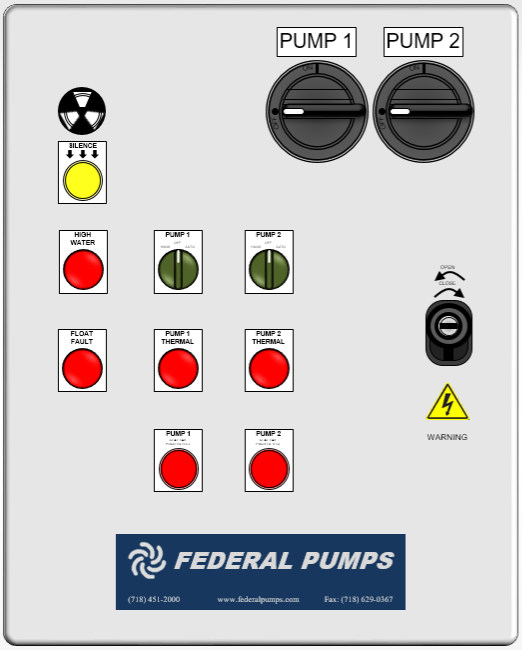
FEDERAL PUMP CORP
1144 UTICA AVENUE, BROOKLYN, NY 11203

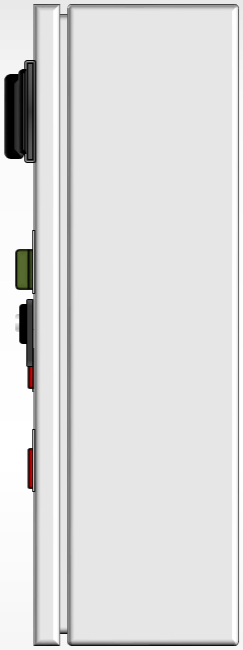
FEDERAL PUMP CORPORATION
Est. 1927

TYPE

SBS

SUBMERS-A-BULB SYSTEM





SUBMERSIBLE BULB ACTIVATED CONTROL PANEL FOR UP TO 50HP POWER SEWAGE OR SUMP SYSTEM.

SIMPLEX & DUPLEX AUTOMATED CONTROL WITH TWO CONTROL STYLES TO KEEP CONTROL WIRING SEALED AND WATERTIGHT

HIGH LIGHT

- Standard NEMA 1,4 & 12 Enclosure
- Automatic control and alternation
- Watertight control design
- Multiplex control options
- Thermal and Moisture Sensor alarm option
- For sewage, effluent, and industrial waste water

INTRODUCTION

The Federal SBS Controller is designed for the control of submersible sewage and sump pumps. However, it can be used for level control of other types of pumps as well. The control system is consisted of a control panel for wall mounting and a pilot device. SBS controllers are available for use with single and duplex pump units

SBS: Control Panel

The standard SBS Control Panel is furnished in a NEMA-1 general purpose enclosure or a NEMA-4 watertight enclosure. Other enclosure types are available when required by special job conditions.

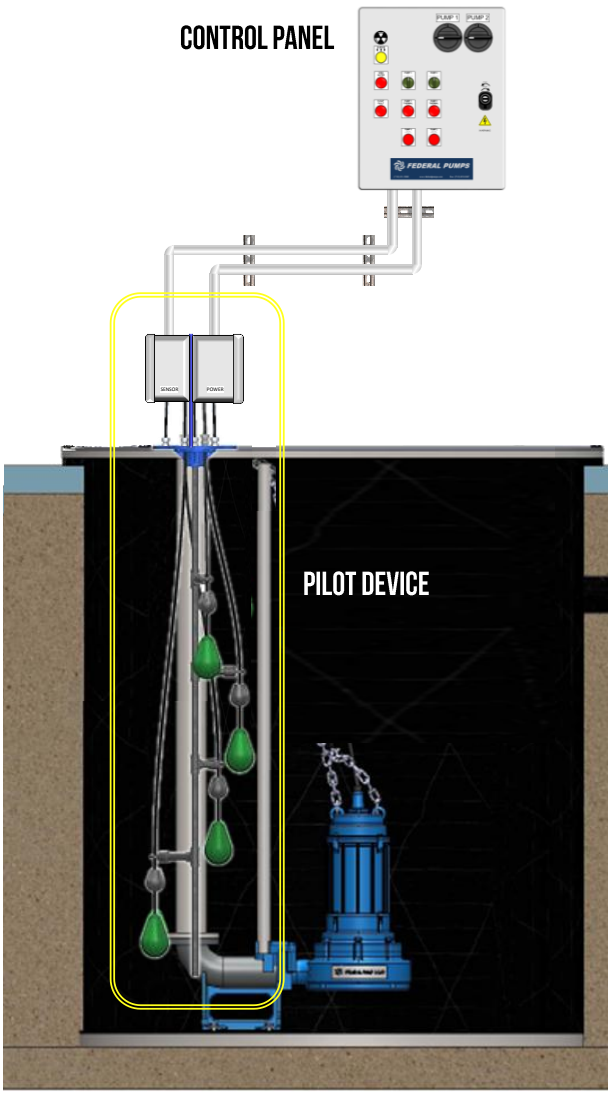
The mechanical hardware in the panel includes through-the-door local disconnect switches, H-O-A switches with integral pilot light, magnetic starters with overload, and adjustable alarm horn with silencing push button.

For digital electronics, the panel includes a Programmable Logic Controller (for Pump-On and Pump-Off, automatic alternation, simultaneous pump operation, and high water alarm signaling), power relay, and control relay. Modular components mounted on rails were selected for the easy repair and replacement.

Options for thermal and moisture sensor alarm previsions are available for the MSC(-QD), VSS(-QD) pump series.

SBS: Pilot Device

The SBS Pilot Device includes the required number of normally open mechanical bulbs with a mounting bracket and junction box. The Pilot Device is available in two styles as illustrated in product detail.



Compatible with, but not limited to, Federal Pump's VSS(-QD), MSC(-QD), BGP(-QD), JJM(-QD), and VSSD in simplex and duplex design, the SBS control system supports 24/7 automatic operation for standard sewage and sump pump service.

PRODUCT DETAILS

DUPLEX SBS CONTROL PANEL

Enclosure
NEMA-1 enclosure, with NEMA-4,4X, & 12 as standard options. Contact the factory for other NEMA type options.

Power Input
Power distribution block standard for all duplex systems with bypass capable design for multi-source power input.

Disconnect & Power Relay
Through the door fused disconnect switch or circuit breaker to disconnect the equipment locally with Power Relay to keep Programmable Logic Controller powered as long as at least one disconnect is energized.

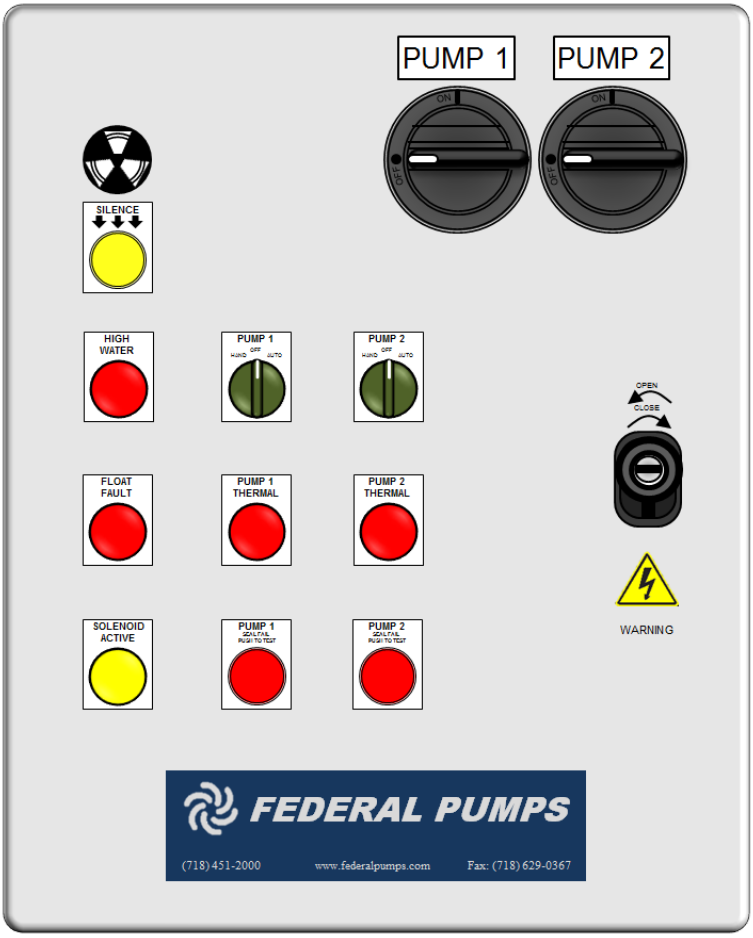
Programmable Logic Controller
PLC for 24/7 automatic operation and alternation of pump equipment and remote alarm condition signal output.

H-O-A switch & Pilot Light
Hand-Off-Automatic switch with integral pilot lights to run the equipment continuously or automatically.

Starter & Overload
Across-the-line magnetic starter with adjustable overload protection.

Control Voltage
Step down control circuit transformer (24VAC) for low voltage control signal

High water & Float fault alarm
Alarm light, buzzer, silencing button, and control relay packaged for local and remote alarm signal. Automatic process fault alarm light to warn operators of possible bulb failure(s).



Thermal and Moisture sensor (optional)
Alarm and test button for thermal overload and moisture detection in sensor equipped pumps

High temperature sensor & air gap (optional)
Temperature sensor, solenoid and air gap to quench the pit in case of temperature exceeding 140° F

PRODUCT DETAILS

DUPLEX SBS PILOT DEVICE

The SBS Pilot Device consists of non-mercury normally open mechanical switches, permanently sealed in solid polyurethane shells. The switches would provide I/O inputs to the PLC for automatic operation. They are mounted in the pit in any one of the two styles as follows:

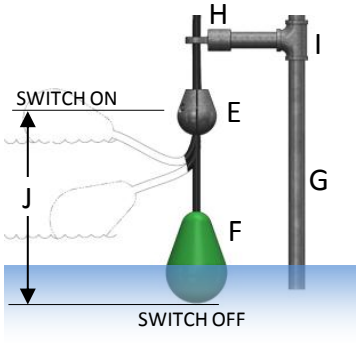
PILOT DEVICE STYLE 1

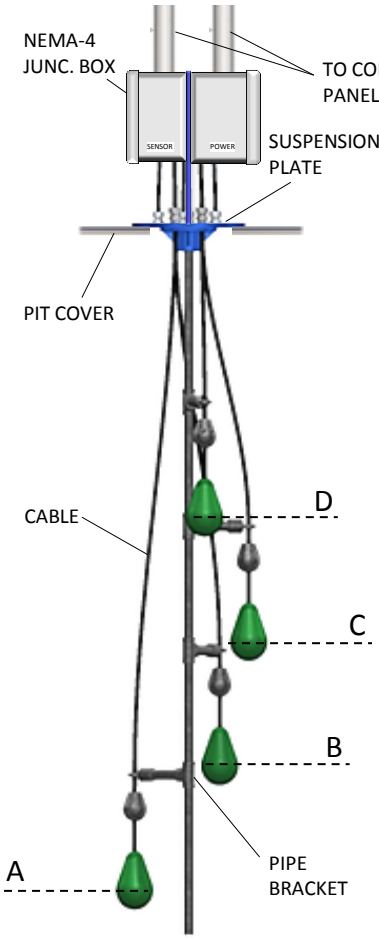
The bulbs are mounted on a round suspension plate which sets on the pit cover, and a NEMA-4 junction box is pedestal-mounted on the same suspension plate for connecting the pilot device to the control panel via conduit.

PILOT DEVICE STYLE 2

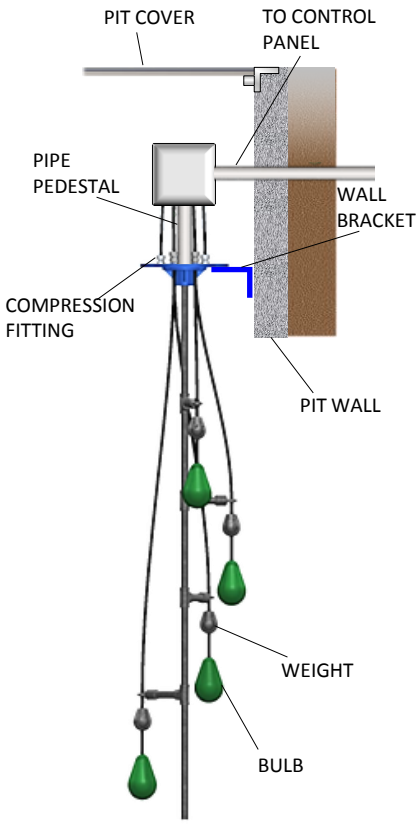
The bulbs are mounted on a bracket for side wall mounting. A NEMA-4 junction box is furnished for underground conduit

Item	Description
A	Both Pumps OFF
B	Pump No.1 ON
C	Pump No.2 ON
D	High Water Alarm





PILOT DEVICE STYLE 1
(FRONT VIEW)



PILOT DEVICE STYLE 2
(SIDE VIEW)

Item	Description
E	Metal weight for float pivot point
F	Polyurethane mechanical switch
G	¾” galvanized steel threaded rod assembly
H	Threaded eye hook holds float in place
I	¾” adjustable tee for float elevation control
J	Allow 12” level for ON/OFF operation.

PERFORMANCE AND SEQUENCE OF OPERATION

ITEM	DESCRIPTION
SBS CONTROL PANEL	
ENCLOSURE	NEMA 1 NEMA 4 & 12 (OPTIONAL)
HORSEPOWER RANGE	½ ~ 7½ HP (1 PHASE) ½ ~ 40 HP (3 PHASE)
AVAILABLE POWER INPUT	1/115V, 1/208V, 1/230V 3/208V, 3/230V, 3/460V
CONTROLS	PROGRAMMABLE LOGIC CONTROL WITH 8 DIGITAL INPUTS & 4 DIGITAL OUTPUT 24VAC CONTROL VOLTAGE
ALARM CONDITIONS	HIGH WATER ALARM THERMAL OVERLOAD (OPTIONAL) MOISTURE DETECTION (OPTIONAL)
CERTIFICATIONS	UL LISTED (OPTIONAL)
SBS PILOT DEVICE	
PILOT DEVICE MOUNTING STYLES	STYLE 1: SUSPENSION PLATE MOUNTED SYSTLE 2: WALL BRACKET MOUNTED
FLOAT SWITCH	MECHANICAL SWITCH IN POLYPROPYLENE SHELL SEALED IN POLYURETHANCE FOAM ADJUSTABLE WEIGHT FOR PIVOT POINT
CABLING	STANDARD 20' SHIELDED SUBMERSIBLE CABLE UP TO 10 AMP @ 120 VAC, 3 AMPS @ 240 VAC CHLORINATED POLYETHYLENE 16 AWG 2, TYPE SJOOW -300V
CERTIFICATIONS	UL LISTED – 47UF
TEMPERATURE	MINIMUM - 32° F MAXIMUM – 170° F (HIGH TEMP TO 200° F BY DESIGN OPTION)
SBS PIT QUENCHER	
AIR GAP	CAST IRON CONTRUCTION WITH ½" NPT OPENING AND 2" NPT MALE THREADING
SOLENOID VALVE	½" 24V NORNMALLY CLOSED SOLENOID VALVE 1" 24V NORMALLY CLOSED SOLENOID VALVE

NOTES:

1. Motors are designed for 20 starts per hour. Level devices and pit depths should be designed to maintain 10~12 starts per hours at maximum 104°F for typical sewage pump applications
2. Float devices require 12" of water level differential from low float(OFF) to high float(ON) position. Basins should be designed to accommodate float level differential
3. High water alarm float(ON level) should be designed to activate at 6" below the bottom of invert to prevent any fluids backing into the supply lines. Float switch tilt travel of 12" should be considered
4. For higher temperature applications (above 104°F) contact factory for special motor insulation, special float materials and accessories that may be required to sustain operation in higher temperature settings
5. Most fiberglass basins limit temperature to less than 120°F. For temperature in excess of 120°F where fiberglass basins are required, contact the factory for special assistance

SELECTION TABLE

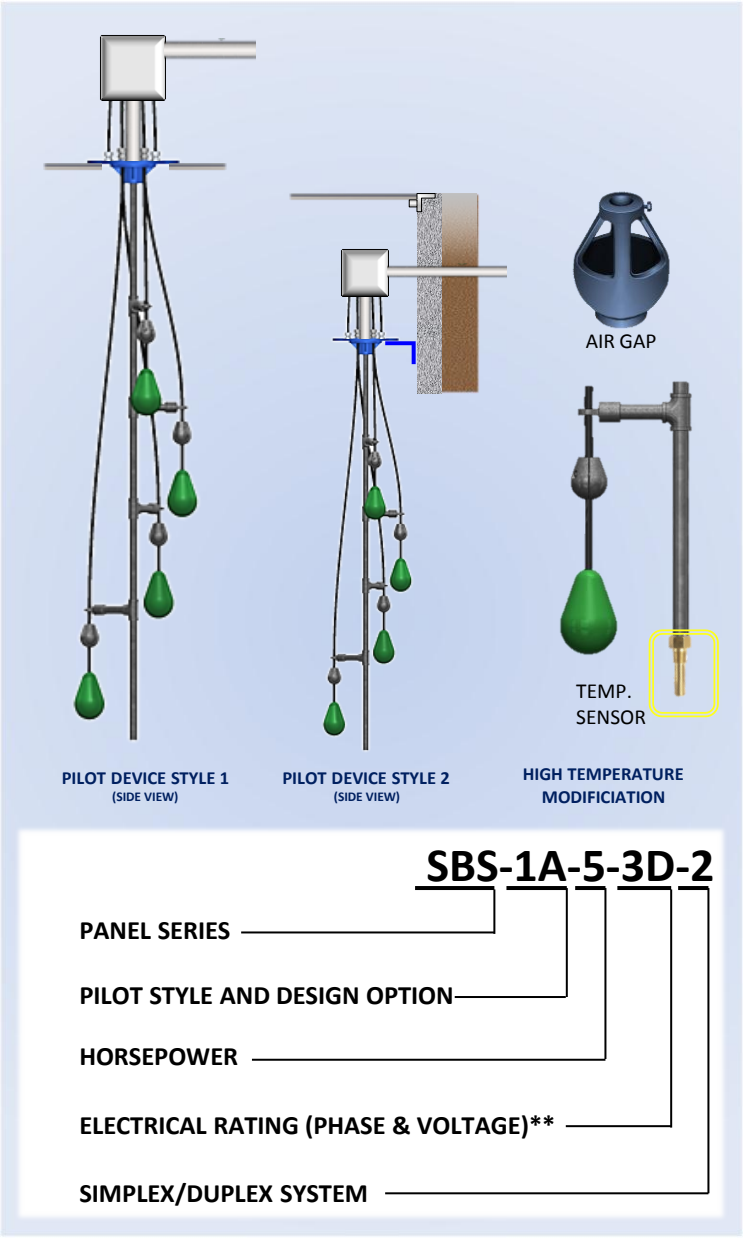
DESIGN OPTIONS COMPONENTS

The SBS control panel is available in several options and should be reviewed in detail prior to order. Dimensions may vary based upon enclosure type, horsepower size, options requested and custom specification requirements. The four options for control panel are as follows:

- ***OPTION A – STANDARD OPTION***
  NEMA-1 Enclosure, Circuit Breaker, Magnetic Starter, H-O-A Switch with integral pilot light, 24VAC CCT, HWA alarm with silencing push button, alternation with PLC, and Form-C dry contact for HWA
- ***OPTION B – PUMP SENSOR OPTION***
  STANDARD OPTION components with the additions of the pump thermal overload and moisture detection alarm light.
- ***OPTION C – PIT QUENCH OPTION***
  STANDARD OPTION components with the addition of temperature sensor, air gap, and two normally close solenoids to maintain liquid temperature below 140°F. Float bulbs will be designed for high temperature application
- ***OPTION D – SENSOR AND QUENCH OPTION***
  Combination of the STANDARD OPTIONS and the added components from the PUMP SENSOR & PIT QUENCH OPTIONS
- ***OPTION X – CUSTOMIZED OPTION***
  Please refer to factory for customized control panel modifications

Example: A 3PH/208V duplex panel is needed for a 7½HP sewage system, and Option B was needed with Style-1 pilot design. The Model No. would be:

"SBS-1B-7½-3B-2"



** 1 = 1PH 3 = 3PH
A = 115V B = 208V C = 230V D = 460V
i.e. 3D = WIRED for 3PH/460V

SELECTION TABLE

DESIGN POWER DRAW

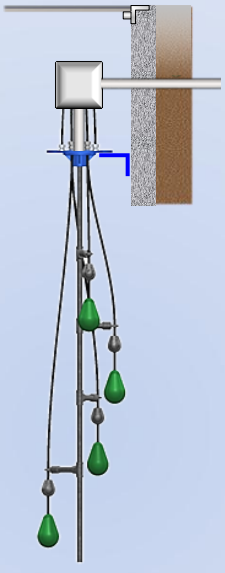
The following tables identify the maximum amp draw designed for each simplex system. Double the draw design for a duplex systems.

HP	1/115	1/208	1/230
½	20 F.D.	20 F.D.	20 F.D.
¾	20 F.D.	20 F.D.	20 F.D.
1	20 F.D.	20 F.D.	20 F.D.
1½	20 F.D.	20 F.D.	20 F.D.
2	30 F.D.	20 F.D.	20 F.D.
3	40 C.B.	20 F.D.	20 F.D.
5	80 C.B.	40 C.B.	40 C.B.
7½	100 C.B.	60 C.B.	60 C.B.

HP	3/208	3/230	3/460
½	20 F.D.	20 F.D.	20 F.D.
¾	20 F.D.	20 F.D.	20 F.D.
1	20 F.D.	20 F.D.	20 F.D.
1½	20 F.D.	20 F.D.	20 F.D.
2	20 F.D.	20 F.D.	20 F.D.
3	20 F.D.	20 F.D.	20 F.D.
5	20 F.D.	20 F.D.	20 F.D.
7½	30 F.D.	30 F.D.	20 F.D.
10	40 C.B.	40 C.B.	30 F.D.
15	60 C.B.	60 C.B.	40 C.B.
20	80 C.B.	80 C.B.	40 C.B.
25	100 C.B.	100 C.B.	60 C.B.
30	125 C.B.	100 C.B.	60 C.B.
40	150 C.B.	150 C.B.	60 C.B.

F.D. = FUSED DISCONNECT
C.B. = CIRCUIT BREAKER

PILOT DEVICE STYLE 1
(SIDE VIEW)



PILOT DEVICE STYLE 2
(SIDE VIEW)

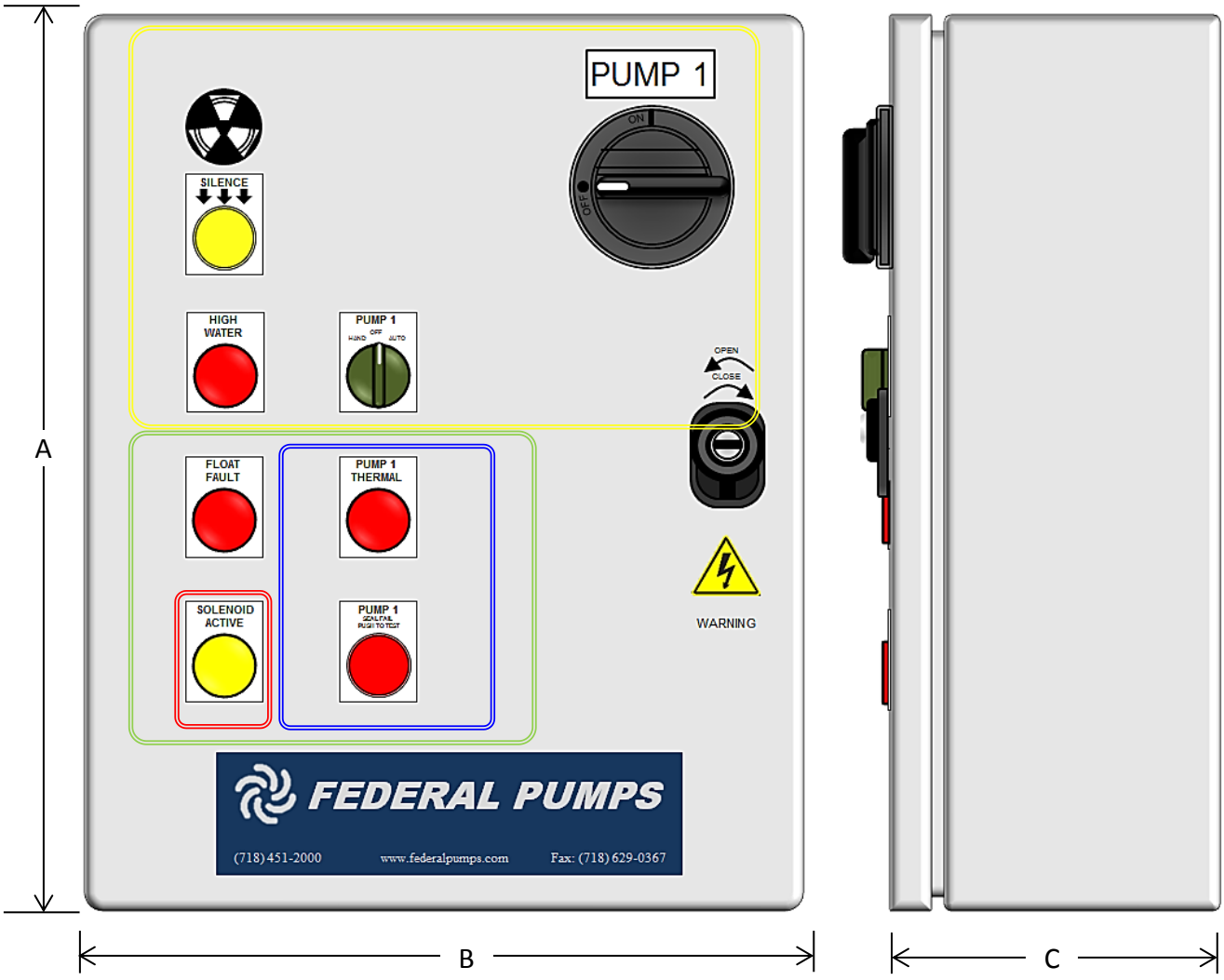
HIGH TEMPERATURE
MODIFICIATION

SBS-1A-5-3D-2

- **PANEL SERIES**
- **PILOT STYLE AND DESIGN OPTION**
- **HORSEPOWER**
- **ELECTRICAL RATING (PHASE & VOLTAGE)****
- **SIMPLEX/DUPLEX SYSTEM**

** **1 = 1PH** **3 = 3PH**
A = 115V **B = 208V** **C = 230V** **D = 460V**
i.e. 3D = WIRED for 3PH/460V

DIMENSIONAL DATA – SIMPLEX CONTROL PANEL

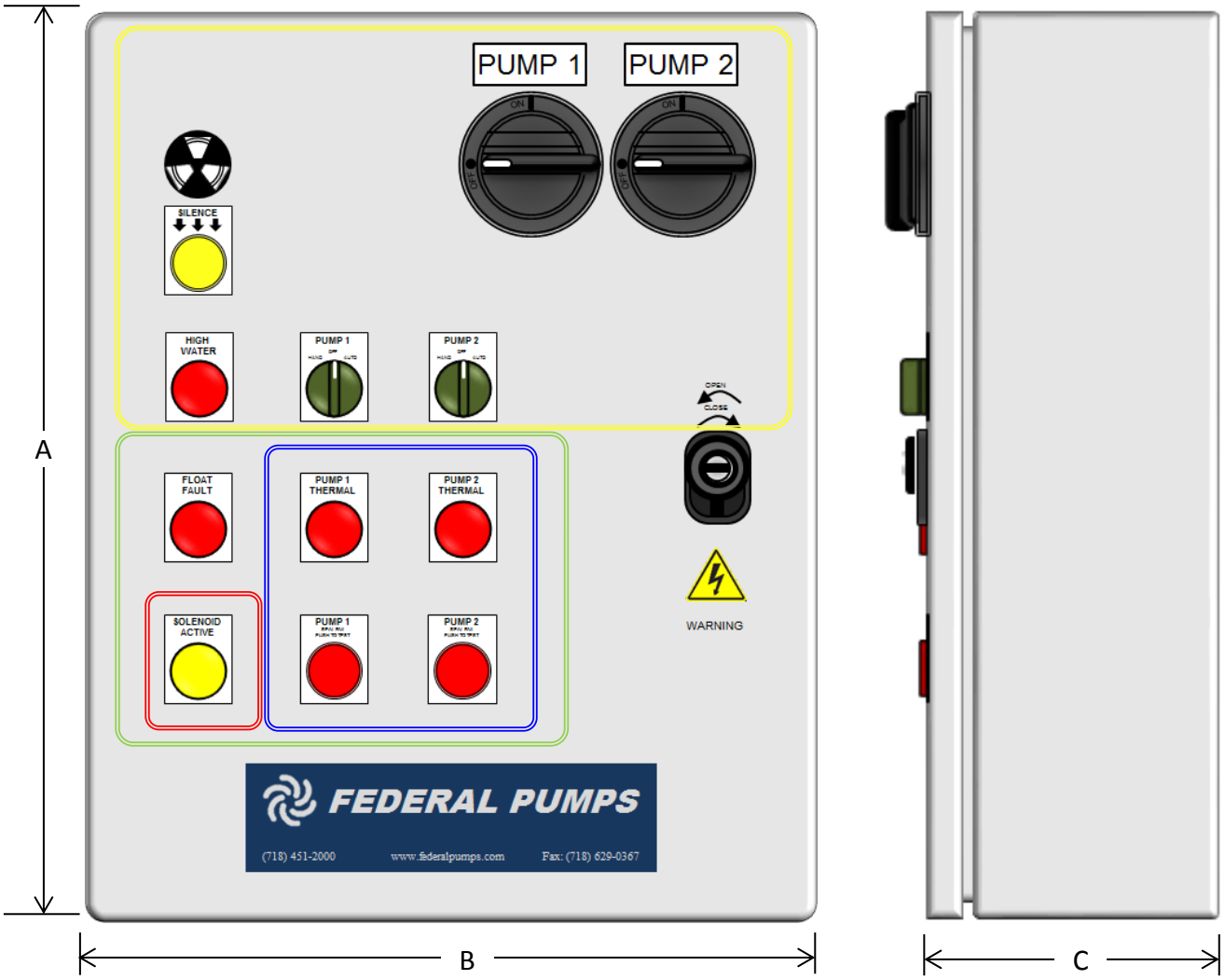


ITEM	A	B	C
Up to 30 Amps with F.D.	15.75	11.81	5.91
All equipment with C.B.	19.69	15.75	7.87

Dimensions in inches

- OPTION A – STANDARD
- OPTION B – PUMP SENSORS
- OPTION C – PIT QUENCHER
- OPTION D – SENSOR & QUENCH

DIMENSIONAL DATA – DUPLEX CONTROL PANEL

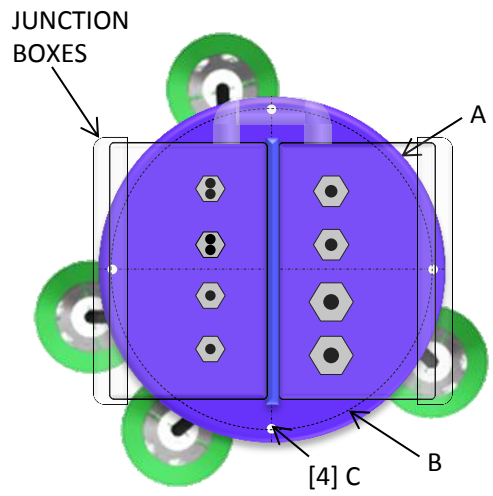


ITEM	A	B	C
Up to 30 Amps with F.D.	19.69	15.75	7.87
All equipment with C.B. up to 60 amps	23.62	23.62	7.87

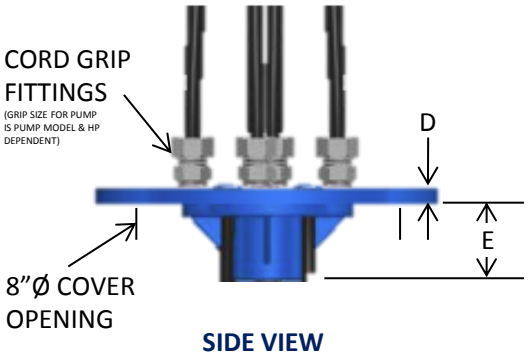
Dimensions in inches

- OPTION A – STANDARD
- OPTION B – PUMP SENSORS
- OPTION C – PIT QUENCHER
- OPTION D – SENSOR & QUENCH

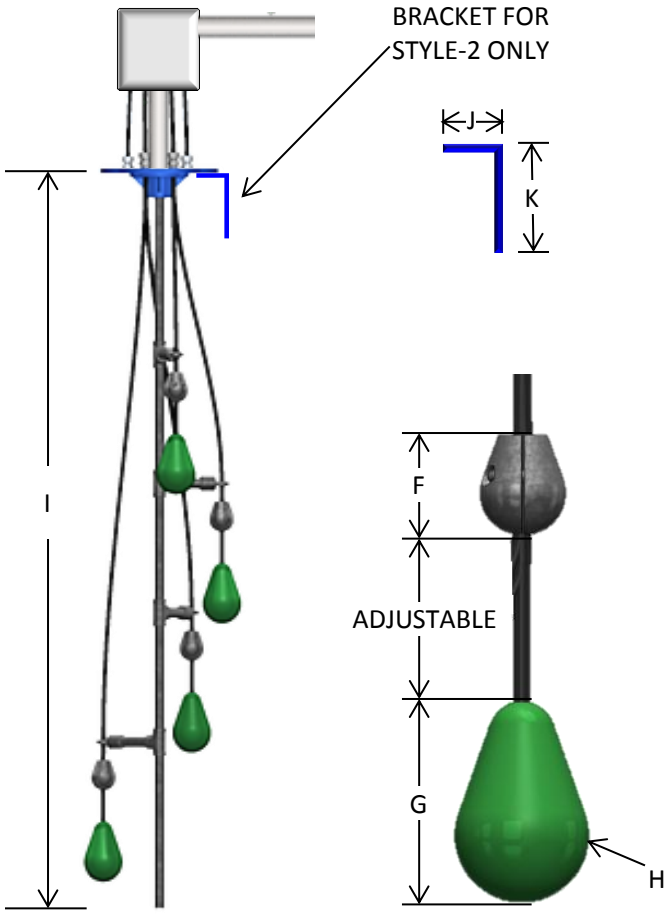
DIMENSIONAL DATA – PILOT DEVICE



TOP VIEW



SIDE VIEW



PILOT DEVICE

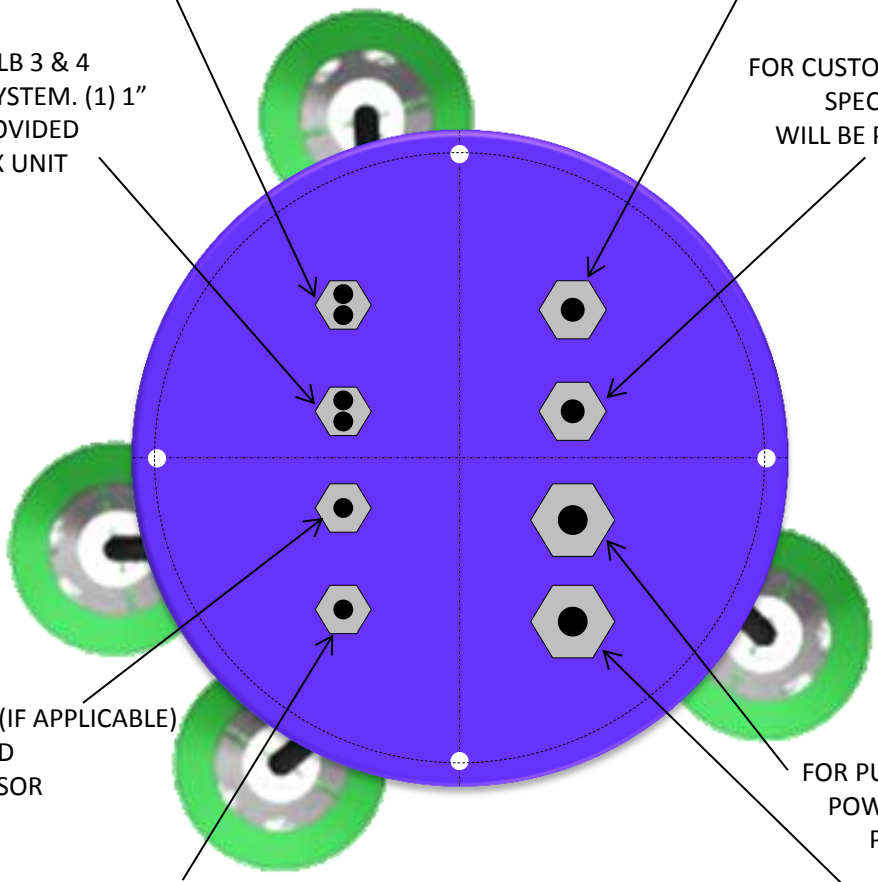
A	B	C	D	E	F	G	H	I	J	K
10⅜Ø	9¼Ø	½Ø	⅜	1¼	2½	4¾	3¼Ø	VARIES BASED ON PIT DEPTH	3	5

Dimensions in inches

Notes:

1. Allow 8" diameter opening in cover for in installation of SBS float system.
2. Ensure liquid tight gasket is installed between SBS plate and basin cover.
3. Submersible motor power cables and sensing cables will exit pit or basin cover through the pilot device suspension plate and into the junction box.
4. NEMA 4 junction box shown is for float bulbs, power cables and sensing cable connections. Even though the cables are insulated, where possible, run conduits from the junction box to the control panel.
5. SBS eye hooks and tees are preset at the factory. Coordinate their elevation in field with basin depth.
6. Contractor to set pilot device in place, draw float wires through eye hooks and through compression fittings and wire junction box to control panel

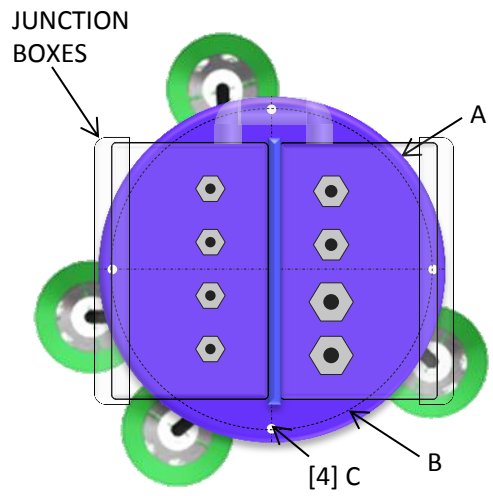
DIMENSIONAL DATA – PILOT DEVICE (SUSPENSION PLATE SCHEMATIC)



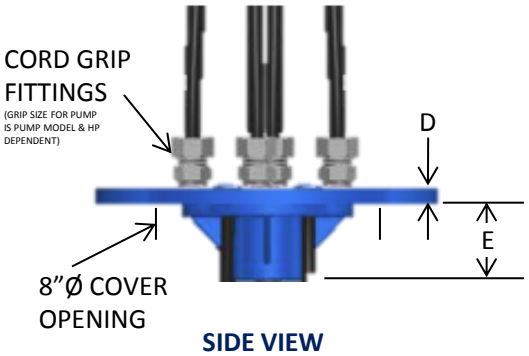
Notes:

1. Contact the factory for the pump power's cord grip size if necessary as it differs depending on the pump model.

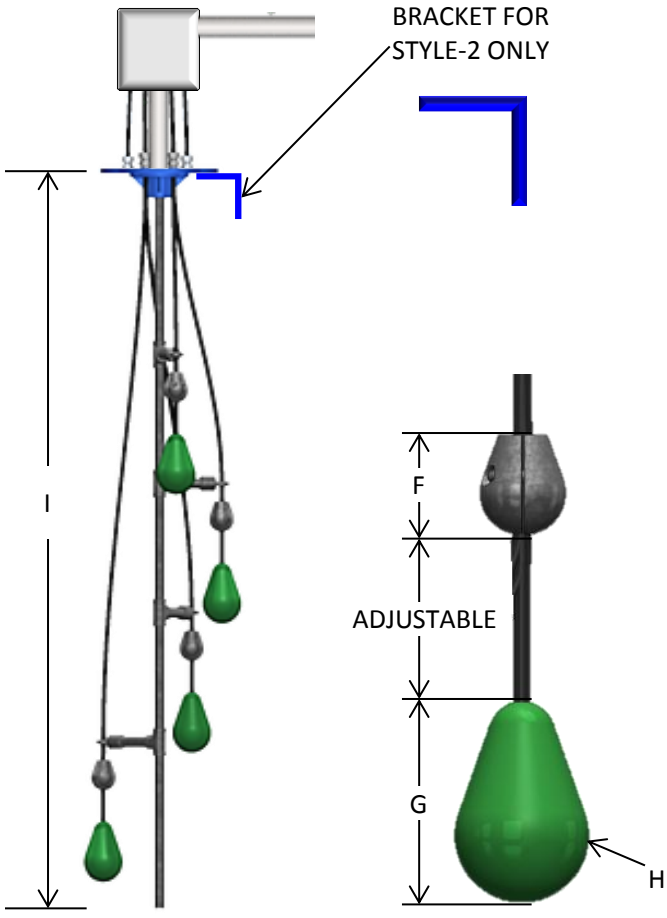
DIMENSIONAL DATA – PILOT DEVICE



TOP VIEW



SIDE VIEW



PILOT DEVICE

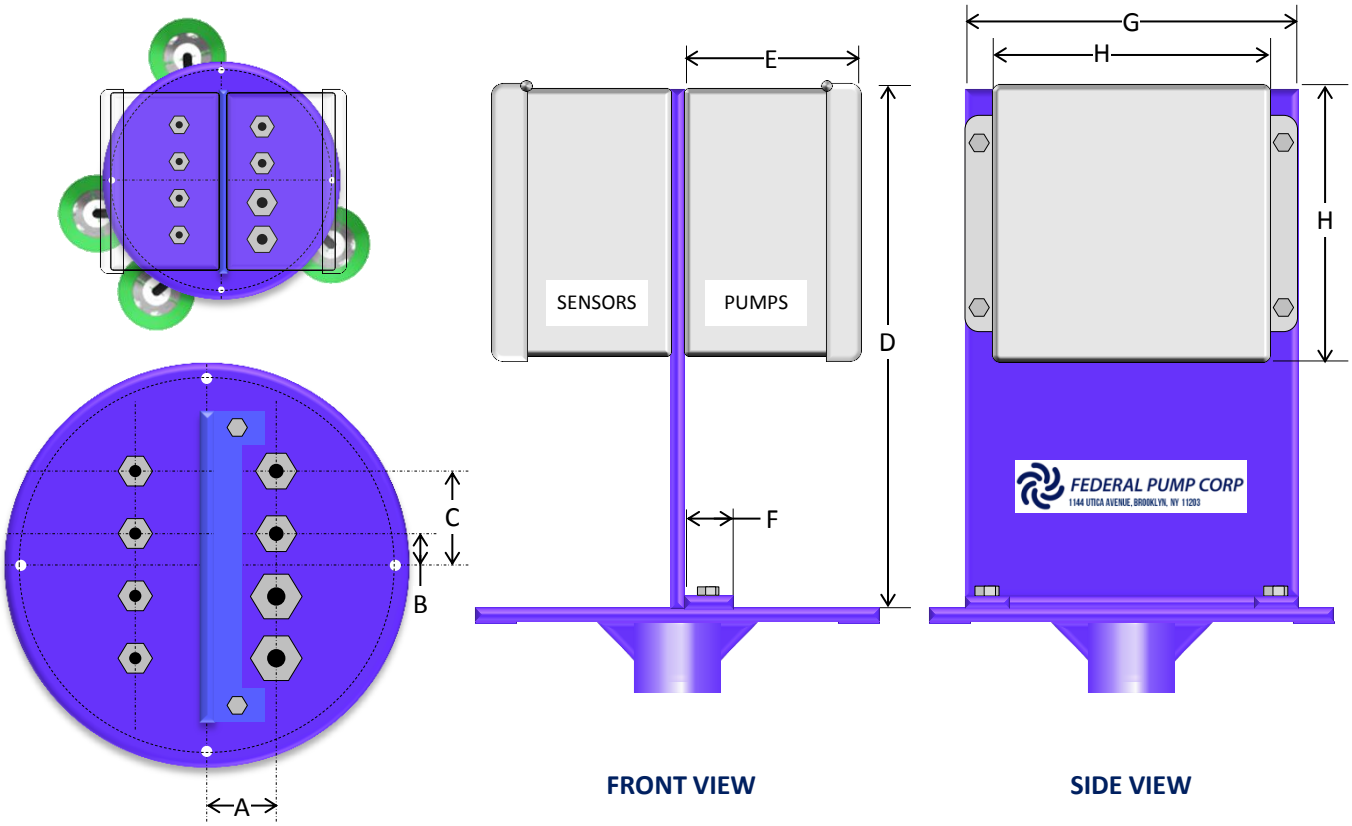
A	B	C	D	E	F	G	H	I
10⅜Ø	9¼Ø	½Ø	⅜	1¼	2½	4¾	3¼Ø	VARIES BASED ON PIT DEPTH

Dimensions in inches

Notes:

1. Allow 8" diameter opening in cover for in installation of SBS float system.
2. Ensure liquid tight gasket is installed between SBS plate and basin cover.
3. Submersible motor power cables and sensing cables will exit pit or basin cover through the pilot device suspension plate and into the junction box.
4. NEMA 4 junction box shown is for float bulbs, power cables and sensing cable connections. Even though the cables are insulated, where possible, run conduits from the junction box to the control panel.
5. SBS eye hooks and tees are preset at the factory. Coordinate their elevation in field with basin depth.
6. Contractor to set pilot device in place, draw float wires through eye hooks and through compression fittings and wire junction box to control panel

DIMENSIONAL DATA – PILOT DEVICE



TOP VIEW
(LESS JUNCTION BOXES)

FRONT VIEW

SIDE VIEW

A	B	C	D	E	F	G	H
1½	1	3	14	4	¾	7½	6

Dimensions in inches

Notes:

1. Allow 8” diameter opening in cover for in installation of SBS float system.
2. Ensure liquid tight gasket is installed between SBS plate and basin cover.
3. Submersible motor power cables and sensing cables will exit pit or basin cover through the pilot device suspension plate and into the junction box.
4. NEMA 4 junction box shown is for float bulbs, power cables and sensing cable connections. Even though the cables are insulated, where possible, run conduits from the junction box to the control panel.
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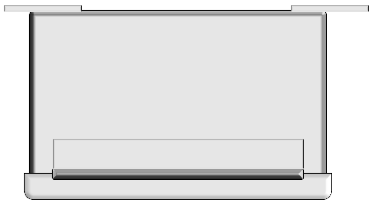
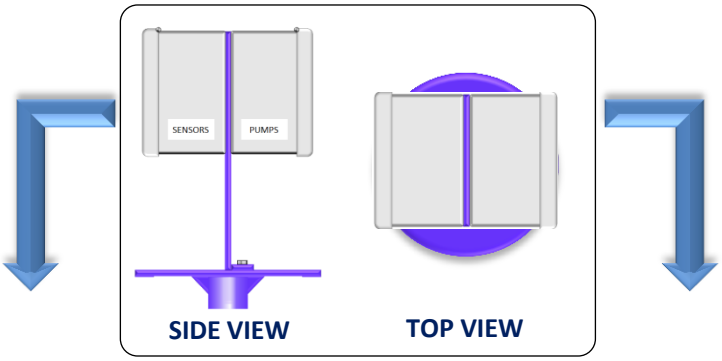
DIMENSIONAL DATA – PILOT DEVICE

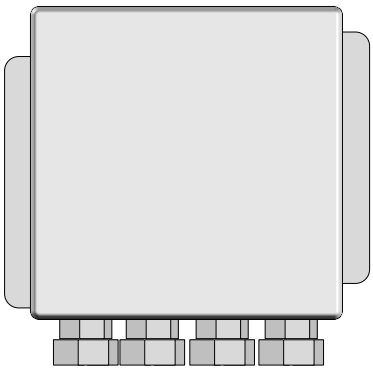


TOP VIEW

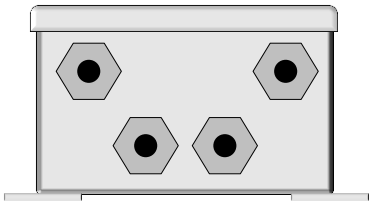


SIDE VIEW

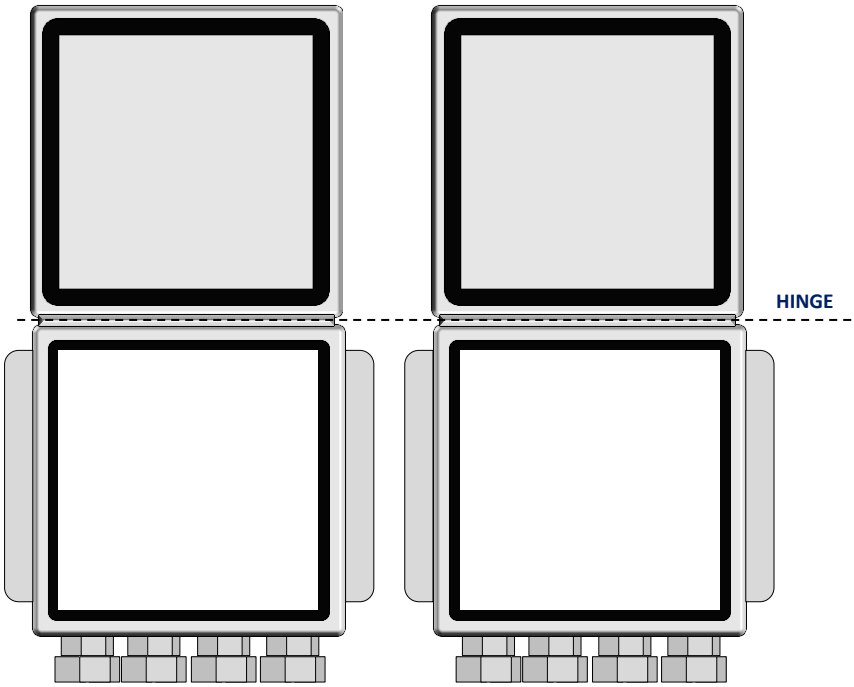
TOP VIEW



FRONT VIEW



BOTTOM VIEW



SENSOR JUNCTION BOX
(INSIDE JUNCTION BOX)

PUMP POWER JUNCTION BOX
(INSIDE JUNCTION BOX)

Notes:

1. Allow 8” diameter opening in cover for in installation of SBS float system.
2. Ensure liquid tight gasket is installed between SBS plate and basin cover.
3. Submersible motor power cables and sensing cables will exit pit or basin cover through the pilot device suspension plate and into the junction box.
4. NEMA 4 junction box shown is for float bulbs, power cables and sensing cable connections. Even though the cables are insulated, where possible, run conduits from the junction box to the control panel.
5. SBS eye hooks and tees are preset at the factory. Coordinate their elevation in field with basin depth.
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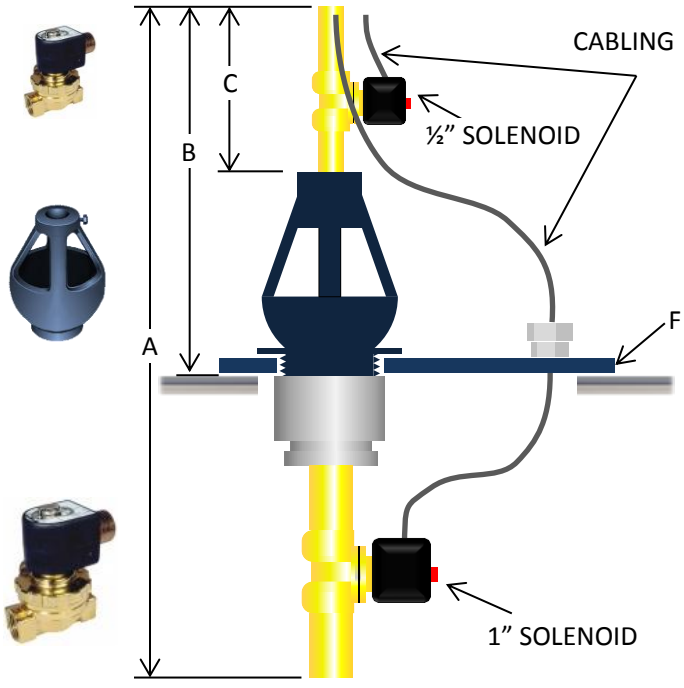
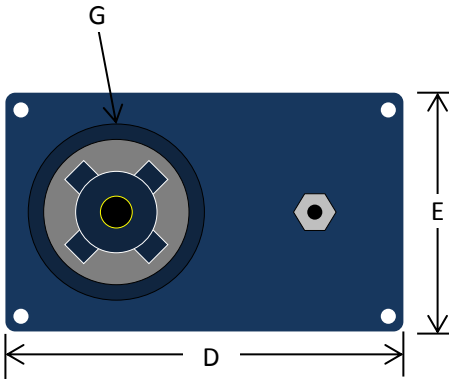
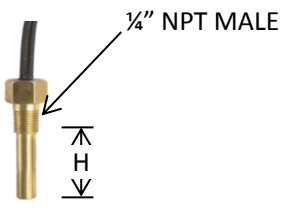
DIMENSIONAL DATA – PIT QUENCHER







TEMPERATURE SWITCH

A	B	C	D	E	F	G	H
30	18	9	10	6	⅜	4½Ø	1

Dimensions in inches

Notes:

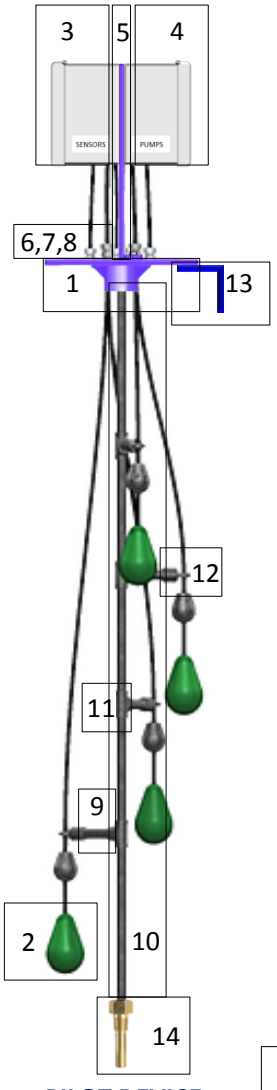
1. Allow 8" x 4" opening in cover for in installation of SBS Pit Quencher.
2. Ensure liquid tight gasket is installed between plate and basin cover.
3. Submersible temperature switch will exit pit or basin cover through the pilot device suspension plate and into the junction box.
4. NEMA 4 junction box shown is for float bulbs, power cables and sensing cable connections. Even though the cables are insulated, where possible, run conduits from the junction box to the control panel.
5. Contractor to connect the ½" solenoid to fresh water. There should be a bypass valve and union prior to the ½" solenoid to be installed by contractor
6. Temperature switch will be mounted onto the pilot device in the factory.

CONTROL COMPONENTS

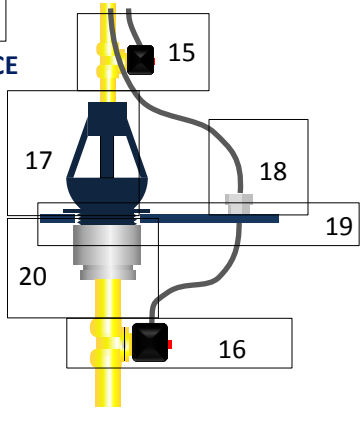
No.	ITEMS	No. REQ'D
1	Suspension plate	1
2	Bulb with cable (standard 20')	4[1]
	Additional cable per foot	
3	NEMA 4 SENSORS Junction box	1
4	NEMA 4 PUMPS Junction box	1
5	Junction box mount	1
6	Float cord grip	4[1]
7	Pump cord grip (HP dependent)	2[2]
8	Moisture & Thermal sensor cord grip	2[2]
9	Suspension nipple	4[1]
10	Suspension pipe (standard up 10')	1
	Additional pipe per foot	
11	Suspension tee	4[1]
12	Suspension loop	4[1]
13	Wall mount clip	1[3]
14	Temperature Sensor	1[4]
15	½" Solenoid	1[4]
16	1" Solenoid	1[4]
17	½" Air gap fitting assembly	1[4]
18	Temperature sensor cord grip	1[4]
19	Quencher suspension plate	1[4]
20	Bushing assembly	1[4]

NOTES:

1. **Quantity for simplex controller is (3)**
2. **Quantity for simplex controller is (1)**
3. **Only applicable for Style 2 Pilot Device design**
4. **Only applicable for Design Options with pit quencher**



PILOT DEVICE



PIT QUENCHER

SUGGESTED SPECIFICATIONS: (SIMPLEX PUMP CONTROL)

Controls
Pump manufacturer shall provide a Federal Pump series SBS simplex Level Control system including simplex Control Panel (for wall mounting) and accessory alarms as detailed in this specification. Simplex Sewage Pump Controller shall include: circuit breaker with thru-the-door disconnect handle, across-the line type magnetic starter with overload protection, HOA selector switch with integral pilot run light, control circuit transformer with fused secondary, high water alarm light, *(OPTIONS B & D ONLY: seal failure and thermal protection alarm),* alarm horn with silence push button, control relays, numbered terminal strip, and N/O circuits for BMS. The control shall be provided in a NEMA 1,4 & 12-UL 508A approved enclosure (or as shown in the plans). The SBS control package will include one pilot device with two NEMA 4 junction boxes and mounting mechanism with float switch cable compression fittings to ensure float switches remain aligned along with (3) non-mercury type tilt level switches. The contractor shall set the level switches as shown in the plans and ensure the high water alarm is set at least 6" below the bottom of the invert. (OPTIONS C & D ONLY: Quenching fixture and solenoid will be included for high temperature liquid operation.)

Sequence of Operation:
Upon rise in liquid level to a predetermined point the float switch will initiate the pump operation and complete the pumping cycle to a predetermined pumps off set point. In the event a high water level condition occurs, the high water level alarm float switch will activate an alarm horn and light to signal the condition. (OPTIONS B & D: An alarm light will be activated along with the alarm horn should the pump fail— notifying the user of a failed pump condition. OPTIONS C & D: An alarm light will be activated if the temperature sensor in the sewage pit experiences temperature above 140F, and open a solenoid tied to fresh water)

SUGGESTED SPECIFICATIONS: (DUPLEX PUMP CONTROL)

Controls
Pump manufacturer shall provide a Federal Pump series SBS Duplex Level Control system including Duplex Control Panel (for wall mounting) and accessory alarms as detailed in this specification. Duplex Sewage Pump Controller shall include: individual circuit breakers with thru-the-door disconnect handles, single-feed power input terminal block, across-the line type magnetic starters with overload protection, HOA selector switches with integral pilot run lights, control circuit transformer with fused secondary , automatic lead/lag alternator, high water alarm light, *(OPTIONS B & D ONLY: seal failure and thermal protection alarms),* common alarm horn with silence push button, control relays, numbered terminal strip, and N/O circuits for BMS. The controls shall be provided in a NEMA 1-UL 508A approved enclosure (or as shown in the plans). The SBS control package will include a NEMA 4 junction box and mounting mechanism with float switch cable compression fittings to ensure float switches remain aligned along with (4) non-mercury type tilt level switches . The contractor shall set the level switches as shown in the plans and ensure the high water alarm is set at least 6" below the bottom of the invert . (OPTIONS C & D ONLY: Quenching fixture and solenoid will be included for high temperature liquid operation.)

Sequence of Operation:
Upon rise in liquid level to a predetermined point the lead float switch will initiate lead pump operation and complete the pumping cycle to a predetermined pumps off set point. If the influent conditions rise above a certain rate where the lead pump alone cannot satisfy demand, the lag pump will start at a predetermined set point and work in parallel with the lead pump to satisfy system conditions and pump down to pumps off level. The lead and lag pumps will alternate cycles every 24 hours for even pump loading. In the event a high water level condition occurs, the high water level alarm float switch will activate an alarm horn and light to signal the condition. In the event the lead or lag pump fails the alternate pump will maintain pump conditions until the level is reduced to pumps off set point. (OPTIONS B & D: An alarm light will be activated along with the alarm horn should the pump fail— notifying the user of a failed pump condition. OPTIONS C & D: An alarm light will be activated if the temperature sensor in the sewage pit experiences temperature above 140F, and open a solenoid tied to fresh water)

FEDERAL PUMP CORP
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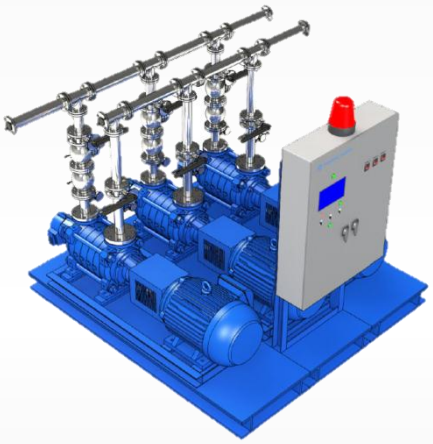
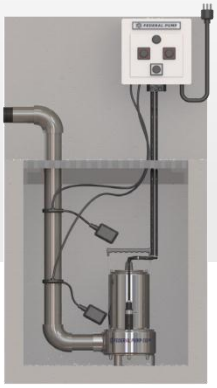
FEDERAL PUMP CORPORATION
Est. 1927

Variable Speed Booster
Model VSPV(up to 300 PSI)



Variable Speed Booster
Model VSPM(up to 1000 PSI)



Oil Shield Elevator Sump System
Model SOSP(up to 100GPM)

Since 1927 Federal Pump has been a leading provider of reliable and innovative fluid handling solutions for supply water management and dewatering pump services.

Its recent introduction of the VSPV & VSPM variable speed domestic water supply system combines innovative technological advancements in premium efficient motors and variable speed drive support programs that reduce energy demand, lower operating costs, and provide more finely tuned supply controls.

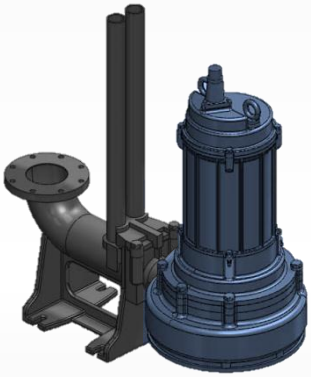
Its VSA/VSP vertical pump rated to 210F provides solutions in dewatering applications where condensate or boiler feed water are collected and then cooled and pumped to city sewer connections providing continuous service where submersible pumps do not provide a sustainable solution.

The SOSP Oil Shield sump pumps alerting building management to potential oil leaks in the elevator areas provide additional building support.

High rise roof fill applications, water make-up systems for mechanical equipment utilizing rain water systems and energy efficient condensate, boiler feed, and vacuum condensate units continue in the focus of energy efficiency and building support.

In the tradition of leadership through product innovation, quality designs, and reliable customer service, Federal Pump continues to be a supplier to those water management and dewatering markets where it first started that tradition of leadership in Brooklyn, N.Y.

Vertical Sewage/Sump Pump
Model VSA/VSP(up to 1400GPM)



Submersible Sewage/Sump Pump
Model MSC-QD/VSS2½D(up to 500GPM)

MANUFACTURED IN NEW YORK
FEDERAL PUMP CORPORATION

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Brooklyn, N.Y. 11203
Tel: 718-451-2000
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TYPE
SBS