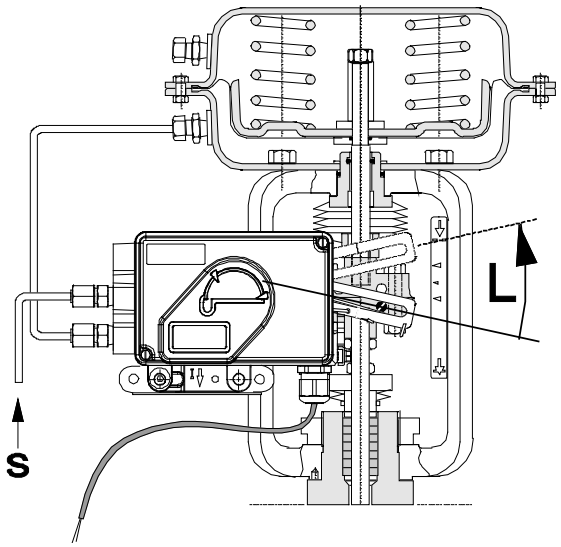
# SRD991 Intelligent Positioner

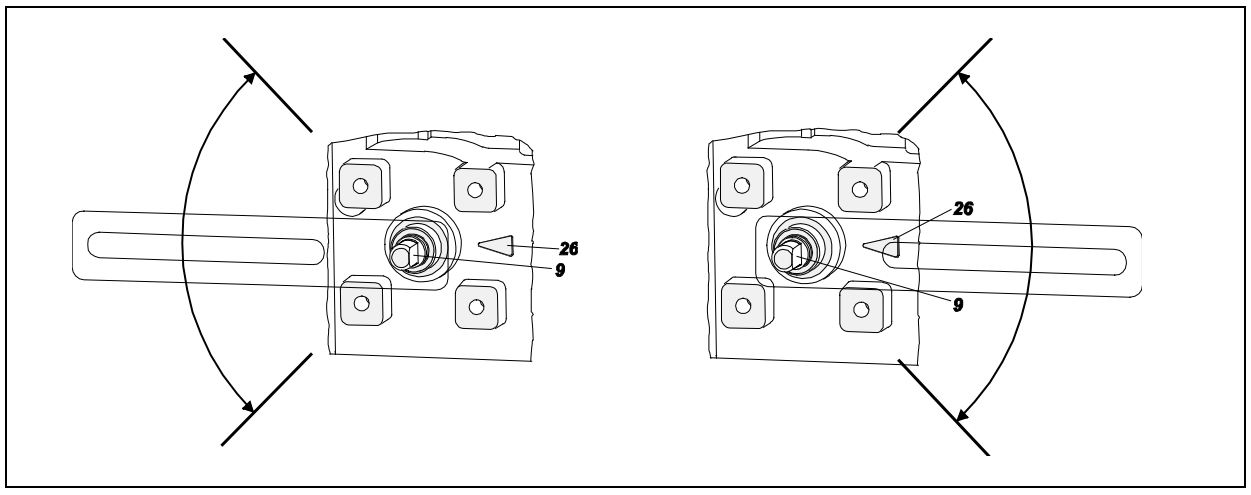
These instructions are to be used as a guide for quick start-up. For more detailed information please refer to the standard documents “Master Instructions” and “Product Specification Sheet”. These can be found on our Website www.foxboro-eckardt.com

**Versions with LCD (and LEDs):**
SRD991 - all versions -



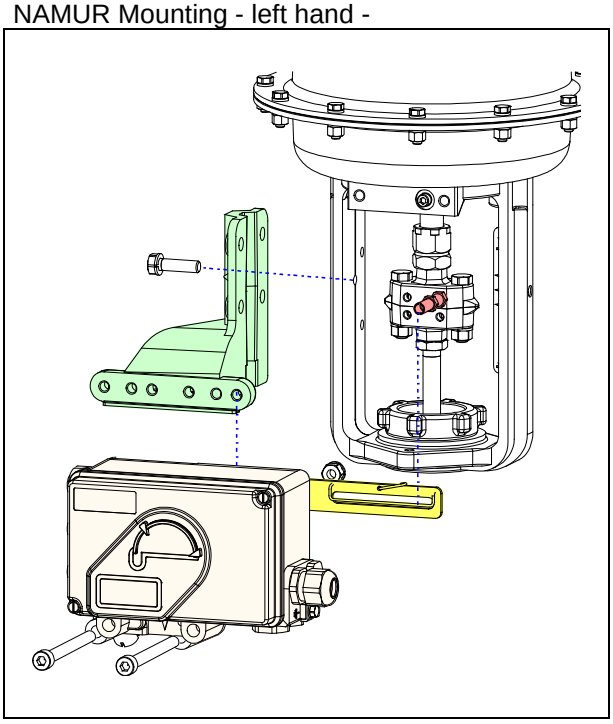

## 1. MOUNTING TO ACTUATORS

During operation the flat side of the spindle ***9*** on the back of the positioner must **always** point towards the arrow ***26***. The working angle around this position is ±45º.

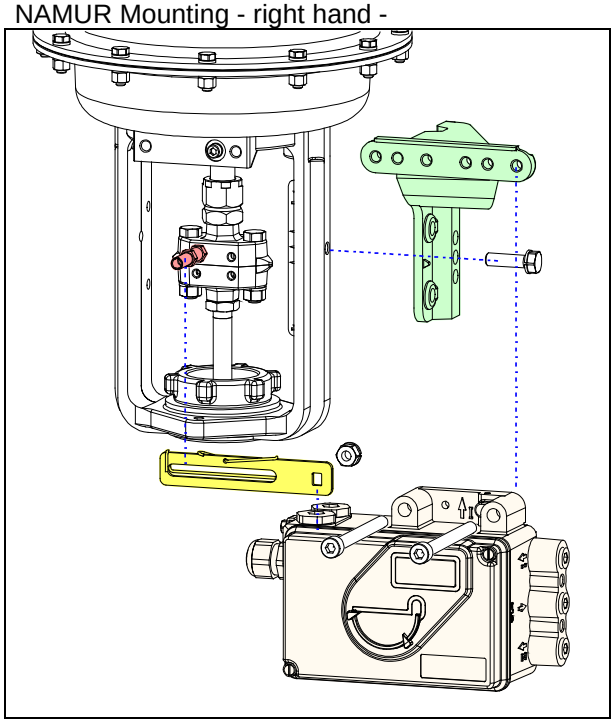


## MOUNTING TO LINEAR ACTUATORS

NAMUR Mounting - left hand -

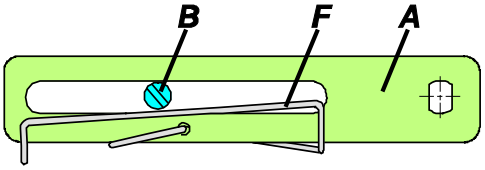


NAMUR Mounting - right hand -



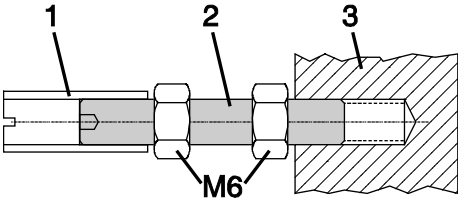
**Feedback lever for linear actuators :**

The carrier bolt ***B*** is in the slot of the feedback lever ***A*** and the compensating spring ***F*** touches the carrier bolt.

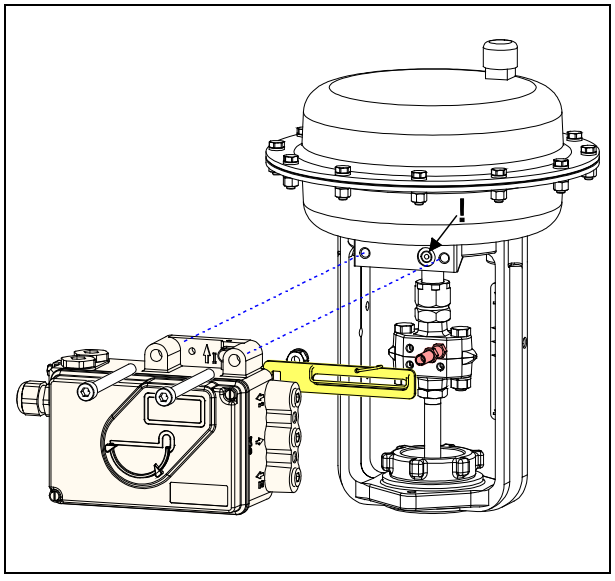



**Carrier bolt B**:

1 threaded sleeve 2 Stud 3 coupling piece

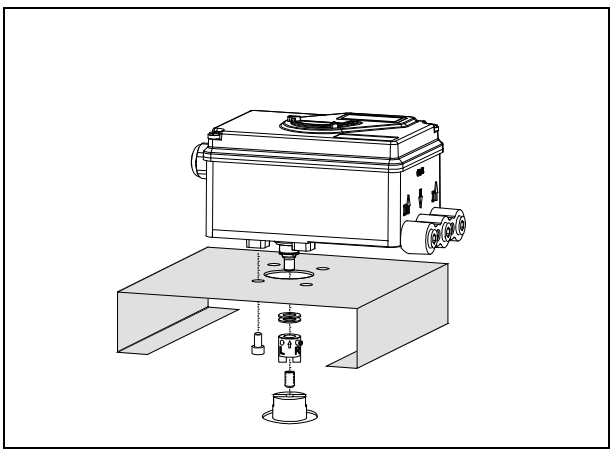



Direct Mounting

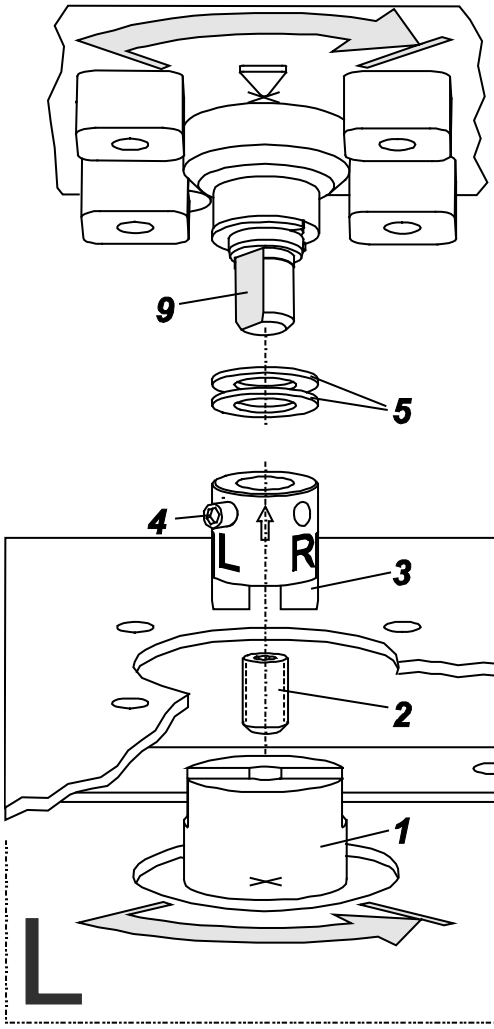


## MOUNTING TO ROTARY ACTUATORS

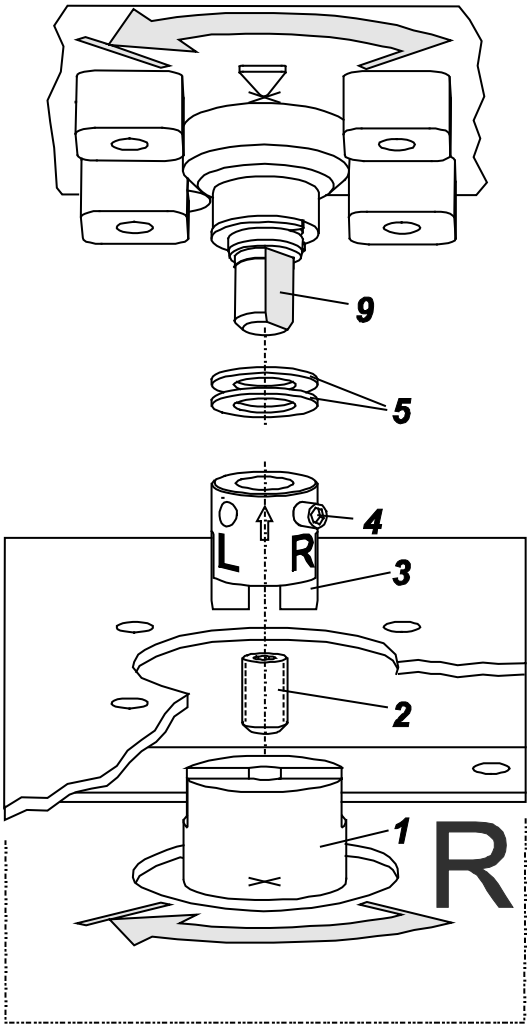
- Do not tighten grub screw 4 against the thread of spindle 9 !
- When in use the flat side of the spindle 9 must move ( 0 ↔ 100%) in front of the arrow 26.
- When the product temperature rises, the drive shaft 1 increases in length. Therefore, the rotary adapter 3 must be mounted so that approx. 1 mm (0.04 in.) of clearance results between the drive shaft 1 and the rotary adapter 3. This is achieved by placing an appropriate number of washers 5, on the feedback spindle 9, before attaching the rotary adapter. Two washers should result in a clearance of 1 mm.



**Actuator, left turning**



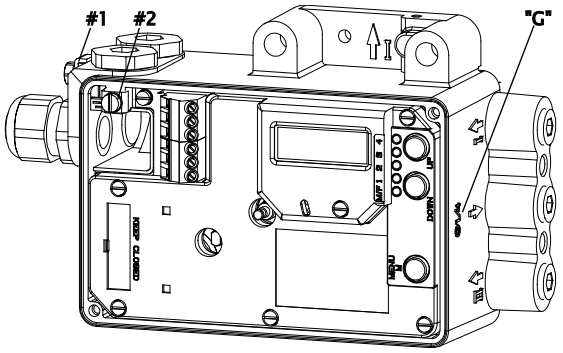

**Actuator, right turning**




## 2. CONNECTIONS

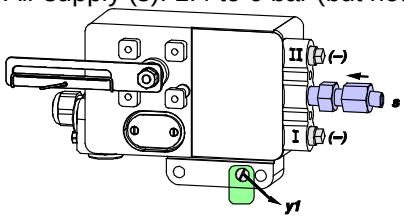
Check before mounting fittings and cable glands if threads are matching, otherwise housing can be damaged. The letter “G” on the housings marks that the pneumatic connections are in G1/4 (otherwise NPT).

Ground
Connect earth cable to screw #1 or screw #2 (in the electrical connection compartment).

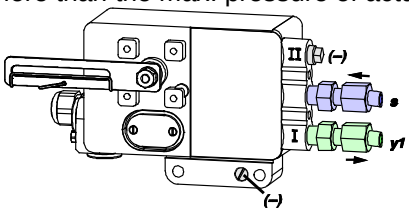



**PNEUMATIC CONNECTIONS**

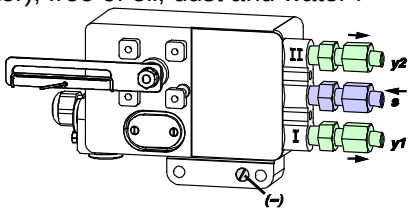
Air supply (s): 1.4 to 6 bar (but not more than the max. pressure of actuator), free of oil, dust and water !




Single acting, Direct mounting




Single acting

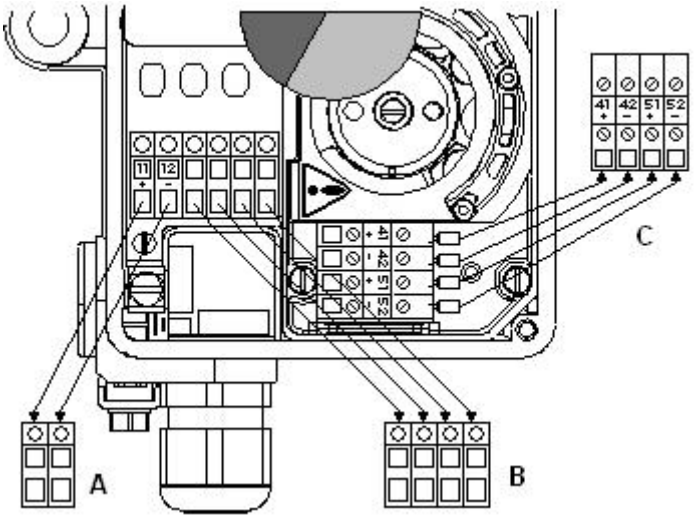



Double acting

s supply y1, y2 pneumatic outputs (--) closed

## 3. ELECTRICAL CONNECTIONS

The safety requirements of document EX EVE0001 as well as the requirements of PSS EVE0105 and MI EVE0105 for SRD991 must be observed!




### 3.1 Setpoint

**3.1.1 SRD991-xD (w/o communication)**
**SRD991-xH (HART)**
**SRD991-xE (FoxCom it1)**

| 11+ | 12- |
|---|---|

***Electric terminal A***

Input 4 to 20 mA

**3.1.2 SRD991-xF (FoxCom it2)**

| 11+ | 12- |
|---|---|

***Electric terminal A***

Supply voltage DC 13 to 36 V *

**3.1.3 SRD991-xP (PROFIBUS PA)**
**SRD991-xQ (FIELDBUS FF)**

| 11 | 12 |
|---|---|

***Electric terminal A***

Bus connection acc. to IEC 1158-2
Supply voltage DC 9 to 32 V*

### 3.2 Inductive Limit Switch

**3.2.1 SRD991-xxxT or U**

Two-wire proximity sensors, Acc. to DIN 19234 or NAMUR

| 41+ | 42- | 51+ | 52- |
|---|---|---|---|

***Electric terminal C***

Switching amplifier with intrinsically safe control circuit

Switching amplifier with intrinsically safe control circuit

**3.2.2 SRD991-xxxR**

| 41+ | 43- | 42 | 52 |
|---|---|---|---|

***Electric terminal C***

Contact 2

Contact 1

Supply voltage DC 10 to 30 V

**3.2.3 SRD991-xxxV**

**Warning**: For connection of micro switches please refer to MI (Master Instruction) and respect the safety requirements described in document EX EVE0001.

### 3.3 Option Board

**3.3.1 Two binary outputs (SRD991-xxP)**

Two-wire system, acc. to DIN 19234 or switched output.

| 81+ | 82- | 83+ | 84- |
|---|---|---|---|

***Electric terminal B***

External power supply (e.g. intrinsically safe control circuit)

External power supply (e.g. intrinsically safe control circuit)

**3.3.2 Two binary inputs (SRD991-xxB)**

Binary inputs with internal supply for connection of sensors or switches (switch **closed** for a normal operation!)

| 13+ | 14- | 15+ | 16- |
|---|---|---|---|

***Electric terminal B***

**3.3.3 Position feedback 4 to 20 mA and 1 Alarm (SRD991-xxQ ou SRD991-xxF)**

Analog output 4 to 20 mA and Binary output
Two-wire system acc. to DIN 19234 or switched.

| 81+ | 82- | 31+ | 32- |
|---|---|---|---|

***Electric terminal B***

Analog output 4 to 20 mA, Two-wire system, supplied with extern power supply.

External power supply (e.g. intrinsically safe control circuit)

**3.3.4 Two binary in-/outputs (SRD991-xxE)**

Two-wire system acc. to DIN 19234 or switched in-/output.

| 81+ | 82- | 83+ | 84- |
|---|---|---|---|

***Electric terminal B***

Binary in-/output 4 to 20 mA, Two-wire system, supplied with ext. power supply

Binary in-/output 4 to 20 mA, Two-wire system, supplied with ext. power supply

* For intrinsically safe circuits please refer to certificate / data label for max. operating voltages etc

## 4. START UP (Setting by means of local keys and LCD / LEDs)

After mounting the positioner on the actuator, air and electrical input connected, you can start-up the SRD. The SRD991 can be adjusted by means of a local key-pad and LCD / LED display.

Attention: Do not touch behind the positioner housing while operating the keys! DANGER OF INJURIES!

**Description of display**

Process variable

```
  87.5 %
Valve position
```

Process variable and diagnostics

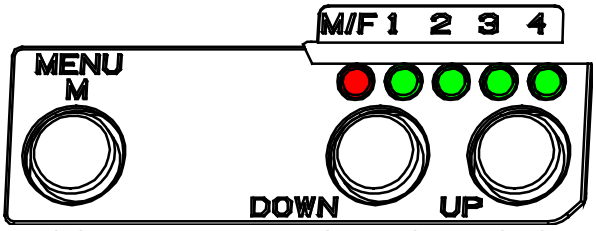
```
  87.5 %
Valve position
Ctrl diff error
```

At configuration: Main menu

```
SRD Main Menu
1  Mounting
2  Autostart
3  Valve Action
```

At configuration the selected item is displayed with dark background.
Further menus with (UP) key.

**Push buttons**




(M) Enter or exit main menu

(DOWN) Previous menu or Parameter

(UP) Next menu or Parameter

|-both simultaneously:-| Enter / store

**Configuration and operation with push buttons and LCD:**

An already configurated device may show the following display:

```
  87.5 %
Valve position
```

For configuration press (M) and main menu appears.

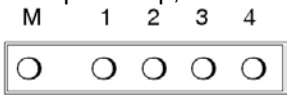
If the SRD wasn't configurated yet, the Main menu*) appears automatically after power-up:

```
SRD Main Menu
1  Mounting
2  Autostart
3  Valve Action
```

In menu 1 you can select the type of mounting.

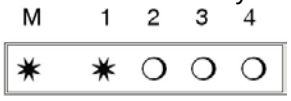
**and LED display:**

An already configurated device is IN OPERATION after power up, and all LEDs are off.




For configuration press (M), and LEDs 'M/F' and '1' flash (= menu 1 is offered).

If the SRD wasn't configurated yet, menu 1 is offered automatically after power-up:




In menu 1 you can select the type of mounting.

*) On delivery the menu language in the display is English. The menu language can be changed over to another stored language. For this select 9.8.2 [german] or 9.8.3 [as ordered] and confirm with keys (UP)+(DOWN) (simultaneously). Leave menu by repeated pressing of (M) key.

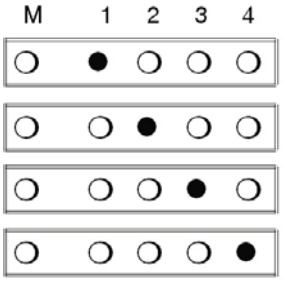
**... and LCD:**

**... and LED display:**

Press keys **(UP)+(DOWN)** simultaneously to enter menu 'Type of mounting'. Select the 'Type of mounting' by pressing **(UP)** or **(DOWN)**.

```
1  Mounting
1.1 Lin left
1.2 Lin right
1.3 rot cclockw
```

(Further menus with **(UP)** key.)




Lin.actuator, left-hand mount.

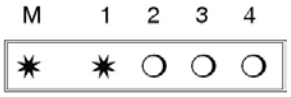
Lin.actuator, right-hand mount.

Rotary actuator, opening ccw

Rotary actuator, opening cw

Press keys **(UP)+(DOWN)** simultaneously to confirm and save.
The SRD moves back to menu level 1 and is in main menu again.

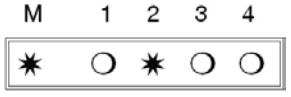
```
SRD Main Menu
1  Mounting
2  Autostart
3  Valve Action
```




To enter next menu (= menu 2, AUTOSTART) press **(UP)** once.

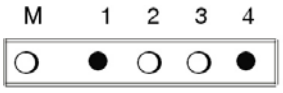
To enter next menu (= menu 2, AUTOSTART) press **(UP)** once, and the LEDs 'M' and '2' flash.

```
SRD Main Menu
1  Mounting
2  Autostart
3  Valve Action
```




Press keys **(UP)+(DOWN)** simultaneously to enter menu 'Autostart'. Select Full or Short autostart* by pressing **(UP)** or **(DOWN)**.

```
2  Autostart
2.1 Endpoints
2.2 Standard
2.3 Enhanced
```




Full autostart

Different Autostart options are available:

`2.1 Endpoints`
Determines only the mechanical stops of actuator/valve

`2.2 Standard`
Autostart recommended for standard application.

`2.3 Enhanced`
Enhanced Autostart. Optimized control behaviour compared to Standard Autostart.

`2.4 Smooth resp.`
Extended Autostart. Dampened control behaviour for e.g. smaller actuators.

`2.5 Fast resp.`
Extended Autostart. Undampened control behaviour for e.g. larger actuators.

Press keys **(UP)+(DOWN)** simultaneously to confirm and to launch Autostart.

The automatic adaptation to the valve is composed of a sequence of steps, explained on the LCD or indicated by the LEDs.

Following the last step the device is IN OPERATION.-

**Menustructure for SRD991/SRD960 with LCD**

SRD Main Menu

| Menu | Factory configuration | Description |
|---|---|---|
| 1 Mounting | | |
| 1.1 Lin left | ✓ | Linear actuator, left-hand or direct mounting |
| 1.2 Lin right | | Linear actuator, right-hand mounting |
| 1.3 Rot cclockw | | Rotary actuator, opening counter-clockwise |
| 1.4 Rot clockw | | Rotary actuator, opening clockwise |
| 2 Autostart | | |
| 2.1 Endpoints | | Adaptation of the mechanical stops only |
| 2.2 Standard | | Autostart recommended for standard application |
| 2.3 Extended | | Enhanced Autostart. Optimized control behaviour compared to Standard Autostart |
| 2.4 Smooth resp. | | Extended Autostart. Dampened control behaviour for e.g. smaller actuators |
| 2.5 Fast resp. | | Extended Autostart. Undampened control behaviour for e.g. larger actuators |
| 3 Valve Action | | |
| 3.1 SRD | | |
| 3.1.1 Direct | ✓ | Valve opens with increasing setpoint value |
| 3.1.2 Reverse | | Valve closes with increasing setpoint value |
| 3.2 Feedback | | |
| 3.2.1 Direct | ✓ | Increasing Current with increasing valve position |
| 3.2.2 Reverse | | Decreasing Current with increasing valve position |
| 4 Character | | |
| 4.1 Linear | ✓ | Linear characteristic |
| 4.2 Eq Perc 1:50 | | Equal percentage characteristic 1:50 |
| 4.3 Quick open | | Inverse equal percentage characteristic 1:50 (quick opening) |
| 4.4 Customer | | Custom characteristic |
| 5 Limits/alarms | | *Not locally available with LED versions of communication FF and Profibus* |
| 5.1 Lower limit | 0 % | Closing limit is set to input value |
| 5.2 Cutoff low | 1 % | 0%-tight sealing point is set to input value |
| 5.3 Cutoff high | 100 % | 100%-tight sealing point is set to input value |
| 5.4 Upper limit | 100 % | Opening limit is set to input value |
| 5.5 Splitr 0 % | 4 mA | Split range 0 %: input value corresponds to 0 % |
| 5.6 Splitr 100 % | 20 mA | Split range 100 %: input value corresponds to 100 % |
| 5.7 Lower Alarm | -10 % | Lower position alarm on output 1 is set to input value |
| 5.8 Upper Alarm | 110 % | Upper position alarm on output 2 is set to input value |
| 5.9 Valve 0% | 4 mA | Configuration of rated-stroke of 0% at 4 mA |
| 5.10 Valve 100% | 20 mA | Configuration of rated-stroke of 100% at 20 mA |
| 5.11 Stroke Range | x° / 20mm | Configuration of nominal travel |
| 5.12 Units | SI | Configuration of temperature and pressure unit SI or Anglo US |
| 6 Parameters | | |
| 6.1 Gain closing | 15 | P: Proportional gain for ‘close valve’ |
| 6.2 Gain opening | 2 | P: Proportional gain for ‘open valve’ |
| 6.3 Res time cl | 7.5 | I: Integration time for ‘close valve’ |
| 6.4 Res time op | 2.4 | I: Integration time for ‘open valve’ |
| 6.5 Rate lim cl | 0.35 | T63: Setting time for ‘close valve’ |
| 6.6 Rate lim op | 0.35 | T63: Setting time for ‘open valve’ |
| 6.7 Control gap | 0.1 | Permitted neutral zone for control difference |
| 7 Output | | Manual setting of IP-Module for testing of pneumatic output |
| 8 Setpoint | | Manual setting of valve position |
| 8.1 12.5% Steps | | Setpoint changes of 12.5% steps by using push buttons Up or Down |
| 8.2 1% Steps | | Setpoint changes of 1% steps by using push buttons Up or Down |
| 8.3 Do PST | | Start Partial Strok Test |

Continue on the next page...

| | | |
|---|---|---|
| 9 Workbench | | |
| 9.1 Reset Config | | Resetting of configuration to setting “ex factory” |
| 9.2 Calib. 4 mA | | Calibrate input current to 4 mA |
| 9.3 Calib. 20 mA | | Calibrate input current to 20 mA |
| 9.4 Calib. -45° | | Calibrate position measuring value to –45° |
| 9.5 Calib. +45° | | Calibrate position measuring value to +45° |
| 9.6 Reset all 1 | | Resetting of configuration and Calibration (!) to “ex factory” setting for **single-acting** output |
| 9.7 Reset all 2 | | Resetting of configuration and Calibration (!) to “ex factory” setting for **double-acting** output |
| 9.8 Go Online | | Setting position into mode Online |
| 9.9 Menu Lang | | |
| 9.9.1 English | ✓ | Standard |
| 9.9.2 Deutsch | | Standard |
| 9.9.3 Français | | Preselected / Freely Defiable |
| 9.10 LCD orient | | |
| 9.10.1 Normal | ✓ | Normal orientation of writing on LCD |
| 9.10.2 Flipped | | Reverse orientation of writing on LCD |
| 9.11 Cal. Feedbk | | Calibration of output current of position transmitter |
| 9.11.1 Cal 4mA | | Calibration of 0% at 4mA |
| 9.11.2 Cal. 20mA | | Calibration of 100% at 20mA |
| 10 - not available - for HART | | |
| 10 Profibus PA - Bus Address | | |
| 10.1 Address LSB | | Ratio from Dec. 0 / Hex 00 to Dec. 15 / Hex 0F |
| 10.2 Address MSB | | Ration from Dec. 0 / Hex 00 to Dec. 112 / Hex 70 |
| 10.3 Address | 126 | Display of Bus Address from Dec. 1 to 127 (Hex 00 to 7F) |
| 10 FOUNDATION Fieldbus H1 | | |
| 10.1 Simulate | | |
| Disabled | ✓ | Simulate disabled |
| Enabled | | Simulate enabled |
| 10.2 Profile | | |
| Link Master | ✓ | Link Master active |
| Basic Device | | Link Master de-activated |

## 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.

**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

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