Valve Control 101

The Evolution of Valve Control

Shifts in process control technology drive shifts in valve control technology

During the past century, the methods of controlling plant processes have progressed through several major stages of automation. Each stage has lasted approximately twenty years before being supplanted by a significant shift in technology.

Not surprisingly, the world of on/off valves has followed a similar pattern of technological change. As process control systems have evolved, the on/off valves have followed a corresponding path of innovations.

Today’s customer requirements are different

Fundamental shift from conventional switchboxes to digital valve controllers

In the past, when the conventional switchbox was the common method of feedback for on/off valves, engineers did not spend much time specifying the type of limit switchboxes they preferred, instead accepting whatever types the valve or actuator vendor supplied. The result? Process plants around the world are now filled with a variety of types and brands of limit switchboxes, with little standardization and considerable variability in quality, features, durability, and price.

Today, however, is different. Process plants have increasingly higher goals to be more productive while using fewer people. To accomplish this, plants must place more emphasis on two things: global product standardization and networking architectures. The combination of the two deliver substantial results and helps achieve the goals of process plants.

Standardization drives costs down by minimizing operator training and maximizing purchasing power. And fieldbus networking techniques deliver proven economic benefits by shortening commissioning cycles, simplifying wiring, and reducing maintenance costs.

As process plants shift to global product standardization and fieldbus networking, they must be careful to shift their view of vendors as well, particularly when it comes to on/off valves. Gone are the days when engineers at process plants can leave it up to valve and actuator vendors to supply whatever type of limit switchboxes they have in stock.

Instead, as field devices become more sophisticated, process plant engineers must seek out key suppliers that can provide expertise and solutions, not just pricing and product.

Which suppliers can deliver on today’s new requirements?

The supplier base of existing switchboxes for on/off valve controllers is highly fragmented and mostly regional. Many of the suppliers are “stuck in switchbox mode.” That is, they are adequately adept at designing and manufacturing conventional switchboxes, but they are not ready for the new world of digital valve control.

This new world of digital valve control requires a new set of skills and expertise not found in traditional switchbox suppliers.

Today’s process manufacturers need switchbox suppliers to demonstrate a solid working knowledge of process control systems and the solutions anywhere in the world.

To meet new customer requirements and to be truly valuable to end users, a supplier must break away from the old “switchbox mode” and prove clearly that it is capable of true “digital valve control.”

What to look for in a Digital Valve Control supplier

Choose suppliers with deep expertise

If your plant processes are shifting to a fieldbus-based process control system, do not assume that your existing switchbox supplier can deliver the capabilities you’ll need for digital valve control. Just because they have been valuable in the past does not guarantee that they have responded well to recent shifts in technology.

Instead, consider other suppliers with proven expertise and experience in providing digital valve controllers, not just conventional switchboxes.

Choose suppliers with multiple busses

Because most plant sites deploy multiple bus protocols within the same process or location, it is helpful to work with suppliers that have a breadth of knowledge across several busses, not just the simple sensor bus networks.

Choose suppliers that have extensive knowledge in multiple busses. Several manufacturers claim expertise in valve networking but are often limited in scope to only the simplest bus protocols.

Choose suppliers with complete solutions

The actual installation of a new process control fieldbus-based architecture goes well beyond the field devices themselves. Often it requires an array of field networking solutions to ease the installation and accelerate the commissioning.

So make sure your supplier of discrete valve controllers has a deep understanding of the process control system and the willingness and capability to take ownership of the critical links between the system and the devices.

Choose suppliers who have global approvals and extensive selection

If your company has plants scattered around the world, it will be important to begin standardizing on products that operate the processes. This minimizes training required and maximizes purchasing power. But before you buy digital valve controllers, make sure the supplier can deliver and support them everywhere you’ll be using them.
The TopWorx Valve Control Program

TopWorx has listened to customers about the three things that matter most – simplicity, selection, and savings – and combined them into one all-encompassing valve control program.

Simplicity
TopWorx valve controllers and monitors offer unmatched simplicity – they’re simple to order, simple to install, and simple to operate. By offering solutions with unique features like potted electronics, direct mounting, LED early warning indicators, and a modular design, TopWorx has ushered in a different way of doing valve control.

Selection
Whether you’re in Alberta, Saudi Arabia, or the Pacific Rim, TopWorx has a valve control solution that will work for you. With a variety of enclosures to tackle any harsh environment, global approvals to satisfy any hazardous area classification, and your choice of sensors and communication inside, TopWorx has every application covered.

Savings
TopWorx valve controllers and monitors all have one thing in common: they save you money. For instance, when you choose a LumiTech valve controller with networking capability, you eliminate the cost of mounting kits and reap the proven economic benefits of today’s bus technologies. And our modular, integrated platforms that combine position sensors, pilot valves, and bus communication save engineering time as well as procurement and inventory costs.

Did You Know?
TopWorx sensor communication modules for AS-i, FOUNDATION Fieldbus, DeviceNet, Profinet and Modbus can be used in a variety of enclosures suitable for use in any process environment.
Valve Control Solutions Overview

Puck Position Sensors

TopWorx Puck Position Sensors provide reliable valve position monitoring while saving space, time, and money. These devices mount directly to rotary valve actuators and are less than 1/3 the size of conventional switchboxes.

Options include
- Sensors
- Proximity sensors
- Bus Communications
- AS-Interface

Linear Valve Monitors & Sensors

Backpack valve position monitors are designed specifically for linear valve applications. They use a unique shaftless design to mount snugly under the bonnet of control valves and are suitable for all hazardous areas.

Options include
- Sensors
- Proximity sensors
- Bus Communications
- AS-Interface

Mounting Kits

The TopWorx VIP bracket program offers the world's largest selection of mounting kits for valve controllers and monitors. After several decades of designing bracket systems for all types of valves and actuators, TopWorx has accumulated over 1,200 different designs.

Options
- Stainless Steel kits
- Custom designs
- Rotary, linear, diaphragm, or knife-gate valves

Discrete Valve Monitors

TopWorx discrete valve monitors integrate sensors, bus communications, and termination points into a variety of enclosures, delivering the ultimate in modularity.

Options include
- Enclosures
  - Lumitech: direct-mount, non-incendive
  - Switchpak: explosion-proof
- Sensors
  - GO Switch leverless limit switches
  - Proximity sensors
  - Mechanical switches
- Bus Communications
  - AS-Interface
  - FOUNDATION Fieldbus
  - DeviceNet
  - Profibus DP
  - Modbus

Discrete Valve Controllers

TopWorx discrete valve controllers integrate sensors, bus communications, pilot valve, and termination points into a variety of enclosures, delivering the ultimate in modularity.

Options include
- Enclosures
  - Lumitech: direct-mount, non-incendive
  - Switchpak: explosion-proof
- Sensors
  - GO Switch leverless limit switches
  - Proximity sensors
- Mechanical switches
- Bus Communications
  - AS-Interface

Sensor-Communications Modules

TopWorx Sensor-Communications Modules are micro-processor based “brains” that mount inside Lumitech or Switchpak enclosures to deliver position sensing and bus networking functionality to on/off valves. They combine position sensors, bus communications, solenoid outputs, and wiring terminals into a compact, sealed module that drops into various Lumitech and Switchpak enclosures.

Options include
- Enclosures
  - Lumitech: direct-mount, non-incendive
  - Switchpak: explosion-proof
- Sensors
  - GO Switch leverless limit switches
  - Proximity sensors
- Bus Communications
  - AS-Interface
  - FOUNDATION Fieldbus
  - DeviceNet
  - Profibus DP
  - Modbus

Pilot Valves

Low Power Solenoids
Ultra Low Power Piezo

Valve Control Solutions Overview

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230 Ryan Way, South San Francisco, CA 94080-6370  
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Bus Networking Solutions for Rotary Valves

Solutions for all rotary valves and actuators:
- Ball valves
- Butterfly valves
- Manual valves
- Dampers
- Rack and pinion actuators
- Scotch yoke actuators
- Vane actuators

Approvals for all hazardous areas:
- Zone 0 intrinsically safe
- Zone 1 explosion proof
- Zone 2 non-incendive

Enclosures for all process environments:
- Engineered resin
- Aluminum
- Stainless steel

Sensor-Communications Modules for all bus networks:
- AS-Interface
- FOUNDATION Fieldbus
- DeviceNet
- Profinet
- Modbus

Other options:
- Integral solenoid valves
- NAMUR and non-NAMUR mounting
- Various visual display dome colors
- Britelite early warning LEDs

Available options:
- Seamless integration with products

TopWorx offers several options that provide local feedback of a valve’s position.

Visual Display Options
- Lumitech Target Available in: DVC, DVM
- Britelite LEDs Available in: DVC, DVM
- Switchpak Dome Available in: DXP, DXS

Shaft Options
Both Lumitech and Switchpak product lines can mount on any valve actuator, whether it has an ISO/NAMUR mounting pattern or not.

Pilot Valve Options
TopWorx leads the way in providing low power pilot valves suitable for corrosive service and Intrinsically Safe applications.
DVC: Discrete Valve Controller

The Lumitech DVC has set a new standard in discrete valve control. Feature-rich yet compact and affordable, its design delivers the ultimate combination of modularity and networking capabilities.

Features:
- Integral pilot valve
- Direct mount with no brackets
- BriteLite early warning LEDs
- Zone 0 (intrinsically Safe, FF)
- Zone 2 (Class I, Div 2)

Options:
- AS-Interface
- FOUNDATION Fieldbus
- DeviceNet
- Profibus DP
- Modbus
- Stainless Steel pilot valve

Enclosure Area Classification

- Z0: Intrinsically Safe
- Zone 0
- EEx ia IIC
- Class I, Div 1 & 2, Groups A,B,C,D
- EEx ia IIC
- Class II, Div 1 & 2, Groups E,F,G
- EEx ia IIC
- Zone 2
- EEx ia IIC
- Class III
- EEx ia IIC
- Class II, Div 2, Groups E,F,G
- EEx ia IIC
- Zone 1
- EEx ia IIC
- Class I, Div 0, Groups A,B,C,D
- EEx ia IIC
- Class III
- EEx ia IIC
- Class II, Div 2, Groups E,F,G
- EEx ia IIC

Visual Display

Target Colors: Green and Red
BriteLite Colors: Green and Red
BriteLite Lens: Polycarbonate, UV resistant

Pilot Valve

Solenoid Valve

Pressure Valve

Dimensions

Visual Display

Wiring

P 1/8“ NPT conduit
M 3/8 metric conduit (includes adapter fitting)
1 Mini-change quick disconnect
3 Euro-change quick disconnect
5 AS-i flat cable adapter
(E1 option must be A3)
(Not rated for hazardous locations)

For Zone 2 (Class I, Div 2) applications of Wiring options 1 & 3, see page 117 for quick disconnect guards.

DVC: Discrete Valve Controller

Enclosure

Area Classification

Sensor-Communications Module

Visual Display

Wiring

Pilot Valve

Ordering Guide

Fill in the boxes to create your ‘ordering number’.
DVM: Discrete Valve Monitor

The Lumitech DVM offers the same functionality as the DVC, less the onboard pilot valve. The DVM is the best choice for customers who prefer a specific brand of solenoid, which can be wired directly to the spare terminals in the DVM.

Features:

- Terminals to wire in external solenoid
- Direct mount with no brackets
- BriteLite early warning LEDs
- Zone 0 (intrinsically Safe, PF)
- Zone 2 (Class I, Div 2)

Options:

- AS-Interface
- Foundation Fieldbus
- DeviceNet
- Profinet
- Profibus DP
- Modbus

Enclosure

Material: PBT blend
Specifications: Flame UL94-V0 & UV resistant
Target Material: PBT blend
Specifications: Flame UL94-0 & UV resistant

Conduit Entries:

- Dome: Polycarbonate, UV & impact resistant
- Adjustment: 360° in 3° increments
- Specifications: Flame UL94-V0 & UV resistant
- Material: PBT blend

Target Specifications:

- Flame UL94-0 & UV resistant
- Material: PBT blend

Visual Display

TARGET COLORS

- Green and Red

Target Colors: Green and Red
BriteLite Colors: Green and Red
BriteLite Lens: Polycarbonate, UV resistant

Ordering Guide

Fill in the boxes to create your "ordering number."
Switchpak DXP

**Enclosure**
- Die-cast aluminum; O-ring sealed
- Coating: Dichromate conversion or anodize inside; powder polyester coating outside
- Conduit Entries: Two 3/4" NPT (Four optional)
- Terminal Strip Contacts: Located on SCM
- Temperature Rating: Determined by other components
- Environment: NEMA Type 4, 4X, 7, 9; IP66
- **Switchpak DXP**
- **Ordering Guide**

**Features**
- Zone 0 (Intrinsically Safe, FF)
- Zone 1 (Class I, Div 1)
- Aluminum enclosure
- O-rings: Buna N; Viton optional
- Dichromate conversion or anodize inside; O-ring sealed; 360° adjustable; bolt-on

**Options**
- AS-Interface
- FOUNDATION Fieldbus
- DeviceNet
- Modbus

**Dimensions**

**Visual Display**
- Visual Display: Impact resistant polycarbonate; O-ring sealed; 360° adjustable; bolt-on
- Green/Red indicator dome, 90°
- Black/White indicator dome, 90°
- 120° through diver indicator dome

**Shaft**
- Shaft: Stainless steel; O-ring sealed
- Shaft Retainer: Stainless steel
- **Ordering number:**
  - S84
  - P84
  - NAMUR

**Pilot Valve**
- **Ordering number:**
  - S85
  - P85

**Solenoid Valve**
- Pneumatic valve
- Piezo Valve
- Filtered air is required for proper valve operation. See our Air Filter on page 170.

**Ordering Guide**
Fill in the boxes to create your "ordering number."
Switchpak DXS

The Switchpak DXS combines sensors, bus communication, and a solenoid valve into a stainless steel Zone 1 (Class I, Div 1) enclosure.

Features:
- Zone 0 (Intrinsically Safe, FF)
- Zone 1 (Class I, Div 1)
- Stainless steel enclosure

Options:
- AS-Interface
- FOUNDATION Fieldbus
- DeviceNet
- Profibus DP
- Modbus

Visual Display:
- Impact resistant polycarbonate; O-ring sealed; 360° adjustable; bolt-on
- GR Green/Red indicator dome
- BY Black/Yellow indicator dome
- TD 120° through divert indicator dome

Shaft:
- Stainless steel; O-ring sealed
- Shaft Retainer: Stainless steel
- N NAMUR shaft
- S Standard 1/4" flat shaft

Pilot Valve:
- 000 No pneumatic valve
- 24VDC, aluminum, 4-way
- 24VDC, stainless steel, 4-way
- 24VDC, stainless steel, 4-way
- Piezo pilot, stainless steel, 4-way

Enclosure:
- Stainless steel, O-ring sealed
- Coating: Powder polyester outside
- O-rings: Buna N, Viton optional
- Cover Bolts: 6 captive socket head stainless steel screws
- Conduit Entries: Two 1/2" NPT (Four optional)
- Terminal Strip Contacts: Located on SCM
- Temperature Rating: Determined by other components
- Environment: NEMA Type 4, 4X, 7, 9; IP66

Ordering Guide
Fill in the boxes to create your ‘ordering number.’

Area Classification

Dimensions

Visual Display

 Shaft

Pilot Valve
Switchpak DXP

The Switchpak DXP combines sensors, bus communication, and a solenoid valve into an aluminum Zone 1 (Class I, Div 1) enclosure.

Features:
- Zone 0 (Intrinsically Safe, FF)
- Zone 1 (Class I, Div 1)
- Aluminum enclosure

Options:
- AS-Interface
- DeviceNet
- Profibus DP
- Modbus

Enclosure:
- Die-cast aluminum; O-ring sealed
- Dichromate conversion or anodize inside; powder polyester coating outside
- O-rings: Buna N; Viton optional
- Cover Bolts: 6 captive socket head stainless steel screws
- conduit Entries: Two 1/4" NPT (four optional)
- Terminal Strip Contacts: Located on SCM
- Temperature Rating: Determined by other components
- Environment: NEMA Type 4, 4X, 7, 9; IP66

Area Classification
- Zone 0 (Intrinsically Safe, FF)
- Zone 1 (Class I, Div 1)
- Aluminum enclosure

For Shaft, choose S or N (both in stock)

Dimensions

Visual Display:
- Impact resistant polycarbonate; 0-ring sealed, 360° adjustable, bolt-on
- Green/Red indicator dome, 90°
- Black/Yellow indicator dome, 90°
- 120° through direct indicator dome

Shaft:
- Stainless steel, 0-ring sealed

Pilot Valve:
- No pneumatic valve
- 24VDC, stainless steel, 4-way
- 24VDC, stainless steel, 4-way

Ordering Guide
- Fill in the boxes to create your "ordering number."
Switchpak DXS

The Switchpak DXS combines sensors, bus communication, and a solenoid valve into a stainless steel Zone 1 (Class I, Div 1) enclosure.

Features:
- Zone 0 (Intrinsically Safe, FF)
- Zone 1 (Class I, Div 1)
- Stainless Steel enclosure

Options:
- AS-Interface
- DeviceNet
- Profinet
- Modbus

Dimensions

Visual Display:
- Impact resistant polycarbonate;
- O-ring sealed;
- 360° adjustable;
- Bolt-on

GR
Green/Red indicator dome
BY
Black/Yellow indicator dome
TD
120° through direct indicator dome

Shaft:
- Stainless steel; O-ring sealed

Shaft Retainer:
- Stainless steel

N
NAMUR shaft
S
Standard 1/4" flat shaft

Pilot Valve
- No pneumatic valve
- 24VDC, stainless steel, 4-way
- 24VDC, aluminum, 4-way
- Piezo pilot, stainless steel, 4-way
- Piezo pilot, aluminum, 4-way

Filtered air is required for proper valve operation. See our Air Filter on page 170.
Conventional Solutions for Rotary Valves

When it comes to topworks for automated rotary valves, there is a need for selection, simplicity, and savings.

With a large selection of modular enclosures and a variety of options that deliver the ultimate in simplicity, TopWorx is sure to have a solution that can generate big savings for you.

**Solutions for all rotary valves and actuators:**
- Ball valves
- Butterfly valves
- Manual valves
- Dampers
- Rack and pinion actuators
- Scotch yoke actuators
- Valve actuators

**Approvals for all hazardous areas:**
- Zone 0 intrinsically safe
- Zone 1 explosion proof
- Zone 2 non-incendive

**Enclosures for all process environments:**
- Engineered resin
- Aluminum
- Stainless steel
- Severe service
- Corrosive atmospheres
- High temperature
- Low temperature
- Heavy washdown
- Sanitary
- Salt water spray
- Underwater

**Sensors for all applications:**
- GO Switch leverless limit switches
- Potted sensor modules
- Mechanical limit switches
- Proximity sensors
- 4-20mA position transmitters
- 0-10k & 0-10k potentiometers

**Other options:**
- Integral solenoid valves
- NAMUR and non-NAMUR mounting
- Various visual display dome colors
- Britelite early warning LEDs

**Enclosures**

- **Lumitech IVC**
  - Non-Incendive
  - Integral Solenoid Valve

- **Switchpak SXP**
  - General Purpose NAMUR

- **Switchpak SXS**
  - Stainless Steel

- **Switchpak SSS**
  - Explosion Proof

**Visual Display Options**

- **Lumitech LEDs** Available in: IVC, IVM
- **Britelite LEDs** Available in: IVC, IVM
- **Switchpak Dome** Available in: SXP, SXS
- **Switchpak Dome** Available in: SSP, SRP, SEP, SUP

**Shaft Options**

- **Non-NAMUR Shaft** Available in: SXP, SXS, SSP, SRP, SEP, SUP
- **NAMUR Shaft** Available in: SXP, SXS, SSP, SRP, SEP, SUP

- **Pepperl + Fuchs Proximity** Available in: SXP, SXS, SUP

**Solenoid Valve Options**

- **TopWorx leads the way in providing low power pilot valves suitable for corrosive service and Intrinsically Safe applications.**

- **Solenoid Valve**
  - Aluminum or Stainless Steel
  - Available in: IVC, IVM, SXP, SXS

**Sensor Options**

- **TopWorx offers a variety of sensor options to cover all process applications.**

- **GO Switch leverless limit switches**
  - Available in: SXP, SXS, SSP, SRP, SEP, SUP

- **Potted Sensor Module**
  - Available in: IVC, IVM, SXP, SXS

- **Mechanical SPDT** Available in: SXP, SXS, SSP, SRP, SEP, SUP
- **Mechanical DPDT** Available in: SXP, SXS, SSP, SRP, SEP
- **Proximity SPDT, SPST** Available in: SSP, SRP, SEP, SUP

**Analog Output Options**

- **TopWorx analog output options provide continuous valve position feedback.**

- **4-20mA Transmitter** Available in: SXP, SXS, SSP, SRP
- **Potentiometer** Available in: SXP, SXS, SSP, SRP

**Available Options**

- **35 Series GO Switches**
  - Available in: IVC, IVM, SXP, SXS, SSP, SRP, SEP, SUP

**Courtesy of Steven Engineering, Inc.**

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- Main Office: (650) 588-9200
- Outside Local Area: (800) 258-9200
- www.stevenengineering.com
DVM: Discrete Valve Monitor

The Lumitech DVM offers the same functionality as the DVC, less the onboard pilot valve. The DVM is the best choice for customers who prefer a specific brand of solenoid, which can be wired directly to the spare terminals in the DVM.

Features:
- Terminals to wire in external solenoid
- Direct mount with no brackets
- BriteLite early warning LEDs
  - Zone 0 Intrinsically Safe (P)
  - Zone 2 (Class I, Div 2)

Options:
- AS-Interface
- Foundation Fieldbus
- DeviceNet
- Profibus DP
- Modbus

Visual Display

Dimensions

Enclosure
Material: PBT blend
Specifications: Flame UL94-0 & UV resistant

Target
Material: PBT blend
Specifications: Flame UL94-V0 & UV resistant
Adjustment: 360° in 3° increments
Dock: Polycarbonate, UV & impact resistant

Conduit Entries:
- (2) 1/2” NPT standard
- (2) M20 metric optional

Cover Gasket: Silicone; Flame UL94-V0 & UV resistant

Fasteners: All 305 series stainless steel

Mounting:
- NAMUR: Direct - no brackets or couplers
- Non-NAMUR: Interface plate. See page 171.

Temperature Rating: Determined by other components

Environment:
- NEMA Type 4, 4X; IP66

Area Classification

Z0: Intrinsically Safe
  - Zone 0
    - EEx ia IIC
    - Groups A, B, C, D
    - Class I, Div 1 & 2
    - Class II, Div 1 & 2
    - Class III
  - (SCM option must be FF)
  - May be installed Intrinsically Safe per NEC Article 504 and with entity approved barrier.

Z2: Non-Incendive
  - Zone 2
    - EEx nc IIC
    - Groups A, B, C, D
    - Class I, Div 2
    - Class II, Div 2
    - Class III
  - (SCM option must be P)

Target Colors:
- Green and Red

BriteLite Colors:
- Green and Red

BriteLite Lens:
- Polycarbonate, UV resistant

Ordering Guide
Fill in the boxes to create your “ordering number.”

Enclosure
- DVM

Sensor-Communications Module
- AS-Interface
  - (Area Classification must be Z2)
  - (See page 174 for SCM-AS specifications)
- Foundation Fieldbus
  - (Area Classification must be Z2)
  - (See page 176 for SCM-FF specifications)
- DeviceNet
  - (Area Classification must be Z2)
  - (See page 177 for SCM-DN specifications)
- Profibus DP
  - (Area Classification must be Z2)
  - (See page 179 for SCM-PB specifications)
- Modbus
  - (Area Classification must be Z2)
  - (See page 179 for SCM-MB specifications)

Visual Display Wiring

- P 1/2” NPT conduit
- M M20 metric conduit (includes adapter fitting)
- 1 Mini-change quick disconnect
- 3 Euro-change quick disconnect
- 5 AS-i flat cable adapter (Cube option must be AS)

For Zone 2 Class I, Div 2 applications, each wiring hole must be fitted with a quick disconnect guard.
**Lumitech DVC**

**DVC: Discrete Valve Controller**

The Lumitech DVC has set a new standard in discrete valve control. Feature-rich yet compact and affordable, its design delivers the ultimate combination of modularity and networking capabilities.

**Features:**
- Integral pilot valve
- Direct mount with no brackets
- BriteLite early warning LEDs
- Zone 0 (intrinsically Safe, FF)
- Zone 2 (Class I, Div 2)

**Options:**
- AS-Interface
- FOUNDATION Fieldbus
- DeviceNet
- Profibus DP
- Modbus

**Specifications:**
- Flame UL94-V0 & UV resistant
- Material: PBT blend
- Target Specifications: Flame UL94-0 & UV resistant
- Material: PBT blend

**Enclosure**
- Lumitech DVC
- DVC-DNZ2BPS44
- 4-way solenoid valve
- (SCM option must be FF)
- (Area Classification must be Z2)

**Dimensions**
- Width: 3.75" (96 mm)
- Height: 5.12" (130 mm)
- Depth: 2.39" (61 mm)

**Fast Track Delivery**

**Visual Display**
- Target Colors: Green and Red
- BriteLite Colors: Green and Red
- BriteLite Lens: Polycarbonate, UV resistant
- Dome and BriteLite (Green/Red)

**Wiring**
- 1/8 NPT conduit
- 1/4 NPT conduit
- 1/2" NPT conduit (includes adapter fitting)

**Pilot Valve**
- Solenoid valve
- 1/2" NPT conduit (includes adapter fitting)
- 1/4" NPT conduit
- 1/2" NPT conduit (includes adapter fitting)
- Euro-change quick disconnect
- Mini-change quick disconnect
- AS-i flat cable adapter
- DeviceNet (not available with FF SCM option)

**Ordering Guide**

Fill in the boxes to create your “ordering number.”
**Valvetop DXP**

The Valvetop DXP combines position sensors, bus networking, and an integral pilot valve into an explosion-proof enclosure with UL/CSA and ATEX approvals.

**Features:**
- Zone 0 (intrinsically safe)
- Zone 1 Explosion Proof
- Aluminum enclosure

**Options:**
- Favourable fieldbus DeviceNet AS-I Modbus
- GO Switch leverless limit switches
- Mechanical limit switches
- Pepper & Fuchs prox sensors

**Visual Display:**
- Impact resistant polycarbonate; O-ring sealed, 360° adjustable, back-on

**Shaft Retainer:**
- Stainless steel

**Visual Display Options:**
- Intrinsically Safe
- Explosion Proof

**Conduit Entries:**
- (2) 3/4” NPT
- (2) 1/2” NPT

**O-Rings:**
- 304 Stainless
- 316 Stainless

**Dimensions:**
- Fast track delivery

**Enclosure:**
- Die-cast aluminum; O-ring sealed

**Coating:**
- Tropicalized inside and out

**Cover built-in:**
- 6-captive slotted stainless steel screws

**Terminal Strip:**
- Standard 12 pt. molded right

**Temperature Rating:**
- Determined by internal components - Consult factory

**Environment:**
- Designed for NEMA Type 4, 4X, 7, IP67

**Area Classification:**
- AS: AS-interface (area class must be 1)
- FF: Favourable fieldbus (area class must be 1)
- DIN: DeviceNet (area class must be 1)
- Modbus (area class must be 1)
- GO Switches (area class 1, L2 or L4)
- L: GO Switches, hermetically sealed SPOT
- Mechanical Switches (area class 2, L4, L5, L6, L8, M)
- Mechanical SPOT T2: Mechanical SPOT - gold contacts
- Mechanical SPOT - gold contacts

**Inductive Switches:**
- (Specify by 3 or 4, i.e. L2 or L4)

**E:**
- (2) p-ff N22 VS-9 inductive NAMUR
- (Specify qty: 2 or 4, i.e. E2 or E4)

**Pilot:**
- Stainless steel:
  - 90° Green OPEN, Red CLOSED
  - 1/8" DD: 304 stainless steel
  - 3/4" DD: 304 stainless steel

**Spool Valve:**
- Blank – no spool value

**Valve Cv:**
- (1) 24Vdc pilot, 4/2” ANSI, fail open/ closed
- (2) 24Vdc pilots, 4/2” ANSI, fail last position
- (1) 110Vac pilot, 1/2” ANSI, fail open/ closed
- (2) 110Vdc pilots, 1/2” ANSI, fail last position
- (2) 110Vdc pilots, 1/2” ANSI, black center
- (1) piece-pilot, fail open position
- (1) piece-pilot, fail last position
- (2) piece-pilots, black center

**Manual Override:**
- Blank – no override

**Enclosure:**
- Die-cast aluminum, O-ring sealed

**Coating:**
- Tropicalized inside and out

**Cover built-in:**
- 6-captive slotted stainless steel screws

**Terminal Strip:**
- Standard 12 pt. molded right

**Temperature Rating:**
- Determined by internal components - Consult factory

**Environment:**
- Designed for NEMA Type 4, 4X, 7, IP67

**Area Classification:**
- AS: AS-interface (area class must be 1)
- FF: Favourable fieldbus (area class must be 1)
- DIN: DeviceNet (area class must be 1)
- Modbus (area class must be 1)
- GO Switches (area class 1, L2 or L4)
- L: GO Switches, hermetically sealed SPOT
- Mechanical Switches (area class 2, L4, L5, L6, L8, M)
- Mechanical SPOT T2: Mechanical SPOT - gold contacts
- Mechanical SPOT - gold contacts

**Inductive Switches:**
- (Specify by 3 or 4, i.e. L2 or L4)

**E:**
- (2) p-ff N22 VS-9 inductive NAMUR
- (Specify qty: 2 or 4, i.e. E2 or E4)

**Pilot:**
- Stainless steel:
  - 90° Green OPEN, Red CLOSED
  - 1/8" DD: 304 stainless steel
  - 3/4" DD: 304 stainless steel

**Spool Valve:**
- Blank – no spool value

**Valve Cv:**
- (1) 24Vdc pilot, 4/2” ANSI, fail open/ closed
- (2) 24Vdc pilots, 4/2” ANSI, fail last position
- (1) 110Vac pilot, 1/2” ANSI, fail open/ closed
- (2) 110Vdc pilots, 1/2” ANSI, fail last position
- (2) 110Vdc pilots, 1/2” ANSI, black center
- (1) piece-pilot, fail open position
- (1) piece-pilot, fail last position
- (2) piece-pilots, black center

**Manual Override:**
- Blank – no override
### Enclosure

**Material:** PBT blend

**Specifications:** Flame UL94-0 & UV resistant

**Options:**
- GO Switch leverless limit switches
- Proximity sensors
- Stainless steel solenoid valve

**Ordering Guide**

Fill in the boxes to create your 'ordering number.'

---

### Sensor

**GO Switches**

- **G2** (2) GO Switches, hermetically sealed SPDT
  - Without BriteLite: 4A/120VAC, 3A/24VDC
  - With BriteLite: 0.25A/120VAC, 0.25A/24VDC

**Proximity Sensors**

- **D2** (2) Hermetically sealed SPDT
  - Without BriteLite: 1A/120VAC, 0.5A/24VDC
  - With BriteLite: 0.25A/120VAC, 0.25A/24VDC

**Ordering Guide**

See page 108 for wiring diagrams and page 182 for GO Switch specifications.

---

### Area Classification

**Zone 0**

- Intrinsically Safe
- Zone 0
- EEX ia IIc
- Groups A,B,C,D
- Class I, Div 1 & 2
- Class II, Div 1 & 2, Groups E,F,G
- Class III

**Zone 2**

- Non-Incendive
- Zone 2
- EEX nc IIc
- Groups A,B,C,D
- Class I, Div 2
- Class II, Div 2, Groups E,F,G
- Class III

**Ordering Guide**

May be installed intrinsically safe per NEC Article 504 and with entity approved barrier.

Install as Non-Incendive per NEC Article 501.

---

### Visual Display

**Target Colors:** Green and Red

**BriteLite Colors:** Green and Red

**BriteLite Lens:** Polycarbonate, UV resistant

**Dome and BriteLite (90° Green/Red)**

**Dome only (90° Green/Red)**

Consult factory for additional color and rotation options.

---

### Wiring

**P** 1/8" NPT conduit

**M** M20 metric conduit (includes adapter fitting)

---

### Solenoid Valve

**141**

120VAC with 1.2 Cv, 1.1 watt, aluminum, 4-way

**144**

24VDC with 1.2 Cv, 0.6 watt, stainless steel, 4-way

**145**

120VAC with 1.2 Cv, 1.1 watt, stainless steel, 4-way

---

**Filtered air is required for proper valve operation. See our Air Filter on page 170.**

---

**Dimensions**

```
Dimensions

```

---

**Credit:** Courtesy of Steven Engineering, Inc. • 230 Ryan Way, South San Francisco, CA 94080-6370 • Main Office: (650) 588-9200 • Outside Local Area: (800) 258-9200 • www.stevenengineering.com
IVM: Integrated Valve Monitor

The Lumitech IVM offers the same functionality as the IVC, less the onboard solenoid valve. Choose the IVM when you prefer a specific brand of solenoid, which can be wired directly to spare terminals in the IVM.

Features:
- Terminals to wire in external solenoid
- Direct mount with no brackets
- BriteLite early warning LEDs
- Zone 0: Intrinsically Safe
- Zone 2 (Class I, Div 2)

Options:
- GO Switch leverless limit switches
- Proximity sensors

Enclosure

- Material: PBT blend
- Specifications: Flammability UL94-0 & UV resistant

Target

- Material: PBT blend
- Specifications: Flammability UL94-V0 & UV resistant
- Adjustment: 360° in 3° increments
- Dome: Polycarbonate, UV & impact resistant

Conduit Entries:
- (2) 1/2" NPT standard
- (2) M20 metric

Cover Gasket:
- Silicone: Flammability UL94-V0 & UV resistant

Fasteners:
- All 303 series stainless steel

Mounting
- NAMUR: Direct - no brackets or couplers
- Non-NAMUR: Interface plate. See page 171.

Operating Temperature:
- Determined by other components

Environment:
- NEMA Type 4, 4X; IP66

Dimensions

Visual Display

- Target Colors: Green and Red
- BriteLite Colors: Green and Red
- BriteLite Lens: Polycarbonate, UV resistant

- Dome and BriteLite (90° Green/Red)
- Dome only (90° Green/Red)

Consult factory for additional color and rotation options.

GO Switches

- (2) GO Switches, hermetically sealed SPDT
- Without BriteLite: 4A/120VAC; 3A/24VDC
- With BriteLite: 0.25A/120VAC; 0.25A/24VDC

Proximity Sensors

- (2) Hermetically sealed SPDT
- Without BriteLite: 1A/120VAC; 0.5A/24VDC
- With BriteLite: 0.25A/120VAC; 0.25A/24VDC

NOTE: GO Switch and Proximity Sensor options are classified as "simple devices." Area Classification

- Z0: Intrinsically Safe
  - Zone 0
  - EEx ia IIc
  - Class I, Div 1 & 2, Groups A,B,C,D
  - Class II, Div 1 & 2, Groups E,F,G
  - Class III

- Z2: Non-Incendive
  - Zone 2
  - EEx nc IIc
  - Class I, Div 2, Groups A,B,C,D
  - Class II, Div 2, Groups E,F,G
  - Class III

Refer to page 102 for GO Switch specifications.

Wiring

- 1/2" NPT conduit
- M20 metric conduit (includes adapter fitting)

Installation:
- GO Switch and Proximity Sensor options are classified as "simple devices." They are suitable for intrinsically safe applications.

- May be installed Intrinsically Safe per NEC Article 504 and with entity approved barrier.

- Install as Non-Incendive per NEC Article 501.

Ordering Guide

Fill in the boxes to create your "ordering number."
### Lumitech PPS

**PPS: Puck Position Sensor**

The Lumitech PPS is the choice for simple valve position monitoring in general purpose environments.

Its space-saving design and resin enclosure make it the ideal choice for heavy washdown applications, often found in the food and beverage industries.

Features:
- A third the size of switchboxes
- BriteLite early warning LEDs
- Options: AS-Interface
- Proximity sensors

### Operating Conditions

- **Ordering Guide**: Fill in the boxes to create your ‘ordering number.’

### Enclosure

- **Operating Temperature**: -13° to 158°F (-25° to 70°C)
- **Housing Material**: Polypropylene (PP)
- **Connector Material**: CuZn, chrome plated
- **Protection**: IP67

### Sensor

- **Sensor Options**:
  - **AS**: AS-Interface protocol & inductive sensors
    - 2 inputs, 1 output
    - No-load Current: ≤ 30mA
    - Supply Voltage: 18 to 33VDC
    - Supply Current: ≤ 110mA
    - Output Current: ≤ 80mA
  - **3S**: DC 3-wire inductive sensors
    - Supply Voltage: 10-65VDC, PNP inputs
    - Rated Operational Current: 200mA
    - No-load Current: ≤ 15mA
  - **NS**: Intrinsically Safe inductive proximity sensors
    - Supply Voltage: 8.2VDC
    - Output Activated: ≤ 1mA
    - Output Non-activated: ≥ 2.2mA

### Area Classification

- **GP**: For use in ordinary environments

### Target

- **T1**: 90° fixed
  - Polymethylmethacrylate (PMMA)
  - Stainless steel targets
  - 20 or 30 mm shaft
- **T2**: Adjustable position
  - Polymethylmethacrylate (PMMA)
  - Stainless steel targets
  - 20 mm shaft
- **T3**: Adjustable position
  - Polymethylmethacrylate (PMMA)
  - Stainless steel targets
  - 30 mm shaft
- **T4**: 90° fixed
  - Aluminium
  - Polymethylmethacrylate targets
  - 20 or 30 mm shaft
  - (Select this target for normally closed operation)

See page 152 for wiring diagrams.

---

**Courtesy of Steven Engineering, Inc.**

230 Ryan Way, South San Francisco, CA 94080-6370

Main Office: (650) 588-9200

Outside Local Area: (800) 258-9200

www.stevenengineering.com
Switchpak SSP

The Switchpak SSP is the classic valve position monitor, offering superb visual display, simple operation, and easy installation in a rugged metal enclosure.

Features:
- Rugged aluminum enclosure
- Zone 1 (Class I, Div 1)

Options:
- GO Switch (levers or limit switches)
- Mechanical limit switches
- Proximity sensors

For Shaft, choose S or N (both in stock)

Ordering Guide
Fill in the boxes to create your 'ordering number.'

- **Enclosure:** Die cast aluminum, O-ring sealed
- **Coating:** Dichromate conversion inside and out; powder polyester coating outside
- **O-rings:** Buna N; Viton optional
- **Cover Bolts:** 4 captive hex stainless steel screws
- **Conduit Outlets:** Two 1/2" NPT
- **Terminal Strip Contacts:** Standard 12 or 16-point
- **Temperature Rating:** Determined by sensor option
- **Environment:** NEMA Type 4, 4X, 7 and 9

Visual Display
- Impact resistant polycarbonate; O-ring sealed; 360° adjustable; EaStar™ optional (green/red indicator standard)
- Green/Red indicator dome
- Green=closed

Shaft
- **Shaft:** Stainless steel, O-ring sealed
- **Shaft Retainer:** Stainless steel
- **NAMUR shaft**

Analog Output
- **Potentiometer:** 0-1K
- **00** None
- **42** 4-20mA transmitter (sensors L4, M4, D4 & W4 excluded)
- **01** Potentiometer 0-10K (sensors L4, M4, D4 & W4 excluded)
- **10** Potentiometer 0-10K (sensors L4, M4, D4 & W4 excluded)
- **50** Potentiometer 0-50K (sensors L4, M4, D4 & W4 excluded)

Shaft
- **Standard NAMUR**

For more information, visit www.stevenengineering.com
The Switchpak SXP combines position sensors and an onboard solenoid valve into a rugged aluminum explosion-proof enclosure that is Cenelec rated and suitable for Zone 1 applications.

**Features:**
- Cenelec rated
- Zone 1 (Class I, Div 1)
- Aluminum enclosure

**Options:**
- GO Switch leverless limit switches
- Proximity sensors
- Analog output
- Integral solenoid valve
- Up to four conduit entries

**Enclosure:**
- Die-cast aluminum; O-ring sealed
- Coating: Dichromate conversion or anodize inside; powder polyester coating outside
- O-rings: Buna N; Viton optional
- Cover Bolts: (2) captive socket head stainless steel screws
- Conduit Entries: Two 3/4" NPT (Four optional)
- Terminal Strip Contacts: Located on SCM
- Temperature Rating: Determined by sensor option
- Environment: NEMA Type 4, 4X, 7, 9; IP66

**Ordering Guide**
Fill in the boxes to create your ‘ordering number.’

**Dimensions**

**Visual Display**
- Impact resistant polycarbonate; O-ring sealed; 360° adjustable; bolt-on
- Green/Red indicator dome
- Black/Yellow indicator dome
- 120° through divert indicator dome

**Shaft**
- Stainless steel; O-ring sealed
- Shaft Retainer: Stainless steel

**Pilot Valve**
- No Pilot Valve
- Standard: NAMUR

**Analog Output**
- 4-20mA
- 0-10K Potentiometer
- 0-1K Potentiometer
- 0-10K Potentiometer

See page 163-164 for sensor specifications.
Switchpak SXS

Enclosure
- Stainless steel; O-ring sealed
- Coating: Powder polyester coating outside
- O-rings: Buna N; Viton optional
- Cover Bolts: 6 captive socket head stainless steel screws
- Conduit Entries: Two 1/2" NPT (Four optional)
- Terminal Strip Contacts: Located on SCM
- Temperature Rating: Determined by sensor option
- Environment: NEMA Type 4, 4X, 7, 9; IP66

Sensor and Analog Output
- GO Switches
- Mechanical Switches
- Proximity Sensors
- Analog Output

Area Classification
- UL/cUL listed
- CE
- CSA

Visual Display
- Impact resistant polycarbonate; O-ring sealed; 360° adjustable; bolt-on
- GR: Green/Red indicator dome
- BY: Black/Yellow indicator dome
- TD: 120° through divert indicator dome

Shaft
- Stainless steel; O-ring sealed
- NAMUR
- Standard

Pilot Valve
- GO Switches
- M2
- T2
- Standard NAMUR

Analog Output
- 4-20mA transmitter
- Potentiometer

Ordering Guide
- Fill in the boxes to create your ordering number.
Switchpak SRP

The Switchpak SRP delivers the same features, benefits, and options as the SSP in a chemical resistant resin enclosure. The SRP is an excellent choice in corrosive or washdown applications.

Features:
- Engineered resin enclosure
- Zone 2 (Class I, Div 2)

Options:
- GO Switch leverless limit switches
- Mechanical limit switches
- Proximity sensors

Enclosure:
- SRP Switchpak SRP

Area Classification:
- Zone 2
- Class I, Div 2, Groups A,B,C,D

Sensor:
- GO Switches
- Mechanical Switches
- Proximity Sensors

Visual Display:
- Impact resistant polycarbonate
- O-ring sealed; 360° adjustable; EaStar™ optional

Shaft:
- Stainless steel; O-ring sealed

Analog Output:
- 4-20mA Potentiometer

Ordering Guide:
Fill in the boxes to create your ordering number.

See pages 192-193 for sensor specifications.
Switchpak SUP

The Switchpak SUP is a unique, compact, and cost-effective valve position monitor designed especially for NAMUR rack and pinion actuators. Mounting brackets are included, saving significant time and money.

Features:
- Anodized aluminum enclosure includes mounting brackets
- General purpose

Options:
- Mechanical limit switches
- Pepperl + Fuchs proximity sensors

Dimensions

Visual Display:
- Polycarbonate dome with green/red indicators; flat polycarbonate cover with Nylon arrow indicator
- GR Green/red indicator dome
- FT Flat top cover (flat visual indication)

Shaft:
- Stainless steel; O-ring sealed
- Shaft Retainer: Stainless steel
- N NAMUR shaft

Analog Output:
- None

Enclosure:
- Anodized aluminum
- Coating: Powder polyester coating (inside & outside)
- O-rings: Buna N
- Cover Bolts: 4 captive phillips head stainless steel screws
- conduit Outlets: Two PG 13.5
- Terminal Strip Contacts: PC board mounted, one strip for switch connection, one pass through for solenoid option
- Mounting: Direct mount to any ISO/NAMUR actuator (bracket included)
- Temperature Rating: Determined by sensor option
- Environment: IEC 529, IP66/IP67

Area Classification:
- GP For use in ordinary environments
- May be installed Intrinsically Safe per NEC Article 504 and with entity approved barrier and Sensor option E2.

Sensor:
- M2 (2) Mechanical SPDT switches
- E2 Pepperl + Fuchs NLD V3-N
- E3 proximity, 2 wire, non-amplified NAMUR Enexia IEC certified

Ordering Guide
Fill in the boxes to create your ‘ordering number.’

SUP-GPM2GRN00
(2) Mechanical SPDT switches
IP66/IP67
Aluminum enclosure

See pages 192-193 for sensor specifications.
Switchpak SEP

The Switchpak SEP is a cost-effective yet versatile valve position monitor for use on NAMUR rack and pinion actuators or non-NAMUR scotch-yoke actuators. The SEP offers superb visual display, simple operation, and easy installation in an aluminum type 4, 4X enclosure.

Features:
- Coated aluminum enclosure
- General purpose

Options:
- Mechanical limit switches
- Proximity SPDT switches
- Proximity SPST switches
- Third conduit entry

Area Classification

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>None</td>
</tr>
<tr>
<td>01</td>
<td>90° 2 position, 3 way indicator dome</td>
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<tr>
<td>02</td>
<td>180° 3 position block center indicator dome</td>
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<tr>
<td>03</td>
<td>45° 4 position indicator dome</td>
</tr>
<tr>
<td>04</td>
<td>2.2° dead band (mechanical switches only)</td>
</tr>
<tr>
<td>05</td>
<td>Multi-function, 2 position/3 position, 3 way indicator dome</td>
</tr>
<tr>
<td>06</td>
<td>Red/Green indicator dome (Flip-open, Green closed)</td>
</tr>
<tr>
<td>07</td>
<td>Black/White indicator dome</td>
</tr>
<tr>
<td>08</td>
<td>120° through divert indicator dome</td>
</tr>
<tr>
<td>09</td>
<td>30° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>10</td>
<td>60° 2 position, 3 way indicator dome</td>
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<tr>
<td>11</td>
<td>30° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>12</td>
<td>60° 2 position, 3 way indicator dome</td>
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<td>13</td>
<td>180° 3 position block center indicator dome</td>
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<tr>
<td>14</td>
<td>120° through divert indicator dome</td>
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<tr>
<td>15</td>
<td>90° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>16</td>
<td>60° 2 position, 3 way indicator dome</td>
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<tr>
<td>17</td>
<td>30° 2 position, 3 way indicator dome</td>
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<td>18</td>
<td>120° through divert indicator dome</td>
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<td>90° 2 position, 3 way indicator dome</td>
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<td>60° 2 position, 3 way indicator dome</td>
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<td>30° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>22</td>
<td>120° through divert indicator dome</td>
</tr>
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<td>23</td>
<td>90° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>24</td>
<td>60° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>25</td>
<td>30° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>26</td>
<td>120° through divert indicator dome</td>
</tr>
<tr>
<td>27</td>
<td>90° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>28</td>
<td>60° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>29</td>
<td>30° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>30</td>
<td>120° through divert indicator dome</td>
</tr>
<tr>
<td>31</td>
<td>90° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>32</td>
<td>60° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>33</td>
<td>30° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>34</td>
<td>120° through divert indicator dome</td>
</tr>
<tr>
<td>35</td>
<td>90° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>36</td>
<td>60° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>37</td>
<td>30° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>38</td>
<td>120° through divert indicator dome</td>
</tr>
<tr>
<td>39</td>
<td>90° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>40</td>
<td>60° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>41</td>
<td>30° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>42</td>
<td>120° through divert indicator dome</td>
</tr>
<tr>
<td>43</td>
<td>90° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>44</td>
<td>60° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>45</td>
<td>30° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>46</td>
<td>120° through divert indicator dome</td>
</tr>
<tr>
<td>47</td>
<td>90° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>48</td>
<td>60° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>49</td>
<td>30° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>50</td>
<td>120° through divert indicator dome</td>
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<tr>
<td>51</td>
<td>90° 2 position, 3 way indicator dome</td>
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<tr>
<td>52</td>
<td>60° 2 position, 3 way indicator dome</td>
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<tr>
<td>53</td>
<td>30° 2 position, 3 way indicator dome</td>
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<tr>
<td>54</td>
<td>120° through divert indicator dome</td>
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<tr>
<td>55</td>
<td>90° 2 position, 3 way indicator dome</td>
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<tr>
<td>56</td>
<td>60° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>57</td>
<td>30° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>58</td>
<td>120° through divert indicator dome</td>
</tr>
<tr>
<td>59</td>
<td>90° 2 position, 3 way indicator dome</td>
</tr>
<tr>
<td>60</td>
<td>60° 2 position, 3 way indicator dome</td>
</tr>
</tbody>
</table>

Enclosure

- Die-cast aluminum
- Coating: Powder polyester coating (inside & outside); O-ring sealed
- O-rings: Buna N; Viton optional
- Cover Bolts: 4 captive phillips head stainless steel screws
- conduit outlets: Two 1/4” NPT
- Terminal Strip Contacts: Standard 12-point with minimum of 2 open contacts provided for accessories
- Temperature Rating: Determined by sensor option
- Environment: NEMA Type 4, 4X

Visual Display

- Impact resistant polycarbonate; O-ring sealed; 360° adjustable; EaStar™ optional (green/red indicator standard)
- GR Green/red indicator dome
- FT Flat top cover (no visual indication)
- BY Black/yellow indicator dome
- TD 120° through divert indicator dome
- 01 90° 2 position, 3 way indicator dome
- 02 180° 3 position block center indicator dome
- 03 45° 4 position indicator dome
- RG Red/green indicator dome (red=open, green=closed)
- ES EaStar™ green/red indicator dome
- 4X 45° 4 position indicator dome

Shaft

- Standard Stainless steel through bronze bearings; O-ring sealed
- NAMUR shaft
- Standard 1/4” flat shaft
- 2 Standard shaft with high resolution cams 2.2° dead band (mechanical switches only)

Analog Output

- 00 None
- 01 None

Switchpak SEP

The Switchpak SEP is a cost-effective yet versatile valve position monitor for use on NAMUR rack and pinion actuators or non-NAMUR scotch-yoke actuators. The SEP offers superb visual display, simple operation, and easy installation in an aluminum type 4, 4X enclosure.

Features:
- Coated aluminum enclosure
- General purpose

Options:
- Mechanical limit switches
- Proximity SPDT switches
- Proximity SPST switches
- Third conduit entry

Ordering Guide

Fill in the boxes to create your ‘ordering number.’

<table>
<thead>
<tr>
<th>Enclosure</th>
<th>4X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area Classification</td>
<td>4X</td>
</tr>
<tr>
<td>Sensor</td>
<td>00</td>
</tr>
<tr>
<td>Visual Display</td>
<td>00</td>
</tr>
<tr>
<td>Shaft</td>
<td>NAMUR</td>
</tr>
<tr>
<td>Analog Output</td>
<td>00</td>
</tr>
</tbody>
</table>

See pages 160-163 for sensor specifications.
Monitoring Solutions for Linear Valves

When it comes to linear valves, TopWorx has all the applications covered. Whether it’s a control valve, gate valve, globe valve, or diaphragm valve, TopWorx can provide reliable position monitoring in any hazardous area or process environment.

Solutions for all linear valves and actuators:
- Control valves
- Globe valves
- Pinch valves
- Gate valves
- Diaphragm valves
- Sanitary valves

Approvals for all hazardous areas:
- Zone 0 intrinsically safe
- Zone 1 explosion proof
- Zone 2 non-incendive

Enclosures for all process environments:
- Engineered resin
- Aluminum
- Stainless steel

Sensors for all applications:
- GO Switch leverless limit switches
- Proximity sensors

Sensor-Communications Modules for all bus networks:
- AS-Interface
- FOUNDATION Fieldbus
- DeviceNet
- Profinet
- Modbus

Other options:
- Green/Red BriteLite LEDs

Conventional

Linear valve monitoring all starts with GO Switch leverless limit switches, suitable for all hazardous areas and process environments.

Switchpak SBP
Zone 1 (Class I, Div 1)
GO Switch inside

GO Switch 7L & Lumitech LPS
Zone 0, 1, or 2
Green or Red LEDs

GO Switch 73 & 7G
SPDT or DPDT Contacts
HiTemp option to 400°F

Bus Networking

Using TopWorx HazLink I/O Modules coupled with GO Switch leverless limit switches, you can connect your linear valves to a variety of bus protocols.

Switchpak SBP

Courtesy of Steven Engineering, Inc.
230 Ryan Way, South San Francisco, CA 94080-6370
Main Office: (650) 588-9200
Outside Local Area: (800) 258-9200
www.stevenengineering.com
Switchpak SBP

The Switchpak SBP fits snugly under the bonnet of linear valve actuators to provide reliable position feedback of linear control valves up to a 4” stroke.

Features:
- No linkages required
- Designed for linear valve actuators
- Rugged aluminum enclosure
- Zone 1 (Class I, Div 1 & 2, Groups A,B,C,D)
- CE Marking
- EMC Directive 89/336/EEC
- May be installed Intrinsically Safe per NEC Article 504 and with entity approved barrier.
- Install per NEC Article 501 as Explosion Proof.

Options:
- GO Switch leverless limit switches
- Proximity sensors

Area Classification
- Zone 1 (Class I, Div 1 & 2, Groups A,B,C,D)
- Zone 2, Div 1 & 2, Groups E,F,G
- CE Marking
- EMC Directive 89/336/EEC

Enclosure:
- Die-cast aluminum; O-ring sealed
- Coating: Dichromate conversion (inside); powder polyester coating (outside)
- O-rings: Buna N
- Cover: Screw cover with O-ring seal
- Cordset Outlets: Three 3/4” NPT
- Terminal Strip Contacts: Standard 12-point with minimum of 2 open contacts provided for accessories
- Temperature Rating: Determined by sensor option
- Environment: NEMA Type 4, 4X, 7 and 9

Sensor:
- GO Switches
  - L2 (2) GO Switches, hermetically sealed SPDT
  - L1 (1) GO Switch, hermetically sealed SPDT
- Proximity Sensors
  - D2 (2) Hermetically sealed SPDT
  - W2 (2) Hermetically sealed SPDT

Temperature Rating:
- Determined by sensor option

Enclosure:
- Die-cast aluminum; O-ring sealed
- Coating: Dichromate conversion (inside); powder polyester coating (outside)
- O-rings: Buna N
- Cover: Screw cover with O-ring seal
- Cordset Outlets: Three 3/4” NPT
- Terminal Strip Contacts: Standard 12-point with minimum of 2 open contacts provided for accessories
- Temperature Rating: Determined by sensor option
- Environment: NEMA Type 4, 4X, 7 and 9

Ordering Guide
Fill in the boxes to create your 'ordering number.'

Enclosure: SBP

Area Classification

Sensor

Dimensions

Target Magnet Assembly

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230 Ryan Way, South San Francisco, CA 94080-6370  
Main Office: (650) 588-8000  
Outside Local Area: (800) 258-9200  
www.stevenengineering.com
Approvals
Sensing Range
Courtesy of Steven Engineering

Differential:
Model 73
(-40° to 105°C). Hi Temp to 400°F (204°C)

Operating Temperature:

Repeatability:

mm) threads and 1/2” NPT

Thread:
M18 x 1.5 external metric

5/8" (16 mm) dia. x 35/8" (92 mm)

thread

3/4"-14 NPT

5/8"-18 UNF-2A THREADS

Outside Local Area: (800) 258-9200

Main Office: (650) 588-9200

230 Ryan Way, South San Francisco, CA 94080-6370

www.stevenengineering.com

Certification Ex89C1233X) (Wiring must be F) (Model 73)

Certificate Ex00C017X (Wiring must be F) (Model 73)

Dimensions

Dimensions

Model 73 and 7G

The GO Switch Model 73 is our most popular leverless limit switch. Its solid stainless steel construction and global certifications make it the ideal choice for a variety of applications. Model 7G adds hermetic seal and Double Pole Double Throw contact options.

Features:
SPTD or DPDT 4A contacts
Intrinsically Safe

-40° to 221°F operating temperature

Options:
Suitable for Zone 0, 1, or 2 explosion proof

Hi Pressure sensing - approx.

.060" (2 mm) end sensing

.072" (2 mm) end sensing

.100" (3 mm) end sensing

Sensing Range with Target Magnet:

(Sensing must be 4)

(Enclosure must be 3)

.060" (1.5 mm) end sensing (10,000 PSI)

.072" (1.8 mm) end sensing (5,000 PSI)

.100" (2.5 mm) end sensing (2,000 PSI)

Target Material:
Ferrous steel

Extended Sensing Range with External Target Magnets

(See Accessories for External Target Magnets)

Target Material: Ferrus stainless

Sensing Range: Approx.

1/1000" (0.3 mm) end sensing (2,000 PSI)

1/1000" (0.3 mm) end sensing (2,000 PSI)

0.002" (.05mm) typical

Approx. 8 milliseconds

Ordering Guide
Fill in the boxes to create your “ordering number.”

Model

Contact Form

Sensing Range

Outlet Position

Enclosure Material

Approvals

Wiring Options

Model 73

16 Gauge (.250” dia.) potted-in PVC cable, rated at 110V (60Hz) 300V UL / CSA listed

Model 7G

18 Gauge (.070” dia.) potted-in Teflon® insulated cable rated at 480°F (250°C) 600V UL / CSA listed

Wiring must be B (Model 73)

Wiring must be A, B (Model 73)

Wiring must be 2, 4, 6, 7, or 8 (Model 73)

- Length greater than 144” (Specify length in feet p. A100 = 100 ft. of leads)
Model 7L

The new GO Switch Model 7L offers the same proven internals as our other 70 Series leverless limit switches, with the addition of Red or Green Britelite LEDs. The new 7L brings increased plant safety and awareness to the reliability of the 70 Series.

Features: 316 stainless steel enclosure
Red or Green Britelite LEDs
Leverless Limit Switch design

---

Model 7L Specifications

- **Contact Form:**
  - Contact Material: Palladium silver with sawtooth surface configuration
  - Ratings: 25A @ 24VDC/120VAC
  - Form: SPDT, Form C
  - Sensing Range: 0.100" nominal
  - Target Material: Ferrous
  - Repeatability: ±0.002" (50mm) typical
  - Sensing Time: 6 milliseconds

- **Outlet Position:**
  - Condut Outlet: 1/2" NPT
  - Bottom of enclosure

- **Enclosure Material:**
  - Stainless Steel type 316
  - (rated 2,000 PSI)

- **Approvals:**
  - C-UL listed
  - General Purpose

- **Wiring Options:**
  - Lead Wires: 18 Gauge (316 stainless steel, 2.13" (54mm) length, with 5/8"-18 UNF x 2.13" (54mm) threads and 1/2" NPT conduit hub)
  - Cable: 18 Gauge (316 stainless steel, 2.13" (54mm) length, with 5/8"-18 UNF x 2.13" (54mm) threads and 1/2" NPT conduit hub)
  - Quick Disconnect: Male Quick Disconnect only, potted-in connector

- **Dimensions:**
  - Lengths greater than 144" (Specify length in feet (e.g. A150 = 150 ft. of leads))
  - Lead Wires: 18 Gauge (.110" dia) potted-in PVC insulated AWM / TEW stranded lead wires, rated at 221°F (105°C) 600V UL / CSA listed
  - Cable: 18 Gauge (316 stainless steel, 2.13" (54mm) length, with 5/8"-18 UNF x 2.13" (54mm) threads and 1/2" NPT conduit hub)

- **Ordering Guide:**
  - Fill in the boxes to create your "ordering number."
Luminator LPS

502.969.8000

LPS: Linear Position Sensor

The Luminator LPS is specifically designed to provide position feedback on linear control valves and knife gate valves. Onboard Green or Red LEDs increase safety and awareness for plant operators.

Features: 316 stainless steel enclosure Green or Red BriteLite LEDs Hermetically sealed sensors Snap action contacts

Sensor

LPS model

Ordering Guide

Fill in the boxes to create your ordering number.

Model

LPS

Sensor

Area Classification

Visual Display

Wiring

BriteLite: Triaxial LEDs

BriteLite Colors: Green or Red

Dimensions

LPS-D2G2A2

Zone 1 (Class 1, Div 2)

Green BriteLite

LPS-D2R2A2

Zone 1 (Class 1, Div 2)

Red BriteLite

Explosion Proof Zone 1 (Class I, Div 1 & 2, Groups A,B,C,D Class II, Div 1 & 2, Groups E,F,G Class III (Visual Display option must be N)

Non-Incendive Zone 2 (Class I, Div 2, Groups A,B,C,D Class II, Div 1 & 2, Groups E,F,G Class III

May be installed intrinsically Safe per NEC Article 504

A2 3 ft. 18 gauge potted-in lead wires

Wiring Diagrams, see page 183.

DCD 4-pin mini change quick disconnect (22 only unless installed I.S. per NEC Article 504)

(Dc option must be M)

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A2 3 ft. 18 gauge potted-in lead wires

A3 6 ft. gauge potted-in lead wires

A4 12 ft. 18 gauge potted-in lead wires

DCD 3-pin mini change quick disconnect (22 only unless installed I.S. per NEC Article 504)

(Dc option must be M)

DCD 4-pin mini change quick disconnect (22 only unless installed I.S. per NEC Article 504)

(Dc option must be M)
## ASCO Solenoid Valves

These common solenoid valves are industry standards that can be used to automate on/off process valves. Topworx offers 3- and 4-way flow options in standard, explosion proof, or intrinsically safe packages, with various power requirements.

### General Specifications
- **Operating Temperatures:**
  - 3-way AC: 32° to 125°F (0° to 52°C)
  - 3-way DC: 32° to 104°F (0° to 40°C)
  - Low Power: -4° to 140°F (-20° to 60°C)
- **Materials:**
  - 3-way SS: Type 4
  - 3-way Brass: Type 4
  - 4-way SS: Type 7
  - 4-way Brass: Type 7

### Part Number & Description

#### 24VDC Solenoid Valves (10.6 to 11.1 Watt)

<table>
<thead>
<tr>
<th>Item</th>
<th>Air Flow</th>
<th>Material</th>
<th>Housing Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>E804G302</td>
<td>3 way</td>
<td>SS</td>
<td>Type 4</td>
</tr>
<tr>
<td>EF832G012</td>
<td>3 way</td>
<td>SS</td>
<td>Type 7</td>
</tr>
<tr>
<td>E8320G194</td>
<td>3 way</td>
<td>Brass</td>
<td>Type 4</td>
</tr>
<tr>
<td>EF8320G194</td>
<td>3 way</td>
<td>Brass</td>
<td>Type 7</td>
</tr>
<tr>
<td>E834G801</td>
<td>4 way, 1 pilot</td>
<td>SS</td>
<td>Type 4</td>
</tr>
<tr>
<td>E834G801</td>
<td>4 way, 1 pilot</td>
<td>SS</td>
<td>Type 7</td>
</tr>
<tr>
<td>EF834G801</td>
<td>4 way, 1 pilot</td>
<td>Brass</td>
<td>Type 4</td>
</tr>
<tr>
<td>EF834G801</td>
<td>4 way, 1 pilot</td>
<td>Brass</td>
<td>Type 7</td>
</tr>
<tr>
<td>E8344G801</td>
<td>4 way, 2 pilots</td>
<td>Brass</td>
<td>Type 4</td>
</tr>
<tr>
<td>EF8344G801</td>
<td>4 way, 2 pilots</td>
<td>Brass</td>
<td>Type 7</td>
</tr>
</tbody>
</table>

#### 24VDC Low Power Solenoid Valves (1.4 Watt)

<table>
<thead>
<tr>
<th>Item</th>
<th>Air Flow</th>
<th>Material</th>
<th>Housing Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>E8344G301</td>
<td>3 way</td>
<td>SS</td>
<td>Type 4</td>
</tr>
<tr>
<td>EF8344G301</td>
<td>3 way</td>
<td>SS</td>
<td>Type 7</td>
</tr>
<tr>
<td>E8344G301</td>
<td>3 way</td>
<td>Brass</td>
<td>Type 4</td>
</tr>
<tr>
<td>EF8344G301</td>
<td>3 way</td>
<td>Brass</td>
<td>Type 7</td>
</tr>
<tr>
<td>E8344G301</td>
<td>4 way, 1 pilot</td>
<td>SS</td>
<td>Type 7</td>
</tr>
<tr>
<td>E8344G301</td>
<td>4 way, 1 pilot</td>
<td>Brass</td>
<td>Type 7</td>
</tr>
<tr>
<td>E8344G301</td>
<td>4 way, 2 pilots</td>
<td>SS</td>
<td>Type 4</td>
</tr>
<tr>
<td>E8344G301</td>
<td>4 way, 2 pilots</td>
<td>Brass</td>
<td>Type 4</td>
</tr>
</tbody>
</table>

#### 24VDC Intrinsically Safe Solenoid Valves (0.46 Watt nominal)

<table>
<thead>
<tr>
<th>Item</th>
<th>Air Flow</th>
<th>Material</th>
<th>Housing Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>W8344G301</td>
<td>3 way</td>
<td>SS</td>
<td>Type 4</td>
</tr>
<tr>
<td>WP8344G301</td>
<td>3 way</td>
<td>Brass</td>
<td>Type 4</td>
</tr>
<tr>
<td>WP8344G301</td>
<td>4 way, 1 pilot</td>
<td>SS</td>
<td>Type 4</td>
</tr>
<tr>
<td>WP8344G301</td>
<td>4 way, 1 pilot</td>
<td>Brass</td>
<td>Type 4</td>
</tr>
<tr>
<td>WP8344G301</td>
<td>4 way, 2 pilots</td>
<td>SS</td>
<td>Type 4</td>
</tr>
<tr>
<td>WP8344G301</td>
<td>4 way, 2 pilots</td>
<td>Brass</td>
<td>Type 4</td>
</tr>
</tbody>
</table>

#### 120VAC Solenoid Valves (20.1 Watt)

<table>
<thead>
<tr>
<th>Item</th>
<th>Air Flow</th>
<th>Material</th>
<th>Housing Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>E8344G301</td>
<td>3 way</td>
<td>SS</td>
<td>Type 4</td>
</tr>
<tr>
<td>EF8344G301</td>
<td>3 way</td>
<td>SS</td>
<td>Type 7</td>
</tr>
<tr>
<td>E8344G301</td>
<td>3 way</td>
<td>Brass</td>
<td>Type 4</td>
</tr>
<tr>
<td>EF8344G301</td>
<td>3 way</td>
<td>Brass</td>
<td>Type 7</td>
</tr>
</tbody>
</table>

---

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## Accessories

**Air Filter Regulator**

Good quality air is essential for the proper operation of Discrete Valve Controllers, pneumatic solenoid valves, and pneumatic actuators. TopWorx recommends using filter regulators in environments where clean, dry air is not available.

### General Specifications
- **Operating Temperature**: 23° to 140°F (-5° to 60°C)
- **Port Size**: 1/4” NPT
- **Max. Operating pressure psig**: 150 (1.0MPa)
- **Filtration**: 5 µm

### Wiring Kits

These Wiring Kits provide an easy way to wire TopWorx spool valves with pneumatic valve pilot electrical connections.

- **Note**: Conduit Box Entry option “T” is for use with TopWorx HazLink I/O (pages 30-32, 76, 96 & 112) and option “H” is for use with TopWorx Discrete Valve Monitors (pages 130-134 & 140-143).

Create your Wiring Kit part number by selecting the number of pilots, conduit box entry size, and wire protection needed for your application.

**Example**: WK-T1C = Wiring kit with one pilot, 3/4” conduit box entry, and cable gland wire protection.

<table>
<thead>
<tr>
<th>Wiring Kit</th>
<th>No. of Pilots</th>
<th>Conduit Box Entry</th>
<th>Wire Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>WK-1</td>
<td>One</td>
<td>T</td>
<td>Liquid Tight (PG), NEMA 4x</td>
</tr>
<tr>
<td>WK-2</td>
<td>Two</td>
<td>H</td>
<td>Cable gland</td>
</tr>
</tbody>
</table>

*Pilot = electro-pneumatic operator*

## Flow Controls

These stainless steel flow controls provide a means to adjust the speed of operation and the air exhaust rate of a pneumatic actuator. Breathers within the flow controls quiet the actuator’s exhaust air and provide some protection against debris entering the air valve ports.

- **Part Numbers**:
  - AL-M20: Flow controls, 1/8” NPT (2 per kit)
  - AL-M21: Flow controls, 1/4” NPT (2 per kit)

## Breathers

These plastic breathers quiet an actuator’s exhaust air and provide protection against debris entering the air valve ports.

- **Part Numbers**:
  - AL-M30: Breathers, 1/8” NPT (2 per kit)
  - AL-M31: Breathers, 1/4” NPT (2 per kit)

## 1A Fuse Kit

This 1 amp circuit board fuse kit provides replacement fuses for devices that use TopWorx DeviceNet Sensor-Communications Modules (SCM-DN), including the DVC-DN, DVM-DN, DXP-DN, DXS-DN, and HazLink.

- **Part Number**: ND601
- **Description**: 1A fuse kit (10 pcs.)

## Non-NAMUR Interface Plate

This Interface Plate enables easy adaptation of Lumitech NAMUR mount valve positioners to non-NAMUR actuator brackets.

- **Materials**: 1/4” thick stainless steel plate and stainless steel intermediate shaft with bronze bushing.

- **Part Number**: Z001205
- **Description**: Non-NAMUR Interface Plate

## General Specifications

- **Operating Temperature**: 23° to 140°F (-5° to 60°C)
- **Port Size**: 1/4” NPT
- **Max. Operating pressure psig**: 150 (1.0MPa)
- **Filtration**: 5 µm

## Wiring Kit Part Number & Description

<table>
<thead>
<tr>
<th>Item</th>
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## Non-NAMUR Interface Plate

- **Part Number**: Z001205
- **Description**: Non-NAMUR Interface Plate

## 1A Fuse Kit

- **Part Number**: ND601
- **Description**: 1A fuse kit (10 pcs.)

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Over the years, customers have asked us to mount our valve controllers and monitors to just about every type and brand of valve and actuator on the planet. As a result, TopWorx has amassed over 1,200 different mounting kit designs. So whether your valve application is rotary or linear, NAMUR or non-NAMUR, in production or obsolete, TopWorx is sure to have a mounting kit that fits your need.

Rotary valve actuators that do not use the ISO/NAMUR standard, such as scotch-yoke or vane actuators, require custom-designed mounting kits to attach topworks accessories. This can be a complex procedure that should not be overlooked by the end user. Since there are no standards, it is more difficult to ensure the proper fit and function of brackets, and consequently the automated valve system itself. TopWorx has a team of designers experienced at solving this problem, making it easy to attach our products to rack and pinion actuators. With an existing library of over 1,200 different designs, there is probably already a design ready for your application.

Note: TopWorx custom mounting kits are always made of heavy-gauge stainless steel, ensuring the proper amount of support in the field.

NAMUR Mounting Kits

The vast majority of rack and pinion valve actuators come with an ISO/NAMUR mounting pattern. This worldwide standard provides a consistent bolt pattern and shaft height regardless of the actuator brand. As a result, there is less need for expensive, custom-made mounting kits, making it easier and less expensive to mount topworks accessories. TopWorx offers several cast aluminum and stainless steel mounting kits that make it easy to attach our products to rack and pinion actuators.

Note: TopWorx Lumitech discrete valve controllers take full advantage of the ISO/NAMUR standard. They are uniquely designed to attach directly to any rack and pinion actuator without mounting kits! This eliminates the hassle and expense of purchasing and installing mounting kits - saving time, money, and space.

Custom (Non-NAMUR) Mounting Kits

Rotary valve actuators that do not use the ISO/NAMUR standard, such as scotch-yoke or vane actuators, require custom-designed mounting kits to attach topworks accessories. This can be a complex procedure that should not be overlooked by the end user. Since there are no standards, it is more difficult to ensure the proper fit and function of brackets, and consequently the automated valve system itself. TopWorx has a team of designers experienced at solving this problem, making it easy to attach our products to scotch-yoke and vane actuators. With an existing library of over 1,200 different designs, there is probably already a design ready for your application.

Note: TopWorx custom mounting kits are always made of heavy-gauge stainless steel, ensuring the proper amount of support in the field.

Linear Valve Mounting Kits

Linear valves, such as control valves, globe valves, knife gate valves, or diaphragm valves, do not conform to any standard mounting patterns. Therefore, custom-designed mounting kits are necessary to attach valve position monitors and sensors. Since TopWorx has been mounting GO Switches onto linear valves and actuators for several decades, there is probably already a design ready for your application - if not, we will create one.
AS-Interface DVC, DVM, DXP & DXS

AS-Interface Sensor-Communications Module (SCM) Layout

DVC-AS, DVM-AS
DXP-AS, DXS-AS

AS-Interface SCM Specifications

<table>
<thead>
<tr>
<th>Electrical Specifications</th>
</tr>
</thead>
</table>
| **Device ID** | 0 = Free Profile  
| Device I/O | 3 = 2 Input/2 Outputs |
| **Inputs** | D0 = Closed limit switch  
| | D1 = Open limit switch  
| | 0 = Switch open  
| | 1 = Switch closed |
| **Outputs** | D2 = Solenoid #1 (open)  
| | D3 = Solenoid #2 (closed)  
| | 0 = De-energize solenoid  
| | 1 = Energize solenoid |
| **Current** | DVC-DN max current = 65mA  
| | DVM-DN max current = open solenoid current + closed solenoid current  
| | max solenoid current = 170mA |

DeviceNet DVC, DVM, DXP & DXS

DeviceNet Sensor-Communications Module (SCM) Layout

DVC-DN, DVM-DN
DXP-DN, DXS-DN

DeviceNet SCM Specifications

<table>
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</tr>
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<td><strong>Cube Current</strong></td>
</tr>
<tr>
<td><strong>Max. Solenoid Current</strong></td>
</tr>
<tr>
<td><strong>Protection</strong></td>
</tr>
</tbody>
</table>

DeviceNet Quick Disconnect Connector Wiring Diagram (DVC & DVM only)

The DVC-DN and DVM-DN connect to a DeviceNet trunk line or drop line using a standard 5-in round mini or micro male (with pins) connector, as shown below:

PIN 1 = Not connected  
PIN 2 = V+  
PIN 3 = V-  
PIN 4 = CANH  
PIN 5 = CANL
FOUNDATION Fieldbus DVC-FF Integral Piezo Pilot Valve

Electrical Specifications

<table>
<thead>
<tr>
<th>Function Block</th>
<th>Execution Times</th>
<th>DVM-FF, DVM-FF</th>
<th>DVP-FF, DVP-FF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve Drivers</td>
<td>8VDC with 50DOC series load output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Consumption</td>
<td>LEDs disabled &lt;72mA</td>
<td>LEDs enabled &lt;120mA</td>
<td></td>
</tr>
<tr>
<td>Maximum Applied Voltage</td>
<td>3VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Voltage</td>
<td>9-32VDC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FM Approved Entity Parameters

| Ymax | 24V |
| Imax | 200mA |
| GI   | 2.5mF |
| Li   | 192μF |
| Pmax | 1.2W |

DVC-FF Integrated Piezo Pilot Valve Specifications

<table>
<thead>
<tr>
<th>Field</th>
<th>Air inlet</th>
<th>Flow Coefficient (Cv)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Operating Pressure</td>
<td>150 PSI (1 MPa)</td>
<td></td>
</tr>
<tr>
<td>Min. Operating Pressure</td>
<td>25 PSI (0.17 MPa)</td>
<td></td>
</tr>
<tr>
<td>Lubrication</td>
<td>Mist required</td>
<td></td>
</tr>
<tr>
<td>Pilot Operator</td>
<td>Optional push button/selective</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>5°F to 150°F (-15°C to 60°C)</td>
<td></td>
</tr>
<tr>
<td>Filtration</td>
<td>2-5 micron point-of-use</td>
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FOUNDATION Fieldbus DVC-FF Piezo Pilot Valves

A TopWorx bolt-on or NAMUR mount pilot valve is required for DVM-FF models. Care should be taken to order the correct pilot valve for applications that require the valve to fail in a certain position on loss of air.

One of the following models should be ordered to accompany all DVM-FF models:

**Single Piezo Pilot Valves**

- LP2-Z1P44 - Single pilot NAMUR mount valve; fail full open or full close
- LP2-Z1P64 - Single pilot bolt mount valve; fail full open or full close

**Dual Piezo Pilot Valves**

- LP2-Z1Q44 - Dual pilot NAMUR mount valve; fail in last position
- LP2-Z1Q64 - Dual pilot bolt mount valve; fail in last position

**Block Center Dribble Control Piezo Pilot Valve**

- LP2-Z1R64 - Dual pilot bolt mount block center valve; fail in place

DVM-FF Piezo Pilot Valve Specifications

| Mounting | 2-Axis 8 W |
| Port size | 1/8" NPT |
| Weight | Single Pilot: 1.2 lb, Dual Pilot: 1.4 lb |
| Installation | Mountable in any position |
| Ambient Temperature | 4°F to 140°F (-20°C to 60°C) |
| Pneumatic | Compatible with any position |
| Nominal Flow | 1.2 Cv |

Valve Operators

| Nominal Current | 1.2mA |
| Switching Voltage | 6V to 9V |
| Duty Cycle | 180% |
| Electrical Protection | IP54 |
| Connection | Push to 28V 4200Ω - industry norms |
**Profibus DP SCM Specifications**

<table>
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<tr>
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<tbody>
<tr>
<td>Max. Solenoid Power</td>
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<tr>
<td>Operating Voltage</td>
</tr>
<tr>
<td>Current</td>
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</tr>
<tr>
<td>Addressing</td>
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<tr>
<td>Additional Features</td>
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**Modbus SCM Specifications**

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**IVC & IVM - Integrated Valve Controller & Monitor**

### IVC & IVM Spool Valve Specifications

**Fluid**: Air, Inert Gas

**Max. Operating Pressure**: 100 PSI (0.7 MPa)

**Min. Operating Pressure**: 22 PSI (0.15 MPa)

**Lubrication**: None required

**Pilot Operator Manual Override**: Non-locking push type (flush)

**Port Size**: 1/4” NPT (supply & work); 1/8” (exhaust)

**Flow Coefficient (Cv)**: 1.2 (Bare valve)

**Weight with fittings & bracket**: 0.42 lb.

**Mounting**: None required - integrated

**NEMA Rating**: Designed to meet 4, 4X - dust tight, weatherproof

**Temperature**: 14° to 122°F (-10° to 50°C)

---

### IVC Coil Electrical Specifications

**Rated AC Voltage**: 115V (50/60 Hz)

**Rated DC Voltage**: 24V

**Allowable Voltage Range**: +/- 10% of rated voltage

**Coil Insulation**: Class B

**Power Consumption (AC)**: 1.2 VA (60 Hz)

**Power Consumption (DC)**: 0.6 Watts

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### IVC Pneumatic Drawing

![Pneumatic Drawing](image-url)

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### IVC & IVM Wiring Diagram

**Sensor option G2**

![Wiring Diagram](image-url)

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### IVC & IVM Circuit Board Wiring Diagrams

**Sensor option G2**

![Circuit Board Wiring Diagrams](image-url)
PPS Puck Position Sensor Wiring Diagrams

Sensor Option 3S
DC 3-wire inductive sensors

Sensor Option NS
Intrinsically safe inductive sensors

Sensor Option AS
AS-Interface & inductive sensors

LPS Linear Position Sensors Wiring Diagrams

Wiring options DCA and DCD
3-pin and 4-pin mini change connector (available with Sensor option W only)

LPS Schematic Drawings

SPST

SPDT
Option L4
(4) SPDT GO Switches
(SSP, SRP)

Option L2
(2) SPDT GO Switches
(SSP, SXP, SXS, SRP, SBP)

Option M4
(4) SPDT Mechanical Switches
(SSP, SXP, SXS, SRP)

Option M2 with Analog Output option 01 or 10
(2) SPDT Mechanical Switches with 1K or 10K ohm potentiometer
(SSP, SXP, SXS, SRP)

Option M2 with Analog Output option 42
(2) SPDT Mechanical Switches with 4-20mA Transmitter
(SSP, SXP, SXS, SRP)

Option L2
(2) SPDT GO Switches
(SSP, SXP, SXS, SRP)

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Option M2 with Analog Output option 42
(2) SPDT Mechanical Switches with 4-20mA Transmitter
(SSP, SXP, SXS, SRP)
Switchpak Wiring Diagrams

SWITCHPAK

Option T2
(2) DPDT Mechanical Switches
(SSP, SXP, SXS, SRP, SEP)

Option D2
(2) SPDT Hermetically Sealed Switches
(SSP, SXS)

Option D4
(4) SPDT Hermetically Sealed Switches
(SSP, SRP)

Option W4
(4) SPST Hermetically Sealed Switches
(SSP, SRP)

Option W2
(2) SPST Hermetically Sealed Switches
(SSP, SRP, SEP, SBP)

Option W2
(2) SPST Hermetically Sealed Switches
(SSP, SRP, SEP, SBP)

Valvetop Technical Reference

Courtesy of Steven Engineering, Inc.
230 Ryan Way, South San Francisco, CA 94080-6370
Main Office: (650) 588-9200
Outside Local Area: (800) 258-9200
www.stevenengineering.com
Option E2
(2) Pepperl + Fuchs NJ2-V3-N Switches (SXP, SXS, SUP)

Option E2 with Analog Output option 42
(2) Pepperl + Fuchs NJ2-V3-N Switches with 4-20mA Transmitter (SXP, SXS)

Option E2 with Analog Output option 01 or 10
(2) Pepperl + Fuchs NJ2-V3-N Switches with 1K or 10K ohm potentiometer (SXP, SXS)

Option F2 & P2
(2) P+F NJ2-11-SN-G switches (F2) or
(2) Inductive non-NAMUR sensors (P2) with 4-20mA Transmitter (SXP, SXS)

Option F2 & P2 with Analog Output option 42
(2) P+F NJ2-11-SN-G switches (F2) or
(2) Inductive non-NAMUR sensors (P2) with 4-20mA Transmitter (SXP, SXS)

Option F2 and P2 with Analog Output option 01 or 10
(2) P+F NJ2-11-SN-G switches (F2) or
(2) Inductive non-NAMUR sensors (P2) with 1K or 10K ohm potentiometer (SXP, SXS)
Within the housing at the conduit entries are two potting compartments available for factory sealed leads. They are designed to UL and CSA specifications; eliminating the need to add a sealed potting compartment within 18" of the Switchpak. Sealing of these compartments in the field also prevents moisture ingress through the conduit.

O-rings

Standard O-rings are Buna-N and are acceptable for most applications. Viton O-rings are available for areas with high heat, moisture, and corrosion. All Switchpaks have O-ring seals between the uppers and lower switch housing, at each end of the shaft, and under the outer dome.

Buna-N: Nitrile rubber
-65° to 275°F (-53° to 135°C)

Viton: Fluorocarbon rubber
-15° to 400°F (-26° to 204°C)

Visual Indication

- Dome shape provides superior strength
- Snap on design for fast, precise 360° adjustment to actual valve position
- Impact resistant Lexan polycarbonate material
- EaStar material optional
- O-ring sealed from moisture and contamination
- Highly visible Green/Red, Open/Closed indication eliminates guesswork
- Custom text options available
- 3-way valve indication available

Shafts and Cams

Adjustment cams allow switch positions to be quickly set to valve position.

Shafts are 300 series stainless steel with stainless steel retaining rings top and bottom and are O-ring sealed through bronze composite Teflon bearings. O-rings are standard Buna-N with Viton optional.

Shafts are available in NAMUR or standard configuration. NAMUR shaft mates directly with NAMUR actuator output shafts without couplers.

Cams are molded Nylon-6 on 4° splines and spring-loaded for easy calibration. Target magnet inserts are used for prox switch options.

A precision gear is mated to the shaft for 4-20mA transmitter and potentiometer options.

Terminal Strips

A pre-wired, 12-point numbered terminal strip is standard for most options. There are two open contacts for an integral solenoid valve connection in all Switchpaks.

- Standard 12-point terminal strip is Nylon Euro style
- Terminal strip will receive maximum 14AWG wire
- Terminal screws and contacts are nickel-plated brass
- A minimum of two terminals are available for accessory mounting with any switch option

Analog Output Option 42 with no sensors

(SSP, SXP, SXS, SRP)

Analog Output option 01 or 10 with no sensors

(SSP, SXP, SXS, SRP)
**Switchpak Sensor Options**

**GO Switch - Model 35**

Sensor options L2 & L4 (SSP, S3P, S3S, SRP, SBP)

The model 35 GO Switch features large contacts with a snap action to switch heavy loads. Model 35 Switches are gold flashed with a built-in wiping action and high contact pressure to switch low loads. All this and hermetic sealing to maintain a clean, dry atmosphere make the Model 35 GO Switch the top choice for critical processes.

Contacts: SPDT, Form C. Silver cadmium oxide, gold flashed.

Contact chamber: Hermetically sealed

Temperature rating: -40° to 221°F (-40 to 105°C)

Response time: 8 milliseconds

**Proximity Sensors**

Sensor options W2, W4, D2 & D4

The double-hinged design and snap action make this switch excellent for high and low current applications. It is literally the best reed switch available.

Contact chamber: Hermetically sealed

Temperature rating: -40° to 180°F (-40 to 82°C)

Tube atmosphere: Vacuum

Contact chamber: Hermetically sealed

Temperature rating: -40° to 221°F (-40 to 105°C)

Response time: 8 milliseconds

**SPST - Bifurcated**

Sensor options W2 & W4 (SSP, S3P, S3S, SRP, SBP)

Contacts: SPST, Form A. Silver cadmium oxide; 3.0A/120VAC; 0.5A/24VDC

**SPDT**

Sensor options D2 & D4 (SSP, S3P, S3S, SRP, SBP)

Contacts: SPDT, Form C. Silver cadmium oxide; 1.0A/120VAC; 0.5A/24VDC

**Mechanical Switches**

Sensor options M2, M4 & T2

- Economical
- SPDT and DPDT contacts
- High current carrying capability
- Temperature rating: -40° to 300°F (-40 to 148°C)
- UL recognized and CSA certified

**Proximity Sensors**

Sensor options E2, F2 & P2

Pepperl + Fuchs NJ2-11-SN-G

Sensor option F2 (SSP, S3P, S3S, SRP, SBP)

Protection: P68

Voltage Range: 5 to 25VDC

Housing Material: High grade steel

Sensing face: PBT

Operating Distance: 2 mm

Pepperl + Fuchs NJ2-11-SN-G

Sensor option E2 (SSP, S3P, S3S, SRP, SBP)

Protection: P67

Voltage Range: 0 to 25VDC

Housing Material: PBT/PVDF

Operating Distance: 2 mm

**Inductive Non-NAMUR Sensors**

Sensor option P2 (SSP, S3P, S3S, SRP, SBP)

Voltage Range: 10 to 30VDC

Operating Distance: 5 mm

**Valvetop Technical Reference**

Courtesy of Steven Engineering, Inc.

230 Ryan Way, South San Francisco, CA 94080-6370

Main Office: (650) 588-9200

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