bürkert
FLUID CONTROL SYSTEMS

Type 8619
multiCELL

Modular transmitter/controller



Operating Instructions

MAN 1000139642 EN Version: D Status: RL (released | freigegeben) printed: 29.08.2013

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1. ABOUT THIS MANUAL

This manual describes the entire life cycle of the device. Please keep this manual in a safe place, accessible to all users and any new owners.

This manual contains important safety information.

Failure to comply with these instructions can lead to hazardous situations.

- This manual must be read and understood.

1.1. Symbols used

DANGER

Warns against an imminent danger.

- Failure to observe this warning can result in death or in serious injury.

WARNING

Warns against a potentially dangerous situation.

- Failure to observe this warning can result in serious injury or even death.

CAUTION

Warns against a possible risk.

- Failure to observe this warning can result in substantial or minor injuries.

NOTE

Warns against material damage.

- Failure to observe this warning may result in damage to the device or system.

Indicates additional information, advice or important recommendations.

Refers to information contained in this manual or in other documents.

→ Indicates a procedure to be carried out.

1.2. Definition of the word "device"

The word "device" used within this manual refers to the controller/transmitter type 8619.

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2. INTENDED USE

Use of this device that does not comply with the instructions could present risks to people, nearby installations and the environment.

- The device is intended, depending on the modules fitted and the measurement sensors connected, for the acquisition, processing, transmission and regulation of physical parameters such as pH, conductivity, temperature or flow rate... .
- This device must be protected against electromagnetic interference, ultraviolet rays and, when installed outdoors, the effects of climatic conditions.
- This device must be used in compliance with the characteristics and commissioning and use conditions specified in the contractual documents and in the user manual.
- Requirements for the safe and proper operation of the device are proper transport, storage and installation, as well as careful operation and maintenance.
- Only use the device as intended.

→ Observe any existing restraints when the device is exported.

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3. BASIC SAFETY INFORMATION

This safety information does not take into account:

- any contingencies or occurrences that may arise during assembly, use and maintenance of the device.
- the local safety regulations that the operator must ensure the staff in charge of installation and maintenance observe.

Danger due to electrical voltage.

- Shut down and isolate the electrical power source before carrying out work on the system.
- Observe all applicable accident protection and safety regulations for electrical equipment.

Various dangerous situations.

To avoid injury take care:

- to prevent any unintentional power supply switch-on.
- to carry out the installation and maintenance work by qualified and skilled staff with the appropriate tools.
- to guarantee a set or controlled restarting of the process after a power supply interruption.
- to use the device only if in perfect working order and in compliance with the instructions provided in the user manual.
- to observe the general technical rules during the planning and use of the device.
- not to use this device in explosive atmospheres.
- not to use this device in an environment incompatible with the materials from which it is made.
- not to make any external modifications to the device such as for instance painting or varnishing any part of the device.
- not to power the device with an AC voltage or a DC voltage higher than 36V DC.

NOTE

Elements / Components sensitive to electrostatic discharges

- This device contains electronic components sensitive to electrostatic discharges. They may be damaged if they are touched by an electrostatically charged person or object. In the worst case scenario, these components are instantly destroyed or go out of order as soon as they are activated.
- To minimise or even avoid all damage due to an electrostatic discharge, take all the precautions described in the EN 100 015-1 norm.
- Also ensure that you do not touch any of the live electrical components.

This device was developed with due consideration given to accepted safety rules and is state-of-the-art. However, risks may arise.

Failure to observe these instructions as well as any unauthorised work on the device excludes us from any liability and also nullifies the warranty which covers the device and its accessories.

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4. GENERAL INFORMATION

4.1. Manufacturer's address and international contacts

To contact the manufacturer of the device, use following address:

Bürkert SAS

Rue du Giessen

BP 21

F-67220 TRIEMBACH-AU-VAL

You may also contact your local Bürkert sales office.

The addresses of our international sales offices are available on the internet at: www.burkert.com

4.2. Warranty conditions

The condition governing the legal warranty is the conforming use of the multiCELL 8619 in observance of the operating conditions specified in this manual.

4.3. Information on the Internet

You can find the Operating instructions and technical data sheets regarding the type 8619 at: www.burkert.com

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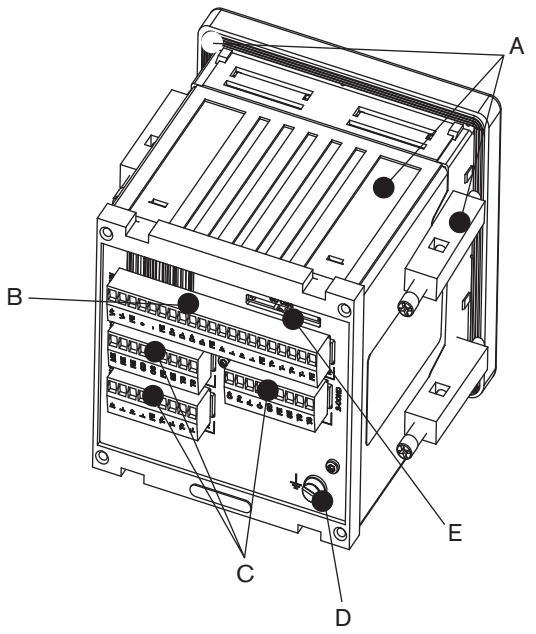
5. DESCRIPTION

5.1. Area of application

The 8619 multiCELL is a multifunction device intended to display, transmit and regulate various physical parameters. It can be used, for example, to manage a water treatment system (a boiler, a cooling tower or a reverse osmosis system).

5.2. General description

5.2.1. Construction



A: standardised 1/4 DIN housing (92x92 mm) with seal, to be built into and attached to the door of the electrical switch housing or cabinet using 4 locking systems.

B: a main board (identified by "M0:MAIN" on the rear plate) :

- used to connect the electrical power source of the multiCELL;
- used to power another device, e.g. a flow-rate sensor;
- offering 2 digital inputs (identified by "DI", digital input), two 4-20 mA current outputs (identified by "AO", analogue output) and 2 digital outputs (identified by "DO", digital output).

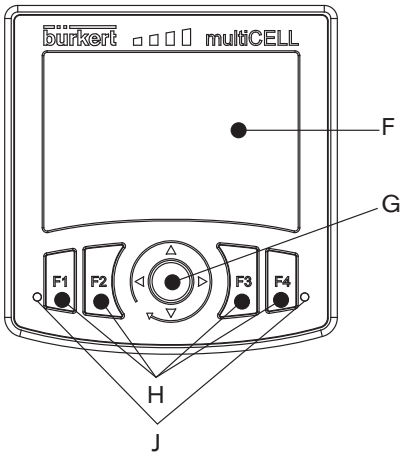
C: 1 to 6 slots for placing the following modules:

- module with light grey connector for connection of a pH or oxidation reduction potential sensor and/or a temperature sensor
- module with green connector for connection of a conductivity sensor and/or a temperature sensor
- module with black connector with two 4-20 mA current outputs and 2 digital outputs.
- module with orange connector with two analogue inputs and 2 digital inputs.

D: functional ground screw (connected internally to all "FE" terminals on the main board and additional modules).

E: memory card (SD type) reader/recorder

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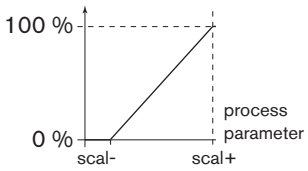


F: display with backlight.
G: navigation button (4 directions).
H: 4 dynamic keys (function keys with dynamic changing assignment).
J: 2 LEDs.

Figure 1 : Design of an 8619

5.3. Functional description

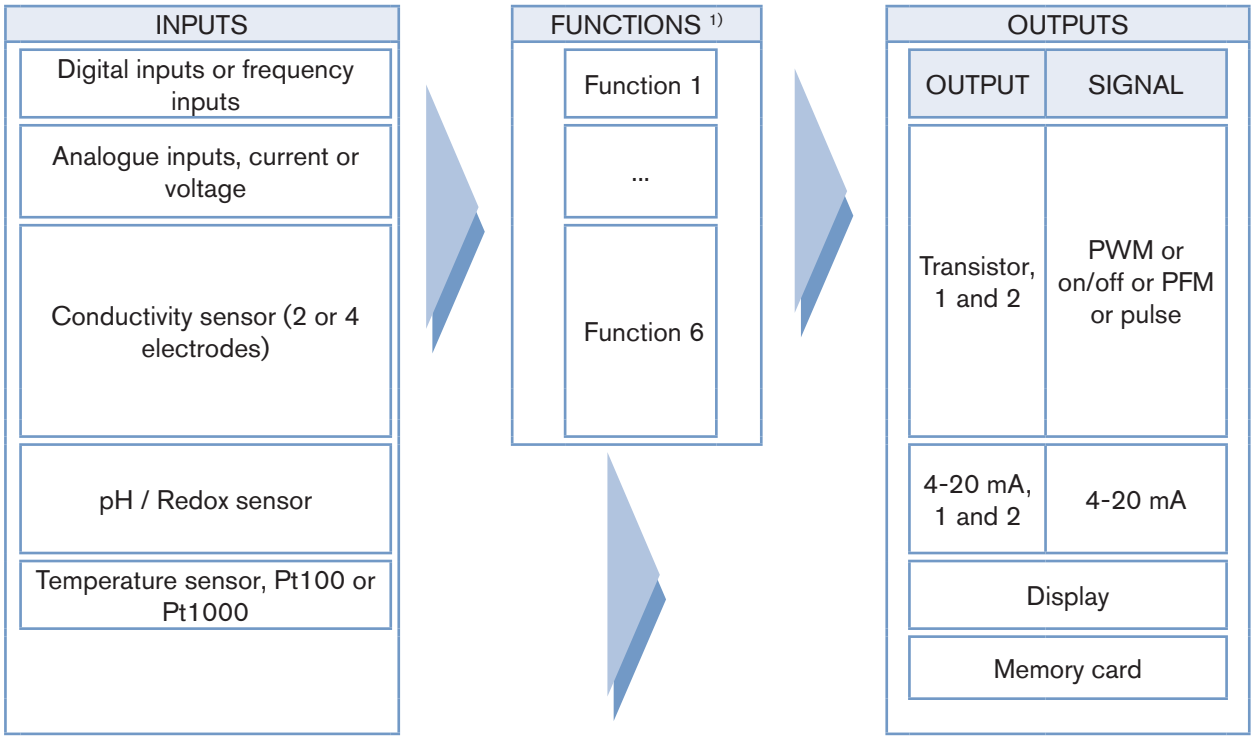
The multiCELL is used to link each input to a function (dosing, for example) which can be fully configured by the user. Depending on the selected model, the following functions are offered as standard or as options:

Function	Availability	Formula	Example for usage
Arithmetic	Standard on all models	A+B, A-B, A/B	Arithmetic procedure between 2 values with the same unit. A or B may be the result of another function.
PASS	Standard on all models	A/B x 100%	Calculation of the passage rate.
REJECT	Standard on all models	(1 - A/B) x 100%	Calculation of the rejection rate.
DEVIAT	Standard on all models	(A/B - 1) x 100%	Calculation of the deviation rate.
PROP (proportional)	Standard on all models		Calculation of an output proportionally to bounded input.
ON/OFF	Standard on all models	ON/OFF control	For all input types.
Flow rate measurement	▪ Standard on models 560205 or 560213 ▪ Optional (see chap. 8.10.4) on all the other models		Each of the 2 digital inputs can be used to measure the flow rate.
PID	Optional (see chap. 8.10.4)	Continuous regulation	For all input types; with internal or external setpoint.

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Function	Availability	Formula	Example for usage
Time dosing	Optional (see chap. 8.10.4)		In a cooling tower, for example; used to dose 2 products at fixed intervals or for twice daily dosing scheduled over one week. The time dosing function can be combined with an ON/OFF function on a conductivity measurement only, in order to ensure prebleed of the system. The "ON/OFF" function must be configured and activated before the time dosing function.
Volume dosing	Optional (see chap. 8.10.4)		Dedicated to cooling towers. Metering of a specific volume of water and activation of an actuator during a specific period in order to add a product, and finally reset the water volume to zero.
Concentration	Optional (see chap. 8.10.4)		The concentration graphs for certain compounds such as NaCl and H_2SO_4 are memorised for use over the entire concentration range.
Datalogger on memory card	Optional (see chap. 8.10.4)		Option to memorise the variations in 1 to 16 values in a given time interval.

5.4. Functional diagram



1) active simultaneously

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5.5. Description of the device name plate

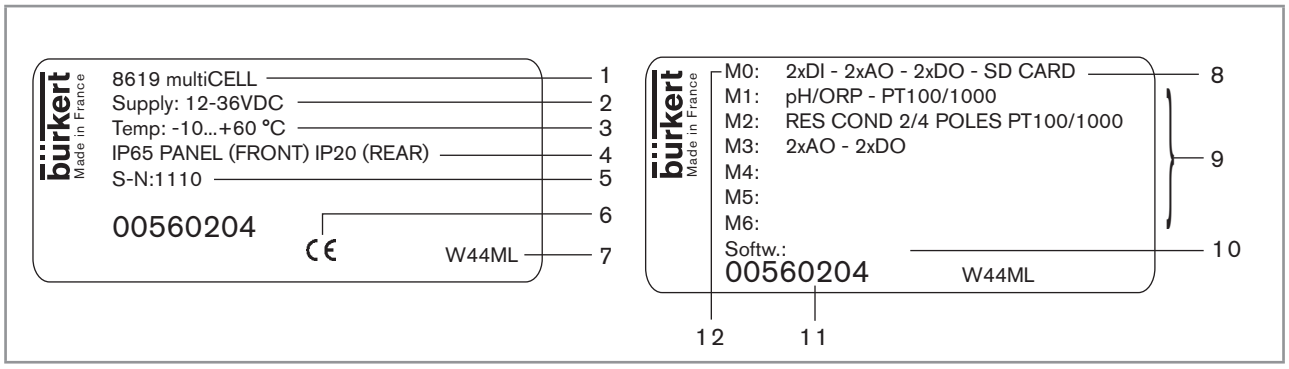


Figure 2 : Example of a name plate

1. Type of device
2. Electrical power supply
3. Ambient temperature range
4. Protection rating
5. Serial number
6. Conformity logo
7. Manufacturing code
8. Device fitted with a memory card reader
9. Properties of the additional modules
10. Software options
11. Order code
12. Properties of the M0:MAIN board

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6. TECHNICAL DATA

6.1. Conditions of use

Ambient temperature	-10 to +70 °C (operating, without memory card), restricted to 0 ... +70°C if a memory card is used
Air humidity	< 85 %, non condensated
Height above sea level	max. 2000 m
Protection rating	▪ IP65 and NEMA4X (on front, once built in, housing closed) ▪ IP20 (non front parts inside the housing)

6.2. Compliance to standards and directives

The device conforms to the EC directives through the following standards:

- EMC: EN 61000-6-2, EN 61000-6-3
- Vibration: EN 60068-2-6
- Shock: EN 60068-2-27

UL recognised devices ( ) for the United States of America and Canada comply to the following standards:

- UL 61010-1
- CAN/CSA-C22.2 n° 61010-1

6.3. General technical data

6.3.1. Mechanical data

Mechanical data	Material
Built in and locking system / seal	PPO / silicone
Front cover, upper layer, and keys / front cover, sublayer, and display	Silicone / PC
Rear plate	Stainless steel 304
Terminal blocks	PBT, contacts in gold-plated copper alloy
Ground screw + spring washer	Stainless steel 316 (A4)

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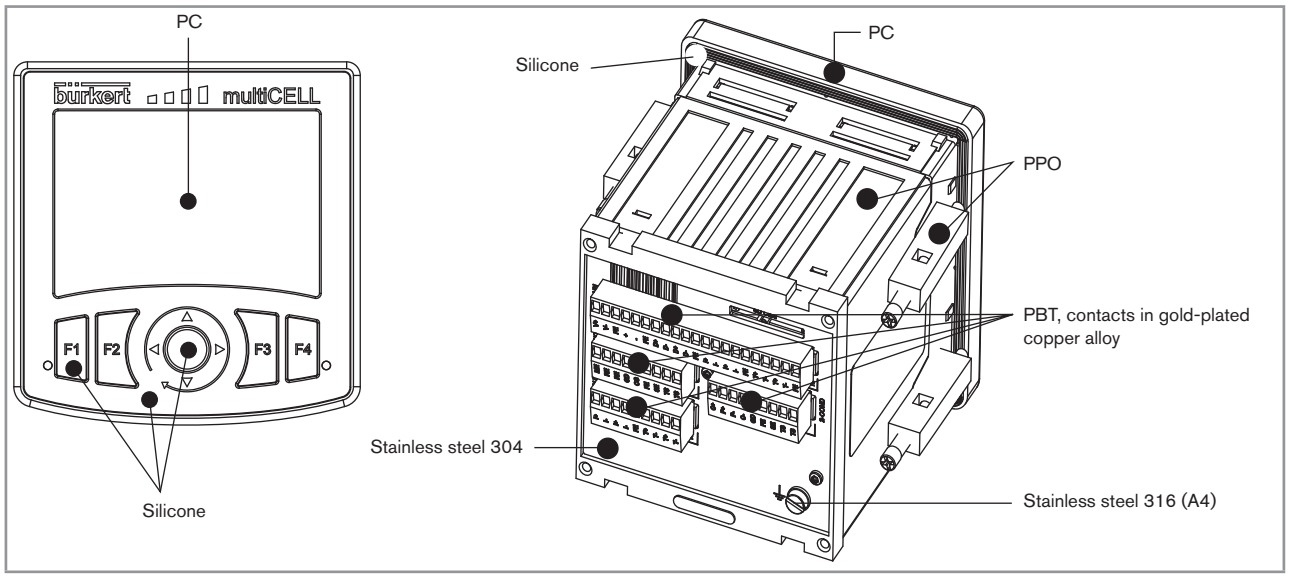


Figure 3 : Materials used for the multiCELL

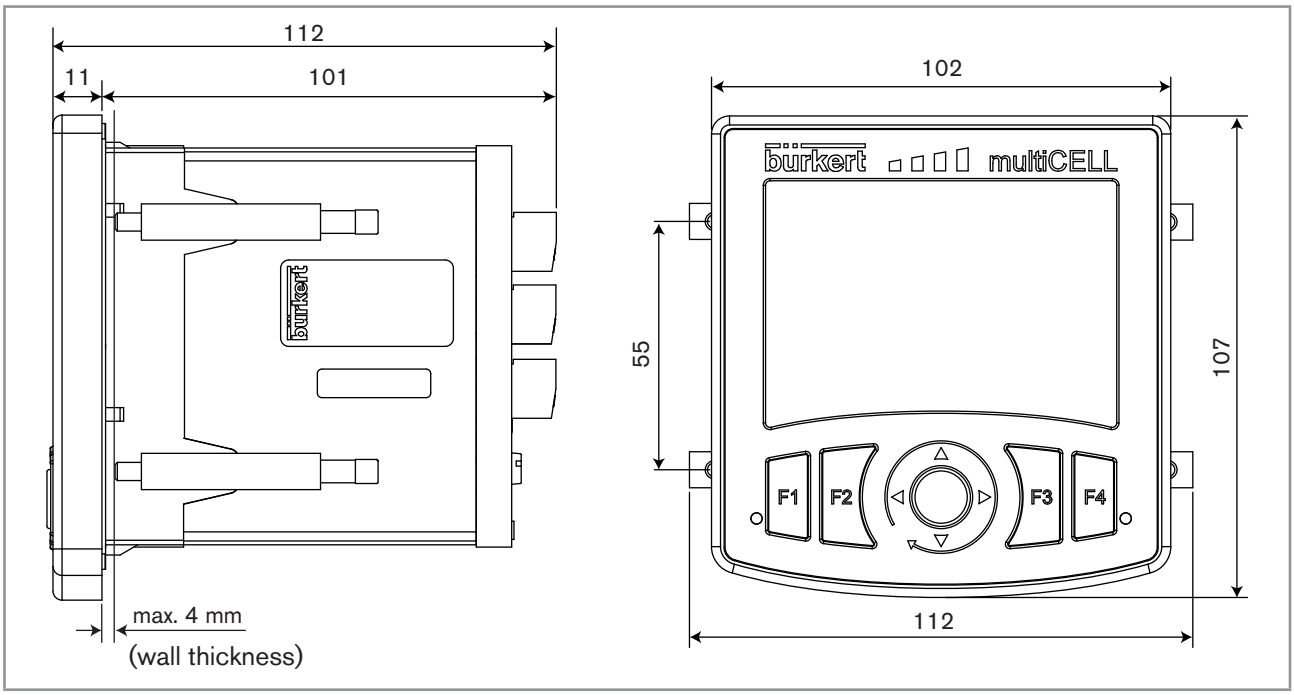


Figure 4 : Dimensions of the multiCELL [mm]

6.3.2. Specifications of the "M0:MAIN" board

Power supply	12-36 V DC, filtered and regulated
Specifications of the power source (not provided) of UL-recognised devices, with variable key PE72	▪ Limited power source (in accordance with chap. 9.3 of the UL 61010-1 standard) ▪ or class 2 type power source (according to the 1310/1585 and 60950-1 standards)

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Max. power consumption (without additional module, outputs not connected)	1.5VA
Power distribution ("PWR OUT")	12-36 V DC, 1.8A max.
All digital inputs ("DI")	▪ Switching threshold V_{on}: 5 à 36 V DC ▪ Switching threshold V_{off}: < 2 V DC ▪ Input impedance: 3kΩ ▪ Galvanically insulated ▪ Protected against polarity reversal and voltage spikes ▪ Frequency: 0.5 to 2500Hz
All analogue outputs ("AO")	▪ 4-20mA current ▪ Any connection mode, in sink or source mode ▪ Galvanically insulated ▪ Protected against polarity reversal ▪ Max. loop impedance: 1100Ω at 36V DC, 610Ω at 24V DC, 100Ω at 12V DC
All digital outputs ("DO")	▪ Transistor ▪ Connection mode unimportant in NPN or PNP mode ▪ Galvanically insulated ▪ Protected against short circuits ▪ Max. voltage: 36V DC ▪ max. 700mA if one transistor is connected but max. 1A for both transistors connected ▪ Max. frequency: 2000Hz
Electrical connection	▪ Per detachable 21-point set-screw connector, orange ▪ Refer to chap. 6.3.8 for the specifications of the connection cables
Flow rate measurement (software option)	Refer to the user manual for the flow sensor connected to the 8619

6.3.3. Specifications of the input board "Input"

Power consumption	0.1 VA
Digital inputs ("DI")	▪ Switching threshold V_{on}: 5 à 36 V DC ▪ Switching threshold V_{off}: < 2 V DC ▪ Input impedance: 3 kΩ ▪ Galvanically insulated ▪ Protected against polarity reversal and voltage spikes ▪ Frequency: 0.5 to 2500 Hz

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Analogue inputs ("AI")	▪ Any connection mode, in sink or source mode ▪ Galvanically insulated ▪ Accuracy: ±0,25% ▪ Current input: 0 - 22 mA or 3,5 - 22 mA. Max. voltage: 36 V DC. Impedance: 50 Ω. Resolution : 1.5 µA ▪ Voltage input: 0 - 5 V DC or 0 - 10 V DC. Max. voltage: 36 V DC. Impedance: 110 kΩ. Resolution: 1 mV
Electrical connection	▪ Per detachable 9-point set-screw connector, orange ▪ Refer to chap. 6.3.8 for the specifications of the connection cables

6.3.4. Specifications of the additional outputs board "OUT"

Power consumption	0.1VA
All digital outputs ("DOx")	▪ Transistor ▪ Any connection mode, in NPN or PNP mode ▪ Galvanically insulated ▪ Protected against short circuits ▪ Max. voltage: 36V DC ▪ max. 700mA per transistor but max. 1A if both transistors are connected ▪ Max. frequency 2000Hz
All analogue outputs ("AOx")	▪ 4-20mA current ▪ Any connection mode, in sink or source mode ▪ Galvanically insulated ▪ Protected against polarity reversal ▪ Max. loop impedance: 1100Ω at 36V DC, 610Ω at 24V DC, 100Ω at 12V DC
Electrical connection	▪ Per detachable 9-point set-screw connector, black ▪ Refer to chap. 6.3.8 for the specifications of the connection cables

6.3.5. Specifications of the memory card reader/recorder

▪ Memory card type	▪ SD (Secure Digital)
▪ Capacity	▪ 2 Go max.
▪ File system	▪ FAT16

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6.3.6. Specifications of the "pH/redox" module

pH measurement	
▪ pH measurement range	▪ -2.00...+16.00
▪ Resolution of pH measurement	▪ 0.01pH
▪ Accuracy of pH measurement	▪ 0.02pH
▪ Potential difference measurement range	▪ -600...+600mV
▪ Resolution of potential difference measurement	▪ 0.1mV ▪ 1mV
▪ Accuracy of potential difference measurement	▪ Electrochemical
▪ pH probe type	
Power consumption	0.1VA
Measurement of the oxidation reduction potential	
▪ Oxidation reduction potential measurement range	▪ -2000 ... +2000mV
▪ Resolution of the potential difference measurement	▪ 0.1mV ▪ 1mV
▪ Accuracy of potential difference measurement	▪ Electrochemical
▪ Oxidation reduction potential probe type	
Temperature measurement	
▪ Measurement range	▪ -25°C ... +130°C
▪ Measurement resolution	▪ 0.1°C
▪ Measurement accuracy	▪ 1°C
▪ Temperature sensor type	▪ Pt100 or Pt1000, with 2 or 3 wires
Electrical connection	▪ Per detachable 9-point set-screw connector, grey ▪ Refer to chap. 6.3.8 for the specifications of connection cables

6.3.7. Specifications of the "COND" conductivity module

Resistance measurement (without conductivity sensor connected)	5Ω ... 1MΩ
Power consumption	0.25VA
Conductivity cell type	With 2 or 4 electrodes; the specifications of Bürkert cells are described in the related operating instructions.

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Conductivity measurement (with connected conductivity sensor)	
▪ Measurement range	▪ 0.000 µS/cm...2 S/cm (depends on the conductivity sensor)
▪ Measurement resolution	▪ 10^{-9}S/cm
▪ Measurement error	▪ < 0.5% of measured value + sensor error
Resistivity measurement (with connected conductivity sensor)	
▪ Measurement range	▪ 0.500Ω.cm...100MΩ.cm (depends on the conductivity sensor)
▪ Measurement resolution	▪ 10^{-1}Ω.cm
▪ Measurement error (without sensor)	▪ < 0.5% of measured value
Temperature measurement	
▪ Measurement range	▪ -40°C ... 200°C
▪ Measurement resolution	▪ 0.1°C
▪ Measurement error	▪ ±1°C
▪ Temperature sensor type	▪ Pt100 or Pt1000, with 2 or 3 wires
Electrical connection	▪ Per detachable 9-point set-screw connector, green ▪ Refer to chap. 6.3.8 for the specifications of the connection cables

6.3.8. Specifications of the connection cables

- Use shielded cables for the electrical connection.
- Be sure to use cables in which the wires present the specifications described in the table below.

Wire specifications	Dimensions of the max. clamping area
▪ Single core H05(07) V-U	0.2...1.5 mm²
▪ Flexible wire H05(07) V-K	0.2...1.5 mm²
▪ With non-insulated end connection	0.2...1.5 mm²
▪ With insulated end connection	0.2...0.75 mm²

Table 1: Specifications of the wires making up the connection cables

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7. INSTALLATION AND WIRING

7.1. Safety instructions

DANGER

Risk of injury due to electrical discharge.

- Shut down and isolate the electrical power source before carrying out work on the system.
- Observe all applicable accident protection and safety regulations for electrical equipment.

WARNING

Risk of injury due to non-conforming installation.

- Electrical installation can only be carried out by qualified and authorised personnel with the appropriate tools.
- Install appropriate safety devices (correctly rated fuse and/or circuit-breaker).
- The use of probes/sensors sold by Bürkert is preferable.
- Follow the instructions on installation and wiring of remote sensors connected to the multiCELL.

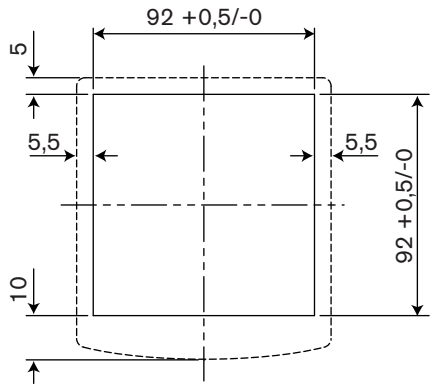
Risk of injury due to unintentional switch on of power supply or uncontrolled restarting of the installation.

- Take appropriate measures to avoid unintentional activation of the installation.
- Guarantee a set or controlled restart of the process subsequent to the installation of the device.

Protect this device against electromagnetic interference, ultraviolet rays and, when installed outdoors, the effects of the climatic conditions.

7.2. Building the device into a housing or cabinet

→ Follow the instructions below to build the multiCELL delivered fully assembled, into a housing or cabinet.



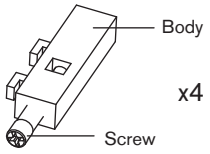
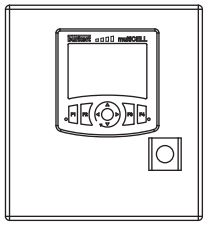
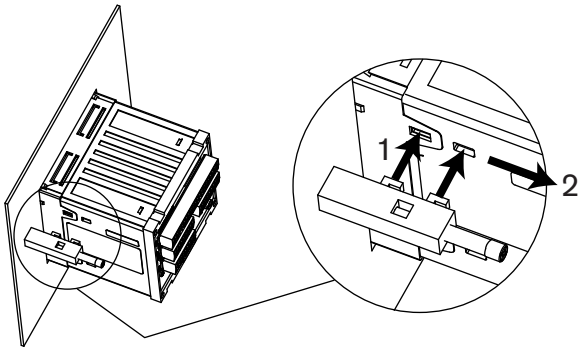
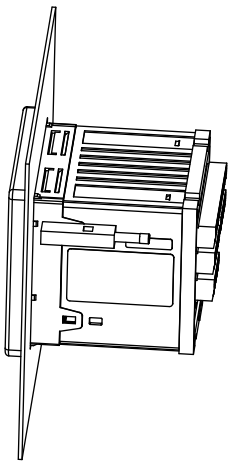
This diagram is not to scale. The dimensions are given in mm.

Stage 1:

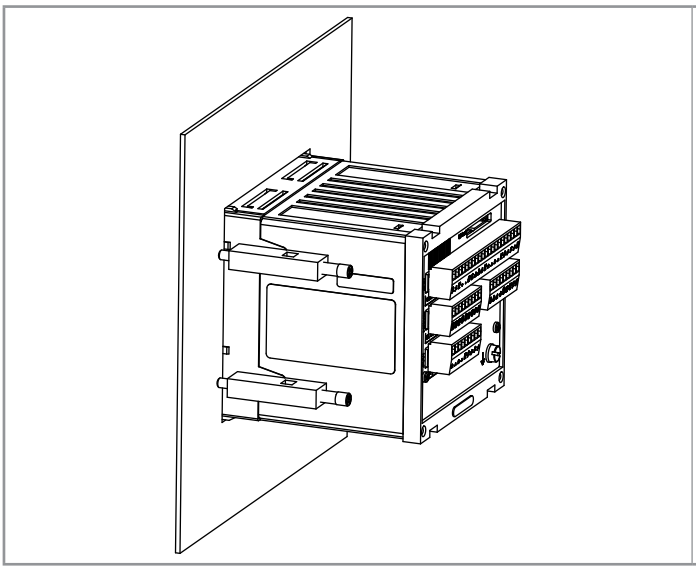
→ Check that the thickness of the door of the housing or cabinet is 4 mm max.

→ Cut out the hole in the door of the electrical housing or cabinet in accordance with the standard, IEC 61554:1999 (DIN 43700), allowing the space required around the cut-out and inside the cabinet to easily handle the 4 locking systems, delivered with the multiCELL.

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	Stage 2: Prepare the 4 locking systems: → Insert a screw into each device. → Tighten the screw until the end of the shaft of the screw is flush with the device.
	Stage 3: → Slide the housing into the cut-out with the connectors to the back until it can go no further.
	Stage 4: → Insert (1) the hooks on the first locking system into the slots on the housing. → Pull the locking system (2) until you hear a click. The click may be heared when tightening the locking system at stage 6.
	Stage 5: → Place the locking system flush against the multiCELL by hand, so that the hooks remain in place.

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Stage 6:

→ Fully tighten the screws using an appropriate screwdriver.

→ Repeat stages 4 to 6 to fit the other 3 locking systems.

Figure 5 : Insertion of the 8619 into a housing or cabinet

7.3. Electrical wiring

DANGER

Risk of injury due to electrical discharge.

- Shut down and isolate the electrical power source before carrying out work on the system.
- Observe all applicable accident protection and safety regulations for electrical equipment.

- Use a high quality electrical power supply (filtered and regulated).
- Connect the functional earth on the installation to the ground screw on the device (see Figure 1)
- Connect the shielding on each wire to an "FE" (functional earth) terminal to guarantee the equipotentiality of the installation.
- Use shielded cables that respect the specifications described in "Table 1: Specifications of the wires making up the connection cables".

7.3.1. Electrical connections

For all versions of the multiCELL, the electrical connection is made by set-screw connectors.

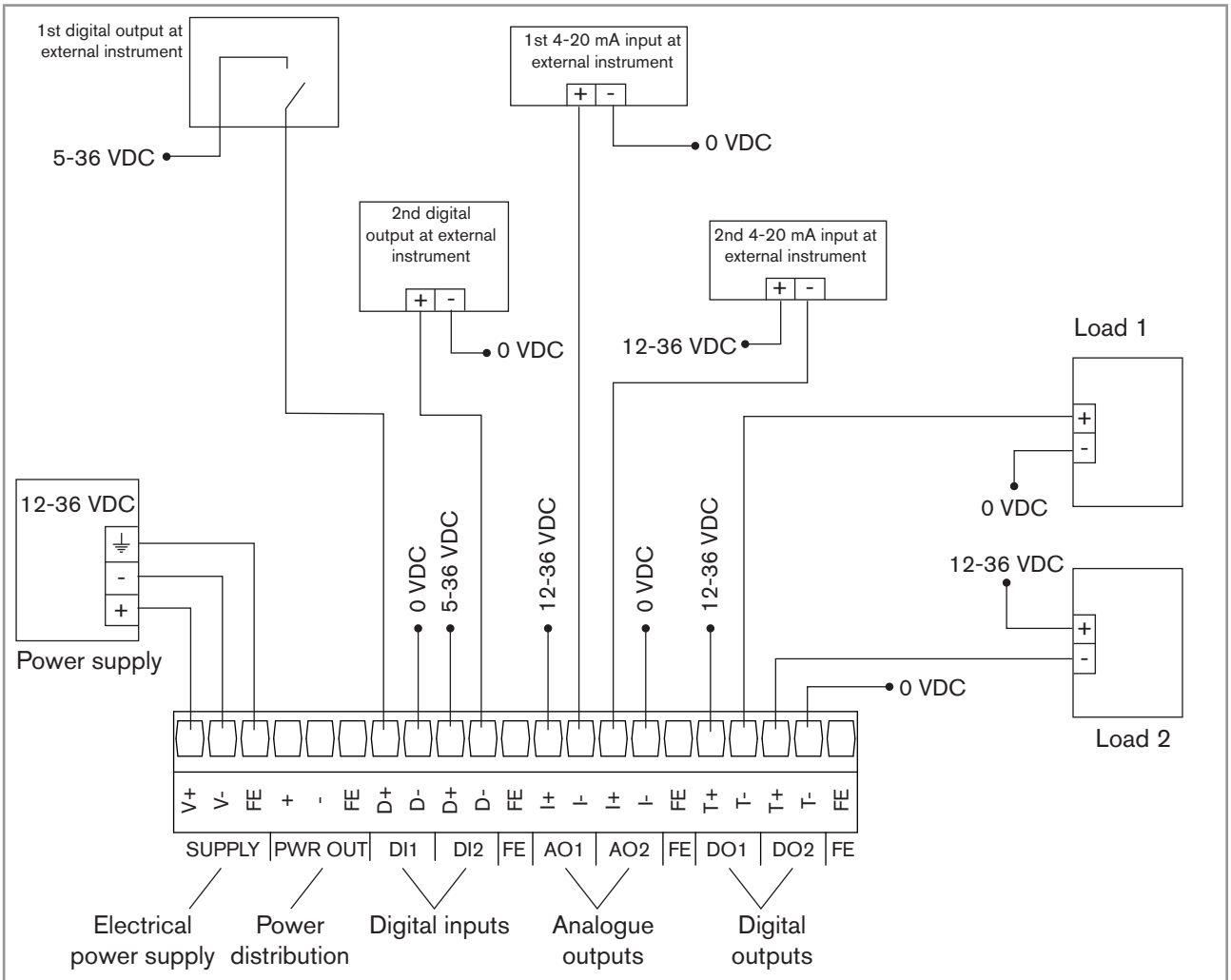
7.3.2. Wiring the M0:MAIN board

The M0:MAIN board is used to connect the multiCELL's electrical power source. It has:

- 2 digital inputs (marked DI1 and DI2), for connecting a flow sensor for example
- Two 4-20 mA analogue outputs (marked AO1 and AO2)
- 2 digital outputs (marked DO1 and DO2)

The inputs and outputs are galvanically insulated and therefore voltage free.

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DI1, DI2, AO1, AO2, DO1 and DO2: designation in the configuration menus of the M0 main board.

FE = functional earth

Figure 6 : Wiring of the "M0:MAIN" board

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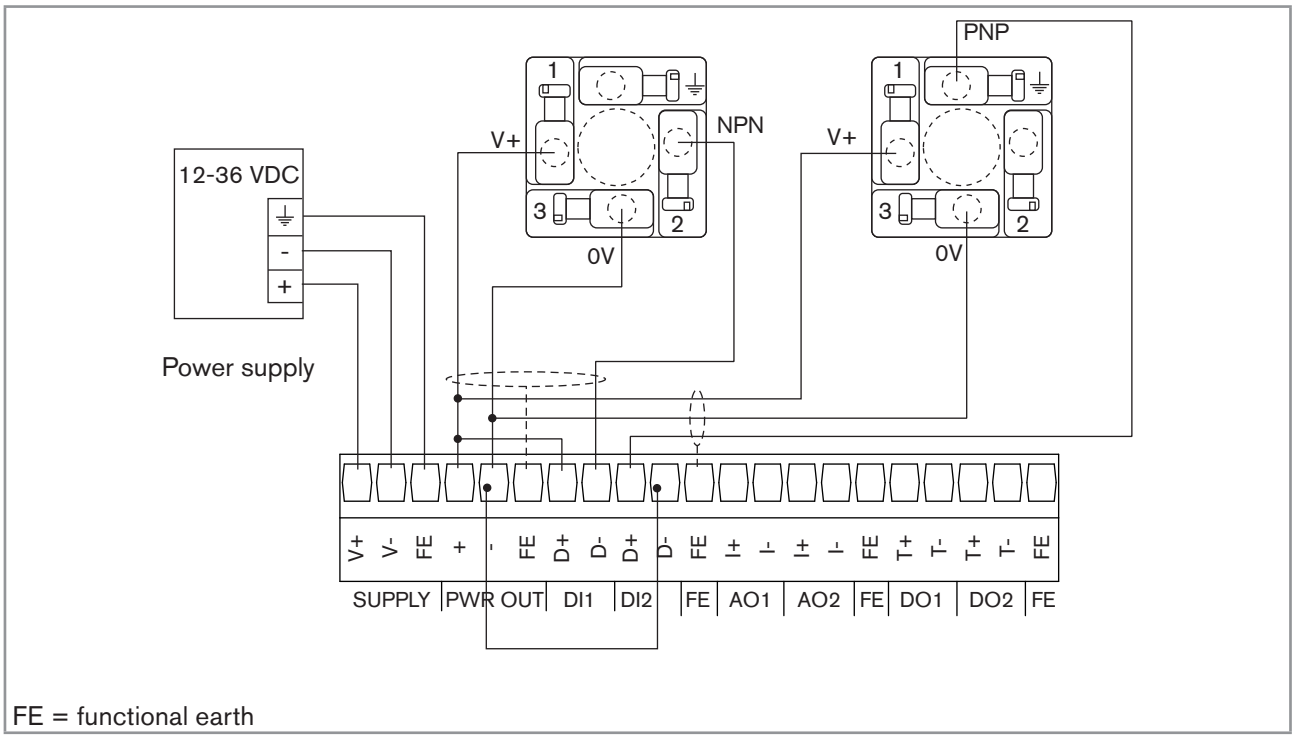


Figure 7 : Connection example for the 8619 with two flow sensors, type 8030

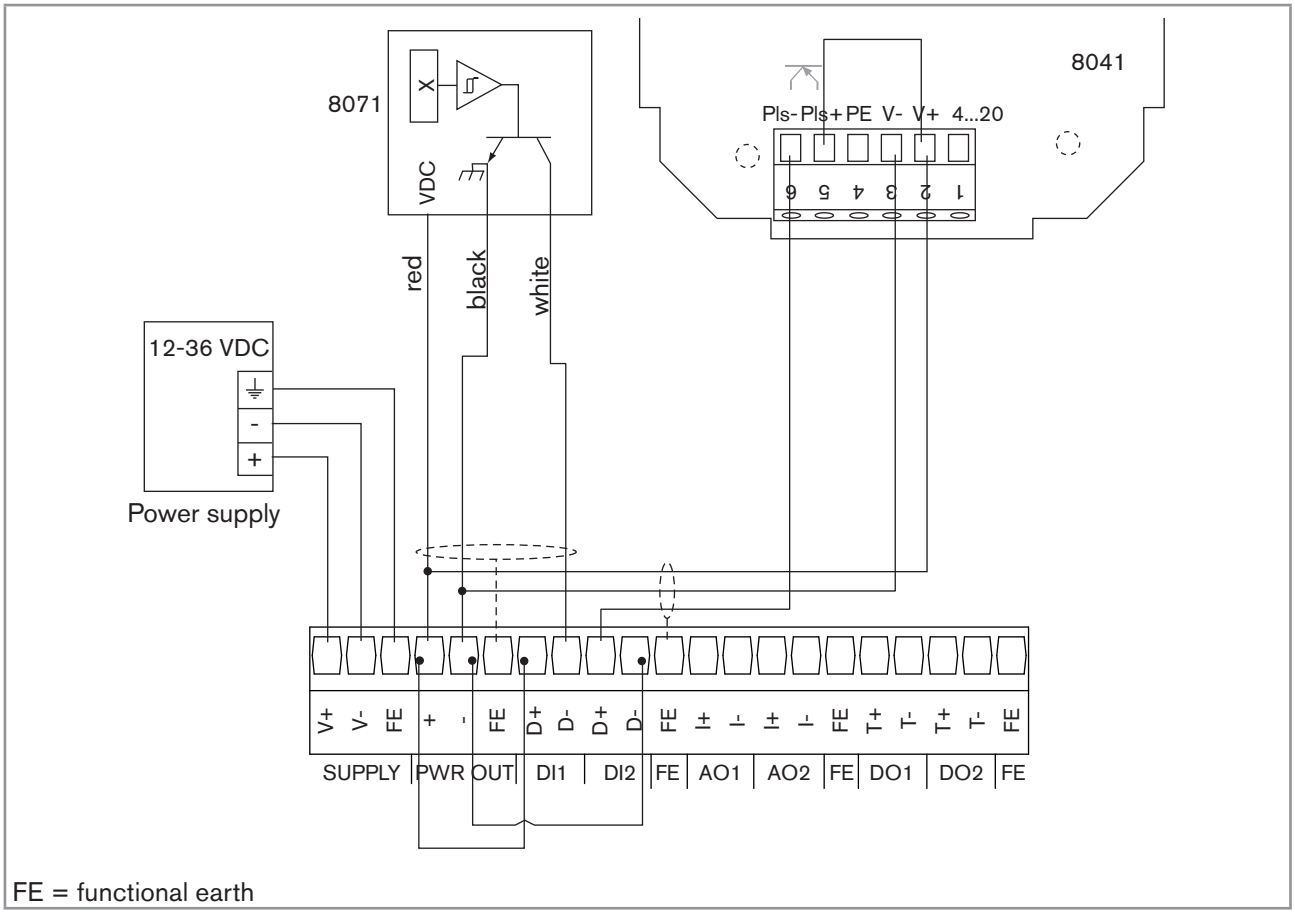


Figure 8 : Connection example for the 8619 with 2 flow sensors, types 8071 and 8041

7.3.3. Wiring the input module "INPUT"

The "INPUT" inputs module has:

- Two analogue inputs;
- Two digital inputs.

The inputs are galvanically insulated, and therefore voltage free.

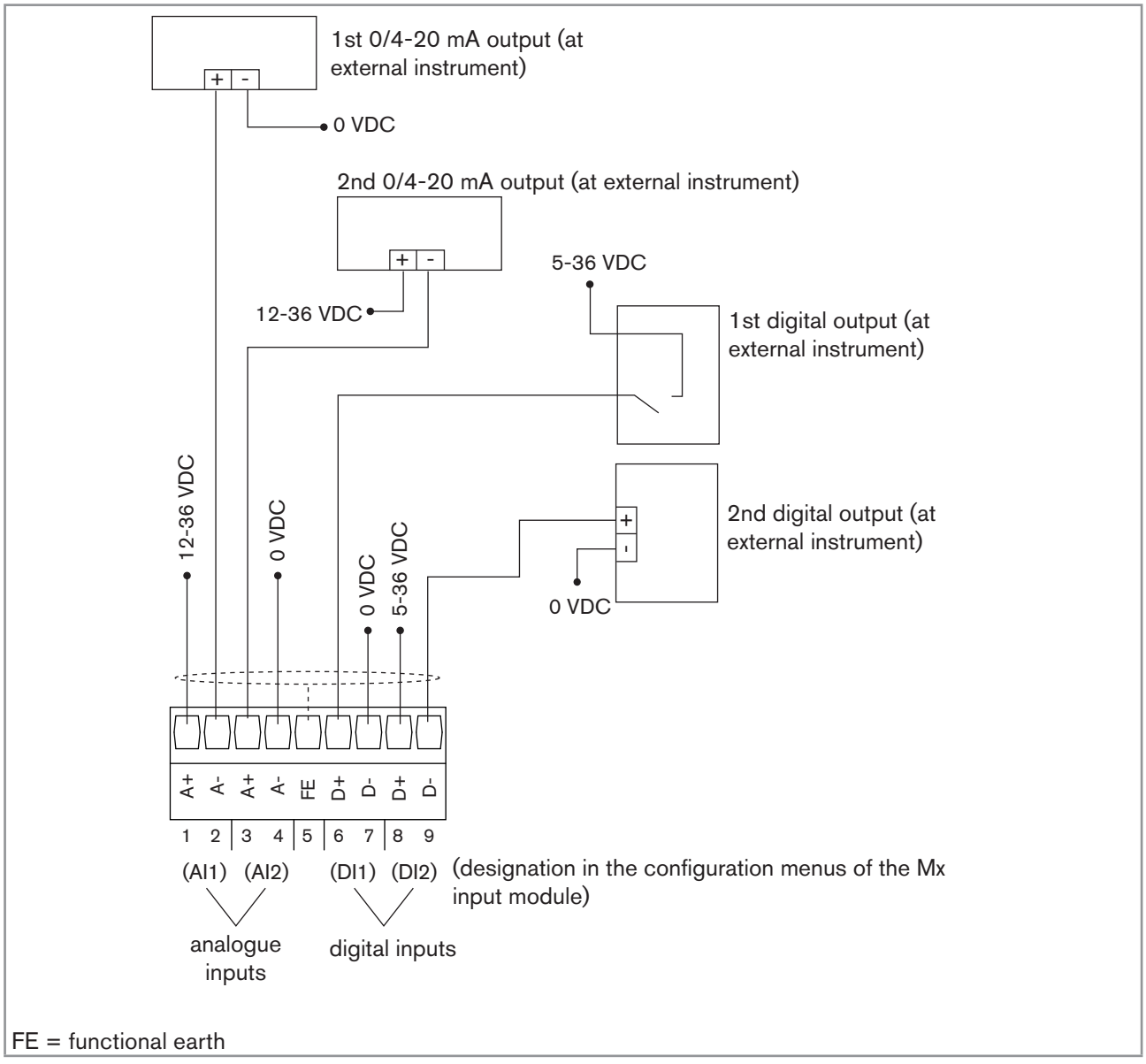


Figure 9 : Connecting the analogue inputs to a 2-wire current transmitter and connecting the digital inputs of the input module

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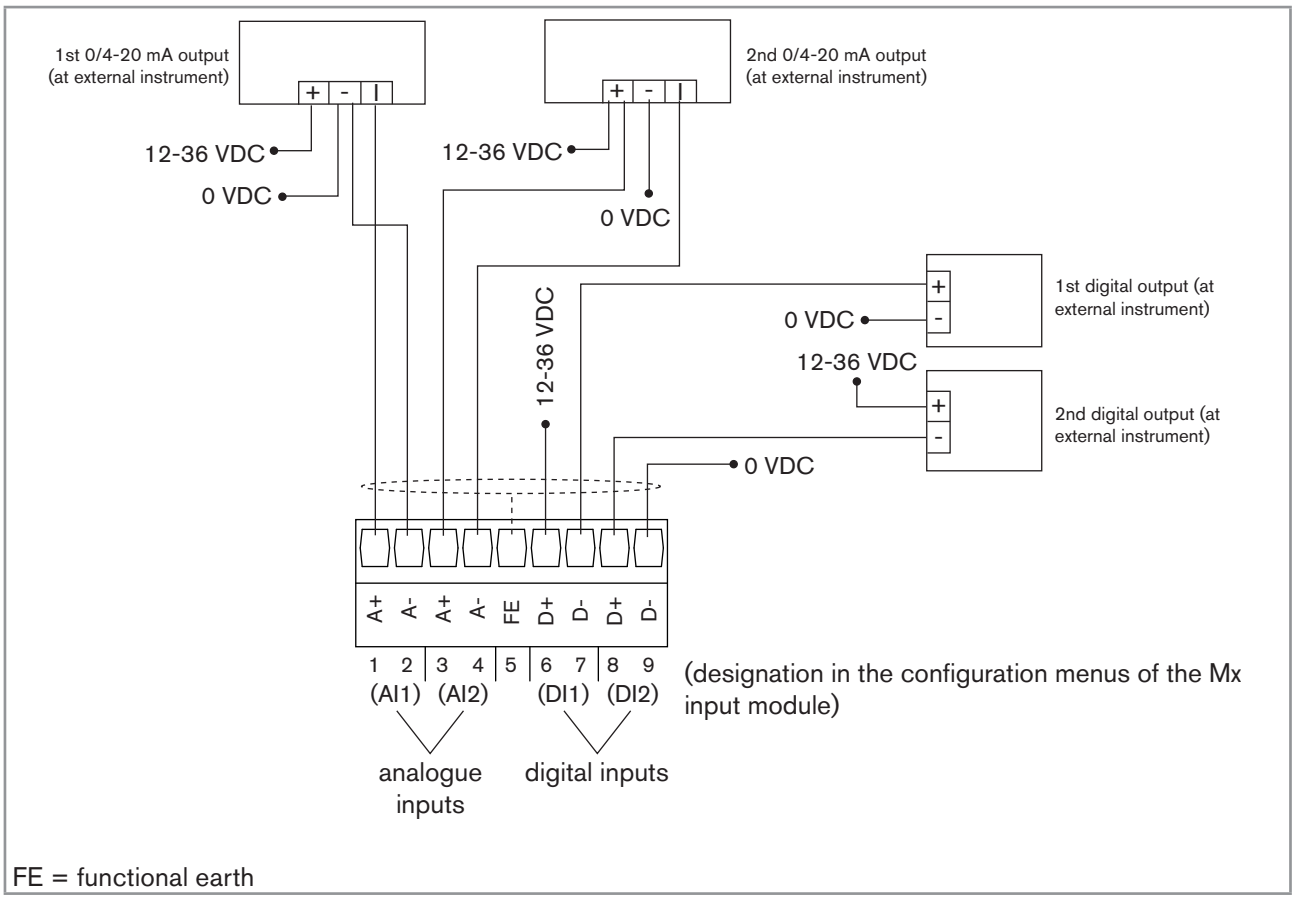


Figure 10 : Connecting the AI1 analogue input in source mode and the analogue input AI2 in sinking mode to a 3-wire current transmitter (for example type 8025 with relay outputs) and connecting the digital inputs of the input module

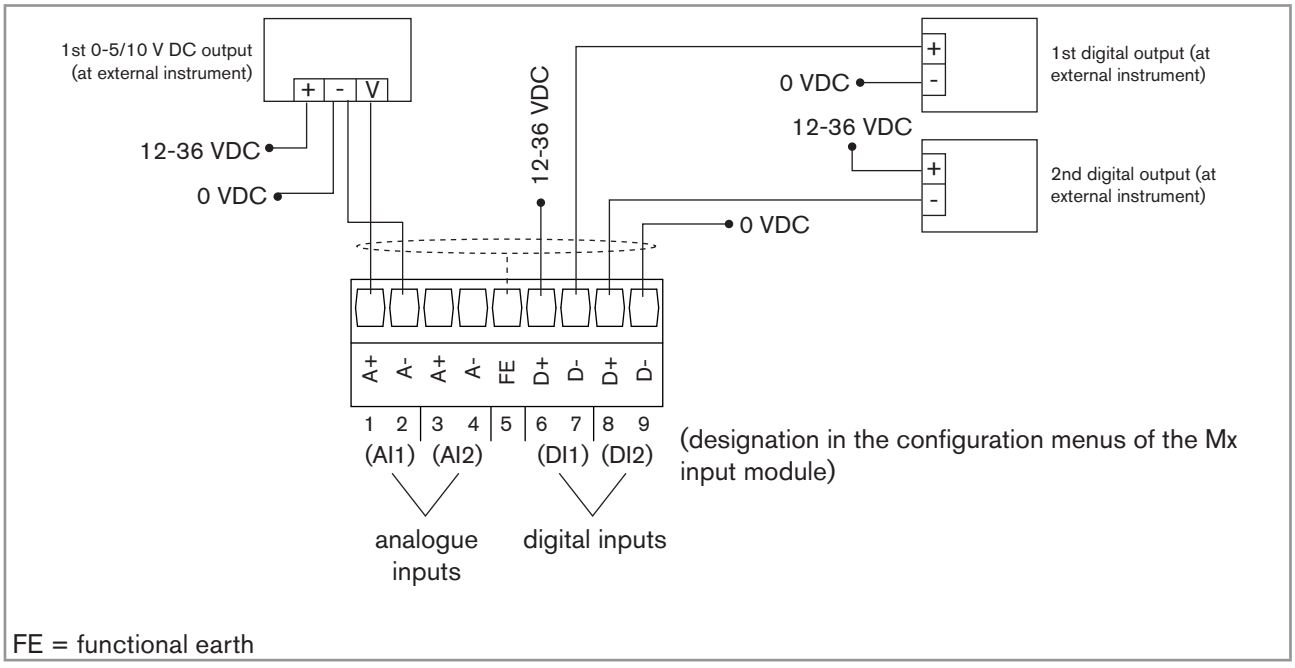


Figure 11 : Connecting the analogue inputs to a voltage transmitter and connecting the digital inputs of the input module

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7.3.4. Wiring the output module "OUT"

The "OUT" outputs module has:

- Two 4-20 mA analogue outputs;
- Two digital outputs.

The outputs are galvanically insulated, and therefore voltage free.

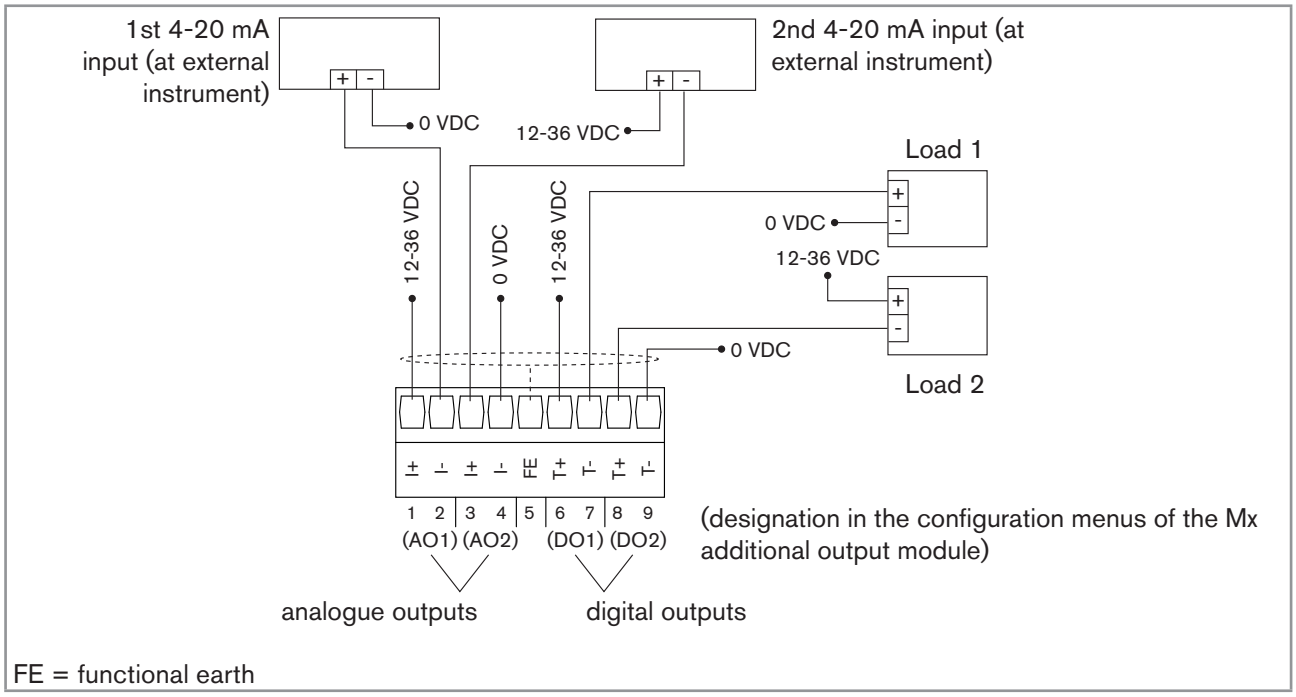
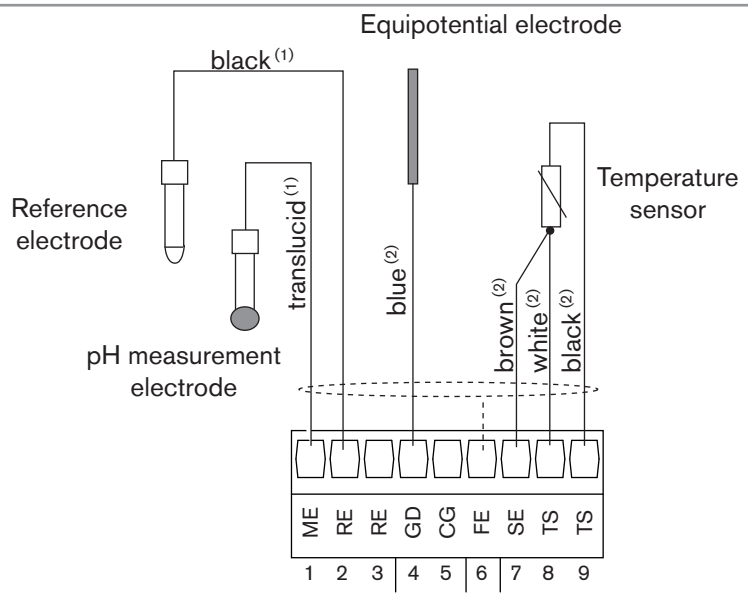


Figure 12 : Wiring the "OUT" output module

7.3.5. Wiring the "pH/ORP" module

- Wire a pH/redox sensor in symmetrical mode to obviate the influence of interference and, in this case, wire the equipotential electrode (compulsory).
- When the pH/redox sensor is wired in asymmetrical mode, measurement of the pH or the oxidation reduction potential may drift over time when the equipotential electrode is not wired.

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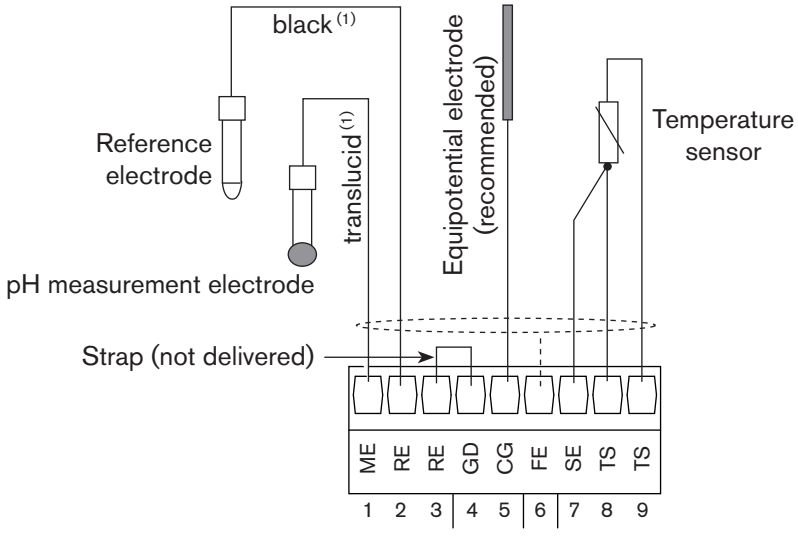


FE = functional earth

(1) Colour of the wires in the Bürkert connection cables with order codes 561904, 561905 or 561906.

(2) Colour of the wires in the Pt1000 sensor with order code 427023 and its Bürkert connection cable with order code 427113.

Figure 13 : Wiring a Bürkert 8200 type sensor and a Pt1000 temperature sensor in symmetrical mode



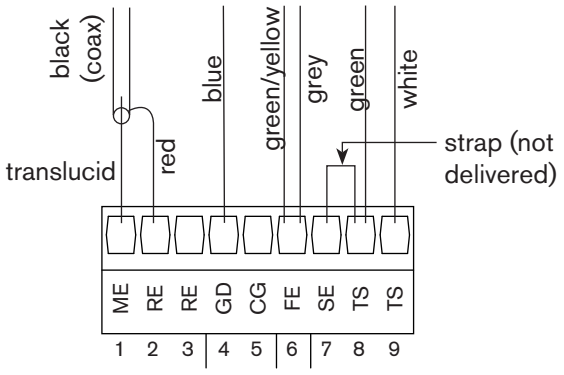
FE = functional earth

(1) Colour of the wires in Bürkert connection cables with order codes 561904, 561905 or 561906.

Figure 14 : Wiring a pH sensor and a Pt100 or Pt1000 temperature sensor in asymmetrical mode to a pH/ORP module

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Wire colour	signal
translucid	pH sensor
red (coax cable shielding)	reference electrode
blue	rhodium electrode
green/yellow	cable shielding
grey	sensor body
green	Pt1000
white	Pt1000



FE = functional earth

Figure 15 : Wiring a Bürkert 8201 type sensor with integrated Pt1000 temperature sensor in symmetrical mode using a Variopin connection cable with order code 554856 or 554857

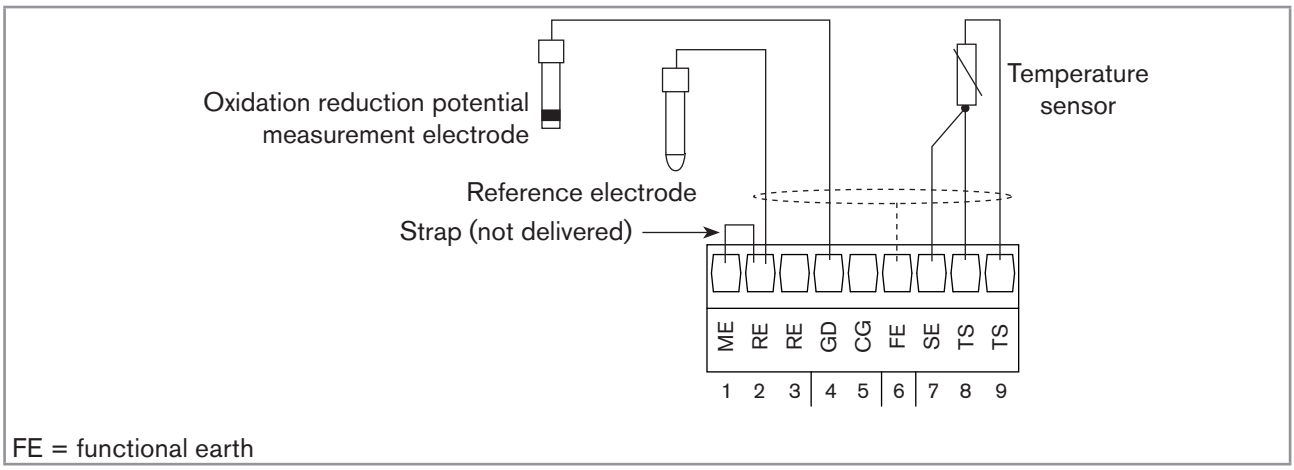


Figure 16 : Wiring an oxidation reduction potential sensor and a Pt100 or Pt1000 temperature sensor in a pH/ORP module

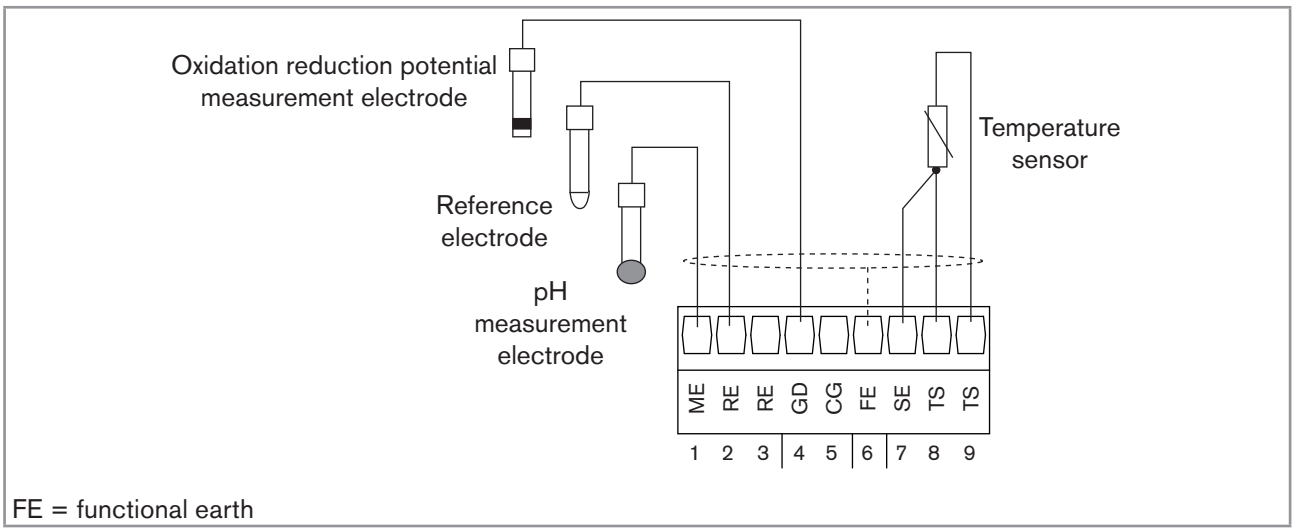
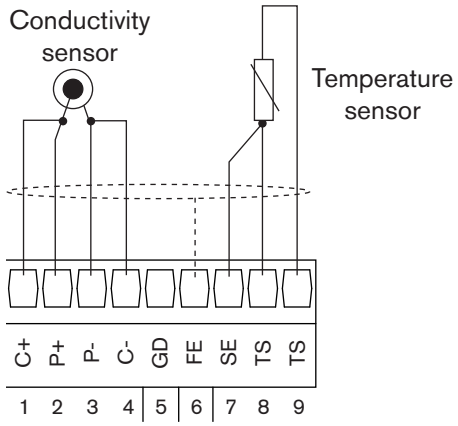


Figure 17 : Wiring a pH sensor, an oxidation reduction potential sensor and a Pt100 or Pt1000 temperature sensor in a pH/ORP module

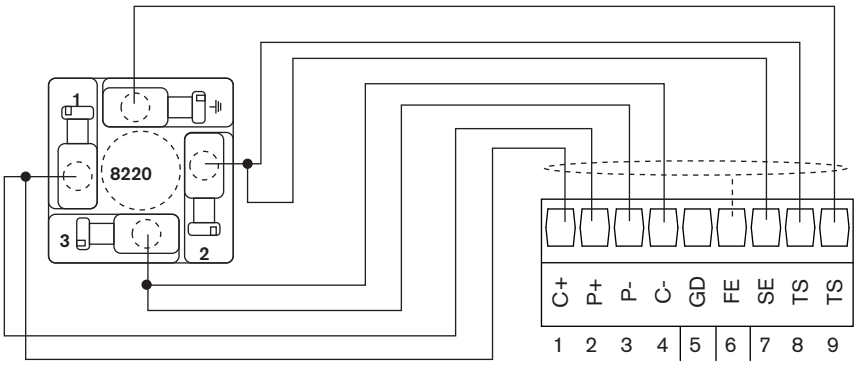
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7.3.6. Wiring the "COND" conductivity module



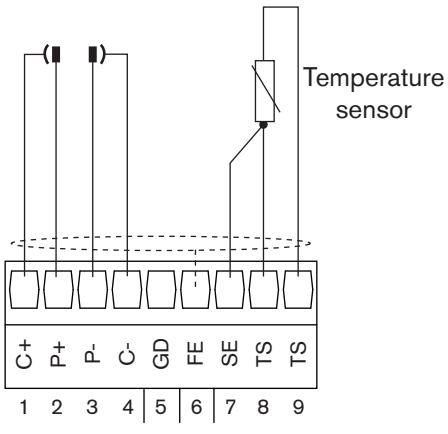
FE = functional earth

Figure 18 : Wiring a resistive conductivity cell with 2 electrodes and a Pt100 or Pt1000 temperature sensor in a conductivity module



FE = functional earth

Figure 19 : Connection example for a 8220 conductivity sensor

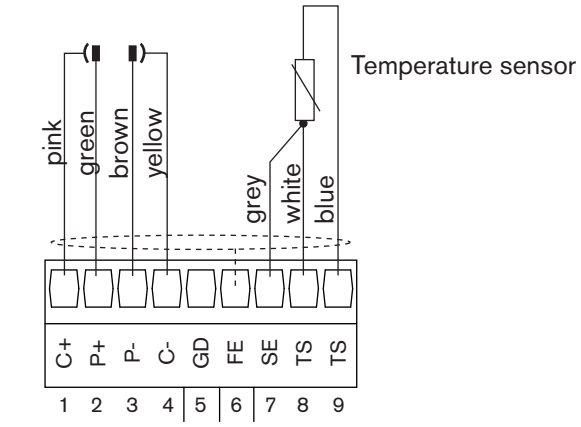


FE = functional earth

Figure 20 : Wiring a resistive conductivity cell with 4 electrodes and a Pt100 or Pt1000 temperature sensor in a conductivity module

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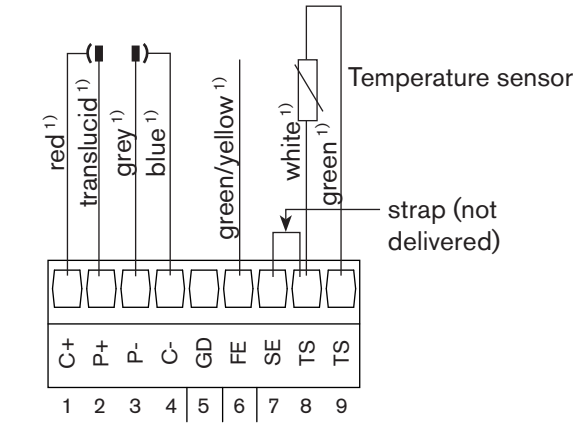
wire colour	signal
pink	current injection +
green	conductivity measurement +
brown	conductivity measurement -
yellow	current injection -
grey	Pt1000
white	Pt1000
blue	Pt1000



FE = functional earth

Figure 21 : Example for the wiring of a conductivity sensor type 8221 with cable gland and connection cable

wire colour	signal
red	current injection +
translucid	conductivity measurement +
grey	conductivity measurement -
blue	current injection -
green/yellow	functional earth
white	Pt1000
green	Pt1000



FE = functional earth

(1) Colour of the wires of the connection cables with order codes 554855, 554856 and 554857.

Figure 22 : Example for the wiring of a conductivity sensor type 8221 with Variopin connector

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8. ADJUSTMENT AND COMMISSIONING

8.1. Safety instructions

WARNING

Risk of injury due to non-conforming adjustment.

Non conforming adjustment could lead to injuries and damage the device and its environment.

- The operators in charge of adjustment must have read and understood the contents of this manual.
- In particular, observe the safety recommendations and intended use.
- The device/installation must only be adjusted by suitably trained staff.

WARNING

Danger due to non-conforming commissioning.

Non-conforming commissioning could lead to injuries and damage the device and its surroundings.

- Before commissioning, make sure that the staff in charge have read and fully understood the contents of the manual.
- In particular, observe the safety recommendations and intended use.
- The device/installation must only be commissioned by suitably trained staff.

Before commissioning, calibrate each measuring sensor connected to the device.

8.2. Switching on the device for the first time

When switching on the device for the first time, the display shows the first view in Process level:

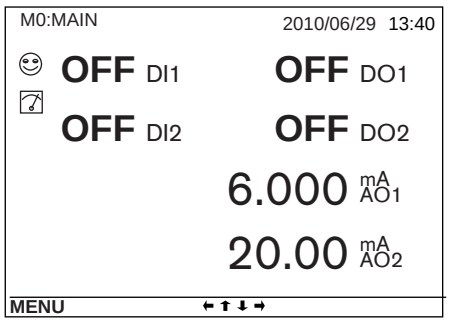


Figure 23 : Display when switching on for the first time

When switched on subsequently, the last active view in the Process leve is displayed. See chap. 8.8 to browse in all views in Process level.

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8.3. Using the navigation button and the dynamic keys

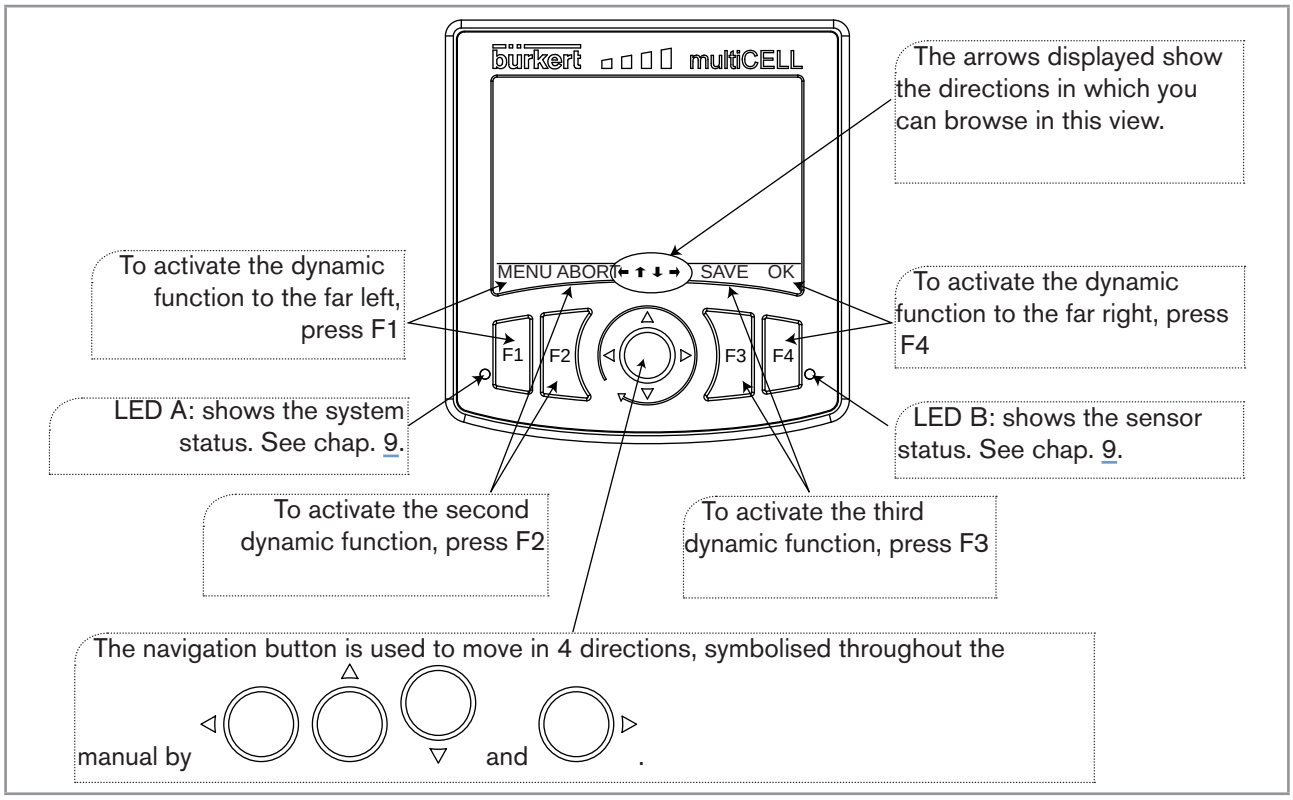
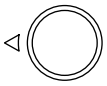
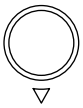
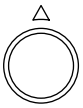
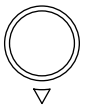
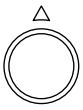
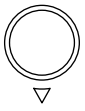
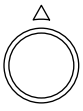
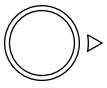
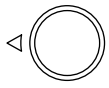
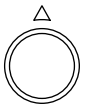
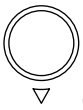
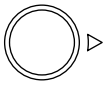
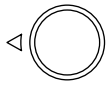
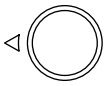
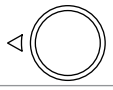


Figure 24 : Using the navigation button and the dynamic keys

You want to...	Press...
....access the Configuration level	Dynamic function, "MENU", from any view in Process level
...go back to Process level	Dynamic function, "MEAS"
...access the menu displayed	Dynamic function, "OK"
...access the highlighted function	Dynamic function, "OK"
...confirm the enter	Dynamic function, "OK"
...save modifications	Dynamic function "SAVE"
...go back to the parent menu	Dynamic function "BACK"
...cancel the current operation	Dynamic function "ABORT"
...set a setpoint value	Dynamic function "SETP"
...activate manual mode in a configured and activated function	Dynamic function "MANU"
...manually set the percentage of the function	Dynamic function "CMD"
...force the result of a function to 0%	Dynamic function "0%"
...force the result of a function to 100%	Dynamic function "100%"
...activate automatic mode in a configured and activated function	Dynamic function "AUTO"
...start teach-in	Dynamic function "START"
...end teach-in	Dynamic function "END"
...answer the question asked in the affirmative	Dynamic function "YES"
...answer the question asked in the negative	Dynamic function "NO"
...select the highlighted character or mode	Dynamic function "SEL"

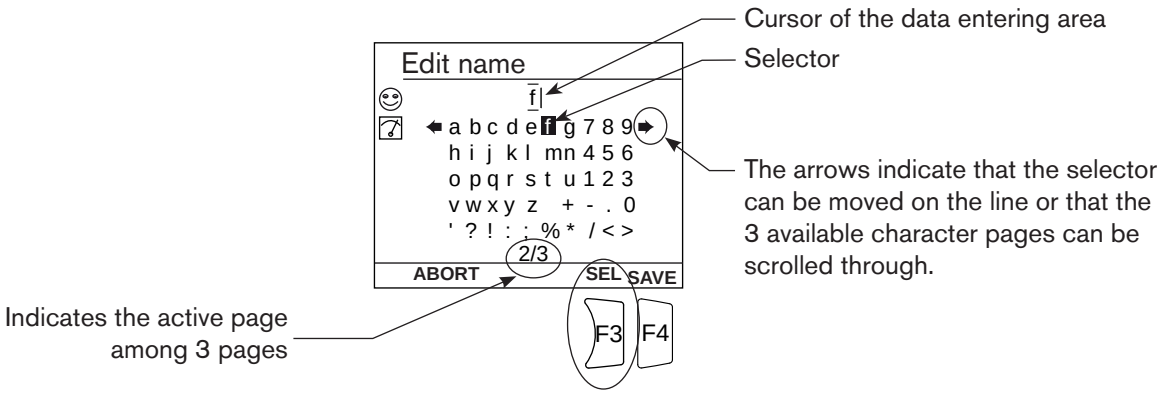
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You want to...	Press...			
...browse in Process level	 next view	 previous view	 next level	 previous level
...browse in the Configuration level menus	 display the next menu		 display the previous menu	
...browse in the menu functions	 highlight the next function		 highlight the previous function	
...set the contrast or brightness percentage for the display (after accessing the function in the "Parameters" menu)	 increase the percentage		 reduce the percentage	
...modify a numerical value or the units	 increment the figure selected or modify the units		 decrement the figure selected or modify the units	
	 select the next figure		 select the previous figure	
...allocate the "+" or "-" sign to a numerical value	 to the extreme left of the numerical value then  until the desired sign is displayed			
...move the decimal point in a numerical value	 to the extreme right of the numerical value then  until the decimal point is in the desired place			

8.4. Entering some text

This chap. describes how to use the keyboard displayed to modify the name of a process variable (13 characters max.), a function (12 characters max.) or the title of a view (12 characters max.).

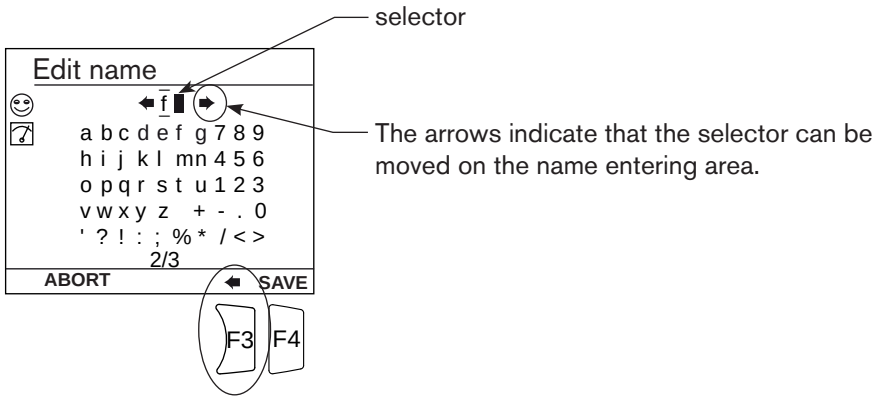
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→ To move the cursor in the data entering area using keys ◁ and ▷, first move the selector into the data entering area using the keys ▽ and △.

→ To insert a character in place of the cursor, move the selector over this character and press key F3 (function "SEL").

→ To remove the character before the cursor, move the selector into the data entering area then press key F3 (function "backspace"):



To retrieve the original name of a variable, even after modification and saving:

→ move the selector into the customized name entering area.

→ delete all the characters.

→ save.

8.5. Entering a numerical value

- Access, for example, the manual calibration function for a conductivity sensor. Refer to chap. 8.9 to access "Calibration" menu.

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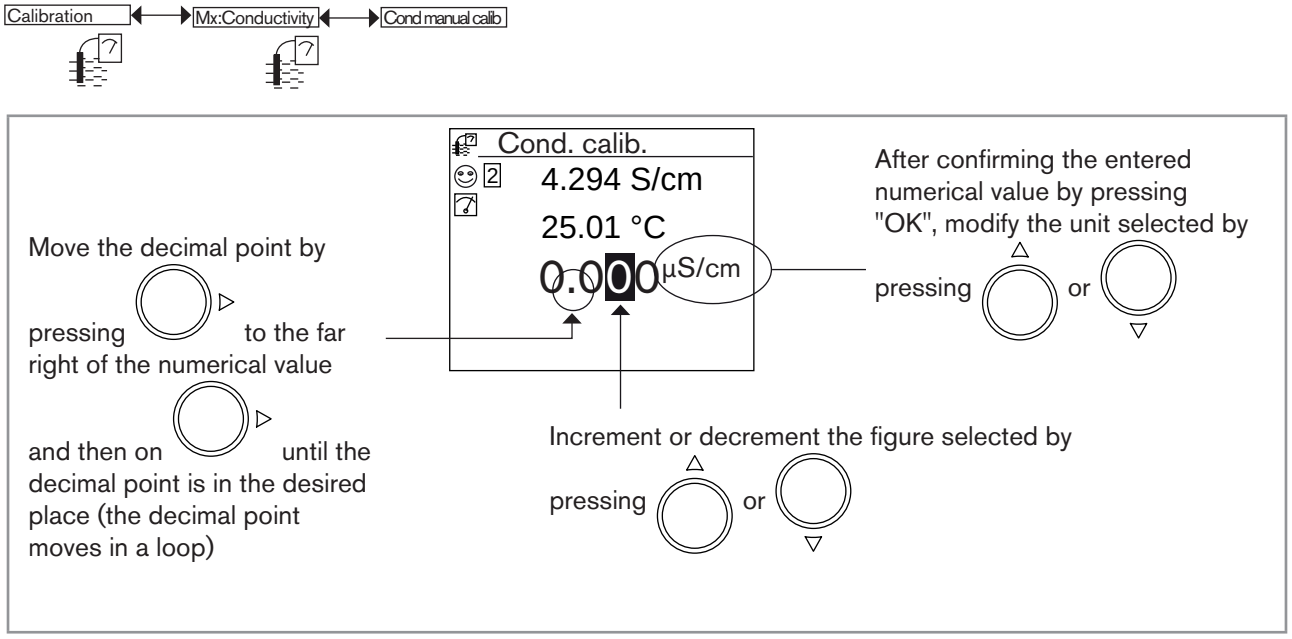
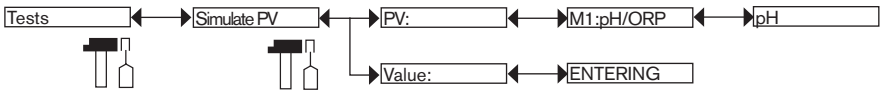


Figure 25 : Example of a numerical value entering

- Access, for example, the pH value simulation function. Refer to chap. 8.9 to access "Tests" menu.



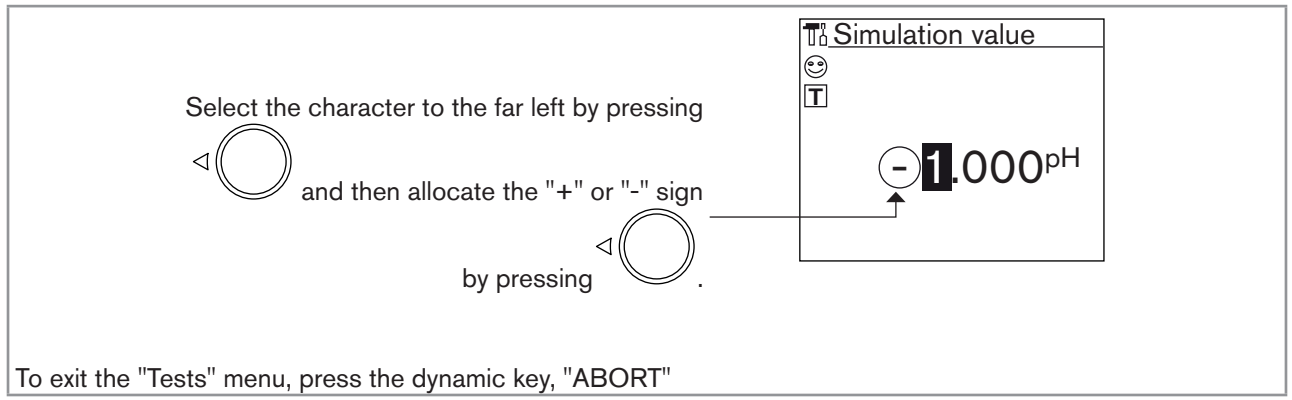


Figure 26 : Changing the sign of a numerical value

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8.6. Description of the icons

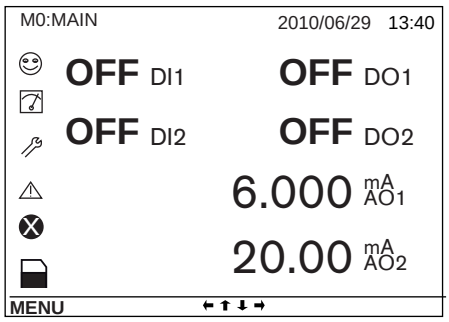


Figure 27 : Position of the icons

Icon	Meaning and alternatives
☺	Default icon when process monitoring is not activated via the "Diagnostics" menu; if monitoring is activated, this icon indicates that the parameters monitored are not out of range. If at least one monitoring is activated, the alternative icons in this position are: ▪ ☺, combined with ⚠ : see chap. 8.12.2 to 8.12.6 ▪ ☹, combined with ⊗ : see chap. 8.12.2 to 8.12.6
	Device currently measuring. The alternative icons in this position are: ▪ H flashing: HOLD mode activated (see chap. 8.11.1) ▪ T flashing: running check that an output is working and behaving correctly (see chap. 8.13.2 to 8.13.3)
	"Maintenance" event; see chap. 8.11.8 and 8.11.9.
⚠	"Warning" event; see chap. 8.11.8, 8.11.9. and 8.12.2 to 8.12.6
⊗	Error" event; see chap. 8.11.8, 8.11.9. and 8.12.2 to 8.12.6
	Memory card inserted and datalogger activated. The alternative to this position is the icon ☒ indicating an error. Go to the menu "Information -> System log", to read the associated error message and go to chap. 9.3.8 to read the meaning of the message.

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8.7. Operating levels

The device has 2 operating levels:

Process level

See chap. 8.8 for the description of Process level.

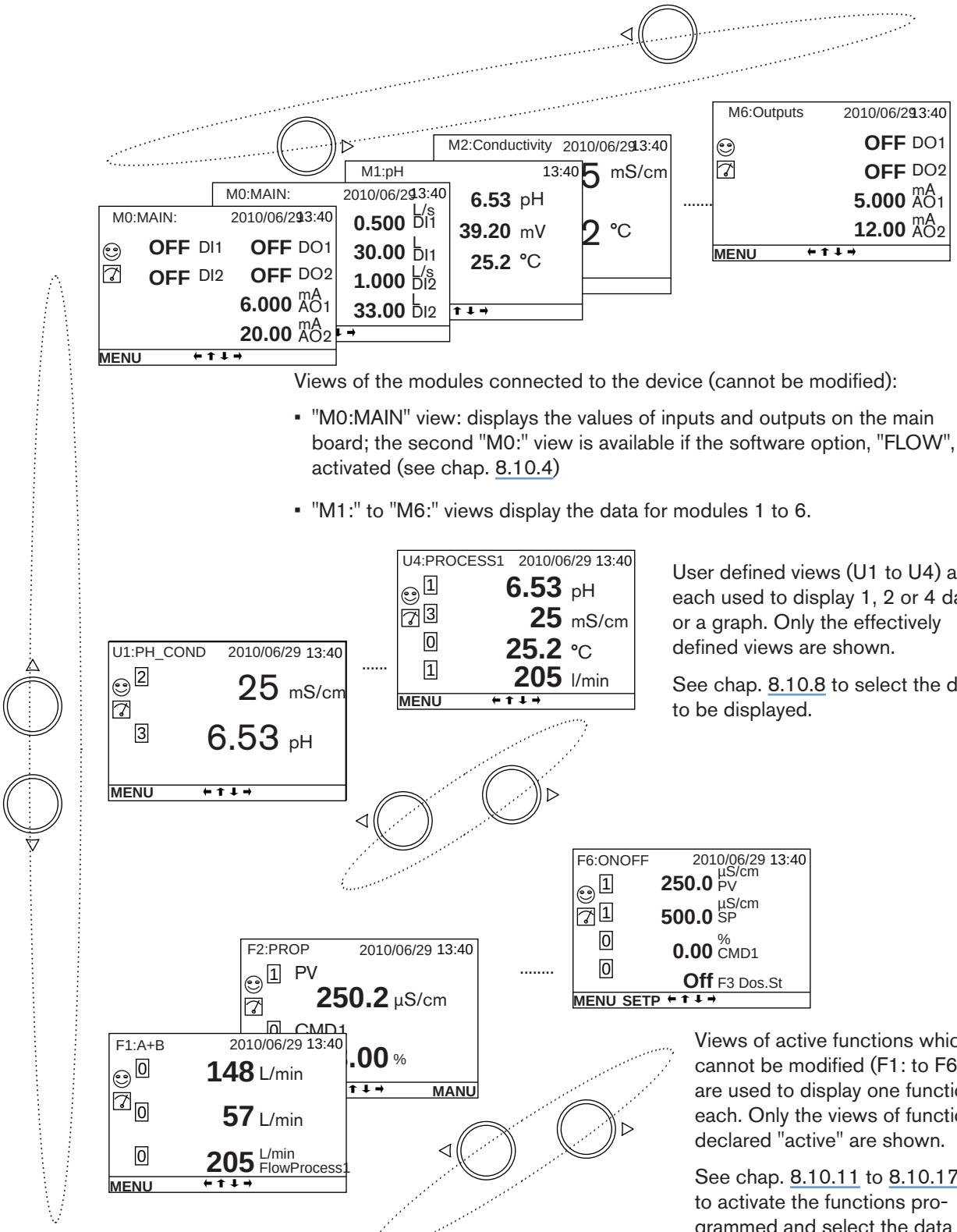
Configuration level

This level comprises 5 menus:

Menu title	Relevant icon
"Parameters": see chap. 8.10	
"Calibration": see chap. 8.11	
"Diagnostics": see chap. 8.12	
"Tests": see chap. 8.13	
"Information": see chap. 8.14	

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8.8. Process level



Views of the modules connected to the device (cannot be modified):

- "M0:MAIN" view: displays the values of inputs and outputs on the main board; the second "M0:" view is available if the software option, "FLOW", is activated (see chap. 8.10.4)
- "M1:" to "M6:" views display the data for modules 1 to 6.

User defined views (U1 to U4) are each used to display 1, 2 or 4 data or a graph. Only the effectively defined views are shown.

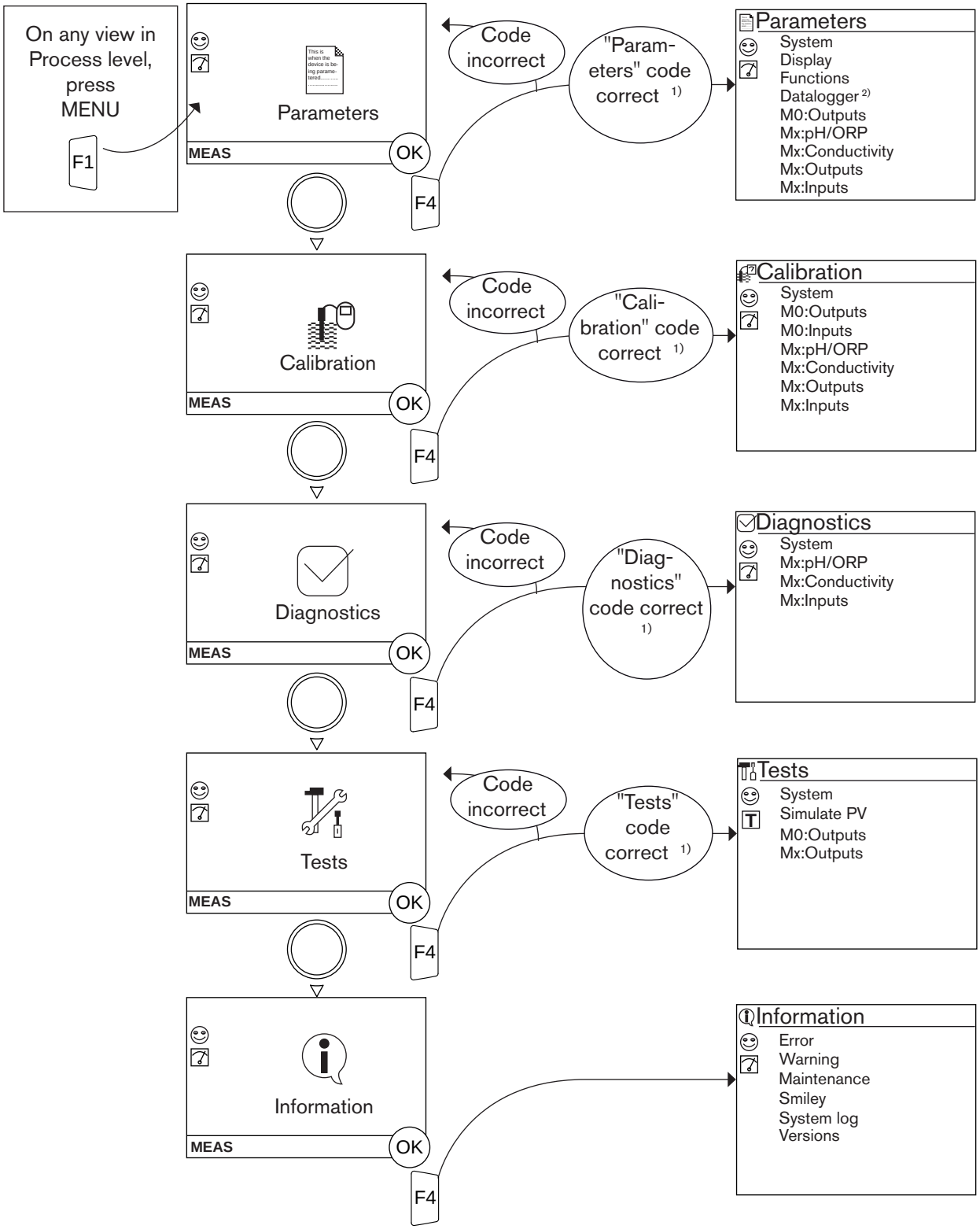
See chap. 8.10.8 to select the data to be displayed.

Views of active functions which cannot be modified (F1: to F6:) are used to display one function each. Only the views of functions declared "active" are shown.

See chap. 8.10.11 to 8.10.17 to activate the functions programmed and select the data to be displayed.

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8.9. Configuration level access



1) The code is not requested if the default code "0000" is used.

2) This menu is available as an option (see chap. 8.10.4).

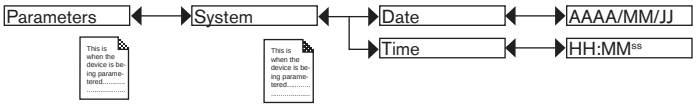
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→ See chap. 8.15 for details of the functions per menu

8.10. Parameters menu

8.10.1. Setting the multiCELL date and time

Refer to chap. 8.9 to access Parameters menu.

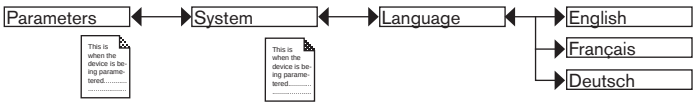


DATE: Set the date

TIME: Set the time

8.10.2. Selecting the display language

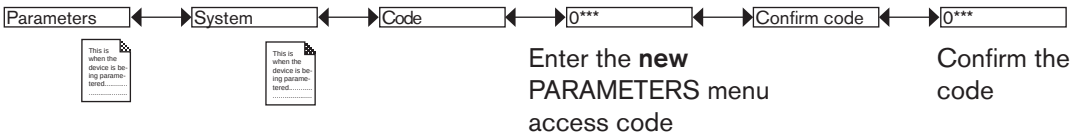
Refer to chap. 8.9 to access Parameters menu.



The messages are displayed in the new language as soon as the choice has been saved.

8.10.3. Modifying the PARAMETERS menu access code

Refer to chap. 8.9 to access Parameters menu.



If the default access code "0000" is kept, the device does not request it to access the "Parameters" menu.

8.10.4. Consulting and/or activating the available software options

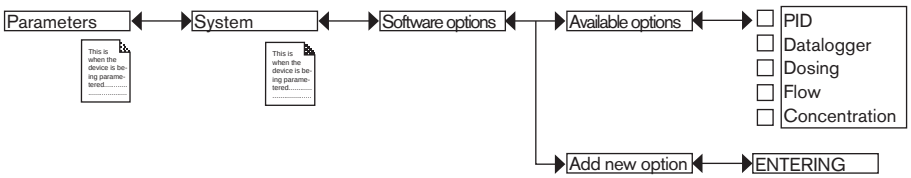
This menu is used:

- to consult the list of software options available
- to activate the options by entering a code. The activation code is obtained on order from your Bürkert dealer: provide him with the order code of the desired option and the order code and serial number of your device which you will find in the menu "Information" -> "Versions" -> "M0:MAIN" -> "Product ID" and "ProductSN".

The "Dosing" option also activates the "Flow" option if it does not exist by default in the device.

Refer to chap. 8.9 to access Parameters menu.

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When an option is ticked, it is activated in the device.

AVAILABLE OPTIONS : Read the options available, whether or not activated on the device:

- *PID*: enables configuring of a PID function on the device; See chap. 8.10.14.
- *DATALOGGER*: enables the saving of data; See chap. 8.10.18.
- *DOSING*: enables configuring of the "Time dosing" and "Volume dosing" functions; See chap. 8.10.15 and 8.10.16. This option automatically activates the "FLOW" option below.
- *FLOW*: the "Flow" and "Totalizer" process inputs are available in the "PV" list on both the "M0:MAIN" board and the input module "Mx:Inputs" (see chap. 8.16).
- *CONCENTRATION*: the concentration tables for a number of solutions are available in the "Parameters" menu -> "Mx:Conductivity" -> "Concentration" (see chap. 8.10.24)

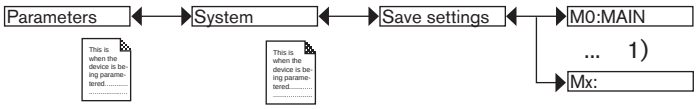
ADD NEW OPTION : enter the activation code for an option.

8.10.5. Saving the data on the memory card

This function is used to save the user parameters ("Parameters" menu) on the memory card in the M0:MAIN board or on each module fitted.

- Insert a memory card in the device.
- Data can only be saved if the "datalogger" function is deactivated. See chap. 8.10.4 and 8.10.18
- The software options activated on the device (see previous chap.) cannot be transferred.

Refer to chap. 8.9 to access Parameters menu.



1) The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16.

If an error message is displayed, refer to chap. 9.3.6.

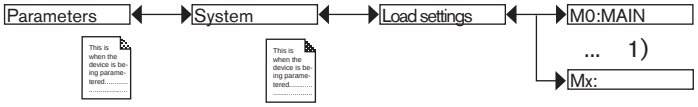
8.10.6. Loading data from the memory card

This function is used to load data from the memory card, initially saved on it.

The device receiving the data must be identical to the one from which these data originate.

- Check that both devices have the same order code and the same activated software options.

Refer to chap. 8.9 to access Parameters menu.



1) The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16..

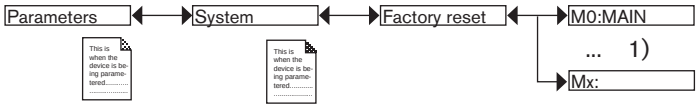
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If an error message is displayed, refer to chap. 9.3.7.

8.10.7. Restoring the default parameters of the Process level and the outputs

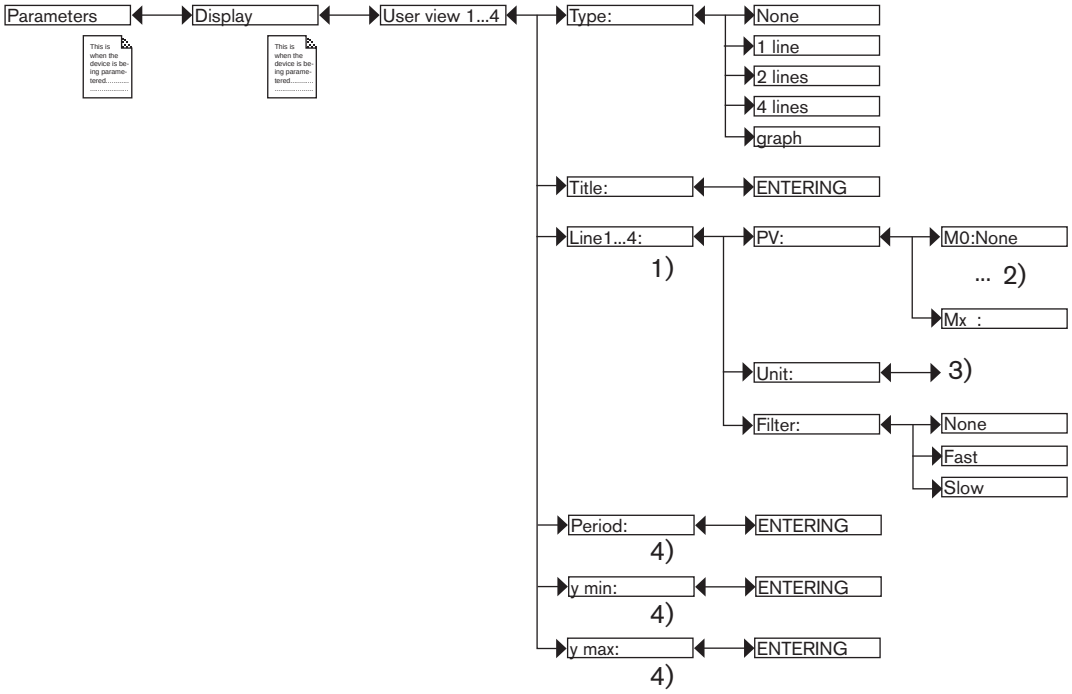
This function is used to restore (dynamic key "Yes") the default parameters of the Process level and outputs or keep (dynamic key "No") the current parameters.

Refer to chap. 8.9 to access Parameters menu.



8.10.8. Customising the "User views 1 to 4"

Refer to chap. 8.9 to access Parameters menu.



1) If "Type" = 1, 2 or 4 "lines"

2) The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16..

3) The choices offered depend on the choice made in "PV" above

4) If "Type" = "graph"

TYPE: Choosing to display 1, 2 or 4 values (on 1, 2 or 4 lines) or a graph in the customised "Ux" view selected.

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TITLE: Entering the name displayed in the corresponding "Ux" view. See chap. 8.4.

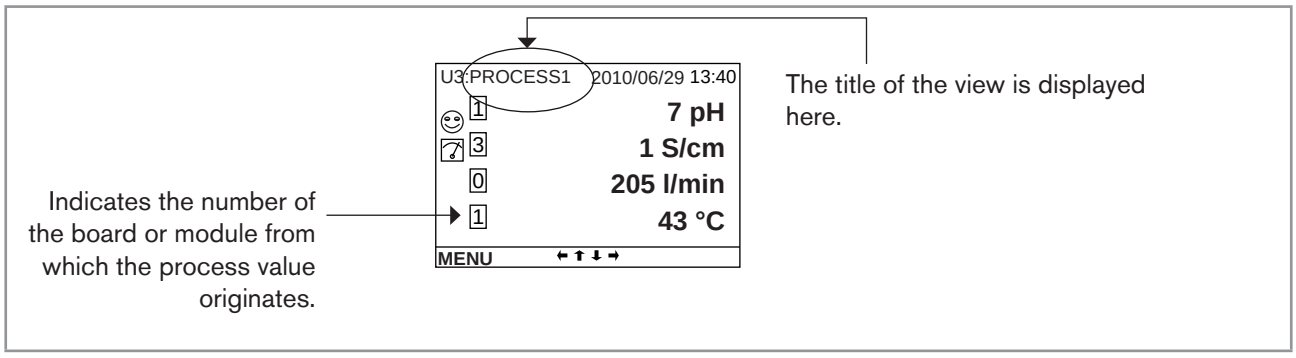


Figure 28 : Example of a title for a customised view

LINE1 to LINE4: Setting the parameters for the values (1, 2 or 4) displayed in a customised "Ux" view:

- *PV*: Select the digital input, the analogue output or the physical parameter to be displayed on the line selected in this customised view. The options available depend on the modules fitted.

  One of the "PVs" in the conductivity module, available for the customised "Ux" views, is "USP" (see chap. 8.10.24).

- *UNIT*: Select the unit in which the digital input, the analogue output or the physical parameter selected is displayed on the PV function above.
- *FILTER*: Select the level of damping for the measurement signal on the digital input, the analogue output or the physical parameter displayed on the line selected. Three levels of damping are proposed: "slow" (slow filtering has a high damping effect), "fast" or "none"

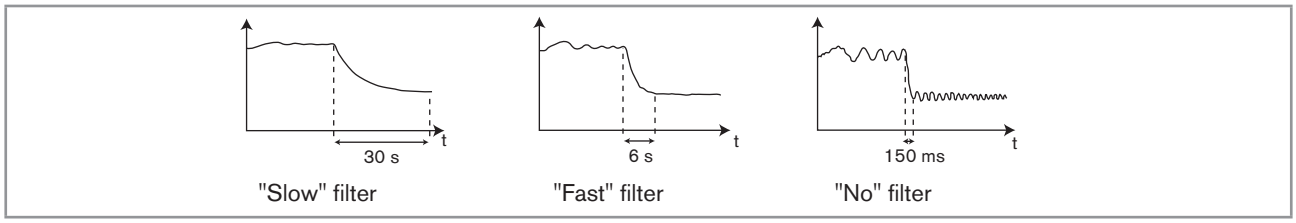


Figure 29 : Types of filters and associated damping effects

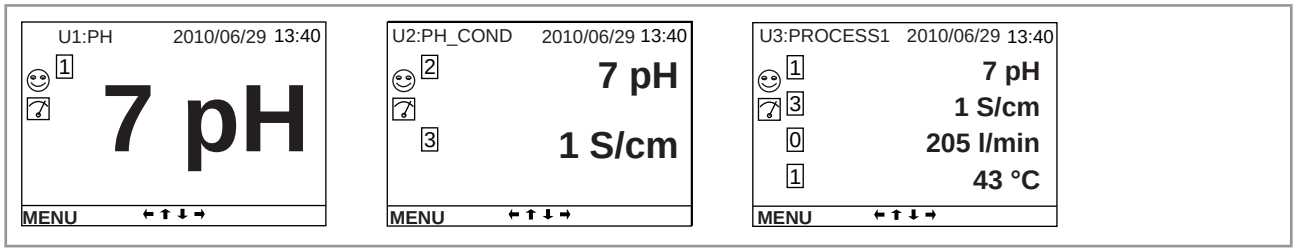


Figure 30 : Examples of customised views with 1, 2 and 4 lines

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LINE: Set the parameters for the graph displayed in a customised "Ux" view:

- *PERIOD*: Enter the graph refresh period in seconds.
- *Y MIN*: Enter the minimum value on the vertical axis for the PV selected.
- *Y MAX*: Enter the maximum value on the vertical axis for the PV selected.

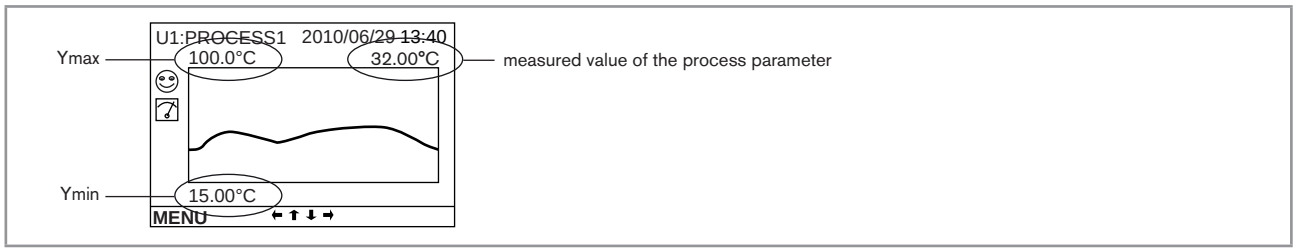


Figure 31 : Example of a customised view of a graph

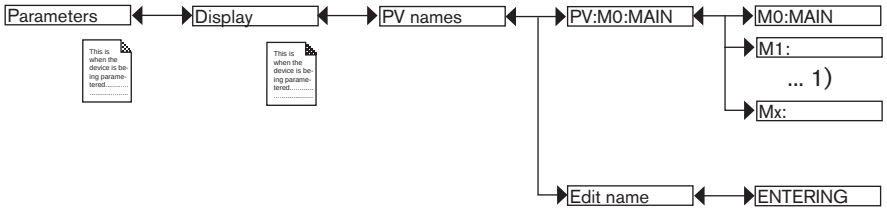
8.10.9. Renaming a process variable

To retrieve the original name of a variable, even after modification and saving:

→ move the selector into the customized name entering area.

→ delete all the characters and save.

Refer to chap. 8.9 to access Parameters menu.



[1] *The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16.*

The entered name appears in the view in Process level. See chap. 8.4.

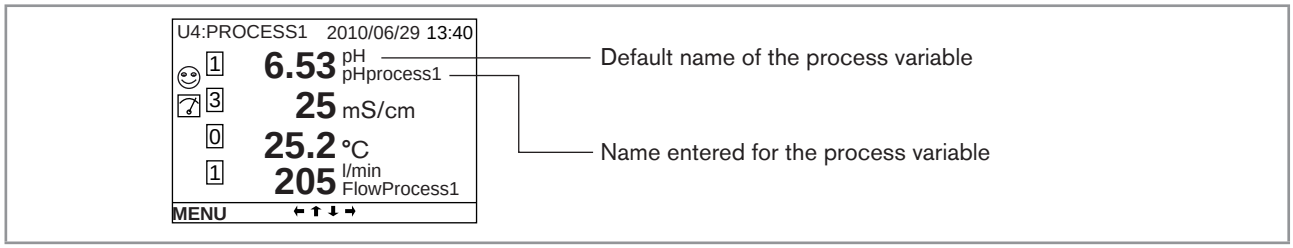
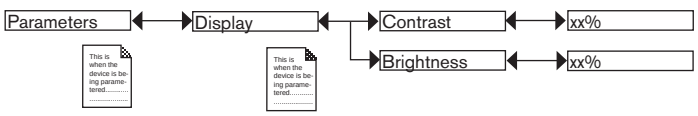


Figure 32 : Example of a renamed process variable

8.10.10. Setting the display contrast and brightness

Refer to chap. 8.9 to access Parameters menu.



→ Set each percentage using and .

CONTRAST: Choose the display contrast level (as a %).

BRIGHTNESS: Choose the light intensity of the display (as a %).

8.10.11. Configuring an arithmetic function

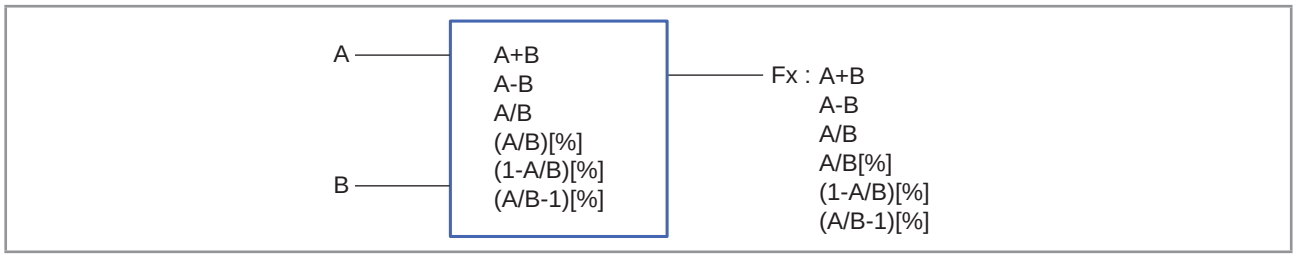


Figure 33 : Arithmetic functions

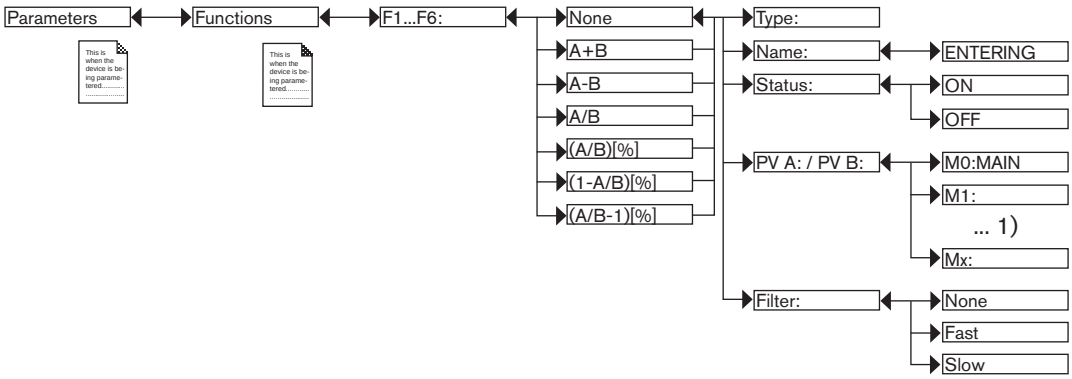
The functional block is used to calculate the image using one of the arithmetic functions available for 2 variables, A and B, selected from the process variables available. Variables A and B must be of a kind and in identical units. Moreover, A and/or B may be the result of a function already used:

Function	Calculation made
A+B	Sum of 2 variables, A and B
A-B	Subtraction between the 2 variables, A and B
A/B	Ratio between the 2 variables, A and B
A/B[%]	Passage rate
(1 - A/B)[%]	Rejection rate
(A/B - 1)[%]	Deviation rate

Once the function has been configured and activated, the result "Fx:" calculated is available in the list of process variables on the "M0:MAIN" board. This list appears in the output configuring, user view configuring and datalogging menus to:

- Assign the result "Fx:" calculated to a physical output (analogue, AO, or digital, DO) (see chap. 8.10.22 and 8.10.22).
- Display the result "Fx:" on one of the user defined "Ux" views: see chap. 8.10.8.
- Logging the values of "Fx:" using the datalogger: see chap. 8.10.18.

Refer to chap. 8.9 to access Parameters menu.



[1] *The choices offered depend on the modules fitted and/or the options activated. SSee chap. 8.10.4 and chap. 8.16.*

TYPE: Indicates the function chosen.

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NAME: Rename the function chosen. See chap. 8.4. This name appears in the view associated with this function in Process level.

STATUS: Used to activate (choose "ON") or deactivate (choose "OFF") the view of the function selected in Process level.

PV A (or PV B): Combine a physical parameter (or the result of one of the functions, F1 to F6, already used) with variable A (or B). Variables A and B must be of the same value type and have the same unit.

FILTER: Choose the level of damping of the input variables. See Figure 29.

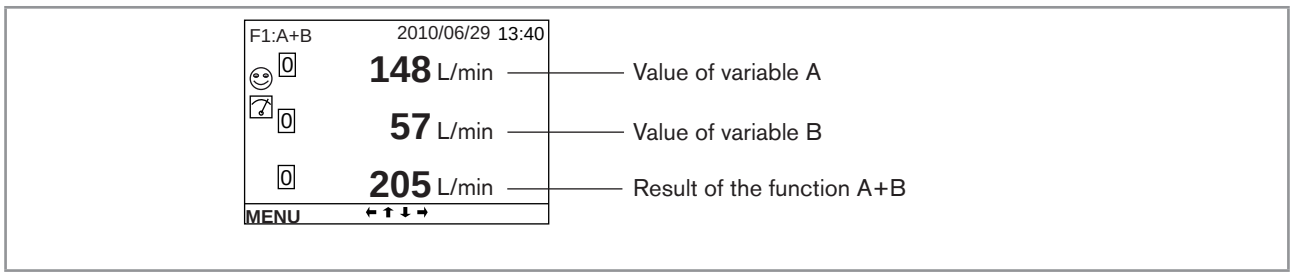


Figure 34 : Example of a view of an active arithmetic function in Process level

8.10.12. Configuring a "PROP" proportional function

Configuring a "PROP" proportional function

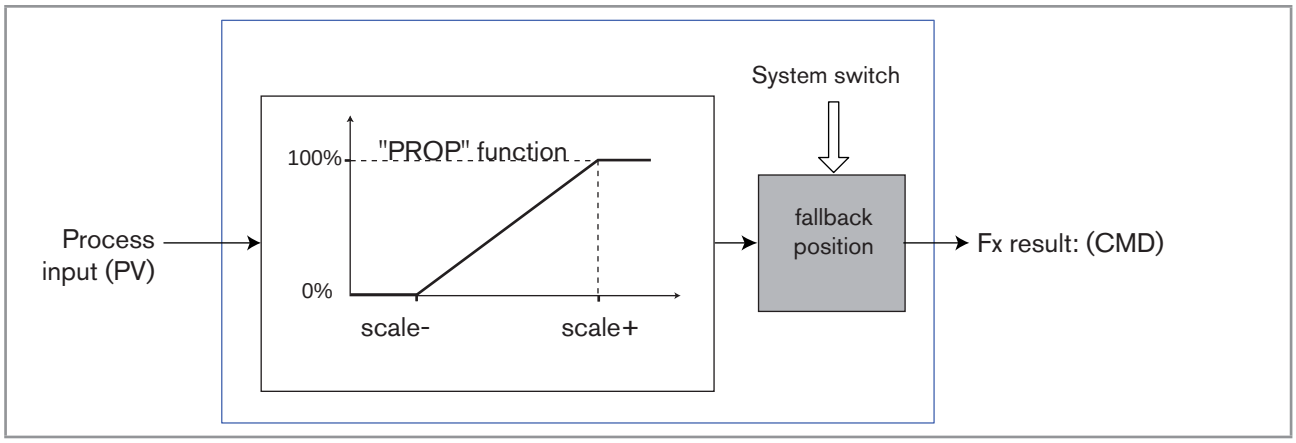
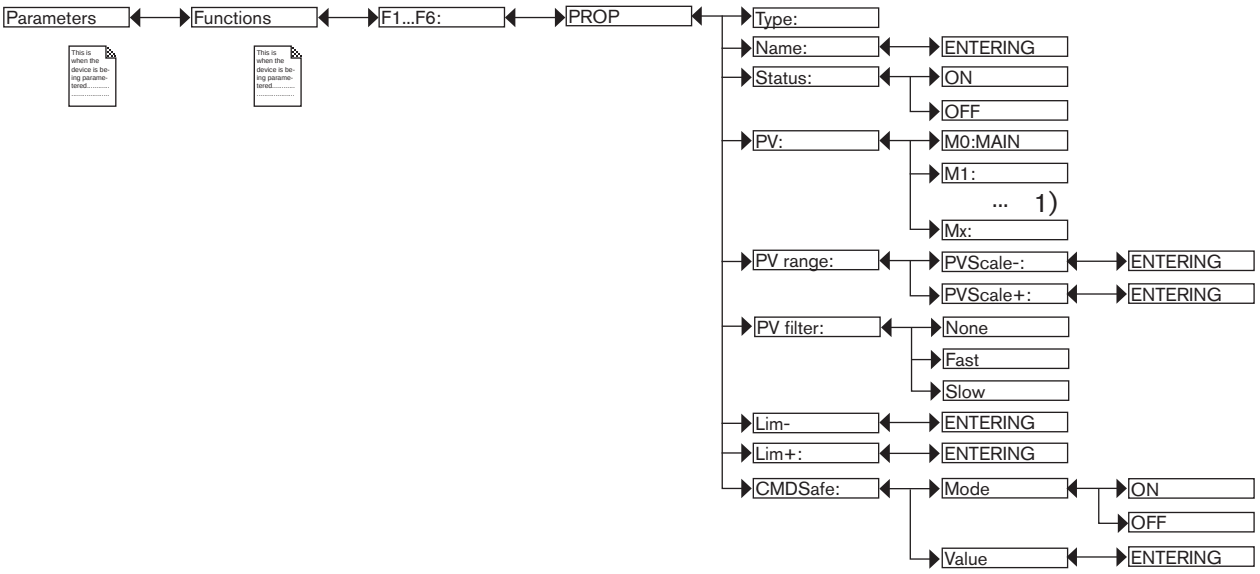


Figure 35 : "PROP" proportional function

Refer to chap. 8.9 to access Parameters menu.

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1) The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16.

Once the function has been configured and activated, the result "Fx:" calculated is available in the list of process variables on the "M0:MAIN" board. This list appears in the output configuring, user view configuring and datalogging menus to:

- Assign the result "Fx:" calculated to a physical output (analogue, AO, or digital, DO) (see chap. 8.10.22 and 8.10.22).
- Display the result "Fx:" on one of the user defined "Ux" views: see chap. 8.10.8.
- Logging the values of "Fx:" using the datalogger: see chap. 8.10.18.

TYPE: Indicates the function chosen (here, "PROP").

NAME: Rename the function chosen. See chap. 8.4. This name appears on the view associated with this function in Process level.

STATUS: Used to activate (choose "ON") or deactivate (choose "OFF") the function selected.

PV: Choose the process input for the function.

PV RANGE: Enter the minimum ("PVScale-") and maximum ("PVScale+") values of the process input.

PV FILTER: Choose the level of damping of the chosen process value. See Figure 29.

LIM-: Enter the lower limit on the output.

LIM+: Enter the upper limit on the output.

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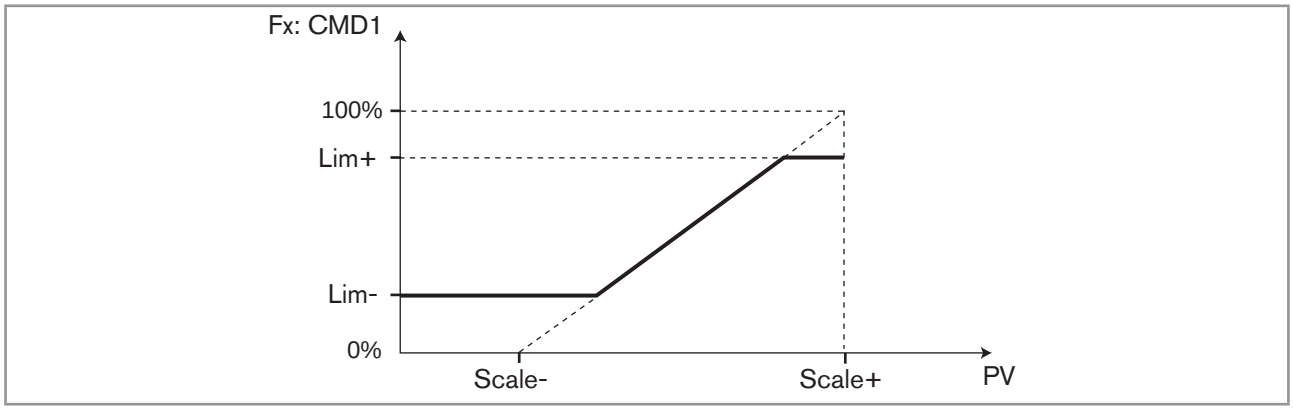


Figure 36 : Using the "LIM-" and "LIM+" parameters on a "PROP" function

CMD SAFE: Confirm (choose "Mode: ON") or do not confirm (choose "Mode:OFF") the use of a fallback position on the output when the "System switch" event (see chap. 8.10.17) has the state "ON". When use of the fallback position is confirmed, enter a fallback position value of between 0 and 100% for each output.

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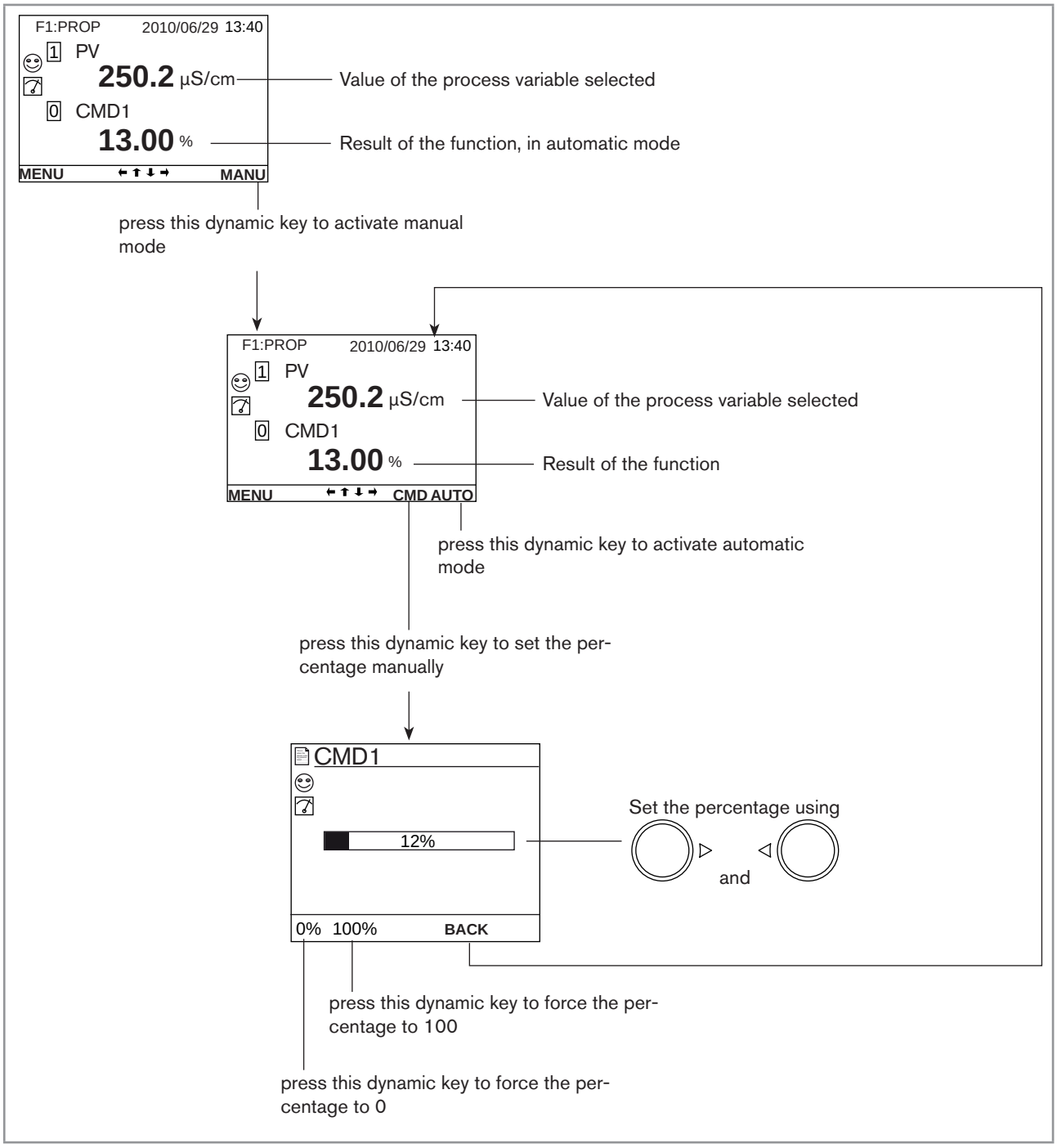


Figure 37 : Examples of a view of a "PROP" function in Process level and switch to manual or automatic mode

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8.10.13. Configuring an "ONOFF" control function

This function is used to set the on/off control.

A conductivity control system can be combined with the "time dosing" function (see chap. 8.10.15) to carry out a prebleed step before dosing.

Once the function has been configured and activated, the result "Fx:" calculated is available in the list of process variables on the "M0:MAIN" board. This list appears in the output configuring, user view configuring and datalogging menus to:

- Assign the result "Fx:" calculated to a physical output (analogue, AO, or digital, DO) (see chap. 8.10.22 and 8.10.22).
- Display the result "Fx:" on one of the user defined "Ux" views: see chap. 8.10.8.
- Logging the values of "Fx:" using the datalogger: see chap. 8.10.18.

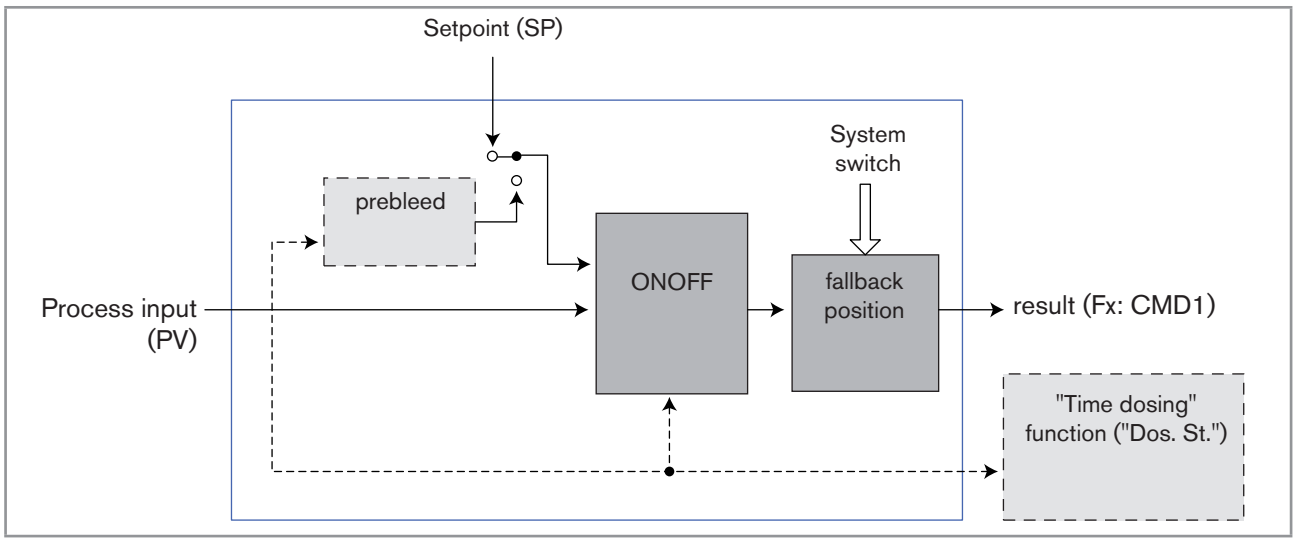


Figure 38 : "ONOFF" function

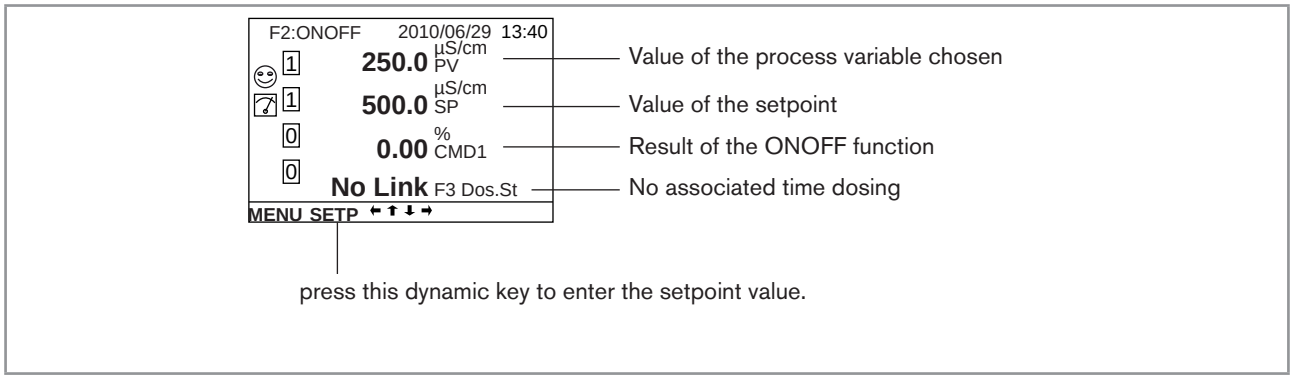
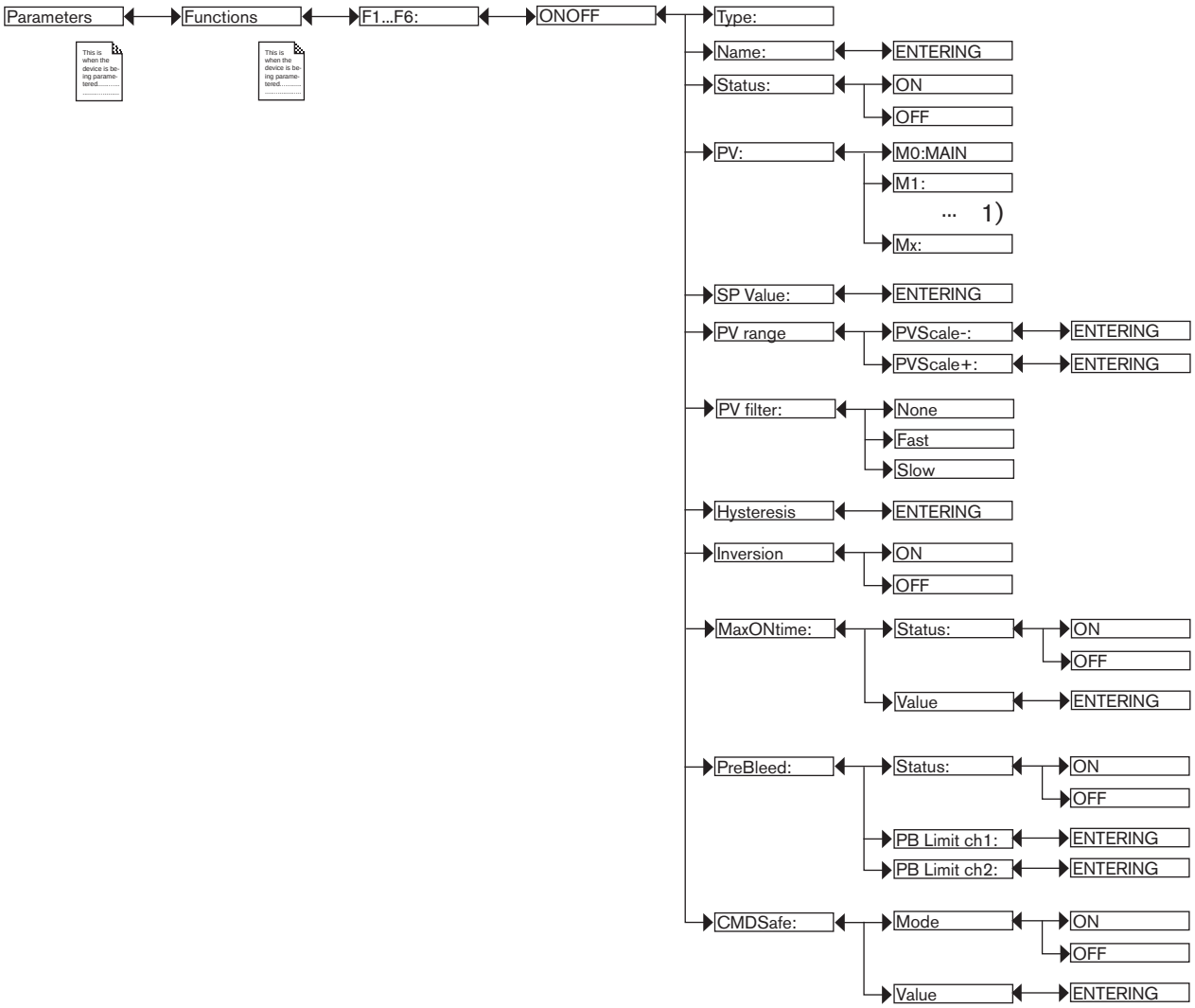


Figure 39 : Example of a view of an "ONOFF" function in Process level with no associated time dosing

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Refer to chap. 8.9 to access Parameters menu.



1) The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16.

TYPE: Indicates the function chosen.

NAME: Rename the function chosen. See chap. 8.4. This name appears in the view associated with this function in Process level.

STATUS: Used to activate (choose "ON") or deactivate (choose "OFF") the function selected.

PV: Choose the process input for the function from the list suggested by the device. This process input may be a measured physical parameter, an analogue output or the result of another active configured function.

SP VALUE: Enter the setpoint value.

PV RANGE: Enter the minimum ("PVScale-") and maximum ("PVScale+") values of the process input.

PV FILTER: Choose the level of damping of the chosen process value. See Figure 29.

HYSTERESIS: Enter a hysteresis value for the switching point.

INVERSION: Used to invert (choose "ON") or not (choose "OFF") the operating direction of switching. See Figure 40.

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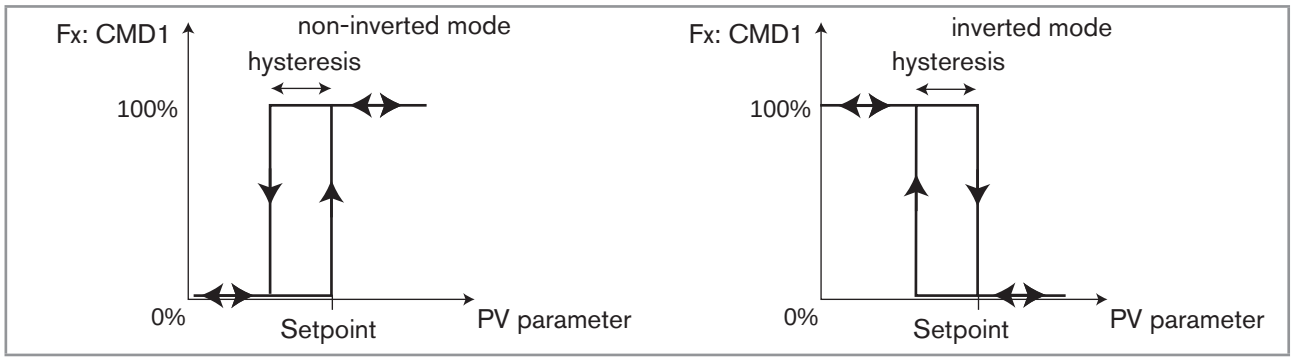


Figure 40 : Hysteresis operating, non-inverted and inverted

MAXONTIME: Enter the max. authorised duration of output control: after this period, the output is deactivated.

PREBLEED: Define (choose "ON") or not (choose "OFF") the ONOFF function for controlling a conductivity function as a prebleed function associated with a time dosing function ("Time Dosing": see chap. 8.10.15). When prebleed is activated, enter the prebleed setpoint value:

- *PBLIMIT1*: enter the prebleed setpoint for channel 1 on the associated "Time Dosing" function.
- *PBLIMIT2*: enter the prebleed setpoint for channel 2 on the associated "Time Dosing" function.

Prebleed lowers the conductivity of the fluid to a value below the standard setpoint value of the ON/OFF controller. When activated, the prebleed setpoint, "PBLIMITx", overrides the standard setpoint of the controller.

A prebleed setpoint value lower than or equal to the conductivity setpoint value of the ON/OFF controller must be entered.

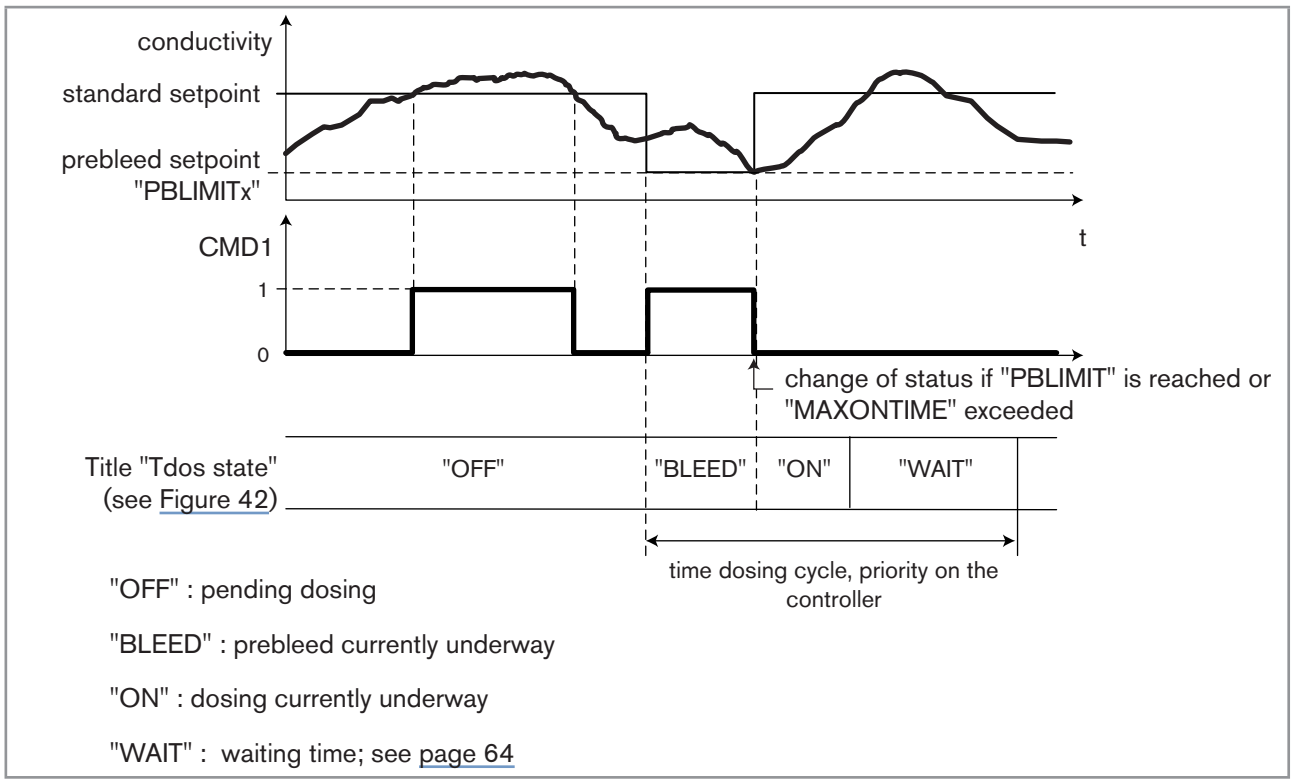


Figure 41 : Combination of "ONOFF" and "TIME DOSING" functions on a conductivity measurement

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CMD SAFE: Confirm (choose "Mode: ON") or do not confirm (choose "Mode:OFF") the use of a fallback position on the output when the "System switch" event (see chap. 8.10.17) has the state "ON". When use of the fallback position is confirmed, enter a fallback position value of between 0 and 100% for each output.

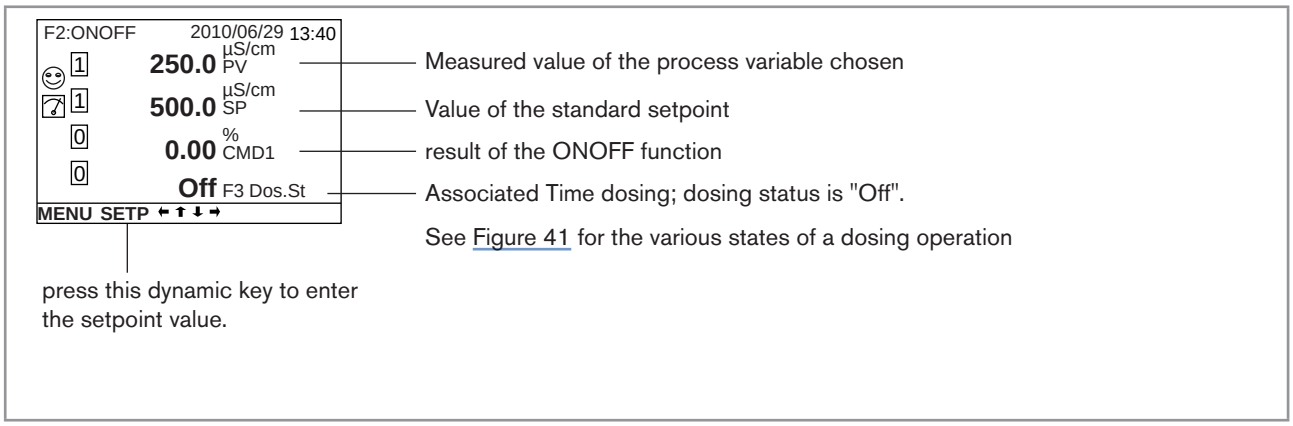


Figure 42 : Example of a view, in Process level, of the ONOFF function associated with a time dosing function

8.10.14. Configuring a PID (proportional integral drift) control function

This function is available as an option. See chap.. 8.10.4.

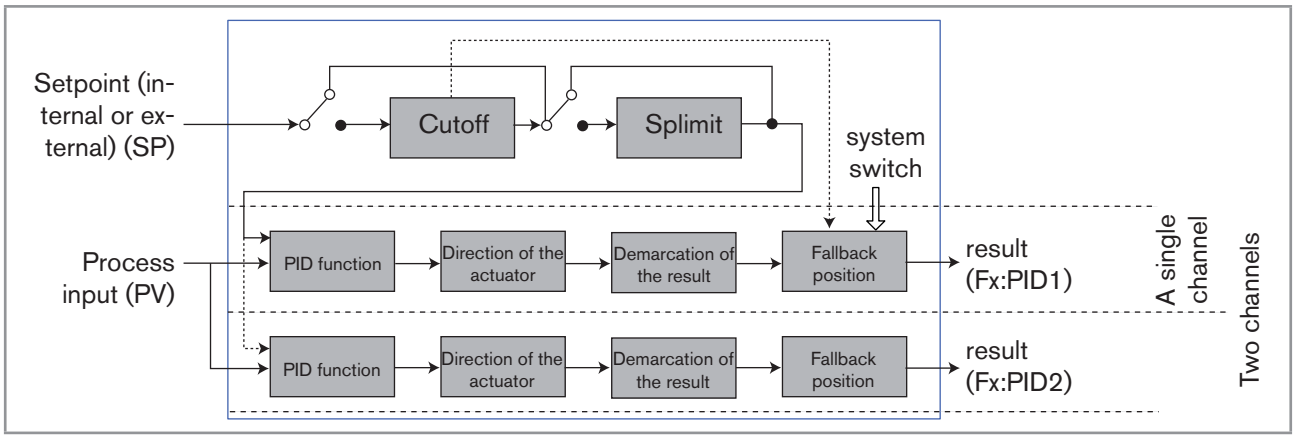


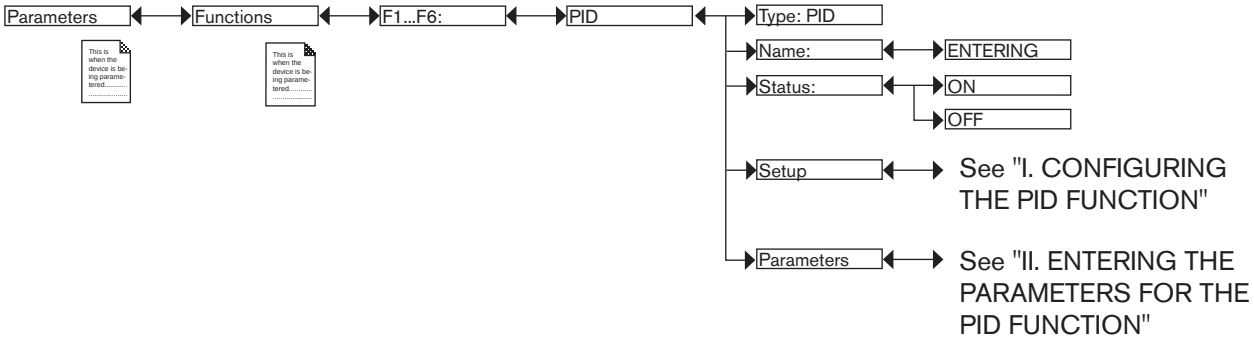
Figure 43 : PID function

Once the function has been configured and activated, the result "Fx:" calculated is available in the list of process variables on the "M0:MAIN" board. This list appears in the output configuring, user view configuring and datalogging menus to:

- Assign the result "Fx:" calculated to a physical output (analogue, AO, or digital, DO) (see chap. 8.10.22 and 8.10.22).
- Display the result "Fx:" on one of the user defined "Ux" views: see chap. 8.10.8.
- Logging the values of "Fx:" using the datalogger: see chap. 8.10.18.

Refer to chap. 8.9 to access Parameters menu.

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TYPE: Indicates the function chosen (here, PID).

NAME: Rename the function chosen. See chap. 8.4. This name appears in the view associated with this function in Process level.

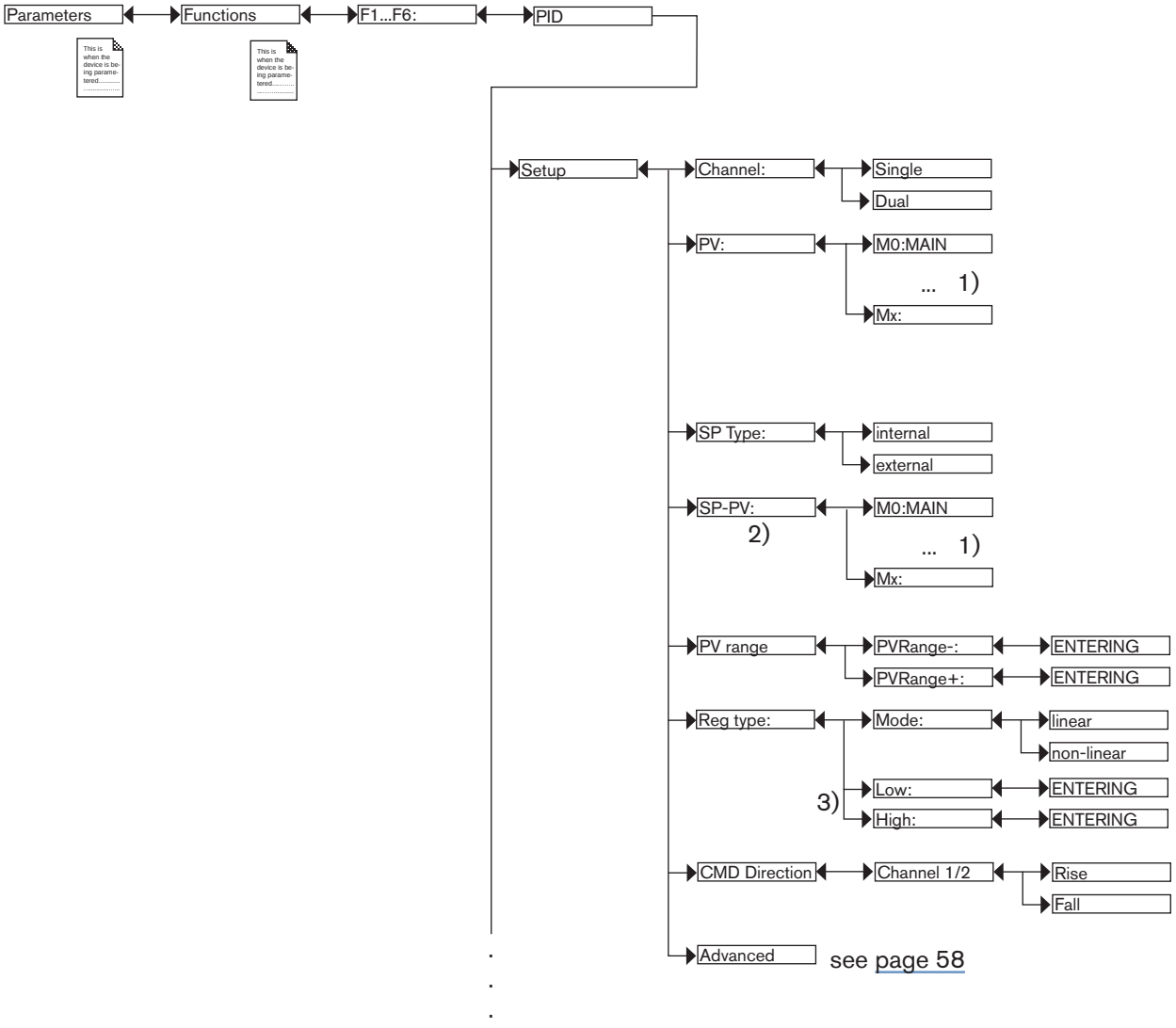
STATUS: Used to activate (choose "ON") or deactivate (choose "OFF") the function.

Configure the PID function in 2 stages: See "I. CONFIGURING THE PID FUNCTION" and "II. ENTERING THE PARAMETERS FOR THE PID FUNCTION".

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I. CONFIGURING THE PID FUNCTION

Refer to chap. 8.9 to access Parameters menu.



1) The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16.

2) This function is present if "SP Type" = "external"

3) These functions are present if "Reg. Type Mode" = "non-linear"

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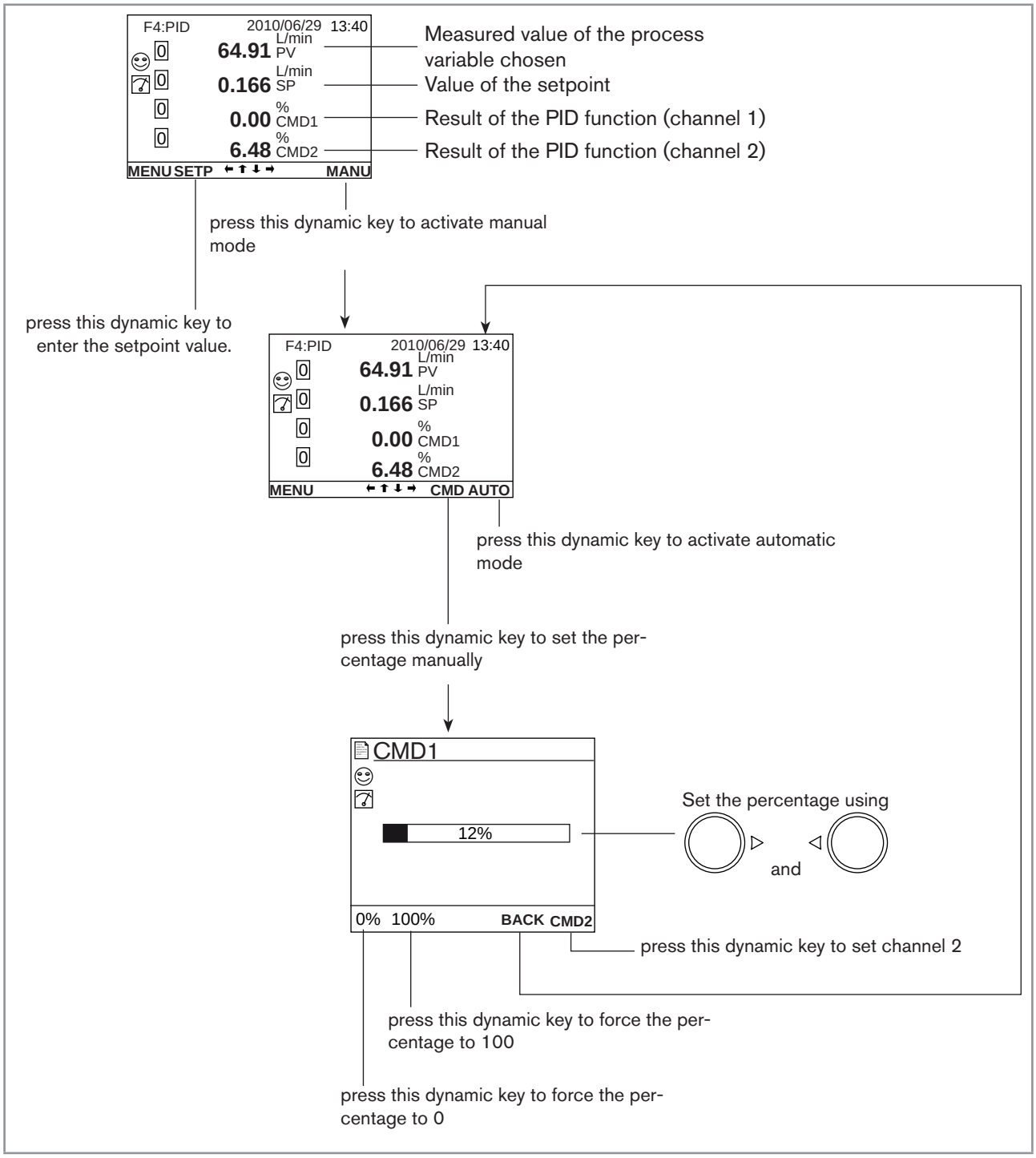


Figure 44 : Example of a view, in Process level, of the PID function, and switching to manual or automatic mode

CHANNEL: Choose to use a single control loop (choose "Single") or a control loop with 2 outputs, each with a set of parameters (choose "Dual").

"Dual" mode is used, for example, to control the pH with an acid output and a base output: when the "acid" output is controlled, the "base" output is at zero and vice versa.

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PV: Choose the process input from the list displayed by the device. This value may be a measurement input or the result of the function.

SP TYPE: Choose between an internal setpoint value (choose "internal") or an external setpoint value (choose "external"; then select the parameter used as the setpoint from the list in the "SP-PV" function below).

SP-PV: Choose the parameter used as the external setpoint for the function.

PV RANGE: Enter the minimum ("PVRange-") and maximum ("PVRange+") measurement values of the process input.

REG TYPE: Choose a linear control mode (choose "linear") or non-linear control mode (choose "non-linear"; then enter under "Low" and "High" the 2 process input thresholds outside of which the "Drift" part is deactivated).

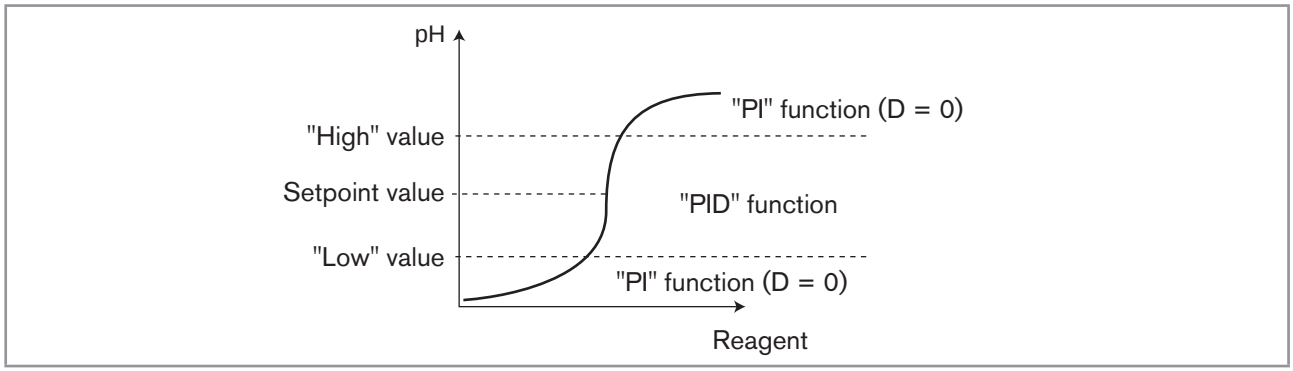


Figure 45 : Example of non-linear control of the pH

CMD DIRECTION: Choose the control direction for the function (CMD1 or CMD2 respectively): ascending (choose "Rise") or descending (choose "Fall").

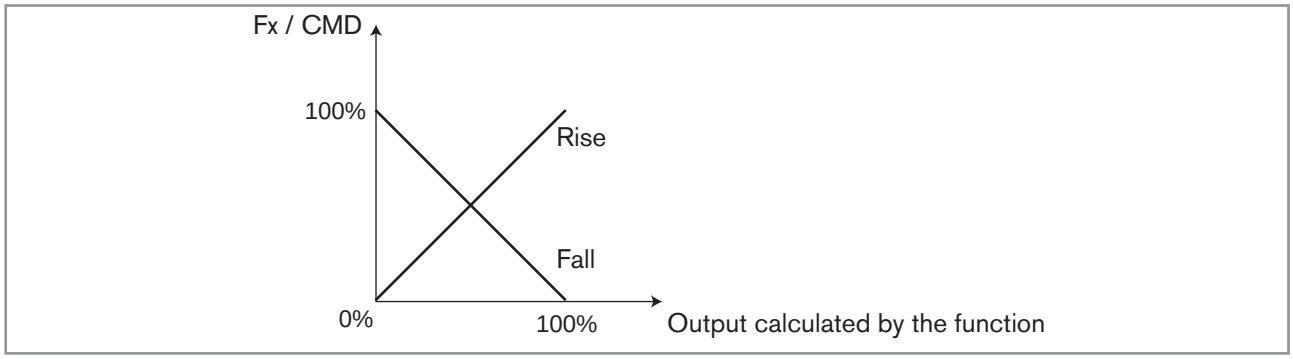
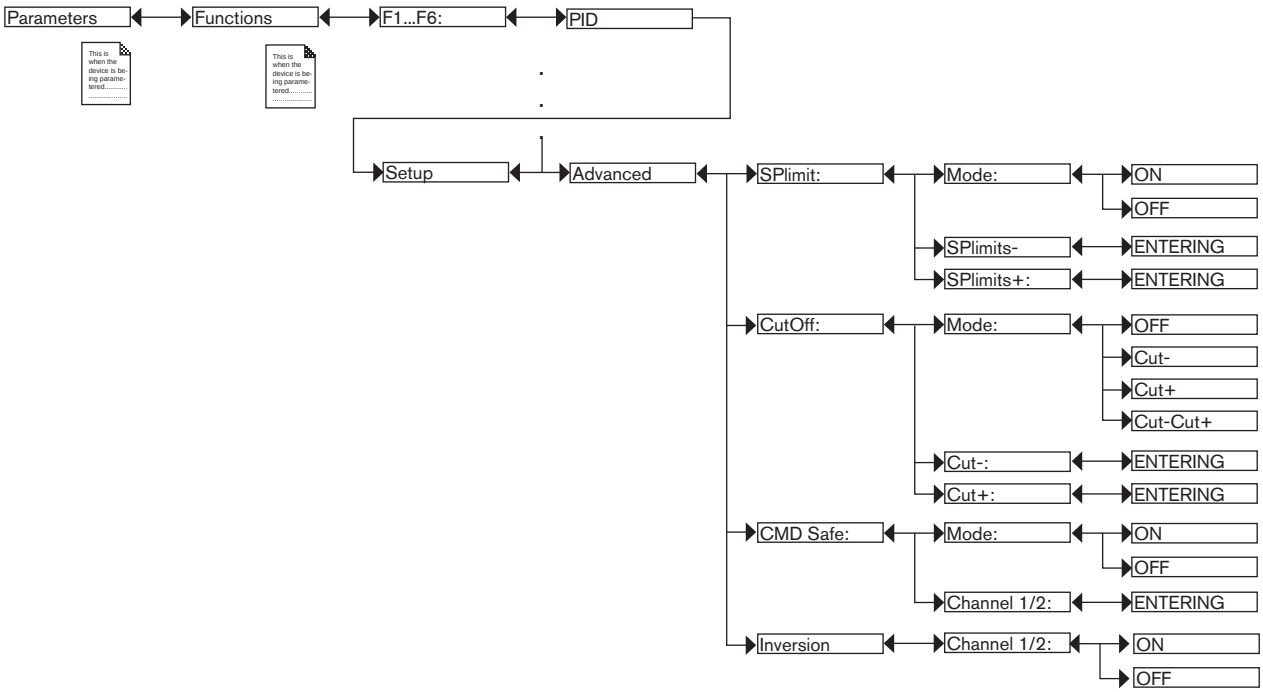


Figure 46 : CMD DIRECTION graphs

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SPLIMIT: Set the low and high limits of the setpoint value in order to limit the working range of the setpoint.

CUTOFF: Force or do not force the module output to 0% or 100% if the setpoint value is outside a range defined by "Cut-" and "Cut+", or under the low range "Cut-", or above the high range "Cut+".

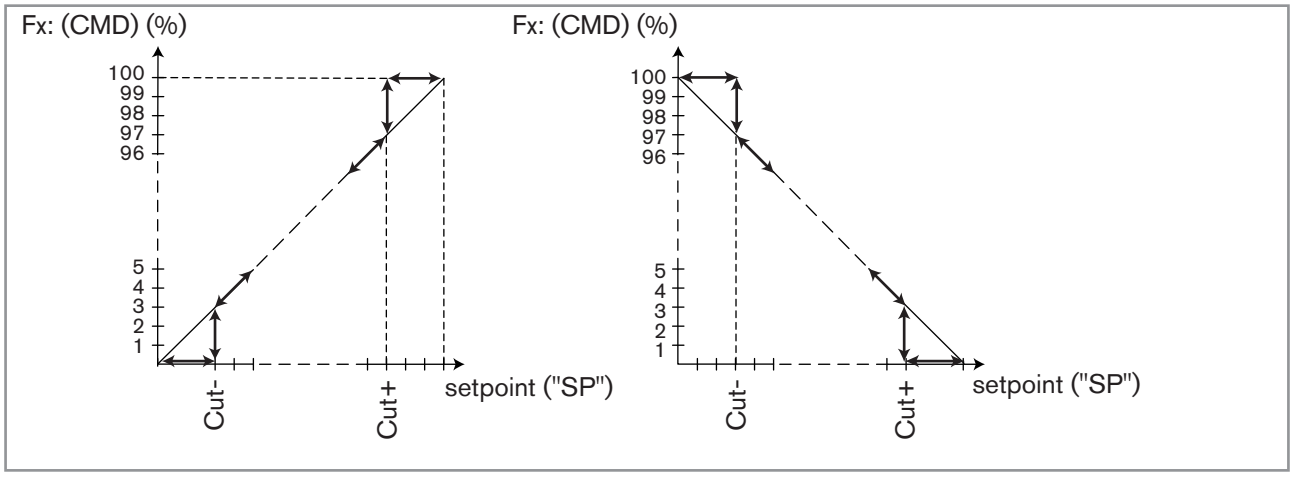


Figure 47 : "CUTOFF" graphs

CMD SAFE: Confirm (choose "Mode: ON") or do not confirm (choose "Mode:OFF") the use of a fallback position on the output when the "System switch" event (see chap. "8.10.17. Configuring the "System switch" event") has the state "ON". When use of the fallback position is confirmed, enter a fallback position value of between 0 and 100% for each output.

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INVERSION: Used to invert (choose "ON") or not (choose "OFF") the operating direction of the output depending on the indication of the difference between setpoint (SP) and measurement (PV). This function is used in particular in an acid-base regulation.

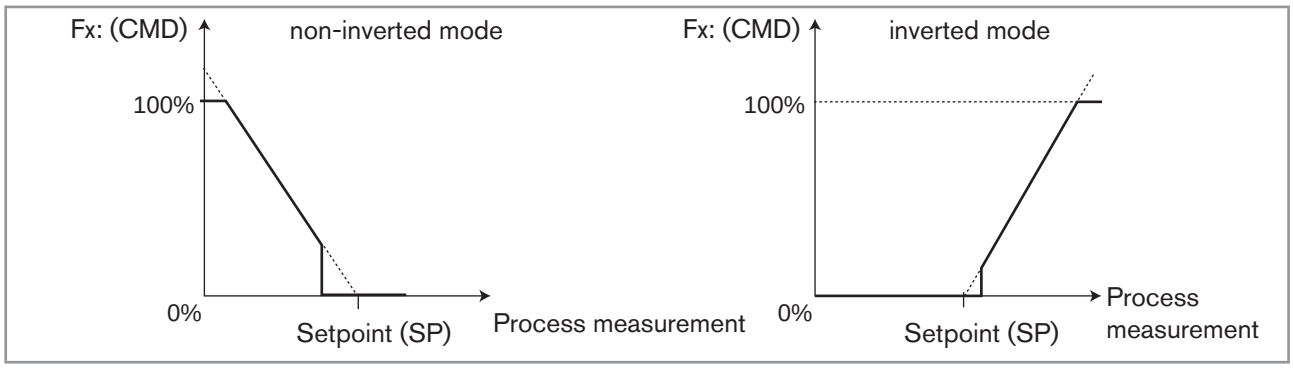
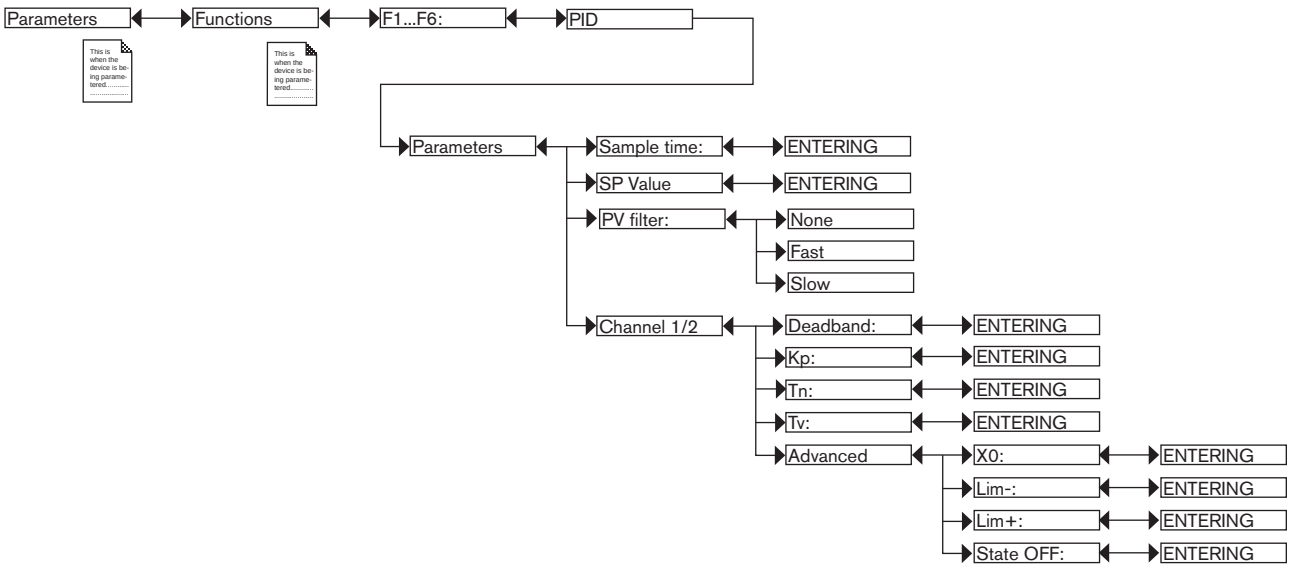


Figure 48 : Operating direction of the output, non-inverted or inverted

II. ENTERING THE PARAMETERS FOR THE PID FUNCTION

Refer to chap. 8.9 to access Parameters menu.



SAMPLE TIME: Define the sampling time (between 0.1 and 60 s).

SP VALUE: Enter the setpoint value.

PV FILTER: Choose the level of damping of the chosen process value. See Figure 29.

DEADBAND: Define the percentage, from 0 to 100%, of the deadband around the setpoint value.

KP: Define the proportional gain applied to the difference between the setpoint value and the measured value.

TN: This parameter represents the integral part of the PID module used to eliminate the static error between the measurement and the setpoint. Enter a value of between 0.1 and 9999 seconds (default value: 9999 s).

TV: This parameter represents the drift part of the PID module used to react quickly to variations in measurement or setpoint and anticipate variations on the controller. Use this variable on slow processes. Enter a value of between 0.0 and 9999 seconds (default value: 0.0 s).

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If the system becomes unstable, the "TV" value set is too high: reduce it as quickly as possible.

X0: Enter the working point of the output, from 0 to 100%.

LIM- and LIM+: Some actuators (proportional solenoid valves) work on a reduced range (e.g. 40 - 80%); the parameters "Lim-" and "Lim+" are used to match the working range of the actuator with that of the 8619: see Figure 49.

STATE OFF: When scaling of the output is configured using the parameters "Lim-" and "Lim+", the parameter "STATE OFF" is used to guarantee the output setting to 0% or 100% to prevent a permanent command subsisting on the actuator terminals.

$$\Delta = \text{"state off"} \times (\text{"Lim+"} - \text{"Lim-"})$$

i.e. a proportional solenoid valve operating between a command of 40% and 80%.

Then set parameters "Lim-" = 40% and "Lim+" = 80%

If "state OFF" = 2%, then Δ = 2% x (80 - 40) = 0.8%

Therefore, when the actual output is below 40 + 0.8 = 40.8%, the command switches to 0% and when the actual output is above 80 – 0.8 = 79.2%, the command switches to 100%.

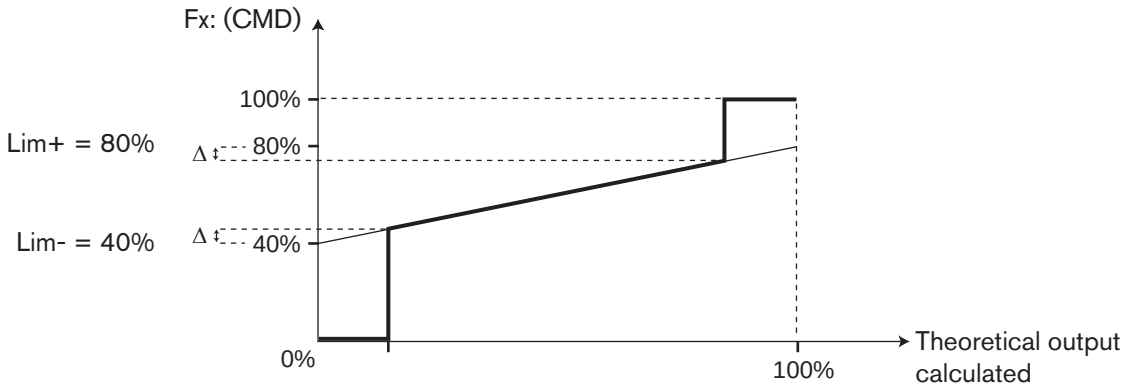


Figure 49 : Example of "Lim-", "Lim+" and "State OFF" parameters setting

8.10.15. Configuring a time dosing cycle

This function is available as an option. See chap. 8.10.4.

It is used to add one or two products to the process, either at regular intervals ("DoMode" = "Period"), or according to the days of the week ("DoMode" = "Week"). The quantity added is proportional to the time open (programmable) of the command unit.

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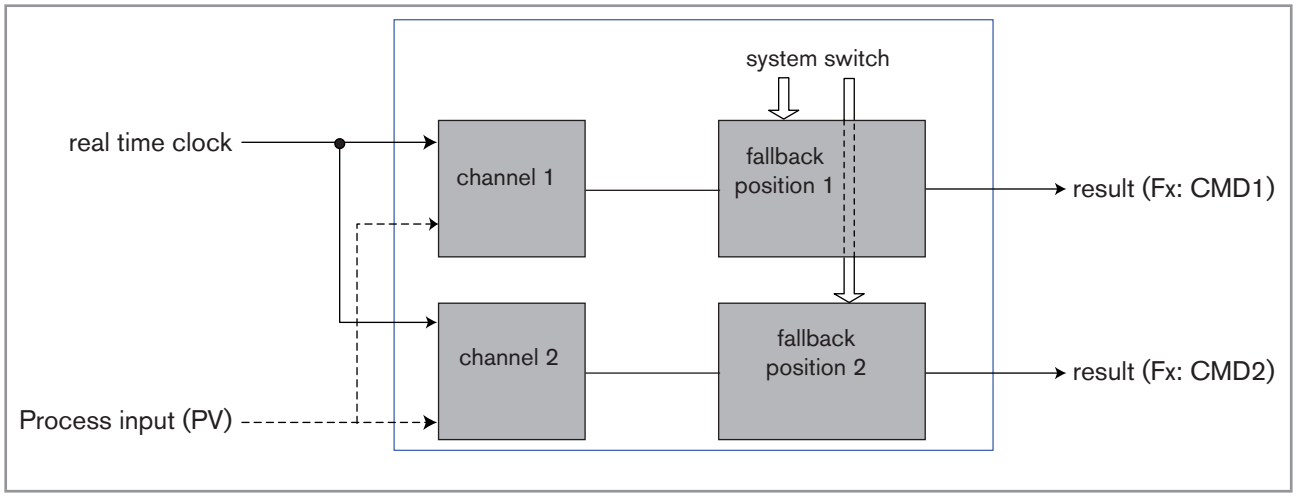


Figure 50 : "Time dosing" function

Once the function has been configured and activated, the result "Fx:" calculated is available in the list of process variables on the "M0:MAIN" board. This list appears in the output configuring, user view configuring and datalogging menus to:

- Assign the result "Fx:" calculated to a physical output (analogue, AO, or digital, DO) (see chap. 8.10.22 and 8.10.22).
- Display the result "Fx:" on one of the user defined "Ux" views: see chap. 8.10.8.
- Logging the values of "Fx:" using the datalogger: see chap. 8.10.18.

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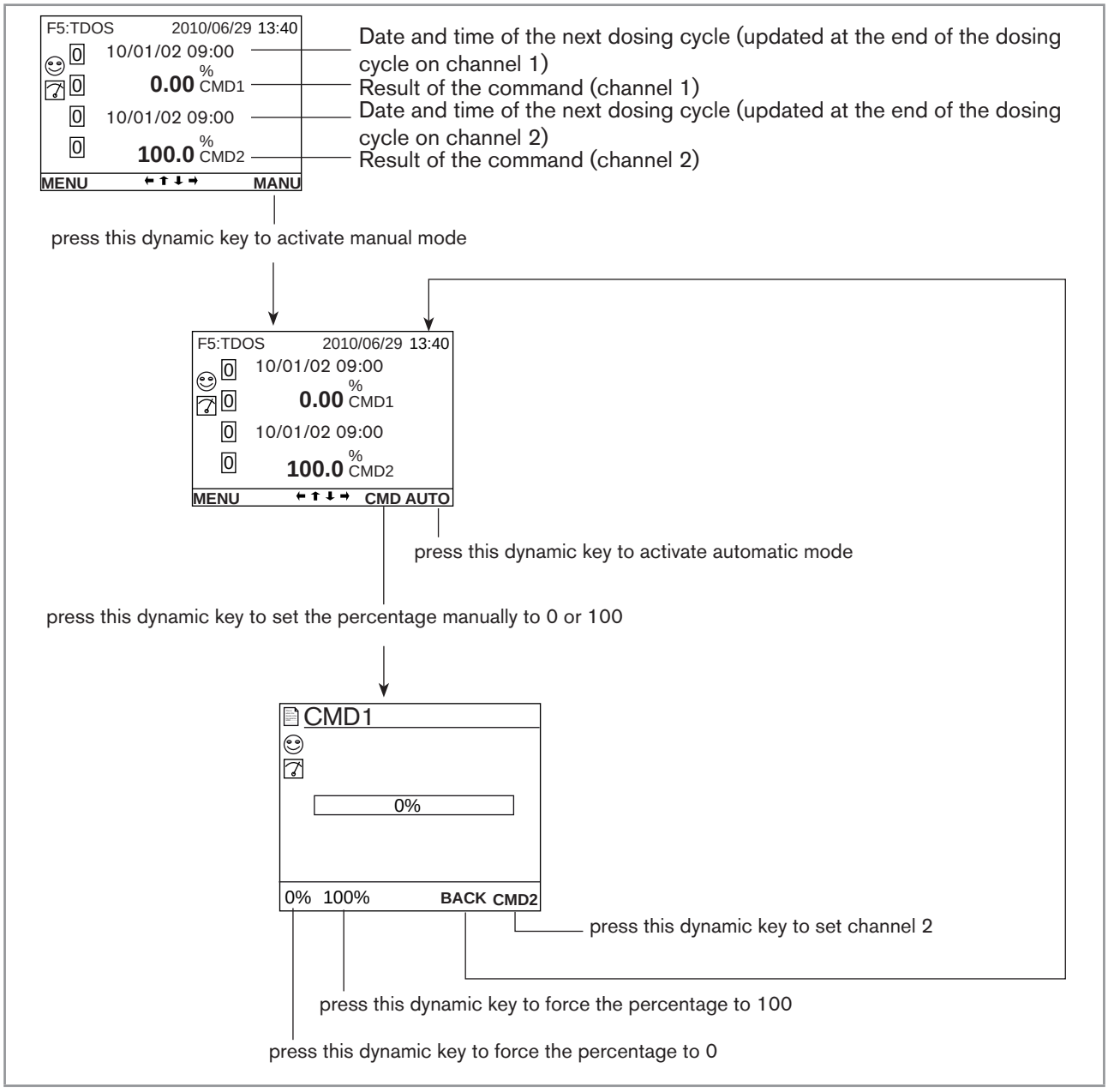
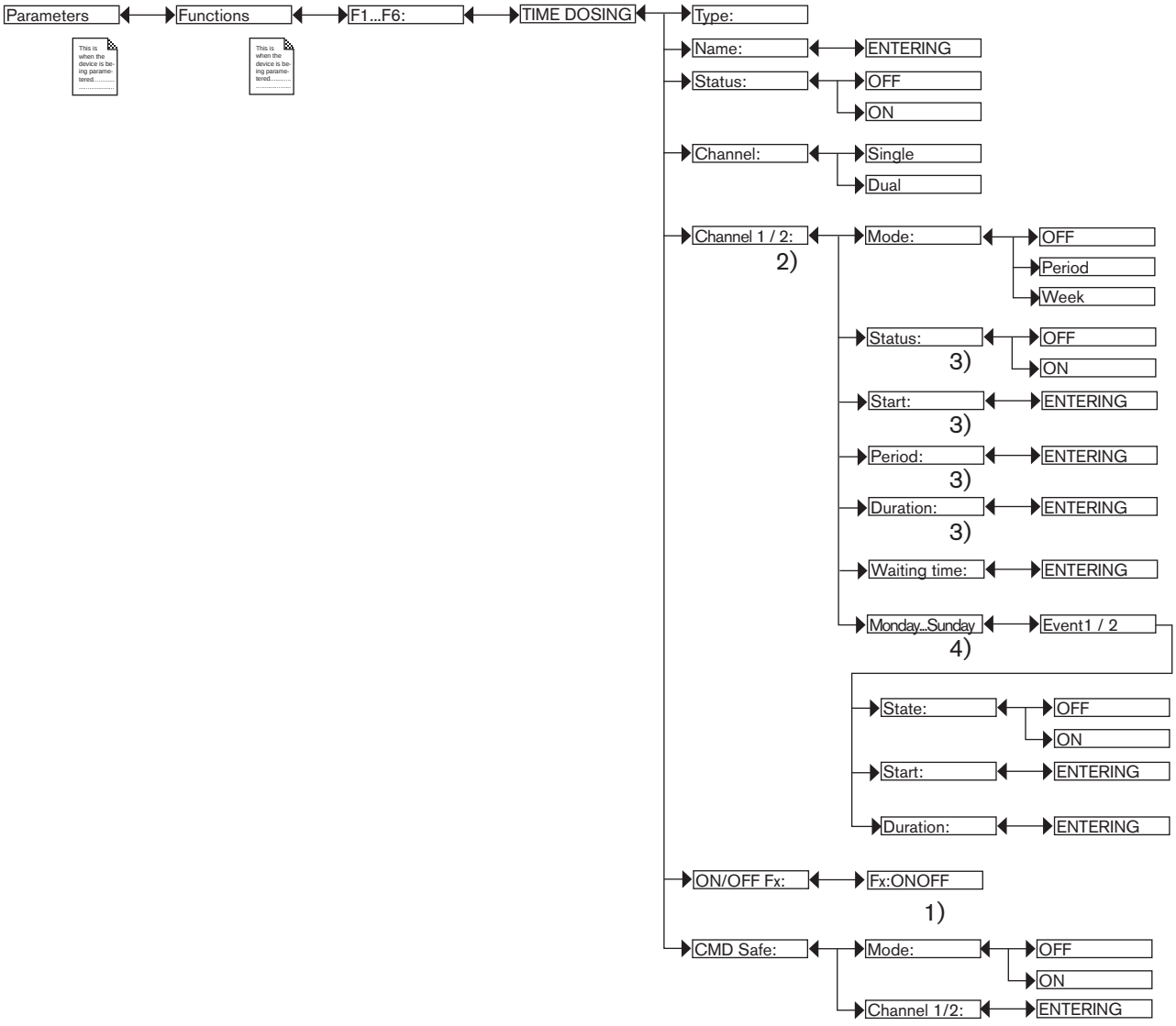


Figure 51 : Example of a view, in Process level, of the "time dosing" function

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Refer to chap. 8.9 to access Parameters menu.



1) "Fx:" represents the ONOFF function declared "active"

2) "Channel2" is present if "Channel" = "Dual"

3) These functions are present only if "Mode" = "Period"

4) These functions are present only if "Mode" = "Week"

TYPE: Indicates the function chosen.

NAME: Rename the function chosen. See chap. 8.4. This name appears in the view associated with this function in Process level.

STATUS: Used to activate (choose "ON") or deactivate (choose "OFF") the function.

CHANNEL: Choose to dose a chemical product (choose "Single") via 1 channel or two chemical products (choose "Dual") via 2 different channels.

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CHANNEL 1 / CHANNEL 2: Set the parameters for channel 1 and, if "CHANNEL" = "DUAL", channel 2.

- *MODE*: Choose to deactivate (choose "OFF") channel 1 or 2 or to configure the channel in dosing mode at regular intervals (choose "Period") or dosing according to the days of the week (choose "Week"). See details below for each mode.

Configure "channel1" or "channel2" in "Period" mode, dosing at regular intervals:

- *STATUS*: Choose to activate (choose "ON") or deactivate (choose "OFF") the channel.
- *START*: Define the time of the first dosing of the day. The subsequent dosing cycles will be run at the intervals defined in "PERIOD" below.
- *PERIOD*: Define the interval between 2 dosing cycles.
- *DURATION*: Define the duration of the dosing cycle.
- *WAITING TIME*: Define the waiting time during which no new dosing cycles can be started, particularly when time dosing is associated with an ONOFF function (see chap. 8.10.13).

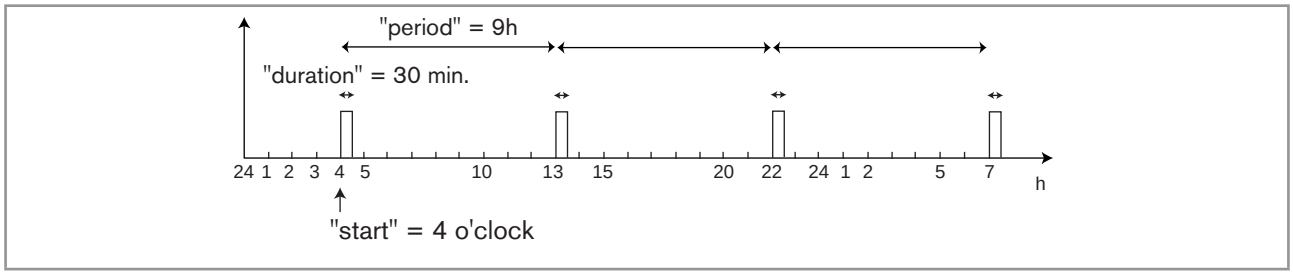


Figure 52 : Example of configuring in "Period" mode

Configure "channel1" or "channel2" in "Week" mode, dosing according to the days of the week:

In this mode, 1 or 2 dosing cycles (or "events") for the same product (in the same channel) can be configured for each day of the week ("Monday" to "Sunday").

- *STATUS*: Choose to activate (choose "ON") or deactivate (choose "OFF") the channel.
- *WAITING TIME*: Define the waiting time during which no new dosing cycles can be started, particularly when time dosing is associated with an ONOFF function (see chap. 8.10.13).
- *START*: Define the start time of the dosing cycle for this day of the week.
- *DURATION*: Define the duration of the dosing cycle.

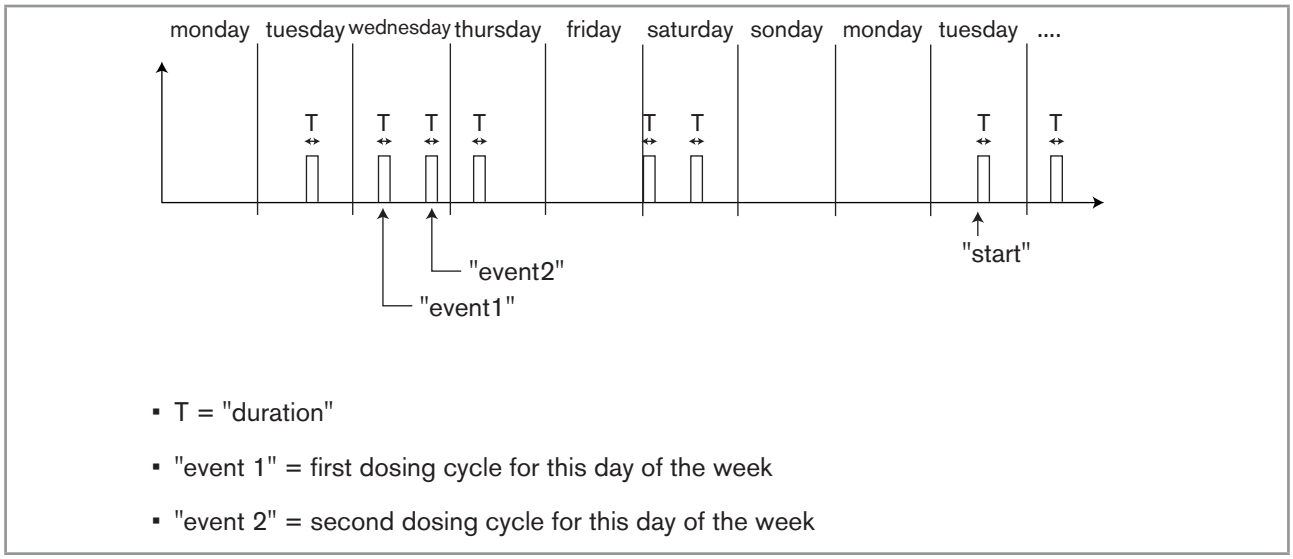


Figure 53 : Example of configuring in "Week" mode

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ON/OFF FX: Combine the TIME DOSING function with an ON/OFF function (see chap. 8.10.13) for a conductivity measurement only in order to ensure prebleed of the system. Configure and activate the "ONOFF" function before this "TIME DOSING" function so that it appears in this menu.

CMD SAFE: Confirm (choose "Mode: ON") or do not confirm (choose "Mode:OFF") the use of a fallback position on the output when the "System switch" event (see chap. 8.10.17) has the state "ON". When use of the fallback position is confirmed, enter a fallback position value of between 0 and 100% for each output.

- The time base is the one set in the "Date" and "Time" functions in the "Parameters" menu. See chap. 8.10.1.
- When the "time dosing" function is already operational, modifying one of its parameters resets the function.
- A new dosing cycle on the same channel cannot start until the previous dosing cycle has finished.
- Channels 1 and 2 operate independently of each other.
- When a dosing cycle is running on one of the channels, a new dosing cycle on the other channel is run according to the following rules:
  - when the current cycle is in prebleed phase, the lowest prebleed setpoint "PBLIMIT" of the 2 cycles is taken into account. Moreover, the longest prebleed duration of the 2 cycles is taken into account.
  - The prebleed phase on the new dosing cycle is not run if the current cycle is in dosing or waiting phase.
  - It is only when both cycles are finished that the conductivity controller takes over.

8.10.16. Configuring a "Volume Dosing" function

This function is available as an option. See chap. 8.10.4

This function is used to add a product to a process during a predefined period after a predefined volume of fluid has been totalized.

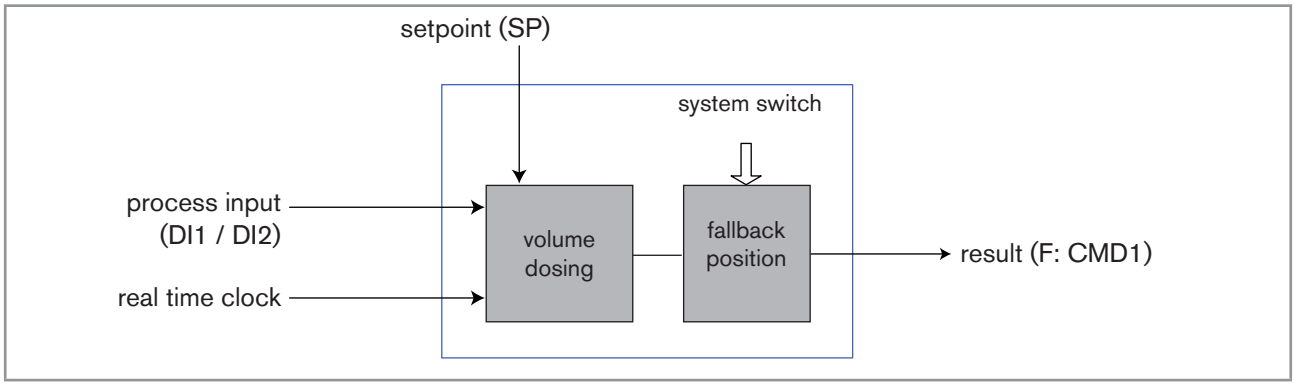


Figure 54 : "Volume dosing" function

Once the function has been configured and activated, the result "Fx:" calculated is available in the list of process variables on the "M0:MAIN" board. This list appears in the output configuring, user view configuring and datalogging menus to:

- Assign the result "Fx:" calculated to a physical output (analogue, AO, or digital, DO) (see chap. 8.10.22 and 8.10.22).
- Display the result "Fx:" on one of the user defined "Ux" views: see chap. 8.10.8.
- Logging the values of "Fx:" using the datalogger: see chap. 8.10.18.

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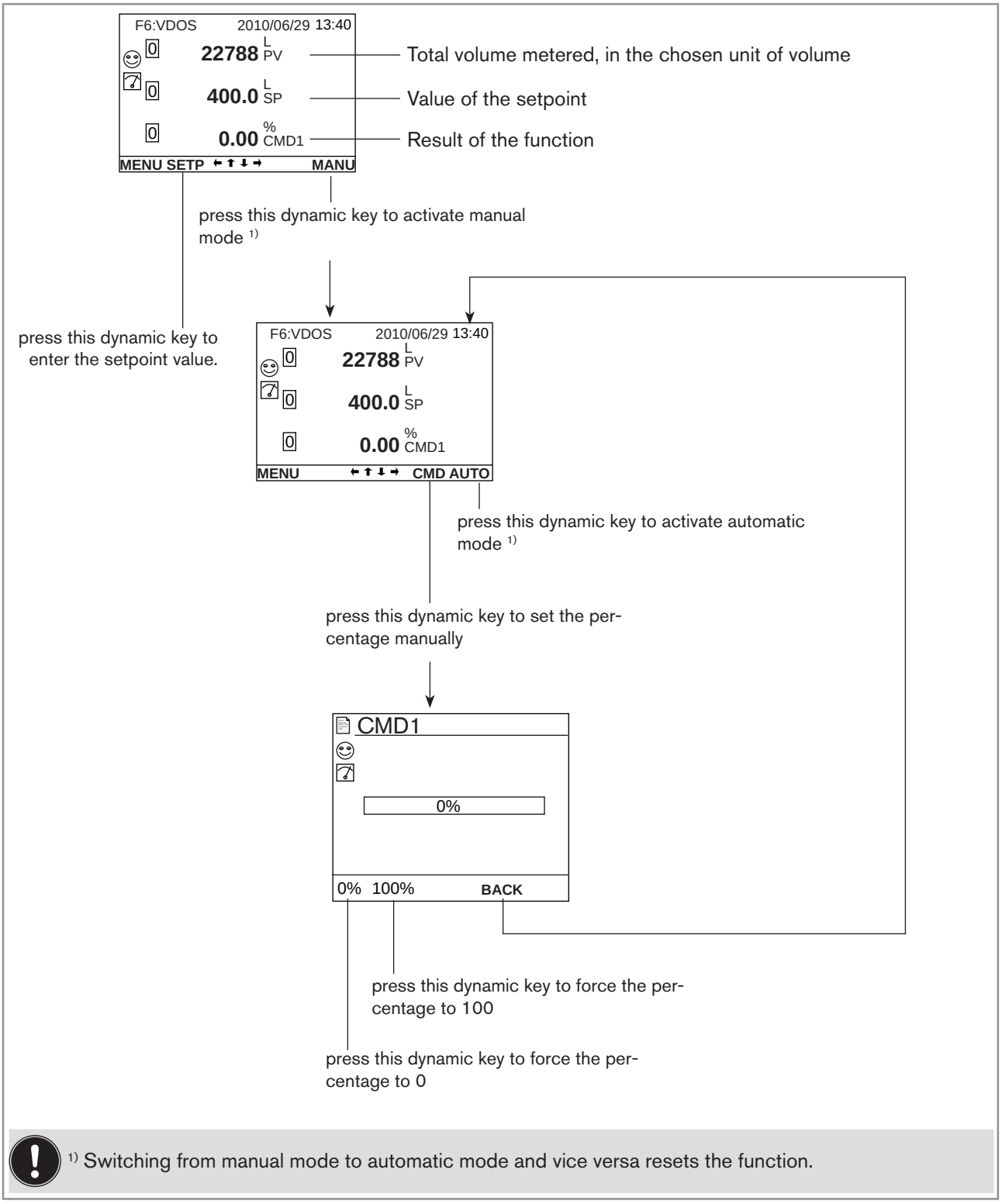
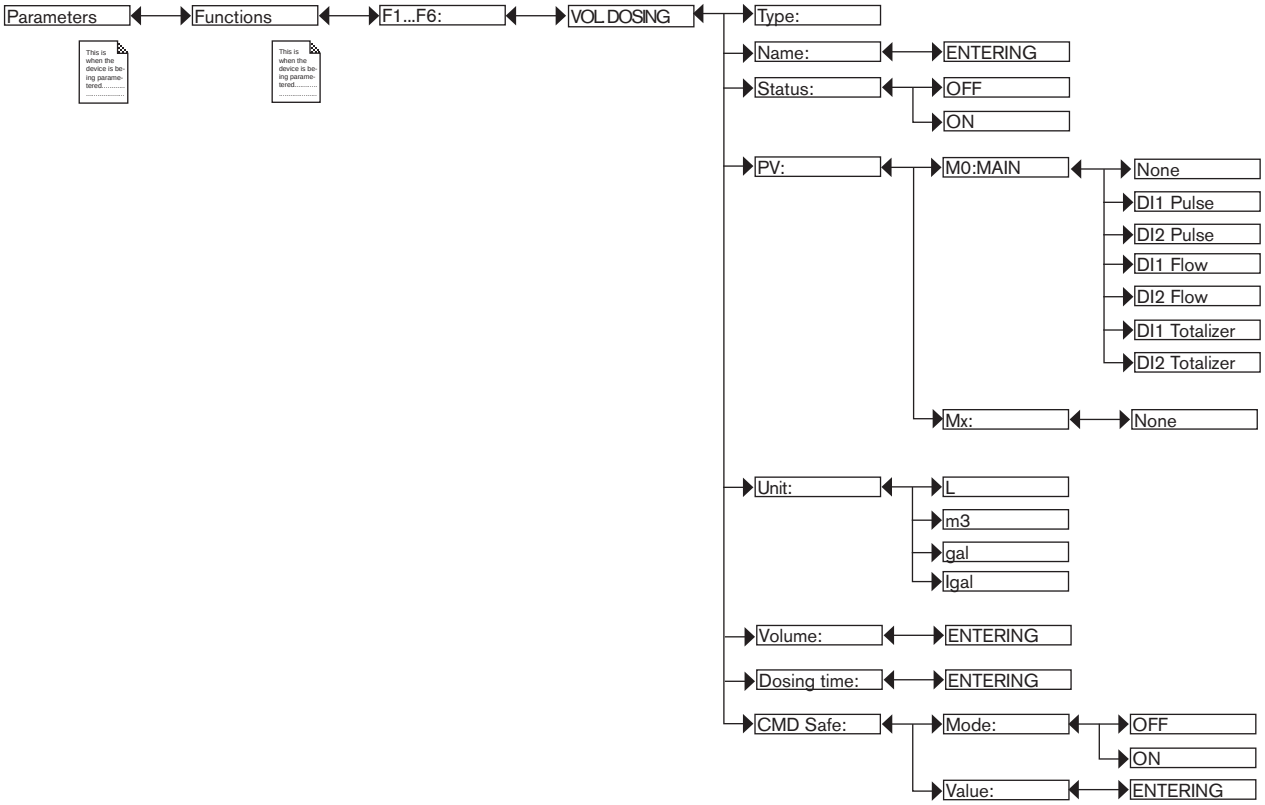


Figure 55 : Example of a view, in Process level, of the "volume dosing" function, and switching to manual or automatic mode

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Refer to chap. 8.9 to access Parameters menu.



TYPE: Indicates the function chosen.

NAME: Rename the function chosen. See chap. 8.4. This name appears in the view associated with this function in Process level.

STATUS: Used to activate (choose "ON") or deactivate (choose "OFF") the function.

PV: Define the digital input "DI1" or "DI2" as the volume metering base.

UNIT: Choose the unit of volume.

VOLUME: Enter the volume to be metered.

DOSING TIME: Enter the duration of dosing.

CMD SAFE: Confirm (choose "Mode: ON") or do not confirm (choose "Mode:OFF") the use of a fallback position on the output when the "System switch" event (see chap. 8.10.17) has the state "ON". When use of the fallback position is confirmed, enter a fallback position value of between 0 and 100% for each output.

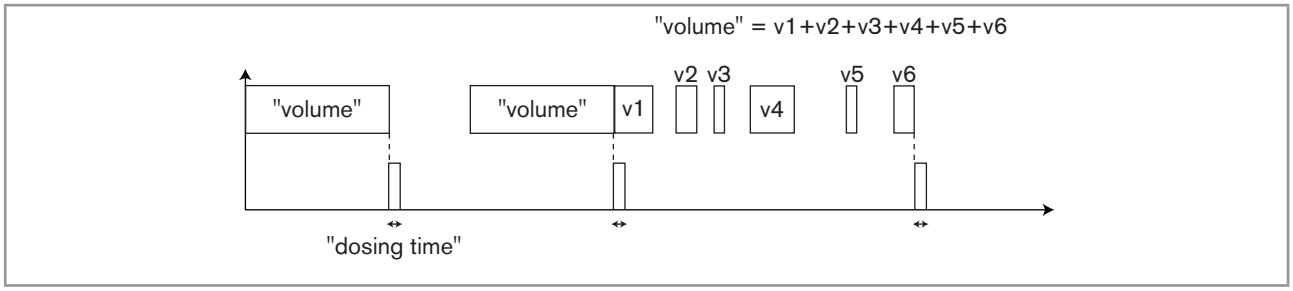


Figure 56 : Example of the "volume dosing" function

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8.10.17. Configuring the "System switch" event

The "System switch" event is used to force the result of a function via the "CMD safe" menu for this function. The function outputs switch automatically to the values set in the "CMD safe" menu for each function when the state of the "System switch" event is "ON".

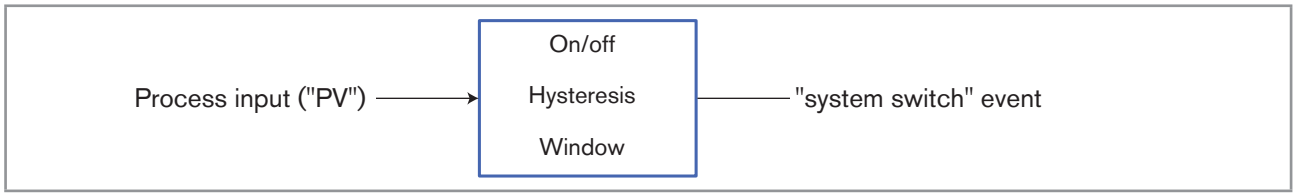
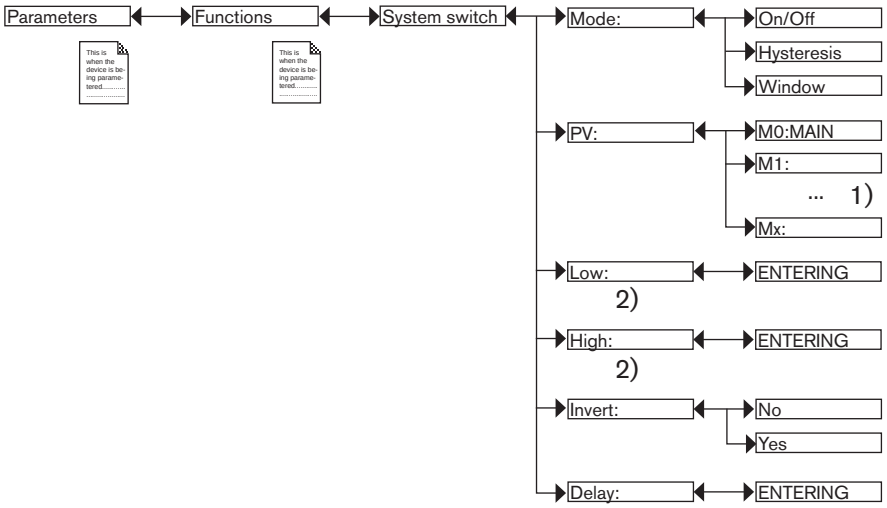


Figure 57 : "System switch" event

Once the "System switch" event has been configured and activated, it is available in the list of process variables on the "M0:MAIN" board. This list appears in the user view configuring and datalogging menus to:

- Display the "System switch" event on one of the user defined "Ux" views: see chap. 8.10.8
- Logging the values of the "System switch" event using the datalogger: see chap. 8.10.18

Refer to chap. 8.9 to access Parameters menu.



1) The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16.

2) These functions are present if "Mode" ≠ "On/Off"

MODE: Choose the switching operating: "On/Off", "hysteresis" or "window".

Configuring in "On/Off" operating

PV: Choose a process input with 2 states, ON or OFF, associated with the "System switch" event.

INVERT: Invert the event or not.

DELAY: Choose the value of the time-out before switching.

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Configuring in "Hysteresis" operating

The output status changes when a threshold is reached:

- by increasing process input value, the output status changes when the high threshold is reached.
- by decreasing process input value, the output status changes when the low threshold is reached.



Figure 58 : Hysteresis operating

PV: Choose the process input associated with the "System switch" event.

LOW: Choose the value of the low switching threshold.

HIGH: Choose the value of the high switching threshold.

INVERT: Invert the event or not.

DELAY: Choose the value of the time-out before switching. This is valid for both thresholds, "Low" and "High". Switching is only done if one of the thresholds, high or low, is exceeded for a duration longer than this time-out.

Configuring in "Window" operating

The output status changes as soon as any threshold (low or high) is reached..

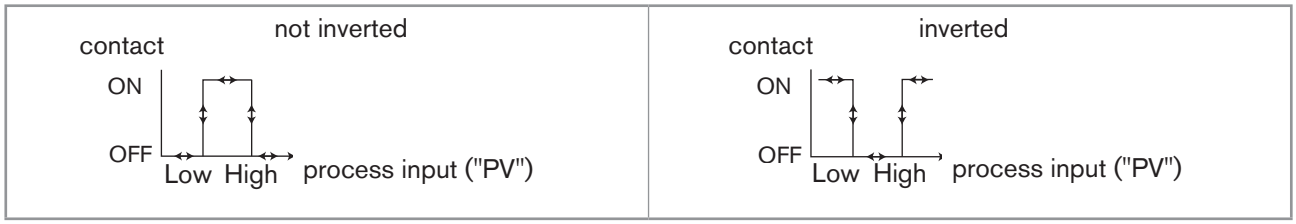


Figure 59 : Window operating

PV: Choose the process input associated with the "System switch" event.

LOW: Choose the value of the low switching threshold.

HIGH: Choose the value of the high switching threshold.

INVERT: Invert the event or not.

DELAY: Choose the value of the time-out before switching. This is valid for both thresholds, "Low" and "High". Switching is only done if one of the thresholds, high or low, is exceeded for a duration longer than this time-out.

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8.10.18. Datalogging (datalogger)

This function is available as an option. See chap. 8.10.4

This function is used to log the measurement history of one to sixteen process inputs ("PV") on the memory card at regular intervals defined in the "Period" function.

Risk of data loss

- Set the "status" of the function to "OFF" before removing the memory card from the device.
- Do not remove the memory card from the device when a file is being written.
- Do not switch off the electrical power source when a file is being written.
- If the datalogging is unintentionally interrupted, check the memory card on a PC and format it if necessary before reuse in the multiCELL.
- If a problem occurs during datalogging, the icon is displayed. For more information, go to the menu "Information -> System log" and then see the table of errors in chap. .

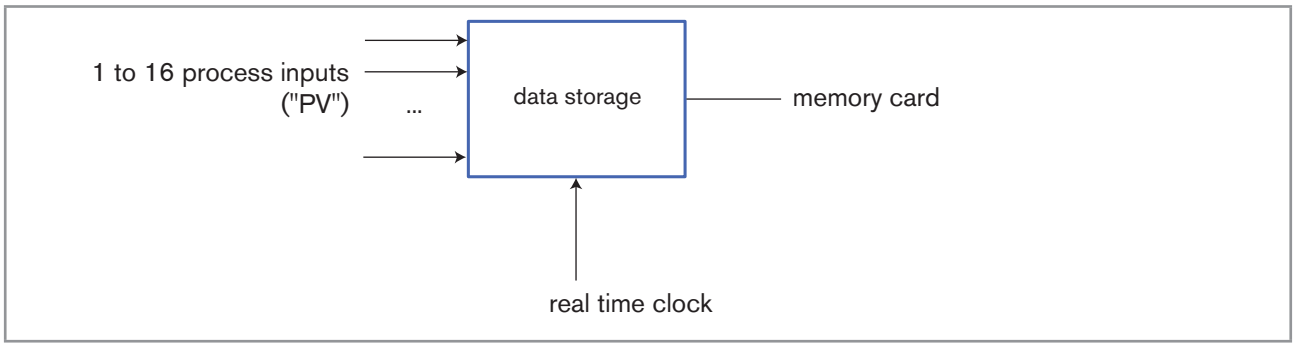
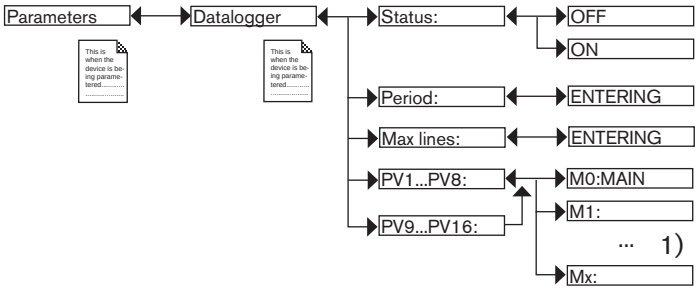


Figure 60 : Datalogger

Refer to chap. 8.9 to access Parameters menu.



[1] *The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16.*

STATUS: Choose to activate (choose "ON") or deactivate (choose "OFF") the datalogger function.

PERIOD: Choose the data storage interval (in seconds), if datalogging is activated.

MAX LINES: Enter the maximum number of lines that a data file contains. The files are saved under "DL000000" to "DL999999".

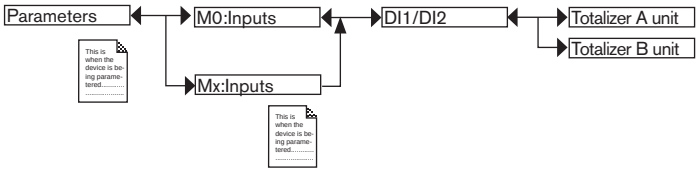
PV1 to PV8 or PV9 to PV16: Choose the process input for which the values are logged.

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8.10.19. Choosing the units for the totalizers

The function is available if the software option "FLOW" is activated. See chap. 8.10.4.

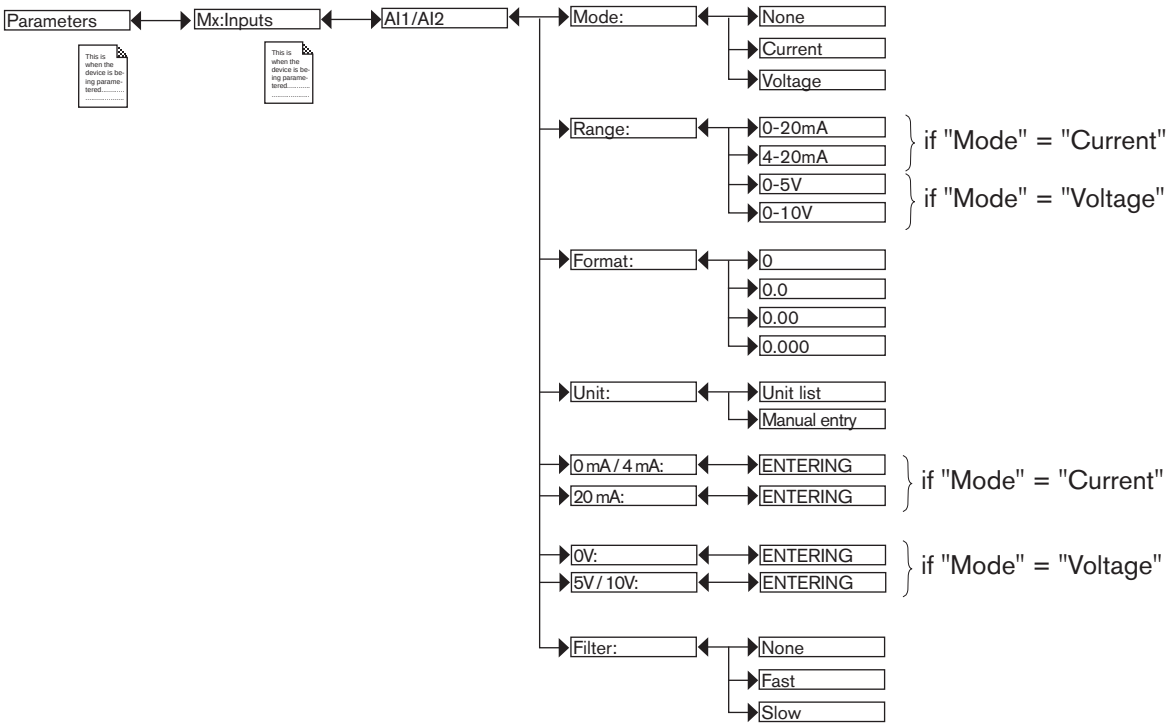
Refer to chap. 8.9 to access Parameters menu.



The function makes it possible to select the units of the totalizers.

8.10.20. Configuring the analogue inputs

Refer to chap.8.9 to access Parameters menu.



MODE: Choose the input signal type, current or voltage.

RANGE: Choose the range of the input signal, depending on the choice made in "MODE".

FORMAT: Choose the number of displayed decimals.

UNIT: Choose the units of the process input associated to the input signal within a predefined list or enter it.

0/4MA: Enter the value of the previously selected process variable, which is associated to a 0/4 mA input current. Instead of being entered, the value can be automatically determined using the function "PV calibration" in the menu "Calibration -> Mx:Inputs -> AI1 or AI2". See chap. 8.11.4.

20MA: Enter the value of the previously selected process variable, which is associated to a 20 mA input current. Instead of being entered, the value can be automatically determined using the function "PV calibration" in the menu "Calibration -> Mx:Inputs -> AI1 or AI2". See chap. 8.11.4.

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0V: Enter the value of the previously selected process variable, which is associated to a 0 V input voltage. Instead of being entered, the value can be automatically determined using the function "PV calibration" in the menu "Calibration -> Mx:Inputs -> AI1 or AI2". See chap. 8.11.4.

5/10V: Enter the value of the previously selected process variable, which is associated to a 5/10 V input voltage. Instead of being entered, the value can be automatically determined using the function "PV calibration" in the menu "Calibration -> Mx:Inputs -> AI1 or AI2". See chap. 8.11.4.

P_1 and P_2 are the values of the process variables which are associated to the selected input range.

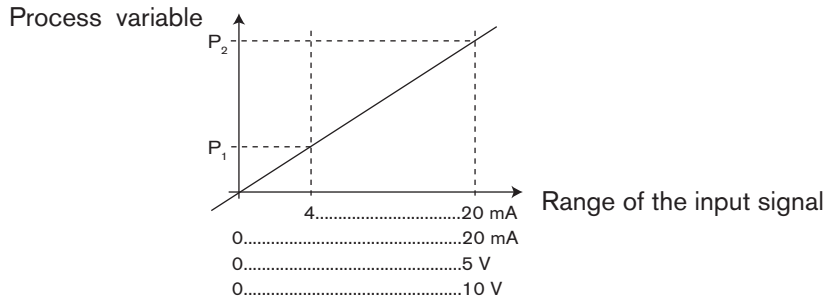
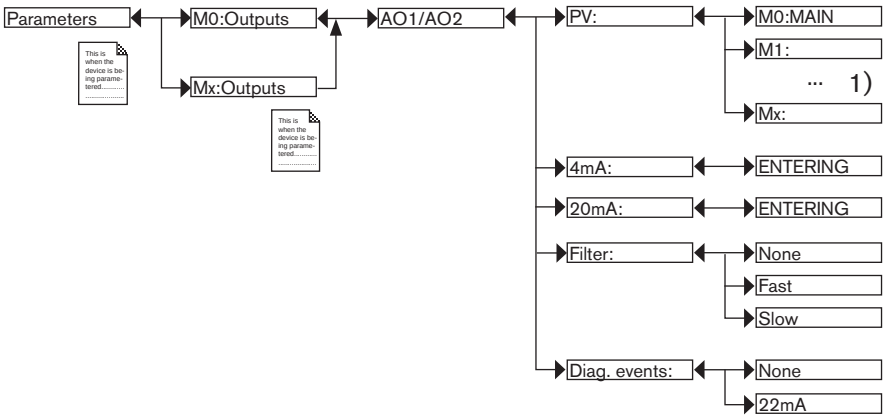


Figure 61 : Configuring an analogue input

FILTER: Choose the level of damping for the fluctuations of the current or voltage value. See Figure 29.

8.10.21. Setting the parameters of the current outputs

Refer to chap. 8.9 to access Parameters menu.



[1] *The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16.*

PV: Choose the process input associated with the current output.

4mA: Choose the value of the process input previously selected, associated with a current of 4 mA, for each current output. See Figure 62.

20mA: Choose the value of the process input previously selected, associated with a current of 20 mA, for each current output. See Figure 62

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P_1 and P_2 are the values associated with a current of 4 mA or 20 mA respectively.

If P1 is higher than P_2, the signal is inverted and the range P_1-P_2 corresponds to the range for the 20-4 mA current.

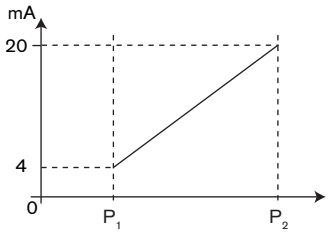


Figure 62 : 4-20 mA current depending on the PV selected

FILTER: Choose the level of damping for the fluctuations of the current value for each current output. See Figure 29.

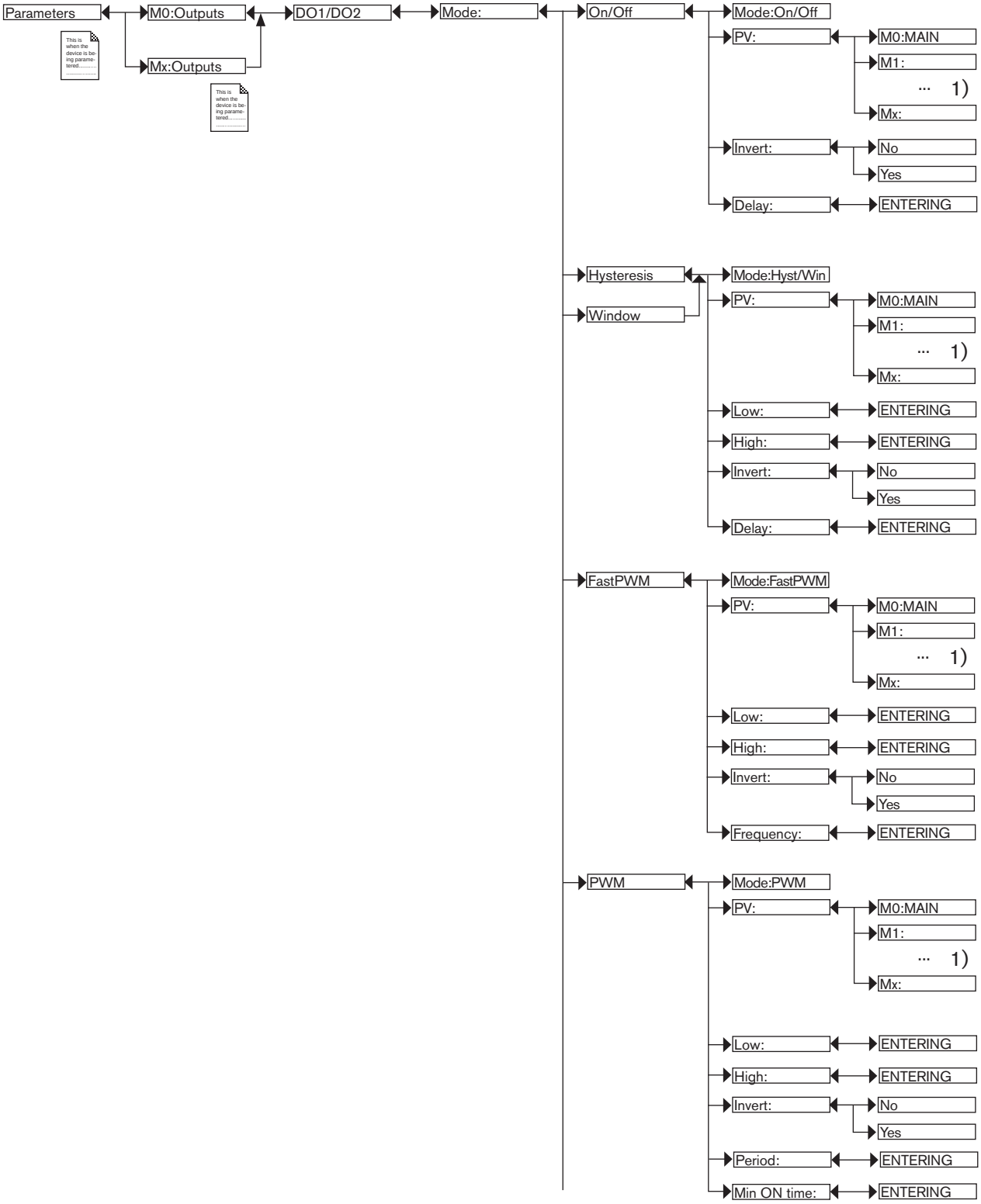
DIAG. EVENTS: Choose to emit a current of 22 mA on the current output selected when an "error" event related to diagnostics (see chap. 8.12.4 to 8.12.6) is generated by the multiCELL or allow the current output to operate normally (choose "none").

See also "If you encounter problems" in chap. 9.3.

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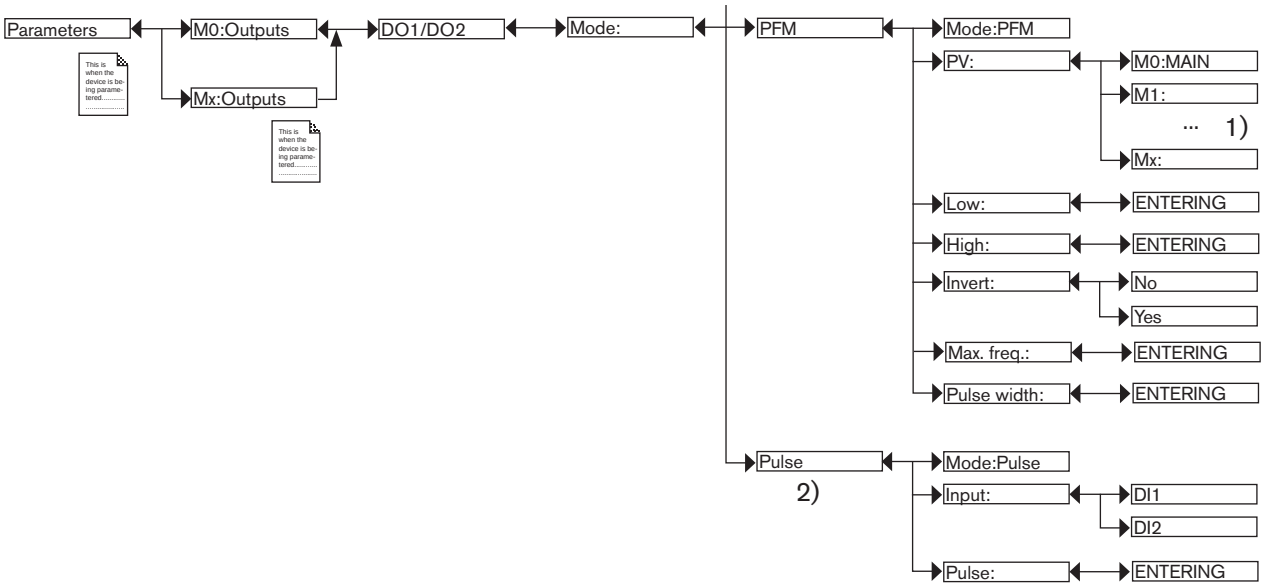
8.10.22. Setting the parameters of the digital outputs

Refer to chap. 8.9 to access Parameters menu.



1) The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16.

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[1] The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16.

[2] Function possible only for the DO1 and DO2 outputs on the M0:MAIN board

MODE: Choose the switching operating for the digital output selected.

Configuring in "On/Off" operating

PV: Choose a process input with 2 states, ON or OFF, associated with the output.

One of the "PVs" on the M0:MAIN board, available in "On/Off" operating, is the "warning" event. Such an event is generated when the calibration date expires and/or during the monitoring of certain process parameters (see chap. 8.11.8, 8.11.9. and 8.12.4 to 8.12.6). When the "warning" event is associated with a digital output, the output switches whenever such an event is generated by the multiCELL. See also chap. 9.3

One of the "PVs" in the conductivity module, available in "On/Off" operating, is "USP" (see chap. 8.10.24).

INVERT: Invert the output or not.

DELAY: Choose the value of the time-out before the output is switched.

Configuring in "Hysteresis" operating

The output status changes when a threshold is reached:

- by increasing process input value, the output status changes when the high threshold is reached.
- by decreasing process input value, the output status changes when the low threshold is reached.



Figure 63 : Hysteresis operating

PV: Choose the process input associated with the output.

LOW: Choose the value of the low switching threshold of the output.

HIGH: Choose the value of the high switching threshold of the output.

INVERT: Invert the output or not.

DELAY: Choose the value of the time-out before switching for each digital output. This is valid for both output thresholds. Switching is only done if one of the thresholds, high or low (functions "High" or "Low"), is exceeded for a duration longer than this time-out.

Configuring in "Window" operating

The output status changes as soon as any threshold (low or high) is reached..



Figure 64 : Window operating

PV: Choose the process input associated with the output selected.

LOW: Choose the value of the process input for the low switching threshold of the output.

HIGH: Choose the value of the process input for the high switching threshold of the output.

INVERT: Invert the output or not.

DELAY: Choose the value of the time-out before switching for each output. This is valid for both output thresholds. Switching is only done if one of the thresholds, high or low (functions "High" or "Low"), is exceeded for a duration longer than this time-out.

Configuring in "FastPWM" operating

This mode is used to control a proportional solenoid valve.

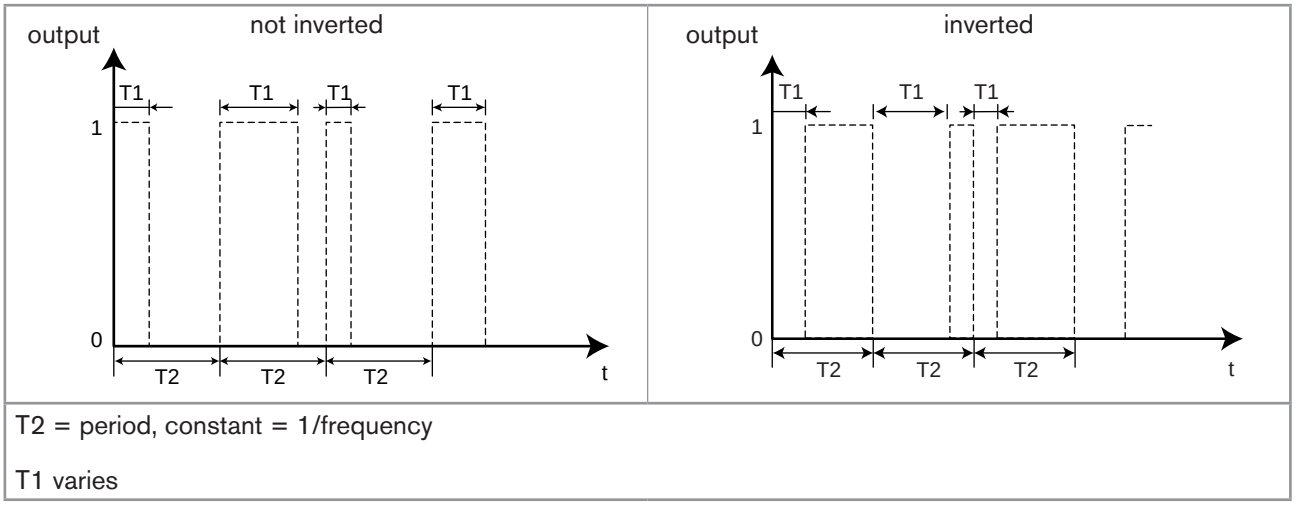


Figure 65 : "FastPWM" operating

PV: Choose the process input associated with the output selected.

LOW: Choose the value of the process input ("PV") corresponding to 0% PWM.

HIGH: Choose the value of the process input ("PV") corresponding to 100 % PWM.

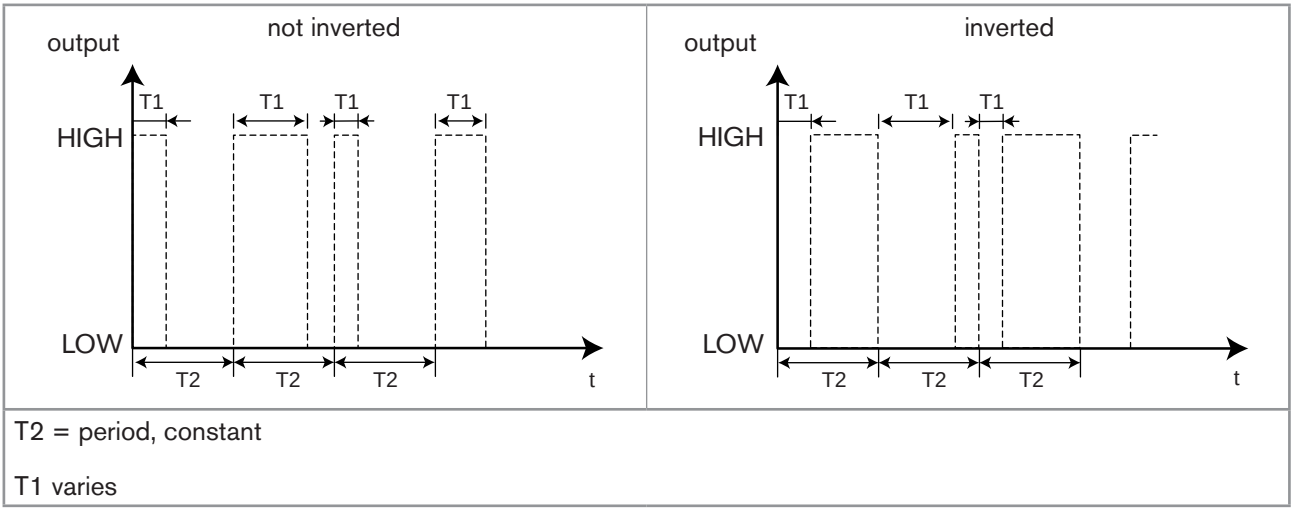
INVERT: Invert the output or not.

FREQUENCY: Choose the value of the output frequency (= 1/T2), from 2 to 2000 Hz.

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Configuring in "PWM" operating

This mode is used to control an "on/off" actuator.



T2 = period, constant

T1 varies

Figure 66 : "PWM" operating

PV: Choose the process input associated with the output selected.

LOW: Choose the value of the process input ("PV") corresponding to 0% PWM.

HIGH: Choose the value of the process input ("PV") corresponding to 100 % PWM.

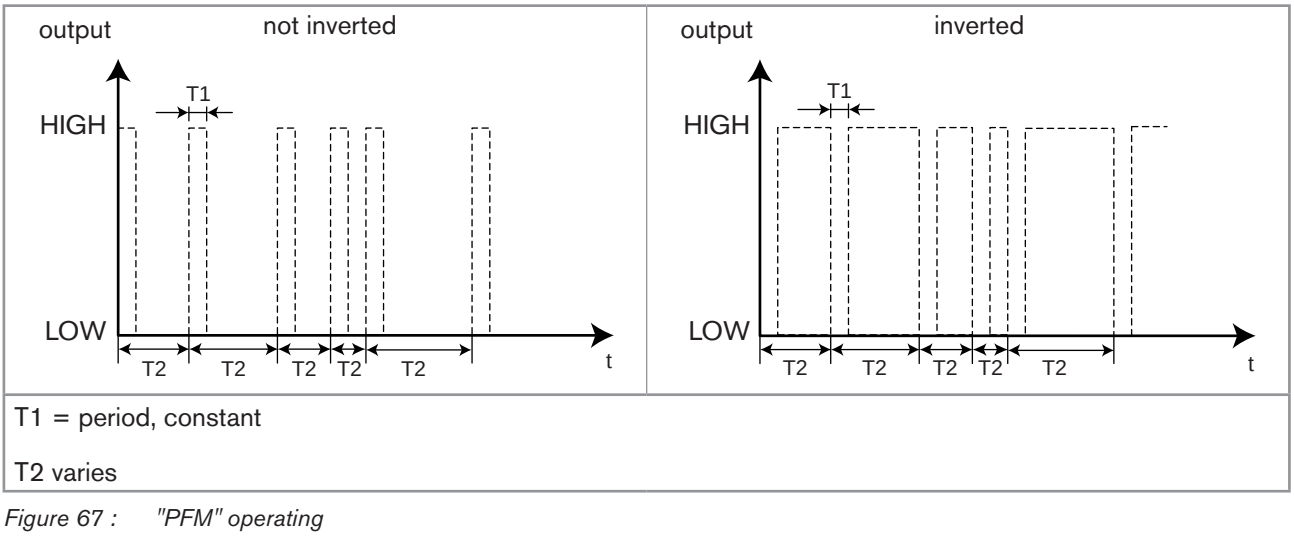
INVERT: Invert the output or not.

PERIOD: Choose the value of period T2 in seconds.

MIN ON TIME: Choose the minimum value of T1 in seconds.

Configuring in "PFM" operating

This mode is used to control a dosing pump, for example.



T1 = period, constant

T2 varies

Figure 67 : "PFM" operating

PV: Choose the process input associated with the output selected.

LOW: Choose the value of the process input corresponding to the min. frequency.

HIGH: Choose the value of the process input corresponding to the max. frequency defined in "MAX. FREQ." below.

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INVERT: Invert the output or not.

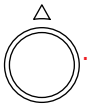
MAX. FREQ.: Choose the maximum value of the pulse frequency (1/T2) (180 pulses per minute maximum)

PULSE WIDTH: Choose the value of the pulse width (T1).

Configuring in "Pulse" operating

This function is available only if the "FLOW" option is activated on the device (see chap. 8.10.4). It is used to generate a pulse on the output each time a predetermined volume of fluid is totalized.

INPUT: Choose the digital input DI1 or DI2 associated with the output selected.

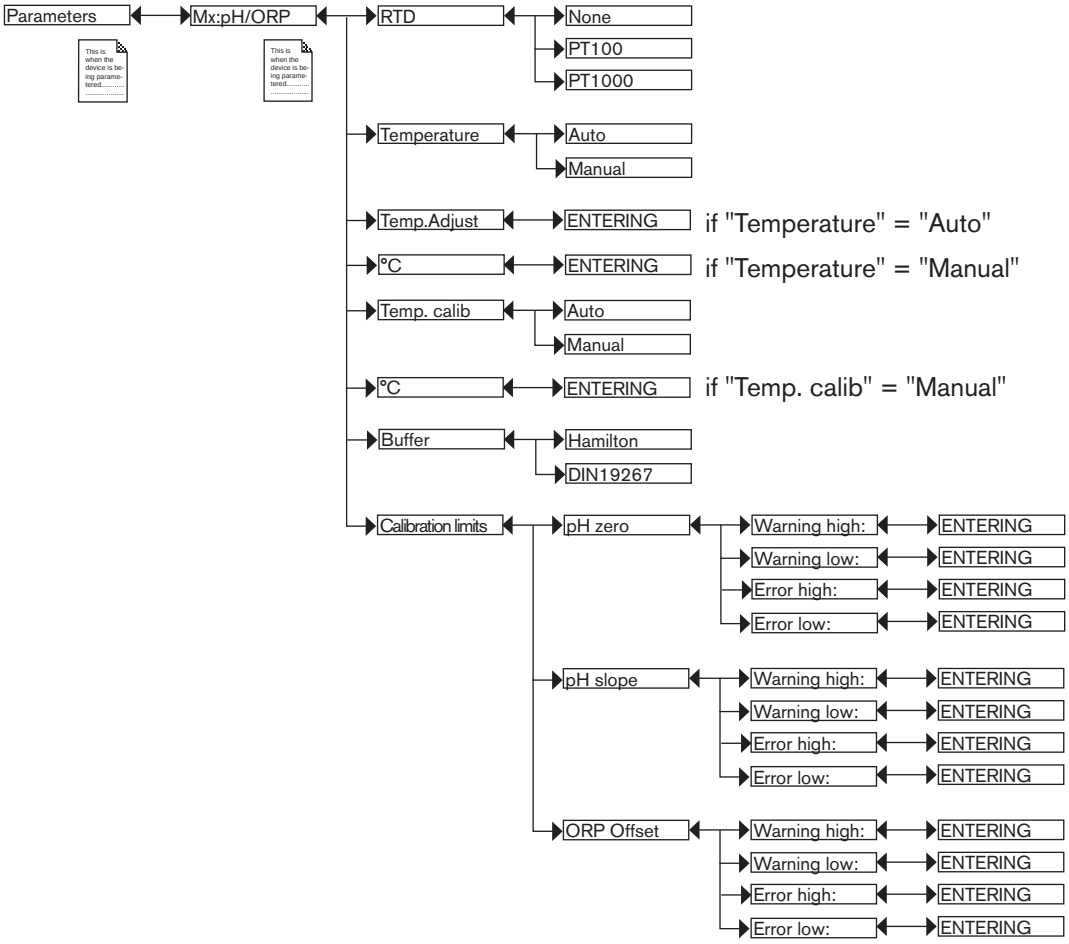
PULSE: Choose the volume of fluid for which a pulse must be transmitted on the output selected. First enter the numerical value and confirm by pressing the dynamic key "OK" to be able to modify the volume unit by successively pressing .

- A "Warning" event is emitted and the message "M0:W:Pulse x lim." is displayed when the volume entered multiplied by the K factor of the device > 1000000.
- A "Warning" event is emitted and the message "M0:W:Pulse x 1:1" is displayed when the volume entered multiplied by the K factor of the device < 1. In this case, the pulse frequency is forced to the value of the input frequency.

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8.10.23. Setting the parameters of a pH/redox module

Refer to chap. 8.9 to access Parameters menu.



RTD: Choose the type of temperature sensor connected to the module.

TEMPERATURE: Choose the value of the temperature used in the process (particularly to compensate for the pH measurement):

- choose "Auto": the temperature of the fluid is measured by the sensor.
- choose "Manual": enter the value of the process temperature (in °C) in the next field, e.g. when no temperature sensor is connected to the module.

TEMP. ADJUST: The temperature measured can be corrected by an offset value. Enter the offset value in °C.

TEMP. CALIB: Choose the value of the temperature used when calibrating the probe/sensor:

- choose "Auto": the temperature of the fluid is measured by the sensor.
- choose "Manual": enter the value of the calibration temperature (in °C) in the next field, e.g. when no temperature sensor is connected to the module.

BUFFER: Choose the type of buffer solution used for automatic calibration of the pH probe/sensor, "Hamilton" solutions sold by Bürkert or solution conforming to DIN 19267:

- the multiCELL automatically recognizes the following "Hamilton" pH buffers: 2 ; 4,01 ; 7 ; 10 ; 12 ;
- the multiCELL automatically recognizes the following "DIN19267" pH buffers: 1,09 ; 4,65 ; 6,79 ; 9,23 ; 12,75.

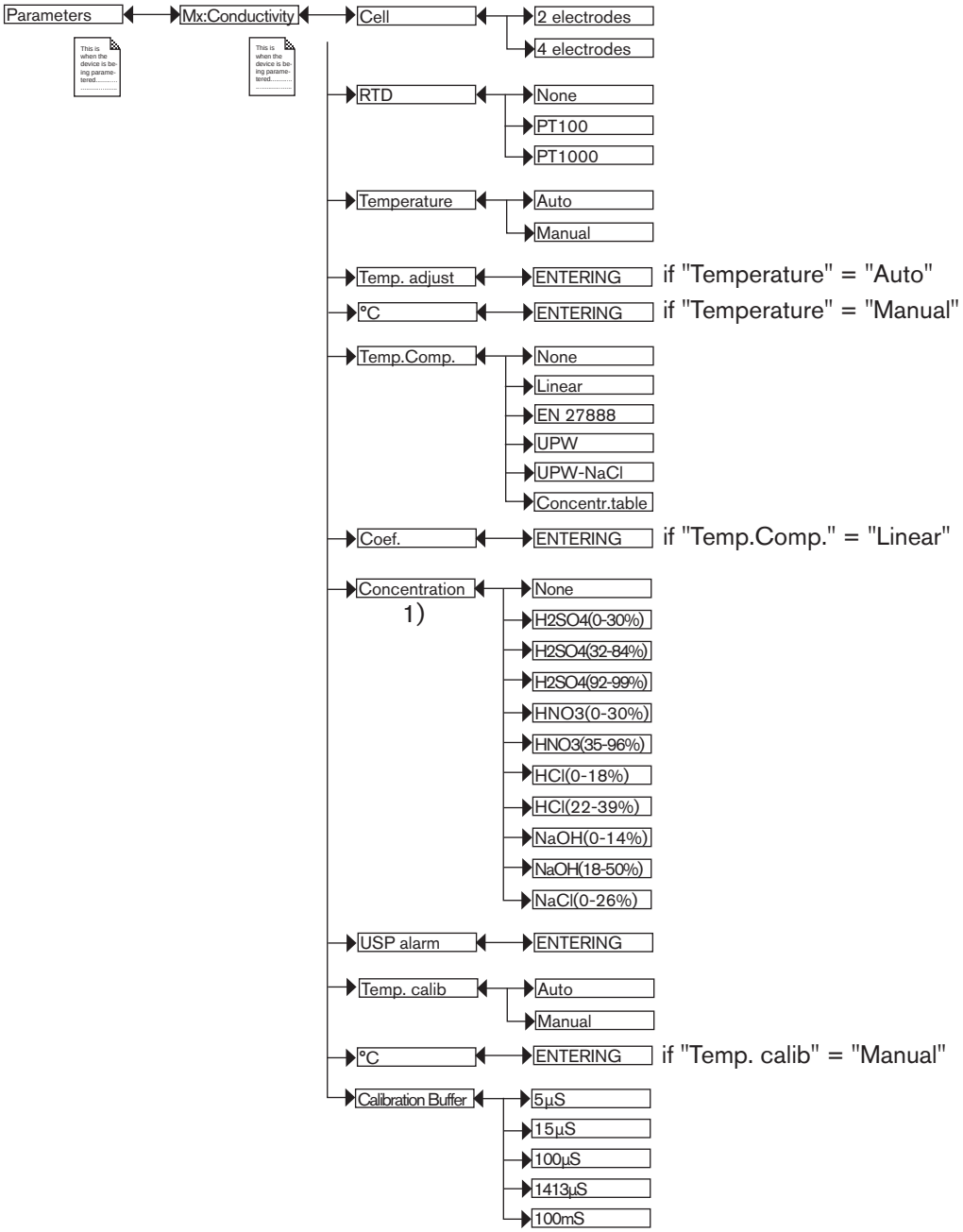
CALIBRATION LIMITS: Enter the ranges outside of which a warning or error message is generated during calibration:

- PH ZERO:
  - WARNING HIGH: Enter the pH0 value above which a warning message is displayed during calibration of the pH sensor.
  - WARNING LOW: Enter the pH0 value below which a warning message is displayed during calibration of the pH sensor.
  - ERROR HIGH: Enter the pH0 value above which an error message is displayed during calibration of the pH sensor.
  - ERROR LOW: Enter the pH0 value below which an error message is displayed during calibration of the pH sensor.
- PH SLOPE:
  - WARNING HIGH: Enter the slope value above which a warning message is displayed during calibration of the pH sensor.
  - WARNING LOW: Enter the slope value below which a warning message is displayed during calibration of the pH sensor.
  - ERROR HIGH: Enter the slope value above which an error message is displayed during calibration of the pH sensor.
  - ERROR LOW: Enter the slope value below which an error message is displayed during calibration of the pH sensor.
- ORP OFFSET:
  - WARNING HIGH: Enter the oxidation reduction potential value above which a warning message is displayed during calibration of the redox sensor.
  - WARNING LOW: Enter the oxidation reduction potential value below which a warning message is displayed during calibration of the redox sensor.
  - ERROR HIGH: Enter the oxidation reduction potential value above which an error message is displayed during calibration of the redox sensor.
  - ERROR LOW: Enter the oxidation reduction potential value below which an error message is displayed during calibration of the redox sensor.

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8.10.24. Setting the parameters of a conductivity module

Refer to chap. 8.9 to access Parameters menu.



1) This menu is available as an option: see chap. 8.10.4.

CELL: Choose the type of conductivity cell, either with 2 or 4 electrodes, connected to the module.

RTD: Choose the type of temperature sensor connected to the module.

TEMPERATURE: Choose the value of the temperature used in the process:

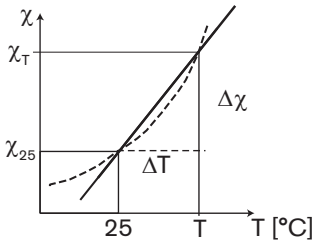
- choose "Auto": the temperature of the fluid is measured by the sensor
- choose "Manual": enter the value of the process temperature (in °C) in the next field, e.g. when no temperature sensor is connected to the module.

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TEMP. ADJUST: The temperature measured can be corrected by an offset value. Enter the offset value in °C.

TEMP.COMP.: Choose the type of temperature compensation to determine the fluid conductivity:

- according to a linear percentage (choose "linear"). The linear temperature compensation may be sufficiently precise for your process whenever the temperature of your process is always > 0°C. Enter a compensation of between 0.00 and 9.99%/°C in the next "Coef." field.
  Use the following graph and equation to calculate the average value of the compensation coefficient α according to a temperature range ΔT and the associated conductivity range $\Delta\chi$:

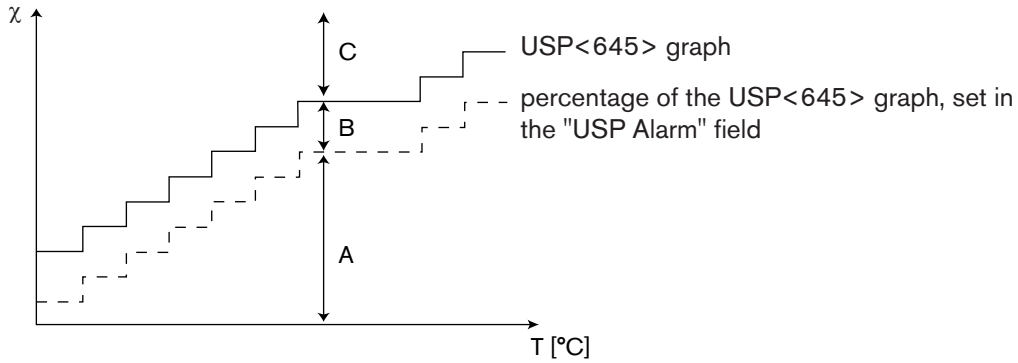


$$\alpha = \frac{\Delta\chi}{\Delta T} \times \frac{1}{\chi_{25}}$$

- or according to the natural water law (choose "EN27888").
- ou according to the ultra pure water law (choose "UPW").
- or according to the ultra pure water and sodium chloride laws (choose "UPW-NaCl").
- or according to the law of the concentration table (choose "Concentration table", available as an option) that has been chosen in the "Concentration" function hereafter.
- or deactivate temperature compensation (choose "None").

CONCENTRATION: Available as an option (see chap. 8.10.4). Choose the mass concentration table for your fluid in the list. This data (%) is then available in the list of process variables for the conductivity module. The fluid concentration is determined using the measured and non-compensated values of the conductivity and the temperature, whatever the choice made in "Temp.Comp.".

USP ALARM: Enter a conductivity value percentage from the table "USP <645>".



Graph zone	Description	Name displayed in the user defined "Ux" view (see chap. 8.10.8)	Associated code in the datalogger (see chap. 8.10.18)	State of the "on/off" output (see chap. 8.10.22)
C	The conductivity of the fluid has exceeded the value in the table USP<645> at the corresponding temperature.	"> Max."	1	ON (output not inverted)

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Graph zone	Description	Name displayed in the user defined "Ux" view (see chap. 8.10.8)	Associated code in the datalogger (see chap. 8.10.18)	State of the "on/off" output (see chap. 8.10.22)
B	The conductivity of the fluid is between the percentage set in the function "USP Alarm" and the value in the table USP<645> at the corresponding temperature.	"USP Alarm"	2	ON (output not inverted)
A	The conductivity of the fluid is below the percentage set in the function "USP Alarm" at the corresponding temperature.	"OK"	0	OFF (output not inverted)

TEMP. CALIB: Choose the value of the temperature used when calibrating the sensor:

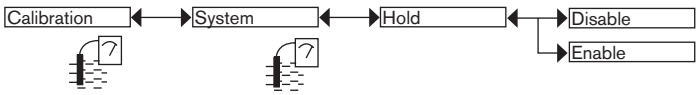
- choose "Auto": the temperature of the fluid is measured by the sensor
- choose "Manual": enter the value of the temperature (in °C) in the next field, e.g. when no temperature sensor is connected to the module.

CALIBRATION BUFFER: Choose the calibration solution used for the automatic calibration of the conductivity sensor.

8.11. Calibration menu

8.11.1. Activate/deactivate the Hold function

Refer to chap. 8.9 to access Calibration menu.



The Hold mode is automatically deactivated when the multiCELL restarts after a power interruption, if the Hold mode was activated at the moment of the power cut-off.

The Hold mode is used to carry out maintenance work without interrupting the process.

To activate the HOLD mode:

→ access the "HOLD" function;

→ choose "Enable";

→ confirm by "OK".

When the device is in Hold mode:

- the display shows the icon H instead of the icon ;
- the current emitted on each 4-20 mA output is fixed at the last value of the process input associated with each output;
- each digital output is fixed at the state acquired at the moment the Hold function is activated;
- the multiCELL remains in Hold mode until the Hold function is deactivated.

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To deactivate the HOLD mode:

→ access the "HOLD" function

→ choose "Disable"

→ confirm by "OK".

8.11.2. Modifying the Calibration menu access code

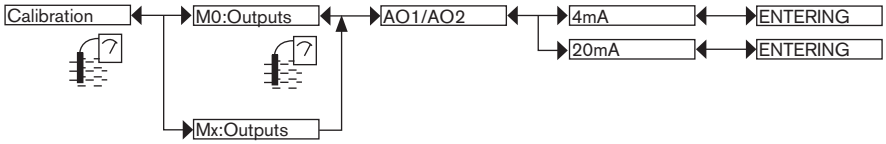
Refer to chap. 8.9 to access Calibration menu. If the default access code "0000" is kept, the device does not request it to access the Calibration menu.



8.11.3. Adjusting the current outputs

Ensure that Hold mode is deactivated before adjusting the current outputs: the icon is displayed.

Refer to chap. 8.9 to access Calibration menu.



4mA: Adjust the offset of the current output.

When the "4mA" function is selected, the multiCELL generates a current of 4 mA:

→ measure the current emitted by the 4-20 mA output using a multimeter;

→ enter the value given by the multimeter.

20mA: Adjust the span on current output 1 or current output 2.

When the "20mA" function is selected, the multiCELL generates a current of 20 mA:

→ measure the current emitted by the 4-20 mA output using a multimeter;

→ enter the value given by the multimeter.

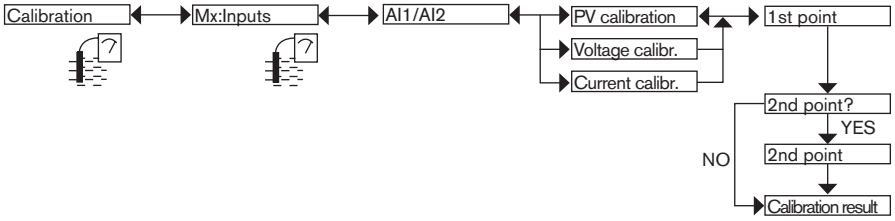
→

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8.11.4. Calibrating the analogue inputs

This calibration does not replace the calibration of the measuring sensor.

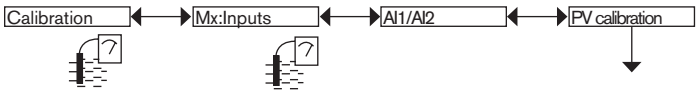
Refer to chap. 8.9 to access Calibration menu.



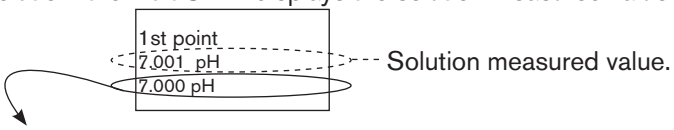
An analogue input, AI1 or AI2, can be calibrated:

- either with respect to the measured process variable (function "PV calibration"). See Figure 68.
- or with respect to the current or voltage source connected to the input. This calibration is used to precisely adjust the bounds of the analogue input to the bounds of the connected instrument.

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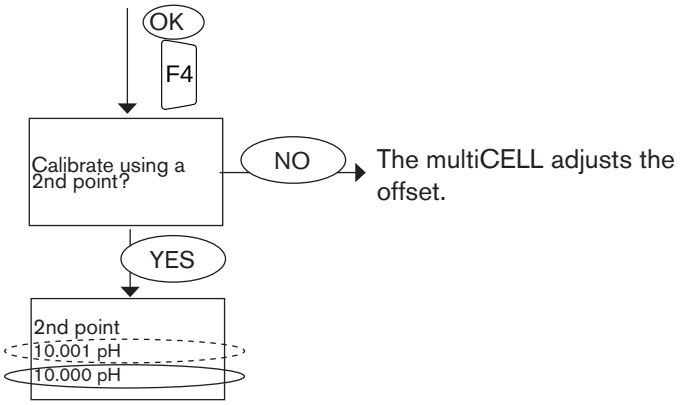


→ Immerse the probe of the sensor (for insatne a pH sensor) in the first buffer solution: the multiCELL displays the solution measured value.



→ Enter the value of the buffer solution (indicated on the bottle).

→ Wait until the measured value stabilises.

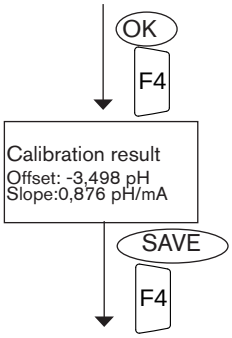


→ Rinse the probe.

→ Immerse the clean probe in the second buffer solution: the multiCELL displays the measured value of the solution.

→ Enter the value of the second buffer solution (indicated on the bottle).

→ Wait until the measured value stabilises.

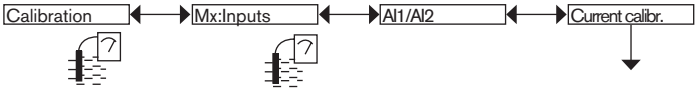


The multiCELL associates the two calibrated values to the range of the selected analogue input signal (slope and offset).

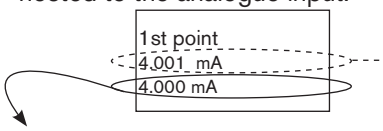
Figure 68 : Example for the calibration of an analogue input with respect to the pH measured by an instrument having a 4-20 mA output

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Connect the analogue input AI1 or AI2 to the current or voltage analogue output of an external instrument (for instance, the 4-20 mA output of a pressure measuring device type 8311).

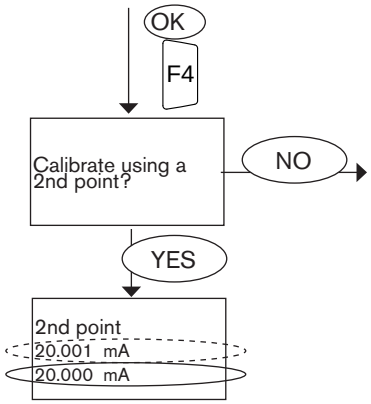


→ Generate a 4 mA current on the 4-20 mA output of the instrument connected to the analogue input.



→ Enter 4 mA.

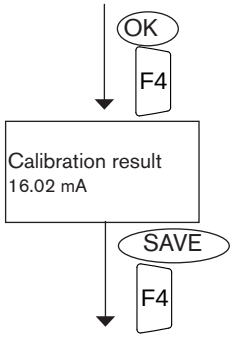
→ Wait for the measurement to stabilize.



→ Generate a 20 mA current on the 4-20 mA output of the instrument connected to the analogue input.

→ Enter 20 mA.

→ Wait for the measurement to stabilize.



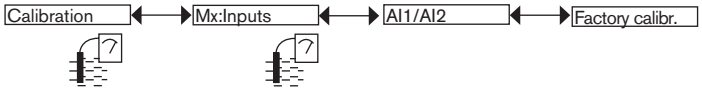
The analogue input signal is adjusted (slope and offset) and the multiCELL displays the input calibrated value.

Figure 69 : Example for the calibration of an analogue input with respect to the current output of a pressure measuring device type 8311

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8.11.5. Restore the factory calibration of the analogue inputs

Refer to chap. 8.9 to access Calibration menu.



8.11.6. Resetting the totalizers

This function is available if the software option "FLOW" is activated. See chap. 8.10.4.

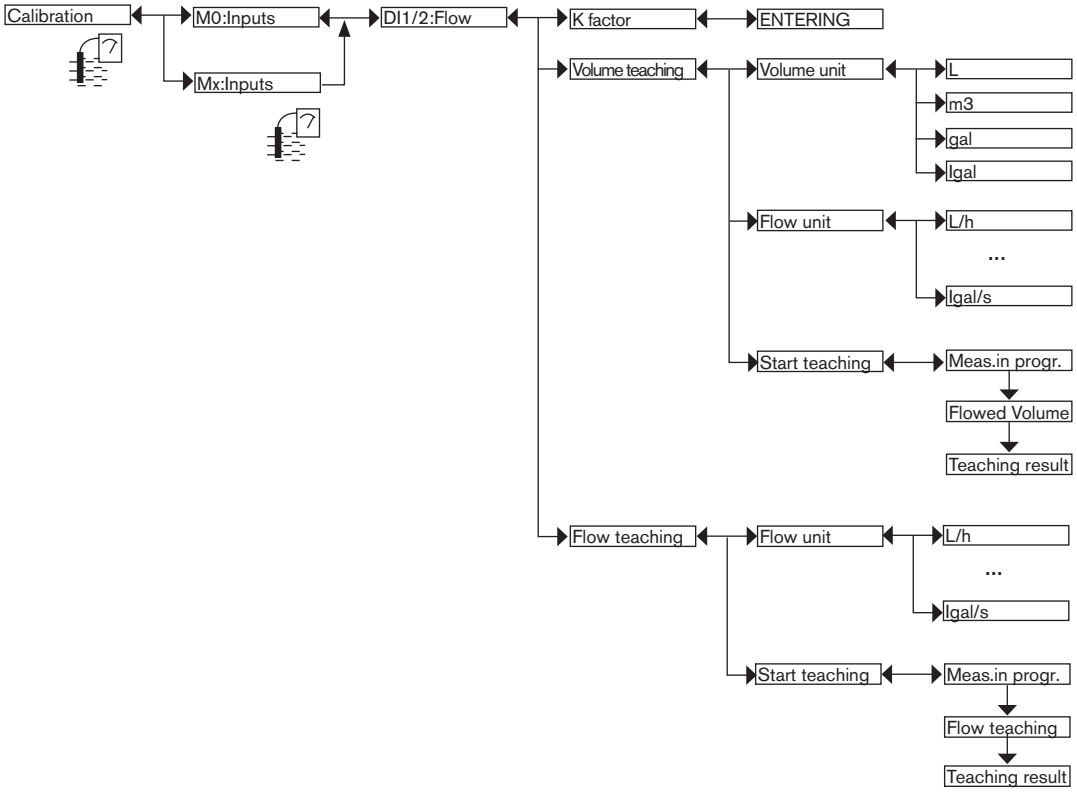
Refer to chap. 8.9 to access Calibration menu.



8.11.7. Entering the K factor for the used fitting or determining it using teach-in

This function is available on the devices with analysis modules if the software option, "FLOW", is activated. See chap. 8.10.4.

Refer to chap. 8.9 to access Calibration menu.



→ Use one of the following 3 methods to configure the pulse input of the multiCELL for a flow rate measurement:

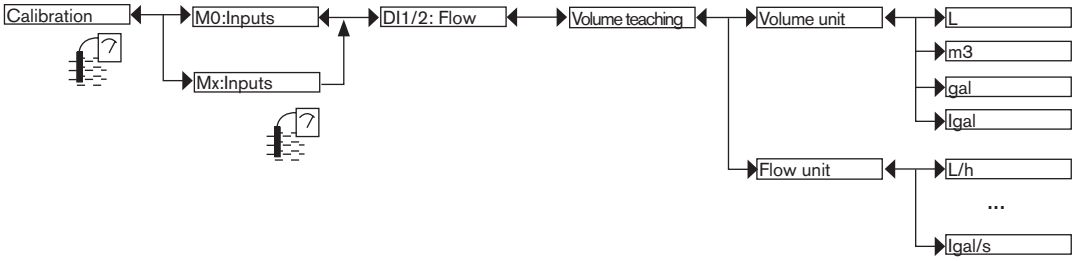
- *K.FACTOR*: Enter the K factor in pulse/liter unique to the fitting used. Refer to the user manual of the fitting used.

- *VOLUME TEACH*: Determine the K factor unique to your installation using a teach-in procedure by volume. Follow the procedure below.
- *FLOW TEACH*: Determine the K factor unique to your installation using a teach-in procedure by flow rate. Follow the procedure on next page.

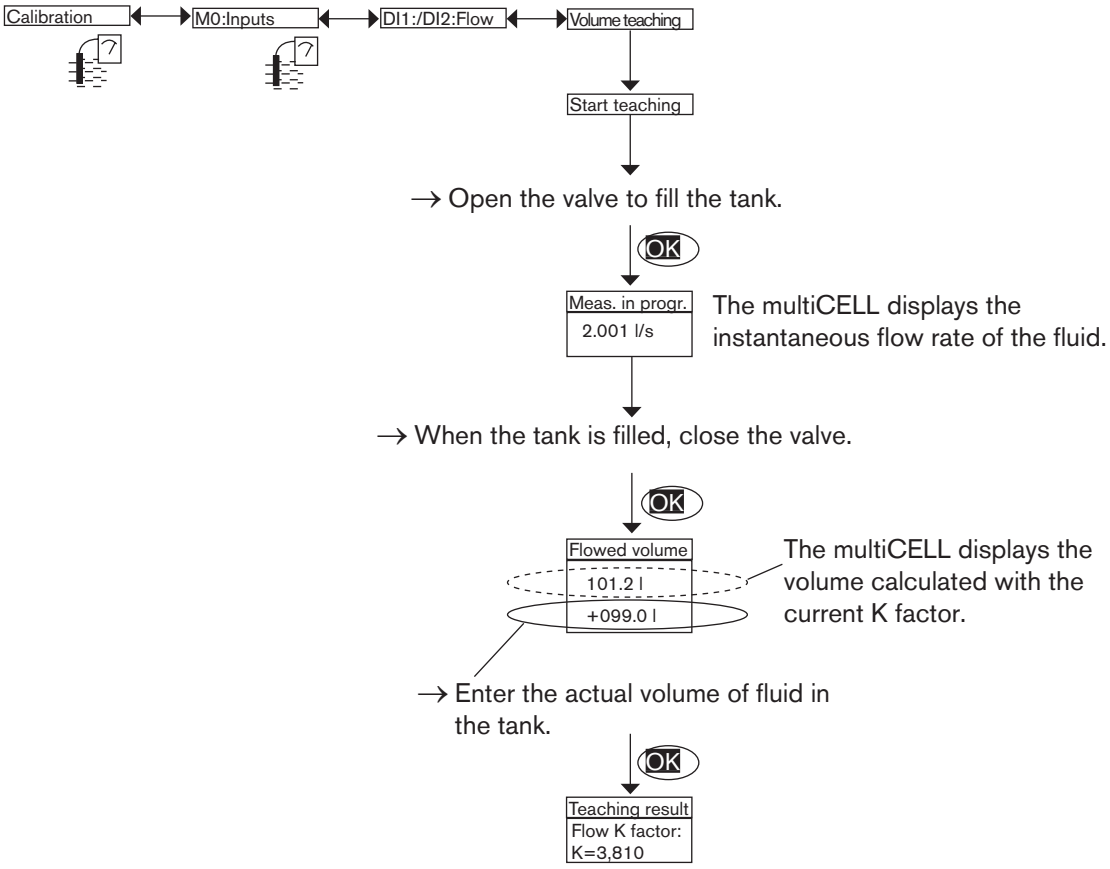
Detailed procedure for teach-in by volume

→ Prepare a tank capable of containing 100 litres, for example;

→ Choose the volume unit and the flow rate unit in which the teach-in is run:



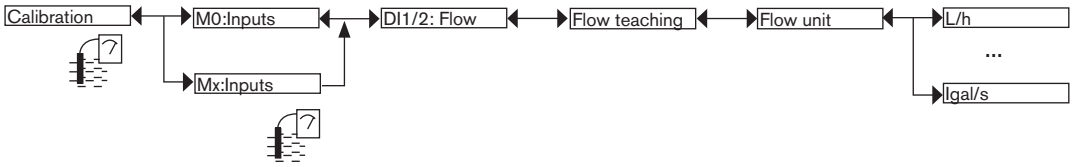
→ Running teach-in by volume:



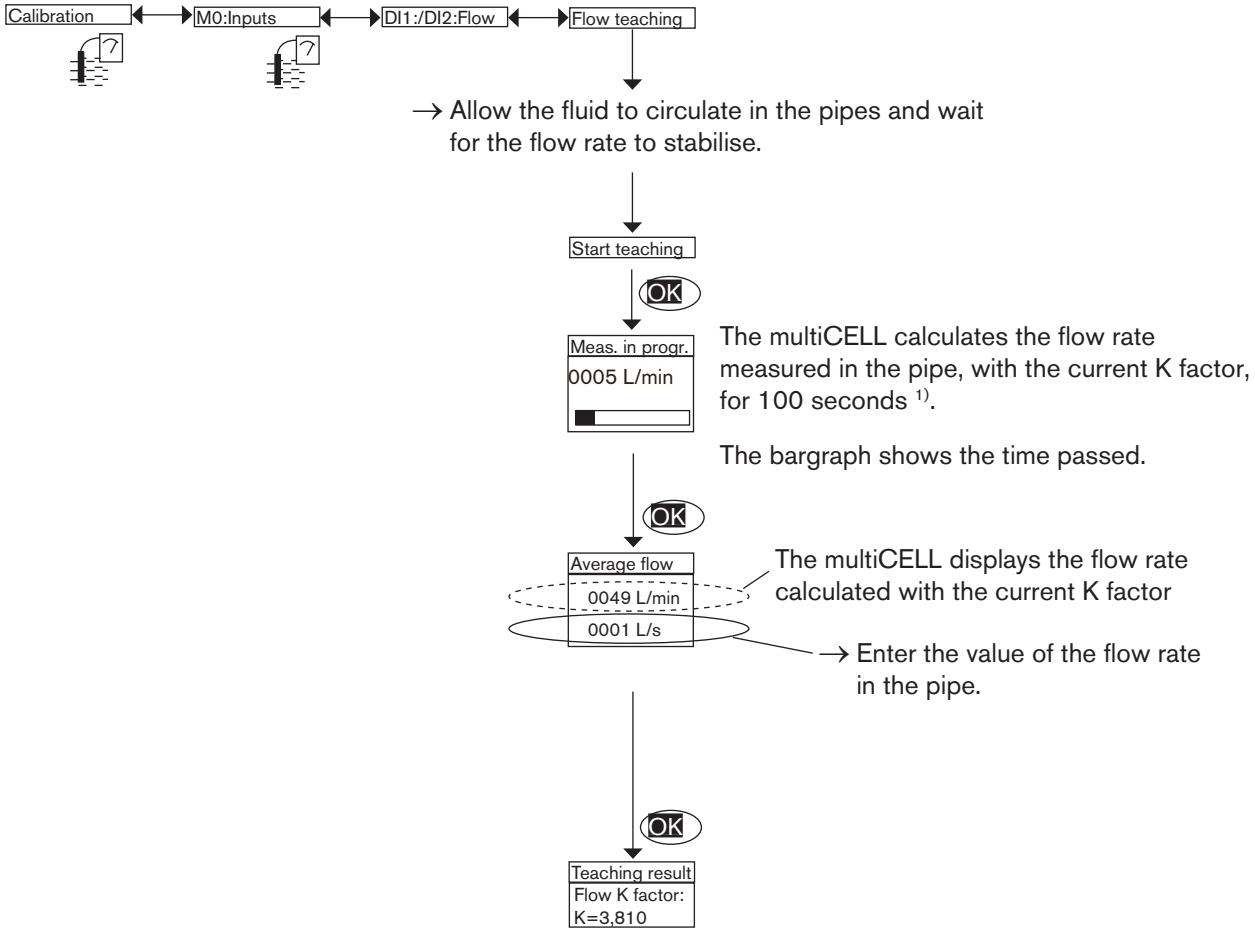
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Detailed procedure for teach-in by flow rate

→ Choose the flow rate unit in which teach-in is run:



→ Run teach-in by flow rate:

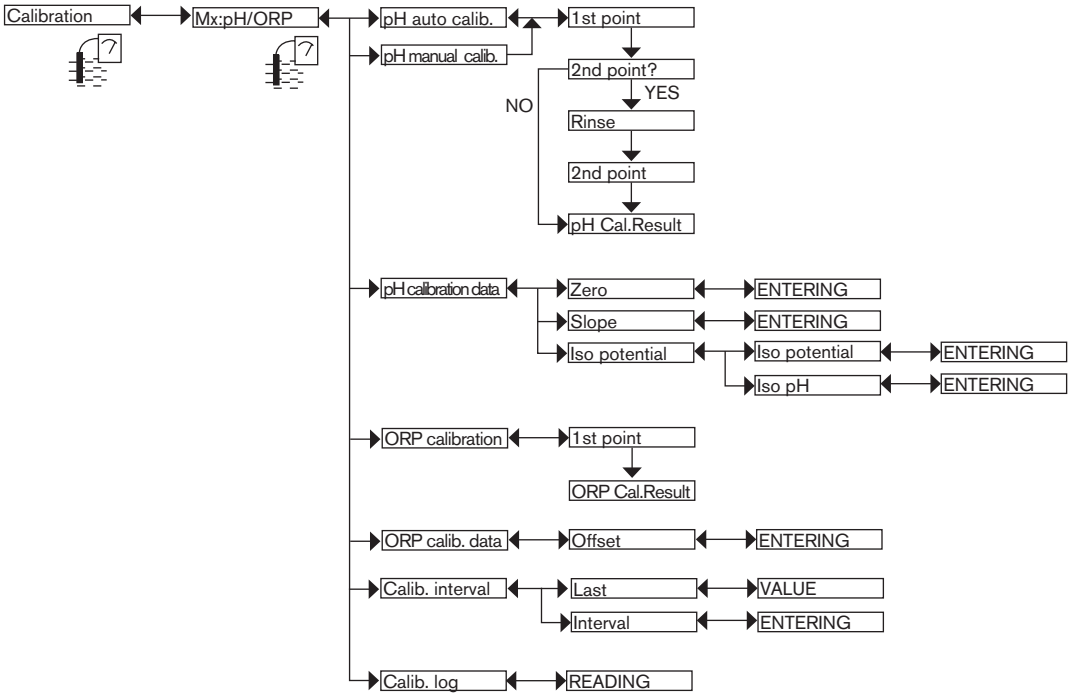


1) Measurement can be suspended at any time by clicking on "OK".

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8.11.8. Calibrating a pH or redox sensor

Refer to chap. 8.9 to access Calibration menu.



→ Use one of the following 3 methods to calibrate a pH sensor:

- *PH AUTO CALIBRATION*: Automatically calibrate the pH sensor; first choose the buffer solution used in the menu "Parameters -> Mx:pH/ORP -> Buffer". The multiCELL automatically recognizes the pH of the buffer used. When a sensor is calibrated automatically, the most recent calibration date is updated (function "LAST" in the sub-menu "CALIBRATION INTERVAL" below).
- *PH MANUAL CALIBRATION*: Calibrate the pH sensor using a 1- or 2-point procedure. See details on p. 84. When a sensor is calibrated manually, the most recent calibration date is updated (function "LAST" in the sub-menu "CALIBRATION INTERVAL" below).
- *PH CALIBRATION DATA*: Enter the zero values and the slope indicated on the certificate for the pH sensor, if provided. This entry does not update the most recent calibration date (function "LAST" in the sub-menu "CALIBRATION INTERVAL" below).

→ Use one of the following 2 methods to calibrate a redox sensor:

- *ORP CALIBRATION*: Calibrate the redox sensor using a 1-point procedure. See details on page 94.
- *ORP CALIBRATION DATA*: Enter the offset value indicated on the certificate for the redox sensor, if provided.

CALIBRATION INTERVAL: Read the date of the most recent manual or automatic calibration and enter the periodicity of calibration, in days: each time a calibration is due, the multiCELL generates a "maintenance" event, signalled on the display by the icon , and a "warning" event, signalled on the display by the icon ⚠. Configure "0000 days" in order not to use the function.

- The "warning" event may be associated with one and/or other digital outputs (see chap. 8.10.22).
- See also "If you encounter problems", chap. 9.3

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CALIB. LOG: Read the latest valid calibration values.

Manually calibrating the pH or redox sensor

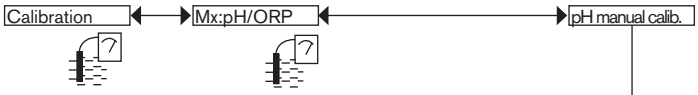
- The pH sensor can be calibrated according to a 1-point or a 2-point procedure.
- The redox sensor can only be calibrated according to a 1-point procedure.

- Modify the default calibration limits before calibrating your sensor: see chap. 8.10.23
- In order not to interrupt the process, activate the HOLD function (see chap. 8.11.1).
- Before each calibration, correctly clean the electrode with a suitable product.
- In a 2-point calibration, the buffer solutions used must be at the same temperature.
- Set the periodicity of calibrations in the "Calibration Interval" function (see previous page): each time a calibration is due, the multiCELL generates a "maintenance" event and a "warning" event.

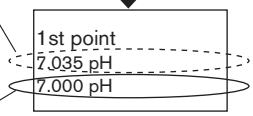
Detailed procedure for the 1- or 2-point calibration of a pH sensor

- The 1-point calibration procedure is used for rapid calibration by adjusting the zero of the measurement graph with a buffer solution with a known pH (to calibrate a pH sensor: see below) or a known oxidation reduction potential (to calibrate a redox sensor: see page 94).
- The 2-point calibration procedure is used for accurate calibration of zero and the slope of the measurement graph of the pH sensor. This operation requires 2 buffer solutions: in general a first solution with a pH of 7 and a second solution with a pH very close to that of the process value to be measured. See below.

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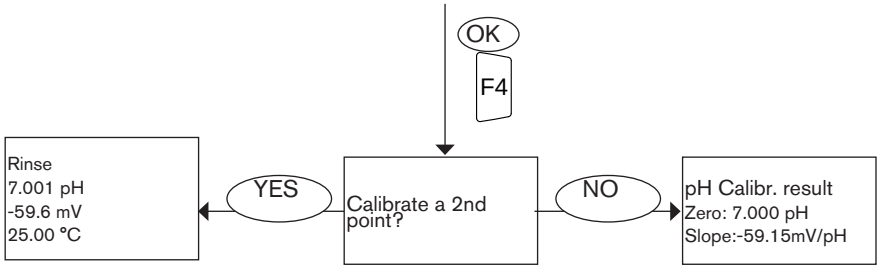


→ Immerse the clean probe in the first buffer solution: the multiCELL displays the measured pH of the solution.



→ Enter the pH of the buffer solution (indicated on the bottle)

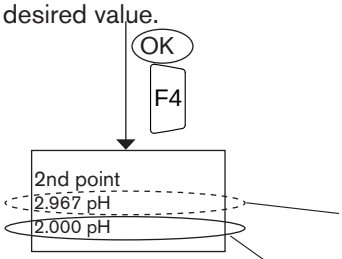
→ Wait until the measured pH stabilises.



→ Rinse the probe.

→ confirm rinsing by "OK" when the pH reaches the desired value.

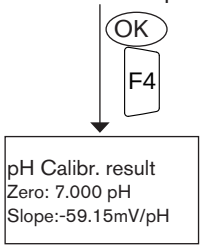
The multiCELL displays the calibration result. [1)]



→ Immerse the clean probe in the second buffer solution: the multiCELL displays the measured pH of the solution.

→ Enter the pH of the second buffer solution (indicated on the bottle)

→ Wait until the measured pH stabilises.



The multiCELL displays the calibration result. [1)]

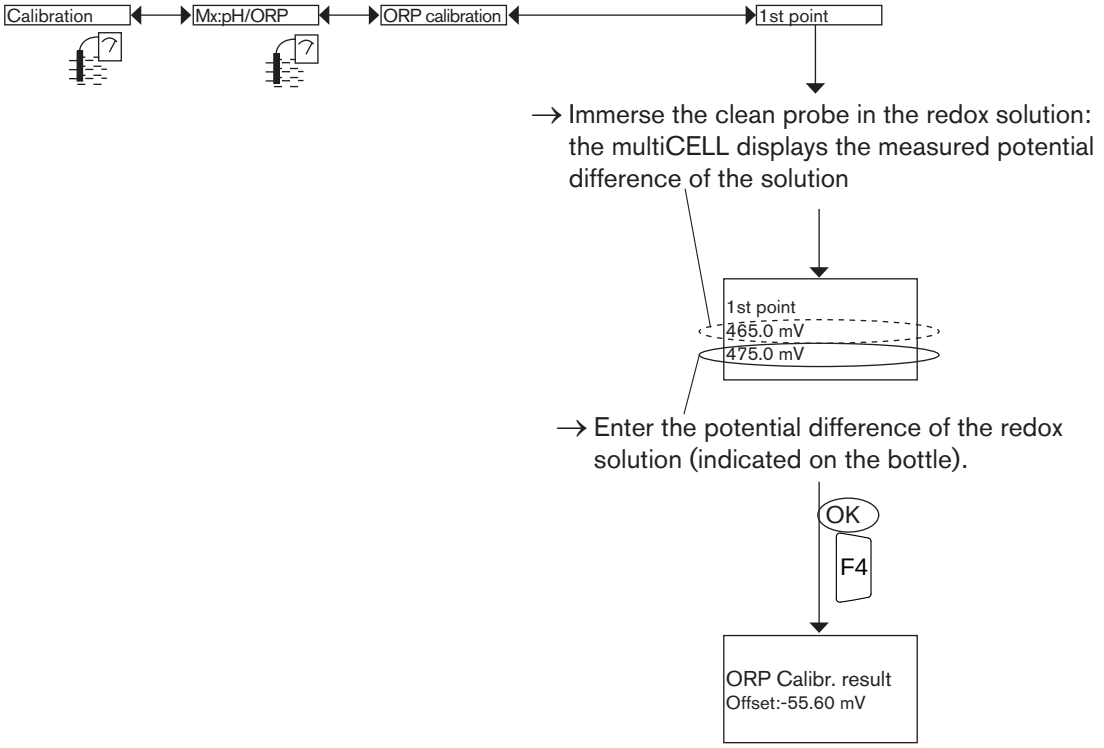
1)

- a possible "warning" message indicates either an error in the buffer solution or the ageing of the probe.
- a possible "error" message indicates that the probe must be replaced.

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Detailed procedure for the calibration of the oxidation reduction potential sensor (1-point only)

The 1-point calibration procedure is used for a quick calibration by adjusting the zero of the measurement graph with a buffer solution with a known oxidation reduction potential.



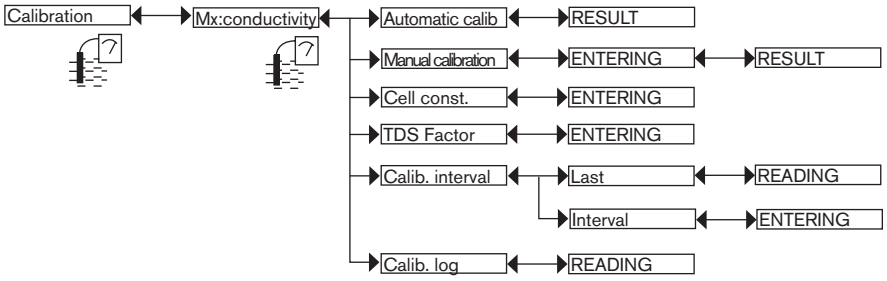
The multiCELL displays the calibration result. [1)]

1)

- a possible "warning" message indicates either an error in the solution or the ageing of the probe.
- a possible "error" message indicates that the probe must be replaced.

8.11.9. Calibrating a conductivity sensor

Refer to chap. 8.9 to access Calibration menu.



→ Use one of the following 3 methods to calibrate a conductivity sensor:

- *AUTOMATIC CALIBRATION*: Calibrate the conductivity sensor by automatically determining its specific C constant; choose the reference solution used in the menu "Parameters -> Mx:conductivity -> Buffer". When a sensor is calibrated automatically, the most recent calibration date is updated (function "LAST" in the sub-menu "CALIBRATION INTERVAL" below).

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- *MANUAL CALIBRATION*: Calibrate the conductivity sensor by determining its specific C constant. See details of the procedure below. When a sensor is calibrated manually, the most recent calibration date is updated (function "LAST" in the sub-menu "CALIBRATION INTERVAL" below).
- *CELL CONST.*: Read the most recent C constant determined by one of the calibration functions or modify it. This entry does not update the most recent calibration date (function "LAST" in the sub-menu CALIB INTERVAL below).

TDS FACTOR: Enter the conversion factor between conductivity and quantity of dissolved solids (TDS) appropriate to your fluid.

CALIBRATION INTERVAL: Read the date of the last automatic or manual calibration (function "LAST") and set the periodicity of calibrations, in days (function "INTERVAL"): each time a calibration is due, the multiCELL generates a "maintenance" event, signalled on the display by the icon , and a "warning" event. Configure "0000 days" in the "INTERVAL" function in order not to use the function.

- The "warning" event may be associated with one and/or other digital outputs (see chap. 8.10.22).
- See also "If you encounter problems", chap. 9.3

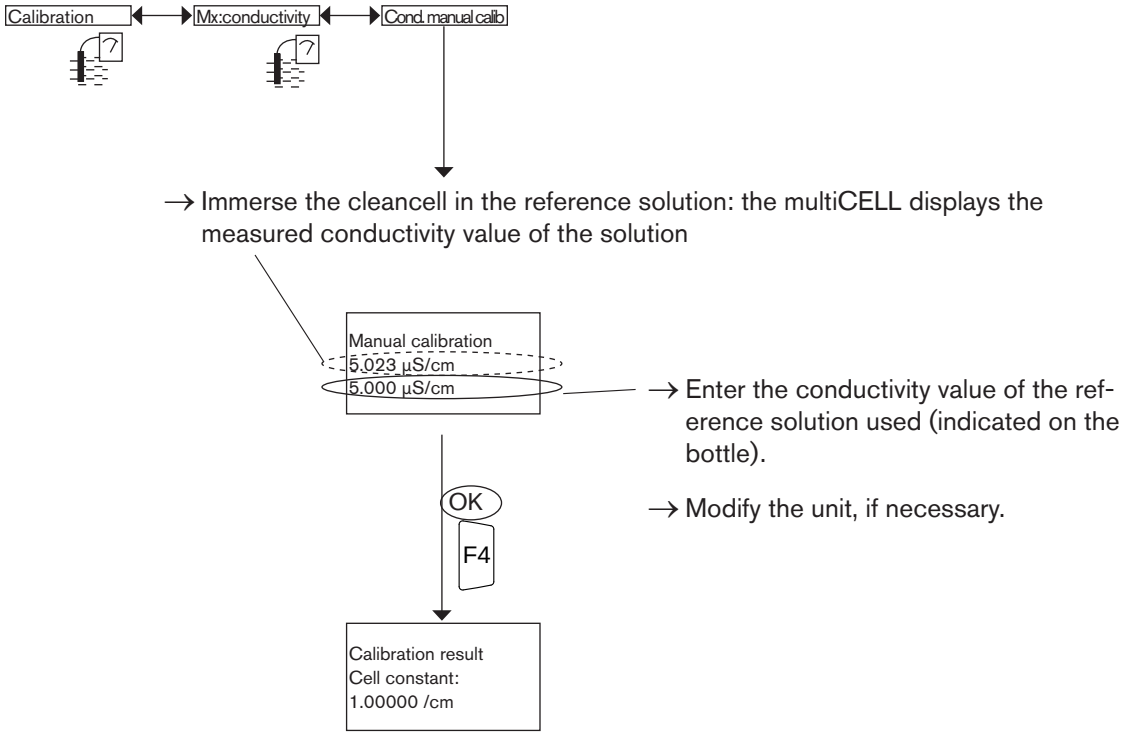
CALIB. LOG: Read the latest valid calibration values.

Details of the calibration procedure for a conductivity sensor

Calibration consists in determining the cell constant specific to each sensor using a solution with a known conductivity.

- In order not to interrupt the process, activate the HOLD function (see chap. 8.11.1).
- Before each calibration, correctly clean the electrode with a suitable product.
- Set the periodicity of calibrations in the "Interval" function in the sub-menu "Calib interval" (see above): each time a calibration is due, the multiCELL generates a "maintenance" event and a "warning" event.

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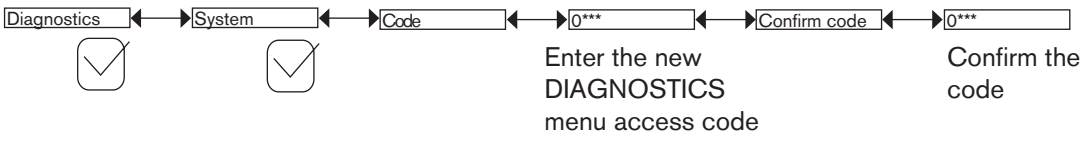


The multiCELL displays the calibration result.

8.12. "Diagnostics" menu

8.12.1. Modifying the "Diagnostics" menu access code

Refer to chap. 8.9 to access the Diagnostics menu. If the default access code "0000" is kept, the device does not request it to access the Diagnostics menu.

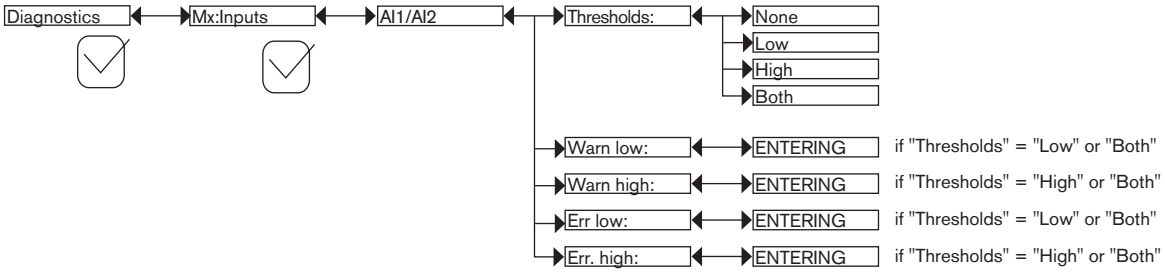


8.12.2. Monitoring the current or voltage value received on the analogue inputs

This function is used to define the behaviour of the limits entered by the user are reached.

Refer to chap. 8.9 to access the Diagnostics menu.

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A malfunction in your process may be revealed by too low or too high value received on the analogue input.

To be warned when the value received on the analogue input is out of range:

→ choose which thresholds have to be monitored, in the "Thresholds" function, and then

→ set one or two threshold values outside of which the multiCELL generates a "warning" event and displays the icons and ;

→ set one or two threshold values outside of which the multiCELL generates an "error" event and displays the icons and .

When a "warning" or "error" event is generated by the multiCELL:

→ go into the "Information" menu to read the cause of generation of this event;

→ correct the problem according to the instructions given in chap. 9.3.

- The "warning" event may also be associated with one and/or other digital outputs. See chap. 8.10.22.
- A current of 22 mA may be emitted on one and/or other of the current outputs when an "error" event related to either the monitoring of the fluid pH, redox, conductivity or temperature values or the monitoring of an analogue input is generated. See chap. 8.10.21 to activate the mode.
- See also "If you encounter problems", chap. 9.3

WARN. LOW: Enter the analogue input value below which a "warning" event is generated.

WARN. HIGH: Enter the analogue input value above which a "warning" event is generated.

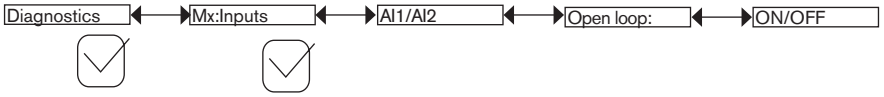
ERR. LOW: Enter the analogue input value below which an "error" event is generated.

ERR. HIGH: Enter the analogue input value above which an "error" event is generated.

8.12.3. Detecting an open loop on a voltage input

This function is available for an analogue input configured in "voltage" mode.

Refer to chap. 8.9 to access the Diagnostics menu.



ON/OFF : Activate or deactivate the open loop detection.

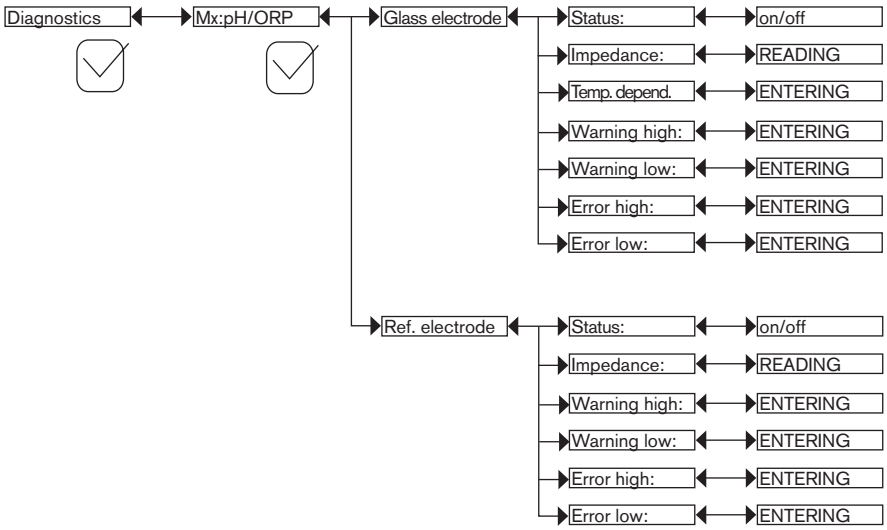
When the function has been activated, an "error" event is generated and the message "Mx:E:AIx open" registered in the data logger if no source is connected to the voltage input or if the wiring is incorrect.

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8.12.4. Monitoring the pH or redox values

This function is used to define the behaviour of the device if problems arise on the pH probe (glass electrode and/or reference electrode) or the redox probe (reference electrode only).

Refer to chap. 8.9 to access the Diagnostics menu.



A malfunction in your process or on the measurement probe may be revealed by too low or too high value of the impedance.

To be warned when the impedance measurement is out of range:

→ activate monitoring of fluid impedance in the "Status" function, and then

→ set an impedance range outside of which the multiCELL generates a "warning" event and displays the icons and ⚠ ;

→ set an impedance range outside of which the multiCELL generates an "error" event and displays the icons and ⊗ .

When a "warning" or "error" event is generated by the multiCELL:

→ go into the "Information" menu to read the cause of generation of this event;

→ and/or read the measured impedance value;

→ if necessary, clean the probe and/or recalibrate the measurement sensor;

→ if necessary, check the process.

- The "warning" event may also be associated with one and/or other digital outputs. See chap. 8.10.22.
- A current of 22 mA may be emitted on one and/or other of the current outputs when an "error" event related to either the monitoring of the fluid pH, redox, conductivity or temperature values or the monitoring of an analogue input is generated. See chap. 8.10.21 to activate the mode.
- See also "If you encounter problems", chap. 9.3

STATUS: Choose to activate or deactivate monitoring of the impedance of the electrode selected.

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This monitoring is done by the generation of a "warning" event if the impedance range defined in the "Warn Hi/Lo" functions below is exceeded and an "error" event if the impedance range defined in the "Err Hi/Lo" functions below is exceeded.

IMPEDANCE: Read the impedance, measured in real time, on the electrode selected.

TEMP. DEPEND.: Temperature correction coefficient for measuring the impedance of a fluid. The default coefficient is valid for probes sold by Bürkert.

WARNING HIGH: Enter the impedance value above which a "warning" event is generated.

WARNING LOW: Enter the impedance value below which a "warning" event is generated.

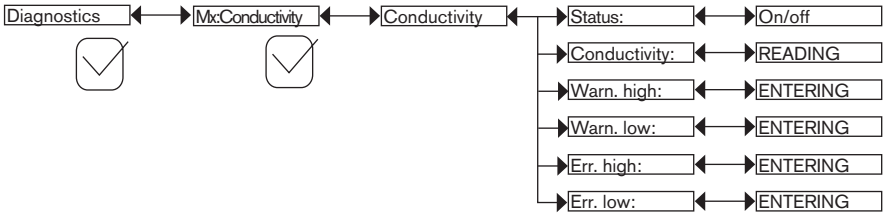
ERROR HIGH: Enter the impedance value above which an "error" event is generated.

ERROR LOW: Enter the impedance value below which an "error" event is generated.

8.12.5. Monitoring the conductivity of the fluid

This function is used to monitor the fluid conductivity and define the device's behaviour if the ranges defined are exceeded.

Refer to chap. 8.9 to access the Diagnostics menu.



A malfunction in your process or on the measurement cell may be revealed by too low or too high a fluid conductivity.

To be warned when the conductivity is out of range:

→ activate monitoring of fluid conductivity in the "Status" function, and then

→ set a fluid conductivity range outside of which the multiCELL generates a "warning" event and displays the icons ☹ and ⚠.

→ set a fluid conductivity range outside of which the multiCELL generates an "error" event and displays the icons ☹ and ⊗ .

When a "warning" or "error" event is generated by the multiCELL:

→ go into the "Information" menu to read the cause of generation of this event

→ and/or read the measured conductivity value.

→ if necessary, clean the cell and/or recalibrate the sensor.

→ if necessary, check the process.

- The "warning" event may also be associated with one and/or other digital outputs. See chap. 8.10.22.
- A current of 22 mA may be emitted on one and/or other of the current outputs when an "error" event related to either the monitoring of the fluid pH, redox, conductivity or temperature values or the monitoring of an analogue input is generated. See chap. 8.10.21 to activate the mode.
- See also "If you encounter problems", chap. 9.3

STATUS: Choose whether or not to activate monitoring of fluid conductivity.

This monitoring is done by the generation of a "warning" event if the fluid conductivity range defined in the "Warn Hi/Lo" functions below is exceeded and an "error" event if the fluid conductivity range defined in the "Err Hi/Lo" functions below is exceeded.

CONDUCTIVITY: Read the fluid conductivity measured in real time by the sensor.

WARN. HIGH: Enter the fluid conductivity value above which a "warning" event is generated.

WARN. LOW: Enter the fluid conductivity value below which a "warning" event is generated.

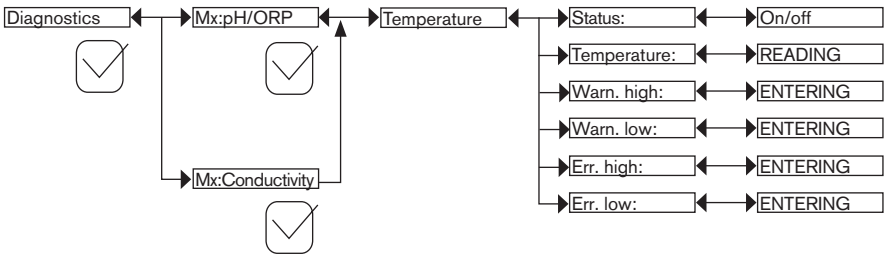
ERR. HIGH: Enter the fluid conductivity value above which an "error" event is generated.

ERR. LOW: Enter the fluid conductivity value below which an "error" event is generated.

8.12.6. Monitoring the temperature of the fluid

This function is used to monitor the fluid temperature and define the device's behaviour if the ranges defined are exceeded.

Refer to chap. 8.9 to access the Diagnostics menu.



A malfunction in your process or on the temperature sensor may be revealed by too low or too high a fluid temperature or by an incorrect temperature measurement.

To be warned when the temperature measurement is out of range:

→ activate monitoring on the fluid temperature in the "Status" function, and then

→ set a temperature range (in °C) outside of which the multiCELL generates a "warning" event and displays the icons ☹ and ⚠ ;

→ set a temperature range (in °C) outside of which the multiCELL generates an "error" event and displays the icons ☹ and ⓧ .

When a "warning" or "error" event is generated by the multiCELL:

→ go into the "Information" menu to read the cause of the event generation

→ and/or read the measured temperature value.

→ check whether the temperature sensor is working correctly by measuring a fluid with a known temperature. If the temperature sensor is faulty, return the device to Bürkert;

→ if the temperature sensor is not the cause of the problem, check the process.

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- The "warning" event may also be associated with one and/or other digital outputs. See chap. 8.10.22.
- A current of 22 mA may be emitted on one and/or other of the current outputs when an "error" event related to either the monitoring of the fluid pH, redox, conductivity or temperature values or the monitoring of an analogue input is generated. See chap. 8.10.21 to activate the mode.
- See also "If you encounter problems", chap. 9.3

STATUS: Choose whether or not to activate monitoring of the fluid temperature.

This monitoring is done by the generation of a "warning" event if the fluid temperature range defined in the "Warn Hi/Lo" functions below is exceeded and an "error" event if the fluid temperature range defined in the "Err Hi/Lo" functions below is exceeded.

TEMPERATURE: Read the fluid temperature measured in real time by the temperature sensor.

WARN. HIGH: Enter the fluid temperature value above which a "warning" event is generated.

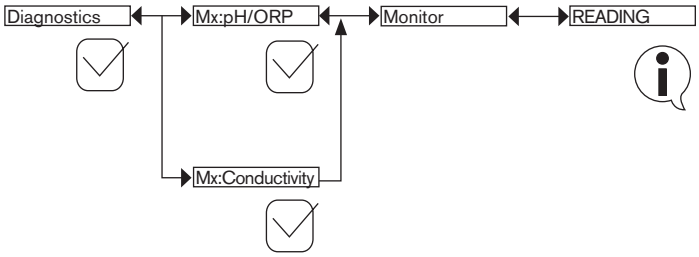
WARN. LOW: Enter the fluid temperature value below which a "warning" event is generated.

ERR. HIGH: Enter the fluid temperature value above which an "error" event is generated.

ERR. LOW: Enter the fluid temperature value below which an "error" event is generated.

8.12.7. Reading the parameters of the pH, redox or conductivity sensor

Refer to chap. 8.9 to access the Diagnostics menu.



8.13. Tests menu

8.13.1. Modifying the "Tests" menu access code

Refer to chap. 8.9 to access "Tests" menu. If the default access code "0000" is kept, the device does not request it to access the "Tests" menu.

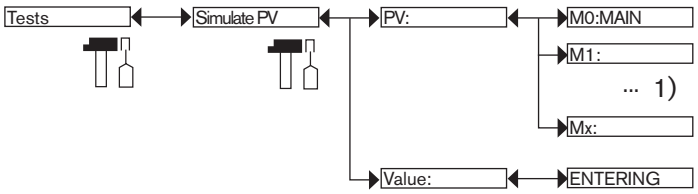


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8.13.2. Simulating an input or a process variable

The icon T is displayed in place of the icon whenever the correct operation test is run on an output. During the test, this output no longer reacts, depending on the physical parameter measured.

Refer to chap. 8.9 to access the Tests menu.



[1] *The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16.*

To exit the "Tests" menu, press the dynamic key, "ABORT".

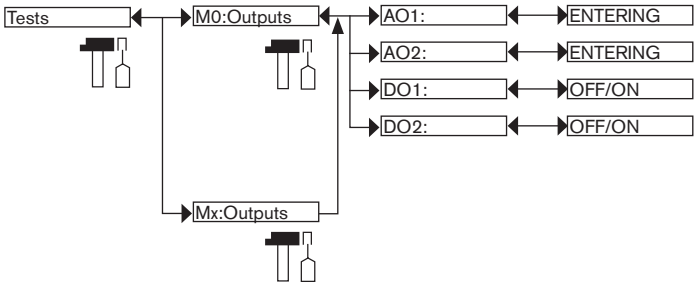
PV: Choose the process input to be simulated. The options available depend on the modules fitted.

VALUE: Enter a process value selected from the "PV" function above to check output behaviour.

8.13.3. Checking that the outputs are working correctly

The icon T is displayed in place of the icon whenever the correct operation test is run on an output. During the test, this output no longer reacts, depending on the physical parameter measured.

Refer to chap. 8.9 to access the Tests menu.



To exit the "Tests" menu, press the dynamic key, "ABORT".

AO1: Check that current output 1 on the selected module is working correctly by entering a current value and then selecting "OK".

AO2: Check that current output 2 on the selected module is working correctly by entering a current value and then selecting "OK".

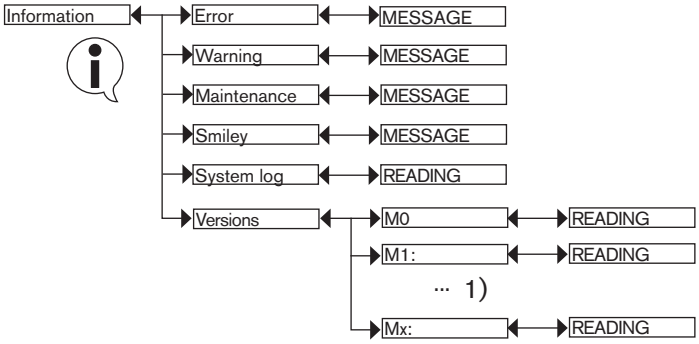
DO1: Check that digital output 1 on the module selected is working correctly by selecting the state "ON" or "OFF" and then "OK".

DO2: Check that digital output 2 on the module selected is working correctly by selecting the state "ON" or "OFF" and then "OK".

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8.14. Information menu

Refer to chap. 8.9 to access the Information menu.



1) The choices offered depend on the modules fitted

This menu is used to read:

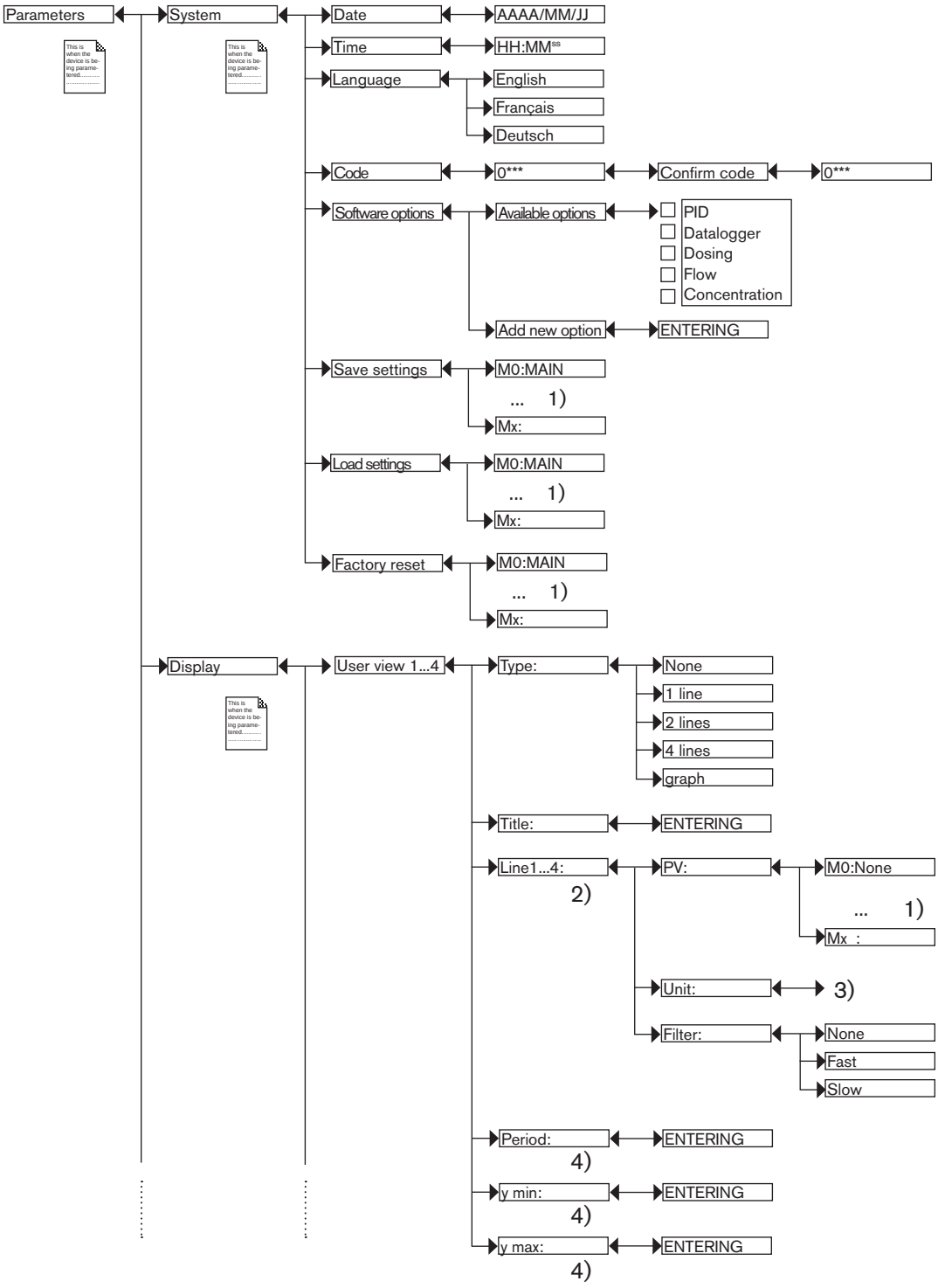
- a short description of the reason why the following icons are displayed by the multiCELL, on the one hand:
  - ERROR :
  - WARNING : ⚠
  - MAINTENANCE :
  - SMILEY : or
- on the other hand:
  - "SYSTEM LOG" function: read all the messages generated by the multiCELL including "error", "warning" and "maintenance" events.
  - "VERSIONS" function: the software version of modules for the acquisition/conversion of measured physical parameters and for the M0:MAIN board: the serial number of the device ("Product SN"), the order code for the device ("Product ID"), etc

See also "If you encounter problems", chap. 9.3

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8.15. Structure of the configuring menus

Refer to chap. 8.9 to access Configuration level.



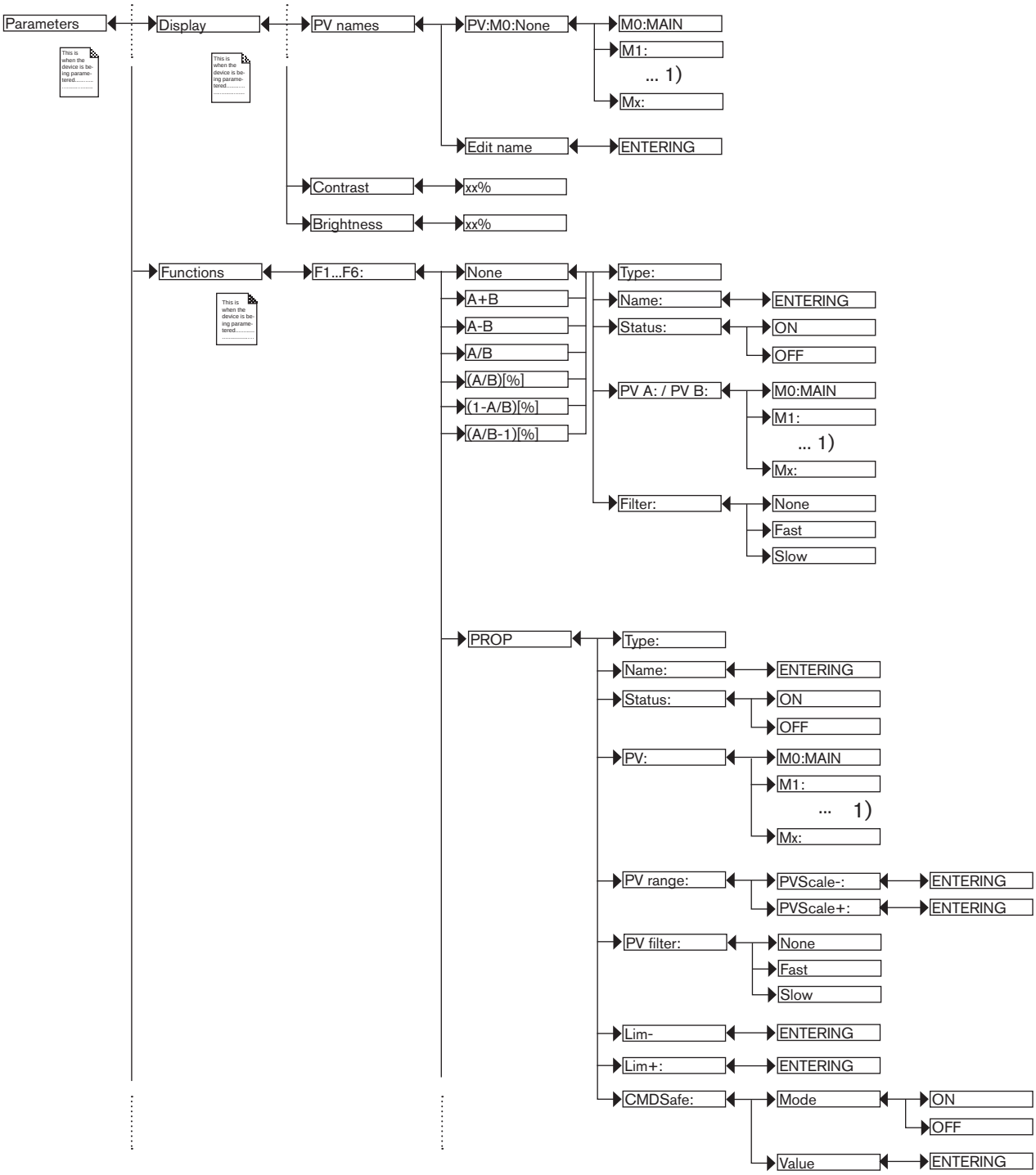
1) The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16.

2) If "Type" = 1, 2 or 4 "lines"

3) The choices offered depend on the chosen "PV".

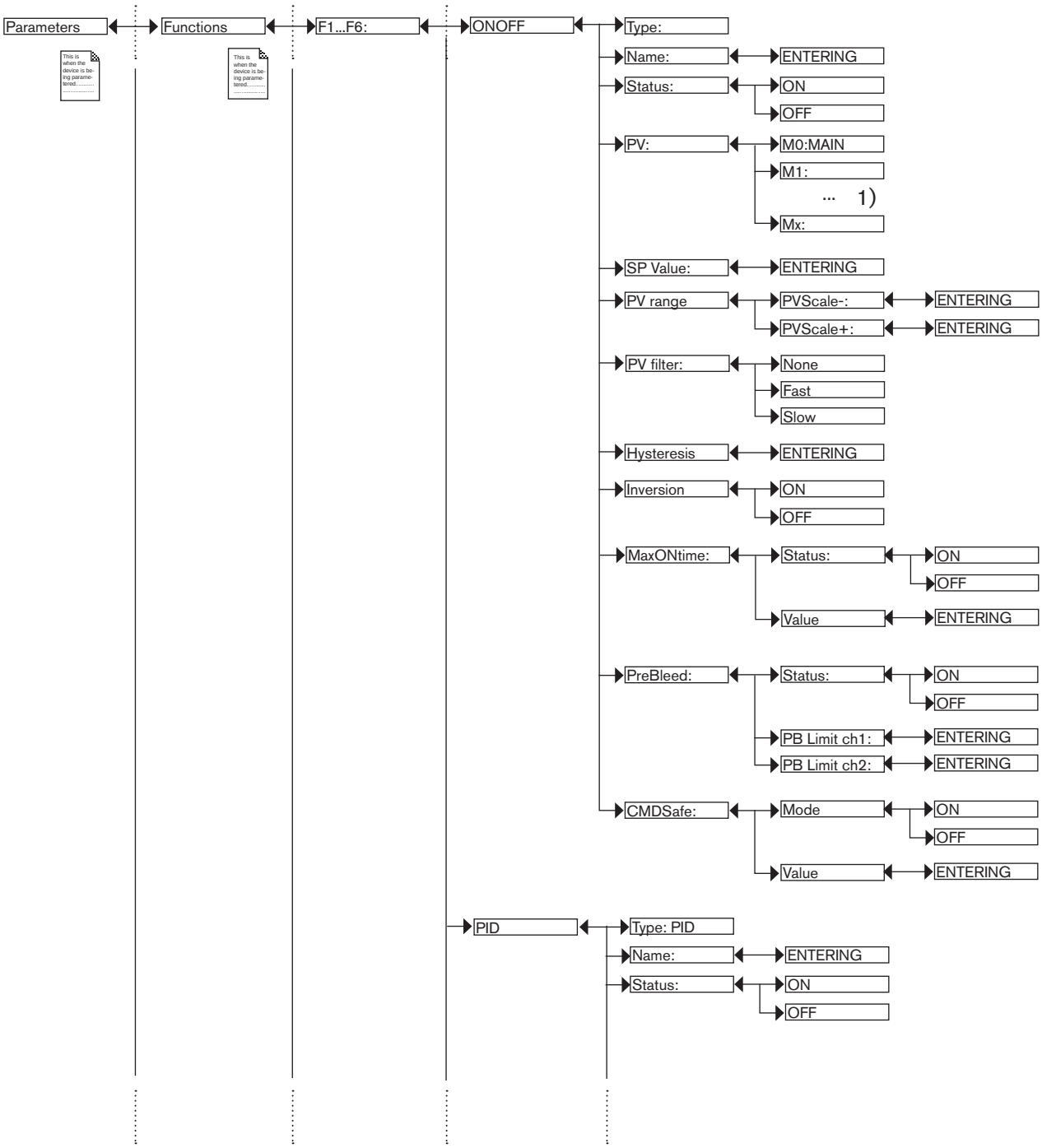
4) If "Type" = "graph"

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[1] *The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16.*

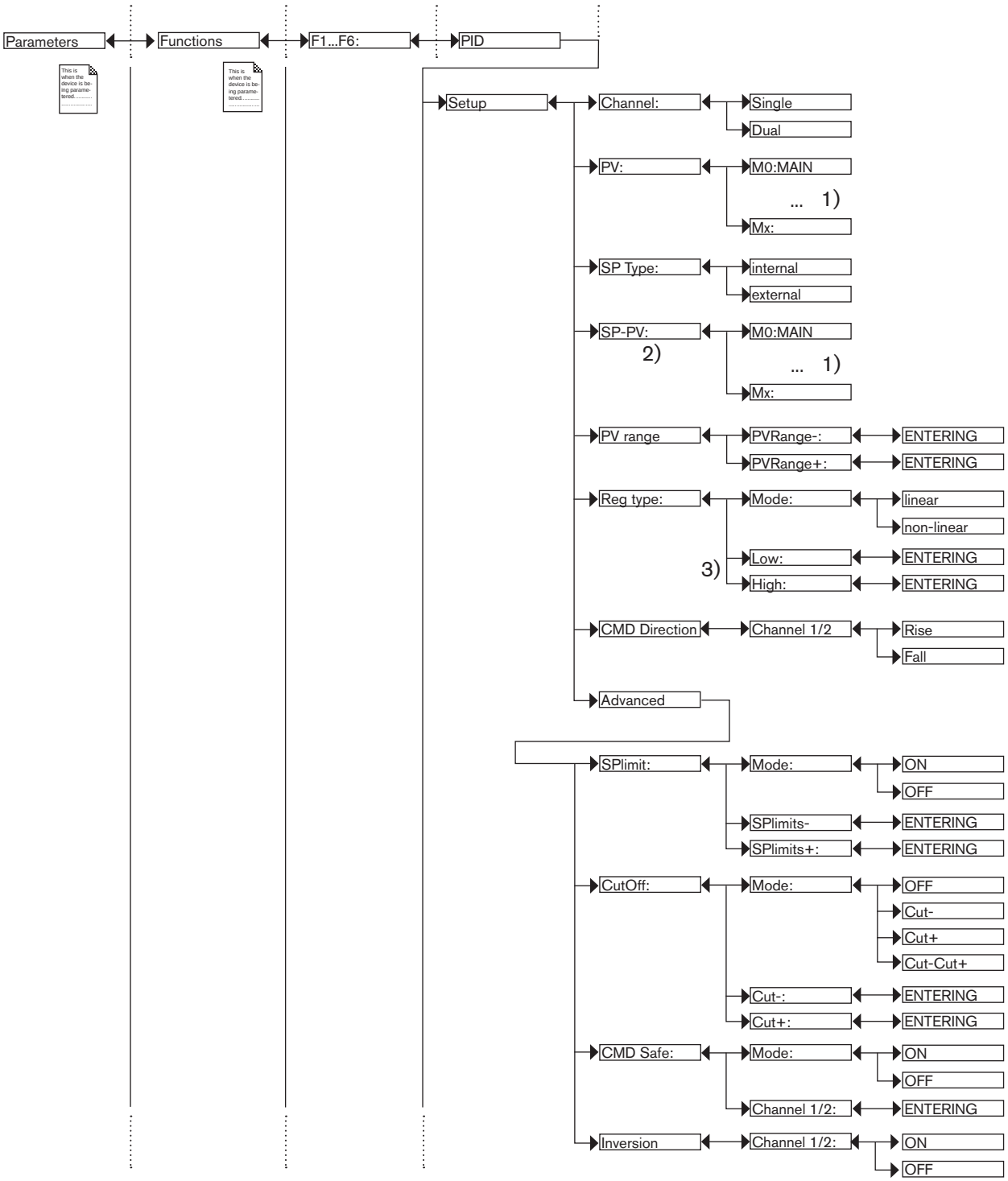
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[1] *The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16.*

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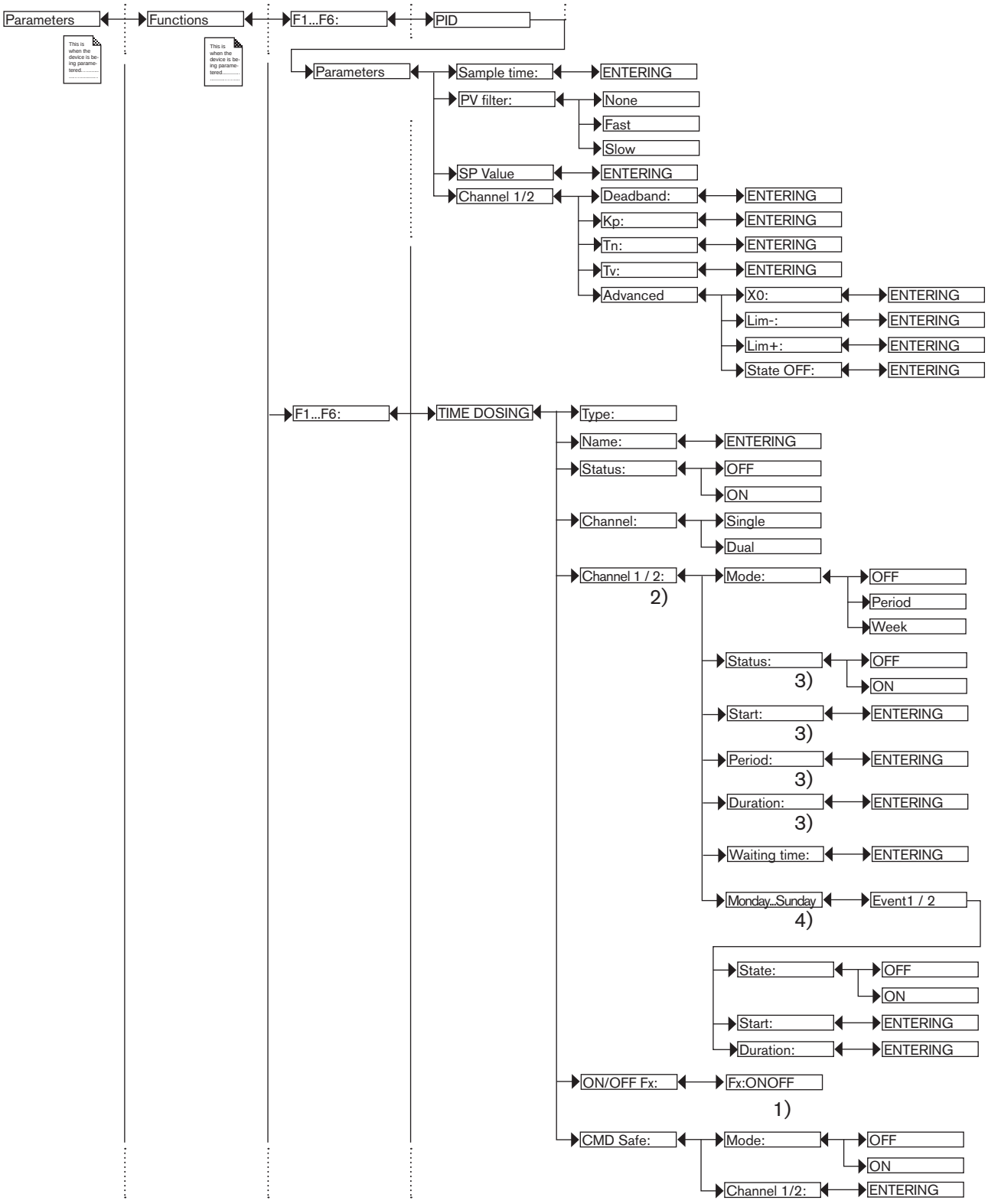
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[1] The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16.

[2] This function is present if "SP Type" = "external"

[3] These functions are present if "Reg. Type Mode" = "non-linear"



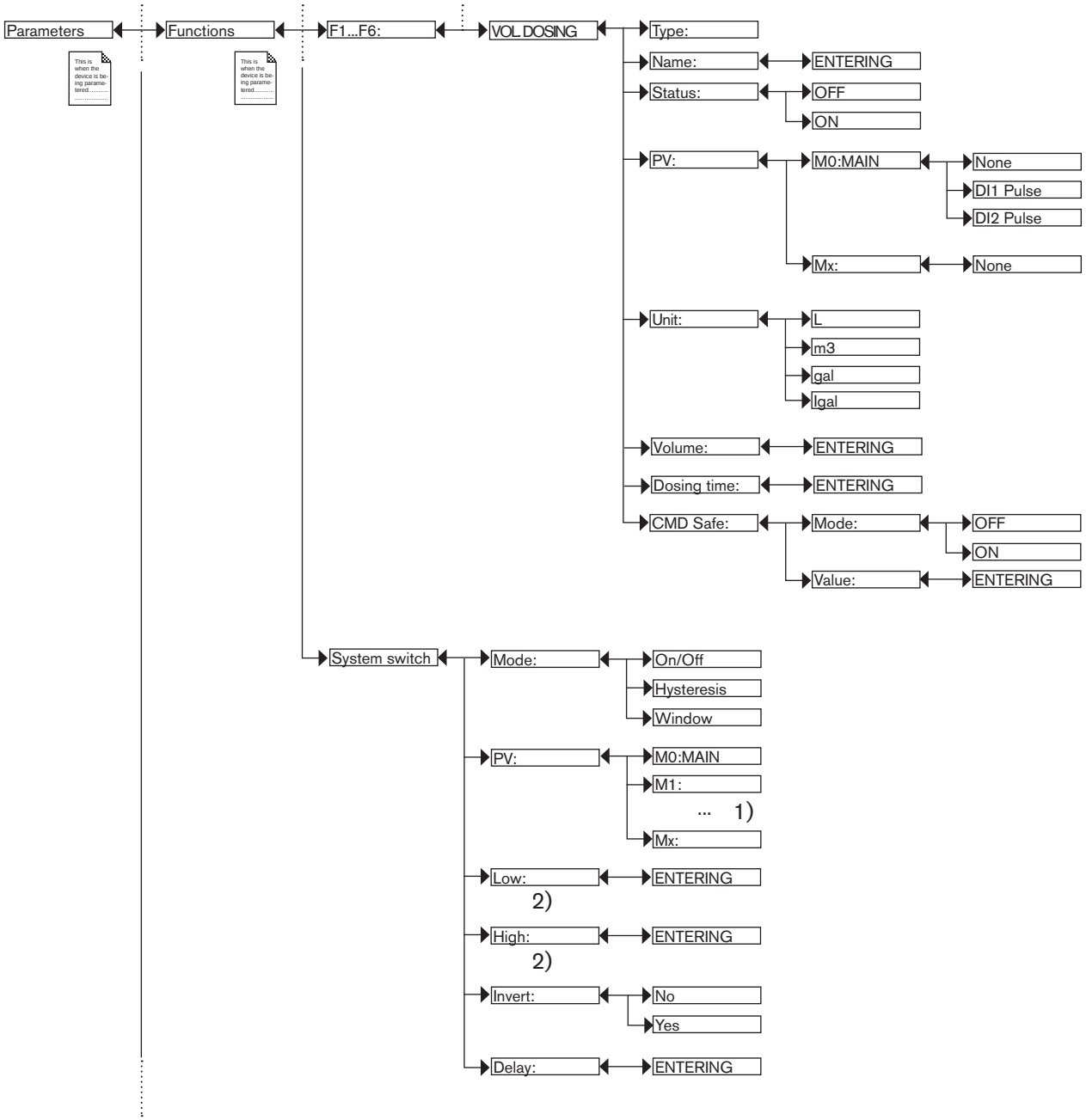
1) "Fx:" represents the ONOFF function declared "active"

2) "Channel2" is present if "Channel" = "Dual"

3) These functions are present only if "Mode" = "Period"

4) These functions are present only if "Mode" = "Week"

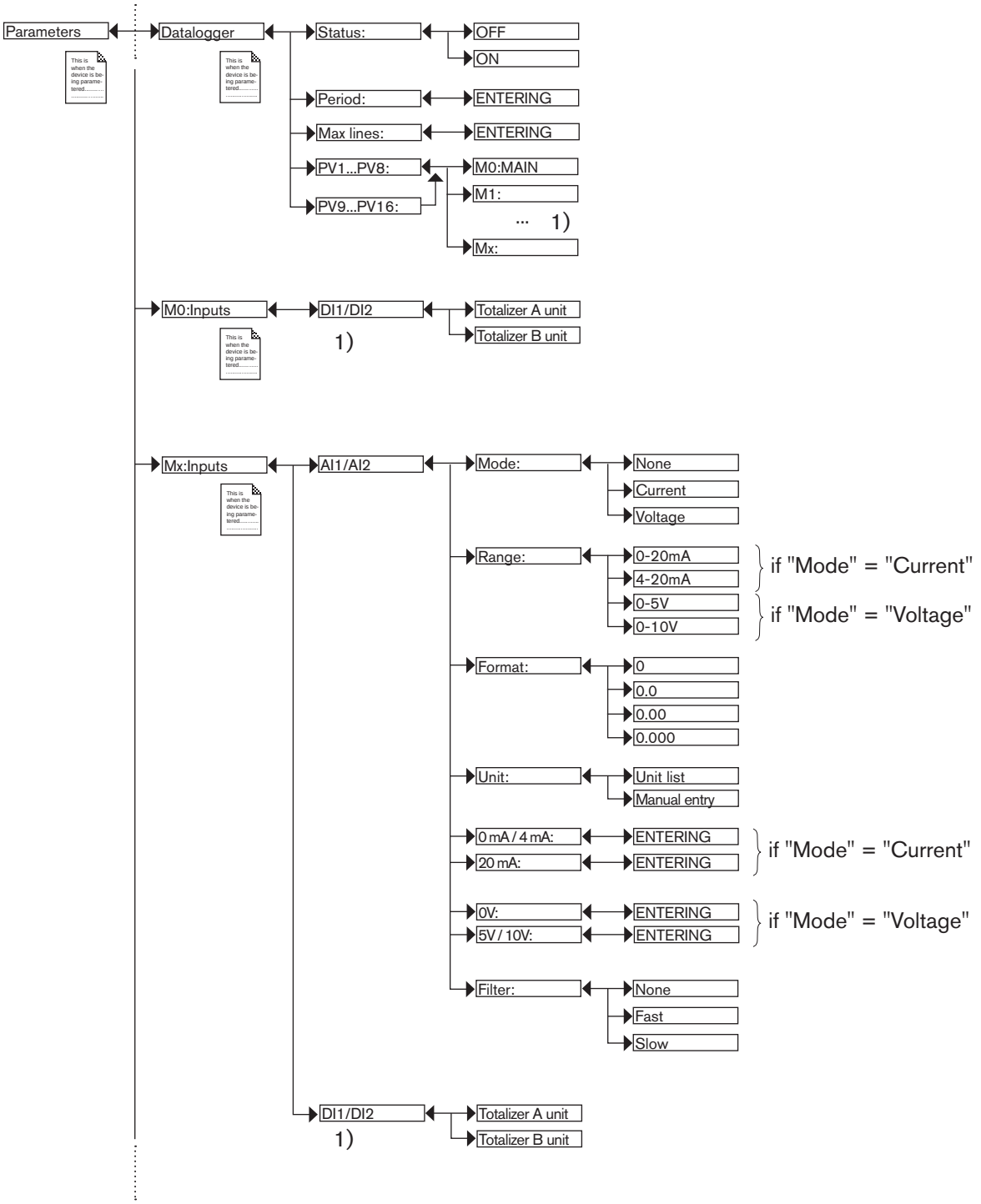
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[1] The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16.

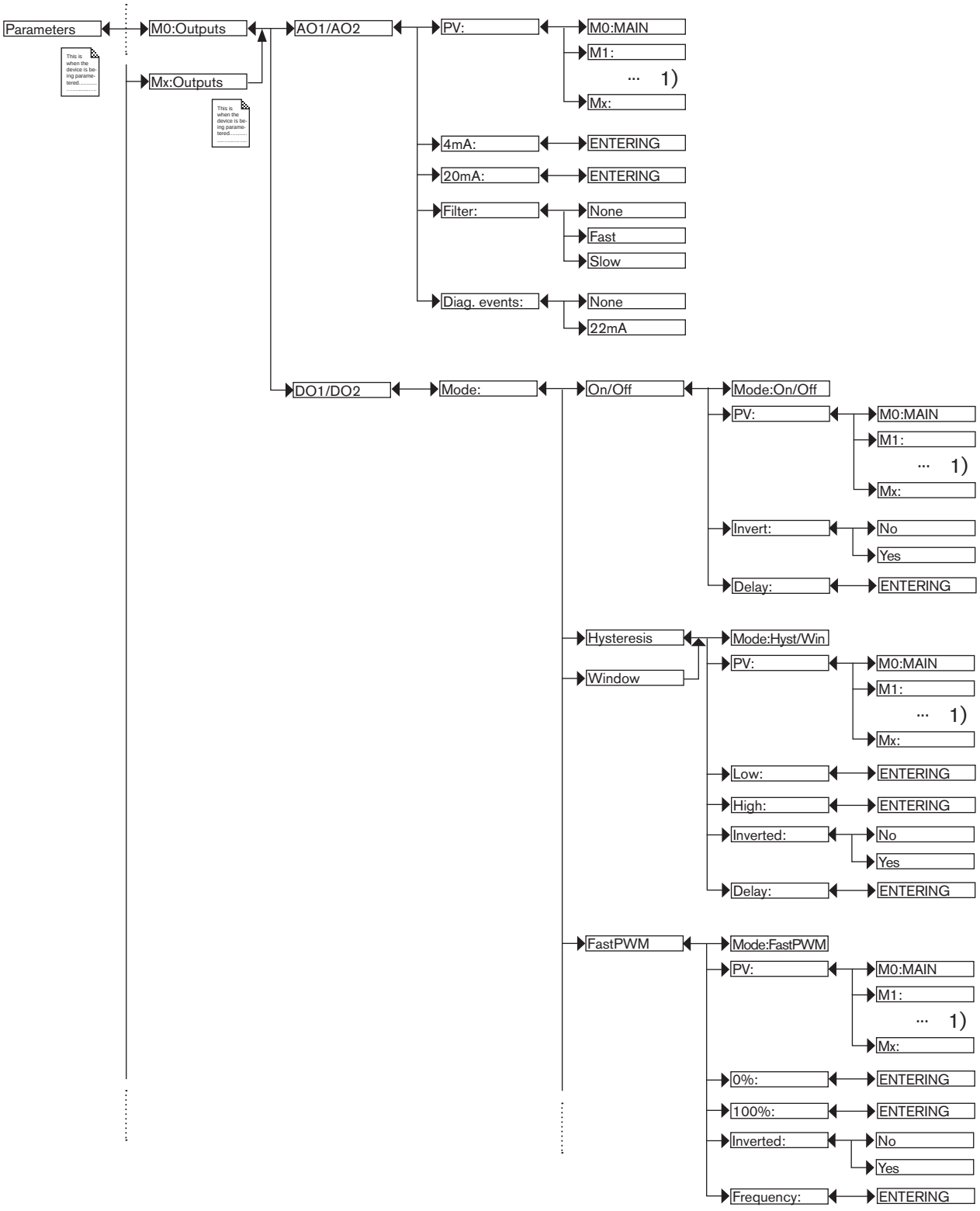
[2] These functions are present if "Mode" = "On/Off"

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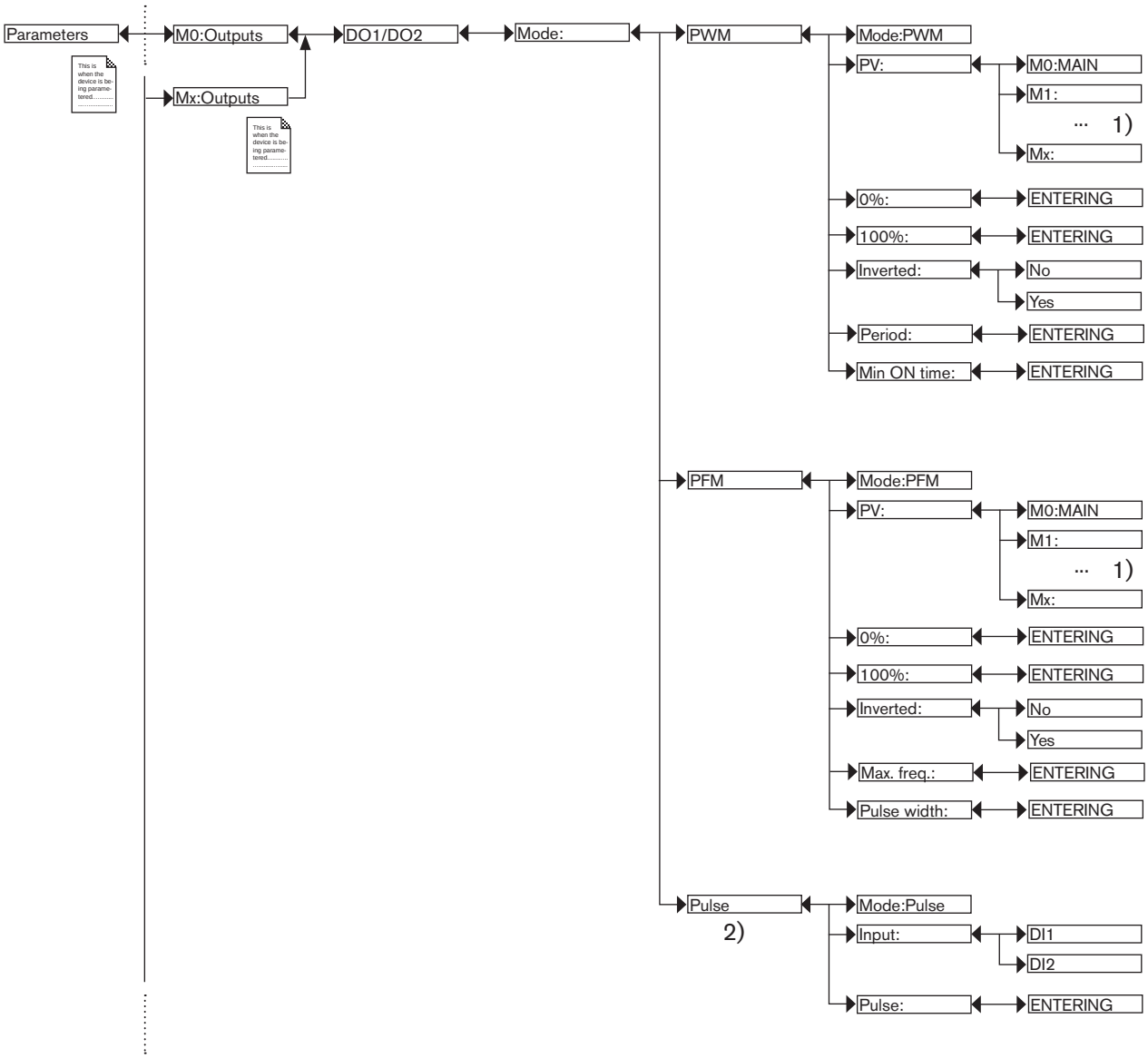


[1] *The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16.*

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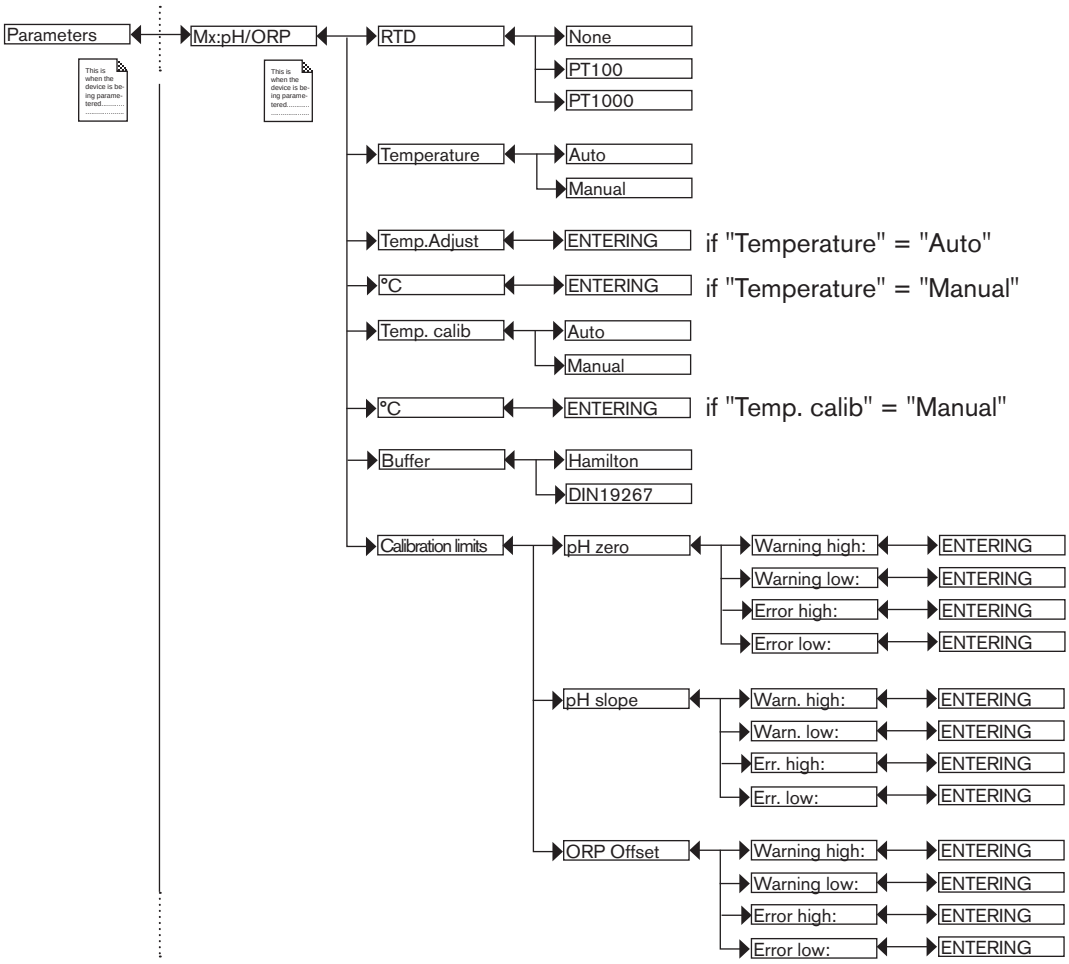
[1] The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16.



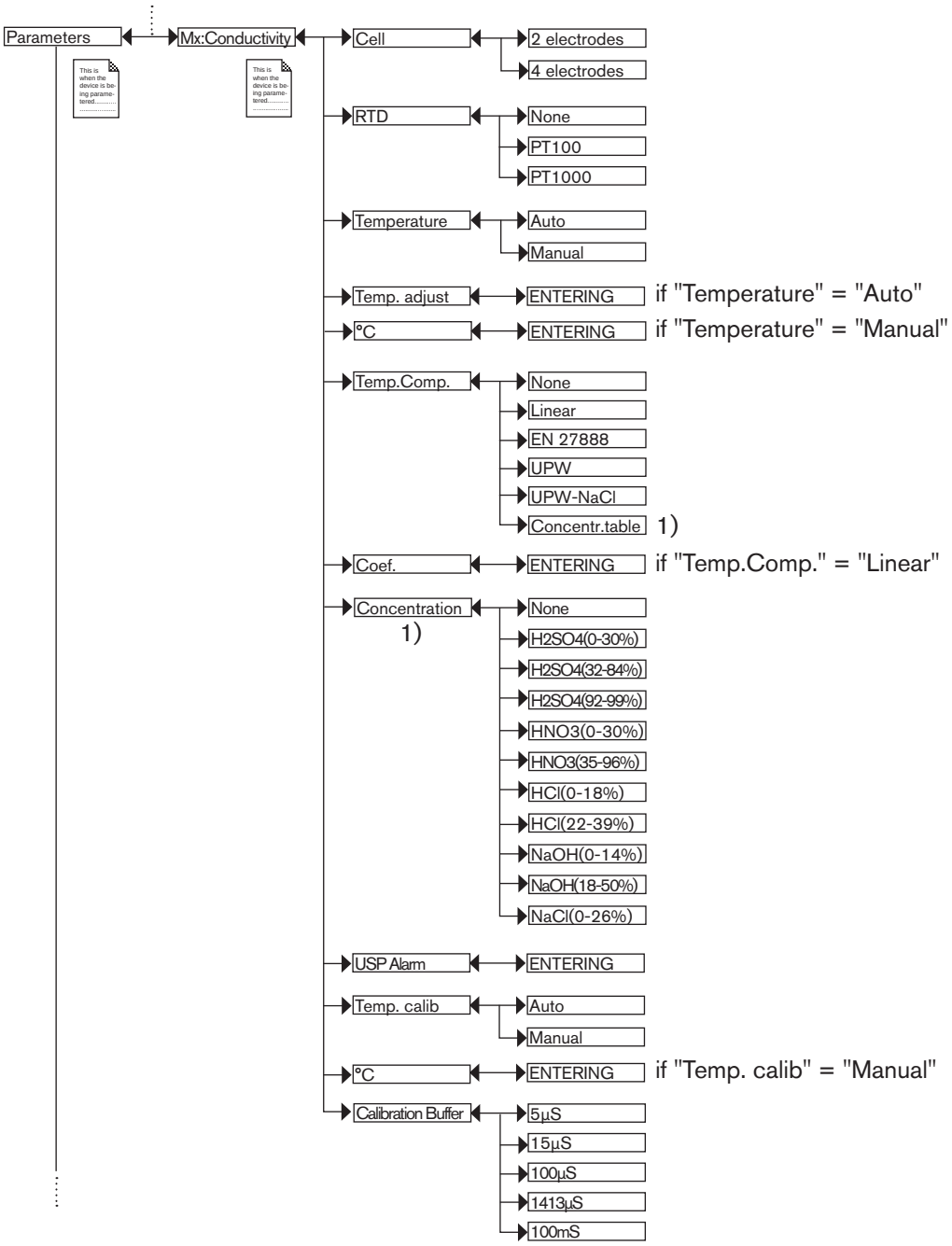
1) The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16.

2) Function possible only for the DO1 and DO2 outputs on the M0:MAIN board

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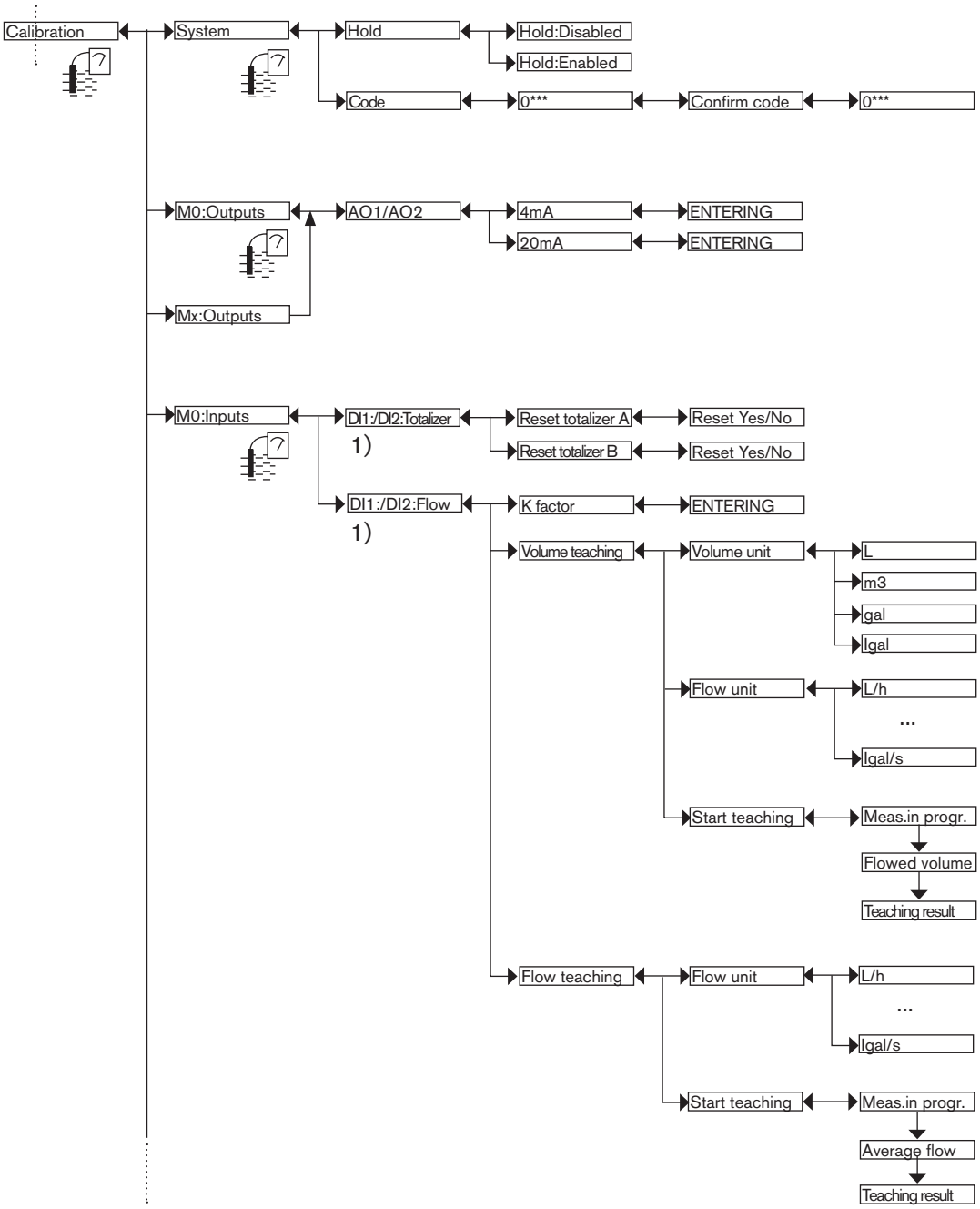


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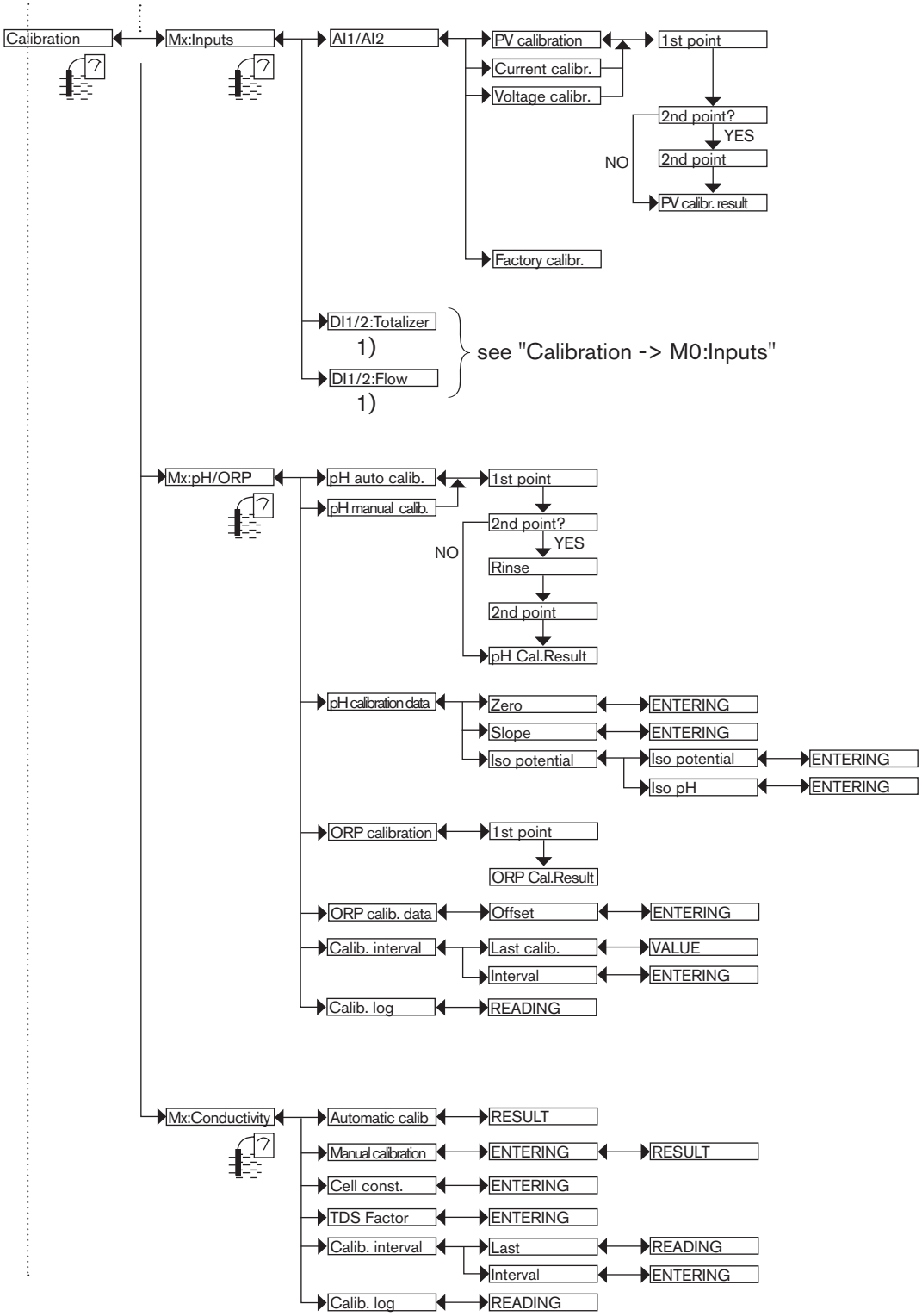
1) This menu is available as an option: see chap. 8.10.4..

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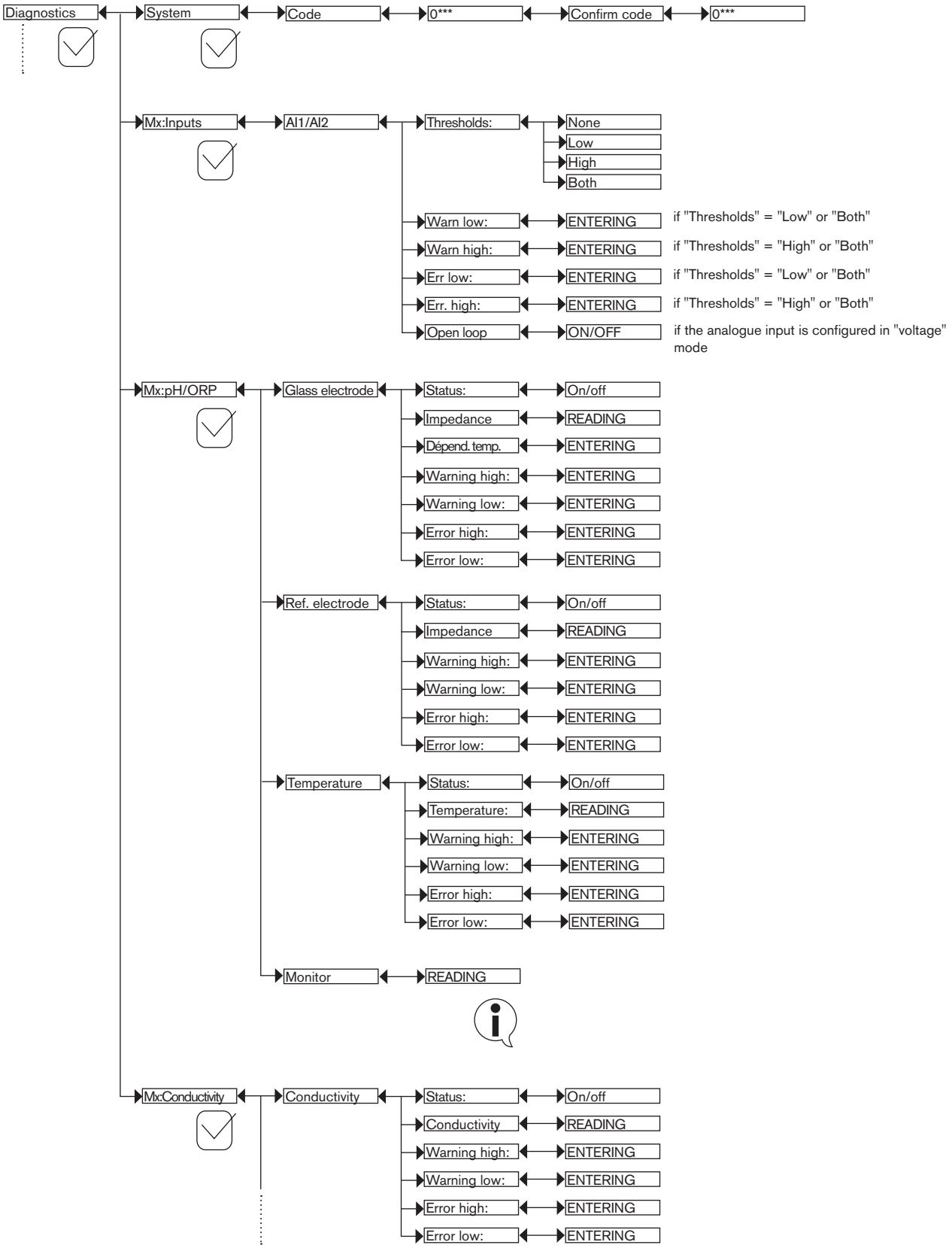
1) This menu is available as an option: see chap. 8.10.4..

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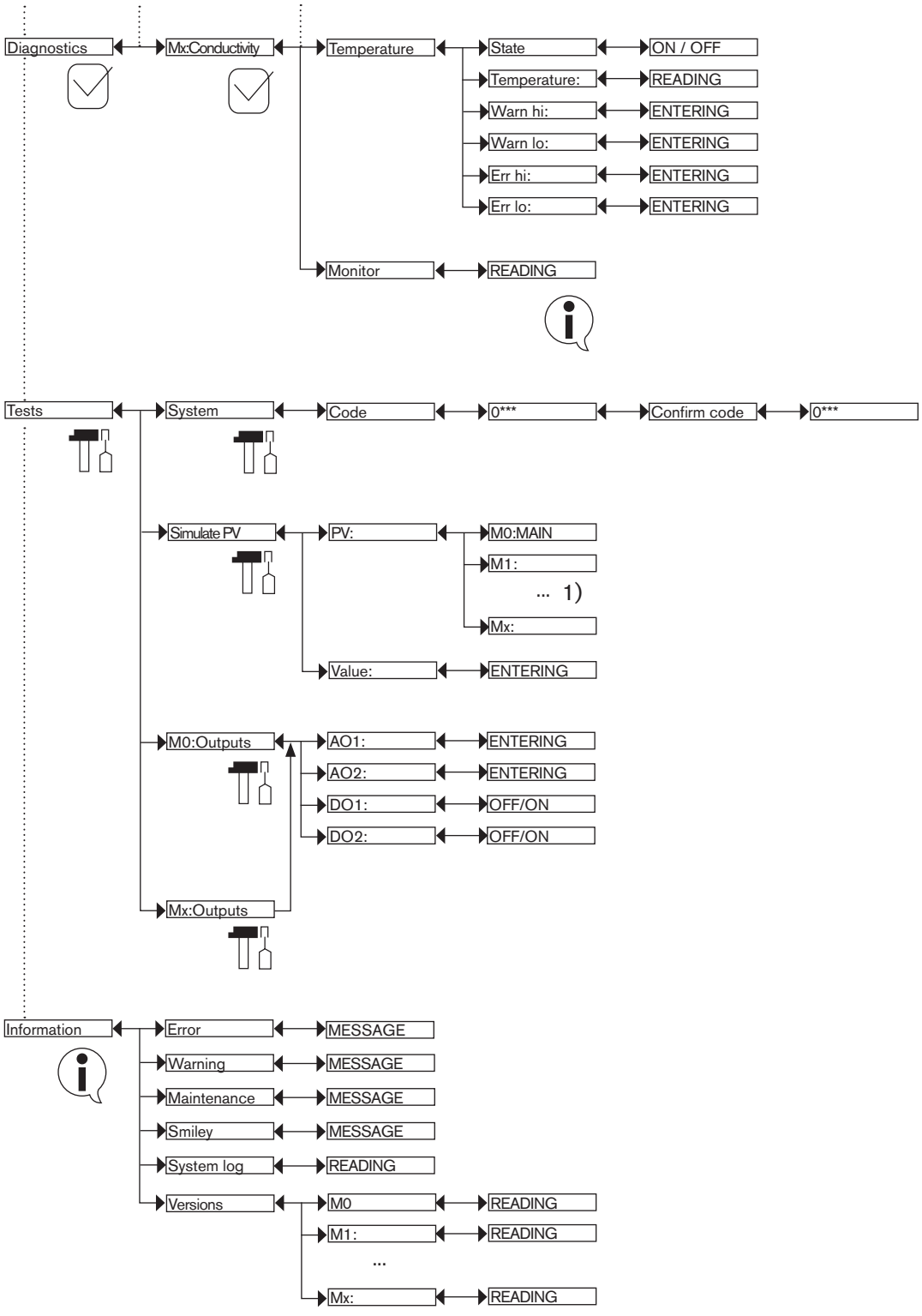


1) This menu is available as an option: see chap. 8.10.4.

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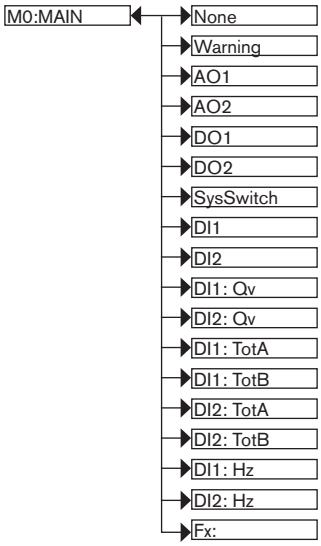


[1] *The choices offered depend on the modules fitted and/or the options activated. See chap. 8.10.4 and chap. 8.16.*

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8.16. Process inputs or values

8.16.1. On the M0:MAIN board



Available on the device if the software option "FLOW" is active. See chap. 8.10.4

"Warning" = event generated by the multiCELL

"AOx" = analogue output

"DOx" = digital output

"System switch" = when the corresponding event is configured and activated

"DIx" = digital input

"DIx Qv" = flow rate on digital input DIx

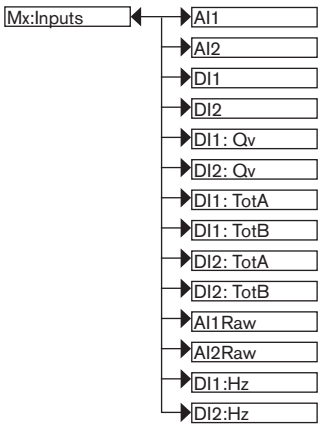
"DIx TotA" = totalizer A on digital input DIx

"DIx TotB" = totalizer B on digital input DIx

"DIx Hz" = frequency on digital input DIx

"Fx:" = result of configured and activated functions

8.16.2. On the input module



Available on the device if the software option "FLOW" is active. See chap. 8.10.4

"AIx" = scaled process variable (see chap. 8.10.20).

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"DIx" = digital input

"DIx Qv" = flow rate on digital input DIx

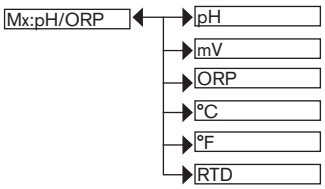
"DIx TotA" = totalizer A on digital input DIx

"DIx TotB" = totalizer B on digital input DIx

"AIxRaw" = current or voltage standard signal on analogue input AIx

"DIx Hz" = frequency on digital input DIx

8.16.3. On the pH/redox module



"pH" = measured pH of the fluid

"mV" = measured pH of the fluid in mV

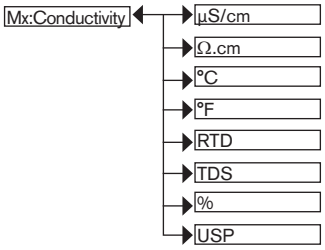
"ORP" = measured oxidation reduction potential of the fluid in mV

"°C" = measured temperature of the fluid in °C

"°F" = measured temperature of the fluid in °F

"RTD" = resistance of the temperature input in Ω

8.16.4. On the conductivity module



"µS/cm" = measured conductivity of the fluid

" Ω.cm" = resistivity

"°C" = measured temperature of the fluid in °C

"°F" = measured temperature of the fluid in °F

"RTD" = input resistance of the temperature stage in Ω

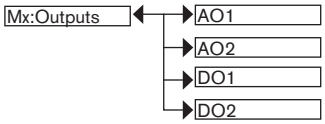
"TDS" = quantity of dissolved solids in the fluid in ppm

"%" = mass concentration of the fluid (software option)

"USP" = state of the USP function

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8.16.5. On the additional outputs module



"AOx" = analogue output

"DOx" = digital output

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9. MAINTENANCE AND TROUBLESHOOTING

9.1. Safety instructions

DANGER

Risk of injury due to electrical discharge.

- Shut down and isolate the electrical power source before carrying out work on the system.
- Observe all applicable accident protection and safety regulations for electrical equipment.

WARNING

Risk of injury due to non-conforming maintenance.

- Maintenance must only be carried out by qualified and skilled staff with the appropriate tools.
- Guarantee a set or controlled restarting of the process, after a power supply interruption.

9.2. Maintenance of the multiCELL

The multiCELL can be cleaned with a duster slightly moistened with water with possible addition of a detergent compatible with the materials it is made of.

Please feel free to contact your Bürkert supplier for any additional information.

9.3. If you encounter problems

9.3.1. "Error" events related to the monitoring of process parameters (Right red LED and icons ⓧ and ☹ displayed)

When an error event related to the monitoring of the process parameters is generated:

- The 4-20 mA output(s) generate a current of 22 mA if "Diag. events" is configured as "22 mA" (see chap. 8.10.21);
- The transistor outputs operate normally.

Message displayed in the "Information" menu	Meaning	Recommended action
"Mx:E:AIx low"	The value of the analogue input of the "Mx:Inputs" module is out of range. This message is displayed if monitoring of the analogue input is activated for the "Mx" module, depending on the ERR LO threshold defined (see chap. 8.12.2).	→ Check the wiring of the input. → Make sure the connected instrument correctly operates.

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Message displayed in the "Information" menu	Meaning	Recommended action
"Mx:E:AIx high"	The value of the analogue input of the "Mx:Inputs" module is out of range. This message is displayed if monitoring of the analogue input is activated for the "Mx" module, depending on the ERR HIGH threshold defined (see chap. 8.12.2).	→ Check the wiring of the input. → Make sure the connected instrument correctly operates.
"Mx:E:AIx open"	An open loop has been detected on the analogue input configured in voltage mode. This message is displayed if detection of an open loop is activated for module "Mx" (see chap. 8.12.3).	→ Check the wiring of the input. → Make sure the connected instrument correctly operates.
"Mx:E:Glass imped."	The impedance of the measurement electrode on the "Mx" module is out of range. This message is displayed if monitoring of the impedance of the measurement electrode on the "Mx" module is activated, depending on the ERROR LOW and ERROR HIGH thresholds defined (see chap. 8.12.4).	→ Go to the "Diagnostics" menu to read the impedance value of the pH electrode (chap. 8.12.4). → if necessary, clean the probe then recalibrate the measurement sensor or replace the probe.
"Mx:E:Ref. imped."	This message is displayed if monitoring of the impedance of the reference electrode is activated, depending on the ERROR LOW and ERROR HIGH thresholds defined (see chap. 8.12.4).	→ Go to the "Diagnostics" menu to read the impedance value of the reference electrode (chap. 8.12.4) → if necessary, clean the probe then recalibrate the measurement sensor or replace the probe.
"Mx:E:Conductivity"	The fluid conductivity is out of range. This message is displayed if monitoring of the fluid conductivity is activated, depending on the ERROR LOW and ERROR HIGH thresholds defined (see chap. 8.12.5).	→ Go to the "Diagnostics" menu to read the fluid conductivity value (chap. 8.12.5) → if necessary, clean the cell then recalibrate the measurement sensor
"Mx:E:Temperature"	The fluid temperature is out of range. This message is displayed if monitoring of the fluid temperature is activated for the "Mx" module, depending on the ERR LO and ERR HI thresholds defined (see chap. 8.12.6).	→ Go to the "Diagnostics" menu to read the value of the temperature measured (chap. 8.12.6). → If necessary, check whether the temperature sensor is working correctly by measuring a fluid with a known temperature. → If the temperature sensor is faulty, return it to the manufacturer. → if the temperature sensor is not the cause of the problem, check the process.

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Message displayed in the "Information" menu	Meaning	Recommended action
"Mx:E:RTD open"	The temperature sensor is not connected to the "Mx" module This message may only be displayed if the measurement mode of the temperature for module "Mx" is set to "automatic" (see chap. 8.10.23 and/or 8.10.24)	→ Connect a temperature sensor to the "Mx" module or → set the temperature value used in the process to "Manual" mode (see chap. 8.10.23 and/or 8.10.24)

9.3.2. "Error" events related to a problem with the device (Left red LED and icons ⊗ and ☺ displayed)

When an error event related to a problem with the device is generated:

- The 4-20 mA output(s) generate a current of 22 mA
- The transistor outputs operate normally.

Message displayed in the "Information" menu	Meaning	Recommended action
"Mx:E:ORP sat." "MxE:pH sat."	The pH and/or redox value is not being correctly measured due to the saturation of the input stage of the measuring board	→ Check the correct wiring of the earth points → check the equipotential surfaces of the installation
"M0:E:Mx com."	The link to the measurement module(s) is interrupted	→ Switch the power supply off then on again → if the error persists, return the device to Bürkert
"Mx:E:Memory FR"	Factory data is lost. The process continues but the accuracy of the device is modified.	→ Switch the power supply off then on again → if the error persists, return the device to Bürkert
"Mx:E:Memory IR"		
"Mx:E:Memory UR"	User data for the sensor is lost	→ Switch the power supply off then on again → check the parameters of all the sensors then save them again → if the error persists, return the device to Bürkert
"Mx:E:Memory UW"		

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Message displayed in the "Information" menu	Meaning	Recommended action
"Mx:E:Memory CR"	The calibration parameters of the "Mx" module are lost	→ Switch the power supply off then on again → if the error originates in the M0:MAIN board, perform a new teach-in → if the error originates in an "Mx" module, calibrate the sensor connected to this module again → if the error persists, return the device to Bürkert
"Mx:E:Memory CW"		
"Mx:E:RTClock"	The clock is faulty. The process continues.	→ Return the device to Bürkert.

9.3.3. "Warning" events related to the monitoring of process parameters (Right orange LED and icons ⚠ and ☺ displayed)

When a "warning" event related to the monitoring of the process parameters is generated:

- The 4-20 mA output(s) operate normally
- The transistor outputs configured in "warning" mode switch.

Message displayed in the "Information" menu	Meaning	Recommended action
"Mx:W:AIx low"	The value of the analogue input of the "Mx:Inputs" module is out of range. This message is displayed if monitoring of the analogue input is activated for the "Mx" module, depending on the WARN LO threshold defined (see chap. 8.12.2).	→ Check the wiring of the input. → Make sure the connected instrument correctly operates.
"Mx:W:AIx high"	The value of the analogue input of the "Mx:Inputs" module is out of range. This message is displayed if monitoring of the analogue input is activated for the "Mx" module, depending on the WARN HIGH threshold defined (see chap. 8.12.2).	→ Check the wiring of the input. → Make sure the connected instrument correctly operates.
"Mx:W:Ref imped."	The impedance of the reference electrode on the "Mx" module is out of range. This message is displayed if monitoring of the impedance of the reference electrode is activated on the "Mx" module, depending on the WARNING LOW and WARNING HIGH thresholds defined (see chap. 8.12.4).	→ Go to the "Diagnostics" menu to read the impedance value of the reference electrode (chap. 8.12.4) → if necessary, clean the probe then recalibrate the measurement sensor or replace the probe.

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Message displayed in the "Information" menu	Meaning	Recommended action
"Mx:W:Glass imped."	The impedance of the measurement electrode on the "Mx" module is out of range. This message is displayed if monitoring of the impedance of the measurement electrode is activated on the "Mx" module, depending on the WARNING LOW and WARNING HIGH thresholds defined (see chap. 8.12.4).	→ Go to the "Diagnostics" menu to read the impedance value of the measurement electrode (chap. 8.12.4). → if necessary, clean the probe then recalibrate the measurement sensor or replace the probe.
"Mx:W:Conductivity"	The fluid conductivity is out of range. This message is displayed if monitoring of the fluid conductivity is activated on the "Mx" module, depending on the WARNING LOW and WARNING HIGH thresholds defined (see chap. 8.12.5).	→ Go to the "Diagnostics" menu to read the fluid conductivity value (chap. 8.12.5) → if necessary, clean the cell then recalibrate the measurement sensor
"Mx:W:Temperature"	The fluid temperature is out of range. This message is displayed if monitoring of the fluid temperature is activated on the "Mx" module, depending on the WARNING LOW and WARNING HIGH thresholds defined (see chap. 8.12.6).	→ Go to the "Diagnostics" menu to read the value of the temperature measured (chap. 8.12.6). → If necessary, check whether the temperature sensor is working correctly by measuring a fluid with a known temperature. → If the temperature sensor is faulty, return it to the manufacturer. → if the temperature sensor is not the cause of the problem, check the process.

9.3.4. "Warning" events related to a problem with the device (Left orange LED and icons ⚠ and ☹ displayed)

When a "warning" event related to a problem with the device is generated:

- The 4-20 mA output(s) operate normally
- The transistor outputs configured in "warning" mode switch.

Message displayed in the "Information" menu	Meaning	Recommended action
"M0:W:Time lost"	The date and time are lost.	→ Set the date and time again (see chap.)
"M0:W:ON/OFF time"	The duration defined in the parameter "MaxONtime" in the ON/OFF function has been exceeded (see chap. 8.10.11)	→ Deactivate then reactivate the ON/OFF function
"M0:W:Pulse x lim."	In "Pulse" mode, the volume entered for a pulse is incorrect (see page 78).	→ Enter an appropriate volume → check the K factor.

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"M0:W:Pulse x 1:1"	In "Pulse" mode, the volume entered for a pulse is incorrect (see page 78).	→ Enter an appropriate volume → check the K factor.

9.3.5. "Maintenance" events related to calibration (Right orange LED and icons 🔧, ⚠ and ☹ displayed)

When a "maintenance" event related to calibration is generated:

- The 4-20 mA output(s) operate normally
- The transistor outputs configured in "warning" mode switch.

Message displayed in the "Information" menu	Meaning	Recommended action
"MxM:Time to cal."	A calibration is due on the sensor in the "Mx" module. The periodicity of calibrations is set in the "INTERVAL" function in the "CALIB INTERVAL" menu (see chap. 8.11.8 or 8.11.9)	→ Calibrate the sensor (chap. 8.11.8 or 8.11.9)

9.3.6. Error messages during data saving

The following error messages may be displayed when saving data (see chap. 8.10.5).

Message displayed	Meaning	Recommended action
"Missing memory card"	No memory card has been inserted into the device or the memory card has not been formatted.	→ Insert a memory card into the device (see chap. 5.2.1). → Format the memory card.
"Datalogger is enabled"	The memory card is already used by the datalogger.	→ Deactivate the datalogger (see chap. 8.10.18)
"File open"	The file cannot be created.	→ Format the memory card.
"Memory card write"	Write problem of the file.	→ Check that the memory card is not write protected. → Check that there is enough free space on the memory card.

9.3.7. Error messages during data loading

The following error messages may be displayed when loading data (see chap. 8.10.6).

Message displayed	Meaning	Recommended action
"Missing memory card"	No memory card has been inserted into the device or the memory card has not been formatted.	→ Insert a memory card into the device (see chap. 5.2.1). → Format the memory card.
"Datalogger is enabled"	The memory card is already used by the datalogger.	→ Deactivate the datalogger (see chap. 8.10.18)

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Message displayed	Meaning	Recommended action
"Memory card read"	The file with the saved data is corrupted.	→ Use another file.
«File open»	The file with the saved data cannot be read: ▪ either because the two devices are not compatible. ▪ or, because the data saving failed.	To check the compatibility between the devices: → save the data of both devices (on two different memory cards), → check that the file names are the same. → if the file names are different, enter the configuration by hand.
«Incompatible module»	You are trying to transfer data saved from a module to a module of different type (e.g. the data saved from a pH module to a conductivity module).	→ Load data to a module of the same type.

9.3.8. Messages during datalogging (icon displayed)

The error messages associated to the icon , can be generated during datalogging (see chap. 8.10.18).

Message displayed in the system log	Signification	Recommended action
"M0:MC read only"	The card is write protected.	Authorize writing on the card by pushing the load lever.
"M0:MC failure"	Problem on the memory card.	▪ Make sure there is a memory card in the device. ▪ Format the memory card. ▪ If the problem persists, change the memory card.
"M0:MC full"	The memory card is full.	▪ Insert an empty memory card or delete data on the current card. ▪ If the problem persists, format the card using a PC. ▪ If the problem persists, change the memory card type.
"M0:MC data loss"	The card was removed when the datalogger was "ON" Data is lost.	Always deactivate the datalogger before removing the memory card from the device (see chap. 8.10.18).

9.3.9. Miscellaneous messages

Message displayed in the system log	Meaning	Recommended action
"M0:Power on"	The device is switched on.	-

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10. SPARE PARTS AND ACCESSORIES

CAUTION

Risk of injury and/or material damage caused by the use of unsuitable parts.

Incorrect accessories and unsuitable replacement parts may cause injuries and damage the device and the surrounding area.

- Use only original accessories and original replacement parts from Bürkert.

Spare part	Order code
4 plastic locking systems	560225

Accessory	Order code
pH sensor connection cable, 3m	561904
pH sensor connection cable, 5m	561905
pH sensor connection cable, 10m	561906
Pt1000 temperature sensor connection cable, 3m	561907
Pt1000 temperature sensor connection cable, 5m	427113
Pt1000 temperature sensor connection cable, 10m	554822
Variopin cable, 3m	554855
Variopin cable, 5m	554856
Variopin cable, 10m	554857
Software option: PID	561836
Software option: datalogger	561837
Software option: dosing	561838
Software option: flow	561839
Software option: concentration	561840

11. PACKAGING, TRANSPORT

ATTENTION

Damage due to transport

Transport may damage an insufficiently protected device.

- Transport the device in shock-resistant packaging and away from humidity and dirt.
- Do not expose the device to temperatures that may exceed the admissible storage temperature range.

12. STORAGE

CAUTION

Poor storage can damage the device.

- Store the device in a dry place away from dust.
- Storage temperature: -20 ... +70°C, restricted to 0 ... +70°C if a memory card is inserted

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13. DISPOSAL OF THE DEVICE

→ Dispose of the device and its packaging in an environmentally-friendly way.

CAUTION

Damage to the environment caused by products contaminated by fluids.

- Keep to the existing provisions on the subject of waste disposal and environmental protection.

Note

Comply with the national and/or local regulations which concern the area of waste disposal.

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