

SpartanPRO™ Surge Relief

Nitrogen Pressure Control System



The SpartanPRO™ Surge Relief is a highly accurate pressure control panel designed for the control of pipeline surge relief valves. The panel is optimized for low maintenance, low cost of ownership, and easy integration. It supplies one or more surge relief valves simultaneously with +/- 0.5 psig accuracy.

Overview

During normal operation, liquid pipeline surge events are caused by rapid changes in flow rate due to opening or closing valves, starting, and stopping pumps, or the activation of ESD devices. Therefore, it is imperative to have reliable surge relief in place to prevent leaks, damages, and injuries. The purpose of a surge relief loading system is to control the nitrogen gas used to operate the relief valve. These valves need to be fast acting and relied upon to open fully in the event of a surge. Nitrogen gas is used to pressurize the valve piston and keep it in the closed position during normal operation. As pipeline pressure increases, the spring and gas pressure is overcome, and the valve opens.

The SpartanPro™ Surge Relief was developed to meet these industry needs. It consists of an electronic pressure controller, color touchscreen HMI, digitally- controlled solenoids valves, a single stage high-pressure letdown regulator, flow metering valves, pressure relief valves, high-pressure nitrogen gas supply cylinders and plenum cylinders. Each are installed within a heated and insulated NEMA 4 cabinet, certified for Class 1, Zone 2 hazardous area locations.

Features and benefits

- Maximize product throughput to by enabling operation closer to pipeline pressure limits
- Eliminate setpoint drift associated with regulator-based systems
- Lower maintenance costs by reducing site visits
- Continuous health diagnostic reporting
- Embedded processor for fully autonomous operation
- Intuitive, simple front panel user interface allows access to each function
- Reduce operating costs by lowering nitrogen consumption
- Minimize unnecessary relief events by using reliable and fault-tolerant system components

SpartanPRO™ Surge Relief leads the industry in performance, functionality, and reliability. Designed, manufactured, and supported by Spartan Controls, Western Canada's leading process automation provider.

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Advantages

Very high accuracy of nitrogen pressure control

- Reliable surge overpressure protection, even at pipeline pressures close to maximum allowable operating pressures
- No setpoint drift normally associated with regulator-based designs
- Advanced dual PID pressure control
- Fully digital setpoints, alarm limits, and deadband

Extremely low nitrogen consumption

- Up to 1 year per nitrogen supply cylinder
- Continuous monitoring of remaining nitrogen
- Alerts and alarms on abnormal nitrogen supply and plenum pressures or excessive consumption

Robust and fault-tolerant design

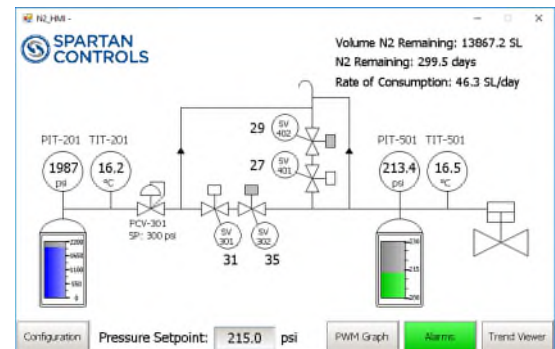
- Redundant high-cycle solenoid valves
- Solenoid valve cycling duty optimization
- Abnormal event alarms
- Automatic preservation of plenum pressure on loss of power, loss of nitrogen supply, and system fault detection
- Upon power failure the system will automatically switch to manual pressure control

Advanced remote connectivity

- Local PLC connectivity (Modbus over ethernet)
- Cellular connectivity, including smart cell phones
- Monitoring for operation, events, trends, nitrogen consumption
- Alarms and alerts
- Remote troubleshooting
- Downloadable historical data and alarm summary

Full color touchscreen operator interface

- Intuitive graphic-based operation
- Fully configuration capability from screen – no laptop required
- Real-time and historical trends
- Low ambient temperature and bright sunlight display



Applications

- Liquid Pipeline
- Refineries
- Terminals
- Marine Loading
- Tank Farms
- Power Distribution

Specifications

Table 1: SpartanPRO™ Surge Relief

Value	
Pressure control accuracy	+/- 3.5 kPag (+/- 0.5 psig)
Adjustable N2 loading setpoint	70 to 4950 kPag (10 to 720 psig)
Configurable deadband	3.5 to 175 kPag (0.5 to 25 psig)
Performance	
Nitrogen consumption	Typically, less than 30 SL per day (1)
Cylinder life	Typically, 6-12 months per bottle
History collection sample rate	5 seconds
History storage size	6 months
Environmental	
Ambient operating temperature	-40° to 60°C (40 to 140 °F)
Communications	
Remote communications	Cellular modem
Digital communication outputs	Modbus RTU, RS485, and Ethernet IP
Electrical rating	
Power requirements	120 VAC, 60 Hz, 8 amps
Hazardous area classification	Class 1, Zone 2, EX 11A/11B T3 (Class 1, Div 2, Groups C, D T3)
Electrical certification	cETLus
Physical	
HMI display	7" LCD touch screen
Cabinet type	NEMA 4, 12 GA steel, white powder coat epoxy paint
Supply cylinder pressure	K or T size supply bottles, CGA 580 (2) 15168 kPag (2200 psig)
Plenum cylinder water volume	66.8 liters (2.36 ft ³)
Cabinet dimensions	1625mm W x 812mm D x 1980mm H (64" W x 32" D x 78" H)
Weight	Approx. 453 kg (1,000 lbs) excluding cylinders)
Outlet gas port connector	¾" Swagelok tube fitting

(1) *Based on average conditions*

(2) *Panel will hold two parallel bottles*

Lifecycle service and support

Our team of trained and certified field experts knows and understands the requirements, needed to develop a customized service program, to suit your application. We provide complete turnkey services and problem solving to assist you every step of the way. From pre-installation services to ongoing maintenance and support long after commissioning, we have the expertise to ensure your Surge Relief panel runs at ideal operating conditions during its lifecycle.

Field services include, but are not limited to the following:

- Startup and commissioning
- Scheduled maintenance
- On-site support
- Training

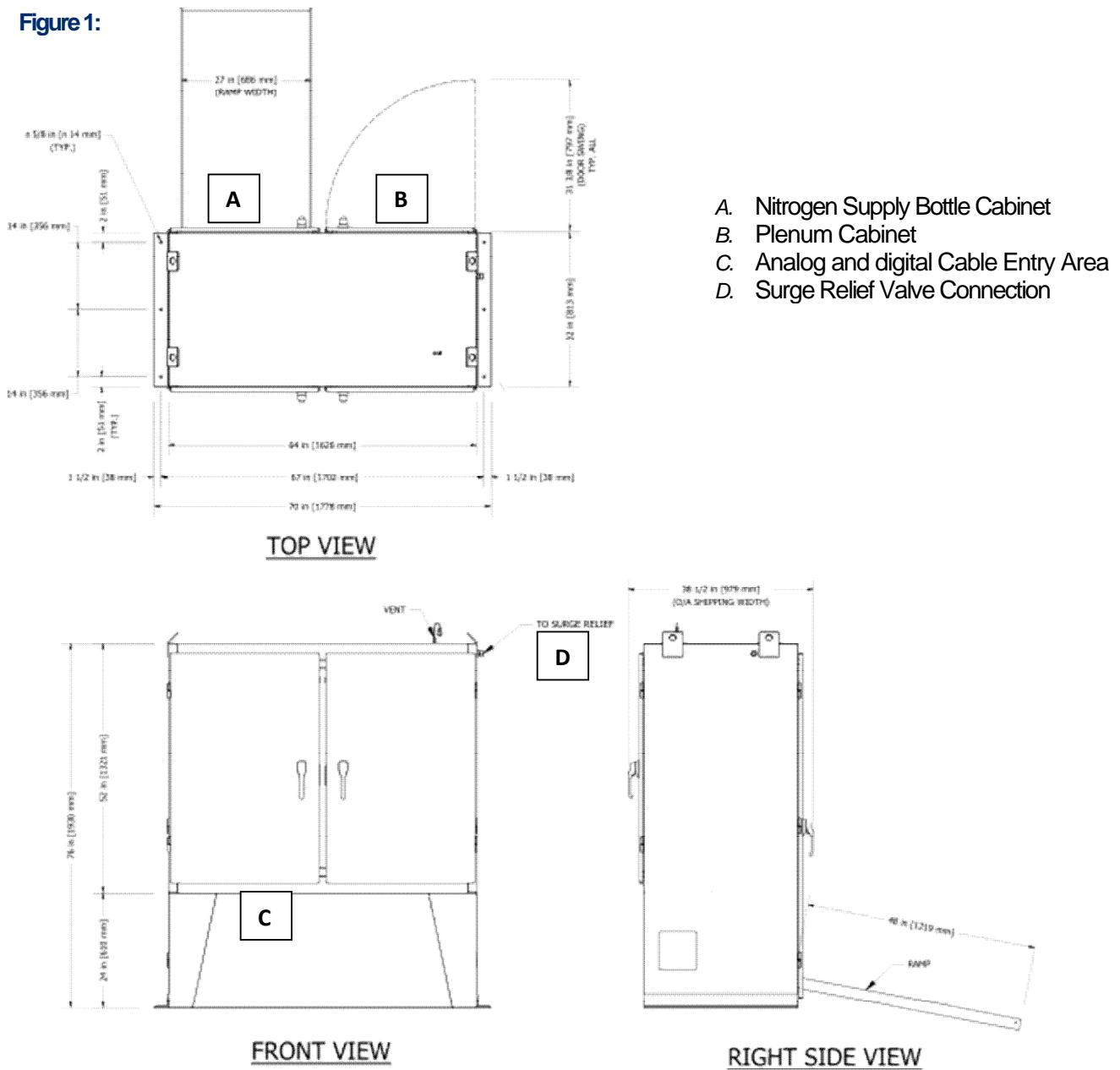
Training services

Whether your goal is to reduce maintenance costs or maximize uptime, Spartan Controls offers a complete list of training courses and continuous support programs to ensure your technicians know how to properly operate and maintain the product during its lifecycle.

All training courses are taught by certified instructors who provide the necessary hands-on training, theory, and conceptual knowledge needed to perform on-the-job functions safely and accurately.

Recommended installation

Figure 1:



Note

1. Cable entries must be drilled as required

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