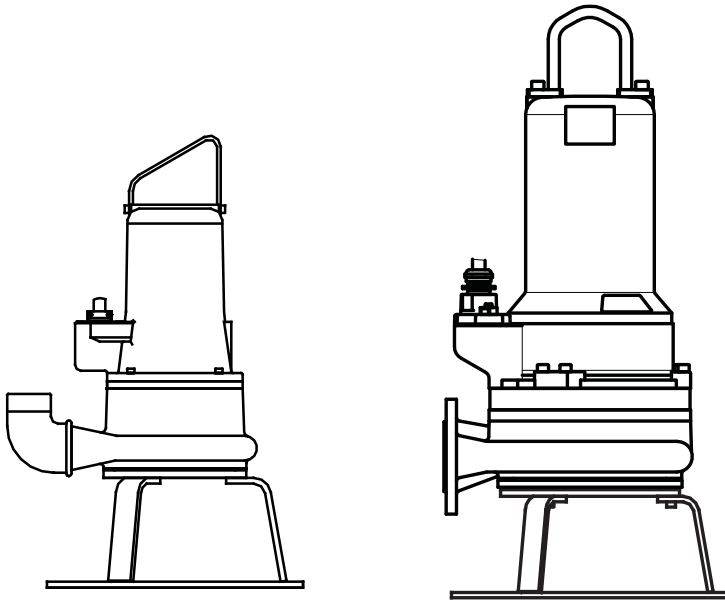


# APG

Installation and operating instructions



## Declaration of conformity

**GB: EC declaration of conformity**

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

- Machinery Directive (98/37/EC).
- Low Voltage Directive (2006/95/EC).  
Standards used: EN 60335-1:2002, EN 60335-2-41:2003.
- EMC Directive (89/336/EEC).  
Standards used: EN 61000-6-2, EN 61000-6-3.

This EC declaration of conformity is only valid when published as part of the Grundfos installation and operating instructions (publication number 96434822 0912).

**DK: EF-overensstemmelseserklæring**

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

- Maskindirektivet (98/37/EF).
- Lavspændingsdirektivet (2006/95/EF).  
Anvendte standarder: EN 60335-1:2002, EN 60335-2-41:2003.
- EMC-direktivet (89/336/EØF).  
Anvendte standarder: EN 61000-6-2, EN 61000-6-3.

Denne EF-overensstemmelseserklæring er kun gyldig når den publiceres som en del af Grundfos-monterings- og driftsinstruktionen (publikationsnummer 96434822 0912).

**GR: Δήλωση συμμόρφωσης EC**

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

- Οδηγία για μηχανήματα (98/37/ΕΚ).
- Οδηγία χαμηλής τάσης (2006/95/ΕΚ).  
Πρότυπα που χρησιμοποιήθηκαν: EN 60335-1:2002, EN 60335-2-41:2003.
- Οδηγία Ηλεκτρομαγνητικής Συμβατότητας (EMC) (89/336/ΕΟΚ).  
Πρότυπα που χρησιμοποιήθηκαν: EN 61000-6-2, EN 61000-6-3.

Αυτή η δήλωση συμμόρφωσης EC ισχύει μόνον όταν συνοδεύει τις οδηγίες εγκατάστασης και λειτουργίας της Grundfos (κωδικός εντύπου 96434822 0912).

**FR : Déclaration de conformité CE**

Nous, Grundfos, déclarons sous notre seule responsabilité, que le produit APG, 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 Machines (98/37/CE).
- Directive Basse Tension (2006/95/CE).  
Normes utilisées: EN 60335-1:2002, EN 60335-2-41:2003.
- Directive Compatibilité Electromagnétique CEM (89/336/CEE).  
Normes utilisées: EN 61000-6-2, EN 61000-6-3.

Cette déclaration de conformité CE est uniquement valide lors de sa publication dans la notice d'installation et de fonctionnement Grundfos (numéro de publication 96434822 0912).

**IT: Dichiarazione di conformità CE**

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

- Direttiva Macchine (98/37/CE).
- Direttiva Bassa Tensione (2006/95/CE).  
Norme applicate: EN 60335-1:2002, EN 60335-2-41:2003.
- Direttiva EMC (89/336/CEE).  
Norme applicate: EN 61000-6-2, EN 61000-6-3.

Questa dichiarazione di conformità CE è valida solo quando pubblicata come parte delle istruzioni di installazione e funzionamento Grundfos (pubblicazione numero 96434822 0912).

**BG: EC декларация за съответствие**

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

- Директива за машините (98/37/ЕК).
- Директива за нисковолтови системи (2006/95/ЕК).  
Приложени стандарти: EN 60335-1:2002, EN 60335-2-41:2003.
- Директива за електромагнитна съвместимост (89/336/ЕЕК).  
Приложени стандарти: EN 61000-6-2, EN 61000-6-3.

Тази EC декларация за съответствие е валидна само когато е публикувана като част от инструкциите за монтаж и експлоатация на Grundfos (номер на публикацията 96434822 0912).

**DE: EG-Konformitätserklärung**

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

- Maschinenrichtlinie (98/37/EG).
- Niederspannungsrichtlinie (2006/95/EG).  
Normen, die verwendet wurden: EN 60335-1:2002, EN 60335-2-41:2003.
- EMV-Richtlinie (89/336/EWG).  
Normen, die verwendet wurden: EN 61000-6-2, EN 61000-6-3.

Diese EG-Konformitätserklärung gilt nur, wenn sie in Verbindung mit der Grundfos Montage- und Betriebsanleitung (Veröffentlichungsnummer 96434822 0912) veröffentlicht wird.

**ES: Declaración CE de conformidad**

Nosotros, Grundfos, declaramos bajo nuestra propia responsabilidad que el producto APG, 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 Maquinaria (98/37/CE).
- Directiva de Baja Tensión (2006/95/CE).  
Normas aplicadas: EN 60335-1:2002, EN 60335-2-41:2003.
- Directiva EMC (89/336/CEE).  
Normas aplicadas: EN 61000-6-2, EN 61000-6-3.

Esta declaración CE de conformidad sólo es válida cuando se publique como parte de las instrucciones de instalación y funcionamiento de Grundfos (número de publicación 96434822 0912).

**HR: EZ izjava o usklađenosti**

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

- Direktiva za strojeve (98/37/EZ).
- Direktiva za niske napon (2006/95/EZ).  
Korištene norme: EN 60335-1:2002, EN 60335-2-41:2003.
- Direktiva za elektromagnetsku kompatibilnost (89/336/EEC).  
Korištene norme: EN 61000-6-2, EN 61000-6-3.

Ova EZ izjava o usklađenosti važeća je jedino kada je izdana kao dio Grundfos montažnih i pogonskih uputa (broj izdanja 96434822 0912).

**HU: EK megfeleléségi nyilatkozat**

Mi, a Grundfos, egyedül felelősséggel kijelentjük, hogy a APG termék, amelyre jelen nyilatkozat vonatkozik, megfelel az Európai Unió tagállamainak jogi irányelvet összehangoló tanács alábbi előírásainak:

- Gépek (98/37/EK).
- Kiszélességi Direktíva (2006/95/EK).  
Alkalmazott szabványok: EN 60335-1:2002, EN 60335-2-41:2003.
- EMC Direktíva (89/336/EEC).  
Alkalmazott szabványok: EN 61000-6-2, EN 61000-6-3.

Ez az EK megfeleléségi nyilatkozat kizárólag akkor érvényes, ha Grundfos telepítési és üzemeltetési utasítás (kiadvány szám 96434822 0912) részeként kerül kiadásra.

## NL: EC overeenkomstigheidsverklaring

Wij, Grundfos, verklaren geheel onder eigen verantwoordelijkheid dat het product APG 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:

- Machine Richtlijn (98/37/EC).
- Laagspannings Richtlijn (2006/95/EC).
- Gebruikte normen: EN 60335-1:2002, EN 60335-2-41:2003.
- EMC Richtlijn (89/336/EEC).
- Gebruikte normen: EN 61000-6-2, EN 61000-6-3.

Deze EC overeenkomstigheidsverklaring is alleen geldig wanneer deze gepubliceerd is als onderdeel van de Grundfos installatie- en bedieningsinstructies (publicatienummer 96434822 0912).

## RU: Декларация о соответствии ЕС

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

- Механические устройства (98/37/EC).
- Низковольтное оборудование (2006/95/EC).
- Применявшиеся стандарты: EN 60335-1:2002, EN 60335-2-41:2003.
- Электромагнитная совместимость (89/336/ЕЭС).
- Применявшиеся стандарты: EN 61000-6-2, EN 61000-6-3.

Данная декларация о соответствии ЕС имеет силу только в случае публикации в составе инструкции по монтажу и эксплуатации на продукцию производства компании Grundfos (номер публикации 96434822 0912).

## RS: EC deklaracija o usaglašenosti

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

- Direktiva za mašine (98/37/EC).
- Direktiva niskog napona (2006/95/EC).
- Korišćeni standardi: EN 60335-1:2002, EN 60335-2-41:2003.
- EMC direktiva (89/336/EEC).
- Korišćeni standardi: EN 61000-6-2, EN 61000-6-3.

Ova EC deklaracija o usaglašenosti važeća je jedino kada je izdata kao deo Grundfos uputstava za instalaciju i rad (broj izdanja 96434822 0912).

## SE: EG-försäkran om överensstämmelse

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

- Maskindirektivet (98/37/EG).
- Lågspänningsdirektivet (2006/95/EG).
- Tillämpade standarder: EN 60335-1:2002, EN 60335-2-41:2003.
- EMC-direktivet (89/336/EEC).
- Tillämpade standarder: EN 61000-6-2, EN 61000-6-3.

Denna EG-försäkran om överensstämmelse är endast giltig när den publiceras som en del av Grundfos monterings- och driftsinstruktion (publikation nummer 96434822 0912).

## PT: Declaração de conformidade CE

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

- Directiva Máquinas (98/37/CE).
- Directiva Baixa Tensão (2006/95/CE).
- Normas utilizadas: EN 60335-1:2002, EN 60335-2-41:2003.
- Directiva EMC (compatibilidade electromagnética) (89/336/CEE).
- Normas utilizadas: EN 61000-6-2, EN 61000-6-3.

Esta declaração de conformidade CE é apenas válida quando publicada como parte das instruções de instalação e funcionamento Grundfos (número de publicação 96434822 0912).

## RO: Declarație de conformitate CE

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

- Directiva Utiliaje (98/37/CE).
- Directiva Tensiune Joasă (2006/95/CE).
- Standarde utilizate: EN 60335-1:2002, EN 60335-2-41:2003.
- Directiva EMC (89/336/CEE).
- Standarde utilizate: EN 61000-6-2, EN 61000-6-3.

Această declarație de conformitate CE este valabilă numai când este publicată ca parte a instrucțiunilor Grundfos de instalare și funcționare (număr publicație 96434822 0912).

## FI: EY-vaatimustenmukaisuusvakuutus

Me, Grundfos, vakuutamme omalla vastuullamme, että tuote APG, jota tämä vakuutus koskee, on EY:n jäsenvaltioiden lainsäädännön yhdenmukaistamisen tähtävänä Euroopan neuvoston direktiivien vaatimusten mukainen seuraavasti:

- Konedirektiivi (98/37/EY).
- Pienjännitedirektiivi (2006/95/EY).
- Sovellettavat standardit: EN 60335-1:2002, EN 60335-2-41:2003.
- EMC-direktiivi (89/336/ETY).
- Sovellettavat standardit: EN 61000-6-2, EN 61000-6-3.

Tämä EY-vaatimustenmukaisuusvakuutus on voimassa vain, kun se julkaistaan osana Grundfosin asennus- ja käyttöohjeita (julkaisun numero 96434822 0912).

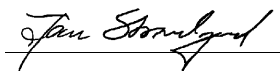
## CN: EC 产品合格声明书

我们格兰富在我们的全权责任下声明，产品 APG，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：

- 机械设备指令 (98/37/EC)
- 低电压指令 (2006/95/EC)。
- 所用标准：EN 60335-1:2002, EN 60335-2-41:2003。
- 电磁兼容性指令 (89/336/EEC)。
- 所用标准：EN 61000-6-2, EN 61000-6-3。

本 EC 合格性声明仅在作为格兰富安装与操作指导手册 (出版号 96434822 0912) 的一部分时有效。

Bjerringbro, 15th August 2012



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.



## Декларация о соответствии на территории РФ

Насосы серии APG сертифицированы на соответствие требованиям Технического регламента о безопасности машин и оборудования (Постановление правительства РФ от 15.09.2009 №753).

Сертификат соответствия:

№ С-ДК.АИ30.В.02496, срок действия до 22.12.2016г.

Истра, 1 августа 2012 г.

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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.*

#### Warning



*If these instructions are not observed, it may lead to electric shock with consequent risk of serious personal injury or death.*

#### Warning



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

#### 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. General description

### 2.1 Applications

Grundfos APG pumps are designed for pumping:

- wastewater
- sludge-containing water
- groundwater
- sewage from restaurants, hotels, camping sites, etc.

The compact design makes the pumps suitable for both temporary and permanent installation.

Furthermore, the pumps are suitable for free-standing installation as well as installation on an auto-coupling system.

The APG pumps are equipped with a cutter system which cuts all destructible solids into small pieces so that they can be led away through pipes of a relatively small diameter.

#### 2.1.1 Potentially explosive environments

*If you order an explosion-proof pump, you will receive a pump not labelled Grundfos.*

#### Note

*We must emphasize that we comply with all obligations with respect to warranty and service of pumps sold by Grundfos as APG pumps.*

Use the explosion-proof APG pump versions for applications involving a risk of explosion.

*The explosion classification of the pumps is EEx de IIB T4. However, the pumps must in each individual case be approved for use at the desired installation site by the local authorities.*

### 2.2 Operating conditions

#### 2.2.1 pH-value

APG pumps in permanent installations can cope with pH-values ranging from 4 to 10.

#### 2.2.2 Liquid temperature

Liquid temperature: 0 °C to +40 °C.  
For short periods up to +60 °C.

#### 2.2.3 Density of pumped liquid

Maximum density of pumped liquid: 1100 kg/m<sup>3</sup>.

#### 2.2.4 Installation depth

Maximum 10 metres below liquid level.

### 2.2.5 Level of pumped liquid

The lowest stop level must always be above the top of the pump housing.

### 2.2.6 Operation

Maximum 20 starts per hour.

**Note** *The pumps are designed for intermittent operation only.*

## 2.3 Sound pressure level

The sound pressure level of the pump is lower than the limiting values stated in the EC Council Directive 98/37/EEC relating to machinery.

## 3. Safety



**Warning**  
*Pump installation in wells must be carried out by specially trained persons.*

## 4. Transportation and storage

The pump may be transported and stored in a vertical or horizontal position. Make sure that it cannot roll or fall over.

Always lift the pump by its carrying handle, never by the motor cable or the hose/pipe.

For long periods of storage, the pump must be protected against moisture and heat.

After a long period of storage, the pump should be inspected before it is put into operation. Make sure that the impeller can rotate freely. Pay special attention to the shaft seals and the cable entry.

## 5. Installation

The extra nameplate supplied with the pump should be fixed at the installation site.

Prior to installation, check the oil level in the oil chamber. See section 8. *Maintenance and service.*

### 5.1 Installation on auto-coupling

See figures 1 and 2, pages 155 and 156, for pumps up to and including 3.3 kW and fig. 4, page 158, for pumps from 4.8 kW up to and including 9.2 kW.

Pumps for permanent installation can be installed on a stationary auto-coupling and operated completely or partially submerged in the pumped liquid.

1. Drill mounting holes for the guide rail bracket on the inside of the pit, and fasten the guide rail bracket provisionally with two screws.
2. Place the auto-coupling base unit on the bottom of the pit. Use a plumb line to establish the correct position. Fasten the auto-coupling base unit with heavy-duty expansion bolts. If the bottom of the pit is uneven, the auto-coupling base unit must be supported so that it is level when fastened.
3. Assemble the discharge line in accordance with the generally accepted procedures and without exposing the line to distortion or tension.

4. Insert the guide rails in the rings of the auto-coupling base unit, and adjust the length of the rails accurately to the guide rail bracket.
5. Unscrew the provisionally fastened guide rail bracket, fit it on top of the guide rails, and finally fasten it firmly to the pit wall.

**Caution** *The guide rails must not have any axial play as this would cause noise during pump operation.*

6. Clean out debris from the pit before lowering the pump into the pit.
7. Fit the auto-coupling half on the discharge port of the pump. Then slide the guide bar of this coupling half between the guide rails, and lower the pump into the pit by means of a chain. When the pump reaches the auto-coupling base unit, the pump will automatically connect tightly.
8. Hang the end of the chain on a suitable hook at the top of the pit.
9. Adjust the length of the motor cable by coiling it up on a relief fitting so the cable is not damaged during operation. Fasten the relief fitting to a suitable bracket at the top of the pit. Make sure that the cables are not sharply bent or pinched.

**Caution** *The end of the cable must not be submerged, as water may penetrate through the cable into the motor.*

### 5.2 Free-standing installation

See figures 3 and 5, pages 157 and 158.

The APG.50.11.3 and APG.50.12.1 pumps have pump housing and base stand cast in one piece for free-standing installation.

The larger APG pumps should be provided with a separate base stand.

For free-standing installation of the pumps, fit a 90° elbow on the discharge port. The pump can be installed with a hose or rigid pipe and valves.

In order to facilitate service of the pump, fit a flexible union or coupling to the discharge line for easy separation.

If a hose is used, make sure that the hose does not buckle, and that the inside diameter of the hose matches that of the discharge port.

If a rigid pipe is used, the union or coupling, non-return valve and isolating valve should be fitted in the sequence mentioned, as seen from the pump side.

Lower the pump into the liquid.

If the pump is installed in muddy conditions or on uneven ground, we recommend placing the pump on bricks.

## 5.3 Pumps with control box

Pumps with a control box may be supplied with a level switch with cable. The level switch cable should be fastened in the retainer on the pump handle.

The level difference between start and stop may be adjusted by adjusting the free length of cable between the level switch and the retainer.

Large difference in level: long cable. Small difference in level: short cable.

## 5.4 Separate level controllers

Three-phase APG pumps without control box or level switch can be supplied with a separate level controller with level switches: type LC for one-pump installations and type LCD for two-pump installations.

The LC controller is fitted with two or three level switches. The third level switch, which is optional, is for high-level alarm.

The LCD controller is fitted with three or four level switches: one for common stop and two for start of pumps. The fourth level switch, which is optional, is for high-level alarm.

When installing the level switches, the following points should be observed:

- To prevent air intake and vibrations, install the stop level switch in such a way that the pump is stopped before the liquid level falls to below the top of the pump housing.
- Install the start level switch in such a way that the pump is started at the required level. However, the pump must always be started before the liquid level reaches the bottom inlet pipe in the pit.
- If installed, the high-level alarm switch should always be placed about 10 cm above the start level switch. However, alarm must always be given before the liquid level reaches the pit inlet pipe.

***To ensure correct operation of the pump, make sure to adjust and fit the level sensor correctly. Carry out a test run of the pump after each adjustment of the level sensor.***

Note

## 6. Electrical connection

The electrical connection of the pump should be carried out in accordance with local regulations.

The operating voltage and frequency are stated on the nameplate. Voltage tolerance:  $\pm 10\%$  of the voltage stated on the nameplate. Make sure that the motor is suitable for the power supply available at the installation site.

## 6.1 Motor protection

All pumps are supplied with 10 metres of cable and a free cable end.

All single-phase pumps supplied without control box must be connected to a separate control box with motor starter and run capacitor. Furthermore, the pumps must be connected to a starting capacitor. For capacitor sizes, see the table below.

### 60 Hz

Pump type	Starting capacitor		Run capacitor	
	[ $\mu$ F]	[V]	[ $\mu$ F]	[V]
APG.50.12.1	50	1 x 230	25	1 x 450
APG.50.18.1	80	1 x 230	40	1 x 450
APG.50.30.1	150	1 x 230	60	1 x 450
APG.50.33.1	150	1 x 230	60	1 x 450

APG.50.12.1 has a thermal switch built into the motor windings. The thermal switch cuts out the motor in case of overtemperature and cuts it in again automatically after cooling.

All 3-phase pumps supplied without control box must be connected to a separate motor starter.

APG pumps of 4.8 kW and up are prepared for star-delta starting, i.e. both ends of the motor windings are accessible through the motor cable. See fig. 1.

- T1 and T3 are connected to the standard set of temperature sensors.
- T1 and T2 are connected to the extra set of temperature sensors in explosion-proof pumps.
- S1 and S2 are connected to a moisture sensor in the oil chamber.

### 6.1.1 Temperature sensors (in stator windings)

All pumps have integrated temperature sensors in the stator windings. Via the safety circuit, the temperature sensors will cut out the motor in case of overtemperature, approx. 140 °C. The maximum operating current of the temperature sensors is 0.5 A at 500 VAC and  $\cos \varphi$  0.6.

Non-explosion-proof pumps only have one set of temperature sensors.

Explosion-proof pumps have two sets of temperature sensors. The extra set of sensors will open at a temperature that is approx. 10 °C higher than the opening temperature of standard sensors. The extra set of sensors provides additional protection against overtemperature in potentially explosive environments.

The temperature sensors must be connected to the safety circuit of the motor-protective circuit breaker via the temperature relay (No 98123042). See fig. 2.

Figure 1 shows the electrical connection of a three-phase, explosion-proof APG pump.

The temperature sensors are connected to the monitoring cable and must be connected to the separate thermistor relay fitted in the safety circuit of the pump controller.

The temperature sensors of pumps above 1.6 kW and three-phase motors are connected to the power supply cable. To ensure automatic restart of the motor when cooled (to ambient temperature), the leads marked T1 and T3 must be connected to the safety circuit. For explosion-proof versions, the same applies to the leads marked T1 and T2.

#### Warning



**Separate motor-protective circuit breakers/control boxes must not be installed in potentially explosive environments.**

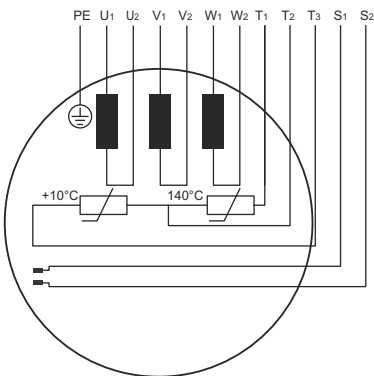


Fig. 1 Wiring diagram, sensors

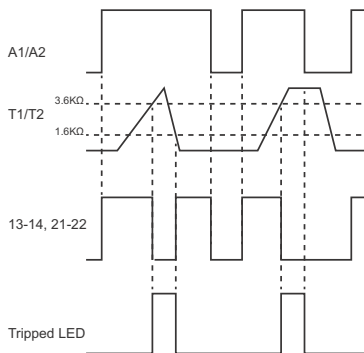
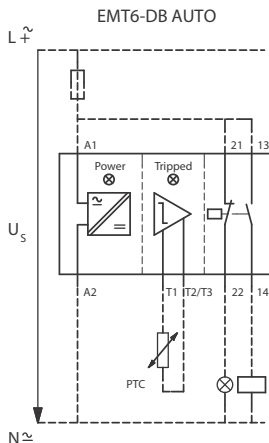


Fig. 2 Wiring diagram, temperature relay

TM05 2157 4511

TM05 3448 1312

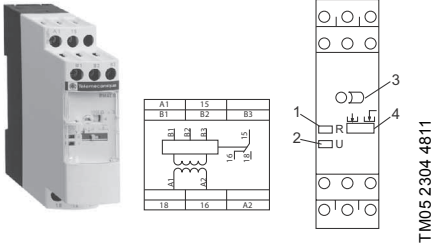


## 6.1.2 Moisture sensor

Applies only to APG.50.48, APG.50.65 and APG.50.92.

Pumps with moisture sensor have a sensor in the oil chamber between the motor and the pump housing.

Through the separate level relay (No 98123045), the moisture sensor transmits a signal to the safety circuit to trip the motor in case of ingress of moisture/water into the pump. See fig. 3.



**Fig. 3** Wiring, moisture relay

## 7. Start-up

Proceed as follows:

1. Check the oil level in the oil chamber.
2. Remove the fuses, and check whether the impeller can rotate freely.
3. Check whether the monitoring units, if used, are operating satisfactorily.
4. Check whether the system has been filled with liquid and vented.
5. Make sure that the pump is submerged in the liquid.
6. Open the isolating valves, if fitted.
7. Check the setting of the level switches.
8. Start the pump.

**Note**

*The pump may be started for a very short period without being submerged in order to check the direction of rotation.*

### 7.1 Direction of rotation

All single-phase pumps are factory-set to the correct direction of rotation.

Before starting up three-phase pumps, check the direction of rotation. The direction of rotation should be clockwise when viewed from above. When starting up, the pump will jerk in the opposite direction of the direction of rotation. If the direction of rotation is wrong, interchange two of the three phases of the power supply.

#### Checking the direction of rotation

The direction of rotation should be checked every time the pump is connected to a new installation.

Check the direction of rotation as follows:

1. Start the pump, and check the quantity of water or the discharge pressure.
2. Stop the pump, and interchange two of the three phases to the motor.
3. Start the pump, and check the quantity of water or the discharge pressure.
4. Stop the pump.
5. Compare the results from points 1 and 3. The phase connection which gives the larger quantity of water or the higher pressure gives the correct direction of rotation.

## 8. Maintenance and service



**Warning**

**Before starting work on the product, switch off the power supply. Make sure that the power supply cannot be accidentally switched on.**



**Warning**

**Make sure that all rotating parts have stopped moving.**

Before carrying out maintenance and service, make sure that the pump has been thoroughly flushed with clean water. Rinse the pump parts in water after dismantling.



**Warning**

**When unscrewing the inspection screw of the oil chamber, please note that pressure may have built up in the chamber. Do not remove the screw until the pressure has been fully relieved.**

Normally operating pumps should be inspected at least once a year. If the pumped liquid is very muddy or sandy, inspect the pump at shorter intervals.

When the pump is new or after replacement of the shaft seals, check the oil level after one week of operation.

For long and trouble-free operation of the pump the following points should be checked regularly:

- Power consumption
- Oil level and oil condition  
If the oil contains water, it becomes greyish white like milk. Water in the oil may be due to a defective shaft seal. The oil should be replaced after 3000 hours of operation. Use Shell Ondina 934 oil or a similar type of oil.

**Note**

**Used oil must be disposed of in accordance with local regulations.**

- Cable entry  
Make sure that the cable entry is watertight and that the cables are not bent sharply and/or pinched.
- Pump parts  
Check the impeller, pump housing, neck ring, etc. for possible wear. Replace defective parts.
- Ball bearings  
Check the shaft for noisy or heavy operation (turn the shaft by hand). Replace defective ball bearings. A general overhaul of the pump is usually required in case of defective ball bearings or poor motor function. This work must be carried out by the manufacturer or a competent workshop.

### 8.1 Replacement of cutter head

Remove the cutter head.

Fit the new cutter head as follows:

1. Knock guide pin (560) into cutter head (23).
2. Fit the cutter head with guide pin on impeller (230). Fit and tighten screw (900.01).
3. Fit threaded pins (904) in suction cover (162).
4. Fit O-ring (412.01) in the suction cover, and grease the cover.
5. Knock the suction cover into pump housing (101) until the suction cover bears against the impeller. Check through the inlet port.
6. Tighten all threaded pins (904) until they easily touch pump housing (101).
7. Give all threaded pins a quarter of a turn.
8. Fasten the suction cover by means of screws (914.01).
9. Fit cutting ring (50) to the suction cover. Fit and tighten screws (900.02).

Pump type	Quantity of oil in oil chamber [l]
APG.50.11	0.70
APG.50.12	0.70
APG.50.18	1.00
APG.50.19	1.00
APG.50.29	1.00
APG.50.30	1.00
APG.50.33	1.00
APG.50.48	1.90
APG.50.65	1.90
APG.50.92	1.90

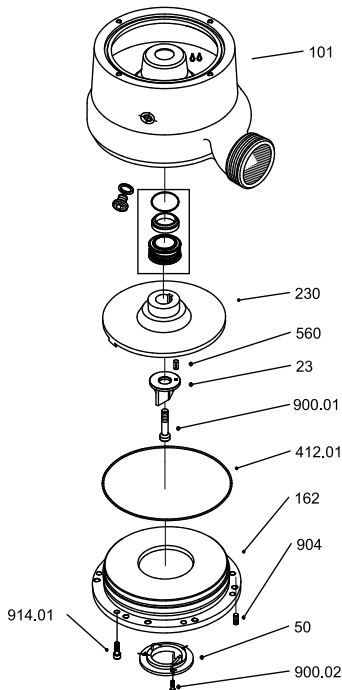


Fig. 4 Exploded view

TMD1 7812 4899

Pos.	Component
23	Cutter head
50	Cutting ring
101	Pump housing
162	Suction cover
230	Impeller
560	Guide pin
412.01	O-ring
900.01	Screw
900.02	Screw
904	Threaded pin
914.01	Screw

The service kit for APG pumps up to and including 3.7 kW includes:  
 1 shaft seal kit  
 1 O-ring kit  
 1 cable entry kit.

The service kit for APG pumps of 4.8 kW and up includes:  
 1 cutter kit  
 1 O-ring kit  
 1 shaft seal kit  
 1 cable entry kit.

### 50 Hz pumps

APG.50.09, 11 and 12	96003308
APG.50.09.3Ex and 11.1Ex	96003300
APG.50.17, 18 and 19	96003309
APG.50.19.3Ex	96003310
APG.50.31	96003311
APG.50.31.3Ex	96003310
APG.50.48.3(Ex)	96843315
APG.50.65.3(Ex)	96843315
APG.50.92.3(Ex)	96843315
APG.50.48.3(Ex) with moisture sensor	96843315
APG.50.65.3(Ex) with moisture sensor	96843315
APG.50.92.3(Ex) with moisture sensor	96843315

### 60 Hz pumps

APG.50.11 and 12	96003308
APG.50.18 and 19	96003309
APG.50.29, 30 and 33	96003311

## 8.3 Oil

1 litre of oil, type Shell Ondina 934.  
 Product number: 96003313.

## 8.4 Contaminated pumps

**Caution** *If used for a liquid which is injurious to health or toxic, the pump will be classified as contaminated.*

If Grundfos is requested to service the pump, Grundfos must be contacted with details about the pumped liquid, etc. before the pump is returned for service. Otherwise Grundfos can refuse to accept the pump for service.

Possible costs of returning the pump to the customer are paid by the customer.

## 9. Fault finding



### Warning

**Before starting fault finding, switch off the power supply, and make sure that all rotating parts have stopped moving. Make sure that the power supply cannot be accidentally switched on.**

Fault	Cause	Remedy
1. Motor does not start. Fuses blow, or motor starter trips immediately. <b>Caution:</b> Do not start again!	a) Supply failure; short-circuit; earth-leakage fault in cable or motor winding.	Have the cable and motor checked and repaired by a qualified electrician.
	b) Fuses blow as they are not the right type.	Install fuses of the correct type.
	c) Impeller blocked by impurities.	Clean the impeller.
	d) Level switch out of adjustment or defective.	Check the level switch.
2. Pump operates, but motor starter trips after a short while.	a) Low setting of thermal relay in motor starter.	Set the relay in accordance with the specifications on the nameplate.
	b) Increased current consumption due to large voltage drop.	Measure the voltage between motor phases. Tolerance: $\pm 10\%$ .
	c) Impeller blocked by impurities. Increased current consumption in all three phases.	Clean the impeller.
3. Pump operates at below-standard performance and power consumption.	a) Impeller blocked by impurities.	Clean the impeller.
	b) Wrong direction of rotation.	Check the direction of rotation, and, if necessary, interchange two phases. See section 7.1 <i>Direction of rotation</i> .
4. Pump operates, but supplies no liquid.	a) Discharge valve closed or blocked.	Check the discharge valve, and open and/or clean, if necessary.
	b) Non-return valve blocked.	Clean the non-return valve.
	c) Air in pump.	Vent the pump.

## 10. 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.

GB: One-pump installation on auto coupling

BG: Една помпа с автоматичен куплунг

DK: 1-pumpe-installation på autokobling

DE: Ein-Pumpen-Anlage mit Kupplungsfußkrümmer

GR: Εγκατάσταση μίας αντλίας με αυτόματη ζεύξη

ES: Una bomba con autoacoplamiento

FR: Une pompe avec système d'accouplement automatique

HR: Instalacija s jednom crpkom na automatskoj spojki

IT: Una pompa con accoppiamento rapido

HU: Egy szivattyú beép. automata csőkapcsolóval

NL: Eén pomp met voetbochtsnelkoppeling

PT: Uma bomba com acoplamento automático

RU: Один насос с автоматической муфтой

RO: 1. Instalarea pompei pe dispozitivul de autocuplare

RS: Ugradnja jedne pumpe sa automatskom spojnicom

FI: Yhden pumpun asennus jalustaliittimellä

SE: En pump installerad med kopplingsfot

CN: 一台泵安装于自动耦合装置上

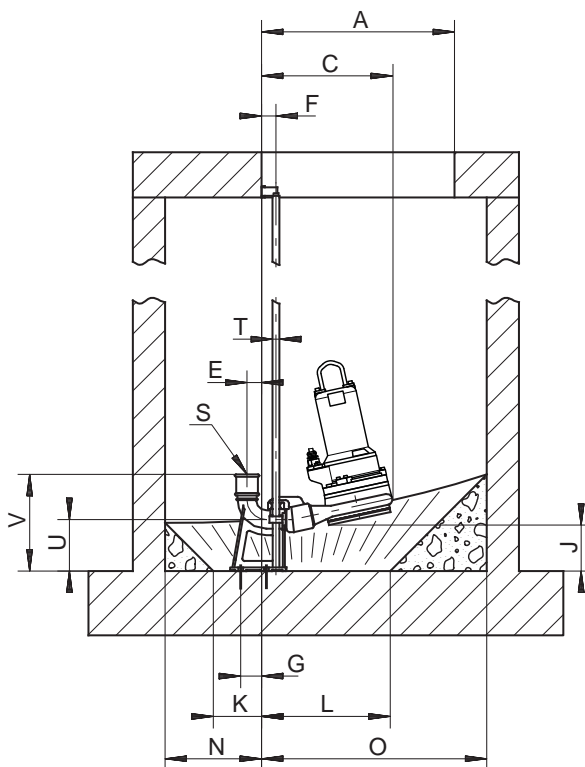


Fig. 1

A	4B	C	D	E	F	G	I	J
Ø600	Ø600	407	300	45	45	65	115	143

K	L	M	N	O	P	R	T	U	V
150	400	200	300	700	500	-	1/2"	160	295

TM05 1635 3311

- |   |   |
|---|---|
| GB: Two-pump installation on auto coupling              | HU: Két szivattyús beép. automata csőkapcsolóval        |
| BG: Две помпи с автоматичен куплунг                     | NL: Tvee pompen met voetbochtsnelkoppeling              |
| DK: 2-pumpe-installation på autokobling                 | PT: Duas bombas com acoplamento automático              |
| DE: Zwei-Pumpen-Anlage mit Kupplungsfußkrümmer          | RU: Два насоса с автоматической муфтой                  |
| GR: Εγκατάσταση δύο αντλιών με αυτόματη ζεύξη           | RO: 2. Instalarea pompei pe dispozitivul de autocuplare |
| ES: Dos bombas con autoacoplamiento                     | RS: Ugradnja dveju pumpi sa automatskom spojnicom       |
| FR: Deux pompes avec système d'accouplement automatique | FI: Kahden pumpun asennus jalustaliittimellä            |
| HR: Instalacija s dvije crpke na automatskoj spojki     | SE: Två pumpar installerade med kopplingsfot            |
| IT: Due pompe con accoppiamento rapido                  | CN: 两台泵安装于自动耦合装置上                                       |

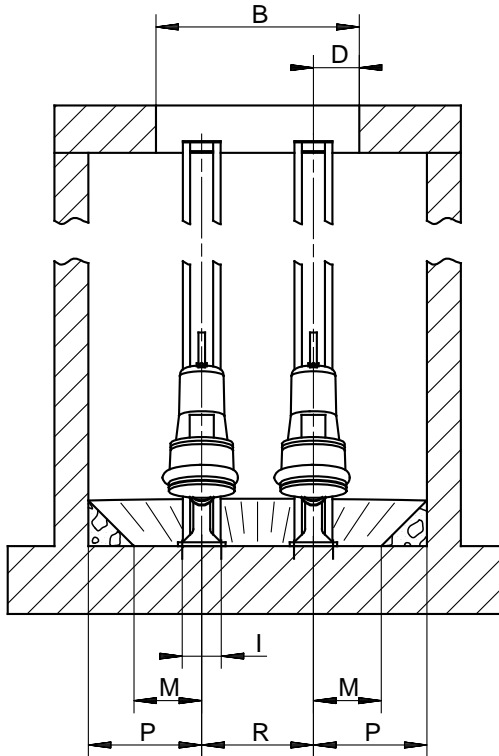


Fig. 2

A	B	C	D	E	F	G	I	J
455	600	407	135	45	45	65	115	143

K	L	M	N	O	P	R	T	U	V
150	400	200	300	700	335	330	½"	160	295

TM01 2607 2098

GB: Free-standing Installation

BG: Свободен монтаж

DK: Fritstående installation

DE: Freistehende Aufstellung

GR: Ανεξάρτητη εγκατάσταση

ES: Instalación portátil

FR: Installation fixe sur socle

HR: Samostojeća instalacija

IT: Installazione su piede d'appoggio

HU: Telepítési méretek hozdozható kivitel esetén

NL: Vrijstaande opstelling

PT: Instalação autónoma

RU: Свободная установка насоса

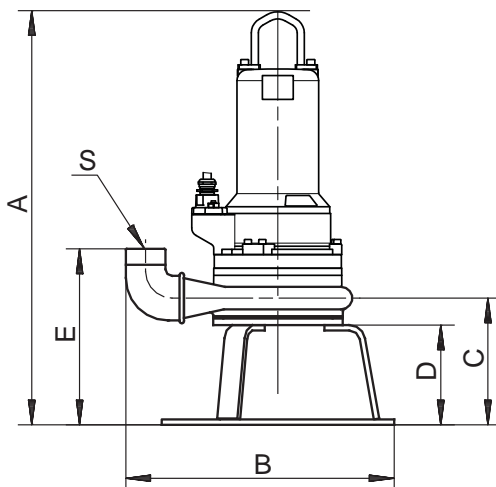
RO: Instalare liberă

RS: Slobodnostojeća ugradnja

FI: Vapaasti seisova asennus

SE: Fristående installation

CN: 独立 (潜水) 安装



TM01 2603 3311

Fig. 3

APG	A	B	C	D	E	S
<b>APG, 50 Hz</b>						
APG.50.09.3	497	304	130	90	207	R 2
APG.50.09.3Ex	497	304	130	90	207	R 2
APG.50.11.1	497	304	130	90	207	R 2
APG.50.11.1Ex	497	304	130	90	207	R 2
APG.50.17.3	618	405	191	150	265	R 2
APG.50.18.1	618	405	191	150	265	R 2
APG.50.19.3	618	405	191	150	265	R 2
APG.50.19.3Ex	618	405	191	150	265	R 2
APG.50.31.3	655	408	191	150	265	R 2
APG.50.31.3Ex	655	408	191	150	265	R 2

APG	A	B	C	D	E	S
<b>APG, 60 Hz</b>						
APG.50.11.3	450	304	133	90	207	R 2
APG.50.12.1	450	304	133	90	207	R 2
APG.50.18.1	620	408	191	150	265	R 2
APG.50.19.3	620	408	191	150	265	R 2
APG.50.29.3	751	408	191	150	265	R 2
APG.50.30.1	751	408	191	150	265	R 2
APG.50.33.1	751	408	191	150	265	R 2

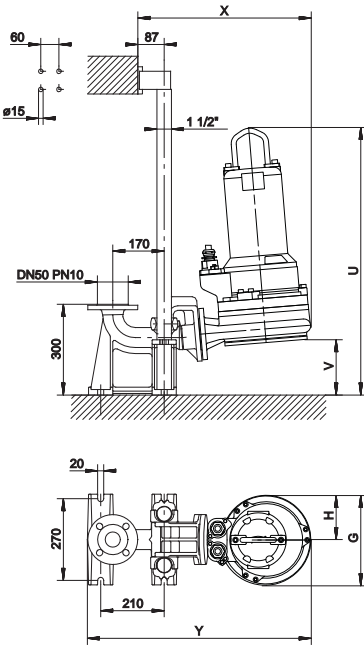


Fig. 4

TM01 4618 3311

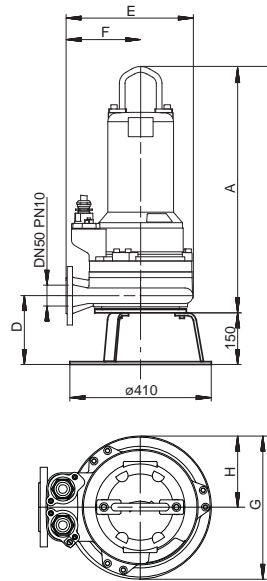


Fig. 5

TM01 5053 0508

Pump type	A	D	E	F	G	H	U	V	X	Y
APG.50.48.3(Ex)	618	193	357	210	297	147	786	182	562	729
APG.50.65.3(Ex)	618	193	357	210	297	147	786	182	562	729
APG.50.92.3(Ex)	691	193	357	210	297	147	789	182	562	729