

Stream-Flo ESD-EH

Powered by PwrESD



Overview

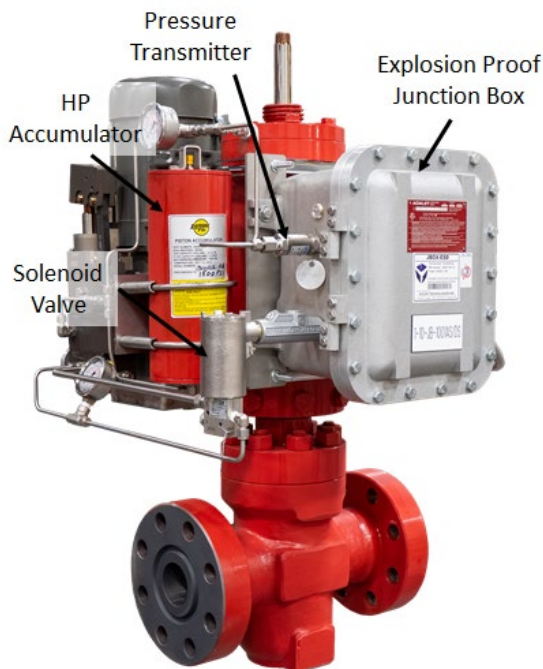
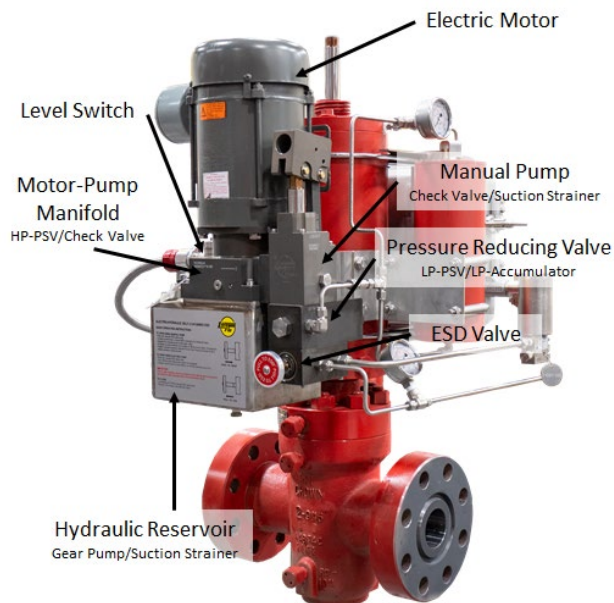
PwrESD is an integrated electro-hydraulic power unit designed to operate hydraulic actuators for surface safety valves (SSVs) and flow-line ESD valves.

The compact system design offers minimum added footprint to the SSV while offering both local and remote opening and closing functions to the valve. PwrESD also minimizes the number of hydraulic fittings and connections to limit potential leakage points.

The system is offered with either 24 VDC or AC powered motor with 1/4 to 1 horsepower (0.18 to 0.75 kW) for remote opening and maintaining a fully open position. It also includes a backup hydraulic hand pump. A 24 VDC low power (0.85 watts) solenoid valve is used to retain the pressure in a low-pressure circuit to control the opening and closing operation of the SSV. The system can integrate pressure transmitters, limit switches, position transmitter, and a hydraulic fluid level switch into an explosion proof electrical enclosure ready for wiring to Stream-Flo's Intelligent Valve Controller (IVC), Distributed Control System (DCS), or Programmable Logic Controller (PLC).

Features and Benefits:

- Compact design – the system is designed to be totally self-contained for ease of installation to new or existing SSVs.
- Local and remote operation.
- Capable of independent emergency shutdown (ESD) initiated through a solenoid valve, manual trip (ESD) valve, and/or fusible element, or other means.
- Multiple power options for the electric motor with CSA/UL and/or ATEX/IECEx certifications.
- Multiple displacement options for the motor-driven hydraulic pump for different valve opening speed requirements.
- Operating hydraulic pressure up to 3,300 psi (22,753 kPa).



Additional Sensors and Control elements can be wired to the junction box including limit switches and position transmitters

Stream-Flo PwrESD mounted to Hydraulic Actuator

Specifications

Basic Electro-Hydraulic Power Unit

Electric Motor

<i>Voltage</i>	115/230 VAC 1PH, 208-230/460 VAC 3PH, or 24 VDC
<i>Power</i>	Power options: ¼ to 1 HP (0.18 to 0.75 kW)
<i>Rotational Speed</i>	1750 rpm (CSA/UL) or 1450 rpm (ATEX/IEC Ex)
<i>Operating Temperature Range</i>	CSA/UL -40°F to +104°F (-40°C to +40°C) ATEX/IEC Ex -4°F to +140°F (-20°C to +60°C)
<i>Hazardous Area Approvals</i>	CSA/UL Class 1 Division 1, Groups C, D ATEX/IEC Ex db IIB T4 Gb

Pumps

<i>Motor-Operated Pump</i>	Micro gear pump Displacement: 0.012 to 0.076 in ³ /rev (0.1 to 1.5 cm ³ /rev) Flow rate: 0.07 to 0.54 gpm (0.26 to 2.04 l/min)
<i>Manual Pump</i>	Plunger pump Displacement: 0.66 to 1.18 in ³ /stroke (10.8 to 19.3 cm ³ /stroke)

Reservoir

<i>Features</i>	Integrates to HP manifold, easily disassembled for maintenance, and accessible level switch port.
<i>Sizes</i>	150 in ³ (2.5 liters) 300 in ³ (4.9 liters) 500 in ³ (8.2 liters)
<i>Hydraulic Fluid</i>	Industrial hydraulic fluid for use to below -40 °F (-40 °C) ambient low temperature

Solenoid Valve

<i>Power Consumption</i>	0.85 watts (3 watts in-rush)
<i>Input Voltage</i>	24 VDC
<i>Operating Temperature Range</i>	-76°F to +122°F (-60°C to +50°C)
<i>Number of ports</i>	3/2
<i>Flow Coefficient (Cv)</i>	0.6
<i>Operating Pressure</i>	0 to 174 psi (0 to 1,200 kPa)
<i>Hazardous Area Approvals</i>	CSA/UL Class 1 Division 1, Groups B, C, D ATEX/IEC Ex d IIC

Hydraulics

<i>Maximum Operating Pressure</i>	3,300 psi (22,753 kPa)
<i>System Temperature rating</i>	-40 °F to 180 °F (-40°C to +82°C) limited by gear pump
<i>Pressure Reducing Valve (PRV)</i>	Flow Coefficient (Cv): 0.43
<i>Low-Pressure Safety/Relief Valve (LP-PSV)</i>	Flow Coefficient (Cv): 6.10 Set Pressure: 150 psi (1,034 kPa)
<i>High-Pressure Safety/Relief Valve (HP-PSV)</i>	Flow Coefficient (Cv): 0.24 Set Pressure up to: 2,500 psi (17,237 kPa) and 4,000 psi (27,580 kPa)

Optional Items

Quick Exhaust Valve

Maximum Working Pressure	6,000 psi (41,369 kPa)
Flow Control Application	Normally Open
Control Function	3-way – poppet assembly operated
Flow Coefficient (Cv)	4.33

Junction Box

Features	Motor contactor, terminal blocks, ground bar, RTD converter, and drain breather
Temperature Sensor	RTD probe
Operating Temperature Range	-40°F to +176°F (-40°C to +80°C)
Hazardous Area Approvals	CSA/UL Class 1 Division 1, Groups A, B, C, D ATEX/IEC Ex d IIB+H2

Level Switch

Measurement Type	Non-contact (Magnetic)
Contact Arrangement	SPDT (Form C)
Operating Temperature Range	-40°F to +212°F (-40°C to +100°C)
Hazardous Area Approvals	CSA/UL Class 1 Division 1, Groups A, B, C, D ATEX/IEC Ex db/tb

Pressure Transmitters

Input voltage	10-30 VDC
Output	4-20 mA
Operating temperature range	Medium: -40°F to +212°F (-40°C to +100°C) Ambient: -40°F to +221°F (-40°C to +105°C)
Hydraulic low-pressure range	0 to 200 psi (0 to 1,379 kPa)
Hydraulic high-pressure range	0 to 5,000 psi (0 to 34,474 kPa)
Line pressure range	0 to 15,000 psi (0 to 103,421 kPa)
Hazardous area approvals	CSA/FM Class 1 Division 1, Groups A, B, C, D ATEX/IEC Ex d IIC T6...T1 Gb

Position Transmitter

Measurement Type	Non-contact (Hall-effect)
Input Voltage	10-30 VDC
Output	4-20 mA
Operating temperature range	-40°F to +185°F (-40°C to +85°C)
Hazardous area approvals	CSA/FM Class 1 Division 1, Groups B, C, D ATEX/IEC Ex d IIB+H2



Limit Switches

Measurement Type	Non-contact (Magnetic)
Contact Arrangement/Material	SPDT (Form C) Tungsten
Operating temperature range	CSA/UL -40°F to +221°F (-40°C to +105°C) ATEX/IEC Ex -4°F to +158°F (-20°C to +70°C)
Hazardous area approvals	CSA/UL Class 1 Division 1, Groups A, B, C, D ATEX/IEC Ex d IIC



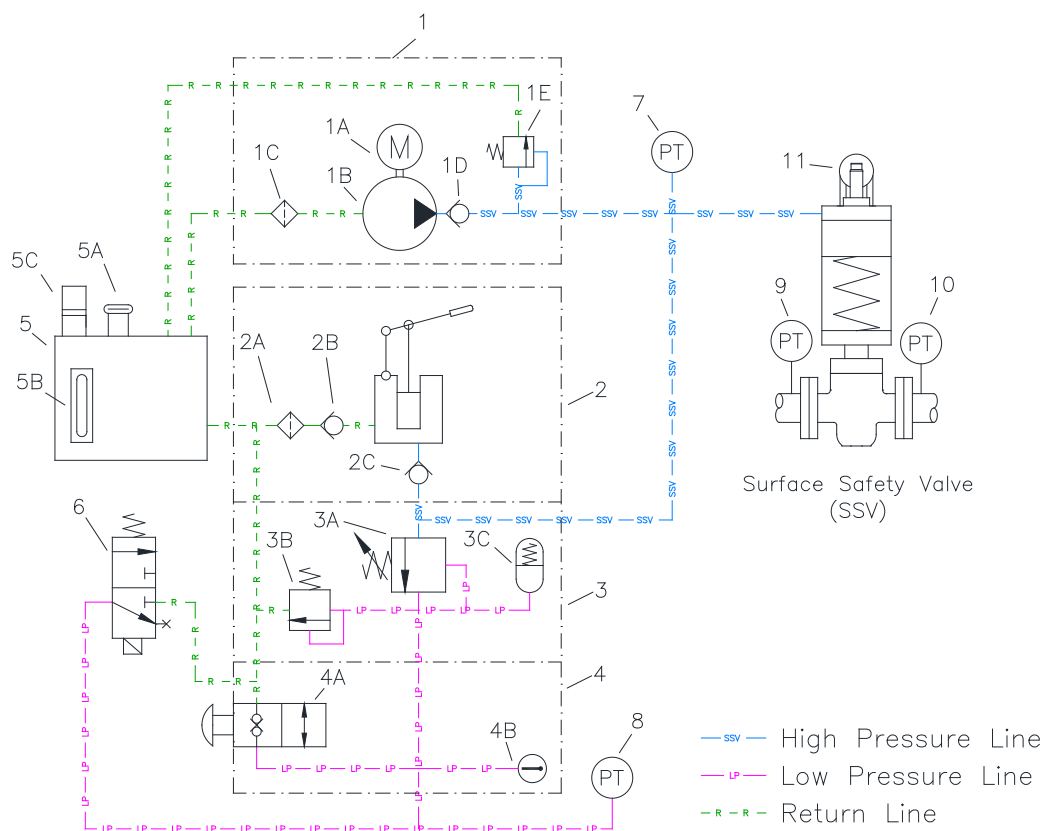
Other Optional Items

- High-pressure accumulator
- Pressure gauges
- Pressure switches
- Motor disconnect switch

Hydraulic Circuit

The PwrESD hydraulic circuit is composed of 2 loops: low-pressure (LP) and high-pressure (HP). The LP circuit is enclosed within the Pressure Reducing Valve - PRV (3) and ESD Valve (4) and connects to a solenoid valve (6). The HP circuit spans between the Power Unit (1), Manual Pump (2), and PRV (3) and connects to the valve actuator or the Surface Safety Valve (SSV).

The circuit has two safety/relief valves (PSVs). The first is HP-PSV (1E), located in the Power Unit assembly (1) to relieve pressure in the HP circuit. The second is LP-PSV (3B), located in the PRV assembly (3), to relieve pressure in the LP circuit.



Item	Description	Item	Description
1	Power Unit	4	ESD Valve Assembly
1A	Electric Motor	4A	ESD Valve
1B	Gear Pump	4B	Fusible Element
1C	Suction Filter	5	Hydraulic Reservoir
1D	Discharge Check Valve	5A	Filler/Breather Cap
1E	HP Pressure Safety/Relief Valve	5B	Sight Glass
2	Manual Pump	5C	Fluid Level Switch
2A	Suction Filter	6	Solenoid Valve
2B	Suction Check Valve	7	Pressure Transmitter, Hydraulic High Pressure
2C	Discharge Check Valve	8	Pressure Transmitter, Hydraulic Low Pressure
3	Pressure Reducing Valve Assembly	9	Pressure Transmitter, Upstream Line Pressure
3A	Pressure Reducing Valve	10	Pressure Transmitter, Downstream Line Pressure
3B	Low Pressure Safety/Relief Valve	11	Valve Position Transmitter / Limit Switches
3C	Low Pressure Accumulator		

Hydraulic circuit of the PwrESD system with recommended instrumentation

Pump and Motor Power Selection

Motor selection is determined based on the hydraulic pump displacement and the hydraulic maximum working pressure (MWP). PwrESD is offered in 5 standard pumps with constant displacement and a hydraulic pressure rating of up to 3300 psi.

Pump Flow Rates

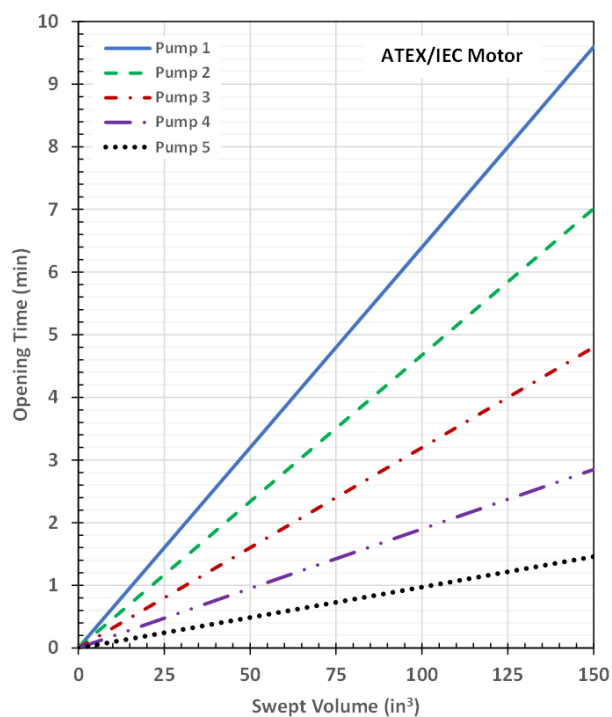
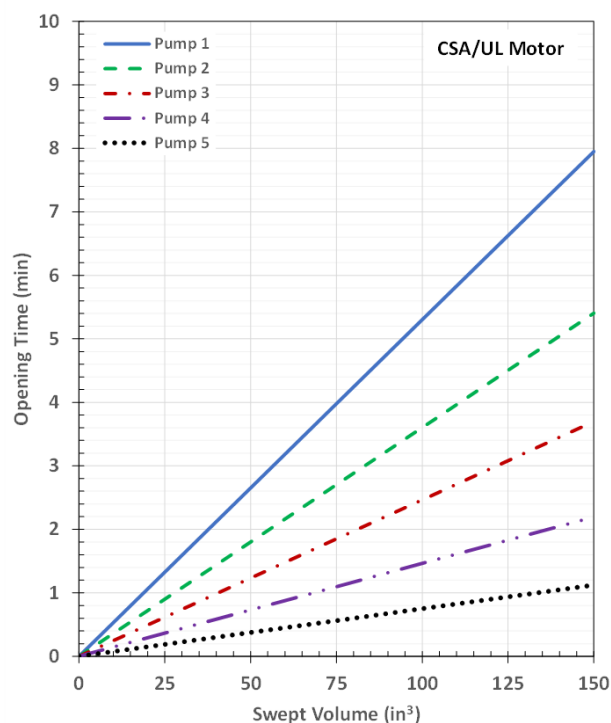
Pump	1	2	3	4	5
Displacement, in ³ /rev (cc/rev)	0.012 (0.19)	0.016 (0.26)	0.023 (0.38)	0.039 (0.64)	0.076 (1.25)
CSA/UL Motors Flow Rate, gpm (l/min)	0.082 (0.309)	0.112 (0.423)	0.163 (0.619)	0.275 (1.042)	0.538 (2.035)
ATEX/IEC Motors Flow Rate, gpm (l/min)	0.068 (0.256)	0.093 (0.351)	0.135 (0.513)	0.228 (0.863)	0.446 (1.686)

Motor Power

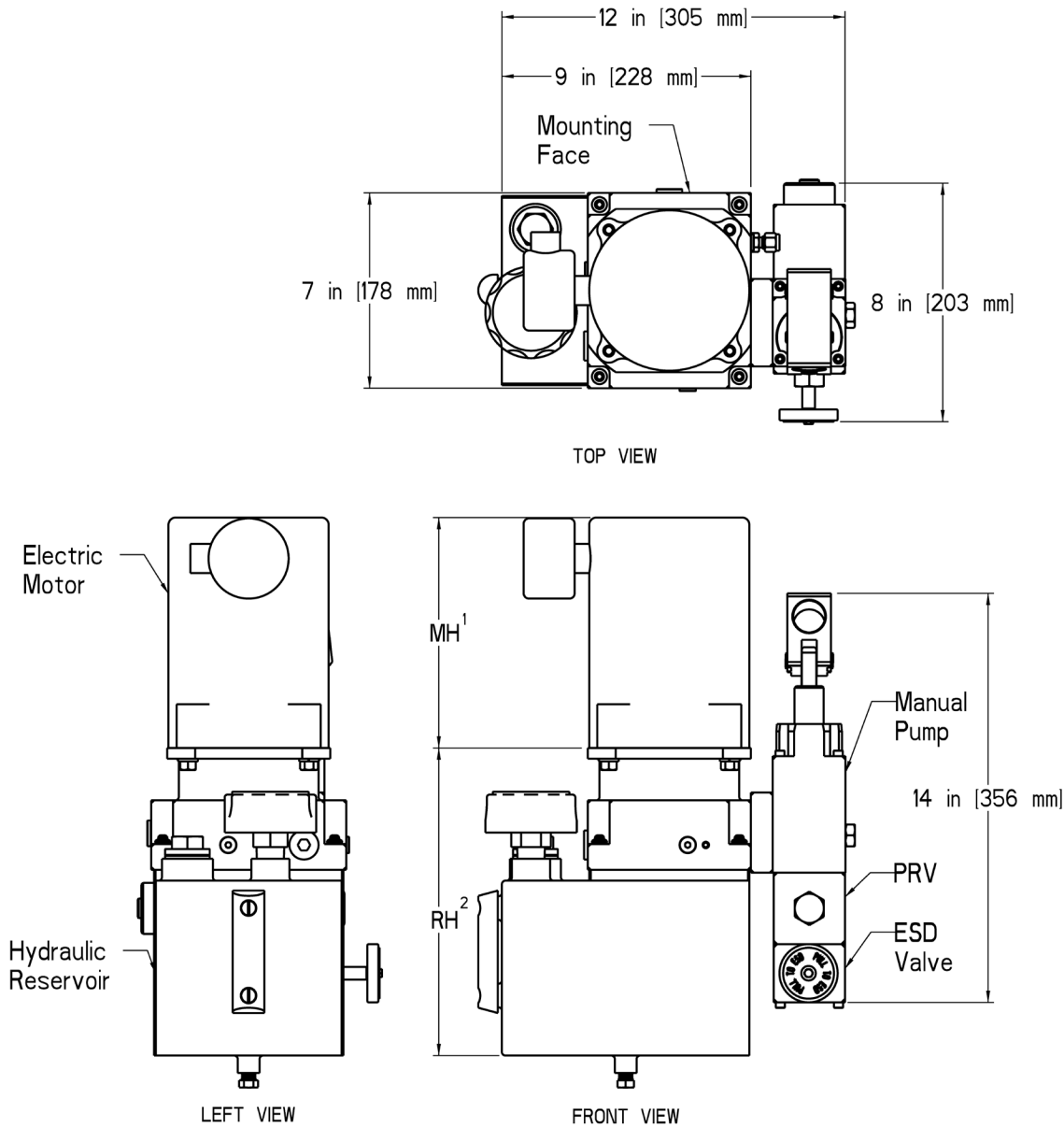
MWP* (psi)		Motor Minimum Required Power, HP (kW)				
CSA/UL	ATEX/IEC	Pump 1	Pump 2	Pump 3	Pump 4	Pump 5
500	600	1/4 (0.18)	1/4 (0.18)	1/4 (0.18)	1/4 (0.18)	1/4 (0.18)
1000	1200	1/4 (0.18)	1/4 (0.18)	1/4 (0.18)	1/3 (0.25)	1/2 (0.37)
1400	1700	1/4 (0.18)	1/4 (0.18)	1/4 (0.18)	1/2 (0.37)	3/4 (0.56)
1800	2150	1/4 (0.18)	1/4 (0.18)	1/3 (0.25)	1/2 (0.37)	1 (0.75)
2350	2850	1/4 (0.18)	1/4 (0.18)	1/2 (0.37)	3/4 (0.56)	1 (0.75)
3300	3300	1/4 (0.18)	1/3 (0.25)	1/2 (0.37)	3/4 (0.56)	

*MWP: Hydraulic Maximum Working Pressure

➔ Select Pump for a required Opening Time

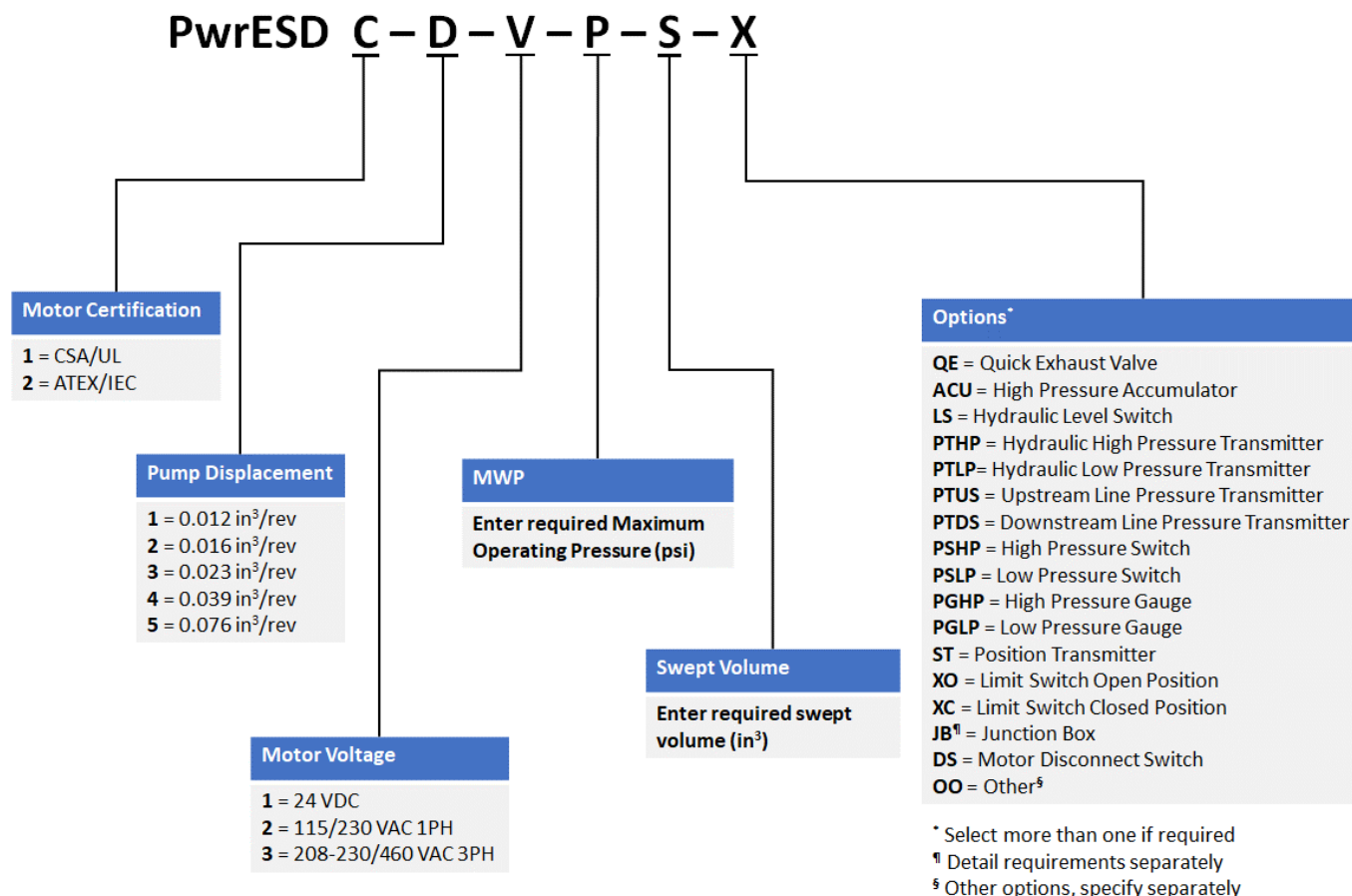


Basic Electro-Hydraulic Power Unit Major Dimensions



¹ Electric Motor Height (MH) varies depending on motor selection.
² Manifold/Reservoir Height (RH); 11 in [279 mm] for 150 in³ reservoir or 13 in [330 mm] for 300 in³ reservoir.

Model Number Selection



Example Model Number:

PwrESD 1-2-1-2000-28-ACU-LS-PTHP-PTLP-ST-JB-DS

- Motor Certification = CSA/UL
- Pump Displacement = 0.016 in³/rev
- Motor Voltage = 24 VDC
- MWP = 2000 psi
- Swept Volume = 28 in³
- Accumulator
- Hydraulic Level Switch
- Hydraulic High Pressure Transmitter
- Hydraulic Low Pressure Transmitter
- Position Transmitter
- Junction Box
- Motor Disconnect Switch



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