

# WATER PRESSURE BOOSTER SYSTEMS

## SUBMITTAL DATA



### APPLICATION

Applications include commercial, industrial, and other installations requiring a boost in water pressure.

**The Penn Pump & Equipment Company** Water Pressure Booster System will efficiently provide a steady downstream pressure regardless of a varying flow rate and/or varying inlet pressure.

### DESIGN FEATURES

- Professionally engineered components
- Compact design minimizes floor space
- Single source responsibility
- Factory assembled and tested



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### PROJECT INFORMATION

Project Name:		Model No. Ordered:
Customer:		Total Capacity:
Engineer:		Boost Pressure:
Reference:	Penn Pump Project Number:	Motor HP:
Date:	PO Number:	Voltage:

***SPECIFY WITH CONFIDENCE, SPECIFY PENN PUMP SYSTEMS***

# WATER PRESSURE BOOSTER SYSTEMS: SERIES WPB

## SUBMITTAL DATA

Furnish and install a packaged water pressure booster system series WPB as manufactured by **Penn Pump & Equipment Company, Inc.**, of Hatfield, PA (215-997-6100). The packaged and tested system shall provide the capacity as scheduled on the drawings.

- A. The pump shall be all stainless steel, end suction, close coupled centrifugal type with a minimum of 175 psi case working pressure, equipped with a 304SS shaft sleeve and a mechanical seal. The pump shall include a bronze modulating thermal safety valve to prevent overheating of the pump casing.
- B. Each pump shall include a 200psi lug style butterfly isolation valve on the inlet and outlet of each pump for ease of service of the pump or check valve, and a VFD compatible wafer check valve. All pump branches and valves are to be 2.5" to minimize pump system friction loss.
- C. Provide a NEMA 1 system logic controller mounted and wired to contain:
  - Single point power connection
  - Main disconnect switch with cover interlock
  - Individual motor circuit protectors
  - Variable Frequency Drives, each with a pressure transducer
  - HOA selector keypad buttons
  - No flow system shut down
  - Electronic pump alternation
  - Lead pump failure protection
  - Low suction shut down
  - High System pressure shutdown with alarm light
  - Remote monitoring contacts
- D. The packaged pumping system shall be factory assembled and tested with Schedule 10 304 Stainless Steel piping and shall include pressure gauges. It shall be cleaned and painted with a high grade enamel prior to shipment. The service of a factory trained representative shall be made available on the project site for start-up and instructing operating personnel.



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# WATER PRESSURE BOOSTER SYSTEMS

## SUBMITTAL DATA

Model Number	GPM Each Pump	Pump Head		Pump HP	Header Size Suction Discharge	Pump Model	Model Number	GPM Each Pump	Pump Head		Pump HP	Header Size Suction Discharge	Pump Model
		PSI	Feet						PSI	Feet			
WPB-6020	60	20	45	2	3" Duplex	323JM	WPB-16020	160	20	45	3	4" Duplex	324JM
6030		30	70	2		323JM	16030		30	70	5		324JM
6040		40	95	3		323JM	16040		40	95	7.5		324JM
6050		50	115	5	3" Triplex	324JM	16050		50	115	7.5	6" Triplex	324JM
6060		60	140	5		324JM	16060		60	140	10		324JM
6070		70	160	5		324JM	16070		70	160	10		327JM
6080		80	185	7.5		327JM	16080		80	185	15		327JM
WPB-8020	80	20	45	2	3" Duplex	323JM	WPB-18020	180	20	45	3	4" Duplex	326JM
8030		30	70	3		323JM	18030		30	70	5		326JM
8040		40	95	5		323JM	18040		40	95	7.5		324JM
8050		50	115	5	3" Triplex	324JM	18050		50	115	7.5	6" Triplex	324JM
8060		60	140	5		324JM	18060		60	140	10		324JM
8070		70	160	7.5		324JM	18070		70	160	15		327JM
8080		80	185	10		325JM	18080		80	185	15		327JM
WPB-10020	100	20	45	2	3" Duplex	323JM	WPB-20020	200	20	45	3	4" Duplex	326JM
10030		30	70	3		323JM	20030		30	70	5		326JM
10040		40	95	5		323JM	20040		40	95	7.5		327JM
10050		50	115	5	4" Triplex	324JM	20050		50	115	10	6" Triplex	327JM
10060		60	140	7.5		324JM	20060		60	140	10		327JM
10070		70	160	7.5		324JM	20070		70	160	15		328JM
10080		80	185	10		325JM	20080		80	185	15		328JM
WPB-12020	120	20	45	2	3" Duplex	324JM	WPB-25020	250	20	45	5	4" Duplex	326JM
12030		30	70	3		324JM	25030		30	70	7.5		326JM
12040		40	95	5		324JM	25040		40	95	7.5		327JM
12050		50	115	7.5	4" Triplex	324JM	25050		50	115	10	6" Triplex	327JM
12060		60	140	7.5		324JM	25060		60	140	15		327JM
12070		70	160	7.5		324JM	25070		70	160	15		328JM
12080		80	185	10		325JM	25080		80	185	20		328Z
WPB-14020	140	20	45	3	3" Duplex	324JM	WPB-30020	300	20	45	7.5	4" Duplex	326JM
14030		30	70	5		324JM	30030		30	70	7.5		326JM
14040		40	95	5		324JM	30040		40	95	10		326JM
14050		50	115	7.5	4" Triplex	324JM	30050		50	115	15	6" Triplex	327JM
14060		60	140	7.5		324JM	30060		60	140	15		327JM
14070		70	160	10		324JM	30070		70	160	20		328Z
14080		80	185	15		325JM	30080		80	185	20		328Z

Note: Selections are 3500 RPM.



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Header options:

- ☐ Grooved (Standard)
- ☐ Class 125/150 ANSI Flanged

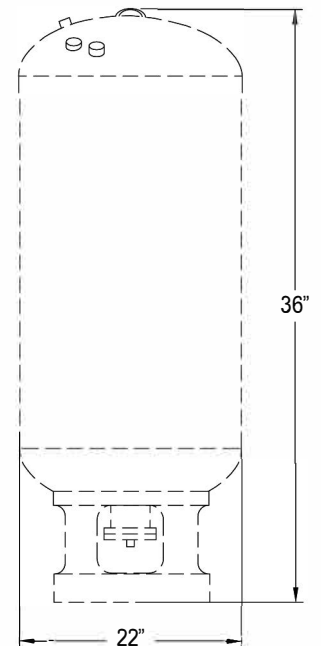
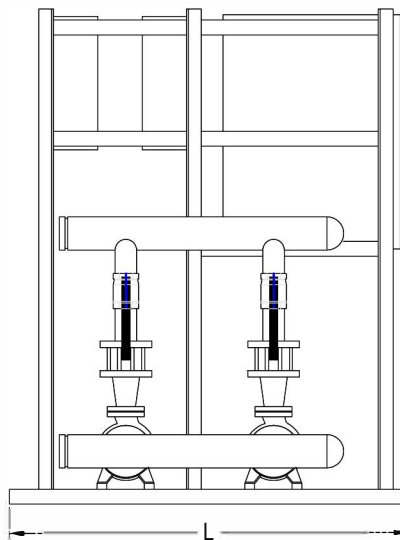
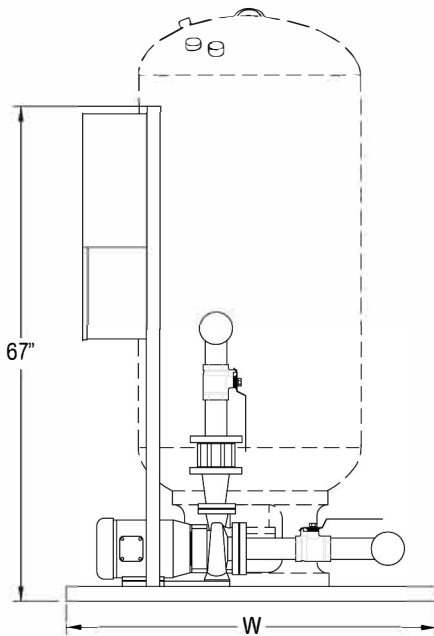
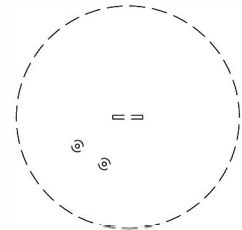
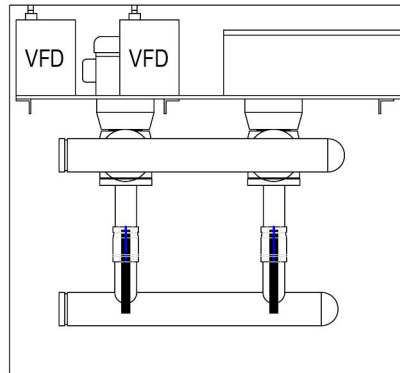
**SPECIFY WITH CONFIDENCE, SPECIFY PENN PUMP SYSTEMS**

NOTES:

1. SYSTEM MANIFOLD CONNECTIONS ARE GROOVED. (CLASS 125/150 ANSI FLANGED OPTIONAL)
2. IF OPTIONAL TANK IS PROVIDED, ONE FIELD CONNECTION IS REQUIRED.
3. DATA IS BASED ON A 44 GALLON TANK. REFER TO TANK DRAWINGS FOR DIMENSIONS AND WEIGHTS OF OTHER MODELS.
4. MAXIMUM SYSTEM PRESSURE MUST NOT EXCEED 175 PSIG OR OPTIONAL ADJACENT TANK PRESSURE RATING.
5. RIGHT HAND SYSTEM IS SHOWN. SPECIFY LEFT HAND IF REQUIRED.
6. FOR DIMENSIONS AND DRY WEIGHT CHOOSE THE LARGEST HP PUMP USED IN THE SYSTEM.
7. CUSTOM DIMENSIONS ARE AVAILABLE, CONSULT FACTORY.
8. 6" HEADERS WILL OVERHANG THE "W" DIMENSION BY 2" FOR 10HP AND 15HP SYSTEMS.

HEADER SIZE AND CONNECTION

- ☐ 3" IPS PIPE 304 SCHEDULE 10 STAINLESS STEEL  
☐ 4" IPS PIPE 304 SCHEDULE 10 STAINLESS STEEL  
☐ 6" IPS PIPE 304 SCHEDULE 10 STAINLESS STEEL
- ☐ GROOVED END (SHOWN)  
☐ CLASS 125/150 ANSI FLANGED (NOT SHOWN)



DIMENSIONS IN INCHES (APPROX.)			SYSTEM WEIGHT IN LBS. (APPROX.)	
HORSEPOWER PER PUMP	L	W	WITHOUT TANK	WITH TANK
2 - 7.5 HORSEPOWER	36	34	1000	1150
10 HORSEPOWER	42	34	1100	1250
15 HORSEPOWER	42	34	1500	1650
20 HORSEPOWER	42	40	1700	1850

Not for construction purposes unless certified.

CERTIFIED BY: \_\_\_\_\_ DATE: \_\_\_\_\_



VARIABLE SPEED DUPLEX END SUCTION WITH CHECK VALVES

PENN PUMP & EQUIPMENT COMPANY, INC.

AND OPTIONAL REMOTE MOUNTED TANK

DATE: 06/05/21

SCALE: NTS

www.pennpump.com

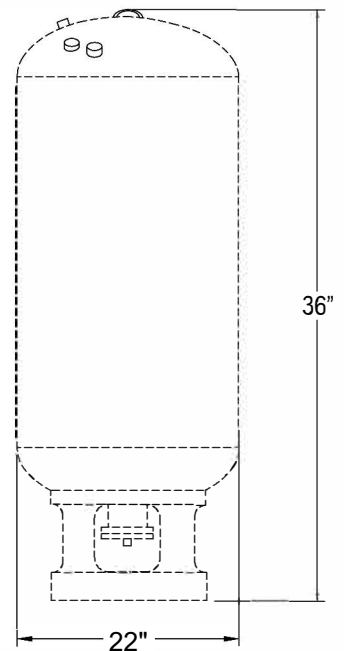
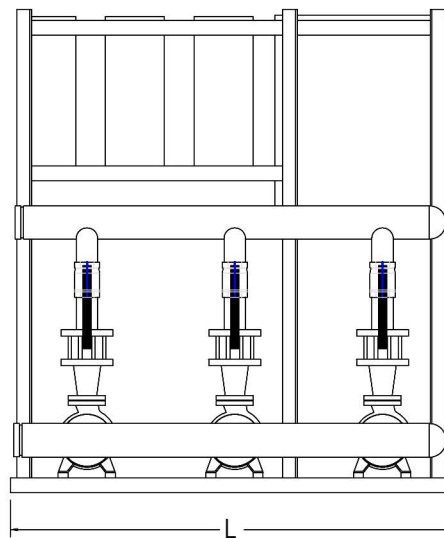
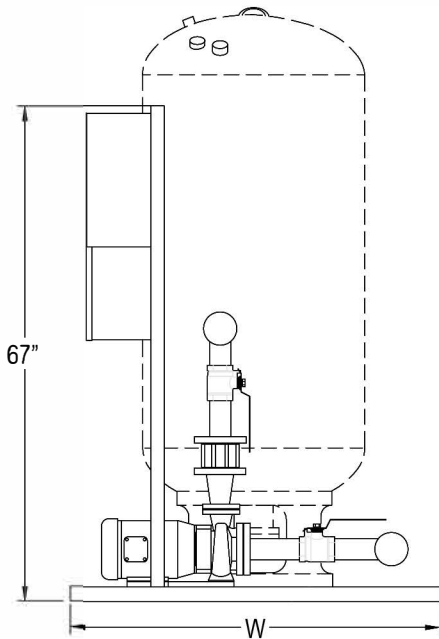
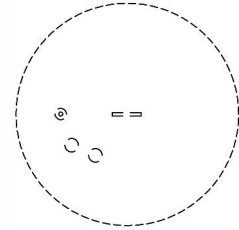
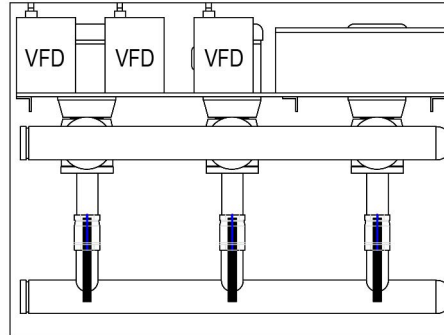
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- ☐ GROOVED END (SHOWN)  
☐ CLASS 125/150 ANSI FLANGED (NOT SHOWN)



DIMENSIONS IN INCHES (APPROX.)			SYSTEM WEIGHT IN LBS. (APPROX.)	
HORSEPOWER PER PUMP	L	W	WITHOUT TANK	WITH TANK
2 - 7.5 HORSEPOWER	52	34	1300	1450
10 HORSEPOWER	60	34	1500	1650
15 HORSEPOWER	60	34	2000	2150
20 HORSEPOWER	60	40	2200	2350

Not for construction purposes unless certified.

CERTIFIED BY: \_\_\_\_\_ DATE: \_\_\_\_\_



VARIABLE SPEED TRIPLEX END SUCTION WITH CHECK VALVES

PENN PUMP & EQUIPMENT COMPANY, INC.

AND OPTIONAL REMOTE MOUNTED TANK

DATE: 06/05/21

SCALE: NTS

www.pennpump.com

# SUBMITTAL DATA

## CENTRIFUGAL PUMPS



### DESIGN FEATURES

- All Stainless Steel construction
- Back pull out design
- Compact design minimizes floor space
- Factory assembled and tested
- Built according to Hydraulic Institute – NEMA Standards

### STANDARD CONSTRUCTION

- Stainless Steel Casing
- Stainless Steel Impeller
- Carbon Steel Shaft
- Stainless Steel Shaft Sleeve
- Open Drip-Proof Motor
- Single Mechanical Seal
- Maximum Working Pressure 175 PSI

### OPTIONS

- TEFC or Explosion-Proof Motors
- High Temperature Seals
- Special Alloy Shaft Seals
- Higher Working Pressure



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The integrated pump specific software and setup parameters, allow the operator to set up specific control values for a wide range of applications. iQpump will automatically adjust pump operating conditions, as the process variables change while still maintaining optimum pump performance and protection.

Most existing systems, which require constant pressure or flow control, are using bypass lines, pressure release valves, throttling valves or impeller trim adjustments. The most efficient method is pump speed control. Pump speed control will reduce energy consumption, while maintaining system optimization.

The iQpump Controller can be configured for Simplex, Duplex, Triplex or up to an eight-pump system. One iQpump Controller can be used as a master, which can also control one or two secondary pump motors. The secondary pump motors can be connected using mechanical motor starters, reduced voltage soft starters, or additional iQpump drives. The software is structured in such a way that it only has a few basic pump parameters to be setup to run this application.

The iQpump controller is available from 5 to 500 horsepower. In addition to Water Pressure Booster Pumps in Commercial and Industrial applications, the iQpump controller is suitable for a variety of other pumping applications such as Submersible Deep Well Pumps, Storage Tank Level Control, Metering Pumps, and HVAC pumps and fans.

### Drive Performance Features

- Ratings: 5-150 HP, 208 VAC 5-150 HP, 230 / 240 VAC 5-500 HP, 480 VAC
- Overload capacity: nominal 110% for 60 sec. (150% peak)
- Starting torque: 100% at 3 Hz
- Motor preheat function
- Adjustable accel/decel: 0.1 to 6000 sec.
- Controlled speed range: 40:1
- Critical frequency rejection: 3 selectable, adjustable bands
- Torque-limiting: 30-180%
- Energy Saving control
- Torque boost: full range, auto
- Power loss ride-thru: 2 sec.
- Auto restart after power loss or fault reset, selectable, programmable
- Feedback signal loss detection
- Serial communications loss detection
- "Up/Down" floating point control capability (PI)
- Stationary motor auto-tuning
- Pump Sleep function
- Run-permissive input

### Pump Control Features

- Operator Keypad with intuitive pump language
- Hand-Off-Auto
- Programmable Pump Process Set Point
- Pump Start Level & Start Time
- Sleep Protection
- Simplex, Duplex, & Triplex Control
- Automatic System Restart
- No Flow Detection
- Low and High Feedback set points
- Pre-Charge Low Level Control
- Thrust Bearing Control
- Automatic System Stabilization
- Motor Condensation Pre-Heat Function

### Protective Features

- Current-limited stall prevention
- Heat sink over-temperature, speed fold-back
- Bi-directional start into rotating motor
- Current-limiting DC bus fuse
- Optically-isolated controls
- Short circuit protection: Phase-phase and phase-neutral
- Ground fault protection
- Short circuit withstand rating: 100K RMS
- Electronic motor overload: UL
- Current limit
- Fault display: last 10 faults
- Fault circuit: OC, OV, OT
- Over torque and under torque protection

### Pump Protective Features

- Dry Well
- Air in System
- Blocked Impeller
- Pump over Cycling
- No Flow Protection
- Loss of Prime
- Transducer Loss
- Over Torque

### Pump Alarms and Messages

- Low Feedback
- High Feedback
- Low Level
- Low Water
- Pump Over Cycling
- No Flow Detection
- Loss of Prime
- Pump Fault
- Motor Thermostat
- Pre-Charge Mode
- Thrust Bearing Active
- Start Mode Active
- Sleep Mode Active

### Service Conditions

- Ambient Temperature:
- -10°C to 40°C (14° F to 104° F) NEMA 1, -10°C to 45°C (14° F to 113° F) protected chassis
- Humidity: 95% RH, non-condensing
- Altitude: 3300 ft; higher by derate
- Input voltage: +10%/-15%
- Input frequency: 50/60 Hz  $\pm$  5%
- 3-phase, 3-wire, phase sequence insensitive

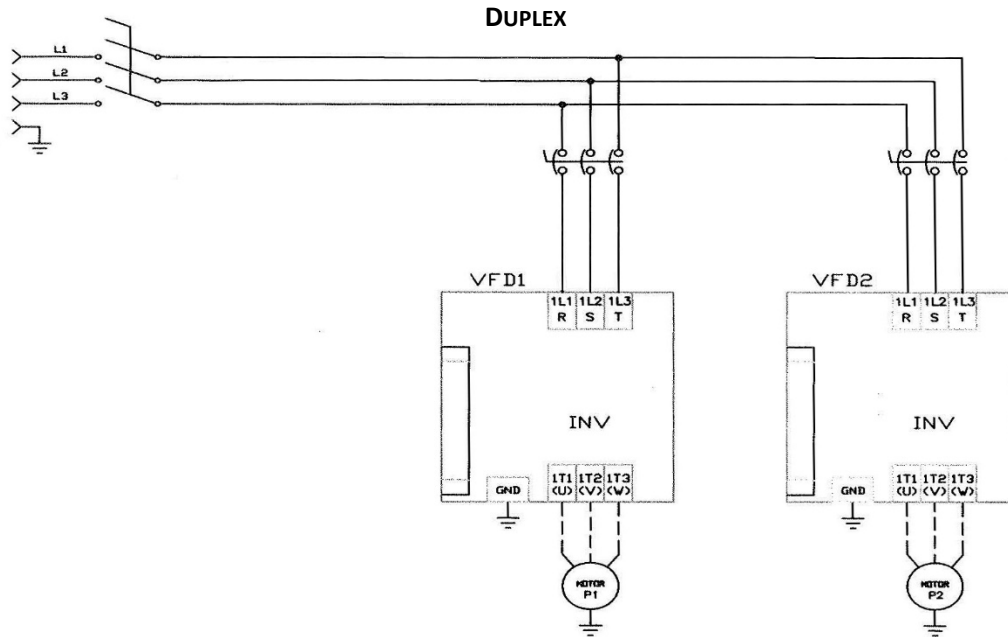
### Design Features

- LCD keypad display, 5 lines x 16 characters, backlit, 6 languages, copy function
- Multi-step speed settings: 5 available
- Setpoint (PI) control
- 32-bit microprocessor logic
- Non-volatile memory, program retention
- Displacement power factor: 0.98
- Output frequency: 0.1 to 120 Hz
- Frequency resolution: 0.06 Hz
- Frequency regulation: 0.1%
- Control Terminal Board: Quick disconnect
- Carrier frequency: selectable to 15 kHz
- 3% DC bus reactor: 30-150 HP, 208 VAC; 30-150 HP, 240 VAC; 40-500 HP, 480 VAC; optional on lower ratings
- 24 VDC control logic, PNP / NPN selectable
- Transmitter/Option power supply
- Input/output terminal status
- Timer function: Elapsed time, Delay on start, Delay on stop
- RS-422/485 port: Modbus protocol
- Volts/hertz ratio: Preset and programmable V/Hz patterns
- Meter Functions: Volt, amp, kilowatt, elapsed run time, speed command
- NEMA 1 or protected chassis
- UL, cUL listed and CE marked; IEC 146;
- MTBF: exceeds 28 years

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# WATER PRESSURE BOOSTER SYSTEMS

## TYPICAL WIRING DIAGRAMS



**APPROXIMATE FULL LOAD AMPS PER MOTOR**

Voltage	Horsepower							
		2	3	5	7 ½	10	15	20
	208	7.5	10.6	16.7	24.2	30.8	46.2	59.4
	230	6.8	9.6	15.2	22	28	42	54
	460	3.4	4.8	7.6	11	14	21	27

**MINIMUM CIRCUIT AMPACITY (MCA)**

Voltage	Horsepower							
		2	3	5	7 ½	10	15	20
	208	18	25	39	55	70	105	135
	230	16	23	35	51	64	96	123
	460	9	12	18	26	33	48	62

**MAXIMUM OVERCURRENT PROTECTION (MOP)**

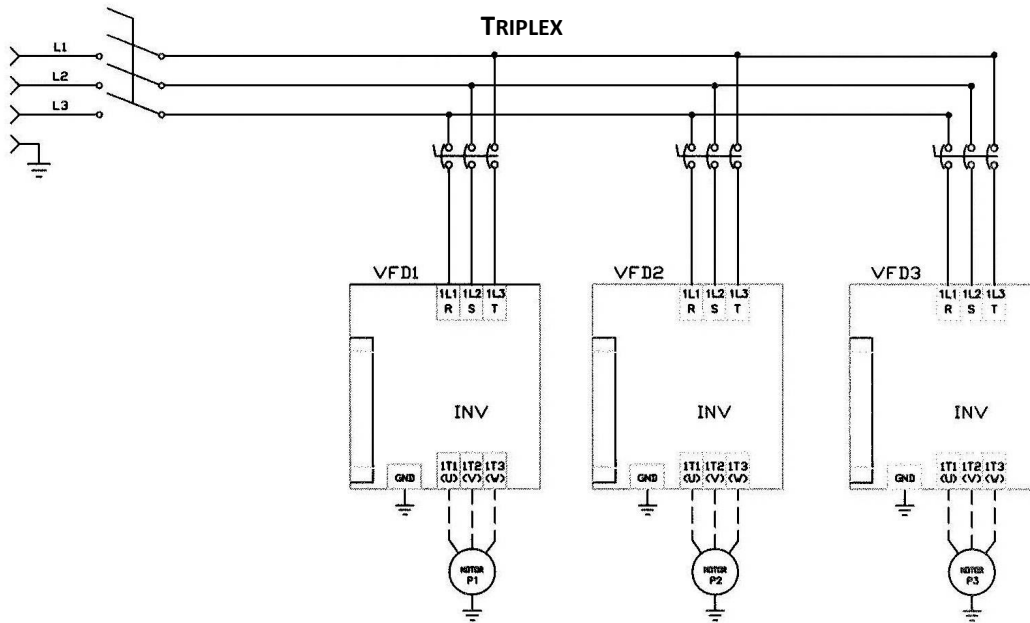
Voltage	Horsepower							
		2	3	5	7 ½	10	15	20
	208	20	30	50	70	100	150	175
	230	20	30	45	70	90	125	175
	460	15	15	25	35	45	60	80

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# WATER PRESSURE BOOSTER SYSTEMS

## TYPICAL WIRING DIAGRAMS



**APPROXIMATE FULL LOAD AMPS PER MOTOR**

Voltage	Horsepower						
	2	3	5	7 ½	10	15	20
208	7.5	10.6	16.7	24.2	30.8	46.2	59.4
230	6.8	9.6	15.2	22	28	42	54
460	3.4	4.8	7.6	11	14	21	27

**MINIMUM CIRCUIT AMPACITY (MCA)**

Voltage	Horsepower						
	2	3	5	7 ½	10	15	20
208	25	35	55	80	101	151	194
230	23	32	50	73	92	138	177
460	12	17	26	37	47	69	89

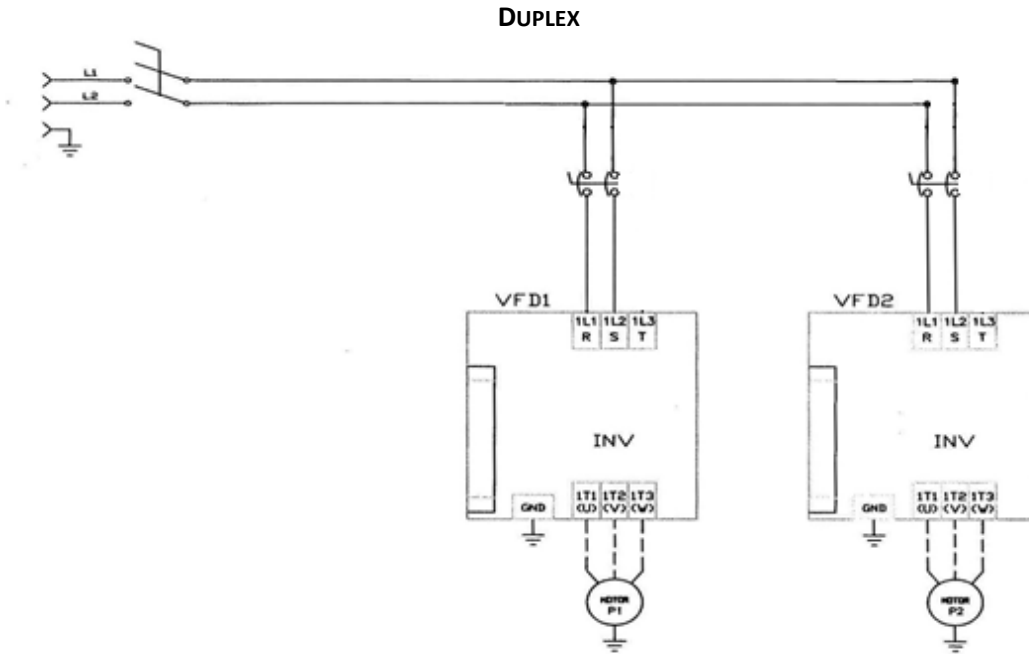
**MAXIMUM OVERCURRENT PROTECTION (MOP)**

Voltage	Horsepower						
	2	3	5	7 ½	10	15	20
208	30	45	70	100	125	175	250
230	25	40	65	90	110	175	225
460	15	20	30	45	60	80	110

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# WATER PRESSURE BOOSTER SYSTEMS

## TYPICAL 240V-1PH INPUT WIRING DIAGRAMS



**APPROXIMATE INPUT CURRENT AMPS PER VFD**

Horsepower						
	2	3	5	7 ½	10	15
240v	13.7	19.0	27.0	43.0	62.0	79.0

**MINIMUM CIRCUIT AMPACITY (MCA)**

Horsepower						
	2	3	5	7 ½	10	15
240v	32	44	62	98	141	179

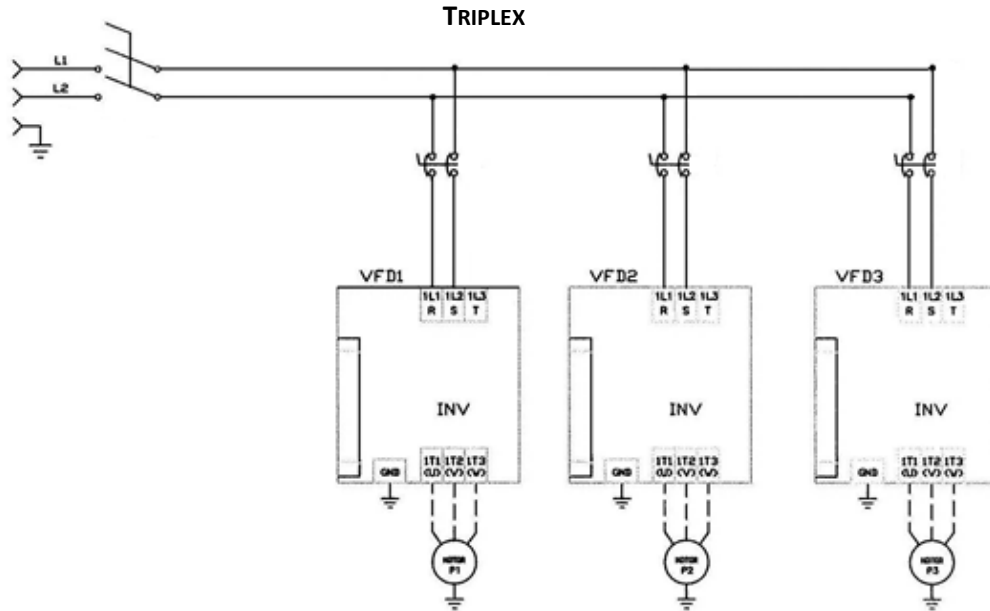
**MAXIMUM OVERCURRENT PROTECTION (MOP)**

Horsepower						
	2	3	5	7 ½	10	15
240v	40	60	80	125	200	250

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# WATER PRESSURE BOOSTER SYSTEMS

## TYPICAL 240V-1PH INPUT WIRING DIAGRAMS



**APPROXIMATE INPUT CURRENT AMPS PER VFD**

Horsepower						
	2	3	5	7 ½	10	15
240v	13.7	19.0	27.0	43.0	62.0	79.0

**MINIMUM CIRCUIT AMPACITY (MCA)**

Horsepower						
	2	3	5	7 ½	10	15
240v	46	63	89	141	203	258

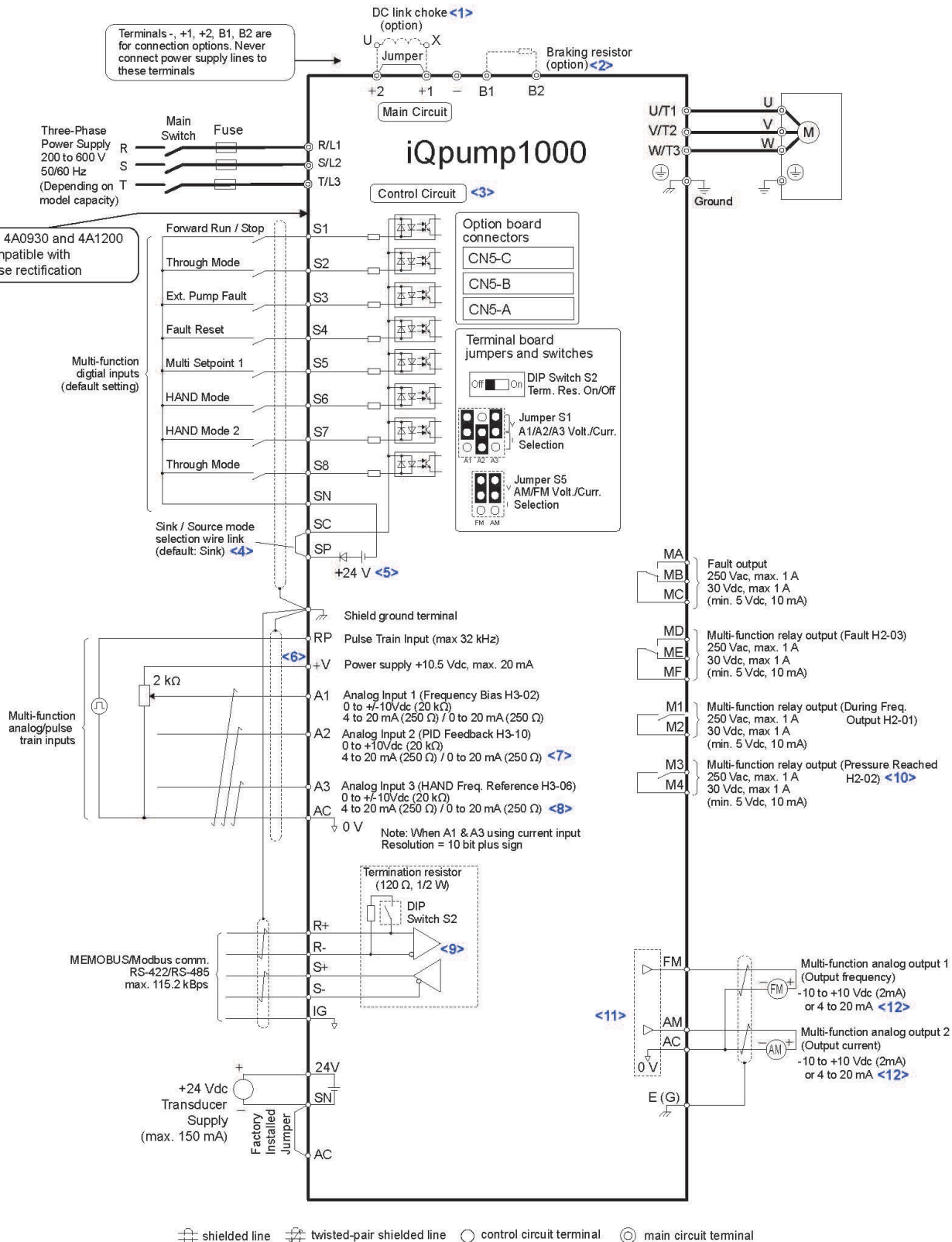
**MAXIMUM OVERCURRENT PROTECTION (MOP)**

Horsepower						
	2	3	5	7 ½	10	15
240v	50	80	110	175	250	300

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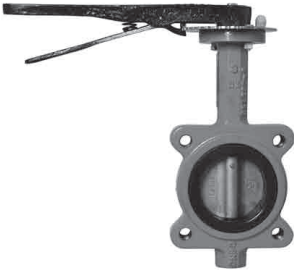
# WATER PRESSURE BOOSTER SYSTEMS

## SUBMITTAL DATA



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### LUG STYLE BUTTERFLY VALVE

Body	Ductile Iron
Stem	416SS
Disc	304SS
Seat	EPDM
Pressure Rating	200 PSI



### VFD COMPATIBLE CHECK VALVE

Body	Epoxy Coated Ductile Iron ASTM A536
Disk	Stainless Steel CF8M 316
Trim	Stainless Steel
Pressure Rating	250 PSI



### THERMAL PURGE VALVE

Body	Brass
Seat	Brass
Spring	300 Series Stainless Steel
Seal	Buna-N
Pressure Rating	300 PSIG
Set Temperature	105°F



### PRESSURE GAUGE - GLYCOL FILLED

Case	Stainless Steel
Bourdon Tube	Brass
Size	2 1/2" Dial
Face	Glass



### HYDRO CUSH TANK (Ships Loose)

Capacity	44 Gallons Standard	86 Gallons Optional
System Connection	Stainless Steel	
Diaphragm	Butyl	
Liner	Polypropylene	
Pressure Rating	150 PSIG	



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