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.

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 ±45°.

Any mechanical backlash may be source of poor control, oscillation and hunting as well as long duration of Autostart. Please use only original mounting parts and ensure that they are correctly mounted and tighten. By not using the original feedback lever or by using them in an inappropriate way, the performance of the positioner may be compromised.

MOUNTING TO LINEAR ACTUATORS

NAMUR Mounting - left hand -

NAMUR Mounting - right hand -
MOUNTING TO LINEAR ACTUATORS (cont’d)

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

MOUNTING TO ROTARY ACTUATORS
• Do not tighten grub screw 4 against the thread of spindle 9! (see next page).
• 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.
2. CONNECTIONS

Check before mounting fittings and cable glands that the threads are matching; otherwise the housing can be damaged. The letter “G” on the housing marks where the pneumatic connections are in G 1/4 (otherwise NPT).

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

PNEUMATIC CONNECTIONS

**WARNING**
To avoid any personal injury resulting from bursting of parts, do not exceed maximum supply pressure of positioner and actuator. To avoid any personal injury or property damage from sudden or fast movement, during air connection: **Do not put your finger or other part at any time inside the valve or in any moving part of the actuator or in the feedback lever mechanism. Do not touch the rear part of the positioner at any time.** Connect air supply only after connections y1 (and y2 for double acting) are done.

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
s supply  y1, y2 pneumatic outputs  (→) closed

Single acting

Double acting
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 Electric Terminal A

3.1.1 SRD991-xD (w/o communication)
SRD991-xH (HART)

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

3.2 Inductive Limit Switch Electric Terminal C

3.2.1 SRD991-xxxT or U
Two-wire proximity sensors, acc. to DIN 19234 or NAMUR

3.2.2 SRD991-xxxR
Contact 2
Contact 1
Supply voltage 10 to 30 V DC

3.2.3 SRD991-xxxV
Warning: For connection of micro switches please refer to MI (Master Instruction) and obey the safety requirements described in document EX EVE0001.

3.3 Option Board Electric Terminal B

3.3.1 Two binary outputs (SRD991-xxP)
Two-wire system, acc. to DIN 19234 or switched output.

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!)

3.3.3 Position feedback 4 to 20 mA and 1 Alarm (SRD991-xxQ or SRD991-xxF)
Analog output 4-20 mA and Binary output Two-wire system acc. to DIN 19234 or switched.

3.3.4 Two binary in-/outputs (SRD991-xxE)
Two-wire system acc. to DIN 19234 or switched in-/output.

* 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)

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

**WARNING**
To avoid any personal injury or property damage from sudden or fast movement, during configuration:
*Do not put your finger or other part at any time inside the valve or in any moving part of the actuator or in the feedback lever mechanism.*
*Do not touch the rear part of the positioner at any time.*

**IN OPERATION:**
An already configurated device may show the following display:

```
87.5 %               Process variable
Valve position
```

For configuration press (M) and Main menu appears.

**CONFIGURATION with push buttons and LCD:**
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
```

(The selected item is displayed with dark background.)

In menu 1 you select the type of mounting: Press keys (UP)+(DOWN) simultaneously to enter this menu.

Select your ‘Type of mounting’ by pressing (UP) or (DOWN).

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

Press keys (UP)+(DOWN) simultaneously to confirm and save. The SRD moves back to Main menu again.

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

To enter next menu (= menu 2, Autostart) press (UP) once:

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

Now press keys (UP)+(DOWN) simultaneously to enter menu ‘Autostart’.

(Continued on next page.)

*) 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.
Several Autostart options are available. Select relevant Autostart by pressing (UP) or (DOWN):

- **2 Autostart**
  - 2.1 Endpoints
  - **2.2 Standard**
  - 2.3 Enhanced
  - 2.4 Smooth resp.
  - 2.5 Fast resp.

→ Determines only the mechanical stops of actuator / valve
→ Recommended for standard applications
→ Optimized control behaviour compared to Standard Autostart
→ Dampened control behaviour for e.g. smaller actuators
→ Undampened control behaviour for e.g. larger actuators

Press keys (UP)+(DOWN) simultaneously to confirm and to launch Autostart. The automatic adaptation to the actuator is composed of a sequence of steps indicated on the LCD.

With the last step the device is **IN OPERATION**:

<table>
<thead>
<tr>
<th>87.5 %</th>
<th>Valve position</th>
</tr>
</thead>
<tbody>
<tr>
<td>87.5 %</td>
<td>Ctrl diff error</td>
</tr>
</tbody>
</table>

Diagnostic messages see following table.

### 5 TROUBLE SHOOTING
(For more details see MI EVE0105 E)

#### Autostart error 1

<table>
<thead>
<tr>
<th>Description of message / LCD text</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air supply too low</td>
<td>Check air supply</td>
</tr>
<tr>
<td>Feedback lever (linear actuator) or Coupling (rotary actuator) incorrectly linked. Potentiometer moves out of operating range of ± 47° of 0° position</td>
<td>Check mounting. Flat area points to arrow on housing</td>
</tr>
<tr>
<td>Coupling (rotary actuator) incorrectly linked (R and L interchanged)</td>
<td>Check mounting</td>
</tr>
<tr>
<td>Pneumatic output to actuator closed or untight. When direct mounting onto FlowTop or FlowPak, the screw plug y1-d is not removed</td>
<td>Check pneumatic connections</td>
</tr>
<tr>
<td>Mechanical stops not determinable</td>
<td>Check spring movement of actuator / check air supply / check mounting</td>
</tr>
<tr>
<td>When using a booster or spool valve, no control parameters can be determined, since air capacity is too high</td>
<td>Device version is not suitable for this actuator; select version with smaller air capacity or remove booster</td>
</tr>
<tr>
<td>Control parameter too high since air capacity is too high (in general, oscillation in valve movement)</td>
<td>Use a booster or the version with spool valve. Reduce control parameter prop.-gain (Menu 6.1 and 6.2) to Code 10 = value 26.6.</td>
</tr>
<tr>
<td>Possibly incomprehensible configuration data</td>
<td>Reset configuration, see Menu 9.1</td>
</tr>
</tbody>
</table>

#### Optionboard error

<table>
<thead>
<tr>
<th>Description of message / LCD text</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configured status of the SRD deviates from existing version (e.g. Option board has been inserted subsequentially)</td>
<td>Check if correct option board has been connected Confirm message by pressing keys (UP)+(DOWN) simultaneously</td>
</tr>
<tr>
<td>Bad contact</td>
<td>Connections to terminals interchanged Check connections Tighten electronics</td>
</tr>
<tr>
<td>Defective</td>
<td>Exchange option board</td>
</tr>
</tbody>
</table>

#### Ctrl diff error

<table>
<thead>
<tr>
<th>Description of message / LCD text</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuator problems (high friction or blocked)</td>
<td>Check actuator</td>
</tr>
<tr>
<td>Insufficient air supply</td>
<td>Check air supply / air filter</td>
</tr>
<tr>
<td>Insufficient parameters for position controls, for example, amplification too small</td>
<td>Check control parameter, check pneumatic components</td>
</tr>
<tr>
<td>IP module or pneumatic amplifier defect</td>
<td>Check with Menu 7; replace if necessary</td>
</tr>
</tbody>
</table>
6 MENU STRUCTURE FOR SRD991 / SRD960

SRD Main Menu

<table>
<thead>
<tr>
<th>Menu</th>
<th>Factory configuration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Mounting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 Lin left</td>
<td>✓</td>
<td>Linear actuator, left-hand or direct mounting</td>
</tr>
<tr>
<td>1.2 Lin right</td>
<td></td>
<td>Linear actuator, right-hand mounting</td>
</tr>
<tr>
<td>1.3 Rot cclockw</td>
<td></td>
<td>Rotary actuator, opening counter-clockwise</td>
</tr>
<tr>
<td>1.4 Rot clockw</td>
<td></td>
<td>Rotary actuator, opening clockwise</td>
</tr>
<tr>
<td>1.5 Linear</td>
<td>For Top Mounting (only for SRD991)</td>
<td></td>
</tr>
<tr>
<td>2 Autostart</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Endpoints</td>
<td></td>
<td>Adaptation of the mechanical stops only</td>
</tr>
<tr>
<td>2.2 Standard</td>
<td></td>
<td>Autostart recommended for standard application</td>
</tr>
<tr>
<td>2.3 Enhanced</td>
<td></td>
<td>Enh. Autostart, Optimized control behaviour compared to Standard Autostart</td>
</tr>
<tr>
<td>2.4 Smooth resp.</td>
<td></td>
<td>Enh. Autostart. Dampered control behaviour for e.g. smaller actuators</td>
</tr>
<tr>
<td>2.5 Fast resp.</td>
<td></td>
<td>Enh. Autostart. Undampened control behaviour for e.g. larger actuators</td>
</tr>
<tr>
<td>3 Valve Action</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 SRD</td>
<td></td>
<td>Action of Positioner:</td>
</tr>
<tr>
<td>3.1.1 Direct</td>
<td>✓</td>
<td>Valve opens with increasing setpoint value</td>
</tr>
<tr>
<td>3.1.2 Reverse</td>
<td></td>
<td>Valve closes with increasing setpoint value</td>
</tr>
<tr>
<td>3.2 Feedback</td>
<td></td>
<td>Action of Feedback Unit:</td>
</tr>
<tr>
<td>3.2.1 Direct</td>
<td>✓</td>
<td>Increasing Current with increasing valve position</td>
</tr>
<tr>
<td>3.2.2 Reverse</td>
<td></td>
<td>Decreasing Current with increasing valve position</td>
</tr>
<tr>
<td>4 Character</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Linear</td>
<td>✓</td>
<td>Linear characteristic</td>
</tr>
<tr>
<td>4.2 Eq Perc 1:50</td>
<td></td>
<td>Equal percentage characteristic 1:50</td>
</tr>
<tr>
<td>4.3 Quick open</td>
<td></td>
<td>Inverse equal percentage characteristic 1:50 (quick opening)</td>
</tr>
<tr>
<td>4.4 Customer</td>
<td></td>
<td>Custom characteristic (Configuration via DTM)</td>
</tr>
<tr>
<td>5 Limits/alarms</td>
<td>(Not locally available with LED versions of communication FF and Profibus)</td>
<td></td>
</tr>
<tr>
<td>5.1 Lower limit</td>
<td>0 %</td>
<td>Closing limit is set to input value</td>
</tr>
<tr>
<td>5.2 Cutoff low</td>
<td>1 %</td>
<td>0%-tight sealing point is set to input value</td>
</tr>
<tr>
<td>5.3 Cutoff high</td>
<td>100 %</td>
<td>100%-tight sealing point is set to input value</td>
</tr>
<tr>
<td>5.4 Upper limit</td>
<td>100 %</td>
<td>Opening limit is set to input value</td>
</tr>
<tr>
<td>5.5 Splitr 0 %</td>
<td>4 mA</td>
<td>Split range 0 %: input value corresponds to 0 %</td>
</tr>
<tr>
<td>5.6 Splitr 100 %</td>
<td>20 mA</td>
<td>Split range 100 %: input value corresponds to 100 %</td>
</tr>
<tr>
<td>5.7 Lower Alarm</td>
<td>-10 %</td>
<td>Lower position alarm on output 1 is set to input value</td>
</tr>
<tr>
<td>5.8 Upper Alarm</td>
<td>110 %</td>
<td>Upper position alarm on output 2 is set to input value</td>
</tr>
<tr>
<td>5.9 Valve 0%</td>
<td>4 mA</td>
<td>Configuration of rated-stroke of 0% at 4 mA</td>
</tr>
<tr>
<td>5.10 Valve 100%</td>
<td>20 mA</td>
<td>Configuration of rated-stroke of 100% at 20 mA</td>
</tr>
<tr>
<td>5.11 Stroke Range</td>
<td>x° / 20 mm</td>
<td>Configuration of nominal travel</td>
</tr>
<tr>
<td>5.12 Units</td>
<td>SI</td>
<td>Configuration of temperature and pressure unit SI or Anglo US</td>
</tr>
<tr>
<td>6 Parameters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.1 Gain closing</td>
<td>15</td>
<td>P. Proportional gain for ‘close valve’</td>
</tr>
<tr>
<td>6.2 Gain opening</td>
<td>2</td>
<td>P. Proportional gain for ‘open valve’</td>
</tr>
<tr>
<td>6.3 Res time cl</td>
<td>7.5</td>
<td>I: Integration time for ‘close valve’</td>
</tr>
<tr>
<td>6.4 Res time op</td>
<td>2.4</td>
<td>I: Integration time for ‘open valve’</td>
</tr>
<tr>
<td>6.5 Rate lim cl</td>
<td>0.35</td>
<td>T63: Setting time for ‘close valve’</td>
</tr>
<tr>
<td>6.6 Rate lim op</td>
<td>0.35</td>
<td>T63: Setting time for ‘open valve’</td>
</tr>
<tr>
<td>6.7 Control gap</td>
<td>0.1</td>
<td>Permitted dead band for control difference</td>
</tr>
<tr>
<td>7 Output</td>
<td></td>
<td>Manual setting of IP-Module for testing of pneumatic output</td>
</tr>
<tr>
<td>8 Setpoint</td>
<td></td>
<td>Manual setting of valve position</td>
</tr>
<tr>
<td>8.1 12.5% Steps</td>
<td></td>
<td>Setpoint changes of 12.5% steps by using push buttons Up or Down</td>
</tr>
<tr>
<td>8.2 1% Steps</td>
<td></td>
<td>Setpoint changes of 1% steps by using push buttons Up or Down</td>
</tr>
<tr>
<td>8.3 Do PST</td>
<td></td>
<td>Start Partial Stroke Test</td>
</tr>
</tbody>
</table>
## Workbench

### 9.1 Reset Config
- Resetting of configuration to setting “ex factory”
- Calibrate input current to 4 mA
- Calibrate input current to 20 mA
- Calibrate position measuring value to -45°
- Calibrate position measuring value to +45°

### 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 (Service function only)

### 9.9 Menu Lang
- Language on LCD:
  - 9.9.1 English
    - Standard English
  - 9.9.2 Deutsch
    - Standard German
  - 9.9.3 Français
    - Preselected / freely definable

### 9.10 LCD orient
- LCD Orientation:
  - 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. 4 mA
    - Calibration of 0% at 4 mA
  - 9.11.2 Cal 20mA
    - Calibration of 100% at 20 mA

## Profibus PA - Bus Address

### 10.1 Address LSB
- Ratio from Dec. 0 / Hex 00 to Dec. 15 / Hex 0F

### 10.2 Address MSB
- Ratio from Dec. 0 / Hex 00 to Dec. 112 / Hex 70

### 10.3 Address
- Display of Bus Address from Dec. 1 to 127 (Hex 00 to 7F)

## FOUNDATION Fieldbus H1

### 10.1 Simulate
- Simulate disabled
- Simulate enabled

### 10.2 Profile
- Link Master active
- Link Master de-activated