Siemens Energy & Automation	INSTALLATION AND SERVICE INSTRUCTION

SD760
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Supersedes Iss. 3

ValvePAC™

Series 760

Intelligent Valve Control

Our Positioners Control the Best Valves & Actuators in the World

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ADDITIONAL INFORMATION

Changes for Revision 4, August 2005

Significant changes are indicated by change bars in the page margins. Some of these changes are listed below. Removed material may not be marked by a change bar.

1. Trademark statements and symbols updated throughout.
2. Product Support section updated.

■

1.0 INTRODUCTION

The Series 760P & 760E Valve Controllers are cam characterized, double-acting, pneumatic or electro-pneumatic valve controllers that accept a 3-15, or 4-20 mA input signal and convert it to a pneumatic output to position a control valve actuator. The controllers can be used with either rectilinear or rotary, single or double acting actuators. A selection of cam profiles and feedback levers is available.

A spool valve is used to load the actuator for positioning in response to an input signal. Mechanical feedback is provided by a characterized cam. Cam profiles are available for linear, equal percentage, or quick opening operation. A blank profile cam is available for custom applications. Rectilinear action can range from 1/2" to 6" in length.

The feedback shaft and characterized cam can be replaced in the field to configure the positioner for use with either a rectilinear or rotary actuator. No additional parts are necessary to change between single or double acting actuators, or direct or reverse action.

Figure 2-1 , Installation Dimensions, shows the connection ports.

1.1 SPECIFICATIONS

TABLE 1-1 Specifications

	760P Pneumatic Positioner	Common *	760E Electro/Pneumatic Positioner
Temperature Range		-40 to 85°C	
Ingress		NEMA 4X, IP65	
Connections		Pneumatic - 1/4" NPT Gauge - 1/8" NPT Electrical - 3/4" NPT, - M25 (optional) Exhaust - 1/4" NPT	
Finish		Epoxy/Polyester powder coat	
Output Configuration		Single or double acting	
Action		Direct or reverse	
Supply Pressure		150 psig max.	
Air Consumption	0.5 scfm (typical)		0.6 scfm (typical)
Flow Capacity Standard Spool		9 scfm (Cv = 0.3)	
Flow Capacity High Flow Spool		18 scfm (Cv = 0.6) Supply (1/2 pressure gain of std.)	
Flow Capacity Lo Flow Spool		9 scfm (Cv = 0.3) Supply	
Input Signal	3-15 psig, 3-27 psig	Up to 50% Split range	4-20 mA
Feedback Signal		90 degree rotary standard 1/2" to 6" rectilinear optional	
Feedback Configuration		Cam characterization	
Pressure Gain		160 %/% @ 60 psig supply std. (800 psi/psi)	
Span		Adjustable -60 to +25% of normal span	
Zero		Adjustable -10 to +60% of normal span	
Linearity (Independent)	0.5% of normal span (typical)		0.75% of normal span (typical)
Hysteresis	0.75% of normal span (typical)		1.0% of normal span (typical)
Deadband		Less than 0.25% of span	
Repeatability		Within 0.5% valve travel	
Supply Pressure Effect		Less than 0.2% valve travel for a 5 psig change in supply pressure	

Materials of Construction		Stainless Steel, Aluminum, Brass, Nickel Plated Brass, Nickel Plated Steel, Polyphenylene Sulfide, Silicone, Silicone on Fiberglass, Neoprene on Nylon, Viton® fluoroelastomer, Viton® fluoroelastomer on Nomex®, Epoxy Polyester powder Coat, Glass Filled Nylon, Polycarbonate, Bronze, Steel	
Electrical Classification FM Approval		Intrinsically Safe, Entity: Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III, Div. 1, when installed in accordance with Moore Products Co. drawing 15032-7602 rev.1; Non-Incendive: Class I, Div. 2, Groups A, B, C, D. Suitable for: Class II, Div. 2, Groups E, F, G; Class III, Div. 2.	
CSA Certification:		Intrinsically Safe: Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III, Div. 1, when installed in accordance with MPCo drawing 15032-7602. Suitable for: Class I, Div. 2, Groups A, B, C, D; Class II, Div. 2, Groups E, F, G; Class III, Div. 2	
CENELEC:		EEx ia IIC T4/T5/T6	
SIRA:		Ex N IIC T5	

* For installations in hazardous locations adhere to guidelines of Control Drawing 15032-7602 for temperature limitations.

TABLE 1-2 Option Specifications

All percentages are based on full span of output, unless otherwise noted.

	4-20 mA Feedback	**1K Ohm Potentiometer**
Temperature Range	-40° to 85° C	-40° to 85° C
Configuration	4-20 mA DC output, direct or reverse acting	Resistive output, direct or reverse acting
Linearity	Less than 1.0%	Less than 1.0%
Hysteresis	Less than 0.5%	Less than 0.5%
Deadband	Less than 0.25%	Less than 0.25%
Repeatability	Within 0.3%	Within 0.3%
Supply voltage effect	less than 0.01% for 5V change in supply	
Ambient temperature effect	Less than 1.0% per 50° F change	Less than 1.0% per 50° F change
Zero / Span	55 to 150 degree input range for full span	0 to 915 Ohm over 90 degree input rotation
Power Requirements	10 to 36 Vdc	
Power Rating		1 Watt max.

	Mechanical Limit Switches	**Proximity Sensors**
Temperature Range	-40° to 85° C	-20° to 85° C
Configuration	Two switches, infinite setpoint resolution	Two sensors, infinite setpoint resolution
Power Rating	10A@125/250 Vac, 10A@24 Vdc, 0.1A@125 Vdc	See barrier manufacturer instructions
Mechanical life	1 million cycles no load, 100,000 full load	Essentially infinite
Connections (per switch)	Normally open, Normally closed, Common	See barrier manufacturer instructions
Repeatability	Within 0.3% valve travel span	Within 0.3% valve travel span

1.2 MODEL DESIGNATION

Each Controller has a nameplate identifying the model number, bill of material, and input range. The following decodes the model number on the nameplate. Before installing or servicing a Controller, review the nameplate information.

Basic Model No.

76 Valve Controller

0 Standard Product - No Private Label

A-Z Reserved for OEM Private Label Products

Input

E1 4 to 20 mAdc

P1 3 to 15 psig

P4 20 to 100kPa

P5 0.2 to 1.0 Bar

P6 0.2 to 1.0 kg/cm^2

Input Option - P2 3-27 / 6-30 psi is now available.

Action

1 1/2 to 4 inch stroke (60° cams)

2 3 to 6 inch stroke (60° cams)

3 1/4 turn - 1/2 inch square shaft (90° cams)

4 1/2 to 2 inch stroke (60° cams)

5 1/4 turn - NAMUR (90° cams)

E 1/2 to 4 inch stroke lever with (1) 90° linear cam

F 2 to 6 inch stroke lever with (1) 90° linear cam

S 1/4 turn NAMUR shaft with set of (3) 60° cams

Enclosure (with 3/4 inch NPT conduit connection)

A Standard

B With Beacon Indicator (for Action selections with 90° cams)

C With Stroking Speed Adjusters

D With Stroking Speed Adjusters and Beacon Indicator (for Action selections with 90° cams)

J With Flat Indicator (for Action selections with 60° cams)

K With Flat Indicator (for Action selections with 90° cams)

L With Stroking Speed Adjusters and Flat Indicator (for Action selections with 60° cams)

M With Stroking Speed Adjusters and Flat Indicator (for Action selections with 90° cams)

Enclosure (with M25 conduit connection) (Electrical Classification for N & 8 only)

E Standard

F With Beacon Indicator (for Action selections with 90° cams)

G With Stroking Speed Adjusters

H With Stroking Speed Adjusters and Beacon Indicator (for Action selections with 90° cams)

N With Flat Indicator (for Action selections with 60° cams)

P With Flat Indicator (for Action selections with 90° cams)

R With Stroking Speed Adjusters and Flat Indicator (for Action selections with 60° cams)

S With Stroking Speed Adjusters and Flat Indicator (for Action selections with 90° cams)

Flow Capacity

A Standard (Cv = 0.3)

B High Flow (Cv = 0.6)

C Low Gain (Cv approximately ½ standard flow gain)

Environmental Construction

A Standard Temperature

C High Temperature (760P with no electrical options) (-30 to 150° C) (-20 to 300° F)

E Ozone Resistant with Viton® fluoroelastomer and iso-elastomeric spring

F Ozone Resistant with Viton® fluoroelastomer and standard spring

Gauges

N Not Required

G Gauges (not available with Hi-Temp Environmental Construction)

Limit Switches

N Not Required

1 Mechanical

2 Proximity Switches (NAMUR Std.)

Feedback

N Not Required

1 Potentiometer - 1K

2 4 - 20 mAdc Feedback

Design Level

A

Electrical Certification (Refer to Specifications)

N Non Approved

7 FM/CSA/SIRA Ex N /CENELEC, EEx ia (3/4 NPT conduit only)**

8 CENELEC, EEx ia/SIRA Ex N (3/4 NPT or 25mm conduit**

76 0 E1 5 A A N G N N A N Sample Model No.

** *Consult factory before ordering.*

1.3 OPTIONS

Options are installed either in the field by the user or at the factory. User installation of options is explained in section 4.0 of this Instruction. The following options are available:

TABLE 1-3 Options

TYPE	DESCRIPTION
Flat Indicator	Flat lens and indicator provide a rough visual indication of valve position.
Hi-Vis™ Beacon Indicator	Beacon lens and indicator provide a rough visual indication of valve position; used only on rotary actuators.
Internal Limit Switches	Two Mechanical SPDT , or two NAMUR proximity switches.
Internal Position Feedback	A Feedback pot to monitor valve position (1K ohm for 90 degree rotary applications; 666 ohms for 60 degree rectilinear applications).
Position Transmitter	Two wire position transmitter provides 4-20mA output proportional to valve position. Requires 10 - 36 V external loop.

1.4 PRODUCT SUPPORT

This section provides the Internet site addresses, e-mail addresses, telephone numbers, and related information for customers to access Siemens product support.

When contacting Siemens for support:

- Please have complete product information at hand:
  For hardware, this information is provided on the product nameplate (part number or model number, serial number, and/or version).
  For most software, this information is given in the Help > About screen.
- If there is a problem with product operation:
  Is the problem intermittent or repeatable? What symptoms have been observed?
  What steps, configuration changes, loop modifications, etc. were performed before the problem occurred?
  What status messages, error messages, or LED indications are displayed?
  What troubleshooting steps have been performed?
  Is the installation environment (e.g. temperature, humidity) within the product's specified operating parameters? For software, does the PC meet or exceed the minimum requirements (e.g. processor, memory, operating system)?
- A copy of the Service Instruction, User's Manual, or other technical literature for each involved product should be at hand. The Siemens public Internet site (see the table) has current revisions of technical literature, in Portable Document Format, for downloading.
- To send an instrument to Siemens for repair, request a Return Material Authorization (RMA).

IMPORTANT

An instrument must be thoroughly cleaned (decontaminated) to remove any process materials, hazardous materials, or blood born pathogens prior to return for repair. Read and complete the Siemens RMA form(s).

TABLE 1-4 Contact Information

NORTH AMERICA	Telephone	+1 800 569 2132, option 2 for Siemens-Moore brand instruments
	Fax	+1 215 283 6358
	E-mail	PITechSupp@sea.siemens.com
	Hours of Operation	8 a.m. to 4:45 p.m. eastern time Monday – Friday (except holidays)
	Public Internet Site	www.sea.siemens.com/ia
	Repair Service	+1 215 646 7400 extension 3187

Outside of North America see the Siemens web site at www.sea.siemens.com/ia; locate "Customer Support Process Instrumentation" and click the Contact Tech Support link to access the Global Support link.

■

2.0 INSTALLATION

Operating temperature limits are stated in the Specifications section of this Instruction. The temperature in the selected location must not exceed the specified operating temperatures.

CAUTION

Exceeding the specified operating temperature limits can adversely affect performance and safety, and may cause damage to the Controller.

The Controller will need to be calibrated before being put into service.

2.1 SHIPPING AND STORAGE

If the controller is to be stocked, stored, or shipped to another location prior to piping, make sure that the factory installed plastic plugs remain in the pneumatic ports to prevent entry of moisture, dirt, or other contaminant.

2.2 MECHANICAL INSTALLATION

Refer to Figure 2-1 for dimensions and mounting hole locations.

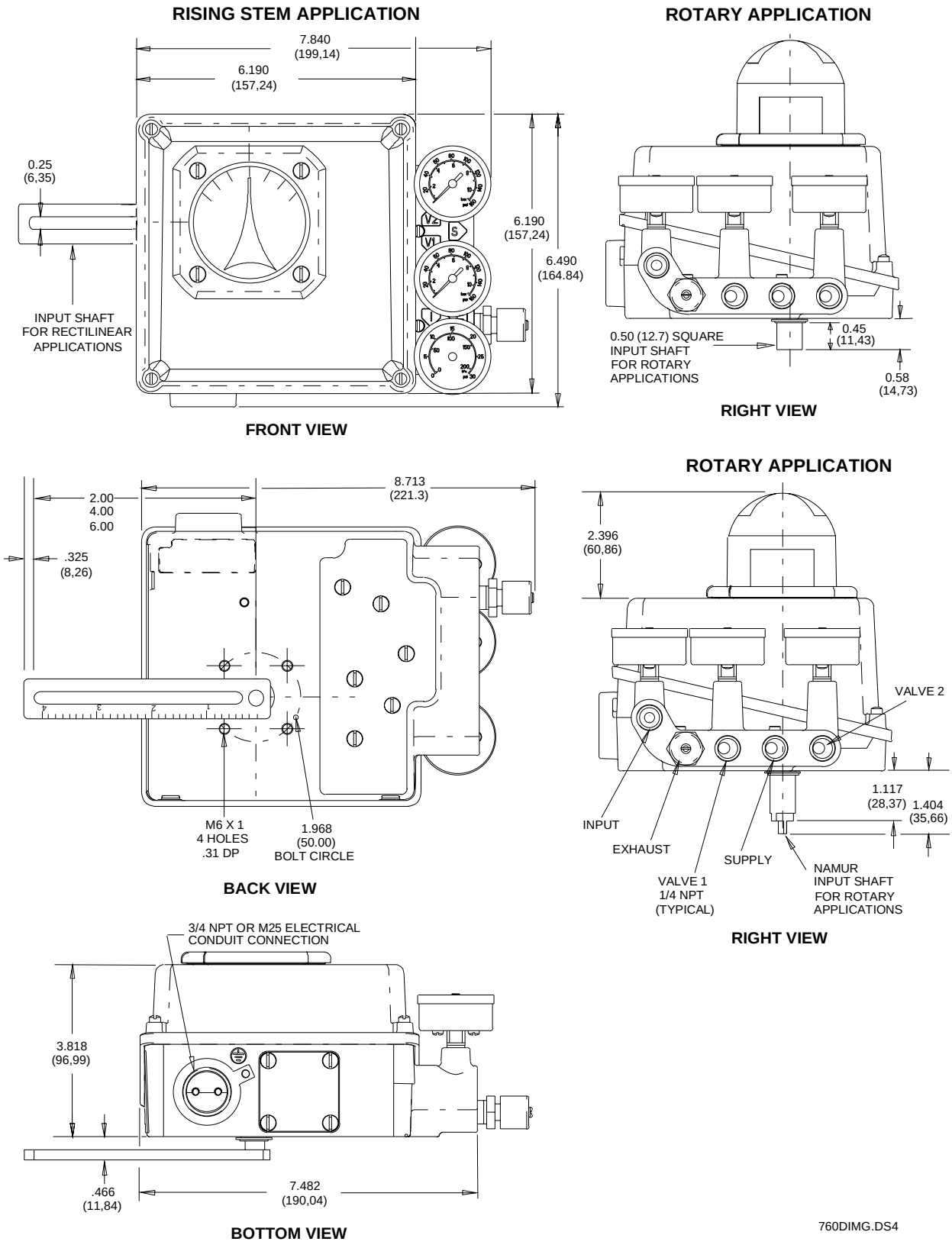


FIGURE 2-1 Installation Dimensions

2.2.1 Procedure

To facilitate the alignment of the feedback shaft mechanism it may be necessary to loosen the cam locking mechanism. See section. 3.1.2.

For feedback connection between controller and actuator, refer to either A or B below depending upon type of actuator to be used.

A. Rising Stem Actuator

Feedback lever must be perpendicular to actuator stem with actuator at mid-stroke.

Connection between actuator stem and feedback lever is typically made using a slotted bracket attached to actuator stem and a feedback pin attached to the slotted bracket. The slotted bracket must be rigid and motion must be transferred without deflection.

Figure 2-2, details A and B show the feedback pin fixed to the slotted bracket, the preferred method. The distance from the centerline of the feedback pin to the centerline of the input shaft must equal .866 x actuator stroke.

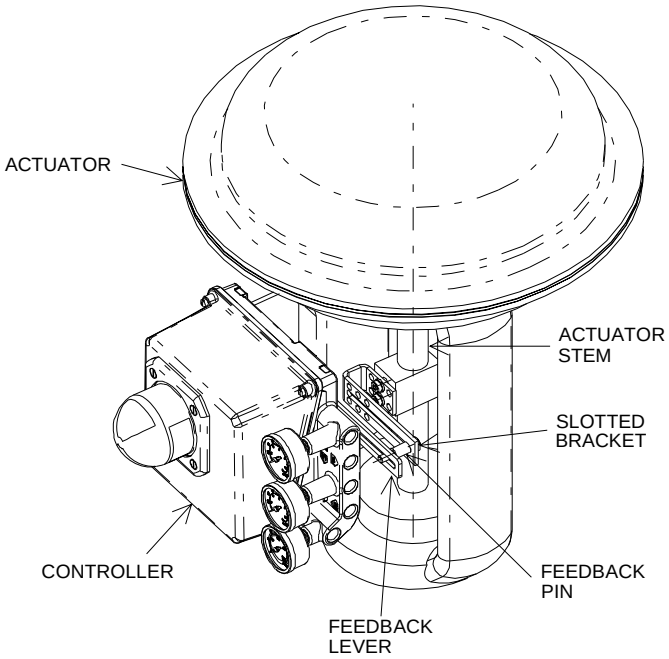
Figure 2-2, detail C shows feedback pin fixed to the feedback lever, an alternate method that causes an increase in linearity error of approximately 2%. The distance from the centerline of the feedback pin to the centerline of the controller input shaft must equal actuator stroke.

B. Rotary Actuator

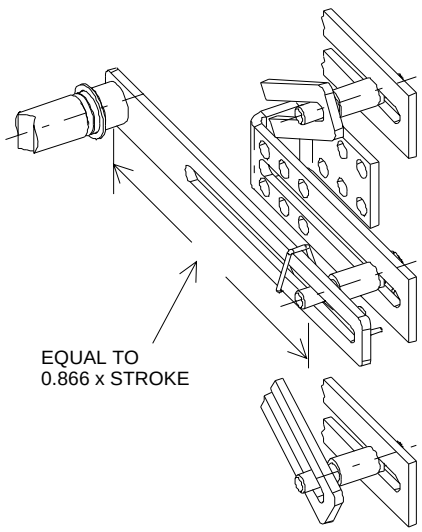
Couple the specified rotary input shaft to actuator shaft.

Shaft centerlines must be in-line to minimize friction and binding as shafts rotate.

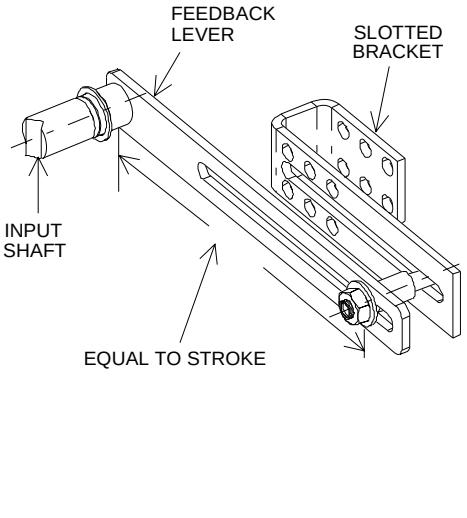
Rigidly mount the controller to actuator to prevent relative motion. The controller may be mounted in any orientation.



A. CONTROLLER MOUNTING AND PREFERRED METHOD OF CONNECTING FEEDBACK PIN



B. PREFERRED METHOD OF STROKE SETTING FOR FEEDBACK PIN CONNECTION. FEEDBACK LEVER SHOWN AT MID-STROKE.



C. METHOD OF CONNECTING FEEDBACK PIN AND STROKE SETTING

760-110.DS4

FIGURE 2-2 Controller Mounting and Feedback Pin Connection

2.3 RETAINING CLIP INSTALLATION

The retaining clip is used in rectilinear applications to hold the feedback pin securely to the pressure side of the feedback lever slot, even at small cam pressure angles. This prevents excessive play in the linkage and limits the amount of error introduced into the system through the linkage.

1. Before installing the spring clip in the intended application, you must determine which side of the feedback lever slot the pin contacts during the valve stroke.

2. Install the controller. See section 2.2.1A.

3. Install the cam in the proper orientation for the intended service. See section 3.1.

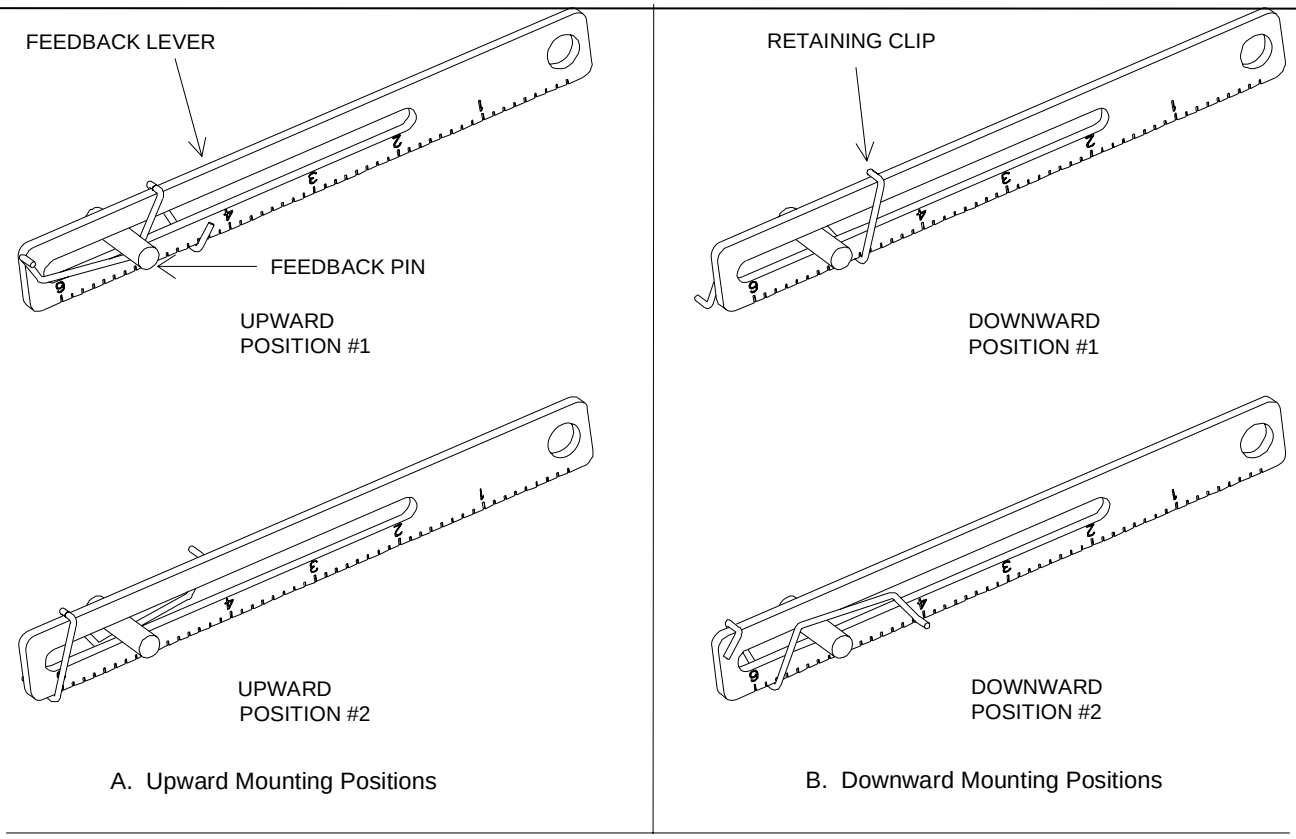
4. Determine which side of the feedback lever slot the pin contacts as the cam is rotated in the direction that causes the range spring to compress. This is the side that the spring clip must force the pin to when it is installed.

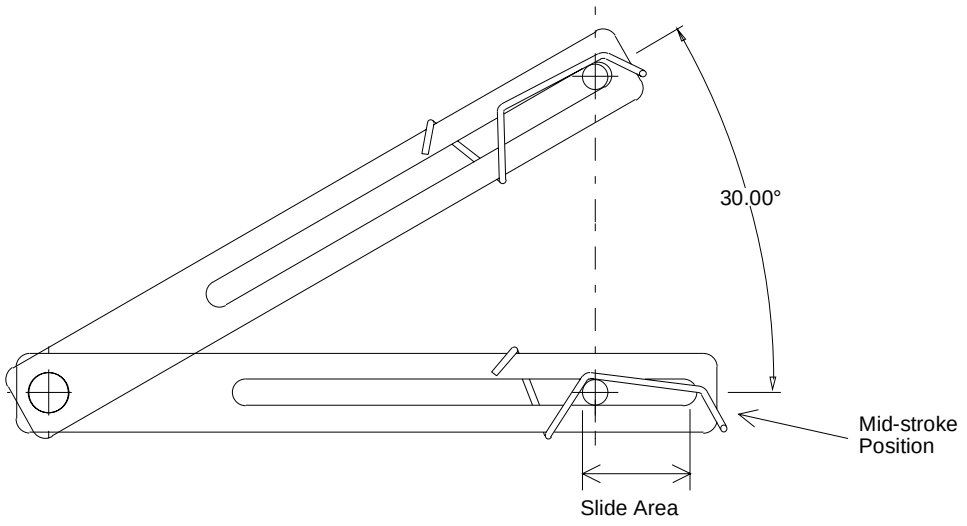
IMPORTANT

The clip must be positioned such that the pin sits in the innermost side of the clip slide area at mid-stroke. See Figure 2-3C.

Figure 2-3 A shows the correct installation of the retaining clip for pressure on the upward side of the feedback lever slot. Figure 2-3 B shows the same for the downward side of the slot.

It may be necessary to separate the feedback pin from the lever to facilitate installation.





C. Feedback Pin Slide Area

FIGURE 2-3 Retaining Clip Position

2.4 PNEUMATIC CONNECTIONS

Pneumatic connections are shown in Figure 2-1 and listed below:

V2 - output to actuator. Pressure in V2 increases with increasing input signal.
S - supply pressure to system.

V1 - output to actuator. Pressure in V1 decreases with increasing input signal.
E - exhaust port. Can be piped away from positioner. DO NOT PLUG.
I - input port. Plugged in 760E electronic valve controllers.

WARNING

Plugging or applying pressure to the Exhaust port will damage the unit and may cause personal injury. Pressure in excess of 150 psi in the V1, V2, or Supply ports may cause damage to the controller. Supply pressure to the controller must not exceed actuator maximum pressure rating. Pressure in excess of 35 psi may cause the input gauge to go out of calibration. Input pressure of 120 psi may cause the input gauge to burst.

Refer to the Table 2-1 to determine the required pneumatic connections between the Controller and the actuator.

TABLE 2-1 Pneumatic Connections

ACTUATOR TYPE	CONTROLLER ACTION	CONNECTIONS
Single acting	Direct acting (output increases with increasing input signal)	Connect V2 and plug V1
Single acting	Reverse acting (output decreases with increasing input signal)	Connect V1 and plug V2
Double acting	---	1. Note actuator position desired for minimum input signal to controller. 2. Connect V2 to actuator port that causes actuator to move away from position noted in above step. 3. Connect V1 to remaining port.

2.4.1 Piping

All pneumatic connections are 1/4" NPT (1/8” for gauges).
User supplied materials:

Scale free piping at least 1/8" ID for standard flow models and 1/4" ID for high flow models.

1/4" NPT pipe fitting is needed for each connection used. Use care not to over-torque the fitting when tightening (12 ft-lb. maximum).

1/4" pipe plug to plug the unused port for single acting actuators.

Piping recommendations:

Blow out all piping before connections are made to prevent dirt, chips, or debris from entering the controller.

Use pipe sealant sparingly and only on male threads. A non-hardening sealant is strongly recommended. Note: Pipe sealing tape is not recommended.

Connect the controller to a source of clean, oil-free instrument air. Instrument air requirements are given in the following section. Failure to do so will increase the possibility of a malfunction or deviation from specified performance.

2.4.2 Instrument Air Requirements

Instrument quality air must be supplied to the Controller.

CAUTION

Synthetic compressor lubricants in the air stream at the controller may cause it to fail.

There are many types of synthetic lubricants. Some may not be compatible with the materials used in the construction of the controller. Wetting of these materials by such an oil mist or vapor may cause them to deteriorate. This can result in failure of the controller. A list of materials used in the controller is found in the SPECIFICATIONS section.

Requirements for a quality instrument air supply can be found in the Instrument Society of America's "Quality Standard for Instrument Air" (ISA-S7.3). Basically this standard calls for the following:

Particle Size - The maximum particle size in the air stream at the instrument should be no larger than 3 microns.

Dew Point - the dew point, at line pressure, should be at least 10° C (18° F) below the minimum temperature to which any part of the instrument air system is exposed at any season of the year. Under no circumstances should the dew point, at line pressure, exceed 2° C (35.6° F).

Oil Content - The maximum total oil or hydrocarbon content, exclusive of non-condensables, should not exceed 1 ppm under normal operating conditions.

2.5 ELECTRICAL CONNECTIONS

2.5.1 Non-Hazardous Locations

An installation in a non-hazardous location should be in accordance with the current editions of applicable National and all Local Electrical Codes.

CE Approved
EN5008-1 and EN5008-2; See Declaration of Conformity at back of this document. Shielded cable is required.

2.5.2 Hazardous Locations

An installation in a hazardous location must be in accordance with the current editions of applicable National and all Local Electrical Codes.

For installation in hazardous locations the Controller or Controller Modules (Options) must display the following:
The NEC or CEC hazardous location(s) for which the equipment is approved.
The FM or CSA logo.
Hazardous location classifications appropriate to the installation.

Before installing a controller in a hazardous location, the need for energy limiting barriers and consideration of the FM entity parameters must be reviewed.

When electrically installing a Controller in a hazardous area, adhere to the guidelines on the control drawing, 15032-7602, included in the back of this document.

A typical system consists of a Controller installed in a hazardous area, energy limiting barriers installed in a non-hazardous location, and interconnecting shielded twisted-pair wiring.

WARNING

Modifications to the Controller or installation of non-approved options will void the electrical approval.

FM and CSA Hazardous Location Precautions

This section provides FM/CSA hazardous locations precautions that should be observed by the user when installing or servicing the equipment described in this manual.

Precautions - English

For Division 1 hazardous locations,

WARNING

Substitution of components may impair intrinsic safety.

For Division 2 hazardous locations.

WARNING

Explosion Hazard - Substitution of components may impair intrinsic suitability for Class I, Division 2.

When the equipment described in this manual is installed without safety barriers, the following precautions should be observed. Switch off the power at its source (in non-hazardous location) before connecting or disconnecting power, signal or other wiring.

Précautions - Français

Emplacements dangereux de Division 1

AVERTISSEMENT

LA SUBSTITUTION DE COMPOSANTS PEUT COMPROMETTRE LA SÉCURITÉ INTRINSÈQUE

Emplacements dangereux de Division 2

AVERTISSEMENT

RISQUE D'EXPLOSION - LA SUBSTITUTION DE COMPOSANTS PEUT RENDRE CE MATÉRIEL INACCEPTABLE POUR LES EMPLACEMENTS DE CLASSE I, DIVISION 2

Lorsque l'appareil décrit dans la notice ci-jointe est installé sans barrières de sécurité, on doit couper l'alimentation électrique a la source (hors de l'emplacement dangereux) avant d'effectuer les opérations suivantes branchement ou débranchement d'un circuit de puissance, de signalisation ou autre.

Sira Certification Service Special conditions for safe use (denoted by 'X' after certificate No.)

1. The following table shows the maximum input parameters.

a	Sensycon I/P Converter:	I_i = 120 mA
b	4-20 mA terminals:	U_i = 42 V dc; I_i = 40 mA; C_o = 34 nF; L_o = 40 mH
c	Proximity switches:	U_i = 25 V

d Limit switch terminals:

TABLE 2-2 Maximum Input Parameters

Voltage (V)	Max. Current (A)	C_o (nF)	L_o (mH)
30	140	220	4
36.5	100	121	8
42	75	83	14
55	50	40	25

2.5.3 EEx ia

SPECIAL CONDITIONS FOR SAFE USE (denoted by 'X' after certificate No.)

1. The 'X' suffix to the certificate number is there to draw attention to the various permitted Temperature Classes and the non-standard ambient temperature ranges, as detailed on the following pages.

Certificate of Conformity SCSNo. Ex 97D2141X.

Temperature Classification

The Temperature Classification of the apparatus depends upon; the ambient temperature required, what configuration of component parts are fitted, and the electrical input parameters. The following tables describe the permutations permitted under the various conditions. The electrical parameters permitted for each piece of apparatus, in a particular maximum ambient temperature are shown as A, B, C, D, E and F and represent the following:

TABLE 2-3 Electrical Parameters

A	B	C	D	E	F
U_i = 30 V	U_i = 15.5 V	U_i = 30 V	I_i = 80 mA	I_i = 69 mA	I_i = 42.6 mA
I_i = 110 mA	I_i = 76 mA	I_i = 400 mA	P_i = 0.92 W	P_i = 0.63 W	P_i = 0.24 W
P_i = 0.78 W	P_i = 242 mW	P_i = 1.3 W			
C_i = 49 nF	C_i = 40 nF				
L_i = 20 µH	L_i = 35 µH				

The minimum ambient temperature is -40°C except when the proximity switches are fitted when it is reduced to -20° C.

TABLE 2-4 Temperature Class T4

TEMP. CLASS. T4		MAXIMUM AMBIENT TEMPERATURE ° C									
APPARATUS	TERMINAL BLOCK	85	80	75	70	65	60	55	50	40	PARAMETERS
SENSYCON I/P CONVERTER	CONVERTER TERMINALS	Ii = 100 mA	Ii = 120 mA	Ii = 120 mA	Ii = 150 mA	Ii = 150 mA	Ii = 150 mA	Ii = 150 mA	Ii = 150 mA	Ii = 150 mA	
4-20 mA PCB	TB1 1, 2, 3									A	
OR											
POTENTIOMETER	TB1 1, 2, 3		E	E	E	E	E	E	E	D	
PROXIMITY SWITCHES	TB2 1, 2, 3			B	B	B	B	B	B	B	
	TB2 4, 5, 6			B	B	B	B	B	B	B	
OR											
LIMIT SWITCHES	TB2 1, 2, 3	C	C	C	C	C	C	C	C	C	
	TB2 4, 5, 6	C	C	C	C	C	C	C	C	C	

TABLE 2-5 Temperature Class T5

TEMP. CLASS. T5		MAXIMUM AMBIENT TEMPERATURE ° C									
APPARATUS	TERMINAL BLOCK	85	80	75	70	65	60	55	50	40	PARAMETERS
SENSYCON I/P CONVERTER	CONVERTER TERMINALS					Ii = 60 mA	Ii = 60 mA	Ii = 60 mA	Ii = 100 mA	Ii = 120 mA	
4-20 mA PCB	TB1 1, 2, 3										
OR											
POTENTIOMETER	TB1 1, 2, 3		F	F	F	F	F	F	F	E	
PROXIMITY	TB2 1, 2, 3							B	B	B	
SWITCHES	TB2 4, 5, 6							B	B	B	
OR											
LIMIT	TB2 1, 2, 3	C	C	C	C	C	C	C	C	C	
SWITCHES	TB2 4, 5, 6	C	C	C	C	C	C	C	C	C	

TABLE 2-6 Temperature Class T6

TEMP. CLASS. T6		MAXIMUM AMBIENT TEMPERATURE ° C									
APPARATUS	TERMINAL BLOCK	85	80	75	70	65	60	55	50	40	PARAMETERS
SENSYCON I/P CONVERTER	CONVERTER TERMINALS							Ii = 50 mA	Ii = 60 mA	Ii = 60 mA	
4-20 mA PCB	TB1 1, 2, 3										
OR											
POTENTIOMETER	TB1 1, 2, 3									F	
PROXIMITY	TB2 1, 2, 3									B	
SWITCHES	TB2 4, 5, 6									B	
OR											
LIMIT	TB2 1, 2, 3		C	C	C	C	C	C	C	C	
SWITCHES	TB2 4, 5, 6		C	C	C	C	C	C	C	C	

Perform the following steps to install the Controller in a hazardous location. Note that barriers may not be needed in an installation.

1. Install Controller as detailed in the preceding sections.

2. Install energy limiting barriers in the non-hazardous area. Refer to the barrier manufacturer's instructions and to the appropriate connection diagram in the control drawing found in the back of this manual.

3. Install conduit for wiring to Controller. Install pull boxes as needed and remove burrs and sharp edges from conduit tubing.

4. Install wiring between Controller and barriers per the control drawing found in the back of this manual. Ground the Controller. A barrier must be grounded and the resistance to ground must not exceed 1 ohm.

5. Install the wiring between barriers and output terminals of the Controller driving device.

6. Check all signal and ground connections before applying power.

7. Proceed to Calibration section.

■

3.0 CALIBRATION

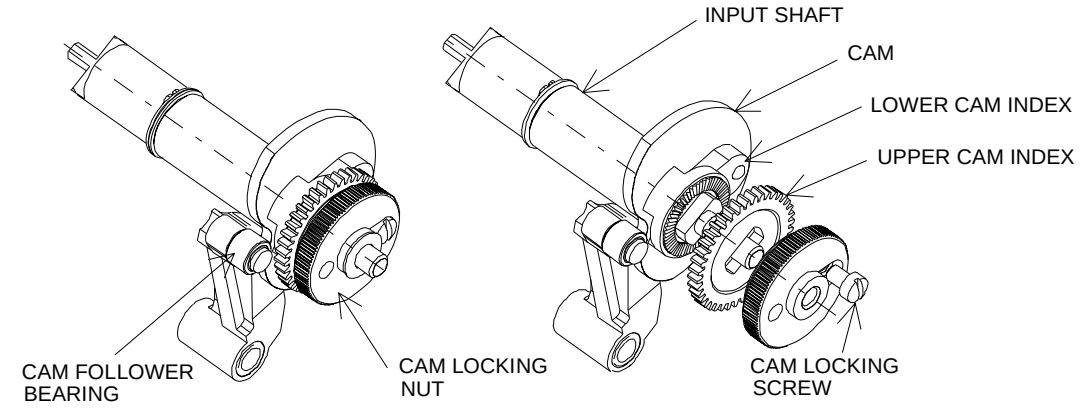
Calibrate a controller before placing it in service and after repair.

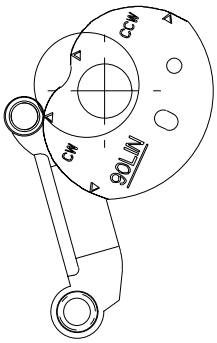
3.1 CAM INSTALLATION AND INDEXING

NOTE

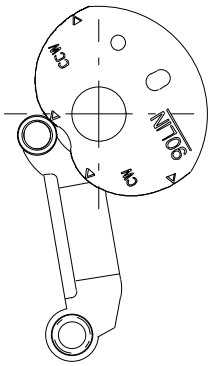
The 760 is shipped with the linear cam installed.

The controller must be mounted before proceeding with this section of the instructions. Use this procedure when changing





INDEXING OF CW CAM



INDEXING OF CCW CAM

the cam or cam lobe.

FIGURE 3-1A **FIGURE 3-1B**

FIGURE 3-1A and 3-1B Indexing of CW and CCW Cams

3.1.1 Cam Identification

Three cam profiles are available as standard. Letter designations are used on each cam for identification. The letters L, EP and QO designate the type of cam lobe profile [i.e., (L) linear, (EP) modified equal percentage, or (QO) quick opening]. The letters CW and CCW denote the lobe of the cam to be used depending on feedback shaft rotation for increasing input signal.

Figure 3-2 shows the standard cam characteristics.

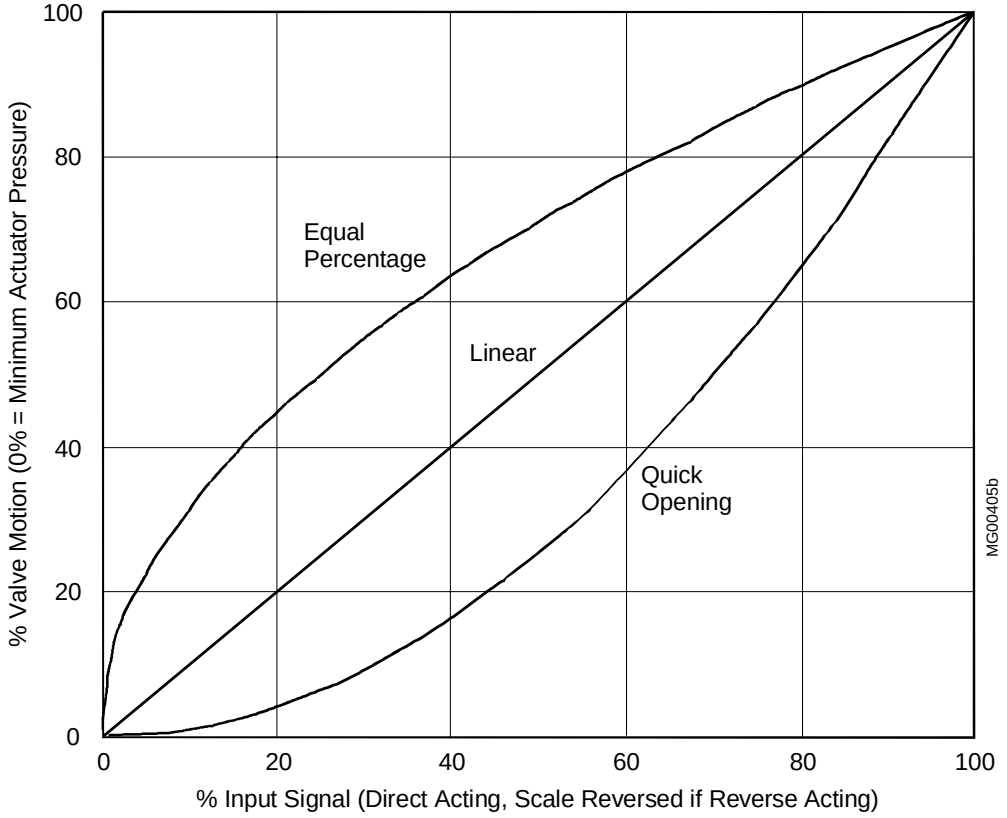


FIGURE 3-2 Standard Cam Characteristics

3.1.2 Procedure

NOTE

The cam is designed to allow 10% over/under-range (negative 9 degrees). However, if under range is used, the zero and span will be slightly interactive.

Refer to Figure 3-1A and 3-1B for Cam and associated hardware identification.

1. Remove cover.

2. Remove beacon indicator and extension shaft if installed (refer to Figure 4-2)

3. Loosen cam locking screw.

4. Loosen knurled cam locking nut.

4. Index cam as follows:
   a) Use the lobe marked CW for clockwise cam rotation with increasing input signal.
   b) Use the lobe marked CCW for counterclockwise cam rotation with increasing input signal.
   For the following steps, refer to Figure 3-1A when using the CW lobe of a cam or to Figure 3-1B when using the CCW lobe of a cam.
   Ensure that valve actuator is seated in the position corresponding to zero percent input signal.
   Carefully align minimum input index line on the cam with cam follower bearing.

5. Tighten knurled cam locking nut.

6. Tighten cam locking screw.

7. Proceed to section 2.4, Pneumatic Connections.

3.2 CALIBRATION EQUIPMENT NEEDED

TABLE 3-1 Calibration Equipment

ITEM	QUANTITY
Pressure regulator, adjustable from 0 to 30 psig (760P only)	1
Test gauge, 0 to 30 psig	1
Small slotted screwdriver	1
Current Source (4-20 mA) 760E only	1
Ammeter (4-20 mA) 760E only	1

NOTE

Elevating the zero and suppressing the span will provide more valve seating force. For example, setting the zero at 2% input and spanning at 98% input will assist the valve in closing tightly and opening fully.

Figure 3-3 locates the calibration adjustments.

3.2.1 Zero Adjustment

1. Apply supply pressure to controller (Supply pressure must not exceed the pressure rating of the actuator).

2. Set input signal to zero % (e.g.: 4 mA or 3 psig).

3. Loosen the zero lockscrew.

4. Turn the zero set screw (>0<) to achieve desired valve position.

5. Tighten zero lockscrew.

3.2.2 Span Adjustment

1. Set the input to 100% (e.g.: 20 mA or 15 psig).

2. Loosen the span lockscrew.

3. Turn the span set screw (|<->|) until the valve is at the desired position.

4. Tighten span lockscrew.

5. Set the input to zero %. Verify that the zero has not changed. Adjust as necessary.

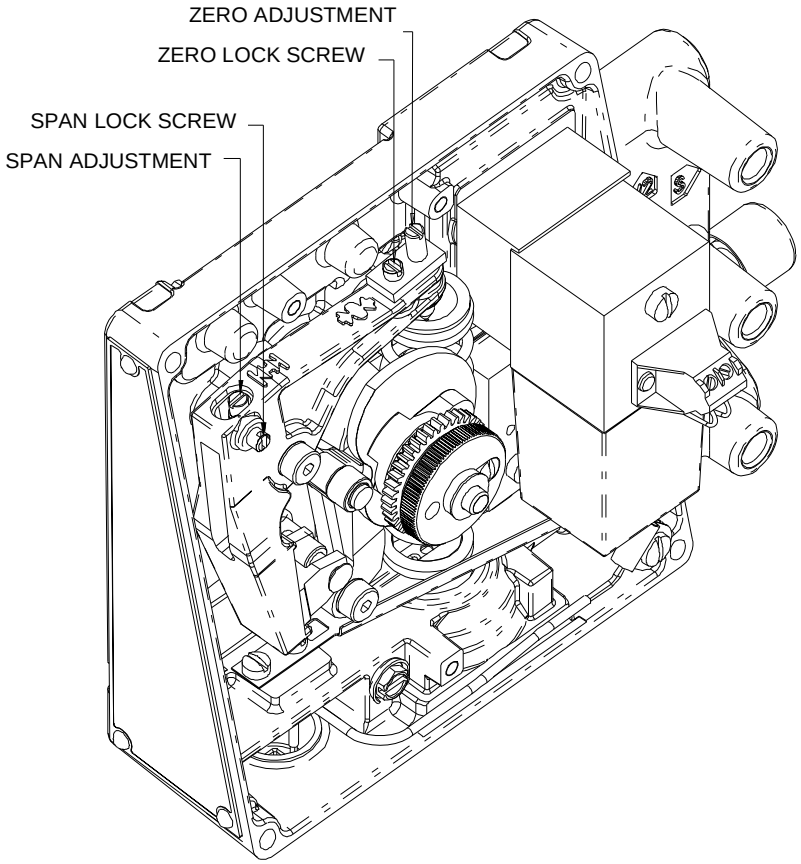


FIGURE 3-3 Calibration Adjustments

■

4.0 OUTPUT OPTIONS

Controller must be calibrated before proceeding. Refer to section 3.0.

4.1 INSTALLATION

CAUTION

The temperature in the intended operating location must not exceed the specified operating temperature limits as follows: Mechanical Limit switches -40°C to +85°C, Proximity Sensors -25°C to +85°C, 4-20 mA Feedback -40°C to +85°C, 1K Feedback -40°C to +85°C. For installations in hazardous locations adhere to guidelines of Control Drawing 15032-7602.

PC Board: All options are built off of a common circuit board platform.

The PC board is held in place by three #8-32 x 1/4" screws, mounted to hex standoffs. To install the board, first insert and tighten the three standoffs (two long, one short) into the three bosses as shown in Figure 4-1. Tighten to approx. 18 in-lb.

If the board includes either the 4-20 mA or 1K potentiometer feedback option, loosen the two mounting screws for the potentiometer bracket and rotate the bracket counter-clockwise (see Figure 4-6). This provides clearance while installing the board.

Mount the board to the three standoffs using the #8-32 x 1/4" screws provided.

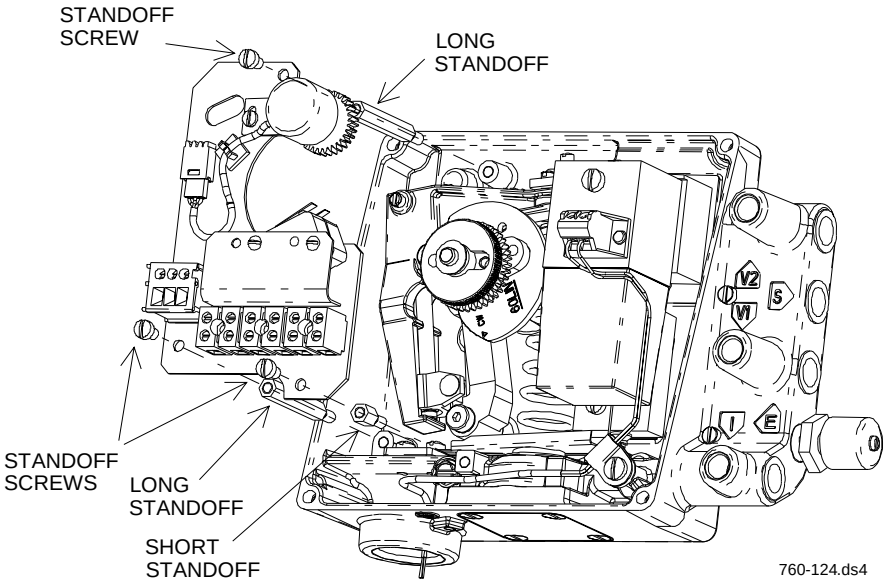


FIGURE 4-1 PC Board Installation

NOTE

The controller cam must be properly indexed and the unit calibrated before proceeding. Refer to Section 3.

If the board includes either of the limit switch options, install the extension shaft next.

Refer to the Figure 4-2 and place the compression washer onto the 1/4-20 threads of the input shaft. Then install and tighten the extension shaft until the compression washer is completely flat. Approx. 15 in-lb.

Spread the limit switch actuator cams by pinching the two tabs and slide them onto the extension shaft, one on top of the other as illustrated in Figure 4-2.

Align the two actuator cams with their respective switches.

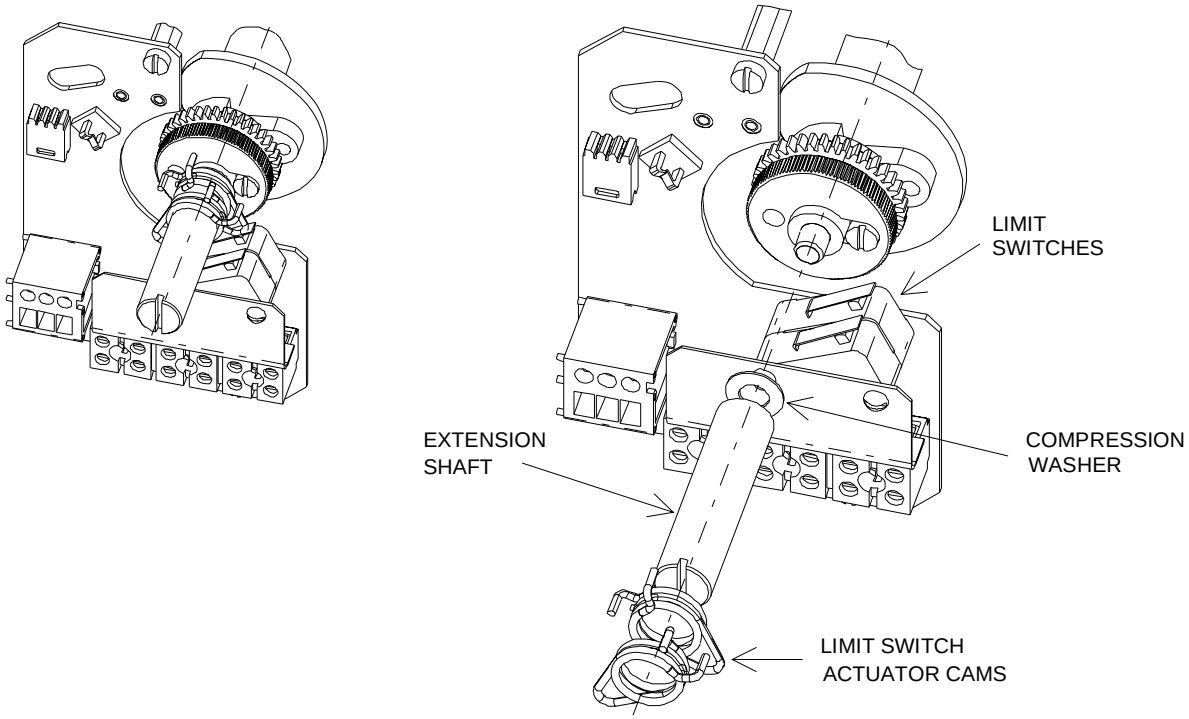


FIGURE 4-2 Mechanical Limit Switches

4.2 ELECTRICAL CONNECTIONS

Refer to Section 2.5 for installation in hazardous locations.

All wiring must be in accordance with applicable national and local electric codes for the intended circuit load.

The 4-20 mA Feedback option and the voltage feedback option will have to be calibrated before electrical connections are made.

4.2.1 Mechanical Limit Switches and Proximity Sensors

The mechanical limit switches are rated for 10A @ 125/250 VAC, 10A @ 24 VDC, 0.1A @ 125 VDC.

The switch connections for both the mechanical limit switches and the proximity sensors are accessed through a six pole terminal block. The terminal connections are labeled as shown in Table 4-1.

TABLE 4-1 Switch Terminal Block Connections

Terminal	Mechanical Switches	Proximity Sensors
1	Lower Switch N.C. (normally closed)	Lower Sensor "+"
2	Lower Switch N.O. (normally open)	--- Not Used ---
3	Lower Switch Com (common)	Lower Sensor "-"
4	Upper Switch N.C.	Upper Sensor "+"
5	Upper Switch N.O.	--- Not Used ---
6	Upper Switch Com	Upper Sensor "-"

CAUTION

The proximity sensors are not intended to carry load current - DO NOT WIRE SENSORS DIRECTLY TO ASSOCIATED APPARATUS.

The proximity switches must be used in conjunction with a switch transfer barrier. The barrier provides either dual transistor outputs or dual relay outputs depending on the model. In order to comply with intrinsic safety approvals, the Pepperl + Fuchs ® proximity switches must be used with an approved Pepperl + Fuchs ® switch transfer barrier. Refer to the model 760 Control Drawing, 15032-7602 (available upon request), for recommended approved barriers, specifications and wiring installation diagrams.

Follow instructions supplied with the barrier for correct wiring of the Proximity Sensors to the barrier.

4.2.2 4-20 mAdc Current Feedback Board Option

The 4-20 mA option connections are made through a three pole terminal block.
A DC loop power supply minimum 10 V, maximum 36 V must be used.
See chart in Figure 4 for a maximum loop load based on supply voltage.
The terminals labeled V1 and V2 are used for the 4-20 mA loop, V3 is not used.
Polarity is not important.
Recommended wiring is twisted shielded pairs, 22AWG or larger.
Refer to Control Drawing 15032-7602 for installation in hazardous locations.

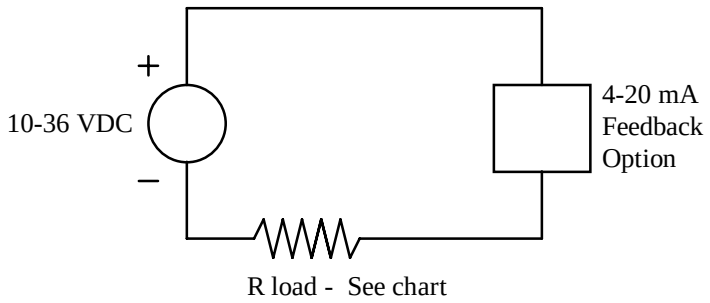


FIGURE 4-3 Typical 4-20 mA Feedback Option Loop with Load

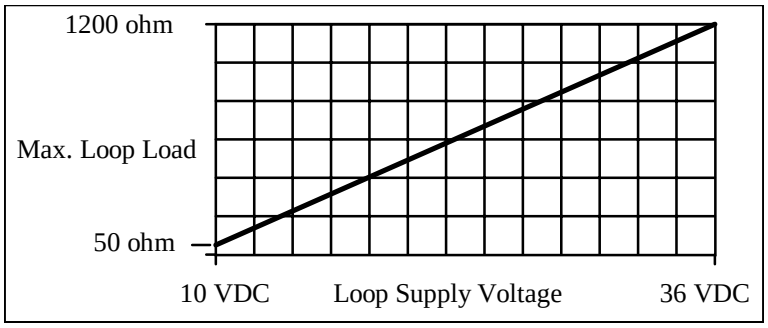


FIGURE 4-4 Maximum Loop Load vs. Loop Supply Voltage

4.2.3 1K Potentiometer Feedback Option

The potentiometer is rated 1 Watt @ 70°C. Do not exceed 32 mA or 32 Volts.
The 1K Feedback option connections are made through a three pole terminal block.
The terminal connections V1, V2, and V3 are detailed in Figure 4-5.

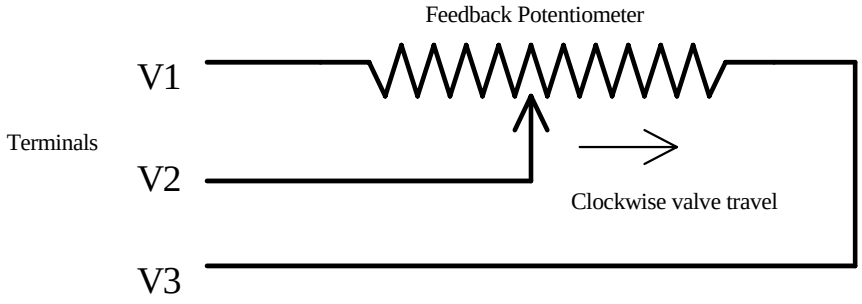


FIGURE 4-5 1K Feedback Potentiometer Schematic

For voltage feedback, connect reference voltage to terminals V1 and V3, and use V2 to measure output voltage.

4.3 CALIBRATION

4.3.1 Mechanical Limit Switches and Proximity Sensors

Install the board with the switches as described above.

With valve and actuator at first desired limit position, squeeze the tabs on one of the cams, and rotate in the direction of valve rotation until the switch triggers. Set valve and actuator at second desired limit position, squeeze the tabs on the second cam, and rotate in the direction of valve rotation until the switch triggers.

4.3.2 4-20 mAdc Current Feedback Board Option

Equipment needed.

TABLE 4-2 Equipment Needed

Item	Quantity
Ammeter	1
Jeweler's Screwdriver	1
Small Slotted Screwdriver	1

Set actuator and valve to 50% +/- 5%. The potentiometer is a continuous turn potentiometer without end stops so you need not worry about damage from rotating past the end of it's range.

Loosen, but do not remove, the potentiometer bracket screws. Swing the potentiometer away from the input gear, and rotate the potentiometer gear until the alignment mark is aligned with the input gear. See Figure 4-6.

Mesh gears lightly to eliminate backlash and tighten bracket mounting screws. The alignment mark should mesh within two gear teeth of the centerline of the gears as illustrated in Figure 4-6.

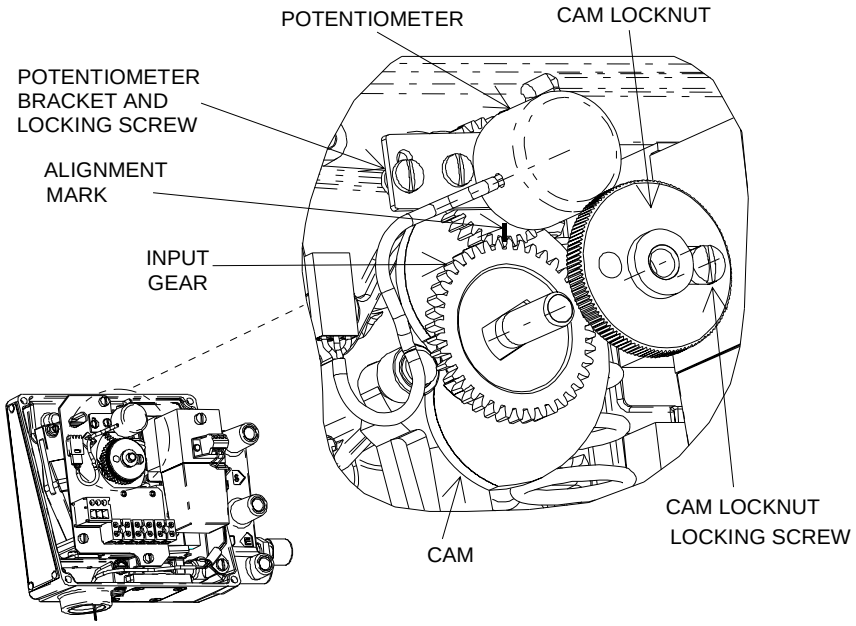


FIGURE 4-6 Potentiometer Gear Bracket Alignment

The 4-20 mA feedback action is determined by a switch on the circuit board. Set switch position for reverse or direct acting according to Table 4-3.

TABLE 4-3 Switch Position for Reverse or Direct Action

Switch Position	Shaft Rotation for 4-20 mA Output
1	CW
2	CCW

For example, while looking at the front of the 760 controller, if you want the output to increase from 4 mA to 20 mA as the input shaft rotates CCW, then the switch should be set to position 2.

Connect a loop power supply with an ammeter in series to terminals V1 and V2 as in Figure 4-7. (Polarity not important.)

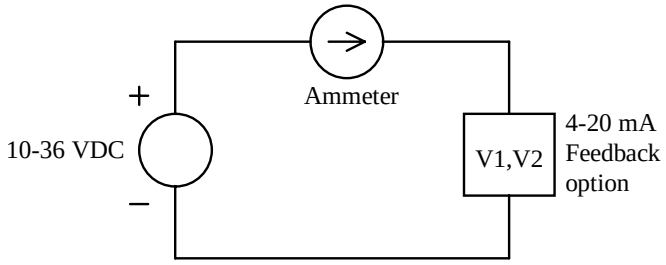


FIGURE 4-7 4-20 mA Loop Calibration

Set valve to the desired 4mA position.

Set 4 mA output with the trimpot labeled BIAS.

Set valve to the desired 20 mA output position.

Set 20 mA output with trimpot labeled SPAN.

Rotate the input shaft back to the 4 mA position and verify that the zero position output has not changed. Adjust as necessary with the BIAS trimpot.

4.3.3 1K Potentiometer Feedback Option

Equipment needed.

TABLE 4-4 Equipment Needed for 1K Feedback Potentiometer Option

Item	Quantity
Ohm-meter	1
Small Slotted Screwdriver	1

Set actuator and valve to 50% +/- 5%. The potentiometer is a continuous turn potentiometer without end stops so you need not worry about damage from rotating past the end of it's range.

Loosen, but do not remove, the potentiometer bracket screws. Swing the potentiometer away from the input gear, and rotate the potentiometer gear until the alignment mark is aligned with the input gear. See Figure 4-6.

Mesh gears lightly to eliminate backlash and tighten bracket mounting screws. The alignment mark should mesh within two gear teeth of the centerline of the gears as illustrated in Figure 4-6.

Each tooth on the potentiometer gear represents 128 ohms of potentiometer resistance. Set valve to 0% position and check resistance between V2 and V1, and between V2 and V3 with ohmmeter. One of these two readings will be high, and one will be low. If low end resistance is less than 0 ohms (false reading) or greater than 130 ohms, disengage and rotate the potentiometer gear by one tooth until the resistance is between 0 and 130 ohms.

Direct or reverse acting - resistive feedback:

Use Table 4-5 to determine correct terminal connections for intended use. For example, if you want the resistance to increase with clockwise input shaft travel (Direct CW), connect to terminals V1 and V2.

TABLE 4-5 Connections for 1K Feedback Option

Action	Direction of Input Shaft Travel	Use these terminals
Direct	CW	V1, V2
Direct	CCW	V2, V3
Reverse	CW	V2, V3
Reverse	CCW	V1, V2

4.4 INDICATORS

4.4.1 Beacon Indicator

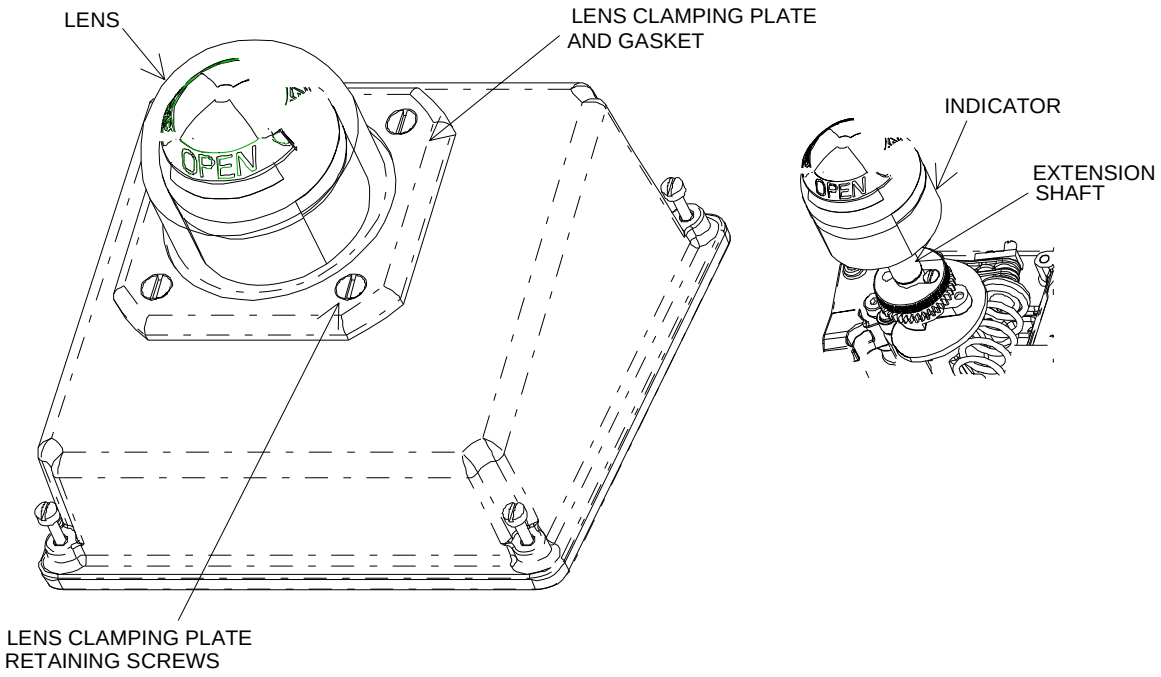


FIGURE 4-8 Beacon Indicator

Use the following procedure to re-install the Beacon Indicator after the unit has been calibrated:

1. Place the compression washer onto the 1/4-20 male threads of the input shaft. Screw the extension shaft onto the input shaft. Tighten the extension shaft until the compression washer is completely flat (approximately 15 in-lb.).

2. Carefully press the indicator onto the top of the extension shaft.

3. Apply the minimum input signal (3 psi or 4 mA) to the valve controller.

4. Rotate the indicator as appropriate.

5. Reinstall cover.

6. Check that the correct message, “OPEN” or “CLOSED” appears in all the windows.

4.4.2 Flat Indicator

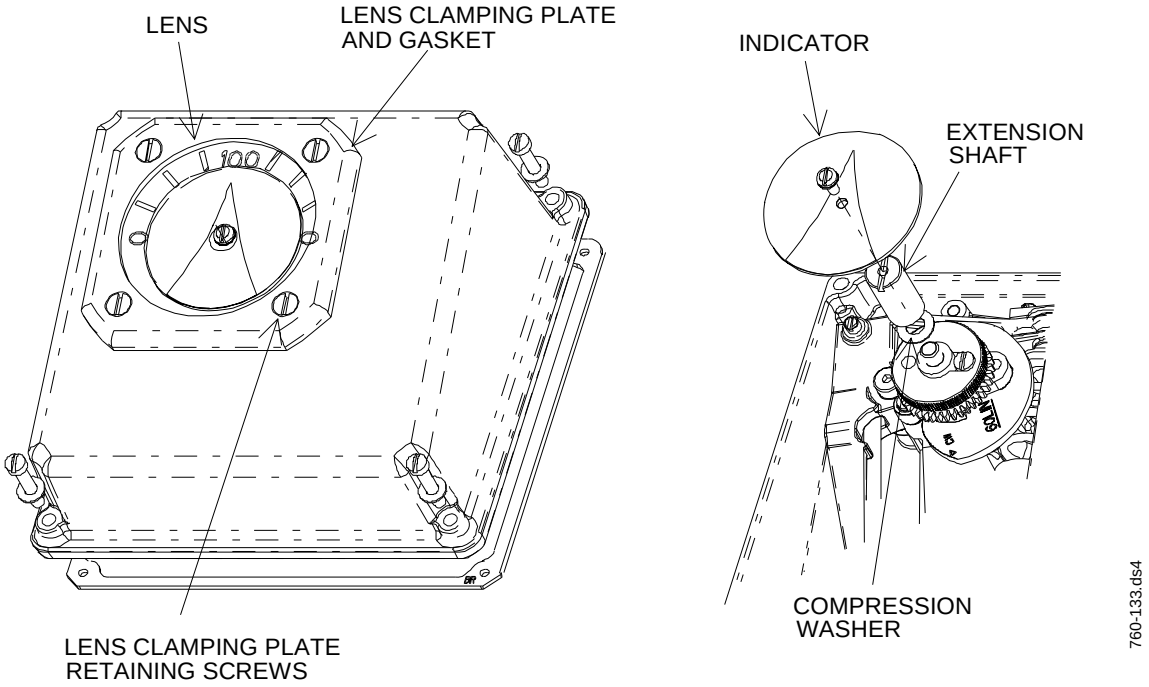


FIGURE 4-9 Flat Indicator

Use the following procedure to re-install the Flat Indicator after the unit has been calibrated:

1. Place the compression washer onto the 1/4-20 male threads of the input shaft. Screw the extension shaft onto the input shaft. Tighten the extension shaft until the compression washer is completely flat (approximately 15 in-lbs.).

2. Install the indicator onto the top of the extension shaft. Install hold down screw but do not tighten.

3. Apply the minimum input signal (3 psi or 4 mA) to the valve controller.

4. Rotate the indicator as appropriate. Tighten hold down screw.

5. Re-install cover.

6. Check that the indicator appears in the proper position.

4.5 I/P CONVERTER

4.5.1 Wiring

See Section 2.5 for general and hazardous location wiring requirements.

1. Attach the input leads (recommend 22 AWG shielded, twisted pair wire minimum) to the + and - connections of the I/P converter terminal strip. The wire should enter the controller through the conduit connection and be routed through the wire clamp.

2. Attach the wire clamp with its screw.

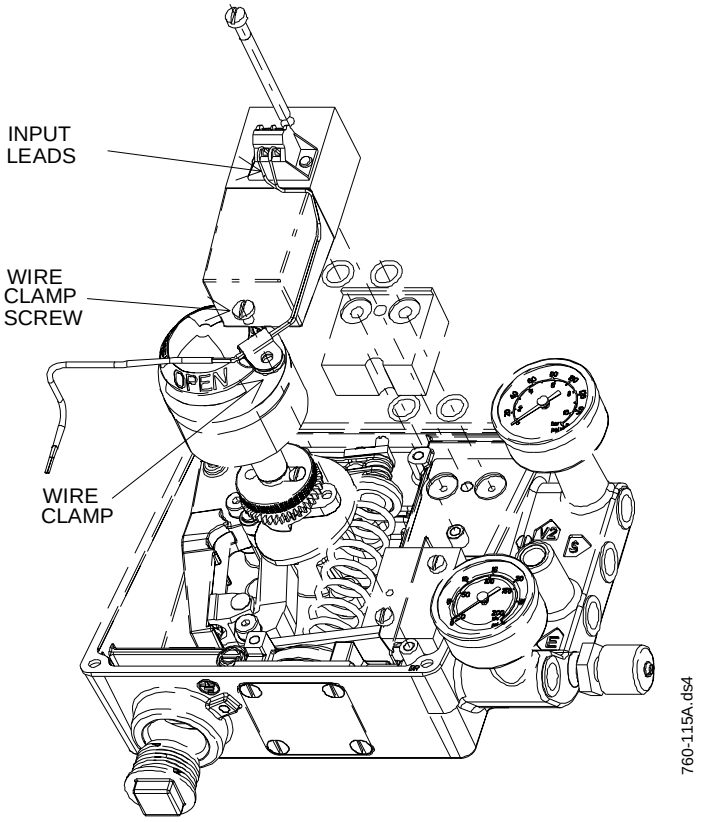


FIGURE 4-10 Wiring for I/P Converter

4.5.2 Calibration

It is not necessary to calibrate the I/P transducer; however, calibration adjustments are available. The I/P transducer can be adjusted by following the procedure outlined below. The I/P accepts a 4-20 mA signal.

Verify the output of the I/P converter as follows:

1. Connect a 0-30 psi test gauge to the 1/8 in. NPT input connection.

2. Apply supply pressure to the supply connection.

3. Apply a 4 mA input signal. Any deviation in the output signal from 3 psi can be corrected with the zero adjustment screw (>0<).

4. Increase the input signal to 20 mA. Any deviation in the output signal from 15 psi can be corrected with the range potentiometer (|<->|).

Perform the valve controller zero and span functions as described in Section 3.0 (Calibration).

4.6 OUTPUT CAPACITY SPOOL KITS

1. Remove I/P Transducer if so equipped.

2. Remove spool block retaining clip.

3. Remove spool block retaining screws.

4. Remove spool block assembly being careful not damage the gasket. Leave gasket in place on the enclosure.

5. Place spool block assembly in a clean area.

6. Remove new spool from container and insert into top of new spool block with the long journal end in first. Spool block should be orientated with the vent hole to the left side as shown in illustration on back page.

7. Position spool block assembly into enclosure and secure with retaining screws. Tighten retaining screws to 20 in. lbs. of torque.

8. Engage bottom end of spool retaining clip into bronze bushing in underside of beam assembly. Insert top end of spool retaining clip into countersink on end of spool at top of spool block.

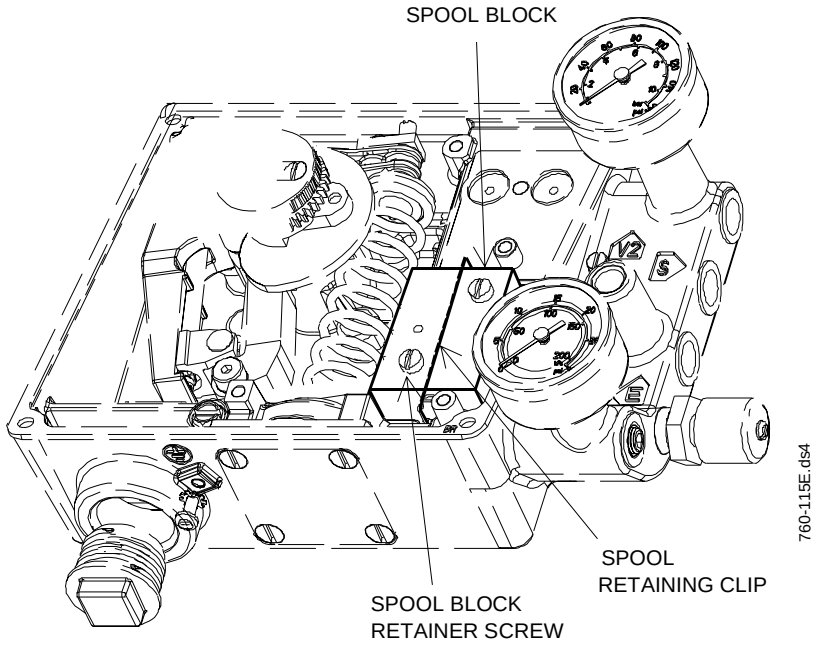


FIGURE 4-11 Output Capacity Spool Kit

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5.0 MAINTENANCE

The Controller requires no routine maintenance. It is highly recommended that quality instrument air be used as described in section 2.2.2 Instrument Air Requirements.

The filter screens may require periodic cleaning. The frequency of their cleaning is conditional depending on the quality of instrument air used.

It is also recommended that the end user perform periodic functionality tests in accordance with the critical nature of the application.

5.1 FILTER SCREENS

Filter screens are located in the V1, V2, and supply ports. Refer to the Parts List at the back of this Instruction.

1. Turn air supply off.

2. Remove a screen with a scribe by carefully pulling on and around the edge of a screen.

3. Insert a new screen until it bottoms using an object, such as the eraser end of a pencil, that will not cause damage.

5.2 SPARE AND REPLACEMENT PARTS

Refer to the parts list at the back of this Instruction for a list of replacement parts and an exploded view. Spare and replacement parts are available from any of the addresses in the warranty statement. Refer to the parts list for recommended on-hand spare parts.

5.3 RETURN FOR REPAIR

To Return for Repair

Call the Service Department at (215) 646-7400, ext. 4RMA (4762) weekdays between 8:00 a.m. and 4:45 p.m. Eastern Time to obtain an RMA (Return Material Authorization) number. Mark the RMA number prominently on the outside of the shipment.

When calling for an RMA number, provide the reason for the return. If returning equipment for repair, failure information (e.g., error code, failure symptom, installation environment) will be requested. A purchase order number will also be needed.

Material Safety Data Sheet

A Material Safety Data Sheet (MSDS) must be included with each item being returned that was stored or used where hazardous materials were present.

Packaging

Package assembly in original shipping materials. Otherwise, package it for safe shipment or contact the factory for shipping recommendations.

The 4-20mA Feedback Option Board must be placed inside a static shielding bag to protect it from electrostatic discharge if returned separately.

WARRANTY

(a) Seller warrants that on the date of shipment the goods are of the kind and quality described herein and are free of non-conformities in workmanship and material. This warranty does not apply to goods delivered by Seller but manufactured by others.

(b) Buyer's exclusive remedy for a nonconformity in any item of the goods shall be the repair or the replacement (at Seller's option) of the item and any affected part of the goods. Seller's obligation to repair or replace shall be in effect for a period of one (1) year from initial operation of the goods but not more than eighteen (18) months from Seller's shipment of the goods, provided Buyer has sent written notice within that period of time to Seller that the goods do not conform to the above warranty. Repaired and replacement parts shall be warranted for the remainder of the original period of notification set forth above, but in no event less than 12 months from repair or replacement. At its expense, Buyer shall remove and ship to Seller any such nonconforming items and shall reinstall the repaired or replaced parts. Buyer shall grant Seller access to the goods at all reasonable times in order for Seller to determine any nonconformity in the goods. Seller shall have the right of disposal of items replaced by it. If Seller is unable or unwilling to repair or replace, or if repair or replacement does not remedy the nonconformity, Seller and Buyer shall negotiate an equitable adjustment in the contract price, which may include a full refund of the contract price for the nonconforming goods.

(c) SELLER HEREBY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, EXCEPT THAT OF TITLE.

SPECIFICALLY, IT DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR

PURPOSE, COURSE OF DEALING AND USAGE OF TRADE.

(d) Buyer and successors of Buyer are limited to the remedies specified in this article and shall have no others for a nonconformity in the goods. Buyer agrees that these remedies provide Buyer and its successors with a minimum adequate remedy and are their exclusive remedies, whether Buyer's or its successors' remedies are based on contract, warranty, tort (including negligence), strict liability, indemnity, or any other legal theory, and whether arising out of warranties, representations, instructions, installations, or non-conformities from any cause.

(e) Note: This article does not apply to any software which may be furnished by Seller. In such cases, the attached Software License Addendum applies.

■

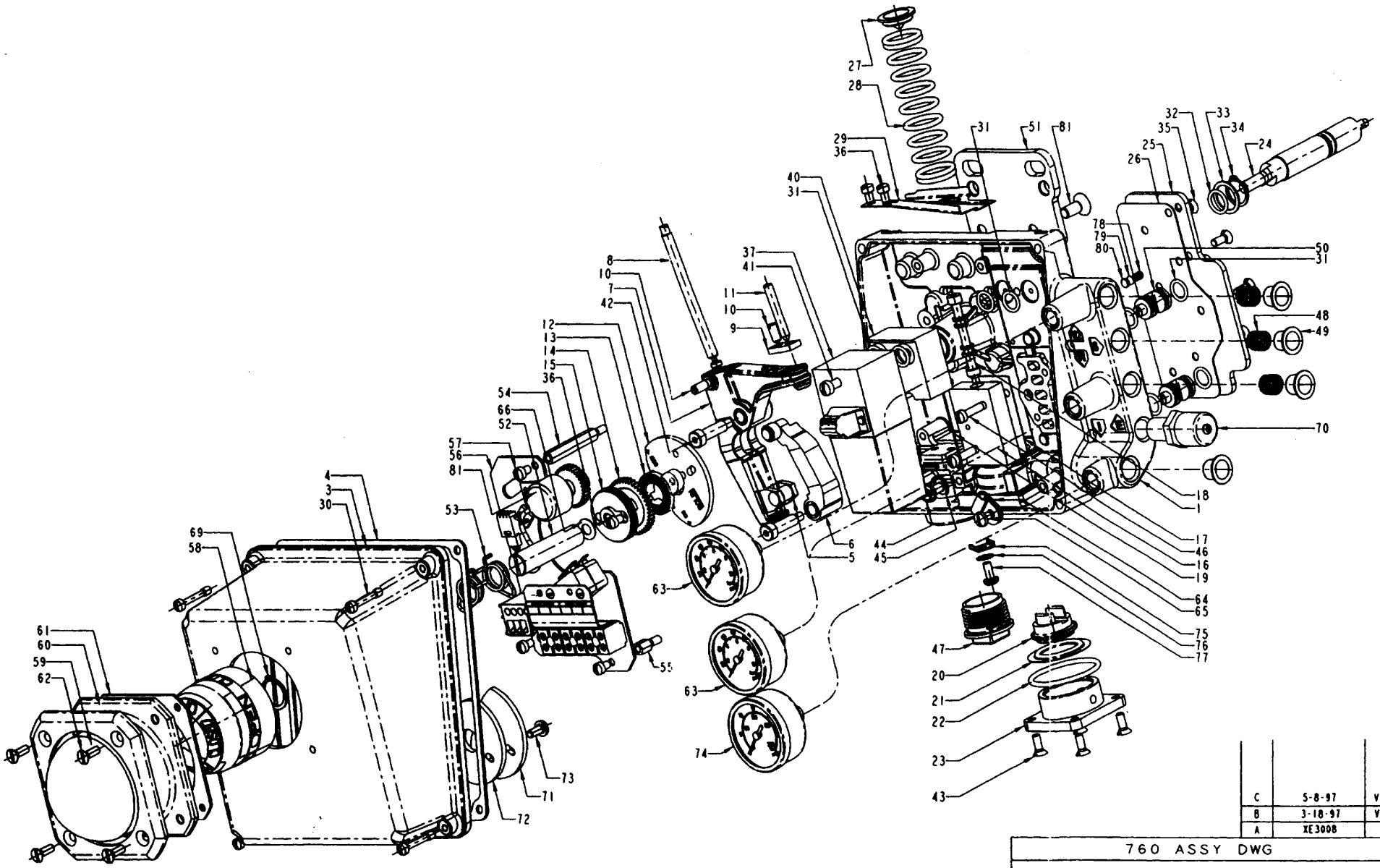
MOORE

SERIES 760 VALVE CONTROLLER

ITEM NO.	PART NO.	DESCRIPTION	QUANTITY
1a	16300-521	Enclosure Base, Std. (3/4 NPT Conduit)	1
1b	16300-525	Enclosure Base, Opt., for Speed Adjusters (3/4 NPT Conduit)	1
1c	16300-104	Enclosure Base, Std. (M25 Conduit)	1
1d	16300-106	Enclosure Base, Opt. for Speed Adjusters (M25 Conduit)	1
2	16300-56	Sleeve Bearing	1
3a	16300-531	Enclosure Cover, Std.	1
3b	16300-533	Enclosure Cover for Beacon Indicator	1
4	16300-332	Cover Gasket	1
5	16300-344	Sled Assembly	1
6	16300-225	Cam Follower Assembly	1
7	16300-368	Lever Assembly	1
8	16300-336	Span Adjusting Screw	1
9	16300-57	Zero Lock Block	1
10a	1-5845	Screw, 10-32 x 1/2 Lg., Slotted Cone Point	2
10b	1-1822	Screw, 8-32 x 1/4 Lg., Fillister Head	1
11	16300-129	Span Adjusting Screw	1
12a	16300-60	Cam, Linear, Rectilinear Input	1
12b	16300-63	Cam, Linear, Rotary Input	1
13	16300-68	Lower Cam Index	1
14	16300-69	Upper Cam Index	1
15	16300-70	Cam Lock Knob	1
16a	16300-54	Spool Block, Std. Capacity	1
16b	16300-55	Spool Block, Hi-Capacity	1
16c	16300-153	Spool Block, Lo-Capacity	1
17a *	16300-251	Gasket, Std., Neoprene/Nylon	1
17b *	16300-239	Gasket, Opt., Fluorosilicone/Dacron	1
18a	16300-45	Spool, Std. & Lo-Capacity	1
18b	16300-46	Spool, Hi-Capacity	1
19 *	16300-241	Spool Clip	1
20	16300-327	Diaphragm Stud	1
21 *	16300-47	Diaphragm, Neoprene/Nylon	1
22 *	2938-69	O-Ring	1
23	16300-227	Booster Cover	1
24a	16300-406	Input Shaft, Square Rotary	1
24b	16300-409	Input Shaft, NAMUR Rotary	1
24c	16300-443	Input Shaft, Rectilinear 2”	1
24d	16300-447	Input Shaft, Rectilinear 4”	1
24e	16300-448	Input Shaft, Rectilinear 6”	1
25	16300-231	Manifold Plate	1
26	16300-232	Block Manifold Gasket	1
27	16300-141	Spring Seat	1
28	16300-331	Spring, 3-15 psig	1
29	16300-80	Beam Assembly	1
30	3175-223	Cover Screw	4
31 *	2938-136	O-Ring, Opt. Speed Adjusters	4
32 *	2938-217	O-Ring, Std.	1
33	16300-429	Washer	1
34	4658-11	Retaining Ring	1
35	1-1905	Screw, 8-32 x 7/16 Lg., Flat Head	6
36	1-1822	Screw, 8-32 x 1/4 Lg., Fillister Head	1
37*	16300-354	I/P Converter (760E only)	1
40a	16300-211	Manifold Plate, 760P	1
40b	16300-334	Manifold Block, 760E	1

ITEM NO.	PART NO.	DESCRIPTION	QUANTITY
41a	1-2355	Screw, (760P) 10-32 x 3/8 Lg., Binding Head	1
41b	1-2830	Screw, (760E) 10-32 x 2 1/4 Lg., Binding Head	1
42	3175-280	Beam Screw	2
43	1-1905	Screw, 8-32 x 7/16 Lg., Flat Head	4
44	1-2364	Screw, 10-32 x 3/8 Lg., Slotted Hex. Washer Head	1
45	12334-138	Washer	1
46	1-2000	Screw, 8-32 x 3/4 Lg., Binding Head	2
47	16300-92	Shipping Plug	1
48	1604-41	Shipping Plug	4
49	2155-225	Filter Screen	4
50	16300-233	Speed Adjusters w/16300-525 Enclosure	2
51	16300-79	Adapter Plate with screws	1
52a	16300-404	Shaft Extension, Opt., (for Alarms w/o Indicator)	1
52b	16300-405	Shaft Extension, Opt., (for Beacon Indicator)	1
53	16300-246	Limit Switch Actuator Cams	2
54	16300-109	Screw Standoff, Long (for Optional PC Board)	2
55	16300-197	Screw Standoff, Short (for Optional PC Board)	1
56a	16310-21	Opt. Limit Switches & 4-20 mAdc Feedback Circuit Board	1
56b	16310-22	Opt. Limit Switches & 1K Feedback Pot. Circuit Board	1
56c	16310-23	Opt. Proximity Switches & 4-20 mAdc Feedback Circuit Board	1
56d	16310-24	Opt. Proximity Switches & 1K Feedback Pot. Circuit Board	1
56e	16310-25	Opt. 4-20 mAdc Feedback Circuit Board	1
56f	16310-26	Opt. 1K Feedback Pot. Circuit Board	1
56g	16310-27	Opt. Limit Switches Circuit Board	1
56h	16310-28	Opt. Proximity Switches Circuit Board	1
57	1-1822	Screw, 8-32 x 1/4 Lg., Fillister Head	3
58	16300-49	Beacon Indicator	1
59	16300-52	Beacon Lens	1
60	16377-87	Beacon Retaining Plate	1
61	16300-86	Lens Gasket	1
62	1-1924	Screw, 8-32 x 1/2 Lg., Flat Head	4
63	12444-2	Gauge, 0-160 psig	2
64	9105-8	Clamp (760E)	1
65	1-1820	Screw (760E) 8-32 x 1/4 Lg., Binding Head	1
66	14418-7	Washer	1
67	5-819	Beacon Upper Label	1
68	5-820	Beacon Lower Label	1
69	4658-12	Retaining Ring	1
70a	16300-538	NEMA 3R Vent, Std.	1
70b	16161-110	NEMA 4X Vent, Opt.	1
71a	16300-62	Cam, Equal Percentage, Rectilinear Input Shaft	1
71b	16300-65	Cam, Equal Percentage, Rotary Input Shaft	1
72a	16300-61	Cam, Quick Opening, Rectilinear Input Shaft	1
72b	16300-64	Cam, Quick Opening, Rotary Input Shaft	1
73	1-1865	Screw, 8-32 x 3/8 Lg., Binding Head	1
74	12444-1	Gauge, 0-30 psig	1
75	20027-299	Star Washer	1
76	1-7268	Lockwasher, #8, Ext. Tooth	1
77	3175-264	Screw	1
78	6937-26	Spring	1
79	16300-34	Disc	1
80	16300-35	Disc	1
81	1-3256	Screw, 1/4-20 x 1/2 Lg., Flat Socket Head Cap	2

* Recommended on-hand spare part. Include nameplate information when ordering.



C	5-8-97	VDB
B	3-18-97	VDB
A	XE3008	

760 ASSY DWG

VDB	3-17-97	1/2X	16300-125

DECLARATION OF CONFORMITY

according to EN 45014

We

Moore Products Co.
Sumneytown Pike, Spring House, PA 19477

declare under our sole responsibility that the product,

Model 760E, Valve Positioner with any factory installed options and in any configuration available from the factory

to which this declaration relates is in conformity with the following standards or other normative documents

EMC: EN50081-1 and EN50081-2 Emissions
EN50082-1 and EN50082-2 Immunity

following the provisions of the EMC directive

Spring House, PA U. S. A.

Date: 12/15/97

Steven F. Close
Manager of Engineering and Marketing
Industrial Products Division

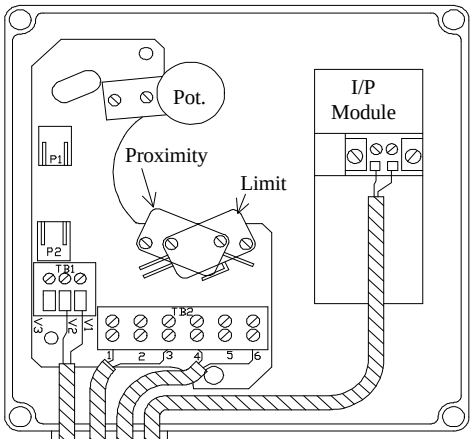
Safe Area

1. Refer to the "model number" label located under the cover in order to identify the configuration of 760 Valve Controller in terms of options it is equipped with. Follow thereafter the installation instructions below for the particular 760 Valve Controller configuration.
2. After selecting the configurations of the intrinsically safe loops for the particular configuration of 760 Valve Controller, refer to Sheet 2 of this Control Drawing to determine the Temperature Code of Controller.

Warning:
Failure to follow the above instructions may impair suitability of 760 Valve Controller for use in Hazardous Locations

Hazardous (Classified) Location

Class I, Division 1, Groups A, B, C, D
Class II, Division 1, Groups E, F, G
Class III, Division 1



Installation Instructions:

1. If 760 Valve Controller is equipped with 4-20 mA feedback option, refer to the sheet 3 of 13 of this control drawing.
2. If 760 Valve Controller is equipped with Potentiometer (1K) option, refer to the sheets 4 to 7 of 13 of this control drawing.
3. If 760 Valve Controller is equipped with Limit Switch #1 option, refer to the sheets 8 to 11 of 13 of this control drawing.
4. If 760 Valve Controller is equipped with Proximity Switch #1 option, refer to the sheet 12 of 13 of this control drawing.
5. If 760 Valve Controller is equipped with Limit Switch #2 option, refer to the sheets 8 to 11 of 13 of this control drawing.
6. If 760 Valve Controller is equipped with Proximity Switch #2 option, refer to the sheet 12 of 13 of this control drawing.
7. If 760 Valve Controller is equipped with I/P option, refer to the sheet 13 of 13 of this control drawing.

Certification Agency Controlled Document
No Changes Allowed Without Reference to the Appropriate Certifying Agency

General Intrinsically Safe Installation Notes

1) Shielded Cable is required and the shield shall be connected as shown. The unterminated end of the shield shall be insulated.
2) The series 760 Valve Controller shall not be connected to, under normal or abnormal conditions, a source of supply that exceeds 250 Vrms or 250 Vdc with respect to earth ground.
3) The user is responsible for compatibility and approval of the user provided associated apparatus.
4) Entity installation requirements (where applicable): $V_{max} \geq V_{oc}$; $I_{max} \geq I_{oc}$; $C_a \geq C_i + C_{cable}$; $L_a \geq L_i + L_{cable}$.
5) Installation must be in accordance with applicable electrical codes, refer to ISA RP12.6 for guidance.
6) Caution: use cables suitable for 5° C above surrounding ambient.
7) These instructions are provided for conformance with FM and CSA Certifications only.

Notes for Installation in Division 2 Locations

1) Limit switches and potentiometers must be installed as intrinsically safe (with barriers). See sheets 8 to 11 for limit switches or sheets 4 to 7 for potentiometer installation notes.
2) Caution: use cables suitable for 5° C above surrounding ambient.

Rev	Date	Details	Approved
2	9 Oct. 97	As Certified	J. Sweeney
3	19 Feb. 98	As FM Approved	J. Sweeney
4	20 April 98	Minor corrections	J. Sweeney

Title

Control Drawing for Series 760 Valve Controller

Moore Products Co.
Spring House PA, USA 19477

Drawing No.

15032-7602

Temperature Code and Ambient Temperature Range for Series 760 Valve Controller

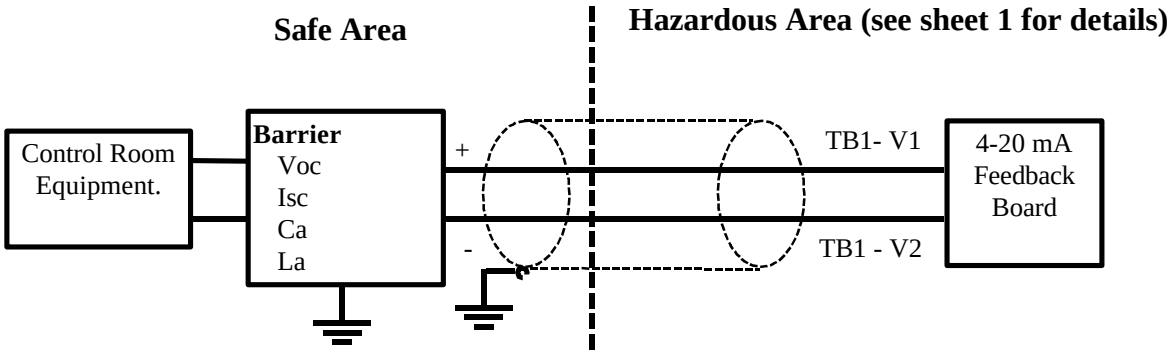
Determine the options that have been installed in your Series 760 Valve Controller by checking the label that is under the cover. Compare the option(s) installed to Table 1 to determine Model 760 Temperature Code and Ambient Temperature Range.

Table 1: Determination of Temperature Code and Permissible Ambient Temperature Range

Option or Combination of Options:	**Temperature Code**	**Ambient Temperature Range**
4-20 mA Feedback Option	T3C	-40°C to +85°C
4-20 mA Feedback and Limit Switch #1 and #2	T3C	-40°C to +85°C
4-20 mA Feedback and Proximity Switch #1 and #2	T3C	-25°C to +85°C
4-20 mA Feedback and I/P Module	T3C	-40°C to +75°C
4-20 mA Feedback and Limit Switch #1 and #2 and I/P Module	T3C	-40°C to +75°C
4-20 mA Feedback and Proximity Switch #1 and #2 and I/P Module	T3C	-25°C to +75°C
Potentiometer Option	None	-40°C to +85°C
Potentiometer and Limit Switch #1 and #2	None	-40°C to +85°C
Potentiometer and Proximity Switch #1 and #2	None	-25°C to +85°C
Potentiometer and I/P Module	T3C	-40°C to +75°C
Potentiometer and Limit Switch #1 and #2 and I/P Module	T3C	-40°C to +75°C
Potentiometer and Proximity Switch #1 and #2 and I/P Module	T3C	-25°C to +75°C
Limit Switch #1 and #2	None	-40°C to +85°C
Limit Switch #1 and #2 and I/P Module	T3C	-40°C to +75°C
Proximity Switch #1 and #2	None	-25°C to +85°C
Proximity Switch #1 and #2 and I/P Module	T3C	-25°C to +75°C
I/P Module	T3C	-40°C to +75°C

4-20 mA Feedback Board Installation

4-20 mA Feedback Board Intrinsically Safe Installation



Barrier must be CSA Certified and FM Approved single channel grounded shunt - diode Zener Barrier or single channel Isolating Barrier

Entity Installation requirements:

Vmax or Vt ≥ Voc, Imax or It ≥ Isc,
Ca ≥ Ci + C cable, La ≥ Li + Lcable

4-20 mA Feedback Board Entity Parameters:

Vmax, or Vt	Imax, It	Ci	Li
30 V	225 mA	49 nF	44 uH

4-20 mA Feedback Board Division 2 FM Approved and CSA Certified:

Maximum Voltage:	42 V
Current:	4 - 20 mA

4-20 mA Feedback Board Ambient Temperature Range: See Sheet 2 of 13

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4	20 April 98	Minor corrections	J. Sweeney

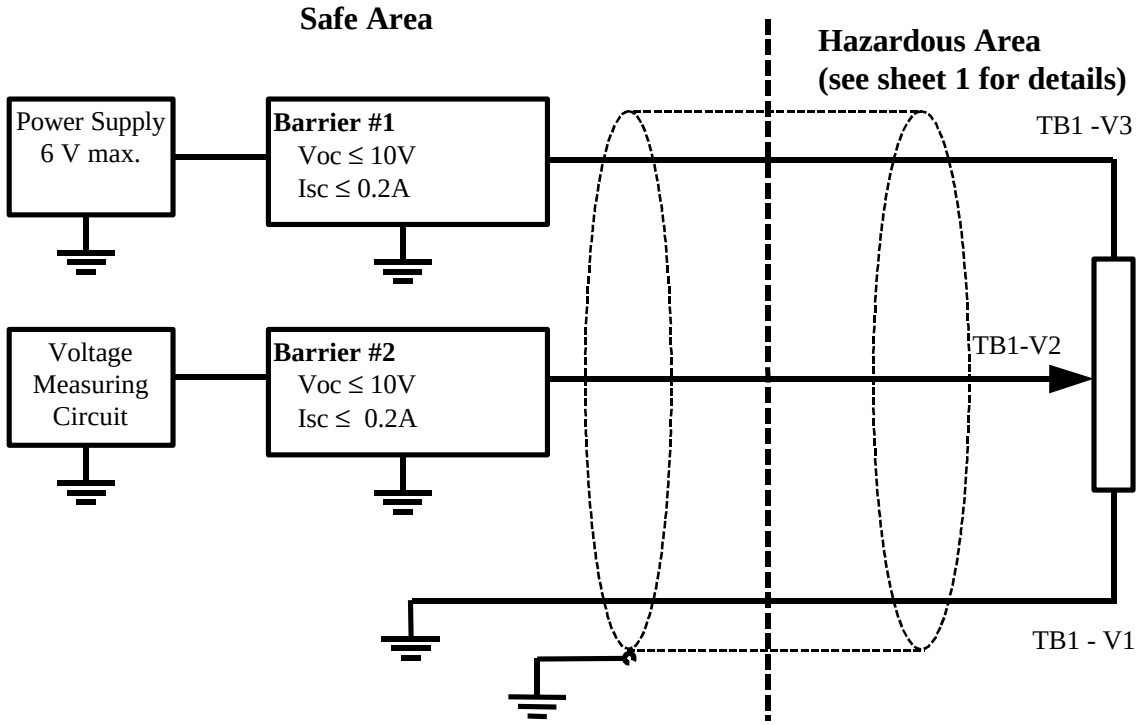
Moore Products Co.
Spring House PA, USA 19477

Title
Control Drawing for
Series 760 Valve Controller

Drawing No.
15032-7602

Potentiometer Installation

Potentiometer Intrinsically Safe and Division 2 Installation - Grounded Circuit Two Barriers



1. Barriers #1 and #2 must be CSA Certified and FM Approved single channel grounded Shunt-Diode Zener Barriers with Voc and Isc parameters as indicated. Alternatively, instead of two single Channel Barriers, one CSA Certified and FM Approved Dual Channel grounded Shunt Diode Barrier (with Voc and Isc parameters, for each channel as indicated for Barriers #1 and #2) may be used.

   CSA Certified and FM Approved MTL 710 Single Channel grounded Shunt Diode Zener Barrier is recommended for use as Barriers #1 and #2.

2. Connections to the terminals TB1-V1 and TB1-V3 may be swapped.

3. Potentiometer Cable Parameters for Intrinsic Safety - Grounded Circuit Two Barriers:

Gas Groups	**Maximum Values**		
	Capacitance	**Inductance**	**L/R Ratio**
A & B	0.22 uF	110 uH	35 uH per Ohm
C & E	0.90 uF	440 uH	140 uH per Ohm
D, F & G	2.40 uF	880 uH	280 uH per Ohm

4. Ambient Temperature Range**:** See Sheet 2 of 13.

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2	9 Oct. 97	As Certified	J. Sweeney
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Title

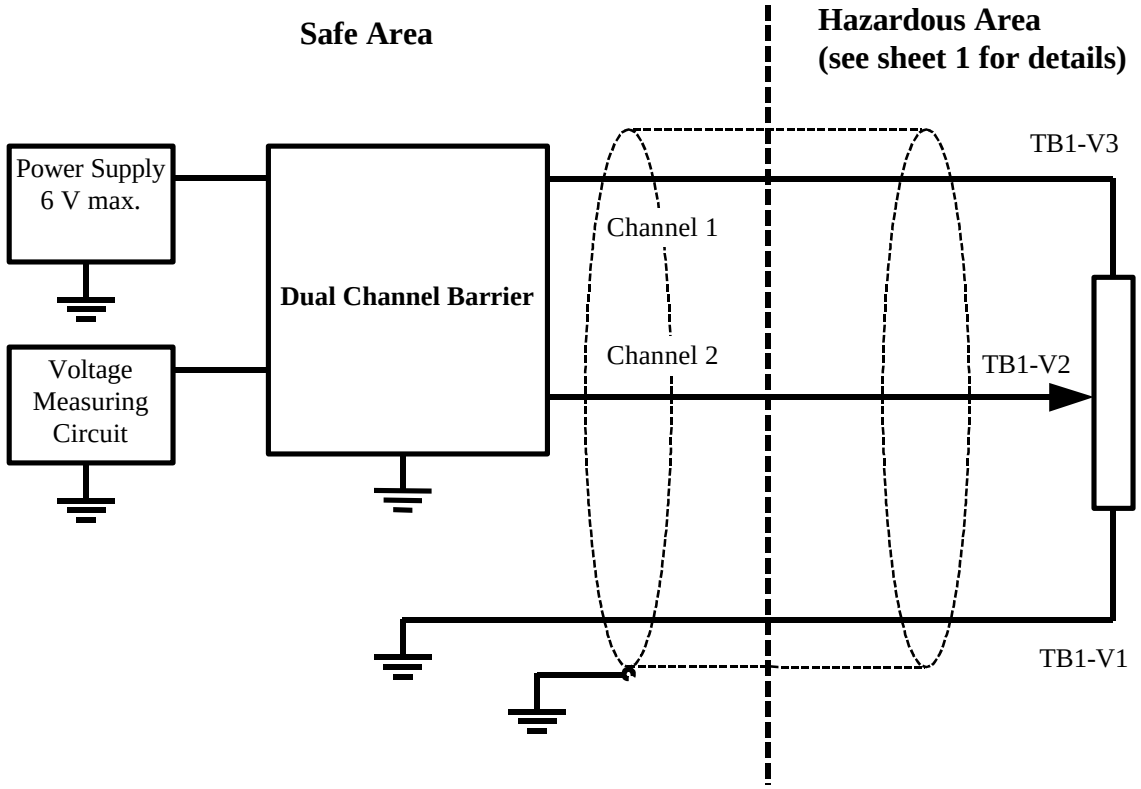
Control Drawing for
Series 760 Valve Controller

Moore Products Co.
Spring House PA, USA 19477

Drawing No.

15032-7602

Potentiometer Intrinsically Safe and Division 2 Installation - Grounded Circuit Dual Channel Barrier



1. Barrier must be CSA Certified and FM Approved dual channel grounded Shunt Diode Zener Barrier with output safety parameters, as follows:

   Voc Channel 1 - Channel 2 ≤ 10V; Voc Channel 1 - earth ≤ 10V;
   Voc Channel 2 - earth ≤ 10V; Isc Channel 1 or Channel 2 ≤ 0.2A.

   CSA Certified and FM Approved MTL760 Dual Channel, star connected Barrier, is recommended.

2. Connections to the terminals TB1-V1 and TB1-V3 may be swapped.

3. Potentiometer Cable Parameters for Intrinsic Safety - Grounded Circuit Dual Channel Barrier:

Gas Groups	**Maximum Values**		
	Capacitance	**Inductance**	**L/R Ratio**
A & B	0.30 uF	110 uH	35 uH per Ohm
C & E	0.90 uF	440 uH	140 uH per Ohm
D, F & G	2.40 uF	880 uH	280 uH per Ohm

4. Ambient Temperature Range**:** See Sheet 2 of 13.

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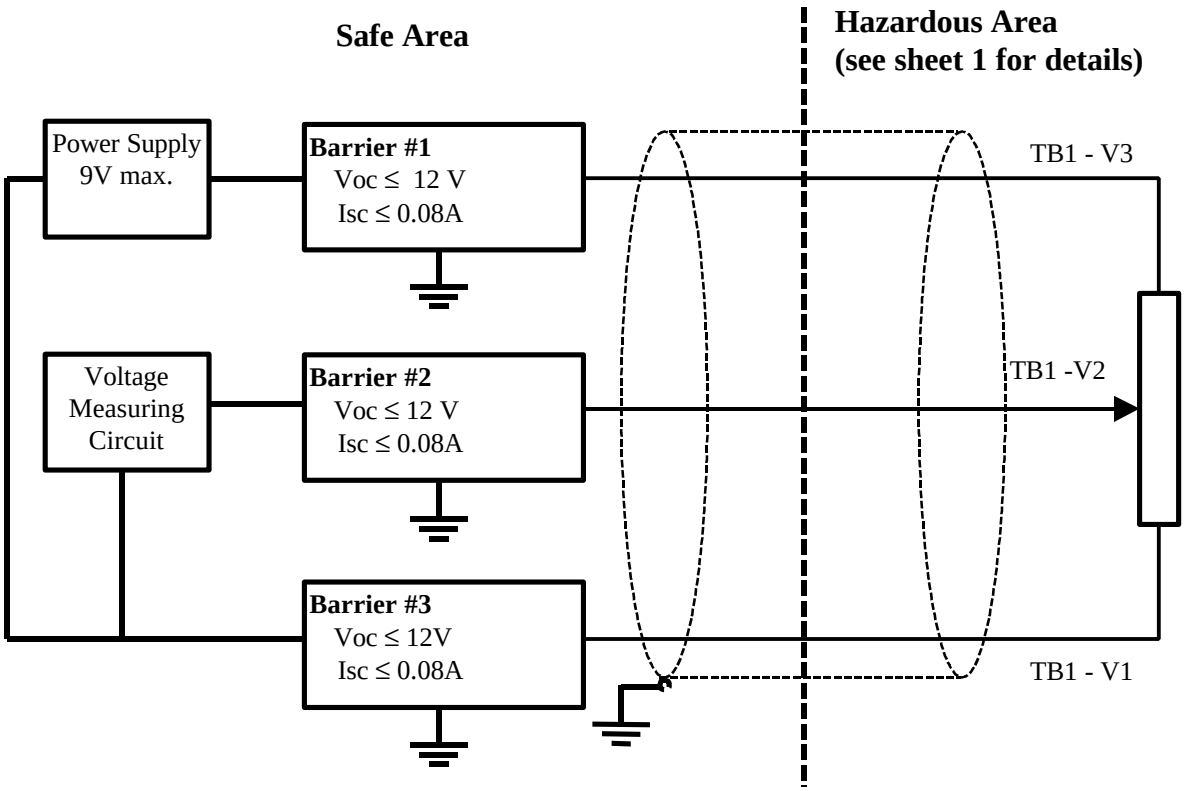
Spring House PA, USA 19477

Title
Control Drawing for
Series 760 Valve Controller

Drawing No.
15032-7602

Potentiometer Intrinsically Safe and Division 2 Installation - Ungrounded Circuit Three Barriers



1. Barriers #1, #2 and #3 must be CSA Certified CSA and FM Approved single channel grounded Shunt Diode Zener Barriers with Voc and Isc parameters as indicated.

   CSA Certified and FM Approved MTL 766 Single Channel Barrier is recommended for use as barrier #1, #2 and #3.

2. Connections to the terminals TB1-V1 and TB1-V3 may be swapped.

3. Potentiometer Cable Parameters for Intrinsic Safety - Ungrounded Circuit Three Barriers:

Gas Groups	**Maximum Values**		
	Capacitance	**Inductance**	**L/R Ratio**
A & B	0.125 uF	110 uH	49 uH per Ohm
C & E	0.57 uF	440 uH	190 uH per Ohm
D, F & G	1.52 uF	880 uH	390 uH per Ohm

4. Ambient Temperature Range**:** See Sheet 2 of 13.

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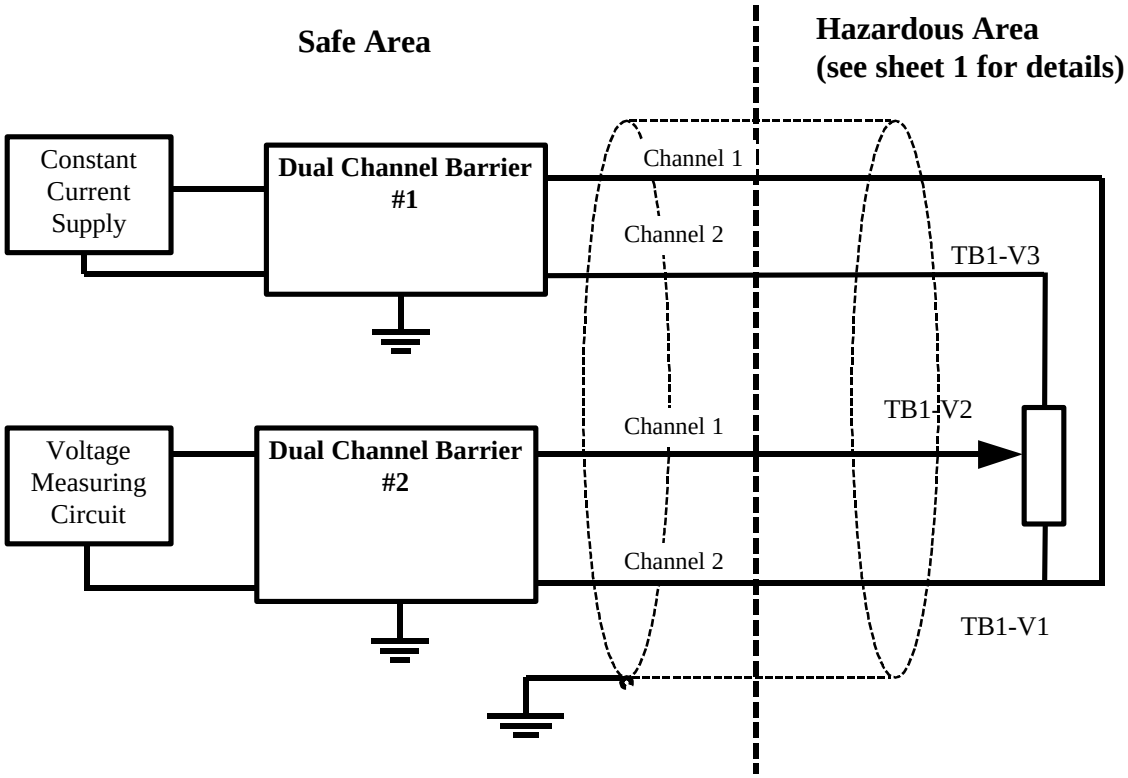
Title
Control Drawing for
Series 760 Valve Controller

Drawing No.
15032-7602

Potentiometer Intrinsically Safe and Division 2 Installation - Ungrounded Circuit Two Dual Channel Barriers



1. Barriers #1 and #2 must be CSA Certified and FM Approved dual channel grounded Shunt Diode Barriers with output safety parameters, as follows:

   Voc (Uo) Channel 1 - earth ≤ 9V; Voc (Uo) Channel 2 - earth ≤ 9V;
   Isc (Io) Channel 1 or Channel 2 ≤ 0.1A.

   CSA Certified and FM Approved MTL 761 Dual Channel Barrier is recommended as Barrier #1 and #2.

2. Connections to the terminals TB1-V1 and TB1-V3 may be swapped.

3. Potentiometer Cable Parameters for Intrinsic Safety - Ungrounded Circuit Two Dual Barriers:

Gas Groups	**Maximum Values**		
	Capacitance	**Inductance**	**L/R Ratio**
A & B	0.31 uF	110 uH	35 uH per Ohm
C & E	1.32 uF	440 uH	140 uH per Ohm
D, F & G	3.52 uF	880 uH	280 uH per Ohm

4. Ambient Temperature Range**:** See Sheet 2 of 13.

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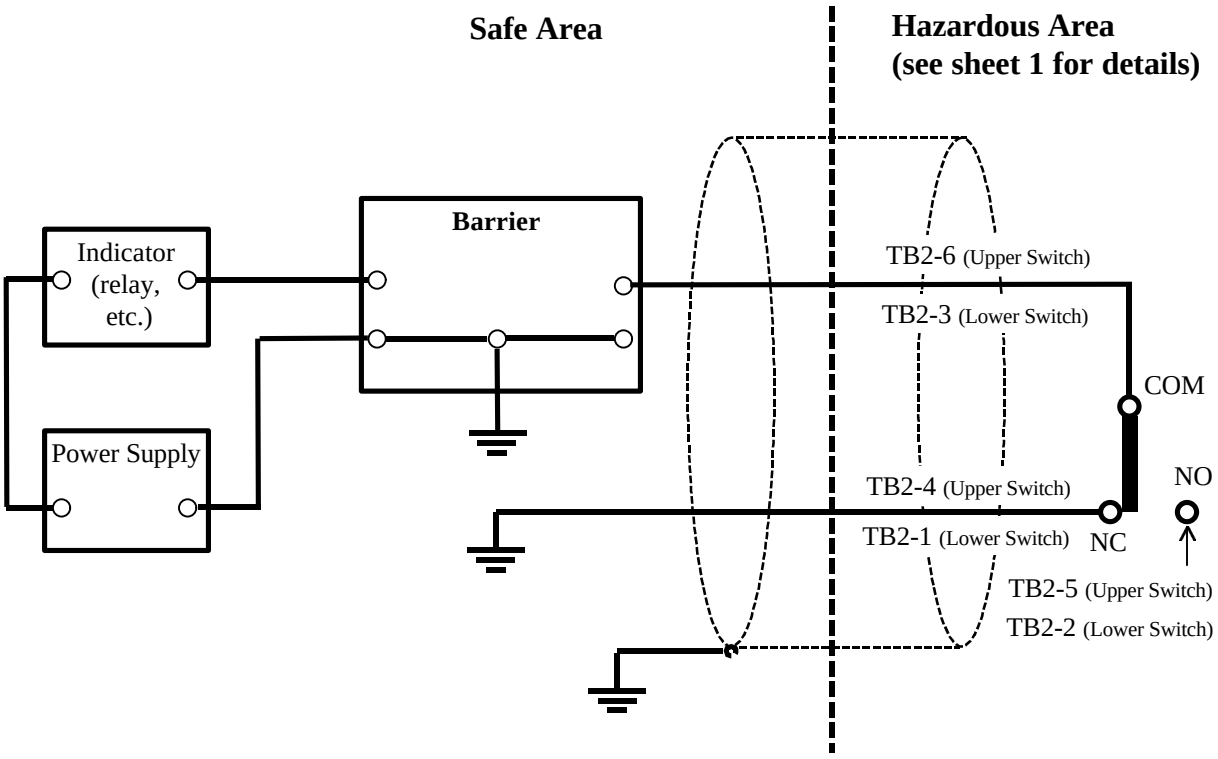
Title
Control Drawing for
Series 760 Valve Controller

Drawing No.
15032-7602

Limit Switch Installation

Limit Switch Intrinsically Safe and Division 2 Installation - Grounded Circuit Single Barrier



1 Barrier must be CSA Certified and FM Approved single channel grounded Shunt-Diode Zener Barrier.

2. Limit Switch Cable Parameters for Intrinsic Safety - Grounded Circuit Single Barrier:

   A) Cable Capacitance may not exceed Ca of the barrier.
   B) Cable Inductance may not exceed La of the barrier or the cable L/R ratio may not exceed the L/R ratio of the barrier.

3. Ambient Temperature Range**:** See Sheet 2 of 13.

4. Normally, TB2-1 and TB2-4 are connected to ground as shown. Alternativly, TB2-2 may be grounded if no connection is made to TB2-1 and/or TB2-5 may be grounded if no connection is made to TB2-4.

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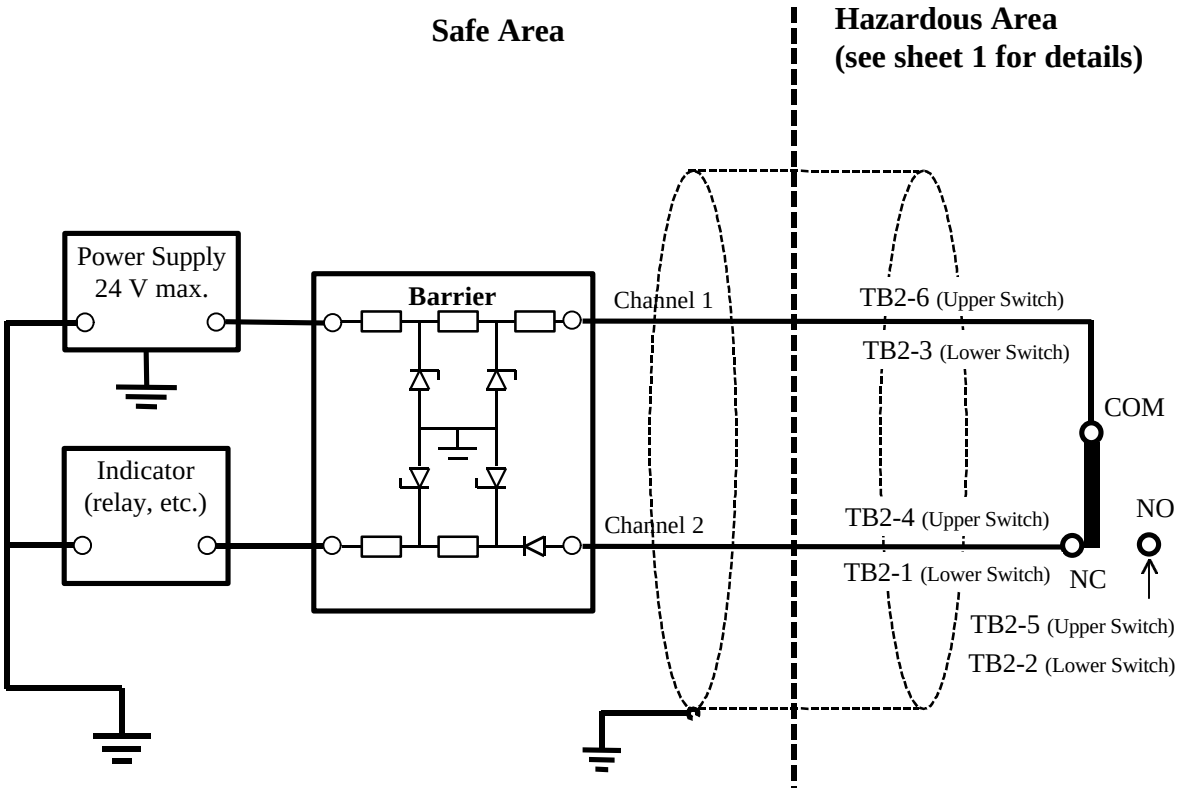
Title
Control Drawing for
Series 760 Valve Controller

Drawing No.
15032-7602

Limit Switch Intrinsically Safe and Division 2 Installation - Ungrounded Circuit Single Barrier



1. Barrier must be CSA Certified and FM Approved dual channel shunt-diode Zener Barrier with output safety parameters, as follows:

   Voc Channel 1 - earth ≤ 28V; Isc Channel 1: ≤ 0.093A
   Voc Channel 2 - earth ≤ 28V; Isc Channel 2: Diode Return.

   CSA Certified and FM Approved MTL787 dual channel Barrier is recommended.

2. Limit Switch Cable Parameters for Intrinsic Safety - Ungrounded Circuit Single Barrier:

   A.) Cable Capacitance may not exceed Ca of the barrier.
   B.) Cable Inductance may not exceed La of the barrier or the cable L/R ratio may not exceed the L/R ratio of the barrier.

3. Ambient Temperature Range**:** See Sheet 2 of 13.

4. Normally, TB2-1 and TB2-4 are connected to Barrier channel 2 as shown. Alternativly, TB2-2 may be connected to Barrier channel 2 if no connection is made to TB2-1 and/or TB2-5 may be connected to Barrier channel 2 if no connection is made to TB2-4.

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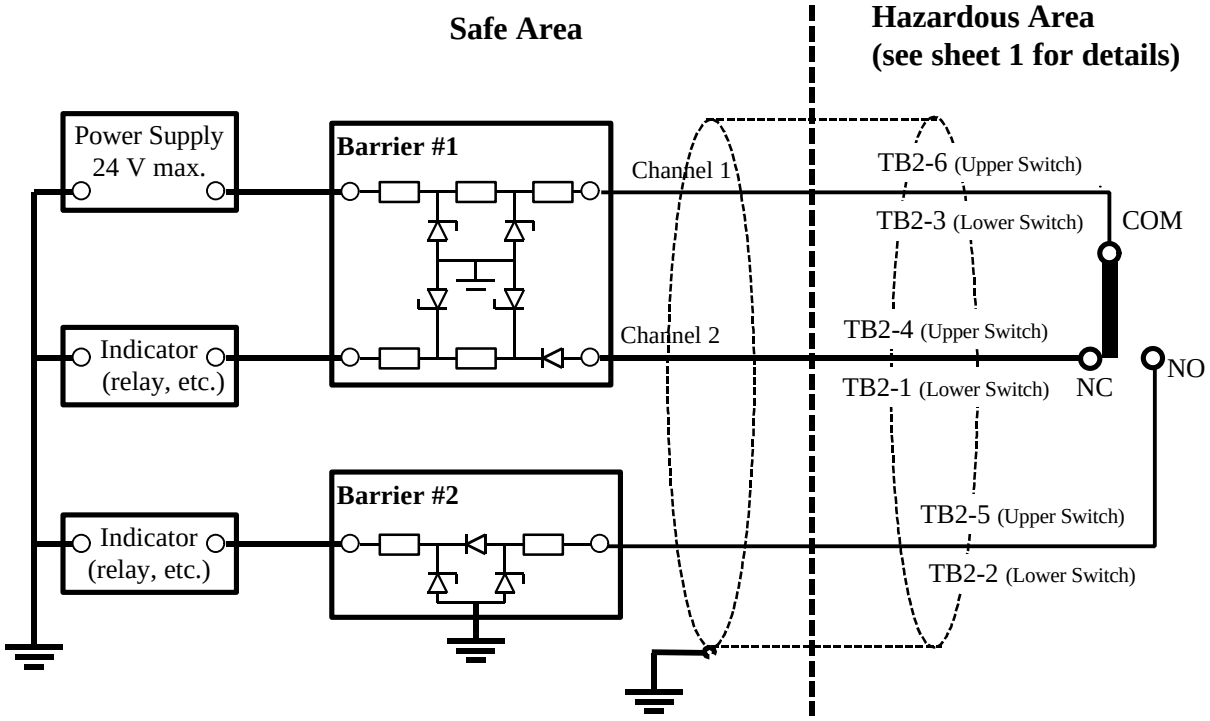
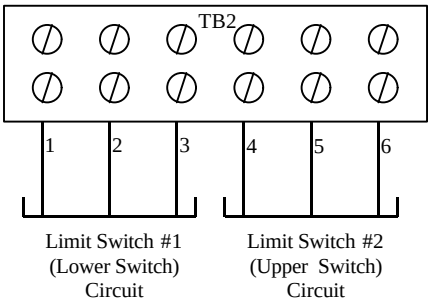
Title
Control Drawing for
Series 760 Valve Controller

Drawing No.
15032-7602

Limit Switch Intrinsically Safe and Division 2 Installation - Ungrounded Circuit Two Barriers



Note that connection is made to all three terminals for Limit Switch #1 (Lower Switch) and Limit Switch #2 (Upper Switch) in this configuration.



1. Barrier #1 must be CSA Certified and FM Approved dual channel Shunt-Diode Zener Barrier with output safety parameters, as follows:

   Voc Channel 1 - earth ≤ 28V; Isc Channel 1: ≤ 0.093A
   Voc Channel 2 - earth ≤ 28V; Isc Channel 2: Diode return.

   CSA Certified and FM Approved MTL 787 Dual Channel Barrier is recommended.

Notes continued on next sheet.

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Control Drawing for
Series 760 Valve Controller

Drawing No.
15032-7602

2. Barrier #2 must be CSA Certified and FM Approved ground referenced Barrier with output safety parameters, as follows:

   Voc ≤ 28V (channel to earth) Isc: Diode return.

   CSA Certified and FM Approved MTL 786 Diode Return Barrier is recommended.

3. Barrier #1 and Barrier #2 must be of the same polarity, either both positive or both negative.

4. Connections to the following terminals may be swapped:

   A) TB2-1 and TB2-2 B) TB2-4 and TB2-5

5. Limit Switch Cable Parameters for Intrinsic Safety - Ungrounded Circuit Two Barriers:

   A) Cable Capacitance may not exceed Ca of the corresponding Barrier.
   B) Cable Inductance may not exceed La of the corresponding Barrier or the cable L/R ratio may not exceed the L/R ratio of the corresponding Barrier.

6. Ambient Temperature Range**:** See Sheet 2 of 13.

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Control Drawing for
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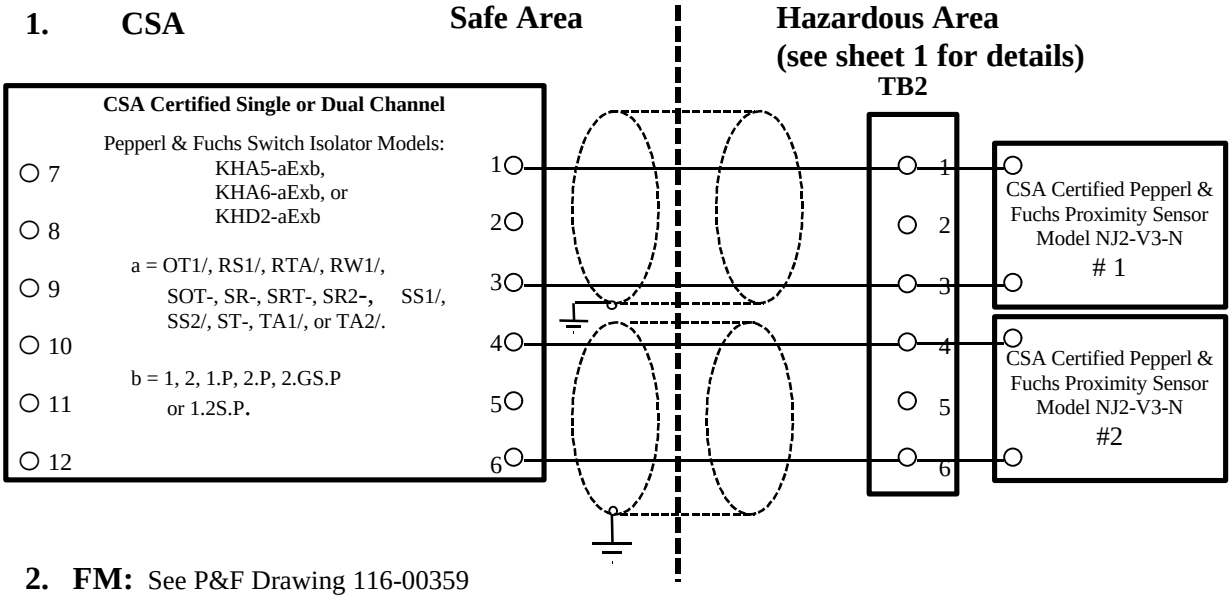
Drawing No.
15032-7602

Proximity Switch Pepperl & Fuchs GmbH Model NJ2-V3-N Installation Instructions

Proximity Switch Intrinsically Safe Installation:

1. CSA



2. FM: See P&F Drawing 116-00359

Proximity Switch Installation in Division 2:

Certification	Input Ratings
CSA Division 2	25 V, 0.05A Maximum
FM Division 2	Maximum Voltage 25 V

Proximity Switch Ambient Temperature Range: See Sheet 2 of 13

Rev	Date	Details	Approved
2	9 Oct. 97	As Certified	J. Sweeney
3	19 Feb. 98	As FM Approved	J. Sweeney
4	20 April 98	Minor corrections	J. Sweeney

Moore Products Co.
Spring House PA, USA 19477

Title
Control Drawing for
Series 760 Valve Controller

Drawing No.
15032-7602

I/P Module Installation Instructions

I/P Module Intrinsically Safe Installation:

1. CSA

I/P Module: CSA Certified Sensycon Type 22/06-65. It is intrinsically safe when connected as per attached Sensycon Control Document No. 900842, Page 4 of 4.

2. FM

See Sensycon Drawing No. 900842

I/P Module Installation in Division 2:

Certification	Input Ratings
CSA Division 2	Current 4-20 mA, 8V maximum, 0.15A maximum
FM Division 2	Current 4-20 mA

I/P Module Ambient Temperature Range: See Sheet 2 of 13.

Rev	Date	Details	Approved
2	9 Oct. 97	As Certified	J. Sweeney
3	19 Feb. 98	As FM Approved	J. Sweeney
4	20 April 98	Minor corrections	J. Sweeney

Moore Products Co.
Spring House PA, USA 19477

Title
Control Drawing for
Series 760 Valve Controller

Drawing No.
15032-7602

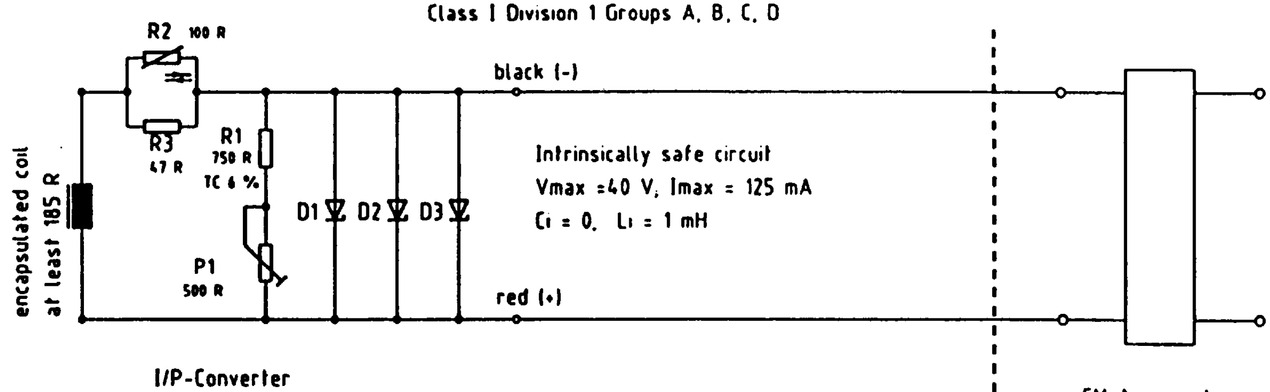
FM Approved

SENSYCON CONTROL DOCUMENT No. 900842

Hazardous Area

Class I Division 1 Groups A, B, C, D

Nonhazardous Area



D1...D3
1N5343B or comparable type

Characteristic: direct acting
0(4)...20 mA
Entity: Imax = 125 mA, Ri according label

Voltage rating of Zener diodes = 7,5 V
Power rating of Zener diodes = 5 W

Note: Location is allowed in Class II, III, Division 1, Group E, F, G for models 22/06-66, 22/06-67, 22/06-68, 22/06-69 only. An approved seal must be used at the enclosure conduit opening to maintain Intrinsic Safe circuit integrity.

Werkstückkanten nach DIN 6784 ohne Angabe	Allgemeintoleranzen DIN 7168-m-C
Technische Oberfläche nach DIN ISO 1302	Vorschrift Längenmaße / Winkelmaße
NO REVISION CAN BE MADE WITHOUT FM APPROVAL	Revision 0
1993 Gezeichnet 07.07. Loogr / Geprüft / Normgepr.	Maßstab / Benennung: Connection Diagram I/P-Converter 22/06-6X
SENSYCON	FM Ident-Nr. 900842

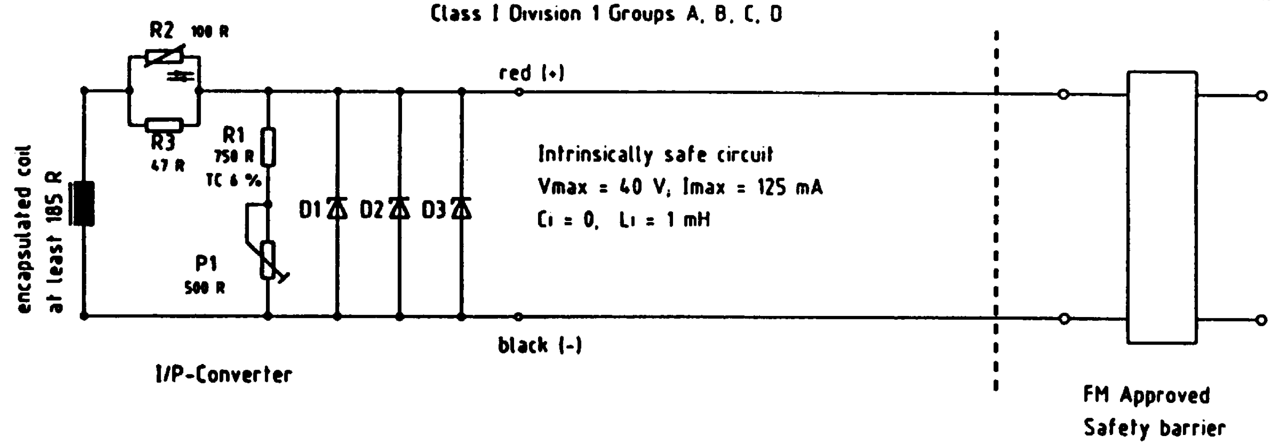
FM Approved

SENSYCON CONTROL DOCUMENT No. 900842

Hazardous Area

Class I Division 1 Groups A, B, C, D

Nonhazardous Area



Intrinsically safe circuit
Vmax = 40 V, Imax = 125 mA
Ci = 0, Li = 1 mH

D1...D3
1N5343B or comparable type

Characteristic: reverse acting

20...0(4) mA

Entity: Imax = 125 mA, Ri according label

Voltage rating of Zener diodes = 7,5 V

Power rating of Zener diodes = 5 W

Note: Location is allowed in Class II, III, Division 1, Group E, F, G for models 22/06-66, 22/06-67, 22/06-68, 22/06-69 only. An approved seal must be used at the enclosure conduit opening to maintain Intrinsic Safe circuit integrity.

Werkstückkanten nach DIN 6784 ohne Angabe

Technische Oberfläche nach DIN ISO 1302

Allgemeintoleranzen DIN 7168-m-C

bis 6	über 6 bis 30	über 30 bis 120	über 120 bis 400	über 400
± 0,1	± 0,2	± 0,3	± 0,5	± 0,8

Vorschrift Längenmaße Winkelmaße

NO REVISION CAN BE MADE WITHOUT FM APPROVAL

Revision 0

1993	Tag	Name
Gezeichnet	01.07.	Loose
Geprüft		
Normgepr.		

Maßstab /

Benennung: Connection Diagram I/P-Converter 22/06-6X

SENSYCON

FM Ident-Nr. 900842

page 2 of 4

Das Urheberrecht an dieser Zeichnung verbleibt uns. Vervielfältigung und unberechtigte Benutzung durch Empfänger od. Dritte hat zivil- u. strafrechtliche Folgen.

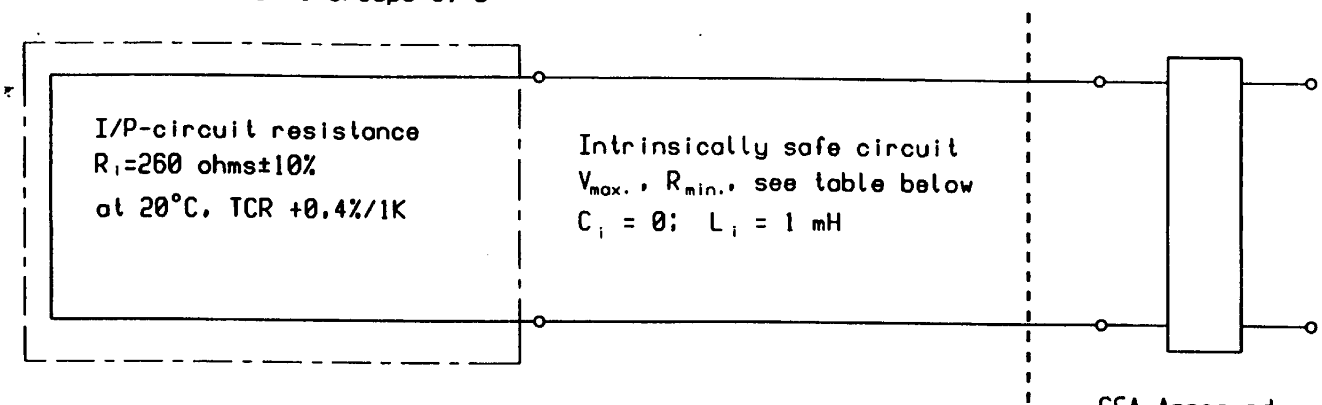
CSA CONTROL DOCUMENT No. 900842 for I/P-Converter Type 22/06-6X

SENSYCON CORPORATION, 210A Fort Collier Road, Winchester, VA 22603 Tel: 703-665-2433 Fax: 703-665-4125

Hazardous Area

Class I Division 1 Groups C, D

Nonhazardous Area



CSA Approved
Safety barrier

Characteristic: direct or reverse acting
0(4)...20 mA or 20...0(4) mA

Note: Location is allowed in Class II, III, Division 1, Group E, F, G for models 22/06-66 22/06-67, 22/06-68, 22/06-69 only. An approved seal must be used at the enclosure conduit opening to maintain Intrinsic Safe circuit integrity.

Hazardous Area

Class I Division 1
Groups C, D

BARRIER PARAMETERS

max. voltage($V_{max.}$)	min. resistance($R_{min.}$)
33	200
30	150
28	120

Werkstückkanten nach DIN 6784 ohne Angabe -0,3 -0,3	Allgemeintoleranzen DIN 7168-m-C	bis 6	über 6 bis 30	über 30 bis 120	über 120 bis 400	über 400
		± 0,1	± 0,2	± 0,3	± 0,5	± 0,8
Technische Oberfläche nach DIN ISO 1302	Vorschrift Längenmaße Winkelmaße					
NO REVISION CAN BE MADE WITHOUT CSA APPROVAL	Revision 1					

1995	Tag	Name	Maßstab	Benennung
Gezeichnet	23/05	thieme	/	Connection Diagramm I/P-Converter 22/06-6X
Geprüft				
Normgepr				

Paß- Ab-maße | SENSYCON | CSA | Ident-Nr 900842

29.5.95 TKH

Blatt von

SENSYCON GMBH

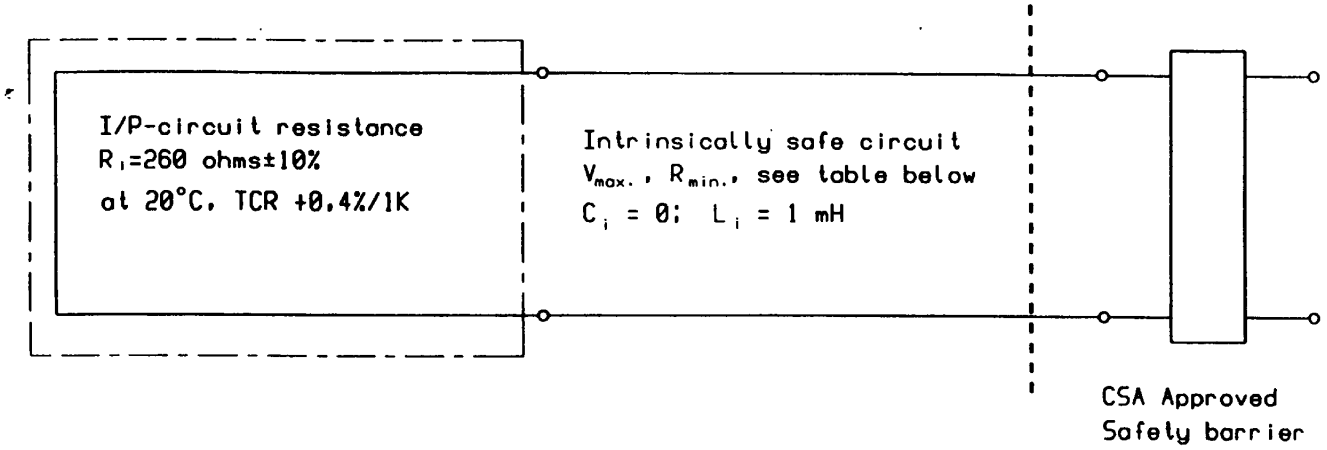
CSA CONTROL DOCUMENT No. 342 for I/P-Converter Type 22/06-6X

SENSYCON CORPORATION, 210A Fort Collier Road, Winchester, VA 22603 Tel: 703-665-2433 Fax: 703-665-4125

Hazardous Area

Class I Division 1 Groups A, B, C, D

Nonhazardous Area



Characteristic: direct or reverse acting
0(4)...20 mA or 20...0(4) mA

Note: Location is allowed in Class II, III, Division 1, Group E, F, G for models 22/06-66 22/06-67, 22/06-68, 22/06-69 only. An approved seal must be used at the enclosure conduit opening to maintain Intrinsic Safe circuit integrity.

Hazardous Area

Class I Division 1

Groups A, B, C, D

BARRIER PARAMETERS

max. voltage($V_{max.}$)	min. resistance($R_{min.}$)
32	400
30	330
29.5	305
28	270
25	200
22	150
12	40

Werkstückkanten nach DIN 6784 ohne Angabe -0,3 -0,3

Allgemeintoleranzen DIN 7168-m-C: bis 6 ± 0,1; über 6 bis 30 ± 0,2; über 30 bis 120 ± 0,3; über 120 bis 400 ± 0,5; über 400 ± 0,8

Technische Oberfläche nach DIN ISO 1302

Vorschrift Längenmaße Winkelmaße

NO REVISION CAN BE MADE WITHOUT CSA APPROVAL

Revision 1

1995	Tag	Name	Maßstab
Gezeichnet	23/05	Thoma	1
Geprüft	30.5		
Normgepr			

Benennung: Connecti on Di agromm I/P-Converter 22/06-6X

29.5.95 TKH

Paß-maße | Ab-maße

SENSYCON

CSA

Ident-Nr 900842

Blatt von

SENSYCON GMBH

HAZARDOUS (CLASSIFIED) LOCATION

CLASS I, DIVISION 1, GROUPS A,B,C,D
CLASS II, DIVISION 1, GROUPS E,F,G
CLASS III, DIVISION 1

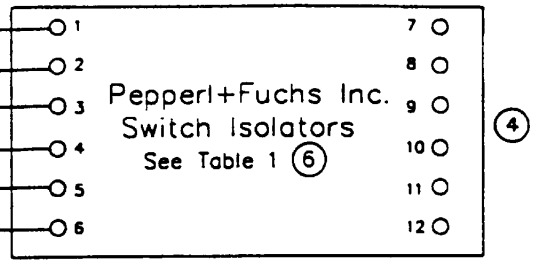
NON-HAZARDOUS LOCATION (9)

or

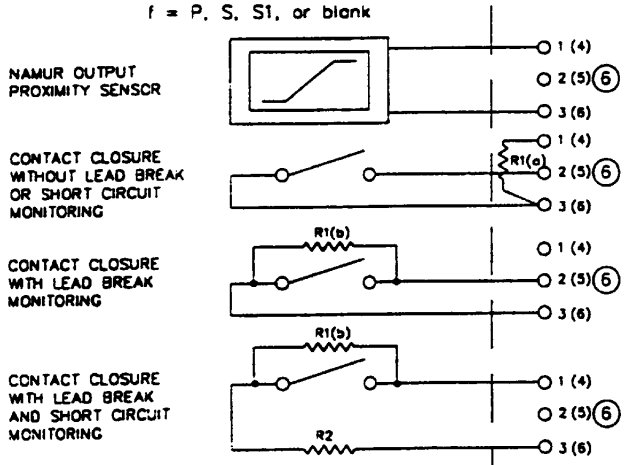
CLASS I, DIVISION 2, GROUPS A,B,C,D

Any Simple Apparatus (2) or approved device with Entity Concept parameters (1) (V_{max}, I_{max}, C_i, L_i,) appropriate for connection to Associated Apparatus with Entity Concept parameters listed in Table 1 or Pepperl+Fuchs NAMUR Proximity Sensor Models (5)
NCNa-d-e, NCBa-d-e, NJa-d-e, NJaf+d+e
SJb-e, RJc-e, RJc-d-e, CJa-d-e, MJa-d-e
OCSa-d-e, OCTa-d-e

Any Simple Apparatus (2) or approved device with Entity Concept parameters (1) (V_{max}, I_{max}, C_i, L_i,) appropriate for connection to Associated Apparatus with Entity Concept parameters listed in Table 1 or Pepperl+Fuchs NAMUR Proximity Sensor Models (5)
NCNa-d-e, NCBa-d-e, NJa-d-e, NJaf+d+e
SJb-e, RJc-e, RJc-d-e, CJa-d-e, MJa-d-e
OCSa-d-e, OCTa-d-e



a = Sensing range (mm)
b = Slot width (mm)
c = Ring diameter (mm)
d = Mechanical form, sensor diameter and mounting style
e = N, NO, N1, N2, N4, SN, S1N, 1N or YN
f = P, S, S1, or blank

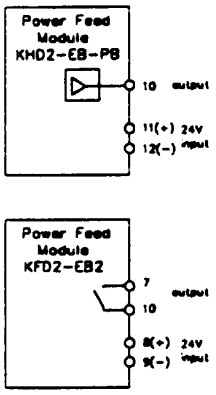


OPTIONAL CONNECTION

The Model KHD2-EB-PB and KFD2-EB2 power feed modules may be used in conjunction with Model PR-02 power rail to energize P+F transformer isolated barriers (KHD2-XX-ExX.P and KFD2 Series).

The Model KHD2-EB-PB power feed module is suitable to be used in a Class I, Div. 2, Group A,B,C,D hazardous location and must be installed in accordance with Note (9).

The Model KFD2-EB2 power feed module must only be mounted in a nonhazardous location.



NOTES:

(1.) The Entity Concept allows interconnection of intrinsically safe and associated apparatus not specifically examined in combination as a system when the approved values of V_{oc} and I_{sc} for the associated apparatus are less than or equal to V_{max} and I_{max} for the intrinsically safe apparatus and the approved values of C_a and L_a for the associated apparatus are greater than $C_i + C_{cable}$, $L_i + L_{cable}$, respectively for the intrinsically safe apparatus.

(2.) "Simple Apparatus" is defined as a device that will neither generate nor store more than 1.2V, 0.1A, 20uJ or 25mW.

(3.) Wiring methods must be in accordance with the National Electrical Code, ANSI/NFPA 70, Article 504 and ANSI/ISA-RP12.6

(4.) Barriers shall not be connected to any device that uses or generates in excess of 250V rms or DC unless it has been determined that the voltage is adequately isolated from the barrier.

(5.) For connection to P+F NAMUR proximity sensors, the total inductance and capacitance must be limited to:

	Groups A,B	Groups C,E	Groups D,F,G
Inductance	82.88mH	296.7mH	742.4mH
Capacitance	0.59µF	3.14µF	9.50µF

(6.) Single channel models use input terminals 4, 5, & 6 only.

(7.) When the field devices are contact closures, resistors R1 and R2 must be connected as shown in the diagrams above for proper performance. R2 should be as close as possible to the contact closure. R2 must be ≥ 400Ω and ≤ 2kΩ, and R1 must be 10kΩ + 5%. Note, resistor R1(a) is not necessary if the barrier contains integral slide switches S1b and S2b and if these switches are set in the appropriate position.

Certification Status			
Agency	Pending	Final	
FM	X		X
CSA			
UL			

q	12-17-96	J.M.	J.M.	D.H.	ECO-1691	Product Part No.	Title Installation Drawing for FM Approved Transformer Isolated Barriers and Sensors
p	11-01-96	J.M.			ECO-1600		
o	8-29-96	J.M.			ECO-1465		
n	8-19-96	J.M.			ECO-1457	THIS DRAWING CONTAINS PROPRIETARY DATA. NO DISCLOSURE, REPRODUCTION, OR USE OF ANY PART MAY BE MADE EXCEPT BY WRITTEN PERMISSION.	
Revisions					ECO No.		
0	3-12-93	B.L.			Pepperl+Fuchs® Inc. Twinsburg, OH 44087-2202	Repl.No. -	Draw. No. 116-0035q
In.	Date	Cons.	Reso.	Appr.			Sh. 1 of 2

NOTES (cont.):

(8.) Any combination of up to 10 channels of the barriers listed in Table 1 may be connected in parallel and connected to a simple apparatus in a hazardous location. R2, if used, must be rated 0.25W minimum if 2-3 channels are connected in parallel and 0.5W minimum if 4-10 channels are connected in parallel. If 2-3 channels are connected in parallel the total cable inductance must be limited to 10mH for Groups A and B, 37mH for Groups C and E, and 80 mH for Groups D, F and G. If 4-10 channels are connected in parallel the total cable inductance must be limited to 1mH for Groups A and B, 3.8mH for Groups C and E, and 7mH for Groups D, F, and G.

(9.) Barriers that are rated "nonincendive," designated by a "Y" in the "NI" column of Table 1, must be installed in an enclosure meeting the requirements of ANSI/ISA S82. The enclosure may be installed in a Class I, Division 2, Group A,B,C, or D hazardous location. Barriers that are not rated nonincendive, designated by a "N" in the "NI" column of Table 1, must also be installed in an enclosure meeting the requirements of ANSI/ISA S82, but the enclosure must be installed in a nonhazardous location.

Table 1: Entity Parameters (8)

Model Numbers	NI	Terminals	V_{oc}(V)	I_{sc}(mA)	Groups	C_a (uF)	L_a(mH)
KFD2-SOT-Ex1, KFD2-SOT-Ex1.LK KFDS-SOT-Ex2, KFD2-SOT-Ex2-Y93522 KFD2-SOT-Ex2.GM, KFD2-SOT-Ex2.GP KFD2-SRT-Ex1, KFD2-ST-Ex1, KFD2-ST-Ex1.LK KFD2-ST-Ex2 KHD2-OT1/Ex1, KHD2-OT1/Ex2, KHD2-OT1/Ex2-B226 KHD2-SOT-Ex2, KHD2-ST-Ex1, KHD2-ST-Ex2 KHD2-TA1/Ex2, KHD2-TA2/Ex1 KHA5-OT1/Ex2, KHA5-OT1/Ex2-B350 KHA5-OT1/Ex2-B363 KHA6-OT1/Ex1, KHA6-OT1/Ex2, KHA6-OT1/Ex2-B350	Y	(6) 1-3, 2-3, 4-6, 5-6	12.9	19.8	A, B	1.273	84.88
					C, E	3.820	298.7
					D, F, G	10.18	744.4
KFD2-SR-Ex1, KFD2-SR-Ex2, KFD2-SR-Ex2.1W.OP KFD2-SR-Ex2.2S.OP, KFD2-SR-Ex2.GS, KFD2-SR-Ex1.2S KHD2-RS1/Ex2, KHD2-RTA/Ex1, KHD2-RW1/Ex1 KHD2-RW1/Ex1-B260 KHD2-SOT-Ex1.P, KHD2-SOT-Ex2.P KHD2-SOT-Ex2.P-Y92846 KHD2-SR-Ex1.P, KHD2-SR-Ex1.2S.P, KHD2-SR-Ex2.GS.P KHD2-SR-Ex2.P, KHD2-SRT-Ex1.P, KHD2-ST-Ex1.P KHD2-ST-Ex2.P KHD2-SS1/Ex2, KHD2-SS1/Ex2-B260, KHD2-SS2/Ex1 KHA5-RS1/Ex2, KHA5-SS1/Ex2, KHA5-SS1/Ex2-B203 KHA6-RS1/Ex2, KHA6-RW1/Ex1, KHA6-SS1/Ex2 KHA6-SS1/Ex2-B217 KFD2-SR2-Ex1.W, KFD2-SR2-Ex1.W.LB KFD2-SR2-Ex2.W KFA5-SR2-Ex1.W, KFA5-SR2-Ex1.W.LB, KFA5-SR2-Ex2.W KFA6-SR2-Ex1.W, KFA6-SR2-Ex1.W.LB, KFA6-SR2-Ex2.W KHD2-SR2-Ex1.W, KHD2-SR2-Ex1.W.LB KHD2-SR2-Ex1.W.LB, KFD2-SR2-Ex1.W.LB KHD2-SR2-Ex2.W KHA5-SR2-Ex1.W, KHA5-SR2-Ex1.W.LB, KHA5-SR2-Ex2.W KHA6-SR2-Ex1.W, KHA6-SR2-Ex1.W.LB, KHA6-SR2-Ex2.W KHA5-SR2-Ex2.W-Y93601, KHA6-SR2-Ex2.W-Y93602	N	(6) 1-3, 2-3, 4-6, 5-6	12.9	19.8	A, B	1.273	84.88
					C, E	3.820	298.7
					D, F, G	10.18	744.4

Certification Status			
Agency		Pending	Final
FM	X		X
CSA			
UL			

q	12-17-96	J.M.	J.M. D.H.	ECO-1691	Product Part No.			Title Installation Drawing for FM Approved Transformer Isolated Barriers and Sensors
p	11-01-96	J.M.		ECO-1600				
o	8-29-96	J.M.		ECO-1465				
n	8-19-96	J.M.		ECO-1457	THIS DRAWING CONTAINS PROPRIETARY DATA. NO DISCLOSURE, REPRODUCTION, OR USE OF ANY PART MAY BE MADE EXCEPT BY WRITTEN PERMISSION.			
Revisions				ECO No.				
0	3-12-93	B.L.			Pepperl+Fuchs® Inc. Twinsburg, OH 44087-2202	Repl.No. -	Draw. No. 116-0035q	Sh. 2 of 2
In.	Date	Cons.	Resp.	Appr.				

Physikalisch-Technische Bundesanstalt

(1) KONFORMITÄTSBESCHEINIGUNG

(2) PTB Nr. Ex-93.C.2104 X

(3) Diese Bescheinigung gilt

I/P-Umformer Typ . 900826

(4) der Firma con G
annov

(5) Die Baua as elek n Betriebsmittels sowie die verschiedenen zulässigen Aus ngen sind in der A zu diese ormitätsbescheinigung festgelegt.

(6) Die alisch-Tech e Bundesanstalt bescheinigt als Prüfstelle nach Artikel 14 der tlinie des der Europäi Gemeinschaften vom 18. Dezember 1975 (76/117/EWG) die ein- st g dieses elektris riebsmittels mit den harmonisierten Europäischen Normen

Elektrisc mittel für ex gefähr reiche

EN 014:1977 + Al (VDE 0170/0171 T (1. gemeine Bestim n
EN 20:1977 + A 2 (VDE 0170/0171 Tei Eigensicherheit

nachdem Betriebsm mit Erfolg einer Bauartprüfu unterzogen wurde. Die Ergebnisse dieser Bauartprüfu sind in einem Prüfbericht/Prüfprotokoll niedergelegt.

(7) Das Betriebsmittel ist mit dem folgenden Kennzeichen versehen:

EEx ia IIC T6

(8) Der Hersteller ist dafür verantwortlich, daß jedes derart gekennzeichnete Betriebsmittel in seiner Bauart mit den in der Anlage genannten Unterlagen übereinstimmt und daß die vorgeschriebenen Stückprüfungen durchgeführt werden.

(9) Das elektrische Betriebsmittel darf mit dem hier abgedruckten gemeinschaftlichen Unterscheidungszeichen gemäß Anhang II der Richtlinie des Rates vom 6. Februar 1979 (79/196/EWG) gekennzeichnet werden.

Im Auftrag

Dr.-Ing. Johannsmeyer
Oberregierungsrat

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT

Braunschweig, 26.08.1993

Physikalisch-Technische Bundesanstalt

ANLAGE

zur Konformitätsbescheinigung PTB Nr. Ex-93.C.2104 X

Der I/P-Umformer Typ Doc. 900826 dient zur Umformung eines eingeprägten Gleichstromes zwischen 0 und 20 mA in einen proportionalen Druck. Als Druckmedien dürfen nur nicht brennbare Gase verwendet werden.

Der zulässige Umgebungstemperaturbereich beträgt je nach Temperaturklasse -55 °C bis +85 °C.

Elektrische Daten

Steuerstromkreis ... in Zündschutzart Eigensicherheit EEx ia IIC
(Kabel) nur zum Anschluß an bescheinigte eigensichere Stromkreise mit dem Höchstwert I_k gemäß folgender Tabelle:

Temperaturklasse	Eingangsstrom Ik	max. Umgebungstemperatur
T6	50 mA	60°C
T6	60 mA	55°C
T5	60 mA	70°C
T4	60 mA	85°C
T5	100 mA	55°C
T4	100 mA	85°C
T5	120 mA	45°C
T4	120 mA	80°C
T4	150 mA	70°C

Die wirksame innere Kapazität und Induktivität sind vernachlässigbar klein.

Prüfungsunterlagen	unterschrieben am
1. Beschreibung (11 Blatt)	11.06.1993
2. Zeichnung Nr. 900826	11.06.1993
900821	11.06.1993
900820	11.06.1993
900836	11.06.1993
900837	11.06.1993
900838	11.06.1993
900839	11.06.1993
900840	11.06.1993
900827	11.06.1993
900828	11.06.1993
900829	11.06.1993
900830	11.06.1993
900831	11.06.1993

Physikalisch-Technische Bundesanstalt

Anlage zur Konformitätsbescheinigung PTB Nr. Ex-93.C.2104 X

Besondere Bedingung

Beim Einsatz des I/P-Umformers Typ DOC.900826 im Temperaturbereich von -55 °C bis -20 °C ist dieser durch Einbau in ein zusätzliches Gehäuse vor Schlageinwirkung zu schützen.

Im Auftrag

Dr.-Ing. Johannsmeier
Oberregierungsrat

Braunschweig, 26.08.1993

Physikalisch-Technische Bundesanstalt

1. NACHTRAG

zur Konformitätsbescheinigung PTB Nr. Ex-93.C.2104 X

der Firma Sensycon GmbH
D-30179 Hannover

Der I/P-Umformer Typ Doc.900826 darf zukünftig auch in geänderter Form als I/P-Umformer Typ Doc.900928 nach den unten aufgeführten Prüfungsunterlagen gefertigt und betrieben werden.

Die Änderungen betreffen den äußeren Aufbau und den Einsatz von brennbarem Gas als pneumatische Hilfsenergie.

Die elektrischen und alle übrigen Daten gelten unverändert für diesen Nachtrag.

Die besondere Bedingung der Konformitätsbescheinigung ist durch den Aufbau für den I/P-Umformer Typ Doc.900928 erfüllt.

Besondere Bedingungen für I/P-Umformer Typ Doc.900928

1. Der I/P-Umformer Typ Doc.900928 ist bei Betrieb mit brennbarem Gas im Freien zu errichten.
2. Das zugeführte Gas ist soweit frei von Luft oder Sauerstoff zu halten, daß es keine explosionsfähige Atmosphäre bildet.
3. Das Abgas ist stets nach außen abzuführen.

Prüfungsunterlagen	unterschrieben am
1. Beschreibung (1 Blatt)	07.04.1995
2. Zeichnung Nr. 900928	07.04.1995
900931	20.07.1995

Im Auftrag

Dr.-Ing. Johannsmeyer
Oberregierungsrat

Braunschweig, 15.08.1995

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 24

Temperaturbereich: mit Kunststoffverschraubung
-40°C statisch
-20°C dynamisch
Temperaturbereich: -55°C auf Anfrage

EEx ia IIC T6

Physikalisch-Technische Bundesanstalt

KONFORMITÄTSBESCHEINIGUNG

PTB Nr. Ex- 83/2022 X

Diese Bescheinigung gilt für das elektrische Betriebsmittel

Näherungsschalter Typen SJ..., RJ..., NJ...,
FJ... u. CJ...

der Firma

Pepperl + Fuchs GmbH + Co KG
D-6800 Mannheim

Die Bauart dieses elektrischen Betriebsmittels sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Konformitätsbescheinigung festgelegt.

Die Physikalisch-Technische Bundesanstalt bescheinigt als Prüfstelle nach Artikel 14 der Richtlinie des Rates der Europäischen Gemeinschaften vom 18. Dezember 1975 (76/117/EWG) die Übereinstimmung dieses elektrischen Betriebsmittels mit den harmonisierten Europäischen Normen

Elektrische Betriebsmittel für explosionsgefährdete Bereiche

EN 50 014-1977 / VDE 0171 Teil 1/5.78 Allgemeine Bestimmungen
EN 50 020-1977 / VDE 0171 Teil 7/5.78 Eigensicherheit "i"

nachdem das Betriebsmittel mit Erfolg einer Bauartprüfung unterzogen wurde. Die Ergebnisse dieser Bauartprüfung sind in einem vertraulichen Prüfprotokoll festgelegt.

Das Betriebsmittel ist mit dem folgenden Kennzeichen zu versehen:

EEx ia IIC T6 bzw. EEx ib IIC T6

Der Hersteller ist dafür verantwortlich, daß jedes derart gekennzeichnete Betriebsmittel in seiner Bauart mit den in der Anlage zu dieser Bescheinigung aufgeführten Prüfungsunterlagen übereinstimmt und daß die vorgeschriebenen Stückprüfungen erfolgreich bestanden wurden.

Das elektrische Betriebsmittel darf mit dem hier abgedruckten gemeinschaftlichen Unterscheidungszeichen gemäß Anhang II der Richtlinie des Rates vom 6. Februar 1979 (79/196/EWG) gekennzeichnet werden.

Im Auftrag

Braunschweig, 4.3.1983

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 24

(Dipl.-Ing. Johannsmeyer)

A N L A G E

zur Konformitätsbescheinigung PTB Nr. Ex-83/2022 X

Die Näherungsschalter dürfen bei Umgebungstemperaturen bis zu 65 °C betrieben werden.

Elektrische Daten

Versorgungs- und Steuerstromkreis .. nur zum Anschluß an eigensichere Stromkreise mit folgenden Höchstwerten:

$U_o \leq 15{,}5$ V

$I_K \leq 52$ mA

$P \leq 169$ mW

Die wirksamen inneren Induktivitäten und Kapazitäten sind aus nachfolgender Tabelle zu ersehen:

Typenbezeichnung	C_i in nF	L_i in µH
SJ 1-...-...	30	29
SJ 1,8-...-...	45	62
SJ 2,2-...-...	30	60
SJ 3,5-...-...	40	160
SJ 5-...-...	60	420
SJ 10-...-...	125	720
SJ 15-...-...	130	980
SJ 30-...-...	150	1005
RJ 10-...-...	45	10
RJ 15-...-...	45	15
RJ 21-...-...	45	20
RJ 43-...-...	45	45
NJ 0,8-F-...-...	30	22
NJ 0,8-4,5-...-...	30	10
NJ 0,8-5GM-...-...	30	10
NJ 1-N1-...-...	30	21
NJ 1-10-...-...	30	21
NJ 1,5-6,5-...-...	30	20
NJ 1,5-8GM-...-...	30	20
NJ 2-F-...-...	45	15
NJ 2-11-...-...	45	15
NJ 2-12GK-...-...	45	24
NJ 2-12GM-...-...	45	24
NJ 2,5-F-...-...	60	25
NJ 4-F-...-...	160	70
NJ 4-12GK-...-...	60	29
NJ 4-12GM-...-...	45	29
NJ 5-11-...-...	45	15
NJ 5-18GK-...-...	45	27
NJ 5-18GM-...-...	85	27
NJ 6-F...-...	85	75
NJ 6-22-...-...	85	75

Physikalisch-Technische Bundesanstalt

Anlage zur Konformitätsbescheinigung PTB Nr. Ex-83/2022 X

Typenbezeichnung	C_i in nF	L_i in µH
NJ 7-F-...-...	100	165
NJ 8-18GK-...-...	60	40
NJ 8-18GM-...-...	100	40
NJ 10-22-...-...	210	75
NJ 10-30GK-...-...	130	70
NJ 10-30GM-...-...	210	70
NJ 10-30GKK-...-...	160	65
NJ 10-32-...-...	170	110
NJ 15-30GK-...-...	170	65
NJ 15-30GKK-...-...	160	65
NJ 15-32-...-...	230	100
NJ 15+B+V-...-...	290	110
NJ 15-40-...-...	290	107
NJ 15-50-...-...	170	123
NJ 20-40-...-...	290	117
NJ 20+B+V-...-...	290	110
NJ 25-50-...-...	220	130
NJ 30+B+V-...-...	210	125
NJ 40-F-...-...	300	160
NJ 40-80-...-...	300	160
NJ 40-FP-...-...	300	168
NJ 1-N2-...-...	45	42
FJ 6-110-...-...	230	143
FJ 7-N-...-...	100	165
SJ 2-...-...	20	30
NJ 15+U-...-...	290	110
NJ 20+U-...-...	290	110
NJ 30+U-...-...	210	125
CJ 1-12GK-N-...-...	$\leq$ 60	-
CJ 4-12GK-N-...-...	$\leq$ 60	-
CJ 2-18GK-N-...-...	$\leq$ 60	-
CJ 6-18GK-N-...-...	$\leq$ 40	-
CJ 15-40-N-...-...	$\leq$ 205	-
NJ 0,6-...-...	15	10
NJ 1,5-18GM-...-...	40	40
NJ 10-F-...-...	85	75
NJ 15-30GM-...-...	190	70
NJ 40+U-...-...	140	125
NJ 6+B+VNBi-...-...	260	150
NJ 10-23Bi-...-...	260	150
SJ 3,5Bi-...-...	50	640

Prüfungsunterlage

Teilbescheinigung PTB Nr. Ex-80/2089 U

Anlage zur Konformitätsbescheinigung PTB Nr. Ex-83/2022 X

Besondere Bedingungen

1. Die Näherungsschalter dürfen mit Versorgungs- und Steuergeräten - die in Zündschutzart [EEx ia] IIB oder IIC bzw. [EEx ib] IIB oder IIC bescheinigt sind - betrieben werden; die Zündschutzart für die Näherungsschalter richtet sich nach der jeweiligen Zündschutzart der Versorgungs- und Steuergeräte.
2. Lautet für die Versorgungs- und Steuergeräte und Näherungsschalter die Zündschutzart [EEx ia] IIB bzw. IIC, so sind die Näherungsschalter gegen mechanische Beschädigung zu schützen.

Im Auftrag

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 24

Braunschweig, 4.3.1983

(Dipl.-Ing. Johannsmeyer)

Physikalisch-Technische Bundesanstalt

1. N A C H T R A G

zur Konformitätsbescheinigung PTB Nr. Ex-83/2022 X

der Firma Pepperl + Fuchs GmbH + Co KG
D-6800 Mannheim

Der Näherungsschalter Typ NJ 10-22-..-... darf künftig auch entsprechend der Zeichnung Nr. 16-116-1 gefertigt werden.

Alle übrigen Daten bleiben unverändert.

Prüfungsunterlage

Zeichnung Nr. 16-116-1 vom 20.4.1983

Im Auftrag

Braunschweig, 16.5.1983

(Dr.-Ing. Schebsdat
Oberregierungsrat

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 24

EEx ia IIC T6 bzw. EEx ib IIC T6

Physikalisch-Technische Bundesanstalt

2. N A C H T R A G

zur Konformitätsbescheinigung PTB Nr. Ex-83/2022 X

der Firma Pepperl + Fuchs GmbH + Co KG
D-6800 Mannheim

Für die Näherungsschalter lautet die Zündschutzart künftig:

EEx ia IIC T1, T2, T3, T4, T5 oder T6
bzw.
EEx ib IIC T1, T2, T3, T4, T5 oder T6

Nachstehend besteht folgende Zuordnung zwischen Umgebungstemperatur, Typen und Temperaturklasse:

a) für die Typen SJ..., RJ...,
NJ..., FJ...,
CJ1-12GK-N-...-..., CJ2-18GK-N-...-...,
CJ4-12GK-N-...-..., CJ6-18GK-N-...-...

Umgebungstemperatur	Temperaturklasse
65 °C	T6
80 °C	T5
100 °C	T4, T3, T2 und T1

b) für den Typ CJ15-40-N-...-...

Umgebungstemperatur	Temperaturklasse
65 °C	T6, T5, T4, T3, T2 und T1

Alle übrigen Daten bleiben unverändert.

Prüfungsunterlage

Zeichnung Nr. 16-116-2 vom 25.4.1983

Im Auftrag

Braunschweig, 3.6.1983

(Dr.-Ing. Schebsdat)
Oberregierungsrat

EEx ia IIC T1...T6
EEx ib IIC T1...T6

Blatt 1/1

HAF

Physikalisch-Technische Bundesanstalt

3. N A C H T R A G

zur Konformitätsbescheinigung PTB Nr. Ex-83/2022 X

der Firma Pepperl + Fuchs GmbH + Co KG
D-6800 Mannheim

Die Schaltung der Initiatoren Typen NJ6+U...+Bi, NJ10-23-Bi-...
und SJ3,5-Bi... wird geändert.
Die Dioden n_1 und n_2 werden durch Zenerdioden ersetzt.

Alle übrigen Angaben bleiben unverändert.

Die "Besonderen Bedingungen" der Konformitätsbescheinigung gelten auch für den 3. Nachtrag.

Prüfungsunterlage
Zeichnung Nr. 16-116-3 unterschrieben am 29.12.1983

Im Auftrag Braunschweig, 14.2.1984

(Dr.-Ing. Schebsdat)
Oberregierungsrat

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 24

EEx ia IIC T6 bzw. EEx ib IIC T6 Blatt 1/1

320012 1.81

Physikalisch-Technische Bundesanstalt

4. N A C H T R A G

zur Konformitätsbescheinigung PTB Nr. Ex-83/2022 X

der Firma Pepperl + Fuchs GmbH + Co KG
D-6800 Mannheim

Die Typenreihe der Näherungsschalter wird um den Typ CJ10-30GM-N erweitert; dieser Typ wird entsprechend den beigefügten Unterlagen gefertigt und darf bis zu einer Umgebungstemperatur von ≤ 65 °C betrieben werden.

Der Näherungsschalter ist je nach angeschlossenem Stromkreis mit folgendem Kennzeichen zu versehen:

EEx ia IIC T6 oder EEx ib IIC T6

Die elektrischen Daten dieser Ausführung lauten:

Versorgungs- und Steuerstromkreis... nur zum Anschluß an eigensichere Stromkreise mit folgenden Höchstwerten:

U_o ≤ 15,5 V
I_k ≤ 52 mA
P_k ≤ 169 mW

Die wirksame innere Induktivität und Kapazität haben folgende Werte:

L_i vernachlässigbar klein
C_i ≤ 180 nF

Prüfungsunterlagen

Zeichnung Nr. 16-116-4 vom 17.12.1984

Im Auftrag

Braunschweig, 24.5.1985

(Dr.-Ing. Schebsdat)
Oberregierungsrat

EEx ia IIC T1...T6
EEx ib IIC T1...T6

Blatt 1/1

320612 1.81

Physikalisch-Technische Bundesanstalt

5. N A C H T R A G

zur Konformitätsbescheinigung PTB Nr. Ex-83/2022 X

der Firma Pepperl + Fuchs GmbH + Co KG
D-6800 Mannheim

Die Typenreihe der Näherungsschalter wird um die Typen NJ 1,5-10GM-...-... und NJ 3,5-12GK-...-... erweitert. Diese Typen werden entsprechend den beigefügten Unterlagen gefertigt.

Alle übrigen Daten bleiben unverändert.

Die "Besonderen Bedingungen" gelten auch für diesen Nachtrag.

Prüfungsunterlage

Zeichnung Nr. 16-116-5 vom 03.09.1985

Im Auftrag

Braunschweig, 13.02.1986

(Dr.-Ing. Schebsdat)
Oberregierungsrat

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT

EEx ia IIC T1...T6
EEx ib IIC T1...T6

6. N A C H T R A G

zur Konformitätsbescheinigung PTB Nr. Ex-83/2022 X

der Firma Pepperl + Fuchs GmbH + Co KG
D-6800 Mannheim 31

Die Näherungsschalter dürfen auch entsprechend der nachfolgenden Prüfungsunterlage betrieben werden.
Die Typenreihe der Näherungsschalter wird um die Typen NJ 5-30GK-S.., NJ 6 S1+U-..., NJ 40 FP-S.., NJ 15-M.., NJ 2-V..-.., RJ 10 und RJ 15 erweitert.

Elektrische Daten

Versorgungs- und Steuerstromkreis... nur zum Anschluß an eigensichere Stromkreise mit folgenden Höchstwerten:

$U = 15{,}5$ V
$I_K = 52$ mA
$P = 169$ mW

Die wirksamen inneren Induktivitäten und Kapazitäten sind der nachfolgenden Tabelle zu entnehmen:

Typenbezeichnung	C_i in nF	Li in µH
NJ 5-30GK	80	110
NJ 6 S1+U..	150	130
NJ 40 FP	300	168
NJ 15	130	80
NJ 2	40	35
RJ 10	70	50
RJ 15	70	15

oder

nur zum Anschluß an eigensichere Stromkreise mit folgenden Höchstwerten:

$U = 15{,}5$ V
$I = 76$ mA
$P = 242$ mW

Die wirksamen inneren Induktivitäten und Kapazitäten der Typen SJ..., RJ..., NJ..., FJ..., CJ 1-12GK-N-...-..., CJ 2-18GK-N-...-..., CJ 4-12GK-N-...-..., CJ 6-18GK-N-...-... und CJ 15-40-N-...-... sind dieser Konformitätsbescheinigung und ihren Nachträgen zu entnehmen.

Anlage zum 6. Nachtrag zur Konformitätsbescheinigung PTB Nr. Ex-83/2022 X

Nachstehend besteht folgende Zuordnung zwischen Umgebungstemperatur, Typen und Temperaturklasse:

a) für die Typen SJ..., RJ..., NJ..., FJ...,
CJ 1-12GK-N-...-..., CJ 2-18GK-N-...-...,
CJ 4-12GK-N-...-..., CJ 6-18GK-N-...-...

Umgebungstemperatur	Temperaturklasse
45°C	T6
60°C	T5
80°C	T4, T3, T2 u.T1

b) für den Typ CJ 15-40-N-...-...

Umgebungstemperatur	Temperaturklasse
45°C	T6, T5, T4, T3, T2 u.T1

Alle übrigen Daten sowie die "Besonderen Bedingungen" Blatt 3/3, Punkt 1-2 bleiben erhalten.

Prüfungsunterlage

Zeichnung Nr. 16-116-6C unterschrieben am 22.07.87

Besondere Bedingungen

3. Die elektrischen Daten und die Zuordnung der Temperaturklasse zur höchstzulässigen Umgebungstemperatur sind dieser Konformitätsbescheinigung zu entnehmen.

Im Auftrag

Braunschweig, 05.10.87

(Dr.-Ing. Schebsdat
Regierungsdirektor

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 24

Ü B E R S E T Z U N G zu PTB-Bescheinigung Nr. Ex-83/2022 X

This certificate is applicable to the electrical apparatus

Proximity Sensors types SJ..., RJ..., NJ...,
FJ... and CJ...

manufactured by Pepperl + Fuchs GmbH + Co KG
D - 6800 Mannheim

The construction of this electrical apparatus and any acceptable variation thereto is specified in the schedule to this certificate of conformity.

The Physikalisch-Technische Bundesanstalt being an approved certification body in accordance with Article 14 of the Council Directive of the European Communities of 18 December 1975 (76/117/EWG) confirms that the apparatus has been found to comply with the harmonised European Standards

Electrical apparatus for explosion hazardous areas

EN 50 014 - 1977 / VDE 0171	Part 1/5.78	General directions
EN 50 020 - 1977 / VDE 0171	Part 7/5.78	Intrinsic safety "i"

and has successfully met the examination and test requirements which are recorded in a confidential test report.

The apparatus marking shall include the code

EEx ia IIC T6 resp. EEx ib IIC T6

The manufacturer has the responsibility to ensure that the apparatus marked like that conforms to the specification laid down in the schedule to this certificate and has successfully met the prescribed sampling inspections.

The electrical apparatus may be marked with the Distinctive Community mark specified in Annex II to the Council Directive of 6 February 1979 (79/196/EWG).

The proximity sensors are designed to be operated at ambient temperatures up to 65 °C.

Electrical data

Supply and control circuit ... only for connection to intrinsically safe circuits with the following maximum values:

$U_o \leq 15{,}5$ V

$I_K \leq 52$ mA

$P \leq 169$ mW

The effective internal inductivities and capacities are shown in the following table:

Type designation	C_i in nF	L_i in µH
SJ 1-...-...	30	29
SJ 1,8-...-...	45	62
SJ 2,2-...-...	30	60
SJ 3,5-...-...	40	160
SJ 5-...-...	60	420
SJ 10-...-...	125	720
SJ 15-...-...	130	980
SJ 30-...-...	150	1005
RJ 10-...-...	45	10
RJ 15-...-...	45	15
RJ 21-...-...	45	20
RJ 43-...-...	45	45
NJ 0,8-F-...-...	30	22
NJ 0,8-4,5-...-...	30	10
NJ 0,8-5GM-...-...	30	10
NJ 1-N1-...-...	30	21
NJ 1-10-...-...	30	21
NJ 1,5-6,5-...-...	30	20
NJ 1,5-8GM-...-...	30	20
NJ 2-F-...-...	45	15
NJ 2-11-...-...	45	15
NJ 2-12GK-...-...	45	24
NJ 2-12GM-...-...	45	24
NJ 2,5-F-...-...	60	25
NJ 4-F-...-...	160	70
NJ 4-12GK-...-...	60	29
NJ 4-12GM-...-...	45	29
NJ 5-11-...-...	45	15
NJ 5-18GK-...-...	45	27
NJ 5-18GM-...-...	85	27
NJ 6-F-...-...	85	75
NJ 6-22-...-...	85	75

S C H E D U L E to PTB-No. Ex-83/2022 X

Type designation	C_i in nF	L_i in µH
NJ 7-F-...-...	100	165
NJ 8-18GK-...-...	60	40
NJ 8-18GM-...-...	100	40
NJ 10-22-...-...	210	75
NJ 10-30GK-...-...	130	70
NJ 10-30GM-...-...	210	70
NJ 10-30GKK-...-...	160	65
NJ 10-32-...-...	170	110
NJ 15-30GK-...-...	170	65
NJ 15-30GKK-...-...	160	65
NJ 15-32-...-...	230	100
NJ 15+B+V-...-...	290	110
NJ 15-40-...-...	290	107
NJ 15-50-...-...	170	123
NJ 20-40-...-...	290	117
NJ 20+B+V...-...	290	110
NJ 25-50-...-...	220	130
NJ 30+B+V-...-...	210	125
NJ 40-F-...-...	300	160
NJ 40-80-...-...	300	160
NJ 40-FP-...-...	300	168
NJ 1-N2-...-...	45	42
FJ 6-110-...-...	230	143
FJ 7-N-...-...	100	165
SJ 2-...-...	20	30
NJ 15+U+...-...	290	110
NJ 20+U+...-...	290	110
NJ 30+U+...-...	210	125
CJ 1-12GK-N...-...	$\leq$ 60	-
CJ 4-12GK-N-...-...	$\leq$ 60	-
CJ 2-18GK-N-...-...	$\leq$ 60	-
CJ 6-18GK-N-...-...	$\leq$ 40	-
CJ 15-40-N-...-...	$\leq$ 205	-
NJ 0,6-...-...	15	10
NJ 1,5-18GM-...-...	40	40
NJ 10-F-...-...	85	75
NJ 15-30GM-...-...	190	70
NJ 40+U-...-...	140	125
NJ 6+B+VNBi-...-...	260	150
NJ 10-23Bi-...-...	260	150
SJ 3,5Bi-...-...	50	640

Test Document

Certification PTB No. Ex-80/2089 U

S C H E D U L E to PTB-No. Ex-83/2022 X

Special Conditions

1. The proximity sensors may be operated with supply and control units being certified for ignition protection class [EEx ia] IIB or IIC resp. [EEx ib] IIB or IIC. The ignition protection class for the proximity sensors is determined by the ignition protection class of the supply and control units.

2. If the ignition protection class for the supply and control units and the proximity sensors is [EEx ia] IIB resp. IIC the proximity sensors have to be protected from mechanical damage.

1. S U P P L E M E N T to PTB-No. Ex-83/2022 X

of Pepperl + Fuchs GmbH + Co KG
D - 6800 Mannheim

In future, the proximity sensor type NJ 10-22-..-... may also be manufactured according to drawing no. 16-116-1.

All other data remain unchanged.

Test document

Drawing no. 16-116-1 dated 20.04.84

2. S U P P L E M E N T to PTB-No. Ex-83/2022 X

of Pepperl + Fuchs GmbH + Co KG
D - 6800 Mannheim

In future, the ignition protection class for the proximity sensors will be:

EEx ia IIC T1, T2, T3, T4, T5 or T6
resp.
EEx ib IIC T1, T2, T3, T4, T5 or T6

In the following are listed the proximity sensor types with their corresponding ambient temperatures in relation to the temperature classes:

a) for types SJ ...,
NJ ...,
CJ 1-12GK-N-...-...,
CJ 4-12GK-N-...-...,
RJ...,
FJ ...,
CJ 2-18GK-N-...-...,
CJ 6-18GK-N-...-...

Ambient temperature	Temperature class
65 °C	T6
80 °C	T5
100 °C	T4, T3, T2 and T1

b) for type CJ 15-40-N-...-...

Ambient temperature	Temperature class
65 °C	T6, T5, T4, T3, T2 and T1

All other data remain unchanged.

Test document

Drawing no. 16-116-2 dated 25.04.83

3. S U P P L E M E N T to PTB-No. Ex-83/2022 X

of Pepperl + Fuchs GmbH + Co KG
D - 6800 Mannheim

The circuits of the sensors types NJ 6+U...+Bi, NJ 10-23-Bi-... and SJ 3,5-Bi... are changed.

The diodes n_1 and n_2 are replaced by Zener diodes.

All other data remain unchanged.

The "special conditions" of the Certificate of Conformity are also applicable to the 3rd supplementation.

Test document

Drawing no. 16-116-3 signed on 29.12.83

4. S U P P L E M E N T to PTB-No. Ex-83/2022 X

of Pepperl + Fuchs GmbH + Co KG
D-6800 Mannheim

The type series of the proximity sensors is enlarged by the type CJ 10-30GM-N; this type is manufactured according to the attached documents and may operate up to an ambient temperature of = 65 °C.

The proximity sensor has to be marked with the following mark according to the connected circuit:

EEx ia IIC T6 or EEx ib IIC T6

The electrical data of this version are:

Supply- and control ciruit

only for connection to intrinsically safe circuits with the following maximum values:

$U_o \leqq 15{,}5$ V
$I_k \leqq 52$ mA
$P_k \leqq 169$ mW

The effective internal inductivity and capacity have the following values:

L_i neglectably small
$C_i \leqq 180$ nF

Test documents

Drawing No. 16-116-4 dated 17.12.1984

5. S U P P L E M E N T to PTB-No. Ex-83/2022 X

of Pepperl + Fuchs GmbH + Co KG
D-6800 Mannheim

The type series of the proximity sensors is enlarged by the types NJ 1,5-10GM-...-... and NJ 3,5-12GK-...-... These types are manufactured according to the attached documents.

All other data remain unchanged.

The "special conditions" are valid for this supplementation, too.

Test documents

Drawing no. 16-116-5 dated 03.09.1985

6. S U P P L E M E N T to PTB-No. Ex-83/2022 X

of Pepperl + Fuchs GmbH + Co KG
D-6800 Mannheim

The proximity sensors may also be operated according to the following test documents.
The type series of the proximity sensors is enlarged by the types NJ 5-30GK-S.., NJ 6 S1+U-..., NJ 40 FP-S.., NJ 15-M.., NJ 2-V..-.., RJ 10 and RJ 15.

Electrical Data

Supply and
control circuit ... only for connection to intrinsically safe circuits with the following maximum values:

$U = 15{,}5$ V
$I_K = 52$ mA
$P^K = 169$ mW

The effective internal inductivities and capacities are shown in the following table:

Type designation	C_i in nF	Li in μH
NJ 5-30GK	80	110
NJ 6 S1+U..	150	130
NJ 40 FP	300	168
NJ 15	130	80
NJ 2	40	35
RJ 10	70	50
RJ 15	70	15

or

only for connection to intrinsically safe circuits with the following maximum values:

$U = 15{,}5$ V
$I = 76$ mA
$P = 242$ mW

The effective internal inductivities and capacities of the types SJ..., RJ..., NJ..., FJ..., CJ 1-12GK-N-...-..., CJ 2-18GK-N...-..., CJ 4-12GK-N-...-..., CJ 6-18GK-N-...-... and CJ 15-40-N-...-... are shown in this certificate of conformity and its supplementations.

S C H E D U L E to PTB-No. Ex-83/2022 X
6. Supplement

In the following are listed the proximity sensor types with their corresponding ambient temperature in relation to the temperature class:

a) for the types SJ..., RJ..., NJ..., FJ...,
CJ 1-12GK-N-...-..., CJ 2-18GK-N-...-...,
CJ 4-12GK-N-...-..., CJ 6-18GK-N-...-...

Ambient temperature	Temperature class
45°C	T6
60°C	T5
80°C	T4, T3, T2 and T1

b) for the type CJ 15-40-N-...-...

Ambient temperature	Temperature class
45°C	T6, T5, T4, T3, T2 and T1

All other data as well as the "special conditions" page 3/3, point 1-2 remain unchanged.

Test documents

Drawing no. 16-116-6C signed on 22.07.87

Special conditions

3. The electrical data and the assignment of the temperature class to the maximum permissible ambient temperature are shown in this certificate of conformity.

7. SUPPLEMENT TO CONFORMITY CERTIFICATE PTB NO. Ex-83/2022 X

of the company Pepperl + Fuchs GmbH
D-6800 Mannheim 31

The proximity switches types SJ..., NJ..., RJ..., FJ... and CJ... may in future be manufactured and operated according to the test document listed below.

The change concerns the sealing of the proximity switch.

All other data remain unchanged.

Test document

Drawing No. 16-116-7 dated 19.05.92

Process Automation Solutions

INSTRUCTION ADDENDUM

SDA760-3
Rev: 1
February 1999

Series 760 Valve Controller
ESD Cautions

INSTRUCTIONS INVOLVED

SD760 Installation And Service Instruction for Series 760 Valve Controller, Issues 1 and 2

INTRODUCTION

The following statements apply to all sections of SD760.

CAUTION

Electrostatic discharge (ESD) can damage the semiconductor devices on circuit boards. A properly grounded conductive wrist strap must be worn whenever a circuit board with semiconductor devices is handled or touched. A service kit with a wrist strap and static dissipative mat is available from Moore (PN 15545-110). Equivalent kits are available from both mail order and local electrical supply companies. Typically, these kits contain instructions for proper use of the kit components.

In addition, you should assume that any procedure that requires handling or touching a circuit board is prefixed with the following step:

Place a conductive wrist strap on your wrist and connect its ground lead to an unpainted area on or inside the Model 760.

A circuit board with semiconductor devices must be placed in a static-shielding bag when not installed in the valve controller.

■

Siemens Energy & Automation	INSTRUCTION ADDENDUM

SDA760-5
Rev. 1
September 2004

Model Series 760 Valve Positioner
Supplemental Instructions for ATEX Certified Models

This addendum amends the technical data provided in SD760 *Installation and Service Instruction, ValvePAC Series 760, Intelligent Valve Control.* It provides details concerning the installation, operation, and servicing of ATEX certified equipment (European ATEX Directive 94/9/EC, Annex II, 1.0.6) described in the above referenced instruction. Included here are the Declaration of Conformity and Sira certificates.

IMPORTANT

The product's certifications are listed on its nameplate. Always refer to this nameplate before installing, operating, or servicing the product.

The information in this addendum supersedes that provided in the above referenced instruction.

The product's date of manufacture is shown on a label inside the cover. See the referenced instruction to remove the cover.

This addendum addresses equipment and protective systems intended for use in potentially explosive atmospheres and is applicable to the European Union. For installations in explosive atmospheres in other locations, see the referenced instruction or contact Siemens; see the Siemens Internet site at http://www.sea.siemens.com/ia/support/incs_sm.html.

The following statements apply to equipment covered by certificate numbers Sira 03ATEX2577X (attached) and Sira 03ATEX4578X (attached):

1. The equipment may be used in a hazardous area with flammable gases and vapours with apparatus groups IIC, IIB, and IIA and with temperature classes T1, T2, T3, T4, T5, and T6.
2. The equipment is certified for use in ambient temperatures in the range of -25°C to +85°C (-40°C for applications not requiring EEx nL or proximity switches) and should not be used outside this range.
3. Installation shall be carried out in accordance with the applicable code of practice by suitably trained personnel.
4. The equipment is not intended to be repaired by the user. Repair of this equipment shall be carried out by the manufacturer in accordance with the applicable code of practice.

5. If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.
    1) Aggressive Substances: e.g. acidic liquids or gases that may attack metals or solvent that may affect polymeric materials.
    2) Suitable Protection: e.g. regular checks as part of routine inspections or establishing from the material's data sheet that it is resistant to specific chemicals.
6. Certificate 03ATEX2577X has an "X" suffix that indicates that special conditions of certification apply. Intrinsically Safe (EEx ia) applications must be installed in accordance with the Special Conditions for Safe Use declared in Certificate Sira 03ATEX 2577X.

■

SIEMENS

EC Declaration of Conformity
EG-Konformitätserklärung

No. A5E00362252- 01

Manufacturer: *Hersteller:*	Siemens Energy & Automation, Inc.
Address: *Anschrift:*	1201 Sumneytown Pike Spring House, PA 19446 USA
Product description: *Produktbezeichnung*	Valve Positioner Model 760 Type / Typ 76abcdefghijkBl with a,b,c,d,e,f,g,h,i,j,k = 0..9, A..Z; l = N,3,4,6

The product described above in the form as delivered is in conformity with the provisions of the following European Directives:
Das bezeichnete Produkt stimmt in der von uns in Verkehr gebrachten Ausführung mit den Vorschriften folgender Europäischer Richtlinien überein:

89/336/EEC Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility.(amended by 91/263/EEC, 92/31/EEC and 93/68/EEC)
Richtlinie des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit.(geändert durch 91/263/EWG, 92/31/EWG und 93/68/EWG).

73/23/EEC Council Directive on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits. (amended by 93/68/EEC).
Richtlinie des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen.
(geändert durch 93/68/EWG)

94/9/EC Directive of the European Parliament and the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres.
Richtlinie des Europäischen Parlaments und des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen.

Spring House, 20.09.2004

Siemens Energy & Automation, Inc.

Sweeney, Approvals Coordinator		Wright, Manager, PIBU	
Name, function *Name, Funktion*	signatur *Unterschrift*	Name, function *Name, Funktion*	signatur *Unterschrift*

Annex A is integral part of this declaration.
Anhang A ist integraler Bestandteil dieser Erklärung.
This declaration certifies the conformity to the specified directives but contains no assurance of properties.
The safety documentation accompanying the product shall be considered in detail.
Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Zusicherung von Eigenschaften
Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

SIEMENS

Annex A to the EC Declaration of Conformity
Anhang A zur EG-Konformitätserklärung

No. A5E00362252- 01

Product description: Valve Positioner
Produktbezeichnung Model 760
Type / Typ 76abcdefghijkBl with a,b,c,d,e,f,g,h,i,j,k = 0..9, A..Z; I = N,3,4,6

Conformity to the Directives indicated on page 1 is assured through the application of the following standards (depending on versions):
Die Konformität mit den auf Blatt 1 angeführten Richtlinien wird nachgewiesen durch die Einhaltung folgender Normen (variantenabhängig):

Direktive *Richtlinie*	Standard / Reference number *Norm / Referenznummer*	Edition *Ausgabedatum*	I = N,3,4,6	I = 6
89/336/EWG	EN 50081-1	1992	x	x
89/336/EWG	EN 50081-2	1993	x	x
89/336/EWG	EN 61000-6-1	2001	x	x
89/336/EWG	EN 61000-6-2	2001	x	x
94/9/EG	EN 50014/A1 + A2	1997		x
94/9/EG	EN 50020	2002		x
94/9/EG	EN 50021	1999		x
73/23/EEC	EN 61010-1 + A1+ A2	1993	x	

Certificates:
Zertifikate:

Certificate *Zertifikat*	I = 6
SIRA 03ATEX2577X	x
SIRA 03ATEX4578	x

sira
Certification Service

1 **EC TYPE-EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: Sira 03ATEX2577X

4 Equipment: Series 760 Valve Controllers

5 Applicant: Siemens Energy and Automation Inc

6 Address: 1201 Sumneytown Pike
Spring House
PA19477-0900
USA

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report number R52A10387A.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 50014:1997 + Amendments 1 and 2
EN 50020:2002

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:

Ex II 2G
EEx ia IIC T4 or T5 or T6 (Ta =-40°C to +85°C)

The applicable temperature class and maximum ambient temperature depend upon the type of device that is incorporated into the equipment. see section 15.1 – special conditions for safe use.

Project Number 52A10387
Date 19 May 2004
C. Index 11

D R Stubbings BA MIEE
Certification Manager

Sira Certification Service
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Sira Certification Service is a service of Sira Test & Certification Ltd

Form 9176 Issue 10

Certification Service

SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE Sira 03ATEX2577X

13 **DESCRIPTION OF EQUIPMENT**

The Series 760E and 760P Valve Controllers are designed to be mounted on a valve to drive an actuator that positions the valve in proportion to an electrical input signal, they also feed back the valve position and line pressure information to control circuitry located in a non-hazardous area. They comprise a number of separate parts housed within a metal enclosure that can be fitted with an optional transparent 'Lexan' dome that permits a valve position indicator to be viewed. External electrical connections are made to the terminal blocks via a threaded entry that accommodates conduit or cable. A number of other threaded entries permit the pneumatic connections.

The Model 760E has the I/P converter fitted and the Model 760P does not.

The Valve Controllers are intended to be configured so that all or some of the separate parts (listed as items 1, 2, and 3 below) may be present.

The separate parts are as follows:

1 A Hartmann & Braun (formerly Sensycon) I/P Converter (TUV 99ATEX1487X) coded EEx ia IIC T6/T5/T4 (Tamb. range = -55 to +85°C), II 2G.

2 A 4-20mA printed circuit board or the pcb may be replaced by a JDK Controls potentiometer P/N 6209-2040 (1 kohm) or –2039-1 (5 kohm).

3 Two proximity switches, Pepperl and Fuchs Type NJ 2-V3-N-Y17905, Type 4, (PTB 00ATEX2032X, coded EEx ia IIC T4/T5/T6 (Tamb range = -20 to + 74°C) or two simple limit switches may be used (Tamb.= -40 to +85°C); these switches are rated at 0.5A, 125V dc.

The applicable safety descriptions are defined in section 15.1

14 **DESCRIPTIVE DOCUMENTS**

14.1

Drawing No.	Sheet	Rev.	Date	Description
15032-7612	1 of 6	1	10 Feb 04	General view, standard case
15032-7612	2 of 6	1	10 Feb 04	I/P converter
15032-7612	3 of 6	1	10 Feb 04	Option PCB parts
15032-7612	4 of 6	1	10 Feb 04	Option PCB layout
15032-7612	5 of 6	1	10 Feb 04	Option board schematics
15032-7612	6 of 6	1	10 Feb 04	Pneumatic and mechanical schematic
5-1030	1 of 1	2	10 Apr 04	Label, general

14.2 Report No. R52A10387A

Date 19 May 2004

Sira Certification Service
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Certification Service

SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE Sira 03ATEX2577X

15 **SPECIAL CONDITIONS FOR SAFE USE** (denoted by X after the certificate number)

15.1 The applicable electrical parameters and corresponding maximum ambient temperatures are defined as follows:

Table 1: I/P Converter, Converter Terminals

Max. amb. temp.	Temp. class	Parameters
>75 <=80°C	T4	Ii = 100 mA
>65 <=75°C	T4	Ii = 120 mA
>55 <=65°C	T4	Ii = 150 mA
	T5	Ii = 60 mA
>50 <=55°C	T4	Ii = 150 mA
	T5	Ii = 60 mA
	T6	Ii = 50 mA
>40 <=50°C	T4	Ii = 150 mA
	T5	Ii = 100 mA
	T6	Ii = 60 mA
<=40°C	T4	Ii = 150 mA
	T5	Ii = 120 mA
	T6	Ii = 60 mA

Table 2: 4 – 20 mA PCB, TB1 1,2,3 or Potentiometer, TB1 1,2,3

Max. amb. temp.	Device	Temp. class	Parameters
>40 <=80°C	Potentiometer	T4	Ii = 69.0 mA, Pi = 0.63 W
		T5	Ii = 42.6 mA, Pi = 0.24 W
<=40°C	Potentiometer	T4	Ii = 80.0 mA, Pi = 0.92 W
		T5	Ii = 69.0 mA, Pi = 0.63 W
		T6	Ii = 42.6mA, Pi = 0.24 W
	4 – 20 mA PCB	T4	Ui = 30 V, Ii = 110 mA, Pi = 0.78 W, Ci = 49 nF, Li = 20 µH

Table 3: Proximity Switches, TB2 1, 2, 3 and TB2 4, 5, 6 or Limit Switches, TB2 1, 2, 3 and TB2 4, 5, 6

Max. amb. temp.	Device	Temp. class	Parameters
>80 <=85°C	Limit switches	T5	Ui = 30 V, Ii = 400 mA, Pi = 1.3 W
<=80°C	Limit switches	T6	Ui = 30 V, Ii = 400 mA, Pi = 1.3 W
>45 <=74°C	Proximity switches	T4	Ui = 16 V, Ii = 76 mA, Pi = 242 mW, Ci = 40 nF, Li = 50 µH
>30 <=45°C	Proximity switches	T5	Ui = 16 V, Ii = 76 mA, Pi = 242 mW, Ci = 40 nF, Li = 50 µH
<=30	Proximity switches	T6	Ui = 16 V, Ii = 76 mA, Pi = 242 mW, Ci = 40 nF, Li = 50 µH

Date 19 May 2004

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Certification Service

SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE Sira 03ATEX2577X

16 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II** (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in Report No. R52A10387A.

17 **CONDITIONS OF CERTIFICATION**

17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.

17.2 Holders of EC type-examination certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.

Date 19 May 2004

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1 **TYPE EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: Sira 03ATEX4578

4 Equipment: Series 760 Valve Controllers

5 Applicant: Siemens Energy and Automation Inc

6 Address: 1201 Sumneytown Pike
Spring House
PA19477-0900
USA

7 This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service certifies that this equipment has been found to comply with the Essential Health and Safety Requirements that relate to the design of Category 3 equipment, which is intended for use in potentially explosive atmospheres. These Essential Health and Safety Requirements are given in Annex II to European Union Directive 94/9/EC of 23 March 1994.

The examination and test results are recorded in confidential report number R52A10388A.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule of this certificate, has been assessed by reference to:

EN 50021:1999

10 If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This TYPE EXAMINATION CERTIFICATE relates only to the design of the specified equipment, and not to specific items of equipment subsequently manufactured.

12 The marking of the equipment shall include the following:

II 3 G
EEx nL IIC T5 (Ta=-25°C to +85°C)

D R Stubbings BA MIEE
Certification Manager

Project Number 52A10388
Date 14 May 2004
C. Index 11

Sira Certification Service
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Form9207 Issue 4

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Certification Service

SCHEDULE

TYPE EXAMINATION CERTIFICATE NUMBER: Sira 03ATEX4578

13 **DESCRIPTION OF EQUIPMENT**

The Series 760E and 760P Valve Controllers are designed to be mounted on a valve to drive an actuator that positions the valve in proportion to an electrical input signal, they also feed back the valve position and line pressure information to control circuitry located in a non-hazardous area. They comprise a number of separate parts housed within a metal enclosure that can be fitted with an optional transparent 'Lexan' dome that permits a valve position indicator to be viewed. External electrical connections are made to the terminal blocks via a threaded entry that accommodates conduit or cable. A number of other threaded entries permit the pneumatic connections.

The Model 760E has the I/P converter fitted and the Model 760P does not.

The Valve Controllers are intended to be configured so that all or some of the separate parts (listed as items 1, 2, and 3 below) may be present.

The separate parts are as follows:

A Hartmann & Braun (formerly Sensycon) I/P Converter

I/P Converter terminals

I_I = 120 mA

2 **A 4-20 mA printed circuit board.**

Terminal block TB1 (1,2,3)

U_i = 42 V
I_i = 40 mA
C_o = 34 nF
L_o = 40 mH

Or

The pcb may be replaced by a JDK Controls potentiometer P/N 6209-2040 (1 kohm) or –2039-1 (5 kohm).

3 **Two proximity switches, Pepperl and Fuchs Type NJ 2-V3-N-Y17905**

Terminal block TB2 (1,2,3 and 4,5,6)

U_i = 25 V

Or

As an alternative to the proximity switches, two simple limit switches may be used; these switches have minimum ratings of 0.25 A, 125 V dc.

Terminal block TB2 (1,2,3 and 4,5,6)

U_i	=	30 V	**Or**	U_i	=	36.5 V	**Or**	U_i	=	42 V	**Or**	U_i	=	55 V
I_i	=	140 mA		I_i	=	92 mA		I_i	=	70 mA		I_i	=	45 mA

Date 14 May 2004

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Certification Service

SCHEDULE

TYPE EXAMINATION CERTIFICATE NUMBER: Sira 03ATEX4578

14 **DESCRIPTIVE DOCUMENTS**

14.1

Drawing No.	Sheet	Rev.	Date	Description
15032-7612	1 of 6	1	10 Feb 04	General view, standard case
15032-7612	2 of 6	1	10 Feb 04	I/P Converter
15032-7612	3 of 6	1	10 Feb 04	Option PCB parts
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15032-7612	5 of 6	1	10 Feb 04	Option board schematic
15032-7612	6 of 6	1	10 Feb 04	Pneumatic and mechanical schematic
5-1030	1 of 1	B	24 Feb 04	Label, general

14.2 Report No. R52A10388A

15 **SPECIAL CONDITIONS FOR SAFE USE** (denoted by X after the certificate number)

None

16 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II** (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in Report No. R52A10388A.

17 **CONDITIONS OF CERTIFICATION**

17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.

17.2 Holders of EC type-examination certificates are required to comply with the production control requirements defined in Article .

Date 14 May 2004

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