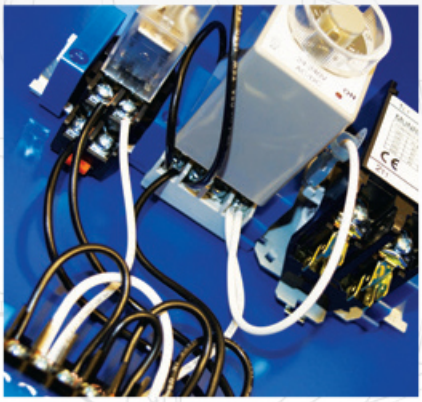
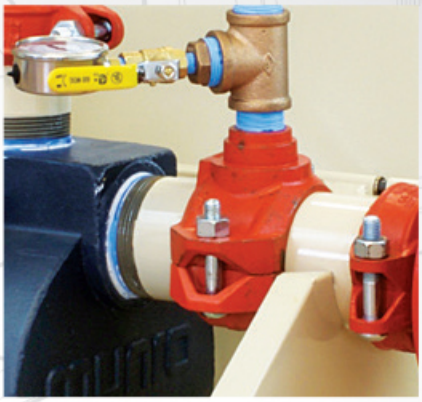
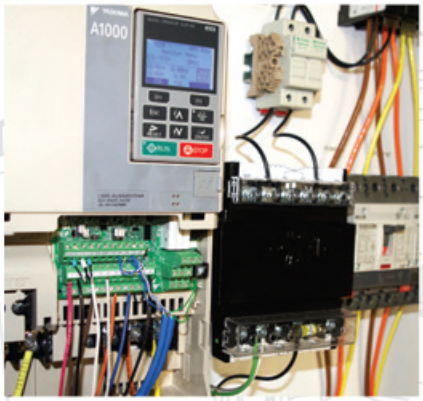
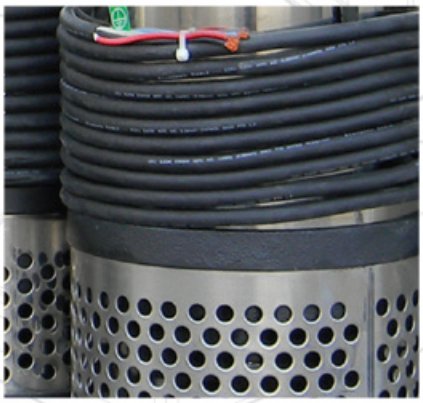






IRRIGATION CATALOG

munro

2019/2020









1889 — Fred Munro moved to Colorado.

1900 — Fred Munro opened the Munro Mercantile Company in Rifle, CO.

1922 — Fred and J.R. Munro expanded the Munro Mercantile company to 5 locations.

1936 — J.R. and John T. Munro moved into the mining equipment reclamation business, opening S&M Supply.

1939 — WWII brought a great need for metals production. Reclaimed mining equipment was in high demand. S&M became a primary mining supply house for the Western United States.

1946 — Western Colorado Uranium boom brought expansion of S&M Supply.

1959 — Uranium bust – the Munros sold their portion of S&M Supply.

1965 — John T. and Allen Munro opened Munro Supply in Grand Junction, CO, and quickly became a pump authority in the Rocky Mountain region.

1972 — Munro installed their first pump station for Steamboat Lakes Development Corporation.

We're For Irrigation.

Munro is your irrigation pumping partner. As manufacturers and innovators of irrigation pumping products for 50 plus years, Munro understands the irrigation market and has the unique ability and desire to serve the irrigation industry better than any other pump company.

We're different. Really.

If you've done business with some of our competitors, you know that they are not focused on helping irrigation wholesalers provide resources and excellent service to their customers. That's why we're different. We WANT to partner with irrigation wholesalers and distributors. We can help you build your pump category to improve your bottom line!

Our products are better.

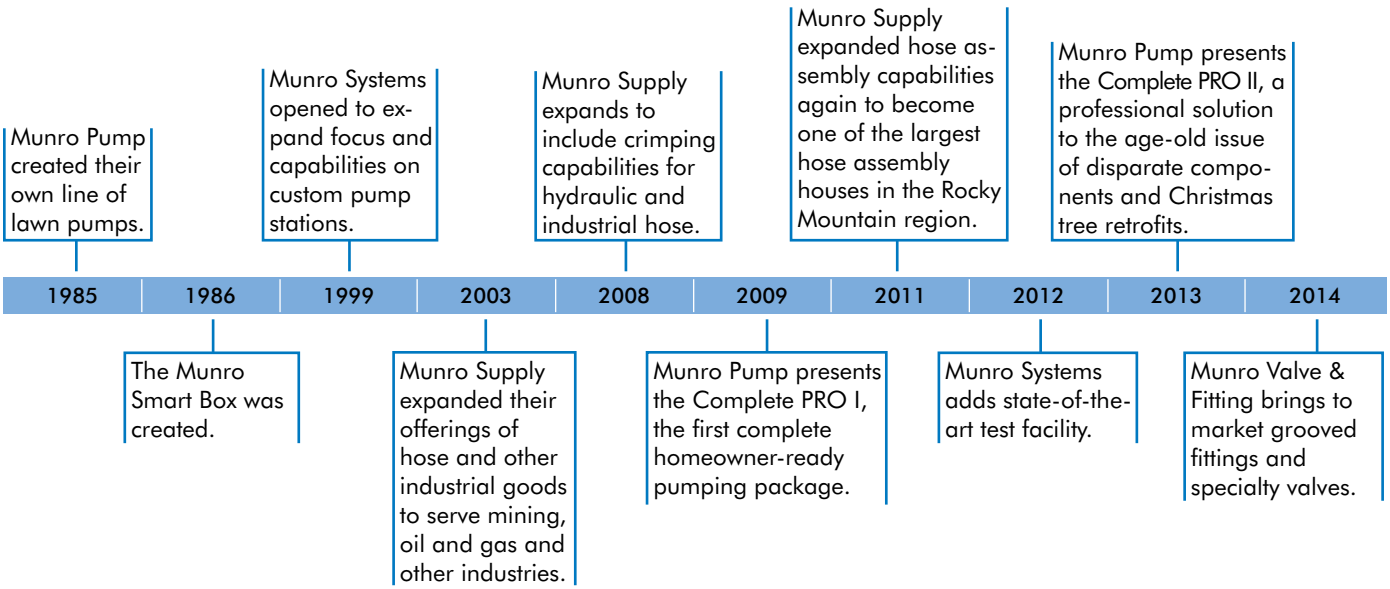
Our pumps are engineered to work better for longer. Our centrifugals offer performance to horsepower that is jaw dropping. Our submersibles outlast our competition and are better built at very competitive prices. Our pump controls are industry leaders. Our pump stations are recognized as innovative problem solvers, nationwide. We consider ease of installation, energy consumption, and difficult conditions to make our products more flexible and easier to use. But enough about us – if you're not sure which pump you need, our handy resources and expert team will help you identify the best equipment for your geography and application.

We've got what you need.

Our customers are always commenting on the breadth of pumping equipment we offer. We understand irrigation so we know which accessories you need for different applications. Need hose or fittings? We're one of the largest suppliers in the Western United States. Need valves, strainers or gauges? We've got those too. And our expanded line of submersibles and specialty pumps means you can rely on Munro for all your pumping needs.

We're easy to do business with.

With next day or two-day delivery to many regions, favorable terms and inventory to keep you rolling, we make it easy to do business with us. Our team understands that you need your orders on-time and complete. We communicate with you every step of the way. We also actively seek out your feedback on our products, people and processes; plus we innovate to meet your needs.



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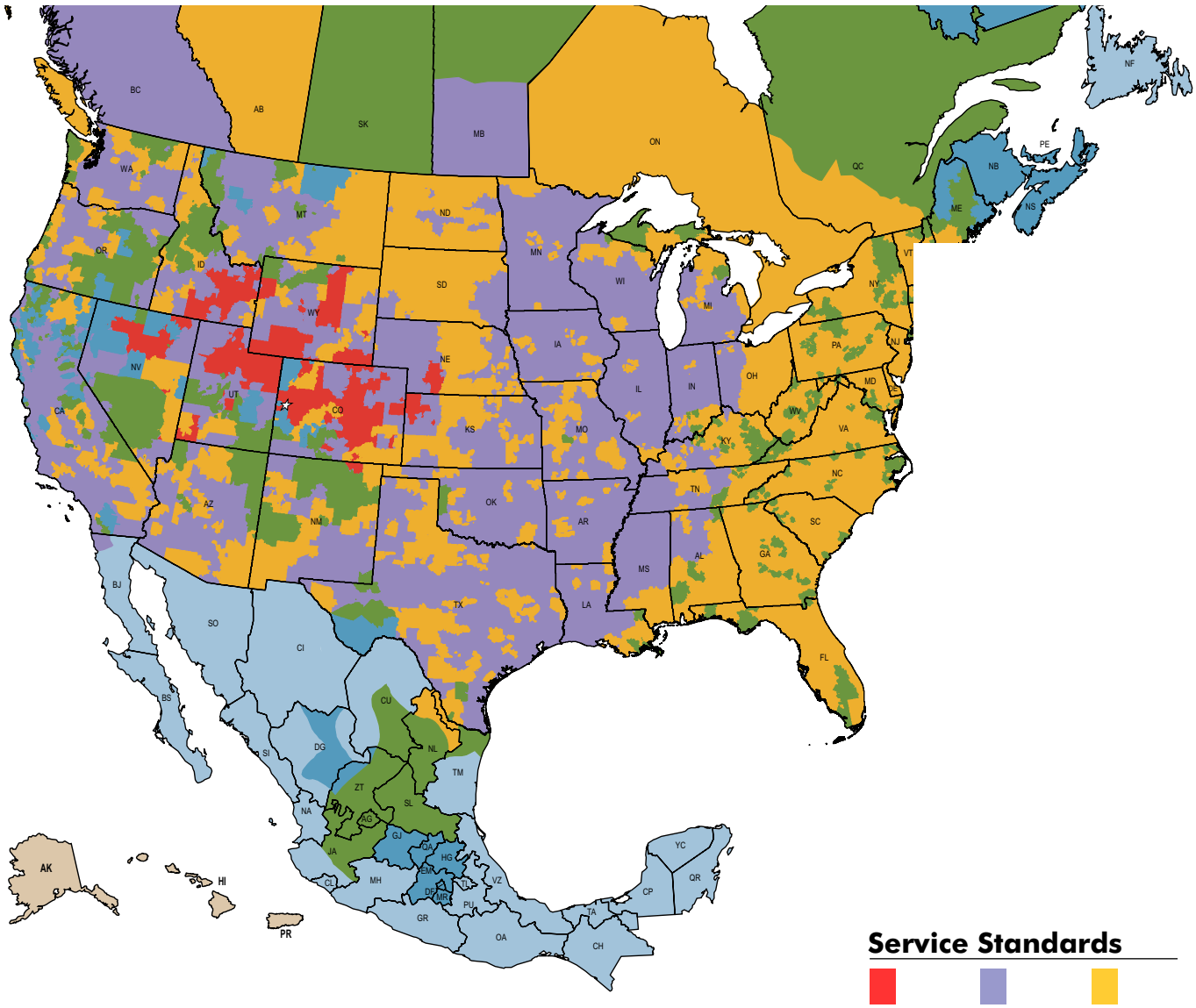
Freight Map



Service Standards

1 Day	2 Days	3 Days
4 Days	5 Days	6+ Days

Estimated freight times when Fedex Priority is used - shipping from Grand Junction, CO.

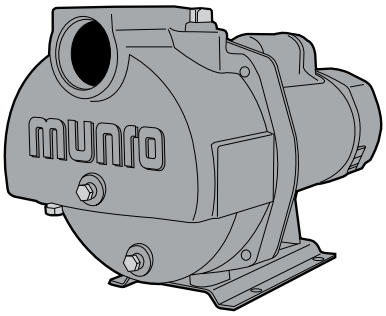
Weather is uncontrollable variable.

As of 9/19/18 fedex.com

FedEx® Freight

Turf Irrigation Centrifugal Pumps

ABOUT CENTRIFUGAL PUMPS



How does a centrifugal pump work?
Using a rotating impeller, a centrifugal pump draws liquid into the center of the impeller and then slings it out again, which increases the speed of the liquid and creates pressure to move the liquid through pipe or hose.

Benefits and Applications
Centrifugal pumps are flexible and have many uses. A centrifugal pump can handle muddy or dirty liquids and high temperatures. These pumps are most commonly used to move or increase pressure (boost) of liquid through a pipe or hose system and can be found in irrigation, water treatment, and even manufacturing environments.

Irrigation professionals use Munro pumps to draw water from lakes, ponds, cisterns, shallow wells and more. In addition, they are commonly applied to increase operating pressure (boost) in pressurized systems including domestic city water.

MUNRO PUMPS ARE EXCEPTIONAL

Outstanding performance to horsepower
Check out our curves. Our pumps outperform common competitor units, time after time.

Time-proven design re-engineered for maximum performance and longevity
With over 50 years experience in designing centrifugal pumps, the engineers at Munro studied the common failure points of competing units and meticulously addressed each with high-grade materials and intelligent design. We refuse to settle.

Built tough in every component
A cast iron body and diffuser, standard on all sizes, mean these pumps are built to last.

Upgraded products without upgraded cost
A brass impeller and silicon carbide seal are standard for our full line, instead of pricey special-order upgrades.

Easiest to install and maintain
Two priming ports, a sensor port and dual chamber drains makes maintenance quick and simple.

Did You Know?
The first centrifugal pump was developed in 1475 – that's what we call proven technology!

Pick-A-Pump

TOTAL HEAD IN FEET												PSI
170	LP3005B/LP1502B	LP3005B										73.69
160	LP3005B/LP1502B	LP3005B/LP1502B	LP3005B	LP3005B								69.26
150	LP3005B/LP1502B	LP3005B	LP3005B/LP1502B	LP3005B	LP3005B	LP3005B						64.93
140	LP300B	LP300B	LP300B	LP1502B	LP3005B	LP3005B	LP3005B					60.60
130	LP200B	LP200B	LP300B	LP300B	LP1502B/LP300B	LP3005B	LP3005B	LP3005B				56.27
120	LP200B	LP200B	LP200B	LP300B	LP1502B/LP300B	LP300B	LP3005B	LP3005B	LP3005B			51.94
110	LP150B	LP200B	LP200B	LP200B	LP300B/LP200B	LP300B	LP300B	LP3005B	LP3005B	LP3005B		47.61
100	LP100B	LP150B	LP150B	LP200B	LP200B	LP200B	LP300B	LP300B	LP3005B	LP3005B	LP3005B	43.29
90	LP075B	LP100B	LP100B	LP150B	LP200B	LP200B	LP300B	LP300B	LP300B	LP3005B	LP3005B	38.96
80	LP075B	LP075B	LP100B	LP150B	LP150B	LP200B	LP200B	LP300B	LP300B	LP3005B	LP3005B	34.63
70	LP075B	LP075B	LP075B	LP100B	LP150B	LP200B	LP200B	LP200B	LP300B	LP300B	LP3005B	30.30
60	LP075B	LP075B	LP075B	LP075B	LP100B	LP150B	LP200B	LP200B	LP300B	LP300B	LP3005B	25.97
50	LP075B	LP075B	LP075B	LP075B	LP075B	LP100B	LP200B	LP200B	LP200B	LP300B	LP3005B	21.64
	20	30	40	50	60	70	80	90	100	110	120	
	GALLONS PER MINUTE											

For larger flows or higher pressure than depicted, consult pump professional.

Munro LP Series ¾hp - 3hp

Designed specifically for turf irrigation, this self-priming pump provides outstanding performance to horsepower ratio. Our LP Series is truly heavy duty, offering standard high-end features that our competitors only offer as pricey add-ons. Professionals trust the LP Series to deliver trouble-free performance.

- **Brass impeller** – durable and low maintenance with the longest life in its class
- **Stainless steel wear ring** – eliminates impeller friction due to rust build-up
- **Cast iron body and internal components** – heavy duty for long-term performance and reliability

COMMON APPLICATIONS

- Residential turf irrigation: Drawing water from ponds, lakes, streams, cisterns and shallow wells
- Booster: Boost domestic water pressure for use in irrigation
- Water transfer

ADVANTAGES

Durable and long lasting – While many centrifugal turf irrigation pumps are made out of plastic, which wears and warps, our cast iron construction and brass impeller mean that our self-priming pumps are built to stand the test of time, even in more unusual or difficult environments. Testing in tough conditions shows Munro LP series pumps last up to four times as long as typical competitors products.

Industry leading performance to horsepower – The proof is in our curves. In many cases a lower horsepower Munro LP pump will meet the same GPM performance that you'd expect to see only in higher horsepower pumps. With greater starting torque and an efficient run cycle, our pumps truly lead the pack.

Easy to install and maintain – With two priming ports and a durable steel base plate, installing a Munro LP Series is a snap. When it's time to maintain or winterize the pump, you'll love our two drain plugs. A stainless steel wear ring reduces oxidation and friction, minimizing wear and repairs. If you do have to service the pump, stainless steel bolts and a dry-socket design provide easy access.

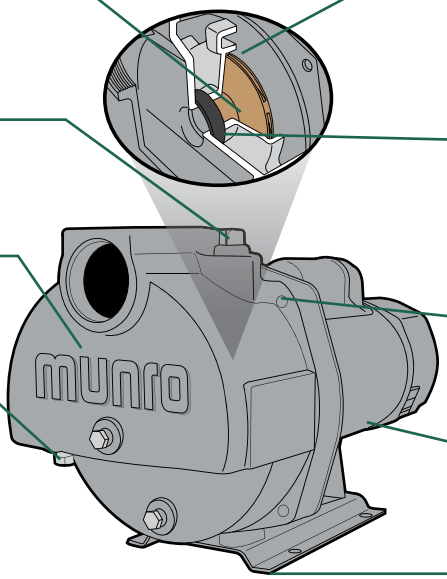
BRASS IMPELLER – Longest life in its class. Offers greatest durability and reduces costly maintenance vs. traditional plastic impellers.

BUILT-IN PRIMING & DRAIN PORTS – Added start-up and maintenance convenience, with stainless steel plugs and no extra parts to buy.

CAST IRON CONSTRUCTION – Designed for long term performance, season after season. No plastic case to warp or crack.

SENSOR PORT – Allows temperature monitoring to avoid costly maintenance issues.

SILICON CARBIDE/CARBON SEAL – Proven tough, this seal is an industrial standard for challenging applications, including higher temperatures and more abrasive conditions.



CAST IRON DIFFUSER – Assures durability for the life of the pump.

STAINLESS STEEL WEAR RING – Reduces springtime oxidation and impeller friction.

STAINLESS STEEL BOLTS – No more "busting knuckles" to remove bolts during maintenance.

THERMALLY PROTECTED MOTOR – Shut down protection protects motor from damage due to over amping.

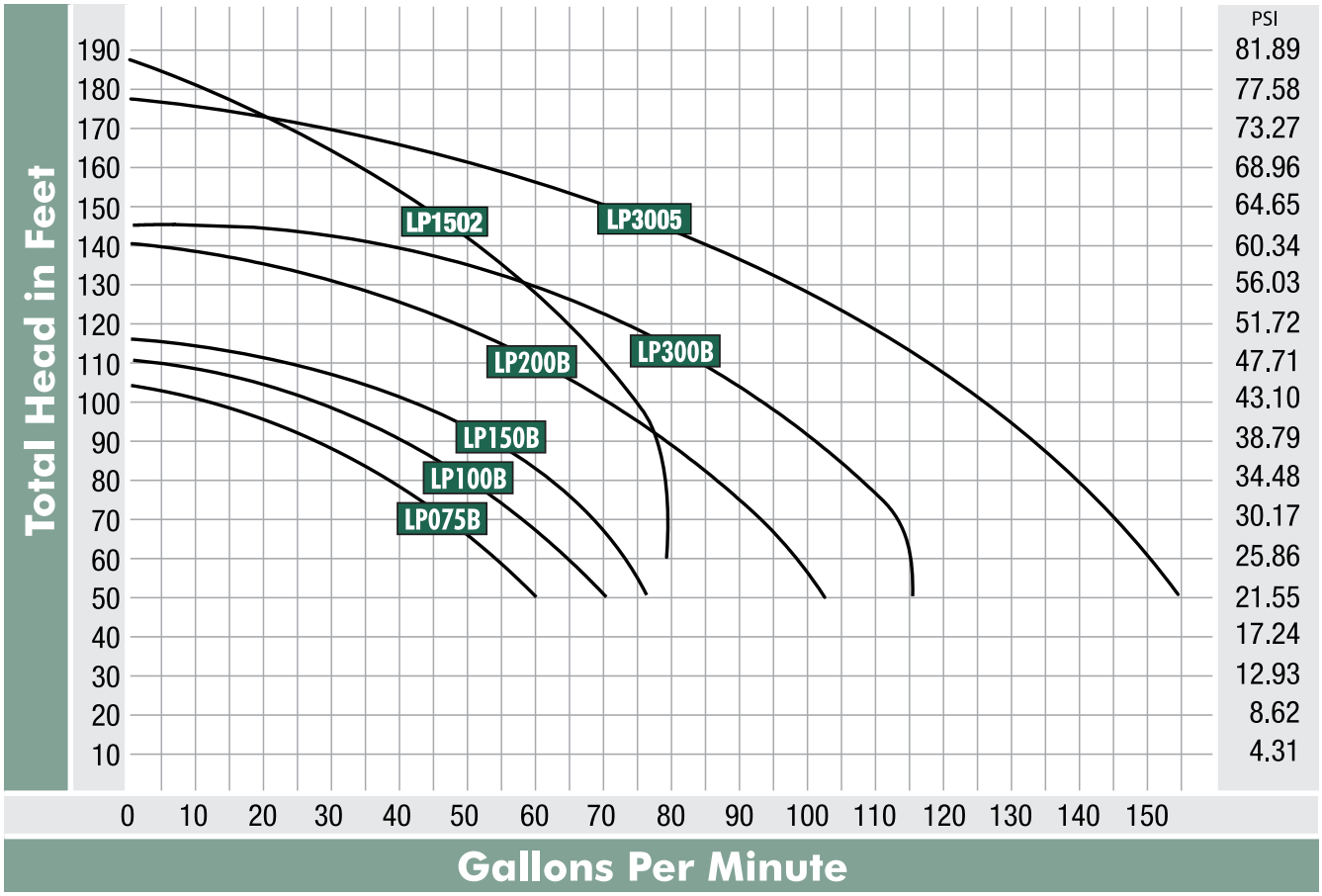
STEEL BASE PLATE – Easiest, most stable mounting. Provides four handy bolt holes.

Munro LP Series ¾hp - 3hp

Curve includes LP 1502 (p.5) & LP3005 (p.8) for reference

Curves

HORSEPOWER RANGE: 3/4 - 5



Did You Know?
Protect your pump using Munro's SmartBox Pump Control.
See p.77-79 for details.

Performance

HP	Capacity – U.S. Gallons per Minute Discharge Pressure (PSI) at 5′ Suction Lift									Shut Off Pressure psi	Model Number
	20	25	30	35	40	45	50	55	60		
3/4	63	53	43	33	25					45	LP075B
1	73	65	57	47	35	18				47	LP100B
1-1/2	75	70	68	60	48	35				49	LP150B
2	102	98	92	82	74	61	52	40		60	LP200B
3	115	114	112	105	100	88	72	56	30	61	LP300B

Suction lift varies, depending upon elevation (altitude) and water temperatures. Max lift is 15 feet at 5000 feet elevation. Maximum case pressure is 150 PSI.

Munro LP Series ¾hp - 3hp

Specifications – Pump

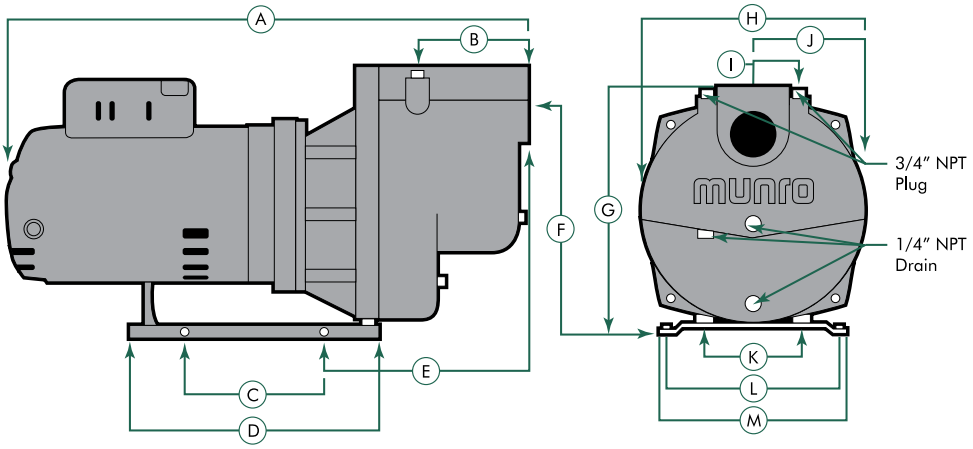
HP	Phase	Discharge	Suction	Approx Ship Weight lbs	Max Liquid Temperature	Model Number
3/4	1	1-1/2"	2"	66	180°	LP075B
1				72		LP100B
1-1/2				72		LP150B
2				80		LP200B
3				94		LP300B
3/4	3			57		LP075B3
1				62		LP100B3
1-1/2				68		LP150B3
2				70		LP200B3
3				76		LP300B3

Specifications – Motor

HP	Phase	Voltage	Hz	RPM	Motor Voltage (Factory) Connected	Service Factor Motor Amps						Model Number
						Single Phase			Three Phase			
						115V	208V	230V	208V	230V	460V	
3/4	1	115/208-230	60	3450	208/230V	11.6	5.8	5.8				LP075B
1						16.6	8.5	8.3				LP100B
1-1/2						23	12.5	11.5				LP150B
2		208/230					13	12				LP200B
3		230					18	17				LP300B
3/4	3	208-230/460	60	3450	208/230V				2.6	2.8	1.4	LP075B3
1									--	3.6	1.8	LP100B3
1-1/2									5.4	5.2	2.6	LP150B3
2									6.8	6.6	3.3	LP200B3
3									--	9.2	4.6	LP300B3

For amperage ratings consult motor nameplate. Specifications subject to change without notice.

Dimensions



HP	A	B	C	D	E	F	G	H	I	J	K	L	M
3/4	19 3/4"	3 5/8"	4 1/4"	8 1/2"	7 1/2"	9 1/2"	10 7/8"	9 1/2"	2 3/8"	4 3/4"	2 5/8"	5 1/4"	6"
1	19 3/4"	3 5/8"	4 1/4"	8 1/2"	7 1/2"	9 1/2"	10 7/8"	9 1/2"	2 3/8"	4 3/4"	2 5/8"	5 1/4"	6"
1 1/2	19 3/4"	3 5/8"	4 1/4"	8 1/2"	7 1/2"	9 1/2"	10 7/8"	9 1/2"	2 3/8"	4 3/4"	2 5/8"	5 1/4"	6"
2	18 3/4"	3 5/8"	4 1/4"	8 1/2"	7 1/2"	9 1/2"	10 7/8"	9 1/2"	2 3/8"	4 3/4"	2 5/8"	5 1/4"	6"
3	20 1/2"	3 5/8"	4 1/4"	8 1/2"	7 1/2"	9 1/2"	10 7/8"	9 1/2"	2 3/8"	4 3/4"	2 5/8"	5 1/4"	6"

Munro LP 1502 - 2.5hp

This very unique pump offers multi-stage performance with single-stage simplicity. The Munro LP 1502 self-priming centrifugal pump provides higher operating pressure like a multi-stage pump without the additional maintenance concerns multiple impellers present. Built for maximum durability and longevity.

- **Brass impeller** – tough and long lasting, one brass impeller means you'll see less maintenance than with other pumps that offer similar performance
- **Stainless steel wear ring** – eliminates impeller friction due to rust build up
- **Heavy-duty motor** – lasts longer and provides application flexibility

COMMON APPLICATIONS

- Residential clean water turf irrigation: Small to mid-size community or commercial turf irrigation
- High-pressure booster
- Water transfer

ADVANTAGES

Multi-stage performance with single-stage simplicity – This self-priming pump is truly unique and in a class by itself, delivering almost 60 gpm at 60 psi. The high-pressure capabilities of this pump can be compared to other brand's multi-stage or 5hp pumps.

Durable and long lasting – Before the LP 1502, only a multi-stage pump could achieve this performance to horsepower ratio. However, additional impellers require a longer shaft, which puts more load on the motor bearing and creates maintenance issues, including misalignment and wear. Keeping the shaft short makes the pump more stable and durable. Add to this our cast iron construction and brass impeller and it's clear that this is a pump made to stand the test of time, even in more unusual or difficult environments.

Easy to install and maintain – Two priming ports make the Munro LP 1502 easy to install and two drain plugs make winterization a snap. A stainless steel wear ring reduces oxidation and friction, minimizing wear and repairs. If you should have to service the pump, stainless steel bolts and dry-socket design provide easy access.

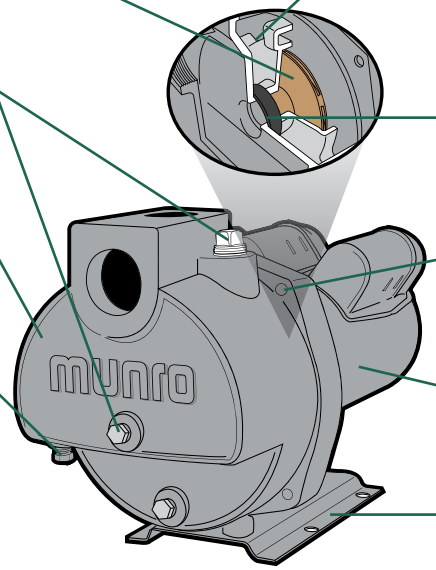
SINGLE BRASS IMPELLER – Longest life in its class. A single solid brass impeller offers greatest durability vs. multiple impeller units. Lower cost to operate and maintain over the life of the pump.

BUILT-IN PRIMING & DRAIN PORTS – Added start-up and maintenance convenience, with stainless steel plugs, no extra parts to buy.

CAST IRON CONSTRUCTION – Designed for long term performance, season after season. No plastic case to warp or crack.

SENSOR PORT – Allows temperature monitoring to avoid costly maintenance issues.

CERAMIC CARBON WITH BUNA RUBBER – Proven tough, this seal is an industrial standard for challenging applications, including higher temperatures and more abrasive conditions.



CAST IRON DIFFUSER – Assures durability for the life of the pump.

STAINLESS STEEL WEAR RING – Reduces springtime oxidation and impeller friction.

STAINLESS STEEL BOLTS – No more "busting knuckles" to remove bolts during maintenance.

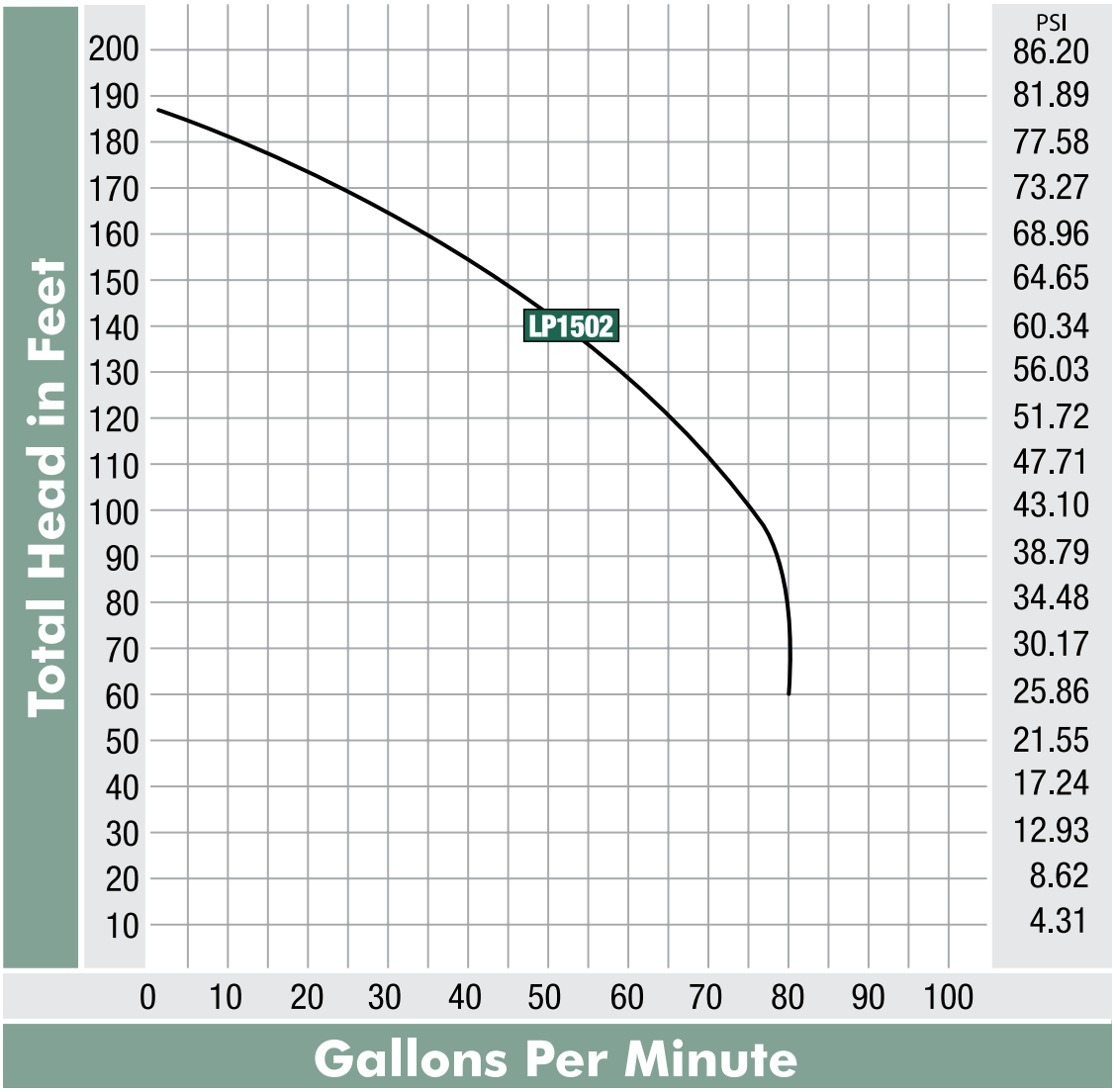
THERMALLY PROTECTED MOTOR – Shut down protection protects motor from damage due to over amping.

STEEL BASE PLATE – Easiest, most stable mounting. Provides four handy bolt holes.

Munro LP 1502 - 2.5hp

Curves

HORSEPOWER RANGE: 2.5



Performance

HP	U.S. Gallons per Minute Discharge Pressure (PSI) at 5′ Suction Lift								Shut Off Pressure psi	Model Number
	20	30	40	50	60	70	80	90		
2.5	--	--	75	67	56	38	0	0	80	LP1502B

Suction lift varies, depending upon elevation (altitude) and water temperatures. Max lift is 15 feet at 5000 feet elevation. Maximum case pressure is 100 PSI.

Munro LP 1502 - 2.5hp

Specifications – Pump

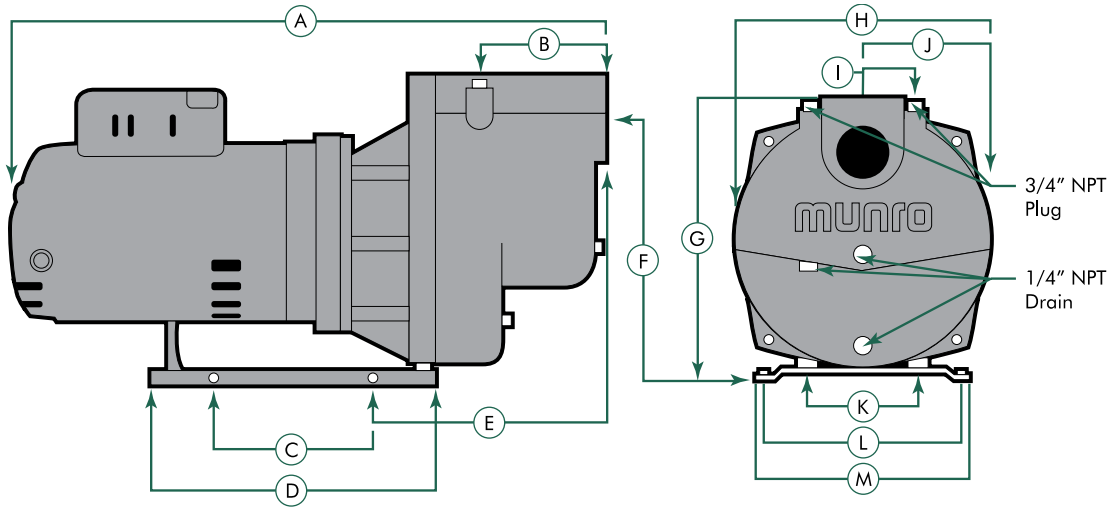
HP	Phase	Discharge	Suction	Approx Ship Weight lbs	Max Liquid Temperature	Model Number
2.5 2.5	1 3	1-1/2"	2"	116 105	180°	LP1502B LP1502B3

Specifications – Motor

HP	Phase	Voltage	Hz	RPM	Motor Voltage (Factory) Connected	Service Factor Motor Amps						Model Number
						Single Phase			Three Phase			
						115V	208V	230V	208V	230V	460V	
2.5	1	208/230	60	3450	208/230	--	15.7	16	--	--	--	LP1502B
2.5	3	208/230/460				--	--	--	--	5.6	2.8	LP1502B3

For amperage ratings consult motor nameplate. Specifications subject to change without notice.

Dimensions



HP	A	B	C	D	E	F	G	H	I	J	K	L	M
2.5	20"	4 1/4"	7.95"	14"	9 1/4"	11 1/4"	13 1/2"	11 1/2"	3"	5 3/4"	4"	7"	8"

Munro LP 3005 Series 5hp

Perfect for mid-size turf applications like athletic fields or small pasture land, this 5 horsepower pump provides professional-grade performance, easy maintenance, and long life. Built with components proven to perform, this pump is a heavy-duty workhorse.

- **Brass impeller** – durable and low maintenance with the longest life in its class
- **Ceramic carbon with buna rubber seal** – proven toughness stands up to less than ideal situations
- **Heavy-duty motor** – lasts longer and provides application flexibility

COMMON APPLICATIONS

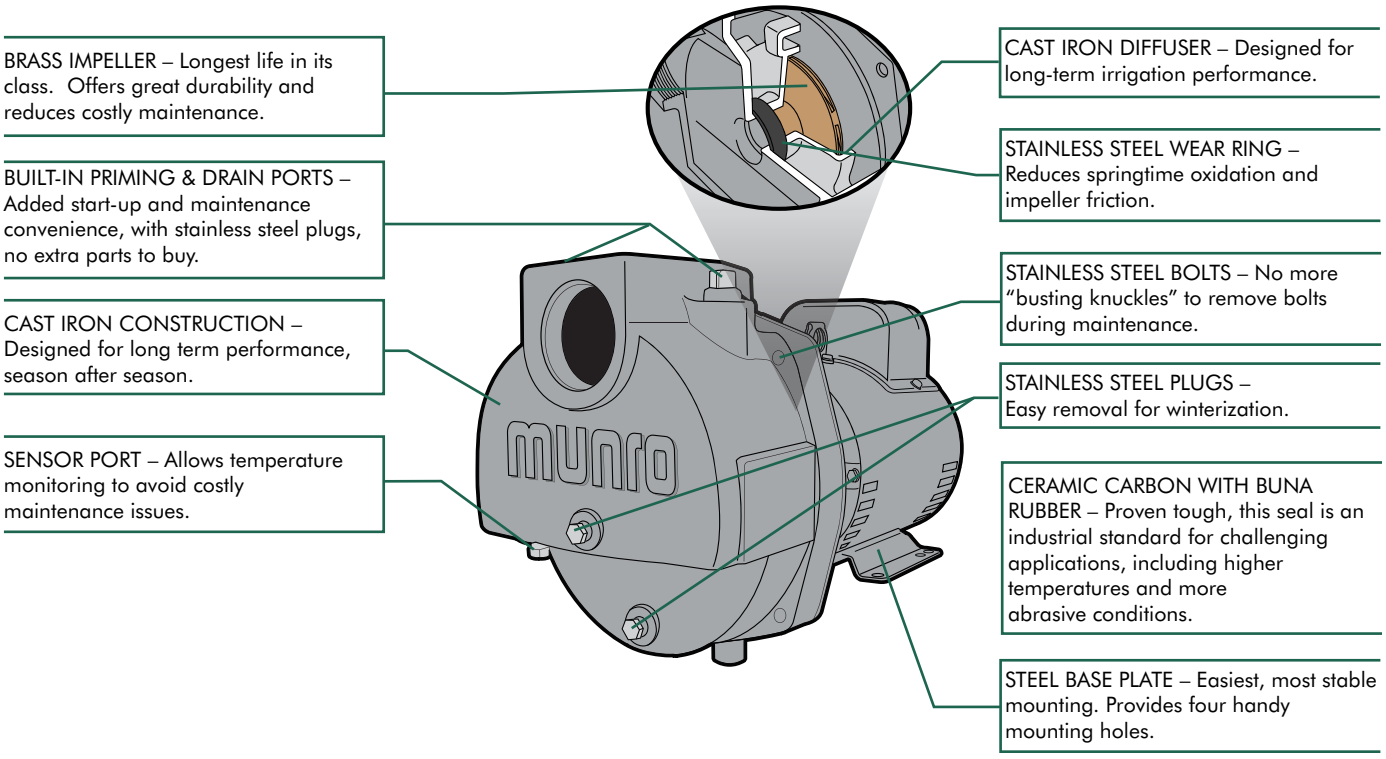
- Turf irrigation: Residential, community or commercial turf irrigation
- High-pressure booster
- Water transfer

ADVANTAGES

Industry leading performance to horsepower – The proof is in our curves. Compared to other 5 horsepower pumps, the Munro LP 3005 has much stronger performance. With high starting torque and an efficient run cycle, our pumps truly lead the pack.

Durable and long lasting – At this horsepower rating, performance requirements lead most pump manufacturers to use heavy-duty materials similar to those that come standard on all of our models. But look closely... we're building the toughest pumps around. Our cast iron construction and brass impeller mean that our self-priming pumps are built to stand the test of time, even in more unusual or difficult environments.

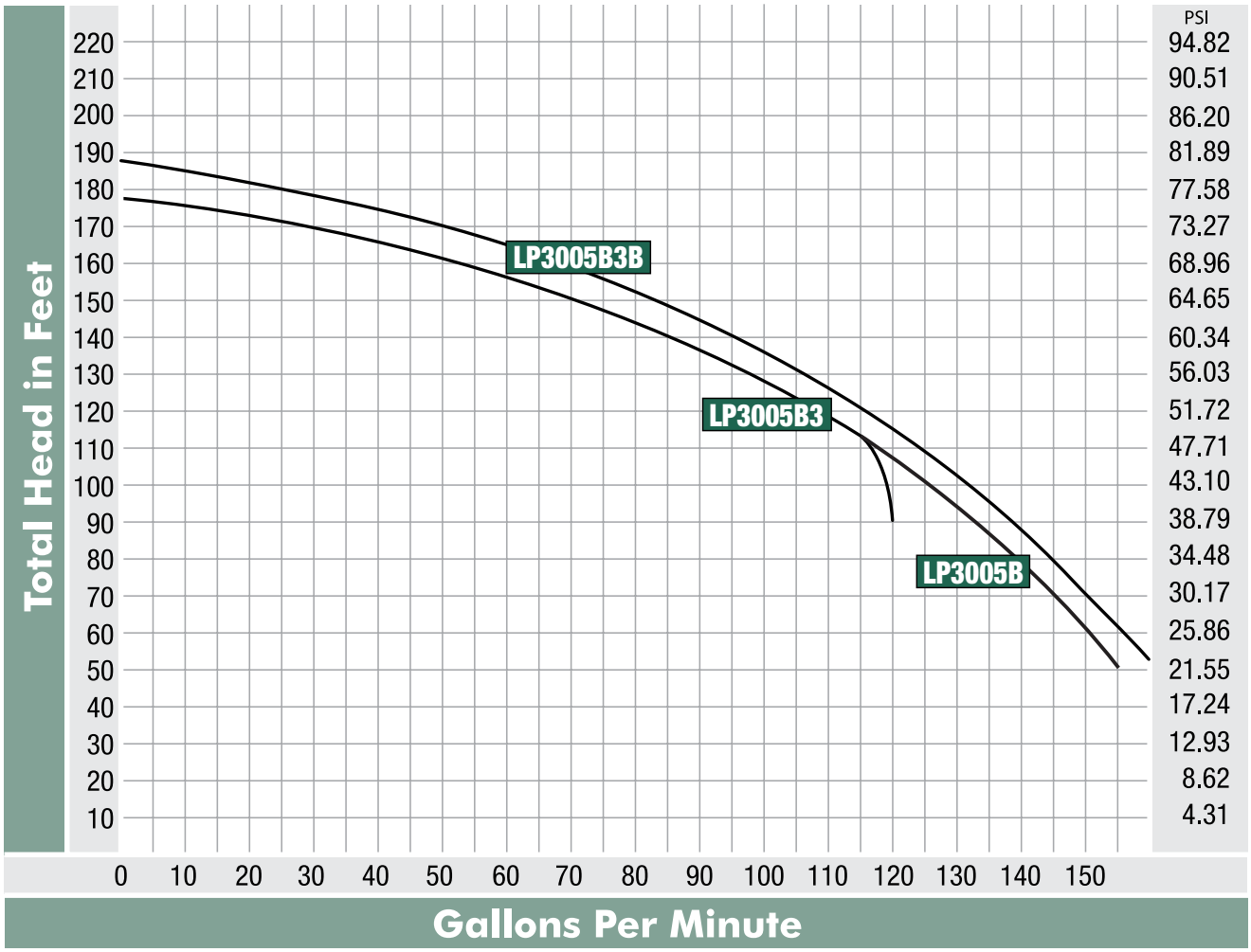
Easy to install and maintain – With two priming ports and a durable steel base plate, installing a Munro LP 3005 is a snap. When it's time to maintain or winterize the pump, you'll love our two drain plugs. A stainless steel wear ring reduces oxidation and friction, minimizing wear and repairs. If you do have to service the pump, stainless steel bolts provide easy access.



Munro LP 3005 Series 5hp

Curves

HORSEPOWER RANGE: 5
PHASE: 1



Performance

HP	Capacity – U.S. Gallons per Minute Discharge Pressure (PSI) at 5′ Suction Lift											Shut Off Pressure psi	Model Number
	20	25	30	35	40	45	50	55	60	65	70		
5	--	--	145	137	132	123	110	98	85	67	47	75	LP3005B
	--	--	--	--	--	120	110	98	85	67	47	75	LP3005B3
	--	160	154	145	135	130	116	107	95	84	63	78	LP3005B3B

Suction lift varies, depending upon elevation (altitude) and water temperatures. Max lift is 15 feet at 5000 feet elevation. Maximum case pressure is 100 PSI.

Munro LP 3005 Series 5hp

Specifications – Pump

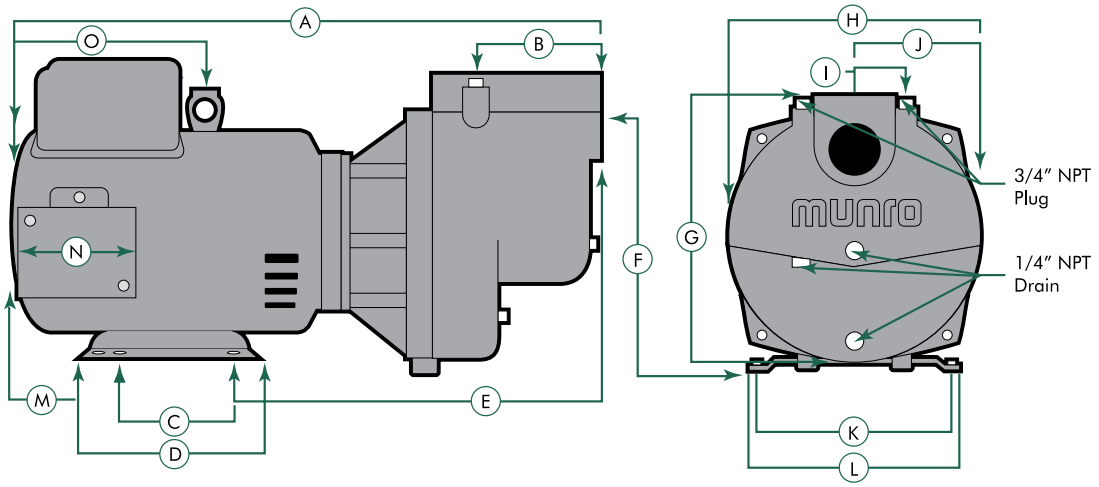
HP	Phase	Discharge	Suction	Approx Ship Weight lbs	Max Liquid Temperature	Model Number
5	1	3″	3″	151	180°	LP3005B
5	3			121		LP3005B3
5	3			135		LP3005B3B

Specifications – Motor

HP	Phase	Voltage	Hz	RPM	Motor Voltage (Factory) Connected	Service Factor Motor Amps						Model Number
						Single Phase			Three Phase			
						115V	208V	230V	208V	230V	460V	
5	1	208/230	60	3450	230V	--	27	24.5	--	--	--	LP3005B
5	3	208-230/460				--	--	--	--	14	7	LP3005B3
*5	3	230/460		3450	230V/460V	--	--	--		17.2	8.6	LP3005B3B

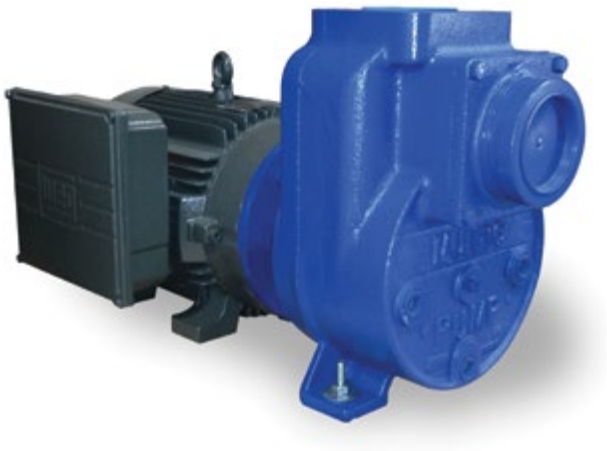
For amperage ratings consult motor nameplate. Specifications subject to change without notice.
*Phase Conversion Compatible

Dimensions



HP	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	21 3/4″	4″	4 1/2″	6 1/2″	13 1/2″	9 1/2″	12 5/8″	11″	3 1/8″	5 5/8″	7 1/2″	8 1/2″	2 1/2″	4 1/4″	7 1/2″

Munro MU Series High and Medium Head 7 1/2 - 20hp



These pumps are ideally suited to turf irrigation applications where greater flows and higher heads are required.

- **Bronze impeller** – the enclosed, single piece design is balanced and trimmed for specific operation
- **Mechanical shaft seal** – proven toughness stands up to less than ideal situations
- **Heavy-duty motor** – lasts longer and provides application flexibility

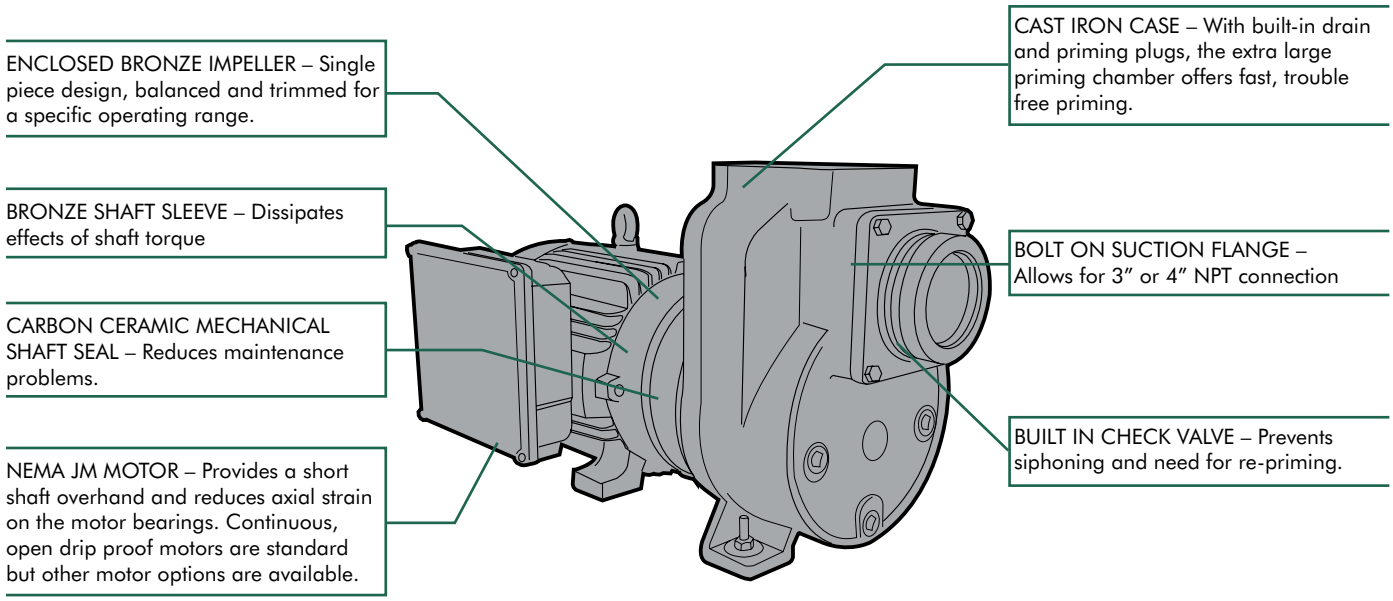
COMMON APPLICATIONS

- Turf irrigation: Residential, mid-size community or commercial
- Booster
- Water transfer

ADVANTAGES

Versatile – These pumps can be used for a wide variety of applications, including irrigation, draining barges and tank cars, and dewatering mines or underground storage facilities. Homeowners use them for sprinkler systems and swimming pools. When it comes to moving water from one place to another, there's no end to the jobs that a self-priming pump can handle!

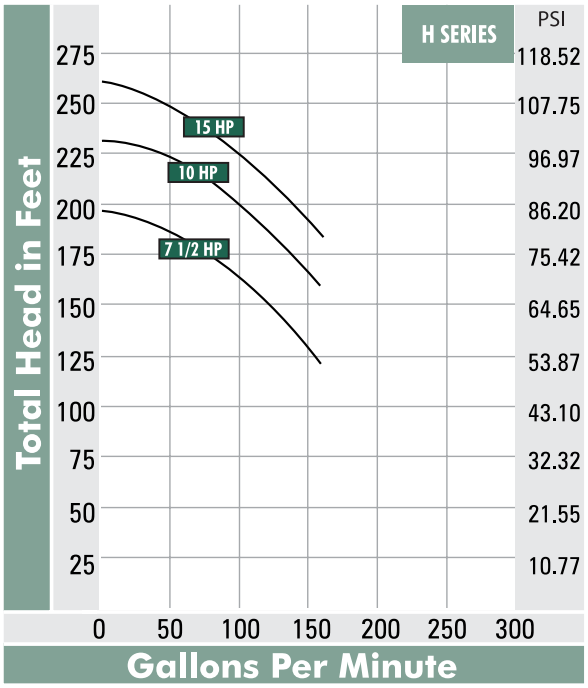
Quick start-up – Because these pumps are self-priming, there is no additional work required to get the pump ready to operate. Just install, fill and go!



Munro MU Series High and Medium Head 7 1/2 - 20hp

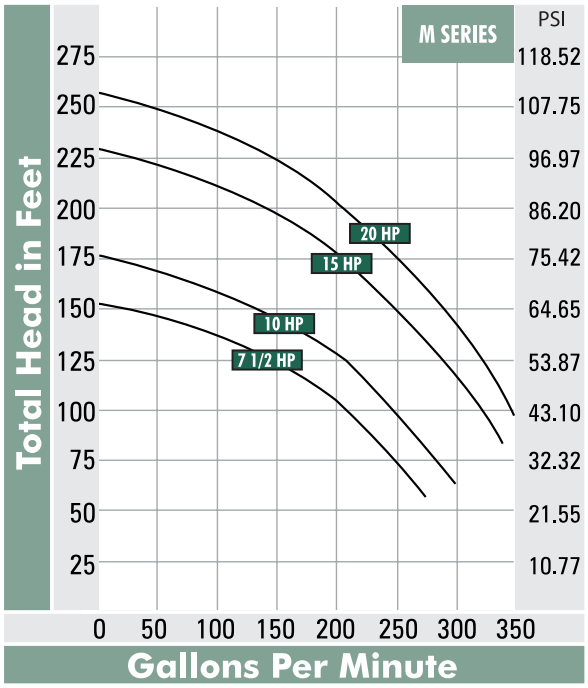
Curves

HORSEPOWER RANGE: 7 1/2 – 15



Curves

HORSEPOWER RANGE: 7 1/2 – 20



Specifications – Pump – H Series

HP	Suction	Discharge	Approx Ship Weight lbs	Max Liquid Temperature	Model Number
7.5	3"	3"	225	100°	MU75HS
7.5			174		MU75HT
10			229		MU10HS
10			197		MU10HT
15			210		MU15HT

Specifications – Motor – H Series

HP	Phase	Volts	Run Amps	Max Liquid Temperature	Model Number
7.5	1	230	37	100°	MU75HS
7.5	3	208/230/460	21/19.4/9.7		MU75HT
10	1	230	47		MU10HS
10	3	208/230/460	28/25/12.5		MU10HT
15	3	208/230/460	42/38/19		MU15HT

Specifications – Pump – M Series

HP	Suction	Discharge	Approx Ship Weight lbs	Max Liquid Temperature	Model Number
7.5	4"	3"	225	100°	MU75MS
7.5			174		MU75MT
10			229		MU10MS
10			197		MU10MT
15			210		MU15MT
20			241		MU20MT

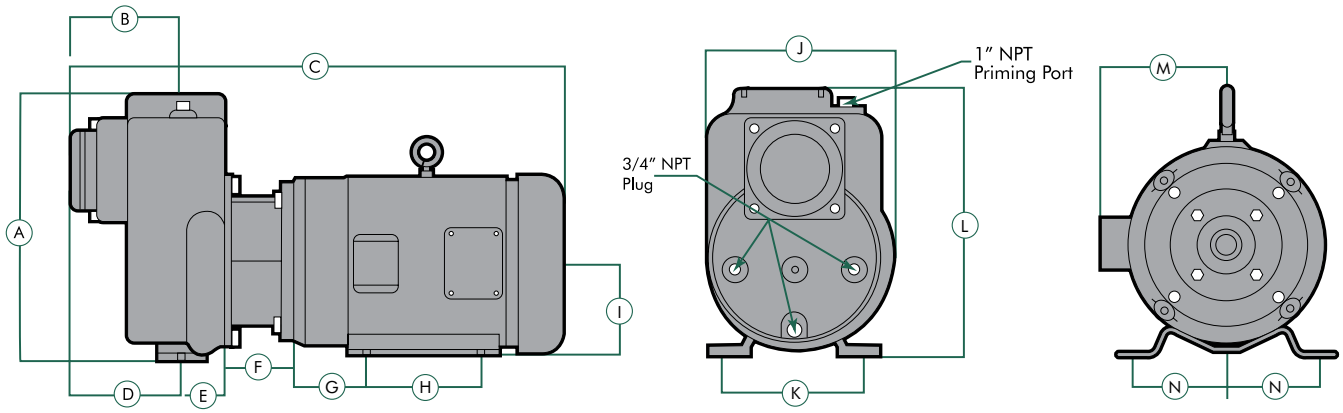
Maximum case pressure is 120 PSI.

Munro MU Series High and Medium Head 7 1/2 - 20hp

Specifications – Motor – M Series

HP	Phase	Volts	Run Amps	Model Number
7.5	1	230	37	MU75MS
7.5	3	208/230/460	21/19.4/9.7	MU75MT
10	1	230	47	MU10MS
10	3	208/230/460	28/25/12.5	MU10MT
15	3	208/230/460	42/38/19	MU15MT
20	3	208/230/460	52.6/47/23.5	MU20MT

Dimensions



Single Phase

HP	A	B	C	D	E	F	G	H	I	J	K	L	M	N
7.5	15 1/4"	8 3/4"	26 5/8"	6 1/8"	2 3/4"	2 7/8"	3 1/2"	5 1/2"	5 1/4"	10 9/16"	7 15/16"	15 5/32"	9 5/16"	4 1/4"
10	15 1/4"	8 3/4"	27 1/4"	6 1/8"	2 3/4"	2 7/8"	3 1/2"	7"	5 1/4"	10 9/16"	7 15/16"	15 5/32"	9 5/16"	4 1/4"

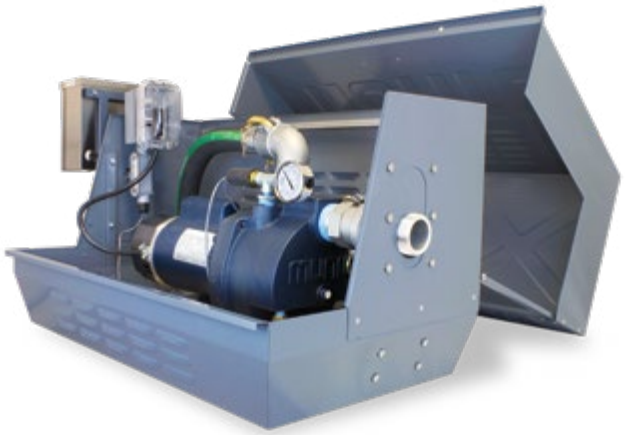
Three Phase

HP	A	B	C	D	E	F	G	H	I	J	K	L	M	N
7.5	15 1/4"	8 3/4"	23 1/2"	6 1/8"	2 3/4"	2 7/8"	2 3/4"	4 1/2"	4 1/2"	10 9/16"	7 15/16"	15 5/32"	8 3/32"	3 3/4"
10	15 1/4"	8 3/4"	25 5/8"	6 1/8"	2 3/4"	2 7/8"	3 1/2"	5 1/2"	5 1/4"	10 9/16"	7 15/16"	15 5/32"	9 5/16"	4 1/4"
15	15 1/4"	8 3/4"	27 1/4"	6 1/8"	2 3/4"	2 7/8"	3 1/2"	7"	5 1/4"	10 9/16"	7 15/16"	15 5/32"	9 5/16"	4 1/4"
20	15 1/4"	8 3/4"	29 1/2"	6 1/8"	2 3/4"	2 5/8"	4 1/4"	8 1/4"	7"	10 9/16"	7 15/16"	15 5/32"	11"	5"

Three Phase TEFC

HP	A	B	C	D	E	F	G	H	I	J	K	L	M	N
7.5	15 1/4"	8 3/4"	30 13/16"	6 1/8"	2 3/4"	2 7/8"	2 3/4"	4 1/2"	4 1/2"	10 9/16"	7 15/16"	15 5/32"	8 3/32"	3 3/4"
10	15 1/4"	8 3/4"	35 1/4"	6 1/8"	2 3/4"	2 7/8"	3 1/2"	7"	5 1/4"	10 9/16"	7 15/16"	15 5/32"	9 5/16"	4 1/4"
15	15 1/4"	8 3/4"	35 1/4"	6 1/8"	2 3/4"	2 7/8"	3 1/2"	7"	5 1/4"	10 9/16"	7 15/16"	15 5/32"	9 5/16"	4 1/4"
20	15 1/4"	8 3/4"	42"	6 1/8"	2 3/4"	2 5/8"	4 1/4"	10"	7"	10 9/16"	7 15/16"	15 5/32"	11"	5"

Introducing the Complete PRO II Series & Universal PRO Enclosure



Complete PRO II

Complete PRO II 5HP
with enclosure

Complete PRO II 5HP
Skid Mount

Visit **munropump.com/completevideo**
to see just how EASY irrigation pump installation can be!

Irrigation Show 2014 New Product Contest Specialty Winner

Universal PRO Enclosure

Munro Complete PRO II

The Munro Complete PRO II is a revolutionary complete pump package that includes a professional-grade pump, the highest quality pump control with built-in pump protection, and simplified plumbing connections – all housed in a unique enclosure designed specifically for a pump. With this complete solution, the days of purchasing and assembling numerous components and housing them in a makeshift enclosure are over.

Munro has incorporated best-in-class pump control with state-of-the-art pump protection features for the highest level of reliability and performance. With durable materials and advanced engineering, this long-lasting, quality product will be one that distributors and contractors will be confident in recommending to installers and end-users.

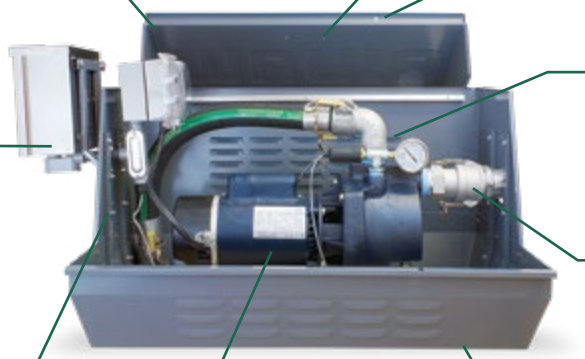
ADVANTAGES

- **Easiest system to select & specify** – With only one product to buy or specify, you have everything you need for a complete pumping system.
- **Highest quality components** – Just like all of Munro's products, the Complete PRO II is made with high-quality materials for a long, trouble-free service life.
- **Fast and easy installation** – This product ships complete, with everything you need to quickly adapt to any existing piping or electrical. All you have to do is hook it up and plug it in – it's really that easy!

ENCLOSURE – Powder-coated stainless steel offers durable, non-corrosive housing to stand up to the elements.

PUMP CONTROL – SmartBox housed in UL-50 Type 3R enclosures features reduced amperage compatible and thermal protection. Or choose from the full range of Munro pump controls, including StartBox, SmartBox and BrainBox.

UNIVERSAL DESIGN – Interchangeable side panels allow for pump to face left or right.



HANDLE – Stainless steel handle for easy accessibility.

SECURITY – Lockable.

SELF COOLING – Vented for air flow to keep the pump cool.

FITTINGS AND ACCESSORIES – From our one-of-a kind Munster fitting to the long-lasting hose and electrical components included, the Munro Complete PRO II is complete with everything you need.

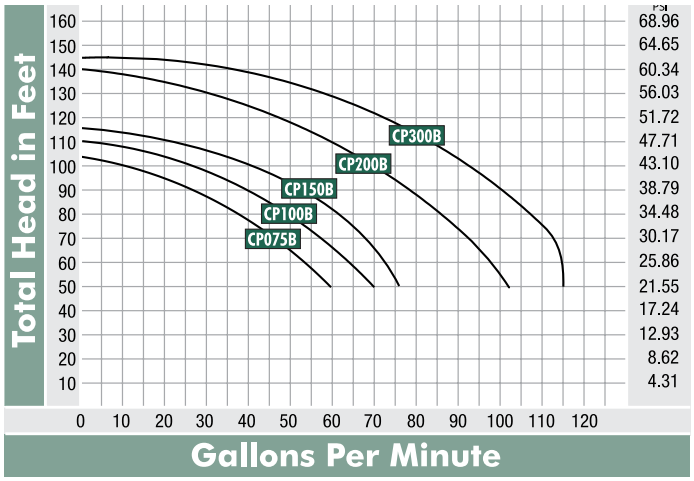
PUMP – Our LP Series centrifugal pumps are durable and long lasting with industry-leading performance to horsepower. Offered in 3/4 - 3 hp, all sizes come with top-of-the-line components that are only available as costly upgrades on other pumps.

DISCHARGE – Discharge holes are knock-outs for easy installation.

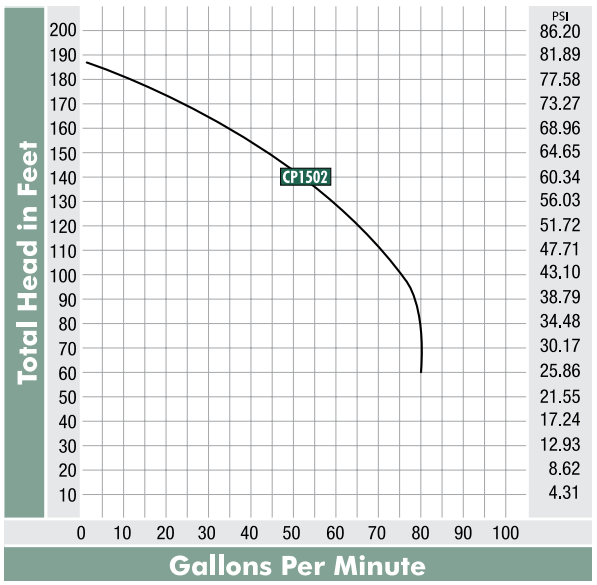
Munro Complete PRO II

Curves

HORSEPOWER RANGE: 3/4 - 3



HORSEPOWER RANGE: 2.5



Specifications

HP	Phase	Standard Voltage	Discharge	Suction	Dimensions			Control	Approx Ship Weight lbs	Model Number
					Height	Length	Depth			
Complete PRO II – SmartBox MPLC242W22TS										
3/4	1	208-230	1 1/2″	2″	23 1/4″	36″	19 1/2″	SmartBox	109	CP075B
1									110	CP100B
1 1/2									120	CP150B
2		208-230							128	CP200B
3		230							143	CP300B
3/4	3	208-230							115	CP075B3
1									121	CP100B3
1 1/2									117	CP150B3
2									128	CP200B3
3									137	CP300B3
2.5	1	208/230							168	CP1502B
2.5	3	208/230							163	CP1502B3

Contact Munro for other control or voltage options.
Lead times vary for specialty or custom options.
Must specify line voltage for 3 phase.
All measurements are approximate and are subject to change.

Did You Know?
Complete PROs are available with BrainBox or Pressure Start controls?
Contact Munro – 800.942.4270

Munro Complete PRO II 5HP

A Better, COMPLETE Solution
With or without enclosure.

This rugged, complete pump system simplifies installation and can be customized for your application. The skid-only version is perfect for indoor installations, while the powder-coated marine grade aluminum enclosure will stand up to outdoor elements.

ADVANTAGES

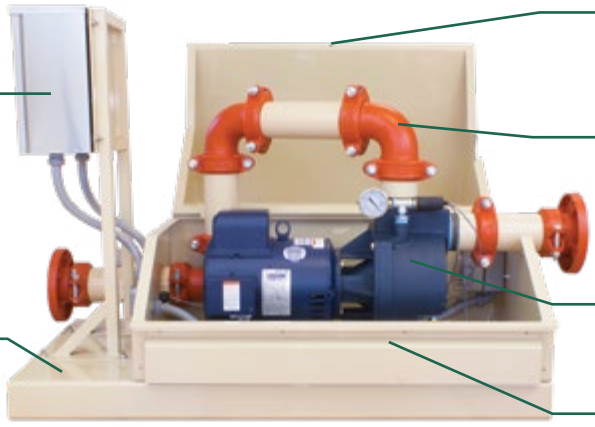
- **Easiest system to select & specify** – One professional package includes pump, smart controls and enclosure.
- **Highest quality components** – High quality materials for a clean, durable installation to be proud of.
- **Fast and easy installation** – Comes complete. No parts to forget, no need for shortcuts. No fuss, no errors.

Did You Know?

Munro offers a variety of adapters to link a grooved coupling to your irrigation system. For steel pipe, groove x weld or groove x thread are great options. For PVC systems, grooved x spigot, groove x thread and other PVC adapters are available. See fitting and flange section on p. 125

PUMP CONTROL – Choose from the full range of Munro pump controls, including StartBoxes, SmartBoxes, and BrainBoxes, housed in their own UL-50 Type 3R enclosures and including features such as thermal protection, safe 24v out and run-dry protection.

ENCLOSURE OR SKID – Powder-coated marine-grade aluminum offers durable housing or base to stand up to the elements. Made to order.



SECURITY – Lockable.

FITTINGS AND ACCESSORIES – From our rugged pipe and grooved couplings to the long-lasting electrical components included, the Munro Complete PRO II is complete with everything you need.

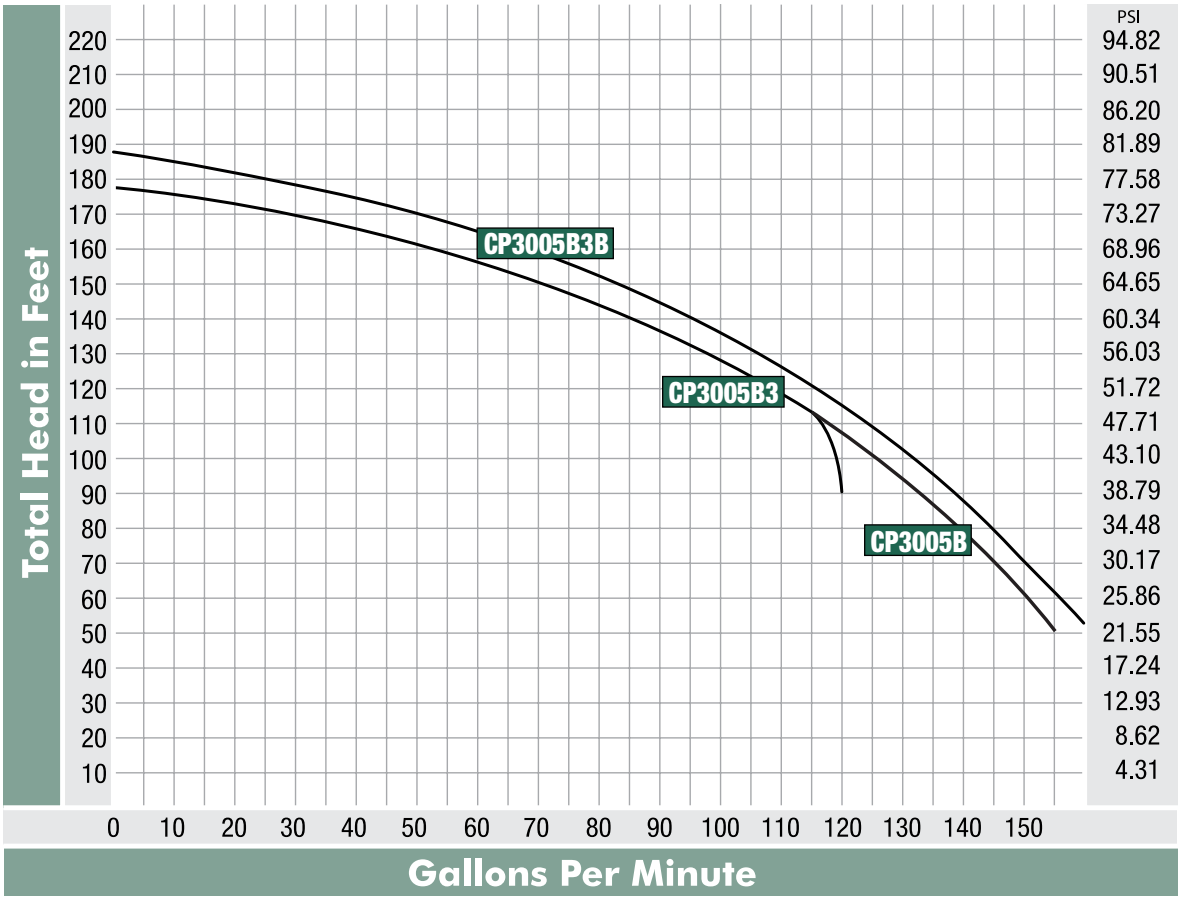
PUMP – Our LP Series 5 hp centrifugal pumps are durable and long lasting with industry-leading performance to horsepower.

SELF COOLING – Vented for air flow to keep the pump cool.

Munro Complete PRO II 5HP

Curves

HORSEPOWER RANGE: 5



NOTE: Curve includes LP1502 (pg.5) for reference

Specifications

HP	Phase	Voltage**	Discharge	Suction	Dimensions			Enclosure	Skid Mounted	Model Number*
					Height	Length	Depth			
5	1	208-230	3"	3"	35.5"	44"	22"	X		CP3005B
	3	208-230						X		CP3005B3
	1	208-230							X	CP3005B-SKID
	3	208-230							X	CP3005B3-SKID
	3	230							X	CP3005B3B-SKID

*Model numbers shown are for Complete PRO II – 5hp with standard SmartBox MPLC2452WTS. Contact Munro for other control or voltage options.
** For 208V, contact factory for special accommodations.
All measurements are approximate and are subject to change, without notice.

Munro Universal PRO Enclosure

Munro's Universal PRO Enclosure is designed specifically for a pump. The powder-coated stainless steel enclosure includes inlet and outlet ventilation points, mounting for a pump control box, and security features to keep your investment safe.

ADVANTAGES

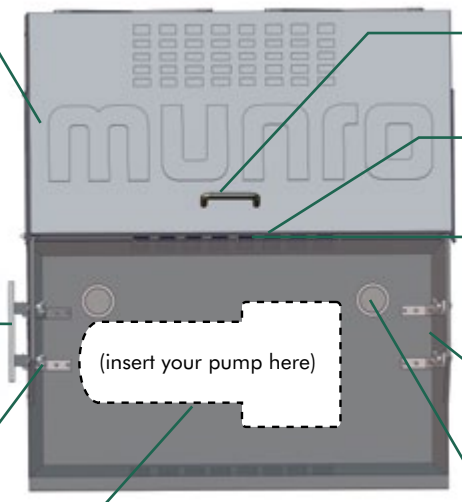
- **Easy** – Order the enclosure separately or include all the fittings you need. Assembly is simple with the hand-held rivet gun.
- **Professional** – With a Universal PRO Enclosure, your pump installation looks professional and is protected. This enclosure is built to last.
- **Better** – Durable, adaptable, and easy to assemble and use. With the Universal PRO Enclosure, you finally have a better way to house a pump, at a great price!

ENCLOSURE – Powder-coated stainless steel offers durable, non-corrosive housing to stand up to the elements.

Stainless steel rivets and hand-held rivet gun included for easy assembly.

PUMP CONTROL MOUNTING – Designed to fit a wide range of pump control panels.

UNIVERSAL DESIGN – Interchangeable side panels allow for pump to face left or right.



HANDLE – Stainless steel handle for easy accessibility.

SECURITY – Lockable.

SELF COOLING – Vented for air flow to keep the pump cool.

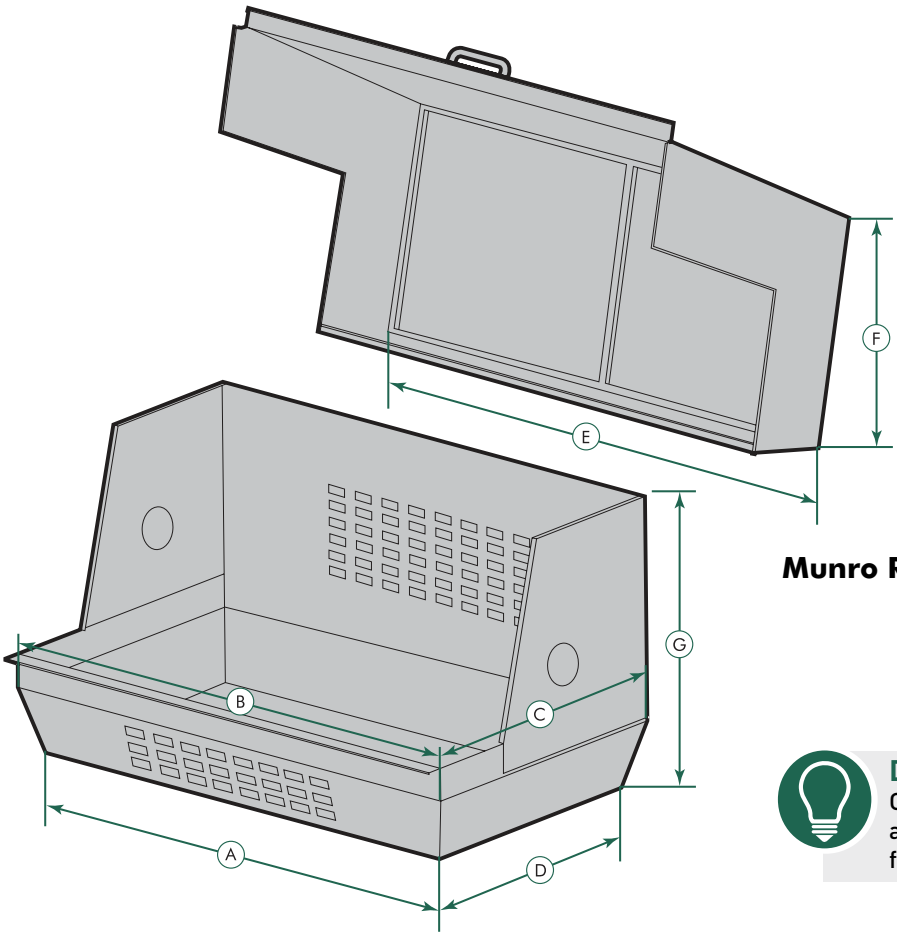
ADJUSTABLE – Height adjustable intake.

PUMP – Universal design will fit a wide-range of irrigation pumps.

DISCHARGE – Discharge holes are knock-outs for easy installation. Provides an anchor in high wind, additional security and a clean look.

Munro Universal PRO Enclosure

Dimensions



Suction and electrical panel adjustment height: 7 3/4" - 13 1/2"

Munro Rivet Gun Included!

Did You Know?
Centrifugal pumps need airflow to cool the motor for optimal longevity.

A	B	C	D	E	F	G	Approx Ship Weight lbs	Model Number
29 3/8"	31 1/2"	17 3/4"	15 3/4"	31 1/2"	13 3/4"	17 1/2"	50	ENCP2

Get everything you need!
For other fitting options, see pages 125–156.

Optional Kits & Assemblies (Order separately)

Pump Electrical Kit

See page 100

Centrifugal Pump Discharge Kit

See page 116

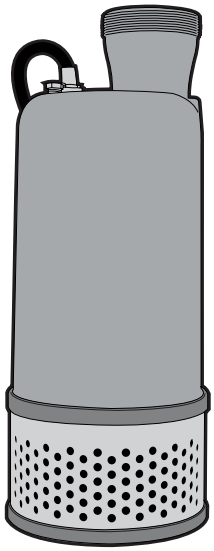
Centrifugal Pump Suction Assembly

See page 130

Centrifugal Pump Stand

See page 177

ABOUT SUBMERSIBLE PUMPS



How does a submersible pump work?

A submersible pump is designed to run while located within the fluid being pumped. The fluid is accelerated by a spinning impeller to create pressure and move the liquid up through pipe or hose.

Benefits and Applications

Submersible pumps run very efficiently, are virtually noiseless, and require minimal maintenance. Top discharge designed submersibles often cool the motor by flowing the fluid past the motor housing. This cooling process allows the pump to run long hours with little or no shutdown period. Submersible pumps have many uses including water features, water transfer, industrial settings, sump, effluent and sewage transfer.

MUNRO PUMPS ARE EXCEPTIONAL

Continuous duty design

We take continuous duty style submersibles a step further by using high-quality components such as abrasion-resistant double mechanical shaft seals and motors built for long life. Our designs keep the motor cool and your pump in service – day after day.

A pump for every job

Whether you need to create a waterfall, pump out a basement, or move sewage – Munro's got it! We have a full line of submersibles and can help you find the perfect pump for your job.

Did You Know?
Use a Munro Liquid Level Pump Control to extend pump life and increase efficiency. See p.76 for details.

Advanced engineering for efficiency and flexibility

We are pump experts who don't settle for the same-old, same-old. We've improved standard industry designs to bring you products that are more efficient and versatile. Many of our submersibles draw lower amps than others on the market, which means they cost less to run. We use high quality components and thoughtful designs to give you more flexibility and versatility.

✓ = Acceptable for Application – ✓✓ = Recommended for Use

Choosing the Right Pump for the Right Application

	RP	FS	POND	FSR	FSL	Bottom Suction	SUMP	FSA	FSA Survivor	FSG	FSE
Irrigation	✓	✓				✓✓					
Water Features	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓					
Dewatering	✓	✓✓	✓✓	✓✓	✓✓						✓✓
Water Transfer	✓	✓✓	✓✓	✓✓	✓✓		✓				✓✓
Industrial	✓	✓✓	✓✓	✓✓	✓✓	✓		✓	✓		✓✓
Sump	✓	✓	✓	✓	✓✓		✓✓				✓✓
Effluent	✓	✓✓	✓✓	✓✓	✓✓		✓	✓✓	✓✓	✓✓	✓✓
Grey water	✓	✓✓	✓✓	✓✓	✓✓	✓	✓	✓✓	✓✓	✓✓	✓✓
Sewage								✓✓	✓✓	✓✓	
Marine	✓	✓		✓	✓			✓	✓	✓	✓✓
Trash		✓						✓✓	✓✓	✓✓	
Flood Control	✓	✓		✓							

Choosing the Right Submersible Pump

Munro RP Series 1/2hp – 5hp

Features semi-open impeller

Recommended for: river and waterfall style decorative water features, both interior and exterior

Other uses: water transfer, wastewater, flood irrigation

Munro RP Amphibious Series 2hp – 5hp

Recommended for: river and flooded irrigation, water features

Other uses: water transfer, wastewater, booster

Munro RP Large Volume 7.5hp – 20 hp

Features aluminum bronze impeller

Recommended for: river and waterfall style water features

Other uses: large volume water transfer, flood control, extraction of water, flood irrigation, tail water recycling

Munro FS Series 1/3 hp – 30 hp

Features high-chrome wear-resistant impeller

Recommended for: river and waterfall style decorative water features, both interior and exterior, dewatering water with some abrasives

Other uses: water transfer, wastewater, flood irrigation

Munro POND Series 1/7hp – 1/3hp

Recommended for: water features, dewatering, utility, sump

Other uses: hot tub drainage, pools, pool covers, cooling water for machinery

Munro FS R Series

Recommended for: dewatering to within 1/8" depth

Other uses: water features, water transfer

Munro FS L Series 1/2hp – 1hp

Recommended for: pondless and waterfall style water features

Other uses: construction dewatering, utility, manholes

Munro 5" Multistage Bottom Suction Submersible Pumps

Recommended for: irrigation, shallow wells, rain collection tanks, grey water

Other uses: dewatering, fountains, pressure boosting domestic non-potable water

Munro SUMP Series 1/7hp – 1/3hp

Recommended for: sump, dewatering, utility

Other uses: hot tub drainage, pools, water features pool covers, cooling water for machinery

Munro FS A Sewage Pumps 1/3hp – 3/4hp

Recommended for: sewage

Other uses: effluent

Munro FS A Industrial Survivor Sewage Pumps 1hp – 2hp

Recommended for: commercial sewage

Other uses: residential sewage

Munro FS G Sewage Grinder Pumps 2hp

Recommended for: sewage

Other uses: effluent

Munro FS E 1/3hp – 3/4hp Sump & Effluent Pumps

Recommended for: sump, effluent

Other uses: utility, dewatering

* Unless otherwise noted Munro submersible pumps not intended for drinking water applications.

Submersible Water Feature Pumps

How does a submersible water feature pump work?
The pump is the most important aspect of any water feature. Whether you are creating melodic raindrops, a rushing river, or a dramatic spillway, selecting the right pump will provide the perfect water volume to make the project a success.

As with any construction project, a properly working water feature is dependent on high-quality components. Well-made long-lasting pumps, like Munro builds, will decrease annoying maintenance issues and cost less to run over the long term. Many features require continuous operation to maintain water turnover and minimize algae. Choosing a pump that is designed for long life operation is essential.

Choosing a pump for a water feature

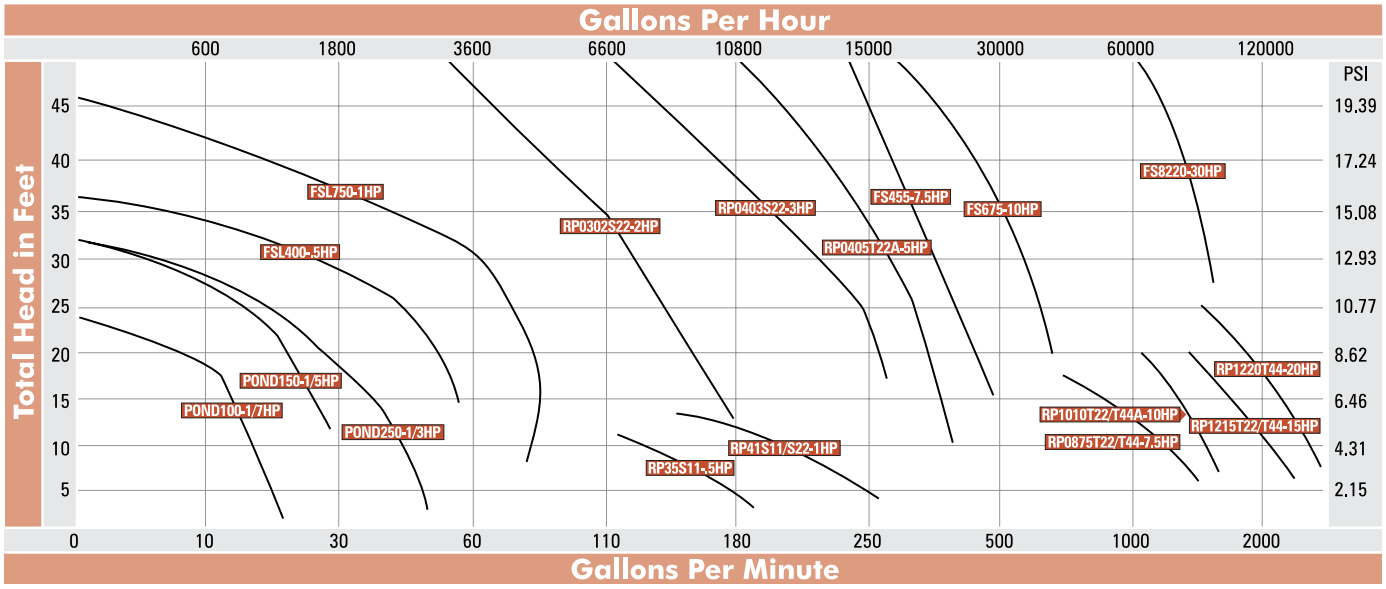
1. **Style of feature** – There are many different types of water features, such as ponds, river/streams, falls, etc., and each require different features and capabilities.

2. **Height of feature** – How high will you need to move the water from the water source to the discharge point?

3. **Width of waterway and depth of water desired over any spillways** – Look for a pump that can create the desired volume of water – too much or too little can make a big difference in the feel of the feature. Many features are designed to provide pleasant ambient sound which can require a higher-volume pump.

4. **Turnover rate** – Cycling the water through a filter will keep it cleaner and healthier. Choose a pump with a gallons per hour (gph) rate high enough to cycle the total volume of your water feature through quickly enough to meet your desired turnover rate. For example, a 1,000 gallon water feature may need a pump that can cycle through at least 500 gph to ensure the total volume is turned over once every two hours, 12 times per 24 hours.

5. **Fish in the water feature** – You'll want to ensure that the pump is safe for the fish. You may also want to consider a higher turnover rate to keep the feature clean.



Calculating GPH Required for Water Features

Depth in Inches	Length (L) of Weir in Feet			Additional GPH for Each Ft. Over 5 Ft.
	1	3	5	
1	2125	6450	10790	2165
1 1/4	2970	9025	15025	3025
1 1/2	3895	11820	19770	3970
1 3/4	4860	14400	24900	5015
2	5910	18120	30360	6120
2 1/4	7020	21660	36300	7320
2 1/2	8170	25320	42360	8580
2 3/4	9420	29100	48900	9900
3	10670	33120	55560	10020

Munro RP Series 1/2hp - 5hp

Designed for continuous duty water features, the Munro RP Series pumps offer high flow to horsepower ratios with low amp draw for a lower operating cost. The RP series pumps work vertically or horizontally for maximum flexibility. The option to mount the pump horizontally can provide special advantages in concealing the pump within complex decorative water features.

- **Abrasion-resistant mechanical shaft seal** – protects the motor for longer life
- **Enclosed channel impeller** – increases efficiency and lowers operating cost
- **Stainless steel outer case** – durable and low maintenance

COMMON APPLICATIONS

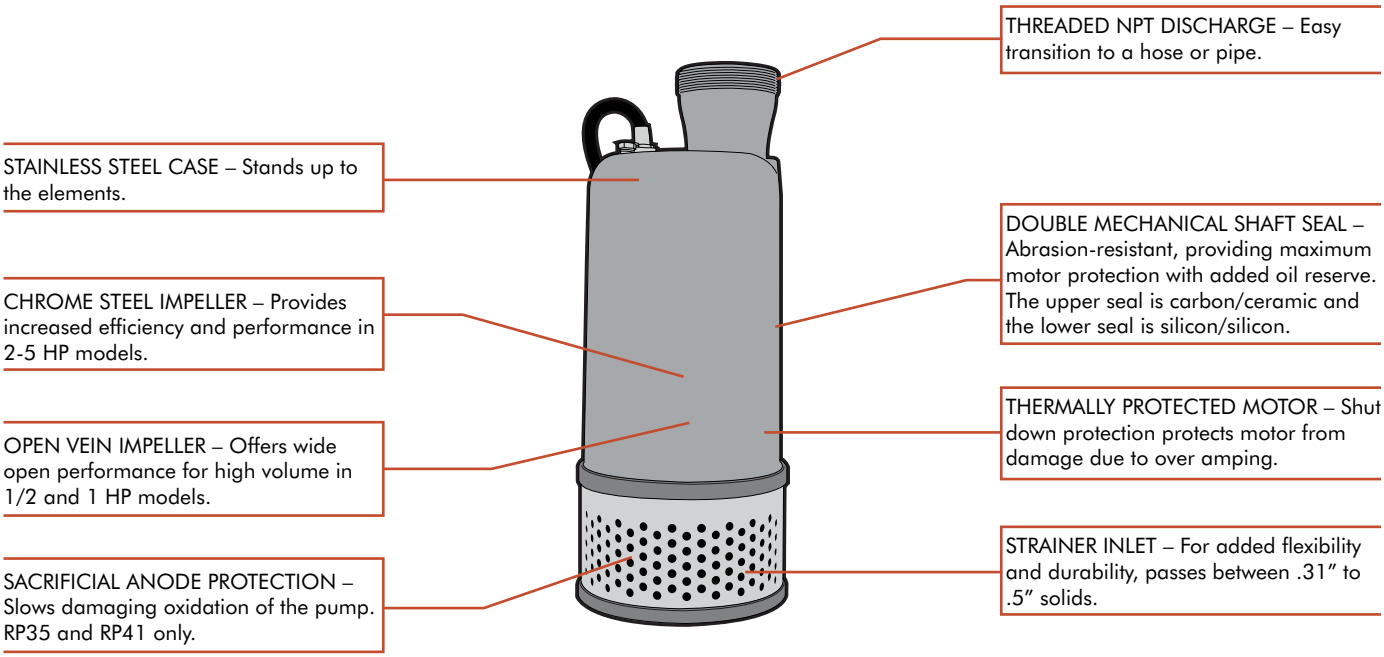
Recommended for: river and waterfall style decorative water features, both interior and exterior
Other uses: non-potable water transfer, wastewater, flood irrigation

ADVANTAGES

Continuous duty design – These pumps are made to run! Our design takes the flow path across the motor housing to whisk away the heat generated by the motor. A cool motor means a longer life.

Low cost to own – When pumps are in continuous use, the energy use and cost can really add up! Our pumps use lower amps than our competitors, which saves power and money.

Industry leading performance to horsepower – High gallon output sets this pump apart from the crowd.

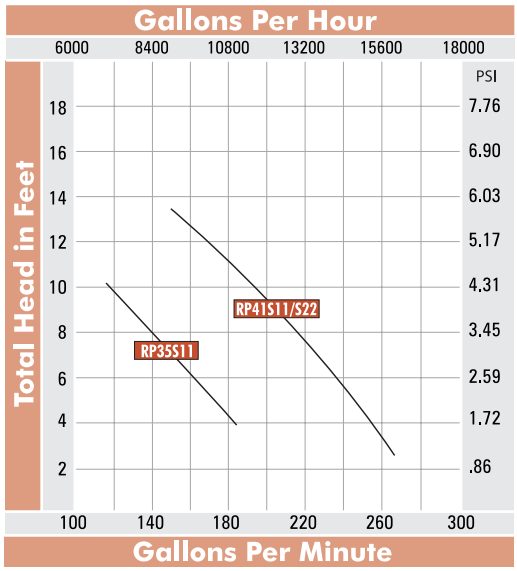


Did You Know?
Submersible pumps used to feed centrifugal pumps need to exceed the centrifugal pump GPM output.

Munro RP Series 1/2hp - 5hp

Curves

HORSEPOWER RANGE: 1/2 – 1



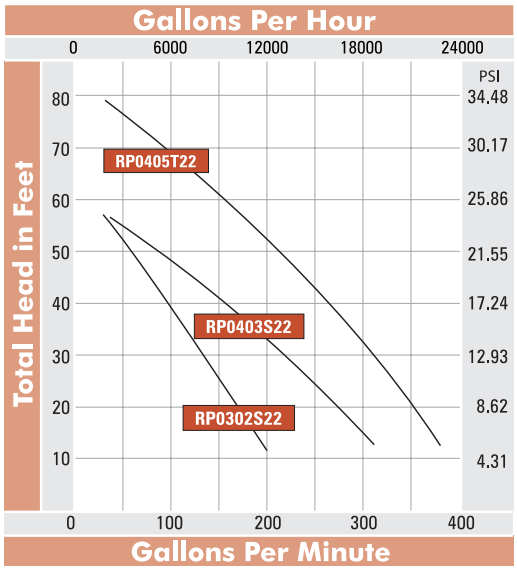
Did You Know?

When installing the RP35, we recommend 3" or larger discharge to reduce friction loss.

When installing the RP41, use only 4" discharge or larger.

Curves

HORSEPOWER RANGE: 2 – 5



Pick-A-Pump

TOTAL HEAD IN FEET	GALLONS PER HOUR					PSI
	600	9000	12000	15000	18000	
70						30.17
60	RP0405	RP0405				25.86
50	RP0403	RP0405	RP0405			21.55
40	RP0403	RP0403	RP0405	RP0405		17.24
30	RP0302	RP0403	RP0403	RP0405	RP0405	12.93
20	RP0302	RP0302	RP0403	RP0403	RP0405	8.62
10		RP41				4.31
5		RP35	RP41	RP41		2.15
	100	150	200	250	300	
	GALLONS PER MINUTE					

Specifications – Pump

HP	Phase	Max Head ft	Max Capacity gpm	Max Capacity gph	Discharge in	Weight lbs	Solid Pass in	Dimension		Model Number
								dia	hgt	
.5	1	10	185	11,100	3	55	.5	8.75"	19"	RP35S11*
1	1	13	278	16,680	4	57	.5	8.75"	19"	RP41S11*
1	1	13	278	16,680	4	57	.5	8.75"	19"	RP41S22*
2	1	60	190	11,400	3	95	.31	9.37"	21"	RP0302S22
3	1	63	305	18,300	4	103	.43	9.37"	21"	RP0403S22
5	3	84	375	22,500	4	103	.43	9.37"	21"	RP0405T22

Specifications – Motor

Power		Amps	Phase	Start Method	Cord Length	Thermal Protection	Liquid Max Temp.	Model Number
HP	Volts							
.5	110	8.4	1	Direct	30'	Y	104° F	RP35S11*
1	110	10.4	1	Direct	30'	Y		RP41S11*
1	208-230	6.5-5.2	1	Direct	30'	Y		RP41S22*
2	208-230	11.25-9.0	1	Cap	24'	Y		RP0302S22
3	208-230	16.75-13.4	1	Cap	24'	Y		RP0403S22
5	208-230	16-12.8	3	Direct	24'	Y		RP0405T22

* Mixed flow impeller – see Did You Know? on p. 30

Munro RP Amphibious Series 2hp - 5hp

This amphibious pump designed for continuous duty water features does not need a vault. The pump can be positioned at the bank instead of the bottom of a non-potable water source because a hose and strainer allows remote intake of fluid. RP amphibious pumps can also be piped pump to pump to double the pressure!

- **Abrasion-resistant mechanical shaft seal** – protects the motor for longer life
- **Enclosed channel impeller** – increases efficiency and lowers operating cost
- **Stainless steel outer case** – durable and low maintenance

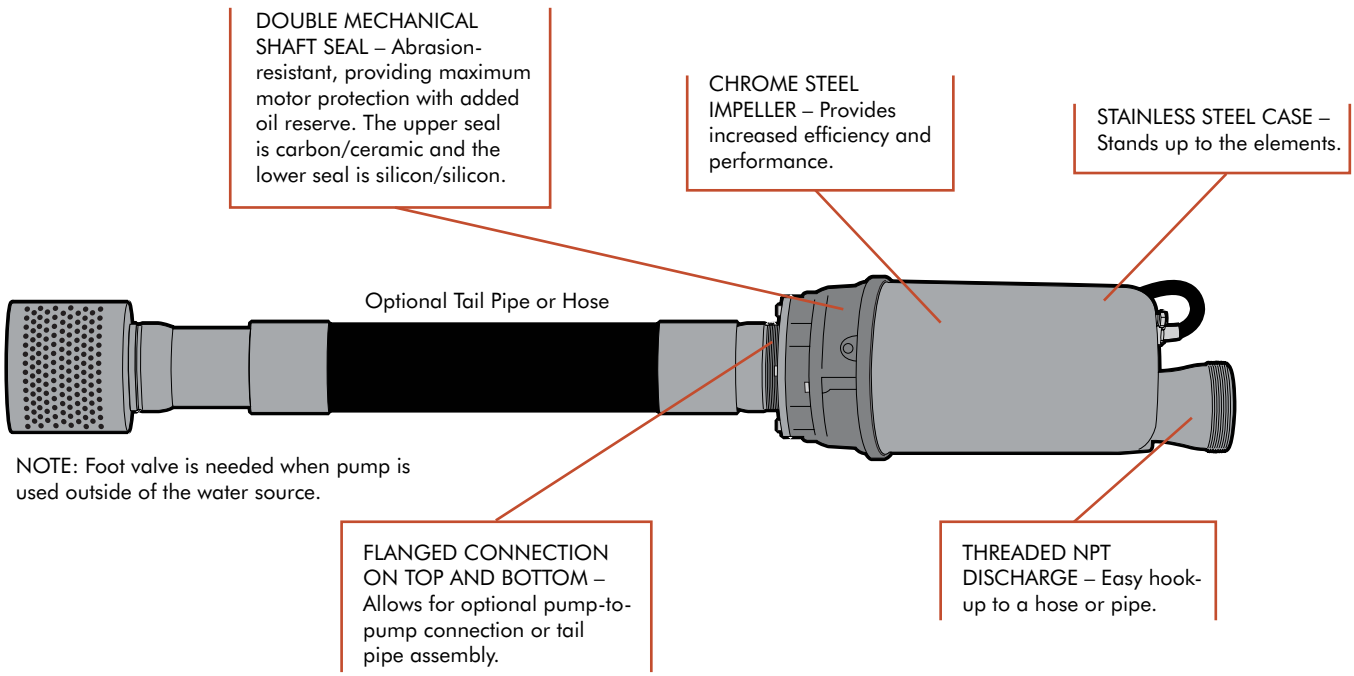
COMMON APPLICATIONS
Recommended for: river and flooded irrigation
Other uses: water transfer, wastewater

ADVANTAGES

Easy to place and maintain – The amphibious design means you can retire your waders! Place this pump right on the bank of the water, where it's easy to maintain. Laying down or standing up, you'll see the same great performance.

Higher than average flow to hp with pump-to-pump pressure boost capability – High gallon output sets this pump apart from the crowd. If you need an extra boost, plumb pump-to-pump and double your output pressure.

Low cost to own – When pumps are in continuous use, the energy use and cost can really add up! Our pumps use lower amps per gallon pumped than most of our competitors, which saves power and money.

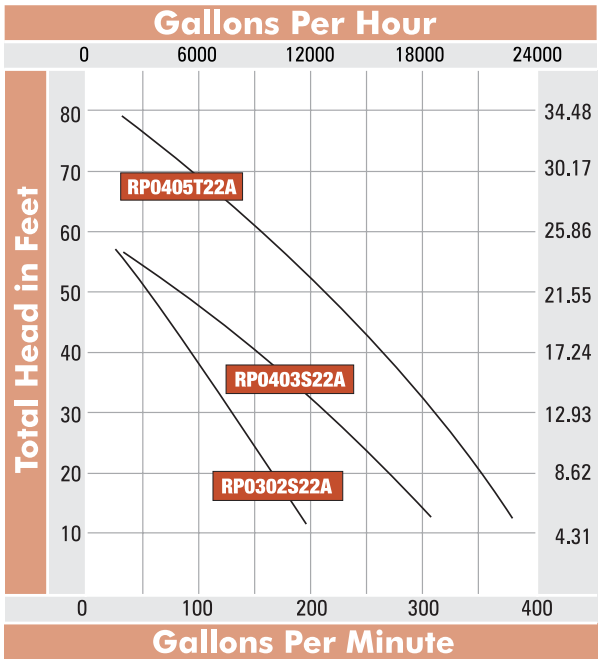


Get everything you need!
Hose assemblies can be found on pages 114–121.

Munro RP Amphibious Series 2hp - 5hp

Curves

HORSEPOWER RANGE: 2 – 5



Pick-A-Pump

TOTAL HEAD IN FEET	GALLONS PER HOUR			PSI
	600	12000	18000	
70	RP0405			30.17
60	RP0405			25.86
50	RP0403	RP0405		21.55
40	RP0403	RP0405		17.24
30	RP0302	RP0403	RP0405	12.93
20	RP0302	RP0403	RP0405	8.62
10				4.31
	100	200	300	
	GALLONS PER MINUTE			

Specifications – Pump

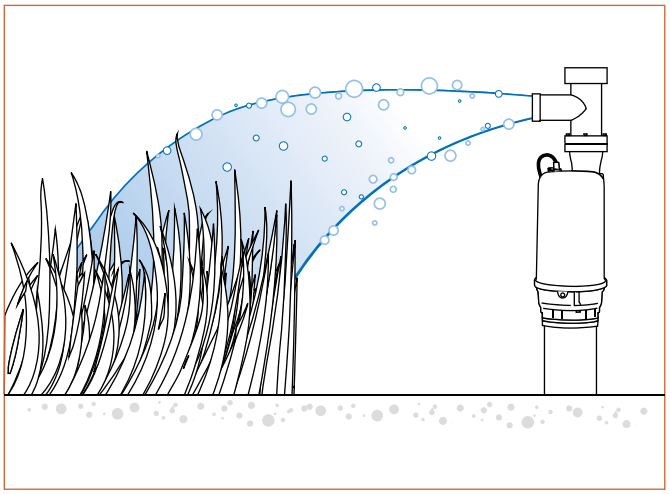
HP	Phase	Max Head ft	Max Capacity gpm	Max Capacity gph	Discharge in	Weight lbs	Solid Pass	Dimension		Model Number
								dia	hgt	
2	1	60	190	11,400	3	95	0.31	9.37″	18″	RP0302S22A
3	1	63	305	18,300	4	103	0.43	9.37″	18″	RP0403S22A
5	3	84	375	22,500	4	103	0.43	9.37″	18″	RP0405T22A

Specifications – Motor

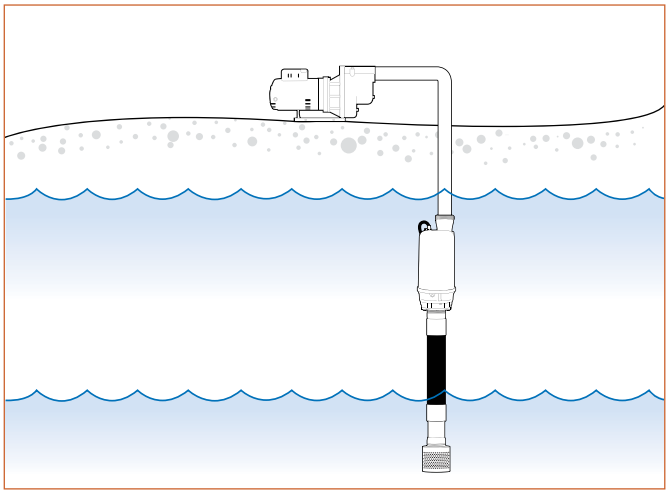
Power		Amps	Phase	Start Method	Cord Length	Thermal Protection	Liquid Max Temp.	Model Number
HP	Volts							
2	208-230	11.25-9.0	1	Cap	24′			RP0302S22A
3	208-230	16.75-13.4	1	Cap	24′	Y	104° F	RP0403S22A
5	208-230	16-12.8	3	Direct	24′			RP0405T22A

Munro RP Pumps - Amphibious Uses

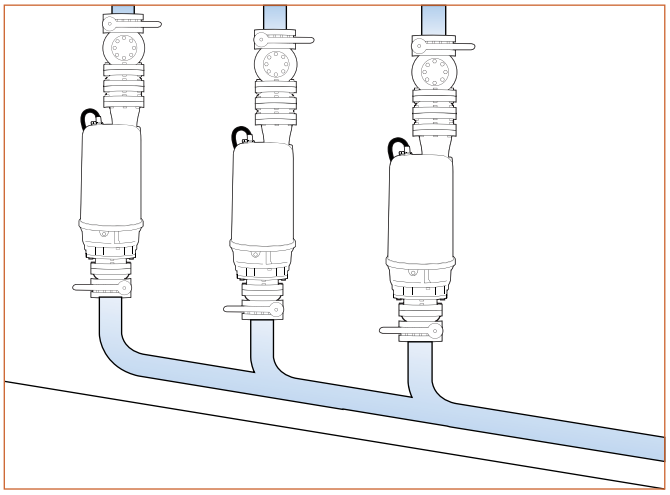
Flood Irrigation



Ditch with Water Level too Low for Centrifugal Pump Alone

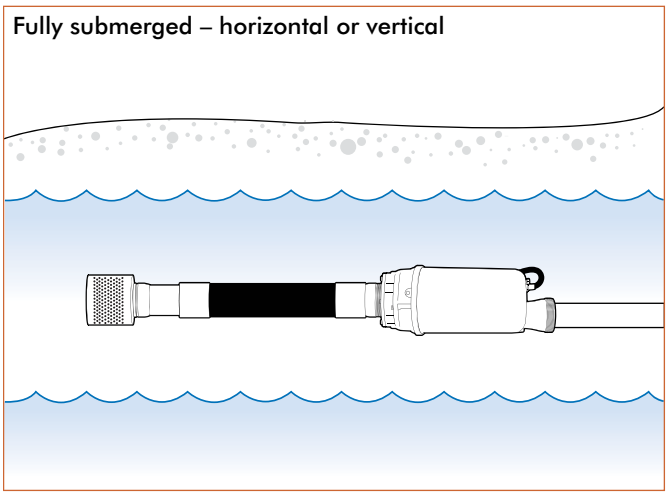


Multi-Pump Boost

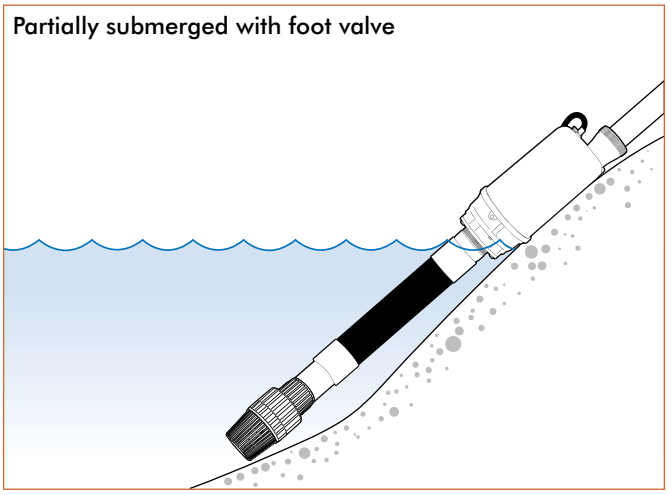


Applications:

Fully submerged – horizontal or vertical



Partially submerged with foot valve



Tail Pipe

Hose with Strainer

Various lengths and configurations available.

For Hose and Strainer options, see pages 114–118, and 174.

Did You Know?

Remote suction keeps the pump at the bank while pulling water from deeper area of pond.

Munro RP Large Volume 7 1/2hp - 20 hp

You can create a river with these pumps! For extremely high gpm capacity with virtually zero noise, the RP Large Volume series has a mixed flow impeller design, achieving high water flow and low head.

- **Abrasion-resistant mechanical shaft seal** – protects the motor for longer life
- **Impeller flow guide vane** – increases efficiency and lowers operating cost
- **Stainless steel outer case** – durable and low maintenance

COMMON APPLICATIONS
Recommended for: river and waterfall style water features
Other uses: large volume non-potable water transfer, flood control, area dewatering, extraction of water, flood irrigation, tail water recycling

ADVANTAGES

Much higher than average flow to horsepower – Using an axial and mixed flow design, the RP large volume pumps live up to their billing. The proof is in our curves – you'll see maximum flow at low head levels.

Continuous duty design – These pumps are made to run! Our design takes the flow path across the motor housing to whisk away the heat generated by the motor. A cool motor means a longer life.

Low cost to operate – These pumps are at their most efficient at full flow. Other pumps can not make that claim!

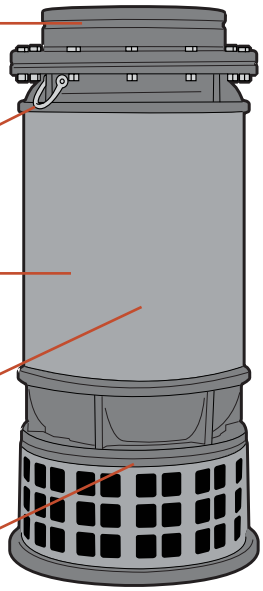
MECHANICAL GROOVE DISCHARGE FITTING – Allows various types of discharge attachments to fit specific application, including flanged, hose barb, or threaded.

LIFTING RING AND CABLE – For safe and easy lifting with forklift.

STAINLESS STEEL CASE – Stands up to the elements.

DOUBLE MECHANICAL SHAFT SEAL – Abrasion-resistant, providing maximum motor protection with added oil reserve. The upper seal is carbon/ceramic and the lower seal is silicon/silicon.

ALUMINUM BRONZE MIXED-FLOW IMPELLER – Maximizes flow rates with little noise or vibration.



Get everything you need!
Other grooved fittings available on pages 144-156.

Optional Discharge & Fittings

Threaded

Size	Model No.
8"	SH59X8X6
10"	SH59X10X6
12"	SH59X12X6

Flanged

Size	Model No.
8"	SH7041X8
10"	SH7041X10
12"	SH7041X12

Hose Barb

Size	Model No.
8"	AP3TCNV0800
10"	AP3TCNV1000
12"	AP3TCNV1200

Coupling

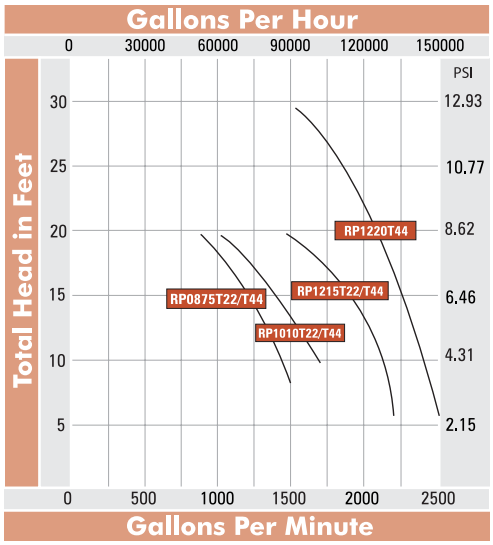
Size	Model No.
8"	M7705X8
10"	M7705X10
12"	M7705X12

(Order separately)

Munro RP Large Volume 7.5hp - 20 hp

Curves

HORSEPOWER RANGE: 7 1/2 – 20



Get everything you need!
See page 119-121 for Discharge Hose assemblies.

Did You Know?
Mixed flow impellers act like a propeller and require more power at low flows/high head.

Pick-A-Pump

TOTAL HEAD IN FEET	GALLONS PER HOUR						PSI
	45000	60000	75000	90000	105000	120000	
25				RP1220			10.78
20				RP1220	RP1220	RP1220	8.62
15			RP1010	RP1215	RP1215	RP1220	6.47
10		RP0875	RP1010	RP1010	RP1215	RP1215	4.31
	750	1000	1250	1500	1750	2000	
	GALLONS PER MINUTE						

Specifications – Pump

HP	Phase	Max Head ft	Max Capacity gpm	Max Capacity gph	Discharge in	Weight lbs	Solid Pass	Dimension		Model Number
								dia	hgt	
7.5	3	19	1,500	54,000	8	268	0.87	13.39"	36.34"	RP0875T22
7.5	3	19	1,500	54,000	8	268	0.87	13.39"	36.34"	RP0875T44
10	3	19	1,650	61,000	10	361	0.87	14.96"	39.96"	RP1010T22
	3	19	1,650	61,000	10	361	0.87	14.96"	39.96"	RP1010T44
15	3	20	2,200	89,000	12	460	0.90	16.93"	42.40"	RP1215T22
	3	20	2,200	89,000	12	460	0.90	16.93"	42.40"	RP1215T44
20	3	25	2,500	91,000	12	485	0.90	16.93"	42.52"	RP1220T44

Specifications – Motor

Power		Amps	Phase	Start Method	Cord Length	Thermal Protection	Liquid Max Temp	Model Number
HP	Volts							
7.5	208-230	26-21.0						RP0875T22
7.5	460	10.5						RP0875T44
10	208-230	33-26.8						RP1010T22
	460	13.4	3	Direct	24'	N	104° F	RP1010T44
15	208-230	46-37.4						RP1215T22
	460	18.7						RP1215T44
20	460	23.7						RP1220T44

Munro POND Series 1/7hp - 1/3hp

Designed for continuous or intermittent duty, the Munro POND Series pumps offer an excellent value and Munro's high-quality standards. This space-saving, yet heavy-duty pump is low-water friendly and long lasting.

- **Abrasion-resistant mechanical shaft seal** – protects the motor for longer life
- **Self-protecting motor** – at high heat, automatic shutdown when there is no more fluid to pump
- **AAS plastic outer case** – durable and non-corrosive

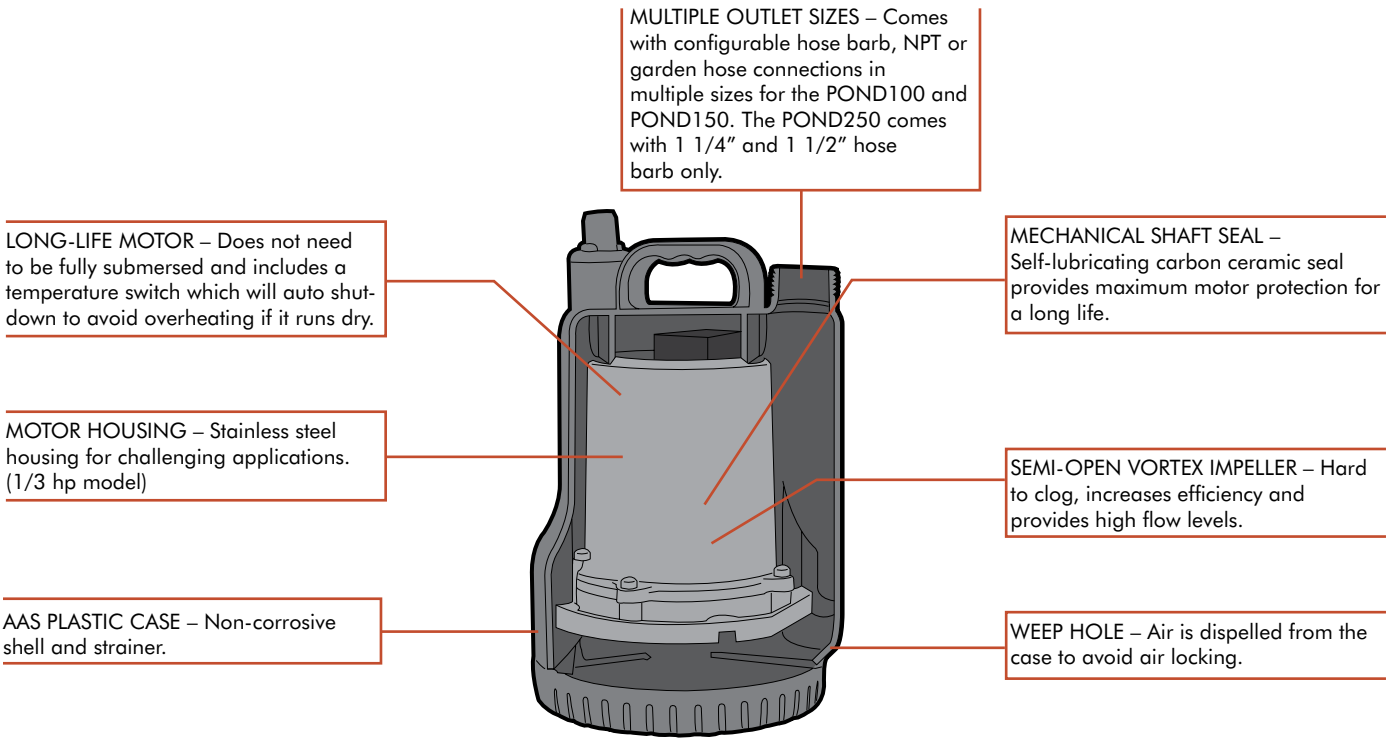
COMMON APPLICATIONS
Recommended for: water features, dewatering, utility, sump
Other uses: hot tub drainage, pools, pool covers, cooling water for machinery

ADVANTAGES

Low failure rate – This pump has a failure rate well under 1% because the same build principles of superior design used in Munro's larger pumps are used in the POND pump. A mechanical shaft seal protects this super-efficient motor.

True continuous duty design – These pumps are made to run! Our design takes the flow path across the motor housing to whisk away the heat generated by the motor. A cool motor means a longer life.

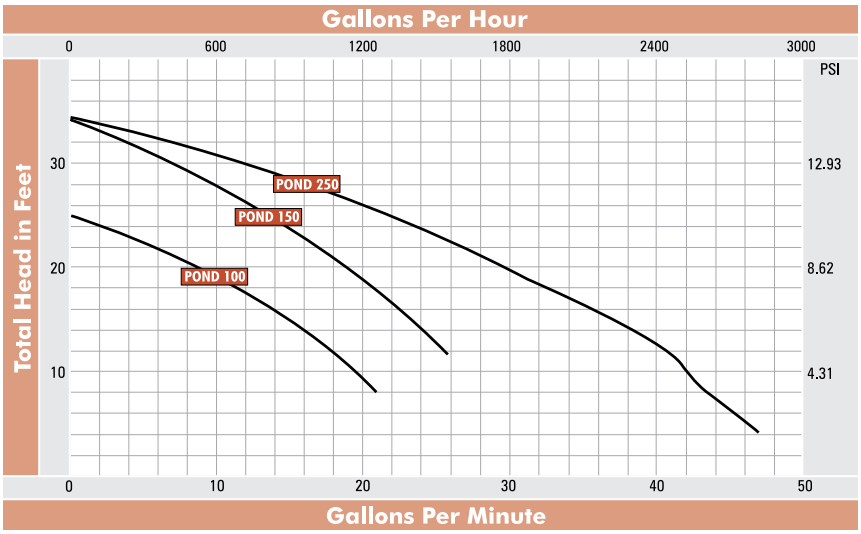
Low cost to own – Our pumps use lower amps and provide higher flows than our competitors, which saves power and money.



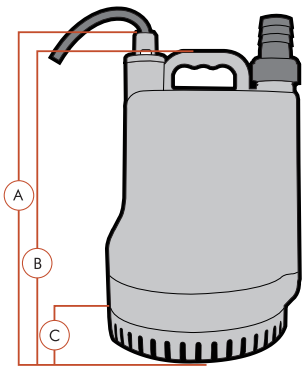
Munro Pond Series 1/7hp - 1/3hp

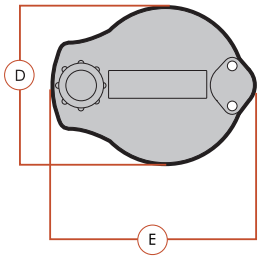
Curves

HORSEPOWER RANGE: 1/7 - 1/3



Dimensions





Did You Know?
The Pond 250 motor housing is stainless steel, so it will stand up to coastal environments.

A	B	C	D	Model Number
10″ 10.5″	9.5″ 10″	2″ 2″	6″ 6″	POND100/150 POND250

Specifications – Pump

HP	Discharge Options in	Max Head ft	Max Capacity gpm	Max Capacity gph	Weight lbs	Solid Passage in	Model Number
1/7	5/8, 3/4, 1″ Hose, 5/8″ GHT, 1″ NPT	25	21	1,260	8	.157	POND100
1/5		34	28	1,680	9	.157	POND150
1/3	1.25″, 1.5″ Hose	34	47	2,820	9	.25	POND250

Specifications – Motor

HP	Volts	Phase	Amps	Thermal Protection	Cord Length ft	Liquid Max Temp.	Model Number
1/7	110	1	2	Y	10	104° F	POND100
1/5	110		3				POND150
1/3	110		4.2				POND250

Submersible Dewatering Pumps

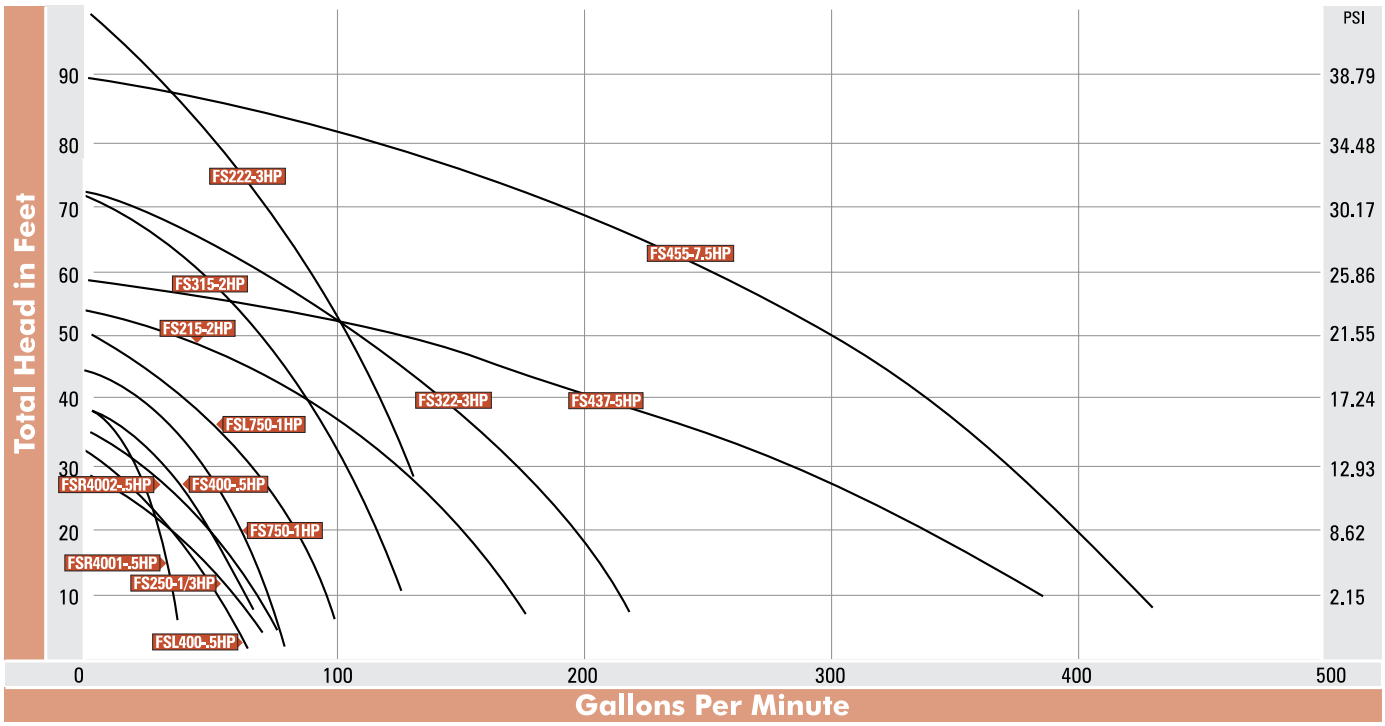
A dewatering pump is an invaluable tool for removing water quickly – whether in a commercial construction application or in a small residential clean-up job. These pumps are available in many different sizes and can range from small portable units to large stationary machines. Choosing the right pump for the job will save time, money and hassle.

Choosing the right dewatering pump

1. Determine the scope of your project
Gallons per minute (GPM) – how much water do you need to move and how quickly do you need to move it?
Head in feet – how high does the pump need to push the water, from the water level to where the water should emerge?
Friction Loss – how long is the discharge pipe or hose, what friction losses must be considered?

2. Determine the frequency of use and portability that you require
Will the pump be used continuously, periodically, or only once or twice? Do you need a pump that can be moved from one job site to another or will the pump be placed at one site for ongoing use?

3. Consider the water
Is it clean or does it include small solids or debris that need to be pumped through?



Need performance greater than 100 feet or 500 GPM? See curves for performance up to 1350 GPM.

Did You Know?
Munro builds dewatering pump stations for everything from wastewater sites to coal mines. We are experts in pumps – everything from small residential to huge commercial or industrial applications!

Munro FS Series 1/3 hp - 30 hp

These extremely durable, long lasting pumps are perfect for countless applications. With our wide array of horsepower ranges, the FS series pumps are durable enough to take on mining and construction dewatering, and are also excellent for irrigation, industrial, and even non-potable residential applications like water features.

- **Abrasion-resistant mechanical shaft seal** – protects the motor for longer life
- **Premium impeller construction** – high chrome steel impeller is extremely hard and wear resistant in our 2 hp and above, while a ductile Iron impeller easily handles 1/3 hp to 1 ½ hp flow conditions
- **Stainless steel case, shaft and strainer** – durable and low maintenance

COMMON APPLICATIONS
Recommended for: dewatering, water transfer
Other uses: water features

ADVANTAGES

Continuous duty design – These pumps are made to run! Our double casing design takes the flow path across the motor housing to whisk away the heat generated by the motor. A cool motor means a longer life.

Wear resistant materials – We use stainless steel in our housing, shaft and strainer, providing wear resistance and a long life in all conditions.

Great performance at a great value – With our heavy duty construction, high head or high gpm capacity, and versatile design, you'll be pleasantly surprised when you compare this pump to its competition!

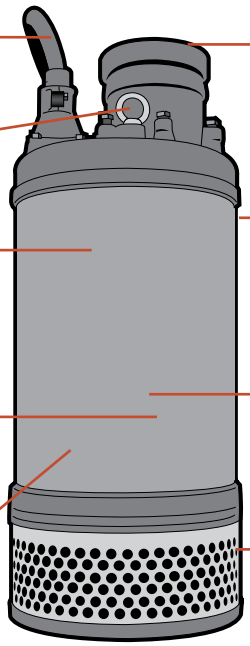
SEALED CABLE ENTRY – Allows for full submersion.

LIFTING RING AND CABLE – For safe and easy lifting with forklift.

STAINLESS STEEL SHAFT – Heat treated and highly wear resistant.

PREMIUM CONSTRUCTION IMPELLERS 2 hp and larger use an extremely durable and abrasion resistant high chrome steel impeller, while the 1/3 to 1 1/2 hp pumps are dynamically balanced with a smooth running ductile iron impeller.

THERMALLY PROTECTED MOTOR – Shut down protection protects motor from damage due to over amping.



THREADED NPT DISCHARGE – Easy hook-up to, hose, pipe or grooved fittings.

STAINLESS STEEL DOUBLE CASING – Water flows past the motor to reduce heat.

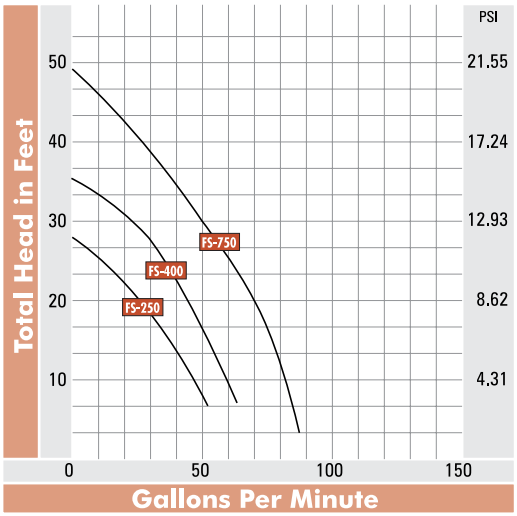
DOUBLE MECHANICAL SHAFT SEAL – Abrasion resistant, providing superior wear resistance and minimal maintenance. The upper seal is carbon/ceramic and the lower seal is silicon/carbide.

STAINLESS STEEL STRAINER – For added longevity and durability.

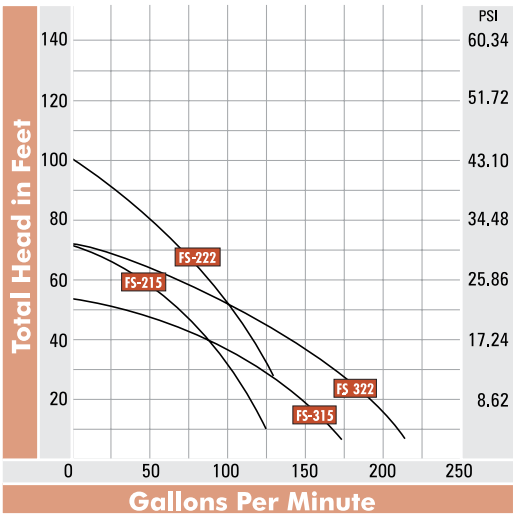
Munro FS Series 1/3 hp - 30 hp

Curves

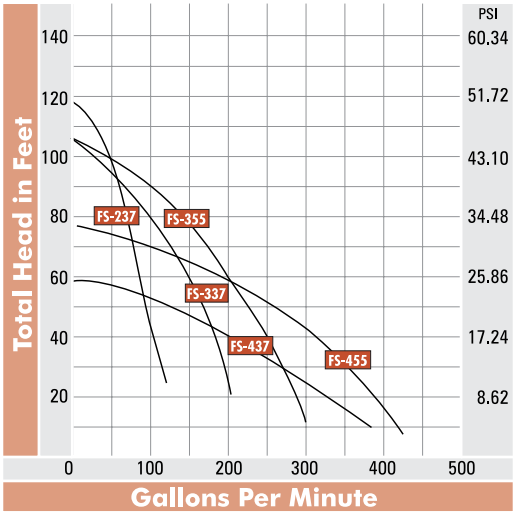
HORSEPOWER RANGE: 1/3 - 1



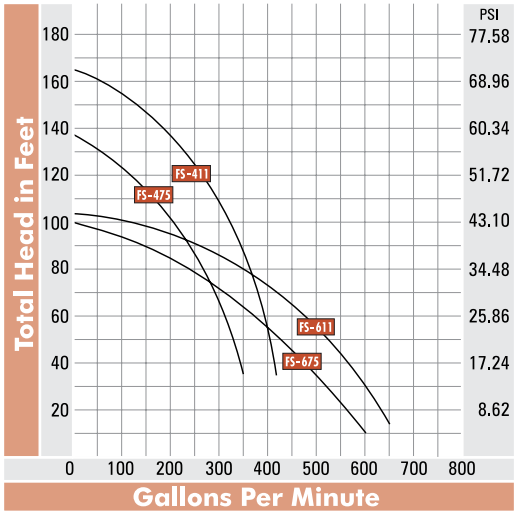
HORSEPOWER RANGE: 2 - 3



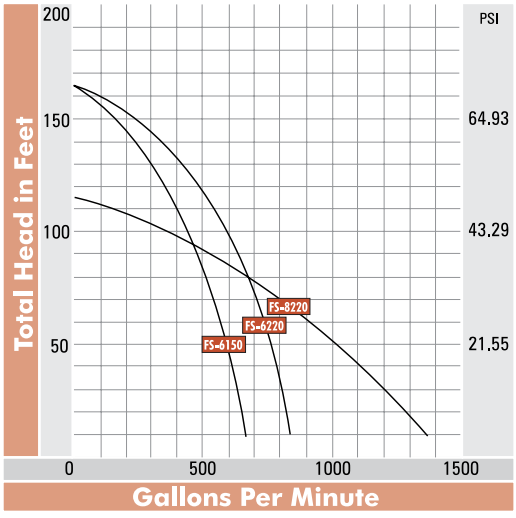
HORSEPOWER RANGE: 5 - 7 1/2



HORSEPOWER RANGE: 10 - 15



HORSEPOWER RANGE: 20 - 30



Get everything you need!
Protect your investments with Munro Controls, see pages 72–100.

Munro FS Series 1/3 hp - 30 hp

Pick-A-Pump

TOTAL HEAD IN FEET	CHOOSING A MUNRO FS PUMP: FS250/400/750 HP RANGE: 1/3 - 1						PSI
40	FS750	FS750					17.24
30	FS400	FS750	FS750	FS750	FS750		12.93
20	FS250	FS400	FS400	FS750	FS750	FS750	8.62
10		FS250	FS250	FS400	FS400	FS750	4.31
	20	30	40	50	60	70	
	GALLONS PER MINUTE						

TOTAL HEAD IN FEET	CHOOSING A MUNRO FS PUMP: FS215/315/222/322 HP RANGE: 2 - 3						PSI
80	FS222	FS222					34.48
70	FS222	FS222		FS237			30.17
60	FS215	FS322	FS222/FS322	FS237			25.86
50	FS315	FS215	FS322	FS222/FS322	FS237		21.55
40	FS315	FS315	FS215/FS315	FS322	FS322		17.24
30		FS315	FS215/FS315	FS215/315	FS322	FS322	12.93
20					FS315	FS322	8.62
	25	50	75	100	125	150	
	GALLONS PER MINUTE						

TOTAL HEAD IN FEET	CHOOSING A MUNRO FS PUMP: FS237/337/437/355/455 HP RANGE: 5 - 7 1/2							PSI
90	FS237	FS355						38.79
80	FS237/FS337	FS337	FS355					34.48
70	FS455	FS237	FS355	FS355				30.17
60	FS455	FS455	FS455	FS355				25.86
50	FS437	FS437	FS337	FS455	FS455			21.55
40		FS437	FS437	FS437	FS455	FS455		17.24
30				FS437	FS437	FS455	FS455	12.93
20						FS437		8.62
10								4.31
	50	100	150	200	250	300	350	
	GALLONS PER MINUTE							

TOTAL HEAD IN FEET	CHOOSING A MUNRO FS PUMP: FS411/475/611/675 HP RANGE: 10 - 15						PSI
150	FS411						64.65
140	FS411						60.34
130	FS411	FS411					56.03
120	FS475	FS411					51.72
110	FS475	FS411	FS411				47.41
100	FS611	FS475	FS411				43.10
90	FS675	FS611	FS411				38.79
80	FS675	FS675	FS611				34.48
70		FS675	FS675	FS611			30.17
60			FS475/FS675	FS611			25.86
50				FS675	FS611		21.55
40				FS675	FS611		17.24
	100	200	300	400	500		
	GALLONS PER MINUTE						

TOTAL HEAD IN FEET	CHOOSING A MUNRO FS PUMP: FS6150/6220/8220 HP RANGE: 20 - 30									PSI
150	FS6220									64.65
140	FS6150	FS6220								60.34
130	FS6150	FS6150	FS6220							56.03
120	FS6150	FS6150	FS6220	FS6220						51.72
110	FS6150	FS6150	FS6150	FS6220						47.41
100	FS8220	FS8220	FS6150	FS6220						43.10
90				FS8220	FS6220					38.79
80				FS6150	FS8220					34.48
70				FS6150	FS8220	FS8220	FS8220			30.17
60				FS6150	FS8220	FS8220	FS8220	FS8220		25.86
50				FS6150		FS6220	FS8220	FS8220	FS8220	21.55
	200	300	400	500	600	700	800	900	1000	
	GALLONS PER MINUTE									

Munro FS Series 1/3 hp - 30 hp

Specifications – Pump

HP	Solids Handling in	Discharge Size in	Weight lbs	Model Number
1/3	.24	1.5	32	FS250S11
1/3	.24	1.5	32	FS250S22
1/2	.24	2	33	FS400S11
1/2	.24	2	33	FS400S22
1	.32	2	40	FS750S11
1	.32	2	37	FS750S22
1	.32	2	35	FS750T22
1	.32	2	35	FS750T44
2	.36	2	83	FS215S11
2	.36	2	81	FS215S22
2	.36	2	70	FS215T22
2	.36	2	60	FS215T44
2	.36	3	83	FS315S11
2	.36	3	81	FS315S22
2	.36	3	59	FS315T22
2	.36	3	78	FS315T44
3	.36	2	88	FS222T22
3	.36	2	68	FS222T44
3	.36	3	68	FS322T22
3	.36	3	69	FS322T44
5	.4	2	142	FS237T22
5	.4	2	122	FS237T44
5	.4	3	143	FS337T22
5	.4	3	135	FS337T44
5	.4	4	145	FS437T22
5	.4	4	144	FS437T44
7.5	.4	3	158	FS355T22
7.5	.4	3	148	FS355T44
7.5	.4	4	133	FS455T22
7.5	.4	4	148	FS455T44
10	.6	4	300	FS475T22
10	.6	4	300	FS475T44
10	.6	6	300	FS675T22
10	.6	6	300	FS675T44
15	.6	4	305	FS411T22
15	.6	4	307	FS411T44
15	.6	6	310	FS611T22
15	.6	6	311	FS611T44
20	.6	6	313	FS6150T22
20	.6	6	313	FS6150T44
30	.8	6	570	FS6220T22
30	.8	6	570	FS6220T44
30	.8	8	581	FS8220T22
30	.8	8	581	FS8220T44

Munro FS Series 1/3 hp - 30 hp

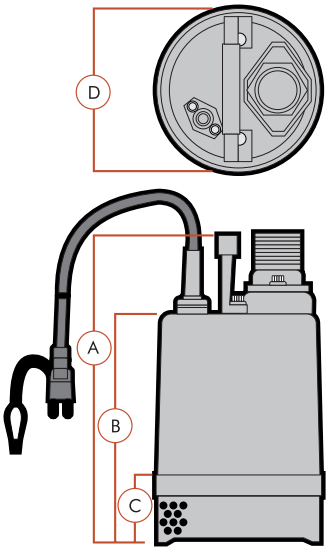
Specifications – Motor

HP	Voltage	Phase	Amps	Thermal Protection	Cord length ft	Liquid Max Temp.	Model Number
1/3	110	1	4	Y	18		FS250S11
1/3	220	1	2.5	Y	18		FS250S22
1/2	110	1	5.3	Y	18		FS400S11
1/2	220	1	3	Y	18		FS400S22
1	110	1	10	Y	18		FS750S11
1	220	1	5	Y	18		FS750S22
1	220	3	4	Y	18		FS750T22
1	440	3	2	Y	18		FS750T44
2	110	1	20	Y	33		FS215S11
2	220	1	10	Y	33		FS215S22
2	220	3	6	Y	33		FS215T22
2	440	3	3	Y	33		FS215T44
2	110	1	20	Y	33		FS315S11
2	220	1	10	Y	33		FS315S22
2	220	3	6	Y	33		FS315T22
2	440	3	3	Y	33		FS315T44
3	220	3	8	Y	33		FS222T22
3	440	3	4.5	Y	33		FS222T44
3	220	3	9	Y	33		FS322T22
3	440	3	4.5	Y	33		FS322T44
5	220	3	15	Y	33		FS237T22
5	440	3	7.5	Y	33		FS237T44
5	220	3	15	Y	33	104° F	FS337T22
5	440	3	7.5	Y	33		FS337T44
5	220	3	15	Y	33		FS437T22
5	440	3	7.5	Y	33		FS437T44
7.5	220	3	25	Y	33		FS355T22
7.5	440	3	11.3	Y	33		FS355T44
7.5	220	3	22.5	Y	33		FS455T22
7.5	440	3	11.3	Y	33		FS455T44
10	220	3	30	Y	33		FS475T22
10	440	3	15	Y	33		FS475T44
10	220	3	30	Y	33		FS675T22
10	440	3	15	Y	33		FS675T44
15	220	3	45	Y	33		FS411T22
15	440	3	22.5	Y	33		FS411T44
15	220	3	45	Y	33		FS611T22
15	440	3	22.5	Y	33		FS611T44
20	220	3	60	Y	33		FS6150T22
20	440	3	30	Y	33		FS6150T44
30	220	3	90	Y	33		FS6220T22
30	440	3	45	Y	33		FS6220T44
30	220	3	90	Y	33		FS8220T22
30	440	3	45	Y	33		FS8220T44

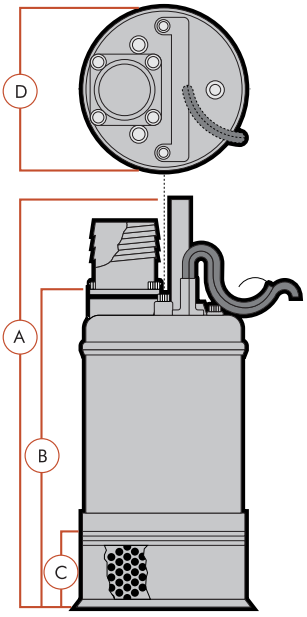
Munro FS Series 1/3 hp - 30 hp

Dimensions

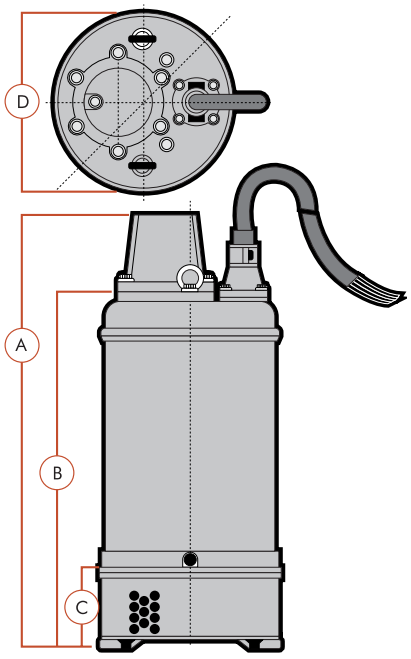
MODELS: FS250/400/750



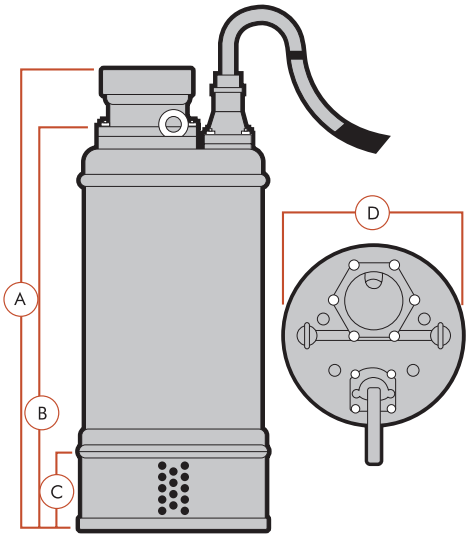
MODELS: FS215/315/222/322/237/ 337/437/355/455



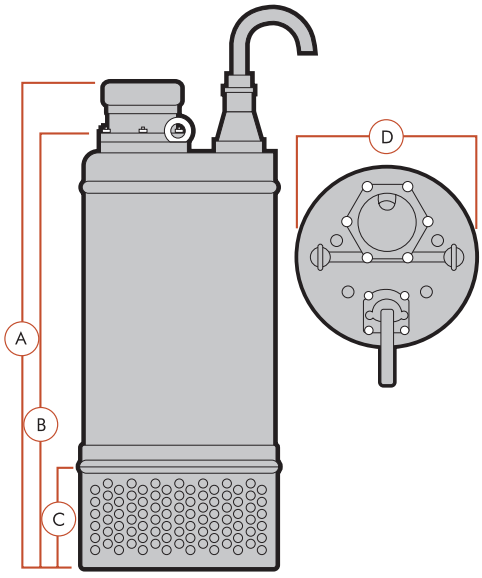
MODELS: FS475/675/411/611



MODELS: FS6150



MODELS: FS6220/8220



A	B	C	D	Model Number
13.375″	10″	3″	7.125″	FS-250/400
14.625″	11.25″	3″	7.125″	FS-750
22″	16″	2.875″	8.5″	FS-215/315
22″	16″	2.875″	8.5″	FS-222/322
25.25″	19.625″	4.75″	11.25″	FS-237/337/437
26.375″	20.625″	4.75″	11.25″	FS-355/455
33.25″	27.375″	7″	13.875″	FS-475/675
33.25″	27.375″	7″	13.875″	FS-411/611
36″	30″	5.75″	13.75″	FS6150
41″	37″	8″	16.5″	FS6220/8220

Munro FSR Series

The Munro FSR is specifically designed for continuous duty to extremely low levels of water. Ideal for pumping out basements or job sites where removing the maximum amount of water is desired. Designed to be easily carried from job to job. Sets up in minutes.

- **Specially designed rubber base** – will pump down to as little as 1/8" of fluid
- **Oil-free motor** – with thermal and over-current protector
- **Abrasion-resistant mechanical shaft seal** – protects the motor for longer life

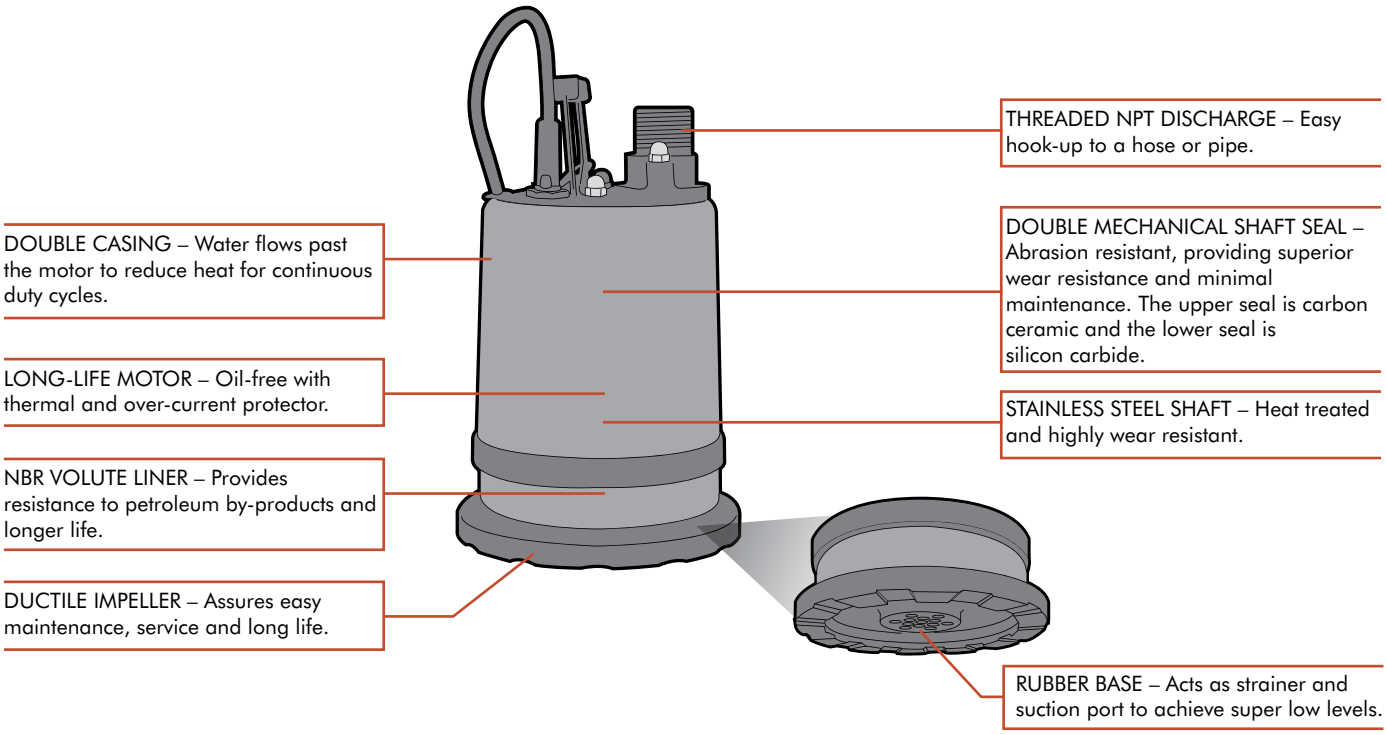
COMMON APPLICATIONS
Recommended for: dewatering
Other uses: water features, non-potable water transfer

ADVANTAGES

Pumps down to 1/8" – When you need to get rid of fluid, especially on a flat surface, this pump is the one for you!

Easy to use – Just place in water and plug it in. Water enters from the bottom so this pump works both fully or partially submersed.

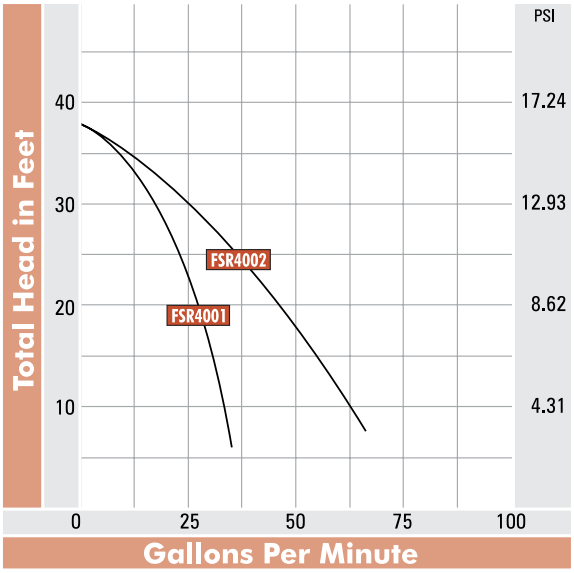
Wear resistant materials – Manufactured to withstand even the worst environment, high-quality materials mean this pump will keep on running, day after day, time after time.



Munro FSR Series

Curves

HORSEPOWER RANGE: 1/2



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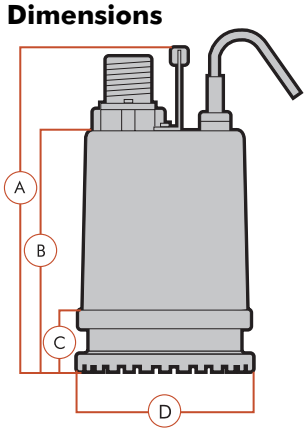


A	B	C	D	Model Number
13″	9.75″	3″	8.25″	FSR4001/4002

Specifications – Pump

HP	Discharge	Solids Pass.	Max Head ft	Max Capacity gpm	Cord Length ft	Weight lbs	Model Number
1/2	1″ 2″ 1″ 2″	0.24″	38	34 65	10	26	FSR4001S11 FSR4002S11 FSR4001S22 FSR4002S22

Specifications – Motor

HP	Volts	Amps	Thermal Protection	Solids Pass.	Liquid Max Temp.	Model Number
1/2	110 110 220 220	5.3 5.3 3 3	Y	0.24″	104° F	FSR4001S11 FSR4002S11 FSR4001S22 FSR4002S22

Munro FSL Series 1/2hp - 1hp

Designed for continuous or intermittent duty, the Munro FSL Series pumps offer an excellent value and Munro's high-quality standards. This light-weight, yet heavy-duty pump has a compact design with unique double casing to reduce heat.

- **Abrasion-resistant mechanical shaft seal** – protects the motor for longer life
- **Polycarbonate impeller** – easy maintenance and quiet operation
- **Aluminum alloy outer case** – lightweight with excellent cooling effect

COMMON APPLICATIONS

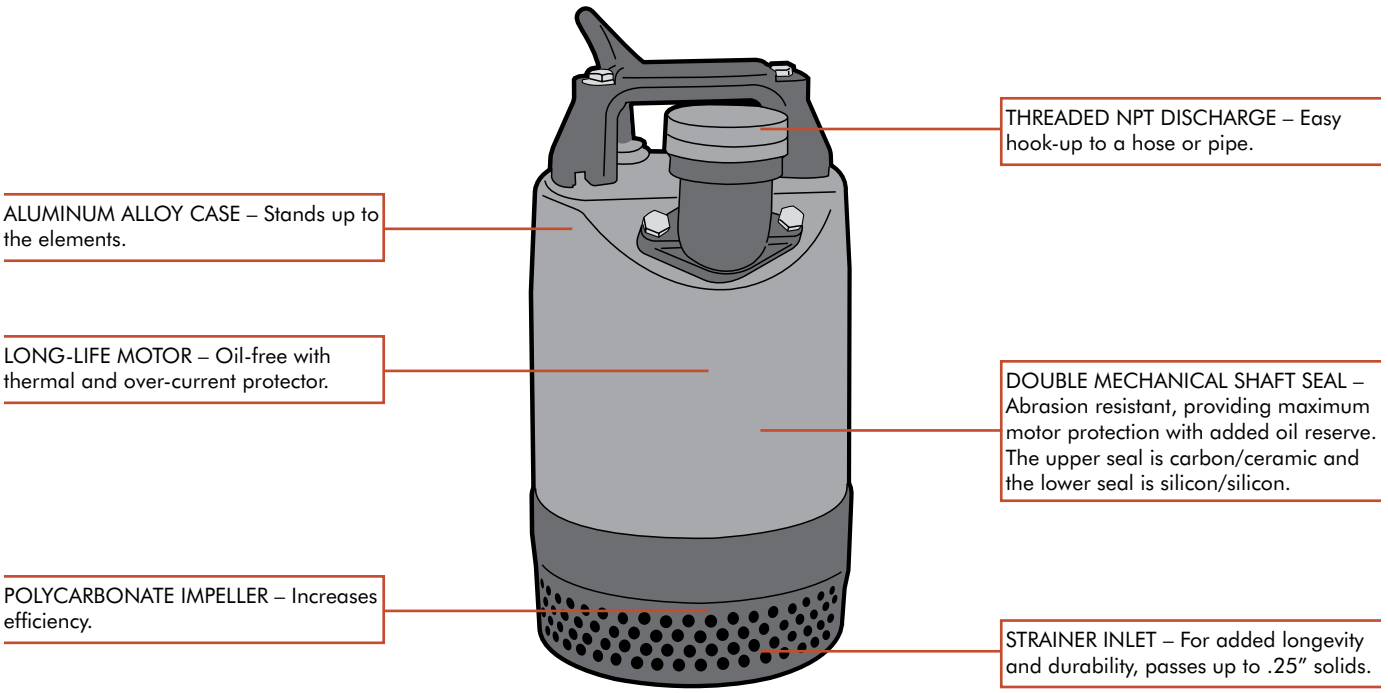
Recommended for: pondless and waterfall style water features
Other uses: construction dewatering, non-potable utility

ADVANTAGES

Great performance at a great value – This lightweight pump offers heavy-duty performance and delivers more gpm than most other pumps in its class.

Continuous duty design – These pumps are made to run! Our design takes the flow path across the motor housing to whisk away the heat generated by the motor. A cool motor means a longer life.

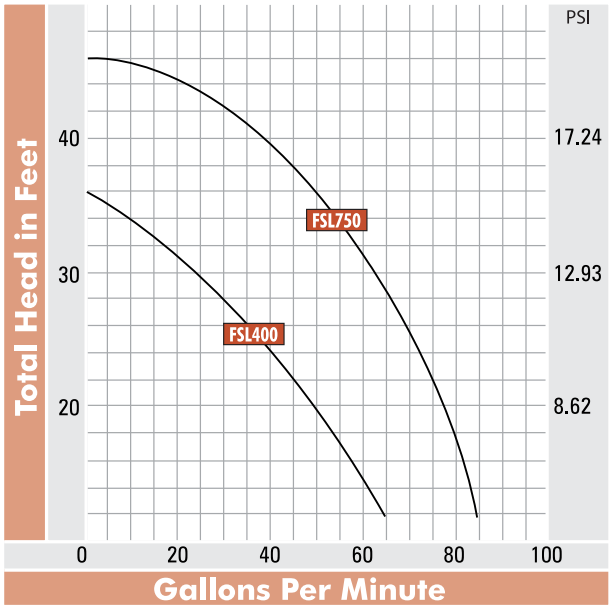
Low cost to own – Our pumps use lower amps than our competitors, which saves power and money.



Munro FSL Series

Curves

HORSEPOWER RANGE: 1/2 - 1



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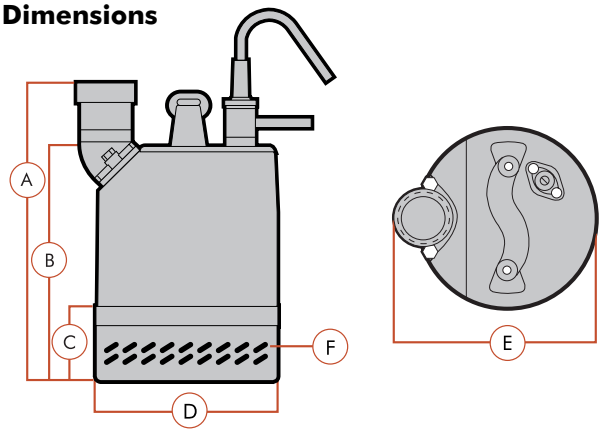


A	B	C	D	E	F	Model Number
11.875″ 13.125″	9.25″ 10.75″	2.75″ 3.5″	7.25″ 7.25″	8″ 8″	.25″ .25″	FSL400S11 FSL750S11

Specifications – Pump

HP	Discharge	Max Liquid Temp.	Solids Pass. in	Max Head ft	Max Capacity gpm	Weight lbs	Model Number
1/2 1	2″	100° F	0.25 0.25	36 49	63 85	16.5 27.5	FSL400S11 FSL750S11

Specifications – Motor

HP	Volts	Amps	Cord Length ft	Thermal Protection	Max Liquid Temp.	Model Number
1/2 1	110	5.3 10	10	Y	104° F	FSL400S11 FSL750S11

Munro Residential Dewatering Series 1/7hp - 1/3hp

Designed for continuous or intermittent duty, the Munro Residential Dewatering Series pumps offer an excellent value and Munro's high-quality standards. This space-saving, yet heavy-duty pump is low-water friendly and long lasting.

- **Abrasion-resistant mechanical shaft seal** – protects the motor for longer life
- **Self-protecting motor** – at high heat, automatic shutdown when there is no more fluid to pump
- **AAS plastic outer case** – durable and non-corrosive

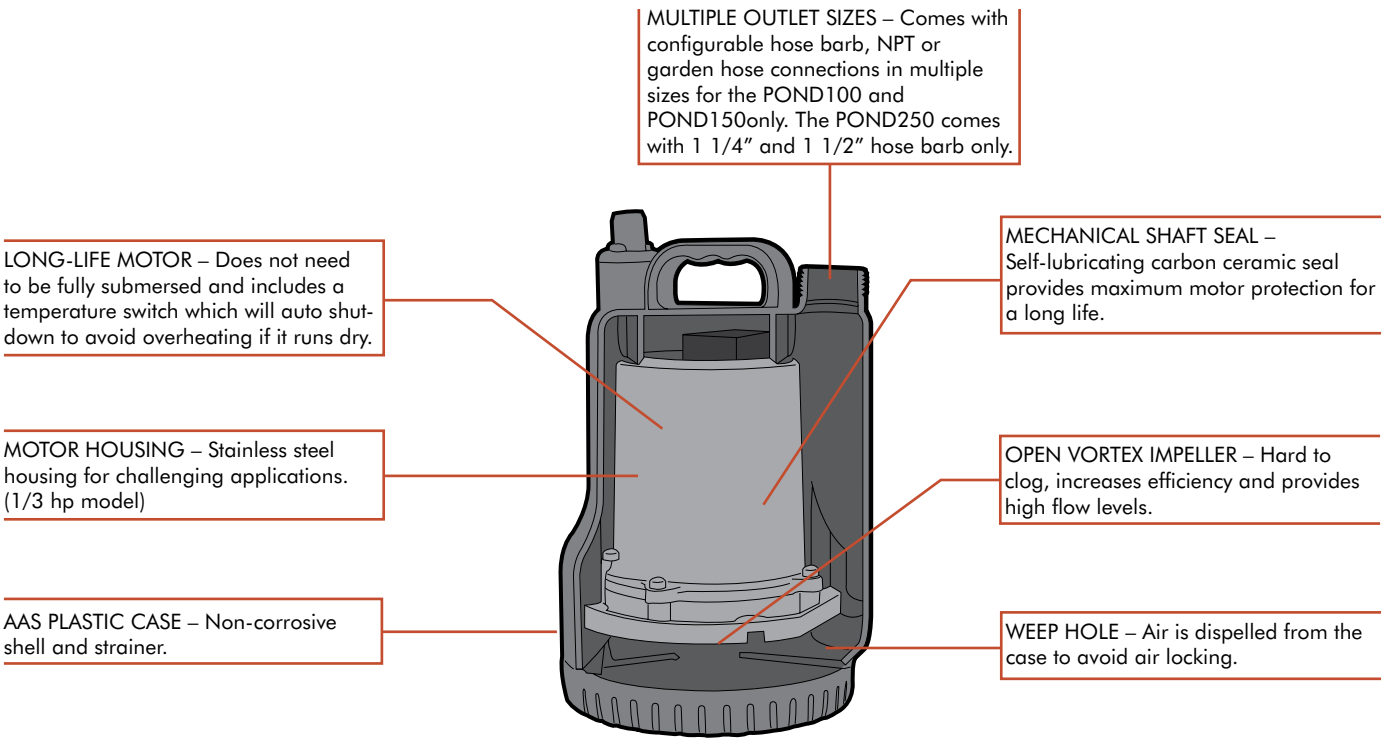
COMMON APPLICATIONS
Recommended for: dewatering, utility, sump, water features
Other uses: hot tub drainage, pools, cooling water for machinery

ADVANTAGES

Low failure rate – This pump has a failure rate well under 1% because the same build principles of superior design are used in Munro's larger pumps are used in the Residential Dewatering pump. A mechanical shaft seal protects this super efficient motor.

True continuous duty design – These pumps are made to run! Our design takes the flow path across the motor housing to whisk away the heat generated by the motor. A cool motor means a longer life.

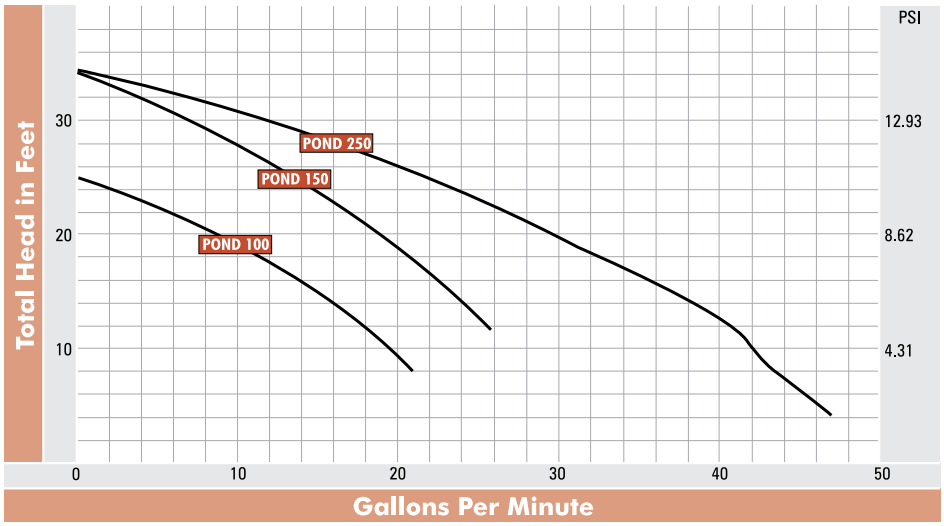
Low cost to own – Our pumps use lower amps and provide higher flows than our competitors, which saves power and money.



Munro Residential Dewatering Series 1/7hp - 1/3hp

Curves

HORSEPOWER RANGE: 1/7 - 1/3



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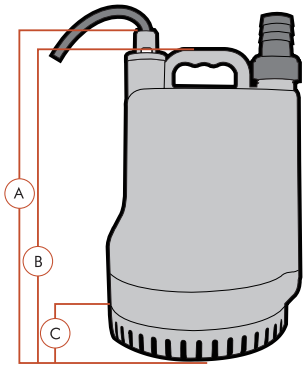
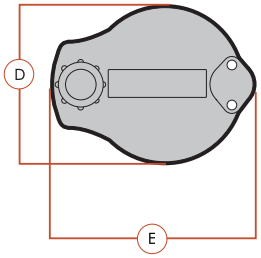




Did You Know?
Float controls can be added to signal pumps!
See page 94.

A	B	C	D	E	Model Number
10″	9.5″	2″	6″	6.5″	POND100/150
10.5″	10″	2″	6″	6.5″	POND250

Specifications – Pump

HP	Discharge Options in	Max Head ft	Max Capacity gpm	Max Capacity gph	Weight lbs	Solid Passage in	Model Number
1/7	5/8, 3/4, 1″ Hose, 5/8″ GHT, 1″ NPT	25	21	1,260	8	.157	POND100
1/5		34	28	1,680	9	.157	POND150
1/3	1.25″, 1.5″ Hose	34	47	2,820	9	.25	POND250

Specifications – Motor

HP	Volts	Phase	Amps	Thermal Protection	Cord Length ft	Liquid Max Temp.	Model Number
1/7	110	1	2	Y	10	104° F	POND100
1/5	110		3				POND150
1/3	110		4.2				POND250

Submersible Sump Pumps

Sump pumps are made for removing groundwater and flood water from around a house or other building. They are most widely used in low lying areas and regions that get heavy rain.

The most important consideration for sump pumps is that they are durable and reliable. When one of these pumps goes out of service, it can be very inconvenient and the resulting flooding can cause thousands of dollars in property damage.

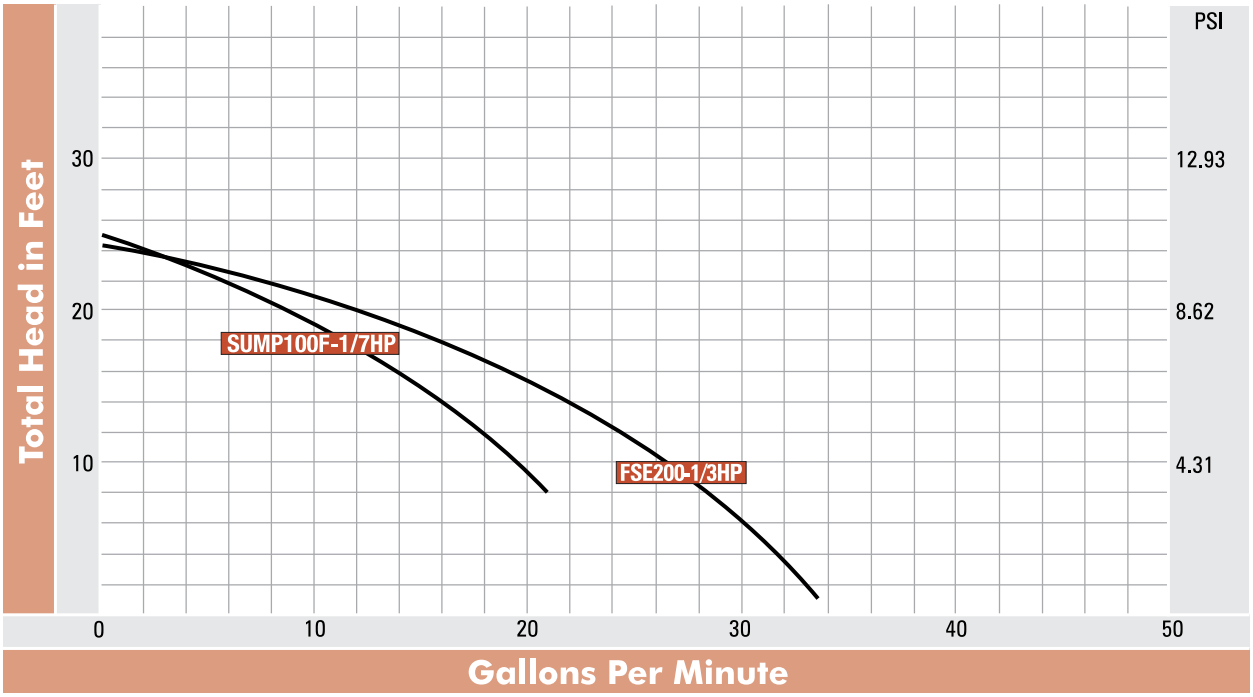
A few considerations when you are buying a sump pump

1. What will the pump be doing?
These versatile pumps can perform lots of different roles, but some are a better fit than others. Will you be emptying a sump after an occasional rain storm? Will the pump be cycling frequently, keeping seeping groundwater out of the house?

2. Pedestal or submersible?
Submersibles are much quieter and more efficient, we always recommend a submersible over a pedestal pump.

3. What size do you need?
Whether retrofitting an existing system or putting in a brand new system, it is important to note the measurements of your existing or new components – the diameter of the discharge pipe and the average amount of water that the pump will need to move.

4. What materials are best for the job?
Because durability is so important in these types of pumps, it's worth making the investment in a pump made out of the highest quality materials possible. We offer a range of pumps and all of our pumps will stand up longer and stronger than our competitors.



Did You Know?
Sump pumps should be checked for proper operation a couple of times per year – pour some water into the sump pit until the submersible pump cycles. This usually only takes a couple of minutes. Don't wait for a failure during a rainstorm to find out that the sump pump doesn't work!

Munro Sump Series 1/7hp

Designed for continuous or intermittent duty, the Munro Sump pump offers an excellent value and Munro's high-quality standards. This space-saving, yet heavy-duty pump is low-water friendly and long lasting.

- **Abrasion-resistant mechanical shaft seal** – protects the motor for longer life
- **Self-protecting motor** – at high heat, automatic shutdown when there is no more fluid to pump
- **AAS plastic outer case** – durable and non-corrosive

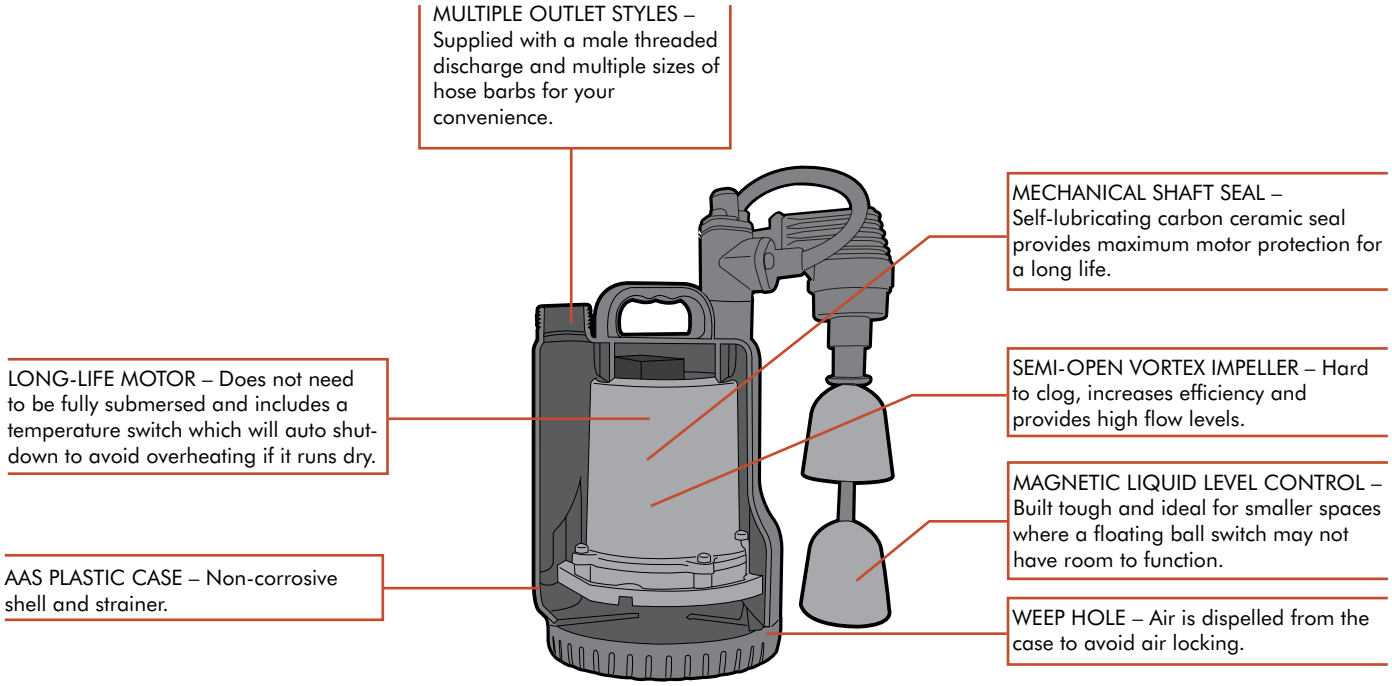
COMMON APPLICATIONS
Recommended for: sump, water features, dewatering, utility
Other uses: hot tub drainage, pools, cooling water for machinery

ADVANTAGES

Low failure rate – This pump has a failure rate well under 1% because the same build principles of superior design are used in Munro's larger pumps are used in the Sump pump. A mechanical shaft seal protects this super efficient motor.

True continuous duty design – These pumps are made to run! Our design takes the flow path across the motor housing to whisk away the heat generated by the motor. A cool motor means a longer life.

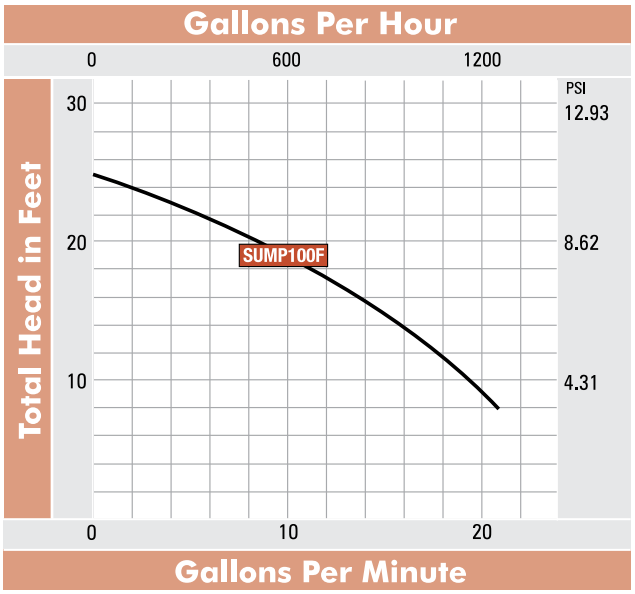
Low cost to own – Our pumps use lower amps and provide higher flows than our competitors, which saves power and money.



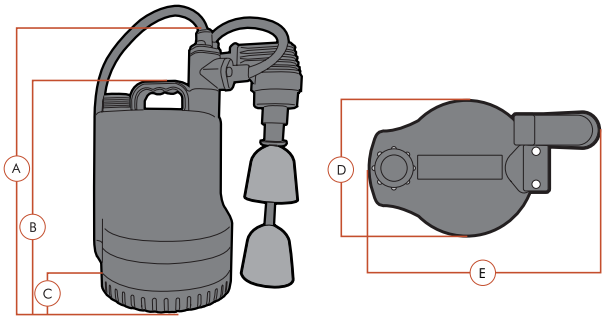
Munro Sump Series 1/7hp

Curves

HORSEPOWER RANGE: 1/7



Dimensions



A	B	C	D	E
10.5"	10"	2"	6"	9"

Did You Know?
The Sump motor housing on our 250 model is stainless steel, making it stand up to coastal environments.

Did You Know?
That this automatic pump will fit inside of a 10" pipe?

Specifications – Pump

HP	Discharge in	Phase	Max Head ft	Max Capacity gpm	Max Capacity gph	Weight lbs	Solid Passage in	Model Number
1/7	1" FNPT1	1	25'	21	1.260	8	.157"	SUMP100F

Specifications – Motor

HP	Volts	Phase	Amps	Thermal Protection	Cord Length ft	Liquid Max Temp.	Model Number
1/7	110	1	2	Y	10'	104° F	SUMP100F

Specifications – Float

Microswitch	Service	On/Off Switching Differentials in	Operating temp	Max Pressure psi	Dimensions in
20(8)A 250 V~	Continuous	Min 2" - Max 6"	32-120° F	7.25	2.36x9.25"

Munro FSE 1/3hp Sump Pump

Designed for year-to-year operation in residential and light commercial sump applications, the Munro FSE is a great value for your basement dewatering or tank projects.

- **Stainless steel motor housing and shaft** – long lasting and low maintenance
- **Oil-free motor** – environmentally friendly, safe for fish and plants
- **Nylon fiber impeller** – durable and non-corrosive

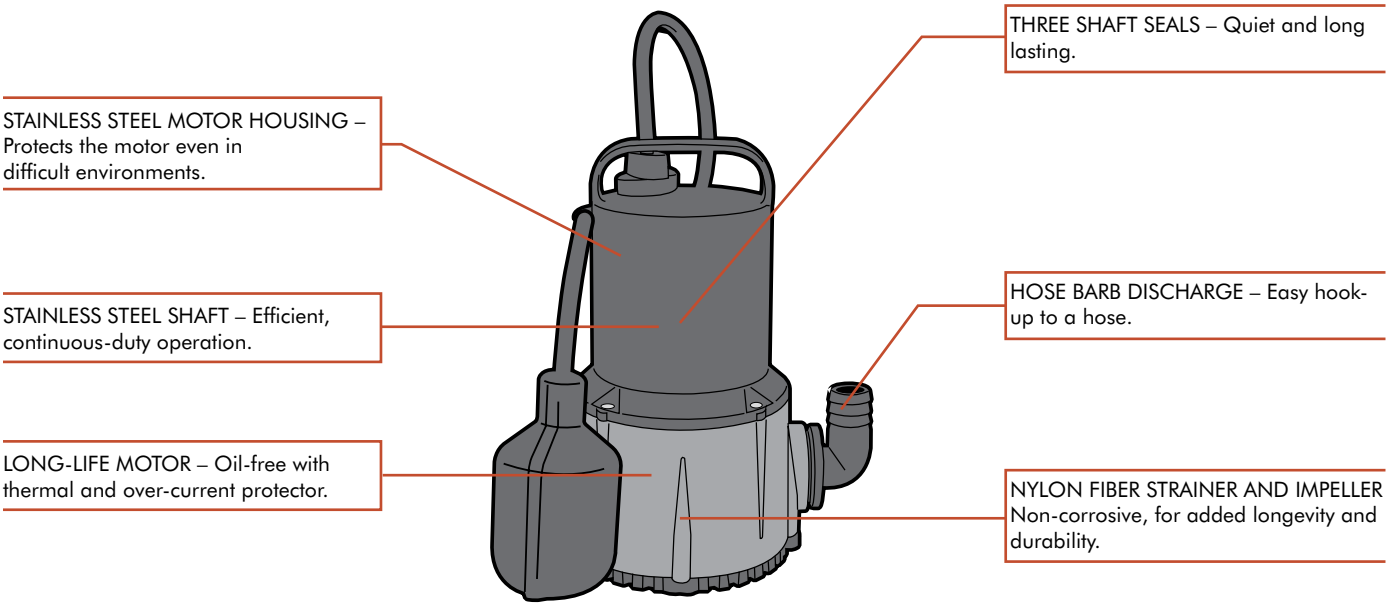
COMMON APPLICATIONS
Recommended for: sump
Other uses: utility, dewatering, effluent

ADVANTAGES

Extended duty design – These pumps are made to run! A stainless steel, heat treated shaft and three shaft seals ensures a long life.

Quiet and long lasting – With a high-quality casing and impeller, this pump is a quiet workhorse.

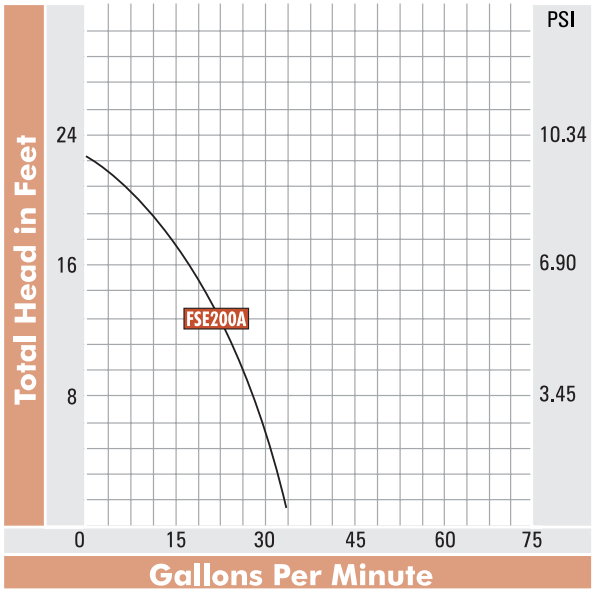
Great performance at a great value – With our heavy-duty construction and versatile design, you'll be pleasantly surprised when you compare this pump to its competition!



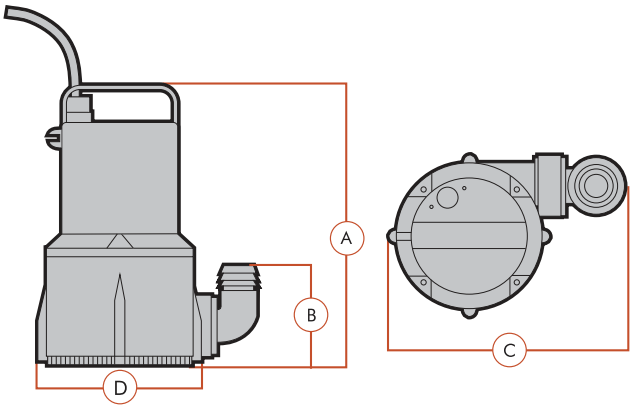
Munro FSE 1/3hp Sump Pump

Curves

HORSEPOWER RANGE: 1/3



Dimensions



A	B	C	D	Model Number
10.125"	3.5"	7.5"	5.75"	FSE200S11

Specifications – Pump

HP	Discharge	Max Liquid Temp.	Solids Pass. in	Max Head ft	Max Capacity gpm	Weight lbs	Model Number
1/3	1 1/4"	104° F	0.2	23	36	8.8	FSE200S11

Specifications – Motor

HP	Volts	Phase	Amps	Cord Length ft	Thermal Protection	Model Number
1/3	110	1	4	10	Y	FSE200S11

Submersible Sewage and Effluent Pumps

Effluent and sewage pumps are designed to pump waste and grey water from a home to a septic system or from a basement bathroom up to your sewage system. They are uniquely designed to pass solids. Munro's effluent pumps pass solids up to .25" and sewage pumps can handle approximately 1.4".

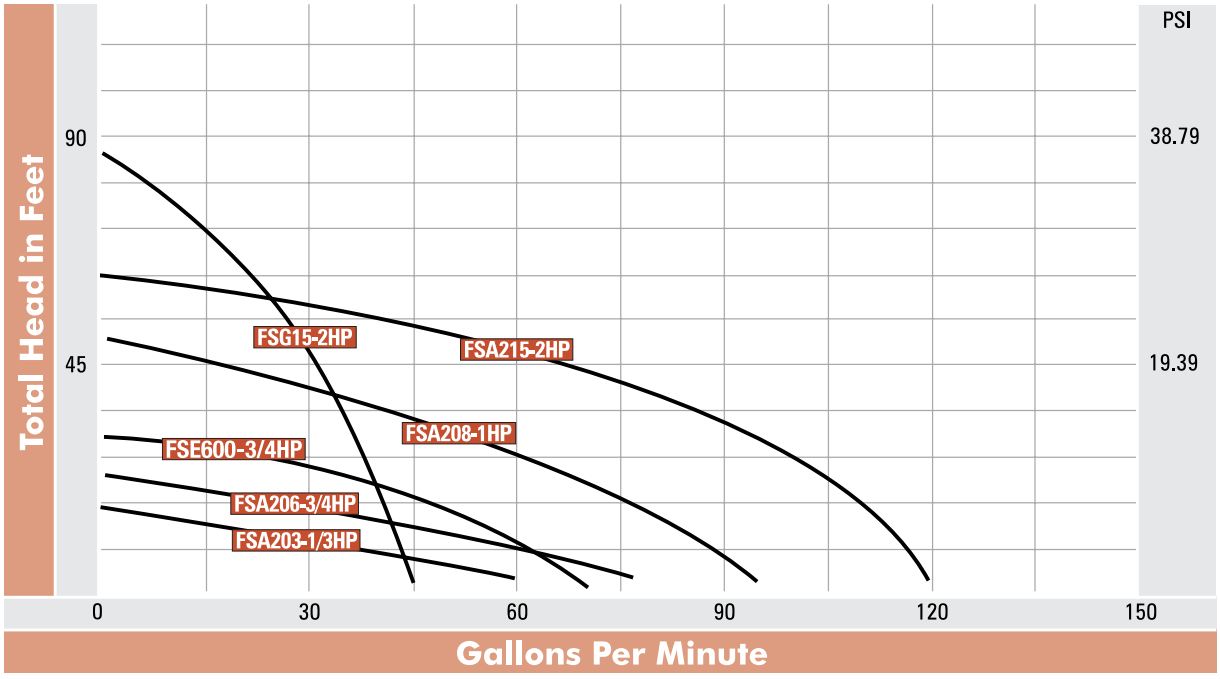
These pumps do dirty work, so it's important to select the most durable and reliable model that your budget will allow. When one of these pumps goes out of service, it can be very inconvenient and very costly.

What makes effluent and sewage pumps different than most other submersibles?

1. They can handle solids
This is key for sewage and grey water applications. A regular sump pump will not be able to handle the dirty fluid.

2. They are made to run intermittently
Some submersibles are made to run continuously. These pumps are designed to run less often, but have more torque and power to eject water with solids or debris, as opposed to clean water.

3. They do the dirty work
Our effluent and sump pumps are made of high quality materials so that they last longer in adverse conditions. If you have ever replaced a pump in a septic system, you know it's a dirty job and one that you hope to never deal with again. Therefore, it's worth it to upgrade to the best built pump possible.



Did You Know?
We recommend a tethered-style float switch because the solids in sewage & grey water can block the operation of a vertical-style switch and coat the contacts of an electronic-type switch – the more simple float switch lasts longer.

Get everything you need!
Float controls can be found on page 94.

Munro FSE 3/4hp Effluent Pump

Designed for year-to-year operation in residential and light commercial applications, the Munro FSE is a great value for your effluent tank projects.

- **Stainless steel motor housing and shaft** – long lasting and low maintenance
- **Oil-free motor** – environmentally friendly
- **Nylon fiber impeller** – durable and non-corrosive

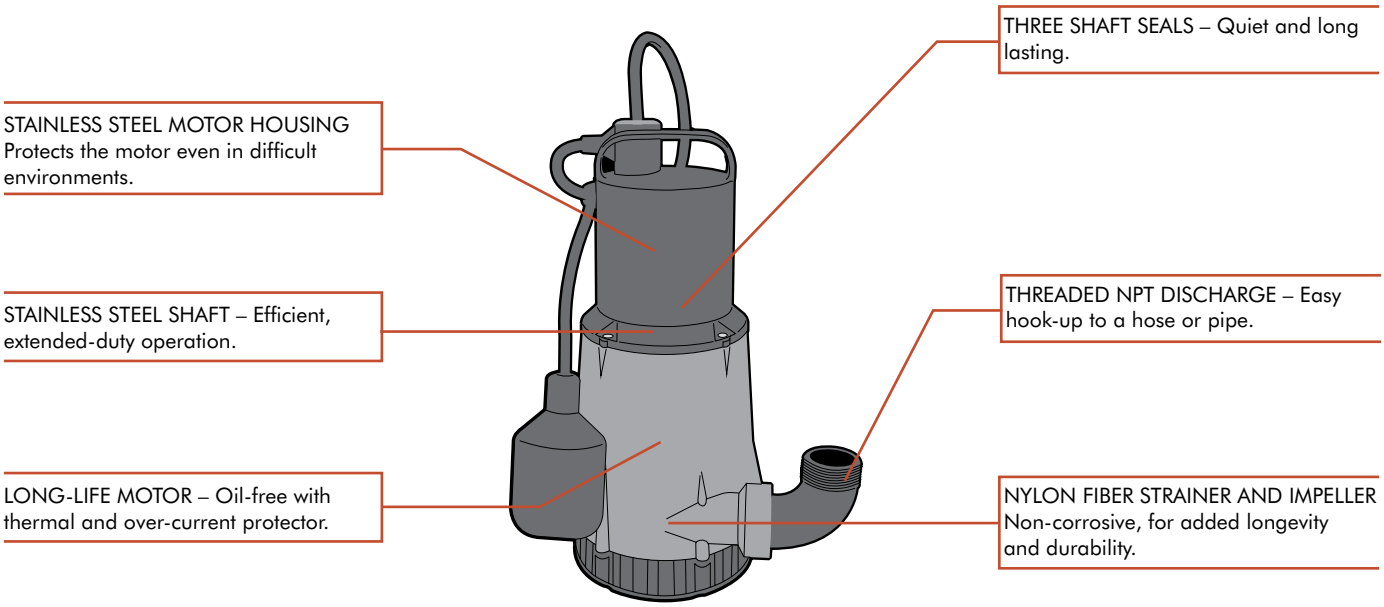
COMMON APPLICATIONS
Recommended for: effluent
Other uses: utility, dewatering, sump

ADVANTAGES

Extended duty design – These pumps are made to run! A stainless steel, heat treated shaft and three shaft seals ensures a long life.

Quiet and long lasting – With a high-quality casing and impeller, this pump is a quiet workhorse.

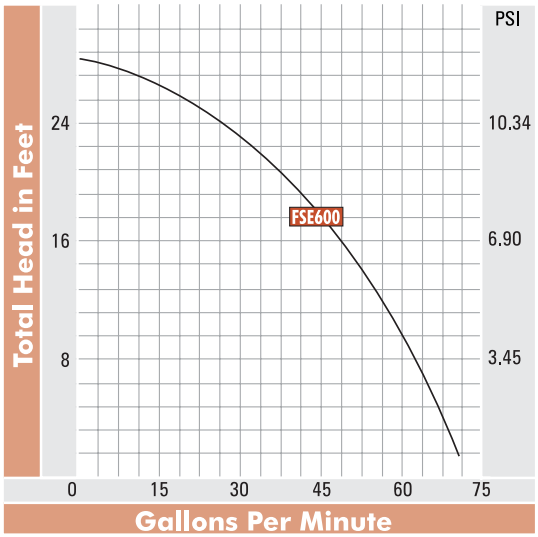
Great performance at a great value – With our heavy duty construction and versatile design, you'll be pleasantly surprised when you compare this pump to its competition!



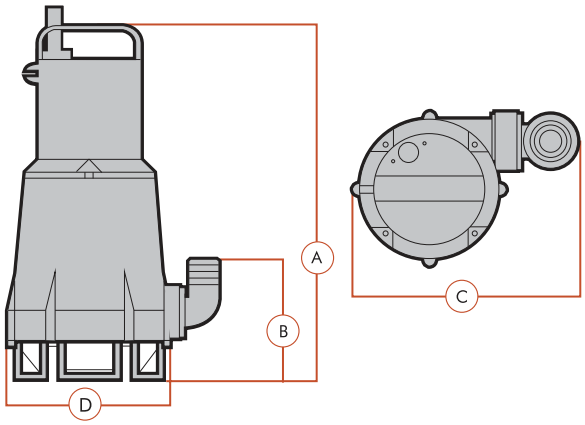
Munro FSE 3/4hp Effluent Pump

Curves

HORSEPOWER RANGE: 3/4



Dimensions



A	B	C	D	Model Number
14.5"	5.5"	9"	6.75"	FSE600S11

Specifications – Pump

HP	Discharge	Max Liquid Temp.	Solids Pass. in	Max Head ft	Max Capacity gpm	Weight lbs	Model Number
3/4	1 1/2"	104° F	0.3	30	69	12.1	FSE600S11

Specifications – Motor

HP	Volts	Phase	Amps	Thermal Protection	Cord Length ft	Liquid Max Temp.	Model Number
3/4	110	1	8	Y	20	104° F	FSE600S11

Munro FSA Sewage Pumps 1/3hp - 3/4hp

The Munro FSA pumps provide years of trouble-free performance in residential and light commercial sewage and effluent applications. The very compact design is built to meet your most demanding requirements.

- **Stainless steel and thermoplastic casing** – lightweight with superior corrosion resistance
- **Ceramic seal** – allows for continuous operation
- **Vortex impeller** – provides superior solids handling

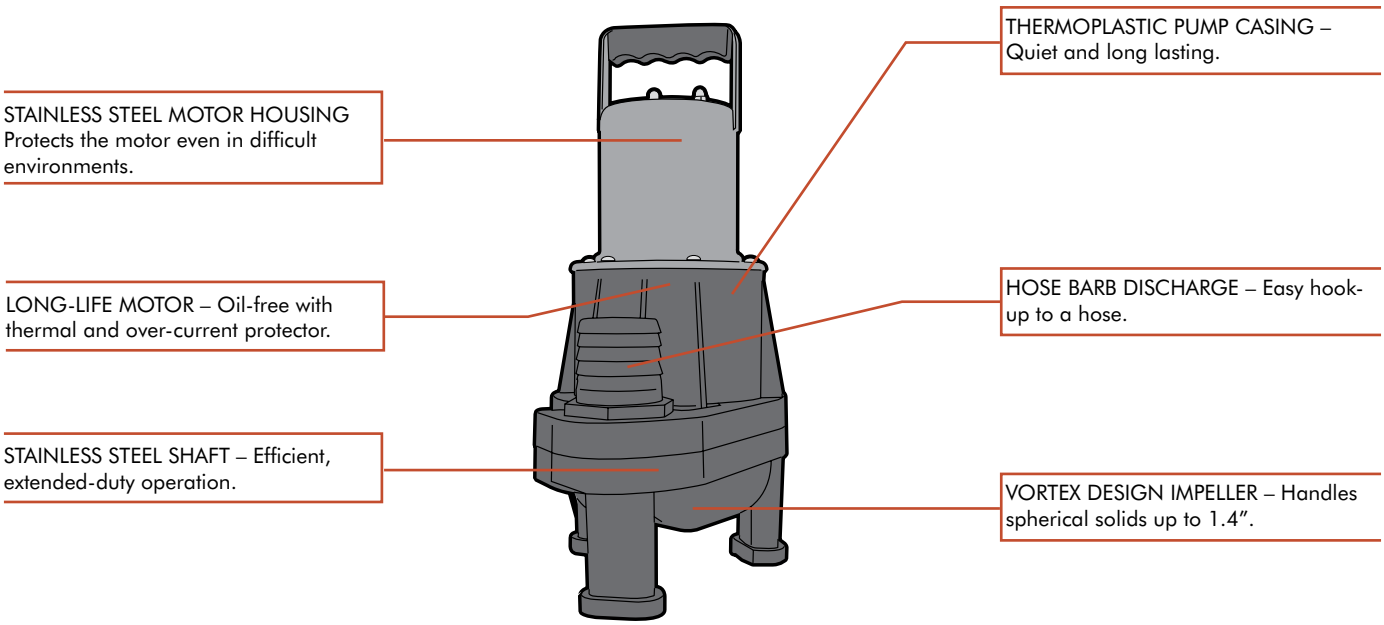
COMMON APPLICATIONS
Recommended for: sewage
Other uses: effluent

ADVANTAGES

Extended duty design – Designed for on-demand intermittent use, this sewage pump will provide years of service, extending the life and limiting service and replacements.

Quiet and long lasting – With a stainless steel shaft and dual ball bearings, this pump offers low corrosion components for long-term use.

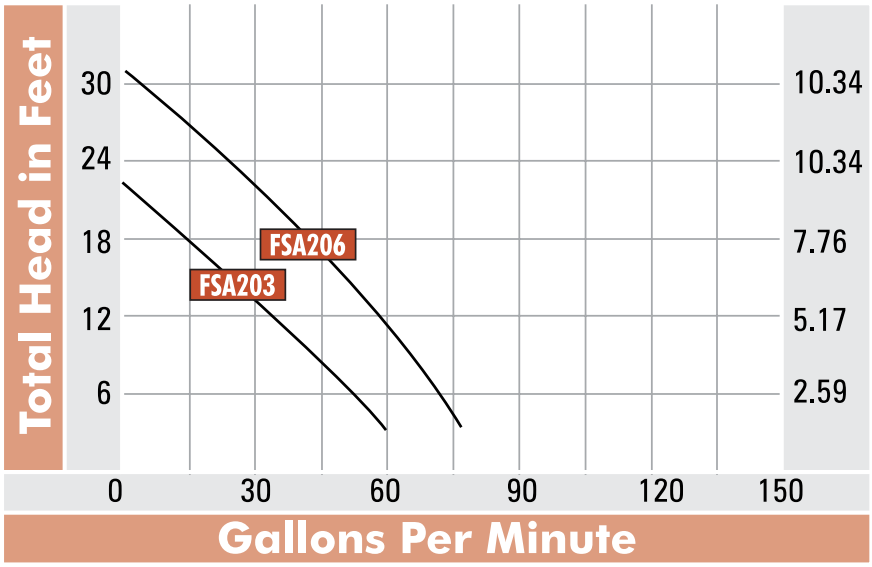
Premium performance – Heavy-duty construction provides trouble-free performance, even in demanding situations.



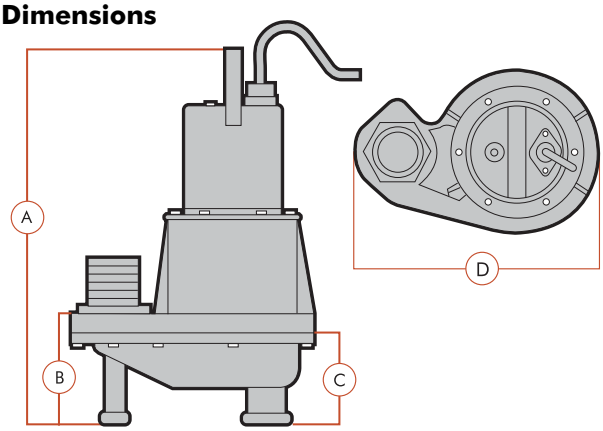
Munro FSA Sewage Pumps 1/3hp - 3/4hp

Curves

HORSEPOWER RANGE: 1/3 - 3/4



Dimensions



A	B	C	D	Model Number
13.375" 14.75"	4.625"	3.75"	9.50"	FSA203S11 FSA206S11

Specifications – Pump

HP	Discharge in	Max Liquid Temp.	Solids Pass. in	Max Head ft	Max Capacity gpm	Weight lbs	Model Number
1/3 3/4	2 2	104° F	1.4 1.4	23 31	58 74	9.2 13.2	FSA203S11 FSA206S11

Specifications – Motor

HP	Volts	Phase	Amps	Thermal Protection	Cord Length ft	Liquid Max Temp.	Model Number
1/3 3/4	110	1	4 8	Y	10 20	104° F	FSA203S11 FSA206S11

Munro FSA Industrial Survivor Sewage Pumps 1hp - 2hp

The Munro Industrial Survivor pumps provide superior sustainability and performance, even in the most difficult environments and demanding requirements. While no pump is ever "fit and forget", these extra heavy-duty pumps have proven their durability year-after-year and have earned customer accolades for long-term intermittent use.

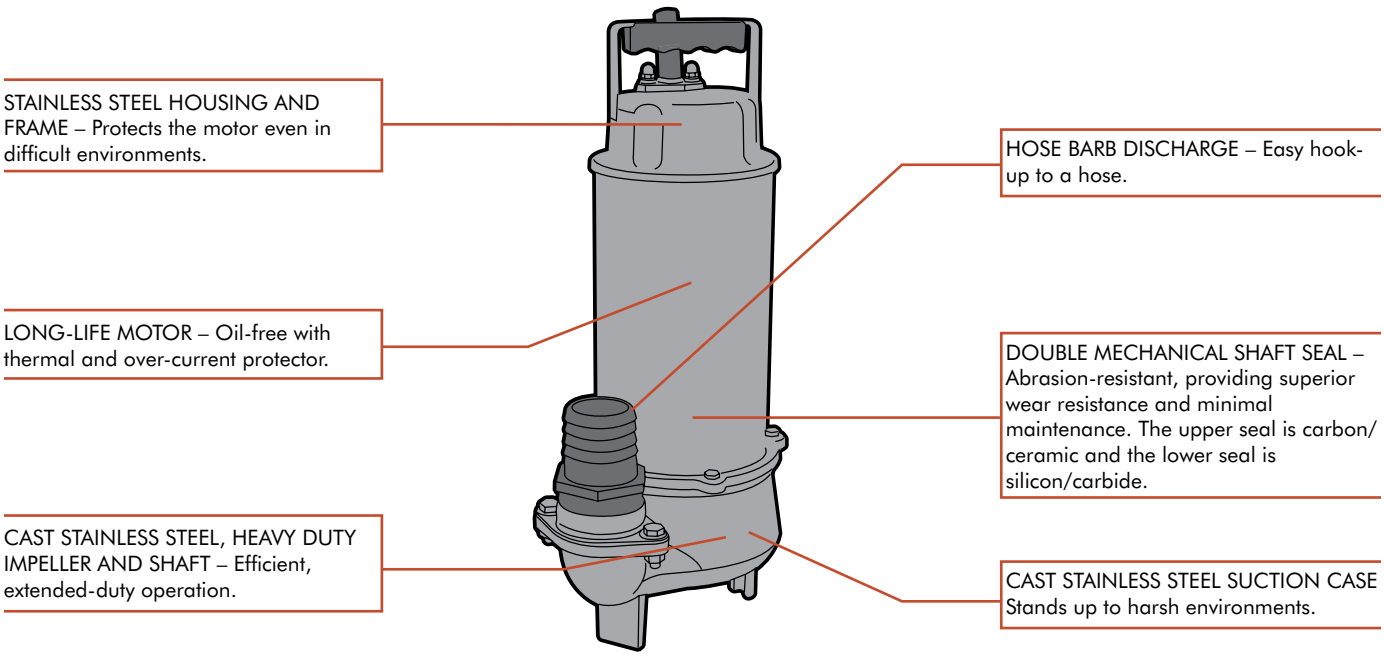
- **All stainless steel** – to stand up to the worst conditions
- **Double mechanical seal** – allows for extended-duty operation
- **Oil-free motor** – thermal and over-current protection

COMMON APPLICATIONS
Recommended for: commercial
Other uses: residential sewage

ADVANTAGES

All stainless steel – This hearty pump boasts a stainless steel cover and frame as well as cast stainless steel impeller, suction case and shaft, to stand up to high temperatures and harsh external conditions. This pump just screams quality.

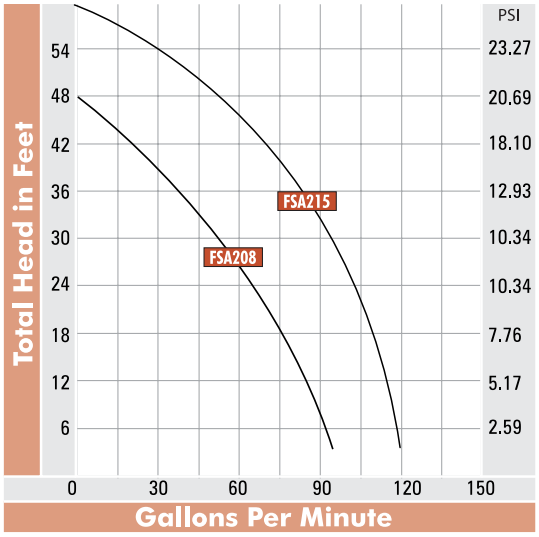
Premium performance – Heavy-duty construction provides trouble-free performance, even in the most demanding situations.



Munro FSA Industrial Survivor Sewage Pumps 1hp - 2hp

Curves

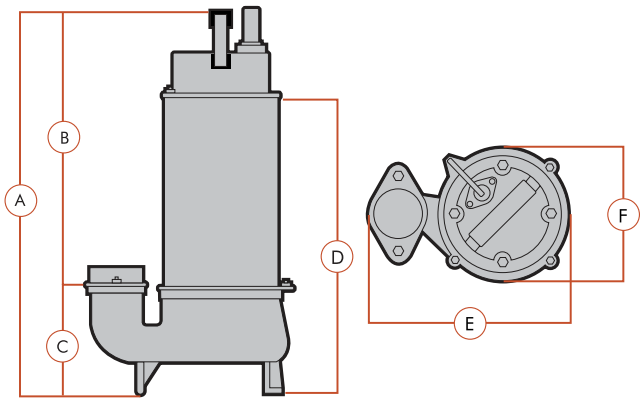
HORSEPOWER RANGE: 1 – 2



Did You Know?
With cast stainless steel bracket, case and impeller, this pump is one of the most heavy-duty pumps on the market!

SUBMERSIBLE

Dimensions



A	B	C	D	E	F	Model Number
16.125″ 17.25″	11.25″ 12.375″	4.75″	12.125″ 13.25″	9.125″	6.125″	FSA208S11/S22 FSA215

Specifications – Pump

HP	Discharge in	Max Liquid Temp.	Solids Pass. in	Max Head ft	Max Capacity gpm	Weight lbs	Model Number
1	2	100° F	1.4	49	95	26.4	FSA208S11
1				49	95	26.4	FSA208S22
2				59	122	33.0	FSA215S22

Specifications – Motor

HP	Volts	Phase	Amps	Thermal Protection	Weight lbs	Cord Length ft	Liquid Max Temp.	Model Number
1	110	1	10	Y	26.4	19	104° F	FSA208S11
1	220		5		26.4			FSA208S22
2	220	1	10		33.0			FSA215S22

Munro FSG Sewage Grinder Pumps 2hp

The Munro FSG Grinder Pump's non-clogging design, small discharge, and high pressure make it ideal for individual residential and light industrial sewer applications.

- **Rigid cast iron construction** – superior for heat dissipation
- **High chrome steel grinding device** – unique cutter designed with chopper and chopper ring will stand up to difficult environments
- **Stainless steel shaft** – heat-treated to last longer

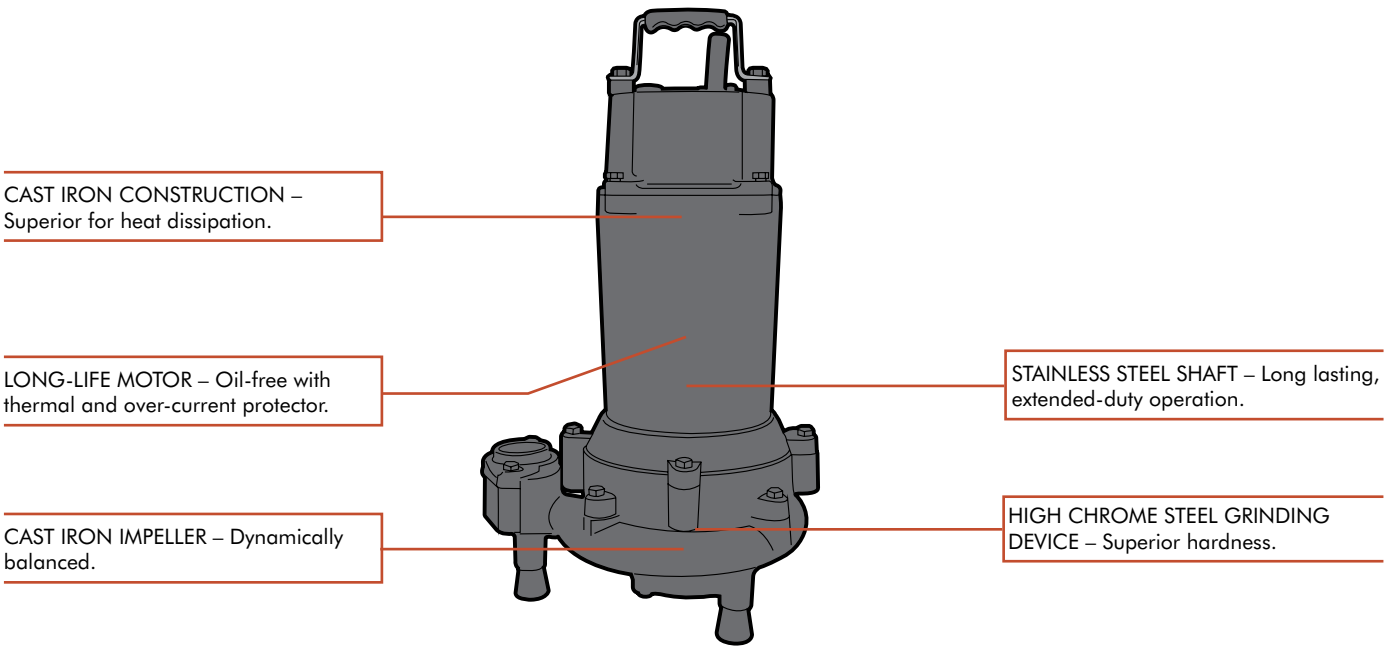
COMMON APPLICATIONS
Recommended for: sewage
Other uses: effluent

ADVANTAGES

Extended duty service – Whether running this pump for hours or minutes at a time, the double mechanical seals and oil-free motor ensure a long life.

Non-clogging design – The high chrome steel chopper and chopper ring will keep solids macerated and moving.

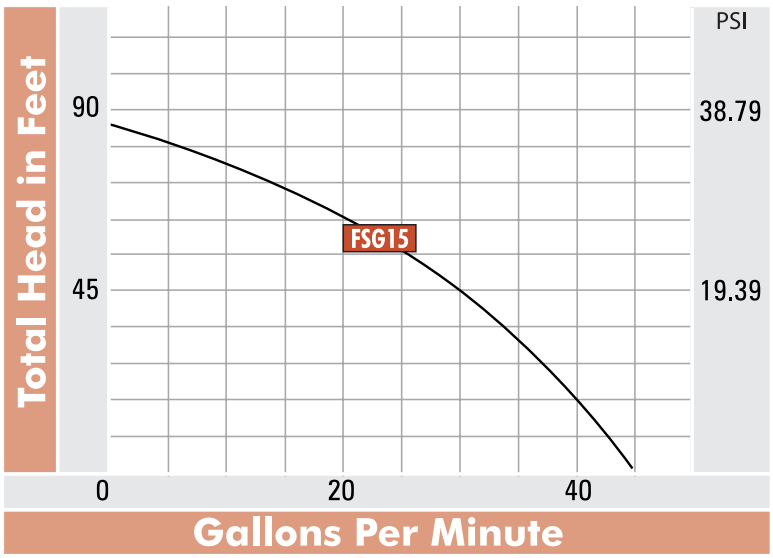
Premium performance – Heavy-duty construction provides trouble-free performance, even in demanding situations.



Munro FSG Sewage Grinder Pumps 2hp

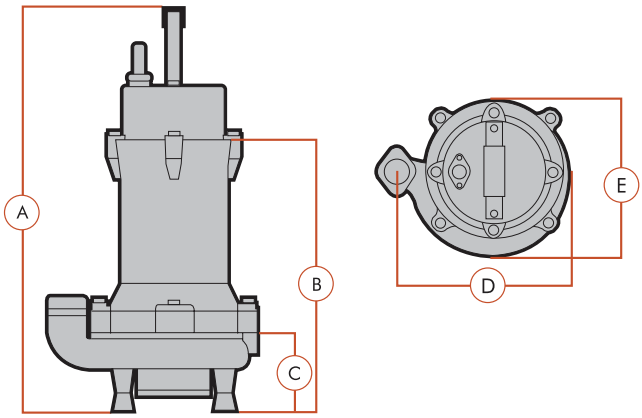
Curves

HORSEPOWER RANGE: 2



Did You Know?
With the capacitor mounted in the motor, this unit will replace most grinder pumps easily and does not need a starting capacitor in a remote panel.

Dimensions



A	B	C	D	E	Model Number
15.125"	14.75"	4"	10"	8.75"	FSG15S22

Specifications – Pump

HP	Discharge in	Max Liquid Temp.	Solids Pass. in	Max Head ft	Max Capacity gpm	Weight lbs	Model Number
2	1 1/4	100° F	.1	98	42	77	FSG15S22

Specifications – Motor

HP	Volts	Phase	Amps	Starting Capacitor	Thermal Protection	Cord Length ft	Liquid Max Temp.	Model Number
2	230	1	20	Y	Y	31	104° F	FSG15S22

Submersible Water Harvesting Pumps

Multistage submersible pumps are designed to bring water up to the surface for use in a variety of applications, most often for domestic and irrigation use. Because sub-surface water is an important water source for many people, choosing the right pump is very important.

Shallow well pumps vs deep well pumps

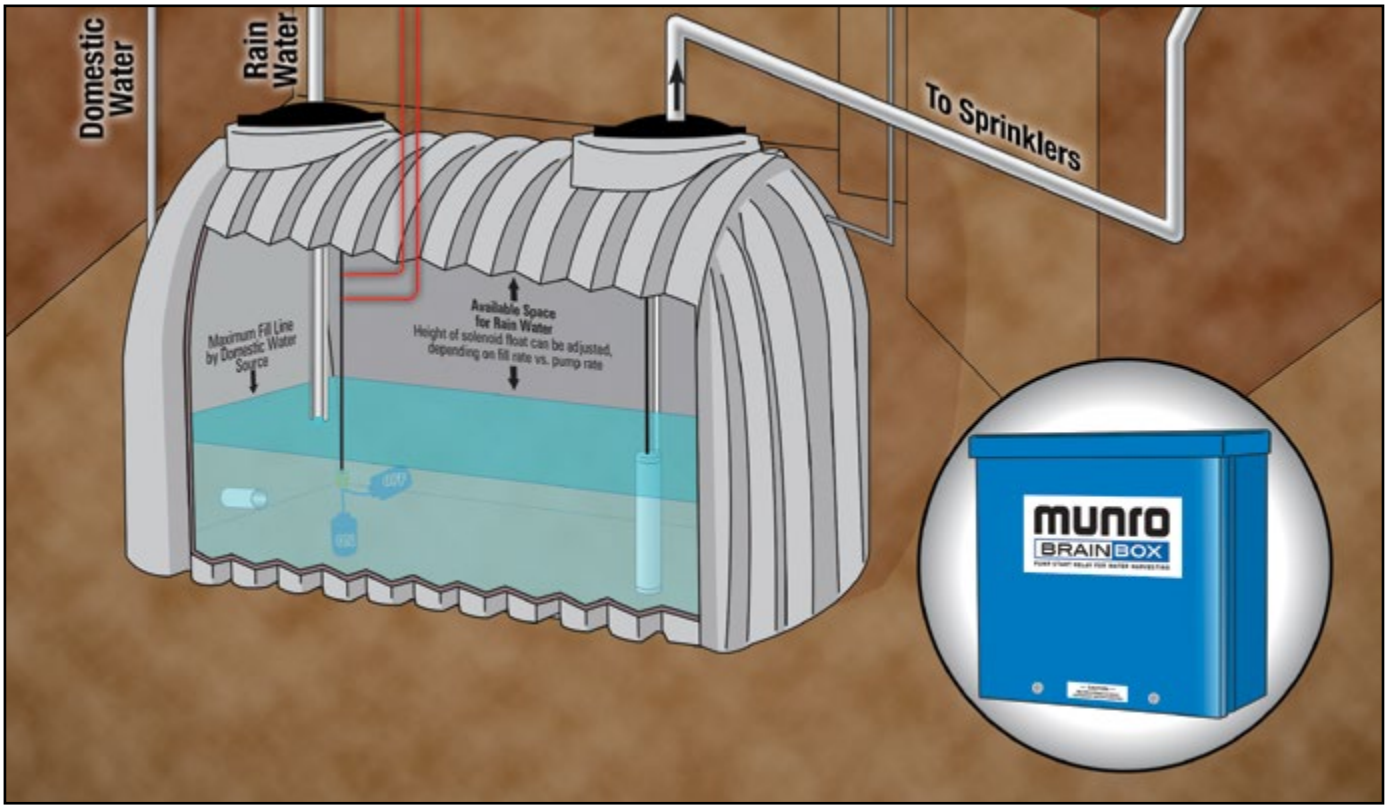
Shallow well pumps are found in applications at sea level (25' or less). This style of well pump is not submersible and is placed outside the well in a well house.

A key feature you should look for is overload protection, which prevents motor burnout. The best shallow well pumps are accompanied by a diaphragm storage tank or a booster to increase PSI, in order to provide constant water pressure to a home. If size is a restriction due to the well house, choose a pump with a booster as this will take up less space.

Deep well pumps can be used in wells as deep as 1000' below ground. Unlike shallow well pumps, deep well pumps are submerged inside the well to allow the impellers to push the water up.

Since these pumps can be several hundred feet below ground, a 3-wire model makes maintenance easier. In a 3-wire model the starter controls are above ground, wired to the pump. A 2-wire model is easier to install, but, should the pump fail, you'll need to bring it up to ground level to fix or replace the electrical controls.

Water Harvesting Application



Munro 5" Multistage Bottom Suction Submersible Pumps

Water Harvesting Sprinkler Pump
Our easy-to-install, high-head multistage submersible pump is designed for turf irrigation service, high head dewatering applications, and high pressure, low gallonage water feature projects that require high head and low flow (i.e., fountains).

- **Stainless steel components outside and inside** – non-corrosive, built to industrial specifications
- **Self-cooling, quiet operation** – the pumped liquid cools the motor for long life
- **Easy installation** – no control box required to start the pump

COMMON APPLICATIONS
- Recommended for: irrigation, shallow wells, rain collection tanks, grey water
- Other uses: dewatering, fountains, pressure boosting domestic water

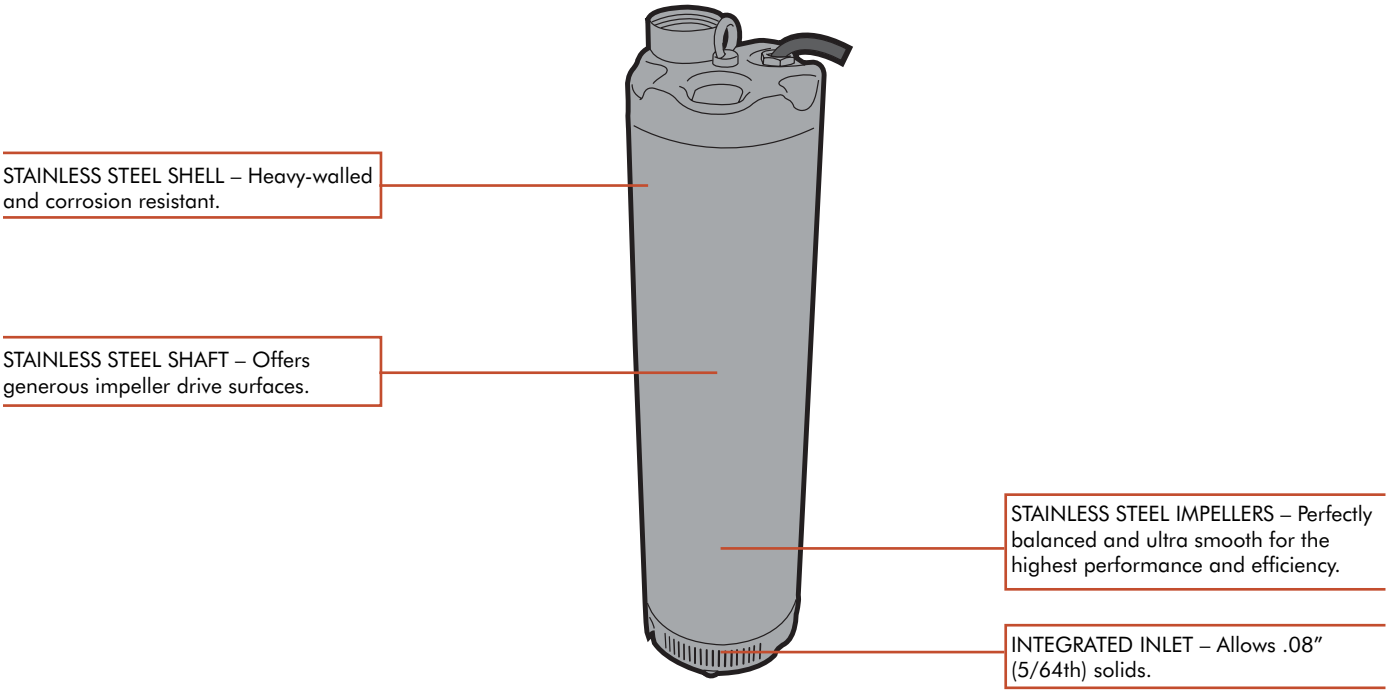
ADVANTAGES

Non-corrosive – All hydraulic parts, including impellers and hydraulic bowl chambers, are made from high-grade stainless steel.

Superior "Draw-Down" Capability – With the lowest draw down in its class, our 4 1/2" capability dwarfs the competition.

Reduced Amp Draw – Offering over 25% less energy consumption reduces operating costs and extends the service life.

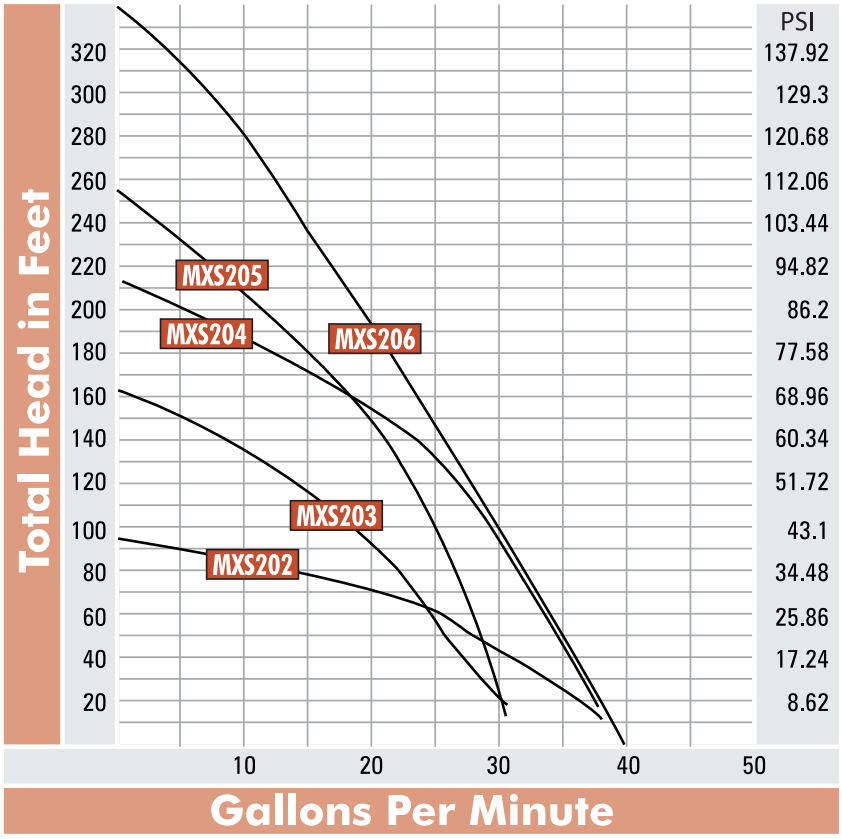
Cooler and Quieter Operation – Using the pumped liquid to cool the motor, the water passing over the motor dampens the noise. No need for expensive "flow-inducer sleeves" required on other pumps.



Munro 5" Multistage Bottom Suction Submersible Pumps

Curves

HORSEPOWER RANGE: 3/4 – 2



Specifications – Pump

HP	Diameter in	Discharge in	Approx. Length in	Weight lbs	Model Number
3/4	5	1.25	15.75	29	MXS202S11
1			17.5	29	MXS203S11
1			17.5	29	MXS203S22
1.2			20	38.5	MXS204S11
1.2			20	38.5	MXS204S22
1.5			21	40	MXS205S22
2			23	46	MXS206S22
1			17.25	30.64	MXS203T22
1.5			20.25	36.38	MXS205T22

Specifications – Motor

HP	Volts	Phase	Amps	Thermal Protection	Cord Length ft	Liquid Max Temp.	Model Number
3/4	110	1	8.5	Y	15 (16/3 Gauge)	104° F	MXS202S11
1	110		10.5				MXS203S11
1	220		5				MXS203S22
1.2	110		13.5				MXS204S11
1.2	220		7				MXS204S22
1.5	220		8				MXS205S22
2	220		9.5				MXS206S22
1	220	3	3.6	N			MXS203T22
1.5	220		5.5				MXS205T22

4" Submersible Well Pumps 1/2 - 20 hp

Constructed of high-quality components, these well pumps are designed to be used vertically. A check valve comes standard on all models. If the well pump is positioned in an open body of water, a flow sleeve must be used (p.70)

- **Durable stainless impellers** – low maintenance and long lasting
- **Self-lubricating bearing** – resists sand and abrasives
- **Universal setup** – good replacement for any other existing well pump

COMMON APPLICATIONS

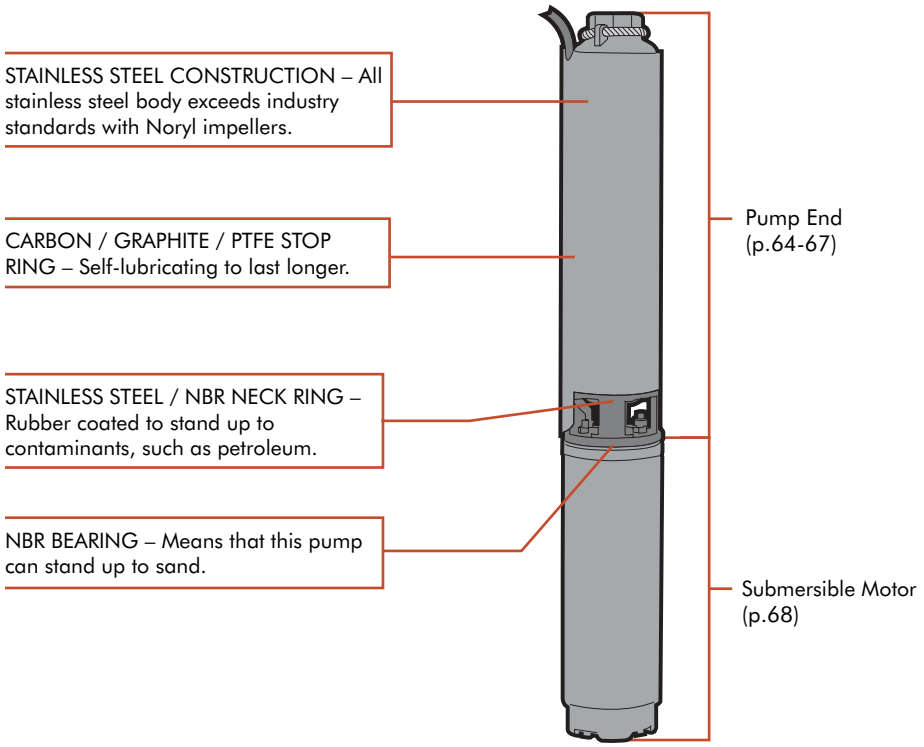
- Recommended for: irrigation, pressure boosting domestic water
- Other uses: potable water supply

ADVANTAGES

High-quality construction – Stainless steel impellers give this pump a longer, multi-functional and trouble-free life.

Flexible and forgiving – Constructed to meet the demands of challenging environments, such as acidic or high-mineral content fluid.

Wide range of sizes and configurations – You'll find just the size and construction you're looking for to meet the requirements for your application. We offer variable speed options and a wide range of sizes and constructions.



Did You Know?

Two-wire and three-phase motors available and on the shelf! (p.68)

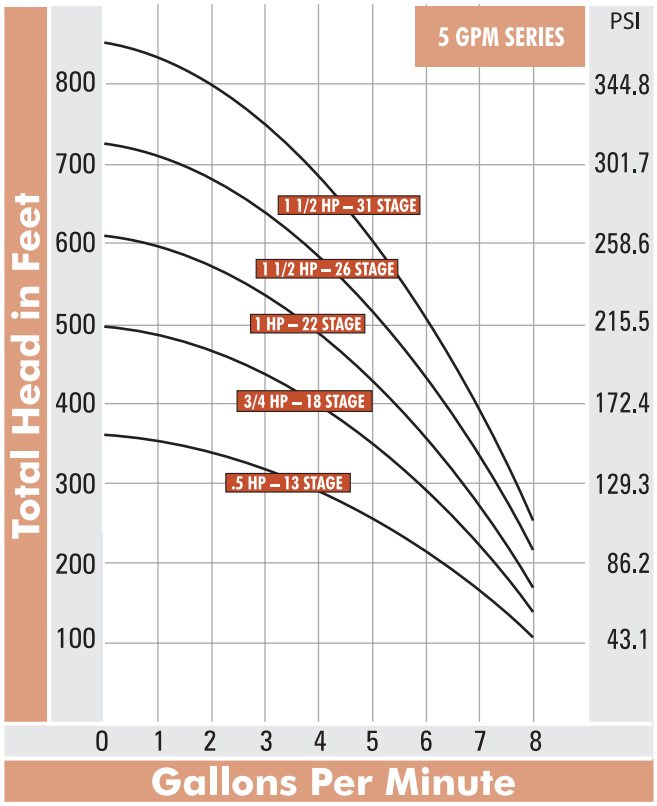
Constant pressure systems available to eliminate that huge pressure tank! (p.68)

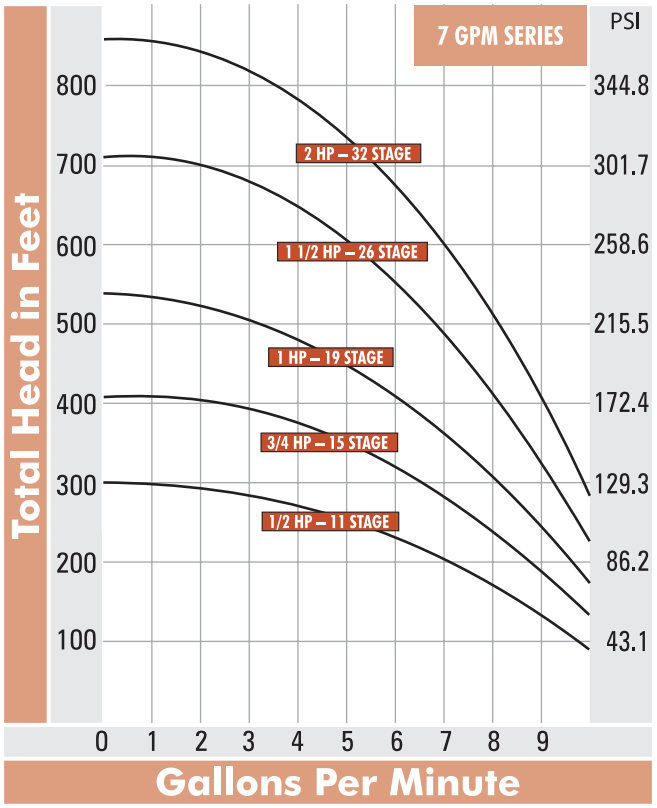
NOTE: Pump ends and Submersible Motors are sold separately.

4" Submersible Well Pumps 5 & 7 GPM Series

Curves

HORSEPOWER RANGE: 1/2 – 2





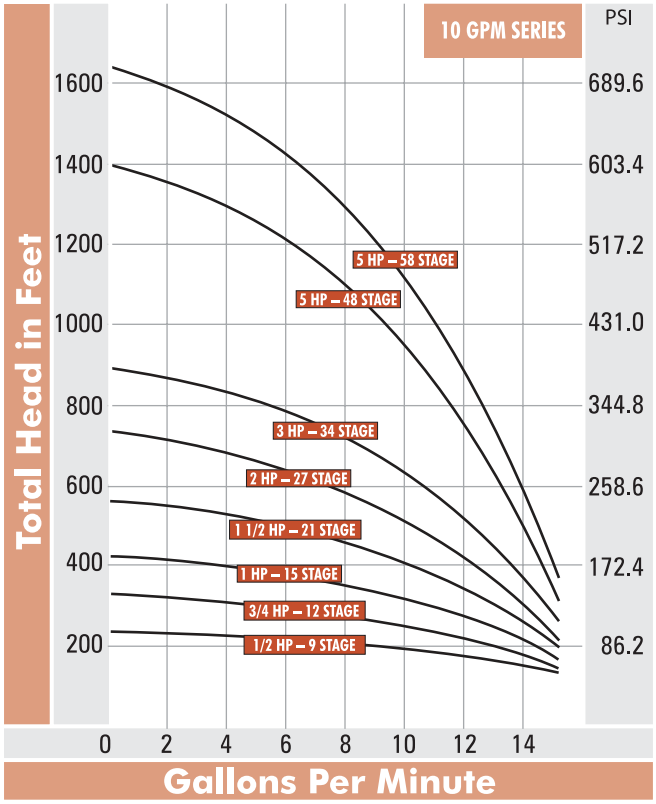
Specifications – Pump End only. Submersible motors (p.68) must be selected and purchased separately.

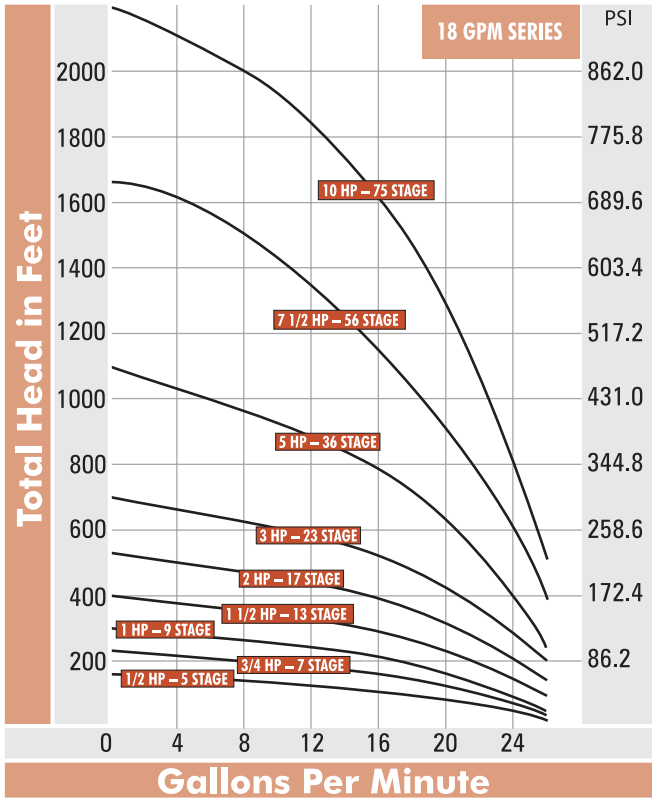
HP	Diameter in	Discharge in	GPM	Approx. Length in	Weight lbs	Liquid Max Temp.	Model Number
1/2	3.9	1 1/4	5	17.3	8	104° F	WI6034863
3/4				21.5	10		WI6034864
1				24.8	12		WI6034865
1 1/2				28.1	13		WI6034866
1 1/2				33.1	20		WI6034867
1/2			7	15.2	10		WI2707563
3/4				18.5	11		WI2707564
1				21.8	12		WI2707565
1 1/2				27.6	16		WI2707566
2				34.5	28		WI2707567

4" Submersible Well Pumps 10 & 18 GPM Series

Curves

HORSEPOWER RANGE: 1/2 – 10





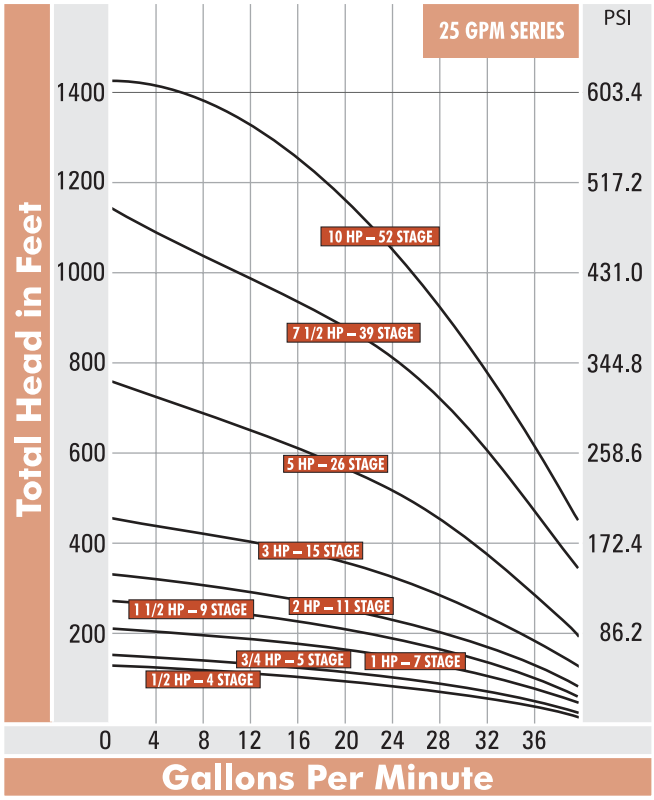
Specifications – Pump End only. Submersible motors (p.68) must be selected and purchased separately.

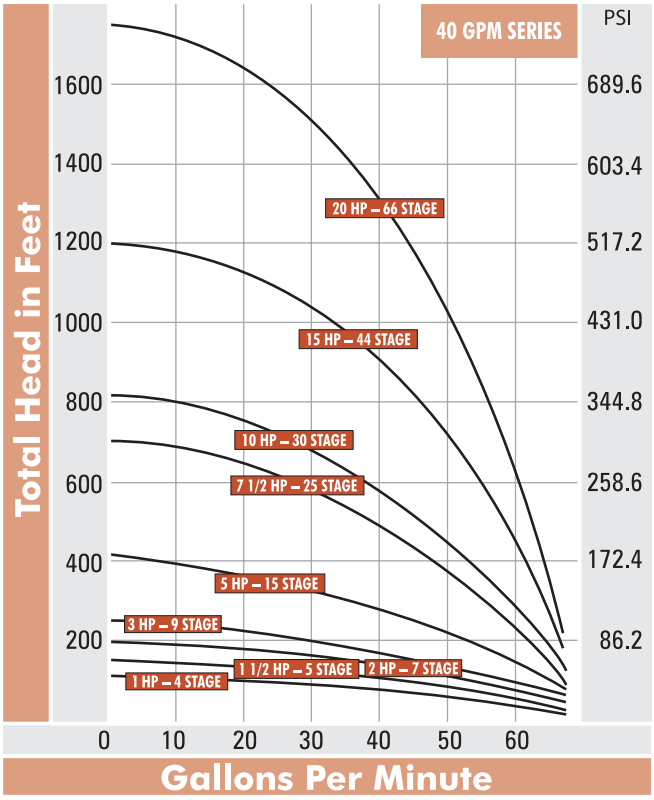
HP	Diameter in	Discharge in	GPM	Approx. Length in	Weight lbs	Liquid Max Temp.	Model Number
1/2	3.9	1 1/4	10	14	7	104° F	WI6034869
3/4				16.5	8		WI6034870
1				19	9		WI6034871
1 1/2				23.9	12		WI6034872
2				28.9	14		WI6034873
3				35.6	22		WI6034874
5				47.7	38		WI6064249
5				64.5	42		WI6064250
1/2			18	10.7	5		WI6034875
3/4				12.4	6		WI6034876
1				14	7		WI6034877
1 1/2				17.3	9		WI6034878
2				20.6	10		WI6034879
3				25.6	13		WI6034880
5				37.2	23		WI6034882
7 1/2				68.8	45		WI6065308
10				84.5	60		WI6064251

4" Submersible Well Pumps 25 & 40 GPM Series

Curves

HORSEPOWER RANGE: 1/2 – 20





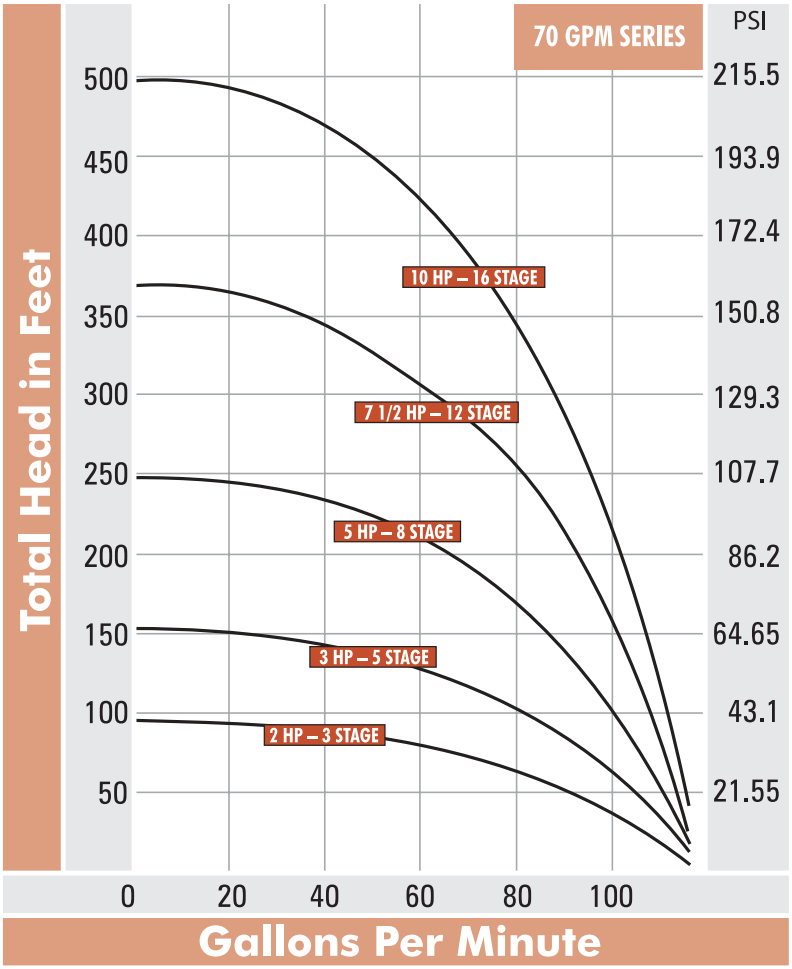
Specifications – Pump End only. Submersible motors (p.68) must be selected and purchased separately.

HP	Diameter in	Discharge in	GPM	Approx. Length in	Weight lbs	Liquid Max Temp.	Model Number
1/2	3.9	1 1/2	25	9.9	5	104° F	WI6034883
3/4				10.7	5		WI6034884
1				12.4	6		WI6034885
1 1/2				14	7		WI6034886
2				15.6	8		WI6034887
3				19	9		WI6034888
5				28.3	14		WI6034890
7 1/2				39.1	25		WI6034891
10				65.5	47		WI6064252
1		2	40	14.6	8		WI6043290
1 1/2				16.2	9		WI6034893
2				19.5	12		WI6034894
3				22.8	14		WI6034895
5				32.8	21		WI6034897
7 1/2				49.3	32		WI6034899
10				57.5	37		WI6034900
15				83	57		WI2707578
20				131.8	73		WI2707579

4" Submersible Well Pumps 70 GPM Series

Curves

HORSEPOWER RANGE: 2 – 10



Specifications – Pump End only. Submersible motors (p.68) must be selected and purchased separately.

HP	Diameter in	Discharge in	GPM	Approx. Length in	Weight lbs	Liquid Max Temp.	Model Number
2	3.9	2	70	14.8	8	104° F	WI6035168
3				19.9	12		WI6035169
5				27.6	16		WI6035170
7 1/2				37.8	21		WI6035171
10				48	27		WI6035172

Submersible Motors

HP	Volts	Amps	Thermal Protection	Service Factor	Length in	Weight lbs	Model Number
2-Wire 4" Water Well Motors							
1/2	115	12		1.60	9.53	18	FR2445049004S
1/2	230	6		1.60	9.53	18	FR2445059004S
3/4	230	8	Y	1.50	10.66	21	FR2445079004S
1	230	10.4		1.40	11.75	24	FR2445089003S
1 1/2	230	13.1		1.30	15.12	32	FR2443099004S
3-Wire Single Phase With Ground Motors							
1/2	115	12		1.60	9.53	18	FR2145049004S
1/2	230	6		1.60	9.53	18	FR2145059004S
3/4	230	8		1.50	10.66	21	FR2145079004S
1	230	10.4	Y	1.40	11.75	24	FR2145089003S
1 1/2	230	11.5		1.30	13.62	29	FR2243009203S
2	230	13.2		1.25	15.12	32	FR2243019204S
3	230	17		1.15	19.06	52	FR2243022604
5	230	27.5		1.15	30.5	69	FR2243038602
3-Wire 4" 3 Phase Motors							
1/2	230	2.9		1.30	9.53	29	FR2345119204S
1/2	460	1.5		1.30	9.53	29	FR2345213116S
2	230	8.1		1.25	13.62	32	FR2343159204S
2	460	4.1	Y	1.25	13.62	32	FR2343259404S
3	230	10.9		1.15	16.06	43	FR2343159204S
3	460	5.5		1.15	16.06	43	FR2343262604
5	230	17.8		1.15	23.2	53	FR2343278602
5	460	8.9		1.15	23.2	53	FR2343278602G

Single Phase Control Boxes

Approx. Weight lbs	Volts	HP	Model Number
3	115	1/2	FW127185
3		1/2	FW127189
3		3/4	FW127197
3		1	FW126319
6		1 1/2	FW133589
6		2	FW126321
7		3	FW126322
12	230	5	FW135269
8		5	FW137225
8		7.5	BES14638
12		7.5	FW135271
8		10	BES19910
12		10	FW135273

Submersible Constant Pressure Systems

"City-like" water pressure for rural water systems in one complete package.

System includes:

- Controller with advance electronics – Air-cooled NEMA 1 enclosure, adjusts 25 to 80 PSI constant pressure and includes pressure switch.
- Factory specified pump end for optimal performance and efficiency.
- Stainless water-lubricated motor – Performance matched for long life, specified to avoid overload.
- Small 4.8 or 14.0 gallon tank – Saves space and money. Properly sized and pre-charged to 35 PSI for use with this system.

Built-in protection & diagnostics for:

- Surge Protection
- Underload – low water conditions
- Undervoltage
- Short Circuit
- Overheated Controller – with auto compensation feature
- Locked Pump – with auto reverse function

Submersible Constant Pressure Systems

Features:

- Easy Installation
- Increases flow as demand increases
- Adjustable constant pressure
- Automatic pump and motor protection
- Smart Reset technology

Applications:

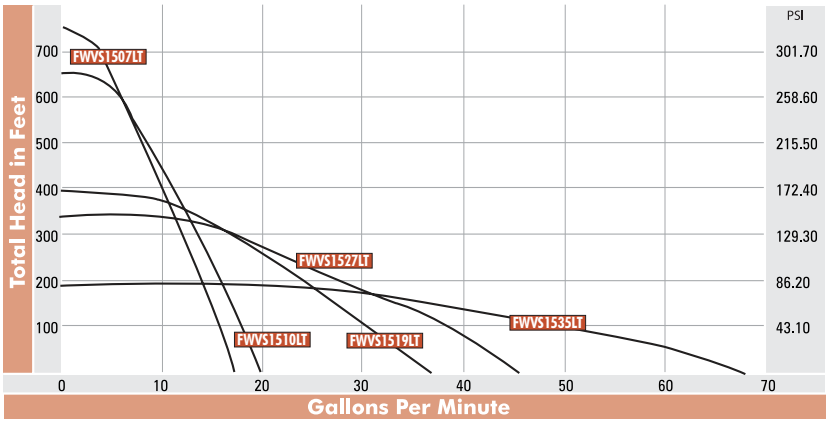
Residential Water Systems
- "City-like" water pressure
- Smaller tank saves space

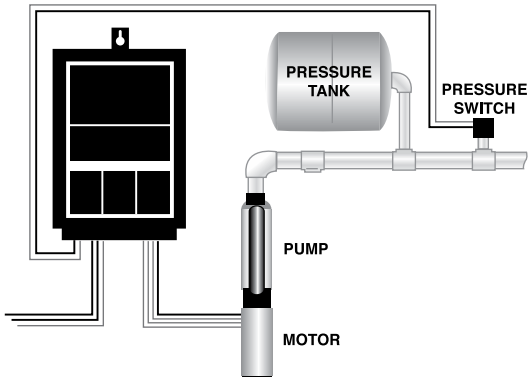
Geothermal Systems
- No need for large buried tanks
- Eliminates pressure cycling

Lawn irrigation Systems
- Handles varying water demand by zone
- Eliminates need for separate system

Water Treatment Systems
- More efficient back flushing
- No need for multiple pumps

Curves





Specifications

Pump Diameter in*	Total Length in	Discharge Size in**	Tank Pressure	Pressure Preset at 50 psi	Controller Enclosure	Amps (RMS)		Voltage Single Phase	Model Number
						Output	Input		
3.88	31.2	1 1/4	14	25-80 Adjustable	Nema 3R	5.9	11	200-250	FWVS1507LT
	30.7	1 1/4	14			5.9	11		FWVS1510LT
	28.8	1 1/4	14			5.9	11		FWVS1519LT
	27.1	1 1/4	14			5.9	11		FWVS1527LT
	23.6	2	14			5.9	11		FWVS1535LT

*Diameter includes Cable Guard
**2" discharge pumps do not include interval check valve

Other sizes available upon request.

Submersible Well Pump Sleeves

Flow sleeves are recommended for wells, large diameter, uncased, top feeding & screened sections

Submersible motors are designed to operate primarily in the vertical, shaft-up position and with a cooling flow of water over the motor. If the pump installation does not provide the minimum flow, a flow inducer sleeve (flow sleeve) must be used.

Conditions requiring a flow sleeve:

- Well diameter is too large to meet flow requirements.
- Pump is in an open body of water.
- Pump is in a rock well or below the well casing.
- The well is top-feeding.
- Pump is set in or below screens or perforations.

Flow Sleeve Features:

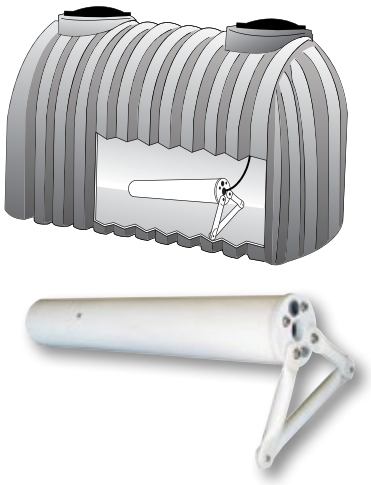
- Range from 7 to 70 GPM of water flow between flow sleeve and submersible motor
- Rubber motor-centering bumpers for even water flow along motor
- Made from corrosion resistant plastic for clean water applications
- Stainless steel fasteners
- Easy installation of industry-proven, long-lasting 4" submersible pump and motor

Did You Know?

If the flow of water is coming from above the pump, then a flow sleeve must be added for motor cooling. A flow sleeve is always required in an open body of water.

Approx. Weight lbs	Approx. Dimensions in	Discharge Size in	Pump & Motor Total Length in	Model Number
9	33	1 1 1/4 2	20 – 30	SA530100SO SA530125SO SA530200SO
11	43	1 1 1/4 2	28 – 40	SA540100SO SA540125SO SA540200SO
14	53	1 1 1/4 2	38 – 50	SA550100SO SA550125SO SA550200SO
17	63	1 1 1/4 2	48 – 60	SA560100SO SA560125SO SA560200SO

Submersible Well Pump Flow Sleeve & Stand



Approx. Weight lbs	Approx. Dimensions in	Discharge Size in	Pump & Motor Total Length in	Model Number
11	33 x 12	1 1 1/4 2	20 – 30	SA530100WS SA530125WS SA530200WS
13	45 x 17	1 1 1/4 2	28 – 40	SA540100WS SA540125WS SA540200WS
16	55 x 19	1 1 1/4 2	38 – 50	SA550100WS SA550125WS SA550200WS
19	65 x 27	1 1 1/4 2	48 – 60	SA560100WS SA560125WS SA560200WS

Specialty Pumps

Munro carries a wide variety of industrial pumps. While not often used by the irrigation industry, if you come across a job that requires these specialty pumps, remember, Munro has it! For more information on these items and more, visit us online at munropump.com.

Munro FTP/FTPS/FTPA Series High Volume Slurry and Sand Pumps
These pumps are built using a 4-pole motor to handle high particulate fluid. Cast iron construction extends the life of the pump by preventing premature wear and failure due to abrasive materials found in mining, aggregate, and construction applications.

Applications:

- FTP pumps open intake makes them ideal for use in mine and quarry dewatering, dredging, open pit coal and ore slurries, sewage treatment plants, and steel mills.
- FTPS/FTPA pumps come with a screen (S) and an optional agitator (A) for use in mine site dewatering, dredging, waste water recycling, slurry or waste treatment on constructions sites, and waste treatment on cement plants.

Transfer pumps
These gasoline engine driven pumps are constructed with a rugged cast iron casing, cast iron impeller, Viton and stainless mechanical seal, and are powered by either a 5 or 8 hp engine.

Applications: agriculture and contractor transfer, booster, sprayer and sprinkler applications.

Out-of-Pond Pumps
This end-suction centrifugal pump is designed for use on the outer perimeter of a pond (or other water source). The pumps provide energy-efficient, continuous operation for lower power consumption. For added protection and weather resistance, motors are enclosed and rated for indoor/outdoor use.

Applications: Irrigation, drawing water from lakes, ponds, cisterns, streams and shallow wells.

Hot Water Circulating Pumps
This is a hydronic circulator used to circulate a fluid within a closed system.

Applications: Circulating water or ethylene glycol in closed hydronic, boiler or solar heating systems.

Munro Jet Pump
The Munro MUSW Series Shallow Well Jet Pumps deliver up to 13 gpm at city water pressure. These sturdy, economical pumps feature a square flanged permanent split capacitor and switchless, double ball bearing motor. The impeller and diffuser are constructed of high impact thermo-plastic for greater efficiency. The MUSW also includes a long-life pressure switch to help automate a well system.

Applications: Booster, residential water systems, clean water systems.

Chemical Feed Pump
These pumps are used to move a precise amount of a liquid into a system over a period of time.

Applications: Fertilizer or pesticide delivery

Also Available:
- Hydrostatic Test Pumps – Hand or Powered
- Fuel Transfer Pumps
- Standard Duty Metallic Diaphragm Pumps
- Heavy Duty Flapper Diaphragm Pumps
- Diaphragm Pumps
- Cistern Pumps – Classic style, Hand Operated
- Hand Pump Primers
- Vertical Turbine Pumps

SLURRY Pumps

TRANSFER Pumps

CHEMICAL FEED Pumps

JET Pumps

OUT-OF-POND Pumps

HOT WATER CIRCULATING Pumps

TYPICAL IRRIGATION PUMP CONTROLS

Normally a lawn controller is used to signal a start/stop cycle for an irrigation system. This controller signals valves to open or close to direct water flow into a particular pipeline, or zone, in an irrigation system. When a pump is present in the system, a lawn controller's start/stop signal is also received by a Pump Start Relay (PSR). This PSR interacts with the incoming signal and the power going to a pump, allowing it to follow the same start/stop pattern.

A lawn controller is the most common way to signal a pump start relay. Other signal devices may also be used, including float switches, pressure switches, and toggle switches.

Each start/stop signal will send a specific signal voltage. Most lawn controllers emit 24v signals, while other signal devices often send higher voltage signals. The signal receiver, or coil, of the electrical contactor inside the PSR must match the signal voltage so it will engage the contactor. Once engaged, power is allowed to flow from the breaker box to the pump motor. When the lawn controller no longer sends the signal, the contactor is no longer engaged and the power flow to the pump motor is stopped.

Pump start controls range from a very simple pump start relay to devices that also offer pump protection to shut the pump down before it is damaged. More complex controls may start and stop multiple pumps, accept signals from multiple devices, or maintain constant pressure.

At Munro, pump start controls and protection is one of our passions and expertise. We have developed innovative products and, when your requirements are unique, we will work with you to create custom solutions.

MUNRO PUMP CONTROLS ARE EXCEPTIONAL

Safe
Reduced External Amperage – All control power leaving a Munro box is low amperage rated so that risk to people or pets is minimized.

UL Listed – Every single component used is tested, approved and certified by Underwriter's Laboratory to assure safe operation.

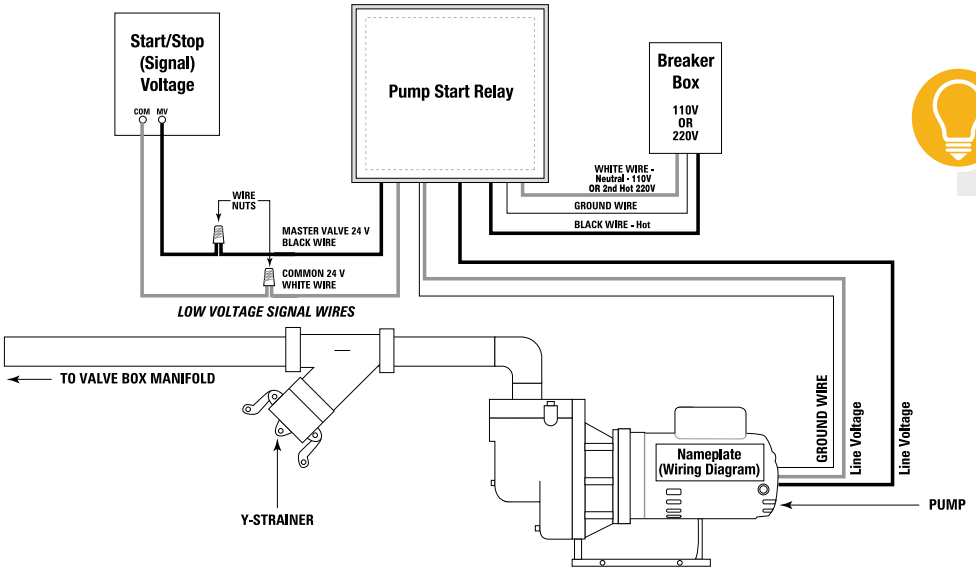
Built tough – UL-50 Type 3R
UL Nema 3R control enclosures are designed to provide protection – available in both Stainless Steel and Powder Coated Steel – to last in all environments.

Easy to install and maintain
Color coded wire leads make wiring Munro boxes a simple process.

Did You Know?
Not sure which control box you need? Check out our new pump control selection tool on p.190

Did You Know?
The SmartBox by Munro was designed in 1986! That's over 30 years of pump protection!

Typical Wiring for Basic Irrigation System Controls



NOTE: Pump controls must be compatible with to the HP of the pump.

Munro StartBox

StartBox™ – Standard (The Old Stand-by)

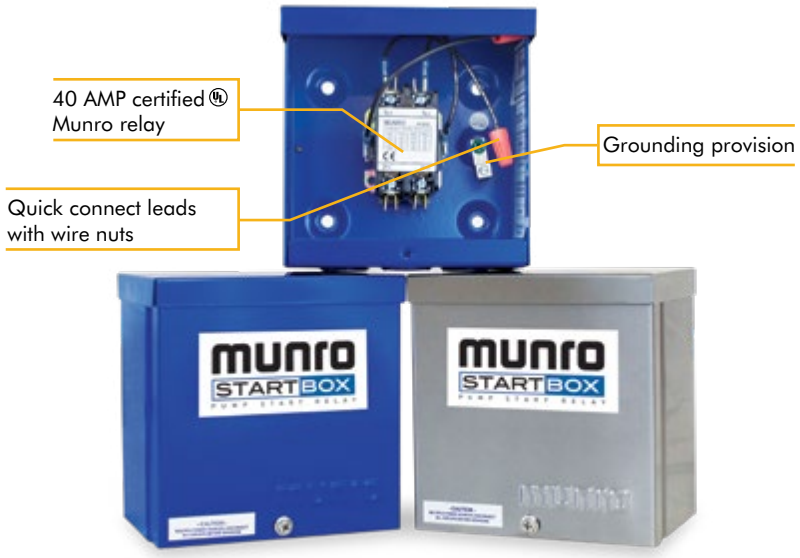
This flexible, easy-to-install pump start relay provides "pilot-duty" operation for all electrically driven pump equipment. No need to wonder which relay to use, the Munro StartBox has a 40 amp relay to work equally well with single phase 3/4 hp to 5 hp.* For use with controllers with a .36 amp signal or stronger.

- Works with any residential turf irrigation pump – available in 24v, 110v and 220v coils
- Color-coded wiring – makes hook up a breeze
- UL and CUL listed relay and enclosure – safe and reliable

*For three phase and larger hp units – see Custom Box section, pages 80-90.

CONSTRUCTION

- Dimensions – 6"x6"x4"
- UL and CUL listed relay
- UL-50 Type 3R listed enclosure – approved for outdoor use, available in stainless steel or powder coated blue



Did You Know?
StartBoxes can have added custom features? See page 89 for information on custom controls.

Specifications

Signal Voltage	Enclosure Color	Electrical Rating	Largest Motor	Short Circuit Rating	Hertz	Inrush/Run	Phase	Model Number
24	BLUE	120V – 24FLA 240V – 28FLA	2HP – 120V 5HP – 240V	120V – 5KA 240V – 5KA	60	360MA/270MA	1	MPSR24
24	STAINLESS STEEL							MPSR24S
110*	BLUE							MPSR110
110*	STAINLESS STEEL							MPSR110S
220*	BLUE							MPSR220
220*	STAINLESS STEEL							MPSR220S

* Reduced 24v Safe Out recommended for external components – float switch, sensors, etc.

Munro StartBox

StartBox™ – Reduced Incoming Amperage (The New Industry Standard)

This flexible, easy-to-install pump start relay provides "pilot-duty" operation for all electrically driven pump equipment and works with any reliable brand of 24v lawn controller – including 2-wire systems and those that provide less than .35 amps for pump start. Voltage specific – 110v or 220v – to match line voltage of the pump.

- Single unit eliminates the need for secondary transformers to be installed with decoders.
- Accepts a low amperage start signal from controller to provide all of the benefits of the standard StartBox, even though signal amperage is reduced.

CONSTRUCTION

- Dimensions – 6"x6"x4"
- UL and CUL listed relay
- UL-50 Type 3R listed enclosure – approved for outdoor use, available in stainless steel or powder coated blue

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Specifications

Pump Voltage	Enclosure Color	Electrical Rating	Largest Motor	Hertz	Resistive (Cos.=1)	Phase	Model Number
110	BLUE	120V – 24FLA	2HP – 120V	60	12AMPS	1	MPSR242W11
110	STAINLESS STEEL	240V – 28FLA	5HP – 240V				MPSR242W11S
220	BLUE						MPSR242W22
220	STAINLESS STEEL						MPSR242W22S

Did You Know?
All Munro control boxes are also available in 3 phase! See pages 89-93 for custom options.

Munro StartBox

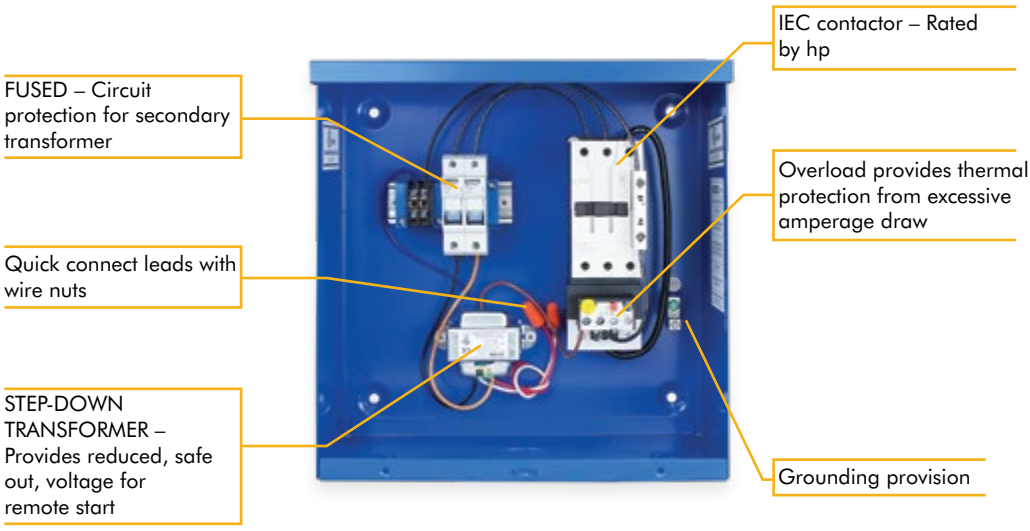
StartBox™ – Thermal Protection

This StartBox variation protects the pump motor from damage due to over amping while still performing all the basic functions of the standard pump start relay.

- Provides the pump motor with thermal overload protection, even when the motor itself does not
- Auto-resets upon cool-down
- For use with single phase motors, but three phase option also available
- Reduced incoming amperage option available

CONSTRUCTION

- Quick-connect terminals
- UL listed relay
- UL-50 Type 3R listed enclosure – approved for outdoor use, available in stainless steel or powder coated blue*



Specifications

Line Voltage	Control Voltage	HP	Amp Range	Dimensions in	Hertz	Model Number
110/220	24	3	14.7 – 15.6	12X12X6	60	MPSR24V3*
110	110	3				MPSR110V3*
220	220	3				MPSR220V3*
110/220	24	5	24.1 – 25.9			MPSR24V5*
220	220	5				MPSR220V5*
110/220	24	7 1/2	34 – 40			MPSR24V75*
220	220	7 1/2				MPSR220V75*
110/220	24	10	40-50			MPSR24V10*
220	220	10				MPSR220V10*

* Add "S" (Stainless) to end of part number.
National electrical code (NEC) states all motors will be thermally protected from excessive "amperage draw."
Motors 2 hp and under are supplied with thermal protection from the motor manufacturer. For motors over 2 hp, StartBox with thermal protection is recommended.

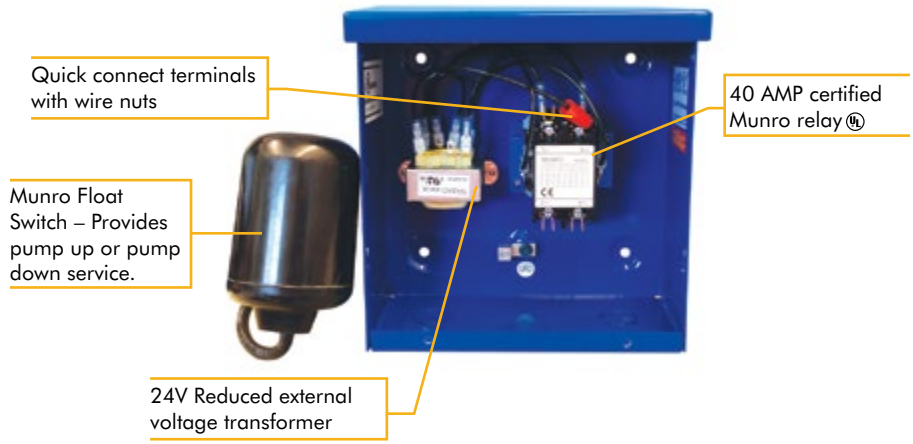
Liquid Level Control Box

Pump Up, Pump Down Control

The water level control box is a simple, cost effective control for applications when the water level is variable. The Munro water level control provides pilot duty operation when thermal overload protection is present, for example, submersible water feature pumps or dewatering pumps. Used any place power can be interrupted, this control transforms all outbound voltage to a low, safe, 24v. Low external voltage is especially important when external sensors or switches are used, such as the float switch included with this control box.

CONSTRUCTION

- Dimensions – 8"x8"x4", 12"x12"x6"
- UL and CUL listed relay
- UL-50 Type 3R listed enclosure – approved for outdoor use, available in stainless steel or powder coated blue



Specifications

Approx. Weight lbs	Dimensions in	Enclosure Color	Product Description	Phase	Motor Voltage	Largest Motor hp	Model Number
12	12X12X6	Blue**	StartBox, Safe Out, Pump Down Float, HOA	1	110	Up to 2HP	MPSR110ADH
12			StartBox, Safe Out, Pump Up Float, HOA				MPSR110AUH
12			StartBox, Safe Out, Pump Down Float, HOA		220	Up to 5HP	MPSR220ADH
12			StartBox, Safe Out, Pump Up Float, HOA				MPSR220AUH
9			StartBox, Pump Down Float			3HP*	MPSR220A3D
			StartBox, Safe Out, Pump Up Float, HOA				MPSR220A3U
9			StartBox, Pump Down Float			5HP*	MPSR220A5D
			StartBox, Safe Out, Pump Up Float, HOA				MPSR220A5U
15			StartBox, Pump Down Float			7.5HP*	MPSR220A75D
			StartBox, Safe Out, Pump Up Float, HOA				MPSR220A75U
			StartBox, Pump Down Float			10HP*	MPSR220A10D
			StartBox, Safe Out, Pump Up Float, HOA				MPSR220A10U

* Includes motor thermal overload protection.

** Add "S" (Stainless), to end of part number.

Munro SmartBox

SmartBox – Standard (The Old Stand-by)

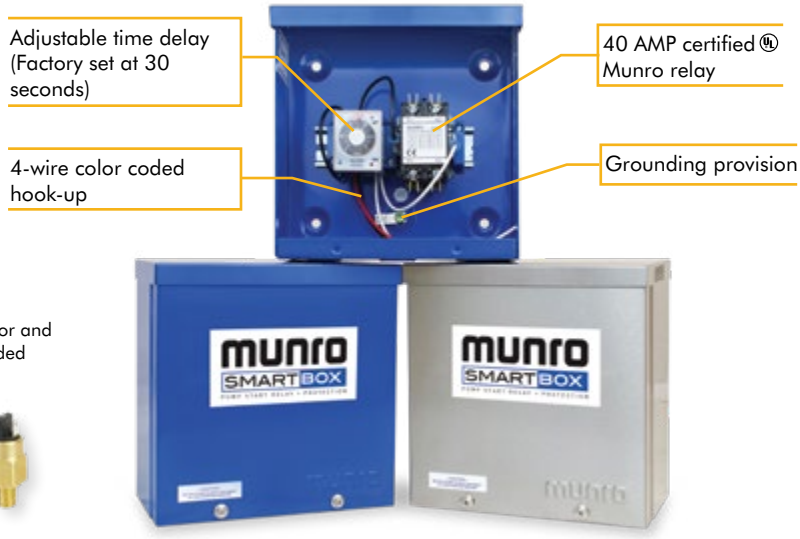
A great option for pump start and pump protection in one, the Munro Smart-Box includes a preset pressure sensor that alerts the control system of potential pump damage due to loss of prime or run-dry. Additionally, the Munro Smart-Box provides personal protection. All external devices are powered at reduced 24 volts. Low risk of line voltage harming people or pets.

No need to wonder which relay to use, the Munro SmartBox has a 40 amp relay to work equally well with single phase 3/4 hp to 5 hp. Available in 24v, 110v, 220v coils.

- Works with any residential turf irrigation pump – available in 24v, 110v, 220v coils
- Color-coded wiring – makes hook up a breeze
- UL listed relay and enclosure – safe and reliable
- Run-dry and dead-head protection

CONSTRUCTION

- Dimensions – 8"x8"x4"
- Quick connect terminals
- UL listed relay
- UL-50 Type 3R listed enclosure – approved for outdoor use, available in stainless steel or powder coated blue



Pressure Sensor and Boot Included

Did You Know?
A temperature switch is now standard in all MPLC boxes with the exception of MPLC24, where it is optional.

c UL us

Specifications

Signal Voltage	Enclosure Color	Electrical Rating	Largest Motor	Short Circuit Rating	Hertz	Line Voltage	Phase	Pressure Sensor	Optional Temperature Sensor	Model Number
24	BLUE STAINLESS STEEL	120V – 24FLA 240V – 28FLA	2HP – 120V 5HP – 240V	120V – 5KA 240V – 5KA	60	110 220	1	Normally Closed 20 PSI	Normally Open 105° F	MPLC24 MPLC24S
110	BLUE STAINLESS STEEL					110				MPLC110 MPLC110S
220	BLUE STAINLESS STEEL					220				MPLC220 MPLC220S

For three phase and larger hp units – see Custom Box section, p. 90,91.

Munro SmartBox

SmartBox – Reduced Incoming Amperage (The New Standard)

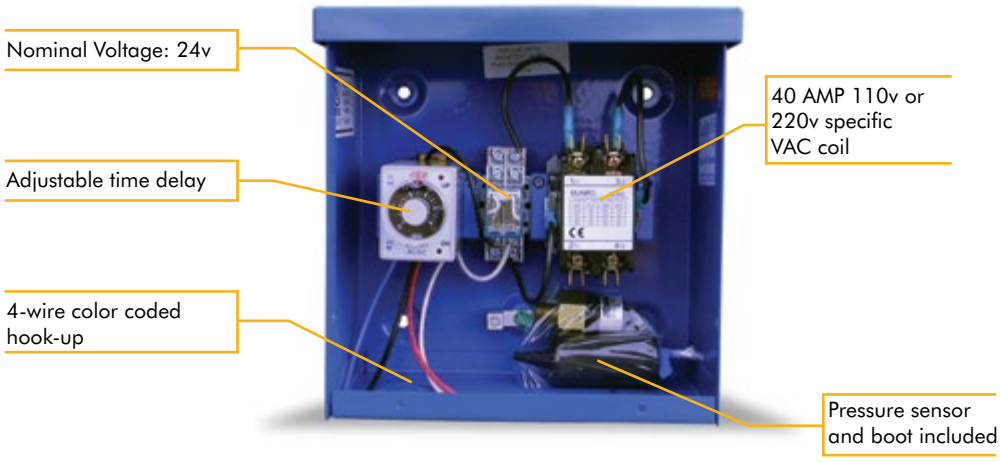
A great option for pump start and protection in one, the Munro SmartBox includes a preset pressure sensor that alerts the control system of potential pump damage due to loss of prime or run-dry, and will work with all reliable lawn controllers. Voltage specific – 110v or 220v – to match line voltage to your pump.

- Accepts a low amperage start/stop signal – to provide all of the benefits of the standard SmartBox, including loss of prime and run-dry protection, even when signal amperage is reduced.
- Compatible 2-wire system – Works with any brand, any style of 24v lawn controller.
- For use with lawn controllers that provide less than .35 amps for pump start signaling.
- Run-dry and dead-head protection

CONSTRUCTION

- Dimensions – 8"x8"x4"
- Color coded wiring
- UL listed relay
- UL-50 Type 3R listed enclosure – approved for outdoor use, available in stainless steel or powder coated blue*

Did You Know?
Works with any brand, any style of 24v irrigation controller



Specifications

Signal Voltage	Enclosure Color	Electrical Rating	Largest Motor	Short Circuit Rating	Hertz	Line Voltage	Phase	Pressure Sensor	Optional Temperature Sensor	Model Number
24	BLUE*	120V – 24FLA 240V – 28FLA	2HP – 120V 5HP – 220V	120V – 5KA 240V – 5KA	60	110 220	1	Normally Closed 20 PSI	Normally Open 105° F	MPLC242W11* MPLC242W22*

* Add "S" (Stainless), to end of part number.

Munro SmartBox

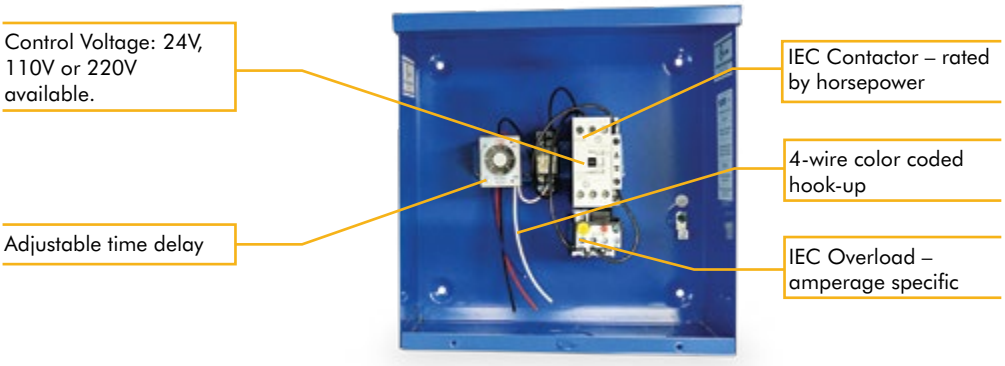
SmartBox – Thermal Protection

This SmartBox variation not only protects the pump from run-dry or loss of prime, it also protects the pump motor from damage due to over amping.

- Provides the pump motor with thermal overload protection, even when the motor itself does not
- Auto-resets upon cool-down
- Available 3 hp and above
- Run-dry and dead-head protection

CONSTRUCTION

- Quick connect terminals
- UL listed contactors and overloads
- UL-50 Type 3R listed enclosure – approved for outdoor use, available in stainless steel or powder coated blue*



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Specifications

Control Voltage	Amp Range	Dimensions in	Hertz	Line Voltage	Phase	Pressure Sensor	Optional Temperature Sensor	Model Number
24 110 220	14.7 – 15.6	12X12X6	60	110/220 110	1	Normally Closed 20 PSI	Normally Open 105° F	MPLC243* MPLC1103* MPLC2203*
24 220	24.1 – 25.9			220				MPLC245* MPLC2205*
24 220 24 220	34 – 50							MPLC2475* MPLC22075* MPLC2410* MPLC22010*

* Add "S" (Stainless), to end of part number.

Munro Pressure Start Control Box

StartBox – On Demand Controls

Grab your hose and water your plants or wash down the driveway, the pump will automatically run on your demand for water. No need for a pressure tank! On demand controls utilizes flow and pressure to detect water demand.

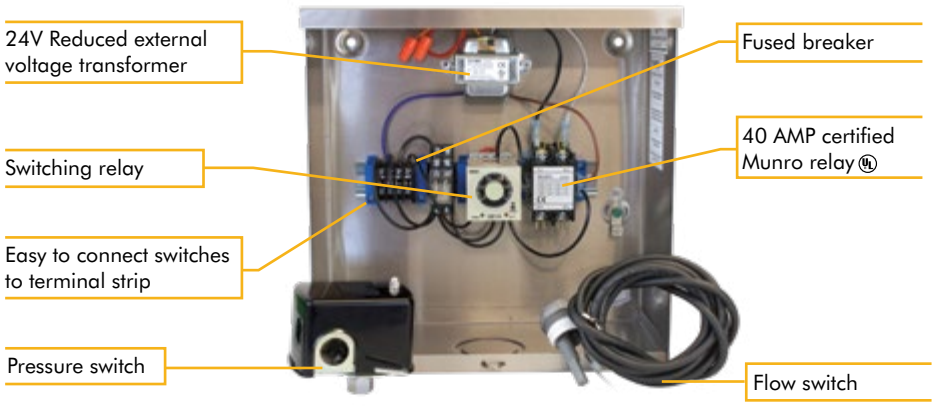
FEATURES AND BENEFITS

- Start and stop up to a 2HP pump
- Connect the pressure and flow switch to any pump discharge and the Pressure Start Control Box will turn the pump on and off
- Low pressure and dead-head protection
- Does not require a pressure tank
- Choose from 110 volt model or 220 volt model
- Low 24 volts to external switches

Did You Know?
This box can be used on a Complete PRO II (p.15)

CONSTRUCTION

- UL-50 Type 3R listed enclosure – available in stainless steel or powder coated blue*
- UL listed components
- Quick-connect terminals



OPTIONS

- Pressure Start Control Box for larger HP motors available
- Higher pressure switches available
- Pump and fittings not included
- Constant pressure available at 50 PSI downstream with system flow 2-50 GPM

NOTE: A water tight system is required. Air leaks in the system will cause pump to short cycle.

Specifications

Ship Weight lbs	Nema 3Enclosure	Pressure Range	1" Flow Switch	Line Voltage	Pump HP Range	Model Number
20	12x12x6	20-90lb	1.25"-1.5"-2" pipe	110	3/4-2	MPSR110AYFT
				220		MPSR220AYFT

* Add "S" (Stainless), to end of part number.

Munro TimeBox

Push-Button-Start Controls

This unique control box is perfect for allowing visitors to access water to keep dust down or sand cool in public spaces – such as athletic courts or fields. Users press a button to turn the water on for a pre-set amount of time (pumping water to sprinklers, misters, etc.). A pre-set lock-out time guards against flooding or overuse. The simple design powers a zone valve, eliminating the need for a separate irrigation controller.

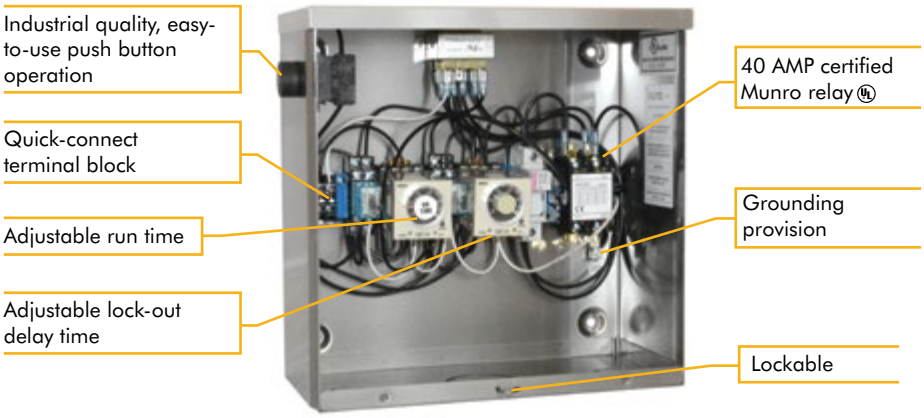
FEATURES AND BENEFITS

- Start and stop up to a 2HP pump and a 24 VAC Solenoid
- 24 volts .5 amps to power external valves – eliminating the need for a separate irrigation controller
- Time settings adjust from 1 second to 10 hours (factory set for 15 min. use and 1 hr. lock-out before re-start is allowed)
- Terminal block – makes hook up a breeze
- UL and CUL listed relay and enclosure – safe and reliable

CONSTRUCTION

- UL-50 Type 3R listed industrial stainless steel control panel – approved for outdoor use
- UL listed components
- Quick-connect terminals

Did You Know?
TimeBox has many uses!
- Arena lighting
- Coaches switch
- Volleyball courts
- Horse arena



Specifications

Ship Weight lbs	Nema 3 Enclosure	Hertz	Phase	Line Voltage	Relay Rating	Largest Motor	Solenoid Valve Start	Model Number
12 20	12Wx12Tx6D 12Wx18Tx8D	60	1	110	1 each/40 amp 2 each/40 amp	2HP	1-24VAC 2-24VAC	MPSR110MYSAV MPSR1102MYSAV

Custom options available for 220 volt single phase or three phase and larger hp units. Contact Munro for more information.

Did You Know?
Our Push-Button-Start control box could be used to provide on-demand lighting in timed increments too!

Munro BrainBox

Rainwater Harvest Control Box

Rainwater harvest controls do not have to be so complicated! Using a series of float control switches, the BrainBox monitors the water level in a holding tank. If there is sufficient held water to feed the pump when the start signal is received, the pump will pull the water from the tank. If there is not enough water available, the BrainBox opens an alternate water source – domestic or secondary water supply. This secondary source can be plumbed into the system directly or can be used to maintain a minimum level in the holding tank. Available for use with 110v and 220v line voltage, single phase*.

Sensor and control features

- A preset pressure sensor alerts the control system of potential pump damage due to loss of prime or run-dry caused by a clogged filter.
- A temperature sensor offers additional protection for pump and pipework in the case of dead head or a solenoid valve not opening.
- Float controls are wired for 24v reduced external voltage, which is safer if people or pets could come in contact with external sensors or switches.

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CONSTRUCTION
- Dimensions – 12"x12"x6"
- Color-coded wiring
- UL-50 Type 3R listed enclosure – approved for outdoor use, available in stainless steel or powder coated blue**

INTERNAL COMPONENTS
- UL listed
- Electrical Rating: 120v/240v – 24/28FLA
- Largest motor: 110v – 2hp 220v – 5hp

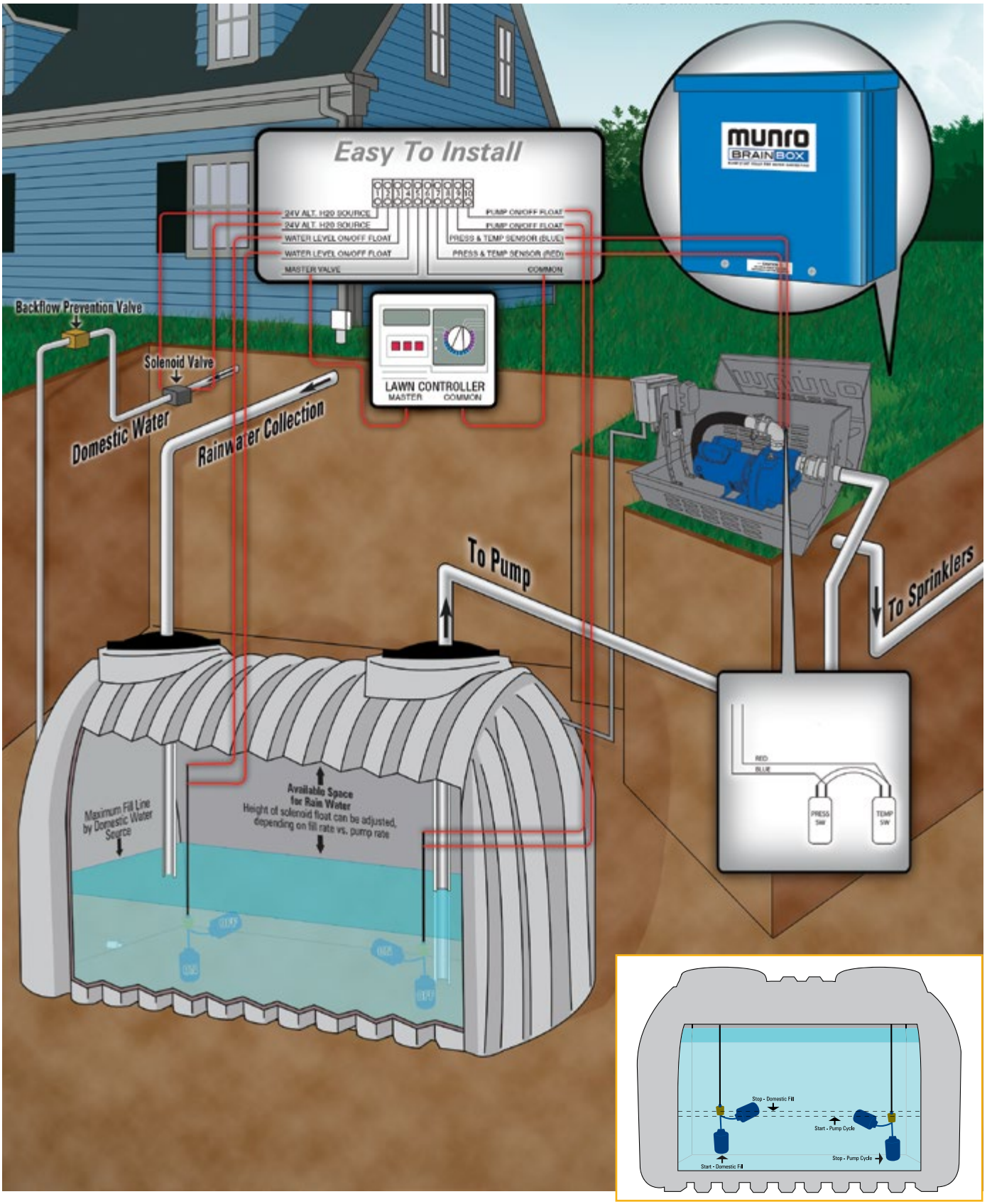
EXTERNAL DEVICES
- Low pressure sensor – fixed at 20 psi
- High temperature sensor – fixed at 105°
- Float control – 13 amp @ 120/240 VAC with 16 AWG cord

Specifications

Signal Voltage	Enclosure Color	No. of Floats	Hertz	Line Voltage	Phase	Model Number
PARTIAL TANK UTILIZATION						
24 24	BLUE**	1 2	60	110/220 110/220	1	MBRB241 MBRB242
FULL TANK UTILIZATION						
24 24	BLUE**	2 2	60	110 220	1	MBRBMAX242WA11 MBRBMAX242WA22

* Low incoming amperage and three phase options available through custom section, p. 91.
** Add "S" (Stainless), to end of part number.

Munro BrainBox – Typical Application Set-Up



Munro BrainBox

BrainBox – Reduced Incoming Amperage

- Accepts a low amperage start/stop signal – to provide all of the benefits of the standard BrainBox, including loss of prime or run-dry protection, and safe reduced voltage float control, even when signal amperage is reduced.
- Compatible 2-wire system – Works with any brand, any style of 24v lawn controller.
- For use with lawn controllers that provide less than .35 amps for pump start signaling.

Specifications

Signal Voltage	Enclosure Color	No. of Floats	Low In-coming Amp Compatible	Hertz	Line Voltage	Phase	Model Number
24	BLUE STAINLESS BLUE STAINLESS	1 2	YES	60	110 110 220 220	1	MBRB242W11 MBRB242W11S MBRB242W22 MBRB242W22S

CONTROLS

BrainBox – Thermal Protection

Protect your pump from amperage overload when using BrainBox.

Provides the Features of Standard BrainBox, Plus

- Provides the pump motor with thermal overload protection, even when the motor itself does not.
- Auto-resets upon cool-down
- Available 3 hp and above

Specifications

Signal Voltage	Enclosure Color	No. of Floats	Thermal Protection	Horsepower	Hertz	Line Voltage	Phase	Model Number
24	BLUE STAINLESS BLUE STAINLESS	2	YES	3 5	60	220	1	MBRB2423 MBRB2423S MBRB2425 MBRB2425S

Use custom control worksheet on p. 93 to specify units larger than 5 hp.

Did You Know?
Custom features like HOA switches or lights can be added to any Munro box. When you have unique needs, think Munro! Our specialty boxes were developed to meet industry requirements and customer requests.

Munro DamBox

Water Feature Protection

The Munro DamBox provides the ultimate water feature pump protection by monitoring and responding to the water level inside a skimmer box.

The Problem: As filters become clogged, the water flow to the pump chamber may not be able to sustain the full capacity of the pump.

Without the Munro DamBox – An unprotected float switch will turn the pump off, allowing the water level to rise. With the higher water level the float switch will turn the pump on again. The pump pumps the chamber dry and turns back off. The damage cycle continues until an operator notices the problem or the pump fails.

With the Munro DamBox – The DamBox will lock-out the pump when the switch drops to indicate a water supply problem versus an incoming flow problem. Once the filter is cleared, a push of a button reactivates the pump protection.

For three phase, see Munro Custom Controls on pages 91-93.

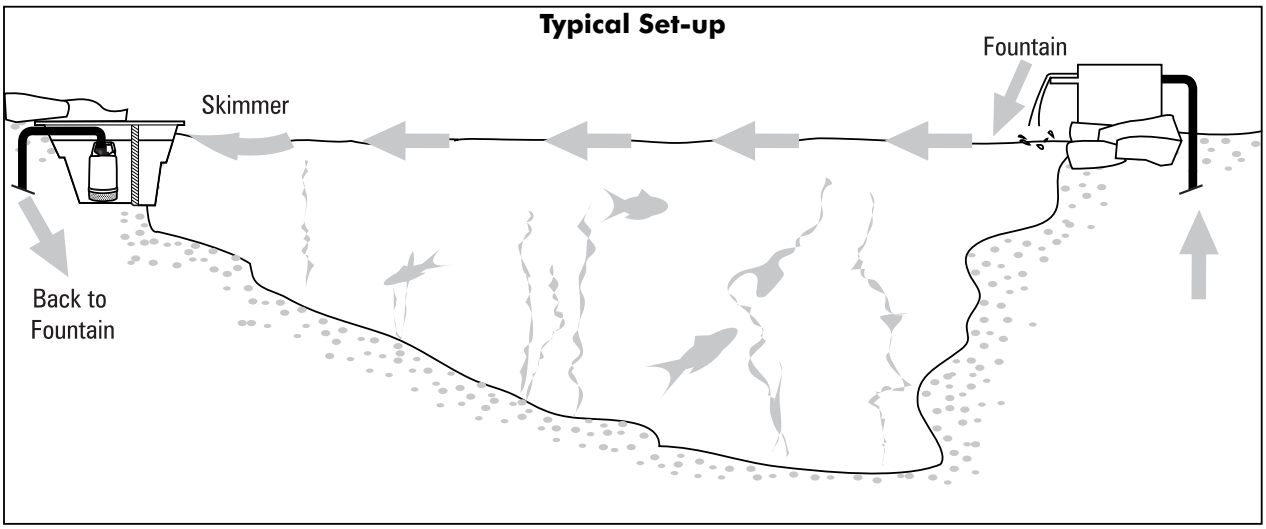
CONSTRUCTION

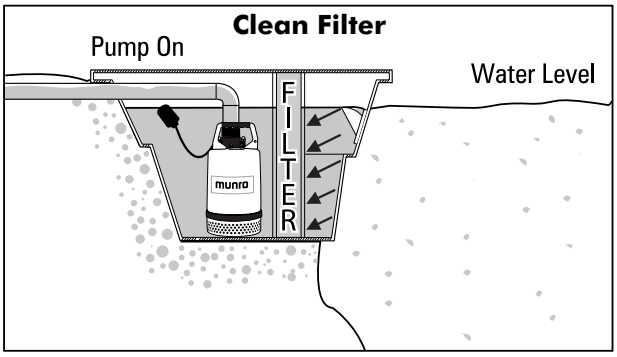
- Ground lug
- Quick-connect terminals
- UL listed relay
- UL-50 Type 3R listed enclosure – approved for outdoor use, available in stainless steel or powder coated blue

Specifications

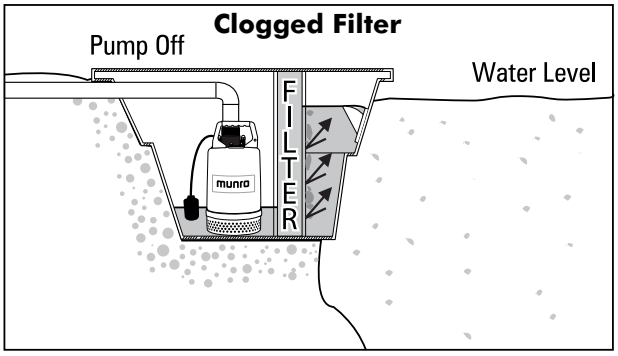
Voltage	Phase	Enclosure Color	Model Number
110	1	BLUE	MPDB110
110		STAINLESS STEEL	MPDB110S
220		BLUE	MPDB220
220		STAINLESS STEEL	MPDB220S

Munro DamBox





A clean filter will allow an equal amount of water to flow freely into the pump chamber as is pumped out of the chamber. The water level is consistent, which allows the pump to run at full capacity without interruption.



Clogged filters do not allow water to flow freely through the filter to the pump chamber. This “dam-ing” of the filter will create a run-dry condition for the pump where more water is pumped out than can enter the pump chamber. When water seeps through the filter the pump will short-cycle as water reaches positive pump conditions, and immediately shut off again when the water level drops.

Optional Features

DamBox – Reduced External Voltage

- Transforms all outbound voltage to a low 24v, especially important when external sensors or switches are used.
- Designed for use with water features utilizing float switches.
- This option is safer if people or pets come in contact with external sensors or switches.

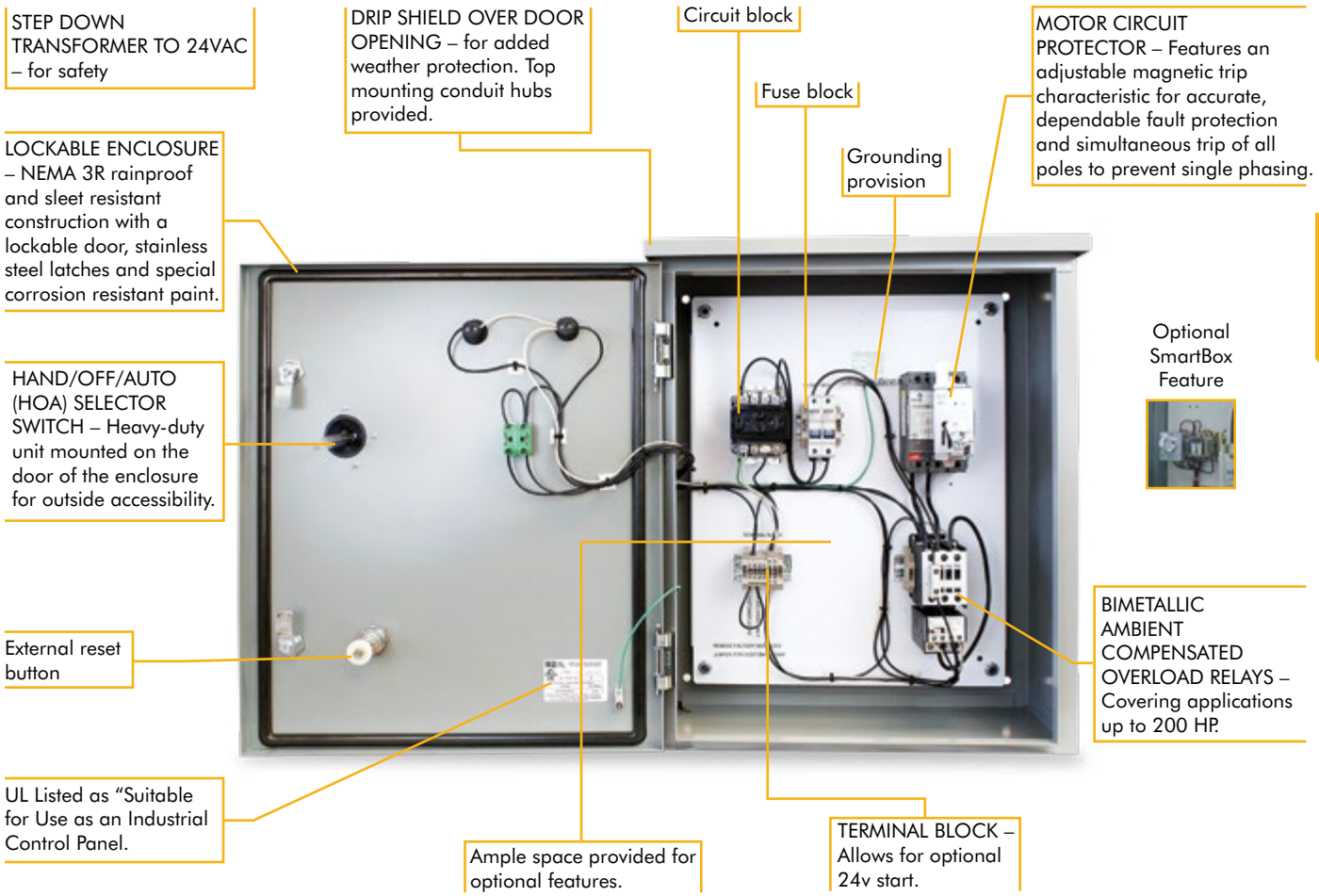
DamBox – Thermal Protection

- Provides the pump motor with thermal overload protection, even when the motor does not.
- Thermal protection and cycling protection are both provided within one enclosure.
- Thermal protection auto-resets upon cool-down, even if the cycle protection does not.
- Available for pumps 3 hp and above.

Munro Pump Control Panels

Housed in NEMA 3R rainproof and sleet-resistant enclosures, Munro Pump Control Panels feature combination starters with accessories and custom modifications to meet the needs of the irrigation market.

- Convenient straight-through wiring – top-line and bottom-load connections offer easily accessible pressure connections for line, load and control
- Overload relays with trip indication – Featuring bimetallic operation with ambient compensation and either manual or automatic reset
- Factory-wired starter and disconnect



Munro Pump Control Panels

Standard Features Include:

- Nema 3R enclosure
- Main circuit breaker
- IEC contactor
- Adjustable thermal overload protection
- External reset pushbutton
- Fused control circuit
- Hand-Off-Auto (HOA) selector switch
- Terminal block for connection of remote control device (low pressure switch)
- NOTE – "MPLC" model numbers designate the use of an optional SmartBox™ pump protection system.

Overload Relay Features

Designed for 2,000,000 electrical operations and 20,000,000 mechanical operations through 20 hp at 460v. Solid state adjustable relays are available for single-class motors up to 10 hp at 230v, and for 3-phase motor applications from fractional horsepower.

- Single-phase and phase unbalance sensitivity for 3-phase units
- Ambient temperature compensated
- Adjustable trip current
- Overload trip indication
- Manual/Auto reset
- Electrically isolated NO-NC contacts

SmartBox™ Optional Features

The Munro SmartBox option offers a preset pressure sensor (preset at 20psi) that alerts the control system of potential pump damage due to loss of prime or run-dry.

Specifications

Approximate Weight lbs	Voltage	Phase	HP	Size in	Model Number
43	220	1	3-5	24x20x8	MPCP2103-05
43			7.5-10		MPCP2107-10
45	220	1	3-5		MPLCCP2103-05*
43			7.5-10		MPLCCP2107-10*
43	220	3	3		MPCP2303-03
43			5-7.5		MPCP2305-07
43			10		MPCP2310-10
43			15-20		MPCP2315-20
43	460	3	3-5		MPCP4303-05
43			7.5-10		MPCP4307-05
43			15-20		MPCP4315-20

* These boxes contain SmartBox low pressure protection
Contact Munro for other panel sizes

Did You Know?
Panels with "Soft-Starts" are also available.

Munro Custom Controls

When you have unique control needs, think Munro. Our custom controls are developed to meet industry requirements and customer requests. Every standard box in the Munro line can have added customized features to expand the StartBox, SmartBox, BrainBox and Pump Control Panel Plus into a unique one-of-a-kind solution.

Complete as much information as you can on the custom control worksheet (page 93), including a brief description of what needs to be done. From that information, a custom, application specific control panel can begin development.

Using the worksheet, let's work together to create custom controls to suit your application and environment.

Analyzing the application

Provide a general description of your application. What does the control box need to control? Do you need to run two pumps with one lawn controller? Or turn lighting on at night? Or manually run the pump independent of the lawn controller?

Every system has the potential to be a unique situation which demands specific configuration of various panel components. At Munro, we look at the whole application and build something just for you.

Specifics

Once we have an idea of what you want the control box to do, we must determine if it is possible. With the power specifics and the pump motor nameplate information we can develop a basic concept. Adding in the custom features, like alarms and HOA's, we finalize a design for your application.

Not every option is listed on the following pages, if you don't see it, ask for it!

Custom Control Options

Safe, Low Output (Standard for all Munro SmartBoxes)  Option **A**	2-Wire Lawn Controller (minimum .05 amps required)  Option **2W**	Multiple Lawn Controllers - Enter # Value  Option **X#C**	Multiple Pumps - Enter # Value  Option **X#P**	Run/Stop Indicator Light  Option **I**
Manual On/Off Toggle Switch  Option **M**	Hand, Off, Auto (HOA)  Option **H**	Alarm  Option **J**	Liquid Level Control  Option **L**	Pressure Start  Option **Y**
Flow Switch  Option **F**	Pump Down  Option **D**	Pump Up  Option **U**	Turn Timer  Option **C3**	24/7 Clock  Option **C4**
		Retry Timer  Option **R**	Temp Sensor  Option **T**	

Custom Control Examples

Other options available

MPLC243230ALT	MPSR2453208	MBRB24220A2W
SmartBox – Uses suspended electrodes to provide high water level pump on and low level pump off control. Works with a 24v lawn controller.	**StartBox** – Lawn controller 24v signal start for a 3 phase pump.	**BrainBox** – Allows alternate water source to run even when the start signal is not active. For use with a low gallon replacement pump to maintain minimum water level for pump priming.
Pump: 3hp, 1ph, 230v	Pump: 5hp, 3ph, 208v	Pump: 3/4hp, 1ph, 230v
Reduced External Voltage Control Circuit	Motor Thermal Overload Protection	Reduced External Voltage Control Circuit
High temp shut-down		Reduced Incoming Amperage – works with all 24v controllers, including 2-wire decoder systems

Building Munro Custom Control Part Numbers

Indicate your custom control part number on the custom control specification work sheet (p. 93).

Box Style	Start Voltage	Horse Power	Motor Phase	Line Voltage	Options	Enclosure

BOX STYLE

- **MPSR** – StartBox - Pilot duty only, no pump protection in place
- **MPSR24** – StartBox with 24V Start
- **MPLC** – SmartBox - Low Pressure cut-off is standard pump protection
- **MPLC24** – SmartBox with 24V Start
- **MBRB** – BrainBox - Pump protection from low pressure and high temperatures is standard. Use with rainwater harvesting tanks and float controls.
- **MBRB24** – BrainBox with 24V Start

START VOLTAGE

(Not required with 24Volt start)

- 110
- 208
- 220
- 440

HORSE POWER

- 3/4 or less *(default)*
- 1
- 2
- 3
- 5
- 7.5 (75)
- 10
- 15
- 20
- 30

Includes Thermal Overload Protection

Higher HP Available
Controls without thermal overload protection available, see page 78

MOTOR PHASE

- Single *(default)*
- Three (3)

LINE VOLTAGE

- 110
- 208
- 220
- 440

OPTIONS

(Add to part number in order listed)

- **A** = Safe, low output (standard for all Munro SmartBoxes)
- **2W** = 2-Wire Lawn Controller (minimum .05 amps required)
- **X#C** Multiple Lawn Controllers - enter # value
- **X#P** = Multiple Pumps - enter # value
- **I** = Run/Stop Indicator Light
- **M** = Manual On/Off Toggle Switch
- **H** = Hand, Off, Auto (HOA)
- **J** = Alarm
- **L** = Liquid Level Control
- **Y** = Pressure Start
- **F** = Flow Switch
- **D** = Pump Down
- **U** = Pump Up
- **C3** = Turn Timer
- **C4** = 24/7 Clock
- **R** = Retry Timer
- **T** = Temp Sensor

NEMA 3R ENCLOSURE

- Blue Enclosure *(default)*
- **S** = SS Enclosure

CONTROLS

Building Your Part Number

Box Style	Start Voltage	Horse Power	Motor Phase	Line Voltage	Options	Enclosure

Other options available

MPSR2205220AU

StartBox – Float activated with single pump up float.

Pump: 5hp, 1ph, 230V

Motor Thermal Overload Protection

Reduced External Voltage Control Circuit

MPLC2203220ADT

SmartBox – Requires resetting should the low pressure or high temp protection trigger a shut down. Features float controls for pump down on/off control.

Pump: 3hp, 1ph, 230V

Motor Thermal Overload Protection

Reduced External Voltage Control Circuit

MBRB2453230A2WH

BrainBox – Features HOA switch. Switch allows the pump to auto start from the lawn controller with a manual hand start.

Pump: 5hp, 3ph, 230V

Reduced External Voltage Control Circuit

Reduced Incoming Amperage – works with all controllers, including 2-wire systems

Single or Three Phase Power Options

All three phase boxes are built for your specific horsepower and signal voltage application. Often with a three phase pump, a lawn controller's 24v signal is not the source of the start/stop cycle. In these instances, the contactor and overload are specific to the incoming signal voltage. We can develop so many different configurations, we simply could not list them all in this resource!

Start/Stop Control Options

Ball Float Controls	Ball floats are used to determine and maintain a preset water level.
Clock	Using a 12 or 24 hour clock instead of a lawn controller to start or stop a water cycle.
Liquid Level Control	Probes are used to determine and maintain a preset water level by a small electrical current.
Switch: Flow	Water movement activates this switch to either start or stop a pump function.
Switch: Pressure	Level of pressure in a pump case or pipeline determines whether this switch is engaged or not.
Sensor: Temperature	Monitors the level of temperature in or near a pump case to help prevent over-heating due to dead head.

Function Options

Pump Down	Designed to keep water level in a holding area at a low level. Pump will turn on when level gets high and shut off again when desired low level is reached.
Pump Up	Designed to keep water level in a holding area at a high level. Pump will turn on when level gets low and shut off again when desired high level is reached.
Retry or Restart	Working with the SmartBox pump protection, this box will retry to start a few minutes after the SmartBox has shut it down. If pressure can rebuild again, the pump will be allowed to continue operation for the duration of the cycle.
Multiple Controllers	One pump can run from the signal of multiple controllers.
Multiple Pumps	One controller is used to signal multiple pumps.
Outlet	An added outlet provides 110v whenever a signal is received.
Lock-out Relay	Demands a manual reset versus an automatic reset. Used to prevent pump damage from cycling.
Delayed Operation Timer	Allows for a short delay from determination of potential problem to actual shut down. Allows time for the problem to self-correct.
Low Amperage Signal (often 2-wire)	Signal able to receive a low amperage and still pull in a pump start relay (below .35 amps).

Safety Options

HOA Switch	A manually operated external switch that allows for automatic (auto) setting to be overridden (hand) or completely disengaged (off).
Horn	Audible warning signal to indicate a potential problem.
Indicator Light	Can be used to illuminate as a run-light, or when there are problems as a warning light.
Reduced External Voltage	Protect people and animals from harm by using a box with Reduced External Voltage. Voltages leaving Munro boxes to go to sensors, floats, or probes are all at or below 30 volts.

Munro Custom Controls Specification Worksheet

Complete worksheet with all basic information and application description, then fax to 970.263.2277 or email to mpi@munrocompanies.com.

Name:	Company:	Phone:
Address:		City/State/Zip:

What problem are we resolving? What does the control need to do?
Part Number (p. 89 – not required):

Application	☐ Irrigation	☐ Water Feature	☐ Other: _____
Type of Pump	☐ Centrifugal	☐ Submersible	☐ Other: _____
No. of Pumps	☐ 1	☐ 2	☐ Other: _____
Pump Nameplate	HP: _____	Phase: _____	Voltage: _____
	FLA: _____	SFA: _____	Pump Brand: _____ Model#: _____
Pump Protection	☐ Loss of prime (pressure)	☐ High temperature (dead head)	☐ Motor Protection (thermal overload)
	☐ Both	☐ None	☐ Other: _____
Type of System	☐ Traditional 24v	☐ 2-Wire Decoder System	☐ Other: _____
Control Signal	☐ Manual	☐ Pressure Switch	☐ Float Balls No. of Floats: _____
	☐ Liquid Level Probes	☐ Other: _____	
Control Source	☐ Lawn Controller	☐ No. of Controllers: _____	☐ Signal Voltage: _____
	☐ Signal Amperage: _____	☐ Clock	☐ Other: _____
Optional Features	☐ Alarm	☐ Indicator Light	
	☐ HOA Switch	☐ Other: _____	☐ Other: _____

For safety, "Reduced External Voltage" is standard for all custom boxes.

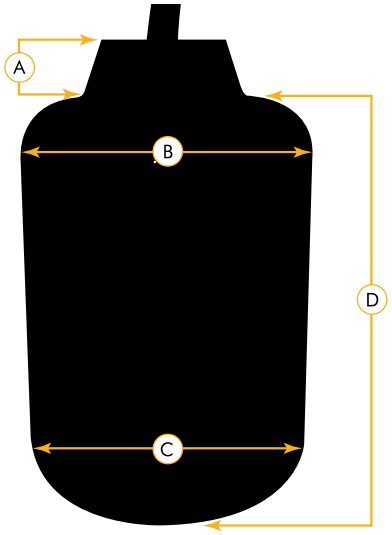
Munro FloatControl

The Munro FloatControl is a direct acting, in-line control system for automatically controlling 1/2 hp and smaller pump motors, or used in conjunction with a pump start relay to accommodate larger hp motors.

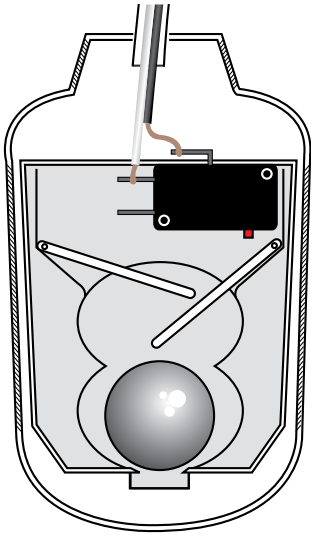
The FloatControl can easily be adjusted to various pump up/down cycles by shortening or lengthening the cord length at the pivot point. The FloatControl is also omni-directional: the pumping differential is maintained in any horizontal position.

TECHNICAL DATA:

- 13Amp at 120/240VAC with 16AWG cord
- Max Operating Temperature: 140°F
- Protection Grade: IP68
- Float approved for drinking water application



FloatControl Dimensions



FloatControl Cutaway

A	B	C	D
.5"	2.75"	2.625"	3.95"

Normally Open	Normally Closed	Weight Included	110V Piggy Back Ends	Quick Ends	16 Feet	33 Feet	55 Feet	Model Number
•		•		•	•			FC0246
•		•		•		•		FC0247
•		•		•			•	FC0248
	•	•		•	•			FC1246
	•	•		•		•		FC1247
	•	•		•			•	FC1248
•		•	•		•			FC0256
•		•	•			•		FC0257
•			•		•			FC0356

Alarm with Float Control

Indoor Alarm Features:

- Can be used with any UL listed switching mechanism rated 1 amps, 24 VAC minimum.
- Operates on low voltage and is isolated from the 120V power line to reduce the possibility of shock.
- UL Listed and CSA Certified.
- NEMA 1 panel features a red warning light, a green "power on" light, push-to-test alarm button, and a horn silence switch.

Outdoor Alarm Features:

- NEMA 4X thermoplastic alarm panel. Horn and light warn of high or low liquid levels.
- Panel exterior features a large, red light specially designed noncorrosive horn, silence switch and alarm test switch.

Approx. Weight lbs	Voltage Alarm		Enclosure	Model Number
	Primary	Secondary		
5	120VAC	120VAC	NEMA 1 - Indoor	SRPW217115
4	120VAC	120VAC	NEMA 4X - Outdoor	SRPW217116

DG Sumptrol Float Switch

Features and Benefits:

- For open tank or sump applications
- 2 Pole, single level operated
- NEMA Type 1
- Manufactured for AGI in an ISO 9001 facility

Approx. Weight lbs	Description	Model Number
3	Contacts Close on Liquid Rise	FU69L1986
3	Contacts Open on Liquid Rise	FU69L2073

Float Switch Accessories

Approx. Weight lbs	Description	Model Number
.5	Plastic 6" Diameter Float	FBP6
.5	Copper Tapped 1/4"-20 Thread	FBC63

Series F59 Two-Pole Liquid Level Switch

These weight operated switches control the liquid level in sumps. Switches are factory adjusted to operate with weights to close the contacts when the liquid rises.

Approx. Weight lbs	Voltage	Poles	HP Rating	Model Number
2	120/240	2	1	MAF59A2C

Time Delay

Adjustable 1 second to 10 minute time delay.

Factory Setting	Description	Mounting	Model Number
30 Seconds	Timer on Delay	8-Pin Base	ELTIMER1

Did You Know?
Munro is a UL approved industrial panel shop.

Munro Pressure Sensor & Boot

Sensor monitors system pressure. 24 volt incoming power makes it suitable for outdoor use.

Features and Benefits:

- Normally closed
- Fixed set point
- 1/4" NPT male
- Nema: 4, 13
- Diff. range: 8 – 16%
- Factory setting: 20 PSI

Note: Boot provides protection for electrical wire connections.

Factory Setting	Description	Mounting	Model Number
20#	Pressure Sensor	1/4" MNPT	ELSWITCH2
–	Pressure Sensor Boot	–	ELBOOTPS

Munro High Temperature Sensor

Monitors the temperature created in a pump during dead head and shuts it down – protecting the pump and the pipework from damage.

Features and Benefits:

- Diff range: 5-9 degrees
- Normally open

Factory Setting	Description	Mounting	Model Number
105˚ 130˚	High Temperature Sensor	1/4" MNPT	ELTEMP2 ELTEMP5

Munro Contactors

Munro's 40 AMP Relays are designed to specific parameters:

- Fully enclosed contacts
- High holding power on oversized contacts
- Low current requirements on the coil for lower required holding power
- UL and CUL Listed
- Available in 24 volt, 110 volt or 220 volt
- Option of a screw base or DIN rail mounting*

Approx. Weight lbs	Description	Mounting	Coil Voltage	Model Number
.6	2-Pole Contactor 40 Amp	Fixed	24	ELRELAY1F*
			110	ELRELAY2F*
			220	ELRELAY3F*
	2-Pole Contactor 90 Amp		24	ELRELAY5P2
	3-Pole Contactor 90 Amp		24	ELRELAY5P3

*Replace "F" in the part number with "D" for dinrail mount base.

Lightning Arrestors

Features and Benefits:

- Clamping level – 130 VRMS
- Response times – <5 nanoseconds
- Filtering
- Energy – 500 joules, 10 x 1,000 usec
- Pulse life – 1,000 – 10,000 amp pulse
- UL 1449 Listed surge suppressor
- Complete protection between ground, neutral and phase

Approx. Weight lbs	Dimensions	Single Phase Volts	Surge Current Amps	Description	Model Number
.25	3.14 x 2.66 x 1.14	120/240	50,000	External	ELDTK120240CM
.2	3.01 x 1.69 x 1.6	110/125	39,000	Internal	ELDTK120HW

Transducers

Measuring device used to monitor and transmit water pressure information. Stainless steel.

Approx. Weight lbs	Operating Temp	Port	Power Supply	PSI	Output	Model Number
2	35˚-155˚F	1/4" NPT	12-30 VDC	0-200	1-11V	SYCSP400DC200PSI

Munro UL 50 Nema 3R Enclosures

Built to last, our Nema 3R electrical enclosures are economical and high quality. Use for controls or junction and pull.

Available Colors:

- Powder-coated Blue
- Stainless Steel

Approx. Weight lbs	Dimensions in	Finish	Color	Lockable	Nema Rating	Model Number
1.8	6x6x4	Powder Coated	Blue	No	NEMA3R	EN664B3
1.65	6x6x4	Stainless Steel	Stainless Steel	No	NEMA3R	EN664S3
2.65	8x8x4	Powder Coated	Blue	No	NEMA3R	EN884B3
2.60	8x8x4	Stainless Steel	Stainless Steel	No	NEMA3R	EN884S3
7.9	12x12x6	Powder Coated	Blue	Yes	NEMA3R	EN12126B3
7.6	12x12x6	Stainless Steel	Stainless Steel	Yes	NEMA3R	EN12126S3
12.05	12x18x8	Powder Coated	Blue	Yes	NEMA3R	EN12188B3
11.8	12x18x8	Stainless Steel	Stainless Steel	Yes	NEMA3R	EN12188S3

Current Transformers

Application – Generally for Ammeter use only
Frequency – 50-400Hz.
Insulation Class – 50-400Hz.

- Flexible leads are UL 1015 150°C, CSA approved, #16 AWG, 24" long
- Non-standard length to be specified

Options:

- Terminals are brass studs No. 8-32 UNC with one flat washer, lock washer and regular nut
- SHT and SFL case styles also available as SHL and SFL with leads
- Mounting bracket kit 0221B00839 when required for MODEL 2SHT
- Approximate weight 0.5 lb.

Typical Three-Phase Horsepower		Motor Operating Amps	Model Number
460V	230V		
3-25	1-10	1 to 40	SY505CT
30-40	15-20	40 to 70	SY755CT
50	25-30	70 to 80	SY1005CT
60	40	80 to 90	SY1505CT
75-100	50-60	90 to 160	SY2005CT

Munro Guard Pressure Switches

Approx. Weight lbs	Min. Close Cut In	Max. Open Cut Out	1 Phase		3 Phase	Max Factory Setting	Max Static psi	NEMA 1 Model Number
			115V	230V	230V			
Munro Guard - Similar to 69WC7								
1/2	32	12	1 1/2	2	3	12	150	LF10WR

Pressure Switches

Approx. Weight lbs	Min. Close Cut In	Max. Open Cut Out	Diff. Range	1 Phase		3 Phase		Factory Setting	NEMA 1 Model Number
				115V	230V	230V	460/ 575V		
For Water Systems									
1/2	3	35	4-8	1 1/2	2	3	---	5-10	FU69WA3
1/2	5	90	10-30	1 1/2	2	3	---	30-50	FU69WA43050
For Air Systems									
1/2	25	100	20-40	1 1/2	2	3	---	80-100	FU69MB6
1/2	40	150	30-40	1 1/2	2	3	---	95-125	FU69MB7
Higher Ratings For Air Systems									
1/2	40	250	35-60	2	3	5	5	115-150	FU69HA1
1/2	10	125	20-35	2	3	5	5	100-125	FU69HA2
Reverse Action For Water or Air									
1/2	80	10	17-22	1 1/2	2	3	---	50-30	FU69WR5
1/2	40	3	6-15	1 1/2	2	3	---	10-5	FU69WR3

Approx. Weight lbs	Min. Close Cut In	Max. Open Cut Out	Diff. Range	1 Phase		3 Phase	Fixed Low Pressure Cut Off	Factory Setting	NEMA 1 Model Number
				115V	230V	230V			
Gard-All									
1/2	10	70	13-30	1 1/2	2	3	6	20-40	FU69WEC
Hi-Gard									
1/2	20	100	--	1 1/2	3	5	--	80	FU69WH6

Pump Savers

Three Phase Motor Protector

Offers Protection from:

- Over current
- Under current
- Current imbalance
- Single phasing
- Reverse phasing

Approx. Weight lbs	Power Consumption	Output Contact Rating	Control Voltage VAC	Model Number
2	5 Watts	480VA @240VAC	100-130VAC	SY520CS115
2	5 Watts	480VA @240VAC	200-250VAC	SY520CS230V
2	5 Watts	470VA @600VAC	400-500VAC	SY520CS460V

For use with enclosures.

Liquid Level Control

Type G Relay: Pump up and pump down control for supply pumps on elevated tanks and towers. High cutoff for pumps and valves.

Approx. Weight lbs	Contact Arrangements				HP	Model Number
	Line Volt	Norm. Closed	Norm. Open	Holding Circuit		
1	110/120	1	1	1	1	BW1500GL1S70CX
1	208/240	1	1	1	1	BW1500GL2S70CX

For use with enclosures.

Wire Suspension Electrodes

Wire suspension electrodes are designed for use in applications requiring long lengths, or where limited head room prevents installation of solid rod electrodes. Type E-1P shielded electrode is assembled in a molded plastic insulating shield 7/16" in diameter. Type E-1S shielded electrode is assembled in a molded plastic shield 9/16" in diameter.

Approx. Weight oz	Length in	Electrode Material	Electrode Type	Model Number
4	4	Brass	With Shield	BW6013W1
4	4	303 Stainless		BW6013W2
2	2	Brass		BW6013W5
2	2	303 Stainless		BW6013W6
2	4	Brass	With Out Shield	BW6013W3

Power Supply Cords

Eliminates the need to hardwire a pump to power source.

Approx. Weight lbs	Volts	Length ft	Max Amps	Type	Gauge/ Cond.	Model Number
.8	115	8	15	SJ	14/3	ELPIG14/3X8
.4	230	24 in	300	3/4 – 2HP	12/3	ELPIGT12/3
		24 in		3HP	10/3	ELPIGT10/3

Pigtail as described above with romex and terminal connectors

Approx. Weight lbs	Volts	Length	Max Volts	Use	Gauge/ Cond.	Model Number
.9	230	8 ft	300	3/4 – 2HP	12/3	12/3
	230	8 ft		3HP	10/3	10/3

Munro Pump Electrical Kit

Our complete kit simplifies pump installation, with everything you need to connect to electrical controls for your pump. With convenient at-the-pump disconnect, there's no more running between the breaker box and the pump! Model Number: CP220ELECT2

INCLUDES:

- **Outlet Assembly:** Waterproof outlet cover with pre-wired receptacle, 220V
- **Pressure Sensor:** NC 30 psi pressure switch, ¼" NPT
- **Sensor Boot:** Buna rubber switch cover
- **Bushing:** ¾" to ¼" galvanized bushing, used to size pressure sensor to ¾" pump port
- **Temperature Sensor:** 130° NO temperature switch
- **Wire way:** Threaded pvc nipples with ½" NPT Pulling El and SLB
- **Box Attachment:** ½" galvanized chase nipple
- **Wire:** Stranded sensor connection wire – includes disconnects

Electrical Outlet

Cover protects outlet from water spray.

Approx. Weight lbs	Volts	Max Amps	Type	Gauge/Cond.	Model Number
1.5	110 230	20	Spec. Grade	12/3	ELCOVOUTLET1T ELCOVOUTLET2T

Underground Wire

- UF-B Underground Sunlight Resistant
- Reel Length - 1,000 Feet

Approx. Weight lbs Per 100'	Size	Model Number
11.3	12/2 with ground	EL123GUF
15.6	10/2 with ground	EL103GUF
31.8	8/2 with ground	EL83UF
44.0	6/2 with ground	EL63UF

Available by the foot

Submersible Cable

- Water Resistant
- Reel Length - 1,000 Feet

Weight Per Reel	Size	Model Number
16 Lbs.	12-3	SA123G
	10-3	SA103G
	8-3	SA83G

Available by the foot

Splice Kits

Shrink splice kit with four connections.

For Wire Size	Model Number
#14, #12, #10	SASP4CHD
8	SASP8CHD
6	SASP6CHD
4	SASP4CHD
2	SASP2CHD
#14, #12, #10	SASP12CHD

From Booster and Prepackaged stations to Custom Solutions, Munro can build it all.

Complete PRO II Series

Simplicity 70 VFD 5HP

The StandAlone Series

4′x5′

2′6″x3′

3′x4′

Munro Complete PRO II

The Munro Complete PRO II is a revolutionary complete pump package that includes a professional-grade pump, the highest quality pump control with built-in pump protection, and simplified plumbing connections – all housed in a unique enclosure designed specifically for a pump. With this complete solution, the days of purchasing and assembling numerous components and housing them in a makeshift enclosure are over!

Munro has incorporated best-in-class pump control with state-of-the-art pump protection features for the highest level of reliability and performance. With durable materials and advanced engineering, this long-lasting, quality product will be one that distributors and contractors will be confident in recommending to installers and end-users.

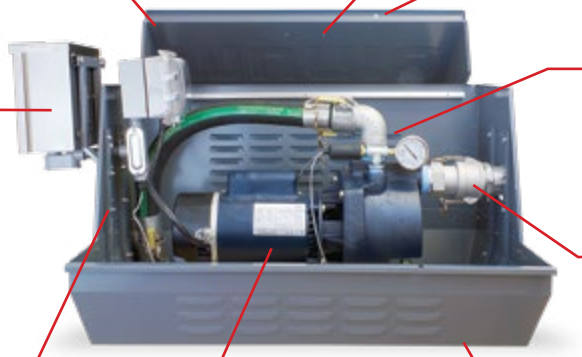
ADVANTAGES

- **Easiest system to select & specify** – With only one product to buy or specify, you have everything you need for a complete pumping system.
- **Highest quality components** – Just like all of Munro's products, the Complete PRO II is made with high-quality materials for a long, trouble-free service life.
- **Fast and easy installation** – This product ships complete, with everything you need to quickly adapt to any existing piping or electrical. All you have to do is hook it up and plug it in – it's really that easy!

ENCLOSURE – Powder-coated stainless steel offers durable, non-corrosive housing to stand up to the elements.

PUMP CONTROL – SmartBox housed in UL-50 Type 3R enclosures features reduced amperage compatible and thermal protection. Or choose from the full range of Munro pump controls, including StartBox, SmartBox and BrainBox.

UNIVERSAL DESIGN – Interchangeable side panels allow for pump to face left or right.



HANDLE – Stainless steel handle for easy accessibility.

SECURITY – Lockable.

SELF COOLING – Vented for air flow to keep the pump cool.

FITTINGS AND ACCESSORIES – From our one-of-a kind Munster fitting to the long-lasting hose and electrical components included, the Munro Complete PRO II is complete with everything you need.

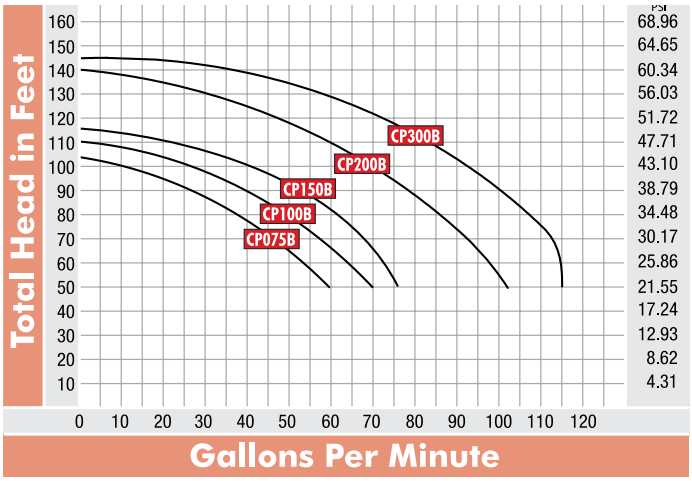
PUMP – Our LP Series centrifugal pumps are durable and long lasting with industry-leading performance to horsepower. Offered in 3/4 - 3 hp, all sizes come with top-of-the-line components that are only available as costly upgrades on other pumps.

DISCHARGE – Discharge holes are knock-outs for easy installation.

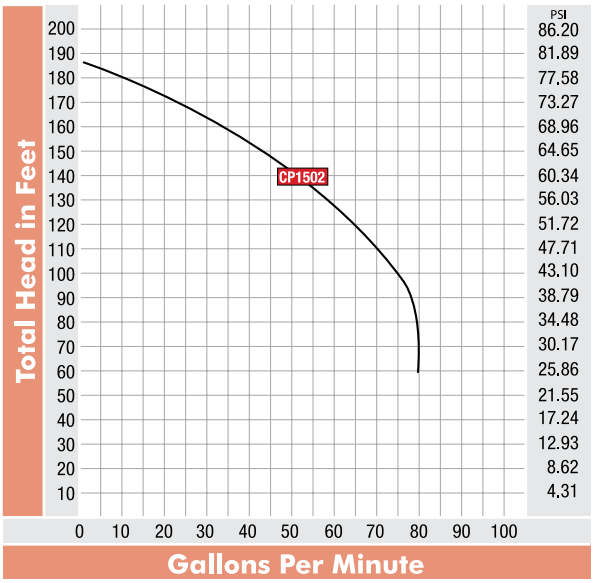
Munro Complete PRO II

Curves

HORSEPOWER RANGE: 3/4 - 3



HORSEPOWER RANGE: 2.5



Specifications

HP	Phase	Standard Voltage	Discharge	Suction	Dimensions			Control	Approx Ship Weight lbs	Model Number
					Height	Length	Depth			
Complete PRO II – SmartBox MPLC242W22TS										
3/4	1	208-230	1 1/2"	2"	23 1/4"	36"	19 1/2"	SmartBox	109	CP075B
1									110	CP100B
1 1/2									120	CP150B
2		208-230							128	CP200B
3		230							143	CP300B
3/4	3	208-230							115	CP075B3*
1									121	CP100B3*
1 1/2									117	CP150B3*
2									128	CP200B3*
3									137	CP300B3*
2.5	1	208/230							168	CP1502B
2.5	3	208/230							163	CP1502B3*

Contact Munro for other control or voltage options. Lead times vary for specialty or custom options.
All measurements are approximate and are subject to change.
*Must specify line voltage for 3 phase.

Visit **munropump.com/completevideo**
to see just how EASY irrigation pump installation can be!

Munro Complete PRO II 5HP

A Better, COMPLETE Solution
With or without enclosure

This rugged, complete pump system (UL QCZJ) simplifies installation and can be customized for your application. The skid-only version is perfect for indoor installations, while the powder-coated marine grade aluminum enclosure will stand up to outdoor elements.

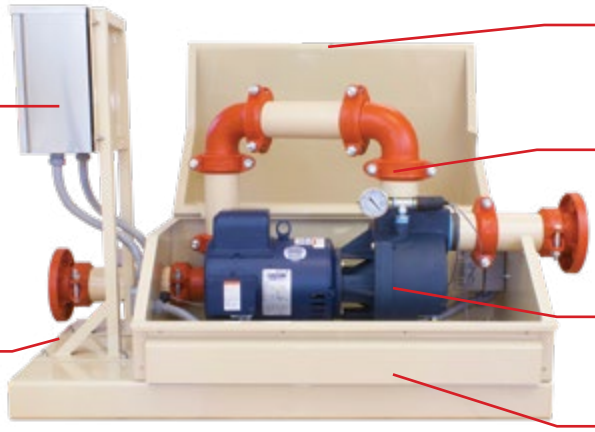
ADVANTAGES

- **Easiest system to select & specify** – One professional package includes pump, smart controls and enclosure.
- **Highest quality components** – High quality materials for a clean, durable installation to be proud of.
- **Fast and easy installation** – Comes complete. No parts to forget, no need for shortcuts. No fuss, no errors.

Did You Know?
Munro offers a variety of adapters to link a grooved coupling to your irrigation system. For steel pipe, groove x weld or groove x thread are great options. For PVC systems, grooved x spigot, groove x thread and other PVC adapters are available.

PUMP CONTROL – Choose from the full range of Munro pump controls, including StartBoxes, SmartBoxes, and BrainBoxes, housed in their own NEMA 3R enclosures and including features such as reduced amperage and thermal protection.

ENCLOSURE OR SKID – Powder-coated marine-grade aluminum offers durable housing or base to stand up to the elements. Made to order.



SECURITY – Lockable.

FITTINGS AND ACCESSORIES – From our rugged pipe and grooved couplings to the long-lasting electrical components included, the Munro Complete PRO II is complete with everything you need.

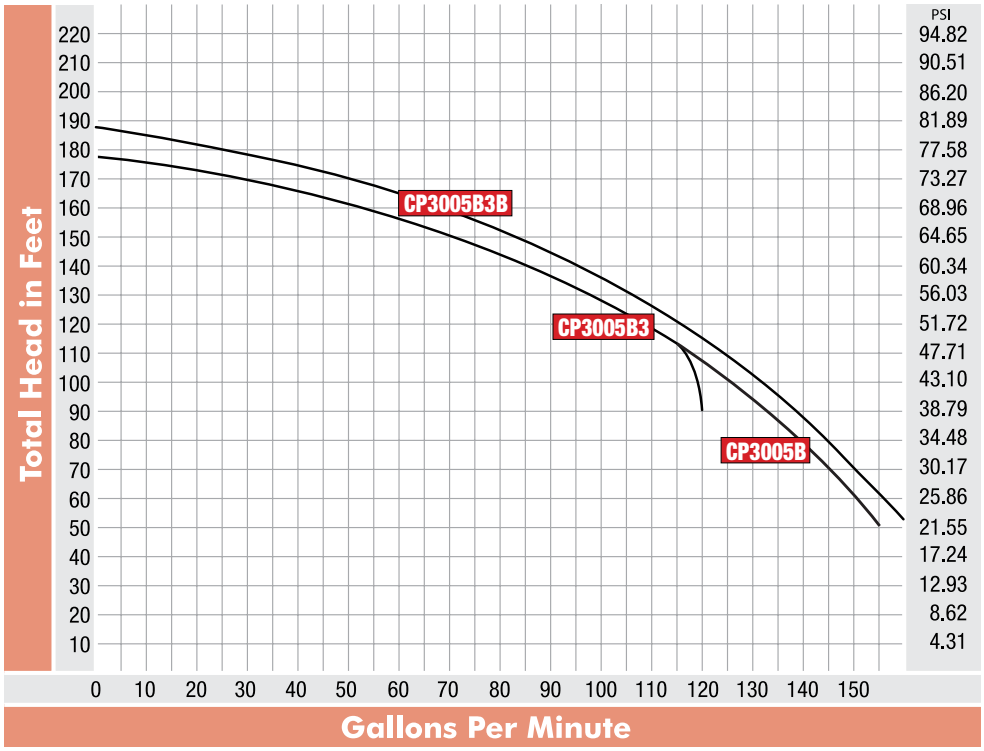
PUMP – Our LP Series 5 hp centrifugal pumps are durable and long lasting with industry-leading performance to horsepower.

SELF COOLING – Vented for air flow to keep the pump cool.

Munro Complete PRO II 5HP

Curves

HORSEPOWER RANGE: 5



Specifications

HP	Phase	Voltage	Discharge	Suction	Dimensions**			With Enclosure	Skid Mounted Only	Model Number*
					Height	Length	Depth			
	1	208-230						X		CP3005B
	3	208-230						X		CP3005B3
5	1	208-230	3"	3"	35.5"	44"	22"		X	CP3005B-SKID
	3	208-230							X	CP3005B3-SKID
	3	230							X	CP3005B3B-SKID

* Model numbers shown are for Complete PRO II - 5hp with standard SmartBox MPLC2452WTS. Contact Munro for other control or voltage options.
**All measurements are approximate and are subject to change, without notice.

Variable Frequency Drives

The new generation of variable frequency drives (VFDs) by Munro Systems can significantly reduce energy costs and provide environmental benefits. In some instances, the payback period for using our variable frequency drive in place of other flow control methods is less than 18 months. Every application is different, but a Munro Systems expert can help you calculate how much energy savings you can expect.

Cost-saving and environmentally conscience

- Operate your pump more efficiently
- Reduces energy costs and usage
- UL listed for 1hp power sources
- Built in pump protection features
- VFD's available in replacement or custom configured

Munro StandAlone Programs for Variable Frequency Drives

Choose from a variety of features to customize the VFD's performance. Our experts can help you specify performance and features to meet your needs.

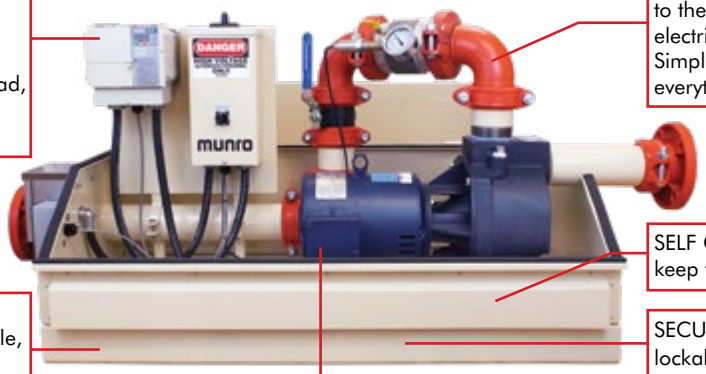
- Sleep activate level
- Sleep on level
- Sleep deactivate level
- Sleep deactivate time
- Feedback detection level high
- Feedback high fault time
- Feedback detection level low
- Feedback detection level low on delay time
- Feedback detection hysteresis
- PID minimum speed
- Loss of prime
- Loss of prime delay
- Line fill mode

The Simplicity 70 VFD

This self-contained ULQCZJ pumping station is a low-maintenance, high-value solution for a large residential or small agricultural, municipal, or commercial irrigation system.

With a variable frequency drive (VFD) and professional-grade pump, the Simplicity 70VFD is an alternative to across-the-line start, which can create pressure changes on low-gallon zones. This system offers a true soft start and soft stop and can be started via pressure or clock start.

VARIABLE FREQUENCY DRIVE WITH SMART SOFTWARE – Cost saving and environmentally conscience constant pressure flow control, with pump protection features: pressure surges, loss of prime, rapid cycling, dead heading, over pressure, motor overload, low/high voltage, thru door breaker disconnect.



FITTINGS AND ACCESSORIES – From our rugged pipe and grooved couplings to the long-lasting gauges, valves and electrical components included, the Simplicity 70VFD is complete with everything you need.

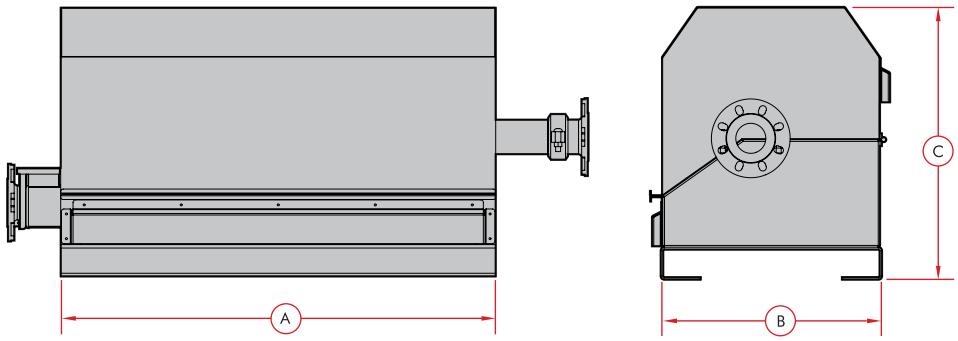
SELF COOLING – Vented for air flow to keep the pump cool.

SECURITY – Panel and enclosure lockable.

ENCLOSURE – Powder-coated marine-grade aluminum offers durable, non-corrosive housing to stand up to the elements.

PUMP – Durable and long lasting centrifugal pumps for boost or suction lift applications, with superior performance to horsepower. Offered in 5 hp, with top-of-the-line components that are only available as costly upgrades on other pumps.

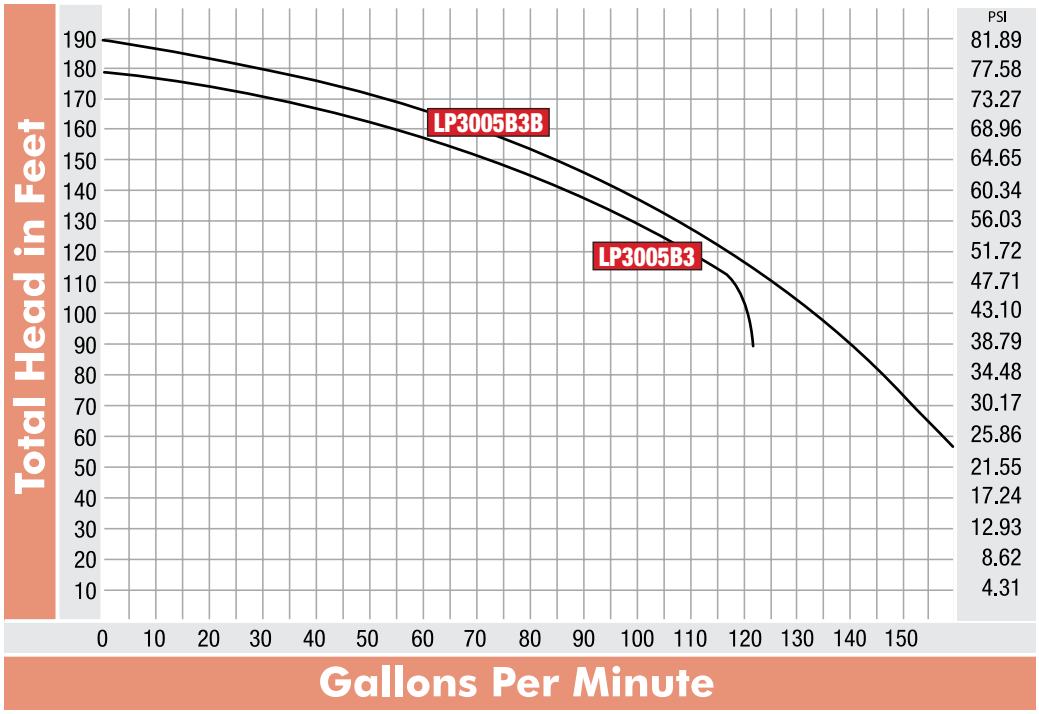
Dimensions



A	B	C
44"	22 1/8"	27 1/4"

The Simplicity 70 VFD

Curves



*If you're using VFD, over 80GPM, Contact Munro.

Choosing the Right Simplicity Size								
PSI								
70	✓	✓	✓					
65	✓	✓	✓	✓	✓			
60	✓	✓	✓	✓	✓	✓		
55	✓	✓	✓	✓	✓	✓	✓	✓
50	✓	✓	✓	✓	✓	✓	✓	✓
45	✓	✓	✓	✓	✓	✓	✓	✓
40	✓	✓	✓	✓	✓	✓	✓	✓
	10	**20**	**30**	**40**	**50**	**60**	**70**	**80**
	GPM							

Specifications

HP	Incoming Power	Voltage	Starting Method	Discharge in	Suction in	Control	Approx Ship Weight lbs	Model Number
5	1ph	208-230-460	PRESSURE/CLOCK	3	3	VFD	232	Simplcity70VFD-5(1)-_____*
	3ph						227	Simplcity70VFD-5(3))-_____*

*Specify voltage

Munro StandAlone

2′6″x3′

Munro's StandAlone Systems are designed to provide superior performance and value, these custom-engineered, UL Listed (QCZJ), integrated control systems solve the problems associated with many packaged pump systems by minimizing cost and complexity.

Munro has been building pump stations since 1972, and was an early adopter of Variable Frequency Drive (VFD) technology. By the mid-90s, we recognized a need to simplify pump station automation, and developed the Munro StandAlone software.

The StandAlone software automates the pump station using only the VFD – no need for external logic, such as hardwired controls or PLCs. This simplification makes our pump stations easier to install and maintain, and much less costly than our competitors. Instead of costly visits from factory reps, station troubleshooting and adjustments can be handled by service provider partners and, in most cases, the system is simple enough for the end user to maintain.

The simple, efficient, and effective Munro StandAlone Pump Station includes the necessary pump(s), suction and discharge fittings, check valves, isolation valves, skid, and enclosure to meet the demands of the application.

Power Options
- 220V or 440V
- Three-phase units to 20 hp
- Single-phase units, with phase conversion, to 75 hp

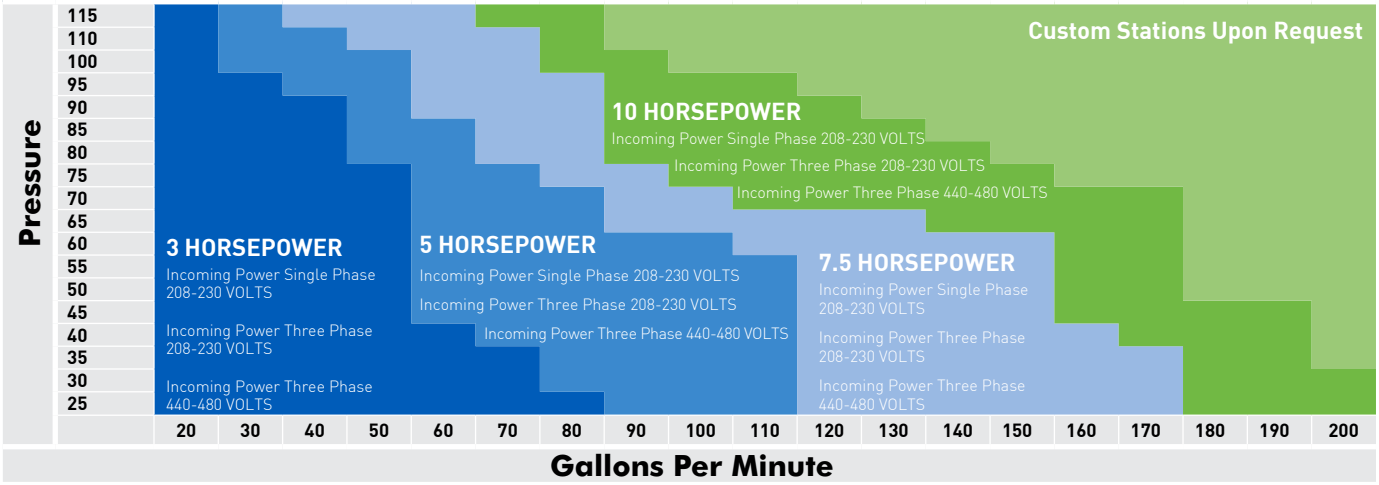
Pump Options
- Self-priming centrifugal
- Horizontal centrifugal
- Vertical centrifugal
- Submersible-style turbine
- Vertical multi-stage

Protection Features
- Pressure surges
- Loss of prime
- Rapid cycling
- Dead heading
- Over pressure
- Motor overload
- Low/high voltage
- Catastrophic discharge line break

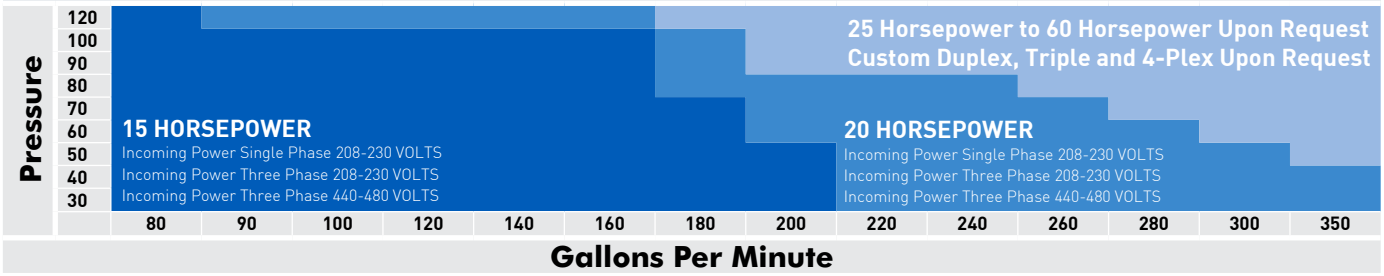
4′x5′

3′x4′

PICK A STATION – 2′ 6″ Wide x 3′ Length x 3′ 7″ High



PICK A STATION – 3′ Wide x 4′ Length x 5′ High



Building Munro StandAlone Part Numbers

Example – a system requiring 20 PSI and 30 GPM, with a 3 HP single phase, 208-230v pump, 2″ piping, no touch screen, a 1″ filter, no flow meter or bypass, in a 2′ 6″x 3′ enclosure, with no master valve, and integrated with a Baseline 3200 controller: SCSUL0820303ADXHXX5X-I

MODEL – SCSUL08	Pressure	Gallons Per Minute	A	B	C	D	E	F	G	H	I	–	J

A. Horsepower
.75
1
2
3
5
7.5
10
15
20

B. Phase Voltage
Single 208v-230v (A)
Three 208v-230v (B)
Three 480v (C)

C. Piping
2″ (0-75 GPM) (D)
3″ (76-180 GPM) (E)
4″ (181-320 GPM) (F)

D. Touch Screen
5.7″ (G)
None (X)

E. Filter Size – (Specify Micron on station request form)
1″ (27 GPM) (H)
1.5″ (65 GPM) (H.5)
Only these sizes used in 2′ 6″ x 3 enclosure
2″ (110 GPM) (I)
3″ (175 GPM) (J)
4″ (350 GPM) (K)
None (X)

F. Flow Meter
2″ (L)
3″ (M)
4″ (N)
None (X)

G. Bypass
2″ (3′ x 4′ enclosure only) (2)
3″ (3′ x 4′ enclosure only) (3)
4″ (4′ x 5′ enclosure only) (4)
None (X)

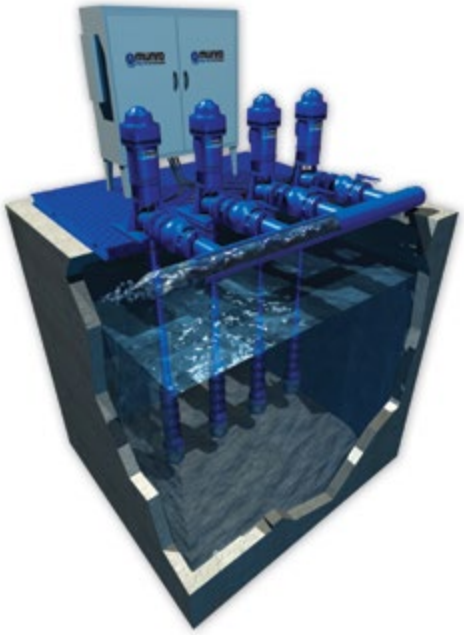
H. Enclosure Size
2′ 6″ x 3′ (5)
3′ x 4′ (6)
4′ x 5′ (7)
None (X)

I. Master Valve
3″ (8)
4″ (9)
None (X)

J. Baseline 3200 Controller
Integrated (I)
None (X)

After review and approval by our Control Technicians, we will append our UL Listing ID, SCSUL08, to the beginning of the part number.

Custom Prefabricated Stations



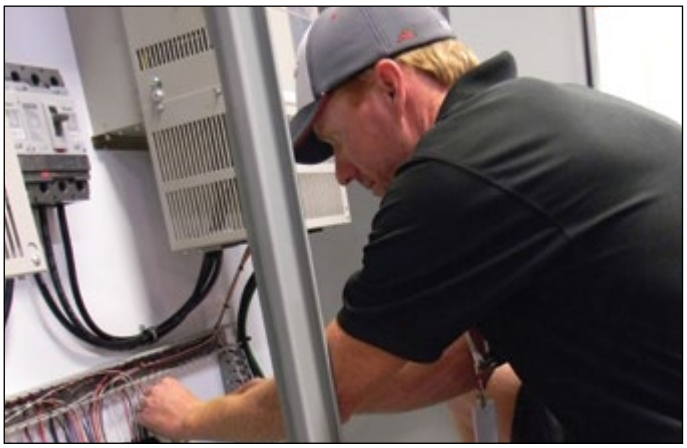
We built our first prefabricated pumping station in 1970. Although pump, pipe and valve technology has seen only minor changes, the technology that drives how the pumps are controlled has changed dramatically! Munro has been on the cutting edge of those changes through the use of Variable Frequency Drives (VFDs) and Programmable Logic Controllers (PLCs) long before they became the industry standard.

Creating unique solutions to meet your requirements
We provide custom systems, designed, built, tested and serviced with a personal commitment to solving customer needs. Each system is designed and specified according to individual customer requirements, ensuring all needs and budget guidelines are met. We can help you identify the problem and apply our expertise to solve it.

We stand behind our stations
With Munro's innovative product line and unmatched expertise, we can offer stations with unprecedented reliability and performance. We routinely assist with installations and troubleshoot to ensure a smooth start-up and ongoing support. And with our Munro Webview remote monitoring, you know your system is performing and we can help troubleshoot, nationwide.

Safety is a top priority
All completed Munro electrical panels are listed with the Underwriters Laboratory (UL 508) to insure that our products meet rigorous safety requirements.

Did You Know?
We test our pump stations to design parameters in our in-house test center to ensure a smooth start up.



Hose

Don't take chances! Ask if your hose distributor is a member of the NAHAD Hose Safety Institute.

Safe Hose Assemblies Protect Your Workforce, Product, Reputation and Profitability

- Workforce – fewer accidents, reduce lost employee time
- Product – avoid unplanned downtime, inconsistent machinery performance or poor product perception
- Reputation – safety issues could bring lawsuits, OSHA fines and environmental issues
- Profitability – any waste cuts into profitability and unsafe workplace, machinery, or equipment creates inefficiency and waste

Our hose capabilities and configurations are endless – with crimp capabilities to 10". If you need help selecting the right hose for the job, just call on the experts at Munro.

What is the best type of hose for my application?
Important aspects for choosing the right type of hose can be summed up in an easy to remember acronym: **STAMPED**

Size ——— Inner diameter and length

Temperature — Minimum and maximum of the material conveyed and environmental expectations

Application — How will the hose be used? Suction or discharge? Will it be drug? What is the environment the hose will be in?

Media ——— What will be going through the hose? Is it water, chemicals, fuels or something else? Dirty water or clean water?

Pressure ——— To how much pressure will the assembly be exposed?

Ends ——— What type, orientation and attachment methods are needed?

Delivery ——— What are the testing, quality, packaging, and delivery requirements?

Common hose types for irrigation applications

Suction (can be used for discharge if shape is required)
- PVC Clear – a basic, economical option (p.114)
- PVC OD critical schedule 40 sized (spa hose) – for applications where glued joints are necessary (p.115)
- PVC Industrial Strength – fabric reinforced hose with external drag helix (p.116)
- Rubber – smooth cover, good for water applications (p.117)

Discharge Layflat Hose – easy to bring to a job site and roll out for immediate use
- PVC Layflat Blue – for lower pressure applications – Max. 40–80 PSI (p.119)
- PVC Layflat Red – for medium pressures – Max. 100–150 PSI (p.119)
- Mill Hose – includes a cloth cover for added durability – Max. 150 PSI (p.120)
- Rubber Discharge Hose – industrial strength discharge hose (p.121)
- General Purpose Air & Water Hose – when garden hose will not cut it... this heavy duty hose is perfect for spray down applications or air compressor service (p.121)

Did You Know?
Need help selecting hose? We have a hose selection tool on p.187

HOSE

Hose End Fitting Options


King Nipples
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Groove King Nipple
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PVC Water Suction Hose

PVC Water Suction Hose is general purpose water hose used for suction and discharge service in irrigation and construction. Flexible, abrasion resistant PVC with a rigid PVC helix. Temperature -4° – 150° F

Hose Size in	Approx. Hose Weight lbs/ft	Working Pressure psi	Model Number
3/4	.2	90	HO075PVC
1	.25	90	HO100PVC
1 1/4	.37	80	HO1250PVC
1 1/2	.44	75	HO150PVC
2	.67	75	HO200PVC
2 1/2	.9	75	HO250PVC
3	1.14	65	HO300PVC
4	1.81	55	HO400PVC
5	3.09	35	HO500PVC
6	3.36	35	HO600PVC

C - Cam and Groove Coupling

KN - King Nipple

Hose Size in	Approx. Hose Weight lbs/ft	Approx. Fittings Weight lbs	Assembled with C + King Nipple				
			5′	10′	15′	20′	25′
1 1/2	.54	2	HO15PVCX5CKN	HO15PVCX10CKN	HO15PVCX15CKN	HO15PVCX20CKN	HO15PVCX25CKN
2	1.1	3	HO2PVCX5CKN	HO2PVCX10CKN	HO2PVCX15CKN	HO2PVCX20CKN	HO2PVCX25CKN
3	2.1	6	HO3PVCX5CKN	HO3PVCX10CKN	HO3PVCX15CKN	HO3PVCX20CKN	HO3PVCX25CKN
4	2.9	10	HO4PVCX5CKN	HO4PVCX10CKN	HO4PVCX15CKN	HO4PVCX20CKN	HO4PVCX25CKN
6	5.75	25	HO6PVCX5CKN	HO6PVCX10CKN	HO6PVCX15CKN	HO6PVCX20CKN	HO6PVCX25CKN

Did You Know?
Hose is sold by the foot or by the assembly!

Assembly

NAHAD Listed Member Colorado's Oldest Listed Member

Schedule 40 Size Hose

Schedule 40-sized grey flexible hose is used primarily for suction line and low pressure applications where a glued end is necessary. Temperature -10° – 130° F

Hose Size in	Approx. Hose Weight in lbs/ft	Working Pressure psi	Model Number
1.0 ID X 1.32 OD	.2	90	HO100SPA
1.5 ID X 1.89 OD	.47	85	HO150SPA
2.0 ID X 2.36 OD	.66	85	HO200SPA
3.0 ID X 3.50 OD	1.20	60	HO300SPA

F - Cam and Groove Coupling

Foot Valves

Y - PVC Cam Coupler

(Included with Assembly)

Hose Size in	Approx. Hose Weight lbs/ft	Approx. Fittings Weight lbs	Hose Kit includes aluminum fitting for pump end and PVC Foot Valve					
			5′	10′	15′	20′	25′	30′
1.5 ID X 1.89 OD	.5	2	MSHK15005FV	MSHK15010FV	MSHK15015FV	MSHK15020FV	MSHK15025FV	MSHK15030FV
2.0 ID X 2.36 OD	.67	3	MSHK20005FV	MSHK20010FV	MSHK20015FV	MSHK20020FV	MSHK20025FV	MSHK20030FV
3.0 ID X 3.50 OD	1.15	6	MSHK30005FV	MSHK30010FV	MSHK30015FV	MSHK30020FV	MSHK30025FV	MSHK30030FV

Manufactured to schedule 40 sizing specifications. Will fit into standard PVC fittings.
Hose expands under pressure.
Not intended for buried applications.

Assembly

Did You Know?
Grab-N-Go suction hose kits come with Part F camlock and Foot Valve.

PVC Industrial Hose

PVC Industrial strength hose is built for challenging environments. Constructed with an outside Helix and fabric reinforced shell, this hose is ideal for use in construction sites, quarries and mining or other hostile environments. Temperature -4° – 150° F

Hose Size in	Approx. Hose Weight lbs/ft	Working Pressure psi	Model Number
2	.54	100	H026200
3	1.15	100	H036200
4	1.9	75	H046200
6	4	70	H066200
8	5.25	50	H086200
10	7.8	35	H0106200
12	11	25	H0126200

20' Standard Length

Custom assemblies available with clamps or crimp sleeves.

Spiral Clamps

Crimp Sleeves

Punch-style Clamps

Munro Centrifugal Pump Discharge Kit

Our specially designed aluminum elbow and hose assembly offers a flexible, easy connection for your discharge line. Quick disconnect camlock fittings allow easy pump removal for winterization or maintenance. Perfect for use in our Universal PRO Pump Enclosure, or anywhere you desire easy connect and disconnect access on the discharge side of your pump.

INCLUDES:

- **Pump to fitting:** 1 ½" NPT Nipple
- **Fitting to hose:** 1 ½" camlock x FMPT for easy hose attachment
- **Hose:**1 ½" Black rubber hose, 150 working psi, 1 ½" camlock fittings on both ends
- **Hose to irrigation inlet: 1 1/2"** PVC glue fitting marries the irrigation system piping and hose

NOTE: Keep camlock lock ears at the top and bottom to avoid leaks.

Rubber Water Suction Hose

NAHAD Listed Member — Colorado's Oldest Listed Member

Rubber Water Suction Hose is a general-duty service hose. This hose offers a long life and increased bend radius when compared to general purpose PVC hose. Temperature -40° – 180° F

Hose Size in	Approx. Hose Weight lbs/ft	Working Pressure psi	Model Number
1	.54	150	H0100BRS
1 1/2	.88		H0150BRS
2	1.1		H0200BRS
2 1/2	1.55		H0250BRS
3	2.1		H0300BRS
4	2.9	100	H0400BRS
5	4.6		H0500BRS
6	5.75		H0600BRS
8	7.78		H0800BRS
10	10.29		H01000BRS
12	16.74		H01200BRS

E - Cam and Groove Coupling

C - Cam and Groove Coupling

King Nipple

Hose Size in	Approx. Hose Weight lbs/ft	Approx. Fittings Weight lbs	Assembled with C + E Cam Fittings					
			5′	10′	15′	20′	25′	50′
1 1/2	.08	2	HO15BRSX5CE	HO15BRSX10CE	HO15BRSX15CE	HO15BRSX20CE	HO15BRSX25CE	HO15BRSX50CE
2	1.05	3	HO2BRSX5CE	HO2BRSX10CE	HO2BRSX15CE	HO2BRSX20CE	HO2BRSX25CE	HO2BRSX50CE
3	1.98	6	HO3BRSX5CE	HO3BRSX10CE	HO3BRSX15CE	HO3BRSX20CE	HO3BRSX25CE	HO3BRSX50CE
4	2.68	10	HO4BRSX5CE	HO4BRSX10CE	HO4BRSX15CE	HO4BRSX20CE	HO4BRSX25CE	HO4BRSX50CE
6	5.37	25	HO6BRSX5CE	HO6BRSX10CE	HO6BRSX15CE	HO6BRSX20CE	HO6BRSX25CE	HO6BRSX50CE

Hose Size in	Approx. Hose Weight lbs/ft	Approx. Fittings Weight lbs	Assembled with C + King Nipple					
			5′	10′	15′	20′	25′	50′
1 1/2	.08	2	HO15BRSX5KN	HO15BRSX10KN	HO15BRSX15KN	HO15BRSX20KN	HO15BRSX25KN	HO15BRSX50KN
2	1.05	3	HO2BRSX5KN	HO2BRSX10KN	HO2BRSX15KN	HO2BRSX20KN	HO2BRSX25KN	HO2BRSX50KN
3	1.98	6	HO3BRSX5KN	HO3BRSX10KN	HO3BRSX15KN	HO3BRSX20KN	HO3BRSX25KN	HO3BRSX50KN
4	2.68	10	HO4BRSX5KN	HO4BRSX10KN	HO4BRSX15KN	HO4BRSX20KN	HO4BRSX25KN	HO4BRSX50KN
6	5.37	25	HO6BRSX5KN	HO6BRSX10KN	HO6BRSX15KN	HO6BRSX20KN	HO6BRSX25KN	HO6BRSX50KN

Custom lengths available.

Did You Know?
Munro can build custom hose assemblies any length to fit your specific needs!

Oilfield Suction Hose

Designed for the most extreme environments – oilfield, underground, and coal mines. Outside corrugation gives this hose extreme flexibility and longevity.
Temperature -20° – 180° F

Hose Size in	Approx. Hose Weight lbs/ft	Working Pressure psi	Model Number
1	.5	150	HO100SUPER
1 1/2	.7		HO150SUPER
2	.9		HO200SUPER
2 1/2	1.20		HO250SUPER
3	1.4		HO300SUPER
4	2.30		HO400SUPER
6	4.75	100	HO600SUPER
8	8.17		HO800SUPER

Hose Size in	Approx. Hose Weight lbs/ft	Approx. Fittings Weight lbs	Assembled with C + E Cam Fittings							
			5′	10′	15′	20′	25′	30′	50′	100′
1 1/2	.8	2	HO150SHX5CE	HO150SHX10CE	HO150SHX15CE	HO150SHX20CE	HO150SHX25CE	HO150SHX30CE	HO150S0HX50CE	HO150SHX100CE
2	1.05	3	HO20SHX5CE	HO20SHX10CE	HO20SHX15CE	HO20SHX20CE	HO20SHX25CE	HO20SHX30CE	HO20S0HX50CE	HO20SHX100CE
3	1.98	6	HO30SHX5CE	HO30SHX10CE	HO30SHX15CE	HO30SHX20CE	HO30SHX25CE	HO30SHX30CE	HO30S0HX50CE	HO30SHX100CE
4	2.68	10	HO40SHX5CE	HO40SHX10CE	HO40SHX15CE	HO40SHX20CE	HO40SHX25CE	HO40SHX30CE	HO40S0HX50CE	HO40SHX100CE
6	5.37	25	HO60SHX5CE	HO60SHX10CE	HO60SHX15CE	HO60SHX20CE	HO60SHX25CE	HO60SHX30CE	HO60S0HX50CE	HO60SHX100CE

Hose Size in	Approx. Hose Weight lbs/ft	Approx. Fittings Weight lbs	Assembled with C + King Nipple				
			5′	10′	15′	20′	25′
1 1/2	.8	2	HO150SHX5KN	HO150SHX10KN	HO150SHX15KN	HO150SHX20KN	HO150SHX25KN
2	1.05	3	HO20SHX5KN	HO20SHX10KN	HO20SHX15KN	HO20SHX20KN	HO20SHX25KN
3	1.98	6	HO30SHX5KN	HO30SHX10KN	HO30SHX15KN	HO30SHX20KN	HO30SHX25KN
4	2.68	10	HO40SHX5KN	HO40SHX10KN	HO40SHX15KN	HO40SHX20KN	HO40SHX25KN
6	5.37	25	HO60SHX5KN	HO60SHX10KN	HO60SHX15KN	HO60SHX20KN	HO60SHX25KN

Petro Hose

Petroleum transfer hose is engineered for those applications for bulk transfer of petroleum products.

Hose Size in	Approx. Hose Weight lbs/ft	Working Pressure psi	Model Number
1	.5	200	HO100PETRO
1 1/2	.8	150	HO150PETRO
2	1	150	HO200PETRO
2 1/2	1.5	150	HO250PETRO
3	1.7	150	HO300PETRO
4	2.5	150	HO400PETRO
8	7.12	100	HO800PETRO

Did You Know?
You can easily calculate the weight of a hose assembly with this simple formula!

Calculating Assembly Weight:									
	X	=	+	=					
Hose Wt per Ft		Length		Subtotal		Fittings Wt		Assembly Wt	

NAHAD Listed Member Colorado's Oldest Listed Member

Collapsible Discharge Hose

Blue Collapsible Discharge Hose

Blue collapsible discharge hose can be coiled or folded, requiring little space in transporting or storage. The 300' standard rolls can be cut to any length. Perfect for low pressure applications. Temperature -10° – 120° F

Hose Size in	Approx. Hose Weight lbs/ft	Working Pressure psi	Model Number
3/4	.08	140	HO075DIS
1	.1	110	HO100DIS
1 1/4	.12	80	HO125DIS
1 1/2	.14	80	HO150DIS
2	.2	80	HO200DIS
3	.3	60	HO300DIS
4	.4	45	HO400DIS
6	.75	40	HO600DIS
8	1.1	40	HO800DIS

Hose Size in	Approx. Hose Weight lbs/ft	Approx. Fittings Weight lbs	Assembled with C + E Cam Fittings		
			25'	50'	100'
1 1/2	.14	2	HO15X25BC&E	HO15X50BC&E	HO15X100BC&E
2	.2	3	HO20X25BC&E	HO20X50BC&E	HO20X100BC&E
3	.3	6	HO30X25BC&E	HO30X50BC&E	HO30X100BC&E
4	.4	10	HO40X25BC&E	HO40X50BC&E	HO40X100BC&E
6	.75	25	HO60X25BC&E	HO60X50BC&E	HO60X100BC&E

Red Collapsible Discharge Hose

Red medium-duty collapsible discharge hose is constructed with a premium quality PVC tube and cover reinforced with multiple spiral fabric. Temperature -5° – 170° F

Hose Size in	Approx. Hose Weight lbs/ft	Working Pressure psi	Model Number
1 1/2	.2	150	HO150DISM
2	.3		HO200DISM
3	.52		HO300DISM
4	.75		HO400DISM
6	1.25	120	HO600DISM
8	1.89		HO800DISM

Hose Size in	Approx. Hose Weight lbs/ft	Approx. Fittings Weight lbs	Assembled with C + E Cam Fittings		
			25'	50'	100'
1 1/2	.2	2	HO15X25RC&E	HO15X50RC&E	HO15X100RC&E
2	.3	3	HO20X25RC&E	HO20X50RC&E	HO20X100RC&E
3	.52	6	HO30X25RC&E	HO30X50RC&E	HO30X100RC&E
4	.75	10	HO40X25RC&E	HO40X50RC&E	HO40X100RC&E
6	1.25	25	HO60X25RC&E	HO60X50RC&E	HO60X100RC&E

Collapsible Mill Hose

Mill Hose is a single jacket lightweight 150 PSI hose designed for clean-up and wash-down in factories and yards. An ideal industrial discharge hose. Polyester reinforces an ozone-resistant extruded synthetic rubber tube. Temperature -58° – 150° F

Hose Size in	Approx. Hose Weight lbs/ft	Working Pressure psi	Model Number
1	.12	150	HO100MILL
1 1/2	.2		HO150MILL
2	.34		HO200MILL
2 1/2	.42		HO250MILL
3	.54		HO300MILL
4	.8		HO400MILL

Hose Size in	Approx. Hose Weight lbs/ft	Approx. Fittings Weight lbs	Assembled with C + E Cam Fittings		
			25′	50′	100′
1	.12	2	HO100MILLX25	HO100MILLX50	HO100MILLX100
1 1/2	.2	3	HO150MILLX25	HO150MILLX50	HO150MILLX100
2	.34	6	HO200MILLX25	HO200MILLX50	HO200MILLX100
2 1/2	.42	7	HO250MILLX25	HO250MILLX50	HO250MILLX100
3	.54	10	HO300MILLX25	HO300MILLX50	HO300MILLX100
4	.8	25	HO400MILLX25	HO400MILLX50	HO400MILLX100

Hose Size in	Approx. Hose Weight lbs/ft	Approx. Fittings Weight lbs	Assembled with C + King Nipple		
			25′	50′	100′
1	.12	2	HO100MILLX25CKN	HO100MILLX50CKN	HO100MILLX100CKN
1 1/2	.2	3	HO150MILLX25CKN	HO150MILLX50CKN	HO150MILLX100CKN
2	.34	6	HO200MILLX25CKN	HO200MILLX50CKN	HO200MILLX100CKN
2 1/2	.42	6.5	HO250MILLX25CKN	HO250MILLX50CKN	HO250MILLX100CKN

King Nipples
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NAHAD Listed Member Colorado's Oldest Listed Member

Collapsible Discharge Hose

Black rubber water discharge hose for agricultural or construction applications. The cover is designed to withstand weather, abrasion and ozone. Temperature -40° – 180° F

Hose Size in	Approx. Hose Weight lbs/ft	Working Pressure psi	Model Number
1 1/2	.45	150	HO150BRDIS
2	.65		HO200BRDIS
2 1/2	.8		HO250BRDIS
3	1.1		HO300BRDIS
4	1.4		HO400BRDIS
5	1.6		HO500BRDIS
6	2		HO600BRDIS
8	4		HO800BRDIS
10	5		HO1000BRDIS
12	6		HO1200BRDIS

Hose Size in	Approx. Hose Weight lbs/ft	Approx. Fittings Weight lbs	Assembled with C + E Cam Fittings			
			25′	30′	50′	100′
2	.65	3	HO2BRDISX25	HO2BRDISX30	HO2BRDISX50	HO2BRDISX100
3	1.1	6	HO3BRDISX25	HO3BRDISX30	HO3BRDISX50	HO3BRDISX100
4	1.4	10	HO4BRDISX25	HO4BRDISX30	HO4BRDISX50	HO4BRDISX100
6	2	25	HO6BRDISX25	HO6BRDISX30	HO6BRDISX50	HO6BRDISX100

Hose Size in	Approx. Hose Weight lbs/ft	Approx. Fittings Weight lbs	Assembled with Grooved Ends	
			10′	25′
6	2	9.4	HO6BRDISX10VIC	HO6BRDISX25VIC
8	4	16.44	HO8BRDISX10VIC	HO8BRDISX25VIC
10	5	21.78	HO10BRDISX10VIC	HO10BRDISX25VIC
12	6	33.18	HO12BRDISX10VIC	HO12BRDISX25VIC

NOTE: 12″ hose cannot be crimped.

Air and Water Hose

Tough, economical and time-proven hose used in countless applications – wash down, service and air compression. Temperature -40° – 200° F

Hose Size in	Approx. Weight lbs/ft	Working Pressure psi	Model Number
1/4	.12	200	HO250200RDIS
3/8	.17		HO375200RDIS
1/2	.21		HO050200RDIS
3/4	.38		HO075200RDIS
1	.43		HO100200RDIS
1 1/4	.81		HO125200RDIS
1 1/2	.89		HO150200RDIS
2	1.28		HO200200RDIS

Hose Size in	Approx. Weight lbs/ft	Approx. Fittings Weight lbs	Assembled with Crows Foot
			50′
1/2	.21	.4	H0050X50CF
3/4	.38	.6	H0075X50CF
1	.43	.6	H0100X50CF

Specialty Hose

Clear Braid Hose

Temperature Range:
-10°F to +130°F

A good discharge hose for potable water and mild chemicals. Temperature -10° – 130° F

Approx. Weight lbs/ft	Working Pressure psi	Hose Size in	Model Number
6.5	250	1/4	HO025CB
9.0		3/8	HO375CB
14		1/2	HO050CB
16		5/8	HO675CB
21	150	3/4	HO075CB
32	125	1	HO100CB
61	100	1 1/4	HO1250CB
72	75	1 1/2	HO150CB
100		2	HO200CB

Agricultural Spray Hose

Use for agricultural spraying such as insecticides, fertilizers, water, compressed air, light chemical solutions and pest control. Temperature -10° – 130° F

Approx. Weight lbs/ft	Working Pressure psi	Hose Size in	Model Number
.13	800	3/8	HO375AGS800
.20		1/2	HO050AGS800
.35		3/4	HO075AGS750
.08	600	1/4	HO250AGS
.12		3/8	HO375AGS
.17		1/2	HO050AGS
.23		5/8	HO575AGS
.27		3/4	HO075AGS

Food Grade Suction/Discharge Hose

Used in food processing for suction and discharge applications. Temperature -30° – 200° F

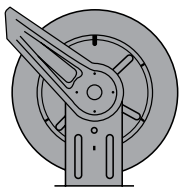
Approx. Weight lbs/ft	Working Pressure psi	Hose Size in	Model Number
1.0	150	1 1/2	HO150FOOD
1.3		2	HO200FOOD
2.15		3	HO300FOOD
3.3		4	HO400FOOD

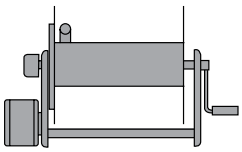
Suction Hose Agricultural / Septic

Used in septic and wastewater applications. Can also be used for pump suction.
Temperature -40° – 160° F

Approx. Weight lbs/ft	Hose Size in	Model Number
.28	1	HO100AGRI
.44	1 1/2	HO150AGRI
.67	2	HO200AGRI
1.14	3	HO300AGRI
1.84	4	HO400AGRI

Hose Reels





We offer air, water and grease spring driven hose reels as well as hand crank motor driven hose reels. Call us for assistance.

Did You Know?
Call today with your specific hose application and pressure requirements.

NAHAD Listed Member Colorado's Oldest Listed Member

Heavy Duty T-Bolt Clamps

- Bolt Material: 8.8 Grade steel. Zinc plated.
- Band and Bridge Material: Stainless steel AISI 430 (Din 1.4016).
- Other components: Zinc plated steel.

Approx. Weight lbs/Carton	Carton Quantity	Range of Adjustment	Model Number
3.2	50	13/16" - 29/32"	CL3019039
3.26		29/32" - 1"	CL3019047
3.29		1" - 1 1/16"	CL3019055
6.23		1 5/16" - 1 7/16"	CL3019098
6.24		1 7/16" - 1 9/16"	CL3019100
6.5		1 9/16" - 1 11/16"	CL3019119
6.96		1 11/16" - 1 7/8"	CL3019127
7.21		1 7/8" - 2"	CL3019135
3.79	25	2" - 2 5/32"	CL3019143
4.25		2 5/32" - 2 5/16"	CL3019151
4.31		2 5/6" - 2 1/2"	CL3019160
4.52		2 1/2" - 2 11/16"	CL3019178
7.22		2 11/16" - 2 7/8"	CL3019186
7.49		2 7/8" - 3 1/8"	CL3019194
7.61		3 1/8" - 3 11/32"	CL3019207
7.9		3 11/32" - 3 9/16"	CL3019215
8.14		3 9/16" - 3 13/16"	CL3019223
8.38		3 13/16" - 4 3/32"	CL3019231
9.33		4 3/32" - 4 3/8"	CL3019240
9.55		4 3/8" - 4 3/4"	CL3019258
7.40	10	5 7/8" - 6 3/8"	CL3019290
8.10		6 3/8" - 6 7/8"	CL3019303
9.25		8 3/8" - 8 7/8"	CL3019346
9.70		8 7/8" - 9 3/8"	CL3019354
10.48	15	12 7/16" - 13"	CL3019485

Sold by the carton or individually.

Punch-Style Clamps

Punch-Lok Clamps are manufactured with electrogalvanized standard steel.

Approx. Weight lbs/Carton	Description	Carton Quantity	Inside Diameter	Model Number
6.1	Galvanized	100	1"	CLCP4
6.1	Stainless Steel		1"	CLCP4S
7.5	Galvanized		1 1/4"	CLCP5
8.1	Galvanized		1 1/2"	CLCP6
8.1	Stainless Steel		1 1/2"	CLCP6S
9.6	Galvanized		2"	CLCP8
9.6	Stainless Steel		2"	CLCP8S
5.6	Galvanized	50	2 1/2"	CLCP10
5.6	Stainless Steel		2 1/2"	CLCP10S
6.2	Galvanized		3"	CLCP12
6.5	Galvanized		3 1/2"	CLCP14
6.5	Stainless Steel		3 1/2"	CLCP14S
4.0	Galvanized	25	4"	CLCP16
4.0	Stainless Steel		4"	CLCP16S
4.6	Galvanized		4 1/2"	CLCP18
4.6	Stainless Steel		4 1/2"	CLCP18S
4.8	Galvanized		5"	CLCP20
4.8	Stainless Steel		5"	CLCP20S
5.1	Galvanized		6"	CLCP24
5.1	Stainless Steel		6"	CLCP24S
12.0	Galvanized	50	7"	CLCP28
12.5	Galvanized		8"	CLCP32
12.5	Stainless Steel		8"	CLCP32S

NAHAD Listed Member Colorado's Oldest Listed Member

Worm Gear Clamps

- All stainless steel construction
- Especially suited to industrial applications
- Screw: 5/16" hex-head – 304 stainless steel
- Band and housing: 1/2" wide – 300 grade stainless steel

Approx. Weight lbs/100	Range of Adjustment	Model Number
5.0	3/8" - 7/8"	CLH6SS
5.0	7/16" - 1"	CLH8SS
5.0	1/2" - 1 1/4"	CLH12SS
5.0	3/4" - 1 1/2"	CLH16SS
6.0	3/4" - 1 3/4"	CLH20SS
6.0	1" - 2"	CLH24SS
6.2	1 1/4" - 2 1/4"	CLH28SS
6.5	1 1/2" - 2 1/2"	CLH32SS
7	7/8" - 2 3/4"	CLH36SS
8.0	1 1/8" - 3"	CLH40SS
10.0	2 1/8" - 4"	CLH56SS
10.0	2 5/8" - 4 1/2"	CLH64SS
13.0	3 1/8" - 5"	CLH72SS
13	3 5/8" - 5 1/2"	CLH80SS
14.0	4 3/4" - 6 1/2"	CLH96SS

Double Bolt Clamps

These reusable clamps provide an efficient means to secure fittings for larger size, light or heavy wall hoses. Two-bolt design provides quadruple, full-circumference take-up. Double-tongue saddles bridge the gap between the reinforced, full-width bolt lugs as clamp is tightened, preventing pinching the hose. Can be attached in field or factory with standard tools. Manufactured with plated malleable iron, with steel machine bolts and nuts.

Approx. Weight lbs	Range of Adjustment	Model Number
.5	7/8" - 1 9/64"	CL3T0029AP
.5	1 5/16" - 1 19/32"	CL3T0040AP
.5	1 5/8" - 1 15/16"	CL3T0049AP
.6	1 7/8" - 2 3/8"	CL3T0060AP
1.6	3 1/2" - 3 13/16"	CL3T0400AP
1.9	4 1/32" - 4 9/32"	CL3T0463AP
2.4	4 1/4" - 4 15/16"	CL3T0525AP
2.6	5 1/8" - 5 11/16"	CL3T0600AP
2.8	5 15/16" - 6 1/2"	CL3T0675AP
3.5	6 1/2" - 7 9/16"	CL3T0769AP
4.6	7 11/16" - 8 3/16"	CL3T0818AP
5.4	8 1/4" - 8 7/8"	CL3T0875AP
5.9	8 15/16" - 9 7/8"	CL3T0988AP
9.2	9 15/16" - 11 3/8"	CL3T1125AP
9.2	11 3/16" - 13"	CL3T1275AP
10.5	12 3/16" - 14"	CL3T1360AP

Center Punch Tools

Approx. Weight lbs	Description	Model Number
1.1	Ratcheting tool 3/8" to 5/8" center punch clamps	CLS038
3.15	Lever tensioning tool for center punch clamps	CLB1
4.4	Screw tensioning tool for lock over clamps	CLC001
1.14	Use with CLC001 (Lever)	CLJ001
1.4	Use with CLC001 (Ratchet)	CLJ050

Munro offers a wide range of fittings and flanges to complete your hose or pipe configuration. We also offer hose assemblies complete with fittings and ready to put into the field!

Common Fittings for Irrigation Applications

Cam & Groove (p. 126-129)
Used in irrigation and industrial applications to make the transition from a piece of equipment to piping.

King Nipple and Hose Menders (p. 131)
Used as inserts for hoses with threaded or grooved ends or to mend two hoses together.

Ball and Socket (p. 132)
Primarily used in irrigation, the single lever allows for quick assembly and removal.

Pin lug hose shank couplings (p. 133)
An economical hose insert by male thread and female thread.

Crows foot couplings (p. 133)
Used for air, water and compressor service.

Garden hose fittings (p. 134)
Transition from pipe thread to garden hose thread and shanks for hoses.

Garden hose and industrial spray nozzles (p. 134)
We carry a wide variety of different materials and configurations.

Fire hose fittings (p. 135)
These fittings transition from a fire hose thread to a pipe thread. Often used by contractors, municipalities and water treatment plants.

Bushings, bell reducers, crosses, tees, caps, pipe nipples, elbows and swaged nipples (p. 136-142)
Components to complete your piping system.

Flanges and flange gaskets (p. 143)
Transition from a flanged end to a thread or weld end.

Grooved fittings (p. 144-156)
Used in countless applications from irrigation to underground coal, hard rock, mining, oil and gas.

Clamps (p. 123-124)
From industrial to worm gear radiator style, we have all varieties of clamps.

HDPE couplings and transition couplings (p. 146-147)
Mechanical HDPE couplings and transition couplings offer a cost-effective, fast and easy way to join high density polyethylene pipe to HDPE and grooved steel pipe and fittings.


Cam and Groove
Page 126


King Nipples
Page 131


Ball & Socket
Page 132


Pin Lug
Page 133


Crows Foot
Page 133


Garden Hose
Page 134


Garden Hose Nozzles
Page 134


Fire Hose
Page 135


Bushings
Page 136


Flanges
Page 143


Grooved Fittings
Page 144-156


Clamps
Page 123-124


HDPE
Page 146-147

Male Cam x Female NPT – Part A

Size in	Aluminum	Polypropylene	Nyglass	Food Grade	Brass	Stainless Steel	Ductile Iron
1/2	AP050A	HF050APG	BV050ANG	FG050A	AP050ABR	AP050ASS	AP050ADI
3/4	AP075A	HF075APG	BV075ANG	FG075A	AP075ABR	AP075ASS	AP075ADI
1	AP100A	HF100APG	BV0100ANG	FG100A	AP100ABR	AP100ASS	AP100ADI
1 1/4	AP125A	HF1250APG	BV1250ANG	FG1250A	AP1250ABR	AP1250ASS	AP1250ADI
1 1/2	AP150A	HF150APG	BV150ANG	FG150A	AP150ABR	AP150ASS	AP150ADI
2	AP200A	HF200APG	BV200ANG	FG200A	AP200ABR	AP200ASS	AP200ADI
2 1/2	AP250A	*HF250APG	*BV250ANG	*FG250A	*AP250ABR	*AP250ASS	*AP250ADI
3	AP300A	HF300APG	BV300ANG	FG300A	AP300ABR	AP300ASS	AP300ADI
4	AP400A	HF400APG	BV400ANG	FG400A	AP400ABR	AP400ASS	AP400ADI
5	AP500A	—	—	—	AP500ABR	AP500ASS	AP500ADI
6	AP600A	—	—	—	AP600ABR	AP600ASS	AP600ADI
*8	AP800A	—	—	—	AP800ABR	AP800ASS	AP800ADI

Female Cam x Male NPT – Part B

Size in	Aluminum	Polypropylene	Nyglass	Food Grade	Brass	Stainless Steel	Ductile Iron
1/2	AP050B	HF050BPG	BV050BNG	FG050B	AP050BBR	AP050BSS	AP050BDI
3/4	AP075B	HF075BPG	BV075BNG	FG075B	AP075BBR	AP075BSS	AP075BDI
1	AP100B	HF100BPG	BV0100BNG	FG100B	AP100BBR	AP100BSS	AP100BDI
1 1/4	AP125B	HF1250BPG	BV1250BNG	FG1250B	AP1250BBR	AP1250BSS	AP1250BDI
1 1/2	AP150B	HF150BPG	BV150BNG	FG150B	AP150BBR	AP150BSS	AP150BDI
2	AP200B	HF200BPG	BV200BNG	FG200B	AP200BBR	AP200BSS	AP200BDI
2 1/2	AP250B	HF250BPG	BV250BNG	FG250B	AP250BBR	AP250BSS	AP250BDI
3	AP300B	HF300BPG	BV300BNG	FG300B	AP300BBR	AP300BSS	AP300BDI
4	AP400B	—	BV400BNG	FG400B	AP400BBR	AP400BSS	AP400BDI
5	AP500B	—	—	—	AP500BBR	AP500BSS	AP500BDI
6	AP600B	—	—	—	AP600BBR	AP600BSS	AP600BDI
*8	AP800B	—	—	—	AP800BBR	AP800BSS	AP800BDI

Female Cam x Hose Shank – Part C

Size in	Aluminum	Polypropylene	Nyglass	Food Grade	Brass	Stainless Steel	Ductile Iron
1/2	AP050C	HF050CPG	BV050CNG	FG050C	AP050CBR	AP050CSS	AP050CDI
3/4	AP075C	HF075CPG	BV075CNG	FG075C	AP075CBR	AP075CSS	AP075CDI
1	AP100C	HF100CPG	BV0100CNG	FG100C	AP100CBR	AP100CSS	AP100CDI
1 1/4	AP125C	HF1250CPG	BV1250CNG	FG1250C	AP1250CBR	AP1250CSS	AP1250CDI
1 1/2	AP150C	HF150CPG	BV150CNG	FG150C	AP150CBR	AP150CSS	AP150CDI
2	AP200C	HF200CPG	BV200CNG	FG200C	AP200CBR	AP200CSS	AP200CDI
2 1/2	AP250C	HF250CPG	BV250CNG	FG250C	AP250CBR	AP250CSS	AP250CDI
3	AP300C	HF300CPG	BV300CNG	FG300C	AP300CBR	AP300CSS	AP300CDI
4	AP400C	HF400CPG	BV400CNG	—	AP400CBR	AP400CSS	AP400CDI
5	AP500C	—	—	—	AP500CBR	AP500CSS	AP500CDI
6	AP600C	—	—	—	AP600CBR	AP600CSS	AP600CDI
*8	AP800C	—	—	—	AP800CBR	AP800CSS	AP800CDI

Stainless fittings are available in 316 or 304. Specify when ordering.
*8" Cam & Groove fittings are not universal across manufacturers. Consult Munro prior to order.

Did You Know?
Heavy-duty or light-duty Cam & Groove available – ask your Munro representative!

Female Cam x Female NPT – Part D

Size in	Aluminum	Polypropylene	Nyglass	Food Grade	Brass	Stainless Steel	Ductile Iron
1/2	AP050D	HF050DPG	BV050DNG	FG050D	AP050DBR	AP050DSS	AP050DDI
3/4	AP075D	HF075DPG	BV075DNG	FG075D	AP075DBR	AP075DSS	AP075DDI
1	AP100D	HF100DPG	BV0100DNG	FG100D	AP100DBR	AP100DSS	AP100DDI
1 1/4	AP125D	HF1250DPG	BV1250DNG	FG1250D	AP1250DBR	AP1250DSS	AP1250DDI
1 1/2	AP150D	HF150DPG	BV150DNG	FG150D	AP150DBR	AP150DSS	AP150DDI
2	AP200D	HF200DPG	BV200DNG	FG200D	AP200DBR	AP200DSS	AP200DDI
2 1/2	AP250D	HF250DPG	BV250DNG	FG250D	AP250DBR	AP250DSS	AP250DDI
3	AP300D	HF300DPG	BV300DNG	FG300D	AP300DBR	AP300DSS	AP300DDI
4	AP400D	HF400DPG	BV400DNG	FG400D	AP400DBR	AP400DSS	AP400DDI
5	AP500D	—	—	—	AP500DBR	AP500DSS	AP500DDI
6	AP600D	—	—	—	AP600DBR	AP600DSS	AP600DDI
*8	AP800D	—	—	—	AP800DBR	AP800DSS	AP800DDI

Male Cam x Hose Shank – Part E

Size in	Aluminum	Polypropylene	Nyglass	Food Grade	Brass	Stainless Steel	Ductile Iron
1/2	AP050E	HF050EPG	BV050ENG	FG050E	AP050EBR	AP050ESS	AP050EDI
3/4	AP075E	HF075EPG	BV075ENG	FG075E	AP075EBR	AP075ESS	AP075EDI
1	AP100E	HF100EPG	BV0100ENG	FG100E	AP100EBR	AP100ESS	AP100EDI
1 1/4	AP125E	HF1250EPG	BV1250ENG	FG1250E	AP1250EBR	AP1250ESS	AP1250EDI
1 1/2	AP150E	HF150EPG	BV150ENG	FG150E	AP150EBR	AP150ESS	AP150EDI
2	AP200E	HF200EPG	BV200ENG	FG200E	AP200EBR	AP200ESS	AP200EDI
2 1/2	AP250E	HF250EPG	BV250ENG	FG250E	AP250EBR	AP250ESS	AP250EDI
3	AP300E	HF300EPG	BV300ENG	FG300E	AP300EBR	AP300ESS	AP300EDI
4	AP400E	HF400EPG	BV400ENG	FG400E	AP400EBR	AP400ESS	AP400EDI
5	AP500E	—	—	—	AP500EBR	AP500ESS	AP500EDI
6	AP600E	—	—	—	AP600EBR	AP600ESS	AP600EDI
*8	AP800E	—	—	—	AP800EBR	AP800ESS	AP800EDI

Male Cam x Male NPT – Part F

Size in	Aluminum	Polypropylene	Nyglass	Food Grade	Brass	Stainless Steel	Ductile Iron
1/2	AP050F	HF050FPG	BV050FNG	FG050F	AP050FBR	AP050FSS	AP050FDI
3/4	AP075F	HF075FPG	BV075FNG	FG075F	AP075FBR	AP075FSS	AP075FDI
1	AP100F	HF100FPG	BV0100FNG	FG100F	AP100FBR	AP100FSS	AP100FDI
1 1/4	AP125F	HF1250FPG	BV1250FNG	FG1250F	AP1250FBR	AP1250FSS	AP1250FDI
1 1/2	AP150F	HF150FPG	BV150FNG	FG150F	AP150FBR	AP150FSS	AP150FDI
2	AP200F	HF200FPG	BV200FNG	FG200F	AP200FBR	AP200FSS	AP200FDI
2 1/2	AP250F	HF250FPG	BV250FNG	FG250F	AP250FBR	AP250FSS	AP250FDI
3	AP300F	HF300FPG	BV300FNG	FG300F	AP300FBR	AP300FSS	AP300FDI
4	AP400F	HF400FPG	BV400FNG	FG400F	AP400FBR	AP400FSS	AP400FDI
5	AP500F	—	—	—	AP500FBR	AP500FSS	AP500FDI
6	AP600F	—	—	—	AP600FBR	AP600FSS	AP600FDI
*8	AP800F	—	—	—	AP800FBR	AP800FSS	AP800FDI

Stainless fittings are available in 316 or 304. Specify when ordering.
*8" Cam & Groove fittings are not universal across manufacturers. Consult Munro prior to order.

Did You Know?
8" Cam & Groove fittings are not universal across manufacturers. Consult Munro prior to order.

Dust Cap – Part DC

Size in	Aluminum	Polypropylene	Nyglass	Food Grade	Brass	Stainless Steel	Ductile Iron
1/2	AP050DC	HF050DCPG	BV050DCNG	FG050DC	AP050DCBR	AP050DCSS	AP050DCDI
3/4	AP075DC	HF075DCPG	BV075DCNG	FG075DC	AP075DCBR	AP075DCSS	AP075DCDI
1	AP100DC	HF100DCPG	BV0100DCNG	FG100DC	AP100DCBR	AP100DCSS	AP100DCDI
1 1/4	AP125DC	HF1250DCPG	BV1250DCNG	FG1250DC	AP1250DCBR	AP1250DCSS	AP1250DCDI
1 1/2	AP150DC	HF150DCPG	BV150DCNG	FG150DC	AP150DCBR	AP150DCSS	AP150DCDI
2	AP200DC	HF200DCPG	BV200DCNG	FG200DC	AP200DCBR	AP200DCSS	AP200DCDI
2 1/2	AP250DC	HF250DCPG	BV250DCNG	FG250DC	AP250DCBR	AP250DCSS	AP250DCDI
3	AP300DC	HF300DCPG	BV300DCNG	FG300DC	AP300DCBR	AP300DCSS	AP300DCDI
4	AP400DC	HF400DCPG	BV400DCNG	FG400DC	AP400DCBR	AP400DCSS	AP400DCDI
5	AP500DC	—	—	—	AP500DCBR	AP500DCSS	AP500DCDI
6	AP600DC	—	—	—	AP600DCBR	AP600DCSS	AP600DCDI
*8	AP800DC	—	—	—	AP800DCBR	AP800DCSS	AP800DCDI

Dust Plug – Part DP

Size in	Aluminum	Polypropylene	Nyglass	Food Grade	Brass	Stainless Steel	Ductile Iron
1/2	AP050DP	HF050DPPG	BV050DPNG	FG050DP	AP050DPBR	AP050DPSS	AP050DPDI
3/4	AP075DP	HF075DPPG	BV075DPNG	FG075DP	AP075DPBR	AP075DPSS	AP075DPDI
1	AP100DP	HF100DPPG	BV0100DPNG	FG100DP	AP100DPBR	AP100DPSS	AP100DPDI
1 1/4	AP125DP	HF1250DPPG	BV1250DPNG	FG1250DP	AP1250DPBR	AP1250DPSS	AP1250DPDI
1 1/2	AP150DP	HF150DPPG	BV150DPNG	FG150DP	AP150DPBR	AP150DPSS	AP150DPDI
2	AP200DP	HF200DPPG	BV200DPNG	FG200DP	AP200DPBR	AP200DPSS	AP200DPDI
2 1/2	AP250DP	HF250DPPG	BV250DPNG	FG250DP	AP250DPBR	AP250DPSS	AP250DPDI
3	AP300DP	HF300DPPG	BV300DPNG	FG300DP	AP300DPBR	AP300DPSS	AP300DPDI
4	AP400DP	HF400DPPG	BV400DPNG	FG400DP	AP400DPBR	AP400DPSS	AP400DPDI
5	AP500DP	—	—	—	AP500DPBR	AP500DPSS	AP500DPDI
6	AP600DP	—	—	—	AP600DPBR	AP600DPSS	AP600DPDI
*8	AP800DP	—	—	—	AP800DPBR	AP800DPSS	AP800DPDI

Stainless fittings are available in 316 or 304. Specify when ordering.
*8" Cam & Groove fittings are not universal across manufacturers. Consult Munro prior to order.

Schedule 40 PVC Cam Couplers & Adapters

PVC Adapter (X)
PVC Slip X Male Cam Adapter

PVC Slip X Cam Coupler (Y)
PVC Slip X Female Cam Adapter

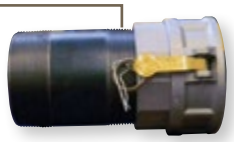
Approx. Weight lbs	Working PSI at Temperatures				PVC Pipe Size in	Model Number
	140˚	100˚	80˚	72˚		
.06	25	65	90	105	1/2	BV050X
					1/2	BV050Y
					3/4	BV075X
					3/4	BV075Y
					1	BV100X
					1	BV100Y
.50					1 1/4	BV125X
					1 1/4	BV125Y
.67					1 1/2	BV150X
					1 1/2	BV150Y
					2	BV200X
					2	BV200Y
1.33	20	50	68	75	3	BV300X
					3	BV300Y

Munro Munster Fitting

Built for tank penetration, this unique one-piece design eliminates the need for separate threaded connections. The integrated hex nut makes for easy wrench installation. This fitting saves time and effort!

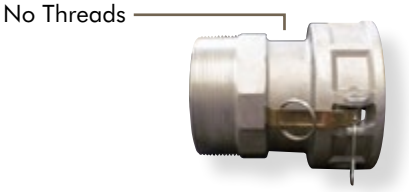
Size	Working Pressure psi	Length in In.	Material Description	Model Number
2"	200	5.25	Aluminum	CA2MUNSTER
4"	100	6.5		CA4MUNSTER

GO FROM THIS...



- Assembly Required
- Leak Point

TO THE MUNSTER!



- **ONE PIECE**
- **ZERO ASSEMBLY**
- **ZERO LEAK POINTS**

Specialty Couplers

Approx. Weight lbs	Picture Reference	Description	Model Number
1.2	90° C	2" Coupler x 90° Hose Barb	AP902CX2HB
4.0	90° C	3" Coupler x 90° 3" Hose Barb	AP903CX3HB
4.2	90° C	4" Coupler x 90° 4" Hose Barb	AP904CX4HB
3.0	90° CA	3" Coupler x 90° 3" Adapter	AP903CX3A
4.91	90° CA	4" Coupler x 90° 4" Adapter	AP904CX4A
7.25	90° CA	6" Coupler x 90° 6" Adapter	AP906CX6A
1.6	B	3" Coupler x 2" MNPT	AP3CX2MNPT
1.4	CA	1.5" Coupler x 2" Adapter	AP150CX2A
1.6	CA	2" Coupler x 1.5" Adapter	AP2CX150A
2	CA	3" Coupler x 2" Adapter	AP3CX2A
2.5	CA	3" Coupler x 2.5" Adapter	AP3CX250A
2.70	CA	4" Coupler x 2" Adapter	AP4CX2A
2.96	CA	4" Coupler x 3" Adapter	AP4CX3A
3.8	CA	5" Coupler x 4" Adapter	AP35040BAAL
6.66	CA	6" Coupler x 4" Adapter	AP6CX4A
1.4	AC	3" Coupler x 2" Adapter	AP3AX2C
0.9	AA	2" Adapter x 2" Adapter	AP2AX2A
1.45	AA	3" Adapter x 3" Adapter	AP3AX3A
2.6	AC	4" Adapter x 3" Coupler	AP4AX3C
4.8	AC	6" Adapter x 4" Coupler	AP6AX4C
2.0	C	3" Coupler x 2" Hose Barb	AP3CX2HB
2.94	C	4" Coupler x 3" Hose Barb	AP4CX3HB
1.8	E	4" Adapter x 3" Hose Barb	AP4AX3HB
1.43	CC	2" Coupler x 2" Coupler	AP2CX2C
2.4	CC	3" Coupler x 3" Coupler	AP3CX3C
3.9	CC	4" Coupler x 4" Coupler	AP4CX4C
1.91	AA	4" Adapter x 4" Adapter	AP4AX4A
5	AA	4" Adapter x 3" Adapter	AP4AX3A
5	AA	6" Adapter x 4" Adapter	AP6AX4A

45 degree couplers and additional specialty couplers also available upon request.

Buna-N Cam Gaskets (NBR)

Size in	Maximum Temperature	Material Description	Model Number
1/2 3/4 1 1 1/4 1 1/2 2 2 1/2 3 4 5 5.5 6 8	180° F	Buna	AP3TGBU050 AP3TGBU075 AP3TGBU100 AP3TGBU0125 AP3TGBU150 AP3TGBU200 AP3TGBU250 AP3TGBU300 AP3TGBU400 AP3TGBU500 AP3TGBU550 AP3TGBU600 AP3TGBU800
1 1/2 2 3 4 6		Buna Extra Thick	AP3TGXBU150 AP3TGXBU200 AP3TGXBU300 AP3TGXBU400 AP3TGXBU600

Did You Know?
8" Cam & Groove fittings are not universal across manufacturers. Consult Munro prior to order.

Cam Handles for Metal Cam Fittings

Size in	Description	Model Number
1/2 - 3/4 1 1 1/2 - 2 1/2 3 - 5 6- 8	Brass Handle	AP3THRPBR075 AP3THRPBR100 AP3THRPB200 AP3THRPB300 AP3THRPB600
1/2 - 3/4 1 1/4 - 2 1/2 3 - 5	Stainless Steel Handle	AP3THRPSS075 AP3THRPSS125 AP3THRPSS300

Munro Centrifugal Pump Suction Kit

Use this simple fitting assembly facing either direction, both parts will fit into the pump inlet. Quick cams transition from pump inlet to isolation valve on suction piping for easier installation and maintenance of your suction line. Perfect for use in our Universal PRO Pump Enclosure, or anywhere you desire easy connect and disconnect access on the suction side of your pump.

INCLUDES:

- **Transition Fitting:** Part F, alum male cam x MNPT
- **Munster Fitting:** Elongated Part B, alum female cam x MNPT

NOTE: Position camlock ears at the top and bottom to avoid leaks.

Munro 1 1/2" Elbow

One-piece, easy-to-use transition fitting from 1 1/2" female thread to 1 1/2" male cam. No leak points – ideal for pump discharge.

NPT Thread X Male Cam	Description	Model Number
1 1/2" X 1 1/2"	Aluminum Male Cam X 90° Female Threaded Elbow	CA150ELBOW

King Nipples & Hose Menders

Approx. Weight lbs	Description	Hose Size in	Model Number
.188	Plated Steel - National Pipe Thread	1/2	AP3TCNP0050
.313		3/4	AP3TCNP0075
.38		1	AP3TCNP0100
.50		1 1/4	AP3TCNP1250
.69		1 1/2	AP3TCNP0150
.94		2	AP3TCNP0200
1.8		2 1/2	AP3TCNP0250
3.0		3	AP3TCNP0300
4.94		4	AP3TCNP0400
9.4		5	AP3TCNP0500
12.3		6	AP3TCNP0600
16.44		8	AP3TCNP0800
21.78		10	AP3TCNP1000
33.18		12	AP3TCNP1200

Approx. Weight lbs	Description	Hose Size in	Model Number
.18	Stainless Steel - National Pipe Thread	1/2	AP3TCNSS050
.26		3/4	AP3TCNSS075
.35		1	AP3TCNSS100
.55		1 1/4	AP3TCNSS125
.66		1 1/2	AP3TCNSS150
1.16		2	AP3TCNSS200
1.31		2 1/2	AP3TCNSS250
2.20		3	AP3TCNSS300
3.31		4	AP3TCNSS400

Approx. Weight lbs	Description	Hose Size in	Model Number
.38	Plain Steel - Grooved End	1	AP3TCNV0100
.50		1 1/4	AP3TCNV0125
.69		1 1/2	AP3TCNV0150
.94		2	AP3TCNV0200
1.8		2 1/2	AP3TCNV0250
3.0		3	AP3TCNV0300
4.94		4	AP3TCNV0400
9.4		6	AP3TCNV0600
16.44		8	AP3TCNV0800
21.78		10	AP3TCNV1000
33.18		12	AP3TCNV1200

Approx. Weight lbs	Description	Hose Size in	Model Number
.02	NY Glass - National Pipe Thread	1/2	HF050NG
.03		3/4	HF075NG
.06		1	HF100NG
.10		1 1/4	HF125NG
.13		1 1/2	HF150NG
.24		2	HF200NG
.59		3	HF300NG
.89		4	HF400NG

Approx. Weight lbs	Description	Hose Size in	Model Number
.02	Poly Glass - National Pipe Thread	1/2	HF050HNPG
.03		3/4	HF075HNPG
.06		1	HF100HNPG
.13		1 1/2	HF150HNPG
.24		2	HF200HNPG
.59		3	HF300HNPG
.89		4	HF400HNPG

Approx. Weight lbs	Description	Hose Size in	Model Number
.02	Food Grade - National Pipe Thread	1/2	FG050HN
.03		3/4	FG075HN
.06		1	FG100HN
.10		1 1/4	FG125HN
.13		1 1/2	FG150HN

Approx. Weight lbs	Description	Hose Size in	Model Number
.10	Plated Steel - Hose Mender	1/2	AP3TMP050
.125		3/4	AP3TMP075
.25		1	AP3TMP100
.375		1 1/4	AP3TMP125
.50		1 1/2	AP3TMP150
1.25		2	AP3TMP200
2.0		2 1/2	AP3TMP250
2.25		3	AP3TMP300
3.0		4	AP3TMP400
10.25		6	AP3TMP600
20.9		8	AP3TMP800
40		12	AP3TMP01200

Ball & Socket (Bauer® Style)

Hose Set | Male NPT | Male End | Female End | Lever Lock | O-Ring

Approx. Weight lbs	Description	Hose Size in	Model Number
4	Hose Set Assembly	3	WL3CS
3	Male End x Male NPT with Lever	3	WL3MENPT
2	Female End x Male NPT	3	WL3FENPT
1.5	Male End x Hose Shank Less Lever	3	WL3MALE
1.6	Female End x Hose Shank	3	WL3FEMALE
2	Lever Locking Ring	3	WL3LOCK
.13	O-Ring	3	WL3RING
12	Hose Set Assembly	4	WL4CS
7.5	Male End x Male NPT with Lever	4	WL4MENPT
3.4	Female End x Male NPT	4	WL4FENPT
3.7	Male End x Hose Shank Less Lever	4	WL4MALE
3.4	Female End x Hose Shank	4	WL4FEMALE
4	Lever Locking Ring	4	WL4LOCK
.22	O-Ring	4	WL4RING
22	Hose Set Assembly	6	WL6CS
14	Male End x Male NPT with Lever	6	WL6MENPT
6	Female End x Male NPT	6	WL6FENPT
6	Male End x Hose Shank Less Lever	6	WL6MALE
6	Female End x Hose Shank	6	WL6FEMALE
8.5	Lever Locking Ring	6	WL6LOCK
.53	O-Ring	6	WL6RING
36	Hose Set Assembly	8	WL8CS
20	Male End x Male NPT with Lever	8	WL8MENPT
12	Female End x Male NPT	8	WL8FENPT
10	Male End x Hose Shank Less Lever	8	WL8MALE
12	Female End x Hose Shank	8	WL8FEMALE
10	Lever Locking Ring	8	WL8LOCK
.66	O-Ring	8	WL8RING

Specialty ball & socket fittings also available.

Pinlug Hose Shank Couplings




Approx. Weight lbs	Description	Hose Size in	Model Number
.5	Complete Set Brass	1	HF100BRPLS
1	Complete Set Ductile Iron	1 1/2	AP3TSHC150D
1	Complete Set Brass	1 1/2	AP3TSHC150B
.56	Complete Set Aluminum	1 1/2	AP3TSHC150AB
2	Complete Set Ductile Iron	2	AP3TSHC200D
2	Complete Set Brass	2	AP3TSHC200B
.88	Complete Set Aluminum	2	AP3TSHC200AB
1.30	Complete Set Aluminum	2 1/2	AP3TSHC250AB
.94	Complete Set Aluminum NST	2 1/2	AP3TSHC250ABN
5	Complete Set Ductile Iron	3	AP3TSHC300D
2.70	Complete Set Aluminum	3	AP3TSHC300AB
4	Complete Set Ductile Iron	4	AP3TSHC400D
4.40	Complete Set Aluminum	4	AP3TSHC400AB
.25	Female Shank Brass	1	AP3TNPF100B
.75	Female Shank Ductile Iron	1 1/2	AP3TSHF16D
.75	Female Shank Brass	1 1/2	AP3TSHF16B
1.25	Female Shank Ductile Iron	2	AP3TSHF21D
1.25	Female Shank Brass	2	AP3TSHF21B
2	Female Shank Ductile Iron	3	AP3TSHF31D
5	Female Shank Ductile Iron	4	AP3TSHF41D
.25	Male Shank Brass	1	AP3TNPM100B
.25	Male Shank Ductile Iron	1 1/2	AP3TSHM16D
.25	Male Shank Brass	1 1/2	AP3TSHM16B
.75	Male Shank Ductile Iron	2	AP3TSHM21D
.75	Male Shank Brass	2	AP3TSHM21B
3	Male Shank Ductile Iron	3	AP3TSHM31D
5	Male Shank Ductile Iron	4	AP3TSHM41D
.5	Gasket	1	AP3TRW100
.5		1 1/2	AP3TRW150
.5		2	AP3TRW200
.75		3	AP3TRW300
1		4	AP3TRW400

Universal Crow Foot Couplings




Approx. Weight lbs	Description	Size in	Model Number
.4	Female National Pipe Thread	1/2	AP3TFE050D
.4		3/4	AP3TFE075D
.6		1	AP3TFE100D
.4	Hose Shank	3/8	AP3THE037D
.4		1/2	AP3THE050D
.6		3/4	AP3THE075D
.6		1	AP3THE100D
.4	Male National Pipe Thread	3/8	AP3TME037D
.4		1/2	AP3TME050D
.6		3/4	AP3TME075D
.6		1	AP3TME100D
1.0	3 Way	1/2 – 1	HF3WAY

Whipchecks

Whipchecks safely keep hose ends in place if a fitting failure occurs.

Approx. Weight lbs	Description	Size in	Model Number
.5	Hose X Hose	1/2 - 1 1/4	HFWC1
1		1 1/2 - 3	HFWC2
2		4	HFWA4
2	Hose to Manifold	4 - 6	HFWC4

Garden Hose Fittings

Approx. Weight lbs	Description	Size in	Garden Hose Thread	Model Number
.13	Male GHT	3/4	Male	GHF86GH
.13	Male NPT	3/4	Male	GHF79GHT
.10	Female NPT	3/4	Male	GHFM75X75FPT
.24	3/4" Female NPT	3/4	Female	GHF75X75F
.24	Male GHT Quick Disconnect	3/4	Female	GHF30450
.13	Short Hose Barb	5/8	Female	GHF675HBX75F
.12	Short Hose Barb	5/8	Male	GHF675HBX75M
.16	Long Hose Barb	5/8	Female	GHF30506
.17	Long Hose Barb	5/8	Male	GHF30511
.15	Short Hose Barb	3/4	Female	GHF75HBX75F
.13	Short Hose Barb	3/4	Male	GHF75HBX75M
.17	Long Hose Barb	3/4	Female	GHF29FGH1212
.20	Long Hose Barb	3/4	Male	GHF29MGH1212
.01	Red Recessed GH Washer	3/4	---	GHF30149
.01	Black Plasticized GH Washer	3/4	---	GHF30150

Garden Hose Nozzles

Approx. Weight lbs	Description	Size in	Model Number
.8	FGHT With Insulated Handle	3/4	HF305572TFR
.7	FGHT x 3/4" MGHT	3/4	PG305573

Spray Nozzles

Approx. Weight lbs	Description	Adjustable	Size in	Model Number
1	Brass Nozzle		3/4 FGHT x 6	NBGHT
.75			1 NPSM	NB1NPSM
1.25			1.25 x 10 NPSM	NB1250NPSM
3.0		X	1.5 FHT - NST	NB15FHT
1.75			1.5 x 12 NPSM	NB15NPSM
3.0		X	1.5 NPT	NB15NPT
7.0		X	2 NPSH	NB2NPSH
2.5			2 NPSM x 12	NB2NPSM
7.0		X	2.5 FHT	NB25FHT
1.4			2 x 12 x 1 Plain	NB2X12X1
.4	Plastic		3/4 FGHT	NPGHT
.5			1 NPT	NP1NPT
.5			1 1/2 FHT	NP15FHT
.5			1 1/2 NPT	NP15NPT
1.0			2 NPT	NP2NPT
2.0			2.5 FHT	NP25FHT

Fire Hose Fittings – NST Thread












Approx. Weight lbs	Size/Description	Model Number
.5	HEX 1" M x 1" MPT	FHFM1X1MHN
.75	HEX 1 1/2" M x 1 1/2" MPT	FHFM15X15MHN
1.0	HEX 1 1/2" M x 2" MPT	FHFM15X2MHN
1.5	HEX 2 1/2" M x 1 1/2" MPT	FHFM25X15MHN
1.5	HEX 2 1/2" M x 2" MPT	FHFM25X2MHN
1.5	HEX 2 1/2" M x 2 1/2" MPT	FHFM25X25MHN
2.0	HEX 2 1/2" M x 3" MPT	FHFM25X3MHN
1.0	HEX 1 1/2" F x 1 1/2" MPT	FHFF15X15MHN
2.25	HEX 2 1/2" F x 2 1/2" MPT	FHFF25X25MHN
1.25	HEX 1 1/2" M x 2" FPT	FHFFM15X2FHN
1.0	HEX 1 1/2" M x 1 1/2" FPT	FHFM15X15FHN
2.25	HEX 2 1/2" M x 2" FPT	FHFFM25X2FHN
2.25	HEX 2 1/2" M x 2 1/2" FPT	FHFM25X25FHN
1.75	ADAPTER 2 1/2" F x 3/4" MPT	FHFF25X75MPTAD
1.75	ADAPTER 2 1/2" F x 1" MPT	FHFF25X1MPTAD
1.75	ADAPTER 2 1/2" F x 1 1/2" MPT	FHFF25X15MPTAD
2.0	ADAPTER 2 1/2" F x 2" MPT	FHFF25X2MPTAD
2.25	ADAPTER 2 1/2" F x 2 1/2" MPT	FHFF25X25MPTAD
.75	ADAPTER 1 1/2" F x 1 1/2" MPT	FHFF15X15MPTAD
2.0	ADAPTER 2 1/2" M x 2" FPT	FHFM25X2FPTAD
1.0	COUPLER 1 1/2" F x 1 1/2" FPT	FHFF15X15FPTCO
2.5	COUPLER 2 1/2" F x 2 1/2" FPT	FHFF25X25FPTCO
1.25	SWIVEL 1 1/2" F x 1 1/2" FPT	FHFF15X15FSW
2.25	SWIVEL 2 1/2" F x 1 1/2" FPT	FHFF25X15FPTSW
2.5	SWIVEL 2 1/2" F x 2" FPT	FHFF25X2FPTSW
2.5	SWIVEL 2 1/2" F x 2 1/2" FPT	FHFF25X25FPTSW
3.0	SWIVEL 2 1/2" F x 3" FPT	FHFF25X3FPTSW
1.0	SWIVEL 1" F x 1" MPT	FHFF1X1MPTSW
1.25	SWIVEL 1 1/2" F x 1 1/2" MPT	FHFF15X15MPTSW
2.5	SWIVEL 2 1/2" F x 2" MPT	FHFF25X2MPTSW
2.5	SWIVEL 2 1/2" F x 2 1/2" MPT	FHFF25X25MPTSW
3.0	SWIVEL 2 1/2" F x 3" MPT	FHFF25X3MPTSW
.75	1 1/2" CAP NST BRASS	FHF15CAP
1.75	2 1/2" CAP NST BRASS	FHF25CAP
.2	1 1/2" CAP NST RED STYRENE	FHF15CAPRS
.4	2 1/2" CAP NST RED STYRENE	FHF25CAPRS
.01	1 1/2" GASKET	FHF15GAS
.05	2 1/2" GASKET	FHF25GAS
.06	3" GASKET	FHF3GAS
1	SPANNER WRENCH	FHFWRENCH

Bushings

Contact us for other materials.

Size Male x Female	BRASS Model Number	GALVANIZED Model Number	BLACK STEEL Model Number
1/4" x 1/8"	BF25X125BU	SFG25X125BU	SFB25X125BU
3/8" x 1/8"	BF375X125BU	SFG375X125BU	SFB375X125BU
3/8" x 1/4"	BF375X25BU	SFG375X25BU	SFB375X25BU
1/2" x 1/8"	BF50X125BU	SFG50X125BU	SFB50X125BU
1/2" x 1/4"	BF50X25BU	SFG50X25BU	SFB50X25BU
1/2" x 3/8"	BF50X375BU	SFG50X375BU	SFB50X375BU
3/4" x 1/8"	BF75X125BU	SFG75X125BU	SFB75X125BU
3/4" x 1/4"	BF75X25BU	SFG75X25BU	SFB75X25BU
3/4" x 3/8"	BF75X375BU	SFG75X375BU	SFB75X375BU
3/4" x 1/2"	BF75X50BU	SFG75X50BU	SFB75X50BU
1" x 1/4"	BF1X25BU	SFG1X25BU	SFB1X25BU
1" x 3/8"	BF1X375BU	SFG1X375BU	SFB1X375BU
1" x 1/2"	BF1X50BU	SFG1X50BU	SFB1X50BU
1" x 3/4"	BF1X75BU	SFG1X75BU	SFB1X75BU
1 1/4" x 1/4"	BF1250X25BU	SFG1250X25BU	SFB1250X25BU
1 1/4" x 3/8"	BF1250X375BU	SFG1250X375BU	SFB1250X375BU
1 1/4" x 1/2"	BF1250X50BU	SFG1250X50BU	SFB1250X50BU
1 1/4" x 3/4"	BF1250X75BU	SFG1250X75BU	SFB1250X75BU
1 1/4" x 1"	BF1250X1BU	SFG1250X1BU	SFB1250X1BU
1 1/2" x 1/4"	BF150X25BU	SFG150X25BU	SFB150X25BU
1 1/2" x 3/8"	BF150X375BU	SFG150X375BU	SFB150X375BU
1 1/2" x 1/2"	BF150X50BU	SFG150X50BU	SFB150X50BU
1 1/2" x 3/4"	BF150X75BU	SFG150X75BU	SFB150X75BU
1 1/2" x 1"	BF150X1BU	SFG150X1BU	SFB150X1BU
1 1/2" x 1 1/4"	BF150X1250BU	SFG150X1250BU	SFB150X1250BU
2" x 3/8"	BF2X375BU	SFG2X375BU	SFB2X375BU
2" x 1/2"	BF2X50BU	SFG2X50BU	SFB2X50BU
2" x 3/4"	BF2X75BU	SFG2X75BU	SFB2X75BU
2" x 1"	BF2X1BU	SFG2X1BU	SFB2X1BU
2" x 1 1/4"	BF2X1250BU	SFG2X1250BU	SFB2X1250BU
2" x 1 1/2"	BF2X150BU	SFG2X150BU	SFB2X150BU
2 1/2" x 1"	BF250X1BU	SFG250X1BU	SFB250X1BU
2 1/2 x 1 1/2"	BF250X150BU	SFG250X150BU	SFB250X150BU
2 1/2" x 2"	BF250X2BU	SFG250X2BU	SFB250X2BU
3" x 1 1/2"	BF3X150BU	SFG3X150BU	SFB3X15BU
3" x 2"	BF3X2BU	SFG3X2BU	SFB3X2BU
3" x 2 1/2"	BF3X250BU	SFG3X250BU	SFB3X250BU
4" x 2"	BF4X2BU	SFG4X2BU	SFB4X2BU
4" x 2 1/2"	BF4X250BU	SFG4X250BU	SFB4X250BU
4" x 3"	BF4X3BU	SFG4X3BU	SFB4X3BU
5" x 4"	BF5X4BU	SFG5X4BU	SFB5X4BU
6" x 4"	BF6X4BU	SFG6X4BU	SFB6X4BU
8" x 6"	BF8X6BU	SFG8X6BU	SFB8X6BU

Various material and schedules also available.

Bell Reducers

Contact us for other materials.

Size Female x Female	BRASS Model Number	GALVANIZED Model Number	BLACK STEEL Model Number
1/4" x 1/8"	BF25X125BE	SFG25X125BE	SFB25X125BE
3/8" x 1/8"	BF375X125BE	SFG375X125BE	SFB375X125BE
3/8" x 1/4"	BF375X25BE	SFG375X25BE	SFB375X25BE
1/2" x 1/8"	BF50X125BE	SFG50X125BE	SFB50X125BE
1/2" x 1/4"	BF50X25BE	SFG50X25BE	SFB50X25BE
1/2" x 3/8"	BF50X375BE	SFG50X375BE	SFB50X375BE
3/4" x 1/4"	BF75X25BE	SFG75X25BE	SFB75X25BE
3/4" x 3/8"	BF75X375BE	SFG75X375BE	SFB75X375BE
3/4" x 1/2"	BF75X50BE	SFG75X50BE	SFB75X50BE
1" x 1/4"	BF1X25BE	SFG1X25BE	SFB1X25BE
1" x 3/8"	BF1X375BE	SFG1X375BE	SFB1X375BE
1" x 1/2"	BF1X50BE	SFG1X50BE	SFB1X50BE
1" x 3/4"	BF1X75BE	SFG1X75BE	SFB1X75BE
1 1/4" x 1/2"	BF1250X50BE	SFG1250X50BE	SFB1250X50BE
1 1/4" x 3/4"	BF1250X75BE	SFG1250X75BE	SFB1250X75BE
1 1/4" x 1"	BF1250X1BE	SFG1250X1BE	SFB1250X1BE
1 1/2" x 1/2"	BF150X50BE	SFG150X50BE	SFB150X50BE
1 1/2" x 3/4"	BF150X75BE	SFG150X75BE	SFB150X75BE
1 1/2" x 1"	BF150X1BE	SFG150X1BE	SFB150X1BE
1 1/2" x 1 1/4"	BF150X1250BE	SFG150X1250BE	SFB150X1250BE
2" x 1/2"	BF2X50BE	SFG2X50BE	SFB2X50BE
2" x 3/4"	BF2X75BE	SFG2X75BE	SFB2X75BE
2" x 1"	BF2X75BE	SFG2X75BE	SFB2X75BE
2" x 1 1/4"	BF2X1250BE	SFG2X1250BE	SFB2X1250BE
2" x 1 1/2"	BF2X150BE	SFG2X150BE	SFB2X150BE
2 1/2" x 1 1/2"	BF250X150BE	SFG250X150BE	SFB250X150BE
2 1/2" x 2"	BF250X2BE	SFG250X2BE	SFB250X2BE
3" x 1 1/2"	BF3X150BE	SFG3X150BE	SFB3X150BE
3" x 2"	BF3X2BE	SFG3X2BE	SFB3X2BE
3" x 2 1/2"	BF3X250BE	SFG3X250BE	SFB3X250BE
4" x 2"	BF4X2BE	SFG4X2BE	SFB4X2BE
4" x 3"	BF4X3BE	SFG4X3BE	SFB4X3BE
5" x 4"	BF5X4BE	SFG5X4BE	SFB5X4BE
6" x 4"	BF6X4BE	SFG6X4BE	SFB6X4BE

Various material and schedules also available.

Crosses

Contact us for other materials.

Size Female x Female in	BRASS Model Number	GALVANIZED Model Number	BLACK STEEL Model Number
1/4	BF25CR	SFG25CR	SFB25CR
3/8	BF375CR	SFG375CR	SFB375CR
1/2	BF50CR	SFG50CR	SFB50CR
3/4	BF75CR	SFG75CR	SFB75CR
1	BF1CR	SFG1CR	SFB1CR
1 1/4	BF1250CR	SFG1250CR	SFB1250CR
1 1/2	BF150CR	SFG150CR	SFB150CR
2	BF2CR	SFG2CR	SFB2CR
3	BF3CR	SFG3CR	SFB3CR

Various material and schedules also available.

Tees

Contact us for other materials.

Size Female x Female in	BRASS Model Number	GALVANIZED Model Number	BLACK STEEL Model Number
1/8	BF125TE	SFG125TE	SFB125TE
1/4	BF25TE	SFG25TE	SFB25TE
3/8	BF375TE	SFG375TE	SFB375TE
1/2	BF50TE	SFG50TE	SFB50TE
3/4	BF75TE	SFG75TE	SFB75TE
1	BF1TE	SFG1TE	SFB1TE
1 1/4	BF1250TE	SFG1250TE	SFB1250TE
1 1/2	BF150TE	SFG150TE	SFB150TE
2	BF2TE	SFG2TE	SFB2TE
2 1/2	BF250TE	SFG250TE	SFB250TE
3	BF3TE	SFG3TE	SFB3TE
4	BF4TE	SFG4TE	SFB4TE
6	BF6TE	SFG6TE	SFB6TE

Various material and schedules also available.

Caps

Contact us for other materials.

Size in	BRASS Model Number	GALVANIZED Model Number	BLACK STEEL Model Number
1/8	BF125CA	SFG125CA	SFB125CA
1/4	BF25CA	SFG25CA	SFB25CA
3/8	BF375CA	SFG375CA	SFB375CA
1/2	BF50CA	SFG50CA	SFB50CA
3/4	BF75CA	SFG75CA	SFB75CA
1	BF1CA	SFG1CA	SFB1CA
1 1/4	BF1250CA	SFG1250CA	SFB1250CA
1 1/2	BF150CA	SFG150CA	SFB150CA
2	BF2CA	SFG2CA	SFB2CA
2 1/2	BF250CA	SFG250CA	SFB250CA
3	BF3CA	SFG3CA	SFB3CA
4	BF4CA	SFG4CA	SFB4CA
6	BF6CA	SFG6CA	SFB6CA

Various material and schedules also available.

Plugs

Contact us for other materials.

Size Male in	BRASS Model Number	GALVANIZED Model Number	BLACK STEEL Model Number
1/8	BF125PL	SFG125PL	SFB125PL
1/4	BF25PL	SFG25PL	SFB25PL
3/8	BF375PL	SFG375PL	SFB375PL
1/2	BF50PL	SFG50PL	SFB50PL
3/4	BF75PL	SFG75PL	SFB75PL
1	BF1PL	SFG1PL	SFB1PL
1 1/4	BF1250PL	SFG1250PL	SFB1250PL
1 1/2	BF150PL	SFG150PL	SFB150PL
2	BF2PL	SFG2PL	SFB2PL
2 1/2	BF250PL	SFG250PL	SFB250PL
3	BF3PL	SFG3PL	SFB3PL
4	BF4PL	SFG4PL	SFB4PL

Various material and schedules also available.

Couplers

Contact us for other materials.

Size Female in	BRASS Model Number	GALVANIZED Model Number	BLACK STEEL Model Number
1/8	BF125CO	SFG125CO	SFB125CO
1/4	BF25CO	SFG25CO	SFB25CO
3/8	BF375CO	SFG375CO	SFB375CO
1/2	BF50CO	SFG50CO	SFB50CO
3/4	BF75CO	SFG75CO	SFB75CO
1	BF1CO	SFG1CO	SFB1CO
1 1/4	BF1250CO	SFG1250CO	SFB1250CO
1 1/2	BF150CO	SFG150CO	SFB150CO
2	BF2CO	SFG2CO	SFB2CO
2 1/2	BF250CO	SFG250CO	SFB250CO
3	BF3CO	SFG3CO	SFB3CO
4	BF4CO	SFG4CO	SFB4CO
6	BF6CO	SFG6CO	SFB6CO
8	BF8CO	SFG8CO	SFB8CO

Various material and schedules also available.

45° Street Elbows

Contact us for other materials.

Size Male x Female in	BRASS Model Number	GALVANIZED Model Number	BLACK STEEL Model Number
1/4"	BF25EL45	SFG25EL45	SFB25EL45
3/8"	BF375EL45	SFG375EL45	SFB375EL45
1/2"	BF50EL45	SFG50EL45	SFB50EL45
3/4"	BF75EL45	SFG75EL45	SFB75EL45
1"	BF1EL45	SFG1EL45	SFB1EL45
1 1/4"	BF1250EL45	SFG1250EL45	SFB1250EL45
1 1/2"	BF150EL45	SFG150EL45	SFB150EL45
2"	BF2EL45	SFG2EL45	SFB2EL45
3"	BF3EL45	SFG3EL45	SFB3EL45
4"	BF4EL45	SFG4EL45	SFB4EL45

Various material and schedules also available.

45° Elbows

Contact us for other materials.

Size Female x Female in	BRASS Model Number	GALVANIZED Model Number	BLACK STEEL Model Number
1/8	BF125EL45	SFG125EL45	SFB125EL45
1/4	BF25EL45	SFG25EL45	SFB25EL45
3/8	BF375EL45	SFG375EL45	SFB375EL45
1/2	BF50EL45	SFG50EL45	SFB50EL45
3/4	BF75EL45	SFG75EL45	SFB75EL45
1	BF1EL45	SFG1EL45	SFB1EL45
1 1/4	BF1250EL45	SFG1250EL45	SFB1250EL45
1 1/2	BF150EL45	SFG150EL45	SFB150EL45
2	BF2EL45	SFG2EL45	SFB2EL45
3	BF3EL45	SFG3EL45	SFB3EL45
4	BF4EL45	SFG4EL45	SFB4EL45
6	BF6EL45	SFG6EL45	SFB6EL45

Various material and schedules also available.

90° Elbows

Contact us for other materials.

Size Female x Female in	BRASS Model Number	GALVANIZED Model Number	BLACK STEEL Model Number
1/8	BF125EL	SFG125EL	SFB125EL
1/4	BF25EL	SFG25EL	SFB25EL
3/8	BF375EL	SFG375EL	SFB375EL
1/2	BF50EL	SFG50EL	SFB50EL
3/4	BF75EL	SFG75EL	SFB75EL
1	BF1EL	SFG1EL	SFB1EL
1 1/4	BF1250EL	SFG1250EL	SFB1250EL
1 1/2	BF150EL	SFG150EL	SFB150EL
2	BF2EL	SFG2EL	SFB2EL
2 1/2	BF250EL	SFG250EL	SFB250EL
3	BF3EL	SFG3EL	SFB3EL
4	BF4EL	SFG4EL	SFB4EL
6	BF6EL	SFG6EL	SFB6EL
8	BF8EL	SFG8EL	SFB8EL

Various material and schedules also available.

90° Street Elbows

Contact us for other materials.

Size Male x Female in	BRASS Model Number	GALVANIZED Model Number	BLACK STEEL Model Number
1/8	BF125STEL	SFG125STEL	SFB125STEL
1/4	BF25STEL	SFG25STEL	SFB25STEL
3/8	BF375STEL	SFG375STEL	SFB375STEL
1/2	BF50STEL	SFG50STEL	SFB50STEL
3/4	BF75STEL	SFG75STEL	SFB75STEL
1	BF1STEL	SFG1STEL	SFB1STEL
1 1/4	BF1250STEL	SFG1250STEL	SFB1250STEL
1 1/2	BF150STEL	SFG150STEL	SFB150STEL
2	BF2STEL	SFG2STEL	SFB2STEL
2 1/2	BF250STEL	SFG250STEL	SFB250STEL
3	BF3STEL	SFG3STEL	SFB3STEL
4	BF4STEL	SFG4STEL	SFB4STEL
6	BF6STEL	SFG6STEL	SFB6STEL

Various material and schedules also available.

Pipe Nipples

Contact us for other materials.

Size	BRASS Model Number	GALVANIZED Model Number	BLACK STEEL Model Number
1/8" x Close (3/4")	BF125XCLOSENI	SFG125XCLOSENI	SFB125XCLOSENI
1/8" x 2"	BF125X2NI	SFG125X2NI	SFB125X2NI
1/8" x 2 1/2"	BF125X25NI	SFG125X25NI	SFB125X25NI
1/8" x 3"	BF125X3NI	SFG125X3NI	SFB125X3NI
1/8" x 4"	BF125X4NI	SFG125X4NI	SFB125X4NI
1/8" x 5"	BF125X5NI	SFG125X5NI	SFB125X5NI
1/8" x 6"	BF125X6NI	SFG125X6NI	SFB125X6NI
1/8" x 8"	BF125X8NI	SFG125X8NI	SFB125X8NI
1/8" x 10"	BF125X10NI	SFG125X10NI	SFB125X10NI
1/8" x 12"	BF125X12NI	SFG125X12NI	SFB125X12NI
1/4" x Close (7/8")	BF25XCLOSENI	SFG25XCLOSENI	SFB25CLOSENI
1/4" x 1 1/2"	BF25X15NI	SFG25X15NI	SFB25X15NI
1/4" x 2"	BF25X2NI	SFG25X2NI	SFB25X2NI
1/4" x 3"	BF25X3NI	SFG25X3NI	SFB25X3NI
1/4" x 4"	BF25X4NI	SFG25X4NI	SFB25X4NI
1/4" x 5"	BF25X5NI	SFG25X5NI	SFB25X5NI
1/4" x 6"	BF25X6NI	SFG25X6NI	SFB25X6NI
1/4" x 8"	BF25X8NI	SFG25X8NI	SFB25X8NI
1/4" x 10"	BF25X10NI	SFG25X10NI	SFB25X10NI
1/4" x 12"	BF25X12NI	SFG25X12NI	SFB25X12NI
3/8" x Close (1")	BF375XCLOSENI	SFG375XCLOSENI	SFB375XCLOSENI
3/8" x 2"	BF375X2NI	SFG375X2NI	SFB375X2NI
3/8" x 3"	BF375X3NI	SFG375X3NI	SFB375X3NI
3/8" x 4"	BF375X4NI	SFG375X4NI	SFB375X4NI
3/8" x 5"	BF375X5NI	SFG375X5NI	SFB375X5NI
3/8" x 6"	BF375X6NI	SFG375X6NI	SFB375X6NI
3/8" x 8"	BF375X8NI	SFG375X8NI	SFB375X8NI
3/8" x 10"	BF375X10NI	SFG375X10NI	SFB375X10NI
3/8" x 12"	BF375X12NI	SFG375X12NI	SFB375X12NI
1/2" x Close (1 1/8")	BF50XCLOSENI	SFG50XCLOSENI	SFB50XCLOSENI
1/2" x 2"	BF50X2NI	SFG50X2NI	SFB50X2NI
1/2" x 3"	BF50X3NI	SFG50X3NI	SFB50X3NI
1/2" x 4"	BF50X4NI	SFG50X4NI	SFB50X4NI
1/2" x5"	BF50X5NI	SFG50X5NI	SFB50X5NI
1/2" x 6"	BF50X6NI	SFG50X6NI	SFB50X6NI
1/2" x 8"	BF50X8NI	SFG50X8NI	SFB50X8NI
1/2" x 10"	BF50X10NI	SFG50X10NI	SFB50X10NI
1/2" x 12"	BF50X12NI	SFG50X12NI	SFB50X12NI
3/4" x Close (3/4")	SFG75XCLOSENI	SFG75XCLOSENI	SFB75XCLOSENI
3/4" x 2"	SFG75X2NI	SFG75X2NI	SFB75X2NI
3/4" x 3"	SFG75X3NI	SFG75X3NI	SFB75X3NI
3/4" x 4"	SFG75X4NI	SFG75X4NI	SFB75X4NI
3/4" x 5"	SFG75X5NI	SFG75X5NI	SFB75X5NI
3/4" x 6"	SFG75X6NI	SFG75X6NI	SFB75X6NI
3/4" x 8"	SFG75X8NI	SFG75X8NI	SFB75X8NI
3/4" x 10"	SFG75X10NI	SFG75X10NI	SFB75X10NI
3/4" x 12"	SFG75X12NI	SFG75X12NI	SFB75X12NI
1" x Close (1 1/2")	BF1XCLOSENI	SFG1XCLOSENI	SFB1XCLOSENI
1" x 2"	BF1X2NI	SFG1X2NI	SFB1X2NI
1" x 3"	BF1X3NI	SFG1X3NI	SFB1X3NI
1" x 4"	BF1X4NI	SFG1X4NI	SFB1X4NI
1" x 5"	BF1X5NI	SFG1X5NI	SFB1X5NI
1" x 6"	BF1X6NI	SFG1X6NI	SFB1X6NI
1" x 8"	BF1X8NI	SFG1X8NI	SFB1X8NI
1" x 10"	BF1X10NI	SFG1X10NI	SFB1X10NI
1" x 12"	BF1X12NI	SFG1X12NI	SFB1X12NI
1 1/4" x Close (1")	BF125XCLOSENI	SFG125XCLOSENI	SFB125XCLOSENI
1 1/4" x 2"	BF125X2NI	SFG125X2NI	SFB125X2NI
1 1/4" x 3"	BF125X25NI	SFG125X25NI	SFB125X25NI
1 1/4" x 4"	BF125X3NI	SFG125X3NI	SFB125X3NI
1 1/4" x 5"	BF125X4NI	SFG125X4NI	SFB125X4NI
1 1/4" x 6"	BF125X5NI	SFG125X5NI	SFB125X5NI
1 1/4" x 8"	BF125X6NI	SFG125X6NI	SFB125X6NI
1 1/4" x 10"	BF125X8NI	SFG125X8NI	SFB125X8NI
1 1/4" x 12"	BF125X10NI	SFG125X10NI	SFB125X10NI

Various material and schedules also available.

Pipe Nipples

Contact us for other materials.

Size	BRASS Model Number	GALVANIZED Model Number	BLACK STEEL Model Number
1 1/2" x Close (1 3/4")	BF150XCLOSENI	SFG150XCLOSENI	SFB150XCLOSENI
1 1/2" x 2"	BF150X2NI	SFG150X2NI	SFB150X2NI
1 1/2" x 3"	BF150X3NI	SFG150X3NI	SFB150X3NI
1 1/2" x 4"	BF150X4NI	SFG150X4NI	SFB150X4NI
1 1/2" x 5"	BF150X5NI	SFG150X5NI	SFB150X5NI
1 1/2" x 6"	BF150X6NI	SFG150X6NI	SFB150X6NI
1 1/2" x 8"	BF150X8NI	SFG150X8NI	SFB150X8NI
1 1/2" x 10"	BF150X10NI	SFG150X10NI	SFB150X10NI
1 1/2" x 12"	BF150X12NI	SFG150X12NI	SFB150X12NI
2" x Close (2")	BF2XCLOSENI	SFG2XCLOSENI	SFB2XCLOSENI
2" x 3"	BF2X3NI	SFG2X3NI	SFB2X3NI
2" x 4"	BF2X4NI	SFG2X4NI	SFB2X4NI
2" x 6"	BF2X6NI	SFG2X6NI	SFB2X6NI
2" x 8"	BF2X8NI	SFG2X8NI	SFB2X8NI
2" x 10"	BF2X10NI	SFG2X10NI	SFB2X10NI
2" x 12"	BF2X12NI	SFG2X12NI	SFB2X12NI
2 1/2" x Close (2 1/2")	BF250XCLOSENI	SFG250XCLOSENI	SFB250XCLNI
2 1/2" x 3"	BF250X3NI	SFG250X3NI	SFB250X3NI
2 1/2" x 6"	BF250X6NI	SFG250X6NI	SFB250X6NI
3" x Close (2 5/8")	BF3XCLOSENI	SFG3XCLOSENI	SFB3XCLOSENI
3" x 3"	BF3X3NI	SFG3X3NI	SFB3X3NI
3" x4"	BF3X4NI	SFG3X4NI	SFB3X4NI
3" x 6"	BF3X6NI	SFG3X6NI	SFB3X6NI
3" x 8"	BF3X8NI	SFG3X8NI	SFB3X8NI
3" x 10"	BF3X10NI	SFG3X10NI	SFB3X10NI
3" x 12"	BF3X12NI	SFG3X12NI	SFB3X12NI
4" x Close (2 7/8")	BF4XCLOSENI	SFG4XCLOSENI	SFB4XCLOSENI
4" x 4"	BF4X4NI	SFG4X4NI	SFB4X4NI
4" x 6"	BF4X6NI	SFG4X6NI	SFB4X6NI
4" x 8"	BF4X8NI	SFG4X8NI	SFB4X8NI
4" x 10"	BF4X10NI	SFG4X10NI	SFB4X10NI
4" x 12"	BF4X12NI	SFG4X12NI	SFB4X12NI
5" x 8"	BF5X8NI	SFG5X8NI	SFB5X8NI
6" x Close	BF6XCLOSENI	SFG6XCLOSENI	SFB6XCLOSENI
6" x 4"	BF6X4NI	SFG6X4NI	SFB6X4NI
6" x 4 1/2"	BF6X45NI	SFG6X45NI	SFB6X45NI
6" x 5"	BF6X5NI	SFG6X5NI	SFB6X5NI
6" x 6"	BF6X6NI	SFG6X6NI	SFB6X6NI
6" x 8"	BF6X8NI	SFG6X8NI	SFB6X8NI
6" x 10"	BF6X10NI	SFG6X10NI	SFB6X10NI

Various material and schedules also available.

Did You Know?
Eccentric reducers eliminate a possible air pocket in a suction reducer. Always install with the flat side up.

Grooved & Threaded Eccentric Swage Nipples

- Suction pipe size should be one pipe size larger than pump inlet.
- Proper design of suction piping should have a maximum velocity of four to six feet per second.
- Any velocity over eight feet per second may result in damage to the pump.
- Orient the eccentric swage nipple with the flat side up.

Nominal Size in	Length in	Approx. Weight lbs	Model Number
3 X 2 NPT	8.0	4.51	MEC2X3NPT
3 X 2 GROOVE	8.0	4.51	MEC2X3GRV
4 X 3 NPT	9.0	7.04	MEC3X4NPT
4 X 3 GROOVE	9.0	7.04	MEC3X4GRV
6 X 4 NPT	12.0	15.99	MEC4X6NPT
6 X 4 GROOVE	12.0	15.99	MEC4X6GRV

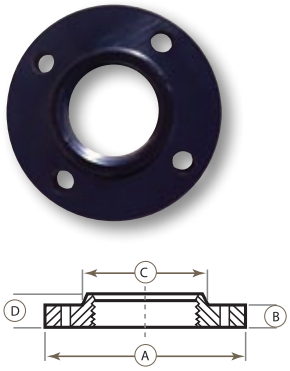
Munro Threaded Concentric Swage Nipples

Nominal Size in	Length in	Approx. Weight lbs	Model Number
2 X 1 1/2	6.5	1.76	MSNX2X150
3 X 2	8.0	4.51	MSNX3X2
4 X 3	9.0	7.04	MSNX4X3
6 X 4	12.0	15.99	MSNX6X4

One Piece Flange x Camlock

Approx. Weight lbs	Description	Model Number
7	B Flange – Aluminum 3"	AP330FLBAL
12	B Flange – Aluminum 4"	AP340FLBAL
4	B Flange – Aluminum 6"	AP360FLBAL
6	A Flange – Aluminum 3"	AP330FLAAL
9	A Flange – Aluminum 6"	AP360FLAAL

Steel Threaded Flanges



Approx. Weight lbs	Diameter of Flange A	Thickness of Flange B (min.)	Diameter of Hub C (min.)	Length of Hub & Thd. D (min.)	Size in	Model Number
1.7	4.620"	0.500"	2.310"	0.810"	1 1/4	SFBTF1250
2.3	5.000"	0.560"	2.560"	0.880"	1 1/2	SFBTF150
4	6.000"	0.620"	3.060"	1.000"	2	SFBTF200
6	7.000"	0.690"	3.560"	1.120"	2 1/2	SFBTF250
7	7.500"	0.750"	4.250"	1.190"	3	SFBTF300
11.8	9.000"	0.940"	5.310"	1.310"	4	SFBTF400
13.2	10.000"	0.940"	6.440"	1.440"	5	SFBTF500
16.5	11.000"	1.000"	7.560"	1.560"	6	SFBTF600
26	13.500"	1.120"	9.690"	1.750"	8	SFBTF800
37.8	16.000"	1.190"	11.940"	1.940"	10	SFBTF1000
65	19.000"	1.25"	15.00"	1.25"	12	SFBTF1200

ANSI Class 150

Full Face Fiber Gasket

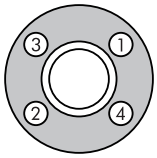
Size in	Model Number
1	MA100FFAG
1 1/4	MA1250FFAG
1 1/2	MA150FFAG
2	MA200FFAG
2 1/2	MA250FFAG
3	MA300FFAG
4	MA400FFAG
5	MA500FFAG
6	MA600FFAG
8	MA800FFAG
10	MA1000FFAG
12	MA1200FFAG

ANSI Class 150

Full Face Rubber Gasket

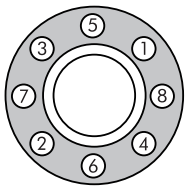
Size in	Model Number
1	MA100FFRRG
1 1/4	MA1250FFRRG
1 1/2	MA150FFRRG
2	MA200FFRRG
2 1/2	MA250FFRRG
3	MA300FFRRG
4	MA400FFRRG
5	MA500FFRRG
6	MA600FFRRG
8	MA800FFRRG
10	MA1000FFRRG
12	MA1200FFRRG

ANSI Class 150



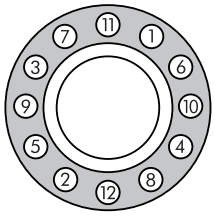
4-Bolt Pattern

Size in	Recommended Torque ft/lbs
1/2	10-15
3/4	
1	
1 1/2	
2	20-30
2 1/2	
3	



8-Bolt Pattern

Size in	Recommended Torque ft/lbs
4	20-30
6	33-50
8	33-50



12-Bolt Pattern

Size in	Recommended Torque ft/lbs
10	53-75
12	80-110
14	100

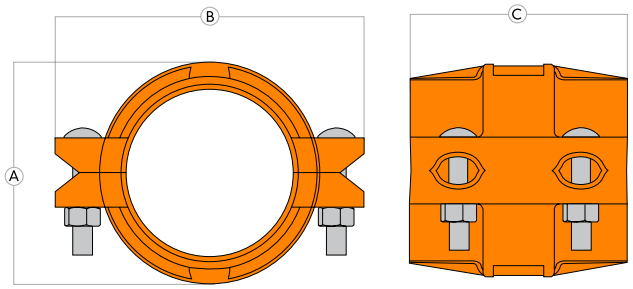
Did You Know?
Munro has countless flange and flange gaskets for unique & high pressure applications.

Did You Know?
Tighten bolts following above pattern to ensure even pressure.

Munro HDPE Coupling M95

Mechanical HDPE couplings offer a cost-effective, fast and easy way to join high density polyethylene pipe and fittings.

Munro HDPE couplings are unique! Lighter, easier to handle design with sharp, well-defined teeth for maximum penetration and grip. Engineered to satisfy the working pressure of DR 7.3 to DR 32.5. Uses 4 high-quality bolts and flanged nuts or washers for improved tightening and holding.



Materials	
Couplings	Ductile iron, non-lead orange rust-inhibiting paint coating, ASTM A536, Grade 65-45-12
Gaskets	Nitrile, orange color-coded, service temperature: -20°F to 180°F (-29°C to 82°C)
Bolts	Carbon steel, heat treated and zinc plated, tensile strength to 110,000 psi: ASTM A 183 Grade 2
Nuts	Carbon steel, zinc plated: ASTM 563 Grade 2
Flanged Nuts	Carbon steel, and zinc plated: ASME B18.2.2-2010. Flanged Nuts have a metric head

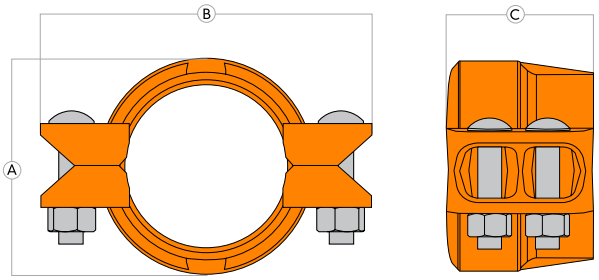
Did You Know?
Find our installation guide on p. 220.

Nominal Size	Pipe OD	Dimensions			Bolts		Approx. Weight	Model Number
		A	B	C	Qty	Size		
in/mm	in/mm	in/mm	in/mm	in/mm		in/mm	lb/kg	
2 50	2.375 60.3	2.7 68.58	4.7 119.38	4.6 116.84		3/8 x 2 3/8 M10 x 60	4 1.81	M95X2
3 80	3.5 88.9	3.9 99.06	7.10 180	4.6 116.84		1/2 x 3 M12 x 75	7 3.2	M95X3
4 100	4.5 114.3	4.9 124.46	8.40 213	5.75 146.05		1/2 x 3 M12 x 75	9 4.1	M95X4
6 150	6.625 168.3	7.1 180.34	10.30 216	5.85 148.59	4	5/8 x 3 1/2 M16 x 90	15 6.8	M95X6
8 200	8.625 219.1	9.1 231.14	13.20 335	6 152.4		5/8 x 3 1/2 M16 x 90	21 9.5	M95X8
10 250	10.750 273.0	11.4 289.56	15.90 403	6.5 165.1		3/4 x 4 3/4 M20 x 120	30 13.6	M95X10
12 300	12.75 323.9	14.5 368.3	17.5 444.5	7.25 184.15		3/4 x 4 3/4 M20 x 120	47 21.31	M95X12

Munro HDPE Transition Coupling M97

Mechanical HDPE transition fittings are an ideal solution to join high density polyethylene pipe with grooved steel pipe.

Munro HDPE transition fittings offer a lighter, easier to handle design with sharp, well-defined teeth for maximum penetration and grip. Engineered to satisfy the working pressure of DR 7.3 to DR 32.5, every Munro HDPE transition fitting use four high-quality bolts and flanged nuts or washers for improved tightening and holding.



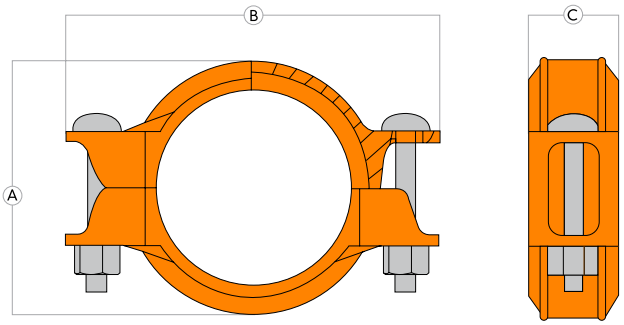
Materials	
Couplings	Ductile iron, non-lead orange rust-inhibiting paint coating, ASTM A536, Grade 65-45-12
Gaskets	Nitrile, orange color-coded, service temperature: -20°F to 180°F (-29°C to 82°C)
Bolts	Carbon steel, heat treated and zinc plated, tensile strength to 110,000 psi: ASTM A 183 Grade 2
Nuts	Carbon steel, zinc plated: ASTM 563 Grade 2
Flanged Nuts	Carbon steel, and zinc plated: ASME B18.2.2-2010. Flanged Nuts have a metric head

Did You Know?
Find our installation guide on p. 222.

Nominal Size	Pipe OD	Dimensions			Bolts		Approx. Weight	Model Number
		A	B	C	Qty	Size		
in/mm	in/mm	in/mm	in/mm	in/mm		in/mm	lb/kg	
2 50	2.375 60.3	3.125 79.37	5.7 144.78	3.125 79.37		3/8 x 2 3/8 M10 x 60	3 1.36	M97X2
3 80	3.5 88.9	4.375 111.12	7.4 187	3.125 79.37		1/2 x 3 M12 x 75	5 2.27	M97X3
4 100	4.5 114.3	5.125 130.17	8.7 220	3.75 95.25		1/2 x 3 M12 x 75	7 3.17	M97X4
6 150	6.625 168.3	6.375 161.95	11.69 296	3.75 95.25	4	5/8 x 3 1/2 M16 x 90	11 4.99	M97X6
8 200	8.625 219.1	9.5 241.3	14 355	4.25 107.95		5/8 x 3 1/2 M16 x 90	18 8.16	M97X8
10 250	10.750 273.0	11.5 292.1	17.1 434	5 127		3/4 x 4 3/4 M20 x 120	28 12.7	M97X10
12 300	12.75 323.9	14.5 368.3	19.5 495.3	5 127		3/4 x 4 3/4 M20 x 120	35 15.87	M97X12

Munro Flexible Coupling M7705

Made to USA standards, to easily interchange with other major manufacturers, the Munro flexible coupling is ideal for use in countless piping applications where misalignment might be present. The M7705 can accommodate vibration, thermal stress and moderate seismic activity. This tried and true coupling offers pressure ratings to 500 PSI, depending on pipe size and wall thickness.



Materials	
Couplings	Ductile iron, non-lead orange rust-inhibiting paint coating, ASTM A536, Grade 65-45-12
Bolts	Carbon steel, heat treated and zinc plated, tensile strength to 110,000 psi: ASTM A 183 Grade 2
Nuts	Carbon steel and zinc plated: ASTM 563 Grade 2
Gaskets	Nitrile, orange color-coded, service temperature: -20°F to 180°F (-29°C to 82°C)

Did You Know?
Find our installation guide on p. 224.

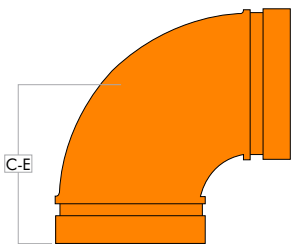
Nominal Size	Pipe OD	Max. Working Pressure (CWP)	Dimensions			Bolts		Approx. Weight	Model Number
			A	B	C	Qty	Size		
in/mm	in/mm	psi/bar	in/mm	in/mm	in/mm		in/mm	lb/kg	
2 50	2.375 60.3	500 35	3.31 84	5.08 129	1.89 48	2	3/8 x 2 1/8 M10 x 55	1.8 0.8	M7705X2
3 80	3.5 88.9	500 35	4.57 116	6.65 169	1.89 48		1/2 x 3 M12 x 75	2.8 1.3	M7705X3
4 100	4.5 114.3	500 35	5.71 145	7.76 197	2.05 52		1/2 x 3 M12 x 75	4.1 1.9	M7705X4
6 150	6.625 168.3	450 31	7.87 200	10.55 268	2.44 62		5/8 x 3 1/2 M16 x 90	6.4 2.9	M7705X6
8 200	8.625 219.1	300 20	10.24 260	13.78 350	2.52 64		5/8 x 3 1/2 M16 x 90	11 4.9	M7705X8
10 250	10.750 273.0	300 20	13.50 343	16.73 425	2.52 64		3/4 x 4 3/4 M20 x 120	16 7.20	M7705X10
12 300	12.750 323.9	300 20	15.35 390	18.39 467	2.52 64		7/8 x 6 1/2 M22 x 165	22.5 10.8	M7705X12

Munro Grooved-end Elbows: 90° Elbow M7110, 45° Elbow M7111

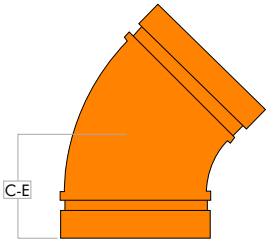
Munro ductile iron grooved fittings are made to USA standards for consistent interchangeability with other major manufacturers.

Materials

Ductile iron, non-lead orange rust-inhibiting paint coating, ASTM A536, Grade 65-45-12



90° Elbow
M7110

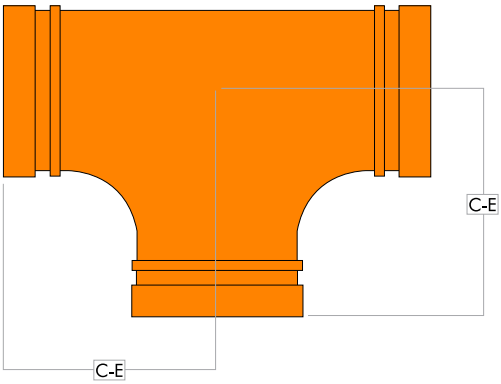


45° Elbow
M7111

Nominal Size	Pipe OD	90° Elbow M7110		Model Number	45° Elbow M7111		Model Number
		C-E	Approx. Wt.		C-E	Approx. Wt.	
in/mm	in/mm	in/mm	lb/kg		in/mm	lb/kg	
2 50	2.375 60.3	3.25 83	1.0 0.5	M7110X2	2.00 51	1.0 0.45	M7111X2
3 80	3.5 88.9	4.25 108	3.4 1.5	M7110X3	2.5 64	2.4 1.1	M7111X3
4 100	4.5 114.3	5.0 1.27	5.8 2.6	M7110X4	3.0 76	3.4 1.5	M7111X4
6 150	6.625 168.3	6.50 165	13.6 6.2	M7110X6	3.5 89	7.8 3.5	M7111X6
8 200	8.625 219.1	7.75 197	32 14.5	M7110X8	4.25 108	16.2 7.3	M7111X8
10 250	10.750 273.0	9.0 229	44 19.95	M7110X10	4.75 121	30 13.6	M7111X10
12 300	12.750 323.9	10.0 254	68 28.57	M7110X12	5.25 133	30 13.6	M7111X12

Munro Grooved-end Tees M7120

Munro ductile iron grooved fittings are made to USA standards for consistent interchangeability with other major manufacturers.



Materials

Ductile iron, non-lead orange rust-inhibiting paint coating, ASTM A536, Grade 65-45-12

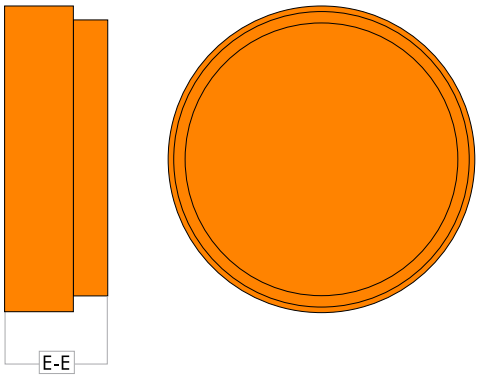
Nominal Size	Pipe OD	C-E	Approx. Weight	Model Number
in/mm	in/mm	in/mm	lb/kg	
2 50	2.375 60.3	3.25 83	2.4 1.0	M7120X2
3 80	3.5 88.9	4.25 108	6 2.7	M7120X3
4 100	4.5 114.3	5.00 127	8.2 3.7	M7120X4
6 150	6.625 168.3	6.50 165	18.9 8.6	M7120X6
8 200	8.625 219.1	7.75 197	33 14.9	M7120X8
10 250	10.750 273.0	9.00 229	62 28.1	M7120X10
12 300	12.75 323.9	10.00 254	81 36.7	M7120X12

Munro Grooved-end Caps M7160

Munro ductile iron grooved fittings are made to USA standards for consistent interchangeability with other major manufacturers.

Materials

Ductile iron, non-lead orange rust-inhibiting paint coating, ASTM A536, Grade 65-45-12



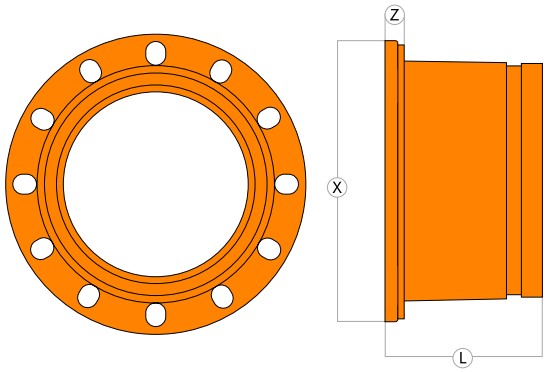
Nominal Size	Pipe OD	E-E	Approx. Weight	Model Number
in/mm	in/mm	in/mm	lb/kg	
2 50	2.375 60.3	1.00 25	0.6 0.27	M7160X2
3 80	3.500 88.9	1.00 25	1.0 0.45	M7160X3
4 100	4.500 114.3	1.00 25	1.4 0.63	M7160X4
6 150	6.625 168.3	1.00 25	5.4 2.45	M7160X6
8 200	8.625 219.1	1.18 30	10.2 4.62	M7160X8
10 250	10.750 273.0	1.25 32	14.0 6.30	M7160X10

Munro Universal Flange Adapter M7170

This all-in-one universal flange adapter accepts ANSI 125/150, PN10, PN16, JIS, 10K and BS-10E flange patterns. In addition, a longer grooved end makes this unique fitting easier to install.

Materials

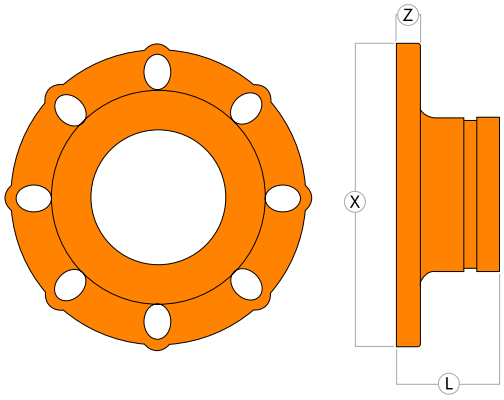
Ductile iron, non-lead orange rust-inhibiting paint coating, ASTM A536, Grade 65-45-12



Nominal Size	Pipe OD	ANSI 125/150	PN 10/16	JIS 10K	BS 10E	Dimensions			Bolts		Approx. Weight	Model Number
						L	X	Z	Qty	Size		
in/mm	in/mm	in/mm	in/mm	in/mm	in/mm	in/mm	in/mm	in/mm		in/mm	lb/kg	
10 254	10.75 273	14.25 362	13.75 350	14.00 355	14.00 356	6.00 152	16.00 406	0.80 20.3	12	7/8 M22	40 18	M7170X10
12 300	12.75 324	17.00 432	16.15 410	15.75 400	16.00 406	6.00 152	19.00 465	1.00 25.4	12	7/8 M22	57 26	M7170X12

Munro Flange Adapter M7180

The ideal product to transition from flanged to grooved components, this flange adapter is compatible with ANSI Class 125/150.



Materials

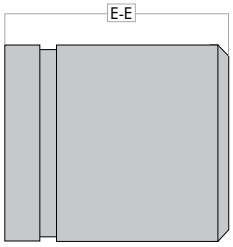
Ductile iron, non-lead orange rust-inhibiting paint coating, ASTM A536, Grade 65-45-12

Nominal Size	Pipe OD	ANSI 125/150	Dimensions			Bolts		Approx. Weight	Model Number
			L	X	Z	Qty	Size		
in/mm	in/mm	in/mm	in/mm	in/mm	in/mm		in/mm	lb/kg	
2 50	2.375 60.3	4.75 121	2.50 64	6.50 165	0.63 16	4	5/8 M16	3.4 1.5	M7180X2
3 80	3.5 88.9	6.00 152	2.75 70	7.87 200	0.63 16		5/8 M16	5.4 2.4	M7180X3
4 100	4.5 114.3	7.50 191	3.00 76	9.00 229	0.63 16	8	5/8 M16	7.8 3.5	M7180X4
6 150	6.625 168.3	9.50 241	3.00 76	11.46 291	0.94 24		3/4 M20	11 4.9	M7180X6

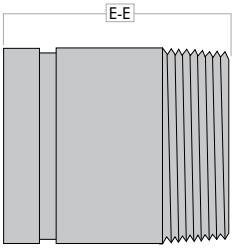
Munro Adapter Nipples: Groove x Thread M59, Groove x Weld M58

Munro grooved fittings are made to USA standards for consistent interchangeability with other major manufacturers.

Materials
Carbon steel, ASTM A733, ANSI B1.20.1



Groove x Weld
M58

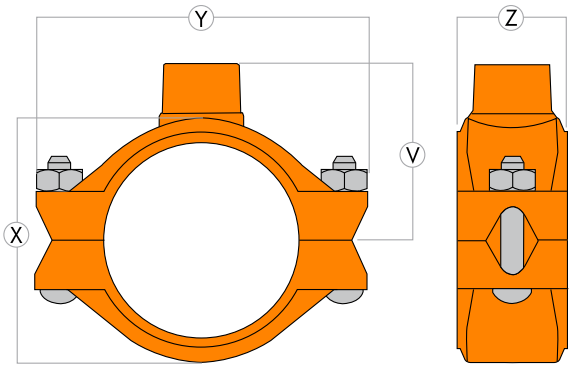


Groove x Thread
M59

Nominal Size	Pipe OD	M58 Groove X Weld		Model Number	M59 Groove X Thread		Model Number
		E-E	Approx. Wt.		E-E	Approx. Wt.	
in/mm	in/mm	in/mm	lb/kg		in/mm	lb/kg	
2 50	2.375 60.3	--	--	--	4.00 102	1.0 0.4	M59X2X4
3 80	3.500 88.9	--	--	--	4.00 102	2.5 1.1	M59X3X4
4 100	4.5 114.3	6.0 152	4.4 1.9	M58X4X6	6.00 152	4.4 1.9	M59X4X6
6 150	6.625 168.3	--	--	--	6.00 152	7.8 3.5	M59X6X6
8 200	8.625 219.1	6.0 152	13.2 5.9	M58X8X6	--	--	--

Munro Mechanical Tee M7721

Outlet couplings, sometimes called mechanical tee or saddle tee, allow you to create a mid-pipe branch outlet quickly and easily. A gasket seals on the joined pipe, in the neck of the outlet. The connection is female threaded. These fittings are not recommended for vacuum applications.

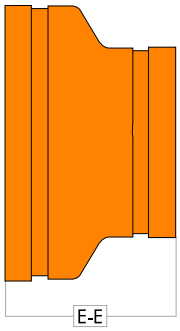


Materials
Ductile iron, non-lead orange rust-inhibiting paint coating, ASTM A536, Grade 65-45-12

Nominal Size	Pipe OD	Dimensions				Bolts		Approx. Weight	Model Number
		V	X	Y	Z	Qty	Size		
in/mm	in/mm	in/mm	in/mm	in/mm	in/mm		in/mm	lb/kg	
4 X 2 101	4.5 114.3	3.9 99	2.6 66	7 177	3.8 96.5	2	5/8 M16	3.2 1.4	M7721X4X2
6 X 2 152	6.625 168.3	5 127	3.6 91.4	9.75 247.6	4 101.6		3/4 M16	6 2.7	M7721X6X2

Munro Concentric Reducer: M7150 and M7150F

Munro ductile iron grooved fittings are made to USA standards for consistent interchangeability with other major manufacturers. Pressure ratings conform to those of the Munro flexible couplings.



Materials
Ductile iron, non-lead orange rust-inhibiting paint coating, ASTM A536, Grade 65-45-12

Nominal Size	Pipe OD	Description	Dimensions E-E	Approx. Weight	Model Number
in/mm	in/mm		in/mm	lb/kg	
2 X 1 50 X 25	2.37 X 1.31 60 X 33	Groove X Female NPT	2.5 63.5	1 0.45	M7150FX2X1
2 X 1 1/2 50 X 40	2.37 X 1.90 60 X 48		2.5 63.5	1 0.45	M7150FX2X150
4 X 2 100 X 50	4.50 X 2.37 114 X 60		3 76	2 0.9	M7150FX4X2
6 X 4 150 X 100	6.62 X 4.50 168 X 114		4 102	6 2.72	M7150FX6X4
10 X 8 250 X 200	10.75 X 8.62 273 X 219	Groove X Groove	6 152	14 6.35	M7150X10X8
12 X 10 300 X 250	12.75 X 10.75 323 X 273		7 178	28 12.7	M7150X12X10
6 X 2 150 X 50	6.62 X 2.37 168 X 60		4 102	5 1.8	M7150X6X2
6 X 4 150 X 100	6.62 X 4.50 168 X 114		4 102	5 2.26	M7150X6X4
8 X 4 200 X 100	8.62 X 4.50 219 X 114		5 127	11 5	M7150X8X4
8 X 6 200 X 150	8.62 X 6.62 219 X 168		5 127	9 4	M7150X8X6

Munro Nitrile Gaskets for M95

Size	Model Number
2"	MG95X2
3"	MG95X3
4"	MG95X4
6"	MG95X6
8"	MG95X8
10"	MG95X10

Munro Nitrile Gaskets for M7705 and M97

Size	Model Number
2"	MGX2
3"	MGX3
4"	MGX4
6"	MGX6
8"	MGX8
10"	MGX10
12"	MGX12

Nuts and Bolts

Size	Model Number
1/2" X 3" w/ nut	50X3BOLT
5/8" X 3.50" w/ nut	675X35BOLT
3/4" X 4.75" w/ nut	75X475BOLT

Get everything you need!
Grooved Check Valves (p. 168) & Butterfly Valves (p.161)

Mechanical Groove Fittings









Approx. Weight lbs	Description	Size in	Model Number
2.5	Elbow 90° Long Radius	2	M7110LRX2
6.5		3	M7110LRX3
11.5		4	M7110LRX4
4.5	Elbow 45° Long Radius	3	M7111LRX3
7.5		4	M7111LRX4
.5	Elbow 22 1/2°	2	M7112X2
2.5		4	M7112X4
5.5		6	M7112X6
11		8	M7112X8
.5	Elbow 11 1/4°	2	M7113X2
2		4	M7113X4
4.5		6	M7113X6
8.5		8	M7113X8
2.5	Tee Reducing Groove	2x2x1	M7121X2X2
5.5		3x3x2	M7121X3X2
10		4x4x1	M7121X4X1
10.5		4x4x2	M7121X4X2
35		8x8x2	M7121X8X2
35.5		8x8x4	M7121X8X4
37.5		8x8x6	M7121X8X6
2.5	Tee Reducing Groove x Groove x MNPT	2x2x1	M7121MX2X1
10		4x4x1	M7121MX4X1
3.5	Cross	2	M7135X2
8.5		3	M7135X3
13.5		4	M7135X4
9	Check Valve	2	M900X2
11		3	M900X3
25		4	M900X4
47		6	M900X6
66		8	M900X8
6.5	Ball Valve	2	M1000X2
13.5		3	M1000X3
55		4	M800X4
79		6	M800X6
4	Butterfly Valve	2	M232X2
7.5		3	M232X3
11.5		4	M232X4
26.5		6	M232X6

Additional finishes: powder coated, galvanized, stainless steel, brass

Standard gaskets are nitrile – other gaskets available

Valves

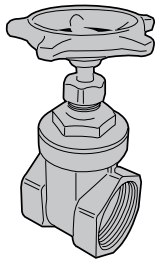
Choosing the right valve is a critical step in any irrigation project. At Munro, we offer a wide range of valves, including different configurations and construction materials. If you don't see what you need, just give us a call. We know valves!

VALVE SELECTION BASICS

All valve types have pros and cons, depending on the application. These tips will help you select the appropriate valve.

Gate Valves

Designed to operate fully open or closed, these valves open slowly and are available in a wide variety of sizes and materials.



Pros:

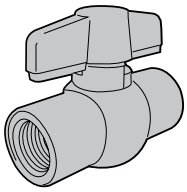
- Slow operation prevents fluid hammer
- Very little pressure loss
- Good seal under high pressure

Cons:

- Seepage is normal under low pressure

Ball Valves

These simple, trouble free valves are also designed to operate fully open or fully closed.



Pros:

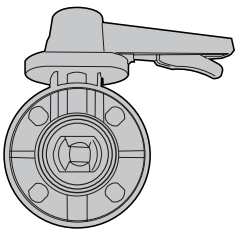
- Good for throttling clear water
- Low pressure drops
- Open and close quickly
- Simple design and operation

Cons:

- Opening too quickly can cause fluid hammer

Butterfly Valves

Generally used for handling large volumes, these valves are very compact.



Pros:

- Can handle large volume
- Can handle slurries
- Compact design

Cons:

- Should not be used for throttling
- Traditional valves need additional hardware to mount

Globe valves

Used to throttle or limit the flow of water, globe valves are used in situations where the flow needs to be adjusted regularly but does not need to be fully open.

Pros:

- Easy to operate, instant access
- Valve does not need to be reseated

Cons:

- Flow is restricted due to baffle

Did You Know?

Munro offers a high-quality butterfly valve with built in cam locks, eliminating the need for additional hardware. See pages 158,159 for more information.

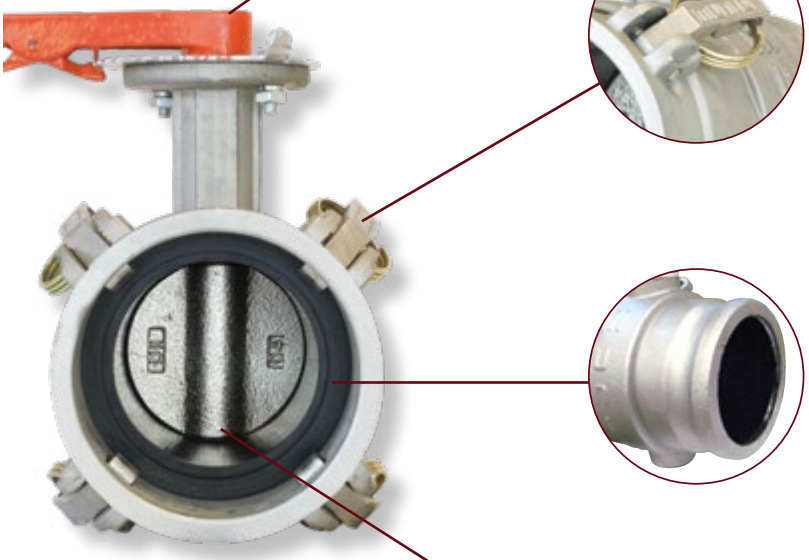
Munro 4" Cam Valves

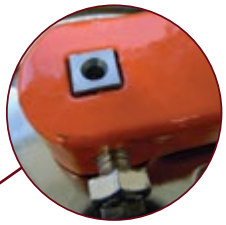
NEW & IMPROVED!

Traditional butterfly valve to camlock assemblies are heavy, time consuming to assemble and difficult to use. We applied our engineering expertise and 40+ years of industry knowledge to design something better.

- Up to 60% lighter – 12lbs up to 35lbs
- No assembly required
- Reduces leak points by more than half
- Every valve is tested

FEATURES AND BENEFITS

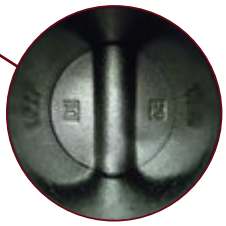




Stainless steel square shaft design minimizes rounding or releasing of disk and increases torque potential for positive shut off.

Four-handle style made of extra heavy-duty stainless steel reduces egg-shaping and ensures 360° mating.

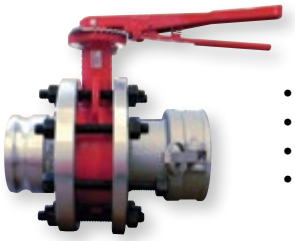
NBR rubber lined to reduce leaks, even when abrasives or hydrocarbons are present.



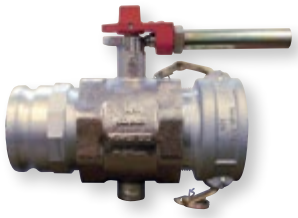
Ductile iron electroplated disk reduces abrasion and oxidation.

Munro 4" Cam Valve Dimensions

DO YOU USE THESE?



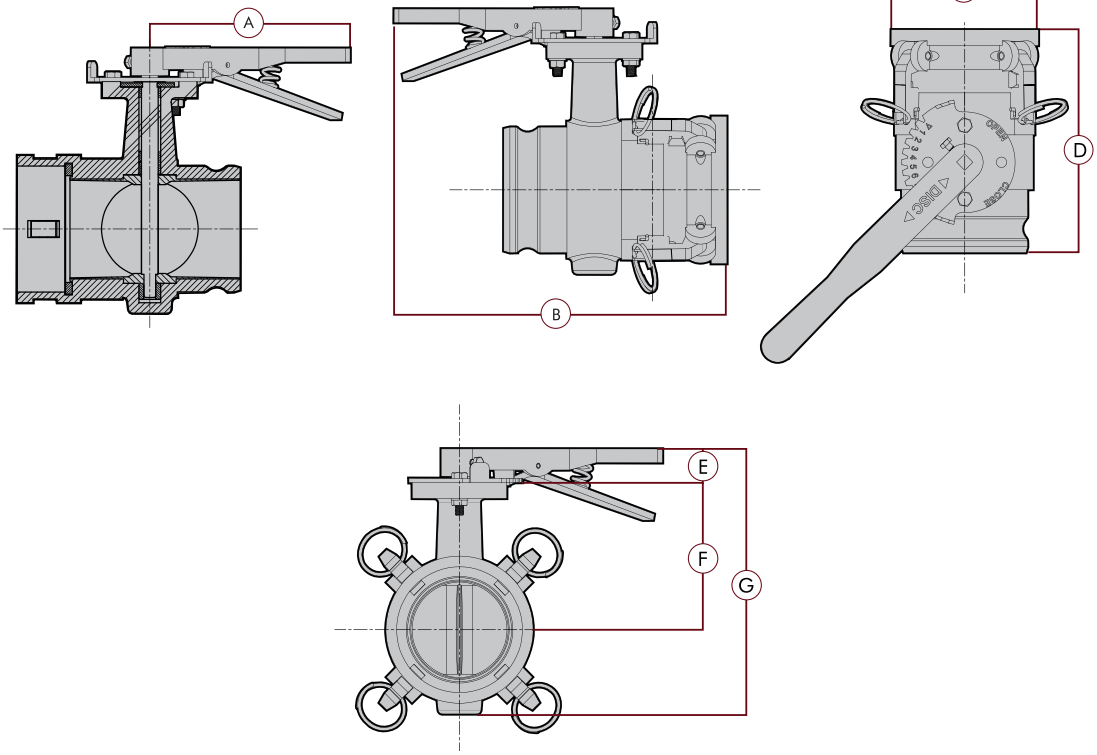
- 3 Pieces
- 2 Leak Points
- 8 Studs
- 35 lbs



- 3 Pieces
- 2 Leak Points
- 24 lbs

YOU NEED THIS!

- **ZERO ASSEMBLY**
- **ZERO LEAK POINTS**
- **12 LBS**



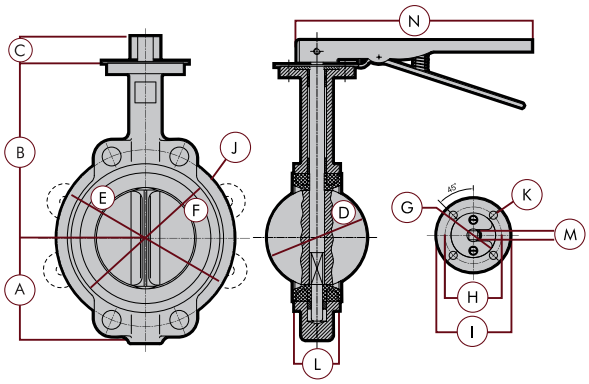
A	B	C	D	E	F	G	Model Number
10.25"	8.25"	5.375"	8.25"	1.25"	5.5"	10"	MY5533

Butterfly Valves for Flange Connections

With forty years of valve experience, Munro understands the demands for a heavy-duty, yet sophisticated valve. This valve features a durable ductile iron body and handle, oil impregnated shaft rings and a ten-position steel disc for easy adjustments.

- Proven construction design – able to withstand the most demanding applications.
- East to install – flexible for multiple applications with holes suitable for ASME flange class 125/150.
- Strong and reliable – one-shaft design improves strength and prevents leakage.

Dimensions in														
A	B	C	D	E	F	G	H	I	J	K	L	M	N	Model Number
3.25	6.25	1.25	2	4.75	4	1.5	2	3	.75	.25	1.5	.4	9.5	BFVMU2WL/LL
3.75	7.25	1.25	3	6	5	1.5	2	3	.75	.25	1.75	.5	9.5	BFVMU3WL/LL
4.5	8	1.25	4	7.5	6.5	2	2.75	3.75	.75	.4	2	.5	10.75	BFVMU4WL/LL
5.5	9	1.25	6	9.5	8.75	2	2.75	3.75	1	.4	2.25	.5	10.75	BFVMU6WL/LL
7	10.25	1.75	8	11.75	10.75	2.75	4	5	1	.5	2.4	.6	15	BFVMU8WL/LL
8	11.5	1.75	10	14.25	13	2.75	4	5	1	.5	2.5	.8	15	BFVMU10WL/LL
9.5	13.25	1.75	12	17	15.75	2.75	4	5	1	.5	3	.8	21.5	BFVMU12WL/LL



Approx. Weight lbs	Disk Material	Rubber Material	Size in	Working Pressure	Style	Model Number
6.6	Ductile Iron	NBR	2	150	Wafer Style	BFVMU2WL
9.0			3			BFVMU3WL
11.9			4			BFVMU4WL
19.0			6			BFVMU6WL
32			8			BFVMU8WL
48.5			10			BFVMU10WL
80.5			12			BFVMU12WL
11.5			2		Full Lug	BFVMU2LL
12.8			3			BFVMU3LL
22.0			4			BFVMU4LL
31.1			6			BFVMU6LL
48.1			8			BFVMU8LL
70.1			10			BFVMU10LL
113.0			12			BFVMU12LL

Hand wheels also available

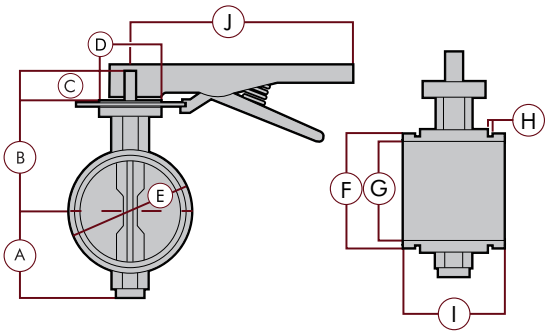
Electric and Pneumatic actuators available

Munro Grooved Butterfly Valves

For grooved fitting configurations, this valve is strong and well built.

- Epoxy coated valve body and disk
- Two-piece square stem driver
- Primary and secondary O-ring seals

Approx. Weight lbs	Working Pressure psi	Size in	Model Number
5.50	175	2	MGBV200
8.10		3	MGBV300
13.25		4	MGBV400



Dimensions in										
A	B	C	D	E	F	G	H	I	J	Model Number
2.40	3.87	1.26	3.03	3.07	2.37	2	.37	3.21	10.5	MGBV200
2.95	4.62	1.26	3.03	4.13	3.5	3	.37	3.85	10.5	MGBV300
3.54	5.38	1.26	3.62	5.20	4.5	4	.37	4.56	10.5	MGBV400

Munro PVC Butterfly Valves

This economical valve is ideally suited for irrigation flow control using minimal piping space.

- Wafer-style disc improves flow
- Rigid plastic body and disc for dependable chemical resistance inside and out
- EPDM face-seal design requires no additional gaskets between mating flanges
- Handle gives clear indication of disc opening degree

Approx. Weight lbs	Working Pressure psi	Size in	Model Number
2.9	150	2	BFV200
3.9		3	BFV300

Munro Stainless Steel Irrigation Foot Valves – 2" & 3"

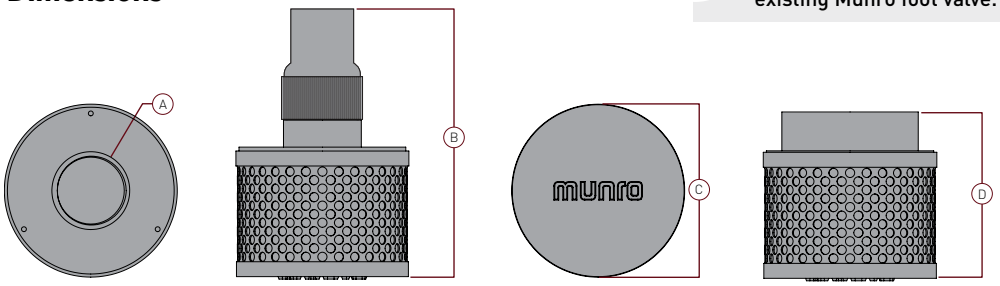
The only foot valve designed specifically for the irrigation industry, these high-quality, spring-loaded foot valves are non-corrosive and available in national pipe thread or PVC slip. With flow velocities similar to the next largest sized valve on the market, this unique product offers unparalleled advantages.

ADVANTAGES

- Easy to use foot valve features a stainless steel basket strainer
- 1/8" perforations = 3175 microns = 6 mesh
- Excellent flow velocity – 29 holes/sq in. = 93%, open area = 38" total open area
- Repairable valve
- Stainless steel components: assembly bolts, springs, strainer
- Will perform in any position

Did You Know?
If you have a Munro 2" or 3" foot valve, you can purchase our new basket strainer with a flange that will connect directly to your existing Munro foot valve.

Dimensions



Basket Strainer with Foot Valve

Basket Strainer to Attach to Foot Valve

A	B	C	D	Model Number
Basket Strainer with Foot Valve				
2" Socket Weld	10"	7"	--	MBSA2CVS
3" Socket Weld	12"			MBSA3CVS
2" NPT	10"			MBSA2CVT
3" NPT	12"			MBSA3CVT
Basket Strainer to Attach to Foot Valve				
2" Basket Strainer Thread	--	7"	6.25	MBSA2ADP
3" Basket Strainer Thread	--		6.75	MBSA3ADP

Specifications

Approx. Weight lbs	Connection Type	Description	Model Number
Basket Strainer with Foot Valve			
4.1	Socket Weld	SS Basket Strainer 2" Check Slip	MBSA2CVS
7		SS Basket Strainer 3" Check Slip	MBSA3CVS
4	NPT	SS Basket Strainer 2" Check NPT	MBSA2CVT
7.15		SS Basket Strainer 3" Check NPT	MBSA3CVT
Basket Strainer to Attach to Foot Valve			
3.5	Foot Valve Thread	SS Basket Strainer 2" to attach to Munro Foot Valve	MBSA2ADP
4.5		SS Basket Strainer 3" to attach to Munro Foot Valve	MBSA3ADP

See pg. 174 for 2" & 3" NPT

Munro PVC Foot Valves

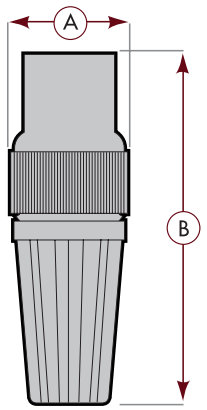
Ideal for quick pump priming, Munro foot valves offer rapid closure to prevent back flow of water. While cast iron foot valves can rust, introducing contaminants, our high quality, non-corrosive PVC foot valve includes stainless steel internal parts for long life and low maintenance.

- All parts are easily replaceable
- Stainless steel components: assembly bolts, springs
- EPDM gasket

Approx. Weight lbs	Design	Size in	Connection Style	Working Pressure psi	Set Up	Model Number
1	Spring Loaded	1 1/4	Threaded	150	Multi-Positional	FV125T
1		1 1/2				FV150T
2		2				FV200T
3 1/2		3				FV300T
6 1/2	Flapper	4			Vertical Only	FV400T
15		6				FV600T
1	Spring Loaded	1 1/4	Socket Weld		Multi-Positional	FV125S
1		1 1/2				FV150S
2		2				FV200S
3 1/2		3				FV300S
5 1/2	Flapper	4			Vertical Only	FV400S
15		6				FV600S

Replacement parts available.

Dimensions		
A	B	Model Number
2"	6 1/4"	FV125T
3"	8"	FV150T
3"	8 1/4"	FV200T
5 1/2"	11 1/4"	FV300T
7 1/2"	14 1/2"	FV400T
11 1/2"	20"	FV600T
2"	6 1/4"	FV125S
3"	8"	FV150S
3"	8 1/4"	FV200S
5 1/2"	11 1/4"	FV300S
7 1/2"	14 1/2"	FV400S
11 1/2"	20"	FV600S



Did You Know?
Pumps prime faster, better and more efficiently with the Munro PVC Foot Valve!

PVC Flanged Swing Foot Valves

Complete with a strainer, this flanged foot valve is easy to install and is ideal for large irrigation systems.

- Smooth flow path eliminates pressure loss
- Industrial grade, maintenance free, sealed unit

Approx. Weight lbs	Design	Pipe Size in	Working Pressure psi	Model Number
33.73	Flapper	8	150	FV800F
39.02		10		FV1000F

PVC Flange

Ideal for easy installation of foot valves or strainers, the Munro PVC flange is heavy duty and non-corrosive.

- 125 lb class flange
- Resistant to most chemicals

Approx. Weight lbs	Holes	Pipe Size in	Working Pressure psi	Model Number
6.28	8	8	150	FVP08
10.03	12	10		FVP10
17.53	12	12		FVP12

Cast Iron Foot Valves

These valves are an economical option for use in irrigation projects, drainage on construction sites and pumping from ponds and streams.

- Sturdy cast iron construction, complete with strainer
- Leather flapper check to retain prime

Approx. Weight lbs	O.D. Valve Leather	Pipe Size in	Model Number
3.0	3"	1 1/2	FV3TFV150
5.5	4 1/4"	2	FV3TFV200
7.3	4 1/2"	2 1/2	FV3TFV250
10.8	5 3/4"	3	FV3TFV300
19.5	7"	4	FV3TFV400
47	10 1/8"	6	FV3TFV600
97	12 7/8"	8	FV3TFV800

Weights and leathers available.

Brass Foot Valves

This valve is a must-have to retain prime in domestic irrigation applications.

- Stainless steel springs
- Tapered stainless steel screen & cap
- Non-corrosive delrin stem guide

Approx. Weight lbs	Size in	Working Pressure psi	Model Number
1/4	1/2	200	FV2T
1/2	3/4		FV3T
3/4	1		FV4T
1 1/4	1 1/4		FV5T
1 1/2	1 1/2		FV6T
3	2		FV8T
7 1/2	3		FV12T

Brass Gate Valves

Brass gate valves are an economical valve to stop flow in an irrigation system, these can also be used to isolate zones.

- Full port, 200 lb CWP
- Screwed in bonnet

Approx. Weight lbs	Size in	Working Pressure psi	Model Number
.68	3/8	200 WOG	GV375T
.55	1/2		GV050T
.68	3/4		GV075T
1.0	1		GV100T
1.44	1 1/4		GV125T
2.2	1 1/2		GV150T
3.3	2		GV200T
6.6	2 1/2		GV250T
7.2	3		GV300T
13.75	4		GV400T

Also Available with Rising Stem

Ductile Iron Flanged Open Gate Valves

This industrial style valve allows full flow. This is a durable, rugged valve.

- 250 PSI non-shock CWP
- Stainless steel stem and bonnet
- Meets AWWA C515

Approx. Weight lbs	Size in	Working Pressure psi	Model Number
32	2	150	GV200IF
52.9	3		GV300IF
73.9	4		GV400IF
149.9	6		GV600IF
214.9	8		GV800IF
335.1	10		GV1000IF
478.4	12		GV1200IF
866	14		GV1400IF
1224	16		GV1600IF

Also available in OS&Y configuration. Class 300 and above also available.

Quick Opening Knife Gate Valves

When full flow and quick stoppage is a must, this is an ideal product. Designed to allow full flow under low pressure, this valve is primarily used in septic tank truck and water transfer applications.

- Heavy cast bronze body
- Quick action open and close
- Lever handle split wedge disc

Approx. Weight lbs	Size in	Working Pressure psi	Model Number
8.2	3	200	GV3QUICK
13.2	4		GV4QUICK
23.4	6		GV6QUICK

Full Port Brass Ball Valve - 600 WOG

A great option for countless irrigation applications, this valve is suitable for various liquids and gases.

Approx. Weight lbs	Size in	Maximum Pressure psi	Model Number
.37	1/4	600 WOG	BAV754T01N
.37	3/8		BAV754T02N
.51	1/2		BAV754T03N
.66	3/4		BAV754T04N
1.15	1		BAV754T05N
1.78	1 1/4		BAV754T06N
2.38	1 1/2		BAV754T07N
3.06	2		BAV754T08N
6.13	2 1/2		BAV754T09N
8.17	3		BAV754T10N
7.10	4		BAV754T11N

Also available in 3-way configuration

Munro 1/4" Ball Valve

Description: 1/4" male x Female, Brass, Short Handle Ball Valve

Approx. Weight lbs	Size in	Working Pressure psi	Model Number
.15	1/4	300	BAVSF25

Stainless Steel Ball Valve

Used in high pressure or chemical applications.

Approx. Weight lbs	Size in	Working Pressure psi	Model Number
.58	1/4	1000 WOG	BAV949161
.63	1/2		BAV949163
1.27	3/4		BAV949164
1.63	1		BAV949165
3.06	1 1/4		BAV949166
4.04	1 1/2		BAV949167
6.05	2		BAV949168

Polypropylene Ball Valve

When a ball valve is desired, polypropylene is an economical option. Inert to most chemicals, this full port valve can be used in many applications.

Approx. Weight lbs	Size in	Working Pressure psi	Model Number
.75	1/2	100 @ 75°F	BV4011A20
.71	3/4		BV4011B20
2.08	1 1/4		BV4011X20
2.04	1 1/2		BV4011D20
3.5	2	75 @ 150°F	BV4011N20
4.25	2 1/2		BV4011W20
6.0	3		BV4011Z20

PVC & Stainless Steel Ball Valve

A stainless steel handle and ball and EPDM o-ring makes this economical valve easy to operate and long lasting. Connection is NPT or socket weld.

Approx. Weight lbs	Size in	Working Pressure psi	Model Number
.22	1/2	235	BV050
.29	3/4		BV075
.46	1		BV100
.71	1 1/4		BV125
.90	1 1/2		BV150
1.85	2		BV200

PVC Ball Valve

A must for any irrigator's toolbox, this is an easy-to-install, threaded, economical valve.

Approx. Weight lbs	Size in	Working Pressure psi	Model Number
.22	1/2	150 @ 73°F	BAV050PVC
.44	3/4		BAV075PVC
.69	1		BAV100PVC
.90	1 1/4		BAV125PVC
1.19	1 1/2		BAV150PVC
1.86	2		BAV200PVC

PVC Check Valve

Our union-style check valve is easy to disassemble and clean, and threaded for easy installation.

Approx. Weight lbs	Length in	Size in	Working Pressure psi	Model Number
1.08 1.32 3.51	6 5/8 7 1/8 10	1.5 2 3	150 @ 73° F	CV150 CV200 CV300

Brass Check Valve

Ideal for a domestic water submersible pump application, this valve can be used vertically or horizontally.

- Stainless steel springs
- Resilient washer holds disc in place.

Approx. Weight lbs	Size in	Working Pressure psi	Model Number
.75 1 1.25 2 2.25 3.75 8.5	1/2 3/4 1 1 1/4 1 1/2 2 3	200 WOG	CV2T CV3T CV4T CV5T CV6T CV8T CV12T

Brass Swing Check Valve

This valve features a screw cap for easy clean out. A hinge-style flapper allows easy low pressure opening and operation. The metal disc makes this suitable for water, oil and gas.

Approx. Weight lbs	Size in	Working Pressure psi	Model Number
.42 .58 .73 1.33 1.83 2.83 11.63 15.25	1/2 3/4 1 1 1/4 1 1/2 2 3 4	200 WOG	SCV521T03 SCV521T04 SCV521T05 SCV521T06 SCV521T07 SCV521T08 SCV521T10 SCV521T11

Munro 3" Grooved No-Lead Brass Check Valve

The lead-free line comes standard with a Buna-S rubber poppet, an extremely durable compound for use with potable drinking water. All other internal components are stainless steel. Each valve is tested twice for casting integrity and back flow protection.

Approx. Weight lbs	Size in	Tap in	Length in	Diameter in	Cracking Pressure lbs	Model Number
11.80	3	1/4	7.40	4.71	1-2	F351

Sump and Sewage PVC Check Valve

Used in sewage applications where full flow is needed utilizing compression gaskets to connect IPS pipe.

Approx. Weight lbs	Solids Handling in	Length in	Diameter in	Size in	Model Number
1 1.75 5	1 1/2 2 3	7 1/2 9 3/4 14	3 1/4 4 1/4 5 3/4	1 1/2 2 3	SRPW2123 SRPW2124 SRPW2125

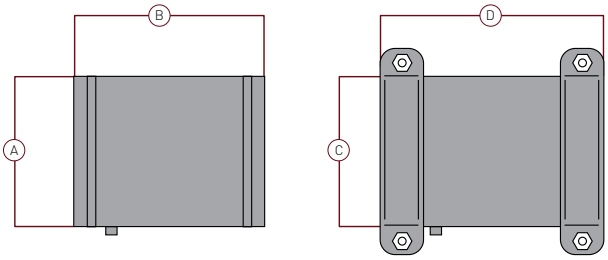
Munro Grooved Check Valves

The Munro grooved check valve features an aluminum or brass body and a Buna-S spring assisted tapered style poppet. This design lends itself to low flow or pulsating flows to reduce cavitation and chattering. This valve was designed with irrigation systems in mind. All internal Parts are rubber or stainless steel.

FEATURES AND BENEFITS

- Every valve is tested to 400 psi
- Poppet engagement pressure is 1 – 2 psi
- 1/4" NPT accessory port for transducer or gauge installation to tap into line pressure
- Repairable valve

Dimensions



A	B	C	D	Model Number
		5.08"	7.75"	MGCV020C
		7.75"	9"	MGCV030C
		9.5"	8.375"	MGCV040C
		5.75"	7.75"	MGCV025MC
		7.75"	8.875"	MGCV040MC
		9.65"	7"	MGCV050MC
3.825"	5.75"			MGCV025M
5.375"	6.825"			MGCV040M
6.125"	5.825"			MGCV050M

Specifications

Approx. Weight lbs	Flow Rate with psi loss	Grooved Couplers	Working psi	Description	Model Number
ALUMINUM CHECK VALVE WITH COUPLINGS					
6.5	60	Y	200	2" High Flow Groove Check Valve, coupler	MGCV020C
6.5	60	Y		2-1/2" Med Flow Groove Check Valve, coupler	MGCV025MC
14	190	Y		3" High Flow Groove Check Valve, coupler	MGCV030C
14	190	Y		4" Med Flow Groove Check Valve, coupler	MGCV040MC
19.5	260	Y		4" High Flow Groove Check Valve, coupler	MGCV040C
19.5	260	Y		5" Med Flow Groove Check Valve, coupler	MGCV050MC
ALUMINUM CHECK VALVE					
3	60	N	200	2-1/2" Med Flow Groove Check Valve	MGCV025M
6	190	N		4" Med Flow Groove Check Valve	MGCV040M
3.5	260	N		5" Med Flow Groove Check Valve	MGCV050M
BRASS CHECK VALVE					
11.80		N		3" Med Flow Groove Check Valve	F351

Globe Style Silent Check Valve

Silent check valves retain the integrity of the pipe by reducing shock and water hammer.

- Cast iron body
- Bronze seat, disc and bushing
- Stainless steel spring

Approx. Weight lbs	Temperature	Size in	Working Pressure psi	Model Number
24	180°F	2 1/2	200	CV2240T
29		3		CV2241T
42		4		CV2242T
52		5		CV2243T
73		6		CV1806
126		8		CV1808
205		10		CV2247T
306		12		CV2248T
380		14	150	CV2249T
501		16		CV2250T

*Other materials available.

Ball Check Valve

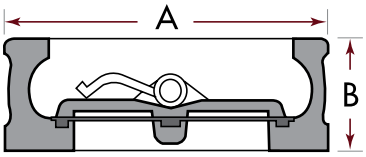
Our ball check valves are made of corrosion resistant PVC and have self-cleaning balls and easy access ports. Available threaded or socket weld for easy gluing to PVC pipe.

Approx. Weight lbs	Maximum Temp.	Size in	Working Pressure psi	Model Number
1	180° F	1 1/4	100	BCV2132T
2		1 1/2		BCV2133T
2		2		BCV2134T

Wafer Style Check Valve

This economical, space saving valve allows for easy flow access and can be used in a vertical or horizontal installation.

Approx. Weight lbs	Dimension "A" in	Dimension "B" in	Size in	Working Pressure psi	Model Number
6.5	4.1	2.125	2	150	WCVC200
11	5.4	2.25	3		WCVC300
13	6.9	2.5	4		WCVC400
22	8.7	3	6		WCVC600
42	11	3.75	8		WCVC800



Discharge Check Valve

Cast iron discharge valve bolts directly to pump for priming and pump protection. The valve comes with automatic, spring activated mechanism with external handle.

Approx. Weight lbs	Description	Model Number
21	2 1/2" Thread x 3" Thread	BEB05922
20	3" Flange x 4" Thread	BEB05923
36	4" Flange x 4" Thread	BEB05924
55	5" Flange x 5" Thread	BEB05925
70	6" Flange x 6" Thread	BEB05926

Float Valve Kits

No need to spend time choosing the individual parts and pieces – we've done it for you in this light weight, high quality, corrosion resistant kit.

Approx. Weight lbs	Rod Length in	Thread Size in	Ball Size in	Working Pressure psi	Size in	Model Number
.51	8	1/4	5	150 PSI @ 73˚F	3/4	FLT075T
.93			6		1	FLT100T
2.2	12	7/16	10		1 1/4	FLT125T
2.2					1 1/2	FLT150T
4.19	18		12		2	FLT200T
18.74			15	100 PSI @ 73˚ F	3	FLT300T

Brass Float Valves

Used for tank measurement and flow control when electricity is not present or practical. Countless applications include stock tanks, vaults and ponds.

Approx. Weight lbs	Flow Cap. at 100 psi	Working Inlet Pressure psi	Recom. Float Diameter in	Fitting Stem	Pipe Size in	Model Number
.54	21	240	6	1/4 x 20 x 10	3/8	FLV375
.71	31	210	6	1/4 x 20 x 10	1/2	FLV500
1.14	60	150	6	1/4 x 20 x 10	3/4	FLV750
1.81	150		8	5/16-18 x 12	1	FLV1000
3.16	347		8	3/8-16 x 12	1 1/4	FLV1250
3	346		8	3/8-16 x 12	1 1/2	FLV1500
3.35	357		8	3/8-16 x 12	2	FLV2000

Available in 3/8" – 3" in PVC

Did You Know?
Float valves up to 3" are available!

Floats

Approx. Weight lbs	Threaded Connection	Diameter in	Material Construction	Model Number
7.3	1/4 - 20	6	Plastic	FBP6
12.6	3/8 - 16	8		FBP8
12.6	5/16 - 18	7		FBP87
6.5	1/4 - 20	5	Copper	FBC5
8.3	1/4 - 20	6		FBC6
20	3/8 - 16	8		FBC8

Did You Know?
Not sure which valve you need? Give us a call. We're here to help!

Stems

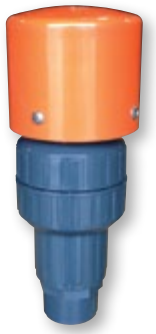
Approx. Weight lbs	Rod Diameter in	Length in	Thread Size in	Model Number
2	1/4	10	1/4 - 20	FLV11
2	5/16	12	5/16 - 18	FLV12
2	3/8	12	3/8 - 16	FLV13

Flow Control Valve

To prevent over-pumping of low yields the flow control valve is used primarily in submersible pump and flow control applications. These valves are self-cleaning and designed to deliver a constant volume of water over a wide pressure drop range.

Available from 3/8" to 1 1/2" at various flows.

PVC Air Evacuating Valves



Maximizing operating efficiency by evacuating air from the piping system, this valve is specifically designed for piping systems with slope changes and large sections.

Approx. Weight lbs	Size in	Working Pressure psi	Set Up	Model Number
.46	1/2	150	Threaded	ARV050T
.48	3/4			ARV075T
.86	1			ARV100T
.97	1 1/4			ARV125T
1.74	1 1/2			ARV150T
2.18	2			ARV200T
3.97	2 1/2			ARV250T
4.48	3			ARV300T
5.31	4			ARV400T

Unloader Valves

Intended for clean water applications with roller or piston pumps, these higher pressure valves are used to relieve pressure.

Approx. Weight oz	Outlet/Inlet (NPT)	Number of Ports	Max. Temp.	Max. gpm	Adjustable psi	Model Number
8	3/8"M x 3/8"M	2	200°F	5	300-600 400-1000 800-1500	HPP33900062D HPP33900063D HPP33900067D

Adjustable Relief Valves

Cast Bronze Body, S.S. Ball Valve

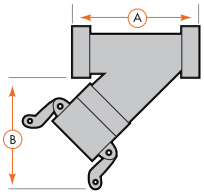
Approx. Weight lbs	Outlet/Inlet (NPT)	Min psi	Max psi	Model Number
1.25	1/2"F x 1/2"M	15	200	HPP33000002
1.25	3/4"F x 3/4"M	15	300	HPP33000001
3.5	1 1/4"F x 1 1/4"M	15	200	HPP33160002

Pre-set Relief Valves

Approx. Weight lbs	Size in	Pressure Relief Setting psi	Model Number
.330	1/2"M x 1/2"F	75	RV16202
.375	3/4"M x 1/2"F		RV16203

2" Munro Y-Strainer

- Easy removable cap for fast cleaning
- Corrosion-resistant buna rubbers and polypropylene and glass-filled nylon components
- Tough Reinforced 316 stainless steel screen available in mesh sizes of 6, 14, 40 or 80
- High capacity flow
- Low pressure loss, 100 PSI Maximum



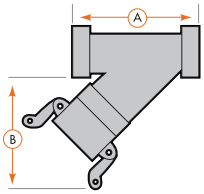
Approx. Weight lbs	Dimensions in		Screen Mesh	Hole Size (approx.) in	Thread Size in	Model Number
	A	B				
4	8.5	9.5	80 30 14 6	.0070 3/32 1/16 3/16	2	BV200A80 BV200A30 BV200A14 BV200A6
O-RING						BVP236

Replacement screens available

2" Munro Deluxe Y-Strainer

The Munro Deluxe Y-Strainer offers all the features of the standard Y-Strainer, with the addition of an aluminum screen cover and a ball valve for quick flushing. The ball valve can be replaced with a solenoid for automatic flushing.

- Filter area screen: 68 sq. in.
- Flows up to 75 GPM
- 100 PSI @ 70°F



Approx. Weight lbs	Dimensions in		Screen Mesh	Hole Size (approx.) in	Thread Size in	Model Number
	A	B				
5	8.5	11	80 30 14 6	3/32 1/16	2	MS20080 MS20030 MS20014 MS2006
O-RING						BVP236

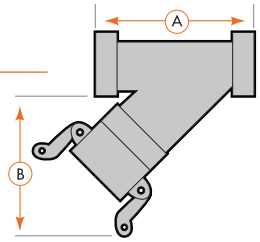
Replacement screens available

3" Munro Y-Strainer

Threaded End Cap

Cam Fitting

- Heavy duty, high capacity
- Extra large stainless steel screen for high capacity flow
- Precision molded glass – reinforced co-polymer
- 4" dust cap with patented safety latch
- 70 PSI Max at 70°F
- 6 Mesh and 40 Mesh available upon request



Approx. Weight lbs	Dimensions in		Screen Mesh	Hole Size (approx.) in	Thread Size in	Model Number
	A	B				
With Thread on Cap - O-RING						BVP62266
8	12	8	20 12	1/32 1/16	3	BV300A20 BV300A12
With Cam Fitting Clean Out - O-RING						BVP11158
16	12	13	20 12	1/32 1/16	3	MS300A20 MS300A12

Replacement screens available

T-Line Strainers & Replacement Screens

Description	Max psi	Max Temp.	Model Number
1/2" w/20 Mesh	100	70° F	BVLST05020
1/2" w/40 Mesh			BVLST05040
1/2" w/80 Mesh			BVLST05080
3/4" w/20 Mesh			BVLST07520
3/4" w/40 Mesh			BVLST07540
3/4" w/80 Mesh			BVLST07580
1" w/20 Mesh			BVLST10020
1" w/40 Mesh			BVLST10040
1" w/80 Mesh			BVLST10080
1/2" to 1" - T-strainer Screen w/20 Mesh			BVLST51220
1/2" to 1" - T-strainer Screen w/40 Mesh			BVLST51240
1/2" to 1" - T-strainer Screen w/80 Mesh			BVLST51280

Munro Basket Strainers

Basket Strainers can be used with all makes of centrifugal pumps. An "open" area of 50% allows strainers to filter out large damaging debris, yet permits sufficient water passage to keep pumps functioning at full capacity.


1/8"


3/16"


3/8"


1/2"


1"

Approx. Weight lbs	Height in	Diameter in	Hole Size in	Thread Size in	Model Number
Munro Stainless Steel Irrigation Basket Strainers					
2.9	5.83	7	1/8	2	MBSA2
3.25	6.08			3	MBSA3
Zinc Plated Steel Basket Strainers					
.25	6 1/4	1 3/4	3/16	1	SPLG0100
.6	6 3/4	2 3/4	3/8	2	SPLG0200
1.5	9 3/4	4	3/8	3	SPLG0300
2.0	9 3/4	5	3/8	4	SPLG0400
1.5	3 3/4	5	3/8	1 1/2	AP3TRHS150
2.0	4	6	3/8	2	AP3TRHS200
2.5	3 1/2	6	3/8	2 1/2	AP3TRHS250
4.0	5	7	3/8	3	AP3TRHS300
5.0	4 1/2	7	3/8	4	AP3TRHS400
22.0	11	11	1	8	AP3TRHS800
1.0	4 1/4	5	3/8	1 1/4	SPRD0125
3.0	3 3/4	7	1	3	SPSQ300100
26.0	15	12	1/2	10	BS10

Y-Strainer Replacement Screens

Approx. Weight oz	Screen Mesh	Size in	Model Number
5	6	2	BVP4S50806
	14		BVP4S50814
	30		BVP4S50830
	40		BVP4S50840
	80		BVP4S50880

Self-Cleaning Strainers

The simple operation of this device makes it a good all around strainer. A small amount of water is returned from the pressure side of the pump to the strainer. Inside, two nozzles spray the screen off and any debris attached to the screen will be removed.

Approx. Weight lbs	GPM Used for Flushing	Screen Mesh	Size in	Model Number
5.6	4	6	2 3 4	STSC200 STSC300 STSC400

Field tested, dependable protection for pumps and water systems!

This self-cleaning suction screen is galvanized or epoxy coated and utilizes a heavy 10, 18 or 30 mesh stainless steel screen designed to increase pump efficiency. The screen continuously removes trash and debris from irrigation water that costs time and money in fuel, pumping efficiency and maintenance costs. It can be used for agricultural, turf, industrial, centrifugal or turbine pump applications.

Approx. Weight lbs	Flow in GPM Screen Mesh		Screen Length in	Total Length in	Diameter in	Flange Size in	Return Inlet to Strainer in	GPM Required to Clean	Min. Req. Operating Pressure	Model Number
	10/18M	30M								
58	325	225	11	25	16	4	1.5	20	35	STCW200
62	550	400	15	28.8		6			40	STCW400
102	750	525	16	32.5	24	8			40	STCW600
115	950	700	18	34.5		10			45	STCW800
123	1350	950	23	39.5		10		28	50	STCW1000
131	1650	1200	26	42.5		12			55	STCW1400
148	1950	1400	28	44.5	26	12			55	STCW1700
160	2350	1650	32	48.5		14		36	60	STCW2000
223	2600	1800	35	52.5	30	16			65	STCW2400

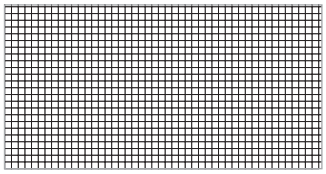
Hardware Cloth Mesh Strainer

Munro strainers are made of galvanized 1/8" hardware cloth for suction screening and may be easily folded and clamped to pipe.

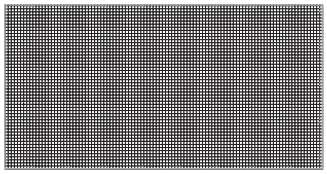
Approx. Weight oz	Description	Mesh	Dimensions in	Model Number
2.4	Galvanized 1/8" Hardware Cloth	8	12 x 3.75	MS1001

Mesh Screen Reference Chart

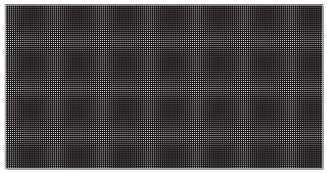
What does mesh size mean? Figuring out mesh sizes is simple. Count the number of openings in one inch of screen. The number of openings is the mesh size. So a 4-mesh screen means there are four little squares across one linear inch of screen. A 100-mesh screen has 100 openings, and so on. As the number describing the mesh size increases, the size of the particles decreases. Higher numbers equal finer material. Mesh size is not a precise measurement of particle size. See page 200 for a Particle Size Table.



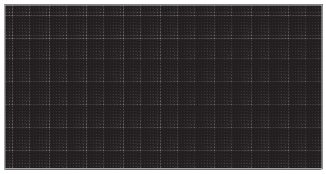
20 Mesh
49% O.A.
0.035" Openings



40 Mesh
41% O.A.
0.016" Openings



60 Mesh
38% O.A.
0.010" Openings



80 Mesh
36% O.A.
0.008" Openings

Pressure Gauges

Dry Gauge – bottom mount

To indicate pressure above atmospheric. Usable on air, oil, gas, water or any other pressure medium which does not attack bronze. Install protective siphon when used on steam.

Approx. Weight lbs	Connection Size in	Dial Size in	Description	Pressure Range psi	Model Number
.3	1/4 Bottom	2 1/2	Dry Gauge with Brass Tube & Socket	0-15 0-30 0-60 0-100 0-160 0-200 0-300 0-400 0-600 0-1000	MUGAUGE15D MUGAUGE30D MUGAUGE60D MUGAUGED MUGAUGE160D MUGAUGE2D MUGAUGE3D GAG14458 GAG14459 GAG14461

Pressure Gauge dial range should be twice the intended operating pressure range.

Liquid Filled – bottom mount

For severe service requiring a waterproof, steam-proof or weatherproof gauge, with the added problems of pulsation and vibration. Gauge has shock absorbing Polyglide movement plus liquid filling to absorb effect of vibration and pulsation.

Approx. Weight lbs	Conn. Size in	Dial Size in	Description	Pressure Range psi	Model Number
.5	1/4 Bottom	2 1/2	Liquid Filled with Brass Tube & Socket	30" Vac. 30"x30# 30"x100# 0-15 0-30 0-60 0-100 0-160 0-200 0-300 0-400 0-600 0-1000 0-2000 0-3000 0-5000	MUGAUGEVAC30 MUGAUGEVAC30X30 GAJ1008AL MUGAUGE15 MUGAUGE30 MUGAUGE60 MUGAUGE MUGAUGE160 MUGAUGE200 MUGAUGE300 MUGAUGE400 MUGAUGE600 MUGAUGE1000 MUGAUGE2000 MUGAUGE3000 MUGAUGE5000

Did You Know?
For 1/4" isolation valve see p. 166

Pressure Gauge dial range should be twice the intended operating pressure range.
Also available: Back mount and panel mount. Various sizes and accuracies.

Munro Centrifugal Pump Pressure Gauge Kit

Gauges are a great indicator of how your pump system is working. This assembly makes installing a gauge a one-piece operation instead of three. Saving time equals saving money!

Pressure Gauge	Bell Reducer	Riser	Model Number
0-100 psi Liquid Filled 1/4" Bottom Mount	3/4" x 1/4"	4" Galvanized	CPGKIT

Standard Gauge Dampener

Prolongs gauge life.

Approx. Weight oz	Stem Size NPT in	Model Number
2	1/4 M x 1/4 F	HPP2404-0047

Centrifugal Pump Stand

A steel, grey powder-coated, universal centrifugal pump stand.

Approx. Weight lbs	Dimensions in	Model Number
2.9	9 W x 7 1/2 D x 3 1/2 H	TPPMBI

Controlled Air Water System Tanks

- All butyl water chamber • Appliance-like finish • Every tank pressure tested
- Sizes to 119 gallons • 5 Year warranty

Approx. Weight lbs	Maximum Operating Pressure psi	Connection Size in	Dimensions Diameter x Height in	Total Volume Gallons	Model Number
10	100	3/4	11 x 14.75	4.6	TPAT15
29.5		1	15.375 x 24.75	14	TPAT44
35		1	15.375 x 32.25	20	TPAT66
55		1	20 x 38.625	36	TPAT111/122
66		1 1/4	23.375 x 38.625	52	TPAT144
102		1 1/4	23.375 x 46.375	65	TPAT211
131		1 1/4	23.375 x 59	86	TPAT266/244
160		1 1/4	26 x 61.25	119	TPAT366

AT25H, 44H Horizontal Tank With Integral Pump Stand

Tank Performance Chart										
Pressure Switch Setting	AT6	AT15	AT25	AT44	AT66	AT111	AT144	AT211	AT266	AT366
20/40	0.8	1.7	3.1	5.2	7.4	11.8	16.3	22.9	31.5	43.6
30/50	0.7	1.4	2.6	4.3	6.2	9.9	13.6	19.2	28.4	36.8
40/60	0.6	1.2	2.3	3.8	5.4	8.6	11.9	16.7	23.0	32.1

Tank Fitting Packages

- Tank Tee • Pressure Gauge • 1" or 1 1/4" Brass or PVC • Pressure Switch • Relief Valve

Approx. Weight lbs	Description	Size in	Model Number
4	Cast Bronze	1	TP100B
4	14" Cross Fabricated	1 1/4	TP125BF
1	11" PVC Tee	1 NPT x 11	TT1X11

Air Chargers (Snifter Valves)

Approx. Weight oz	Length in	Type of Cap	Size in	Model Number
.5	7/8	Vented	1/8	MA940006
	1	Solid	1/4	MA940009

Boots
Steel toe boots available in ozone and tear resistant rubber or full-grain leather. Available in whole sizes 3-15 (rubber) and 7-12, 13, 14M; 8-12, 13W (leather).

Ear Protection
Disposable foam earplugs rated at 29 dB Noise Reduction Rating (NRR) or a muff style protection with 26 dB NRR available.

Safety Vests
These lime-colored vests come in a wide variety of sizes from Small to 5XL.

Respirators
Half face-piece with changeable cartridges in small, medium or large.

Tie-Downs
Ratchet lock hi-test webbing with a working load limit of either 500 or 3,333 lbs.

Support Harnesses
Nylon full body harness with pass-thru leg buckles available in medium through 2XL.

Hard Hats
Comfortable, lightweight protection consisting of a polyethylene shell. Available in sizes 6 ½ through 8.

Rain Gear
Made from PVC and nylon, the flame resistant bib and jacket are available in sizes S to 6XL.

Gloves
Available in nylon (size 6-10), cowhide leather (size small-2XL) and PVC (size L) for a variety of applications, wet or dry.

Safety Glasses
Low-cost, basic eye protection to more comfortable upgraded options with UV protection available.

Cut-off Saw Blades
Metal cutting circular saw blades with different configurations to cut through steel, stainless, aluminum, thin steel and steel studs.

Sledgehammers
Ten and 12 pound hammers for heavy demolition feature a 36 inch rubber gripped fiberglass handle.

Drill Bits
Use for routine maintenance, repair work, rethreading, cutting internal threads in pipes or drilling – taper, bottoming or high speed styles.

Spill Pads
Available in oil only or universal sorbents, these spill pads can absorb oil and petroleum products, water and chemical based fluids.

Sealants
Slow drying, soft setting pipe thread sealants which can be used on a variety of materials, including: steel, iron, brass, aluminum, stainless steel and PVC.

Hand Cleaners
Wipes used to remove oil, grease, grime, stains and other materials.

Rivet Gun/Rivets
Hand held rivet guns make joining metal together a snap. Stainless steel rivets also available. Limited sizes.

Did You Know?
Munro stocks and sources 1000's of items – ask us!

Munro Freeze Defeat

Munro guards your pump from freezing weather!

Is your pump ready for winter? Try Freeze Defeat, the NEW pump winterization fluid by Munro!

Rest easy knowing your pump is protected. Non-toxic, pump winterization fluid. Antifreeze protection to -25 degrees.

- Prevents damage due to freezing
- Helps protect your pump from corrosion
- Promotes longevity by keeping your pump rust free

Did You Know?
We have a handy winterization guide on p. 241!

Specifications

Approx. Weight lbs per Case	Volume per Bottle	Case Quantity	Model Number
27.9	2 Liters	6	FD25

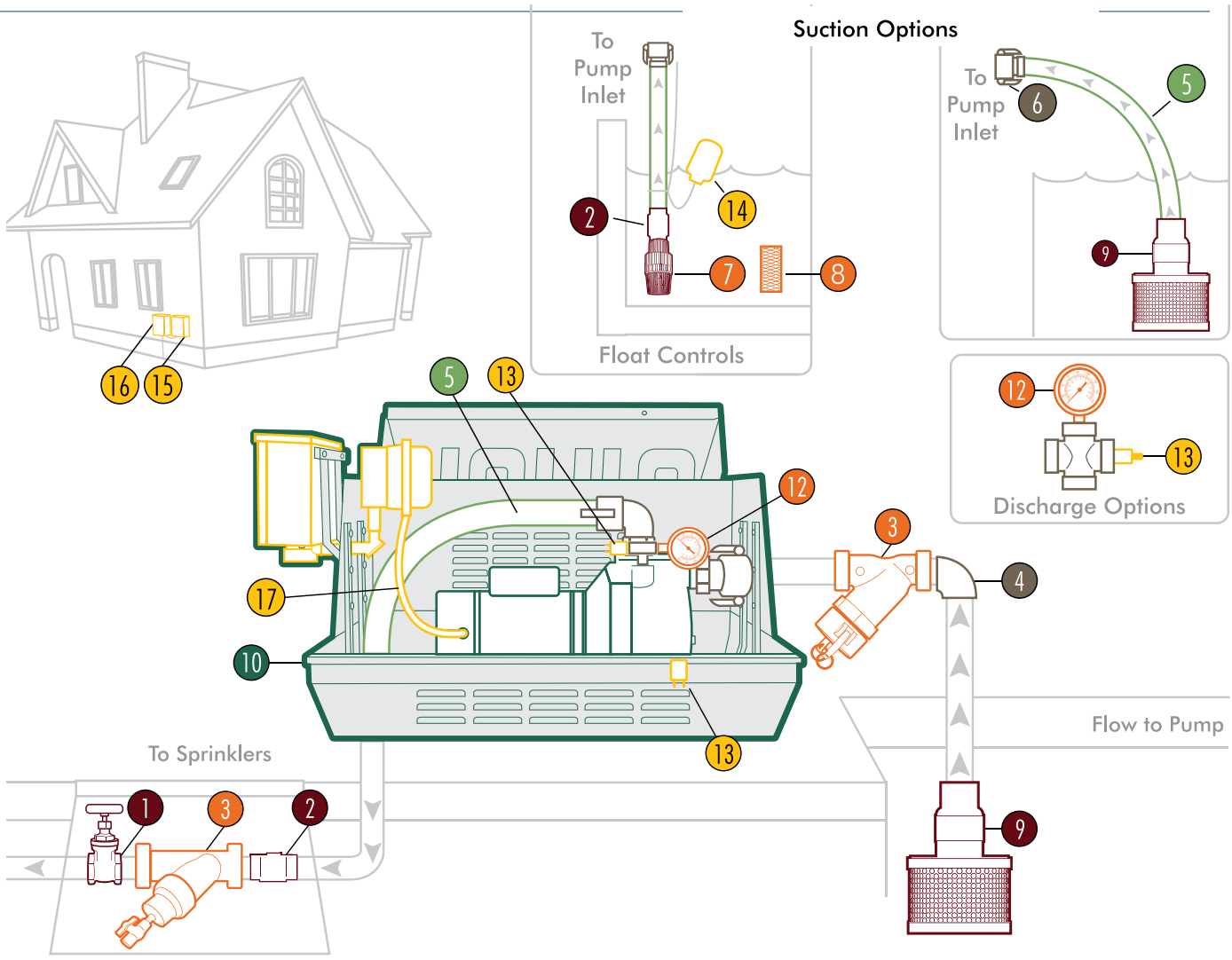
To see just how EASY it is to winterize your pump using Freeze Defeat!
Visit **munropump.com/FreezeDefeat**

Notes

Table of Contents

Ground Water Application

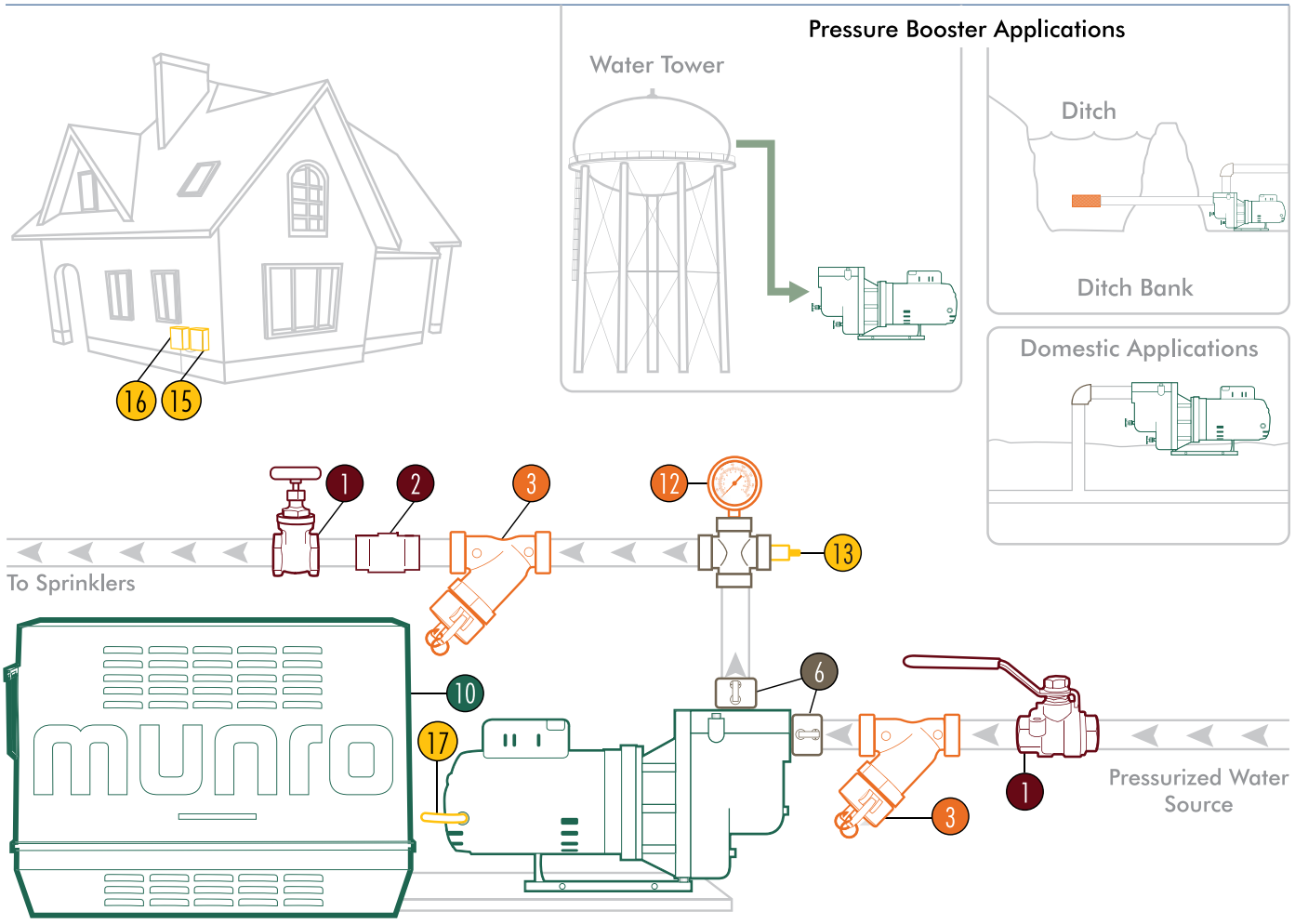
Drawing from a shallow well, cistern, ditch or pond



Product Identification – Color coded to catalog section	
Discharge & Suction Components	
1	ISOLATION VALVE – Gate and ball valves allows pump isolation for ease of maintenance and winterization. (Pg. 165,166)
2	CHECK VALVE – On suction side, keeps pipe and pumps full of water, reducing wear at start of run-cycle. On discharge side, prevents system damage from water back-flowing or hammering. (Pg. 167)
3	Y-STRAINER – Keeps sprinklers from clogging by straining the water through a screen mesh. The "Y" design allows for easy cleaning of the screen mesh. (Pg. 173)
4	PIPE FITTINGS – Airtight line allows water to flow to and from pump. Multiple configurations are available. (Pg. 138-142)
5	HOSE – Provides a less expensive and more flexible alternative to steel or PVC pipework. (Pg. 113-122)
6	CAM COUPLING – Easily connect and disconnect while still being vacuum tight. (Pg. 126)
Suction Only Components	
7	PVC FOOT VALVE – Keeps pipe and pump full of water, reducing unnecessary wear on pump at start of cycle. (Pg. 163)
8	INLET SCREEN – Screening allows water to flow without debris being pulled into the pump. Reduces amount of Y-strainer cleaning. (Pg. 174)
9	IRRIGATION FOOT VALVE – Large surface area allows water flow to sufficiently supply pump at full capacity while keeping line pull at start-up. (Pg. 162)

Booster Application

System provides some initial pressure



Product Identification – Color coded to catalog section	
Pump & System Accessories	
10	UNIVERSAL PRO ENCLOSURE – Protects pump from rain, dust and heat. Increases efficiency and adds to motor life. (Pg. 19)
12	PRESSURE GAUGE – This troubleshooting tool monitors system for pressure. (Pg. 176)
13	MONITORING SENSORS – Pressure and temperature sensors offers loss of prime and high temp protection when coupled with SmartBox controls. (Pg. 96)
Electrical Components	
14	FLOAT CONTROL – Provides hands-free pump operation by automatically signaling start and stop of pump cycle with rise and fall of float. (Pg. 94)
15	START SIGNAL – Command control to start and stop pump cycle – timer, lawn controller, manual switch. (See our Control Section on Pg. 72–93)
16	ELECTRICAL RELAY – Relay switch which allows electrical power to run between breaker and pump motor. (Pg. 96)
17	WIRING – For power supply and pump start. (Pg. 73-92)

Centrifugal Pump Data Worksheet

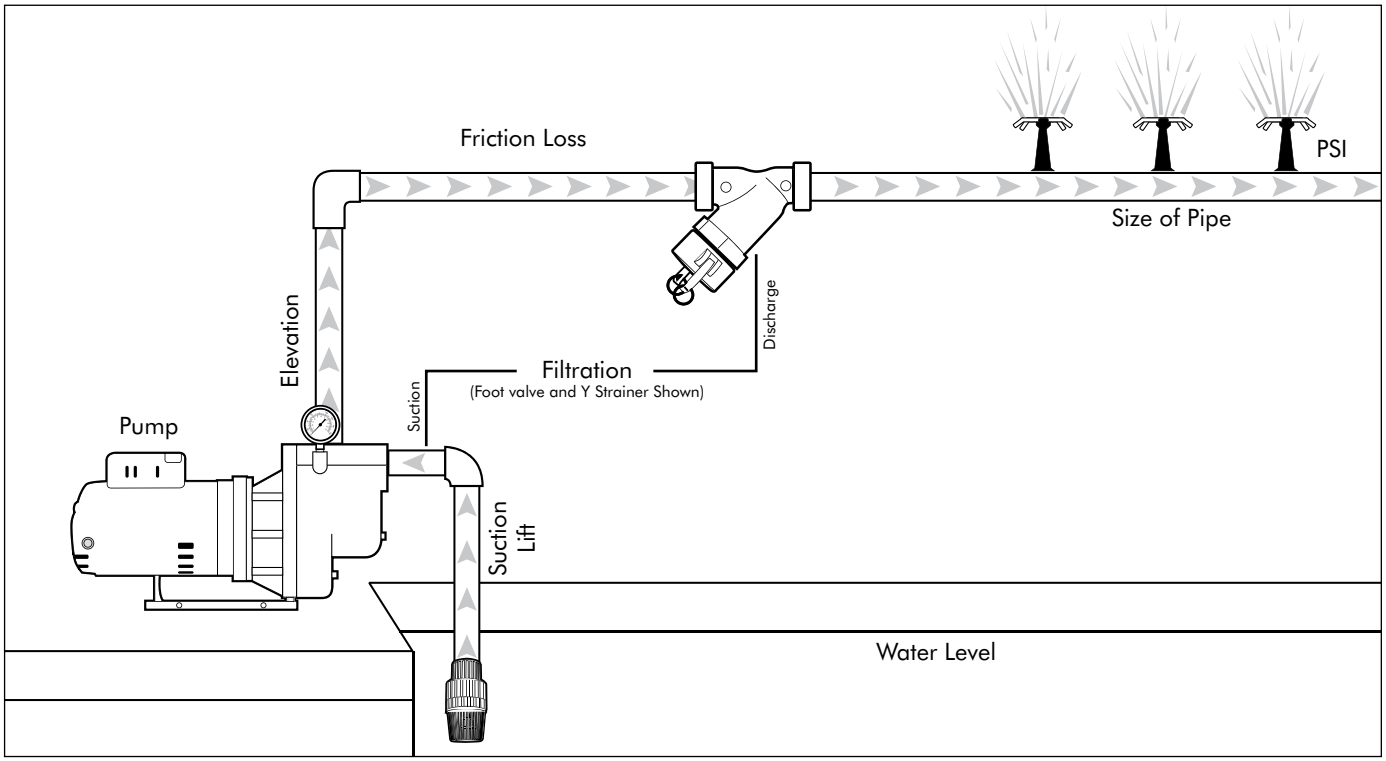
Complete worksheet then fax to 970.263.2277 or email to mpi@munropump.com.

Name:	Company:	Phone:
Address:		City/State/Zip:

GPM	**Pumping Requirements** To size a pump, first figure total gallonage needed. (For example: Irrigation system, household usage, etc.)	_____GPM
Total Dynamic Head (TDH)	**Elevation** a. Suction Lift To determine suction lift, measure the vertical distance between the water level and the pump inlet. (Total measurement in feet) b. Elevation Change To figure elevation, measure the vertical distance from the pump inlet to the highest point in the system. (Total measurement in feet)	(a) _____FEET (b) _____FEET
	+	
	Friction Loss To estimate friction loss, keep velocity feet per second at 5' +/- 1' to determine ideal pipe size. Refer to friction loss chart. (Total measurement in feet) *Refer to fitting manufacturer's friction loss info and add.	_____FEET
	+	
	PSI - Pounds Per Square Inch Determine the pressure required at the end of the line of the largest zone. Convert to head in feet using the following equation. PSI x 2.31 = HEAD IN FEET	_____FEET
	=	
	Total Dynamic Head (TDH) Total the sum of elevation, friction loss and PSI. This total equals TDH in feet.	_____TDH

Misc.	**Electrical**			**Filtration**	**Power Supply**
	Voltage:	☐ 110 Volt	☐ 220 Volt ☐ 440 Volt	☐ Suction	☐ Engine Driven
	Phase:	☐ Single Phase	☐ Three Phase	☐ Discharge	☐ Gas

H20	**Water Supply**			
	☐ Suction from Pond	☐ Pump in Well	☐ Flooded Suction	☐ Irrigation Ditch



Water Feature Pump Data Worksheet

Complete worksheet then fax to 970.263.2277 or email to mpi@munropump.com.

Name:	Company:	Phone:
Address:		City/State/Zip:

GPH

Pumping Requirements
To size a pump, first figure how big the water feature will be. Use table attached, then divide the figure by 60 to get GPM

_____GPM

Total Dynamic Head (TDH)

Elevation
a. Suction Lift
When using a submersible pump, suction lift should be "0". When using a non-submersible pump, measure vertical distance from water level to pump inlet.
(Total measurement in feet)
b. Elevation Change
To figure elevation, measure the vertical distance from the surface of water to the highest point of discharge.
(Total measurement in feet)

(a) _____FEET
(b) _____FEET

+

Friction Loss
To estimate friction loss, keep velocity feet per second at 5' +/- 1' to first determine ideal pipe size. Then using friction loss chart, calculate loss per 100' of pipe based on flow + pipe size determined above. Multiply loss per 100' by number of 100' sections of pipe. (Total measurement in feet)

_____FEET

+

PSI - Pounds Per Square Inch
Determine the pressure required to run both the fountain head and/or pressure filters (refer to the manufacturer's specifications). PSI x 2.31 = HEAD IN FEET

_____FEET

=

Total Dynamic Head (TDH)
Total the sum of elevation, friction loss and PSI. This total equals TDH in feet.

_____TDH

Misc.

Electrical				**Filtration**			
Voltage:	☐ 110 Volt	☐ 220 Volt	☐ 440 Volt	Gravity:	☐ Waterfall	☐ Skimmer	Check manufacturer's specifications to determine PSI for filters.
Phase:	☐ Single Phase	☐ Three Phase		Pressure:	☐ Pressure	☐ Sand	

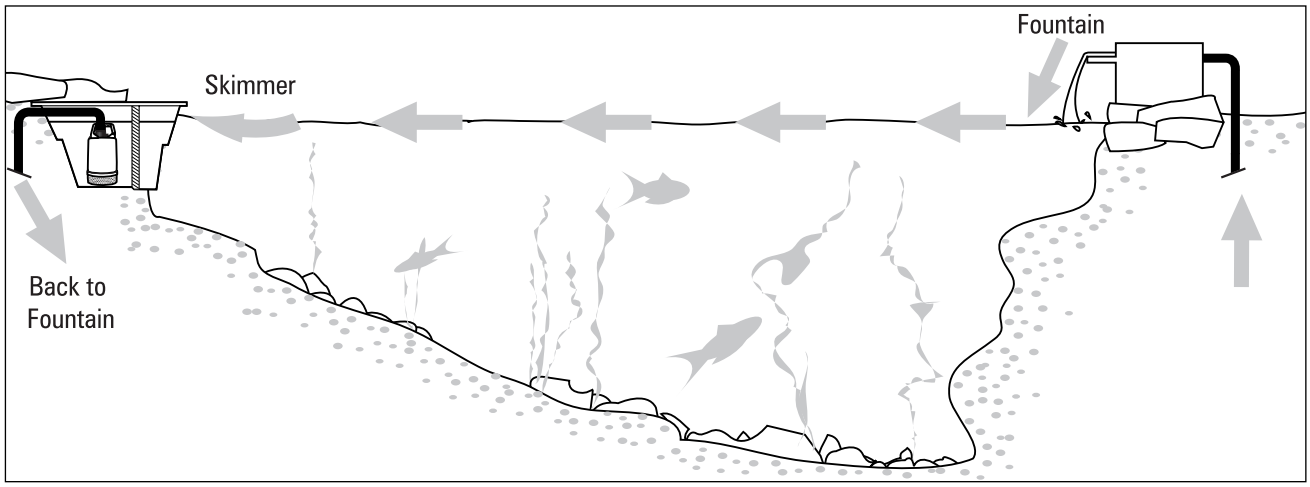
Feature

☐ Pond ☐ Fountain ☐ Pond-less

Weir Chart

Calculating GPH Required for Water Features

Depth in Inches	Length (L) of Weir in Feet			Additional gpm for each ft over 5 ft
	1	3	5	
1	2420	6420	10790	2615
1 1/4	2970	9025	15025	3025
1 1/2	3895	11820	19770	3970
1 3/4	4860	14400	24900	5015
2	5910	18120	30360	6120
2 1/4	7020	21660	36300	7320
2 1/2	8170	25320	42360	8580
2 3/4	9420	29100	48900	9900
3	10670	33120	55560	10020



Well Pump Data Worksheet

Complete worksheet then fax to 970.263.2277 or email to mpi@munropump.com.

Name:	Company:	Phone:
Address:		City/State/Zip:

Well depth: Determined by the drillers report

Type of pump

- ☐ Less than 25' – Shallow Well Jet Pump
- ☐ 25' to 170' – Deep Well Jet Pump
- ☐ 25' to 400' – Submersible Well Pump

Electrical

Voltage: ☐ 110 Volt ☐ 220 Volt ☐ 440 Volt

Phase: ☐ Single Phase ☐ Three Phase

GPM

Pump Requirements:
Size of pump determined by counting the number of water using fixtures – showers, faucets, outdoor water spigots, dish-washing machine, refrigerators, clothes washers – times 3GPM.

_____GPM

Total Dynamic Head (TDH)

Elevation
a. Suction Lift
To determine suction lift, measure the distance between the water level and the pump inlet. This will be 0 for submersible pumps. (Total measurement in feet)

(a) _____FEET

b. Elevation Change
To figure elevation, measure the distance from the pump outlet to the highest point in the system. (Total measurement in feet)

(b) _____FEET

Friction Loss +
To estimate friction loss, first determine the size of pipe use. Refer to friction loss chart. Figure .5 foot of friction loss per valve or elbow (Total measurement in feet)

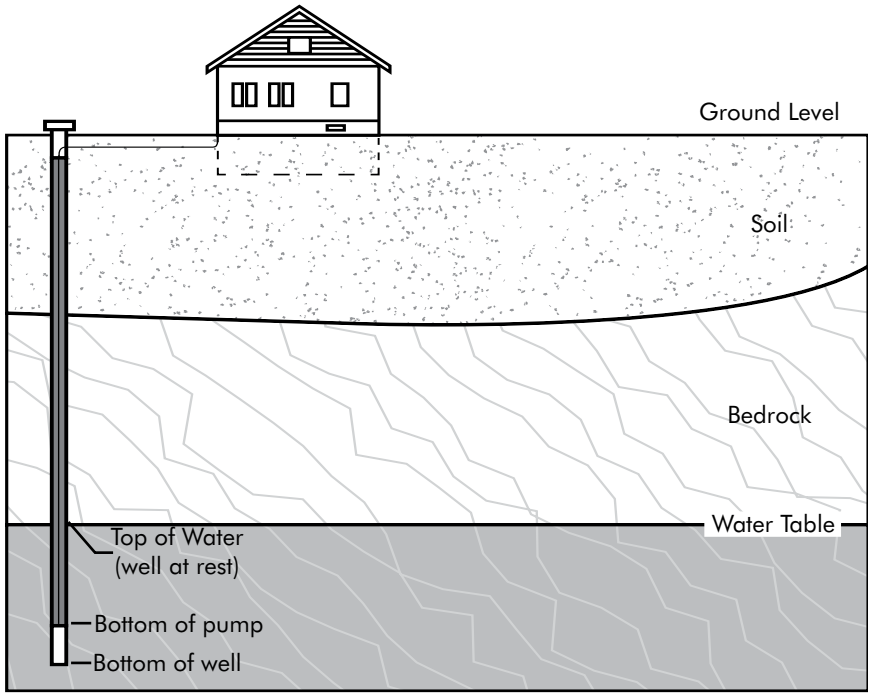
_____FEET

PSI - Pounds Per Square Inch +
Determine the pressure required to run all of the water using fixtures (refer to the manufacturer's specifications)
PSI x 2.31 = HEAD IN FEET

_____FEET

Total Dynamic Head (TDH) =
Total the sum of elevation, friction loss and PSI. This total equals TDH in feet.

_____TDH



Hose Selection Worksheet

Our hose capabilities and configurations are endless – with crimp capabilities to 10". If you need help selecting the right hose for the job, just call on the experts at Munro.

What is the best type of hose for my application?
Important aspects for choosing the right type of hose can be summed up in an easy to remember acronym: **STAMPED**

Size – Inner diameter:	Length:
Temperature – Material conveyed: Min: Max:	Environment: Min: Max:
Application – How will the hose be used?	
Suction or Discharge? ☐ Suction ☐ Discharge	Will it be drug? ☐ Yes ☐ No
What is the environment the hose will be in?	
Media – What will be going through the hose? ☐ Dirty Water ☐ Clean Water ☐ Chemicals ☐ Fuels ☐ Other:	
Pressure – To how much pressure will the assembly be exposed?	Max PSI:
Ends – What type?	Orientation?
What attachment methods are needed?	

Delivery Information

Quantity Required:	Date Required:
Package Type:	
Requested Delivery Date:	Ship Via:
Testing Required: ☐ Yes ☐ No	Type:
Certification Required: ☐ Yes ☐ No	Type:

Special Requirements?

Common hose types:
Suction (can be used for discharge if shape is required)

- PVC Clear – a basic, economical option
- PVC OD critical schedule 40 sized (spa hose) – for applications where glued joints are necessary
- PVC Industrial Strength – fabric reinforced hose with external drag helix
- Rubber – smooth cover, good for water applications
- Oilfield Suction – offers durable external cover and enhanced bend radius and is acceptable in applications where hydrocarbons may be present

Discharge Layflat Hose – easy to bring to a job site and roll out for immediate use

- PVC Layflat Blue – for lower pressure applications – Max. 40–80 PSI
- PVC Layflat Red – for medium pressures – Max. 100–150 PSI
- Mill Hose – includes a cloth cover for added durability – Max. 150 PSI
- Rubber Discharge Hose – industrial strength discharge hose
- General Purpose Air & Water Hose – when garden hose will not cut it... this heavy duty hose is perfect for spray down applications or air compressor service

Common hose end fitting options


King Nipples
p. 131


C - Cam and Groove Coupling
p. 126


E - Cam and Groove Coupling
p. 127


Groove King Nipple
p. 131


Crows Foot
p. 133


Ball & Socket
p. 132


Pin Lug
p. 133

Munro Pump Station Request for Quote Worksheet

Complete worksheet then fax to 970.263.2269 or email to msy@munropump.com.

PROJECT NAME_____

LOCATION_____

CLIENT (COMPANY)_____

Contact Name_____ Email_____

Phone_____ Fax_____

PROJECT TIME LINE

*Stations typically ship 6 to 8 weeks after the purchase order is received.

Request quote by_____ Project bid date_____

Expected project start date_____ Expected completion date_____

SYSTEM CRITERIA

Dynamic inlet pressure (at the pump)_____

(less all pressure losses prior to the pump i.e.; backflow, meter, elevation, friction losses, etc.)

Pressure boost required_____

Suction lift ☐ Yes ☐ No Height of suction lift_____

Max. flow rate_____ Min. flow rate_____

Total operating pressure_____

Power source

☐ 230V/1PH ☐ 208V/3PH ☐ 230V/3PH ☐ 460V/3PH

Signature required for power verification_____

Station start

☐ Clock start (from external 24v signal)

☐ Remote pressure start (from change in system pressure)

Filtration requirements

Suction: ☐ Yes ☐ No Discharge: ☐ Yes ☐ No Discharge filter micron_____

Enclosure

☐ None ☐ Powder coated marine grade aluminum (standard)

☐ Powder coated stainless steel ☐ Other _____

VFD (Variable Frequency Drive – our preferred pump control) ☐ Yes ☐ No

Baseline 3200 Controller Integration ☐ Yes ☐ No

Notes or other requirements_____

_____

_____

Munro Custom Controls Specification Worksheet

Complete worksheet with all basic information and application description, then fax to 970.263.2277 or email to mpi@munropump.com.

Name:	Company:	Phone:
Address:		City/State/Zip:

What problem are we resolving? What does the control need to do?
Part Number (p. 89 – not required):

Application	☐ Irrigation	☐ Water Feature	☐ Other: _____
Type of Pump	☐ Centrifugal	☐ Submersible	☐ Other: _____
No. of Pumps	☐ 1	☐ 2	☐ Other: _____
Pump Nameplate	HP: _____	Phase: _____	Voltage: _____
	FLA: _____	SFA: _____	Pump Brand: _____ Model#: _____
Pump Protection	☐ Loss of prime (pressure)	☐ High temperature (dead head)	☐ Motor Protection (thermal overload)
	☐ Both	☐ None	☐ Other: _____
Type of System	☐ Traditional 24v	☐ 2-Wire Decoder System	☐ Other: _____
Control Signal	☐ Manual	☐ Pressure Switch	☐ Float Balls No. of Floats: _____
	☐ Liquid Level Probes	☐ Other: _____	
Control Source	☐ Lawn Controller	☐ No. of Controllers: _____	☐ Signal Voltage: _____
	☐ Signal Amperage: _____	☐ Clock	☐ Other: _____
Optional Features	☐ Alarm	☐ Indicator Light	
	☐ HOA Switch	☐ Other: _____	☐ Other: _____

For safety, "Reduced External Voltage" is standard for all custom boxes.

Fundamentals of pump controls

In your home lighting, all wires are attached to breakers in your breaker box. You don't have to run out and engage a breaker each time you want to turn on a light… you simply flip a switch. One side of the switch is continually attached and 'hot' from the wire from your breaker box, and the flipping of the switch allows the power to reach your light fixture. The person, by flipping the switch, is signaling when the light should be on.

Pump controls function similarly. They are like a light switch reacting to a signal for your pump to turn on and provide water to your irrigation system.

Pump Start Relays (StartBox)

A pump start relay requires an independent start/stop signal to determine when power should be sent to the pump. Pump start relays, like your light switch, only function flipped on or off; and require an external force to flip them on or off.

Irrigation systems commonly use lawn controllers to signal the pump start relay to allow power to reach, and turn on, the pump. When the lawn controller stops sending the 'on' signal, the pump start relay will automatically switch 'off' and power to the pump is discontinued.

While not every irrigation system uses a lawn controller, an outside force must act on a pump start relay to start and stop the power flow to the pump. Pump start relays continue the flow of power based on the signal from that outside force.

Pump Start Relays + Protection (SmartBox)

SmartBoxes provide the same start/stop function that the StartBox does. Additionally, though, a SmartBox monitors the pump to protect it from running dry due to loss of prime and/or dead-heading. The way that the SmartBox protects the pump is by monitoring the pump system for abnormal running conditions through the use of a sensor.

A SmartBox will override the 'on' signal of the lawn controller and discontinue power to your pump if the pressure sensor indicates that the condition of loss of prime exists. Once the lawn controller has stopped sending the 'on' signal, the SmartBox clears the protective shut-down and will send power to the pump again at the next 'on' signal.

Which pump control box do I need?

Follow the steps below to determine the appropriate pump control for your application, using the pump control selection chart. If you do not see an option that fits your application, you may need a custom control box.

1) Determine the primary function of your base box. The base box type is indicated in the chart title.

I WANT TO...	YOU NEED A...
Simple pump on/off	StartBox Control
Pump on/off with protection to avoid pump meltdowns	SmartBox Control
Utilize harvested water from a tank when it is available	BrainBox Water Harvesting Control
Protect a water feature pump from cycling	DamBox Water Feature Control
Maintain a Liquid, or tank, level	Liquid Level Control
Use multiple pumps or controllers on a system	Specialty Controls
Limit run time and frequency of a pump or lighting system	Specialty Controls
Start and stop a pump on demand	Specialty Controls

2) Use the following guidelines to determine the specific features of your box, always following the sectional titles.
    a. Control Voltage – Is the Start/Stop or Signal Voltage being sent to your system. Lawn Controllers send a 24v signal, while floats, sensors, and switches may match the pump voltage.
    b. Product Description – Provides a list of features included on the listed control box
    c. Protections – There are two different types of pump protection offered.
        i. Low Pressure System cut-off protects your pump from running dry and damaging the seal.
        ii. High Temperature System shut-down protects your pipework from over-heating if a valve doesn't open.
    d. Low Incoming Amp Compatible – Some lawn controllers send less than a .35 amp signal. These controllers require special accommodation based on the line voltage running to the pump.
    e. Low Voltage/Safe Out – Any voltage leaving the control box, to floats or other external components, will be reduced to a safe 24v level. This is recommended whenever an external component, like a float switch, is used.
    f. Hand Off Auto (HOA) – Provides an override to shut off (O) or start (H) power to the pump, even if the lawn controller is not cycling. Normal run cycle (A) enables full control function.
    g. Motor Information – Shows the amperage range and maximum hp allowed by each box. Consult the motor nameplate to verify this information.
3) Items listed as optional (O) can be ordered by contacting Munro at 800-942-4270.
4) Items listed as not available (--) are not applicable to this box configuration.
5) NEC requires all motors to be thermally protected either by motor design or control panel. Consult motor nameplate. If the motor is not thermally protected, please select a control box with thermal protection to comply with NEC.

Note: Part numbers shown in WHITE are stocked items and typically ship in 1-3 days. YELLOW shaded are non-stock and may take up to 10 business days to ship. Please verify all ship times when placing your order.

StartBox – Pump Start Relays

Control Voltage	Product Description	Protections		Low Incoming Amp Compatible		Low Voltage - Safe Out*	Thermal Protection	HOA	Motor Info		Box Size	Page #	Part Number	
		Low Pressure Cut-off	High Temp Shut-down	110V	220V				Motor Shut-down (amp range)	Max HP			Blue Box	SS Box
24v Control	StartBox - 24v	See SmartBox options		N	N	Y	N	O	120v - 24FLA 240v - 28FLA	120v - 2hp 240v - 5hp	6x6x4	73	MPSR24	MPSR24S
	LOW INCOMING AMP COMPATIBLE													
	StartBox - 24v, Low Incoming Amp, Safe Out 110 line	See SmartBox options		Y	N	Y	N	O	120v - 24FLA 240v - 28FLA	120v - 2hp 240v - 5hp	8X8X4	74	MPSR242W11	MPSR242W11S
	StartBox - 24v, Low Incoming Amp, Safe Out 220 line			N	Y	Y	N	O			8X8X4	74	MPSR242W22	MPSR242W22S
	THERMALLY PROTECTED													
	Startbox - 24v, 3hp w/ Therm Pro, HOA	See SmartBox options		O	O	Y	Y	Y	14.7 - 15.8	3 hp	12x12x6	75	MPSR24V3	MPSR24V3S
	Startbox - 24v, 5hp w/ Therm Pro, HOA			O	O	Y	Y	Y	24.1 - 25.9	5 hp	12x12x6	75	MPSR24V5	MPSR24V5S
	StartBox - 24v, 7.5hp w/ Therm Pro, HOA			O	O	Y	Y	Y	34 - 40	7.5 hp	12x12x6	75	MPSR24V75	MPSR24V75S
	Startbox - 24v, 10hp w/ Therm Pro, HOA			O	O	Y	Y	Y	40 - 50	10 hp	12x12x6	75	MPSR24V10	MPSR24V10S
110v Control	StartBox - 110v	See SmartBox section		O	See 220V Control	O	N	O	24 FLA	2	6X6X4	73	MPSR110	MPSR110S
	StartBox - 110v, Safe Out			O		Y	N	O	56 FLA	5	12x12x6	73	MPSR110A	MPSR110AS
	StartBox - 110v - w/ Therm Pro			O		--	N	O	34 FLA	3	8X8X4	75	MPSR110V3	MPSR110V3S
	StartBox - 110v, (3 - 10 hp) w/Therm Pro, HOA			O		O	N	Y	Varies by hp	10	12x12x6	90	Call for part #	Call for part #
220v Control	StartBox - 220v	See SmartBox section		--		N	N	N	28 FLA	5	6X6X4	73	MPSR220	MPSR220S
	StartBox - 220v, HOA					N	N	Y	28 FLA	5	8X8X4	73	MPSR220H	MPSR220HS
	LOW VOLTAGE (24V) SAFE OUT													
	StartBox - 220v, Safe Out, HOA	See SmartBox section		--		Y	N	Y	28 FLA	5	12X12X6	73	MPSR220A	MPSR220AS
	THERMAL PROTECTION PROVIDED													
	StartBox - 220v, 3hp, w/ Therm Pro	See SmartBox section		--		O	Y	N	14.7 - 15.8	3	12X12X6	75	MPSR220V3	MPSR220V3S
	StartBox - 220v, 3hp, w/ Therm Pro, HOA					O	Y	Y	14.7 - 15.8	3	12X12X6	75	MPSR220V3H	MPSR220V3HS
	StartBox - 220v, 5hp, w/ Therm Pro					O	Y	N	24.1 - 25.9	5	12X12X6	75	MPSR220V5	MPSR220V5S
	StartBox - 220v, 5hp, w/ Therm Pro, HOA					O	Y	Y	24.1 - 25.9	5	12X12X6	75	MPSR220V5H	MPSR220V5HS
	StartBox - 220v, 7.5hp w/ThermPro					O	Y	N	34 - 40	7.5	12X12X6	75	MPSR220V75	MPSR220V75S
	StartBox - 220v, 7.5hp w/ThermPro, HOA					O	Y	Y	34 - 40	7.5	12X12X6	75	MPSR220V75H	MPSR220V75HS
	StartBox - 220v, 10hp w/ Therm Pro					O	Y	N	40 - 50	10	12X12X6	75	MPSR220V10	MPSR220V10S
	StartBox - 220v, 10hp w/ Therm Pro, HOA					O	Y	Y	40 - 50	10	12x12x6	75	MPSR220V10H	MPSR220V10HS

*Recommended whenever an external component, like a float switch, is used.
Consult motor nameplate to verify specific motor data
NEC requires all motors to be thermally protected either by motor design or control panel – consult motor nameplate
Highlighted items are built to order and may take up to 10 business days to ship. Please verify ship times when placing your order.

Y = Yes, Included
O = Option Available – see page 90 for custom box or contact Munro
-- = Not Available
N = NO , Not Included

SmartBox – Pump Start Relay + Protection

Control Voltage	Product Description	Protections		Low Incoming Amp Compatible		Low Voltage - Safe Out*	Thermal Protection	HOA	Motor Info		Box Size	Page #	Part Number	
		Low Pressure Cut-off	High Temp Shut-down	110V	220V				Motor Shut-down (amp range)	Max HP			Blue Box	SS Box
24v Control	SmartBox - 24v	Y	N	N	N	Y	N	O	120v - 24FLA 240v - 28FLA	120v - 2hp 240v - 5hp	8X8X4	77	MPLC24	MPLC24S
	SmartBox - 24v, Temp Sensor	Y	Y	N	N	Y	N	O			8X8X4	77	MPLC24T	MPLC24TS
	LOW INCOMING AMP COMPATIBLE													
	SmartBox - 24v, Low Incoming Amp, Low Pressure and High Temp Sensors, 110 line, HOA	Y	Y	Y	N	Y	N	Y	120v - 24FLA 240v - 28FLA	120v - 2hp 240v - 5hp	12x12x6	78	MPLC242W11	MPLC242W11S
	SmartBox - 24v, Low Incoming Amp, Low Pressure and High Temp Sensors, 220 line, HOA	Y	Y	N	Y	Y	N	Y			12x12x6	78	MPLC242W22	MPLC242W22S
	THERMALLY PROTECTION PROVIDED													
	SmartBox - 24v, 3hp w/ Therm Pro, Low Pressure and High Temp Sensors, HOA	Y	Y	O	O	Y	Y	Y	14.7 - 15.8	3 hp	12x12x6	79	MPLC243	MPLC243S
	SmartBox - 24v, 5hp w/ Therm Pro, Low Pressure and High Temp Sensors, HOA	Y	Y	O	O	Y	Y	Y	24.1 - 25.9	5 hp	12x12x6	79	MPLC245	MPLC245S
	SmartBox - 24v, 7.5hp w/Therm Pro, Low Pressure and High Temp Sensors, HOA	Y	Y	O	O	Y	Y	Y	34 - 40	7.5 hp	12x12x6	79	MPLC2475	MPLC2475S
	SmartBox - 24v, 10hp w/ Therm Pro, Low Pressure & High Temp Sensor, HOA	Y	Y	O	O	Y	Y	Y	40 - 50	10 hp	12x12x6	79	MPLC2410	MPLC2410S
110v Control	SmartBox - 110v	Y	O	O	See 220V Controls	O	N	O	24 FLA	2 hp	6x6x4	77	MPLC110	MPLC110S
	SmartBox - 110v, Safe Out	Y	O	--		Y	N	O	24 FLA	2 hp	12x12x6	90	Call for part #	Call for part #
	SmartBox - 110v, (3 - 10 hp) w/Thermal Pro, HOA	Y	O	O		O	Y	O	Varies by hp	10 hp	12x12x6	90	Call for part #	Call for part #
220v Control	SmartBox - 220v, Safe Out, Low Pressure and High Temp Sensors	Y	Y	--		Y	N	O	28 FLA	5	12X12X6	77	MPLC220	MPLC220S
	THERMAL PROTECTION PROVIDED													
	SmartBox - 220v 3hp w/ ThermPro, Low Pressure and High Temp Sensors	Y	Y	--		O	Y	N	14.7 - 15.8	3	12X12X6	79	MPLC2203	MPLC2203S
	SmartBox - 220v 3hp w/ ThermPro, Low Pressure and High Temp Sensors, HOA	Y	Y			O	Y	Y	14.7 - 15.8	3	12X12X6	79	MPLC2203H	MPLC2203HS
	SmartBox - 220v 5hp w/ ThermPro, Low Pressure and High Temp Sensors	Y	Y			O	Y	N	24.1 - 25.9	5	12X12X6	79	MPLC2205	MPLC2205S
	SmartBox - 220v 5hp w/ ThermPro, Low Pressure and High Temp Sensors, HOA	Y	Y			O	Y	Y	24.1 - 25.9	5	12X12X6	79	MPLC2205H	MPLC2205HS
	SmartBox - 220v 7.5hp w/ThermPro, Low Pressure and High Temp Sensors	Y	Y			O	Y	N	34 - 40	7.5	12X12X6	79	MPLC22075	MPLC22075S
	SmartBox - 220v 7.5hp w/ThermPro, Low Pressure and High Temp Sensors, HOA	Y	Y			O	Y	Y	34 - 40	7.5	12X12X6	79	MPLC22075H	MPLC22075HS
	SmartBox - 220v 10hp w/ThermPro, Low Pressure and High Temp Sensors	Y	Y			O	Y	N	40 - 50	10	12X12X6	79	MPLC22010	MPLC22010S
	SmartBox - 220v 10hp w/ThermPro, Low Pressure and High Temp Sensors, HOA	Y	Y			O	Y	Y	40 - 50	10	12X12X6	79	MPLC22010H	MPLC22010HS

*Recommended whenever an external component, like a float switch, is used.
Consult motor nameplate to verify specific motor data
NEC requires all motors to be thermally protected either by motor design or control panel – consult motor nameplate
Highlighted items are built to order and may take up to 10 business days to ship. Please verify ship times when placing your order.

Y = Yes, Included
O = Option Available – see page 90 for custom box or contact Munro
-- = Not Available
N = NO , Not Included

RESOURCES

munro

BrainBox – Water Harvest Controls

Control Voltage	Product Description	Protections		Low Incoming Amp Compatible		Low Voltage - Safe Out*	Thermal Protection	HOA	Motor Info		No. of Floats	Box Size	Special Features	Page #	Part Number	
		Low Pressure Cut-off	High Temp Shut-down	110V	220V				Motor Shut-down (amp range)	Max HP					Blue Box	SS Box
24v	PARTIAL TANK UTILIZATION															
	BrainBox - 24v, Safe Out, Low Pressure and High Temp Sensors, 1 Float	Y	Y	O	O	Y	Y	O	120v - 24 FLA 240v - 28 FLA	5	1	12x12x6	Uses any avail. water in a tank	82	MBRB241	MBRB241S
	BrainBox - 24v, Safe Out, Low Pressure and High Temp Sensors, 2 Floats	Y	Y	O	O	Y	Y	O		5	2	12x12x6		82	MBRB242	MBRB242S
	BrainBox - 24v, Low Incoming Amp, Low Pressure and High Temp Sensors, 2 Floats, 110v Line	Y	Y	Y	N	O	Y	O		2	2	12x12x6		84	MBRB242W11	MBRB242W11S
	BrainBox - 24v, Low Incoming Amp, Low Pressure and High Temp Sensors, 2 Floats, 220v Line	Y	Y	N	Y	O	Y	O		5	2	12x12x6		84	MBRB242W22	MBRB242W22S
	FULL TANK UTILIZATION															
	BrainBox Max - 24v, Low Incoming Amp, Safe Out, Indicator Lights, 2 Float, 110v line	Y	Y	Y	N	Y	Y	O	120v - 24 FLA 240v - 28 FLA	2	2	12x12x6	Uses tank water only when full	82	MBRBMAX242WA11	MBRBMAX242WA11S
	BrainBox Max - 24v, Low Incoming Amp, Safe Out, Indicator Lights, 2 Float, 220v line	Y	Y	N	Y	Y	Y	O		5	2	12x12x6		82	MBRBMAX242WA22	MBRBMAX242WA22S

DamBox – Water Feature Protection

Control Voltage	Product Description	Protections		Low Incoming Amp Compatible		Low Voltage - Safe Out	Thermal Protection	HOA	Motor Info		Box Size	Special Features	Page #	Part Number	
		Low Pressure Cut-off	High Temp Shut-down	110V	220V				Motor Shut-down (amp range)	Max HP				Blue Box	SS Box
110v	DamBox - 110v	O	O	O	--	O	N	O	24 FLA	2	8x8x6	Prevents pump cycling due to clogged filter	85	MPDB110	MPDB110S
220V	DamBox - 220v	O	O	--	O	O	N	O	24 FLA	5	8x8x6		85	MPDB220	MPDB220S

*Recommended whenever an external component, like a float switch, is used.
Consult motor nameplate to verify specific motor data
NEC requires all motors to be thermally protected either by motor design or control panel – consult motor nameplate
Highlighted items are built to order and may take up to 10 business days to ship. Please verify ship times when placing your order.

Y = Yes, Included
O = Option Available – see page 90 for custom box or contact Munro
-- = Not Available
N = NO , Not Included

RESOURCES

Liquid Level Controls

Control Voltage	Product Description	Protections		Low Voltage - Safe Out* (A)	HOA (H)	Thermal Protection	Motor Info		Float Switch Included	Box Size	Page #	Part Number	
		Low Pressure Cut-off	High Temp Shut-down				Thermal Overload Protection (amp range)	Largest Motor				Blue Box	SS Box
110v Control	StartBox - 110v, Safe Out, Pump Down Float, HOA	O	O	Y	Y		24 FLA	2	1	12X12X6	76	MPSR110ADH	MPSR110ADHS
	StartBox - 110v, Safe Out, Pump Up Float, HOA	O	O	Y	Y			2	1	12X12X6	76	MPSR110AUH	MPSR110AUHS
220v Control	StartBox - 220v, Safe Out, Pump Down Float, HOA	O	O	Y	Y		28 FLA	5	1	12X12X6	76	MPSR220ADH	MPSR220ADHS
	StartBox - 220v, Safe Out, Pump Up Float, HOA	O	O	Y	Y			5	1	12X12X6	76	MPSR220AUH	MPSR220AUHS
	StartBox - 220v, 3 hp, Safe Out, Pump Down Float	See BrainBox Options		Y	N		14.7 - 15.8	3	1	12X12X6	76	MPSR220A3D	MPSR220A3DS
	StartBox - 220v, 3 hp, Safe Out, Pump Up Float, HOA			Y	Y			3	1	12X12X6	76	MPSR220A3U	MPSR220A3US
	StartBox - 220v, 5 hp, Safe Out, Pump Down Float			Y	N		24.1 - 25.9	5	1	12X12X6	76	MPSR220A5D	MPSR220A5DS
	StartBox - 220v, 5 hp, Safe Out, Pump Up Float, HOA			Y	Y			5	1	12X12X6	76	MPSR220A5U	MPSR220A5US
	StartBox - 220v, 7.5 hp, Safe Out, Pump Down Float			Y	N		34 - 40	7.5	1	12X12X6	76	MPSR220A75D	MPSR220A75DS
	StartBox - 220v, 7.5 hp, Safe Out, Pump Up Float, HOA			Y	Y			7.5	1	12X12X6	76	MPSR220A75U	MPSR220A75US
	StartBox - 220v, 10 hp, Safe Out, Pump Down Float			Y	N		40 - 50	10	1	12X12X6	76	MPSR220A10D	MPSR220A10DS
	StartBox - 220v, 10 hp, Safe Out, Pump Up Float, HOA			Y	Y			10	1	12x12x6	76	MPSR220A10U	MPSR220A10US

Specialty Boxes

Control Voltage	Product Description	Protections		Low Incoming Amp Compatible (W)		Low Voltage - Safe Out*	Thermal Protection	HOA	Motor Info		Box Size	Special Features	Info on Page #	Part Number	
		Low Pressure Cut-off	High Temp Shut-down	110V	220V				High Thermal Motor Shut-down	Max HP				Blue Box	SS Box
MULTIPLE PUMPS OR CONTROLLERS															
24	Startbox - 24v to work with 2 controllers and 1 pump	O	O	O	O	--		O	--	3	12x12x6	Multiple Controllers	90	MPSR24X2C	MPSR24S2CS
220	StartBox - 220v to run 2 pumps with 1 lawn controller	O	O	O	O	O		O	28 FLA	3	12x12x6	Multiple Pumps	90	MPSR220X2P	MPSR220X2PS
TIMEBOX															
110	TimeBox - 110v, Timed/Adjustable on/off	--	--	--	--	Y		--	24 FLA	2	12x12x6	1-24v Solenoid Valve Start Signal	81	MPSR110MYSAV	MPSR110MYSAVS
110	TimeBox - 110v, Timed/Adjustable on/off	–	--	--	--	Y		--		2	12x12x6	1-24v Solenoid Valve Start Signal	81	MPSR1102MYSAV	MPS-R1102MYSAVS
PRESSURE AND FLOW START/STOP															
220	StartBox - 110v, Pressure and Flow start	--	Y	--	--	Y		--	24 FLA	2	12x12x6	Self-Monitoring System - no tank required	80	MPSR110AYFT	MPSR110AYFST
220	StartBox - 220v, Pressure and Flow start	--	Y	--	--	Y		--	28 FLA	2	12x12x6	Self-Monitoring System - no tank required	80	MPSR220AYFT	MPSR220AYFST

*Recommended whenever an external component, like a float switch, is used.
Consult motor nameplate to verify specific motor data
NEC requires all motors to be thermally protected either by motor design or control panel – consult motor nameplate
Highlighted items are built to order and may take up to 10 business days to ship. Please verify ship times when placing your order.

Y = Yes, Included
O = Option Available – see page 90 for custom box or contact Munro
-- = Not Available
N = NO , Not Included

RESOURCES

munro

Friction Loss - Schedule 40 Pipe

For Water at 60°F per 100 Feet of Pipe

Pipe Size	3/4" (1.05" OD)			1" (1.315" OD)			1-1/4" (1.66" OD)			1-1/2" (1.9" OD)			2" (2.375" OD)			2-1/2" (2.875" OD)		
U.S. Gallons Per Min.	VEL Ft. Per Sec.	Head Loss Feet Steel	Head Loss Feet Plastic	VEL Ft. Per Sec.	Head Loss Feet Steel	Head Loss Feet Plastic	VEL Ft. Per Sec.	Head Loss Feet Steel	Head Loss Feet Plastic	VEL Ft. Per Sec.	Head Loss Feet Steel	Head Loss Feet Plastic	VEL Ft. Per Sec.	Head Loss Feet Steel	Head Loss Feet Plastic	VEL Ft. Per Sec.	Head Loss Feet Steel	Head Loss Feet Plastic
2	1.20	1.93	1.04	0.80	0.60	0.32												
4	2.40	6.94	3.74	1.50	2.14	1.16	0.86	0.56	0.30	0.63	0.20	0.11						
6	3.60	14.70	7.95	2.20	4.54	2.45	1.29	0.85	0.46	0.95	0.56	0.31	0.57	0.17	0.09			
8	**4.80**	25.00	13.50	3.00	7.78	4.20	1.72	1.20	0.65	1.26	0.96	0.52	0.77	0.28	0.15	0.54	0.12	0.06
10	**6.00**	37.80	20.40	3.70	11.70	6.32	2.15	2.04	1.10	1.58	1.45	0.78	0.96	0.43	0.23	0.67	0.18	0.10
12	7.20	53.00	28.60	**4.50**	16.40	8.86	2.57	3.08	1.66	1.89	2.04	1.10	1.15	0.60	0.33	0.80	0.25	0.14
15	9.00	80.00	43.30	**5.60**	24.80	13.39	3.17	6.54	3.53	2.37	3.09	1.67	1.53	1.03	0.56	0.98	0.36	0.19
18	10.80	112.00	60.50	6.70	34.70	18.74	3.86	6.72	3.63	2.84	4.31	2.33	1.72	1.28	0.69	1.21	0.54	0.29
20	12.00	136.00	73.50	7.40	42.10	22.73	**4.29**	9.13	4.93	3.15	5.24	2.83	1.91	1.55	0.84	1.34	0.65	0.35
25				9.30	63.60	34.34	**5.36**	11.10	5.99	3.80	7.30	3.94	2.55	2.73	1.47	1.63	0.92	0.50
30				11.10	89.20	48.17	6.43	16.80	9.07	**4.72**	11.00	5.94	2.87	3.29	1.78	2.01	1.39	0.75
35				13.00	119.00	64.26	7.51	23.50	12.69	**5.51**	14.70	7.94	3.35	4.37	2.36	2.35	1.84	0.99
40				14.90	152.00	82.08	8.58	31.20	16.85	6.30	18.30	9.88	3.82	5.60	3.02	2.68	2.36	1.27
45				16.70	189.00	102.06	9.64	50.20	27.11	7.03	23.20	12.53	**4.30**	6.96	3.76	3.02	2.93	1.58
50							10.70	60.40	32.62	7.87	23.40	12.64	**4.78**	8.46	4.57	3.35	3.56	1.92
55							11.80	72.55	39.18	8.66	34.00	18.36	**5.26**	10.10	5.45	3.69	4.24	2.29
60							12.90	84.70	45.74	9.44	39.60	21.38	**5.74**	11.90	6.43	**4.02**	4.99	2.69
65							13.95	99.35	53.65	10.23	45.90	24.79	6.21	13.70	7.40	**4.36**	5.79	3.13
70							15.00	114.00	61.56	11.02	53.00	28.62	6.69	15.80	8.53	**4.69**	6.64	3.59
75							16.10	129.00	69.66	11.80	60.00	32.40	7.17	17.90	9.67	**5.03**	7.55	4.08
80							17.20	144.00	77.76	12.59	68.00	36.72	7.65	20.20	10.91	**5.36**	8.50	4.59
85							18.25	161.50	87.21	13.38	75.00	40.50	8.13	22.60	12.20	**5.70**	9.51	5.14
90							19.30	179.00	96.66	14.71	84.00	45.36	8.61	25.10	13.55	6.03	10.60	5.72
95										14.95	93.00	50.22	9.08	27.70	14.96	6.37	11.70	6.32
100										15.74	102.00	55.08	9.56	30.50	16.47	6.70	12.80	6.91
110										17.31	122.00	65.88	10.50	36.40	19.66	7.37	15.30	8.26
120										18.89	143.00	77.22	11.50	42.70	23.06	8.04	18.00	9.72
130										20.46	166.00	89.64	12.40	49.60	26.78	8.71	20.90	11.29
140										22.04	190.00	102.60	13.40	56.90	30.73	9.38	23.90	12.91
150										23.60	218.00	117.72	14.30	64.70	34.94	10.00	27.30	14.74
160										25.20	245.00	132.30	15.30	72.80	39.31	10.70	30.70	16.58
170										26.80	275.00	148.50	16.30	81.40	43.96	11.40	34.30	18.52
180										28.40	305.00	164.70	17.20	90.50	48.87	12.10	38.10	20.57
190													18.20	100.00	54.00	12.70	42.10	22.73
200													19.10	110.00	59.40	13.40	46.30	25.00
220													21.00	131.00	70.74	14.70	55.30	29.86
240													22.90	154.00	83.16	16.10	66.40	35.86
260													24.90	179.00	96.66	17.40	75.30	40.66
280													26.80	205.00	110.70	18.80	86.30	46.60
300													28.70	233.00	125.82	20.10	98.10	52.97
320																20.92	103.00	55.62
340																22.22	116.00	62.64
360																23.53	123.00	66.42
380																24.84	142.00	76.68
400																26.80	167.00	90.18
450																30.20	208.00	112.32

Values are for estimating purposes only.

For Water at 60°F per 100 Feet of Pipe

Pipe Size	3″ (3.5″ OD)			4″ (4.5″ OD)			6″ (6.625″ OD)			8″ (8.625″ OD)			10″ (10.75″ OD)			12″ (12.75″ OD)		
U.S. Gallons Per Min.	VEL Ft. Per Sec.	Head Loss Feet Steel	Plastic	VEL Ft. Per Sec.	Head Loss Feet Steel	Plastic	VEL Ft. Per Sec.	Head Loss Feet Steel	Plastic	VEL Ft. Per Sec.	Head Loss Feet Steel	Plastic	VEL Ft. Per Sec.	Head Loss Feet Steel	Plastic	VEL Ft. Per Sec.	Head Loss Feet Steel	Plastic
45	1.95	1.02	0.55															
50	2.17	1.24	0.67															
55	2.39	1.47	0.79															
60	2.60	1.74	0.94															
65	2.82	2.01	1.09															
70	3.04	2.31	1.25	1.76	0.62	0.33												
75	3.25	2.62	1.41	1.91	0.73	0.39												
80	3.47	2.96	1.60	2.02	0.79	0.43												
85	3.69	3.31	1.79	2.17	0.91	0.49												
90	3.91	3.67	1.98	2.27	0.98	0.53												
95	**4.12**	4.06	2.19	2.42	1.12	0.60												
100	**4.34**	4.47	2.41	2.52	1.19	0.64												
110	**4.77**	5.33	2.88	2.77	1.42	0.77												
120	**5.21**	6.26	3.38	3.02	1.67	0.90												
130	**5.64**	7.26	3.92	3.28	1.93	1.04												
140	6.08	8.32	4.49	3.53	2.22	1.20	1.56	0.30	0.16									
150	6.51	9.48	5.12	3.78	2.53	1.37	1.70	0.36	0.19									
160	6.94	10.70	5.78	**4.03**	2.84	1.53	1.78	0.39	0.21									
170	7.71	13.30	7.18	**4.29**	3.18	1.72	1.92	0.45	0.24									
180	7.81	13.20	7.13	**4.54**	3.53	1.91	2.00	0.48	0.26									
190	8.63	15.50	8.37	**4.79**	3.90	2.11	2.16	0.55	0.30									
200	8.68	16.10	8.69	**5.05**	4.29	2.32	2.22	0.58	0.32									
220	9.55	19.20	10.37	**5.55**	5.12	2.76	2.44	0.70	0.38									
240	10.40	22.60	12.20	6.05	6.01	3.25	2.67	0.82	0.44									
260	11.30	26.20	14.15	6.55	6.97	3.76	2.89	0.95	0.51									
280	12.20	30.00	16.20	7.08	8.00	4.32	3.11	1.09	0.59	1.80	0.29	0.15						
300	13.00	34.10	18.41	7.57	9.09	4.91	3.33	1.24	0.67	1.92	0.32	0.18						
320	13.90	38.40	20.74	8.07	10.20	5.51	3.56	1.39	0.75	2.05	0.37	0.20						
340	14.80	43.00	23.22	8.58	11.50	6.21	3.78	1.56	0.84	2.18	0.41	0.22						
360	15.60	47.80	25.81	9.08	12.70	6.86	**4.00**	1.73	0.93	2.30	0.45	0.24						
380	16.50	52.80	28.51	9.59	14.10	7.61	**4.22**	1.92	1.04	2.43	0.50	0.27						
400	17.40	58.00	31.32	10.10	15.50	8.37	**4.44**	2.11	1.14	2.57	0.55	0.30	1.63	0.183	0.10			
450	20.40	78.00	42.12	11.49	19.00	10.26	**5.00**	2.62	1.41	2.88	0.69	0.37	1.83	0.228	0.12			
500	21.70	87.70	47.36	12.60	23.40	12.64	**5.56**	3.19	1.72	3.20	0.84	0.45	2.04	0.277	0.15			
550	23.90	105.00	56.70	13.90	27.90	15.07	6.11	3.80	2.05	3.52	1.00	0.54	2.24	0.330	0.18			
600	26.00	123.00	66.42	15.10	32.80	17.71	6.66	4.46	2.41	3.85	1.17	0.63	2.44	0.388	0.21			
650	28.20	143.00	77.22	16.40	38.00	20.52	7.22	5.17	2.79	**4.17**	1.36	0.73	2.64	0.450	0.24			
700				17.60	43.60	23.54	7.78	5.93	3.20	**4.49**	1.56	0.84	2.85	0.516	0.28			
750				18.90	49.50	26.73	8.34	6.74	3.64	**4.81**	1.77	0.96	3.06	0.590	0.32			
800				20.20	55.80	30.13	8.90	7.60	4.10	**5.13**	1.99	1.07	3.25	0.660	0.36			
850				21.40	62.40	33.70	9.45	8.50	4.59	**5.45**	2.23	1.20	3.47	0.750	0.41			
900				22.70	69.30	37.42	10.00	9.44	5.10	**5.77**	2.48	1.34	3.66	0.821	0.44	2.56	0.34	0.18
950				24.00	76.60	41.36	10.50	10.20	5.51	6.09	2.74	1.48	3.88	0.910	0.49	2.70	0.33	0.18
1000				25.20	84.30	45.52	11.10	11.50	6.21	6.41	3.02	1.63	**4.07**	0.998	0.54	2.84	0.41	0.22
1100				27.70	101.00	54.54	12.20	13.70	7.40	7.05	3.60	1.94	**4.48**	1.190	0.64	3.12	0.50	0.27
1200							13.30	16.10	8.69	7.69	4.23	2.28	**4.89**	1.400	0.76	3.41	0.58	0.31
1300							14.40	18.60	10.04	8.33	4.90	2.65	**5.30**	1.620	0.87	3.69	0.67	0.36
1400							15.60	21.40	11.56	8.97	5.62	3.03	**5.70**	1.86	1.00	3.98	0.77	0.42
1500							16.70	24.30	13.12	9.61	6.39	3.45	6.10	2.11	1.14	**4.26**	0.88	0.47
1600							17.80	27.40	14.80	10.30	7.20	3.89	6.51	2.38	1.29	**4.55**	0.99	0.53
1800							20.00	34.10	18.41	11.50	8.95	4.83	7.32	2.96	1.60	**5.11**	1.23	0.66
2000							22.20	41.40	22.36	12.80	10.90	5.89	8.14	3.60	1.94	**5.68**	1.50	0.81
2200							24.40	49.40	26.68	14.10	13.00	7.02	8.95	4.29	2.32	6.25	1.78	0.96
2400							26.70	58.00	31.32	15.40	15.20	8.21	9.76	5.04	2.72	6.81	2.10	1.13
2600										16.70	17.70	9.56	10.60	5.84	3.15	7.38	2.43	1.31
2800										18.00	20.30	10.96	11.40	6.70	3.62	7.95	2.78	1.50
3000										19.20	23.00	12.42	12.20	7.61	4.11	8.52	3.17	1.71
3200										20.80	26.80	14.47	13.00	8.58	4.63	9.10	3.51	1.90
3500										22.40	30.60	16.52	14.30	10.08	5.44	9.95	4.21	2.27
3800										24.00	34.90	18.85	15.51	13.40	7.24	10.80	4.90	2.65
4200										27.20	44.00	23.76	16.91	14.75	7.97	11.92	5.83	3.15
4500										28.80	48.80	26.35	18.30	16.10	8.69	12.80	6.70	3.62
5000										32.00	59.30	32.02	20.30	19.60	10.58	14.20	8.15	4.40
5500										35.30	70.70	38.18	22.40	23.40	12.64	15.60	9.72	5.25
6000													24.40	27.50	14.85	17.00	11.40	6.16
6500													26.40	31.80	17.17	18.40	13.20	7.13
7000													28.50	36.50	19.71	19.90	15.20	8.21
7500																22.70	19.40	10.48

Values are for estimating purposes only.

Wire Size Chart - Single Phase

Motor Rating		Circuit Size	Fuse Size	Full Load Amps	Copper Wire Size													
Volts	HP				KW	12	10	8	6	4	2	0	00	000	0000	250	300	350
120 (1ø)	1/4	20	10	5.8	0.186	291	464	692	1171	1863	2350	3737	4715	5942	7492			
	1/3	20	10	7.2	0.246	230	365	546	924	1471	2338	3721	4691	5914	7457	8811		
	1/2	20	15	9.8	0.373	171	272	407	689	1096	1742	2773	3495	4406	5556	6565		
	3/4	20	15	13.8	0.559	130	207	310	524	834	1326	2110	2660	3354	4229	4997		
	1	20	20	16	0.746	99	157	236	399	635	1009	1607	2025	2553	3220	3804		
	1-1/2	30	25	20	1.12		128	192	325	515	822	1309	1650	2080	2624	3100		
	2	30	40	24	1.49			134	226	360	573	912	1150	1449	1828	2160	2592	
	1/4	20	5	2.9	0.186	1166	1853	2769	4685	7453	11850							
	1/3	20	5	3.6	0.246	920	1462	2186	3699	5884	9355							
	1/2	20	8	4.9	0.373	650	1025	1550	2620	4160	6610	10530	13250					
	3/4	20	8	7	0.559	490	785	1175	1990	3170	5040	8020	10109	12745				
	1	20	10	9	0.746	360	600	895	1515	2410	3835	6105	7695	9705	1225			
208 (1ø)	1-1/2	20	15	11	1.12	250	405	605	1025	1635	2595	4130	5205	6568	9230			
	2	20	20	12	1.49	240	385	585	985	1573	2500	3980	5015	6325	7975			
	2-1/2	30	20	14	1.9	205	325	495	840	1335	2125	3575	4510	5690	7175			
	3	30	25	18	2.24	175	275	415	700	1115	1775	2825	3560	4495	5665			
	5	40	35	29	3.73		185	280	475	755	1205	1920	2415	3050	3845			
	7-1/2	60	50	44	5.59			205	350	555	885	1410	1780	2245	2830	3345		
	10	60	60	55	7.46				270	430	685	1095	1380	1740	2195	2595	3115	
	1/4	20	5	2.9	0.186	1166	1853	2769	4685	7453	11850	18857						
	1/3	20	5	3.6	0.246	920	1462	2186	3699	5884	9355	14887	18764					
	1/2	20	8	4.9	0.373	685	1090	1629	2756	4384	6970	11092	13981					
	3/4	20	8	6.9	0.559	522	829	1240	2098	3337	5305	8443	10642	13416				
	1	20	10	8	0.746	397	631	944	1597	2540	4039	6428	8102	10215	12881			
240 (1ø)	1-1/2	20	15	10	1.12	269	427	639	1081	1720	2734	4351	5484	6914	8719			
	2	20	20	12	1.49	259	411	615	1041	1656	2633	4190	5281	6658	8398			
	2-1/2	30	20	11.6	1.9	220	344	522	885	1407	2238							
	3	30	25	17	2.24	184	292	437	739	1176	1871	2977	3752	4731	5966			
	5	40	30	28	3.73		198	296	502	798	1269	2020	2546	3210	4048			
	7-1/2	50	45	40	5.59			218	369	588	935	1488	1876	2365	2983	3524		
	10	60	60	50	7.46				286	456	725	1153	1455	1834	2313	2733	3279	

Values are for estimating purposes only and may not meet NEC code. Design should be verified.

Wire Size Chart - Three Phase

Motor Rating		Circuit Size	Fuse Size	Full Load Amps	Copper Wire Size																
Volts	HP				KW	12	10	8	6	4	2	0	00	000	0000	250	300	350	400	500	600
208 (3ø)	1-1/2	20	10	6.6	1.12	530	843	1340	2131	3389	5385	8576	10809								
	2	20	15	7.5	1.49	407	648	1031	1639	2607	4145	6597	8310								
	3	20	15	10.6	2.24	289	459	731	1162	1849	2939	4678	5896	7433	9373						
	5	30	25	16.7	3.73	181	289	459	730	1162	1847	2940	3706	4670	5892	6961					
	7-1/2	30	35	24.2	5.59		202	321	511	811	1293	2058	2594	3270	4124	4872					
	10	40	40	30.2	7.46			251	399	635	1010	1608	2026	2555	3222	3807	4568	5329	6091	7614	
	15	60	60	46.2	11.19				266	423	673	1072	1351	1703	2148	2538	3045	3553	4060	5076	
	20	100	80	59.4	14.91					328	520	829	1046	1318	1663	1964	2357	2750	3143	3929	
	25	100	100	74.8	18.64						414	559	831	1048	1321	1561	1874	2186	2498	3123	3748
	30	125	150	88	22.37							268	337	425	537	634	761	888	1015	1269	1522
240 (3ø)	1-1/2	20	10	6	1.12	641	1019	1522	2576	4098	6516	10369									
	2	20	10	6.8	1.49	492	783	1170	1979	3148	5006	7966	10041								
	3	20	15	9.6	2.24	354	563	841	1423	2264	3600	5730	7222	9105	11482						
	5	30	20	15.2	3.73	243	386	577	977	1555	2472	3935	4960	6253	7885	9316	11179	13042	14906		
	7-1/2	30	30	22	5.59		268	401	679	1080	1717	2733	3445	4343	5476	6470	7764	9059	10353	12941	15529
	10	40	35	28	7.46			299	507	806	1282	2041	2573	3243	4090	4832	5799	6766	7731	9666	11598
	15	50	50	42	11.19				395	629	1001	1593	2008	2531	3192	3771	4526	5280	6035	7543	9052
	20	70	70	54	14.91					423	672	1070	1349	1701	2145	2535	3042	3549	4056	5070	6084
	25	80	80	68	18.64						547	870	1097	1384	1745	2062	2474	2886	3299	4124	4948
	30	100	100	80	22.37						446	710	894	1128	1422	1680	2017	2353	2689	3361	4034
480 (3ø)	1-1/2	20	5	3	1.12	2693	4280	6396													
	2	20	5	3.4	1.49	2019	3210	4797	8116												
	3	20	10	4.8	2.24	1615	2568	3837	6492	10328											
	5	20	10	7.6	3.73	973	1547	2311	3911	6221	9891										
	7-1/2	20	15	11	5.59	678	1079	1612	2728	4339	6899	10978									
	10	20	20	14	7.46	504	802	1199	2029	3227	5131	8165	10292								
	15	30	25	21	11.19		626	936	1583	2519	4004	6373	8032	10127	12770						
	20	40	35	27	14.91			629	1064	1693	2691	4283	5399	6806	8583						
	25	40	40	34	18.64				865	1377	2189	3483	4391	5536	6981	8248	9897	11547			
	30	50	50	40	22.37				705	1122	1784	2840	3579	4513	5691	6723	8068	9413			
	40	70	70	52	29.83					860	1368	2177	2744	3460	4362	5155	6186	7217	8248	10310	
	50	100	90	65	37.29						1094	1741	2195	2768	3490	4124	4948	5773	6598	8248	9897
	60	100	100	77	44.74						932	1484	1871	2359	2974	3514	4217	4920	5623	7029	8435
	75	150	150	96	55.93							1209	1524	1922	2424	2863	3436	4009	4582	5727	6873
	100	175	175	124	74.57								1176	1482	1869	2209	2651	3093	3534	4418	5302
	125	200	200	156	93.21										1539	1819	2183	2547	2911	3638	4366
	150	250	250	180	111.86												1903	2220	2537	3172	3806
	175	300	250	210	130.50													2014	2301	2877	3452
	200	300	275	240	149.14														2062	2577	3093
	250	400	350	302	186.43															2104	2524
	300	500	500	361	223.71																

Values are for estimating purposes only and may not meet NEC code. Design should be verified.

Capacities of Steel Pipe

Standard Schedule 40

Diameter	Cubic in per ft	Cubic ft per ft	Gallons per ft	Water lb/ft	Diameter	Cubic ft per ft	Gal/ft	Water lb/ft
1/8 in	0.67	--	0.003	0.028	42 in	9.621	71.97	599.51
1/4 in	1.24	--	0.005	0.045	48 in	12.57	94.00	783.02
3/8 in	2.25	--	0.010	0.083	54 in	15.90	119.0	991.27
1/2 in	3.63	--	0.016	0.132	60 in	19.64	147.0	1224.51
3/4 in	6.39	--	0.028	0.232	66 in	23.76	177.8	1481.07
1 in	10.7	--	0.045	0.375	72 in	26.27	211.5	1761.79
1-1/4 in	18.0	--	0.077	0.649	78 in	33.18	248.2	2067.51
1-1/2 in	24.4	--	0.106	0.882	84 in	38.48	287.9	2398.21
2 in	40.3	--	0.174	1.454	90 in	44.18	330.5	2753.06
2-1/2 in	57.4	--	0.248	2.073	96 in	50.26	376.0	3132.08
3 in	57.4	--	0.383	3.201	102 in	56.75	424.5	3536.08
4 in	153	--	0.660	5.516	108 in	63.62	475.9	3964.25
6 in	347	--	1.500	12.52	114 in	70.88	530.2	4416.57
8 in	601	--	2.600	21.68	120 in	78.54	587.5	4893.87
10 in	946	--	4.096	34.13	11 ft	95.03	710.9	5921.80
12 in	1356	0.784	5.870	48.50	12 ft	113.1	846.0	7047.18
16 in	2411.64	1.396	10.44	86.96	13 ft	132.7	992.9	8270.86
18 in	3053.82	1.767	13.22	110.12	14 ft	153.9	1151	9587.83
20 in	3769.92	2.182	16.32	135.94	15 ft	176.7	1322	11012.26
24 in	5428.5	3.142	23.50	195.75	16 ft	201.1	1504	12528.32
30 in	8482.32	4.909	36.72	305.88	17 ft	227.0	1698	14144.34
36 in	12145.98	7.069	52.88	440.49	18 ft	254.5	1904	15860.32

Conversion Tables

FRACTION TO DECIMAL CONVERSION TABLE

1/3 = .33	2/3 = .6				
1/4 = .25	3/4 = .75				
1/5 = .20	2/5 = .4	3/5 = .6	4/5 = .8		
1/6 = .16	5/6 = 0.83				
1/7 = .142857	2/7 = .285714	3/7 = .428571	4/7 = .571428	5/7 = .714285	6/7 = .857142
1/8 = .125	3/8 = .375	5/8 = .625	7/8 = .875		
1/9 = .1	2/9 = .2	4/9 = .4	5/9 = .5	7/9 = .7	8/9 = .8
1/10 = .1	3/10 = .3	7/10 = .7	9/10 = .9		
1/11 = .09	2/11 = .18	3/11 = .27	4/11 = .36	5/11 = .45	6/11 = .54
	7/11 = .63	8/11 = .72	9/11 = .81	10/11 = .90	
1/12 = .083	5/12 = .416	7/12 = .583	11/12 = .916		
1/16 = 0.0625	3/16 = .1875	5/16 = .3125	7/16 = .4375	11/16 = .6875	13/16 = .8125
	15/16 = .9375				
1/32 = 0.03125	3/32 = .09375	5/32 = .15625	7/32 = .21875	9/32 = .28125	11/32 = .34375
	13/32 = .40625	15/32 = .46875	17/32 = .53125	19/32 = .59375	21/32 = .65625
	23/32 = .71875	25/32 = .78125	27/32 = .84375	29/32 = .90625	31/32 = .96875

Circumference of circle = 3.1416 x dia = 6.2832 x radius • Area of circle = .7854 x (dia)2 = 3.1416 x (radius)2 • Area of Sphere = 3.1416 x (dia)2 • Volume of Sphere = .5236 x (dia)3 • 1 lb per sq in is equivalent to .06804 atmospheres.

Important Note: Any span of numbers that are underlined signifies that those numbers are repeated. For example, 0.09 signifies 0.090909. Only fractions in the lowest terms are listed. For instance, to find 2/8, first simplify it to 1/4 then search for it in the table above.

PARTICLE SIZE TABLE

Inch	Millimeter	Microns	Mesh
0.00	--	25	--
0.0015	--	37	400
0.002	--	50	300
0.003	--	75	200
0.004	1/10	100	150
0.005	1/8	125	115
0.006	--	149	100
0.007	--	177	80
0.010	1/4	250	60
0.011	--	280	50
0.016	--	406	40
0.020	1/2	500	--
0.021	--	533	30
0.030	3/4	750	--
0.033	--	838	--
0.034	--	840	20
0.039	1	1000	16
0.045	--	1143	--
0.046	--	1190	14
0.055	--	1410	12
0.059	1 1/2	1500	--
0.062	--	1575	--
0.065	--	1680	10
0.079	2	2000	9
0.093	--	2380	8
0.094	--	2388	--
0.110	--	2790	7
0.118	3	3000	--
0.125	--	3175	--
0.131	--	3330	6
0.156	4	4000	5
0.185	--	4700	4
0.1875	--	4763	--
0.197	5	5000	--
0.236	6	6000	--
0.250	--	6350	--
0.263	--	6700	3

HOW MUCH IS THAT?

1	US bushel	=	1.24 cu feet	1	BR bushel	=	1.284 cu feet
1	peck	=	1/4 bushel	1	mil. gallons per day	=	694.4 gpm
1	pottle	=	2 quarts	1	comb	=	4 bushels
1	wey	=	4 bushels	1	last	=	80 bushels
1	US gallon	=	128 fl ounces	1	BR gallon	=	1.20 US gallons
1	firkin	=	9 gallons	1	butt	=	108 gallons
1	puncheon	=	84 gallons	1	tierce	=	42 gallons
1	pipe	=	108 gallons	1	hogshead	=	54 gallons
1	runlet	=	18 gallons	1	gill	=	4 ounces
1	furlong	=	660 feet	1	chain	=	66 feet
1	hand	=	4 inches	1	rod	=	16.5 feet
1	perch	=	8 feet	1	fathom	=	6 feet
1	stat. mile	=	5280 feet	1	naut. mile	=	6076 feet
1	US ton	=	2000 lbs	1	BR ton	=	2200 lbs
1	metric ton	=	2240 lbs	1	stone	=	14 lbs
1	mech. horsepower	=	33000 ft-lb/min	1	royal cubit	=	20.62 inches
1	drum fluid	=	55 gallons	1	barrel fluid	=	31.5 gallons

METRIC CONVERSION TABLE

To Convert From	To	Multiply By	To Convert From	To	Multiply By
Length			**Length**		
mm	inches	.03937	inches	mm	25.40
cm	inches	.3937	inches	cm	2.540
meters	inches	39.37	inches	meters	.0254
meters	feet	3.281	feet	meters	.3048
meters	yards	1.0936	feet	km	.0003048
km	feet	3280.8	yards	meters	.9144
km	yards	1093.6	yards	km	.0009144
km	miles	.6214	miles	km	1.609
Area			**Area**		
sq mm	sq inches	.00155	sq inches	sq mm	645.2
sq cm	sq inches	.155	sq inches	sq cm	6.452
sq meters	sq feet	10.764	sq feet	sq meters	.09290
sq meters	sq yards	1.196	sq yards	sq meters	.8361
sq km	sq miles	.3861	sq miles	sq km	2.590
hectares	acres	2.471	acres	hectares	.4047
Volume			**Volume**		
cu cm	cu inches	.06102	cu inches	cu cm	16.387
cu cm	fl ounces	.0338	cu inches	liters	.01639
cu meters	cu feet	35.314	cu feet	cu meters	.02832
cu meters	cu yards	1.308	cu feet	liters	28.317
cu meters	US gallons	264.2	cu yards	cu meters	.7646
liters	cu inches	61.023	fl ounces	cu cm	29.57
liters	cu feet	.03531	US gallon	cu meters	.003785
liters	US gallons	.2642	US gallon	liters	3.785
Weight			**Weight**		
grams	grains	15.432	grains	grams	.0648
grams	ounces	.0353	ounces	grams	28.350
kg	ounces	35.27	ounces	kg	.02835
kg	pounds	2.2046	pounds	kg	.4536
kg	US tons	.001102	US tons	kg	907.2
Unit Weight			**Unit Weight**		
gr/sq cm	lb/sq in	.01422	lb/ft	kg/m	1.4881
gr/cu cm	lb/cu in	.0361	lb/sq in	gr/sq cm	70.31
kg/sq cm	lb/sq in	14.22	lb/sq in	kg/sq cm	.07031
kg/cu m	lb/cu ft	.0624	lb/cu in	gr/cu cm	27.68
kg/m	lb/ft	.6720	lb/cu ft	kg/cu m	16.018
Unit Volume			**Unit Volume**		
liters/min	US gpm	.2642	US gpm	liters/min	3.785
liters/min	cfm	.03531	US gpm	liters/hr	227.1
liters/hr	US gpm	.0044	US gpm	cu m/hr	.2271
cu m/min	cfm	35.314	cfm	liters/min	28.317
cu m/hr	cfm	.5886	cfm	cu m/min	.02832
cu m/hr	US gpm	4.4028	cfm	cu m/hr	1.6992
Power			**Power**		
watts	ft-lb/sec	.7376	ft-lb/sec	watts	1.356
watts	hp	.00134	hp	watts	745.7
kw	hp	1.3410	hp	kw	.7457
cheval-vap	hp	.9863	hp	cheval-vap	1.0139

ENGLISH CONVERSION TABLE

Length			**Volume**		
inches	feet	.0833	cu inches	cu feet	.0005787
inches	yards	.0278	cu inches	cu yards	.00002143
feet	inches	12	cu inches	US gallon	.004329
feet	yards	.3333	cu feet	cu inches	1728
feet	miles	.0001894	cu feet	cu yards	.03704
yards	feet	3	cu feet	US gallon	7.481
yards	miles	.0005682	cu yards	cu feet	27
Area			**Weight**		
sq inches	sq feet	.00694	grains	ounces	.002286
sq inches	sq yards	.000772	ounces	grains	437.5
sq feet	sq inches	144	ounces	pounds	.0625
sq feet	sq yards	.11111	pounds	ounces	16
sq yards	sq inches	1296	pounds	US tons	.0005
sq yards	sq feet	9	pounds	long tons	.000446
sq yards	acres	.000207	US tons	pounds	2000
acres	sq feet	43560	long tons	pounds	2240

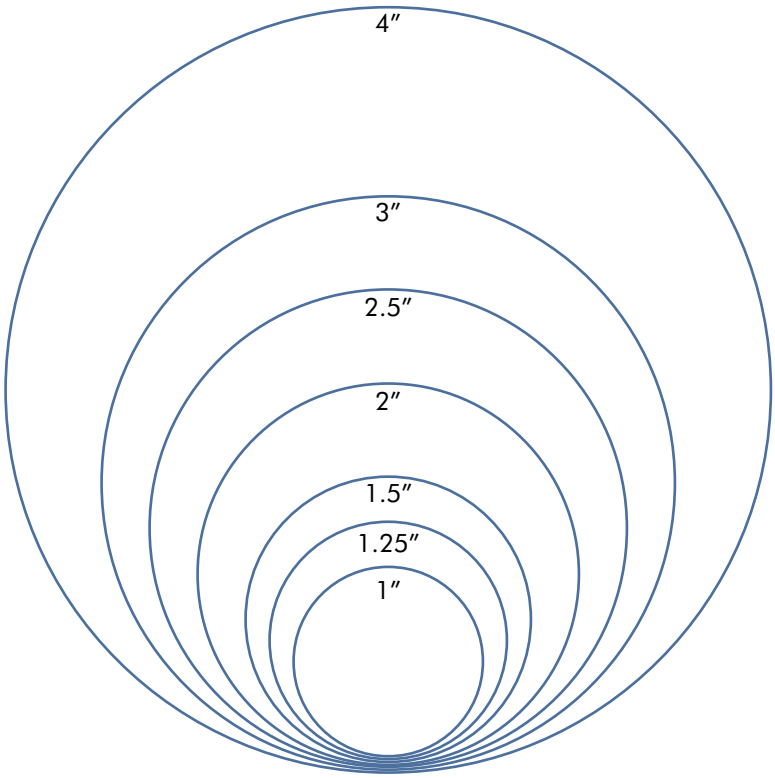
Decimal Equivalent Chart

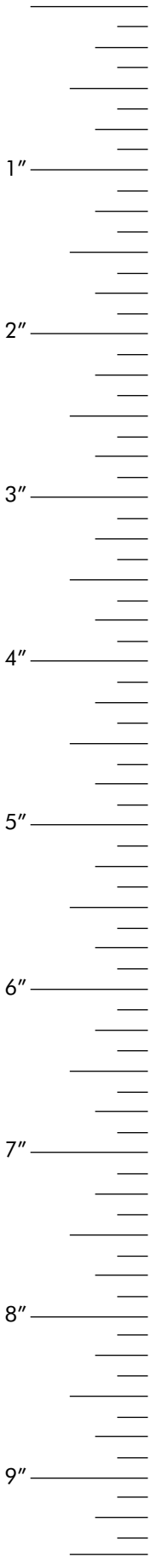
Fraction	Decimals	Millimeters
1/64	.15625	0.397
1/32	.03125	0.794
3/64	.046875	1.191
1/16	**.0625**	**1.588**
5/64	.078125	1.984
3/32	.09375	2.381
7/64	.109375	2.778
1/8	**.1250**	**3.175**
9/64	.140625	3.572
5/32	.15625	3.969
11/64	.171875	4.366
3/16	**.1875**	**4.763**
13/64	.203125	5.159
7/32	.21875	5.556
15/64	.234375	5.953
1/4	**.2500**	**6.350**
17/64	.265625	6.747
9/32	.28125	7.144
19/64	.296875	7.541
5/16	**.3125**	**7.938**
21/64	.328125	8.334
11/32	.34375	8.731
23/64	.359375	9.128
3/8	**.3750**	**9.525**
25/64	.390625	9.922
13/32	.40625	10.319
27/64	.421875	10.716
7/16	**.4375**	**11.113**
29/64	.453125	11.509
15/32	.46875	11.906
31/64	.484375	12.303
1/2	**.5000**	**12.700**

Fraction	Decimals	Millimeters
33/64	.515625	13.097
17/32	.53125	13.494
35/64	.546875	13.891
9/16	**.5625**	**14.288**
37/64	.578125	14.684
19/32	.59375	15.081
39/64	.609375	15.478
5/8	**.6250**	**15.875**
41/64	.640625	16.272
21/32	.65625	16.669
43/64	.671875	17.066
11/16	**.6875**	**17.463**
45/64	.703125	17.859
23/32	.71875	18.256
47/64	.734375	18.653
3/4	**.7500**	**19.050**
49/64	.765625	19.447
25/32	.78125	19.844
51/64	.796875	20.241
13/16	**.8125**	**20.638**
53/64	.828125	21.034
27/32	.84375	21.431
55/64	.859375	21.828
7/8	**.8750**	**22.225**
57/64	.890625	22.622
29/32	.90625	23.019
59/64	.921875	23.416
15/16	**.9375**	**23.813**
61/64	.953125	24.209
31/32	.96875	24.606
63/64	.984375	25.003
1	**1.000**	**25.400**

MM	Inches	MM	Inches
.1	.0039	46	1.8110
.2	.0079	47	1.8504
.3	.0118	48	1.8898
.4	.0157	49	1.9291
.5	.0197	50	1.9685
.6	.0236	51	2.0079
.7	.0276	52	2.0472
.8	.0315	53	2.0866
.9	.0354	54	2.1260
1	.0394	55	2.1654
2	.0787	56	2.2047
3	.1181	57	2.2441
4	.1575	58	2.2835
5	.1969	59	2.3228
6	.2362	60	2.3622
7	.2756	61	2.4016
8	.3150	62	2.4409
9	.3543	63	2.4803
10	.3937	64	2.5197
11	.4331	65	2.5591
12	.4724	66	2.5984
13	.5118	67	2.6378
14	.5512	68	2.6772
15	.5906	69	2.7165
16	.6299	70	2.7559
17	.6693	71	2.7953
18	.7087	72	2.8346
19	.7480	73	2.8740
20	.7874	74	2.9134
21	.8268	75	2.9528
22	.8661	76	2.9921
23	.9055	77	3.0315
24	.9449	78	3.0709
25	.9843	79	3.1102
26	1.0236	80	3.1496
27	1.0630	81	3.1890
28	1.1024	82	3.2283
29	1.1417	83	3.2677
30	1.1811	84	3.3071
31	1.2205	85	3.3465
32	1.2598	86	3.3858
33	1.2992	87	3.4242
34	1.3386	88	3.4646
35	1.3780	89	3.5039
36	1.4173	90	3.5433
37	1.4567	91	3.5827
38	1.4961	92	3.6220
39	1.5354	93	3.6614
40	1.5748	94	3.7008
41	1.6124	95	3.7402
42	1.6535	96	3.7795
43	1.6929	97	3.8189
44	1.7323	98	3.8583
45	1.7717	99	3.8976
		100	3.9370

Measuring Tools





"High Voltage" (motor nameplate reference)	Highest voltage on which a motor will run.
"Low Voltage" (motor nameplate reference)	Lowest voltage on which a motor will turn. Possible wiring adjustment, shown on name plate.
2-Wire Decoder System	Electrical signal system that connects irrigation zone valves and pump accessories in a continuous loop to save wiring. Each valve has a decoder which will interpret controller signal to open or close an irrigation zone.
2-Wire Water Well Motor	Motor which has own starting circuitry built into the motor, which is suspended from the bottom of the pump. The pump must be pulled out of the well to replace the start circuitry.
Adapter	Any designed connection between two different points, determined by either size or style.
Air Lock	An air bubble caught in a pump or pipework that prevents the flow of water.
Alignment (Shaft to Shaft)	Centerline of the pump is aligned to the drive shaft of a pump motor.
Ambient Compensated	Environmental conditions around an operating system to be considered during system design and planning.
Ambient Heat	The temperature surrounding a pump or other piece of equipment.
Amperage	Amount of electrical flow.
Amperes (Amps)	Measurement of flowing electrical energy.
Amphibious	Equipment that can function both on land and submersed in water.
Application	Action of putting a piece of equipment into operation under specific conditions to achieve a specific outcome.
Atmospheric Pressure	The pressure exerted by the weight of the gases surrounding the earth – measured as pounds per square inch.
Back Flow	Occurs when water flows in reverse within the piping.
Back Plate	Pump component, also known as a bracket, attaches motor and pump housing.
Back flow Prevention Device	Used to prevent the flow of water from the pump system back to the water source.
Ball Valve	Manually operated valve which contains a spherical disk in order to control flow.
Bar	Metric term for pressure measurement.
Base Plate	Mounting bracket for a pump.

Basket Strainer	A filter usually containing a type of mesh, to filter particulates out of a fluid.
Best Efficiency Point	The "Sweet Spot" where the pump power required is best utilized for maximum performance.
Booster Station	A mounted system, complete with pump and controls, designed to increase pressure in an already pressurized system.
Bump (motor)	Momentarily supplying power to a pump to determine impeller rotation.
Butterfly Valve	Manually or automatically operated valve that can restrict or stop flow in pipework.
Cam Coupling (Fitting)	Connection fitting which allows a quick hook-up and removal of hose at a pump or other connection point.
Cam Valve	One piece combination of a butterfly valve and camlock fittings. Replacement for traditional fitting/valve assemblies that are heavier and more costly.
Capacitor Run	Run capacitors boost the power factor rating of a motor and stay in the circuit throughout the run cycle.
Capacitor Start	Starting capacitors store energy to give single phase motor winding the impetus to start turning.
Capacitor Start Motor	Motor in which a capacitor is in series with the start winding during start process.
Carbide	A compound that is formed when carbon combines with an element creating a very hard metal often used as a mechanical seal face.
Cavitate	Occurs when a material collapses in on itself (implodes), releasing stored energy in the molecules.
Cavitation Damage	The pitting or wearing away of the impeller caused by the collapsing of any bubbles in the pump.
Centrifugal Force	An inertial force that draws a rotating body away from the center of rotation.
Centrifugal Pump	A pump that uses centrifugal force to lift and accelerate liquid. Fluid is forced from the center of the impeller outwards.
Ceramic	A hard, chemically inert material, used for seal faces.
Check Valve	These valves only allow for a one-way flow of liquid, entering at one end and exiting at the other.
Chemical Feeder	A device used to introduce chemicals into a water system.

Circuit Breaker	An automatic device for stopping the flow of current in an electric circuit as a safety measure.
Cistern	Waterproof receptacle for holding liquids.
Clear Water	Water with little or no visual floating particulate.
Closed Impeller	A two-sided impeller designed to have enclosed vanes which increases the velocity of the liquid moving through the pump resulting in higher head pressure.
Contactor	A contactor is an electrically controlled switch used for switching an electrical power circuit, similar to a relay except with higher current ratings.
Continuous Duty Design	A design specification that allows motors to run for long periods of time through heat disbursement.
Control Box	A device that contains electrical components. A pump control box is used to power and control a pump. An irrigation control box is used to power and control an irrigation system.
Corrosion Resistant	Corrodes at a rate of .002 inches or less per year.
Current	The movement of an electrical charge carried by electrons along a path (conductor, wire). Current is measured in terms of amperes (amps).
Cycling	See Short Cycling
Dead Head	The pounds per square inch point on a pump performance curve where the unit is pumping zero gallons per minute. Can be caused by a valve not opening while the pump is running and will cause a pump to overheat or cavitate if not addressed.
Density	Mass per unit volume.
Dewatering	Removing or transferring water from one area to another.
Diffuser	Component of pump that directs the discharge flow of water.
Discharge	The pump orifice where water exits the pump.
Discharge Head	The total head, including static head and friction head, on the discharge side of the pump.
Drawdown	The difference between the static water level and the pumping water level in a well.
Drawdown Level	The water level in a well measured while the pump is pumping at full capacity.
Dry End	The motor end of the pump.
Dry Running	Running the pump without fluid at the seal face.

Dual Seal	Two seals running in various configurations.
Ductility	The property of a metal that lets you give it a great deal of mechanical deformation without cracking.
Dynamic (System) Head	The pressure per square inch or static distance a pump can move fluid.
Dynamic Elastomer	As related to a mechanical shaft seal, the rubber part that has to move or flex to compensate for seal face wear or shaft movement.
Efficiency	Rating reflecting the effective use of power.
Effluent	Wastewater or sewage – treated or untreated – that flows out of a plant, sewer, or industrial facility.
Elastomer	A polymer with elastic properties similar to natural rubber.
Electrical Disconnect Switch	A manually operated, external switch that is used to make sure that an electrical circuit can safely be completely de-energized.
Electrical Ground	Circuits connected to the ground to protect the user.
Electrical Phase (motor nameplate reference)	Usually motors are designed to run on either single or three phase power. Check the motor nameplate to determine. Consult power company for availability of power.
Electrical Relay	A switch operated by electricity, capable of using various voltage signals to control multiple loads.
Elevation	The vertical distance that a fluid must travel from the pump to the highest point in the discharge system.
EPDM (Ethylene Propylene Diene Monomer)	Elastomer used by a wide range of applications.
Extended-Duty Design	Designed for long-term intermittent use. (Not continuous duty use)
Eye of the Impeller	The center of the impeller, where the fluid enters.
Face Seals	Seal device that has one rotating and one stationary part.
Filter	A device used to remove solid particles from a fluid.
Flange	A bolted device used to couple to a pipe. Often used on the suction or discharge of a pump.
Float Control	See Float Switch
Float Switch	A device used to detect the level of liquid.

Flow Control Valve	A device that regulates the flow or pressure of a liquid.
Flow Sleeve	A sleeve attached to a submersible pump to force liquid to pass around it and enter the pump's suction intake from below, to water-cool the motor.
Flow Switch	A device designed to monitor fluid flow in a pipe.
Foot Valve	Use to prevent debris from entering the pump or pipe and to prevent back flow.
Friction	The resistance to motion of two objects or surfaces that touch.
Friction Loss	The loss of pressure or head due to resistance to flow in the pipe and fittings.
Friction Loss Calculations	Total pressure lost to friction based on the type of pipe used, the internal diameter of the pipe, the average flow rate, and the length of the pipe.
Friction Loss Charts	Table showing resistance per 100' of pipe to water movement within various types of piping material.
Full Load Amps (FLA)	This is the rating on the motor nameplate. The FLA is the amperage rating at the motor nameplate horsepower rating and at its rated (nominal) voltage.
Full Port Ball Valve	A valve that allows for full pipe size flow (no friction loss) when in the open position.
Fuse	A safety device utilizing a thin strip of metal that will melt and break an electric current if the current exceeds a safe level.
Gallons Per Hour (GPH)	Flow rate measurement per running hour.
Gallons Per Minute (GPM)	Flow rate measurement per running minute.
Gasket	A plastic or rubber ring or flat plastic or paper device used in machinery as a seal against air, oil, or high pressure.
Gate Valve	This valve opens and closes by lifting or dropping a gate or wedge.
Gauge (Pressure)	A measurement instrument used to monitor discharge PSI and/or intake vacuum.
Globe Valve	Named for their spherical shape, these valves are used for regulating flow in a pipeline, consisting of a movable disk-type element and a stationary seat.
Governor	A spring-loaded device that maintains a constant speed, which is mounted on the motor shaft and designed to regulate rotational speed or momentum.
Gray Water	Non-toilet household wastewater that is sometimes recycled especially for use in gardening or for flushing toilets.
Ground Water	The water that systems pump and treat from aquifers.

H-O-A (Hand-Off-Auto)	A toggle switch, which allows you to choose how you want the pump to run. Auto allows flow switches to turn the pump on or off, while hand allows for manual on/off.
Head in Feet	A term used to define water pressure in vertical feet. Head X 2.31 = PSI
Hertz (HZ)	One unit or cycle of AC electric flow.
Horse Power	One horsepower is defined as the ability to move 33,000 pounds one foot in a minute. It is a measure of the work performed.
Hose Connector	The fitting used to connect the hose to the wall or pump fitting.
Hydraulic Shock	A damaging condition that occurs when a column of liquid changes direction quickly and increases in velocity. Also known as water hammer.
Impeller	The working part of a pump designed to sling fluid by rotation. Attached to end of motor shaft.
Impeller Eye	The center of the impeller, where the fluid enters.
Impeller Vane	Located between the eye and the discharge side of the impeller. Directs the flow of the liquid to the outside diameter of the impeller.
Implode	Occurs when a material collapses in on itself, releasing stored energy in the molecules, causing damage to a pump. (Cavitation)
Inlet	The opening which water passes through to enter the pump.
Jammed Impeller	Occurs when some type of debris is pulled into the suction port that stops motor rotation.
Joule	A metric unit for the measurement of energy. Defined as the energy required to move one Newton over one meter.
Kilowatt	One thousand watts of electrical power.
Lift	The vertical height water must be moved to enter the pump chamber.
Lip Seal (Grease seal)	A spring loaded elastomer seal commonly used to seal bearing.
Liquid Level Control	General term given to any device that monitors the height change of liquid that can send a start/stop or warning signal to a separate electrical device.
Liquid Level Probes	An electrical device that detects the level of liquid within a tank.
Low Flow	A condition where very little or no fluid movement is taking place within a pump. Can cause excessive heat or cavitation inside the pump volute.
Mechanical Groove Fitting	Components of a pipe joining system where a bolted coupling and gasket use grooves to join different parts together.

Mechanical Seal	A positive sealing device used to seal all fluids. In the pump industry, a seal is used to protect the motor from the fluid being pumped.
Minimum Flow	Lowest possible flow of fluid through a pump that will not cause damage due to excessive heat buildup or cavitation.
Motor Bearings	Supports both ends of the motor shaft allowing it to rotate smoothly with a minimum of friction and wear.
NBR (Nitrile Rubber)	Synthetic Rubber that is resistant to oil, fuel and certain chemicals.
Nema1 Enclosure	General-purpose electrical enclosure. Protects against dust, light and indirect splashing; primarily prevents contact with live parts. Used indoors and under normal atmospheric conditions.
Nema3R Enclosure	Electrical enclosure intended for outdoor use. Mainly used in the irrigation industry to protect electrical components from falling rain and ice formation.
Nema4 Enclosure	Watertight (weatherproof) electrical enclosure used outdoors. Used for industrial applications; employing gaskets to protect against wind-driven or directed water, dust, or particle entry.
Net Positive Suction Head (NPSH)	Shows the difference between the actual pressure of a liquid in a pipeline and the liquid's vapor pressure at a given temperature. NPSH is an important parameter to consider when designing a circuit. When the liquid pressure drops below the vapor pressure, liquid boiling occurs, and the final effect will be cavitation.
Net Positive Suction Head Available (NPSHA)	Amount of head available to overcome Net Positive Suction Head.
Net Positive Suction Head Required (NPSHR)	Amount of head required by the pump to keep the liquid being pumped in a liquid state.
Nozzle	A fluid discharge device that increases the velocity of the liquid flowing through it.
O-Ring Groove	The space into which an O-ring is inserted.
Ohms Meter	Device used to check the resistance of the flow of electricity.
Open Impeller	Impellers designed with open blades or vanes. This impeller works best when unrestricted.
Parallel (Electrical)	A closed electrical circuit in which the current is divided into two or more paths and then returns via a common path to complete the circuit.
Parallel Operation	Multiple pumps are discharging to a common header.
Permeable	Allowing some material to pass through.
pH	A measurement of water acidity or alkalinity.

Pitting	Surface voids caused by corrosion, erosion or cavitation.
Polymers	A chemical compound with many repeating structural units.
Potable Water	Any water, such as an approved domestic water supply, which is bacteriologically safe and otherwise suitable for drinking.
Pressure Drop	The decrease of hydrostatic force due to the effects of friction or restrictions on a flowing liquid.
Pressure Head	The pump head exerted by atmospheric pressure or any additional pressure that might be in the vessel.
Pressure Sensor	A device that measures the pressure of a gas or liquid.
Pressure Switch	Electrical/pneumatic device used to turn the pump on and off.
Prime	Filling the pump case to remove any trapped air in the system.
Propeller	Designed with open blades, a propeller works most efficiently when unrestricted and pushing high volumes of water.
PSI	Pounds per square inch. See atmospheric pressure.
Pump	Converts mechanical energy into hydraulic energy.
Pump Curve	A diagram supplied by the pump manufacturer to describe the relationship between the pressure and the capacity of a particular pump.
Pump Efficiency	Rating reflecting the effective use of power by a pump.
Pump Hat	Small cover for protecting the pump motor from the elements while providing shade for cooling.
Pump Volute	The pump reservoir in which a fluid enters the intake and exits through the discharge.
PVC	Polyvinyl Chloride. Plastic material widely used in irrigation for pipe and fittings because it is light, inexpensive, easy to assemble and can have a long life.
Rate of Flow	The measurement of the volume of flow per unit of time expressed in gallons. See GPM or GPH.
Reduced External Voltage (REV)	A wiring configuration assuring any voltage leaving an electrical panel to a float, probe or other device is rated at a safe level below 30V.
Reduced Incoming Amps (RIA)	A component configuration that will work with low incoming amperage signals. Will work with all start/stop signal controls – including 2-wire systems.
Relief Valve	A type of valve used to relieve the pressure in a system.

Resistance	Impedes the flow of electrons, and is measured in Ohms.
Rotation Clockwise (CW)	A left to right shaft rotation while facing the shaft end of a motor, or suction tap of a pump.
Rotation Counterclockwise (CCW)	A right to left shaft rotation while facing the shaft end of a motor, or suction tap of a pump. Most pumps run this direction.
Seal Faces	The lapped faces that provide the primary sealing in a mechanical seal.
Seal Life	Time a seal should run leak free until the face is worn away.
Self Priming	The ability to exhaust gases from a pump case.
Semi-Open Impeller	This type of impeller has only one shroud. The other side of the impeller is in close contact with the pump volute case. The vanes of the impeller are spaced far enough apart to pass solids.
Septic Tank	A container used to collect wastewater and treat that water for below-grade discharge.
Series (Electrical)	An electrical circuit connected so that current passes through each circuit element in turn without branching.
Service Factor Amps (SFA)	Commonly thought as the degree to which an electric motor can be operated over the specified horsepower without danger of overloading or failure.
Sewage	Raw sewage wastewater from residential, commercial or industrial sites.
Short Cycling	When a pump repeatedly turns on and off, which can cause damage to a pump. (See Cycling)
Shut off Head	The total head, created by a pump, that is running against a closed discharge.
Silica Carbide	Synthetically produced crystalline compound that is incredibly hard – used in pump seals.
Skimmer	A device that separates debris from the top of the water.
Slurry	A mixture of liquid and thinly divided solids.
SmartBox	A Munro pump control that offers exceptional pump protection against loss of prime or heat.
Soft Start	Device used to temporarily reduce the load and torque in the power-train and electrical current surge of the motor during startup.
Solenoid Valve	An automatic valve which may be remotely located in the landscape and controlled via a signal cable from the central controller (timer).
Soluble	When one liquid dissolves or mixes with another liquid.

Specific Gravity	Ratio of the weight of a volume of a substance to an equal volume of water.
Stainless Steel	Alloy steels containing a high percentage of chromium.
Start Signal	An electrical signal sent to begin a water cycle. Signal can initiate from a switch, controller, manual operation or other means.
StartBox	A Munro pump control that provides pilot duty operation between start signal and pump.
Static Head	The height difference between the liquid supply and the point of discharge.
Strainer	Any device used to sift debris from inlet of pipework.
Suction Head	The energy per unit weight of fluid on the suction side of a pump.
Suction Leak	An escape of liquid from, or insertion of air into, the piping system going into a pump.
Suction Lift	The condition where the water supply is below the pump.
Suction Side (of a pump)	The side of the pump where the inlet is located.
Sump	A low space that collect liquids such as water or chemicals.
System Head	The total head caused by friction in the piping, valves and fittings.
Tank	A container used for storage.
Temperature Switch	A device used to monitor the temperature within a pump.
Thermal Overload	Over-working equipment causing it to generate heat to the point of damaging itself.
Thermal Overload Protection	A bi-metallic heat detection device that will shut an over-worked motor down before the generated heat causes damage to itself.
Time Delay	An adjustable timer capable of delaying an action after start signal is received.
Total Dynamic Head (TDH)	Total height that a fluid is to be pumped, taking into account all losses, which include friction loss, pounds per square inch and elevation change.
Transducer	Attached to the pump and used to send a vibration signal to a meter where it can be read.
Turbidity	A measurement of the amount of suspended solids (colloids) in a solution.

Vacuum	A volume of space that is essentially empty of matter, such that its gaseous pressure is much less than atmospheric pressure. Vacuums are used to produce suction in a pump case.
Vaporize	Fluid passes from a solid or liquid to a gaseous state.
Variable Frequency Drive (VFD)	Control circuitry that runs a motor at varying hertz (cycles) based on demand.
Variable Speed Motor	Used to control flow in a system by varying the frequency of the motor. Recommended for circulating systems and any other system where the main head is friction losses in the piping system.
Velocity	The measurement of the motion of liquids, expressed in feet per second.
Vent	To remove heat, air or gas from a system.
Viscosity	Resistance to deformation by shear force. Example: honey has a higher viscosity than water.
Viton	An E.I. DuPont Dow manufactured elastomer widely used in the sealing industry. The generic name is fluorocarbon.
Voltage	Electrical force or pressure that causes current to flow in a circuit.
Voltage Imbalance	Difference between the highest and the lowest voltage exceeding 4%.
Volute Casing	The pump reservoir in which a fluid enters in the intake and exits through the discharge.
Vortex Impeller	This impeller creates a revolving mass of water which forms a whirlpool. Minimizing the risk of clogging.
Vortexing	Creating a whirlpool effect that can draw air into the suction of the pump losing prime.
W.O.G.	Designation for parts rated for water, oil and gas.
Water Hammer	A damaging condition that occurs when a column of liquid changes direction quickly and increases in velocity. Also known as hydraulic shock.
Water-Cooled	Liquid is forced past the motor so that the heat of the motor can be transferred to the liquid increasing usage time and usable life.
Watt	A measurement of electrical power where watts = volts x amps. One watt is the rate of energy expended when a steady current of one amp flows under a pressure of one volt.
Wear Ring	Used with closed impeller pumps to restrict leakage from the high pressure side of the pump to the low pressure side. Prolongs the useful life of the pump.

Weep Hole - Nema 3R box	Small opening meant as an outlet for water to escape an electrical box.
Weep Hole - pump	Small opening meant as an outlet for air to escape a pump case to prevent air lock.
Weir	A barrier that is designed to alter flow characteristics across rivers and streams.
Well Cap	A tight-fitting, vermin-proof seal designed to prevent contaminants from flowing inside of the well casing.
Well Casing	The tubular lining of a well. Also a steel or plastic pipe installed during construction to prevent collapse of the well hole.
Wiring Diagram	Shows how the pump is wired for voltage.
Y-Strainer	Inline strainer that removes unwanted solids from liquid, gas, or steam lines.
Zone	In irrigation system design, a zone is the area to be watered by a single control valve. Zones are ideally comprised of similar sprinkler types and plants with similar water requirements.

ANSI Process Pump	Horizontal, end suction, single stage pump with dimensionally standard sizes. Used in transfer and process applications for many types of industrial and manufacturing applications.
API Process Pump	Pump built to API 610 standard for use in industrial applications.
Auger Pump	Pump that raises water by means of helical impellers in the pump casing. Used in irrigation and dewatering applications.
Axial Flow Pump	Also known as propeller pump, pump that is very high flow, low head. Used in dewatering, circulating and irrigation applications.
Booster Pump	This pump is used to boost the pressure in a system.
Canned Motor Pumps	A seal-less centrifugal pump, with an impeller that is attached to the motor rotor. Used in chemical or high temperature pump applications. Can be flooded rotor or magnetic drive.
Circulator Pump	Pump that is used in HVAC systems in buildings circulating all temperatures of water.
Concrete Pump	A concrete pump is designed to pump concrete and other mixed aggregate solutions.
Cryogenic Pump	Used in applications where the liquid is at a very low temperature.
Deep Well Jet Pump	Uses a venturi, which becomes a second pump that charges the above ground unit, to increase pressure.
Deep Well Submersible Pump	Pump that can be submersed 1000's of feet.
Diaphragm Pump	Reciprocating positive displacement pump used where the fluid has high solids or high viscosity. Works with two valves like a human heart.
Double Suction Pump (horizontal split case)	The rotor is suspended between bearings with the fluid entering on either side of the impeller.
Drum Pump	This slim pump is used to move small quantities of liquids out of drums and carboys.
Effluent Pump	A pump used in sanitary sump drainage and grey water applications. Usually pumps smaller solids than a sewage pump.
End Suction Pump	Flow enters the end of the casing and is pushed out of the top, used to transfer or circulate liquid. This is not a self-priming pump and requires a foot valve.
Fire Pump	Centrifugal pump, employing high pressure, used for fire fighting.

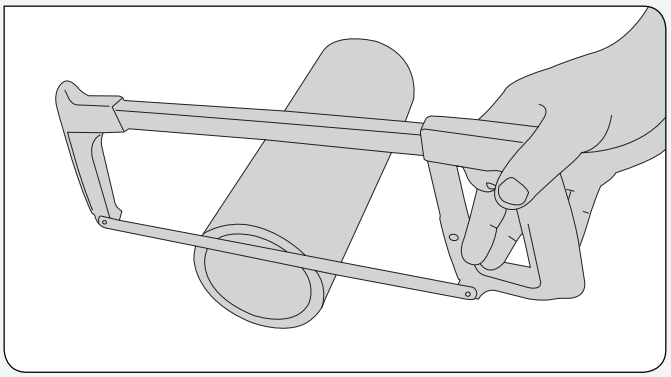
Flexible Impeller Pump	Type of rotary displacement pump that has a rotating rubber impeller with vanes that bend then straighten as the impeller rotates to conform to the internal cam in the pump casing. Used in marine services.
Gear Pump	Positive displacement pump in which liquid is passed between two meshing gears and the surrounding casing. Used for clean oils and other viscous liquids.
Grinder Pump	A sewage pump designed to chop or cut solids into smaller pieces.
Horizontal Split Pump	Centrifugal pump that has a single, double suction impeller supported between two bearings. Used in higher flow applications.
Hydraulic Ram Pump	Cyclic water pump powered by hydro power, using the water hammer effect to develop pressure that allows a portion of the input water that powers the pump to be lifted to a point that is higher than where the water originally was. Used for pumping water to an elevation higher than the water source. Requires no outside source of power.
Jet Pump	A centrifugal pump with a venturi attached, either at the pump (shallow well) or in the well (deep well).
Lobe Pump	Employs two shaft drive lobes which mesh with each other but do not touch, due to the use of timing gears. Used for food, beverage, pharmaceutical and biotech applications.
Magnetic Drive Pump	A seal-less centrifugal pump transmitting torque from the motor to the impeller using a rotating outer magnet which transmits the magnetic flux through a can to an inner magnet that is attached to the impeller. Used for pumping chemicals, hydrocarbons or other liquids difficult to seal.
Metering pump	Type of reciprocating positive displacement diaphragm pump that has a very low flow rate. Used to meter low doses with high accuracy, for chemical treatment applications.
Mixed Flow Pump	Functions as a compromise between radial and axial flow pumps, the fluid experiences both radial acceleration and life and exits the impeller somewhere between 0-90 degrees from the axial acceleration.
Multistage Pump	A pump that utilizes multiple impellers, sometimes to boost pressure or increase the depth of a deep well pump.
Peristaltic Pumps	Also known as a hose pump that has a roller or shoe that squeezes a tube or hose as it rotates. Used in applications where solids or corrosive liquids exist.
Piston Pumps	Pumps that employ double acting reciprocating pistons. Used in oil production and high pressure applications. Utilizes some type of sliding scale.
Plunger Pumps	Pumps that are built with 3 or 5 single acting reciprocating plungers. Used in oil or high pressure applications. Works on close tolerance.

Positive Displacement Pump	This pump does not have impellers, but instead relies on rotating or reciprocating parts that directly push liquid in an enclosed volume, until enough pressure is built up to move the liquid into the discharge system. Used in low flow, high pressure, high viscosity or fragile solid applications.
Progressive Cavity Pump	A type of positive displacement pump that transfers fluid by means of the progress, through the pump, of a sequence of small fixed shape, discrete cavities as the rotor is turned. Applications include: oil, slurry, and sewage pumping.
Regenerative Turbine Pump	Type of pump in which the fluid takes multiple trips through the vanes of the impeller increasing flow and pressure. Used in boiler feed applications.
Roller Pump	Employs rollers that revolve utilizing centrifugal force inside the pump housing to force a liquid through the outlet to the nozzle. Used for agricultural applications and industrial spraying.
Sand Pump (Plunger Sand Centrifugal)	A type of plunger pump that removes chopped-up drill core from a drill hole.
Screw Pumps (Gear, Auger) (See Auger)	Built with two inter-meshing screws, driven by timing gears, these pumps are used in fuel transfer, and other applications requiring high flow rates of viscous liquids. See Auger.
Self-Priming Pump	A centrifugal pump having the capability of dispersing a certain amount of air from its pump body, assuming the pump has been primed initially, when operating under a suction lift; to free itself of entrained gas without losing prime and to continue normal pumping operation without attention.
Sewage Pump	A pump designed to pump raw sewage water.
Shallow-Well Jet Pump	A type of pump that will work to a maximum depth of about 25 feet. The water returns through a venturi orifice and is either attached or pre-cast into the pump body to assist with lift. See Jet Pump.
Single-stage Submersible Pump	A submersible pump with only one impeller.
Slurry Pump	A pump that handles abrasive slurry in mining, procession, dredging and slurry applications.
Spur-gear Pump (Internal Gear)	Utilizing a “gear within a gear” system, the inter-meshing gear provides pockets of liquid which rotate and force liquid from the pump. Used in industrial applications to pump fluids such as fuel, glycol and asphalt.
Submersible Pump	Pumps with an enclosed motor that are able to be submersed. Used in sump, dewatering and irrigation applications.
Trash Pump	Self-priming centrifugal designed to handle rocks and other solids, used in dewatering applications.
Utility Pump	A versatile submersible pump similar to a sump pump.

Vane Pumps	These pumps employ a rotor with vanes located in slots, rotating inside an eccentrically shaped casing. Used in transferring oils and other viscous liquids.
Vertical Sump Pump	These pumps are built with a vertical shaft supported in a center column to allow the motor to run above the pumped product. Used in sump applications.
Vertical Turbine Pump	Vertical shaft pump that is designed to fit in a bore-hole well or for short coupled units, rivers or ponds. Used for irrigation and booster applications.
Vortex Pump	A type of pump used for excessive solids. The impeller is recessed into the volute and pumps by creating a vortex within the chamber.

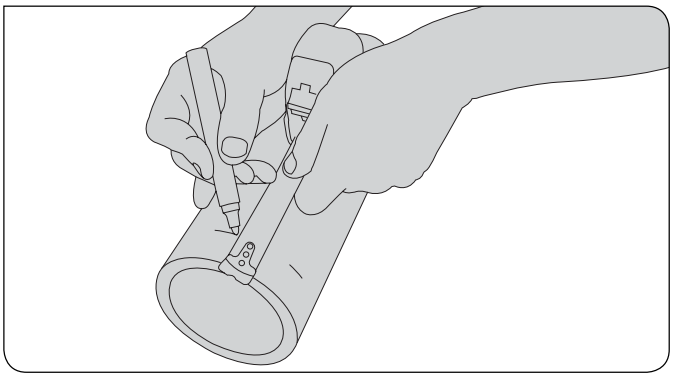
Associations

ANSI	American National Standards Institute	www.ansi.org
API	American Petroleum Institute	www.api.org
ARCSA	American Rainwater Catchment Systems Association	www.arcsa.org
ASIC	American Society of Irrigation Consultants	www.asic.org
ASLA	American Society of Landscape Architects	www.asla.org
ASME	American Society of Mechanical Engineers	www.asme.org
AWWA	American Water Works Association	www.awwa.org
CE	Consumer Electronics Association	www.ce.org
CSA	Canadian Standards Association	www.csagroup.org
D.I.N. Standard	Deutsches Institut fur Normung	www.din.de/en
E.P.A.	Environmental Protection Agency	www.epa.gov
EASA	Electrical Apparatus Service Association	www.easa.com
FM	Industrial and Commercial Product Certification	www.fmglobal.com
IA	Irrigation Association	www.irrigation.org
ISO	International Standards Organization	www.iso.org
NAHAD	(National) Association for Hose and Accessory Distributors	www.nahad.org
NEC	National Electric Code	www.nec.com
NEMA	National Electrical Manufacturers Association	www.nema.org
OSHA	Occupational Safety and Health Administration	www.osha.gov
UL	Underwriter's Laboratories	www.ul.com



1. CUT THE PIPE

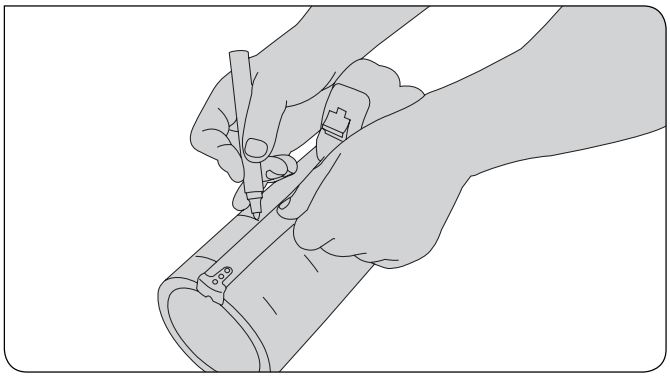
Make certain that the pipes are cut squarely and free of imperfections.



2. MEASURE FOR GASKET PLACEMENT

Measure and mark a minimum of 4 equally spaced lines around each of the pipes you will join. These lines will mark where the edge of the gasket should be, to ensure that the gasket is centered between the 2 pipes.

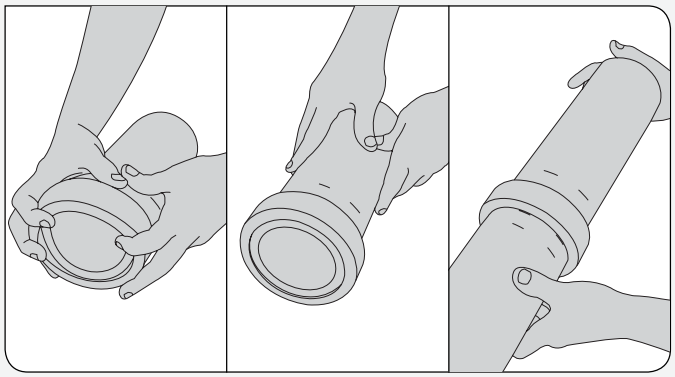
- 2" thru 4" pipe - mark 7/8" from the end of the pipe
- 6" pipe - mark 1" from the end of the pipe
- 8" thru 12" pipe - mark 1 1/16" from the end of the pipe



3. MEASURE FOR COUPLING PLACEMENT

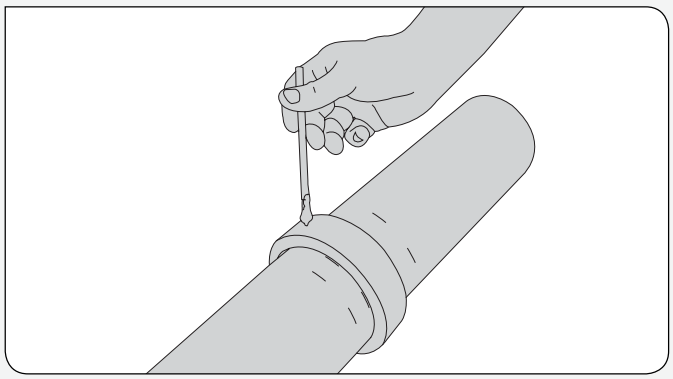
Measure and mark another set of a minimum of 4 equally spaced lines around each of the pipes you will join. These lines will mark where the edge of the fitting should be, to ensure that the pipe placement is correct when the coupling is installed.

- 2" thru 4" pipe - mark 2 5/16" from the end of the pipe
- 4" thru 6" pipe - mark 3" from the end of the pipe
- 8" pipe - mark 3 1/16" from the end of the pipe
- 10" pipe - mark 3 1/4" from the end of the pipe
- 12" pipe - mark 3 9/16" from the end of the pipe



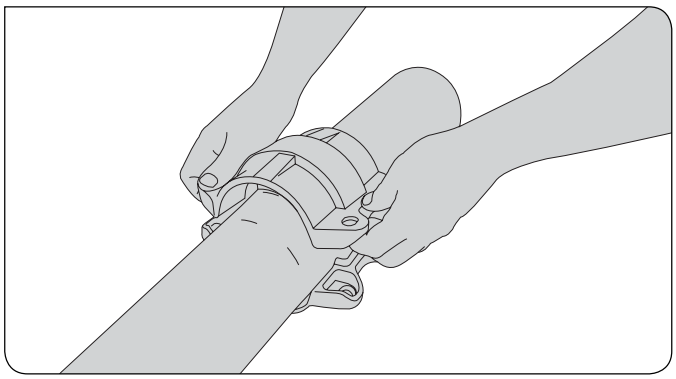
4. INSTALL GASKET

Ensure that the gasket is free from burrs or any imperfections and that the gasket material and size is acceptable for the intended service. Slide the gasket over the pipe end so that it is flush with the pipe end. Next, butt up against and center with the other pipe. Slide the gasket into place, so that it is equally covering both pieces of pipe. Use the first set of lines that you marked on the pipe as a guide to ensure proper placement, centering the gasket between the pipes.



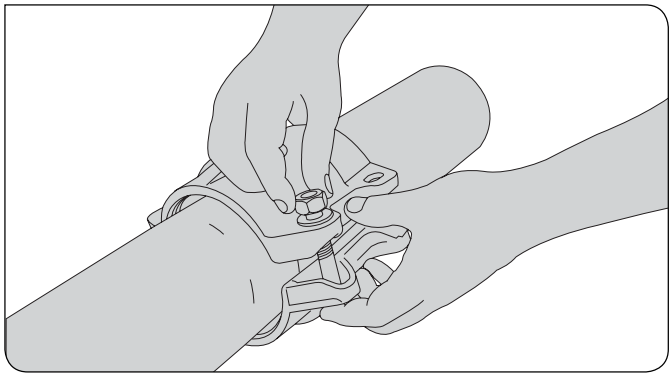
5. PREPARE GASKET

Apply a thin coating of lubricant on the exterior and lip of the gasket. We recommend only silicon based lubricant for our Nitrile gaskets. Please check with the pipe manufacturer to ensure that your chosen lubricant is compatible with the pipe.



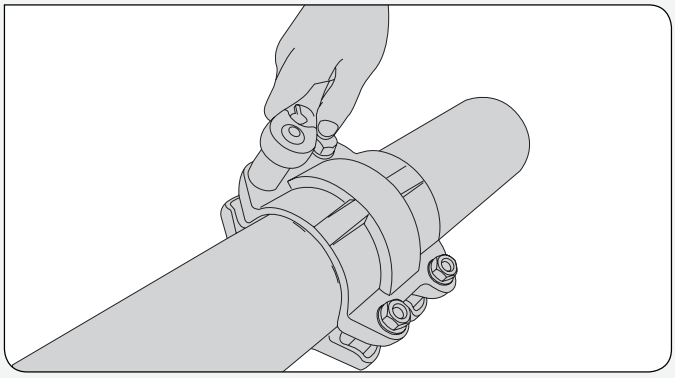
6. INSTALL HOUSINGS

Place the coupling halves over the gasket. Ensure that the two halves mate correctly, that the gasket stays centered on the pipe and that the pipes remain butted together. Use the lines that you marked on the pipe as a guide to ensure proper placement.



7. INSTALL BOLTS

Either a flanged nut or a nut and a washer are provided. Add washers (if provided) and hand tighten nuts.



8. TIGHTEN NUTS

When metal to metal contact is achieved, bolt torque should fall within specified range.

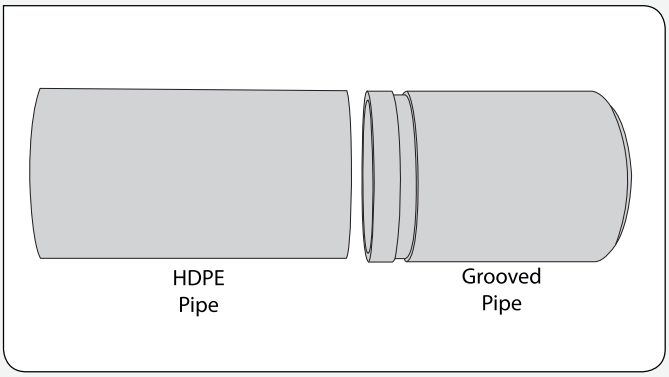
SPECIFIED BOLT TORQUE

Specified bolt torque is for the oval neck track bolts used on Munro couplings. The nuts must be tightened alternately and evenly until fully tightened. CAUTION: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

⚠ CAUTION

Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation.
Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

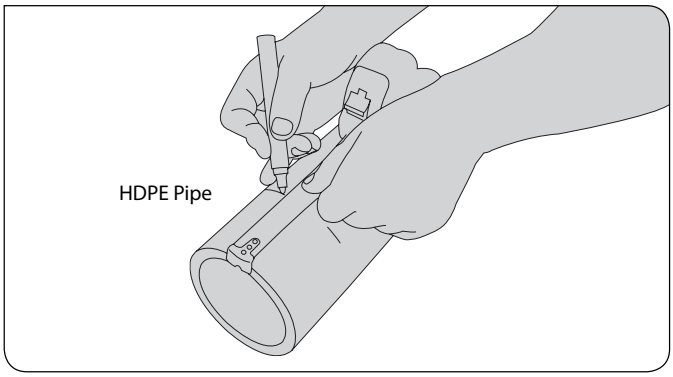
BOLT TORQUE		
Coupling Bolts	Minimum	Maximum
In.	Ft.-Lbs./N-m	Ft.-Lbs./N-m
1/2 X 2 3/8 (2" couplings)	80 110	100 150
1/2 X 3 (3"- 4" couplings)	80 110	100 150
5/8 X 3 1/2 (6"- 8" couplings)	100 135	130 175
3/4 X 4 3/4 (10"- 12" couplings)	130 175	180 245



1. INSPECT PIPES ENDS

Inspect the steel grooved pipe. Make certain that any burrs, grease, dirt or foreign objects are removed from the grooved end. Ends must be free of sharp edges, indentations, or other defects.

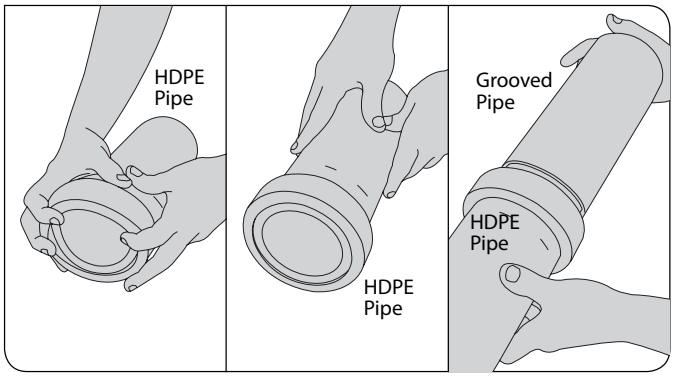
Inspect the HDPE pipe. Make certain that the pipes are cut squarely and free of imperfections.



2. MEASURE FOR COUPLING PLACEMENT

Measure and mark, at a minimum, 5 equally spaced lines around the HDPE pipe to ensure that the pipe placement is correct when the coupling is installed.

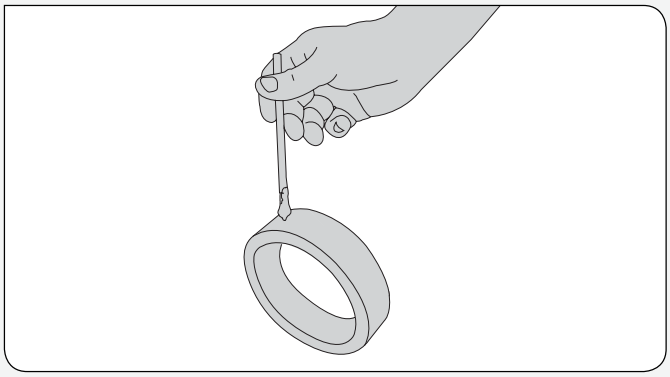
- 2" thru 3" pipe - mark 2 1/8" from the end of the pipe
- 4" thru 6" pipe - mark 2 3/4" from the end of the pipe
- 8" pipe - mark 3" from the end of the pipe
- 10" pipe - mark 3 3/4" from the end of the pipe
- 12" pipe - mark 3 7/8" from the end of the pipe



3. INSTALL GASKET

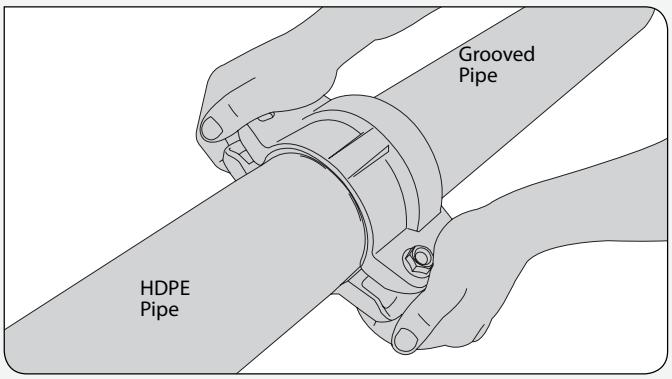
Inspect gasket to ensure that it is the correct material for the application and that it is clean and free of defects.

Slide the gasket over the end of the HDPE pipe until the gasket is not overhanging the end of the pipe. Next, align the HDPE pipe end with the grooved steel pipe end and slide the gasket into place so that it is centered between the two pipe ends. The gasket should not extend into the groove on the steel pipe.



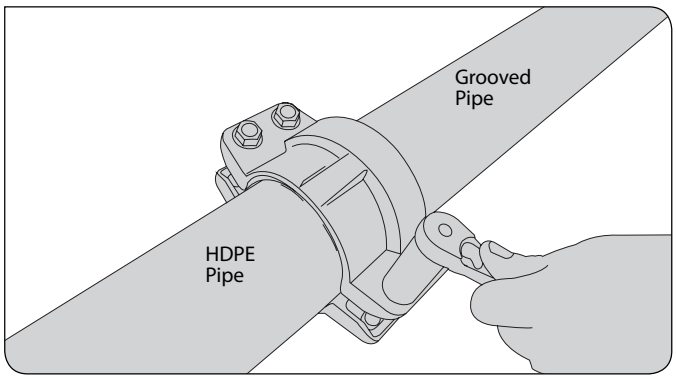
4. LUBRICATE GASKET

Coat the sealing edges and outer surface of the gasket with a thin layer of silicon-based lubricant (available from Munro).



5. INSTALL HOUSINGS AND BOLTS

Align housings over the gasket. Your marks on the HDPE pipe should align with the edge of the housing. You may find it easier to start with one bolt in place, with the nut unthreaded to the end of the bolt. Insert the bolts through the housings and thread the nuts on the bolts until they are finger tight. Ensure that the housings are not misaligned and that the oval head of each bolt sits properly in the bolt hole.



6. TIGHTEN NUTS

Using the torque specification table as a guide, ensure that the nuts are tightened alternately and equally until metal to metal contact is made with no gaps.

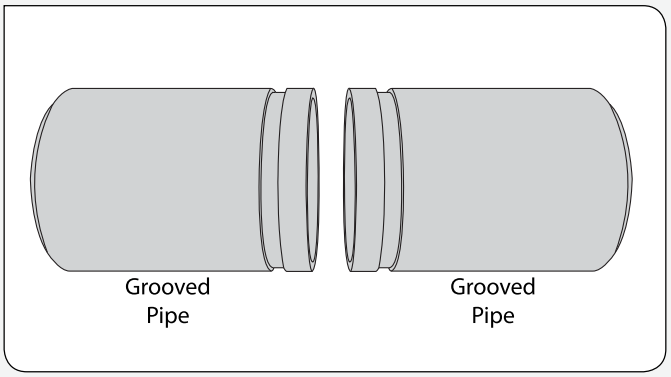
SPECIFIED BOLT TORQUE

Specified bolt torque is for the oval neck track bolts used on Munro couplings. The nuts must be tightened alternately and evenly until fully tightened. CAUTION: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

⚠ CAUTION

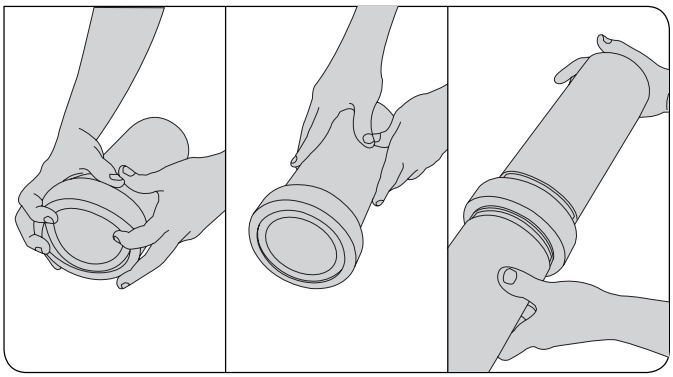
Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

BOLT TORQUE		
Coupling Bolts	Minimum	Maximum
In.	Ft.-Lbs./N-m	Ft.-Lbs./N-m
1/2 X 2 3/8 (2" couplings)	80 110	100 150
1/2 X 3 (3"- 4" couplings)	80 110	100 150
5/8 X 3 1/2 (6"- 8" couplings)	100 135	130 175
3/4 X 4 3/4 (10"- 12" couplings)	130 175	180 245



1. INSPECT GROOVED END PIPES OR FITTINGS

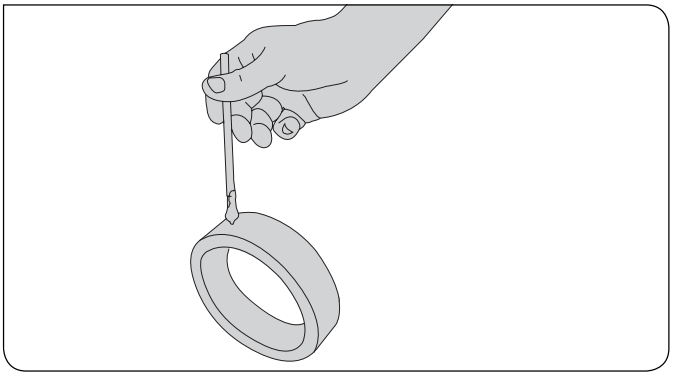
Make certain that any burrs, grease, dirt or foreign objects are removed from the grooved end. Ends must be free of sharp edges, indentations, or other defects.



2. INSTALL GASKET

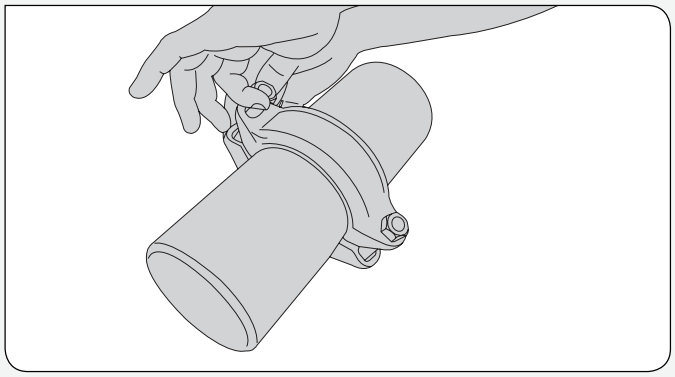
Inspect gasket to ensure that it is the correct material for the application and that it is clean and free of defects.

Slide the gasket over the end of the pipe until the gasket is not overhanging the end of the pipe. Next, align the two pipe ends and slide the gasket into place so that it is centered between the two pipe ends, between the groove on either pipe.



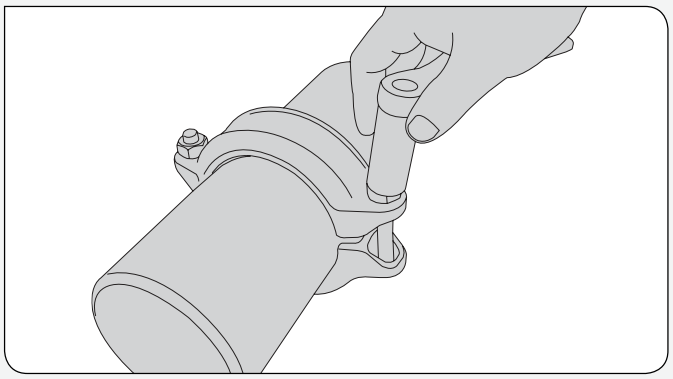
3. LUBRICATE GASKET

Coat the sealing edges and outer surface of the gasket with a thin layer of silicon-based lubricant (available from Munro).



4. INSTALL HOUSINGS AND BOLTS

Ensure that the grooved ends remain aligned and together. Align the housings over the gasket. Ensure that the housing's grooved end is inserted into the pipe's groove. Insert the bolts through the housings and thread the nuts on the bolts until they are finger tight. Ensure that the housings are not misaligned and that the oval head of each bolt sits properly in the bolt hole.



5. TIGHTEN NUTS

Using the torque specification table as a guide, ensure that the nuts are tightened alternately and equally until metal to metal contact is made with no gaps.

SPECIFIED BOLT TORQUE

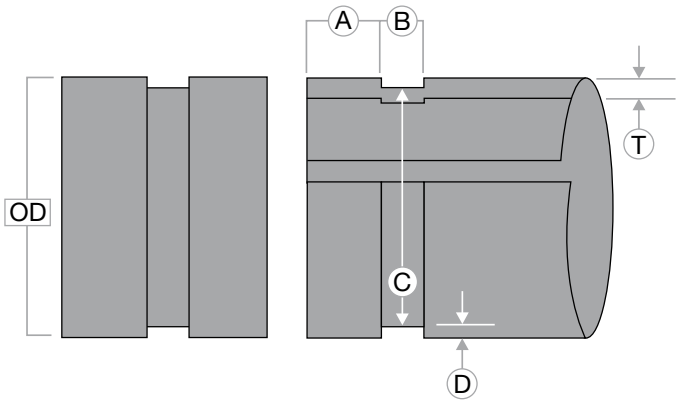
Specified bolt torque is for the oval neck track bolts used on Munro couplings. The nuts must be tightened alternately and evenly until fully tightened. CAUTION: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

⚠ CAUTION

Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation.
Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

BOLT TORQUE		
Coupling Bolts	Minimum	Maximum
In.	Ft.-Lbs./N-m	Ft.-Lbs./N-m
1/2 X 2 3/8 (2" couplings)	80 110	100 150
1/2 X 3 (3"- 4" couplings)	80 110	100 150
5/8 X 3 1/2 (6"- 8" couplings)	100 135	130 175
3/4 X 4 3/4 (10"- 12" couplings)	130 175	180 245

Standard Cut Groove for Steel and Other IPS Pipe

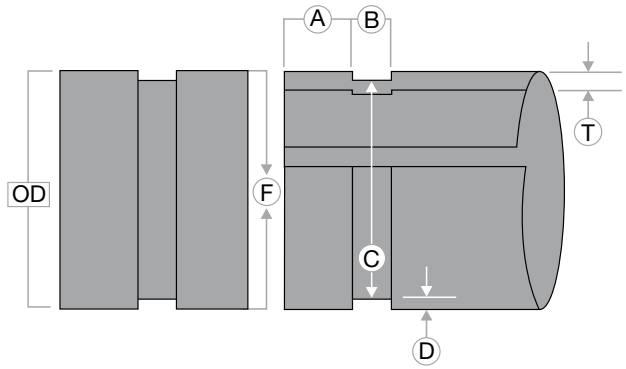


Nominal Size	Pipe OD						A		B		D		C				T	
	Basic		Tolerance +		Tolerance -		Gasket Seat ± 0.03 in ± 0.77 mm		Groove Width ± 0.03 in ± 0.77 mm		Groove Depth (Reference)		Groove Diameter Actual		Groove Diameter Tolerance + 0.00		Min. Pipe Wall Thickness	
in	in/mm		in/mm		in/mm		in/mm		in/mm		in/mm		in/mm		in/mm		in/mm	
1	1.32	33.7	0.01	0.33	-0.01	-0.33	0.62	15.88	0.31	7.93	0.06	1.70	1.19	30.23	-0.01	-0.38	0.12	3.3
1 1/4	1.66	42.4	0.01	0.41	-0.01	-0.41	0.62	15.88	0.31	7.93	0.06	1.70	1.53	38.99	-0.01	-0.38	0.13	3.5
1 1/2	1.90	48.3	0.01	0.48	-0.01	-0.48	0.62	15.88	0.31	7.93	0.07	1.98	1.77	45.09	-0.01	-0.38	0.14	3.6
2	2.37	60.3	0.02	0.61	-0.02	-0.61	0.62	15.88	0.31	7.93	0.07	1.98	2.25	57.15	-0.01	-0.38	0.14	3.6
2 1/2	2.87	73.0	0.02	0.74	-0.02	-0.74	0.62	15.88	0.31	7.93	0.07	1.98	2.72	69.09	-0.01	-0.46	0.15	4.0
3	3.50	88.9	0.03	0.89	-0.03	-0.79	0.62	15.88	0.31	7.93	0.07	1.98	3.34	84.94	-0.01	-0.46	0.17	4.5
3 1/2	4.00	101.6	0.04	1.02	-0.03	-0.79	0.62	15.88	0.31	7.93	0.08	2.11	3.83	97.38	-0.02	-0.51	0.19	5.0
4	4.48	114.0	0.04	1.14	-0.03	-0.79	0.62	15.88	0.37	9.53	0.08	2.11	4.33	110.08	-0.02	-0.51	0.19	5.0
5	5.56	141.3	0.05	1.42	-0.03	-0.79	0.62	15.88	0.37	9.53	0.08	2.13	5.39	137.03	-0.02	-0.51	0.19	5.0
6	6.62	168.3	0.06	1.60	-0.03	-0.79	0.62	15.88	0.37	9.53	0.08	2.16	6.45	163.96	-0.02	-0.56	0.21	5.4
8	8.62	219.1	0.06	1.60	-0.03	-0.79	0.75	19.05	0.43	11.10	0.09	2.34	8.44	214.40	-0.02	-0.64	0.21	5.4
10	10.74	273.0	0.06	1.60	-0.03	-0.79	0.75	19.05	0.50	12.70	0.09	2.39	10.56	268.28	-0.02	-0.69	0.24	6.3
12	12.75	323.9	0.06	1.60	-0.03	-0.79	0.75	19.05	0.50	12.70	0.10	2.77	12.53	318.29	-0.02	-0.76	0.27	7.1

"A" Dimension	The distance from the pipe end to the groove, identifies the gasket seating area. This area must be free from indentations, projections (including weld seams), and roll marks from the pipe end to the groove to ensure a leak-tight seal for the gasket. All foreign material, such as loose paint, scale, oil, grease, chips, rust, and dirt must be removed.
"B" Dimension	The groove width, controls expansion, contraction, and angular deflection of flexible couplings by the distance it is located from the pipe and its width in relation to the coupling housings' "key" width. The bottom of the groove must be free of all foreign material, such as dirt, chips, rust, and scale that may interfere with proper coupling assembly.
"C" Dimension	The proper diameter at the base of the groove. This dimension must be within the diameter's tolerance and concentric with the outer diameter (OD) for proper coupling fit. The groove must be of uniform depth for the entire pipe circumference.
"D" Dimension	The normal depth of the groove, a reference for a "trial groove" only. Variations in pipe OD affect this dimension and must be altered, if necessary, to keep the "C" dimension within tolerance. This groove must conform to the "C" dimension described above.
"T" Dimension	The lightest grade (minimum, nominal wall thickness) of pipe that is suitable for cut or roll grooving.

Munro grooved fittings are made to USA standards and adhere to AWWA C-606 groove dimensions.

Standard Roll Groove for Steel and Other IPS Pipe



Nominal Size	Pipe OD						A		B		D		C				T		F	
	Basic		+ Tolerance -				Gasket Seat ± 0.03 in ± 0.77 mm		Groove Width ± 0.03 in ± 0.77 mm		Groove Depth (Reference)		Groove Diameter				Min. Pipe Wall Thickness		Reference	
													Actual		Tolerance + 0.00					
in	in/mm		in/mm		in/mm		in/mm		in/mm		in/mm		in/mm		in/mm		in/mm		in/mm	
1	1.32	33.7	0.01	0.33	-0.01	-0.33	0.62	15.88	0.28	7.14	0.06	1.60	1.19	30.23	-0.01	-0.38	0.07	1.8	1.35	34.5
1 1/4	1.66	42.4	0.01	0.41	-0.01	-0.41	0.62	15.88	0.28	7.14	0.06	1.60	1.53	38.99	-0.01	-0.38	0.07	1.8	1.70	43.3
1 1/2	1.90	48.3	0.01	0.48	-0.01	-0.48	0.62	15.88	0.28	7.14	0.06	1.60	1.77	45.09	-0.01	-0.38	0.07	1.8	1.94	49.4
2	2.37	60.3	0.02	0.61	-0.02	-0.61	0.62	15.88	0.34	8.74	0.06	1.60	2.25	57.15	-0.01	-0.38	0.07	1.8	2.44	62.2
2 1/2	2.87	73.0	0.02	0.74	-0.02	-0.74	0.62	15.88	0.34	8.74	0.07	1.98	2.72	69.09	-0.01	-0.46	0.09	2.3	2.96	75.2
3	3.50	88.9	0.03	0.89	-0.03	-0.79	0.62	15.88	0.34	8.74	0.07	1.98	3.34	84.94	-0.01	-0.46	0.09	2.3	3.51	89.39
3 1/2	4.00	101.6	0.04	1.02	-0.03	-0.79	0.62	15.88	0.34	8.74	0.08	2.11	3.83	97.38	-0.02	-0.51	0.09	2.3	4.07	103.4
4	4.48	114.0	0.04	1.14	-0.03	-0.79	0.62	15.88	0.34	8.74	0.08	2.11	4.29	109.20	-0.02	-0.51	0.09	2.3	4.48	114.0
5	5.56	141.3	0.05	1.42	-0.03	-0.79	0.62	15.88	0.34	8.74	0.08	2.13	5.39	137.03	-0.02	-0.51	0.11	2.9	5.64	143.5
6	6.62	168.3	0.06	1.60	-0.03	-0.79	0.62	15.88	0.34	8.74	0.08	2.16	6.45	163.96	-0.02	-0.56	0.11	2.9	6.72	170.7
8	8.62	219.1	0.06	1.60	-0.03	-0.79	0.75	19.05	0.46	11.91	0.09	2.34	8.44	214.40	-0.02	-0.64	0.11	2.9	8.72	221.5
10	10.74	273.0	0.06	1.60	-0.03	-0.79	0.75	19.05	0.46	11.91	0.09	2.39	10.56	268.28	-0.02	-0.69	0.14	3.6	10.84	275.4
12	12.75	323.9	0.06	1.60	-0.03	-0.79	0.75	19.05	0.46	11.91	0.10	2.77	12.53	318.29	-0.02	-0.76	0.15	4.0	12.84	326.2

"A" Dimension	The distance from the pipe end to the groove, identifies the gasket seating area. This area must be free from indentations, projections (including weld seams), and roll marks from the pipe end to the groove to ensure a leak-tight seal for the gasket. All foreign material, such as loose paint, scale, oil, grease, chips, rust, and dirt must be removed.
"B" Dimension	The groove width, controls expansion, contraction, and angular deflection of flexible couplings by the distance it is located from the pipe and its width in relation to the coupling housings' "key" width. The bottom of the groove must be free of all foreign material, such as dirt, chips, rust, and scale that may interfere with proper coupling assembly.
"C" Dimension	The proper diameter at the base of the groove. This dimension must be within the diameter's tolerance and concentric with the outer diameter (OD) for proper coupling fit. The groove must be of uniform depth for the entire pipe circumference.
"D" Dimension	The normal depth of the groove, a reference for a "trial groove" only. Variations in pipe OD affect this dimension and must be altered, if necessary, to keep the "C" dimension within tolerance. This groove must conform to the "C" dimension described above.
"T" Dimension	The lightest grade (minimum, nominal wall thickness) of pipe that is suitable for cut or roll grooving.
"F" Standard Roll Groove Only	Maximum allowable pipe-end flare diameter is measured at the extreme pipe-end diameter.

Munro grooved fittings are made to USA standards and adhere to AWWA C-606 groove dimensions.

Troubleshooting Common Issues - *Centrifugal Pumps and Controls*

This guide was developed to assist you in troubleshooting common centrifugal pump issues for small turf and irrigation applications (5hp and below). If you need additional assistance, please contact Munro at 1.800.942.4270 or contact your local irrigation wholesaler.

Common Issues

"My pump is running, but the sprinklers are not acting normal." See Reduced Performance (pg. 230)

"The pump is running, but there is no water coming out." See Pump Runs But No Water (pg. 231)

"The water comes out, then goes away. Then it comes out…" See Pump Surging/Flow Cycles (pg. 232)

"The motor just sits there and hums." See Motor Hums (pg. 233)

"When I turn the pump on, nothing happens." See Motor Does Not Run At All (pg. 234)

"The pump runs for a little while and then stops and then starts again." See Motor Cycles and/or Nothing Happens (pg. 235)

"Nothing is happening. I have a pump start relay." See StartBox (pg. 236)

"My pump runs for 30 seconds and shuts off and does not restart." See SmartBox (pg. 237)

Evaluating the System

1. Have there been any changes to the system environment?
    a. New fencing – Possible damage to pipework
    b. Added zones – Pump is now undersized
    c. Aeration or animals – Possible damage to sprinkler heads or pipework
    d. Water source – Lower levels than usual

2. Look for obvious problem areas
    a. Leaking from case or seal area
    b. Cracked or worn components
    c. Clogged filters or screens
    d. Damaged gaskets in camlocks and o-rings

3. Determine the primary issue
    a. Reduced Performance (pg. 230)
    b. Pump Runs but No Water (pg. 231)
    c. Pump Surging/Flow Cycles (pg. 232)
    d. Motor Hums (pg. 233)
    e. Motor Does Not Run (pg. 234)
    f. Motor Cycles (pg. 235)
    g. Munro StartBox (pg. 236)
    h. Munro SmartBox (pg. 237)

⚠ Safety Precautions

- Remember when using any tool, refer to the manufacturer's guidelines for proper use.
- ALWAYS turn the breaker off to work on a pump. Some troubleshooting checks require the pump to be energized, be sure the area is secure prior to the task. Be sure to turn the breaker off again if problem persists.
- NEVER examine, make wiring changes, or touch the motor before disconnecting the electrical supply. Thermal overload protectors automatically reset and can close the electrical circuit without warning.

How To

Check Volts Entering Pump

While the motor is running, use a voltmeter to determine if line voltage getting to the motor is the same as indicated leaving the breaker box.

Check for Air Leaks Using Plastic Wrap

Wrap plastic wrap tightly around a potential air leak path (union joint or cam fitting), turn pump on. If an air leak exists, the plastic wrap will tighten to the area.

Clear Centrifugal Switch

Debris can get caught in the centrifugal switch inside the motor. A soft hammer or 2x4 board can be used to firmly tap the butt of the motor. After three or four taps, try to engage the motor. If necessary, repeat.

Access the Wrench Slot

Check the motor shaft for a slot to fit an open-ended wrench. This can aid in diagnosis and tear-down/assembly procedure.

Tear Down and Reassembly of a Pump, Including to Replace a Seal or Clean the Impeller

Refer to the Owners Manual for instructions on tearing down the pump to replace the seal, clean the impeller, or access the inside of the pump for any reason. Visit our YouTube channel for instructional videos: www.youtube.com/users/munrocompanies

Tools You May Need

- Soft faced hammer or 2x4 board
- Thin profile wrench – 9/16 and 5/8
- Wrench or socket set
- Voltmeter
- Pry bar
- Flathead screwdriver
- Plastic wrap
- Lubricant
- Pipe wrench

Did You Know?
A pressure gauge on the pump is a good indicator of system performance. Low pressure while the pump is running indicates a suction or obstruction problem. Normal pressure readings at the pump commonly indicate a sprinkler head or pipework problem.

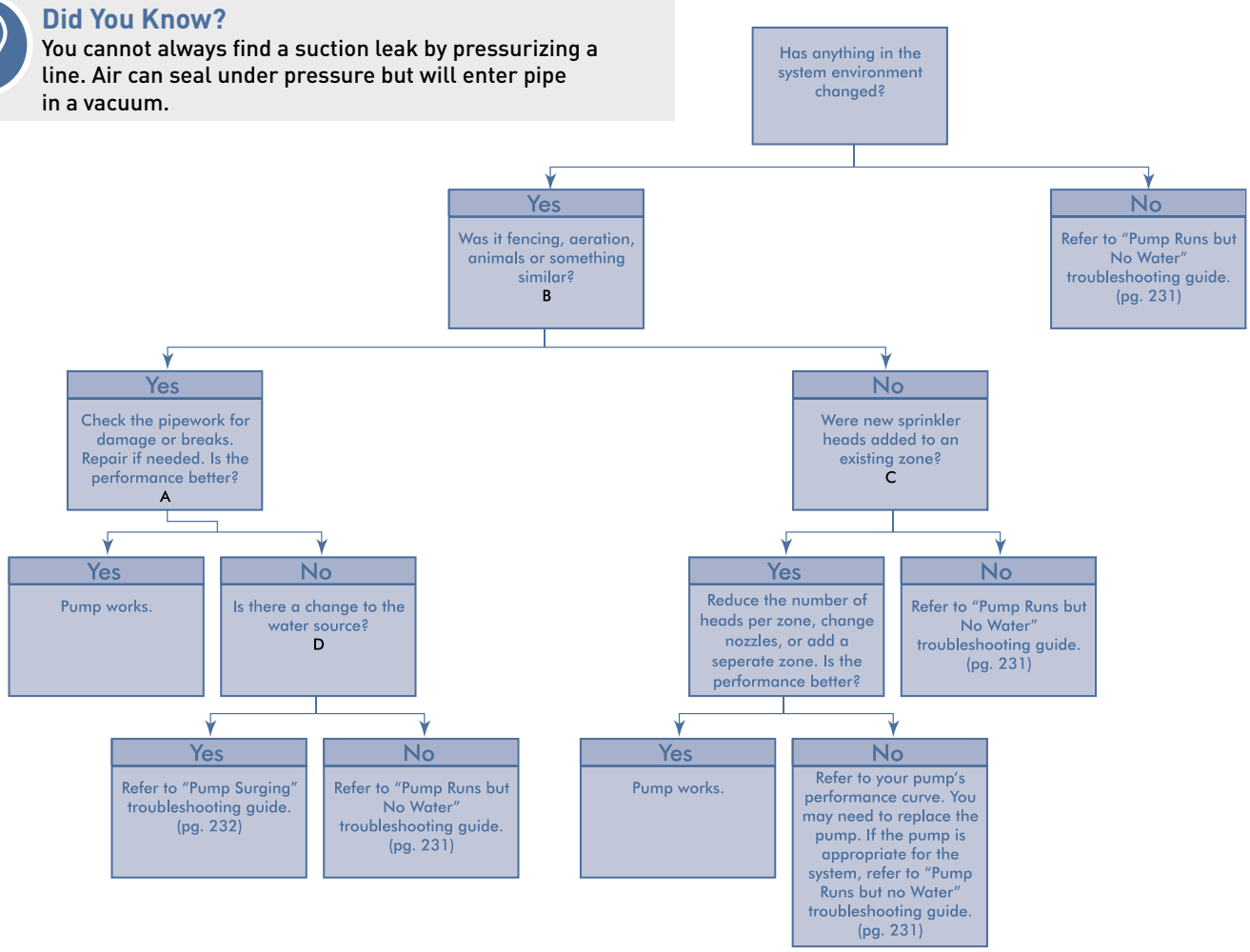
Did You Know?
80% of all pump issues are on the suction side.

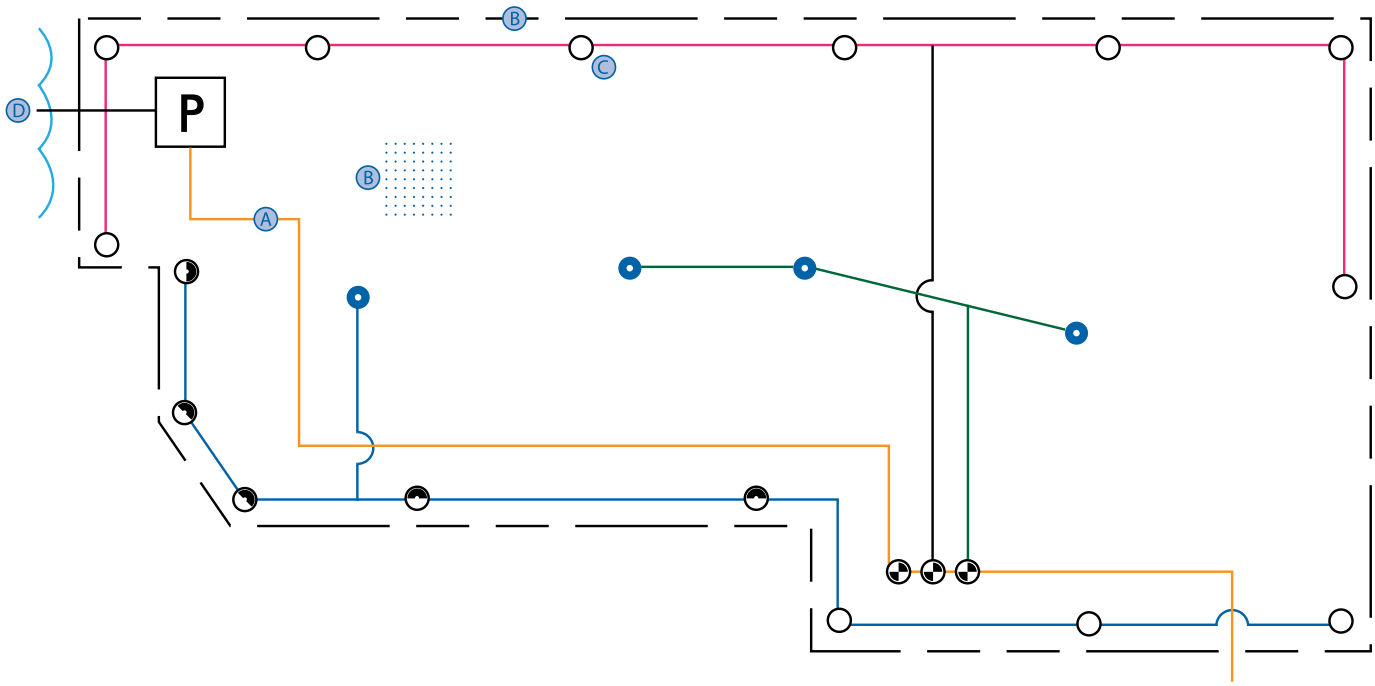
Possible Replacement Parts

- Gaskets: case, diffuser, cam fitting
- Mechanical shaft seal
- Union o-rings

Troubleshooting Guide - *Reduced Performance*

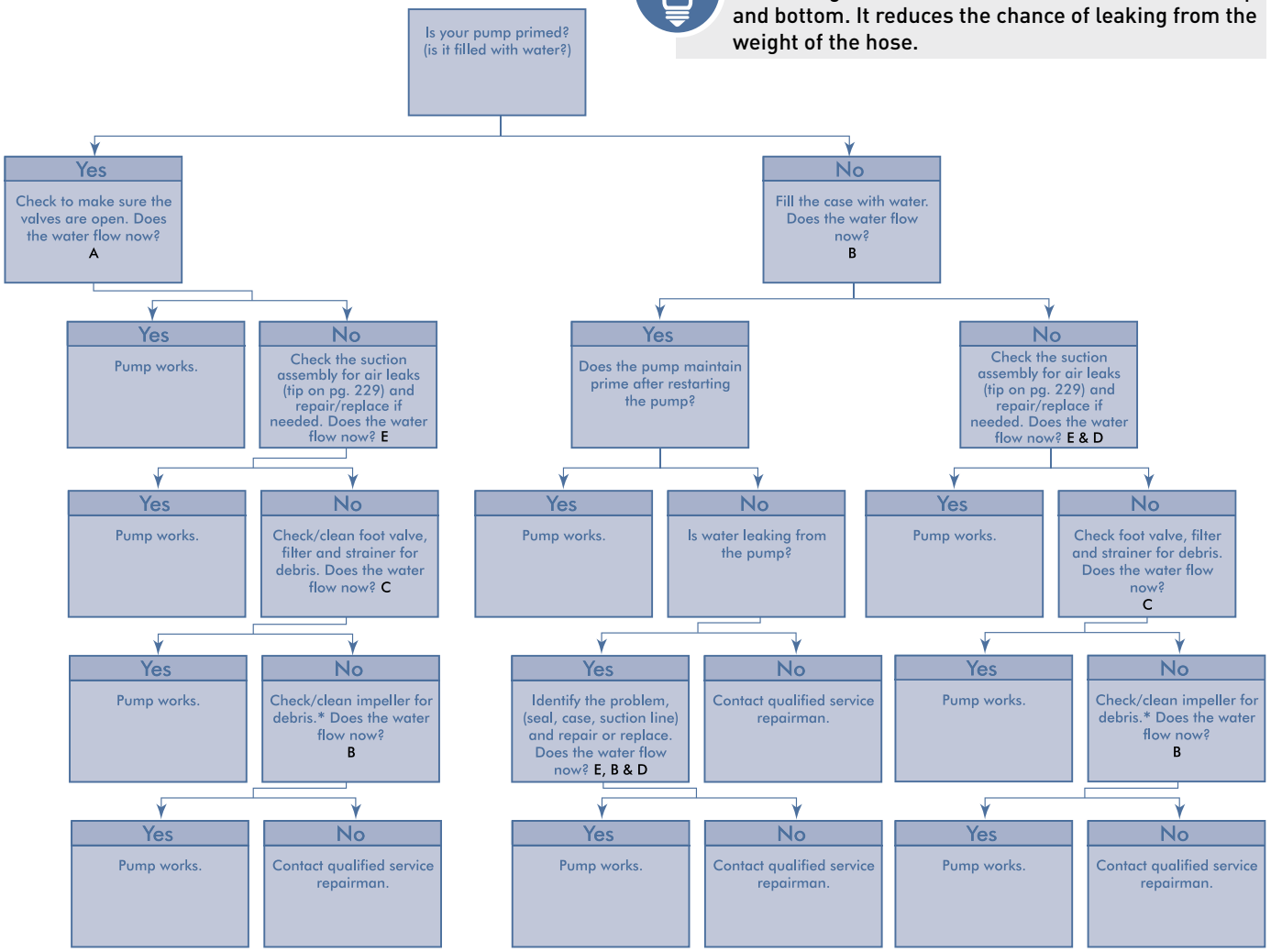
Did You Know?
You cannot always find a suction leak by pressurizing a line. Air can seal under pressure but will enter pipe in a vacuum.

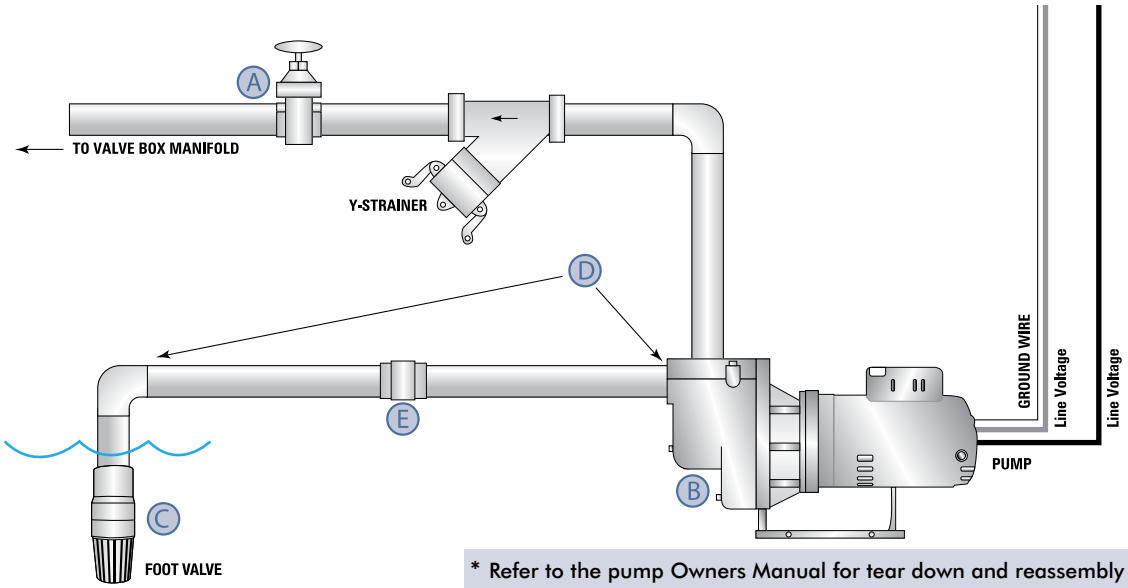




Troubleshooting Guide - *Pump Runs but No Water*

Did You Know?
Cam fittings are best used with the handles to the top and bottom. It reduces the chance of leaking from the weight of the hose.



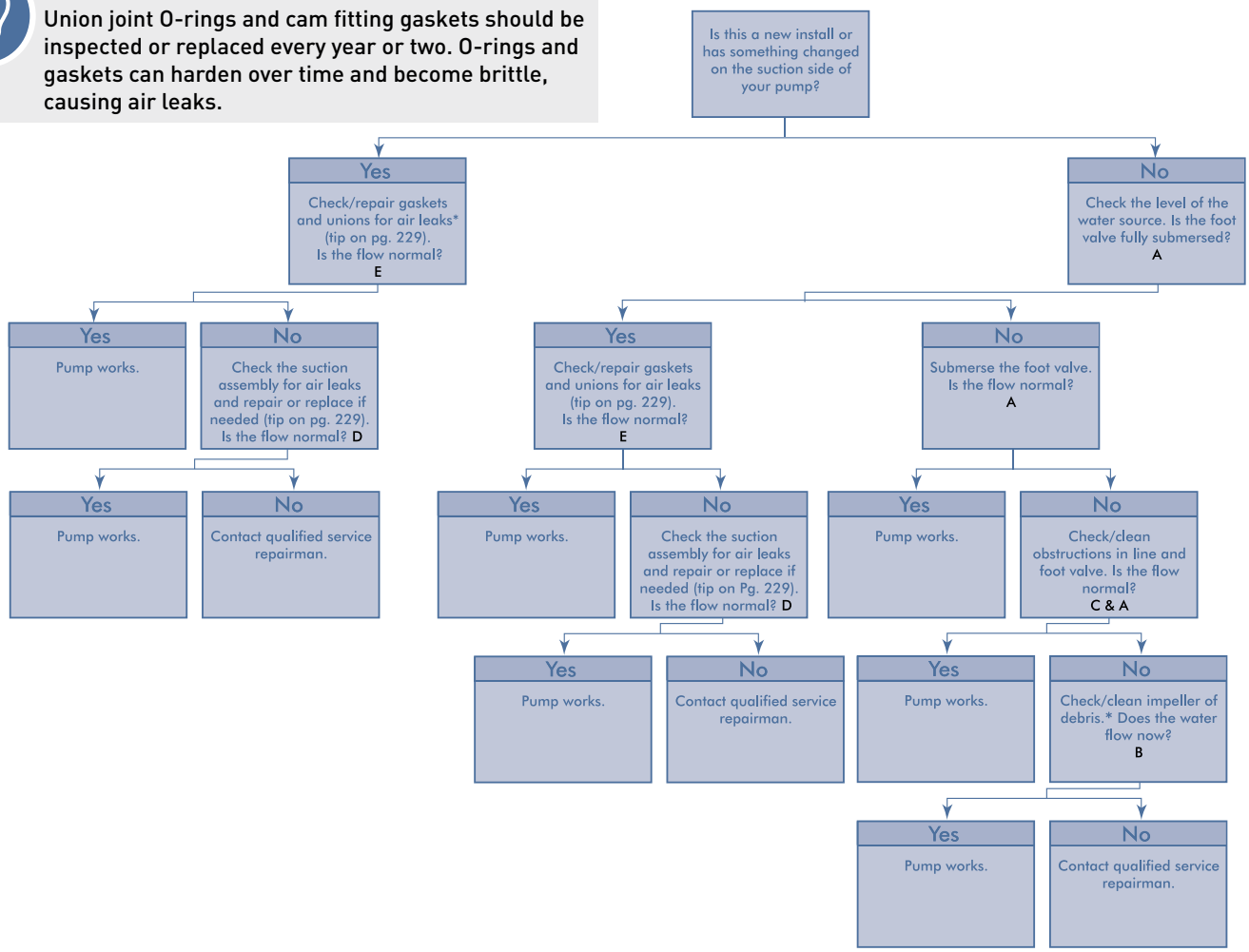


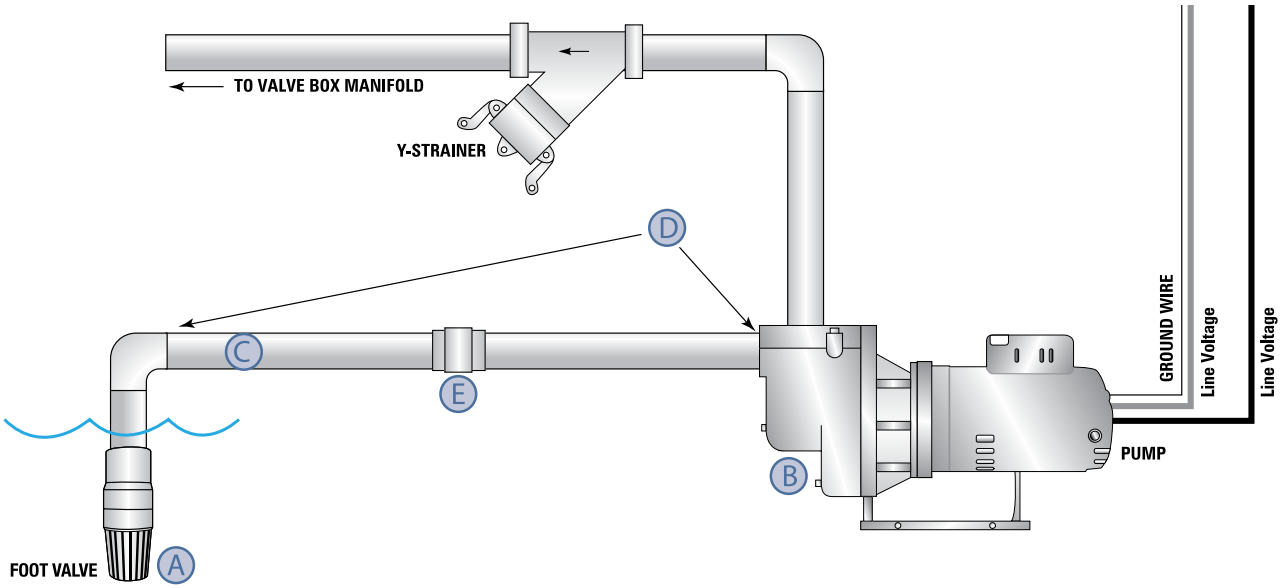
* Refer to the pump Owners Manual for tear down and reassembly instructions.

RESOURCES

Troubleshooting Guide - *Pump Surging (Flow Cycles)*

Did You Know?
Union joint O-rings and cam fitting gaskets should be inspected or replaced every year or two. O-rings and gaskets can harden over time and become brittle, causing air leaks.



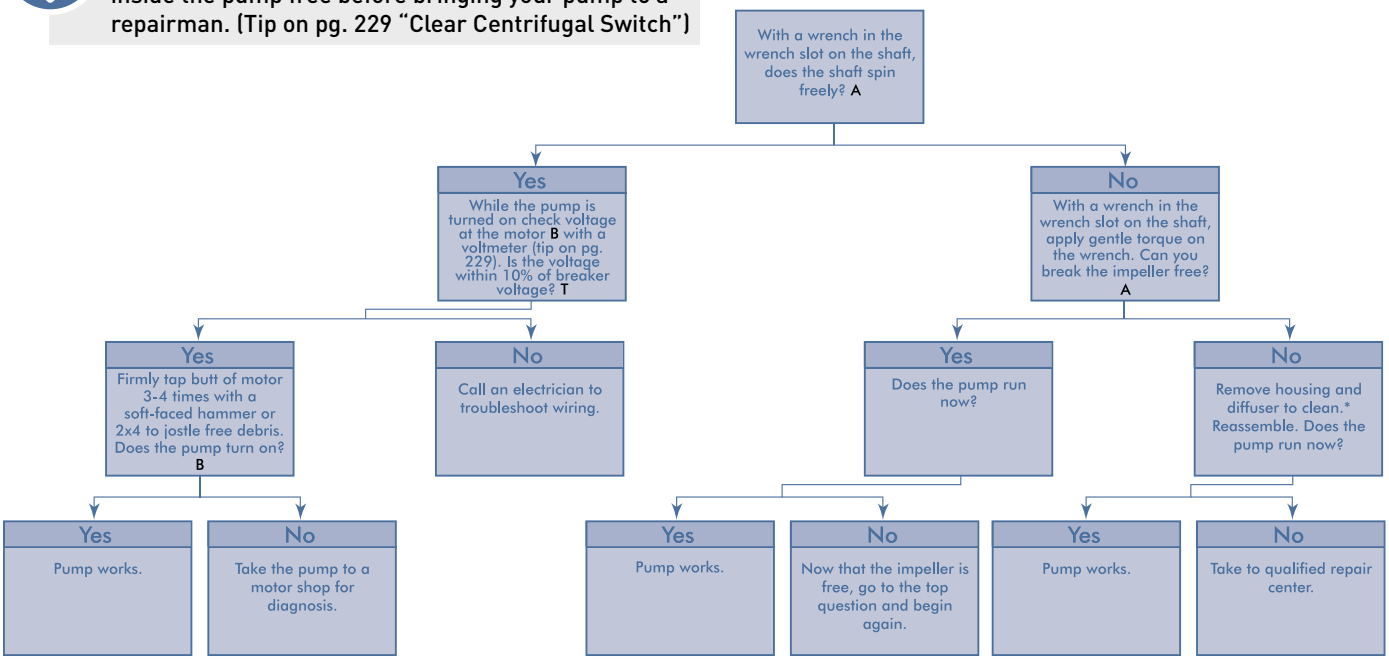


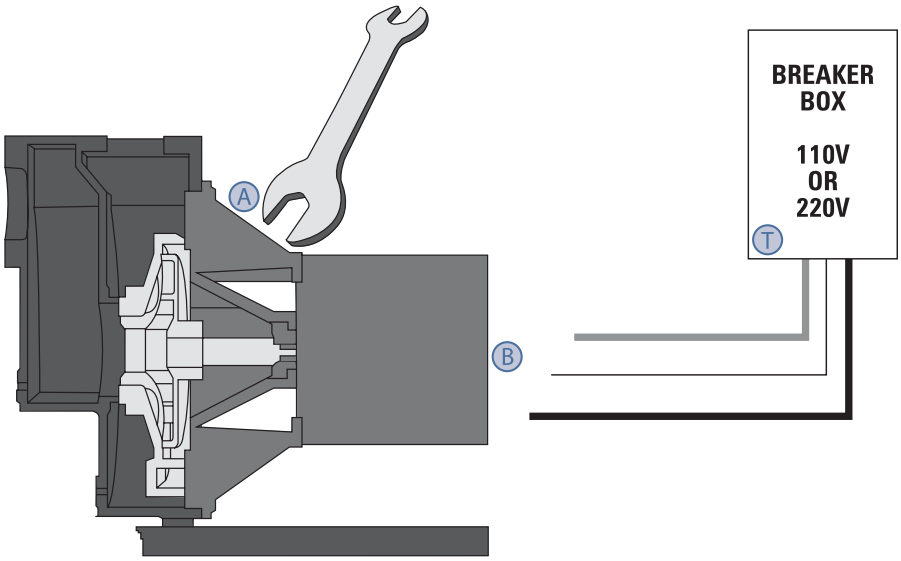
* Refer to the pump Owners Manual for tear down and reassembly instructions.

RESOURCES

Troubleshooting Guide - *Motor Hums*

Did You Know?
To avoid an unnecessary trip, try jostling any debris inside the pump free before bringing your pump to a repairman. (Tip on pg. 229 "Clear Centrifugal Switch")



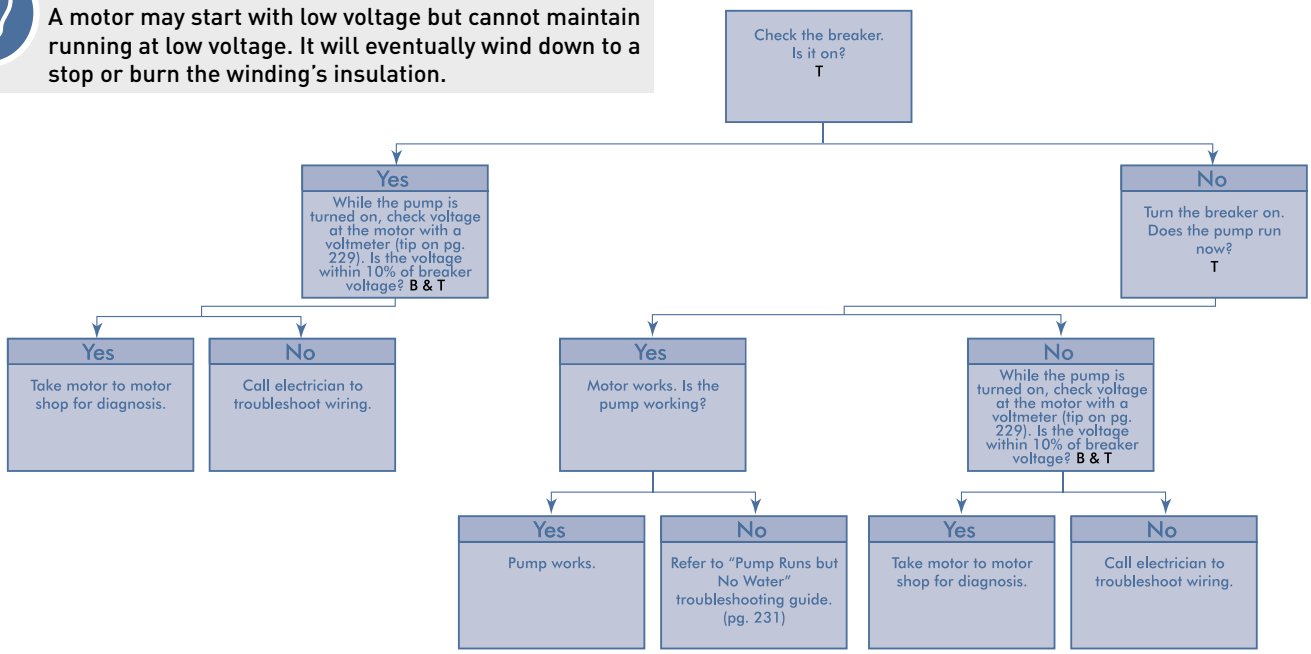


* Refer to the pump Owners Manual for tear down and reassembly instructions.

RESOURCES

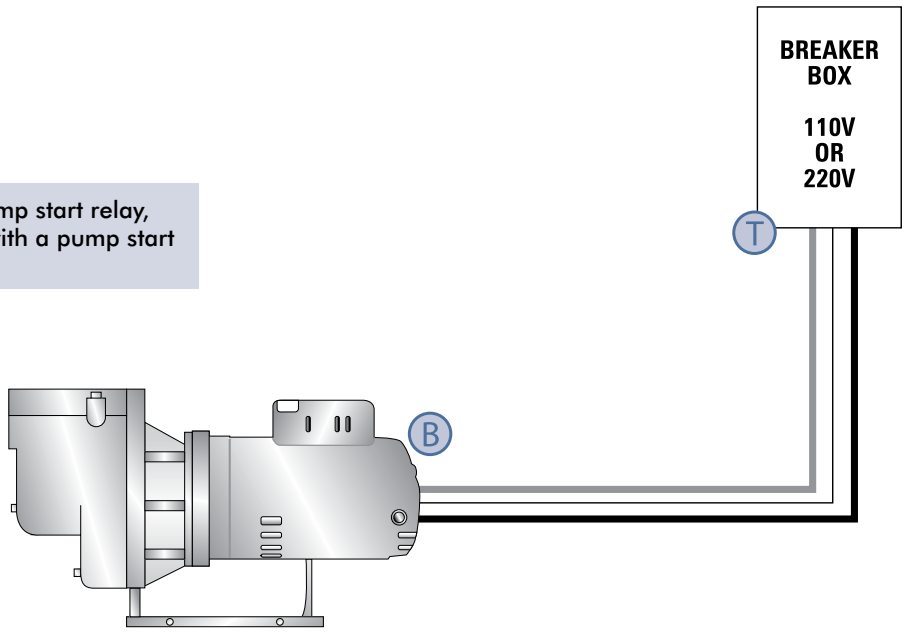
Troubleshooting Guide - *Motor Does Not Run at All*

Did You Know?
A motor may start with low voltage but cannot maintain running at low voltage. It will eventually wind down to a stop or burn the winding's insulation.



Did You Know?
A two-pole motor with 60 cycle current will run at a nominal 3600 RPM.

Note: For systems without a pump start relay, also see pg. 235. For systems with a pump start relay, also see pg. 236.

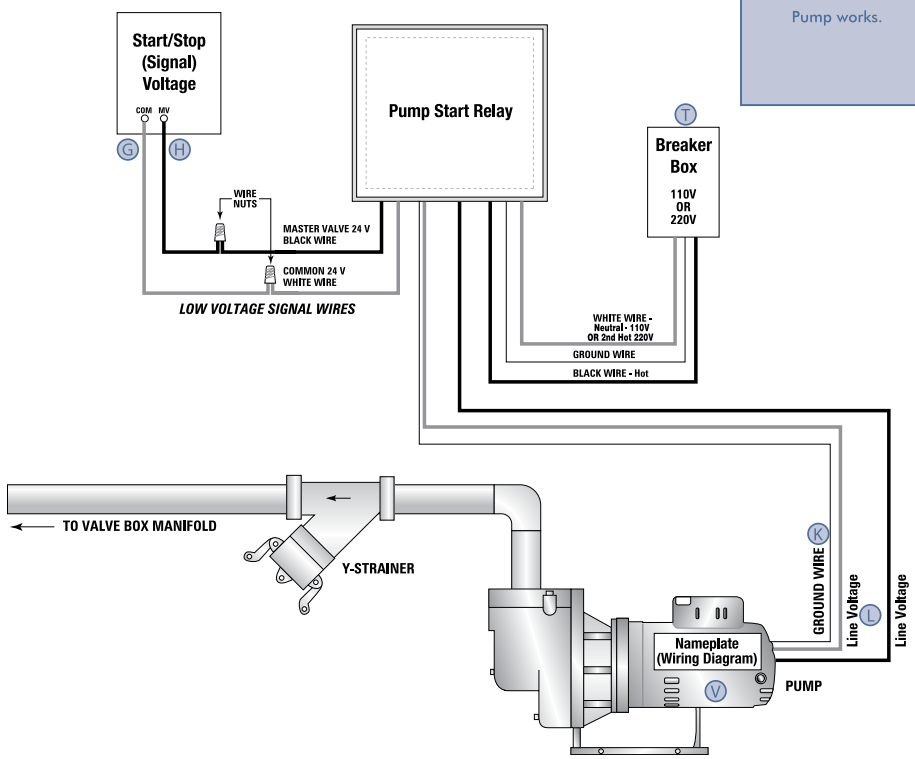


Troubleshooting Guide - *Motor Cycles and/or Nothing Happens*

Did You Know?
A capacitor start motor has an average of 1.5 times more torque during the start process.

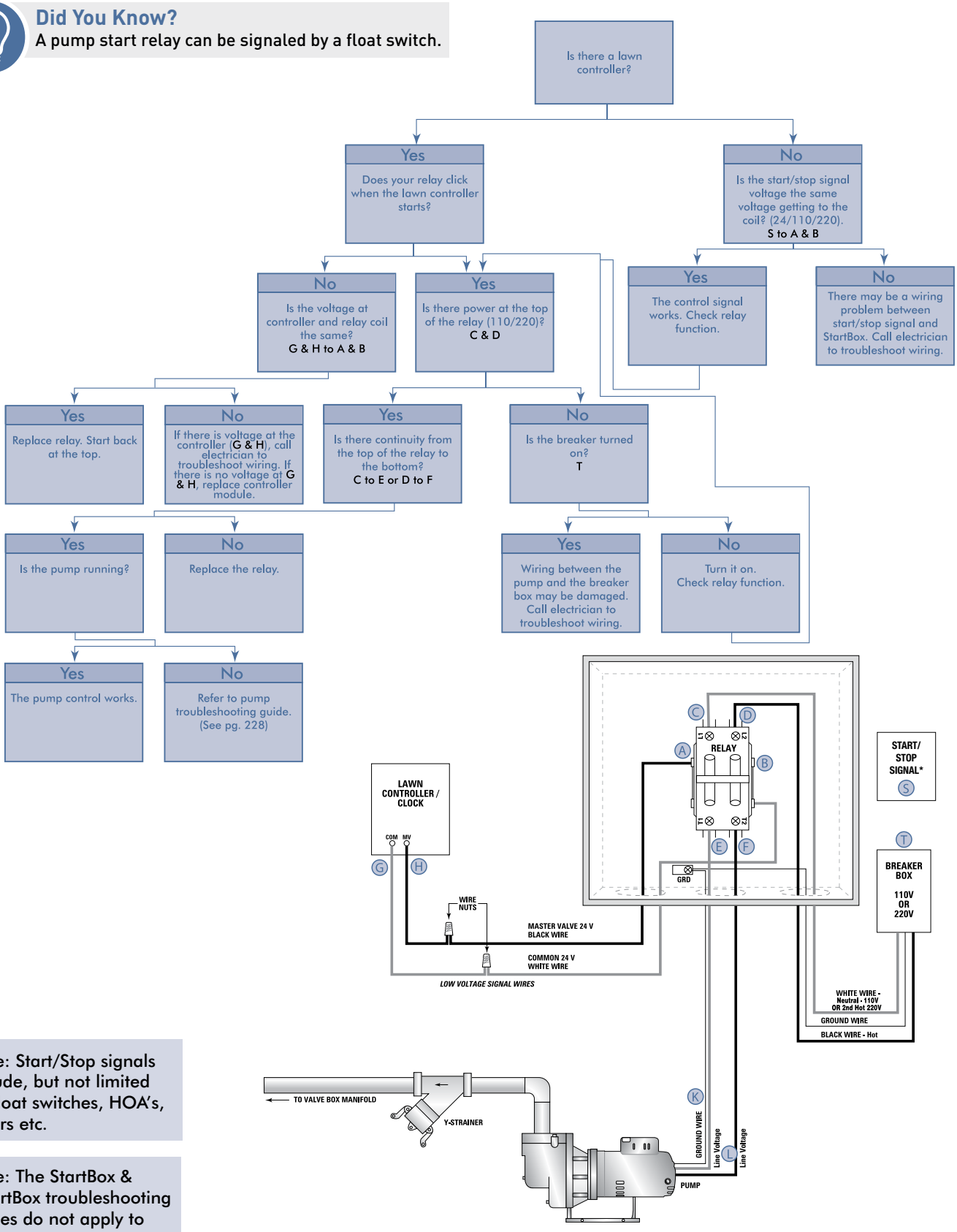
Does the pump run a short time and then stop?

- **Yes** — Using voltmeter, check wire voltage at the pump (tip on pg. 229). Is the voltage within 10% of breaker voltage? T & L at V
  - **Yes** — Compare the "at the pump" voltage (from previous step) to the voltage listed on the motor nameplate. Are they the same? V
    - **Yes** — Motor may be damaged. Contact local EASA rated motor shop for assistance.
    - **No** — Rewire motor according to nameplate diagram. Does the pump work now? V
      - **Yes** — Pump works.
      - **No** — Wiring may be damaged. Call an electrician for assistance.
  - **No** — Wiring between pump and the breaker box may be damaged. Call an electrician to troubleshoot wiring.
- **No** — Check breaker box to assure breaker is on. Does the pump run now? T
  - **Yes** — Pump works.
  - **No** — Is the pump controlled by a lawn controller?
    - **Yes** — Refer to "SmartBox" or "StartBox" troubleshooting guide. (pg. 236, 237)
    - **No** — Is the pump controlled by a float?
      - **Yes** — Verify float control configuration. Does it work now?
        - **Yes** — Pump works.
        - **No** — Call electrician to check wiring.
      - **No** — Is the pump controlled by a manual on-off switch?
        - **Yes** — Verify switch wiring and functionality. Is the pump working now?
          - **Yes** — Pump works.
          - **No** — Call electrician to troubleshoot wiring.
        - **No** — Call electrician to troubleshoot wiring.



Troubleshooting Guide - *StartBox*

Did You Know?
A pump start relay can be signaled by a float switch.



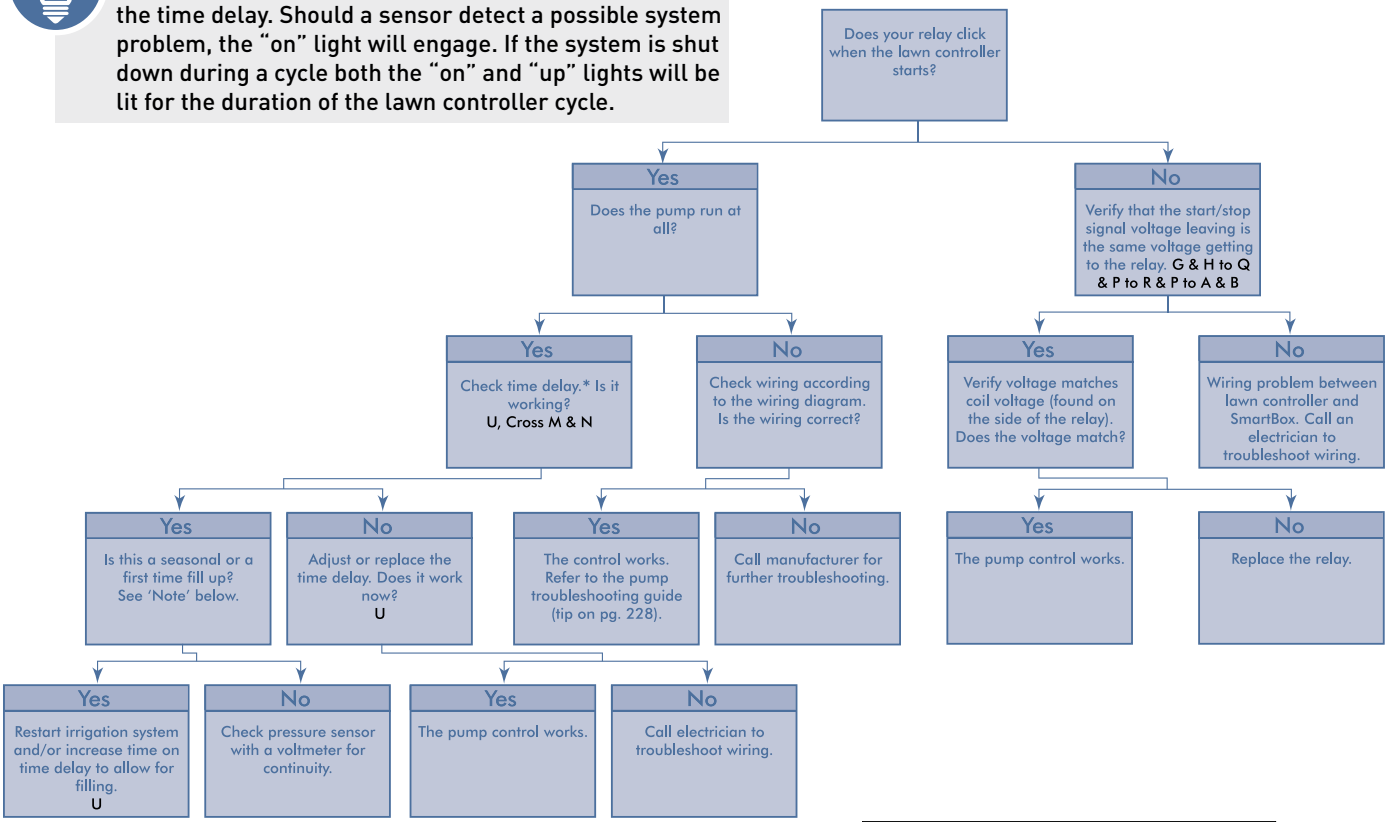
Note: Start/Stop signals include, but not limited to, float switches, HOA's, timers etc.

Note: The StartBox & SmartBox troubleshooting guides do not apply to 2-wire decoder systems.

Troubleshooting Guide - *SmartBox*

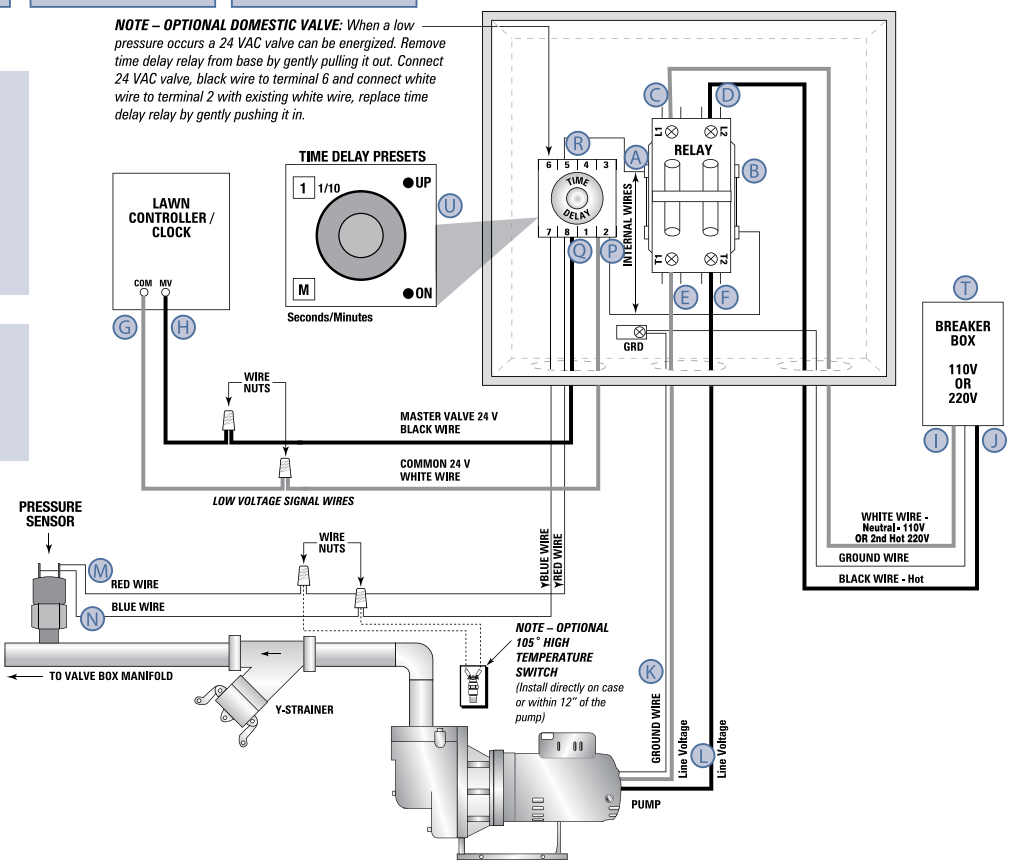
Did You Know?

During a normal "run" cycle, no lights should be lit on the time delay. Should a sensor detect a possible system problem, the "on" light will engage. If the system is shut down during a cycle both the "on" and "up" lights will be lit for the duration of the lawn controller cycle.



* Turn the time delay down to 5 seconds. Next, cross the red and blue wire. The "on" light should turn on. After 5 seconds the system should shut off and both the "on" and "up" lights should be on.

Note: Filling system lines may require multiple run cycles to build enough pressure to initiate the sensor.



RESOURCES

Irrigation Pump Wiring Instructions

READ AND FOLLOW SAFETY INSTRUCTIONS!

⚠ This is the safety alert symbol. When you see this symbol on your pump or in this manual, look for one of the following signal words and be alert to the potential for personal injury.

⚠ DANGER warns about hazards that WILL cause serious personal injury, death or major property damage if ignored.

⚠ WARNING warns about hazards that CAN cause serious personal injury, death or major property damage if ignored.

⚠ CAUTION warns about hazards that WILL or CAN cause minor personal injury, or property damage if ignored.

The label NOTICE indicates special instructions which are important but not related to hazards.

Carefully read and follow all safety instructions in this manual and on pump.

⚠ WARNING

Hazardous voltage. Can shock, burn, or cause death.

Ground pump before connecting to power supply.

⚠ Wire motor for correct voltage. See "Motor & Electrical" section of this manual and motor nameplate.

⚠ Ground motor before connecting to power supply.

⚠ Meet National Electrical Code, Canadian Electrical Code, and local codes for all wiring.

⚠ Follow wiring instructions in this manual when connecting motor to power.

MOTOR AND ELECTRICAL:

GENERAL SAFETY – ELECTRICAL

1. Follow all local electrical and safety codes, including the National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).
2. ⚠ Disconnect the main power before handling the unit for ANY REASON.
3. ⚠ Replace damaged or worn cords immediately.
4. ⚠ Use extreme caution around an operating pump and motor – it may be hot enough to cause serious burns.
5. ⚠ Ground motor before connecting to power supply.
6. ⚠ If unsure of electrical connection, call a licensed electrician. High voltage can shock, burn, or cause death.

GENERAL OPERATION – ELECTRICAL

1. Refer to motor nameplate to verify that supply voltage and motor wiring is the same.
2. Verify motor phase against supply power phase.

GENERAL SAFETY – MOTOR

1. ⚠ Disconnect the main power before handling the unit for ANY REASON.
2. ⚠ An operating motor will run at a high temperature and will be too hot to touch.
3. Keep pump motor ventilated to reduce damage due to heat.
4. Motor is not waterproof and should never be submersed into any liquid.
5. Motor is designed to work with up to a 15-degree angle of water impact. Do not allow water to spray directly onto motor. External motor protection should be used to eliminate environmental concerns.
6. To reduce the risk of electric shock, the motor must be securely and adequately grounded. Refer to National Electric Code (NEC Article 250 – Grounding) for additional information.
7. ⚠ When in doubt, call a licensed electrician. High voltage can shock, burn, or cause death.

WIRING CONNECTION:

ROTATION

1. All Munro pumps run in a Counter-Clockwise (CCW) rotation only. (When facing the pump's suction tapping, all single phase Munro pump motors are pre-wired to run in a Counter-Clockwise (CCW) rotation only. Rotation from the motor end perspective is Clockwise (CW); and is marked as such on the motor nameplate). Tampering with or reversing the rotation will damage your pump and void the warranty.

BUMP ROTATION CHECK

1. All 3-phase motors should be "bumped" to check for proper rotation.
2. Bumping a motor is a split-second application of power to verify CCW rotation of shaft. See Rotation section above.
3. Improper rotation can cause catastrophic pump failure and voids the warranty.

GENERAL WIRING INFORMATION

1. Refer to the connection diagram located on the nameplate of the motor.
2. Grounding the motor can be achieved by securing the motor to a metal raceway system. Alternately a separate grounding wire connected to bare metal on the motor frame, or to the green grounding screw located inside the motor terminal box, or other suitable means is acceptable. (Refer to NEC Article 250 – Grounding for specifics.)
3. Verify voltage and phase of power source with motor nameplate before connecting to motor.
4. To change rotation, switch any two wires.

MOTOR PROTECTION

⚠ Fuses and circuit breakers are used as a safety device for the wire circuit. They do NOT offer motor protection.

1. Consult local or national electric codes for proper fuse protection based on the motor data located on the motor nameplate.

THERMAL OVERLOAD

1. All motors must be thermally protected – either within the motor or externally.
2. The internal overload is usually automatic and resets itself once the temperature has dropped to a safe point.
3. Overload helps protect the motor from burnout from overload of low voltage, high voltage and other causes.
4. Frequent tripping of the overload indicates motor or power problems. Immediate professional attention is recommended.

Irrigation Pump Operation

5. ⚠ NEVER examine, make wiring changes, or touch the motor before disconnecting the electrical supply. Thermal overload protectors automatically reset and can close the electrical circuit without warning.
6. ⚠ The overload should never be tampered with or removed.

PUMP:

GENERAL SAFETY – PUMP

1. ⚠ An operating pump, with a blocked discharge, will heat the water and pump housing. Allow pumps to cool before handling.
2. High temperature sensors can help protect plastic plumbing from disfiguring and/or expanding.
3. Running a pump without water may cause damage to the seal.

GENERAL OPERATION – PUMP

1. Locate the pump as close to the water source as is practical.
2. Total suction lift (vertical lift plus any friction loss in suction line) should not exceed 10' for optimal performance. Suction lift of 15' is attainable depending on elevation, water temperature, and atmospheric condition. Pump performance is affected when suction lift exceeds 15'.
3. Fill the pump case and suction pipe with water to expel as much air as possible prior to start-up. Running a pump dry may cause damage to the seal and void warranty.
4. Pump and pipe must be drained if there is any danger of freezing.

PIPE CONNECTION

1. Plastic or galvanized steel pipe are most commonly used. Support pipe if needed.
2. Keep suction and discharge lines as large as possible. Pipe should not be smaller than the corresponding suction and discharge holes.
3. Avoid excess fittings when possible. Use straight runs when possible.
4. All joints and connections should have pipe-specific sealing compound applied and be completely tightened.
5. Isolation valves or unions on suction and discharge allow for easy pump removal with multi-pump or positive inlet pressure applications.
6. Suction pipe should never have a higher elevation than the pump.

OPERATION:

INITIAL PRIMING

1. Remove one priming plug from pump housing and fill the pump body and suction line completely with water.
2. Normal system start-up will take a few minutes for air to expel from system and water to begin to cycle – depending on suction lift. If no water is flowing after a few minutes, turn the pump off and refer to troubleshooting guide. Do NOT run pump dry for any period of time.
3. Unit must be full of liquid before operating. Never run dry. Running a pump dry may cause damage to the seal and void the warranty.
4. Do not run against a closed discharge for more than a few minutes.

Rotation

1. Single phase motors are pre-wired for CCW and should never be reversed.
2. Three phase motors must be phased at job site.

Maintenance – Lubrication

1. No lubrication is required. The ball bearings are permanently lubricated and sealed at the factory.

Maintenance – Freezing

1. Drain the entire system if there is a danger of freezing.
2. Drain valves are provided in both upper and lower pump case chambers.
3. Closing the drain valves and filling the pump case with Munro Freeze Defeat (p.179), will reduce the oxidation in the case over the winter. Before spring start-up, drain the Freeze Defeat from the case.

RECOMMENDED OPTIONAL EQUIPMENT:

1. Strainer – Use of strainers prevent large debris from entering pump system through suction line.
2. Pressure Gauge – Use of a pressure gauge helps to determine if pump is working at maximum efficiency.
3. Discharge Valve – Use of a gate or ball valve on the discharge side of a pump allows pump isolation for removal.
4. Foot Valve – Use of a foot valve (or check valve) can aide the priming of a centrifugal pump. If suction lines are kept full, the pump does not have to evacuate the air before pumping water.

Call Munro technical support for any questions relating to start-up or operation of this pump.
Toll Free: 1.800.942.4270

Rotary Seal Assembly Replacement

⚠ CAUTION Make certain the power supply is disconnected before attempting to service the unit!

Seal Removal

1. Remove the case bolts and pump body from motor assembly.
2. Remove diffuser bolts and diffuser from motor assembly.
3. Insert an open-end 9/16" (LP075B, LP100B, LP150B, LP200B, LP300B) or an 5/8" (LP1502B) wrench into the side of the mounting ring, slowly turning the impeller until the wrench seats itself onto the flats of the shaft. Once properly seated, the wrench will keep the shaft from turning. LP3005B model uses keyed shaft and sleeve. Removal of these impellers may require high heat to remove the shaft sleeves.
4. Expose the seal assembly by spinning the impeller counterclockwise to unthread it from the motor shaft.
5. The seal spring will release as the impeller is removed.
6. Being careful not to damage the motor shaft, remove the seal head, seat and rubber from the seal pocket. The use of a screwdriver or similar tool may be necessary.
7. Should the seal be difficult to remove, the mounting ring can be completely removed for easier access by taking out the mount ring bolts.
8. Once the seal is removed, clean the pocket removing all debris.

⚠ CAUTION The rotary seal assembly must be handled carefully to avoid damaging the precision lapped faces of the sealing components.

Seal Installation

NOTE: It is recommended to only install new seals. Do not install used or dirty seals.

NOTE: Application of a light coat of multi-purpose chassis grease to the diameter of the rubber gasket may make installation easier. Be certain the seat is kept clean and free of dirt and/or grease at all times.

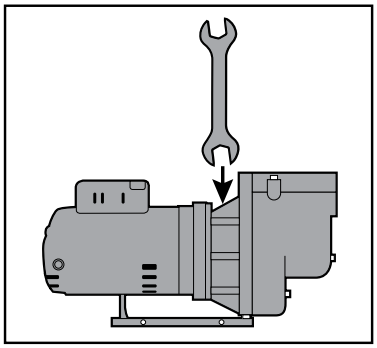
1. Insert the seal seat rubber gasket into the recessed area of the mount ring.
2. Slip the seal head assembly onto the motor shaft.
3. Using uniform pressure, be sure the seal's seat or mounting ring has completely bottomed-out in recessed area.
4. After placing the spring, install the impeller and bolt the diffuser onto the motor assembly.
5. Replace and bolt the pump body to the motor assembly.

Did You Know?

By touching the seal face, the oil from your skin will shorten the life of the seal.

WINTERIZATION

1. Turn off lawn controller and source water valve – break suction vacuum.
2. If feasible, disconnect water source and discharge piping.
3. On pump case, open both top and bottom drain valves or plugs to remove water from pump chambers.
4. If blowing out irrigation system with pressurized air, use a narrow box wrench (dia. 1) to prevent the shaft from spinning. When impeller spins too fast, motor governor can be damaged.
5. Once water is drained from pump case, close drain valves.
6. Fill pump case with Munro Freeze Defeat (p.179) pump winterization fluid. Munro Freeze Defeat will keep cast iron pump cases from rusting and keep the impeller free for spring start-up.



dia. 1

To see just how EASY it is to winterize your pump using Freeze Defeat!
Visit **munropump.com/FreezeDefeat**

SPRING STARTUP

1. Drain the Munro Freeze Defeat.
2. Close top and bottom drain plugs or valves. Fill case with water to prime.
3. Reconnect water source and discharge piping.
4. Turn on lawn controller and source water valve.
5. If issues arise, refer to your owner's manual or the Munro Troubleshooting Guide for Centrifugal Pumps and Controls on p.228

Munro Freeze Defeat is safe for most grasses and landscaping when drained and residual diluted fluid is introduced into irrigation water. Use caution with fragile plants, flushing pump with water prior to start up.

GOVERNING LAW & LIMITED WARRANTY FOR PUMPS, PUMP CONTROLS, VALVES, FITTINGS AND ACCESSORIES MANUFACTURED BY MUNRO

GOVERNING LAW: It is understood and agreed that these Terms and Conditions of Sale (this "Agreement") shall be interpreted under and pursuant to the laws of the State of Colorado; you agree that any action at law or suit which is related to any contact of sale brought against us shall be filed in a federal or state court located in the State of Colorado.

LIMITED WARRANTY: Munro, Inc. (the "Company") hereby warrants, in accordance with and subject to the provisions herein contained, your unit against defects in materials and workmanship under normal use and service when properly connected for a period of 12 months or 1000 hours of operation (which ever occurs first), from the date of purchase. In the event of a breakdown or failure of your unit or part thereof, within the period of 12 months or 1000 hours of operation, which prevents normal function, and is found to be the result of a defect in materials or workmanship, the Company will repair the breakdown or failure and/or replace any defective part or the whole unit at the Company's discretion. Freight charges will be the customer or ultimate consumer's responsibility.

Further, we warrant to our immediate customer and to the ultimate consumer (the "Customer") that products of our manufacture will be free of defects in material and workmanship under normal use and service, when installed and maintained in accordance with our instructions, for a period of twelve (12) months from date of installation or eighteen (18) eighteen months from date of shipment, whichever occurs first. As used herein, the "Ultimate Consumer" is defined as the purchaser who first uses the product after its initial installation or, in the case of product designed for non-permanent installation, the first owner who used the product. It is our immediate customer's obligation to make known to the Ultimate Consumer the terms and conditions of this warranty. This warranty provides limited specific legal rights, and there may also be other rights, which vary from state to state. As, and to the extent, covered by the federal consumer product warranties Law (the Magnuson-Moss Act, 15 U.S. Code §2301, et seq., (1) the duration of any implied warranties associated with the product by virtue of said law is limited to the same duration as stated herein, to the fullest extent allowed, (2) this warranty is for all purposes a LIMITED WARRANTY, and (3) no claims of any nature whatsoever shall be made against the Company, unless and until the Ultimate Consumer notifies the Company in writing of the defect, and delivers the product and/or defective part(s) Customer paid freight (see Return Policy section, below) to our factory or nearest authorized service facility. Some states do not allow limitation on how long an implied warranty lasts, so the above limitation may be limited by such law, to the extent applicable. **THE SOLE AND EXCLUSIVE REMEDY FOR BREACH OF ANY AND ALL WARRANTIES WITH RESPECT TO ANY PRODUCT SHALL BE TO REPLACE OR REPAIR AT OUR ELECTION, F.O.B. POINT OF MANUFACTURER OR AUTHORIZED REPAIR FACILITY, SUCH PRODUCTS AND/OR PARTS AS PROVEN DEFECTIVE. THERE SHALL BE NO FURTHER LIABILITY, WHETHER BASED ON WARRANTY, NEGLIGENCE OR OTHERWISE.** Unless expressly stated otherwise, statements as to the nature of performance specifications furnished in addition to the foregoing material and workmanship warranties on product manufactured by the Company, if any, are subject to laboratory tests corrected for field performance. Any additional statements in the nature of performance specifications must be in writing and such writing must be signed by our authorized representative. Due to inaccuracies in field testing, if a conflict arises between the results of field testing conducted by or for user, and laboratory tests corrected for field performance, the latter shall control. Components or accessories supplied by us but manufactured by others are warranted only to the extent of, and are subject to, the terms and conditions of the original manufacturer's warranty.

RECOMMENDATIONS FOR SPECIAL APPLICATIONS OR THOSE RESULTING FROM SYSTEMS ANALYZES AND EVALUATIONS WE CONDUCT WILL BE BASED ON OUR BEST AVAILABLE EXPERIENCE AND PUBLISHED INDUSTRY INFORMATION. SUCH RECOMMENDATIONS DO NOT CONSTITUTE A WARRANTY OF SATISFACTORY PERFORMANCE AND NO SUCH WARRANTY IS GIVEN.

This warranty shall not apply when damage is caused by (a) improper installation, mechanical or electrical, (b) improper power (i.e., voltage, etc.) (c) lightning (d) freezing (e) sand or other abrasive material (f) scale or corrosion build-up due to excessive chemical content. This warranty does not extend to or cover the unit or any part of it which, in the opinion of the Company, has worn by wear and tear, abraded or corroded by fluid pumped or environmental conditions, run in a dry condition, operated at high temperatures or outside the technical specifications of the unit. Mechanical seal failure is not warranted outside of initial start up. Any modification of the original equipment will also void this warranty. We will not be responsible for loss, damage or labor cost due to interruption of service caused by defective parts, nor charges incurred by others without our prior written approval.

This warranty is void if our inspection reveals the product was used in a manner inconsistent with normal industry practice and/or our specific recommendations. The purchaser is responsible for communication of all necessary information regarding the intended application and use of the product.

UNDER NO CIRCUMSTANCES WILL WE BE RESPONSIBLE FOR ANY OTHER DIRECT, INDIRECT, OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LOST PROFITS, LOST INCOME, LABOR CHARGES, DELAYS IN PRODUCTION, IDLE PRODUCTION, REGARDLESS OF WHETHER SUCH DAMAGES ARE CAUSED BY ANY DEFECTS IN MATERIAL AND/OR WORKMANSHIP AND/OR DAMAGE OR DELAYS IN SHIPMENT. THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER EXPRESS OR IMPLIED WARRANTY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

No rights extended under this warranty may be assigned to any other person, whether by operation of law or otherwise, without our prior written approval. If any litigation is commenced between the parties hereto for the enforcement of any rights hereunder, the successful party in subject litigation shall be entitled to receive from the unsuccessful party all costs incurred in connection therewith, including a reasonable amount for attorney's fees.

PRICING

All prices provided are guaranteed for only 30 days from the date of written quote, unless otherwise noted. Unless noted, prices do not include applicable taxes or freight costs. Prices are otherwise subject to change without notice. Customer is responsible for payment of all applicable state and local taxes, or for providing a valid sales tax exemption certificate. The Company reserves the right to reject any order.

PAYMENT TERMS

The Company accepts cash, checks, money orders, direct deposit, Visa, MasterCard, Discover and American Express. Credit card payments made on the date of invoice or within 10 business days of invoice date will not incur a fee. Credit card payments made 11 or more business days after the date of invoice will incur a 3% service charge. For Customers with established credit, terms are net, due 30 days following the date of invoice. A finance charge is computed on a periodic rate of 2% per month, which is an annual rate of 24%, on any previous balance not paid within 30 days (minimum service charge of 50¢). Customer agrees to pay all costs of collection and all attorney's fees if the account becomes delinquent and is referred for collection.

FREIGHT & SHIPPING

Freight terms are FOB Munro, Inc. dock, unless otherwise noted. Unless other arrangements are made, The Company will ship to an address provided by Customer, by the most efficient means we find. Shipping and handling charges will be added to invoices. The Company is not liable for any delays in shipping or issues related to arrival times and do not guarantee delivery dates.

RETURN POLICY

1. 30-days, new condition – Upon the Company's verification that the product is in new condition, the Company will provide a refund for the price paid less a 15% restocking fee, for all stock items returned in new condition within 30 days of purchase and sent freight prepaid to our factory or nearest authorized service facility. Any returned product that is damaged through misuse, is missing parts, or is in unsellable condition due to Customer tampering will result in the Customer being charged a higher restocking fee based on the condition of the product.
2. Custom orders – All custom items are non-refundable. All custom order cancellations must be approved and may be denied or subject to restocking fees and other charges.
3. Damaged in shipping – Great care is taken in filling, checking and packing your order. Should your order be damaged or lost in transit, write so on the delivery receipt before signing. If a truck shipment is damaged, please obtain an inspection report from the truck line immediately. The Company will help to resolve the situation to the best of our ability.
4. Warranty claim – Please note that products must not be returned to our factory or nearest authorized service facility for warranty consideration without the Munro distributor first contacting Munro to initiate a Return Merchandise Authorization (RMA). For complete warranty process, please see warranty process document, available on our website: http://www.munropump.com/MunroCompanies/media/About-us-images/Munro-Warranty-Procedure.pdf

ENTIRE AGREEMENT

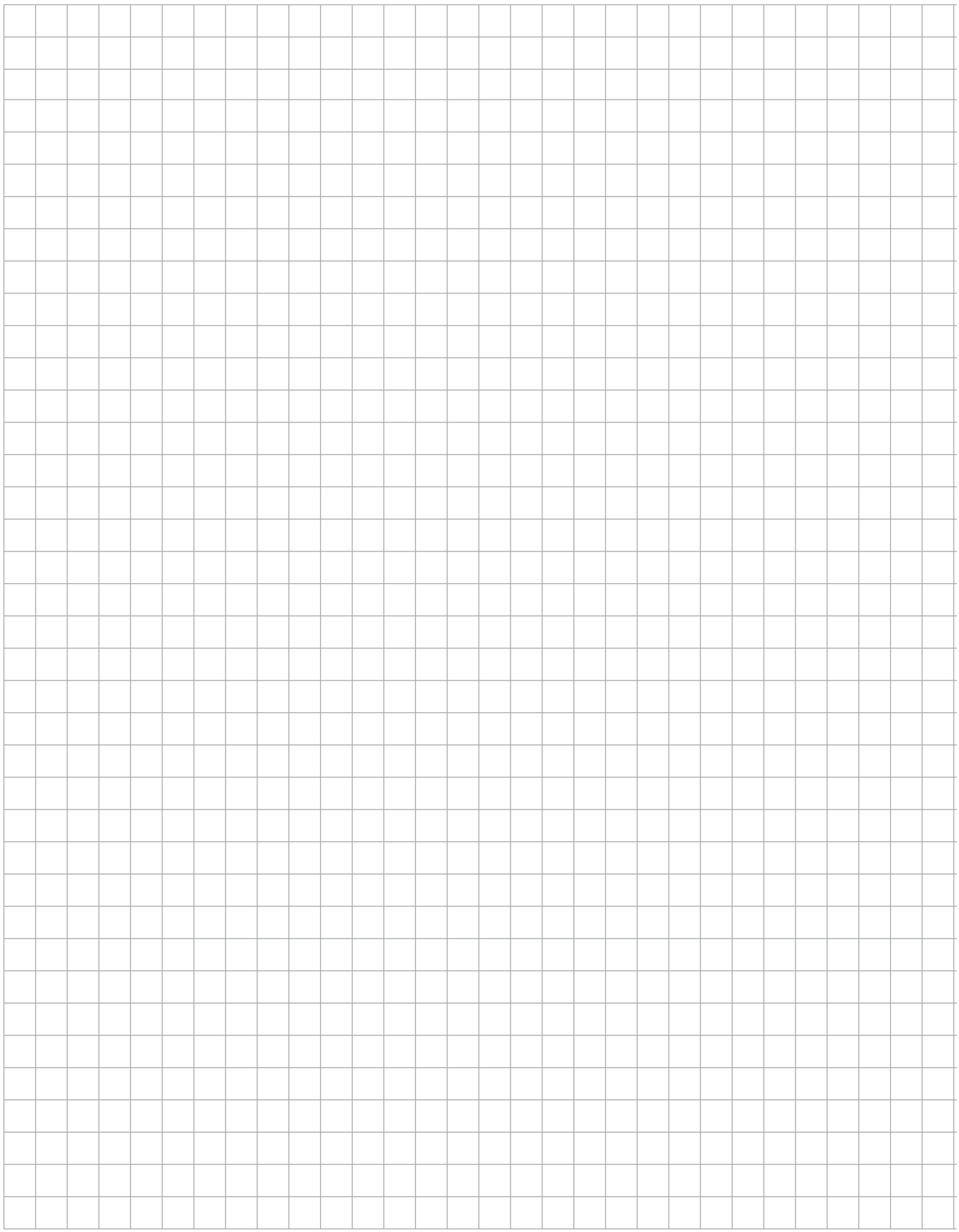
No employee or agent of Munro, Inc. has been authorized to make any promises, representations or warranties binding Munro Inc., or its parent company, Munro Companies, Inc., or its owners or management, other than those contained here or those which have been reduced to writing and signed by an officer of Munro Companies, Inc. Any verbal or written statements made by an employee or agent which are contrary to the provisions of this Agreement shall be deemed mere expressions of opinion and not binding. This Agreement constitutes the entire agreement between Munro, Inc. and the Customer with respect to the purchase of equipment, superseding all other agreements, whether oral or written.

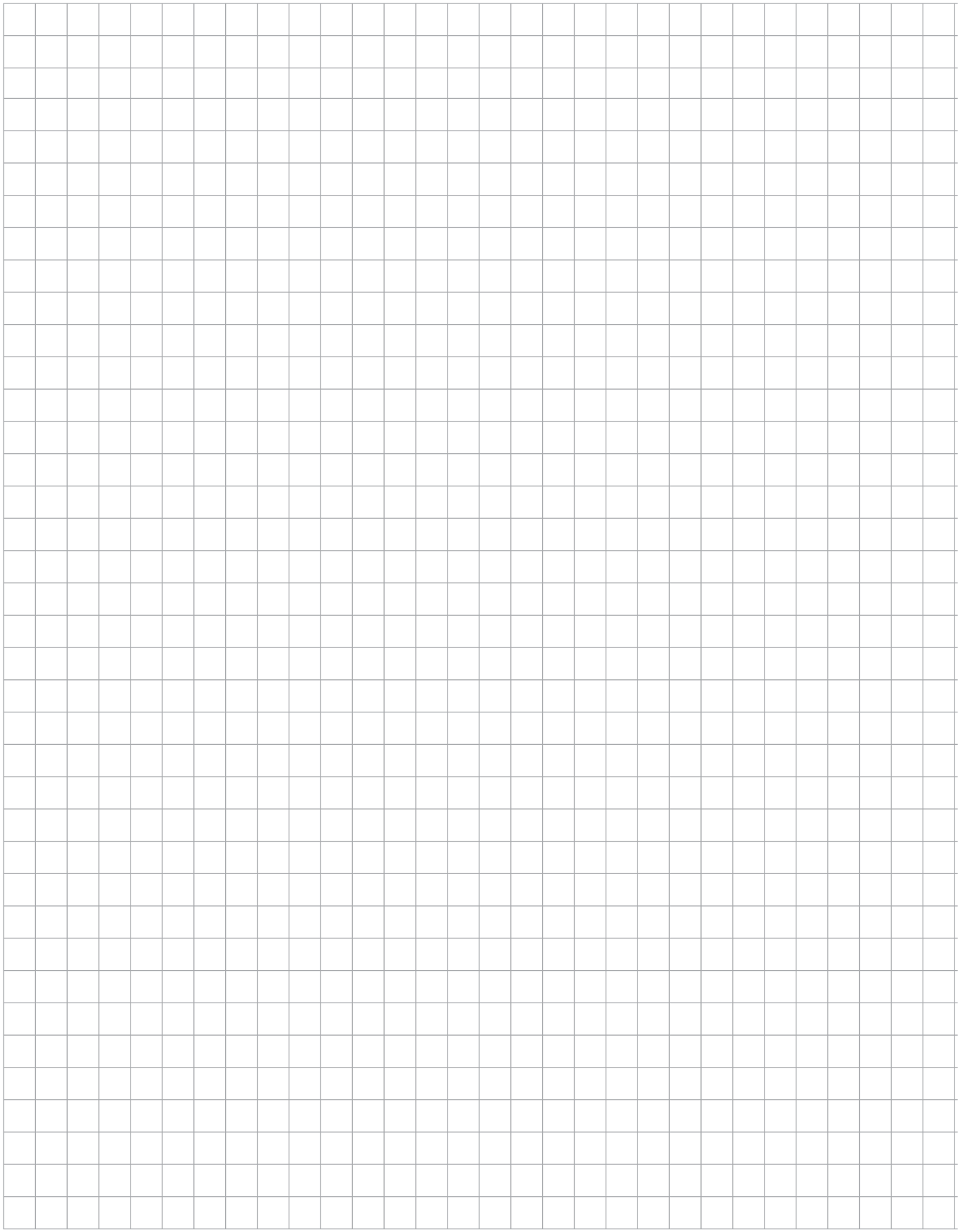
YOUR ACCEPTANCE OF ANY GOODS SUPPLIED BY US, OR ON OUR BEHALF, SHALL, WITHOUT LIMITATION CONSTITUTE ACCEPTANCE OF ALL TERMS, AND CONDITIONS STATED ABOVE.

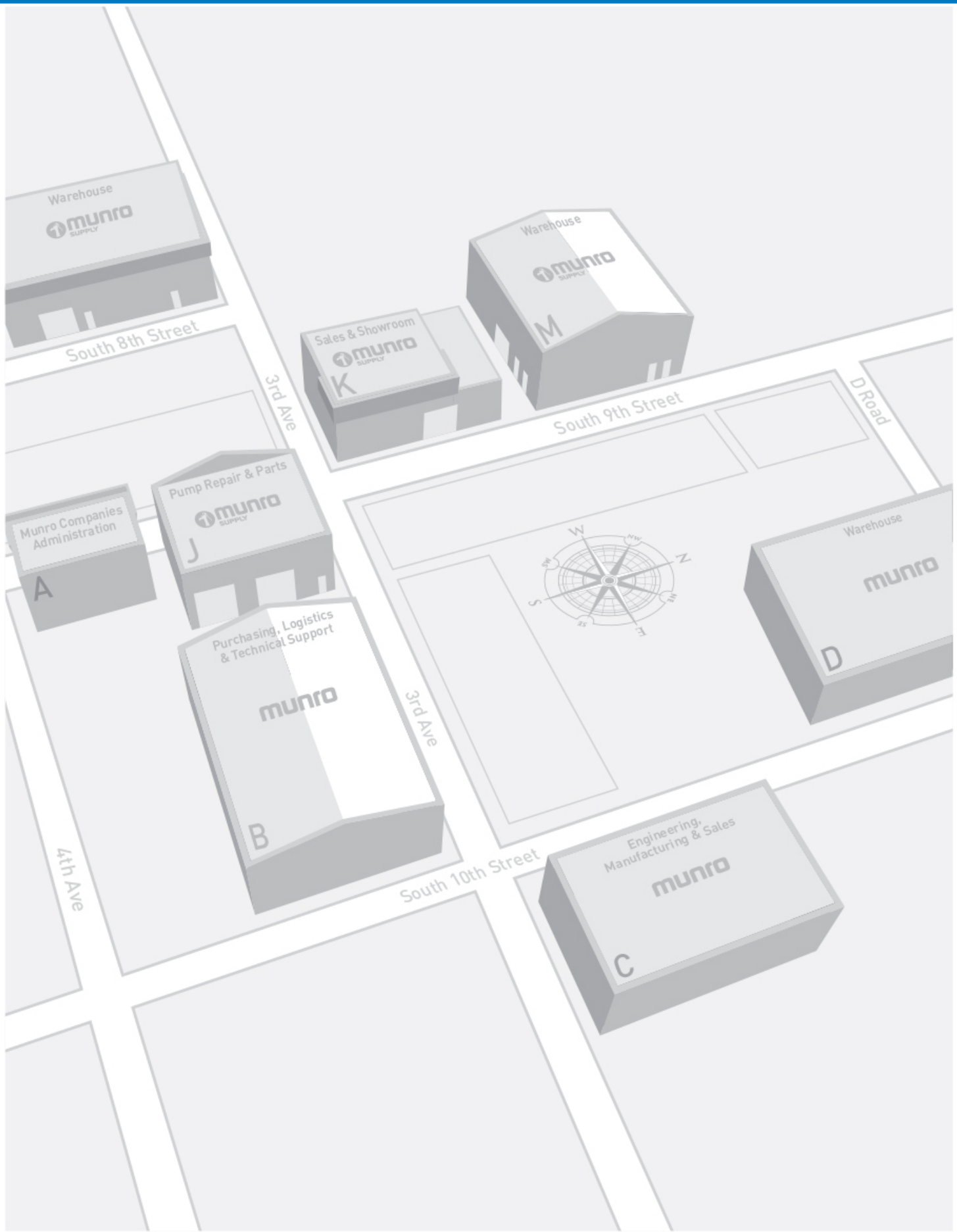
MUNRO PRODUCTS

ALPHABETICAL PRODUCT LISTINGS

Notes



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SUPPLY
South 8th Street
3rd Ave
Sales & Showroom
munro
SUPPLY
K
Warehouse
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South 9th Street
D Road
Pump Repair & Parts
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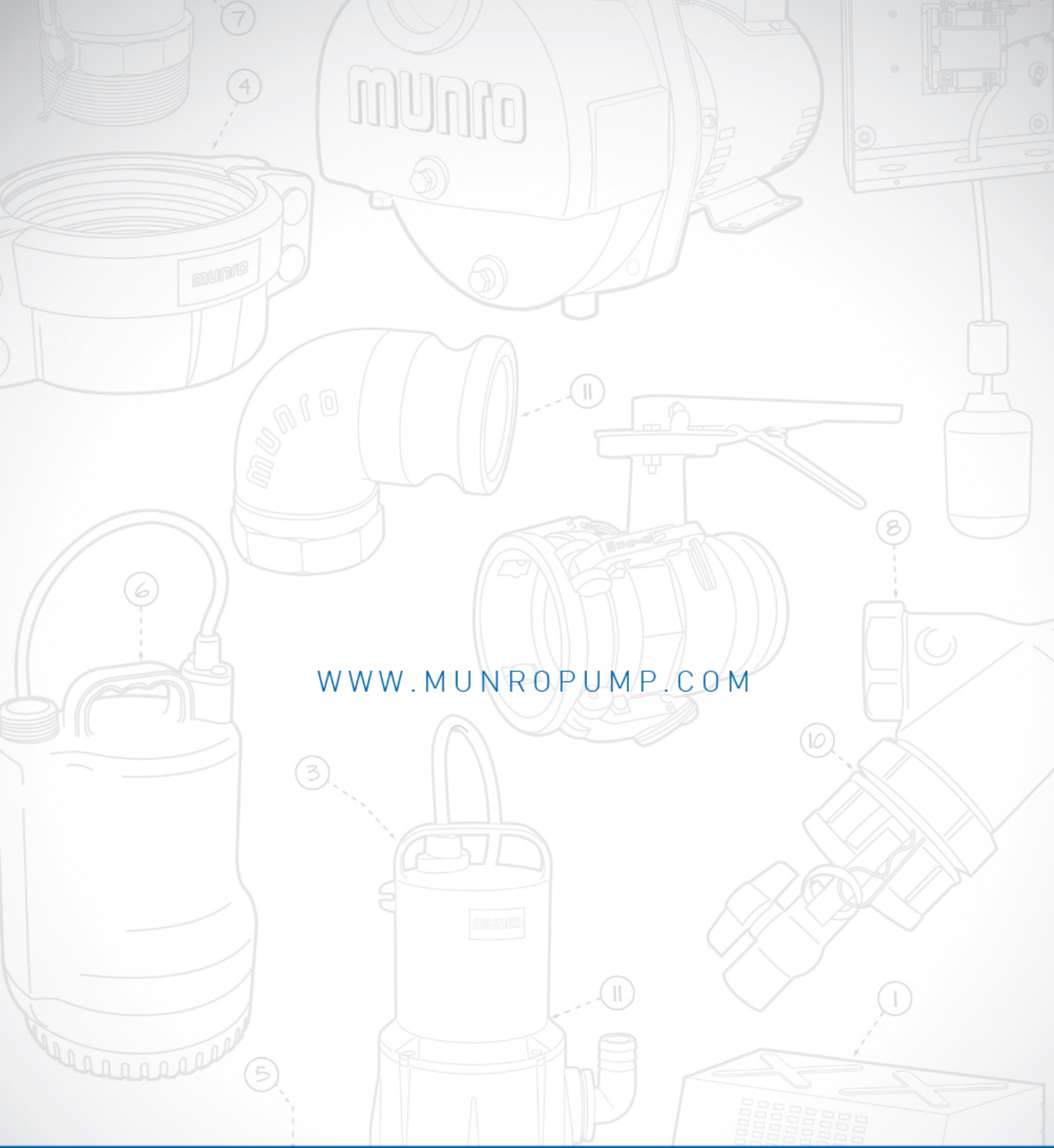

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