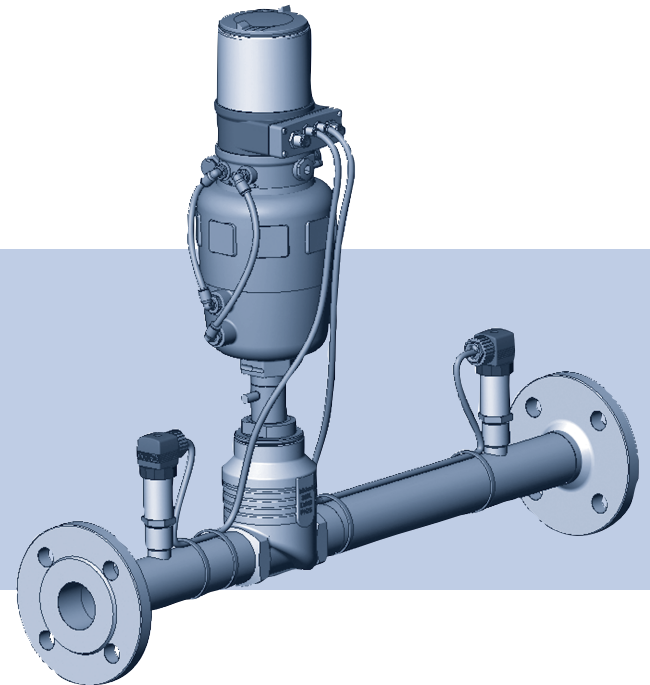


Type 8750 Classic with Type 8693

Flow controller



Quickstart

English

We reserve the right to make technical changes without notice.
Technische Änderungen vorbehalten.
Sous réserve de modifications techniques.

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Operating Instructions 1210/00_EU-EN_00810234 / Original DE

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1. QUICKSTART GUIDE

The quickstart guide describes the entire life cycle of the device. Keep these instructions in a location which is easily accessible to every user and make these instructions available to every new owner of the device.

Important Safety Information.

Read Quickstart carefully and thoroughly. Study in particular the chapters entitled Basic Safety Instructions and Authorized Use.

- ▶ Quickstart must be read and understood.

The Quickstart guide illustrates the installation and commissioning of the equipment with examples.

A detailed description of the process controller can be found in the operating instructions for Type 8693.



The operating instructions can be found on the Internet at:

www.burkert.com

1.1. Definition of terms / Abbreviation

In these instructions, the term “device” always refers to the flow controller Type 8750.

FMR = Flow controller

2. SYMBOLS

The following symbols are used in these instructions.



DANGER!

Warns of an immediate danger.

- ▶ Failure to observe the warning will result in a fatal or serious injury.



WARNING!

Warns of a potentially dangerous situation.

- ▶ Failure to observe the warning may result in a serious or fatal injury.



CAUTION!

Warns of a possible danger.

- ▶ Failure to observe this warning may result in a moderate or minor injury.

NOTE!

Warns of damage to property.



Important tips and recommendations.



Refers to information in these operating instructions or in other documentation.

- ▶ Indicates an instruction to prevent risks.

→ designates a procedure which you must carry out.

3. AUTHORIZED USE

Non-authorized use of the flow controller Type 8750 may be a hazard to people, nearby equipment and the environment.

- The device is designed as a simple system for determining and controlling the volumetric flow rate of gases.
- Do not expose the device to direct sunlight.
- Do not use the device outdoors.
- Use according to the authorized data, operating conditions, and conditions of use specified in the contract documents and operating instructions. These are described in Chapter "[7. Technical data](#)".
- Use the device only in conjunction with third-party devices and components recommended and authorized by Bürkert.
- Correct transportation, storage, and installation, as well as careful use and maintenance are essential for reliable and faultless operation.
- Use the device only as intended.

3.1. Restrictions

If exporting the system/device, observe any existing restrictions.

4. BASIC SAFETY INSTRUCTIONS

These safety instructions do not make allowance for any

- Contingencies and events which may arise during the installation, operation, and maintenance of the devices.
- Local safety regulations – the operator is responsible for observing these regulations, also in relation to the installation personnel.



Risk of injury from high pressure in the equipment/device.

- ▶ Before working on equipment or device, switch off the pressure and deaerate/drain lines.

Risk of electric shock.

- ▶ Before reaching into the device, switch off the power supply and secure to prevent reactivation.
- ▶ Observe applicable accident prevention and safety regulations for electrical equipment.

Risk of burns/risk of fire if used during long-term operation through hot device surface.

- ▶ Keep the device away from highly flammable substances and media and do not touch with bare hands.

General hazardous situations.

- ▶ Devices without a separate Ex type label may not be used in a potentially explosive area.
- ▶ Only trained technicians may perform installation and maintenance work.

- ▶ That the system cannot be activated unintentionally.
- ▶ After an interruption in the power supply or pneumatic supply, ensure that the process is restarted in a defined or controlled manner.
- ▶ The device may be operated only when in perfect condition and in consideration of the operating instructions.
- ▶ The general rules of technology apply to application planning and operation of the device.
- ▶ Do not supply the pilot air port with aggressive or flammable media.
- ▶ Do not supply the pilot air port with liquids.
- ▶ Do not physically stress the body (e.g. by placing objects on it or standing on it).
- ▶ Do not make any internal or external changes on the device.

NOTE!**Electrostatic sensitive components/modules.**

The device contains electronic components which react sensitively to electrostatic discharge (ESD). Contact with electrostatically charged persons or objects are hazardous to these components. In the worst case scenario, they will be destroyed immediately or will fail after start-up.

- ▶ Observe the requirements specified in EN 61340-5-1 to minimize/avoid the possibility of damage caused by a sudden electrostatic discharge.
- ▶ Do not touch electronic components while the supply voltage is switched on.

5. GENERAL INFORMATION**5.1. Contact address****Germany**

Bürkert Fluid Control Systems
Sales Center
Christian-Bürkert-Str. 13-17
D-74653 Ingelfingen
Tel. + 49 (0) 7940 - 10 91 111
Fax + 49 (0) 7940 - 10 91 448
E-mail: info@de.buerkert.com

International

Contact addresses can be found on the final pages of the printed operating instructions.

And also on the Internet at:

www.burkert.com

5.2. Warranty

The warranty is only valid if the flow controller Type 8750 is used as intended in accordance with the specified application conditions.

5.3. Information on the Internet

The operating instructions and data sheets for Type 8750 / Type 8693 can be found on the Internet at:

www.burkert.com

6. SYSTEM DESCRIPTION

6.1. General description

To determine and control the volumetric flow rate, the pressure drop over the control valve is measured continuously by the two pressure sensors. This pressure difference and the valve flow characteristic are the parameters used to determine the volumetric flow. This measured volumetric flow is compared with the set point – internally via display/keyboard or externally via standard signal or bus protocol – evaluated in a PID controller and set on the position controller as the new set point.

The system consists of:

- Control valve Type 2712 with process controller Type 8693
- Two pressure sensors Type 8323

Options:

- Binary input
- Analog feedback
- 2 binary outputs
- Bus communication (PROFIBUS DP or DeviceNet)

Other:

- The flow controller is supplied with a factory setting.
- The device is operated via 4 function keys and a display.
- The valve seat can be exchanged.

6.2. Structure

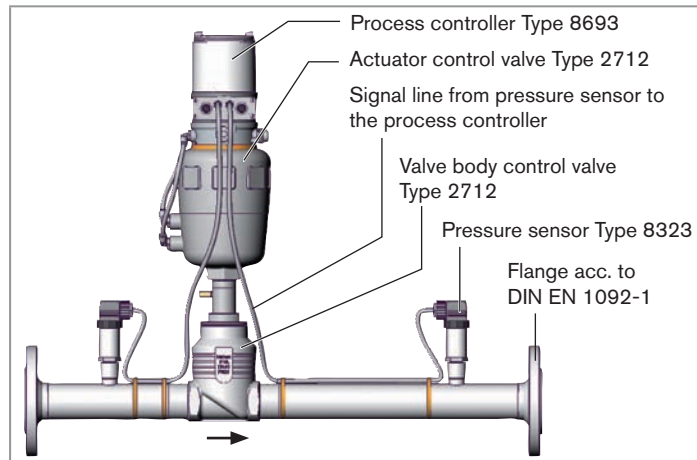


Fig. 1: Structure

6.2.1. Action diagram of the FMR

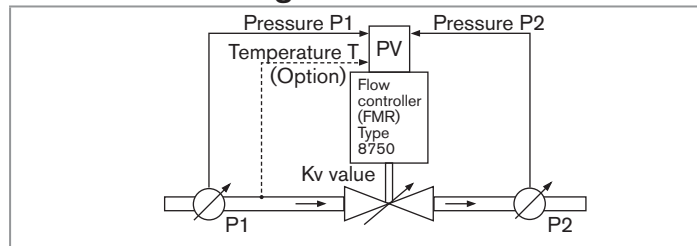


Fig. 2: Action diagram

6.2.2. Electrical interfaces

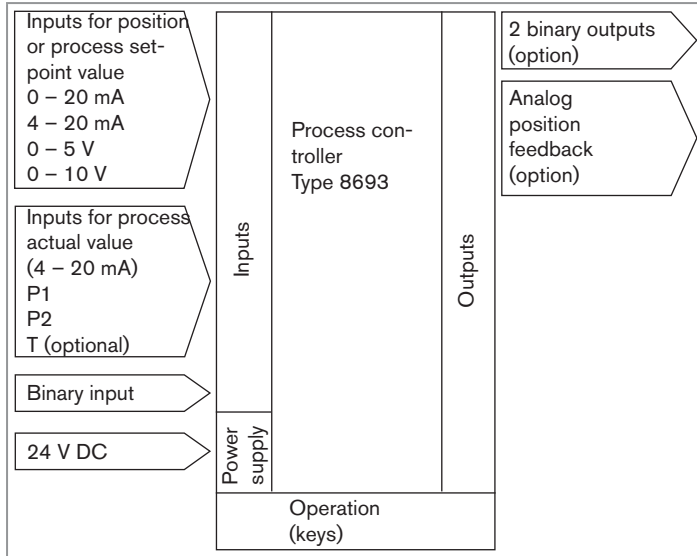


Fig. 3: Interfaces

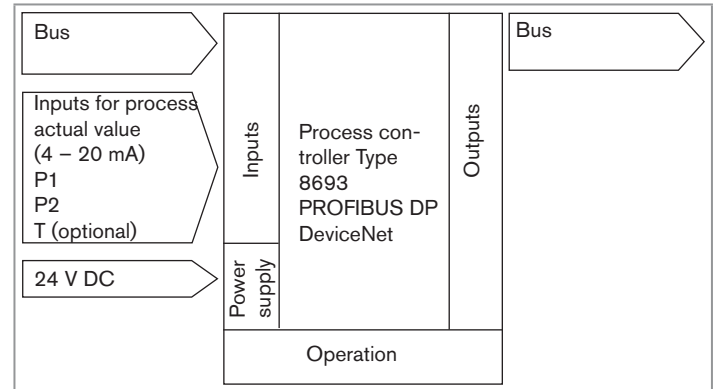


Fig. 4: Interfaces - Bus

7. TECHNICAL DATA

7.1. Conformity

Type 8750 conforms to the EC directives according to the EC Declaration of Conformity.

7.2. Standards

The applied standards which are used to demonstrate compliance with the EC Directives are listed in the EC type test certificate and/or the EC Declaration of Conformity.

7.3. Operating conditions

Ambient temperature 0 – +55 °C

Degree of protection

IP65 / IP67 according to EN 60529 (only if cables, plugs and sockets have been connected correctly and in compliance with the exhaust air concept in Chapter [“9.3. Pneumatic connection of the process controller”](#))

7.4. Mechanical data

Materials

| | |
|--------------------------|----------------------------------|
| Valve body | stainless steel cast 1.4404/316L |
| Sensor connection | 1.4301 or 1.4404 |
| Flange | stainless steel 316L |
| Actuator | Polyamide (PA) |
| Process controller seals | PPS, PC, stainless steel EPDM |

Packing gland

PTFE rings with silicone grease

Other wetted parts

stainless steel 1.4571

Inlet and outlet sections

acc. to EN ISO 5167-1

Inlet sections

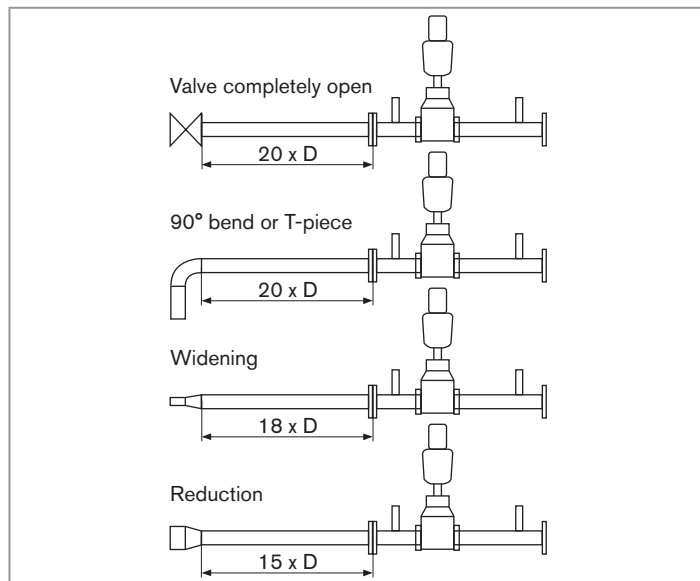


Fig. 5: Inlet sections

Outlet sections

already integrated in the system (6 x DN)

Typ 8750

Technical data

Dimensions

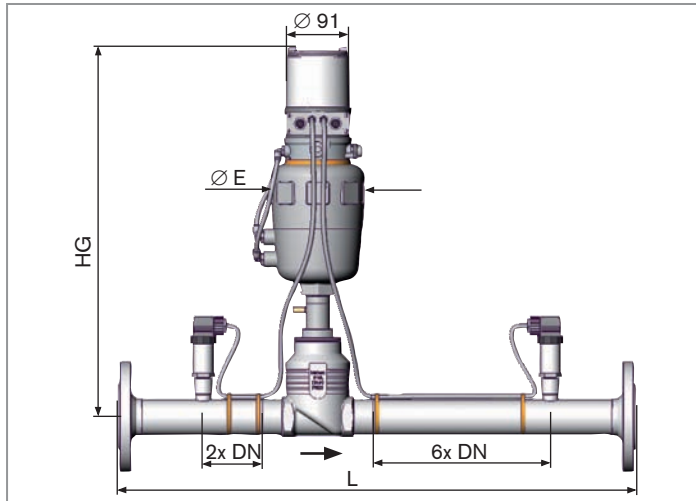


Fig. 6: Dimensions

| DN pipe connection [mm] | L [mm] | HG [mm] | Ø E [mm] |
|-------------------------|--------|---------|----------|
| 15 | 330 | 414 | 101 |
| 25 | 500 | 412 | 101 |
| 40 | 700 | 501 | 127 |
| 50 | 800 | 538 | 157 |
| 65 | 1000 | 567 | 157 |
| 80 | 1200 | 637 | 261 |
| 100 | 1400 | 647 | 261 |

Tab. 1: Dimensions

7.5. Type label

Example:

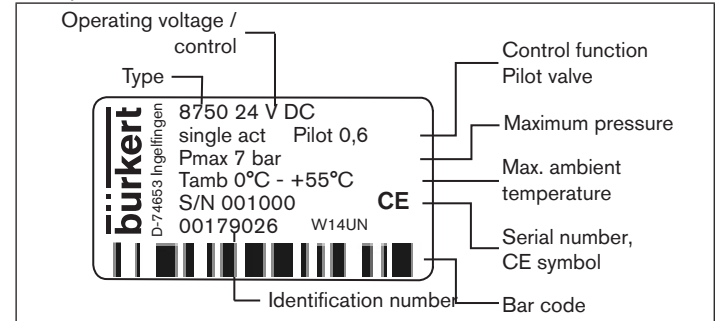


Fig. 7: Example of type label

7.6. Fluidic data

| | |
|----------------|--|
| Control medium | neutral gases, air |
| | Quality classes as per DIN ISO 8573-1 |
| Dust content | Class 5: max. particle size 40 µm, max. particle density 10 mg/m ³ |
| Water content | Class 3: max. pressure dew point -20 °C or min. 10 °C below the lowest operating temperature |
| Oil content | Class 5: max. 25 mg/m ³ |

| | |
|--------------------------------------|--|
| Temperature range control medium | 0 – +50 °C |
| Pressure range control medium | 5.5 – 7 bar (DN 15 – DN 65) 5 – 6 bar (DN 80 – DN 100) |
| Intrinsic air consumption | 0 l/min |
| Connections | plug-in hose connector 6 mm / 1/4" threaded connection G 1/8 |
| Flow media | air and gases steam on request |
| Temperature range Media | 0 – +80 °C |
| Pressure range Media | 0 – 16 bar |
| Connections | flange acc. to DIN EN 1092-1, ANSI, JIS |
| Pressure measurement range of sensor | 0 – 6/10 or 16 bar depending on the pressure range of media others available on request |
| Measurement section | acc. to DIN EN 60534-2-3 |
| Orifices | DN 15 - DN 100 |
| Sensor connections | threaded connection G 1/2 |

7.7. Electrical data

| | |
|-------------------------|---|
| Connections | |
| Operating voltage | circular plug-in connector M12 x 1, 4-pole |
| External signals | circular plug-in connector M12 x 1, 8-pole circular plug-in connector M8 x 1, 8-pole |
| Operating voltage | 24 V DC - maximum residual ripple 10 % |
| Power consumption | < 5 W |
| Set-point value default | 0/4 – 20 mA or 0 – 5/10 V field bus as option |
| Display | multifunction display |
| User interface | 4 function keys |

Typ 8750

Technical data

Kv value table for FMR versions (specifications for valve stroke and flow rate in %)

The measured set of values for each seat combination is stored in the FMR memory at the factory.

| Valve design | | | Flow rate Kv in [%] | | | | | | | | | | | | | | | | | | | | |
|--------------|--------------|------------|----------------------|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|
| | | | Valve stroke POS [%] | | | | | | | | | | | | | | | | | | | | |
| DN pipe [mm] | DN seat [mm] | Kvs [m³/h] | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
| 15 | 8 | 2,1 | 0,0 | 3,3 | 3,8 | 4,8 | 5,2 | 5,7 | 6,2 | 7,6 | 9,0 | 11,0 | 12,9 | 16,2 | 20,5 | 24,8 | 30,0 | 37,6 | 45,2 | 58,1 | 76,2 | 90,5 | 100,0 |
| | 10 | 3,1 | 0,0 | 2,9 | 3,5 | 4,2 | 4,8 | 5,5 | 6,1 | 7,7 | 10,0 | 12,6 | 15,8 | 19,7 | 24,2 | 29,7 | 35,5 | 44,2 | 54,8 | 67,7 | 80,6 | 92,6 | 100,0 |
| | 15 | 4,3 | 0,0 | 3,3 | 4,0 | 4,4 | 5,1 | 6,5 | 8,1 | 9,8 | 12,1 | 15,1 | 18,6 | 22,8 | 27,9 | 34,4 | 41,9 | 51,2 | 62,8 | 74,4 | 86,0 | 94,4 | 100,0 |
| 25 | 15 | 5,3 | 0,0 | 2,6 | 3,2 | 3,6 | 4,2 | 5,1 | 6,6 | 8,1 | 9,8 | 12,1 | 15,1 | 18,5 | 22,6 | 27,5 | 34,0 | 43,0 | 54,7 | 66,0 | 77,4 | 88,7 | 100,0 |
| | 20 | 7,2 | 0,0 | 2,8 | 3,5 | 3,9 | 4,3 | 5,3 | 6,5 | 7,9 | 9,7 | 12,2 | 15,3 | 18,5 | 22,2 | 27,5 | 34,7 | 42,8 | 52,8 | 63,9 | 75,0 | 87,5 | 100,0 |
| | 25 | 12,0 | 0,0 | 2,9 | 3,2 | 3,9 | 5,4 | 6,8 | 8,3 | 10,2 | 12,5 | 15,0 | 18,3 | 22,7 | 28,3 | 35,3 | 42,5 | 49,6 | 58,3 | 67,9 | 78,3 | 89,2 | 100,0 |
| 40 | 25 | 13,6 | 0,0 | 2,9 | 3,7 | 4,5 | 5,5 | 6,6 | 8,1 | 10,1 | 12,5 | 15,4 | 19,1 | 23,0 | 27,9 | 34,1 | 41,2 | 49,6 | 58,8 | 68,4 | 78,7 | 89,0 | 100,0 |
| | 32 | 20,2 | 0,0 | 2,4 | 3,0 | 3,5 | 4,2 | 5,1 | 6,4 | 8,2 | 10,4 | 12,9 | 15,8 | 19,0 | 22,8 | 27,8 | 34,2 | 43,3 | 54,5 | 64,4 | 74,3 | 85,6 | 100,0 |
| | 40 | 23,8 | 0,0 | 2,5 | 2,9 | 3,7 | 4,6 | 5,7 | 7,1 | 9,0 | 11,3 | 13,7 | 16,8 | 20,8 | 25,2 | 31,5 | 38,7 | 47,5 | 58,0 | 67,2 | 76,5 | 87,0 | 100,0 |
| 50 | 32 | 21,0 | 0,0 | 2,3 | 2,9 | 3,5 | 4,3 | 5,1 | 6,2 | 7,9 | 10,0 | 12,5 | 15,2 | 18,3 | 21,9 | 26,7 | 32,9 | 43,0 | 55,2 | 65,5 | 76,2 | 87,4 | 100,0 |
| | 40 | 24,6 | 0,0 | 2,4 | 2,8 | 3,3 | 4,1 | 5,4 | 6,9 | 8,5 | 10,6 | 13,1 | 16,3 | 19,8 | 24,0 | 29,8 | 37,4 | 47,2 | 56,9 | 66,3 | 76,8 | 87,8 | 100,0 |
| | 50 | 37,0 | 0,0 | 2,4 | 3,0 | 3,9 | 5,1 | 6,4 | 7,8 | 9,8 | 12,2 | 15,0 | 18,4 | 22,7 | 28,4 | 34,9 | 41,9 | 50,7 | 59,5 | 68,9 | 79,2 | 89,2 | 100,0 |
| 65 | 40 | 17,5 | 0,0 | 2,6 | 3,7 | 4,6 | 5,4 | 6,3 | 7,4 | 8,9 | 10,9 | 13,2 | 16,0 | 19,2 | 22,9 | 26,9 | 31,4 | 37,3 | 44,6 | 53,9 | 66,9 | 82,3 | 100,0 |
| | 50 | 26,0 | 0,0 | 2,7 | 3,8 | 5,0 | 6,2 | 7,6 | 9,2 | 11,2 | 13,5 | 15,9 | 18,8 | 22,5 | 26,5 | 31,8 | 37,7 | 45,2 | 54,2 | 64,5 | 76,5 | 88,5 | 100,0 |
| | 65 | 52,0 | 0,0 | 1,5 | 2,5 | 3,3 | 4,0 | 4,9 | 6,2 | 8,0 | 10,6 | 13,5 | 17,5 | 22,3 | 28,3 | 37,1 | 47,1 | 60,6 | 72,3 | 80,6 | 87,7 | 93,8 | 100,0 |
| 80 | 50 | 42,0 | 0,0 | 2,0 | 2,4 | 2,9 | 3,6 | 4,5 | 5,5 | 6,8 | 8,3 | 10,0 | 11,9 | 14,3 | 16,9 | 20,5 | 25,0 | 30,7 | 38,1 | 46,8 | 59,5 | 76,4 | 100,0 |
| | 65 | 70,0 | 0,0 | 2,0 | 2,4 | 2,9 | 3,6 | 4,4 | 5,4 | 6,7 | 8,1 | 9,7 | 11,7 | 14,2 | 17,4 | 22,0 | 27,9 | 36,1 | 46,4 | 58,0 | 71,4 | 85,7 | 100,0 |
| | 80 | 100,0 | 0,0 | 2,1 | 2,6 | 3,2 | 4,2 | 5,5 | 7,0 | 8,6 | 10,5 | 12,9 | 16,0 | 20,0 | 25,0 | 31,9 | 40,0 | 49,5 | 60,0 | 71,0 | 83,0 | 92,4 | 100,0 |
| 100 | 65 | 75,0 | 0,0 | 1,9 | 2,3 | 2,8 | 3,5 | 4,2 | 5,1 | 6,2 | 7,6 | 9,1 | 11,1 | 13,7 | 16,8 | 21,2 | 26,7 | 33,6 | 42,7 | 54,0 | 68,0 | 83,3 | 100,0 |
| | 80 | 115,0 | 0,0 | 1,8 | 2,3 | 2,9 | 3,7 | 4,8 | 6,1 | 7,6 | 9,6 | 12,0 | 14,8 | 18,3 | 23,0 | 30,0 | 38,3 | 47,4 | 56,5 | 66,3 | 77,4 | 88,5 | 100,0 |
| | 100 | 140,0 | 0,0 | 2,3 | 2,8 | 3,3 | 4,1 | 5,1 | 6,4 | 7,9 | 9,6 | 11,8 | 14,6 | 18,4 | 22,9 | 29,1 | 36,4 | 46,1 | 59,3 | 72,5 | 84,3 | 93,3 | 100,0 |

Tab. 2: Flow rate Kv

8. CONTROL AND DISPLAY ELEMENTS

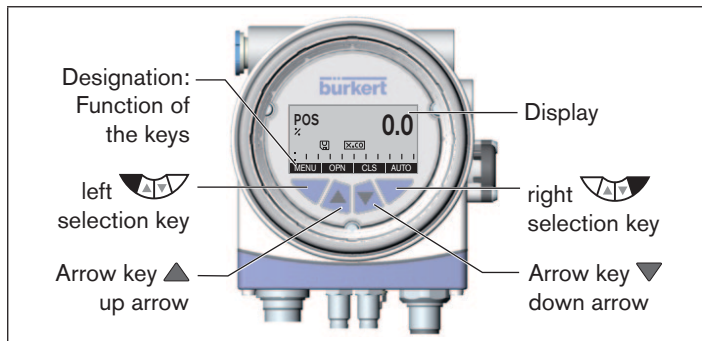


Fig. 8: Description of control elements

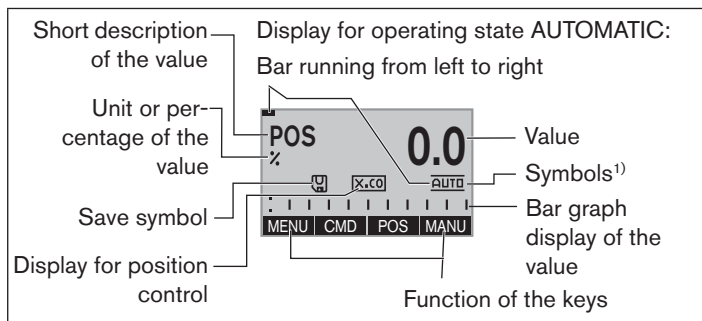


Fig. 9: Description of display

1) Symbols are displayed according to the activated functions

8.1. Function of the keys

The functions of the 4 keys differ depending on the operating state (AUTOMATIC or MANUAL) and operating level (process level or setting level).

The function of the keys is displayed in the gray text field which is above the key.

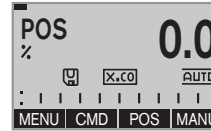
| Function of the keys on the process level: | | | |
|--|----------------------|---|---------------------|
| Key | Function of the keys | Description of the function | Operating state |
| Arrow key ▲ | OPN (OPEN) | Manual opening of the actuator | MANUAL |
| | | Change the displayed value (z.B. POS-CMD-TEMP...) | AUTOMATIC |
| Arrow key ▼ | CLS (CLOSE) | Manual closing of the actuator | MANUAL |
| | | Change the displayed value (e.g. POS-CMD-TEMP...) | AUTOMATIC |
| Selection key | MENU | Change to the setting level Note: Press key for approx. 3 s. | AUTOMATIC or MANUAL |
| Selection key | AUTO | Return to AUTOMATIC operating state | MANUAL |
| | MANU | Change to MANUAL operating state | AUTOMATIC |

| Function of the keys on the setting level: | | |
|--|-----------------------------|---|
| Key | Function of the keys | Description of the function |
| Arrow key ▲ | | Scroll up in the menus |
| | + | Increase numerical values |
| Arrow key ▼ | | Scroll down in the menus |
| | - | Decrease numerical values |
| | ← | Change by one digit to the left; when entering numerical values |
| Selection key | EXIT (BACK) | Return to the process level |
| | | Gradually return from a sub-menu option |
| | ESC | Leave a menu |
| | STOP | Stop a sequence |
| Selection key | ENTER SELEC OK INPUT | Select, activate or deactivate a menu option |
| | EXIT (BACK) | Gradually return from a sub-menu option |
| | RUN | Start a sequence |
| | STOP | Stop a sequence |
| | | |

Tab. 3: Function of the keys

8.2. Operating state

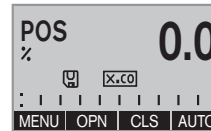
The process controller has 2 operating states: AUTOMATIC and MANUAL



AUTOMATIC

In the AUTOMATIC operating state, normal controller mode is implemented.

(Bar running along the upper edge of the display and symbol **AUTO** displayed).



MANUAL

In the MANUAL operating state, the valve can be opened and closed manually via the arrow keys **▲ OPN** / **▼ CLS**.

8.2.1. Changing the operating state

Use the right selection key to switch between the two operating states AUTOMATIC **AUTO** and MANUAL **MANU**.

| | | |
|-----------------------------------|---------------------------|-------|
| Switching from AUTOMATIC ⇌ MANUAL | MANU ²⁾ | press |
| Switching from MANUAL ⇌ AUTOMATIC | AUTO | press |

Tab. 4: Changing the operating state

2) Only possible if POS, CMD, PV (,SP) is displayed.

8.3. Operating levels

The process controller has 2 operating levels:

- **Process level**

Display and operation of the current process



Operating state: AUTOMATIC / MANUAL

- **Setting level**


Inputting the operating parameters

Supplementing the menu by optional menu options

8.3.1. Switching between the operating levels

| | | |
|--|-------------|---|
| Switching from process level ⇒ setting level | MENU |  press for 3 s ³⁾ |
| Switching from setting level ⇒ process level | EXIT |  press |

Tab. 5: Changing the operating level

 If the device is in the AUTOMATIC operating state when changing to the setting level, the process continues running during the setting.

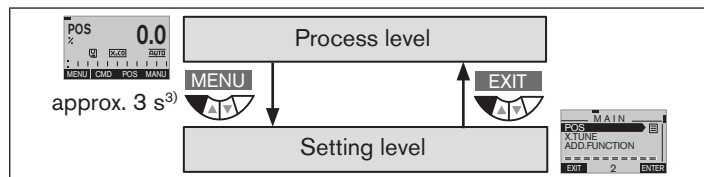
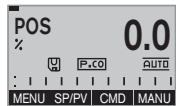
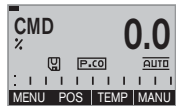
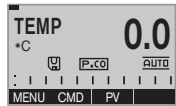
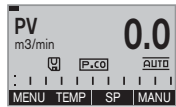
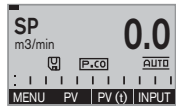


Fig. 10: Operating levels

³⁾ During these 3 s (countdown), 2 bars converge.

8.4. Display in AUTOMATIC operating state

| Description of the display | Display |
|--|---|
| Set-point position of the valve actuator (0 – 100 %) |  |
| Nominal position of the valve actuator (0 – 100 %) |  |
| Internal temperature in the body of the device (°C) |  |
| Process actual value |  |
| Process set-point value |  |

| Description of the display | Display |
|---|---------|
| Simultaneous display of the nominal position and the set-point position of the valve actuator (0 – 100 %) | |
| Graphical display of SP and PV with time axis | |
| Graphical display of POS and CMD with time axis | |
| Value overview Pressure sensor P1 and P2 | |
| Time, weekday and date | |
| Automatic adjustment of the position controller | |

| Description of the display | Display |
|---|---------|
| Automatic optimization of the process controller parameters | |
| Automatic linearization of the process characteristics | |
| Simultaneous display of the nominal position and the set-point position of the valve actuator (0 – 100 %) | |

Tab. 6: Display in the AUTOMATIC operating state

8.5. Master code

Operation of the device can be locked via a freely selectable user code. In addition, there is a non-changeable master code with which you can perform all operator control actions on the device. This 4-digit master code can be found on the last pages of this quickstart guide in the Chapter [“Master code”](#).

If required, cut out the code and keep it separate from this quickstart guide.

9. ASSEMBLY

9.1. Safety instructions



DANGER!

Risk of injury from high pressure in the equipment/device.

- ▶ Before working on equipment or device, switch off the pressure and deaerate/drain lines.

Risk of electric shock.

- ▶ Before reaching into the device, switch off the power supply and secure to prevent reactivation.
- ▶ Observe applicable accident prevention and safety regulations for electrical equipment.



WARNING!

Risk of injury from improper assembly.

- ▶ Installation must only be carried out by authorized technicians and with the appropriate tools.

Risk of injury from unintentional activation of the system and uncontrolled restart.

- ▶ Secure system against unintentional activation.
- ▶ Following assembly, ensure a controlled restart.

9.2. Before installation

The FMR can be installed in any position, preferably with the process controller face up.



- To avoid turbulent flows around the pressure sensor, fit an inlet section upstream of the FMR (dimensions acc. to EN ISO 5167-1, see [“Fig. 5: Inlet sections”, page 10](#))
- Ensure that the pipelines are correctly lined and are not twisted. If necessary, pipelines must be suitably attached or supported.
- Observe flow direction (arrow on valve body).

9.2.1. Installation

- Clean pipelines and joints (sealing material, swarf, etc.).
- Connect FMR to pipeline.

9.3. Pneumatic connection of the process controller



DANGER!

Risk of injury from high pressure in the equipment/device.

- ▶ Before working on equipment or device, switch off the pressure and deaerate/drain lines.



WARNING!

Risk of injury from unsuitable connection hoses.

Hoses which cannot withstand the pressure and temperature range may result in hazardous situations.

- ▶ Use only hoses which are authorized for the indicated pressure and temperature range.
- ▶ Observe the data sheet specifications from the hose manufacturers.

Procedure:

- Connect the control medium to the pilot air port (1)
(3 – 7 bar; instrument air, free of oil, water and dust).
- Fit the exhaust air line or a silencer to the exhaust air port (3).



Important information for the problem-free functioning of the device:

- The installation must not cause back pressure to build up.
- To make the connection, select a hose with sufficient cross section.
- The exhaust air line must be designed in such a way that no water or other liquid can get into the device through the exhaust air port (3).

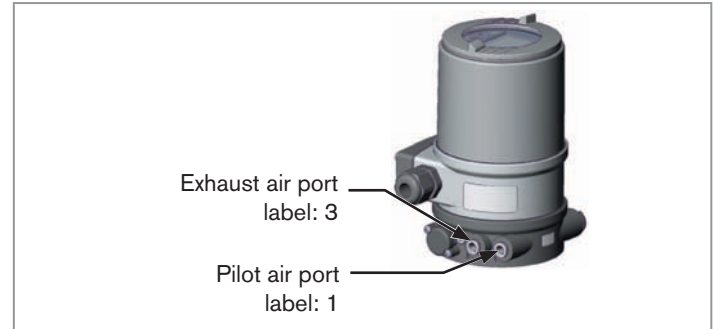


Fig. 11: Pneumatic connection



Caution (exhaust air concept):

In compliance with protection class IP67, an exhaust air line must be installed in the dry area.

The applied pilot pressure must always be maintained at least 0.5 – 1 bar above the pressure which is required to move the pneumatic actuator to its end position. This ensures that the control behavior is not extremely negatively affected in the upper stroke range on account of too little pressure difference.

During operation, keep the fluctuations of the pilot pressure as low as possible (max. $\pm 10\%$). If fluctuations are greater, the control parameters measured with the *X.TUNE* function are not optimum.

10. ELECTRICAL INSTALLATION



DANGER!

Risk of electric shock.

- ▶ Before reaching into the device, switch off the power supply and secure to prevent reactivation.
- ▶ Observe applicable accident prevention and safety regulations for electrical equipment.



WARNING!

Risk of injury from improper installation.

- ▶ Installation must only be carried out by authorized technicians and with the appropriate tools!

Risk of injury from unintentional activation of the system and uncontrolled restart.

- ▶ Secure system against unintentional activation.
- ▶ Following assembly, ensure a controlled restart.

10.1. Electrical installation, 24 V DC with circular plug-in connector (multi-pole variant)

Signal values

| | |
|--------------------------------------|---|
| Operating voltage | 24 V DC |
| Set-point value (process controller) | 0 – 20 mA; 4 – 20 mA 0 – 5 V; 0 – 10 V |
| Actual value | 4 – 20 mA |

Procedure:

→ Connect the process controller according to the following tables.

When the operating voltage is applied, the process controller is operating.

→ Now enter the required basic settings and actuate automatic adjustment of the process controller, as described in Chapter [“11. Start-up 24 V DC”, page 25.](#)

Typ 8750

Electrical installation

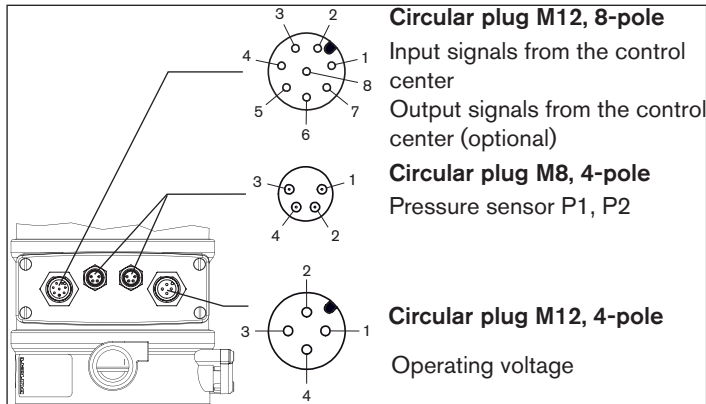


Fig. 12: Connection with 24 V DC circular plug-in connector

- 4) The indicated colors refer to the connecting cable available as an accessory (919061).
- 5) The indicated colors refer to the connecting cable available as an accessory (92903474).
- 6) The indicated colors refer to the connecting cable available as an accessory (918038).

Circular plug M12, 8-pole

| Set-point value, binary input | | |
|------------------------------------|--------------------------|--|
| Pin | Wire color ⁴⁾ | Assignment |
| 8 | red | Set-point value + (0/4 – 20 mA / 0 – 5/10 V) |
| 7 | blue | Set-point value GND |
| 1 | white | Binary input + |
| Input/output signals - option only | | |
| Pin | Wire color ⁴⁾ | Assignment |
| 6 | pink | Analog position feedback + |
| 5 | gray | Analog position feedback GND |
| 4 | yellow | Binary output 1 |
| 3 | green | Binary output 2 |
| 2 | brown | Binary outputs GND |

Tab. 7: Circular plug M12, 8-pole

Circular plug M8, 4-pole (pressure sensor)

| Pin | Wire color ⁵⁾ | Assignment |
|-----|--------------------------|---------------------------------------|
| 1 | brown | + 24 V pressure sensor power supply |
| 2 | white | 4 – 20 mA output from pressure sensor |

Tab. 8: Circular plug M8, 4-pole (pressure sensor)

Circular plug M12, 4-pole (operating voltage)

| Pin | Wire color ⁶⁾ | Assignment |
|-----|--------------------------|-----------------------------|
| 1 | brown | Operating voltage + 24 V DC |
| 3 | blue | Operating voltage GND |

Tab. 9: Circular plug M12, 4-pole (operating voltage)

10.2. Electrical installation PROFIBUS DP

Procedure:

→ Connect the process controller according to the following tables.

The electrical connection module of Type 8693 features a setscrew with nut which is used to connect the Technical Earth (TE) (see “Fig. 13: Connection with PROFIBUS DP”).

→ Connect setscrew (TE connection) to a suitable grounding point. To ensure electromagnetic compatibility (EMC), ensure that the cable is as short as possible (max. 30 cm, Ø 1.5 mm²).

When the operating voltage is applied, the process controller is operating.

→ Now make the required basic settings and actuate automatic adjustment of the process controller, as described in Chapter “13. PROFIBUS DP start-up”, page 35.



The settings in the *BUS.COMM* menu option are described in Chapter “13. PROFIBUS DP start-up”.

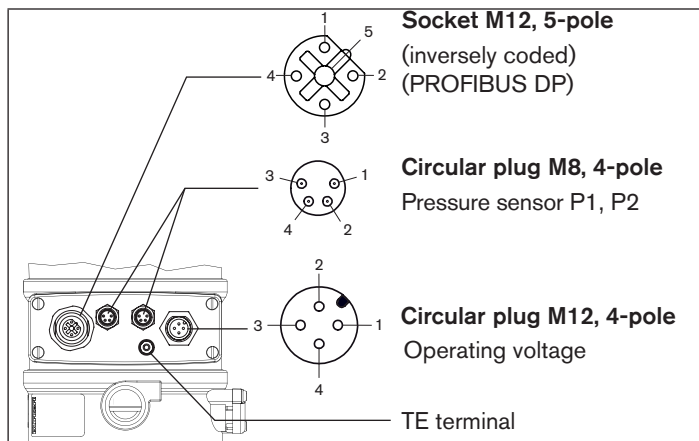


Fig. 13: Connection with PROFIBUS DP

Socket M12, 5-pole (bus connection)

| Pin | Signal |
|-----|-----------|
| 1 | VP+5 |
| 2 | RxD/TxD-N |
| 3 | DGND |
| 4 | RxD/TxD-N |
| 5 | Shielding |

Tab. 10: Socket M12, 5-pole (bus connection)

Circular plug M8, 4-pole (pressure sensor)

| Pin | Wire color ⁷⁾ | Assignment |
|-----|--------------------------|---------------------------------------|
| 1 | brown | + 24 V pressure sensor power supply |
| 2 | white | 4 – 20 mA output from pressure sensor |

Tab. 11: Circular plug M8, 4-pole (pressure sensor)

Circular plug M12, 4-pole (operating voltage)

| Pin | Wire color ⁸⁾ | Assignment |
|-----|--------------------------|-----------------------------|
| 1 | brown | Operating voltage + 24 V DC |
| 3 | blue | Operating voltage GND |

Tab. 12: Circular plug M12, 4-pole (operating voltage)

7) The indicated colors refer to the connecting cable available as an accessory (92903474).

8) The indicated colors refer to the connecting cable available as an accessory (918038).

10.3. Electrical installation DeviceNet

Procedure:

→ Connect the process controller according to the following tables.

The electrical connection module of Type 8693 features a setscrew with nut which is used to connect the Technical Earth (TE) (see [“Fig. 14: Connection with DeviceNet”](#)).

→ Connect setscrew (TE connection) to a suitable grounding point. To ensure electromagnetic compatibility (EMC), ensure that the cable is as short as possible (max. 30 cm, Ø 1.5 mm²).

When the operating voltage is applied, the process controller is operating.

→ Now make the required basic settings and actuate automatic adjustment of the process controller, as described in Chapter [“14. DeviceNet start-up”](#), page 39.



The settings in the *BUS.COMM* menu option are described in Chapter [“14. DeviceNet start-up”](#).

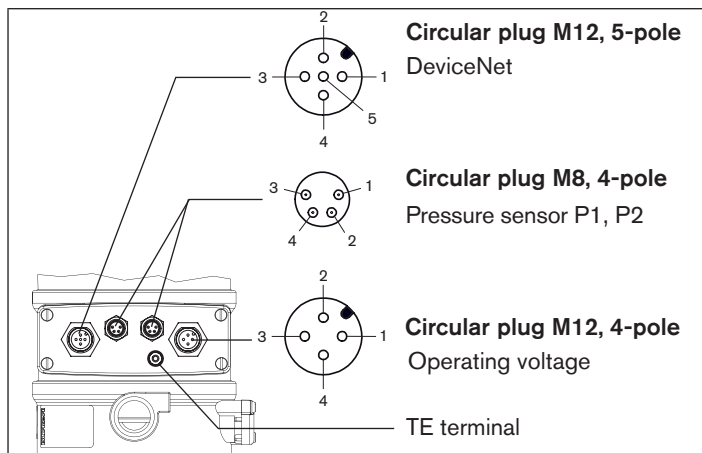


Fig. 14: Connection with DeviceNet

Circular plug M12, 5-pole (bus connection)

| Pin | Signal |
|-----|-----------|
| 1 | Shielding |
| 2 | V+ |
| 3 | V- |
| 4 | CAN H |
| 5 | CAN L |

Tab. 13: Circular plug M12, 5-pole (bus connection)

Circular plug M8, 4-pole (pressure sensor)

| Pin | Wire color ⁹⁾ | Assignment |
|-----|--------------------------|---------------------------------------|
| 1 | brown | + 24 V pressure sensor power supply |
| 2 | white | 4 – 20 mA output from pressure sensor |

Tab. 14: Circular plug M8, 4-pole (pressure sensor)

Circular plug M12, 4-pole (operating voltage)

| Pin | Wire color ¹⁰⁾ | Assignment |
|-----|---------------------------|-----------------------------|
| 1 | brown | Operating voltage + 24 V DC |
| 3 | blue | Operating voltage GND |

Tab. 15: Circular plug M12, 4-pole (operating voltage)

⁹⁾ The indicated colors refer to the connecting cable available as an accessory (92903474).

¹⁰⁾ The indicated colors refer to the connecting cable available as an accessory (918038).

11. START-UP 24 V DC



WARNING!

Risk of injury from improper operation.

Improper operation may result in injuries as well as damage to the device and the area around it.

- ▶ Before start-up, ensure that the operating personnel are familiar with and completely understand the contents of the operating instructions.
- ▶ Observe the safety instructions and intended use.
- ▶ Only adequately trained personnel may operate the system/the device.





A detailed description of the start-up and operating procedures for Type 8693 can be found in the operating instructions for Type 8693.

To set up the flow controller, perform the following steps:



- Specify the standard settings of the process controller (input signal (standard signal)).
- Perform the automatic adjustment (*X.TUNE*) of the process controller.
- Add the *F.CONTROL* auxiliary function to the main menu using the configuration menu (*ADDFUNCTION*) and create settings.

11.1. General procedure for creating settings for the flow controller

| Key | Action | Description |
|---------------------|---|--|
| MENU | Press  for 3 s (countdown in the display) | Switching from process level ⇌ setting level |
| → Execute settings. | | |
| EXIT | Press  | Switching from setting level ⇌ process level |

Tab. 16: General procedure for creating settings








You must exit the main menu by pressing the left selection key  **EXIT** before the modified data is saved to the memory (EEPROM). During the save process, the save symbol  is indicated on the display.

11.2. Define basic settings

Setting the input signal

Procedure:

| Key | Action | Description |
|--------------|--|--|
| MENU | Press  for 3 s (countdown in the display) | Switching from process level \Rightarrow setting level |
| ▲ / ▼ | Select <i>INPUT</i> | Selection <i>INPUT</i> menu |
| ENTER | Press  | Change to <i>INPUT</i> menu |
| ▲ / ▼ | Select 4 - 20 mA, 0 - 20 mA, 0 - 10 V or 0 - 5 V | Select the input signal |
| SELEC | Press  | Specifying the input signal |
| EXIT | Press  | Exit <i>INPUT</i> menu |
| EXIT | Press  | Switching from setting level \Rightarrow process level |

Tab. 17: Setting the input signal

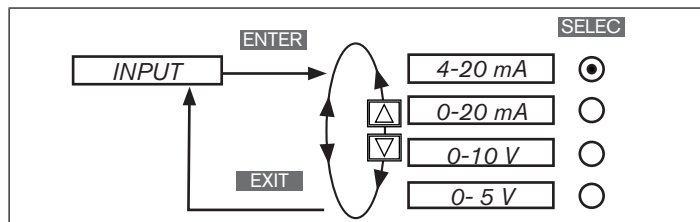




Fig. 15: Operating structure *INPUT* (select input signal)

! You must exit the main menu by pressing the left selection key  **EXIT** before the modified data is saved to the memory (EEPROM). During the save process, the save symbol  on the display.

11.3. Automatic adjustment (X.TUNE)



WARNING!

Danger of injury due to the valve position changing when the X.TUNE function is run at operating pressure.

- ▶ Never run X.TUNE while the process is running.
- ▶ Secure system against unintentional activation.

NOTE!

An incorrect control pressure or incorrectly connected operating pressure at the valve seat may cause the controller to be wrongly adjusted.

- X.TUNE **must always** be run at the control pressure available during subsequent operation (= pneumatic auxiliary energy).
- Run the X.TUNE function preferably **without** operating medium pressure to exclude interference caused by flow forces.





The following functions are actuated automatically:

- Adjustment of the sensor signal to the (physical) stroke of the actuating element used.
- Determination of parameters of the PWM signals to control the control valves integrated in Type 8693.
- Setting the controller parameters of the process controller. Optimization occurs according to the criteria of the shortest possible correction time with simultaneous freedom from overshoot.





To stop X.TUNE, press the left or right selection key **STOP**

Procedure:

| Taste | Action | Description |
|---|---|--|
| MENU | Press  for 3 s (countdown in the display) | Switching from process level ⇔ setting level |
|  | Select X.TUNE | Selection X.TUNE menu |
| RUN | Press  for 5 s (countdown in the display) | Start of the automatic adjustment X.TUNE |
| | | Messages on the progress of the X.TUNE on the display: „TUNE #1...“ - „X.TUNE READY“ ¹¹⁾ |
| EXIT | Press any key | Exit X.TUNE menu |
| EXIT | Press  | Switching from setting level ⇔ process level |

Tab. 18: Setting the input signal







You must exit the main menu by pressing the left selection key  **EXIT** before the modified data is saved to the memory (EEPROM). During the save process, the save symbol  is indicated on the display.

¹¹⁾ „TUNE err/break“ if a fault occurs.

11.4. Configuring the *F.CONTROL* auxiliary function

→ Add the auxiliary function *F.CONTROL* to the main menu using the configuration menu (*ADDFUNCTION*).

Procedure:

| Key | Action |
|---|---|
| MENU | Press  for approx. 3 s |
| ▲ / ▼ | Select <i>ADD.FUNCTION</i> |
| ENTER | Press  |
| ▲ / ▼ | Select <i>F.CONTROL</i> |
| ENTER | Press  |
| EXIT | Press  |
| The <i>F.CONTROL</i> function is now activated and incorporated into the main menu (<i>MAIN</i>). | |

Tab. 19: Incorporating *F.CONTROL* into the main menu (*MAIN*)

→ Enter the basic settings for the flow controller under *F.CONTROL*.

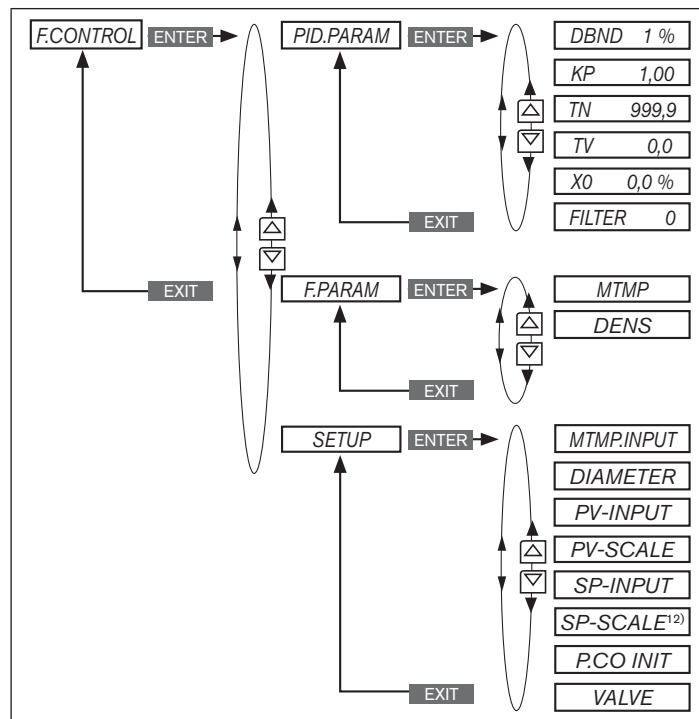


Fig. 16: Operating structure - basic settings for flow controller

12) The *SP SCALE* function is indicated only if the external set-point value default (external) menu option is activated under *SP INPUT*.

F.CONTROL - Settings:


| PID.PARAM Parameter settings for the PID process controller | |
|--|--|
| DBND 0,1 % | Insensitivity area (dead band) of the PID process controller |
| KP 0,00 | Amplification factor of the process controller |
| TN 0,5 | Reset time |
| TV 0,0 | Hold-back time |
| X0 0,0 % | Working point |
| FILTER 0 | Filtering of the process actual value input |

| F.PARAM Parameter settings for the flow controller | |
|---|---|
| MTMP | Manually specifying the medium temperature <i>MTMP.INPUT</i> : In this case, manual refers to: |
| DENS | Density: Enter the density of the medium |

| SETUP Setting up the flow controller | |
|---|--|
| MTMP.INPUT | Specify the medium temperature: can be set either via temperature transmitter or via bus |
| DIAMETER | Enter the pipe diameter |
| PV-INPUT | Indication of the signal type for process actual value |

| | |
|-------------------------------|--|
| PV-SCALE | Scaling the process controller (m/s or m³/h only) |
| SP-INPUT | Type of the set-point value default (internal or external) |
| SP-SCALE¹³⁾ | Scaling the position controller (for external set-point value default only) |
| P.CO-INIT | Enables a smooth switchover between AUTOMATIC and MANUAL operating state |
| VALVE | Save a valve-specific Kv characteristic and the Kvs value, customer settings also possible |

Tab. 20: Basic settings for the flow controller

 The parameter settings for the PID process controller can be created automatically with the help of the *P.TUNE* function (description see “operating instructions for Type 8693”).

¹³⁾ The *SP SCALE* function is indicated only if the external set-point value default (external) menu option is activated under *SP INPUT*

11.4.1. Change the process set-point value

Procedure:

1. Set the set-point value default on the setting level:

In the main menu (MAIN), select the *F.CONTROL* function

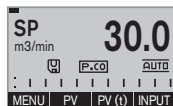


→ Use the **EXIT** key (press 4 x) to return to the process level.

2. On the process level, manually change the process set-point value:

→ Use the arrow keys ▲ ▼ to select the display for the process set-point value (SP).

→ Press **INPUT** key.



→ Enter the process set-point value (see image below).

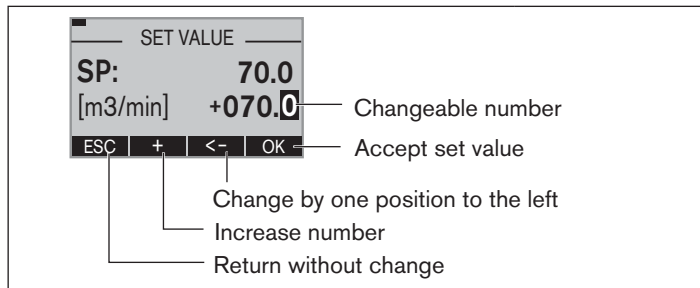


Fig. 17: Enter values

12. ADDITIONAL FMR FUNCTIONS

Overview

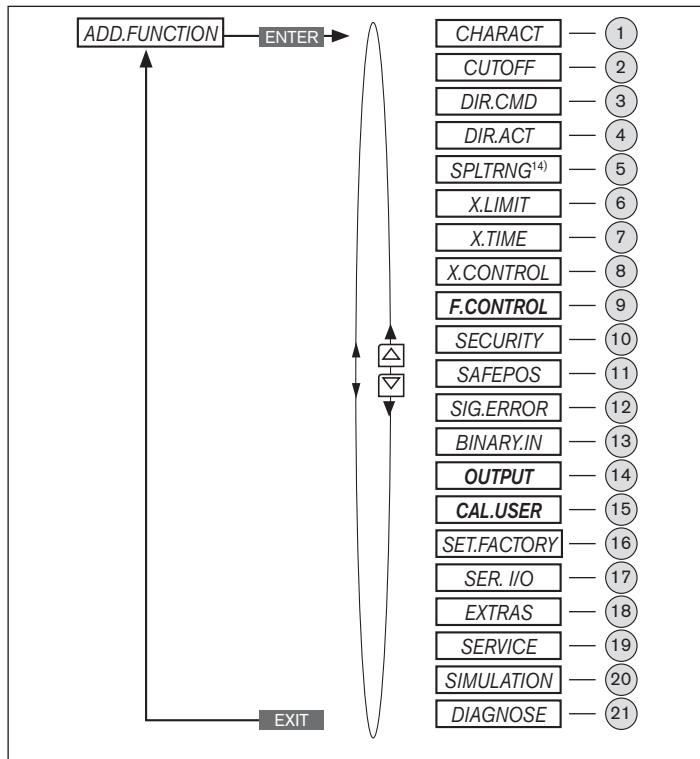


Fig. 18: Overview of FMR auxiliary functions

| No | Description |
|----|---|
| ① | Selecting the transfer characteristic between input signal and stroke (correction characteristic) |
| ② | Sealing function for position controller |
| ③ | Effective sense of direction between input signal and nominal position |
| ④ | Assignment of the aeration state of the actuator chamber to the set-point position |
| ⑤ | Signal split range ¹⁴⁾ ; input signal as a % for which the valve runs through the entire stroke range. |
| ⑥ | Limit the mechanical stroke range |
| ⑦ | Limit the control speed |
| ⑧ | Parameterization of the position controller |
| ⑨ | Parameterization of the PID process controller |
| ⑩ | Code protection for settings |
| ⑪ | Input the safety position |
| ⑫ | Configuration of signal level fault detection |
| ⑬ | Activation of the binary input |
| ⑭ | Configuration of outputs (option) |
| ⑮ | Calibration |
| ⑯ | Reset to factory settings |
| ⑰ | Configuration of serial interface |
| ⑱ | Adjusting the display |

| No | Description |
|----|---|
| ⑲ | For internal use only |
| ⑳ | Simulation of set-point value, process valve, process |
| ㉑ | Diagnosis menu (option) |

Tab. 21: Description of auxiliary functions

¹⁴⁾ The auxiliary function *SPLTRNG* can only be selected if *F.CONTROL* (process control) is not activated.

The auxiliary functions listed here can be activated and set in accordance with the control task.



A detailed description of the auxiliary functions and settings can be found in the user instructions for Type 8693.

The following auxiliary functions differ from Type 8693 and are described in these instructions:

- *CAL.USER* see Chapter [“12.2. CAL.USER - Changing the factory calibration”](#)
- *OUTPUT* see Chapter [“12.3. OUTPUT - Configuration of the analog output”](#)







12.1. Activating and deactivating auxiliary functions

You can activate the auxiliary functions on the setting level by adding them to the main menu (MAIN). The parameters for the auxiliary functions can then be set.

To deactivate an auxiliary function, remove it from the main menu. The previous settings created using this auxiliary function will then be rendered invalid again as a result.

12.1.1. Including auxiliary functions in the main menu



Procedure:

| Key | Action |
|---|---|
| MENU | Press  for approx. 3 s |
|  | Select <i>ADD.FUNCTION</i> |
| ENTER | Press  |
|  | Select the auxiliary function |
| ENTER | Press  |
| EXIT | Press  |

The auxiliary function is now activated and added to the main menu (MAIN).

Tab. 22: Adding auxiliary functions to the main menu (MAIN)



You must exit the main menu by pressing the left selection key  **EXIT** before the modified data is saved to the memory (EEPROM). During the save process, the save symbol  is indicated on the display.

12.2. CAL.USER - Changing the factory calibration

→ Add the *CAL.USER* auxiliary function to the main menu using the configuration menu (*ADDFUNCTION*).

→ Enter the settings for the flow controller under *CAL.USER*.

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Additional FMR functions

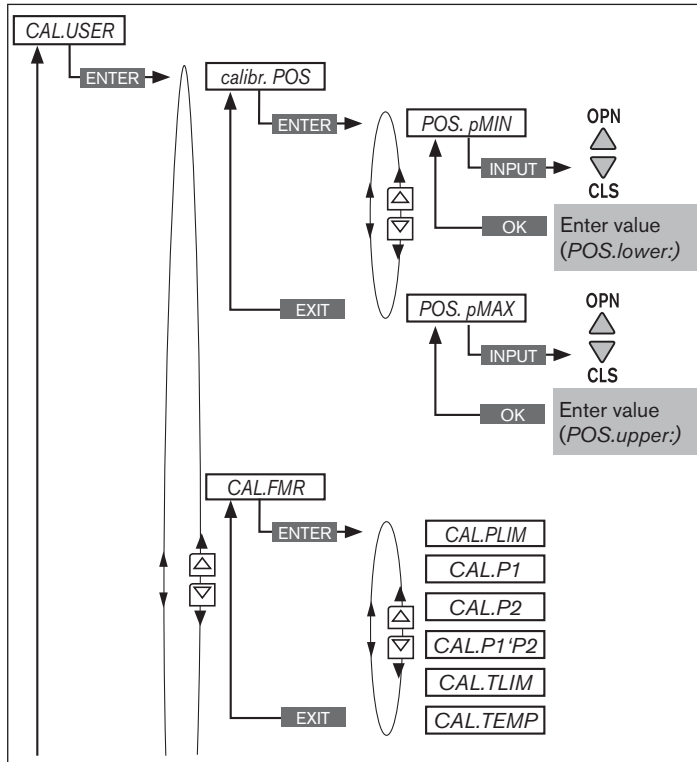


Fig. 19: Operating structure CAL.USER - changing the factory calibration - 1

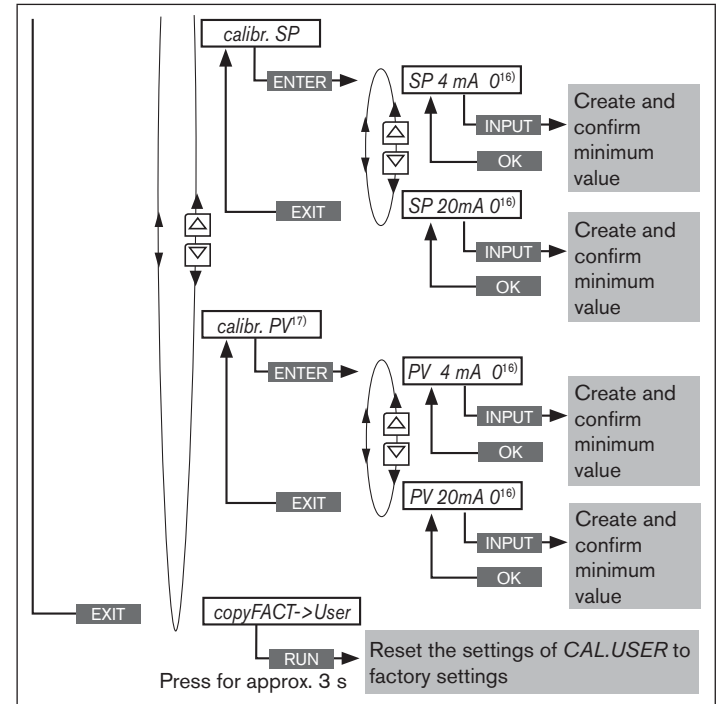


Fig. 20: Operating structure CAL.USER - changing the factory calibration - 2

15) If you press the key **ESC** the value remains unchanged.

16) The specified input signal type is displayed.

17) If the specified signal type for the process actual value is Pt 100, the input screen for the temperature value appears.

CAL.USER - Settings:

| | |
|--------------------|---|
| calibr. POS | Calibration of the position actual value |
| POS. pMIN | Set the minimum position of the valve |
| POS. pMAX | Set the maximum position of the valve |

| | |
|------------------|--|
| CAL.FMR | Calibration of the flow controller |
| CAL.PLIM | Measurement range of the pressure sensor |
| CAL.P1 | Calibration of pressure sensor 1 |
| CAL.P2 | Calibration of pressure sensor 2 |
| CAL.P1'P2 | P1-P2 comparison increase in accuracy |
| CAL.TLIM | Measurement range of the temperature transmitter |
| CAL.TEMP | Calibrating the temperature transmitter |

| | |
|-------------------|--|
| calibr. SP | Calibrating the process set-point value |
| SP 4mA 0 | Minimum value of the input signal |
| SP 20mA 0 | Maximum value of the input signal |

| | |
|-----------------------------|---|
| calibr. PV | Calibrating the process actual value |
| for input signal 4 - 20 mA: | |
| PV 4mA 0 | Minimum value of the input signal |
| PV 20mA 0 | Maximum value of the input signal |
| for input signal Pt 100: | |
| 0000 | Temperature |

copyFACT->USER **Reset to factory settings**
Tab. 23: CAL.USER settings

12.3. OUTPUT - Configuration of the analog output

The analog output can send feedback regarding the current position (POS) or the set-point value (CMD), the process actual value (PV), the process set-point value (SP), the pressure at the input (P1), the pressure at the output (P2) or the medium temperature (MTMP) to the control center.

- Add the auxiliary function *OUTPUT* to the main menu using the configuration menu (*ADDFUNCTION*).
- Create the settings for the flow controller under *OUT ANALOG*.

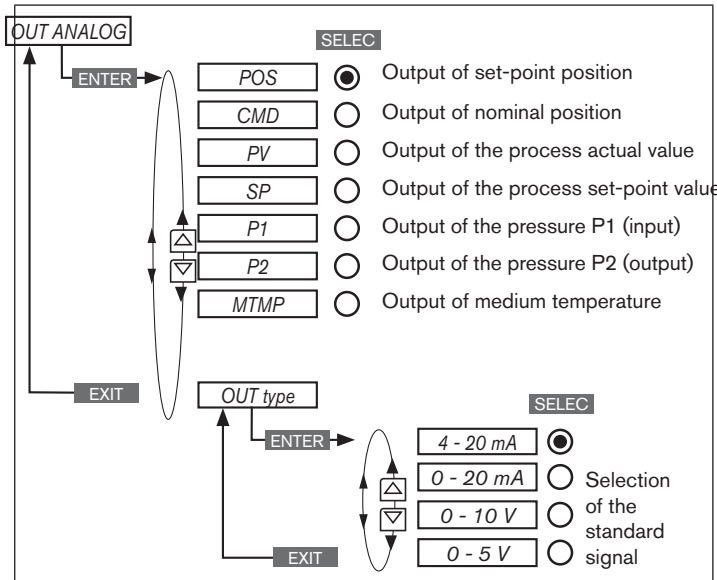


Fig. 21: Operating structure OUT ANALOG - analog output

13. PROFIBUS DP START-UP

Procedure:

- Perform the automatic adjustment (*X.TUNE*) of the process controller.
- Add the *F.CONTROL* auxiliary function to the main menu using the configuration menu (*ADDFUNCTION*) and make settings.
- Make settings in the *BUS.COMM* function.
- Configuration of the process values.

13.1. Settings in BUS.COMM

- Address 0** Enter a device address (value between 0 and 126)
- BUS FAIL** Activate or deactivate approach of the safety position
- SafePos off** The actuator remains in the position which corresponds to the set-point value last transferred (default setting).
- SafePos on** If there is a fault in the bus communication, the behavior of the actuator depends on the activation of the *SAFEPOS* auxiliary function.

SAFEPOS activated:

The actuator moves to the safety position which is specified in the *SAFEPOS* auxiliary function.

SAFEPOS deactivated:

The actuator moves to the safety end position which it would assume if the electrical and pneumatic auxiliary energy failed. See Chapter “15. Safety end positions”.

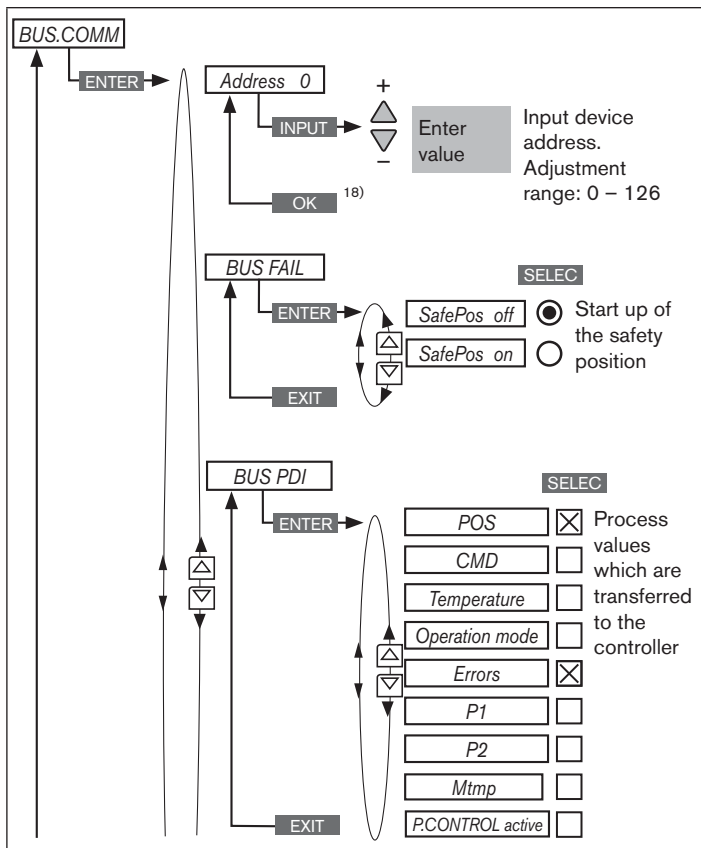


Fig. 22: Operating structure BUS.COMM - 1

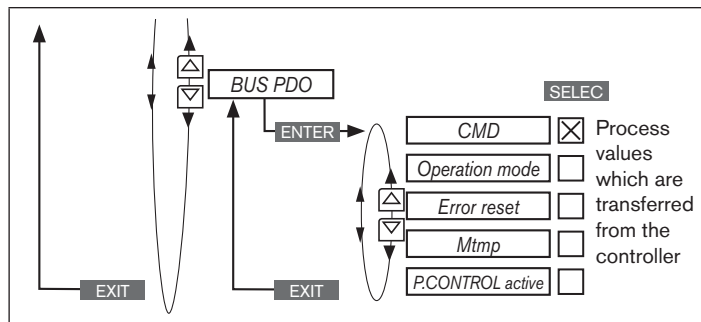


Fig. 23: Operating structure BUS.COMM - 2

18) If you press the key **ESC**, the value remains unchanged.

13.2. Configuration of the process values

The following components are required for the configuration:

- Software suitable for the configuration. For example Step7 from Siemens.
- GSD file (Download from the Bürkert homepage)

For more detailed information see supplementary instructions on the Bürkert homepage:

- "Configuration on the PROFIBUS by means of GSD file"
www.burkert.com → Type 8793 → Config. PROFIBUS by GSD file

→ First input the PDI (Process Data Input).

Typ 8750

PROFIBUS DP start-up

PDI: Process Data Input (from the process controller to the controller)

| Name | Description | Identifier |
|----------------|---|--|
| <i>PDI:POS</i> | Actual position (position) Actual value of positioner as ‰. Value range 0 – 1000. Values < 0 or > 1000 are possible if e.g. <i>X.TUNE</i> has not run through correctly. | GSD file: <i>PDI:POS</i> Identifier (HEX): 41, 40, 00 |
| <i>PDI:CMD</i> | Set-point position (command) Set-point value of positioner as ‰. Value range 0 – 1000. | GSD file: <i>PDI:CMD</i> Identifier (HEX): 41, 40, 01 |
| <i>PDI:PV</i> | Process actual value (process value) Actual value of process controller in physical unit (as set in the menu <i>P.CO INP</i> or <i>P.CO SCAL</i>), max. value range -999 – 9999, depending on internal scaling. | GSD file: <i>PDI:PV</i> Identifier (HEX): 41, 40, 02 |
| <i>PDI:SP</i> | Process set-point value (set-point) Set-point value of process controller in physical unit (as set in the menu <i>P.CO INP</i> or <i>P.CO SCAL</i>), max. value range -999 – 9999, depending on internal scaling. | GSD file: <i>PDI:SP</i> Identifier (HEX): 41, 40, 03 |

| Name | Description | Identifier |
|-----------------|---|---|
| <i>PDI:TEMP</i> | Device temperature (temperature) Temperature of 0.1 °C is measured on the CPU board by the sensor, value range -550 (-55 °C) – +1250 (+125 °C). | GSD file: <i>PDI:TEMP</i> Identifier (HEX): 41, 40, 04 |
| <i>PDI:MODE</i> | Operating state (operation mode) Operating state: 0: <i>AUTO</i> 1: <i>MANUAL</i> 2: <i>XTUNE</i> 9: <i>P.QLIN</i> 10: <i>P.TUNE</i> 12: <i>BUSSAFEPOS</i> | GSD file: <i>PDI:MODE</i> Identifier (HEX): 41, 00, 05 |
| <i>PDI:ERR</i> | Error Indicates the number of the process value (output) which was not written. The value is retained until it is deleted with <i>PDO:ERR</i> . HEX 14 <i>PDO:CMD / SP</i> 16 <i>PDO:MODE</i> | GSD file: <i>PDI:ERR</i> Identifier (HEX): 41, 00, 06 |

| Name | Description | Identifier |
|--------------------|--|--|
| <i>PDI:P1</i> | Pressure before the valve 0000-XXXX depending on sensor range | GSD file: <i>PDI:P1</i> Identifier (HEX): 41, 40, 07 |
| <i>PDI:P2</i> | Pressure before the valve 0000-XXXX depending on sensor range | GSD file: <i>PDI:P2</i> Identifier (HEX): 41, 40, 08 |
| <i>PDI:MTMP</i> | Medium temperature Temperature in °C on 1 °C exactly Value range 0 °C – 150 °C | GSD file: <i>PDI:MTMP</i> Identifier (HEX): 41, 40, 09 |
| <i>PDI:PCONact</i> | 0: Positioner 1: Process controller | GSD file: <i>PDI:PCONact</i> Identifier (HEX): 41, 00, 0A |

Tab. 24: Process Data Input, PROFIBUS DP

→ Then input the process data output.

PDO: Process Data Output (from the controller to the process controller)

| Name | Description | Identifier |
|-------------------|--|---|
| <i>PDO:CMD/SP</i> | Process set-point value (set-point) Set-point value of process controller in physical unit (as set in the menu <i>P.CO INP</i> or <i>P.CO SCAL</i>), max. value range -999 – 9999, depending on internal scaling. If the value is too small or too large, the last valid value is used and is indicated in <i>ERR</i> with HEX 14. | GSD file: <i>PDO:CMD/SP</i> Identifier (HEX): 81, 40, 14 |
| <i>PDO:MODE</i> | Operating state (operation mode) Value range 0, 1 or 12: Operating state: 0: <i>AUTO</i> 1: <i>MANUAL</i> 12: <i>BUSSAFEPOS</i> If the value is too small or too large, the last valid value is used and is indicated in <i>ERR</i> with HEX 16. | GSD file: <i>PDO:MODE</i> Identifier (HEX): 81, 00, 16 |

| Name | Description | Identifier |
|-------------------|--|---|
| <i>PDO:ERR</i> | Reset error display If the value > 0, <i>ERR</i> is reset. | GSD file: <i>PDO:ERR</i> Identifier (HEX): 81, 00, 17 |
| <i>PDO:MTMP</i> | Medium temperature Temperature in °C on 1 °C exactly Value range 0 °C – 150 °C | GSD file: <i>PDO:MTMP</i> Identifier (HEX): 81, 40, 18 |
| <i>PDO:CONact</i> | 0: Positioner 1: Process controller | GSD file: <i>PDO:CONact</i> Identifier (HEX): 81, 00, 19 |

Tab. 25: Process Data Output, PROFIBUS DP

14. DEVICENET START-UP

Procedure:

- Perform the automatic adjustment (*X.TUNE*) of the process controller.
- Add the *F.CONTROL* auxiliary function to the main menu using the configuration menu (*ADDFUNCTION*) and create settings.
- Make settings in the *BUS.COMM* function.
- Configuration of the process values.

14.1. Settings in *BUS.COMM*

Enter a device address (value between 0 and 63)

Selection of the baud rate

- The baud rate can be changed either by pressing the operator keys on the device or via the bus.
- A change has no effect until a reset (send a reset message to the identity object) or power up is implemented. This means if the changed baud rate attribute is accessed before a reset or power up, the read (changed) value does not agree with the still current baud rate (to be changed) of the network.

Select 125 kbit/s, 250 kbit/s or 500 kbit/s

- BUS FAIL** Activate or deactivate approach of the safety position
- SafePos off** The actuator remains in the position which corresponds to the set-point value last transferred (default setting).
- SafePos on** If there is a fault in the bus communication, the behavior of the actuator depends on the activation of the *SAFEPOS* auxiliary function.

SAFEPOS activated: The actuator moves to the safety position which is specified in the *SAFEPOS* auxiliary function.

SAFEPOS deactivated: The actuator moves to the safety end position which it would assume if the electrical and pneumatic auxiliary energy failed. See Chapter ["15. Safety end positions"](#).

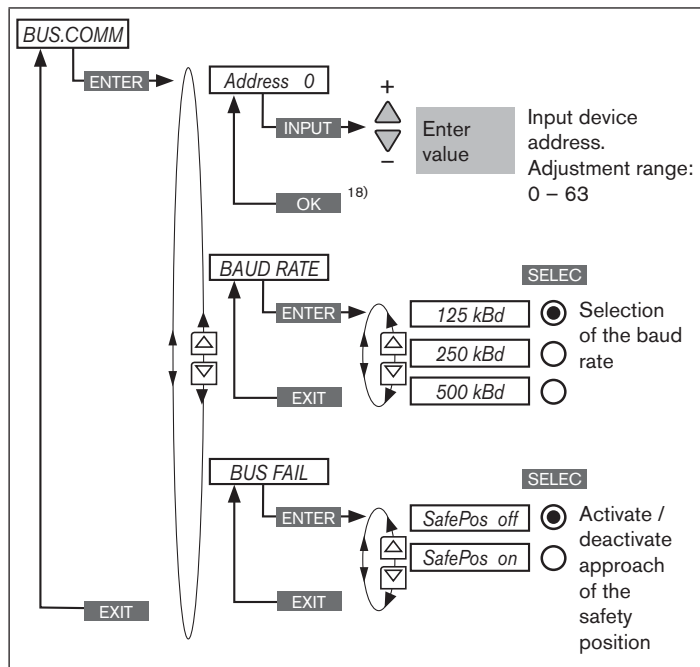


Fig. 24: Operating structure *BUS.COMM* - DeviceNet

14.2. Configuration of the process data

The following components are required for the configuration:

- Software suitable for the configuration. For example RSNetWorx for DeviceNet (Rev. 4.12.00).
- ESD file (is on the supplied CD).

Transferring process data

The process data is transferred via an I/O connection. 5 static input and 2 static output assemblies can be selected for the transfer. In these assemblies selected attributes are combined in one object.

Selecting the process data

The process data is selected by setting the device parameters during initialization of the I/O connection according to the DeviceNet specification. The following device parameters can be set:

- Active Input Assembly and Active Output Assembly or
- Produced Connection Path and Consumed Connection Path
- if supported by the DeviceNet Master/Scanner -.

14.2.1. Static Input Assemblies

| Name | Address of data attribute of the assemblies for read access. Class, instance, attributes | Format of the data attribute |
|-------------------------------------|--|---|
| <i>POS+ERR</i> (factory setting) | 4, 1, 3 | Byte 0: POS low Byte 1: POS high Byte 2: ERR |
| <i>POS+CMD+ERR</i> | 4, 2, 3 | Byte 0: POS low Byte 1: POS high Byte 2: CMD low Byte 3: CMD high Byte 4: ERR |
| <i>PV+ERR</i> | 4, 3, 3 | Byte 0: PV low Byte 1: PV high Byte 2: ERR |
| <i>PV+SP+ERR</i> | 4, 5, 3 | Byte 0: PV low Byte 1: PV high Byte 2: SP low Byte 3: SP high Byte 4: ERR |

| Name | Address of data attribute of the assemblies for read access. Class, instance, attributes | Format of the data attribute |
|--------------------------|--|---|
| <i>PV+SP+CMD+ERR</i> | 4, 5, 3 | Byte 0: PV low Byte 1: PV high Byte 2: SP low Byte 3: SP high Byte 4: CMD low Byte 5: CMD high Byte 6: ERR |
| <i>PV+P1+P2+MTMP+ERR</i> | 4, 6, 3 | Byte 0: PV low Byte 1: PV high Byte 2: P1 low Byte 3: P1 high Byte 4: P2 low Byte 5: P2 high Byte 6: MTMP low Byte 7: MTMP high Byte 8: ERR |

| Name | Address of data attribute of the assemblies for read access. Class, instance, attributes | Format of the data attribute |
|---------------------------------|--|--|
| <i>PV+SP+CMD+P1+P2+MTMP+ERR</i> | 4, 7, 3 | Byte 0: PV low Byte 1: PV high Byte 2: SP low Byte 3: SP high Byte 4: CMD low Byte 5: CMD high Byte 6: P1 low Byte 7: P1 high Byte 8: P2 low Byte 9: P2 high Byte 10: MTMP low Byte 11: MTMP high Byte 12: ERR |
| <i>PV+POS+ERR+PCON</i> | 4, 8, 3 | Byte 0: PV low Byte 1: PV high Byte 2: POS low Byte 3: POS high Byte 4: ERR Byte 5: PCON active |

| Name | Address of data attribute of the assemblies for read access. Class, instance, attributes | Format of the data attribute |
|---------------------------|--|--|
| <i>PV+POS+ERR+PCON+P1</i> | 4, 9, 3 | Byte 0: PV low Byte 1: PV high Byte 2: POS low Byte 3: POS high Byte 4: ERR Byte 5: PCON active Byte 6: P1 low Byte 7: P2 low |

Tab. 26: Static Input Assemblies, DeviceNet

The addresses indicated in “[Tab. 26](#)” can be used as a path statement for the Produced Connection Path attribute of an I/O connection.

This I/O connection can be used to transfer the attributes described in more detail in the following “[Tab. 27](#)” as input process data.

Nevertheless, by using this address data, the attributes combined in the assemblies can also be accessed acyclically at any time via Explicit Messages.

| Name | Description of the input data attributes | Attribute Address Class, Instance, Attribute; Data type, Length |
|------------|---|---|
| <i>POS</i> | Actual position Actual value of process controller as ‰. Value range 0 – 1000. However, values <0 or >1000 are also possible if e.g. <i>X.TUNE</i> has not run through correctly. | 111, 1, 59; INT, 2 byte |
| <i>CMD</i> | Set-point position Set-point value of positioner as ‰. Value range 0 – 1000. | 111, 1, 58; UINT, 2 byte |
| <i>PV</i> | Process actual value (process value) Actual value of process controller in physical unit (as set in the menu <i>P.CO INP</i> or <i>P.CO SCAL</i>), max. value range -999 – 9999, depending on internal scaling. | 120, 1, 3; INT, 2 byte |
| <i>SP</i> | Process set-point value Set-point value of process controller in physical unit (as set in the menu <i>P.CO INP</i> or <i>P.CO SCAL</i>), max. value range -999 – 9999, depending on internal scaling. | 120, 1, 2; INT, 2 byte |

| Name | Description of the input data attributes | Attribute Address Class, Instance, Attribute; Data type, Length |
|----------------|--|---|
| <i>ERR</i> | Error Indicates the number of the process value (output) which was not written. The value is retained until it is deleted with "1" by acyclically writing the "Error" attribute (access via Explicit Message – Set Attribute Single). HEX 0X14 INP 0X15 SP | 100, 1, 1; USINT, 1 byte |
| <i>P1</i> | Pressure before the valve in bar | 120, 1, 7; INT, 2 byte |
| <i>P2</i> | Pressure after the valve in bar | 120, 1, 8; INT, 2 byte |
| <i>MTMP</i> | Medium temperature in °C | 120, 1, 9; INT, 2 byte |
| <i>PCONact</i> | <i>P.CONTROL</i> active | 120, 1, 10; USINT, 1 byte |

Tab. 27: Input data attributes; DeviceNet

14.2.2. Static Output Assemblies

| Name | Address of data attribute of the assemblies for read access. Class, instance, attributes | Format of the data attribute |
|---------------------------------|--|--|
| <i>INP</i> (factory setting) | 4, 21, 3 | Byte 0: INP low Byte 1: INP high |
| <i>SP</i> | 4, 22, 3 | Byte 0: SP low Byte 1: SP high |
| <i>MTMP</i> | 4, 23, 3 | Byte 0: MTMP low Byte 1: MTMP high |
| <i>SP+MTMP</i> | 4, 24, 3 | Byte 0: SP low Byte 1: SP high Byte 2: MTMP low Byte 3: MTMP high |
| <i>MTMP+SP+ERR+PCON</i> | 4, 25, 3 | Byte 0: MTMP low Byte 1: MTMP high Byte 2: SP low Byte 3: SP high Byte 4: ERR Byte 5: PCON active |

Tab. 28: Static Output Assemblies, DeviceNet

The addresses indicated in "Tab. 28" can be used as a path statement for the Consumed Connection Path attribute of an I/O connection.

This I/O connection can be used to transfer the attributes described in more detail in the following “[Tab. 29](#)” as output process data.

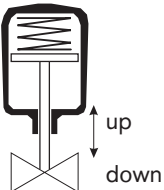
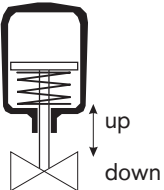
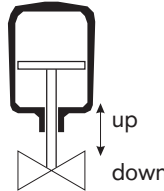
Nevertheless, by using this address data, the attributes combined in the assemblies can also be accessed acyclically at any time via Explicit Messages.

| Name | Description of the output data attributes | Attribute Address Class, Instance, Attribute; Data type, Length |
|------------|--|---|
| <i>INP</i> | Set-point position Set-point value of process controller as ‰. Value range 0 – 1000. In "pure" position controller mode (<i>F.CONTROL</i> inactive) the transfer of the INP set-point position is required; as a process controller (<i>F.CONTROL</i> active) the transfer of INP is not possible. If the value is too small or too large, the last valid value is used and is indicated in <i>ERR</i> with HEX 14. | 111, 1, 58; UINT, 2 byte |

| Name | Description of the output data attributes | Attribute Address Class, Instance, Attribute; Data type, Length |
|----------------|---|---|
| <i>SP</i> | Process set-point value Set-point value of process controller in physical unit (as set in the menu <i>P.CO INP</i> or <i>P.CO SCAL</i>), max. value range -999 – 9999, depending on internal scaling. If the value is too small or too large, the last valid value is used and is indicated in <i>ERR</i> with HEX 15. | 120, 1, 2; INT, 2 byte |
| <i>MTMP</i> | Medium temperature in °C | 120, 1, 9; INT, 2 byte |
| <i>PCONact</i> | <i>P.CONTROL</i> active | 120, 1, 10; USINT, 1 byte |

Tab. 29: Output data attributes; DeviceNet



15. SAFETY END POSITIONS

| Actuator system | Designation | Safety end positions after failure of the auxiliary power | |
|--|-------------------------------------|--|--|
| | | electrical | pneumatic |
|  | single-acting Control function A | down | pilot-controlled control system: down direct-acting control system: not defined |
|  | single-acting Control function B | up | pilot-controlled control system: up direct-acting control system: not defined |
|  | double-acting Control function I | down / up (depending on the connection of the control cables) | not defined |

Tab. 30: Safety end positions

16. ERROR MESSAGES

General error messages (display only for external set-point value and with activated *SIG.ERR*).

| Display | Cause | Remedial action |
|---|--|--------------------------------|
|  | Minimum input value has been reached. | Do not reduce value further. |
|  | Maximum input value has been reached. | Do not increase value further. |
| SP error | Signal error set-point value process controller | Check signal |
| P1 error | Signal error actual value P1 Flow control system | Check signal |
| P2 error | Signal error actual value P2 Flow control system | Check signal |
| invalid code | Incorrect access code. | Enter correct access code. |
| EEPROM fault | EEPROM defective. | Not possible, device defective |

Tab. 31: General error messages

Typ 8750

Error messages

Error messages while the *X.TUNE* function is running

| Display | Cause | Remedial action |
|-------------------|---|--|
| X.TUNE ERROR 1 | No compressed air connected. | Connect compressed air. |
| X.TUNE ERROR 2 | Compressed air failure while <i>X.TUNE</i> is running | Check compressed air supply. |
| X.TUNE ERROR 3 | Actuator or control system deaeration side leaking | Not possible, device defective. |
| X.TUNE ERROR 4 | Control system aeration side leaking. | Not possible, device defective. |
| X.TUNE ERROR 6 | The end positions for POS-MIN and POS-MAX are too close together. | Check compressed air supply. |
| X.TUNE ERROR 7 | Incorrect assignment POS-MIN and POS-MAX. | To determine POS-MIN and POS-MAX, move the actuator in the direction indicated on the display. |

Tab. 32: Error messages during *X.TUNE*

Error messages while the *P.Q'LIN / P.TUNE* function is running

| Display | Cause | Remedial action |
|--------------------|---|--|
| P.Q LIN ERROR 1 | No compressed air connected. No change to process variable. | Connect compressed air. Check process and, if required, switch on pump or open the shut-off valve. Check process sensor. |
| P.Q LIN ERROR 2 | Current node of the valve stroke was not reached, as <ul style="list-style-type: none"> ▪ compressed air supply failed during <i>P.Q'LIN</i>. ▪ <i>X.TUNE</i> was not executed. | Check compressed air supply. Execute <i>X.TUNE</i> . |

Tab. 33: Error messages during *P.Q'LIN / P.TUNE*

16.1. Error messages on field bus devices

| Display | Cause | Remedial action |
|---|----------------------------|---------------------------------|
| MFI fault Not possible, device defective. | Field bus board defective. | Not possible, device defective. |

Tab. 34: Error messages on field bus devices

On PROFIBUS DP

| Display | Device state | Remedial action |
|--|-------------------------------------|---|
| BUS offline is displayed approx. every 3 seconds | Offline. | Device is not connected to the bus. <ul style="list-style-type: none"> ▪ Bus connection including plug configuration correct? ▪ Power supply and bus connection of the other nodes correct? |
| BUS no connection is displayed approx. every 3 seconds | Online, no connection to the master | Device is connected correctly to the bus, the network access procedure has ended without errors, however there is no established connection to the master. |

Tab. 35: Error messages PROFIBUS DP

On DeviceNet

| Display | Device state | Remedial action |
|--|-------------------------------------|---|
| BUS offline is displayed approx. every 3 seconds | Offline. | Device is not connected to the bus, the network access procedure (duplicate MAC-ID test, duration approx. 2 s) has still not ended or device is only active network node <ul style="list-style-type: none"> ▪ Baud rate correctly set across network? ▪ Bus connection including plug configuration correct? ▪ Power supply and bus connection of the other nodes correct? |
| BUS no connection is displayed approx. every 3 seconds | Online, no connection to the master | Device is connected correctly to the bus, the network access procedure has ended without errors, however there is no established connection to the master. |

| | | |
|---|-------------------------|---|
| BUS timeout is displayed approx. every 3 seconds | I/O connection timeout. | An I/O connection is in the TIME OUT state. → New connection establishment by master; ensure that I/O data is transferred cyclically or, if COS confirmed, that corresponding Acknowledge messages are sent by the master. |
| BUS critical error is displayed approx. every 3 seconds | Critical bus error. | Other device with the same address in the network or BUS OFF due to communication problems. → Change address of the device and restart device. → Error analysis in the network with a bus monitor. |

Tab. 36: Error messages DeviceNet

16.2. Other error messages

| Display | Cause | Remedial action |
|--|---|---------------------------------|
| POS = 0 (bei CMD > 0 %) or POS = 100 %, (when CMD < 100 %). PV = 0 (when SP > 0) or PV = PV (when SP > SP). | Sealing function (CUTOFF) is unintentionally activated. | Deactivate sealing function. |
| Applies only to devices with binary output: Binary output does not switch. | Binary output: <ul style="list-style-type: none"> ▪ Current > 100 mA ▪ Short circuit | Check binary output connection. |

Tab. 37: Other error messages

17. ACCESSORIES

| Designation | Order no. |
|--|--|
| M12 connecting cable, 8-pole, 2 m assembled cable | 919061 |
| M12 connecting cable, 4-pole, 5 m assembled cable | 918038 |
| M8 connecting cable, 4-pole 5 m assembled cable | 92903475 |
| USB adapter for connection to a PC in con- junction with an extension cable | 227093 |
| Communications software based on FDT/ DTM technology | Information at www.burkert.com |

Tab. 38: Accessories

18. SHUTDOWN

18.1. Disassembly



DANGER!

Risk of injury from high pressure in the equipment/device.

- ▶ Before working on equipment or device, switch off the pressure and deaerate/drain lines.

Risk of electric shock.

- ▶ Before reaching into the device, switch off the power supply and secure to prevent reactivation.
- ▶ Observe applicable accident prevention and safety regulations for electrical equipment.



WARNING!

Risk of injury from improper removal.

- ▶ Removal may be carried out by authorized technicians only and with the appropriate tools.

- Remove electrical connections on the process controller.
- Release the pneumatic connection on the process controller.
- Remove FMR from pipeline.

Typ 8750
Operating structure

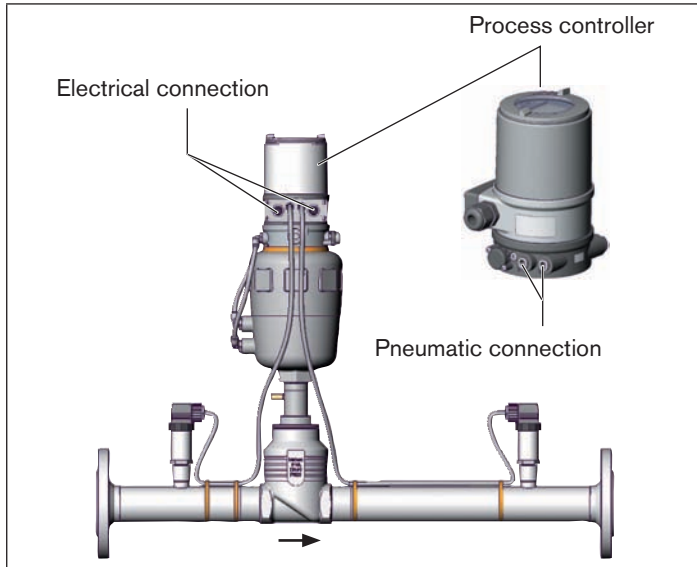


Fig. 25: Disassembly of FMR

19. OPERATING STRUCTURE

The factory presets are highlighted in blue to the right of the menu in the operating structure.



Menu options activated or selected at the factory



Menu options not activated or selected at the factory

2 %, 10 sec Values set at the factory

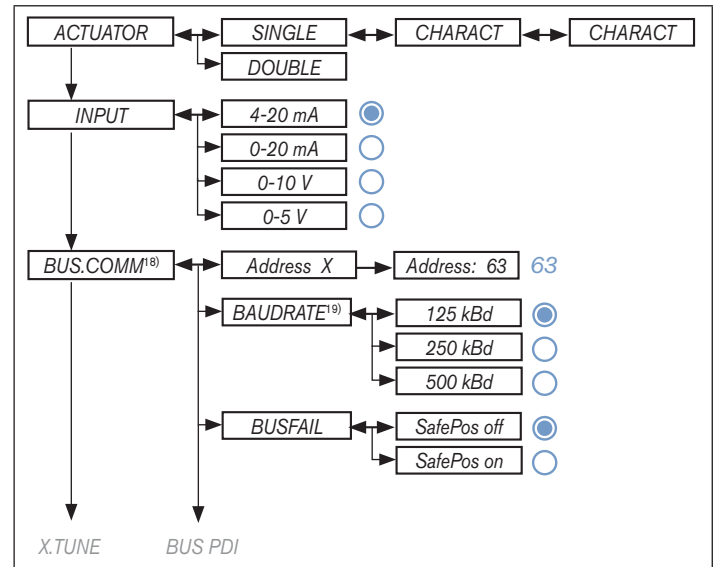


Fig. 26: Operating structure FMR - 1

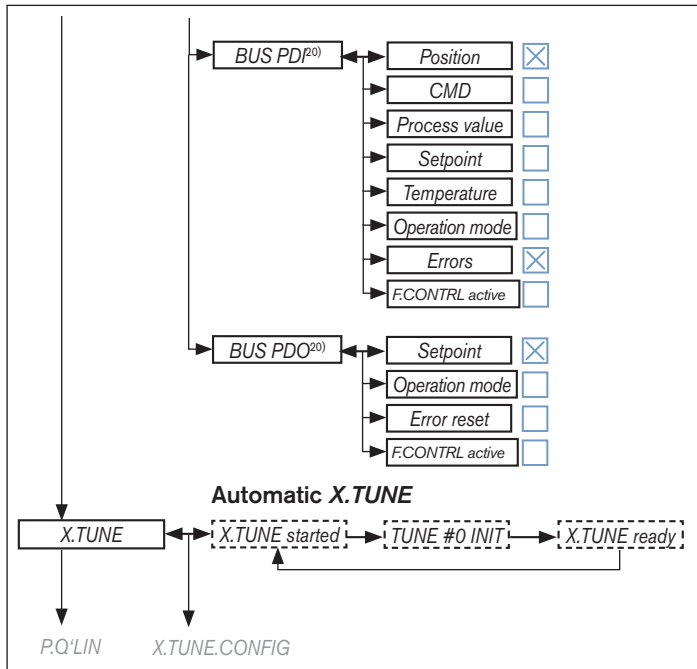


Fig. 27: Operating structure FMR - 2

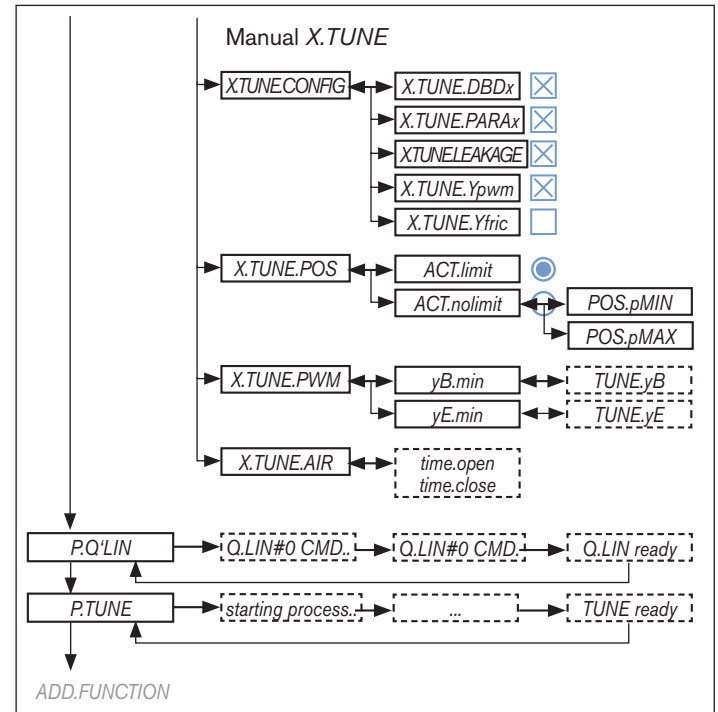


Fig. 28: Operating structure FMR - 3

19) Only for field bus

20) Only DeviceNet

21) Only PROFIBUS DP

Typ 8750

Operating structure

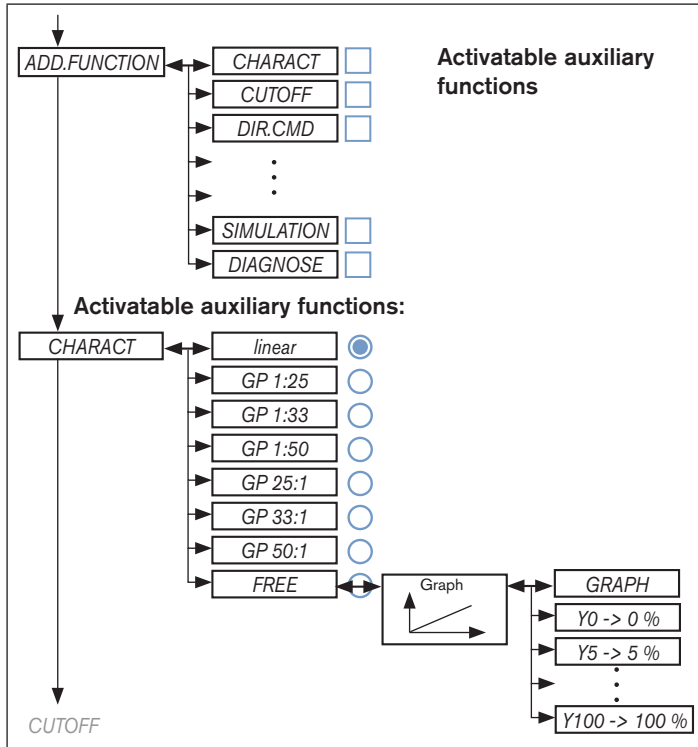


Fig. 29: Operating structure FMR - 4

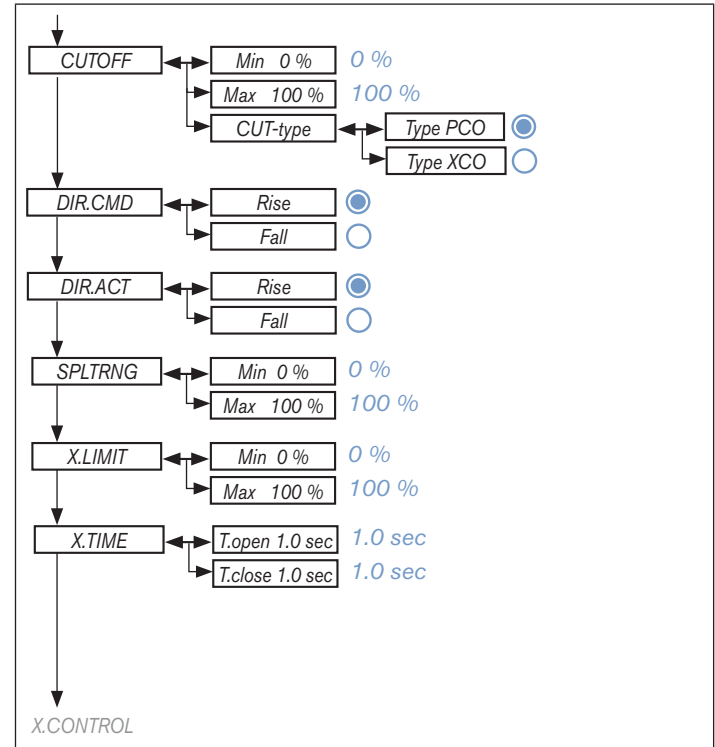


Fig. 30: Operating structure FMR - 5

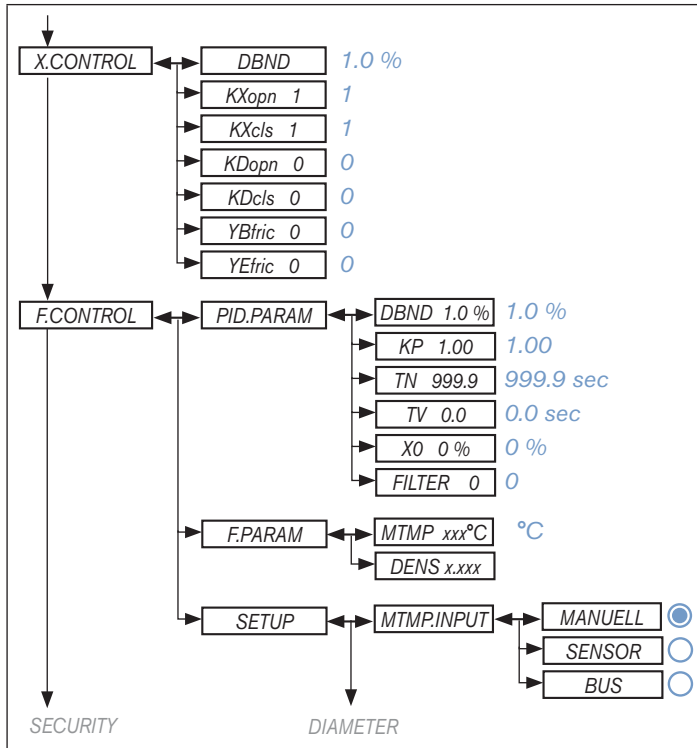


Fig. 31: Operating structure FMR - 6

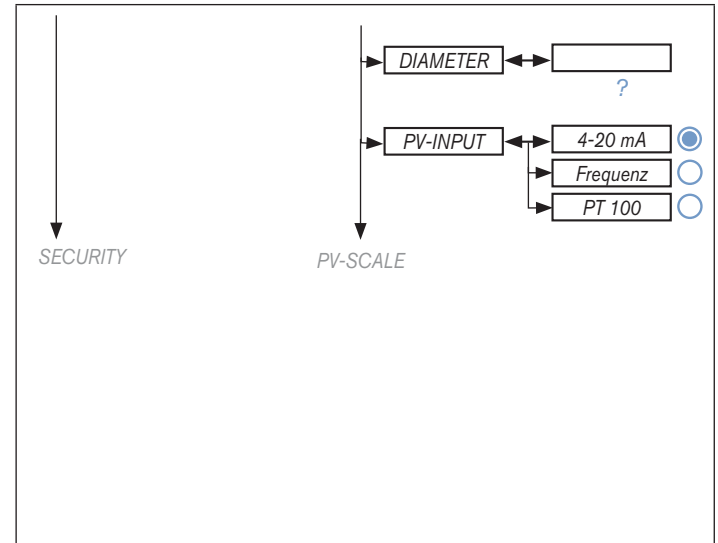


Fig. 32: Operating structure FMR - 7

Typ 8750

Operating structure

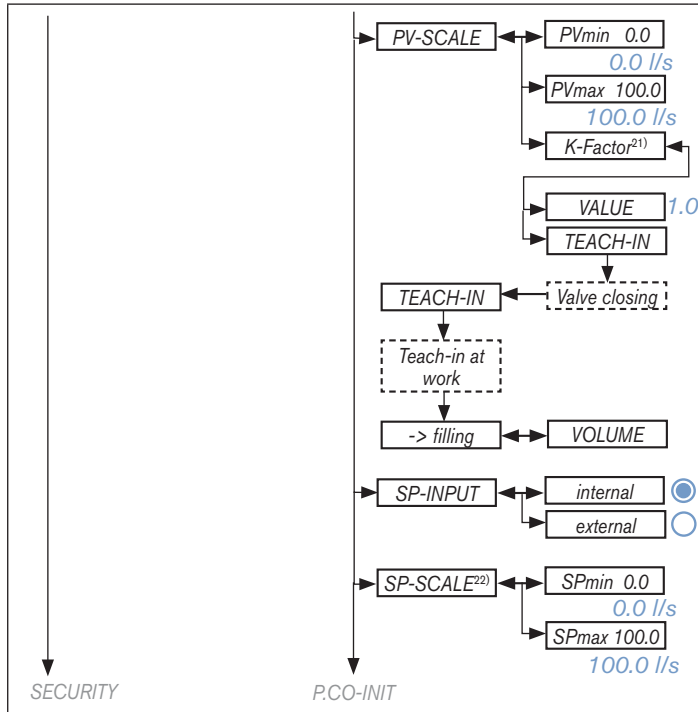


Fig. 33: Operating structure FMR - 8

22) Only for frequency signal type (F.CONTROL → SETUP → PV-INPUT → Frequency)

23) Only for external set-point value default (P.CONTROL → SETUP → SP-INPUT → external)

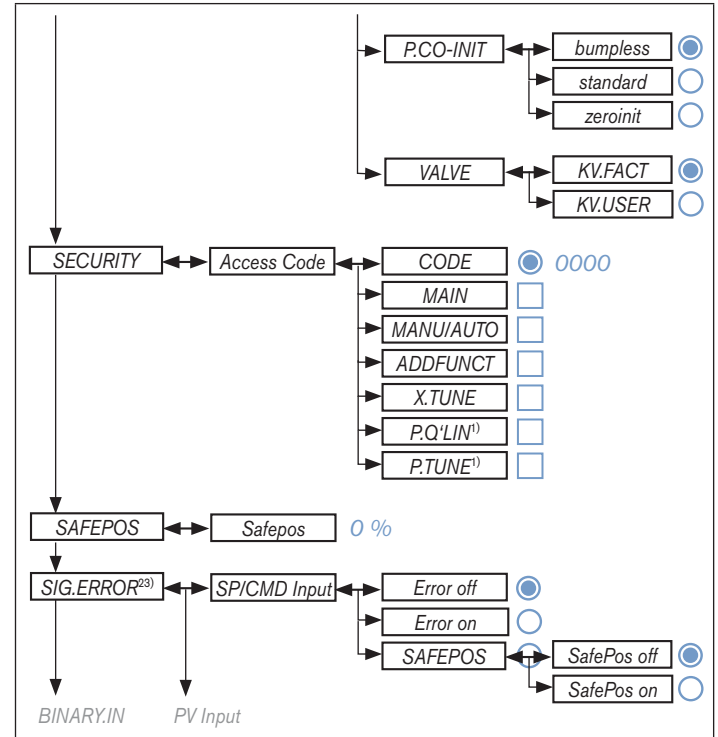


Fig. 34: Operating structure FMR - 9

24) Only for signal type 4-20 mA and Pt 100

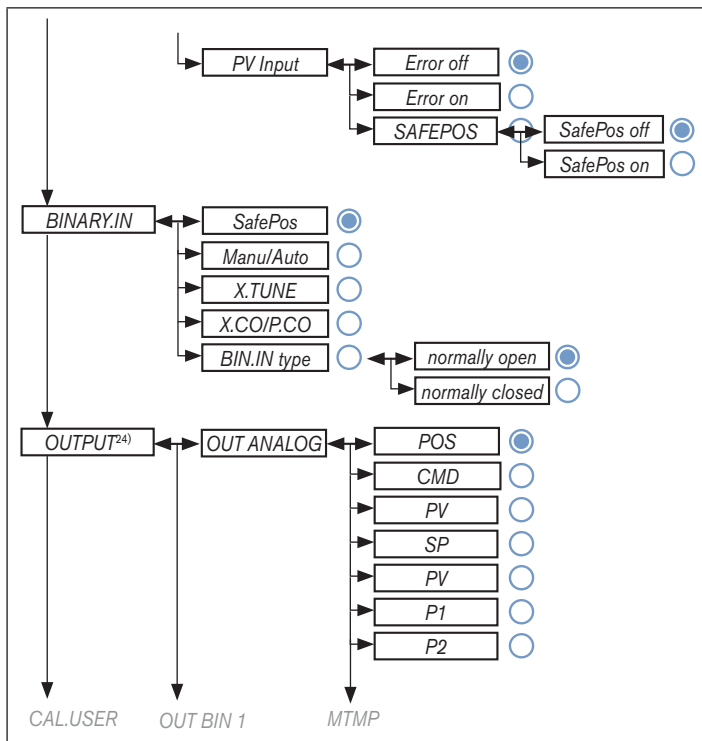


Fig. 35: Operating structure FMR - 10

²⁵⁾ Optional. The number of outputs varies depending on the version.

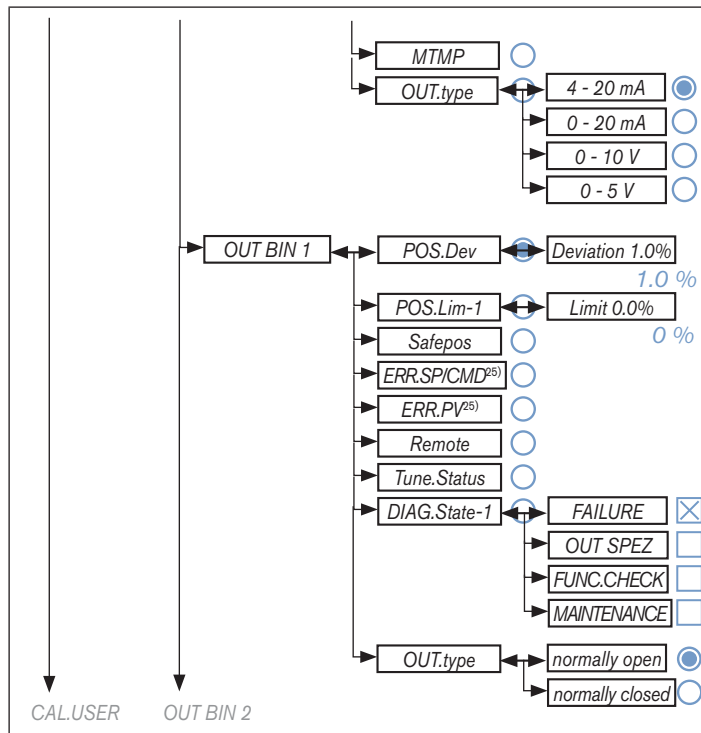


Fig. 36: Operating structure FMR - 11

²⁶⁾ Only if fault detection is activated for the input signal (SIG.ERROR → SP/CMD Input or PV-Input → Error on)

Typ 8750

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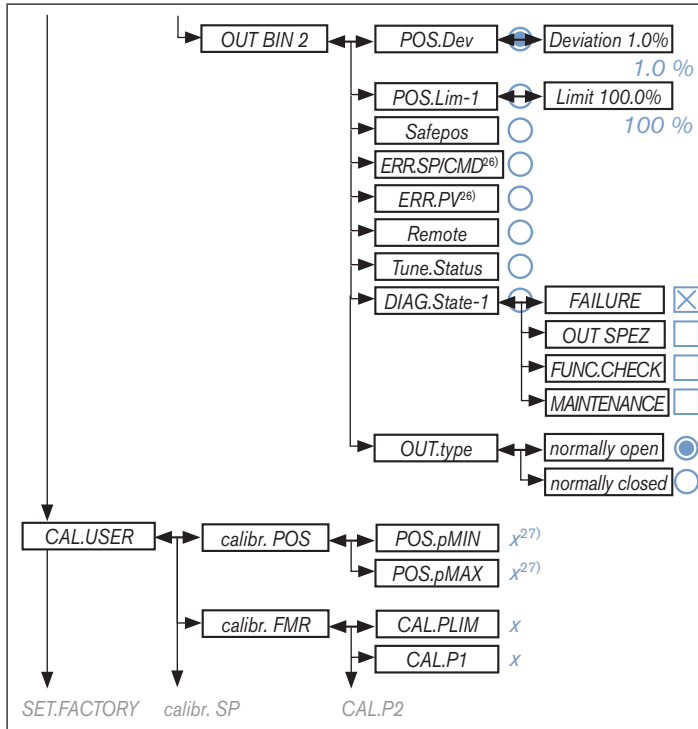


Fig. 37: Operating structure FMR - 12

²⁷⁾ Only if fault detection is activated for the input signal (SIG.ERROR → SP/CMD Input or PV-Input → Error on)

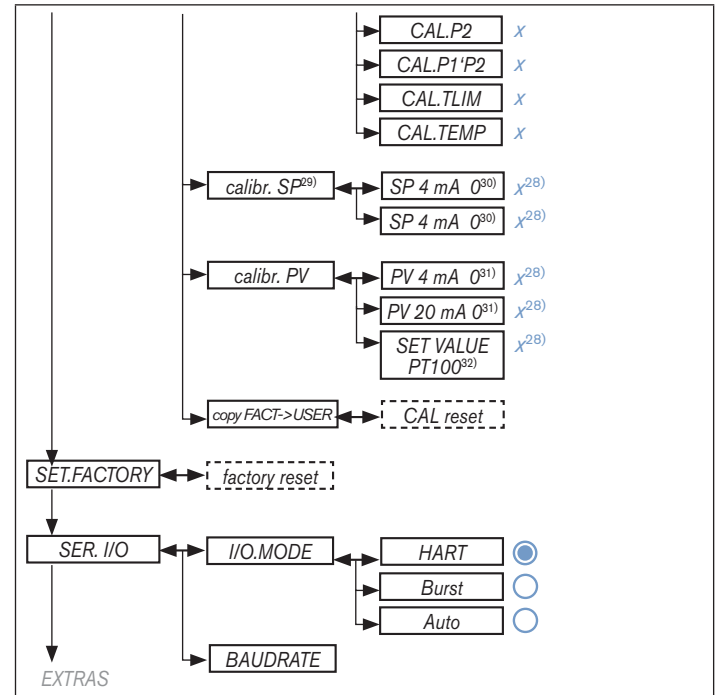


Fig. 38: Operating structure FMR - 13

²⁸⁾ Value is set for X.TUNE (automatic or manual).

²⁹⁾ Value is set by the manufacturer during device-specific calibration.

³⁰⁾ Only for external set-point value default (F.CONTROL → SETUP → SP-INPUT → external)

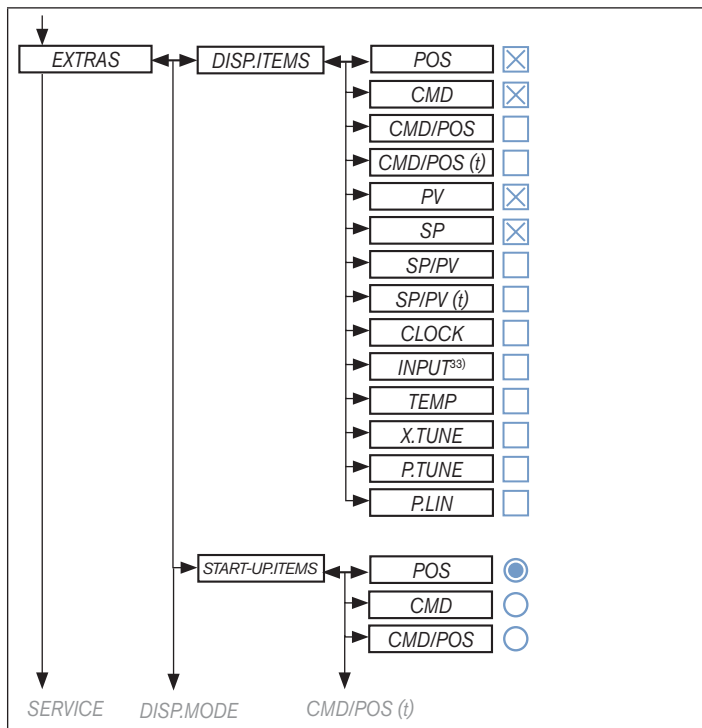


Fig. 39: Operating structure FMR - 14

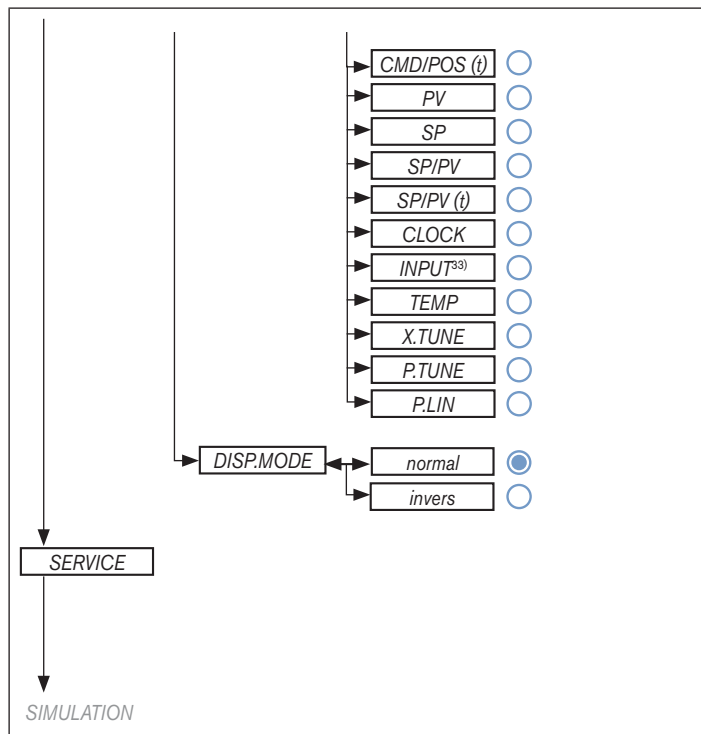


Fig. 40: Operating structure FMR - 15

³¹⁾ The signal type selected in the INPUT menu is displayed.

³²⁾ Only for signal type 4-20 mA (P:CONTROL→SETUP→PV-INPUT→4-20mA)

³³⁾ Only for circuit with Pt 100 (P:CONTROL→SETUP→PV-INPUT→PT 100)

³⁴⁾ Not for field bus

Typ 8750

Operating structure

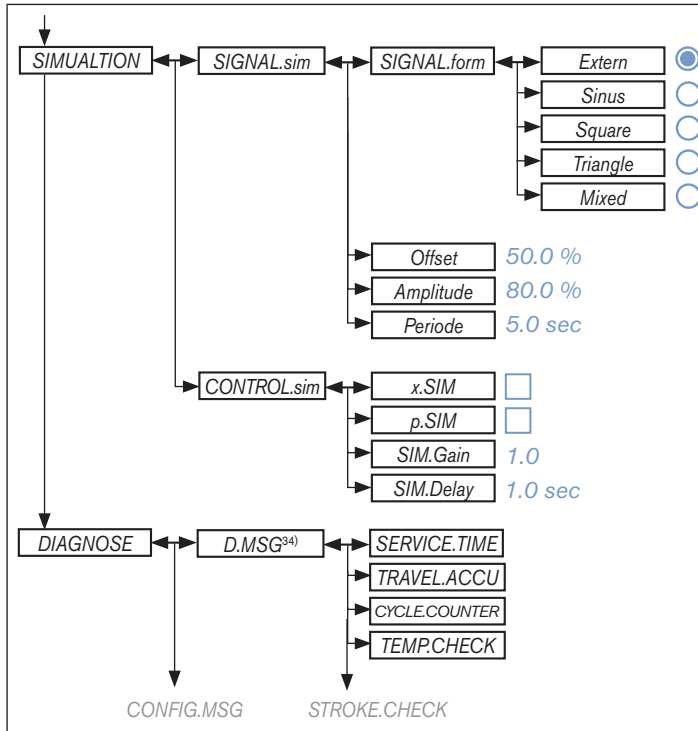


Fig. 41: Operating structure FMR - 16

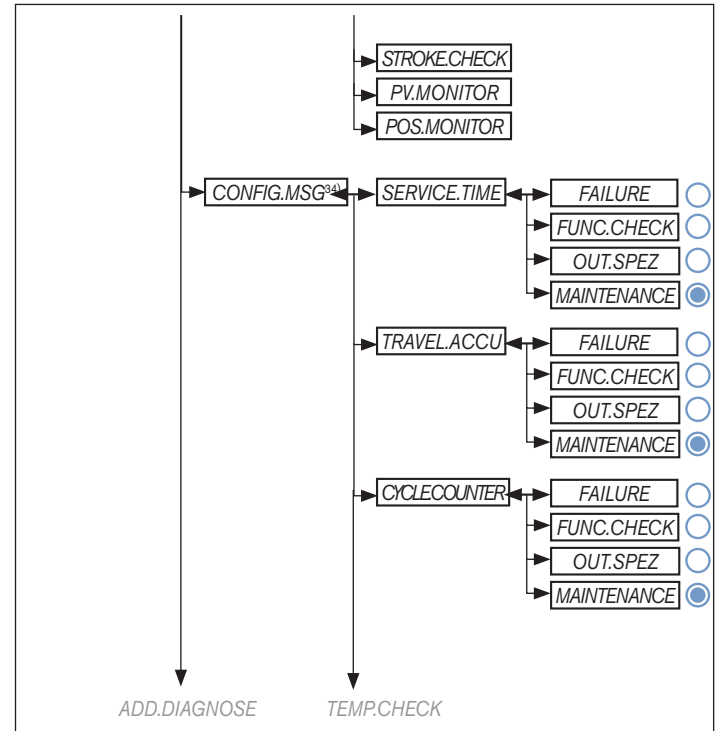


Fig. 42: Operating structure FMR - 17

³⁵⁾ The sub-menu lists only the activated diagnostic functions.

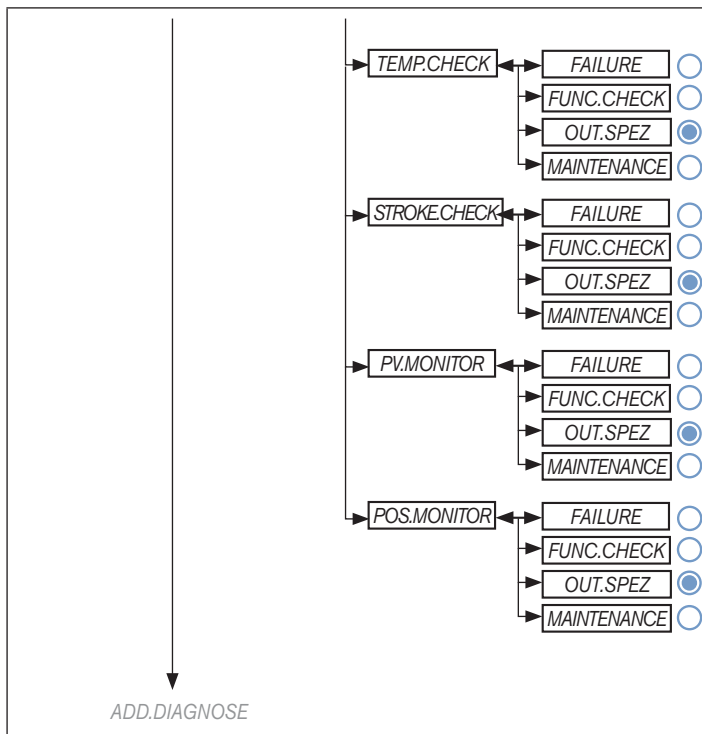


Fig. 43: Operating structure FMR - 18

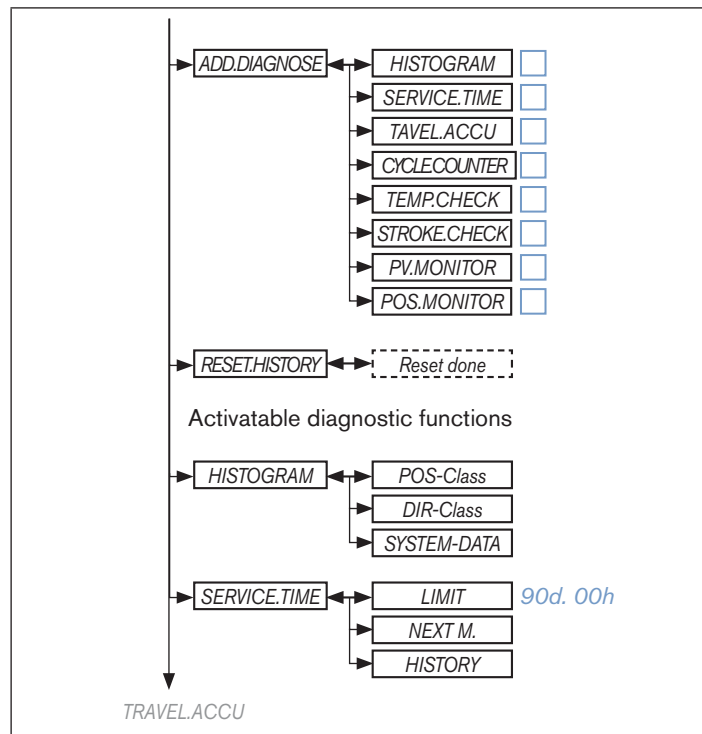


Fig. 44: Operating structure FMR - 19

Typ 8750

Operating structure

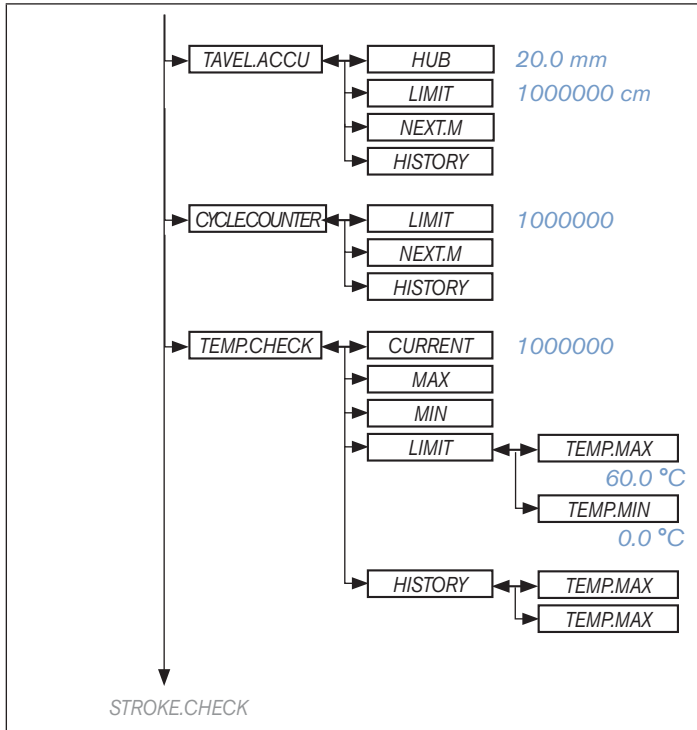


Fig. 45: Operating structure FMR - 20

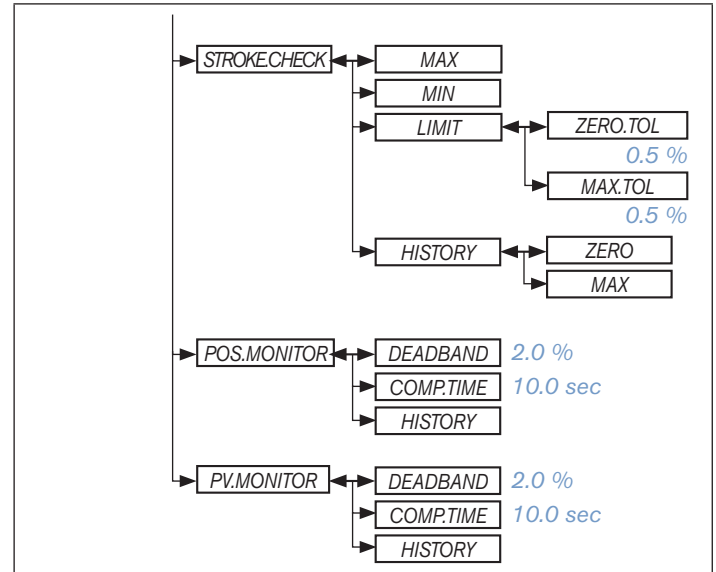


Fig. 46: Operating structure FMR - 21

20. TRANSPORT, STORAGE, PACKAGING

NOTE!

Transport damage.

- ▶ Inadequately protected devices may be damaged during transportation.
- ▶ Protect the device against moisture and dirt in shock-resistant packaging during transportation.
- ▶ Prevent the temperature from exceeding or dropping below the permitted storage temperature.
- ▶ Protect the electrical interfaces of the coil and the pneumatic connections from damage by placing protective caps on them.

Incorrect storage may damage the device.

- ▶ Store the device in a dry and dust-free location.
- ▶ Storage temperature -20 to 55°C.

Damage to the environment caused by device components contaminated with media.

- ▶ Dispose of the device and packaging in an environmentally friendly manner.
- ▶ Observe applicable disposal and environmental regulations.

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