Siemens Industry, Inc.	INSTALLATION AND SERVICE INSTRUCTION

SD760
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May 2019

ValvePAC Series 760

Pneumatic and Electro-Pneumatic

Valve Positioners

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Changes for Revision 10, May 2019

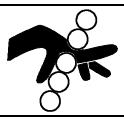
Section	Change
Cover	Revision number and date updated.
Page iii	Updated approval certificates Control Air I/P Converter

■

PREFACE

Conventions and Symbols

The following symbols may be used in this manual and may appear on the equipment. The reader should become familiar with the symbols and their meaning. Symbols are provided to quickly alert the reader to safety related text.

Symbol	Meaning
	Indicates an immediate hazardous situation which, if not avoided, *will* result in death or serious injury.
	Indicates a potentially hazardous situation which, if not avoided, *could* result in death or serious injury.
	Indicates a potentially hazardous situation which, if not avoided, *may* result in minor or moderate injury.
CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in property damage.
NOTICE	Indicates a potential situation which, if not avoided, may result in an undesirable result or state.
Important	Identifies an action that should be taken to avoid an undesirable result or state.
Note	Identifies additional information that should be read.
	**Electrical shock hazard.** The included Warning text states that the danger of electrical shock is present.
	**Electrical shock hazard.** Indicated that the danger of electrical shock is present.
	**Explosion hazard.** Indicates that the danger of an explosion hazard exists.
	**Electrostatic discharge.** The presence of this symbol indicates that electrostatic discharge can damage the electronic assembly.
	**Pinch hazard.** Indicates that a pinch hazard exists if correct procedures are not followed.

Qualified Persons

The described equipment should be installed, configured, operated, and serviced only by qualified persons thoroughly familiar with this manual. A copy of this manual, on the Process Instrumentation User Manual CD, accompanies the equipment. The current version of the manual, in Portable Document Format (PDF), can be downloaded from the Siemens Internet site; see the Customer/Product Support section of this manual.

For the purpose of this manual and product labels, a qualified person is one who is familiar with the installation, assembly, commissioning, and operation of the product, and who has the appropriate qualifications for their activities such as:

- Training, instruction, or authorization to operate and maintain devices/systems according to the safety standards for electrical circuits, high pressures, and corrosive, as well as, critical media.
- For devices with explosion protection: training, instruction or authorization to work on electrical circuits for systems that could cause explosions.
- Training or instruction according to the safety standards in the care and use of suitable safety equipment.

Scope

This manual does not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in connection with installation, operation, or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the support group listed in the Customer/Product Support section of this manual. The contents of this manual shall not become part of or modify any prior or existing agreement, commitment or relationship.

Warranty

The sales contract contains the entire obligation of Siemens. The warranty contained in the contract between the parties is the sole warranty of Siemens. Any statements continued herein do not create new warranties or modify the existing warranty.

General Warnings and Cautions

WARNING

An explosion-proof device may be opened only after power is removed from the device.

An intrinsically safe device loses its license as soon as it is operated in a circuit that does not meet the requirements of the examination certificate valid in your country.

The device may be operated with high pressure and corrosive media. Therefore, serious injury and/or considerable material damage cannot be ruled out in the event of handling of the device.

The perfect and safe operation of the equipment is conditional upon proper transport, proper storage, installation and assembly, as well as, on careful operation and commissioning.

The equipment may be used only for the purposes specified in this manual.

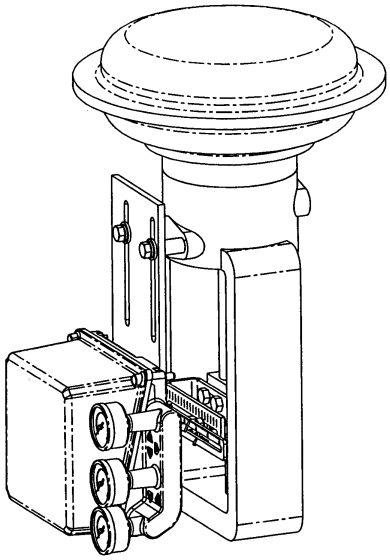
CAUTION

Electrostatic discharge can damage or cause the failure of semiconductor devices such as integrated circuits and transistors. The symbol at right appears on a circuit board or other electronic assembly to indicate that special handling precautions are needed.

- A properly grounded conductive wrist strap must be worn whenever an electronics module or circuit board is handled or touched. A service kit with a wrist strap and static dissipative mat is available from most electronics supply companies.
- Electronic assemblies must be stored in static protective bags when not installed in equipment.

1.0 INTRODUCTION

The ValvePAC™ Series 760 valve positioners are available in pneumatic and electro-pneumatic models, 760P and 760E respectively. Both are cam characterized, double-acting valve positioners. The 760P pneumatic positioner accepts a 3-15 psig or 3-27 psig input signal and converts it to a pneumatic output to position a control valve actuator. The 760E electro-pneumatic positioner accepts a 4-20 mA current signal and converts it to a pneumatic output. They can be used with linear or rotary, single or double acting actuators. Shown at right is a 760 mounted to a sample linear actuator. A selection of cam profiles and feedback levers (for linear operation) is available. A wide selection of mounting kits is available to allow mounting the positioner on most valve actuators.



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. Linear action can range from 1/2" to 6" in length.

Positioner installation is quite flexible. While the positioner is often ordered for use with a specific actuator, it can be reconfigured on site for use with either a linear or rotary actuator. Also, no additional parts are necessary to change between single and double acting actuators, or between direct and reverse actions. A selection of input shaft kits and feedback kits is available for Design Level B[1] positioners. Design Level D positioners feature a universal input shaft which allows customer selectable external adapters and feedback levers so replacement of the input shaft is not needed when changing application.

Available indicator options include a yellow flat indicator, an red and green beacon indicator, and pressure gauges, as shown on the cover of this manual. Output options include 4-20 mA feedback, 1K Ω potentiometer feedback, mechanical limit switches, and proximity switches. These options can be easily added in the field.

This manual is divided into five sections: Introduction, Installation, Cam Indexing and Positioner Calibration, Option Kit Installation, and Maintenance. A Parts List with an exploded view drawing of the positioner follows the Maintenance section.

IMPORTANT

This publication is for positioner design levels A, B, and D. Information that applies to a specific design level(s) is identified by the words Design Level and the appropriate letter(s).

Save this manual. It should be available to those installing, configuring, operating, and servicing the subject positioners. See Section 1.4 Customer/Product Support to download the current revision of this publication.

The Cam Indexing and Positioner Calibration section and other procedures specify an input signal of 3-15 psig (760P) or 4-20 mA (760E). If other engineering units (e.g. kPa) are to be used, substitute the equivalent values for the specified values for best accuracy.

1.1 SPECIFICATIONS

Functional and performance specifications for Model 760P Pneumatic and Model 760E Electro-Pneumatic Valve Positioners are listed below. Table 1-1 lists positioner specifications for each of the four major options. For installation in a hazardous location, see Control Drawing 15032-7602 (following Section 2, Installation) for temperature limitations.

[1] The design level is shown in the second to last letter in the positioner model designation, as stated on the nameplate label.

Functional

Temperature Range:
- 760P without options ..... -40°C to +85°C (-40°F to +185°F)
- 760P with high temperature option ..... -29°C to +149°C (-20°F to +300°F), Viton® input diaphragm
- 760E without options ..... -40°C to +75°C (-40°F to +167°F)
- 760P or E with Option Kit ..... See Table 1-1 Positioner Specifications with Option Kit Installed

Ingress ..... NEMA 4X, IP65

Connections:
- Pneumatic ..... 1/4 NPT
- Gauge ..... 1/8 NPT
- Electrical ..... 3/4 NPT or M25 (conduit adapter, Design Level D)
- Exhaust ..... 1/4 NPT

Finish ..... Epoxy/Polyester Powder Coat

Output Configuration ..... Single or Double-Acting

Action ..... Direct or Reverse

Supply Pressure ..... 150 psig maximum

Air Consumption:
- Standard Spool ..... 0.5 scfm
- Low Gain Spool ..... 0.5 scfm
- High Flow Capacity Spool ..... 1.0 scfm typical

Flow Capacity (at 60 psi with 25% drop)
- Standard Spool ..... 9 scfm (Cv = 0.3) (1/2 pressure gain of standard)
- Low Flow Spool ..... 9 scfm (Cv = 0.3)
- High Flow Spool ..... 18 scfm (Cv = 0.6)

Input Signal
- 760P ..... 3-15 psig, 3-27 psig (see Table 1-3 Model Designation)
- 760E ..... 4-20 mA

Mechanical Feedback
- Rotary ..... 90 degree standard
- Linear ..... 1/2-inch to 6-inches, longer lengths available on request

Cam Characterization ..... Equal %, Quick Opening, Linear

Pressure Gain ..... 160%/% @ 60 psi supply standard, 80%/% with high temp option

Span ..... Adjustable -60% to +25% of normal span[2]

Zero ..... Adjustable -10% to +60% of normal span[2]

Performance

Linearity:
- 760P ..... 0.5% of normal span[2] (typical)
- 760E ..... 0.75% of normal span[2] (typical)

Hysteresis:
- 760P ..... 0.75% of normal span[2] (typical)
- 760E ..... 1.0% of normal span[2] (typical)

Deadband ..... Less than or equal to 0.25% of span

Repeatability ..... Within 0.5% of span[3]

Supply Pressure Effect ..... Less than 0.2% of span[3] for a 5 psi change in supply pressure

Hazardous Area Class Approvals

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 Siemens drawing 15032-7602
Non-Incendive:
Class I, Div. 2, Groups A, B, C, D

[2] Normal span is 12 psig (760P) or 16 mA (760E).
[3] Valve travel span

Suitable for:
Class II, Div. 2, Groups 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 Siemens 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

EMC ..... EN50081-1 and EN50081-2 Emission
EN61000-6-1 and EN61000-6-2 Immunity

ATEX Certification ..... 11 2 G EEx ia 11C T4/T5/T6
11 3 G EEx nL IIC T5
See ATEX Certifications for service restrictions
SIRA 03ATEX2577X and SIRA 03ATEX4578

Enclosure ..... Type 4X, in accordance with NEMA standard 250
Type IP65 in accordance with IEC standard 529

Table 1-1 Positioner Specifications with an Installed Output Option Kit

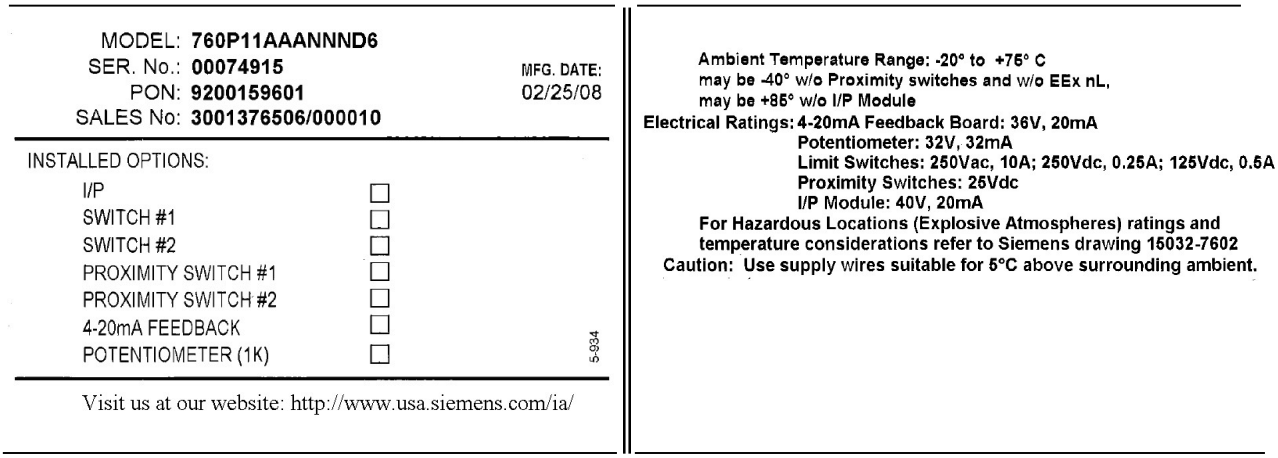
Note: All percentages are based on full span of output, unless otherwise noted.

Parameter↓ Option→	**4-20 mA Feedback Board**	**1K Ω Potentiometer Feedback Board**
Temperature Range: 760P 760E	 -40° to +85°C (-40° to +185°F) -40° to +75°C (-40° to +167°F)	 -40° to +85°C (-40° to +185°F) -40° to +75°C (-40° to +167°F)
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 28°C (50°F) change	Less than 1.0% per 28°C (50°F) change
Zero / Span	55° to 150° input range for full span	0 to 915 Ohms over 90° input rotation
Power Requirements	10 to 36 Vdc	-----
Power Rating	-----	1 Watt @ 70°C (158°F) Do not exceed 32 mA or 32 Volts

Parameter↓ Option→	**Mechanical Limit Switch Board**	**Proximity Sensor Limit Switch Board**
Temperature Range: 760P 760E	 -40° to +85°C (-40° to +185°F) -40° to +75°C (-40° to +167°F)	 -20° to +85°C (-4° to +185°F) -20° to +75°C (-4° to +167°F)
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 manuals
Mechanical life	1 million cycles no load, 100,000 full load	Essentially infinite
Connections (per switch)	Form C: Normally Open, Normally Closed, Common	See barrier manufacturer manuals
Repeatability	Within 0.3% valve travel span	Within 0.3% valve travel span

1.2 MODEL DESIGNATION

Each positioner has a nameplate label and a ratings label inside the cover; see Figure 1-1. The nameplate label shows the complete model number, serial number, and installed options. The model designation list, Table 1-2, presents the alphanumeric identifier for each model feature. The ratings label shows the temperature and electrical ratings.



Sample Nameplate Label **Sample Ratings Label**

Figure 1-1 Positioner Labels, Inside Cover

The approvals plate on the outside of the positioner shows agency approvals and certifications applicable to the positioner.

IMPORTANT

Before installing, operating or servicing a positioner, review the approvals plate information.

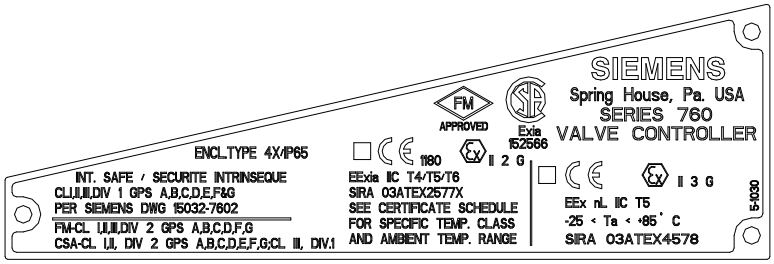


Figure 1-2 Approvals Plate

IMPORTANT

ATEX Certification - Mark one of the two check boxes on the approvals plate to indicate degree of protection.

1.2.1 Design Levels

This publication addresses three positioner design levels: A, B, and D. Significant changes are listed in Table 1-3. The design level of a positioner is shown as the next to last character in the positioner model designation.

Table 1-2 Model Designation

Valve Positioner Base Model	760										
Input Signal											
4 to 20 mA [1]		E1									
3 to 15 psig		P1									
3 to 27 psig		P2									
20 to 100 kPa		P4									
0.2 to 1 Bar		P5									
0.2 to 1.0 kg/cm^2		P6									
Action											
1/2-inch to 4-inch stroke (with 3, 60° cams)			1								
2-inch to 6-inch stroke (with 3, 60° cams)			2								
1/4-turn, 1/2-inch square shaft (with 3, 90° cams)			3								
1/2-inch to 2-inch stroke (with 3, 60° cams)			4								
1/4-turn, NAMUR style shaft (with 3, 90° cams)			5								
1/4-turn 1/2-inch square shaft (with 3, 60° cams)			7								
1/2-inch to 4-inch stroke lever (with 1, 90° linear cam)			E								
2-inch to 6-inch stroke lever (with 1, 90° linear cam)			F								
1/4-turn NAMUR shaft (with 3, 60° cams)			S								
Enclosure Type with 4X/IP65 with 3/4-Inch NPT Conduit Connection											
Standard				A							
With Beacon Indicator –for Action selections with 90° cams [1]				B							
With Stroking Speed Adjusters [3]				C							
With Stroking Speed Adjusters and Beacon Indicator [1] [3]				D							
With Flat Indicator – for Action selections with 60° cam [1]				J							
With Flat Indicator – for Action selections with 90° cam [1]				K							
With Stroking Speed Adjusters and Flat Indicator – for Action selections with 60° cam [1] [3]				L							
With Stroking Speed Adjusters and Flat Indicator – for Action selections with 90° cam [1] [3]				M							
Enclosure Type 4X/IP65 with M25 Conduit Connection [3]											
Standard				E							
With Beacon Indicator (For Action selections with 90° cams [1])				F							
With Stroking Speed Adjusters [3]				G							
With Stroking Speed Adjusters and Beacon Indicator [1] [3]				H							
With Flat Indicator – for Action selections with 60° cam [1]				N							
With Flat Indicator – for Action selections with 90° cam [1]				P							
With Stroking Speed Adjusters and Flat Indicator – for Action selections with 60° cam [1] [3]				R							
With Stroking Speed Adjusters and Flat Indicator – for Action selections with 90° cam [1] [3]				S							
Flow Capacity											
Standard capacity spool valve assembly (Cv = 0.3)					A						
High flow capacity spool valve assembly (Cv = 0.6)					B						
Low flow gain spool valve assembly (approximately 1/2 standard flow gain) [4]					C						
Environmental Construction											
Std. temp. 760P: -40°C to +85°C (-40°F to +185°F); 760E: -40°C to +75°C (-40°F to +167°F)						A					
High temperature (760P with no electrical options and no approvals) -29°C to +149°C (-20°F to +300°F)						C					
Ozone resistant with Viton® fluoroelastomer and iso-elastomeric spring						E					
Ozone resistant with Viton® fluoroelastomer and standard spring						F					
Gauges											
Not Required							N				
Gauges, 3 [1]							G				
Limit Switch Boards [1]											
Not Required								N			
Mechanical								1			
Proximity Switches (NAMUR Standard)								2			
Output Options [1]											
Not Required									N		
Potentiometer 1K Ohm									1		
4-20 mAdc Feedback									2		
Potentiometer, 1K Ohm with Stainless Steel Feedback Gear									3		
4-20 mA Feedback with Stainless Steel Feedback Gear									4		
Design Level										D	
Electrical Certification (Refer to Specifications) [2]											
Non-Approved											N
FM / CSA / ATEX / CE [1]											6
FM / CSA / CE [1, 5]											7

Notes:

1) Not available with High Temperature Option. **2)** Consult factory for other certifications.

3) Discontinued option, shown for reference only. For 3/4NPT to M25 conduit adapter, order TGX:16300-1439. The speed adjuster function can be implemented with an externally piped flow restrictor such as ASCO catalog number V0222 or equivalent.

4) Used on small volume actuators (i.e., piston diameter less than 4″ (10mm))

5) Discontinued option.

Table 1-3 Design Levels

Design Level	Significant Features or Changes From Previous Design Level
A	• Initial design level. External dimensions shown in Figure 2-1. • Input shaft with one of the following integral shaft ends: feedback lever (with slot for 1/4-inch diameter feedback pin), NAMUR style, or 0.5-inch square. See Figures 2-5 and 2-11.
B	• Input shaft/O-ring configuration revised. External dimensions shown in Figure 2-1. • Input shaft with one of the following integral shaft ends: feedback lever (with slot for 1/4-inch diameter feedback pin), NAMUR style, or 0.5-inch square. See Figure 2-5 and 2-11.
D	• Universal input shaft with D-shaped shaft end to accept a NAMUR style adapter, square adapter, or linear adapter introduced. See Figures 2-2 and 2-3. • Feedback lever and retaining clip revised. Slot in feedback lever increased in width to accept 5/16-inch feedback pin. • All enclosures have a 3/4-inch NPT conduit connection. An adapter is supplied when an M25 conduit connection is specified.

1.3 OPTIONAL KITS

An option kit can be installed either at the factory or on site by the installer. Several examples are described below.

- Bracket Kit – Order a Siemens bracket kit to mount the positioner on a particular actuator (specify manufacturer and model). Table 1-4 lists common bracket kits. Each kit includes mounting bracket, hardware, installation instructions, and other parts as required. Typically, a feedback kit (input shaft kit or adapter/feedback lever) is also ordered. A custom bracket kit may be ordered if an existing kit is not available.
- Mechanical Feedback Kit – Order a Siemens feedback kit to couple the actuator shaft to the positioner input shaft. Installation instructions are provided with most kits. See Table 1-5 for a partial list. Contact Siemens, Process Instrumentation for the current list of feedback kits.
- Cam Kit – Order to (typically) linearize the valve characteristic. A linear cam is installed in the positioner at the factory (unless otherwise ordered) and several models include a selection of cams; see Table 1-2 Model Designation for the cams included with a particular positioner model. See Table 1-5 for cam kits.
- Output Option Kit – Order to add features (e.g. Mechanical Limit Switches, Proximity Limit Switches, Feedback Potentiometer and 20 mA Feedback) to a positioner. These kits are also used when servicing a positioner to replace a failed assembly. Installation is described in Section 4 of this manual and in an installation instruction provided with most kits. See Table 1-5 for output option kits.

The circuit board based output option kits listed in Table 1-1 were available at the time this manual was published. Also, see Table 1-5 for additional kit details and part numbers. Contact the factory or your local Siemens Industry, Inc., Process Industries division representative for current options. Refer to Customer/Product Support later in this publication for contact information.

Table 1-4 Bracket Kits

	BRACKET DIMENSIONS A x B, mm (inches)	TYPE	PART NUMBER
NAMUR Mounting Kits	80 x 20 (3.150 x 0.787)	Rotary	6DR40041D
	80 x 30 (3.150 x 1.181)	Rotary	6DR40042D
	130 x 30 (5.118 x 1.181)	Rotary	6DR40043D
	130 x 50 (5.118 x 1.968)	Rotary	6DR40044D
Model 750 to Model 760	Adapter Plate	-----	16300-79

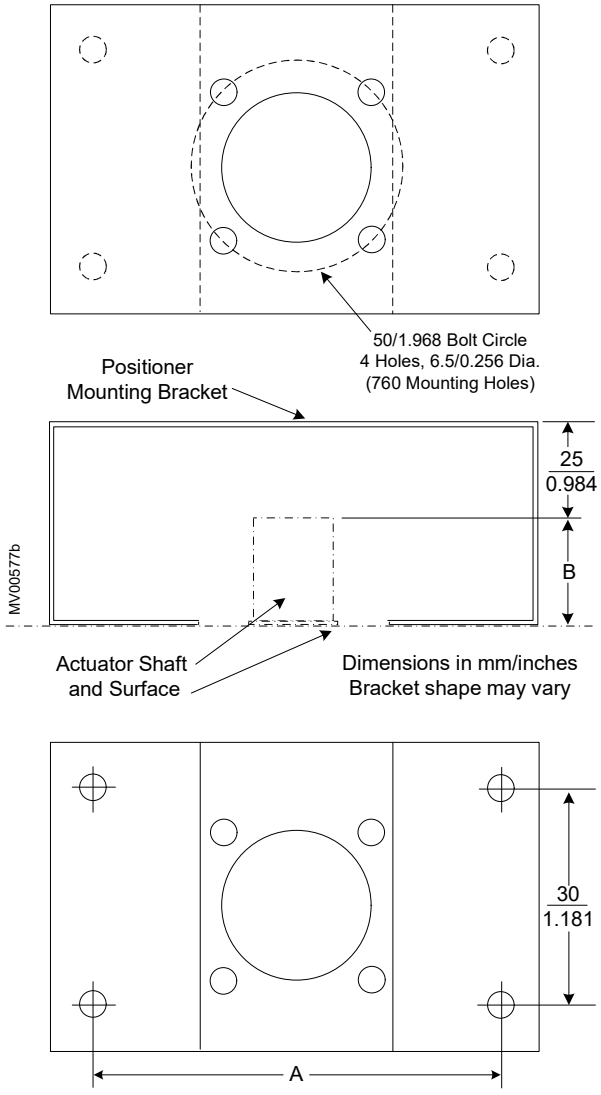


Table 1-5 Cam, Input Shaft, Indicator, Output, and Other Kits

Description	Order Number
Conversions	
I/P Module Kit (converts 760P to 760E)	**16300-1355**
Sealing Plate Kit (converts 760E to 760P)	**16300-641**
3-15 PSI Input Spring (Std. Temp.)	**16300-331**
Pressure Gauge Kit, (3) Gauges	**16300-442**
90° Beacon Indicator Kit (for 1/4 Turn Actuators)	**16300-488**
60° Flat Indicator Kit (for Lever Action Actuators)	**16300-486**
90° Flat Indicator Kit (for 1/4 Turn Actuators)	**16300-487**
3-15 PSI Conversion Kit (Hi Temp.)	**16300-640**
3-27/6-30 PSI Conversion Kit (Std. Temp.)	**16300-771**
Hi-temp 3-27 PSI	**16300-772**
3/4 NPT to M25 Metric Conduit Adapter, Stainless Steel, Design Level D	**16300-1439**
Output Options (Circuit Board Based Kits) and Spool Options	
Mechanical Limit Switches Kit (2) SPDT	**16300-500**
Proximity Limit Switches Kit (2) NAMUR type	**16300-501**
1KΩ Feedback Potentiometer Kit (Approx. 918Ω for 90°; 612Ω for 60° rotary operation)	**16300-503**
4 to 20 mAdc Feedback Kit	**16300-502**
Mechanical Limit Switches and 1KΩ Feedback Potentiometer Kit (Approximately 918Ω for 90°; 612Ω for 60° rotary operation)	**16300-505**
Mechanical Limit Switches and 4 to 20 mAdc Feedback Kit	**16300-504**
Proximity Limit Switches and 1KΩ Feedback Potentiometer Kit (Approximately 918Ω for 90°; 612Ω for 60° rotary operation)	**16300-507**
Proximity Limit Switches and 4 to 20 mAdc Feedback Kit	**16300-506**
1KΩ Feedback Potentiometer Kit w/SS feedback gear (Approximately 918Ω for 90°; 612Ω for 60° rotary operation)	**16300-580**
4 to 20 mAdc Feedback Kit w/SS feedback gear	**16300-577**
Mechanical Limit Switches and 1KΩ Feedback Potentiometer Kit w/SS feedback gear (Approximately 918Ω for 90°; 612Ω for 60° rotary operation)	**16300-581**
Mechanical Limit Switches and 4 to 20 mAdc Feedback Kit w/SS feedback gear	**16300-578**
Proximity Limit Switches and 1KΩ Feedback Potentiometer Kit w/SS feedback gear (Approximately 918Ω for 90°; 612Ω for 60° rotary operation)	**16300-582**
Proximity Limit Switches and 4 to 20 mAdc Feedback Kit w/SS feedback gear	**16300-579**
Note: Above listed options are limited to standard upper temperature limit of +185° F.	
Standard Flow Spool Valve Kit	**16300-468**
High Flow Spool Valve Kit	**16300-469**
Low Gain Spool Valve Kit	**16300-470**
Cams	
760 P/E Cam Kit, rotary 90° Action (3 cams: Linear, QO, =%)	**16300-783**
760 P/E Cam Kit, linear 60° Action (3 cams: Linear, QO, =%)	**16300-784**
75° Rotary-Linear	**16300-805**
Cam, 180° - CW, Rotary - Linear	**16300-807**
Cam, 30° - Rectilinear - Linear	**16300-816**
Cam, 180° - CCW, Rotary - Linear	**A6X30005613**
Spare Parts Kits (Figures 2-5 and 2-11)	
Spare Parts Kit includes all recommended rebuild parts as shown in SD760, Issue 2	**16300-686**
760 I/P Transducer Filter Kit, (5) per bag, for a Sensecon, ABB or ControlAir Transducer	
NAMUR Adapter Kit, Design Level D	**TGX:16300-1556**
Square Adapter Drive 1/2", Design Level D	**TGX:16300-1545**
Linear Adapter, Design Level D	**TGX:16300-1557**
Lever Kit 1/2" to 2" Stroke, Design Level D	**TGX:16152-712**
Lever Kit 1/2" to 4" Stroke, Design Level D	**TGX:16152-714**
Lever Kit 2" to 6" Stroke, Design Level D	**TGX:16152-716**
Lever Kit 2" to 10" Stroke, Design Level D	**TGX:16152-720**
Spare Parts	
NEMA 4 Exhaust Vent	**16300-203**

Retaining clip, Design Levels A and B	**16300-8**
One-Piece Input Shaft Kits, Design Levels A and B (Figures 2-5 and 2-11)	
Input Shaft with NAMUR Shaft End	**16300-690**
Input Shaft with 0.5” x 0.5” Square Shaft End	**16300-693**
Input Shaft with 0.65” x 0.65” Square Shaft End	**16300-694**
Input Shaft with 0.25” to 2” Feedback Lever	**16300-695**
Input Shaft with 0.25” to 4” Feedback Lever	**16300-696**
Input Shaft with 3” to 6” Feedback Lever	**16300-697**
Universal Input Shaft Kit, Design Level D (Figures 2-3 and 2-13)	**TGX:16300-1587**
NAMUR Adapter, Design Level D	**TGX:16300-1556**
Square Adapter, Design Level D	**TGX:16300-1545**
Linear Adapter, Design Level D	**TGX:16300-1557**
Feedback Lever Kit, 2” , Design Level D	**TGX:16152-712**
Feedback Lever Kit, 4” , Design Level D	**TGX:16152-714**
Feedback Lever Kit, 6” , Design Level D	**TGX:16152-716**

1.4 CUSTOMER/PRODUCT SUPPORT

Support is available through an online Support Request service; a link is provided in the table at the end of this section.

When contacting Siemens for support:

- Please provide complete product information:
    - This information is provided on the product nameplate (part number or model number, serial number, and/or version).
- 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 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 product Service Instruction, User’s Manual, or other technical publication 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 warranty or non-warranty service, call Customer Service and Returns and 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).

For support and the location of your local Siemens representative, refer to the table below for the URL of the Process Instrumentation (PI) portion of the Siemens public Internet site. Once at the site, click **Support** in the right column and then **Product Support**. Next select the type of support desired: sales, technical (see the table below), documentation, or software.

Online Support Request	http://www.siemens.com/automation/support-request
Technical Support	1-800-333-7421; 8 a.m. to 4:45 p.m. eastern time, Monday through Friday (except holidays)
Customer Service & Returns	1-800-365-8766 (warranty and non-warranty)
Public Internet Site	http://www.usa.siemens.com/pi
Technical Publications in PDF	Click the above link to go to the PI home page. Click **Support** and then **Manuals** and then, under "Additional Manuals," select the product line (e.g. Control Solutions)

■

2.0 INSTALLATION

This section describes installation of a Series 760 Valve Positioner on either a linear actuator or a rotary actuator. Installation of the mechanical feedback linkage is also described. Optional Siemens bracket kits and feedback kits are featured in these procedures.

Section 2.1 describes shipping and storage of the positioner. A list of materials to be supplied by the installer will be found in Section 2.2. Mechanical Installation procedures are provided in Section 2.3. This section is divided into two subsections: 2.3.1 Linear Actuator Applications and 2.3.2 Rotary Actuator Applications. Pneumatic connections are identified and supply air recommendations are stated in Section 2.4 Pneumatic Connections. Section 2.5 Electrical Connections contains wiring data for non-hazardous and hazardous locations, with references to the control drawing and approval certificates as appropriate. Following Section 2.5, the Siemens control drawing, declaration of conformity, and approval certificates are found.

Installation Sequence

The following is a typical installation sequence. It may be necessary to rearrange the sequence as circumstances dictate, although the final step should always be calibration.

1. Mount the positioner on the actuator using a Siemens bracket kit or installer fabricated mounting bracket. Install either the Siemens mechanical feedback components or installer fabricated feedback components.
2. Change the cam to the desired type and lobe, as necessary, and index the cam. Refer to Section 3.2 Cam Installation and Indexing.
3. Install options (e.g. Output Option Kit, Indicator Option Kit) in the positioner. Refer to Section 4 Option Kit Installation and to the Instructions provided with the kit.
4. Calibrate the positioner, align the beacon or flat indicator as needed, and check that the valve operates correctly. Refer to Section 3.3 Calibration.

Hazardous Area Installations

Before continuing, read the following warning. If installing in a hazardous area, refer to Siemens control drawing 15032-7602 and the certifications following Section 2.5 Electrical Connections. The positioner approvals plate, Figure 1-2, must display the required agency approvals for the installation location and hazardous area classification.

WARNING

Electrical shock hazard
Explosion hazard

Can cause death or injury.

- Remove power from all wires and terminals before working on equipment.
- In potentially hazardous atmosphere, remove power from equipment before connecting or disconnecting power, signal, or other circuit.
- Observe all pertinent regulations regarding installation in hazardous area.

2.1 SHIPPING AND STORAGE

Carefully unpack the positioner. Save the shipping materials in case reshipment is needed.

If the positioner is to be temporarily stocked, stored for an extended period, or shipped to another location prior to piping, the factory installed plastic plugs must remain inserted in all otherwise un-piped pneumatic ports and conduit connectors to prevent entry of moisture, dirt, or other contaminants.

2.2 INSTALLATION MATERIALS

Siemens mounting bracket kits, feedback kits, and cam kits are listed in Section 1.3 Optional Kits. Installer supplied materials include the following. This list will vary with installation site and involved process equipment.

- Pipe, appropriate fittings, and non-hardening pipe sealant
- Instrument quality, pressure regulated air
- If installing in a hazardous area, refer to Siemens control drawing 15032-7602 at the end of Section 2.5 for electrical installation wiring, barriers, and entity data for barrier selection
- Electrical conduit and fittings
- Anti-static service kit – A kit containing a conductive mat and wrist strap is available from most electronic supply companies. When handling a circuit board, always use the kit to protect semiconductor components from electrostatic discharge.

2.3 MECHANICAL INSTALLATION

This section is divided by actuator/valve action – Section 2.3.1 is for linear applications and Section 2.3.2 is for rotary. For either action, mounting considerations and a typical procedure are provided.

Before beginning an installation, the positioner-to-actuator mounting and feedback linkage must be carefully considered. A positioner mounting bracket kit with mechanical feedback components can be ordered from Siemens. Each mounting bracket kit is designed for a specific actuator or series of actuators and includes the bracket, hardware, and other parts. If a kit is not available for a particular actuator or actuator model, a custom mounting bracket and feedback linkage can be ordered from Siemens or fabricated on-site.

Positioner dimensions and mounting hole locations are shown in Figure 2-1, for design levels A and B, and in Figure 2-2, for design level D. Figures 2-2 and 2-3 provide dimension details for design level D adapters and feedback levers.

For actuator dimensions and mounting details, refer to the actuator manufacturer's literature.

CAUTION

Exceeding the positioner or actuator specified operating temperature limits can adversely affect performance and safety and may cause damage to the instrument. Refer to Section 1.1 Specification for positioner environmental specifications.

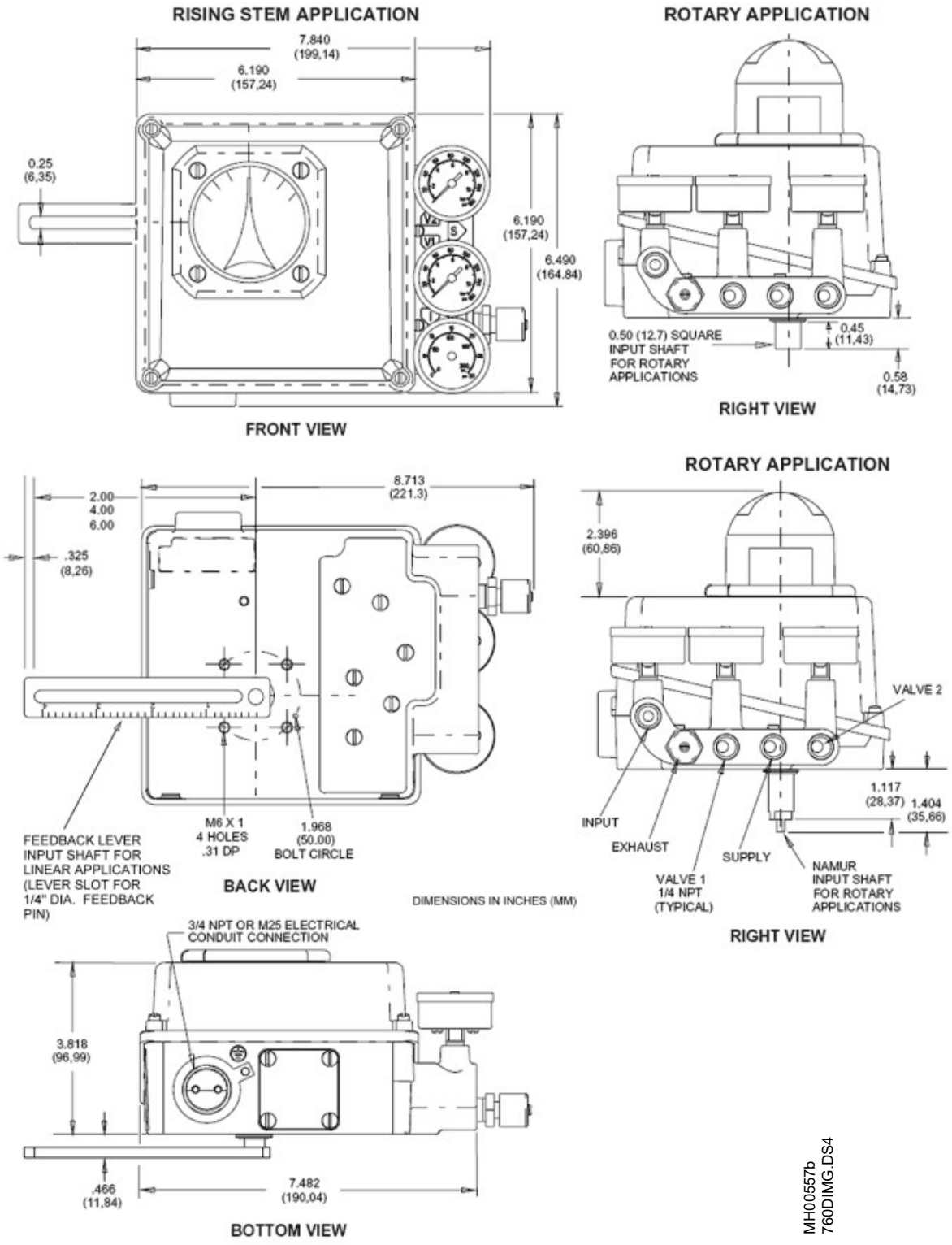


Figure 2-1 Installation Dimensions, Design Levels A and B

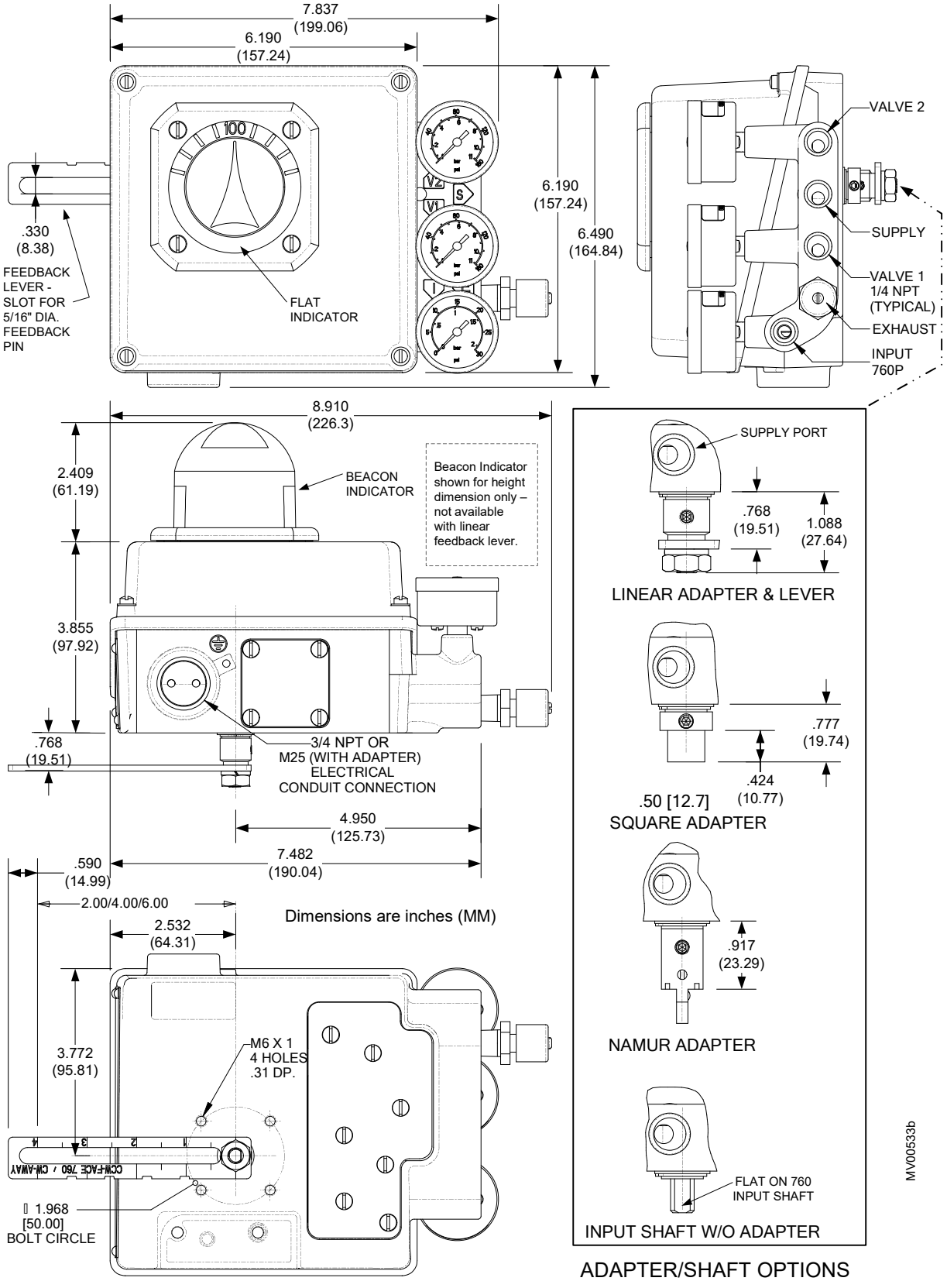


Figure 2-2 Installation Dimensions and Adapter/Shaft Options, Design Level D

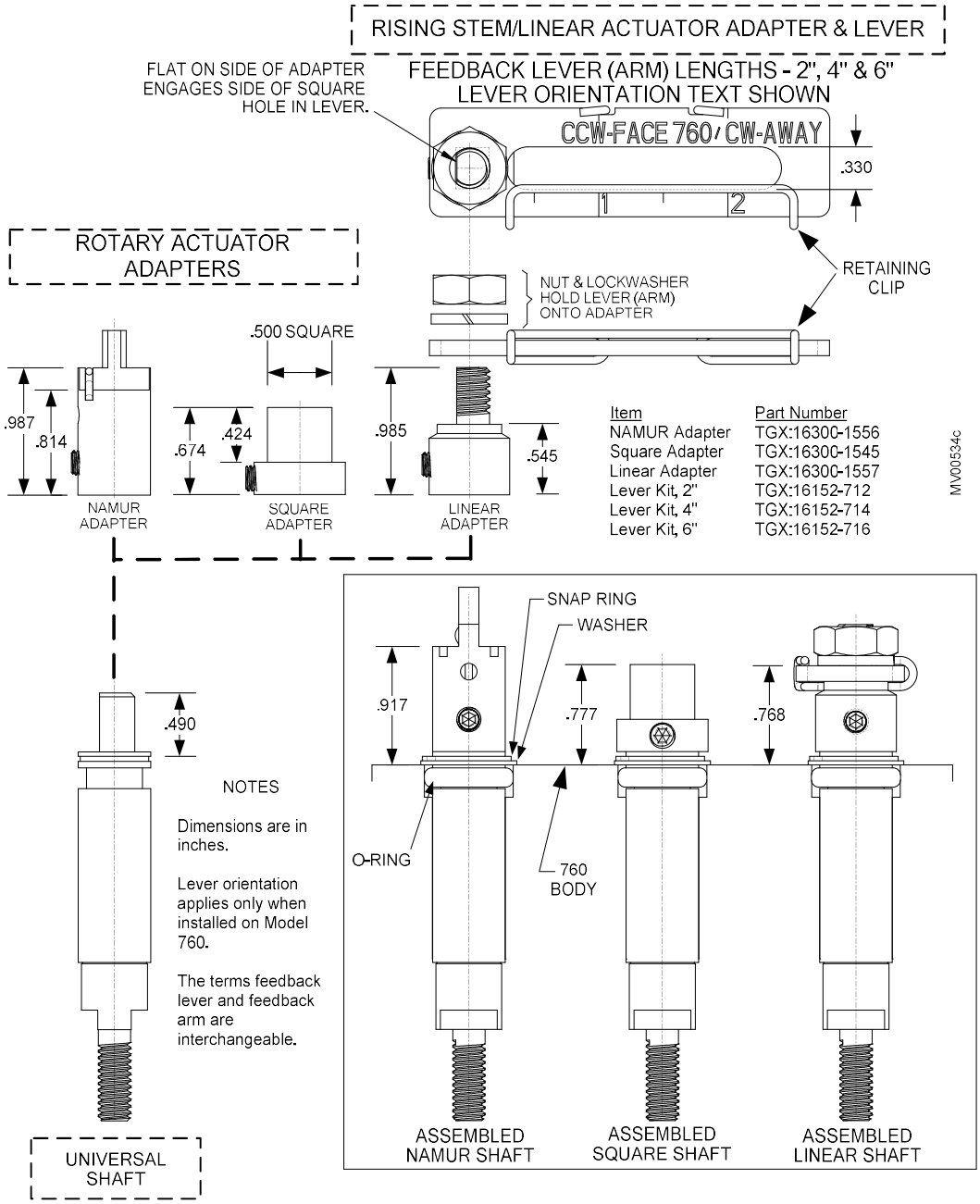


Figure 2-3 Shaft Adapter Options and Feedback Lever Installation, Design Level D

2.3.1 Linear Actuator Applications

Figure 2-4 shows the positioner mounted on a typical linear actuator. The bracket and mounting hardware are provided in an optional Siemens bracket kit. Bracket design will vary with actuator manufacturer and model. Actuator shaft position is fed to the positioner through a feedback linkage. As shown in the figure, the stem bracket is fixed to the actuator shaft and the feedback pin is secured to the stem bracket. A feedback lever is fixed to the linear adapter, which is fastened to the positioner input shaft. The feedback pin rides in the slot in the feedback lever. As the actuator stem rises and falls, the linear motion is converted by the feedback linkage to a rotary motion and coupled to the positioner input shaft. This linkage will vary with positioner design level and model as well as with actuator manufacturer and actuator model. Mounting kits and feedback linkage components are available from Siemens for many actuators.

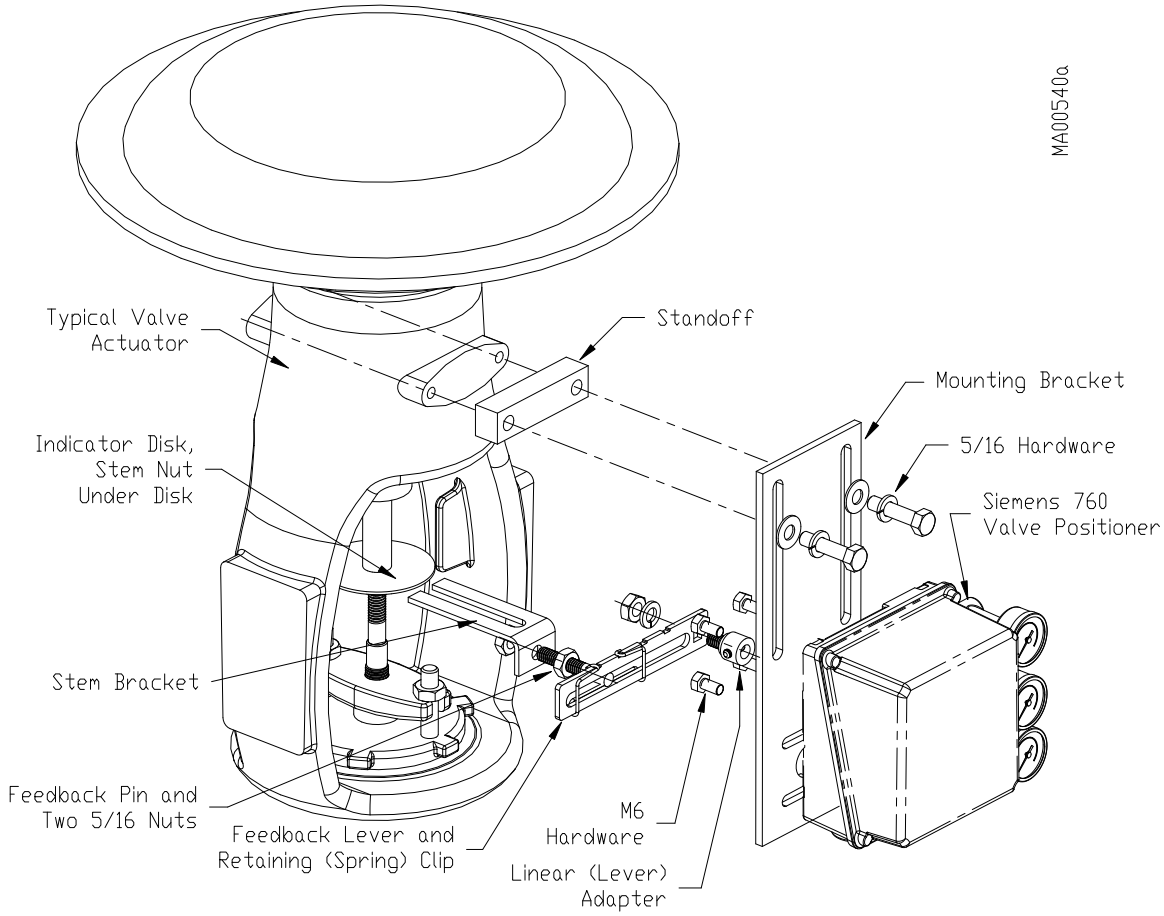


Figure 2-4 Positioner with Typical Linear Actuator

Note the Installation Considerations on page 2-7. Then perform the Mechanical Installation procedure on page 2-9. A typical Siemens linear bracket kit is used to mount the positioner on a linear or rising stem actuator and a typical Siemens feedback kit is used to couple the actuator shaft to the positioner input shaft. If another mounting bracket and feedback linkage will be installed, use this procedure as a guide. The input shaft and feedback lever for design levels A and B and for design level D are shown in Figures 2-5 and 2-6.

Note

Refer to the Kit Installation Instructions supplied in Siemens bracket kits and adapter kits to mount the positioner and install the feedback linkage.

Installation Considerations

- The positioner may be mounted in any orientation.
- When the installation is completed, the feedback lever must be approximately perpendicular to the actuator stem with the actuator at mid-stroke.
- The feedback linkage between actuator stem and positioner input shaft typically includes a slotted bracket attached to the actuator stem, a feedback lever attached to the positioner input shaft, and a feedback pin fastened to either the feedback lever or the slotted bracket. See Figures 2-4, 2-7, and 2-8.
- The feedback linkage must be rigid and motion must be transferred from the actuator to the positioner input shaft without deflection or hysteresis.
- Figure 2-7, 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 0.866 x actuator stroke.
- Figure 2-7, detail C, shows the feedback pin fixed to the feedback lever. This is 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 positioner input shaft must equal actuator stroke.
- With the positioner mounted on the actuator, pneumatic ports must be accessible for piping and electrical conduit connections must be accessible for wiring; allow space for conduit runs. Remove plastic pipe plugs just prior to piping and installing conduit.

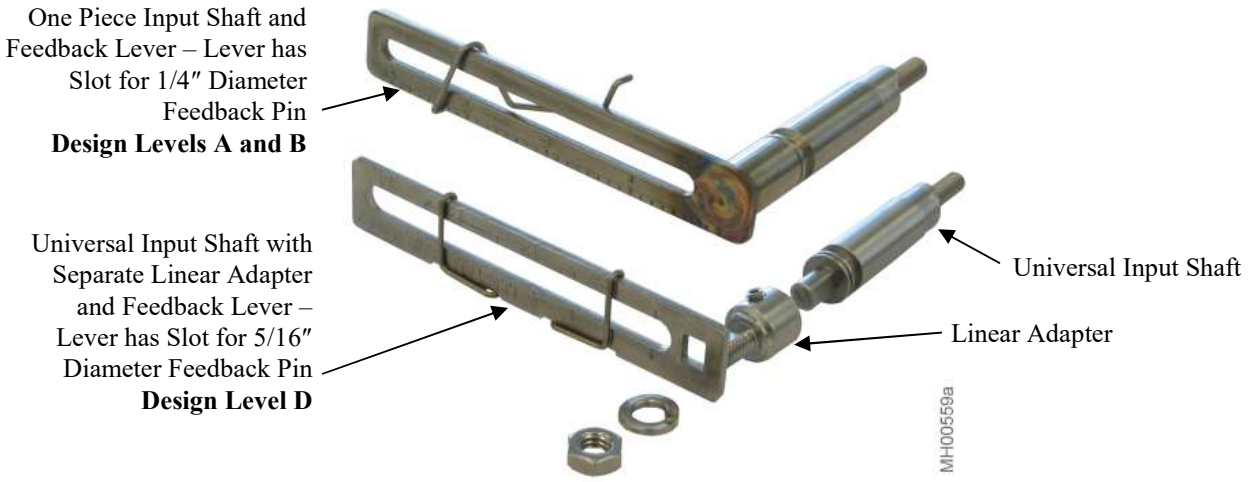


Figure 2-5 Feedback Lever Assemblies, Linear Applications, Design Levels A, B, and D

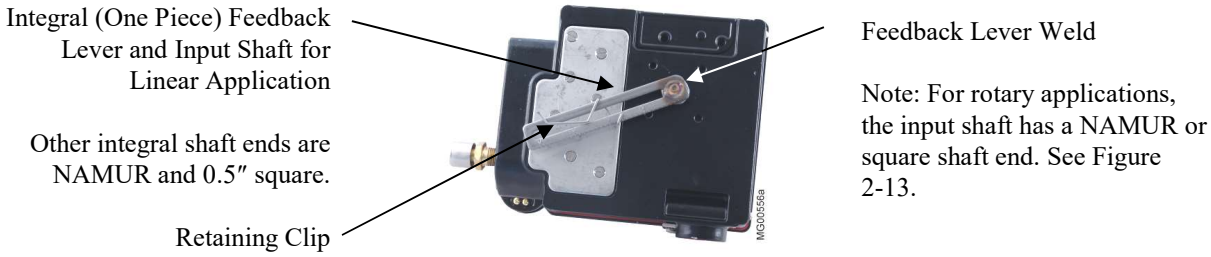
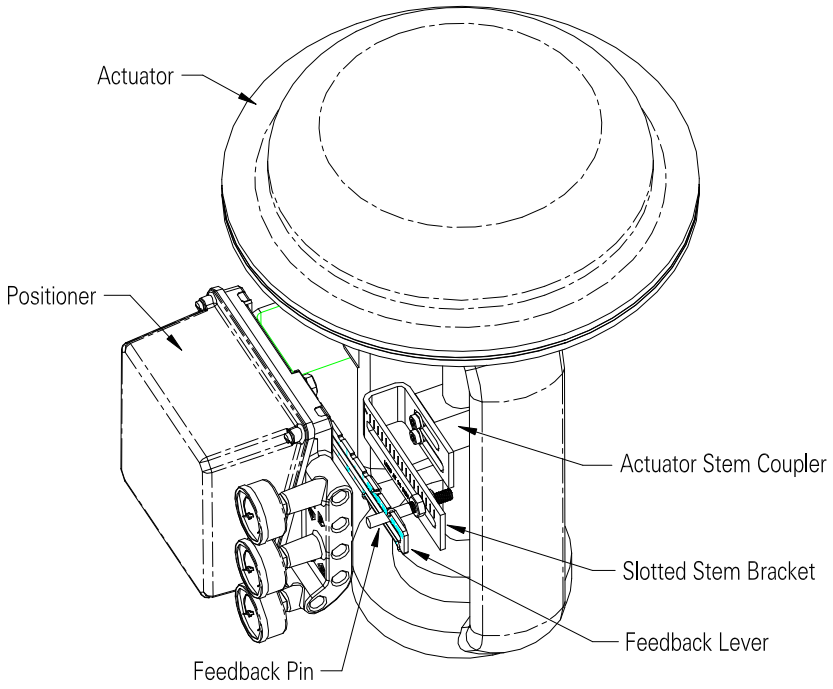
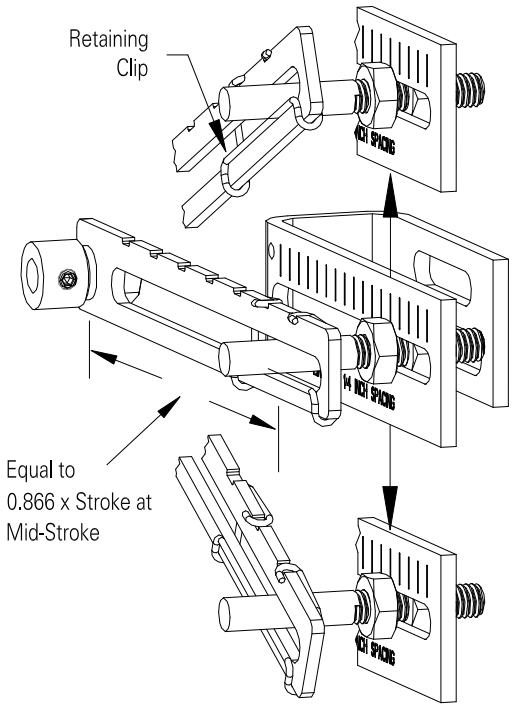


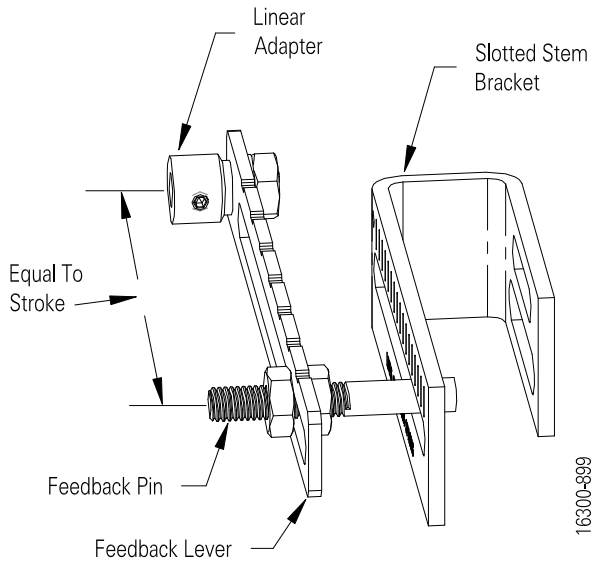
Figure 2-6 Integral Feedback Lever Input Shaft, Design Levels A and B



A. Positioner Mounting and Preferred Method of Connecting Feedback Pin

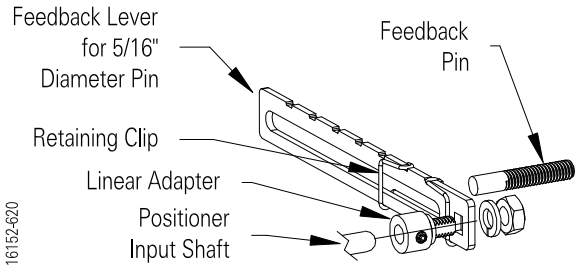


B. Preferred Method of Stroke Setting for Feedback Pin Connection



C. Method of Connecting Feedback Pin and Stroke Setting

Figure 2-7 Positioner Mounting and Feedback Pin Connection



Design Level D

Figure 2-8 Separate Input Shaft and Feedback Lever for Linear Actuators

Mechanical Installation

1. Determine needed cam characteristic (linear, equal percentage or quick opening); the linear cam is factory installed unless otherwise specified on the order. Determine direction of rotation of cam and input shaft (CW or CCW) with increasing input signal. This information will be needed to (1) orient the feedback lever –design level D, (2) change the cam, if necessary, and (3) index the cam.
2. Fasten the mounting bracket to the positioner. Mounting bracket shape will vary with the design of the actuator.
3. Read the positioner design level: A, B, or D. See the next to last character in the 14-character model designation on the nameplate label (Figure 1-1).
   - Design level D: The end of the positioner input shaft protruding from the back of the positioner will be D-shaped (round shaft with a flat on one side). Perform steps 4 and 5 below.
   - Design level A or B: The input shaft and feedback lever are permanently attached. Go to step 6.
4. Design Level D: Fasten the linear (lever) adapter to the positioner input shaft. If desired, apply a thread locking solution to the adapter setscrew. *Tighten the adapter setscrew on the flat of the input shaft to prevent adapter slippage.*
5. Design Level D: Orient the feedback lever and install the retaining clip as follows.
   1) Orient the feedback lever as described and shown in Figure 2-9.

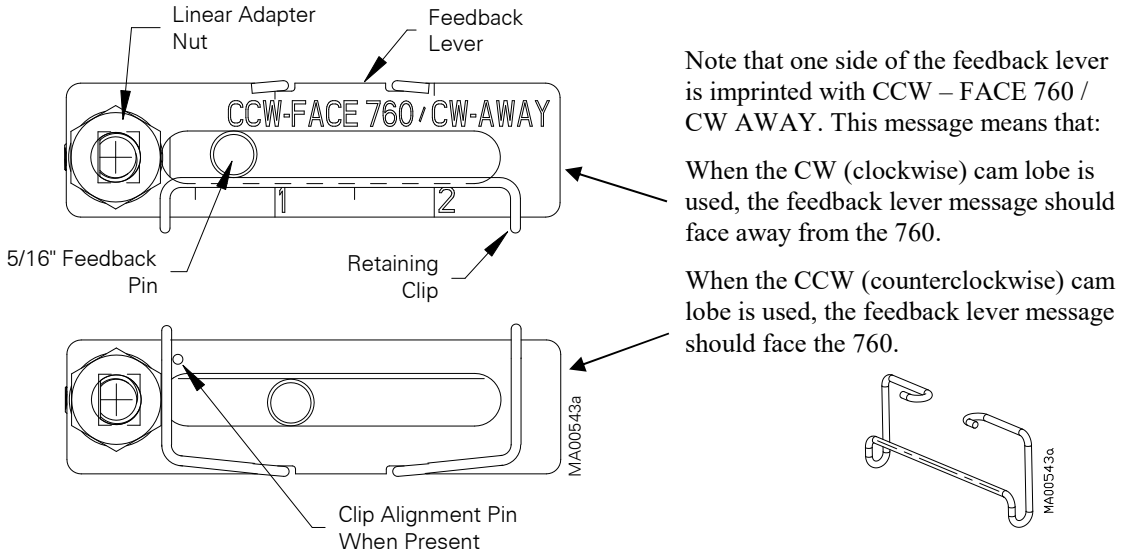


Figure 2-9 Feedback Lever Orientation and Retaining Clip Position, Design Level D

2) Press the long un-notched edge of the lever into the retaining clip and lift the two hooked ends of the clip until they can be placed in two notches in the lever and hook onto the lever. See Figures 2-10 and 2-11.

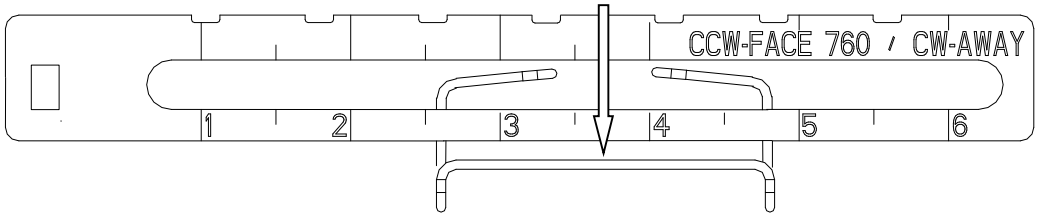


Figure 2-10 Placing the Feedback Lever into the Retaining Clip

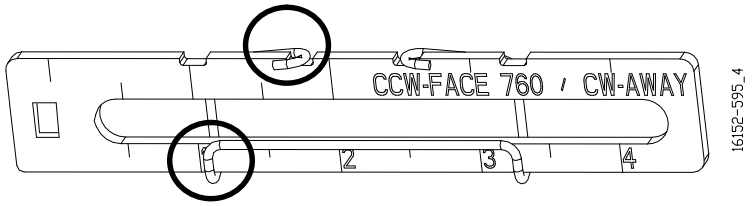


Figure 2-11 Placing the Retaining Clip on the Feedback Lever

3) Then fasten the lever to the linear adapter using the supplied split lockwasher and nut.

6. Fasten the feedback pin to the actuator shaft. This is often accomplished with a slotted bracket as shown in Figure 2-4. In other instances the pin may be threaded into an existing hole in the stem block.

7. Determine the required feedback pin length as follows.

   1) Hold the positioner against the actuator to simulate the installed position.

   2) Rotate the lever against the pin and mark the pin at the required length with a piece of tape. The pin must be long enough to enter the slot in the lever and extend beyond the lever by at least 1/8-inch.

   3) Remove the pin and cut it to length. Remove any burrs and slightly bevel the cut end. Re-install the pin.

8. Mount the positioner on the actuator and guide the feedback pin into the slot in the feedback lever.

Note

Design Level D: The retaining clip is typically installed on the feedback lever at the factory. If this makes inserting the 5/16-inch feedback pin in the feedback lever difficult, remove the clip and either reinstall it after inserting the pin in the lever slot or when indexing the cam in Section 3 Cam Indexing and Positioner Calibration. Reposition the retaining clip on the feedback lever as shown in Figure 3-6 or 3-7.

2.3.2 Rotary Actuator Applications

Figure 2-12 shows a positioner and a typical rotary actuator. The positioner is mounted to the actuator using a bracket and appropriate hardware. Actuator/valve position is fed to the positioner through a NAMUR shaft adapter or other style adapter. Figure 2-13 shows typical adapters for design levels A, B and D. The adapter on the positioner input shaft will often directly engage the actuator shaft. In other instances, an additional coupler will be needed to transfer actuator shaft rotation to the positioner input shaft. The mounting bracket and shaft adapter(s) will vary with positioner design level and model as well as with actuator manufacturer and actuator model. Figure 2-14 shows several feedback methods. Mounting kits and adapters are available from Siemens for many rotary actuators.

Read the following Installation Considerations. Then perform the Mechanical Installation procedure on page 2-12. A typical Siemens rotary bracket kit is used to mount the positioner on a rotary actuator and a Siemens feedback kit is used to couple the actuator shaft to the positioner input shaft. If another mounting bracket and feedback linkage will be installed, use this procedure as a guide.

Note

Refer to the Kit Installation Instructions supplied in Siemens bracket kits and adapter kits to mount the positioner and install the feedback linkage.

Installation Considerations

- The positioner may be mounted in any orientation but it must be rigidly mounted to the actuator.
- Align actuator shaft and positioner input shaft centerlines to minimize friction and binding as the shafts rotate – minimize backlash for best accuracy.
- When the positioner is mounted, the pneumatic ports must be accessible for piping and the electrical conduit entrance must be accessible for wiring; allow sufficient space for conduit runs. Remove pipe plugs just prior to piping and installing conduit.

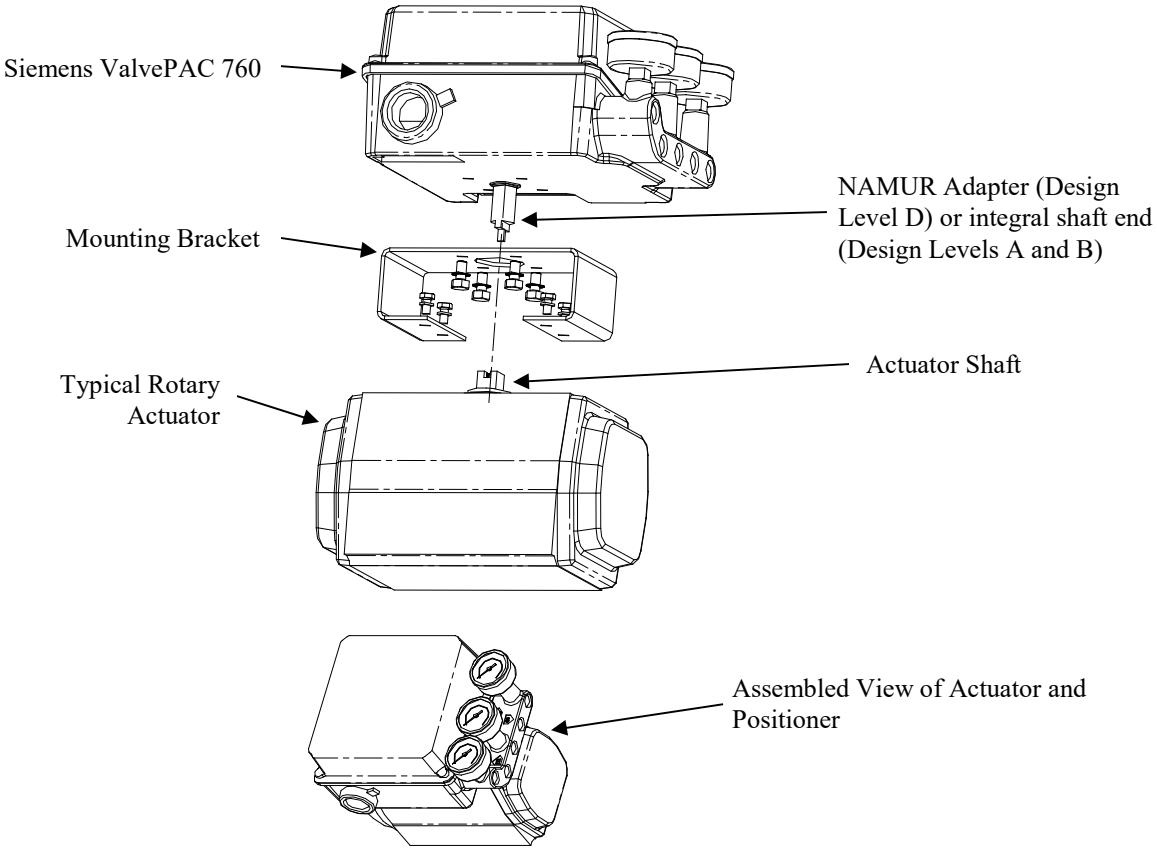


Figure 2-12 Positioner with Rotary Actuator Example

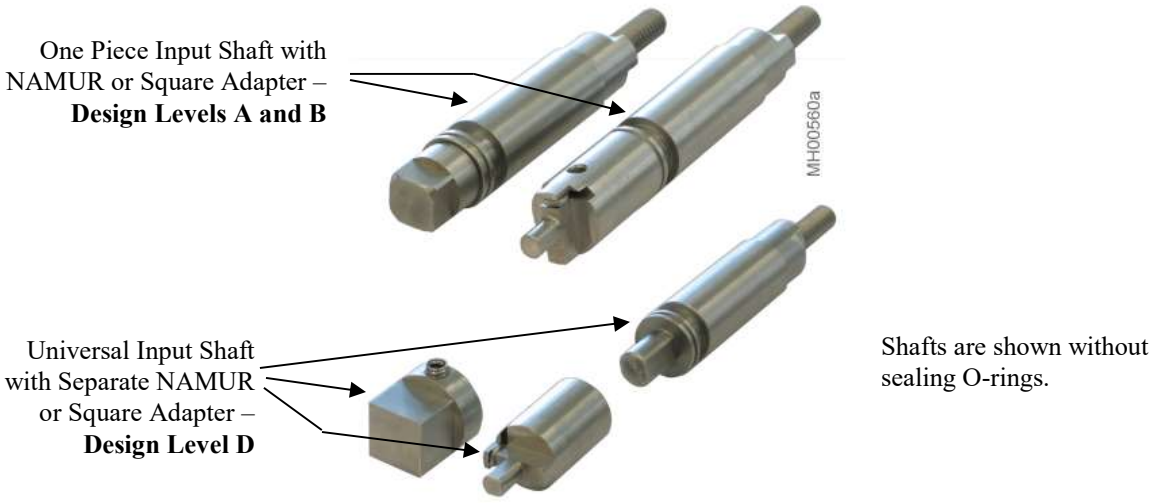


Figure 2-13 Feedback Components, Rotary Applications, Design Levels A, B, and D

Mechanical Installation

1. Determine cam characteristic (linear, equal percentage or quick opening) and direction of rotation of cam and input shaft (CW or CCW) with increasing input signal. This information will be needed to change the cam, if necessary, and then to index the cam.
2. Fasten the mounting bracket to the valve positioner. Mounting bracket shape will vary with the design of the actuator.
3. If the end of the positioner input shaft is D-shaped (round with a flat on one side), perform step 4. If the end of the positioner input shaft is a NAMUR style or 0.5″ square shape, go to step 5.
4. Install a NAMUR style adapter, 0.5″ square adapter, or other adapter (see Figures 2-3, 2-13 and 2-14). Fasten the adapter to the positioner input shaft. If desired, apply a thread locking solution to the setscrew. *Tighten the adapter setscrew on the flat of the input shaft to prevent adapter slippage.*
5. Mount the positioner/bracket assembly on the actuator and connect the mechanical feedback components. Refer to the Kit Installation Instructions included with the Siemens bracket kit and the feedback kit to install the feedback linkage.

IMPORTANT

Check that all adapters/couplers are *fully inserted.* If the NAMUR adapter or shaft end includes an anti-backlash spring, the adapter must be fully inserted in the mating slot for the anti-backlash spring to function.

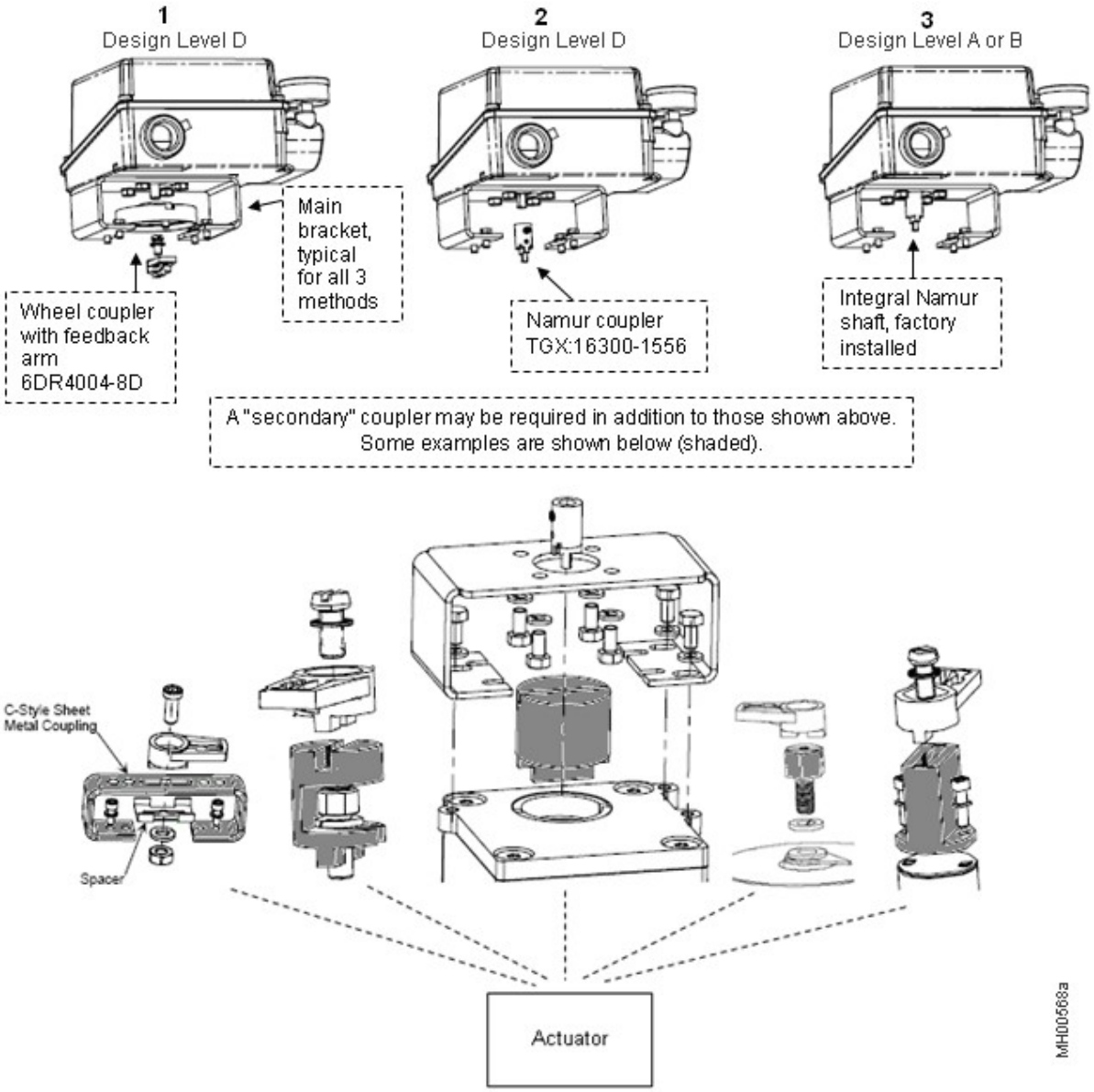


Figure 2-14 Rotary Actuator, Basic Feedback Methods

2.4 PNEUMATIC CONNECTIONS

This section identifies the pneumatic connections between (1) the positioner and actuator, (2) the positioner and a source of *instrument quality air* and (3) the positioner [Model 760P] and the pneumatic control or input signal source. Connections are listed in Table 2-1 and shown in Figures 2-1 and 2-2. Piping is discussed in Section 2.4.1 and instrument air requirements are presented in Section 2.4.2. As required, the exhaust can be piped away from the positioner.

Refer to Table 2-2 and the actuator manufacturer's literature to determine the required pneumatic connections between the positioner and the actuator. Table 2-3 identifies the actuator fail position with loss of either input signal or supply air for single acting and double acting actuators.

Table 2-1 Pneumatic Connections

PORT	PURPOSE
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	760P input port. Plugged in 760E electro-pneumatic valve positioners.

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 port may damage the positioner.

Supply pressure to the positioner must not exceed actuator maximum pressure rating.

Input 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.

Table 2-2 Pneumatic Connections

ACTUATOR TYPE	POSITIONER 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 positioner. 2. Connect V2 to actuator port that causes actuator to move away from position noted in above step. 3. Connect V1 to remaining port.

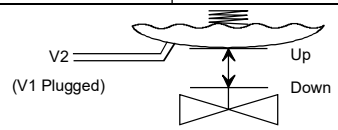
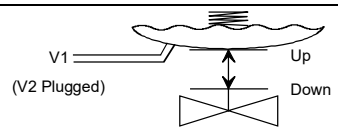
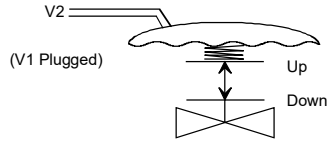
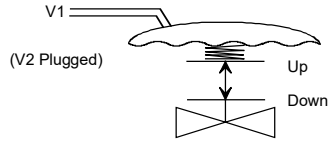
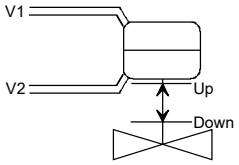
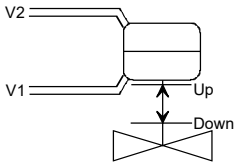
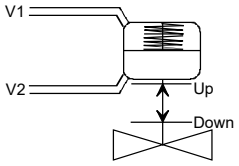
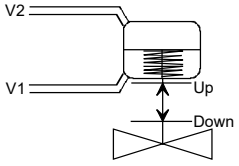
2.4.1 Piping

Pneumatic supply, input, output, and exhaust connections are 1/4 NPT. Gauge connections are 1/8 NPT.

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 for each connection. Tighten fittings to 12 ft-lb. (16.3 Nm) maximum. Do not over tighten.
- 1/4″ pipe plug to plug the unused port for single acting actuators.

Table 2-3 Actuator Fail Position with Loss of Input Signal or Supply Air

	Positioner Connection(s)	Actuator Type	Action	Fail Position After Loss Of:	
				Input Signal	Supply Air
Single Acting			Direct acting: Valve moves upward as input signal increases.	Down to spring position	Down to spring position
			Reverse acting: Valve moves downward as input signal increases.	Up	Down to spring position
			Direct acting: Valve moves downward as input signal increases.	Up to spring position	Up to spring position
			Reverse acting: Valve moves upward as input signal increases.	Down	Up to spring position
Double Acting			Valve moves upward as input signal increases	Down	Undetermined
			Valve moves downward as input signal increases	Up	Undetermined
			Valve moves upward as input signal increases	Down to spring position	Down to spring position
			Valve move downward as input signal increases	Up	Up to spring position

MG00552a

Piping recommendations:

- Blow out all piping before connections are made to prevent dirt, chips, or debris from entering the positioner.
- Use pipe sealant sparingly and only on male threads. A non-hardening sealant is strongly recommended. Pipe sealing tape is not recommended.
- Connect the positioner to a source of clean, oil-free instrument air. Failure to do so will increase the possibility of a malfunction or deviation from specified performance. Instrument air requirements are given in the following section.

After piping the positioner, go to Section 2.5 Electrical Connections.

2.4.2 Instrument Air Requirements

Instrument quality air must be supplied to the positioner. Connect the positioner to a source of clean, dry, oil-free instrument air. Failure to do so will increase the possibility of a malfunction or deviation from specified performance.

CAUTION

Use of process fluids other than instrument air is not recommended. No claim is made as to the suitability of this product for use with other process fluids, such as hazardous gases, except as listed on the appropriate certificate. Non-approved instruments are suitable for use with instrument air only. Optional features and modifications such as tapped exhaust do not imply suitability for use with hazardous gases except as listed on the approval certificate.

There are many types of synthetic compressor lubricants. Some may not be compatible with the materials used in construction of the instrument. Wetting of these materials by such an oil mist or vapor, etc., may cause them to deteriorate. This may ultimately result in failure of the positioner.

CAUTION

Synthetic compressor lubricants in the instrument air may cause deterioration of some positioner components resulting in positioner failure.

Positioner 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

The 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

Refer to the nameplate inside the cover for positioner model and installed options. Read the approvals plate on the side of the positioner for approvals and certifications, and for permitted installation environments. Models and options requiring electrical connections are listed below.

Model 760E: 4-20 mA input signal wiring to I/P Transducer
Model 760P or Model 760E with any of the following options:
- 4-20 mA feedback board
- 1K Ohm potentiometer board
- Mechanical limit switch board
- Proximity sensors limit switch board

Refer to Table 1-1 for positioner environmental ratings when an option board is installed. Wiring connections are shown in Section 4 Option Kit Installation for each circuit board based option kit and the I/P converter. Also refer to Siemens control drawing 15032-7602, at the end of this section, for electrical specifications and wiring.

Electrical Conduit Connection

The positioner enclosure has a NEMA 4X rating. To maintain the rating when any electrical option is installed, a sealed electrical connection must be made using appropriate conduit and non-hardening pipe sealant.

Design level A and B positioners have either a 3/4 NPT or M25 conduit connection thread, as specified on the order. All design level D positioners have a 3/4 NPT thread. When a metric conduit connection is specified, a 3/4 NPT to M25 conduit adapter is provided (Siemens part number TGX:16300-1439).

2.5.1 Non-Hazardous Locations

An installation in a non-hazardous location should be in accordance with the current editions of the National Electrical Code and applicable local codes.

CE Approved
EN50081-1 and EN50081-2 Emission
EN61000-6-1 and EN61000-6-2 Immunity
See the Declaration of Conformity at the end of this section. Shielded cable is required.

2.5.2 Hazardous Locations

An installation in a hazardous location must be in accordance with the current edition of the National Electrical Code and applicable local codes.

WARNING

Electrical shock hazard
Explosion hazard

Can cause death or injury.

- Modifications to the positioner or installation of non-approved options will void the electrical approval.
- Observe all pertinent regulations regarding installation in hazardous area.

For a positioner to be installed in a hazardous location, the approvals plate on that positioner (see Figure 1-2) 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

Refer to control drawing 15032-7602 at the end of this section for FM entity parameters and to determine the need for energy limiting barriers. A typical system consists of a positioner with output option(s) that is installed in a hazardous area, energy limiting barriers installed in a non-hazardous location, and interconnecting shielded twisted-pair wiring.

2.5.2.1 FM and CSA Hazardous Location Precautions

This section provides FM/CSA hazardous location 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,

Substitution of components may impair intrinsic safety.

For Division 2 hazardous locations,

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, switch off applied 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.

2.5.2.2 Sira Certification Service Special Conditions for Safe Use

See SIRA certificate 03ATEX2577X. Special conditions for safe use are denoted by an 'X' after certificate number.

2.5.2.3 Supplemental Instructions for ATEX Certified Models

This section 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 this manual. Included at the end of this section are the Sira certificates and the Declaration of Conformity.

IMPORTANT

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

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

This section addresses equipment and protective systems intended for use in potentially explosive atmospheres. It is applicable to installations in the European Union. For an installation in an explosive atmosphere in another location, see other sections in this instruction or contact Siemens; see Section 1.4 Customer/Product Support.

The following statements apply to equipment covered by certificate numbers Sira 03ATEX2577X and Sira 03ATEX4578:

1. The equipment may be used in a hazardous area with flammable gases and vapors 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 Ex 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 (Ex ia) applications must be installed in accordance with the Special Conditions for Safe Use declared in Certificate Sira 03ATEX 2577X.

2.5.2.4 Hazardous Location Installation Steps

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

1. Install positioner as detailed in the preceding sections.
2. Install energy limiting barriers in the non-hazardous area. Refer to the barrier manufacturer's manuals and to the appropriate connection diagram in the control drawing(s) found in this manual.
3. Install conduit for wiring to positioner. Install pull boxes as needed and remove burrs and sharp edges from conduit tubing.

4. Install wiring between positioner and barriers per the control drawing(s) found in this manual. Ground the positioner. 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 positioner driving device.
6. Check all signal and ground connections before applying power.
7. Proceed to Section 3 Cam Indexing and Positioner Calibration.

2.5.2.5 Control Drawings, Declarations, and Certifications

The following pages contain the appropriate 760 and component certification documents including EC Declaration of Conformity, control drawings, and certificates.

IMPORTANT

After completing the steps in Section 2 Installation, go to Section 3 Cam Indexing and Positioner Calibration to index the cam and calibrate the positioner.

■

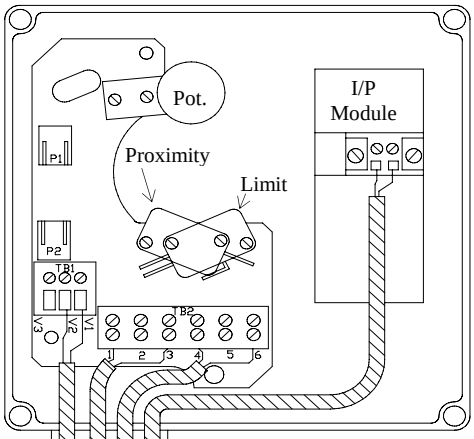
Safe Area

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.

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3	19 Feb. 98	As FM Approved	J. Sweeney
4	20 April 98	Minor corrections	J. Sweeney
5	14 June 07	ControlAir I/P Added	J. Sweeney
6	19 May 08	Minor correction pg 13	J. Sweeney
7	22 June 11	Correct pg 12; add SII	J. Sweeney

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Title
Control Drawing for
Series 760 Valve Controller

Drawing No.
15032-7602

Temperature Code and Ambient Temperature Range for Series 760 Valve Controller

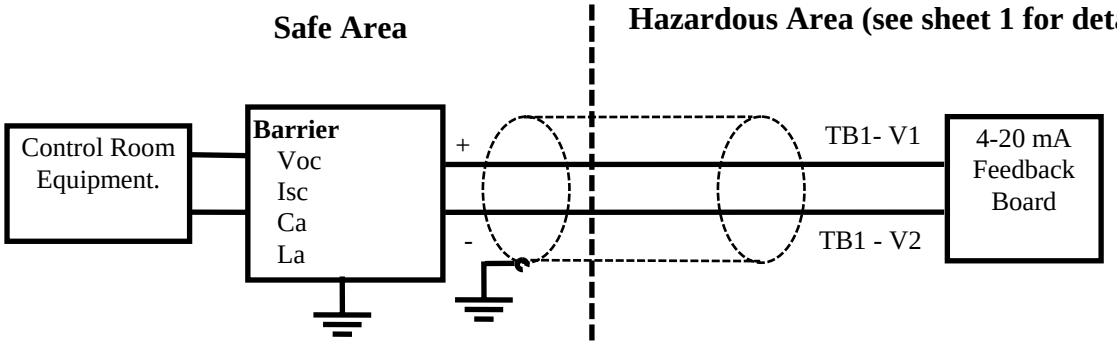
Determine the options that have been installed in your Series 760 Valve Controller by checking the label that is under the cover. Compare the option(s) installed to Table 1 to determine Model 760 Temperature Code and Ambient Temperature Range.

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 – ABB	T3C	-40°C to +75°C
I/P Module – ControlAir	T4	-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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7	22 June 11	Correct pg 12; add SII	J. Sweeney

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Control Drawing for
Series 760 Valve Controller

Drawing No.

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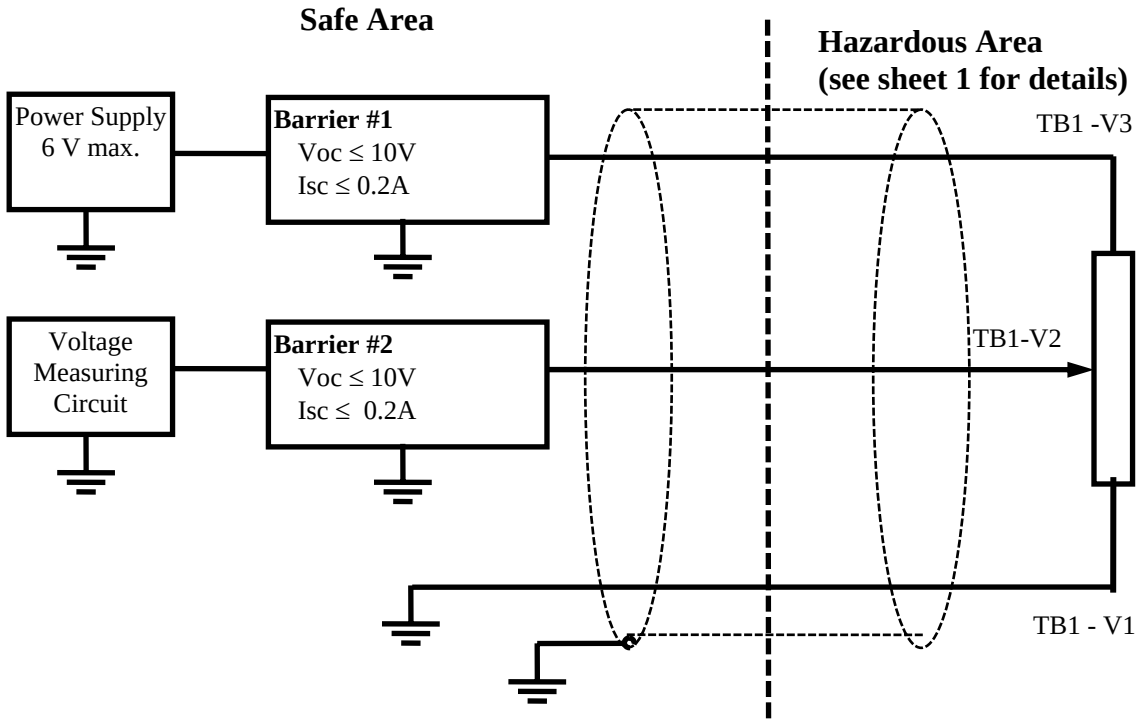
Potentiometer Installation

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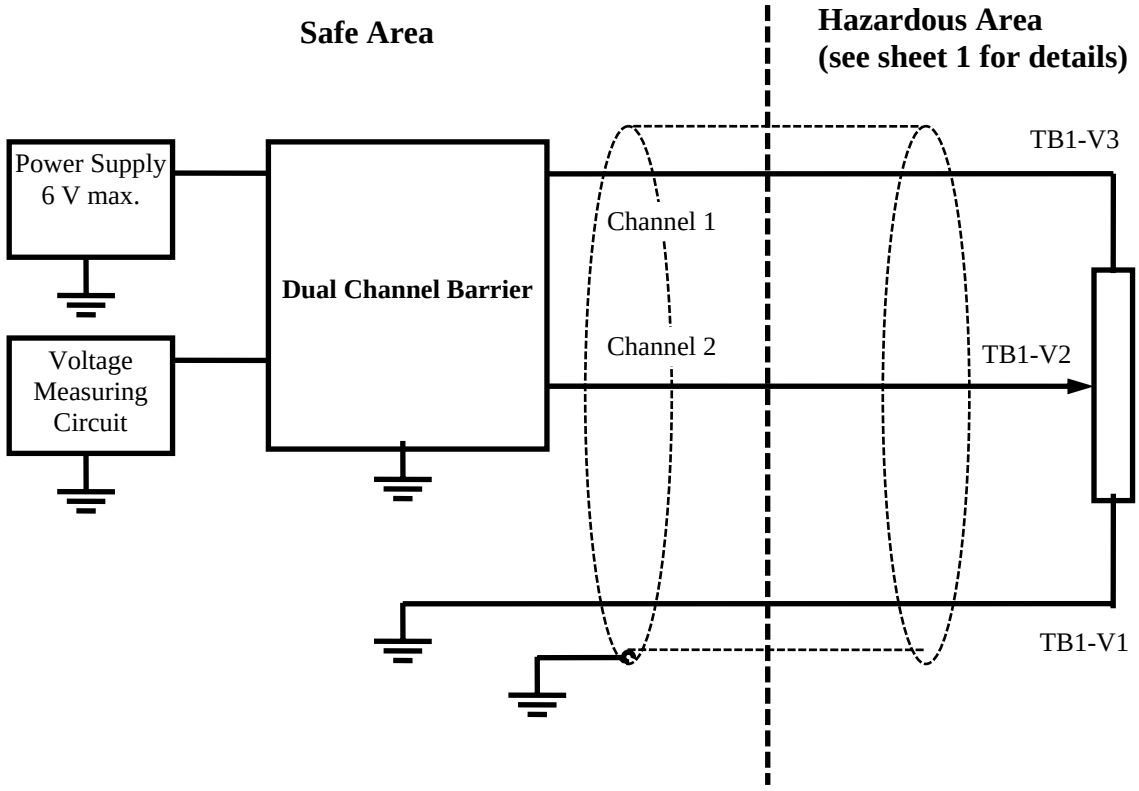
Potentiometer Intrinsically Safe and Division 2 Installation - Grounded Circuit Dual Channel Barrier



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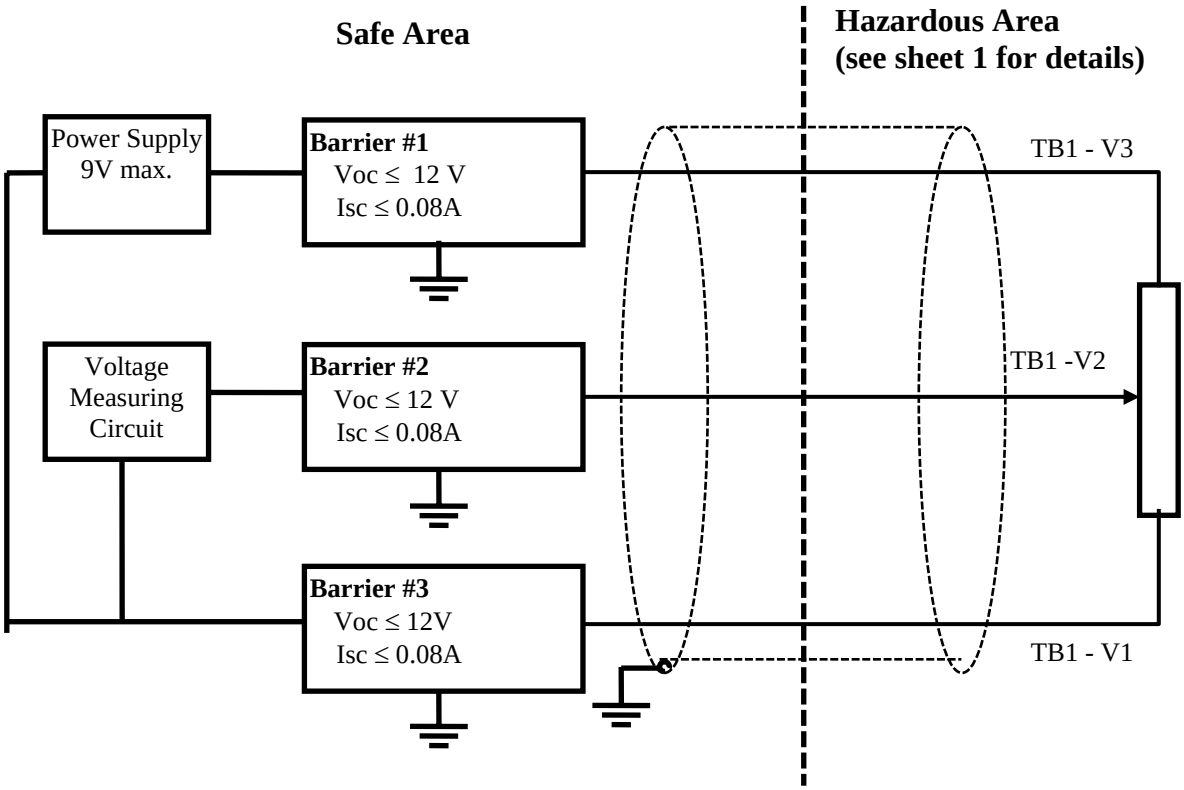
Potentiometer Intrinsically Safe and Division 2 Installation - Ungrounded Circuit Three Barriers



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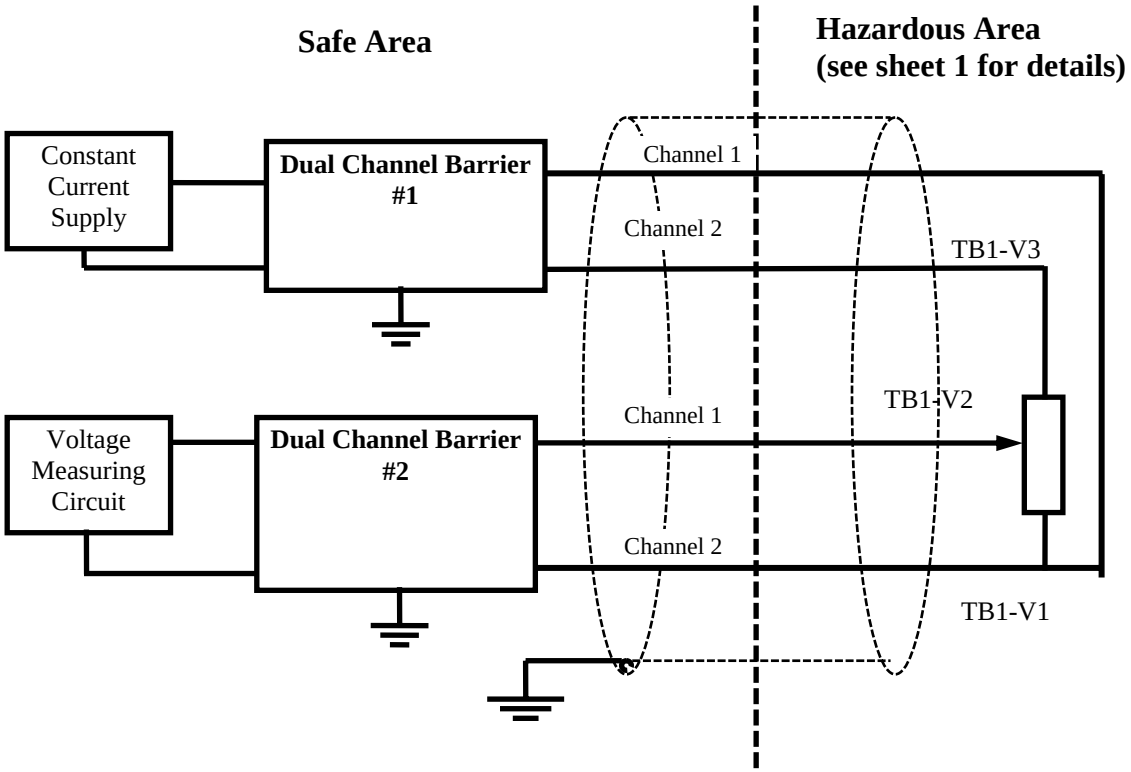
Potentiometer Intrinsically Safe and Division 2 Installation - Ungrounded Circuit
Two Dual Channel Barriers



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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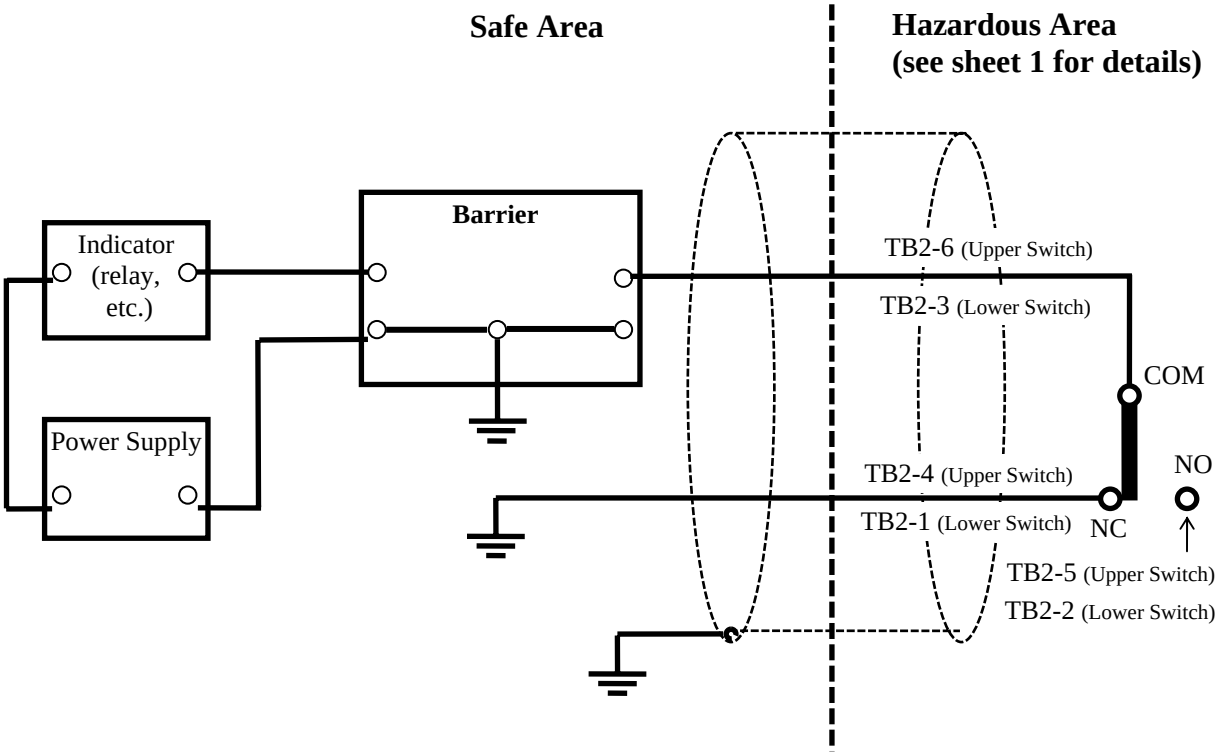
Limit Switch Installation

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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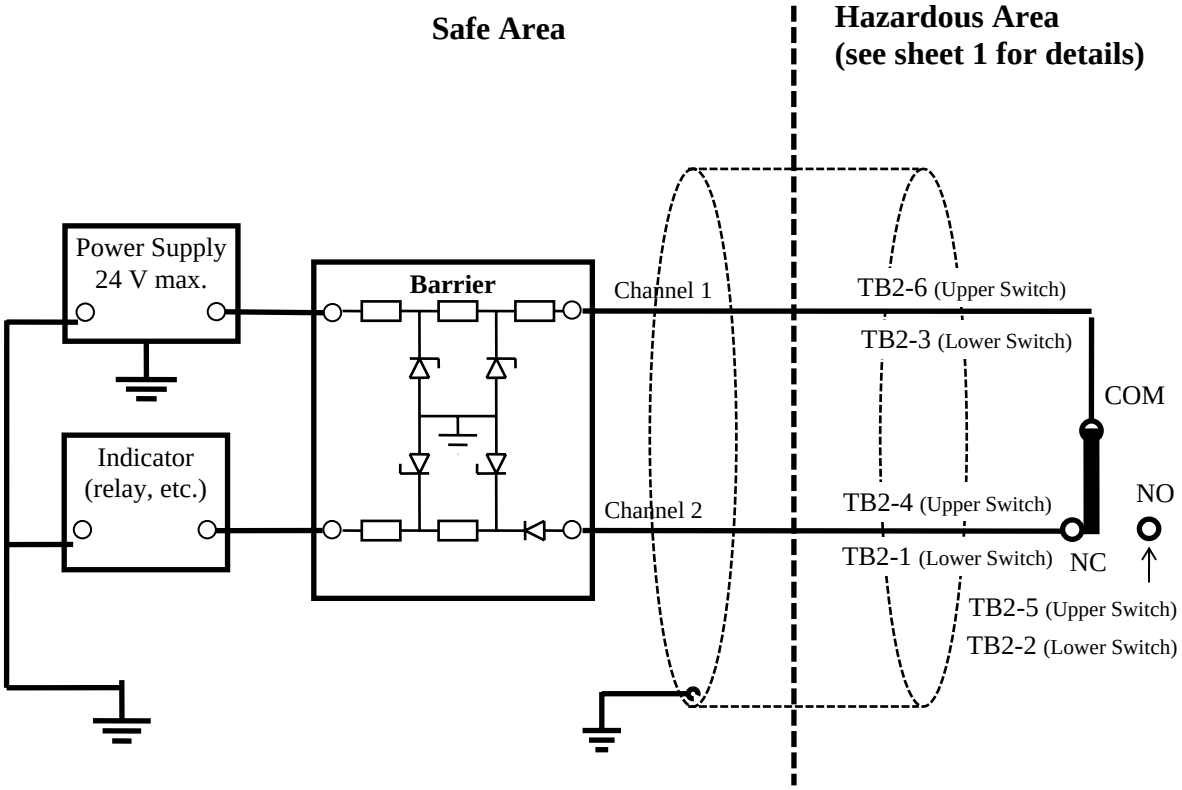
Series 760 Valve Controller

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.

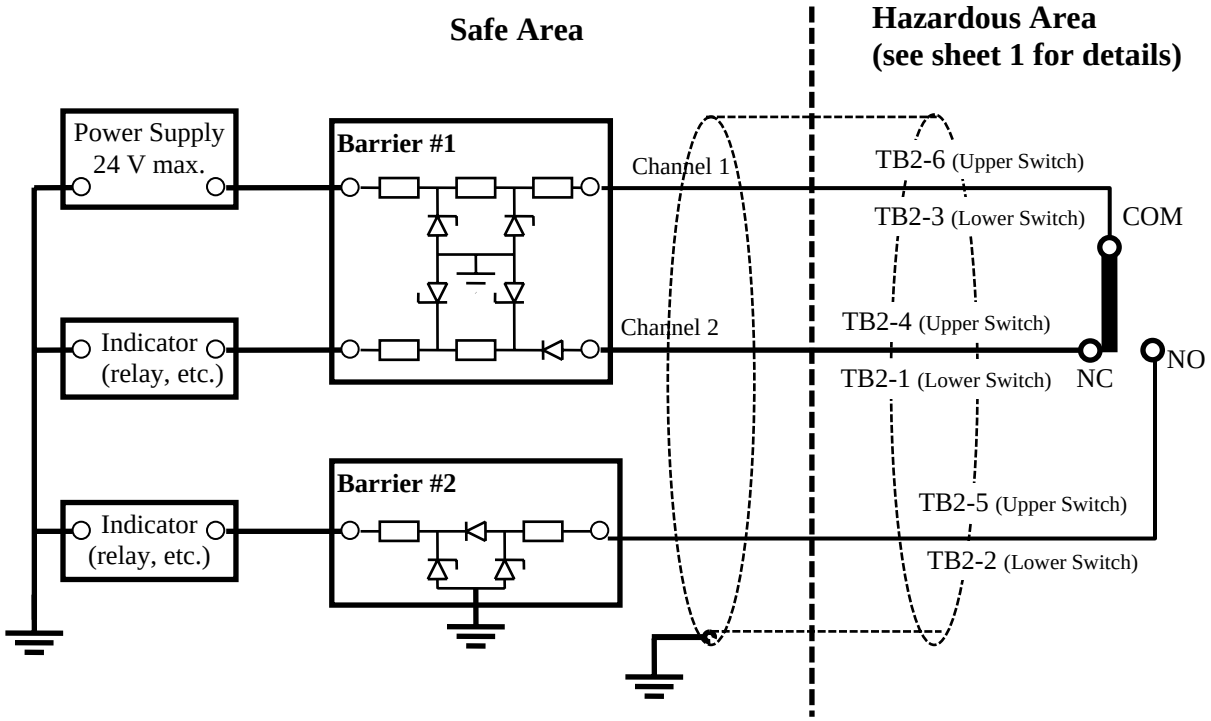
Rev	Date	Details	Approved
3	19 Feb. 98	As FM Approved	J. Sweeney
4	20 April 98	Minor corrections	J. Sweeney
5	14 June 07	ControlAir I/P Added	J. Sweeney
6	19 May 08	Minor correction pg 13	J. Sweeney
7	22 June 11	Correct pg 12; add SII	J. Sweeney

Siemens Industry, Inc.
Spring House PA, USA 19477

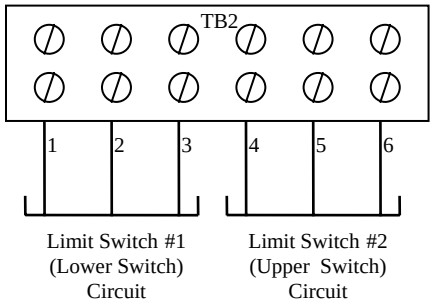
Title
Control Drawing for
Series 760 Valve Controller

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.

Rev	Date	Details	Approved
3	19 Feb. 98	As FM Approved	J. Sweeney
4	20 April 98	Minor corrections	J. Sweeney
5	14 June 07	ControlAir I/P Added	J. Sweeney
6	19 May 08	Minor correction pg 13	J. Sweeney
7	22 June 11	Correct pg 12; add SII	J. Sweeney

Siemens Industry, Inc.
Spring House PA, USA 19477

Title
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 $\leq$ 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.

Rev	Date	Details	Approved
3	19 Feb. 98	As FM Approved	J. Sweeney
4	20 April 98	Minor corrections	J. Sweeney
5	14 June 07	ControlAir I/P Added	J. Sweeney
6	19 May 08	Minor correction pg 13	J. Sweeney
7	22 June 11	Correct pg 12; add SII	J. Sweeney

Siemens Industry, Inc.
Spring House PA, USA 19477

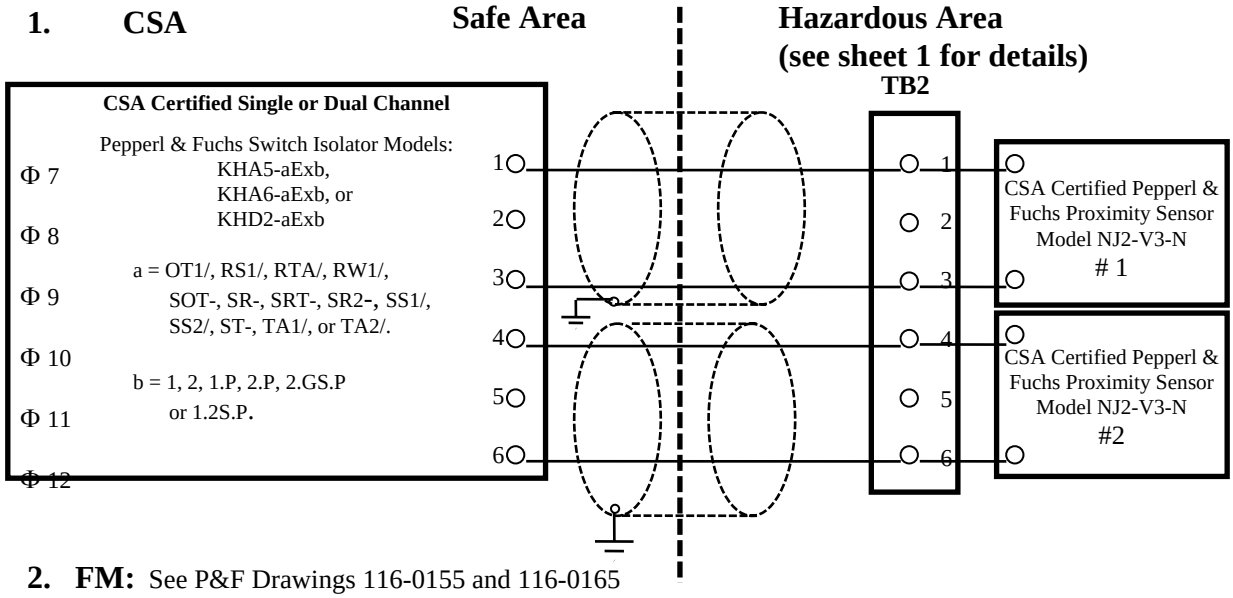
Title
Control Drawing for
Series 760 Valve Controller

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 Drawings 116-0155 and 116-0165

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
3	19 Feb. 98	As FM Approved	J. Sweeney
4	20 April 98	Minor corrections	J. Sweeney
5	14 June 07	ControlAir I/P Added	J. Sweeney
6	19 May 08	Minor correction pg 13	J. Sweeney
7	22 June 11	Correct pg 12; add SII	J. Sweeney

Siemens Industry, Inc.
Spring House PA, USA 19477

Title
Control Drawing for
Series 760 Valve Controller

Drawing No.
15032-7602

I/P Module Installation Instructions

Determine the manufacturer of the supplied I/P Module and follow the appropriate instructions below:

ABB Model 22/06-65

I/P Module Intrinsically Safe Installation:

1. CSA

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

2. FM

See ABB 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.

ControlAir Model T590

I/P Module Intrinsically Safe Installation:

1. CSA

I/P Module: CSA Certified ControlAir Model T590. It is intrinsically safe when connected as per attached ControlAir Control Document No. 431-990-047.

2. FM

See ControlAir Drawing No. 431-990-047

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
3	19 Feb. 98	As FM Approved	J. Sweeney
4	20 April 98	Minor corrections	J. Sweeney
5	14 June 07	ControlAir I/P Added	J. Sweeney
6	19 May 08	Minor correction pg 13	J. Sweeney
7	22 June 11	Correct pg 12; add SII	J. Sweeney

Siemens Industry, Inc.
Spring House PA, USA 19477

Title
Control Drawing for
Series 760 Valve Controller

Drawing No.
15032-7602

SIEMENS

EU Declaration of Conformity
EU-Konformitätserklärung
EU-Déclaration de Conformité

CE

No. A5E35251639A/004

Manufacturer: *Hersteller:* *Fabricant:*	Siemens Industry, Inc. PD PA PI
Address: *Anschrift:* *Adresse:*	1201 Sumneytown Pike Spring House PA 19477 USA
Product description: *Produktbezeichnung:* *Identificateur:*	Valve Positioner Model 760 with suffixes

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:
Le produit mentionné ci-dessus, tel qu'il est livré, est conforme aux dispositions des Directives Européennes suivantes :

2014/30/EU EMC	Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to electromagnetic compatibility *Richtlinie des Europäischen Parlaments und des Rates zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit* *Directive du parlement Européen et du conseil relative à l'harmonisation des législations des États membres concernant la compatibilité électromagnétique*
2014/35/EU LVD	Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits *Richtlinie des Europäischen Parlaments und des Rates zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die Bereitstellung elektrischer Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen auf dem Markt* *Directive du parlement Européen et du conseil relative à l'harmonisation des législations des États membres concernant la mise à disposition sur le marché du matériel électrique destiné à être employé dans certaines limites de tension*
2014/34/EU ATEX	Directive of the European Parliament and the Council on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres *Richtlinie des Europäischen Parlaments und des Rates zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen* *Directive du parlement Européen et du conseil relative à l'harmonisation des législations des États membres concernant les appareils et les systèmes de protection destinés à être utilisés en atmosphères explosibles*
2014/68/EU PED	Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment *Richtlinie des Europäischen Parlaments und des Rates zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die Bereitstellung von Druckgeräten auf dem Markt* *Directive du parlement Européen et du conseil relative à l'harmonisation des législations des États membres concernant la mise à disposition sur le marché des équipements sous pression*
2011/65/EC RoHS	Directive of the European Parliament and the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment. *Richtlinie des Europäischen Parlaments und des Rates zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräte.* *Directive du parlement Européen et du relative à la limitation de l'utilisation de certaines substances dangereuses dans les équipements électriques et électroniques*

Annex A is integral part of this declaration..
Anhang A ist integraler Bestandteil dieser Erklärung.
L'annexe A fait partie intégrante de la présente déclaration

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 Beschaffenheits- oder Haltbarkeitsgarantie nach §443 BGB.
Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.
La présente déclaration atteste la conformité aux Directives citées. Elle n'est pas assimilable à un descriptif justifiant certaines propriétés.
La documentation relative à la sécurité accompagnant le produit doit être examinée en détail.

For implement: Legal Form / Rechtsform

SIEMENS

EU Declaration of Conformity
EU-Declaration de Conformite
EU-Konformitätserklärung

No. A5E35251639A/004

Spring House, 02.11.2017
Siemens Industry, Inc.

Anderson, Manager, PLM
Research & Development / Entwicklung
(Name, function / Funktion)

signature / *Unterschrift*

Rodgers, Quality Manager
Quality / Qualität
(Name, function / Funktion)

signature / *Unterschrift*

Anhang A ist integraler Bestandteil dieser Erklärung
Annex A is integral part of this declaration
L'annexe A fait partie intégrante de la présente déclaration

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Zusicherung von Eigenschaften.
Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.
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.
La documentation relative à la sécurité accompagnant le produit doit être examinée en détail.

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Annex A to the EU Declaration of Conformity
Anhang A zur EU-Konformitätserklärung
Annexe A de la Déclaration de conformité

No. A5E35251639A/004

Product description: Valve Positioner
Produktbezeichnung: Model 760 with suffixes
Identificateur:

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):
La conformité aux Directives indiquées sur la page 1 est garantie par l'application des normes suivantes (selon les versions) :

Directive *Richtlinie* *Directive*	Standard / Reference number *Norm / Referenznummer* *Norme / référence*	Edition *Ausgabedatum* *Edition*	
2014/30/EU	EN 61326-1*	2013	
2014/34/EU	EN 60079-0	2012/A11:2013	
2014/34/EU	EN 60079-11	2012	
2014/34/EU	EN 60079-15	2010	
2014/35/EU	EN 61010-1	2010	
Note 1: The manufacturer declares that this product complies with the requirements of the new editions of the standards. The changes of the new editions have been checked and do not affect this product.			

* all environments included / *beinhaltet alle Umgebungen/dans tout type d'environnement*

II 2 G Sira03ATEX2577X Ex ia IIC T6 Gb

II 3 G Sira03ATEX4578 Ex nA II T6 Gc

EC-type examination certificate *EG-Baumusterprüfbescheinigung* *Certificat évaluation de type*					
Sira 03ATEX2577X					
Sira 03ATEX4578					

Inspection / Surveillance:
Kontrolle / Überwachung:
Controle / Supervision:

Directive *Richtlinie* *Directive*		Notified Body Product Quality Assurance *Benannte Stelle Qualitätssicherung Produktion* *Organisme notifie*	No.:
2014/34/EU	ATEX	Baseefa Buxton UK	1180

1 **EC TYPE-EXAMINATION CERTIFICATE**

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

3 Certificate Number: **Sira 03ATEX2577X** Issue: **2**

4 Equipment: **Series 760 Valve Controllers**

5 Applicant: **Siemens Industry, 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 the confidential reports listed in Section 14.2.

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 60079-0:2012 EN 60079-11:2012

The above list of documents may detail standards that do not appear on the UKAS Scope of Accreditation, but have been added through Sira's flexible scope of accreditation, which is available on request.

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:

II 2G
Ex ia IIC T4 or T5 or T6 Gb (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 70004449

C Ellaby
Deputy Certification Manager

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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 equipment enclosure meets the ingress protection requirements of at least IP65.

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.

1 One of the following I/P converters can be fitted:
   a) ABB (formally Hartmann & Braun GmbH) I/P Converter (Certificate: TUV 99ATEX1487X) coded EEx ia IIC T6/T5/T4 (Tamb. range = -55 to +85°C), II 2G.
   b) ControlAir Inc. I/P Converter (Certificate: FM 07ATEX0002X) coded EEx ia IIC T6/T5/T4 (Tamb. range = -55 to +85°C), II 1G.
2 A 4-20mA printed circuit board or the PCB may be replaced by a Spectrum Sensors and Controls Inc. P/N 6209-2040-230 (1kohm +/-10%) type or P/N 6209-2039-130 (5kohm +/-10% type).
3 Two proximity switches, Pepperl and Fuchs Type NJ 2-V3-N, 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.

Variation 1 - This variation introduced the following changes:

i. A number of drawing changes were recognised, in addition, alternative and replacement component devices were introduced, the product description has therefore been amended and the special conditions for safe use have also been modified.

Variation 2 - This variation introduced the following changes:

i. Following appropriate re-assessment to demonstrate compliance with the requirements of the latest series of standards, the documents originally listed, EN 50014:1997 + Amendments 1 and 2, and EN 50020:2002 were replaced by EN 60079-0:2012 and EN 60079-11:2012 the markings in Section 12 being updated accordingly.
ii. The recognition of minor circuit and mechanical modifications.
iii. The Applicants name was changed from Siemens Energy and Automation Inc to Siemens Industry, Inc.
iv. The IP65 rating has been included in the product description

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14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report no.	Comment
0	19 May 2004	R52A10387A	The release of prime certificate.
1	12 October 2007	R52A16928A	This Issue covers the following changes: • All previously issued certification was rationalised into a single certificate, Issue 1, Issue 0 referenced above is only intended to reflect the history of the previous certification and has not been issued as a document in this format. • The introduction of Variation 1.
2	07 November 2014	R70004449A	The introduction of Variation 2.

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 and depend on the type of I/P Converter fitted:

Table 1: I/P Converter, Converter Terminals dependant on I/P Converter fitted

FM 07ATEX0002X (ControlAir Inc.)				
T Class	Tamb. Max	Ii	Ui	Pi
T6	-55°C to +55°C	60 mA	38.8 V	2.328 W
T6	-55°C to +60°C	50 mA	42.5 V	2.125 W
T5	-55°C to +85°C	23 mA	6.75 V	0.155 W
T5	-55°C to +45°C	120 mA	28 V	3.36 W
T5	-55°C to +55°C	100 mA	30 V	3W
T5	-55°C to +70°C	60 mA	38.8 V	2.328 W
T4	-55°C to +70°C	150 mA	25.5 V	3.825 W
T4	-55°C to +80°C	120 mA	28 V	3.36 W
T4	-55°C to +85°C	100 mA	30 V	3 W
T4	-55°C to +85°C	60 mA	38.8 V	2.328 W

TUV 99ATEX1487X (ABB)		
T Class	Tamb. Max	Ii
T6	-55°C to +55°C	60 mA
T6	-55°C to +60°C	50 mA
T5	-55°C to +45°C	120 mA
T5	-55°C to +55°C	100 mA
T5	-55°C to +70°C	60 mA
T4	-55°C to +70°C	150 mA
T4	-55°C to +80°C	120 mA
T4	-55°C to +85°C	100 mA
T4	-55°C to +85°C	60 mA

Table 2: 4 – 20 mA PCB, TB1 - 1,2,3 or Potentiometer (6920 Series), 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

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Web: www.siracertification.com

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°C	Proximity switches	T6	Ui = 16 V, Ii = 76 mA, Pi = 242 mW, Ci = 40 nF, Li = 50 µH

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 the reports listed in Section 14.2.

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.

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Certificate Annexe

Certificate Number: **Sira 03ATEX2577X**

Equipment: **Series 760 Valve Controllers**

Applicant: **Siemens Industry, Inc.**

Issue 0

Number	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

Issue 1

Number	Sheet	Rev.	Date (Sira stamp)	Description
15032-7612	1 of 7	6	03 Oct 07	General view, standard case
15032-7612	2 of 7	6	03 Oct 07	I/P Converter
15032-7612	3 of 7	6	03 Oct 07	Option PCB parts
15032-7612	4 of 7	6	03 Oct 07	Option PCB layout
15032-7612	5 of 7	6	03 Oct 07	Option board schematics
15032-7612	6 of 7	6	03 Oct 07	Pneumatic and mechanical schematic
15032-7612	7 of 7	6	03 Oct 07	Miscellaneous notes

Issue 2

Number	Sheets	Rev.	Date (Sira stamp)	Title
15032-7612	1 of 7	9	30 Sep 14	General view, standard case
15032-7612	2 of 7	9	30 Sep 14	I/P Converter
15032-7612	3 of 7	9	30 Sep 14	Option PCB parts
15032-7612	4 of 7	9	30 Sep 14	Option PCB layout
15032-7612	5 of 7	9	30 Sep 14	Option board schematics
15032-7612	6 of 7	9	30 Sep 14	Pneumatic and mechanical schematic
15032-7612	7 of 7	9	30 Sep 14	Miscellaneous notes
5-1030	1 of 1	3	11 Jun 14	Certification label
5-934A	1 of 1	3	11 Jun 14	Internal label

Sira Certification Service
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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** Issue: **2**

4 Equipment: **Series 760 Valve Controllers**

5 Applicant: **Siemens Industry, 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 the confidential reports listed in Section 14.2.

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 60079-0:2004 EN 60079-15:2005

The above list of documents may detail standards that do not appear on the UKAS Scope of Accreditation, but have been added through Sira's flexible scope of accreditation, which is available on request.

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
Ex nL IIC T5 Gc (Ta=-25°C to +85°C)

Project Number 70004449

C Ellaby
Deputy Certification Manager

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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 equipment enclosure meets the ingress protection requirements of at least IP65.

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 One of the following I/P converters can be fitted:

a) ABB (formerly Hartmann & Braun GmbH) I/P Converter (TUV 99ATEX1487X)
I/P Converter terminals: I_i = 120 mA

b) ControlAir Inc. I/P Converter (FM 07ATEX0003X)

i. I/P Converter terminals (Ex nL version):

FM 07ATEX0003X (ControlAir Inc.)				
T Class	Tamb.	Ii	Ui	Pi
T5	-55°C to +70°C	60 mA	38.8 V	2.328 W
T5	-55°C to +55°C	100 mA	30 V	3.0 W
T5	-55°C to +45°C	120 mA	28 V	3.36 W
T5	-55°C to +85°C	23 mA	6.75 V	0.155 W

ii. I/P Converter terminals (Ex nAnL version):
Ui = 40V
Ii = 20mA (Tamb. -55°C to +85°C)

2 A 4-20 mA printed circuit board
Terminal block TB1 (1,2,3): Ui = 42 V
Ii = 40 mA
Co = 34 nF
Lo = 40 mH

Or
The pcb may be replaced by a Spectrum Sensors and Controls Inc. P/N 6209-2040-230 (1 kohm +/-10%) type or P/N 6209-2039-130 (5kohm +/-10% type).

3 Two proximity switches, Pepperl and Fuchs Type NJ 2-V3-N
Terminal block TB2 (1,2,3 and 4,5,6): Ui = 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

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SCHEDULE

TYPE EXAMINATION CERTIFICATE **Sira 03ATEX4578**
Issue 2

Variation 1 - This variation introduced the following changes:

i. A number of drawing changes were recognised, in addition, alternative and replacement component devices were introduced, the product description has therefore been amended.

Variation 2 - This variation introduced the following changes:

i. Following appropriate re-assessment to demonstrate compliance with the requirements of the latest series of standards, the document originally listed, EN 50021:1999, was replaced by EN 60079-0:2004 and EN 60079-15:2005 the markings in Section 12 being updated accordingly.
ii. The recognition of minor circuit and mechanical modifications.
iii. The description was modified to clarify that only T5 is applicable to the I/P Converter terminals (Ex nL version).
iv. The Applicants name was changed from Siemens Energy and Automation Inc to Siemens Industry, Inc.
v. The IP65 rating has been included in the product description.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report no.	Comment
0	14 May 2004	R52A10388A	The release of the prime certificate.
1	12 October 2007	R52A16928A	This Issue covers the following changes: • All previously issued certification was rationalised into a single certificate, Issue 1, Issue 0 referenced above is only intended to reflect the history of the previous certification and has not been issued as a document in this format. • The introduction of Variation 1.
2	07 November 2014	R70004449A	The introduction of Variation 2.

15 SPECIAL CONDITIONS FOR SAFE USE

None

16 ESSENTIAL HEALTH AND SAFETY REQUIREMENTS (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed reports listed in Section 14.2.

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 Type Examination Certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.

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Certificate Annexe

Certificate Number: **Sira 03ATEX4578**

Equipment: **Series 760 Valve Controllers**

Applicant: **Siemens Industry, Inc.**

Issue 0

Number	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	B	24 Feb 04	Label, general

Issue 1

Number	Sheet	Rev.	Date (Sira stamp)	Description
15032-7612	1 of 7	6	03 Oct 07	General view, standard case
15032-7612	2 of 7	6	03 Oct 07	I/P Converter
15032-7612	3 of 7	6	03 Oct 07	Option PCB parts
15032-7612	4 of 7	6	03 Oct 07	Option PCB layout
15032-7612	5 of 7	6	03 Oct 07	Option board schematics
15032-7612	6 of 7	6	03 Oct 07	Pneumatic and mechanical schematic
15032-7612	7 of 7	6	03 Oct 07	Miscellaneous notes

Issue 2

Drawing	Sheets	Rev.	Date (Sira stamp)	Title
15032-7612	1 of 7	9	30 Sep 14	General view, standard case
15032-7612	2 of 7	9	30 Sep 14	I/P Converter
15032-7612	3 of 7	9	30 Sep 14	Option PCB parts
15032-7612	4 of 7	9	30 Sep 14	Option PCB layout
15032-7612	5 of 7	9	30 Sep 14	Option board schematics
15032-7612	6 of 7	9	30 Sep 14	Pneumatic and mechanical schematic
15032-7612	7 of 7	9	30 Sep 14	Miscellaneous notes
5-1030	1 of 1	3	11 Jun 14	Certification label
5-934A	1 of 1	3	11 Jun 14	Internal label

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HAZARDOUS (CLASSIFIED) LOCATION

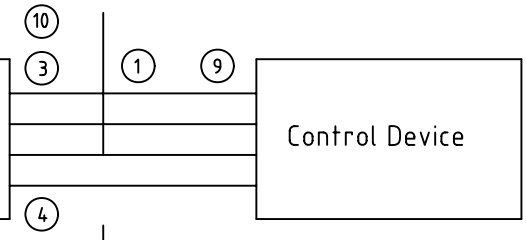
CLASS I, ZONE 2, GROUPS IIC, IIB, IIA (Ta = 50°C) T5
CLASS I, DIVISION 2, GROUPS A, B, C and D
CLASS II, DIVISION 1, GROUPS E, F and G
CLASS III DIVISION 1 HAZARDOUS LOCATIONS

NON-HAZARDOUS LOCATION

PROXIMITY SENSORS

Models C (Capacitive), I (Analog Inductive), M (Magnetic), N (Discrete Inductive), S (Slot), R (Ring) followed by combination of numbers and letters. "-" dashes and/or "+" pluses may be included. (2) (10)

(5) (6) (7)



See Table 1. for sensors with nonincendive field wiring parameters.
See Table 2. for sensors with exceptions.

NOTES:

(1) Wiring methods must be in accordance with the National Electrical Code, ANSI/NFPA 70, Article 501-4(b) for Class I, Division 2; 502-4(a) for Class II, Division 1; 502-4(b) for Class II, Division 2; 503-3(a) for Class III, Division 1; 503-3(b) for Class III, Division 2. Zone 2 wiring requirements are equivalent to Division 2 wiring requirements. See manufacturer's instructions for connection of devices and electrical data.

(2) These proximity sensors are rated "Nonincendive". Proximity sensors without a provision for conduit connection (i.e. via a conduit adapter) or a sensor with a plastic base must be mounted in a tool secured enclosure meeting the requirements of ANSI/ISA S82. Alternatively, sensors in accordance with Table 1 may be wired according to nonincendive field wire methods (a conduit connection or enclosure is not needed).

(3) Proximity sensors, conduit, enclosures, and exposed noncurrent-carrying metal parts must be grounded and bonded in accordance with the National Electrical Code, ANSI/NFPA 70, Article 250.

(4) WARNING - DO NOT CONNECT OR DISCONNECT WHILE CIRCUIT IS LIVE UNLESS LOCATION IS KNOWN TO BE NONHAZARDOUS.

(5) The relay outputs of a proximity sensor must be supplied by a nonincendive source.

(6) Sensitivity adjustment should only be done when the area is known to be nonhazardous.

(7) A temperature rating of T5 applies for all nonincendive proximity sensors. SEE TABLE 2 for exceptions

(8) The nonincendive field wiring concept allows interconnection of nonincendive circuits with a nonincendive source when the approved values of Voc and Isc of the nonincendive source are less than or equal to Vmax and Imax of the nonincendive circuit and the approved values of Ca and La for the nonincendive source are greater than Ci + Ccable and Li + Lcable, respectively, for the nonincendive circuit.

(9) All Nonincendive sources must be approved.

(10) Sensors using V93, V94,V95 connectors ("mini" 7/8") with the locking clamp (P+F model V9-CL-D2) and V1, V12 connectors with locking clamp (P & F model V1-Clip) are suitable to be mounted outside the protective enclosure. Wiring methods must be in accordance to the National Electrical Code, ANSI/NFPA 70.

(11) NJa-b-c-d-e. Inductive Cylinder Position Sensor is suitable for Class I, Div 2 only.
NI/I/2/ABCD/T5 Ta=50°C
a=1.5, 2, 3
b=C, D, F, PD, FD1
c=US, E02, E2, E0
d=any diameter
e=V1, V12, V93, V94, V95 connectors
NEMA 4X

TABLE 1 - NONINCENDIVE PARAMETERS (8)

MODEL NUMBER	Vmax (V)	Imax (mA)	C_i(UF)	L_i(mH)
NJ2-12GM40-E2	60.0	200	0	0
NJ5-18GM50-E2	60.0	200	0	0

TABLE 2 - EXCEPTIONS

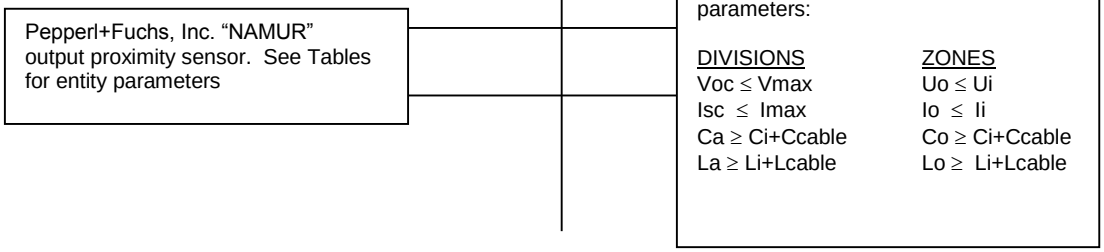
MODEL NUMBER	RESTRICTION
NBN3-F25-E8	Do not use in a Class II, Division 1, Group E Hazardous Location
V9-CL-D2 & V1-Clip	Not Approved for use in Class II or III locations
NJ type SENSOR See Note (11)	Class I, Div 2 ONLY
NJ2-FD1 type SENSOR See Note 11	Class I, Div 2 ONLY / Ta = 85C /T4A

Certification Status			
Agency		Pending	Final
FM	X		X
CSA			
UL			

scale: none	date: 2009-Feb-25				
PEPPERL+FUCHS	CONTROL DRAWING Nonincendive sensors FM	change notice	respons.	US.DRL	116-0155E
		150-1681	approved	US.DWR	
Twinsburg			norm	US.GAP	sheet 1 of 1

HAZARDOUS (CLASSIFIED) LOCATION
Class I, Division 1, Groups A, B, C, D
Class II, Division 1, Groups E, F, G
Class III, Division 1
or
Class I, Zone 0, Groups IIC T6 (Ta = 60ºC)

NONHAZARDOUS LOCATION



Notes:

1. For installation in a Division 1 hazardous (classified) location, the wiring must be in accordance with the National Electrical Code, NFPA 70, Article 504. For installation in a Zone 0 hazardous (classified) location, the wiring must be in accordance with the National Electrical Code, NFPA 70, Article 505. For additional information refer to ISA RP-12.6.

2. The Entity Concept allows interconnection of intrinsically safe and associated apparatus not specifically examined in combination as a system when the approved values of Voc (or Uo) and Isc (or Io) for the associated apparatus are less than or equal to Vmax (or Ui) and Imax (or Ii) for the intrinsically safe apparatus and the approved values of Ca (or Co) and La (or Lo) for the associated apparatus are greater than Ci + Ccable, Li + Lcable, respectively for the intrinsically safe apparatus.

3. 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.

4. Note associated apparatus with only Zone 1 approved connections limits the mounting of the sensors to Zone 1.

5. 'a' in model number indicates option not affecting safety.

6. NAMUR sensors are also nonincendive for Class I, Division 2, Groups A,B,C, and D; Class II, Division 1, Groups E,F, and G; Class III, Division 1; Class I, Zone 2, Groups IIC, IIB, IIA T5 hazardous (classified) locations and need not be connected to an associated apparatus when installed in accordance with Control Drawing 116-0155.

7. The correlation between Typee of connected circuit, maximum permissible ambient temperature and temperature class are indicated at the top of each Table.

8. Model number NMB8-SAE16GM27-N1-FE-V1 approved for Class I, Division 1, Groups C and D T4 (Ta = 85ºC). See Table 12.

9. **Warning** - Equipment with non-metallic enclosures shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. The equipment shall only be cleaned with a damp cloth.

TABLE 1 – CAPACITIVE SENSORS (CBN..., CCB..., CCN…, CJ…)

			Type 1 Ui = 16 V Ii = 25 mA Pi = 34 mW			Type 2 Ui = 16 V Ii = 25 mA Pi = 64 mW			Type 3 Ui = 16 V Ii = 52 mA Pi = 169 mW			Type 4 Ui = 16 V Ii = 76 mA Pi = 242 mW		
			Maximum permissible ambient temperature for application in temperature class											
Model	**Ci**	**Li**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**
CBN2-F46-Na	45 nF	0 µH	73°C	78°C	78°C	67°C	72°C	72°C	46°C	51°C	51°C	32°C	37°C	37°C
CBN5-F46-Na	45 nF	0 µH	73°C	78°C	78°C	67°C	72°C	72°C	46°C	51°C	51°C	32°C	37°C	37°C
CBN5-F46A-Na	45 nF	0 µH	73°C	78°C	78°C	67°C	72°C	72°C	46°C	51°C	51°C	32°C	37°C	37°C
CCN5-F46A-Na	45 nF	0 µH	73°C	78°C	78°C	67°C	72°C	72°C	46°C	51°C	51°C	32°C	37°C	37°C
CCB10-30GMa-Na	155 nF	0 µH	74°C	89°C	96°C	70°C	85°C	88°C	54°C	61°C	61°C	42°C	43°C	43°C
CCN2-F46A-Na	45 nF	0 µH	73°C	78°C	78°C	67°C	72°C	72°C	46°C	51°C	51°C	32°C	37°C	37°C
CCN10-F46A-Na	45 nF	0 µH	73°C	78°C	78°C	67°C	72°C	72°C	46°C	51°C	51°C	32°C	37°C	37°C
CJ1-12GK-N-a	60 nF	0 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
CJ2-18GK-N-a	60 nF	0 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
CJ4-12GK-N-a	60 nF	0 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
CJ6-18GK-N-a	60 nF	0 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
CJ15-40-N-a	140 nF	0 µH	74°C	89°C	100°C	69°C	84°C	100°C	53°C	68°C	80°C	42°C	57°C	61°C
CJ40-FP-N-a	145 nF	0 µH	74°C	89°C	100°C	69°C	84°C	100°C	53°C	68°C	80°C	42°C	57°C	61°C

TABLE 2 – INDUCTIVE SENSORS (FJ…)

			Type 1 Ui = 16 V Ii = 25 mA Pi = 34 mW			Type 2 Ui = 16 V Ii = 25 mA Pi = 64 mW			Type 3 Ui = 16 V Ii = 52 mA Pi = 169 mW			Type 4 Ui = 16 V Ii = 76 mA Pi = 242 mW		
			Maximum permissible ambient temperature for application in temperature class											
Model	**Ci**	**Li**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**
FJ6-110-Na	150 nF	110 µH	73°C	88°C	100°C	73°C	88°C	100°C	62°C	77°C	81°C	54°C	63°C	63°C
FJ7-Na	65 nF	220 µH	73°C	88°C	100°C	73°C	88°C	100°C	62°C	77°C	81°C	54°C	63°C	63°C

TABLE 3 – MAGNETIC SENSORS (MC..., MJ…)

Model	Vmax ,Ui	Imax, Ii	Pi	Ci	Li
MC60-12GM50-1N	16 V	30 mA	75 mW	15 nF	25 µH
MC60-12GM50-1N-V1	16 V	30 mA	75 mW	15 nF	25 µH
MJ35-F12-1N	16 V	30 mA	75 mW	15 nF	25 µH

TABLE 4 – INDUCTIVE SENSORS (NCB…)

			Type 1 Ui = 16 V Ii = 25 mA Pi = 34 mW			Type 2 Ui = 16 V Ii = 25 mA Pi = 64 mW			Type 3 Ui = 16 V Ii = 52 mA Pi = 169 mW			Type 4 Ui = 16 V Ii = 76 mA Pi = 242 mW		
			Maximum permissible ambient temperature for application in temperature class											
Model	**Ci**	**Li**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**
NCB2-F1-N0a	90 nF	100 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NCB2-V3-N0a	100 nF	100 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NCB4-12GMa-N0a	120 nF	50 µH	74°C	89°C	100°C	69°C	84°C	100°C	51°C	66°C	74°C	39°C	52°C	52°C
NCB8-18GMa-N0a	120 nF	50 µH	74°C	89°C	100°C	69°C	84°C	100°C	51°C	66°C	74°C	39°C	52°C	52°C
NCB15+Ua+N0a	110 nF	160 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NCB15-30GMa-N0a	120 nF	150 µH	74°C	89°C	100°C	69°C	84°C	100°C	51°C	66°C	74°C	39°C	52°C	52°C
NCB40-FP-N0a	220 nF	360 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C

Table 5 – INDUCTIVE SENSORS (NCN…)

			Type 1 Ui = 16 V Ii = 25 mA Pi = 34 mW			Type 2 Ui = 16 V Ii = 25 mA Pi = 64 mW			Type 3 Ui = 16 V Ii = 52 mA Pi = 169 mW			Type 4 Ui = 16 V Ii = 76 mA Pi = 242 mW		
			Maximum permissible ambient temperature for application in temperature class											
Model	**Ci**	**Li**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**
NCN3-F24a-N4a	100 nF	100 µH	75°C	90°C	100°C	71°C	86°C	100°C	57°C	72°C	87°C	N/A	N/A	N/A
NCN3-F24a-SN4a	100 nF	150 µH	75°C	90°C	100°C	71°C	86°C	100°C	57°C	72°C	87°C	N/A	N/A	N/A
NCN3-F25a-N4a	100 nF	100 µH	74°C	89°C	100°C	69°C	84°C	100°C	51°C	66°C	91°C	N/A	N/A	N/A
NCN3-F25a-N4-K	100 nF	100 µH	73°C	88°C	100°C	63°C	83°C	100°C	48°C	63°C	82°C	N/A	N/A	N/A
NCN3-F25a-N4-Y41364	100 nF	100 µH	73°C	88°C	100°C	63°C	83°C	100°C	48°C	63°C	82°C	N/A	N/A	N/A
NCN3-F25a-SN4a	100 nF	150 µH	74°C	89°C	100°C	69°C	84°C	100°C	51°C	66°C	87°C	N/A	N/A	N/A
NCN3-F31a-N4a	100 nF	100 µH	77°C	92°C	100°C	75°C	90°C	100°C	67°C	82°C	90°C	N/A	N/A	N/A
NCN3-F31K-N4(-Ya)	100 nF	100 µH	77°C	92°C	100°C	75°C	90°C	100°C	67°C	82°C	90°C	N/A	N/A	N/A
NCN3-F31K-N4a	100 nF	100 µH	63°C	78°C	100°C	63°C	78°C	100°C	63°C	78°C	90°C	N/A	N/A	N/A
NCN3-F36a-N4a	100 nF	100 µH	75°C	90°C	100°C	71°C	86°C	100°C	57°C	72°C	87°C	N/A	N/A	N/A
NCN4-M3K-N4a	100 nF	100 µH	73°C	88°C	100°C	67°C	82°C	100°C	47°C	62°C	78°C	N/A	N/A	N/A
NCN4-V3-N0a	100 nF	100 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NCN15-Ma-N0a	100 nF	100 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NCN20+Ua+N0a	110 nF	160 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NCN30+Ua+N0a	110 nF	160 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NCN40+Ua+N0a	120 nF	130 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NCN50-FP-N0a	220 nF	360 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C

TABLE 6 – INDUCTIVE SENSORS (NJ0,8… TO NJ2…)

			Type 1 Ui = 16 V Ii = 25 mA Pi = 34 mW			Type 2 Ui = 16 V Ii = 25 mA Pi = 64 mW			Type 3 Ui = 16 V Ii = 52 mA Pi = 169 mW			Type 4 Ui = 16 V Ii = 76 mA Pi = 242 mW		
			Maximum permissible ambient temperature for application in temperature class											
Model	**Ci**	**Li**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**
NJ0,8-F-Na	30 nF	50 µH	73°C	88°C	100°C	67°C	82°C	100°C	45°C	60°C	78°C	30°C	45°C	57°C
NJ1,5-F-Na	30 nF	50 µH	73°C	88°C	100°C	67°C	82°C	100°C	45°C	60°C	78°C	30°C	45°C	57°C
NJ2,5-F-Na	40 nF	50 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NJ2-11-SNa	50 nF	150 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NJ2-11-SN-Ga	50 nF	150 µH	76°C	91°C	100°C	73°C	88°C	100°C	62°C	77°C	81°C	54°C	63°C	63°C
NJ2-12GK-SNa	50 nF	150 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NJ2-F1-Na	30 nF	50 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NJ2-V3-Na	40 nF	50 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C

TABLE 7 – INDUCTIVE SENSORS (NJ3… TO NJ10…)

			Type 1 Ui = 16 V Ii = 25 mA Pi = 34 mW			Type 2 Ui = 16 V Ii = 25 mA Pi = 64 mW			Type 3 Ui = 16 V Ii = 52 mA Pi = 169 mW			Type 4 Ui = 16 V Ii = 76 mA Pi = 242 mW		
			Maximum permissible ambient temperature for application in temperature class											
Model	**Ci**	**Li**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**
NJ3-18GK-S1Na	70 nF	200 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NJ4-12GK-SNa	70 nF	150 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NJ4-F-Na	150 nF	100 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NJ5-18GK-SNa	120 nF	200 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NJ5-30GK-S1Na	100 nF	200 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NJ6-22-SNa	110 nF	150 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NJ6-22-SN-Ga	110 nF	150 µH	76°C	91°C	100°C	73°C	88°C	100°C	62°C	77°C	81°C	54°C	63°C	63°C
NJ6S1+Ua+Na	180 nF	150 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NJ6-F-Na	70 nF	100 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NJ8-18GK-SNa	120 nF	200 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NJ10-30GK-SNa	120 nF	150 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NJ10-F-Na	85 nF	100 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C

TABLE 8 – INDUCTIVE SENSORS (NJ15… TO NJ50…)

			Type 1 Ui = 16 V Ii = 25 mA Pi = 34 mW			Type 2 Ui = 16 V Ii = 25 mA Pi = 64 mW			Type 3 Ui = 16 V Ii = 52 mA Pi = 169 mW			Type 4 Ui = 16 V Ii = 76 mA Pi = 242 mW		
			Maximum permissible ambient temperature for application in temperature class											
Model	**Ci**	**Li**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**
NJ15+Ua+Na	140 nF	130 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NJ15-30GK-SNa	120 nF	180 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NJ15-M1a-Na	140 nF	100 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NJ15S+Ua+Na	180 nF	150 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NJ20+Ua+Na	150 nF	130 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NJ20S+Ua+Na	200 nF	150 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NJ30+Ua+Na	160 nF	130 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NJ30P+Ua+1Na	150 nF	170 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NJ40+a+Na	180 nF	130 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NJ40+Ua+Na	180 nF	130 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NJ40-FP-SNa	370 nF	300 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NJ50-FP-Na	320 nF	360 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C

TABLE 9 – INDUCTIVE SENSORS (NCB1,5… TO NJ20-40-N…)

			Type 1 Ui = 16 V Ii = 25 mA Pi = 34 mW			Type 2 Ui = 16 V Ii = 25 mA Pi = 64 mW			Type 3 Ui = 16 V Ii = 52 mA Pi = 169 mW			Type 4 Ui = 16 V Ii = 76 mA Pi = 242 mW		
			Maximum permissible ambient temperature for application in temperature class											
Model	**Ci**	**Li**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**
NCB1,5aMaN0a	90 nF	100 µH	74°C	89°C	100°C	69°C	84°C	100°C	51°C	66°C	85°C	39°C	54°C	67°C
NCB2-12GKa-N0a	90 nF	100 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NCB2-12GMa-N0a	90 nF	100 µH	76°C	91°C	100°C	73°C	88°C	100°C	62°C	77°C	81°C	54°C	63°C	63°C
NCN4-12GKa-N0a	95 nF	100 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NCN4-12GMa-N0a	95 nF	100 µH	76°C	91°C	100°C	73°C	88°C	100°C	62°C	77°C	81°C	54°C	63°C	63°C
NCB5-18GKa-N0a	95 nF	100 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NCB5-18GMa-N0a	95 nF	100 µH	76°C	91°C	100°C	73°C	88°C	100°C	62°C	77°C	81°C	54°C	63°C	63°C
NCN8-18GKa-N0a	95 nF	100 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NCN8-18GMa-N0a	95 nF	100 µH	76°C	91°C	100°C	73°C	88°C	100°C	62°C	77°C	81°C	54°C	63°C	63°C
NCB10-30GKa-N0a	105 nF	100 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NCB10-30GMa-N0a	105 nF	100 µH	76°C	91°C	100°C	73°C	88°C	100°C	62°C	77°C	81°C	54°C	63°C	63°C
NCN15-30GKa-N0a	110 nF	100 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NCN15-30GMa-N0a	110 nF	100 µH	76°C	91°C	100°C	73°C	88°C	100°C	62°C	77°C	81°C	54°C	63°C	63°C
NJ0,2-10GM-Na	20 nF	50 µH	73°C	88°C	100°C	68°C	83°C	100°C	49°C	64°C	67°C	36°C	42°C	42°C
NJ0,8-4,5-Na	30 nF	50 µH	73°C	88°C	100°C	68°C	83°C	100°C	49°C	64°C	67°C	36°C	42°C	42°C
NJ0,8-5GM-Na	30 nF	50 µH	73°C	88°C	100°C	68°C	83°C	100°C	49°C	64°C	67°C	36°C	42°C	42°C
NJ1,5-6,5a-Na	30 nF	50 µH	73°C	88°C	100°C	68°C	83°C	100°C	49°C	64°C	67°C	36°C	42°C	42°C
NJ1,5-10GM-N-Ya	20 nF	50 µH	73°C	88°C	100°C	68°C	83°C	100°C	49°C	64°C	67°C	36°C	42°C	42°C
NJ1,5-8GM-Na	30 nF	50 µH	73°C	88°C	100°C	68°C	83°C	100°C	49°C	64°C	67°C	36°C	42°C	42°C
NJ1,5-8-Na	20 nF	50 µH	73°C	88°C	100°C	68°C	83°C	100°C	49°C	64°C	67°C	36°C	42°C	42°C
NJ1,5-18GM-N-Da	50 nF	60 µH	76°C	91°C	100°C	73°C	88°C	100°C	62°C	77°C	81°C	54°C	63°C	63°C
NJ2-11-Na	45 nF	50 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NJ2-11-N-Ga	30 nF	50 µH	76°C	91°C	100°C	73°C	88°C	100°C	62°C	77°C	81°C	54°C	63°C	63°C
NJ2-12GK-Na	45 nF	50 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NJ2-12GM-Na	30 nF	50 µH	76°C	91°C	100°C	73°C	88°C	100°C	62°C	77°C	81°C	54°C	63°C	63°C
NJ2-14GM-Na	30 nF	50 µH	76°C	91°C	100°C	73°C	88°C	100°C	62°C	77°C	81°C	54°C	63°C	63°C
NJ2,5-14GM-Na	30 nF	50 µH	76°C	91°C	100°C	73°C	88°C	100°C	62°C	77°C	81°C	54°C	63°C	63°C
NJ4-12GK-Na	45 nF	50 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NJ4-14GK-Na	45 nF	50 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C

TABLE 9 – INDUCTIVE SENSORS (NCB1,5… TO NJ20-40-N…) continued

			Type 1 Ui = 16 V Ii = 25 mA Pi = 34 mW			Type 2 Ui = 16 V Ii = 25 mA Pi = 64 mW			Type 3 Ui = 16 V Ii = 52 mA Pi = 169 mW			Type 4 Ui = 16 V Ii = 76 mA Pi = 242 mW		
			Maximum permissible ambient temperature for application in temperature class											
Model	**Ci**	**Li**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**
NJ4-12GM-Na	45 nF	50 µH	73°C	88°C	100°C	68°C	83°C	100°C	49°C	64°C	67°C	36°C	42°C	42°C
NJ4-30GM-N-200a	70 nF	100 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
NJ5-10-11-Na	70 nF	100 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	78°C	30°C	45°C	57°C
NJ5-11-Na	45 nF	50 µH	72°C	87°C	100°C	65°C	80°C	100°C	42°C	57°C	82°C	26°C	41°C	63°C
NJ5-18GK-Na	70 nF	50 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NJ5-18GM-Na	70 nF	50 µH	76°C	91°C	100°C	73°C	88°C	100°C	62°C	77°C	81°C	54°C	63°C	63°C
NJ6-22-Na	130 nF	100 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NJ8-18GK-Na	70 nF	50 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NJ8-18GM-Na	70 nF	50 µH	76°C	91°C	100°C	73°C	88°C	100°C	62°C	77°C	81°C	54°C	63°C	63°C
NJ10-22-Na	130 nF	100 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NJ10-30GKa-Na	140 nF	100 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NJ10-30GM-Na	140 nF	100 µH	76°C	91°C	100°C	73°C	88°C	100°C	62°C	77°C	81°C	54°C	63°C	63°C
NJ15-30GKa-Na	140 nF	100 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NJ15-30GM-Na	140 nF	100 µH	76°C	91°C	100°C	73°C	88°C	100°C	62°C	77°C	81°C	54°C	63°C	63°C
NJ25-50-Na	150 nF	140 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C
NJ20-40-Na	140 nF	140 µH	73°C	88°C	100°C	69°C	84°C	100°C	51°C	66°C	80°C	39°C	54°C	61°C

TABLE 10 – INDUCTIVE RING SENSORS (RC…, RJ…)

			Type 1 Ui = 16 V Ii = 25 mA Pi = 34 mW			Type 2 Ui = 16 V Ii = 25 mA Pi = 64 mW			Type 3 Ui = 16 V Ii = 52 mA Pi = 169 mW			Type 4 Ui = 16 V Ii = 76 mA Pi = 242 mW		
			Maximum permissible ambient temperature for application in temperature class											
Model	**Ci**	**Li**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**
RC10-a-N3a	90 nF	120 µH	75°C	90°C	100°C	70°C	85°C	100°C	55°C	70°C	90°C	N/A	N/A	N/A
RC10-a-N0a	150 nF	100 µH	75°C	90°C	100°C	70°C	85°C	100°C	55°C	70°C	90°C	N/A	N/A	N/A
RC15-a-N0-a	150 nF	100 µH	75°C	90°C	100°C	70°C	85°C	100°C	55°C	70°C	90°C	N/A	N/A	N/A
RC15-a-N3a	90 nF	70 µH	75°C	90°C	100°C	70°C	85°C	100°C	55°C	70°C	90°C	N/A	N/A	N/A
RJ10-Na	30 nF	20 µH	75°C	90°C	100°C	70°C	85°C	100°C	55°C	70°C	90°C	N/A	N/A	N/A
RJ10-a-Na	30 nF	20 µH	75°C	90°C	100°C	70°C	85°C	100°C	55°C	70°C	90°C	N/A	N/A	N/A
RJ10-Bia	90 nF	20 µH	75°C	90°C	100°C	70°C	85°C	100°C	55°C	70°C	90°C	N/A	N/A	N/A
RJ10-a-Bia	90 nF	20 µH	75°C	90°C	100°C	70°C	85°C	100°C	55°C	70°C	90°C	N/A	N/A	N/A
RJ15-Na	130 nF	20 µH	75°C	90°C	100°C	70°C	85°C	100°C	55°C	70°C	90°C	N/A	N/A	N/A
RJ15-a-Na	130 nF	20 µH	75°C	90°C	100°C	70°C	85°C	100°C	55°C	70°C	90°C	N/A	N/A	N/A
RJ15-Bia	90 nF	50 µH	75°C	90°C	100°C	70°C	85°C	100°C	55°C	70°C	90°C	N/A	N/A	N/A
RJ15-a-Bia	90 nF	50 µH	75°C	90°C	100°C	70°C	85°C	100°C	55°C	70°C	90°C	N/A	N/A	N/A
RJ21-Na	30 nF	25 µH	75°C	90°C	100°C	70°C	85°C	100°C	55°C	70°C	90°C	N/A	N/A	N/A
RJ21-Bia	70 nF	50 µH	75°C	90°C	100°C	70°C	85°C	100°C	55°C	70°C	90°C	N/A	N/A	N/A
RJ43-Na	40 nF	50 µH	75°C	90°C	100°C	70°C	85°C	100°C	55°C	70°C	90°C	N/A	N/A	N/A

TABLE 11 – INDUCTIVE SLOT SENSORS (SC..., SJ…)

			Type 1 Ui = 16 V Ii = 25 mA Pi = 34 mW			Type 2 Ui = 16 V Ii = 25 mA Pi = 64 mW			Type 3 Ui = 16 V Ii = 52 mA Pi = 169 mW			Type 4 Ui = 16 V Ii = 76 mA Pi = 242 mW		
			Maximum permissible ambient temperature for application in temperature class											
Model	**Ci**	**Li**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**	**T6**	**T5**	**T4-T1**
SC2-N0a	150 nF	150 µH	55°C	67°C	95°C	48°C	60°C	88°C	23°C	35°C	63°C	6°C	18°C	46°C
SC3,5a-N0a	150 nF	150 µH	56°C	68°C	96°C	49°C	61°C	89°C	28°C	40°C	68°C	13°C	25°C	53°C
SC3,5-N0-Ya	150 nF	150 µH	55°C	67°C	95°C	48°C	60°C	88°C	23°C	35°C	63°C	6°C	18°C	46°C
SJ1,8-N-Ya	30 nF	100 µH	73°C	88°C	100°C	67°C	82°C	100°C	45°C	60°C	78°C	30°C	45°C	57°C
SJ2-Na	30 nF	100 µH	56°C	68°C	96°C	49°C	61°C	89°C	28°C	40°C	68°C	13°C	25°C	53°C
SJ2-SNa	30 nF	100 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	78°C	30°C	45°C	57°C
SJ2-S1Na	60 nF	100 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	78°C	30°C	45°C	57°C
SJ2,2-Na	30 nF	100 µH	73°C	88°C	100°C	67°C	82°C	100°C	45°C	60°C	78°C	30°C	45°C	57°C
SJ3,5-a-Na	50 nF	250 µH	56°C	68°C	96°C	49°C	61°C	89°C	28°C	40°C	68°C	13°C	25°C	53°C
SJ3,5-H-a	50 nF	250 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
SJ3,5-SNa	30 nF	100 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
SJ3,5-S1Na	30 nF	100 µH	73°C	88°C	100°C	66°C	81°C	100°C	45°C	60°C	89°C	30°C	45°C	74°C
SJ5-a-Na	50 nF	250 µH	56°C	68°C	96°C	49°C	61°C	89°C	28°C	40°C	68°C	13°C	25°C	53°C
SJ5-Ka	50 nF	550 µH	55°C	67°C	95°C	48°C	60°C	88°C	25°C	37°C	65°C	9°C	21°C	49°C
SJ10-Na	50 nF	100 µH	55°C	67°C	95°C	48°C	60°C	88°C	25°C	37°C	65°C	9°C	21°C	49°C
SJ15-Na	150 nF	1200 µH	55°C	67°C	95°C	48°C	60°C	88°C	25°C	37°C	65°C	9°C	21°C	49°C
SJ30-Na	150 nF	1250 µH	55°C	67°C	95°C	48°C	60°C	88°C	25°C	37°C	65°C	9°C	21°C	49°C

TABLE 12 – INDUCTIVE SENSORS (NMB…)

Model	**Vmax ,Ui**	**Imax, Ii**	**Pi**	**Ci**	**Li**
NMB8-SAE16GM27-N1-FE-V1	16 V	25 mA	100 mW	2 µF	8 mH

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(1) # EG-Baumusterprüfbescheinigung

(2) Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen - **Richtlinie 94/9/EG**

(3) EG-Baumusterprüfbescheinigungsnummer

PTB 00 ATEX 2032 X

(4) Gerät: Quaderförmige induktive Sensoren Typen FJ..., NJ... und NC...

(5) Hersteller: Pepperl + Fuchs GmbH

(6) Anschrift: D-68307 Mannheim

(7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Baumusterprüfbescheinigung festgelegt.

(8) Die Physikalisch-Technische Bundesanstalt bescheinigt als benannte Stelle Nr. 0102 nach Artikel 9 der Richtlinie des Rates der Europäischen Gemeinschaften vom 23. März 1994 (94/9/EG) die Erfüllung der grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie.

Die Ergebnisse der Prüfung sind in dem vertraulichen Prüfbericht PTB Ex 00-29269 festgelegt.

(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit

EN 50014:1997 **EN 50020:1994**

(10) Falls das Zeichen „X" hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Gerätes in der Anlage zu dieser Bescheinigung hingewiesen.

(11) Diese EG-Baumusterprüfbescheinigung bezieht sich nur auf Konzeption und Bau des festgelegten Gerätes gemäß Richtlinie 94/9/EG. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Inverkehrbringen dieses Gerätes.

(12) Die Kennzeichnung des Gerätes muß die folgenden Angaben enthalten:

II 2 G EEx ia IIC T6

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, 30. Juni 2000

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 24

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig

(13) # Anlage

(14) ## EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

(15) Beschreibung des Gerätes

Die quaderförmigen induktiven Sensoren Typen FJ..., NJ... und NC... dienen zur Umformung von Wegänderungen in elektrische Signale.

Die quaderförmigen induktiven Sensoren dürfen mit eigensicheren Stromkreisen, die für die Kategorien und Explosionsgruppen [EEx ia] IIC oder IIB bzw. [EEx ib] IIC oder IIB bescheinigt sind, betrieben werden. Die Kategorie sowie die Explosionsgruppe der eigensicheren quaderförmigen induktiven Sensoren richtet sich nach dem angeschlossenen, speisenden eigensicheren Stromkreis.

Elektrische Daten

Auswerte- und Versorgungsstromkreis ..... in Zündschutzart Eigensicherheit EEx ia IIC/IIB
bzw. EEx ib IIC/IIB
nur zum Anschluß an bescheinigte eigensichere Stromkreise
Höchstwerte:

Typ 1	Typ 2	Typ 3	Typ 4
U_i = 16 V	U_i = 16 V	U_i = 16 V	U_i = 16 V
I_i = 25 mA	I_i = 25 mA	I_i = 52 mA	I_i = 76 mA
P_i = 34 mW	P_i = 64 mW	P_i = 169 mW	P_i = 242 mW

Der Zusammenhang zwischen dem Typ des angeschlossenen Stromkreises, der höchstzulässigen Umgebungstemperatur und der Temperaturklasse sowie den wirksamen inneren Reaktanzen für die einzelnen Typen der quaderförmigen induktiven Sensoren ist der Tabelle zu entnehmen:

Typen	C_i [nF]	L_i [µH]	Typ 1			Typ 2			Typ 3			Typ 4		
			Höchstzulässige Umgebungstemperatur in °C bei Einsatz in Temperaturklasse											
			T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
FJ 6-110-N...	150	110	73	88	100	73	88	100	62	77	81	54	63	63
FJ 7-N...	65	220	73	88	100	73	88	100	62	77	81	54	63	63
NCB2-F1-N0...	90	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB2-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCN4-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB15+U...+N0...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCB40-FP-N0...	220	360	73	88	100	66	81	100	45	60	89	30	45	74
NCN15-M...-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCN20+U...+N0...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCN30+U...+N0...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCN40+U...+N0...	120	130	73	88	100	66	81	100	45	60	89	30	45	74
NCN50-FP-N0...	220	360	73	88	100	66	81	100	45	60	89	30	45	74
NJ 0,8-F-N...	30	50	73	88	100	67	82	100	45	60	78	30	45	57
NJ 1,5-F-N...	30	50	73	88	100	67	82	100	45	60	78	30	45	57
NJ 2,5-F-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 2-F1-N...	30	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 2-V3-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 4-F-N...	150	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 6-F-N...	70	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 10-F-N...	85	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 15+U.+N...	140	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 15-M1.-N...	140	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 20+U.+N...	150	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 30+U.+N...	160	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 30P+U.+1N...	150	170	73	88	100	66	81	100	45	60	89	30	45	74
NJ 40+...+N...	180	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 50-FP-N...	320	360	73	88	100	66	81	100	45	60	89	30	45	74

(16) Prüfbericht PTB Ex 00-29269

(17) Besondere Bedingungen

1. Beim Einsatz der quaderförmigen induktiven Sensoren Typen FJ..., NJ... und NC... im Temperaturbereich von -60°C bis -20 °C sind diese durch Einbau in ein zusätzliches Gehäuse vor Schlageinwirkung zu schützen.
2. Die Anschlußteile der quaderförmigen induktiven Sensoren Typen FJ..., NJ... und NC...sind so zu errichten, daß mindestens die Schutzart IP20 gemäß IEC-Publikation 60529:1989 erreicht wird.
3. Der Zusammenhang zwischen dem Typ des angeschlossenen Stromkreises, der höchstzulässigen Umgebungstemperatur und der Temperaturklasse sowie den wirksamen inneren Reaktanzen für die einzelnen Typen der quaderförmigen induktiven Sensoren ist der Tabelle unter Punkt (15) dieser EG-Baumusterprüfbescheinigung zu entnehmen.
4. Bei Einsatz in Gruppe IIC ist bei den folgenden Typen der quaderförmigen induktiven Sensoren die unzulässige elektrostatische Aufladung der Kunststoffgehäuse zu vermeiden und ein entsprechender Warnhinweis auf dem Gerät anzubringen:

   NCB40-FP-N0...
   NCN40+U...+N0...
   NCN50-FP-N0...
   NJ 30P+U...+1N...
   NJ 40+U...+N...
   NJ 50-FP-N...

5. Bei den folgenden Typen der quaderförmigen induktiven Sensoren ist die unzulässige elektrostatische Aufladung der Metallgehäuseteile zu vermeiden. Gefährliche elektrostatische Aufladungen der Metallgehäuseteile können durch Erdung dieser Metallgehäuseteile vermieden werden, wobei sehr kleine Metallgehäuseteile (z.B. Schrauben) nicht geerdet werden müssen:

   FJ 6-110-N...
   FJ 7-N...
   NCB15+U3+N0...
   NCB15+U4+N0...
   NCB40-FP-N0-P3...
   NCB40-FP-N0-P4...
   NCN20+U3+N0...
   NCN20+U4+N0...
   NCN30+U3+N0...
   NCN30+U4+N0...
   NCN40+U3+N0...
   NCN40+U4+N0...
   NCN50-FP-N0-P3...
   NCN50-FP-N0-P4...
   NJ 15+U3+N...
   NJ 15+U4+N...
   NJ 15-M1-N-V
   NJ 20+U3+N...
   NJ 20+U4+N...
   NJ 30+U3+N...
   NJ 30+U4+N...
   NJ 30P+U3+1N...
   NJ 30P+U4+1N...
   NJ 40+U3+N...
   NJ 40+U4+N...
   NJ 50-FP-N-P3...
   NJ 50-FP-N-P4...

(18) Grundlegende Sicherheits- und Gesundheitsanforderungen

Durch vorgenannte Normen abgedeckt.

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, 30. Juni 2000

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

1. ERGÄNZUNG

gemäß Richtlinie 94/9/EG Anhang III Ziffer 6

zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Gerät: Quaderförmige induktive Sensoren Typen FJ..., NJ... und NC...

Kennzeichnung: Ⓔx **II 2 G EEx ia IIC T6**

Hersteller: Pepperl + Fuchs GmbH

Anschrift: 68307 Mannheim, Deutschland

Beschreibung der Ergänzungen und Änderungen

Die bestehende EG-Baumusterprüfbescheinigung für die quaderförmigen induktiven Sensoren der Typen FJ..., NJ... und NC... wird um die Typen NCN2-F56-N1... und NBN4-V3-N0... entsprechend den ergänzenden Prüfungsunterlagen des Prüfberichtes erweitert. Für diese Typen gelten die unten aufgeführten "Elektrischen Daten".

Desweiteren dürfen die quaderförmigen induktiven Sensoren der Typen FJ..., NJ... und NC... zukünftig auch entsprechend den ergänzenden Prüfungsunterlagen des Prüfberichtes gefertigt werden. Die Änderungen betreffen den inneren Aufbau, die Erweiterung der möglichen Gießharztypen, die Art und Weise der Kennzeichnung mit Typschildern sowie den Typschlüssel der Sensoren mit Unterteilen. Der Typschlüssel dieser Sensoren kann mit einem zusätzlichen Zeichen ergänzt werden (z.B. U3., U4., P3., P4.).

Die „Besonderen Bedingungen" insbesondere die Punkte 4 und 5 gelten für die Typen mit geändertem Typschlüssel sinngemäß übertragen.

Alle anderen Angaben gelten unverändert auch für diese erste Ergänzung.

Elektrische Daten

Auswerte- und
Versorgungsstromkreis ..... in Zündschutzart Eigensicherheit EEx ia IIC/IIB

bzw. EEx ib IIC/IIB

nur zum Anschluß an bescheinigte eigensichere Stromkreise

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

1. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Höchstwerte:

Typ 1	Typ 2	Typ 3	Typ 4
U_i = 16 V	U_i = 16 V	U_i = 16 V	U_i = 16 V
I_i = 25 mA	I_i = 25 mA	I_i = 52 mA	I_i = 76 mA
P_i = 34 mW	P_i = 64 mW	P_i = 169 mW	P_i = 242 mW

Der Zusammenhang zwischen dem Typ des angeschlossenen Stromkreises, der höchstzulässigen Umgebungstemperatur und der Temperaturklasse sowie den wirksamen inneren Reaktanzen für die neuen Typen der quaderförmigen induktiven Sensoren ist der Tabelle zu entnehmen:

			Typ 1			Typ 2			Typ 3			Typ 4		
Typen	C_i	L_i	Höchstzulässige Umgebungstemperatur in °C bei Einsatz in Temperaturklasse											
	[nF]	[µH]	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
NCN2-F56-N1...	100	100	75	90	100	70	85	100	55	70	87	-	-	-
NBN4-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74

Prüfbericht: PTB Ex 01-20124

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, 23. August 2001

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

2. ERGÄNZUNG

gemäß Richtlinie 94/9/EG Anhang III Ziffer 6

zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Gerät: Quaderförmige induktive Sensoren Typen FJ..., NJ... und NC...

Kennzeichnung: **II 2 G EEx ia IIC T6**

Hersteller: Pepperl + Fuchs GmbH

Anschrift: Königsberger Allee 87
68307 Mannheim; Deutschland

Beschreibung der Ergänzungen und Änderungen

Die nachfolgend aufgeführten quaderförmigen induktiven Sensoren Typen NJ... und NC...dürfen zukünftig auch in explosionsgefährdeten Bereichen eingesetzt werden, die den Einsatz von Kategorie 1-Geräten erfordern.

Die Änderungen betreffen ausschließlich die "Elektrischen Daten" (geänderte höchstzulässige Umgebungstemperaturen für den Einsatz als Kategorie 1-Gerät, Reduzierung des eigensicheren Auswerte- und Versorgungsstromkreises auf die Kategorie ia) sowie die Kennzeichnung der nachfolgend aufgeführten Typen der quaderförmigen induktiven Sensoren.

NCB2-F1-N0...
NCB2-V3-N0...
NCN4-V3-N0...
NCB15+U...+N0...
NCB40-FP-N0...
NCN15-M...-N0...
NCN20+U...+N0...
NCN30+U...+N0...
NCN40+U...+N0...
NCN50-FP-N0...
NJ 2-V3-N...
NJ 15+U.+N...
NJ 20+U.+N...
NJ 30+U.+N...
NJ 40+...+N...
NJ 50-FP-N...

Die Kennzeichnung der oben aufgeführten Sensoren lautet für den Einsatz als Kategorie 1-Gerät zukünftig:

II 1 G EEx ia IIC T6

Die "Besonderen Bedingungen" gelten unverändert auch für den Einsatz als Kategorie 1-Gerät.

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

2. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Elektrische Daten

Auswerte- und Versorgungsstromkreis ..... in Zündschutzart Eigensicherheit EEx ia IIC/IIB
nur zum Anschluß an bescheinigte eigensichere Stromkreise
Höchstwerte:

Typ 1	Typ 2	Typ 3	Typ 4
U_i = 16 V	U_i = 16 V	U_i = 16 V	U_i = 16 V
I_i = 25 mA	I_i = 25 mA	I_i = 52 mA	I_i = 76 mA
P_i = 34 mW	P_i = 64 mW	P_i = 169 mW	P_i = 242 mW

Der Zusammenhang zwischen dem Typ des angeschlossenen Stromkreises, der höchstzulässigen Umgebungstemperatur für den Einsatz als Kategorie 1-Gerät und der Temperaturklasse sowie den wirksamen inneren Reaktanzen für die einzelnen Typen der quaderförmigen induktiven Sensoren ist der nachfolgenden Tabelle zu entnehmen:

Typen	C_i	L_i	Typ 1			Typ 2			Typ 3			Typ 4		
			Höchstzulässige Umgebungstemperatur in °C bei Einsatz in Temperaturklasse											
	[nF]	[µH]	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
NCB2-F1-N0...	90	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB2-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCN4-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB15+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCB40-FP-N0...	220	360	56	68	96	49	61	89	28	40	68	13	25	53
NCN15-M...-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCN20+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCN30+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCN40+U...+N0...	120	130	56	68	96	49	61	89	28	40	68	13	25	53
NCN50-FP-N0...	220	360	56	68	96	49	61	89	28	40	68	13	25	53
NJ 2-V3-N...	40	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 15+U.+N...	140	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 20+U.+N...	150	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 30+U.+N...	160	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 40+...+N...	180	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 50-FP-N...	320	360	56	68	96	49	61	89	28	40	68	13	25	53

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

2. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Prüfbericht: PTB Ex 03-22406

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, 04. April 2003

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

3. ERGÄNZUNG

gemäß Richtlinie 94/9/EG Anhang III Ziffer 6

zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Gerät: Quaderförmige induktive Sensoren Typen FJ..., NJ... und NC...

Kennzeichnung: **II 2 G EEx ia IIC T6**

Hersteller: Pepperl + Fuchs GmbH

Anschrift: Königsberger Allee 87
68307 Mannheim; Deutschland

Beschreibung der Ergänzungen und Änderungen

Die EG-Baumusterprüfbescheinigung wird um den quaderförmigen induktiven Sensor Typ NJ 3-V3-N... erweitert. Der quaderförmige induktive Sensor Typ NJ 3-V3-N... ist ausschließlich für den Betrieb in explosionsgefährdeten Bereichen vorgesehen, die den Einsatz von Kategorie 2-Geräten erfordern.

Die weiteren Änderungen betreffen die Art der Kennzeichnung, den inneren Aufbau sowie die Betriebsanleitung der quaderförmigen induktiven Sensoren. Die "Elektrischen Daten", die "Besonderen Bedingungen" sowie alle weiteren sicherheitsrelevanten Angaben sind von diesen Änderungen nicht betroffen.

Elektrische Daten

Auswerte- und Versorgungsstromkreis ..... in Zündschutzart Eigensicherheit EEx ia IIC/IIB
nur zum Anschluß an bescheinigte eigensichere Stromkreise
Höchstwerte:

Typ 1	Typ 2	Typ 3	Typ 4
U_i = 16 V	U_i = 16 V	U_i = 16 V	U_i = 16 V
I_i = 25 mA	I_i = 25 mA	I_i = 52 mA	I_i = 76 mA
P_i = 34 mW	P_i = 64 mW	P_i = 169 mW	P_i = 242 mW

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3. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Der Zusammenhang zwischen dem Typ des angeschlossenen Stromkreises, der höchstzulässigen Umgebungstemperatur für den Einsatz als Kategorie 2-Gerät und der Temperaturklasse sowie den wirksamen inneren Reaktanzen für diesen Typ der quaderförmigen induktiven Sensoren ist der nachfolgenden Tabelle zu entnehmen:

			Typ 1			Typ 2			Typ 3			Typ 4		
Typ	C_i [nF]	L_i [µH]	Höchstzulässige Umgebungstemperatur in °C bei Einsatz in Temperaturklasse											
			T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
NJ 3-V3-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74

Prüfbericht: PTB Ex 04-23369

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, 26. Februar 2004

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

4. ERGÄNZUNG

gemäß Richtlinie 94/9/EG Anhang III Ziffer 6

zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Gerät: Quaderförmige induktive Sensoren Typen FJ..., NJ... und NC...

Kennzeichnung: **II 2 G EEx ia IIC T6 bzw.**

II 1 G EEx ia IIC T6

Hersteller: Pepperl + Fuchs GmbH

Anschrift: Königsberger Allee 87, 68307 Mannheim; Deutschland

Beschreibung der Ergänzungen und Änderungen

Die quaderförmigen induktiven Sensoren der Typen FJ..., NJ... und NC... dürfen zukünftig auch wie in den Prüfungsunterlagen zum Prüfbericht PTB Ex 06-25344 beschrieben gefertigt und betrieben werden.

Die Änderungen betreffen die Erweiterung der Typenreihe NC... (neue Typen), die Einführung einer Typenreihe NB... , den inneren Aufbau (weitere Schaltplanbeispiele, neue LED-Typen, neue Vergussmasse), die Festlegung von Einsatzbedingungen als Kategorie 1-Gerät für jetzt alle quaderförmigen induktiven Sensoren die Bestandteil dieser EG-Baumusterprüfbescheinigung sind sowie die Anpassung der „Besonderen Bedingungen".

Die EG-Baumusterprüfbescheinigung wird um folgende Typen der quaderförmigen induktiven Sensoren erweitert:

NBN3-F69-N0...
NBN4-V3-N0-Y189289
NCN40-L2-N0...
NCB20-L2-N0...

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

4. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Für folgende Typen der quaderförmigen induktiven Sensoren werden die Einsatzbedingungen als Kategorie 1-Gerät mit dieser 4. Ergänzung neu festgelegt.

FJ 6-110-N...	NJ 1,5-F-N...
FJ 7-N...	NJ 2-F1-N...
NCN2-F56-N1...	NJ 2,5-F-N...
NBN3-F69-N0...	NJ 3-V3-N...
NBN4-V3-N0...	NJ 4-F-N...
NBN4-V3-N0-Y189289	NJ 6-F-N...
NCN40-L2-N0...	NJ 10-F-N...
NCB20-L2-N0...	NJ 15-M1.-N...
NJ 0,8-F-N...	NJ 30P+U.+1N...

Zur besseren Verständlichkeit werden die „Elektrischen Daten" sowie die Tabellen, welche die Zusammenhänge zwischen den höchstzulässigen Umgebungstemperaturen, den Temperaturklassen, den „Elektrischen Daten" sowie den Gerätekategorien herstellen, für alle Typen der quaderförmigen induktiven Sensoren nachfolgend dargestellt.

Des Weiteren werden die geänderten „Besonderen Bedingungen" dargestellt.

Elektrische Daten

Auswerte- und
Versorgungsstromkreis ..... in Zündschutzart Eigensicherheit EEx ia IIC/IIB/IIA
bzw. EEx ib IIC/IIB/IIA
nur zum Anschluss an bescheinigte eigensichere Stromkreise
Höchstwerte:

Typ 1	Typ 2	Typ 3	Typ 4
U_i = 16 V	U_i = 16 V	U_i = 16 V	U_i = 16 V
I_i = 25 mA	I_i = 25 mA	I_i = 52 mA	I_i = 76 mA
P_i = 34 mW	P_i = 64 mW	P_i = 169 mW	P_i = 242 mW

Beim Einsatz als Kategorie 1-Gerät ist zu beachten, dass der Auswerte- und Versorgungsstromkreis der Zündschutzart Eigensicherheit EEx ia IIC/IIB entsprechen muss.

Die Zusammenhänge zwischen dem Typ des angeschlossenen Stromkreises, der höchstzulässigen Umgebungstemperatur für den Einsatz als Kategorie 1- bzw. Kategorie 2-Gerät und der Temperaturklasse sowie den wirksamen inneren Reaktanzen für die einzelnen Typen der quaderförmigen induktiven Sensoren sind den nachfolgenden Tabellen zu entnehmen.

Typen	C_i [nF]	L_i [µH]	Typ 1			Typ 2			Typ 3			Typ 4		
			Höchstzulässige Umgebungstemperatur in °C bei Einsatz in Temperaturklasse											
			T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
FJ 6-110-N...	150	110	59	71	99	56	68	96	45	57	81	37	49	63
FJ 7-N...	65	220	59	71	99	56	68	96	45	57	81	37	49	63
NCB2-F1-N0...	90	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB2-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCN2-F56-N1...	100	100	57	69	97	53	65	93	37	49	77	-	-	-
NBN3-F69-N0...	100	100	55	67	95	48	60	88	24	36	63	-	-	37
NBN4-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NBN4-V3-N0-Y189289	120	100	55	67	95	48	60	88	24	36	63	-	-	37
NCN4-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB15+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCN15-M...-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB20-L2-N0...	110	200	56	68	96	49	61	89	28	40	68	13	25	53
NCN20+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCN30+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCB40-FP-N0..	220	360	56	68	96	49	61	89	28	40	68	13	25	53
NCN40+U...+N0...	120	130	56	68	96	49	61	89	28	40	68	13	25	53
NCN40-L2-N0...	105	300	56	68	96	49	61	89	28	40	68	13	25	53
NCN50-FP-N0...	220	360	56	68	96	49	61	89	28	40	68	13	25	53
NJ 0,8-F-N...	30	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 1,5-F-N...	30	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 2,5-F-N...	40	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 2-F1-N...	30	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 2-V3-N...	40	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 3-V3-N...	40	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 4-F-N...	150	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 6-F-N	70	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 10-F-N...	85	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 15+U.+N...	140	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 15-M1.-N...	140	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 20+U.+N...	150	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 30+U.+N...	160	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 30P+U.+1N...	150	170	56	68	96	49	61	89	28	40	68	13	25	53
NJ 40+...+N...	180	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 50-FP-N...	320	360	56	68	96	49	61	89	28	40	68	13	25	53

Tabelle 1: Einsatz als Kategorie 1-Gerät

Typen	C_i [nF]	L_i [µH]	Typ 1			Typ 2			Typ 3			Typ 4		
			Höchstzulässige Umgebungstemperatur in °C bei Einsatz in Temperaturklasse											
			T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
FJ 6-110-N...	150	110	73	88	100	73	88	100	62	77	81	54	63	63
FJ 7-N...	65	220	73	88	100	73	88	100	62	77	81	54	63	63
NCB2-F1-N0...	90	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB2-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCN2-F56-N1...	100	100	75	90	100	70	85	100	55	70	87	-	-	-
NBN3-F69-N0...	100	100	72	87	100	65	80	100	41	56	63	24	37	37
NBN4-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NBN4-V3-N0-Y189289	120	100	72	87	100	65	80	100	41	56	63	24	37	37
NCN4-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB15+U...+N0...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCN15-M...-N0..	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB20-L2-N0...	110	200	73	88	100	66	81	100	45	60	89	30	45	74
NCN20+U...+NO...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCN30+U...+NO...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCB40-FP-N0..	220	360	73	88	100	66	81	100	45	60	89	30	45	74
NCN40+U...+NO...	120	130	73	88	100	66	81	100	45	60	89	30	45	74
NCN40-L2-N0...	105	300	73	88	100	66	81	100	45	60	89	30	45	74
NCN50-FP-N0...	220	360	73	88	100	66	81	100	45	60	89	30	45	74
NJ 0,8-F-N...	30	50	73	88	100	67	82	100	45	60	78	30	45	57
NJ 1,5-F-N...	30	50	73	88	100	67	82	100	45	60	78	30	45	57
NJ 2,5-F-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 2-F1-N...	30	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 2-V3-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 3-V3-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 4-F-N...	150	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 6-F-N	70	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 10-F-N...	85	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 15+U.+N...	140	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 15-M1.-N...	140	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 20+U.+N...	150	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 30+U.+N...	160	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 30P+U.+1N...	150	170	73	88	100	66	81	100	45	60	89	30	45	74
NJ 40+...+N...	180	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 50-FP-N...	320	360	73	88	100	66	81	100	45	60	89	30	45	74

Tabelle 2: Einsatz als Kategorie 2-Gerät

4. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Besondere Bedingungen

1. Beim Einsatz der quaderförmigen induktiven Sensoren Typen FJ..., NJ..., NB... und NC... im Temperaturbereich von -60 °C bis -20 °C sind diese durch Einbau in ein zusätzliches Gehäuse vor Schlageinwirkung zu schützen.

2. Die Anschlussteile der quaderförmigen induktiven Sensoren Typen FJ..., NJ..., NB... und NC... sind so zu errichten, dass mindestens die Schutzart IP20 gemäß IEC-Publikation 60529:1989 erreicht wird.

3. Der Zusammenhang zwischen dem Typ des angeschlossenen Stromkreises, der höchstzulässigen Umgebungstemperatur und der Temperaturklasse sowie den wirksamen inneren Reaktanzen für die einzelnen Typen der quaderförmigen induktiven Sensoren ist den Tabellen 1 und 2 dieser 4. Ergänzung der EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X zu entnehmen.

4. Bei Einsatz der folgenden Typen der quaderförmigen induktiven Sensoren entsprechend der Explosionsgruppen und Gerätekategorien der nachfolgenden Tabelle ist die unzulässige elektrostatische Aufladung der Kunststoffgehäuse zu vermeiden. Ein entsprechender Warnhinweis ist auf dem Gerät anzubringen:

Typ	Einsatz als Kategorie 1-Gerät	Einsatz als Kategorie 2-Gerät
FJ 6-110-N...	IIB/IIC	IIC
FJ 7-N...	IIC	-
NCB2-F1-N0...	IIC	-
NCB2-V3-N0...	IIC	-
NBN3-F69-N0...	IIC	-
NBN4-V3-N0...	IIC	-
NBN4-V3-N0-Y189289	IIC	-
NCN4-V3-N0...	IIC	-
NCB15+U...+N0...	IIC	IIC
NCN15-M...-N0..	IIC	-
NCB20-L2-N0...	IIC	-
NCN20+U...+NO...	IIC	IIC
NCN30+U...+NO...	IIC	IIC
NCB40-FP-N0..	IIA/IIB/IIC	IIC
NCN40+U...+NO...	IIB/IIC	IIC
NCN40-L2-N0...	IIC	-
NCN50-FP-N0...	IIA/IIB/IIC	IIC
NJ 2,5-F-N...	IIC	-
NJ 2-F1-N...	IIC	-
NJ 2-V3-N...	IIC	-
NJ 3-V3-N...	IIC	-

NJ 4-F-N...	IIC	IIC
NJ 6-F-N	IIC	-
NJ 10-F-N...	IIC	-
NJ 15+U.+N...	IIC	IIC
NJ 15-M1.-N...	IIC	-
NJ 20+U.+N...	IIC	IIC
NJ 30+U.+N...	IIC	IIC
NJ 30P+U.+1N...	IIB/IIC	IIC
NJ 40+...+N...	IIB/IIC	IIC
NJ 50-FP-N...	IIA/IIB/IIC	IIC

5. Bei den folgenden Typen der quaderförmigen induktiven Sensoren ist die unzulässige elektrostatische Aufladung der Metallgehäuseteile zu vermeiden. Gefährliche elektrostatische Aufladungen der Metallgehäuseteile können durch Erdung dieser Metallgehäuseteile vermieden werden, wobei sehr kleine Metallgehäuseteile (z.B. Schrauben) nicht geerdet werden müssen:

FJ 6-110-N...
FJ 7-N...
NCB15+U3+N0...
NCB15+U4+N0...
NCB20-L2-N0...
NCB40-FP-N0-P3...
NCB40-FP-N0-P4...
NCN20+U3+N0...
NCN20+U4+N0...
NCN30+U3+N0...
NCN30+U4+N0...
NCN40-L2-N0...
NCN40+U3+N0...
NCN40+U4+N0...
NCN50-FP-N0-P3...
NCN50-FP-N0-P4...
NJ 15+U3+N...
NJ 15+U4+N...
NJ 15-M1-N-V
NJ 20+U3+N...
NJ 20+U4+N...
NJ 30+U3+N...
NJ 30+U4+N...
NJ 30P+U3+1N...
NJ 30P+U4+1N...
NJ 40+U3+N...
NJ 40+U4+N...
NJ 50-FP-N-P3...
NJ 50-FP-N-P4...

Prüfbericht: PTB Ex 06-25344

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

Braunschweig, 19. April 2006

5. ERGÄNZUNG

gemäß Richtlinie 94/9/EG Anhang III Ziffer 6

zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Gerät: Quaderförmige induktive Sensoren Typen FJ..., NJ...; NB... und NC...

Kennzeichnung: ⟨Ex⟩ **II 2 G EEx ia IIC T6 bzw. II 1 G EEx ia IIC T6**

Hersteller: Pepperl + Fuchs GmbH

Anschrift: Lilienthalstrasse 200, 68307 Mannheim, Deutschland

Beschreibung der Ergänzungen und Änderungen

Die quaderförmigen induktiven Sensoren der Typen FJ..., NJ...; NB... und NC... dürfen zukünftig auch wie in den Prüfungsunterlagen zum Prüfbericht PTB Ex 08-26271 beschrieben gefertigt und betrieben werden.

Die Änderungen betreffen die Erweiterung der Typenreihe NB..., den inneren Aufbau (weitere Alternative für das Vergussmaterial, weitere alternative LED-Typen) sowie eine weitere Alternative für die Aufbringung der Kennzeichnung.

Des weiteren wurde die EG-Baumusterprüfbescheinigung an den aktuellen Normenstand angepasst. Die Kennzeichnung ändert sich daraufhin wie folgt:

⟨Ex⟩ **II 2 G Ex ia IIC T6 bzw. II 1 G Ex ia IIC T6**

Die EG-Baumusterprüfbescheinigung wird um folgende Typen der quaderförmigen induktiven Sensoren erweitert:

NBB15-U.K-N0...
NBB20-U.K-N0...
NBN30-U.K-N0...
NBN40-U.K-N0...

5. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Zur besseren Verständlichkeit werden die „Elektrischen Daten" sowie die Tabellen, welche die Zusammenhänge zwischen den höchstzulässigen Umgebungstemperaturen, den Temperaturklassen, den „Elektrischen Daten" sowie den Gerätekategorien herstellen, für alle Typen der quaderförmigen induktiven Sensoren nachfolgend dargestellt.
Des weiteren werden die geänderten „Besonderen Bedingungen" bezogen auf alle Typen dieser EG-Baumusterprüfbescheinigung dargestellt.

Elektrische Daten

Auswerte- und
Versorgungsstromkreis ..... in Zündschutzart Eigensicherheit Ex ia IIC/IIB
bzw. Ex ib IIC/IIB

nur zum Anschluss an bescheinigte eigensichere Stromkreise
Höchstwerte:

Typ 1	Typ 2	Typ 3	Typ 4
U_i = 16 V	U_i = 16 V	U_i = 16 V	U_i = 16 V
I_i = 25 mA	I_i = 25 mA	I_i = 52 mA	I_i = 76 mA
P_i = 34 mW	P_i = 64 mW	P_i = 169 mW	P_i = 242 mW

Beim Einsatz als Kategorie 1-Gerät ist zu beachten, dass der Auswerte- und Versorgungsstromkreis der Zündschutzart Eigensicherheit Ex ia IIC/IIB entsprechen muss.

Die Zusammenhänge zwischen dem Typ des angeschlossenen Stromkreises, der höchstzulässigen Umgebungstemperatur für den Einsatz als Kategorie 1- bzw. Kategorie 2-Gerät und der Temperaturklasse sowie den wirksamen inneren Reaktanzen für die einzelnen Typen der quaderförmigen induktiven Sensoren sind den nachfolgenden Tabellen zu entnehmen.

5. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Typen	C_i [nF]	L_i [µH]	Typ 1			Typ 2			Typ 3			Typ 4		
			Höchstzulässige Umgebungstemperatur in °C bei Einsatz in Temperaturklasse											
			T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
FJ 6-110-N...	150	110	59	71	99	56	68	96	45	57	81	37	49	63
FJ 7-N...	65	220	59	71	99	56	68	96	45	57	81	37	49	63
NCB2-F1-N0...	90	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB2-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCN2-F56-N1...	100	100	57	69	97	53	65	93	37	49	77	-	-	-
NBN3-F69-N0...	100	100	55	67	95	48	60	88	24	36	63	-	-	37
NBN4-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NBN4-V3-N0-Y189289	120	100	55	67	95	48	60	88	24	36	63	-	-	37
NBB15-U.K-N0...	110	200	56	68	96	49	61	89	28	40	68	13	25	53
NBB20-U.K-N0...	110	200	56	68	96	49	61	89	28	40	68	13	25	53
NBN30-U.K-N0...	105	300	56	68	96	49	61	89	28	40	68	13	25	53
NBN40-U.K-N0...	105	300	56	68	96	49	61	89	28	40	68	13	25	53
NCN4-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB15+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCN15-M...-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB20-L2-N0...	110	200	56	68	96	49	61	89	28	40	68	13	25	53
NCN20+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCN30+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCB40-FP-N0..	220	360	56	68	96	49	61	89	28	40	68	13	25	53
NCN40+U...+N0...	120	130	56	68	96	49	61	89	28	40	68	13	25	53
NCN40-L2-N0...	105	300	56	68	96	49	61	89	28	40	68	13	25	53
NCN50-FP-N0...	220	360	56	68	96	49	61	89	28	40	68	13	25	53
NJ 0,8-F-N...	30	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 1,5-F-N...	30	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 2,5-F-N...	40	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 2-F1-N...	30	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 2-V3-N...	40	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 3-V3-N...	40	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 4-F-N...	150	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 6-F-N	70	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 10-F-N...	85	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 15+U.+N...	140	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 15-M1.-N...	140	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 20+U.+N...	150	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 30+U.+N...	160	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 30P+U.+1N...	150	170	56	68	96	49	61	89	28	40	68	13	25	53
NJ 40+...+N...	180	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 50-FP-N...	320	360	56	68	96	49	61	89	28	40	68	13	25	53

Tabelle 1: Einsatz als Kategorie 1-Gerät

5. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Typen	C_i [nF]	L_i [µH]	Typ 1			Typ 2			Typ 3			Typ 4		
			Höchstzulässige Umgebungstemperatur in °C bei Einsatz in Temperaturklasse											
			T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
FJ 6-110-N...	150	110	73	88	100	73	88	100	62	77	81	54	63	63
FJ 7-N...	65	220	73	88	100	73	88	100	62	77	81	54	63	63
NCB2-F1-N0...	90	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB2-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCN2-F56-N1...	100	100	75	90	100	70	85	100	55	70	87	-	-	-
NBN3-F69-N0...	100	100	72	87	100	65	80	100	41	56	63	24	37	37
NBN4-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NBN4-V3-N0-Y189289	120	100	72	87	100	65	80	100	41	56	63	24	37	37
NBB15-U.K-N0...	110	200	73	88	100	66	81	100	45	60	89	30	45	74
NBB20-U.K-N0...	110	200	73	88	100	66	81	100	45	60	89	30	45	74
NBN30-U.K-N0...	105	300	73	88	100	66	81	100	45	60	89	30	45	74
NBN40-U.K-N0...	105	300	73	88	100	66	81	100	45	60	89	30	45	74
NCN4-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB15+U...+N0...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCN15-M...-N0..	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB20-L2-N0...	110	200	73	88	100	66	81	100	45	60	89	30	45	74
NCN20+U...+NO...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCN30+U...+NO...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCB40-FP-N0..	220	360	73	88	100	66	81	100	45	60	89	30	45	74
NCN40+U...+NO...	120	130	73	88	100	66	81	100	45	60	89	30	45	74
NCN40-L2-N0...	105	300	73	88	100	66	81	100	45	60	89	30	45	74
NCN50-FP-N0...	220	360	73	88	100	66	81	100	45	60	89	30	45	74
NJ 0,8-F-N...	30	50	73	88	100	67	82	100	45	60	78	30	45	57
NJ 1,5-F-N...	30	50	73	88	100	67	82	100	45	60	78	30	45	57
NJ 2,5-F-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 2-F1-N...	30	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 2-V3-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 3-V3-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 4-F-N...	150	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 6-F-N	70	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 10-F-N...	85	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 15+U.+N...	140	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 15-M1.-N...	140	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 20+U.+N...	150	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 30+U.+N...	160	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 30P+U.+1N...	150	170	73	88	100	66	81	100	45	60	89	30	45	74
NJ 40+...+N...	180	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 50-FP-N...	320	360	73	88	100	66	81	100	45	60	89	30	45	74

Tabelle 2: Einsatz als Kategorie 2-Gerät

5. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Besondere Bedingungen

1. Beim Einsatz der quaderförmigen induktiven Sensoren Typen FJ..., NJ..., NB... und NC... im Temperaturbereich von -60 °C bis -20 °C sind diese durch Einbau in ein zusätzliches Gehäuse vor Schlageinwirkung zu schützen.
2. Die Anschlussteile der quaderförmigen induktiven Sensoren Typen FJ..., NJ..., NB... und NC... sind so zu errichten, dass mindestens die Schutzart IP20 gemäß EN 60529:1991 + A1:2000 erreicht wird.
3. Der Zusammenhang zwischen dem Typ des angeschlossenen Stromkreises, der höchstzulässigen Umgebungstemperatur und der Temperaturklasse sowie den wirksamen inneren Reaktanzen für die einzelnen Typen der quaderförmigen induktiven Sensoren ist den Tabellen 1 und 2 dieser 5. Ergänzung der EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X zu entnehmen.
4. Bei Einsatz der folgenden Typen der quaderförmigen induktiven Sensoren entsprechend der Explosionsgruppen und Gerätekategorien der nachfolgenden Tabelle ist die unzulässige elektrostatische Aufladung der Kunststoffgehäuse zu vermeiden und ein entsprechender Warnhinweis ist auf dem Gerät anzubringen:

Typ	Einsatz als Kategorie 1-Gerät	Einsatz als Kategorie 2-Gerät
FJ 6-110-N...	IIB/IIC	IIC
FJ 7-N...	IIC	-
NCB2-F1-N0...	IIC	-
NCB2-V3-N0...	IIC	-
NBN3-F69-N0...	IIC	-
NBN4-V3-N0...	IIC	-
NBN4-V3-N0-Y189289	IIC	-
NBB15-U.K-N0...	IIC	IIC
NBB20-U.K-N0...	IIC	IIC
NBN30-U.K-N0...	IIC	IIC
NBN40-U.K-N0...	IIC	IIC
NCN4-V3-N0...	IIC	-
NCB15+U...+N0...	IIC	IIC
NCN15-M...-N0..	IIC	-
NCB20-L2-N0...	IIC	-
NCN20+U...+NO...	IIC	IIC
NCN30+U...+NO...	IIC	IIC
NCB40-FP-N0..	IIA/IIB/IIC	IIC
NCN40+U...+NO...	IIB/IIC	IIC
NCN40-L2-N0...	IIC	-
NCN50-FP-N0...	IIA/IIB/IIC	IIC
NJ 2,5-F-N...	IIC	-
NJ 2-F1-N...	IIC	-
NJ 2-V3-N...	IIC	-

NJ 3-V3-N...	IIC	-
NJ 4-F-N...	IIC	IIC
NJ 6-F-N	IIC	-
NJ 10-F-N...	IIC	-
NJ 15+U.+N...	IIC	IIC
NJ 15-M1.-N...	IIC	-
NJ 20+U.+N...	IIC	IIC
NJ 30+U.+N...	IIC	IIC
NJ 30P+U.+1N...	IIB/IIC	IIC
NJ 40+...+N...	IIB/IIC	IIC
NJ 50-FP-N...	IIA/IIB/IIC	IIC

5. Bei den folgenden Typen der quaderförmigen induktiven Sensoren ist die unzulässige elektrostatische Aufladung der Metallgehäuseteile zu vermeiden. Gefährliche elektrostatische Aufladungen der Metallgehäuseteile können durch Erdung dieser Metallgehäuseteile vermieden werden, wobei sehr kleine Metallgehäuseteile (z.B. Schrauben) nicht geerdet werden müssen:

FJ 6-110-N...
FJ 7-N...
NBB15-U3K-N0...
NBB15-U4K-N0...
NBB20-U3K-N0...
NBB20-U4K-N0...
NBN30-U3K-N0...
NBN30-U4K-N0...
NBN40-U3K-N0...
NBN40-U4K-N0...
NCB15+U3+N0...
NCB15+U4+N0...
NCB20-L2-N0...
NCB40-FP-N0-P3...
NCB40-FP-N0-P4...
NCN20+U3+N0...
NCN20+U4+N0...
NCN30+U3+N0...
NCN30+U4+N0...
NCN40-L2-N0...
NCN40+U3+N0...
NCN40+U4+N0...
NCN50-FP-N0-P3...
NCN50-FP-N0-P4...
NJ 15+U3+N...
NJ 15+U4+N...
NJ 15-M1-N-V
NJ 20+U3+N...
NJ 20+U4+N...
NJ 30+U3+N...
NJ 30+U4+N...
NJ 30P+U3+1N...
NJ 30P+U4+1N...
NJ 40+U3+N...
NJ 40+U4+N...
NJ 50-FP-N-P3...
NJ 50-FP-N-P4...
NJ 30+U4+N...

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

5. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Angewandte Normen

EN 60079-0:2006 **EN 60079-11:2007** **EN 60079-26:2007**

Prüfbericht: PTB Ex 08-26271

Zertifizierungssektor Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

Braunschweig, 26. November 2008

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

6. ERGÄNZUNG

gemäß Richtlinie 94/9/EG Anhang III Ziffer 6

zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Gerät:	quaderförmige induktive Sensoren Typ FJ..., NJ..., NB... und NC...
Kennzeichnung:	**II 2 G Ex ia IIC T6 oder II 1 G Ex ia IIC T6**
Hersteller:	Pepperl+Fuchs GmbH
Anschrift:	Lilienthalstraße 200, 68307 Mannheim, Deutschland

Beschreibung der Ergänzungen und Änderungen

Die quaderförmigen induktiven Sensoren der Typen FJ..., NJ...; NB... und NC... dürfen zukünftig auch wie in den Prüfungsunterlagen zum Prüfbericht PTB Ex 15-24243 beschrieben gefertigt und betrieben werden.
Die Änderungen betreffen die Berücksichtigung des aktuellen Standes der angewandten Normen und daraus resultierend die Kennzeichnung der quaderförmigen induktiven Sensoren Typ FJ..., NJ..., NB... und NC..., die „Besonderen Bedingungen" sowie den äußeren und inneren Aufbau (Aufnahme alternativer Gehäusematerialien, Aufnahme weiterer alternativer Gießharzmaterialien, Umwicklung der Platinen mit PTFE-Band).

Die Kennzeichnung lautet zukünftig:

II 2 G Ex ia IIC T6...T1 Gb oder II 1 G Ex ia IIC T6...T1 Ga

Die „Elektrischen Daten" sowie alle anderen Angaben gelten unverändert gegenüber der 5. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X.

Besondere Bedingungen

1. Beim Einsatz der quaderförmigen induktiven Sensoren Typen FJ..., NJ..., NB... und NC... im Temperaturbereich von -60 °C bis -20 °C sind diese durch Einbau in ein zusätzliches Gehäuse vor Schlageinwirkung zu schützen.
2. Die Anschlussteile der quaderförmigen induktiven Sensoren Typen FJ..., NJ..., NB... und NC... sind so zu errichten, dass mindestens die Schutzart IP20 gemäß EN 60529 erreicht wird.
3. Der Zusammenhang zwischen dem Typ des angeschlossenen Stromkreises, der höchstzulässigen Umgebungstemperatur und der Temperaturklasse sowie den wirksamen inneren Reaktanzen für die einzelnen Typen der quaderförmigen induktiven Sensoren ist den

6. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Tabellen 1 und 2 der 5. Ergänzung der EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X zu entnehmen.

4. Bei Einsatz der folgenden Typen der quaderförmigen induktiven Sensoren entsprechend der Explosionsgruppen und Gerätekategorien der nachfolgenden Tabelle ist die unzulässige elektrostatische Aufladung der Kunststoffgehäuse zu vermeiden und ein entsprechender Warnhinweis ist auf dem Gerät anzubringen:

Typ	Einsatz als Kategorie 1-Gerät	Einsatz als Kategorie 2-Gerät
FJ 6-110-N...	IIB/IIC	IIC
FJ 7-N...	IIC	-
NCB2-F1-N0...	IIC	-
NCB2-V3-N0...	IIC	-
NBN3-F69-N0...	IIC	-
NBN4-V3-N0...	IIC	-
NBN4-V3-N0-Y189289	IIC	-
NBB15-U.K-N0...	IIC	IIC
NBB20-U.K-N0...	IIC	IIC
NBN30-U.K-N0...	IIC	IIC
NBN40-U.K-N0...	IIC	IIC
NCN4-V3-N0...	IIC	-
NCB15+U...+N0...	IIC	IIC
NCN15-M...-N0..	IIC	-
NCB20-L2-N0...	IIC	-
NCN20+U...+NO...	IIC	IIC
NCN30+U...+NO...	IIC	IIC
NCB40-FP-N0..	IIA/IIB/IIC	IIC
NCN40+U...+NO...	IIB/IIC	IIC
NCN40-L2-N0...	IIC	-
NCN50-FP-N0...	IIA/IIB/IIC	IIC
NJ 2,5-F-N...	IIC	-
NJ 2-F1-N...	IIC	-
NJ 2-V3-N...	IIC	-
NJ 3-V3-N...	IIC	-
NJ 4-F-N...	IIC	IIC
NJ 6-F-N	IIC	-
NJ 10-F-N...	IIC	-
NJ 15+U.+N...	IIC	IIC
NJ 15-M1.-N...	IIC	-
NJ 20+U.+N...	IIC	IIC
NJ 30+U.+N...	IIC	IIC
NJ 30P+U.+1N...	IIB/IIC	IIC
NJ 40+...+N...	IIB/IIC	IIC
NJ 50-FP-N...	IIA/IIB/IIC	IIC

6. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

5. Bei den folgenden Typen der quaderförmigen induktiven Sensoren ist die unzulässige elektrostatische Aufladung der Metallgehäuseteile zu vermeiden. Gefährliche elektrostatische Aufladungen der Metallgehäuseteile können durch Erdung dieser Metallgehäuseteile vermieden werden, wobei sehr kleine Metallgehäuseteile (z.B. Schrauben) nicht geerdet werden müssen:

FJ 6-110-N...	NCB40-FP-N0-P3...	NJ 15-M1-N-V
FJ 7-N...	NCB40-FP-N0-P4...	NJ 20+U3+N...
NBB15-U3K-N0...	NCN20+U3+N0...	NJ 20+U4+N...
NBB15-U4K-N0...	NCN20+U4+N0...	NJ 30+U3+N...
NBB20-U3K-N0...	NCN30+U3+N0...	NJ 30+U4+N...
NBB20-U4K-N0...	NCN30+U4+N0...	NJ 30P+U3+1N...
NBN30-U3K-N0...	NCN40-L2-N0...	NJ 30P+U4+1N...
NBN30-U4K-N0...	NCN40+U3+N0...	NJ 40+U3+N...
NBN40-U3K-N0...	NCN40+U4+N0...	NJ 40+U4+N...
NBN40-U4K-N0...	NCN50-FP-N0-P3...	NJ 50-FP-N-P3...
NCB15+U3+N0...	NCN50-FP-N0-P4...	NJ 50-FP-N-P4...
NCB15+U4+N0...	NJ 15+U3+N...	NJ 30+U4+N...
NCB20-L2-N0...	NJ 15+U4+N...	

6. Für die folgenden Typen der quaderförmigen induktiven Sensoren sind die für den Einsatz als Ga-Gerät maximal zulässigen Massenanteile von metallischen Werkstoffen überschritten. In explosionsgefährdeten Bereichen, die den Einsatz von Ga-Geräten erfordern, ist durch geeignete Maßnahmen sicherzustellen, dass keine Zündgefahr durch Schlag- oder Reibwirkung ausgehen kann.

NBB15-U3K-N0...	NCN20+U3+N0...	NJ 30+U3+N...
NBB15-U4K-N0...	NCN20+U4+N0...	NJ 30+U4+N...
NBB20-U3K-N0...	NCN30+U3+N0...	NJ 30P+U3+1N...
NBB20-U4K-N0...	NCN30+U4+N0...	NJ 30P+U4+1N...
NBN30-U3K-N0...	NCN40+U3+N0...	NJ 40+U3+N...
NBN30-U4K-N0...	NCN40+U4+N0...	NJ 40+U4+N...
NBN40-U3K-N0...	NCN50-FP-N0-P3...	NJ 50-FP-N-P3...
NBN40-U4K-N0...	NCN50-FP-N0-P4...	NJ 50-FP-N-P4...
NCB15+U3+N0...	NJ 15+U3+N...	
NCB15+U4+N0...	NJ 15+U4+N...	
NCB40-FP-N0-P3...	NJ 20+U3+N...	
NCB40-FP-N0-P4...	NJ 20+U4+N...	

6. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Angewandte Normen

EN 60079-0:2012, EN 60079-11:2012, EN 60079-26:2007

Prüfbericht: PTB Ex 15-24243

Konformitätsbewertungsstelle, Sektor Explosionsschutz
Im Auftrag

Braunschweig, 15. April 2015

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

7. ERGÄNZUNG

gemäß Richtlinie 94/9/EG Anhang III Ziffer 6

zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Gerät:	Quaderförmige induktive Sensoren Typ FJ..., NJ..., NB... und NC...
Kennzeichnung:	**II 2 G Ex ia IIC T6...T1 Gb oder II 1 G Ex ia IIC T6...T1 Ga**
Hersteller:	Pepperl+Fuchs GmbH
Anschrift:	Lilienthalstraße 200, 68307 Mannheim, Deutschland

Beschreibung der Ergänzungen und Änderungen

Die quaderförmigen induktiven Sensoren Typ FJ..., NJ..., NB... und NC... dürfen zukünftig auch wie in den Prüfungsunterlagen zum Prüfbericht PTB Ex 16-25158 beschrieben gefertigt und betrieben werden.

Die Änderungen betreffen die Anwendung eines neuen Normenstandes der EN 60079-0, die Erweiterung der EG-Baumusterprüfbescheinigung für die quaderförmigen induktiven Sensoren Typ FJ..., NJ..., NB... und NC... um die Zündschutzart Ex ia IIIC und um den Typ NBN40-U.LK-N0... sowie die Verwendung weiterer Gießharzsysteme zum Vergießen der quaderförmigen induktiven Sensoren.

Daraus resultierend ändern sich die Kennzeichnung, die „Elektrischen Daten" sowie die „Besonderen Bedingungen" für die quaderförmigen induktiven Sensoren Typ FJ..., NJ..., NB... und NC... .

Die Kennzeichnung lautet zukünftig:

II 1 G Ex ia IIC T6... T1 Ga oder II 2 G Ex ia IIC T6...T1 Gb

bzw.

II 1 D Ex ia IIIC T135 °C Da oder II 2 D Ex ib IIIC T135 °C Db

ZSEx10101d b

7. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Elektrische Daten

Auswerte- und Versorgungsstromkreis ..... nur zum Anschluss an bescheinigte eigensichere Stromkreise
Ex ia IIC/IIB für EPL Ga
bzw. Ex ia IIIC für EPL Da
bzw. Ex ia IIC/IIB oder Ex ib IIC/IIB für EPL Gb
bzw. Ex ia IIIC oder Ex ib IIIC für EPL Db

Höchstwerte:

Typ 1	Typ 2	Typ 3	Typ 4
U_i = 16 V	U_i = 16 V	U_i = 16 V	U_i = 16 V
I_i = 25 mA	I_i = 25 mA	I_i = 52 mA	I_i = 76 mA
P_i = 34 mW	P_i = 64 mW	P_i = 169 mW	P_i = 242 mW

Tabelle 1

7. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Der Zusammenhang zwischen dem Typ des angeschlossenen Stromkreises, der höchstzulässigen Umgebungstemperatur in °C für den Einsatz als EPL Ga-Gerät und der Temperaturklasse sowie den wirksamen inneren Reaktanzen für die einzelnen Typen der quaderförmigen induktiven Sensoren ist der nachfolgenden Tabelle 2 zu entnehmen:

Typen	C_i	L_i	Typ 1			Typ 2			Typ 3			Typ 4		
			Höchstzulässige Umgebungstemperatur in °C bei Einsatz in Temperaturklasse											
	[nF]	[µH]	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
FJ 6-110-N...	150	110	59	71	99	56	68	96	45	57	81	37	49	63
FJ 7-N...	65	220	59	71	99	56	68	96	45	57	81	37	49	63
NCB2-F1-N0...	90	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB2-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCN2-F56-N1...	100	100	57	69	97	53	65	93	37	49	77	-	-	-
NBN3-F69-N0...	100	100	55	67	95	48	60	88	24	36	63	-	-	37
NBN4-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NBN4-V3-N0-Y189289	120	100	55	67	95	48	60	88	24	36	63	-	-	37
NBB15-U.K-N0...	110	200	56	68	96	49	61	89	28	40	68	13	25	53
NBB20-U.K-N0...	110	200	56	68	96	49	61	89	28	40	68	13	25	53
NBN30-U.K-N0...	105	300	56	68	96	49	61	89	28	40	68	13	25	53
NBN40-U.K-N0...	105	300	56	68	96	49	61	89	28	40	68	13	25	53
NBN40-U.LK-N0...	165	130	56	68	96	49	61	89	28	40	68	13	25	53
NCN4-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB15+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCN15-M...-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB20-L2-N0...	110	200	56	68	96	49	61	89	28	40	68	13	25	53
NCN20+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCN30+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCB40-FP-N0...	220	360	56	68	96	49	61	89	28	40	68	13	25	53
NCN40+U...+N0...	120	130	56	68	96	49	61	89	28	40	68	13	25	53
NCN40-L2-N0...	105	300	56	68	96	49	61	89	28	40	68	13	25	53
NCN50-FP-N0...	220	360	56	68	96	49	61	89	28	40	68	13	25	53
NJ 0,8-F-N...	30	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 1,5-F-N...	30	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 2,5-F-N...	40	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 2-F1-N...	30	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 2-V3-N...	40	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 3-V3-N...	40	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 4-F-N...	150	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 6-F-N...	70	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 10-F-N...	85	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 15+U.+N...	140	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 15-M1.-N...	140	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 20+U.+N...	150	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 30+U.+N...	160	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 30P+U.+1N...	150	170	56	68	96	49	61	89	28	40	68	13	25	53
NJ 40+...+N...	180	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 50-FP-N...	320	360	56	68	96	49	61	89	28	40	68	13	25	53

Tabelle 2

7. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Der Zusammenhang zwischen dem Typ des angeschlossenen Stromkreises, der höchstzulässigen Umgebungstemperatur in °C für den Einsatz als EPL Gb-Gerät und der Temperaturklasse sowie den wirksamen inneren Reaktanzen für die einzelnen Typen der quaderförmigen induktiven Sensoren ist der nachfolgenden Tabelle 3 zu entnehmen:

Typen	C_i	L_i	Typ 1			Typ 2			Typ 3			Typ 4		
			Höchstzulässige Umgebungstemperatur in °C bei Einsatz in Temperaturklasse											
	[nF]	[µH]	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
FJ 6-110-N...	150	110	73	88	100	73	88	100	62	77	81	54	63	63
FJ 7-N...	65	220	73	88	100	73	88	100	62	77	81	54	63	63
NCB2-F1-N0...	90	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB2-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCN2-F56-N1...	100	100	75	90	100	70	85	100	55	70	87	-	-	-
NBN3-F69-N0...	100	100	72	87	100	65	80	100	41	56	63	24	37	37
NBN4-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NBN4-V3-N0-Y189289	120	100	72	87	100	65	80	100	41	56	63	24	37	37
NBB15-U.K-N0...	110	200	73	88	100	66	81	100	45	60	89	30	45	74
NBB20-U.K-N0...	110	200	73	88	100	66	81	100	45	60	89	30	45	74
NBN30-U.K-N0...	105	300	73	88	100	66	81	100	45	60	89	30	45	74
NBN40-U.K-N0...	105	300	73	88	100	66	81	100	45	60	89	30	45	74
NBN40-U.LK-N0...	165	130	73	88	100	66	81	100	45	60	89	30	45	74
NCN4-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB15+U...+N0...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCN15-M...-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB20-L2-N0...	110	200	73	88	100	66	81	100	45	60	89	30	45	74
NCN20+U...+N0...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCN30+U...+N0...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCB40-FP-N0...	220	360	73	88	100	66	81	100	45	60	89	30	45	74
NCN40+U...+N0...	120	130	73	88	100	66	81	100	45	60	89	30	45	74
NCN40-L2-N0...	105	300	73	88	100	66	81	100	45	60	89	30	45	74
NCN50-FP-N0...	220	360	73	88	100	66	81	100	45	60	89	30	45	74
NJ 0,8-F-N...	30	50	73	88	100	67	82	100	45	60	78	30	45	57
NJ 1,5-F-N...	30	50	73	88	100	67	82	100	45	60	78	30	45	57
NJ 2,5-F-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 2-F1-N...	30	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 2-V3-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 3-V3-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 4-F-N...	150	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 6-F-N...	70	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 10-F-N...	85	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 15+U.+N...	140	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 15-M1.-N...	140	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 20+U.+N...	150	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 30+U.+N...	160	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 30P+U.+1N...	150	170	73	88	100	66	81	100	45	60	89	30	45	74
NJ 40+...+N...	180	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 50-FP-N...	320	360	73	88	100	66	81	100	45	60	89	30	45	74

Tabelle 3

7. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Der Zusammenhang zwischen dem Typ des angeschlossenen Stromkreises, der höchstzulässigen Umgebungstemperatur für den Einsatz als EPL Da- oder Db-Gerät sowie den wirksamen inneren Reaktanzen für die einzelnen Typen der quaderförmigen induktiven Sensoren ist der nachfolgenden Tabelle 4 zu entnehmen:

			Typ 1	Typ 2	Typ 3	Typ 4
Typen	C_i [nF]	L_i [µH]	Höchstzulässige Umgebungstemperatur in °C			
FJ 6-110-N...	150	110	100	100	81	63
FJ 7-N...	65	220	100	100	81	63
NCB2-F1-N0...	90	100	100	100	89	74
NCB2-V3-N0...	100	100	100	100	89	74
NCN2-F56-N1...	100	100	100	100	87	-
NBN3-F69-N0...	100	100	100	100	63	37
NBN4-V3-N0...	100	100	100	100	89	74
NBN4-V3-N0-Y189289	120	100	100	100	63	37
NBB15-U.K-N0...	110	200	100	100	89	74
NBB20-U.K-N0...	110	200	100	100	89	74
NBN30-U.K-N0...	105	300	100	100	89	74
NBN40-U.K-N0...	105	300	100	100	89	74
NBN40-U.LK-N0...	165	130	100	100	89	74
NCN4-V3-N0...	100	100	100	100	89	74
NCB15+U...+N0...	110	160	100	100	89	74
NCN15-M...-N0...	100	100	100	100	89	74
NCB20-L2-N0...	110	200	100	100	89	74
NCN20+U...+N0...	110	160	100	100	89	74
NCN30+U...+N0...	110	160	100	100	89	74
NCB40-FP-N0...	220	360	100	100	89	74
NCN40+U...+N0...	120	130	100	100	89	74
NCN40-L2-N0...	105	300	100	100	89	74
NCN50-FP-N0...	220	360	100	100	89	74
NJ 0,8-F-N...	30	50	100	100	78	57
NJ 1,5-F-N...	30	50	100	100	78	57
NJ 2,5-F-N...	40	50	100	100	89	74
NJ 2-F1-N...	30	50	100	100	89	74
NJ 2-V3-N...	40	50	100	100	89	74
NJ 3-V3-N...	40	50	100	100	89	74
NJ 4-F-N...	150	100	100	100	89	74
NJ 6-F-N...	70	100	100	100	89	74
NJ 10-F-N...	85	100	100	100	89	74
NJ 15+U.+N...	140	130	100	100	89	74
NJ 15-M1.-N...	140	100	100	100	89	74
NJ 20+U.+N...	150	130	100	100	89	74
NJ 30+U.+N...	160	130	100	100	89	74
NJ 30P+U.+1N...	150	170	100	100	89	74
NJ 40+...+N...	180	130	100	100	89	74
NJ 50-FP-N...	320	360	100	100	89	74

Tabelle 4

7. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

Besondere Bedingungen

1. Beim Einsatz der quaderförmigen induktiven Sensoren Typen FJ..., NJ..., NB... und NC... im Temperaturbereich von -60 °C bis -20 °C sind diese durch Einbau in ein zusätzliches Gehäuse vor Schlageinwirkung zu schützen.
2. Die Anschlussteile der quaderförmigen induktiven Sensoren Typen FJ..., NJ..., NB... und NC... sind so zu errichten, dass mindestens die Schutzart IP20 gemäß EN 60529:1991 + A1:2000 erreicht wird.
3. Der Zusammenhang zwischen dem Typ des angeschlossenen Stromkreises, der höchstzulässigen Umgebungstemperatur und der Temperaturklasse sowie den wirksamen inneren Reaktanzen für die einzelnen Typen der quaderförmigen induktiven Sensoren ist den Tabellen 2 und 3 dieser 7. Ergänzung der EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X zu entnehmen.
4. Bei den folgenden Typen der quaderförmigen induktiven Sensoren ist die unzulässige elektrostatische Aufladung der Metallgehäuseteile zu vermeiden. Gefährliche elektrostatische Aufladungen der Metallgehäuseteile können durch Erdung dieser Metallgehäuseteile vermieden werden, wobei sehr kleine Metallgehäuseteile (z.B. Schrauben) nicht geerdet werden müssen:

FJ 6-110-N...	NCB15+U4+N0...	NJ 15+U3+N...
FJ 7-N...	NCB20-L2-N0...	NJ 15+U4+N...
NBB15-U3K-N0...	NCB40-FP-N0-P3...	NJ 15-M1-N-V
NBB15-U4K-N0...	NCB40-FP-N0-P4...	NJ 20+U3+N...
NBB20-U3K-N0...	NCN20+U3+N0...	NJ 20+U4+N...
NBB20-U4K-N0...	NCN20+U4+N0...	NJ 30+U3+N...
NBN30-U3K-N0...	NCN30+U3+N0...	NJ 30+U4+N...
NBN30-U4K-N0...	NCN30+U4+N0...	NJ 30P+U3+1N...
NBN40-U3K-N0...	NCN40-L2-N0...	NJ 30P+U4+1N...
NBN40-U3LK-N0...	NCN40+U3+N0...	NJ 40+U3+N...
NBN40-U4K-N0...	NCN40+U4+N0...	NJ 40+U4+N...
NBN40-U4LK-N0...	NCN50-FP-N0-P3...	NJ 50-FP-N-P3...
NCB15+U3+N0...	NCN50-FP-N0-P4...	NJ 50-FP-N-P4...

7. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

5. Bei Einsatz der folgenden Typen der quaderförmigen induktiven Sensoren entsprechend der Explosionsgruppen und Gerätekategorien der nachfolgenden Tabelle 5 ist die unzulässige elektrostatische Aufladung der Kunststoffgehäuse zu vermeiden. Beim Einsatz der entsprechenden Typen der quaderförmigen induktiven Sensoren in explosionsfähigen Gasatmosphären ist ein entsprechender Warnhinweis auf den Sensoren bzw. in der Nähe der Sensoren anzubringen. Beim Einsatz in explosionsfähigen Staubatmosphären sind die Hinweise dazu in der Betriebsanleitung zu beachten.

Typ	Gruppe II (1G)	Gruppe II (2G)	Gruppe III (1D bzw. 2D)
FJ 6-110-N...	IIB/IIC	IIC	III
FJ 7-N...	IIC	-	III
NCB2-F1-N0...	IIC	-	-
NCB2-V3-N0...	IIC	-	-
NBN3-F69-N0...	IIC	-	-
NBN4-V3-N0...	IIC	-	-
NBN4-V3-N0-Y189289	IIC	-	-
NBB15-U.K-N0...	IIC	IIC	III
NBB20-U.K-N0...	IIC	IIC	III
NBN30-U.K-N0...	IIC	IIC	III
NBN40-U.K-N0...	IIC	IIC	III
NBN40-U.LK-N0...	IIA/IIB/IIC	IIC	III
NCN4-V3-N0...	IIC	-	-
NCB15+U...+N0...	IIC	IIC	III
NCN15-M...-N0...	IIC	-	III
NCB20-L2-N0...	IIC	-	III
NCN20+U...+N0...	IIC	IIC	III
NCN30+U...+N0...	IIC	IIC	III
NCB40-FP-N0..	IIA/IIB/IIC	IIC	III
NCN40+U...+N0...	IIB/IIC	IIC	III
NCN40-L2-N0...	IIC	-	III
NCN50-FP-N0...	IIA/IIB/IIC	IIC	III
NJ 2,5-F-N...	IIC	-	-
NJ 2-F1-N...	IIC	-	III
NJ 2-V3-N...	IIC	-	-
NJ 3-V3-N...	IIC	-	-
NJ 4-F-N...	IIC	IIC	-
NJ 6-F-N...	IIC	-	III
NJ 10-F-N...	IIC	-	III
NJ 15+U.+N...	IIC	IIC	III
NJ 15-M1.-N...	IIC	-	III
NJ 20+U.+N...	IIC	IIC	III
NJ 30+U.+N...	IIC	IIC	III
NJ 30P+U.+1N...	IIB/IIC	IIC	III
NJ 40+...+N...	IIB/IIC	IIC	III
NJ 50-FP-N...	IIA/IIB/IIC	IIC	III

Tabelle 5

7. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 00 ATEX 2032 X

6. Für die folgenden Typen der quaderförmigen induktiven Sensoren sind die für den Einsatz als Ga-Gerät maximal zulässigen Massenanteile von metallischen Werkstoffen überschritten. In explosionsgefährdeten Bereichen, die den Einsatz von Ga-Geräten erfordern, ist durch geeignete Maßnahmen sicherzustellen, dass keine Zündgefahr von Schlag- oder Reibwirkung ausgehen kann.

NBB15-U3K-N0...	NCB40-FP-N0-P3...	NJ 20+U3+N...
NBB15-U4K-N0...	NCB40-FP-N0-P4...	NJ 20+U4+N...
NBB20-U3K-N0...	NCN20+U3+N0...	NJ 30+U3+N...
NBB20-U4K-N0...	NCN20+U4+N0...	NJ 30+U4+N...
NBN30-U3K-N0...	NCN30+U3+N0...	NJ 30P+U3+1N...
NBN30-U4K-N0...	NCN30+U4+N0...	NJ 30P+U4+1N...
NBN40-U3K-N0...	NCN40+U3+N0...	NJ 40+U3+N...
NBN40-U3LK-N0...	NCN40+U4+N0...	NJ 40+U4+N...
NBN40-U4K-N0...	NCN50-FP-N0-P3...	NJ 50-FP-N-P3...
NBN40-U4LK-N0...	NCN50-FP-N0-P4...	NJ 50-FP-N-P4...
NCB15+U3+N0...	NJ 15+U3+N...	
NCB15+U4+N0...	NJ 15+U4+N...	

Angewandte Normen

EN 60079-0:2012 + A11:2013, EN 60079-11:2012

Prüfbericht: PTB Ex 16-25158

Konformitätsbewertungsstelle, Sektor Explosionsschutz
Im Auftrag

Braunschweig, 19. April 2016

Dr.-Ing. F. Lienesch
Regierungsdirektor

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(1) # EC-TYPE-EXAMINATION CERTIFICATE

(Translation)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

PTB 00 ATEX 2032 X

(4) Equipment: Cuboidal inductive sensors, types FJ..., NJ... and NC...

(5) Manufacturer: Pepperl + Fuchs GmbH

(6) Address: D-68307 Mannheim

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

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council 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 and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 00-29269.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50014:1997 **EN 50020:1994**

(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 in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.

(12) The marking of the equipment shall include the following:

II 2 G EEx ia IIC T6

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, June 30, 2000

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 24

(13) # SCHEDULE

(14) ## EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

(15) Description of equipment

The cuboidal inductive sensors, types FJ..., NJ... and NC... are used to convert displacements into electrical signals.

The cuboidal inductive sensors may be operated with intrinsically safe circuits certified for categories and explosion groups [EEx ia] IIC or IIB resp. [EEx ib] IIC or IIB. The category as well as the explosion group of the intrinsically safe cuboidal inductive sensors depends on the connected supplying intrinsically safe circuit.

Electrical data

Evaluation and
supply circuit..... type of protection Intrinsic Safety EEx ia IIC/IIB
resp. EEx ib IIC/IIB
only for connection to certified intrinsically safe circuits
maximum values:

type 1	type 2	type 3	type 4
U_i = 16 V	U_i = 16 V	U_i = 16 V	U_i = 16 V
I_i = 25 mA	I_i = 25 mA	I_i = 52 mA	I_i = 76 mA
P_i = 34 mW	P_i = 64 mW	P_i = 169 mW	P_i = 242 mW

The assignment of the type of the connected circuit to the maximum permissible ambient temperature and the temperature class as well as the effective internal reactances for the individual types of cuboidal inductive sensors is shown in the following table:

types	C_i [nF]	L_i [µH]	type 1			type 2			type 3			type 4		
			maximum permissible ambient temperature in °C for application in temperature class											
			T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
FJ 6-110-N...	150	110	73	88	100	73	88	100	62	77	81	54	63	63
FJ 7-N...	65	220	73	88	100	73	88	100	62	77	81	54	63	63
NCB2-F1-N0...	90	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB2-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCN4-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB15+U...+N0...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCB40-FP-N0...	220	360	73	88	100	66	81	100	45	60	89	30	45	74
NCN15-M...-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCN20+U...+N0...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCN30+U...+N0...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCN40+U...+N0...	120	130	73	88	100	66	81	100	45	60	89	30	45	74
NCN50-FP-N0...	220	360	73	88	100	66	81	100	45	60	89	30	45	74
NJ 0,8-F-N...	30	50	73	88	100	67	82	100	45	60	78	30	45	57
NJ 1,5-F-N...	30	50	73	88	100	67	82	100	45	60	78	30	45	57
NJ 2,5-F-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 2-F1-N...	30	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 2-V3-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 4-F-N...	150	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 6-F-N...	70	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 10-F-N...	85	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 15+U.+N...	140	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 15-M1.-N...	140	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 20+U.+N...	150	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 30+U.+N...	160	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 30P+U.+1N...	150	170	73	88	100	66	81	100	45	60	89	30	45	74
NJ 40+...+N...	180	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 50-FP-N...	320	360	73	88	100	66	81	100	45	60	89	30	45	74

(16) Test report PTB Ex 00-29269

(17) Special conditions for safe use

1. For the application within a temperature range of -60 °C to -20 °C the cuboidal inductive sensors, types FJ..., NJ... and NC... must be protected against damage due to impact by mounting into an additional housing.
2. The connection facilities of the cuboidal inductive sensors, types FJ..., NJ... and NC... shall be installed as such that at least a degree of protection of IP20 according to IEC-publication 60529:1989 is met.
3. The assignment of the type of the connected circuit to the maximum permissible ambient temperature and the temperature class as well as the effective internal reactances for the individual types of cuboidal inductive sensors is shown in the table given under item (15) of this EC-type-examination certifcate.
4. With the application in group IIC inadmissible electrostatic charge of the plastic housing has to be avoided for following types of cuboidal inductive sensors (warning label on the device):

NCB40-FP-N0...	NJ 30P+U...+1N...
NCN40+U...+N0...	NJ 40+U...+N...
NCN50-FP-N0...	NJ 50-FP-N...

5. Inadmissible electrostatic charge of parts of the metal housing has to be avoided for the following types of cuboidal inductive sensors. Dangerous electrostatic charges of parts of the metal housing can be avoided by grounding of these parts whereas very small parts of the metal housing (e.g. screws) don't need to be grounded:

FJ 6-110-N...	NCN30+U4+N0...	NJ 20+U4+N...
FJ 7-N...	NCN40+U3+N0...	NJ 30+U3+N...
NCB15+U3+N0...	NCN40+U4+N0...	NJ 30+U4+N...
NCB15+U4+N0...	NCN50-FP-N0-P3...	NJ 30P+U3+1N...
NCB40-FP-N0-P3...	NCN50-FP-N0-P4...	NJ 30P+U4+1N...
NCB40-FP-N0-P4...	NJ 15+U3+N...	NJ 40+U3+N...
NCN20+U3+N0...	NJ 15+U4+N...	NJ 40+U4+N...
NCN20+U4+N0...	NJ 15-M1-N-V	NJ 50-FP-N-P3...
NCN30+U3+N0...	NJ 20+U3+N...	NJ 50-FP-N-P4...

(18) Essential health and safety requirements

Met by the standards mentioned above

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, June 30, 2000

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

1. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

(Translation)

Equipment: Cuboidal inductive sensors, types FJ..., NJ... and NC...

Marking:  **II 2 G EEx ia IIC T6**

Manufacturer: Pepperl + Fuchs GmbH

Address: 68307 Mannheim, Deutschland

Description of supplements and modifications

The existing EC-type examination certificate for the cuboidal inductive sensors of types FJ..., NJ... and NC... will be extended for the types NCN2-F56-N1... and NBN4-V3-N0... corresponding to supplementary test documents listed in the test report. The "Electrical data" listed below are valid for these types.

Furthermore the cuboidal inductive sensors of types FJ..., NJ... and NC... may in future also be manufactured according to the supplementary test documents of the test report. The modifications concern the the internal construction, the extension of possible types of casting resin, the way of marking with type plates as well as the type code of sensors with bottom parts.
The type code of these sensors may be supplemented with additional marks (e.g. U3., U4., P3., P4.).

The "Special Conditions", particularly item 4 and 5 are anlogously valid for types with changed type code.

All other details are also valid for this 1st. supplement without changes.

Electrical data

Evaluation and
supply circuit..... type of protection Intrinsic Safety EEx ia IIC/IIB
resp. EEx ib IIC/IIB
for connection to certified intrinsically safe circuits only

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

Maximum values:

type 1	type 2	type 3	type 4
U_i = 16 V	U_i = 16 V	U_i = 16 V	U_i = 16 V
I_i = 25 mA	I_i = 25 mA	I_i = 52 mA	I_i = 76 mA
P_i = 34 mW	P_i = 64 mW	P_i = 169 mW	P_i = 242 mW

The correlation between type of connected circuit, maximum permissible ambient temperature and temperature class as well as the effective internal reactances for the new types of cuboidal inductive sensors is to be taken from the table:

			type 1			type 2			type 3			type 4		
types	C_i	L_i	maximum permissible ambient temperature in °C for application in temperature class											
	[nF]	[µH]	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
NCN2-F56-N1...	100	100	75	90	100	70	85	100	55	70	87	-	-	-
NBN4-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74

Test report: PTB Ex 01-20124

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, 2001-08-23

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

2. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

(Translation)

Equipment: cubical inductive sensors, types FJ..., NJ... and NC...

Marking:  **II 2 G EEx ia IIC T6**

Manufacturer: Pepperl + Fuchs GmbH

Address: Königsberger Allee 87
68307 Mannheim; Germany

Description of supplements and modifications

The cubical inductive sensors of type series NJ... and NC... , listed as follows, may in future also be used in hazardous areas requiring apparatus of category 1.

The modifications exclusively concern the "Electrical data" (modified maximum permissible ambient temperatures for use as category-1-apparatus, reduction of the intrinsically safe evaluation and supply circuit to category ia) as well as the marking of the following types of cubical inductive sensors.

NCB2-F1-N0...	NCN20+U...+N0...	NJ 20+U.+N...
NCB2-V3-N0...	NCN30+U...+N0...	NJ 30+U.+N...
NCN4-V3-N0...	NCN40+U...+N0...	NJ 40+...+N...
NCB15+U...+N0...	NCN50-FP-N0...	NJ 50-FP-N...
NCB40-FP-N0...	NJ 2-V3-N...	
NCN15-M...-N0...	NJ 15+U.+N...	

In future the marking of the above-listed sensors for application as category-1-apparatus will be:

 **II 1 G EEx ia IIC T6**

The "Special conditions" are also valid for use as category-1-apparatus without changes.

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

2. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

Electrical data

Evaluation and supply circuit ..... type of protection Intrinsic Safety EEx ia IIC/IIB
for connection to certified intrinsically safe circuits only
Maximum values:

type 1	type 2	type 3	type 4
U_i = 16 V	U_i = 16 V	U_i = 16 V	U_i = 16 V
I_i = 25 mA	I_i = 25 mA	I_i = 52 mA	I_i = 76 mA
P_i = 34 mW	P_i = 64 mW	P_i = 169 mW	P_i = 242 mW

The assignment of the type of the connected circuit to the maximum permissible ambient temperature for use as category-1-apparatus and the temperature class as well as the effective internal reactances for the individual types of cubical inductive sensors is shown in the following table:

types	C_i	L_i	type 1			type 2			type 3			type 4		
			maximum permissible ambient temperature in °C for use in temperature class											
	[nF]	[µH]	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
NCB2-F1-N0...	90	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB2-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCN4-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB15+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCB40-FP-N0...	220	360	56	68	96	49	61	89	28	40	68	13	25	53
NCN15-M...-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCN20+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCN30+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCN40+U...+N0...	120	130	56	68	96	49	61	89	28	40	68	13	25	53
NCN50-FP-N0...	220	360	56	68	96	49	61	89	28	40	68	13	25	53
NJ 2-V3-N...	40	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 15+U.+N...	140	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 20+U.+N...	150	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 30+U.+N...	160	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 40+...+N...	180	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 50-FP-N...	320	360	56	68	96	49	61	89	28	40	68	13	25	53

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

2. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

Test report: PTB Ex 03-22406

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, April 04, 2003

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

3. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

(Translation)

Equipment: Cuboidal inductive sensors, types FJ..., NJ... and NC...

Marking: ⟨Ex⟩ **II 2 G EEx ia IIC T6**

Manufacturer: Pepperl + Fuchs GmbH

Address: Königsberger Allee 87, 68307 Mannheim, Germany

Description of supplements and modifications

The EC-type examination certificate will be extended for the cuboidal inductive sensor, type NJ 3-V3-N... . The cuboidal inductive sensor, type NJ 3-V3-N... is exclusively intended for operation in hazardous areas where category-2 equipment is required.

Further modifications concern the marking, the internal construction as well as the operating instructions of the cuboidal inductive sensors. These modifications have no affect on the "Electrical data", the "Special conditions" and all further safety relevant specifications.

Electrical data

Evaluation and supply circuit

type of protection Intrinsic Safety EEx ia IIC/IIB
only for connection to certified intrinsically safe circuits
Maximum values:

type 1	type 2	type 3	type 4
U_i = 16 V	U_i = 16 V	U_i = 16 V	U_i = 16 V
I_i = 25 mA	I_i = 25 mA	I_i = 52 mA	I_i = 76 mA
P_i = 34 mW	P_i = 64 mW	P_i = 169 mW	P_i = 242 mW

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

3. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

For relationship of the type of connected circuit, the maximum permissible ambient temperature for application as category-2 equipment, and the temperature class as well as the effective internal reactances for this type of cuboidal inductive sensor, reference is made to the following table:

			type 1			type 2			type 3			type 4		
type	C_i	L_i	Maximum permissible ambient temperature in °C for application in temperature class											
	[nF]	[µH]	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
NJ 3-V3-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74

Test report: PTB Ex 04-23369

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, February 26, 2004

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

4. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

(Translation)

Equipment: Cuboidal inductive sensors, types FJ..., NJ... and NC...

Marking: ⟨Ex⟩ **II 2 G EEx ia IIC T6 or**

⟨Ex⟩ **II 1 G EEx ia IIC T6**

Manufacturer: Pepperl + Fuchs GmbH

Address: Königsberger Allee 87, 68307 Mannheim, Germany

Description of supplements and modifications

In the future the cuboidal inductive sensors of types FJ..., NJ... and NC... may also be manufactured and operated according to the test documents listed in the test report PTB Ex 06-25344.

The modifications concern the extension of type series NC... (new variants), the introduction of type series NB... , the internal construction (further examples of the circuit diagram, new LED-types, new casting compound), the predefinition of the operating conditions for application as category-1 equipment, now relating to all cuboidal inductive sensors certified within the scope of this EC-type examination certificate as well as the adaption of the "Special Conditions".

The EC-type examination certificate is extended for the following types of cuboidal inductive sensors:

NBN3-F69-N0...
NBN4-V3-N0-Y189289
NCN40-L2-N0...
NCB20-L2-N0...

4. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

The operating conditions for application as category-1 equipment are newly predefined with this 4. supplement for the following types of cuboidal inductive sensors.

FJ 6-110-N...	NJ 1,5-F-N...
FJ 7-N...	NJ 2-F1-N...
NCN2-F56-N1...	NJ 2,5-F-N...
NBN3-F69-N0...	NJ 3-V3-N...
NBN4-V3-N0...	NJ 4-F-N...
NBN4-V3-N0-Y189289	NJ 6-F-N...
NCN40-L2-N0...	NJ 10-F-N...
NCB20-L2-N0...	NJ 15-M1.-N...
NJ 0,8-F-N...	NJ 30P+U.+1N...

For improved comprehensibility the "electrical data" as well as the tables which form the relationship between maximum permissible ambient temperature, temperature classes, electrical data and equipment catagories, are indicated for all types of cuboidal inductive sensors as follows.

Furthermore, the altered "Special Conditions" are specified.

Electrical data

Evaluation and supply circuit..... type of protection Intrinsic Safety EEx ia IIC/IIB
resp. EEx ib IIC/IIB
only for connection to certified intrinsically safe circuits
maximum values:

type 1	type 2	type 3	type 4
U_i = 16 V	U_i = 16 V	U_i = 16 V	U_i = 16 V
I_i = 25 mA	I_i = 25 mA	I_i = 52 mA	I_i = 76 mA
P_i = 34 mW	P_i = 64 mW	P_i = 169 mW	P_i = 242 mW

For the application as category-1 equipment the evaluation and supply circuit must correspond to type of protection Intrinsic Safety EEx ia IIC/IIB.

The relationship between type of the connected circuit, maximum permissible ambient temperature for application as category-1 resp. category-2 equipment and temperature class as well as the effective internal reactances for the individual types of cuboidal inductive sensors, is shown in the following tables:

types	C_i [nF]	L_i [µH]	type 1			type 2			type 3			type 4		
			maximum permissible ambient temperature in °C for application in temperature class											
			T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
FJ 6-110-N...	150	110	59	71	99	56	68	96	45	57	81	37	49	63
FJ 7-N...	65	220	59	71	99	56	68	96	45	57	81	37	49	63
NCB2-F1-N0...	90	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB2-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCN2-F56-N1...	100	100	57	69	97	53	65	93	37	49	77	-	-	-
NBN3-F69-N0...	100	100	55	67	95	48	60	88	24	36	63	-	-	37
NBN4-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NBN4-V3-N0-Y189289	120	100	55	67	95	48	60	88	24	36	63	-	-	37
NCN4-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB15+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCN15-M...-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB20-L2-N0...	110	200	56	68	96	49	61	89	28	40	68	13	25	53
NCN20+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCN30+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCB40-FP-N0..	220	360	56	68	96	49	61	89	28	40	68	13	25	53
NCN40+U...+N0...	120	130	56	68	96	49	61	89	28	40	68	13	25	53
NCN40-L2-N0...	105	300	56	68	96	49	61	89	28	40	68	13	25	53
NCN50-FP-N0...	220	360	56	68	96	49	61	89	28	40	68	13	25	53
NJ 0,8-F-N...	30	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 1,5-F-N...	30	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 2,5-F-N...	40	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 2-F1-N...	30	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 2-V3-N...	40	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 3-V3-N...	40	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 4-F-N...	150	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 6-F-N	70	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 10-F-N...	85	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 15+U.+N...	140	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 15-M1.-N...	140	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 20+U.+N...	150	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 30+U.+N...	160	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 30P+U.+1N...	150	170	56	68	96	49	61	89	28	40	68	13	25	53
NJ 40+...+N...	180	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 50-FP-N...	320	360	56	68	96	49	61	89	28	40	68	13	25	53

Table 1: Application as category-1 equipment

types	C_i [nF]	L_i [µH]	type 1			type 2			type 3			type 4		
			maximum permissible ambient temperature in °C for application in temperature class											
			T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
FJ 6-110-N...	150	110	73	88	100	73	88	100	62	77	81	54	63	63
FJ 7-N...	65	220	73	88	100	73	88	100	62	77	81	54	63	63
NCB2-F1-N0...	90	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB2-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCN2-F56-N1...	100	100	75	90	100	70	85	100	55	70	87	-	-	-
NBN3-F69-N0...	100	100	72	87	100	65	80	100	41	56	63	24	37	37
NBN4-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NBN4-V3-N0-Y189289	120	100	72	87	100	65	80	100	41	56	63	24	37	37
NCN4-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB15+U...+N0...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCN15-M...-N0..	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB20-L2-N0...	110	200	73	88	100	66	81	100	45	60	89	30	45	74
NCN20+U...+NO...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCN30+U...+NO...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCB40-FP-N0..	220	360	73	88	100	66	81	100	45	60	89	30	45	74
NCN40+U...+NO...	120	130	73	88	100	66	81	100	45	60	89	30	45	74
NCN40-L2-N0...	105	300	73	88	100	66	81	100	45	60	89	30	45	74
NCN50-FP-N0...	220	360	73	88	100	66	81	100	45	60	89	30	45	74
NJ 0,8-F-N...	30	50	73	88	100	67	82	100	45	60	78	30	45	57
NJ 1,5-F-N...	30	50	73	88	100	67	82	100	45	60	78	30	45	57
NJ 2,5-F-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 2-F1-N...	30	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 2-V3-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 3-V3-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 4-F-N...	150	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 6-F-N	70	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 10-F-N...	85	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 15+U.+N...	140	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 15-M1.-N...	140	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 20+U.+N...	150	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 30+U.+N...	160	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 30P+U.+1N...	150	170	73	88	100	66	81	100	45	60	89	30	45	74
NJ 40+...+N...	180	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 50-FP-N...	320	360	73	88	100	66	81	100	45	60	89	30	45	74

Tabelle 2: Application as category-2 equipment

4. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

Special conditions for safe use

1. For the application within a temperature range of -60 °C to -20 °C the cuboidal inductive sensors, types FJ..., NJ..., NB... and NC... must be protected against damage due to impact by mounting into an additional housing.

2. The connection facilities of the cuboidal inductive sensors, types FJ..., NJ..., NB... and NC... shall be installed as such that at least a degree of protection of IP20 according to IEC-publication 60529:1989 is met.

3. The relationship between type of the connected circuit, maximum permissible ambient temperature and temperature class as well as the effective internal reactances for the individual types of cuboidal inductive sensors, is shown in tables No.1 and No.2 given in this 4. supplement to EC-type-examination certifcate PTB 00 ATEX 2032 X.

4. When the following types of cuboidal inductive sensors are applied corresponding to explosion groups and equipment categories tabulated below, inadmissible electrostatic charge of the plastic housing has to be avoided. An appropriate warning note is to be indicated the equipment

type	application as category-1 equipment	application as category-2 equipment
FJ 6-110-N...	IIB/IIC	IIC
FJ 7-N...	IIC	-
NCB2-F1-N0...	IIC	-
NCB2-V3-N0...	IIC	-
NBN3-F69-N0...	IIC	-
NBN4-V3-N0...	IIC	-
NBN4-V3-N0-Y189289	IIC	-
NCN4-V3-N0...	IIC	-
NCB15+U...+N0...	IIC	IIC
NCN15-M...-N0..	IIC	-
NCB20-L2-N0...	IIC	-
NCN20+U...+NO...	IIC	IIC
NCN30+U...+NO...	IIC	IIC
NCB40-FP-N0..	IIA/IIB/IIC	IIC
NCN40+U...+NO...	IIB/IIC	IIC
NCN40-L2-N0...	IIC	-
NCN50-FP-N0...	IIA/IIB/IIC	IIC
NJ 2,5-F-N...	IIC	-
NJ 2-F1-N...	IIC	-
NJ 2-V3-N...	IIC	-
NJ 3-V3-N...	IIC	-

4. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

NJ 4-F-N...	IIC	IIC
NJ 6-F-N	IIC	-
NJ 10-F-N...	IIC	-
NJ 15+U.+N...	IIC	IIC
NJ 15-M1.-N...	IIC	-
NJ 20+U.+N...	IIC	IIC
NJ 30+U.+N...	IIC	IIC
NJ 30P+U.+1N...	IIB/IIC	IIC
NJ 40+...+N...	IIB/IIC	IIC
NJ 50-FP-N...	IIA/IIB/IIC	IIC

5. Inadmissible electrostatic charge of parts of the metal housing has to be avoided for the following types of cuboidal inductive sensors. Dangerous electrostatic charge of parts of the metal housing can be avoided by grounding of these parts whereas very small parts of the metal housing (e.g. screws) do not need to be grounded:

FJ 6-110-N...
FJ 7-N...
NCB15+U3+N0...
NCB15+U4+N0...
NCB20-L2-N0...
NCB40-FP-N0-P3...
NCB40-FP-N0-P4...
NCN20+U3+N0...
NCN20+U4+N0...
NCN30+U3+N0...
NCN30+U4+N0...
NCN40-L2-N0...
NCN40+U3+N0...
NCN40+U4+N0...
NCN50-FP-N0-P3...
NCN50-FP-N0-P4...
NJ 15+U3+N...
NJ 15+U4+N...
NJ 15-M1-N-V
NJ 20+U3+N...
NJ 20+U4+N...
NJ 30+U3+N...
NJ 30+U4+N...
NJ 30P+U3+1N...
NJ 30P+U4+1N...
NJ 40+U3+N...
NJ 40+U4+N...
NJ 50-FP-N-P3...
NJ 50-FP-N-P4...

Test report: PTB Ex 06-25344

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

Braunschweig, April 20, 2006

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

5. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

(Translation)

Equipment: Cuboidal inductive sensors, types FJ..., NJ... NB... and NC...

Marking: ⟨Ex⟩ **II 2 G EEx ia IIC T6 or II 1 G EEx ia IIC T6**

Manufacturer: Pepperl + Fuchs GmbH

Address: Lilienthalstrasse 200, 68307 Mannheim, Germany

Description of supplements and modifications

In the future the cuboidal inductive sensors of types FJ..., NJ... NB... and NC... may also be manufactured and operated as described in the test documents listed in the test report PTB Ex 08-26271.

The modifications concern the extension of type series NB... , the internal construction (further alternative casting compound and alternative LED-types) as well as a further alternative for the application of the marking.

Furthermore, the EC-type examination certificate was adapted to the current state of standards. Therefore the marking has changed as follows:

⟨Ex⟩ **II 2 G Ex ia IIC T6 or II 1 G Ex ia IIC T6**

The EC-type examination certificate is extended for the following types of cuboidal inductive sensors:

NBB15-U.K-N0...
NBB20-U.K-N0...
NBN30-U.K-N0...
NBN40-U.K-N0...

ZSEx10101e.dot

5. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

For improved comprehensibility the "electrical data" as well as the tables which form the relationship between maximum permissible ambient temperature, temperature classes, electrical data and equipment catagories, are represented for all types of cuboidal inductive sensors as follows.

Furthermore, the altered "Special Conditions" are represented. These are applicable to all types specified in this EC-type examination certificate.

Electrical data

Evaluation and supply circuit..... type of protection Intrinsic Safety Ex ia IIC/IIB
resp. Ex ib IIC/IIB
only for connection to certified intrinsically safe circuits
maximum values:

type 1	type 2	type 3	type 4
U_i = 16 V	U_i = 16 V	U_i = 16 V	U_i = 16 V
I_i = 25 mA	I_i = 25 mA	I_i = 52 mA	I_i = 76 mA
P_i = 34 mW	P_i = 64 mW	P_i = 169 mW	P_i = 242 mW

For the application as category-1 equipment the evaluation and supply circuit must correspond to type of protection Intrinsic Safety Ex ia IIC/IIB.

For relationship between type of the connected circuit, maximum permissible ambient temperature for application as category-1 resp. category-2 equipment and temperature class as well as the effective internal reactances for the individual types of cuboidal inductive sensors, reference is made to the following tables:

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

5. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

types	C_i	L_i	type 1			type 2			type 3			type 4		
			maximum permissible ambient temperature in °C for application in temperature class											
	[nF]	[µH]	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
FJ 6-110-N...	150	110	59	71	99	56	68	96	45	57	81	37	49	63
FJ 7-N...	65	220	59	71	99	56	68	96	45	57	81	37	49	63
NCB2-F1-N0...	90	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB2-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCN2-F56-N1...	100	100	57	69	97	53	65	93	37	49	77	-	-	-
NBN3-F69-N0...	100	100	55	67	95	48	60	88	24	36	63	-	-	37
NBN4-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NBN4-V3-N0-Y189289	120	100	55	67	95	48	60	88	24	36	63	-	-	37
NBB15-U.K-N0...	110	200	56	68	96	49	61	89	28	40	68	13	25	53
NBB20-U.K-N0...	110	200	56	68	96	49	61	89	28	40	68	13	25	53
NBN30-U.K-N0...	105	300	56	68	96	49	61	89	28	40	68	13	25	53
NBN40-U.K-N0...	105	300	56	68	96	49	61	89	28	40	68	13	25	53
NCN4-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB15+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCN15-M...-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB20-L2-N0...	110	200	56	68	96	49	61	89	28	40	68	13	25	53
NCN20+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCN30+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCB40-FP-N0..	220	360	56	68	96	49	61	89	28	40	68	13	25	53
NCN40+U...+N0...	120	130	56	68	96	49	61	89	28	40	68	13	25	53
NCN40-L2-N0...	105	300	56	68	96	49	61	89	28	40	68	13	25	53
NCN50-FP-N0...	220	360	56	68	96	49	61	89	28	40	68	13	25	53
NJ 0,8-F-N...	30	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 1,5-F-N...	30	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 2,5-F-N...	40	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 2-F1-N...	30	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 2-V3-N...	40	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 3-V3-N...	40	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 4-F-N...	150	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 6-F-N	70	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 10-F-N...	85	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 15+U.+N...	140	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 15-M1.-N...	140	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 20+U.+N...	150	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 30+U.+N...	160	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 30P+U.+1N...	150	170	56	68	96	49	61	89	28	40	68	13	25	53
NJ 40+...+N...	180	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 50-FP-N...	320	360	56	68	96	49	61	89	28	40	68	13	25	53

Table 1: Application as category-1 equipment

5. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

types	C_i	L_i	type 1			type 2			type3			type 4		
			maximum permissible ambient temperature in °C for application in temperature class											
	[nF]	[µH]	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
FJ 6-110-N...	150	110	73	88	100	73	88	100	62	77	81	54	63	63
FJ 7-N...	65	220	73	88	100	73	88	100	62	77	81	54	63	63
NCB2-F1-N0...	90	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB2-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCN2-F56-N1...	100	100	75	90	100	70	85	100	55	70	87	-	-	-
NBN3-F69-N0...	100	100	72	87	100	65	80	100	41	56	63	24	37	37
NBN4-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NBN4-V3-N0-Y189289	120	100	72	87	100	65	80	100	41	56	63	24	37	37
NBB15-U.K-N0...	110	200	73	88	100	66	81	100	45	60	89	30	45	74
NBB20-U.K-N0...	110	200	73	88	100	66	81	100	45	60	89	30	45	74
NBN30-U.K-N0...	105	300	73	88	100	66	81	100	45	60	89	30	45	74
NBN40-U.K-N0...	105	300	73	88	100	66	81	100	45	60	89	30	45	74
NCN4-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB15+U...+N0...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCN15-M...-N0..	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB20-L2-N0...	110	200	73	88	100	66	81	100	45	60	89	30	45	74
NCN20+U...+NO...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCN30+U...+NO...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCB40-FP-N0..	220	360	73	88	100	66	81	100	45	60	89	30	45	74
NCN40+U...+NO...	120	130	73	88	100	66	81	100	45	60	89	30	45	74
NCN40-L2-N0...	105	300	73	88	100	66	81	100	45	60	89	30	45	74
NCN50-FP-N0...	220	360	73	88	100	66	81	100	45	60	89	30	45	74
NJ 0,8-F-N...	30	50	73	88	100	67	82	100	45	60	78	30	45	57
NJ 1,5-F-N...	30	50	73	88	100	67	82	100	45	60	78	30	45	57
NJ 2,5-F-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 2-F1-N...	30	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 2-V3-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 3-V3-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 4-F-N...	150	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 6-F-N	70	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 10-F-N...	85	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 15+U.+N...	140	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 15-M1.-N...	140	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 20+U.+N...	150	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 30+U.+N...	160	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 30P+U.+1N...	150	170	73	88	100	66	81	100	45	60	89	30	45	74
NJ 40+...+N...	180	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 50-FP-N...	320	360	73	88	100	66	81	100	45	60	89	30	45	74

Table 2: Application as category-2 equipment

5. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

Special conditions for safe use

1. For the application within a temperature range of -60 °C to -20 °C the cuboidal inductive sensors, types FJ..., NJ..., NB... and NC... must be protected against damage due to impact by mounting into an additional housing.

2. The connection facilities of the cuboidal inductive sensors, types FJ..., NJ..., NB... and NC... shall be installed as such that a minimum degree of protection of IP20 in accordance with IEC-publication 60529:1991 + A1:2000, is met.

3. For relationship between type of the connected circuit, maximum permissible ambient temperature and temperature class as well as the effective internal reactances for the individual types of cuboidal inductive sensors, reference is made to tables 1 and 2 given in this 5. supplement to EC-type-examination certifcate PTB 00 ATEX 2032 X.

4. When the following types of cuboidal inductive sensors are applied corresponding to explosion groups and equipment categories tabulated below, inadmissible electrostatic charge of the plastic housing has to be avoided. The equipment shall be labelled with an appropriate warning note.

Type	Application as category-1 equipment	Application as category-2 equipment
FJ 6-110-N...	IIB/IIC	IIC
FJ 7-N...	IIC	-
NCB2-F1-N0...	IIC	-
NCB2-V3-N0...	IIC	-
NBN3-F69-N0...	IIC	-
NBN4-V3-N0...	IIC	-
NBN4-V3-N0-Y189289	IIC	-
NBB15-U.K-N0...	IIC	IIC
NBB20-U.K-N0...	IIC	IIC
NBN30-U.K-N0...	IIC	IIC
NBN40-U.K-N0...	IIC	IIC
NCN4-V3-N0...	IIC	-
NCB15+U...+N0...	IIC	IIC
NCN15-M...-N0..	IIC	-
NCB20-L2-N0...	IIC	-
NCN20+U...+NO...	IIC	IIC
NCN30+U...+NO...	IIC	IIC
NCB40-FP-N0..	IIA/IIB/IIC	IIC
NCN40+U...+NO...	IIB/IIC	IIC
NCN40-L2-N0...	IIC	-
NCN50-FP-N0...	IIA/IIB/IIC	IIC
NJ 2,5-F-N...	IIC	-
NJ 2-F1-N...	IIC	-

NJ 2-V3-N...	IIC	-
NJ 3-V3-N...	IIC	-
NJ 4-F-N...	IIC	IIC
NJ 6-F-N	IIC	-
NJ 10-F-N...	IIC	-
NJ 15+U.+N...	IIC	IIC
NJ 15-M1.-N...	IIC	-
NJ 20+U.+N...	IIC	IIC
NJ 30+U.+N...	IIC	IIC
NJ 30P+U.+1N...	IIB/IIC	IIC
NJ 40+...+N...	IIB/IIC	IIC
NJ 50-FP-N...	IIA/IIB/IIC	IIC

5. Inadmissible electrostatic charge of parts of the metal housing has to be avoided for the following types of cuboidal inductive sensors. Dangerous electrostatic charge of parts of the metal housing can be avoided by grounding these parts whereas very small parts of the metal housing (e.g. screws) do not need to be grounded:

FJ 6-110-N...
FJ 7-N...
NBB15-U3K-N0...
NBB15-U4K-N0...
NBB20-U3K-N0...
NBB20-U4K-N0...
NBN30-U3K-N0...
NBN30-U4K-N0...
NBN40-U3K-N0...
NBN40-U4K-N0...
NCB15+U3+N0...
NCB15+U4+N0...
NCB20-L2-N0...
NCB40-FP-N0-P3...
NCB40-FP-N0-P4...
NCN20+U3+N0...
NCN20+U4+N0...
NCN30+U3+N0...
NCN30+U4+N0...
NCN40-L2-N0...
NCN40+U3+N0...
NCN40+U4+N0...
NCN50-FP-N0-P3...
NCN50-FP-N0-P4...
NJ 15+U3+N...
NJ 15+U4+N...
NJ 15-M1-N-V
NJ 20+U3+N...
NJ 20+U4+N...
NJ 30+U3+N...
NJ 30+U4+N...
NJ 30P+U3+1N...
NJ 30P+U4+1N...
NJ 40+U3+N...
NJ 40+U4+N...
NJ 50-FP-N-P3...
NJ 50-FP-N-P4...
NJ 30+U4+N...

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

5. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

Applied standards

EN 60079-0:2006 **EN 60079-11:2007** **EN 60079-26:2007**

Test report: PTB Ex 08-26271

Zertifizierungssektor Explosionsschutz
By order:

Braunschweig, November 26, 2008

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

6. S U P P L E M E N T

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

(Translation)

Equipment: Cubical inductive sensors, types FJ..., NJ... NB... and NC...

Marking: **II 2 G Ex ia IIC T6 or II 1 G Ex ia IIC T6**

Manufacturer: Pepperl+Fuchs GmbH

Address: Lilienthalstraße 200, 68307 Mannheim, Germany

Description of supplements and modifications

In the future the cubical inductive sensors of types FJ..., NJ... NB... and NC... may also be manufactured and operated as described in the test documents listed in the test report PTB Ex 15-24243.
The modifications concern the consideration of the current state of the applied standards and – resulting from this – the marking of the cubical inductive sensors of types FJ..., NJ... NB... and NC... , the "special conditions" as well as the external and internal construction (inclusion of alternative enclosure materials, inclusion of further alternative casting resin materials, wrapping PCB´s with PTFE-ribbon).

In the future the marking will read:

II 2 G Ex ia IIC T6...T1 Gb or II 1 G Ex ia IIC T6...T1 Ga

The „electrical data" as well as all other specifications apply without changes as given in the 5th supplement to EC-type examination certificate PTB 00 ATEX 2032 X.

Special conditions for safe use

1. For the application within a temperature range of -60 °C to -20 °C the cubical inductive sensors, types FJ..., NJ..., NB... and NC... shall be protected against damage due to impact by mounting into an additional housing.
2. The connection facilities of the cubical inductive sensors, types FJ..., NJ..., NB... and NC... shall be installed as such that a minimum degree of protection of IP20 in accordance with EN 60529 is met.
3. For relationship between type of the connected circuit, maximum permissible ambient temperature and temperature class as well as the effective internal reactances for the individual types of cubical inductive sensors, reference is made to tables 1 and 2 given in the 5. supplement to EC-type-examination certifcate PTB 00 ATEX 2032 X.

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6. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

4. When the following types of cubical inductive sensors are applied corresponding to the explosion groups and equipment categories tabulated below, inadmissible electrostatic charge of the plastic housing has to be avoided. The equipment shall be labelled with an appropriate warning note.

Type	Application as category-1 equipment	Application as category-2 equipment
FJ 6-110-N...	IIB/IIC	IIC
FJ 7-N...	IIC	-
NCB2-F1-N0...	IIC	-
NCB2-V3-N0...	IIC	-
NBN3-F69-N0...	IIC	-
NBN4-V3-N0...	IIC	-
NBN4-V3-N0-Y189289	IIC	-
NBB15-U.K-N0...	IIC	IIC
NBB20-U.K-N0...	IIC	IIC
NBN30-U.K-N0...	IIC	IIC
NBN40-U.K-N0...	IIC	IIC
NCN4-V3-N0...	IIC	-
NCB15+U...+N0...	IIC	IIC
NCN15-M...-N0..	IIC	-
NCB20-L2-N0...	IIC	-
NCN20+U...+NO...	IIC	IIC
NCN30+U...+NO...	IIC	IIC
NCB40-FP-N0..	IIA/IIB/IIC	IIC
NCN40+U...+NO...	IIB/IIC	IIC
NCN40-L2-N0...	IIC	-
NCN50-FP-N0...	IIA/IIB/IIC	IIC
NJ 2,5-F-N...	IIC	-
NJ 2-F1-N...	IIC	-
NJ 2-V3-N...	IIC	-
NJ 3-V3-N...	IIC	-
NJ 4-F-N...	IIC	IIC
NJ 6-F-N	IIC	-
NJ 10-F-N...	IIC	-
NJ 15+U.+N...	IIC	IIC
NJ 15-M1.-N...	IIC	-
NJ 20+U.+N...	IIC	IIC
NJ 30+U.+N...	IIC	IIC
NJ 30P+U.+1N...	IIB/IIC	IIC
NJ 40+...+N...	IIB/IIC	IIC
NJ 50-FP-N...	IIA/IIB/IIC	IIC

6. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

5. Inadmissible electrostatic charge of parts of the metal housing has to be avoided for the following types of cubical inductive sensors. Dangerous electrostatic charge of parts of the metal housing can be avoided by grounding these parts whereas very small parts of the metal housing (e.g. screws) do not need to be grounded:

FJ 6-110-N...	NCB40-FP-N0-P3...	NJ 15-M1-N-V
FJ 7-N...	NCB40-FP-N0-P4...	NJ 20+U3+N...
NBB15-U3K-N0...	NCN20+U3+N0...	NJ 20+U4+N...
NBB15-U4K-N0...	NCN20+U4+N0...	NJ 30+U3+N...
NBB20-U3K-N0...	NCN30+U3+N0...	NJ 30+U4+N...
NBB20-U4K-N0...	NCN30+U4+N0...	NJ 30P+U3+1N...
NBN30-U3K-N0...	NCN40-L2-N0...	NJ 30P+U4+1N...
NBN30-U4K-N0...	NCN40+U3+N0...	NJ 40+U3+N...
NBN40-U3K-N0...	NCN40+U4+N0...	NJ 40+U4+N...
NBN40-U4K-N0...	NCN50-FP-N0-P3...	NJ 50-FP-N-P3...
NCB15+U3+N0...	NCN50-FP-N0-P4...	NJ 50-FP-N-P4...
NCB15+U4+N0...	NJ 15+U3+N...	NJ 30+U4+N...
NCB20-L2-N0...	NJ 15+U4+N...	

6. The maximum permissible mass fractions of metallic materials are exceeded for the following types of cubical inductive sensors when applied as EPL Ga-equipment. In hazardous areas requiring the application of EPL Ga-equipment it shall be ensured by appropriate measures that an ignition hazard due to impact or friction effects cannot occur.

NBB15-U3K-N0...	NCN20+U3+N0...	NJ 30+U3+N...
NBB15-U4K-N0...	NCN20+U4+N0...	NJ 30+U4+N...
NBB20-U3K-N0...	NCN30+U3+N0...	NJ 30P+U3+1N...
NBB20-U4K-N0...	NCN30+U4+N0...	NJ 30P+U4+1N...
NBN30-U3K-N0...	NCN40+U3+N0...	NJ 40+U3+N...
NBN30-U4K-N0...	NCN40+U4+N0...	NJ 40+U4+N...
NBN40-U3K-N0...	NCN50-FP-N0-P3...	NJ 50-FP-N-P3...
NBN40-U4K-N0...	NCN50-FP-N0-P4...	NJ 50-FP-N-P4...
NCB15+U3+N0...	NJ 15+U3+N...	
NCB15+U4+N0...	NJ 15+U4+N...	
NCB40-FP-N0-P3...	NJ 20+U3+N...	
NCB40-FP-N0-P4...	NJ 20+U4+N...	

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

6. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

Applied standards

EN 60079-0:2012, EN 60079-11:2012, EN 60079-26:2007

Test report: PTB Ex 15-24243

Konformitätsbewertungsstelle, Sektor Explosionsschutz
On behalf of PTB:

Braunschweig, April 15, 2015

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

7. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

(Translation)

Equipment: Cubical inductive sensors, types FJ..., NJ... NB... and NC...

Marking: **II 2 G Ex ia IIC T6 Gb or II 1 G Ex ia IIC T6 Ga**

Manufacturer: Pepperl+Fuchs GmbH

Address: Lilienthalstraße 200, 68307 Mannheim, Germany

Description of supplements and modifications

In the future the cubical inductive sensors of types FJ..., NJ... NB... and NC... may also be manufactured and operated as described in the test documents listed in test report PTB Ex 16-25158.
The modifications concern the application of a new state of the standard EN 60079-0, the extension of the EC-type examination certificate for the cubical inductive sensors of types FJ..., NJ... NB... and NC... for Ex ia IIIC type of protection and by type NBN40-U.LK-N0... as well as the use of further casting resin systems for the encapsulation of the cubical inductive sensors.

Resulting from this, the marking, the "Electrical Data" as well as the "Special Conditions" of the cubical inductive sensors of types FJ..., NJ... NB... and NC... change.

In the future the marking will read:

II 1 G Ex ia IIC T6... T1 Ga or II 2 G Ex ia IIC T6...T1 Gb

or

II 1 D Ex ia IIIC T135°C Da or II 2 D Ex ib IIIC T135°C Db

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7. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

Electrical data

Evaluation and supply circuit..... only for connection to certified intrinsically safe circuits

Ex ia IIC/IIB for EPL Ga
or Ex ia IIIC for EPL Da
or Ex ia IIC/IIB or Ex ib IIC/IIB for EPL Gb
or Ex ia IIIC or Ex ib IIIC for EPL Db

Maximum values:

Type 1	Type 2	Type 3	Type 4
U_i = 16 V	U_i = 16 V	U_i = 16 V	U_i = 16 V
I_i = 25 mA	I_i = 25 mA	I_i = 52 mA	I_i = 76 mA
P_i = 34 mW	P_i = 64 mW	P_i = 169 mW	P_i = 242 mW

Table 1

7. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

For relationship between the type of connected circuit, the maximum permissible ambient temperature for the application as EPL-Ga equipment and the temperature class as well as the effective internal reactances for the individual types of cubical inductive sensors, reference is made to the following table 2:

Types	C_i [nF]	L_i [µH]	Type 1			Type 2			Type 3			Type 4		
			Maximum permissible ambient temperature in °C for application in temperature class											
			T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
FJ 6-110-N...	150	110	59	71	99	56	68	96	45	57	81	37	49	63
FJ 7-N...	65	220	59	71	99	56	68	96	45	57	81	37	49	63
NCB2-F1-N0...	90	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB2-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCN2-F56-N1...	100	100	57	69	97	53	65	93	37	49	77	-	-	-
NBN3-F69-N0...	100	100	55	67	95	48	60	88	24	36	63	-	-	37
NBN4-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NBN4-V3-N0-Y189289	120	100	55	67	95	48	60	88	24	36	63	-	-	37
NBB15-U.K-N0...	110	200	56	68	96	49	61	89	28	40	68	13	25	53
NBB20-U.K-N0...	110	200	56	68	96	49	61	89	28	40	68	13	25	53
NBN30-U.K-N0...	105	300	56	68	96	49	61	89	28	40	68	13	25	53
NBN40-U.K-N0...	105	300	56	68	96	49	61	89	28	40	68	13	25	53
NBN40-U.LK-N0...	165	130	56	68	96	49	61	89	28	40	68	13	25	53
NCN4-V3-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB15+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCN15-M...-N0...	100	100	56	68	96	49	61	89	28	40	68	13	25	53
NCB20-L2-N0...	110	200	56	68	96	49	61	89	28	40	68	13	25	53
NCN20+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCN30+U...+N0...	110	160	56	68	96	49	61	89	28	40	68	13	25	53
NCB40-FP-N0...	220	360	56	68	96	49	61	89	28	40	68	13	25	53
NCN40+U...+N0...	120	130	56	68	96	49	61	89	28	40	68	13	25	53
NCN40-L2-N0...	105	300	56	68	96	49	61	89	28	40	68	13	25	53
NCN50-FP-N0...	220	360	56	68	96	49	61	89	28	40	68	13	25	53
NJ 0,8-F-N...	30	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 1,5-F-N...	30	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 2,5-F-N...	40	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 2-F1-N...	30	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 2-V3-N...	40	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 3-V3-N...	40	50	56	68	96	49	61	89	28	40	68	13	25	53
NJ 4-F-N...	150	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 6-F-N...	70	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 10-F-N...	85	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 15+U.+N...	140	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 15-M1.-N...	140	100	56	68	96	49	61	89	28	40	68	13	25	53
NJ 20+U.+N...	150	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 30+U.+N...	160	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 30P+U.+1N...	150	170	56	68	96	49	61	89	28	40	68	13	25	53
NJ 40+...+N...	180	130	56	68	96	49	61	89	28	40	68	13	25	53
NJ 50-FP-N...	320	360	56	68	96	49	61	89	28	40	68	13	25	53

Table 2

7. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

For relationship between the type of connected circuit, the maximum permissible ambient temperature for the application as EPL-Gb equipment and the temperature class as well as the effective internal reactances for the individual types of cubical inductive sensors, reference is made to the following table 3:

Types	C_i [nF]	L_i [µH]	Type 1			Type 2			Type 3			Type 4		
			Maximum permissible ambient temperature in °C for application in temperature class											
			T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
FJ 6-110-N...	150	110	73	88	100	73	88	100	62	77	81	54	63	63
FJ 7-N...	65	220	73	88	100	73	88	100	62	77	81	54	63	63
NCB2-F1-N0...	90	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB2-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCN2-F56-N1...	100	100	75	90	100	70	85	100	55	70	87	-	-	-
NBN3-F69-N0...	100	100	72	87	100	65	80	100	41	56	63	24	37	37
NBN4-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NBN4-V3-N0-Y189289	120	100	72	87	100	65	80	100	41	56	63	24	37	37
NBB15-U.K-N0...	110	200	73	88	100	66	81	100	45	60	89	30	45	74
NBB20-U.K-N0...	110	200	73	88	100	66	81	100	45	60	89	30	45	74
NBN30-U.K-N0...	105	300	73	88	100	66	81	100	45	60	89	30	45	74
NBN40-U.K-N0...	105	300	73	88	100	66	81	100	45	60	89	30	45	74
NBN40-U.LK-N0...	165	130	73	88	100	66	81	100	45	60	89	30	45	74
NCN4-V3-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB15+U...+N0...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCN15-M...-N0...	100	100	73	88	100	66	81	100	45	60	89	30	45	74
NCB20-L2-N0...	110	200	73	88	100	66	81	100	45	60	89	30	45	74
NCN20+U...+N0...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCN30+U...+N0...	110	160	73	88	100	66	81	100	45	60	89	30	45	74
NCB40-FP-N0...	220	360	73	88	100	66	81	100	45	60	89	30	45	74
NCN40+U...+N0...	120	130	73	88	100	66	81	100	45	60	89	30	45	74
NCN40-L2-N0...	105	300	73	88	100	66	81	100	45	60	89	30	45	74
NCN50-FP-N0...	220	360	73	88	100	66	81	100	45	60	89	30	45	74
NJ 0,8-F-N...	30	50	73	88	100	67	82	100	45	60	78	30	45	57
NJ 1,5-F-N...	30	50	73	88	100	67	82	100	45	60	78	30	45	57
NJ 2,5-F-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 2-F1-N...	30	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 2-V3-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 3-V3-N...	40	50	73	88	100	66	81	100	45	60	89	30	45	74
NJ 4-F-N...	150	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 6-F-N...	70	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 10-F-N...	85	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 15+U.+N...	140	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 15-M1.-N...	140	100	73	88	100	66	81	100	45	60	89	30	45	74
NJ 20+U.+N...	150	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 30+U.+N...	160	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 30P+U.+1N...	150	170	73	88	100	66	81	100	45	60	89	30	45	74
NJ 40+...+N...	180	130	73	88	100	66	81	100	45	60	89	30	45	74
NJ 50-FP-N...	320	360	73	88	100	66	81	100	45	60	89	30	45	74

Table 3

7. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

For relationship between the type of connected circuit, the maximum permissible ambient temperature for the application as EPL-Da or Db equipment as well as the effective internal reactances for the individual types of cubical inductive sensors, reference is made to the following table 4:

			Type 1	Type 2	Type 3	Type 4
Types	C_i [nF]	L_i [µH]	Maximum permissible ambient temperature in °C			
FJ 6-110-N...	150	110	100	100	81	63
FJ 7-N...	65	220	100	100	81	63
NCB2-F1-N0...	90	100	100	100	89	74
NCB2-V3-N0...	100	100	100	100	89	74
NCN2-F56-N1...	100	100	100	100	87	-
NBN3-F69-N0...	100	100	100	100	63	37
NBN4-V3-N0...	100	100	100	100	89	74
NBN4-V3-N0-Y189289	120	100	100	100	63	37
NBB15-U.K-N0...	110	200	100	100	89	74
NBB20-U.K-N0...	110	200	100	100	89	74
NBN30-U.K-N0...	105	300	100	100	89	74
NBN40-U.K-N0...	105	300	100	100	89	74
NBN40-U.LK-N0...	165	130	100	100	89	74
NCN4-V3-N0...	100	100	100	100	89	74
NCB15+U...+N0...	110	160	100	100	89	74
NCN15-M...-N0...	100	100	100	100	89	74
NCB20-L2-N0...	110	200	100	100	89	74
NCN20+U...+N0...	110	160	100	100	89	74
NCN30+U...+N0...	110	160	100	100	89	74
NCB40-FP-N0...	220	360	100	100	89	74
NCN40+U...+N0...	120	130	100	100	89	74
NCN40-L2-N0...	105	300	100	100	89	74
NCN50-FP-N0...	220	360	100	100	89	74
NJ 0,8-F-N...	30	50	100	100	78	57
NJ 1,5-F-N...	30	50	100	100	78	57
NJ 2,5-F-N...	40	50	100	100	89	74
NJ 2-F1-N...	30	50	100	100	89	74
NJ 2-V3-N...	40	50	100	100	89	74
NJ 3-V3-N...	40	50	100	100	89	74
NJ 4-F-N...	150	100	100	100	89	74
NJ 6-F-N...	70	100	100	100	89	74
NJ 10-F-N...	85	100	100	100	89	74
NJ 15+U.+N...	140	130	100	100	89	74
NJ 15-M1.-N...	140	100	100	100	89	74
NJ 20+U.+N...	150	130	100	100	89	74
NJ 30+U.+N...	160	130	100	100	89	74
NJ 30P+U.+1N...	150	170	100	100	89	74
NJ 40+...+N...	180	130	100	100	89	74
NJ 50-FP-N...	320	360	100	100	89	74

Table 4

7. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

Special conditions for safe use

1. For the application within a temperature range of -60 °C to -20 °C the cuboidal inductive sensors, types FJ..., NJ..., NB... and NC... shall be protected against damage due to impact by mounting into an additional housing.
2. The connection facilities of the cuboidal inductive sensors, types FJ..., NJ..., NB... and NC... shall be installed as such that at least a degree of protection of IP20 according to EN 60529:1991 + A1:2000 is met.
3. The relationship between type of the connected circuit, maximum permissible ambient temperature and temperature class as well as the effective internal reactances for the individual types of cuboidal inductive sensors, is shown in tables No. 2 and No. 3 given in this 7. supplement to EC-type-examination certifcate PTB 00 ATEX 2032 X.
4. Inadmissible electrostatic charge of parts of the metal housing has to be avoided for the following types of cuboidal inductive sensors. Dangerous electrostatic charge of parts of the metal housing can be avoided by grounding of these parts whereas very small parts of the metal housing (e.g. screws) do not need to be grounded:

FJ 6-110-N...	NCB15+U4+N0...	NJ 15+U3+N...
FJ 7-N...	NCB20-L2-N0...	NJ 15+U4+N...
NBB15-U3K-N0...	NCB40-FP-N0-P3...	NJ 15-M1-N-V
NBB15-U4K-N0...	NCB40-FP-N0-P4...	NJ 20+U3+N...
NBB20-U3K-N0...	NCN20+U3+N0...	NJ 20+U4+N...
NBB20-U4K-N0...	NCN20+U4+N0...	NJ 30+U3+N...
NBN30-U3K-N0...	NCN30+U3+N0...	NJ 30+U4+N...
NBN30-U4K-N0...	NCN30+U4+N0...	NJ 30P+U3+1N...
NBN40-U3K-N0...	NCN40-L2-N0...	NJ 30P+U4+1N...
NBN40-U3LK-N0...	NCN40+U3+N0...	NJ 40+U3+N...
NBN40-U4K-N0...	NCN40+U4+N0...	NJ 40+U4+N...
NBN40-U4LK-N0...	NCN50-FP-N0-P3...	NJ 50-FP-N-P3...
NCB15+U3+N0...	NCN50-FP-N0-P4...	NJ 50-FP-N-P4...

7. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

5. When the following types of cuboidal inductive sensors are applied corresponding to explosion groups and equipment categories specified in the following table 5, inadmissible electrostatic charge of the plastic housing has to be avoided. When the respective types of cuboidal inductive sensors are applied in potentially explosive gas atmospheres an appropriate warning note shall be affixed on or near the sensors. When the sensors are applied in combustible dust atmospheres the corresponding notes given in the operating instructions manual shall be considered.

Type	Group II (1G)	Group II (2G)	Group III (1D or 2D)
FJ 6-110-N...	IIB/IIC	IIC	III
FJ 7-N...	IIC	-	III
NCB2-F1-N0...	IIC	-	-
NCB2-V3-N0...	IIC	-	-
NBN3-F69-N0...	IIC	-	-
NBN4-V3-N0...	IIC	-	-
NBN4-V3-N0-Y189289	IIC	-	-
NBB15-U.K-N0...	IIC	IIC	III
NBB20-U.K-N0...	IIC	IIC	III
NBN30-U.K-N0...	IIC	IIC	III
NBN40-U.K-N0...	IIC	IIC	III
NBN40-U.LK-N0...	IIA/IIB/IIC	IIC	III
NCN4-V3-N0...	IIC	-	-
NCB15+U...+N0...	IIC	IIC	III
NCN15-M...-N0...	IIC	-	III
NCB20-L2-N0...	IIC	-	III
NCN20+U...+N0...	IIC	IIC	III
NCN30+U...+N0...	IIC	IIC	III
NCB40-FP-N0..	IIA/IIB/IIC	IIC	III
NCN40+U...+N0...	IIB/IIC	IIC	III
NCN40-L2-N0...	IIC	-	III
NCN50-FP-N0...	IIA/IIB/IIC	IIC	III
NJ 2,5-F-N...	IIC	-	-
NJ 2-F1-N...	IIC	-	III
NJ 2-V3-N...	IIC	-	-
NJ 3-V3-N...	IIC	-	-
NJ 4-F-N...	IIC	IIC	-
NJ 6-F-N...	IIC	-	III
NJ 10-F-N...	IIC	-	III
NJ 15+U.+N...	IIC	IIC	III
NJ 15-M1.-N...	IIC	-	III
NJ 20+U.+N...	IIC	IIC	III
NJ 30+U.+N...	IIC	IIC	III
NJ 30P+U.+1N...	IIB/IIC	IIC	III
NJ 40+...+N...	IIB/IIC	IIC	III
NJ 50-FP-N...	IIA/IIB/IIC	IIC	III

Table 5

7. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2032 X

6. The maximum permissible mass fractions of metallic materials are exceeded for the following types of cubical inductive sensors when applied as EPL Ga-equipment. In hazardous areas requiring the application of EPL Ga-equipment it shall be ensured by appropriate measures that an ignition hazard due to impact or friction effects cannot occur.

NBB15-U3K-N0...	NCB40-FP-N0-P3...	NJ 20+U3+N...
NBB15-U4K-N0...	NCB40-FP-N0-P4...	NJ 20+U4+N...
NBB20-U3K-N0...	NCN20+U3+N0...	NJ 30+U3+N...
NBB20-U4K-N0...	NCN20+U4+N0...	NJ 30+U4+N...
NBN30-U3K-N0...	NCN30+U3+N0...	NJ 30P+U3+1N...
NBN30-U4K-N0...	NCN30+U4+N0...	NJ 30P+U4+1N...
NBN40-U3K-N0...	NCN40+U3+N0...	NJ 40+U3+N...
NBN40-U3LK-N0...	NCN40+U4+N0...	NJ 40+U4+N...
NBN40-U4K-N0...	NCN50-FP-N0-P3...	NJ 50-FP-N-P3...
NBN40-U4LK-N0...	NCN50-FP-N0-P4...	NJ 50-FP-N-P4...
NCB15+U3+N0...	NJ 15+U3+N...	
NCB15+U4+N0...	NJ 15+U4+N...	

Applied standards

EN 60079-0: 2012 + A11:2013, EN 60079-11: 2012

Test report: PTB Ex 16-25158

Konformitätsbewertungsstelle, Sektor Explosionsschutz
On behalf of PTB

Braunschweig, April 19, 2016

Dr.-Ing. F. Lienesch
Regierungsdirektor

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 56

1. (North America) Control equipment connected to the Associated Apparatus must not use or generate more than 250 Vrms or Vdc.

2. (North America) The IS Barriers or Equipment (Associated Apparatus) must be FM Approved and CSA certified and the configuration of associated Apparatus must be FM Approved and CSA certified under the Entity Concept. The Associated Apparatus may be installed within the Hazardous (Classified) location for which it is certified. The Associated Apparatus and hazardous location loop apparatus manufacturer's control drawings must be followed when installing this equipment. An AEx [ib] Associated Apparatus is suitable only for connection to Class I, Zone 1, Hazardous (Classified) Locations and is not suitable for Class I, Zone 0, or Class I, Division 1 Hazardous (Classified) Locations.

   (ATEX) The IS Barriers or other Associated Apparatus shall comply with the ATEX directive 94/9/EC.

3. (US) Installation should be in accordance with ANSI/ISA RP12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and Article 500 of the National Electrical Code (ANSI/NFPA 70)

   (Canada) Installation should be in accordance with Section 18 of the Canadian Electrical Code.

   (ATEX) Installation shall be in accordance with the applicable local installation rules Energy Limitation Parameters specified.

4. (North America) Units must be mounted in a suitable enclosure for Type 4X installations.

5. (North America) Units are suitable for Class I, Division 2, Groups A, B, C, and D hazardous (classified) locations. Transducers to be installed in accordance with the

   (US) National Electrical Code (ANSI/NFPA 70) Division 2 hazardous (classified) location wiring techniques

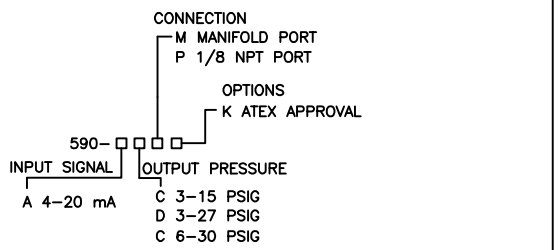
   (Canada) Canadian Electrical Code.

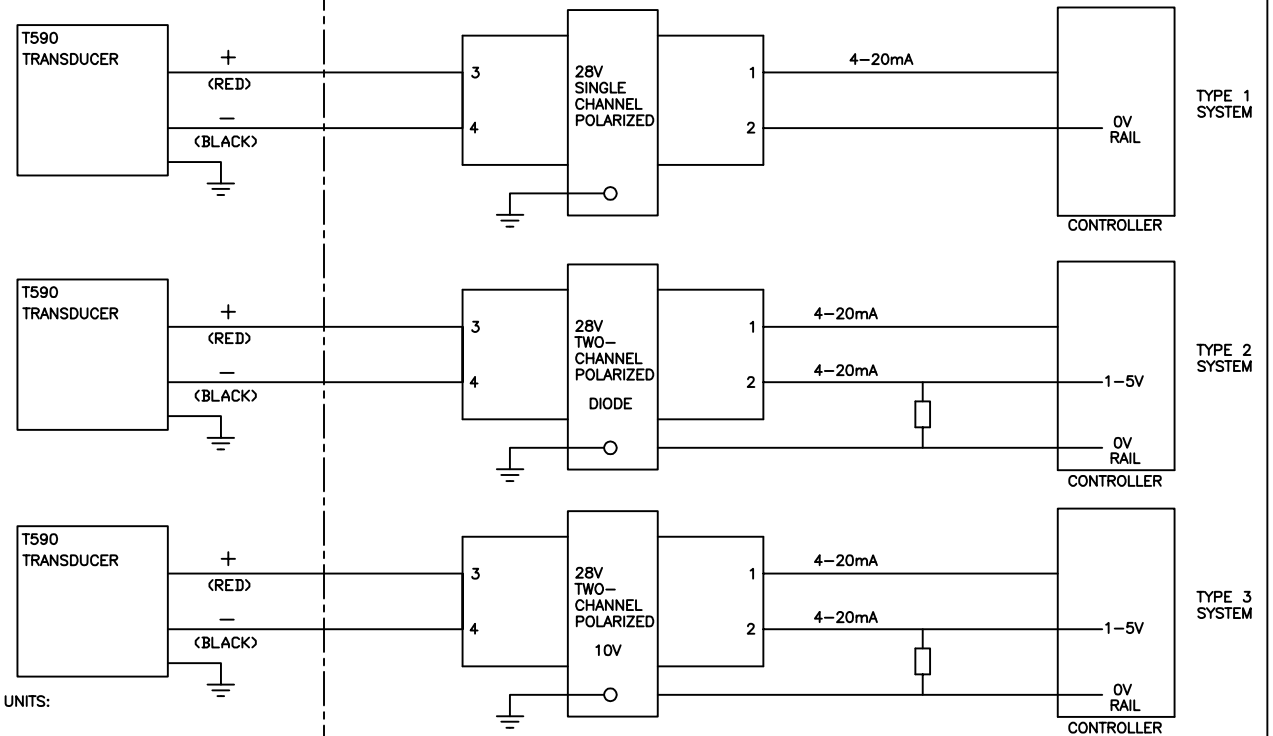
6. The Intrinsic Safety Entity concept allows the interconnection of two Intrinsically safe devices with entity parameters not specifically examined in combination as a system when:

   Ui or Vmax >Uo or Voc
   Ii or Imax > Io or Isc or It
   Ca or Co > Ci + Ccable
   La or Lo > Li ÷ Lcable
   Pi > Po.

   Entity Parameters for: MODELS TYPE 590X
   Ui (Vmax) = 40 V
   Ii (Imax) = 150 mA
   Ci=0
   Li=0
   Pi = 0.7 watts

7. No revision to this drawing is permitted without prior FM Approval and CSA Certification.





HAZARDOUS LOCATION UNITS:
FM & CSA

INTRINSICALLY SAFE:
CLASS I, DIV. I, GROUPS A, B, C, D
SUITABLE FOR:
CLASS I, DIV. 2, GROUPS A, B, C, D

HAZARDOUS LOCATION UNITS:
ATEX(FM)
FM07ATEX02X II 1 G Ex ia IIC T4* Ta=-55°C TO +85°C
FM07ATEX03X II 3 G Ex nL IIC T4* Ta=-55°C TO +85°C
II 3 G Ex nA nL IIC T6** Ta=-55°C TO +85°C

* SEE ENERGY LIMITING PARAMETERS TABLE BELOW
** T6 TEMPERATURE CLASS FOR SELF PROTECTED ENERGY LIMITED APPARATUS, THE 4-20 mA INPUT VOLTAGE OF 40Vdc.

ENERGY LIMITING PARAMETERS

TEMP. CLASS	Ta	Li	Ui	Pi
T6	60° C	50 mA	42.5 V	2.125 W
T6	55° C	60 mA	38.8 V	2.328 W
T5	70° C	60 mA	38.8 V	2.328 W
T5	55° C	100 mA	30.0 V	3.0 W
T5	45° C	120 mA	28.0 V	3.36 W
T4	85° C	60 mA	38.8 V	2.328 W
T4	85° C	100 mA	30.0 V	3.0 W
T4	80° C	120 mA	28.0 V	3.36 W
T4	70° C	150 mA	25.5 V	3.825 W
T5	85° C	23 mA	6.75 V	0.155 W

ControlAir Inc.
AMHERST, NH USA

TOLERANCES	REVISIONS			INTERCONNECTION DIAGRAM		
DECIMAL .XX ± .01 .XXX ± .005	NO.	DATE	BY	T590 INTRINSICALLY SAFE		
FRACTIONAL ± 1/64	1	ECN #2179 8-15-06	KJM			
	2	ECN #2283 4-5-07	KJM			
	3			DRAWN BY KJM	SCALE NONE	MATERIAL SEE ABOVE
ANGULAR ± 1/4°	4			CHECKED	DATE 8-5-05	DRAWING NO. 431-990-047
	5			TRACED	APP'D	

1 # EU-TYPE EXAMINATION CERTIFICATE

2 **Equipment or Protective systems intended for use in Potentially Explosive Atmospheres - Directive 2014/34/EU**

3 **EU-Type Examination Certificate No:** **FM07ATEX0002X**

4 **Equipment or protective system: (Type Reference and Name)** **T-590-AabK I/P Converter**

5 **Name of Applicant:** **ControlAir Inc.**

6 **Address of Applicant:** **8 Columbia Drive**
Amherst, NH 03031
United States of America

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

8 FM Approvals Europe Ltd, notified body number 2809 in accordance with Article 17 of Directive 2014/34/EU of 26 February 2014, 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:

3030620EC dated 15th June 2007

9 Compliance with the Essential Health and Safety Requirements, with the exception of those identified in item 15 of the schedule to this certificate, has been assessed by compliance with the following documents:

EN 60079-0:2012+ A11:2013 and EN 60079-11:2012

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

11 This EU-Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12 The marking of the equipment or protective system shall include:

II 1 G Ex ia IIC T* Ta = -55°C to Ta max

*Temperature class and maximum ambient temperature as indicated on Page 2.

Digitally signed by Richard Zammitt
DN: cn=Richard Zammitt, o, ou=FM Approvals Europe Limited, email=richard.zammitt@fmapprovals.com, c=IE

Richard Zammitt
Certification Manager, FM Approvals Europe Ltd.

Issue date: 09th April 2019

FM Approvals Europe Ltd. One Georges Quay Plaza, Dublin. Ireland. D02 E440
T: +353 (0) 1761 4200 E-mail: atex@fmapprovals.com www.fmapprovals.com

SCHEDULE

to EU-Type Examination Certificate No. FM07ATEX0002X

13 **Description of Equipment or Protective System:**

The T590 is an electro-mechanical current to pressure converter. The unit's electronics operate on a 4 to 20 mA current loop. The ambient operating temperature range of the T590 is -55°C to 85°C, however the temperature class and the maximum permitted operating temperature are dependant on the Energy Limitation Parameters specified below. The circuitry for the T590 is contained on a single circuit board that is mounted to the transducer's drive coil on the aluminium manifold and covered with a plastic cover. The I/P Converter is intended to be installed within an additional enclosure.

T590-AabK. I/P Converter.
II 1 G Ex ia IIC T* Ta = -55°C to Ta max
a = Output Pressure: C, D, E
b = Connection: M, P

Energy Limitation Parameters

Temperature Class	*Ta max*	I_i	U_i	P_i
T4	85°C	60 mA	38.8 V	2.328 W
T4	85°C	100 mA	30 V	3.0 W
T4	80°C	120 mA	28 V	3.36 W
T4	70°C	150 mA	25.5 V	3.825 W
T5	70°C	60 mA	38.8 V	2.328 W
T5	55°C	100 mA	30 V	3 W
T5	45°C	120 mA	28 V	3.36 W
T5	85°C	23 mA	6.75 V	0.155 W
T6	60°C	50 mA	42.5 V	2.125 W
T6	55°C	60 mA	38.8 V	2.328 W

14 **Specific Conditions of Use:**

1. The non-metallic cover of the I/P converter is considered to constitute an electrostatic discharge hazard. Clean only with a damp cloth.
2. The I/P converter enclosure's metal base must be mounted as part of a bonded structure.
3. The I/P converter enclosure contains aluminium and is considered to constitute a potential risk of ignition by impart or friction and must be taken into account during installation.
4. The user shall permanently mark the protection type chosen. Once the type of protection has been marked is shall not be changed.

15 **Essential Health and Safety Requirements:**

The relevant EHSRs that have not been addressed by the standards listed in this certificate have been identified and assessed in the confidential report identified in item 8.

16 **Test and Assessment Procedure and Conditions:**

This EU-Type Examination Certificate is the result of testing of a sample of the product submitted, in accordance with the provisions of the relevant specific standard(s), and assessment of supporting documentation. It does not imply an assessment of the whole production.

SCHEDULE

to EU-Type Examination Certificate No. FM07ATEX0002X

Whilst this certificate may be used in support of a manufacturer's claim for CE Marking, FM Approvals Europe Ltd accepts no responsibility for the compliance of the equipment against all applicable Directives in all applications.

This Certificate has been issued in accordance with FM Approvals Europe Ltd's ATEX Certification Scheme.

17 **Schedule Drawings**

A list of the significant parts of the technical documentation is annexed to this certificate and a copy has been kept by the Notified Body.

18 **Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
19th June 2007	Original Issue.
13th May 2013	Supplement 1: Report Reference: – 3023940rev130401 dated 1st May 2013 and 3023940rev130416 dated 1st May 2013. Description of the Change: Documentation update with document obsolescence and CDL reformatting.
09th April 2019	Supplement 2: Report Reference: – RR216273 dated 12th November 2019. Description of the Change: Documentation update, update of standards. Certificate transferred from FM Approvals Ltd., notified body no. 1725, to FM Approvals Europe Ltd., notified body no. 2809

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T: +353 (0) 1761 4200 E-mail: atex@fmapprovals.com www.fmapprovals.com

1 TYPE EXAMINATION CERTIFICATE

2 **Equipment or Protective systems intended for use in Potentially Explosive Atmospheres - Directive 2014/34/EU**

3 **Type Examination Certificate No:** **FM07ATEX0003X**

4 **Equipment or protective system: (Type Reference and Name)** **T-590-AabK I/P Converter**

5 **Name of Applicant:** **ControlAir Inc.**

6 **Address of Applicant:** **8 Columbia Drive**
Amherst, NH 03031
United States of America

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

8 FM Approvals Europe Ltd. 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:

3030620EC dated 15th June 2007

9 Compliance with the Essential Health and Safety Requirements, with the exception of those identified in item 15 of the schedule to this certificate, has been assessed by compliance with the following documents:

EN 60079-0:2012+ A11:2013 and EN 60079-15:2010

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

11 This Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12 The marking of the equipment or protective system shall include:

II 3 G Ex nL IIC T* Ta = -55°C to Ta max

II 3 G Ex nA nL IIC T6 Ta = -55°C to +85°C

*Temperature class and maximum ambient temperature as indicated in description.

Digitally signed by Richard Zammitt
DN: cn=Richard Zammitt, o, ou=FM Approvals Europe Limited, email=richard.zammitt@fmapprovals.com, c=IE

Richard Zammitt
Certification Manager, FM Approvals Europe Ltd.

Issue date: 09th April 2019

FM Approvals Europe Ltd. One Georges Quay Plaza, Dublin. Ireland. D02 E440
T: +353 (0) 1761 4200 E-mail: atex@fmapprovals.com www.fmapprovals.com

SCHEDULE

to Type Examination Certificate No. FM07ATEX0003X

13 **Description of Equipment or Protective System:**

The T590 is an electro-mechanical current to pressure converter. The unit's electronics operate on a 4 to 20 mA current loop. The ambient operating temperature range of the T590 is -55°C to 85°C, however the temperature class and the maximum permitted operating temperature are dependant on the Energy Limitation Parameters specified below. The circuitry for the T590 is contained on a single circuit board that is mounted to the transducer's drive coil on the aluminium manifold and covered with a plastic cover. The I/P Converter is intended to be installed within an additional enclosure.

T590-AabK. I/P Converter. (Ex nL version)
II 3 G Ex nL IIC T* Ta = -55°C to Ta max
a = Output Pressure: C, D, E
b = Connection: M, P

Energy Limitation Parameters

Temperature Class	*Ta max*	I_i	U_i	P_i
T4	85°C	60 mA	38.8 V	2.328 W
T4	85°C	100 mA	30 V	3.0 W
T4	80°C	120 mA	28 V	3.36 W
T4	70°C	150 mA	25.5 V	3.825 W
T5	70°C	60 mA	38.8 V	2.328 W
T5	55°C	100 mA	30 V	3 W
T5	45°C	120 mA	28 V	3.36 W
T5	85°C	23 mA	6.75 V	0.155 W
T6	60°C	50 mA	42.5 V	2.125 W
T6	55°C	60 mA	38.8 V	2.328 W

T590-AabK. I/P Converter. (Ex nL version)
II 3 G Ex nAnL IIC T6 Ta = -55°C to +85°C
a = Output Pressure: C, D, E
b = Connection: M, P

Input parameters
Ui = 40 V ; Ii = 20 mA

14 **Specific Conditions of Use:**

1. The non-metallic cover of the I/P converter is considered to constitute an electrostatic discharge hazard. Clean only with a damp cloth.
2. The I/P converter enclosure's metal base must be mounted as part of a bonded structure.
3. The I/P converter enclosure contains aluminium and is considered to constitute a potential risk of ignition by impact or friction and must be taken into account during installation.
4. If the T590 I/P Converter is installed as Category 3 equipment, Then it shall be installed in an Enclosure which maintains an ingress protection rating of IP54 and meets the enclosure requirements of EN 50014 or EN 60079-0.
5. The user shall permanently mark the protection type chosen. Once the type of protection has been marked it shall not be changed.

SCHEDULE

to Type Examination Certificate No. FM07ATEX0003X

15 **Essential Health and Safety Requirements:**

The relevant EHSRs that have not been addressed by the standards listed in this certificate have been identified and assessed in the confidential report identified in item 8.

16 **Test and Assessment Procedure and Conditions:**

This Type Examination Certificate is the result of testing of a sample of the product submitted, in accordance with the provisions of the relevant specific standard(s), and assessment of supporting documentation. It does not imply an assessment of the whole production.

Whilst this certificate may be used in support of a manufacturer's claim for CE Marking, FM Approvals Europe Ltd accepts no responsibility for the compliance of the equipment against all applicable Directives in all applications.

This Certificate has been issued in accordance with FM Approvals Europe Ltd's ATEX Certification Scheme.

17 **Schedule Drawings**

A list of the significant parts of the technical documentation is annexed to this certificate and a copy has been kept by FM Approvals Europe Ltd.

18 **Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
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T: +353 (0) 1761 4200 E-mail: atex@fmapprovals.com www.fmapprovals.com

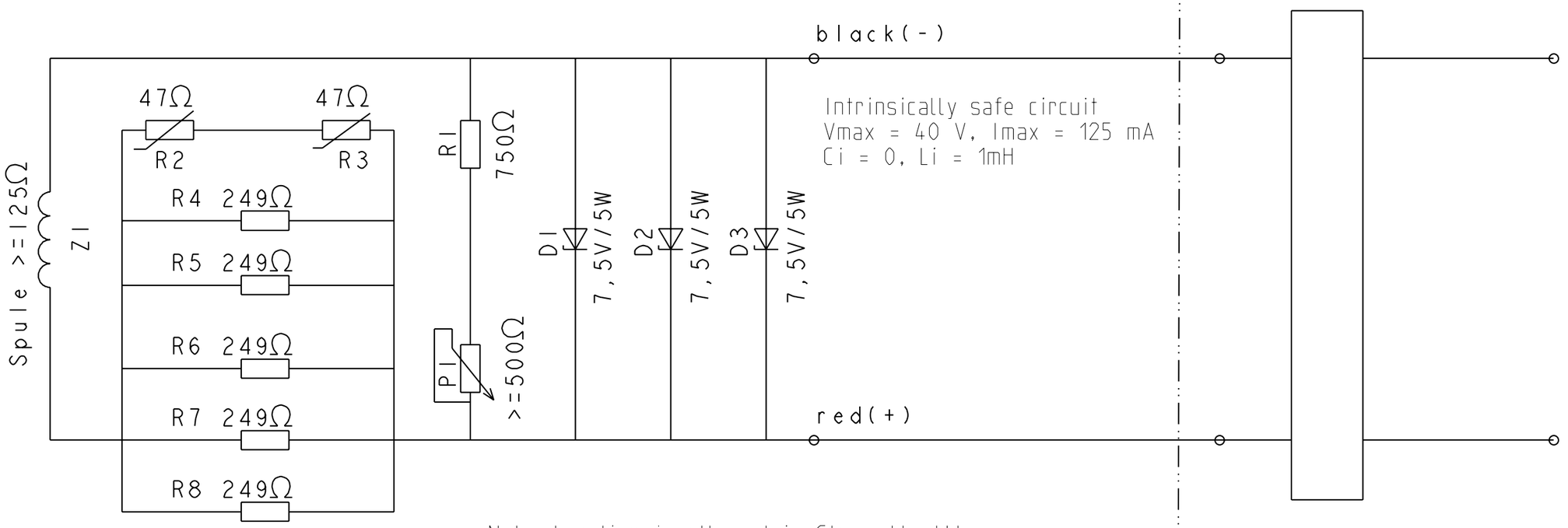
ABB Automation Products

Control Document No. 900842
for I/P-Converter Type 22/06-a

FM Approved

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

Nonhazardous Area



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.

No revision can be made without FM notification

D1...D3
1N5343B or comparable type

Characteristic: direct acting

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

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

Fit									Surface:
Over-Allowance									
Under-Allowance									WN:

Workpiece edges acc.to DIN 6784 ±0,3 ±0,3 not specified:	Surface Finish DIN ISO 1302	General Tolerances DIN ISO 2768-m-K

Material: Rev.3 (06.06.2013)
Part-No: WN:

Rev.	Amendment	Date	Name

All Dimensions in mm

	Date	Name
Drawn	07.07.93	Lasarzik
Checked	20.03.00	Neuhaus

ABB Automation

Title: Connection Diagramm
I/P-Converter 22/06-a

Scale:

Drawing No. (Part No): 900842 FM

Sheet: 1/4

Replacement for: _ Category: _

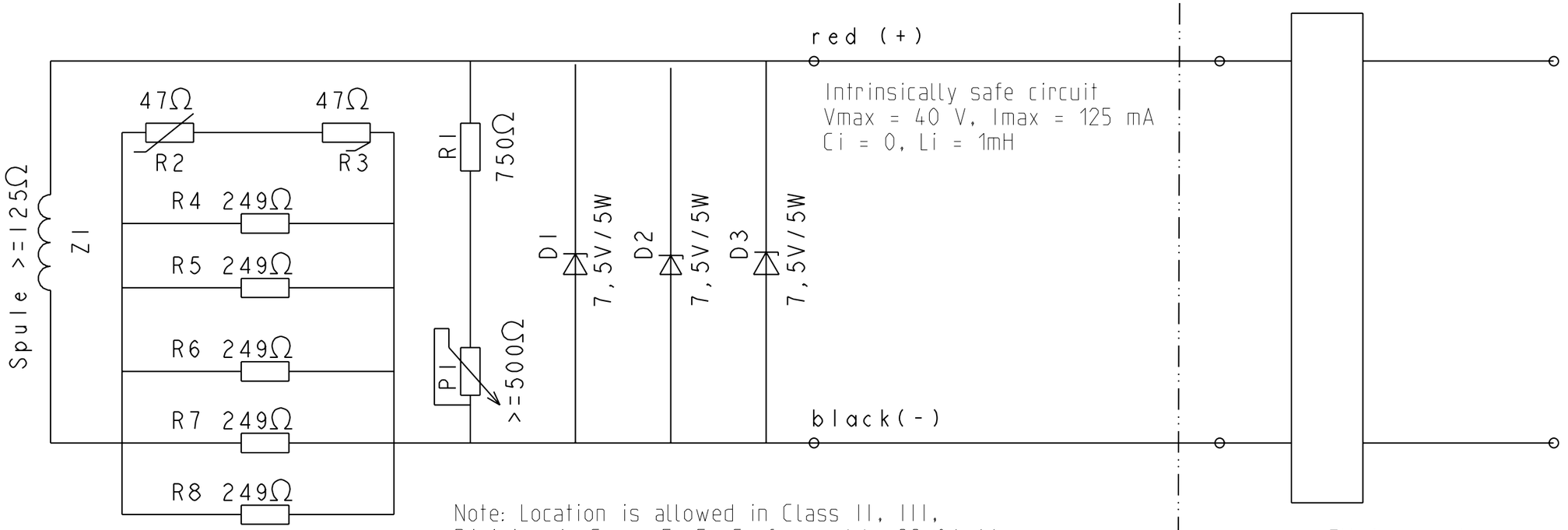
ABB Automation Products

Control Document No. 900842
for I/P-Converter Type 22/06-a

FM Approved

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

Nonhazardous Area



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.

No revision can be made without FM notification

D1...D3
1N5343B or comparable type

Characteristic: reverse acting

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

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

Fit									Surface:
Over-Allowance									
Under-Allowance									WN:

Workpiece edges acc.to DIN 6784 not specified: ±0,3 ±0,3	Surface Finish DIN ISO 1302	General Tolerances DIN ISO 2768-m-K

Material: Rev.3 (06.06.2013)
Part-No: WN:

Rev.	Amendment	Date	Name

All Dimensions in mm

	Date	Name
Drawn	07.07.13	Lasarzik
Checked	20.03.00	Neuhaus

ABB Automation

Title: Connection Diagramm
I/P-Converter 22/06-a

Scale:

Drawing No. (Part No): 900842 FM

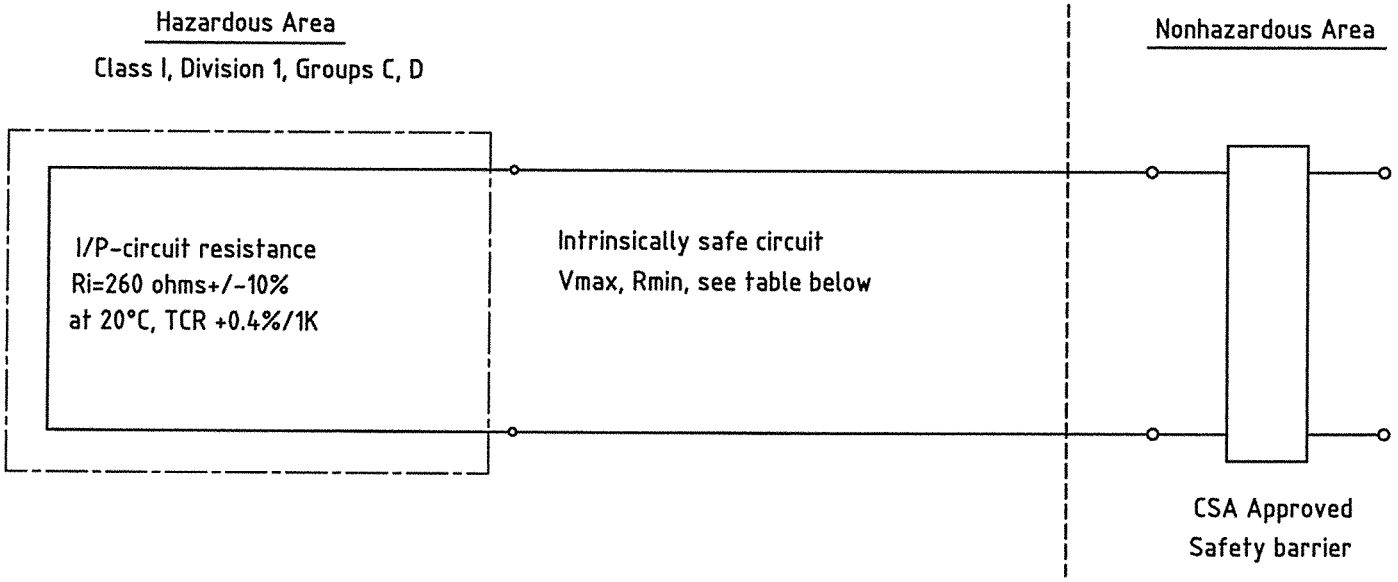
Sheet: 2/4

Replacement for: _ Category: _

ABB Automation Products

Control Document No. 900842
for I/P-Converter Type 22/06-XX

CSA Approved



Characterristic: 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 (Vmax)	min. resistance (Rmin)
33	200
30	150
28	120

No revision can be made without CSA notification

Werkstückkanten nach DIN 6784 ohne Angaben -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:					
	Rev. 2 (20.03.00)					

1995	Tag	Name	Maßstab
Gezeichnet	23.05.	Thieme	
Geprüft	20.03.00	Nau	
Normgepr.			

Benennung:
Connection Diagram
I/P-Converter 22/06-XX

TKM

Paß- Ab- maße

ABB Automation

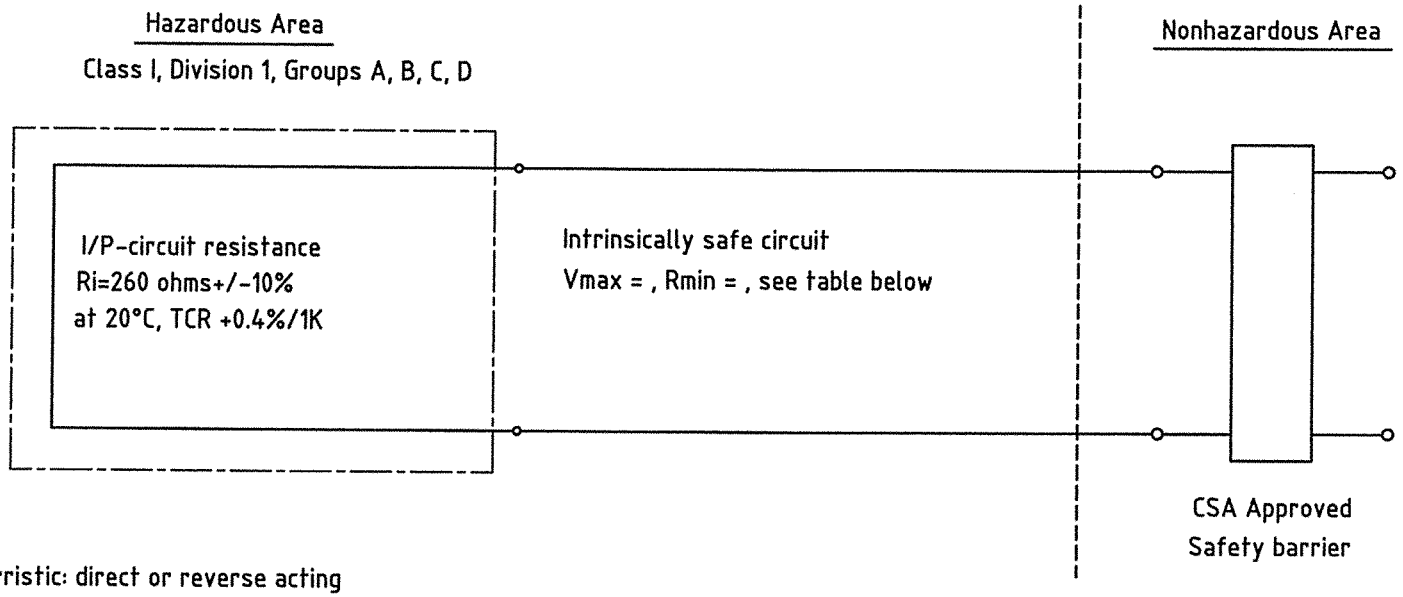
Ident-Nr. 900842 CSA

Blatt 3/4 von

ABB Automation Products

Control Document No. 900842
for I/P-Converter Type 22/06-XX

CSA Approved



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

Hazardous Area

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

max. voltage (Vmax)	min. resistance (Rmin)
32	400
30	330
29.5	305
28	270
25	200
22	150
12	40

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.

No revision can be made without CSA notification

Werkstückkanten nach DIN 6784 ohne Angaben -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 :				
			Rev. 2 (20.03.00)					
1995	Tag	Name	Maßstab	Benennung : Connection Diagram I/P-Converter 22/06-XX				TKM
Gezeichnet	23.05.	Thieme						
Geprüft	20.03.00							
Normgepr.								
Paß- / Ab-maße	ABB Automation			Ident-Nr. 900842 CSA				Blatt 4/4 von

Translation

(1) # EC-TYPE EXAMINATION CERTIFICATE

(2) Equipment or Protective System intended for use in potentially explosive atmospheres - **Directive 94/9/EC**

(3) EC-Type Examination Certificate Number

TÜV 99 ATEX 1487 X

(4) Equipment or Protective System: I/P transformer type Doc 901068 and 901069

(5) Manufacturer: Hartmann & Braun GmbH & Co. KG
Geschäftsbereich Gerätetechnik

(6) Address: D-30179 Hannover, Hackethalstr. 7

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

(8) The TÜV Hannover/Sachsen-Anhalt e.V., TÜV Certification Body N° 0032 in accordance with Article 9 of the Council Directive 94/9/EC of March 23, 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements krelating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report N° 99/PX23890.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50 014:1997 **EN 50 020:1994**

(10) If the sign "X" is placed after the certification number, it indicates that the equipment or protective system 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 or protective system. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment or protective system.

(12) The marking of the equipment or protective system shall include the following:

Ex II 2 G EEx ia IIC T6

TÜV Hannover/Sachsen-Anhalt e.V.
TÜV CERT-Zertifizierungsstelle
Am TÜV 1
D-30519 Hannover

Hannover, 1999-10-29

Head of the Certification Body

TÜV NORD CERT

(13) **SCHEDULE**

(14) **EC-TYPE EXAMINATION CERTIFICATE N° TÜV 99 ATEX 1487 X**

(15) Description of equipment or protective system

The I/P transformer type Doc 901068 and 901069 is used for the transformation of an impressed direct current of the range of 0 ... 20 mA into a proportional pressure. The proportional pressure can be used for the control of pneumatically adjustable devices resp. mechanisms of every manner.

Electrical data

Supply circuit (terminal +,-)	in type of protection "Intrinsic Safety" EEx ia IIC only for the connection to certified intrinsically safe circuits

The permissible ambient temperature range in dependence of the temperature class and of the input current has to be taken from the following table:

temperature class	input current	ambient temperature range
T6	50 mA	-55°C to +60°C
T6	60 mA	-55°C to +55°C
T5	60 mA	-55°C to +70°C
T4	60 mA	-55°C to +85°C
T5	100 mA	-55°C to +55°C
T4	100 mA	-55°C to +85°C
T5	120 mA	-55°C to +45°C
T4	120 mA	-55°C to +80°C
T4	150 mA	-55°C to +70°C

The effective internal inductance and capacitance is negligibly small.

(16) Test documents are listed in the test report N° 99/PX23890.

(17) Special condition for safe use

1. When using combustible gas as auxiliary energy the I/P transformer type Doc 901069 has to erected outdoors.
2. The feeded gas has to be kept free of air or oxygen in such a way that it is ensured that no potentionally explosive atmosphere can occur.
3. The gas must always be purged outwards.

(18) Essential Health and Safety Requirements

no additional ones

Translation

2. SUPPLEMENT to

EC-TYPE EXAMINATION CERTIFICATE No. TÜV 99 ATEX 1487 X

of the company: ABB Automation Products GmbH
Schillerstraße 72
D-32425 Minden

When operated with combustible gases the I/P transformer type DOC 901069 as pneumatic auxiliary power may be installed outdoors resp. indoors when sufficient ventilation is given (see 17 „Special conditions for safe use").

All other data apply unchanged.

(16) The test documents are listed in the test report N° 04YEX551065-1.

(17) Special conditions for safe use

When operated with combustible gases the I/P transformer type DOC 901069 as pneumatic auxiliary power has to be installed outdoors resp. indoors when sufficient ventilation is given.

The supplied gas has to be kept free of air or oxygen so that it cannot form an explosive atmosphere.

The exhaust gases must always be exhausted outside.

(18) Essential Health and Safety Requirements
no additional ones

TÜV NORD CERT GmbH & Co. KG
TÜV CERT-Certification Body
Am TÜV 1
D-30519 Hannover
Tel.: 0511 986-1470
Fax: 0511 986-2555

Hanover, 2004-07-08

Head of the
Certification Body

BA 02 11.03

Ex Grenzwerte für TEIP11 und TZIM
Ex limit values for TEIP11 and TZIM

I_i	U_i	P_i
50 mA	42,5 V	2,125 W
60 mA	38,8 V	2,328 W
100 mA	30 V	3,0 W
120 mA	28 V	3,36 W
150 mA	25,5 V	3,825 W

Innere Induktivität und Kapazität vernachlässigbar.
The effective internal inductance and capacitance is negligibly small.

Die Werte wurden ermittelt aus:
The values are determined from:

Ex-Zertifikat TÜV 99 ATEX 1487 X
Ex certification TÜV 99 ATEX 1487 X

EN 50020 Teil 7, Anhang A, Tabelle A.1
EN 50020 part 7, annex A, table A.1

Zulässiger Kurzschlussstrom entsprechend der Spannung und der Gerätegruppe, für Betriebsmittel der Gruppe IIC mit einem Sicherheitsfaktor von 1,5.

Permissible short circuit current according to the voltage and device group for devices of group IIC with a safety factor of 1.5.

ABB Automation Products GmbH, Schillerstr. 72, D 32425 Minden
Tel. +49 571 830-0, Fax +49 571 830 1860

I/P-Umformer/Converter

TEIP 11

Doc. 901068 Ri = 260 Ω

Schutzart/Protection:
II 2 G EEx ia IIC T6

TÜV 99 ATEX 1487 X

Ii u. Tu siehe Zertifikat 0032

ABB Automation
D 32425 Minden, Made in Germany

I/P-Umformer/Converter

TEIP 11

Doc. 901069 Ri = 260 Ω

Schutzart/Protection:
II 2 G EEx ia IIC T6

TÜV 99 ATEX 1487 X

Ii u. Tu siehe Zertifikat 0032

ABB Automation
D 32425 Minden, Made in Germany

Translation

3. SUPPLEMENT

to Certificate No.	**TÜV 99 ATEX 1487 X**
Equipment:	I/P-Converter TEIP11, type Doc. 901068xxxx resp. I/P-Converter TEIP11-PS, type Doc. 901068xxxx resp. type Doc. 901069xxxx
Manufacturer: Address:	ABB Automation Products GmbH Schillerstraße 72 32425 Minden Germany
Order number:	8000386302
Date of issue:	2012-06-27

Amendments:

The changes relate to a modification of the type designation and the extension or replacement of the electronic circuit boards using conventional placement (wired components) by an electronic circuit board with surface mount components (SMD).
A typification of the SMD versions with appropriate adjustments to the identification, temperature classes and type plates was performed.
Furthermore the equipment was evaluated according to the newest standards.

The device designation "I/P Converter type Doc. 901068 and Doc. 901069" was changed and reads:

I/P-Converter TEIP11, Doc. 901068
resp.
I/P-Converter TEIP11-PS, Doc. 901068 resp. Doc. 901069

For the I/P Converter type TEIP11 resp. TEIP11-PS in the execution Doc. 901068 or Doc. 901069 (wired components) the following electrical data are unchanged until now:

Temperature classes and maximum electrical values:

Temperature class	Eingangsstrom I_i	Ambient temperature range T_a
T6	50 mA	-55 °C to +60 °C
T6	60 mA	-55 °C to +55 °C
T5	60 mA	-55 °C to +70 °C
T4	60 mA	-55 °C to +85 °C
T5	100 mA	-55 °C to +55 °C
T4	100 mA	-55 °C to +85 °C
T5	120 mA	-55 °C to +45 °C
T4	120 mA	-55 °C to +80 °C
T4	150 mA	-55 °C to +70 °C

The execution of the I/P- Converter with the electronic circuit board for surface-mounted devices (SMD) is as follows:

I/P-Converter TEIP11, type Doc. 901068-SMD
resp.
I/P-Converter TEIP11-PS, type Doc. 901068-SMD resp. Doc. 901069-SMD

On the specific housing type plates of the I/P- converter TEIP11 resp. TEIP11-PS the used electronic circuit boards with surface mount components (SMD) is indicated by Doc. 901068-**SMD** resp. Doc. 901069-**SMD**.

For the I/P converter TEIP11 resp. TEIP11-PS in the execution with surface mounted components Doc. 901068-SMD or Doc. 901069-SMD, the number of temperature classes is reduced. In the temperature class T4 a limitation of the maximum input current to 120 mA is required and the associated adjusted ambient temperature range T_a changes as follows:

Temperature classes and maximum electrical values:

Temperatur class	Input current I_i	Ambient temperature range T_a
T4	120 mA	-55 °C to +60 °C
T4	100 mA	-55 °C to +85 °C
T6	60 mA	-55 °C to +40 °C

All other data apply unchanged for this supplement.

The device will then be labeled as follows:

II 2G Ex ia IIC T6 Gb resp. II 2G Ex ia IIC T4 Gb

The equipment incl. of this supplement meets the requirements of these standards:

EN 60079-0:2009 EN 60079-11:2012

(16) The test documents are listed in the test report No. 11 203 386302.

(17) Special conditions for safe use

no additional ones

(18) Essential Health and Safety Requirements

no additional ones

TÜV NORD CERT GmbH, Langemarckstraße 20, 45141 Essen, notified by the central office of the countries for safety engineering (ZLS), Ident. Nr. 0044, legal successor of the TÜV NORD CERT GmbH & Co. KG Ident. Nr. 0032

The head of the notified body

Schwedt

Hanover office, Am TÜV 1, 30519 Hannover, Tel.: +49 (0) 511 986-1455, Fax: +49 (0) 511 986-1590

FM Approvals
1151 Boston Providence Turnpike
P.O. Box 9102 Norwood, MA 02062 USA
T: **781 762 4300** F: 781-762-9375 www.fmapprovals.com

CERTIFICATE OF COMPLIANCE

HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT

This certificate is issued for the following equipment:

22/06-65. I/P Signal Converter.
IS / I, II, III / 1 / ABCDEFG / T5 - 900842; Entity;
NI / I / 2 / ABCD / T5;
S / II / 2 / G /T5;
S / III / 2 /T5

Entity Parameters:
V_{Max} = 40 V, I_{Max} = 125 mA, C_i = 0, L_i = 1.0 mH.

Special conditions
1. The 22/06-65 shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.

22/06-6a. I/P Signal Converter.
IS / I, II, III / 1 / ABCDEFG / T5 - 900842; Entity;
NI / I / 2 / ABCD/ T5;
S / II / 2 / G/ T5;
S / III / 2/ T5

Entity Parameters:
V_{Max} = 40 V, I_{Max} = 125 mA, C_i = 0, L_i = 1.0 mH.
a = 6, 7, 8 or 9.

Equipment Ratings:

Intrinsically safe for Class I, II and III, Division 1, Groups ABCDEF& G hazardous (classified) locations in when installed in accordance with the entity concept and drawing, 900842. Temperature classification T5. Nonincendive for Class I, Division 2, Groups ABC & D. Temperature classification T5. Suitable for Division 1 Class III.

FM Approved for:

ABB Automation Products GmbH
Minden, Germany

FM Approvals

Member of the FM Global Group

This certifies that the equipment described has been found to comply with the following Approval Standards and other documents:

Class 3610	2010
Class 3600	2011
Class 3611	2004

Original Project ID: 0003043782 Approval Granted: March 20, 2014

Subsequent Revision Reports / Date Approval Amended

Report Number	Date	Report Number	Date

FM Approvals LLC

J.E. Marquedant
Group Manager, Electrical

20 March 2014
Date

To verify the availability of the Approved product, please refer to www.approvalguide.com

CSA INTERNATIONAL

Certificate of Compliance

Certificate: 1138768 **Master Contract:** 203012

Project: 2413770 **Date Issued:** May 5, 2011

Issued to: **ABB Automation Products GmbH**

72 Schillerstrasse
Minden, 32425
Germany
Attention: Wolfgang Lasarzik

The products listed below are eligible to bear the CSA Mark shown

Ron Wildish

Issued by: Ron Wildish

PRODUCTS

CLASS 2258 02 - PROCESS CONTROL EQUIPMENT - For Hazardous Locations

Class I, Div 2, Groups A, B, C and D:

Model 22/06-XX, 22/06-6X I/P, E5-EX/US and E5-EX/US-SS converters and Model TZIM Positioner; input rated 4-20mA, 40V dc max; Temp Coded T3C.

Note: These devices (ie. those Certified for Class I, only) are for installation in suitable enclosures as acceptable to the local authority having jurisdiction.

CLASS 2258 03 - PROCESS CONTROL EQUIPMENT - Intrinsically Safe and Non-Incendive Systems - For Hazardous Locations

Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III, Div. 1:

Models 22/06-99, 22/06-99-X, 22/06-66, 22/06-67, 22/06-68, 22/06-69 and E5-IS/US. I/P converters; input rated 4-20mA, 40V dc max; Intrinsically safe when connected through one CSA Certified zener barrier, rated 32 Vmax, 400 ohms min; 30 Vmax, 330 ohms min.; 29.5 Vmax, 305 ohms min.; 28 Vmax, 270 ohms min; 25 Vmax, 200 ohms min; 22 Vmax, 150 ohms min; or 12 Vmax, 40 ohms min; when connected per ABB Connection Diagram 900842; Temp Coded T3C.

Class I, Div. 1, Groups C, D; Class II, Div. 1, Groups E, F, G; Class III, Div. 1:

Models 22/06-99, 22/06-99-X, 22/06-66, 22/06-67, 22/06-68, 22/06-69 and E5-IS/US. I/P converters; input rated 4-20mA, 40V dc max; Intrinsically safe when connected through one CSA Certified zener barrier, rated

33 Vmax, 200 ohms min; 30 Vmax, 150 ohms min.; or 28 Vmax, 120 ohms min; when connected per ABB Connection Diagram 900842; Temp Coded T3C.

Class I, Div. 1, Groups A, B, C and D:

Model 22/06-XX, 22/06-6X I/P and E5-IS/US converters and Model TZIM Positioner; input rated 4-20mA, 40V dc max; Intrinsically safe when connected to one CSA Certified Zener barrier rated 32 Vmax, 400 ohms min; 30 Vmax, 330 ohms min.; 29.5 Vmax, 305 ohms min.; 28 Vmax, 270 ohms min; 25 Vmax, 200 ohms min; 22 Vmax, 150 ohms min; 12 Vmax, 40 ohms min; when connected per ABB Connection Diagram 900842; Temp Coded T3C.

Model TZIM Positioner; input rated 4-20mA, 40V dc max; Intrinsically safe when connected to one CSA Certified Zener barrier, rated 32 Vmax, 400 ohms min; 30 Vmax, 330 ohms min.; 29.5 Vmax, 305 ohms min.; 28 Vmax, 270 ohms min; 25 Vmax, 200 ohms min; 22 Vmax, 150 ohms min; 12 Vmax, 40 ohms min.; when connected per ABB Connection Diagram 900988; Temp Coded T3C.

Class I, Div. 1, Groups C and D:

Model 22/06-XX, 22/06-6X I/P and E5-IS/US converters and Model TZIM Positioner; input rated 4-20mA, 40V dc max; Intrinsically safe when connected to one CSA Certified Zener barrier, rated 33 Vmax, 200 ohms min; 30 Vmax, 150 ohms min.; or 28 Vmax, 120 ohms min; when connected per ABB Connection Diagram 900842; Temp Coded T3C.

Model TZIM Positioner; input rated 4-20mA, 40V dc max; Intrinsically safe when connected to one CSA Certified Zener barrier, rated 33 Vmax, 200 ohms min; 30 Vmax, 150 ohms min.; or 28 Vmax, 120 ohms min; when connected per ABB Connection Diagram 900988; Temp Coded T3C.

Note: These devices (ie. those Certified for Class I, only) are for installation in suitable enclosures as acceptable to the local authority having jurisdiction.

APPLICABLE REQUIREMENTS

C22.2 No. 0-10 - General Requirements – Canadian Electrical Code, Part II

C22.2 No. 142-M1987 - Process Control Equipment

C22.2 No. 157-92 - Intrinsically Safe and Non-Incendive Equipment for Use in Hazardous Locations

C22.2 No. 213-M1987 - Non-Incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations

3.0 CAM INDEXING AND POSITIONER CALIBRATION

This section describes indexing the installed cam and calibrating the positioner. Changing the cam to one with a different characteristic is also described. Calibrate a positioner after changing or indexing the cam, after installing an Option Kit that affects calibration [e.g. Input Shaft Kit or Flow Output (Spool) Kit], and after repair.

WARNING

Electrical shock hazard
Explosion hazard

Can cause death or injury.

- Remove power from all wires and terminals before working on equipment.
- In potentially hazardous atmosphere, remove power from equipment before connecting or disconnecting power, signal, or other circuit.
- Observe all pertinent regulations regarding installation in hazardous area.

CAUTION

Pinch hazard

Remove supply pressure before working on this equipment.

3.1 EQUIPMENT NEEDED

- Pressure regulator, adjustable from 0 to 30 psig, 760P only
- Test gauge, 0 to 30 psig
- Small slotted screwdriver
- Current source, 4-20 mA, 760E only
- Ammeter, 4-20 mA, 760E only
- Common hand tools

3.2 CAM INSTALLATION AND INDEXING

The positioner is cam characterized and is shipped with a linear cam installed, unless otherwise specified on the order. This section describes installing another cam type, as necessary, and selecting the cam lobe (CW or CCW). Figure 3-1 shows the cam and related parts.

Also discussed in this section is installation of a retaining clip on a feedback lever.

IMPORTANT

Before proceeding, the positioner should be mounted on the actuator, the feedback linkage installed, positioner and actuator piped, and, for Model 760E, positioner input signal connections completed.

3.2.1 Cam Identification

Three standard cam profiles are available: LIN (linear), EP (modified equal percentage), and QO (quick opening). The letters CW and CCW identify the cam lobes.

- Use the CW lobe when the input shaft (as viewed in Figure 3-1) rotates clockwise with an increasing input signal.
- Use the CCW lobe when an increasing input signal causes the input shaft to rotate counterclockwise.

Figure 3-2 shows standard 60° and 90° cams and Figure 3-3 shows the characteristics of the three standard cams.

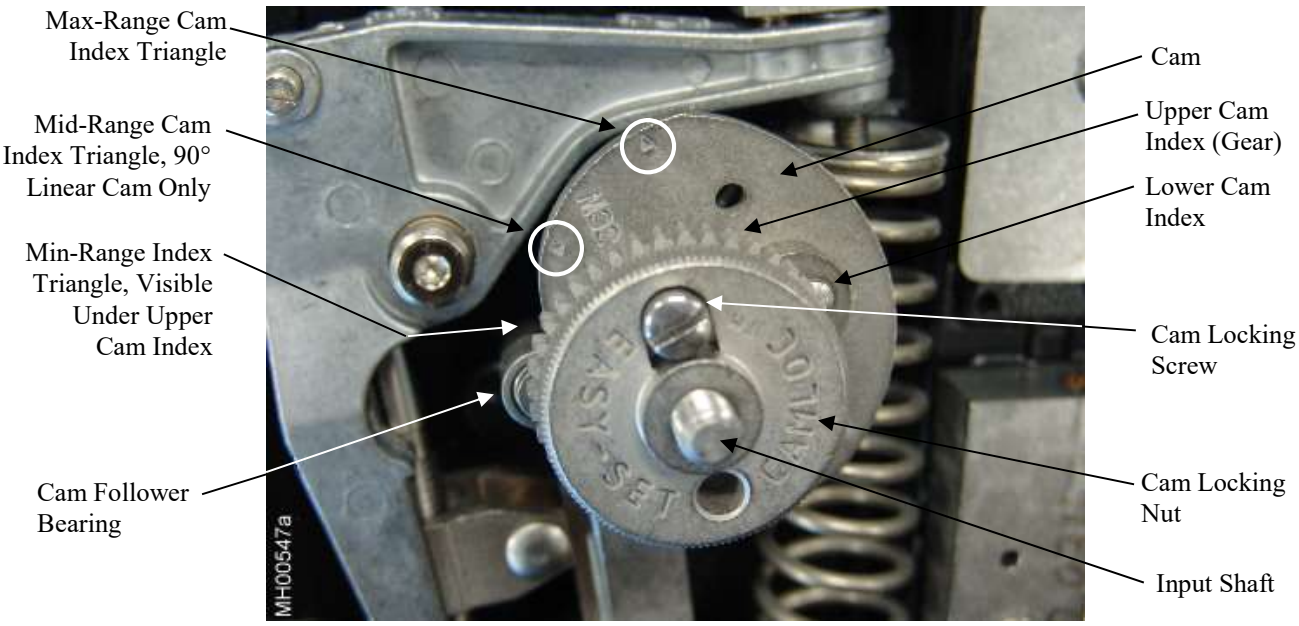
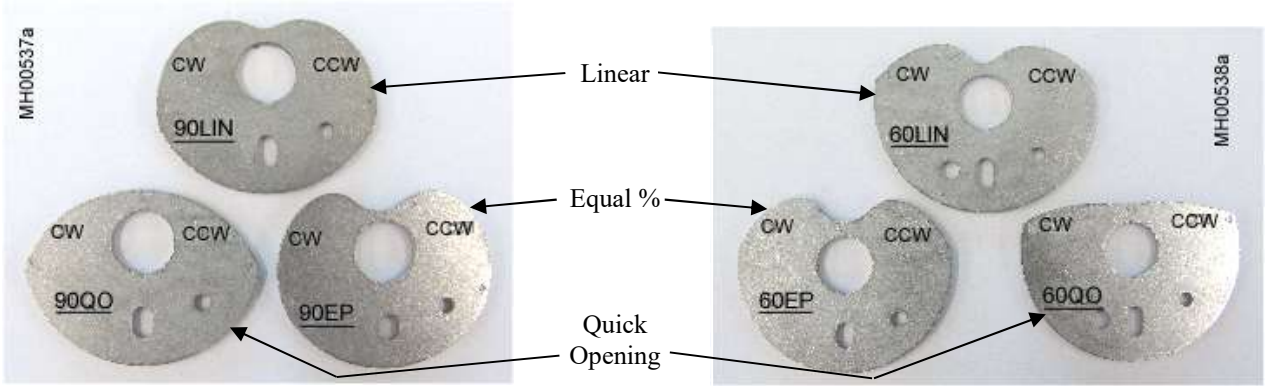


Figure 3-1 Cam and Cam Indexing Components



90-Degree Cams **60-Degree Cams**

Figure 3-2 Standard Cams

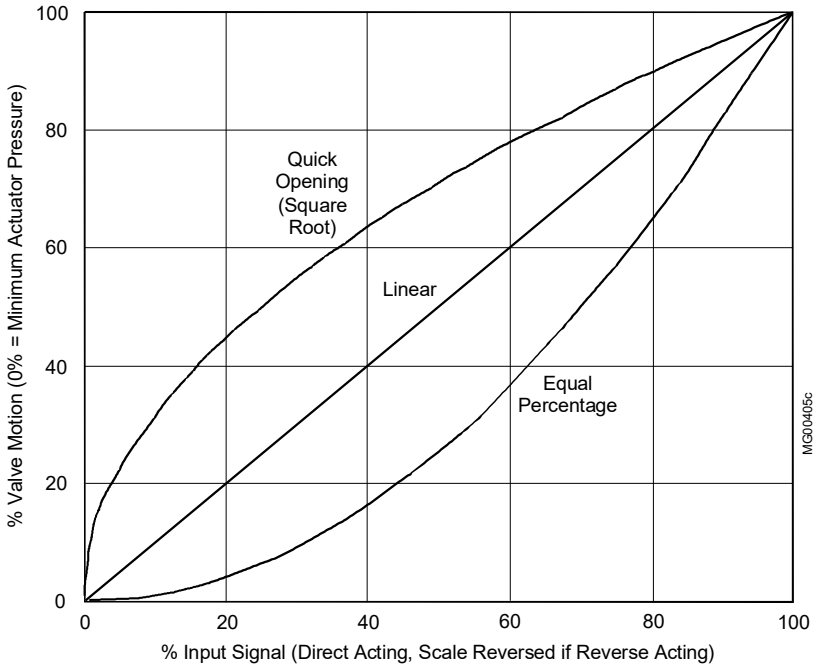


Figure 3-3 Standard Cam Characteristics

3.2.2 Cam Indexing

Refer to Figures 3-1, 3-4, and 3-5 and the exploded view drawing in the Parts List section for cam and associated hardware identification.

1. Seat the actuator in the position corresponding to zero percent input signal.
2. Remove supply air pressure from the positioner and actuator.

CAUTION

Do not apply supply air pressure to the actuator or the valve positioner during the indexing process. Applying pressure could cause unexpected movement that could lead to personal injury or equipment damage.

3. Remove electrical power from the positioner. Remove the 4-20 mA input signal from a Model 760E positioner.
4. Remove the positioner cover by loosening four straight-slot screws.
5. If installed, remove the following:
   1) Beacon or flat indicator, see Figure 4-9 or 4-10
   2) PC board-based feedback or limit switch option, see Figure 4-1
   3) Extension shaft and compression washer; see Figure 4-2
6. Loosen the cam locking screw in the cam locking nut and loosen the cam locking nut 2-3 turns; see Figure 3-4.

   To replace the installed cam, perform the following four steps. Otherwise, go to Step 7.

   1) Remove the cam locking nut, upper cam index, lower cam index, and the installed cam.
   2) Install the needed cam with the cam type (e.g. 90LIN) and lobe text (e.g. CCW) visible.
   3) Install the lower cam index on the input shaft so the pin extending from the index engages the elongated hole in the cam.

4) Install the upper cam index so the teeth on its rear face engage the teeth in the lower cam index and the slot engages the input shaft. Loosely thread the cam locking nut onto the input shaft. Do not tighten at this time.

IMPORTANT

While the positioner is *operating*, the cam follower should:
1. Move between the index triangles on the selected cam lobe
2. Never enter the cam valley - see the adjacent figure

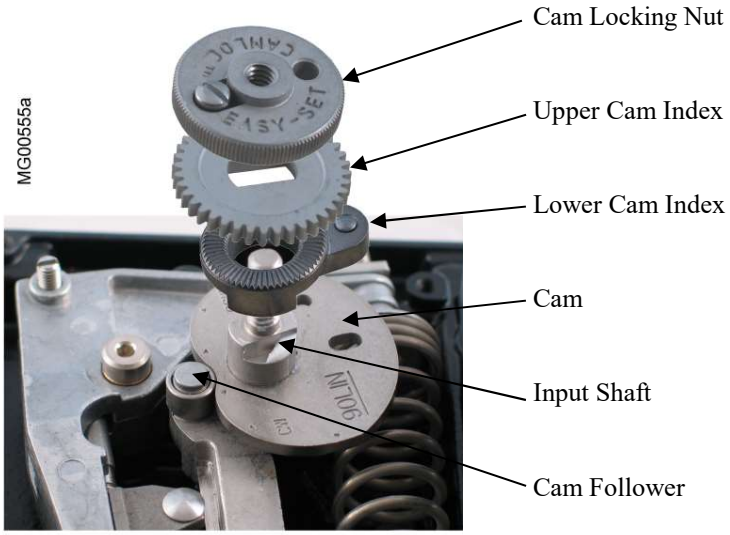


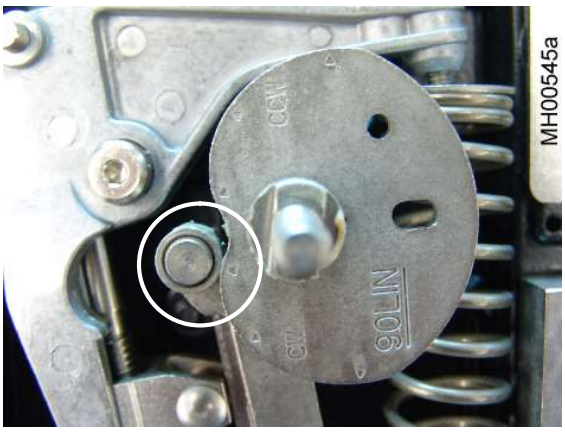
Figure 3-4 Cam Index Components

7. To index the cam:

1) Lift the upper cam index to disengage it from the lower cam index. Rotate the cam and carefully align the minimum input (Min-Range) index triangle on the cam with the point of contact of the cam follower bearing. See Figures 3-1, 3-4, and 3-5.

- Use the lobe marked CW for clockwise cam rotation with increasing input signal.
- Use the lobe marked CCW for counterclockwise cam rotation with increasing input signal.

2) Hold the cam in place and press the upper cam index against the lower cam index. Be sure to engage the slot in the upper cam index with the input shaft. Tighten the knurled cam locking nut. Tighten the cam locking screw.



Indexing of CW Cam Lobe	Indexing of CCW Cam Lobe

Note: For clarity, the cam and cam follower bearing are shown without the cam locking hardware. The cam locking hardware must be loosely installed when indexing a cam.

Figure 3-5 Indexing of CW and CCW Cams

8. If removed in Step 5, install the beacon or flat indicator compression washer, extension shaft, and indicator.
9. Install the retaining clip as described below.

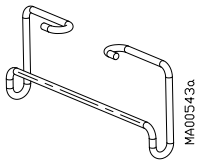
The purpose of the retaining clip is to hold the feedback pin securely against the pressure side of the feedback lever slot, even at small cam pressure angles. This prevents excessive play in the linkage and limits the amount of error introduced into the system through the linkage.

It may be necessary to separate the feedback pin from the lever to ease installation of a retaining clip.

Design Levels A and B

1) Note whether the CW or CCW cam lobe is being used; see step 7 above.
2) Figure 3-6 shows two clip positions in details A and B. Select the position that: 1) provides consistent retaining action as the feedback pin moves in the slot and 2) locates the clip where it does not interfere with nearby parts.
   - CW Cam Lobe: Figure 3-6 detail A shows the correct installation of the retaining clip for pressure on the upward side of the feedback lever slot.
   - CCW Cam Lobe: Figure 3-6B shows the same for the downward side of the slot.
3) With the lever at mid stroke, adjust the location of the clip on the lever as shown in Figure 3-6, detail C. This will allow the pin to slide away from the lever pivot point as the lever moves away from mid stroke.

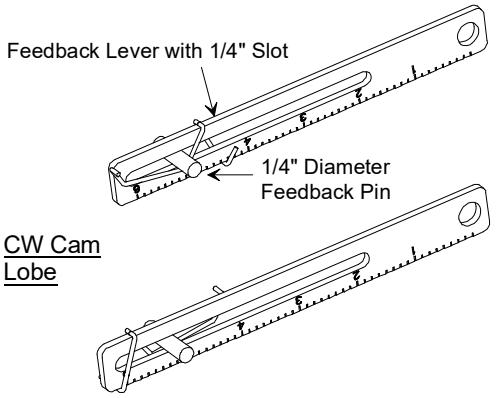
Design Level D, retaining clip shown at right



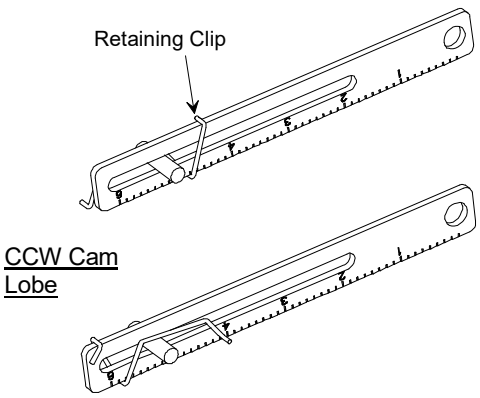
1) Note whether the CW or CCW cam lobe is being used; see step 7 above.
2) Figure 3-7 shows retaining clip positions in details A and B. Select the position that: 1) provides consistent retaining action as the feedback pin moves in the slot and 2) locates the clip where it does not interfere with nearby parts. The clip may be installed on either side of the lever.[4] The hooked ends of the clip will fit into recesses cut into the lever.
   - CW Cam Lobe: Figure 3-7 detail A shows the correct installation of the retaining clip for pressure on the upward side of the feedback lever slot.
   - CCW Cam Lobe: Figure 3-7 detail B shows the same for the downward side of the slot.
3) With the lever at mid stroke, adjust the location of the clip on the lever such that the side of the clip closest to the linear adapter is close to the feedback pin. This will allow the pin to slide away from the linear adapter as the lever moves away from mid stroke. See Figures 2-9, 3-6 detail C, and 3-7.

Go to Section 3.3 Calibration after installing the clip.

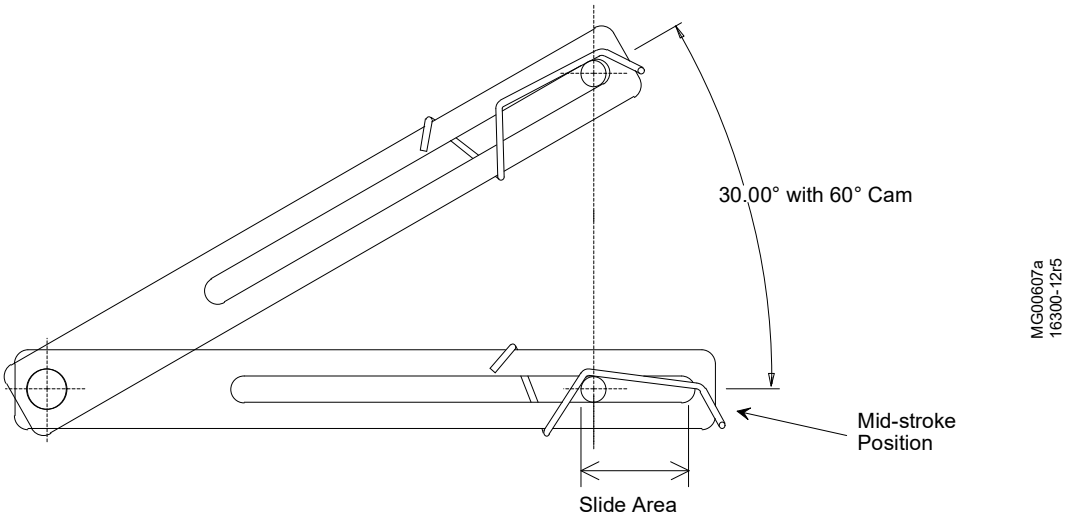
[4] The 2″ feedback lever must have the retaining clip installed so the clip engages the alignment pin as shown in Figure 2-9.



A. CW Cam Lobe, Upward Pin Pressure Mounting Positions

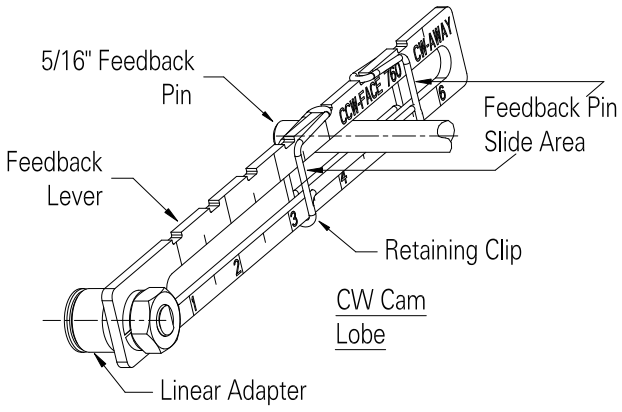


B. CCW Cam Lobe, Downward Pin Pressure Mounting Positions

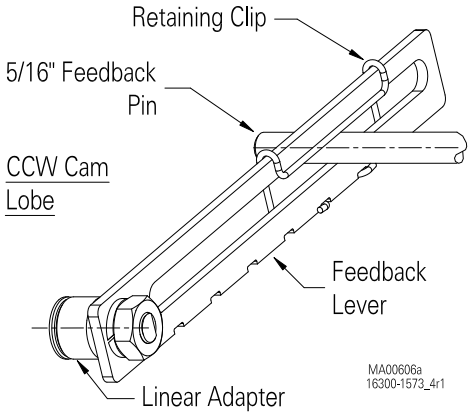


C. Feedback Pin Slide Area

Figure 3-6 Retaining Clip Position, Design Levels A and B



A. CW Cam Lobe, Upward Pin Pressure Mounting Position



B. CCW Cam Lobe, Downward Pin Pressure Mounting Position

Figure 3-7 Retaining Clip Position, Design Level D

3.3 CALIBRATION

See Figure 3-8 for the location of the zero and span calibration adjustments.

IMPORTANT

Calibrate the positioner by adjusting only the zero and span screws shown in Figure 3-8.
Model 760E: Do not adjust the factory set I/P calibration screws shown in Figure 4-10.

While calibrating the positioner, ensure that:

- Linear action – The positioner feedback lever is approximately perpendicular to the valve stem at the 50% stroke position. Adjust positioner location as necessary. Refer to Section 2.3.1 Linear Actuator Applications as needed.
- Linear action – The feedback pin moves freely in the feedback lever slot for the entire valve stroke. Adjust the pin position and positioner location as necessary. Shorten the feedback pin if it contacts adjacent parts or the positioner during normal range of motion.
- Rotary and linear action – The feedback linkage moves smoothly without binding and does not prevent the valve from fully stroking.
- Rotary and linear action – All linkage hardware and positioner mounting hardware is secure.

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.

Cams are designed to allow 10% over/under-range. However, if under range is used, the zero and span will be slightly interactive.

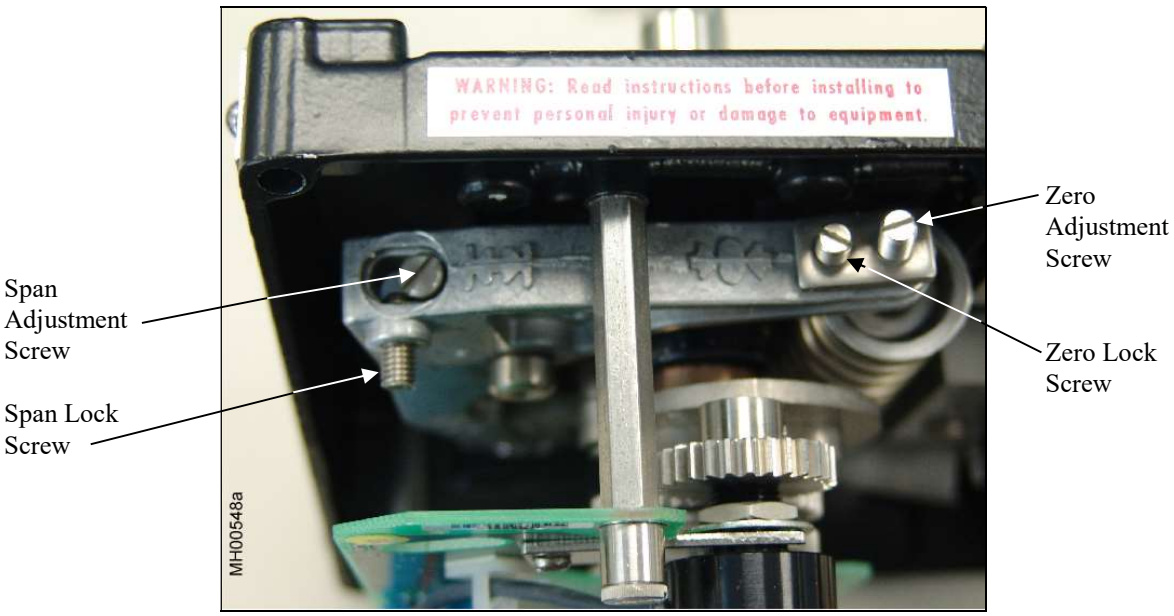


Figure 3-8 Calibration Adjustments

1. Make all needed pneumatic and electrical connections. Refer to Section 2 Installation as needed. See Figure 4-11 for I/P Transducer terminal polarity.
2. Remove the positioner cover by loosening four cover screws.

3. Apply supply pressure to the positioner and actuator.

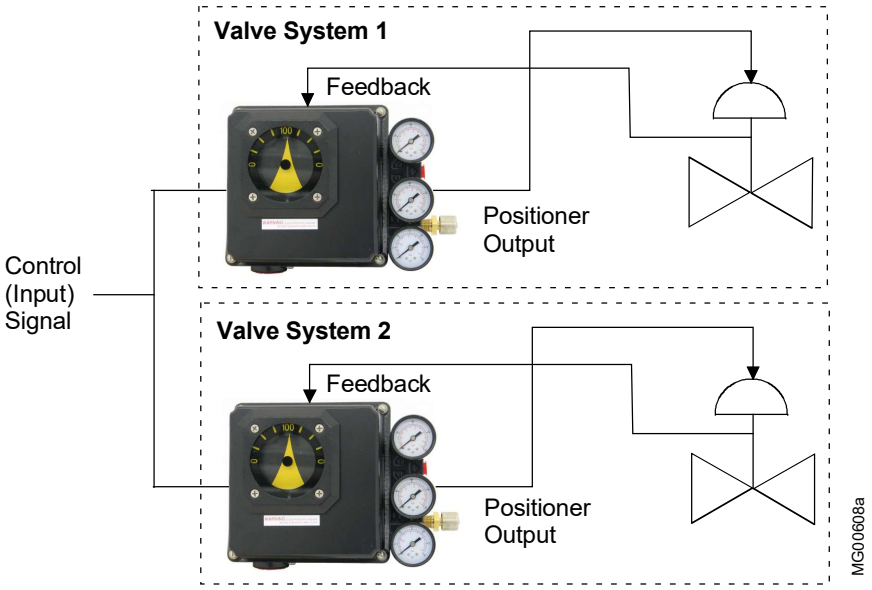
CAUTION

Do not exceed the maximum actuator and valve positioner air pressures stated in the manufacturer's literature. Exceeding these ratings could cause personal injury or equipment damage.

4. Apply an input signal (e.g.: 4 mA or 3 psig) and set it to zero %.
5. Loosen the zero lock screw. Turn the zero adjustment screw (>0<) to achieve desired valve position.
6. Tighten zero lock screw.
7. Set the input to 100% (e.g.: 20 mA or 15 psig).
8. Loosen the span lock screw. Turn the span adjustment screw (|<->|) until the valve is at the desired position.
9. Tighten span lock screw.
10. Set the input to zero %. Verify that the zero has not changed. Adjust as necessary.
11. Remove supply air and all electrical power from the positioner. If removed to index the cam, install removed indicator and PC board-based option. Refer to Section 4 Option Kit Installation as necessary.
12. Install positioner cover and tighten the screws to 20 lb in (2.3 N m).

3.4 SPLIT RANGING

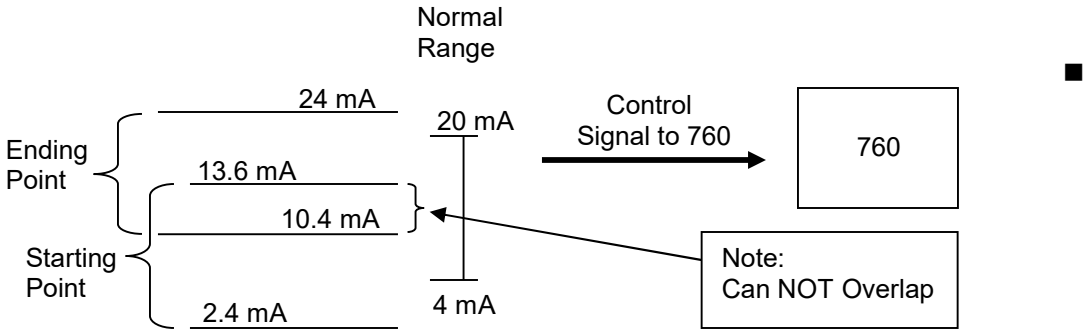
Split ranging allows a single control signal to be used to position two valve systems. As shown below, the common control signal is connected to 2 positioners. This signal may be pneumatic (3 – 15 psig) or electronic (4 – 20 mA). Each positioner is connected to a valve or other device. Although both valve systems use the common input, each system operates independently. Typically, each system will have a unique positioner calibration since each will operate over a specific portion of the complete control range.



As an example, in the above figure, Valve System 1 operates from the fully closed position to its fully open position when the control signal goes from 4 mA to 12 mA (or 3 psig to 9 psig). Valve System 2 remains closed during this first portion of the control range, opening only when the control signal reaches 12 mA (or 9 psig). It continues to open to its full position when the control signal reaches 20 mA (or 15 psig). Reverse action is also possible on one or both of these devices.

Since the valve systems operate independently, what control ranges are possible? As stated in the Section 1.1 Specifications, the "ZERO" setting is adjustable between -10% to +60% of normal control range, and the "SPAN" setting is adjustable between -60% to +25% of normal control range. The normal span is 12 psig (for a pneumatic positioner) or 16 mA (for an electro-pneumatic positioner), span being the difference between the lowest and highest control signals. As shown in the figure below, this means the "ZERO" can be set as low as 2.4 mA (or 1.8 psig), or as high as 13.6 mA (or 10.2 psig). "SPAN" can be set as low as 10.4 mA (or 4.8 psig) and as high as 24 mA (or 19 psig). The only restriction is that, in any valve system, the "ZERO" & "SPAN" settings may NEVER overlap.

These values are achieved during positioner calibration by adjusting the "ZERO" screw and "SPAN" screw settings, see Figure 3-8 for screw locations.



4.0 OPTION KIT INSTALLATION

This section describes installation of several popular option kits in a 760 Valve Positioner. Locate the option kit to be installed in the following table, in the "Option Kit" column. Refer to the "See Section" column for an installation procedure for that kit. An exploded view of the positioner is in the Parts List section.

IMPORTANT

When all options have been installed, install the cover and tighten the four cover screws to 20 lb in (2.3 N m).

Option Kit	See Section
Mechanical Limit Switches and Proximity Sensors*	4.1 PC Board-Based Option Kits
4-20 mAdc Current Feedback Option*	
1K Potentiometer Feedback Option*	
Beacon and Flat Indicator Kits*	4.2 Indicators Kits
Feedback Lever and Rotary Shaft Kits**	4.3 Feedback Lever and Rotary Shaft Kits
I/P Transducer Kit**	4.4 I/P Transducer Kit
Flow Output (Spool) Kits**	4.5 Flow Output (Spool) Kits
750 Adapter Plate	4.6 Model 750 Adapter Plate

* Index cam and calibrate positioner before installing kit. Refer to Section 3 Cam Indexing and Positioner Calibration.

** Install kit before indexing cam and calibrating the positioner.

Before proceeding, note the following warning and cautions.

WARNING

Electrical shock hazard
Explosion hazard

Can cause death or injury.

- Remove power from all wires and terminals before working on equipment.
- In potentially hazardous atmosphere, remove power from equipment before connecting or disconnecting power, signal, or other circuit.
- Observe all pertinent regulations regarding installation in hazardous area.

CAUTION

Pinch hazard

Remove supply pressure before working on this equipment.

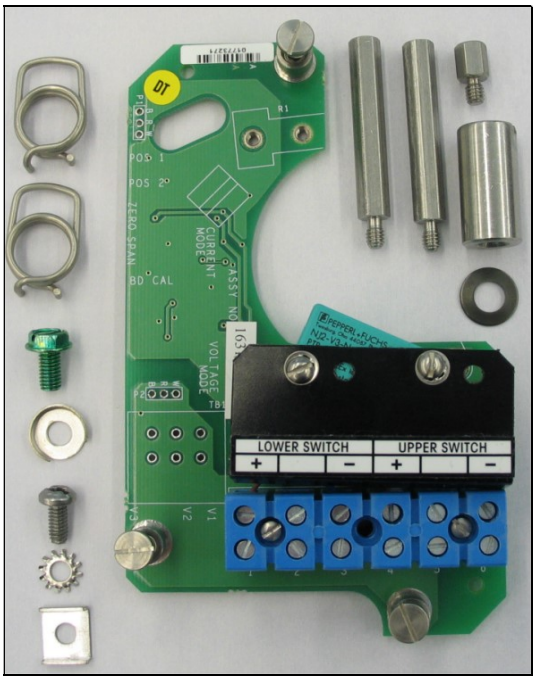
CAUTION

The temperature in the installed location must not exceed the temperature range stated in Table 1-1 Positioner Specifications with an Installed Option Kit.

For installation in a hazardous location, refer to Control Drawing 15032-7602 at the end of Section 2 Installation.

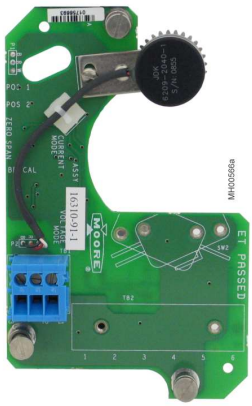
4.1 PC BOARD-BASED OUTPUT OPTION KITS

This section provides installation details for the single function option kits in Figure 4-1 and for dual function board kits that combine two of these options on a single PC board. Refer to Section 1.3 Optional Kits for a list of available kits.



Proximity Sensor Limit Switch Board and Kit Components

4-20 mA Feedback Board



1K Ohm Potentiometer Board

Mechanical Limit Switch and 4-20 mA Board

Figure 4-1 Output Option Boards

Circuit Board Handling

Electrostatic discharge can damage semiconductor devices. A properly grounded conductive wrist strap must be worn whenever a circuit board assembly is handled or touched. An anti-static service kit with a wrist strap and static dissipative mat is available from most electronics supply companies.

Store an uninstalled circuit board in a static shielding bag.

Equipment Needed

- Common hand tools for installing and wiring printed circuit board assemblies
- Torque wrench [20 lb. in. (2.3 Nm)]
- Anti-Static Service Kit (described above)

4.1.1 Installation

These kits use a common circuit board with the electrical components on the board determined by the option(s) residing on the board. The PC board is supported by three 8-32 x 1/4" screws and hex standoffs.

Most of the following steps will be performed for all output option board kits. Where a step is performed only for a particular board type, the board type is stated.

1. Remove supply pressure from the positioner.
2. Remove all electrical signals and power from the positioner.
3. To protect sensitive semiconductor devices from electrostatic discharge, fasten a conductive wrist strap on your wrist and connect the wrist strap ground lead to a good ground.
4. Loosen four positioner cover screws and remove the cover.
5. Thread three hex standoffs (two long and one short) from the option kit into bosses in the positioner enclosure; see Figure 4-2 for the location of long and short standoffs. Tighten the three standoffs.
6. 4-20 mA and 1K Ω potentiometer feedback option kits only – Loosen two screws securing the potentiometer bracket to the circuit board and rotate the bracket counterclockwise; see Figure 4-2. This provides clearance while installing the board.
7. Place the board on the three standoffs and tighten the captive screws.

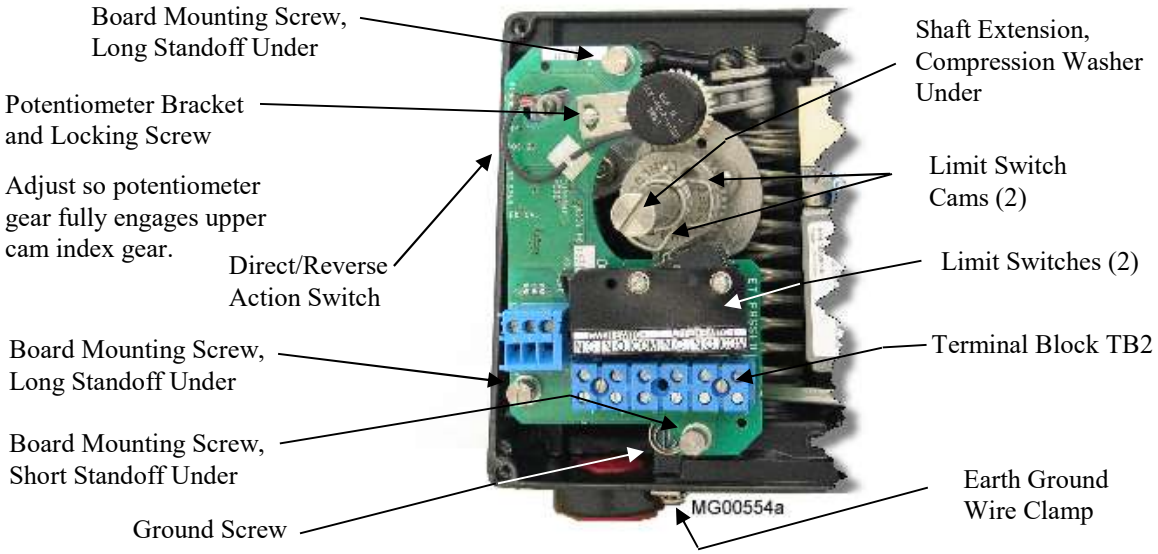


Figure 4-2 PC Board Installation and Mechanical Limit Switch Components

8. Mechanical or Proximity Limit Switch option kit – Install the extension shaft and compression washer. *(Skip this step and go to Step 9 if a beacon or flat indicator is already installed.)* Place the compression washer on the 1/4-20 threads of the input shaft. Install and tighten the extension shaft until the compression washer is completely flat. See Figure 4-2 and the exploded view drawing is in the Parts List section.
9. Mechanical or Proximity Limit Switch option kit – Install two limit switch actuator cams; see Figure 4-2.
    1) If a beacon indicator or flat indicator is installed, remove the indicator from the extension shaft. A beacon indicator can be pulled axially off the extension shaft; the flat indicator is secured with a single screw.
    2) For each actuator cam, pinch together the two tabs and slide the actuator cam onto the extension shaft until it aligns with a limit or proximity switch.
    3) If removed above, install the indicator. The indicator can be aligned during option calibration.
10. Install the green ground screw and washer, the enclosure earth ground wire clamp, and, as needed, the I/P wire clamp; see Figures 4-1, 4-2 and 4-11.

Go to Section 4.1.2 Calibration and Wiring of PC Board-Based Options. Perform the steps for the option kit being installed.

4.1.2 Calibration and Wiring of PC Board-Based Options

In the following subsections, locate the feedback or limit switch option being installed.

Refer to Section 2.5 Electrical Connections when installing in a hazardous location. All wiring must be in accordance with applicable national and local electrical codes for the intended electrical circuit load.

WARNING

Electrical shock hazard

Hazardous voltage can cause death or serious injury.

Remove power from all wires and terminals before working on this equipment.

4.1.2.1 Mechanical Limit Switches

Table 4-1 lists connections for these options and Figure 4-3 identifies the involved terminals.

Table 4-1 TB2 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 "-"

Calibration, Mechanical Limit Switches

1. Refer to Table 4-1 and find the desired switch action. Connect an ohmmeter across that pair of switch terminals.
2. Apply supply air pressure and set valve and actuator to the first desired limit position.
3. Squeeze the tabs on one of the cams and rotate it in the direction of positioner input shaft rotation with increasing input signal until the switch triggers causing a change in ohmmeter reading.

4. Set valve and actuator at the second desired limit position. Connect the ohmmeter across the desired pair of terminals.
5. Squeeze the tabs on the second cam, and rotate it in the direction of input shaft rotation until the switch triggers.
6. Exercise the valve and check switch operation. Disconnect calibration equipment.

Note

Due to normal tolerances, it may be necessary to adjust the position of the limit switches to insure that the switch actuating levers make contact with the cams throughout the full range of travel. If proper limit switch actuation is not occurring, loosen the switch mounting screws and reposition the switches toward the input shaft.

Wiring, Mechanical Limit Switches

Refer to Table 4-1, Figure 4-3, and Control Drawing 15032-7602, at the end of Section 2, and connect the two switches to external devices or barriers as needed for the required degree of protection. For mechanical limit switch electrical ratings, refer to Table 1-1.

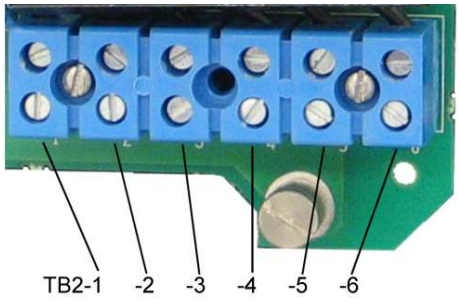


Figure 4-3 TB2 Terminals

4.1.2.2 Proximity Sensor Limit Switches

Proximity limit 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 Control Drawing 15032-7602, at the end of Section 2, for approved barriers, specifications and wiring diagrams.

Wiring, Proximity Sensors

Follow Control Drawing 15032-7602 and the instructions supplied with the barrier and for correct wiring of the Proximity Sensors to the barrier. Terminal connections are listed in Table 4-1 and shown in Figure 4-3.

CAUTION

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

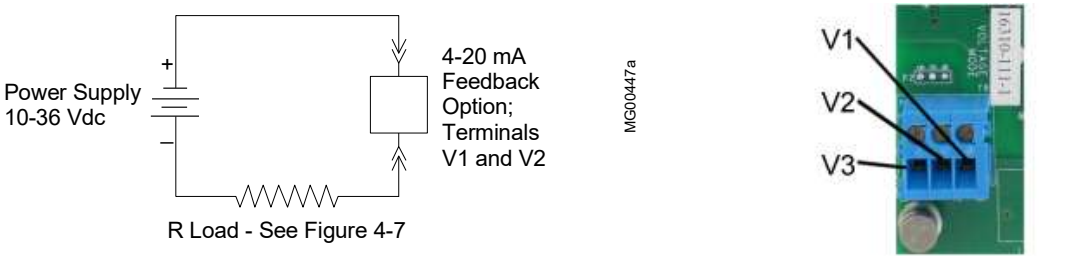
Calibration, Proximity Sensors

1. After wiring the switches, apply power to the proximity switches and external circuitry so switching action can be observed.
2. Apply supply air pressure to the positioner and set valve and actuator to the first desired switch position.

3. Squeeze the tabs on one of the cams and rotate it in the direction of positioner input shaft rotation with increasing input signal until the switch triggers.
4. Set valve and actuator at the second desired switch position.
5. Squeeze the tabs on the second cam, and rotate it in the direction of input shaft rotation until the switch triggers.
6. Exercise the valve and check switch operation. Disconnect calibration equipment.

4.1.2.3 4-20 mAdc Current Feedback Board Option

Refer to Figure 4-4 for a wiring schematic and terminal identification.



A. Schematic **B. TB1 Terminals**

Figure 4-4 Typical 4-20 mA Feedback Option Loop with Load

Calibration, 4-20 mAdc Board

The equipment needed for calibration is listed in Section 3.1.

1. Apply supply air pressure and set actuator and valve to 50% +/- 5%.
2. Loosen, but do not remove, the potentiometer bracket screws. Swing the potentiometer away from the upper cam index gear. Rotate the potentiometer gear until the red alignment mark is aligned with the centerline of the input shaft. (The potentiometer is a continuous turn potentiometer without end stops so it cannot be damaged by rotating past the end of its range.) See Figure 4-5.

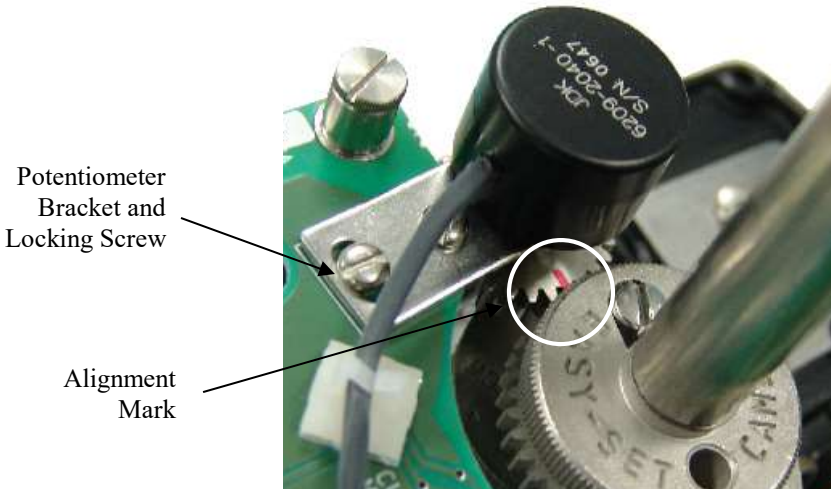


Figure 4-5 Potentiometer Alignment

3. Mesh the gears lightly to eliminate backlash and tighten both of the bracket mounting screws. The red alignment mark should mesh within two gear teeth of the centerline of the gears.

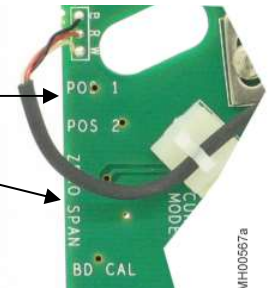
4. Set the 4-20 mA feedback Dir/Rev Action switch; refer Table 4-2. For example, while looking at the front of the positioner, if you want the output to increase from 4 mA to 20 mA as the input shaft rotates CCW, set the switch to position 2.

Table 4-2 Limit Switch Position for Reverse or Direct Action

Dir/Rev Action Switch Position	Shaft Rotation for 4-20 mA Output
Pos 1	CW
Pos 2	CCW

Partial view of 4-20 mA Board showing:
Dir/Rev Switches and Zero and Span Potentiometers

Components are on back of board.



5. Connect a DC power supply and ammeter in series to terminals V1 and V2 as shown in Figure 4-6.

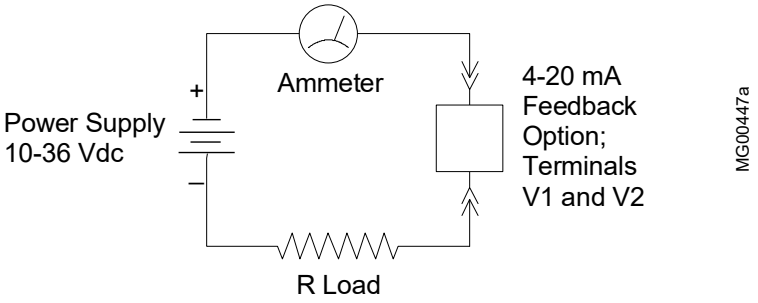


Figure 4-6 4-20 mA Loop Calibration

6. Apply supply air pressure and set the valve to the desired 4 mA position.
7. Set the 4 mA output with the potentiometer labeled ZERO.
8. Set the valve to the desired 20 mA output position.
9. Set the 20 mA output with the potentiometer labeled SPAN.
10. 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 ZERO potentiometer.
11. Disconnect calibration equipment.

Wiring, 4-20 mAdc Board

Connect a user-supplied DC loop power supply and load to terminal block TB1 on the PC board as shown in Figure 4-4. 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, 22 AWG (0.38 mm^2) or larger.

The power supply must furnish 10-36 Vdc at the required load current. See Figure 4-7 for a maximum loop load based on supply voltage.

Refer to Control Drawing 15032-7602 for installation in a hazardous location.

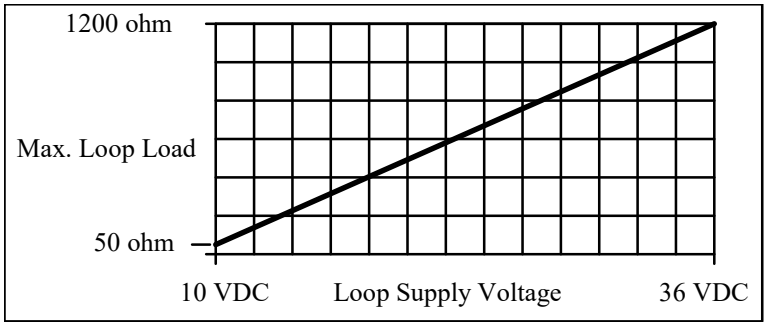


Figure 4-7 Maximum Loop Load vs. Loop Supply Voltage

4.1.2.4 1K Ω Potentiometer Feedback Option

The potentiometer is a continuous turn potentiometer without end stops so it will not be damaged by rotating it past the end of its range. Calibration and wiring connections are to TB1; see Figure 4-4B. The potentiometer is rated at 1 Watt. Do not exceed 32 mA or 32V.

Calibration, 1K Ω Board

An ohmmeter and the equipment listed in Section 3.1 are needed for calibration.

1. Apply supply air pressure and set actuator and valve to 50% +/-5%.
2. Loosen, but do not remove, the potentiometer bracket screws. Swing the potentiometer away from the input gear. Rotate the potentiometer gear until the red alignment mark is aligned with the input gear. See Figure 4-5.
3. Mesh gears tightly to eliminate backlash and tighten both bracket mounting screws. The alignment mark should mesh within two gear teeth of the centerline of the gears as illustrated in Figure 4-5.
4. Set valve to 0% position. Read the resistance between V2 and V1 and between V2 and V3 with an ohmmeter. One of these two readings will be high, and one will be low. If low end resistance is less than 0 Ω (false reading) or greater than 130 Ω, disengage and rotate the potentiometer gear by one tooth until the resistance is between 0 and 130 Ω. Each tooth on the potentiometer gear represents 128 Ω of potentiometer resistance.
5. Disconnect calibration equipment.

Wiring – Voltage Feedback

Connections are made to terminal block TB1; see Figures 4-4B and 4-8. For voltage feedback, connect reference voltage to terminals V1 and V3, and use V2 to measure output voltage. Refer to Control Drawing 15032-7602 for installation in a hazardous location.

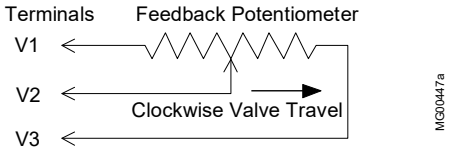


Figure 4-8 1K Ω Feedback Potentiometer Schematic

Wiring (Direct or Reverse Acting) – Resistive Feedback

Refer to Table 4-3 to determine the correct terminal connections for the intended use. For example, if resistance is to increase with clockwise input shaft rotation (Direct CW), connect to terminals V1 and V2.

Table 4-3 Connections for 1K Ω 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

4.2 INDICATOR KITS

There are several indicator kits: a beacon indicator kit and three flat indicator kits, for 60-degree, 75-degree and 90-degree rotation. To field install a kit, refer to the Kit Installation Instruction supplied with the kit. The following procedures are intended to support re-installing the indicator after indexing the cam and calibrating the positioner.

4.2.1 Beacon Indicator

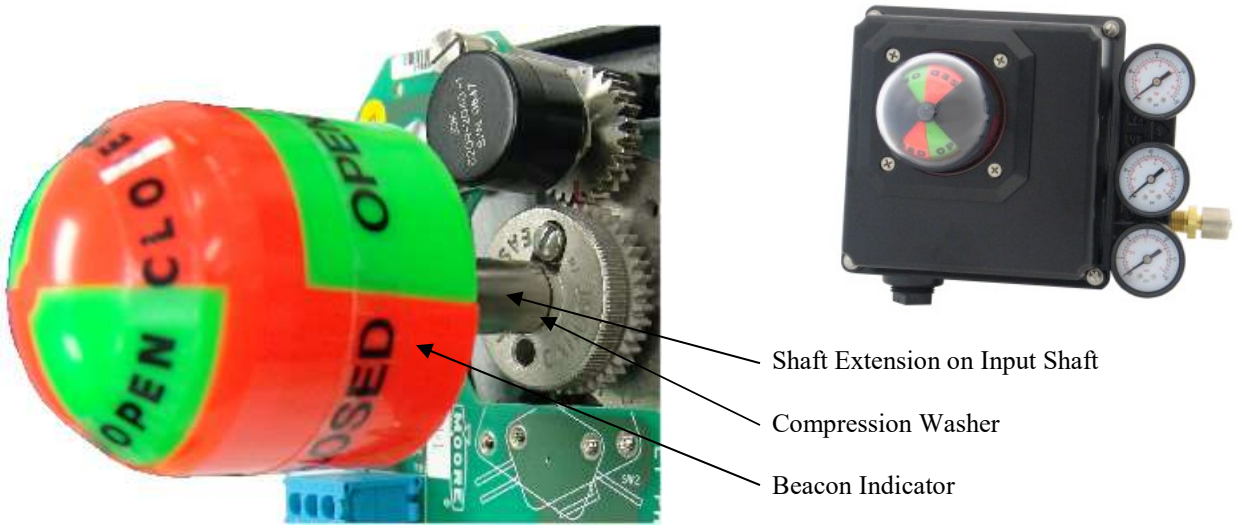


Figure 4-9 Beacon Indicator

Perform the procedure below to re-install the Beacon Indicator after a positioner has been calibrated. See Figure 4-9.

1. Place the compression washer onto the 1/4-20 male threads of the input shaft. Thread the extension shaft onto the input shaft. Tighten the extension shaft until the compression washer is completely flat.
2. Carefully press the indicator onto the top of the extension shaft. Be sure that the snap-ring inside the indicator remains in position.
3. Apply the minimum input signal (3 psi or 4 mA) to the valve positioner.
4. Rotate the indicator to display the appropriate text when the cover is installed.
5. Reinstall positioner cover. Tighten cover screws to 20 lb. in. (2.3 N m).
6. Check that the correct message, “OPEN” or “CLOSED” appears in all lens windows.

4.2.2 Flat Indicator

Use the following procedure to re-install the Flat Indicator after the positioner has been calibrated. See Figure 4-10.

1. Place the compression washer onto the 1/4-20 male threads of the input shaft. Thread the extension shaft onto the input shaft. Tighten the extension shaft until the compression washer is completely flat.
2. Place the indicator disk on the end of the extension shaft. Install the hold down screw but do not tighten.
3. Apply the minimum input signal (3 psi or 4 mA) to the valve positioner.
4. Rotate and position the indicator as needed. Tighten hold down screw.
5. Install positioner cover. Tighten cover screws to 20 lb. in. (2.3 N m).
6. Check that the indicator provides the proper indication.

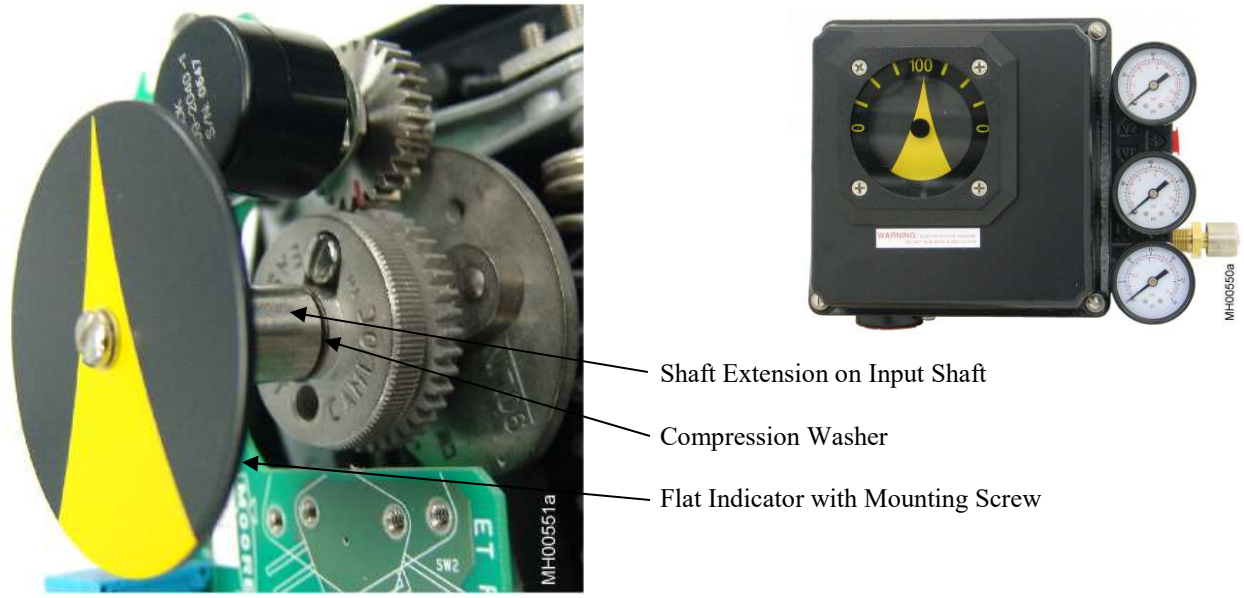


Figure 4-10 Flat Indicator

4.3 INPUT SHAFT KITS FOR DESIGN LEVELS A AND B

An Input Shaft Kit for Design Levels A and B contains an input shaft that terminates in either a feedback lever for linear applications or a NAMUR shaft end or square shaft end for rotary applications.

Note

Shaft kits for design levels A and B have been discontinued. Table 1-5 lists the universal replacement shaft kit for design levels A, B, and D. The table also lists the NAMUR, square, and linear adapters, and feedback levers, to be used with the universal shaft kit.

The following procedure is provided for users with one-piece design level A or B shaft kits in spare parts stock. While installing the kit, refer to the exploded view of the positioner in the Parts List section and to the instruction supplied with the kit.

1. Remove supply pressure from the Positioner.
2. Remove the positioner cover. Remove beacon/flat indicator, shaft extension, and compression washer (if installed). Remove PC board-based option board (if installed).

3. Loosen the cam locking screw. Remove the cam lock nut, upper and lower cam indexes, and the cam. See Figures 3-1 and 3-4 as needed.
4. Pull the input shaft out through the back of the positioner enclosure. The retaining ring, thrust washer, and O-ring will remain attached. These parts are pre-installed in shaft kits.

CAUTION

O-rings are pre-lubricated. If additional lubrication is needed, Molykote 55 is recommended for standard black O-rings and Dow Corning 3451 is recommended for orange silicon O-rings. Do not use a silicone based lubricant.

5. Insert the input shaft from the kit through the back of the positioner, threaded end first. Rotating the shaft slightly while inserting will ease installation.
6. Index the cam and calibrate the positioner. Refer to Section 3 Cam Indexing and Positioner Calibration as needed.
7. Install beacon or flat indicator and PC board-based option removed during calibration.
8. Install the cover and tighten the cover screws to 20 lb. in. (2.3 N m).

4.4 I/P TRANSDUCER KIT

This section describes installation of the I/P Transducer Kit in a Model 760P converting the positioner to a Model 760E. Refer to the kit instruction supplied with the I/P Transducer for additional information.

1. Remove supply pressure from the Positioner and loosen four screws securing the cover. Remove the cover.
2. Place a small amount of non-hardening pipe sealant on the pipe plug from the transducer kit. Thread the plug into the "I" pneumatic input port.
3. Refer to Figure 4-11 and the exploded view drawing in the Parts List section and remove the screw securing the 1-1/2-inch square manifold plate near the spool block. Remove the plate. Save the two O-rings.
4. Place two O-rings from Step 3 in the enclosure recesses.

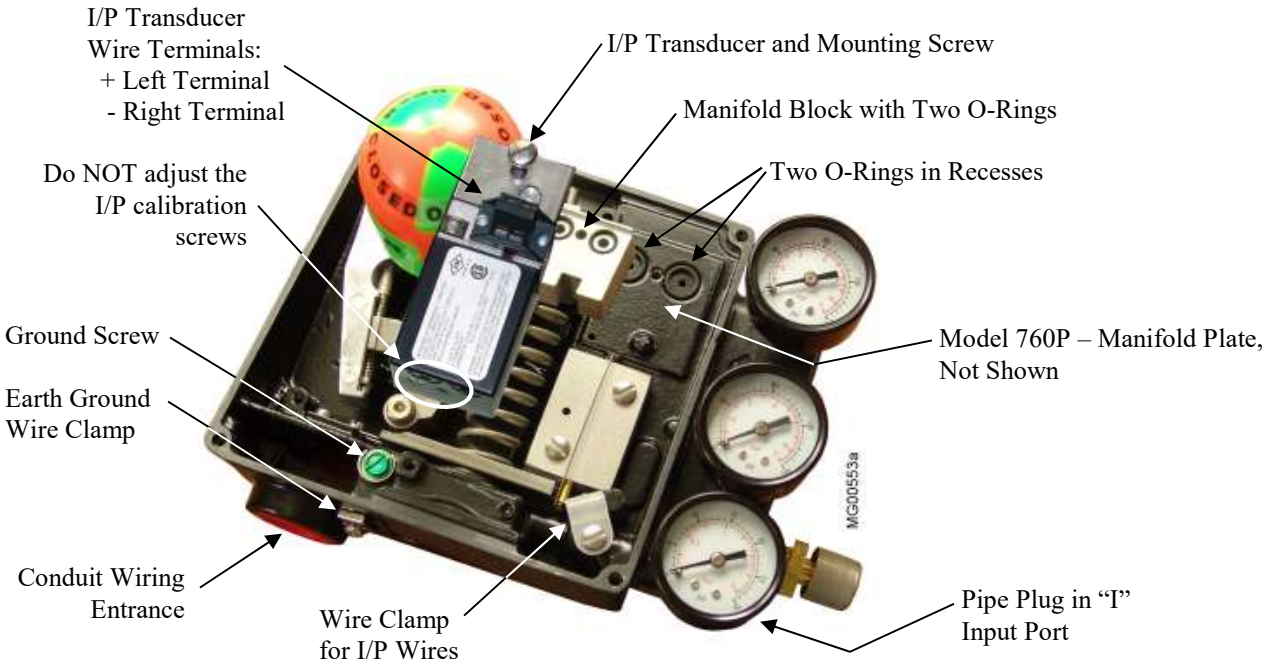


Figure 4-11 I/P Installation, Exploded View

5. Place two O-rings from the kit in the recesses in the manifold block and place the manifold block in the positioner enclosure so the transducer mounting screw holes align.
6. Insert the 10-32 x 2-1/4-inch screw from the kit into the I/P Transducer from the kit. Place the I/P Transducer over the manifold block and guide the screw through the manifold block. Thread the screw into the enclosure. Align the I/P and manifold block and tighten the screw securely.
7. Install the wire clamp from the kit as shown in Figure 4-11.
8. Refer to Siemens control drawing 15032-7602 and attach the input leads (recommend 22 AWG shielded, twisted pair wire minimum) to the + and - connections of the I/P Transducer terminal strip. The wire should enter the positioner through the conduit connection and be routed through the wire clamp. See Section 2.5 for general and hazardous location wiring requirements.
9. Verify I/P operation and calibration by performing the procedure in Section 3.3 Calibration.

IMPORTANT

Calibrate the positioner by adjusting only the zero and span screws shown in Figure 3-7. Do not adjust the factory set I/P calibration screws shown in Figure 4-11.

10. Install positioner cover and tighten screws to 20 lb. in. (2.3 N m).

4.5 OUTPUT CAPACITY SPOOL KITS

The following steps must be carried out with clean hands and tools and in a clean area. Contaminants will affect spool performance.

1. Remove supply pressure from the Positioner and then remove the positioner cover.
2. Model 760E only: Remove the I/P Transducer and manifold; see Section 4.4. Save all hardware and O-rings for later installation.
3. At the spool block (see Figure 4-12), carefully note how the spool retaining clip is installed:
   - At the top of the block, the clip is inserted in the countersink in the end of the spool
   - At the bottom of the block, the clip is in the bronze bushing in the underside of the beam assembly.
4. Remove and discard the spool retaining clip.

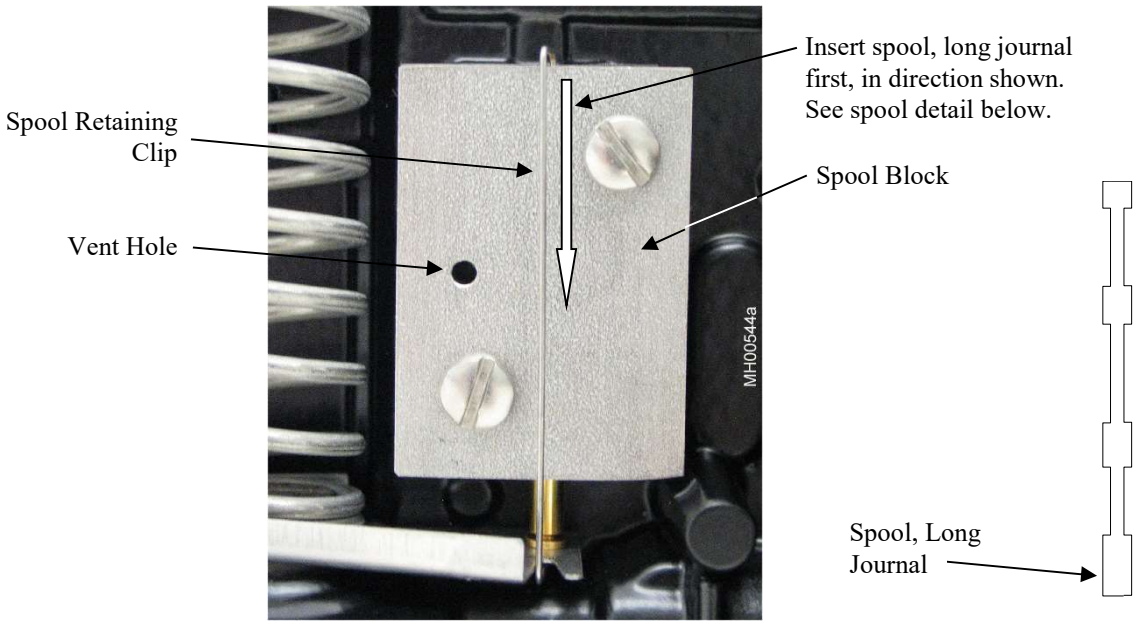
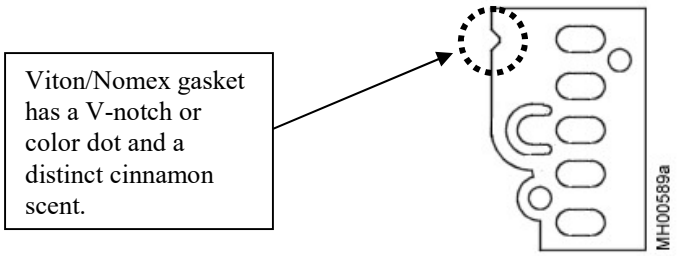


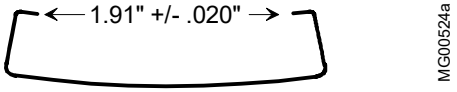
Figure 4-12 Output Capacity Spool Kit

5. Remove and discard two spool block retaining screws, the spool block, spool, and gasket under the block.
6. Orient the spool block from the kit with the vent hole to the left as shown in Figure 4-12.
7. Remove the new spool from its tubular container. Place a finger over the spool hole in the bottom of the spool block to prevent the spool from falling through the block. Insert the spool, *long journal first*, into the top of the spool block. The spool should drop through the block under its own weight.
8. Select a spool block gasket (see the detail below) from the Output Capacity Kit:
   - High temperature application or ozone atmospheric condition – Select the Viton/Nomex gasket.
   - Other applications – Select the neoprene/nylon gasket.



Spool Block Gasket

9. Align the selected gasket with the matching air passages and mounting holes in the new spool block. Insert two 8-32 screws from the kit through the block and gasket.
10. Install the block and gasket in the enclosure. Align the spool block and gasket with the air passages and mounting holes in the enclosure. Tighten the hardware to 20 lb in. (2.3 N m).
11. Lift the beam assembly slightly and place one end of the spool retaining clip (shown below) into the bronze bushing in the underside of the beam assembly. At the top of the spool block, gently bend the clip only enough to insert the free end into the countersink in the end of the spool. *Do not permanently deform the clip from the original shape.*



12. Model 760E only: Install the I/P Transducer.
13. Check positioner calibration. Calibrate as needed. Ensure that there are no air leaks and the spool valve operates freely.
14. Install the cover and tighten screws to 20 lb. in. (2.3 N m).

4.6 MODEL 750 ADAPTER PLATE KIT

Use the Model 750 Adapter Plate Kit when a Model 760 Positioner is to replace an installed Model 750 Positioner. The adapter plate has a pair of tapped holes and a pair of clearance slots that match those in Model 750E and 750P Positioners. The pair of countersunk holes is for mounting the Model 760. See Figure 4-13 below.

The adapter plate can also be used for mounting a Model 760 in other situations as well.

See Table 1-4 for kit part number. Model 760 dimensions are shown in Section 2 Installation.

Feedback Lever/Feedback Pin Compatibility

A Model 750 feedback lever (linear applications) has a 1/4-inch slot for a 1/4-inch feedback pin. This is the same as a Model 760 Design Level A or B, assuring compatibility. If replacing a 750 with a 760 Design Level D, which uses a 5/16-inch feedback pin, it will be necessary to change some components, such as the feedback lever, in the feedback linkage. Refer to Section 5.2 Feedback Lever and Feedback Pin Compatibility.

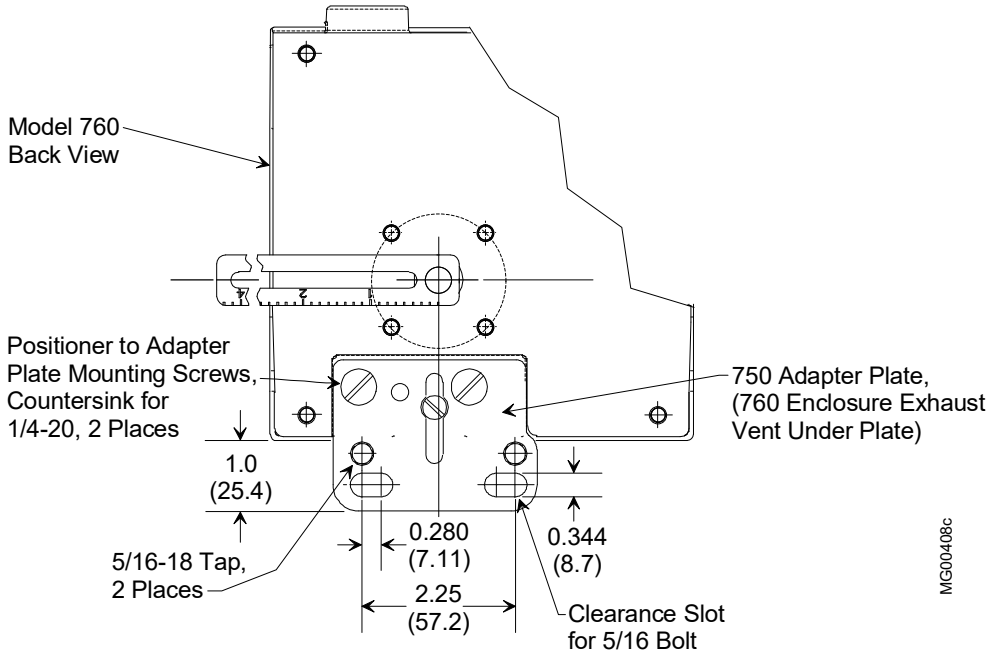


Figure 4-13 Model 760 Positioner with Optional Model 750 Adapter Plate

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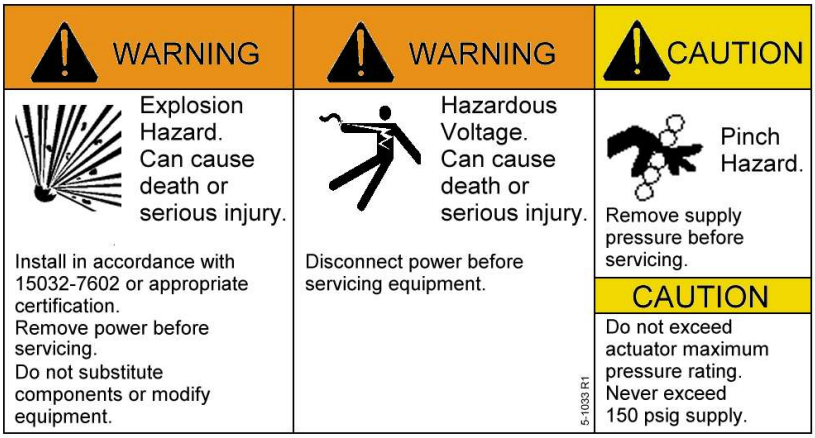
5.0 MAINTENANCE

The positioner requires no routine maintenance. It is highly recommended that quality instrument air be used as described in section 2.4.2 Instrument Air Requirements.

Filter screens at the pneumatic ports may require periodic replacement. The frequency of cleaning is dependent upon the quality of instrument air used.

The end user should perform periodic functionality tests of the positioner 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 section for the filter screen part number.

1. Turn air supply off. Disconnect piping.
2. Remove a screen with a scribe by carefully pulling on and around the edge of a screen.
3. Using a piece of stiff, hollow tubing approximately 1/4" in diameter, insert each new screen until it bottoms. Do not insert the screen using the eraser end of a pencil or a length of solid rod as they can distort the factory-shaped screen, possibly reducing maximum flow.
4. Connect piping and check for leaks.

5.2 FEEDBACK LEVER AND FEEDBACK PIN COMPATIBILITY (Linear Action Only)

To successfully replace an installed design level A or B positioner with a design level D positioner, note the following two considerations.

A. Feedback Pin Diameter

The 1/4-inch feedback pin employed in a design level A or B installation should not be used with the design level D feedback lever that has a 5/16-inch slot. Figure 5-1 shows the design level A or B lever and feedback pin. Figure 5-2 shows the design level D pin and lever. Instead, the feedback pin should be changed to the 5/16-inch diameter pin to snugly fit the design level D feedback lever.

Note

In some cases it may be necessary to change additional mechanical feedback components when replacing a design level A or B positioner with a design level D positioner.

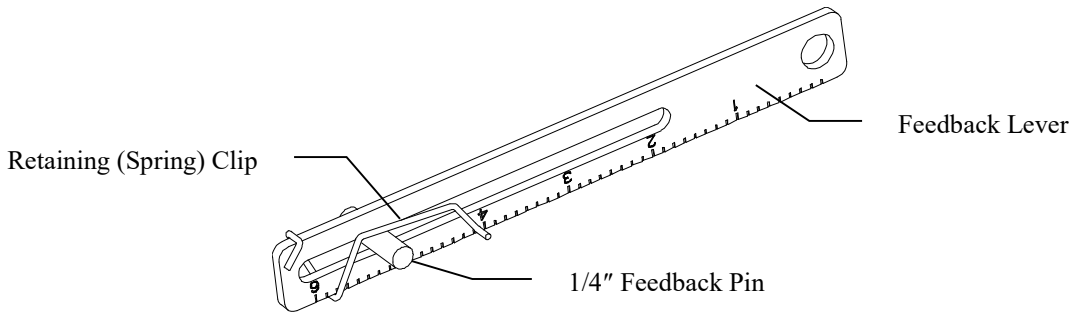


Figure 5-1 Feedback Lever for 1/4-Inch Feedback Pin, Design Levels A and B

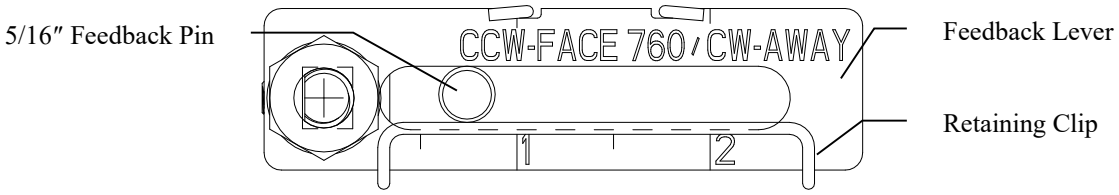


Figure 5-2 Feedback Lever for 5/16-Inch Feedback Pin, Design Level D

B. Conduit Connection Thread

All design level D enclosures have a 3/4 NPT conduit connection. To accommodate an M25 conduit connection, a 3/4 NPT to M25 adapter is available (order part number TGX:16300-1439).

5.3 SPARE AND REPLACEMENT PARTS

Refer to the Parts List section following Section 5 for a list of replacement parts and an exploded view. Spare and replacement parts are available from Siemens; see Section 1.4 Customer/Product Support. Refer to the Parts List section for recommended on-hand spare parts.

5.3.1 Input Shaft Replacement (Design Level A or B)

When replacing the input shaft in a design level A or B positioner, order the Universal Input Shaft used in Design Level D and the adapter needed for coupling to the actuator or feedback linkage. See Table 1-4 Option Kits for part numbers.

Note

It may be necessary to change additional mechanical feedback components.

It may be necessary to add a shim between the positioner and mounting plate.

5.3.2 I/P Transducer Filter Replacement

Each I/P transducer contains a field replaceable supply air input filter. Frequency of filter replacement is dependent upon the cleanliness of the supply air piped to the positioner. If the I/P transducer seems to be sluggish, the filter may simply be dirty.

To replace the filter:

1. Remove supply air pressure from the positioner and then loosen the four cover screws. Remove the cover.
2. To locate the filter access screw, refer to Figure 4-11; the slotted, countersunk screw is directly above the wire terminals on the I/P transducer.
3. Remove the access screw and use a scribe or other pointed instrument to carefully pick out the installed filter. Do not damage a mesh screen underneath the filter.
4. Align the replacement filter concentrically over the hole in the transducer. Using a blunt, small diameter tool, gently press the filter into the hole. Be careful to not damage or puncture the filter. The filter should evenly "cup" as it is pressed into the hole. Fully insert the filter and install the access screw.
5. Install the positioner cover. Tighten four cover screws to 20 lb. in. (2.3 N m).
6. Test the positioner for proper operation.

5.4 RETURN FOR REPAIR

See Section 1.4 Customer/Product Support for details concerning returning a positioner to the factory for repair. Also, note the following:

- Package assembly in original shipping materials. Otherwise, package for safe shipment or contact Siemens for shipping recommendations.
- An uninstalled circuit board with semiconductor components must be placed inside a static shielding bag to protect it from electrostatic discharge.

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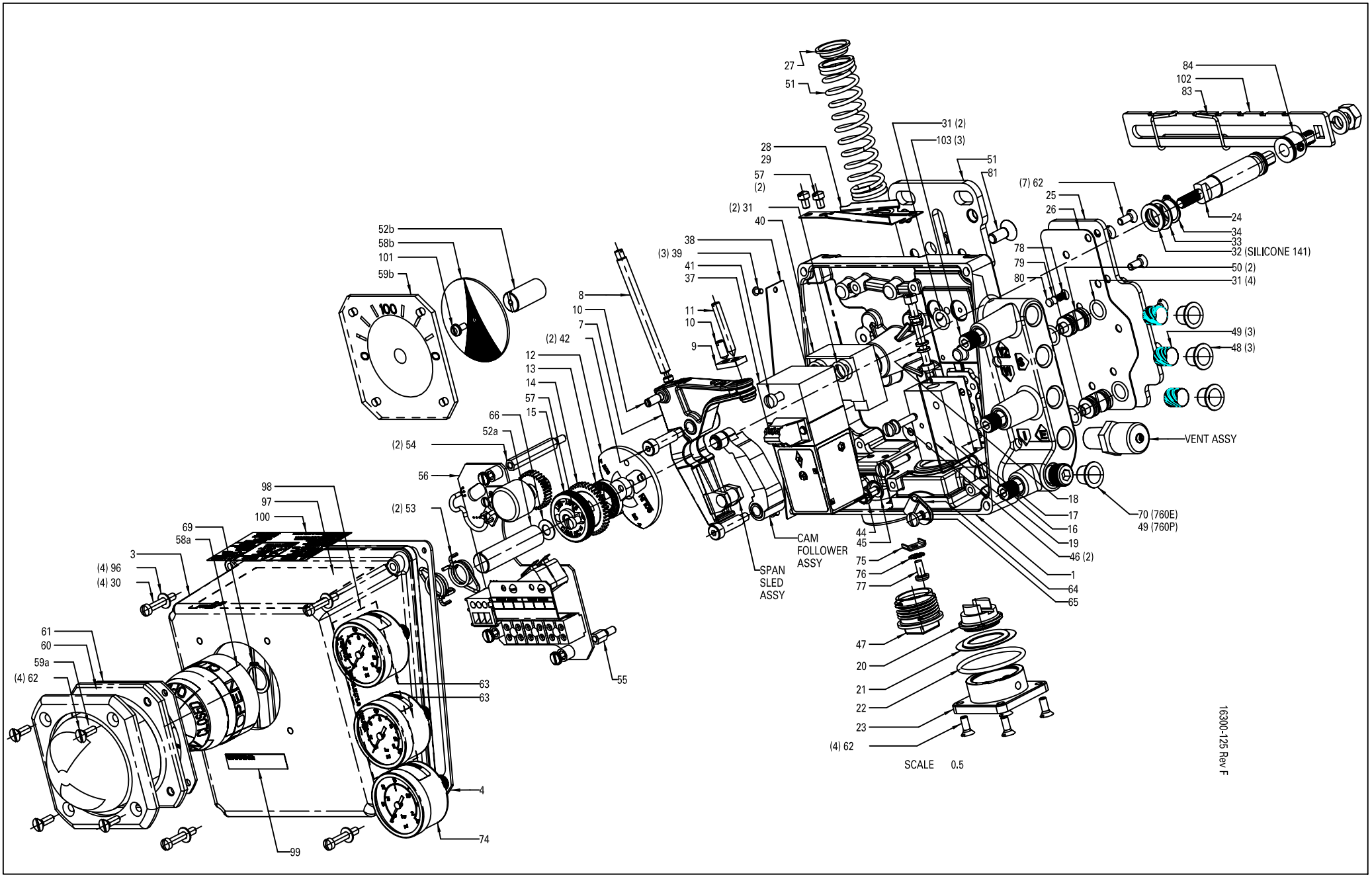

Siemens Drawing No. 16300-125PL, December 2011

Series 760 Valve Controller Exploded View, Design Level "D"

Parts List Notes

1. Some items may not be available for separate purchase.
2. An * indicates a recommended on-hand spare part; order Spare Parts Kit PN 16300-686. Include nameplate information when ordering.
3. Refer to Table 1-5 in SD760 either to order kits to upgrade or service a positioner or to order most individual parts. This Parts List is provided to help the reader identify items in the accompanying exploded view drawing. Include nameplate information (e.g. complete model number and serial number) when ordering.
4. Some 760 model code options are not shown in the accompanying exploded view drawing or listed in this Parts List. See SD760, Table 1-5 for additional options.
5. Speed adjuster parts are no longer available. The function can be implemented with an externally piped flow restrictor such as ASCO catalog number V0222 or equivalent.

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) – Note 5	1
1c	16300-104	Enclosure Base, Std. (M25 Conduit)	1
1d	16300-106	Enclosure Base, Opt. for Speed Adjusters (M25 Conduit) – See Note 5	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
24	See Note 3	Input Shaft, Design Level D, Order Linear or Rotary Adapter Separately	1
24a	16300-406	Input Shaft, Square Rotary, Design Level A/B	1
24b	16300-409	Input Shaft, NAMUR Rotary, Design Level A/B	1
24c	16300-443	Input Shaft, Linear 2" , Design Level A/B	1
24d	16300-447	Input Shaft, Linear 4" , Design Level A/B	1
24e	16300-448	Input Shaft, Linear 6" , Design Level A/B	1
25	16300-231	Manifold Plate	1

ITEM NO.	PART NO.	DESCRIPTION	QUANTITY
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	1-2040	Cover Screw	4
31 *	2938-136	O-Ring, Opt. Speed Adjusters – See Note 5	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*	- - - - -	I/P Converter (760E only) – Order repair kit 16300-1355	1
40a	16300-211	Manifold Plate, 760P	1
40b	16300-334	Manifold Block, 760E	1
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 – See Note 5	2
51	16300-79	Adapter Plate with screws	1
52	16300-404	Shaft Extension, Opt., (for Alarms w/o Indicator)	1
52a	See Note 3	Shaft Extension, Opt., (Beacon Indicator Kit)	1
52b	See Note 3	Shaft Extension, Opt., (Flat Indicator Kit)	1
53	See Note 3	Limit Switch Actuator Cams	2
54	See Note 3	Screw Standoff, Long (used in Optional Output Kit)	2
55	See Note 3	Screw Standoff, Short (used in Optional Output Kit)	1
56	See Note 3	Output Option Kit (includes standoffs and other parts as appropriate)	1
57	1-1822	Screw, 8-32 x 1/4 Lg., Fillister Head	3
58a	See Note 3	Beacon Indicator Kit (includes lens, gasket and other parts)	1
58b	See Note 3	Flat Indicator Kit (includes lens, gasket and other parts)	1
59a	See Note 3	Beacon Lens	1
59b	See Note 3	Flat Indicator 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	See Note 3	Retaining Ring, Beacon Indicator Kit	1
70	16300-203	NEMA 4X Vent, Std.	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

ITEM NO.	PART NO.	DESCRIPTION	QUANTITY
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
83	See Note 3	Retaining Clip, Design Level D	1
84	See Note 3	Linear Adapter, Design Level D	1
96	1-7440	Flat Washer, For Cover Retaining Screws	4
97, 98, 99, 100	.....	Labels	.....
101	See Note 3	Screw, Flat Indicator Kit	1
102	See Note 3	Lever Arm, Linear Action, Design Level D	1
103	3240	Threaded Plug, In lieu of Gauges	3