composite Bowl –
Operating Conditions Temperature Range: Max. Inlet Pressure:	0° to 125° F (-18° to 52° C) Poly Bowl – 150 PSIG (10.4 bar) Composite Bowl – 150 PSIG (10.4 bar)
Operating Conditions Temperature Range: Max. Inlet Pressure:	0° to 125° F (-18° to 52° C) Poly Bowl – 150 PSIG (10.4 bar) Composite Bowl – 150 PSIG (10.4 bar) Air flow is at 90 PSIG (6.2 bar) inlet and 5 PSIG
Operating Conditions Temperature Range: Max. Inlet Pressure: Flow:	0° to 125° F (-18° to 52° C) Poly Bowl – 150 PSIG (10.4 bar) Composite Bowl – 150 PSIG (10.4 bar) Air flow is at 90 PSIG (6.2 bar) inlet and 5 PSIG (0.4 bar) pressure drop
Operating Conditions Temperature Range: Max. Inlet Pressure: Flow:	0° to 125° F (-18° to 52° C) Poly Bowl – 150 PSIG (10.4 bar) Composite Bowl – 150 PSIG (10.4 bar) Air flow is at 90 PSIG (6.2 bar) inlet and 5 PSIG (0.4 bar) pressure drop 1/8" = 13 scfm (6 dm <sup>3</sup> /s)

CAUTION: Outlet pressure adjustment ranges are not minimum or maximum outlet pressure limits. Regulators can be adjusted to zero PSIG secondary pressure and, generally, to pressures in excess of those specified. The use of these regulators to control pressures outside of the specified ranges is not recommended.





Relieving with manual drain

# **Dimensional Data**

# Dimensions in Inches (mm) 2.00 2,18 (50.8) (55.4)2.85 (72.3) 3/16-18 UNEF 1.21 (30.7) 0 3.41 (86.5) .87 (22.2) 1.75
#### Ordering

From the chart below select the model number associated with port size, pressure range and drain option required. If other options are needed, use menu below the chart to select the proper model number. For BSP threads, consult factory.



Note: Not all menu combinations are valid. See price book to verify.

Port Size	Flow	Weight	Filter Element	Pressure Range	Compo	osite Bowl	Poly w/Bow	Bowl I Guard
NPT	scfm	lbs. (kg.)	(Micron)	PSIG (bar)	Push Drain	Automatic Drain	Push Drain	Automatic Drain
1/8"	13	2.05 (.93)	20	5-125 (.4-8.6)	P29112-120	P29112-124	P29112-100	P29112-104
1/4"	13	2.03 (.92)	20	5-125 (.4-8.6)	P29122-120	P29122-124	P29122-100	P29122-104

Basic Model No.	Port Size NPT
P2911X-XXX	1/8" with Brass Inserts
P2912X-XXX	1/4" with Brass Inserts
P2913X-XXX	1/8" Molded Thread (No Insert)
P2914X-XXX	1/4" Molded Thread (No Insert)
	Control/Drain Option
	0 - Standard Knob/Manual Drain
	3 - Tamper Resistant Knob/ Manual Drain
Filter Element	4 - Standard Knob/Auto Drain
2 - 20 Micron	
4 - 5 Micron	Relieving Bowl Option
	0 - Relieving / Poly w/Guard
Pressure Range PSI	G (bar) 2 - Relieving / Composite
1 - 5-125 (.4-8.6) n	o gauge 3 - Non-Relieving / Poly w Guard
2 - 0-50 (0-3.5) no	gauge
4 - 0-15 (.0-1) no g	auge
6 - 5-125 (.4-8.6) w	ı/gauge



#### Accessories

7 - 0-50 (0-3.5) w/gauge



Kit Includes: Two Clamps, Screws and O-Rings

104263 Clamp Kit



Kit Includes: T-Bracket, Clamp, Screws, and O-Rings

104262 T-Type Wall Mount Bracket Kit



100095-160

Model No.	Description
29668	Mounting Bracket
104094	Panel Mount Nut
104039	Stud Mount
104255	Service Kit, Relieving
104256	Service Kit, Non-Relieving
104109	Tamper Resistant Kit
29863	0-60 PSIG Gauge
100095-160	0-150 PSIG Gauge
29846	0-15 PSIG Gauge
29850	0-160 PSIG Gauge
104258	Poly Bowl w/Guard
104259	Composite Bowl
104265	Nut & Bracket Kit (Includes 104094 Nut and 29668 Bracket)
29660-1	5 Micron Element
29660-2	20 Micron Element
104264	Pulse Drain Kit

## Air Systems Components Module/Air 1000 Combination Units

#### **Performance Specifications**

#### Filter-Regulator-Lubricator

Max. Inlet Pressure:	150 PSIG (10.4 bar)
Operating Temperature:	0° to 125°F (-18° to 52°C)
Filter Element:	20 Micron
Pressure Range in Regulator:	5 to 125 PSIG (.4 to 8.6 bar)
Gauge:	0 to 150 PSI
Gauge Port:	1/8 NPT



C28121-800

#### Ordering

Select the basic model number which represents the port size and bowl option required. If other options are required, order each unit separately. Units are shipped assembled. For BSP threads, consult factory.

Port	Models				Components		
Size NPT	With T-Mounts	Without T-mounts	Weight Ibs. (kg.)	Filter	Regulator	Lubricator	
Push Dra	Push Drain • Polycarbonate Bowl with Bowl Guard						
1/8"	C28111-800	C28112-800	5.54 (1.88)	F25111-200	R27111-600	L26111-100	
1/4"	C28121-800	C28122-800	5.42 (2.46)	F25121-200	R27121-600	L26121-100	
Automat	Automatic Drain • Polycarbonate Bowl with Bowl Guard						
1/8"	C28111-801	C28112-801	5.54 (1.88)	F25111-201	R27111-600	L26111-100	
1/4"	C28121-801	C28122-801	5.42 (2.46)	F25121-201	R27121-600	L26121-100	

Notes: Order lock-out valve separately and attach to filter inlet with clamp kit (104263). To order modular model with pipe nipples, place a "3" in the sixth position of the model number. Example: C28XX3-XXX

#### Dimensional Data Dimensions Inches (mm)







#### Air Systems Components Module/Air 1000 Combination Units

#### **Performance Specifications**

#### **Piggyback Lubricator**

Max. Inlet Pressure:	150 PSIG (10.4 bar)
Operating Temperature:	0° to 125°F (-18° to 52°C)
Filter Element:	20 Micron
Pressure Range in Regulator;	5 to 125 PSIG (.4 to 8.6 bar)
Gauge:	0 to 150 PSI
Gauge Port:	1/8 NPT



#### Ordering

Select the basic model number which represents the port size and bowl option required. If other options are required, order each unit separately. Units are shipped assembled. For BSP threads, consult factory.

Port	Models With Without		Weight	Components		
NPT	T-Mounts	T-mounts	lbs. (kg.)	Filter/Regulator	Lubricator	
Push Dra	ain • Polycarbona	ate Bowl with Bo	wl Guard			
1/8"	C28111-600	C28112-600	4.14 (1.88)	P29112-600	L26111-100	
1/4"	C28121-600	C28122-600	4.06 (1.84)	P29122-600	L26121-100	
Automat	Automatic Drain • Polycarbonate Bowl with Bowl Guard					
1/8"	C28111-601	C28112-601	4.14 (1.88)	P29112-604	L26111-100	
1/4"	C28121-601	C28122-601	4.06 (1.84)	P29122-604	L26121-100	



Filter/Regulator Lubricator

Notes: Order lock-out valve separately and attach to filter inlet with clamp kit (104263). To order modular model with pipe nipples, place a "3" in the sixth position of the model number. Example: C28XX3-XXX

#### Dimensional Data Dimensions Inches (mm)





#### 1/8" and 1/4" Port Sizes (Ideal for water & low flow application)

ARO Miniature Series Regulators are the ideal choice where a small, compact unit is required to provide accurate control of either air or water flow. It's diaphragm design provides a durable, no-leak seal especially effective in water and low-flow applications. Offering exceptional repeatability, the ARO Mini Regulator quickly returns to within 1% of its initial setting after any change in downstream pressure, when used in the mid-range of it's rated regulatory capability. This regulator is constructed of materials approved by the National Sanitation Foundation (NSF).

- A corrosion-resistant, glass-reinforced composite body can be ordered with either molded threads or corrosion-resistant, zinc-plated steel inserts.
- A stainless steel valve spring is the only metallic part to come in contact with the regulated medium.
- Buna N diaphragm is fabric-reinforced for superior sealing in water and low-flow applications.
- Regulator can be panel-mounted up to a thickness of 3/16".
   1-3/16" 18 spring housing thread allows easy panel mounting.
- A non-rising, locking adjustment knob cannot be vibrated loose. Simply pull and rotate the knob to adjust the downstream pressure setting. A tamper resistant adjustment knob is also available.





Relieving

Non-Relieving

#### **Dimensional Data**





CAUTION: Outlet pressure adjustment ranges are not minimum or maximum outlet pressure limits. Regulators can be adjusted to zero PSIG secondary pressure and, generally, to pressures in excess of those specified. The use of these regulators to control pressures outside of the specified ranges is not recommended.

#### **Performance Specifications**

Materials of Construction			
Body:	Glass-reinforced composite		
Seals:	Buna N		
Diaphragm:	Buna N		
Valve Seat:	Acetal resin		
Spring Housing:	Glass-filled nylon		
Knob:	Acetal resin		
Valve Spring:	Stainless Steel		

#### Performance Specifications

Max. Inlet Pressure:	250 PSIG ( 17 bar)
Pressure Range in Regulator:	0 to 125 PSIG (0 to 8.6 bar)
Operating Temperature Range:	0° to 150° F (-18° to 65° C)
Weight:	1/8" = .25 lbs. (115 g)
	1/4" = .22 lbs. (100 g)
* Air Flow:	1/8" = 13 SCFM (6 dm3/s)
	1/4" = 13 SCFM (6 dm3/s)
** Water Flow:	1/8" = 1.75 GPM (6.6 L /min.)
	1/4" = 2 GPM (7.6 L /min.)
Gauge Port:	1/8" NPT

\* Air flow is at 125 PSIG (8.6 bar) inlet and 100 PSIG (6.9 bar) outlet

\*\* Water flow is at 60 PSIG (4.1 bar) inlet and 40 PSIG (2.8 bar) outlet.

#### Ordering

#### 1/8" and 1/4" Port Sizes (Ideal for water & low flow application)

Select the basic model number associated with the thread type (brass or molded threads) and port size (1/8" or 1/4") desired from the table below. For BSP threads, consult factory. **Note:** Not all menu combinations are valid. See price book to verify.





127122-600 (Shown with 29850 Gauge)

#### Accessories

Model	Description		29668 2.56
29040	Gauge = 0.20  PSIC (0.2  bar)		(65) 1.69 1.10
29700-1	Gauge = 0.60  PSIC (0.4  bar)	Server and	(43) (30)
29003	Gauge 0 100 PSIG (0-4 Dai)	<b>O</b>	
29850	Gauge 0-160 PSIG (0-11 bar)	100005-160	
100095-160	Gauge 0-150 PSIG (0-10 bar)	100095-100	28 7 75
29539	Spring 5-125 lb. (Gold)	$\langle \rangle \langle 0 \rangle$	(7)
29540	Spring 0-50 lb. (Green)		(13)
29754-1	Spring 0-25 lb. (Blue)		
29622	Spring 0-15 lb. (Black)		104094
29668	Mounting Bracket		(44)
104094	Panel Mounting Nut		
104039	Stud Mount		.58
104158	Service Kit- Relieving Type		(15)
104159	Service Kit- Non-Relieving Type		
104109	Tamper-Resistant Knob Kit		
104265	Nut & Bracket Kit		3/8 - 16 UNC 1/8 NPT
	(Includes 104094 Nut & 29668 Bracket)		104039

#### Miniature Series (1/8")

For Accurate, Low-Cost Control of Air and Water Flow

- Corrosion Protection Brass body with internal stainless steel valve spring provides corrosion protection against regulated fluids.
- Accurate, Reliable Control Non-rising, locking adjustment knob maintains the desired setting.
- Mounting Flexibility Panel mounting nut is part of the regulator and is included at no additional cost. Industry standard 1-3/16" - 18 threaded spring housing enables easy panel mounting (max. panel thickness is 3/16"). Available mounting bracket and stud mount provide a choice of wall mountings. Compact size is ideal for installations where space is limited.
- Durability Brass construction makes this regulator the perfect choice for your most rugged and demanding air and water applications.

#### **Applications**

- · Medical and Dental Equipment
- · Beverage Dispensing Equipment
- Lawn Irrigation Systems
- Water Purification Systems
- Car Wash Equipment
- · Miniature Pneumatic Plumbing Circuits

#### **Performance Specifications**

Max. Inlet Press.:	250 PSIG (17 bar)
Max. Adjusted Press.:	125 PSIG (8.6 bar)
Operating Temp.:	0° to 150°F (-18° to 65°C)
Weight:	1/8" = .25 lbs. (115 g)
	1/4" = .22 lbs.(100 g)
Air Flow*:	1/8" = 13 SCFM
	1/4" = 13 SCFM
Water Flow**:	1/8" = 1.75 GPM
	1/4" = 2.0 GPM

\* Air flow is at 125 PSIG (8.6 bar) inlet and 100 PSIG (6.9 bar outlet).

\*\* Water flow is at 60 PSIG (4.1 bar) inlet and 40 PSIG (2.8 bar) outlet.

**WARNING:** These regulators are designed for use in industrial compressed air or water systems only. Never use these regulators where pressure or temperature can exceed the rated operating conditions. See SPECIFICATIONS.

#### Ordering

Model Number	Port Size NPT	Gauge Port NPT	Туре
B27112-020	1/8"	1/8"	Non-Relieving
B27122-020	1/4"	1/8"	Non-Relieving
B27112-000	1/8"	1/8"	Relieving
B27122-000	1/4"	1/8"	Relieving



**Graphic Symbols** 



Non-Relieving

Accessories	5
Part Number	Description
29850	*Gauge 0-160 PSIG (0-11 bar)
29668	Mounting Bracket
104094	Panel Mounting Nut
	(Included with regulator)
104039	Stud Mounting

\*Gauge has polycarbonate lens.

#### **Dimensional Data**



#### Accessory Kits



Filters					
Kit Number:	Description:	Kit Contents:			
29586	Coalescing .01-	(1) Element			
	Micron Element				
29660-1	5 Micron Element	(1) Element			
29660-2	20-Micron Element	(1) Element			
104257	Service Kit	(2) O-Rings			
104258	Polycarbonate Bowl	(1) Polycarbonate bowl w/Guard			
	w/guard	(1) Valve, (1) O-Ring			
104259	Composite Bowl	(1) Composite Bowl,			
		(1) Valve, (1) O-Ring			
104264	Automatic Drain Kit	(1) Pulse Drain, (1) O-Ring			

#### Regulators

Kit Number:	Description:	Kit Contents:
104039	Stud Mount	(1) Stud and Mounting Nut
104109	Tamper Resistant Knob Kit	
104255	Service Kit	(1) Spring, (1) Washer, (1)
	(Relieving)	Diaphragm, (1) O-Ring
104256	Service Kit	(1) Spring, (1) Washer, (1)
	(Non-Relieving)	Diaphragm, (1) O-Ring
104265	Mounting Nut Bracket Kit	(1) Mounting Nut, (1) Wall Bracket

#### Lubricators

Kit Number:	Description:	Kit Contents:
104181	Service Kit	(1) Compensating Valve and O-Rings
104260	Polycarbonate Bowl w/Guard	
104261	Composite Bowl	(1) Composite Bowl, (1) O-Ring

#### **Modular Components**

Kit Number:	Description:	Kit Contents:
104253-1	Safety Lockout/Tagout	1/8" NPT Threads
104253-2	Safety Lockout/Tagout	1/4" NPT Threads
104253-1-B	Safety Lockout/Tagout	1/8" BSP Threads
104253-2-B	Safety Lockout/Tagout	1/4" BSP Threads
104254-1	Manifold	1/8" NPT Manifold, (1) Pipe Plug
104254-2	Manifold	1/4" NPT Manifold, (1) Pipe Plug
104254-1-B	Manifold	1/8" BSP Manifold, (1) Pipe Plug
104254-2-B	Manifold	1/4" BSP Manifold, (1) Pipe Plug
104262	T-Bracket Mounting Kit	(1) Bracket, (1) O-Ring, (2) Screws
104263	Clamp Kit	(2) Clamps, (1) O-Ring, (2) Screws
Y237-2	Pipe Nipple	1/8" NPT Threads
Y27-2-C	Pipe Nipple	1/4" NPT Threads

#### Air Systems Components Module/Air 2000

Features 1/4", 3/8", & 1/2" Ports

**Durable black finish** with silkscreened graphics (no labels), enhances the overall look of any machine or fixture.



**Units have threaded ports** in the housing allowing users to mix pipe nipples and modular configurations to meet their needs.

#### Totally modular design

permits removal of unit(s) from line without disturbing the hard piping. This allows for easy repair and reduced downtime.



**Safety lock-out valve** meets OSHA regulation 1910.147 which requires protection from unexpected start-up of a machine during service or maintenance.

**Modular end pipe adapters** provide plumbing flexibility and allow for reduced inventory by stocking one size FRL and the various sizes of adapters.



Filter with optional service life indicator shows when element is clogged and needs service. **Modular spacer has retained o-rings** and screws to prevent loss during routine maintenance and to simplify assembly. (Screws are 5/32" or 4 mm allen head type.)

Patented double seal push drain is easy to operate and requires no tools for service. Optional automatic drain eliminates manual draining.







Filter-Coalescing Filter Provides 99.9% contaminant removal







Safety Lock-out Valve Protection from unexpected start-up

T-type wall mounting bracket provides a rugged heavy-duty wall mount with excellent wall to unit clearance for installing connections.

**Right angle panel bracket** provides for a cleaner installation and also doubles as a mounting bracket. Flow enters from behind panel thru the panel brackets.

> Lubricator has large fill port which can be serviced under pressure simplifying routine maintenance. Screwdriver adjustment slot has an optional tamper resistant cap which prevents unauthorized adjustment of oil delivery.





Quick change bowl with bayonet attachment. For safety, bowl cannot be removed when pressurized. One quarter (1/4) turn bayonet attachment allows sight glass to be positioned in 900 increments.

Push-pull non-rising regulator knob allows easy one hand adjustment. Pull down to adjust, push up to lock.

Three bowl options provide the user with a bowl to fit any application.



Metal w/sight glass

Poly bowl w/bowl guard





To Remove To Attach



**Manifold Block** Provides additional circuit design

**Pipe Adapters** 1/4", 3/8", 1/2" and 3/4" Pipe Sizes

For cleaner installation

**Right Angle panel Brackets** 

The modular FRL with pipe nipple capability!

Individual components have threaded ports, allowing either modular configurations or pipe nipple connections.



(page 58)

#### **Performance Specifications**

#### 1/4", 3/8" & 1/2" Ports

Max. Inlet Pressure:	Polycarbonate Bowl - 150 PSIG (10.4 bar)
	Metal Bowl - 175 PSIG (12 bar)
Operating Temperature Range:	Polycarbonate Bowl - 0° to 125° F (-18° to 52°C)
	Metal Bowl - 0° to 175°F (-18° to 79°C)
Filter Element:	40 micron
Pressure Range in Regulator:	5 to 125 PSIG (.3 to 8.6 bar)
Gauge:	0 to 160 PSI
Gauge Port:	1/4" NPT
Filter Drain:	Manual (standard); Automatic (optional)

### Ordering

Select the basic model number which represents the port size and bowl option required. Modular models listed include Gauge and "T" Brackets, and are shipped assembled. Pipe nippled models include Gauge and Nipples, and are shipped unassembled. If other options are required, order each unit separately.

For BSP threads, add -B to end of model number.

NOTE: To order modular models without "T" Brackets, place a "2" in sixth position of model number. Example: CXXXX2-XXX. See page 58 for Mounting Brackets for pipe nippled models.

NOTE: Not all menu combinations are valid. See price book to verify.

#### Models & Dimensions, in. (mm)

and (2) appropriate size pipe nipples.

Port Size	Moc Modular	lels Ninnled	Weight Ibs. (ka)	Filter	Components Regulator	Luhricator
push drain	metal bowl v	with sight glass	1001 (ltg)		nogulator	Lubridator
1/4"	C28221-810	C28223-810	5.5 (2.5)	F25221-110	R27221-600	L26221-110
3/8"	C28231-810	C28233-810	5.4 (2.4)	F25231-110	R27231-600	L26231-110
1/2"	C28241-810	C28243-810	5.3 (2.4)	F25241-110	R27241-600	L26241-110
push drain	• polycarb. bo	wl with bowl gu	lard			
1/4"	C28221-800	C28223-800	5.5 (2.5)	F25221-100	R27221-600	L26221-100
3/8"	C28231-800	C28233-800	5.4 (2.4)	F25231-100	R27231-600	L26231-100
1/2"	C28241-800	C28243-800	5.3 (2.4)	F25241-100	R27241-600	L26241-100
automatic	drain • metal t	owl with sight (	glass			
1/4"	C28221-811	**	5.5 (2.5)	F25221-111	R27221-600	L26221-110
3/8"	C28231-811	**	5.4 (2.4)	F25231-111	R27231-600	L26231-110
1/2"	C28241-811	**	5.3 (2.4)	F25241-111	R27241-600	L26241-110
automatic drain • polycarb bowl with bowl gua			vl guard			
1/4"	C28221-801	**	5.5 (2.5)	F25221-101	R27221-600	L26221-100
3/8"	C28231-801	**	5.4 (2.4)	F25231-101	R27231-600	L26231-100
1/2"	C28241-801	**	5.3 (2.4)	F25241-101	R27241-600	L26241-100

For pipe nippled FRL combo units with automatic drain, order individual filter, regulator and lubricator components and pipe nipples.



GRAPHIC SYMBOL









#### **Performance Specifications**

#### 1/4", 3/8" & 1/2" Ports

Max. Inlet Pressure:	Polycarbonate Bowl - 150 PSIG (10.4 bar)
	Metal Bowl - 175 PSIG (12 bar)
Operating Temperature Range:	Polycarbonate Bowl - 0° to 125° F (-18° to 52°C)
	Metal Bowl - 0° to 175° F (-18° to 79°C)
Filter Element:	40 micron
Filter Drain:	Manual (standard); Automatic (optional)
Pressure Range in Regulator:	5 to 125 PSIG (.3 to 8.6 bar)
Gauge:	0 to 160 PSI
Gauge Port:	1/4" NPT

#### Ordering

Select the basic model number which represents the port size and bowl option required. Modular models listed include Gauge and "T" Brackets, and are shipped assembled. Pipe nippled models include Gauge and Nipple, and are shipped unassembled. If other options are required, order each unit separately.

For BSP threads, add -B to end of model number.

NOTE: To order modular models without "T" Brackets, place a "2" in sixth position of model number. Example: CXXXX2-XXX. See page 58 for Mounting Brackets for pipe nippled models.

NOTE: Not all menu combinations are valid. See price book to verify.

#### Models & Dimensions, in. (mm)

Port Size	e Models		Weight	Comp	onents
NPT	Modular	Nippled	lbs. (kg)	Filter	Lubricator
push drain •	metal bowl with	sight glass			
1/4"	C28221-610	C28223-610	4.1 (1.9)	P29221-610	L26221-110
3/8"	C28231-610	C28233-610	4.0 (1.8)	P29231-610	L26231-110
1/2"	C28241-610	C28243-610	3.9 (1.8)	P29241-610	L26241-110
push drain •	polycarb. bowl v	with bowl guard			
1/4"	C28221-600	C28223-600	4.1 (1.9)	P29221-600	L26221-100
3/8"	C28231-600	C28233-600	4.0 (1.8)	P29231-600	L26231-100
1/2"	C28241-600	C28243-600	3.9 (1.8)	P29241-600	L26241-100
automatic d	rain • metal bow	with sight glass			
1/4"	C28221-611	**	4.1 (1.9)	P29221-614	L26221-110
3/8"	C28231-611	* *	4.0 (1.8)	P29231-614	L26231-110
1/2"	C28241-611	**	3.9 (1.8)	P29241-614	L26241-110
automatic drain • polycarb bowl with bowl gua			ard		
1/4"	C28221-601	**	4.1 (1.9)	P29221-604	L26221-100
3/8"	C28231-601	**	4.0 (1.8)	P29231-604	L26231-100
1/2"	C28241-601	* *	3.9 (1.8)	P29241-604	L26241-100

NOTE: Two piece modular models include (1)104171 T-Brackets and (1) 100067 Gauge. Pipe Nippled models include (1) 100067 Gauge and (1) appropriate sized pipe nipple.

For pipe nippled FRL combo units with automatic drain, order individual filter/regulator and lubricator components and pipe nipples.











#### **Performance Specifications**

#### 1/4", 3/8" & 1/2" Ports

Max. Inlet Pressure:	Polycarbonate Bowl - 150 PSIG (10.4 bar)
	Metal Bowl - 175 PSIG (12 bar)
Operating Temperature Range:	Polycarbonate Bowl - 0° to 125° F (-18° to 52°C)
	Metal Bowl - 0° to 175° F (-18° to 79°C)
Filter Element:	40 micron
Filter Drain:	Manual (standard); Automatic (optional)

#### Ordering

Select the basic model number which represents the port size and bowl option required. Modular models listed include Gauge and "T" Brackets, and are shipped assembled. Pipe nippled models include Gauge and Nipple, and are shipped unassembled. If other options are required, order each unit separately.

For BSP threads, add -B to end of model number.

**Note:** To order modular models without "T" Brackets, place a "2" in sixth position of model number. Example: CXXXX2-XXX. See page 58 for Mounting Brackets for pipe nippled models.

Note: Not all menu combinations are valid. See price book to verify.

Models & Dimensions, in. (mm)

	Port Size Mode		dels	Weight	Compo	onents	
	NPI	Modular	Nippled	lbs. (kg)	Filter	Lubricator	
	push drain • metal bowl with sight glass						
	1/4"	C28221-710	C28223-710	3.6 (1.6)	F25221-110	L26221-110	
	3/8"	C28231-710	C28233-710	3.5 (1.6)	F25231-110	L26231-110	
	1/2"	C28241-710	C28243-710	3.3 (1.5)	F25241-110	L26241-110	
	push drain • j	polycarb. bowl v	with bowl guard				
	1/4"	C28221-700	C28223-700	3.6 (1.6)	F25221-100	L26221-100	
	3/8"	C28231-700	C28233-700	3.5 (1.6)	F25231-100	L26231-100	
	1/2"	C28241-700	C28243-700	3.3 (1.5)	F25241-100	L26241-100	
_	automatic dra	ain • metal bow	l with sight glass	6			
	1/4"	C28221-711	**	3.6 (1.6)	F25221-111	L26221-110	
	3/8"	C28231-711	**	3.5 (1.6)	F25231-111	L26231-110	
	1/2"	C28241-711	**	3.3 (1.5)	F25241-111	L26241-110	
	automatic drain • polycarb bowl with bowl guard						
	1/4"	C28221-701	**	3.6 (1.6)	F25221-101	L26221-100	
	3/8"	C28231-701	**	3.5 (1.6)	F25231-101	L26231-100	
	1/2"	C28241-701	**	3.3 (1.5)	F25241-101	L26241-100	

NOTE: Modular models include (1)104171 T-Bracket. Pipe Nippled models include (1) appropriate sized pipe nipple. For pipe nippled FRL combo units with automatic drain, order individual filter, lubricator components and pipe nipple.













#### 1/4", 3/8" & 1/2" Ports

ARO Module/Air 2000<sup>®</sup> Series filters are designed to remove from the air any rust, scale, condensed water and other debris which may cause wear and premature failure of air tools, valves, cylinders, air motors and other air-driven equipment. Filter units should be installed upstream of the regulator and lubricator to protect them from contamination. These filters are ideal for OEM and MRO applications.

- Units have threaded ports for direct connection to pipe plumbing or, when used with modular port adapter kits, a single unit or combination of units can be piped into the air system in a modular arrangement.
- Rugged zinc die-cast bowl guard has large, full-length slots for easy visual checking of liquid. Other bowl options include a metal bowl with sight glass and a plain metal bowl. NOTE: See cautions on the use of polycarbonate bowls. (Page 326)
- Warning and technical information is printed in English, Spanish, French and German on standard units.
- The quick-change bowl with bayonet attachment provides easy bowl removal and filter element replacement. Bayonet attachment design allows sight gauge location at 90° increments.
- Optional filter service life indicator shows when element is clogged and needs changing. See page 281 for more information.
- 40 micron filter element with 12% more filter area.
- Automatic Drain has 1/8" NPT connection for drain line. 10 PSIG minimum operating pressure.

SE		
H.		
	T	

GRAPHIC SYMBOLS AUTOMATIC DRAIN MANUAL DRAIN

Performance Specifications	Models & Dimensions, in. (mm)
Body:	Zinc die-cast
Bowls:	Polycarbonate or Zinc die-cast
Bowl Guard:	Zinc die-cast
Sight Glass:	Polyimide-Nylon 12
Seals:	Buna N
Drain:	Brass and Buna N
Filter Element:	Porous polypropylene
Sump Capacity:	2.87 oz. (85 cc)
Filter Area:	8.24 sq. in. (5318 mm2)
Max. Inlet Pressure:	Polycarbonate bowl - 150 PSIG (10.4 bar)
	Metal bowl - 175 PSIG (12 bar)
Operating Temperature Range:	Polycarbonate Bowl - 0° to 125° F (-18° to 52°C)
	Metal Bowl - 0° to 175° F (-18° to 79°C)
* Flow:	1/4" = 54 scfm (25 dm 3/s)
	3/8" = 100 scfm (47 dm 3/s)
	$1/2" - 122 \operatorname{scfm} (58 \operatorname{dm} 3/s)$

\* Air flow is at 90 PSIG (6.2 bar) inlet and 5 PSIG (0.4 bar) pressure drop.





#### Ordering

#### 1/4", 3/8" & 1/2" Ports

From the chart below, select the model number associated with port size and bowl and drain option required. If other options are needed, use menu at bottom.

Port Size	FI	ow		Bowl Size	Filter Flement	Weight
Npt	Scfm	(Dm <sub>3/S</sub> )	Model	Oz. (ml)	(micron)	lbs. (kg)
flex drain • r	netal bow	l with sight	glass			
1/4"	54	(25)	F25221-110	6.0 (177)	40	1.48 (.68)
3/8"	100	(47)	F25231-110	6.0 (177)	40	1.46 (.66)
1/2"	122	(58)	F25241-110	6.0 (177)	40	1.43 (.65)
flex drain • p	olycarb. I	bowl with bo	wl guard			
1/4"	54	(25)	F25221-100	6.0 (177)	40	1.48 (.68)
3/8"	100	(47)	F25231-100	6.0 (177)	40	1.46 (.66)
1/2"	122	(58)	F25241-100	6.0 (177)	40	1.43 (.65)
automatic dr	rain • meta	al bowl with	sight glass			
1/4"	54	(25)	F25221-111	6.0 (177)	40	1.48 (.68)
3/8"	100	(47)	F25231-111	6.0 (177)	40	1.46 (.66)
1/2"	122	(58)	F25241-111	6.0 (177)	40	1.43 (.65)
automatic drain • polycarb bowl with bowl guard						
1/4"	54	(25)	F25221-101	6.0 (177)	40	1.48 (.68)
3/8"	100	(47)	F25231-101	6.0 (177)	40	1.46 (.66)
1/2"	122	(58)	F25241-101	6.0 (177)	40	1.43 (.65)



F25241-100

#### **Additional Models Available**

Select the basic model number associated with the port size desired. From the table below, select the numbers representing the filter options required. For BSP threads, add -B to end of model number.



#### Filter Accessories

Model	Description
104068	Automatic Drain for filter bowl.
104107	Mounting Bracket (for use with pipe nipples)
104149	Push Drain Kit for filter bowl
104176	Filter Service Kit (Includes O-ring and Manual Drain)
104182	Sight Glass Service Kit (Includes 2 O-rings and Sight glass)
100031-1	40 Micron Filter Element
100031-2	20 Micron Filter Element
100031-3	5 Micron Filter Element
100032	Coalescing Filter Element
104202	Polycarbonate bowl w/guard
104204	Metal bowl w/ sight glass
104206	Metal bowl
104248	Activated Charcoal Element





#### 1/4", 3/8" & 1/2" Ports

These high efficiency filters are designed for paint spraying, instrumentation controls, and other compressed air applications where the delivered air must be free of oil and fine particles. These filters are ideal for OEM and MRO applications.

- One-piece coalescing filter element removes 99.9% of oil aerosols and particles down to .3 micron.
- Units have threaded ports for direct connection to pipe plumbing.
- · Warning and technical information is printed in English, Spanish, French and German on standard units.
- · Bayonet bowl attachment provides easy bowl removal and filter element replacement.
- Optional filter service life indicator shows when element needs changing. See page 281.

#### Ordering

From the chart below, select the model number associated with port size and bowl/drain option required. If other options are needed, use menu below.

Specifications, dimensions and accessories same as standard filter, see pages 278 and 279.

Port Size	FI	ow		Bowl Size	Weinht
Npt	Scfm	(Dm3/s)	Model	Oz. (ml)	Lbs. (kg)
push drain •	metal bov	vl with sight (	glass		
1/4"	40	(17)	F25221-310	6.0 (177)	1.48 (.68)
3/8"	51	(24)	F25231-310	6.0 (177)	1.46 (.66)
1/2"	53	(25)	F25241-310	6.0 (177)	1.43 (.65)
push drain •	polycarb.	bowl with bo	wl guard		
1/4"	40	(17)	F25221-300	6.0 (177)	1.48 (.68)
3/8"	51	(24)	F25231-300	6.0 (177)	1.46 (.66)
1/2"	53	(25)	F25241-300	6.0 (177)	1.43 (.65)
automatic drain • metal bowl with sight glass					
1/4"	40	(17)	F25221-311	6.0 (177)	1.48 (.68)
3/8"	51	(24)	F25231-311	6.0 (177)	1.46 (.66)
1/2"	53	(25)	F25241-311	6.0 (177)	1.43 (.65)
automatic drain • polycarb bowl with bowl guard					
1/4"	40	(17)	F25221-301	6.0 (177)	1.48 (.68)
3/8"	51	(24)	F25231-301	6.0 (177)	1.46 (.66)
1/2"	53	(25)	F25241-301	6.0 (177)	1.43 (.65)

#### Additional Models Available **Base Model**

3

NOTE: Not all menu combinations are valid. See price book to verify.







GRAPHIC SYMBOLS

Pre-Filters are essential for long coalescing life.

#### **Recommended Installation**

Use in conjunction with an upstream filter. Filter units should also be installed upstream of the regulator or lubricator to protect them from contamination.



STANDARD COALESCING PRE-FILTER FILTER





1/4"

3/8"

#### 1/4", 3/8" & 1/2" Ports

Units equipped with the Filter Service Indicator are designed to indicate when the filter element is clogged and needs to be serviced. The highly visible rising collar is seen from any angle. Pressure is monitored at two different points in a system (inlet and outlet) and acts on opposite sides of a diaphragm sensor. A change in pressure (pressure drop) causes the collar to rise, indicating element is clogged.

- · Pop-up three-color indicator provides visual monitoring of filter element efficiency.
- Service life indicator changes from green to red when element is clogged and needs changing.
- The rising collar is visible from 360°.

#### Ordering

From the chart below, select the model number associated with port size and bowl and drain option required. If other options are needed, refer to menu on page 279. Specifications, options and accessories same as standard filter, see pages 278 and 279.

Port Size Npt	Flow Scfm	(Dm <sub>3/S</sub> )	Model with Standard Element	Fle scfm	ow (Dm <sub>3/S</sub> )	Model with Coalescing Element
push drain •	metal bowl	with sight g	lass			
1/4"	54	(25)	F25222-110	40	(17)	F25222-310
3/8"	100	(47)	F25232-110	51	(24)	F25232-310
1/2"	122	(58)	F25242-110	53	(25)	F25242-310
push drain •	push drain ● polycarb. bowl with bowl guard					
1/4"	54	(25)	F25222-100	40	(17)	F25222-300
3/8"	100	(47)	F25232-100	51	(24)	F25232-300
1/2"	122	(58)	F25242-100	53	(25)	F25242-300

#### Accessories

#### **Coalescing Filter Accessories**

•	
104068	Automatic Drain for filter bowl.
104107	Mounting Bracket (for use with pipe nipples)
104149	Push Drain Kit for filter bowl
104176	Filter Service Kit (Includes O-ring and Manual Drain)
104182	Sight Glass Service Kit (Includes 2 O-rings and Sight glass)
100032	Coalescing Filter Element
104202	Polycarbonate bowl w/guard
104204	Metal bowl w/ sight glass
104206	Metal bowl







#### 1/4", 3/8" & 1/2" Ports

ARO Module/Air 2000<sup>®</sup> Series regulators are designed to provide quick response and accurate pressure regulation over a wide range of applications. Two gauge ports allow for more versatility in mounting and usage of the unit. Three spring options allow for spring changes, instead of entire regulator changes, to meet most air pressure applications.

- Units have threaded ports for direct connection to pipe plumbing or, when used with modular port adapter kits, a single unit or combination of units can be piped into the air system in a modular arrangement.
- Push-pull, non-rising knob allows one-hand adjustment. Pull to adjust, push to lock. Arrows on the knob indicate direction of pressure increase/ decrease.
- · Regulator can be mounted either up or down, increasing user flexibility.
- Balanced valve-type diaphragm regulation assures positive pressure adjustment and rapid response to inlet pressure changes.
- Regulator offers in-line repairability. Valve and diaphragm can be replaced without removing unit from line.
- Regulator can be panel-mounted up to 1/4" thickness. Hole diameter is 1-7/8".
- · Buna N diaphragm and seals provide excellent elasticity and longer life.
- A tamper-resistant clamp is available. Units can be preset and locked to specific requirements.
- Order regulator with or without gauge.

#### **Performance Specifications**

Models & Dimensions, in. (mm)

Body:	Zinc die-cast
Seals:	Buna N
Diaphragm:	Buna N
Valve:	Brass
Spring Housing:	Glass-Filled Nylon
Cap and Knob:	High Impact ABS
Max. Inlet Pressure:	200 PSIG (13.8 bar)
Pressure Range in Regulator:	0 to 200 PSIG (0 to 13.8 bar)
Operating Temperature Range:	0° to 180° F (-18° to 82°C)
Gauge Port:	1/4" NPT
*Flow:	1/4" = 100 scfm (47 dm 3/s)
	3/8" = 130 scfm (61 dm 3/s)
	1/2" = 150 scfm (71 dm 3/s)

\*Air flow is at 100 PSIG (6.9 bar) inlet and 90 PSIG (6.2 bar) outlet.

**CAUTION:** Outlet pressure adjustment ranges are not minimum or maximum outlet pressure limits. Regulators can be adjusted to zero PSIG secondary pressure and, generally, to pressures in excess of those specified. The use of these regulators to control pressures outside of the specified ranges is not recommended.



**GRAPHIC SYMBOLS** 







#### Ordering

#### 1/4", 3/8" & 1/2" Ports

From the chart below, select the model number associated with port size and gauge option required. If other options are needed, use menu at bottom.

Port Size Npt	Flow Scfm	(Dm3/s)	Models Spring Range O To 50 Psig (0-3.5 Bar)	5-125 Psig (.4-8.6 Bar	Weight ) Lbs. (Kg)
relieving-	type with	out gauge			
1/4"	100	(47)	R27221-200	R27221-100	1.38 (.63)
3/8"	130	(61)	R27231-200	R27231-100	1.34 (.61)
1/2"	150	(71)	R27241-200	R27241-100	1.30 (.59)
relieving-type with gauge					
1/4"	100	(47)	R27221-700	R27221-600	1.38 (.63)
3/8"	130	(61)	R27231-700	R27231-600	1.34 (.61)
1/2"	150	(71)	R27241-700	R27241-600	1.30 (.59)

Select the basic model number associated with the port size desired. From the table below, select the numbers representing the regulator options required. For BSP threads, add -B to



R27241-600



#### end of model number.

Additional Models Available

NOTE: Not all menu combinations are valid. See price book to verify.



#### Accessories

Model No.	Description
100066	Gauge 0 - 60 PSIG
100067	Gauge 0 - 160 PSIG
100083	Gauge 0 - 300 PSIG
104107	Mounting Bracket
104172	Wall Mounting Kit
	(includes Panel Nut & Bracket.)
104173	Panel Mount Nut
104175	Tamper Resistant Kit
104177	Service Kit, Relieving Type
104178	Service Kit, Non-Relieving Type
104209	Knob Repair Kit
29594	Spring, 5 - 125 lb. (Gold)
29595	Spring, 0 - 50 lb. (Green)
29596	Spring, 10 - 200 lb. (Silver)
29623	Wall Mounting Bracket
29999	U-Bolt Mounting Bracket





29999 (13) .906 53 (23)29/32 (23) 188 (5)



104172 (includes Bracket & Nut)

104173

2 4

(61)



#### 1/4" & 3/8" Ports

Precision/Air regulators are high precision, multi-stage pressure regulators. The highest degree of regulation and repeatability are achievable by reacting to down stream pressure fluctuations as small as 0.01 PSIG (0.07 KPA) above set pressure. Action occurs as downstream pressure is piloted to the control chamber to act on a finely tuned stainless steel measuring capsule. A continuous bleed of less than 0.08 SCFM (0.15 m/hr.) works on the pilot diaphragm causing appropriate movement of the supply valve or the relief valve. Movements as small as .0001 inches (.0025mm) will cause the main valve to correct to the proper position. Relief flows of up to 10 SCFM can be achieved on the high relief model (-100 models). Exhaust is achieved through the exhaust vents located in the side of the body.

- The Precision/Air Regulator controls output pressure with an accuracy of 0.1%, and has very low sensitivity to changes in supply pressure and flow.
- This regulator has been designed to eliminate need for any readjustment of the regulated pressure after long "down time." At start-up, the regulated pressure will return to its output setting.
- The regulated pressure is held constant over substantial changes in flow due to the high-gain pneumatic servoamplifier. Particularly good from dead end to 203.4 m3/hr. (12 SCFM).
- The unit may be installed in any position. It can be panel mounted or supported by in-line plumbing.

Performance Specification	<b>S</b> Models & Dimensions, in. (mm)
Body:	Zinc die-cast
Diaphragm:	Buna N
Metering Capsule:	Stainless Steel
Knob:	Phenolic Plastic
Flow Capacity:	14 SCFM (25 m3/hr.)
Exhaust Capacity:	Up to 10 SCFM
Sensitivity:	.125 Inches (3.2 mm) Water Column
Total Air Consumption:	6 SCFH (.17 m3/hr.)
Pilot Bleed Rate:	0.08 SCFM (0.15 m3/hr.)
Supply Pressure Variation:	Less than .005 PSIG (.03 kpa) @ 25 PSIG variance
Maximum Supply Pressure:	150 PSIG (1050 kpa) A filter with 5 micron element should be installed ahead of unit.
Operating Temperature Range:	20° to 150°F (-7° to 66°C)



#### APPLICATIONS

- Air gauging
- Gas mixing
- Web tensioning
- Roll loading
- Air hoists





#### Ordering

#### 1/4" & 3/8" Ports

PORT		MODELS		
SIZE	FLOW	Spring Range		WEIGHT
NPT	2 to 120 PSIG (.4-8.6 bar)	2 to 60 PSIG .4-4.1 bar)	2-25 PSIG .4-1.7 bar)	lbs. (kg)
1/4"	PR4021-100	PR4021-200	PR4021-300	1.4 (.64)
3/8"	PR4031-100	PR4031-200	PR4031-300	1.4 (.64)



FLOW, SCFM (m<sup>3</sup>/hr)

Accessories

Precision/Air Regulators





#### 1/4", 3/8" & 1/2" Ports

ARO Module/Air 2000<sup>®</sup> Series "Piggyback" units are compact to save space, giving more design flexibility. The filter and regulator have a common inlet and a common outlet. This saves on space, set-up time and piping costs.

- Units have threaded ports for direct connection to pipe plumbing or, when used with modular port adapter kits, a single unit or combination of units can be piped into the air system in a modular arrangement.
- Push-pull, non-rising knob allows one-hand adjustment. Pull to adjust, push to lock. Arrows on the knob indicate pressure increase and decrease.
- Balanced valve-type diaphragm regulation assures positive pressure adjustment and rapid response to inlet pressure changes.
- Regulator offers in-line repairability. Valve and diaphragm can be replaced without removing unit from line.
- Bayonet bowl attachment provides easy filter element removal.
- Inlet / outlet is stamped into housing for easy air line hookup.
- Automatic drain has 1/8" NPT connection for draining away contaminant's.
- 10 PSIG minimum operating pressure.

NOTE: See cautions on the use of polycarbonate bowls. (Page 326)

-	
Body:	Zinc die-cast
Bowls:	Polycarbonate or Zinc d ie-cast
Bowl Guard:	Zinc die-cast
Sight Glass:	Polyimide-Nylon 12
Seals:	Buna N
Drain:	Brass and Buna N
Filter Element:	Porous polypropylene
Diaphragm:	Buna N
Valve:	Brass
Spring Housing:	Glass-Filled Nylon
Max. Inlet Pressure:	Polycarbonate bowl - 150 PSIG (10.4 bar)
	Metal bowl – 175 PSIG (12 bar)
Operating Temperature Range:	Polycarbonate Bowl - 0° to 125° F (-18° to 52°C)
	Metal Bowl - 0° to 175° F (-18° to 79°C)
Gauge Port:	1/4" NPT
*Flow:	1/4" = 93 scfm (44 dm 3/s)
	3/8" = 135 scfm (64 dm 3/s)
	1/2" = 140 scfm (66 dm 3/s)

#### Performance Specifications Models & Dimensions, in. (mm)

\*Air flow is at 100 PSIG (6.9 bar) inlet and 90 PSIG (6.2 bar) outlet.

**CAUTION:** Outlet pressure adjustment ranges are not minimum or maximum outlet pressure limits. Regulators can be adjusted to zero PSIG secondary pressure and, generally, to pressures in excess of those specified. The use of these regulators to control pressures outside of the specified ranges is not recommended.









#### Ordering

Port Size Npt	Flow Scfm	Model (Dm3/s)	Bowl Filter Size Element W/o Gauge W/ Gauge	Weight Oz. (MI)	(Micron)	Lbs. (Kg)
push drai	n • metal bo	wl with sigl	ht glass			
1/4"	93	(44)	P29221-110P29221-610	6.0 (177)	40	2.05 (.93)
3/8"	135	(64)	P29231-110P29231-610	6.0 (177)	40	2.03 (.92)
1/2"	140	(66)	P29241-110P29241-610	6.0 (177)	40	2.00 (.91)
push drai	n • polycarb.	bowl with	bowl guard			
1/4"	93	(44)	P29221-100P29221-600	6.0 (177)	40	2.05 (.93)
3/8"	135	(64)	P29231-100P29231-600	6.0 (177)	40	2.03 (.92)
1/2"	140	(66)	P29241-100P29241-600	6.0 (177)	40	2.00 (.91)
automatic drain • metal bowl with sight glass						
1/4"	93	(44)	P29221-114P29221-614	6.0 (177)	40	2.05 (.93)
3/8"	135	(64)	P29231-114P29231-614	6.0 (177)	40	2.03 (.92)
1/2"	140	(66)	P29241-114P29241-614	6.0 (177)	40	2.00 (.91)
automatic drain • polycarb bowl with bowl guard						
1/4"	93	(44)	P29221-104P29221-604	6.0 (177)	40	2.05 (.93)
3/8"	135	(64)	P29231-104P29231-604	6.0 (177)	40	2.03 (.92)
1/2"	140	(66)	P29241-104P29241-604	6.0 (177)	40	2.00 (.91)

# 

\*Note: 10-175 PSI pressure range can be ordered only with Metal Bowl or Metal Bowl with Sight Glass.



Select the basic model number associated with the port size desired. From the table below, select the numbers representing the options required. For BSP threads, add -B to end of model number.



#### Accessories

"Piggyback"				
Model	Description	Model	Description	
100066	Gauge 0-60 PSIG	104182	Sight Glass Service Kit	
100067	Gauge 0-160 PSIG	104202	Poly Bowl w/ Guard	
100083	Gauge 0-300 PSIG	104204	Metal Bowl w/ Sight Glass	
104107	Mounting Bracket	104206	Metal Bowl	
104149	Push Drain Kit	29594	Spring, 5-125 lb. (Gold)	
104172	Wall Mounting Kit	29595	Spring, 0-50 lb. (Green)	
	(includes Panel Nut & Bracket)	29596	Spring, 10-200 lb. (Silver)	
104173	Panel Mount Nut	29623	Mounting Bracket	
104175	Tamper Resistant Kit	29999	U-Bolt Mounting Bracket	
104179	Service Kit, Relieving Type	104068	Automatic Drain	
104180	Service Kit, Non-Relieving Type	104209	Knob Repair Kit	



104173 2.4 (61) 104172 (includes Bracket & Nut) 104172 (includes Bracket & Nut) 29999 29999

#### 1/4", 3/8" & 1/2" Ports

ARO Module/Air 2000® oil-fog lubricator features an adjustment needle on top of the transparent sight dome. The adjustment needle features finer threads and improved tolerances between the needle and seat. Lubricator drip rate adjustment is easier to set. The required amount of lubrication can be efficiently delivered for longer life of tools, cylinders, valves, pumps, air motors and other air-operated equipment.

- Lubricator can be filled while under pressure. This avoids the inconvenience of system pressure shut-down and the resulting downtime.
- The oil adjustment screw has an optional tamper-resistant cap which helps prevent unauthorized adjustment of oil.
- Increase / decrease markings on castings show direction to turn adjustment screw for easy oil drip set-up.
- Warning and technical information is printed in English, Spanish, French and German on standard units.
- Bayonet bowl attachment provides easy removal.
- Units have threaded ports for direct connection to pipe plumbing or, when used with modular port adapter kits, a single unit or combination of units can be piped into the air system in a modular arrangement.

#### NOTE: See cautions on the use of polycarbonate bowls. (Page 326)





#### Performance Specifications Models & Dimensions, in. (mm)

Body:	Zinc die-cast
Bowls:	Polycarbonate or Zinc die-cast
Bowl Guard:	Zinc die-cast
Sight Glass:	Polyimide-Nylon 12
Seals:	Buna N
Sight Dome:	Polycarbonate
Oil Capacity:	6 oz. (177 ml)
Max. Inlet Pressure:	Polycarbonate bowl — 150 PSIG (10.4 bar)
	Metal bowl — 175 PSIG (12 bar)
Operating Temperature Range:	Polycarbonate Bowl - 0° to 125° F (-18° to 52°C)
	Metal Bowl - 0° to 175° F (-18° to 79°C)
*Flow:	1/4"=75 scfm (35 dm 3/s)
	3/8" = 100 scfm (47 dm 3/s)
	1/2" = 110 scfm (52 dm 3/s)

\*Air flow is at 90 PSIG (6.2 bar) inlet and 10 PSIG (0.7 bar) pressure drop.





#### **Ordering Information**

1/4", 3/8" & 1/2" Ports

Port Size	F	low		Bowl Size	Weight
NPT	scfm	(dm 3/s)	Model	oz. (ml)	lbs. (kg)
Metal bowl with	ı sight glass				
1/4"	75	(35)	L26221-110	6.0 (177)	1.50 (.68)
3/8"	100	(47)	L26231-110	6.0 (177)	1.44 (.65)
1/2"	110	(52)	L26241-110	6.0 (177)	1.36 (.62)
Polycarb. bowl with bowl guard					
1/4"	75	(35)	L26221-100	6.0 (177)	1.50 (.68)
3/8"	100	(47)	L26231-100	6.0 (177)	1.44 (.65)
1/2"	110	(52)	L26241-100	6.0 (177)	1.36 (.62)

From the chart at left, select the model number associated with port size and bowl option required. If other options are preferred, use menu below.

#### Additional Models Available

Select the basic model number associated with the port size desired. From the table below, select the numbers representing the lubricator options required. For BSP threads, add -B to end of model number.



#### Lubricator

Model No.	Description
104027	Tamper-Resistant Plug
104107	Mounting Bracket
104181	Service Kit
104182	Sight Glass Service Kit
104203	Polycarbonate Bowl w/ guard
104205	Metal Bowl w/ sight glass
104207	Metal Bowl
104211	Metal Bowl w/ sight glass and Quick-Fill Adapter
104226	Sight Dome Service Kit
29235	Quick-Fill Adapter
29665	Lubricating Oil (1 qt.) For additional details, see page 319.



L26241-100



29665



104211

#### **Modular Spacer Kit**

Spacer has retained O-rings and allen head screws for ease of assembly/disassembly. One spacer kit is required to connect any two units or accessories together in the modular format. Kit includes: the spacer block, two clamps and two O-rings. Screws take a size 4mm or 5/32" allen head wrench. To assemble, simply put the spacer between the units and tighten screws for a secure seal. Fits all port sizes.

#### Threaded 1/4"- 3/4" NPT Pipe Adapters

Threaded pipe adapter blocks allow a single unit or multiple units to be plumbed into an air system in the modular arrangement. These pipe adapters allow for ease of service when removing a unit from the line. The adapters can also be used to pipe different diameters (in and out) in the plumbing set-up. Kit includes two adapters and two spacer kits (Model 104167). See page 308 for mounting dimensions.

#### **T-Type Wall Mounting Brackets**

These brackets provide heavy duty wall mounting. They are excellent for mounting a single unit or multiple units which are in the modular arrangement. T-type mount gives good wall-to-unit clearance for installing fittings and other connections. Kit includes a spacer, bracket and clamp.

#### **Right Angle Piping Bracket Kit**

90° elbow brackets provide for neater air installations by bringing air into the backside of units and hiding all pipe connections. Kit includes two 90° elbows and two spacer kits (Model 104167). See page 308 for mounting dimensions.

#### Wall Mounting Kit

May be used to mount FRL combo units which include a regulator, "Piggyback" Filter/Regulator units, or individual regulators. Kit includes Model 29623 Bracket and Model 104173 Panel Mounting Nut. Bracket and Nut may be ordered individually.

#### Modular Manifold Block Kit

This manifold can be installed before or after any unit in the modular arrangement, providing four additional 1/4" NPT ports for greater circuit design flexibility. When installed between the regulator and lubricator, clean, regulated air can be used to signal other equipment. Kit includes: manifold, two spacers, three pipe plugs, four clamps and O-rings. On Pipe Port Adapters, Manifold Kits, 3-Way Shut-off Valves and Piping Bracket Kit, Threads are NPT.



Model 104168-2 1/4" NPT Ports 104168-3 3/8" NPT Ports 104168-4 1/2" NPT Ports 104168-6 3/4" NPT Ports







Model 104172



Model 104170











Manifold creates four additional 1/4" NPT outlet ports

#### Accessories

#### Safety Shutoff, Lockout Valve

Meets OSHA Lockout/Tagout regulation 1910.147. Exhaust-type safety shutoff valve can be used in the modular arrangement or in-line, depending on application requirements. The safety shut-off valve should be installed upstream from the F-R-L unit, and it is excellent for isolating and depressurizing a downstream unit requiring maintenance. The valve operates by pushing the lever down (closed position), exhausting downstream air. The valve may be locked in the exhausted position. When using the valve in the modular arrangement, it is secured to the unit with a modular spacer or T-type modular bracket.

#### **Performance Specifications**

Models & Dimensions, in. (mm)

Max. Inlet:	175 PSIG (12 bar)
Max. Temperature:	0° to 125° F (-18° to 52°C)
Body:	Zinc die-cast
Seals:	Buna N
Slide:	Delrin

#### Ordering

MODEL	PORT SIZE
104174-2	1/4" NPT
104174-3	3/8" NPT
104174-4	1/2" NPT
100085	Lockout Hasp

#### Note

ARO Safety Lockout Valves meet OSHA Lockout/Tagout regulation 1910.147, which requires protection from unexpected start up of a machine during service or maintenance.









Shown as individual unit.





#### Accessories Air System Components

#### Accessories

#### **Pressure Switch**

Pressure Switch allows the sensing of high or low pressure thresholds. Use with Model 104170 Manifold Block. Features include:

- Water resistant
- External pressure adjustment with allen screw
- Can be wired normally open or normally closed
- Computer-compatible since it allows electrical current to flow or to be stopped.

#### **Performance Specifications**

Models & Dimensions,	in.	(mm	)
Modium:			

Medium:	Compressed Air
Modium.	oomprosou An
Max. Operating Pressure:	150 PSI (10.4 bar)
Adjustable Pressure Range:	20 to 100 PSI (1.4 to 6.9 bar)
Differential Pressure:	5 to 10 PSI (0.3 to 0.9 bar)
Operating Temperature Range:	-40° to 300° F
Weight:	11 oz.
Contact Type:	N.O./ N.C.
Contact Ratings:	5 Amps at 125 VDC
	5 Amps at 250 VAC
Contact:	Silver Alloy wiping contact with snap action
Accuracy:	20% accuracy or better. Switch is $\pm 2$ or 5% of set point(whichever is greater)
Cycle Life:	1,000,000 plus
Thread:	1/4-18 NPT male

#### Ordering

MODEL	DESCRIPTION
104196	Switch only (without connector)
Coil Connectors	
104196-CHW	Switch with molded cable connector, 36" leads
104196-CSN	Switch with strain relief connector
104196-CDW	Switch with 1/2" conduit connector, 18" leads







Model 104196



104196-CHW



104196-CDW



104196-CSN



#### Air Systems Components Module/Air 3000 Piggyback Lubricator

#### **Features**

- The Module/Air 3000 Heavy-Duty Series units extends the life of air operated equipment while reducing operating costs. These unites efficiently remove solid particles from compressed air lines-making them the perfect choice for large flow applications.
- Polycarbonate bowl with metal guard standard
- Automatic drain has pipe connection for draining away contaminants.
- Push-pull, non-rising adjustment knob.
- Bracket and Gauge comes standard with all units.

#### **Performance Specifications**

Construction:	Piston Type Regulation
Material:	Body/Aluminum Die-Cast
	Bowl/Polycarbonate
Filter Element:	40 Micron (Standard)
Temperature Range:	14 to 140 F (-10 to 60 C)
Pressure Range:	5 to 170 PSI (.4 to 11.7 bar)
Max. Pressure:	170 PSI (11.7 bar)
Max. Flow Rate:	Piggyback, 300 scfm
	Lubricator, 320 scfm
Media:	Compressed Air
Bowl Capacity:	Filter, 7 oz.
	Lubricator, 8 oz.
Seals:	Buna-N
Weight:	Piggyback-Lube, 4.6 lbs. (2105 g)
	Piggyback, 3 lbs. (1360 g)

#### Ordering

MODEL	DESCRIPTION
P29351-600	Piggyback, 3/4" NPT, w/Gauge & Bracket
P29361-600	Piggyback, 1" NPT, w/Gauge & Bracket
P29351-604	Piggyback, 3/4" NPT, w/Gauge, Bracket & Auto Drain
P29361-604	Piggyback, 1" NPT, w/Gauge, Bracket & Auto Drain
C28351-600	Piggyback/Lube Combo, 3/4" NPT, w/Gauge & Bracket
C28361-600	Piggyback/Lube Combo, 1" NPT, w/Gauge & Bracket
100067	Gauge, 0-160 PSI
104282	Bracket
104283	Auto Drain
104284	Filter Element, 40 Micron (Standard)
104285	Filter Element, 5 Micron
104286	Filter Bowl
104287	Lubricator Bowl







C28351-600



C28361-600



P293X1-60X

#### 1/2", 3/4" & 1" Ports

For application and feature/ benefit information for the combination units on this page, refer to individual component pages: Filters - page 47

Regulators - page 48 Lubricators - page 49

#### **Performance Specifications**

Max. Inlet Pressure:	200 PSIG (13.8 bar)
Operating Temperature Range:	0° to 125° F (-18° to 52° C)
Filter Element:	40 Micron
Bowl:	Polycarbonate w/ Bowl Guard
Pressure Range in Regulator:	5 to 125 PSI (.4 to 8.6 bar)
Gauge:	0 to 160 PSI



GRAPHIC SYMBOL



#### Ordering

PORT							
SIZE					COMPONENTS	;	PIPE
NPT	MODEL	LBS. (kg)	FILTER	REGULATOR	LUBRICATOR	GAUGE	NIPPLE
Select the	basic model	number whic	h represents	the port size de	esired. If other	options ar	e desired,
order each	n component	t separately.					

1/2"	28343	10.16 (4.61)	25341-020	27344-000	26341-020	100067	Y27-54-C
3/4"	28353	10.12 (4.59)	25351-020	27354-000	26351-020	100067	Y27-55-C
1"	28363	9.37 (4.25)	25361-020	27364-000	26361-020	100067	Y27-56-C
NOTE chiesed upperscripted. For according unit shares the last disit from 0.45.0. Events 10.00050							

NOTE: Shipped unassembled. For assembled unit, change the last digit from 3 to 8. Example: 28358.

#### **Performance Specifications**

#### Filter-Regulator

Max. Inlet Pressure:	200 PSIG (13.8 bar)
Operating Temperature Range:	0° to 125° F (-18° to 52° C)
Filter Element:	40 Micron
Bowls:	Polycarbonate w/ Bowl Guard
Pressure Range in Regulator:	5 to 125 PSI (.4 to 8.6 bar)
Gauge:	0 to 160 PSI

#### Ordering

PORT							
SIZE		GAUGE	WEIGHT	CON	IPONENTS		PIPE
NPT	MODEL	PORT	LBS. (kg.)	FILTER	REGULATOR	GAUGE	NIPPLE
Select the basic model number which represents the port size desired. If other options are desired,							
order ea	ach compor	ent senarate	elv.				

order each component separately.							
1/2"	28344	1/4"	7.11 (3.22)	25341-020	27344-000	100067	Y27-54-C
3/4"	28354	1/4"	7.06 (3.20)	25351-020	27354-000	100067	Y27-55-C
1"	28364	1/4"	6.46 (2.93)	25361-020	27364-000	100067	Y27-56-C
NOTE OF							

NOTE: Shipped unassembled. For assembled unit, change the last digit from 4 to 9. Example: 28349





#### Air Systems Components Heavy-Duty Series Filter-Regulator-Lubricator

#### **Performance Specifications**

#### 1/2", 3/4" & 1" Ports

Max. Inlet Pressure:	200 PSIG (13.8 bar)
Operating Temperature Range:	0° to 125° F (-18° to 52° C)
Filter Element:	40 Micron
Bowl:	Polycarbonate with metal guard
Lubricator:	Combination Fog-Type / Drop-Type

#### Ordering

PORT	COMPONENTS					
SIZE	WEIGHT					
NPT	MODEL	LBS. (kg)	FILTER	LUBRICATOR	NIPPLE	
Select the basic model number which represents the port size desired. If other options are desired, order each component separately.						
1/2"	28342	6.61 (3)	25341-020	26341-020	Y27-54-C	
0.741	00050	0.50 (0.00)	05054 000	00054 000	V07 FF 0	

1"	28362	6.13 (2.78)	25361-020	26361-020	Y27-56-C
3/4"	28352	6.52 (2.96)	25351-020	26351-020	Y27-55-C
1/2	20042	0.01 (0)	20041 020	20041 020	121 04 0

NOTE: Shipped unassembled. For assembled unit, change the last digit from 2 to 7. Example: 28347





#### **Heavy Duty Series**

Filter-Regulator-Lubricator



Filter-Regulator





Filter-Lubricator





#### 1/2", 3/4" & 1" Ports

These ARO Heavy-Duty Series filters extend the life of air-operated equipment while reducing maintenance costs. These units efficiently remove solid particles from compressed air lines – making them the perfect choice for large flow applications.

- The baffle and filter assembly is completely encased, leaving the entire bowl for sump.
- Polycarbonate bowl and metal guard standard.
- · Tie-rod filter assembly permits quick, easy service.
- Twist drain is brass construction with large passage area for draining.
- Optional automatic drain has 1/8" pipe outlet for draining away contaminant's.

#### **Performance Specifications**

	•		
Sump Capacity:	10 oz. (295 ml)	Body:	Zinc Die Cast
Filter Area:	9.1 in. (5871 mm)	Bowls:	Polycarbonate or Steel
Max. Inlet Pressure:	Polycarbonate Bowl -	Bowl Guards:	Steel With E-Coat Finish
	200 PSIG (13.8 bar)	Seals:	Buna-N
	Metal Bowl -	Drain:	Brass Twist Type
	250 PSIG (17 bar)	Element:	Sintered Bronze
Oper. Temp. Range:	Polycarbonate bowl -		5, 20, 40 Micron
	0° to 125° F (-18° to 52° C)		
	Metal Bowl -		



25361-020





\*Air flow is at 125 PSIG (8.6 bar) and 100 PSIG (6.9 bar) outlet.

#### Ordering

Weight:

\*Flow:

Select basic model representing the port size desired. Add number representing filter options required.

0° to 200° F (-18° to 93° C)

1/2" = 82 SCFM (39 dm3/s),

3/4" = 87 SCFM (41 dm3/s) 1" = 88 SCFM (42 dm3/s)

1/2 = 3.62 lbs. (1.65 kg), 3/4" = 3.48 lbs. (1.58 kg)

1" = 3.26 lbs. (1.48 kg)



#### Accessories

Filter					
MODEL	DESCRIPTION	MODEL	DESCRIPTION	MODEL	DESCRIPTION
29397	Bowl Guard	29390	5 Micron Element	104020	Service Kit
29967	Metal Bowl	29391	20 Micron Element	104069	Polycarbonate Bowl
29969-2	Automatic Drain	29392	40 Micron Element	Y57-1	Twist Drain



#### 1/2", 3/4" & 1" Ports

These ARO Heavy-Duty Series regulators provide accurate and quick response to flow demands and line pressure changes, giving air-powered equipment the precise air pressure control needed.

- Zinc die-cast bodies are corrosion-resistant.
- Units can be panel-mounted.
- Balanced valve eliminates chatter and increases accuracy.
- Diaphragms and seals are nylon reinforced for enhanced elasticity and seal life.
- Easy-turn adjustment knob provides precise regulation under any pressure.

#### **Performance Specifications**

Max. Inlet Pressure:	250 PSIG (17 bar)	Spring Housing:	Zinc Die Cast			
Press. Range in Reg.:	0 to 250 PSIG (0 to 17 bar)	Body:	Zinc Die Cast			
Oper. Temp. Range:	0° to 200° F (-18° to 93° C)	Seals:	Buna-N			
Gauge Port:	1/4" NPT	Diaphragm:	Buna-N			
Weight:	1/2 = 3.30 lbs. (1.5 kg),	Valve:	Brass			
	3/4" = 3.21 lbs. (1.45 kg)	Knob:	High Impact ABS			
	1" = 2.82 lbs. (1.28 kg)					
*Flow:	1/2" = 256 SCFM (121 dm3/s),					
	3/4" = 287 SCFM (135 dm3/s)					
	1" = 293 SCFM (138 dm3/s)					
*Air flow is at 125 PSIG (8.6 bar) and 100 PSIG (6.9 bar) outlet.						

27364-600

GRAPHIC SYMBOLS





\*CAUTION: Outlet pressure adjustment ranges are not minimum or maximum outlet pressure limits. Regulators can be adjusted to zero PSIG secondary pressure and, generally, to pressures in excess of those specified. The use of these regulators to control pressures outside of the specified ranges is not recommended.



#### Select the basic model number which represents the port size desired. From table below, select the number representing required. Order accessories concernately

Ordering



#### Accessories

Regulator						
MODEL	DESCRIPTION	MODEL	DESCRIPTION			
100066	Gauge 0-60 PSIG (0-4 bar)	29970	Mounting Bracket (U-Bolt Type),			
100067	Gauge 0-160 PSIG (0-11 bar)		3/4" and 1" Pipe			
100083	Gauge 0-300 PSIG (0-21 bar)	29960	Service Kit, Relieving Type			
29077	Mounting Bracket, L-Type	29995	Service Kit, Non-Relieving Type			
29999	Mounting Bracket (U-Bolt Type),	29002	Spring, 5-125 lb. (Gold)			
	1/4", 3/8" and 1/2" Pipe	29119	Spring, 0-50 lb. (Green)			
		29120	Spring, 10-250 lb. (Silver)			

#### 1/2", 3/4" & 1" Ports

Extra rugged Heavy-Duty Series lubricators deliver the reliable lubrication needed for long service life of air line system and equipment. Units are convertible from droptype to fog-type by rotating sight dome 180 degrees. For best results, lubricator should be located as close as possible to equipment being lubricated.

- · Zinc die-cast bodies are corrosion-resistant.
- Tie-rod construction simplifies unit disassembly for quick and easy servicing.
- Two separate fill plugs allow unit to be filled from front or back. Lubricators can be filled under pressure. A quick-fill adapter is available for fast, easy filling.
- · Polycarbonate bowl allows visual monitoring. Metallic bowl available for applications involving the use of harsh chemicals. Standard bowl guard protects polycarbonate bowl.

#### **Performance Specifications**

Max. Inlet Pressure:	250 PSIG (17 bar)	Body:	Zinc Die Cast
	Metal 200 PSIG (13.8 bar)	Bowls:	Polycarbonate or Steel
	Polycarbonate	Bowl Guards:	Steel With E-Coat Finish
Oper. Temp. Range:	Polycarbonate bowl -	Sight Glass:	Polyimide Nyloniz
	0° to 125° F (-18° to 52° C)	Seals:	Buna-N
	Metal Bowl -		
	0° to 200° F (-18° to 93° C)		
Oil Capacity:	10 oz. (295 ml)		
Weight:	1/2" = 2.98 lbs. (1.35 kg),		
	3/4" = 2.83 lbs. (1.28 kg)		
	1" = 2.70 lbs. (1.22 kg)		
*Flow:	1/2" = 65 SCFM (31 dm3/s),		
	3/4" = 75 SCFM (35 dm3/s)		
	1" = 75 SCFM (35 dm3/s)		

\* Flow is at 90 PSIG (6.2 bar) inlet and 5 PSIG (0.4 bar) pressure drop.

#### Ordering

Select the basic model number which represents the port size desired. From table below, select the number representing lubricator options required.



#### Accessories

Lubricator					
MODEL	DESCRIPTION	MODEL	DESCRIPTION		
104069	Polycarbonate Bowl	29665	ARO Lubricating Oil (1 Quart). See pg. 71.		
29967	Metal Bowl	104023	Service Kit		
29397	Bowl Guard	Y57-1	Twist Drain		
29235	Quick-Fill Adapter				





26361-220 with tamper **Resistant Cap** 

**GRAPHIC SYMBOL** 









29967

#### 3/4", 1", 1-1/4" & 1-1/2" Ports

For application and feature/ benefit information for the combination units on this page, refer to individual component pages: Filters - page 296 Regulators - page 297 Lubricators - page 298

#### **Performance Specifications**

-	
Max. Inlet Pressure:	250 PSIG (20.7 bar)
Operating Temperature Range:	0° to 175° F (-18° to 79° C)
Filter Element:	40 Micron Sintered Bronze
Bowl:	Metal Bowl/w Sight Glass
Pressure Range in Regulator:	5 to 125 PSI (.4 to 8.6 bar)
Gauge:	0 to 160 PSI





 $\square$ 

#### Ordering

PORT				COMPONENTS			
SIZE		WEIGHT					PIPE
NPT	MODEL	LBS. (kg)	FILTER	REGULATOR	LUBRICATOR	GAUGE	NIPPLE
Select the	e basic model	number which r	epresents the p	oort size desired. If	other options ar	e desired,	order each

compon	ient separately.						
3/4"	C28453-810	11.50 (5.23)	F25451-110	R27451-100	L26451-110	100067	Y27-55-C
1"	C28463-810	11.50 (5.23)	F25461-110	R27461-100	L26461-110	100067	Y27-56-C
1-1/4"	C28473-810	11.50 (5.23)	F25471-110	R27471-100	L26471-110	100067	Y27-57-C
1-1/2"	C28483-810	10.50 (4.77)	F25481-110	R27481-100	L26481-110	100067	Y27-58-C

NOTE: Combinations models are shipped unassembled.

#### **Dimensional Data**

#### Super-Duty





299

#### 3/4", 1", 1-1/4" & 1-1/2" Ports

ARO Super-Duty filters are specifically designed for use in applications where large air flow and bowl capacities are required. The removal of liquid and solid contaminant's by these filters protects air tools, valves, cylinders and pumps.

- · Aluminum die-cast housings are lightweight and corrosion-resistant.
- 40 micron sintered bronze filter element has a large surface area and can be cleaned and replaced for long service life.
- Filter utilizes a depth-type element assembly that can be disassembled and cleaned without the use of tools *or* removal from the air line.
- Metal bowl with sight glass is standard. Bowl also features a spiral ramp thread to permit quick disconnect for easy filter maintenance.

#### Performance Specifications

Bowl Capacity:	32 oz. (946 ml)
Max. Inlet Pressure:	250 PSIG (17 bar)
Oper. Temp. Range:	0° to 175° F (-18° to 79° C)
Weight:	3/4" = 5.0 lbs. (2.27 kg)
	1" = 5.0 lbs. (2.27 kg)
	1-1⁄4" = 4.65 lbs. (2.11 kg)
	1-1⁄2" = 4.30 lbs. (1.95 kg)
*Flow:	3/4" = 345SCFM (163 dm3/s),
	1" = 345 SCFM (163 dm3/s)
	1-1/4" = 445 SCFM (210 dm3/s),
	1-1/2" = 445 SCFM (210 dm3/s)
Body:	Aluminum
Bowl:	Aluminum
Sight GlasS:	Pyrex
Seals:	Buna-N
Element:	Sintered Bronze 40 Micron

Note:\*Maximum Flow at 90 PSIG (6.9 bar) inlet pressure and 5 PSIG (.4 bar) pressure drop.

#### Ordering

Select basic model representing the port size desired. Add number representing filter options required.





F25481-110



#### **Dimensional Data**






#### 2" Ports

ARO Super-Duty filters are specifically designed for use in applications where large air flow and bowl capacities are required. The removal of liquid and solid contaminant's by these filters protects air tools and other equipment.

- · Aluminum die-cast housings are lightweight and corrosion-resistant.
- 40 micron sintered bronze filter element has a large surface area and can be cleaned and replaced for long service life.
- Filter utilizes a depth-type element assembly that can be disassembled and cleaned without the use of tools *or* removal from the air line.
- Metal bowl with sight glass is standard. Bowl features a bayonet connection to permit quick disconnect for easy maintenance.

### **Performance Specifications**

Max. Inlet Pressure:	250 PSIG (17 bar)
Oper. Temp. Range:	0° to 175° F (-18° to 79° C)
Weight:	2" = 16.5 lbs. (7.5 kg)
*Flow:	2" = 1300 SCFM (613 dm3/s)
Body:	Aluminum
Bowl:	Aluminum
Sight Glass:	Pyrex
Seals:	Buna-N
Element:	Sintered Bronze 40 Micron



F25491-110



\*Flow is at 90 PSIG (6.2 bar) inlet and 5 PSIG (.4 bar) pressure drop.

## Ordering

Select basic model representing the port size desired. Add number representing filter options required.



Dir	nens	sion	al I	Data



		2" I	Ports	3										_
bar	psig	Inlet	ps	i			25		40		60		90	
1.0_	_14	Pres	sure	(bar)	_		(1.6)	_	(2.8)		(4.0)		(6.3)	
							/		$\boldsymbol{V}$		V		Υ	120
.8_	-12						$\vdash$			┢╱				(8.0)
	L10						V			Ζ_		r		150
.6_	Γ.							7			Y			(10.0) 180
	⊢° ∣									┢╴			ľ	(12.5)
4	L6						V				<u>۲</u>		r	
						$\boldsymbol{\Lambda}$						r		
	<b>-</b> 4			_	$\leftarrow$		⊬>	1	6					
.2-	L													
	Γ		$\mathbb{N}$	$\mathbb{N}$	N	$\mathbb{N}$								
0_	Lol			$\sim$										
		0 2	00 40	0 60	00 8	00 10	00 12	00 14	00 16	00 18	00 20	00 22	200 so	fm
			100	200	300	400	500	600	700	800	900	1000	) di	n³/s
				200			FL	ow			500			

Accessories						
Model	Description	Model	Description			
104068	Automatic Drain	104228	40 Micron Element			
104229	Service Kit	104241	Twist Drain			
104230	Sight Glass Kit	104227	5 Micron Element			

#### 3/4", 1" & 1-1/4" Ports

ARO Super-Duty high performance oil removal filters are designed to remove 99% of the oil and water aerosols found in all compressed air lines.

- Pop-up filter service indicator is standard. Indicator changes from green to red when . element needs to be replaced.
- Super efficient coalescing filter element removes particles down to 0.01 micron. •

## **Performance Specifications**

Bowl Capacity:	32 oz. (946 ml)
Max. Inlet Pressure:	250 PSIG (17 bar)
Oper. Temp. Range:	0° to 175° F (-18° to 79° C)
Weight:	1-1/4 = 4.65 lbs. (2.11 kg),
*Flow:	3/4" = 50 SCFM (24 dm3/s),
	1" = 150 SCFM (71 dm3/s),
	1-1/4"= 150 SCFM (71 dm3/s)
Body:	Aluminum
Bowl:	Aluminum
Sight Glass:	Pyrex
Seals:	Buna-N
Drain:	Twist Type
Element:	Synthetic Fiber and Polyurethane Foam



F25462-310

\*Flow is at 90 PSIG (6.2 bar)inlet and 5 PSIG (.4 bar) pressure drop.

### Ordering

Select basic model representing the port size desired. Add number representing filter options required.



Accessories							
Model	Description	Model	Description				
104068	Automatic Drain	104231	Coalescing Element				
104115	U-Bolt Mounting Bracket	104241	Twist Drain				
104116	Service Kit	104246	Mechanical Filter Service				
104163	Sight Gauge Kit		Indicator				

## **Dimensional Data**





#### 1-1/2" & 2" Ports

ARO Super-Duty high performance oil removal filters are designed to remove 99% of the oil and water aerosols found in all compressed air lines.

- Pop-up filter service indicator is standard. Indicator changes from green to red when element needs to be replaced.
- Super efficient coalescing filter element removes particles down to 0.01 micron.

### **Performance Specifications**

Sump Capacity:	6 oz. (946 ml)
Max. Inlet Pressure:	250 PSIG (17 bar)
Oper. Temp. Range:	0° to 175° F (-18° to 79° C)
Weight:	1-1/2"= 16.0 lbs. (7.27 kg)
	2"= 6.5 lbs. (7.5 kg)
*Flow:	1-1/2"= 440 SCFM (207 dm3/s)
	2"= 1000 SCFM (472 dm3/s)
Body:	Aluminum
Bowl:	Aluminum
Sight Glass:	Pyrex
Seals:	Buna-N
Element:	Synthetic Fibber and Polyurethane Foam

\*Flow is at 90 PSIG (6.2 bar)inlet and 5 PSIG (.4 bar) pressure drop.

## Ordering

Select basic model representing the port size desired. Add number representing filter options required.

2 = W	ith Mechanical Standard)	3 = Coalescing	1 = Metal Bowl w/Sight Glass	0 = Manual Drain 1 = Auto Drain
Filter Se		Filter Element	Bowl Ontion	Drain Option
PORT S 1-1/2 2"	IZE BASIC MODEI 2" F2548X- F2549X-	3X X 3X X	Shaded area indicates Best-Selling Models	

**NOTE:** For maximum element service life, install a general purpose filter with a 5 micron element upstream of the coalescing filter.

Accessories							
Model	Description	Model	Description				
104068	Automatic Drain	104230	Sight Glass Kit				
104115	U-bolt Mounting Bracket	104232	Coalescing Element				
104229	Service Kit	104241	Twist Drain				

\*Flow is at 90 PSIG (6.2 bar)inlet and 5 PSIG (.4 bar) pressure drop.

## **Dimensional Data**



MANUAL DRAIN



AUTOMATIC DRAIN





#### 3/4", 1", 1-1/4 & 1-1/2" Ports

Super-Duty Series regulators are used in large flow compressed air systems to help maintain constant outlet pressure. Gauge ports are 1/4" full flow and can be used as auxiliary outlet ports.

- Units can be mounted to a panel that is 1/16" min. to 5/32" max. thickness. •
- Aluminum Die Cast body is light weight and corrosion resistant. .
- Non-rising adjustment knob can be locked. Easy adjustment under any pressure. .
- Buna N diaphragms and seals provide excellent elasticity and long seal life. •
- . Balanced valve design gives accurate and guick response to flow demands.

#### Performance Specifications

Max. Inlet Pressure:	300 PSIG (20.7 bar)
Press. Range in Reg.:	5 to 250 PSIG (.4 to 17 bar)
Oper. Temp. Range:	0° to 175° F (-18° to 79° C)
Weight:	3/4" = 3.51 lbs. (1.60 kg), 1" = 3.22 lbs. (1.46 kg) 1-1/4 = 2.90 lbs. (1.31 kg), 1-1/2" = 2.58 lbs. (1.17 kg)
*Flow:	3/4" = 180 SCFM (85 dm3/s), 1" = 200 SCFM (94 dm3/s) 1-1/4" = 440 SCFM (207 dm3/s), 1-1/2" = 440 SCFM (207 dm3/s)
Spring Housing;	Aluminum
Body;	Aluminum
Seals:	Buna-N
Diaphragm:	Buna-N
Valve:	Aluminum & Nylon
Knob:	High Impact

\*Air flow is at 150 PSIG (10.4 bar) and 90 PSIG (6.9 bar) outlet ..

### Ordering

Select the basic model number which represents the port size desired. From table below, select the number representing lubricator options required.



2= 5 - 50 3=10 - 250

) (	(.4 - 3.5)	ino gauge	
) (	(7 - 17)	No gauge	

Accessories							
Model	Description	Model	Description				
100066	Gauge 0-60 PSIG (0-4)	104115	U-Bolt Mounting Bracket				
100067	Gauge 0-160 PSIG (0-11)	104120	Spring, 5-50 lb.				
100083	Gauge 0-300 PSIG (0-21)	104121	Spring, 5-125 lb.				
104117	Service Kit, Relieving Type	104122	Spring, 15-250 lb.				
104114	Panel Nut & Mounting Bracket						

\*CAUTION: Outlet pressure adjustment ranges are not minimum or maximum outlet pressure limits. Regulators can be adjusted to zero PSIG secondary pressure and, generally, to pressures in excess of those specified. The use of these regulators to control pressures outside of the specified ranges is not recommended.



R27461-100 (order gauges separately)



## **Dimensional Data**



304

#### 2" Ports

Super-Duty High Flow regulators are used in large flow compressed air systems to help maintain constant outlet pressure. Gauge ports are full flow and can be used as auxiliary outlet ports.

- · Aluminum Die Cast body is light weight and corrosion resistant.
- Non-rising adjustment knob can be locked. Easy adjustment under any pressure.
- Balanced valve design gives accurate and quick response to flow demands.
- Exceptionally high relief flow.

## **Performance Specifications**

Max. Inlet Pressure:	450 PSIG	Spring Housing	Aluminum
Press. Range in Reg:	15 to 250 PSIG (1.0 to 17 bar)	Body	Aluminum
Oper. Temp. Range:	0° to 175° F (-18° to 79° C)	Seals	Buna-N
Weight:	2" = 9 lbs. (4.1 kg)	Diaphragm	Buna-N
*Flow:	2" = 1000 SCFM (472 dm3/s)	Valve	Teflon
-	-	Knob	High Impact ABS

\*Air flow is at 100 PSIG (10.4 bar) and 90 PSIG (6.9 bar) outlet.

**Ordering** Dimensions, in. (mm)

Select model representing port size and pressure range desired. **Order gauge and accessories separately.** 

PORT Size NPT	MODEL	GAUGE PORT NPT	EXHAUST Port NPT	PRESSUR PSIG	E RANGE* Bar	
2"	R27491-100	1/4"	3/4"	5-125	.4-8.6	
2"	R27491-200	1/4"	3/4"	5-50	.4-5	
2"	R27491-300	1/4"	3/4"	15-250	1.1-17	

Shaded area indicates Best-Selling Models

NOTE: All models are relieving type only.

\*CAUTION: Outlet pressure adjustment ranges are not minimum or maximum outlet pressure limits. Regulators can be adjusted to zero PSIG secondary pressure and, generally, to pressures in excess of those specified. The use of these regulators to control pressures outside of the specified ranges is not recommended.



R27491-100



## **Dimensional Data**





#### 3/4", 1", 1-1/4 & 1-1/2" Ports

ARO Super-Duty High Flow lubricators are designed for application in compressed air systems where a constant ratio of oil-to-air is desired over widely varying air flows. They provide lubrication to air tools, cylinders, and other air-powered equipment. Recommended for lengthy, complex piping systems or multiple points of lubrication.

- · Bodies feature aluminum die-cast construction for corrosion resistance.
- Oil feed adjustment has a screw driver adjustment that offers tamper-resistant capability. Automatic flow sensing delivers oil in proportion to air flow.
- Bowl is aluminum with glass sight gauge and has a spiral ramp thread to permit quick disconnect for easy maintenance.
- Optional quick-fill adapter and fill pump are available for lubricator filling and maintenance. See accessories below.

#### **Performance Specifications**

Max. Inlet Pressure:	250 PSIG (17 bar)
Oper. Temp. Range:	0° to 175° F (-18° to 79° C)
Oil Capacity:	32 oz. (946 ml)
Weight:	3/4" = 4.60 lbs. (2.09 kg),
	1" = 4.30 lbs. (1.95 kg)
	1-1/4" = 3.94 lbs. (1.79 kg),
	1-1/2" = 3.58 lbs. (1.62 kg)
*Flow:	3/4" = 190 SCFM (90 dm3/s),
	1" = 200 SCFM (94 dm3/s)
	1-1/4" = 220 SCFM (104 dm3/s),
	1-1/2" = 220 SCFM (104 dm3/s)
Body:	Aluminum
Sight Glass:	Pyrex
Seals:	Buna-N

\* Flow is at 90 PSIG (6.2 bar) inlet and 5 PSIG (.4 bar) pressure drop.

## Ordering

Select basic model representing the port size desired. Add number representing filter options required.



Description
Service Kit
ARO Lubricating Oil. (See page 71).
Sight Feed Dome Kit
Sight Gauge Kit
Quick-Fill Adapter (1/8"-27 Threads)
U-Bolt Mounting Bracket
Twist Drain Kit



L26481-110



## **Dimensional Data**









**Dimensional Data** 

Module/Air 2000 Series



## Air Systems Components FRL Mounting Options

## **Features**

**Miniature Series** 



104039 Stud Mount For use on Piggyback and Regulator units.



29668 Mounting Bracket with 104094 Panel Mounting Nut For Use on Piggyback and Regulator units.





Panel Mounting Use 104094 Panel Mounting Nut Use 29722 for Panel Mount Gauge





U-Bolt Mounting Brackets 29999 for 1/2" pipe 29970 for 3/4" & 1" pipe

**Super Duty Series** 





-11-

29077 L- Type Mounting Bracket

104115 U- Bolt Mounting Bracket For both 1 1/4" & 1 1/2" pipe

# Performance Specifications 1/8" & 1/4" NPT

## For Compressed Air or Inert Gas

GRAPHIC SYMBOL



Lens:	Polycarbonate or Glass
Connection Location:	Centered back or bottom
Scale:	Dual - PSIG and bar
Accuracy:	2% of full scale at mid range.
	3% of full scale at other ranges
Max. Inlet Pressure:	100% of full scale on gauge
Max. Operating Temp:	150° F (65°C)
Media:	Compressed air or inert gas

CAUTION: The accuracy of pressure gauge indicator can change, both during shipment (despite care in packaging) and during the service life.

Model Number	Thread NPT	Dual PSIG	Range (bar)	Case Material	Lens	Diaı in.	neter (mm)
Bottom Porte	ed Gauges						
29724	1/8"	0-60	(0-4)	Steel	Polycarbonate	1.5	(38)
29725	1/8"	0-160	(0-11)	Steel	Polycarbonate	1.5	(38)
29727	1/4"	0-60	(0-4)	Steel	Polycarbonate	2.0	(51)
29728	1/4"	0-160	(0-11)	Steel	Polycarbonate	2.0	(51)
Back Ported	Gauges				-		
29755-1	1/8"	0-30	(0-2)	Steel	Polycarbonate	1.5	(38)
29846	1/8"	0-15	(0-1)	Plastic	Polycarbonate	1.5	(38)
29863	1/8"	0-60	(0-4)	Steel	Polycarbonate	1.5	(38)
29883	1/8"	0-160	(0-4)	Steel	Glass	2.0	(38)
29850	1/8"	0-160	(0-11)	Plastic	Polycarbonate	1.5	(38)
29975	1/8"	0-160	(0-11)	Steel	Glass	1.5	(38)
Back Ported	Gauges (w/B	lack Face &	Neon Need	le)	-		
100066	1/4"	0-60	(0-4)	Plastic	Polycarbonate	2.0	(51)
100090	1/4"	0-60	(0-4)	Steel	Glass	2.0	(51)
100067	1/4"	0-160	(0-11)	Plastic	Polycarbonate	2.0	(51)
100091	1/4"	0-160	(0-11)	Steel	Glass	2.0	(51)
100083	1/4"	0-300	(0-21)	Plastic	Polycarbonate	2.0	(51)
Panel-Mount	ted/Back Port	ed Gauges*			-		
29720	1/8"	0-15	(0-1)	Steel	Polycarbonate	1.5	(38)
29721	1/8"	0-60	(0-4)	Steel	Polycarbonate	1.5	(38)
29722	1/8"	1-160	(0-11)	Steel	Polycarbonate	1.5	(38)



29725



100067



\*NOTE: Require 1.625" (41.275 mm) diameter hole for mounting.

## Performance Specifications

1/8" & 1/4" NPT For Compressed Air or Inert Gas

•	
Case Material	Metal
Lens	Polycarbonate
Connection Location	Centered Back
Media	Compressed Air or Inert Gas
Maximum Inlet Pressure	100% of Full Scale on Gauge
Max Operating Temperature	150° F (65°C)



100095-160

Model Number	Thread Npt	Range Psi	Used On	Dial Face Inches	Size (Mm)	
100095-160	1/8"	0-150	Miniature	1.5	(38)	
100096-160	1/4"	0-150	Module/Air	2.0	(51)	
			Heavy Duty			
			Super Heavy Duty			

## **Pipe Nipples**

Part Number	Npt Size	ARO FRL Series
Y237-2	1/8"	Miniature
Y27-2-C	1/4"	Miniature
Y27-52-C	1/4"	Module/ Air 2000
Y27-53-C	3/8"	Module/ Air 2000
Y27-54-C	1/2"	Module/ Air 2000 & Heavy Duty
Y27-55-C	3/4"	Heavy Duty
Y27-56-C	1"	Heavy-Duty
Y27-57-C	1-1/4"	Super-Duty
Y27-58-C	1-1/2"	Super-Duty



## Air Systems Components FRL Competitive Cross Reference

## Filters

	ARO	Arrow	M-Pneu	Parker	Schrader	Norgren	WATTS	Wilkerson	SMC		
Miniature	Miniature										
1/8"	F25111-200	F300-01	F150-1	8AF01B 14F01B	7AF01B	F07-100-MITA	F35-01AH F504-01AH	F08-01-SK00 F00-01-000	NAF2000-N01		
1/4"	F25121-200	F300-02	F150-2	8AF11B 14F11B	7AF11B	F07-200-MITA	F35-02AH F504-02AH	F08-02-SK00 F00-02-000	NAF2000-N02		
Module/A	ir 2000 with P	oly Bowl ar	nd Guard	•	·	•	·	·			
1/4"	F25221-100	F352	F60-2 F100-2	06F12A	06F12A	F72G-2AN-QT3 F08-200-M3TA	F602-02BJ F75-02BJ	F16-02-000 F18-02-SK00	NAF3000-N02		
3/8"	F25231-100	F353	F60-3 F100-3	06F22A 07F22A	06F22A 07F22A	F72G-3AN-QT3 F08-300-M3TA	F602-03BJ F75-03BJ	F16-03-000 F18-03-SK00	NAF3000-N03 NAF4000-N03		
1/2"	F25241-100	F354	F60-4 F100-4	06F32A 07F32A	06L32A 07F32A	F74G-4AN-OP3 F08-400-M3TA	F602-04BJ F75-04BJ	F16-04-000 F18-04-SK00	NAF4000-N04		
Module/A	ir 2000 with N	letal Bowl a	and Sight Gla	ass							
1/4"	F25221-110	F362W	BF60-2 BF100-2	06F14A	06F14A	F72G-2AN-QD3 F08-200-M3DA	F602-02WJ F75-02WJ	F16-02-G00 F18-02-SL00	NAF3000-N028		
3/8"	F25231-110	F373W F363W	BF60-3 BF100-3	06F24A 07F24A	06F24A 07F24A	F72G-3AN-QD3 F08-300-M3DA	F602-03WJ F75-03WJ	F16-03-G00 F18-03-SL00	NAF3000-N038 NAF4000-N038		
1/2"	F25241-110	F374W F364W	BF60-4 BF100-4	06F34A 07F34A	06F34A 07F34A	F74G-4AN-QD3 F08-400-M3DA	F602-04WJ F75-04WJ	F16-04-G00 F18-04-SL00	NAF4000-N048		
Heavy Du	ity					÷		•			
3/4"	25351-020	F329-06	F100-6	08F44A	08F44A	F17-600-M3DA	F602-06WJ	F38-06-SL00 F30-06-000	NAF4000-N06		
1"	25361-020	F329-08	F100-8	08F54A	08F54A	F17-800-M3DA	F602-08WJ	F38-08-SL00 F30-08-000	NAF5000-N10		
Super Du	ty										
<u>1-1/4"</u> 1-1/2"	F25471-110 F25481-110	N/A F329-12	BF100-10 BF100-12	08F64A 08F74A	08F64A 08F74A	F17-AOO-M3DA F17-B00-M3DA	F602-10WJ F602-12WJ	F42-0A-000 F42-0B-000	N/A N/A		

## Regulators

	ARO	Arrow	M-Pneu	Parker	Schrader	Norgren	WATTS	Wilkerson	SMC
Miniature	)								
				8AR013F			R35-01C	R08-01-C000	
1/8"	127112-000	R161	R55-1	14R013F	7AR013F	R07-100-RNLA	R364-01C	R00-01-000	NAR2000-N01
				8AR113F			R35-02C	R08-01-C000	
1/4"	127122-000	R162	R55-2	14R113F	7AR113F	R07-200-RNLA	R364-02C	R00-01-000	NAR2000-N02
Module/A	ir 2000				•		•		
			R60-2			R72G-2AK-RMN	R119-02C	R16-02-000	
1/4"	R27221-100	R352	R75-2	06R113A	06R113A	R08-200-RNMA	R75-02C	R18-02-C000	NAR3000-N02
			R60-3	06R213A	06R213A	R72G-3AK-RMN	R119-03C	R16-03-000	NAR3000-N03
3/8"	R27231-100	R353	R75-3	07R213A	07R213A	R08-300-RNMA	R75-03C	R18-03-C000	NAR4000-N03
			R60-4	06R313A	06R313A	R74G-4AK-RMN	R119-04C	R16-04-000	
1/2"	R27241-100	R354	R75-4	07R313A	07R313A	R08-400-RNMA	R75-04C	R18-04-C000	NAR4000-N04
Heavy Du	ıty	•			•	•		•	•
								R38-06-F000	
3/4"	27354-000	1586	R180M-6	08R413A	08R413A	R17-600-RNLA	R119-06C	R30-06-000	NAR4000-N06
								R38-08-F000	
1"	27364-000	1588	R180M-8	08R513A	08R513A	R17-800-RNLA	R119-08C	R30-08-000	NAR5000-N10
Super Du	Super Duty								
1-1/4"	R27471-100	N/A	R180M-10	08R613A	08R613A	R17-A00-RNLA	R119-10C	R03-0A-000	N/A
1-1/2"	R27481-100	N/A	R180M-12	08R713A	08R713A	R17-B00-RNLA	R119-12C	R30-0B-000	N/A

## Filter / Regulator

	ARO	Arrow	M-Pneu	Parker	Schrader	Norgren	WATTS	Wilkerson	SMC		
Miniatu	Miniature										
				8AE01B13F			B35-01AHC	C04-01-000			
1/8"	P29112-100	B741	CFR55-1	14E01B13F	7AE01B13F	B07-102-MIKA	B508-01AHC	B08-01-FK00	NAW2000-N01-C		
1/4"	P29122-100	B742	CFR55-2	8AE11B13F 14E11B13F	7AE11B13F	B07-202-MIKA	B35-02AHC B508-02AHC	C04-02-000 B08-02-FK00	NAW2000-N02-C		
Module	Air 2000 with	Poly Boy	vl and Guard								
		B752	CFR60-2			B72G-2AK-QT3-RMG		CB6-02-000			
1/4"	P29221-100	B762	CFR100-2	06E12A13A	06E12A13A	B08-297-M0MA	B75-02BJC	B18-02-FK00	NAW3000-N020		
		B753	CFR60-3	06E22A13A	06E22A13A	B72G-3AK-QT3-RMG		CB6-03-000	NAW3000-N030		
3/8"	P29231-100	B763	CFR100-3	07E22A13A	07E22A13A	B08-397-M0MA	B75-03BJC	B18-03-FK00	NAW4000-N030		
		B754	CFR60-4	06E32A13A	06E32A13A	B74G-4AK-QT3-RMG		CB6-04-000			
1/2"	P29241-100	B764	CFR100-4	07E32A13A	07E32A13A	B08-497-M0MA	B75-04BJC	B18-04-FK00	NAW4000-N040		
Module	Air 2000 with	Metal Bo	wl and Sight	Glass		·					
		B752W	BCFR60-2			B72G-2AK-QD3-RMG	B11-02WJC	CB6-02-G00			
1/4"	P29221-110	B762W	BCFR100-2	06E14A13A	06E14A13A	B08-297-M3MA	B75-02WJC	B18-02-SL00	NAW3000-N028		
		B752W	BCFR60-3	06E24A13A	06E24A13A	B72G-3AK-QD3-RMG	B11-03WJC	CB6-03-G00	NAW3000-N038		
3/8"	P29231-110	B762W	BCFR100-3	07E24A13A	07E24A13A	B08-397-M3MA	B75-03WJC	B18-03-SL00	NAW4000-N038		
		B752W	BCFR60-4	06E34A13A	06E34A13A	B74G-4AK-QD3-RMG	B11-04WJC	CB6-04-G00			
1/2"	P29241-110	B762W	BCFR100-4	07E34A13A	07E34A13A	B08-497-M3MA	B75-04WJC	B18-04-SL00	NAW4000-N048		
Heavy [	Heavy Duty										
3/4"	N/A	N/A	CFR100-6	N/A	N/A	B74G-6AK-QD3-RMG	B105-06-WJC	B38-06-SL00	NAW4000-N06		
1"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	B38-08-SL00	N/A		

## Lubricators

	ARO	Arrow	M-Pneu	Parker	Schrader	Norgren	WATTS	Wilkerson	SMC
Miniatu	re								
1/8"	L26111-100	1811	L10-1 L50-1	8AL00G	7AL00G	L07-100-MPAA	L508-01A L35-01A2A	L08-01-LK00 L00-01-000	NAL2000-N01
1/4"	L26121-100	1812	L10-2 L50-2	8AL10G 14L10G	7AL10G	L07-200-MPAA	L508-02A L35-02AA	L08-02-LK00 L00-02-000	NAL2000-N01
Module	Air 2000 with/	Poly Bow	I and Guard						
1/4"	L26221-100	L352	L60D-2 L28D-2	06L12B	06L12B	L08-200-OPCA L72M-2AP-QTN	L606-02B L75-02B	L16-02-000 L18-02-LK00	NAL3000-N02
3/8"	L26231-100	L353	L60D-3 L28D-3	06L22B 07L22B	06L22B 07L22B	L08-300-OPCA L72M-3AP-QTN	L606-03B L75-03B	L16-03-000 L18-03-LK00	NAL3000-N03 NAL4000-N03
1/2"	L26241-100	L354	L60D-4 L28D-4	06L32B 07L32B	06L32B 07L32B	L08-400-OPCA L74M-4AP-QTN	L606-04B L75-04B	L16-04-000 L18-04-LK00	NAL4000-N04
Module	Air 2000 with	Metal Bo	wl and Sight	Glass					
1/4"	L26221-110	L372W L452M	BL60D-2 BL28D-2	06L14B	06L14B	L08-200-OPDA L72M-2AP-QDN	L606-02W L75-02W	L16-02-G00 L18-02-LL00	NAL3000-N028
3/8"	L26231-110	L373W L453M	BL60D-3 BL28D-3	06L24B 07L24B	06L24B 07L24B	L08-300-OPDA L72M-3AP-QDN	L606-03W L75-03W	L16-03-G00 L18-03-LL00	NAL3000-N038 NAL4000-N038
1/2"	L26241-110	L374W L454M	BL60D-4 BL28D-4	06L34B 07L34B	06L34B 07L34B	L08-400-OPDA L74M-4AP-QDN	L606-04W L75-04W	L16-04-G00 L18-04-LL00	NAL4000-N048
Heavy [	Duty								
3/4"	26351-020	4106	L29D-6	08L44B	08L44B	L17-600-MPDA	F606-06W	L38-06-LK00 L30-06-000	NAL4000-N06
1"	26361-020	4108	L29D-8	08L54B	08L54B	L17-800-MPDA	F606-08W	L38-08-LK00 L30-08-000	NAL5000-N10
Super D	Duty						•		
1-1/4"	L26471-110	N/A	L29D-10	08L64B	08L64B	L17-AOO-MPDA	F606-10W	L42-0A-000	N/A
1-1/2"	L26481-110	4112	L29D-12	08L74B	08L74B	L17-B00-MPDA	F606-12W	L42-0B-000	N/A

## Safety Blow Guns

ARO Safety Blow Guns are designed to prevent pressure buildup above 29 PSIG if nozzle is obstructed [to meet OSHA requirement 29 CFR1910.242(b)]. The composite bodied guns on this page are extremely lightweight and corrosion resistant.

## Features

Model 8440 - Our most popular blow gun!

- Built-in orifice and non-removable relieved tip prevent pressure buildup above 29 PSIG, if nozzle is obstructed.
- · Provides greater chip removal force with less air consumption.
- Tough polyester body offers corrosion resistance.
- Shop safety yellow color makes for easy identification.
- Weighs just 2.7 oz., for easy handling.
- Thumb-actuated lever throttle provides excellent flow control.
- · Hook-shaped body for convenient storage when not in use.



INLET PSI	PSI AT TIP DEAD END	CFM AT TIP	NOISE LEVEL dB(A)
30	5.0	4	78
60	12.0	6	81
90	12.6	8	85
100	12.8	9	87
120	16.2	11	89
150	21.0	12	90
180	27.0	14	90

### **Performance Specifications**

Max. Inlet Pressure:	250 PSIG (17 bar)
Max. Inlet Pressure:	180 PSIG (12 bar)
Regulated Pressure:	29 PSIG (2 bar) max.
Temperature Range:	32° to 175° F (0° to 79° C)
Inlet Size:	1/4" NPT (female)
Weight:	2.7 oz.

CAUTION: These blow guns should not be used for fluids other than compressed air, nor in applications which may exceed maximum recommended operating conditions. Proper eye protection should always be worn when operating these devices.

To order, specify Model 8440. For BSP threads. (Consult Factory)

#### **Composite Body**

ARO Safety Blow Guns are designed to prevent pressure buildup above 29 PSIG if nozzle is obstructed [to meet OSHA requirement 29 CFR1910.242(b)]. The composite bodied guns on this page are extremely lightweight and corrosion resistant.

#### Models 8338, 8338-1 & 8338-2

#### Internal regulation offers tamper resistance!

- Unique built-in internal regulation, as compared to the traditional thru-the-tip design, helps ensure compliance with OSHA requirement against pressure buildup.
- Tough polyester body provides corrosion resistance.
- · Lightweight, ergonomic design offers easy, comfortable handling.
- · Hand lever actuation provides excellent flow control.
- Slim barrel design allows access into hard-to-reach places.

## **Performance Specifications**

Max. Inlet Pressure:	250 PSIG (17 bar)
Regulated Pressure:	29 PSIG (2 bar) max.
Temperature Range:	32° to 175° F (0° to 79° C)
Inlet Size:	1/4" NPT (female)
Weight:	4.8 oz.

iniet PSI	PSI at Tip Dead End	CFM at Tip	Noise Level dB(A)	
30	26.75	6.3	75	
60	27.0	10.0	83	
90	27.25	13.0	86	
100	27.5	13.1	87	
120	27.75	13.2	87	
150	28.0	13.4	87	

CAUTION: These blow guns should not be used for fluids other than compressed air, nor in applications which may exceed maximum recommended operating conditions.

Proper eye protection should always be worn when operating these devices.



## Ordering

	5
Model	Description
8338	Standard Tip Gun. Tapered standard tip concentrates the air stream for efficient chip and dirt removal.
8338-1	Air Shield Tip Gun. Tapered air shield tip generates a protective cone for chip deflection.
8338-2	Rubber Tip Gun. Tapered rubber tip provides a leakproof connection for blowing out fuel lines and other openings.

#### Accessories

#### Tips

(All accessory tips fit the 8338 Series Blow Gun)

•	
Model	Description
22101	Brass Tip
22151	Rubber Tip
22180-1	Standard Tip
22180-2	Air Shield Tip
33970	10" (254mm) Extension Tip
22180-3	3" (76mm) Extension Tip









22151



## **Features/Specifications**

#### **Metal Body**

These ARO Safety Blow Guns meet OSHA requirement 29 CFR1910.242(b). They feature rugged die-cast bodies and are ideal for applications where a metal bodied gun is preferred.

#### Models 7444-J & 7444-K

- OSHA-compliant non-removable pressure relief tip limits back pressure buildup to 29 PSIG.
- Non-removable pinned spring prevents tampering with internal regulation.
- · Rugged aluminum casting offers extra durability and corrosion resistance.
- Thumb button throttle provides excellent variable flow control.

Max. Inlet Pressure	Model 7444-J - 100 PSIG (7 bar)
	Model 7444-K - 180 PSIG (12 bar)
Regulated Pressure	29 PSIG (2 bar) max.
Operating Temperature	32° to 175° F (0° to 79° C)
Inlet Size	1/4" NPT (female)
Weight	5.3 oz.

#### Models 8451-1, 8451-2, 8451-3 & 8451-6

- Designed to prevent pressure buildup above 29 PSIG (to meet OSHA requirements).
- Rugged, chrome plated steel body incorporates convenient hang-up hook.
- · Comfortable contoured lever throttle or button throttle provides variable flow control.

Max. Inlet Pressure	150 PSIG (10.4 bar)
Regulated Pressure	29 PSIG (2 bar) max.
Operating Temperature	32° to 175° F (0° to 79° C)
Inlet Size	1/4" NPT (female)
Weight	7.0 oz.

## Ordering

Model	Description
8451-1	Standard Tip Gun. Generates concentrated stream of air. (Lever Throttle)
8451-2	Shield Tip Gun. Generates cone of air for chip deflection. (Lever Throttle)
8451-3	3" (76 mm) Extension Tip. (Lever Throttle)
8451-6	6" (152 mm) Extension Tip (Lever Throttle)

To order, specify Model 7444-J for lower oper-acting pressures (up to 100 PSIG maximum), and Model 7444-K for higher operating pressures (up to 180 PSIG maximum).

CAUTION: These blow guns should not be used for fluids other than compressed air, nor in applications which may exceed maximum recommended operating conditions.

Proper eye protection should always be worn when operating these devices.



8451-3 & -6

Mode	l 7444-J			Mod	el 7444	-K		Mod	el 8451	-1		Mo	del 8451	-2		Mod	els 8451	-3 &	8451-6	j
iniet PSI	PSI at Tip Dead End	CFM at Tip	Noise Level dB(A)	Inlet PSI	PSI at Tip Dead End	CFM at Tip	Noise Level dB(A)	iniet PSI	PSI at Tip Dead End	CFM at Tip	Noise Level dB(A)	iniet PSI	PSI at Tip Dead End	CFM at Tip	Noise Level dB(A)	iniet PSI	PSI at Tip Dead End	CFM at Tip	Noise Level dB(A)	
30	5.0	7.0	72	30	1.0	3.5	68	30	5.0	4.0	81	30	3.0	7.6	79	30	3.0	7.6	81	
60	13.5	12.0	82	60	4.0	6.5	73	60	11.0	7.5	86	60	7.0	13.7	85	60	11.0	9.7	85	
90	25.5	16.0	87	90	8.0	9.0	78	90	14.0	11.0	89	90	11.0	20.0	89	90	17.0	14.5	89	
100	29.0	17.5	90	100	9.5	9.6	78	120	17.0	14.7	91	120	15.0	26.2	93	120	23.0	19.4	90	
-	-	-	-	120	13.0	10.5	78	150	20.0	18.4	94	150	19.0	32.0	95	150	30.0	23.9	92	
-	-	-	-	150	19.0	12.7	82	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	180	25.0	14.8	85	-	-	-	-	-	-	-	-	-	-	-	-	

ARO Balancers are ideal for improving both the ergonomics and the productivity of a particular work area. They position tools within easy reach and take the weight of the equipment out of the operators hands, minimizing unnecessary actions and strain/fatigue. Equipment life is also extended by reducing tool wear and damage due to mishandling.

Typical applications for ARO 2 to 15 lb. capacity balancers include electric and pneumatic power tools, strapping and staple guns, meat processing saws, portable rivet guns, and air/water hose suspension.

#### Model 8375-( )

- Large adjustment knob enables easy tension adjustment.
- Durable woven nylon cable provides smooth operation.
- Adjustable stop to set length of cable travel.
- · Convenient 360° swivel and clevis pin hanger for easy mounting.
- Lightweight, high-impact composite case.
- Snap-type tool clip included.

#### Model 7472, 5lb. Capacity

Ideal for use with small to medium portable power tools, small fixtures, pendent stations and air hoses.

- Center-pull design for smooth performance.
- · Adjustable spring tension.
- Adjustable cable clamp to set length of travel.
- Nylon coated steel aircraft cable for smooth, long lasting performance.
- Compact, rugged steel housing.

#### Model 7072- ( ), 10 & 15 lb. Capacity

Rugged balancers suitable for a wide range of applications, including larger nutsetters and impact wrenches.

- Center-pull design for smooth performance.
- · Adjustable spring tension.
- Adjustable cable clamp to set length of cable travel.
- Nylon-coated steel aircraft cable for smooth, long lasting performance.
- · Durable steel housing.

## **Specifications / Ordering**

Model	Cap	acity	Workin	g Cable	Hook	to Hook	W	Width		
Nulliper	IU.	(ky)		(111)		(11111)		(11111)		
8375-2	1-2	(0.5-0.9)	5.2	(1.6)	10.4	(263)	4.0	(102)		
8375-4	2-4	(0.9-1.8)	5.2	(1.6)	10.4	(263)	4.0	(102)		
7472	3-5	(1.4-2.3)	8.0	(2.4)	10.4	(264)	5.4	(136)		
7072	6-10	(2.7-4.5)	8.0	(2.4)	14.0	(356)	8.1	(205)		
7072-15	11-15	(5.0-6.8)	8.0	(2.4)	14.0	(356)	8.1	(205)		



Typical applications include large portable nutsetters and impact wrenches, heavy-duty grinders, woodborers, chippers, portable riveters, hydraulic punches, automatic jigs and fixtures, multiple-spindle nutrunners, welding machines and portable hydraulic clamps.

- Adjustable mainspring provides smooth, even torque.
- Convenient external mainspring adjustment and lifetime lubrication offers easy maintenance.
- Cable on all tapered drums can be replaced without disassembly for reduced downtime.
- Snap-type hooks have an automatic snap lock.
- Upper shackle rotates 360°.

## **Specifications / Ordering**

Model Number	Capacity Lb. (Kg)	Working Cable Length Ft. (M)	Width In. (Mm)	Depth In. (Mm)	Hook To Hook In. (Mm)
8076-15	Cancelled replaced by	7072-15			
7670-18	18-25 (8.1-11.4)	6.6 (2.0)	8.8 (222)	3.3 (86)	20.7 (525)
7670-25	25-35 (11.4-15.9)	6.6 (2.0)	7.75 (197)	6.6 (169)	20.7 (525)
7670-35	35-45 (15.9-20.5)	6.6 (2.0)	7.75 (197)	6.6 (169)	20.7 (525)
7670-45	45-60 (20.5-27.3)	6.6 (2.0)	7.75 (197)	6.6 (169)	20.7 (525)

CAUTION: It is recommended that a secondary support chain be attached to all balancers mounted overhead.



Accessories	
Model Number	Description
33872-8-F	7472 - 5 lb. Replacement Cable Assembly
32359-8-J	7072 - 10 lb. Replacement Cable Assembly
32359-8-J	7072-15 - 15 lb. Replacement Cable Assembly
29796	Replacement Cable Assembly Fits: 7670-18, -25, -35, -45

#### 1/4", 3/8" & 1/2" I.D.

- Self-retracting for easy storage in minimum space to reduce clutter.
- Minimizes safety hazards from tripping or tangling.
- A low-cost alternative to bulky, expensive hose reels.
- Resistant to most chemicals, gasoline, oil and grease.
- Lightweight and highly flexible with 360° swivel fittings to reduce user strain and fatigue.
- Abrasion and corrosion resistant.
- Ideal for use with portable air tools, spray guns, moving air cylinders and hoists.
- Retractability is easily restored by reversing hose through its axis.

## **Performance Specifications**

Max. Operating Pressure:	180 PSI (12.4 bar)
Operating Temperature Range:	-20° to 170° F (-29° to 77° C)
Hose Material:	Nylon II

## Ordering

	Thread Size Male NPT	Hose I.D.	Hose O.D.	Hose Length	Working Length	Outside Coil Diameter	Inside Diameter	Retracted Length
Model				ft. (mm)	ft. (mm)	in.	in.	ft. (mm)
Assembli	Assemblies (Include swivel fittings at both ends)							
628004-1	2 1/4"	1/4"	5/16"	12 (3.7)	11 (3.3)	3"	2-1/2"	6 (152)
628004-2	5 1/4"	1/4"	5/16"	25 (7.6)	23.5(7.2)	3"	2-1/2"	12 (305)
628004-5	0 1/4"	1/4"	5/16"	50 (15.2)	47 (14.3)	3"	2-1/2"	23 (584)
628020-1	2 3/8"	3/8"	15/32"	12 (3.7)	10 (3.0)	5-1/2"	4-1/2"	5 (127)
628020-2	5 3/8"	3/8"	15/32"	25 (7.6)	22 (6.7)	5-1/2"	4-1/2"	10 (254)
628020-5	0 3/8"	3/8"	15/32"	50 (15.2)	44(13.4)	5-1/2"	4-1/2"	20 (508)
628023-1	2 1/2"	1/2"	5/8"	12 (3.7)	8.5 (2.6)	8"	6-1/2"	5 (127)
628023-2	5 1/2"	1/2"	5/8"	25 (7.6)	19 (5.8)	8"	6-1/2"	9 (229)
628023-5	0 1/2"	1/2"	5/8"	50 (15.2)	38(11.6)	8"	6-1/2"	18 (457)



628004-12

#### Swivel Fitting Kits (use for repair)

KIT NO.	HOSE I.D.	THREAD SIZE MALE NPT
22800	1/4"	1/4"
22801	3/8"	3/8"
22802	1/2"	1/2"

**NOTE:** Order one kit for each hose end.



#### **Lubricating Oil**

ARO Lubricating Oil is recommended for use with pneumatic power tools, motors, valves, cylinders and hoists. It is specially formulated for use in air line lubricators. Proper, regular lubrication helps ensure longer, trouble-free operation by reducing wear, save power and cut equipment maintenance costs.

ARO Lubricating Oil is available in 1-quart containers, and may be ordered by specifying part number **29665** (one 1-quart container).

**NOTE:** There are twelve 1-quart containers per case.

Viscosity:	100-200 S.S.U. @ 100°F (38°C) min. aniline point of 200°F (93°C).
Class:	II Lubricant
Approx. SAE No:	Light SAE 10, non-detergent.



29665

Air accessories are popular impulse-purchased products. For walk-in retail sales, counter sales, and customer pickup areas, many of the most popular ARO Air Systems Components are available in "clamshell" point-of-purchase display packaging to add a new dimension to your air accessory marketing efforts:

- Colorful, eye-catching graphics attract customers' attention.
- · Contemporary clamshell design offers a durable package with maximum product visibility.
- · Smaller overall size than "skincard" or "blister pack" allows maximum use of available premium display area.
- · Bar coding provides more convenient and effective inventory control.



Uraering	
Model	Description
Blow Guns	
7444-K-S	Model 7444-K Safety Blow Gun
8338-S	Model 8338 Safety Blow Gun
8338-1-S	Model 8338-1 Safety Blow Gun, air shield tip
8440-S	Model 8440 Safety Blow Gun
8451-1-S	Model 8451-1 Safety Blow Gun
Miniature FRL's & G	auges
F25121-200-S	Model F1/4" Miniature Filter
L26121-100-S	Model 126121-000 1/4" Miniature Lubricator
127122-010-S	Model 127122-000 1/4" Miniature Regulator
	with Model 29850 0 - 160 psi Gauge
P29122-100-S	Model 129121-400 1/4" Miniature Piggyback
	Filter/Regulator with manual drain
P29122-104-S	Model 129121-404 1/4" Miniature Piggyback
	Filter/Regulator wit automatic drain
F25111-200-S	1/8" Filter
L26111-100-S	1/8" Lubricator
P29112-100-S	1/8" Piggyback
29850-S	Model 29850 Gauge, 1/8" NPT, 0-160 psi
100066-S	Model 100066 Gauge, 1/4" NPT, 0-60 psi
100067-S	Model 100067 Gauge, 1/4" NPT, 0-160 psi
Coil Hose	·
628004-12	12 ft., 1/4" I.D. Recoil Hose
628004-25	25 ft., 1/4" I.D. Recoil Hose



8440-S



8338-S



8451-S









127122-010-S

# Air System Components Point-of-Purchase Display Packaging

## **Features**

Versatile A-frame package design allows either peg hook or shelf display.

## Ordering

		B 1.0
	Model	Description
	Filters	
	F25221-100-S	1/4" Filter, poly bowl & guard
	F25231-100-S	3/8" Filter, poly bowl & guard
	F25241-100-S	1/2" Filter, poly bowl & guard
	F25221-110-S	1/4" Filter, metal bowl with sight glass
	F25231-110-S	3/8" Filter, metal bowl with sight glass
	F25241-110-S	1/2" Filter, metal bowl with sight glass
	F25221-101-S	1/4" Filter, poly bowl & guard, auto drain
	F25231-101-S	3/8" Filter, poly bowl & guard, auto drain
	F25241-101-S	1/2" Filter, poly bowl & guard, auto drain
	Lubricators	
_	L26221-100-S	1/4" Lubricator, poly bowl & guard
	L26231-100-S	3/8" Lubricator, poly bowl & guard
	L26241-100-S	1/2" Lubricator, poly bowl & guard
	L26221-110-S	1/4" Lubricator, metal bowl with sight glass
	L26231-110-S	3/8" Lubricator, metal bowl with sight glass
	L26241-110-S	1/2" Lubricator, metal bowl with sight glass
-	Benulators	
_		1/4" Daliaving Degulator (5, 105 pai) and
	NZ1221-000-3	1/4 Relieving Regulator (5-125 psi) and
	D07001 600 C	2/0" Baliaving Bagulater (5, 125 pai) and
	R21231-000-3	3/6 Relieving Regulator (5-125 psi) and
	D07041 600 S	1/0" Policy ing Pogulator (5, 125 poi) and
	NZ1241-000-3	1/2 Relieving Regulator (5-125 psi) and
_	D20221 600 6	1/4" Diggyback (5, 125 pai), poly bowl 8
	F 2922 1-000-3	auard with 100067 Gauge (0-160 pci)
	D20221 600 S	2/2" Diggyback (5-125 psi) poly bowl 8
	1 29231-000-3	auard with 100067 Gauge (0-160 psi)
	D202/1_600_S	1/2" Piggyback (5-125 psi) poly bowl &
	1 2 3 2 4 1 - 000 - 3	auard with 100067 Gauge (0-160 psi)
	P20221_610_S	1/1" Piggyback (5-125 psi) metal bowl w/
	123221 010 0	sight glass & 100067 Gauge (0-160 psi)
	P20231-610-S	3/8" Piggyback (5-125 psi) metal howl w/
	123231 010 3	sight glass & 100067 Gauge (0-160 psi)
	P202/1-610-S	1/2" Piggyback (5-125 psi) metal howl w/
	120241 010 0	sight glass & 100067 Gauge (0-160 psi)
	P29221-614-S	1/4" Piggyback (5-125 psi) metal howl w/
	120221 014 0	sight glass auto drain & 100067 Gauge
	P29231-614-S	3/8" Piggyback (5-125 nsi) metal howl w/
		sight glass auto drain & 100067 Gauge
	P29241-614-S	1/2" Piggyback (5-125 psi) metal howl w/
		sight glass, auto drain, & 100067 Gauge





Shelf Display











## **Flow Data**

The following flow data are provided to further help in the sizing/ selection of individual ARO filters, regulators and lubricators or combo units. First, determine the maximum system flow requirements. Second, determine the maximum allowable pressure drop at rated flow in SCFM. Third, refer to the flow charts to select the pipe size/ series of FRL by choosing the curve that offers minimum pressure drop at the desired flow in SCFM.

## **Filters**



## Regulators





1/4" MODULE/AIR REGULATOR PRESSURE DROP TEST



## Air System Components Flow Data for Filters, Regulators & Lubricators

**Regulators** 

10

15

6 6

20 25 AIR FLOW

30 35 40



20 25 AIR FLOW

30 35 40 45 dma

0 5 10 15

## **Filter-Regulator-Lubricator Combos**



60 PSIG (4.1 bar)

5 10 15 20 25 30 35 40 AIR FLOW INLET PRESSURE - 100 PSIG (6.9 bar)

dm9/r

15

35 PSIG (2.4 bar) 10

60 PSIG (4.1 bar)

dm3/e

5 10 15 20 25 30 35 40 4 AIR FLOW INLET PRESSURE - 100 PSIG (6.9 bar)

35 PSI (2.4 ba

10

## **Filter-Lubricator Combos**



## Filter/Regulators



**1" HEAVY-DUTY filter-regulator** PRESSURE DROP TEST



3/8" MODULE/AIR filter/regulators PRESSURE DROP TEST



#### 1/2" MODULE/AIR filter/regulators PRESSURE DROP TEST





#### **Compatible Lubricants**

Although air line lubrication is not required for most ARO valves, other mechanisms in the system may need such lubrication. When a lubricator is used it should be supplied only with oils which are compatible with the materials used in the valves for seals and poppets. Generally speaking, these are petroleum base oils with oxidation inhibitors, and aniline point between 180°F (82°C) and 220°F (104°C) and an ISO 32, or lighter, viscosity. Oils with phosphate type additives, such as zinc dithiophosphate, must be avoided because they can harm polyurethane valve components.

The best oils to use in pneumatic systems are those specifically compounded for air line lubricator service. We recommend ARO Lubricative Oil P/N 29665, it is specially formulated for use with pneumatic power tools, motors, valves, cylinders and hoists.

#### **Cautions of the Use of Polycarbonate Plastic Bowls**

**Use Only with Compressed Air**. Filters and lubricators with polycarbonate plastic bowls are specifically designed for compressed air service, and their use with any other fluid (liquid or gas) is a misapplication. The use with or injection of certain hazardous fluids in the system (e.g., alcohol or liquefied petroleum gas) could be harmful to the plastic bowl or result in a combustible condition or hazardous leakage. Before using with a fluid other than air, or for non-industrial applications, or for life support systems. Consult the factory.

**Use Metal Bowl Guard When Supplied.** A metal bowl guard is supplied with all but the smallest bowls, and must always be used to minimize danger from fragmentation in the event of failure of a plastic bowl.

**Avoid Harmful Substances.** Some compressor oils, chemical cleaners, solvents, paints, and fumes will attack plastic bowls and can cause bowl failure. Do not use with or near these materials. When a bowl becomes dirty, replace the bowl or wipe it with a clean dry cloth. Immediately replace any plastic bowl which is crazed, cracked, or deteriorated.

Carbon disulfida	Ethylene dieblewide	Dheenheuse huduouud shlewide
Carbon disuitide	Ethylene alchioride	Phosphorous hydroxyl chloride
Carbon tetrachloride	Ethylene glycol	Phosphorous trichloride
Caustic potash solution	Formic acid	Propionic acid
Caustic soda solution	Freon (refrigerant & propellant)	Pyridine
Chlorobenzene	Gasoline (high aromatic)	Sodium hydroxide
Chloroform	Hydrazine	Sodium sulfide
Cresol	Hydrocarbons	Styrene
Cyclohexanol	Hydrochloric acid	Sulfuric acid
Cyclohexanone	Lacquer thinner	Sulfuryl chloride
Cyclohexene	Methyl alcohol	Tetrahydronaphthalene
Dimethyl formamide	Methylene chloride	Thiophene
Dioxane	Methylene salicylate	Toluene
Ethane tetrachloride	Milk of lime (CaOH)	Turpentine
Ethyl acetate	Nitric acid	Xylene
Ethyl ether	Nitrobenzene	Perchlorethylene
Ethylamine	Nirocellulose lacquer	
Ethylene chlorohydrin	Phenol	
	Carbon disulfide Carbon tetrachloride Caustic potash solution Caustic soda solution Chlorobenzene Chloroform Cresol Cyclohexanol Cyclohexanol Cyclohexanone Cyclohexene Dimethyl formamide Dioxane Ethane tetrachloride Ethyl acetate Ethyl acetate Ethyl ether Ethylamine Ethylene chlorohydrin	Carbon disulfideEthylene dichlorideCarbon tetrachlorideEthylene glycolCaustic potash solutionFormic acidCaustic soda solutionFreon (refrigerant & propellant)ChlorobenzeneGasoline (high aromatic)ChloroformHydrocarbonsCresolHydrocarbonsCyclohexanolLacquer thinnerCyclohexeneMethyl alcoholDimethyl formamideMethylene chlorideDioxaneMilk of lime (CaOH)Ethyl acetateNitric acidEthyl etherNitrobenzeneEthylene chlorohydrinPhenol

#### Substances HARMFUL to Polycarbonate Plastic Bowls

#### Trade Names of Substances HARMFUL to Polycarbonate Plastic Bowls

• Atlas Perma-Guard • Buna N • Cellulube #150 & #220 • Crylex #5 cement • Eastman 910 • Garlock 98403 (polyurethane) • Haskel 568-023 • Hilgard Company's hil phene • Houghton & Co. oil 1120, 1130, 1055 • Houstsafe 1000 • Kano Kroil • Keystone penetrating oil #2 • Loctite 271, 290, 601 • Loctite Teflon sealant • Marvel Mystery Oil • Minn. Rubber 366Y • National Compound N11 Nylock VC-3 • Parco 1306 Neoprene • Permabond 910 • Petron PD287 • Prestone • Pydraul AC • Sears Regular Motor Oil • Sinclair oil "Lily White" • Stauffer Chemical FYRQUEL 150 • Stillman SR 269-75 (polyurethane) • Stillman SR 513-70 (neoprene) • Tannergas • Telar • Tenneco and Erol 495 & 500 oils • Titon • Vibra-tite • Zerex

The Ingersoll-Rand Fluid Products ("I/R FP") warrants to the original use purchaser of the I/R FP Air Systems Components depicted in this catalog that I/R FP will repair or replace, free of charges, including return shipping costs within the Continental United States of America, any such product which under normal use and service proves defective in material or workmanship, as determined by I/R FP inspection, twenty-four months from date of purchase, provided the claimed defective product, or part thereof, is promptly returned to the I/R FP Service Repair Center or a factory-authorized service repair center, with transportation charges prepaid.

If I/R FP inspection discloses no defect in material or workmanship, repair or replacement and return will be made at customary charges.

The foregoing warranty supersedes, voids and is in lieu of all or any other warranties, expressed or implied, and no warranty of merchantability or fitness for particular purpose is intended or made. I/R FP's sole obligation and the original use purchaser's sole remedy is as stated above and in no event shall I/R FP be liable for any special, direct, indirect, incidental, consequential or other damages or expenses of any nature including, without limitation, loss of profits or production time incurred by the original use purchaser or any other party.

MODEL	PAGE	MODEL	PAGE
012-A	58	104196-CDW	292
012-D	58	10/106-CHW	202
024 A		104106 CSN	202
024-A	50	104190-0510	232
024-D	58	104202	2/9, 281, 287
04334009	208	104203	289
100031-1	279	104204	279, 281, 287
100031-2	279	104205	289
100031-3	279	104206	279, 281, 287
100032	279, 281	104207	289
100066	283, 287, 297, 304, 309	104209	283, 287
100066-S	320	104211	289
100067	283 287 293 294 297 299 304 309	104226	263 289
100067 \$	200, 201, 200, 201, 201, 201, 200, 001, 000	10/227	201
100007-3	000 007 007 004 000	104227	
100083	283, 287, 297, 304, 309	104228	301
100090	309	104229	301, 303
100091	309	104230	301, 303
100095-160	261, 265, 269, 310	104231	302
100096-160	310	104232	303
100207-1	285	104235	300
100207-2	285	104241	300, 301, 302, 303, 306
103-A	80	104246	302
104020	296	104248	279
104020		104252 1	257 271
104023	290	104253-1	207, 271
104027	203, 289	104253-1-B	2/1
104039	261, 265, 269, 270, 271	104253-2	257, 271
104068	279, 281, 287, 300, 301, 302, 303	104253-2-B	271
104069	296, 298	104254-1	257, 271
104094	261, 265, 269, 270	104254-1-B	271
104104 - X XX	87	104254-2	257, 271
104107	279, 281, 283, 287, 289	104254-2-B	271
104109	261, 265, 269, 271	104255	261, 265, 271
104114	304	104256	261 265 271
10/115	300 302 303 304 306	10/257	250, 271
104116	300, 302, 303, 304, 300	104257	259, 271
104117	300, 302	104250	209, 200, 271
104117	304	104259	209, 265, 271
104118	306	104260	263, 271
104119	300	104261	263, 271
104120	304	104262	257, 259, 271
104121	304	104263	257, 259, 271
104122	304	104264	259, 265, 271
104124	306	104265	261, 265, 269, 271
104149	279, 281, 287	104282	293
104158	269	104283	293
104159	269	104284	293
104163	300, 302, 306	104285	293
10/167	290	10/286	203
104169.2	290	104200	
104108-2	290	104207	293
104168-3	290	105-A	80
104168-4	290	109-A	80
104168-6	290	114054	91
104169	290	114130	134
104170	290	114138-33	37
104171	290	114138-38	37
104172	283, 287, 290	114138-39	37
104173	283, 287	114153-33	37
104175	283 287	114153-38	37
104176	070 001	114153-39	97
10/177	213, 201	114155	
104170	283	114100	37
1041/8	283	1141/1	134
1041/9	287	1141/2	134
104180	287	114173	134
104181	263, 271, 289	114174	134
104182	279, 281, 287, 289	114175	134
104196	292	114417	45

PAGE 292 292



MODEL	PAGE	MODEL	PAGE
114418	44	117045-200	111
114419	44	117045-300	111
114420	44	117045-400	111
114421	44	117045-500	111
114597-10	41	117045-600	111
114597-11	41	117523-05	102
114597-13	41	117523-07	102
114597-15	41	117523-14	102
114597-17	41	117523-15	102
114598-10	41	117523-20	102
114598-11	41	117555-05	102
114599	41	117555-07	102
114806	63	117555-11	102
114807	63	117555-14	102
115046-XX	88, 89	117555-17	102
115064-XX	88, 89	117822-1	123
1150/4	134	117822-2	123
115075	134	117822-3	123
115076	134	11/98/	51
115277	123	118108-05	102
115270	123	110100-07	102
115279	123	110100-11	102
115280	123	118108-17	102
115282	123	118108-20	102
115283	123	118108-25	102
115284	123	118108-50	102
115285	123	118109-05	102
115286	123	118109-07	102
115287	123	118109-11	102
115288	123	118109-14	102
115289	123	118109-17	102
115290	123	118109-20	102
115291	123	118109-25	102
115292	123	118109-50	102
115293	123	11811 X - X X X	112
115294	123	118119-05	102
115295	123	118119-07	102
115296	123	118119-14	102
115477	123	118119-15	102
115478	123	118119-20	102
115480	123	118121-05	102
115481	123	118121-07	102
115906	114	118121-14	102
115907	114	118121-15	102
115908	114	118123-100	111
115909	114	118123-200	111
116218-XX	88, 89	118154-XX	88, 89
116345-2	56	118573-X2	92
116345-3	56	1185/3-X3	92
116345-4	56	118573-X4	92
116345-5	56	118592-05	102
116343-0	100	110592-15	102
116259	123	110097-12	92
116361	123	118507-3	92
116464	123	118507-7	92
116647-XX	00 00	118598-14	92
116737	70	118598-4	<u> </u>
116738	72	118598-8	<u> </u>
116807	51	118598-9	<u> </u>
116808	51	118605-4	50
116809	51	11860X - X	52
117045-100	111	118612	52
			52

MODEL	PAGE	MODEL	PAGE
118618	52	119625	123
118683	136	119626	123
118684	136	119627	123
118685	136	119628	123
118686	136	119629	123
118687	136	119630	123
118688	136	119631	123
118689	136	119632	123
118690	136	119633	123
118691	136	119634	123
118692	136	119635	123
118693	136	119636	123
118694	136	119637	123
118695	136	119638	123
118696	123	119639	123
118697	123	119640	123
118698	123	119641	123
118699	123	119642	123
118700	123	119646	123
118701	123	119647	123
118702	123	119648	123
118703	123	119649	123
118704	123	119650	123
118/05	123	119690-XX	58, 88, 89
119212-120	92	119698-2	58
119212-30	92	119698-3	58
119212-60	92	119698-4	58
119213	92	119698-5	58
110221	52	110609 7	50
119243	52 60 66	119090-7	36
119243	60,66	110715-33	34
119245	60,66	110715-30	34
119306	50	119796	123
119307-XXX	86	119797	123
119308-XXX	86	119798	123
119309-XXX	86	119799	123
119310-XXX	86	119800	123
119378-XX	88, 89	119892-38	34
119416	88	119892-39	34
119454	134	119897-15	115
119455	134	119897-18	115
119456	134	119897-20	115
119457	134	119897-25	115
119458	134	119897-30	115
119581-1	124	119897-40	115
119581-2	124	119999-015	137
119581-3	124	119999-021	137
119582-1	124	119999-034	137
119582-2	124	119999-035	137
119582-3	124	119999-036	137
119583-1	124	119999-037	137
119583-2	124	119999-045	137
119583-3	124	120-A	58
119584	124	127112- X X X	269
110500	124	12/122- X X X	269
119586	124	12/122-010-S	320
119010 119010	123	12/132- X X X	269
119619	123	12/142- X X X	269
110001	123	13111 2VV V	60, 66
11000	123	<u>2AX-X</u> 00211.1	/9
110022	123	20311-1	85
110624	123	20311-2	68
113024	123	20011-0	60



MODEL	PAGE	MODEL	PAGE
20311-4	85	26341-020	294, 295
20311-6	85	26351- X X X	298
20311-8	85	26351-020	294, 295
20312-1	85	26361- X X X	298
20312-2	85	26361-020	294, 295
20312-3	85	2734 X - X 0 X	297
20312-4	85	27344-000	294
20312-6	85	2735 X - X 0 X	297
20312-8	85	27354-000	294
20313-1	85	2736 X - X 0 X	297
20313-2	85	27364-000	294
20313-3	85	28342	295
20313-4	85	28343	200
20313-6	85	28344	204
20313-8	85	28352	295
20524	114	28252	233
20524	114	20333	254
20529	114	20334	234
20330	114	20302	250
20331	114	20303	294
20532	114	28304	294
20533	114	29002	297
20534	114	29077	297
20535	114	29119	297
20536	114	29120	297
20537	114	29235	289, 298, 306
20538	114	29390	296
20539	114	29391	296
20540	114	29392	296
20541	114	29397	296, 298
20542	114	29539	261, 269
20543	114	29540	261, 269
20544	114	29586	259, 271
20545	114	29594	283, 287
20546	114	29595	283, 287
20547	114	29596	283, 287
20548	114	29622	261, 269
20549	114	29623	283, 287
20556	114	29660-1	259, 265, 271
20557	114	29660-2	259, 265, 271
20558	114	29665	243, 263, 289, 298, 306
20559	114	29668	261, 265, 269, 270
20560	114	29720	309
20965-1	66	29721	309
20965-2	66	29722	309
20973-1	82	29724	309
20973-2	82	29725	309
20973-3	82	29727	309
20973-4	82	29728	309
20975	82	29754-1	261, 269
22101	314	29755-1	269, 309
22151	314	29796	317
22180-1	314	29846	261, 265, 269, 309
22180-2	314	29850	261, 265, 269, 270, 309
22180-3	314	29850-S	320
22800	318	29863	261 265 269 309
22801	318	29883	
22802	218	29960	
25341- X X X	010	20067	206-200
25341_020	230	20060-2	290, 290
20041-020 	294, 290	23303-2	290
20001° A A A	290	23310	297
200011020	294, 295	2331.0	309
2030 I- X X X	296	29995	297
20301-020	294, 295	29999	283, 287, 297
26341- X X X	298	2U-812	193

MODEL	PAGE	MODEL	PAGE
30016	199, 202	33500-3	200
30016-К	202	33500-5	200
30018	199, 202	33628-()	200
30131	210	33872-8-F	317
30131-2	210	33906	199, 202
30209-К	202	33907	199, 202
30384-5	202	33970	314
30384-9	202	34332	240
30442	202	34518	201, 202
30442-К	202	34655-1	242
30510-К	202	34921	242
30629	202	35014	242
30712	202	35113	242
30896	201, 202	35203	242
30896-К	202	35205	242
3106	137	363101	192
31330	202	36310-2	192
31330-К	202	36322	192
31367	202	363221	192
31427	201, 202	36460	243
31432	201, 202	365111	192
31812-( )	211	36511-1	192
31812-4	211	36518	192
32060	201, 202	365181	192
320601	202	36786	192
32282-2	219, 220	367881	192
32283	218	36788-1	192
32284	219	36934	212
32288	218, 220	36953	202
32359-8-J	317	37013	72
32447	219	37017	192
32452	217	370181	192
32453	219	37019	192
32455	219	37020	192
32491	219	370211	192
32509	217	370221	192
32510	219	37023	192
32528	217, 218	37024	192
32529	217	37025	192
32530	217, 218	370251	192
32968-1	202	37025-1	192
32968-2	202	37026	192
32908-3	202	370201	192
32906-4 	202	07110	192
32906-5	202	37112	12
22069 7	202	27652 22	241
22069 0	202	27652 64	241
32968-0	202	37653 - 80	241
32984-1	202	37653 -100	241
32984-2	202	37654	241
32984-3	202	37655	241
32984-4	202	37656	241
32984-5	202	37708	240
32984-6	202	38083	217. 218. 219
32984-7	202	38171	218
32984-8	202	38406	217
32984-9	202	38408	219
33090	219	38409	217. 220
33153	243	38417-1	218
33226-( )	212, 214	38417-2	218
33226-8	214	38418-1	220
33364	240	38418-2	220
33381-1	242	38419-2	218



MODEL	PAGE	MODEL	PAGE
38814-3	192	44360-(#)	210
38814-4	192	44361-( )	226
38815-3	192	44367	221
38815-4	192	44523	240
39001	221	44546-(#)	210
39489	240	44548	210
39862-1	214	44561-()	226
39862-2	214	44595	241
39862-3	214	44694	221
39929	221	45630	192
46X-X	82	456301	192
40004-*	241	45707(1)	242
40102-1	221	45708(1)	242
40164	243	45709(1)	242
40259	193	45710(1)	242
40278	218	45779	212
40768	202	45780	221
40847	202	45934(1)	242
40856	217, 218	45935(1)	242
40907	219	46094-*	241
41084	201, 202	46119-()	211
41084-K	202	46119-2	211
4120-EXT	210	46328	223
41329-1	243	46343-1	175, 178, 182, 186, 192
41335	243	46343-10	175, 178, 182, 186, 192
41336	243	46343-12	192
41619-1	243	46343-2	175, 178, 182, 186, 192
41750-()	212	46343-3	175, 178, 182, 186, 192
41/50-3	212	46343-4	1/5, 1/8, 182, 186, 192
41/59	243	46343-5	1/5, 1/8, 182, 186, 192
41800	221	46343-6	1/5, 1/8, 182, 186, 192
42114	221	40343-8	1/5, 1/8, 182, 186, 192
42122-2	221	46344-1	192
42341	221	46344-10	192
42133	242	46344-12	192
43002	240	46344-2	192
43048(1)	242	46344-4	192
43049	242	46344-5	192
43059	240	46344-6	192
43095	240	46344-8	192
43096	242	46364-*	241
43097	242	46369-*	241
43101	242	46373	226
43106-*	241	463732	226
43110	242	46472	223
43111	240	46477	226
43231	240	46490	226
43441 – 1	241	464902	226
43441 – 2	241	46513	226
43456	242	46565	242
43458	242	46831	225
43459	242	46860	208
43460*	242	46861	208
43494	200	46866	208
43497-( )	200	46867	208
43554 – 1	241	46884(-1)	192, 193
43554 - 2	241	46884(-1)1	192
43554 – 3	241	46885(-1)	193
44010	240	46992	221
44061	242	4/340	202
44109	242	4/341	199, 201, 202
44120	241	4/353-1	221
4430U-( )	202, 209, 226	47369	221

MODEL	PAGE	MODEL	PAGE
47407	221	600-2	88
47568-( )	211	600-3	88
47568-1	211	600-4	88
47618	225	61113	22
47755	221	61879	22
47756	221	621514-10	21
47795	223	621515-10	21
47822	225	621516-10	21
48248-1	221	621517-10	21
48249-1	221	621518-10	21
48275-1	210	621519-10	21
48446-1	221	621520-10	21
48447-1	221	621523-10	21
48803-1	221	621524-10	21
48804-1	221	622514-10	21
48817-1	221	62274	22
48818-1	221	628004-12	318, 320
48869	210	628004-25	318, 320
48894	221	628004-50	318
48931	225	628020-12	318
48934	223	628020-25	318
48994	222	628020-50	318
48995	222	628023-12	318
49040-13	224, 225	628023-25	318
49094	208	628023-50	318
49095	208	635129	21, 28
49096-1	208	635193	28
49097	208	635392	28
49098	208	635395-2	28
49099-1	208	635399	28
49558	240	636077	28
49559	240	636103	28
49600	210	637336	21
49692	210	637337	21
49693	208	640015-1	26
49694	208	640095-2-B	26
49/98	210	640165	26
49799	210	650717-0	19
49800 - 10	241	650718-0	19
49800 - 100	241	650719-0	19
49800 - 20	241	65096 1	22
49800 - 50	241		11 10
49800 - 40	241	6661XX-XXX	11, 12
49800 - 80	241	6661XX-XXX-C	14 15 16
49801	210	6662XX-XXX-C	17,18
49802	210	67231	21
49837	210 221	67231-6	21
49840	210	67231-7	21
49846	210. 221	67234	21
49877	208	67234-7	21
49878	208	7000	92
49879	208	7002	214
49880	208	7014	226
49975	210	7014-E	221
49977	210	7015	226
49978	210	7015-11	221
49982	210	7015-E	221
49987	210	7072	316
49988	210	7072-15	316
50XX-XX	60	7114-E	211
59003-842	90	7149-C	221
59809	90	7150	134
600-1	88	7151	134



MODEL	PAGE
7152	134
7153-0	221
7165-B	215
7025 0	213
7233-0	221
7236-0	221
7429-D	202
7438-D	200
7439-D	200
7441-D	200
	315
7444-K	315
7444 K	220
7444-K-5	320
/453	226
7456	226
7472	223, 316
7670-18	317
7670-25	317
7670-35	317
7670-45	317
7670 10	171 105
7700	
77005	200, 201, 200, 209, 240, 241, 242
//UUE	241, 243
7703	240
7708E	238, 239
7712EL	237, 239
7712ER	239
7714EL	237, 239
771/EP	239
7710	200
77105	235, 239
//2UE	238, 239
7732E	238, 239
7740B	234, 240, 241, 242
7756E	235, 239
77617-Z	21
7770E	235. 239
7776E	235_239
7700	226, 220, 240, 241, 242, 242
7700	230, 239, 240, 241, 242, 243
//9UA	236, 239, 243
7792A	236, 239
7796AL	237, 239
7796EL	239
7798AL	237, 239
	239
7799AL	237, 239
7020 P	100
7030-D 7001 D	100
/831-B	199
7832-В	199
7840	226
7843	226
7845-E	199
7846-E	199
7847-E	199
7848-F	100
7040 E	100
7.049°E	199
/ ð4λ	226
7850-Е	199
7851-E	199
7852-E	199
7853-E	199
7854-E	199
7855-E	100
7857	100
7007	220
	226
/8/4	226

MODEL	PAGE
7874-E1	212
7874-E2	212
788X	226
789X	226
78XX-E	199
7939	226
7944	226
7945	226
7078	220
7970	211
7980	211
7980-2	211
/980-A	211
80090244	210
80090301	210
80092810	210
80092885	210
80093008	210
80093313	210
8038	226
8038-E	215
8039	226
8039-E	215
8040	226
8040-E	215
8067	226
8067-E2	212
8076-15	317
8120	214
8212-1B	221
8213-1B	221
8299	226
8315	214
8316	221
8317	221, 226
8318	221, 226
8338	314
8338-1	314
8338-1-S	320
8338-2	314
8338-5	320
8375-2	223 316
9275 A	223, 510
8416	223, 310
0410	221
8417	221
8418	221
8426-2	201
8426-3	201
8426-4	201
8426-5	201
8426-6	201
8426-7	201
8440-S	320
8446-B	221
8446-B()	221
8446-B5C-V	206
8446-B5K-V	206
8446-B6C-V	206
8446-B6K-V	206
8447-D()	221
8447-E	221
8447-E5T-V	206
8447-F6T-V	200
8448	200
8448-Δ1( )	209
וא-טוייט // ו ( )	221

MODEL	PAGE	MODEL
8448-A1C	209, 210	A449PS
8448-A1K	209, 210	AG024A-( )-( )
8448-A3()	221	AG024A-15-Q
8448-A3C	209, 210	AG024A-26-Q
8448-A3K	209, 210	AG024A-8-Q
8451-1	315	AG024A-9-Q
8451-1-S	320	AG027A-( )-( )
8451-2	315	AG027A-15-Q
8451-3	315	AG027A-26-Q
8451-6	315	AG027A-8-Q
8457-A( )	221	AG027A-9-Q
8457-B	221	AG028A-( )-( )
8457-B5T-V	206	AG028A-15-Q
8457-B6T-V	206	AG028A-26-Q
8506	192, 221, 226	AG028A-8-Q
8506-ADB	201	AG028A-9-Q
8506-ADK	201	AG054A-()-()
8506-APR-A	1/6	AG054A-10-Q
8506-APR-P	1/6	AG054A-16-Q
	201	AG054A-24-Q
	201	AG054A-6-U
	176	AG057A-()-()
8500-BFR-D	102 221 226	AG057A-10-Q
8509-4DB	201	AG057A-24-0
8509-ADK	201	AG057A-8-0
8509-APB-A	176	AG058A-()-()
8509-APB-P	176	AG058A-10-Q
8509-ATA	201	AG058A-16-Q
8509-ATB	201	AG058A-24-Q
8509-ATC	201	
8509-BPR-D	176	AR028A-10R-( )
8515	192, 221, 226	AR028A-14L-()
8515-APR-A	176	AR028A-17R-()
8515-APR-P	176	AR028A-25L-( )
8515-BPR-D	176	AR028A-48L-( )
8521	192, 221, 226	AR028A-5R-( )
8521-APR-A	176	AR028A-9L-( )
8521-APR-P	176	AR058A-16R-( )
8521-BPR-D	176	AR058A-24R-( )
8525-C	201, 221	AR058A-6H-( )
8526-C	201	AR058A-9R-( )
8527-C	221	AS028A-15-Q
8683	192	AS028A-26-Q
8683-BPR-(1	176	AS028A-8-Q
8683-BPR-D	1/6	ASU28A-9-Q
8683-BPR-P	1/6	AS058A-10-Q
8684	192	ASU58A-17-U
8084-BPR-(1	176	ASU58A-25-U
	176	ASU30A-0-U 
0004-DFR-F 	26	B27112-000
94421	26	B27172 020
94422	26	B27122-020
95183	20	BHR15
95189	21	BHR25
95190	21	C28111-600
95199	21	C28111-601
95200	21	C28111-800
98403	137	C28111-801
ANTXX-XXXXX-XXX	125	C28112-600
ANXXX-XXXXX-XXX	121	C28112-601
AXXXXX-XXX-X-C	50	C28112-800
A412SS-120-A-C	50	C28121-600


MODEL	PAGE	MODEL	PAGE
C28121-601	267	C28463-810	299
C28121-800	266	C28473-810	299
C28121-801	266	C28483-810	299
C28122-600	267	CAT33P-XXX-X-C	56
C28122-601	267	CAT33S-XXX-X	56
C28122-800	266	CAT44P-XXX-X-C	56
C28123-600	22	CAT66P-XXX-X*-C	58
C28221-600	276	CAT77S-XXX-X*-C	58
C28221-601	276	CAT88P-XXX-X*-C	58
C28221-610	276	CATXXB-XXX-X	58
C28221-611	276	CBW	43, 88, 89
C28221-700	277	CDL-XXX	43, 88, 89
C28221-701	277	CDN	43, 89
C28221-710	277	CDW	43, 89
C28221-711	277	CDW-30	58, 88, 89
<u>C28221-800</u>	275	CHL6-012	37
C28221-801	275	CHL6-024	37
028221-810	275	CHL6-120	3/
028221-811	275	CHL-XXX	43, 88, 89
	276		43, 88, 89
	270		20,00,09
028223-700	2//		3/
C28223-800	277	CSL0-012	37
	275	CSL6-120	37
C28231_600	275	CSL-XXX	43 88 89
C28231-601	276	CSN	43,89
C28231-610	276	CSN-30	58 88 89
C28231-611	276	CSN6	37
C28231-700	277	CSN-MICRO	63
C28231-701	277	DG021B-33-A	194
C28231-710	277	D10-8888	240
C28231-711	277	DA005-APNN-2-0	20
C28231-800	275	DA005-APNN-2-A	20
C28231-801	275	DA005-APNN-B-D	21
C28231-810	275	DA005-APNN-B-L	21
C28231-811	275	DA005-APNN-B-P	20
C28233-600	276	DA005-ASTT-2-A	20
C28233-610	276	DA005-PPNN-2-A	20
C28233-700	277	DA005-PPNN-2-N	20
C28233-710	277	DA005-PPNN-B-J	21
C28233-800	275	DA005-PPNN-B-M	20
C28233-810	275	DA005-PPTT-2-A	20
C28241-600	276	DA005-PPUU-2-A	20
C28241-601	276	DA005-PPUU-2-C	20
028241-610	276	DA005-SS11-2-A	20
028241-611	276	DA023B-11-()	198
628241-700	2//	DA023B-21-()	198
C28241-701	277	DA023B-57-()	198
	277	DA052B-37()	190
C28241-800	275	DA053B-21-()	190
028241-801	275	DA053B-52-( )	198
C28241-810	275	DG021B-( )-( )	224
C28241-811	275	DG021B-10-( )	195
C28243-600	276	DG021B-19-( )	195
C28243-610	276	DG021B-220-()	135
C28243-700	277	DG021B-33-( )	135
C28243-710	277	DG021B-5-()	195
C28243-800	275	DG021B-64-()	195
C28243-810	275	DG022B-()-()	224
C28351-600	293	DG022B-15-()	195
C28361-600	293	DG022B-170-()	195
C28453-810	299	DG022B-26-()	195

MODEL	PAGE	MODEL	PAGE
DG022B-4-()	195	DR051B-7-( )	197
DG022B-50-( )	195	DR053B-27-()	198
DG022B-8-()	195	DR053B-41-()	198
DG051B-( )-( )	224	DR053B-52-()	198
DG051B-11-( )	195	EXX2XX-XXX-X-C	66
DG051B-15-( )	195	E112HM	92
DG051B-180-( )	195	E112LM	92
DG051B-27-( )	195	E112PD	92
DG051B-33-( )	195	E152HM	92
DG051B-4-( )	195	E152LM	92
DG051B-52-( )	195	E152PD	92
DG051B-6-( )	195	E212BD	92
DG052B-( )-( )	224	E212BS	92
DG052B-10-( )	195	E212CA	92
DG052B-15-( )	195	E212CP	92
DG052B-170-( )	195	E212CS	92
DG052B-25-( )	195	E212FA	92
DG052B-30-( )	195	E212FP	92
DG052B-4-( )	195	E212FS	92
DG052B-50-( )	195	E212HA	92
DG052B-6-( )	195	E212HM	92
DG055A-10-L	201	E212HP	92
DG055A-21-B	201	E212HS	92
DG055A-38-F	201	E212JD	92
DL021B-10-()	196	E212JS	92
DL021B-19-( )	196	E212KD-XXX-X	92
	196	E212KS-XXX-X	92
DL021B-33-()	196		92
	196		92
	196		92
DL022B-15-( )	196		92
	190		92
	106		92
DL022D-0-()	190	E212FE E212DS	92
	190	E212F3	92
DL051B-13-()	190	E212DA E212DD	92
DI 051B-730-( )	190	F212RS	92
DL051B-23-( )	196	F212SA-XXX-X	92
DI 051B-4-( )	196	F212SD-XXX-X	92
DI 051B-52-( )	196	F212SP-XXX-X	92
DI 051B-6-()	196	F212SS-XXX-X	92
DI 0528-10-( )	196	F212TM	92
DL052B-15-()	196	E252BD	92
DL052B-25-()	196	E252BS	92
DL052B-30-( )	196	E252CA	92
DL052B-4-()1	196	E252CP	92
DL052B-6-()	196	E252CS	92
DR021B-15-()	197	E252FA	92
DR021B-170-()	197	E252FP	92
DR021B-26-()	197	E252FS	92
DR021B-50-( )	197	E252GA	92
DR021B-7-()	197	E252GS	92
DR023B-11-()	198	E252HA	92
DR023B-21-()	198	E252HM	92
DR023B-37-( )	198	E252HP	92
DR023B-5-()	198	E252HS	92
DR023B-73-( )	198	E252JD	92
DR051B-11-( )	197	E252JS	92
DR051B-125-( )	197	E252KS-XXX-X	92
DR051B-19-( )	197	E252LA	92
DR051B-28-( )	197	E252LM	92
DR051B-36-( )	197	E252LP	92
DR051B-4-()	197	E252LS	92



MODEL	PAGE	MODEL	PAGE
E252PA	92	F25221-101-S	321
E252PD	92	F25221-110	275, 277, 279
E252PE	92	F25221-110-S	321
E252PS	92	F25221-111	275, 277, 279
E252RA	92	F25221-300	280
E252RP	92	F25221-301	280
E252RS	92	F25221-310	280
E252SA-XXX-X	92	F25221-311	280
E252SN-XXX-X	92	F25222-100	281
E252SP-XXX-X	92	F25222-110	281
E252SS-XXX-X	92	F25222-300	281
E252TM	92	F25222-310	281
E252UA	92	F2523X-3XX	280
E252US	92	F2523X-XXX	279
E312LS	92	F25231-100	275, 277, 279
E312PD	92	F25231-100-S	321
E312SD-XXX-X	92	F25231-101	275, 277, 279
E312TS	92	F25231-101-S	321
E512LM	92	F25231-110	275, 277, 279
E612LM	92	F25231-110-S	321
E712SD-XXX-X	92	F25231-111	275, 277, 279
ETA2-99	191	F25231-300	280
ETA2-P925	191	F25231-301	280
ETA2-PC99	191	F25231-310	280
ETT-1/ETT-4/ETT-12/ETT-30	191	F25231-311	280
ETT-12-US	191	F25232-100	281
ETT-1-US	191	F25232-110	281
ETT-30-US	191	F25232-300	281
ETT-4-US	191	F25232-310	281
ETT-BC-US/ETT-BC-UK/ETT-BC-EU	191	F2524X-3XX	280
ETT-CASE	191	F2524X-XXX	279
ETT-P7574	191	F25241-100	275, 277, 279
ETT-QD	191	F25241-100-S	321
ETT-RA	191	F25241-101	275, 277, 279
EV 125	84	F25241-101-S	321
EV 250	84	F25241-110	275, 277, 279
EV 30-A	84	F25241-110-S	321
EV 35-A	84	F25241-111	275, 277, 279
EV 375	84	F25241-300	280
F164	192	F25241-301	280
F1645	192	F25241-310	280
F25111-200	259, 266	F25241-311	280
F25111-200-S	320	F25242-100	281
F25111-201	259, 266	F25242-110	281
F25111-220	259	F25242-300	281
F25111-221	259	F25242-310	281
F25111-300	259	F25451-XXX	300
F25111-301	259	F25451-110	299
F25111-320	259	F2545X-3XX	302
F25111-321	259	F25461-XXX	300
F25111-XXX	259	F25461-110	299
F25121-200	259, 266	F2546X-3XX	302
F25121-200-S	320	F25471-XXX	300
F25121-201	259, 266	F25471-110	299
F25121-220	259	F254/X-3XX	302
F25121-221	259	+25481-XXX	300
F25121-XXX	259	+25481-110	299
F25131-XXX	259	F2548X-3XX	303
F25141-XXX	259	F25491-XXX	301
F2522 X - 3 X X	280	F2549X-3XX	303
F2522 X - X X X	279	GH011A	211
F25221-100	275, 277, 279	GH011A-600-1	211
F25221-100-S	321		92
F25221-101	275, 277, 279	Н2ХХХХ-ХХХ-Х-С	75

MODEL	PAGE	MODEL
H212BD	93	K214SD-XXX-X
H212PA	93	K214SS-XXX-X
H212PD	93	K214TM
H212SA-XXX-X	93	K216BD
H212SD-XXX-X	93	K216BS
H213BD	93	K216PD
H213PA	93	K216PS
H213PD	93	K216RS
H213SA-XXX-X	93	K216SD-XXX-X
H213SD-XXX-X	93	K216SS-XXX-X
H214BD	93	K218BD
H214PA	93	K218BS
H214PD	93	K218PD
H214SA-XXX-X	93	K218PS
H214SD-XXX-X	93	K218RS
H242BD	93	K218SD-XXX-X
H242PA	93	K218SS-XXX-X
H242PD	93	K233BD
H242SA-XXX-X	93	K233BS
H242SD-XXX-X	93	K233FP
H243BD	93	K233F5
	93	K233LM
	93	K233L3
	93	N233FD
H2433D-7AA-A	93	K233F3
H252SS-XXX-X	93	K233SD-XXX-X
H253PS	93	K233SS-XXX-X
H253SS-XXX-X	93	K233TM
H254PS	93	K234BD
H254SS-XXX-X	93	K234BS
H282PS	93	K234FP
H282SS-XXX-X	93	K234FS
H283PS	93	K234LM
H283SS-XXX-X	93	K234LS
HX133	192	K234PD
HX134	192	K234PS
HX1345	192	K234RS
HX135	192	K234SD-XXX-X
HX136	192	K234SS-XXX-X
HX137	192	K234TM
HX138	192	K236BD
KXXXXX-XXX-X-C	71	K236BS
K213BS	93	K236PD
K213FP	93	K236PS
K213F5	93	
K213R5	93	
K213LW	93	K23053-XXX-X
K213PD	93	K238BS
K213PS	93	K238PD
K213BS	93	K238PS
K213SD-XXX-X	93	K238RS
K213SS-XXX-X	93	K238SD-XXX-X
K213TM	93	K238SS-XXX-X
K214BD	93	K243BD
K214BS	93	K243BS
K214FP	93	K243FP
K214FS	93	K243FS
K214LM	93	K243LM
K214LS	93	K243LS
K214PD	93	K243PD
K214PS	93	K243PS
K214RS	93	K243RS



MODEL	PAGE	MODEL	PAGE
K243SD-XXX-X	93	K348SD-XXX-X	93
K243SS-XXX-X	93	K513LM	93
K243TM	93	K513TM	93
K244BD	93	K514LM	93
K244BS	93	K514TM	93
K244FP	93	K533LM	93
K244FS	93	K533TM	93
K244LM	93	K534LM	93
K244LS	93	K534TM	93
K244PD	93	K543LM	93
K244PS	93	K543TM	93
K244RS	93	K544LM	93
K244SD-XXX-X	93	K544TM	93
K244SS-XXX-X	93	K613LM	93
K244TM	93	K613TM	93
K246BD	93	K614LM	93
K246BS	93	K614TM	93
K246PD	93	K633LM	93
K246PS	93	K633TM	93
K246RS	93	K634LM	93
K246SD-XXX-X	93	K634TM	93
K246SS-XXX-X	93	K643I M	93
K248BD	93	K643TM	93
K248BS	93	K644I M	93
K248PD	93	K644TM	93
K248PS	93	K713LS	93
K248BS	93	K713PD	93
K248SD-XXX-X	93	K713SD-XXX-X	93
K248SS-XXX-X	93	K713TS	93
K313LS	93	K714LS	93
K313PD	93	K714PD	93
K313SD-XXX-X	93	K714SD-XXX-X	93
K313TS	93	K714TS	93
K314LS	93	K716PD	93
K314PD	93	K716SD-XXX-X	93
K314SD_XXX_X	93	K718PD	93
K314TS	93	K718SD-XXX-X	93
K316PD	93	K728SD-XXX-X	93
K316SD-XXX-X	93	K733LS	93
K318PD	93	K733PD	93
K318SD-XXX-X	93	K733SD-XXX-X	93
K3331 S	93	K733TS	93
K333PD	93	K734LS	93
K333SD-XXX-X	93	K734PD	93
K333TS	93	K734SD-XXX-X	93
K334LS	93	K734TS	93
K334PD	93	K736PD	93
K334SD-XXX-X	93	K736SD-XXX-X	93
K334TS	93	K738PD	93
K336PD	93	K738SD-XXX-X	93
K336SD-XXX-X	93	K743LS	93
K338PD	93	K743SD-XXX-X	93
K338SD-XXX-X	93	K743TS	93
K343I S	93	K7441 S	93
K343PD	93	K744PD	93
K343SD-XXX-X	93	K744SD-XXX-X	93
K343TS	03	K744TS	03
K344I S	02	K746PD	
K344PD		K746SD-XXX-X	
K344SD-XXX-X	03	K748PD	
K344TS		K748SD-XXX-X	
K3/6PD		126111-100	200 730 330 530
K346SD-XXX-X		L26111-100-S	200, 200, 207
K348PD		126111-120	020
	55		203

#### MODEL

MODEL	PAGE
L26111-XXX	263
L26121-100	263, 266, 267
L26121-100-S	320
L26121-120	263
L26121-XXX	263
L26131-XXX	263
L26141-XXX	263
L26221 - X X X	289
L26221-100	275, 276, 277, 289
L26221-100-S	321
L26221-110	275, 276, 277, 289
L26221-110-S	321
L26231 - X X X	289
L26231-100	275, 276, 277, 289
L26231-100-S	321
L26231-110	2/5, 2/6, 2/7, 289
L26231-110-5	321
126241-100	209
L26241-100-S	321
26241-110	275 276 277 289
L26241-110-S	321
L26451- X X X	306
L26451-110	299
L26461- X X X	306
L26461-110	299
L26471- X X X	306
L26471-110	299
L26481- X X X	306
L26481-110	299
LLG-5	243
LM2203A-11-B	26
LM2203A-31-B	26
LM2203A-41-B	26
LM2203A-51-B	26
LM2250-21-E	27
LM2250-31-E	27
LW2250-41-E	21
LM2250E-21-B	27
LM22301-21-5	26
LM2305A-31	26
I M2305A-41	20
LM2305A-51	26
LM2350-21-B	27
LM2350-31-B	27
LM2350-41-B	27
LM2350-61-B	27
LM2350E-41-B	27
LP2001-1-B	27
LP2002-1-B	27
LP2003-1-B	27
LP2004-1-B	27
LP2006-1-B	27
LP2100-1	26
LP2100-2	26
LP3001-1	27
LP3002-1	27
LP3003-1	27
LP3004-1	27
LP3005-1	27
LP300/-1	27
LP3100-2	26
LF3100-2	26

MODEL	PAGE
M-XXX-XX*-XXX-X-C	42
M81XXX-XXX-X-C	37
M211HS	80
M211LS	80
M211BS	80
M212CS	40 41
M212ES	45
M212HS_10	40 41
M212LIS-10 	40, 41
M212/10*11	41
M212H3-13	41
M212H5-15	41
M212H5-17	41
M212LM	44, 47, 92
M212LM-R	44
M212LS	44, 47, 92
M212LS-10	41
M212LS-11	41
M212LS-R	44
M212PD	48, 92
M212PS	47, 92
M212RS	40, 41
M212SD	48
M212SD-XXX-X	92
M212SS	47
M212SS-XXX-X	92
M212TM	45
M212TS	45
M213LM	44, 47, 92
M213LS	44, 47, 92
M213PD	48, 92
M213PS	47.92
M213SD	48
M213SD-XXX-X	92
M213SS	47
M213SS-XXX-X	92
M214DD	
M214 D M214 D	40
M214PFD M214DS	47.02
M214F3	47, 92
M2145D	40
M214SD-XXX-X	92
M21455	47
M214SS-XXX-X	92
M251HS	80
M251LS	80
M251RS	80
M252CS	40, 41
M252FS	45
M252HS-10	40, 41
M252HS-11	41
M252HS-13	41
M252HS-15	41
M252HS-17	41
M252LM	44
M252LS	44
M252LS-10	41
M252LS-11	41
M252RS	40. 41
M252TM	45
M252TS	45
M26M02-02	43
M26M02-04	43
M26M02-06	40
Wi20W02-00 	43
M26M02-10	43
	43



#### MODEL

MODEL	PAGE
M26M02-12	43
M26MB	43
M291CS	41
M291HS-10	41
M291HS-11	41
M291HS-13	41
M291HS-15	41
M291HS-17	41
M291LS-10	41
M291LS-10-2	41
M291LS-11	41
M291RS	41
M2X2FM	92
M2X2TM	92
M30M03-02	43
M30M03-04	43
M30M03-06	43
M30M03-08	43
M30M03-10	43
M30M03-12	43
M30MB	43
M312PD	48, 92
M312SD	48
M312SD-XXX-X	92
M313PD	48, 92
M313SD	48
M313SD-XXX-X	92
M314PD	48, 92
M314SD	48
M314SD-XXX-X	92
M34M04-02	43
M34M04-04	43
M34M04-06	43
M34M04-08	43
M34M04-10	43
M34M04-12	43
M34MB	43
M512LR	45
M513LR	45
M514LR	45
M812SD-XXX-X	92
M812SS-XXX-X	92
M813SD-XXX-X	92
MKN	51
МКР	51
MP3651-7	60, 66
NA051A-10-( )	190
NA051A-16-( )	190
NA051A-24-( )	190
NA051A-4-( )	190
NA051A-6-()	190
NA051A-8-()	190
NA054A-10-( )	190
NA054A-16-( )	190
NA054A-24-( )	190
NAU34A-4-()	190
NAU54A-6-()	190
NAU54A-8-()	190
NM22U2X - X1 - X31	22
NM2304A-11-311	24
NMZ304A-41-311	24
	188
NKU21B-1/R-()	188
NKUZ1B-33K-( )	188

MODEL	PAGE
NR021B-5R-()	188
NR023B-10R-()	183
NR023B-17R-()	183
NR023B-5R-( )	183
NR051B-11H-()	188
NR051B-16R-()	188
NR051B-24R-()	188
NR051B-6H-()	188
NR051B-8H-()	188
NR053B-11H-()	183
NR053B-16R-( )	183
NR053B-6H-()	183
NR053B-8H-()	183
NR053B-9R-( )	183
P114400	63
P211SC-012-D	63
P211SC-012-E	63
P211SC-024-D	63
P211SC-024-E	63
P211SC-120-A	63
P211SC-120-B	63
P211SS-012-D	63
P211SS-012-E	63
P211SS-024-D	63
P211SS-024-E	63
P211SS-120-A	63
P211SS-120-B	63
P221SC-012-D	63
P221SC-012-E	63
P221SC-024-D	63
P221SC-024-F	63
P221SC-120-A	63
P221SC-120-B	63
P221SS-012-D	63
P221SS-012-E	63
P221SS-024-D	63
P221SS-024-F	63
P221SS-120-A	63
P221SS-120-B	63
P251SS-012-D	63
P251SS-012-E	63
P251SS-024-D	63
P251SS-024-F	63
P251SS-120-A	63
P251SS-120-B	63
P261SS-012-D	63
P261SS-012-F	63
P261SS-024-D	63
P261SS-024-F	63
P261SS-120-A	63
P261SS-120-B	63
P29112-100	265
P29112-100-S	320
P29112-104	265
P29112-120	265
P29112-124	265
P20112-600	267
P29112-604	207
P2011X-XXX	207
221122-100	200
P20122-100-S	200
	320
P20122-104-S	200
P20122-101-0	320
123122 120	200

PAGE

#### MODEL

P29122-124	265
P29122-600	9, 10, 11, 12, 267
P29122-604	267
P2912X-XXX	265
P2913X-XXX	265
P2914X-XXX	265
P29221-100 P29221-600	287
P29221-104 P29221-604	287
P29221-110 P29221-610	287
P29221-114 P29221-614	287
P29221-600	276
P29221-600-S	321
P29221-604	276
P29221-610	14, 19, 276
P29221-610-S	321
P29221-614	276
P29221-614-S	321
P2922X - X X X	287
P29231-100 P29231-600	287
P29231-104 P29231-604	287
P29231-110 P29231-610	287
P29231-114 P29231-614	287
P29231-600	276
P29231-600-S	321
P29231-604	276
P29231-610	276
P29231-610-S	321
P29231-614	276
P29231-614-S	321
P2923X - X X X	287
P29241-100 P29241-600	287
P29241-104 P29241-604	287
P29241-110 P29241-610	287
P29241-110 P29241-610 P29241-114 P29241-614	287
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600	287 287 276
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S	287 287 276 321
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604	287 287 276 321 276
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610	287 287 276 321 276 15, 16, 17, 18, 276
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610 P29241-610-S	287 287 276 321 276 15, 16, 17, 18, 276 321
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614	287 287 276 321 276 15, 16, 17, 18, 276 321 276
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614 P29241-614 P29241-614-S	287 287 276 321 276 15, 16, 17, 18, 276 321 276 321
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614 P29241-614 P29241-614-S P2924X - X X X	287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 276 321
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614 P29241-614 P29241-614-S P2924X - X X X P29351-600	287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 287 287
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614 P29241-614-S P29241-614-S P2924X - X X X P29351-600 P29351-604	287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 287 293 293
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614-S P29241-614-S P29241-614-S P2924X - X X X P29351-600 P29351-604 P29361-600	287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 276 321 287 287 283 293 293
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614-S P29241-614-S P29241-614-S P2924X - X X X P29351-600 P29351-600 P29351-600	287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 276 321 287 283 293 293 293
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614-S P29241-614-S P2924X - X X X P29351-600 P29351-604 P29361-604 PD02P-XXX-XXX	287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 287 293 293 293 293 293
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614-S P29241-614-S P2924X - X X X P29351-600 P29351-600 P29351-604 P29361-600 P29361-604 PD02P-XXX-XXX PD05P-AXS-XXX	287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 287 293 293 293 293 293 293 293
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614 P29241-614-S P29241-614-S P2924X - X X X P29351-600 P29351-600 P29351-604 P29361-604 PD02P-XXX-XXX PD05P-AXS-XXX PEN	287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 287 293 293 293 293 293 293 293 293 293 293
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614 P29241-614-S P29241-614-S P2924X - X X X P29351-600 P29351-604 P29361-604 PD02P-XXX-XXX PD05P-AXS-XXX PEN PPN	287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 276 321 287 293 293 293 293 293 293 293 293 293 293
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614-S P29241-614-S P2924X - X X X P29351-600 P29351-604 P29361-604 P29361-604 PD02P-XXX-XXX PD05P-AXS-XXX PEN PFN PR4021 - X X X	287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 276 321 287 293 293 293 293 293 293 293 293 293 293
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614-S P29241-614-S P2924X - X X X P29351-600 P29351-604 P29351-604 P29361-600 P29361-604 PD02P-XXX-XXX PD05P-AXS-XXX PEN PPN PR4021 - X X X PR4021-100	287 287 276 276 321 276 15, 16, 17, 18, 276 321 276 321 276 321 287 293 293 293 293 293 293 293 293 293 293
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614-S P29241-614-S P2924X - X X X P29351-600 P29351-600 P29351-604 P29361-600 P29361-604 PD02P-XXX-XXX PD05P-AXS-XXX PEN PPN PR4021 - X X X PR4021-100 PR4021-200	287 287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 287 293 293 293 293 293 293 293 293 293 293
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614-S P29241-614-S P2924X - X X X P29351-600 P29351-600 P29351-604 P29361-600 P29361-604 PD02P-XXX-XXX PD05P-AXS-XXX PEN PFN PR4021 - X X X PR4021-100 PR4021-200 PR4021-300	287 287 276 276 321 276 15, 16, 17, 18, 276 321 276 321 287 293 293 293 293 293 293 293 293 293 293
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614-S P29241-614-S P2924X - X X X P29351-600 P29351-600 P29351-604 P29361-600 P29361-604 PD02P-XXX-XXX PD05P-AXS-XXX PEN PPN PR4021 - X X X PR4021-100 PR4021-200 PR4031 - X X X	287 287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 287 293 293 293 293 293 293 293 293 293 293
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614-S P29241-614-S P2924X - X X X P29351-600 P29351-600 P29351-604 P29361-604 PD02P-XXX-XXX PD05P-AXS-XXX PD05P-AXS-XXX PEN PPN PR4021-100 PR4021-200 PR4031 - X X X PR4031-100	287 287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 287 293 293 293 293 293 293 293 293 293 293
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614 P29241-614-S P29241-614-S P2924X - X X X P29351-600 P29351-600 P29351-604 P29361-600 P29361-604 PD02P-XXX-XXX PD05P-AXS-XXX PD05P-AXS-XXX PEN PPN PR4021 - X X X PR4021-100 PR4021-200 PR4021-300 PR4031-100 PR4031-100 PR4031-100 PR4031-200	287 287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 287 293 293 293 293 293 293 293 293 293 293
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614 P29241-614-S P29241-614-S P2924X - X X X P29351-600 P29351-600 P29351-604 P29361-604 PD02P-XXX-XXX PD05P-AXS-XXX PD05P-AXS-XXX PEN PPN PR4021 - X X X PR4021-100 PR4021-200 PR4021-300 PR4031-100 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-300	287 287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 287 293 293 293 293 293 293 293 293 293 293
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614-S P29241-614-S P29241-614-S P2924X - X X X P29351-600 P29351-600 P29351-604 P29361-600 P29361-604 PD02P-XXX-XXX PD05P-AXS-XXX PD05P-AXS-XXX PEN PPN PR4021 - X X X PR4021-100 PR4021-200 PR4021-300 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-300 PT005A	287 287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 287 293 293 293 293 293 293 293 293 293 293
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614 P29241-614-S P29241-614-S P2924X - X X X P29351-600 P29351-600 P29351-604 P29361-600 P29361-604 PD02P-XXX-XXX PD05P-AXS-XXX PD05P-AXS-XXX PEN PPN PR4021 - X X X PR4021 - 100 PR4021-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-300 PT005A PT005A(1)	287 287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 287 293 293 293 293 293 293 293 293 293 293
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614 P29241-614-S P29241-614-S P2924X - X X X P29351-600 P29351-600 P29351-604 P29361-600 P29361-604 PD02P-XXX-XXX PD05P-AXS-XXX PD05P-AXS-XXX PEN PPN PR4021 - X X X PR4021-100 PR4021-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PT005A PT005A(1) PT005A-SB	287 287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 287 293 293 293 293 293 293 293 293 293 293
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614 P29241-614-S P29241-614-S P2924X - X X X P29351-600 P29351-600 P29351-604 P29361-604 PD02P-XXX-XXX PD05P-AXS-XXX PD05P-AXS-XXX PEN PPN PR4021-100 PR4021-100 PR4021-200 PR4031-X X X PR4031-100 PR4031-200	287 287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 287 293 293 293 293 293 293 293 293 293 293
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614 P29241-614-S P29241-614-S P29241-614-S P29241-614-S P29244 - X X X P29351-600 P29351-600 P29351-604 P29361-600 P29361-604 PD02P-XXX-XXX PD05P-AXS-XXX PD05P-AXS-XXX PEN PPN PR4021 - X X X PR4021-100 PR4021-200 PR4021-200 PR4031 - X X X PR4031-100 PR4031-100 PR4031-200 PR4031-200 PR4031-300 PT005A PT005A(1) PT005A-SB PT010A PT010A(1)	287 287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 287 293 293 293 293 293 293 293 293 293 293
P29241-110 P29241-610 P29241-114 P29241-614 P29241-600 P29241-600-S P29241-604 P29241-610 P29241-610-S P29241-614 P29241-614-S P29241-614-S P29351-600 P29351-600 P29351-604 P29351-604 PD02P-XXX-XXX PD05P-AXS-XXX PEN PPN PR4021 - X X X PR4021-100 PR4021-200 PR4021-200 PR4021-200 PR4021-200 PR4021-200 PR4031-00 PR4031-00 PR4031-00 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PR4031-200 PT005A PT005A PT005A PT005A PT010A PT010A(1) PT010A-SB	287 287 287 276 321 276 15, 16, 17, 18, 276 321 276 321 287 293 293 293 293 293 293 293 293 293 293

MODEL	PAGE
PT020A	239
PT020A-SB	239
PTN	51
R27111-100	261
R27111-200	261
R27111-600	261, 266
B27111-700	261
R27111-XXX	261
R27121-100	261
P27121-200	201
P27121 600	201
	201, 200
R27121-700	201
R2/121-XXX	261
R2/131-XXX	261
R2/141-XXX	261
R27221 - X X X	283
R27221-100	283
R27221-200	283
R27221-600	275, 283
R27221-600-S	321
R27221-700	283
R27231 - X X X	283
R27231-100	283
R27231-200	283
R27231-600	275, 283
R27231-600-S	321
R27231-700	283
R27241 - X X X	283
R27241-100	283
R27241-200	283
R27241-600	275. 283
B27241-600-S	321
B27241-700	283
R27451- X X X	304
B27451-100	299
R27461- X X X	304
B27461-100	2004
R27471- X X X	304
P27471 100	200
	299
	304
R27401-100	299
R2/491-100	305
R2/491-200	305
R27491-300	305
RS23B-CLV-1	207
RS23B-CLV-2	207
RS23B-PLV-1	207
RS23B-PLV-2	207
RS23B-VLV-1	207
RS23B-VLV-2	207
RS25B-CLV-1	206
RS25B-CLV-2	206
RS25B-CSV-1	206
RS25B-CSV-2	206
RS25B-PSV-1	206
RS25B-PSV-2	206
RS25B-VLV-1	206
BS25B-VIV-2	200
B\$26B-CI V-1	200
	200
	206
	206
K520B-05V-2	206
K9208-P9V-1	206
KS26B-PSV-2	206



MODEL	PAGE	MODEL	PAGE
RS26B-VLV-1	206	SHXX-XXXX-XXX	105
RS26B-VLV-2	206	SL021B-15-Q	186
SA024C-26-Q	174	SL021B-26-Q	186
SNXXX-XXXXX-XXX	122	SL021B-9-Q	186
SXXX-XXXX-XXX	101	SL022B-15-Q	185
S5XSMX-1	34	SL022B-26-Q	185
SA023B-15-Q	181	SL022B-9-Q	185
SA023B-26-Q	181	SL023B-15-Q	181
SA023B-9-Q	181	SL023B-26-Q	181
SA024C-15-Q	178	SL023B-9-Q	181
SA024C-26-Q	178	SL029B-15-Q	185
SA024C-8-Q	178	SL029B-26-Q	185
SA024C-9-Q	178	SL029B-9-Q	185
SA053B-10-Q	181	SL051B-10-Q	186
SA053B-17-Q	181	SL051B-17-Q	186
SA053B-25-Q	181	SL051B-25-Q	186
SA053B-8-Q	181	SL051B-8-Q	186
SA054C-10-Q	178	SL052B-10-Q	185
SA054C-17-Q	178	SL052B-17-Q	185
SA054C-25-Q	178	SL052B-25-Q	185
SA054C-8-Q	178	SL052B-8-Q	185
SDXX-B4B4-XXX	109	SL053B-10-Q	181
SDXX-D4B4-XXX	109.110	SL053B-17-Q	181
SDXX-N4B4-XXX	108	SL053B-25-Q	181
SDXX-P4B4-XXX	108	SL053B-8-Q	181
SG021B-()-()	224	SL059B-10-Q	185
SG021B-15-Q	186	SL059B-17-Q	185
SG021B-26-0	186	SL059B-25-Q	185
SG021B-9-0	186	SL059B-8-Q	185
SG022B-()-()	224	SML51N ñ XX	34
SG022B-15-0	184	SML81N-02	37
SG022B-26-Q	184	SML81N-04	37
SG022B-9-Q	184	SML81N-06	37
SG023B-()-()	224	SML81N-08	37
SG023B-15-Q	180	SML81N-10	37
SG023B-26-Q	180	SML81N-12	37
SG023B-9-Q	180	SML81N-16	37
SG029B-()-()	224	SQ024C-15-Q	175
SG029B-15-Q	184	SQ024C-26-Q	175
SG029B-26-Q	184	SQ024C-8-Q	175
SG029B-9-Q	184	SQ024C-9-Q	175
SG051B-( )-( )	224	SQ054C-10-Q	175
SG051B-10-Q	186	SQ054C-16-Q	175
SG051B-17-Q	186	SQ054C-24-Q	175
SG051B-25-Q	186	SQ054C-8-Q	175
SG051B-8-Q	186	SR021B-10R-()	187
SG052B-( )-( )	224	SR021B-14L-()	187
SG052B-10-Q	184	SR021B-17R-( )	187
SG052B-17-Q	184	SR021B-25L-()	187
SG052B-25-Q	184	SR021B-33R-()	187
SG052B-8-Q	184	SR021B-48L-()	187
SG053B-( )-( )	224	SR021B-5R-()	187
SG053B-10-Q	180	SR023B-10R-()	182
SG053B-17-Q	180	SR023B-14L-()	182
SG053B-25-Q	180	SR023B-17R-()	182
SG053B-8-Q	180	SR023B-25L-()	182
SG059B-( )-( )	224	SR023B-48L-()	182
SG059B-10-Q	184	SR023B-5R-()	182
SG059B-17-Q	184	SR023B-9L-()	182
SG059B-25-Q	184	SR051B-11H-()	187
SG059B-8-Q	184	SR051B-16R-()	187
SHXX-N4B4-XXX	104, 105	SR051B-24R-()	187
SHXXP4B4-XXX	105	SR051B-6H-()	187
SHXX-P4B4-XXX	104, 105	SR051B-8H-()	187

MODEL	PAGE	MODEL
SR053B-11H-()	182	Y27-55-C
SR053B-16R-()	182	Y27-56-C
SR053B-6H-()	182	Y27-57-C
SR053B-8H-()	182	Y27-58-C
SR053B-9R-()	182	Y57-1
SR269-75	137	
SR513-70	137	
SRB21A-10-H	189	
SRB21A-10-P	189	
SRB21A-17-H	189	
SRB21A-17-P	189	
SBR51A-16-H	189	
SRR51A-16-P	189	
SPYY_B/B/LYYY	106 107	
	106, 107	
	106, 107	
	100, 107	
	107	
55KXX-N4B4-XXX	107	
SSXX-B4B4-XXX	106, 107	
SSXX-N4B4-XXX	104, 105	
SSXX-P4B4-XXX	104, 105	
SSXX-X4B4-XXX	105	
SSXX-XXXX-XXX	105	
SV10-C	85	
SV20-C	85	
TIR-426	240	
TIR6600B-G08AA	239	
TIR6600B-G08AE	239	
TIR6600B-G08AH	239	
TIR6600B-P00AA	239	
TIR6600B-P00AE	239	
TIR6600B-P00AH	239	
TIR6600S-307AA	239	
TIR6600S-307AE	239	
TIR6600S-G08AA	239	
TIR6600S-G08AE	239	
TIR6600S-G08AH	239	
TIR6600S-P00AA	239	
TIR6600S-P00AE	239	
TIR6600S-P00AH	239	
XF16	192	
XF1610	192	
XF165	192	
XF166	192	
XF167	192	
XE168	192	
XE169	192	
XP161	193	
XP162	193	
XP163	100	
XI 100 XPR07	100	
VDR073	103	
XP78071	193	
VDZB072	102	
VD7D072	193	
XP20010	193	
	192	
Xh3012	192	
XK300	192	
XH308	192	
Y237-2	271, 310	
Y27-2-C	271, 310	
Y27-52-C	310	
Y27-53-C	310	
Y27-54-C	294, 295, 310	

MODEL	PAGE
Y27-55-C	294, 295, 299, 310
Y27-56-C	294, 295, 299, 310
Y27-57-C	299, 310
Y27-58-C	299, 310
Y57-1	296, 298

### Notes



# ARO<sup>®</sup> Competitive Model Crossover Service Phone: 800-276-4658 Fax: 800-266-7016

E-Mail: www.crossover@irco.com

Please check which type of product(s) you want crossed-over. Circle the competitive name and provide their model number. ARO<sup>®</sup> will respond to this request within 3-8 hrs.



Other Brands:

E-Mail:

Competitive Models	Nearest ARO <sup>®</sup> Model #	Net Price / Delivery

### Distributor Information (Don't forget Fax number!)

### **End-User Information**

Name:	Name:
Street:	Street:
City:	
State / ZIP:	City:
Contact:	State:
Phone:	ZIP:
Fax:	
	*All suggestions by IR should be checked for function and

\*All suggestions by IR should be checked for function and compatibility before ordering.

### **Contact Information**

### **United States**

Marketing/Sales/Service Headquarters Ingersoll-Rand Productivity Solutions 1467 Rte. 31 South Annandale, NJ 08801

**Customer Svc. Center** Ingersoll-Rand Productivity Solutions 510 Hester Drive White House, TN 37188 Telephone: (615) 672-0321 Fax: (615) 285-0802

Customer Svc. Center Ingersoll-Rand Productivity Solutions One ARO Center Bryan, OH 43506 Telephone: (800) 276-4658 Fax: (800) <u>266-7016</u>

Sales Office Ingersoll-Rand Productivity Solutions 1872 Enterprise Drive Rochester Hills, MI 48309 Telephone: (248) 293-5700 Fax: (248) 293-5807

#### **Sales Office**

Ingersoll-Rand Productivity Solutions 1467 Route 31 South Annandale, NJ 08801 Telephone: (908) 238-7129 Fax: (908) 238-7053

Disclaimer: Nothing contained within this brochure is intended to extend any warranty or representation, expressed or implied, regarding the products described herein. Any such warranties or other terms or conditions of the sale of products shall be in accordance with Ingersoil-Rand Standard Terms and Conditions of Sale for such products which are available upon request.

Product improvement is a continuing goal at Ingersoll-Rand. Designs and specifications are subject to change without notice or obligation.

#### Canada

#### Marketing/Sales/Service Headquarters

Ingersoll-Rand Canada Inc. 51 Worcester Road Toronto, Ontario M9W 4K2 Telephone: (416) 213-4500 Fax: (416) 213-4510

#### Alberta

Ingersoll-Rand Canada Inc. 9720-54 Avenue Edmonton, Alberta T6E 0A9 Telephone: (780) 438-5039 Fax: (780) 430-4500

### Quebec

Ingersoll-Rand Canada Inc. 3501 St. Charles Blvd. Suite 104 Kirkland, Quebec H9H 4S3 Telephone: (514) 695-9040 Fax: (514) 695-0963

#### **British Columbia**

Ingersoll-Rand Canada Inc. 1200 Cliveden Ave. Delta, B.C. V3M 6G4 Telephone: (604) 523-0803 Fax: (604) 523-0801

#### Latin America

#### Marketing/Sales/Service Headquarters

Ingersoll-Rand Company 730 N.W. 107th Ave. Suite 300 Miami, FL 33172-3107 Telephone: (305) 559-0500 Fax: (305) 222-0864

#### Brasil

Ingersoll-Rand do Brasil Ltda. Productivity Solutions Av. Dr. Cardoso de Melo 1855 cj. 152-04548-005 Sao Paulo,. SP Brasil Telephone: (55) 11 3049-8900 Fax: (55) 11 <u>3846-4985</u>

#### Chile

Ingersoll-Rand Chile Nueva Tajamar 555, 15th fl. Las Condes, Santiago Chile Telephone: (56) 2 339-7939 Fax: (56) 2 339-7940

#### Mexico

Ingersoll-Rand S.A. de C.V. Productivity Solutions Blvd. Centro Industrial #11 Fracc. Industrial Puente de Vigas, 54090 Tlaneplanta, Edo. de Mexico, Mexico Telephone: (52) 5 565-3061 Fax: (52) 5 565-3072

### Europe/Middle East/Africa

Productivity Solutions Headquarters and European Customer Care Centre Ingersoll-Rand Zone du Chêne Sorcier BP 62 78346 Les Clayes sous Bois Cedex France Telephone: +33 (0)1 30 07 68 00 Fax: +33 (0)1 30 07 69 80

#### **Ingersoll-Rand Distribution Centre**

Swan Lane Hindley Green Wigan Lancashire WN2 4EZ England Phone: +44 (0)1942 257131 Fax: +44 (0)1942 526255

### Asia/Pacific

### Marketing/Sales/Service Headquarters

Ingersoll-Rand Asia Pacific 23/F., 625 Kings Point Road North Point Hong Kong Phone: (852) 2527 -0183 Fax: (852) 2529 -5976

#### Australia

Ingersoll-Rand Australia, Ltd. 1 Hartnett Drive Mail: PMB 2, Carrum Downs BC, Vic., 3201 Seaford, Victoria 3198 Australia Phone: (61) 3 9554 1600 Fax: (61) 3 9554 1611 India Ingersoll-Rand Wadco Tools, Ltd. 37A, Site 4 Sahibabad Industrial Area Ghaziabad 201 010 (UP)

India Phone: (91) 0120-4771-001-4 Fax: (91) 0120-4771-005

For additional specific information on Ingersoll-Rand locations in Europe and Asia, visit our website at: www.air.ingersoll-rand.com.



Ingersoll-Rand Company Customer Service / Distribution Center One ARO<sup>®</sup> Center Bryan, Ohio 43506-0151