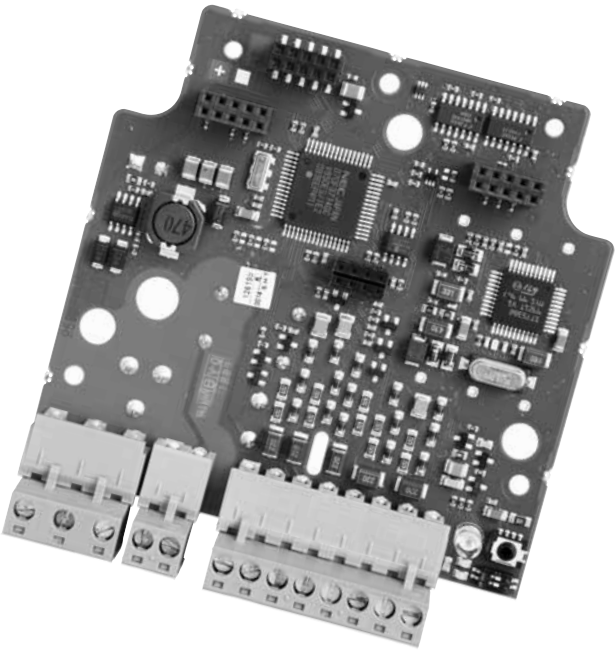
# Multi-purpose IO module

## for Grundfos AUTO$_{ADAPT}$ pumps

Installation and operating instructions



# Multi-purpose IO module

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## GB Declaration of Conformity

We, Grundfos, declare under our sole responsibility that the product, IO module, to which this declaration relates, is in conformity with these Council directives on the approximation of the laws of the EC member states:

– Low Voltage Directive (2006/95/EC).
  Standard used: EN 61010-1: 2001.
– EMC Directive (2004/108/EC).
  Standard used: EN 61326-1: 2006.

## BG Декларация за съответствие

Ние, фирма Grundfos, заявяваме с пълна отговорност, че продукта IO модул, за който се отнася настоящата декларация, отговаря на следните указания на Съвета за уеднаквяване на правните разпоредби на държавите членки на ЕС:

– Директива за нисковолтови системи (2006/95/EC).
  Приложен стандарт: EN 61010-1: 2001.
– Директива за електромагнитна съвместимост (2004/108/EC).
  Приложен стандарт: EN 61326-1: 2006.

## CZ Prohlášení o shodě

My firma Grundfos prohlašujeme na svou plnou odpovědnost, že výrobek Modul IO, na nějž se toto prohlášení vztahuje, je v souladu s ustanoveními směrnice Rady pro sblížení právních předpisů členských států Evropského společenství v oblastech:

– Směrnice pro nízkonapěťové aplikace (2006/95/ES).
  Použitá norma: EN 61010-1: 2001.
– Směrnice pro elektromagnetickou kompatibilitu (EMC) (2004/108/ES).
  Použitá norma: EN 61326-1: 2006.

## DK Overensstemmelseserklæring

Vi, Grundfos, erklærer under ansvar at produktet, IO-modul, som denne erklæring omhandler, er i overensstemmelse med disse af Rådets direktiver om indbyrdes tilnærmelse til EF-medlemsstaternes lovgivning:

– Lavspændingsdirektivet (2006/95/EF).
  Anvendt standard: EN 61010-1: 2001.
– EMC-direktivet (2004/108/EF).
  Anvendt standard: EN 61326-1: 2006.

## DE Konformitätserklärung

Wir, Grundfos, erklären in alleiniger Verantwortung, dass das Produkt E/A-Modul, auf das sich diese Erklärung bezieht, mit den folgenden Richtlinien des Rates zur Angleichung der Rechtsvorschriften der EU-Mitgliedsstaaten übereinstimmt:

– Niederspannungsrichtlinie (2006/95/EG).
  Norm, die verwendet wurde: EN 61010-1: 2001.
– EMV-Richtlinie (2004/108/EG).
  Norm, die verwendet wurde: EN 61326-1: 2006.

## EE Vastavusdeklaratsioon

Meie, Grundfos, deklareerime enda ainuvastutusel, et toode IO moodul, mille kohta käesolev juhend käib, on vastavuses EÜ Nõukogu direktiividega EMÜ liikmesriikide seaduste ühitamise kohta, mis käsitlevad:

– Madalpinge direktiiv (2006/95/EC).
  Kasutatud standard: EN 61010-1: 2001.
– Elektromagnetiline ühilduvus (EMC direktiiv) (2004/108/EC).
  Kasutatud standard: EN 61326-1: 2006.

## GR Δήλωση Συμμόρφωσης

Εμείς, η Grundfos, δηλώνουμε με αποκλειστικά δική μας ευθύνη ότι τα προϊόντα Μονάδα IO, στα οποία αναφέρεται η παρούσα δήλωση, συμμορφώνονται με τις εξής Οδηγίες του Συμβουλίου περί προσέγγισης των νομοθεσιών των κρατών μελών της ΕΕ:

– Οδηγία χαμηλής τάσης (2006/95/EC).
  Πρότυπο που χρησιμοποιήθηκε: EN 61010-1: 2001.
– Οδηγία Ηλεκτρομαγνητικής Συμβατότητας (EMC) (2004/108/EC).
  Πρότυπο που χρησιμοποιήθηκε: EN 61326-1: 2006.

## ES Declaración de Conformidad

Nosotros, Grundfos, declaramos bajo nuestra propia responsabilidad que el producto Módulo IO, al cual se refiere esta declaración, está conforme con las Directivas del Consejo en la aproximación de las leyes de los Estados Miembros del EM:

– Directiva de Baja Tensión (2006/95/CE).
  Norma aplicada: EN 61010-1: 2001.
– Directiva EMC (2004/108/CE).
  Norma aplicada: EN 61326-1: 2006.

## FR Déclaration de Conformité

Nous, Grundfos, déclarons sous notre seule responsabilité, que le produit Module IO, auquel se réfère cette déclaration, est conforme aux Directives du Conseil concernant le rapprochement des législations des Etats membres CE relatives aux normes énoncées ci-dessous :

– Directive Basse Tension (2006/95/CE).
  Norme utilisée : EN 61010-1 : 2001.
– Directive Compatibilité Electromagnétique CEM (2004/108/CE).
  Norme utilisée : EN 61326-1 : 2006.

## HR Izjava o usklađenosti

Mi, Grundfos, izjavljujemo pod vlastitom odgovornošću da je proizvod IO modul, na koji se ova izjava odnosi, u skladu s direktivama ovog Vijeća o usklađivanju zakona država članica EU:

– Direktiva za niski napon (2006/95/EZ).
  Korištena norma: EN 61010-1: 2001.
– Direktiva za elektromagnetsku kompatibilnost (2004/108/EZ).
  Korištena norma: EN 61326-1: 2006.

## IT Dichiarazione di Conformità

Grundfos dichiara sotto la sua esclusiva responsabilità che il prodotto Modulo I/O, al quale si riferisce questa dichiarazione, è conforme alle seguenti direttive del Consiglio riguardanti il riavvicinamento delle legislazioni degli Stati membri CE:

– Direttiva Bassa Tensione (2006/95/CE).
  Norma applicata: EN 61010-1: 2001.
– Direttiva EMC (2004/108/CE).
  Norma applicata: EN 61326-1: 2006.

## LV Paziņojums par atbilstību prasībām

Sabiedrība GRUNDFOS ar pilnu atbildību dara zināmu, ka produkts Ievadu/izvadu modulis, uz kuru attiecas šis paziņojums, atbilst šādām Padomes direktīvām par tuvināšanos EK dalībvalstu likumdošanas normām:

– Zema sprieguma direktīva (2006/95/EK).
  Piemērotais standarts: EN 61010-1: 2001.
– Elektromagnētiskās saderības direktīva (2004/108/EK).
  Piemērotais standarts: EN 61326-1: 2006.

## LT Atitikties deklaracija

Mes, Grundfos, su visa atsakomybe pareiškiame, kad gaminys IO modulis, kuriam skirta ši deklaracija, atitinka šias Tarybos Direktyvas dėl Europos Ekonominės Bendrijos šalių narių įstatymų suderinimo:

– Žemų įtampų direktyva (2006/95/EB).
  Taikomas standartas: EN 61010-1: 2001.
– EMS direktyva (2004/108/EB).
  Taikomas standartas: EN 61326-1: 2006.

## NL Overeenkomstigheidsverklaring

Wij, Grundfos, verklaren geheel onder eigen verantwoordelijkheid dat het product IO-module waarop deze verklaring betrekking heeft, in overeenstemming is met de Richtlijnen van de Raad in zake de onderlinge aanpassing van de wetgeving van de EG lidstaten betreffende:

– Laagspannings Richtlijn (2006/95/EC).
  Gebruikte norm: EN 61010-1: 2001.
– EMC Richtlijn (2004/108/EC).
  Gebruikte norm: EN 61326-1: 2006.

## PL Deklaracja zgodności

My, Grundfos, oświadczamy z pełną odpowiedzialnością, że nasze wyroby Moduł IO, których deklaracja niniejsza dotyczy, są zgodne z następującymi wytycznymi Rady d/s ujednolicenia przepisów prawnych krajów członkowskich WE:

– Dyrektywa Niskonapięciowa (LVD) (2006/95/WE).
  Zastosowana norma: EN 61010-1: 2001.
– Dyrektywa EMC (2004/108/WE).
  Zastosowana norma: EN 61326-1: 2006.

## RU Декларация о соответствии

Мы, компания Grundfos, со всей ответственностью заявляем, что изделия Модуль IO, к которым относится настоящая декларация, соответствуют следующим Директивам Совета Евросоюза об унификации законодательных предписаний стран-членов ЕС:

– Низковольтное оборудование (2006/95/EC).
  Применявшийся стандарт: EN 61010-1: 2001.
– Электромагнитная совместимость (2004/108/EC).
  Применявшийся стандарт: EN 61326-1: 2006.

## SK Prehlásenie o konformite

My firma Grundfos prehlasujeme na svoju plnú zodpovednosť, že výrobok Modul IO, na ktorý sa toto prehlásenie vzťahuje, je v súlade s ustanovením smernice Rady pre zblíženie právnych predpisov členských štátov Európskeho spoločenstva v oblastiach:

– Smernica pre nízkonapäťové aplikácie (2006/95/EC).
  Použitá norma: EN 61010-1: 2001.
– Smernica pre elektromagnetickú kompatibilitu (2004/108/EC).
  Použitá norma: EN 61326-1: 2006.

## RS Deklaracija o konformitetu

Mi, Grundfos, izjavljujemo pod vlastitom odgovornošću da je proizvod IO modul, na koji se ova izjava odnosi, u skladu sa direktivama Saveta za usklađivanje zakona država članica EU:

– Direktiva niskog napona (2006/95/EC).
  Korišćen standard: EN 61010-1: 2001.
– EMC direktiva (2004/108/EC).
  Korišćen standard: EN 61326-1: 2006.

## SE Försäkran om överensstämmelse

Vi, Grundfos, försäkrar under ansvar att produkten IO-modul, som omfattas av denna försäkran, är i överensstämmelse med rådets direktiv om inbördes närmande till EU-medlemsstaternas lagstiftning, avseende:

– Lågspänningsdirektivet (2006/95/EG).
  Tillämpad standard: EN 61010-1: 2001.
– EMC-direktivet (2004/108/EG).
  Tillämpad standard: EN 61326-1: 2006.

## HU Megfelelőségi nyilatkozat

Mi, a Grundfos, egyedüli felelősséggel kijelentjük, hogy a IO modul termék, amelyre jelen nyilatkozik vonatkozik, megfelel az Európai Unió tagállamainak jogi irányelveit összehangoló tanács alábbi előírásainak:

– Kisfeszültségű Direktíva (2006/95/EK).
  Alkalmazott szabvány: EN 61010-1: 2001.
– EMC Direktíva (2004/108/EK).
  Alkalmazott szabvány: EN 61326-1: 2006.

## UA Свідчення про відповідність вимогам

Компанія Grundfos заявляє про свою виключну відповідальність за те, що продукт Модуль IO, на який поширюється дана декларація, відповідає таким рекомендаціям Ради з уніфікації правових норм країн - членів ЕС:

– Низька напруга (2006/95/EC).
  Стандарти, що застосовувалися: EN 61010-1: 2001.
– Електромагнітна сумісність (2004/108/EC).
  Стандарти, що застосовувалися: EN 61326-1: 2006.

## PT Declaração de Conformidade

A Grundfos declara sob sua única responsabilidade que o produto Módulo IO, ao qual diz respeito esta declaração, está em conformidade com as seguintes Directivas do Conselho sobre a aproximação das legislações dos Estados Membros da CE:

– Directiva Baixa Tensão (2006/95/CE).
  Norma utilizada: EN 61010-1: 2001.
– Directiva EMC (compatibilidade electromagnética) (2004/108/CE).
  Norma utilizada: EN 61326-1: 2006.

## RO Declarație de Conformitate

Noi, Grundfos, declarăm pe propria răspundere că produsele Modul IO, la care se referă această declarație, sunt în conformitate cu aceste Directive de Consiliu asupra armonizării legilor Statelor Membre CE:

– Directiva Tensiune Joasă (2006/95/CE).
  Standard utilizat: EN 61010-1: 2001.
– Directiva EMC (2004/108/CE).
  Standard utilizat: EN 61326-1: 2006.

## SI Izjava o skladnosti

V Grundfosu s polno odgovornostjo izjavljamo, da so naši izdelki IO modul, na katere se ta izjava nanaša, v skladu z naslednjimi direktivami Sveta o približevanju zakonodaje za izenačevanje pravnih predpisov držav članic ES:

– Direktiva o nizki napetosti (2006/95/ES).
  Uporabljena norma: EN 61010-1: 2001.
– Direktiva o elektromagnetni združljivosti (EMC) (2004/108/ES).
  Uporabljena norma: EN 61326-1: 2006.

## FI Vaatimustenmukaisuusvakuutus

Me, Grundfos, vakuutamme omalla vastuullamme, että tuote IO-moduuli, jota tämä vakuutus koskee, on EY:n jäsenvaltioiden lainsäädännön yhdenmukaistamiseen tähtäävien Euroopan neuvoston direktiivien vaatimusten mukainen seuraavasti:

– Pienjännitedirektiivi (2006/95/EY).
  Sovellettu standardi: EN 61010-1: 2001.
– EMC-direktiivi (2004/108/EY).
  Sovellettu standardi: EN 61326-1: 2006.

## TR Uygunluk Bildirgesi

Grundfos olarak bu beyannameye konu olan IO modülü ürünlerinin, AB Üyesi Ülkelerin kanunlarını birbirine yaklaştırma üzerine Konsey Direktifleriyle uyumlu olduğunun yalnızca bizim sorumluluğumuz altında olduğunu beyan ederiz:

– Düşük Voltaj Yönetmeliği (2006/95/EC).
  Kullanılan standart: EN 61010-1: 2001.
– EMC Diretifi (2004/108/EC).
  Kullanılan standart: EN 61326-1: 2006.

## CN 产品合格声明书

我们格兰富在我们的全权责任下声明，产品 IO 模块，即该合格证所指之产品，符合欧共体使其成员国法律趋于一致的以下欧共理事会指令：

- 低电压指令 (2006/95/EC)。
  所用标准: EN 61010-1: 2001。
- 电磁兼容性指令 (2004/108/EC)。
  所用标准: EN 61326-1: 2006。

## JP 適合宣言

**Grundfos は、その責任の下に、IO モジュール 製品が EC 加盟諸国の法規に関連する、以下の評議会指令に適合していることを宣言します：**

- **低電圧指令 (2006/95/EC)。**
  **適用規格：EN 61010-1: 2001。**
- **EMC 指令 (2004/108/EC)。**
  **適用規格：EN 61326-1: 2006。**

## KO 적합성 선언

Grundfos 에서는 자사의 단독 책임에 따라 이 선언과 관련된 I/O 모듈 제품이 EC 회원국 법률에 기반한 다음 이사회 지침을 준수함을 선언합니다:

- 저전압 지침(2006/95/EC).
  사용된 표준: EN 61010-1: 2001.
- EMC 지침(2004/108/EC).
  사용된 표준: EN 61326-1: 2006.

Bjerringbro, 16th July 2010

Jan Strandgaard
Technical Director
Grundfos Holding A/S
Poul Due Jensens Vej 7
8850 Bjerringbro, Denmark

Person authorised to compile technical file and
empowered to sign the EC declaration of conformity.

# **English (GB)** Installation and operating instructions

**Original installation and operating instructions.**

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***Warning***

***Prior to installation, read these installation and operating instructions. Installation and operation must comply with local regulations and accepted codes of good practice.***

## 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

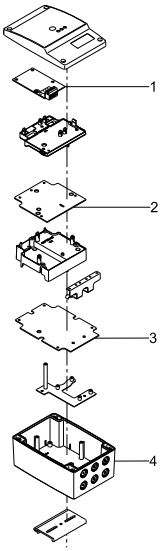
***Notes or instructions that make the job easier and ensure safe operation.***

## 2. Introduction

This manual describes how to connect and configure the multi-purpose IO module fitted in the CIU unit (CIU = Communication Interface Unit). The CIU unit is a data collection and communication unit.

The manual also describes the communication between the CIU unit and the pumps when using the Grundfos R100 remote control.

Figure 1 and the table below give an overview of the modules and the installation and operating instructions supplied with the CIU unit.




TM04 6487 0410

**Fig. 1** Modules in the CIU unit

| Pos. | Description |
|---|---|
| 1 | CIM 2XX module.<br>See installation and operating instructions for the CIM module and the Quick guide for the CIU unit. |
| 2 | IO module.<br>See these installation and operating instructions and the Quick guide for the CIU unit. |
| 3 | Power supply and GENIbus module.<br>See installation and operating instructions and Quick guide for the CIU unit. |
| 4 | CIU unit.<br>See installation and operating instructions and Quick guide for the CIU unit. |

The CIU unit is used as an interface for the following:

- Configuration of pump parameters required for water level control.
- Online monitoring of pump pit and pump values.
- Manual water level control (forced start/stop).
- Obtaining of measured and logged data that is very useful for pump service and pit optimisation.

Note ***The CIU unit is not used for water level control in the pump pit.***

## 3. Applications

The CIU unit is designed for use together with Grundfos DP, EF, SL1, SLV and SEG AUTO$_{ADAPT}$ pumps.

Communication between the CIU unit and the pumps can be established via the main network interface in the CIU unit or with the Grundfos R100 remote control.

The following CIU units are available:

- CIU 902 (without CIM module)
- CIU 202 Modbus unit
- CIU 252 GSM/GPRS unit
- CIU 272 GRM unit
  (GRM = Grundfos Remote Management).

The CIU unit incorporates one or two modules:

- Multi-purpose IO module with I/O functionality, IR communication interface and powerline communication.
- CIM 2XX module (optional).

For further information about the CIM module fitted, see installation and operating instructions for the relevant CIM module.

If a CIM module is fitted in the CIU unit, sensors connected to the digital input of the IO module can be remotely monitored by a centrally located SCADA system.

Caution ***When the CIU unit is used, the internal alarm relay in the pump should not be used. The CIU unit takes over the alarm function.***

Note ***If the IO module is used in a manner not specified by Grundfos, the protection provided by the IO module may be impaired.***

### 3.1 Operating mode

The user has to decide which operating mode to use for the actual system.

Possible operating modes:

- single-pit mode
- multi-pit mode.

The pump is factory-set to operate in single-pit mode.

If the system is to operate in multi-pit mode, contact your local Grundfos company.

Caution ***Single-pit mode and multi-pit mode cannot operate at the same time.***

#### 3.1.1 Single-pit mode

In single-pit mode, all pumps (up to four) connected to the CIU unit are installed in the same pit. The load is automatically distributed on the pumps as they are operating alternately. If the flow into the pit is increased, a second pump is automatically started (parallel operation). See fig. 2.

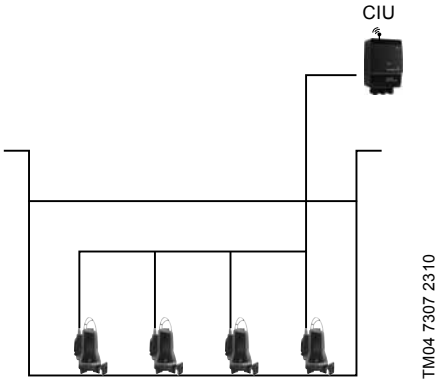



**Fig. 2** Single-pit mode

#### 3.1.2 Multi-pit mode

In multi-pit mode, the pumps connected to the CIU unit are installed in separate pump pits (up to four). A CIU unit can monitor up to four pumps. See fig. 3.

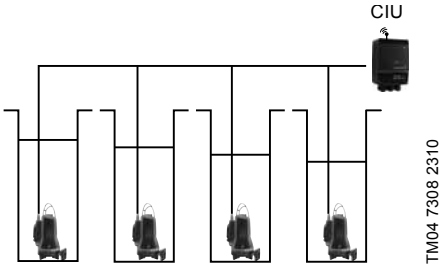



**Fig. 3** Multi-pit mode

In multi-pit mode, the CIU unit regards the connected pumps as four systems with their own settings.

If the system is to operate in multi-pit mode, contact your local Grundfos company.

# 4. Installation

Note ***For further information about setup of multi-pit mode, contact your local Grundfos company.***

***Warning***

***Before beginning installation, make sure that the power supply has been switched off and that it cannot be accidentally switched on.***

The installation procedure depends on the number of pumps to be installed, i.e. one or more pumps. In the following, only systems with one CIU unit will be described.

To ensure easy and correct installation, we recommend you to carefully follow the order of installation below.

### 4.1 Pit with one pump and a CIU unit

1. Install the pump in the pit.
2. Install the CIU unit.
   See installation and operating instructions for the CIU unit.

Caution ***The GENIbus connection is not used in this application.***

3. Connect all relevant leads to the IO module.
   See section *5. IO module*.
4. Connect all relevant leads to the CIM module, if fitted.
   See installation and operating instructions for the relevant CIM module.
5. Switch on the power supply to the CIU unit and the pump. The CIU unit automatically establishes communication with the pump.
6. Check that the CIU unit communicates with the pump, using the Grundfos R100 remote control.
   See section *6.1.1 CIU unit and pump status*.

### 4.2 Pit with two or more pumps and a CIU unit

1. Install the pumps in the pit.
2. Install the CIU unit.
   See installation and operating instructions for the CIU unit.

Caution ***The GENIbus connection is not used in this application.***

3. Connect all relevant leads to the IO module.
   See section *5. IO module*.
4. Connect all relevant leads to the CIM module, if fitted.
   See installation and operating instructions for the relevant CIM module.
5. Switch on the power supply to the CIU unit and pump 1. The CIU unit automatically establishes communication with the pump.
6. Check that the CIU unit communicates with pump 1, using the Grundfos R100 remote control.
   See section *6.1.1 CIU unit and pump status*.
7. Switch on the power supply to pump 2.
8. Check with the R100 that the CIU unit communicates with pump 2.
   See section *6.1.1 CIU unit and pump status*.
9. Repeat points 7 and 8 until all pumps have been switched on.

### 4.3 Replacement of pump

1. Switch off the power supply to the system.
2. Replace the pump.
3. Switch on the power supply to the system.
4. Establish communication with the pump, using the R100, and reset all addresses.
   See section *6.4.6 System self-configuration*.
5. Set new addresses with the R100.
   See section *4.2 Pit with two or more pumps and a CIU unit*.

### 4.4 Removing a pump for service

1. Switch off the power supply to the system.
2. Remove the pump.
3. Switch on the power supply to the system.
4. Establish communication with the pump, using the R100, and reset all addresses.
   See section *6.4.6 System self-configuration*.
5. Set new addresses with the R100.
   See section *4.2 Pit with two or more pumps and a CIU unit*.

Note ***When a pump is removed from the system, the warning or alarm "Communication fault, pump" will appear.***

### 4.5 EMC-correct installation

In order to ensure correct and stable function, it is very important to follow the guidelines below.

**Grundfos recommendations**

Use only screened signal cables for all inputs and outputs.

Note ***Any isolating plastic tape between screen and sheath must be removed before mounting the cable in the earth clamp.***

Note ***Do not twist screen ends, as this will destroy the screen effect at high frequencies.***

## 5. IO module

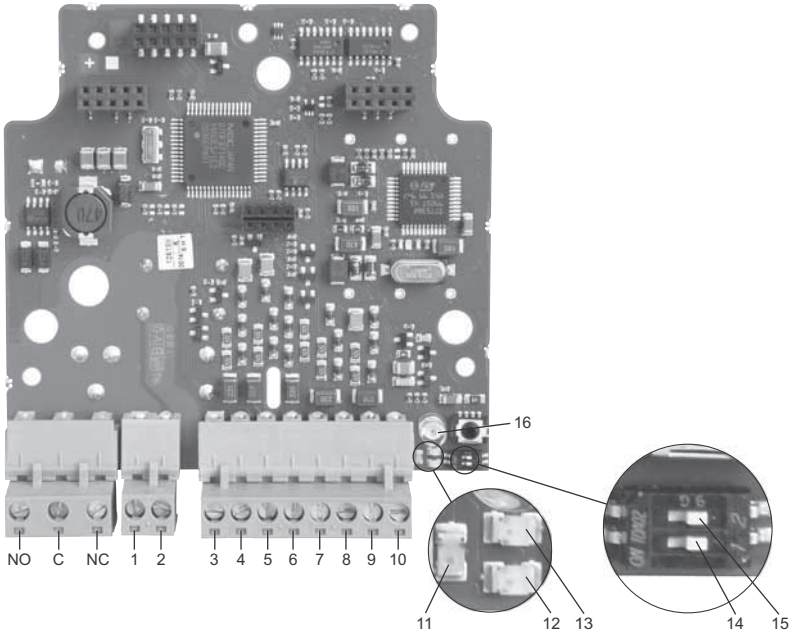



**Fig. 4** IO module

| Pos. | Designation | Description | Section |
|---|---|---|---|
| NO | NO | Terminals for alarm relay output. | *5.1 Alarm relay output* |
| C | C | | |
| NC | NC | | |
| 1 | A | Terminals for powerline communication. | *5.2 Communication between CIU unit and pumps* |
| 2 | B | | |
| 3 | DI1 | Terminals for external alarm reset (NO). | *5.3 Resetting of external alarm* |
| 4 | GND | | |
| 5 | DI2 (NO) | Terminals for high water level. | *5.4 High water level* |
| 6 | DI2 (NC) | | |
| 7 | GND | | |
| 8 | DI3 (NO) | Terminals for external alarm. | *5.5 General-purpose alarm* |
| 9 | DI3 (NC) | | |
| 10 | GND | | |
| 11 | LED1 | Red status LED for indication of alarm. Flashes when an alarm has been generated. | *5.6 LEDs* |
| 12 | LED2 | Yellow status LED for indication of IR activity. Flashes when IR communication is active. | |
| 13 | LED3 | Green status LED for indication of system status. Flashes when communication to a pump has been established. | |

| Pos. | Designation | Description | Section |
|---|---|---|---|
| 14 | SW1 | This DIP switch is used to enable the NC contactor function for "High water level". Default is OFF. | *5.4 High water level* |
| 15 | SW2 | This DIP switch is used to enable the NC contactor function for general-purpose alarm. Default is OFF. | *5.5 General-purpose alarm* |
| 16 | IR LED | LED for indication of IR communication with the Grundfos R100 remote control. | *5.7 LED for indication of IR communication* |

The terminals on the IO module are described in the following sections. See also fig. 4.

### 5.1 Alarm relay output

The alarm relay of the IO module has two functions. It can be used either as a normally open (NO) relay or as a normally closed (NC) relay.

The alarm relay output is activated by any alarm in the system. If the alarm disappears, the alarm relay is automatically reset.

The alarm relay can also be activated by one of these inputs:

- input for high water level (NO/NC).
  – See section *5.4 High water level*.
- input for external alarm (NO/NC).
  – See section *5.5 General-purpose alarm*.

**Note** ***Maximum contact load: 230 VAC, 2 A.***

The alarm relay can be manually reset via the relay reset input. See section *5.3 Resetting of external alarm*.

For connections, see fig. 5 and section *5. IO module*.

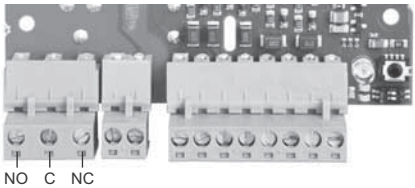



**Fig. 5** Alarm relay output

| Pos. | Description |
|---|---|
| NO | Use this terminal when the relay is to be used as a normally open relay. |
| C | Common terminal. |
| NC | Use this terminal when the relay is to be used as a normally closed relay. |

### 5.2 Communication between CIU unit and pumps

The IO module communicates with each pump via powerline communication. Each pump in the pit has a unique internal number (GENIbus number).
This GENIbus number is set automatically by the controller built into the Grundfos pumps.
See section *4. Installation*.

#### 5.2.1 Connecting the communication leads

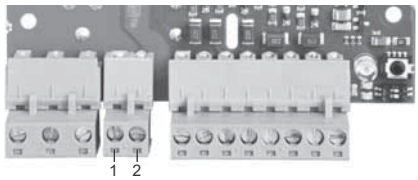



**Fig. 6** Communication

Terminals 1 and 2 are used to establish communication with each pump. If more than one pump are installed in the system, the leads are to be connected as shown in fig. 7.

**Example**

Leads 4 and 6 from each power supply cable must be connected in the lower part of the terminal block, or similar, used for communication. The terminal block is not supplied with the product.

In the upper part of the terminal block, a parallel connection is to be made. Then connect lead 4 to terminal (pos. 1) and lead 6 to terminal (pos. 2). See fig. 7.

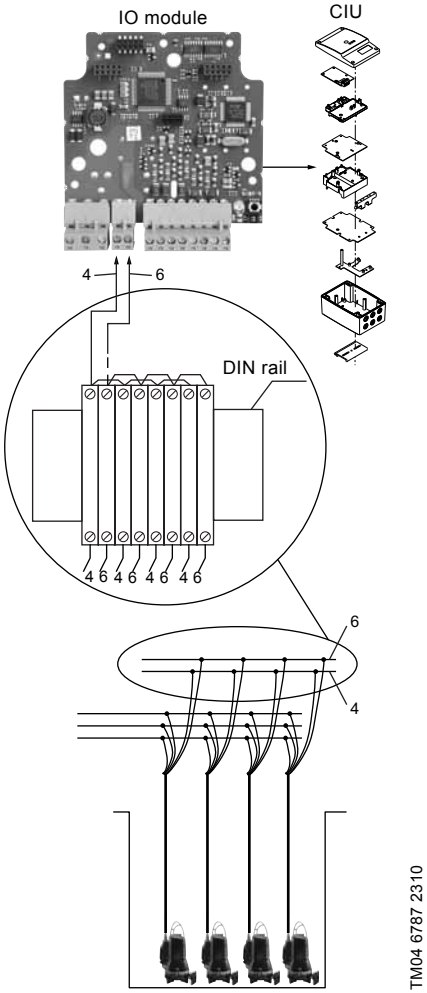



**Fig. 7** Powerline connection

**Connection**

| Terminal | Lead number | Data signal |
|---|---|---|
| 1 | 4 | A |
| 2 | 6 | B |

### 5.3 Resetting of external alarm

The IO module has one digital input that is used to reset the alarm relay output. Connect the resetting switch/contact as shown in fig. 8.

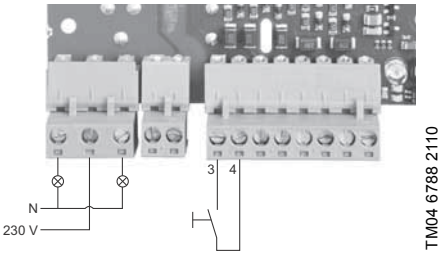



**Fig. 8** Alarm resetting (manual resetting)

### 5.4 High water level

See fig. 9.

The IO module has one digital input (with NO/NC options) that can be used for detection of high water level. Before the NC option can be used, it must be enabled by setting the DIP switch to ON (left) (pos. 14). See fig. 4.

Use terminal (pos. 5) when an NO contact is to be used to indicate high water level.

Use terminal (pos. 6) when an NC contact is to be used to indicate high water level. See fig. 9.

Caution ***Only one terminal is to be used.***

The input for high water level (NO/NC) triggers the alarm relay, and one or more pumps are started.

If the CIU unit incorporates a CIM 252 GSM/GPRS module, an SMS message can be sent to a centrally located SCADA system and/or directly to a mobile phone.

If the system is connected to GRM, an SMS message indicating high water level can be sent by the GRM server, if requested.

**Example**

The input for high water level triggers the alarm relay, and the red indicator light illuminates, indicating abnormal operation.
The green indicator light indicating normal operation is off. LED1 (pos. 11) flashes. The number of flashes indicates the current alarm. See section *7.1.1 System alarms and warnings* and fig. 9.

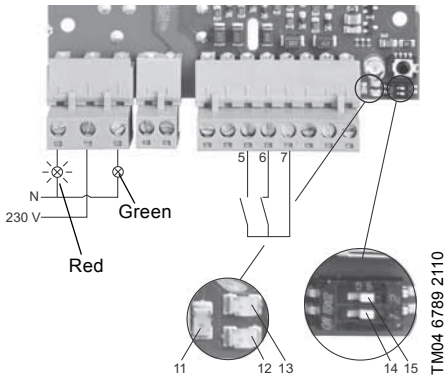



**Fig. 9** Detection of high water level

### 5.5 General-purpose alarm

See fig. 10.

The input for external alarm (NO/NC) triggers the alarm relay as long as it is enabled. Before the NC option can be used, it must be enabled by setting the DIP switch to ON (left) (pos. 15). See fig. 4.

The user can connect any alarm sensor or switch to this input.

If the CIU unit incorporates a CIM 252 GSM/GPRS module, an SMS message can be sent to a centrally located SCADA system and/or directly to a mobile phone.

If the system is connected to GRM, an SMS message indicating a general-purpose alarm can be sent by the GRM server, if requested.

**Example 1**

An overflow float switch has been installed in the system, and it has been activated. The overflow float switch triggers the alarm relay, and the red indicator light illuminates, indicating abnormal operation.

The green indicator light indicating normal operation is off. LED1 (pos. 11) flashes. The number of flashes indicates the current alarm. See section *7.1.1 System alarms and warnings* and fig. 10.

**Example 2**

A switch has been installed in the pit manhole cover. If the manhole cover is open, the switch triggers the alarm relay, and the red indicator light illuminates, indicating abnormal operation.

The green indicator light indicating normal operation is off. LED1 (pos. 11) flashes. The number of flashes indicates the current alarm. See section *7.1.1 System alarms and warnings* and fig. 10.

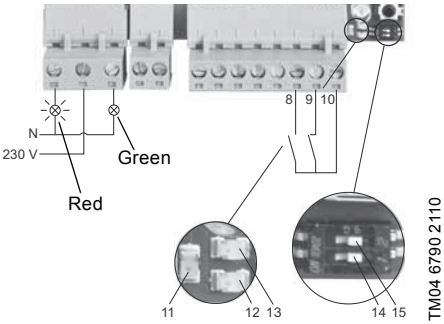



**Fig. 10** Detection of overflow

### 5.6 LEDs

The IO module has three LEDs.

The three LEDs are intended for use during installation and commissioning. They are only visible when the cover of the CIU unit has been removed.

See fig. 11.

- Red status LED (LED1) (pos. 11) for indication of alarm.
  See section *5.6.1 LED1 for indication of alarm*.
- Yellow status LED (LED2) (pos. 12) for indication of IR activity.
  See section *5.6.2 LED2 for indication of IR activity*.
- Green status LED (LED3) (pos. 13) for indication of system status.
  See section *5.6.3 LED3 for indication of system status*.

During start-up, the LEDs will flash in a circular counter-clockwise pattern for about two seconds.

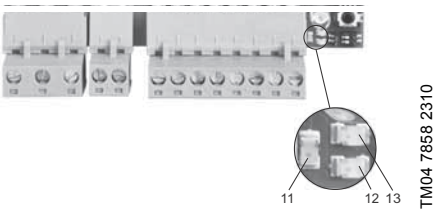



**Fig. 11** Status LEDs

#### 5.6.1 LED1 for indication of alarm

LED1 (pos. 11) flashes red when an alarm is generated. A special flash pattern is used to indicate individual alarms.
See section *7.1 Grundfos alarms and warnings*.

Only CIU events will be indicated by LED1.

#### 5.6.2 LED2 for indication of IR activity

LED2 (pos. 12) flashes yellow when IR communication has been established via the Grundfos R100 remote control.

### 5.6.3 LED3 for indication of system status

The LED3 (pos. 13) flashes green when communication to one or more pumps has been established. If the IO module cannot recognise the pumps, the LED3 (pos. 13) will be permanently green.

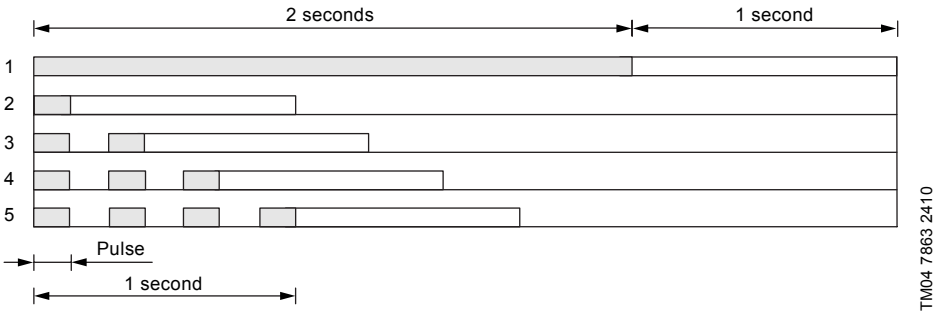



**Fig. 12** LED flash pattern during start-up

| Pos. | LED3 status | Description |
|---|---|---|
| 1 | Illuminates for 2 seconds, then a delay of 1 second. | No pumps detected by the IO module. |
| 2 | Pulsating green, 1 pulse per second, then a delay of 1 second. | One pump installed in the pit. |
| 3 | Pulsating green, 2 pulses per second, then a delay of 1 second. | Two pumps installed in the pit. |
| 4 | Pulsating green, 3 pulses per second, then a delay of 1 second. | Three pumps installed in the pit. |
| 5 | Pulsating green, 4 pulses per second, then a delay of 1 second. | Four pumps installed in the pit. |

### 5.7 LED for indication of IR communication

When communication has been established using the Grundfos R100 remote control, LED2 (pos. 12) is flashing green.

The IO module is designed to communicate with the R100.

The R100 is used for the following purposes:

- to read system and pump status
- to read alarms and warnings
- to set or change application and pump parameters.

See section *6. R100 remote control*.

TM04 6791 2310

**Fig. 13** IR communication

## 6. R100 remote control

The CIU unit is designed for wireless IR communication with the Grundfos R100 remote control.

During communication, the R100 must be pointed at the CIU unit.

The R100 offers additional setting options and status displays for the pump.

The R100 displays are divided into eight parallel menus (fig. 14):

**0. GENERAL**

See operating instructions for the R100.

**1. OPERATION**

**2. STATUS (SYSTEM)**

**3. STATUS (PUMP 1)**

**4. STATUS (PUMP 2)**

**5. STATUS (PUMP 3)**

**6. STATUS (PUMP 4)**

**7. SYSTEM INSTALLATION**

The number stated above each individual display in fig. 14 refers to the section in which the display is described.

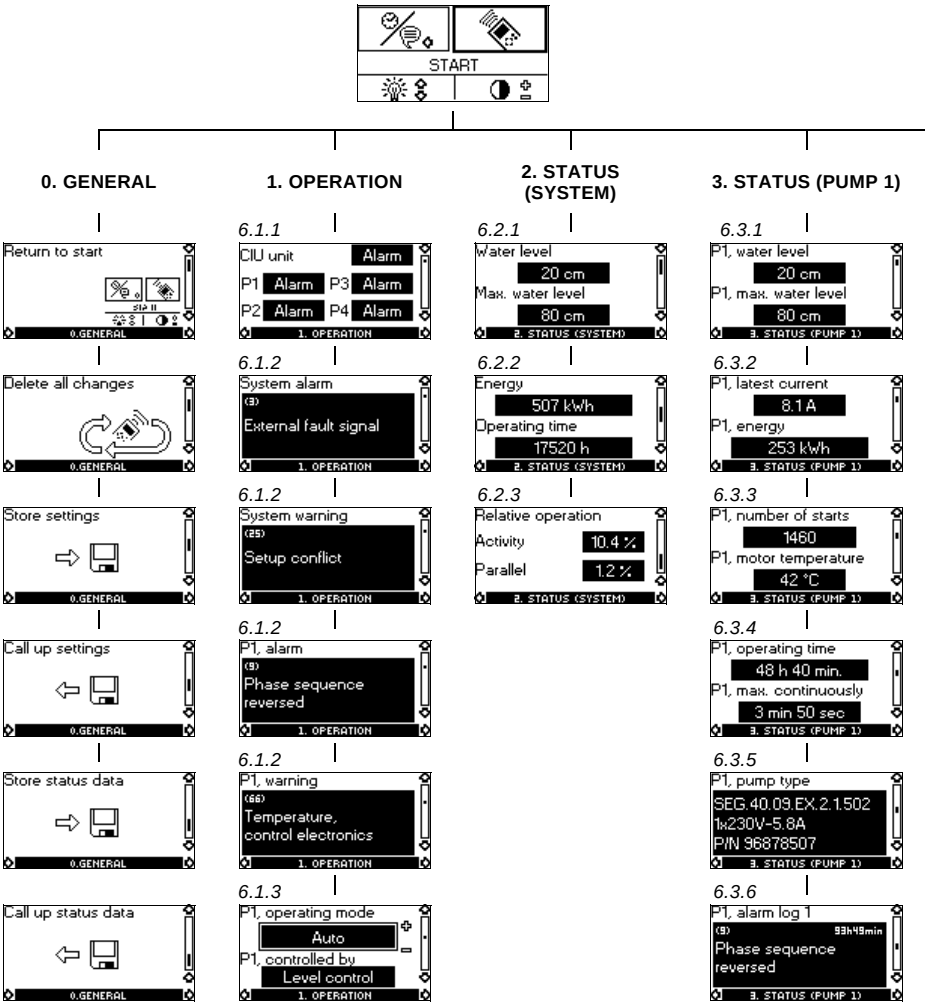



**Fig. 14** R100 menu overview

The R100 menu overview continues on the next page.

Note

***The menus OPERATION and STATUS (pump) are available for pumps 2, 3 and 4 if they are installed in the system. Five alarms can be stored in the alarm log for each pump. If a sixth alarm is received, the oldest alarm will automatically be removed.***

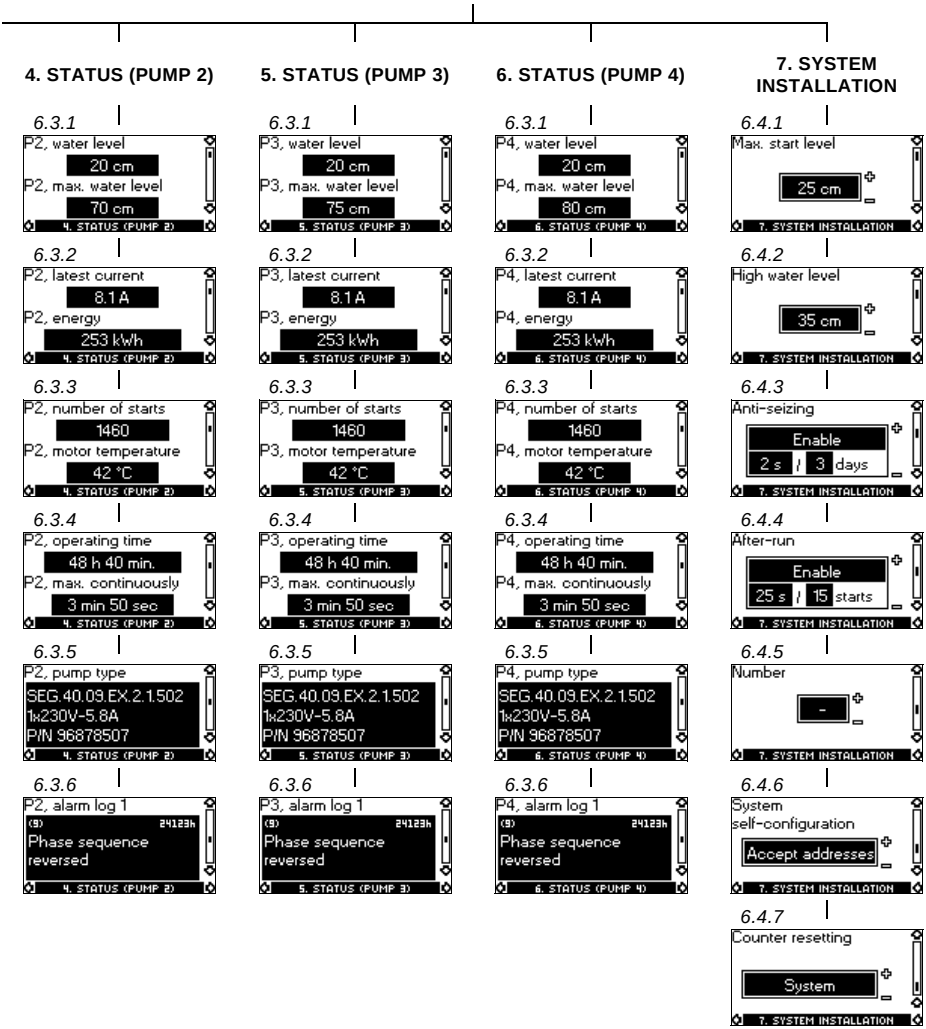



**Fig. 15** R100 menu overview (continued)

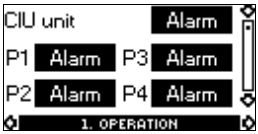
### 6.1 Menu OPERATION

Start communication by pointing the R100 at the CIU unit.

When communication between the R100 and the CIU unit has been established, the **OPERATION** menu appears in the display.

#### 6.1.1 CIU unit and pump status

This display depends on the operating mode selected in display "P1, operating mode".
See section *6.1.3 Operating mode*.




The CIU unit indicates its own status:

- OK
- Alarm
- Warn
- "!" (indicates no contact with an already detected pump).

A flashing P# indicates pump activity.

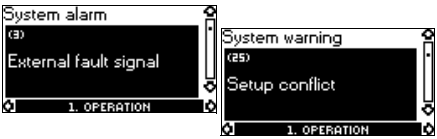
#### 6.1.2 Fault indications

Fault indications are divided into two sections:

- System alarms and warnings
- Pump alarms and warnings.

**System alarms and warnings**

These displays show examples of a system alarm and a system warning.

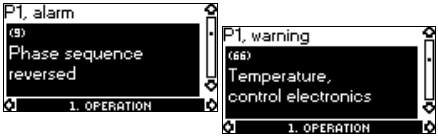



If a system fault has occurred, the cause will appear in this display. The value (3) is the fault code.
See section *7.1.1 System alarms and warnings*.

The fault indication can be reset in this display. If the fault cause has not disappeared when resetting is attempted, this will be indicated in the display.

**Pump alarms and warnings**

These displays show examples of a pump alarm and a pump warning.



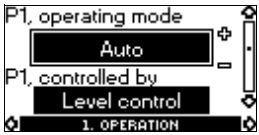

If a pump fault has occurred, the cause will appear in this display. The value (9) is the fault code.
See section *7.1.2 Pump alarms and warnings*.

The fault indication can be reset in this display. If the fault cause has not disappeared when resetting is attempted, this will be indicated in the display.

#### 6.1.3 Operating mode

This display is used to set the operating mode and control source for each individual pump.

The pump will run in this mode until it is switched off. When the power supply is switched on again, the pump will start in "Auto" mode.




Select an operating mode:

- Auto (controlled by built-in sensors).
- Start (the pump is running until an alarm is generated or the pump is set to "Stop" or "Auto").
- Stop (stopped).
- Pump down (drains the pump pit).
- Level control (controlled by the built-in level pressure sensor).
- R100 (R100 remote control).
- Remotely (SCADA).

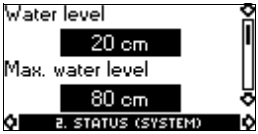
## 6.2 Menu STATUS (SYSTEM)

The displays appearing in this menu are status displays only. It is not possible to change or set values.

The status values in these displays are stated as a guide.

The counters for the system and each pump (1 to 4) can be reset in the **INSTALLATION** menu, display "Counter resetting". See section *6.4.7 Counter resetting*.

### 6.2.1 Water level



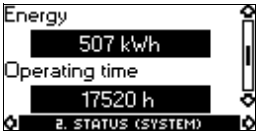

**Field "Water level":**

The value is the actual average of the water levels for all pumps in the pit.

**Field "Max. water level":**

Maximum measured water level for one of the pumps since last counter reset.

### 6.2.2 Energy



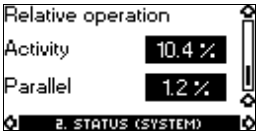

**Field "Energy":**

Total energy consumption for the system since last counter reset. The energy consumption is an accumulated value.

**Field "Operating time":**

Total number of operating hours since last counter reset.

### 6.2.3 Relative operation




**Field "Activity":**

Percentage of pump operating time (one or more pumps) (1 + 2 + 3 + 4, fig. 16) during the last 30 days.

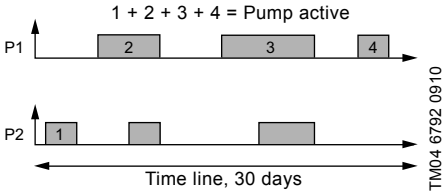



**Fig. 16** Activity

**Field "Parallel":**

Operating time of two or more pumps running in parallel (1 + 2, fig. 17) during the last 30 days shown in percentage of total operating time.

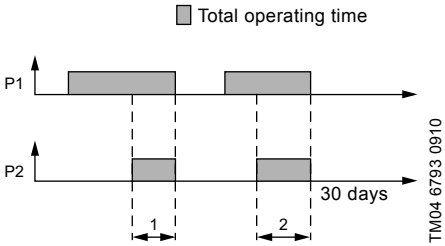
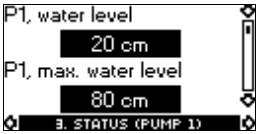



**Fig. 17** Parallel operation

### 6.3 Menu STATUS (PUMP 1)

The pump status displays are only shown for pump 1. Similar displays are available for pumps 2 to 4, if installed.

#### 6.3.1 P1, water level



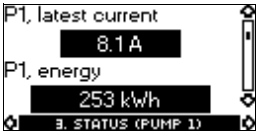

**Field "P1, water level":**

Actual water level in the pit measured by pump 1.

**Field "P1, max. water level":**

Maximum water level measured since last counter reset.

#### 6.3.2 P1, latest current




**Field "P1, latest current":**

In the case of single-phase connection, the display shows the supply current.

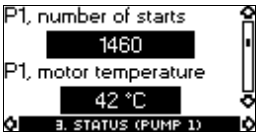
In the case of three-phase connection, the display shows the average current of all three phases, calculated as follows:

$$I_{average} \quad \frac{I_{L1} + I_{L2} + I_{L3}}{3} \text{ [A]}$$

**Field "P1, energy":**

Total energy consumption for pump 1 since last counter reset.

#### 6.3.3 P1, number of starts




**Field "P1, number of starts":**

Total number of starts for pump 1 since last counter reset.

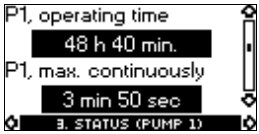
**Field "P1, motor temperature":**

Actual motor temperature measured with a Pt1000 sensor.

Repetitive accuracy: ± 3 %.

Absolute accuracy: ± 10 %.

#### 6.3.4 P1, operating time



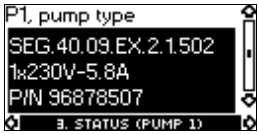

**Field "P1, operating time":**

Total number of operating hours and minutes for pump 1 since last counter reset.

**Field "P1, max. continuously":**

Maximum continuous operating time in minutes and seconds for pump 1 since last counter reset.

#### 6.3.5 P1, pump type

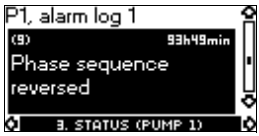



The following is shown in the display:

- pump type
- rated voltage and current
- product number.

#### 6.3.6 P1, alarm log 1 (2 to 4)

For each pump, an alarm log is generated. The maximum number of events in the log is five.




**Field "(9)":**

The value (9) is the fault code.
See section *7.1 Grundfos alarms and warnings*.

**Field "Phase sequence reversed":**

This text string is the alarm log text.
See section *7.1 Grundfos alarms and warnings*.

## 6.4 Menu SYSTEM INSTALLATION

In this menu, the settings to be considered when installing the pump are made. Values set in this menu apply to all pumps in the system.

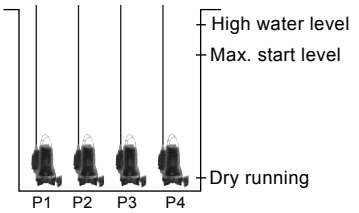



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**Fig. 18** Level indication

| | |
|---|---|
| High water level | At this level, the alarm relay output is triggered, and an alarm is generated.<br>Factory default setting:<br>Max. start level + 10 cm. |
| Max. start level | The highest level at which the pump will start.<br>Factory default setting: 25 cm. |
| Dry-running level | Dry-running level.<br>Fixed value. |

### 6.4.1 Max. start level

This display is only available in single-pit mode.

Set the maximum permissible start level for the pumps.

### 6.4.2 High water level

This display is only available in single-pit mode.

When "High water level" is reached, an alarm is generated, and all pumps will start.

Set the water level that has to indicate "High water level". This value must be higher than "Max. start level" to avoid conflicting levels.

### 6.4.3 Anti-seizing

This display is only available in single-pit mode.

The anti-seizing function is enabled by selecting "Enable". Set operating time (seconds) and the interval (days) between activations of the anti-seizing function.

Factory default setting: 2 s / 3 days (operating time).

### 6.4.4 After-run

***Warning***

***This function cannot be used on pumps with SuperVortex impeller. These pumps cannot start with air in the hydraulic system.***

***Warning***

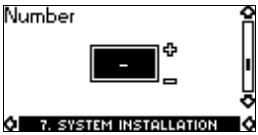
***This function must not be used in Ex installations.***

The after-run function is enabled by selecting "Enable". Set the operating time (seconds) and the interval (number of starts) between activations of the after-run function.

Factory default setting: 6 s / 15 starts.

### 6.4.5 Number

The number refers to the CIU unit. It is only necessary to change the number if several CIU units have to communicate at the same GENIbus level.




Enter the desired pump number to change the factory-set pump number.

Factory default setting: 1.

### 6.4.6 System self-configuration

This display is used to enable the self-configuration function.

See section *4. Installation*.

Select the desired function/action:

- Reset addresses
  (resets all pump addresses)
- Accept addresses
  (accepts all pump addresses)
- Copy parameters
  (copies the parameters of pump 1 to the other pumps in the system).

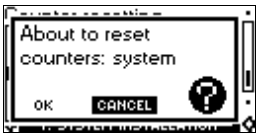
### 6.4.7 Counter resetting

This display is used to reset system and pump counters.

Select the counters to be reset:

- All alarm logs (P1...P4)
- All pumps
- Pump 1
- Pump 2
- Pump 3
- Pump 4
- System.

When one of the above options has been chosen, a warning will appear in the display.



# 7. Fault finding

## 7.1 Grundfos alarms and warnings

The Grundfos alarms and warnings that may appear in the system are divided into two sections:

- System alarms and warnings
- Pump alarms and warnings.

### 7.1.1 System alarms and warnings

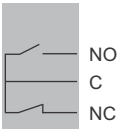
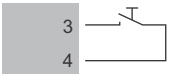
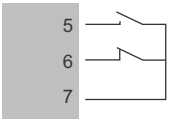
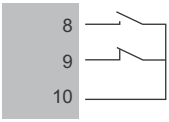
| Code | System events | Description | LED1 | Alarm | Warning |
|---|---|---|---|---|---|
| 3 | General-purpose alarm | The input for external alarm is activated. | 1 pulse | ● | - |
| 10 | Communication fault, pump | The internal communication between the CIU unit and one or more pumps has failed. | 2 pulses | ● | ● |
| 25 | Setup conflict | Two or more pumps have the same internal GENIbus address. | 3 pulses | ● | ● |
| 191 | High-level alarm | The high-level alarm has been triggered. | 4 pulses | ● | - |
| 236 | Pump 1 fault | One of the faults in section *7.1.2 Pump alarms and warnings* has occurred. | 5 pulses | ● | ● |
| 237 | Pump 2 fault | | 6 pulses | ● | ● |
| 238 | Pump 3 fault | | 7 pulses | ● | ● |
| 239 | Pump 4 fault | | 8 pulses | ● | ● |

### 7.1.2 Pump alarms and warnings

| Code | Pump events | Description | Alarm | Warning |
|---|---|---|---|---|
| 9 | Phase sequence reversed | The pump cannot start due to wrong phase sequence (two phases interchanged). | ● | - |
| 32 | Overvoltage | The supply voltage to the pump exceeds the limit stated on the nameplate (+ 20 %). | ● | - |
| 40 | Undervoltage | The supply voltage to the pump is below the limit stated on the nameplate (- 15 %). | ● | - |
| 48 | Overload | Motor or pump is overloaded. The motor protection ($I^2t$) has tripped. | ● | ● |
| 57 | Dry running | The dry-running sensor has been activated. | ● | ● |
| 65 | Motor temperature (Pt1000) | The Pt1000 sensor has triggered the alarm relay. Fault code 65 is disabled as default. | ● | ● |
| 66 | Temperature, control electronics | The NTC sensor has triggered the alarm relay. Fault code 66 is disabled as default. | ● | ● |
| 69 | Thermal switch 1 in motor | Thermal switch 1 open (150 °C). | ● | - |
| 70 | Thermal switch 2 in motor | Thermal switch 2 open (160 °C, single-phase, 170° C, three-phase). | ● | - |
| 82 | Verification error, code area (ROM) | ROM content validation failed. | - | ● |
| 83 | Verification error, parameter area (EEPROM) | EEPROM content validation failed. | - | ● |
| 191 | High-level alarm | The water level has exceeded the limit set as "High water level". | - | ● |

## 8. Overview of inputs and outputs

| | |
|---|---|
| AI | Analog input |
| AO | Analog output |
| C | Common |
| DI | Digital input |
| NC | Normally closed contact |
| NO | Normally open contact |

| Terminal | Designation | Data | Diagram |
|---|---|---|---|
| **Relay output** | | | **IO module** |
| NO | Normally open contact | Maximum contact load: 240 VAC, 2 A<br>Minimum contact load: 5 VDC, 10 mA |  |
| C | Common | | |
| NC | Normally closed contact | | |
| **Powerline communication** | | | |
| 1 | A | Signals for powerline communication | |
| 2 | B | | |
| **Alarm relay reset** | | | |
| 3 | DI1 | Terminals for alarm relay reset (NC) |  |
| 4 | GND | | |
| **High water level** | | | |
| 5 | DI2 (NO) | Terminals for high water level |  |
| 6 | DI2 (NC) | | |
| 7 | GND | | |
| **General-purpose alarm** | | | |
| 8 | DI3 (NO) | Terminals for general-purpose alarm |  |
| 9 | DI3 (NC) | | |
| 10 | GND | | |

## 9. Technical data

| | |
|---|---|
| Supply voltage | 24 VDC ± 10 % and<br>5 VDC ± 5 % |
| Power consumption | Maximum 3.5 W |
| Cables | Cross-section:<br>0.5 to 2.5 $mm^2$ or<br>AWG 20-13 |
| | Length:<br>The above values apply to cable lengths not exceeding 30 metres. |

### 9.1 Relay output

| | |
|---|---|
| Normally open contact | C, NO |
| Normally closed contact | C, NC |
| Maximum contact load | 240 VAC, 2 A |
| Minimum contact load | 5 VDC, 10 mA |

### 9.2 Digital inputs

| | |
|---|---|
| Open-circuit voltage | 5 VDC |
| Closed-circuit current | 10 mA |
| Frequency range | 0 to 16 Hz |
| Logic "0"<br>Logic "1" | < 1.5 V<br>> 4.0 V |

Caution ***Only potential-free devices must be connected to the digital inputs.***

## 10. Maintenance

The IO module is maintenance-free during normal use and operation. The IO module must only be cleaned with a dry dust-free cloth.

## 11. Service

The IO module cannot be serviced. If the IO module is faulty, the CIU unit must be replaced.

## 12. 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.

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