

FAMILY OWNED



AMERICAN PROUD™

4" Submersible Motors

Application Guide

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FW2290
0525

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1/2 through 2 HP Single Phase
1/2 through 3 HP Three Phase



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Model Number and Date Codes

F&W Date Code Explanation



21 A K - 01 - 001

Calendar Year

Month

(A = Jan, etc.

Letter "I" is not used)

Manufacturing
Facility

Sequence of Motor

Day of Month

DOE Compliance

PUMP MODEL	Impeller Dia.	P.E.I.Cl.
4F35	3.072"	0.89
4F55	3.075"	0.93
4F85	3.070"	0.99

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4" Submersible Motors

Motor Specifications & Fuse Sizing

60HZ SINGLE PHASE							Fuse or Circuit Breakers Amp	
							MAXIMUM PER NEC	
	HP	Volt.	F&W Motor PN	Max. Amps	Winding Res. (Ohms)	LR Amps	Dual Element Time Delay Fuse	Circuit Breaker
2 Wire	1/2	115	137412	12	1.1-1.4	64	20	30
	1/2	230	137414	6	4.1-5.3	32	10	15
	3/4	230	137416	8	2.9-3.7	40	15	20
	1	230	137418	10.4	2.2-2.8	48	20	30
	1-1/2	230	137420	13.1	1.6-2.0	65.5	20	30
3 Wire	1/2	115	137426	12	M 1.1-1.4 A 4.3-5.3	48	20	30
	1/2	230	137428	6	M 4.1-5.3 A 18.0-21.9	23	10	15
	3/4	230	137430	8	M 2.9-3.7 A 11.0-13.5	39	15	20
	1	230	137432	10.4	M 2.2-2.8 A 10.2-12.6	42	20	25
	1-1/2	230	137434	11.5	M 1.7-2.2 A 7.8-9.6	52	20	30
	2	230	137435	13.2	M 1.8-2.5 A 5.4-7.0	50	20	30

*M = Main Res. (Yellow to Black)

*A= Aux. Res. (Yellow to Red)

4" Submersible Motors

Motor Specifications & Fuse Sizing

60HZ THREE PHASE - 3 WIRE					
HP	Volt.	F&W Motor PN	Max. Amps	Winding Res. (Ohms)	LR Amps
1/2	230	137585	2.9	9.5-10.9	15.2
1/2	460	137591	1.5	38.4-44.1	7.6
3/4	230	137586	3.8	6.8-7.8	21.4
3/4	460	137592	1.9	27.2-30.9	10.7
1	230	137587	4.7	4.9-5.6	26.9
1	460	137593	2.4	19.9-23.0	13.5
1-1/2	230	137588	5.9	3.2-4.0	33.2
1-1/2	460	137594	3.1	13.0-16.0	16.6
2	230	137589	8.1	2.3-3.0	45
2	460	137595	4.1	9.2-12.0	22.5
3	230	137590	10.9	1.8-2.2	60.3
3	460	137596	5.5	7.2-8.8	31

Using an ohmmeter, check the resistance between cables as follows:

Unknown Value	Known Value
Cable 1 to Cable 2	Lowest - Black to Yellow
Cable 1 to Cable 3	Intermed. - Red to Yellow
Cable 2 to Cable 3	Highest - Black to Red



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4" Submersible Motors

Submersible Pump Cable Selection

60°C Insulation									
VOLTS	HP	WIRE SIZE (AWG)							
		14	12	10	8	6	4	3	2
		LENGTH IN FEET							
115	1/2	105	160	265	400	625	950	1150	1470
230	1/2	420	650	1070	1615	2500	3810	4620	5880
	3/4	315	485	800	1210	1875	2855	3465	4410
	1	245	375	615	930	1440	2200	2665	3390
	1.5 (3W)	205	320	530	800	1240	1905	2320	2965
	1.5 (2W)	190	295	490	740	1145	1745	2115	2690
	2	160	250	415	635	1000	1550	1905	2465

75°C Insulation									
VOLTS	HP	WIRE SIZE (AWG)							
		14	12	10	8	6	4	3	2
		LENGTH IN FEET							
115	1/2	100	155	255	385	595	910	1105	1410
230	1/2	400	620	1020	1540	2390	3645	4420	5635
	3/4	300	465	765	1155	1790	2735	3315	4230
	1	230	355	590	890	1380	2100	2250	3255
	1.5 (3W)	200	305	505	765	1190	1825	2220	2840
	1.5 (2W)	185	280	465	705	1095	1670	2025	2580
	2	155	240	395	605	955	1480	1820	2360

4" Submersible Motors

Submersible Pump Cable Selection

Three-Phase 60°C & 75°C Insulation									
VOLTS	HP	WIRE SIZE (AWG)							
		14	12	10	8	6	4	3	2
		LENGTH IN FEET							
230	1/2	930	1490	2350	3700	5760	8910		
	3/4	670	1080	1700	2580	4190	6490	8060	9860
	1	560	910	1430	2260	3520	5460	6780	8290
	1.5	420	670	1060	1671	2610	4050	5030	6160
	2	320	510	810	1280	2010	3130	3890	4770
	3	240	390	620	990	1540	2400	2980	3660
460	1/2	3770	6020	9460					
	3/4	2730	4350	6850					
	1	2300	3670	5770	9070				
	1.5	1700	2710	4270	6730				
	2	1300	2070	3270	5150	8050			
	3	1000	1600	2520	3970	6200			

Lengths listed meet the NEC ampacity requirements for either individual conductors or jackets 60°C or 75°C cable and can be in conduit or direct buried.

NEC and local codes should be followed and observed for any other cable being used.

Cable lengths listed are calculated to allow a 5% voltage drop per NEC for alternating current. If a 3% voltage drop is desired, the values listed should be multiplied by 0.6 to obtain the maximum cable length.

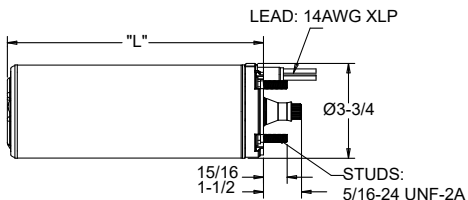


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4" Submersible Motors

Motor Dimensions



SINGLE PHASE		"L"
HP	Wire	SS
1/2	2 and 3	10.10
3/4	2 and 3	11.23
1	2 and 3	12.10
1-1/2	2	15.43
1-1/2	3	14.06
2	3	15.43

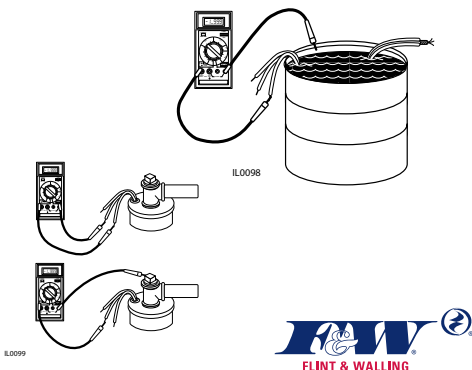
THREE PHASE		"L"
HP	Wire	SS
1/2	3	10.10
3/4	3	11.23
1	3	11.23
1-1/2	3	12.10
2	3	14.06
3	3	15.56



4" Submersible Motors

Insulation Resistance Test

1. This test is recommended when the splicing is complete and pump is being test run in a tank of water or installed in the well.
2. Confirm multimeter ohmmeter function by clipping the leads together and verifying resistance readings $<0.2\Omega$
3. Clip one multimeter lead to bare cable end.
4. Clip the other lead to motor ground wire with pump and cable submerged.
5. Insulation Readings for installed motor:
 - A. 2,00,000 ohms or greater indicates excellent insulation condition.
 - B. 500,000-2,000,000 ohms indicates motor is in good condition.
 - C. Less than 500,000 ohms indicates damaged insulation.



4" Submersible Motors

Submersible Control Boxes



Model	HP	Volt	Amp	KW	Phase	Weight		Size (In.)
						Lbs.	KG	
022875	1/2	115	12	0.37	1	3	1.4	9 x 3.5 x 5.5
022876	1/2	230	6	0.37	1	3	1.4	9 x 3.5 x 5.5
022877	3/4	230	8	0.55	1	3	1.4	9 x 3.5 x 5.5
022878	1	230	10.4	0.75	1	3	1.4	9 x 3.5 x 5.5
022879	1-1/2	230	8.0/11.5	1.10	1	6.8	3.1	9.5 x 5.9 x 7.7
025242	2	230	13.2	1.50	1	7.1	3.2	9.5 x 5.9 x 7.7
025243	3	230	17	2.20	1	7.1	3.2	9.5 x 5.9 x 7.7
025244	5	230	27.5	3.70	1	10	4.5	15.7 x 5.9 x 7.8



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4" Submersible Motors

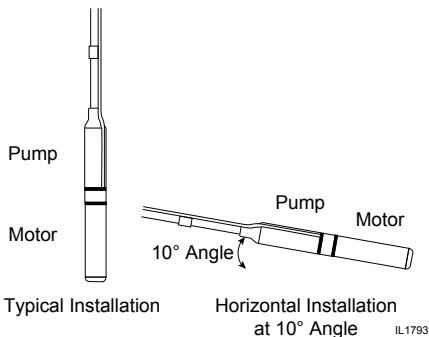
Installation – Vertical vs. Horizontal

The pump is designed to be vertically positioned with the pump end up. The pump applies down thrust onto the motor, which seats the axial bearing firmly into the running position.

If the application requires the pump to be placed **HORIZONTALLY**, it is important to provide the following:

- Minimum 10° angle (motor in the down position)
- Decrease the starts per day
- Avoid open flow pump applications to prevent motor bearing damage

Depending upon the specific application, this will minimize the impact to motor life.



Problem Diagnosis Chart

Symptom — Circuit breaker trips or fuses blow when motor starts

Possible Cause

1. Incorrect voltage
2. Incorrect fuses or circuit breaker
3. Defective pressure switch
4. Control box malfunction
5. Bound pump
6. Defective cable or motor winding
7. Shorted or open motor winding

Symptom — Motor runs but circuit breaker, fuses or motor overload trips

Possible Cause

1. Incorrect voltage
2. Overheated protectors
3. Improperly wired control box
4. Defective cable or motor winding
5. Defective pump

Symptom — Motor does not start and circuit breaker or fuses are NOT tripped

Possible Cause

1. No power
2. Defective pressure switch
3. Defective wiring



Symptom — Pump runs, but delivers little or no water

Possible Cause

1. Air locked pump
2. Low water level in well
3. Check valve stuck or installed improperly
4. Leak in drop pipe
5. Pump screen blocked
6. Worn pump

Symptom — Pump keeps running

Possible Cause

1. Pressure switch
2. Low level well
3. Leak in system
4. Misapplied pump

Symptom — Pump starts too often

Possible Cause

1. Pressure switch
2. Leak in system
3. Check valve
4. Water-logged tank
5. Pressure tank too small



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[illegible]



Groundwater Support Team
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