Operating Instructions

DULCOMETER® Cool-Control, Type D1C
Measured variable inductive Conductivity

DED1C1S001

Type D

DED1C1W001

Type W

D1C A	___	___	**K**	**6**	___	___	___	___	___	**2**	**0**	**0**	**E**

Please enter the identity code of your device here!

Please read through operating instructions completely before commissioning this equipment! · Do not discard! · Any part which has been subject to misuse is excluded from the warranty!

Part No. 986816 **ProMinent Dosiertechnik GmbH · 69123 Heidelberg · Germany** BA DM 124 05/05 GB

Publishing Details

Publishing Details:

Operating Instructions
DULCOMETER® Cool-Control, Type D1C
Measured variable inductive Conductivity

Address:

ProMinent Dosiertechnik GmbH
Im Schuhmachergewann 5-11
69123 Heidelberg · Germany

Postfach 101760
69007 Heidelberg · Germany

Phone: +49 (6221) 842-0
Fax: +49 (6221) 842-419

info@prominent.com
www.prominent.com

Subject to technical alterations.

Table of Contents

		Page
	Table of Contents	3
1	**General user information**	6
2	**Safety**	7
2.1	Correct use	7
2.2	Safety informations	7
2.3	Applicable types of standards	7
3	**Storage and Transport**	8
4	**Assembly and Installation**	8
4.1	Safety guidelines	8
4.2	Mechanical assembly	9
4.2.1	Assembly of Cool-Control D (control panel installation)	9
4.2.2	Assembly of Cool-Control W (wall mounted)	10
4.3	Electrical installation	11
4.3.1	Electrical installation of the Cool-Control D (control panel mounted)	11
4.3.2	Electrical installation of the Cool-Control W (wall mounted)	12
5	**Function description**	15
5.1	Description of the function of a cooling tower	15
5.2	Function description Cool Control	16
5.3	Description of desalination	19
5.4	Description of emergency mode	19
5.5	Biocide metering description	20
5.6	Description of inhibitor metering	20
5.6.1	Contact inhibitor mode	20
5.6.2	Periodic inhibitor mode	21
5.6.3	%bleed inhibitor mode	21
5.6.4	II bleed inhibitor mode	21
5.7	Mechanical construction	22
5.7.1	Panel mounting in accordance with DIN 43700 (96 x 96 mm)	22
5.7.2	Wall mounting	22
5.8	Electrical construction	22
6	**Device overview / Control elements**	23
7	**Operation**	25
7.1	Operating diagram	25
7.1.1	Operating menu	26
7.1.2	Access code	26
7.2	Operating menu, overview	26
7.2.1	Overview of restricted operating menu	26

Table of Contents

7.2.2	Overview of complete operating menu	27
7.2.3	General overview	28
7.3	Description of input menus	32
7.3.1	Permanent display	32
7.3.2	Desalination control	33
7.3.3	Biocide control	34
7.3.4	Inhibitor metering, “contact” mode	36
7.3.5	Calibrating pumps	40
7.3.6	Conductivity measurement, overview	44
7.3.7	Conductivity measurement - setting measurement parameters	45
7.3.8	Conductivity measurement - zero point calibration (ZP)	46
7.3.9	Conductivity measurement - cell constant calibration (CC)	47
7.3.10	Conductivity measurement - calibrating α	48
7.3.11	Conductivity measurement – installation factor setting	50
7.3.12	Conductivity measurement – type of sensor setting	51
7.3.13	Conductivity measurement - correction value setting temperature compensation	52
7.3.14	Connection inhibitor pump	54
7.3.15	Pulse-type water meter	54
7.3.16	Setting mA output	55
7.3.17	Real-time clock	55
7.3.18	Alarm relay	56
7.3.19	Limits setting	56
7.3.20	Pause control input	57
7.3.21	Manual control	57
7.3.22	General settings	58
8	**Commissioning examples**	59
9	**Troubleshooting**	64
10	**Maintenance**	65
11	**Disposal**	66
12	**Technical Data**	67
13	**Spare parts / Accessories**	69
	Overview of terminal arrangement	70
	Wiring diagram „G“	71
	Wiring diagram „S“	72
	“ICT 1” terminal connection diagram	73
	Parameter log	74
	EC conformity declaration	79
	Troubleshooting table	80

D1C A	DULCOMETER® Cool-Control, Type D1C
	Type of mounting
D	Control panel installation (96 x 96 mm) (IP 54)
W	Wall mounting (IP 65)
	Operating voltage
0	230 V 50/60 Hz
1	115 V 50/60 Hz
4	24 V AC/DC
	Measured variable
K	Conductivity for cooling tower controller
	Connection of measured variable
6	Terminal for inductive conductivity measuring cells
	Correction variable
0	None
2	Temperature via terminal (Pt 100)
4	Manual temperature input
	Disturbance value actuation
0	None
2	Flow as frequency 0...500 Hz (Contact water meter)
	Control input
0	None
1	Pause
	Signal output
0	None
1	Standard signal 0/4-20 mA measured value (conductivity)
	Power control
G	Alarm and 2 power relay (desalination valve and biocide 2)
S	Alarm relay and motorised valve (desalination valve only)
	Pump control
2	two pumps (inhibitor and biocide 1)
	Control characteristic
0	2 point control with hysteresis/desalination
	Protocol output
0	None
	Language
D	German
E	English
F	French
S	Spanish

D1C A	___	___	K	6	___	___	___	___	___	2	0	0	E

Please enter the identity code of your device here!

1 General user information

Please read through the following instructions carefully. Knowledge of these instructions will help you use the operating instructions manual more effectively.

Points are highlighted as follows

- Indicates step by step instructions
- ▶ Indicates enumerated points

User guidelines

NOTE

Guidelines are intended to make your job easier.

and safety guidelines:

WARNING

Describes a possibly hazardous situation.
If the situation is not avoided you will be in grave danger and may lead to serious injury.

CAUTION

Indicates a possibly dangerous situation. Non-observance can lead to personal injury or damage to property.

IMPORTANT

Indicates a possibly harmful situation. Non-observance can lead to damage to property. damage to property if safety guidelines are not observed.

2 Safety

2.1 Correct use

- The Cool-Control is a microprocessor-controlled device for controlling all functions necessary for the operation of a cooling tower (excluding intake).
- The Cool-Control device is designed only for the applications described in this Operating Instructions Manual.
- All other uses and modifications are prohibited.

2.2 Safety informations

IMPORTANT

- ***When an error message has been actuated the Cool-Control will resume control functions (possibly unexpectedly) as soon as the cause of the problem has been remedied. If necessary, switch off the Cool-Control before troubleshooting (press the Enter key repeatedly until the "Ɛ" symbol has stopped flashing) and prevent the system from being restarted manually.***
- ***Prevent overdosing of hazardous media if a sensor fails or has been removed. Adjust the system accordingly.***
- ***You are obliged to observe the instructions in this operating instructions manual. The equipment may only be used in accordance with the technical data in the aforementioned operating instructions manual.***
- ***The Cool-Control should be operated only by appropriately trained and authorised personal.***
- ***The device may not be used outdoors without additional protection (secondary housing, weatherproof cover). The housing can be damaged if subjected to direct sunlight.***

2.3 Applicable types of standards

The device complies with the following standards:

EC low voltage guideline (73/23/EEC) and 93/44/EEC

EC EMC guideline (89/336/EEC) and 92/31/EWG in preparation

Supply voltage in accordance with DIN IEC 38

Electrical sagety in accordance with EN 61010-1

Electromagnetic emitted interference in accordance with EN 55011 group 1 / class B

Interference immunity in accordance with IEC 801-2, -3, -4 resp. DIN VDE 0843, Part 2, Part 3, Part 4 or EN 50082-2

EN 60335-1 Safety of electrical devices for household use

EN 50081-1 EMC, emitted interference, residential areas

EN 50082-2 EMC, emitted interference, industrial areas

EN 60555-2 EMC, reactions in power supply networks, harmonics

EN 60555-3 EMC, reactions in power supply networks, voltage fluctuations

3 Storage and Transport

Transport and store the Cool-Control in its original packaging.
Additionally, protect the packed Cool-Control from damp or the effects of chemicals.

Environmental conditions for storage and transportation:

Temperature:	-10 °C to 70 °C
Air humidity:	Cool-Control W < 95 % relative humidity, non-condensing
	Cool-Control D < 80 % relative humidity, non-condensing

4 Assembly and Installation

Controls metering pumps, solenoid valves, servomotor without feedback and provides mA standard signal.

The device has no mains switch. It is ready to operate as soon as it has been connected to the mains.

The device complies with corresponding requirements for electrical resources. To this end the following standards have been complied with:

- Supply voltage in accordance with - DIN IEC 38
- Electrical safety in accordance with - EN 61010-1
- Elektromagnetic emitted interference in accordance with - EN 55011 group 1/class A

4.1 Safety guidelines

WARNING

- ***The device is only suitable for installation into a control panel. Do not operate the device unless installed in this manner.***
- ***Take all standard general safety precautions for the installation. Observe national directives.***
- ***Read through the operating instructions carefully before starting installation and commissioning.***
- ***The device must be installed by specially trained personnel with corresponding proof of relevant qualification.***
- ***The mains connection values specified on the device must comply with the power supply on site.***
- ***The power lead and the data leads may not be laid alongside leads if cross-interference could result. Take precautions to prevent electrical interference if that is the case. Excessive interference may cause the device to malfunction or break down.***

4.2 Mechanical assembly

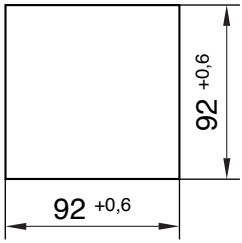
Please remove the protective film from the display.

4.2.1 Assembly of Cool-Control D (control panel installation)

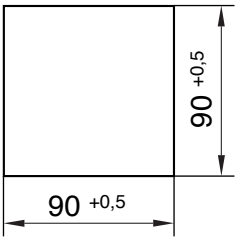
The device is designed for mounting in a control panel. The housing complies with DIN 43700.

DIN 43700 specifies requirements for the cut-out provided in the panel for installation of the device.

DED1C1S003



Cut-out in accordance with DIN 43700

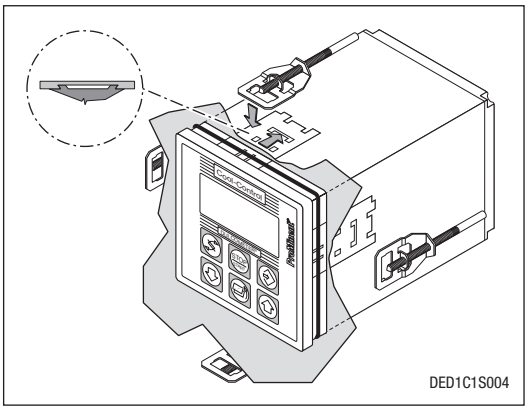


Cut-out in accordance with ProMinent recommendation

We recommend a smaller cut-out. The device is held in place better (less lateral play) and the seal is compressed evenly.

Preparing the cut-out:

- A drilling template, scale 1:1, is supplied with the device. This allows you to select the optimum position for the device on the control panel.
- Line up the template in the correct position on the panel with the aid of a spirit level and fix in place. Centre-punch the corners and drill with a ø 6 mm drill bit. Then use a keyhole saw to cut from one hole to the next. Saw out the aperture until the measurements fall within the specified tolerances.
- File the edges smooth.
- Before inserting the device into the panel cut-out, check that the seal is located correctly. Insert the device into the cut-out from the outside. Attach shackles and push back to the stop. All four shackles must be attached to achieve the IP 54 enclosure rating.
- Use a suitably sized screwdriver to screw the threaded rods forwards until the seal is evenly compressed around its circumference.
- Check once more that the seal is correctly seated, if necessary loosen the threaded rods, reposition and retighten.



DED1C1S004

4.2.2 Assembly of Cool-Control W (wall mounted)

NOTE

Once mounted, the device should be easy to read and operate (ideally at eye level).

Wall mounting

The device can be screwed straight onto the wall using the wall bracket provided (drilling template supplied).

Fixtures for wall mounting:

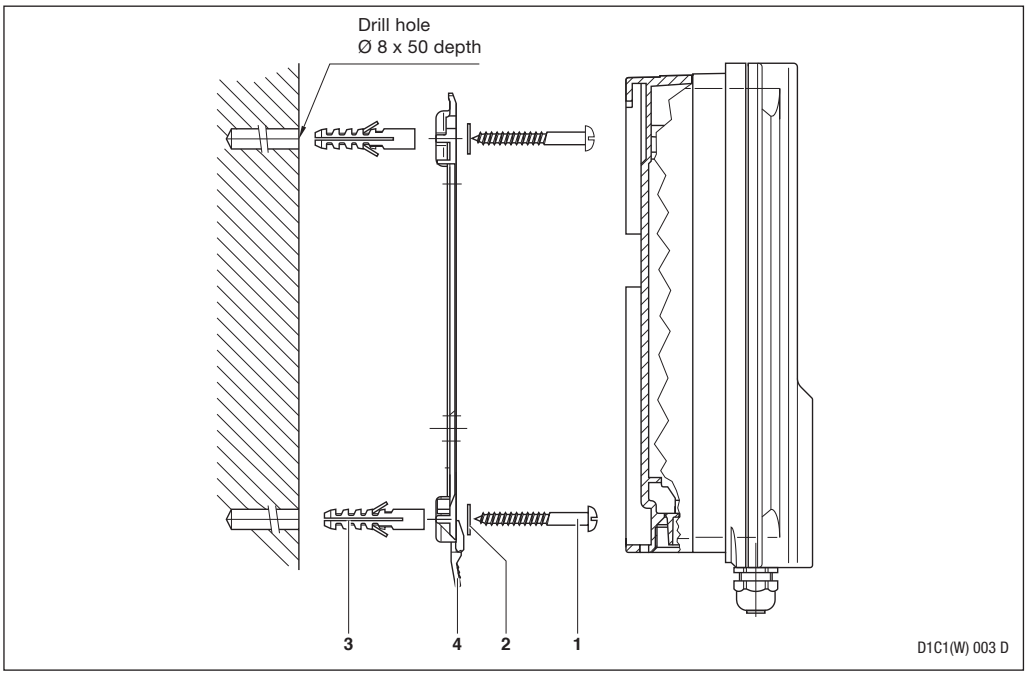
- Item **(1)** 3 pc. 5 x 45 round-head screw
- Item **(2)** 3 pc. 5.3 U-washer
- Item **(3)** 3 pc. d8 plastic wall plugs

The wall bracket **(4)** can be used as a drilling aid. Hold against the wall in the place where you want to mount the device.

NOTE

Take care when positioning the bracket that you leave sufficient space to attach the cable. Allow 120 mm clearance above for the "parking position".

Mark the holes and drill. Push in wall plugs **(3)** and screw on the bracket with the screws **(1)** and U-washers **(2)**. Place the device onto the bracket, push lightly against the wall and push up approx. 4 mm until you hear it snap into place.

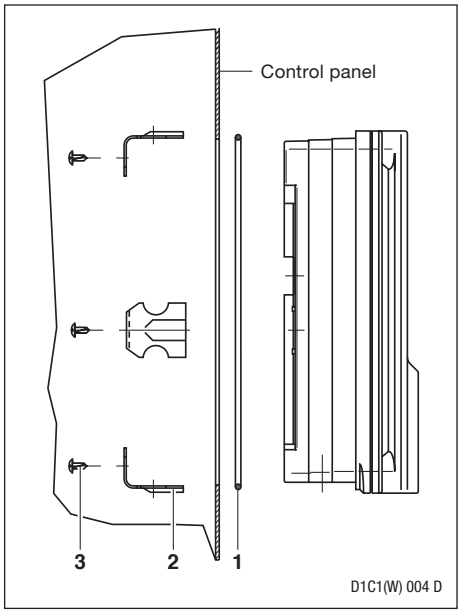


Control panel assembly

A 4 mm wide lip round the perimeter of the housing (with a circumferential groove to hold the seal) rests on the surface of the control panel when the device is installed. When installed, the front projects approx. 35 mm from the control panel. The device is inserted from the outside into a cut-out provided in the control panel. The device is attached to the control panel from the inside with the fixtures provided.

Fixtures for panel mounting:

- Item **(1)** 1 pc. d3 foam rubber seal
- Item **(2)** 6 pc. galvanised steel shackles
- Item **(3)** 6 pc. PT galvanised self-tapping screws



Procedure

Using the cutting template provided, line up the precise location of the device on the control panel. If possible, it should be at eye-level. Ensure that there is sufficient clearance above for the “parking position”. Punch the corners and drill, 12-13 mm hole diameter.

IMPORTANT

Measurements on photocopied cutting templates will vary from the original.

Use stamping tool or keyhole saw to prepare the cut-out as shown in the drawing. The control panel should be 2-3 mm thick. Before inserting the device into the cut-out, push the seal evenly into the groove around the lip of the device. The controller is fastened to the control panel from behind with the shackles and screws, by a second person if necessary.

4.3 Electrical installation

WARNING

- ***Bind together wires at a distance of 30 mm from the terminal with cable ties. It must not be possible for live wires to come into contact with low voltage terminals if they should come loose.***

The connections are shown on the wiring diagrams (see page 65, 66, 67).

4.3.1 Electrical installation of the Cool-Control D (control panel mounted)

WARNING

- ***Electrical wiring must be carried out after the device has been installed in the control panel.***
- ***The device must be disconnected from the mains when it is dismantled with leads still attached.***

The device has terminals on the back for electrical connections (see page 65). The number and type of terminals depends on the device type.

4.3.2 Electrical installation of the Cool-Control W (wall mounted)

Opening the device

WARNING

- ***In general only qualified personnel should open the device.***
- ***Ensure before opening the device (e.g. for servicing) that the power supply is disconnected and cannot be reconnected while work is being carried out on the device.***
- ***The device should generally be opened only when mounted on the wall or in a control panel.***

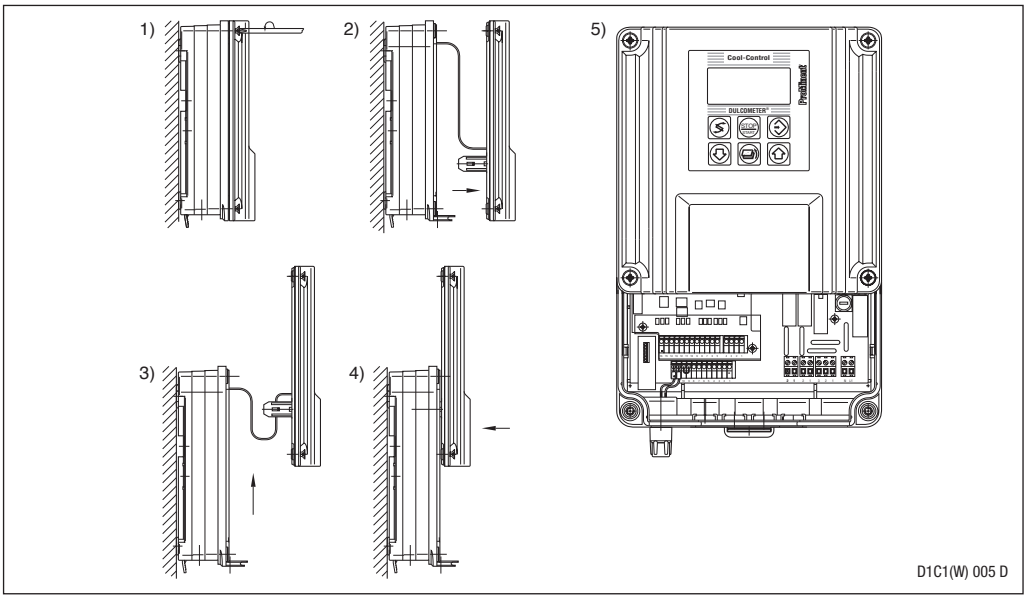
► To open the housing, first unscrew the four countersunk screws (permanently attached).

► The upper section is attached to the lower section by snap-on catches. The housing can be opened by pulling the front section forwards. This will release the catches.

► Slide the rails of the upper section into the insert approx. 100 mm higher up - it is now in the “parking position” (see diagram). The fuse and the connection terminals are now easily accessible.

Control of the biocide pumps:

- Biocide pump 1: Controlled by hook-up function.
- Biocide pump 2: Connect a bromide sluice to the power supply for the pump or solenoid valve.



Electrical installation of wall-mounted device

Firstly break open the same number of threaded cable bushes as there are cables.

Special tools are provided to break open the bushes.
Use the following tools:

- Back row (Fig. 1): screwdriver DIN 5262-B, size 1 (ø 4.5 mm)
- Front row (Fig. 2): screwdriver DIN 5262-B, size 0 (ø 3.0 mm)

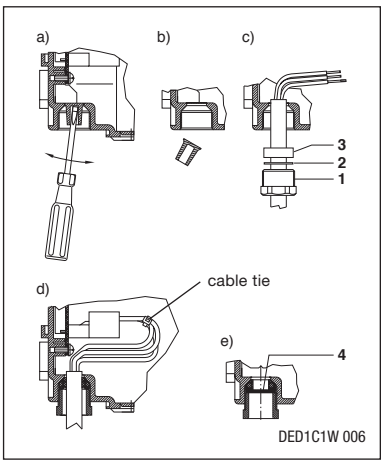


Figure 1 : Back row

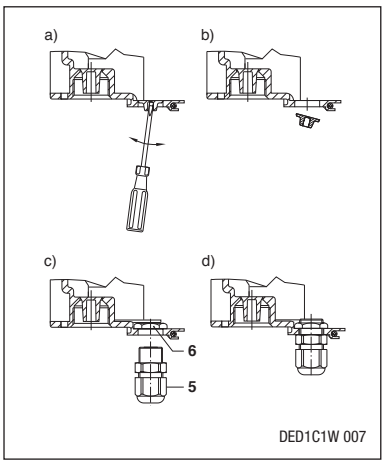


Figure 2: Front row

- ▶ Strip cables to a suitable distance (depending on position of terminals). Push threaded connectors (1), compression collar (2) and seal (3) over cable and insert into threaded cable bushes.

- ▶ Screw in threaded connectors and tighten with SW 19 spanner. Cut the wires to the exact length, strip to approx. 7 mm and attach to terminals as shown in the wiring diagram.

- ▶ Use connector sleeves for wires if used. Use PG 11 dummy plugs (4) supplied to stop up any unused threaded cable bushes.

Packing list for cable connectors

5 off threaded connector	PG 11	Item **(1)**
5 off compression collar	PG 11	Item **(2)**
5 off sealing collar	PG 11 int. ø 9 mm	Item **(3)**
3 off sealing collar	PG 11 int. ø 7 mm	Item **(3)**
3 off sealing collar	PG 11 int. ø 5 mm	Item **(3)**
2 off sealing collar	PG 11 int. ø 4 mm	Item **(3)**
5 off sealing collar	PG 11 2 x ø 5 mm	Item **(3)**
2 off sealing collar	PG 11 2 x ø 4 mm	Item **(3)**
3 off dummy plug	PG 11	Item **(4)**

Detachable version also includes

4 off threaded connector	PG 7	Item **(5)**
4 off nuts	PG 7 brass, nickel plated	Item **(6)**

The four additional bushes in the front row can be used for PG 7 threaded connectors. All commercially available PG 7 cable fittings can be used (enclosure rating IP 65 compliant) with nuts (brass, nickel plated).

Available from ProMinent as:

1 off PG 7 threaded cable connector, black	Part no. 703896
1 off PG 7 brass, nickel plated nut	Part no. 703819

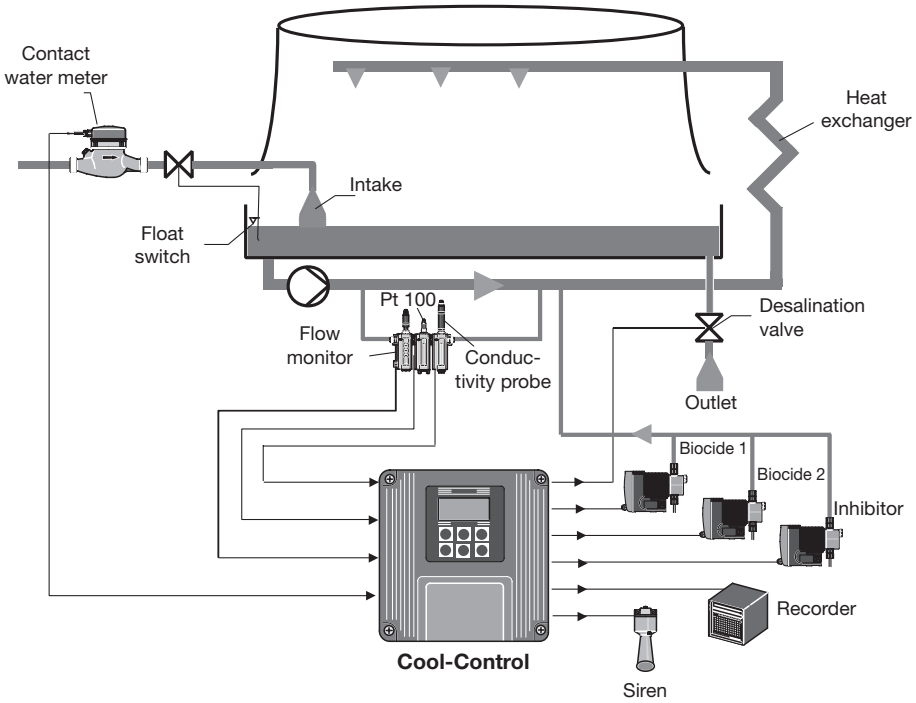
- ▶ Place the PG 7 nut (6) on the inside and screw in the PG 7 threaded connector (5) from the outside (SW15).

Electrical installation of panel-mounted device

Generally only the back row of threaded cable bushes is used in the panel-mounted version. The front row (PG 7 cable bushes) is located outside the control panel. The cable fittings provided are not needed in the panel-mounted version. In this case the individual wires are inserted straight through the holes (no strain relief or seals) and wired according to the wiring diagram. Break open the cable bushes as described in section 4.3.2.

5 Function description

5.1 Description of the function of a cooling tower



The water which evaporates from the cooling tower is replenished via the intake. The water level is kept constant by an independent float switch. The result of these processes is to increase the salt in the recirculating water. Therefore the desalination valve is opened at preset intervals to reduce the salt content. The resulting water loss is supplemented by the intake.

An inhibitor is added in proportion to the volume of the water intake to prevent corrosion and scaling of the cooling tower.

Biocides are metered at regular intervals to prevent the water in the cooling tower from stagnating.

5.2 Function description Cool Control

The DULCOMETER® D1C Cool Control is a compact cooling tower control system capable of performing any function required (desalination, biocide and inhibitor control).

The Cool Control system controls the discharge (desalination) according to the measured conductivity in the water circulation.

It uses an inlet contact flow meter to activate the inhibitor pump in proportion to quantities.

A daily or weekly automatic time switch enables the Cool Control to control up to two biocide pumps independently of each other. It also makes use of locking device functions such has automatic desalination and desalination block.

The Cool Control processes the inductive conductivity input signal, displays the measured value and allocates it to other equipment via a 4-20 mA output.

If e.g. the cooling process is interrupted, the Cool Control regulator can be halted using the pause input.

In the event of a fault it can trigger an alarm device.

A key selection criterion for the Cool Control is the identcode feature “power drive” (see identcode P.5). The differences between using the power relay output and the relay output are displayed in the diagrams below (see also terminal connection diagram P.68 and 69).

At the same time, the following can also be activated:

With “power drive” “G”

- Two biocide pumps or one biocide pump and one bromide sluice
- One solenoid valve as desalination valve

With “power drive” “S”

- One biocide pump
- One motorised valve as desalination valve

The second biocide pump is not applicable here, as two power relay outputs are required to activate the motorised valve.

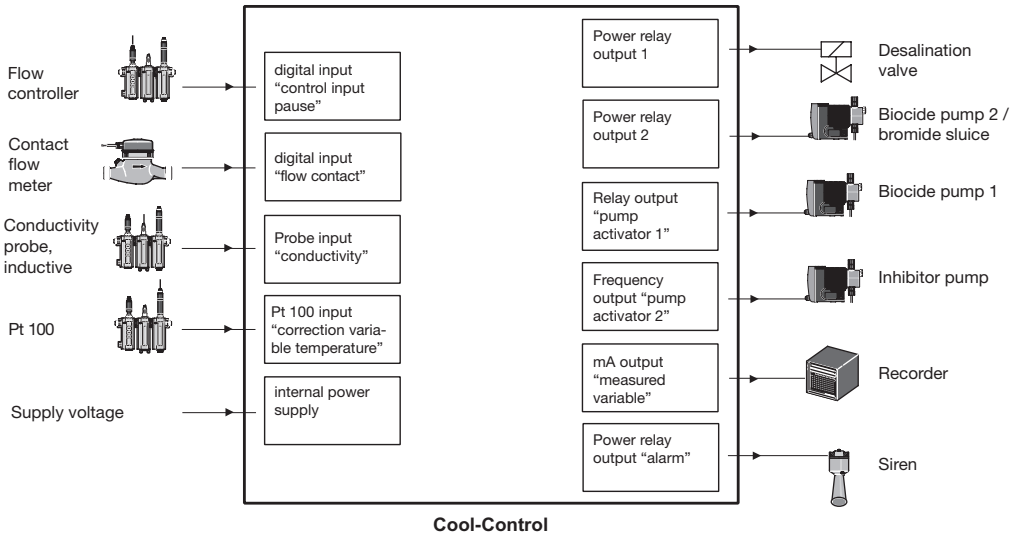


Fig. 1: Inputs/outputs for "Power drive" "G"

Activation of units

With "Power drive" "G"

Unit	Contact input	Connection function	Switch for power supply
Inhibitor pump	x	x	
Biocide pump 1		x	
Biocide pump 2 / bromide sluice			x
Desalination valve = solenoid valve			x
Siren			x

There is an option to activate the inhibitor pump via its contact input or connection function (Cool Control menu setting "Connect inhibitor pump").

The biocide pump 1 must be activated using its connection function, as the Cool Control relay "relay output" is closed when pumping biocide. The biocide pump 2 is activated by a power relay, which connects the pump to the power supply.

Function description

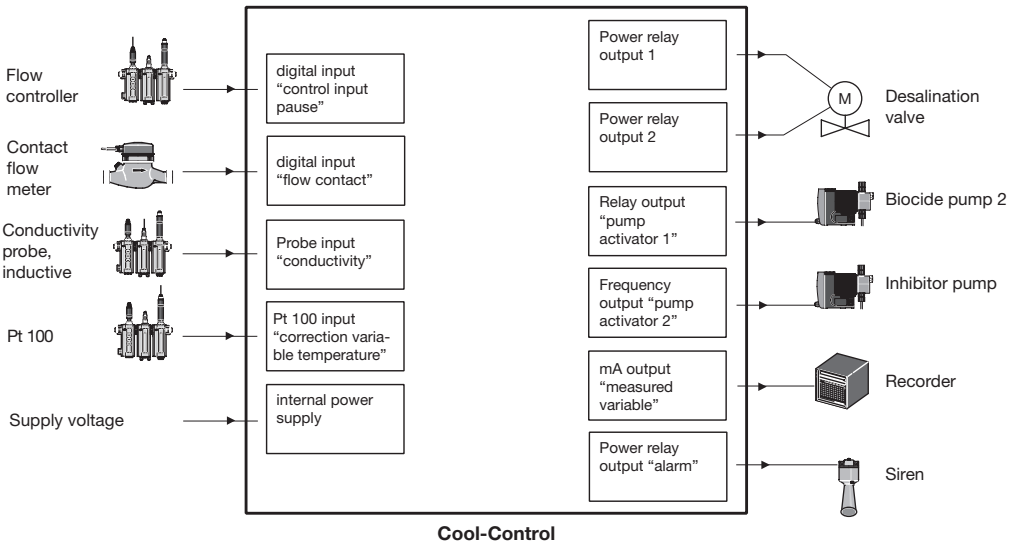


Fig. 2: Inputs/outputs for "power drive" "S"

Activation of units

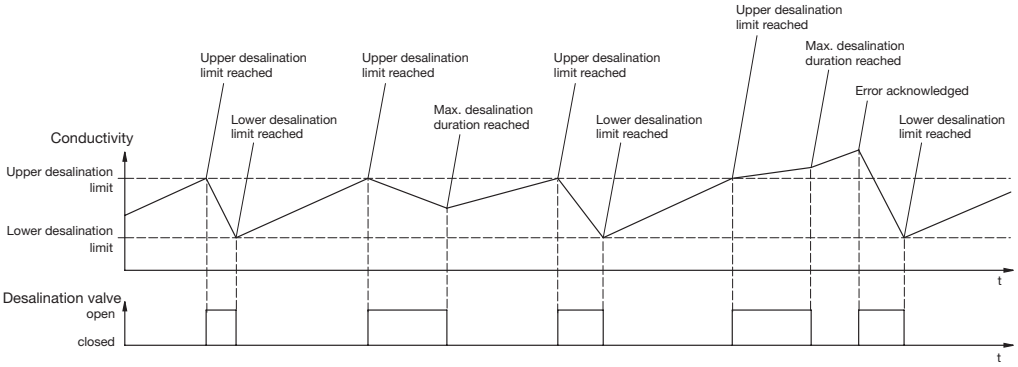
With "power drive" "S"

Unit	Contact input	Connection function	Switch for power supply
Inhibitor pump	x	x	
Biocide pump 1		x	
Desalination valve = solenoid valve			x
Siren			x

There is an option to activate the inhibitor pump via its contact input or connection function (Cool Control menu setting "Connect inhibitor pump").

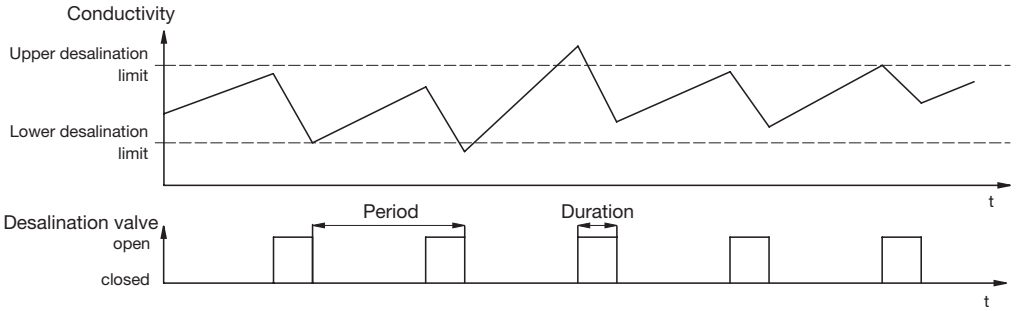
The biocide pump 1 must be activated using its connection function, as the Cool Control relay "relay output" is closed when pumping biocide. The biocide pump 2 is activated by a power relay, which connects the pump to the power supply.

5.3 Description of desalination



The figure above shows the various processes involved in desalination. The desalination valve opens and closes depending on the preset desalination limits. If the conductivity reaches or exceeds the “Upper limit”, the desalination valve opens. The conductivity falls as a result of the level-controlled intake of fresh water. As soon as the conductivity reaches or falls below the “Lower limit” the Cool-Control closes the desalination valve prematurely. If desalination is stopped prematurely and the conductivity exceeds the “Upper limit” the Cool-Control will stop and signal an error.

5.4 Description of emergency mode

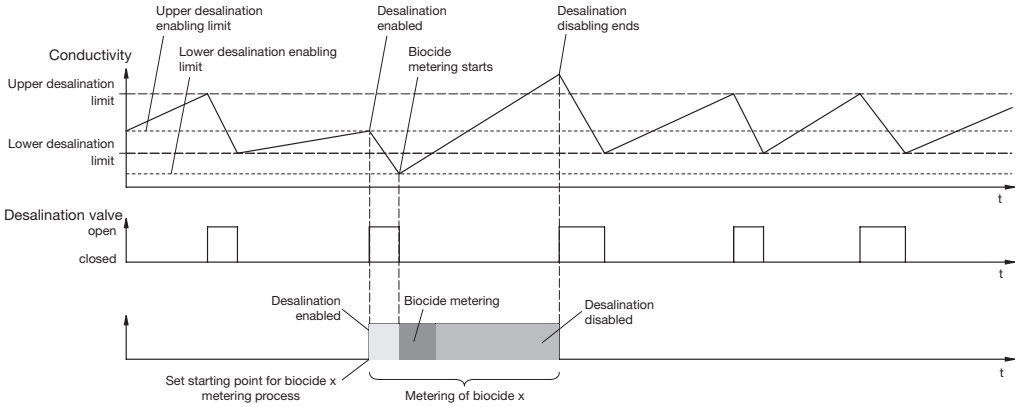


If the conductivity probe fails, the cooling tower can continue to be operated in emergency mode. The Cool-Control then carries out desalination independently of the conductivity probe at preset emergency mode intervals and for preset periods.

5.5 Biocide metering description

The Cool-Control can meter two different biocides. Metering of biocides is timer-controlled in which 10 metering processes are carried out per cycle and cycles can be 1 day or 1, 2 or 4 weeks.

It is possible to enable desalination before biocide metering and disable desalination afterwards.



Desalination enabled

If the conductivity at the starting point of the biocide metering is above the preset upper desalination enabling limit, the Cool-Control will enable desalination up to the lower desalination enabling limit (also variable). Biocide metering is delayed for the duration of the desalination enabling.

Desalination disabled

The desalination valve remains closed during biocide metering and for a period afterwards (to allow the biocide to break down).

5.6 Description of inhibitor metering

The Cool-Control can meter an inhibitor in 4 different ways:

- Contact inhibitor mode
- Periodic inhibitor mode
- %bleed inhibitor mode
- II bleed inhibitor mode

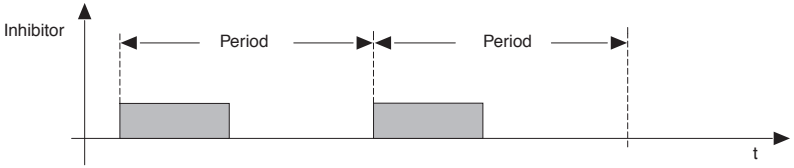
5.6.1 Contact inhibitor mode

In “Contact” inhibitor mode, inhibitor is metered in proportion to the intake water quantity.

A contact water meter in the water intake measures the intake quantity and transmits the signal to the Cool-Control. Both commercial contact water meters and magnetic inductive water meters with contact outputs are suitable for this purpose. In general contact water meters with a pulse length of between 1 - 100 litres are used.

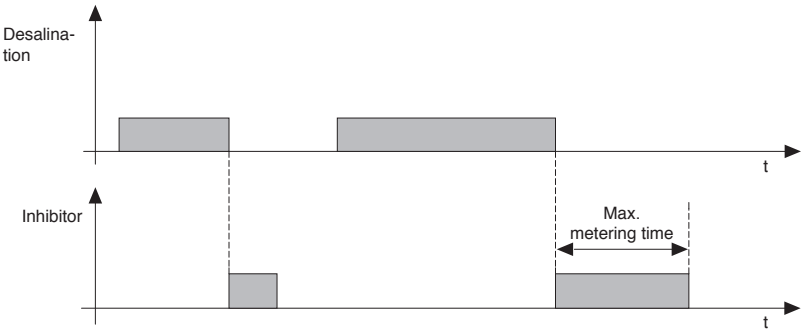
5.6.2 Periodic inhibitor mode

The Cool-Control controls the inhibitor pump periodically. A preset quantity of inhibitor is metered at the start of each period. During desalination, no inhibitor is metered.



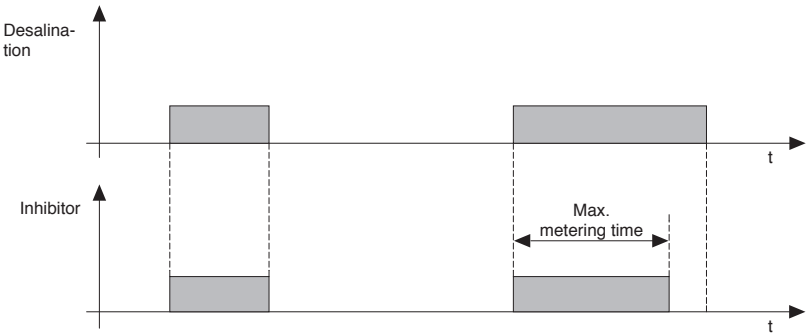
5.6.3 %bleed inhibitor mode

The inhibitor is metered after desalination. The Cool-Control determines the desalination duration and then meters inhibitor in the percentage ratio to the desalination duration which is set under “%bleed”.



5.6.4 II bleed inhibitor mode

Inhibitor is metered in parallel with desalination.



5.7 Mechanical construction

The Cool-Control is delivered in panel or wall mounted variants.

5.7.1 Panel mounting in accordance with DIN 43700 (96 x 96 mm)

The Cool Control D is a device for mounting into a control panel in accordance with DIN 43700, measuring 96 x 96 mm, depth 140 mm. The device is completely housed in either a control panel or a housing. The device is electrically connected directly via terminals on the back.

The terminals project out of the back of the device.

Shackles are provided on the outside of the housing to fix the device into the control panel.

The front section holds the display circuit with the graphical display. It has six control keys and a transparent display window.

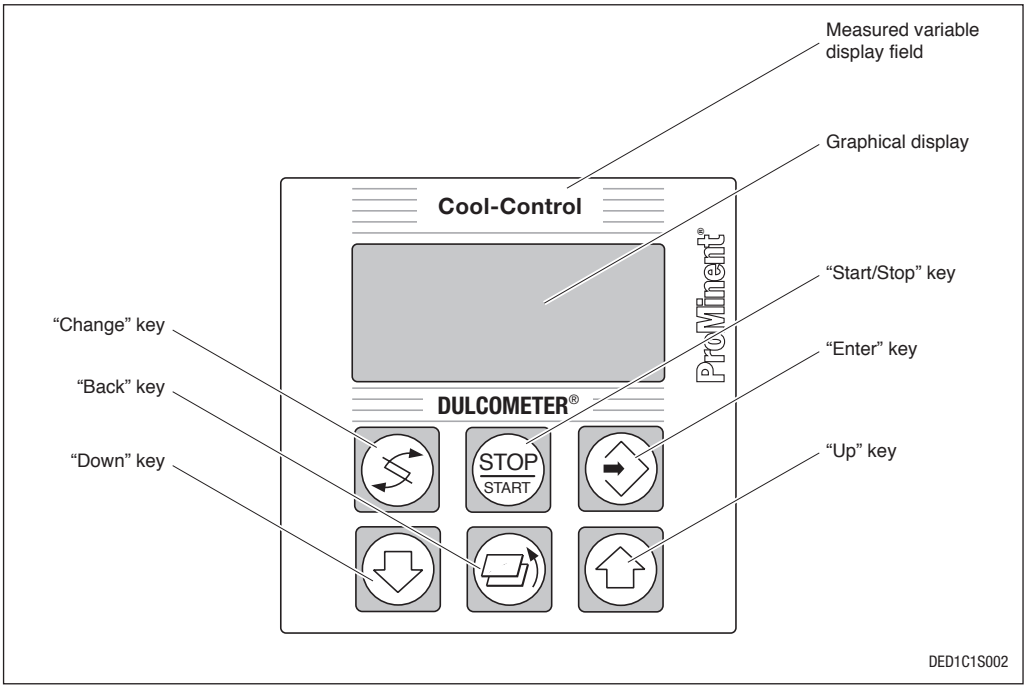
5.7.2 Wall mounting

The Cool Control W can be either wall or panel mounted (panel mounting assembly kit part no. 792908). The robust plastic housing comprises an upper and a lower section. The upper section holds the graphical display and a transparent window. The processor, mains and options circuit boards are situated in the lower section. A ribbon cable connects the circuitry to the display. The device is electrically connected via cable bushes on the underside of the housing, which are broken open as required. A bracket for easy wall mounting is attached to the back of the housing.

5.8 Electrical construction

The device processes an input signal taking into account the correction variable and user information. The result is displayed and transmitted to other devices via a standard signal output.

6 Device overview / Control elements

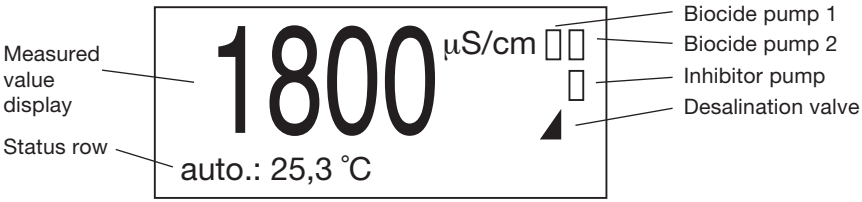


	CHANGE key Change within a menu level and to change from one value to another within a menu option
	START/STOP key Start/stop control and metering function
	ENTER key Acknowledge, confirm or save displayed value or status. Acknowledge an alarm

	UP key Increase a displayed numerical value and change a value (display flashes)
	BACK key Exit operating menu (return to the start of that setting)
	DOWN key Decrease a displayed numerical value and change a value (display flashes)

Device overview / control elements

Permanent display 1



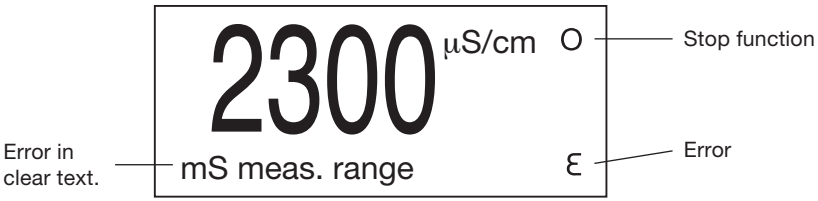
Pump “off”

Pump “on”

Desalination valve “closed”

Desalination valve “open”

Error display

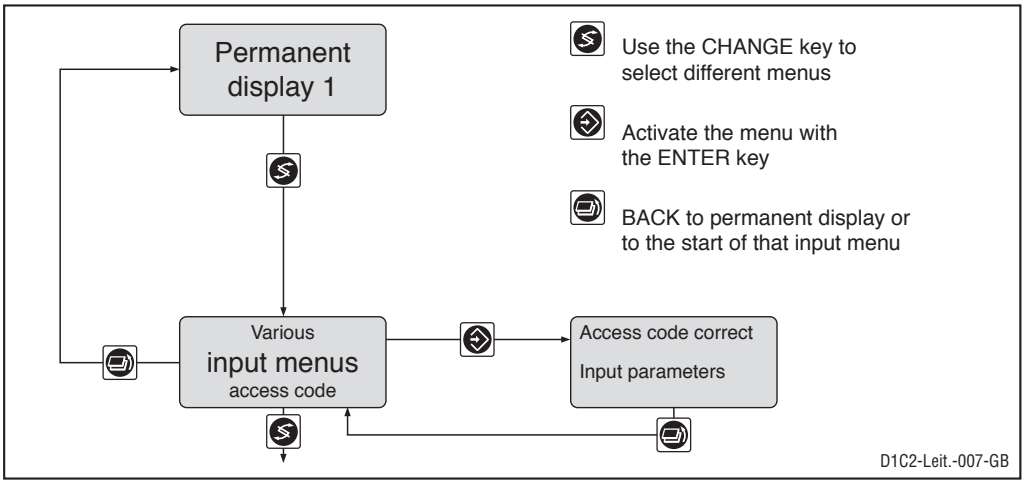


IMPORTANT

The pump control symbols for the Cool-Control have the opposite meanings to those for the DULCOMETER® D1C controllers!

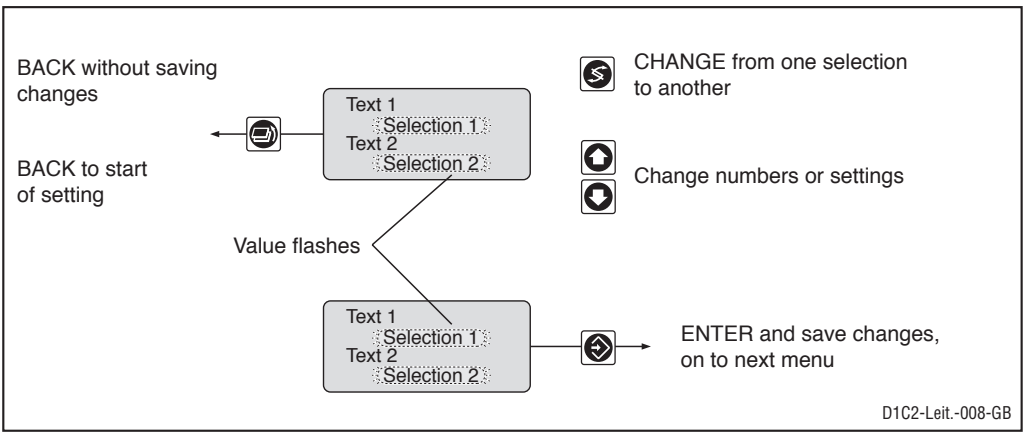
7 Operation

7.1 Operating diagram



NOTE

- ***Access to the input menus can be protected by an access code. Values are then displayed in read-only mode.***
- ***The number and scope of input menus depends upon the device version.***
- ***If the correct access code is entered for an input menu the subsequent input menus are also accessible.***
- ***If no keys are pressed within a period of 10 minutes, the device will automatically exit the calibration menu or input menu and return to permanent display 1.***



7.1.1 Operating menu

The Cool-Control has two different comprehensive settings menus - one “complete” menu and one “restricted” menu. All values can be preset and/or changed in the full menu. The Cool-Control is supplied with the full menu to allow all values to be input during commissioning. The limited menu is intended for normal operating mode. If you need to alter settings, you can access all parameters by switching to the full menu.

7.1.2 Access code

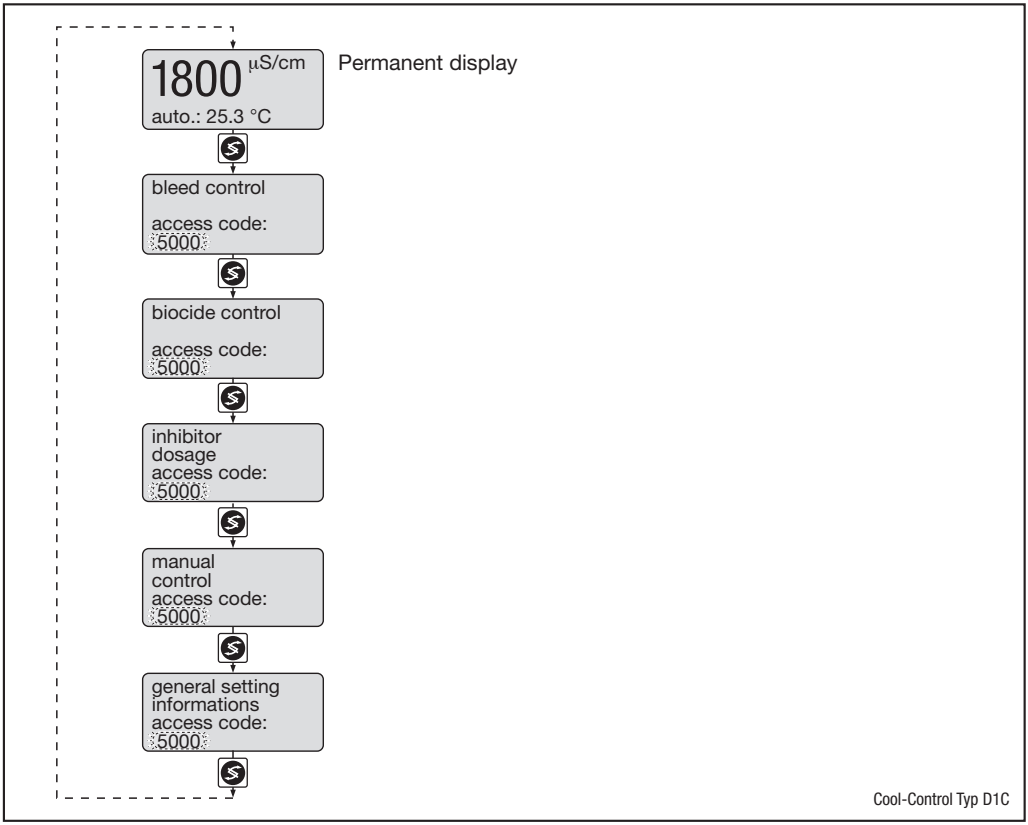
Access to the input menus can be protected by setting an access code. The Cool-Control is supplied with the access code set to 5000, which permits access to the input menus. All menus are accessible, even if an access code is activated, to enable the user to check values. Settings cannot, however, be changed without the code.

7.2 Operating menu, overview

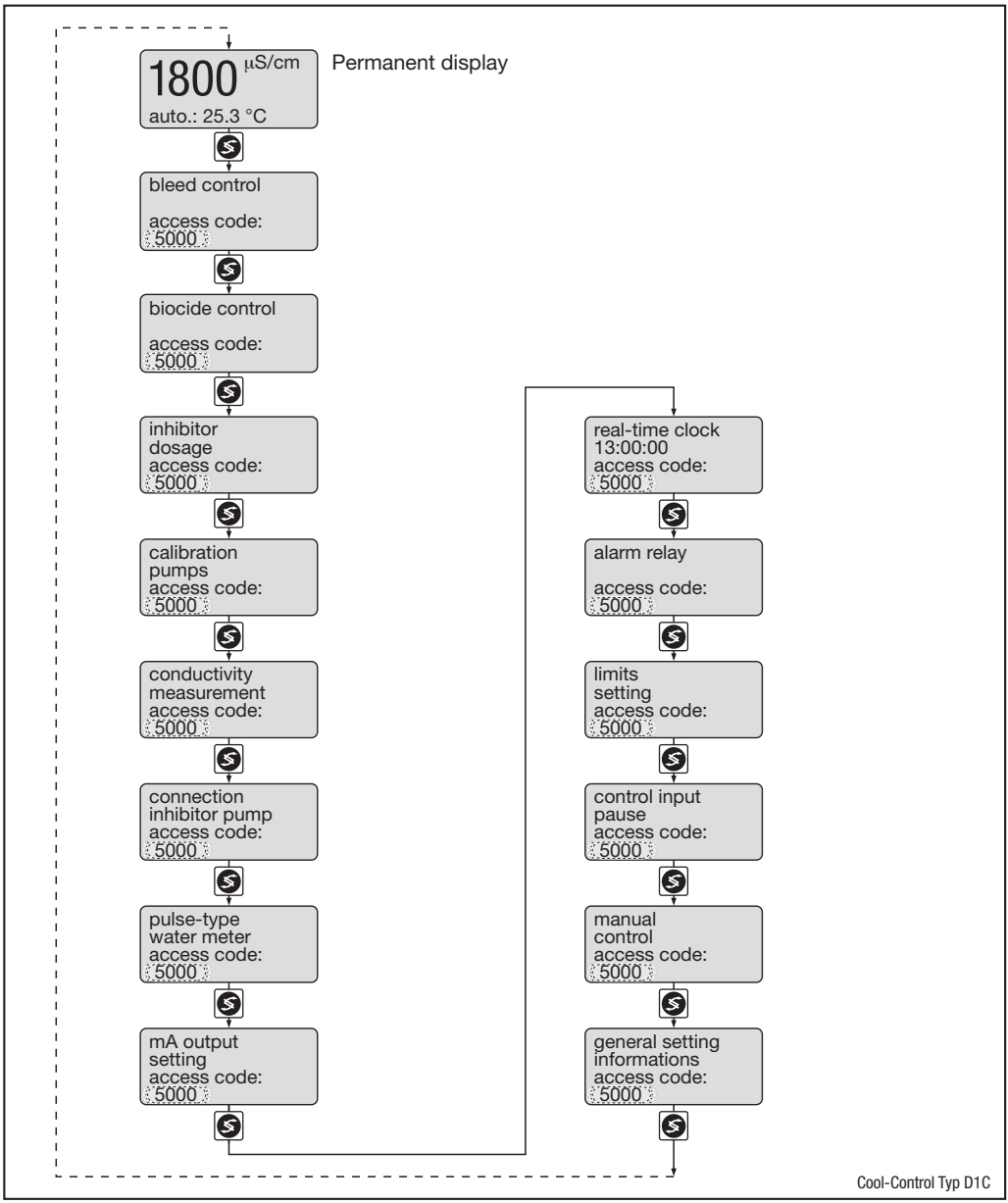
7.2.1 Overview of restricted operating menu

NOTE

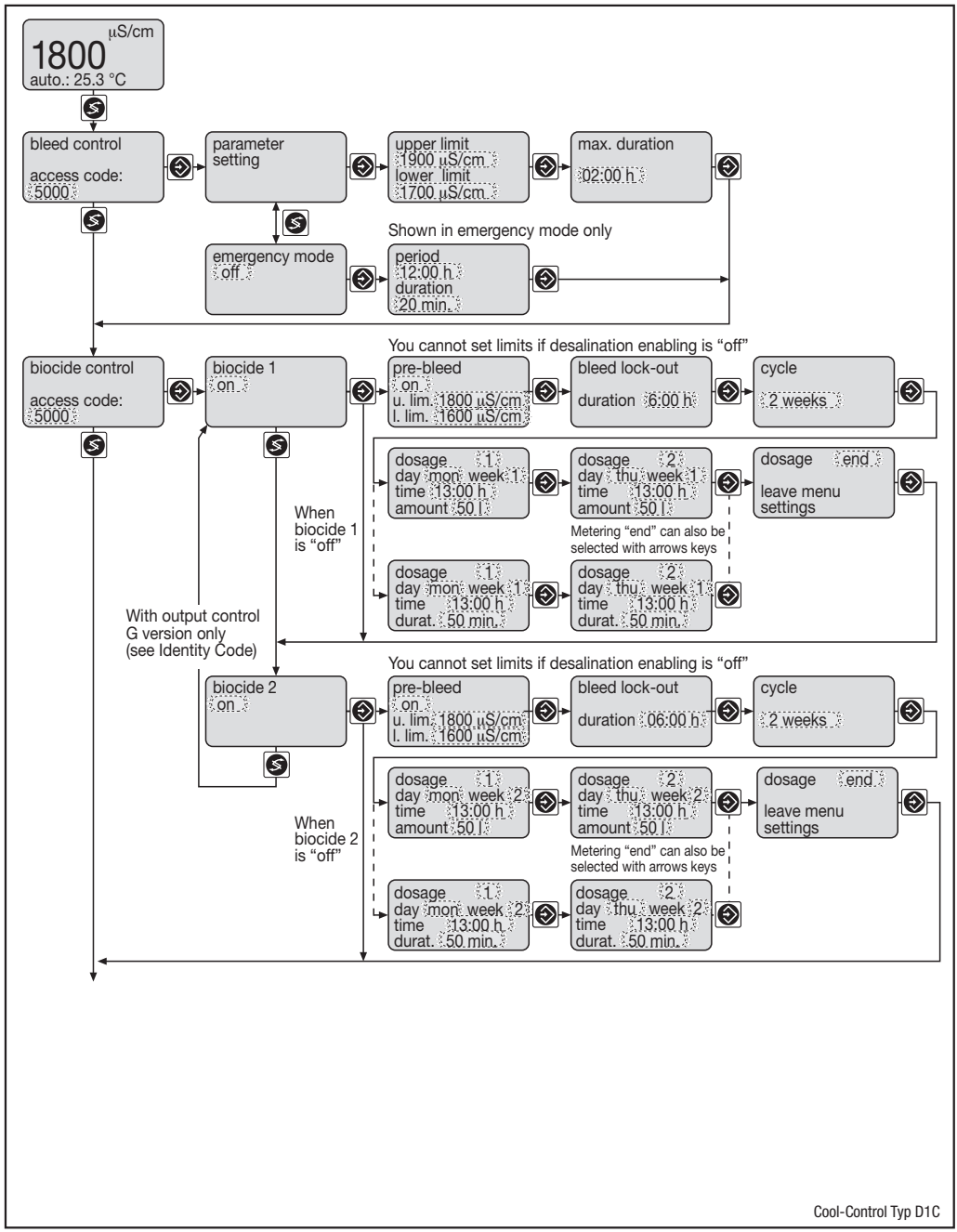
Explanations of the individual input menus are given in the following sections.

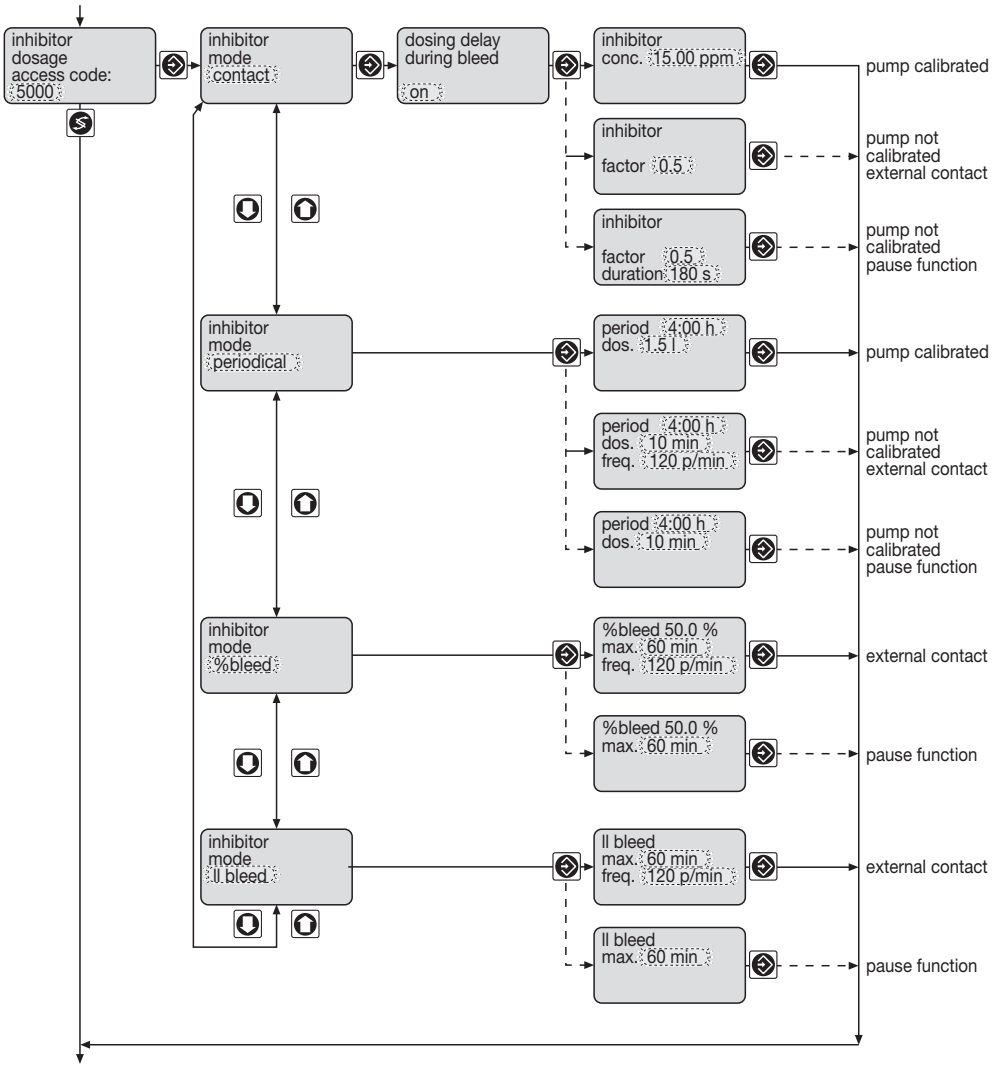


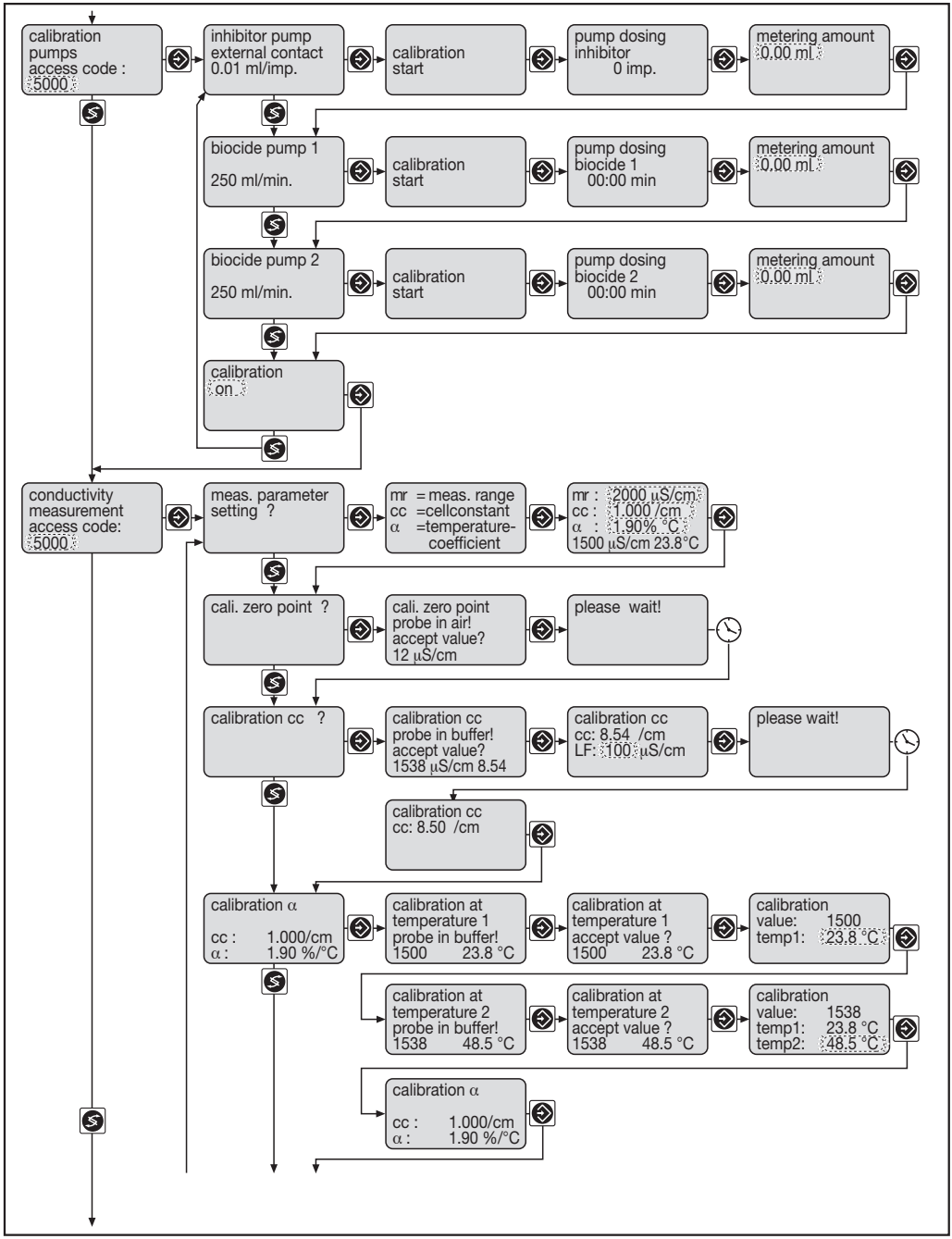
7.2.2 Overview of complete operating menu

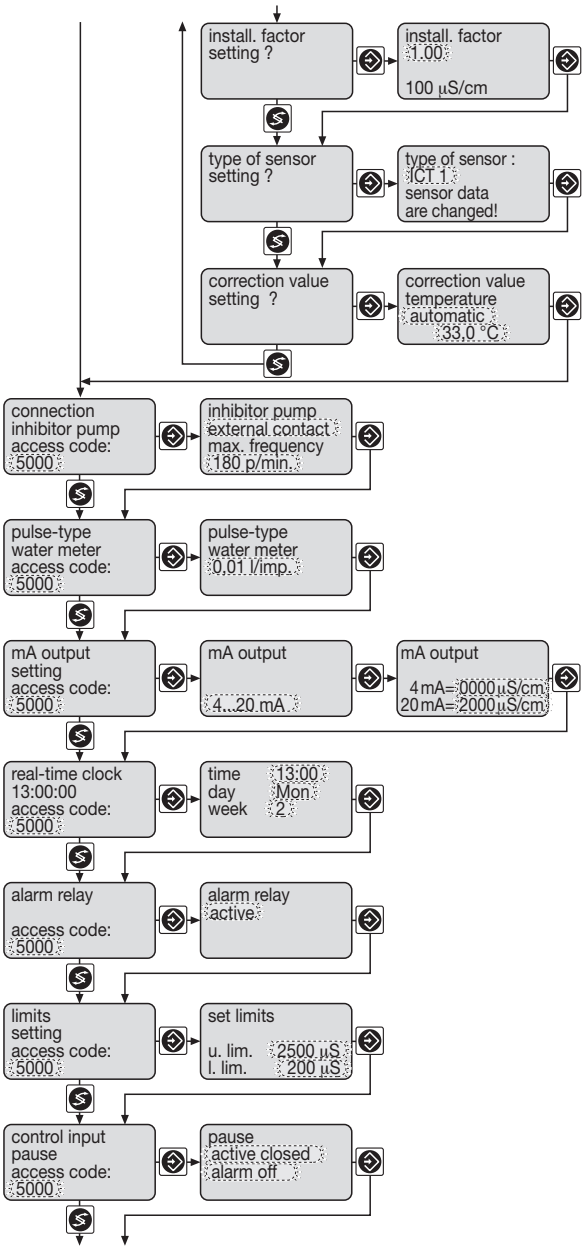


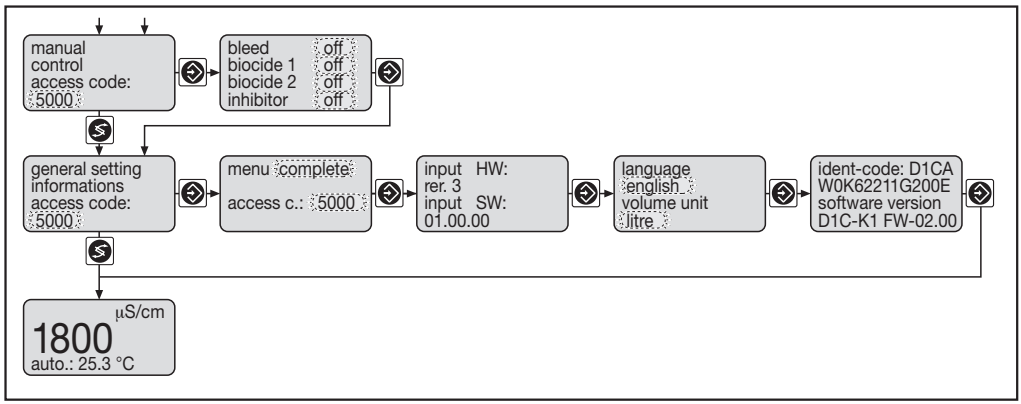
7.2.3 General overview




inhibitor
dosage
access code:
5000
inhibitor
mode
contact
dosing delay
during bleed
on
inhibitor
conc. 15.00 ppm
pump calibrated
inhibitor
factor 0.5
pump not
calibrated
external contact
inhibitor
factor 0.5
duration 180 s
pump not
calibrated
pause function
inhibitor
mode
periodical
period 4:00 h
dos. 1.5 l
pump calibrated
period 4:00 h
dos. 10 min
freq. 120 p/min
pump not
calibrated
external contact
period 4:00 h
dos. 10 min
pump not
calibrated
pause function
inhibitor
mode
%bleed
%bleed 50.0 %
max. 60 min
freq. 120 p/min
external contact
%bleed 50.0 %
max. 60 min
pause function
inhibitor
mode
ll bleed
ll bleed
max. 60 min
freq. 120 p/min
external contact
ll bleed
max. 60 min
pause function

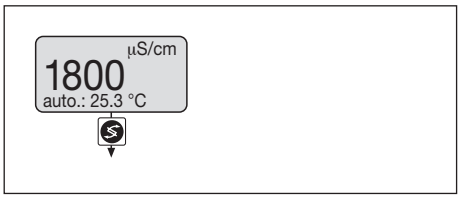

calibration pumps access code : 5000
inhibitor pump external contact 0.01 ml/imp.
calibration start
pump dosing inhibitor 0 imp.
metering amount 0.00 ml
biocide pump 1 250 ml/min.
calibration start
pump dosing biocide 1 00:00 min
metering amount 0.00 ml
biocide pump 2 250 ml/min.
calibration start
pump dosing biocide 2 00:00 min
metering amount 0.00 ml
calibration on
conductivity measurement access code: 5000
meas. parameter setting ?
mr = meas. range
cc =cellconstant
α =temperature-coefficient
mr : 2000 µS/cm
cc : 1.000 /cm
α : 1.90% /°C
1500 µS/cm 23.8°C
cali. zero point ?
cali. zero point probe in air! accept value? 12 µS/cm
please wait!
calibration cc ?
calibration cc probe in buffer! accept value? 1538 µS/cm 8.54
calibration cc cc: 8.54 /cm LF: 100 µS/cm
please wait!
calibration cc cc: 8.50 /cm
calibration α cc : 1.000/cm α : 1.90 %/°C
calibration at temperature 1 probe in buffer! 1500 23.8 °C
calibration at temperature 1 accept value ? 1500 23.8 °C
calibration value: 1500 temp1: 23.8 °C
calibration at temperature 2 probe in buffer! 1538 48.5 °C
calibration at temperature 2 accept value ? 1538 48.5 °C
calibration value: 1538 temp1: 23.8 °C temp2: 48.5 °C
calibration α cc : 1.000/cm α : 1.90 %/°C


install. factor setting ?
install. factor 1.00 100 µS/cm
type of sensor setting ?
type of sensor : ICT 1 sensor data are changed!
correction value setting ?
correction value temperature automatic 33,0 °C
connection inhibitor pump access code: 5000
inhibitor pump external contact max. frequency 180 p/min.
pulse-type water meter access code: 5000
pulse-type water meter 0,01 l/imp.
mA output setting access code: 5000
mA output 4...20 mA
mA output 4 mA= 0000 µS/cm 20 mA= 2000 µS/cm
real-time clock 13:00:00 access code: 5000
time 13:00 day Mon week 2
alarm relay access code: 5000
alarm relay active
limits setting access code: 5000
set limits u. lim. 2500 µS l. lim. 200 µS
control input pause access code: 5000
pause active closed alarm off



7.3 Description of input menus

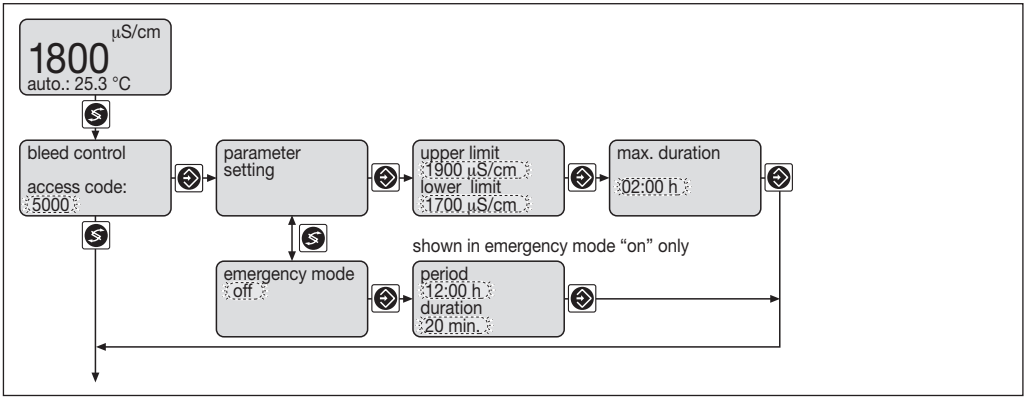
7.3.1 Permanent display



The permanent display shows:

- The conductivity of the recirculating water
- The temperature of the recirculating water (optional)
- The period of desalination disablement remaining after biocide metering (optional)
- The status of connected pumps
- Whether the desalination valve is open or closed
- Emergency mode if the Cool-Control is operating in emergency mode.

7.3.2 Desalination control



The desalination functions are given in the desalination menu.

Desalination parameters

Parameter	Description	Range
upper limit 2000 µS/cm	The conductivity “upper limit” is the point at which the desalination valve is opened.	0 - 2000 mS/cm
lower limit 1000 µS/cm	The conductivity “lower limit” is the point at which the desalination valve is closed.	0 - 2000 mS/cm
max. duration 02:00 h	The desalination period is monitored. If the “max. duration” time is exceeded during desalination the desalination valve is closed.	0 - 8:20 h

Parameters for emergency mode

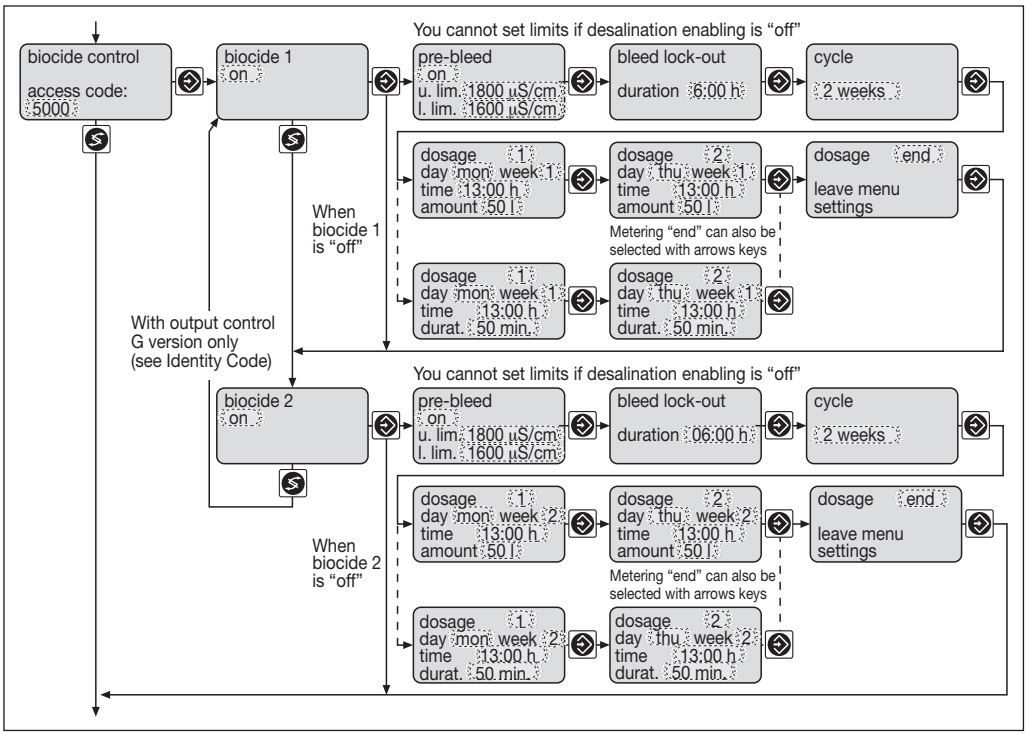
Parameter	Description	Range
emergency mode off	Emergency desalination is carried out at regular intevals in emergency mode “on”.	on / off
periode 12:00 h	The duration of the periods in the desalination cycle in emergency mode.	0 - 72:00 h
duration 20 min.	The duration of the desalination in emergency mode.	0 - 500 min

All desalination control and emergency mode parameters can be set in the “Desalination control” input menu (explanation of terms see section 5 “Function description”).

IMPORTANT

- ***If the “Maximum duration” period has elapsed before the conductivity has reached the “Lower limit”, desalination will be stopped prematurely and a warning will be given.***
- ***If the Cool-Control has stopped desalination prematurely and the conductivity has exceeded the “Upper limit”, the Cool-Control will stop and give an error message.***

7.3.3 Biocide control



Parameters for biocide metering

Parameter	Description	Range
biocide 1 on	A biocide pump is controlled via the Cool-Control's biocide output. The user can program a maximum of 10 metering events.	on / off
pre-bleed on	Desalination can be enabled before biocide metering if the conductivity in the cooling tower exceeds the upper limit.	on / off
pre-bleed u. lim. 0 µS/cm	u. lim. = upper limit	0 - 2000 mS/cm
pre-bleed l. lim. 0 µS/cm	Desalination is ended when the conductivity in the cooling tower falls below the lower limit (lower limit)	0 - 2000 mS/cm
bleed lock-out duration 6:00 h	After biocide metering, desalination will be disabled for a preset period. Desalination cannot recommence until this time has elapsed.	0 - 72:00 h

Parameter	Description	Range
cycle 2 weeks	The cycle time for the biocide timing is set with the “cycle” parameter. 10 metering events can be programmed into each cycle.	1 day 1 week 2 weeks 4 weeks
dosage 1	The user can input individually 10 metering events. Press the Enter key to call up the menus for the 10 metering events in turn.	1 - 10
day mon	The operator can set the day of the metering.	Mon - Sun
week 1	The user can select the metering week in 2 and 4 week cycles.	
time 13:00 h	The user sets the starting time for the biocide metering.	0 - 24:00 h
amount 50 l	The user sets the feed quantity per biocide dose.	0 - 999.9 l / gallons
durat. 50 min.	If the pump has not been calibrated, the parameter “duration” will be displayed in place of “amount”. This is the length of time that the biocide pump runs during metering.	0 - 250 min.

The same settings can be applied to both pumps, i.e. biocide 1, biocide 2.

NOTE

- ***The Cool-Control uses the same value for the maximum duration of enabled desalination as is set for desalination control (“Max. duration” parameter).***
- ***The “Biocide metering process protocol” sheet in the appendix will provide you with an overview of these metering processes.***

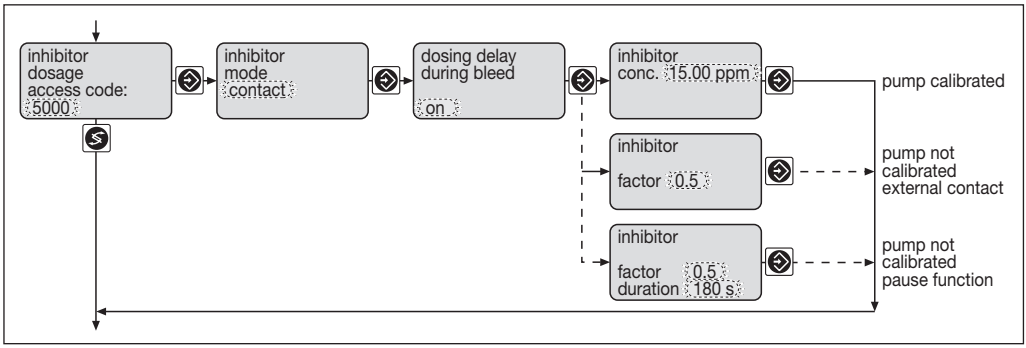
Only one biocide can be metered at a time. If the biocide 2 metering process is activated before the metering process of biocide 1 is completed (e.g. desalination enabled or desalination disabled), biocide 2 metering is delayed.

If the starting points for the biocide 2 and biocide 1 metering processes are the same, the biocide 1 cycle is started and biocide 2 is delayed.

If a new metering process of a particular biocide is activated before the previous process of the same biocide is complete (even if it has already been delayed), the Cool-Control overrides the new metering process and transmits a warning in the permanent display.

The solenoid valve for a bromide sluice can also be activated via the power relay output 2 (for biocide 2). If no more biocide is used, you must switch off “biocide 1”.

7.3.4 Inhibitor metering, “contact” mode



Parameter for Inhibitor metering, “contact” mode

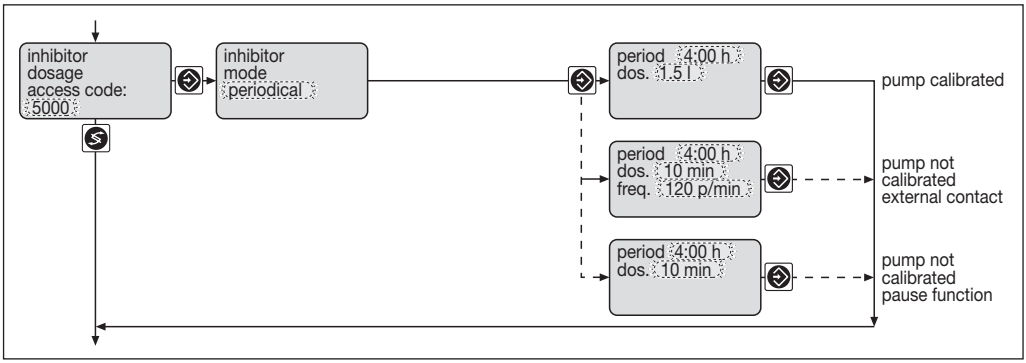
Parameter	Description	Range
Inhibitor mode contact	A contact water meter detects the amount of additional water added for replenishment of the cooling tower. The inhibitor is metered in proportion to the additional water.	
dosing delay during bleed on	No inhibitor is metered during desalination. The water meter pulses are stored and inhibitor metering is delayed until after desalination is complete.	on / off
dosing delay during bleed off	Inhibitor is metered during desalination.	
inhibitor conc. 15.00 ppm	The inhibitor pump has been calibrated and connected via the contact input or the pause function: The concentration (conc.) of the inhibitor is given in ppm (1 ppm = 1 ml inhibitor per 1 m^3 additional water).	0 - 500.0 ppm
*) inhibitor factor 0.5	This display appears if the inhibitor pump has been connected via the contact input and has not been calibrated. The factor is the ratio of the contact water meter pulses to the metering pulses of the inhibitor pump.	0.001 - 9999
*) inhibitor factor 0.5 duration 180 s	This display appears if the inhibitor pump has been connected via the contact input and has not been calibrated. The factor is the ratio of the contact water meter pulses of the inhibitor pump. The length of the metering pulse is set under the “duration” parameter.	Factor: 0.001 - 9999 Duration: 10 - 500 s

*) Do not use this menu if possible. Calibrate the inhibitor pump and set the concentration under conc. in ppm.

IMPORTANT

First, enter the connection type for the inhibitor pump in the “Inhibitor pump connection” input menu and calibrate the inhibitor pump in the “Calibrating pumps” input menu. If using a contact water meter, check the intake volume settings at each contact “l/imp” (“gal/imp”) in the “Contact water meter” input menu.

Inhibitor metering, “periodic” mode

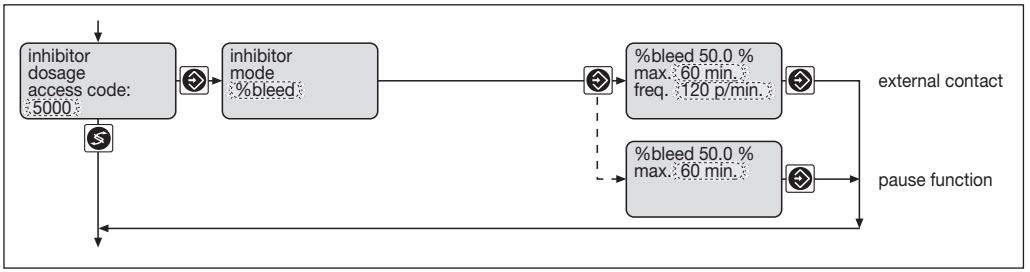


Parameter for Inhibitor metering, “periodic” mode

Parameter	Description	Range
inhibitor mode periodical	The inhibitor is metered at regular intervals.	
period 4:00 h dos. 1.5 l	The inhibitor pump has been calibrated and connected via the contact input or the pause function: The period is the interval between consecutive metering processes. The “dos.” parameter contains the feed quantity value in litres per dose.	period: 0 - 24:00 h dos.: 0 - 99.9 l/gall.
*) period 4:00 h dos. 10 min freq. 120 p/min.	This display appears if the inhibitor pump has been connected via the contact input and has not been calibrated: The period is the interval between consecutive metering processes (Start of metering!) The dos. parameter is the duration of the metering process. The stroking rate is set under the freq. parameter.	period: 0 - 24:00 h dos.: 0 - 180 min. freq. 0 - 500 p/min.
*) period 4:00 h dos. 10 min.	This display appears if the inhibitor pump has been connected via the contact input and has not been calibrated: The period is the interval between consecutive metering processes (Start of metering!) The dos. parameter is the duration of the metering process.	period: 0 - 24:00 h dos.: 0 - 180 min.

*) Do not use this menu if possible. Calibrate the inhibitor pump and enter the “period” and the feed quantity “dos.”.

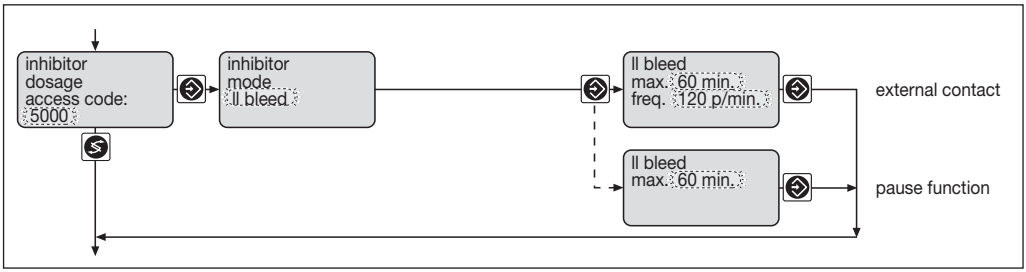
Inhibitor metering, “% desalination” mode



Parameters for Inhibitor metering, “% desalination” mode

Parameter	Description	Range
inhibitor mode %bleed	The inhibitor is metered after desalination at a percentage ratio in relation to the duration of the desalination.	
%bleed 50.0 % max. 60 min. freq. 120 p/min.	The inhibitor pump has been calibrated and connected via the contact input: The “%bleed” parameter determines the percentage ratio of the duration of desalination to the duration of the inhibitor metering. The “max.” parameter limits the uninterrupted metering period to the preset value. Metering stops once this time has elapsed. The stroking rate is set under the “freq.” parameter.	%bleed: 0 - 100 % max.: 0 - 180 min. freq.: 0 - 500 p/min.
%bleed 50.0 % max. 60 min.	This display appears when the pump has been connected via the pause function: The “%bleed” parameter determines the percentage ratio of the duration of desalination to the duration of the inhibitor metering. The “max.” parameter limits the uninterrupted metering period to the preset value. Metering stops once this time has elapsed.	%bleed: 0 - 100 % max.: 0 - 180 min.

Inhibitor metering, “II bleed” mode



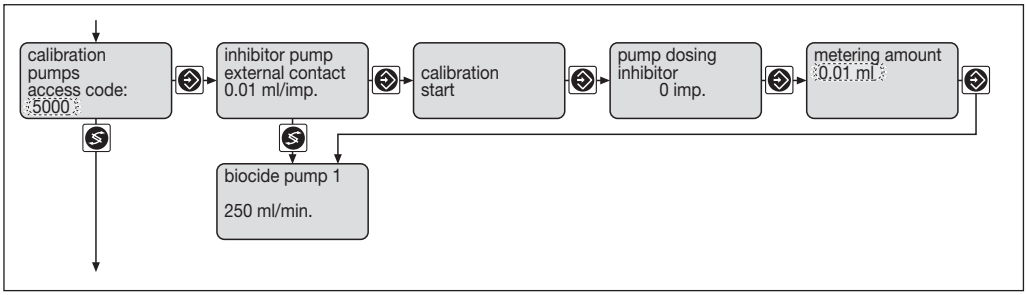
Parameter for Inhibitor metering, “II bleed” mode

Parameter	Description	Range
inhibitor mode II bleed	The inhibitor is metered in parallel to the desalination process.	
II bleed max. 60 min. freq. 120 p/min.	The inhibitor pump has been calibrated and connected via the contact input.: The “max.” parameter limits the uninterrupted metering period to the preset value. Metering stops once this time has elapsed. The stroking rate is set under the “freq.” parameter.	max.: 0 - 180 min. freq.: 0 - 500 p/min.
II bleed max. 60 min.	This display appears when the pump has been connected via the pause function: The “max.” parameter limits the uninterrupted metering period to the preset value. Metering stops once this time has elapsed.	max.: 0 - 180 min.

7.3.5 Calibrating pumps

Calibrate Inhibitor pump (external contact)

Preparation: connect the inhibitor pump to the Cool-Control via the contact input.



Parameters for the calibration of the inhibitor pumps

Parameter	Description	Range
inhibitor pump external contact 0.01 ml/imp.	The menu shows the inhibitor pump control type (external contact = one metering stroke per external pulse) and the result of the last calibration in ml/pulse (ml/metering stroke).	
calibration start	Calibration of the inhibitor pump begins after you press the Enter key.	
pump dosing inhibitor 0 imp.	Calibration is underway. The number of pump strokes carried out is displayed. End the calibration process by pressing the Enter key again after 100 strokes or a max. 1 minute.	
metering amount 0.01 ml	The quantity metered during the calibration is entered into the controller using the arrow keys.	0.01 - 600.0 ml

NOTE

We recommend that you calibrate all connected pumps and set calibration to "on". This makes it a lot easier to commission the Cool-Control.

Selecting inhibitor pumps:

The pumps must be fitted with a contact input.

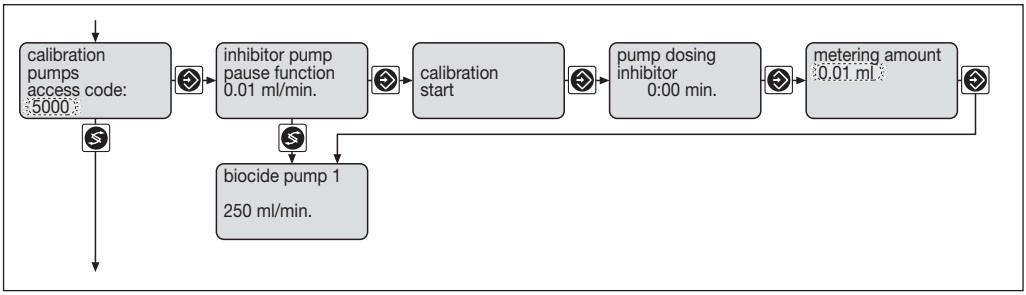
The following pumps can be used:

- Beta® BT4a 1000 - 0220 (0.74 - 32.0 l/h)
- Beta® BT5a 1605 - 0232 (4.1 - 32.0 l/h)
- gamma/ L GALa 1000 - 0232 (0.74 - 32,0 l/h)
- Sigma 1 SICa 12017 - 04120 (17.0 - 120.0 l/h)

The calibration time for pumps with a max. metering capacity of up to 36 l/h must not exceed 60 sec. The calibration time must be reduced for pumps with a metering capacity of more than 36 l/h (e.g.: 72 l/h, maximum calibration time 30 sec.).

Calibrating inhibitor pumps (pause function)

Preparation: connect the inhibitor pump to the Cool-Control via the pause function.



Parameter for the calibration of the inhibitor pumps

Parameter	Description	Range
inhibitor pump pause function 0.01 ml/min.	The menu shows the inhibitor pump control type (pause function = the pump meters as long as the contact is closed) and the result of the last calibration in ml/min. on (1 ml = 0.001 l).	
calibration start	Calibration of the inhibitor pump begins after you press the Enter key.	
pump dosing inhibitor 00:00 min.	Calibration is underway. The calibration period elapsed is displayed. End the calibration process by pressing the Enter key again after 100 strokes or a max. 1 minute.	
metering amount 0.01 ml	The quantity metered during the calibration is entered into the controller using the arrow keys.	0.01 - 600.0 ml

Selecting inhibitor pumps:

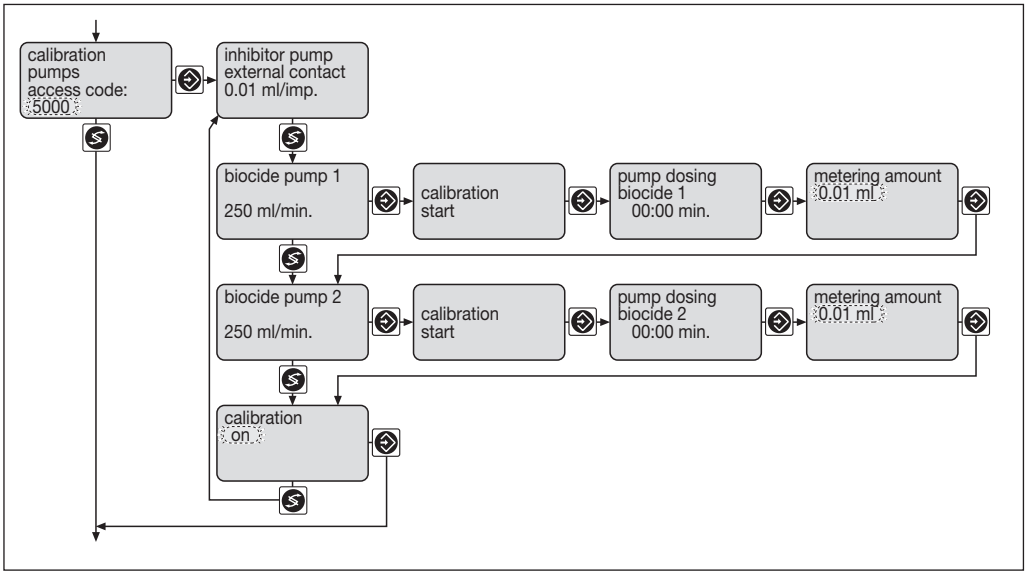
The pumps must be fitted with a pause function.

The following pumps can be used:

- Beta® BT4a 1000 - 0220 (0.74 - 32.0 l/h)
- Beta® BT5a 1605 - 0232 (4.1 - 32.0 l/h)
- gamma/ L GALa 1000 - 0232 (0.74 - 32,0 l/h)
- Sigma 1 SICa 12017 - 04120 (17.0 - 120.0 l/h)

The calibration time for pumps with a max. metering capacity of up to 36 l/h must not exceed 60 sec. The calibration time must be reduced for pumps with a metering capacity of more than 36 l/h (e.g.: 72 l/h, maximum calibration time 30 sec.).

Calibrating biocide pumps



Parameters for the calibration of the biocide pumps

Parameter	Description	Range
biocide pump 1 250 ml/min.	The menu shows the result of the last calibration in ml/min (1 ml = 0.001 l).	
calibration start	Calibration of the biocide pump begins after you press the Enter key.	
pump dosing biocide 1 00:00 min	Calibration is underway. The calibration period elapsed is displayed. End the calibration process by pressing the Enter key again after 100 strokes or a max. 1 minute.	
metering amount 0.01 ml	The quantity metered during the calibration is entered into the controller using the arrow key.	0.01 - 6000 ml
calibration on	Switch calibration to “on” even after each pump (inhibitor, biocide 1, biocide 2) has been calibrated.	on / off

Calibration of biocide pump 2 is carried out in the same way as for biocide pump 1.

IMPORTANT

Protect yourself from hazardous media (protective clothing, safety goggles,…)

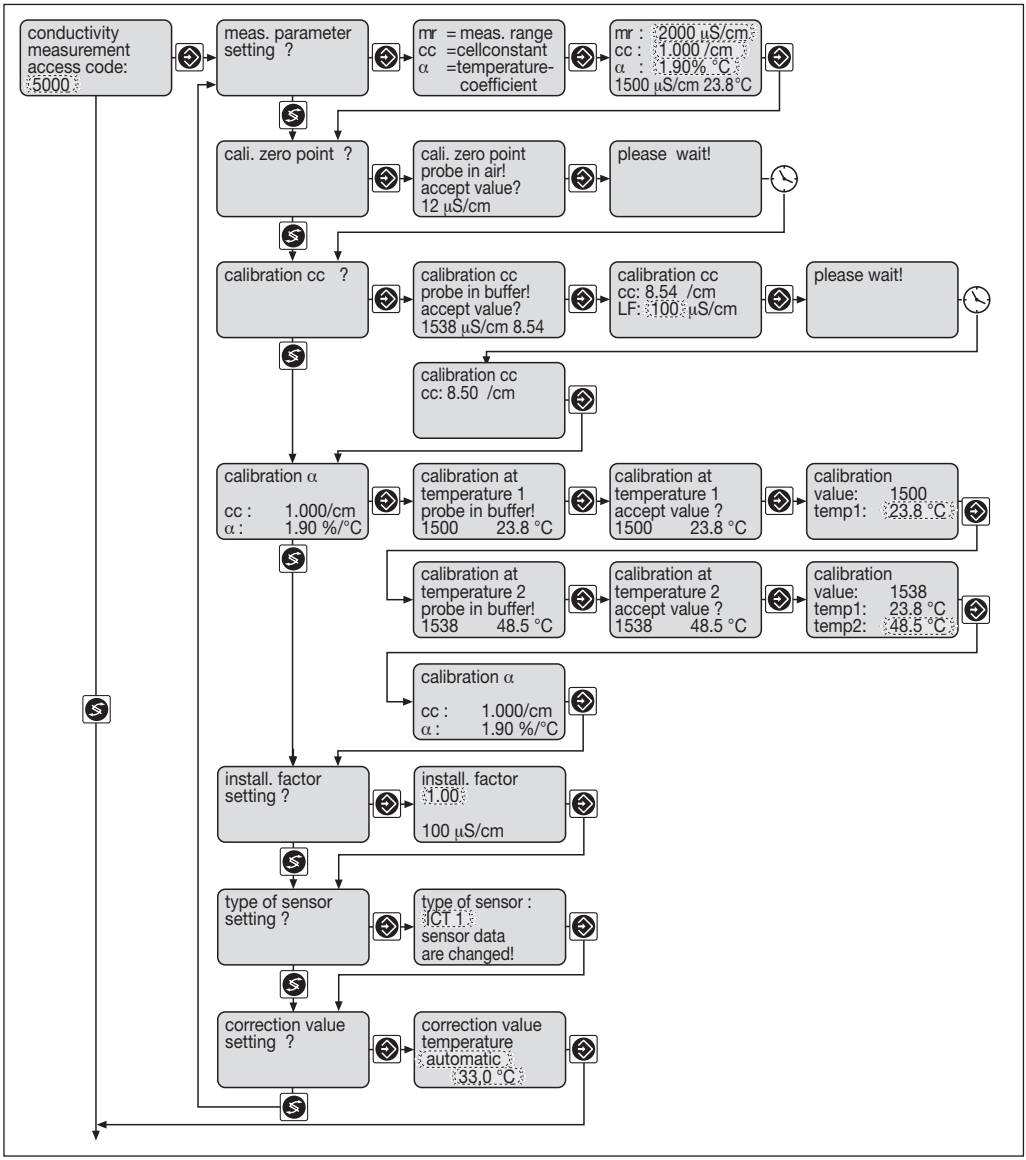
NOTE

- ***If metering in gallons, set the volume unit first in the "General settings"***
- ***If calibrating the inhibitor pump, check that the control type in the "Inhibitor pump connection" input menu is correct.***
- ***If calibrating for the first time, calibrate all pumps before setting the "Calibration" menu option to "on".***

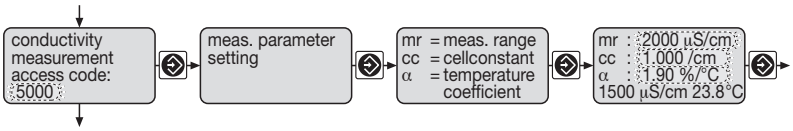
The calibration process is the same for all pumps:

- ▶ Select the required pump in the calibration menu
- ▶ Feed the suction line from the pump into a measuring container containing the feed chemical
- ▶ Select the "Start calibration" menu option
- ▶ Press the "Enter" key
- ▶ Press the "Enter" key again to stop the process after the required period (approx. 1 min.) or number of pulses (approx. 100 strokes)
- ▶ Read off the dosed quantity at the measuring container
- ▶ Enter the metered quantity with the arrow keys.

7.3.6 Conductivity measurement, overview



7.3.7 Conductivity measurement - setting measurement parameters



Parameters for conductivity measurement

Parameter	Description	Range
mr: 2000 µS/cm	Set the required conductivity measuring range.	500 µS/cm 2000 µS/cm 5000 µS/cm 20 mS/cm
cc: 1.000 /cm	Set the cell constant for the conductivity band according to the manufacturer's specifications.	0.0060 - 12.00 /cm
α : 1.90 %/°C	The pre-set temperature coefficient (1.9%/°C) for the sample water should not normally be changed. If the temperature of the sample medium rises, the measured conductivity value is lowered by 1.9% with regard to an α-value of 1.9%/°C.	1.9 %/°C

Set the measuring range in this menu. Set the cell constants of the conductivity probe (refer to your operating instructions) without calibrating and enter the temperature coefficient.

Setting measurement range

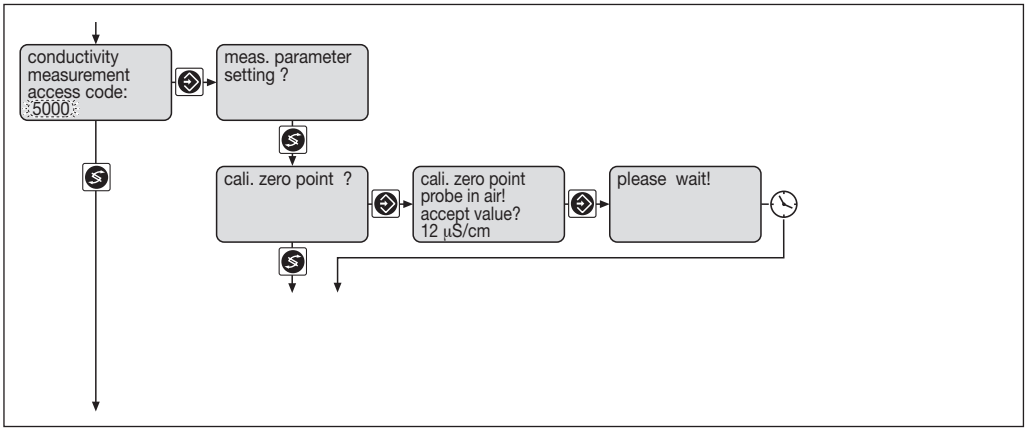
IMPORTANT

If you alter the measurement range, metering stops and the desalination limits ("Upper limit", "Lower limit") in the "Desalination control" input menu, the desalination enabling limits ("u. lim.", "l. lim.") in the "Biocide control" input menu, the values in the "Set limit" and "Set mA output" input menus default to their starting values! Check settings in all menus!

Setting the temperature coefficients of the sample water

It is not generally necessary to change the preset temperature coefficients (1.9 %/°C for water) of the sample water. If it is necessary for any reason, set the temperature coefficients of the sample water at „α“.

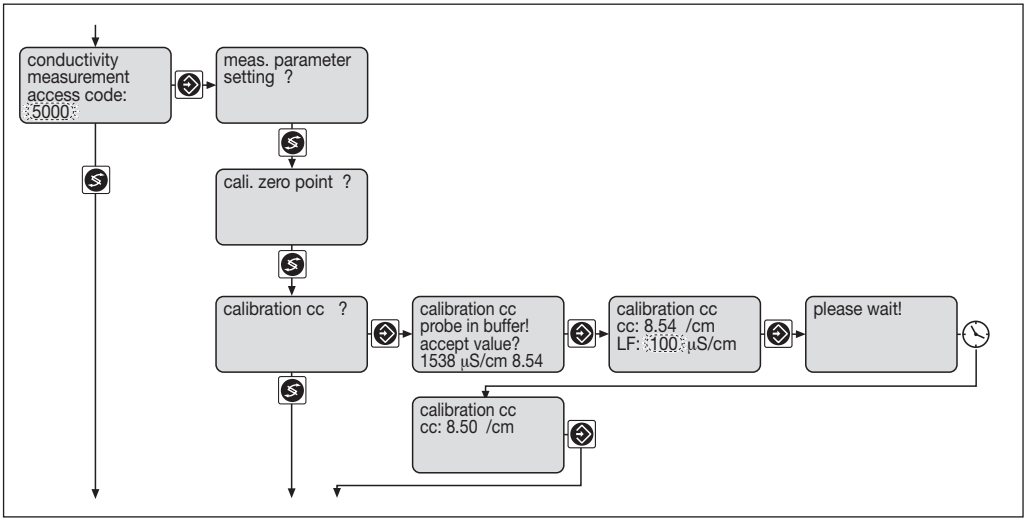
7.3.8 Conductivity measurement - zero point calibration (ZP)



In order to determine the precise zero point (ZP) for the sensor, hold the sensor in the air – in the second menu item, the DULCOMETER® D1C displays the conductivity measured, without zero-point correction. If the value is constant, press the Enter key.

During calibration, dosing is reduced to the basic load set, control is halted and control of limit values and fault treatment is regulated. The output signal of the output “measured value” is frozen.

7.3.9 Conductivity measurement - cell constant calibration (CC)

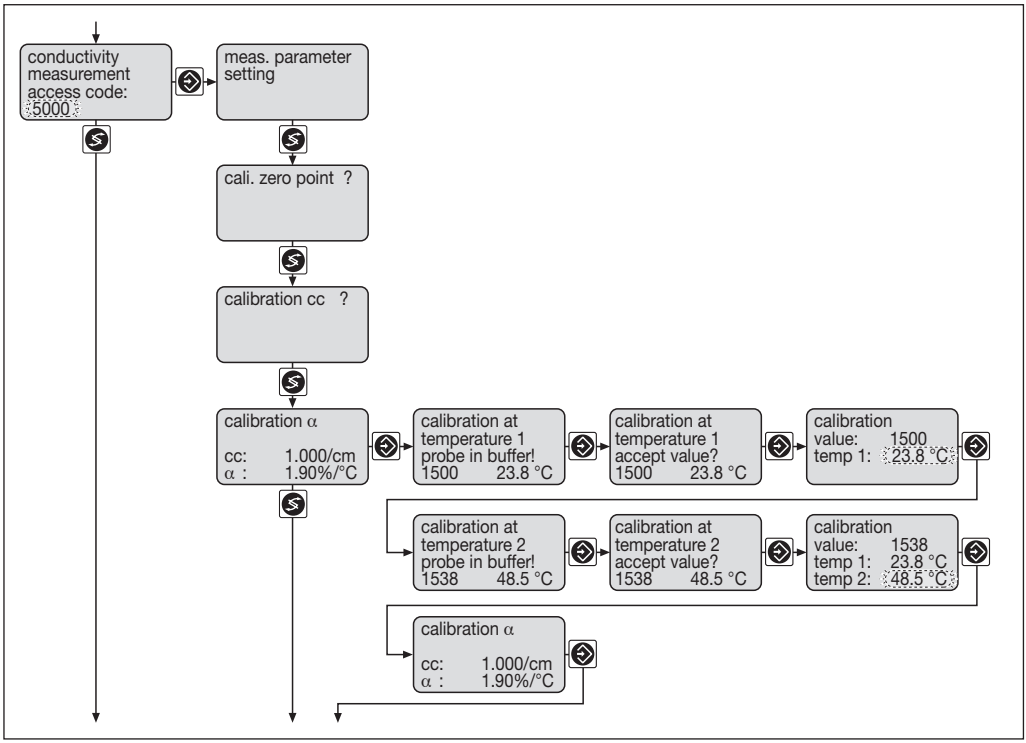


Parameter	Description	Range
Calibrate CC probe in probe! Accept value? 1538 µS/cm 8.54	Immerse the probe in the calibration solution and once the conductivity is stabilised, press the Enter key.	
Calibrate CC CC 8.54 /cm Conductivity: xxx µS/cm	You can manually enter the precise conductivity of the calibration solution here, then press the Enter key and wait.	0-2000 µS/cm
Calibrate CC CC: 8.50 /cm	If the cell constant CC seems reasonable, press the Enter key to save the cell constant.	

In order to determine the precise cell constant (CC), immerse the sensor in a calibration solution (buffer 1) for which the conductivity is known – in the second menu item the DULCOMETER® D1C displays the conductivity it has calculated using the current parameters. If the value is constant, press the Enter key. In the next menu item, enter the conductivity of the calibration solution (arrow key). After you have pressed the Enter key, the D1C displays and saves the newly calculated cell constant.

During calibration, dosing is reduced to the basic load set, control is halted and control of limit values and fault treatment is regulated. The output signal of the output “measured value” is frozen.

7.3.10 Conductivity measurement - calibrating α (only if correction variable = 2 or 4 in the identity code)



Parameter	Description	Range
calibration at temperature 1 probe in buffer! 1500 23.8 °C	Insert the probe in the sample water. Press the Enter key once the conductivity and temperature values are stable.	
calibration at temperature 1 accept value? 1500 23.8 °C	Press the Enter key again.	
calibration value: 1500 temp1: 23.8 °C	The measured values for sample 1 are displayed. If no Pt 100 connected for temperature measurement, enter the temperature for sample 1 manually.	0 - 100 °C
calibration at temperature 2 probe in buffer! 1538 48.5 °C	Increase the temperature of the sample water by 10 to 50 °C. Insert the probe in the sample. Press the Enter key once the conductivity and temperature values are stable.	

Parameter	Description	Range
calibration at temperature 2 accept value? 1538 48.5 °C	Press the Enter key again.	
calibration value: 1538 temp 1: 23.8 °C temp 2: 48.5 °C	The measured values for sample 2 are displayed. If no Pt 100 connected for temperature measurement, enter the temperature for sample 2 manually. Press the Enter key to calculate and display the α-value.	0 - 100 °C

Error message/Warning	Cause	Comment
Temp. difference not ok !	Δ temperature ≥ 10.0 °C Δ temperature ≤ 50.0 °C	
Temp. range limited: xx - 100 °C		With the new temperature coefficient α, temperatures can only be measured correctly within a limited range.

NOTE

- ***It is not generally necessary to change the preset temperature coefficients of the sample water (α = 1.9 %/°C for water). If it is necessary for any reason and α is known, set the temperature coefficients of the sample water under "α" in the "Set measurement parameters" input menu. Only calibrate if absolutely necessary.***
- ***Ensure that "Correction value" is not set to "off" in the "Conductivity measurement - set correction value" menu option.***

Calibration α (temperature coefficient)

The temperature coefficient is determined by a two-point calibration. When you access the "Calibration" menu option:

- System stops (effects of a "Stop", see "Troubleshooting" section)
- The limit value monitor is disabled (see "Set limit values" menu)
- Error processing is interrupted (unless a calibration error occurs)
- The standard signal of the mA output is set to 0/4 mA.

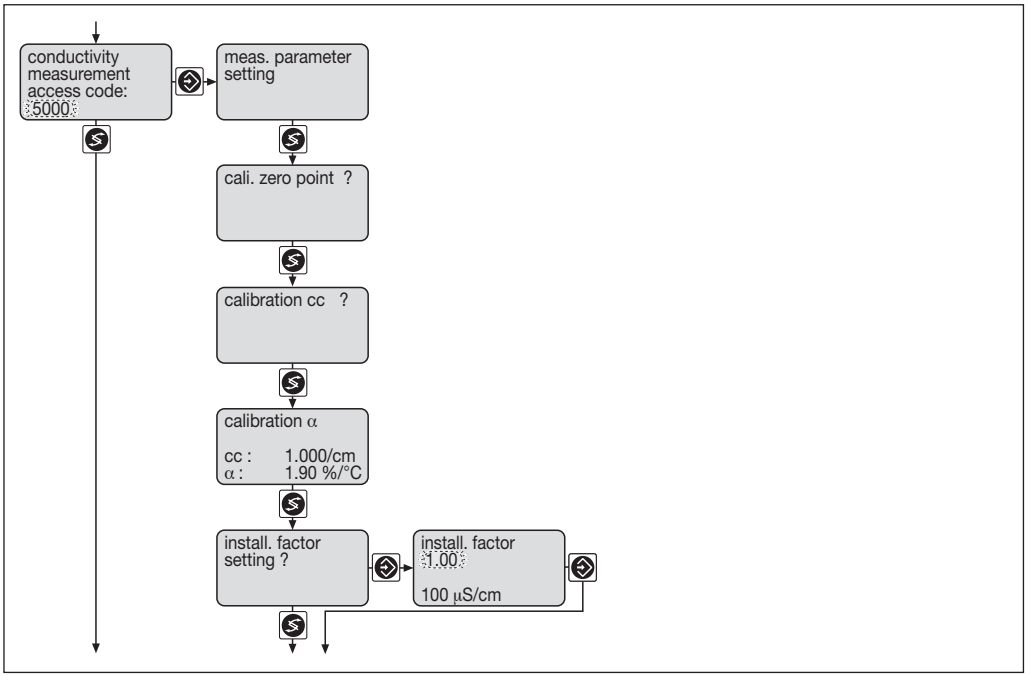
IMPORTANT

Use the same sample water at both temperatures.

- ▶ Check the measurement range in the "measurement parameters setting?" menu
- ▶ Check the cell constant in the "measurement parameters setting?" menu. If it is incorrect, enter the cell constant given on the probe
- ▶ Insert the probe in a container filled with sample water (temperature 1 should be same interval from the subsequent process temperature as temperature 2 in the next calibration stage (interval approx. 5 … 25 °C))
- ▶ Shake air bubbles off the probe

- ▶ If the probe does not incorporate a temperature gauge, insert a temperature gauge in the sample water
- ▶ Wait until the conductivity and temperature values are stable (may be a few minutes)
- ▶ Press the Enter key to confirm the conductivity at “temperature 1”
- ▶ Increase the temperature of the sample water by 10 °C to 50 °C
- ▶ Wait until the conductivity and temperature values are stable (may be a few minutes)
- ▶ Press the Enter key to confirm the conductivity at “temperature 2”
- ▶ The Cool-Control will display the new temperature constant
- ▶ Set the cell constants immediately as described in the “measurement parameters setting” section.

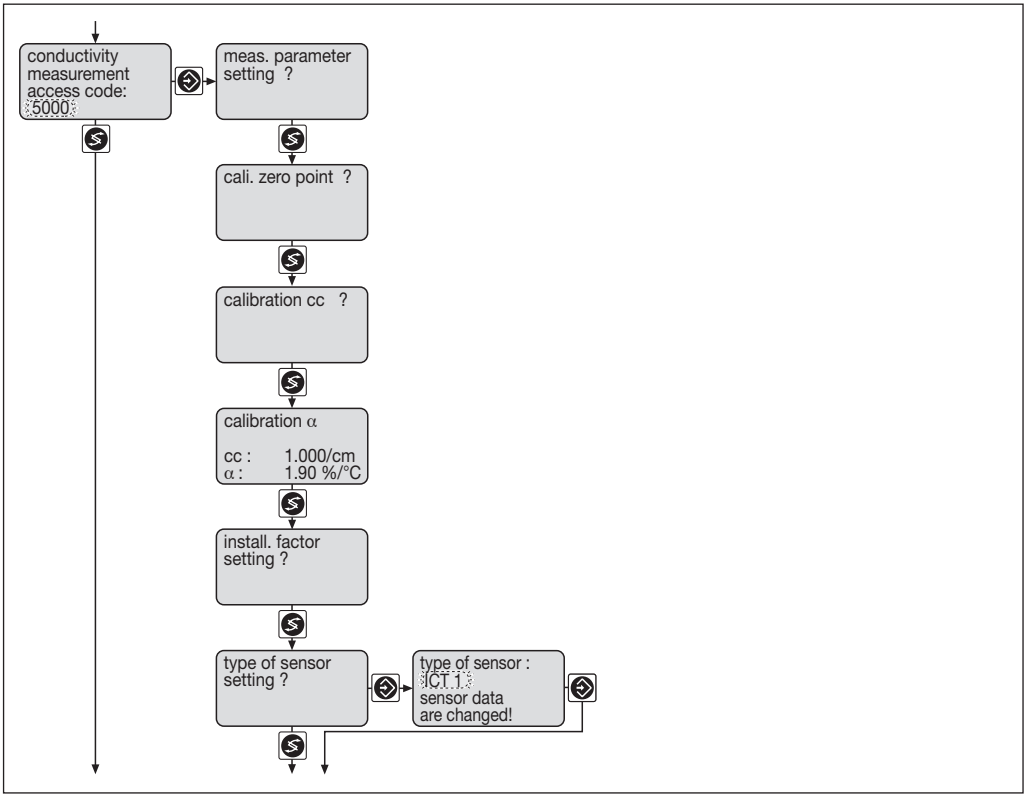
7.3.11 Conductivity measurement – installation factor setting



Parameter	Description	Range
Installation factor 1.00 Accept value? 100 µS/cm	Manually enter the installation factor for the sensor installed.	0.01 – 9.99

Use the sensor documentation data and the installation geometry to determine the installation factor.

7.3.12 Conductivity measurement – type of sensor setting



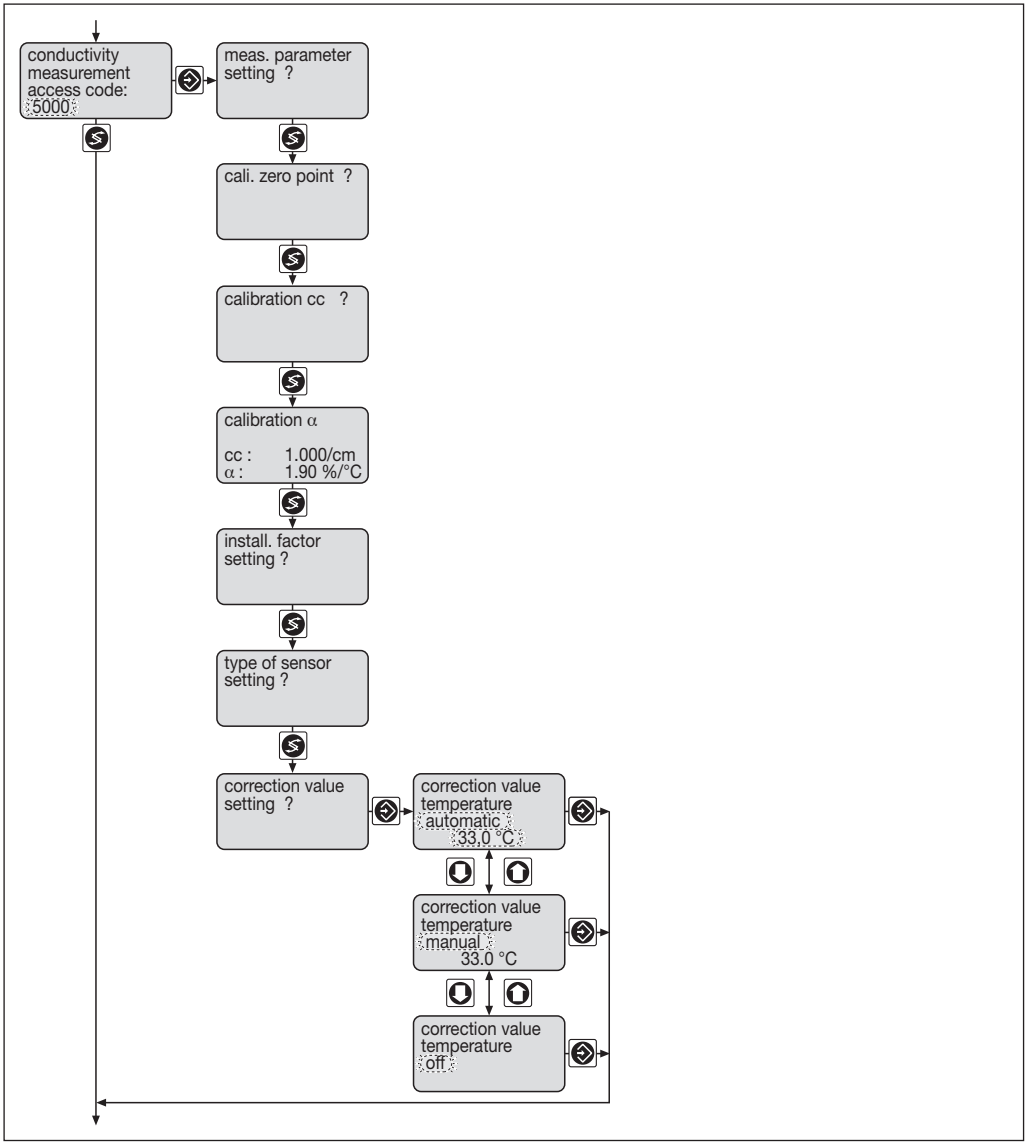
Parameter	Description	Range
Sensor type: ICT 1 Probe data is changed	Select the sensor type used.	ICT 1 ICT 1-IMA ICT 2 ICT 3

When changing the sensor type, the activation parameters already stored in the DULCOMETER® D1C for this sensor type are loaded when you press the Enter key. Dosing and control is then halted. The fault messages relating to the measured variables are deleted.

IMPORTANT

- ***Limit values, reference values and output signals are set to default values***
- ***Check settings in all menus!***

7.3.13 Conductivity measurement - correction value setting temperature compensation (only if correction value = 2 or 4 in the identity code)



Parameter	Description	Range
correcting value temperature automatic 33.0 °C	Temperature compensation is set to “automatic” if the sample water temperature is detected by a temperature sensor along with the conductivity measurement. The measured temperature can be changed to allow resistances to be compensated. For this, the sample water temperature is measured with a manual device and the temperature shown in the menu is compared with this value.	0 - 100 °C
correcting value temperature manual 33.0 °C	Temperature compensation is set to “manual” if the temperature of the sample water cannot be measured with a Pt 100. The actual temperature of the sample water is measured with a manual device and entered here.	0 - 100 °C
correcting value temperature off	No temperature compensation.	

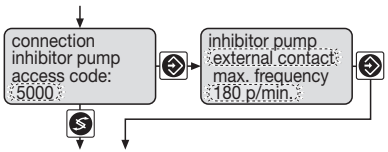
NOTE

- ***If “correcting value” is set to “off”, the display of temperature and temperature coefficient α is omitted from all menus.***
- ***If “correcting value” is set to “automatic”, the temperature value is frozen if you access the “correcting value” menu option.***
- ***Once an offset correction has been entered it is applied consistently then on.***

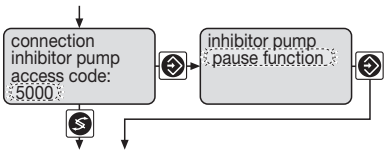
If “correcting value” is set to “automatic”, the temperature displayed is corrected by an offset. If an offset correction has been carried out the display will show “temp. calibrated”.

7.3.14 Connection inhibitor pump

Contact input

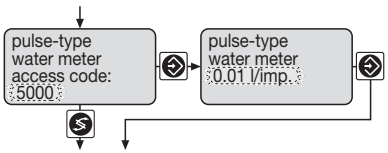


Pause function



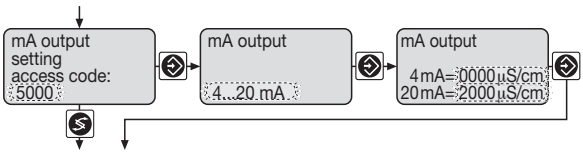
Parameter	Description	Range
inhibitor pump external contact max. frequency 180 p/min.	If the pump is connected to the Cool-Control via the contact input, select “external contact”. One discharge stroke is carried out for every external metering pulse. The maximum stroking rate for the inhibitor pump should be set to below the “max. frequency”.	max. frequency: 0 - 500 p/min.
inhibitor pump pause function	If the pump is connected to the Cool-Control via the hook up function, select “pause function”. The pump meters as long as the contact is made.	

7.3.15 Pulse-type water meter



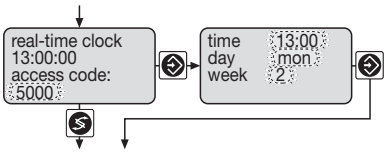
Parameter	Description	Range
pulse-type water meter 0.01 l/imp.	The pulse length for the contact water meter in litres / pulse is entered into the Cool-Control. The value is displayed in the “General settings” menu in litres or gallons, depending on the selected setting.	0.001 - 99.99 l/imp. 0.001 - 99.99 g/imp.

7.3.16 Setting mA output



Parameter	Description	Range
mA output 4.... 20 mA	The conductivity is present in the form of a current signal. Select either 0 - 20 mA or 4 - 20 mA setting.	0....20 mA 4....20 mA
mA output 0 mA = -100 µS/cm 20 mA = 2100 µS/cm	0 - 20 mA: Determines the relationship between conductivity and current signal.	0 - 2100 mS/cm
mA output 4 mA = -100 µS/cm 20 mA = 2100 µS/cm	4 - 20 mA: Determines the relationship between conductivity and current signal.	4 - 2100 mS/cm

7.3.17 Real-time clock

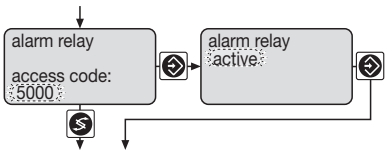


Parameter	Description	Range
time 13:00 day mon week 2	Time settings are carried out in this menu option.	Time: 0:00 - 24:00 Day: Mon - Sun Week: 1, 2, 3, 4

IMPORTANT

- ***The biocide controller timers do not recognize that a real-time clock has been set! The Cool-Control may therefore repeat or omit biocide metering processes. Will not affect an ongoing biocide metering process.***
- ***The timer settings may be lost if the system is disconnected from the mains for a long period.***

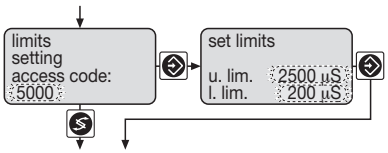
7.3.18 Alarm relay



Parameter	Description	Range
alarm relay active	The user can select the alarm relay function: Alarm relay “active” means that the alarm relay is transmitting a device alarm to an external appliance. Alarm relay “not active” means that the alarm relay is switched off and will remain inactive in the event of a device alarm.	active / not active

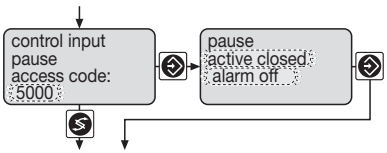
If the alarm relay is “active”, the alarm relay contact is closed if a fault occurs. The contact is opened once the fault has been remedied or acknowledged.

7.3.19 Limits setting



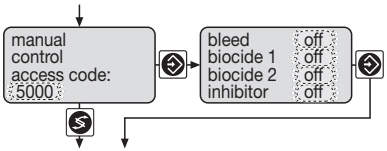
Parameter	Description	Range
set limits u. lim. 2000 µS/cm l. lim. 1000 µS/cm	An alarm or a warning is actuated if values exceed the upper or lower limits (u. lim. or l. lim.)	0 - 2000 mS/cm

7.3.20 Pause control input (only for control input = 1 in identity code)



Parameter	Description	Range
pause active closed alarm off	The “Pause control input” is used to stop the Cool-Control. The input is connected to the flow sensor in the inline probe housing. You can choose whether the “Pause control input” is activated when a contact is made (Active closed) or broken (Active opened). You can also decide whether to activate a warning “Alarm off” or an alarm “Alarm on” (see page 64 and page 80).	active closed / active opened Alarm off / Alarm on

7.3.21 Manual control

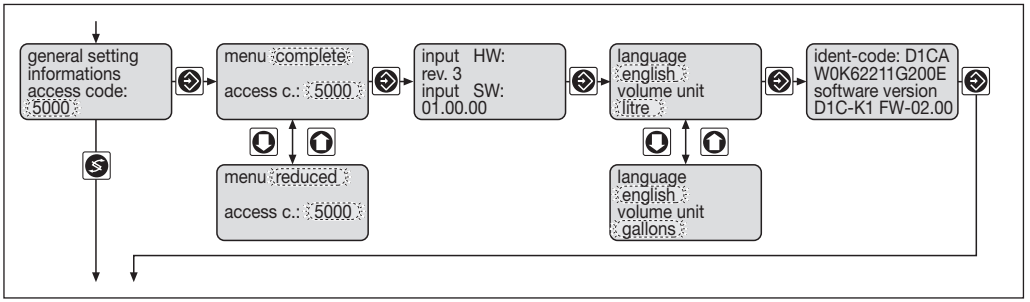


Parameter		Description	Range
bleed	off	The Cool-Control output can be switched on and off manually. After exiting the menus, all inputs are automatically reset to “off” and/or assume the current control function status.	on / off
biocide 1	off		
biocide 2	off		
inhibitor	off		

IMPORTANT

Accessing a menu option activates a “Stop” (see “Troubleshooting”).

7.3.22 General settings



Parameter	Description	Range
menu complete access c.: 5000	A full or limited menu can be displayed. The access code can be changed to prevent unauthorised access to the control parameters.	complete / reduced
language english volume unit litre	You can select one of the following languages - German, English, French and Spanish. The volume unit can be changed from gallons to litres. The temperature unit is automatically adjusted at the same time. If you select litres, the temperature is measured in °C and if you select gallons the temperature is measured in °Fahrenheit.	Language: German, English, French, Spanish Volume unit: Litre / gallons

IMPORTANT

If the volume unit is changed (and confirmed with the Enter key), all values relating to the volume unit revert to default values. You must recalibrate the pump and check whether you need to change the "Biocide controller", "Inhibitor metering" and "Contact water meter" settings in the input menus.

NOTE

When you change the volume unit the temperature unit is automatically changed in the permanent display . However, the temperature unit in the calibration menu is always "°C".

8 Commissioning examples

This section shows how to carry out the necessary settings for metering biocide or inhibitor.

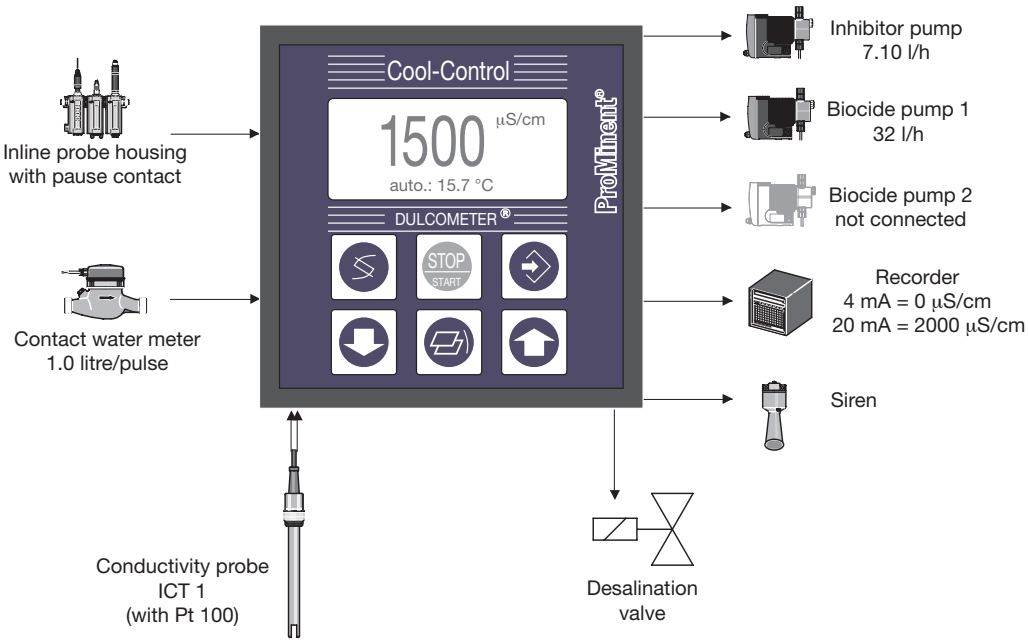
IMPORTANT

You must be familiar with the safety instructions in this operating manual.

NOTE

You must be familiar with chapter 7.

Configuration example

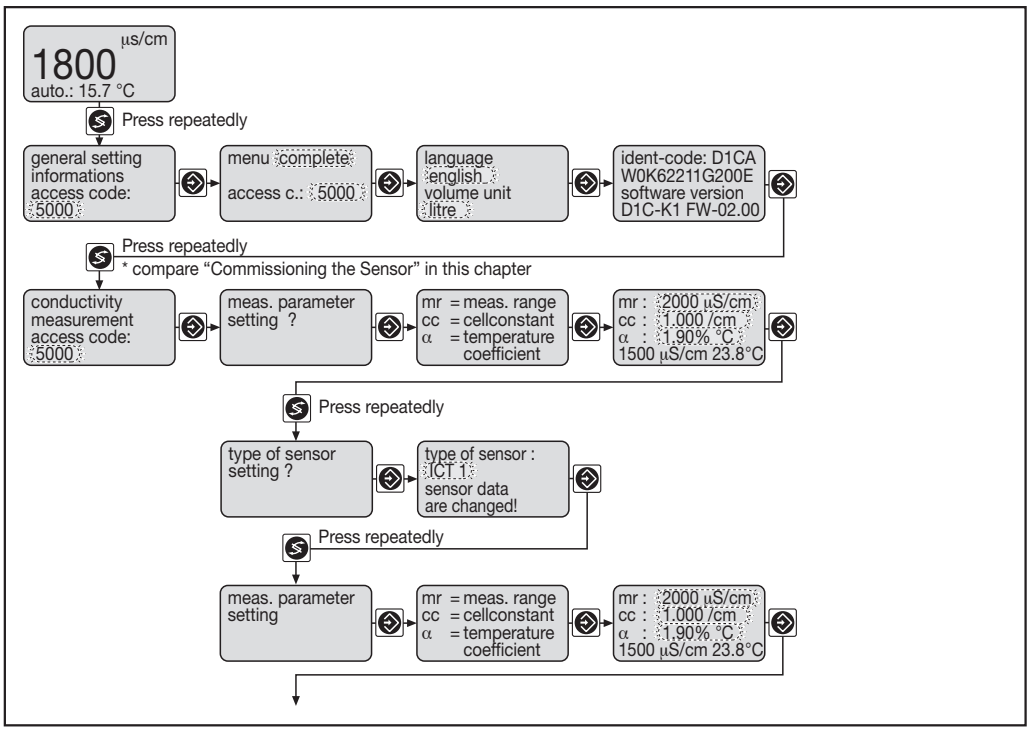


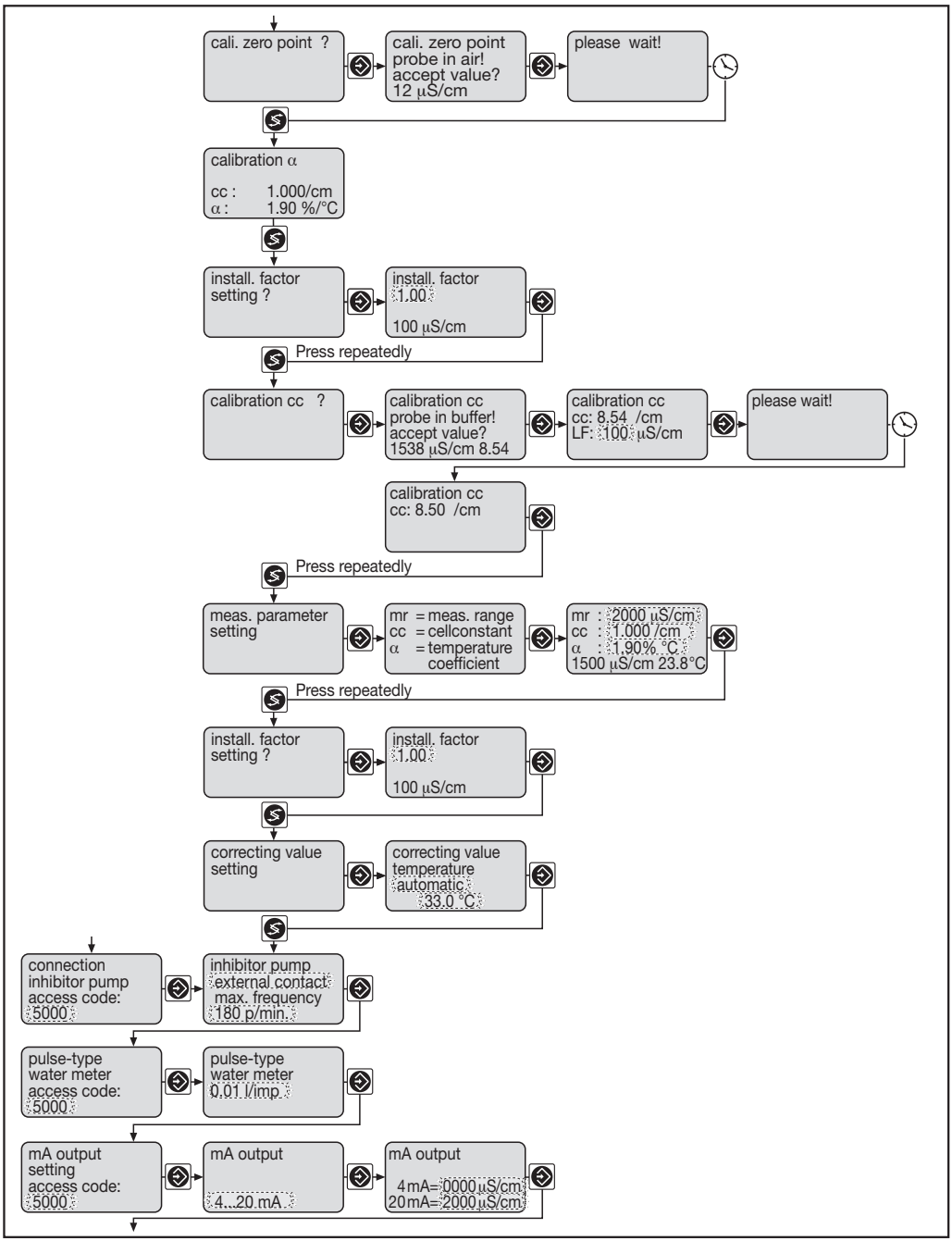
Commissioning examples

Parameter examples

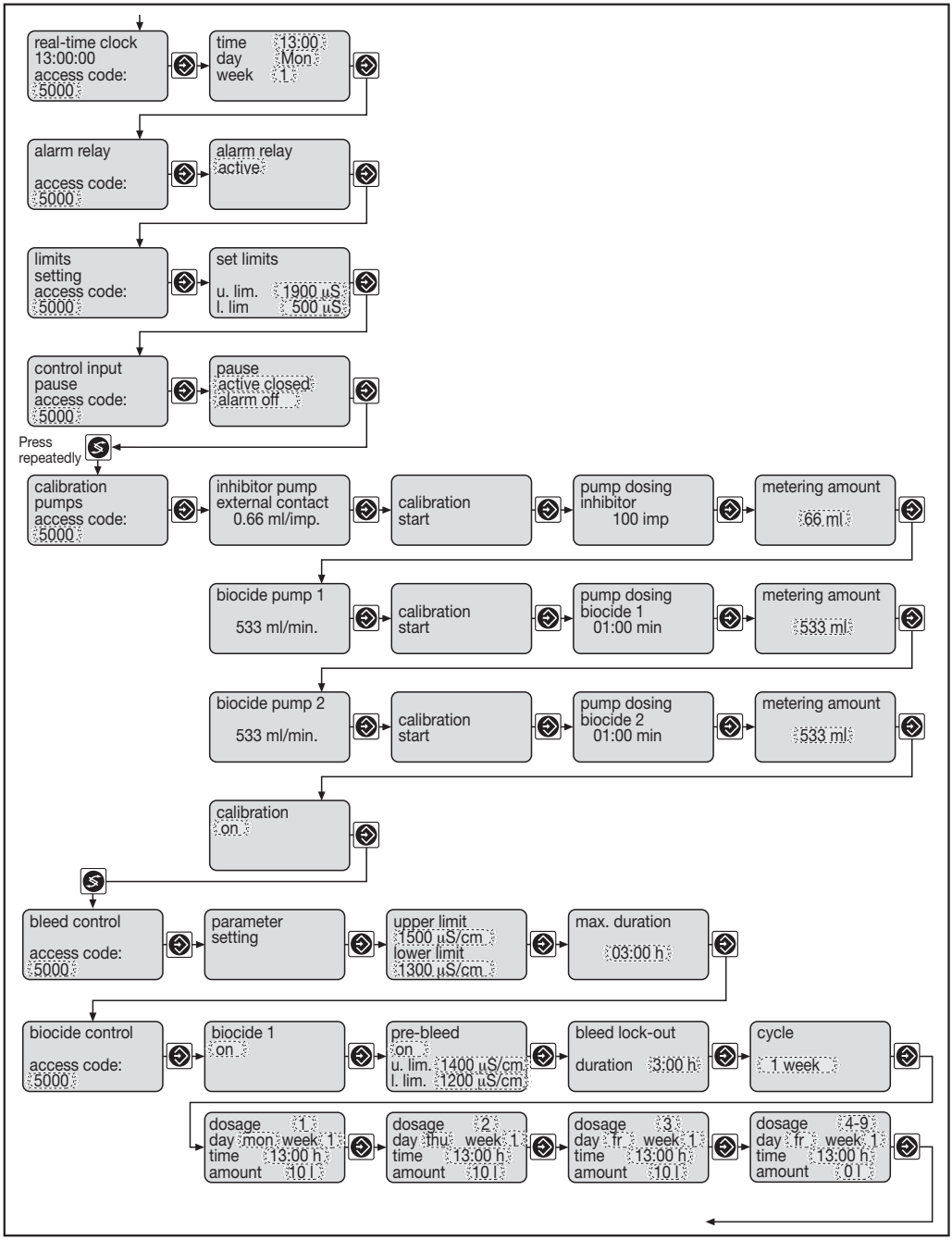
Contact water meter	pulse length: 1.0 l/pulse
Inhibitor pump:	7.10 l/h, contact input, 180 strokes/min
Biocide pump 1:	32 l/h, hook up function
Biocide pump 2:	not connected
Conductivity probe:	type: ICT 1, cell constant: 8.54 cm^{-1}, with Pt 100 measurement range: 0.2 – 1000 mS/cm
Inline probe housing:	with pause contact (flow: contact is made)
Conductivity measurement range:	2000 µS/cm
Bleed upper limit:	1500 µS/cm
Bleed lower limit:	1300 µS/cm
Bleed enabling u.l.:	1400 µS/cm
Bleed enabling l.l.:	1200 µS/cm
Limit value u.l.:	1900 µS/cm
Limit value l.l.:	500 µS/cm
mA output:	4 mA = 0 µS/cm, 20 mA = 2000 µS/cm

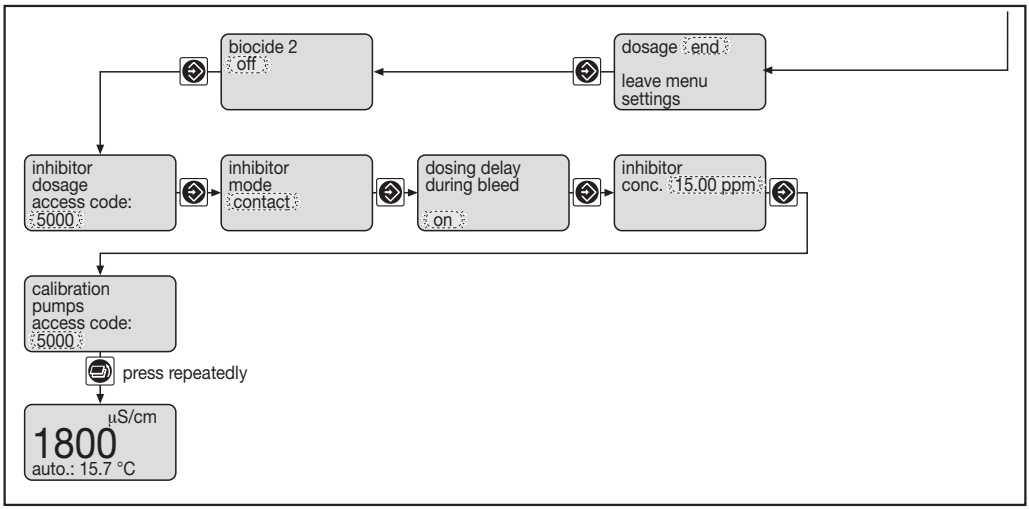
Procedure




cali. zero point ?
cali. zero point probe in air! accept value? 12 µS/cm
please wait!
calibration α
cc : 1.000/cm
α : 1.90 %/°C
install. factor setting ?
install. factor 1.00
100 µS/cm
Press repeatedly
calibration cc ?
calibration cc probe in buffer! accept value? 1538 µS/cm 8.54
calibration cc cc: 8.54 /cm LF: 100 µS/cm
please wait!
calibration cc cc: 8.50 /cm
Press repeatedly
meas. parameter setting
mr = meas. range
cc = cellconstant
α = temperature coefficient
mr : 2000 µS/cm
cc : 1.000 /cm
α : 1.90% °C
1500 µS/cm 23.8°C
Press repeatedly
install. factor setting ?
install. factor 1.00
100 µS/cm
correcting value setting
correcting value temperature automatic 33.0 °C
connection inhibitor pump access code: 5000
inhibitor pump external contact max. frequency 180 p/min.
pulse-type water meter access code: 5000
pulse-type water meter 0.01 l/imp
mA output setting access code: 5000
mA output 4..20 mA
mA output 4 mA= 0000 µS/cm 20 mA= 2000 µS/cm

Commissioning examples




biocide 2
off
dosage end
leave menu
settings
inhibitor
dosage
access code:
5000
inhibitor
mode
contact
dosing delay
during bleed
on
inhibitor
conc. 15.00 ppm
calibration
pumps
access code:
5000
press repeatedly
µS/cm
1800
auto.: 15.7 °C

9 Troubleshooting

IMPORTANT

After an error signal has been actuated, the Cool-Control resumes control functions (possibly unexpectedly) once the cause of the problem has been remedied.

If necessary, shut down the Cool-Control before troubleshooting (press the Enter key repeatedly until the "ε" symbol has stopped flashing) and manually prevent the system from being restarted.

You will find the "Troubleshooting table" on the last two pages of this manual.

To reset the alarm relay, acknowledge the error message with the Enter key.

Acknowledging the first error message cancels all current error messages.

To enable the Cool-Control to restart, remedy the cause of the problem (automatically resets the alarm relay). The Cool-Control will then respond once more to all internal signals (start biocide metering…) and external signals (contact water meter contact, pause).

Stop

If a "Stop" is activated (the "O" symbol appears) the Cool-Control will react as follows:

- ceases all metering processes
- closes the desalination valve
- sets the mA output to 0/4 mA
- ignores all incoming signals
- ignores all new faults

If the "Stop" has been triggered by an error message or a warning, the Cool-Control will restart once the fault has been remedied.

If unacknowledged faults are present, only these will appear in the status row of the permanent display (the "ε" symbol will flash).

If no unacknowledged faults are present, the status row of the permanent display will show acknowledged faults, warnings and status messages in turn (the "ε" symbol will not flash).

10 Maintenance

WARNING

- ***Ensure that the device is disconnected from the power supply before servicing. The Cool-Control has no main switch! The power supply must therefore be switched off via an external main switch or via the main fuse. All general safety directives apply.***
- ***Terminals XR 1-3 may be live even after switching off the power supply.***
- ***Replace fuses with the correct original fuse only.***

  Use only fuses from the manufacturer.

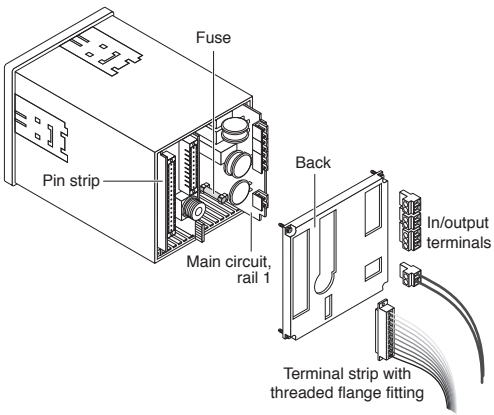
  Use a 5 x 20 mm fine wire fuse.

Fuse value at mains voltage	***90…254 V:***	***0.160 A slow blow fuse, p. no. 71.20.48***
	24 V:	***0.315 A slow blow fuse, p. no. 71.20.26***

Changing the fuse in the Cool-Control D:

The device can be opened from the back as follows:

- ▶ Unscrew the flange screws from the plug-in terminal strips
- ▶ Remove terminal strips along with electrical connections
- ▶ Unscrew the back and put to one side, the screws are permanently attached to the cover
- ▶ The mains circuit is located on the right-hand side (viewed from the back). Pull this out.
- ▶ If necessary remove the fuse and replace with a new fuse
- ▶ Ensure that you replace the card into the same rail. It produces the electrical connection to the display circuit
- ▶ Push the card towards the plug contact as far as it will go
- ▶ Replace the back and screw on
- ▶ Plug the terminal strips with the electrical leads back onto the correct pin strips and screw in place.

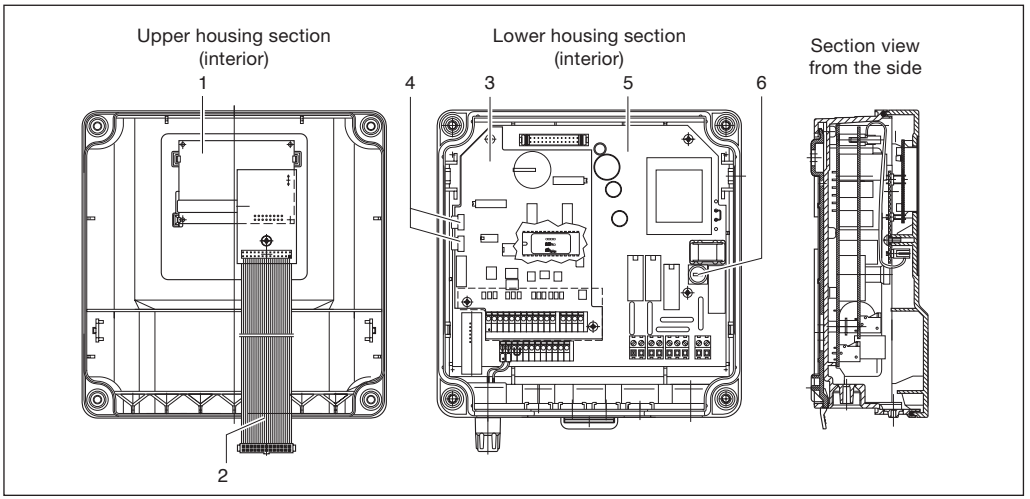


Changing the fuse in the Cool-Control W:

- The following safety precautions must be taken before changing the device fuse (disconnect from the mains!)

The mains fuse is held in a closed fuse holder **(6)** in the terminal area.

- Open the device and put the cover in the “parking position”
- Open the fuse holder’s bayonet fittings
- Remove the fuse and insert a new one
- Close the fuse holder (bayonet fittings) and replace the cover.



Item **(1)** “Display” electrical assembly
Item **(2)** Ribbon cable
Item **(3)** “I/O/S” electrical assembly
Item **(4)** Ribbon cable
Item **(5)** “Processor” electrical assembly
Item **(6)** Fuse holder

11 Disposal

IMPORTANT

Observe all locally applicable directives.
(Material details - see “Technical data, Material details”).

12 Technical Data

Temperature information
a) Cool-Control D

Admissible ambient temperature:	0 °C...45 °C
Admissible storage temperature:	-10 °C...70 °C

b) Cool-Control W

Admissible ambient temperature:	-5 °C...40 °C
Admissible storage temperature:	-10 °C...70 °C

Material details / chemical resistance

Part	**Material**
Housing and frame, Cool-Control D	PPO GF 10
Housing, Cool-Control W	PPE GF 10
Back, Cool-Control D	PPE GF 20
Keypad	Polyester film PET
Seal	Foam rubber CR
Inside seal, Cool-Control D	Silicon based seal
Shackles and screws	Zinc plated steel
Screws M5	A2

Chemical resistance:
The device is resistant to normal atmospheres in technical areas.

Dimensions and weights
a) Cool-Control D
96 x 96 mm in accordance with DIN 43700, depth 140 mm

Device weight without packaging:	approx. 850 g
Gross weight of device with packaging:	approx. 1200 g

b) Cool-Control W

198 x 200 x 76 mm	(B x H x T) wall mounted
198 x 200 x 35 mm	(B x H x T) panel mounted, outer dimensions
198 x 200 x 38 mm	(B x H x T) panel mounted, internal dimensions

Device weight without packaging:	approx. 1,2 kg
Gross weight of device with packaging:	approx. 2,0 kg

Electrical Data
115/230 V version

Nominal voltage:	230 VAC (180-254 VAC) / 115 VAC (90-127 VAC), 50/60 Hz
Maximum current consumption:	140 mA at 115 V 70 mA at 230 V
Internal fuse protection:	fine fuse 5 x 20 mm 160 mA, 250 V slow blow

Technical Data

24 V version

Nominal voltage: 24 V = or 24 V~, 50/60 Hz
(operate with low voltage fuse only)

Internal fuse protection: fine fuse 5 x 20 mm
315 mA, 250 V slow blow

Input inductive
Conductivity via terminals: The following sensors can be added:

Sensor	Measuring range
ICT 1	0.2 – 1000 mS/cm
ICT 1-IMA	0.2 – 1000 mS/cm
ICT 2	0 – 2000 mS/cm
ICT 3	0 – 2000 mS/cm

Pt 100 input:

Input range:	0 °C…100 °C
Reproducibility:	±0.5 °C
Resolution:	0.1 °C

Digital inputs: Joint reference potential but electrically isolated from other in/outputs
Insulation voltage: 500 V
- Pause
- Disturbance signal up to 10 Hz or up to 500 Hz
(programmable depending on identity code)

Standard signal output mA: Electrically isolated from other in/outputs

Insulation voltage:	500 V
Output range:	0/4…20 mA (programmable)
Maximum burden:	600 Ω current output 1 400 Ω current output 2
Reproducibility:	0.5 % of output range in relation to displayed value

Frequency output
or relay output
(2 reed relay)
for pump activation:

Contact type:	N/O, varistor actuated
Max. load:	25 V peaks, 0,100 A excitation current
Contact service life:	> 50 x 10^6 switch cycles contact load 10 V, 10 mA
max. Freq.:	8.33 Hz (500 strokes/min)
Contact making time:	100 ms

Power relay output
for desalination valve
and biocide pump 2:

Contact type:	make/break, varistor actuated
Max. load:	250 V~, 3 A, 700 VA
Contact service life:	> 20 x 10^6

Power relay output
for alarm signal:

Contact type:	make/break, varistor actuated
Max. load:	250 V~, 3 A, 700 VA
Contact service life:	> 20 x 10^6 switch cycles

Contact and moisture protection (IP)

Cool-Control D: Installed device: enclosure rating IP 54 corresponding DIN 40050

Cool-Control W: Device in closed housing: enclosure rating IP 65 corresponding to DIN VDE 0470 corresponding to EN 60529 and IEC 529
Outer seal (panel mounted): enclosure rating IP 65 corresponding to DIN VDE 0470 corresponding to EN 60529 and IEC 529.

Changeable moisture climate requirements

Cool-Control D: Admissible relative humidity: max. 80 % (no condensation permissible)

WARNING

The device is not suitable for installation in changeable humidity climates as there is no sealed housing and therefore the device is subject to constant airflow!

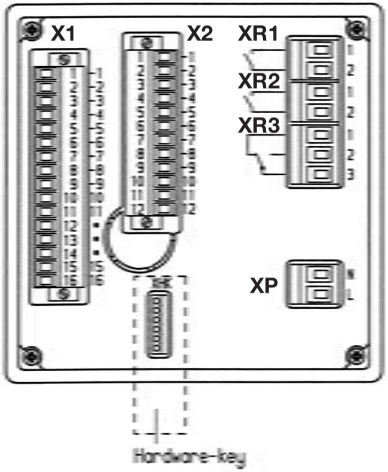
Cool-Control W: Changeable moisture climate in accordance with FW DIN 50016

13 Spare parts / Accessories

• Assembly kit for panel mounting (W)	Part no.: 792908
• Sensors, signal leads	See product catalogue, section 6

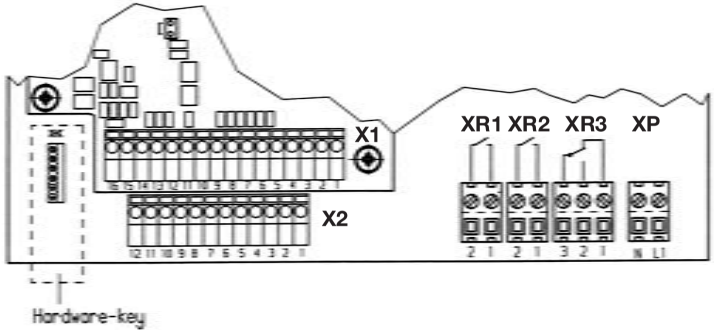
Klemmenanordnung Schalttafelgerät

Terminal order
switchboard mounting



Klemmenanordnung Wandgerät

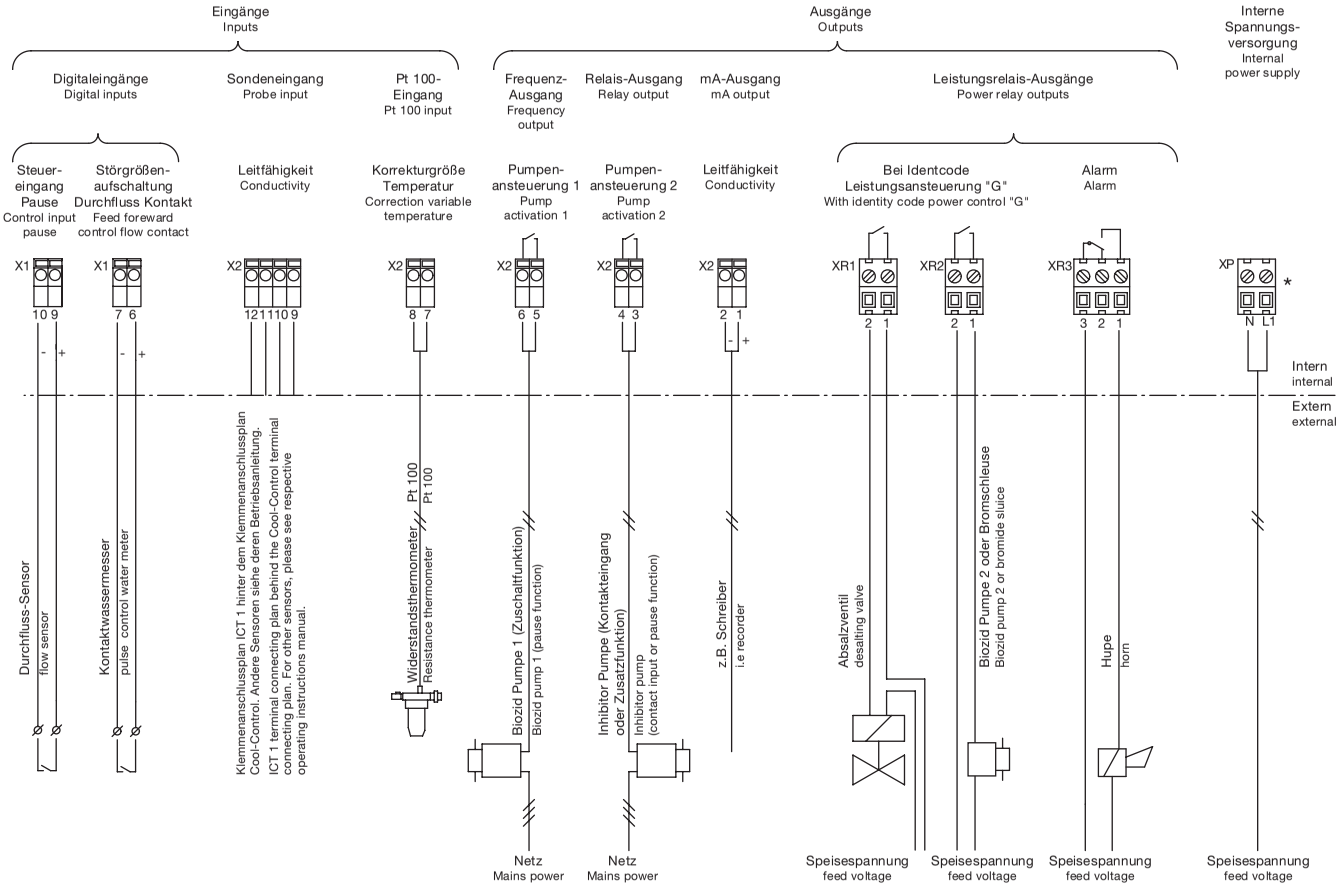
Terminal order
wall mounting



ACHTUNG
Die Beschriftungen der Klemmen der Leisten X1 und X2 nicht verwechseln!

CAUTION
Do not confuse the labelling of the terminals of strips X1 and X2!

Bei Identcode Leistungsansteuerung "G"
With identity code power control "G"

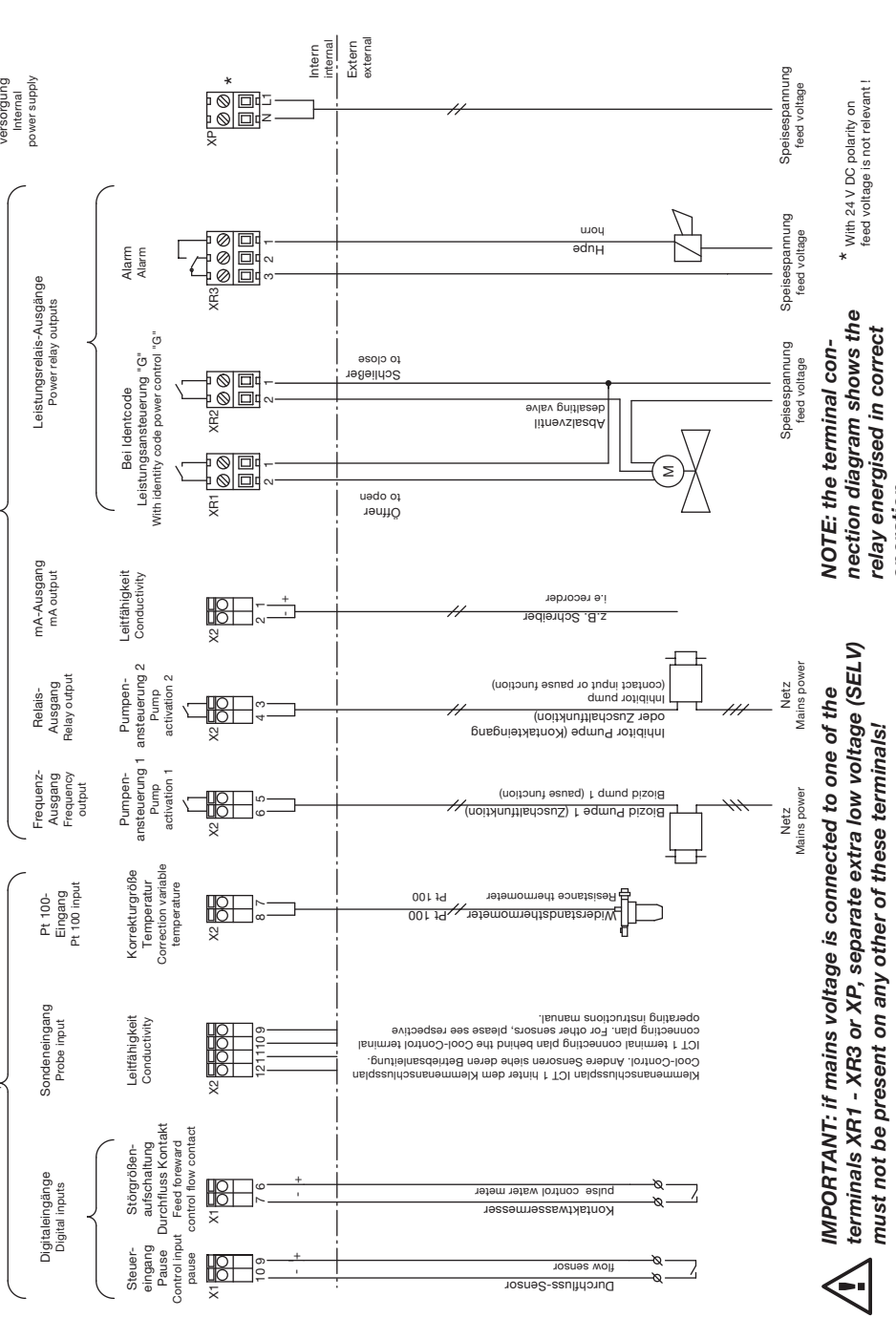


IMPORTANT: if mains voltage is connected to one of the terminals XR1 - XR3 or XP, separate extra low voltage (SELV) must not be present on any other of these terminals!

NOTE relay XR3: the equipment is ready for operation and no alarm is standing.

* With 24 V DC polarity on feed voltage is not relevant !

Wiring diagram „S“

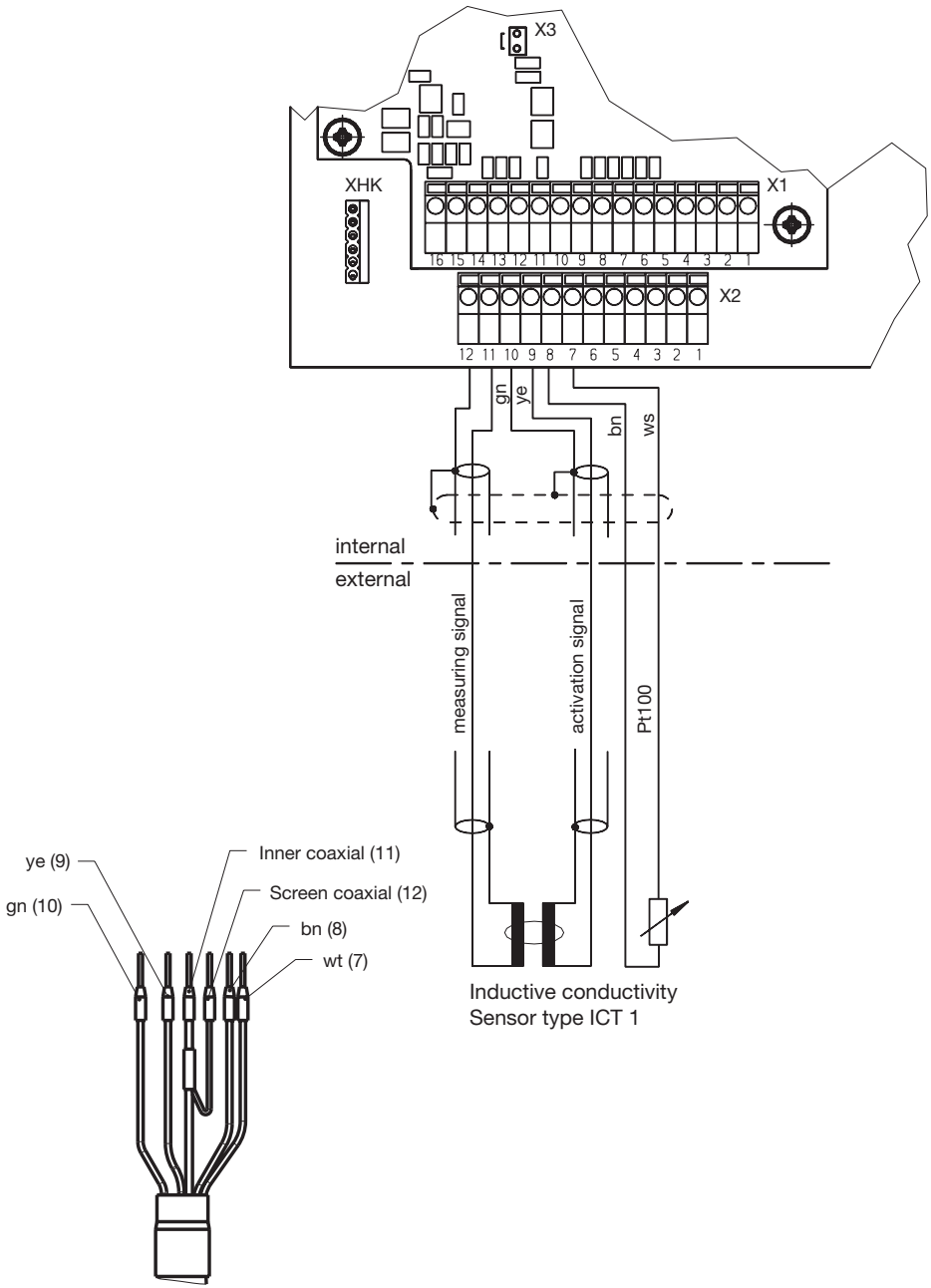


IMPORTANT: if mains voltage is connected to one of the terminals XR1 - XR3 or XP, separate extra low voltage (SELV) must not be present on any other of these terminals!

NOTE: the terminal connection diagram shows the relay energised in correct operation.

* With 24 V DC polarity on feed voltage is not relevant !

“ICT 1” terminal connection diagram



Inductive conductivity
Sensor type ICT 1

Parameter log

Use a copy of this form to obtain an overview of all parameters.

Settings menu	Settings range	Standard value	Customer value
Desalination control:			
- upper limit	10 µS/cm…2000 mS/cm	2000 µS/cm	
- lower limit	0.0 µS/cm…2000 mS/cm	1000 µS/cm	
- max. period	off / 0:01…8:20h	1:00h	
Biocide control (biocide 1):			
- biocide 1	on / off	off	
- compulsory desalination	on /off	off	
- compulsory desalination upper limit	10 µS/cm…2000 mS/cm	0 µS/cm	
- compulsory desalination lower limit	0.0 µS/cm…2000 mS/cm	0 µS/cm	
- duration of desalination block	00:00…72:00h	0.00h	
- cycle time	1 day 1/2/4 weeks	1 day	
Dosing 1:			
- day	Mon…Sun	Mon	
- week	1…4	1	
- time	00:00…23:59 h:min	12:00 h:min	
- quantity	000.0…999.9 litres	0	
Dosing 2:			
- day	Mon…Sun	Mon	
- week	1…4	1	
- time	00:00…23:59 h:min	12:00 h:min	
- quantity	000.0…999.9 litres	0	
Dosing 3:			
- day	Mon…Sun	Mon	
- week	1…4	1	
- time	00:00…23:59 h:min	12:00 h:min	
- quantity	000.0…999.9 litres	0	
Dosing 4:			
- day	Mon…Sun	Mon	
- week	1…4	1	
- time	00:00…23:59 h:min	12:00 h:min	
- quantity	000.0…999.9 litres	0	
Dosing 5:			
- day	Mon…Sun	Mon	
- week	1…4	1	
- time	00:00…23:59 h:min	12:00 h:min	
- quantity	000.0…999.9 litres	0	

Settings menu	Settings range	Standard value	Customer value
Dosing 6:			
- day	Mon…Sun	Mon	
- week	1…4	1	
- time	00:00…23:59 h:min	12:00 h:min	
- quantity	000.0…999.9 litres	0	
Dosing 7:			
- day	Mon…Sun	Mon	
- week	1…4	1	
- time	00:00…23:59 h:min	12:00 h:min	
- quantity	000.0…999.9 litres	0	
Dosing 8:			
- day	Mon…Sun	Mon	
- week	1…4	1	
- time	00:00…23:59 h:min	12:00 h:min	
- quantity	000.0…999.9 litres	0	
Dosing 9:			
- day	Mon…Sun	Mon	
- week	1…4	1	
- time	00:00…23:59 h:min	12:00 h:min	
- quantity	000.0…999.9 litres	0	
Dosing 10:			
- day	Mon…Sun	Mon	
- week	1…4	1	
- time	00:00…23:59 h:min	12:00 h:min	
- quantity	000.0…999.9 litres	0	
Biocide control (biocide 2):			
- biocide 2	on / off	off	
- compulsory desalination	on /off	off	
- compulsory desalination upper limit	10 µS/cm…2000 mS/cm	0 µS/cm	
- compulsory desalination lower limit	0.0 µS/cm…2000 mS/cm	0 µS/cm	
- duration of desalination block	00:00…72:00h	0.00h	
- cycle time	1 day 1/2/4 weeks	1 day	
Dosing 1:			
- day	Mon…Sun	Mon	
- week	1…4	1	
- time	00:00…23:59 h:min	12:00 h:min	
- quantity	000.0…999.9 litres	0	

Parameter log

Settings menu	Settings range	Standard value	Customer value
Dosing 2:			
- day	Mon…Sun	Mon	
- week	1…4	1	
- time	00:00…23:59 h:min	12:00 h:min	
- quantity	000.0…999.9 litres	0	
Dosing 3:			
- day	Mon…Sun	Mon	
- week	1…4	1	
- time	00:00…23:59 h:min	12:00 h:min	
- quantity	000.0…999.9 litres	0	
Dosing 4:			
- day	Mon…Sun	Mon	
- week	1…4	1	
- time	00:00…23:59 h:min	12:00 h:min	
- quantity	000.0…999.9 litres	0	
Dosing 5:			
- day	Mon…Sun	Mon	
- week	1…4	1	
- time	00:00…23:59 h:min	12:00 h:min	
- quantity	000.0…999.9 litres	0	
Dosing 6:			
- day	Mon…Sun	Mon	
- week	1…4	1	
- time	00:00…23:59 h:min	12:00 h:min	
- quantity	000.0…999.9 litres	0	
Dosing 7:			
- day	Mon…Sun	Mon	
- week	1…4	1	
- time	00:00…23:59 h:min	12:00 h:min	
- quantity	000.0…999.9 litres	0	
Dosing 8:			
- day	Mon…Sun	Mon	
- week	1…4	1	
- time	00:00…23:59 h:min	12:00 h:min	
- quantity	000.0…999.9 litres	0	
Dosing 9:			
- day	Mon…Sun	Mon	
- week	1…4	1	
- time	00:00…23:59 h:min	12:00 h:min	
- quantity	000.0…999.9 litres	0	

Settings menu	Settings range	Standard value	Customer value
Dosing 10:			
- day	Mon…Sun	Mon	
- week	1…4	1	
- time	00:00…23:59 h:min	12:00 h:min	
- quantity	000.0…999.9 litres	0	
Inhibitor dosing			
- inhibitor mode	contact/periodic/ % desalination/II desalination	contact	
- dosing delay during desalination	on / off	off	
- inhibitor concentration	0…500.0 ppm	0 ppm	
Pump calibration			
- inhibitor pump	0.01…600.0 ml/Imp		
- biocide pump 1	0.01…600.00 ml/min		
- biocide pump 2	0.01…600.00 ml/min		
- calibration	on / off	off	
Conductivity measurement			
- MR (measuring range)	200 / 2000 µS/cm	2000 µS/cm	
- CC (cell constant)	0.0060…12.00 / cm		
- α (temperature coefficient)	0.00…10.00 %/oC	1.9%/oC	
- conductivity calibration solution	0…2000 mS/cm		
- installation factor	0.01…1.00		
- sensor type	ICT1 ICT 1 – IMA ICT 2 / CLS 5 ICT 3	ICT	
- correction value	automatic / manual / off		
Inhibitor pump connection			
- connection switch function	contact input/	contact input	
- max. frequency	0…500 p/min	180 p/min	
Contact flow meter			
- contact flow meter	0.001…99.99 l/Imp	10.00l/Imp	
Set mA output			
- mA output	0.20 mA / 4..20mA	4..20mA	
- 0/4 mA	-100 µS/cm…2100 mS/cm	-100 µS/cm	
- 20 mA	-100 µS/cm…2100 mS/cm	2100 µS/cm	

Parameter log

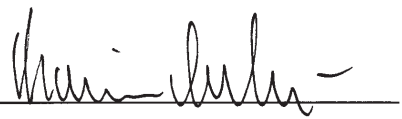
Settings menu	Settings range	Standard value	Customer value
Real time			
- time	00:01…23:59 hh:mm	12:00 hh:mm	
- day	Mon – Sun	Mon	
- week	1…4	1	
Alarm relay			
- alarm relay	active / inactive	active	
Set limits			
- upper limit	0…2000 mS/cm	2000 µS/cm	
- lower limit	0…2000 mS/cm	1000 µS/cm	
Control input pause			
- pause	active closed/ active open	active closed	
- alarm	on / off	off	
General settings information			
- menu	collapsed / expanded	expanded	
- access code	0000…9999	5000	
- language	German / English French / Spanish	German	
- unit of volume	litres / gallons	litres	
- ident code	e.g. D1CA M0K32211G200D		
- programme version	e.g. D1C-K1 FW 01.10		

EC Declaration of Conformity

We,

ProMinent Dosiertechnik GmbH
Im Schuhmachergewann 5 - 11
D - 69123 Heidelberg

hereby declare that, on the basis of its functional concept and design and in the version brought into circulation by us, the product specified in the following complies with the relevant, fundamental safety and health stipulations laid down by EC directives.
Any modification to the product not approved by us will invalidate this declaration.

Product description :	***Measurement and control system, DULCOMETER***
Product type :	***D1C / D2C***
Serial number :	***see type identification plate on device***
Relevant EC regulations :	***EC - low voltage directive (73/23/EEC)*** ***EC - EMC - directive 89/336/EEC subsequently 92/31/EEC***
Harmonized standards used, in particular :	***EN 60335-1, EN 61010-1/2, EN 60204-1*** ***EN 50081-1/2, 50082-1, EN 55014-1/2*** ***EN 61000-3-2/3, EN 61000-6-2***
National standards and other technical specifications used, in particular :	
Date/manufacturer´s signature :	***11th December 2000*** 
The undersigned :	*Dr. Rainer V. Dulger, Executive Vice President R&D and Production*

No.	Error text	Fault	Symbol	Effect	Alarm with acknowledgment	Comment	Remedy
1	**mS meas. range** ↓↑	Measured value outside measurement range	ε O	Stop*	yes		Check measurement range settings
2	**System defect**	defective electronic data, defective amplifier, check SPI	ε O	Stop	yes		Contact service technician
3	**defective conductivity**	defective conductivity	ε O	Stop	yes	defective probe cable	replace probe cable
4	**Pause**	Controller stopped externally	ε O	Stop	yes	Pause control input „active“ (only when alarm = „on“); no other fault check	
5	**mS limit** ↓↑	Limits exceeded	ε		yes		Identify the cause; change limit values in „Set limit values“ if necessary
6	**Time error**	Clock has no valid data (e.g. after long term disconnection from power)	ε O	Stop	yes	Set to default values	Set clock
7	**Check Te. input**	Signal higher/lower than temperature correction variable	ε O	Stop*	yes	Signal <3.0 +0.2 mA or >23 +0.2 mA	Check probe, transducer and cable connector
8	**Contact error**	Pulse meter overrun, contact water meter	ε O	Stop	yes	Fault cancelled when acknowledged; meter set to zero	
9	**Bleed stop**	Maximum desalination time exceeded and measured value is above upper desalination limit	ε O	Stop	yes	Desalination interrupted	Check desalination line, desalination valve

*no stop during emergency mode

No.	Warning	Fault	Symbol	Effect	Alarm with acknowledgment	Comment	Remedy
1	**Stop key**	Stop	Ɛ O	Stop	-		-
2	**Pause**	Controller stopped externally	Ɛ O	Stop	-	Pause control input „active“ (only when alarm = „off“)	-
3	**bleed stop**	Maximum desalination time exceeded	Ɛ		-	Desalination interrupted. Warning is automatically cancelled once metering is subsequently completed	Check desalination line, desalination valve, check desalination duration
4	**inhib. dos. stop**	Maximum inhibitor metering time exceeded	Ɛ		-	Limits maximum metering time in inhibitor mode % desalination and IIdesalination inhibitor metering is stopped. Warning is automatically cancelled once inhibitor metering is subsequently completed	Check setting
5	**BiocideX XX del. (X= 1 or 2, XX= 1-10) bioc.x xx delay**	Dose no. XX of biocide X has been delayed	Ɛ		-	Warning is cancelled once that metering action has been completed without delay	Check setting
6	**BiozideX XX ign. (X= 1 or 2, XX= 1-10) bioc.x xx ignore**	Dose no. XX of biocide X has been ignored because same biocide has just been metered and/or delayed	Ɛ		-	Warning is cancelled once that metering action has been completed at a preset time.	Check setting

Operating Instruction DULCOMETER® Cool-Control, Type D1C, Inductive conductivity
Subject to technical modifications · Printed in the F.R. Germany
ProMinent Dosiertechnik GmbH · Im Schuhmachergewann 5-11 · D-69123 Heidelberg
Postfach 101760 · 69007 Heidelberg · Germany
info@prominent.com · www.prominent.com