# FIELD DEVICES – ***POSITIONERS***
Quick Guide

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.
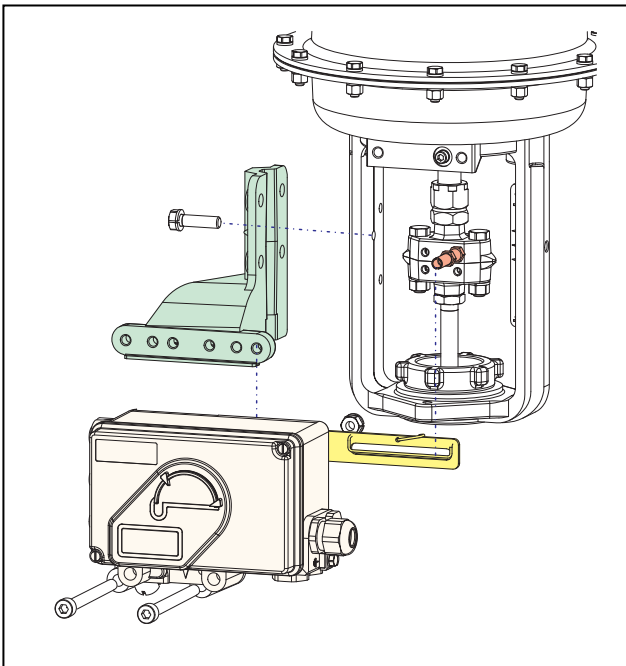
1. MOUNTING TO ACTUATORS

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 ±45º.
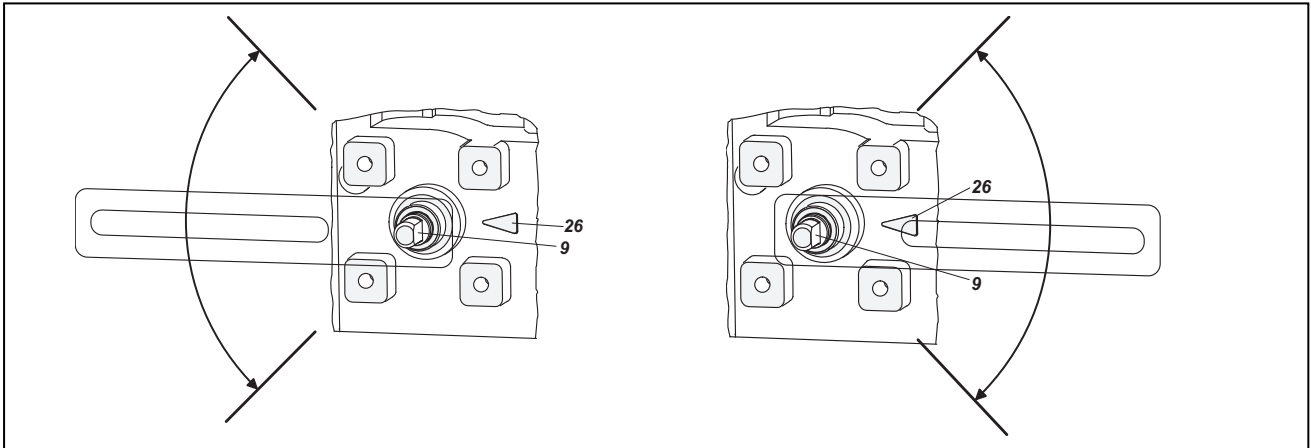

Any mechanical backlash may be source of poor control, oscillation and hunting as well as long duration of Autostart. Please use only original mounting parts and make sure that they are correctly mounted and tightened. By not using the original feedback lever or by using them in an inappropriate way,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

MOUNTING TO LINEAR ACTUATORS
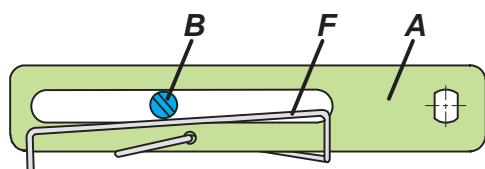NAMUR Mounting - left hand -   NAMUR Mounting - right hand -
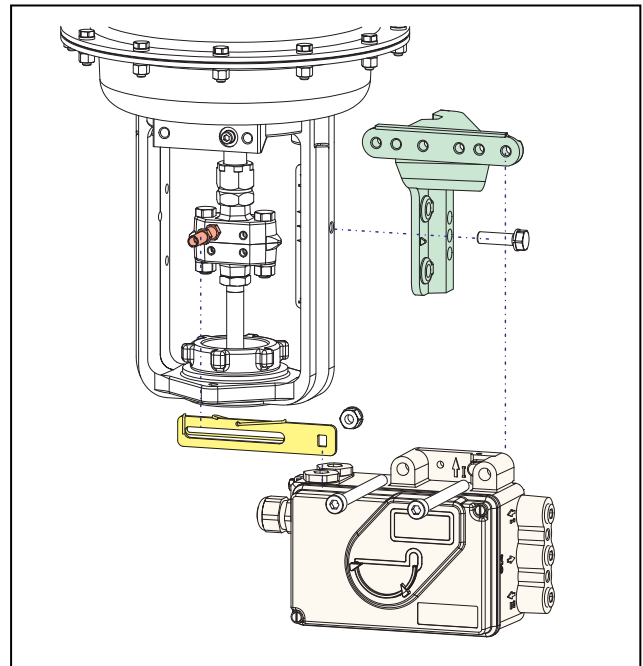
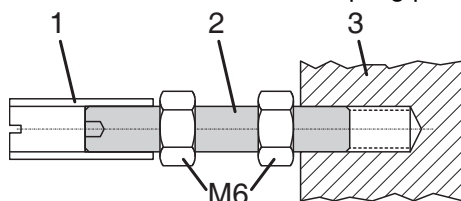Schneider Electric

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

Direct Mounting
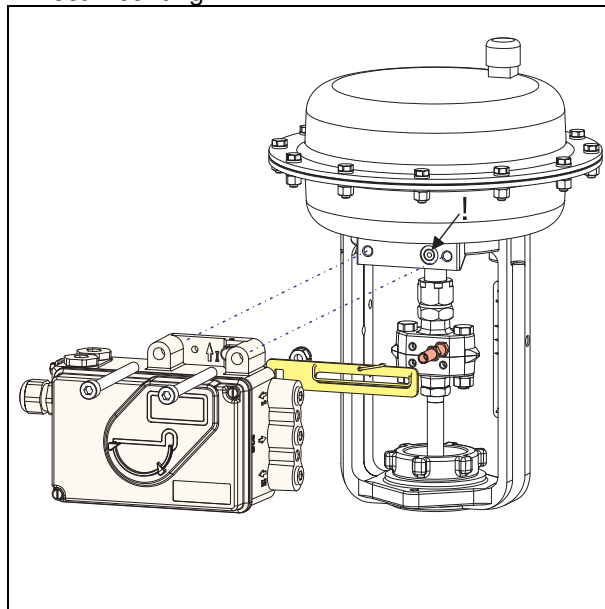
MOUNTING TO ROTARY ACTUATORS

- 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*.
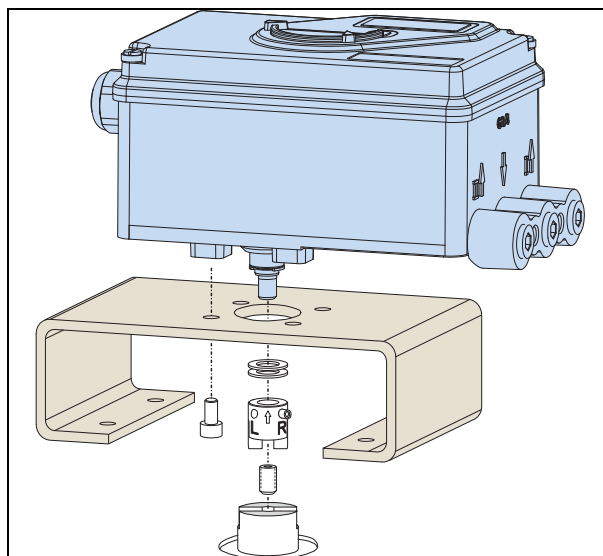
- When the product temperature rises, the drive shaft *1* increases in length. Therefore, the rotary adapter *3* must be mounted so that approx. 1 mm (0.04 in.) of clearance results between the drive shaft *1* and the rotary adapter *3*. This is achieved by placing an appropriate number of washers *5* on the feedback spindle *9* before attaching the rotary adapter. Two washers should result in a clearance of 1 mm.

Actuator, left turning

Actuator, right turning
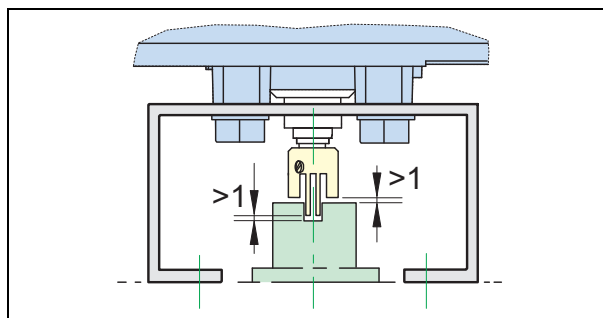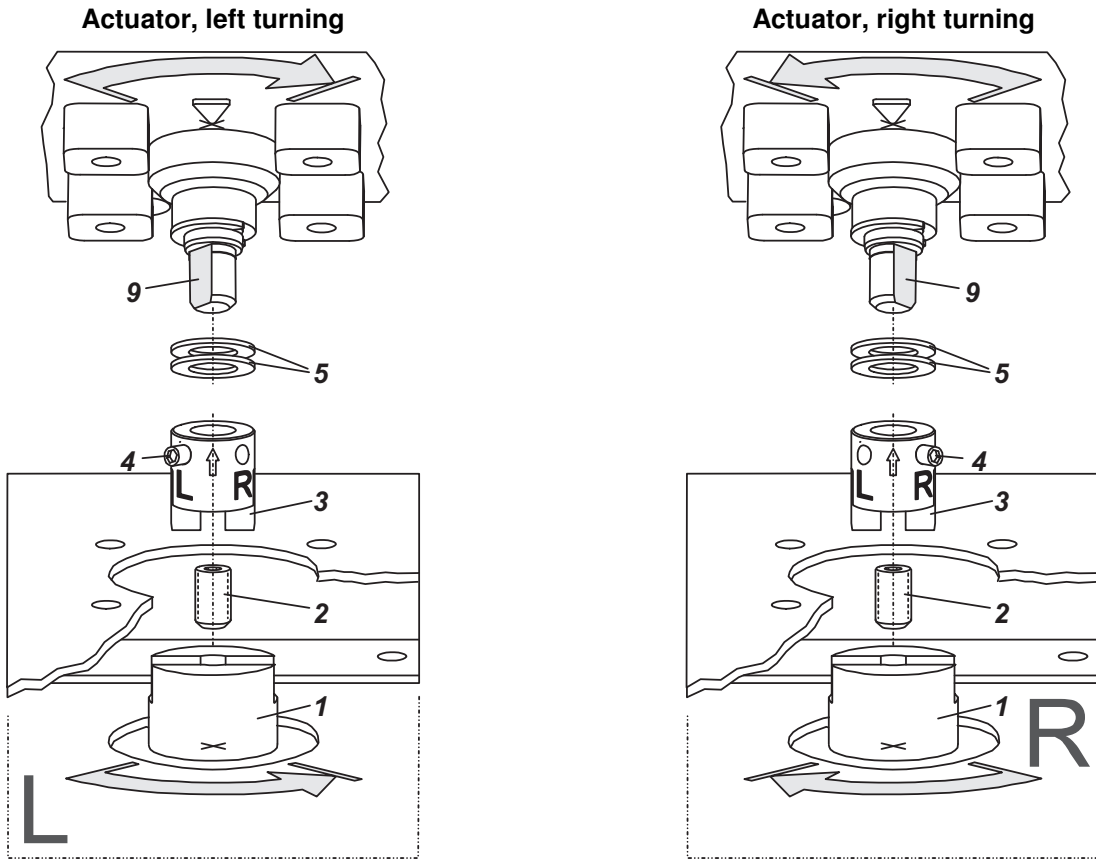
2. CONNECTIONS

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).
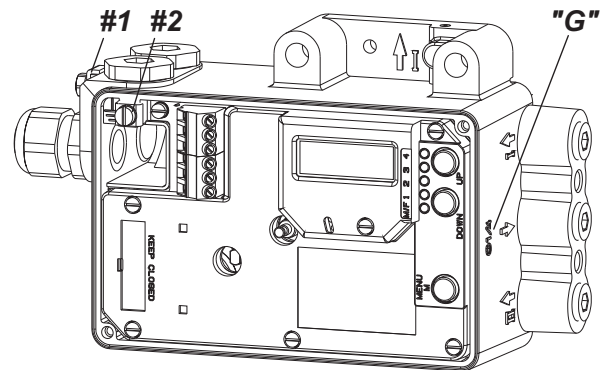
PNEUMATIC CONNECTIONS

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, according to ISO 8573-1 Solid particle class 2, Oil rate class 3 !

Single acting, Direct mounting   Single acting   Double acting

s supply   y1, y2 pneumatic outputs   (--) closed
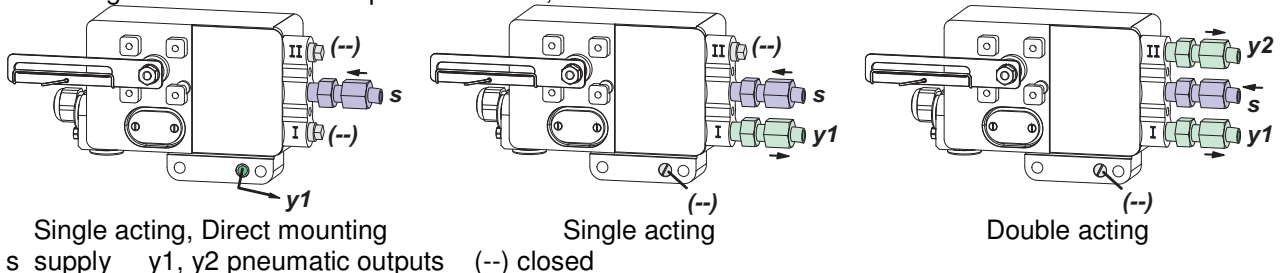
3. ELECTRICAL CONNECTIONS

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   Electric Terminal A

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

11+	12–

Input 4 to 20 mA

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

11	12

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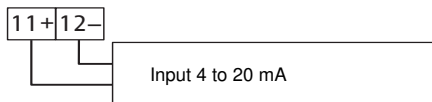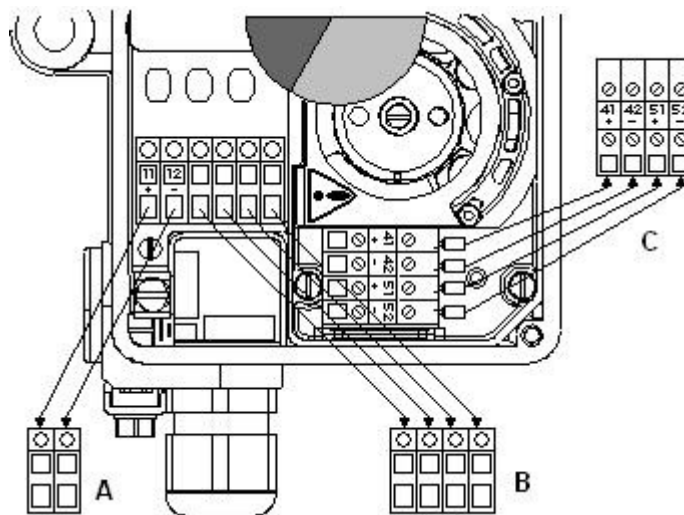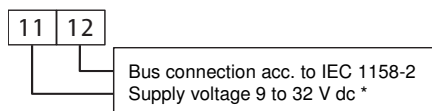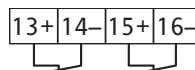Supply voltage 9 to 32 V dc *

3.2 Option Board   Electric Terminal B

3.2.1 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–

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

81+	82–	83+	84–

Analog output 4 to 20 mA,
Two-wire system, supplied by
external power supply

Binary output ,
Two-wire system, supplied by
external power supply 8 to 36 V dc
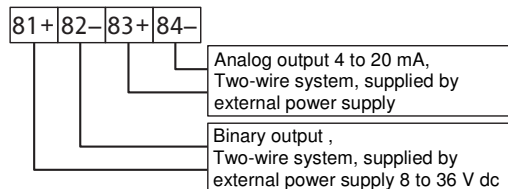
3.2.3 Two binary in-/outputs (SRD991-xxE)
Two-wire system acc. to DIN 19234

81+	82–	83+	84–

Binary in-/ output ,
Two-wire system, supplied by
external power supply 8 to 36 V dc

Binary in-/ output ,
Two-wire system, supplied by
external power supply 8 to 36 V dc
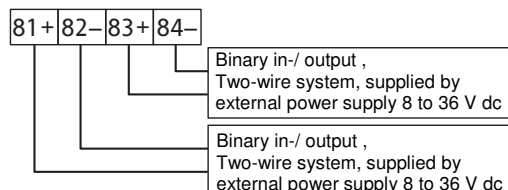
3.3 Inductive Limit Switches   Electric Terminal C

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

41+	42–	51+	52–

Switching amplifier with
intrinsically safe control circuit

Switching amplifier with
intrinsically safe control circuit

3.3.2 SRD991-xxxR

41+	43–	42	52

Contact 2

Contact 1

Supply voltage 10 to 30 V dc
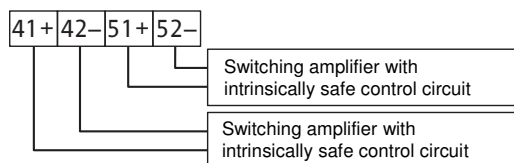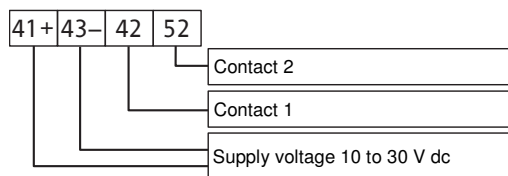
3.3.3 SRD991-xxxV
Warning: For connection of micro switches please refer to MI (Master Instruction) and obey the safety requirements described in document EX EVE0001.

* 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.***

Push buttons

(M)	(DOWN)	(UP)
Enter or	Previous	Next
exit Main	menu or	menu or
menu	Parameter	Parameter
	|-both simultaneously:-|	
	Enter / store	

IN OPERATION:
An already configured device may show the following display:

$$87.5\ \%$$
Valve position   Process variable

For configuration press (M) and Main menu appears.

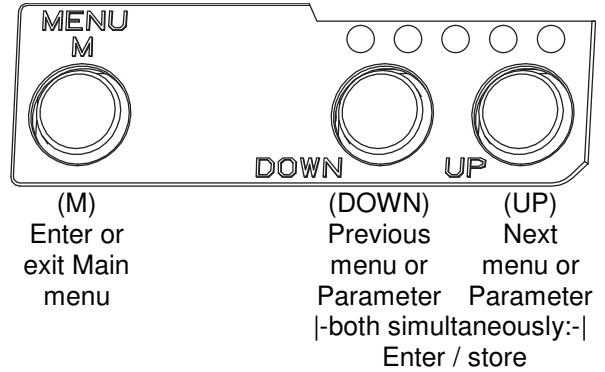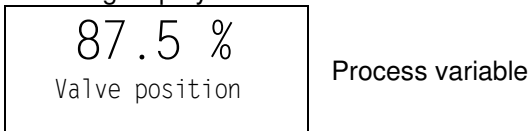**CONFIGURATION with push buttons and LCD:**

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

```
SRD Main Menu
1   Mounting
2   Autostart
3   Valve Action
```
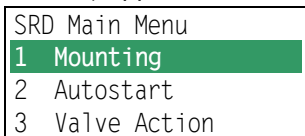
(The selected item is displayed with dark background.)

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 Stroke left
1.2 Stroke right
1.3 Rot cclockw
```
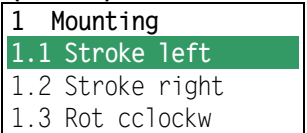
Press keys **(UP)+(DOWN)** simultaneously to confirm and save. The SRD moves back to Main menu again.

```
SRD Main Menu
1   Mounting
2   Autostart
3   Valve Action
```
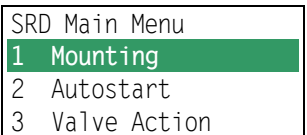
To enter next menu (= menu 2, Autostart) press **(UP)** once:

```
SRD Main Menu
1   Mounting
2   Autostart
3   Valve Action
```
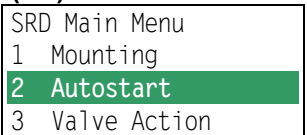
Now press keys **(UP)+(DOWN)** simultaneously to enter menu 'Autostart'.

(Continued on next page.)

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*) 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	→ Determines only the mechanical stops of actuator / valve
2.2 Standard	→ **Recommended for standard applications**
2.3 Enhanced	→ Optimized control behaviour compared to Standard Autostart
2.4 Smooth resp.	→ Damped control behaviour for e.g. smaller actuators
2.5 Fast resp.	→ Undamped 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**:

87.5 %
Valve position

Process variable

87.5 %
Valve position
Ctrl diff error

Diagnostic messages see following table.

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

Autostart err 1	
Description of message / LCD text	Remedy
Air supply too low	Check air supply
Feedback lever (linear actuator) or Coupling (rotary actuator) incorrectly linked. Potentiometer moves out of operating range of ± 47° of 0° position	Check mounting. Flat area points to arrow on housing
Coupling (rotary actuator) incorrectly linked (R and L interchanged)	Check mounting
Pneumatic output to actuator closed or untight. When direct mounting onto FlowTop or FlowPak, the screw plug y1-d is not removed	Check pneumatic connections
Mechanical stops not determinable	Check spring movement of actuator / check air supply / Check mounting
When using a booster or spool valve, no control parameters can be determined, since air capacity is too high	Device version is not suitable for this actuator; select version with smaller air capacity or remove booster
Control parameter too high since air capacity is too high (in general, oscillation in valve movement)	Use a booster or the version with spool valve. Reduce control parameter prop.-gain (Menu 6.1 and 6.2)
Possibly incomprehensible configuration data	Reset configuration, see Menu 9.1

Optionboard err	
Description of message / LCD text	Remedy
Configured status of the SRD deviates from existing version (e.g. Option board has been inserted subsequently)	Check if correct option board has been connected Confirm message by pressing keys **(UP)+(DOWN)** simultaneously
Bad contact	Connections to terminals interchanged Check connections Tighten electronics
Defective	Exchange option board

Ctrl diff error	
Description of message / LCD text	Remedy
Actuator problems (high friction or blocked)	Check actuator
Insufficient air supply	Check air supply / air filter
Insufficient parameters for position controls, for example, amplification too small	Check control parameter, check pneumatic components
IP module or pneumatic amplifier defect	Check with Menu 7; replace if necessary

MENU STRUCTURE FOR SRD991 / SRD960

SRD Main Menu

Menu	Factory configuration	Description
		06.17
1 Mounting		
1.1 Stroke left	✓	Linear actuator, left-hand or direct mounting
1.2 Stroke right		Linear actuator, right-hand mounting
1.3 Rot cclockw		Rotary actuator, opening counter-clockwise
1.4 Rot clockw		Rotary actuator, opening clockwise
1.5 Linear Pot.		For Top Mounting (only for SRD991)
2 Autostart		
2.1 Endpoints		Adaptation of the mechanical stops only
2.2 Standard		Autostart recommended for standard application
2.3 Enhanced		Enh. Autostart. Optimized control behaviour compared to Standard Autostart
2.4 Smooth Resp.		Enh. Autostart. Damped control behaviour for e.g. smaller actuators
2.5 Fast Resp.		Enh. Autostart. Undamped control behaviour for e.g. larger actuators
3 Valve Action		
3.1 SRD		Action of Positioner:
3.1.1 Direct	✓	Valve opens with increasing setpoint value
3.1.2 Reverse		Valve closes with increasing setpoint value
3.2 Feedback		Action of Feedback Unit:
3.2.1 Direct	✓	Increasing Current with increasing valve position
3.2.2 Reverse		Decreasing Current with increasing valve position
3.3 Accessories		
3.3.1 None		No accessories mounted
3.3.2 Booster		Booster mounted
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 (Configuration via DTM)
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 Valve corr.		Tuning of position for mounting adaption
5.12 Stroke	x° / 20 mm	Configuration of nominal travel
5.13 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	2.7	I : Integration time for 'open valve'
6.5 Rate time cl	0.0	D: Derivative time for 'close valve'
6.6 Rate time op	0.0	D: Derivative time for 'open valve'
6.7 Trav time cl	0.35	Positioning time for 'close valve'
6.8 Trav time op	0.35	Positioning time for 'open valve'
6.9 Control gap	0.1	Permitted dead band for control difference
6.10 Fine tuning		Fine tuning of control for booster applications

Menu		Description
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 0.1 % Steps		Setpoint changes of 0.1 % steps by using push buttons Up or Down
8.4 Do PST		Start the Partial Stroke Test
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 (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
10 Profibus PA - Bus Address		*Profibus only.*
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		*FF only.*
10.1 Simulate		
Disabled	✓	Simulate disabled
Enabled		Simulate enabled
10.2 Profile		
Link Master		Link Master active
Basic field dev	✓	Link Master de-activated
10.3 Address	248	Bus Address, change by using push buttons Up or Down