Assembly instructions
Multi-Channel Measuring and Control System
DULCOMARIN® II Swimming Pool Controller and Disinfection Controller DXCa

Part 1: Assembly and installation

Please enter the identity code of your device here! DXCa _______________________

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!
Technical changes reserved.
These operating instructions and supplementary instructions are only valid in combination with the following operating and supplementary instructions:

- Multi-channel measuring and control system operating instructions DULCOMARIN® II, Swimming Pool Controller and Disinfection Controller DXCa Part 2: Operation
- Supplementary instructions DULCOMARIN® II, Screen plotter operation
- Supplementary instructions DULCOMARIN® II, M-Module (measuring module for pH, redox [ORP], temperature) DXMaM connection
- Supplementary instructions DULCOMARIN® II, A-Module (control module, pump and standard signal outputs mA) DXMaA
- Supplementary instructions DULCOMARIN® II, N-Module (power supply module without relay) DXMaN
- Supplementary instructions DULCOMARIN® II, P-Module (power supply module with relay) DXMaP
- Supplementary instructions DULCOMARIN® II, I-Module (current input module, standard signal inputs mA) DXMaI
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1 Device identification / identity code

The identity code describes the DULCOMARIN® II, compact controller

1) The supplied cable is for connection to a hub, switch, router or an intranet.

For direct connection of the DULCOMARIN® II to a PC/MAC, the supplied LAN coupling and category 5 cross-over cable are required.

The maximum LAN cable length is approximately 100 m.

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

The scope of supply of the DXCa includes:
- 1 T-coupler
- 1 CAN connection cable
- 1 terminating resistance coupling and 1 terminating resistance plug
- 1 SD memory card 64 MB or greater
- 1 card reader suitable for PCs

<table>
<thead>
<tr>
<th>DXCa</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Mounting type:</td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>Wall mounted (IP 65)</td>
</tr>
<tr>
<td>S</td>
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<tr>
<td>0</td>
<td>With operating elements</td>
</tr>
<tr>
<td>D</td>
<td>With operating elements for use in drinking water/disinfection applications</td>
</tr>
<tr>
<td>Communication interfaces:</td>
<td></td>
</tr>
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<td>none</td>
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<tr>
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**The identity code describes the complete DULCOMARIN® II DULCO® Net Central Unit.**

If the central unit is populated with modules, then the following applies:

- Module 1 preferably as M module
- Module 2 preferably allocated to the A module.
- Module 3 must always be allocated to the P or N module.

1) Module 1 preferably as M module
2) only in version: "2" without controls

<table>
<thead>
<tr>
<th>DXCa</th>
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<tbody>
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<td>S Control cabinet (IP 54)</td>
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<td>6 OPC-Server + Embedded Web-Server, LAN incl. 5 m LAN patch cable 1:1, LAN-coupling, 5 m cross-over-cable 1)</td>
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<tr>
<td>A</td>
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<tr>
<td>M</td>
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<th>Application:</th>
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<td>S</td>
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<table>
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<th>Preset language:</th>
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</table>

Device identification / identity code 7
2 Introduction

The operating instructions describe the technical data and functions of the multi-channel measuring and control system DULCOMARIN® II Swimming Pool Controller and Disinfection Controller DXCa. The operating instructions subsequently refer to the system merely as DXCa.

2.1 Explanation of the safety information

These operating instructions provide information on the technical data and functions of the product. These operating instructions provide detailed safety information and are provided as clear step-by-step instructions.

The safety information and notes are categorised according to the following scheme. A number of different symbols are used to denote different situations. The symbols shown here serve only as examples.

**DANGER!**

*Nature and source of the danger*
Consequence: Fatal or very serious injuries.
Measure to be taken to avoid this danger
Danger!
– Denotes an immediate threatening danger. If this is disregarded, it will result in fatal or very serious injuries.

**WARNING!**

*Nature and source of the danger*
Possible consequence: Fatal or very serious injuries.
Measure to be taken to avoid this danger
Warning!
– Denotes a possibly hazardous situation. If this is disregarded, it could result in fatal or very serious injuries.

**CAUTION!**

*Nature and source of the danger*
Possible consequence: Slight or minor injuries, material damage.
Measure to be taken to avoid this danger
Caution!
– Denotes a possibly hazardous situation. If this is disregarded, it could result in slight or minor injuries. May also be used as a warning about material damage.
2.2 Users' qualifications

WARNING!
Danger of injury with inadequately qualified personnel!
The operator of the plant / device is responsible for ensuring that the qualifications are fulfilled.
If inadequately qualified personnel work on the unit or loiter in the hazard zone of the unit, this could result in dangers that could cause serious injuries and material damage.
- All work on the unit should therefore only be conducted by qualified personnel.
- Unqualified personnel should be kept away from the hazard zone

<table>
<thead>
<tr>
<th>Training</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td>Instructed personnel</td>
<td>An instructed person is deemed to be a person who has been instructed and, if required, trained in the tasks assigned to him/her and possible dangers that could result from improper behaviour, as well as having been instructed in the required protective equipment and protective measures.</td>
</tr>
<tr>
<td>Trained user</td>
<td>A trained user is a person who fulfills the requirements made of an instructed person and who has also received additional training specific to the system from ProMinent or another authorized distribution partner.</td>
</tr>
<tr>
<td>Trained qualified personnel</td>
<td>A qualified employee is deemed to be a person who is able to assess the tasks assigned to him and recognize possible hazards based on his/her training, knowledge and experience, as well as knowledge of pertinent regulations. The assessment of a person's technical training can also be based on several years of work in the relevant field.</td>
</tr>
<tr>
<td>Training</td>
<td>Definition</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Electrician</td>
<td>Electricians are deemed to be people, who are able to complete work on electrical systems and recognize and avoid possible hazards independently based on his/her technical training and experience, as well as knowledge of pertinent standards and regulations. Electricians should be specifically trained for the working environment in which they are employed and know the relevant standards and regulations. Electricians must comply with the provisions of the applicable statutory directives on accident prevention.</td>
</tr>
<tr>
<td>Customer Service depart-</td>
<td>Customer Service department refers to service technicians, who have received proven training and have been authorised by ProMinent to work on the system.</td>
</tr>
<tr>
<td>ment</td>
<td></td>
</tr>
</tbody>
</table>

**Note for the system operator**

The pertinent accident prevention regulations, as well as all other generally acknowledged safety regulations, must be adhered to!
3 Safety and responsibility

3.1 General safety information

**WARNING!**
**Unexpected start-up**
The DULCOMARIN® II has no on/off switch. It starts working as soon as voltage is supplied to the mains cable.

Possible consequence: Fatal or very serious injuries

- Measure: Ensure that there can be no unauthorised access to the device
- Match your actions to this particular feature
  - Only connect the device to the mains if all preparatory tasks have been completed and the device can be placed in service without any danger

**WARNING!**
**Possibility of overdosing of feed chemicals**
Prevent overdosing of feed chemicals in the event of sensor failure or removal.

Possible consequence: Fatal or very serious injuries

- Measure: Configure your processes so that uncontrolled dosing during sensor selection or malfunction is not possible

**WARNING!**
**Maintenance of the degree of protection**
Screw the transparent interface cover in place over the LEDs so that leak-tightness is recreated, if it has been opened.

Otherwise the IP 65 rating is not achieved.

**CAUTION!**
Only use the devices which are described in these operating instructions with CANopen third party devices which are certified.

3.2 Correct and proper use

**NOTICE!**
**Compensation for control deviations**
Damage to the product or its surroundings

- The controller can be used in processes, which require compensation of > 30 seconds
NOTICE!
Correct and proper use

The unit is intended to measure and regulate liquid media. The marking of the measured variables is located on the controller and is absolutely binding.

The unit may only be used in accordance with the technical details and specifications provided in this operating manual and in the operating manuals for the individual components (such as, for example, sensors, fittings, calibration devices, metering pumps etc.). Any other uses or modifications are prohibited.
4 Planning aids and requirements for the installation site

Ambient conditions

CAUTION!
Protect the module against moisture and the effects of chemicals, even while still packaged.
The DULCOMARIN® II is resistant to the normal atmospheres in plant rooms

Store and transport the module in its original packaging.

Ambient conditions for storage and transportation:
- Temperature: -10 °C ... 70 °C
- Max. permissible relative humidity: 95 %, non-condensing (DIN IEC 60068-2-30)

Ambient conditions for operation:
- Temperature: 0 °C ... 50 °C
- Max. permissible relative humidity: 95 %, non-condensing (DIN IEC 60068-2-30)

4.1 Requirements for the installation site

- Do not position the DULCOMARIN® II outside
- Protect the DULCOMARIN® II against sun and frost
- Secure the DULCOMARIN® II against unauthorized access
- A mains connection is necessary
4.2 Determine the requirement for cables and accessories

![Diagram of measuring point](AXAS5)

**Fig. 1: A typical complete measuring point could appear as shown:**

<table>
<thead>
<tr>
<th>Item.</th>
<th>Quantity</th>
<th>Description</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>T-coupler M12 5-pole CAN</td>
<td>1022155</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>M module DXMa M W 0 S DE 01</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>Connecting cable - CAN, M12, 5 pole, 0.5 m</td>
<td>1022137</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Chlorine sensor CLE 3.1-CAN-10 ppm</td>
<td>1023426</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>Chlorine sensor CTE 1 CAN-10 ppm</td>
<td>1023427</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>Redox sensor RHES-Pt-SE</td>
<td>150703</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>pH sensor PHES 112 SE</td>
<td>150702</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Coaxial cable 2 m - SN6 - pre-assembled</td>
<td>1024106</td>
</tr>
<tr>
<td>9</td>
<td>2</td>
<td>Control lead 2 x 0.25 mm²</td>
<td>725122</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>Connecting cable - CAN, M12, 5 pole, 0.5 m</td>
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<tr>
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<td>In-line probe housing DGMa 3 2 2 T 0 0 0</td>
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</table>

The central unit and each external module includes enclosed accessories.
Planning aids and requirements for the installation site

Fig. 2: Central unit DXCa

Accessories, supplied

<table>
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<tr>
<th>Item</th>
<th>Quantity</th>
<th>Description</th>
<th>Part no.</th>
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<td>1</td>
<td>Connecting cable - CAN, M12, 5 pole, 0.5 m</td>
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<td>1</td>
<td>T-coupler, M12,5-pole CAN</td>
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</tr>
<tr>
<td>-</td>
<td>1</td>
<td>Terminating resistance M12 socket [male]</td>
<td>1022154</td>
</tr>
<tr>
<td>-</td>
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<td>Terminating resistance M 12 plug [female]</td>
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Planning aids and requirements for the installation site

Fig. 3: External modules DXMa

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<tbody>
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<td>1</td>
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</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Connecting cable - CAN, M12, 5 pole 0.5 m</td>
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### Fig. 4: Beta/4 CANopen

**Accessories, supplied**

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<td>T-coupler, M12,5-pole CAN</td>
<td>1022155</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Connecting cable - CAN, M12, 5 pole 1 m</td>
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</table>

### Fig. 5: Sensors DXUa

**Accessories, supplied**

<table>
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<td>Connecting cable - CAN, M12, 5 pole 0.5 m</td>
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</table>
Planning aids and requirements for the installation site

1. Determine the requirement for power supply modules, see Chapter 4.3 ‘Allocate power supply modules (DULCOMARIN® II DULCO-Net)’ on page 18.

2. Determine the requirement for connection cables between the external modules.

3. Determine the requirement for holding clamps for the connection cables (ASV pipe clips, 16 mm, order no. 359904).

4.3 Allocate power supply modules (DULCOMARIN® II DULCO-Net)

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

1. Ensure that for each power supply module there is a power outlet.

   The distance between the power supply modules should not exceed 50 m.

2. Distribute the power supply modules as uniformly as possible over the CAN bus line.

3. With an A module with connected plotters: arrange one of the power supply modules as close as possible to the A module.

   The central unit always contains a power supply module.

<table>
<thead>
<tr>
<th>Number of pools</th>
<th>Additional N- or P-modules</th>
<th>Number of pools</th>
<th>Additional N- or P-modules</th>
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<td>-</td>
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<td>4</td>
<td>16</td>
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Divide the number of pools by ‘2’. If a remainder is obtained, round down: (Exception: number of pools = 2).
4.4 Routing the CAN bus backbone

**CAUTION!**
Maximum backbone length
Possible consequence: Malfunctions.
- The maximum backbone length (without branching cables) must be less than 400 m

**CAUTION!**
Maximum length of branching cables
Possible consequence: Malfunctions.
The T-pieces and connecting cables (branching cables) enclosed with the modules (M-, A-, G-, N-, R-, I- modules, CAN sensors and metering pumps with CAN bus must be used.
Branching cables are the connections branching from the CAN bus backbone to the modules.

The external modules can be placed in any sequence along the CAN bus backbone. The operating instructions show for example possible sequences of the external modules.

*Each CAN cable has a plug or coupling on each end so that these can be coupled together in sequence to create longer cables.*

**Rule**
Arrange the external modules in groups for each pool.
First assemble and install the external modules and their attachments. Only then should you connect the external modules with the CAN bus backbone and with each other via the the shortest route.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part no.</th>
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<tbody>
<tr>
<td>Connecting cable - CAN, M12, 5 pole, 0.5 m</td>
<td>1022137</td>
</tr>
<tr>
<td>Connecting cable - CAN, M12, 5 pole, 1 m</td>
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<td>Connecting cable - CAN, M12, 5 pole, 2 m</td>
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<td>Connecting cable - CAN, M12, 5 pole, 5 m</td>
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<tr>
<td>Connecting cable - CAN sold by the metre</td>
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</tbody>
</table>
5   Assembly and installation

5.1 Procedure with DXC housing (large)

The DXC housing is suitable for mounting on a wall or in a control panel.

5.1.1 Wall mounting

Mounting materials (contained in the scope of delivery)

- 1 x wall bracket
- 4 x PT screws 5 x 35 mm
- 4 x washers 5.3
- 4 x rawl plug Ø 8 mm, plastic

Wall mounting

Take the wall bracket out of the DXC housing.

Fig. 6: Removing the wall bracket

1.  Pull the two snap hooks (1) outwards
    ⇒ The wall brackets snaps slightly downwards.

2.  Push the wall bracket downwards (2) from the DXC housing and fold (3) it out

3.  Use the wall bracket as a drilling template to mark the positions of four drill holes

4.  Drill the holes: Ø 8 mm, d = 50 mm
Fig. 7: Fitting the wall bracket
5. Screw the wall bracket into position using the washers, see Fig. 7

Fig. 8: Fitting the wall bracket
6. Hook the bottom of the DXC housing (1) into the wall bracket
7. Lightly press the DXC housing at the top (2) against the wall bracket
8. Then check that the DXC housing is hooked in at the top and press down (3) until it audibly engages
5.1.2 Control panel mounting

**CAUTION!**
**Thickness of the control panel**
The control panel must be sufficiently thick to ensure that after fitting it does not bend. With steel panels it must be at least 2 mm thick; select plastic correspondingly thicker. Only in this way can the IP 54 rating be attained.

**When fitted, the DXC housing extends approx. 45 mm from the control panel. A drilling template is enclosed.**

---

1. Establish the exact position of the DXC housing using the drilling template on the control panel and secure it
2. Mark the holes for the attachment screws using a centre punch and the drilling holes for the cut-out using the drilling template
3. Drill four securing holes using a 5 mm Ø drill bit

**CAUTION!**
Take care not to cut yourself on the resulting edges.

4. Either punch the cut-out out or drill four inner holes using a 5 mm Ø drill bit and then cut the cut-out using a jigsaw
5. De-burr the resulting edges
6. Undo the four housing screws
7. Lift the front part out and disconnect the P module ribbon cable

---

*Fig. 9: Control panel mounting*
8. Remove the front part

9. Now break out the necessary threaded holes of the lower series, see Chapter 5.1.3 ‘Installation (electrical)’ on page 23

10. Screw the back part to the control panel (using the supplied PT screws)

11. Plug the ribbon cable back on

12. Move the front part into the ‘park position’

13. Place the front part on the rear part of the DXC housing and screw it in

14. **CAUTION!**
   Protection class IP 54
   Once again check the seating of the seal. Protection class IP 54 is only achieved if the control panel mounting is correct.

### 5.1.3 Installation (electrical)

**WARNING!**
Failure of the circulating pumps
In the event that the circulating pump fails, it is not sufficient to use the sample water limit contact of the in-line probe housing on its own in order to stop the control for the corresponding pool (contact K1 of the M module).

The pool controller must also be set to Pause using the contact K2 ‘Pause control’ of the M module.

Suitable triggers are:
- the zero volt contact of the filter control
- the zero volt contact of the circulation pump’s motor protection switch
- a flow monitor in the circulation line

**WARNING!**
Safe operating status
Both hardware and software safety precautions must be taken to ensure that the DULCOMARIN® II adopts a safe operating status in the event of a fault. E.g. use limit switches, mechanical locks, ...

During installation the device must not be electrically live.

The installation must only be carried out by technically trained personnel.

Observe the technical data in these instructions.
Assembly and installation

NOTICE!
Cable strain relief
With control panel mounting, the cables must be routed in a site-provided cable duct to ensure strain relief.

1. Plan which threaded holes shall be broken out (mark the desired threaded holes)

CAUTION!
When breaking open the threaded holes, avoid pushing the screwdriver deep into the housing. Parts inside the device could be damaged.

Fig. 10: Breaking out threaded holes

2. To break out the threaded holes, punch the slit in the middle of the threaded holes using a screwdriver (tip width 3.5 - 4 mm, see Fig. 10) and lever the material out

3. De-burr the resulting edges
Fig. 11: Fitting the threaded cable glands

1. Blanking plug
2. Union nut
3. Multiple seal insert
4. Threaded cable gland
5. Lock nut

4. Screw in the appropriate threaded cable glands (4) using suitable lock nuts (5) and tighten firmly

5. Insert multiple seal inserts (3) depending on the cable diameter being used

6. Guide the cables into the threaded cable glands

7. Further steps are contained in § Chapter 5.1.4 ‘Connect the coaxial cable’ on page 26 and § Chapter 5.1.5 ‘Connecting the terminals’ on page 26.

8. Tighten the union nuts (2) of the threaded cable glands so that they are properly sealed

9. Place the front part on the rear part

10. Manually tighten the four housing screws

11. **CAUTION!**

   Protection class IP 54

   Once again check the seating of the seal. Protection class IP 54 is only achieved if the control panel mounting is correct.
5.1.4 Connect the coaxial cable

The pH or redox sensor is connected using a coaxial cable.

![Diagram](image1.png)

*Fig. 12: Removing the cable insulation*

1. Uncover the cable shielding according to Fig. 12
2. Tightly clamp the shielding

5.1.5 Connecting the terminals

The wiring diagram is contained in the appendix. Additionally there is an info field on the modules adjacent to the terminals containing connection information.

![Diagram](image2.png)

*Fig. 13: Removing the cable insulation*

1. Remove the insulation from the fork ends according to Fig. 13 and press on the corresponding cable end sleeves
2. Pull off the terminal blocks P1 to P4 for installation
3. To fit the cable, push the supplied screwdriver right into the square opening of the corresponding terminal in order to plug the cable end into the terminal block
4. Connect the cables according to the wiring diagram
5. Push the pulled-off terminal blocks back onto the circuit board after connecting the cables
6. Check the cabling using the wiring diagram

5.2 Procedure with DXM housing (small)

5.2.1 Mounting (mechanical)

For wall mounting, please observe the following steps:

Mounting materials (contained in the scope of delivery):

- 1 x wall/pipe bracket
- 2 x half-round head screws 5x45 mm
- 2 x washers 5.3
- 2 x rawl plug Ø 8 mm, plastic
- 1 x sealing cap
- 1 x safety screw (PT)

1. Remove the wall/pipe bracket from the DXM
2. Pull the two snap hooks outwards and push them upwards (1)
3. Fold the wall/pipe bracket away and pull it out (2) in a downwards direction
4. Mark two drill holes diagonal to each other by using the wall/pipe bracket as a drilling template
5. Drill the holes: Ø 8 mm, d = 50 mm
6. Tighten the wall/pipe bracket

7. Hook in the housing at the top in the wall/pipe bracket and push it using light pressure at the bottom against the wall/pipe bracket. Then press the housing upwards, until it audibly engages

5.2.2 Installation (electrical)

WARNING!
Safe operating status
During installation the device must not be electrically live.

The installation must only be carried out by technically trained personnel.

Observe the technical data in these instructions.

NOTICE!
Cable strain relief
With control panel mounting, the cables must be routed in a site-provided cable duct to ensure strain relief.

For wall mounting

1. Undo the four housing screws.

2. NOTICE!
The hinge between the front and rear part of the housing cannot absorb high mechanical loading. When working on the front part of the housing you must support it.

Raise the front part slightly forwards and then fold out to the left.
3. The large threaded cable gland (M20 x 1.5) is only for use with the coaxial cable.

Punch out as many threaded holes on the bottom side of the rear part as required.

---

**Fig. 14**

1. Threaded cable gland
2. Reducing insert
3. Clamping nut
4. Terminal diagram

4. Screw the corresponding threaded cable glands (1) in and tighten

5. Insert the reducing inserts (2) in the threaded cable glands according to the cable cross section used

6. Guide the cables into the threaded cable glands
Further steps are contained in Chapter 5.1.4 ‘Connect the coaxial cable’ on page 26 and Chapter 5.1.5 ‘Connecting the terminals’ on page 26. Thereafter please continue with the following steps:

8. Tighten the union nuts (3) of the threaded cable glands so that they are properly sealed

9. Fold the front part onto the rear part

10. NOTICE!

   Protection class IP 65

   Once again check the seating of the seal. Protection class IP 65 is only achieved if the control panel mounting is correct.

   As necessary, pull the front part slightly forwards to relieve the strain on the seal.

Manually tighten the housing screws

For control panel mounting (internal module)

NOTICE!

Cable strain relief

With control panel mounting, the cables must be routed in a site-provided cable duct to ensure strain relief.

Connect the cables as follows: Chapter 5.1.4 ‘Connect the coaxial cable’ on page 26 and Chapter 5.1.5 ‘Connecting the terminals’ on page 26

5.3 install the CAN bus cable

CAUTION!

Maximum backbone length

Possible consequence: Malfunctions.

- The maximum backbone length (without branching cables) must be less than 400 m

CAUTION!

Maximum length of branching cables

Possible consequence: Malfunctions.

The T-pieces and connecting cables (branching cables) enclosed with the modules (M-, A-, G-, N-, R-, I- modules, CAN sensors and metering pumps with CAN bus must be used.

Branching cables are the connections branching from the CAN bus backbone to the modules.
5.3.1 Connections outside the housing

**CAUTION!**

**T-coupling**

Never connect a T-coupling directly to the housing. The panel plug at the housing can break off.


**CAUTION!**

**IP65 protection rating**

Screw in the CAN cable threaded cable glands by hand up to the stop. Otherwise the IP65 rating is not achieved.


**NOTICE!**

Sequentially screw together the individual parts of the CAN bus line starting from one side. Otherwise it can occur that at one or several points socket is aligned with socket or plug with plug.

CAN devices always have plugs, never sockets.

---

**CAN bus line**

*External modules, CAN version of chlorine sensor and DULCOMARIN® II are connected with each other via a CAN bus line. The individual CAN devices are inserted in this CAN bus line. There is a terminating resistance at each end of the CAN bus line.*

1. Connect the supplied branching cables (e.g. 0.5 m) with a T-piece on the end to each module and the DULCOMARIN® II

2. Screw the T-pieces of the CAN modules sequentially together using CAN cables or directly one after the other

3. On each of the remaining ends of the CAN bus line screw on a terminating resistance (1 x with a plug connector, 1 x with a socket connector).
Fig. 15: Inserting modules in the CAN bus line, compact version

1. CAN connection cable (branching cable 0.5 m)
2. Terminating resistance, M12 socket
3. T-coupling
4. CAN connection cable
5. Chlorine sensor CTE
6. Chlorine sensor CLE
7. CAN connection cable (branching cable 0.5 m)
8. T-coupling
9. Terminating resistance, M12 plug
Fig. 16: Inserting modules in the CAN bus line

I. Control room
II. Plant room, e.g. pool 1
III. Plant room, e.g. pool 2
A. Terminating resistance at the end of the CAN bus line (the system can be extended from here)
5.3.2 Connections inside the DXC housing

In general it is not necessary to make modification to the cable connectors inside the DXC housing.

All CAN bus cables end at the P module (power supply module with relay) or the N module (power supply module):

- the 5 conductors of the panel plug CAN 1 (4) at (3)
- the 16 pole ribbon cable of the display and operating module (not shown) at (2)
- the 10 pole ribbon cable from the A module (control module) (6) and from the M module (measurement module) (5) at (1)

Fig. 17: CAN cabling inside the DXC housing

1. Cable connection to the display and operating module
2. Cable connection to the A and M modules
3. Cable connection to the panel plug CAN 1
4. Panel plug CAN 1
5. M module (measurement module)
6. A module (control module)
7. P module (power supply module with relay)
If there is no P module or N module in the DXC housing:

- Use a so-called L circuit board as a distributor for the CAN bus lines

**Fig. 18: Use of an L circuit board**

1. Cable connection to the A and M modules
2. Cable connection to the display and operating module
3. Cable connection to the panel plug CAN 1
4. Panel plug CAN 1
6  Device overview and operating elements

Keys

**Fig. 19: Keys**

1. Enter key
2. Start/Stop key
3. ESC key
4. Arrow keys
5. Function keys, variably assigned
Fig. 20: Displays

1. LCD display
2. CAN 1-LED
3. Device LED
7 Functional description (general)

Fig. 21: Measurement and control system for a filter circuit

1. Multi-channel measuring and control system DULCOMARIN® II
2. In-line probe housing DGMa
3. Chlorine sensor CLE
4. Chlorine sensor CTE
5. T-coupling
6. Terminating resistance, M12 socket
7. Terminating resistance, M12 plug
8. CAN connection cable
9. pH sensor
10. ORP sensor
11. Coaxial cable
12. Control line
13. Metering pump 1
14. Metering pump 2
15. Signal horn
I. Plant room

The multi-channel measuring and control system DULCOMARIN® II is suitable for controlling one or more systems (filtration circuits, pools ...) (version dependent).

The base functions are distributed over the following modules:

- M module (measurement module)
- I module (current input module)
- A module (control module)
- R module (control module for chlorine gas metering devices)
P module (power supply module with relay)
N module (power supply module)

M module (measurement module)
- Measuring and control of the pH value
- Measuring and display (optional rules) of the redox potential
- Measuring and display of the temperature of the sample water
- Measuring and display of the circulating flow
- Monitoring the sample water
- Measuring the temperature of the sample water
- Measuring of free chlorine
- Measuring of total chlorine
- Displaying of combined chlorine
  - optional; calculated from total chlorine and free chlorine

Chlorine sensors:
- Measuring of free chlorine and temperature
- Measuring of total available chlorine and temperature
- Measuring of combined chlorine as a chlorine difference measurement

I module (current input module)
- Measurement monitoring and pause (2 contact inputs)
- Connection of 3 sensors
  - (3 standard signal inputs 0/4...20 mA, of which 2 as 2-conductor connection)
- Measuring and control of fluoride
- Measuring and control of ClO₂
- Measuring and control of chlorite
- Measuring and control of H₂O₂
- Measuring of PES (peracetic acid)
- Measuring and display of dissolved oxygen
- Measuring and display of ammonia
- Measuring and display of conductive conductivity
- Measuring and display of flow
- Measuring and display of turbidity
- Measuring and display of UV intensity

A module (control module)
- Control of metering pumps for pH correction and disinfectant metering (over 3 frequency outputs, 3 contact inputs for pump errors or container level monitoring)
- Output of measured values for pH value, redox potential, free chlorine or total chlorine or combined chlorine or temperature (4 analog outputs 0/4...20 mA, freely programmable and scalable)

R module (control module for chlorine gas metering devices)
- Control of a servomotor with response signal for disinfectant metering (2 relay outputs, position feedback input)

P module (power supply module with relay)
- Control of solenoid valve or hose pump for pH correction (via pulse length output)
- Control of solenoid valve or hose pump for disinfectant (via pulse length output)
- Control of hose pump for flocculant (via pulse length output) on minimisation of the combined chlorine (via relay output)
Functional description (general)

- Alarm (via relay output)
- Provision of the CAN bus with supply voltage
- N module (power supply module)
- Provision of the CAN bus with supply voltage
- CANopen metering pumps (Beta/4a, delta DLTa, Sigma S1Ca-S2Ca-S3Ca)
- Metering of pH correction agents, disinfectants or flocculants
8 Maintenance, repairs and disposal

Maintenance

**CAUTION!**

**Solvent**

Do not under any circumstances use solvent to clean the surfaces. Solvent can attack the surfaces.

Clean the housing with a damp cloth. Then rub dry.

The DULCOMARIN® II is maintenance free. Replace the batteries after 10 years as a precautionary measure. The DULCOMARIN® II displays a warning should replacement be necessary sooner.

Battery type: CR2032, 3 V approx. 190 mAh

The battery is clamped in a holder on the rear side of the DXC housing upper section.

![Fig. 22: Removing the battery](image)

1. Unscrew the four retaining screws at the front on the housing upper section and take the housing upper section off from the housing lower section.

2. Press on the holder lug to release the battery from the holder, see Fig. 22.

3. Insert a new battery in the holder

   In so doing avoid pressing with the fingers on the battery poles. This will result in poor contacts.

4. Place the housing upper section on the housing lower section

5. Manually tighten the four retaining screws

**NOTICE!**

**Hazardous waste**

The battery is hazardous waste. It must be disposed of separately. Observe the conditions which apply on your site.

Repairs

For repair please send the DULCOMARIN® II to the manufacturer.
8.1 Disposal of used parts

- **Users' qualification**: instructed persons, see Chapter 2.2 ‘Users' qualifications’ on page 9

**NOTICE!**

- Regulations governing disposal of used parts
  - Note the current national regulations and legal standards which apply in your country

ProMinent Dosierotechnik GmbH, Heidelberg will take back decontaminated used devices providing that they are covered by adequate postage.
9  Technical data spare parts and accessories

**Technical data**

You can find the technical data in the operating instructions of the individual modules, see also the section "Further applicable documents".

### Spare parts and accessories

<table>
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<tr>
<th>Description:</th>
<th>Part no.</th>
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<tbody>
<tr>
<td>T-coupler M12 5-pole CAN</td>
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<td>Terminating resistance, M12 socket</td>
<td>1022154</td>
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<tr>
<td>Terminating resistance, M12 plug</td>
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<td>Connecting cable - CAN M12, 5 pole 0.5 m</td>
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<td>Connecting cable - CAN M12, 5 pole 2 m</td>
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<td>Connecting cable - CAN M12, 5 pole 5 m</td>
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<td>Connecting cable - CAN M12, 5 pole Sold by the metre</td>
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<td>Plug-CAN M12 5 pole Screwed connection</td>
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<td>Cable combination coaxial 2 m-SN6, pre-assembled</td>
<td>1024106</td>
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<td>Cable combination coaxial 5 m-SN6, pre-assembled</td>
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* Membrane caps and electrolyte for chlorine sensors, see the respective operating instructions of the sensor
# 10 EC Declaration of Conformity and fulfilled standards

## EC Declaration of Conformity

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<th>Source</th>
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<tr>
<td>ProMinent Dosiertechnik GmbH</td>
<td>Im Schuhmachergewann 5 - 11</td>
</tr>
<tr>
<td>D - 69123 Heidelberg</td>
<td></td>
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We, ProMinent Dosiertechnik GmbH, hereby declare that the product identified below conforms to the basic health and safety requirements of the EC Directive, by virtue of its design and construction, and in the configuration placed on the market by us. This declaration is no longer applicable if changes are made to the product without our authorisation.

**Product description:** DULCOMARIN II measuring and control unit

**Producttype:**
- DXCa
- DXMaN
- DXMaP

**Serial no.:** see type plate on the unit

**Applicable EC Directives:**
- EC Low Voltage Directive (2006/95/EC)

**Applied harmonised standards, especially:**
- DIN EN 60068-2-30, DIN EN 61010-1, DIN EN 60335-1, DIN EN 50106, DIN EN 60204-1, DIN EN 60529, DIN EN 61326,
- DIN EN 61000-3-2, DIN EN 61000-3-3, DIN EN 50325-4, DIN EN 60745-1

**Date/ Manufacturer signature:** 07.03.2012

**Name/ position of the signatory:** Joachim Schall, Manager Innovation and Technology

---

*Fig. 23: EC Declaration of Conformity*
Fig. 24: Wiring diagram DULCOMARIN® II compact (typical arrangement of modules)

I. M module (measurement module) DXMaM
II. A module (control module) DXMaA
III. P module (power supply module with relay) DXMaP
M module (measurement module) DXMaM

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### P module (power supply module with relay) DXMaP

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<th>Description</th>
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### CAN connection module

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