

# AQUAVAR SOLO™

Constant Pressure Controllers for: 1Ø – 3-Wire Motors,  
1Ø – 2-Wire CentriPro Motors, 3Ø – 3Ø Motors

## FEATURES

**NEMA 3R Enclosure:** Rainproof, outdoor rated enclosure.

**Current Limit Selector Switch:** Rotary switch to set current limit to match motor Service Factor Amps (SFA).

**Dry Well Sensitivity Switch:** Choice of low or high sensitivity.

**Pressure Drop:** Choose a 5 or 20 PSI pressure drop for re-starts.

**Low Pressure Cut-Off:** Set on or off depending on application.

**Constant Pressure:** Provides consistent pressure even as flow requirements vary.

Controller acts as a pump protection device and troubleshooting device. Flashing lights indicate system faults.

Standard pressure sensor cable is 10' long. Optional lengths of 25', 50', 100', 150' and 200' are available.

Integrated output motor filter protects the motor from voltage spikes and limits electrical interference with devices such as portable telephones, radios, televisions and garage door openers.

**Cooling Fan:** Allows operation in ambient temperatures up to 122°F.



Tested to UL 508C and CSA 22.2 0-M91, 14-95 and 0.4-M1982  
Standards By Canadian Standards Association File #LR38549

### SPECIFICATIONS – 3Ø MODELS / 1Ø INPUT AND 3Ø OUTPUT

#### Controller Temperature Range:

- Minimum Ambient Temperature: 14°F (-10°C)
- Maximum Ambient Temperature: 122°F (50°C)

**Input Voltage:** single-phase, 230 Volt, two (2) wire grounded system.

**Output Voltage:** variable frequency, variable voltage, three-phase power to the motor.

**Speed Selector Switch:** Selects Output Frequency of either –

- 30 - 60 Hz - Use matched HP Water End and Motor
- 30 - 80 Hz - Use mis-matched Water End and Motor

#### Enclosure Dimensions:

- Height: 18.6"
- Width: 9.9"
- Depth: 5.3"

#### Packaged Dimensions:

- Height: 21"
- Width: 13"
- Depth: 8"

#### Motor Compatibility with 3AS\_ \_ Models

HP	Three Phase	
	CentriPro & Pentek XE	Franklin Electric
1/2	N/A	N/A
3/4	Yes	Yes
1	Yes	Yes
1 1/2	Yes	Yes
2	Yes	Yes
3	Yes	Yes
5	Yes	Yes

#### 3AS20 SPECIFICATIONS

- HP Range: 3/4 to 2
- Unit Weight: 19 lbs.
- Packaged Weight: 23 lbs.
- Pressure Set point adjustable from 20 - 85 psi using the standard 100 psi sensor. ①

#### 3AS30 SPECIFICATIONS

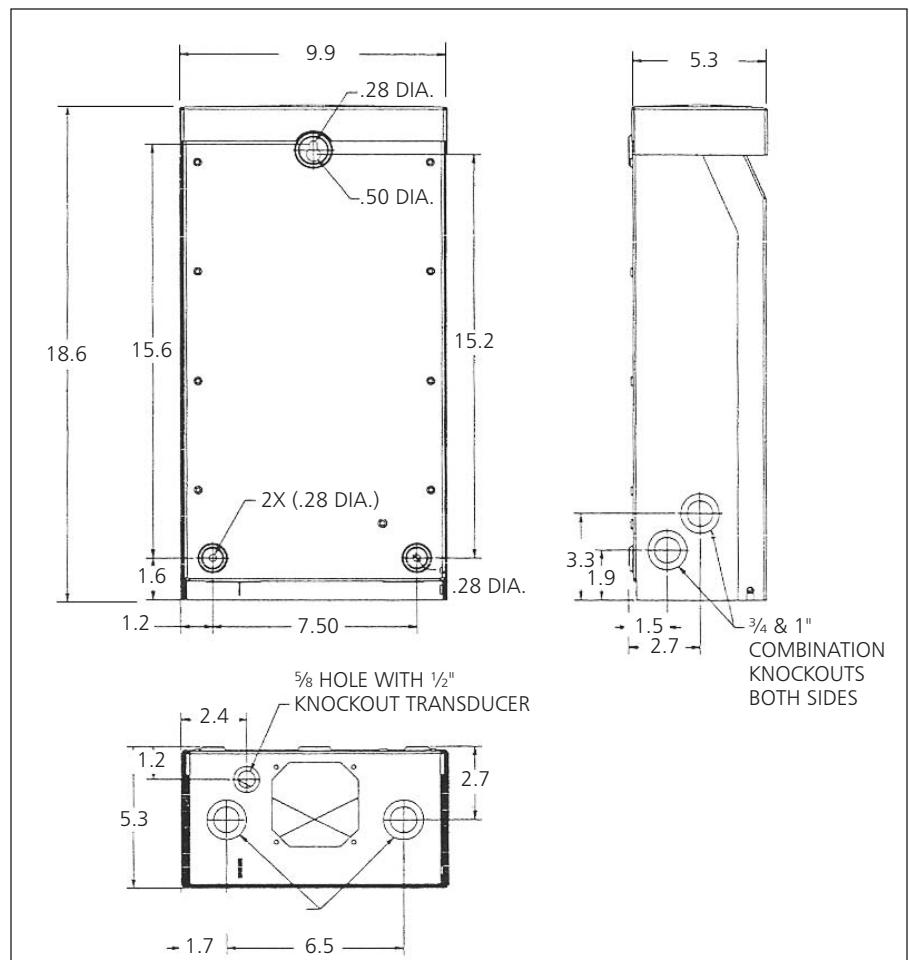
- HP Range: 1 1/2 to 3
- Unit Weight: 20 lbs.
- Packaged Weight: 24 lbs.
- Pressure Set point adjustable from 20 - 85 psi using the standard 100 psi sensor. ①

#### 3AS50 SPECIFICATIONS

- HP Range: 3 to 5
- Unit Weight: 25 lbs.
- Packaged Weight: 29 lbs.
- Pressure Set point adjustable from 20 - 100 psi using the standard 200 psi sensor. ①

① Higher pressures are available using a higher pressure sensor. See page 4.

### DIMENSIONS (inches) – ALL MODELS



### SPECIFICATIONS – 1AS15 – 1Ø MODEL – 1Ø INPUT AND 1Ø OUTPUT

**Controller Temperature Range:**

- Minimum Ambient Temperature: 14°F (-10°C)
- Maximum Ambient Temperature: 122°F (50°C)

**Input Voltage:** single-phase, 230 Volt, two (2) wire grounded system.

**Output Voltage:** 1Ø, variable voltage, variable frequency, single phase power to the 2-wire or 3-wire motor

**Speed/Frequency:** 30-60 only

**Enclosure Dimensions:**

- Height: 18.6"
- Width: 9.9"
- Depth: 5.3"

**Packaged Dimensions:**

- Height: 21"
- Width: 13"
- Depth: 8"

**1AS15 SPECIFICATIONS**

- Unit Weight: 19 lbs.
- Packaged Weight: 23 lbs.
- Pressure Set point adjustable from 20 - 85 psi using the standard 100 psi transducer.
- HP Range:

**Motor Compatibility with Aquavar SOLO 1AS15**

HP	Single Phase 2-Wire		Single Phase 3-Wire	
	CentriPro & Pentek XE	Franklin Electric	CentriPro & Pentek XE	Franklin Electric
1/2	Yes	No	Yes	Yes
3/4	Yes	No	Yes	Yes
1	Yes	No	Yes	Yes
1 1/2	Yes	No	Yes	Yes
2	N/A	No	Yes	No <sup>ⓐ</sup>
3	N/A	No	N/A	N/A
5	N/A	No	N/A	N/A

<sup>ⓐ</sup> The 2 HP Franklin Electric motor's amp draw is too high.

## TANK SIZING

**Diaphragm Tank Sizing and Pre-Set Pressure Recommendations:**

Diaphragm type (captive air) tanks are required on these systems.

**Table 1: Tank Sizing Selection**

Maximum Pump GPM	Recommended Tanks		
	Total Volume	Order No.	or Order No.
10	2	V6P	TP6P
23	4.5	V15P	TP15P
41	8.2	V25P	TP25P
70	13.9	V45	TP45
100	19.9	V60	TP60

Use Total Tank Volume, not drawdown volume, to select the proper tank size. The total tank volume should be approximately 20% of the pump's maximum flow. For example, when using a 10 gpm pump the system requires a minimum 2 gallon (total volume) tank.

The tank sizing recommendations are field proven to prevent objectionable pressure drops on start-up and provide smooth operation for the majority of variable speed pump systems.

When using the default, 5 PSI pressure drop, setting: Set the tank pressure, while tank is empty of water, to 20 psi below the desired system pressure setting. Ex. for a 50 psi system pressure, charge the tank to 30 psi.

See IOM for other settings or if using a large tank.

**Table 2: Controller, Breaker, Generator Sizing**

Motor		Controller Model <sup>②</sup>				Circuit Breaker <sup>③</sup>	Generator <sup>④</sup> (VA)		
HP	Voltage <sup>①</sup>	1AS15	3AS20	3AS30	3AS50				
1/2	230					15	2200		
	200								
3/4	230						20	2900	
	200								
1	230							30	3500
	200								
1 1/2	230					40			4400
	200								
2	230						50		6100
	200								
3	230							30	8100
	200								
5	230					40		13300	
	200								

① Supply voltage must be 196 VAC – 265 VAC.

② Shaded areas indicate which controller models can be used with which motors. Lighter shading indicates combinations where controller will limit peak performance to 85% of catalog value for pump/motor.

③ Circuit Breaker or Dual Element Time Delay Fuse Size (Amps) protecting branch circuit supplying controller.

④ Minimum size of single phase 240 V generator required.

**Table 3: Service Factor Amps All Motors**

HP	230 Volt						200 Volt	
	1Ø 2-Wire		1Ø 3-Wire		3Ø		3Ø	
	CentriPro	Franklin	CentriPro	Franklin	CentriPro	Franklin	CentriPro	Franklin
1/2	4.7	Not approved for use with CentriPro Controller	6.3	6.0				
3/4	6.4		8.3	8.0	3.9	3.8	4.5	4.4
1	9.1		9.7	9.8	4.7	4.7	5.5	5.4
1 1/2	11.0		11.1	11.5	6.1	5.9	7.2	6.8
2	–		12.2	–	7.6	8.1	8.8	9.3
3	–		–	–	10.1	10.9	12.0	12.5
5	–		–	–	17.5	17.8	20.2	20.5

### PRESSURE RANGES FOR ALL AVAILABLE TRANSDUCERS

Transducer	1AS15 / 3AS20		3AS30		3AS50	
	Minimum PSI	Maximum PSI	Minimum PSI	Maximum PSI	Minimum PSI	Maximum PSI
100 PSI ①	20	85	20	85	10	50
200 PSI ②	40	170	40	170	20	100
300 PSI	60	255	60	255	30	150

① Standard on 1AS15/3AS20, 3AS30

② Standard on 3AS50

**Warning!** Exploding tank can injure or kill, some combinations of Transducer and Controller allow system pressure adjustment to exceed the maximum working pressure of the tank and piping.

Ensure system pressure is set below the maximum working pressure of the tank and system piping.

Protect tank and piping against overpressure, install a properly sized pressure relief valve (PRV) able to pass full pump flow at the maximum working pressure of the tank. In finished basements or where PRV blow-off can cause property damage, pipe the PRV to a suitable drain.

**Table 4: Wire Sizing**  
**Maximum Cable Lengths in Feet to Limit Voltage Drop to 5% for 230 V Systems ①**

### 1A515 Controller to Motor – Controllers with 2-Wire 1Ø Motors

Motor Lead Lengths - CentriPro 2-Wire Motors - Based on Service Factor Amps, 30° C Ambient and 5% Voltage Drop														
Motor Rating				60° C & 75° C Insulation - AWG Copper Wire Size										
Volts	HP	kW	SFA	14	12	10	8	6	4	2	1/0	2/0	3/0	4/0
230	½	0.37	4.7	466	742	1183	1874	2915	4648	7379	11733	14803	18688	23544
	¾	0.55	6.4	342	545	869	1376	2141	3413	5419	8617	10871	13724	17290
	1	0.75	9.1	241	383	611	968	1506	2400	3811	6060	7646	9652	12160
	1½	1.1	11.0	199	317	505	801	1246	1986	3153	5013	6325	7985	10060

### 1A515 Controller to Motor – Controllers with 3-Wire 1Ø Motors

Motor Lead Lengths - CentriPro 3-Wire Motors (CSIR) - Based on Service Factor Amps, 30° C Ambient and 5% Voltage Drop														
Motor Rating				60° C & 75° C Insulation - AWG Copper Wire Size										
Volts	HP	kW	SFA	14	12	10	8	6	4	2	1/0	2/0	3/0	4/0
230	½	0.37	6.3	348	553	883	1398	2175	3467	5505	8753	11044	13942	17564
	¾	0.55	8.3	264	420	670	1061	1651	2632	4178	6644	8383	10582	13332
	1	0.75	9.7	226	359	573	908	1413	2252	3575	5685	7173	9055	11408
	1½	1.1	11.1	197	314	501	793	1234	1968	3124	4968	6268	7913	9969
	2	1.5	12.2	180	286	456	722	1123	1790	2843	4520	5703	7199	9070

### All Models – Service Entrance to Controller

Controller Input	Motor HP	Copper Wire Size 75°C Insulation Exposed to a Maximum of 50°C (122°F) Ambient Temperature ②																	
		14	12	10	8	6	4	3	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500
230V 1 PH	¾	279	445	706	1020	1608	2552	3186	4019	5065	6383	8055							
	1	226	360	571	824	1300	2064	2576	3250	4095	5161	6513	8201						
	1½	*	<b>286</b>	455	657	1036	1644	2052	2589	3262	4111	5188	6533	8236	9710				
	2	*	*	<b>331</b>	478	754	1197	1495	1886	2376	2995	3779	4759	5999	7073	8455	9852		
	3	*	*	<b>246</b>	355	561	890	1111	1401	1766	2225	2808	3536	4458	5256	6283	7321	8343	
	5	*	*	*	<b>218</b>	<b>343</b>	545	680	858	1081	1363	1720	2165	2730	3219	3847	4483	5109	6348

### 3A520, 30, 50 Controller to Motor – Controllers with 3Ø Motors

Controller Output	Motor HP	Copper Wire Size 75°C Insulation Exposed to a Maximum of 50°C (122°F) Ambient Temperature ②																	
		14	12	10	8	6	4	3	2	1	1/0	2/0	3/0	4/0	250	300	350	400	500
230V 3 PH	¾	690	1100	1748	2523	3978	6316	7884	9945										
	1	558	890	1413	2040	3216	5106	6375	8041										
	1½	445	709	1126	1625	2562	4068	5078	6406	8072									
	2	324	516	820	1184	1866	2963	3699	4666	5879	7410	9351							
	3	241	384	609	880	1387	2202	2749	3467	4369	5506	6949	8750						
	5	*	235	373	539	849	1348	1683	2123	2675	3372	4255	5358	6755	7964	9520			

① Reduce lengths by 13% for 200 V systems.

\* Wire does not meet the N.E.C. ampacity requirement.

② Lengths in bold require 90° C wire.

■ Shading indicates 40° C maximum ambient.

The lengths in each of the Wire Sizing tables represent 100% of the allowable voltage drop when motor is running at full load. When sizing wire, the voltage drop of each wire segment must be included. The total must not exceed 100% of the allowable drop. Take for example a 1.5 HP motor with a distance from Service Entrance to Controller of 100' and 500' between the Controller and Motor.

- Service Entrance to Controller = 100' of 10 AWG (100/455) = 22 % (455' is from the S.E. to Controller chart)
  - Controller to Motor = 500' of 12 AWG (500/709) = 71 % (709' is from the Controller to Motor chart)
- Total Drop (must be ≤ 100%)      93 %

If the distance from the Controller to Motor was 600' (600/709) = 85% + 22% = 107%, we would need to use #10 wire for that segment, ex. 600/1126 = 53% + 22% (for 100' of #10) = 75% which is acceptable. It is also acceptable to use different wire sizes for the Buried and Well sections of wire.

### 3Ø, 4" MOTORS – ELECTRICAL DATA, 60 HERTZ 3450 RPM

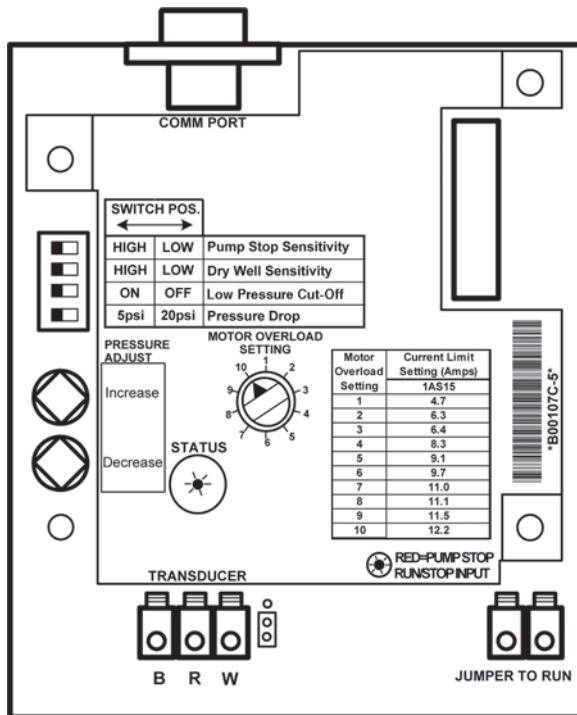
CentriPro #	Red Jacket #	HP	kW	Volts	SF	Full Load		Service Factor		Locked Rotor Amps	Line - Line Resistance
						Amps	Watts	Amps	Watts		
M07430	75C323	0.75	0.55	200	1.5	3.8	812	4.5	1140	32	2.6-3.0
M10430	100C323	1	0.75		1.4	4.6	1150	5.5	1500	29	3.4-3.9
M15430	150C323	1.5	1.1		1.3	6.3	1560	7.2	1950	40	1.9-2.5
M20430	200C323	2	1.5		1.25	7.5	2015	8.8	2490	51	1.4-2.0
M30430	300C323	3	2.2		1.15	10.9	2890	12.0	3290	71	0.9-1.3
M50430	500C323	5	3.7		1.15	18.3	4850	20.2	5515	113	0.4-0.8
M07432	75C313	0.75	0.55	230	1.5	3.3	850	3.9	1185	27	3.3-4.3
M10432	100C313	1	0.75		1.4	4.0	1090	4.7	1450	26.1	4.1-5.1
M15432	150C313	1.5	1.1		1.3	5.2	1490	6.1	1930	32.4	2.8-3.4
M20432	200C313	2	1.5		1.25	6.5	1990	7.6	2450	44	1.8-2.4
M30432	300C313	3	2.2		1.15	9.2	2880	10.1	3280	58.9	1.3-1.7
M50432	500C313	5	3.7		1.15	15.7	4925	17.5	5650	93	.85-1.25

### 1Ø, 4" MOTORS – ELECTRICAL DATA, 60 HERTZ 3450 RPM

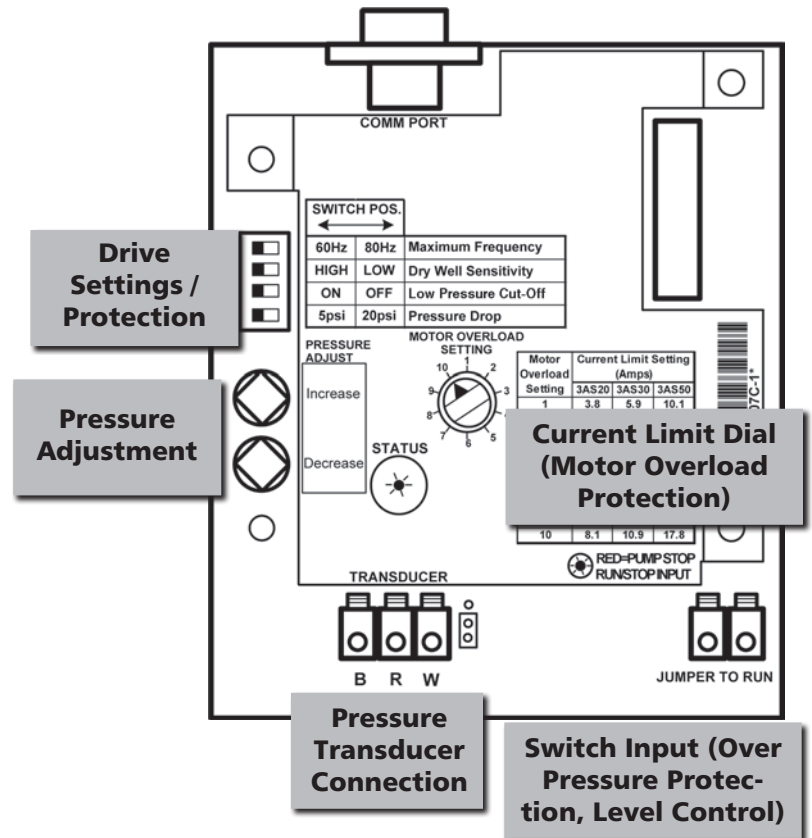
Type	Motor Order Number		HP	KW	Volts	SF	Full Load		Service Factor		Locked Rotor Amps	Winding Resistance	
	CentriPro	Red Jacket					Amps	Watts	Amps	Watts		Main	Start
2 Wire PSC	M05422	50C211	0.5	0.37	230	1.6	3.7	834	4.7	1073	19.5	4.5-5.2	–
	M07422	75C211	0.75	0.55		1.5	5.0	1130	6.4	1459	24.8	3.0-4.8	–
	M10422	100C211	1.0	0.75		1.4	7.9	1679	9.1	1990	21.7	4.2-5.2	–
	M15422	150C211	1.5	1.1		1.3	9.2	2108	11.0	2520	42.0	1.9-2.3	–
3 Wire	M05412	50C311	0.5	0.37		1.6	5.5	745	6.3	1033	22.3	4.2-4.9	17.4-18.7
	M07412	75C311	0.75	0.55		1.5	7.2	1014	8.3	1381	32.0	2.6-3.6	11.8-13
	M10412	100C311	1	0.75		1.4	8.4	1267	9.7	1672	41.2	2.2-3.2	11.3-12.3
	M15412	150C311	1.5	1.1		1.3	9.7	1693	11.1	2187	47.8	1.6-2.3	7.9-8.7
	M20412	200C311	2	1.5	1.25	9.9	2170	12.2	2660	49.4	1.6-2.2	10.8-12.0	

### USER INTERFACE BOARD

#### 1AS Controllers



#### 3AS Controllers



The AQUAVAR SOLO™ 1AS15 model 30-60 hertz speeds only.

The AQUAVAR SOLO™ 3AS models provide the option of operating the system at either 30-60 or 30-80 hertz speeds.

Controller	30 - 60 Hertz (Standard Speed) Setting		30 - 80 Hertz (High Speed) Setting	
	Water End	Motor HP	Water End	Motor HP
3AS20	1	1	1/2	1
3AS20	1 1/2	1 1/2	3/4	1 1/2
3AS20	2	2	1	2
3AS30	1 1/2	1 1/2	3/4	1 1/2
3AS30	2	2	1	2
3AS30	3	3	1 1/2	3
3AS50	5	5	3	5

When using the "80 hertz" setting with mis-matched water ends and motors, use the larger pump curve as the top curve. The bottom, or 30 hertz, curve is calculated using the smaller wet end curve and the Affinity Laws. The ProPak Bulletins have curves. See BGPROPAK60 or BGPROPAK80 for curves.



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