

## SRD991 Intelligent Positioner with HART, PROFIBUS-PA, FOUNDATION Fieldbus H1 or Without Communication



The intelligent positioner SRD991 is designed to operate pneumatic valve actuators and can be operated from control systems (e.g. the Foxboro I/A Series System), controllers or PC-based configuration- and operation tools such as the FDT/DTMs VALcare™ or Valve Monitor. The positioner is available with different communication protocols. The multi-lingual full text graphical-LCD (optional with infrared interface), in conjunction with the 3 push buttons, allows a comfortable and easy local configuration and operation. For installations in contact with explosive atmospheres, certificates are available.

### MAIN FEATURES

#### Intelligent

- Auto-start with self-calibration
- Self diagnostics, status- and diagnostic messages
- Easy local operation with three key pads
- Multi-Lingual full text graphical LCD
- VALcare™ or Valve Monitor DTM for valve diagnostics and predictive maintenance

#### with communication

- HART, PROFIBUS-PA, FOUNDATION Fieldbus H1,
- Configuration by means of local keys, hand-held terminal (HART), PC or I/A Series system or with an infrared interface by means of IrCom

#### without communication

- Input signal 4 to 20 mA

- Stroke 8 to 260 mm (0.3 to 10.2 in) with standard lever; larger stroke with special lever
- Angle range up to 95° (up to 300° on request)
- 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 60534-6-1 – VDI/VDE 3847
- Mounting on rotary actuators acc. to VDI/VDE 3845 and IEC IEC 60534-6-2
- Protection class IP 66 and NEMA 4X
- Approved for SIL applications
- Explosion protection: Intrinsic Safety according to ATEX and FM/CSA

**FOXBORO**  
**ECKARDT**

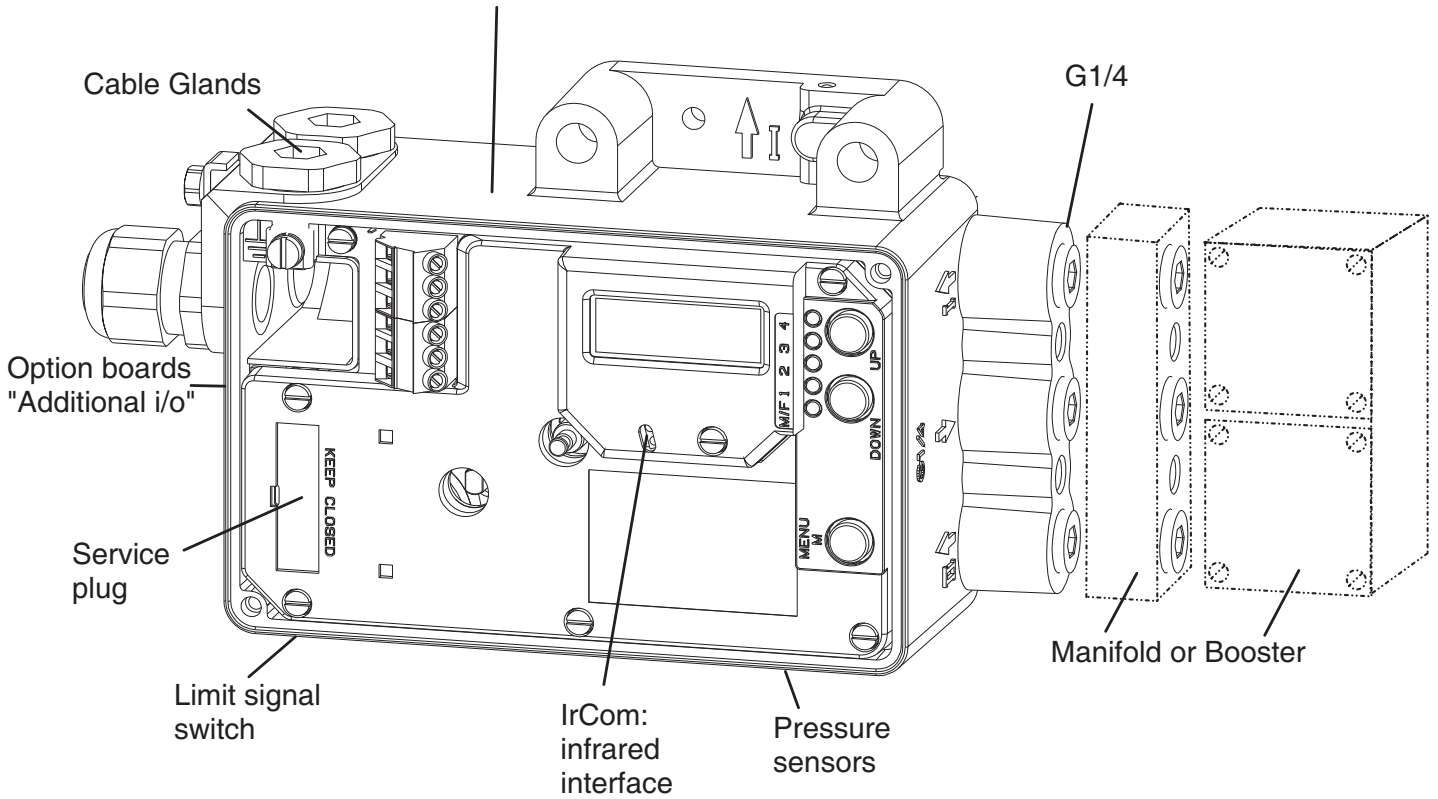
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**Electronics Version:**

HART, FoxCom (Digital), PROFIBUS PA, FOUNDATION Fieldbus H1 or "without communication"



## OVERVIEW

The SRD991 consists of a **basic device** with a digital controller that supports different **communication protocols** (or also simply 4-20 mA input). Into this basic device, **additional equipment** can be built such as plug-in cards for electrical input/output signals, position feedback and pressure sensors.

The pneumatic part is available in different versions (**single / double acting** or **spool valve**). For very large actuators, **boosters** with increased air capacity can be flanged on. Also, different **manifolds** for connection of gauges can be flanged on. For the pneumatic screw connections we offer different threads in the housing and adapters.

For use in **hazardous areas** there are approvals according to ATEX, FM, CSA ...

The device can be configured locally by means of push buttons and **LCD / LED**, or with PC + EDC82 Modem connected to the service plug of the SRD991. By means of communication the device can be configured remotely or with **IrCom** + PC (Infrared Interface at approx. 0.5 m).

A large variety of attachment kits for all common valves and actuators are available. The list is updated continuously and can be found on the Internet under [http://www.foxboro-eckardt.eu/products/positioners\\_en.html](http://www.foxboro-eckardt.eu/products/positioners_en.html).

For high temperature or high vibration application, we recommend to mount the SRD991 **remotely** and not directly on the valve. For this, use the potentiometer unit (like the SRI990 - TXQxxxx - H).

Please consult [TI EVE0105\\_R](#) for specifications.

To ensure the high performance of the positioner, we offer **Advanced Diagnostics** and **Premium Diagnostics** utilities:

|   | Premium Diagnostics | Advanced Diagnostics |
|---|---------------------|----------------------|
| Autostart                                     | Yes                 | Yes                  |
| Custom Characterization                       | Yes                 | Yes                  |
| Autodiagnostic                                | Yes                 | Yes                  |
| Alarm Management                              | Yes                 | Yes                  |
| Alarm Output for Switching (with Optionboard) | Yes                 | Yes                  |
| Status List acc. NE107                        | Yes                 | Yes                  |
| Position History                              | Yes                 | Yes                  |
| Response History                              | Yes                 | Yes                  |
| On Line Friction                              | Yes                 |                      |
| Stepping Signature                            | Yes                 |                      |
| Ramping Signature                             | Yes                 |                      |
| Sensitivity Signature                         | Yes                 |                      |
| Valve Signature                               | Yes                 |                      |
| PST (Partial Stroke Test)                     | Yes                 |                      |
| PST Predictive Maintenance                    | Yes                 |                      |

### Additional equipment, built into the basic device:

|  |             |  |
|--|-------------|--|
| Option Board "2 Binary Inputs" <u>or</u>         | B           | 2 external switches (supplied by SRD) release a control function in the SRD, e.g. "close valve" (configurable)   |
| Option Board "2 Binary Outputs" <u>or</u>        | P           | 2 binary outputs (to be supplied externally) become active during value limit in excess of the measured valve position   |
| Option Board "2 Binary Inputs/Outputs" <u>or</u> | E           | 2 channels, each configurable as an input or output (to be supplied externally)  |
| Option Board "Position Feedback"                 | F,<br>Q     | 1 output 4-20 mA (to be supplied externally) gives stroke / angle of rotation, 1 alarm output becomes active with a configurable event   |
| Limit switch                                     | T,U,<br>R,V | Supplies NAMUR signals when exceeding or falling below of two limit values. Inductive sensors, independent of the controller, in normal or safety version or three-wire, or micro switches |
|  | D           | Entry for remote potentiometer of external potentiometer unit  |
| Pressure sensors                                 |             | 2 sensors measure the pressure of supply air and output y1 for <b>Premium Diagnostics</b> ; the values are passed on via communication   |
| LCD <u>or</u>                                    |             | Full text graphic LCD in 3 languages   |
| LCD and IrCom                                    |             | Full text graphic LCD in 3 languages and infrared interface  |

**Accessories** like Manifolds and Boosters see page 24.

## Special Versions of SRD991:

### SRD991 Stainless Steel Housing

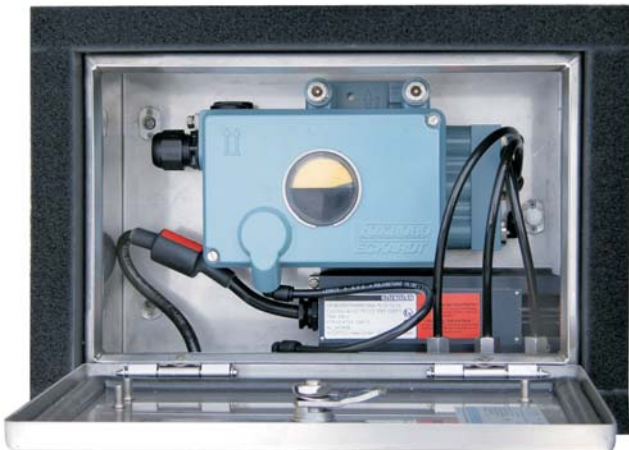
To be order with model code SRD991-xxxxxxx-Zxxx



Please consult [TI EVE0105 INOX](#) for specifications.  
For dimensional drawings see page 33

### SRD991 for very Low Temperature

Version with heating system for temperature down to  $-60^{\circ}\text{C}$

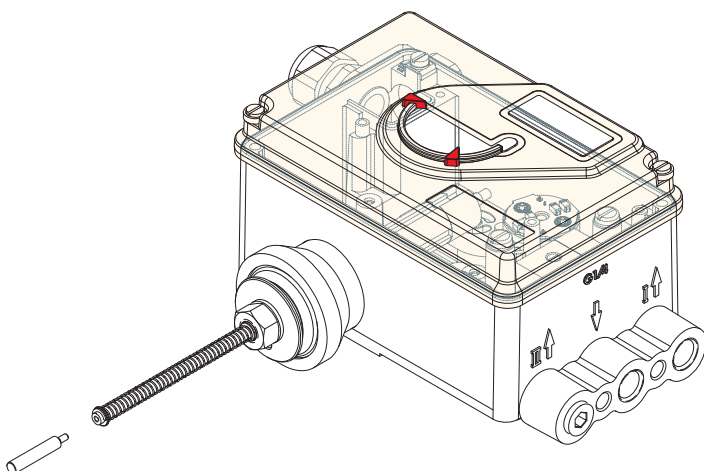


Please consult [TI EVE0105 VLT](#)

### SRD991 for Top Mounting onto small actuators

This version is designed for direct mounting on top of small actuators without yoke - solution for actuators up to 50 mm stroke.

Instead of the rotary potentiometer, a linear pot is used that feeds back the actual position of the actuator.



The Model Code of this basic device is  
SRD991- ..... ZZZ ... -W

The adapter part is dependent on the manufacturer and type of actuator and can be ordered under the code EBZG-TMxx.

Please consult us for the latest list of available adapter parts.

### SRD991 designated for PST (Partial Stroke Test for Emergency Shut Down)

Final control elements in Emergency Shutdown (ESD) applications such as ON-OFF-, Blow Down and Venting-valves remain in one position over a long time without any mechanical movement. These valves can show a tendency to get stuck and as a result might not operate upon demand. This can have a severe impact on the functionality of a Safety System and could result in an adverse condition to the operating personnel, plant equipment and the environment. The Partial Stroke Test (PST) offers operators a tool to identify the troubleshooting function of ESD valves. The test can be easily executed via the FDT-DTM based configuration diagnostic tool VALcare™/Valve Monitor.

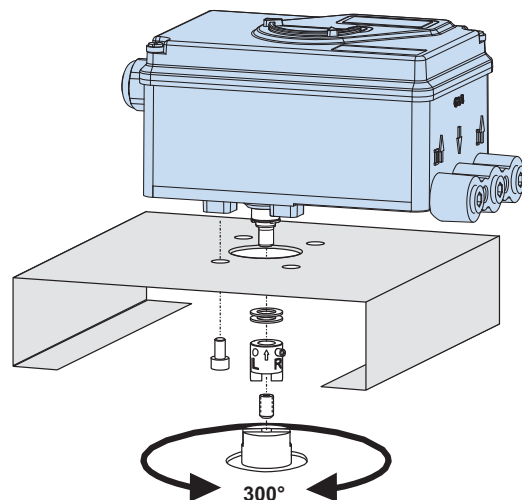


Please consult [TI EVE0105 PST](#)

### SRD991 for actuator with rotation up to 300°

This special version of the SRD991 is designed to be mounted by means of standard attachment kit (like the EBZG-R) onto rotary actuator with rotation up to 300°. This special version is made of a standard SRD991 with new gears.

To be ordered under special version ECEP EP0256



Please consult [TI EVE0105 LR](#)

**FUNCTIONAL SPECIFICATIONS (common data for all versions)**

**Travel range**

Stroke range . . . . . 8 ... 260 mm (0.3 ... 10.2 in)  
 with standard feedback levers; special levers on request  
 Rotation angle range . . . . . up to 95°  
 (without mechanical stop)  
 and up to 300° with a special  
 construction on request  
 (ECEP EPO256)

**Supply**

Supply air pressure . . . . . 1.4 ... 6 bar (20 ... 90 psig)  
 with spool valve <sup>3)</sup> . . . . . 1.4 ... 7 bar (20 ... 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 . . . . . according to ISO 8573-1  
 - Solid particle size and density class 2  
 - Oil rate . . . . . class 3  
 - Pressure dew point 10 K under ambient temperature

The use of filter regulator for air supply of positioner is strongly recommended. It reduces the air pressure to actuator's maximum pressure and keeps it constant.

For supply with Natural Gas instead of compressed air please consult [TI EVE0105\\_G](#).

**Response characteristic <sup>1) 2)</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 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>4)</sup>  | 2 700 (95)  | 5 000 (177)  | 7 500 (265)    |
| with Spool Valve <sup>3)</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.

**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) |

1) Data measured according to VDI/VDE 2177  
 2) With stroke 30 mm and lever length 90 mm  
 3) Spool valve is the type of amplifier used in device SRD991-Cxxxxx-S  
 4) Standard diaphragm amplifier

## FUNCTIONAL SPECIFICATIONS (common data for all versions)

### Features

#### Automatic start-up . . . . . (Autostart functionality)

Automatic determination of the mechanical end positions of the valve (initial value and final value), IP motor parameters, direction of action of the spring and control parameter.

The control parameters are optimized dynamically during this routine.

This procedure makes a perfect adjustment and optimization to the actuator possible without additional manual settings! Several autostart modes are available (details see on next page).

### Options

- Built-in independent inductive limit switches
- Pressure sensors for monitoring of air supply and output pressure I (y1)
- Additional inputs / outputs:
  - Position feedback 4-20 mA + binary alarm output, to be supplied external
  - 2 binary outputs (position alarms)
  - 2 binary inputs, to be supplied external
  - 2 contact inputs, internal supplied
  - 2 binary in-/outputs, to be supplied external

### Operation and Configuration

The local LCD enable a fast and easy configuration as well as univocal diagnostic.

Local . . . . . with local key pads

Display. . . . . Multi-lingual Graphic LCD, some versions with 5 LEDs

The positioner in the version with LCD contains three different menu languages. Standard menu languages:

- English
- German

Freely selectable third language:

- French      - Portuguese   - Spanish
- Italian     - Swedish      - ...

(further menu languages see Model Code page 23).

The third menu language has to be selected and specified with the order, otherwise standard: French.

The third, freely selectable menu language can be modified to another language by means of the VALcare™ DTM. <sup>2)</sup>

The additional languages can be downloaded from our homepage. [PLF selector](#)

### Diagnostics

#### – in the field:

- Status and Diagnostic messages via LCD

#### – via VALcare™ or Valve Monitor DTM <sup>4)</sup>:

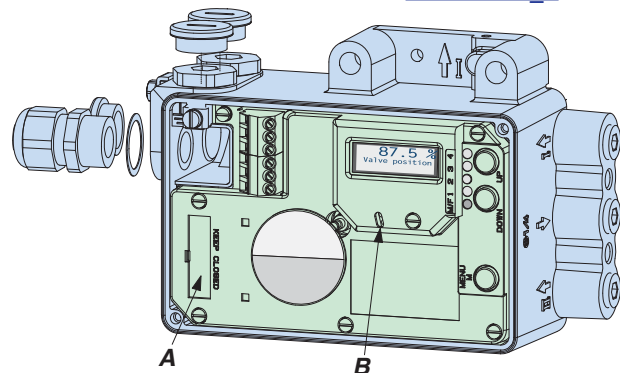
- Service Management for planning and scheduling of service intervals
- Histograms for displaying the position- and response-history over time
- Partial Stroke Test for the functional inspection of safety related actuators
- Hours in operation, cycle counter and travel sum of the actuator are determined
- 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, insufficient air capacity /supply air pressure /positioning pressure)
- if equipped with pressure sensors (optional, see page 3):
  - 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 diagnostic possibilities in control operation by means of external sensors (optional). See also the VALcare™ Documentation.

### Service plug and IrCom

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](#).



If the SRD is equipped with option "IrCom" **B**, communication can take place contactless via infrared with the positioner (even with a closed cover!). A modem "IR Interface" (not Ex) connected via RS232 interface to a PC with VALcare™ (DTM) makes communication possible up a range of approx. 0.5 m.

(If the notebook has an IrDa interface, this cannot be used despite being similar technology as IrDa instruction set has no communication commands for positioners.)

2) With the versions "Intelligent without communication" this is only possible with modem EDC82

3) By means of "Additional inputs / outputs"

4) For the SRD991 without communication the use of the service plug is necessary to have access at the diagnostic with DTM.

**Manual local and remote 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<br>- Standard Autostart<br>- Enhanced Autostart<br>- Smooth response<br>- Fast response |
| 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 of 12.5 % or 1 %                               |
| 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<br>Switch from Link Master to Basic Field Device   |

**Software supported configurations:**

- by means of Hand Held Terminal (HART)
- PC by means of VALcare™ Software
- PC among others by means of PC20/ PC50 /IFDC
- I/A Series System and other DCSs
- Depending on the version, configurations can be achieved by a non-contact, protocol-independent infrared interface by means of IRCOM.

**Failure handling**

In case of Single Acting, Safety position at

- Air supply failure . . . . . pressure y1 = zero
- Electric power failure . . . . . pressure y1 = zero
- Failure of electronics . . . . . pressure y1 = zero

In case of Double Acting or spool valve amplifier, safety position at

- Air supply failure . . . . . pressure y1 = zero / y2 = zero
- Electric power failure . . . . . pressure y1 = zero / y2 = full air supply pressure
- Failure of electronics . . . . . pressure y1 = zero / y2 = full air supply pressure

For all types of amplifiers (with FF H1 or Profibus PA)

- 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

**Spool Valve Amplifier for single and double acting application**

Spool valve amplifier as option for the SRD991 can be used with double acting actuator and also with single acting actuator.

In case of single acting application, one of the pneumatic output must be closed:

- If y1 is used, y2 is closed and failure handling for Electric power failure and Failure of electronics becomes y1=zero.
- If y2 is used, y1 is closed and failure handling for Electric power failure and Failure of electronics becomes y2=full air supply.

## PHYSICAL SPECIFICATIONS (common data for all versions)

### Mounting

#### Attachment to stroke actuators

- direct, FlowPak/FlowTop . . with attachment kit EBZG –E

- for casting yoke

acc. to IEC 534-6 (NAMUR) . with attachment kit EBZG –H  
or –H1

- for pillar yoke

acc. to IEC 534-6 (NAMUR) . with attachment kit EBZG –K  
or –K1

Stroke range

with standard feedback lever (EBZG-A ) 8 ... 70 mm

with extended feedback lever (EBZG-B ) 60 .. 120 mm

with extended feedback lever (EBZG-A1) 110 .. 260 mm

Larger stroke ranges can be realised with special levers.

#### Attachment to rotary actuators

##### acc. to VDI/VDE 3845 ....

with attachment kit . . . . . EBZG -R

- Further attachment kits see ModelCodes page 26

- Mounting orientation see attachment dimensions starting  
from page 27

### Materials

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

All moving parts of

feedback system . . . . . 1.4306 / 1.4571 / 1.4104

Attachment kits . . . . . V4A or Aluminum, finished  
with DD varnish

(depending upon version) . . (Alloy No. 230)

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

Pneumatic diaphragms . . . . PVMQ (Silicone elastomer,  
suitable for use in the paint  
industry)

### Weight

Single acting . . . . . approx. 1.7 kg (3.7 lbs)

Double acting. . . . . approx. 2.0 kg (4.4 lbs)

### Pneumatic connection

NAMUR mounting . . . . . G 1/4 for pipe diameter 6 to  
12 mm (0.24 to 0.47 in) for air  
supply and outputs y1, y2 to  
the actuator;

1/4-18NPT with additional  
connection manifold

Direct mounting . . . . . Instead of the output y1, an  
air connection on the back  
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

Wire cross section . . . . . 0.3 to 2.5 mm<sup>2</sup> (AWG 22-14)

Test sockets . . . . . for options and communicator  
connection

### Ambient conditions

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

The device can be operated at a class Dx location

Ambient temperature

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

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

If the device is exposed to sunlight and the temperature may rise  
above 80 °C, we recommend a sun shade.

Storage conditions

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

Indicators

LCD (visible) <sup>2)</sup> . . . . . –25 ... 70 °C (–13 ... 176 °F)

LEDs (if present). . . . . –40 ... 80 °C (–40 ... 176 °F)

Relative humidity . . . . . up to 100 %

Protection class <sup>3)</sup>

acc. to IEC 529 . . . . . IP 66

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

### Electromagnetic compatibility EMC

Operating conditions . . . . . industrial environment

Immunity according to

EN 61326 . . . . . fulfilled

IEC 61326 . . . . . fulfilled

EN 61000-6-2 . . . . . fulfilled

Emission according to

EN 61326

Class A and Class B . . . . . fulfilled

EN 61000-6-4 . . . . . fulfilled

EN 55011 Group 1,

Class A and Class B . . . . . fulfilled

NAMUR recommendation

EMV NE21 . . . . . fulfilled

## SAFETY REQUIREMENTS

### CE label

Electromagnetic  
compatibility <sup>4)</sup> . . . . . 2004/108/EC

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 (bzw. IEC 1010-1).

- 1) Details see Certificates of Conformity. With Option -T only –20 °C
- 2) Below –20 °C the LCD reacts only slowly; above +70°C the background becomes dark
- 3) Under service as directed
- 4) With PROFIBUS or FOUNDATION Fieldbus only, if shield of wiring is grounded on both sides
- 5) Pneumatic connection 1/4-18NPT made with a separate manifold delivered together with the device



**Electrical classification** <sup>1) 2)</sup>

see Certificates of Conformity EX EVE0105 A

**Type of protection “Intrinsically Safe”**

Type AI 638 . . . . . II 2 G EEx ia IIB/IIC,  
 II 2 G EEx ib IIB/IIC

Temperature classes

Version with HART communication and "without communication":  
 T4 with explosion protection code EA4

Version with communications HART, FOUNDATION Fieldbus and PROFIBUS-PA:

T4 / T6 with explosion protection code EAA  
 Certificate of Conformity . . . . . [PTB 00 ATEX 2128](#)

For use in hazardous areas in circuits certified as intrinsically safe with the following maximum values:

Input circuit: U max = 30 V, I max = 130 mA, P max = 0.9 W  
 Li = negligible, Ci = 1.3 nF (5.3 nF to earth)

Ambient temperature ranges:

Temperature class T4: . . . . -40 °C to + 80 °C

Temperature class T6: . . . . -40 °C to + 55 °C

**Explosion protection Zone 2**

Installation of the SRD991 in potentially explosive atmospheres for Zone 2 (explosion protection EEx nA / nL)

The Intelligent Positioner SRD991, type AI 638 in protection level intrinsic safety "ia" (II 2 G EEx ib/ia IIB/IIC T6/T4 Gb) can be operated in potentially hazardous areas of Zone 2 (EEx nA / nL Gc) also on a normal (not intrinsically safe) power supply, of which the voltage output is not higher than the maximum value for explosion protection intrinsic safety (according to EN 50014 / EN 50020) described in the EC-Type-Examination Certificate PTB 00 ATEX 2128.

The non intrinsic safe circuit has additionally to fulfill the requirements of EN 61010-1 (IEC 1010-1), protection grade III, overvoltage category I.

See our [Manufacturer's Declaration](#) on our website.

**Explosion protection Zone 20**

Certificate of Conformity . . . . . [IBExU08 ATEX 1148](#)  
 EX II 1D Ex iaD 20 T 100°C. . . . . -40 °C < T<sub>a</sub> < +80 °C

Electrical Data

Supply circuit in type of protection Intrinsic safety Ex ia or Ex ib

| Profibus / Fieldbus |         | HART |        |
|---------------------|---------|------|--------|
| Ui                  | 24 V DC | Ui   | 30V DC |
| Ii                  | 380 mA  | Ii   | 130 mA |
| Pi                  | 5.32 W  | Pi   | 0.9 W  |
| Ci                  | 1.3 nF  | Ci   | 1.3 nF |
| Li                  | 5 μH    | Li   | 5 μH   |

Ci: effective inner capacity

Li: effective inner inductivity

The supply connections have an inner capacity of max. 5.3 nF opposite the ground.

The positioner type SRD991 fulfils the requirements of explosion protection for the Equipment Group II and Category 1D in type of protection Intrinsic safety for dust with a maximum surface temperature of 100 °C.

**FM Type of protection**

IS / I, II, III / 1 / ABCDEFG / T4 Ta = 80°C Entity; Type 4X;  
 DOKZ 534 396 058

NI / I / 2 / ABCD; S / II,III / FG / T4 Ta = 80°C; Type 4X;

IS / I,II,III / 1 / ABCDFG / T4 Ta = 55°C Entity; Type 4X;  
 DOKZ 534 396 049

NI / I / 2 / ABCD; S / II,III / 2 / FG / T4 Ta = 80°C, T6 Ta = 55°C; Type 4X

**CSA Type of protection “Intrinsic Safety / Non-Incendive”**

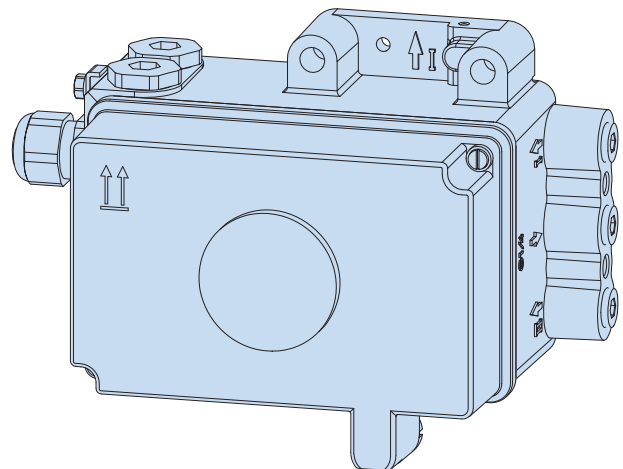
Class I. Groups A, B, C and D: Class II. Groups E, F and G: Class III:

Ex ia IIC T4/T6 IP65:

HART / 4 - 20mA / Profibus/Fieldbus -abbcdefg-j Positioner: 12-36 Vdc. 4-20 mA or 48 Vdc, Intrinsically Safe when installed as per submittor's drawings DOKZ 534 396 067 or DOKZ 534 396 076 : Temp. Code T4 at max amb. 80°C or T6 at max. amb. 55°C

Class I. Div 2. Groups A. B. C and D: Class II. Div 2. Group F and G: Class III. Div 2: IP65 End

With Electrical Classification ATEX + Zone 20 Dust, Codes ED4 and EDA, the Travel indicator is not visible.



1) With appropriate order only  
 2) National requirements must be observed

## SRD991 with HART communication SRD991-xHxxxx

Signal Input . . . . . Two wire system  
 Reverse polarity protection . . standard feature  
 Signal range . . . . . 4 to 20 mA  
 Operating range . . . . . 3.6 to 21.5 mA  
 Input voltage . . . . . DC 12...36 V <sup>1)</sup> (unloaded)  
 Load . . . . . 420 Ohms, 8.4 V at 20 mA  
 Communication signal . . . . . HART, 1200 Baud, FSK  
 (Frequency Shift Key)  
 modulated on 4 to 20 mA  
 0.5 Vpp at 1 kOhm 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 µF.  
 Start-up time . . . . . approx. 3 sec  
 Interruption time without power down:  
 with LCD . . . . . typ. 80 ms <sup>2)</sup>

### Configuration

Local / Display . . . . . see page 6  
 Software/Driver . . . . . VALcare™ or Valve  
 Monitor(DTM)  
 Hardware . . . . . HART Modem for RS232 or  
 USB port  
 Hand Held Terminal . . . . . e.g. HT991, HT375, HHT50  
 I/A Series System . . . . . FBM215 or FBM218  
 (redundant) in combination  
 with CP60 <sup>3)</sup>/ FCP270  
 Other control systems . . . . . AMS, Siemens SIMATIC PDM  
 (ProcessDeviceManager)  
 Any decentralised Control  
 System

### DTM for HART

#### Local Configuration

LCD Display . . . . . see page 6

#### Trough HART Communication

- PC20 standalone Software for PC (only via RS232)
- VALcare™
- Valve Monitor
- Can be integrated onto any FDT Frame onto any Host  
 suspending of FDT Frame
- H275/375
- AMS for Emerson
- PDM
- via service port

1) On request we can specify higher voltage limits

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

3) Check CP for suitable ECBs

## SRD991 with communication PROFIBUS-PA and FOUNDATION Fieldbus H1 SRD991-xPxxxx or SRD991-xQxxxx

### PROFIBUS-PA

Data transfer . . . . . according 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 6  
Software . . . . . VALcare™ -DTM  
Hardware . . . . . PC- or PCMCIA- interfaces  
from Softing  
I/A Series System . . . . . FBM 223 in combination with  
CP60  
Other control systems . . . . . All Profibus-PA- compatible,  
e.g. Siemens SIMATIC PDM  
(Process Device Manager)

### FOUNDATION Fieldbus H1

Data transfer . . . . . FF Specification Rev. 1.4,  
Link-Master (LAS)  
Certified according to . . . . . ITK 4.01  
Function Blocks . . . . . PID, AO, Transducer,  
Resource  
Certified according to . . . . . ITK 4.6  
Function Blocks . . . . . PID, AO, 2xDI, 1xDO  
Transducer, Resource  
Additional functionality . . . . . Flat Addressing  
DD files . . . . . the actual file can be down-  
loaded from our [homepage](#)

### Configuration

Local / Display . . . . . see page 6  
Software . . . . . VALcare™ -DTM  
or National Instruments  
NI-FBUS configurator  
Hardware . . . . . FBUS-interfaces from  
National Instruments  
(AT-FBUS and  
PCMCIA- FBUS)  
I/A Series System . . . . . FBM220 or FBM221 in  
combination with CP60  
Other control systems . . . . . All FOUNDATION Fieldbus  
H1- compatible, e.g. SMAR, Fisher Rosemount Delta-V,  
Honeywell, Yokogawa, ABB

### For both fieldbus devices

Input signal . . . . . digital  
Supply voltage . . . . . DC 9 to 32 V <sup>1)</sup>  
max. Supply voltage . . . . . DC 48 V  
Operating current . . . . . 10.5 mA ± 0.5 mA (base current)  
Current amplitude . . . . . ± 8 mA  
Fault current . . . . . base current + 0 mA  
(base current + 4 mA by means of independent  
FDE-safety circuit) according to IEC 1158-2  
Operating values . . . . . according to IEC 1158-2  
Start-up time (init phase) . . . . . approx. 2 sec  
Bus connection . . . . . Fieldbus interface based on  
IEC 1158-2 according to FISCO-Model  
Power supply . . . . . Power supply is achieved  
dependant on the application by means of fieldbus  
power supply units or segment coupler

### Electrical classification thereto

see Page 9

1) Data of "Intrinsically Safe" version

**SRD991 without communication****SRD991-xDxxxx**

Signal Input . . . . . Two wire system  
Reverse polarity protection . . Standard feature  
Signal range . . . . . 4 to 20 mA  
Operating range . . . . . 3.6 to 21.5 mA  
Input voltage . . . . . DC 8.5 to 36 V <sup>1)</sup> (unloaded)  
Load . . . . . 300 Ohms, 6 V at 20 mA  
With applications without communication the capacity  
parallel to input may not be higher than 100  $\mu$ F.  
Start-up time . . . . . approx. 3 sec  
Interruption time without power down:  
with LCD . . . . . typ. 80 ms <sup>2)</sup>

**Electrical classification thereto**

see Page 9

**Configuration**

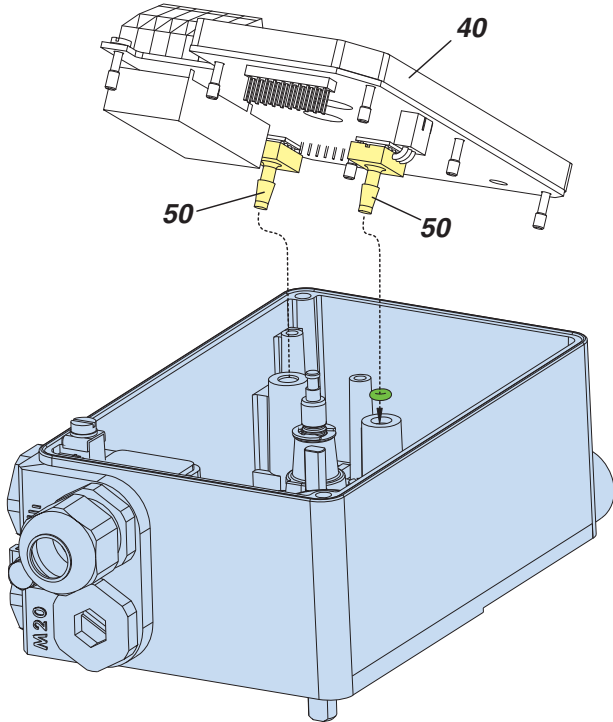
Local / Display . . . . . see page 6  
Software . . . . . VALcare™ (DTM)  
Hardware . . . . . per modem EDC82

1) On request we can specify higher voltage limits

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

**OVERVIEW ADDITIONAL EQUIPMENT**  
(built into any basic device)

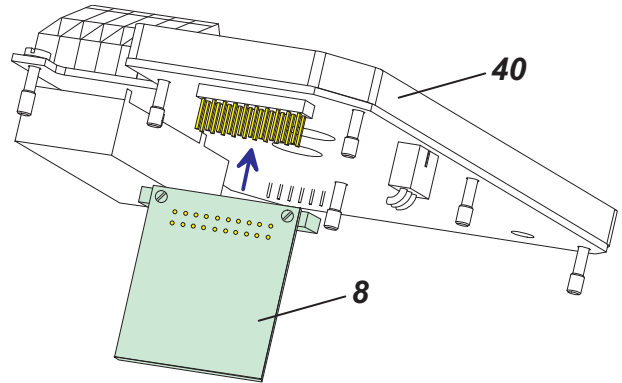
**Built-in Pressure sensors for Premium Diagnostic, Code Option -B**  
For supply air and output y1 to actuator  
Measuring range . . . . . 0 to 8 bar (0 to 120 psig)  
Accuracy . . . . . 2 %  
Temperature influence . . . . . 0.5 % / 10 K (-40 to 80°C)



Pressure sensors 50

**Additional Inputs / Outputs:**

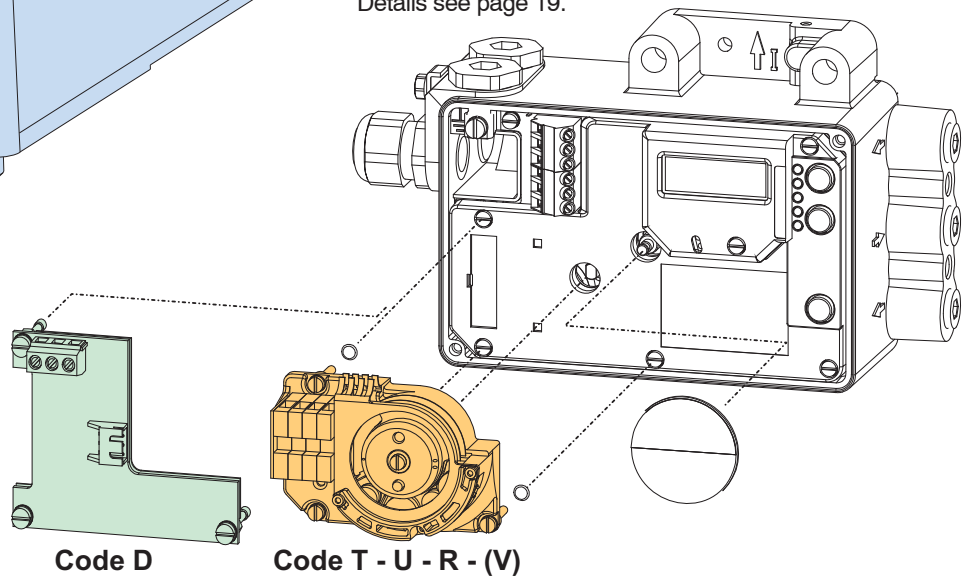
One module "Additional inputs / outputs" 8 can be plugged onto main electronics 40 :



- 2 Binary inputs or
  - 2 Binary outputs or
  - 2 Binary in/outputs or
  - Position feedback and Alarm
- Details see following pages.

**Built-in Limit Switch**

Details see page 19.



**Parts Kits** for additional installation of auxiliary functions

| Model code, Additional inputs / outputs              | Supply   | Parts Kit      |
|--|----------|----------------|
| Code B: 2 Binary inputs (Contact inputs)             | internal | EW 411 407 325 |
| Code E: 2 Binary in/outputs                          | external | EW 411 407 956 |
| Code P: 2 Binary outputs                             | external | EW 411 407 316 |
| Code F: Position feedback 4-20 mA and Alarm (ATEX)   | external | EW 426 434 228 |
| Code Q: Position feedback 4-20 mA and Alarm (FM/CSA) | external | EW 411 407 282 |
| Model code, Limit signal switch                      |          |                |
| Code T: Limit signal switch, normal version          | external | EW 426 164 012 |
| Code U: Limit signal switch, security version        | external | EW 426 164 021 |
| Code R: Limit signal switch, 3-wire                  | external | EW 426 164 057 |
| Code V: Limit signal switch, micro switches          | external | EW 426 164 066 |
| Code D: Entry for remote potentiometer               | internal | EW 426 164 093 |



**Additional Inputs / Outputs:**

**Two binary outputs** (limit signals) – Code P

Stroke / angle derived from positioner feedback  
 2 galvanically separated limit signals  
 Signaling of limit value exceeding of the measured valve stem position.  
 Limit signals / alarms freely configurable via local keys or via communication.

Two-wire system, according to DIN 19234, for external supply.

supply voltage . . . . . DC 8 to 36 V <sup>1) 2)</sup>

Logic:

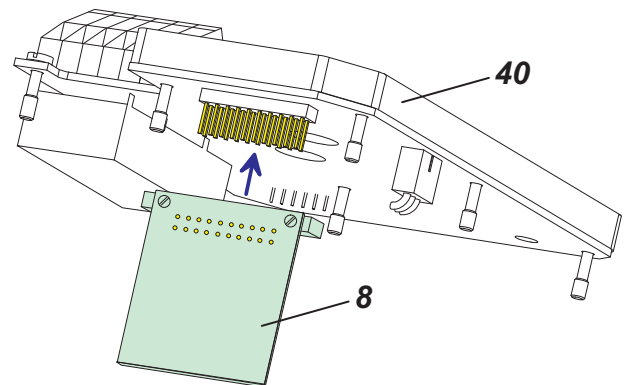
- limit value not exceeded . . . < 1 mA
- limit value exceeded. . . . . > 2.2 mA (typ. 6 mA)
- device fault. . . . . < 50  $\mu$ A

configurable as switch output:

- limit value not exceeded . . . < 50  $\mu$ A
- limit value exceeded. . . . . > 20 mA/20 V / > 40 mA/10 V (power derated)

Reference: AB1 for upper, AB2 for lower limit

- Terminals for AB1<sup>3)</sup> . . . . . A: 81+
- B: 82–
- AB2<sup>3)</sup> . . . . . C: 83+
- D: 84–



One module “Additional inputs / outputs” **8** can be plugged onto main electronics **40** :

- 2 Binary inputs or
- **2 Binary outputs** or
- 2 Binary in/outputs or
- Position feedback and Alarm

**Electrical Classification ATEX:**

Types of protection and temperature classes as basic device, see page 9.

Additions for this option, Type AI 638 P, in EC- Certificate of Conformity [PTB 00 ATEX 2128](#):

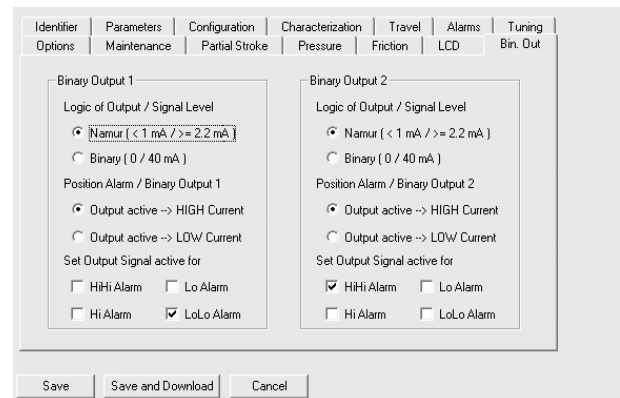
For use in hazardous areas in circuits certified as intrinsically safe with the following maximum values:

$U_i = 16\text{ V}$ ,  $I_i = 80\text{ mA}$ ,  $P_i = 250\text{ mW}$

Internal capacitance and inductance:  $C_i = 26\text{ nF}$ ,  $L_i = 5\text{ }\mu\text{H}$

The electric circuits of “2 binary outputs” are galvanically separated from all other circuits and from earth.

**DTM Configuration window**



1) Other values in hazardous areas  
 2) On request we can specify higher voltage limits  
 3) Terminals 81 ... 84 are marked as K21 ... K32 within certificate of conformity.

## Additional Inputs / Outputs:

### Two binary in/outputs – Code E

This option board is recommended for PST applications.

#### Output:

2 galvanically separated signals

Limit signals / alarms freely configurable via local keys or via communication.

Two-wire system, according to DIN 19234, for external supply.

supply voltage . . . . . DC 8 to 36 V <sup>1) 2)</sup>

Configured as NAMUR signal:

Logic:

- limit value not exceeded . . . < 1 mA
- limit value exceeded. . . . . typ. 6 mA
- device fault. . . . . < 50 µA

Configured as On/Off signal:

- 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 value

- Terminals for AB1<sup>3)</sup> . . . . . A: 81+
- B: 82–
- AB2<sup>3)</sup> . . . . . C: 83+
- D: 84–

#### Input:

The kind of Signals Input can be configured as On/Off or as NAMUR signal in accordance (DIN 19234)

Configured as NAMUR signal:

Unloaded supply voltage . . . > 8 V

Input

- Logic 0. . . . . > 0.35 mA, < 1 mA
- Logic 1. . . . . > 2.2 mA, < 6 mA
- Input current Limited to. . . . . approx. 6 mA

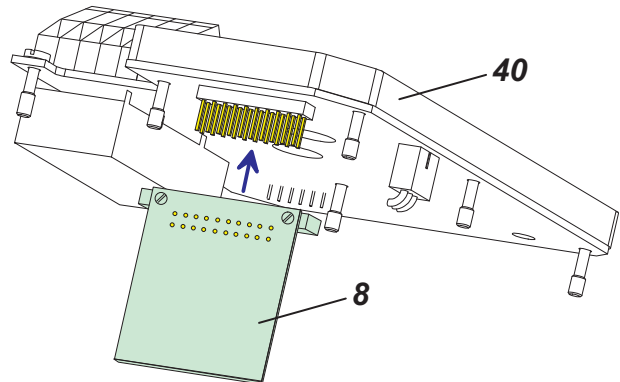
Configured as On/Off signal:

Input:

- Logic 0. . . . . < 4 mA
- Logic 1. . . . . > 6 mA
- Signal Voltage Range . . . . . 8 to 36 V <sup>1)</sup>

## Electrical Classification ATEX:

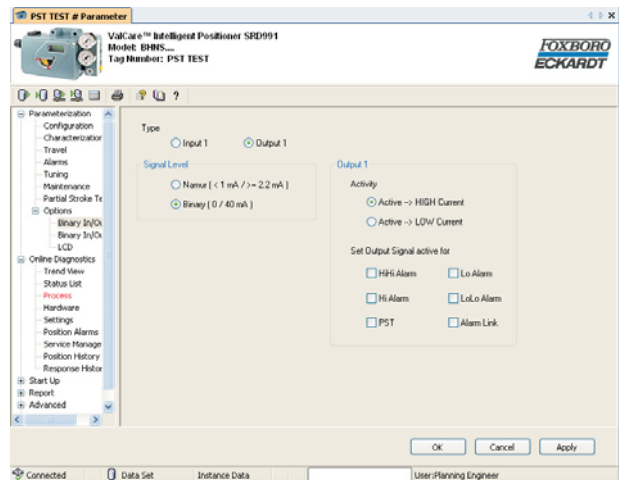
See [PTB 00 ATEX 2128](#) Certificate



One module “Additional inputs / outputs” **8** can be plugged onto main electronics **40** :

- 2 Binary inputs or
- 2 Binary outputs or
- **2 Binary in/outputs** or
- Position feedback and Alarm

## DTM Configuration window



1) Other values in hazardous areas  
 2) On request we can specify higher voltage limits  
 3) Terminals 81 ... 84 are marked as K21 ... K32 within certificate of conformity.





**Entry for remote potentiometer**  
(for remote mounting main unit)

– Code D

This remote application is used in applications where high temperatures or vibration are present and can result in negative influences to the control. It can also be used in places not easy to reach, to ensure an easier handling of the unit, or for cylinders with large strokes.

The Positioner SRD991 (Remote unit) is mounted far away from the valve or cylinder in a safe environment.

The Potentiometer unit is mounted on the valve or cylinder. This potentiometer unit can be made of a derivative version of the SRI990 positioner (only potentiometer in the housing) or of an external potentiometer like a linear potentiometer for application onto cylinders, for example.

This option is to be used with a potentiometer unit 3 wires system with ca. 5 kOhm resistance.

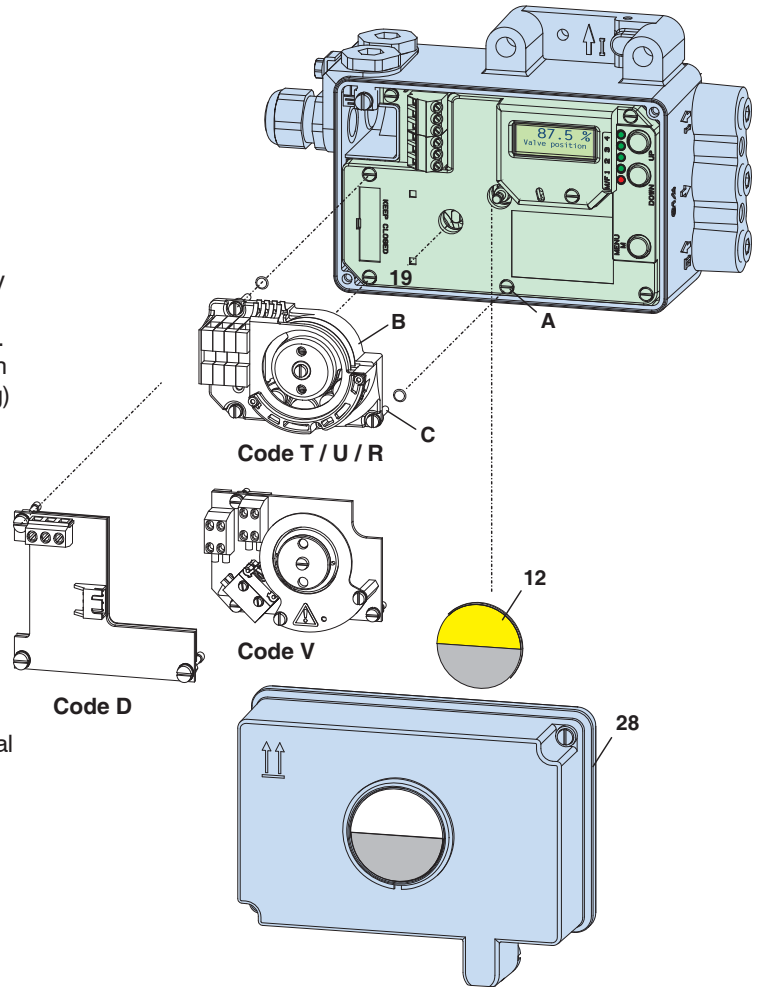
If the following requirements are observed, the set-up is insensitive to electrical disturbances caused by high electromagnetic fields, EMC and HF-radiation.

Cable Length max. . . . . 10 m (32 ft)

Cable Specification (not supplied by Foxboro Eckardt):

- 3-wire twisted pair, shielded
- Shield needs to be connected on both ends to the internal ground
- Shield endings need to be kept very short when connecting to the ground
- A HF cable gland is not required

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

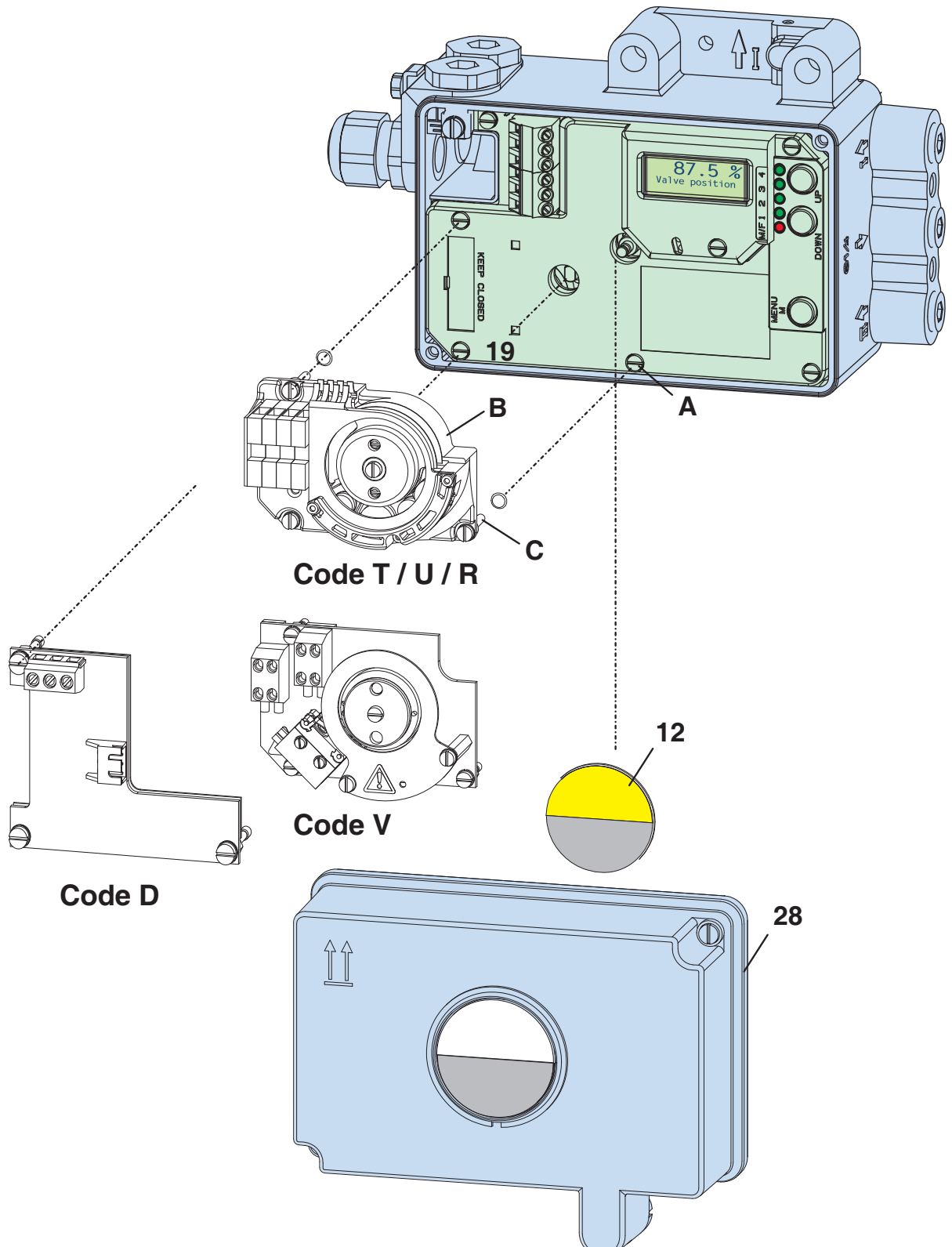


**Built-in Limit Switches**

- Stroke / angle derived from positioner feedback.
- standard version (SJ2-N) . . . . . Code T (only to -20°C)
  - security version (SJ2-SN) . . . . . Code U
  - 3-wire (SI2-K08-AP7/ PNP) . . . . . Code R (no Ex)
  - Micro switches . . . . . Code V (no Ex)
  - Entry for remote potentiometer . . . Code D

**Materials**

- Control vanes. . . . . Aluminum
- Transmission shaft. . . . . 1.4571



**Inductive Limit Switch (Code T, U)**

Output . . . . . 2 inductive proximity sensors  
 acc. to DIN 19 234 or NAMUR for connection to  
 switching amplifier <sup>1)</sup>

Current consumption  
 vane clear . . . . . > 2.2 mA  
 vane interposed . . . . . < 1 mA

for control circuit with the following electrical values:  
 supply voltage . . . . . DC 8 V, R<sub>i</sub> approx. 1 kOhm  
 supply voltage range. . . . . DC 5 to 25 V (with "no Ex")  
 residual ripple . . . . . < 10 % p.p.  
 permissible  
 line resistance . . . . . < 100 Ohms

Response characteristic <sup>2) 3)</sup>  
 switching differential . . . . . < 1 %  
 switching point repeatability < 0.2 %

Terminals for GW1 . . . . . 41+, 42–  
 GW2 . . . . . 51+, 52–

**Electrical Classification ATEX of versions "T" and "U":**

Types of protection and temperature classes as basic device, see page 9.

Additions for this option, Type AI 638 K, in EC- Certificate of Conformity [PTB 00 ATEX 2128](#):

Types of protection and temperature classes as basic device. For use in hazardous areas in circuits certified as Intrinsically Safe with the following maximum values:

U<sub>i</sub>= 16 V, I<sub>i</sub>= 25 mA, P<sub>i</sub>= 64 mW

Internal capacitance and inductance: C<sub>i</sub>= 30 nF, L<sub>i</sub>= 100 μH  
 The electric circuits of "Built-in Limit Switch" are galvanically separated from all other circuits and from earth.

**Inductive Limit Switch, three-wire system**

– Code R

Input . . . . . Stroke / angle from actuator  
 via positioner feedback lever

Output . . . . . 2 inductive proximity sensors,  
 three-wire system,  
 LED indication,  
 contact, pnp <sup>2)</sup>

Supply voltage U<sub>s</sub> . . . . . DC 10 to 30 V  
 Residual ripple . . . . . ± 10 %, U<sub>s</sub> = 30 V  
 Switching frequency. . . . . 2 kHz  
 Constant current . . . . . 100 mA  
 Response characteristic <sup>6)</sup>  
 Gain . . . . . continuously adjustable  
 from 1:1 to approx. 7:1

Switching differential . . . . . < 1 %  
 Switching point  
 repeatability. . . . . < 0.2 %

Terminals for GW1 . . . . . 42  
 GW2 . . . . . 52  
 Supply. . . . . 41+, 43–

1) Operating mode min. (= low) / max. (= high) selectable by adjustment of switch vanes

2) Data measured according to VDI/VDE 2177

3) With stroke 30 mm and lever length 90 mm

**Mechanical Switches (Micro Switches) Code V**

(only without Ex protection)  
 Stroke / angle derived from positioner feedback lever

Output . . . . . 2 mechanical switches (Micro  
 switches) <sup>5) 6)</sup>

Manufacturer . . . . . Saia-Burgess  
 Type . . . . . V4NS-C4-AC1-UL  
 (UL- and CSA-approved)

Parts set for subsequent mounting:  
 Code V . . . . . EW 426 164 066

**Absolute limit values AC**

of mechanical switches built into positioner:

U<sub>max</sub>. . . . . 130 V AC <sup>7)</sup>

I<sub>max</sub> . . . . . 0.5 A (resistive Load) <sup>7)</sup>

I<sub>max</sub> . . . . . 0.03 A (inductive Load) <sup>8)</sup>

**Absolute limit values DC**

of mechanical switches built into positioner: <sup>9)</sup>

U<sub>max</sub>. . . . . 30 V DC

I<sub>max</sub> . . . . . 1 A

Switching Differential: . . . . . < 2.5 %

Terminals for SW1 . . . . . 41, 42

SW2 . . . . . 51, 52

The circuit of the mechanical switches have to be protected by a suitable fuse. The diameter of the protective conductor needs to be at least 1.5 mm<sup>2</sup> / AWG 16.

**Input for Remote Potentiometer (code D)**

This option is necessary when the positioner is not mounted directly onto the valve but far away of it. In this case a potentiometer with 3 wires must be mounted onto the valve to give the valve position to the controller.

Remote potentiometer type to use in connection to this option:

Resistance of 5 kOhm up to 10 kOhm  
 (for other value of resistance please consult us).

If the following requirements are observed, the set-up is insensitive to electrical disturbances caused by high electromagnetic fields, EMC and HF-radiation.

Cable length max. . . . . 10 m (32 ft)

Cable specification (not supplied by Foxboro Eckardt):

- 3-wire twisted pair, shielded
- Shield needs to be connected on both ends to the internal ground
- Shield endings need to be kept very short when connecting to the ground
- A HF cable gland is not required

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

5) Operating mode min. (=low) / max. (=high) selectable by adjusting the respective vane

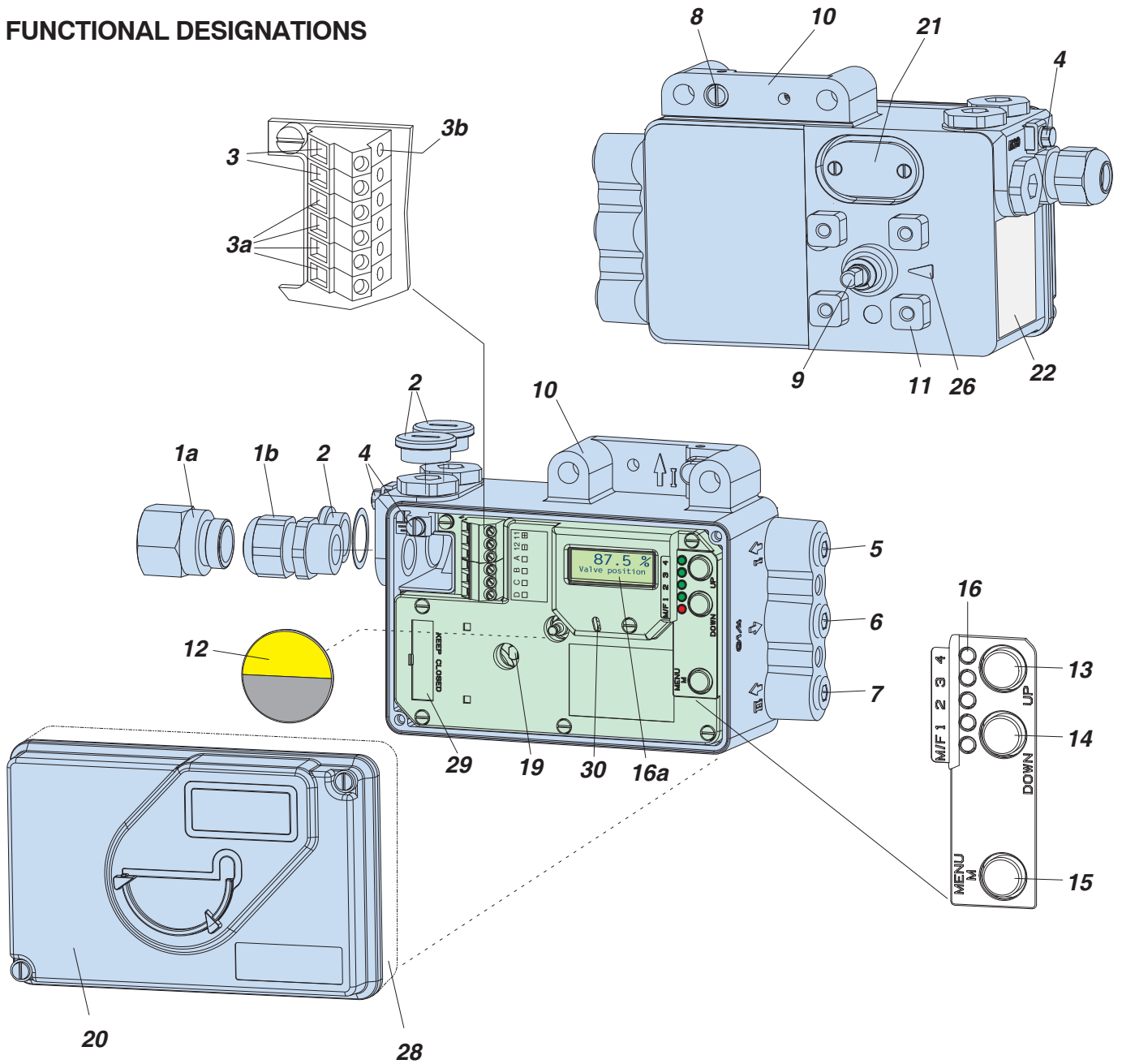
6) Operating mode normally open / normally closed selectable by vane adjustment

7) Approval according to UL (UL 1054) and CSA (CSA 22.2 No. 55) at 6,000 operations and T = 65 °C / 149 °F

8) Based on EN 61058-1, at 10,000 operations and T = 85 °C / 185 °F

9) General rating at 50,000 operations and T = 85 °C / 185 °F

**FUNCTIONAL DESIGNATIONS**



- 1a** Adapter, eg. 1/2"-14 NPT
- 1b** Cable gland
- 2** Plug, interchangeable with Pos. 1
- 3** Screw terminals <sup>1)</sup> (11 / 12) for input (w) or for bus connection IEC 1158-2
- 3a** Screw terminals <sup>1)</sup> for additional inputs / outputs
- 3b** Test sockets Ø 2 mm, integrated in terminal block
- 4** Ground connection
- 5** Female thread G 1/4 for output I (y1)
- 6** Female thread G 1/4 for air supply (s)
- 7** Female thread G 1/4 for output II (y2)
- 8** Direct attachment hole for output I (y1)
- 9** Feedback shaft
- 10** Connection manifold for attachment to stroke actuators (not with VDI/VDE 3847 version)
- 11** Connection base for attachment to rotary actuators
- 12** Travel indicator

- 13** Key UP
- 14** Key DOWN
- 15** Key M (Menu)
- 16** Status display (1 red LED, 4 green LEDs) <sup>2)</sup>
- 16a** LCD with true text in 3 different languages
- 19** Fixing shaft for limit switch
- 20** Cover with window to 12
- 21** Air vent, dust and water protected
- 22** Data label
- 26** Arrow is perpendicular to shaft 9 at angle 0 degree
- 28** High cover with built-in limit switch
- 29** Plug for service connector
- 30** IrCom interface

1) Alternatively WAGO terminals instead of screw terminals  
 2) Depending on the version, the device is equipped with or without LEDs

**MODEL CODES SRD991**

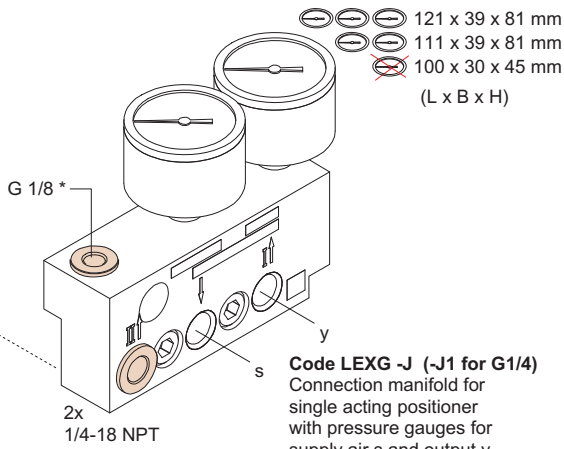
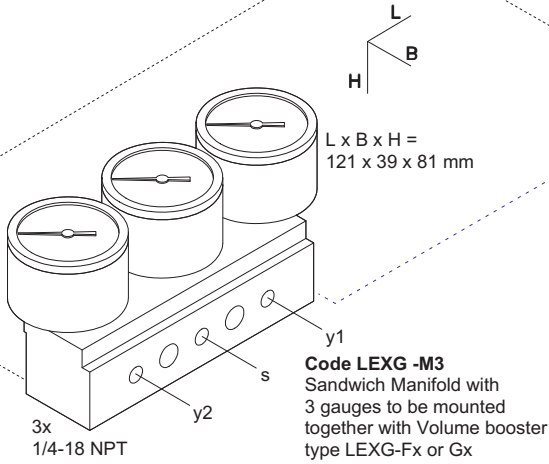
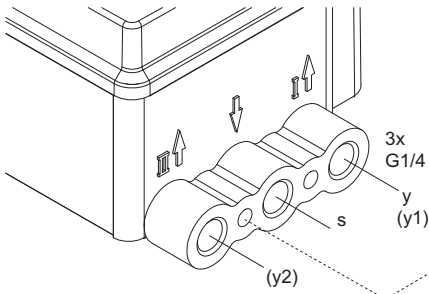
|  |               |    |  |  |  |  |  |   |        |
|--|---------------|----|--|--|--|--|--|---|--------|
| <b>Intelligent Positioner</b>  | <b>SRD991</b> |    |  |  |  |  |  |   | 010811 |
| <b>VERSION</b>   |               |    |  |  |  |  |  |   |        |
| Single Acting . . . . .  |               | -B |  |  |  |  |  |   |        |
| Double Acting . . . . .  |               | -C |  |  |  |  |  |   |        |
| <b>Input/Communication</b>   |               |    |  |  |  |  |  |   |        |
| Intelligent without communication (4 - 20 mA) . . . . .  |               | D  |  |  |  |  |  |   |        |
| HART Communication (4 - 20 mA) . . . . .   |               | H  |  |  |  |  |  |   |        |
| FoxCom Communication (Digital/IT2) . . . . . (1)   |               | F  |  |  |  |  |  |   |        |
| PROFIBUS-PA (acc. to FISCO) . . . . .  |               | P  |  |  |  |  |  |   |        |
| FOUNDATION Fieldbus H1 (incl. PID-Function Block, acc. to FISCO) . . . . .   |               | Q  |  |  |  |  |  |   |        |
| <b>Additional Inputs/Outputs</b>   |               |    |  |  |  |  |  |   |        |
| Prepared For Additional In-/Outputs . . . . .  |               | N  |  |  |  |  |  |   |        |
| Two Binary Outputs . . . . .   |               | P  |  |  |  |  |  |   |        |
| Position Feedback 4 - 20 mA and one Binary Output for Alarm (g)(e) . . . . .   |               | Q  |  |  |  |  |  |   |        |
| Binary Inputs . . . . . (z)  |               | B  |  |  |  |  |  |   |        |
| Binary Inputs-Outputs (mandatory for ESD application) . . . . . (z)  |               | E  |  |  |  |  |  |   |        |
| Position Feedback 4 - 20 mA and one Binary Output for Alarm (z) . . . . .  |               | F  |  |  |  |  |  |   |        |
| <b>Built-In Limit Switch</b>   |               |    |  |  |  |  |  |   |        |
| Without Built-In Limit Switch . . . . .  |               | S  |  |  |  |  |  |   |        |
| Inductive Limit Switch - Intrinsicly Safe (Standard Version SJ2-N) . . . . .   |               | T  |  |  |  |  |  |   |        |
| Inductive Limit Switch - Intrinsicly Safe (Security Version SJ2-SN) . . . . .  |               | U  |  |  |  |  |  |   |        |
| Inductive Limit Switch - Three wire version . . . . . (u)  |               | R  |  |  |  |  |  |   |        |
| Mechanical Switches (Micro-Switches) / UL- and CSA-approved . . . . . (u)  |               | V  |  |  |  |  |  |   |        |
| Potentiometer Input - CEM Filter (for Remote Mounting - main unit) . . . . . (k)   |               | D  |  |  |  |  |  |   |        |
| <b>Cable Entry</b>   |               |    |  |  |  |  |  |   |        |
| M20 x 1.5 Without Cable Gland . . . . .  |               |    |  |  |  |  |  | 1 |        |
| 1/2"-14 NPT (with Adapter(s) M20x1.5 to 1/2"-14 NPT) . . . . .   |               |    |  |  |  |  |  | 6 |        |
| M20 x 1.5 With One Plastic Cable Gland . . . . .   |               |    |  |  |  |  |  | 7 |        |
| <b>Electrical Classification</b>   |               |    |  |  |  |  |  |   |        |
| Without Ex. . . . .  |               |    |  |  |  |  |  |   | ZZZ    |
| for Input/Communication D, H. . . . . (y)  |               |    |  |  |  |  |  |   |        |
| for Input/Communication H, F. . . . . (x)  |               |    |  |  |  |  |  |   |        |
| EEx ia IIC T4 according to ATEX . . . . . (c)  |               |    |  |  |  |  |  |   | EA4    |
| II 2 G EEx ia IIC T6 according to ATEX. . . . . (d)  |               |    |  |  |  |  |  |   | EAA    |
| II 3 D/D Ex n T4 according to ATEX . . . . . (b)   |               |    |  |  |  |  |  |   | 2C4    |
| II 3 D/D Ex n T6 according to ATEX . . . . . (b)   |               |    |  |  |  |  |  |   | 2CA    |
| II 2 G EEx ia IIC T4 according to ATEX + Zone 20 Dust . . . . . (c)  |               |    |  |  |  |  |  |   | ED4    |
| II 2 G EEx ia IIC T6 according to ATEX + Zone 20 Dust . . . . . (d)  |               |    |  |  |  |  |  |   | EDA    |
| FM Nonincendive for Class I, Division 2, Groups A, B, C, D, Hazardous Locations Indoors And Outdoors, NEMA 4X. . . . .               |               |    |  |  |  |  |  |   | NFM    |
| for Input/Communication D, H . . . . . (y)   |               |    |  |  |  |  |  |   |        |
| FM Approved for Intrinsic Safety Class I, Division 1, Groups A, B, C, D, Hazardous Locations Indoors And Outdoors, NEMA 4X. . . . .  |               |    |  |  |  |  |  |   | FAA    |
| for Input/Communication D, H . . . . . (y)   |               |    |  |  |  |  |  |   |        |
| CSA Approved for Intrinsic Safety Class I, Division 1, Groups A, B, C, D, Hazardous Locations Indoors And Outdoors, NEMA 4X. . . . . |               |    |  |  |  |  |  |   | CAA    |
| for Input/Communication D, H . . . . . (y)   |               |    |  |  |  |  |  |   |        |
| GOST Approved for Intrinsic Safety ExialICT4 . . . . . (c)   |               |    |  |  |  |  |  |   | GA4    |
| GOST Approved for Intrinsic Safety ExialICT6..T4 . . . . . (d)   |               |    |  |  |  |  |  |   | GAA    |
| <b>Attachment Kit</b>  |               |    |  |  |  |  |  |   |        |
| Order as Auxiliary . . . . .   |               |    |  |  |  |  |  |   | N      |
| <b>Manifold</b>  |               |    |  |  |  |  |  |   |        |
| Pneumatic connection 1/4 - 18 NPT made of an additional manifold . . . . .   |               |    |  |  |  |  |  |   | Y      |
| Pneumatic connection G 1/4. . . . .  |               |    |  |  |  |  |  |   | R      |
| (continued on next page)   |               |    |  |  |  |  |  |   |        |

**MODEL CODES SRD991 (continued)**

| <b>OPTIONS</b>  |      |
|---|------|
| Premium Diagnostics Features (made with built-in Pressure Sensors) (v) . . . . .        | -B   |
| Positioner free of copper and its alloys . . . . .                                      | -C   |
| Infrared Interface For Communication By Means Of IRCOM . . . . .                        | -I   |
| Pneumatic Amplifier in the "Spool Valve" Version . . . . .                              | -S   |
| Approved for SIL2 / SIL3 application . . . . .  | -Q   |
| Custom Configuration . . . . .  | -T   |
| Version of Positioner according to VDI/VDE 3847. . . . .                                | -N   |
| Version for ESD Valve with PST functionalities . . . . .                                | -E   |
| Stainless Steel Housing . . . . .   | -Z   |
| Stainless Steel Housing without SST gauges . . . . .                                    | -Z1  |
| Top Mounting version of SRD991 with built-in linear potentiometer. . . (j)(l) . . . . . | -W   |
| LCD with Menu-Language in English / German / French. . . . .                            | -V01 |
| LCD with Menu-Language in English / German / Spanish . . . . .                          | -V02 |
| LCD with Menu-Language in English / German / Portuguese . . . . .                       | -V03 |
| LCD with Menu-Language in English / German / Polish . . . . .                           | -V04 |
| LCD with Menu-Language in English / German / Czech . . . . .                            | -V05 |
| LCD with Menu-Language in English / German / Italian . . . . .                          | -V06 |
| LCD with Menu-Language in English / German / Turkish . . . . .                          | -V07 |
| LCD with Menu-Language in English / German / Swedish . . . . .                          | -V08 |
| LCD with Menu-Language in English / German / Finnish . . . . .                          | -V09 |
| LCD with Menu-Language in English / German / Chinese . . . . . (b)                      | -V10 |
| LCD with Menu-Language in English / German / Russian . . . . .                          | -V11 |
| LCD with Menu-Language in English / German / Hungarian . . . . .                        | -V12 |
| LCD with Menu-Language in English / German / Serbian . . . . .                          | -V13 |
| LCD with Menu-Language in English / German / Dutch . . . . .                            | -V14 |
| LCD with Menu-Language in English / German / Romanian . . . . .                         | -V15 |
| LCD with Menu-Language in English / German / Lithuanian . . . . .                       | -V16 |
| <b>Tag No. Labeling</b>   |      |
| Stamped With Weather Resistant Color . . . . .  | -G   |
| Stainless Steel Label Fixed With Wire . . . . .   | -L   |

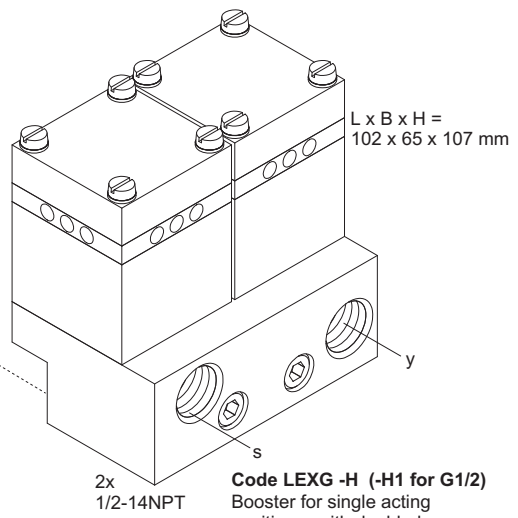
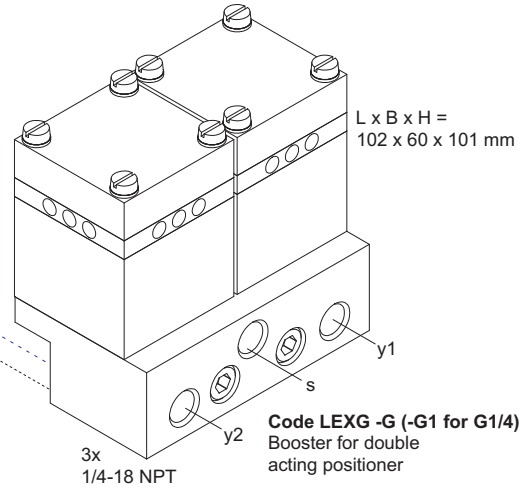
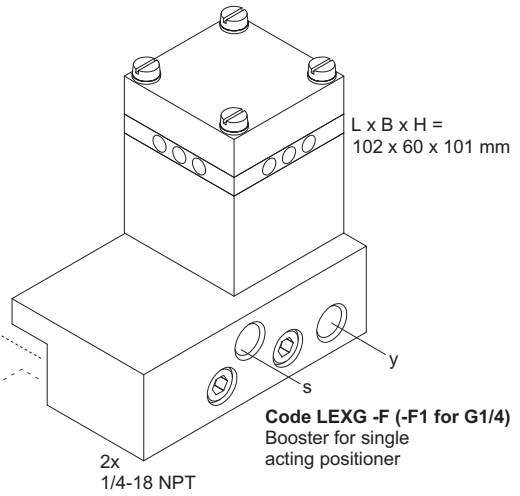
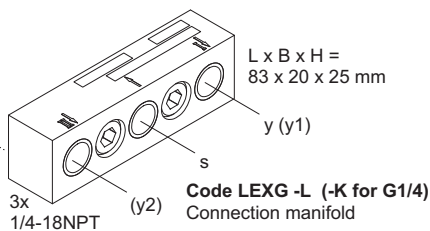
- (a) ONLY WITH (additional Inputs/Outputs E) AND (Optional Feature -B)
- (b) Not released
- (c) Only with Input/Communication D, H
- (d) Only with Input/Communication F, H, P and Q
- (e) NOT WITH (electrical certification ZZZ, EA4, EAA, GA4, GAA)
- (f) Available WITH (Version: C) AND (Built-in Limit Switch: S, D) AND (Electrical Classification: ZZZ, EA4, EAA, GA4, GAA, NFM, FAA) OR WITH (Version: B) AND (Built-in Limit Switch: S, D) AND (Electrical Classification: ZZZ, EA4, EAA, GA4, GAA, NFM, FAA)
- (g) Available ONLY WITH (Electrical Classification:FAA, NFM, CAA)
- (h) Available WITH (Version: B) OR WITH (Version: C) AND (Optional Features: S)
- (j) ONLY WITH (Built-in limit switch -S) AND (Electrical Classification -ZZZ)
- (k) Only with ELECTRICAL CLASSIFICATION EA4, EAA or ZZZ
- (l) NOT WITH (optional feature -N OR Z OR Z1)
- (n) Only with Version -C
- (s) Only available with Optional Feature LCD (-V01 to -Vxx)
- (v) Only available for Input/Communication F, H, P and Q in connection with Electrical Classification ZZZ, FAA, NFM, EAA, CAA & GAA
- (w) Only available for Version single-acting -B in connection with Input/Communication -D and -H
- (x) Only in connection with Optional Features -B
- (y) Not with Optional Features -B
- (z) Not available with Electrical Classification FAA, NFM and CAA
- (1) On request

Accessories, for all basic devices



Code LEXG -M (-M1 for G1/4)  
Connection manifold for double acting positioner with pressure gauges for supply air s, outputs y1 and y2

Code LEXG -N (-N1 for G1/4)  
as -M, -M1, but without pressure gauges



\* Unused threads for pressure gauges are closed by means of lock screw Part No. 425 024 013.



**Model Codes Accessories**

| <b>Accessories for intelligent Positioners</b>  |             |
|---|-------------|
| <b>Cable Gland</b>  | <b>BUSG</b> |
| M20 x 1.5 stainless steel . . . . .   | -S6         |
| M20 x 1.5 plastic, color gray . . . . .   | -K6         |
| M20 x 1.5 plastic, color blue . . . . .   | -K7         |
| M20 x 1.5 plastic, 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         |
| <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>Manifold (for SRD960, SRD991 and SRI990)</b>   | <b>LEXG</b> |
| With Connection G 1/4 . . . . .   | -K          |
| <b>Gauge Manifold (for SRD960, SRD991 and SRI990 with 1/4 - 18 NPT connection)</b>                              |             |
| Without gauges . . . . .  | -N          |
| With gauges for Version single acting . . . . .   | -J          |
| With gauges for Version double acting . . . . .   | -M          |
| Sandwich Manifold with gauges to be mounted together with Volume booster type LEXG-Fx or Gx . . . . .           | -M3         |
| <b>with G1/4 connection</b>   |             |
| Without gauges . . . . .  | -N1         |
| With gauges for Version single acting . . . . .   | -J1         |
| With gauges for Version double acting . . . . .   | -M1         |
| <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         |

(continued next page)

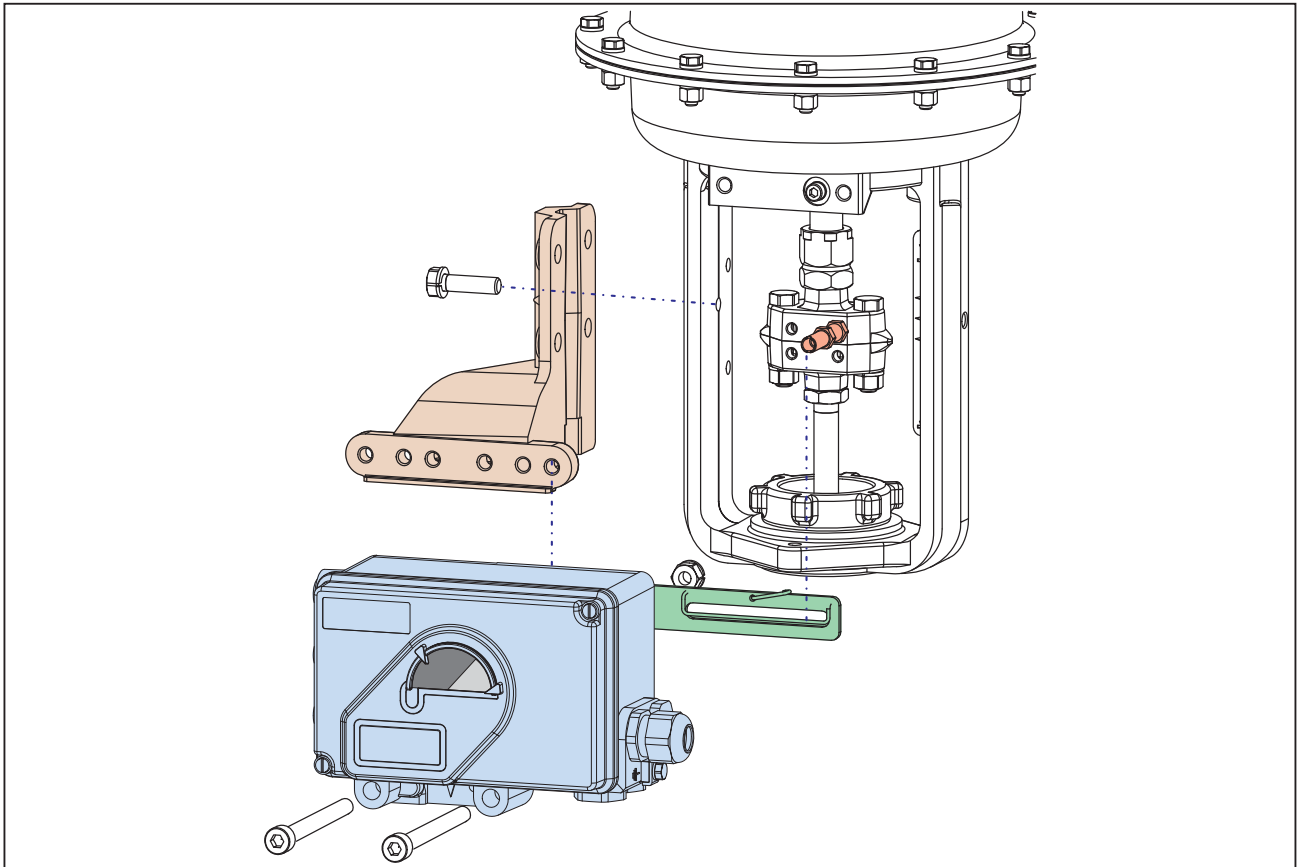
**MODEL CODES Attachment kits**

| ACCESSORIES FOR POSITIONER (SRD991, SRI990, SRD960)  |  | 012007      |
|--|--|-------------|
| Attachment Kit   |  | <b>EBZG</b> |
| For diaphragm actuators with casting yoke acc. NAMUR (incl. standard Couple lever)                                     |  | -H          |
| 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 FoxTop / FoxPak (g)  |  | -E          |
| Brackets VDI/VDE 3845 (A = 130 mm/5.12 in; B = 50 mm/1.97 in)  |  | -C3         |
| Brackets VDI/VDE 3845 (A = 80 mm/3.15 in; B = 30 mm/1.18 in)   |  | -C2         |
| Brackets VDI/VDE 3845 (A = 80 mm/3.15 in; B = 20 mm/0.79 in)   |  | -C1         |
| For Badger Meter - Research Control Series 754 and 755 Size 1/2 inch   |  | -B1         |
| For Fisher 657, 667 (linear) size 30 and 40  |  | -F1         |
| 1051, 1052, 1061 size 40   |  | -F2         |
| 657, 667 size 30 and 60  |  | -F3         |
| 657, 667 size 70 and 100   |  | -F4         |
| 1051, 1052, 1061 size 33   |  | -F5         |
| 1051, 1052, 1061 size 60   |  | -F6         |
| For Foxboro P-Series / such as -H with installed height 80 mm/3.15 in  |  | -H1         |
| NAMUR-Attachment kit for centered mounting position on the casting yoke  |  | -H2         |
| For mounting on ADAR control valve   |  | -H3         |
| micro flow control valve (k)   |  | -H4         |
| Such as -K with installed height 80 mm/3.15 in   |  | -K1         |
| For Kinetrol (Actuator Size 05)  |  | -K2         |
| (Actuator Size 07)   |  | -K3         |
| (Actuator Size 09)   |  | -K4         |
| For Metso / Neles Rotary actuators Type AB6 and Type BJ & BC size 8 and 10, B1C11                                      |  | -L1         |
| Type BJ and BC size 12 and 16, B1C17   |  | -L2         |
| For ARI-Armaturen - Direct Mounting to actuator type DR  |  | -P1         |
| For ARCA - Direct Mounting to actuator type BR 812   |  | -P2         |
| For Samson Type 3277 with 1/4 - 18 NPT   |  | -S1         |
| Type 3277 with G 1/4   |  | -S2         |
| Type 3277 with 1/4 - 18 NPT and gauges for supply- and output-pressure (g)   |  | -S5         |
| Type 3277 with G 1/4 and gauges for supply- and output-pressure (g)  |  | -S6         |
| Micro flow Type 3277-5 (k)   |  | -S8         |
| Tuflin / XOMOX Type MX60 (h)   |  | -T1         |
| Type MX200 (h)   |  | -T2         |
| Type MX450 / Typ MX750 / Typ MX1250 (h)  |  | -T3         |
| Type MX3000 (h)  |  | -T4         |
| For Hagan actuators (left of pneumatic cylinder)   |  | -X2         |
| (right of pneumatic cylinder)  |  | -X1         |
| For AMRI rotary actuator (requires minor modification of actuator. Please consult ECKARDT production before ordering!) |  | -X3         |
| For Siemens actuators V-Series   |  | -S3         |
| For Sereg Maxflo, Revca, Reglob new type   |  | -S4         |
| Maxflo "old type"  |  | -S7         |
| CNX (Flowsolve)  |  | -S9         |
| For Masoneilan Type Camflex II   |  | -M          |
| 47/48 (Sigma-F)  |  | -M1         |
| Type 37/38 size 15 and 18 (complete kit)   |  | -M2         |
| Type 87/88 all size  |  | -M4         |
| Varipac  |  | -M5         |
| 37/38 size 9, 11, 13   |  | -M6         |
| / Severn Glocon Type Domotor size small (h)  |  | -M7         |
| For Valtek Linear Actuator all Sizes - Stroke up to 4 inch / 102 mm  |  | -V1         |
| For VETEC Type R150  |  | -V2         |

\*) We recommend to contact our field service dept. before selection of these mounting kits.  
 Further Attachment kits on request. See also [http://www.foxboro-eckardt.eu/products/positioners\\_en.html](http://www.foxboro-eckardt.eu/products/positioners_en.html).

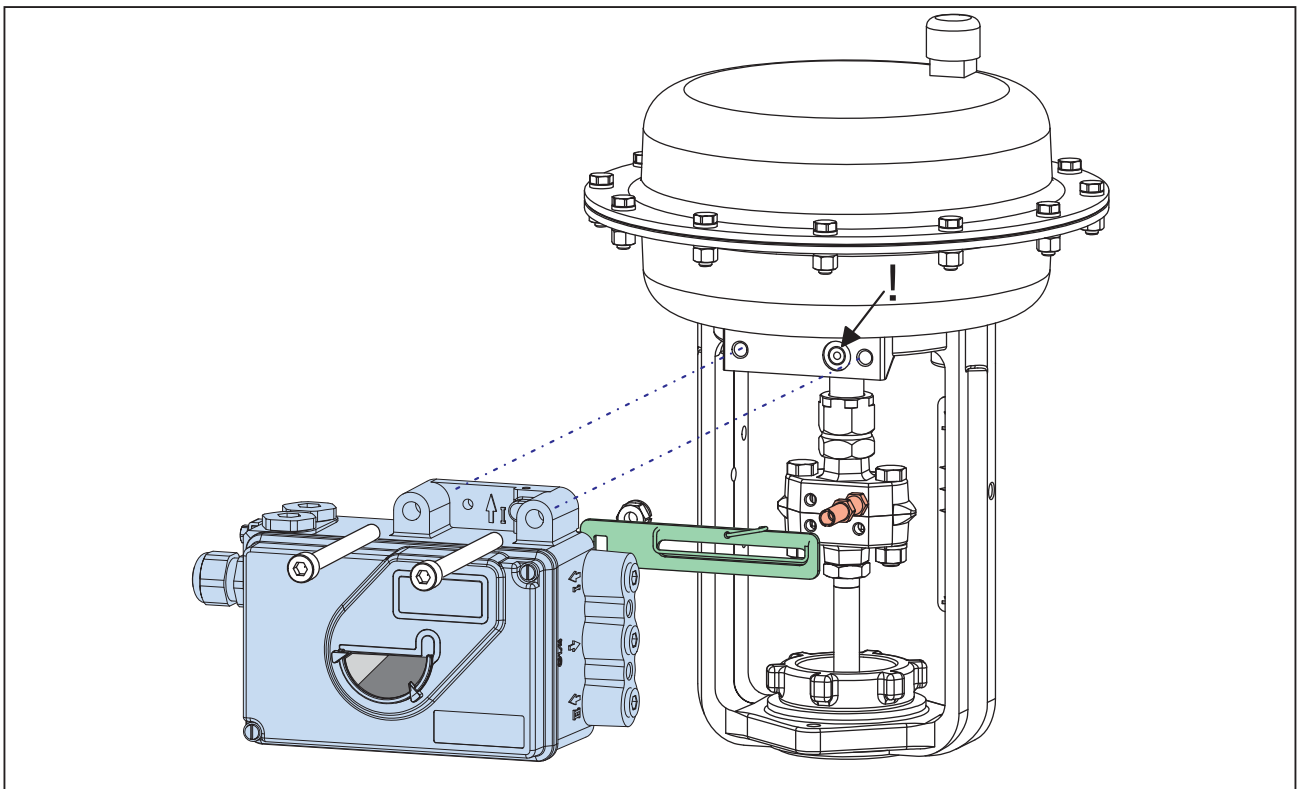
### MOUNTING TO LINEAR ACTUATORS

Attachment to stroke actuators acc. to IEC 534-6 (NAMUR), left hand



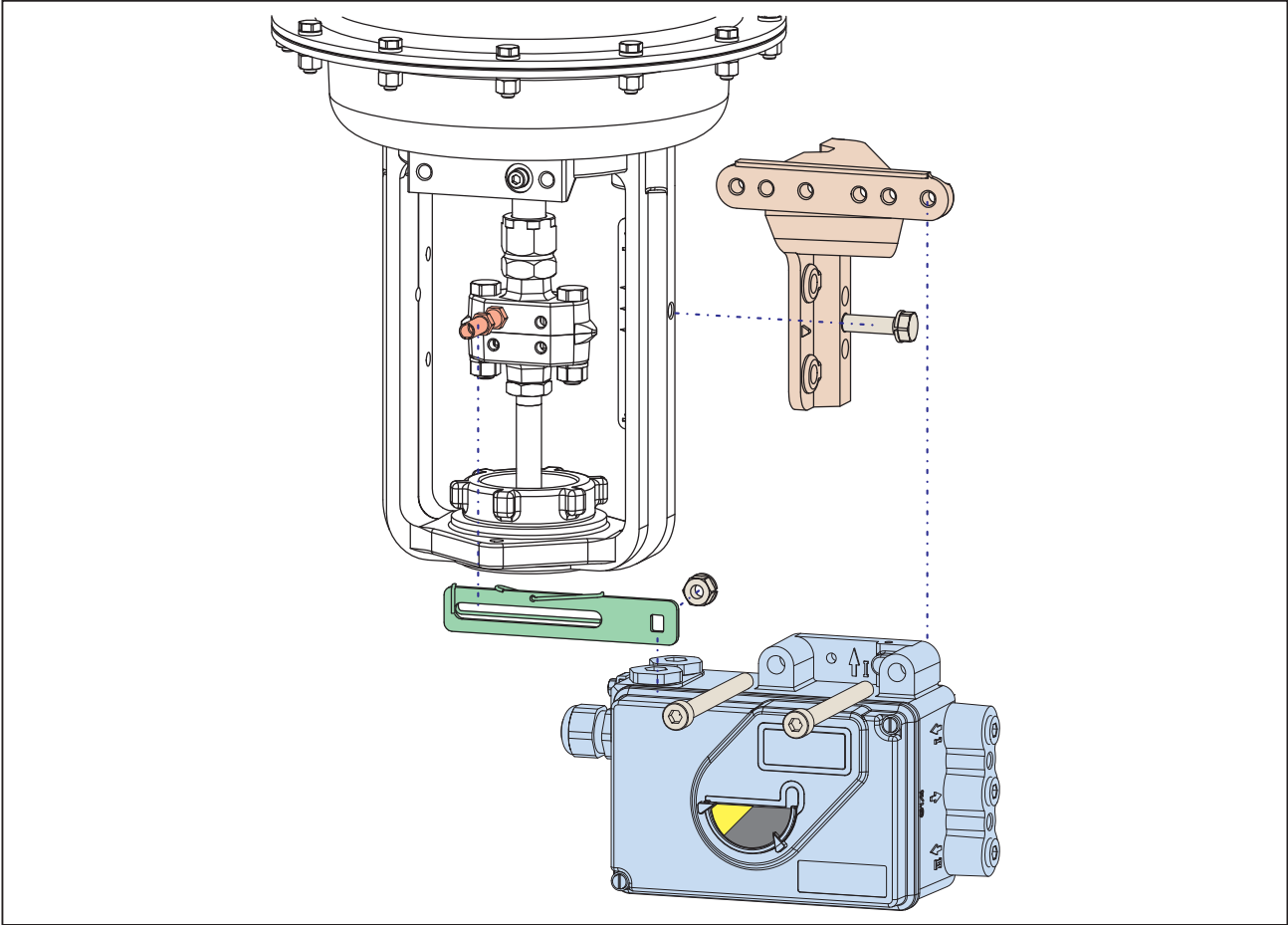
### MOUNTING TO LINEAR ACTUATORS

Direct attachment to stroke actuators



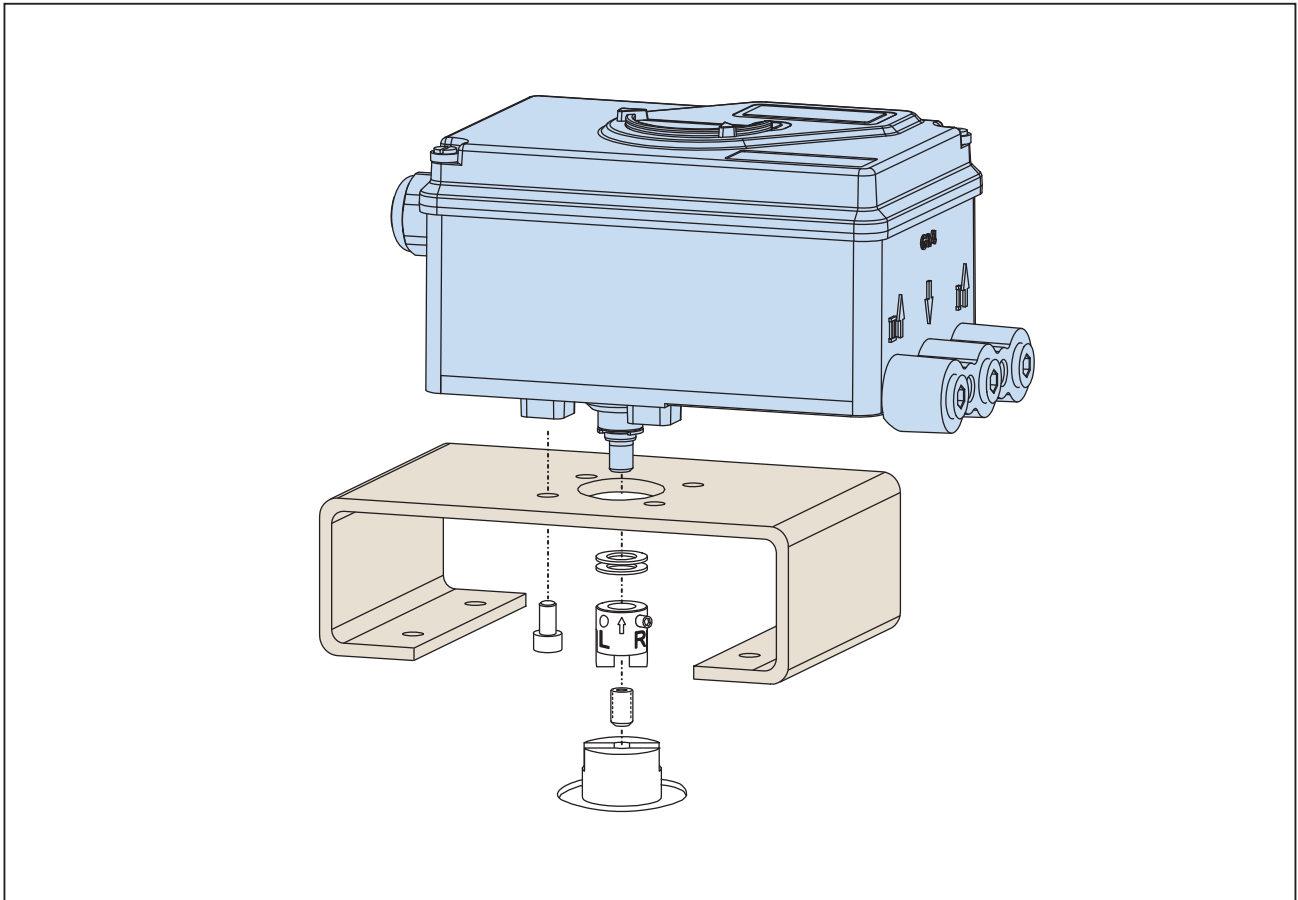
## MOUNTING TO LINEAR ACTUATORS

Attachment to stroke actuators acc. to IEC 534-6 (NAMUR), right hand

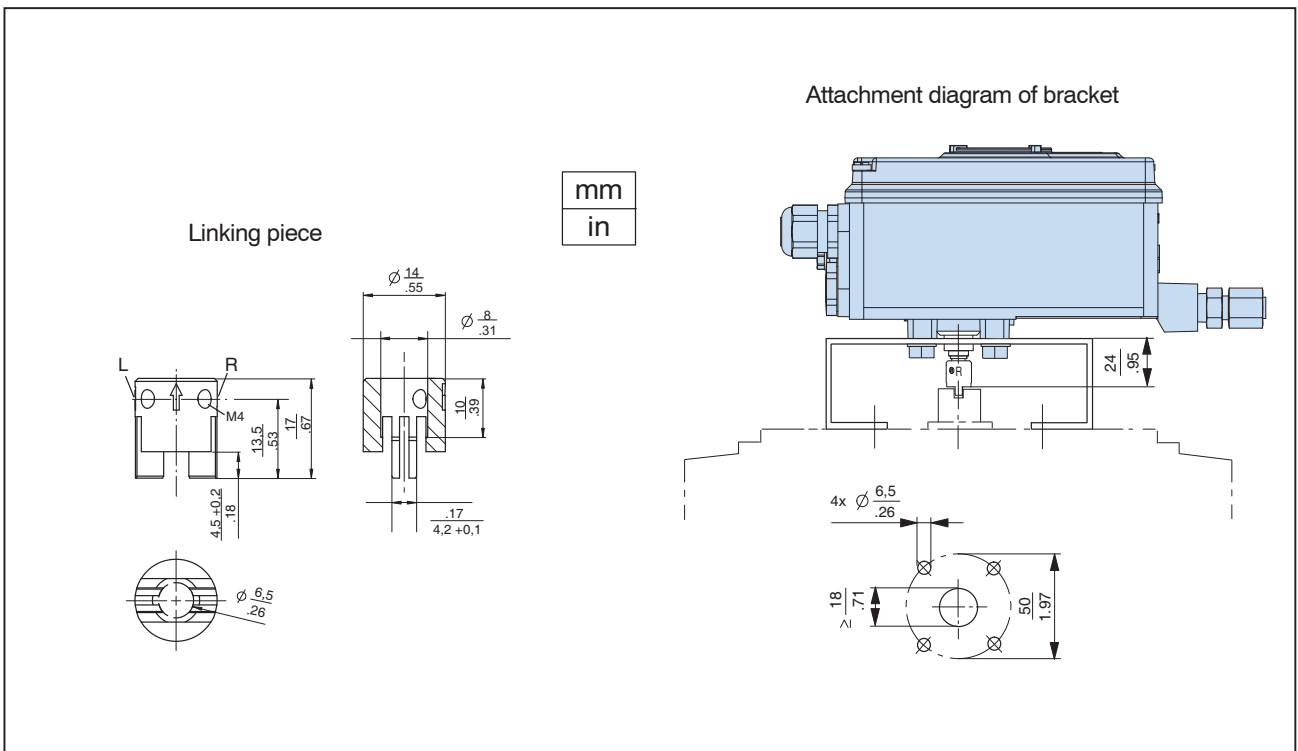


### MOUNTING TO ROTARY ACTUATORS

Delivery of bracket by manufacturer of actuator

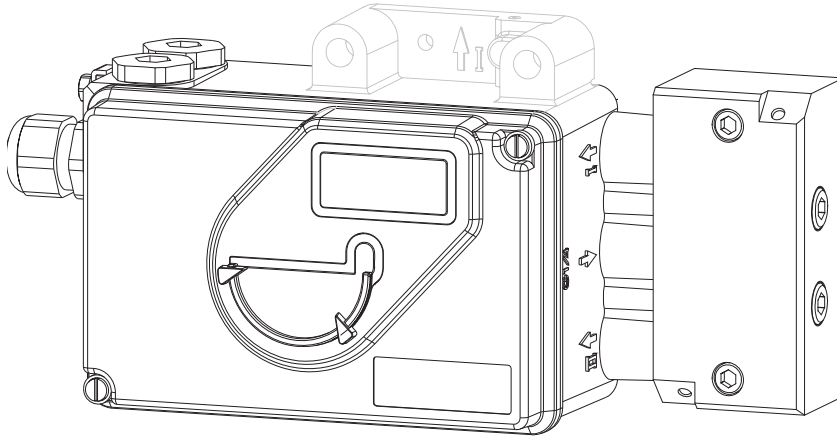


### DIMENSIONS – Attachment to rotary actuators acc. to VDI/VDE 3845

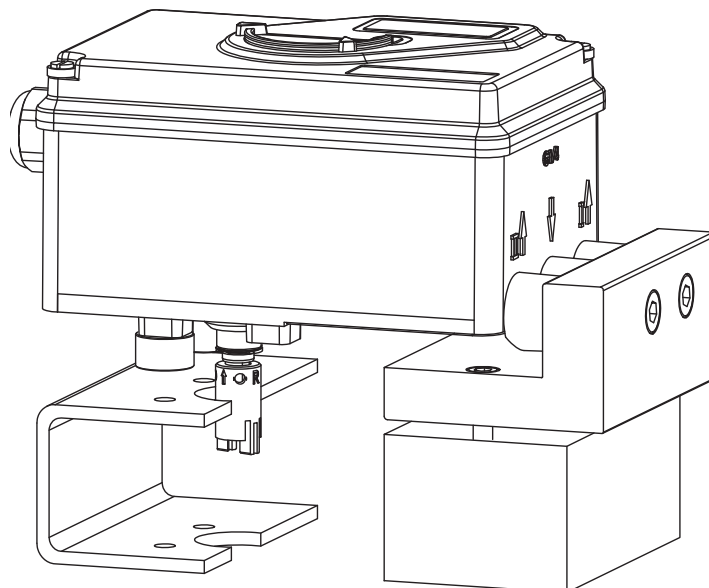


**MOUNTING acc. to VDI/VDE 3847**

Mounting to Linear Actuators

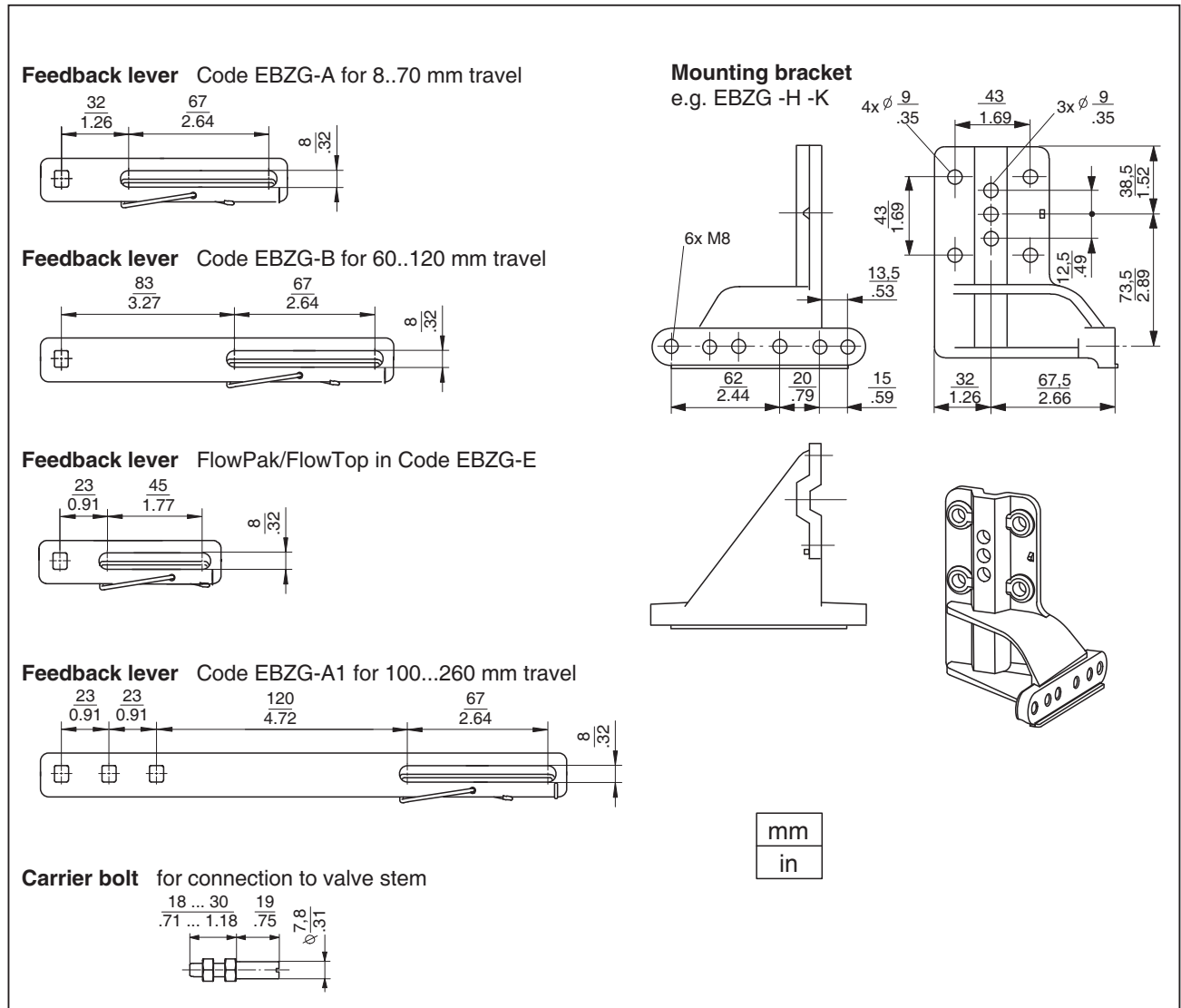


Mounting to Rotary Actuators



**DIMENSIONS**

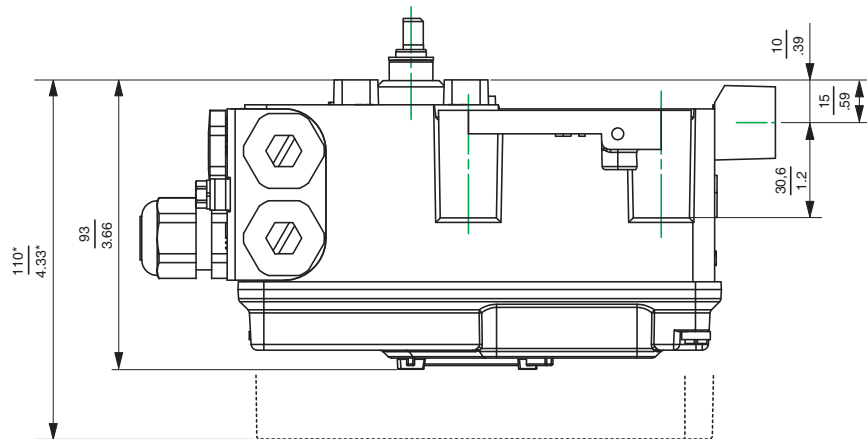
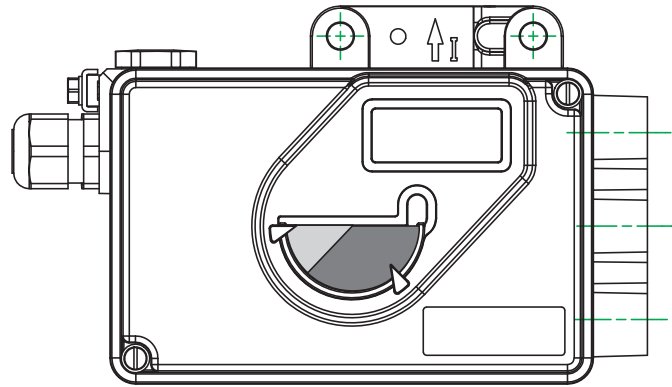
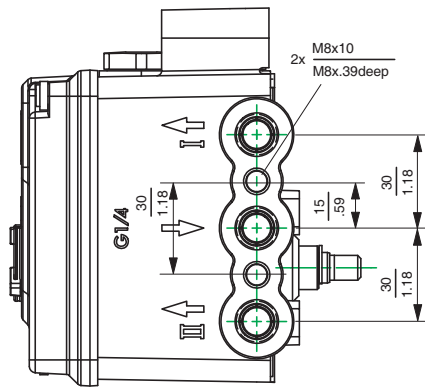
Components of Attachment kits (samples)



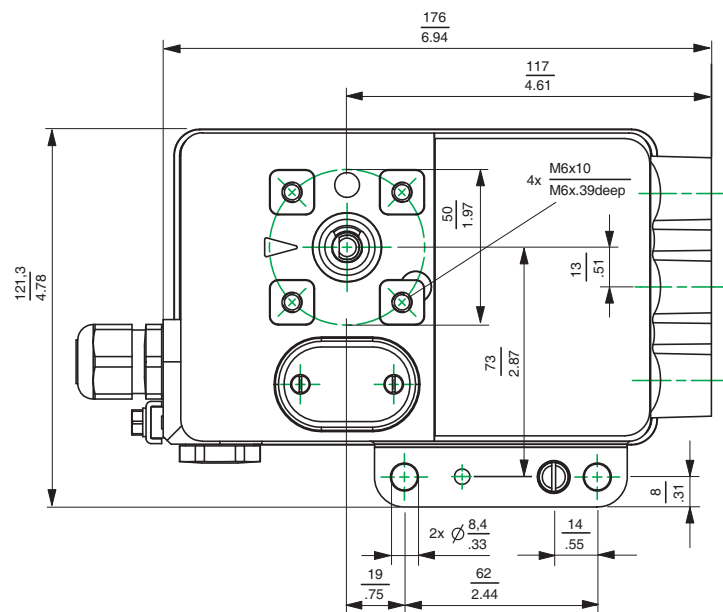
**Weights of LEXG manifolds**

- LEXG -F = 0.90 kg
- LEXG -F1 = 1.00 kg
- LEXG -G = 1.25 kg
- LEXG -G1 = 1.38 kg
- LEXG -H = 1.40 kg
- LEXG -H1 = 1.55 kg
- LEXG -J/-J1 = 0.40 kg
- LEXG -M/-M1 = 0.45 kg
- LEXG -N/-N1 = 0.28 kg
- LEXG -K = 0.12 kg

## DIMENSIONS



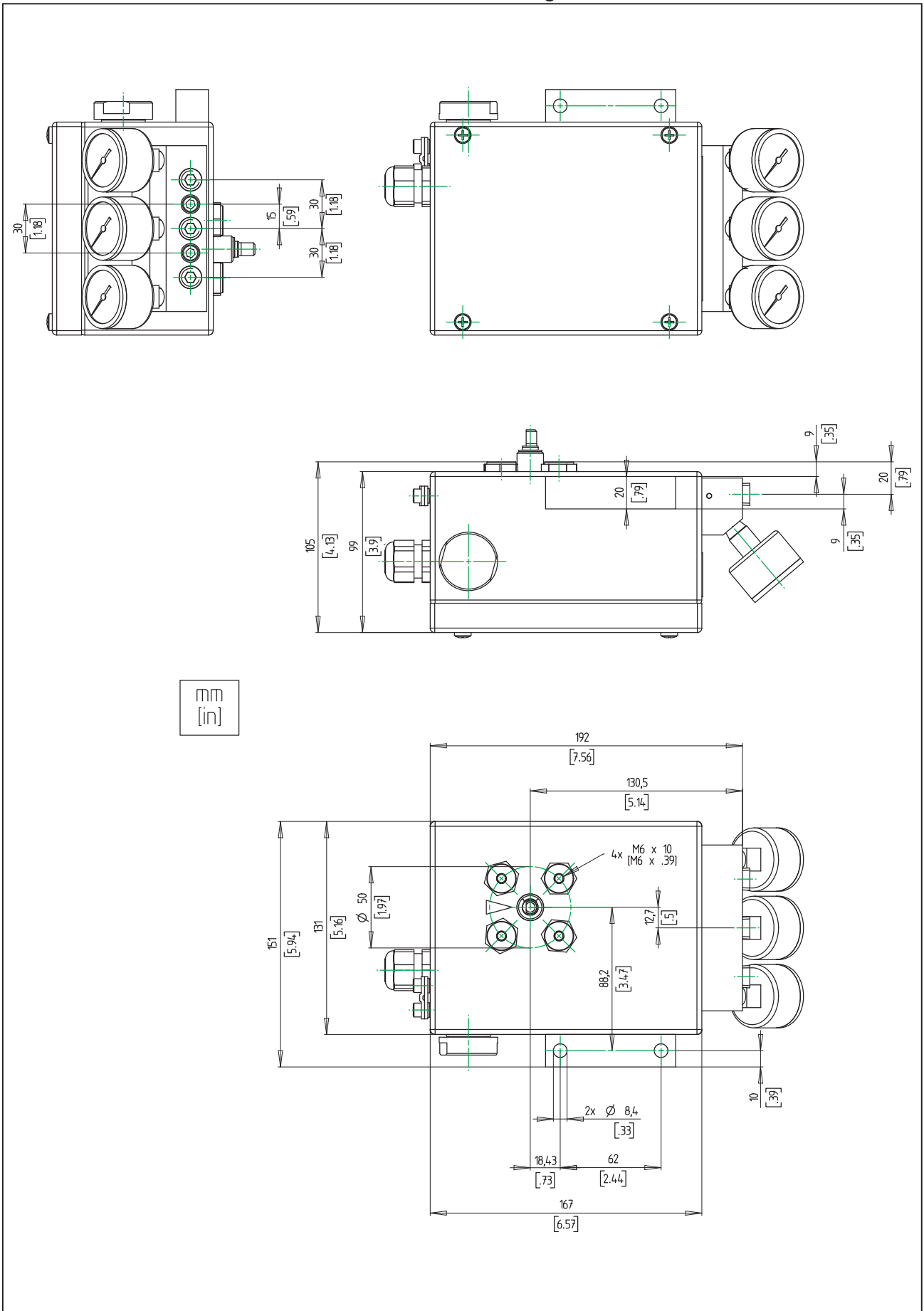
|    |
|----|
| mm |
| in |



\*) Dimensions with high cover  
for optional "limit switch"



**DIMENSIONS INOX** SRD991 in stainless steel housing



### 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 easily 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, FOUNDATION Fieldbus and IRCOM

### Additional Documentation for other products

#### Specifications website

[PSS EVE0101](#) [SRP981](#) Pneumatic Positioner

[PSS EVE0102](#) [SRI986](#) Electro-Pneumatic Positioner

[PSS EVE0103](#) [SRI983](#) Electro-Pneumatic Positioner- explosion proof or EEx d version

[PSS EVE0105](#) [SRD991](#) Intelligent Positioner

[PSS EVE0107](#) [SRI990](#) Analog Positioner

[PSS EVE0109](#) [SRD960](#) Universal Positioner

PSS EMO0100 Accessories for devices with HART Protocol

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