CU 211 and CU 212
Installation and operating instructions
Declaration of Conformity

We Grundfos declare under our sole responsibility that the products CU 211 and CU 212, to which this declaration relates, are in conformity with these Council directives on the approximation of the laws of the EC member states:

— **Low Voltage Directive** (2006/95/EC)


Bjerringbro, 15th September 2008

[Signature]

Jan Strandgaard
Technical Director
Installation and operating instructions

CONTENTS

1. Symbols used in this document 3
2. General description 3
   2.1 Control panel 4
   2.2 DIP switch 4
   2.3 Dimensions 5
3. Identification 5
   3.1 Nameplate 5
   3.2 Type key 5
4. Application 5
5. Functions 6
   5.1 Two float switches and parallel operation with three float switches 6
   5.2 Three float switches and parallel operation with four float switches 8
   5.3 Four float switches and parallel operation with 100% standby operation 10
   5.4 Four float switches and parallel operation 12
   5.5 Two electrodes 14
   5.6 Three electrodes 16
   5.7 Three electrodes and one float switch 18
   5.8 Flow switch 20
6. Installation 22
   6.1 Location 22
7. Electrical connection 22
8. Overview of terminals 23
9. Wiring diagrams CU 211 24
   9.1 CU 211, single-phase, inputs 24
   9.2 CU 211, single-phase, outputs 25
   9.3 CU 211, single-phase, inputs from IO 111 26
   9.4 CU 211, single-phase, outputs for modem 27
   9.5 CU 211, single-phase, outputs for CIU 270 28
   9.6 CU 211, three-phase, inputs 29
   9.7 CU 211, three-phase, outputs 30
   9.8 CU 211, three-phase, inputs from IO 111 31
   9.9 CU 211, three-phase, outputs for modem 32
   9.10 CU 211, three-phase, outputs for CIU 270 33
10. Wiring diagrams CU 212 34
   10.1 CU 212, single-phase, inputs 34
   10.2 CU 212, single-phase, outputs 35
   10.3 CU 212, single-phase, inputs from IO 111 36
   10.4 CU 212, single-phase, outputs for modem 37
   10.5 CU 212, single-phase, outputs for CIU 270 38
   10.6 CU 212, three-phase, inputs 39
   10.7 CU 212, three-phase, outputs 40
   10.8 CU 212, three-phase, inputs from IO 111 41
   10.9 CU 212, three-phase, outputs for modem 42
   10.10 CU 212, three-phase, outputs for CIU 270 43
11. Maintenance 44
12. Service 44
13. Disposal 44

1. Symbols used in this document

Warning
If these safety instructions are not observed, it may result in personal injury!

Caution
If these safety instructions are not observed, it may result in malfunction or damage to the equipment!

Note
Notes or instructions that make the job easier and ensure safe operation.

Warning
These instructions must be observed for explosion-proof pumps. It is advisable also to follow these instructions for standard pumps.

2. General description

The control units CU 211 and CU 212 are designed for control of pumps in wastewater, water supply and draining systems.

CU 211 is designed for control of one pump and CU 212 of two pumps.

CU 211 and CU 212 have an alarm output for common alarm and an alarm output for separate high-level alarm.

Furthermore, the control units incorporate a buzzer.

![Fig. 1 CU 212](image)
2.1 Control panel

![Control panel CU 212](image)

**Fig. 2** Control panel CU 212

Key to the symbols in fig. 2:

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Green indicator lights for pumps 1 and 2; flashing for start delay, shining for pump operation. CU 211 has only one indicator light.</td>
</tr>
<tr>
<td>2</td>
<td>Red indicator lights for pumps 1 and 2; flashing for thermo fault, shining for fault in motor protector. CU 211 has only one indicator light.</td>
</tr>
<tr>
<td>3</td>
<td>Red indicator light; indicating wrong phase sequence (three-phase pumps only).</td>
</tr>
<tr>
<td>4</td>
<td>Red indicator light; shining for common alarm.</td>
</tr>
<tr>
<td>5</td>
<td>ON-OFF-AUTO selector switch for pump 1.</td>
</tr>
<tr>
<td>6</td>
<td>ON-OFF-AUTO selector switch for pump 2. CU 211 has no selector switch for pump 2.</td>
</tr>
<tr>
<td>7</td>
<td>Reset button. Push-button for manual resetting of external alarm devices and the built-in buzzer. See section 2.1.1 Resetting of alarm.</td>
</tr>
<tr>
<td>8</td>
<td>Orange indicator light; shining for liquid level 1. See section 4. Application.</td>
</tr>
<tr>
<td>9</td>
<td>Orange indicator light; shining for liquid level 2. See 4. Application.</td>
</tr>
<tr>
<td>11</td>
<td>Orange indicator light; shining for liquid level 4, flashing for high-level alarm. See section 4. Application.</td>
</tr>
<tr>
<td>12</td>
<td>Green indicator light; shining when the power supply has been switched on.</td>
</tr>
</tbody>
</table>

2.1.1 Resetting of alarm

The reset button is a push-button for manual resetting of external alarm devices and the built-in buzzer. The button is NOT for resetting of alarm indications; do this by means of the ON-OFF-AUTO selector switch. Even if the fault condition still exists, the external alarm devices and the built-in buzzer will be reset when the reset button is pressed.

2.2 DIP switch

CU 211 and CU 212 have a 10-pole DIP switch positioned in the bottom right corner. See fig. 3.

**Caution**

When setting the DIP switch, the control unit must have been switched off for at least 1 minute.

Each individual switch (1 to 10) of the DIP switch can be set to position OFF or ON.

**Note**

The DIP switch must not be set to other switch combinations than those described in section 5. Functions.

![DIP switch setting](image)
2.3 Dimensions

Fig. 4 Dimensional sketch of control unit and DIN rail

3. Identification

3.1 Nameplate

The nameplate is fitted on the side of the control unit.

Key to the nameplate:

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Type designation</td>
</tr>
<tr>
<td>2</td>
<td>Product number</td>
</tr>
<tr>
<td>3</td>
<td>Rated voltage and frequency</td>
</tr>
<tr>
<td>4</td>
<td>Max. power</td>
</tr>
<tr>
<td>5</td>
<td>Enclosure class</td>
</tr>
<tr>
<td>6</td>
<td>Max. ambient temperature</td>
</tr>
<tr>
<td>7</td>
<td>Contact current</td>
</tr>
<tr>
<td>8</td>
<td>Contact voltage</td>
</tr>
<tr>
<td>9</td>
<td>Serial number</td>
</tr>
<tr>
<td>10</td>
<td>Production code (year-week code)</td>
</tr>
</tbody>
</table>

Fig. 5 Nameplate, CU 212

Key to the nameplate:

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Type designation</td>
</tr>
<tr>
<td>2</td>
<td>Product number</td>
</tr>
<tr>
<td>3</td>
<td>Rated voltage and frequency</td>
</tr>
<tr>
<td>4</td>
<td>Max. power</td>
</tr>
<tr>
<td>5</td>
<td>Enclosure class</td>
</tr>
<tr>
<td>6</td>
<td>Max. ambient temperature</td>
</tr>
<tr>
<td>7</td>
<td>Contact current</td>
</tr>
<tr>
<td>8</td>
<td>Contact voltage</td>
</tr>
<tr>
<td>9</td>
<td>Serial number</td>
</tr>
<tr>
<td>10</td>
<td>Production code (year-week code)</td>
</tr>
</tbody>
</table>

3.2 Type key

Example

Grundfos control unit

Variant designation

CU 212

Voltage [V]

Phases:

1 = single-phase
3 = three-phase

1) 211 = single-pump control
212 = two-pump control.

4. Application

CU 211 and 212 can be used for level control in a wide range of industrial, private and public applications.

Examples:

• tanks in industry
• wastewater collection tanks
• lifting stations (with more than one pump).

CU 211 can be set to operation/control in seven different applications.

CU 212 can be set to operation/control in four different applications.

See section 5. Functions for additional information.
5. Functions
This section describes a number of systems for which CU 211 and CU 212 are designed and the associated DIP switch settings.

5.1 Two float switches and parallel operation with three float switches
Use **CU 211** in systems with one pump and two float switches. The pump is controlled by the liquid level in the tank.
- When the float switch, pos. 1, is lifted up by the liquid, the pump is started.
- When the float switch, pos. 1, is no longer lifted up by the liquid, the settable stop delay sets in, and after that the pump is stopped.
- When the float switch, pos. 2, is lifted up by the liquid, the high-level alarm is activated.

Use **CU 212** in systems with two pumps in parallel operation and three float switches. The pumps are controlled by the liquid level in the tank.
- When the float switch, pos. 1, is lifted up by the liquid, the first pump is started.
- When the float switch, pos. 2, is lifted up by the liquid, the second pump is started.
- When the float switch, pos. 1, is no longer lifted up by the liquid, the settable stop delay sets in, and after that both pumps are stopped.
- The pumps alternate automatically.
- When the float switch, pos. 3, is lifted up by the liquid, the high-level alarm is activated.

---

**Fig. 6** Systems with one pump and two float switches

**Fig. 7** Systems with two pumps in parallel operation and three float switches
5.1.1 DIP switch setting

The DIP switch settings apply to both system types and to both CU 211 and CU 212.

- **Switches 1, 2 and 3: System type**

  - Switches 1, 2 and 3: System type
    - CU 211: Two float switches.
    - CU 212: Parallel operation with three float switches.

- **Switch 4: Start delay and automatic test run**

  - This setting activates a start delay in the range from 0 to 255 sec. (random) after the power supply has been switched on.
  - **Automatic test run is carried out every 24 hours.**

- **Switches 5, 6 and 7: Stop delay**

  - The **stop delay** is the time from the stop signal is given until the pump is stopped.
  - The pump must not run dry.

<table>
<thead>
<tr>
<th>0 sec.</th>
<th>60 sec.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Switch" /></td>
<td><img src="image" alt="Switch" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>15 sec.</th>
<th>90 sec.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Switch" /></td>
<td><img src="image" alt="Switch" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>30 sec.</th>
<th>120 sec.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Switch" /></td>
<td><img src="image" alt="Switch" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>45 sec.</th>
<th>180 sec.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Switch" /></td>
<td><img src="image" alt="Switch" /></td>
</tr>
</tbody>
</table>

- **Switch 8:**

  - Switch 8 has no function in connection with these system types, but keep the setting in this position.

- **Switch 9: Alarm resetting**

  - This setting ensures that alarm signals from external alarm devices and the built-in buzzer are reset automatically. However, an alarm signal will only be reset if the cause of the fault no longer exists.

  - At this setting, the alarm signal must be reset manually by means of the reset button.
  - See section 2.1.1 Resetting of alarm.

- **Switch 10: Restarting**

  - This setting enables automatic restarting after the motor PTC resistor/thermal switch has cut out the pump.
  - However, restarting will not happen until the motor has cooled off again.

  **Warning**
  
  *When the pump(s) connected is (are) used in potentially explosive environments, switch 10 must not be set to this position.*

  - This setting requires the pumps to be restarted manually after the motor PTC resistor/thermal switch has caused the pump to be cut out. Reset by means of the ON-OFF-AUTO selector switch.

  **Warning**
  
  *When the pump(s) connected is (are) used in potentially explosive environments, switch 10 must not be set to this position.*
5.2 Three float switches and parallel operation with four float switches

Use CU 211 in systems with one pump and three float switches. The pump is controlled by the liquid level in the tank.

– When the float switch, pos. 2, is lifted up by the liquid, the pump is started.
– When the float switch, pos. 1, is no longer lifted up by the liquid, the pump is stopped. It is possible to set a stop delay which delays the stop of the pump.
– When the float switch, pos. 3, is lifted up by the liquid, the high-level alarm is activated.

Use CU 212 in systems with two pumps in parallel operation and four float switches. The pumps are controlled by the liquid level in the tank.

– When the float switch, pos. 2, is lifted up by the liquid, the first pump is started.
– When the float switch, pos. 3, is lifted up by the liquid, the second pump is started.
– When the float switch, pos. 1, is no longer lifted up by the liquid, the settable stop delay sets in, and after that both pumps are stopped.
– The pumps alternate automatically.
– When the float switch, pos. 4, is lifted up by the liquid, the high-level alarm is activated.

Fig. 8  Systems with one pump and three float switches

Fig. 9  Systems with two pumps in parallel operation and four float switches
5.2.1 DIP switch setting

The DIP switch settings apply to both system types and to both CU 211 and CU 212.

- **Switches 1, 2 and 3: System type**

  This setting encodes the system type.
  - CU 211: Three float switches.
  - CU 212: Parallel operation with four float switches.

- **Switch 4: Start delay and automatic test run**

  This setting activates a start delay in the range from 0 to 255 sec. (random) after the power supply has been switched on.
  
  **Automatic test run is carried out every 24 hours.**

- **Switches 5, 6 and 7: Stop delay**

  The **stop delay** is the time from the stop signal is given until the pump is stopped.
  The pump must not run dry.

<table>
<thead>
<tr>
<th>Stop Delay (sec)</th>
<th>DIP Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 sec.</td>
<td>![DIP Setting]</td>
</tr>
<tr>
<td>15 sec.</td>
<td>![DIP Setting]</td>
</tr>
<tr>
<td>30 sec.</td>
<td>![DIP Setting]</td>
</tr>
<tr>
<td>45 sec.</td>
<td>![DIP Setting]</td>
</tr>
<tr>
<td>60 sec.</td>
<td>![DIP Setting]</td>
</tr>
<tr>
<td>90 sec.</td>
<td>![DIP Setting]</td>
</tr>
<tr>
<td>120 sec.</td>
<td>![DIP Setting]</td>
</tr>
<tr>
<td>180 sec.</td>
<td>![DIP Setting]</td>
</tr>
</tbody>
</table>

- **Switch 8:**

  Switch 8 has no function in connection with these system types, but keep the setting in this position.

- **Switch 9: Alarm resetting**

  This setting ensures that alarm signals from external alarm devices and the built-in buzzer are reset automatically. However, an alarm signal will only be reset if the cause of the fault no longer exists.

  At this setting, the alarm signal must be reset manually by means of the reset button. See section 2.1.1 Resetting of alarm.

- **Switch 10: Restarting**

  This setting enables automatic restarting after the motor PTC resistor/thermal switch has caused the pump to cut out. However, restarting will not happen until the motor has cooled off again.

  **Warning**

  *When the pump(s) connected is (are) used in potentially explosive environments, switch 10 must not be set to this position.*

  This setting requires the pumps to be restarted manually after the motor PTC resistor/thermal switch has caused the pump to be cut out. Reset by means of the ON-OFF-AUTO selector switch.

  **Warning**

  *When the pump(s) connected is (are) used in potentially explosive environments, switch 10 must not be set to this position.*
5.3 Four float switches and parallel operation with 100 % standby operation

Use CU 211 in systems with one pump and four float switches. The pump is controlled by the liquid level in the tank.
- When the float switch, pos. 3, is lifted up by the liquid, the pump is started.
- When the float switch, pos. 2, is no longer lifted up by the liquid, the pump is stopped. It is possible to set a stop delay which delays the stop of the pump.
- When the float switch, pos. 4, is lifted up by the liquid, the high-level alarm is activated.
- When the float switch, pos. 1, is no longer lifted up by the liquid, the dry running alarm is activated.

Use CU 212 in systems with two pumps in parallel operation and four float switches with 100 % standby operation. The pumps are controlled by the liquid level in the tank.
- When the float switch, pos. 2, is lifted up by the liquid, the first pump is started.
- When the float switch, pos. 3, is lifted up by the liquid, the second pump is started.
- When the float switch, pos. 1, is no longer lifted up by the liquid, the settable stop delay sets in, and after that both pumps are stopped.
- The pumps alternate automatically.
- When the float switch, pos. 4, is lifted up by the liquid, the high-level alarm is activated.

Fig. 10 Systems with one pump and four float switches

Fig. 11 Systems with two pumps in parallel operation with 100 % standby operation and four float switches
5.3.1 DIP switch setting

The DIP switch settings apply to both system types and to both CU 211 and CU 212.

- **Switches 1, 2 and 3: System type**

  This setting encodes the system type.
  - CU 211: Four float switches.
  - CU 212: 100 % standby operation.

- **Switch 4: Start delay and automatic test run**

  This setting activates a start delay in the range from 0 to 255 sec. (random) after the power supply has been switched on.
  *Automatic test run is carried out every 24 hours.*

  This setting causes the pump to start immediately after the mains supply has been switched on.
  No automatic test run.

- **Switches 5, 6 and 7: Stop delay**

  The *stop delay* is the time from the stop signal is given until the pump is stopped.
  The pump must not run dry.

<table>
<thead>
<tr>
<th>Stop Delay (sec.)</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 sec.</td>
<td>![0 sec setting]</td>
</tr>
<tr>
<td>15 sec.</td>
<td>![15 sec setting]</td>
</tr>
<tr>
<td>30 sec.</td>
<td>![30 sec setting]</td>
</tr>
<tr>
<td>45 sec.</td>
<td>![45 sec setting]</td>
</tr>
<tr>
<td>60 sec.</td>
<td>![60 sec setting]</td>
</tr>
<tr>
<td>90 sec.</td>
<td>![90 sec setting]</td>
</tr>
<tr>
<td>120 sec.</td>
<td>![120 sec setting]</td>
</tr>
<tr>
<td>180 sec.</td>
<td>![180 sec setting]</td>
</tr>
</tbody>
</table>

- **Switch 8:**

  Switch 8 has no function in connection with these system types, but keep the setting in this position.

- **Switch 9: Alarm resetting**

  This setting ensures that alarm signals from external alarm devices and the built-in buzzer are reset automatically. However, an alarm signal will only be reset if the cause of the fault no longer exists.

  At this setting, the alarm signal must be reset manually by means of the reset button.
  See section *2.1.1 Resetting of alarm*.

- **Switch 10: Restarting**

  This setting enables automatic restarting after the motor PTC resistor/thermal switch has caused the pump to cut out. However, restarting will not happen until the motor has cooled off again.

  **Warning**
  *When the pump(s) connected is (are) used in potentially explosive environments, switch 10 must not be set to this position.*

  This setting requires the pumps to be restarted manually after the motor PTC resistor/thermal switch has caused the pump to be cut out. Reset by means of the ON-OFF-AUTO selector switch.

  **Warning**
  *When the pump(s) connected is (are) used in potentially explosive environments, switch 10 must not be set to this position.*
5.4 Four float switches and parallel operation

Use **CU 212** in systems with two pumps and four float switches in so-called "full-control operation". The pumps are controlled by the liquid level in the tank.

– When the float switch, pos. 3, is lifted up by the liquid, the first pump is started.
– When the float switch, pos. 4, is lifted up by the liquid, the second pump is started.
– When the float switch, pos. 2, is no longer lifted up by the liquid, the second pump is stopped.
– When the float switch, pos. 1, is no longer lifted up by the liquid, the first pump is stopped.

It is possible to set a stop delay which delays the stop of the pumps.
– The pumps alternate automatically.

**Fig. 12** Systems with two pumps and four float switches in parallel, full-control operation
5.4.1 DIP switch setting

The DIP switch settings apply to CU 212.

- Switch 1, 2 and 3: System type

This setting encodes the system type.
CU 212: Four float switches in parallel, full-control operation.

- Switch 4: Start delay and automatic test run

This setting activates a start delay in the range from 0 to 255 sec. (random) after the power supply has been switched on.

Automatic test run is carried out every 24 hours.

- Switches 5, 6 and 7: Stop delay

The stop delay is the time from the stop signal is given until the pump is stopped.

The pump must not run dry.

<table>
<thead>
<tr>
<th>Stop Delay (sec)</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 sec.</td>
<td>![Setting Icon]</td>
</tr>
<tr>
<td>15 sec.</td>
<td>![Setting Icon]</td>
</tr>
<tr>
<td>30 sec.</td>
<td>![Setting Icon]</td>
</tr>
<tr>
<td>45 sec.</td>
<td>![Setting Icon]</td>
</tr>
<tr>
<td>60 sec.</td>
<td>![Setting Icon]</td>
</tr>
<tr>
<td>90 sec.</td>
<td>![Setting Icon]</td>
</tr>
<tr>
<td>120 sec.</td>
<td>![Setting Icon]</td>
</tr>
<tr>
<td>180 sec.</td>
<td>![Setting Icon]</td>
</tr>
</tbody>
</table>

- Switch 8:

Switch 8 has no function in connection with this system type, but keep the setting in this position.

- Switch 9: Alarm resetting

This setting ensures that alarm signals from external alarm devices and the built-in buzzer are reset automatically. However, an alarm signal will only be reset if the cause of the fault no longer exists.

At this setting, the alarm signal must be reset manually by means of the reset button. See section 2.1.1 Resetting of alarm.

- Switch 10: Restarting

This setting enables automatic restarting after the motor PTC resistor/thermal switch has caused the pump to cut out. However, restarting will not happen until the motor has cooled off again.

Warning
When the pump(s) connected is (are) used in potentially explosive environments, switch 10 must not be set to this position.

This setting requires the pumps to be restarted manually after the motor PTC resistor/thermal switch has caused the pump to be cut out. Reset by means of the ON-OFF-AUTO selector switch.

Warning
When the pump(s) connected is (are) used in potentially explosive environments, switch 10 must not be set to this position.
5.5 Two electrodes

Use CU 211 for systems with two electrodes. The pump is controlled by the liquid level in the borehole.

– The electrode, pos. 1, is a reference electrode.
– When the electrode, pos. 2, registers liquid, the settable start delay sets in, and after that the pump is started.
– When the electrode, pos. 2, no longer registers liquid, the pump is stopped.
– The pressure switch, pos. 3, will stop the pump if the pump discharge pressure exceeds the pressure switch cut-out pressure. The pump will restart automatically when the pressure falls to the pressure switch cut-in pressure if the electrode, pos. 2, also registers liquid.

**Fig. 13** System with one pump and two electrodes
5.5.1 DIP switch setting

The DIP switch settings apply to CU 211.

- **Switches 1, 2 and 3: System type**
  
  This setting encodes the system type.
  
  CU 211: Two electrodes.

- **Switch 4: Start delay and automatic test run**
  
  This setting activates a start delay in the range from 0 to 255 sec. (random) after the power supply has been switched on.
  
  *Automatic test run is carried out every 24 hours.*

- **Switches 5, 6, 7 and 8: Stop delay**
  
  The **stop delay** is the time from the stop signal is given until the pump is stopped.

  The pump must not run dry.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Switches</th>
<th>Setting</th>
<th>Switches</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 min.</td>
<td>5 6 7 8 9</td>
<td>30 min.</td>
<td>5 6 7 8 9</td>
</tr>
<tr>
<td>2 min.</td>
<td>5 6 7 8 9</td>
<td>35 min.</td>
<td>5 6 7 8 9</td>
</tr>
<tr>
<td>3 min.</td>
<td>5 6 7 8 9</td>
<td>40 min.</td>
<td>5 6 7 8 9</td>
</tr>
<tr>
<td>5 min.</td>
<td>5 6 7 8 9</td>
<td>45 min.</td>
<td>5 6 7 8 9</td>
</tr>
<tr>
<td>10 min.</td>
<td>5 6 7 8 9</td>
<td>50 min.</td>
<td>5 6 7 8 9</td>
</tr>
<tr>
<td>15 min.</td>
<td>5 6 7 8 9</td>
<td>55 min.</td>
<td>5 6 7 8 9</td>
</tr>
<tr>
<td>20 min.</td>
<td>5 6 7 8 9</td>
<td>60 min.</td>
<td>5 6 7 8 9</td>
</tr>
<tr>
<td>25 min.</td>
<td>5 6 7 8 9</td>
<td>65 min.</td>
<td>5 6 7 8 9</td>
</tr>
</tbody>
</table>

- **Switch 9: Alarm resetting**
  
  This setting ensures that alarm signals from external alarm devices and the built-in buzzer are reset automatically. However, an alarm signal will only be reset if the cause of the fault no longer exists.

  At this setting, the alarm signal must be reset manually by means of the reset button.

  See section 2.1.1 Resetting of alarm.

- **Switch 10: Restarting**
  
  This setting enables automatic restarting after the motor PTC resistor/thermal switch has caused the pump to cut out. However, restarting will not happen until the motor has cooled off again.

  **Warning**
  
  *When the pump(s) connected is (are) used in potentially explosive environments, switch 10 must not be set to this position.*

  This setting requires the pumps to be restarted manually after the motor PTC resistor/thermal switch has caused the pump to be cut out. Reset by means of the ON-OFF-AUTO selector switch.

  **Warning**
  
  *When the pump(s) connected is (are) used in potentially explosive environments, switch 10 must not be set to this position.*
5.6 Three electrodes

Use CU 211 for systems with three electrodes. The pump is controlled by the liquid level in the borehole.

– The electrode, pos. 1, is a reference electrode.
– When the electrode, pos. 3, registers liquid, the pump is started.
– When the electrode, pos. 2, no longer registers liquid, the pump is stopped. It is possible to set a stop delay which delays the stop of the pump.
– The pressure switch, pos. 4, will stop the pump if the pump discharge pressure exceeds the pressure switch cut-out pressure. The pump will restart automatically when the pressure falls to the pressure switch cut-in pressure if the electrode, pos. 3, also registers liquid.

Fig. 14 System with one pump and three electrodes
5.6.1 DIP switch setting

The DIP switch settings apply to CU 211.

• Switches 1, 2 and 3: System type

This setting encodes the system type.
CU 211: Two electrodes.

• Switch 4: Start delay and automatic test run

This setting activates a start delay in the range from 0 to 255 sec. (random) after the power supply has been switched on.
Automatic test run is carried out every 24 hours.

• Switches 5, 6 and 7: Stop delay

The stop delay is the time from the stop signal is given until the pump is stopped.
The pump must not run dry.

<table>
<thead>
<tr>
<th>Stop Delay (sec)</th>
<th>Switch Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4 5 6 7 8</td>
</tr>
<tr>
<td>15</td>
<td>4 5 6 7 8</td>
</tr>
<tr>
<td>30</td>
<td>4 5 6 7 8</td>
</tr>
<tr>
<td>45</td>
<td>4 5 6 7 8</td>
</tr>
<tr>
<td>60</td>
<td>4 5 6 7 8</td>
</tr>
<tr>
<td>90</td>
<td>4 5 6 7 8</td>
</tr>
<tr>
<td>120</td>
<td>4 5 6 7 8</td>
</tr>
<tr>
<td>180</td>
<td>4 5 6 7 8</td>
</tr>
</tbody>
</table>

• Switch 8:

Switch 8 has no function in connection with this system type, but keep the setting in this position.

• Switch 9: Alarm resetting

This setting ensures that alarm signals from external alarm devices and the built-in buzzer are reset automatically. However, an alarm signal will only be reset if the cause of the fault no longer exists.

At this setting, the alarm signal must be reset manually by means of the reset button.
See section 2.1.1 Resetting of alarm.

• Switch 10: Restarting

This setting enables automatic restarting after the motor PTC resistor/thermal switch has caused the pump to cut out. However, restarting will not happen until the motor has cooled off again.

Warning
When the pump(s) connected is (are) used in potentially explosive environments, switch 10 must not be set to this position.

This setting requires the pumps to be restarted manually after the motor PTC resistor/thermal switch has caused the pump to be cut out. Reset by means of the ON-OFF-AUTO selector switch.

Warning
When the pump(s) connected is (are) used in potentially explosive environments, switch 10 must not be set to this position.
5.7 Three electrodes and one float switch

Use CU 211 in systems with three electrodes and one float switch in applications such as tank filling. The pump is controlled by the liquid level in the tank.

– The electrode, pos. 1, is a reference electrode.
– When the electrode, pos. 2, no longer registers liquid, the pump is started.
– When the electrode, pos. 3, registers liquid, the pump is stopped. It is possible to set a stop delay which delays the stop of the pump.
– When the float switch, pos. 4, is lifted up by the liquid, the high-level alarm is activated.
– The pump can be stopped by means of the manual on/off switch, pos. 5.

Note

The three electrodes may be replaced by float switches.

Fig. 15 One pump, three electrodes and one float switch in a tank filling system
5.7.1 DIP switch setting

The DIP switch settings apply to CU 211.

- **Switches 1, 2 and 3: System type**

  This setting encodes the system type.
  
  CU 211: Three electrodes and one float switch in a tank filling system.

- **Switch 4: Start delay and automatic test run**

  This setting activates a start delay in the range from 0 to 255 sec. (random) after the power supply has been switched on.
  
  *Automatic test run is carried out every 24 hours.*

- **Switches 5, 6 and 7: Stop delay**

  The **stop delay** is the time from the stop signal is given until the pump is stopped.
  
  The pump must not run dry.

<table>
<thead>
<tr>
<th>0 sec.</th>
<th>60 sec.</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Switch Setting](4 5 6 7 8)</td>
<td>![Switch Setting](4 5 6 7 8)</td>
</tr>
<tr>
<td>15 sec.</td>
<td>90 sec.</td>
</tr>
<tr>
<td>![Switch Setting](4 5 6 7 8)</td>
<td>![Switch Setting](4 5 6 7 8)</td>
</tr>
<tr>
<td>30 sec.</td>
<td>120 sec.</td>
</tr>
<tr>
<td>![Switch Setting](4 5 6 7 8)</td>
<td>![Switch Setting](4 5 6 7 8)</td>
</tr>
<tr>
<td>45 sec.</td>
<td>180 sec.</td>
</tr>
<tr>
<td>![Switch Setting](4 5 6 7 8)</td>
<td>![Switch Setting](4 5 6 7 8)</td>
</tr>
</tbody>
</table>

- **Switch 8:**

  Switch 8 has no function in connection with this system type, but keep the setting in this position.

- **Switch 9: Alarm resetting**

  This setting ensures that alarm signals from external alarm devices and the built-in buzzer are reset automatically. However, an alarm signal will only be reset if the cause of the fault no longer exists.

  At this setting, the alarm signal must be reset manually by means of the reset button. See section 2.1.1 *Resetting of alarm.*

- **Switch 10: Restarting**

  This setting enables automatic restarting after the motor PTC resistor/thermal switch has caused the pump to cut out. However, restarting will not happen until the motor has cooled off again.

  **Warning**
  
  *When the pump(s) connected is (are) used in potentially explosive environments, switch 10 must not be set to this position.*

  This setting requires the pumps to be restarted manually after the motor PTC resistor/thermal switch has caused the pump to be cut out. Reset by means of the ON-OFF-AUTO selector switch.

  **Warning**
  
  *When the pump(s) connected is (are) used in potentially explosive environments, switch 10 must not be set to this position.*
5.8 Flow switch

Use CU 211 in systems controlled by a flow switch in applications such as draining systems. The pump is controlled by the flow in the discharge line.

- The pump is stopped when the flow switch, pos. 2, registers that there is no liquid flow.
- When the pump has stopped, a settable start delay sets in, and after that the pump will try to restart. The restart attempt will be interrupted when the settable dry running time has elapsed if the flow switch still does not register flow.
- The pump can be restarted manually by means of the switch, pos. 1.

![Flow switch in a draining system](image)

**Fig. 16** Flow switch in a draining system
5.8.1 DIP switch setting

The DIP switch settings apply to CU 211.
• Switches 1, 2 and 3: System type
  This setting encodes the system type.
  CU 211: Flow switch in a draining system.

• Switches 4, 5 and 6: Dry running time
  The dry running time is the time the pump is allowed to run after start even if the flow switch registers no flow. The pump is stopped again if the flow switch still does not register flow.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Seconds</th>
<th>Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>40</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

• Switches 7, 8, 9 and 10: Start delay
  The start delay is the time from the pump stopped until the pump attempts to restart.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Seconds</th>
<th>Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>50</td>
</tr>
<tr>
<td>7</td>
<td>10</td>
<td>70</td>
</tr>
<tr>
<td>8</td>
<td>12</td>
<td>90</td>
</tr>
</tbody>
</table>

* If the DIP switch was set to "no restart", the pump can only be restarted by means of the switch.
6. Installation

Before installation, check these points:
• does the variant correspond to the one ordered?
• does CU 211/CU 212 match the supply voltage and frequency of the installation site?
• has CU 211/CU 212 been damaged during the transport?

**Warning**

CU 211 and CU 212 must not be used for other purposes than the ones specified.

**Warning**

Before installing CU 211 and CU 212, make sure that the power supply has been switched off and that it cannot be accidentally switched on.

The installation must be carried out by authorized personnel in accordance with local regulations.

All safety regulations must be observed on the installation site.

6.1 Location

**Enclosure**

CU 211 and CU 212 have enclosure class IP20. In order to reduce the pollution level to 2, CU 211 and CU 212 must be installed in a protective enclosure with minimum IPX4 enclosure class according to IEC 60529. The enclosure must be made of fire retardant material.

**Ambient temperature**

Ambient temperature: –30 °C to +50 °C.

CU 211 and CU 212 must not be exposed to direct sunlight.

**Installation altitude**

CU 211 and CU 212 must be installed max. 2000 m above sea level.

**Warning**

Do not install CU 211 and CU 212 in potentially explosive environments.

If the controlled pumps are in potentially explosive environments, CU 211 and CU 212 must be used in combination with float switches.

**Ex**

Float switches located in potentially explosive environments must be connected via an EEx barrier, such as Grundfos no. 96440300. The EEx barrier itself must not be installed in potentially explosive environments.

Equipment/material located in potentially explosive environments must be approved for this in each individual situation.

Likewise the cabling into potentially explosive environments must be made according to current regulations.

**Note**

Use EEx approved float switches, such as Grundfos no. 96003332 or 96003695.

7. Electrical connection

**Supply voltage:**
- Single-phase = 230 V +/-10 % 50/60 Hz
- Three-phase = 400 V +/-10 % 50/60 Hz.

**Supply current:**
- Max. 250 mA. See also section 8. Overview of terminals.

**Mounting and removal**

CU 211 and CU 212 are designed for mounting on a 35 mm DIN rail (EN 50 022).

Mount CU 211 and CU 212 in this way:
1. Hold the bottom of the control unit up against the DIN rail.
2. Push the unit upwards.
3. Tip the unit into place. See fig. 17.

**Warning**

Do not install CU 211 and CU 212 in potentially explosive environments.

If the controlled pumps are in potentially explosive environments, CU 211 and CU 212 must be used in combination with float switches.

**Ex**

Float switches located in potentially explosive environments must be connected via an EEx barrier, such as Grundfos no. 96440300. The EEx barrier itself must not be installed in potentially explosive environments.

Equipment/material located in potentially explosive environments must be approved for this in each individual situation.

Likewise the cabling into potentially explosive environments must be made according to current regulations.

**Note**

Use EEx approved float switches, such as Grundfos no. 96003332 or 96003695.
## 8. Overview of terminals

The designations of the terminals refer to the wiring diagrams on the following pages.

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Terminal</th>
<th>Description</th>
<th>Electrical data</th>
<th>Function</th>
<th>Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AC</td>
<td>Supply output for level 1 and 2</td>
<td>13-18 AC / 12 VDC</td>
<td>The level 1 and 2 inputs are designed for either AC or DC transmitters, such as electrodes or float switches.</td>
<td></td>
</tr>
<tr>
<td>1 1</td>
<td></td>
<td>Terminal for level 1</td>
<td></td>
<td></td>
<td><img src="image1.png" alt="Diagram" /></td>
</tr>
<tr>
<td>1 2</td>
<td></td>
<td>Terminal for level 2</td>
<td>1 mA</td>
<td></td>
<td><img src="image2.png" alt="Diagram" /></td>
</tr>
<tr>
<td>2</td>
<td>G</td>
<td>Earth (GND) for level 3 and 4</td>
<td>0 V</td>
<td></td>
<td><img src="image3.png" alt="Diagram" /></td>
</tr>
<tr>
<td>2 3</td>
<td></td>
<td>Terminal for level 3</td>
<td></td>
<td></td>
<td><img src="image4.png" alt="Diagram" /></td>
</tr>
<tr>
<td>2 4</td>
<td></td>
<td>Terminal for level 4</td>
<td>5 V output max. 0.5 mA</td>
<td>The level 3 and 4 inputs are designed for DC transmitters, such as float switches. A max. cable length of 100 metres is recommended.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>G</td>
<td>Frame connection for S1-2 and T1-2</td>
<td>0 V</td>
<td></td>
<td><img src="image5.png" alt="Diagram" /></td>
</tr>
<tr>
<td>3 1</td>
<td></td>
<td>Terminal for motor protector</td>
<td>5 V output max. 0.5 mA</td>
<td>S1 is input for alarm from overload relay.</td>
<td></td>
</tr>
<tr>
<td>3 2</td>
<td></td>
<td>Terminal for motor protector</td>
<td>5 V output max. 2.2 mA</td>
<td>T1 is input from a thermal switch fitted inside the pump.</td>
<td></td>
</tr>
<tr>
<td>3 3</td>
<td></td>
<td>Terminal for thermal circuit breaker</td>
<td>5 V output max. 0.5 mA</td>
<td>S2 only applies to two-pump systems; otherwise the same as S1.</td>
<td></td>
</tr>
<tr>
<td>3 4</td>
<td></td>
<td>Terminal for thermal circuit breaker</td>
<td>5 V output max. 2.2 mA</td>
<td>T2 only applies to two-pump systems; otherwise the same as T1.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>H3</td>
<td>Terminal for NC-contact for high-level alarm</td>
<td>Max 230 VAC 2 A</td>
<td>Depending on the application and the DIP switch setting, one of the level inputs can trip the high-level alarm.</td>
<td></td>
</tr>
<tr>
<td>5 1</td>
<td></td>
<td>Frame connection for high-level alarm</td>
<td></td>
<td></td>
<td><img src="image6.png" alt="Diagram" /></td>
</tr>
<tr>
<td>5 2</td>
<td></td>
<td>Terminal for NO-contact for high-level alarm</td>
<td></td>
<td></td>
<td><img src="image7.png" alt="Diagram" /></td>
</tr>
<tr>
<td>6</td>
<td>GA1</td>
<td>Terminal for NC-contact for common alarm</td>
<td></td>
<td></td>
<td><img src="image8.png" alt="Diagram" /></td>
</tr>
<tr>
<td>6 1</td>
<td></td>
<td>Frame connection for common alarm</td>
<td>Max. 230 VAC 2 A</td>
<td>All alarms trip the alarm relay.</td>
<td></td>
</tr>
<tr>
<td>6 2</td>
<td></td>
<td>Terminal for NO-contact for common alarm</td>
<td></td>
<td></td>
<td><img src="image9.png" alt="Diagram" /></td>
</tr>
<tr>
<td>7</td>
<td>L1</td>
<td>Supply input. Only three-phase version</td>
<td>400 V</td>
<td>Mains supply input.</td>
<td></td>
</tr>
<tr>
<td>7 1</td>
<td></td>
<td>Supply input</td>
<td>400 V/230 V</td>
<td>In three-phase versions the rated voltage is 400 V on L1, L2 and L3. In single-phase versions the rated voltage is 230 V on L and N.</td>
<td></td>
</tr>
<tr>
<td>7 2</td>
<td></td>
<td>Supply input</td>
<td>400 V/230 V</td>
<td></td>
<td><img src="image10.png" alt="Diagram" /></td>
</tr>
<tr>
<td>8</td>
<td>CP1</td>
<td>Terminal for start/stop of pump</td>
<td></td>
<td>P1 is an NO-contact designed for start and stop of pump 1. Depending on the DIP switch setting, the relay will close according to the signals from the level inputs.</td>
<td></td>
</tr>
<tr>
<td>8 1</td>
<td></td>
<td>Terminal for start/stop of pump 1</td>
<td>Max. 400 V 2 A</td>
<td></td>
<td><img src="image11.png" alt="Diagram" /></td>
</tr>
<tr>
<td>8 2</td>
<td></td>
<td>Terminal for start/stop of pump 2</td>
<td>Max. 400 V 2 A</td>
<td>P2 only applies to two-pump systems; otherwise the same as P1.</td>
<td></td>
</tr>
<tr>
<td>8 3</td>
<td></td>
<td>Terminal for start/stop of pump 2</td>
<td></td>
<td></td>
<td><img src="image12.png" alt="Diagram" /></td>
</tr>
</tbody>
</table>
9. Wiring diagrams CU 211

9.1 CU 211, single-phase, inputs

For FLOAT switches or ELECTRODES

For FLOAT switches or REMOTE input

Motor

Thermal switch

CU211.230.1

Input

AC 1 2 3 4

123 4GAC

250 mA
9.2 CU 211, single-phase, outputs

CU211.230.1 output

Thermal Switch

Pump 1

L
N
CP1
9.3 CU 211, single-phase, inputs from IO 111

For FLOAT switches or ELECTRODES

For FLOAT switches or REMOTE input

CU 211.230.1
Input

IO 111 Pumpe 1

M 1-
Pumpe 1

1 K5
1 F

Insulation
Controller status
Auto reset
Supply voltage
Alarm relay

P 1...P 5

Pump sensor cable

TM04 2726 2906

English (GB)
9.4 CU 211, single-phase, outputs for modem

CU 211.230.1 output

SMS modul

Thermal Switch
Pump 1

Com
O 1
O 2

Batt
1 A
9.5 CU 211, single-phase, outputs for CIU 270

CU 211.230.1
output

IO 111 PUMPE 1

Thermal Switch Pump 1

CIU 270

GRM

TM04 2725 2008
CU 211.400.3 output

Thermal Switch Pump 1
CU 211.400.3
Input

IO 111 Pumpe 1

Pump Sensor cable

For FLOAT switches or ELECTRODES
or REMOTE input

For FLOAT switches or ELECTRODES
or REMOTE input

M 3-
Pumpe 1

- OFF

- OFF

Insulation Contactor status Auto reset Supply voltage Alarm relay

24 V

250 mA
CU 211.400.3
output

Thermal Switch
Pump 1
9.10 CU 211, three-phase, outputs for CIU 270

[Diagram of electrical connections involving CU 211, 230.1 output, CIU 270, PUMPE 1, and other components such as Thermal Switch.]
10. Wiring diagrams CU 212

10.1 CU 212, single-phase, inputs

For FLOAT switches or ELECTRODES

Motor 1
Thermal switch

Motor 2
Thermal switch

Pumpe 1
F

Pumpe 2
F
10.3 CU 212, single-phase, inputs from IO 111
10.4 CU 212, single-phase, outputs for modem

CU 212.230.1 output

SMS modul

Thermal Switch

Pump 2

Thermal Switch

Pump 1

145 L

151 N

297 1 A

408 Batt

192 CU 212.230.1 output

Thermal Switch

Pump 1

Thermal Switch

Pump 2

GA 1

GA 2

GA 3

267 P 1

267 P 2

336 1 F 2 1 F 3

364 1 K 5 1 K 6

364 O 1

364 O 2

269 1 K 5 1 K 6

269 H 1

269 H 2

269 H 3

269 CP1

269 CP2
10.6 CU 212, three-phase, inputs

For FLOAT switches or ELECTRODES
For FLOAT switches or REMOTE input

CU 212.400.3
Input

Pumpe 1  Pumpe 2
10.7 CU 212, three-phase, outputs
10.9 CU 212, three-phase, outputs for modem
10.10 CU 212, three-phase, outputs for CIU 270

CIU 270

CU 212.400.3 output

GRM

Thermal Switch
Pump 1
Thermal Switch
Pump 2

IO 111 PUMPE 1
IO 111 PUMPE 2

TM04 2743 2008
11. Maintenance
CU 211 and CU 212 require no maintenance. CU 211 and CU 212 may only be cleaned with a dustless cloth.

12. Service
CU 211 and CU 212 cannot be serviced. In case of faults in the control unit, replace it.

13. Disposal
This product or parts of it must be disposed of in an environmentally sound way:
1. Use the public or private waste collection service.
2. If this is not possible, contact the nearest Grundfos company or service workshop.

Subject to alterations.