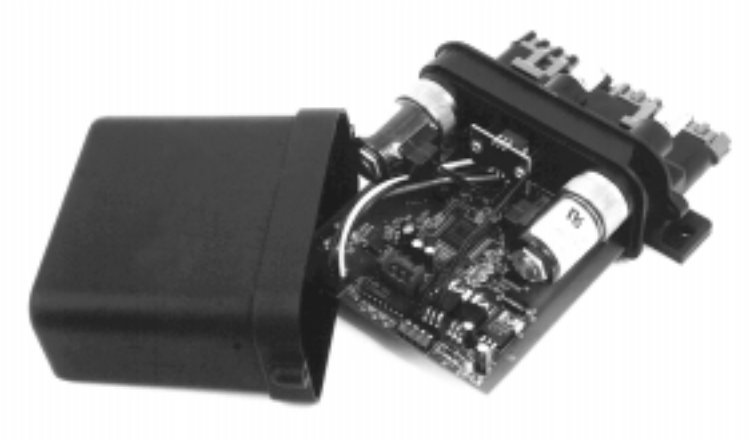
nexen

WEB CONTROL PRODUCTS

User Manual



SmartValve

FORM NO. L-20353-C-0302

In accordance with Nexen's established policy of constant product improvement, the specifications contained in this manual are subject to change without notice. Technical data listed in this manual are based on the latest information available at the time of printing and are also subject to change without notice.

Technical Support:
800-843-7445
(651) 484-5900

www.nexengroup.com

WARNING

Read this manual carefully before installation and operation.

Follow Nexen's instructions and integrate this unit into your system with care.

This unit should be installed, operated and maintained by qualified personnel ONLY.

Improper installation can damage your system or cause injury or death.

Comply with all applicable codes.

Nexen Group, Inc.
560 Oak Grove Parkway
Vadnais Heights, Minnesota 55127

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INTRODUCTION

Read this manual carefully, making full use of its explanations and instructions. The “Know How” of safe, continuous, trouble-free operation depends on the degree of your understanding of the system and your willingness to keep all components in proper operating condition. Pay particular attention to all NOTES, CAUTIONS, and WARNINGS to avoid the risk of personal injury or property damage. It is important to understand that these NOTES, CAUTIONS, and WARNINGS are not exhaustive. Nexen cannot possibly know or evaluate all conceivable methods in which service may be performed, or the possible hazardous consequences of each method. Accordingly, anyone who uses a procedure that is not recommended by Nexen must first satisfy themselves that neither their safety or the safety of the product will be jeopardized by the service method selected.

The Nexen SmartValve Controller is a microprocessor based pressure controller that is ideally suited for use with Nexen torque limiters, brakes and clutches. The SmartValve replaces much of the valves, regulators, air lines and plumbing needed to provide multiple pressures to Nexen’s pneumatic products.

The SmartValve uses both analog and digital pressure set points. The SmartValve uses a 0-10 VDC analog signal to output a proportional 0-80 psig. Four digital inputs allows the SmartValve to output 16 different standard or custom pressures that are stored onboard. The SmartValve features an input which senses a switch closure that signals the SmartValve to exhaust the air pressure, as required (e.g., torque limiter overload). In addition, a solid state relay output can be connected to an alarm to indicate overload situations.

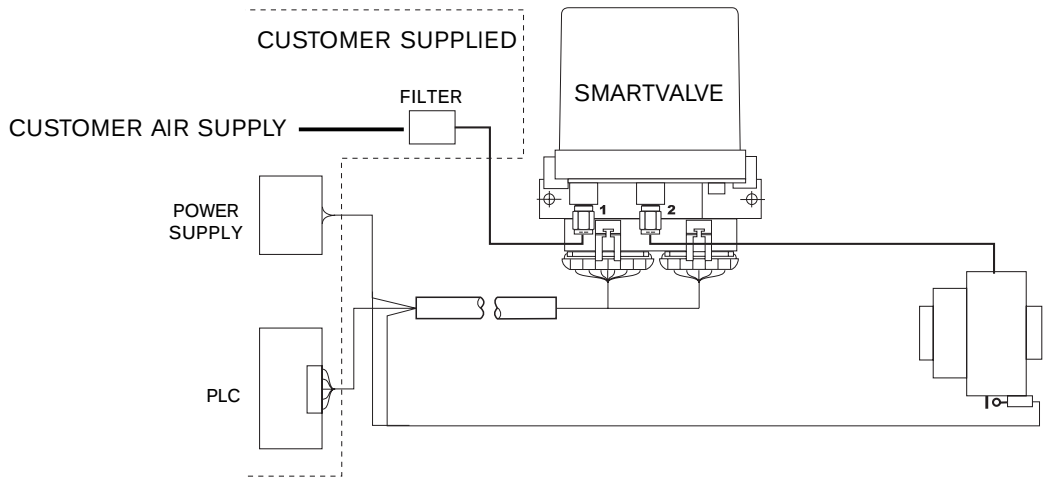


FIGURE 1 SMARTVALVE SYSTEM OVERVIEW

FORM NO. L-20353-C-0302

INSTALLATION

The SmartValve should be located near the pneumatic product being controlled and can be mounted horizontally or vertically. While the SmartValve is a sealed product and protected from the ingress of water and dust, the SmartValve must not be mounted such that the exhaust port is hit directly with the spray from a wash down hose or similar item. Also, allow enough clearance around the SmartValve to facilitate removal of the cover and the hold down screws.

NOTE: For best performance and reliability, use a regulated clean air supply and a filter that measures 20 micron or less.

CAUTION

Mount the SmartValve in a shock and vibration free area with an ambient temperature of less than 140°F [60°C] and more than 32°F [0°C].

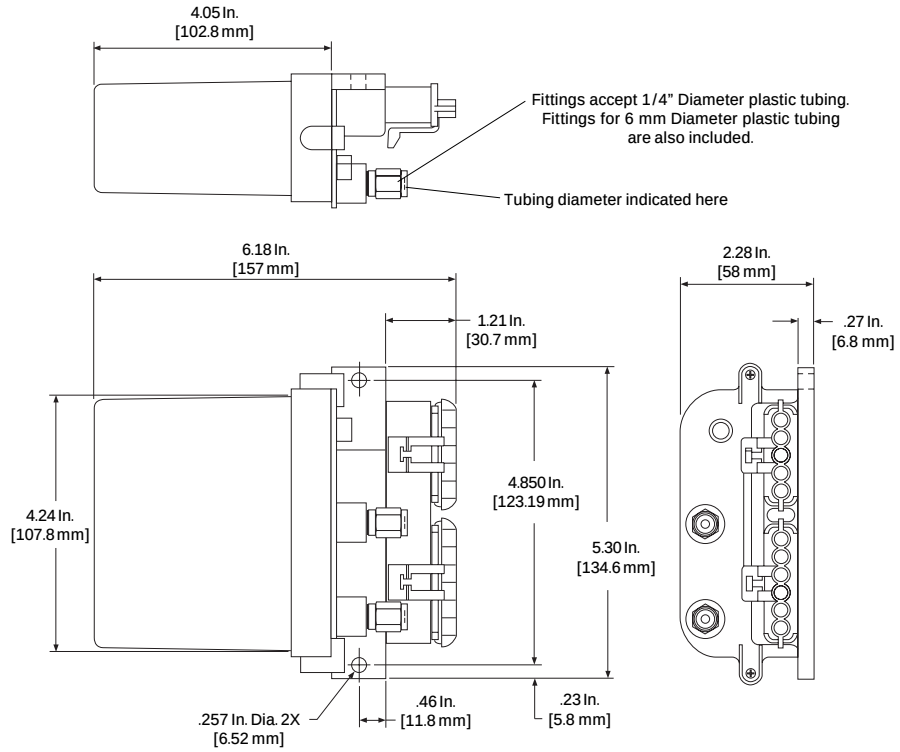
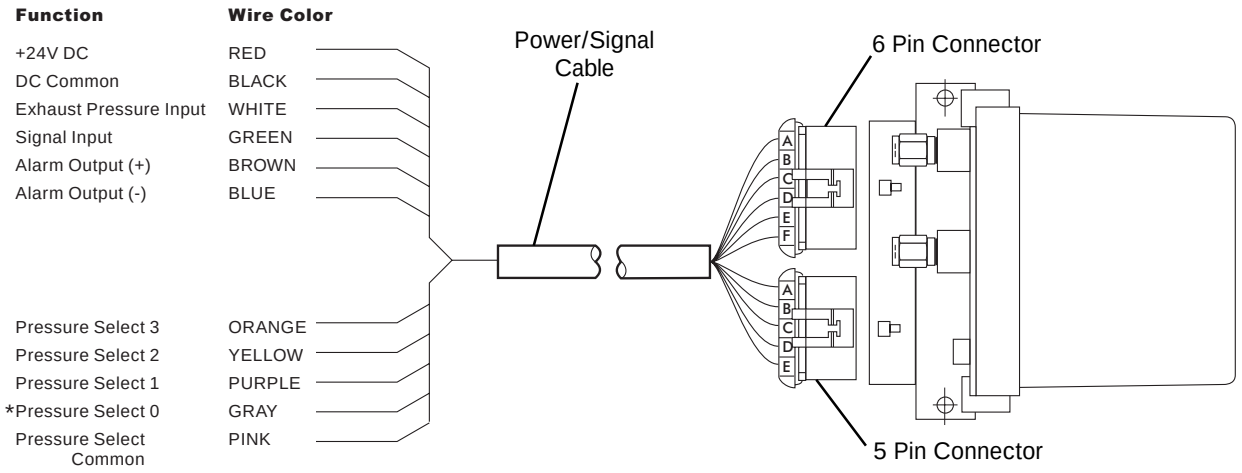


FIGURE 2 INSTALLATION DIMENSIONS

ELECTRICAL CONNECTIONS



*Pressure Select 0 also serves as the analog pressure select input.

FIGURE 3 SMARTVALVE ELECTRICAL CONNECTIONS

+24 VDC & DC Common: The SmartValve requires 24VDC to operate; refer to the *SPECIFICATIONS* section for current rating.

Exhaust Pressure Input: Normally 12-24 VDC is present at this input, at any time the voltage is removed the SmartValve will respond by exhausting all air pressure and provide an alarm signal. This input uses the same DC Common as the + 24 VDC power supply. A yellow indicator D9 on the SmartValve printed circuit board will be on when 24 VDC is present at this input.

Alarm Output: This output is an optically isolated relay that is activated upon a torque overload. The action of the relay is controlled by jumper W3. When W3 is set to NORMAL, the relay will conduct current during an alarm event and when set to "REVERSE", the relay will block current during an alarm event. Voltage and current ratings of the relay are listed in the *SPECIFICATIONS* section.

CAUTION

The alarm output transistor will only conduct current in one direction. Observe the proper polarity per Figure 3.

Pressure Select Inputs: These inputs allow users to select one of sixteen pressures depending on the input sequence, refer to the *OPERATION* section for more details. The inputs will accept a 12-24VDC signal and are optically isolated. An input is selected by applying 12-24 VDC and deselected by removing the voltage. The Pressure Select Common is independent of the +24VDC power supply common and facilitates connecting these inputs to another controller (i.e. PLC or computer) that has a different power supply than the SmartValve. Yellow indicators marked “0", "1", "2", "3” on the SmartValve printed circuit board will turn on when 12-24VDC is present at the corresponding input. Refer to the *SPECIFICATIONS* section for the current requirement of these inputs. Figure 4 shows the pressure select input connections.

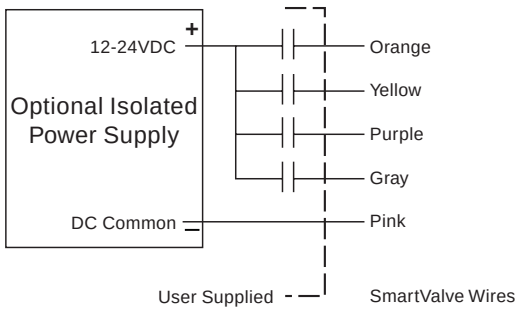


FIGURE 4 PRESSURE SELECT INPUT CONNECTIONS

Analog Pressure Selection Input: An analog signal can be used to select pressures through the Pressure Select "0" input. The SmartValve will convert the 0-10VDC input to a 0-80 psig output Figure 5 displays the analog pressure select input connections.

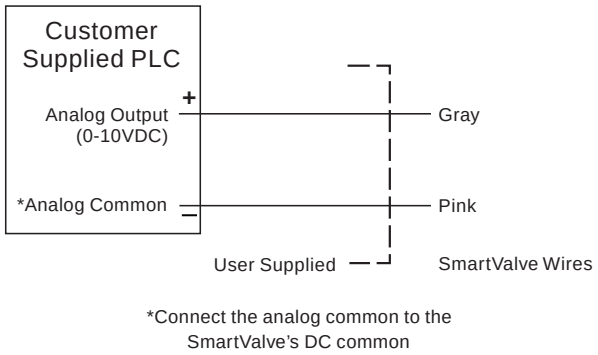


FIGURE 5 ANALOG PRESSURE SELECT INPUTS

SETUP

Digital Pressure Selection - Jumper and Switch Settings (See Figure 6)

Jumper W1	ON
Jumper W2	DIG
Jumper W3	NORM, alarm output transistor turns on during an alarm REV, alarm output transistor turns off during an alarm
Mode Switch	Select “0-2”, see Table 1.

NOTE: Table 1 displays the standard mode switch settings "0-2". Mode switch settings “3-7” are reserved for custom pressure tables. Contact Nexen (1-800-843-7445) if you require a custom table for your application.

					Pressure (psig)		
Pressure Selection Value	Pressure Select Inputs				Mode Switch		
	3	2	1	0	0	1	2
0	off	off	off	off	hold	0	hold
1	off	off	off	on	0	5	0
2	off	off	on	off	6	10	20
3	off	off	on	on	12	15	24
4	off	on	off	off	18	20	28
5	off	on	off	on	24	25	30
6	off	on	on	off	30	30	34
7	off	on	on	on	36	35	38
8	on	off	off	off	42	40	40
9	on	off	off	on	48	45	44
10	on	off	on	off	54	50	48
11	on	off	on	on	60	55	50
12	on	on	off	off	66	60	54
13	on	on	off	on	72	65	58
14	on	on	on	off	78	70	70
15	on	on	on	on	84	75	80

TABLE 1 DIGITAL PRESSURE SELECTION MODE

Analog Pressure Selection - Jumper and Switch Settings (See Figure 6)

Jumper W1	ON
Jumper W2	ANA
Jumper W3	NORM, alarm output transistor turns on during an alarm REV, alarm output transistor turns off during an alarm
Mode Switch	Select “F”

Maintain Pressure Function - Jumper and Switch Settings (See Figure 6)

Jumper W1	ON
Jumper W2	DIG
Jumper W3	NORM, alarm output transistor turns on during an alarm REV, alarm output transistor turns off during an alarm
Mode Switch	Select “E”

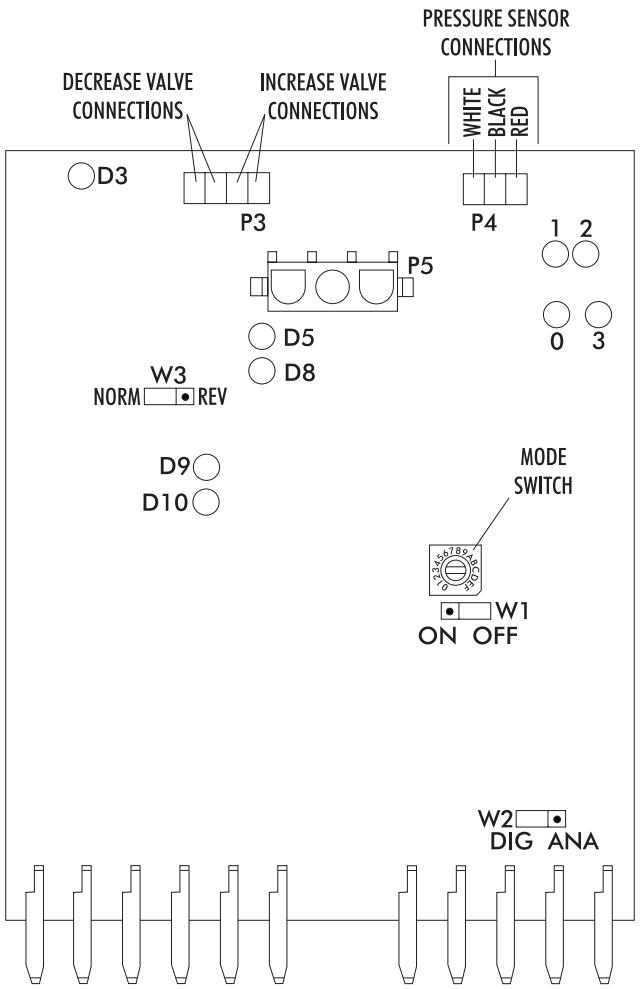


FIGURE 6 SMARTVALVE CIRCUIT BOARD

DESIGNATION	COLOR	FUNCTION
0	YELLOW	"ON" when pressure select input 0 is selected.
1	YELLOW	"ON" when pressure select input 1 is selected.
2	YELLOW	"ON" when pressure select input 2 is selected.
3	YELLOW	"ON" when pressure select input 3 is selected.
D3	GREEN	"ON" when power is present.
D5	RED	"ON" when increasing pressure.
D8	RED	"ON" when decreasing pressure.
D9	YELLOW	"ON" when voltage is applied to signal input.
D10	YELLOW	"ON" when voltage is applied to signal input.

TABLE 2 LED INDICATOR LIGHT LEGEND

OPERATION

Digital Pressure Selection

NOTE: Make the proper setting in SETUP and the correct connections in ELECTRICAL CONNECTIONS before you apply power to the SmartValve.

During the Digital Pressure Selection mode of operation, the SmartValve will provide sixteen different pressures that correspond to the decoded value of the four pressure select inputs (refer to Table 1 in ***SETUP***). Select a pressure by applying 12-24VDC to the appropriate pressure selct inputs and observe the pressure output with a pressure gauge. The output pressure should match closely with the pressure given in Table 1 that corresponds to the input selections made and setting of the mode switch. Apply a voltage signal to the SmartValve's exhaust pressure input and the output pressure will go to zero. At this time, the Alarm Output will change from on-to-off or off-to-on depending on W3. This condition can only be reset by choosing another pressure via the pressure select inputs.

Analog Pressure Selection

NOTE: Make the proper setting in SETUP and the correct connections in ELECTRICAL CONNECTIONS before you apply power to the SmartValve.

During the Analog Pressure Selection mode of operation, the SmartValve converts a 0-10VDC signal into a 0-80 psig output. Observe the pressure output with a pressure gauge. As the voltage increases, the pressure will increase linearly with it. Apply a voltage signal to the SmartValve's exhaust pressure input and the output pressure will go to zero. At this time, the Alarm Output will change from on-to-off or off-to-on depending on W3. This condition can only be reset by applying zero volts to the analog input. After that, the output pressure will track the input voltage again. See Figure 5.

Maintain Pressure Function

NOTE: Make the proper setting in SETUP and the correct connections in *ELECTRICAL CONNECTIONS* before you apply power to the SmartValve.

During the Maintain Pressure Selection mode of operation, the SmartValve measures the internal air pressure of the valve manifold and maintains that pressure. At start-up, the SmartValve responds to the default pressure select inputs (Table 1) as if it were set in Mode 1 of the Digital Pressure Selection mode of operation, until you apply a 12-24VDC signal to the signal input wire (refer to Figure 3). When you apply a 12-24VDC signal, the SmartValve measures the air pressure of the manifold's interior and uses that pressure reading as a set point. This pressure will be maintained until the 12-24VDC signal is removed from the signal input wire. When the 12-24VDC is removed, the SmartValve shuts off its internal solenoid valves and no longer maintains the air pressure. The air pressure will remail constant providing there are no air leaks in the manifold, the external tubing or any of the devices connected to it.

TROUBLESHOOTING

Refer to Figure 6 and Table 2 for identification and locations of components.

PROBLEM	PROBABLE CAUSE	SOLUTION
Selecting different pressures with the digital inputs has no effect on the output pressure.	No power to the SmartValve.	Check that the green power LED, D3, is on. If not, then there is no power to the SmartValve. Next, check to see if there is +24VDC across terminals A and B of the six pin connector. If not, then suspect the power supply or the wiring between this connector and the power supply. If voltage is present, then look for pin damage in the SmartValve connector housing and return the SmartValve to Nexen, for re pair, if no damage is found.
	Pressure Select Inputs not wired properly.	Review *ELECTRICAL CONNECTIONS* section Figure 4 for proper wiring example and change wiring if necessary.
	Mode switch or Jumper W2 set improperly.	Review the switch and jumper settings for digital pressure selection in the *SETUP* section and make changes if necessary.
	Inadequate or no air pressure to the SmartValve.	Check to see if 85-150 [5.9 to 10.3 BAR] psig is available at the SmartValve's pressure input, refer to Figure 2.
Selecting different pressures with the analog input has no effect on the output pressure.	No power to the SmartValve.	Check that the green power LED, D3, is on. If not, then there is no power to the SmartValve. Next, check to see if there is +24 VDC across terminals A and B of the six pin connector. If not, then suspect the power supply or the wiring between this connector and the power supply. If voltage is present, then look for pin damage in the SmartValve connector housing and return the SmartValve to Nexen, for re pair, if no damage is found.
	Analog Pressure Select Input not wired properly.	Review *ELECTRICAL CONNECTIONS* section Figure 5 for proper wiring example and change wiring if necessary.
	Mode switch or Jumper W2 set improperly.	Review the switch and jumper settings for ana log pressure selection in the *SETUP* section and make changes if necessary.
	Inadequate or no air pressure to the SmartValve.	Check to see if 85-150 [5.9 to 10.3 BAR] psig is available at the SmartValve's pressure input, refer to Figure 2.

Continued

PROBLEM	PROBABLE CAUSE	SOLUTION
After removing the Exhaust Pressure signal, the output pressure is not exhausted by the SmartValve.	Exhaust Pressure signal does not make it to the SmartValve.	Remove Exhaust Pressure signal and observe that LED D9 turns off. If it does not, then inspect connector 1 and the wiring back to the signal source for bad connections.
	Exhaust Pressure signal does not cause the SmartValve to exhaust air pressure.	Remove Exhaust Pressure signal and observe that LED D9 turns off. If D9 turns on, then signal source must be changed such that +24VDC is applied normally and then removed during an overload condition.
During torque overloads, the output pressure is exhausted but no alarm indication is given.	Bad connection between connector 1 and alarm output receiving device (IE Programmable Logic Controller or indicator).	Examine wiring and connections and make necessary repairs.
	Alarm output not configured properly	Jumper W3 determines whether the alarm output relay conducts current or not during an overload condition, refer to "ALARM OUTPUT" in the *ELECTRICAL CONNECTIONS* section and "JUMPER W3" in the *SETUP* section.

SPECIFICATIONS

Power Supply ---------- +24 VDC @ 500 mA
Operating Ambient Temperature ---------- 32°F to 140°F [0 to 60°C]
Supply Air Pressure ---------- 85 to 150 psig [5.9 to 10.3 BAR]
Supply Air Filtering ---------- 20 micron element
Exhaust Pressure and Signal Input ---------- 12-24VDC @ 24 mA maximum, non isolated

Pressure Selection Inputs ---------- 12-24VDC @ 24 mA maximum,optically isolated

Analog Pressure Selection Input ---------- 0-10VDC @ 1 mA, non isolated

Alarm Output ---------- 100VDC max. @ 150 mA maximum,optically isolated

Enclosure ---------- Nylon with o-ring seal
Cable ---------- 20 AWG conductors, 78 in. [2 m] long
Air Line Diameter ---------- 0.25 in. or 6 mm
Accuracy ---------- +/- .25% full scale @ 77°F [25°C]
Cv Factor ---------- 0.030

SmartValve ---------- 964508
Optional Power Supply ---------- 964509

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Warranties

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560 Oak Grove Parkway
Vadnais Heights, MN 55127

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Fax: 651.286.1099
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