

# CentriPro

## BALANCED FLOW<sup>®</sup>

BF20, BF30 and BF50  
Constant Pressure Controllers for  
 $\frac{3}{4}$  - 2, 3 and 5 HP Submersible Pumps



### 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 restarts.
- **Broken Pipe:** 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 15' 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.

### AGENCY LISTINGS



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

*Engineered for life*

## **BALANCED FLOW CONTROLLER – NEW FEATURES**

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New, more versatile user interface board

- Provides switch connection for optional pressure or level switch **(A)**
  - N.O. ① Float – use to pump down – empty a tank or for low water protection
  - N.C. ② Float – use to pump up – fill a tank or pond
  - Pressure Switch – use for over-pressure protection
- New current limit settings for all new CentriPro motors **(B)**
- Dry well sensitivity switch **(C)**
- Broken pipe protection **(D)**
- 5 or 20 PSI pressure drop restart switch **(E)**
- Transducer better protected from transient power surges

① Normally Open – switch contacts are open in the hanging (down) position.

② Normally Closed – switch contacts are closed in the hanging (down) position.

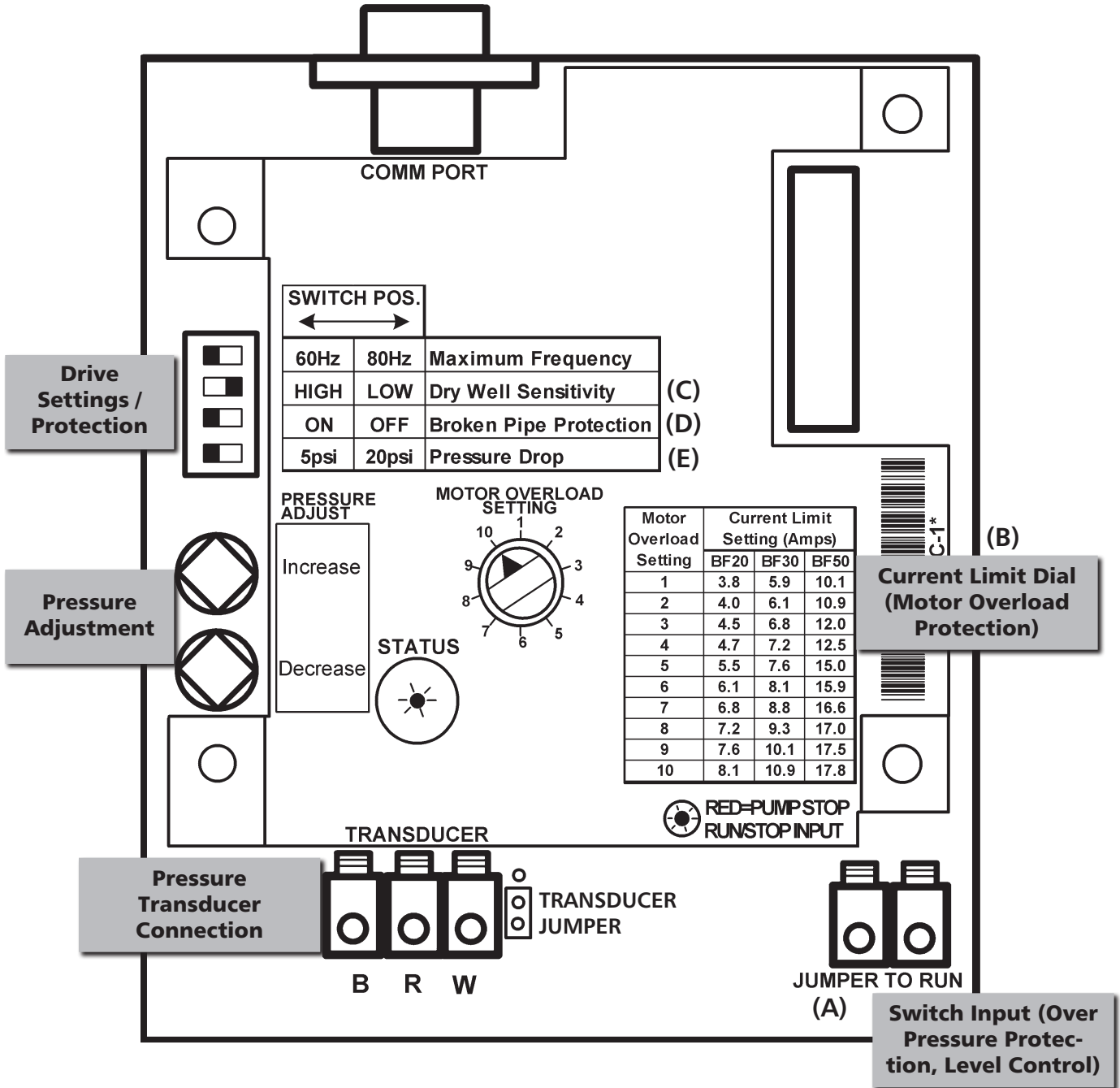
## **TRANSDUCER – NEW AND IMPROVED**

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- Larger port orifice to prevent clogging
- Case to electronics surge protection
- All Stainless Steel construction
- Pressure surge capability without the use of a pressure snubber
- Case coupled noise immunity
- Reverse voltage protection
- Line to electronics ground surge protection on all lines
- Transducer cable has ground wire built-in
- Ground clamp provided for transducer to cable grounding

**Log on to [www.centripro.com](http://www.centripro.com), click on either the Goulds Pumps or Red Jacket logo, click on Electrical Controls Water, click on Balanced Flow Controller. You will see all Balanced Flow data.**

## USER INTERFACE BOARD



## SPECIFICATIONS

### ALL BALANCED FLOW CONTROLLERS

#### Controller Temperature Range:

- Minimum Ambient Temperature: 0°F
- 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 WE and Motor
- 30 - 80 Hz - Use mis-matched WE and Motor

#### Enclosure Dimensions:

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

#### Packaged Dimensions:

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

### BF20 SPECIFICATIONS

- HP Range:  $\frac{3}{4}$  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

### BF30 SPECIFICATIONS

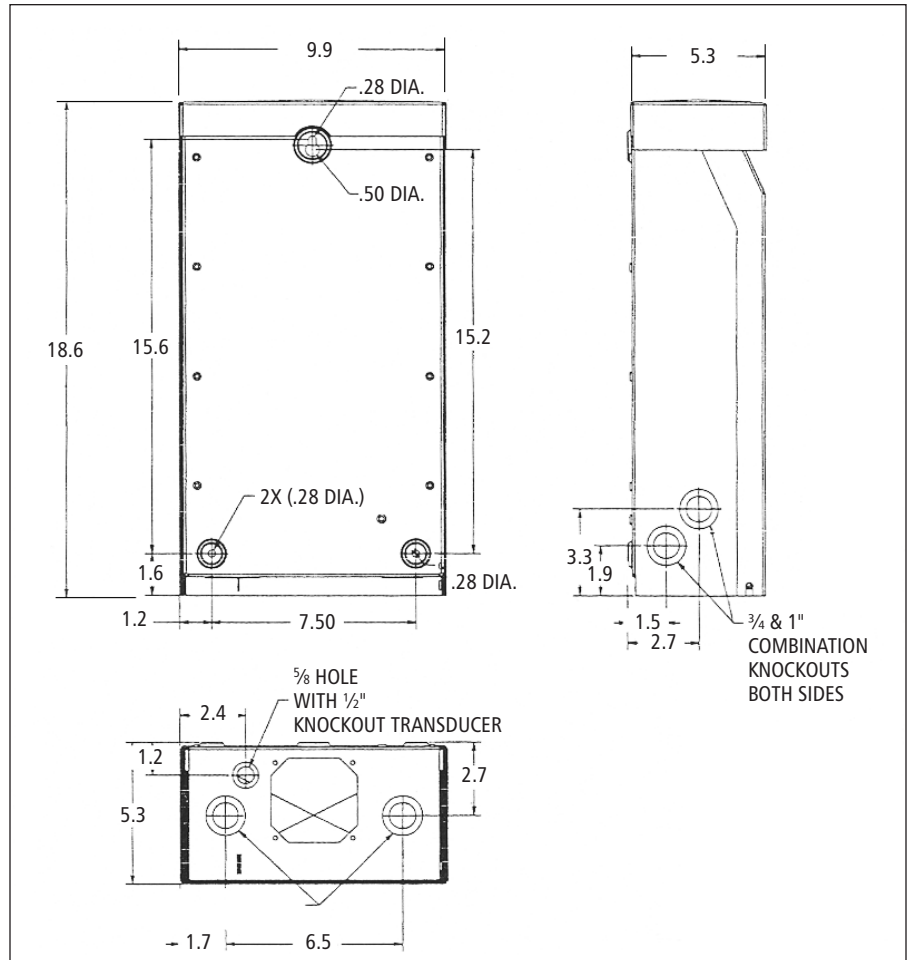
- HP Range:  $\frac{3}{4}$  to 3
- Unit Weight: 20 lbs.
- Packaged Weight: 24 lbs.
- Pressure Set point adjustable from 20 - 85 psi using the standard 100 psi sensor. ①

### BF50 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 7.

## DIMENSIONS (inches)



## WIRE SIZING – MAXIMUM CABLE LENGTHS IN FEET TO LIMIT VOLTAGE DROP TO 5% FOR 230 V SYSTEMS ⑤

### 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 ⑥															
		14	12	10	8	6	4	2	1/0	2/0	3/0	4/0	250	300	350	400	500
230V 1 PH	½	366	583	925	1336	2107	3345	5267	8364								
	¾	279	445	706	1020	1608	2552	4019	6383	8055							
	1	226	360	571	824	1300	2064	3250	5161	6513	8201						
	1½	*	<b>286</b>	455	657	1036	1644	2589	4111	5188	6533	8236	9710				
	2	*	*	<b>331</b>	478	754	1197	1886	2995	3779	4759	5999	7073	8455	9852		
	3	*	*	<b>246</b>	355	561	890	1401	2225	2808	3536	4458	5256	6283	7321	8343	
	5	*	*	*	<b>218</b>	<b>343</b>	545	858	1363	1720	2165	2730	3219	3847	4483	5109	6348

### Controller to Motor

Controller Output	Motor HP	Copper Wire Size 75°C Insulation Exposed to a Maximum of 50°C (122°F) Ambient Temperature ⑥														
		14	12	10	8	6	4	2	1/0	2/0	3/0	4/0	250	300		
230V 3 PH	½	905	1442	2290	3306	5213	8276									
	¾	690	1100	1748	2523	3978	6316	9945								
	1	558	890	1413	2040	3216	5106	8041								
	1½	445	709	1126	1625	2562	4068	6406								
	2	324	516	820	1184	1866	2963	4666	7410	9351						
	3	241	384	609	880	1387	2202	3467	5506	6949	8750					
	5	*	235	373	539	849	1348	2123	3372	4255	5358	6755	7964	9520		

⑤ Reduce lengths by 13% for 200 V systems.

⑥ Lengths in bold require 90°C wire. Shading indicates 40° C maximum ambient.

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

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.

## ELECTRICAL DATA, 60 HERTZ, 3450 RPM, 4" MOTORS

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

## CONTROLLER, BREAKER, GENERATOR SIZING

3 Phase Motor		Controller Model ②			Circuit Breaker ③	Generator ④ (VA)
HP	Voltage ①	BF20	BF30	BF50		
¾	230				15	2900
	200					
1	230				20	3500
	200					
1½	230				30	6100
	200					
2	230				40	8100
	200					
3	230				50	13300
	200					

## SERVICE FACTOR AMPS 3 PHASE MOTORS

HP	230 Volt, 3Ø		200V, 3Ø	
	CentriPro SFA	Franklin SFA	CentriPro SFA	Franklin SFA
¾	4.0	3.8	4.5	4.4
1	4.7	4.7	5.5	5.4
1½	6.1	5.9	7.2	6.8
2	7.6	8.1	8.8	9.3
3	10.1	10.9	12	12.5
5	17.5	17.8	20.2	20.5

### NOTES:

- ① Motor Nameplate must be the same as supply voltage.
- 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.

The Balanced Flow® provides 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
BF20	1	1	½	1
BF20	1½	1½	¾	1½
BF20	2	2	1	2
BF30	1½	1½	¾	1½
BF30	2	2	1	2
BF30	3	3	1½	3
BF50	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.

Our website has 30-60 and 30-80 hertz curves posted in pdf format for your use.

## PRESSURE RANGES FOR ALL AVAILABLE TRANSDUCERS

Transducer	BF20		BF30		BF50	
	Minimum PSI	Maximum PSI ③	Minimum PSI	Maximum PSI ③	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 BF20 and BF30    ② Standard on BF50    ③ Effective August, 2009

**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.

## 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.

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.



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