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Fine Controls (UK) LTD, Bassendale Road, Croft Business Park,
Bromborough, Wirral, CH62 3QL UK
Tel: 0151 343 9966
Email: sales@finecontrols.com

Type 8619 multiCELL

Modular transmitter/controller
Modularer Transmitter/Controller
Transmetteur/contrôleur modulaire



Operating Instructions

Bedienungsanleitung
Manuel d'utilisation

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

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Operating Instructions 1007/00_EU-ML_00561096_Original_FR

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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 you against an imminent danger.

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



WARNING

Warns you against a potentially dangerous situation.

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



CAUTION

Warns you against a possible risk.

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

NOTE

Warns you against material damage.

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



Indicates additional information, advice or important recommendations for your safety and for the correct operation of the device.



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

→ Indicates a procedure to be carried out.

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.

2.1. Restraints

Observe any existing restraints when the device is exported.

2.2. Foreseeable misuse

- Do not use this device in explosive atmospheres.
- Do not use this device in an environment incompatible with the materials from which it is made.
- Do not make any external modifications to the device such as for instance painting or varnishing any part of the device.
- Do not power the device with an AC voltage or a DC voltage higher than 36VDC.

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 power supply switch-on.
- carry out the installation and maintenance work by qualified and skilled staff with the appropriate tools.
- guarantee a set or controlled restarting of the process after a power supply interruption.
- use the device only if in perfect working order and in compliance with the instructions provided in the user manual.
- observe the general technical rules during the planning and use of the device.

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.

4. GENERAL INFORMATION

4.1. Contents of the delivery

When you receive the merchandise, make sure that the contents of the delivery have not been damaged in any way and ensure that they correspond exactly with the delivery note or packing list. If this is not the case, contact your retailer immediately.

The addresses of our international branches can be found on the last pages of this manual. They can also be found on the Internet under: www.burkert.com → Bürkert → Company → Locations.

4.2. Warranty conditions

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

The terms and conditions of any warranty are governed by our general terms and conditions of sale.



The legal warranty only covers possible defects in the 8619 type multiCELL and its components.

Bürkert cannot be held responsible for any losses or damage related to the product, the service, this warranty or other, including financial or intangible losses, the price paid for the product, a loss of profits, revenues, data, enjoyment or use of the product or of any related product, or indirect or fortuitous loss or damage.

In the event of differences in interpretation and understanding of this chap. 4.2, the French version alone shall prevail.

4.3. Information on the Internet

You can find the user manuals and technical data sheets regarding the type 8619 at:

www.burkert.com → Documentation → Datasheets or Manuals/Approvals → Type 8619

The complete manual in 3 languages (French, English, German) can be ordered under code: 561096.

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

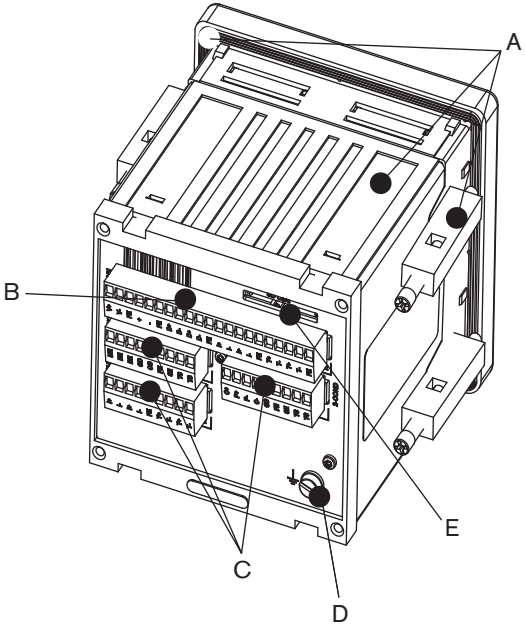
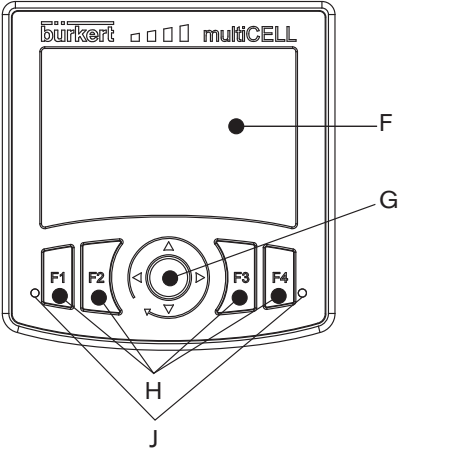
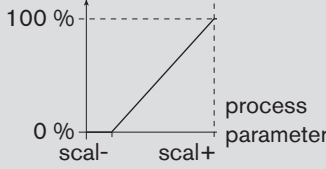
	<p>A: standardised 1/4 DIN housing (92x92 mm) with seal, to be built into and attached to the door of the electrical switch housing or cabinet using 4 locking systems.</p> <p>B: a main board (identified by "MO:MAIN" on the rear plate) :</p> <ul style="list-style-type: none"> ▪ used to connect the electrical 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). <p>C: 1 to 6 slots for placing the following modules:</p> <ul style="list-style-type: none"> ▪ light grey module for connection of a pH or oxidation reduction potential sensor and/or a temperature sensor ▪ green module for connection of a conductivity sensor and/or a temperature sensor ▪ black module with two 4-20 mA current outputs and 2 digital outputs. <p>D: functional ground screw (connected internally to all "FE" terminals on the main board and additional modules).</p> <p>E: memory card (SD type) reader/recorder</p>
	<p>F: display with backlight.</p> <p>G: navigation button (4 directions).</p> <p>H: 4 dynamic keys (function keys with dynamic changing assignment).</p> <p>J: 2 LEDs.</p>

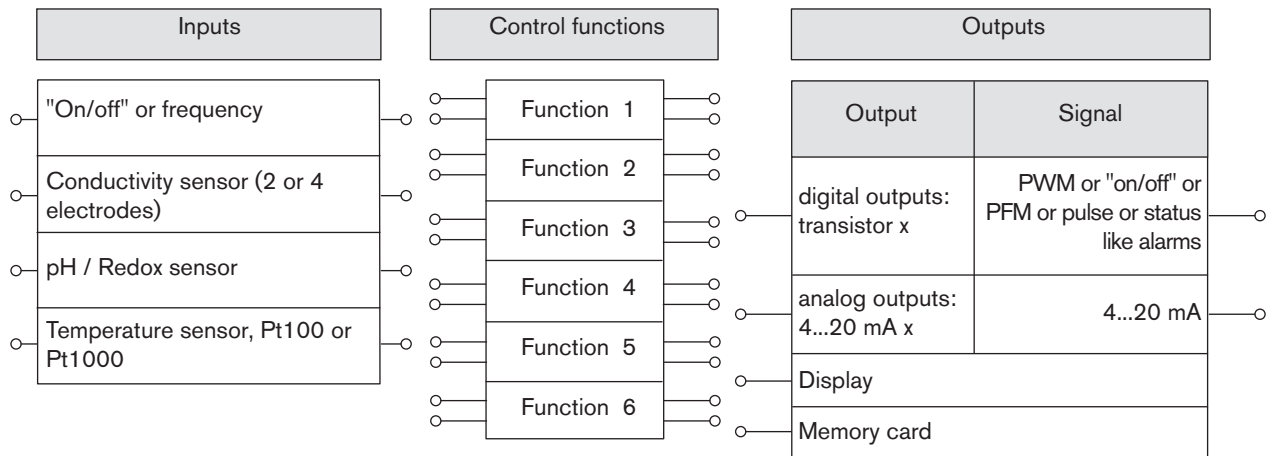
Fig. 1: Design of an 8619

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	$A/B \times 100\%$	Calculation of the passage rate.
REJECT	Standard on all models	$(1 - A/B) \times 100\%$	Calculation of the rejection rate.
DEVIAT	Standard on all models	$(A/B - 1) \times 100\%$	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	<ul style="list-style-type: none"> ▪ Standard on models 560205 or 560213 ▪ Optional (see chap. 9.9.4) on all the other models 		Each of the 2 digital inputs can be used to measure the flow rate.
PID	Optional (see chap. 9.9.4)	Continuous regulation	For all input types; with internal or external setpoint.
Time dosing	Optional (see chap. 9.9.4)		<p>In a cooling tower, for example; used to dose 2 products at fixed intervals or for twice daily dosing scheduled over one week.</p> <p>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.</p>
Volume dosing	Optional (see chap. 9.9.4)		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. 9.9.4)		The concentration graphs for certain compounds such as NaCl and H ₂ SO ₄ are memorised for use over the entire concentration range.
Datalogger on memory card	Optional (see chap. 9.9.4)		Option to memorise the variations in 1 to 16 values in a given time interval.

5.4. Functional diagram



5.5. Description of the product label

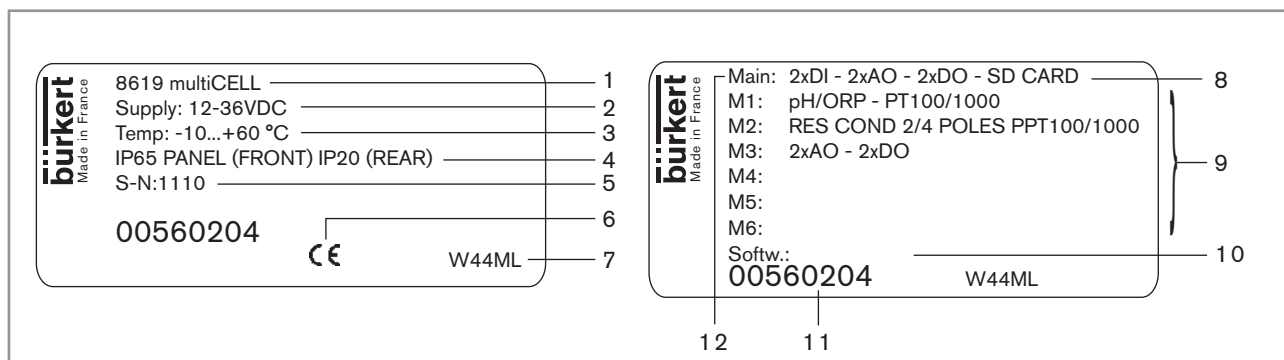








Fig. 2: Example of a label

1. Type of device
2. Electrical power supply
3. Ambient temperature range
4. Protection rating
5. Serial number
6. EC logo
7. Manufacturer 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

5.6. Versions available

Supply voltage	M0:MAIN board	Additional modules	Inputs	Outputs	UL recognized	Order code
12-36 VDC	fitted	1 "pH/ORP" module	<ul style="list-style-type: none"> 2 "DI" digital inputs ("on/off") on the M0:MAIN board 1 pH/ORP input + 1 temperature input, on the "pH/ORP" module 	<ul style="list-style-type: none"> 2 4-20 mA "AO" outputs 2 "DO" transistor outputs 	no	560200
					yes 	560208
12-36 VDC	fitted	1 "COND" module	<ul style="list-style-type: none"> 2 "DI" digital inputs ("on/off") on the M0:MAIN board 1 conductivity input + 1 temperature input, on the "COND" module 	<ul style="list-style-type: none"> 2 4-20 mA "AO" outputs 2 "DO" transistor outputs 	no	560201
					yes 	560209
12-36 VDC	fitted	2 "pH/ORP" modules + 1 "OUT" module	<ul style="list-style-type: none"> 2 "DI" digital inputs ("on/off") on the M0:MAIN board 1 pH/ORP input + 1 temperature input, on each "pH/ORP" module 	<ul style="list-style-type: none"> 4 4-20 mA "AO" outputs 4 "DO" transistor outputs 	no	560202
					yes 	560210
12-36 VDC	fitted	2 "COND" modules + 1 "OUT" module	<ul style="list-style-type: none"> 2 "DI" digital inputs ("on/off") on the M0:MAIN board 1 conductivity input + 1 temperature input on each "COND" module 	<ul style="list-style-type: none"> 4 4-20 mA "AO" outputs 4 "DO" transistor outputs 	no	560203
					yes 	560211
12-36 VDC	fitted	1 "pH/ORP" module + 1 "COND" module + 1 "OUT" module	<ul style="list-style-type: none"> 2 "DI" digital inputs ("on/off") on the M0:MAIN board 1 pH/ORP input + 1 temperature input on the "pH/ORP" module 1 conductivity input + 1 temperature input on the "COND" module 	<ul style="list-style-type: none"> 4 4-20 mA "AO" outputs 4 "DO" transistor outputs 	no	560204
					yes 	560212
12-36 VDC	fitted	-	2 "DI" digital inputs ("on/off" or frequency)	<ul style="list-style-type: none"> 2 4-20 mA "AO" outputs 2 "DO" transistor outputs 	no	560205
					yes 	560213


6. TECHNICAL DATA

6.1. Conditions of use

- Ambient temperature: -10... +60°C (operating)
restricted to 0 ... +60°C, if a memory card is used
- Air humidity: < 85%, non condensated
- 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

- EMC: EN 61000-6-2 (2005), EN 61000-6-3 (2001)
- Vibration: EN 60068-2-6
- Shock: EN 60068-2-27

UL recognised devices () for the United States of America and Canada with variable key PE72 also 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)

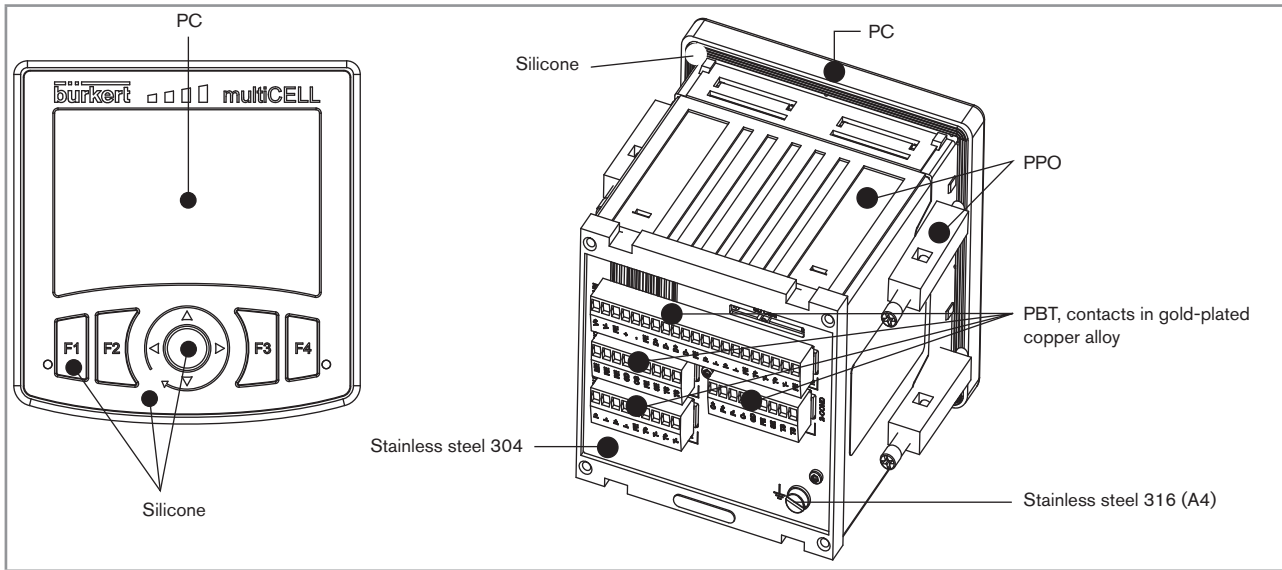


Fig. 3: Materials used for the multiCELL

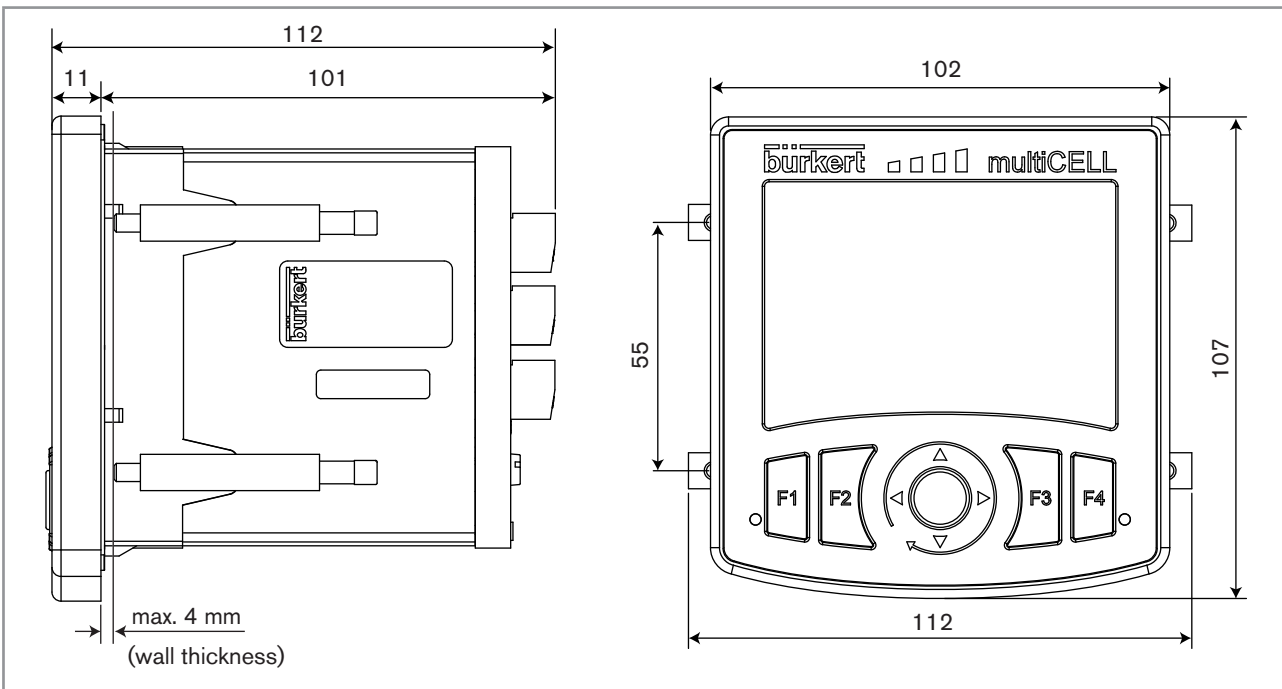


Fig. 4: Dimensions of the multiCELL [mm]

6.3.2. Specifications of the "M0:MAIN" board

Power supply	12-36 VDC, filtered and regulated
Specifications of the power source (not provided) of UL-recognised devices, with variable key PE72	<ul style="list-style-type: none"> ▪ 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)
Max. power consumption (without additional module, outputs not connected)	1.5VA

MAN 1000139642 EN Version: - printed: 05.08.2010 Status: RL (released | freigegeben)

Power distribution ("PWR OUT")	12-36 VDC, 1.8A max.
All digital inputs ("DI")	<ul style="list-style-type: none"> ▪ Voltage: 5-36VDC ▪ Input impedance: 3kΩ ▪ Galvanically insulated ▪ Protected against polarity reversal and voltage spikes ▪ Frequency: 0.5 to 2500Hz
All analogue outputs ("AO")	<ul style="list-style-type: none"> ▪ 4-20mA current ▪ Any connection mode, in sink or source mode ▪ Galvanically insulated ▪ Protected against polarity reversal ▪ Max. loop impedance: 1100Ω at 36VDC, 610Ω at 24VDC, 100Ω at 12VDC
All digital outputs ("DO")	<ul style="list-style-type: none"> ▪ Transistor ▪ Connection mode unimportant in NPN or PNP mode ▪ Galvanically insulated ▪ Protected against short circuits ▪ Max. voltage: 36VDC ▪ max. 700mA if one transistor is connected but max. 1A for both transistors connected ▪ Max. frequency: 2000Hz
Electrical connection	<ul style="list-style-type: none"> ▪ Per detachable 21-point set-screw connector, orange ▪ Refer to chap. 6.3.6 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 "pH/redox" module

pH measurement	
<ul style="list-style-type: none"> ▪ pH measurement range ▪ Resolution of pH measurement ▪ Accuracy of pH measurement ▪ Potential difference measurement range ▪ Resolution of potential difference measurement ▪ Accuracy of potential difference measurement ▪ pH probe type 	<ul style="list-style-type: none"> ▪ -2.00...+16.00 ▪ 0.01pH ▪ 0.02pH ▪ -600...+600mV ▪ 0.1mV ▪ 1mV ▪ Electrochemical
Current consumption	0.1VA

Measurement of the oxidation reduction potential	
<ul style="list-style-type: none"> ▪ Oxidation reduction potential measurement range ▪ Resolution of the potential difference measurement ▪ Accuracy of potential difference measurement ▪ Oxidation reduction potential probe type 	<ul style="list-style-type: none"> ▪ -2000 ... +2000mV ▪ 0.1mV ▪ 1mV ▪ Electrochemical
Temperature measurement	
<ul style="list-style-type: none"> ▪ Measurement range ▪ Measurement resolution ▪ Measurement accuracy ▪ Temperature sensor type 	<ul style="list-style-type: none"> ▪ -25°C ... +130°C ▪ 0.1°C ▪ 1°C ▪ Pt100 or Pt1000, with 2 or 3 wires
Electrical connection	<ul style="list-style-type: none"> ▪ Per detachable 9-point set-screw connector, grey ▪ Refer to chap. 6.3.6 for the specifications of connection cables

6.3.4. Specifications of the "COND" conductivity module

Conductivity measurement	
<ul style="list-style-type: none"> ▪ Measurement range ▪ Measurement resolution ▪ Measurement error ▪ Conductivity cell type 	<ul style="list-style-type: none"> ▪ 0.000 μS/cm...2000 mS/cm ▪ 10⁻⁹S/cm ▪ < 0.5% of measured value + sensor error ▪ With 2 or 4 electrodes; the specifications of Bürkert cells are described in the relevant manual.
Resistivity measurement	
<ul style="list-style-type: none"> ▪ Measurement range ▪ Measurement resolution ▪ Measurement error (without sensor) 	<ul style="list-style-type: none"> ▪ 0.500Ωcm...2.000MΩ/cm ▪ 10⁻¹Ωcm ▪ < 0.5% of measured value
Current consumption	0.25VA
Temperature measurement	
<ul style="list-style-type: none"> ▪ Measurement range ▪ Measurement resolution ▪ Measurement error ▪ Temperature sensor type 	<ul style="list-style-type: none"> ▪ -40°C ... 200°C ▪ 0.1°C ▪ 1°C ▪ Pt100 or Pt1000, with 2 or 3 wires
Electrical connection	<ul style="list-style-type: none"> ▪ Per detachable 9-point set-screw connector, green ▪ Refer to chap. 6.3.6 for the specifications of the connection cables

6.3.5. Specifications of the additional "OUT" outputs board

Current consumption	0.1VA
All digital outputs ("DOx")	<ul style="list-style-type: none"> ▪ Transistor ▪ Any connection mode, in NPN or PNP mode ▪ Galvanically insulated ▪ Protected against short circuits ▪ Max. voltage: 36VDC ▪ max. 700mA per transistor but max. 1A if both transistors are connected ▪ Max. frequency 2000Hz
All analogue outputs ("AOx")	<ul style="list-style-type: none"> ▪ 4-20mA current ▪ Any connection mode, in sink or source mode ▪ Galvanically insulated ▪ Protected against polarity reversal ▪ Max. loop impedance: 1100Ω at 36VDC, 610Ω at 24VDC, 100Ω at 12VDC
Electrical connection	<ul style="list-style-type: none"> ▪ Per detachable 9-point set-screw connector, black ▪ Refer to chap. 6.3.6 for the specifications of the connection cables

6.3.6. 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 mm ²
▪ Flexible wire H05(07) V-K	0.2...1.5 mm ²
▪ With non-insulated end connection	0.2...1.5 mm ²
▪ With insulated end connection	0.2...0.75 mm ²

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

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.

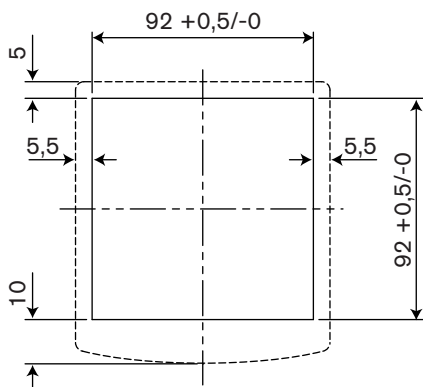
- Electrical installation can only be carried out by qualified and authorised personnel with the appropriate tools.
- Install appropriate safety devices (correctly rated fuse and/or circuit-breaker).
- The use of probes/sensors sold by Bürkert is preferable.
- Follow the instructions on installation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

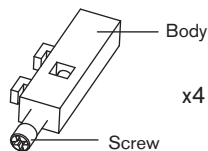
- Take appropriate measures to avoid unintentional activation of the installation.
- Guarantee a set or controlled restart of the process subsequent to the installation of the device.

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.

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.

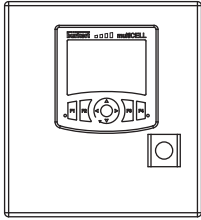
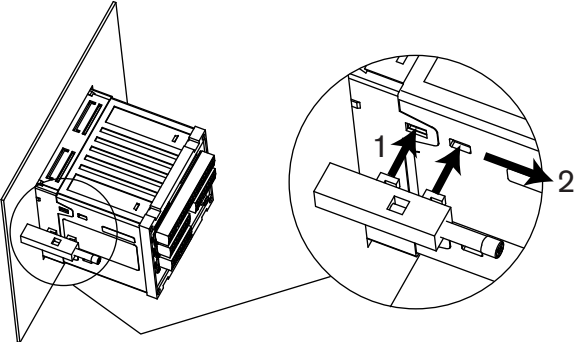
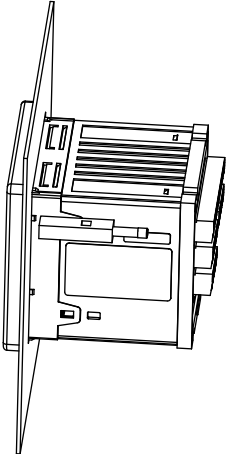
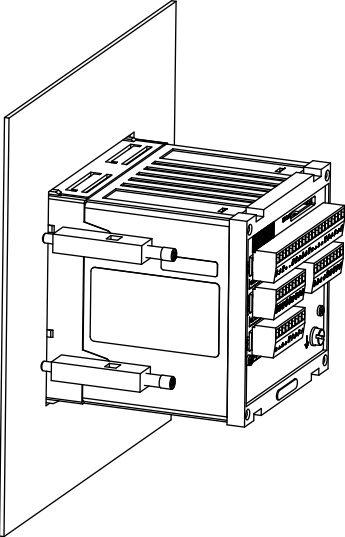
	<p>Stage 3:</p> <p>→ Slide the housing into the cut-out with the connectors to the back until it can go no further.</p>
	<p>Stage 4:</p> <p>→ Insert (1) the hooks on the first locking system into the slots on the housing.</p> <p>→ Pull the locking system (2) until you hear a click. The click may be heard when tightening the locking system at stage 6.</p>
	<p>Stage 5:</p> <p>→ Place the locking system flush against the multiCELL by hand, so that the hooks remain in place.</p>
	<p>Stage 6:</p> <p>→ Fully tighten the screws using an appropriate screwdriver.</p> <p>→ Repeat stages 4 to 6 to fit the other 3 locking systems.</p>

Fig. 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 Fig. 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.

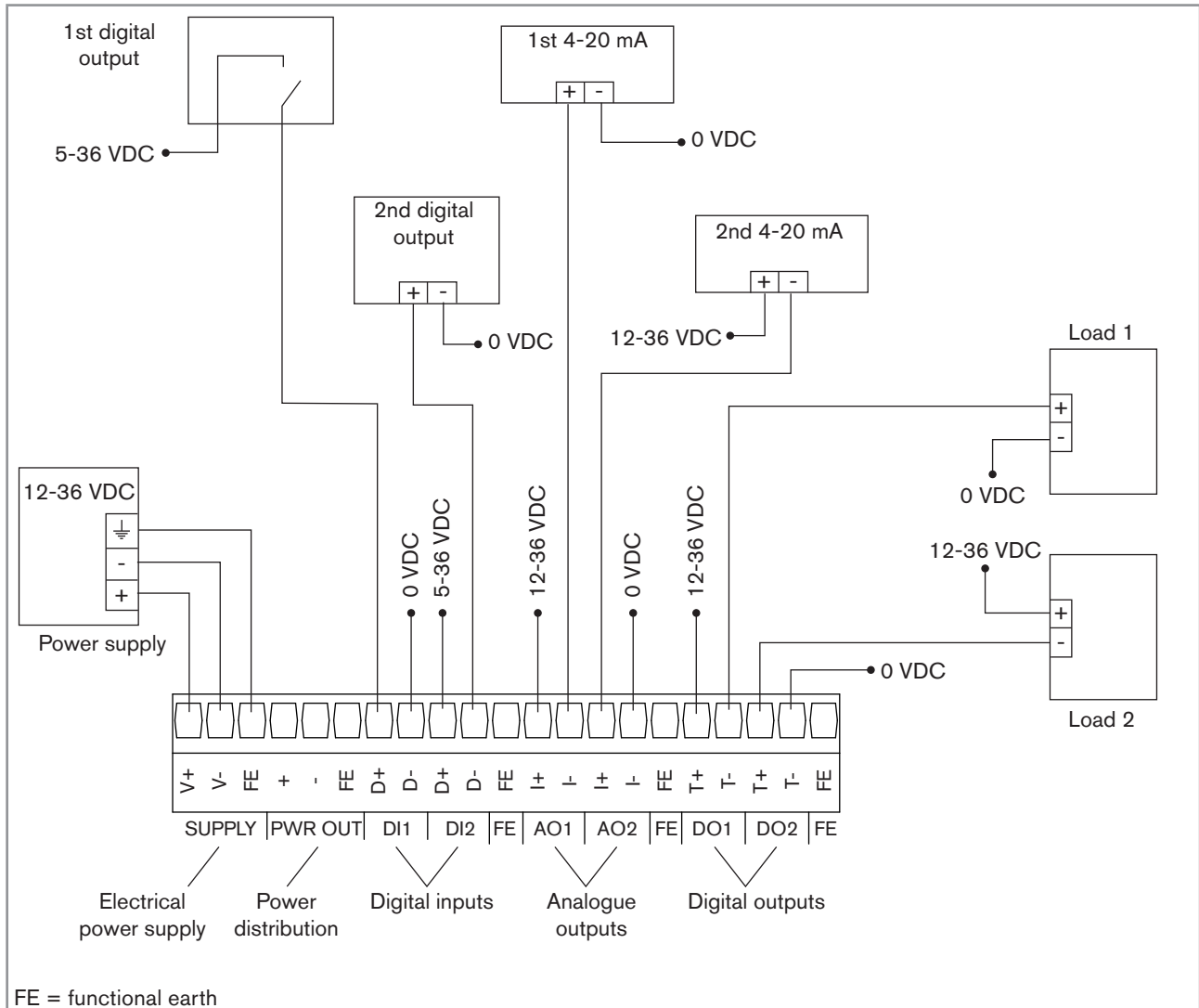


Fig. 6: Wiring of the "MO:MAIN" board

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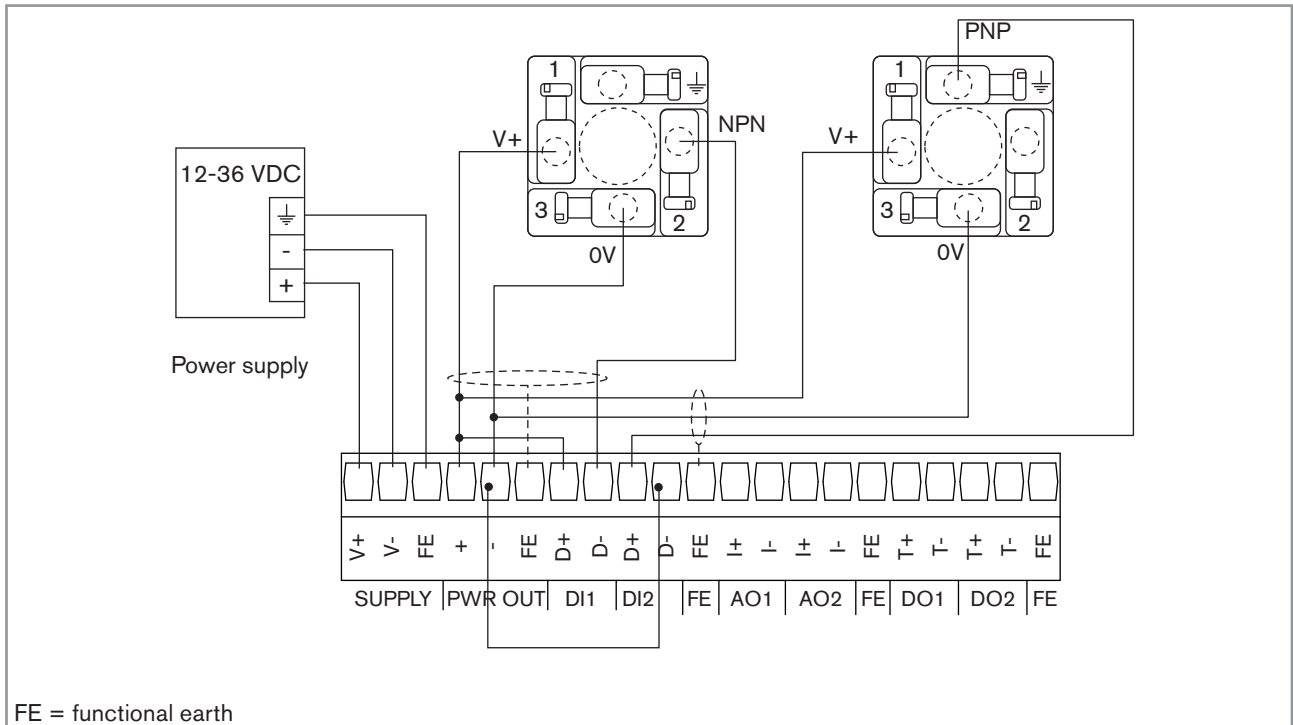


Fig. 7: Connection example for the 8619 with two flow sensors, type 8030

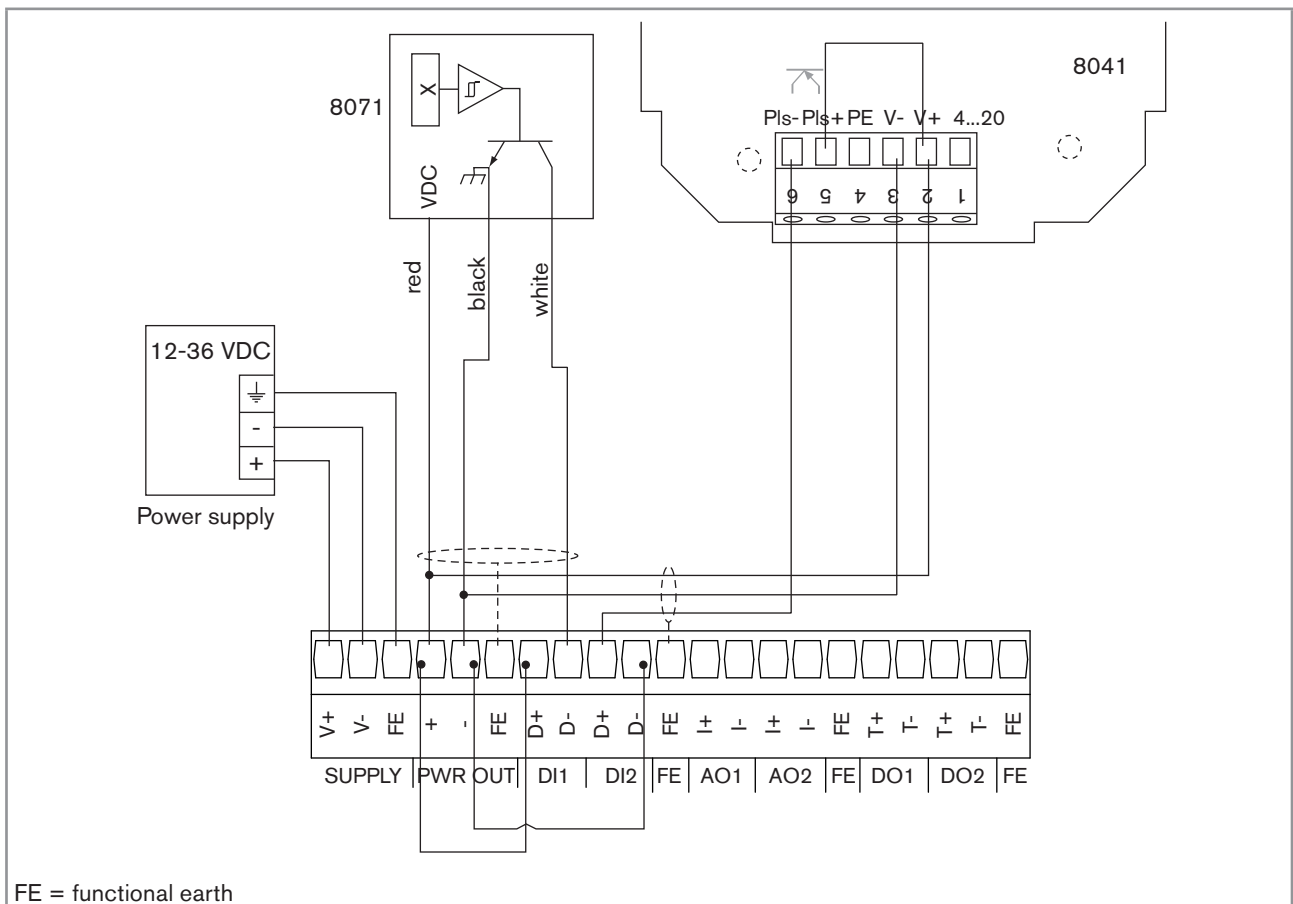


Fig. 8: Connection example for the 8619 with 2 flow sensors, types 8071 and 8041

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7.3.3. Wiring the "OUT" outputs module

Wiring the "OUT" outputs module:

- Two 4-20 mA analogue outputs (marked AO1 and AO2);
- Two digital outputs (marked DO1 and DO2).

The outputs are galvanically insulated, and therefore voltage free.

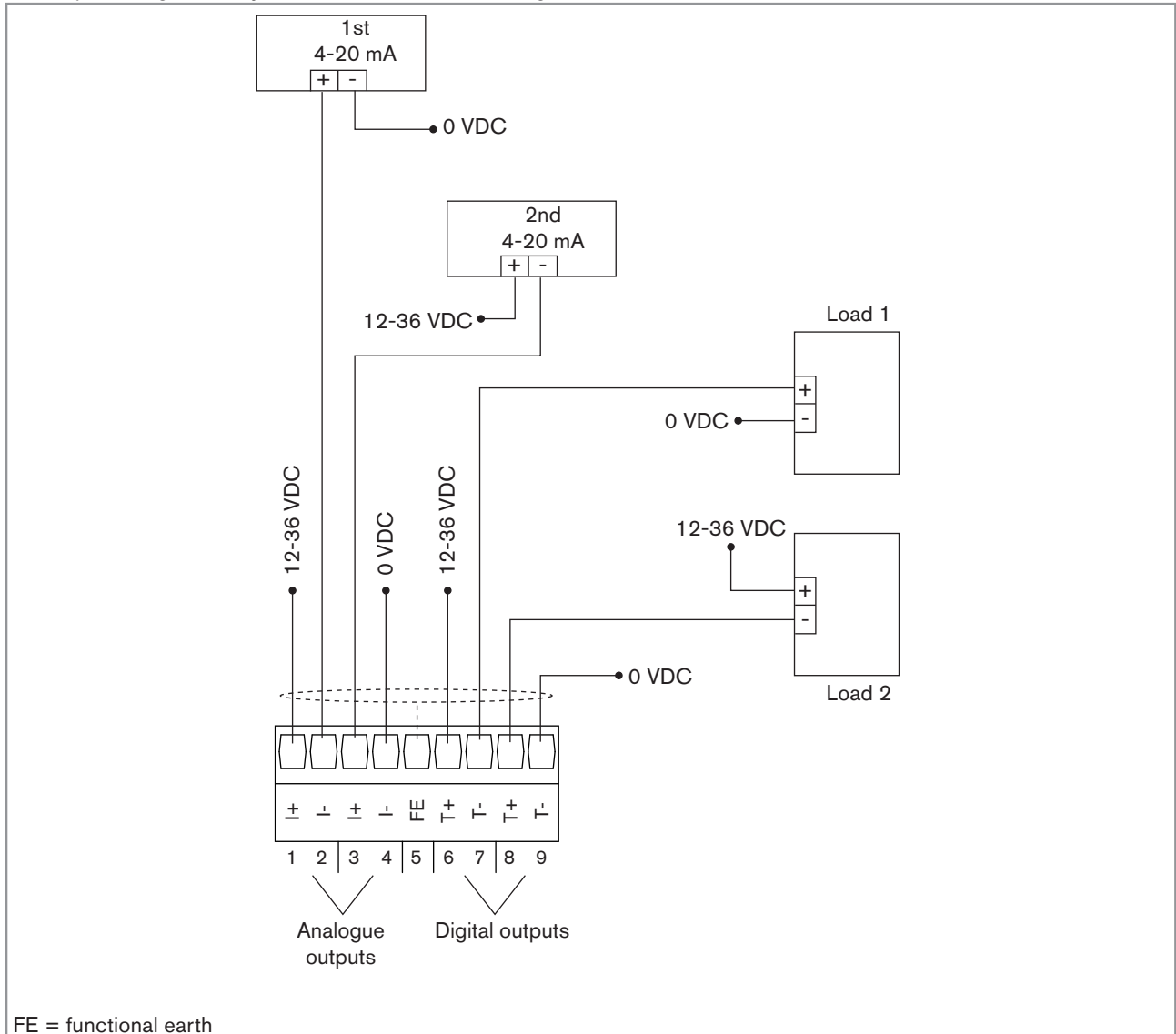


Fig. 9: Wiring the "OUT" outputs module

7.3.4. 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.

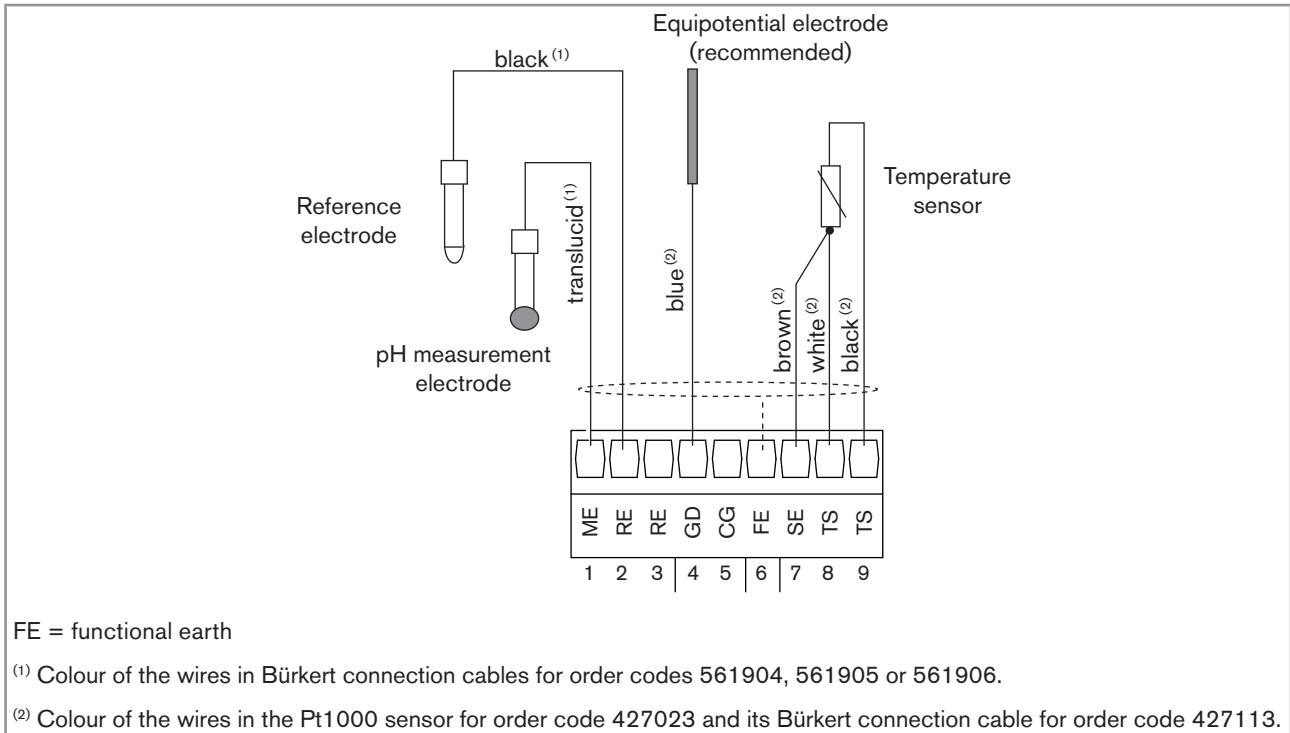


Fig. 10: Wiring a Bürkert 8200 type sensor and a Pt1000 temperature sensor in symmetrical mode

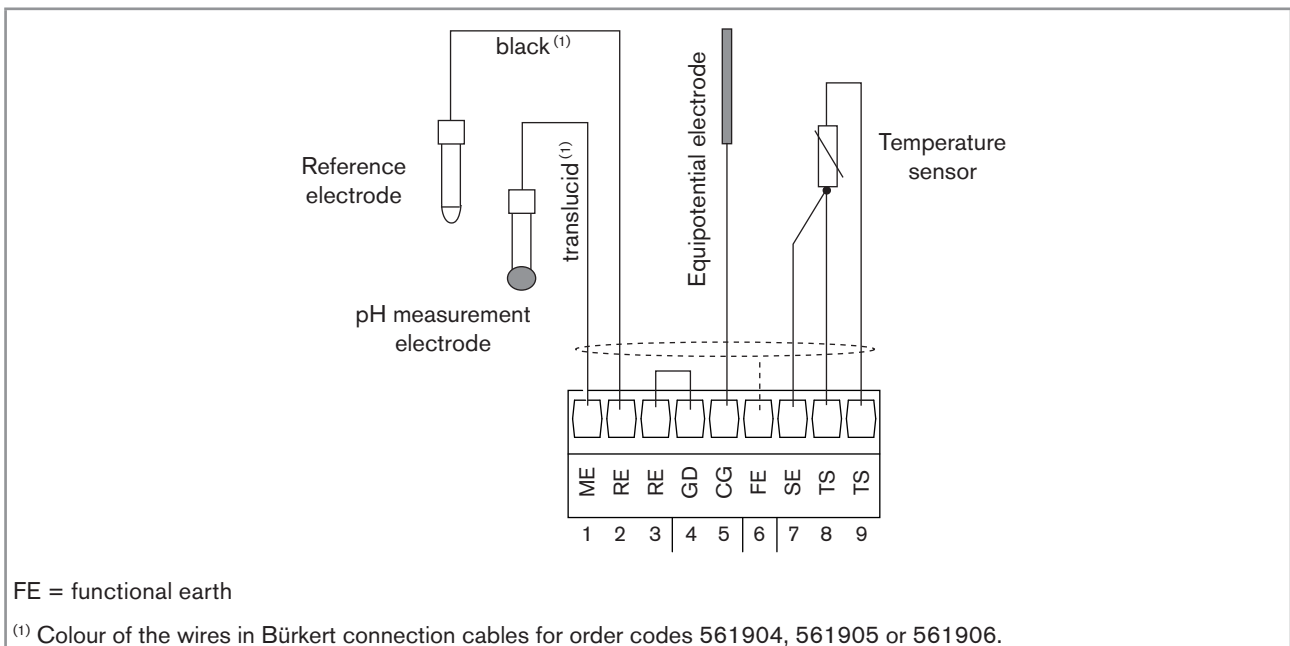


Fig. 11: Wiring a pH sensor and a Pt100 or Pt1000 temperature sensor in asymmetrical mode to a pH/ORP module

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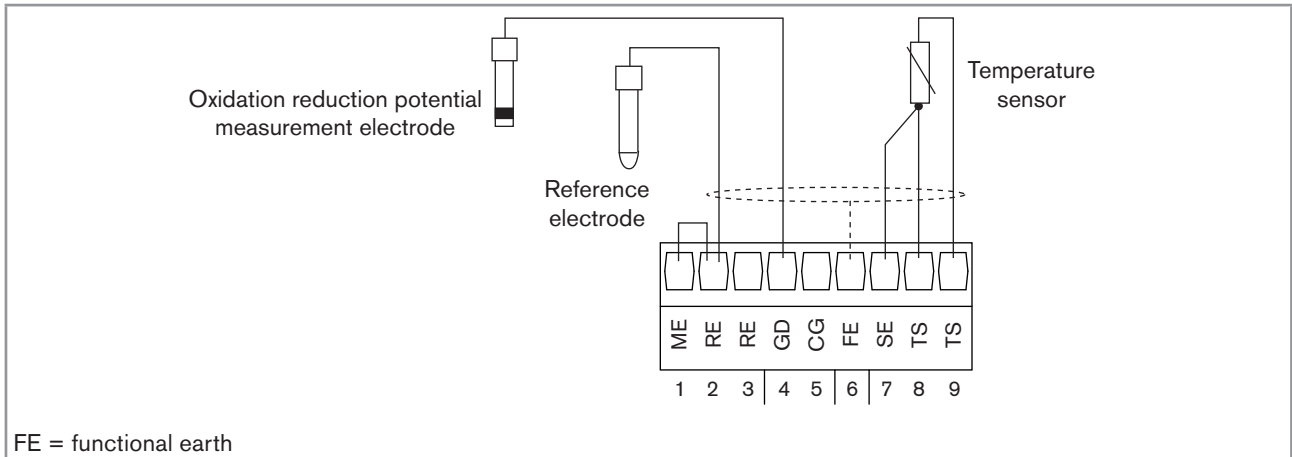


Fig. 12: Wiring an oxidation reduction potential sensor and a Pt100 or Pt1000 temperature sensor in a pH/ORP module

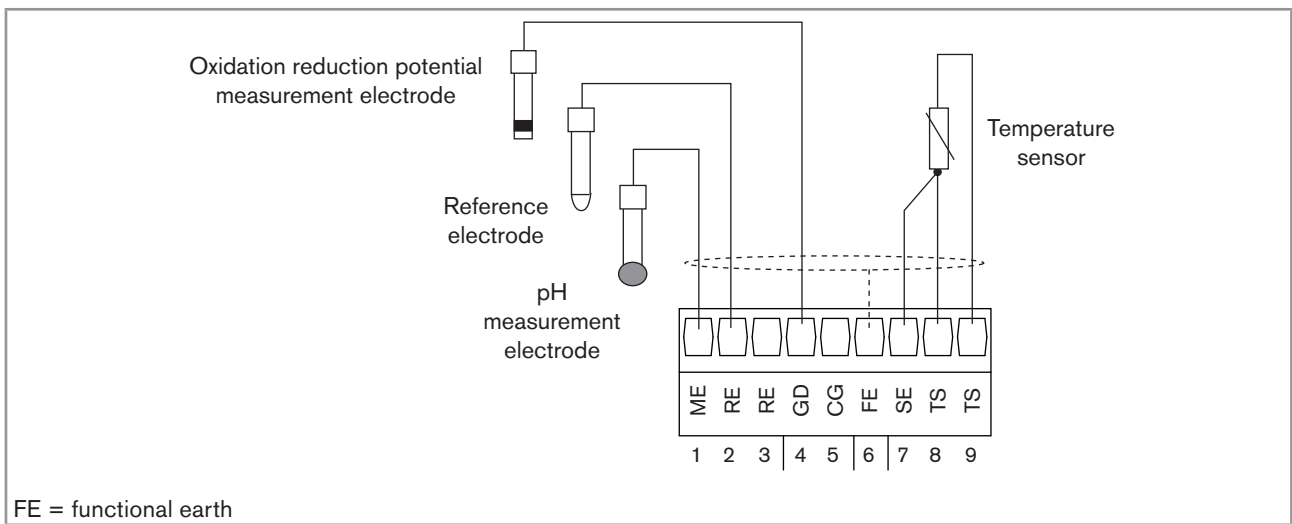


Fig. 13: Wiring a pH sensor, an oxidation reduction potential sensor and a Pt100 or Pt1000 temperature sensor in a pH/ORP module

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7.3.5. Wiring the "COND" conductivity module

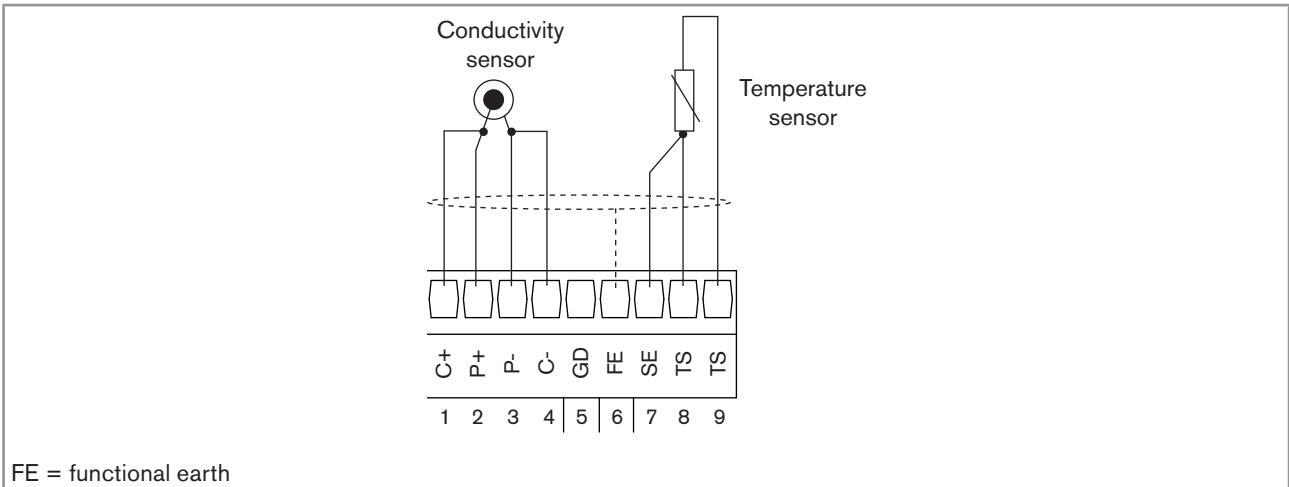


Fig. 14: Wiring a resistive conductivity cell with 2 electrodes and a Pt100 or PT100 temperature sensor in a conductivity module

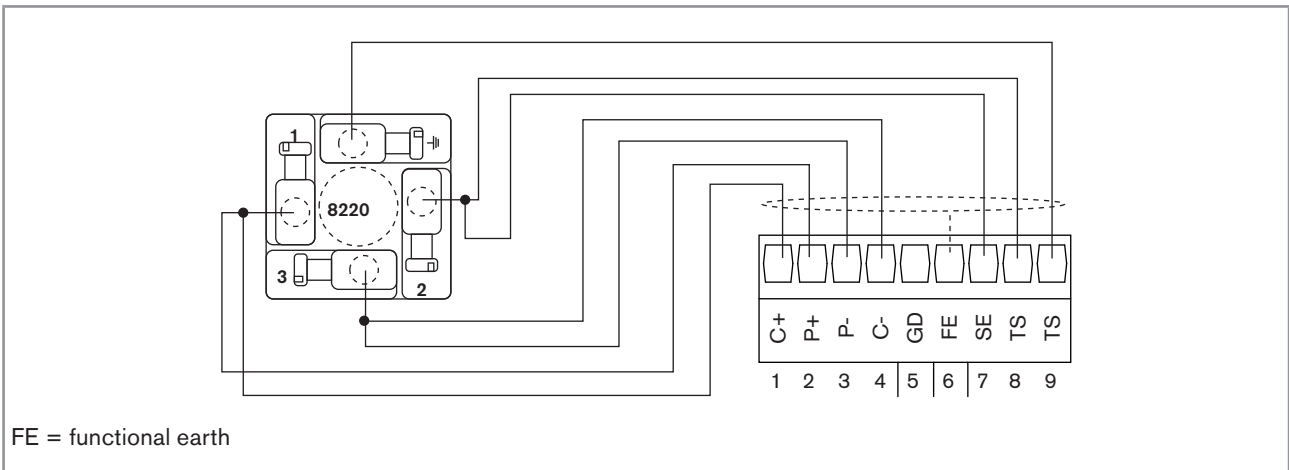


Fig. 15: Connection example for a 8220 conductivity sensor

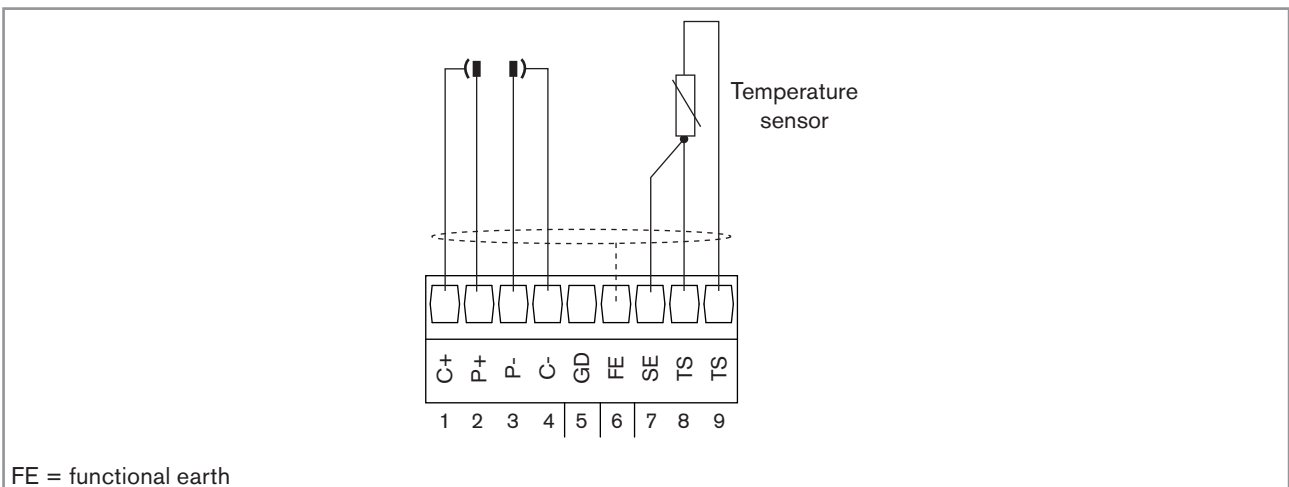


Fig. 16: Wiring a resistive conductivity cell with 4 electrodes and a Pt100 or PT100 temperature sensor in a conductivity module

8. COMMISSIONING

8.1. Safety instructions



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.



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

9. ADJUSTMENT AND FUNCTIONS

9.1. 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.

9.2. Functions

The device has 2 modes of use:

Read mode

See chap. 9.7 for the description of Read mode.

Configuring Mode

This mode comprises 5 menus:

Menu title	Relevant icon
"Parameters": see chap. 9.9	
"Calibration": see chap. 9.10	
"Diagnostics": see chap. 9.11	
"Tests": see chap. 9.12	
"Information": see chap. 9.13	

9.3. Using the navigation button and the dynamic keys

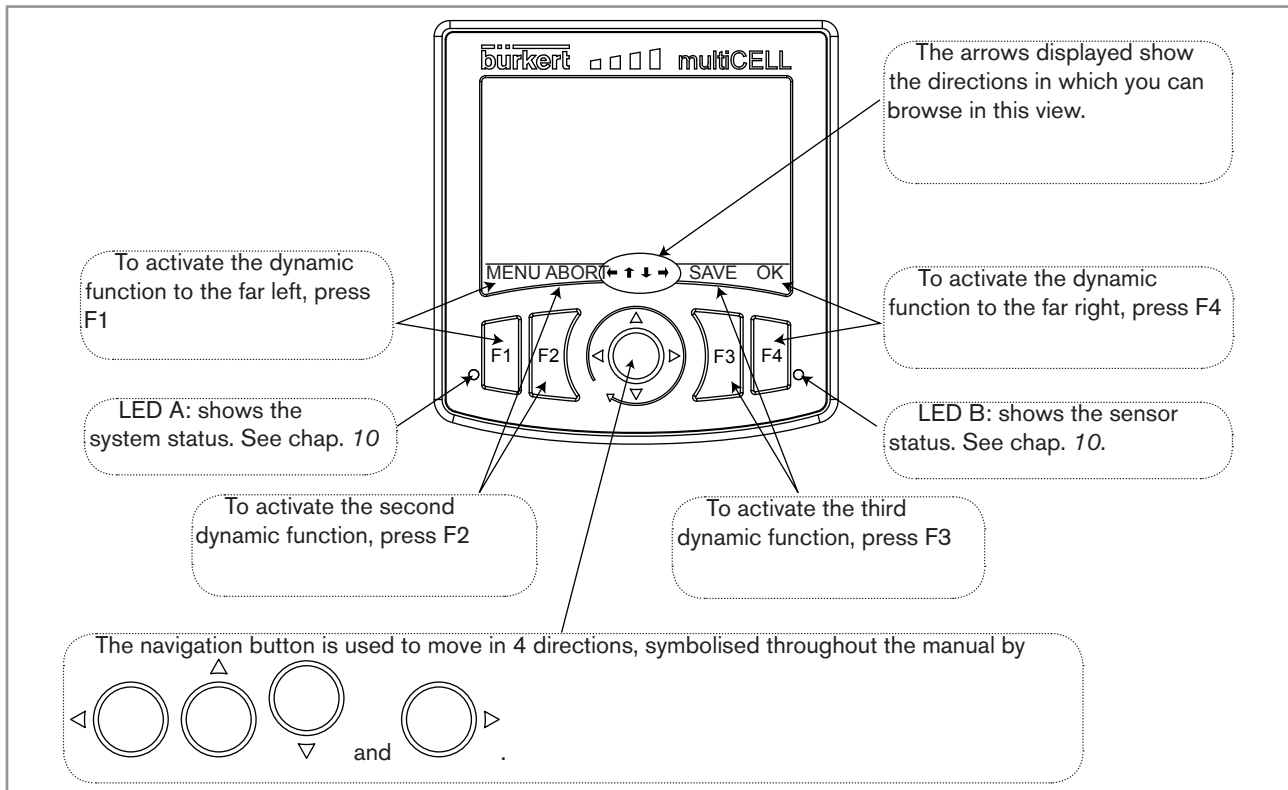

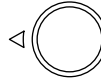
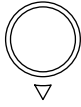
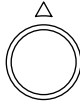





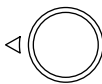



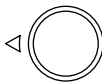
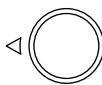





Fig. 17: Using the navigation button and the dynamic keys

You want to...	Press...
....access the Configuring mode	Dynamic function, "MENU", from any view in Read mode
...go back to Read mode	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 Read mode	 next view  previous view  next level  previous level
...browse in the Configuring mode 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

9.4. Modifying a name

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.).



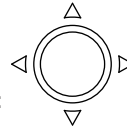
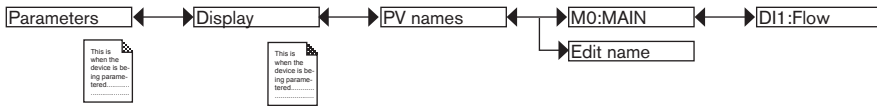
To retrieve the original name, even after modification and saving:

→ edit the new name

→ delete all the characters using one of the methods described on p. 32.

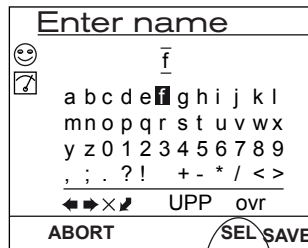
Example: rename a variable (choose one of the variables suggested).

Refer to chap. 9.8 to access Parameters menu.

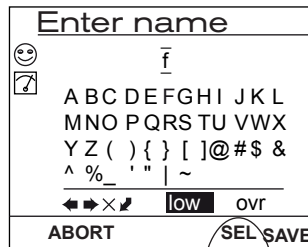


→ Place the cursor over the desired letter, using the navigation button:

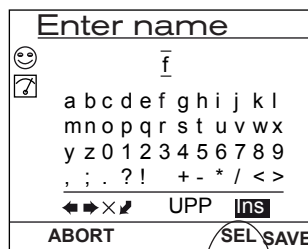
→ Select the highlighted letter by pressing the key **F3** (function "SEL"):



→ Display the capital letters and different signs by placing the cursor over "UPP" then pressing the key **F3** (function "SEL"):

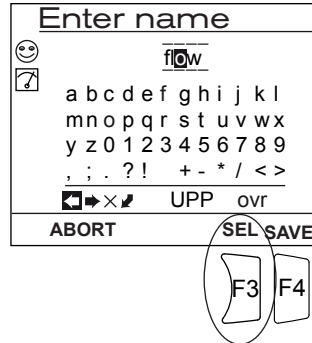


→ By default, the "character insertion" ("Ins") mode is activated; to activate the "character overwrite" mode, place the cursor over "ovr" then press the key **F3** (function "SEL"):

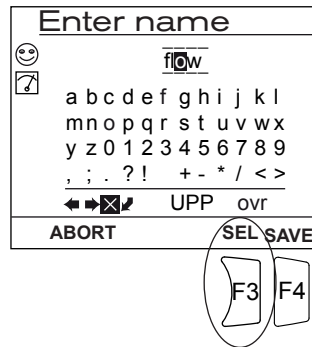


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→ to select a character in the entered name, place the cursor over the arrows ◀ or ▶ and press the key **F3** (function "SEL"):



→ to delete the character selected in the entered name, place the cursor over × and press the key **F3** (function "SEL"):

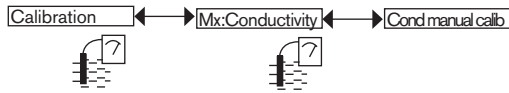


→ to delete the character preceding the character selected in the entered name, place the cursor over and press the key **F3** (function "SEL"):



9.5. Entering a numerical value

- Access, for example, the manual calibration function for a conductivity sensor. Refer to chap. 9.8 to access "Calibration" menu.



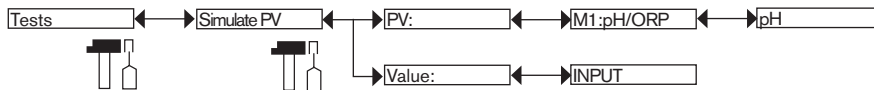
Move the decimal point by pressing to the far right of the numerical value and then on until the decimal point is in the desired place (the decimal point moves in a loop)

Increment or decrement the figure selected by pressing or

After confirming the numerical value input by pressing "OK", modify the unit selected by pressing or

Fig. 18: Example of a numerical value entering

- Access, for example, the pH value simulation function. Refer to chap. 9.8 to access "Tests" menu.



Select the character to the far left by pressing and then allocate the "+" or "-" sign by pressing .

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

Fig. 19: Changing the sign of a numerical value

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9.6. Description of the display

9.6.1. Description of the icons

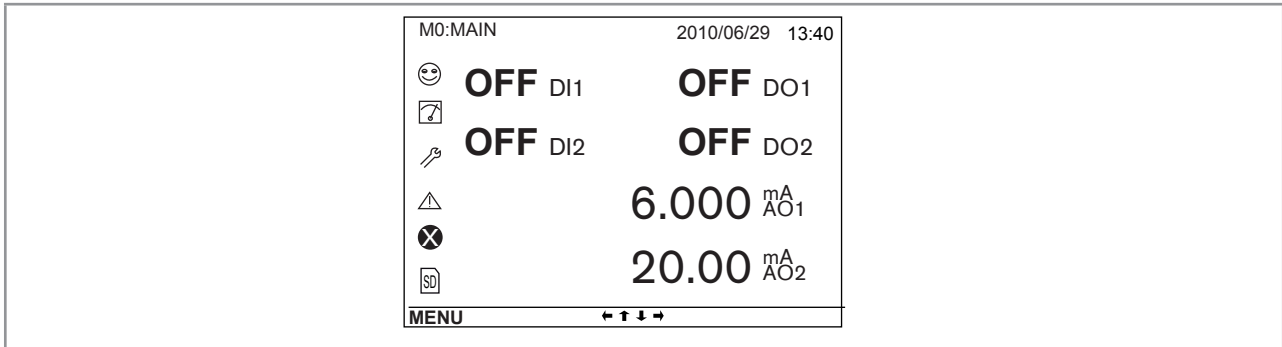


Fig. 20: Position of the icons

Icon	Meaning and alternatives
	<p>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.</p> <p>If monitoring of the electrodes and/or the fluid temperature and/or the fluid conductivity are activated, the alternative icons in this position are:</p> <ul style="list-style-type: none"> Smiley face icon, combined with : see chap. 9.11.2 to 9.11.4 Smiley face icon, combined with : see chap. 9.11.2 to 9.11.4
	<p>Device currently measuring.</p> <p>The alternative icons in this position are:</p> <ul style="list-style-type: none"> flashing: HOLD mode activated (see chap. 9.10.1) flashing: running check that an output is working and behaving correctly (see chap. 9.12.2 to 9.12.3)
	"Maintenance" event; see chap. 9.10.6 and 9.10.7
	"Warning" event; see chap. 9.10.6, 9.10.7 and 9.11.2 to 9.11.4
	Error" event; see chap. 9.10.6, 9.10.7 and 9.11.2 to 9.11.4
	<p>Memory card inserted.</p> <p>The alternative to this position is the icon indicating a memory card error.</p>

9.6.2. Switching on the device for the first time

When switching on the device for the first time, the display shows the first view in READ mode:

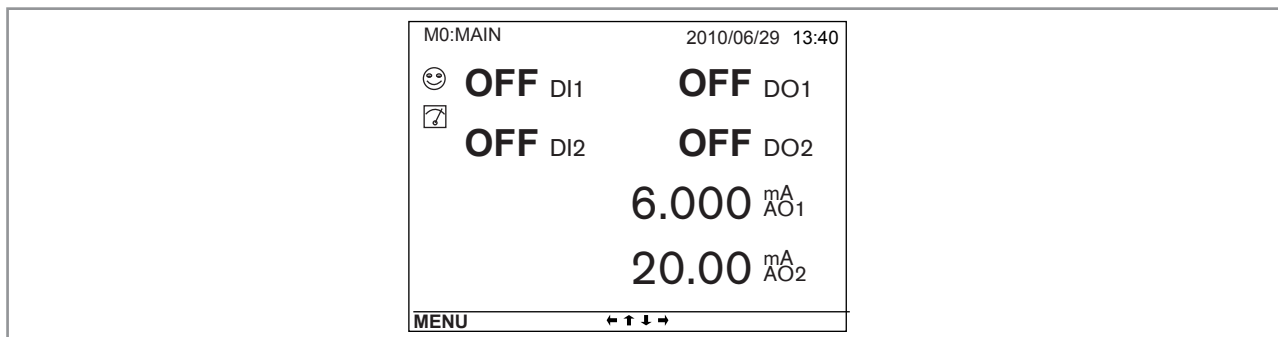
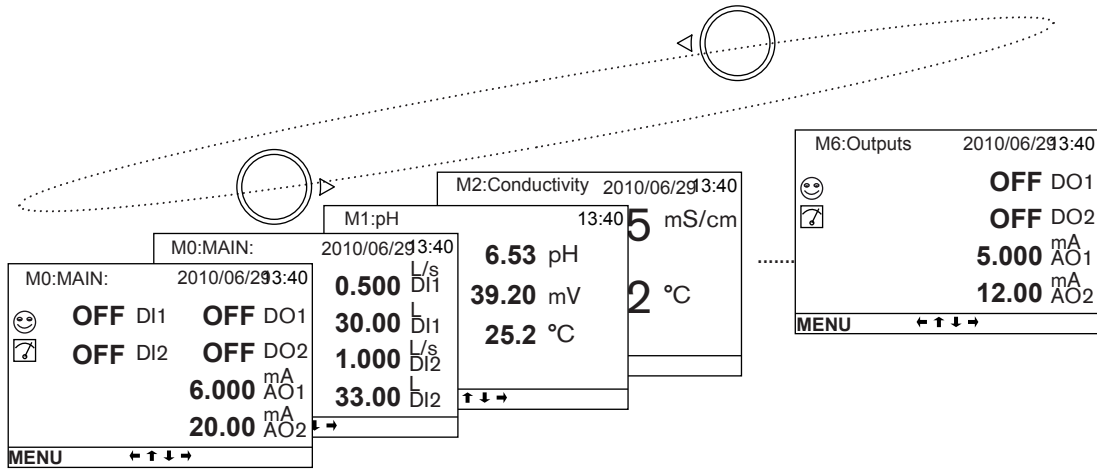


Fig. 21: Display when switching on for the first time



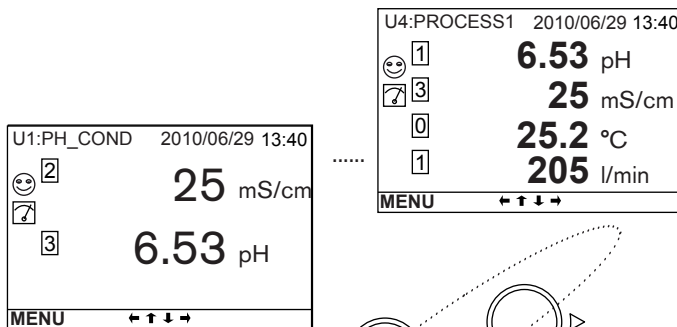
When switched on subsequently, the last active view in the Read menu is displayed. See chap. 9.7 to browse in all views in Read mode.

9.7. Read mode



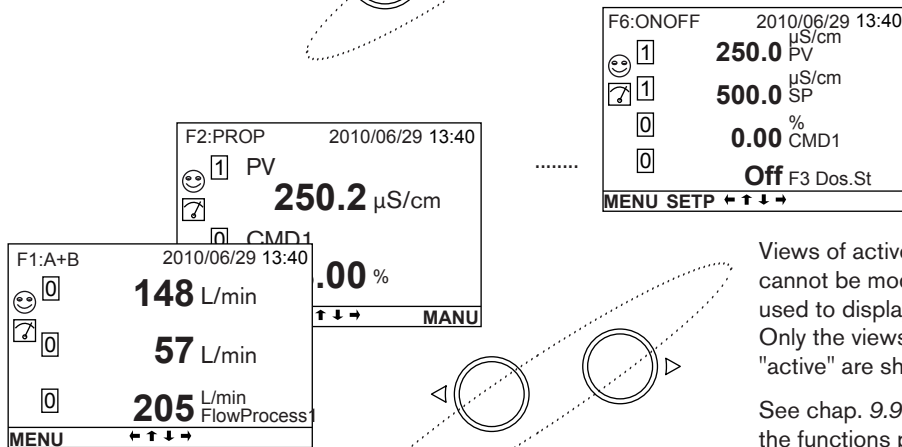
Views of the modules connected to the device (cannot be modified):

- "M0:MAIN" view: displays the values of inputs and outputs on the main board; the second "M0:" view is available on the devices with analysis modules if the software option, "FLOW", is activated (see chap. 9.9.4)
- "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.

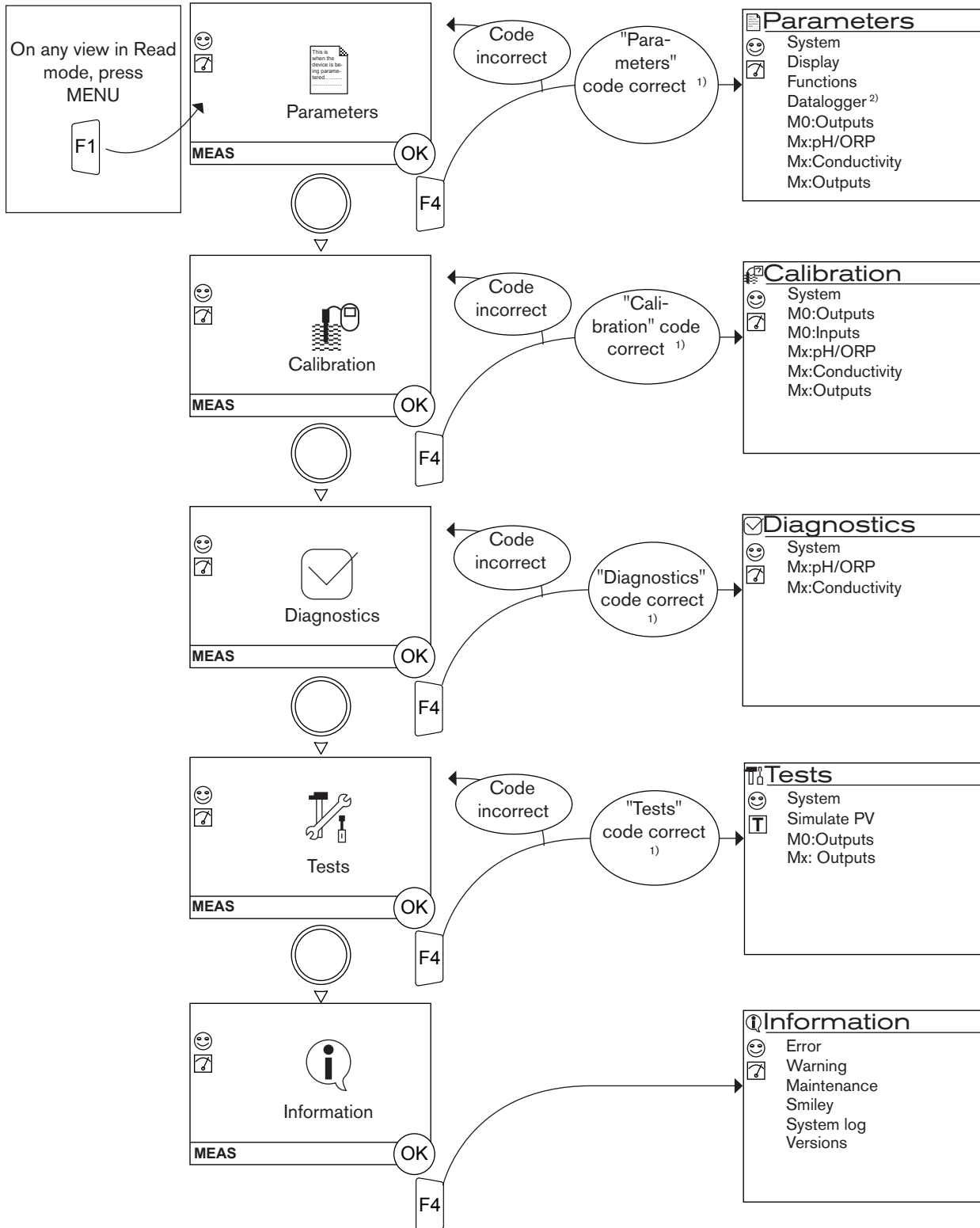
See chap. 9.9.8 to select the data to be displayed.



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. 9.9.11 to 9.9.15 to activate the functions programmed and select the data to be displayed.

9.8. Configuring mode access



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

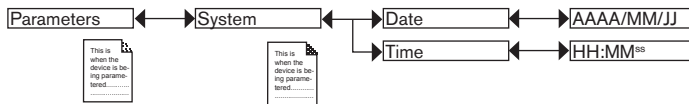
²⁾ This menu is available as an option (see chap. 9.9.4).

→ See chap. 9.14 for details of the functions per menu

9.9. Parameters menu

9.9.1. Setting the multiCELL date and time

Refer to chap. 9.8 to access Parameters menu.

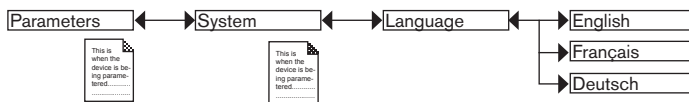


DATE: Set the date

TIME: Set the time

9.9.2. Selecting the display language

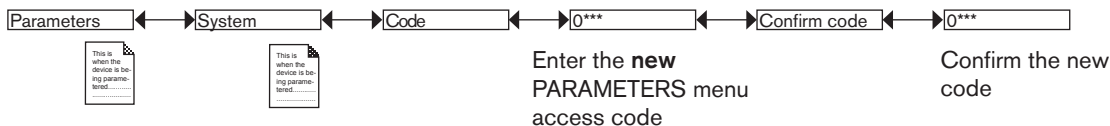
Refer to chap. 9.8 to access Parameters menu.



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

9.9.3. Modifying the PARAMETERS menu access code

Refer to chap. 9.8 to access Parameters menu.



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

9.9.4. Consulting and/or activating the available software options

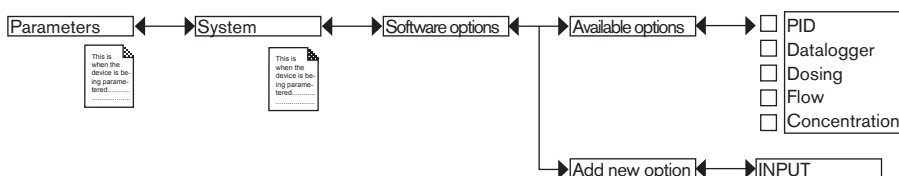
This menu is used:

- 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 for your device, the product identifier and its serial number, which you will find in the "Information" menu -> "Versions" -> "M0:MAIN" -> "Product ID" and "ProductSN"), specific to each device and each option.



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

Refer to chap. 9.8 to access Parameters menu.



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. 9.9.14.
- **DATALOGGER**: enables the saving of data; See chap. 9.9.18.
- **DOSING**: enables configuring of the "Time dosing" and "Volume dosing" functions; See chap. 9.9.15 and 9.9.16. This option automatically activates the "FLOW" option below.
- **FLOW**: the "Flow" and "Totalizer" process inputs are available in the "PV" list on the "M0:MAIN" board (see chap. 9.15) and use the digital inputs of the M0:MAIN board as inputs for the measurement signals.
- **CONCENTRATION**: the concentration tables for a number of solutions are available in the "Parameters" menu -> "Mx:Conductivity" -> "Concentration" (see chap. 9.9.22)

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

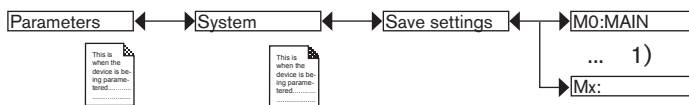
9.9.5. Saving the data on the memory card

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 "save data" function is deactivated. See chap. 9.9.4 and 9.9.18
- The software options activated on the device (see previous chap.) cannot be transferred.

Refer to chap. 9.8 to access Parameters menu.



¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.



If an error message is displayed, refer to chap. 10.3.6.

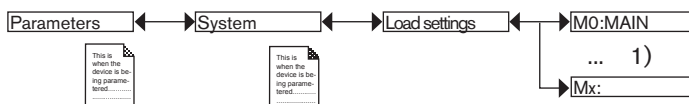
9.9.6. Loading data from the memory card

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. 9.8 to access Parameters menu.



¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.

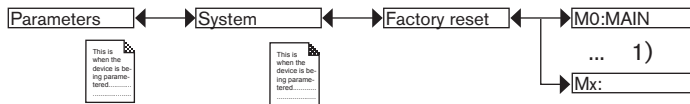


If an error message is displayed, refer to chap. 10.3.7.

9.9.7. Restoring the default parameters of the Read mode and the outputs

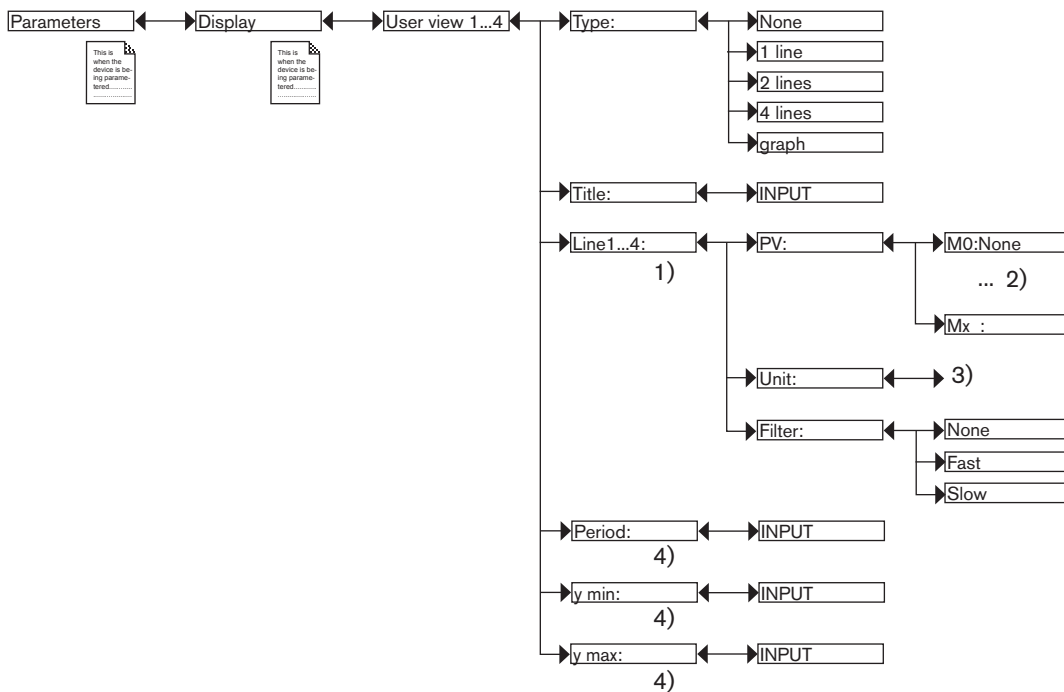
This function is used to restore (dynamic key "Yes") the default parameters of the Read mode and outputs or keep (dynamic key "No") the current parameters.

Refer to chap. 9.8 to access Parameters menu.



9.9.8. Customising the "User views 1 to 4"

Refer to chap. 9.8 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. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.

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.

TITLE: Entering the name displayed in the corresponding "Ux" view. See chap. 9.4. *Modifying a name.*

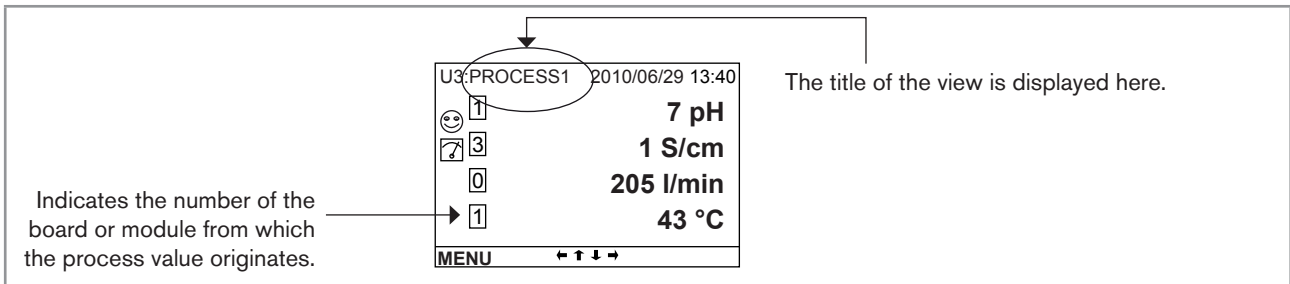


Fig. 22: Example of a title for a customised view

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. 9.9.22).

- **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"

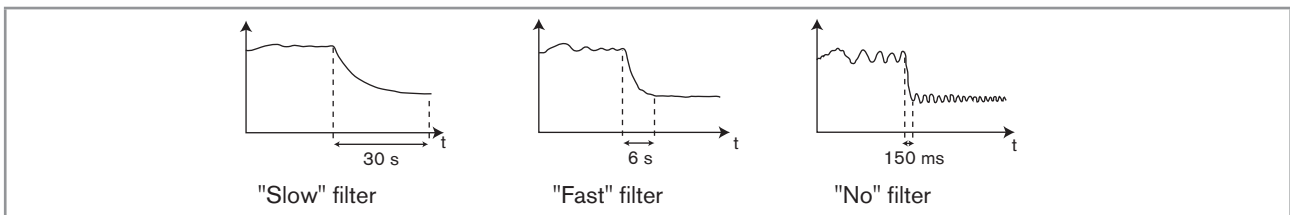


Fig. 23: Types of filters and associated damping effects

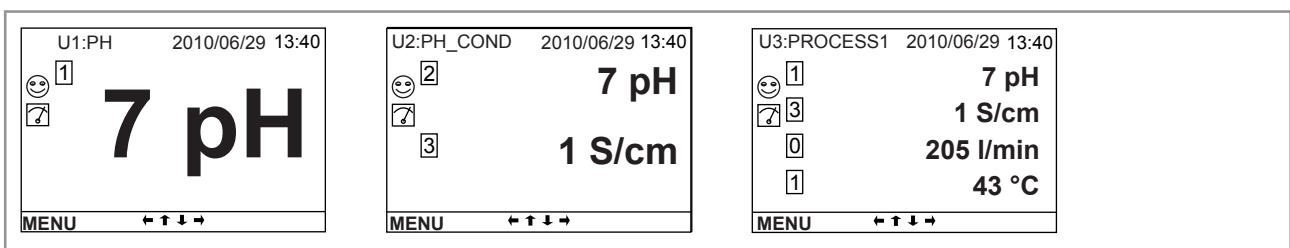


Fig. 24: Examples of customised views with 1, 2 and 4 lines

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.

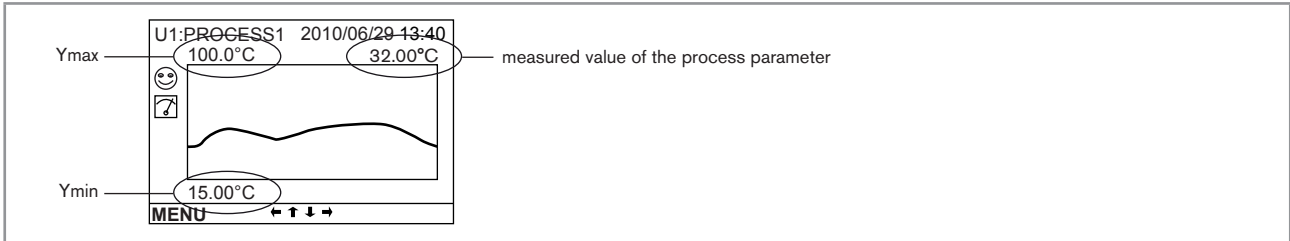
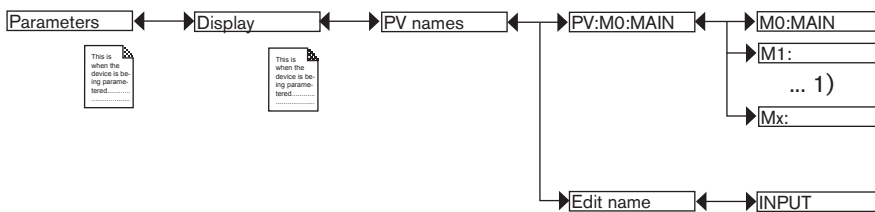


Fig. 25: Example of a customised view of a graph

9.9.9. Renaming a process variable

Renaming a process variable 9.8 to access Parameters menu.



¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.

The entered name appears in the view in Read mode. See chap. 9.4. Modifying a name.

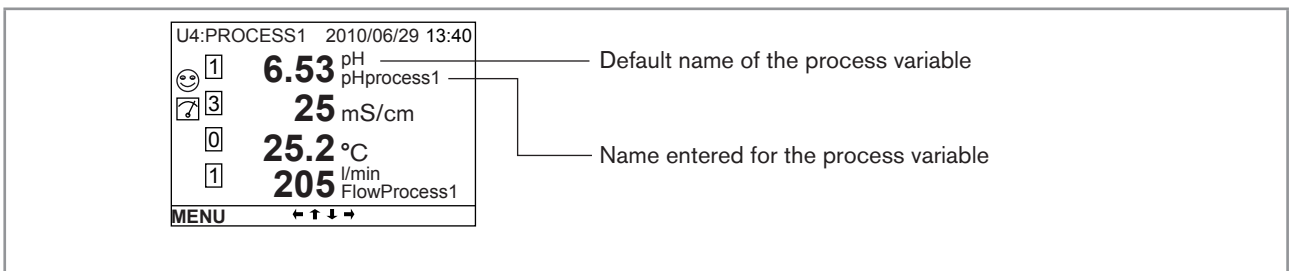
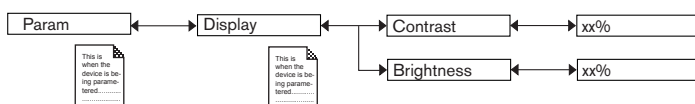


Fig. 26: Example of a renamed process variable

9.9.10. Setting the display contrast and brightness

Refer to chap. 9.8 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 %).

9.9.11. Configuring an arithmetic function

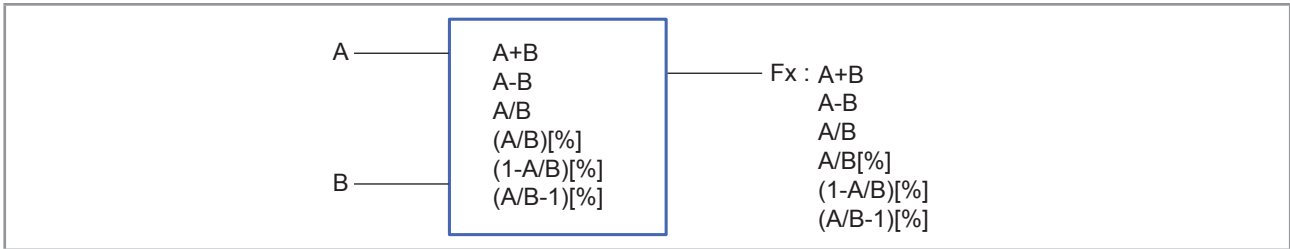


Fig. 27: Arithmetic functions

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:

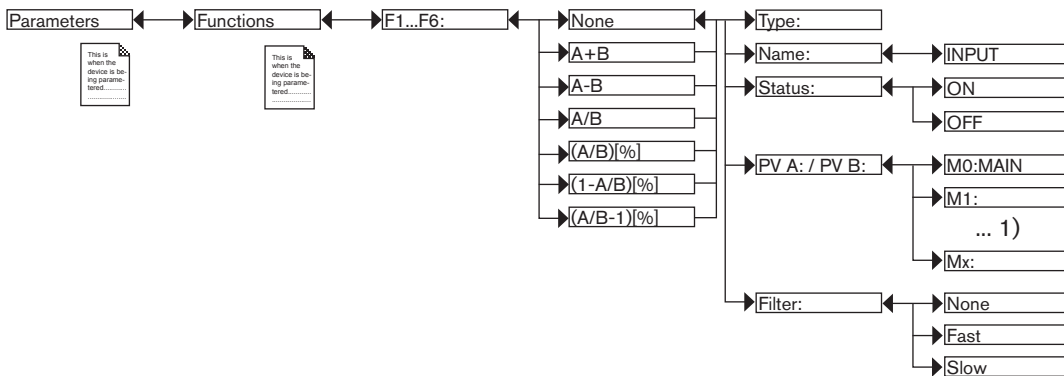
Function	Calculation made
A+B	Sum of 2 variables, A and B
A-B	Subtraction between the 2 variables, A and B
A/B	Ratio between the 2 variables, A and B
A/B[%]	Passage rate
(1 - A/B)[%]	Rejection rate
(A/B - 1)[%]	Deviation rate

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. 9.9.19 and 9.9.20).
- Display the result "Fx:" on one of the user defined "Ux" views: see chap. 9.9.8
- Logging the values of "Fx:" using the datalogger: see chap. 9.9.18

Refer to chap. 9.8 to access Parameters menu.



¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.

TYPE: Indicates the function chosen.

NAME: Rename the function chosen. See chap. 9.4. *Modifying a name* . This name appears in the view associated with this function in Read mode.

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

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 Fig. 23: Types of filters and associated damping effects.

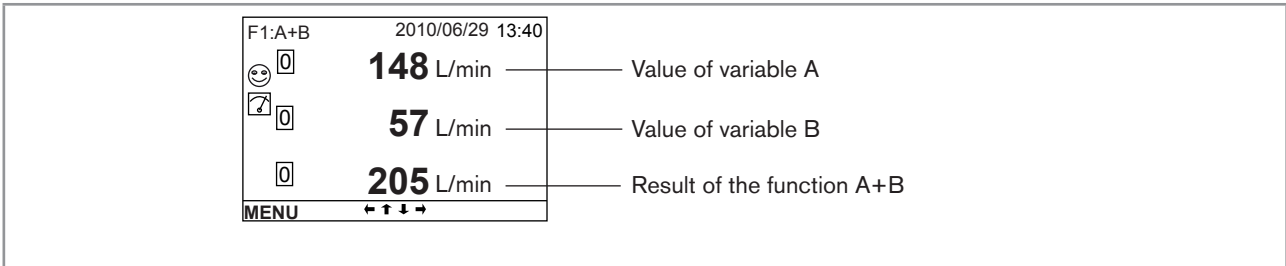


Fig. 28: Example of a view of an active arithmetic function in Read mode

9.9.12. Configuring a "PROP" proportional function

Configuring a "PROP" proportional function

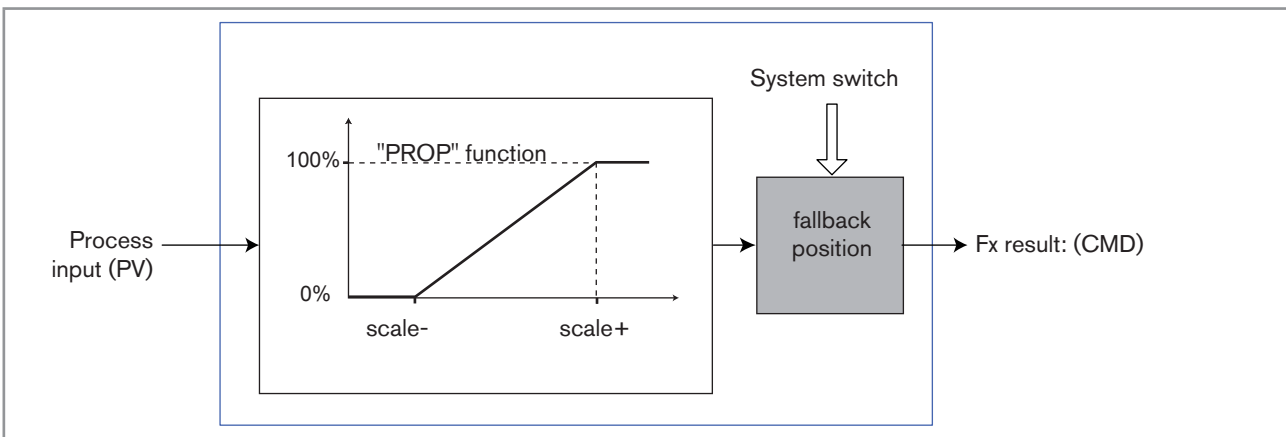
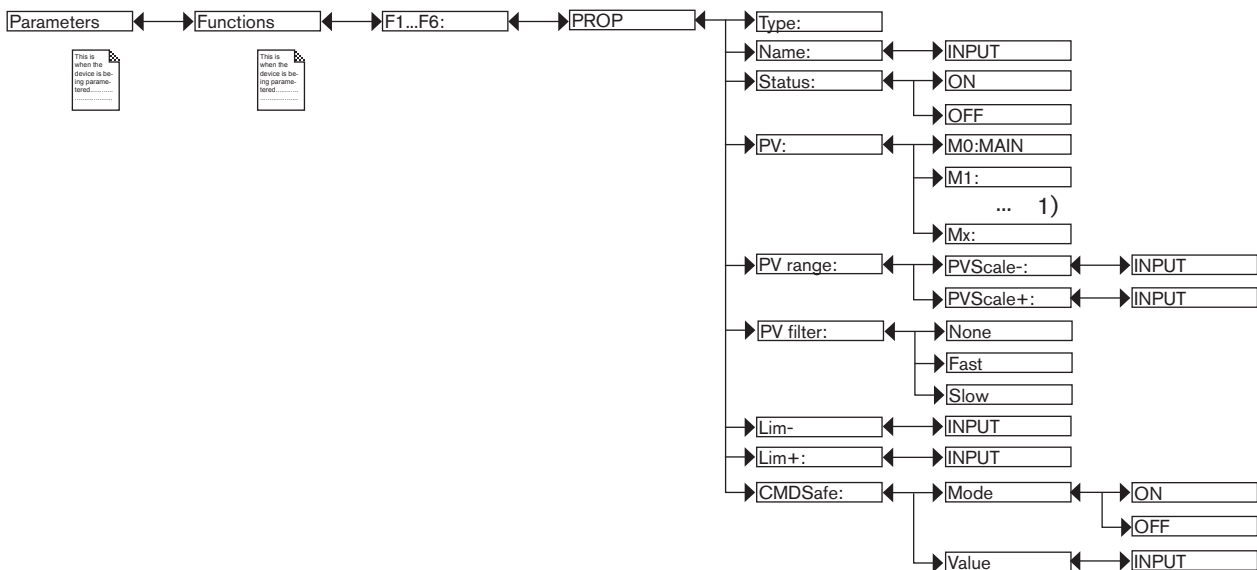


Fig. 29: "PROP" proportional function

Refer to chap. 9.8 to access Parameters menu.



¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.

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. 9.9.19 and 9.9.20).
- Display the result "Fx:" on one of the user defined "Ux" views: see chap. 9.9.8
- Logging the values of "Fx:" using the datalogger: see chap. 9.9.18

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

NAME: Rename the function chosen. See chap. 9.4. *Modifying a name*. This name appears on the view associated with this function in Read mode.

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 Fig. 23: *Types of filters and associated damping effects*.

LIM-: Enter the lower limit on the output.

LIM+: Enter the upper limit on the output.

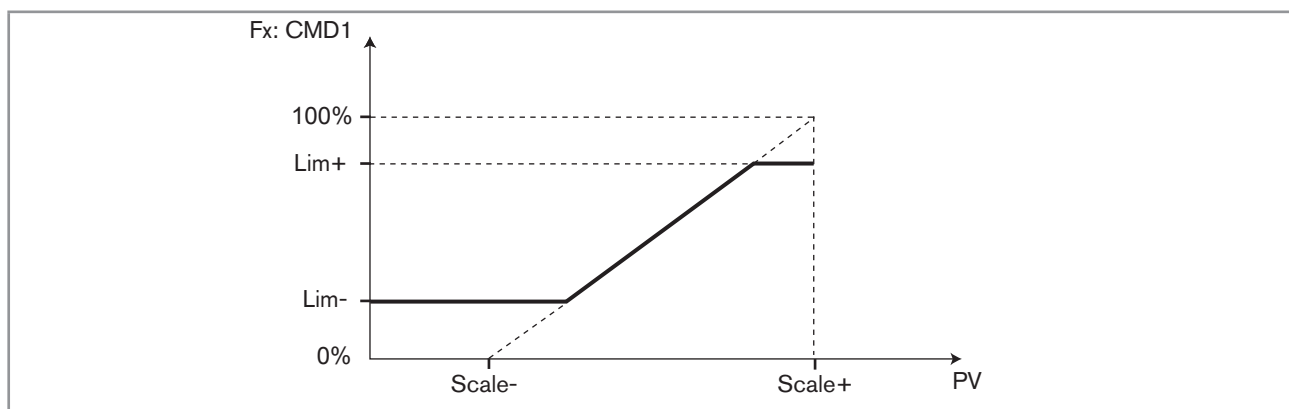


Fig. 30: Using the "LIM-" and "LIM+" parameters on a "PROP" function

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. 9.9.17) 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.

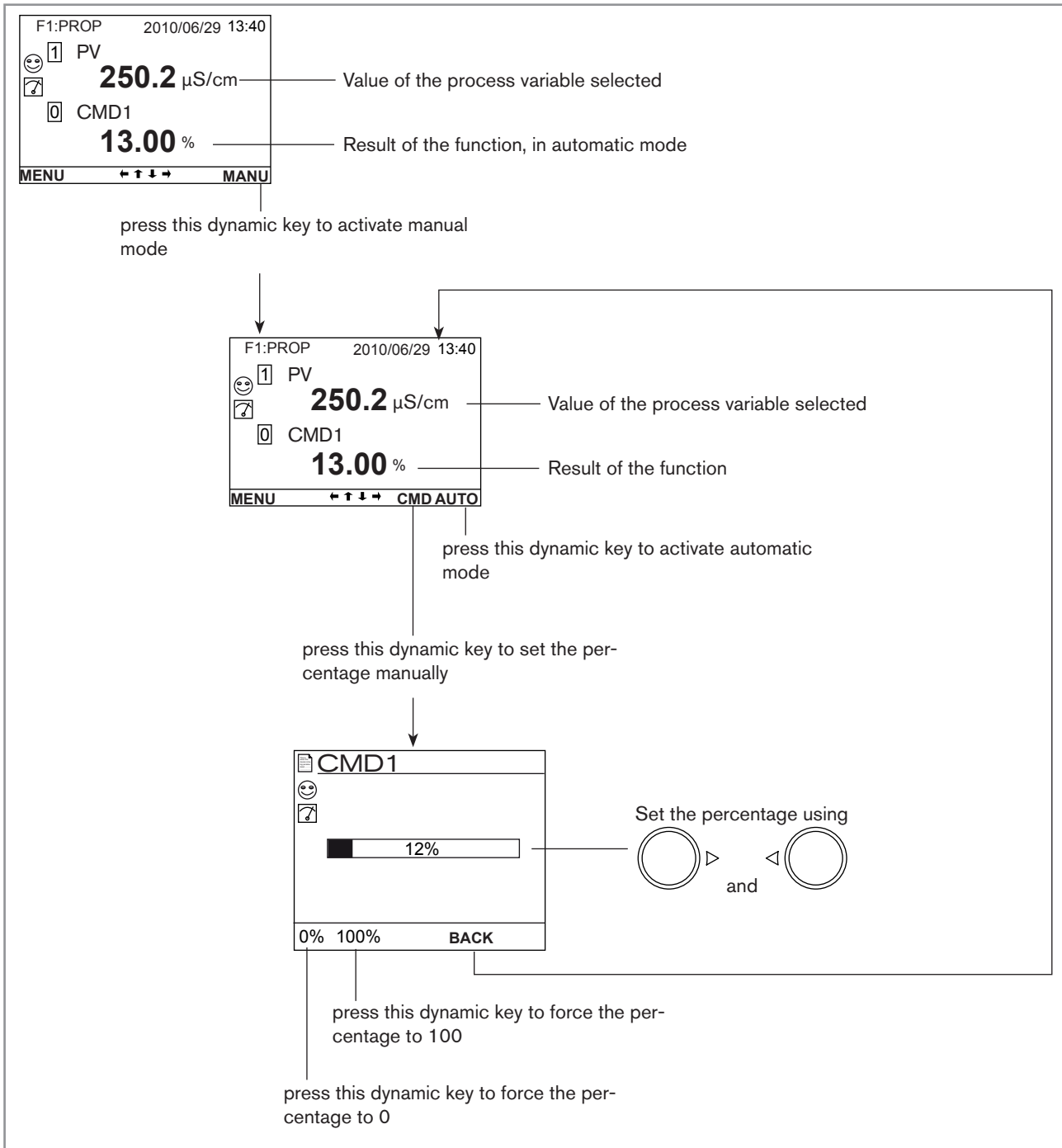


Fig. 31: Examples of a view of a "PROP" function in Read mode and switch to manual or automatic mode

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9.9.13. 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. 9.9.15) 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. 9.9.19 and 9.9.20).
- Display the result "Fx:" on one of the user defined "Ux" views: see chap. 9.9.8
- Logging the values of "Fx:" using the datalogger: see chap. 9.9.18

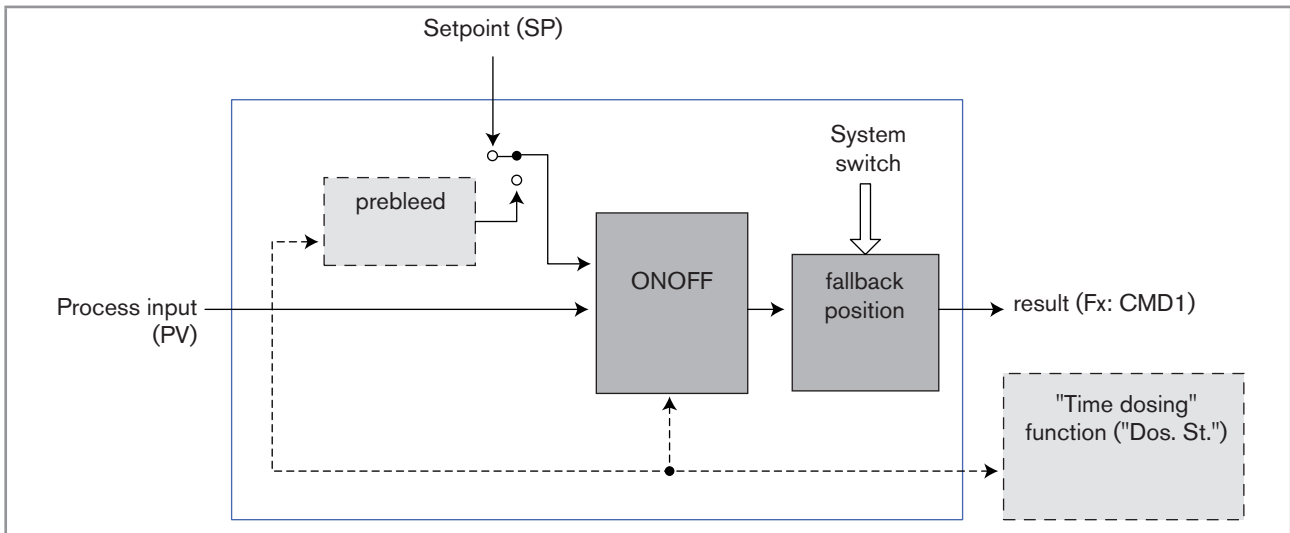


Fig. 32: "ONOFF" function

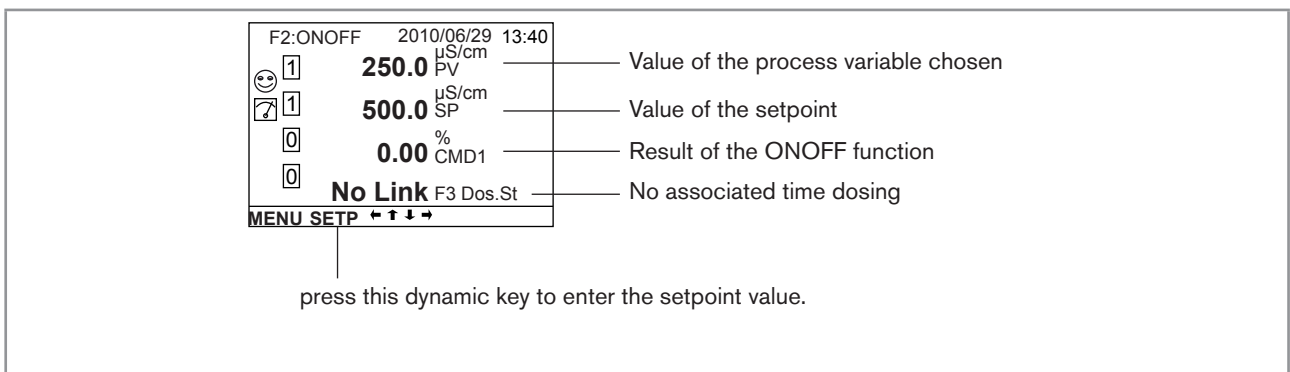
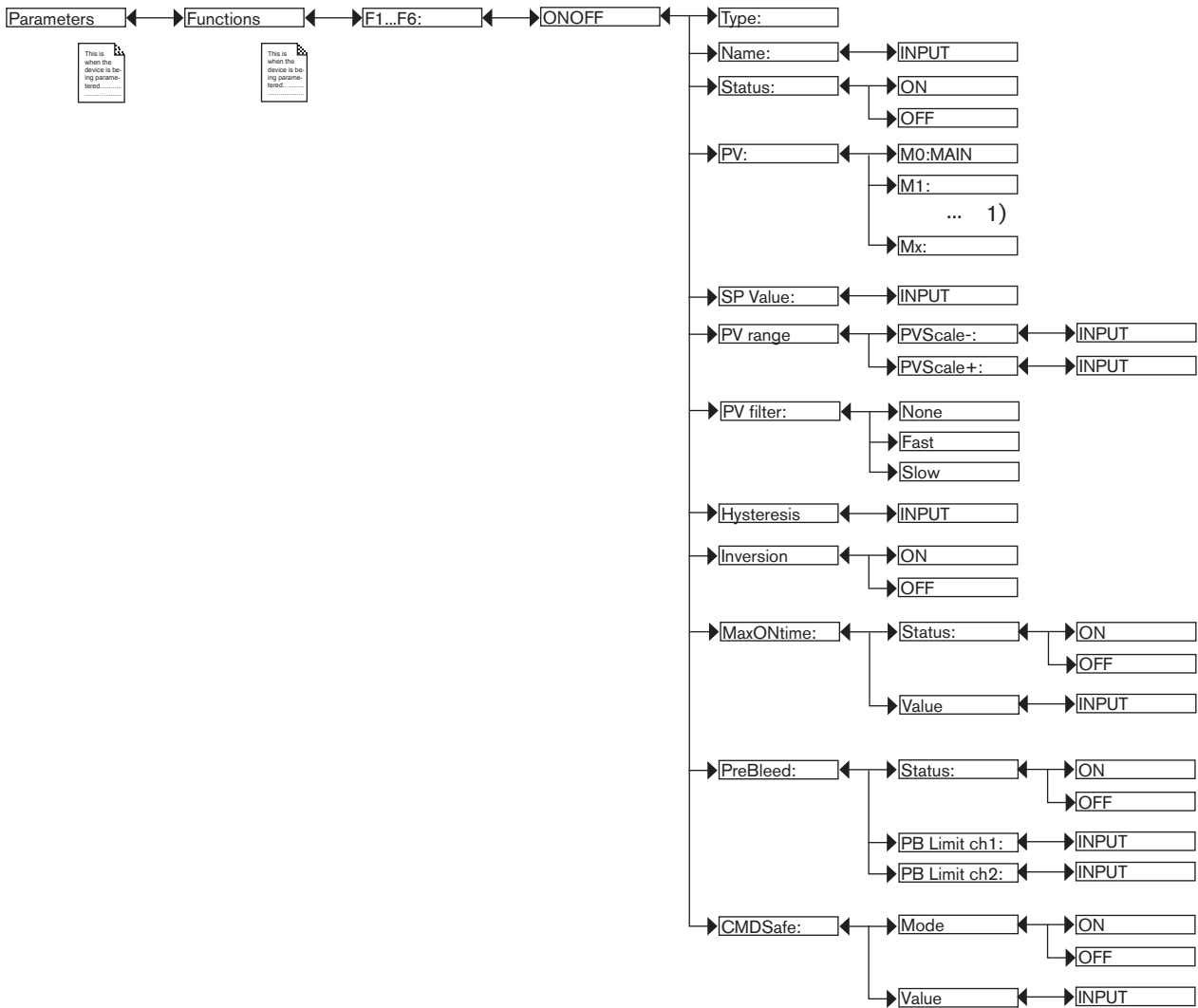


Fig. 33: Example of a view of an "ONOFF" function in Read mode with no associated time dosing

Refer to chap. 9.8 to access Parameters menu.



¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.

TYPE: Indicates the function chosen.

NAME: Rename the function chosen. See chap. 9.4. *Modifying a name.* This name appears in the view associated with this function in Read mode.

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 ("PVSscale-") and maximum ("PVSscale+") values of the process input.

PV FILTER: Choose the level of damping of the chosen process value. See Fig. 23: *Types of filters and associated damping effects.*

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 Fig. 34: *Hysteresis mode, non-inverted and inverted.*

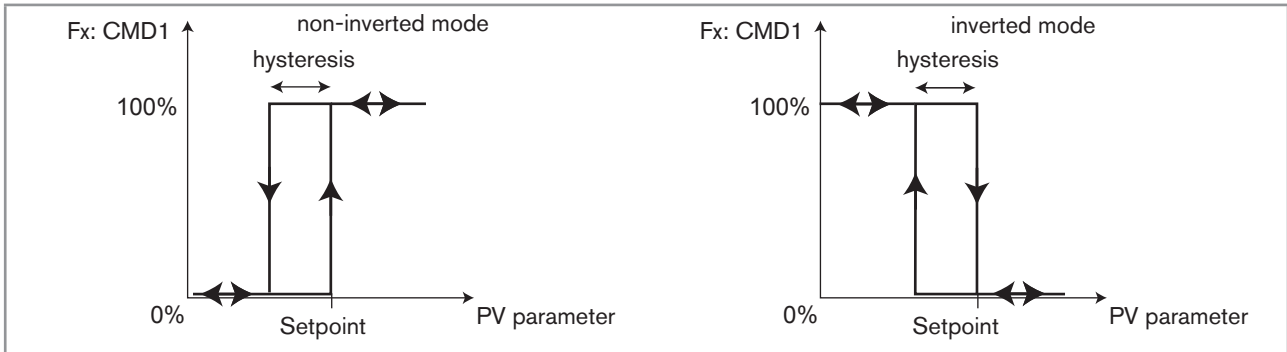


Fig. 34: Hysteresis mode, non-inverted and inverted

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. 9.9.15). 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.

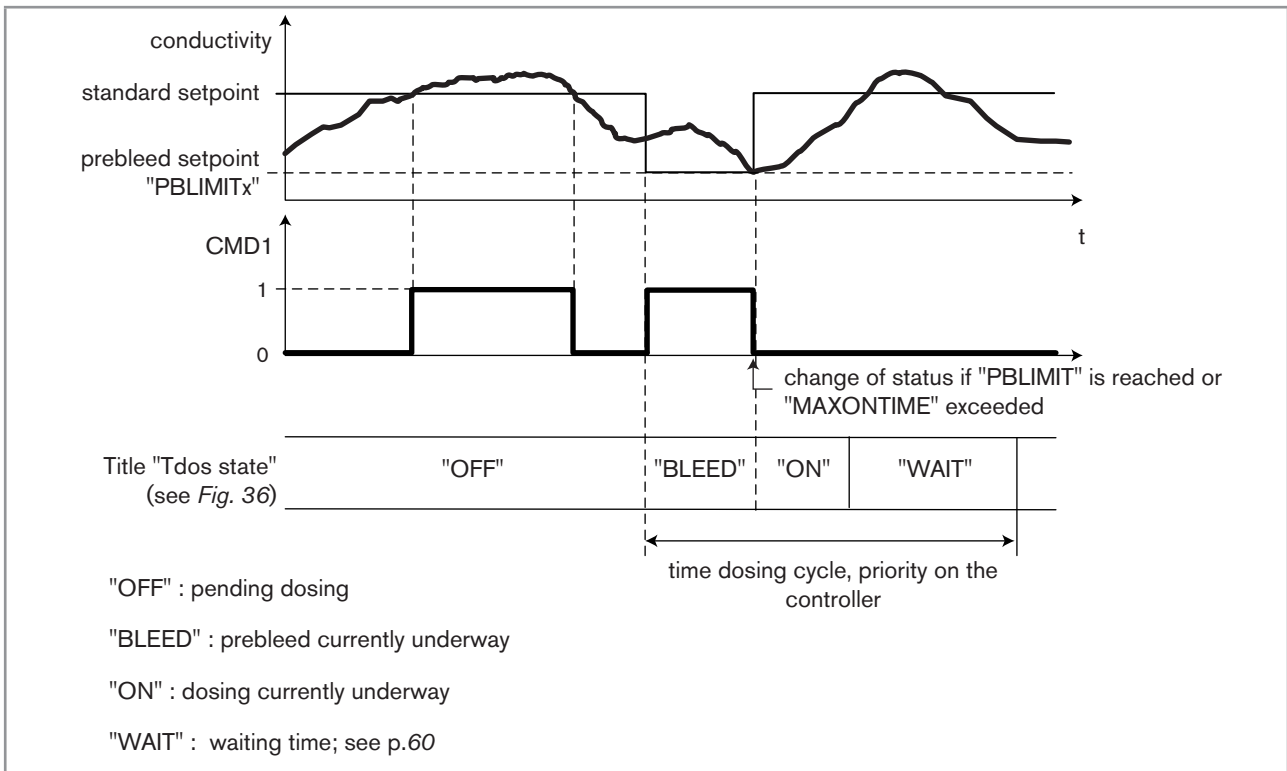


Fig. 35: Combination of "ONOFF" and "TIME DOSING" functions on a conductivity measurement

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. 9.9.17) 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.

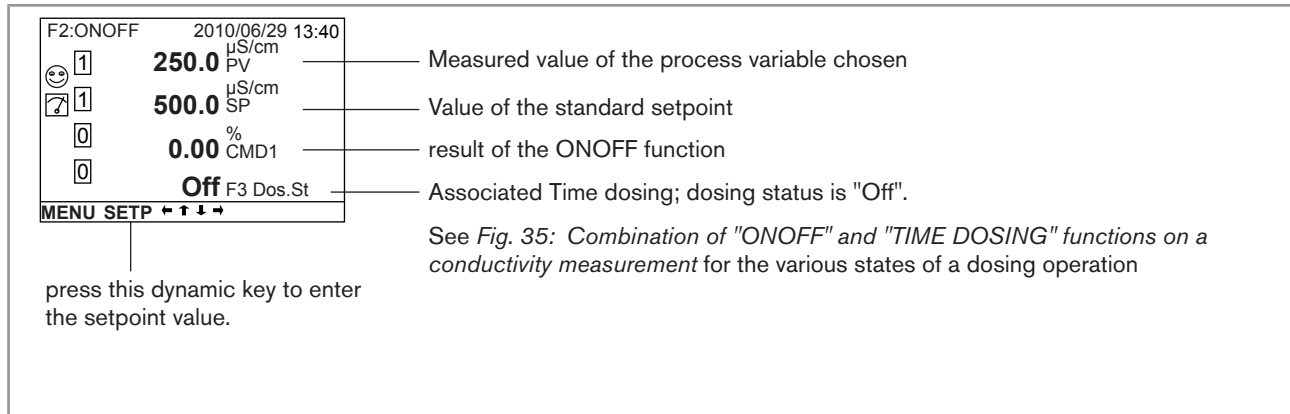


Fig. 36: Example of a view, in Read mode, of the ONOFF function associated with a time dosing function

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

This function is available as an option. See chap. 9.9.4

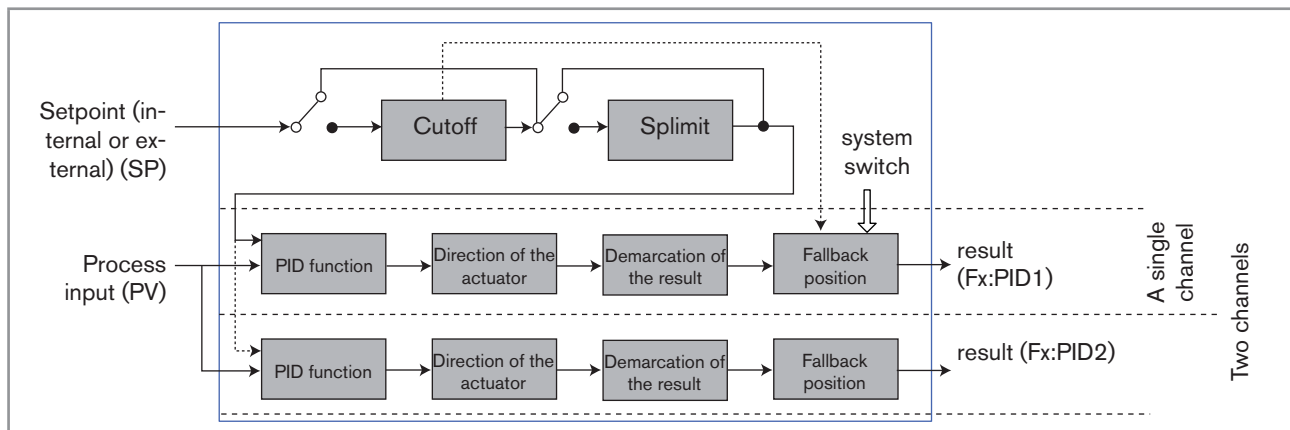


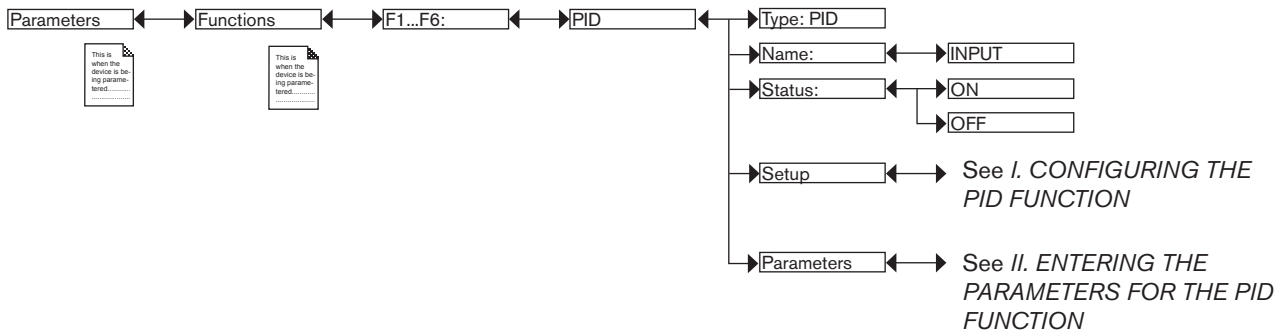
Fig. 37: PID function

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. 9.9.19 and 9.9.20).
- Display the result "Fx:" on one of the user defined "Ux" views: see chap. 9.9.8
- Logging the values of "Fx:" using the datalogger: see chap. 9.9.18

Refer to chap. 9.8 to access Parameters menu.



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

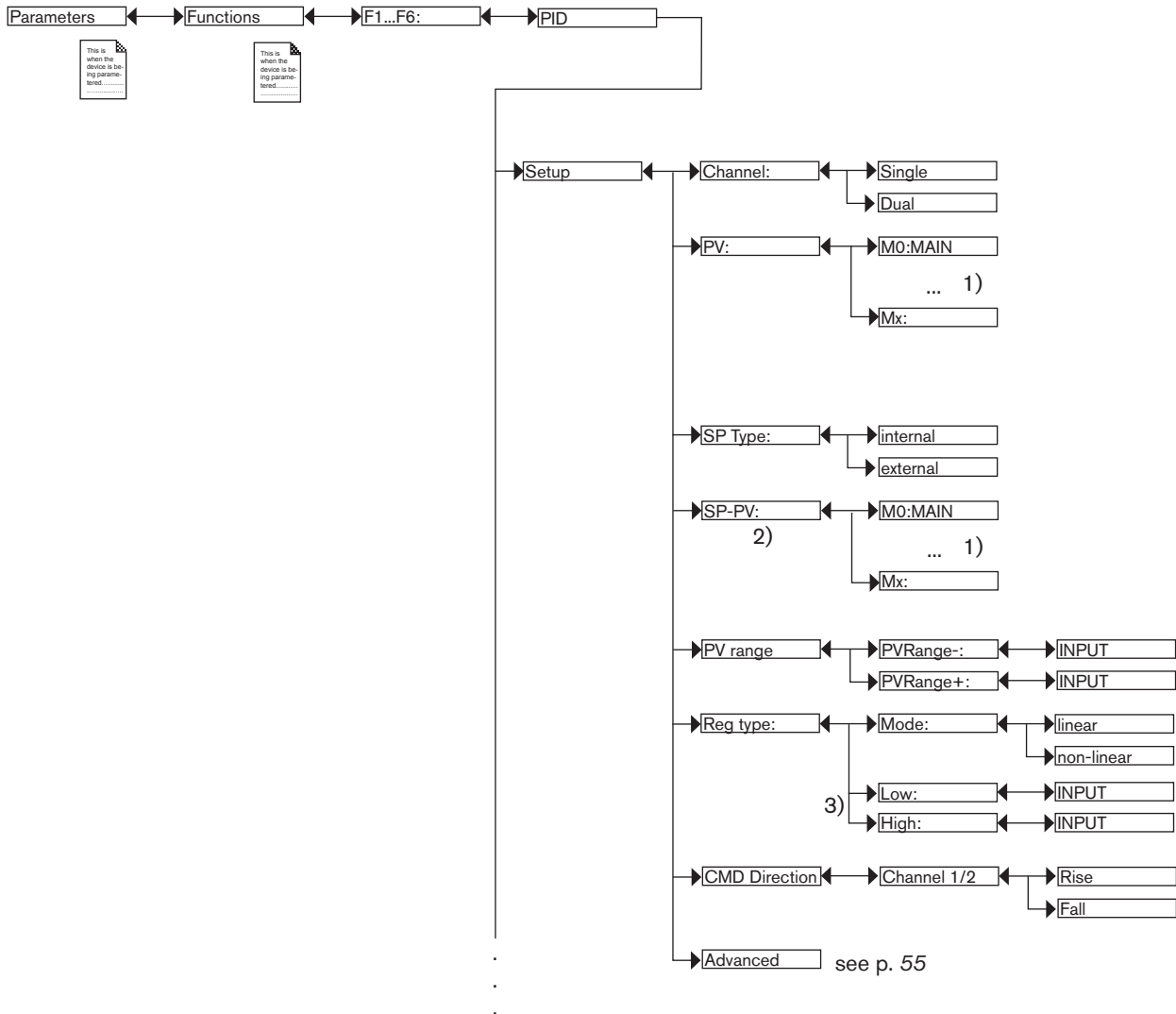
NAME: Rename the function chosen. See chap. 9.4. *Modifying a name*. This name appears in the view associated with this function in Read mode.

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*

I. CONFIGURING THE PID FUNCTION

Refer to chap. 9.8 to access Parameters menu.



¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.

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

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

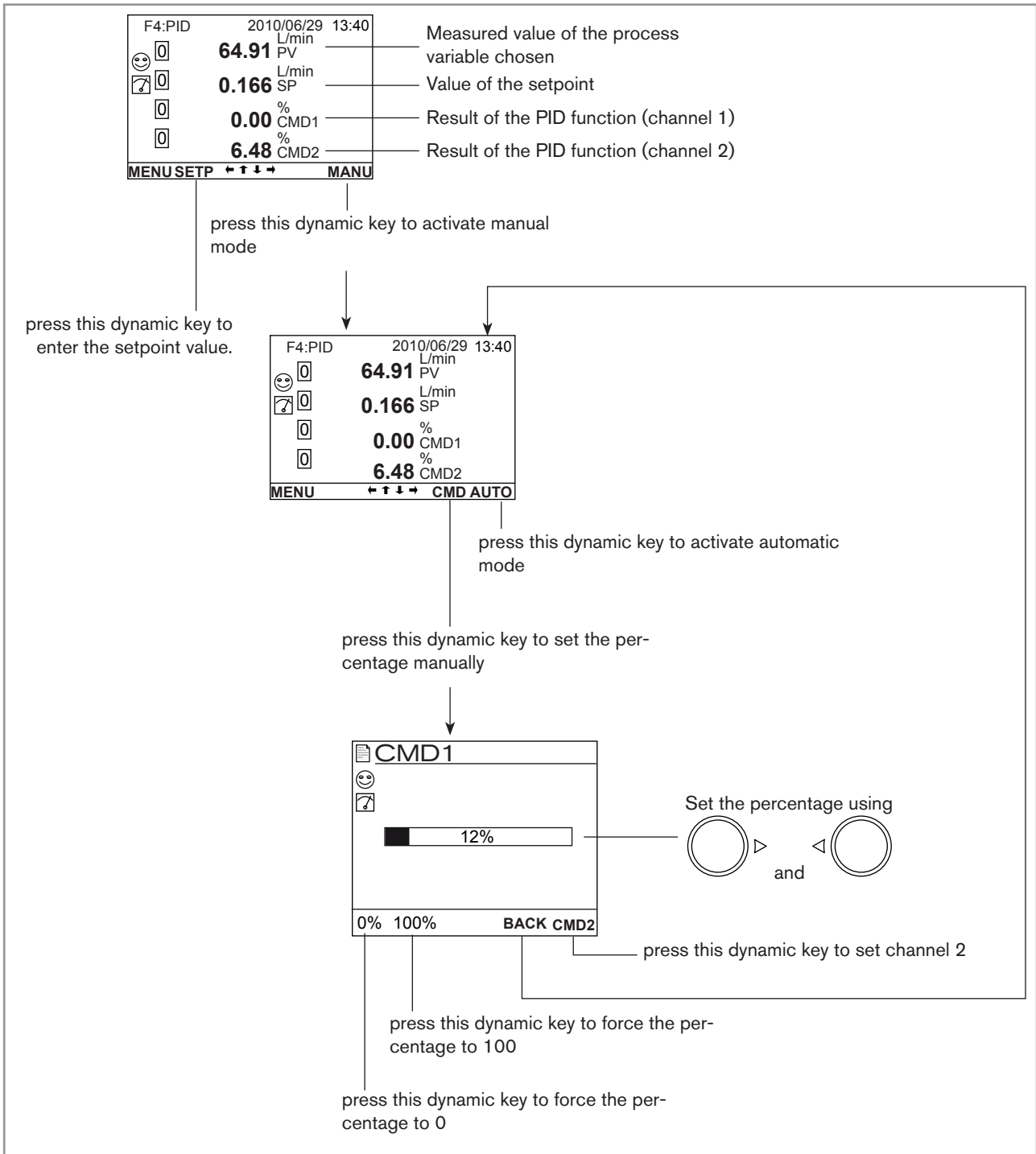


Fig. 38: Example of a view, in Read mode, of the PID function, and switching to manual or automatic mode

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.

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.

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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).

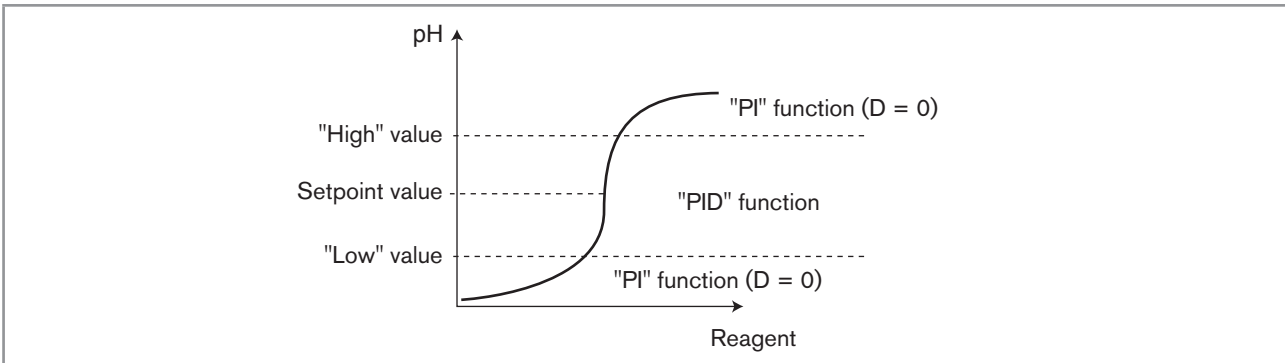


Fig. 39: Example of non-linear control of the pH

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

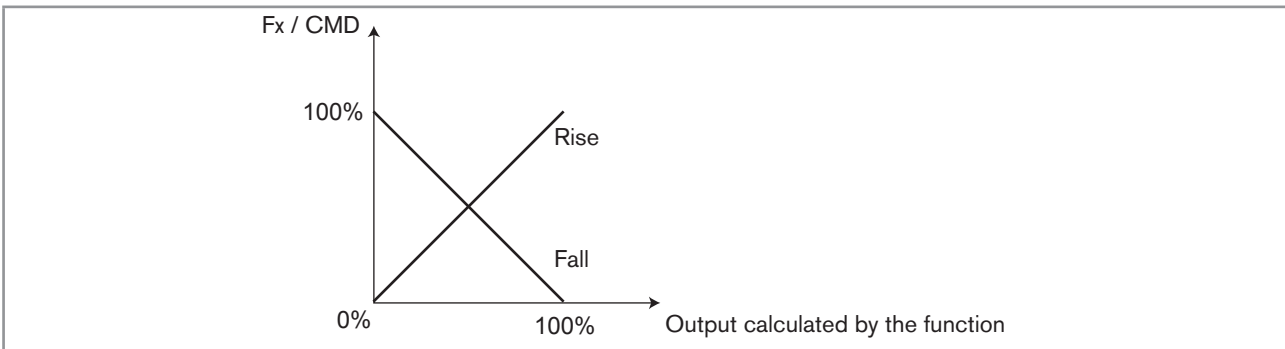
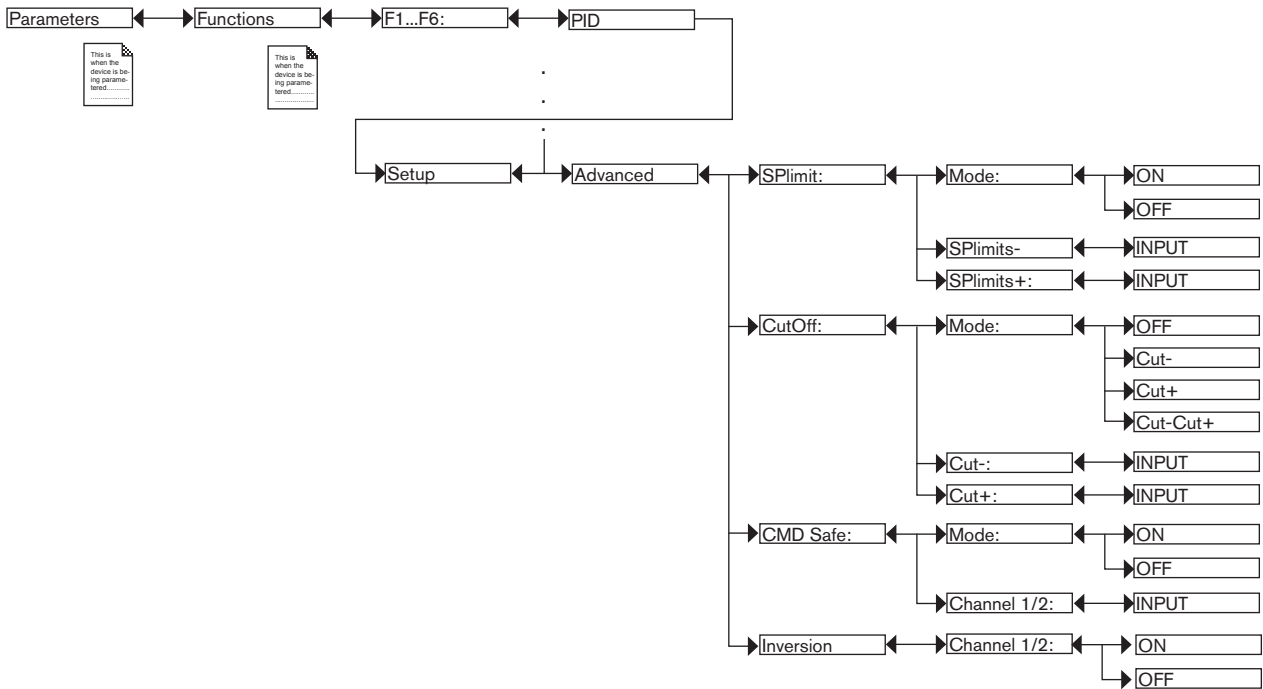


Fig. 40: CMD DIRECTION graphs



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+".

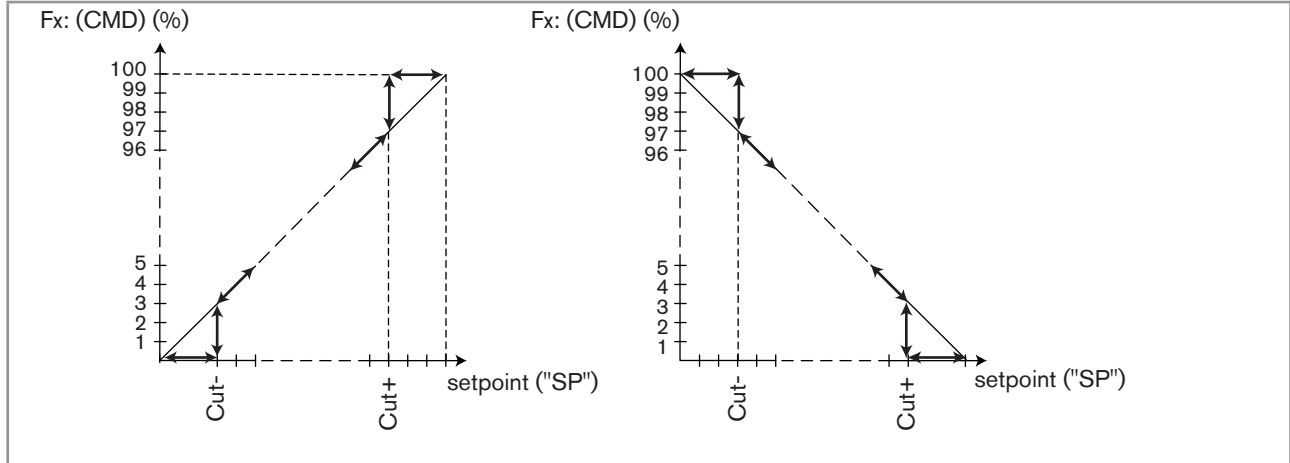


Fig. 41: "CUTOFF" graphs

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. 9.9.17) 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.

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.

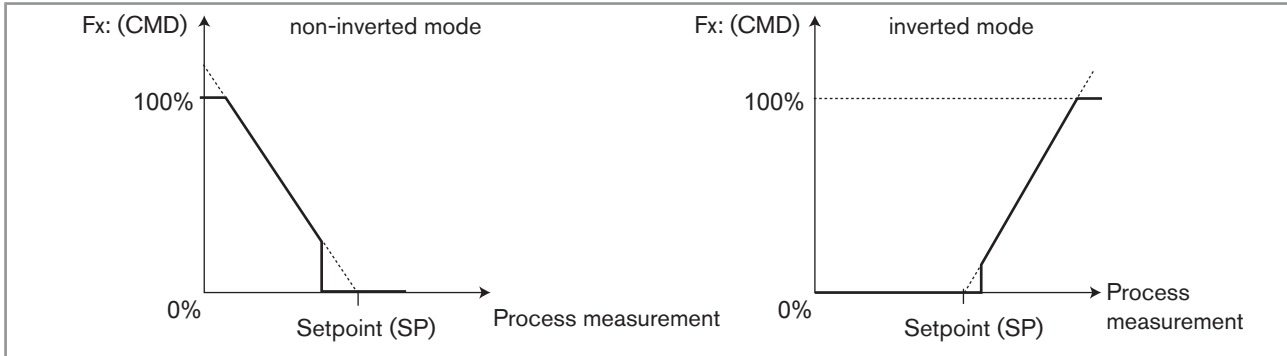
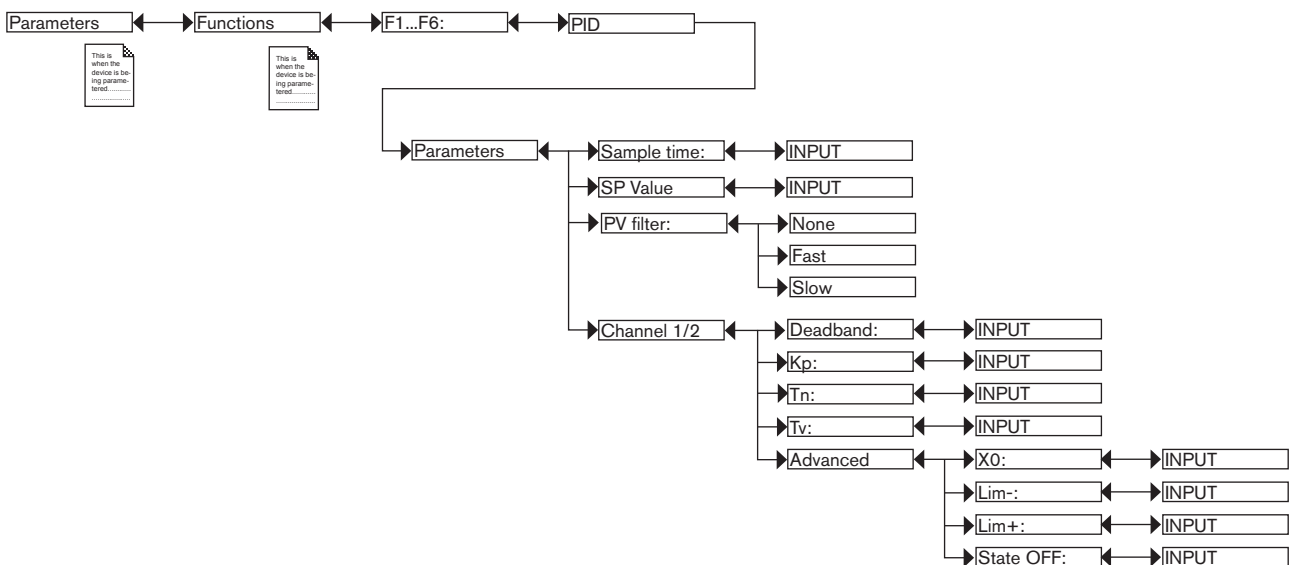


Fig. 42: Operating direction of the output, non-inverted or inverted

II. ENTERING THE PARAMETERS FOR THE PID FUNCTION

Refer to chap. 9.8 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 Fig. 23: Types of filters and associated damping effects.

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).



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 Fig. 43.

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 $\Delta = 2\% \times (80 - 40) = 0,8\%$

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%.

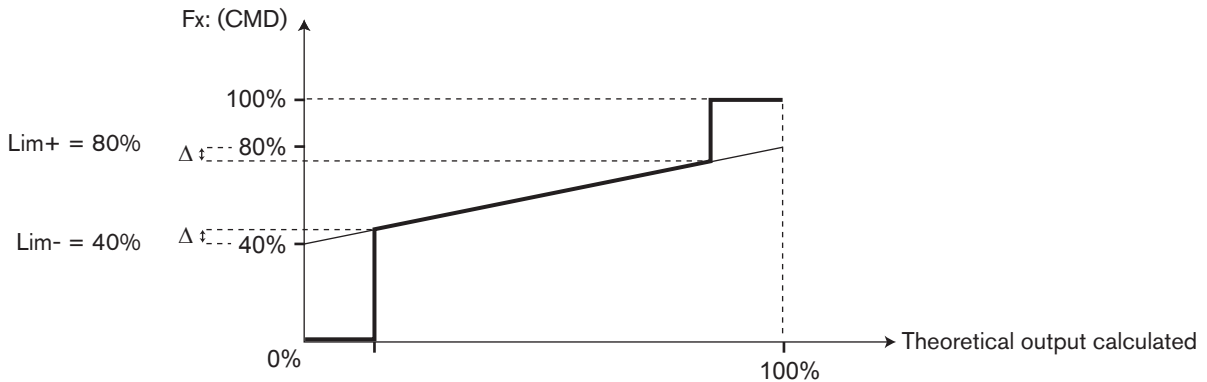


Fig. 43: Example of "Lim-", "Lim+" and "State OFF" parameters setting

9.9.15. Configuring a time dosing cycle

This function is available as an option. See chap. 9.9.4

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.

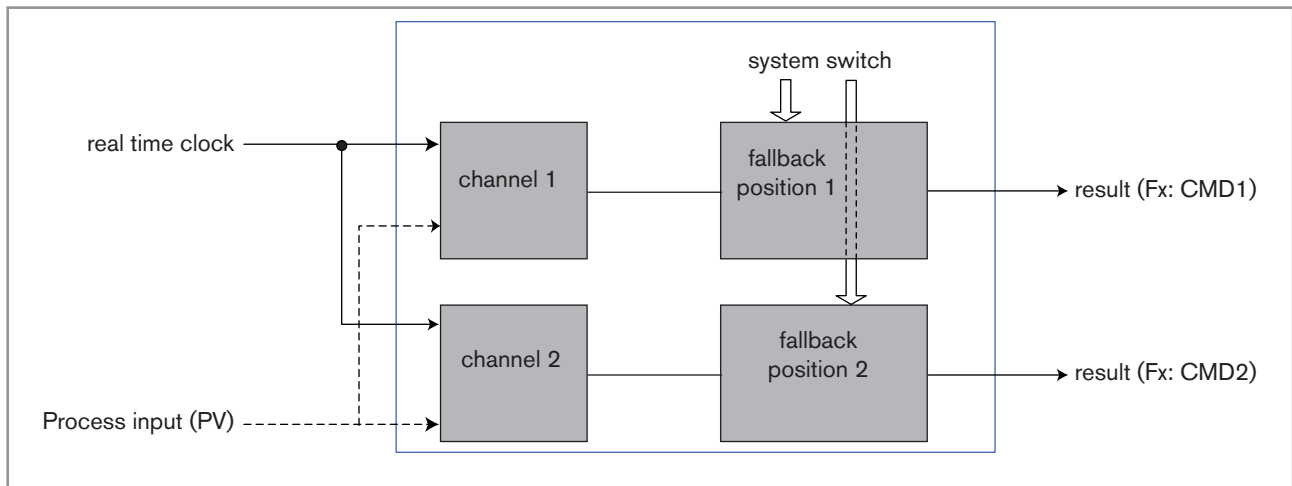


Fig. 44: "Time dosing" function

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. 9.9.19 and 9.9.20).
- Display the result "Fx:" on one of the user defined "Ux" views: see chap. 9.9.8
- Logging the values of "Fx:" using the datalogger: see chap. 9.9.18

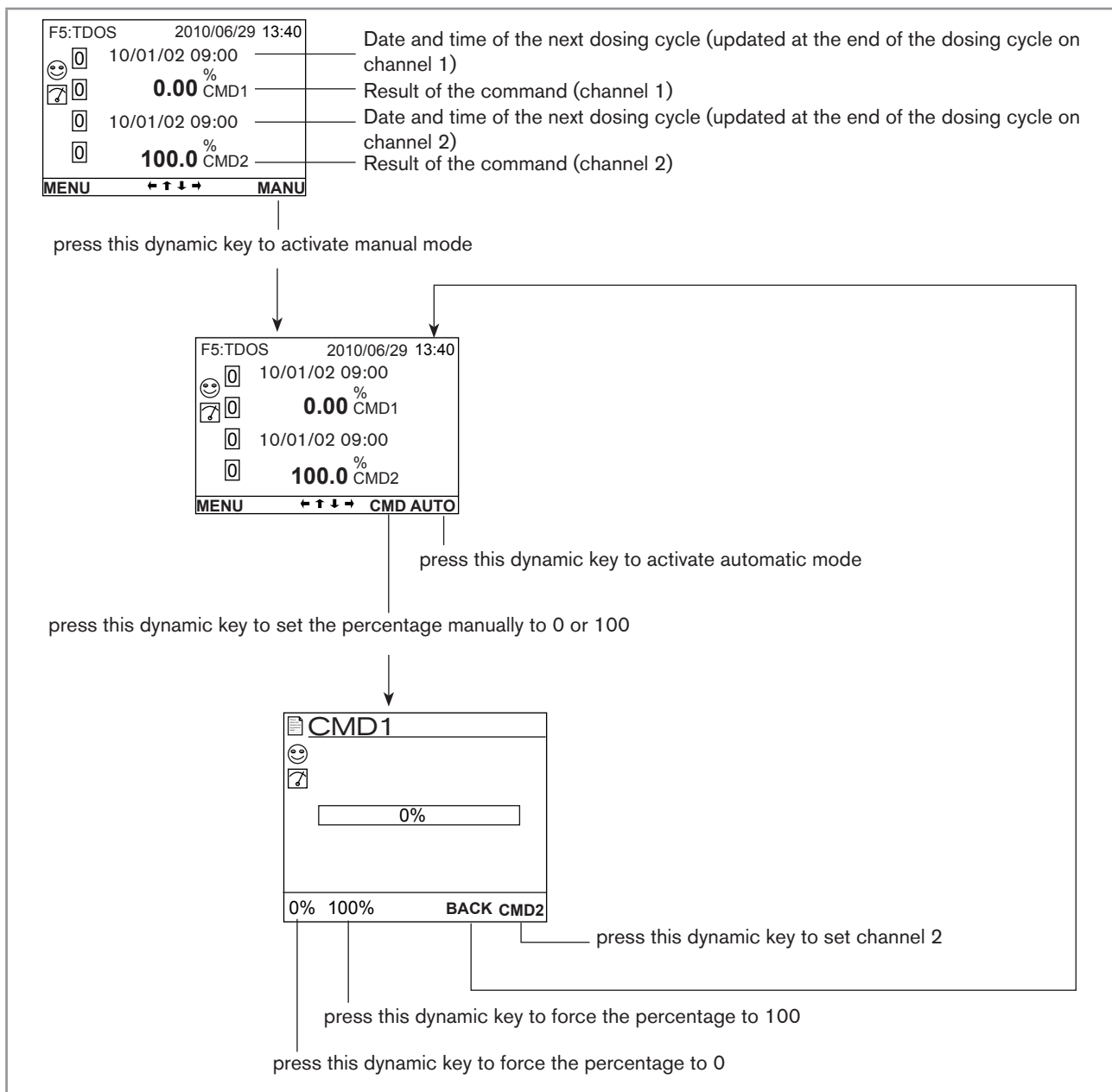
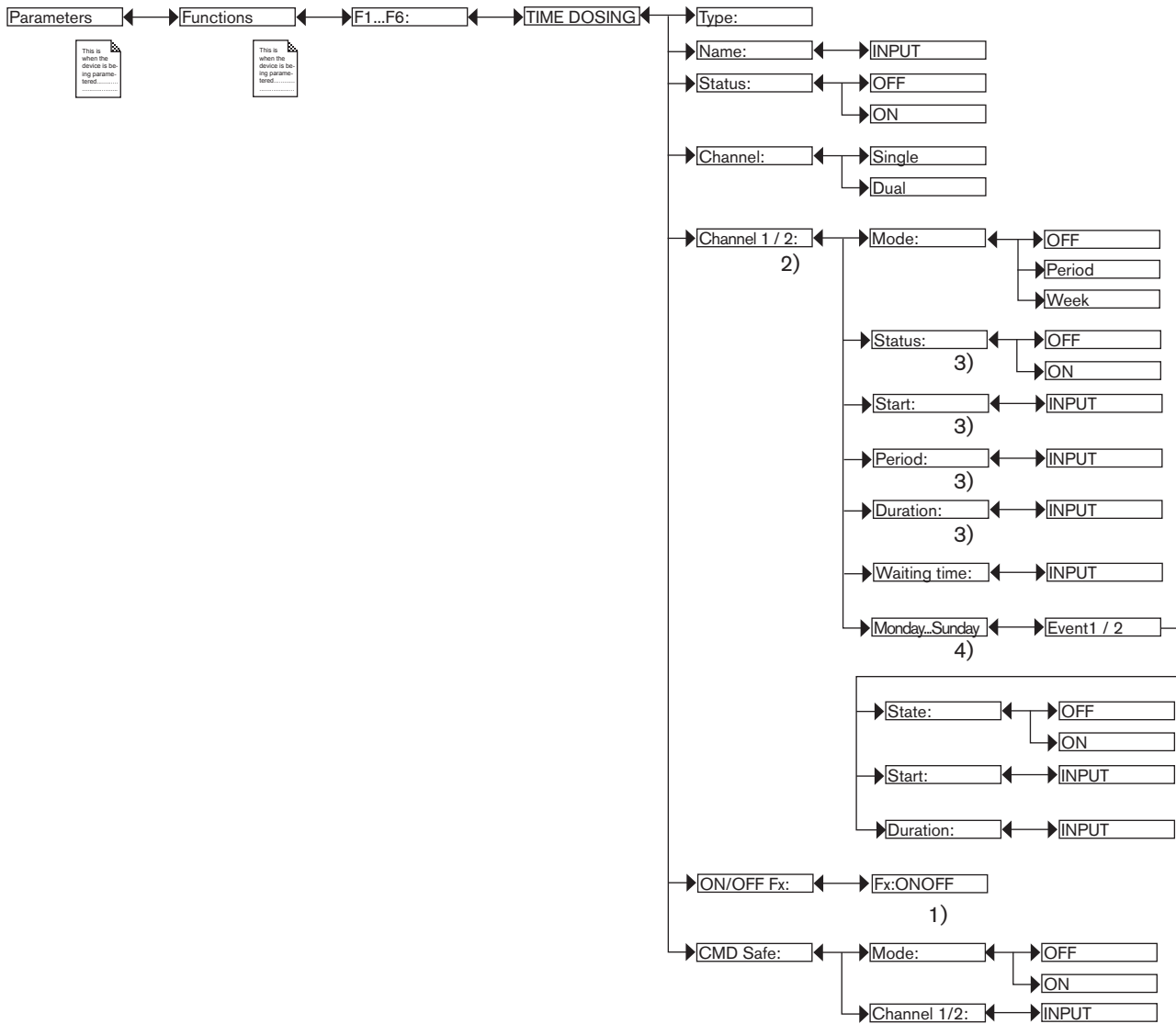


Fig. 45: Example of a view, in Read mode, of the "time dosing" function

Refer to chap. 9.8 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. 9.4. *Modifying a name.* This name appears in the view associated with this function in Read mode.

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.

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. 9.9.13).

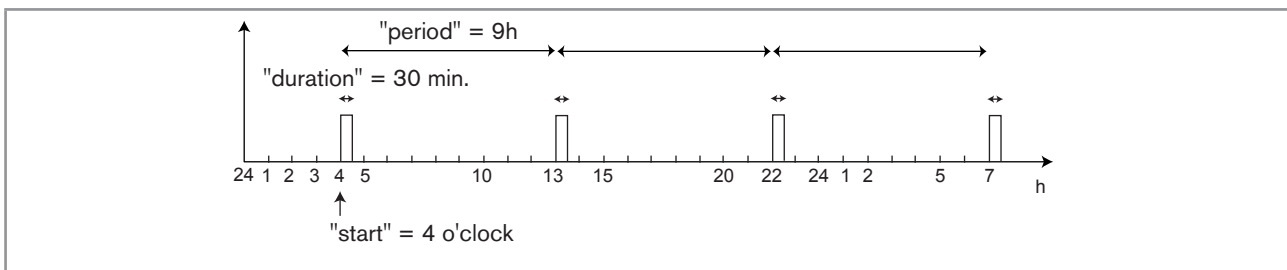


Fig. 46: Example of configuring in "Period" mode

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. 9.9.13).
- **START:** Define the start time of the dosing cycle for this day of the week.
- **DURATION:** Define the duration of the dosing cycle.

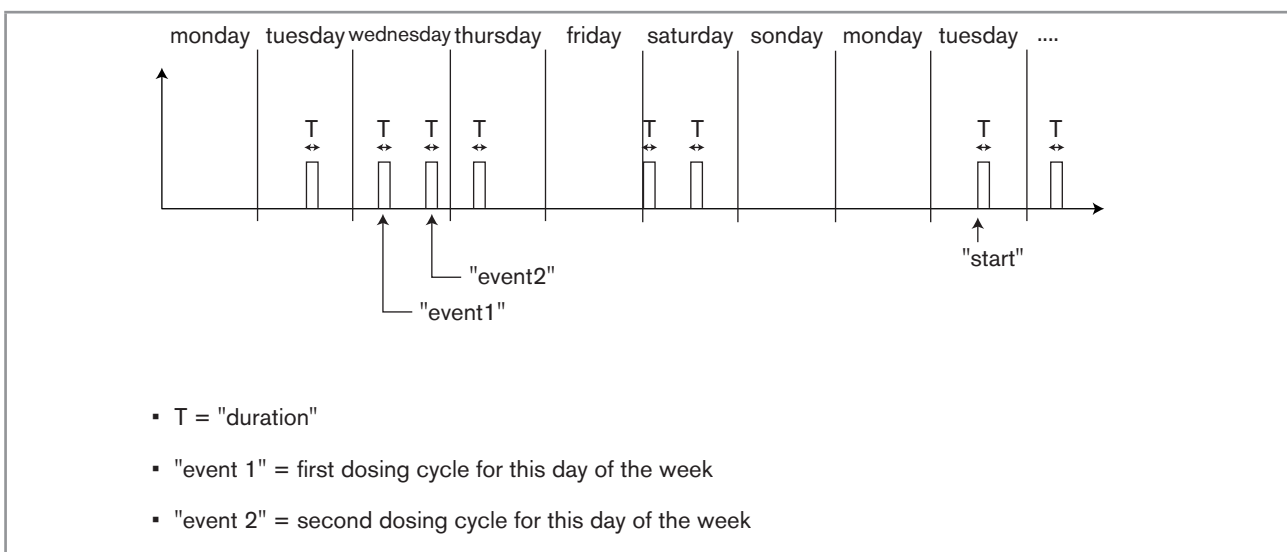


Fig. 47: Example of configuring in "Week" mode

ON/OFF FX: Combine the TIME DOSING function with an ON/OFF function (see chap. 9.9.13) 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. 9.9.17) 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. 9.9.1
- 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.

9.9.16. Configuring a "Volume Dosing" function

This function is available as an option. See chap. 9.9.4

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

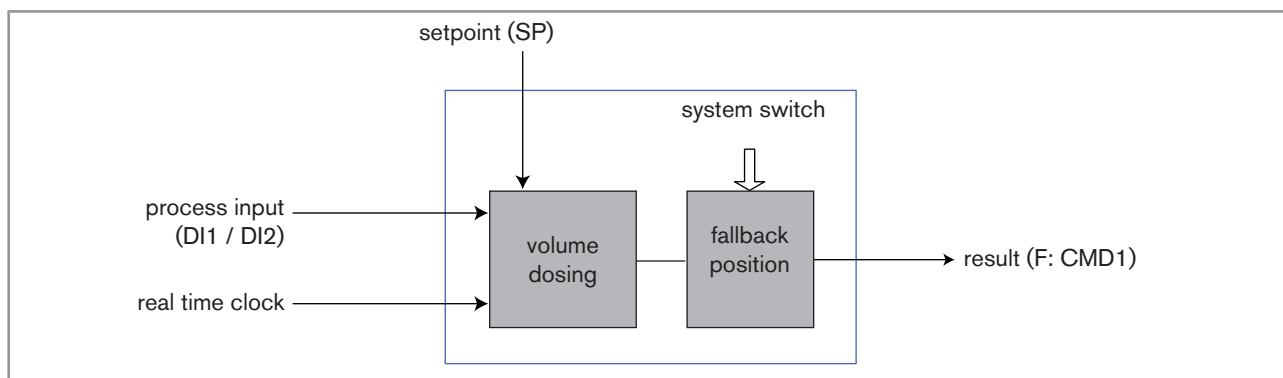


Fig. 48: "Volume dosing" function

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. 9.9.19 and 9.9.20).
- Display the result "Fx:" on one of the user defined "Ux" views: see chap. 9.9.8
- Logging the history of the "Fx:" values using the datalogger: see chap. 9.9.18

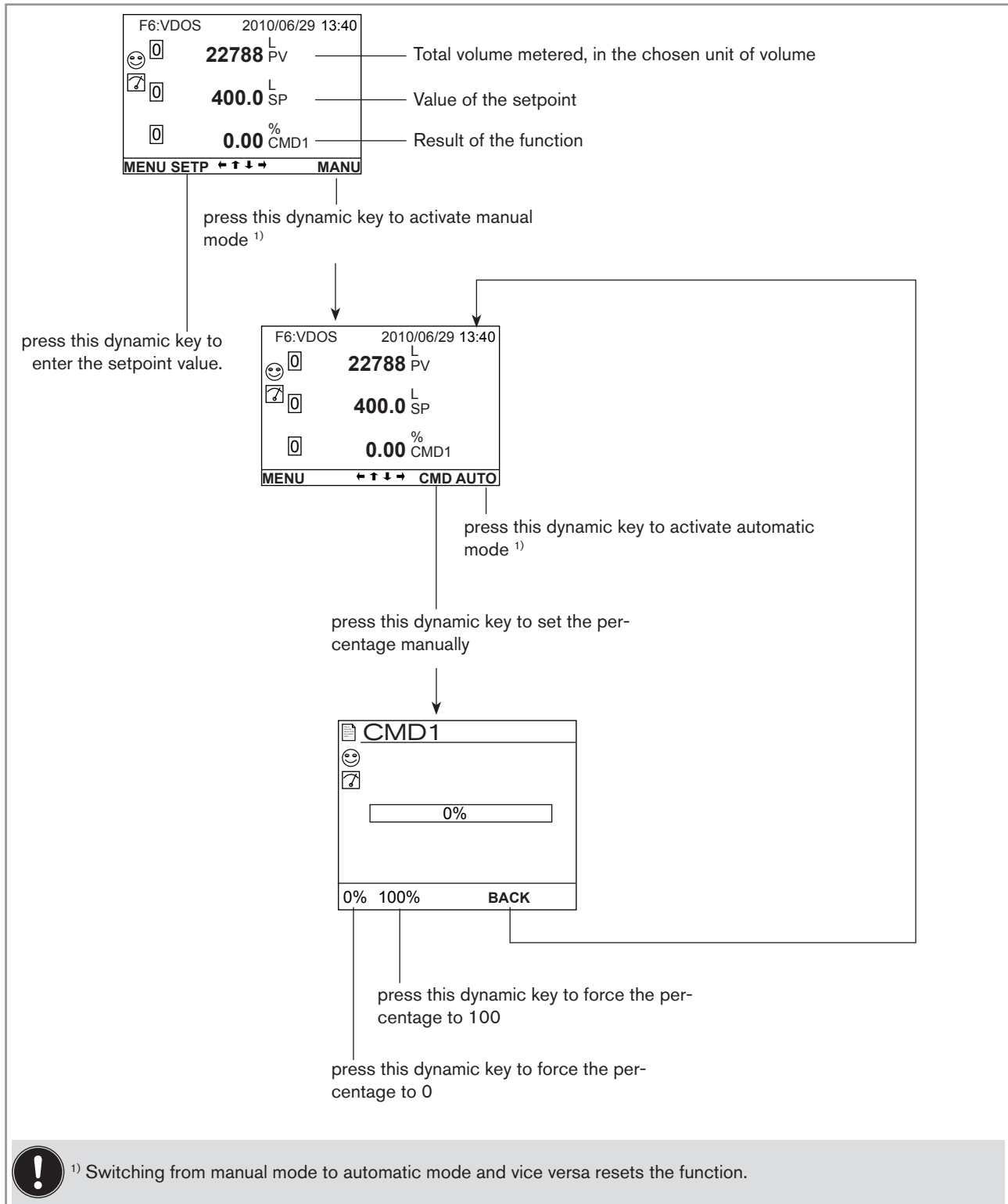
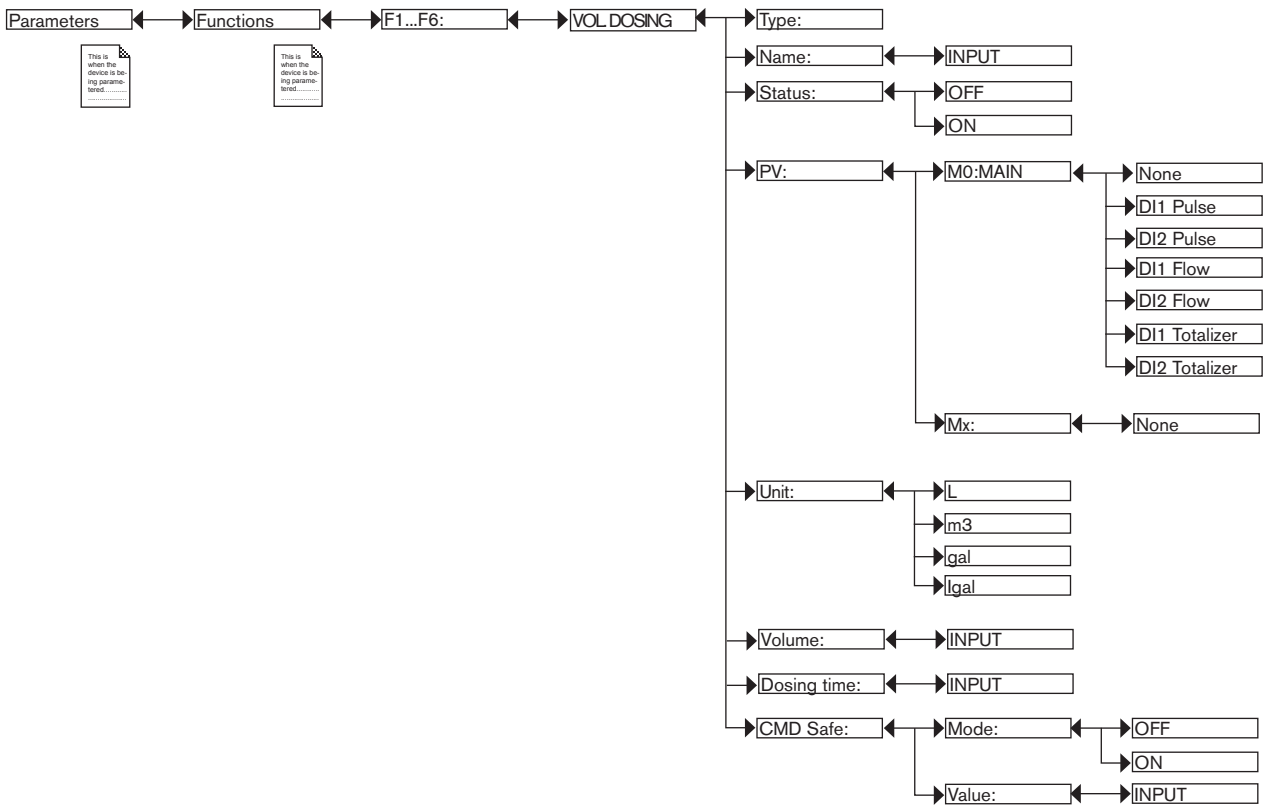


Fig. 49: Example of a view, in Read mode, of the "volume dosing" function, and switching to manual or automatic mode

Refer to chap. 9.8 to access Parameters menu.



TYPE: Indicates the function chosen.

NAME: Rename the function chosen. See chap. 9.4. *Modifying a name*. This name appears in the view associated with this function in Read mode.

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. 9.9.17) 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.

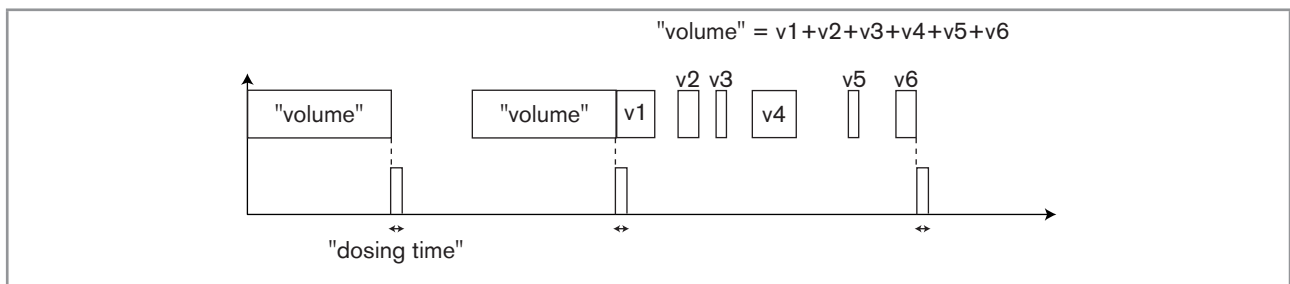


Fig. 50: Example of the "volume dosing" function

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9.9.17. 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".

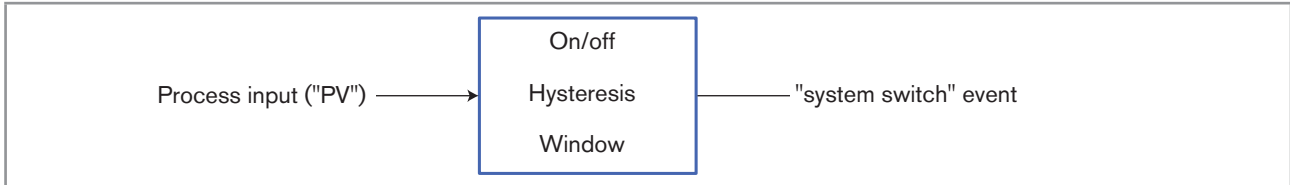
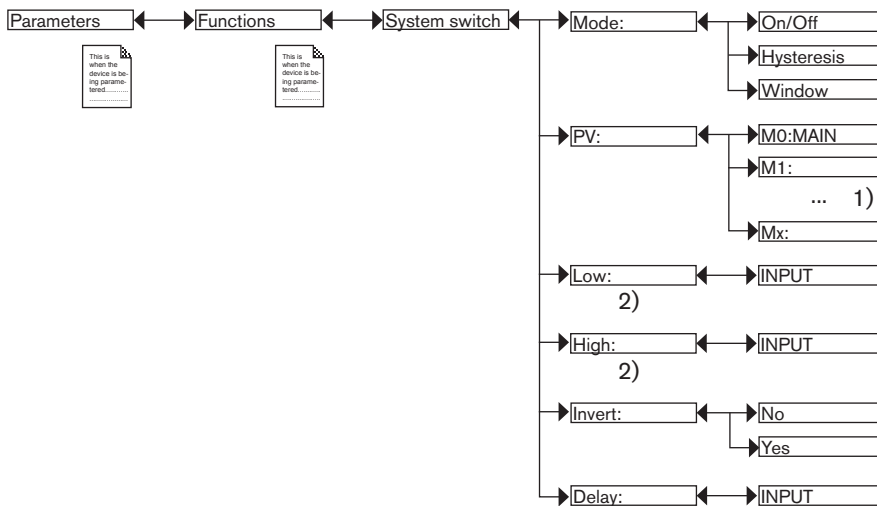


Fig. 51: "System switch" event

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. 9.9.8
- Logging the values of the "System switch" event using the datalogger: see chap. 9.9.18

Refer to chap. 9.8 to access Parameters menu.



¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.

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

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

Configuring in "On/Off" mode

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.

Configuring in "Hysteresis" mode

The change of state is done when a threshold is detected (increasing flow rate: threshold high (function High) to be detected; decreasing flow rate: threshold low (function Low) to be detected).

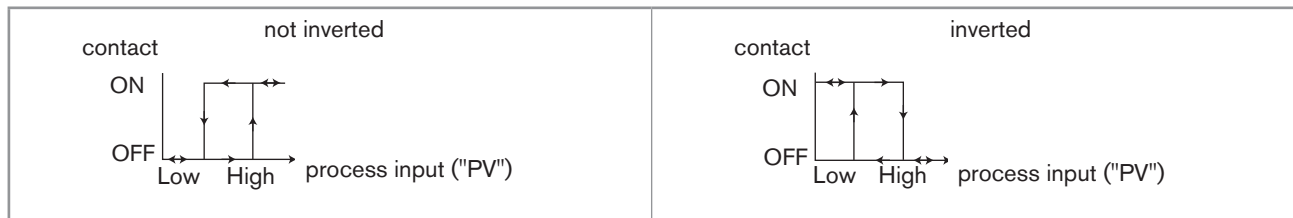


Fig. 52: Hysteresis mode

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" mode

The change of state is done whenever one of the thresholds is detected.

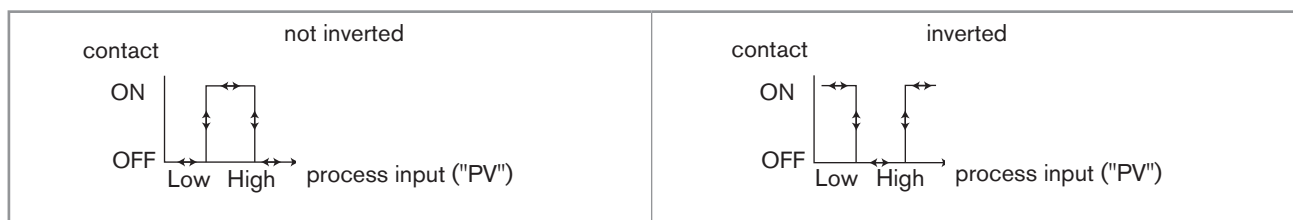


Fig. 53: Window mode

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.

9.9.18. Datalogging (datalogger)

This function is available as an option. See chap. 9.9.4

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.

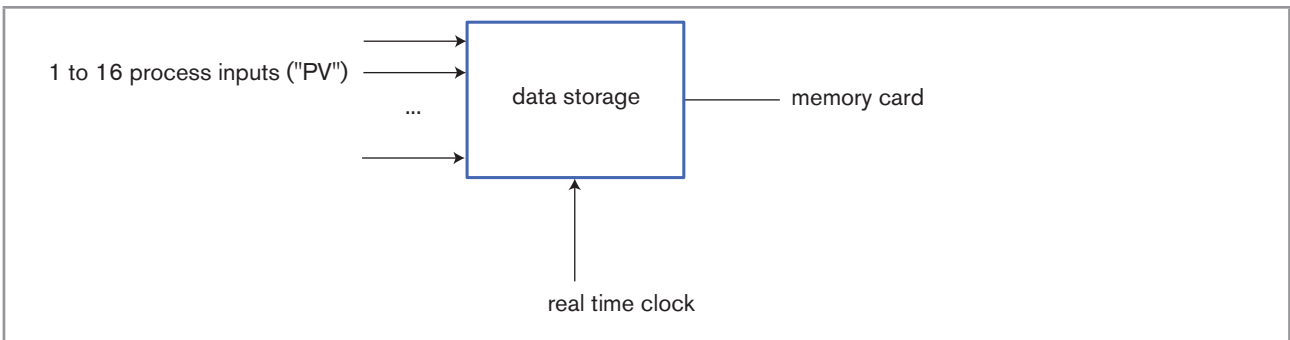
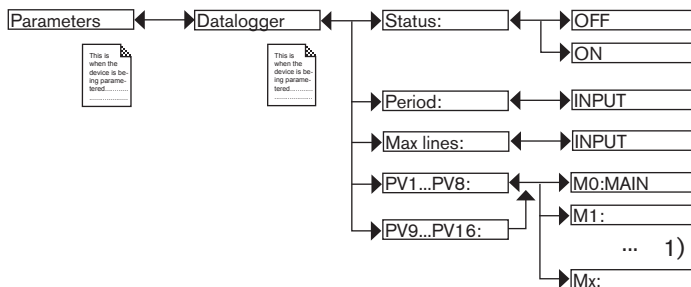


Fig. 54: Datalogger

Refer to chap. 9.8 to access Parameters menu.



¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.

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".

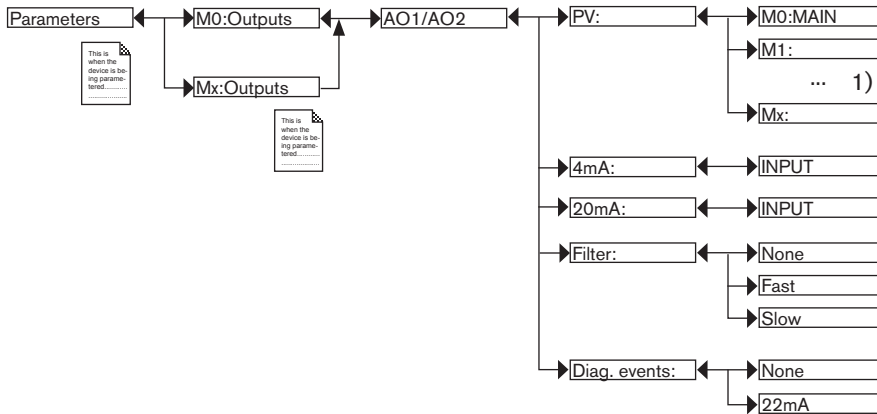
PV1 to PV8 or PV9 to PV16: Choose the process input for which the values are logged.



One of the "PVs" in the conductivity module, available in the datalogger, is "USP" (see chap. 9.9.22).

9.9.19. Setting the parameters of the current outputs

Refer to chap. 9.8 to access Parameters menu.



¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.

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 Fig. 55.

20mA: Choose the value of the process input previously selected, associated with a current of 20 mA, for each current output. See Fig. 55

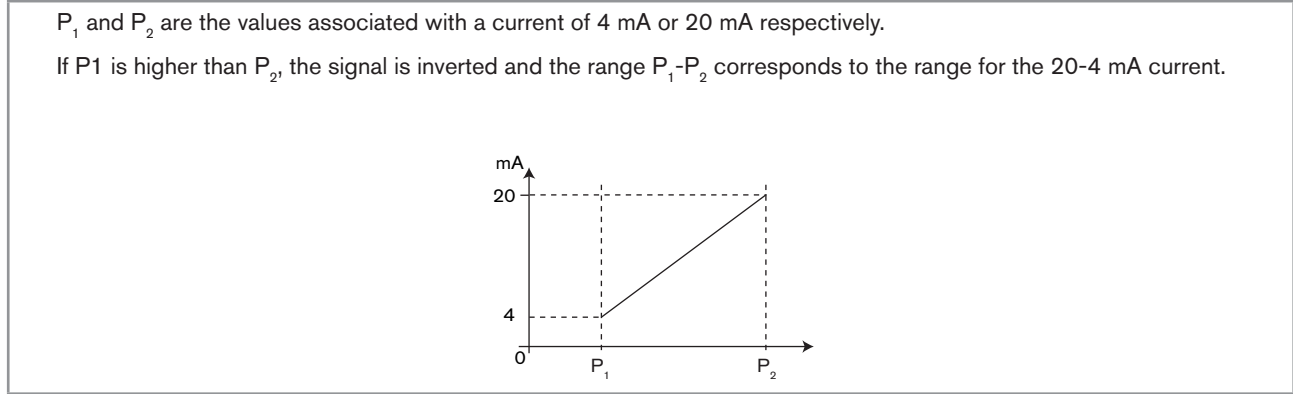


Fig. 55: 4-20 mA current depending on the PV selected

FILTER: Choose the level of damping for the fluctuations of the current value for each current output. See Fig. 23: Types of filters and associated damping effects.

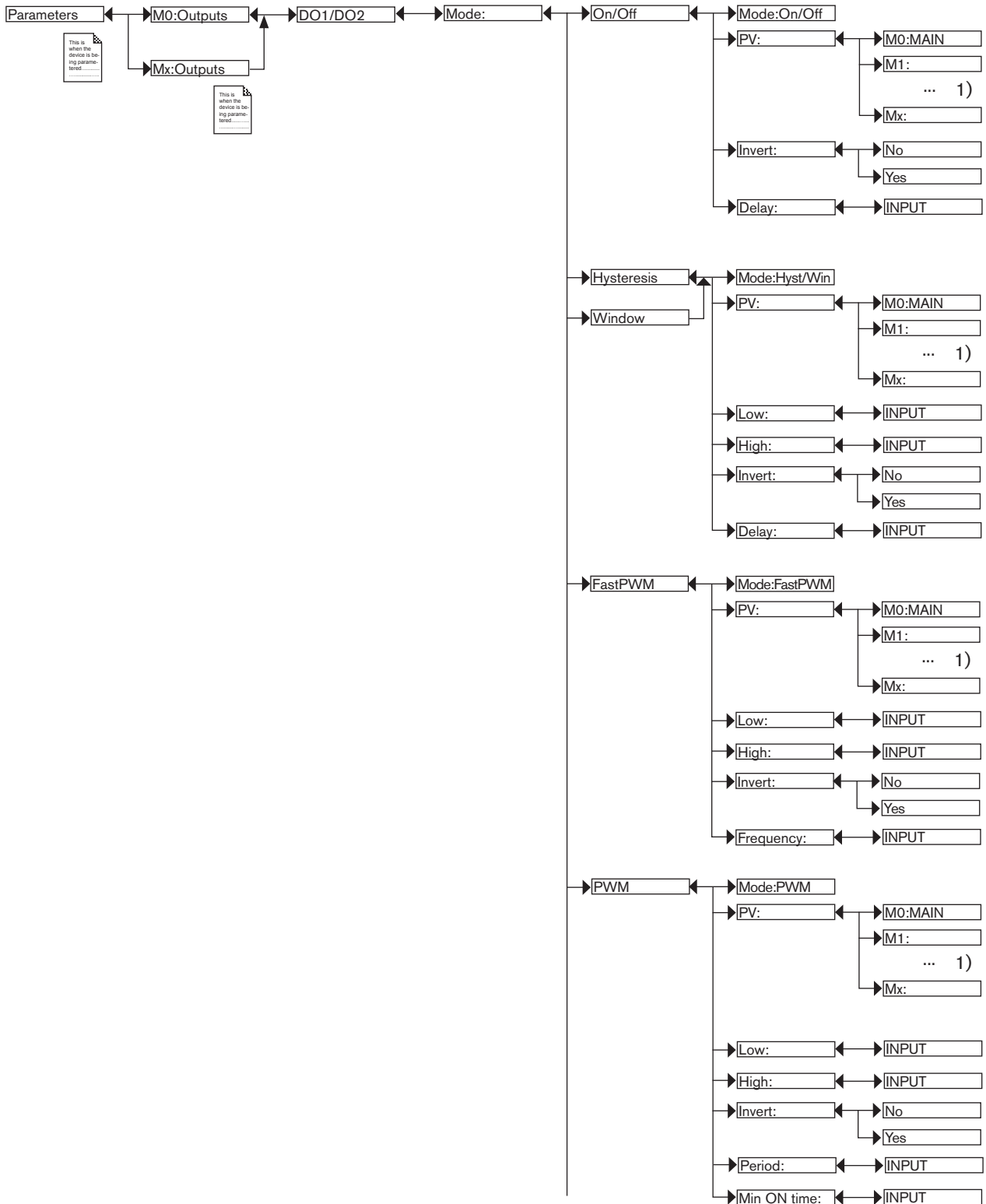
DIAG. EVENTS: Choose to emit a current of 22 mA on the current output selected when an "error" event related to diagnostics (see chap. 9.11.2 to 9.11.4) is generated by the multiCELL or allow the current output to operate normally (choose "none").

See also "If you encounter problems" in chap. 10.3

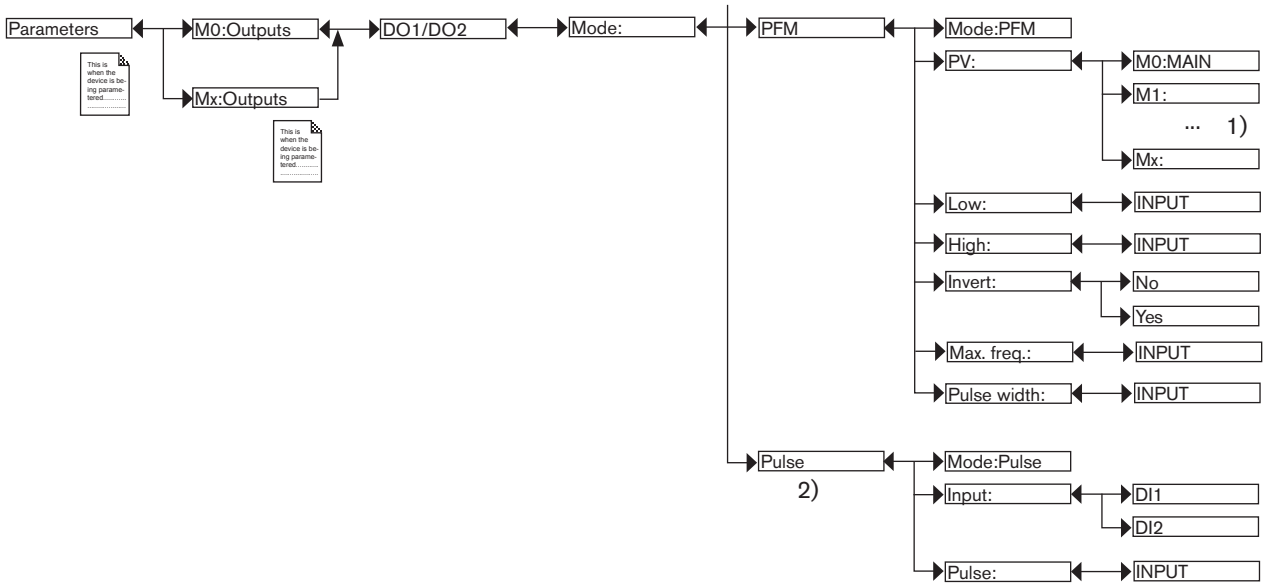
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9.9.20. Setting the parameters of the digital outputs

Refer to chap. 9.8 to access Parameters menu.



¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.



¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.

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

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

Configuring in "On/Off" mode

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" mode, 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. 9.10.6, 9.10.7, and 9.11.2 to 9.11.4). 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. 10.3

i One of the "PVs" in the conductivity module, available in "On/Off" mode, is "USP" (see chap. 9.9.22).

INVERT: Invert the output or not.

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

Configuring in "Hysteresis" mode

The change of state of the digital output is done when a threshold is detected (increasing flow rate: threshold high (function High) to be detected; decreasing flow rate: threshold low (function Low) to be detected).

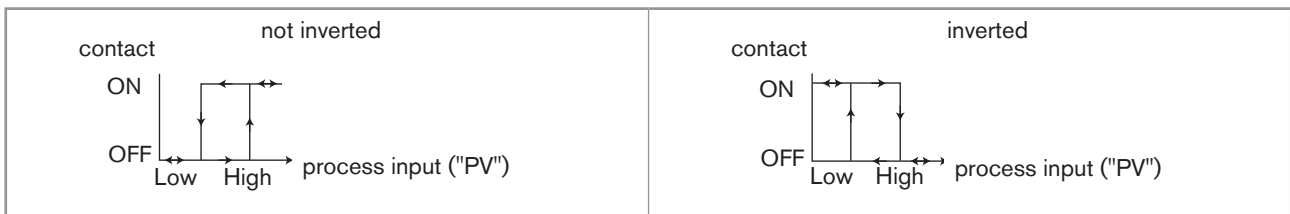


Fig. 56: Hysteresis mode

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" mode

The change of state is done whenever one of the thresholds is detected.

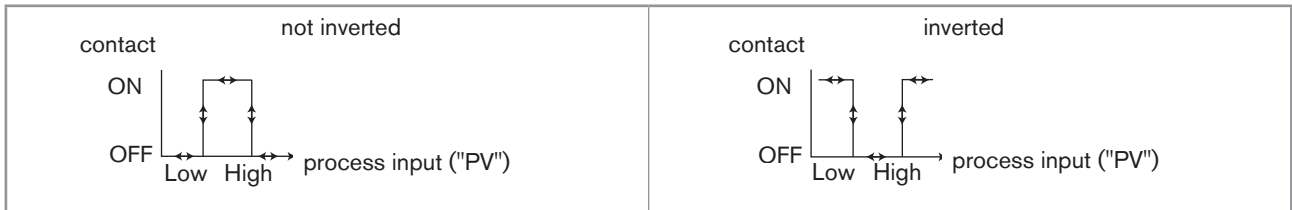


Fig. 57: Window mode

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" mode

This mode is used to control a proportional solenoid valve.

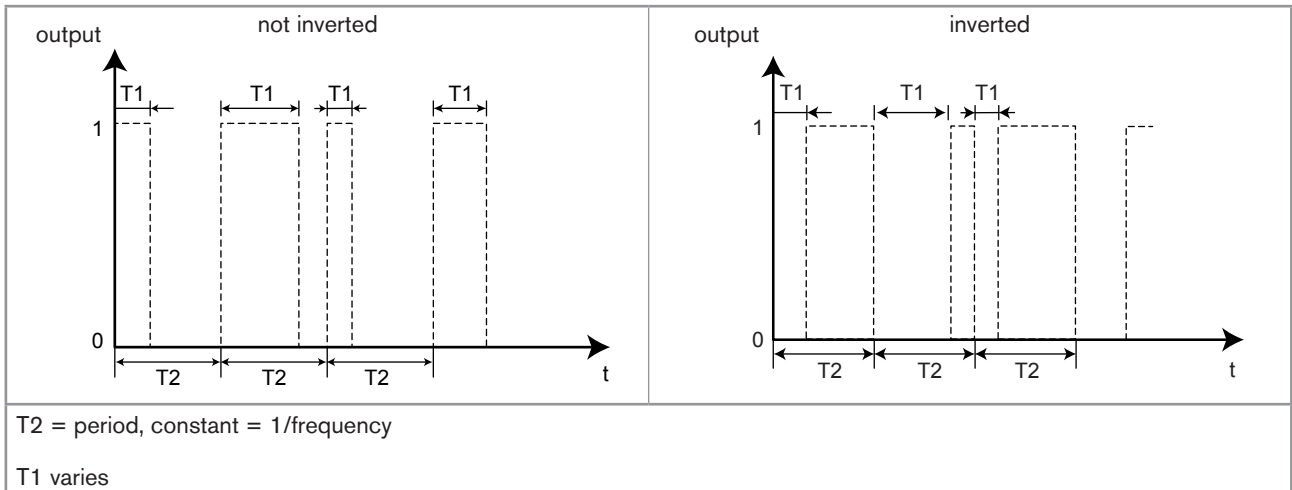


Fig. 58: "FastPWM" mode

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" mode

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

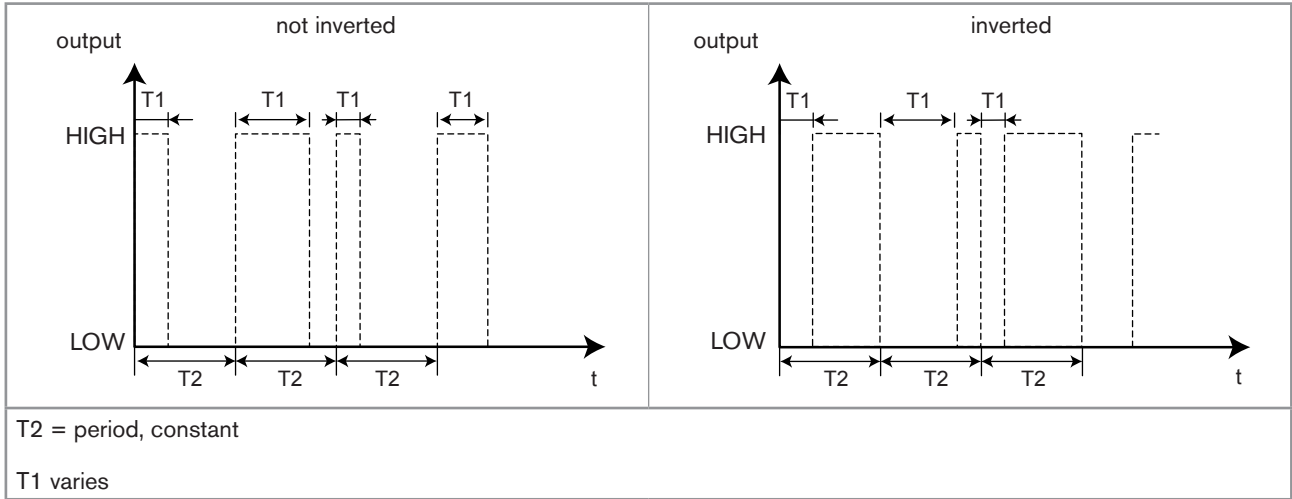


Fig. 59: "PWM" mode

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" mode

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

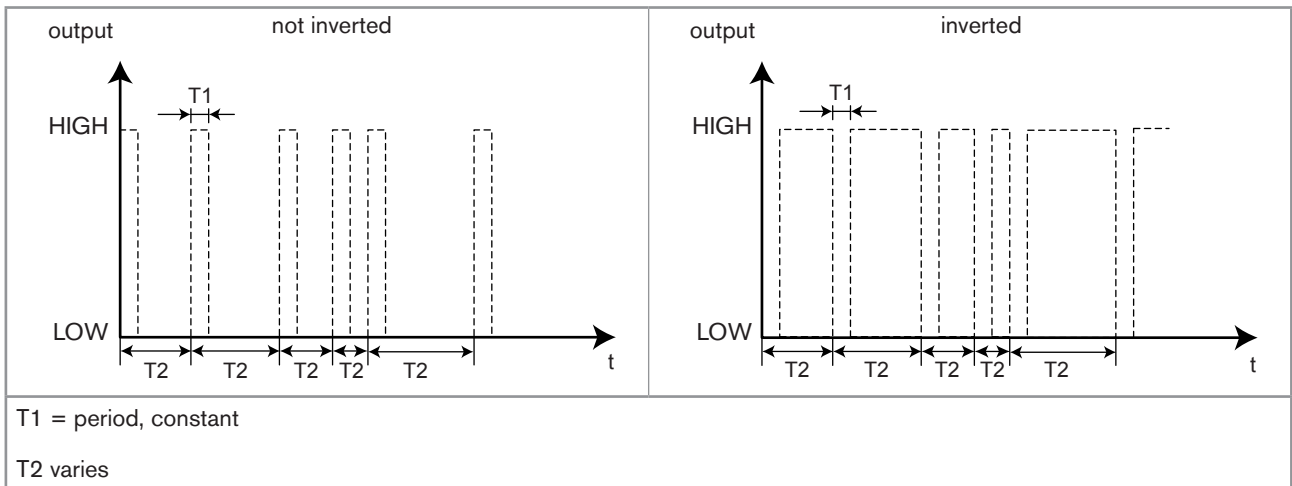


Fig. 60: "PFM" mode

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.

INVERT: Invert the output or not.

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

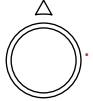
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PULSE WIDTH: Choose the value of the pulse width (T1).

Configuring in "Pulse" mode

This function is available only if the "FLOW" option is activated on the device (see chap. 9.9.4). 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.

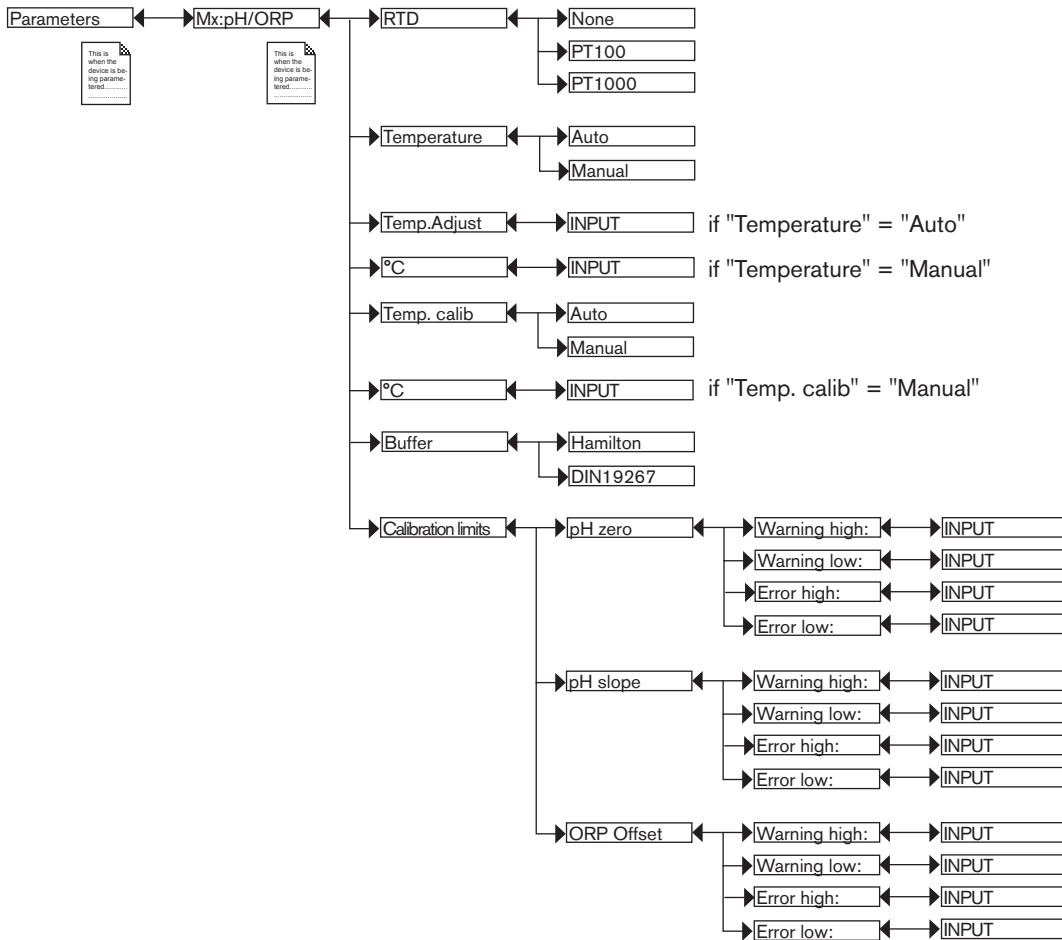
PULSE: Choose the volume of fluid for which a pulse must be transmitted on the output selected. First enter the numerical value and confirm by pressing the dynamic key "OK" to be able to modify the volume unit by successively pressing .



- 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.

9.9.21. Setting the parameters of a pH/redox module

Refer to chap. 9.8 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:

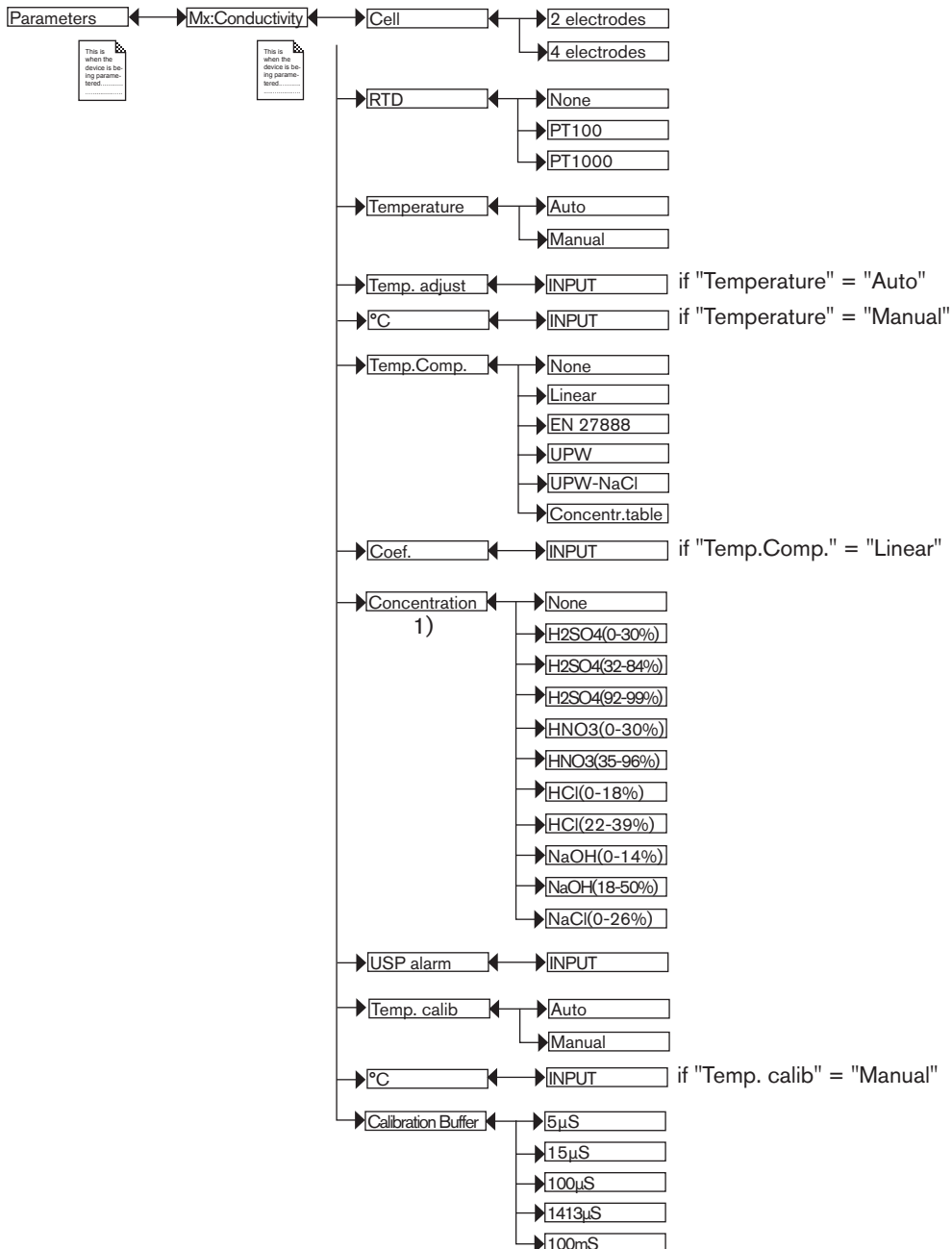
- the multiCELL automatically recognizes the following "Hamilton" pH buffers: 2 ; 4,01 ; 7 ; 10 ; 12 ;
- the multiCELL automatically recognizes the following "DIN19267" pH buffers: 1,09 ; 4,65 ; 6,79 ; 9,23 ; 12,75.

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.

9.9.22. Setting the parameters of a conductivity module

Refer to chap. 9.8 to access Parameters menu.



¹⁾ This menu is available as an option: see chap. 9.9.4

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:

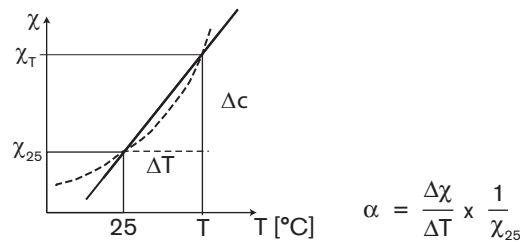
- choose "Auto": the temperature of the fluid is measured by the sensor
- choose "Manual": enter the value of the process temperature (in °C) in the next field, e.g. when no temperature sensor is connected to the module.

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.

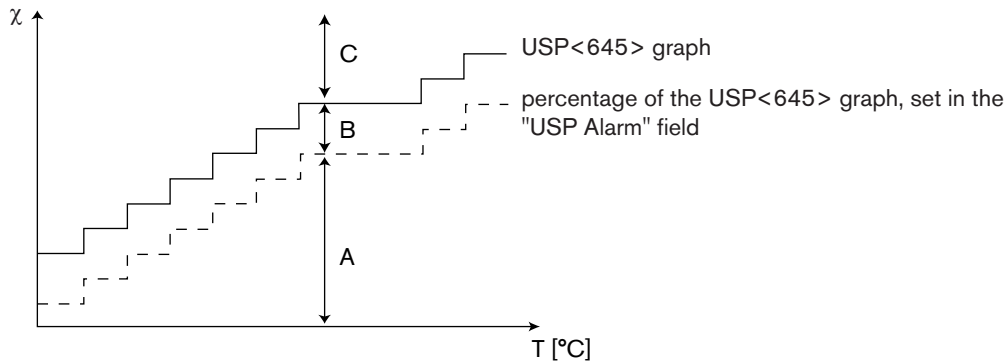
Use the following graph and equation to calculate the average value of the compensation coefficient α according to a temperature range ΔT and the associated conductivity range $\Delta \chi$:



- or according to the natural water law (choose "EN27888").
- or 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. 9.9.4). 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. 9.9.8)	Associated code in the datalogger (see chap. 9.9.18)	State of the "on/off" output (see chap. 9.9.20)
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)
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)

Graph zone	Description	Name displayed in the user defined "Ux" view (see chap. 9.9.8)	Associated code in the datalogger (see chap. 9.9.18)	State of the "on/off" output (see chap. 9.9.20)
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:

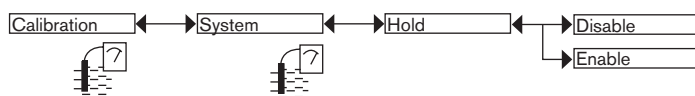
- choose "Auto": the temperature of the fluid is measured by the sensor
- choose "Manual": enter the value of the temperature (in °C) in the next field, e.g. when no temperature sensor is connected to the module.

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

9.10. Calibration menu

9.10.1. Activate/deactivate the Hold function

Refer to chap. 9.8 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  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.

To deactivate the HOLD mode:

- access the "HOLD" function
- choose "Disable"
- confirm by "OK"


9.10.2. Modifying the Calibration menu access code

Refer to chap. 9.8 to access Calibration menu. If the default access code "0000" is kept, the device does not request it to access the Calibration menu.

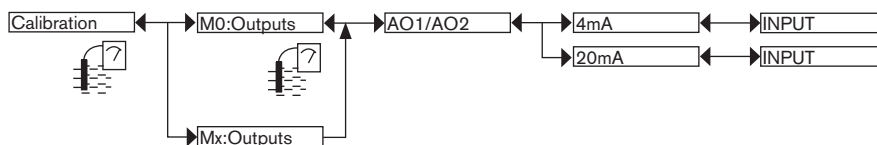


9.10.3. Adjusting the current outputs



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

Refer to chap. 9.8 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.

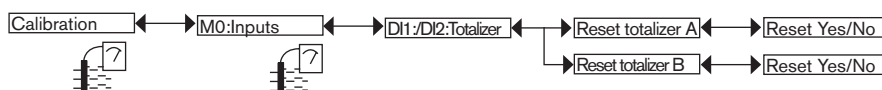
When the "20mA" function is selected, the multiCELL generates a current of 20 mA:

- measure the current emitted by the 4-20 mA output using a multimeter;
- enter the value given by the multimeter.

9.10.4. Resetting the totalizers

This function is available on the devices with analysis modules if the software option, "FLOW", is activated. See chap. 9.9.4

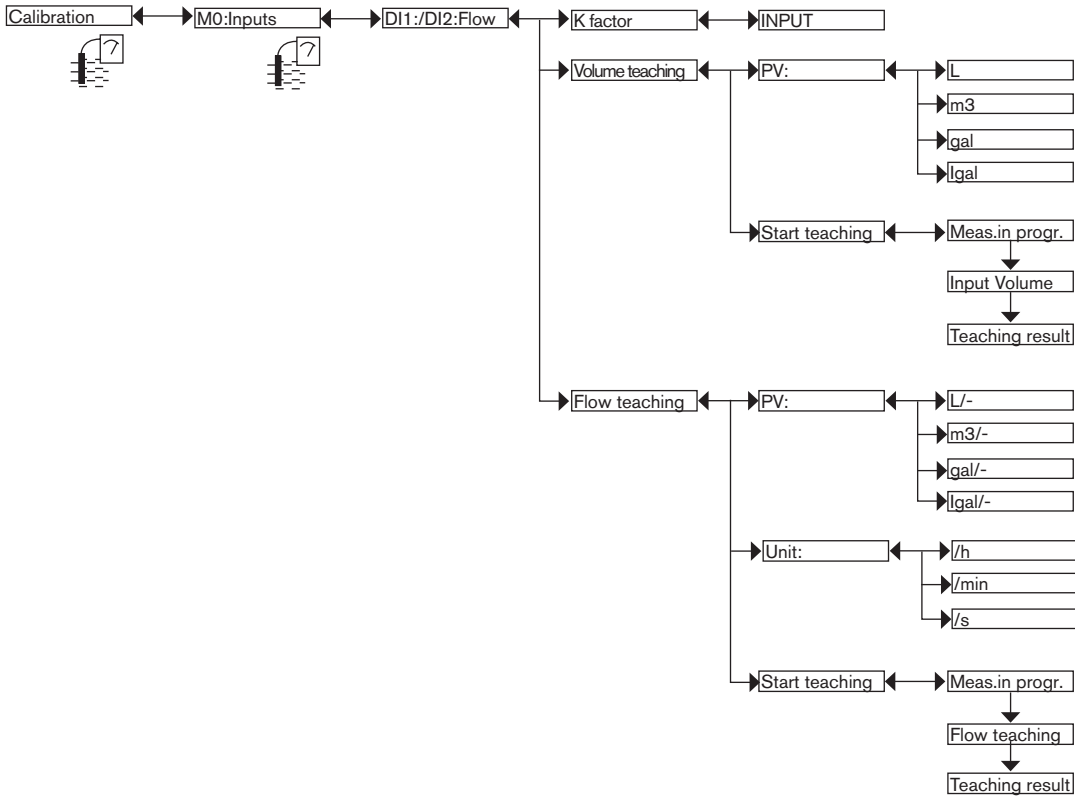
Refer to chap. 9.8 to access Calibration menu.



9.10.5. 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. 9.9.4

Refer to chap. 9.8 to access Calibration menu.



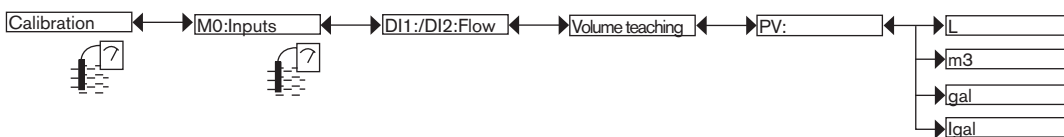
→ Use one of the following 3 methods to configure the pulse input of the multiCELL for a flow rate measurement:

- **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 p. 81.

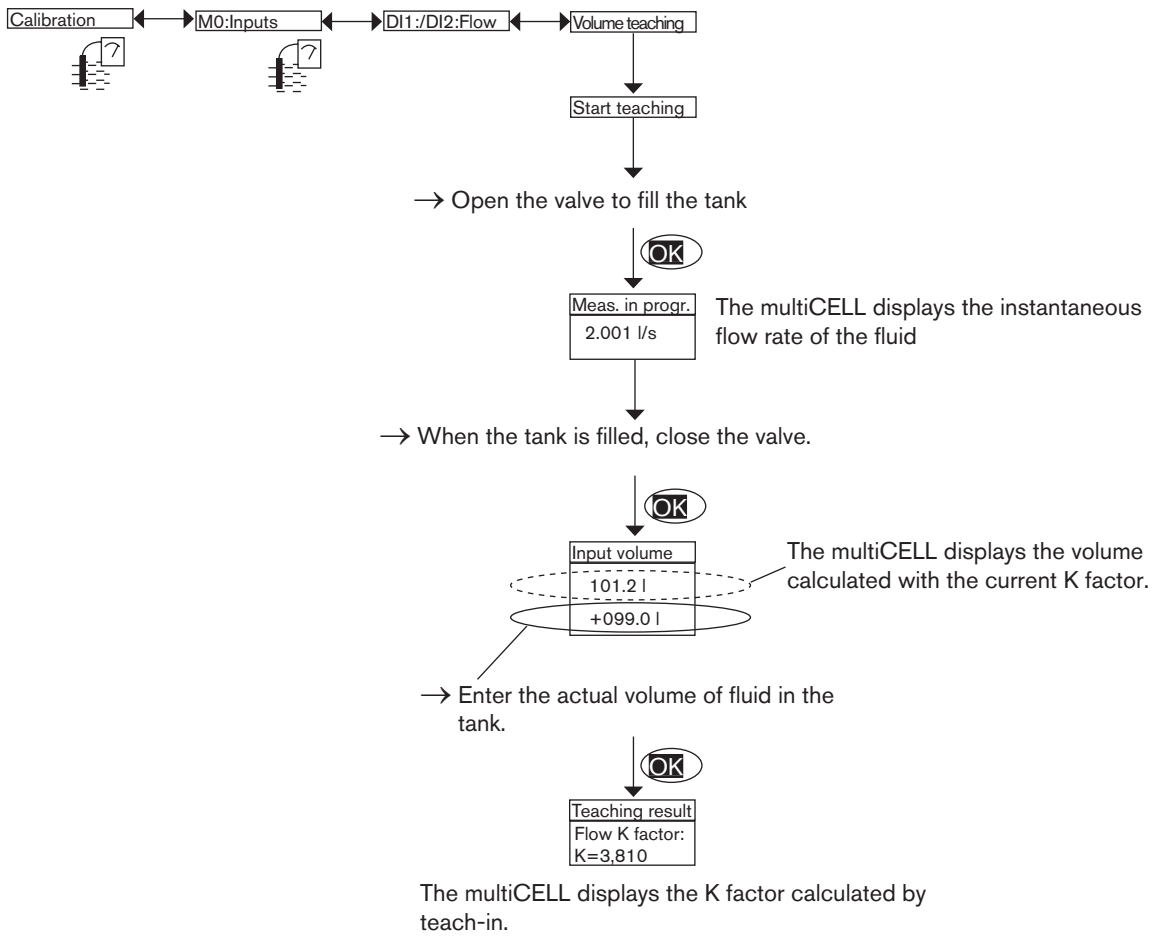
Detailed procedure for teach-in by volume

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

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

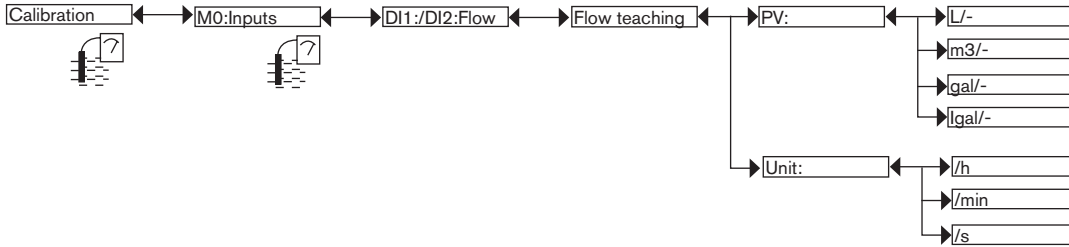


→ Running teach-in by volume:

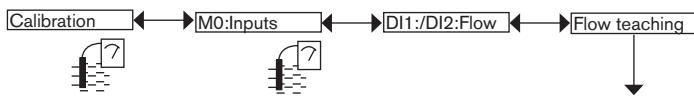


Detailed procedure for teach-in by flow rate

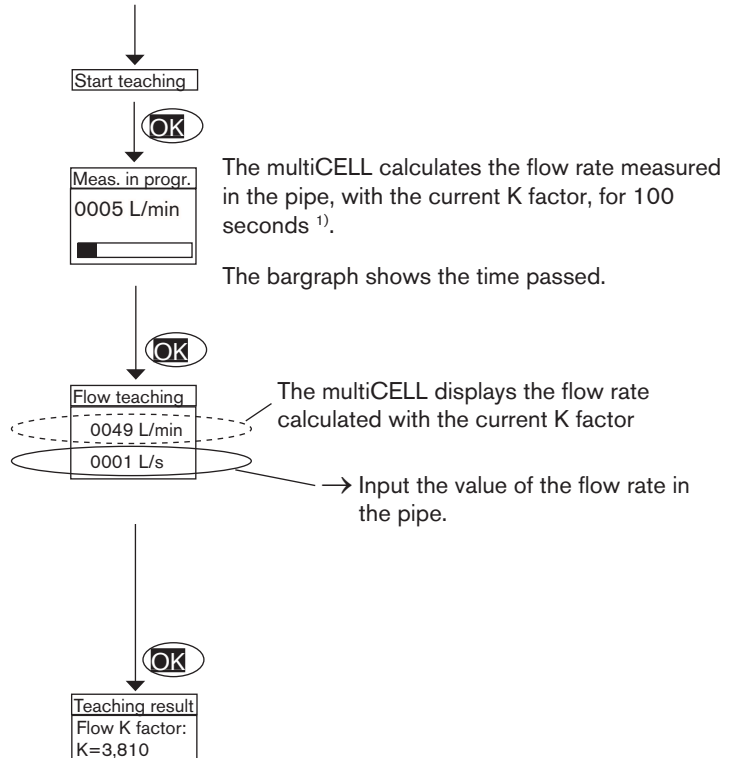
→ Choose the flow rate unit and the time unit in which teach-in is run:



→ Run teach-in by flow rate:



→ Allow the fluid to circulate in the pipes and wait for the flow rate to stabilise.



The multiCELL calculates the flow rate measured in the pipe, with the current K factor, for 100 seconds ¹⁾.

The bargraph shows the time passed.

The multiCELL displays the flow rate calculated with the current K factor

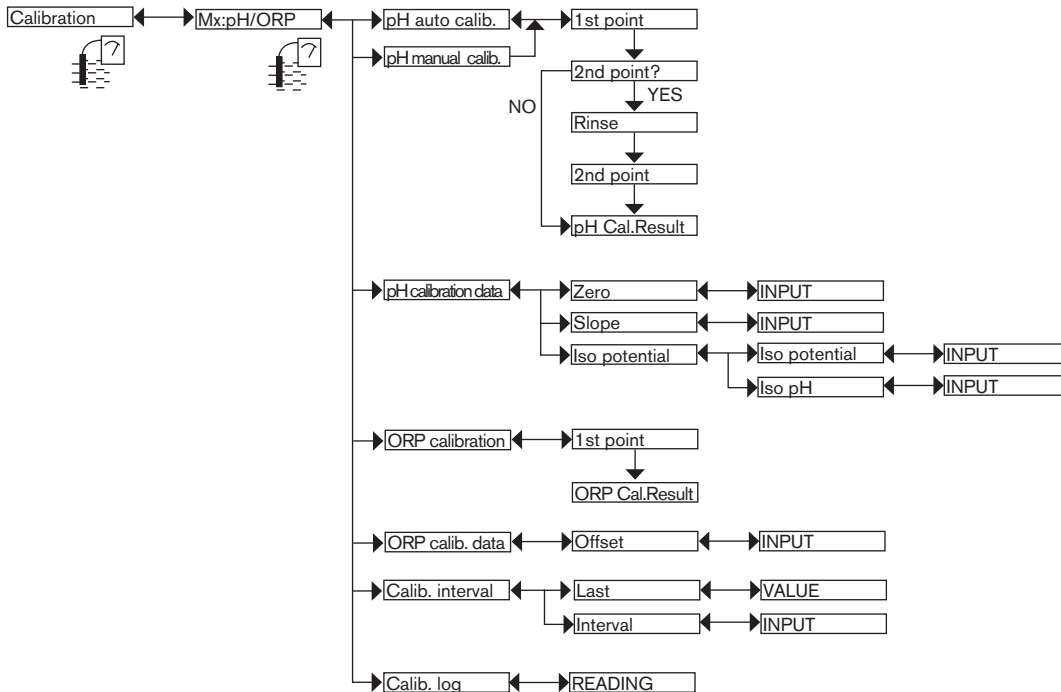
→ Input the value of the flow rate in the pipe.

The multiCELL displays the K factor calculated by teach-in.

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

9.10.6. Calibrating a pH or redox sensor

Refer to chap. 9.8 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 p. 83.
- **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. 9.9.20).
- See also "If you encounter problems", chap. 10.3

CALIB. LOG: Read the latest valid calibration values.

Manually calibrating the pH or redox sensor

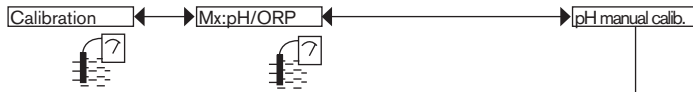
- The pH sensor can be calibrated according to a 1-point or a 2-point procedure.
- The redox sensor can only be calibrated according to a 1-point procedure.



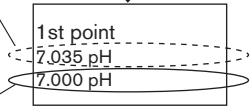
- Modify the default calibration limits before calibrating your sensor: see chap. 9.9.21
- In order not to interrupt the process, activate the HOLD function (see chap. 9.10.1).
- Before each calibration, correctly clean the electrode with a suitable product.
- In a 2-point calibration, the buffer solutions 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 p. 85).
- 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 p. 83.

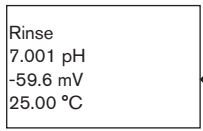


→ Immerse the clean probe in the first buffer solution: the multiCELL displays the measured pH of the solution.



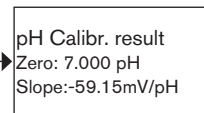
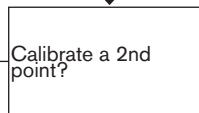
→ Enter the pH of the buffer solution (indicated on the bottle)

→ Wait until the measured pH stabilises.

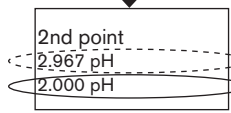


→ Rinse the probe.

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



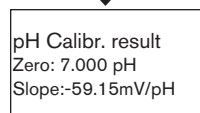
The multiCELL displays the calibration result. ¹⁾



→ 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.



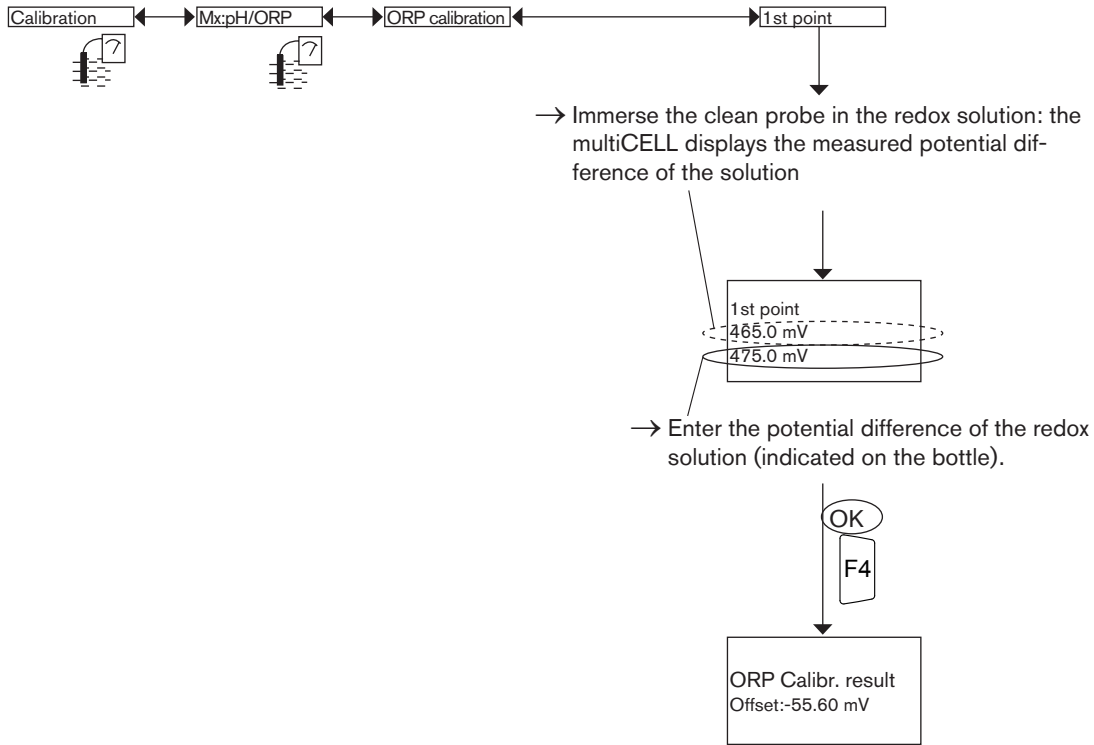
The multiCELL displays the calibration result. ¹⁾

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.

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.



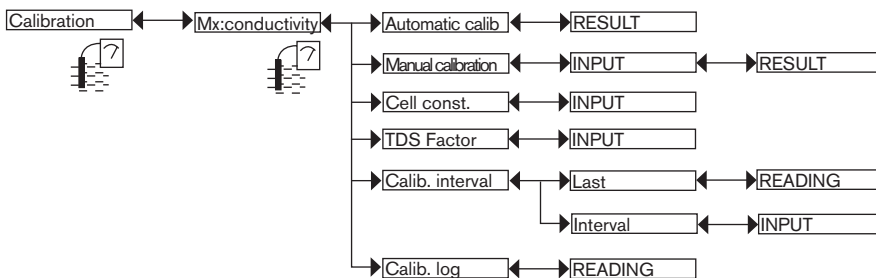
The multiCELL displays the calibration result. ¹⁾

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.

9.10.7. Calibrating a conductivity sensor

Refer to chap. 9.8 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).

MAN 1000139642 EN Version: - printed: 05.08.2010 Status: RL (released | freigegeben)

- **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. 9.9.20).
- See also "If you encounter problems", chap. 10.3

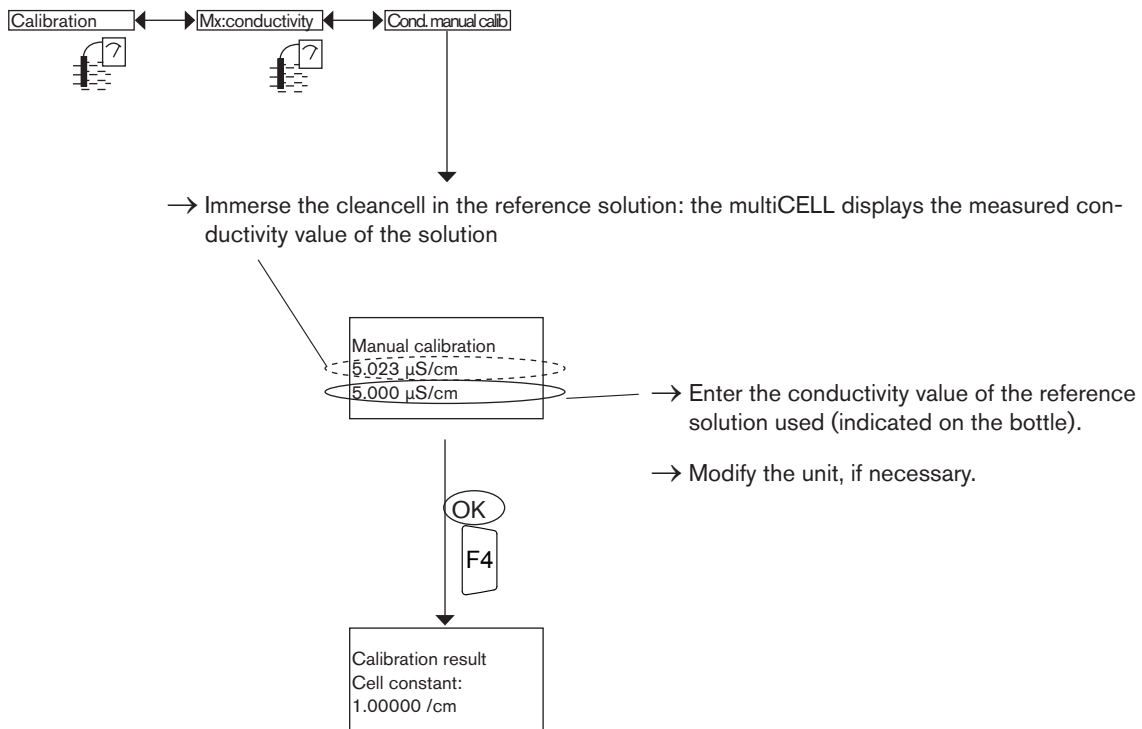
CALIB. LOG: Read the latest valid calibration values.

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. 9.10.1).
- 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.

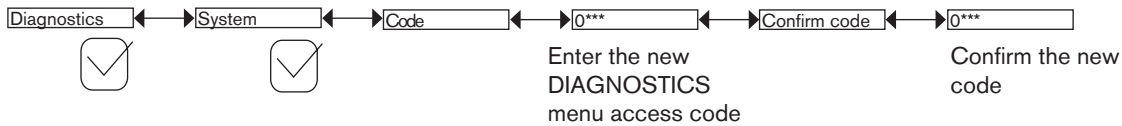


The multiCELL displays the calibration result.

9.11. "Diagnostics" menu

9.11.1. Modifying the "Diagnostics" menu access code

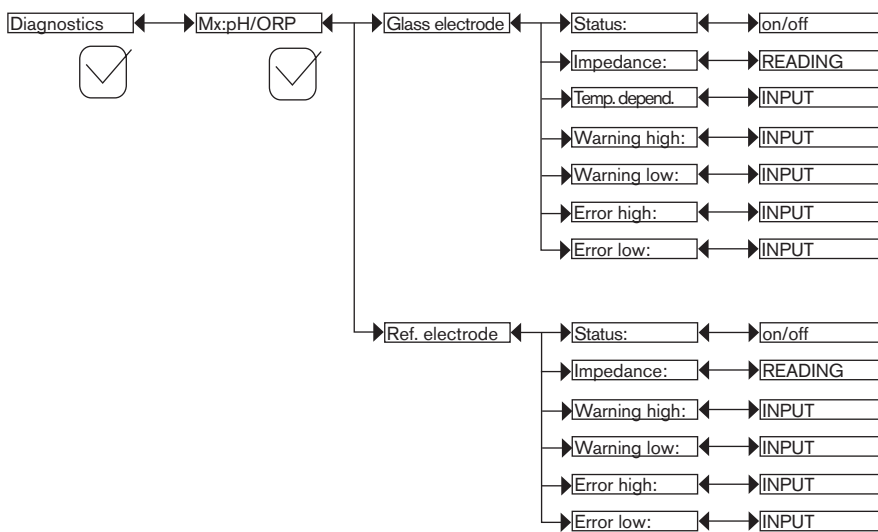
Refer to chap. 9.8 to access the Diagnostics menu. If the default access code "0000" is kept, the device does not request it to access the Diagnostics menu.



9.11.2. 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. 9.8 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. 9.9.20
- A current of 22 mA may be emitted on one and/or other of the current outputs when an "error" event related to the monitoring of the pH, redox, conductivity or fluid temperature values is generated. See chap. 9.9.19 to activate the mode.
- See also "If you encounter problems", chap. 10.3

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

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.

See also "If you encounter problems", chap. 10.3

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.

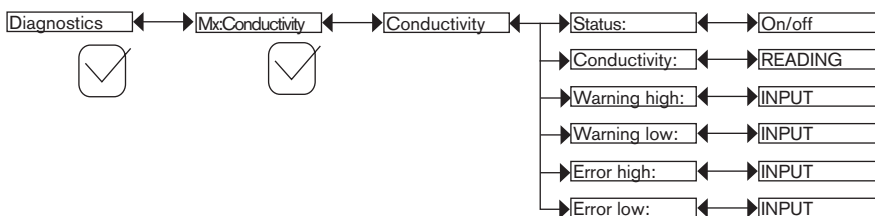
ERROR HIGH: Enter the impedance value above which an "error" event is generated.

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

9.11.3. 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. 9.8 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. 9.9.20
- 
 ▪ A current of 22 mA may be emitted on one and/or other of the current outputs when an "error" event related to the monitoring of the pH, redox, conductivity or fluid temperature values is generated. See chap. 9.9.19 to activate the mode.
- See also "If you encounter problems", chap. 10.3

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.


 See also "If you encounter problems", chap. 10.3

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

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

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

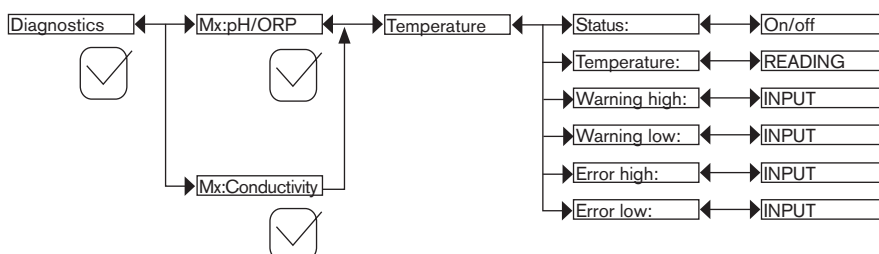
ERROR HIGH: Enter the fluid conductivity value above which an "error" event is generated.

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

9.11.4. 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. 9.8 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.

- The "warning" event may also be associated with one and/or other digital outputs. See chap. 9.9.20
- A current of 22 mA may be emitted on one and/or other of the current outputs when an "error" event related to the monitoring of the pH, redox, conductivity or fluid temperature values is generated. See chap. 9.9.19 to activate the mode.
- See also "If you encounter problems", chap. 10.3

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.

See also "If you encounter problems", chap. 10.3

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

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

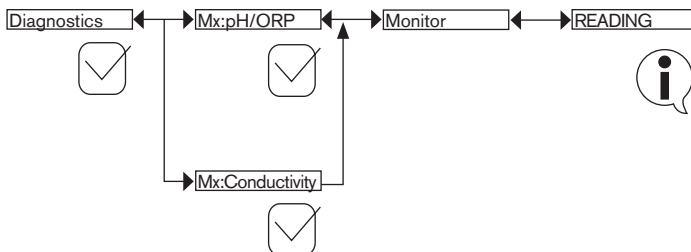
WARNING LOW: Enter the fluid temperature value below which a "warning" event is generated.

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

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

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

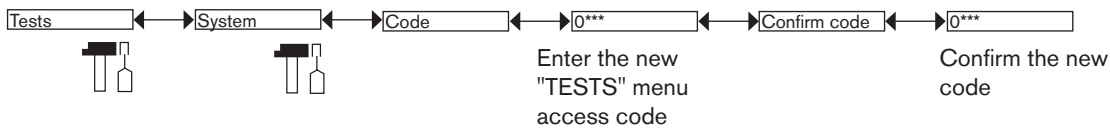
Refer to chap. 9.8 to access the Diagnostics menu.



9.12. Tests menu

9.12.1. Modifying the "Tests" menu access code

Refer to chap. 9.8 to access "Tests" menu. If the default access code "0000" is kept, the device does not request it to access the "Tests" menu.

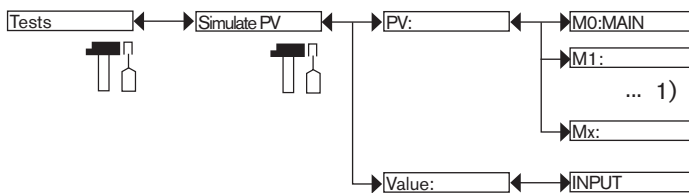


9.12.2. Checking that the outputs are behaving correctly



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. 9.8 to access the Tests menu.



¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.



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.

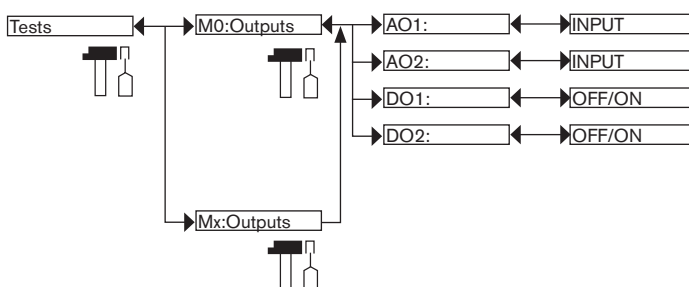
VALUE: Enter a process value selected from the "PV" function above to check output behaviour.


9.12.3. 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. 9.8 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".

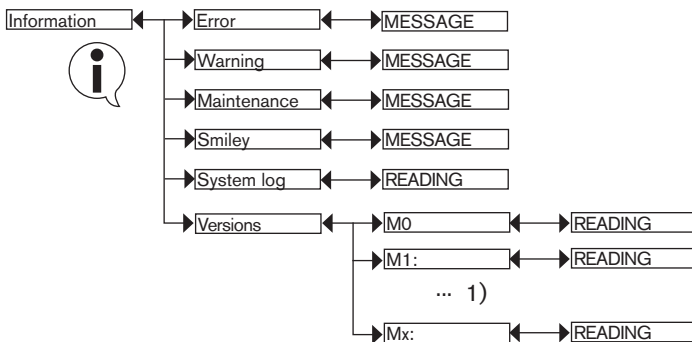
AO2: Check that current output 2 on the selected module is working correctly by entering a current value and then selecting "OK".

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".

9.13. Information menu






Refer to chap. 9.8 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 

 See also "If you encounter problems", chap. 10.3

- on the other hand:

- "SYSTEM LOG" function: read all the "error", "warning" and "maintenance" events generated by the multiCELL and the following messages:

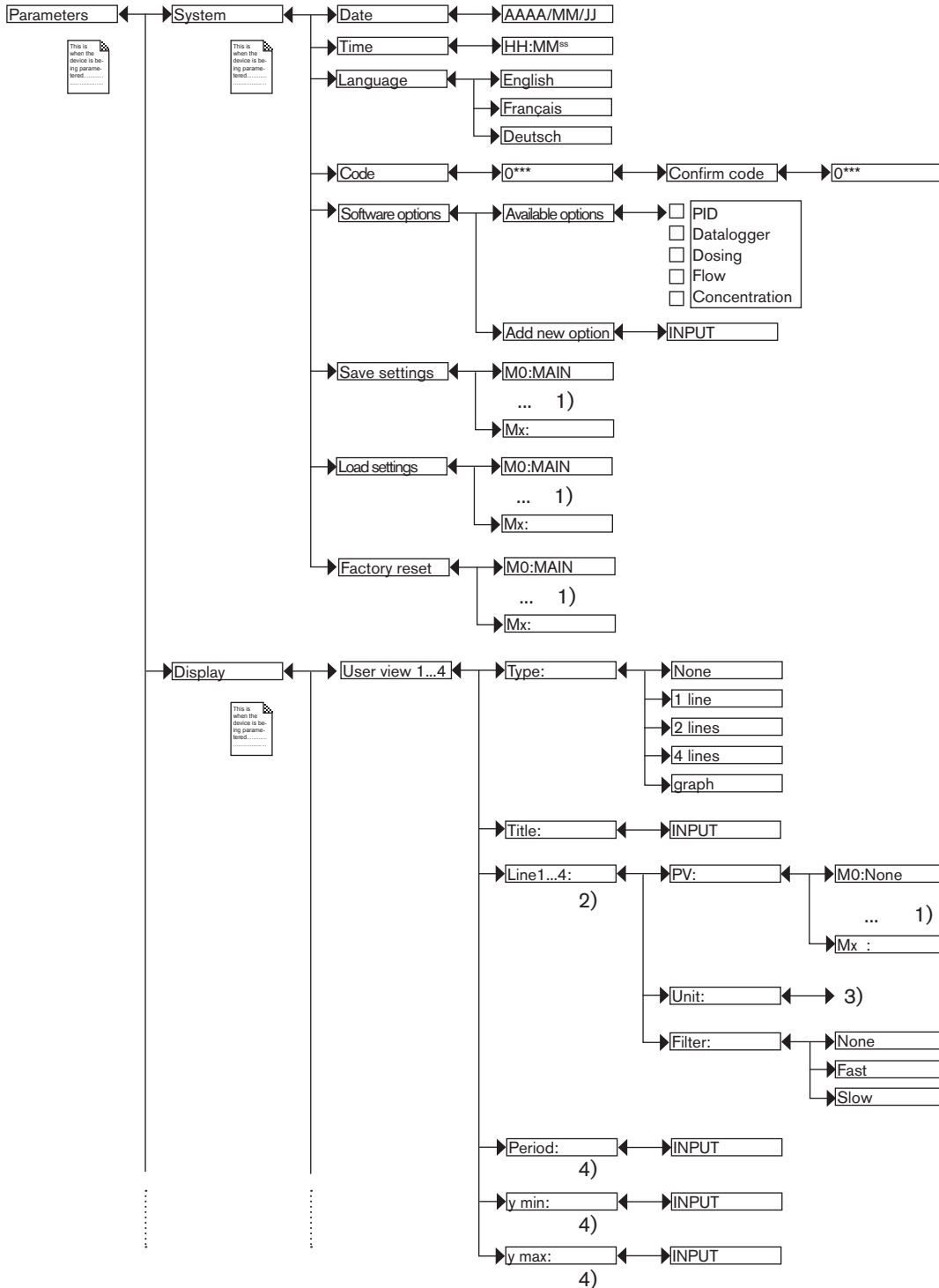
Message displayed in the log	Meaning	What to do
"M0:Power on"	The device is switched on.	-
"M0:MC full"	The memory card is full.	Delete data from the memory card or use a new memory card.
"M0:MC data lost"	Data loss from the memory card because the card was removed when the datalogger was "ON".	Temporarily deactivate the datalogger before removing the memory card from the device (see chap. 9.9.18).

Message displayed in the log	Meaning	What to do
"M0:MC failed"	Problem on the memory card.	<ul style="list-style-type: none">▪ Format the memory card.▪ If the problem persists, change the memory card.

- "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

9.14. Structure of the configuring menus

Refer to chap. 9.8 to access Configuring mode.

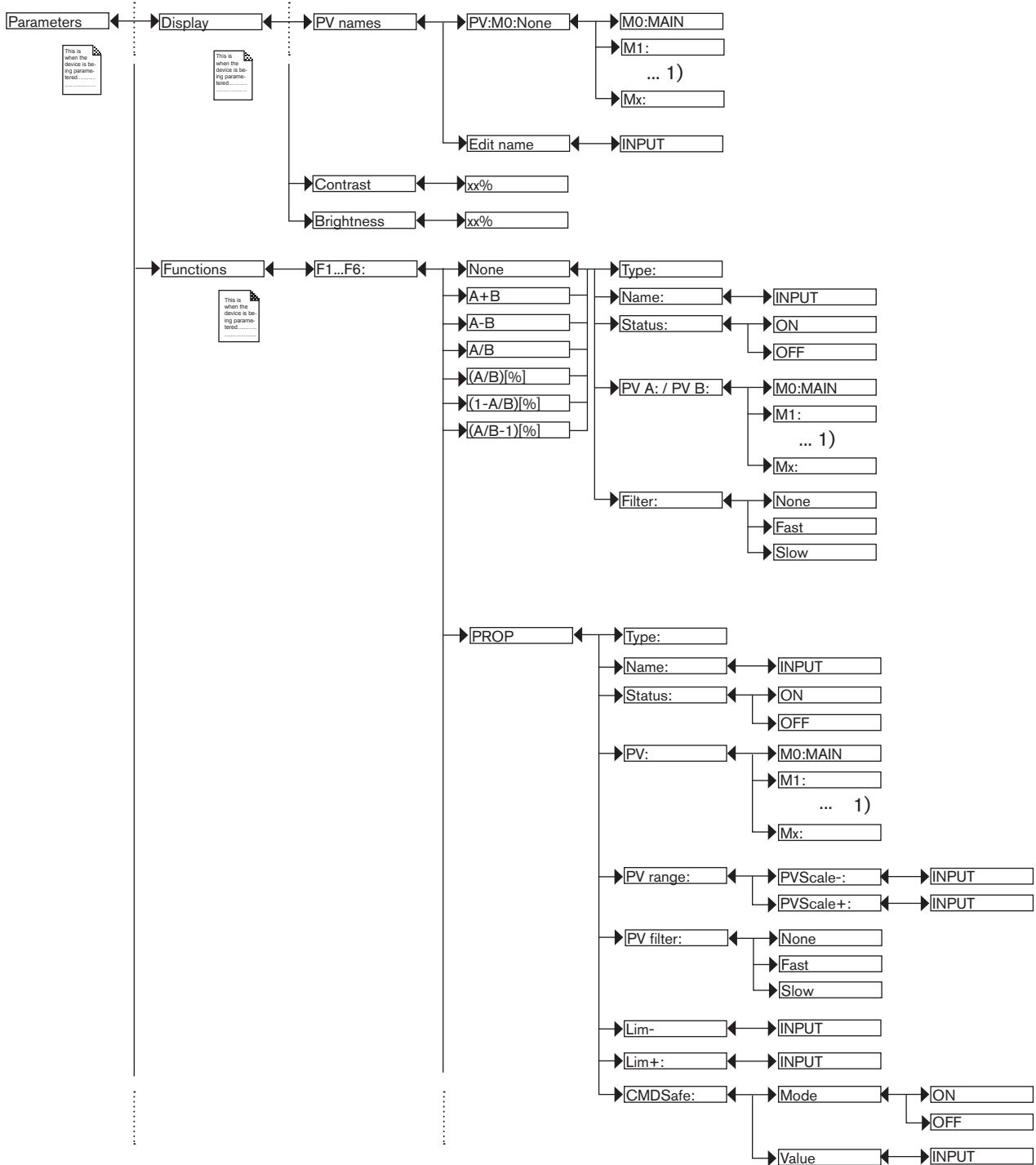


¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.

²⁾ If "Type" = 1, 2 or 4 "lines"

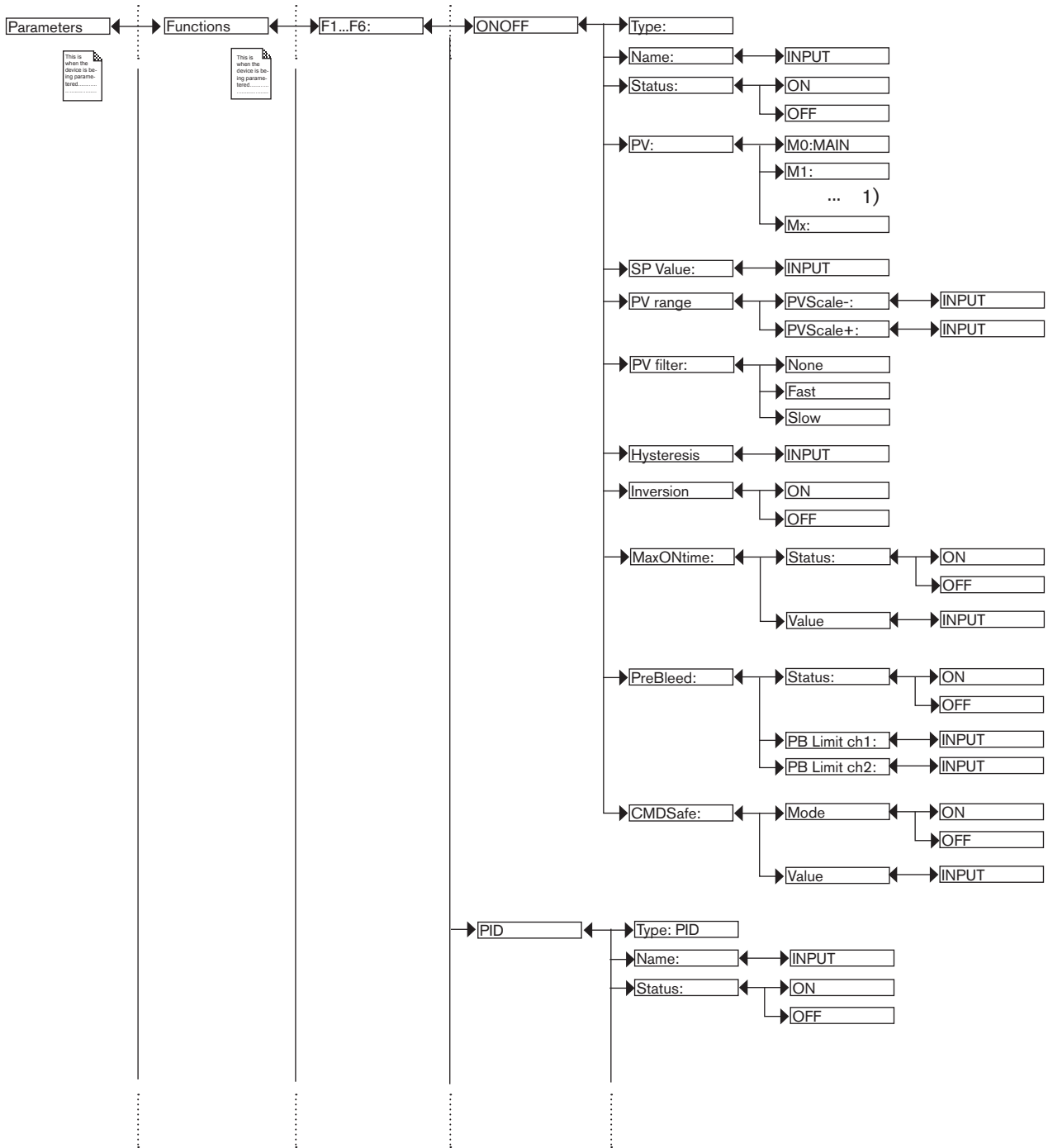
³⁾ The choices offered depend on the chosen "PV".

⁴⁾ If "Type" = "graph"

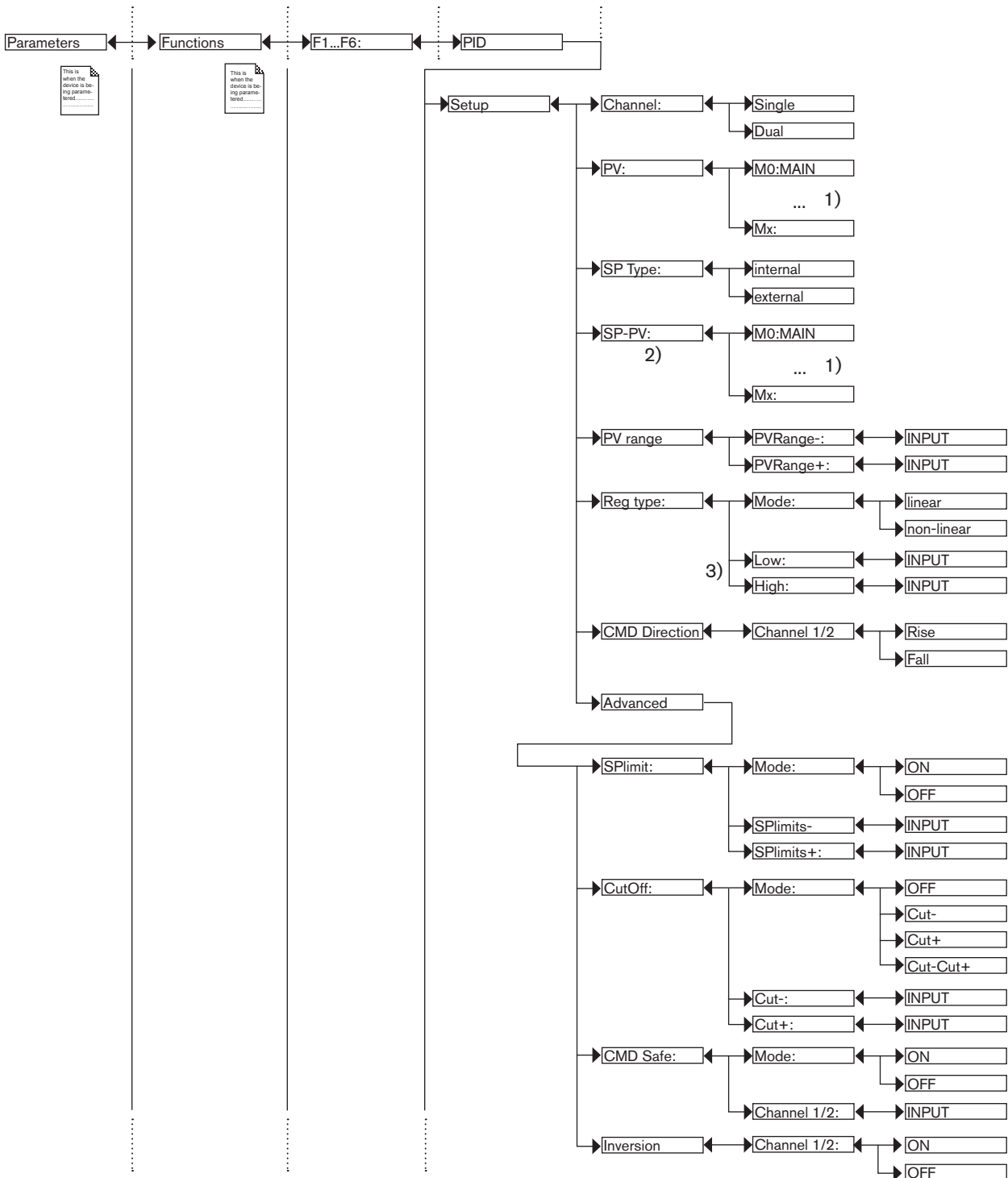


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¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.



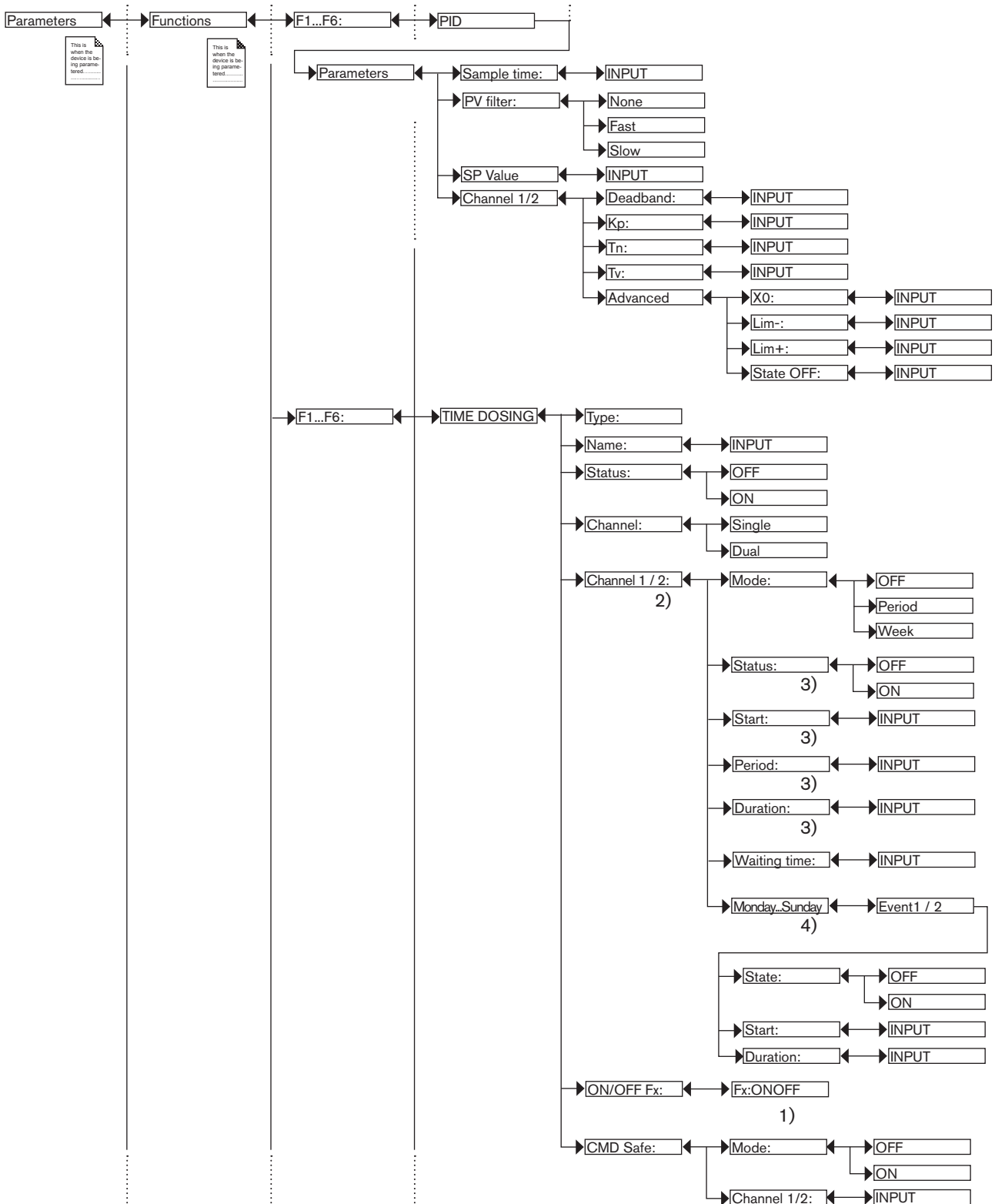
¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.



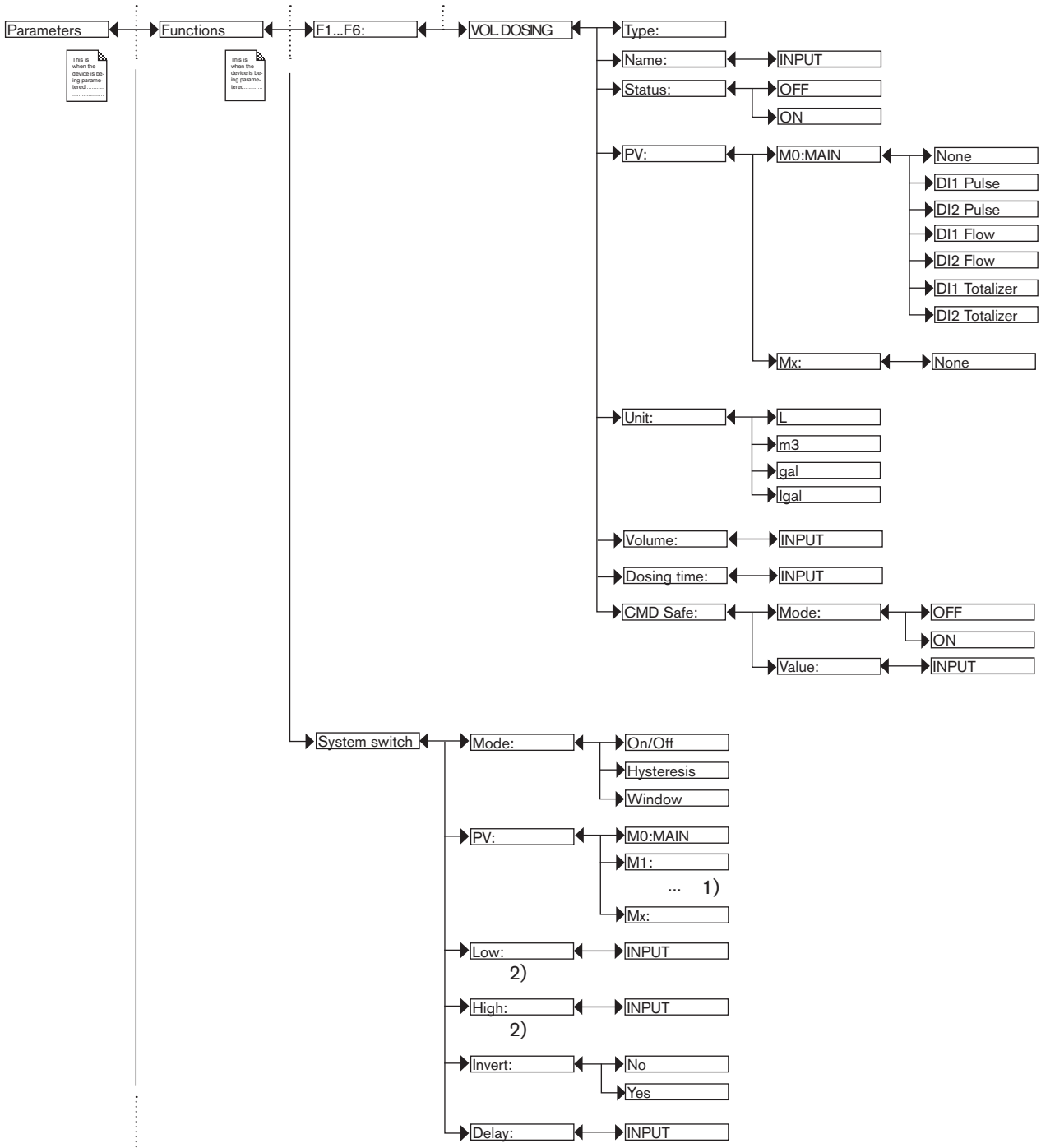
¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.

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

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



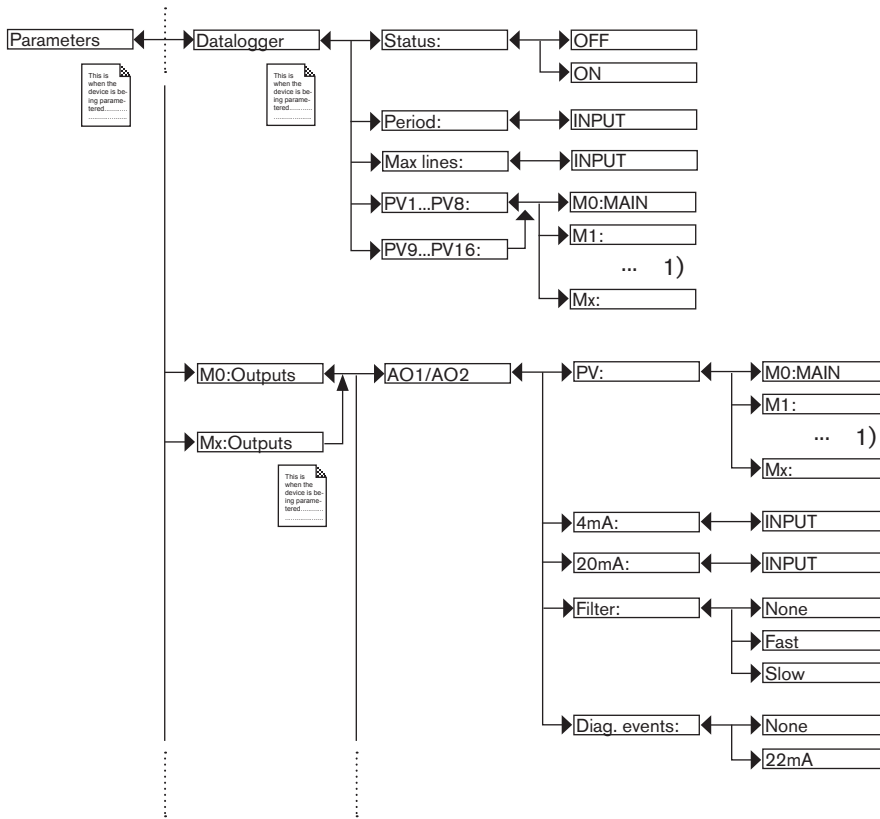
1) "Fx:" represents the ONOFF function declared "active"
 2) "Channel2" is present if "Channel" = "Dual"
 3) These functions are present only if "Mode" = "Period"
 4) These functions are present only if "Mode" = "Week"



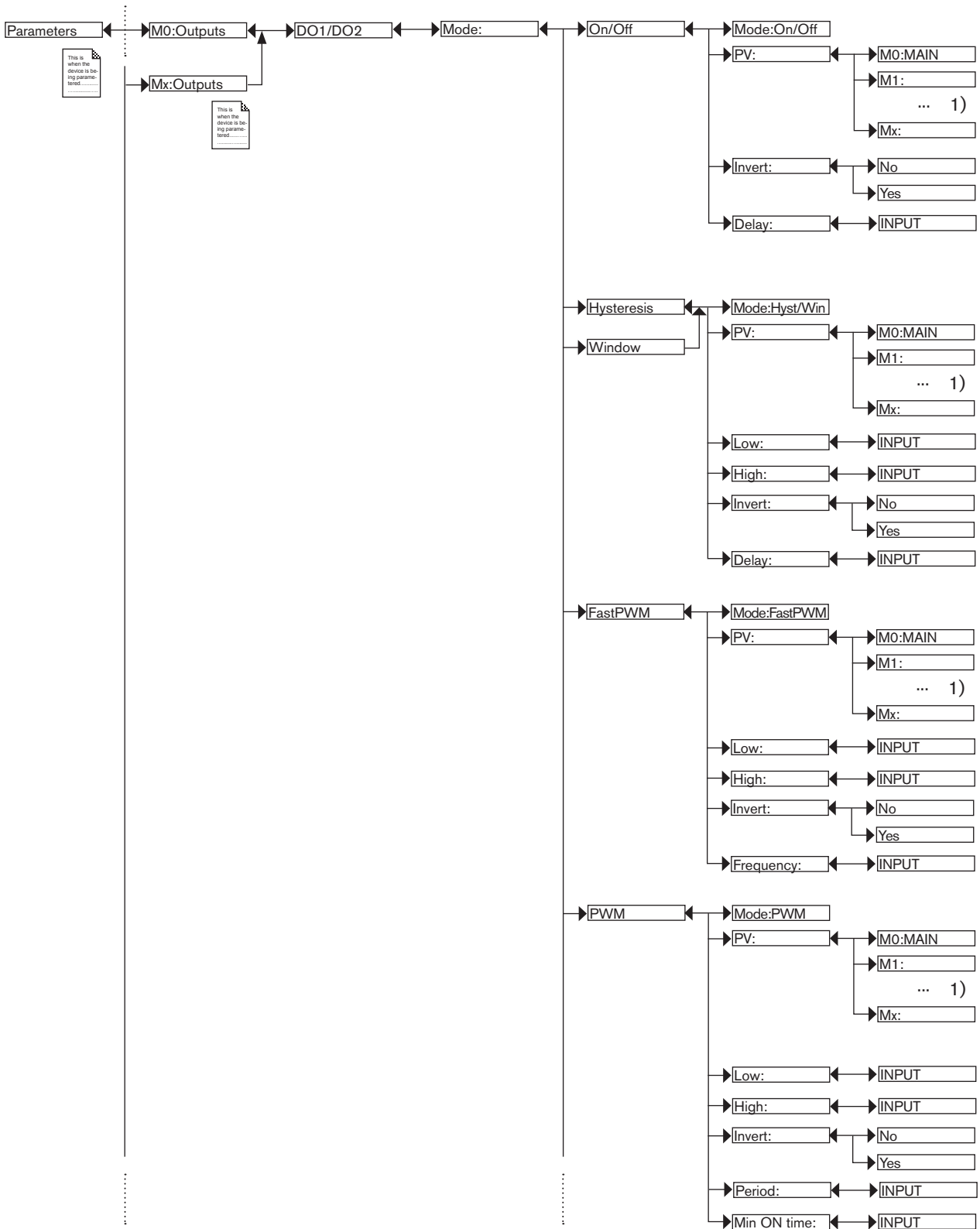
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¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.

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

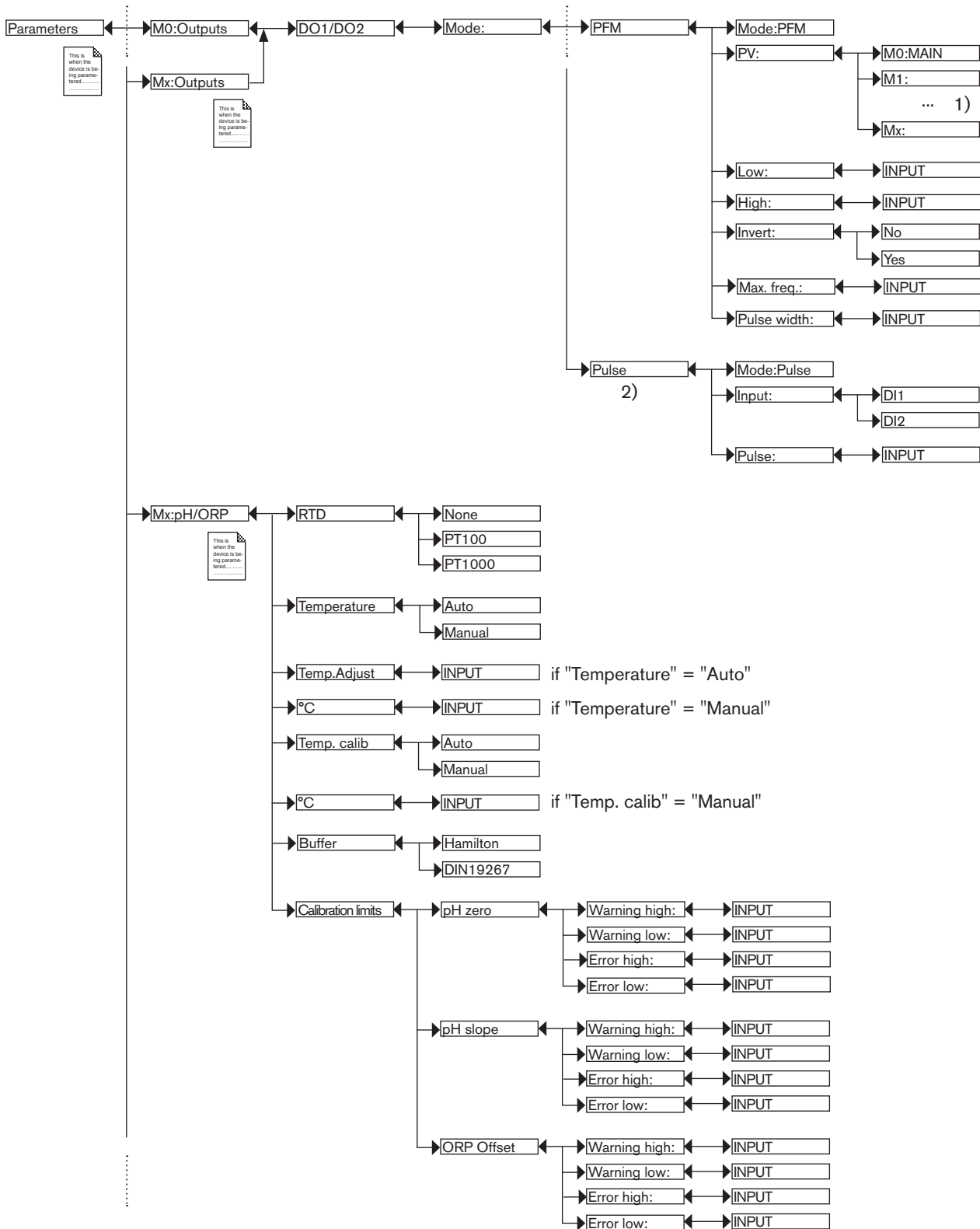


¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.



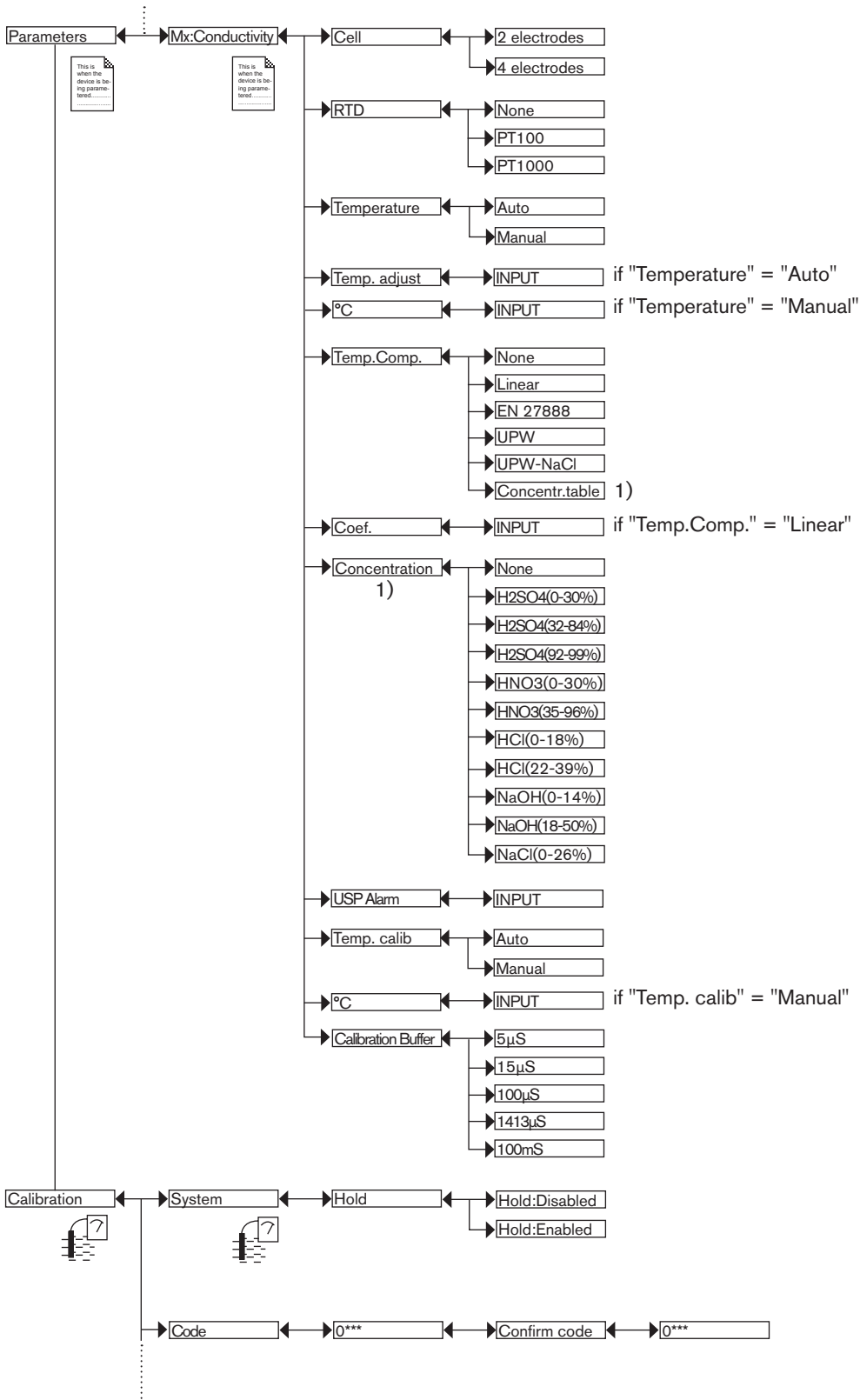
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¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.



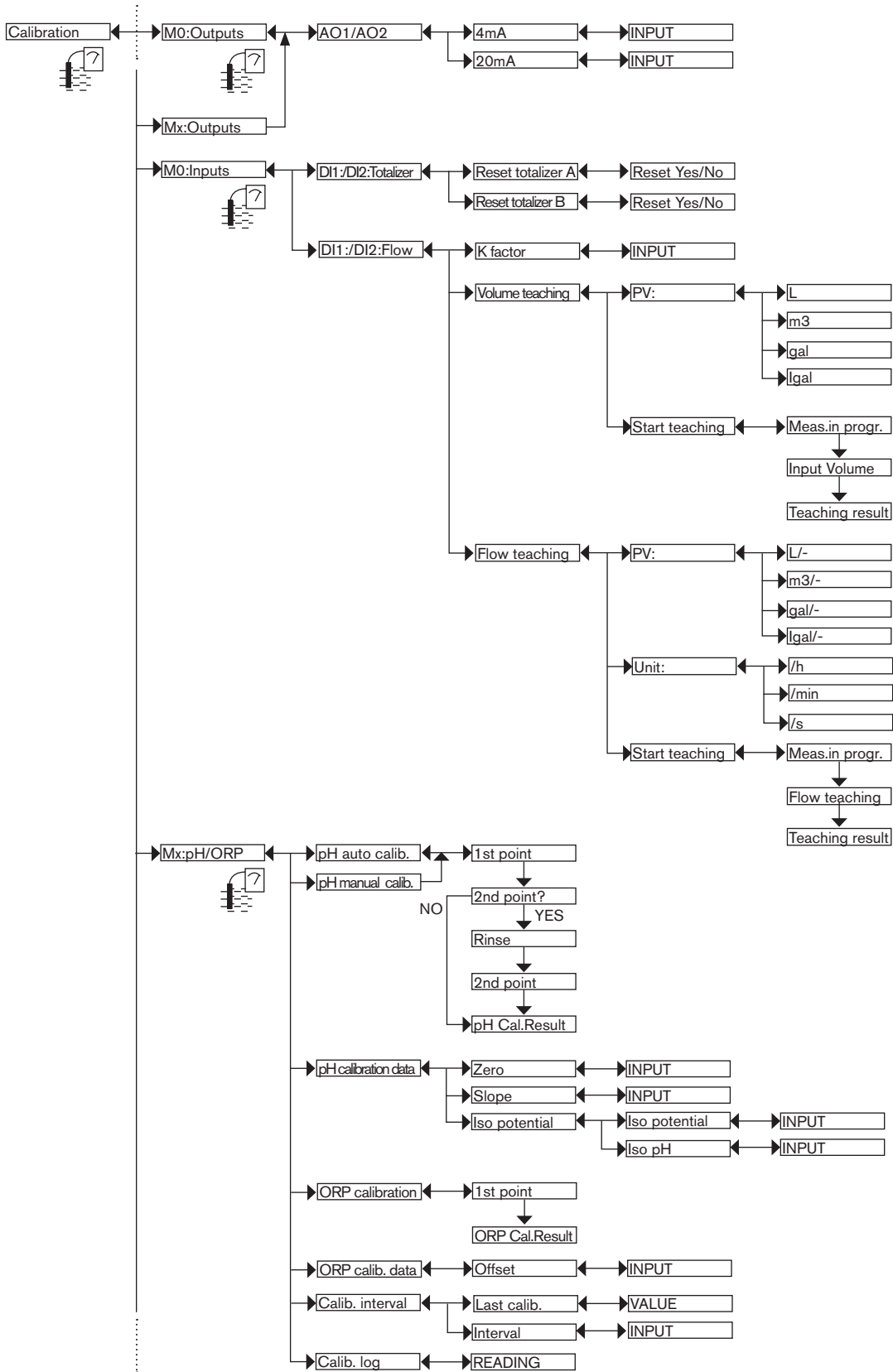
¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.

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

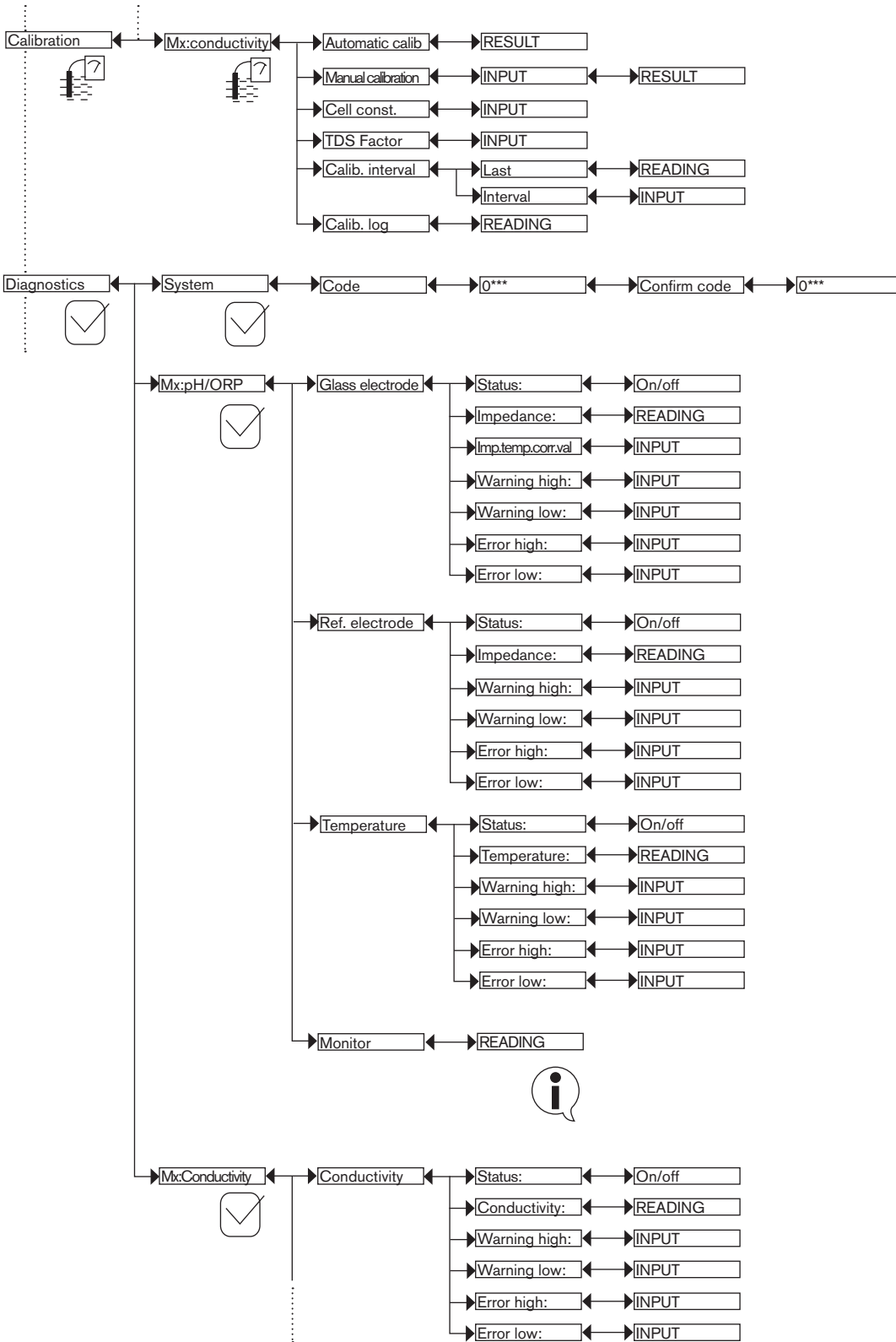


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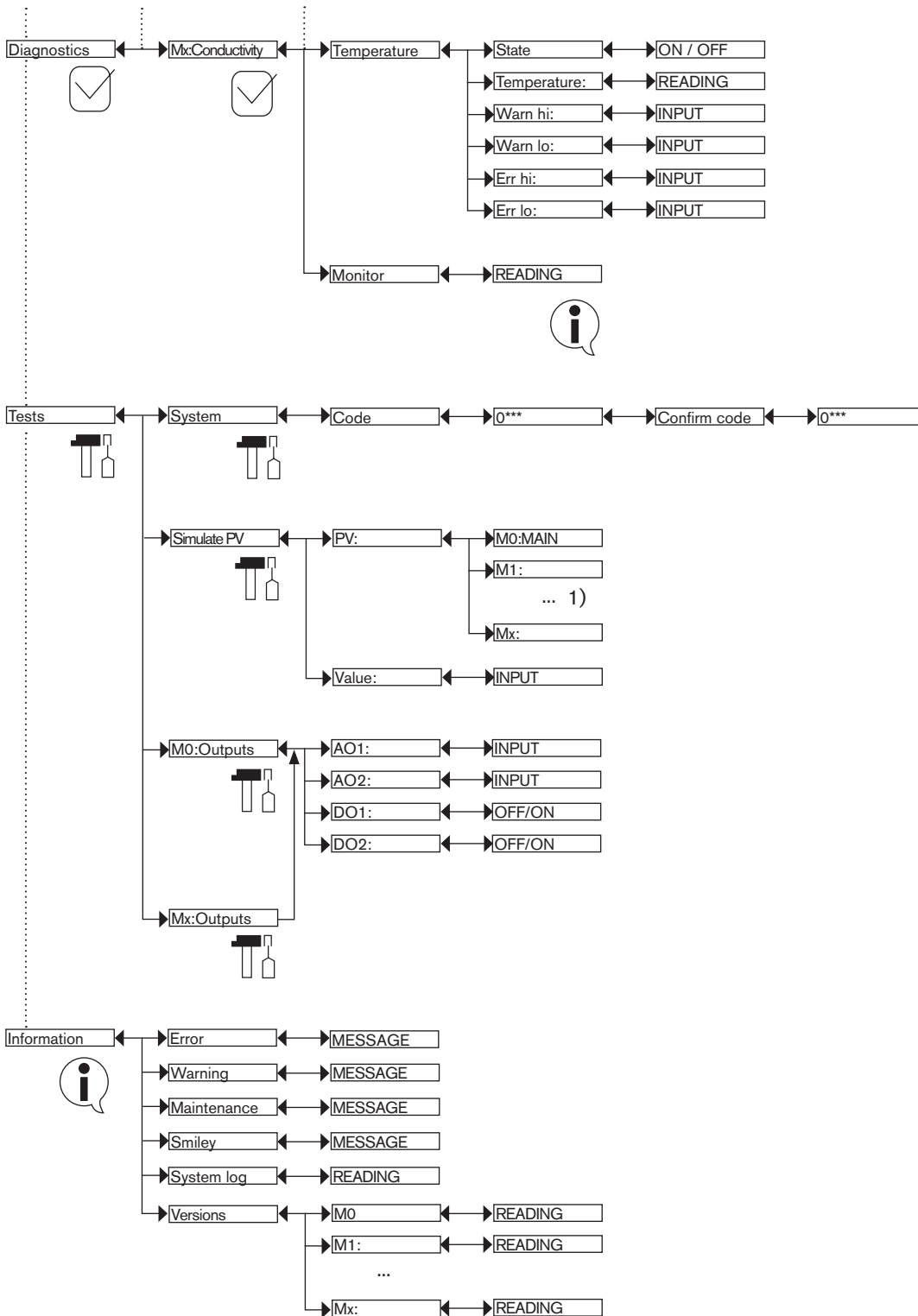
¹⁾ This menu is available as an option: see chap. 9.9.4



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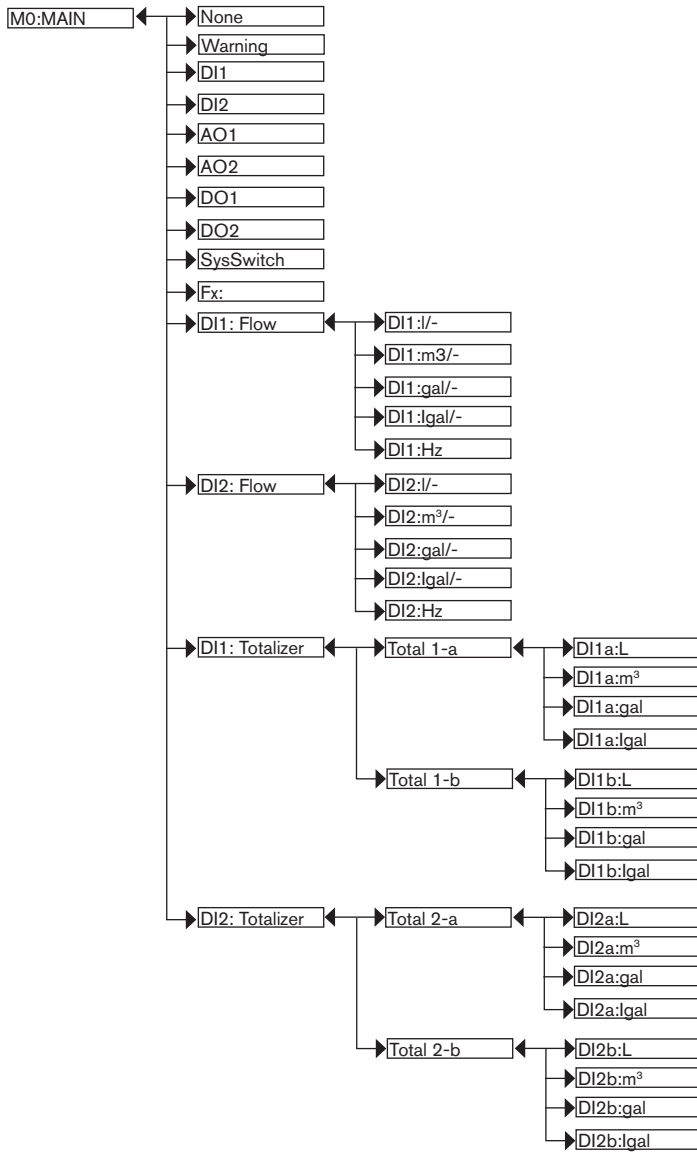
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¹⁾ The choices offered depend on the modules fitted and/or the options activated. See chap. 9.9.4. Consulting and/or activating the available software options and chap. 9.15. Process inputs or values.

9.15. Process inputs or values

9.15.1. On the M0:MAIN board



only available as an option on the versions with analysis modules: see chap. 9.9.4

"Warning" = event generated by the multiCELL

"DIx" = digital input

"AOx" = analogue output

"DOx" = digital output

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

"Fx:" = result of configured and activated functions

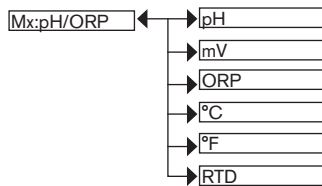
"DI1 Flow" = flow rate on digital input DI1

"DI2 Flow" = flow rate on digital input DI2

"DI1 Totalizer" = totalizers a and b on digital input DI1

"DI2 Totalizer" = totalizers a and b on digital input DI2

9.15.2. On the pH/redox module



"pH" = measured pH of the fluid

"mV" = measured pH of the fluid in mV

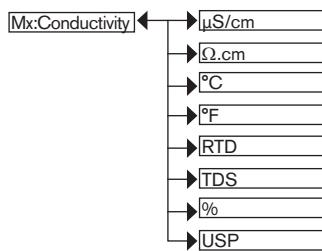
"ORP" = measured oxidation reduction potential of the fluid in mV

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

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

"RTD" = resistance of the temperature input in Ω

9.15.3. On the conductivity module



" $\mu\text{S}/\text{cm}$ " = measured conductivity of the fluid

" $\Omega.\text{cm}$ " = resistivity

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

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

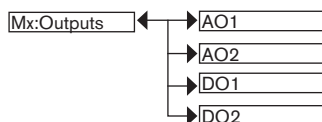
"RTD" = input resistance of the temperature stage in Ω

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

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

"USP" = state of the USP function

9.15.4. On the additional outputs module



"AOx" = analogue output

"DOx" = digital output

10. MAINTENANCE AND TROUBLESHOOTING

10.1. 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.

10.2. 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.

10.3. If you encounter problems

10.3.1. "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) on the M0:MAIN board generate a current of 22 mA if "Diag. events" is configured as "22 mA" (see chap. 9.9.19);
- The transistor outputs operate normally.

Message displayed in the "Information" menu	Meaning	What to do
"Mx:E:Glass impeded."	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. 9.11.2).	→ Go to the "Diagnostics" menu to read the impedance value of the pH electrode (chap. 9.11.2). → if necessary, clean the probe then recalibrate the measurement sensor or replace the probe.
"Mx:E:Ref. impeded."	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. 9.11.2).	→ Go to the "Diagnostics" menu to read the impedance value of the reference electrode (chap. 9.11.2) → if necessary, clean the probe then recalibrate the measurement sensor or replace the probe.

Message displayed in the "Information" menu	Meaning	What to do
"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. 9.11.3).	→ Go to the "Diagnostics" menu to read the fluid conductivity value (chap. 9.11.3) → 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. 9.11.4).	→ Go to the "Diagnostics" menu to read the value of the temperature measured (chap. 9.11.4). → 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.
"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. 9.9.21 and/or 9.9.22)	→ Connect a temperature sensor to the "Mx" module or → set the temperature value used in the process to "Manual" mode (see chap. 9.9.21 and/or 9.9.22)

10.3.2. "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) on the M0:MAIN board generate a current of 22 mA
- The transistor outputs operate normally.

Message displayed in the "Information" menu	Meaning	What to do
"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" "Mx:E:Memory IR"	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

Message displayed in the "Information" menu	Meaning	What to do
"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"		
"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.

10.3.3. "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	What to do
"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. 9.11.2).	→ Go to the "Diagnostics" menu to read the impedance value of the reference electrode (chap. 9.11.2) → if necessary, clean the probe then recalibrate the measurement sensor or replace the probe.
"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. 9.11.2).	→ Go to the "Diagnostics" menu to read the impedance value of the measurement electrode (chap. 9.11.2). → if necessary, clean the probe then recalibrate the measurement sensor or replace the probe.

Message displayed in the "Information" menu	Meaning	What to do
"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. 9.11.3).	→ Go to the "Diagnostics" menu to read the fluid conductivity value (chap. 9.11.3) → 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. 9.11.4).	→ Go to the "Diagnostics" menu to read the value of the temperature measured (chap. 9.11.4). → 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.

10.3.4. "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	What to do
"M0:W:Time lost"	The date and time are lost.	→ Set the date and time again (see chap. 9.9.1)
"M0:W:ON/OFF time"	The duration defined in the parameter "Max-ONtime" in the ON/OFF function has been exceeded (see chap. 9.9.11)	→ Deactivate then reactivate the ON/OFF function
"M0:W:Pulse x lim."	In "Pulse" mode, the volume entered for a pulse is incorrect (see p. 72).	→ Enter an appropriate volume → check the K factor.
"M0:W:Pulse x 1:1"	In "Pulse" mode, the volume entered for a pulse is incorrect (see p. 72).	→ Enter an appropriate volume → check the K factor.

10.3.5. "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	What to do
"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. 9.10.6 or 9.10.7)	→ Calibrate the sensor (chap. 9.10.6 or 9.10.7)

10.3.6. Error messages during data saving

The following error messages may be displayed when saving data (see chap. 9.9.5).

Message displayed	Meaning	What to do
"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. 9.9.18)
"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.

10.3.7. Error messages during data loading

The following error messages may be displayed when loading data (see chap. 9.9.6).

Message displayed	Meaning	What to do
"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. 9.9.18)
"Memory card read"	The file with the saved data cannot be read.	→ Check (on a PC) that the file with the saved data (named MxUSER.BIN) is present on the memory card.
«File open»	The file with the saved data is corrupted.	→ Use another file.
«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.

11. 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

12. 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.

13. STORAGE

CAUTION

Poor storage can damage the device.

- Store the device in a dry place away from dust.
- Storage temperature: -20 ... +60°C, restricted to 0 ... +60°C if a memory card is inserted

14. 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.

