# 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 selfcontained 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	
Voltage	115/230 VAC 1PH, 208-230/460 VAC 3PH, or 24 VDC
Power	Power options: ¼ to 1 HP (0.18 to 0.75 kW)
Rotational Speed	1750 rpm (CSA/UL) or 1450 rpm (ATEX/IEC Ex)
Operating Temperature Range	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)
Hazardous Area Approvals	CSA/UL Class 1 Division 1, Groups C, D
	ATEX/IEC Ex db IIB 14 Gb
Pumps	
Motor-Operated Pump	Micro gear pump
	Displacement: 0.012 to 0.076 in <sup>3</sup> /rev (0.1 to 1.5 cm <sup>3</sup> /rev)
	Flow rate: 0.07 to 0.54 gpm (0.26 to 2.04 l/min)
Manual Pump	Plunger pump
	Displacement: 0.66 to 1.18 in <sup>3</sup> /stroke
	(10.8 to 19.3 cm3/stroke)
Reservoir	
Features	Integrates to HP manifold, easily disassembled for maintenance, and accessible level switch
	port.
Sizes	150 in <sup>3</sup> (2.5 liters)
	300 in <sup>3</sup> (4.9 liters)
Hydraulic Fluid	Industrial hydraulic fluid for use to below -40 $^\circ$ F (-40 $^\circ$ C) ambient low temperature
Solenoid Valve	
Power Consumption	0.85 watts (3 watts in-rush)
Input Voltage	24 VDC
Operating Temperature Range	-76°F to +122°F (-60°C to +50°C)
Number of ports	3/2
Flow Coefficient (Cv)	0.6
Operating Pressure	0 to 174 psi (0 to 1,200 kPa)
Hazardous Area Approvals	CSA/UL Class 1 Division 1, Groups B, C, D
	ATEX/IEC Ex d IIC
Hydraulics	
Maximum Operating Pressure	3,300 psi (22,753 kPa)
System Temperature rating	-40 °F to 180 °F (-40°C to +82°C) limited by gear pump
Pressure Reducing Valve (PRV)	Flow Coefficient (Cv): 0.43
Low-Pressure Safety/Relief Valve	Flow Coefficient (Cv): 6.10
	Set Pressure: 150 psi (1,034 kPa)
High-Pressure Safety/Relief Valve	Flow Coefficient (Cv): 0.24
	Set Pressure up to: 2,500 psi (17,237 kPa) and 4,000 psi (27,580 kPa)
Trip/Reset Control	(1) Manual Emergency Shutdown Valve (ESDV), or
	(2) Manual Override Valve (MOV)
	1



# **Optional Items**

## Quick Exhaust Valve

Maximum Working Pressure6,000 psi (41,369 kPa)Flow Control ApplicationNormally OpenControl Function3-way – poppet assembly operatedFlow Coefficient (Cv)4.33

#### Junction Box

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

## Level Switch

Measurement Type Contact Arrangement Operating Temperature Range Hazardous Area Approvals

Non-contact (Magnetic) SPDT (Form C) -40°F to +212°F (-40°C to +100°C) 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 T6T1 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 TypeNon-contact (Magnetic)Contact Arrangement/MaterialSPDT (Form C) TungstenOperating temperature rangeCSA/UL -40°F to +221°F (-40°C to +105°C)Hazardous area approvalsCSA/UL Class 1 Division 1, Groups A, B, C, DATEX/IEC Ex d IIC

# Other Optional Items

- High-pressure accumulator
- Pressure switches

- Pressure gauges
- 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.



#### 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, in³/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 (I/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 (I/min)	0.068 (0.256)	0.093 (0.351)	0.135 (0.513)	0.228 (0.863)	0.446 (1.686)

#### **Motor Power**

MW	'P⁺ (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**



<sup>&</sup>lt;sup>1</sup> Electric Motor Height (MH) varies depending on motor selection.
<sup>2</sup> Manifold/Reservoir Height (RH); 11 in [279 mm] for 150 in<sup>3</sup> reservoir or 13 in [330 mm] for 300 in<sup>3</sup> 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 in<sup>3</sup>
- Accumulator
- Hydraulic Level Switch
- Hydraulic High Pressure Transmitter
- Hydraulic Low Pressure Transmitter
- Position Transmitter
- Junction Box
- Motor Disconnect Switch



# Stream-Flo Industries Head Office and Manufacturing Facility

4505 74 Avenue Edmonton, Alberta, Canada T6B 2H5 Tel: 780.468.6789 | Fax: 780.469.7724

#### Stream-Flo USA Head Office

8726 Fallbrook Drive Houston, Texas, USA 77064 Tel: 832.912.1022 | Fax: 281.653.1188

## **Stream-Flo International Hub**

Stream-Flo Middle East DMCC Unit 2404, Swiss Tower, Jumeirah Lakes Towers, Sheikh Zayed Road, PO Box: 2562 Dubai, UAE

Follow us on:



For more information: streamflo.com info@streamflo.com The Stream-Flo Group of Companies

