

# SRD960 Universal Positioner

## SRD960-T Position Transmitter

For Ex d / Explosion Proof application



The Universal Positioner SRD960 is designed to operate pneumatic valve actuators and is available in the version Ex d / explosionproof (flameproof). It can be operated from control systems (e.g. the Foxboro I/A Series System), controllers, or PC-based configuration- and operation tools such as VALcare™. The positioner is available with different communication protocols. The multi-lingual backlit full text grafic-LCD in connection with the external 4 push buttons allows a comfortable and easy local configuration and operation.

## MAIN FEATURES

### Intelligent

- Auto-start with self-calibration
- Self diagnostics, status- and diagnostic messages
- Easy operation with four key pads
- Multi-Lingual backlit full text grafical LCD
- With communication HART, FOUNDATION Fieldbus H1, PROFIBUS-PA
- Configuration by means of local keys, hand- held terminal (HART), PC, or I/A Series system
- **Advanced Diagnostic / Premium Diagnostic:** FDT-based Software vor valve diagnostic and Predictiv Maintenance
- Stroke 8 to 120 mm / 260 mm (0.3 to 4.7 in / 10.2 in)
- Angle range up to 95 °
- Supply air pressure up to 6 bar (90 psig), with spool valve up to 7 bar (105 psig)
- Single or double-acting
- Mounting on linear actuators according to NAMUR – IEC 534, Part 6 – VDI/VDE 3847
- Mounting on rotary actuators acc. to VDI/VDE 3845
- Protection class IP 66, NEMA 4X
- Approved for SIL applications
- Explosion protection: Flameproof acc. to ATEX, Explosion proof acc. to FM / CSA

**OVERVIEW of SRD960 Positioner**

**Electronics Version:** (see P. , 8)

"H" HART ( -20 mA) P.8

"P" PROFIBUS PA P.8

"Q" FOUNDATION Fieldbus H1 P.8

**Additional I/o:** P.11

- Bi directional inputs
- Bi directional outputs
- Position feedback
- Limit switches

**Mounting brackets** P.15

1/2" -18NPT  
G1/4

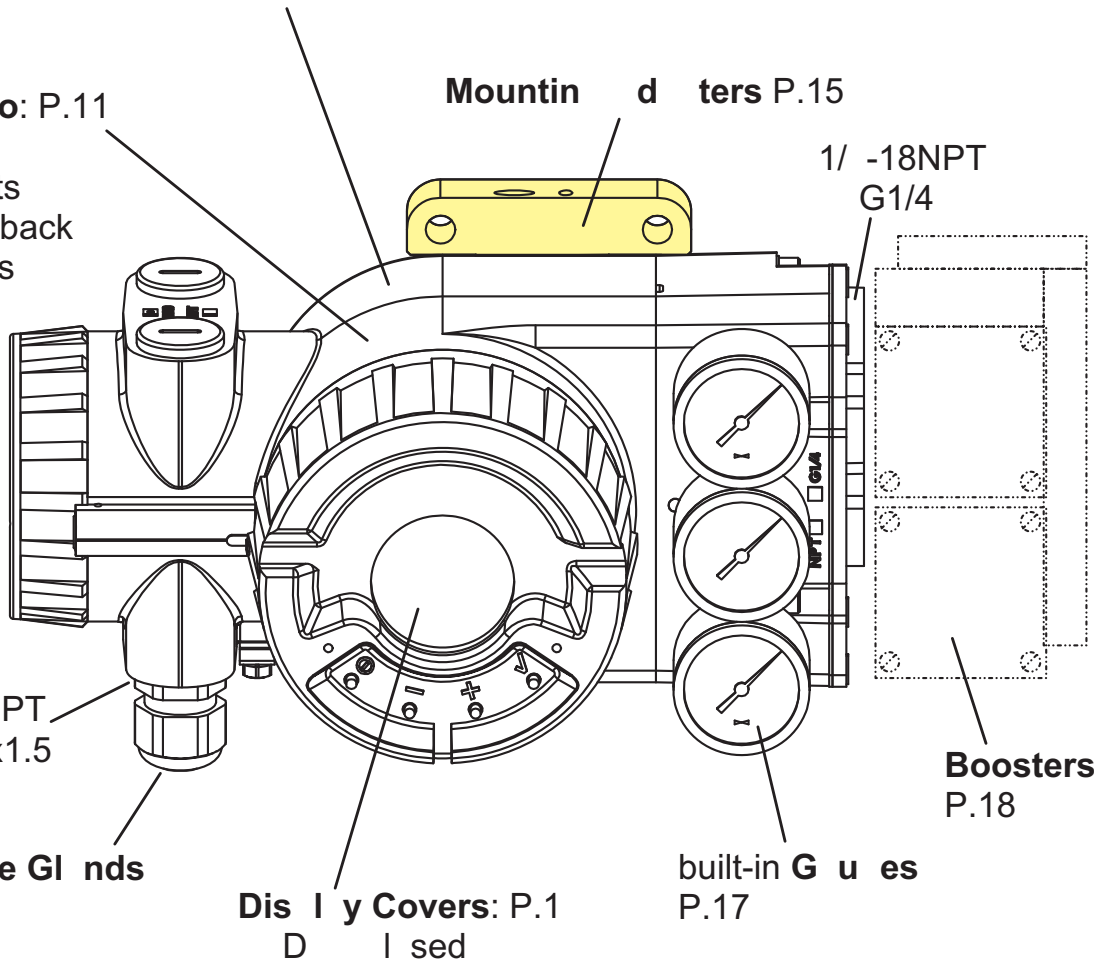
1/2-1 NPT  
M20x1.5

**Compatible glands**  
P.19

**Display Covers:** P.1  
Digital

**built-in gauges**  
P.17

**Boosters**  
P.18



**Combinations**

Device version	Controller	Display	local configuration	remote configuration
"H" HART (4-20)	Digital	LCD	push buttons	via communication
"P" Profibus	Digital	LCD	push buttons	via communication
"Q" F.Fieldbus	Digital	LCD	push buttons	via communication

**FUNCTIONAL SPECIFICATIONS (common data for SRD960 -B or C)**

**Travel range**

Stroke range . . . . . 8 to 260 mm (0.3 to 10.2 in)  
 with standard feedback levers; special levers on request  
 Rotation angle range . . . . . up to 95 °  
 (without mechanical stop)

**Supply**

Supply air pressure<sup>5)</sup> . . . . . 1.4 to 6 bar (20 to 90 psig)  
 with spool valve<sup>4)</sup> . . . . . 1.4 to 7 bar (20 to 105 psig)  
 Output to actuator . . . . . 0 to ~100 % of supply air  
 pressure (up to 5.5 bar at  
 6 bar supply air pressure)  
 Air supply<sup>1)</sup> . . . . . according to ISO 8573-1  
 Solid particle size and density class 2  
 Oil rate . . . . . class 3  
 Pressure dew point 10 K under ambient temperature  
 For air supply, we recommend the FOXBORO ECKARDT  
 FRS923 filter regulator.

**Response characteristic**<sup>2) 3)</sup>

Sensitivity . . . . . < 0.1 % of travel span  
 Non-linearity (terminal  
 based adjustment) . . . . . < 0.4 % of travel span  
 Hysteresis . . . . . < 0.3 % of travel span  
 Supply air dependence. . . . . < 0.1 % / 1 bar (15 psi)  
 Temperature effect. . . . . < 0.3 % / 10 K  
 Mechanical vibration  
 10 to 60 Hz up to 0.14 mm,  
 60 to 500 Hz up to 2 g . . . . . < 0.25 % of travel span

**Air consumption (steady state) I<sub>n</sub>/h (scfh)**

Supply air pressure bar (psig)	1.4 (20)	3 (45)	6 (90)
single acting	80 (2.8)	130 (4.6)	220 (7.8)
double acting	130 (4.6)	230 (8.1)	430 (15.2)
Spool Valve	100 (3.5)	240 (8.5)	500 (17.7)

**Air output I<sub>n</sub>/h (scfh)**

at max. deviation, single and double acting:

Supply air pressure bar (psig)	1.4 (20)	3 (45)	6 (90)
without booster <sup>5)</sup>	2 700 (95)	5 000 (177)	7 500 (265)
with Spool Valve <sup>4)</sup>	6 000 (211)	12 000 (423)	18 000 (636)
with booster code F, G			21 000 (742)
with booster code H			42 000 (1 484)

Note: The use of boosters in connection with Spool valve is not recommended.

1) Pressure dew point 10 K under ambient temperature  
 2) Data measured according to VDI/VDE 2177  
 3) With stroke 30 mm and lever length 90 mm  
 4) Spool valve is the type of amplifier used in device SRD960-C  
 5) Standard diaphragm amplifier  
 Devices SRD960-B and SRD960-Cxxxxxxxx-M are using "standard" diaphragm amplifier

## FUNCTIONAL SPECIFICATIONS (common data for SRD960 -B or C)

### Features

Automatic start-up . . . . . Autostart functionality  
 Automatic detection of mechanical stops, control parameters and of direction of spring force. A dynamic optimization is included in this procedure. This procedure allows a full adaptation on optimization of the positioner to the actuator without any manual adjustments!

### Options

- Built-in independent inductive limit switches
- Pressure Sensors for supply air pressure and output pressure I (y1) and II (y2)
- Additional Inputs / outputs:
  - 2 binary outputs (position alarms)
  - Position feedback 4-20 mA + binary alarm output
  - 2 binary inputs

### Operation and configuration

Local . . . . . with four keys  
 Display . . . . . Multi-Lingual Graphic LCD  
 The positioner in LCD version is available with three different menu languages:  
 Two menu languages are standard:  
 - English  
 - German

Freely definable third language (additional languages on request):  
 - French            - Portuguese            - Spanish  
 - Italian            - Swedish                - etc.

The third menu language has to be selected and specified with order.

All additional Menu languages can be downloaded into the positioner by means of the operation- and configuration software VALcare™. Additional language [downloads](#) are available on our homepage.

### Position feedback and alarms

Position feedback / valve position . . via communication  
 Optional <sup>1)</sup> . . . . . 4-20mA position feedback

Alarms . . . . . via communication  
 Optional <sup>1)</sup> . . . . . 1 alarm output

Position alarms . . . . . via communication  
 Hi and Lo alarm  
 Hi/Hi and Lo/Lo alarm  
 Optional <sup>1)</sup> . . . . . 2 binary outputs  
 Hi and Lo alarm  
 Hi/Hi and Lo/Lo alarm

Independent feedback:

Limit switch (inductive) . . . . . Standard version  
 Security version

### Diagnosis

#### – local

- Self diagnostics
- Status- and diagnostic messages

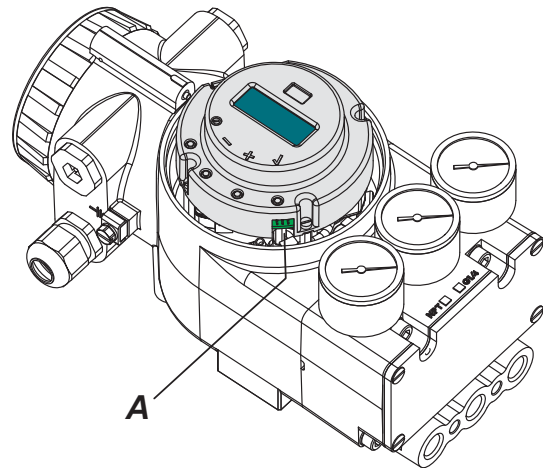
#### – via VALcare™ Valve Diagnostic Software:

- Service Management for planning and scheduling of service intervals
- Histograms for displaying the position- and response history over time
- Partial Stroke Test for the functional inspection of safety related actuators
- Hours in operation, cycle counter and travel sum of the actuator are determined
- Surveillance of loop current
- Shows condition of device:
  - Potentiometer
  - IP Motor
  - Exceeding range of actuator (possible indication for wear of plug or seat)
  - Remaining control deviation (possible indication for jammed actuator, blocked valve stem or plug, not sufficient air capacity /supply air pressure /positioning pressure)
- if equipped with pressure sensors (optional):
  - Monitoring of the stem friction
  - Histograms for displaying the friction-history over time
  - surveillance of air supply and output pressure, each with display of physical value
- Additional diagnostical possibilities in control operation by means of external sensors (optional).  
 See also the VALcare Documentation.

### Service plug

All basic devices are equipped with a service plug **A** at the front side. There via RS232 interface a PC with VALcare (DTM) can be connected via modem EDC82 (galv. separated, not Ex).

Information about EDC82 modem see [TI EVE0102\\_Y](#).



1) By means of additional inputs/outputs (Option Board)

**Manual settings:**

Actuator mode . . . . .	linear or rotary actuator
Linear valve . . . . .	left or right mounted
Rotary actuator . . . . .	opening clockwise or counter-clockwise
Characteristic of setpoint . . . . .	linear, equal percentage, invers- equal percentage or custom (22 points)
Valve function . . . . .	opens or closes with increasing setpoint
Split range . . . . .	free upper and lower values
Travel limits . . . . .	free upper and lower values
Cutoffs . . . . .	free upper and lower values
Stroke range . . . . .	configurable
Temperature unit . . . . .	configurable (°C or °F)
Autostart . . . . .	- Endpoints - Standard Autostart - Enhanced Autostart <sup>1)</sup> - Smooth response <sup>1)</sup> - Fast response <sup>1)</sup>
Control parameters . . . . .	Determined during Autostart.
Working range . . . . .	freely adjustable (for indication on LCD)
Manual adjustment of . . . . .	P-gain, I-time, T63-time and dead band
Manual operation . . . . .	Manual input of setpoint to drive the valve in steps with 12.5 % or 1 % <sup>1)</sup>
Pneumatic test . . . . .	Function to test the pneumatic output
Workshop . . . . .	input and angle calibration
LCD language . . . . .	dependent on version
LCD orientation . . . . .	dependent on version
PROFIBUS-PA . . . . .	Bus address
FOUNDATION Fieldbus . . . . .	Simulation Switch from Link Master to Basic Field Device

**Software supported configurations:**

- By means of Hand Held Terminal (HART)
- PC by means of VALcare Software
- I/A Series System, Foxboro Evo and other DCSs

**Failure handling**

## Safety position at

- Air supply failure . . . . . pressure y1 = zero
- Electric power failure . . . . . pressure y1 = zero
- Failure of electronics . . . . . pressure y1 = zero
- Failure of communication is recognized by configurable watch dog with response delay of 0.1 s to 24 h

behavior. . . . . configurable as  
pressure y1 = zero or  
stop at last value or  
a configured value

Diagnostic report . . . . . via communication and local LCD

- historical status . . . . . is set if alarm was activated at any time (also just short alarms)

Reset. . . . . by acknowledging

1) from HW-Rev. 3.4 / Firmware Rev. 16

## PHYSICAL SPECIFICATIONS (common data for SRD960 -B or C or T)

### Mounting (see page 17 for details)

Attachment preparation by means of mounting adapter

#### Option N for

- NAMUR according to IEC 534, Part 6
- Direct to IFC-/Flowserve actuators such as FoxPak and FoxTop

- Rotary actuators according to VDI/VDE 3845

#### Option R for

- Rotary actuators according to VDI/VDE 3845

#### Option T for

- Integrated mounting with air connection on back - for details refer to page 21, Attachment prep.

#### Option D for

- NAMUR according to VDI/VDE 3847
- Rotary actuators according to VDI/VDE 3845

#### Option F for

- NAMUR according to IEC 534, Part 6
- Rotary actuators according to VDI/VDE 3845

Attachment to stroke actuators

- direct to FlowPak/FlowTop with attachment kit EBZG -E1
- for casting yoke acc. to IEC 534-6 (NAMUR) . . . . . with attachment kit EBZG -H

Stroke range with feedback lever:

- standard (EBZG-A ) 8 to 70 mm / 0.31 to 2.76 in
  - extended (EBZG-B ) 60 to 120 mm / 2.36 to 4.72 in
  - extended (EBZG-A1) 110 to 260 mm / 4.33 to 10.24 in
- Larger stroke ranges can be realised with special levers.

- for pillar yoke acc. to

IEC 534-6 (NAMUR) . . . . . with attachment kit EBZG -K

Stroke range with feedback lever

- standard . . . . . 8 to 70 mm / 0.31 to 2.76 in
- extended . . . . . 60 to 120 mm / 2.36 to 4.72 in

Attachment to rotary actuators

acc. to VDI/VDE 3845 . . . . . with attachment kit EBZG -R

- Further attachment kits see ModelCodes page19 -

### Materials

Housing and covers . . . . . Aluminum (Alloy No. 230) finished with 2 component DD varnish

All moving parts of

feedback system (V4A) . . . . . 1.4306 / 1.4571 / 1.4104

Mounting bracket . . . . . Aluminum (Alloy No. 230)

Pneumatic diaphragm . . . . . Silicone (suitable for use in lacquer industry according to Lab-Test)

### Weight

Single acting . . . . . approx. 2.7 kg (3.7 lbs)

Double acting. . . . . approx. 3 kg (4.4 lbs)

### Pneumatic connection

NAMUR mounting . . . . . 3 x female threads

1/4-18 NPT or G1/4 for pipe diameter 6 to 12 mm (0.24 to 0.47 in) for air supply and outputs y1, y2 to the actuator

Direct mounting . . . . . Instead of the output y1 an air connection on the backside with O-ring will be used (closed at NAMUR mounting).

### Electrical connection

Line entry . . . . . 1 or 2 cable glands 1/2-14 NPT or M20 x1.5 (others with Adapter AD-...)

Cable diameter . . . . . 6 to 12 mm (0.24 to 0.47 in)

Screw terminals . . . . . 2 terminals for input, 4 terminals for additional inputs / outputs;

Tightening torque . . . . . min. 0.5 Nm, max. 0.6 Nm

Wire cross section . . . . . solid wire 0.5 to 6 mm<sup>2</sup> stranded wire 0.5 to 4 mm<sup>2</sup>

crimped wire . . . . . 0.5 to 2.5 mm<sup>2</sup> (AWG 21-14)

Test sockets . . . . . integrated in terminals, for options and communicator connection

## PHYSICAL SPECIFICATIONS (common data for SRD960 -B or -C or -T)

### Ambient conditions

Operating conditions . . . . . acc. to IEC 654-1

The device can be operated at a class Dx location

Ambient temperature for

Operation <sup>1)</sup> . . . . . -40 to 80 °C (-40 to 176 °F)

Transport and storage . . . -40 to 80 °C (-40 to 176 °F)

Storage conditions acc.

to IEC 60721-3-1: . . . . . 1K5; 1B1; 1C2; 1S3; 1M2

Display

LCD (visible) <sup>2)</sup> . . . . . -25 to 80 °C (-13 to 176 °F)

Relative humidity . . . . . up to 100 %

Protection class

acc. to IEC 529. . . . . IP 66 <sup>3)</sup>

acc. to NEMA. . . . . Type 4X

### Electromagnetic compatibility EMC

Operating conditions: . . . . . industrial environment

Immunity according to

- EN 61 326-1 . . . . . fulfilled

Emission according to

- EN 55 011,

Group 1, Class B . . . . . fulfilled

NAMUR

recommendation NE21. . . . . fulfilled

## SAFETY REQUIREMENTS

### CE label

Electromagnetic

compatibility <sup>4)</sup> . . . . . 2004/108/EG

Low-voltage regulation . . . . . not applicable

### Safety

According to EN 61010-1

(or IEC 1010-1) . . . . . safety class III

Overvoltage Category I

Internal fuses . . . . . only with PROFIBUS or FOUNDATION Fieldbus, but not replaceable

External fuses . . . . . limitation of power supplies for fire protection must be observed acc. to EN 61010-1, appendix F (or IEC 1010-1).

Compliance with the essential health and safety requirements has been assured by compliance with EN 50014:1997 + A1 + A2 EN 50018:2000

### Electrical Classification <sup>5) 6)</sup>

See certificate of conformity EX EVE0109 A (de)(en)

### Type of protection ATEX "Ex d – Flameproof"

II 2 G EEx d IIC Temperature class T4...T6

(Design AD 639)

EC-Type-Examination Certificate [PTB 02 ATEX 1084 X](#)

Permissible ambient temperature range:

Temperature class T4 . . . . . -30 °C to 80 °C  
(-22 °F to 176 °F)

Temperature class T4 . . . . . (on request)  
-40 °C to 80 °C  
(-40 °F to 176 °F)

Temperature class T6 . . . . . -30 °C to 75 °C  
(-22 °F to 167 °F)

Temperature class T6 . . . . . (on request)  
-40 °C to 75 °C  
(-40 °F to 167 °F)

For connections in explosion protected hazardous areas according to directive 94/9/EG appendix II, with the following maximum values:

Input circuit:

Maximum electrical power . . . . . P max = 2.5 W

Electrical connections . . . . . U max = up to 60 V

Self-heating of device surface . . . . . 1.3 K/W

### Type of protection FM "explosion proof"

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

hazardous locations, indoor and outdoor, NEMA 4X

### Type of protection CSA "explosion proof"

Ex d II (H<sub>2</sub>) T4/T6 Gb

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

Class II, Division 1, Groups E, F and G

hazardous locations, indoor and outdoor, NEMA 4X

- 1) Details see Certificates of Conformity. With built-in "Inductive Limit Switch" Code T only -20 °C
- 2) Below -20 °C reaction time for value changes is reduced
- 3) Under service as directed
- 4) With PROFIBUS or FOUNDATION Fieldbus only, if shield of wiring is grounded on both sides.
- 5) With appropriate order only
- 6) National requirements must be observed

## SRD960 with HART communication SRD960-xHxxxx

### Signal Input

Two wire system  
 Reverse polarity protection . . . standard feature  
 Signal range . . . . . 4-20 mA  
 Operating range . . . . . 3.6 to 21.5 mA  
 Voltage range of unloaded  
 input signal . . . . . DC 12 to 36 V  
 Load . . . . . 420 Ohms, 8.4 V at 20 mA  
 Communication signal . . . . HART, 1200 Baud, FSK  
 (Frequency Shift Key)  
 modulated on 4-20 mA  
 0.5 Vpp at 1kOhm load  
 Input impedance Zi . . . . . Z = 320 Ohms  
 for ac voltage 0.5 to 10 kHz with < 3 dB non-linearity  
 Cable capacity and inductance see HART standard  
 specifications (e.g. C < 100 nF).  
 Impedance of other devices at the input (parallel or serial)  
 must be within HART spec.  
 Applications without communication require not to exceed  
 input capacitance parallel to the input not higher than 100  $\mu$ F.

Start-up time (init phase) . . . approx. 2 sec

Interruption time without power down:  
 - with LCD . . . . . 85 ms<sup>1)</sup>

### Configuration

Local / Display . . . . . see page 4  
 Software . . . . . VALcare™ (FDT-Software)  
 Hardware . . . . . Modem MOD991 for PC, IBM  
 compatible  
 Hand Terminal . . . . . HART Hand held terminal  
 I/A Series System . . . . . on request  
 Other control systems . . . . AMS, Siemens SIMATIC PDM  
 (ProcessDeviceManager)

## SRD960 with communication PROFIBUS-PA SRD960-xPxxxx

Data transfer . . . . . acc. to PROFIBUS- PA profile  
 class B based on EN 50170 and DIN 19245 part 4  
 GSD file . . . . . the actual file can be down-  
 loaded from our [homepage](#)

### Configuration

Local / Display . . . . . see page 4  
 Software . . . . . VALcare™ (FDT-Software)  
 Hardware . . . . . PC- or PCMCIA-interfaces  
 from Softing  
 I/A Series System . . . . . with FBM223  
 Other control systems . . . . All Profibus-PA- compatible,  
 e.g. Siemens SIMATIC PDM  
 (ProcessDevice Manager)

## SRD960 with communication FOUNDATION Fieldbus H1 SRD960-xQxxxx

Data transfer . . . . . FF Specification Rev. 1.4,  
 Link-Master (LAS)

Two revisions of Firmware can be selected for the  
 FOUNDATION Fieldbus devices in the model code of the  
 positioner. The selection of the Firmware revision is  
 depending of the DCS compatibility, the DD Files already  
 installed in the DCS and the installed base on your site.

Double check interoperability of following characteristics  
 with your DCS before ordering!

When selected **Firmware FF16** in the model code :

Certified according to . . . . . ITK 4.6  
 Function Blocks . . . . . PID, AO, 2xDI, 1xDO  
 Transducer, Resource

When selected **Firmware FF18** in the model code :

Certified according to . . . . . ITK 6.0.1  
 Function Blocks . . . . . PID, AO, 4xDI, 1xDO, IS, OS,  
 AI, MAI, Transducer,  
 Resource

Additional functionality . . . Flat Addressing  
 DD files . . . . . the actual file can be down-  
 loaded from our [homepage](#)

### Configuration

Local / Display . . . . . see page 4  
 Software . . . . . VALcare™ (FDT-Software)  
 or National Instruments NI-FBUS configurator  
 Hardware . . . . . FBUS-interfaces (AT-FBUS  
 and PCMCIA- FBUS)  
 I/A Series System . . . . . with FBM220 / 221  
 Other control systems . . . . All Fieldbus FOUNDATION  
 H1-compatible. Fisher Rosemount Delta-V, Honeywell,  
 Yokogawa, ABB

### For both fieldbus versions

Input signal . . . . . digital  
 Supply voltage . . . . . DC 9 to 32 V<sup>2)</sup>  
 max. Supply voltage . . . . . DC 36 V  
 Operating current . . . . . 10.5 mA  $\pm$  0.5 (base current)  
 Current amplitude . . . . .  $\pm$  8 mA  
 Fault current . . . . . base current + 0 mA  
 (base current + 4 mA by means of independent  
 FDE-safety circuit) according to IEC 1158-2  
 Start-up time (init phase) . . . approx. 2 sec

### Operating values

Bus connection . . . . . Fieldbus interface based  
 on IEC 1158-2 according to FISCO-Model  
 (see Electrical certifications)

Power supply . . . . . Power supply is achieved  
 dependant on the application by means of fieldbus  
 power supply units or segment coupler

1) Worst case conditions 4-20mA, with position feedback option, i/p-output  
 with max. current

2) Data of "Intrinsically Safe" version



## Special SRD960 versions for particular uses

These devices contain only the functions described below and are constructed without controller and without pneumatic parts in a shortened housing.

### SRD960 -TXQ:

#### Stand alone Position Transmitter unit

The actual value of the actuator is converted to a 4-20 mA signal.

<b>Input</b> .....	Stroke / Rotary angle by means of conductive plastic precision potentiometer
<b>Output</b> .....	Two wire system
Signal range .....	4 to 20 mA / 20 to 4 mA or free configuration 3.8 to 20.5 mA
Permitted load .....	$R_{bmax} = (U_s - 12 \text{ V}) / 0.02 \text{ A} [\Omega]$ ( $U_s$ = supply voltage)

#### Power supply

Reverse polarity protection . . .	standard feature
Supply voltage .....	$U_s = \text{DC } 12 \text{ to } 36 \text{ V}$
Permitted ripple .....	< 10 % p.p.
Supply voltage dependency . . .	negligible

#### Response characteristic

Non-linearity (terminal based adjustment) .....	< 1% F.S.
Hysteresis .....	< 0.5% F.S.
Load dependency .....	negligible
Temperature effect. ....	< 0.1 % / 10 K

Weight. .... approx. 2.3 kg

#### Configuration and status

Local configuration. .... 2 push buttons and 2 LEDs

### SRD960 -TXT, -TXU, -TXR, -TXV:

#### Limit Switch

Contains a limit switch pair that monitors the actual value of the actuator. When exceeding the adjustable value, a signal is generated. Inductive limit switch or microswitch.

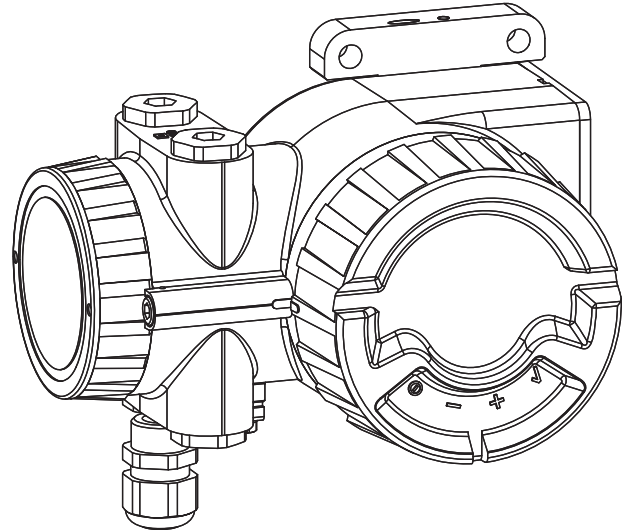
#### Inductive Limit Switch

- Standard version (SJ2-N) ..... SRD960-TXT
- Security version (SJ2-SN) ..... SRD960-TXU
- in three wire technology (SI 2-K08-AP7) SRD960-TXR

#### Mechanical Limit Switches

- Micro Switches ..... SRD960-TXV

Details see page 13.



### SRD960-TXNSSX -H:

#### Potentiometer unit for remote mounting application

Contains a potentiometer, which is the value of the actuator, forwarded the value on to the actual positioner mounted in a protected place.

Can be used for applications where vibrations or extreme temperatures may disturb or damage the positioner.

#### Travel Range

Stroke range ..... 8 to 260 mm (0.3 to 10.2 in) with standard feedback levers; special levers on request  
Rotation angle range ..... up to 95 °  
(without mechanical stop)

#### Response Characteristic

please refer you to the technical data of the positioner SRD960 with which is mounted together.

Weight. .... approx 2.3 kg

#### Ambient conditions

Ambient temperature ..... -40 to 100 °C (-40 to 212 °F)  
IP66

For more information about remote mounting please consult [TI EVE0105\\_R](#).

**OPTION for all SRD960 -B or C****Pressure sensors** [item 3]

Three built-in pressure sensors, Code "Option -B",  
for supply air, output y1 and y2 to actuator,  
necessary for Premium Diagnostic

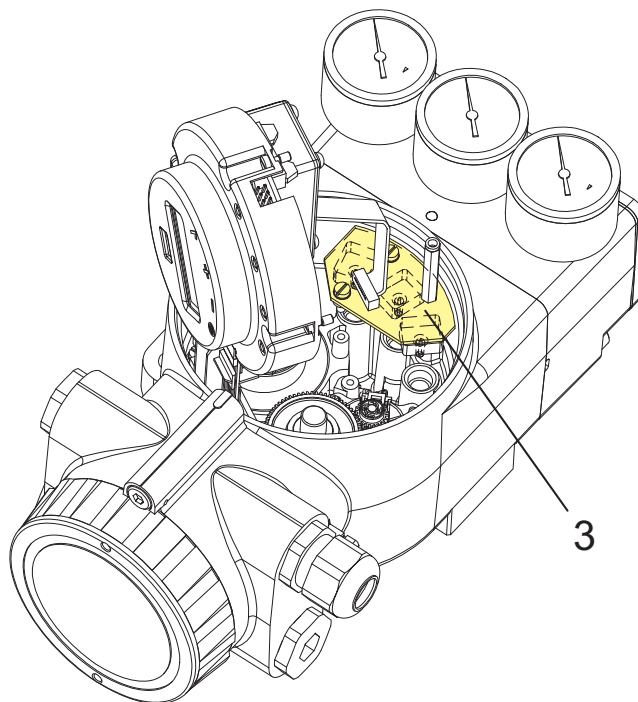
Measuring range . . . . . 0 to 8 bar (0 to 120 psig)

Accuracy . . . . . 0.5 %

Temperature influence . . . . . 0.5 % / 10 K (-40 to 80 °C)

Parts set for subsequent mounting:

Option B (3x pressure sensors) . . . . . EW 426 247 311



Option -B "Built-in pressure sensors"

**ADDITIONAL EQUIPMENT**

**Additional Inputs / Outputs, built into any SRD960 -B or C**

Order in Model Code: SRD960-□□ P

**Two binary outputs (limit signals) [item 1]**

Stroke / angle derived from positioner feedback, configurable  
galvanically separated 2 limit signals, two-wire system, according to DIN 19234, for external supply supply voltage . . . . . DC 8 to 48 V

Logic:  
limit value not exceeded . . . < 1 mA  
limit value exceeded . . . . . > 2.2 mA (typ. 6 mA)  
device fault . . . . . < 50 µA  
configurable as switch output:  
limit value not exceeded . . . < 50 µA  
limit value exceeded . . . . . > 20 mA / 20 V  
> 40 mA / 10 V  
(power derated)

Reference: AB1 for upper, AB2 for lower limit  
Terminals for AB1 . . . . . 81+, 82-  
AB2 . . . . . 83+, 84-

Explosion protection thereto see page 7.

Parts set for subsequent mounting:  
Code P . . . . . EW 426 346 021

Order in Model Code: SRD960-□□ Q

**Position feedback 4-20 mA [item 1]**

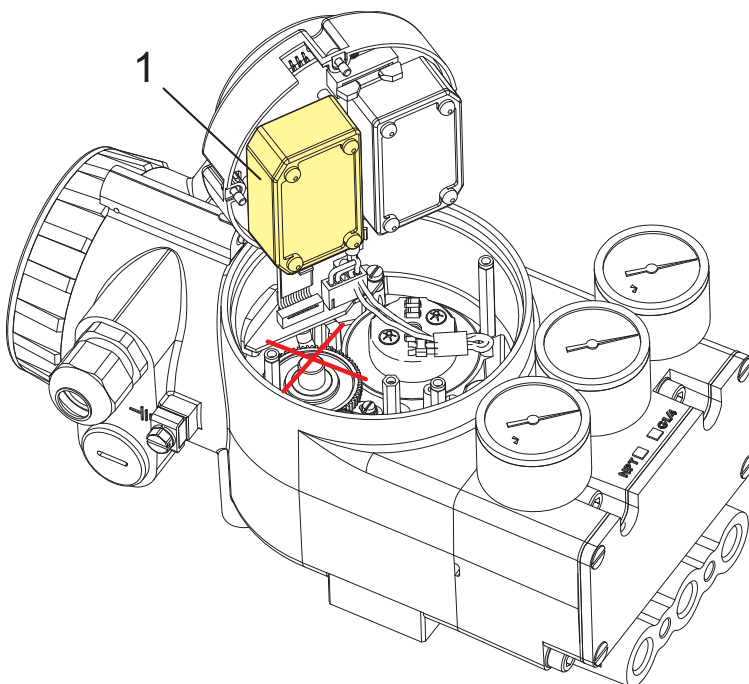
Stroke / angle derived from positioner feedback, 1 output analog, galvanically separated, two-wire system according to DIN 19234, for external supply supply voltage. . . . . DC 8 to 48 V  
signal range . . . . . 3.8 to 21.5 mA  
0 % and 100 % configurable  
device fault . . . . . < 1 mA  
Terminals for AI1 . . . . . 31+, 32-

1 Binary output alarm, galvanically separated, two-wire system, according to DIN 19234, for external supply supply voltage. . . . . DC 8 to 48 V  
Logic . . . . . no alarm < 1 mA  
alarm > 2.2 mA  
device fault < 50 µA

Terminals for AB1 . . . . . 81+, 82-  
The binary output for Alarm will be activated in the following cases:  
- Remaining control deviation  
- Circuit to I/P module is disturbed  
- Circuit to potentiometer is disturbed  
- Calibration error:  
- no angle calibration  
- no current calibration  
- Autostart failed  
(Pre-settings can be configured via communication)

Explosion protection thereto see page 7.

Parts set for subsequent mounting:  
Code Q . . . . . EW 426 346 039



## ADDITIONAL EQUIPMENT (continued)

### Additional Inputs / Outputs, built into any SRD960 -B or C

Order in Model Code: SRD960-□□ B

#### Two Binary Contact Inputs [item 1]

Two independent binary inputs, supplied by the basic device, for connection of sensors. A connected switch is loaded with 3 V, 150 μA.

Both binary inputs can be used for diagnostics or also configurable for the control functions.

Switch 1	Switch 2	Actuator control function
close	close	normal operation
open	close	go to stop at 0 %
close	open	go to stop at 100 %
open	open	hold last position

Terminals for EB1 . . . . . 13+, 14-  
EB2 . . . . . 15+, 16-

Requirements for connected switches:

Capacitance in parallel . . . . . < 100 nF

Resistance for ON . . . . . < 2 kOhms  
for OFF . . . . . > 10 kOhms

Hysteresis . . . . . 2 to 5 kOhms

For application with . . . . . - mechanical switches  
- opto couper outputs  
- open collector / drain  
outputs of transistor  
circuits

For further informationen about the contact inputs please consult [TI EVE0105\\_B](#).

Explosion protection thereto see page 7.

Parts set for subsequent mounting:

Code B . . . . . EW 426 346 012

Order in Model Code: SRD960-□□ E

#### Two Binary Signal Inputs/Outputs [item 1]

Two Binary Inputs/Outputs are configure by the device as Input or as output, as well as the kind of Signals as on/off or as to NAMUR signal in accordance (DIN 19234).

#### Configured as NAMUR:

Input/Output

Logic 0 . . . . . > 0.35 mA, < 1 mA

Logic 1 . . . . . > 2.2 mA < 6 mA

Input current Limited to . . . . . < 6 mA

#### On/Off Signal

Output:

Logic 0 . . . . . < 50 μA

Logic 1 . . . . . > 40 mA / 10 V

Input:

Logic 0 . . . . . < 4 mA

Logic 1 . . . . . > 6 mA

Signal Voltage Range . . . . . 6 ... 36 V

Terminals for Ch1 . . . . . 81+, 82-  
Ch2. . . . . 83+, 84-

Part set for subsequent mounting:

Code E . . . . . EW 426 247 417



**LOCAL DISPLAY**

Order in Model Code: SRD960-□□□□□□□□□□□□□□□□

- Cover with LCD and 4 external push buttons

The positioner in version with LCD is available with three different menu languages:

Standard menu languages:

- English
- German

Freely definable third language (additional languages on request):

- French
- Portuguese
- Spanish
- Italian
- Swedish, ...
- see ModelCode

The third menu language has to be selected and specified with order.

The pre-set menu language is English. This menu language can easily be set to another pre-configured menu language by means of the local push buttons.

All "freely definable" third Menu languages can be downloaded into the positioner by means of the operation- and configuration software VALcare™. This way also the pre-configured third language can be modified. The additional language [downloads](#) are available on our homepage.

Despite some special functions all configurable parameters are accessible by means of the local push buttons.

**Displayed data in operation:**

- valve position
- stem position
- input current
- setpoint digital
- setpoint stem
- supply pressure
- output pressure 1
- output pressure 2
- temperature
- valve cycles
- travel sum
- Hours of operation
- Tag number
- Tag name
- Firmware version

**Configuration Main Menus:**

- 1: attachment
- 2: autostart
- 3: valve function
- 4: characteristics
- 5: limits / alarms
- 6: parameters
- 7: pneumatic output
- 8: manual setting of valve position
- 9: calibration / workshop
- 10: Bus Address/Simulation (Profibus PA / F.Fieldbus)

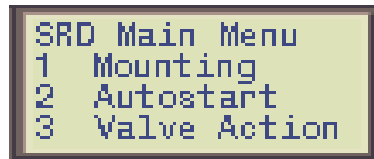
For configuration details see Master Instructions ([MI](#)) or Quick Guide ([QG](#)).



Value  
What is displayed



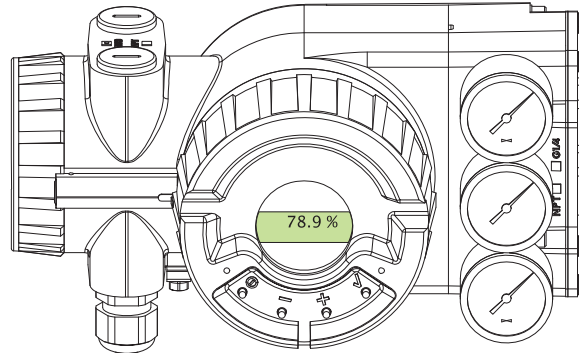
Status and diagnostic message



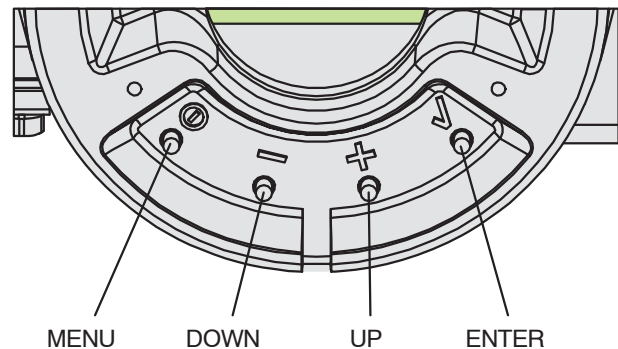
Configuration Menus

LCD orientation can be changed by means of local push buttons under Menu 9.9

**LCD Cover**



**Local Push buttons:**



## ATTACHMENT PREPARATION

Order in Model Code: SRD960-□□□□□□□□□□

The Universal Positioner needs a linking piece for attachment to the different brands of actuators.

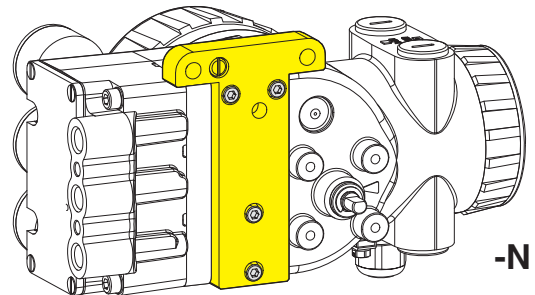
The standard Mounting Adapter is marked with Option N.

### Mounting Adapter

Preparation for attachment to:

- NAMUR, according to IEC 534-6
- Direct mounting to FoxPak and FoxTop actuators, with y1-d air supply (no external tubing for y)
- Rotary actuators acc. to VDI/VDE 3845

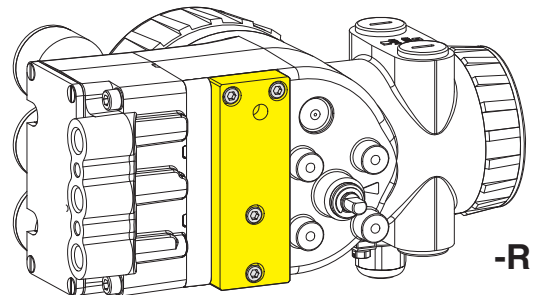
**Order Option N.**



Preparation for attachment to:

- Rotary actuators acc. to VDI/VDE 3845

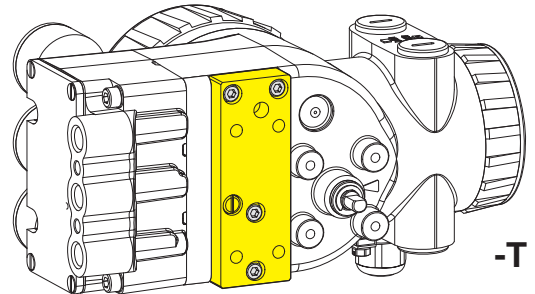
**Order Option R.**



Preparation for attachment to:

- Integrated mounting with air connections on rear
- Rotary actuators acc. to VDI/VDE 3845

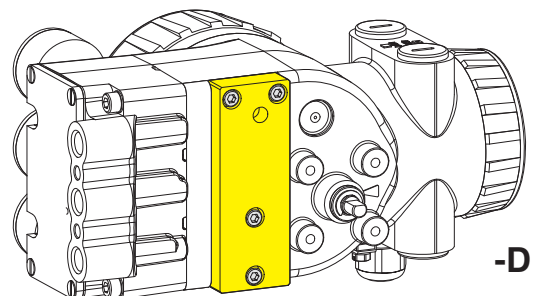
**Order Option T.**



Preparation for attachment to:

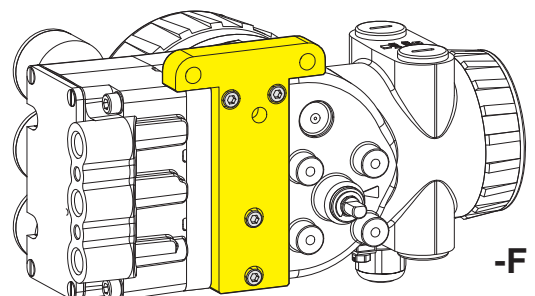
- NAMUR, according to VDI/VDE 3847
- Rotary actuators acc. to VDI/VDE 3845

**Order Option D.**

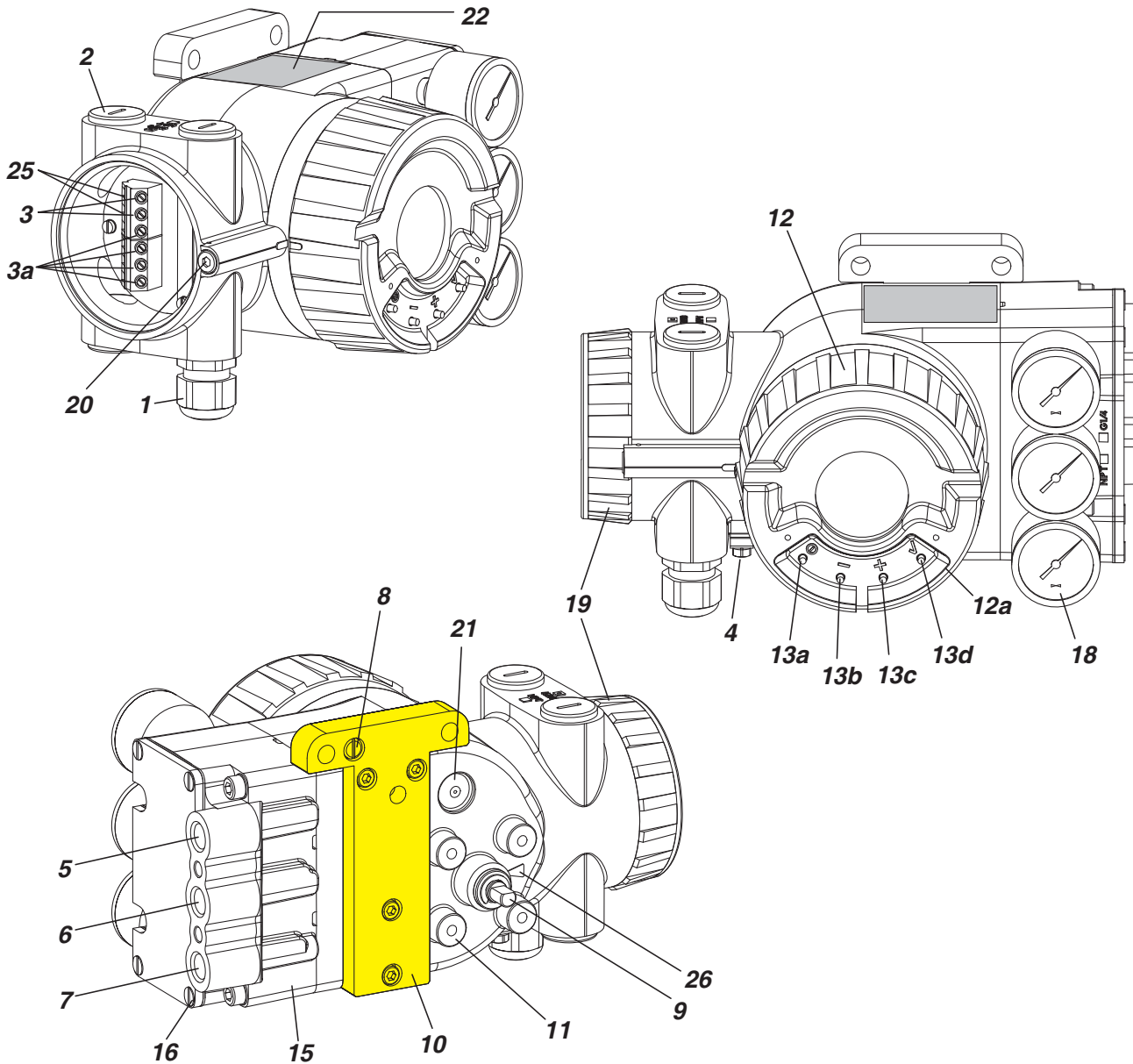


as Option N, but no y1-d air supply (with external tubing for y)

**Order Option F.**



## FUNCTIONAL DESIGNATIONS



- 1 Cable gland <sup>1)</sup>  
 2 Plug, interchangeable with Pos. 1 <sup>1)</sup>  
 3 Connection <sup>2)</sup> (11 +/12 -) for input (w) or terminals (11 / 12) for bus connection IEC 1158-2  
 3a Connection <sup>2)</sup> for additional inputs / outputs  
 4 Ground connection  
 5 Female thread G ¼ or ¼-18 NPT <sup>3)</sup> for output I (y1)  
 6 Female thread G ¼ or ¼-18 NPT <sup>3)</sup> for air supply (s)  
 7 Female thread G ¼ or ¼-18 NPT <sup>3)</sup> for output II (y2)  
 8 Direct attachment hole for output I (y1)  
 9 Feedback shaft  
 10 Connection manifold for attachment to stroke actuators (see page 17 for details)  
 11 Connection base for attachment to rotary actuators  
 12 Cover with window and push buttons  
 12a Push button protection cover (option -X)  
 13a Key **Ⓚ** MENU  
 13b Key **-** DOWN  
 13c Key **+** UP  
 13d Key **✓** ENTER / STORE  
 15 pneumatic unit with amplifier and connection  
 16 4 screws for connection of pneumatic unit  
 18 built-in pressure gauges for air-supply, output Y1 and output Y2  
 19 Cover for electronic connection compartment  
 20 Protection screw for electronic connection- and electronic compartment  
 21 Air vent, dust and water protected (IP65 and NEMA 4X)  
 22 Data label  
 25 Tip jacks, 2 mm dia.  
 26 Arrow is perpendicular to shaft 9 at angle 0 degree

1) See cable glands BUSG on page 19  
 The device is supplied with dust protection covers  
 2) Screw terminals or WAGO Cage clamps  
 3) Type of thread marked on housing



**Model Codes SRD960**

Universal Positioner	SRD960	280115
<b>Version</b>		
Single Acting . . . . .	-B	
Double Acting . . . . .	-C	
Position Transmitter (w/o pneumatic components) . . . . .	-T	
Local Control Panel (LCP960) for PST Monitoring . . . . .	-L	
<b>Input / Communication</b>		
HART (4-20 mA) . . . . .	(g)(p)	H
Profibus PA based on IEC 1158-2 (MBP)		
according to FISCO (Fieldbus) . . . . .	(g)(p)	P
FOUNDATION Fieldbus H1 based on IEC 1158-2 (MBP)		
according to FISCO (Fieldbus) . . . . .	(g)(p)	Q
not applicable. . . . .	(f)	X
<b>Additional Inputs / Outputs</b>		
Without Additional Inputs / Outputs . . . . .	(n)(p)	N
Binary Input - integrated. . . . .	(g)(p)	B
Binary Output - integrated . . . . .	(g)(p)	P
Binary Inputs/Outputs (mandatory for ESD application) . . . . .		E
Analog Position Feedback (4-20 mA) . . . . .		Q
- integrated and connected as Option Board . . . . .	(g)(p)	
- stand alone feedback unit . . . . .	(f)(p)	
Potentiometer Input (for Remote Mounting - main unit)(g)(p) . . . . .		D
Limit Switches (standard version SJ2-N) . . . . .	(p)	T
Limit Switches (security version SJ2-SN) . . . . .	(p)	U
Limit Switch (three-wire version) . . . . .	(p)	R
Mechanical Switches (Micro Switches) . . . . .	(p)	V
<b>Display / Indication</b>		
LEDs (cover without window and without external pushbuttons) . . . . .	(p)	S
Graphical LCD (cover with window and with external pushbuttons) . . . . .	(g)	D
<b>Gauges</b>		
Without Gauges . . . . .		S
Built-In Gauges with scale in bar/psi . . . . .	(g)(p)	M
Built-In stainless steel Gauges with scale in bar/psi . . . . .	(g)(p)	Z
<b>Pneumatical Connection</b>		
1/4 - 18 NPT. . . . .	(g)(p)	N
G 1/4 . . . . .	(g)(p)	G
not applicable . . . . .	(f)	X
<b>Electrical Connection</b>		
1/2 - 14 NPT (w/o cable glands or plugs for certified SRD960) . . . . .		6
M20 x 1.5 (w/o cable glands or plugs for certified SRD960) . . . . .		7
<b>Electrical Certification / Explosion protection</b>		
Flameproof II 2 G EEx d IIB/IIC T4/T5/T6 according to ATEX (w/o cable glands or plugs) . . . . .		EDZ
Explosion-proof according to FM (w/o cable glands or plugs) . . . . .	(g)(p)	FDZ
Explosion-proof according to CSA (w/o cable glands or plugs) . . . . .	(g)(p)	CDZ
GOST Approved For Explosion-proof . . . . .		GDZ
Without Ex (with cable glands and plugs). . . . .		ZZZ
<b>Mounting Preparation on Positioner</b>		
NAMUR acc. to IEC 534-6 / Direct Mounting to Flowserve actuators FlowPak and FlowTop / / Rotary Actuators according to VDI/VDE 3845 . . . . .	(p)	N
Rotary Actuators according to VDI/VDE 3845 . . . . .	(p)	R
Integrated attachment with air channels on back / Rotary Actuators according to VDI/VDE 3845. (g)(p) . . . . .		T
Direct mounting acc. to NAMUR VDI/VDE 3847 / Rotary Actuators according to VDI/VDE 3845.(a)(g)(p) . . . . .		D
NAMUR acc. to IEC 534-6 / Rotary Actuators according to VDI/VDE 3845 . . . . .		F
<b>Language</b>		
LCD Language in English / German / French . . . . .	(e)(g)	A
LCD Language in English / German / Spanish . . . . .	(e)(g)(p)	B
LCD Language in English / German / Portuguese (e)(g)(p) . . . . .		C
LCD Language in English / German / Polish . . . . .	(e)(g)(p)	D
LCD Language in English / German / Czech. . . . .	(e)(g)(p)	E
LCD Language in English / German / Italian . . . . .	(e)(g)(p)	F
LCD Language in English / German / Turkish . . . . .	(e)(g)(p)	G
LCD Language in English / German / Swedish. . . . .	(e)(g)(p)	H
LCD Language in English / German / Finnish . . . . .	(e)(g)(p)	J
LCD Language in English / German / Chinese . . . . .	(a)(e)(g)(p)	K
LCD Language in English / German / Russian . . . . .	(e)(g)(p)	L
LCD Language in English / German / Hungarian. (e)(g)(p) . . . . .		M
LCD Language in English / German / Serbian . . . . .	(e)(g)(p)	N

**MODEL CODES SRD960 (continued)**

LCD Language in English / German / Dutch . . . . .	(e)(g)(p)	O
LCD Language in English / German / Romanian. (e)(g)(p)	(e)(g)(p)	P
LCD Language in English / German / Lithuanian. (e)(g)(p)	(e)(g)(p)	Q
Without . . . . .	(h)(p)	S
<b>Options</b>		
Diaphragm Amplifier for double acting positioner . . . . .	(j)(p)(g)	-M
Premium Diagnostics Features (made with built-in pressures sensors) (HART); Build in pressure sensors (analog, FF, Profibus) . . . . .	(d)(g)(p)	-B
Cover for protection of local push buttons . . . . .	(g)(k)	-X
Approved for SIL2 / SIL3 application . . . . .	(i)(p)(g)	-Q
Custom Configuration . . . . .	(g)(p)	-T
Application down to -40°C . . . . .	(l)	-F
Certificate EN 10204-2.1 - Certificate of compliance with the order . . . . .		-1
Cage Clamp Connection (WAGO) instead of Screw terminals. . . . .	(p)	-W
Feedback-Unit for Remote Mounting - Version of Position Transmitter only with a potentiometer (m)(p)(q) . . . . .	(b)(p)(q)	-H
Version for ESD Valve with PST functionalities. . . . .	(b)(p)(g)	-E
FOUNDATION Fieldbus H1 firmware revision 16 . . . . .		-FF16
FOUNDATION Fieldbus H1 firmware revision 18 . . . . .		-FF18
<b>Tag No. Labeling</b>		
Stamped With Weather Resistant Color . . . . .		-G
Stainless Steel Label Fixed With Wire . . . . .		-L

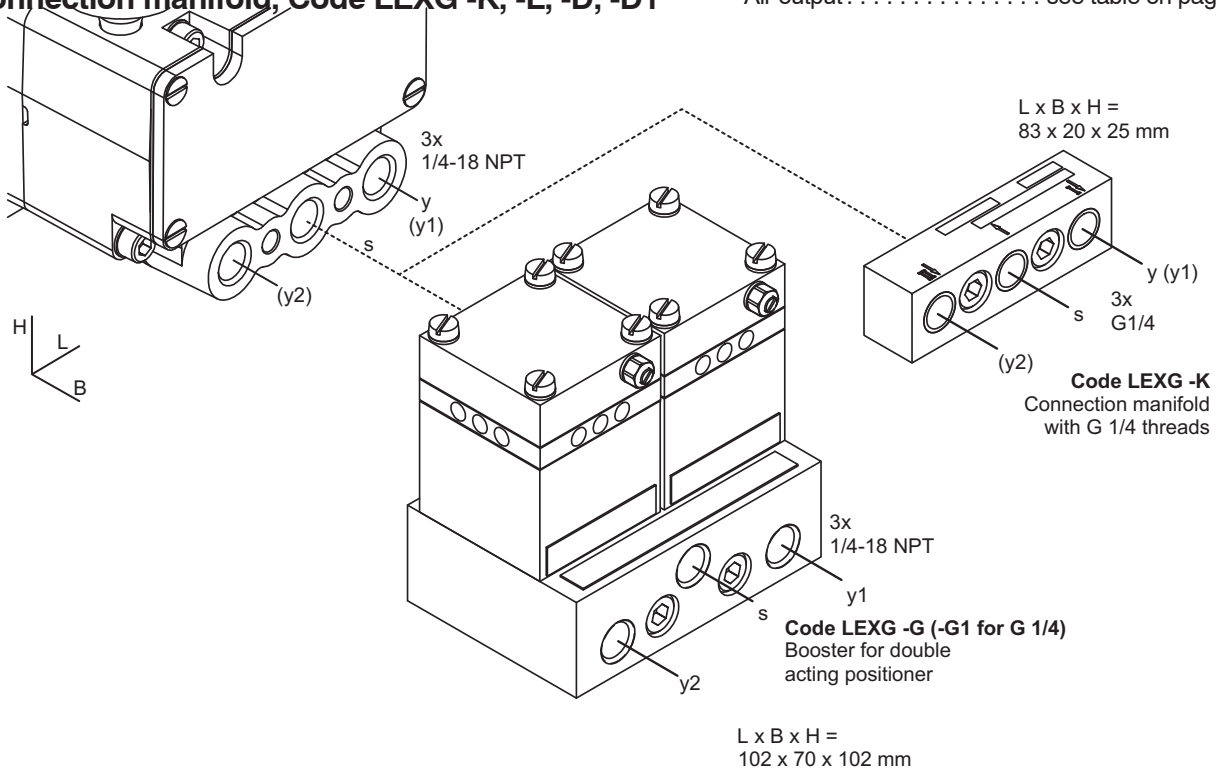
  

(a) Not released	(j) ONLY WITH (Version: C)
(b) ONLY WITH (additional Inputs/Outputs E) AND (Optional Feature -B)	(k) Not in connection with Display / Indication S
(d) Not available with Input / Communication D	(l) ONLY with Electrical Classification xDx
(e) Only with Display / Indication D	(m) Only available with Version T, Input/communication X, Additional inputs outputs N, Display S, Gauges S, Pneumatical connection X, Electrical classification xDx or ZZZ, Mounting preparation F, Language S
(f) NOT WITH Version -B, Version C	(n) WITH (Version: B, C) OR WITH (Version: T) AND (Input: X) AND (Optional Features: H)
(g) Not available with Version -T	(p) NOT WITH Version -L
(h) Not available with Display / Indication D	
(i) Only available for Version single-acting -B in connection with Input/Communication D and H	

**ACCESSORIES, FOR ALL DEVICES**

**Booster relays, Code LEXG -F, -G, -H  
Connection manifold, Code LEXG -K, -L, -D, -D1**

Lateral attachment to positioner  
Air output . . . . . see table on page 3

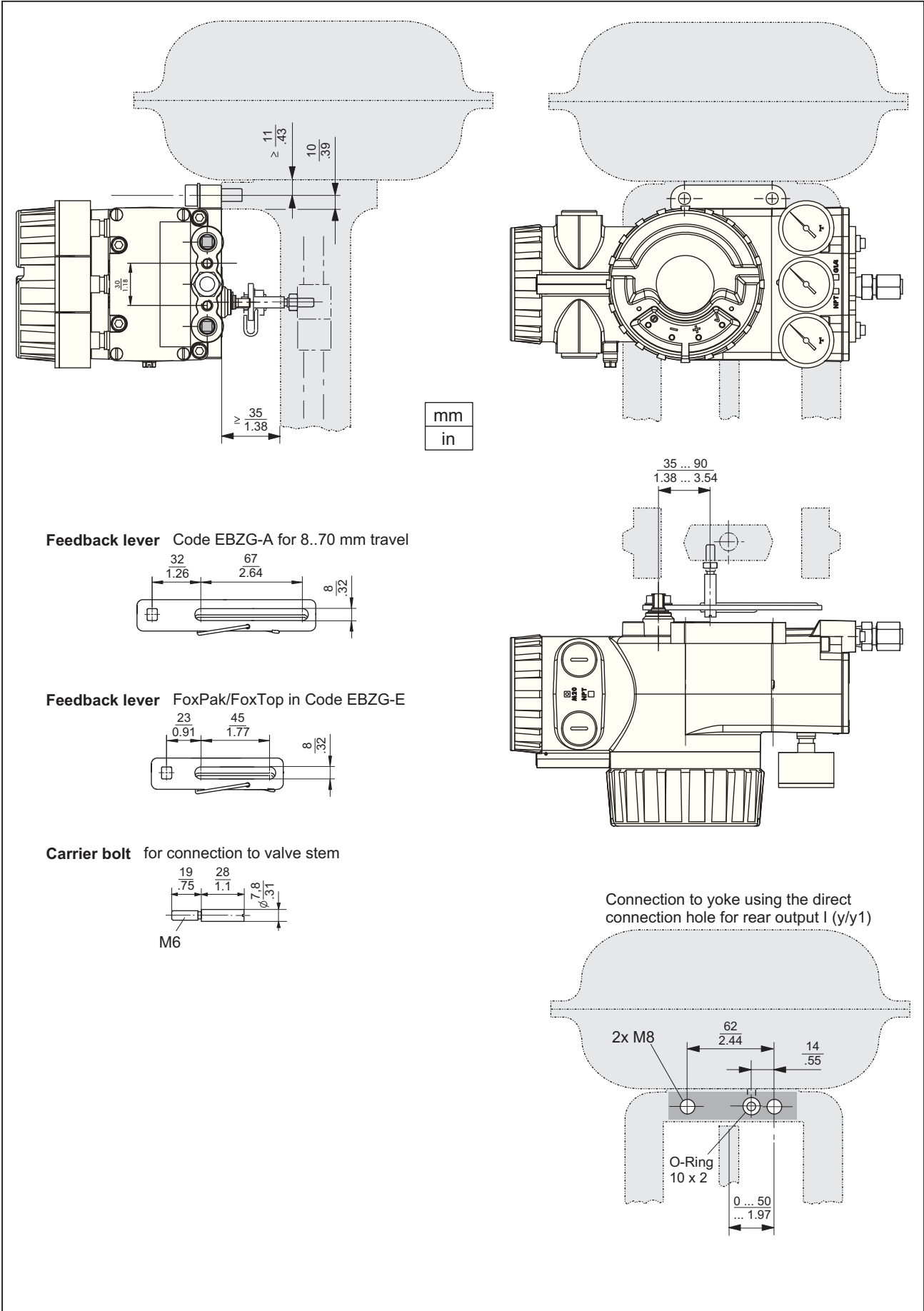


The use of boosters together with a spool valve amplifier is not recommended.  
So avoid to select LEXG-G with SRD960-C. In case of need select LEXG-G with SRD960-Cxxxxxxxx-M

## Model Codes Accessories

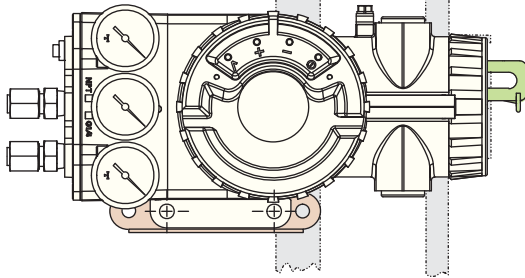
<b>Parts for Intelligent Positioner</b>	
<b>Attachment kit</b>	<b>EBZG</b>
for diaphragm actuators with casting yoke acc. NAMUR (incl. standard couple lever) . . . . .	-H2
for diaphragm actuators with pillar yoke acc. NAMUR (incl. standard couple lever) . . . . .	-K
for directly mounting (incl. standard couple lever) . . . . .	-D
for mounting to rotary actuators acc. VDI/VDE 3845 (without bracket) . . . . .	-R
for FlowTop / FlowPak . . . . .	-E1
Further Attachment kits on request. See also our Internet .	
<b>Couple lever</b>	
standard (stroke max. 80 mm) . . . . .	-A
extended (stroke max. 120 mm) . . . . .	-B
extended (stroke max. 260 mm) . . . . .	-A1
<b>Manifold (for SRD960, SRD991 and SRI990)</b>	<b>LEXG</b>
With Connection G 1/4. . . . .	-K
<b>Booster Relay (for SRD960, SRD991 and SRI990, with connection 1/4 - 18 NPT)</b>	
for Version single acting . . . . .	-F
for Version double acting . . . . .	-G
for Version single acting with doubled output capacity . . . . .	-H
<b>with connection G1/4 - 18</b>	
for Version single acting . . . . .	-F1
for Version double acting . . . . .	-G1
for Version single acting with doubled output capacity . . . . .	-H1
<b>Booster Relay (mounted independent from positioner, for SRD960, SRD991 und SRI990, with connection G1/4)</b>	
for Version single acting . . . . .	-X1
for Version double acting . . . . .	-Y1
for Version single acting with doubled output capacity . . . . .	-Z1
<b>Adapter</b>	<b>AD</b>
Adapter 1/2" NPT to 3/4" NPT (stainless steel) . . . . .	-A3
Adapter M20 x 1.5 to 1/2" - 14 NPT (internal thread) (Brass nickel plated) . . . . .	-A5
Adapter M20 x 1.5 to 1/2" - 14 NPT (internal thread) (stainless steel) . . . . .	-A6
Adapter M20 x 1.5 to PG13.5 (internal thread) (stainless steel) . . . . .	-A7
Adapter M20 x 1.5 to G1/2" (internal thread) (stainless steel) . . . . .	-A8
Adapter (plastic) M20 x 1.5 to PG13.5 (internal thread) . . . . .	-A9
<b>Cable Gland</b>	<b>BUSG</b>
M20 x 1.5 stainless steel . . . . .	-S6
M20 x 1.5 plastics, color gray . . . . .	-K6
M20 x 1.5 plastics, color blue . . . . .	-K7
M20 x 1.5 plastics, color white. . . . .	-K9
M20 x 1.5 HF-cable gland for Fieldbus . . . . .	-P4
M20 x 1.5 Plug-connector for Fieldbus (ss / threaded connection 7/8 - UN) . . . . .	-F2
M20 x 1.5 Plug-connector for Profibus PA (ss / threaded connection M12). . . . .	-P3
M20 x 1.5 stainless steel EEx d . . . . .	-S7
M20 x 1.5 brass zink plated EEx d . . . . .	-S8
1/2-14 NPT cable gland 6...12 mm, Stainless steel, EEx d . . . . .	-N1
1/2-14 NPT cable gland 6...12 mm, Steel zink plated, EEx d . . . . .	-N2
1/2-14 NPT, brass zink plated, EEx d . . . . .	-N3
M20 x 1.5 Plug, plastic . . . . .	-V3
M20 x 1.5 Plug, EEx d / explosionproof certified, stainless steel . . . . .	-V4
1/2-14 NPT Plug, EEx d / explosionproof certified, stainless steel . . . . .	-V5
M20 x 1.5 Plug, brass zink plated, EEx d . . . . .	-V6
1/2-14 NPT Plug, brass zink plated, EEx d . . . . .	-V7

**DIMENSIONS – Direct attachment to stroke actuators**

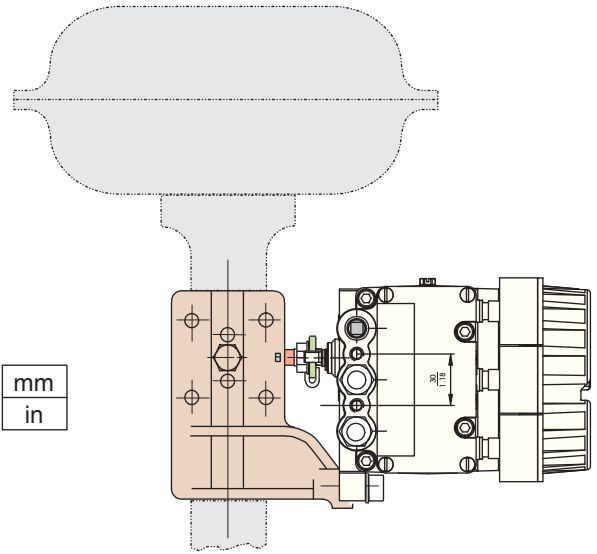


**Attachment to stroke actuators acc. to IEC 534-6 (NAMUR)**

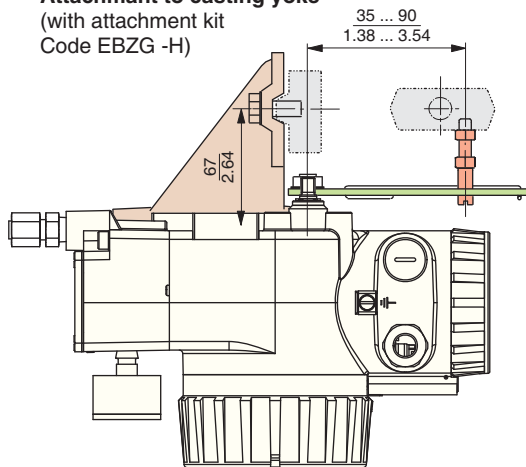
LCD orientation can be changed by means of local push buttons under Menu 9.9.2 to „flipped“, to ensure a correct orientation of the display.



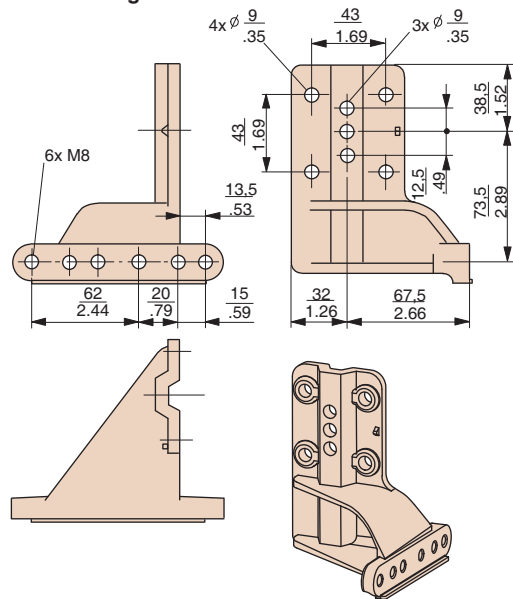
mm  
in



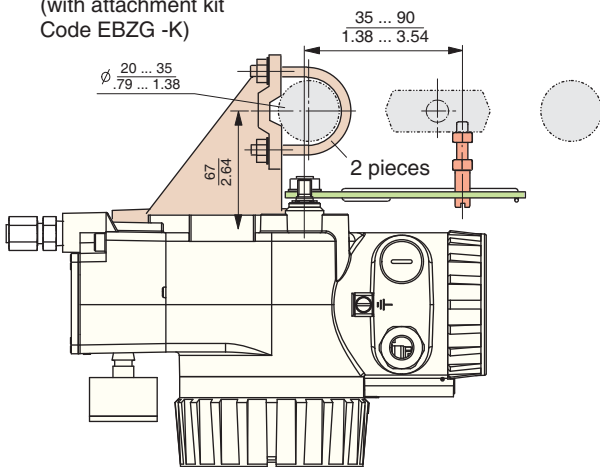
**Attachment to casting yoke**  
(with attachment kit  
Code EBZG -H)



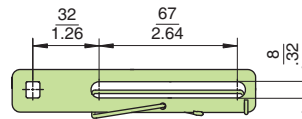
**Mounting bracket**



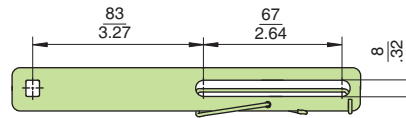
**Attachment to pillar yoke**  
(with attachment kit  
Code EBZG -K)



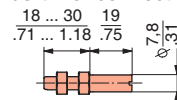
**Feedback lever** Code EBZG-A for 8..70 mm travel



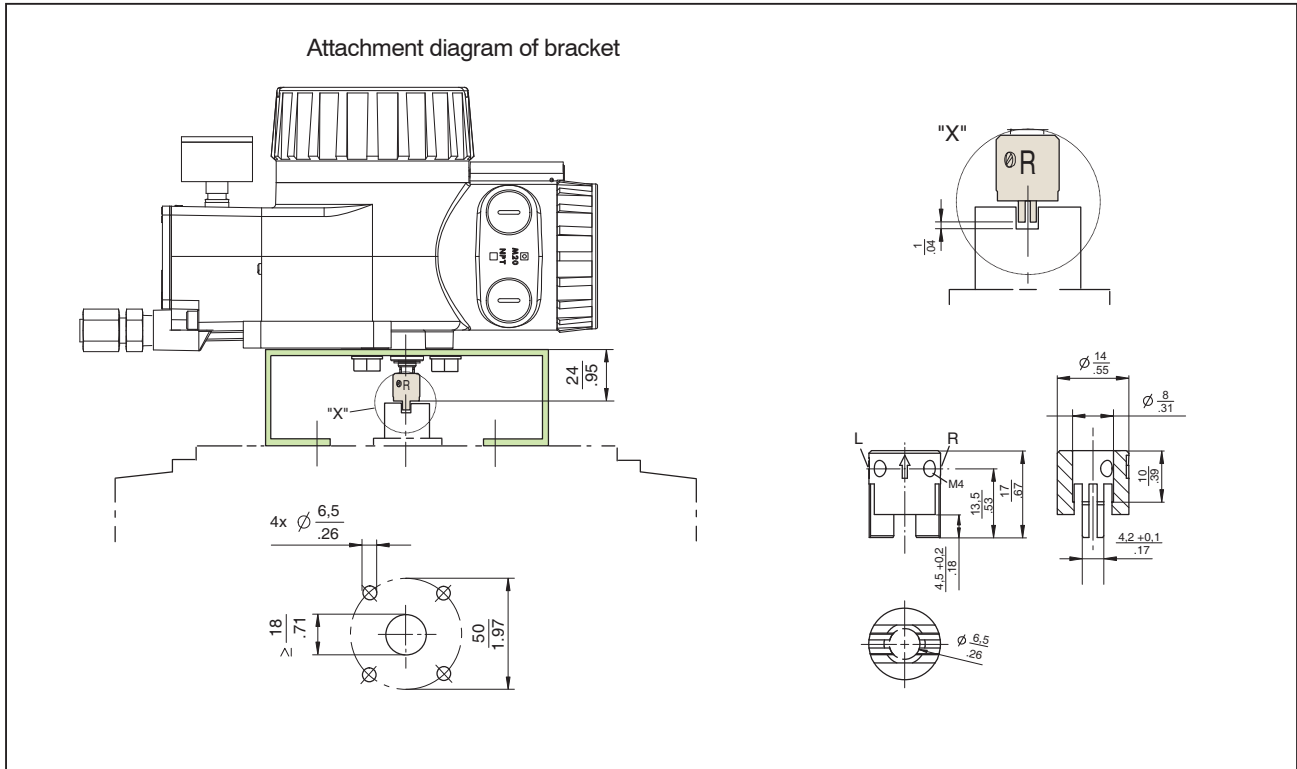
**Feedback lever** Code EBZG-B for 60..120 mm travel



**Carrier bolt** for connection to valve stem



**DIMENSIONS – Attachment to rotary actuators acc. to VDI/VDE 3845**



Delivery of bracket by manufacturer of actuator  
or see EBZG -C1, -C2 or -C3



### Additional Documentation for this product

#### Technical Information of Attachment Kits for Positioners:

[TI EVE0011 A](#) Overview of Attachment Kits of all positioners on actuators/valves of different manufacturers

#### Quick Guide:

[QG EVE0105 A](#) Extract of Master Instruction for an easy to use, easy understandable and fast start-up. This document highlights the most important aspects.

#### Master Instructions:

[MI EVE0105 E](#) SRD991 – all versions –

#### Technical Information for Fieldbus-Communication:

[TI EVE0105 P](#) SRD991/960 -PROFIBUS-PA

[TI EVE0105 Q](#) SRD991/960 -FOUNDATION Fieldbus H1

#### Master Instruction for HART-Communication:

[MI EVE0105 B](#) HART with Hand-Held Terminal

#### Technical Information

[TI EVE0102 U](#) Upgrade Kits

[TI EVE0105 S](#) SIL Functional safety

[TI EVE0305 MUX](#) Use of HART Multiplexer

#### Valve diagnostic-, configuration- and operation-software VALcare™:

[MI EVE0501 V](#) VALcare Valve diagnostic for Positioners  
HART/ PROFIBUS-PA, and FOUNDATION Fieldbus

### Additional Documentation for other products

#### Specifications device

<a href="#">PSS EVE0101</a>	SRP981	Pneumatic Positioner
<a href="#">PSS EVE0102</a>	SRI986	Electro-Pneumatic Positioner
<a href="#">PSS EVE0103</a>	SRI983	Electro-Pneumatic Positioner- explosion proof or EEx d version
<a href="#">PSS EVE0105</a>	SRD991	Intelligent Positioner
<a href="#">PSS EVE0107</a>	SRI990	Analog Positioner
<a href="#">PSS EVE0109</a>	SRD960	Universal Positioner

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