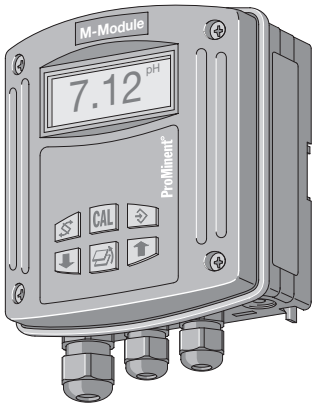
Operating Instructions

DULCOMARIN® II Pool Controller
Part 1: Mounting and Installation



DXCa ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

Please enter the identcode of your controller!

These operating instructions apply only in conjunction with the "Operating Instructions DULCOMARIN® II Pool Controller, Part 2: Operation" and the module-specific supplementary instructions!

Please carefully read these operating instructions before use! · Do not discard!
The operator shall be liable for any damage caused by installation or operating errors!

Part No. 986907 **ProMinent Dosiertechnik GmbH · 69123 Heidelberg · Germany** BA DC 037 11/07 GB

Imprint:
Operating instructions
DULCOMARIN® II Pool Controller
Part 1: Mounting and Installation

ProMinent Dosiertechnik GmbH
Im Schuhmachergewann 5-11
69123 Heidelberg
Germany

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

info@prominent.com
www.prominent.com

Printed in Germany

Device identification / Identcode

The identcode describes the entire **DULCOMARIN® II compact** unit.

DXCa | **DULCOMARIN® II Pool Controller, Series DXC**

Mounting type:
- **W** Wall mounted (IP 65)
- S Control cabinet (IP 54)

Design:
- **0** with controls

Communication interfaces:
- **0** none
- 5 Embedded web server, LAN including 5 m LAN patch cable 1:1, LAN coupling, 5 m crossover cable* [1)]
- 6 OPC server + embedded web server, LAN including 5 m LAN patch cable 1:1, LAN coupling, 5 m crossover cable* [1)]

Option:
- 1 Videographic recorder with data logger including SD card and USB card reader for PC

Module 1:
- **M** M-module, measurement module for pH, ORP, temperature

Module 2:
- 0 Not used
- **A** A-module, actuator module: 3 pump and 4 analogue outputs

Module 3:
- **P** P-module, power supply module, 1 alarm relay, 3 solenoid valve relays
- N N-module, power supply module without relays

Application:
- **S** Swimming pool

Language:
- DE German
- **EN** English
- ES Spanish
- FR French
- IT Italian
- PL Polish

Approvals:
- 01 CE-mark

DXCa	W	0	0	1	M	A	P	S	EN	01

The identcode refers to the **DULCOMARIN® II compact** controller.

[1)] The supplied cable is for connecting to a hub, switch, router or intranet. The supplied LAN coupling and the crossover cable Cat. 5 are required for connecting the DULCOMARIN® II directly to a PC/MAC.

The maximum length of the LAN cable is approximately 100 m.

To operate the web server on a PC we recommend using Microsoft® Internet Explorer 5 or higher as your browser.

The following components are supplied in the DXCa package:
1 T-distributor, 1 connection cable CAN,
1 termination resistance connector and
1 termination resistance plug
1 64 MB SD card, 1 card reader for PC

Device identification / Identcode

The identcode describes the entire **DULCOMARIN® II DULCO®-Net** central unit.

DXCa — **DULCOMARIN® II Pool Controller, Series DXC**

Mounting type:
- **W** Wall mounted (IP 65)
- S Control cabinet (IP 54)

Design:
- **0** With controls
- 2 Without controls

Communication interfaces:
- **0** None
- 5 Embedded web server, LAN including 5 m LAN patch cable 1:1, LAN coupling, 5 m crossover cable [1)]
- 6 OPC server + embedded web server, LAN including 5 m LAN patch cable 1:1, LAN coupling, 5 m crossover cable [1)]

Option:
- **0** without videographic recorder [2)]
- 1 Videographic recorder with data logger including SD card and USB card reader for PC

Module 1:
- **0** Not used
- M M-module, measurement module: pH, ORP, temperature
- A A-module, actuator module: 3 pump and 4 analogue outputs

Module 2:
- **0** Not used
- A A-module, actuator module: 3 pump and 4 analogue outputs
- M M-module, measurement module: pH, ORP, temperature

Module 3:
- **0** Not used
- P P-module, power supply module, 1 alarm relay, 3 solenoid valve relays
- N N-module, power supply module unit without relays
- A A-module, actuator module: 3 pump and 4 analogue outputs
- M M-module, measurement module: pH, ORP, temperature

Application:
- **S** Swimming pool

Language:
- 00 without
- DE German
- **EN** English
- ES Spanish
- FR French
- IT Italian
- PL Polish

Approval:
- **01** CE mark

DXCa W 0 0 1 0 0 P S EN 01

The Identity Code describes the complete **DULCOMARIN® II DULCO®-Net** central unit.

However, the peripheral components referred to in the above parts list are not included.

If the central unit is equipped with modules, the following notes apply:

Module 1 ideally used as an M-module
Module 2 ideally used as an A-module

Module 3 must always be used as a P-module or N-module

[1)] Module 1 ideally used as an M-module

[2)] only in version 2 without control

General user information

Please read through the following user guidelines! Familiarity with these points ensures optimum use of the operating instructions.

Key points in the text are indicated as follows:

- enumerated points

▶ hints

Working guidelines:

NOTE

Notes are intended to make your work easier.

and safety guidelines:

CAUTION

Characterizes a possibly hazardous situation.
There is a danger of slight or minor injury if these notes are disregarded!

1 About this controller

In our times of wellness, swimming and bathing are among the most popular leisure-time activities.

Pools are used by many people at the same time. Swimming pool and bathing basin water are not allowed to pose any health risks, in particular not through pathogens.

Thus, automatically controlled dosing units according to DIN 19643 and devices for measuring free chlorine, redox/ORP, and pH value must be installed in all public swimming and bathing pools.

The DULCOMARIN® II is the ideal solution

The DULCOMARIN® II is a measuring and control device exclusively designed for the special demands of swimming pools.

ProMinent is the first supplier using the DULCOMARIN® II with a standard bus system for networking the sensors and actuators and the control device for swimming pools. The device is equipped with the standardised bus system CANopen®. This is a system that already has a well-proven record of success in a variety of applications including elevators, motor vehicles, ships, medical equipment as well as building installations and rail vehicles. The prerequisite for all these applications is a fast and extremely reliable transmission medium.

Various types according to DIN 19643 are available to suit the most diverse applications such as exclusive private swimming pools, whirlpools and public swimming pools. Preset appropriate setpoints and limit values facilitate commissioning of the controller almost without any operating expense.

All modules are based on the plug & play principle.

A flexible system that, corresponding to specific requirements, can be configured as a compact or distributed modular system while being fully prepared for future applications.
The DULCOMARIN® II can be configured in two ways:
The **DULCOMARIN® II compact** is used to control one single swimming pool.
The distributed modular system **DULCOMARIN® II DULCO®-Net** is designed for controlling up to 16 filtration cycles.

2 Safety chapter

2.1 Proper use

The pool controller DULCOMARIN® II is exclusively designed for:

- **Measuring and controlling of the pH value or the redox/ORP**
- **Measuring and controlling of the chlorine concentration**
- **Measuring of the temperature**
- **Dosing of flocculants**
- **Displaying of the measuring values**
- **Creating of output signals**
- **The pool controller is exclusively designed for use in swimming pools!**

All other uses or conversions shall require prior consultation with ProMinent Dosiertechnik GmbH, Heidelberg in writing!

- **The controller may not be used for applications in the open!**

2.2 Notes on safety

CAUTION

- ***To guarantee safety, all persons coming into contact with the controller, must read and observe these operating instructions. It is only through reading and observing the operating instructions that possibly emerging risks can be minimised.***
- ***The DULCOMARIN® II may only be operated by specially trained and authorised personnel!***
- ***Only use the devices described in these operating instructions together with certified other-make CANopen devices!***
- ***Prevent any excess dosing of hazardous material in case of sensor failure or removal. Prepare your controller for these events.***
- ***The transparent interface cover above the LEDs (opened in fig. 11) must be re-tightened in a moisture-resistant way if ever opened. Otherwise, the degree of protection IP 65 will not be guaranteed.***
- ***The DULCOMARIN® II has no on/off switch. The controller starts operating as soon as it is connected to the mains supply.***

3 Storage and transport

CAUTION

Only store and transport the DULCOMARIN® II in its original packaging.
Also protect the packaged DULCOMARIN® II against humidity and exposure to chemicals.

Environmental conditions for storage and transport:

Temperature: -10 °C to 70 °C

Relative humidity: max. 95 % relative humidity, non-condensing

4 Requirements on the installation location and planning aids

4.1 Requirements on the installation location

- Do not position the DULCOMARIN® II in the open!
- The DULCOMARIN® II must be protected against exposure to the sun and freezing!
- It must be able to secure DULCOMARIN® II against unauthorized access!
- A mains connection is required.

WARNING

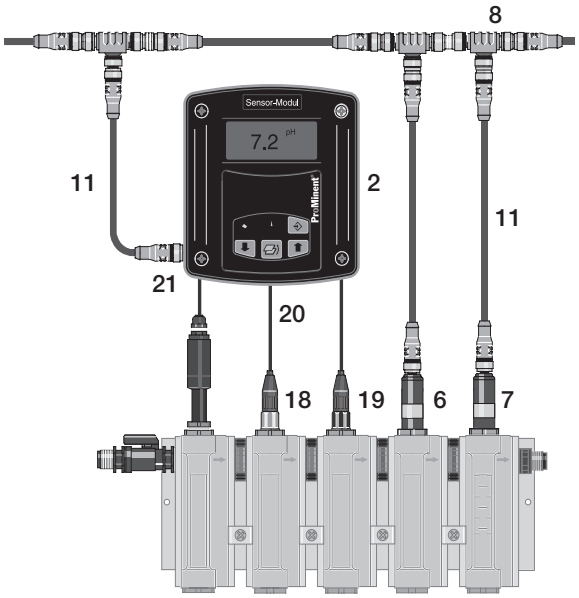
With control of a chlorine gas dosing unit (e.g. control valve): In case of failure of the system it must be guaranteed that the chlorine gas dosing unit still operates.
The mains connections must be protected separately.

CAUTION

It must be possible to switch on and off the socket-outlets for the power supply modules together for all power supply modules and independent of other devices.

4.2 Determination of the required cables and accessories

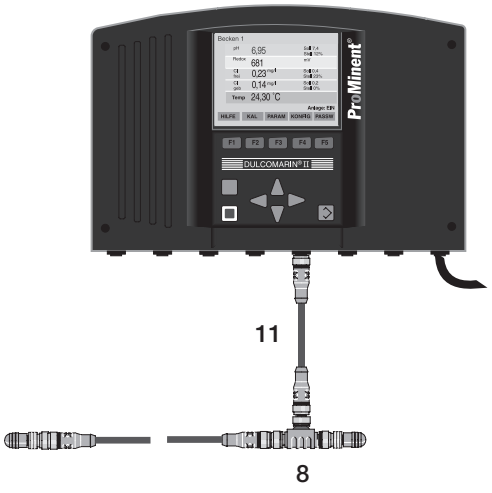
A complete measuring system could look as follows:



Item	Number	Designation	Order no.
2	1	M-module DXMa M W 0 S DE 01	
5	1	In-line probe DGMa 3 2 2 T 0 0 0	
6	1	Chlorine sensor CTE 1 CAN-10 ppm	1023427
7	1	Chlorine sensor CLE 3.1-CAN-10 ppm	1023426
8	3	T-distributor M12 5P CAN	1022155
11	4	Connecting cable - CAN, M12, 5P, 0.5 m	1022137
18	1	pH electrode PHES 112 SE	150702
19	1	ORP electrode RHES-Pt-SE	150703
20	2	Coax cable 2 m - SN6 - prefabricated	1024106
21	2	Signal lead 2 x 0.25 mm2	725122

Accessories are enclosed with the central unit and all external modules.

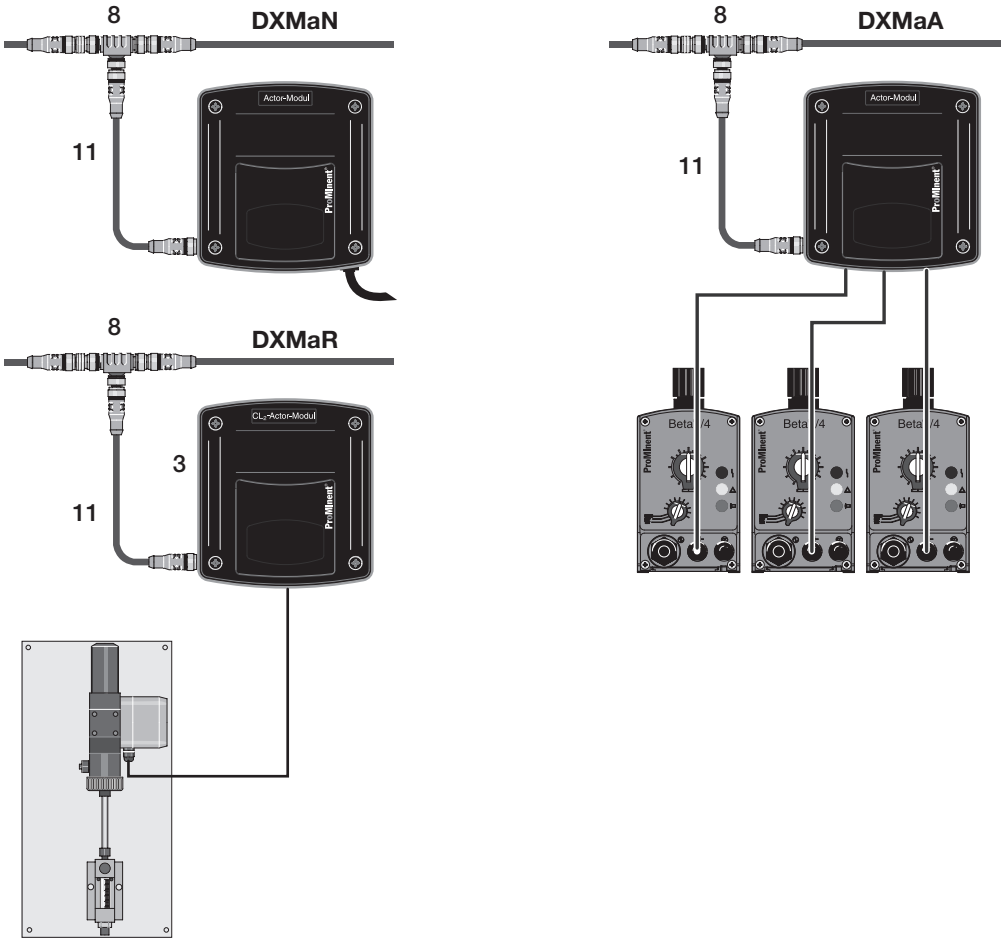
Central unit DXCa:



Accessories, enclosed

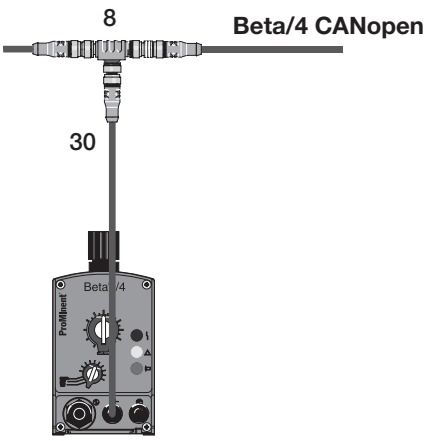
Number	Designation	Order no.
1	T-distributor, M12, 5P, CAN	1022155
1	Load resistor M12 coupling (male)	1022154
1	Load resistor M12 plug (female)	1022592
1	Connecting cable - CAN, M12, 5P, 0.5 m	1022137

External module DXMa:



Accessories, enclosed

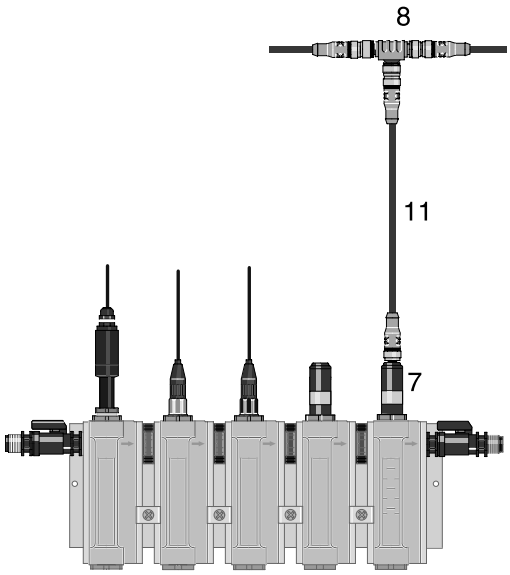
Item	Number	Designation	Order no.
8	1	T-distributor, M12, 5P, CAN	1022155
11	1	Connecting cable - CAN, M12, 5P, 0.5 m	1022137



Supplied accessories

Item	Quantity	Description	Order No.
8	1	T-distributor, M12, 5-pin, CAN	1022155
30	1	Connecting cable - CAN, M12, 5-pin, 1 m	1022139

Sensors DXUa:



Accessories, enclosed

Item	Number	Designation	Order no.
8	1	T-distributor, M12, 5P, CAN	1022155
11	1	Connecting cable - CAN, M12, 5P, 0.5 m	1022137

- ▶ Determine the required power supply modules (see next chapter).
- ▶ Determine the required connecting cables between the external modules.
- ▶ Finally, determine the required retaining clamps for the connecting cables. (ASV pipe clamp, 16 mm, order no. 359904).

Arrange the power supply modules in the CAN Bus main train (DULCOMARIN® II DULCO-Net)

There is always one power supply module in the central unit.

- Determine the additionally required number of power supply modules (N-module and P-module).

Divide the number of pools by “2”, round off if there is a remainder:

Number of pools	Additional N- or P-modules	Number of pools	Additional N- or P-modules
1	-	9	4
2	-	10	5
3	1	11	5
4	2	12	6
5	2	13	6
6	3	14	7
7	3	15	7
8	4	16	8

(Exception: Number of pools = 2)

- Distribute the power supply modules as evenly as possible across the CAN bus train.
- The distance between the power supply modules should not exceed 15 m.
- In case of an A-module with connected recorders: Position one of the power supply modules as close as possible to the A-module.
- Make sure that a socket-outlet exists for each power supply module.

Routing of the CAN bus main train

CAUTION

- ***Please also read the chapter 5.3 “CAN bus cables, installation”.***
- ***The sum of the spur lines branching off of the CAN bus main train must remain smaller than 10 m (do not forget to count the CAN cables in the DXC housings (length 0.6 m)).***

NOTE

- ***The external modules may be positioned in any sequence in the CAN bus main train. The examples in this operating instructions show idealised sequences of external modules.***
- ***Each CAN cable has a connector and a coupling at its ends so that the cables can be extended by coupling one to the other.***

Rule:
First mount and install the external modules and their peripherals, then connect the external modules and the CAN bus main train using the shortest distance possible.
Group the external modules for each pool!

List of the available CAN cables, external

Connecting cable – CAN, M 12, 5P, 0.5 m	1022137
Connecting cable – CAN, M 12, 5P, 1 m	1022139
Connecting cable – CAN, M 12, 5P, 2 m	1022140
Connecting cable – CAN, M 12, 5P, 5 m	1022141
Connecting cable – CAN, by the meter	1022160

5 Mounting and installation

CAUTION

- ***The DULCOMARIN® II is resistant to normal atmospheres prevailing in the control rooms.***
- ***The controller must be protected against rain, freezing, and direct exposure to the sun. The controller may therefore not be mounted in the open!***
- ***The mounting location must be a freeze-protected room having an ambient temperature ranging between 0 °C and 50 °C. The atmosphere in this room must be non-condensing.***
- ***The transparent interface cover above the LEDs (opened in fig. 11) must be re-tightened in a moisture-resistant way if ever opened. Otherwise, the degree of protection IP 65 will not be guaranteed.***

5.1 Procedures for DXC housings (large)

5.1.1 Mounting (mechanical)

The DXC housing may be wall-mounted or mounted in a control panel.

5.1.1.1 Wall mounting

Mounting material (included in the scope of delivery)

1 x wall bracket

4 x PT screws 5 x 35 mm

4 x washer 5.3

4 x plugs Ø 6 mm, plastic

Please observe the following steps for wall mounting

- ▶ Remove wall bracket from the DXC housing:

  Pull both snap-on hooks away from the controller - the wall bracket is lowered a bit (fig. 1,1).

  Seen from the DXC housing, push the wall bracket to the bottom and lift to the top (figs. 1, 2 and 3).
- ▶ Use the wall bracket as drilling template and mark four holes.
- ▶ Drill the holes: Ø 6 mm, d = 50 mm
- ▶ Fasten the wall bracket with the screws and washers (fig. 2).
- ▶ Place the DXC housing in the bottom of the wall bracket (fig. 3, 1) and press it carefully into the top of the wall bracket (fig. 3, 2). Then check whether the controller is securely positioned at the top and press to the bottom until an audible click is heard (fig. 3, 3).

Fig. 1: Wall bracket - disassembly and mounting

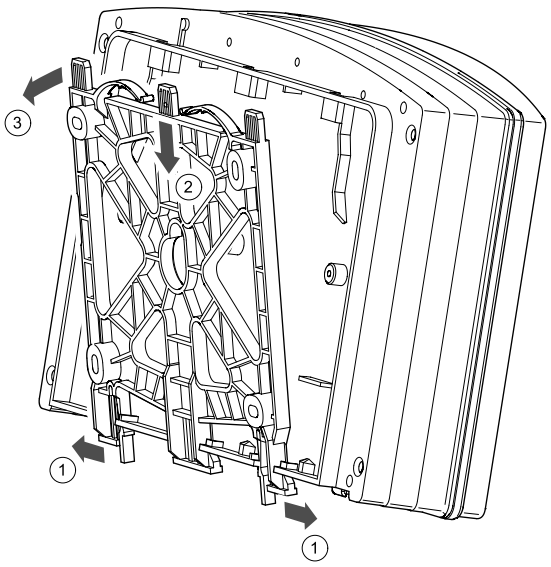


Fig. 2: Wall bracket - disassembly and mounting

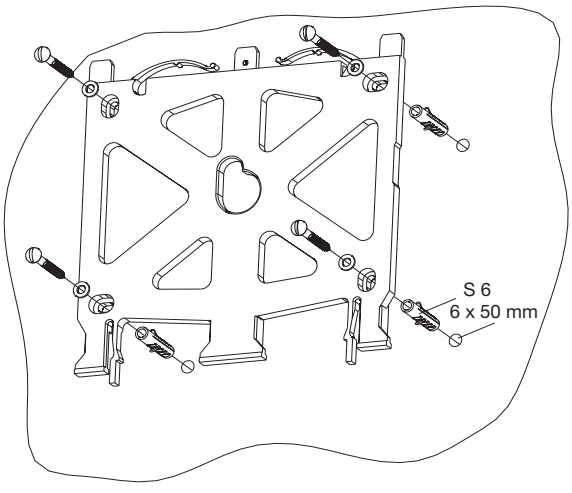
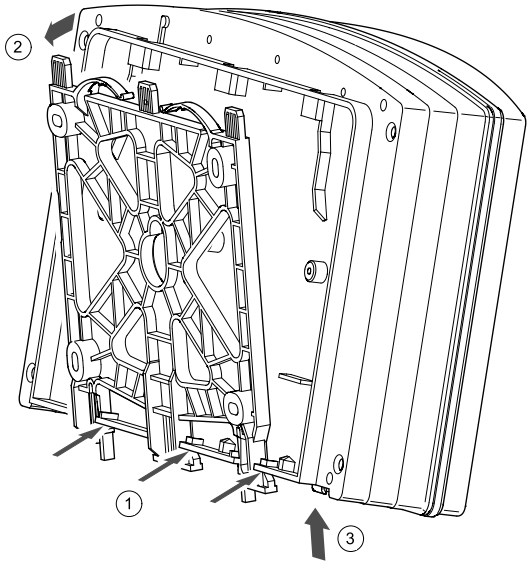


Fig. 3:
Wall bracket - disassembly and mounting



5.1.1.2 Control panel mounting

CAUTION

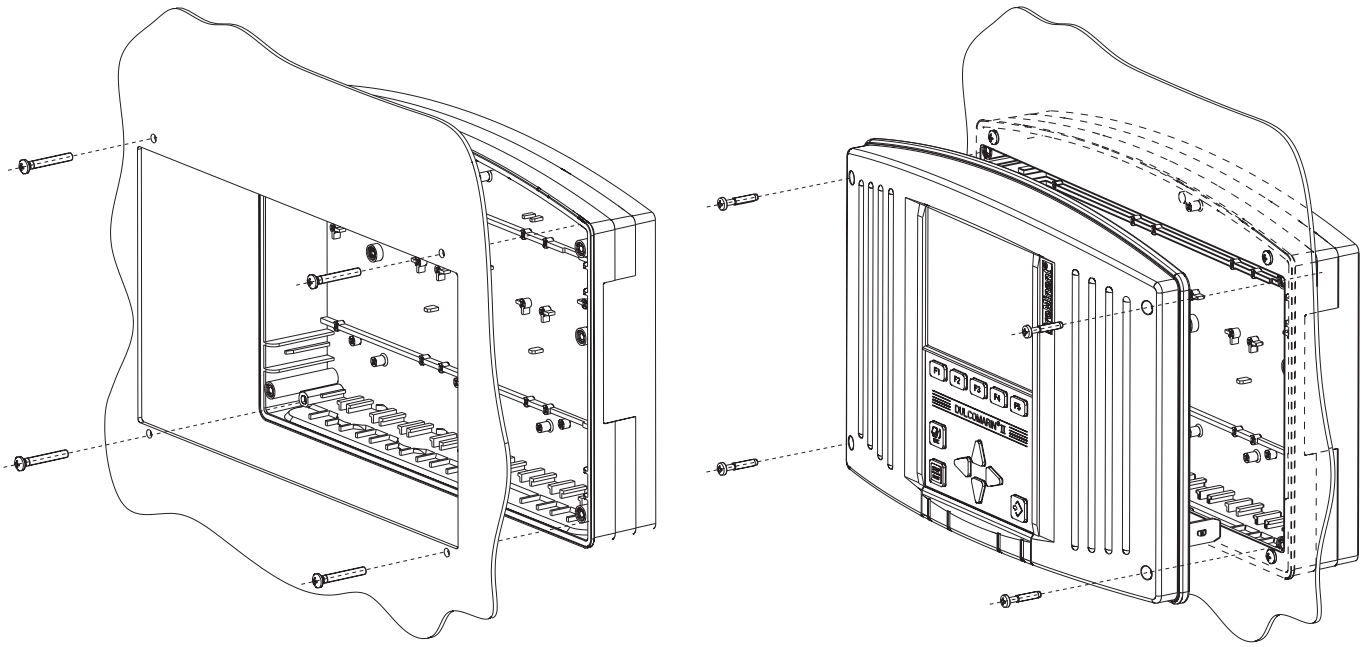
The control panel must be of sufficient strength to prevent any deformation after mounting! (Steel must have a strength of at least 2 mm; plastics must be of greater strength!)

Otherwise, the degree of protection IP 54 will not be guaranteed!

NOTE

When mounted, the DXC housing protrudes approx. 45 mm from the front of the control panel. A drilling template is enclosed.

Fig. 4:
Control panel mounting



Please observe the following steps for control panel mounting

- ▶ Use the drilling template to position the DXC housing correctly at the control panel and fix the template.
- ▶ Punch-mark the holes for the mounting screws and the holes for the recess through the drilling template.
- ▶ Use a drill of Ø 5 mm for drilling the holes.
- ▶ Either punch out the recess or drill the inner four holes with a drill of Ø 5 mm and remove the recess with a compass saw.

CAUTION

The edges created may result in injuries!

- ▶ Break off the edges.
- ▶ Loosen the four housing screws.
- ▶ Lift the front part and disconnect the flat cable from the P-module.
- ▶ Remove the front part.
- ▶ It is recommended to break out the threaded holes in the bottom row in this step. (nos. 1 - 10, see chapter 4.2).
- ▶ Use the enclosed PT screws to fix the rear part to the control panel.
- ▶ Re-connect the flat cable.
- ▶ Place the front part in “park position”.

NOTE

First make the electrical connections of the DULCOMARIN® II and then complete the mounting.

- ▶ Position the front part on the rear part of the DXC housing and tighten the screws.

CAUTION

Check again for a correct position of the gaskets!

The degree of protection IP 54 will only be guaranteed if the assembly was performed correctly!

5.1.2 Installation (electrical)

CAUTION

- ***The installation may only be performed by specially trained personnel!***
- ***Please observe the relevant information in Chap. 10 “Technical Data” and the supplementary instructions DULCOMARIN® II, Modules DXMa.***
- ***During the installation, the device must not be connected to the mains supply!***
- ***On the hardware side and the software side safety measures must be taken to guarantee that the DULCOMARIN® II goes into a safe operating condition in the event of failure! E.g. use limit value switches, manual interlocks, …***

WARNING

- ***In the event of the circulating pump failing, the measurement water limit contact of the flow sensor alone is not sufficient to stop the control for the corresponding pool (contact K1 of the M-module)!***
  The control of the pool must be additionally set to Pause via contact K2 “Pause Control” of the M-module.
  Suitable triggering elements include:
  - ***The floating contact of the filter control***
  - ***The floating contact of the motor protection switch for the circulation pump***
  - ***A flow monitoring device in the circulation line***
- ***In case of devices operated through system voltage ensure that the system voltage range used by the device matches the local supply!***
- ***In case of supply of the devices with 24 V auxiliary voltage, ensure that the extra-low voltage is safely separated from other voltages!***

- ***The signal lines of the DULCOMARIN® II must not be routed together with high-interference lines.***
  Very large interferences may result in malfunctions of the DULCOMARIN® II.
- ***In case of mounting in a control panel, the cable must be routed in a cable conduit provided by the customer to relieve strain.***

▶ Plan which threaded holes are to be broken out (colour desired threaded holes).

▶ It is recommended to remove the modules at the break-out positions (loosen the red knurled screw). The modules are thus protected against damage.

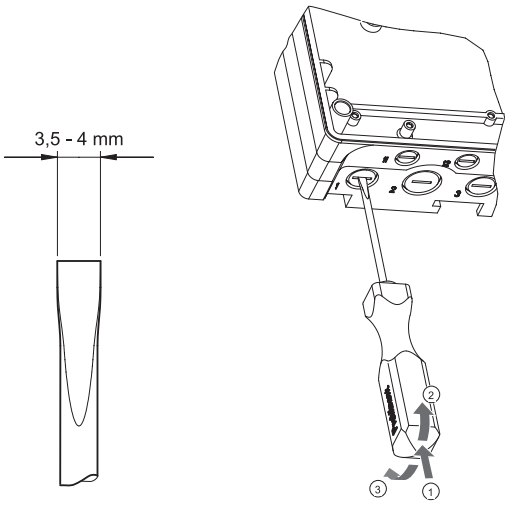
CAUTION

When breaking out the threaded holes make sure that the screwdriver does not penetrate the housing too deeply.
Interior parts of the controller might be damaged.

▶ To break out the threaded holes, push a small or medium-sized screwdriver (blade size 3.5 - 4 mm) into the slot at the centre of the threaded hole and push out the material (fig. 5).

▶ Refinish the edges.

Fig. 5: Break-out threaded hole



▶ Re-mount the modules.

▶ Re-connect the flat cable to the front part and place the front part in park position.

▶ Fix the corresponding screw fittings (fig. 6, 2) with the matching fastening nuts (fig. 6, 1) and tighten securely.

▶ Position the multiple gaskets (fig. 6, 2) into the screw fittings depending on the used cable cross-section (see table in the terminal diagram in the annex).

▶ Insert the cables into the screw fittings.

▶ The further steps are described in 5.1.2.2 “Coaxial cable, connection” and 5.1.2.3 “Terminals, connection”.

Please continue with the following steps:

▶ Tighten the union nut (fig. 6,4) of the screw fittings such that the fitting is tightly sealed.

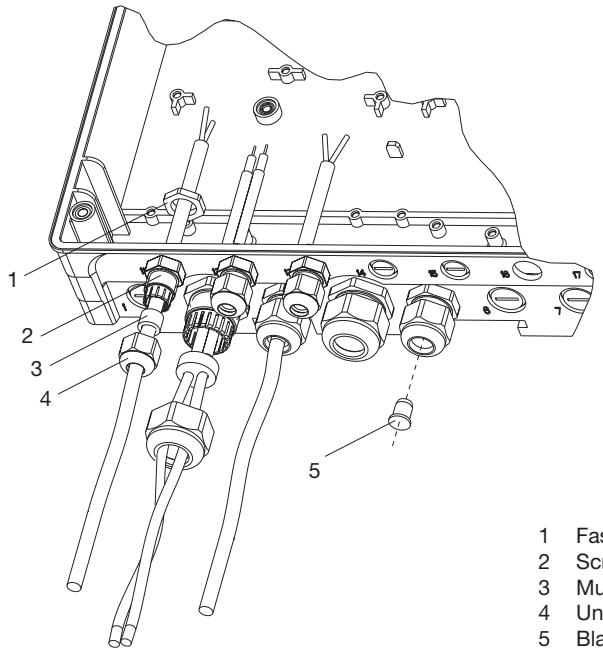
▶ Position the front part onto the rear part.

CAUTION

Check again for a correct position of the gaskets! The degree of protection IP 65 will only be guaranteed if the assembly was performed correctly!

▶ Tighten the housing screws finger-tight.

Fig. 6:
Screw fitting - mounting



1 Fastening nut
2 Screw fitting
3 Multiple gasket
4 Union nut
5 Blanking plug

5.1.2.2 Coaxial cable, connection

The pH and/or redox/ORP sensor is connected through a coaxial cable

▶ Expose the shield of the cable (reference electrode) as shown in fig. 7 (right side) and fix using the shield clip.

The liquid reference potential must not be connected for measurements under normal conditions.

In case of difficult electrical conditions, an equipotential bonding pin is to be connected to terminal no. 5 or no. 6 (activate later the liquid equipotential bonding in “Configuration” and “Parameter settings”).

The annex (terminal diagram) contains an overview of the connection options.

5.1.2.3 Terminals, connection

▶ Strip the cable ends as shown in fig. 7 (left side) and press on appropriate wire end ferrules.

▶ Disconnect the terminal blocks P1 through P4 for installation purposes.

▶ For the connection of the cables, insert the enclosed screwdriver completely into the square opening at the relevant terminal to be able to insert the cable end into the terminal block.

▶ Connect the cables as shown in the terminal diagram.

▶ Having connected the cables, re-connect each disconnected terminal block at its original position on the board.

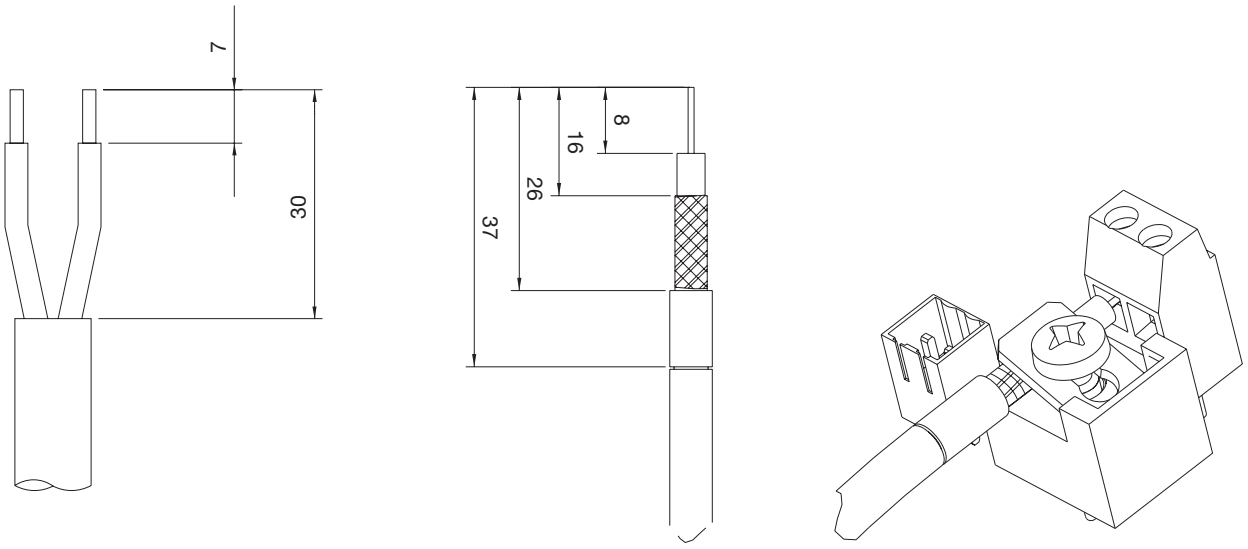
▶ Check the entire wiring based on the terminal diagram.

NOTE

The terminal diagram is shown in the annex.

In addition, the modules are equipped with a label close to the terminals showing the data for connection.

Fig. 7:
Cables, stripping



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3713_DXC

5.2 Procedures for DXM housings (small)

5.2.1 Mounting (mechanical)

The DMT is suitable for mounting on a wall.

Installation material (included in scope of delivery):

1x Wall/pipe bracket

2x Mushroom head screw 5x45 mm

2x Washer 5.3

2x Wall plug Ø 8 mm, plastic

1x Sealing cap

1x Lock screw (PT)

Please pay attention to the following steps for wall mounting:

- ▶ Detach wall/pipe bracket from the DMT:
  Pull the two snap hooks outward and press upward (Fig. 8, ①).
  Detach the wall/pipe bracket from the DMT and remove by pulling downward (Fig. 8, ②).
- ▶ Using the wall/pipe bracket as a drilling template, mark two drilling holes positioned diagonally.
- ▶ Drill holes: Ø 8 mm, d = 50 mm
- ▶ Screw down wall/pipe bracket using washers (Fig. 9).
- ▶ Attach the DMT at the top of the wall/pipe bracket (Fig. 10, ①) and press lightly against the wall/pipe bracket (Fig. 10, ②); then push upward until it is heard to snap in (Fig. 10, ③).

Fig. 8

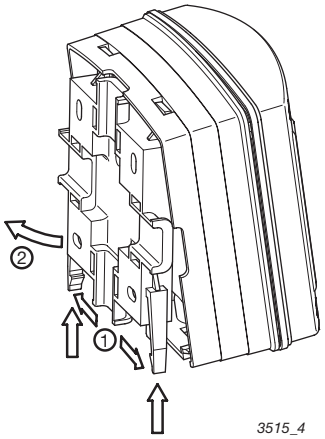


Fig. 9

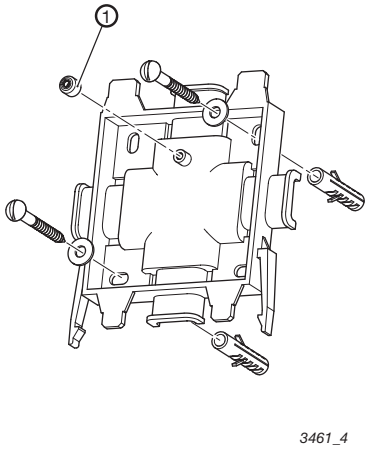
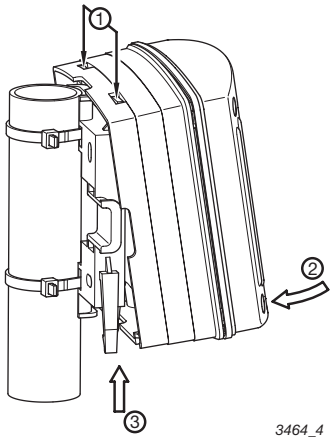


Fig. 10



5.2.2 Installing (electrical)

CAUTION

- ***Only a qualified technician is permitted to carry out the installation and connection procedure!***
- ***Installation/connection must only be performed after the DMT has been mounted!***
- ***Carry out installation corresponding to the data provided in the Technical Data (see operating instructions for the module)!***
- ***The device must be disconnected from the power supply when carrying out the installation procedure!***
- ***The signal lines of the DXM must not be installed together with lines that are particularly susceptible to interference!***
  Very high levels of interference can cause malfunctions in the DMX!
- ***The hinge between the front and rear sections of the housing is capable of bearing only light loads! Firmly brace the front section when working on the module!***

5.2.2.1 Wall mounting

▶ Slacken off the four housing screws.

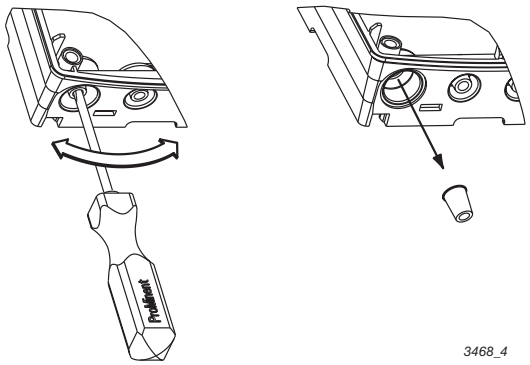
▶ Lift the front section forwards a little and open to the left.

NOTE

- ***The large screw connection (M20x1.5) is for coaxial cables only.***
- ***It is advisable to lead the power supply cable on the left through the small screw connections (M16x1.5).***

▶ Break out as many threaded holes as required on the underside of the rear section (Fig. 11).

Fig. 11



- ▶ Screw in and firmly tighten the corresponding screw connections (Fig. 12, ①).
- ▶ Fit reducer adapters in the screw connections corresponding to the cable cross section used (Fig. 12, ②).
- ▶ Pass the cables through the screw connections.
- ▶ The further steps are described under 5.2.2.4 Connecting Terminals.

Then continue with the following steps:

- ▶ Tighten the clamping screws (Fig. 12, ③) of the screw connections until they are tight.
- ▶ Close the front section on to the rear section.

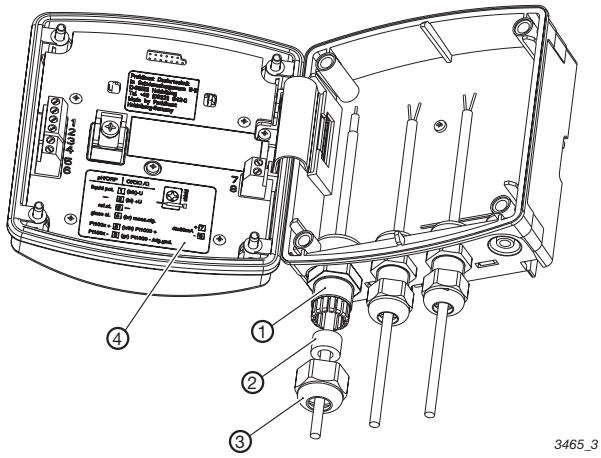
CAUTION

Again check that the seal is fitted correctly! The type of protection IP 65 can be achieved only if the module is installed correctly!

(If necessary, pull the front section forward a little to relieve the seal.)

- ▶ Hand tighten the housing screws.

Fig. 12



5.2.2.2 Control Panel Mounting (Internal Module)

NOTE

The cables must be installed in a cable duct on site for strain relief purposes.

Connect the cables as follows:

- ▶ The procedure is described under 5.2.2.4 Connecting Terminal.

5.2.2.3 Connecting Terminals

- ▶ Strip the ends of the cables as shown in Fig. 7 (on right) and press on corresponding wire end ferrules.
- ▶ Connect the cables corresponding to the terminal connection diagram (see operating instructions for the module).

5.3 CAN bus cable, installation

CAUTION

The sum of the spur lines branching off of the CAN bus main train must remain smaller than 10 m (do not forget to count the CAN cables in the DXC housings (length 0.6 m)).

5.3.1 Connections external to the housing

CAUTION

- ***Connect the individual parts of the CAN bus train one after each other starting from one side!***
  Otherwise, there is the possibility that at one or several positions socket may be positioned on socket or plug on plug!
- ***Never connect a T-distributor directly to the housing!***
  The flush-type connector at the housing might break!
- ***Manually tighten the screw fittings of the CAN cables up to the stop!***
  Otherwise, the degree of protection IP 65 will not be guaranteed.

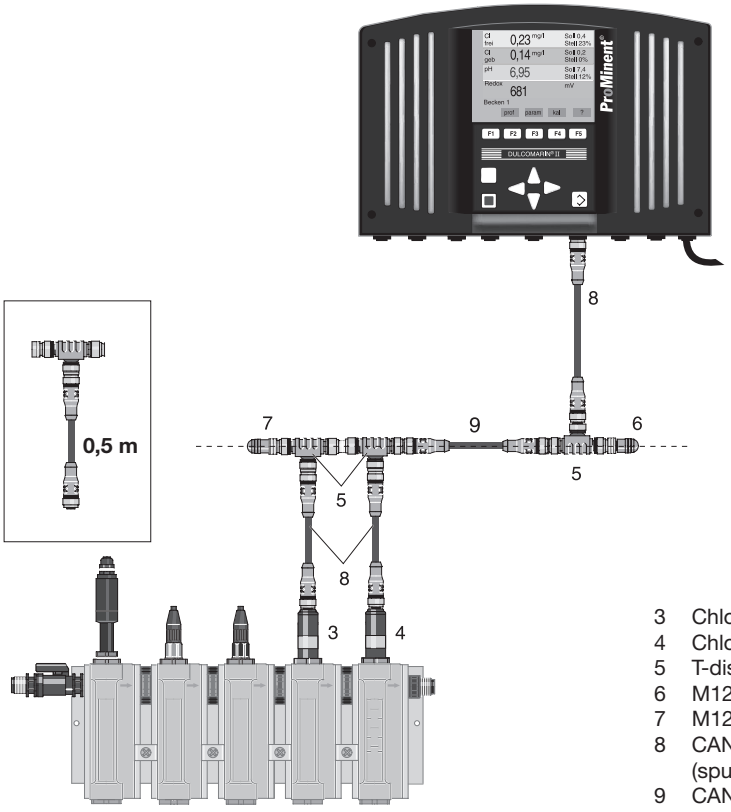
NOTE

The CAN devices are always equipped with connectors, never with sockets.

External modules, CAN-type chlorine sensor and the DULCOMARIN® II are interconnected by a CAN bus train. This is normally a CAN bus cable with a load resistor each at its ends (CAN connecting cable and T-distributor on dashed line in Fig. 13). The individual CAN devices are looped into this CAN bus train:

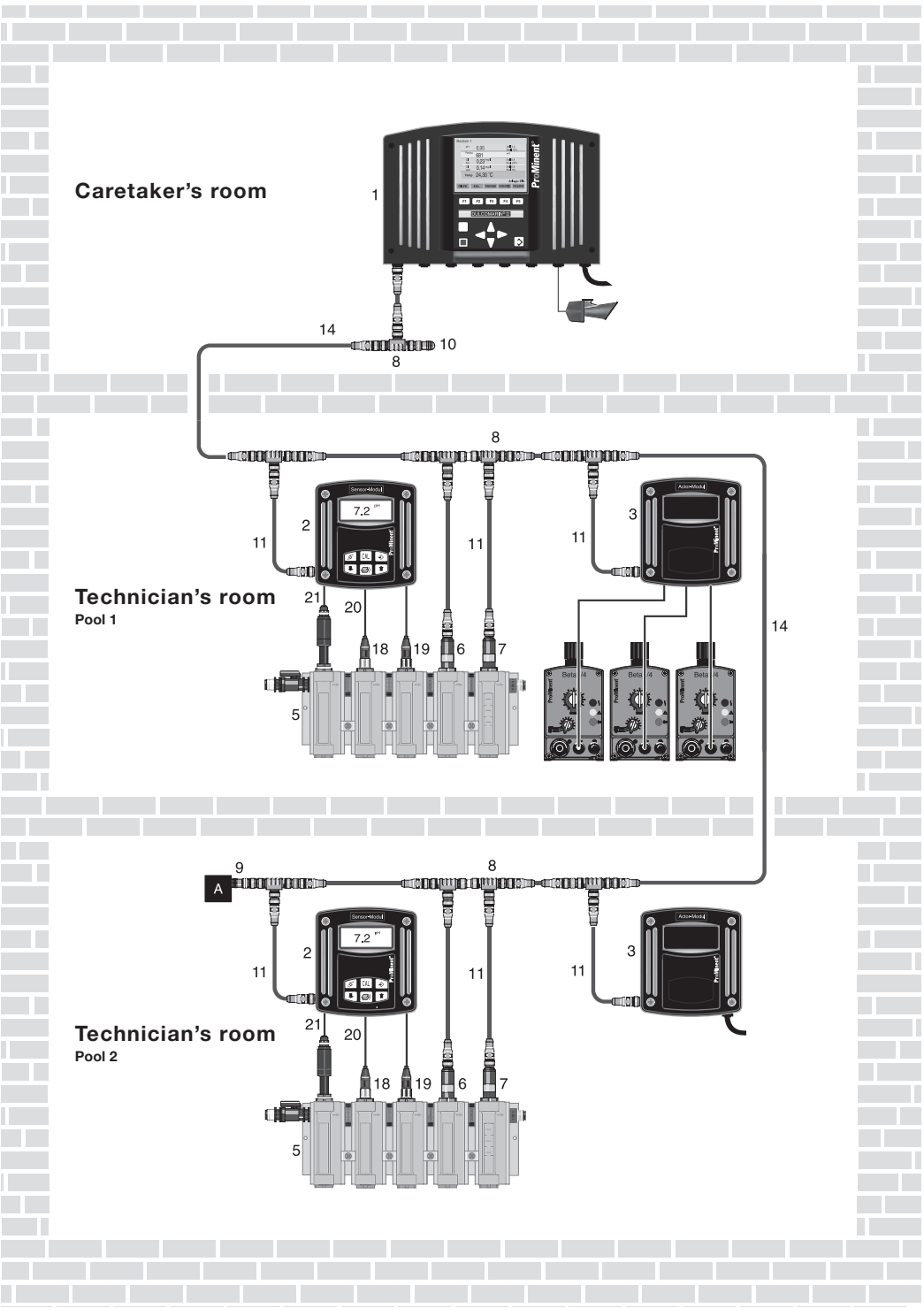
- ▶ Connect a spur line as short as possible (e.g. 0.5 m) with a T-piece at the end (see box in fig. 13) to each module and the DULCOMARIN® II (DXC: flush-type connector CAN 1).
- ▶ connect the T-pieces of the CAN modules one after each to CAN cables or directly couple with each other
- ▶ fix a load resistor each at both remaining ends of the CAN bus train (1 x with connection plug, 1 x with connection socket).

Fig. 13: Looping in of modules into the CAN bus train, Compact version



3 Chlorine sensor CLE
4 Chlorine sensor CTE
5 T-distributor
6 M12 load resistor coupling
7 M12 load resistor plug
8 CAN connecting cable (spur line 0.5 m)
9 CAN connecting cable

Fig. 14:
Looping in of modules into the CAN bus train, DULCO®-Net version



A = Terminating resistor at end of CAN bus
(the system can be expanded from this point)

5.3.2 Connections within the DXC housing

NOTE

In general it is not necessary to change anything at the cable connections within the DXC housing.

All CAN bus cables end at the P-module (power supply module with relay) (5), see fig. 15, or the N-module (power supply module):

- the five wires of the flush-type connector CAN 1 (1) at (2)
- the 16P flat cable of the display and operating module (not shown) at (3)
- the 10P flat cable of the A-module (actuator module) (6) and the M-module (measurement module) (7) at (4)

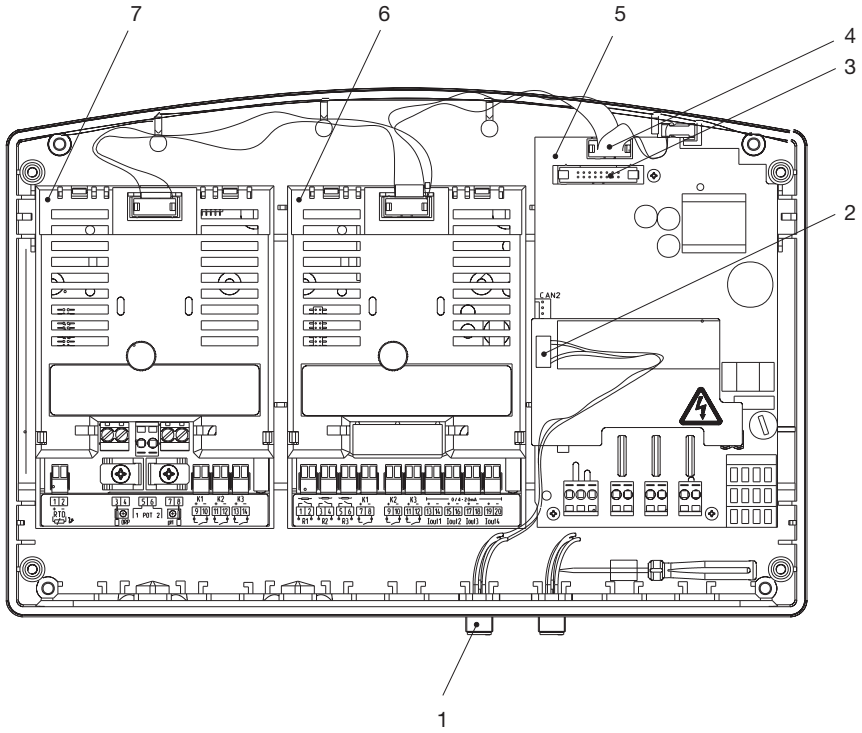


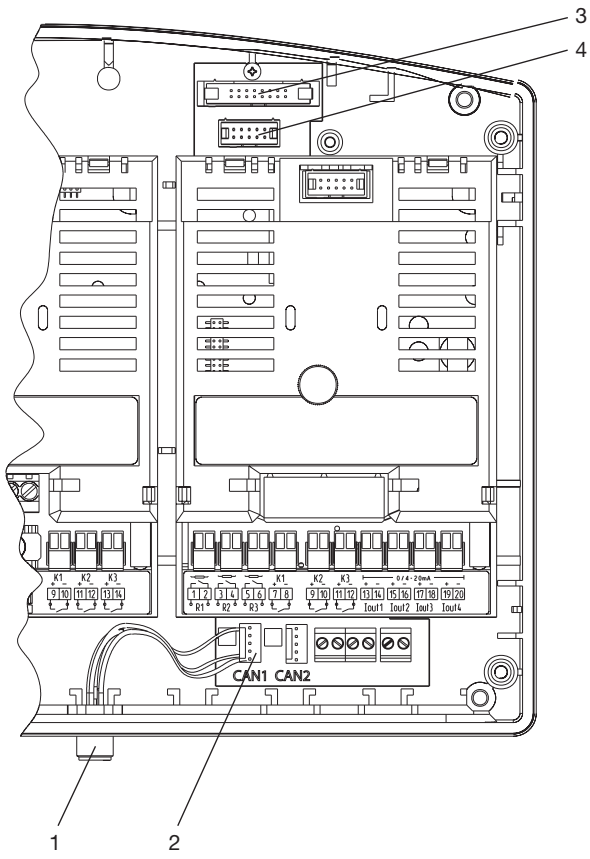
Abb. 15: CAN connection within the DXC housing

1 Flush-type connector CAN 1
2 Cable connection to the flush-type connector CAN 1
3 Cable connection to the A-module and the M-module
4 Cable connections to the display and operating module
5 P-module (Power supply module with relays)
6 A-module (Actuator module)
7 M-module (Measurement module)

If no P-module or N-module is located in the DXC housing:

Use a so-called L-board as distributor for the CAN bus lines (see fig. 16).

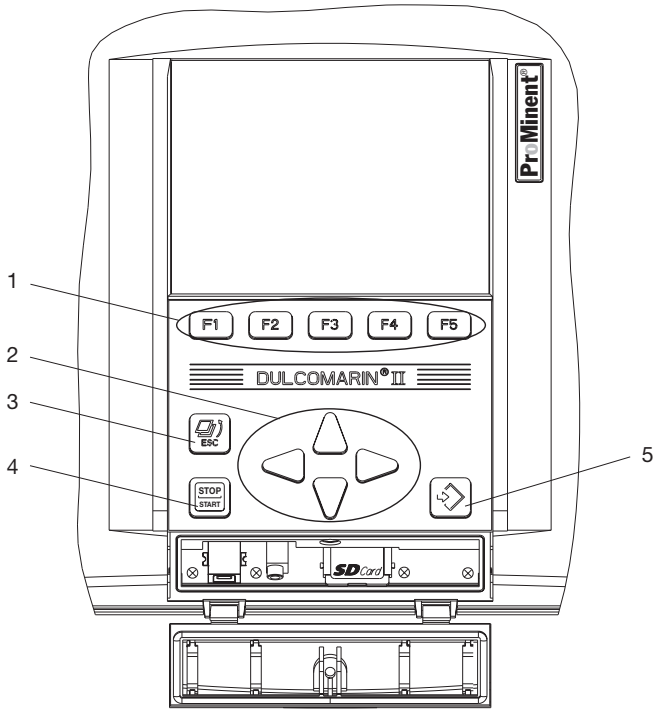
Fig. 16: Use of L-board



1 Flush-type connector CAN 1
2 Cable connection to the flush-type connector CAN 1
3 Cable connection to the A-module and the M-module
4 Cable connections to the display and operating module

6 Controller layout and controls

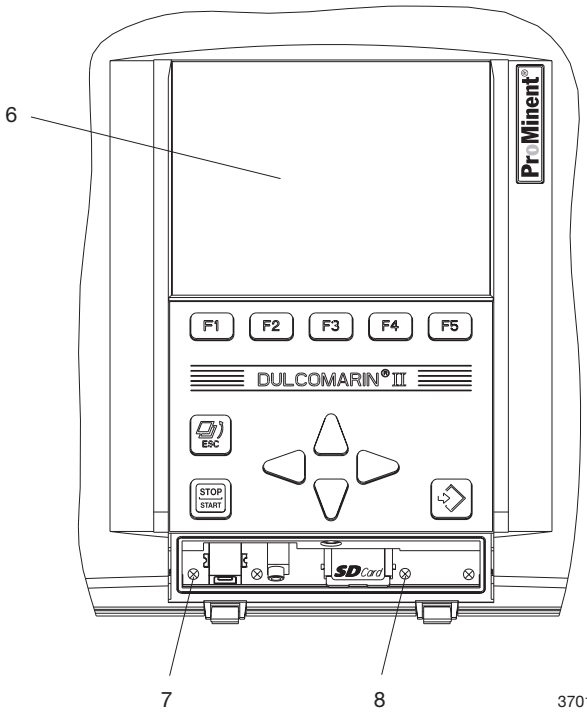
Fig. 17: Keys



1 Function keys, variable assignment
2 Arrow keys
3 ESC key
4 Start/stop key
5 Enter key

3701_3_1

Fig. 18: Displays



6 LCD screen
7 Device LED
8 CAN 1 LED

7 Description of functions (general)

The DULCOMARIN® II swimming pool controller is suitable for controlling one or several pools (depending on design).

The basic functions are assigned to the following modules (see also fig. 19)

- M-module (Measurement module)
- A-module (Actuator module)
- R-module (Actuator module for chlorinators)
- P-module (Power supply module with relay)
- N-module (Power supply module)

M-module (Measurement module)

- Measurement and control of the pH value
- Measurement and display (optional control) of the redox/ORP
- Measurement and display of the temperature of the sample water
- Measurement and display of the circulation throughput
- Monitoring of the sample water
- Measurement of the temperature of the sample water
- Measurement of free chlorine
- Measurement of total chlorine
- Display of combined chlorine
  (optional; calculated from difference of total chlorine and free chlorine)

Chlorine sensors:

- Measuring free chlorine and temperature
- Measuring total available chlorine and temperature
- Measuring bound chlorine as chlorine difference measurement

A-module (Actuator module)

- Control of dosing pumps for pH correction and disinfectant dosing
  (via 3 frequency outputs, 3 switch inputs for pump errors or monitoring of tank level)
- Output of measuring values for pH value, redox/ORP, free chlorine, total chlorine, combined chlorine, or temperature (4 analogue outputs 0/4...20 mA, user-programmable and scalable)

R-module (Actuator module for chlorinators)

- Control of an actuator with position feedback for disinfectant dosing (2 relay outputs, position feedback input))

P-module (Power supply module with relay)

- Control of solenoid valve or peristaltic pump for pH correction (via pulse length output)
- Control of solenoid valve or peristaltic pump for disinfectants (via pulse length output)
- Control of peristaltic pump for flocculants (via pulse length output) or minimisation of combined chlorine (via relay output)
- Alarm (via relay output)
- Supply of the CAN bus with supply voltage

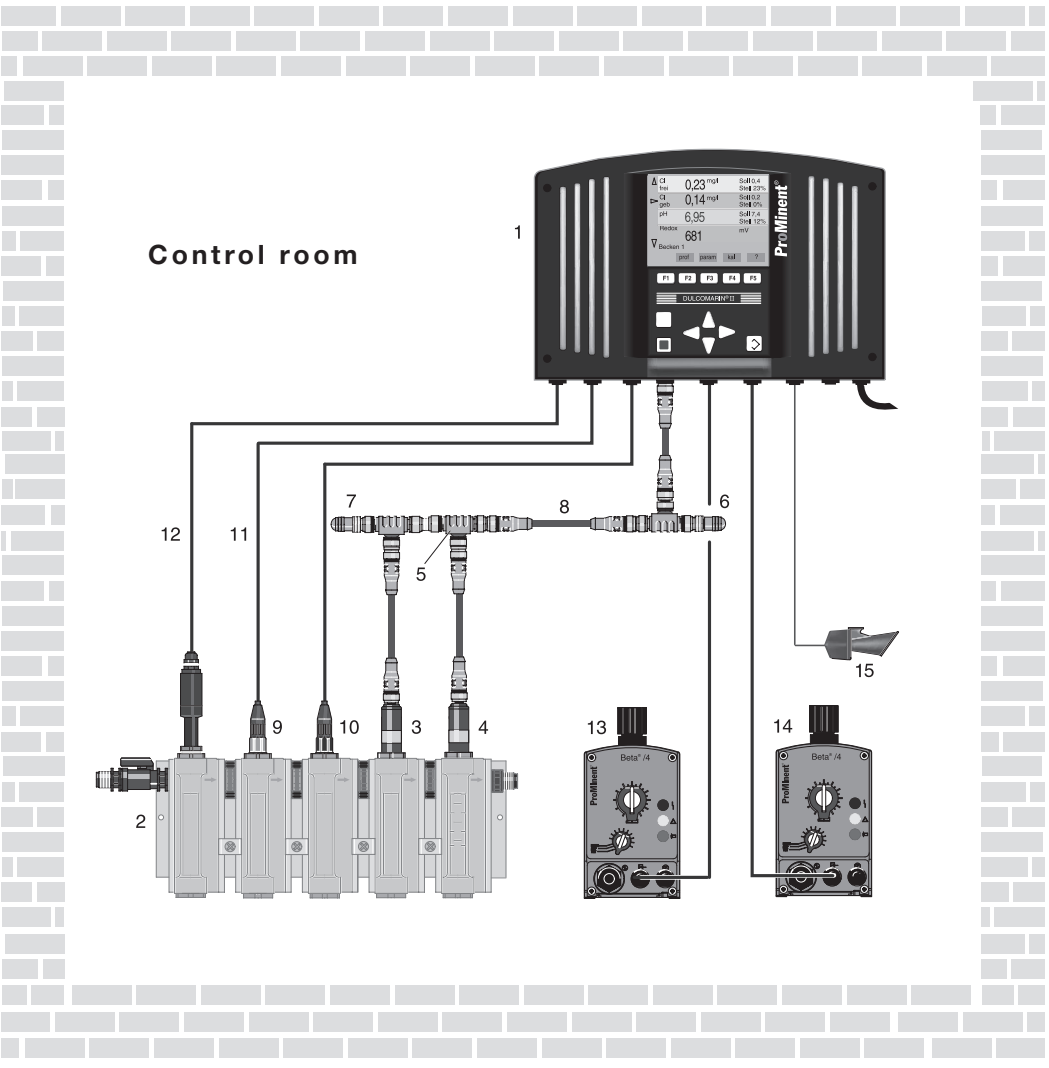
N-module (Power supply module)

- Supply of the CAN bus with supply voltage

CANopen Metering pumps (Beta/4a, delta DLTa, Sigma S1Ca-S2Ca-S3Ca)

- For metering of pH correction agent, disinfectant or flocculant

Fig. 19: Measuring and control system for one filtration cycle



pk_5_020

1 Pool controller DULCOMARIN® II
2 In-line probe housing DGMa
3 Chlorine sensor CLE
4 Chlorine sensor CTE
5 T-distributor
6 M12 load resistor coupling
7 M12 load resistor plug
8 CAN connecting cable
9 pH sensor
10 redox/ORP sensor
11 coaxial cable
12 control lead
13 Dosing pump 1
14 Dosing pump 2
15 Alarm horn

8 Maintenance and repair

Maintenance

The DULCOMARIN® II is maintenance-free.
As a preventative measure, replace the battery after 10 years. (The DULCOMARIN® II also triggers an alert.)
It is recommended to clean the housing with a cloth dampened with soap water.
Subsequently, rub dry.

CAUTION

Do not use any solvents! Otherwise the surfaces may be damaged!

Repairs

Please return the DULCOMARIN® II to ProMinent for any repairs required.

9 Disposal

CAUTION

Lithium batteries may emit substances detrimental to health, they may get hot or explode if treated improperly or with force (heating up, short-circuiting, crushing, …)!

CAUTION

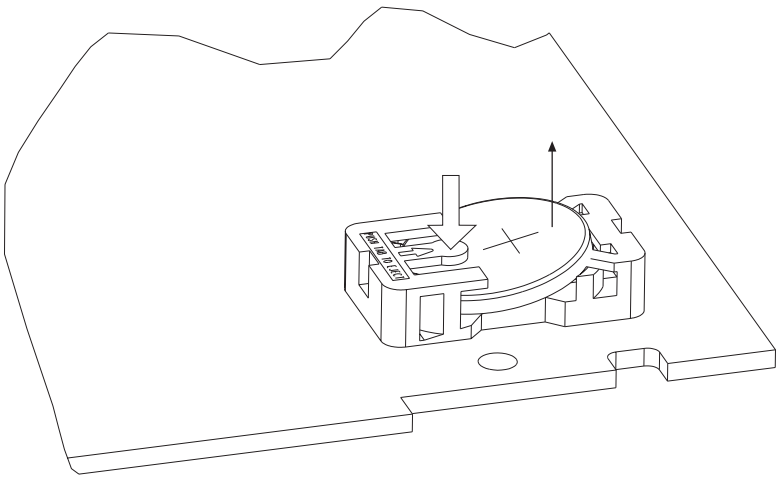
- ***The lithium battery is hazardous waste!***
  The battery must be disposed of separately from the controller!
  Please observe the relevant local regulations!
- ***Electronic waste is hazardous waste!***
  Please observe the relevant local regulations!

The battery is located in a retainer on the back of the upper DXC housing part.

▶ Loosen the four fixing screws at the front of the upper housing part, separate the upper housing part from the lower part to gain access to the battery.

▶ Press onto the lug at the retainer (see fig. 20) and remove the battery from the retainer.

Fig. 20:
Removal of battery



10 Technical data

(supplementary to modules)

11 Replacement parts and accessories

Description:	Order no.
Chlorine sensor CLE 3-CAN-10 ppm**	1023425
Chlorine sensor CLE 3.1-CAN-10 ppm**	1023426
Chlorine sensor CTE 1-CAN-10 ppm**	1023427
Chlorine sensor CGE 2-CAN-10 ppm**	1024420
T-distributor M12 5P CAN	1022155
M12 load resistor coupling	1022154
M12 load resistor plug	1022592
Connecting cable - CAN, M12, 5P, 0.5 m	1022137
Connecting cable - CAN, M12, 5P, 1 m	1022139
Connecting cable - CAN, M12, 5P, 2 m	1022140
Connecting cable - CAN, M12, 5P, 5 m	1022141
Connecting cable - CAN, sold by the meter	1022160
Plug-CAN M12 5P, screw terminal	1022156
Coupling-CAN M12 5P, screw terminal	1022157
pH electrode PHES 112 SE	150702
Redox/ORP electrode RHES-Pt-SE	150703
Cable combination Coax 0.8 m - SN6, prefabricated	1024105
Cable combination Coax 2 m - SN6, prefabricated	1024106
Cable combination Coax 5 m - SN6, prefabricated	1024107
Signal lead, sold by the meter, 2x0,25 mm^2	725122
Buffer solution pH 4, red, 50 ml	506251
Buffer solution pH 7, green, 50 ml	506253
Buffer solution redox/ORP 465 mV, 50 ml	506240
Fuse 5x20, slow, 0.63 AT VDE	712030
Battery 3 V, approx. 190 mAh Li-battery BR2032	732829

** For diaphragm caps and electrolytes for chlorine sensors see the equipment catalogue

12 EC Declaration of Conformity

EC Declaration of Conformity

We,

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

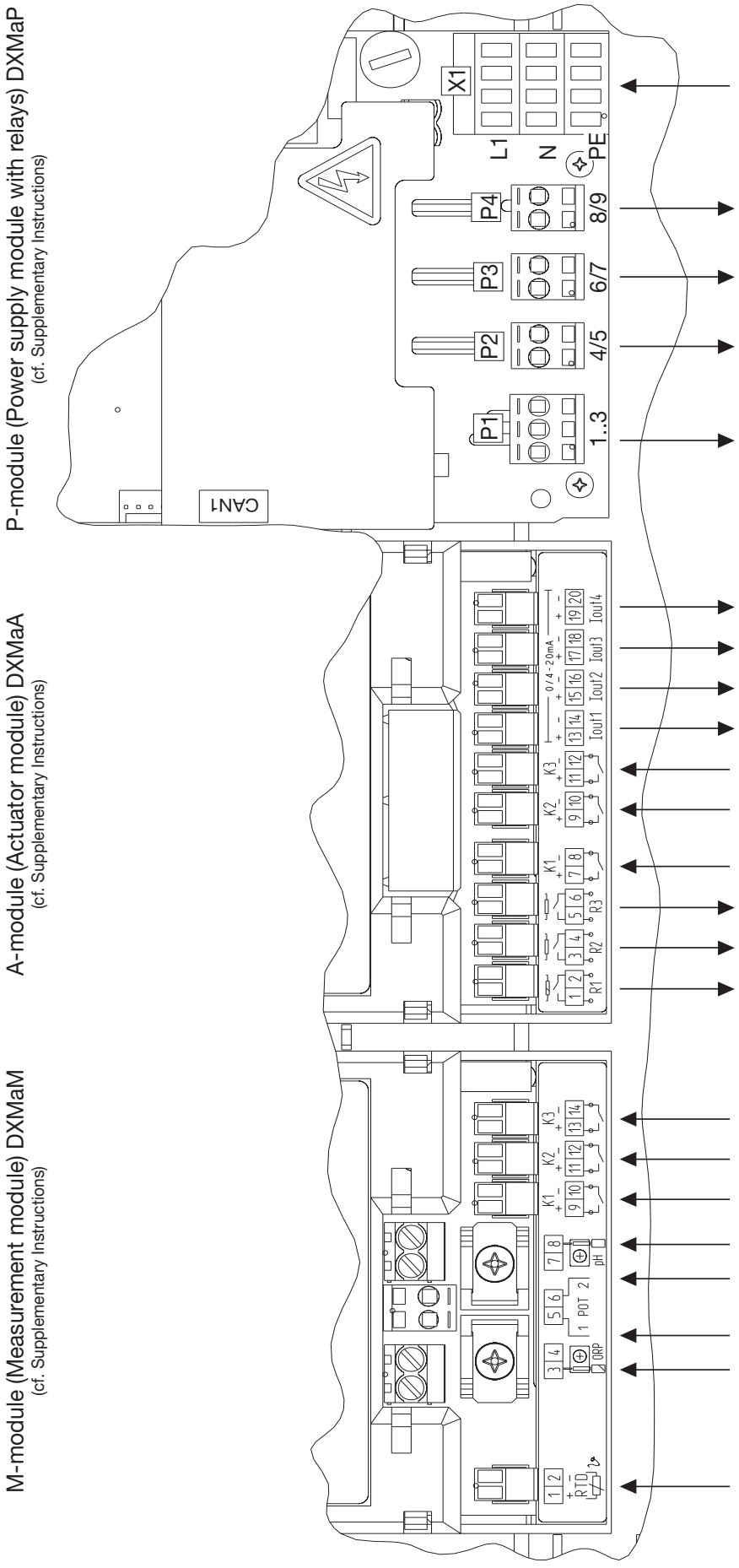
hereby declare that, on the basis of its functional concept and design and in the version brought into circulation by us, the product specified in the following complies with the relevant, fundamental safety and health stipulations laid down by EC regulations.
Any modification to the product not approved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

Product description :	***measurement and control system DULCOMARIN II***
Product type :	***DXCa, DXMa***
Serial number :	***see type identification plate on device***
Relevant EC regulations :	***EC - low voltage directive (2006/95/EC)*** ***EC - EMC - directive (2004/108/EC)***
Harmonised standards used, in particular	***EN 60068-2-30, EN 61010-1, EN 60335-1,*** ***EN 50106, EN 60204-1, EN 60529,*** ***EN 61326, EN 61000-3-2, EN 61000-3-3,*** ***EN 60746-1***
National standards and other technical specifications used, in particular :	***DIN 19265, ISO 11898-2***
Date/manufacturer´s signature :	*01.10.2007* Dr. Johannes Hartfiel
The undersigned :	*Dr. Johannes Hartfiel, assistent development manager*

CAN standards and specifications complied with
The controller meets the standardised CAN specification for hardware 2.0 (ISO99-1, ISO99-2). This includes the CAN protocol (ISO 11898-1) and details about the physical application layer in accordance with ISO 11898-2 (high speed CAN to 1Mbit/sec.) and ISO 11898-3 (low speed CAN to 125kBit/sec.).
The device complies with the CAN-Open specification CIA-DS401, the basis of the European Standard EN50325-4.
It complies with the controller device profile CiA-404.

Terminal diagram (DULCOMARIN® compact)

(Example arrangement of the modules)



Wiring of the modules within the DULCOMARIN® compact

(for example on the previous page)

	Description	Terminal description	Terminal no.	Pol.	Function	Rec. cable diameter	Drilling hole no. / size	Remarks
Module DXMaM	Temperature input **Pt1000**/*100*	RTD	1	+	Temp.-sensor	d 5	1/M16	
			2	-				
	ORP input 1	ORP(pH)	3	Ref.	ORP-sensor	d3/d5	2 / M20	Lead cable through multiple gasket set 2x5 or 2x4 mm
			4	meas sig.				
	Liquid reference potential 1	Pot.1	5				11 / M12	
	Liquid reference potential 2	Pot.2	6		pH-sensor		11 / M12	
	pH input 2	(ORP)pH	7	Ref.		d3/d5	2 / M20	Lead cable through multiple gasket set 2x5 mm
			8	meas sig.				
	Digital input 1	K 1	9	+	Error sample water	d 4	3 / M16	Lead cable through multiple gasket set 2x4 mm
			10	-				
	Digital input 2	K 2	11	+	Pause (backflushing)	d 4		
			12	-				
	Digital input 3	K 3	13	+	ECO!Mode	d 4	12 / M12	
			14	-				
Module DXMaA	Relay output 1	R 1	1	+	Pump acid control or pump alkaline control	d 5	13 / M12	
			2	-				
	Relay output 2	R 2	3	+	Pump chlorine control Pump acid control Pump redox/ORP control	d 5	14 / M12	
			4	-				
	Relay output 3	R 3	5	+	Pump flocculant control Pump chlorine control Pump redox/ORP control	d 5	15 / M12	
			6	-				
	Digital input 1	K 1	7	+	Error pump or level	d 4	4 / M20	Lead 2 cables through multiple gasket set 2x4 mm
			8	-				
	Digital input 2	K 2	9	+	Error pump or level	d 4		
			10	-				
	Digital input 3	K 3	11	+	Error pump or level	d 4	5 / M16	
			12	-				
	Power output 0/4-20mA 1	I out 1	13	+	Recorder connection pH	d 4	6 / M16 2	Lead 2 cables through multiple gasket set 2x4 mm
			14	-				
	Power output 0/4-20mA 2	I out 2	15	+	Recorder connection ORP	d 4		
			16	-				
	Power output 0/4-20mA 3	I out 3	17	+	Recorder connection free chlorine	d 4	7 / M16 2	Lead 2 cables through multiple gasket set 2x4 mm
			18	-				
	Power output 0/4-20mA 4	I out 4	19	+	Recorder connection combined chlorine or recorder connection temperature	d 4		
			20	-				
Module DXMaP	Alarm relay	P 1	1		Control signal-horn	d 6.5	8 / M16	
			2					
			3					
	Power relay 1	P 2	4		Control solenoid valve (DULCO®flex) acid or control solenoid valve (DULCO®flex) alkaline	d 6.5	9 / M16	
			5					
	Power relay 2	P 3	6		Control solenoid valve (DULCO®flex) chlorine or control solenoid valve (DULCO®flex) ORP control solenoid valve (DULCO®flex) acid control solenoid valve (DULCO®flex) alkaline	d 6.5	18 / M12	
			7					
	Power relay 3	P 4	8		Control UV plant (ozone, activated carbon) Control solenoid valve (DULCO®flex) chlorine or control solenoid valve (DULCO®flex) ORP Control heater	d 6.5	19 / M12	
			9					
	Power	X 1	10	PE		d 6.5	10 / M16	
			11	N				
			12	L(1)				
CAN module connection	CAN 1 - bus connection	CAN 1	1	Shield		Plug (A-coding)	16 / M12	
			2	24V				
			3	ground				
			4	CAN high				
			5	CAN low				

* The detailed assignment options are described in the “Supplementary instructions DULCOMARIN® II, Modules DXMa”.

NOTE

The terminal diagrams for further modules are described in the “Supplementary instructions DULCOMARIN® II, Modules DXMa”.

Technical changes reserved.

ProMinent Dosiertechnik GmbH
Im Schuhmachergewann 5-11
69123 Heidelberg
Germany

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

info@prominent.com
www.prominent.com