

# DME, Variant AR (60-940 l/h)

Installation and operating instructions





# DME, Variant AR (60-940 I/h)

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# Declaration of conformity

## GB Declaration of Conformity

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

- Machinery Directive (2006/42/EC).  
Standards used: EN 809: 1998, EN ISO 12100-1+A1: 2009, EN ISO 12100-2+A1: 2009
- Low Voltage Directive (2006/95/EC).  
Standard used: EN 60204-1+A1: 2009.
- EMC Directive (2004/108/EC).  
Standards used: EN 61000-6-2: 2005, EN 61000-6-4: 2007.

## DE Konformitätserklärung

Wir, Grundfos, erklären in alleiniger Verantwortung, dass die Produkte DME, auf die sich diese Erklärung bezieht, mit den folgenden Richtlinien des Rates zur Angleichung der Rechtsvorschriften der EU-Mitgliedsstaaten übereinstimmen:

- Maschinenrichtlinie (2006/42/EG).  
Normen, die verwendet wurden: EN 809: 1998, EN ISO 12100-1+A1: 2009, EN ISO 12100-2+A1: 2009.
- Niederspannungsrichtlinie (2006/95/EG).  
Normen, die verwendet wurde: EN 60204-1+A1: 2009.
- EMV-Richtlinie (2004/108/EG).  
Normen, die verwendet wurden: EN 61000-6-2: 2005, EN 61000-6-4: 2007.

## ES Declaración de Conformidad

Nosotros, Grundfos, declaramos bajo nuestra entera responsabilidad que los productos DME, a los cuales se refiere esta declaración, están conformes con las Directivas del Consejo en la aproximación de las leyes de los Estados Miembros del EM:

- Directiva de Maquinaria (2006/42/CE).  
Normas aplicadas: EN 809: 1998, EN ISO 12100-1+A1: 2009, EN ISO 12100-2+A1: 2009.
- Directiva de Baja Tensión (2006/95/CE).  
Norma aplicada: EN 60204-1+A1: 2009.
- Directiva EMC (2004/108/CE).  
Normas aplicadas: EN 61000-6-2: 2005, EN 61000-6-4: 2007.

## IT Dichiarazione di Conformità

Grundfos dichiara sotto la sua esclusiva responsabilità che i prodotti DME, ai quali si riferisce questa dichiarazione, sono conformi alle seguenti direttive del Consiglio riguardanti il riavvicinamento delle legislazioni degli Stati membri CE:

- Direttiva Macchine (2006/42/CE).  
Norme applicate: EN 809: 1998, EN ISO 12100-1+A1: 2009, EN ISO 12100-2+A1: 2009.
- Direttiva Basse Tensione (2006/95/CE).  
Norma applicata: EN 60204-1+A1: 2009.
- Direttiva EMC (2004/108/CE).  
Norme applicate: EN 61000-6-2: 2005, EN 61000-6-4: 2007.

## PT Declaração de Conformidade

A Grundfos declara sob sua única responsabilidade que os produtos DME, aos quais diz respeito esta declaração, estão em conformidade com as seguintes Directivas do Conselho sobre a aproximação das legislações dos Estados Membros da CE:

- Directiva Máquinas (2006/42/CE).  
Normas utilizadas: EN 809: 1998, EN ISO 12100-1+A1: 2009, EN ISO 12100-2+A1: 2009.
- Directiva Baixa Tensão (2006/95/CE).  
Norma utilizada: EN 60204-1+A1: 2009.
- Directiva EMC (compatibilidade electromagnética) (2004/108/CE).  
Normas utilizadas: EN 61000-6-2: 2005, EN 61000-6-4: 2007.

## SE Försäkran om överensstämmelse

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

- Maskindirektivet (2006/42/EG).  
Tillämpade standarder: EN 809: 1998, EN ISO 12100-1+A1: 2009, EN ISO 12100-2+A1: 2009.
- Lågspänningsdirektivet (2006/95/EG).  
Tillämpad standard: EN 60204-1+A1: 2009.
- EMC-direktivet (2004/108/EG).  
Tillämpade standarder: EN 61000-6-2: 2005, EN 61000-6-4: 2007.

## DK Overensstemmelseserklæring

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

- Maskindirektivet (2006/42/EF).  
Anvendt standarder: EN 809: 1998, EN ISO 12100-1+A1: 2009, EN ISO 12100-2+A1: 2009.
- Lavspændingsdirektivet (2006/95/EF).  
Anvendt standard: EN 60204-1+A1: 2009.
- EMC-direktiv (2004/108/EF).  
Anvendte standarder: EN 61000-6-2: 2005, EN 61000-6-4: 2007.

## GR Δήλωση Συμμόρφωσης

Εμείς, η Grundfos, δηλώνουμε με αποκλειστικά δική μας ευθύνη ότι τα προϊόντα DME 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 (2006/42/ΕC).  
Πρότυπα που χρησιμοποιήθηκαν: EN 809: 1998, EN ISO 12100-1+A1: 2009, EN ISO 12100-2+A1: 2009.
- Οδηγία χαμηλής τάσης (2006/95/ΕC).  
Πρότυπο που χρησιμοποιήθηκε: EN 60204-1+A1: 2009.
- Οδηγία Ηλεκτρομαγνητικής Συμβατότητας (EMC) (2004/108/ΕC).  
Πρότυπα που χρησιμοποιήθηκαν: EN 61000-6-2: 2005, EN 61000-6-4: 2007.

## FR Déclaration de Conformité

Nous, Grundfos, déclarons sous notre seule responsabilité, que les produits DME, auxquels se réfère cette déclaration, sont conformes aux Directives du Conseil concernant le rapprochement des législations des Etats membres CE relatives aux normes énoncées ci-dessous :

- Directive Machines (2006/42/CE).  
Normes utilisées : EN 809 : 1998, EN ISO 12100-1+A1 : 2009, EN ISO 12100-2+A1 : 2009.
- Directive Basse Tension (2006/95/CE).  
Norme utilisée : EN 60204-1+A1: 2009.
- Directive Compatibilité Electromagnétique CEM (2004/108/CE).  
Normes utilisées : EN 61000-6-2: 2005, EN 61000-6-4: 2007.

## NL Overeenkomstigheidsverklaring

Wij, Grundfos, verklaren geheel onder eigen verantwoordelijkheid dat de producten DME waarop deze verklaring betrekking heeft, in overeenstemming zijn met de Richtlijnen van de Raad in zake de onderlinge aanpassing van de wetgeving van de EG Lidstaten betreffende:

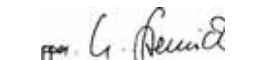
- Machine Richtlijn (2006/42/EC).  
Gebruikte normen: EN 809: 1998, EN ISO 12100-1+A1: 2009, EN ISO 12100-2+A1: 2009.
- Laagspannings Richtlijn (2006/95/EC).  
Gebruikte norm: EN 60204-1+A1: 2009.
- EMC Richtlijn (2004/108/EC).  
Gebruikte normen: EN 61000-6-2: 2005, EN 61000-6-4: 2007.

## FI Vaatimustenmukaisuusvakuutus

Me, Grundfos, vakuutamme omalla vastuullamme, että tuotteet DME, joita tämä vakuutus koskee, ovat EY:n jäsenvaltioiden lainsäädännön yhdenmukaistamiseen tähtäävien Euroopan neuvoston direktiivien vaatimusten mukaisia seuraavasti:

- Konedirektiivi (2006/42/EY).  
Sovellettavat standardit: EN 809: 1998, EN ISO 12100-1+A1: 2009, EN ISO 12100-2+A1: 2009.
- Pienjännittdirektiivi (2006/95/EY).  
Sovellettu standardi: EN 60204-1+A1: 2009.
- EMC-direktiivi (2004/108/EY).  
Sovellettavat standardit: EN 61000-6-2: 2005, EN 61000-6-4: 2007.

Pfintzal, 1st March 2011



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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. Safety instructions

These installation and operating instructions contain general instructions that must be observed during installation, operation and maintenance of the pump. It must therefore be read by the installation engineer and the relevant qualified operator prior to installation and start-up, and must be available at the installation location at all times.

### 1.1 Identification of safety instructions in these instructions

The safety instructions are identified by the following symbols:

#### Warning



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

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

**Caution**

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

**Note**

### 1.2 Qualification and training of personnel

The personnel responsible for the installation, operation and service must be appropriately qualified for these tasks. Areas of responsibility, levels of authority and the supervision of the personnel must be precisely defined by the operator. If necessary, the personnel must be trained appropriately.

#### Risks of not observing the safety instructions

Non-observance of the safety instructions may have dangerous consequences for the personnel, the environment and the pump and may result in the loss of any claims for damages.

It may lead to the following hazards:

- Personal injury from exposure to electrical,

mechanical and chemical influences.

- Damage to the environment and personal injury from leakage of harmful substances.

### 1.3 Safety instructions for the operator/ user

The safety instructions described in these instructions, existing national regulations on health protection, environmental protection and for accident prevention and any internal working, operating and safety regulations of the operator must be observed. Information attached to the pump must be observed.

Leakages of dangerous substances must be disposed of in a way that is not harmful to the personnel or the environment.

Damage caused by electrical energy must be prevented, see the regulations of the local electricity supply company.

**Caution**

***Before starting work on the pump, the pump must be disconnected from the mains. The system must be pressureless!***

**Note**

***The mains plug is the separator separating the pump from the mains.***

Only original accessories and original spare parts should be used. Using other parts can result in exemption from liability for any resulting consequences.

### 1.4 Safety of the system in the event of a failure in the dosing pump

The dosing pump was designed according to the latest technologies and is carefully manufactured and tested.

If it fails regardless of this, the safety of the overall system must be ensured. Use the relevant monitoring and control functions for this.

**Caution**

***Make sure that any chemicals that are released from the pump or any damaged lines do not cause damage to system parts and buildings.***

***The installation of leak monitoring solutions and drip trays is recommended.***

## 1.5 Dosing chemicals

### Warning

***Before switching the supply voltage back on, the dosing lines must be connected in such a way that any chemicals in the dosing head cannot spray out and put people at risk.***

***The dosing medium is pressurised and can be harmful to health and the environment.***



### Warning

***When working with chemicals, the accident prevention regulations applicable at the installation site should be applied (e.g. wearing protective clothing).***

***Observe the chemical manufacturer's safety data sheets and safety instructions when handling chemicals!***



**Caution**

***A deaeration hose, which is routed into a container, e.g. a drip tray, must be connected to the deaeration valve.***

**Caution**

***The dosing medium must be in liquid aggregate state!***

***Observe the freezing and boiling points of the dosing medium!***

***The resistance of the parts that come into contact with the dosing medium, such as the dosing head, valve ball, gaskets and lines, depends on the medium, media temperature and operating pressure.***

**Caution**

***Ensure that parts in contact with the dosing medium are resistant to the dosing medium under operating conditions, see data booklet!***

***Should you have any questions regarding the material resistance and suitability of the pump for specific dosing media, please contact Grundfos.***

## 2. General description

The Grundfos DME dosing pump is a self-priming diaphragm pump.

The pump consists of:

- a **cabinet** incorporating the drive unit and electronics,
- a **dosing head** with back plate, diaphragm, valves, connections and vent valve,
- a **control panel** incorporating display and buttons. The control panel is fitted either to the front or to the side of the cabinet.

The motor is controlled in such a way that the dosing gets as even and constant as possible, irrespective of the capacity range in which the pump is operating.

This is carried out as follows:

The speed of the suction stroke is kept constant and the stroke relatively short, irrespective of the capacity. Contrary to conventional pumps, which generate the dosing stroke as a short pulse, the duration of the dosing stroke will be as long as possible. Thus, an even dosing without peak values is ensured. As the pump is always dosing at full stroke length, it ensures the same high accuracy and suction capability, irrespective of the capacity, which is infinitely variable in the ratio of 1:800.

The pump features an LCD display and a user-friendly control panel which gives access to the pump functions.

### 2.1 Applications

The DME dosing pump is designed for handling chemicals within the following ranges of applications, among others:

- drinking water treatment
- wastewater treatment
- cooling water treatment
- washing systems
- process water treatment
- chemical industry.

## 2.2 Type key

(Cannot be used for pump configuration.)

Code	Example	DME	60	-	10	AR	-	PP/	E/	C-	F-	3	1	1	F	
	Pump range															
	<b>Maximum capacity [l/h]:</b> 60 150 375 940															
	<b>Maximum pressure [bar]:</b> 4 10															
	<b>Control variant:</b> AR Standard AP Standard + Profibus															
	<b>Dosing head material:</b> PP Polypropylene PV PVDF SS Stainless steel 1.4401															
	<b>Gasket material:</b> E EPDM T PTFE V FKM															
	<b>Valve ball material:</b> C Ceramics G Glass SS Stainless steel 1.4401 T PTFE															
	<b>Control panel:</b> F Front-fitted S Side-fitted															
	<b>Voltage:</b> 3 1 x 100-240 V, 50-60 Hz															
	<b>Valves:</b> 1 Standard valve 2 Spring-loaded valve															
	<b>Connection, suction/discharge:</b> A1 Threaded Rp 3/4 A2 Threaded Rp 1 1/4 Q Tubing 19/27 mm + 25/34 mm															
	<b>Mains plug:</b> F EU (Schuko) G UK I AU B USA J JP E CH L Argentina															



### 3. Technical data

#### 3.1 Mechanical data

	DME 60	DME 150	DME 375	DME 940
Maximum capacity* <sup>1</sup> [l/h]	60	150	376	940
Maximum capacity with anti-cavitation 75 %* <sup>1</sup> [l/h]	45	112	282	705
Maximum capacity with anti-cavitation 50 %* <sup>1</sup> [l/h]	33.4	83.5	210	525
Maximum capacity with anti-cavitation 25 %* <sup>1</sup> [l/h]	16.1	40.4	101	252
Maximum pressure [bar]	10	4	10	4
Maximum stroke rate per minute [strokes/min.]			160	
Maximum suction lift during operation [m]			4	
Maximum suction lift when priming with wet valves [m]			1.5	
Maximum viscosity with spring-loaded valves* <sup>2</sup> [mPa s]		3000 [mPa s] at 50 % capacity		
Maximum viscosity without spring-loaded valves* <sup>2</sup> [mPa s]		200		
Diaphragm diameter [mm]	79	106	124	173
Liquid temperature [°C]		0 to 50		
Ambient temperature [°C]		0 to 45		
Accuracy of repeatability		±1 %		
Sound pressure level [dB(A)]		<70		

\*<sup>1</sup> Irrespective of counter pressure

\*<sup>2</sup> Maximum suction lift 1 metre

#### 3.2 Electrical data

	DME 60	DME 150	DME 375	DME 940
Supply voltage [VAC]		1 x 100-240 V		
Maximum current consumption [A]	at 100 V	1.25		2.4
	at 230 V	0.67		1.0
Maximum power consumption P <sub>1</sub> [W]		67.1		240
Frequency [Hz]		50-60		
Enclosure class		IP 65		
Insulation class		B		
Supply cable		1.5 m H05RN-F with plug		

#### 3.3 Input/output data

The pump offers various input and output options, depending on control variant.

Signal input	
Voltage in level sensor input [VDC]	5
Voltage in pulse input [VDC]	5
Minimum pulse-repetition period [ms]	3.3
Impedance in analog 0/4-20 mA input [Ω]	
The analog input requires a signal which is isolated from frame. Min. resistance to frame: 50 kΩ	250
Maximum loop resistance in pulse signal circuit [Ω]	250
Maximum loop resistance in level signal circuit [Ω]	250
Signal output	
Maximum load of alarm relay output, at ohmic load [A]	2
Maximum voltage, alarm relay output [V]	42

### 3.4 Dimensions

See dimensions at the end of these instructions.  
All dimensions are in mm.


## 4. Installation



### 4.1 Safety instructions



- Liquid is under pressure and may be hazardous.
- When working with chemicals, local safety rules and regulations must be observed (e.g. wear protective clothes).
- Before starting work on the dosing pump and system, disconnect the electricity supply to the pump, ensuring that it cannot be accidentally switched on. Before reconnecting the electricity supply, make sure that the dosing hose is positioned in such a way that any chemical left in the dosing head is not ejected, thereby exposing persons to danger.
- If the vent valve in the dosing head is used, it must be connected to a hose which is led back to the tank.
- When changing a chemical, make sure that the materials of the dosing pump and system are resistant to the new chemical. If there is any risk of chemical reaction between the two types of chemicals, clean the pump and system thoroughly before adding the new chemical.

Proceed as follows:

Place the suction tube in water and press the  button until residual chemical has been removed.

**Note:** When the buttons  and  are pressed simultaneously, the pump can be set to run for a specific number of seconds at maximum capacity. The remaining number of seconds will appear in the display. The maximum value is 300 seconds.

### 4.2 Installation environment

- Exposure to direct sunlight should be avoided. This applies especially to pumps with plastic dosing heads, as this material can be damaged by sunlight.
- If the pump is installed outside, an enclosure or similar protection is required to protect the pump against rain and similar weathers.

### 4.3 Installation of pump

- See also the installation example in section 4.4.
- **Note:** The dosing head may contain water from the factory test. If a liquid which must not come into contact with water is to be dosed, it is recommended to let the pump run with another liquid to remove the water from the dosing head before installation.
- Always install the pump on the supporting foot with vertical suction and discharge ports.
- Always use suitable tools for the mounting of plastic parts. Never apply unnecessary force.
- Tighten the dosing head after 2 to 5 operating hours (torque 5.5 Nm).
- Make sure that the dosing pump and system are designed in such a way that neither system equipment nor buildings are damaged in case of leakage from the pump or rupture of hoses/pipes. The installation of leakage hoses and collecting tanks is recommended.
- Make sure that the drain hole in the dosing head points downwards, see fig. 1.  
**Note:** It is important that the drain pipe/hole is not inserted direct into the tank contents, as gasses may penetrate into the pump.

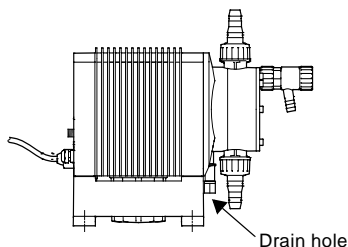


Fig. 1

TM02 7066 2503

#### 4.4 Installation example

The drawing in fig. 2 shows an installation example.

The DME pump can be installed in many different ways. The sketch below shows an example with side-fitted control panel. The tank is a Grundfos chemical tank with a Grundfos level control unit.

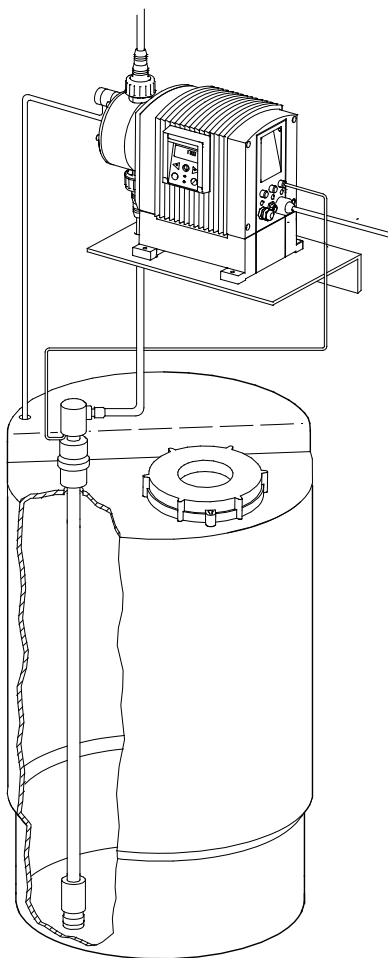
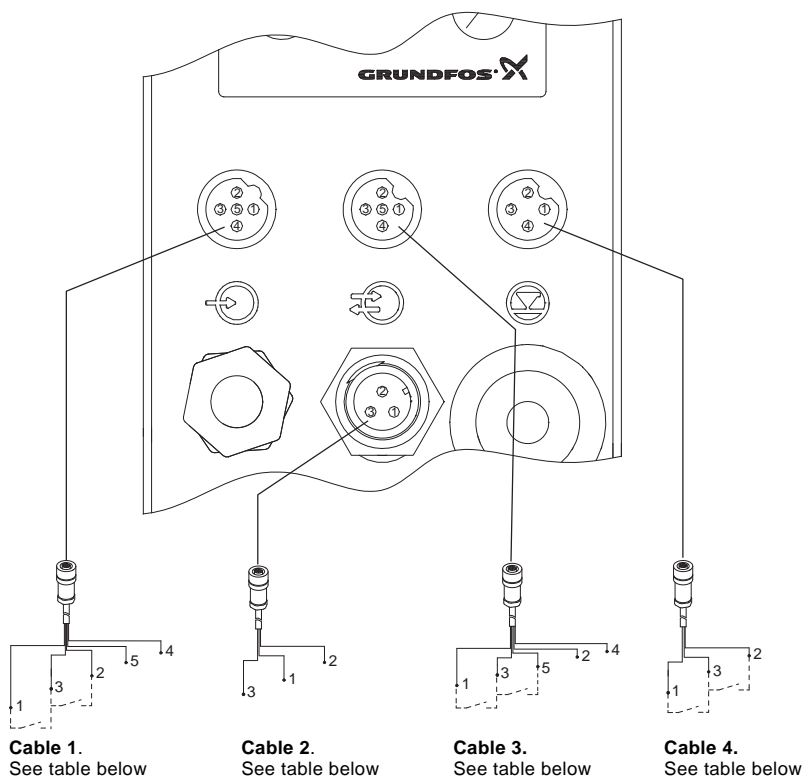


Fig. 2

#### 4.5 Electrical connection

- The electrical connection of the pump should be carried out by qualified persons in accordance with local regulations.
- For electrical data of the pump, see section 3.2.
- Do not lay signal cables, if any, together with power cables.

## 4.6 Connection overview



TM02 7069 0307

Fig. 3

**Table 1: Input for analog signal, pulse signal and diaphragm leakage**

Number / colour	1 / brown	2 / white	3 / blue	4 / black	5 / grey
Function					
Analog				(-) 4-20 mA input	(+) 4-20 mA input
Pulse	Potential-free		Potential-free		
Pulse	5 V			Ground	
Number / colour	2 / black	3 / brown	4 / blue		
Diaphragm leakage*	5 V	PNP	Ground		

\* Grundfos diaphragm leakage sensor, product number 96534443

**Table 2: Alarm relay output**

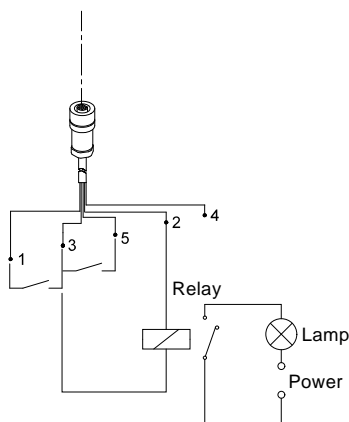
Number / colour	1 / brown	2 / white	3 / blue
Function			
Alarm relay	Common	Normally open	Normally closed

**Table 3: Input for dosing stop and dosing monitoring or dosing output**

Number / colour	1 / brown	2 / white	3 / blue	4 / black	5 / grey
<b>Function</b>					
Dosing stop (input)	5 V		Ground		
Dosing stop (input)	Potential-free		Potential-free		
Dosing monitoring			Potential-free		Potential-free
Dosing monitoring			Ground		5 V
Dosing output (pump running)			Open collector (NPN)*		Ground

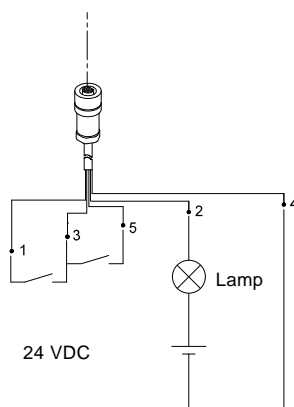
\* Open collector (NPN) can be used for a relay or a lamp.

**1. Using the internal 5 VDC power supply:  
Max. current: 100 mA**



TM03 7868 5006

**2. Using an external power supply:  
Max. 24 VDC - 100 mA**



TM03 7869 5006

**Fig. 4****Table 4: Level input**

Number / colour	1 / brown	2 / white	3 / blue	4 / black
<b>Function</b>				
Empty tank	Potential-free*		Potential-free*	
Empty tank	5 V		Ground	
Low level	Potential-free*		Potential-free*	
Low level	5 V		Ground	

\* The function of the potential-free contact sets can be selected via the control panel (NO = normally open and NC = normally closed), see section 5.21.

## 5. Functions

### 5.1 Control panel

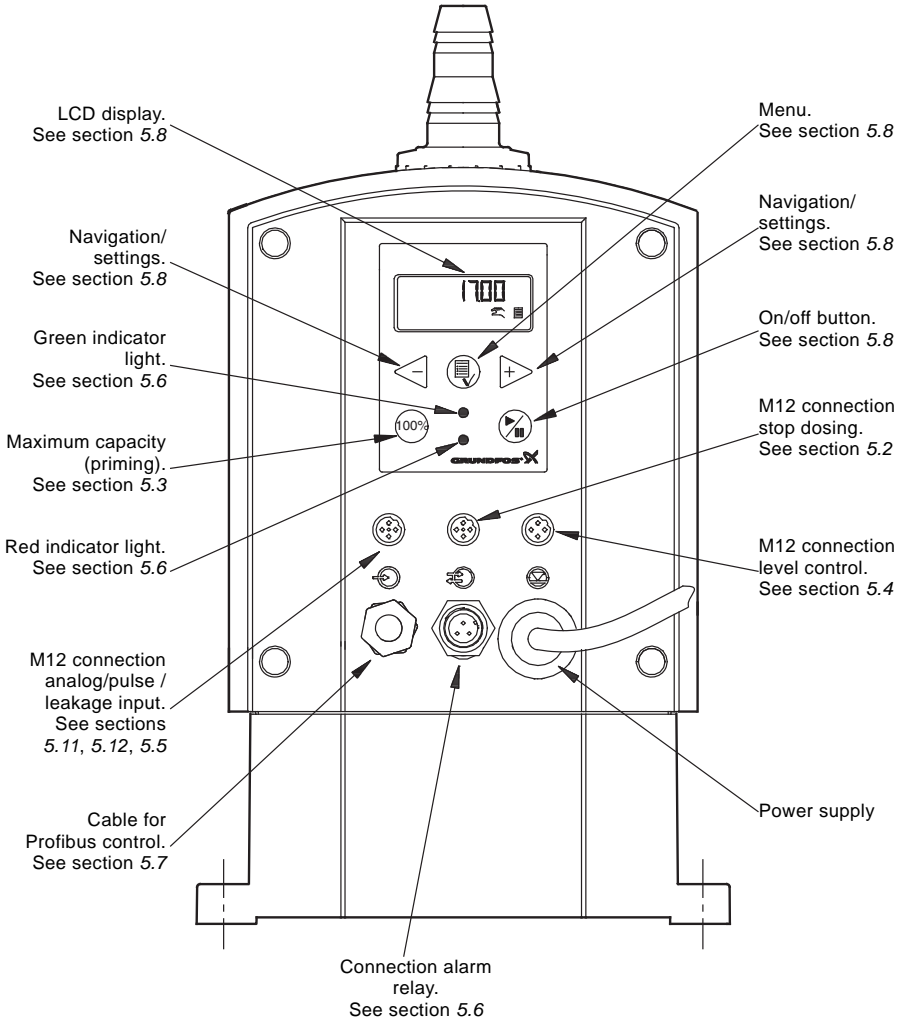



Fig. 5

## 5.2 Start/stop of pump



The pump can be started/stopped in two different ways:

- Locally on the pump control panel.
- By means of an external on/off switch.  
See connection overview in section 4.6.

## 5.3 Priming/venting of pump

The pump control panel incorporates a  button. Press this button if the maximum pump capacity is required over a short period, e.g. during start-up. When the button is released, the pump automatically returns to the previous operating mode.

During priming/venting, it is recommended to let the pump run without a counter pressure or to open the vent valve.

**Note:** When the buttons  and  are pressed simultaneously, the pump can be set to run for a specific number of seconds at maximum capacity. The remaining number of seconds will appear in the display. The maximum value is 300 seconds.

## 5.4 Level control

The pump can be fitted with a level control unit for monitoring of the chemical level in the tank.

The pump can react to two level signals. The pump will react differently, depending on the influence on the individual level sensors.

Level sensors	Pump reaction
Upper sensor activated (closed contact)	<ul style="list-style-type: none"> <li>• Red indicator light is on.</li> <li>• Pump <b>running</b>.</li> <li>• Alarm relay activated.</li> </ul>
Lower sensor activated (closed contact)	<ul style="list-style-type: none"> <li>• Red indicator light is on.</li> <li>• Pump <b>stopped</b>.</li> <li>• Alarm relay activated.</li> </ul>

For connection of the level control unit and alarm output, see section 4.6.

## 5.5 Diaphragm leakage sensor

The pump can be fitted with a diaphragm leakage sensor, which detects diaphragm leakage.

The sensor should be connected to the drain hole in the dosing head.

In case of diaphragm leakage, the signal from the sensor generates an alarm and the alarm relay will be activated. See also section 5.6.

For connection of the diaphragm leakage sensor, see section 4.6.

## 5.6 Alarm output and indicator lights

The green and red indicator lights on the pump are used for operating and fault indication.













In control variant "AR", the pump can activate an external alarm signal by means of a built-in alarm relay which must only be connected to a safety extra low voltage (SELV) connection.

Note




**Connect the alarm relay only to voltages which comply with the SELV requirements in EN/IEC 60 335-1.**

The alarm signal is activated by means of an internal potential-free contact.

The functions of the indicator lights and the built-in alarm relay appear from the table below.

Condition	Green LED	Red LED	Display	Alarm output
Pump running	On	Off	Normal indication	
Set to stop	Flashing	Off	Normal indication	
Pump fault	Off	On	EEPROM	
Supply failure	Off	Off	Off	
Pump running, low chemical level* <sup>1</sup>	On	On	LOW	
Empty tank* <sup>1</sup>	Off	On	EMPTY	
Analog signal < 2 mA	Off	On	NO mA	
The pump is running, but the dosed quantity is too small according to the signal from the dosing monitor* <sup>2</sup>	On	On	NO FLOW	
Overheating	Off	On	MAX. TEMP.	
Internal communication fault	Off	On	INT. COM.	
Internal Hall fault* <sup>3</sup>	Off	On	HALL	
Diaphragm leakage* <sup>4</sup>	Off	On	LEAKAGE	



Condition	Green LED	Red LED	Display	Alarm output
Maximum pressure exceeded* <sup>4</sup>	Off* <sup>5</sup>	On	OVERLOAD	
More pulses than capacity	On	On	MAX. FLOW	
No motor rotation detected* <sup>3</sup>	Off	On	ORIGO	

\*<sup>1</sup> Requires connection to level sensors.  
See section 5.22 *Empty tank (alarm)*.

\*<sup>2</sup> Requires activation of the dosing monitoring function and connection to a dosing monitor.

\*<sup>3</sup> Please contact a Grundfos service centre.


\*<sup>4</sup> Alarms can be reset  when the faults have been corrected.

\*<sup>5</sup> The pump will make 10 attempts to restart before going into permanent OFF mode.

## 5.7 Fieldbus communication

The pump can be configured for fieldbus applications (Profibus). Apart from the usual installation and operating instructions, Profibus pumps are supplied with a special Profibus installation and operating instructions.

### 5.8 Menu

The pump features a user-friendly menu which is activated by pressing the  button. During start-up, all texts will appear in English language. To select local language, see section 5.20.

All menu items are described in the following sections. When ✓ appears at a menu item, it means that this item is activated. By selecting "RETURN" anywhere in the menu structure, you will return to the operating display without changes.

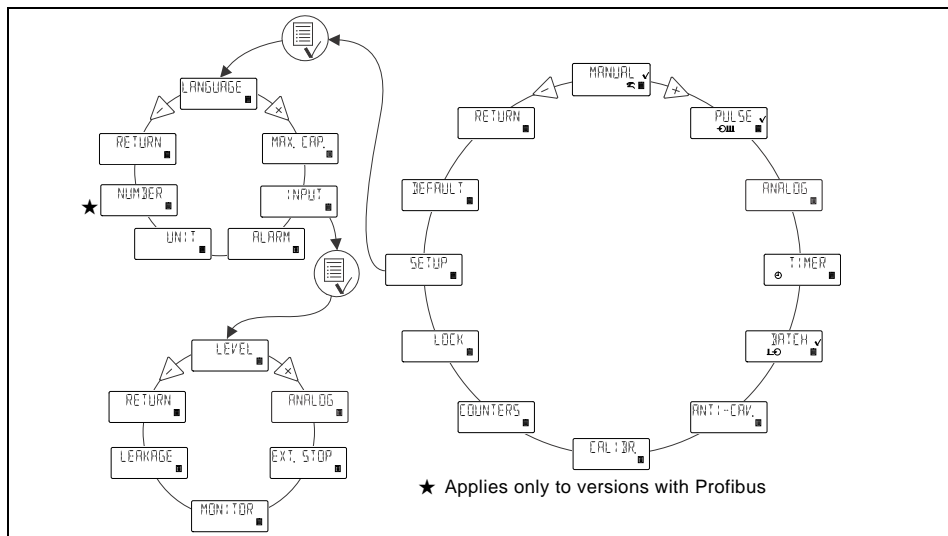

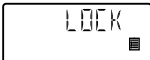








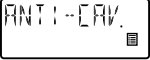

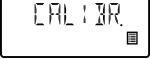





Fig. 6

	See section 5.10		See section 5.25
	See section 5.11		See section 5.18
	See section 5.12		See section 5.19
	See section 5.13		See section 5.20
	See section 5.14		See section 5.16
	See section 5.15		See section 5.21
	See section 7.		See section 5.22
	See section 5.17		See section 5.23

## 5.9 Operating modes

**Note:** The displayed l and ml values are only reliable if the pump has been calibrated to the actual installation, see section 7.

The pump can run in five different operating modes:

- **Manual**
- **Pulse**
- **Analog**
- **Timer** (internal batch control)
- **Batch** (external batch control)

See description in the following sections.

### 5.10 Manual

The pump is dosing as constantly and evenly as possible, without any external signals.

Set the quantity to be dosed in l/h or ml/h. The pump automatically changes between the measuring units.

Setting range:

DME 60: 75 ml/h - 60 l/h

DME 150: 200 ml/h - 150 l/h

DME 375: 500 ml/h - 375 l/h

DME 940: 1200 ml/h - 940 l/h

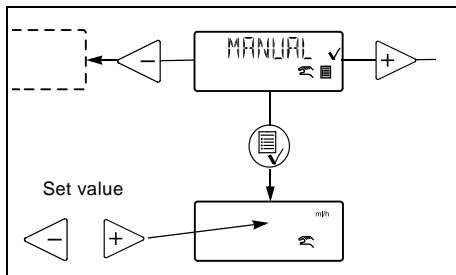


Fig. 7

### 5.11 Pulse

The pump is dosing according to an external pulse signal, i.e. a water meter with pulse output or a controller.

Set the quantity to be dosed per pulse in ml/pulse. The pump adjusts its capacity according to two factors:

- Frequency of external pulses.
- The set quantity per pulse.

The pump measures the time between two pulses and then calculates the speed giving the capacity required (set quantity per pulse multiplied by the pulse frequency).

The pump does not start until it has received the second pulse, and thus it delivers a constant flow as in the case of "manual" control. The pump calculates a speed for each pulse received.

The pump stops

- when the time between two pulses is three times longer than the time between the two previous pulses, or
- if the time between two pulses exceeds 2 minutes.

The pump will operate at the latest calculated speed until one of the two cases occurs.

The pump stops at the point reached in its duty cycle and starts at this point again having received two new pulses.

Setting range:

DME 60: 0.000625 ml/pulse - 120 ml/pulse

DME 150: 0.00156 ml/pulse - 300 ml/pulse

DME 375: 0.00392 ml/pulse - 750 ml/pulse

DME 940: 0.00980 ml/pulse - 1880 ml/pulse

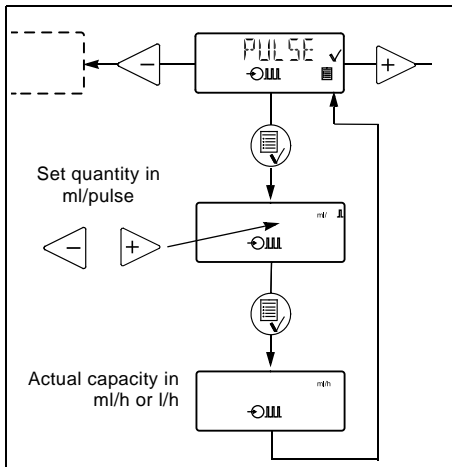


Fig. 8

If the set quantity per pulse multiplied by the pulse frequency exceeds the pump capacity, the pump will run at maximum capacity. Excess pulses will be ignored and "MAX. FLOW" will appear in the display.

### 5.12 Analog

The pump is dosing according to an external analog signal. The dosed quantity is proportional to the input value in mA.

- 4-20 (default): 4 mA = 0 %.
- 20 mA = 100 %.
- 20-4: 4 mA = 100 %.
- 20 mA = 0 %.
- 0-20: 0 mA = 0 %.
- 20 mA = 100 %.
- 20-0: 0 mA = 100 %.
- 20 mA = 0 %.

See fig. 9.

The capacity limitation will influence the capacity. 100 % corresponds to the maximum capacity of the pump or the set maximum capacity, see section 5.16.

The analog input requires a signal which is isolated from frame. Min. resistance to frame: 50 kΩ.

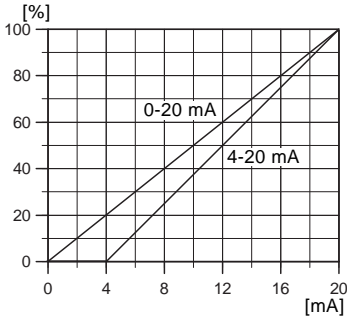


Fig. 9

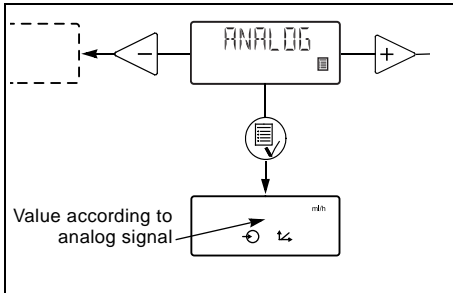


Fig. 10

If 4-20 mA or 20-4 mA is selected and the signal falls below 2 mA, the pump will indicate a fault. This situation occurs if the connection is interrupted, for instance if the wire is damaged.

Change the analog mode as illustrated in fig. 11:

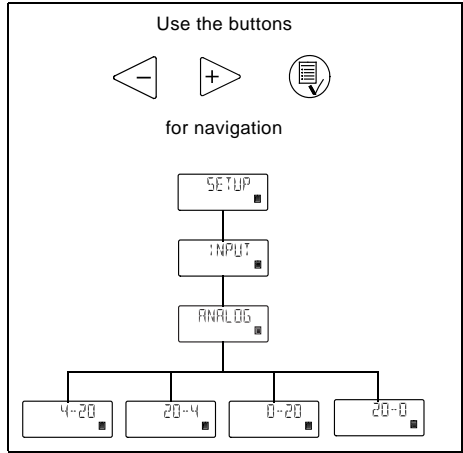


Fig. 11

TMM02 4498 1102

### 5.13 Timer

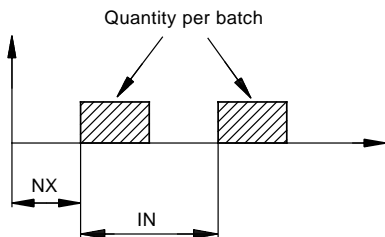
The pump is dosing the set quantity in batches at the maximum capacity or the set maximum capacity, see section 5.16.

The time until the first dosing "NX" and the following sequences "IN" can be set in minutes, hours and days. The maximum time limit is 9 days, 23 hours and 59 minutes (9:23:59). The lowest acceptable value is 1 minute. The internal timer continues even if the pump is stopped by means of the on/off button, empty tank or stop signal, see fig. 12.

During operation, "NX" will always count down from "IN" to zero. In this way, the remaining time until the next batch can always be read.

"IN" must be higher than the time required to perform one batch. If "IN" is lower, the next batch will be ignored.

In case of supply failure, the set quantity to be dosed, the "IN" time and the remaining "NX" time are stored. When the supply is reconnected, the pump will start up with the "NX" time at the time of the supply failure. In this way, the timer cycle will continue, but it has been delayed by the duration of the supply failure.



TM01 8942 0900

Fig. 12

Setting range:

DME 60: 6.25 ml/batch - 120 l/batch

DME 150: 15.6 ml/batch - 300 l/batch

DME 375: 39.1 ml/batch - 750 l/batch

DME 940: 97.9 ml/batch - 1880 l/batch

Only values corresponding to complete dosing strokes (according to the calibration factor) can be selected. The minimum setting depends on the calibration factor. The minimum setting shown above corresponds to the default calibration value.

**Example:**

If the calibration factor is 625 (= 6.25 ml/stroke), the minimum settable value in timer or batch mode will be 6.25 ml (= 1 stroke) -> the next will be 12.5 ml (= 2 strokes), etc.

These steps will continue up to a value corresponding to 100 dosing strokes. Above this value, the setting range has standard steps as in other operating modes.

If the calibration factor is changed after the setting of timer or batch mode, the pump will automatically recalculate a new number of dosing strokes per batch and change the display value to the nearest possible value compared to the first one set.

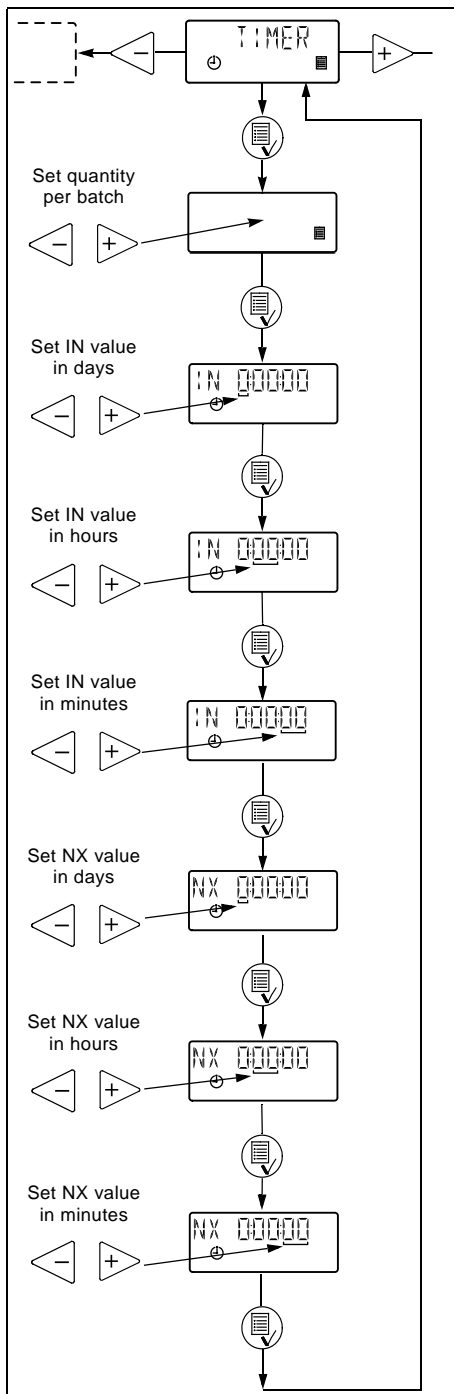


Fig. 13

### 5.14 Batch

The pump is dosing the set quantity in batches at the maximum capacity or the set maximum capacity, see section 5.16.

The quantity is dosed every time the pump receives an external pulse.

If the pump receives new pulses before the previous batch is performed, these pulses will be ignored.

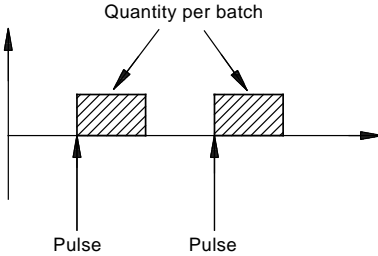


Fig. 14

The setting range is the same as for Timer, see section 5.13.

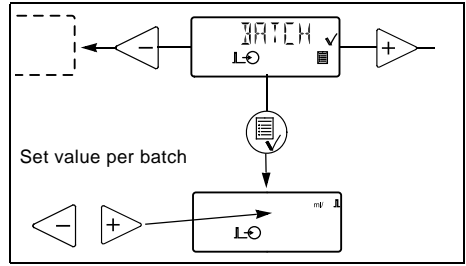


Fig. 15

### 5.15 Anti-cavitation

The pump features an anti-cavitation function. When this function is selected, the pump extends its suction stroke, resulting in optimized priming.

The anti-cavitation function is used:

- when pumping liquids of high viscosity
- in the case of a long suction tube
- in the case of a high suction lift.

Depending on the circumstances, the motor speed during the suction stroke can be reduced by 75 %, 50 % or 25 % compared to the normal motor speed during the suction stroke.

The maximum pump capacity is reduced when the anti-cavitation function is selected. See section 3.1 *Mechanical data*.

TM01 8947 0900

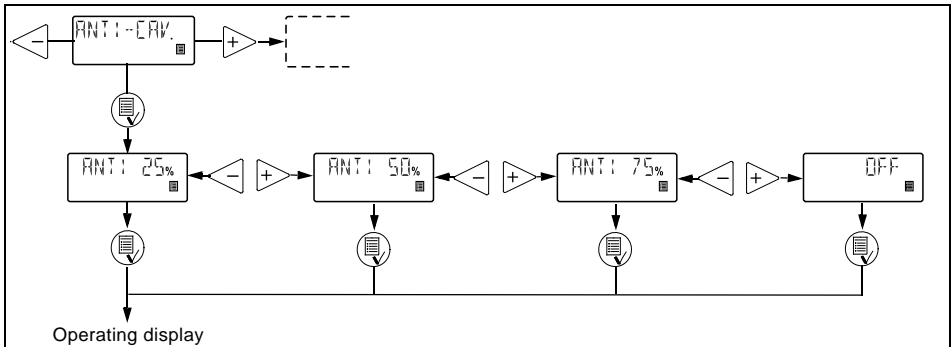


Fig. 16

## 5.16 Capacity limitation

This function offers the possibility of reducing the maximum pump capacity (MAX. CAP.). It influences the functions in which the pump is normally operating at maximum capacity.

Under normal operating conditions, the pump cannot operate at a capacity which is higher than the one stated in the display. This does not apply to the maximum capacity button (100%), see section 5.3.

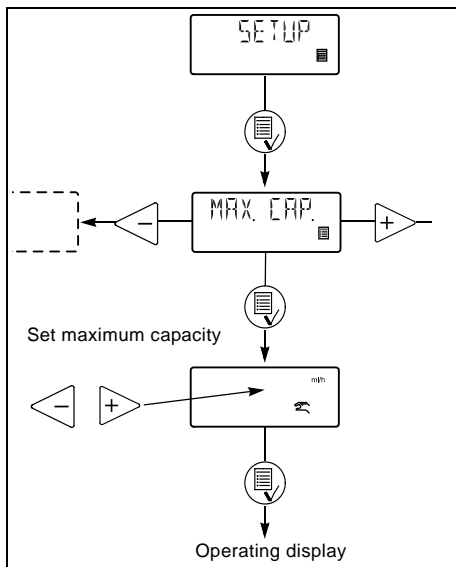


Fig. 17

## 5.17 Counters

The pump can display "non-resettable" counters for:

- **"QUANTITY"**  
Accumulated value of dosed quantity in litres or US gallons.
- **"STROKES"**  
Accumulated number of dosing strokes.
- **"HOURS"**  
Accumulated number of operating hours.
- **"POWER ON"**  
Accumulated number of times the electricity supply has been switched on.

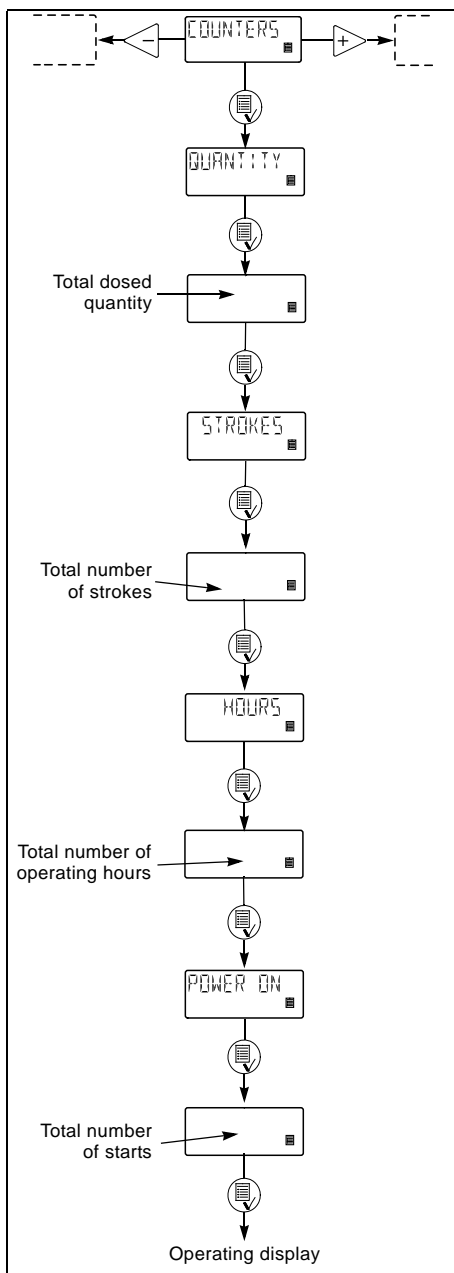


Fig. 18

## 5.18 Resetting

When "DEFAULT" is activated, the pump will return to the factory settings.

**Note:** The calibration is also set back to the default setting. This means that a new calibration is required when the "DEFAULT" function has been used.

Default settings are the factory settings of standard pumps. Select "DEFAULT" in the "SETUP" menu.

### Default settings:

Operating mode:	Manual
Capacity:	Maximum capacity
Control panel lock:	Unlocked
Default lock code:	2583
Anti-cavitation:	Not active
Analog signal:	4-20 mA
Digital inputs:	NO (normally open)
Capacity limitation:	Maximum capacity
Alarm reset required to restart the pump	
Dosing monitoring:	Off
Language:	English
Units:	Metric

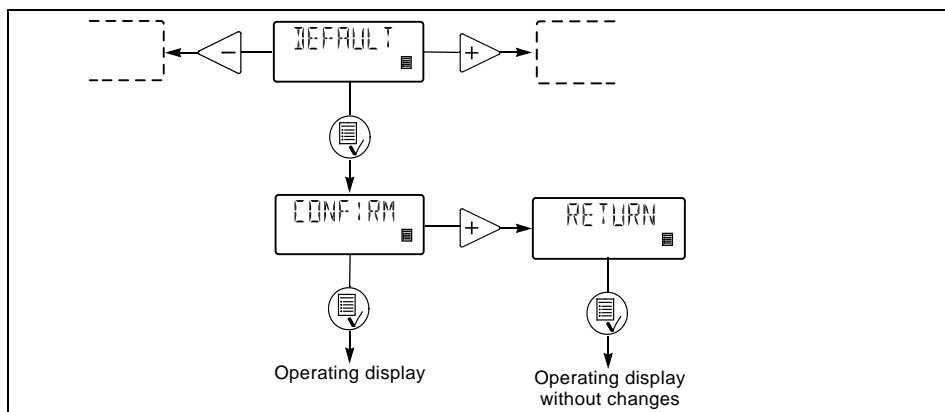


Fig. 19

## 5.19 Return



Fig. 20

The "RETURN" function makes it possible to return from any level in the menu to the operating display without changes after the menu functions have been used.

## 5.20 Language

The display text can be displayed in one of the following languages:

- English
- German
- French
- Italian
- Spanish
- Portuguese
- Dutch
- Swedish
- Finnish
- Danish
- Czech
- Slovak
- Polish
- Russian



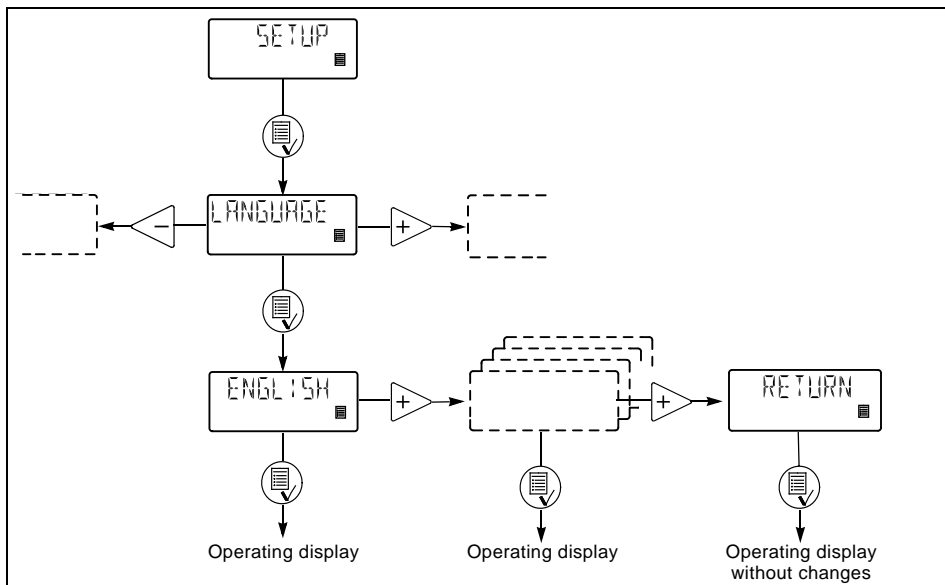


Fig. 21

### 5.21 Input setup

Fig. 22 shows all possible settings.

The inputs for level, stop dosing and diaphragm leakage can be changed from NO (normally open) to NC (normally closed) function. If changed, the inputs must be short-circuited in normal operation. The dosing monitoring input can be changed from "OFF" to "ON".

For the analog input, one of the following signal types can be selected:

- 4-20 mA (default)
- 20-4 mA
- 0-20 mA
- 20-0 mA.

See also section 5.12 Analog.

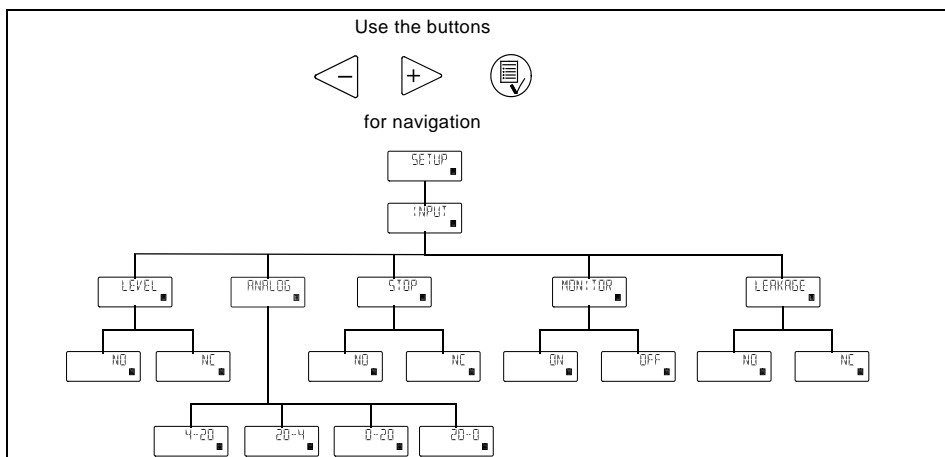


Fig. 22

## 5.22 Empty tank (alarm)

The alarm function can be set to "AUT. RES." or "MAN. RES.". This function is used when the level sensor indicates "EMPTY".

The alarm can be reset automatically (AUT. RES.) or manually (MAN. RES.).

For more information about other alarm functions, see section 5.6 *Alarm output and indicator lights*.

## 5.23 Measuring units

It is possible to select metric units (litre/millilitre) or US units (gallons).

### Metric measuring units:

- **In manual and analog modes**, set the quantity to be dosed in litres per hour (l/h) or millilitres per hour (ml/h).
- **In pulse mode**, set the quantity to be dosed in ml/pulse. The actual capacity is indicated in litres per hour (l/h) or millilitres per hour (ml/h).
- **For calibration**, set the quantity to be dosed in ml per 100 strokes.
- **In timer and batch modes**, set the quantity to be dosed in litres (l) or millilitres (ml).
- Under the "QUANTITY" menu item in the "COUNTERS" menu, the dosed quantity is indicated in litres.

### US measuring units:

- **In manual and analog modes**, set the quantity to be dosed in gallons per hour (gph).
- **In pulse mode**, set the quantity to be dosed in ml/pulse. The actual capacity is indicated in gallons per hour (gph).
- **For calibration**, set the quantity to be dosed in ml per 100 strokes.
- **In timer and batch modes**, set the quantity to be dosed in gallons (gal).
- Under the "QUANTITY" menu item in the "COUNTERS" menu, the dosed quantity is indicated in US gallons (gal).

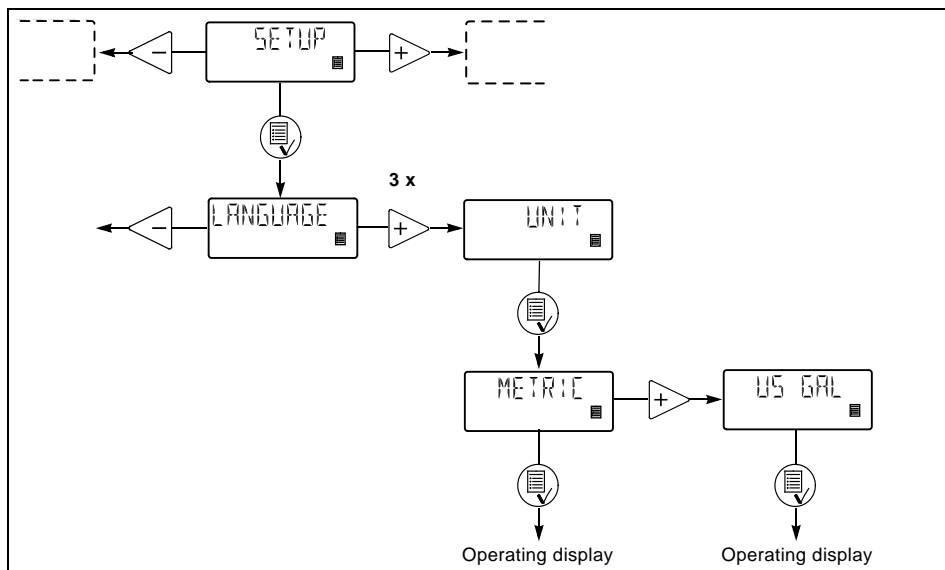
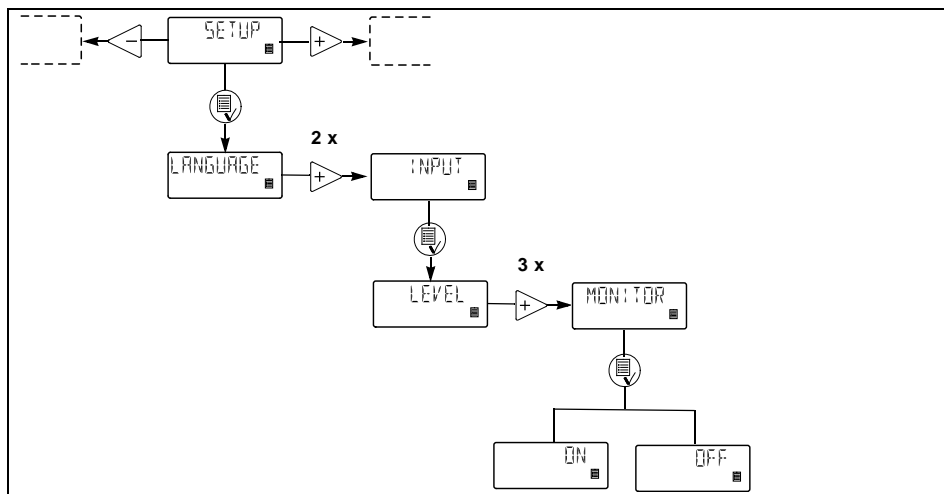


Fig. 23

## 5.24 Dosing monitoring

The pump incorporates a dosing monitoring input (see connection overview in fig. 3).



**Fig. 24**

The dosing monitoring input is designed to receive a potential-free pulse signal from a dosing monitor.

The dosing monitoring input feature enables the pump to react on gas accumulation in the suction line.

A dosing monitor must always be connected to the suction side of the pump.

## 5.25 Control panel lock

It is possible to lock the buttons on the control panel to prevent malfunction of the pump. The locking function can be set to "ON" or "OFF". The default setting is "OFF".

A PIN code must be entered to change from "OFF" to "ON". When "ON" is selected for the first time, "0000" will appear in the display. If a code has already been entered, it will appear when an attempt to change to "ON" is made. This code can either be re-entered or changed.


If no code has been entered, a code must be set in the same way as the "NX" and "IN" values described in section 5.13.

If a code has already been entered, active digits are flashing.

If attempts are made to operate the pump in locked condition, "LOCKED" will appear in the display for 2 seconds, followed by "0000". A code must be entered. If the entering of a code has not been started within 10 seconds, the operating display without changes will appear.


If a wrong code is entered, "LOCKED" will appear in the display for 2 seconds, followed by "0000". A new code must be entered. If the entering of a code has not been started within 10 seconds, the operating display without changes will appear. This display will also appear if the entering of the correct code exceeds 2 minutes.

If the locking function has been activated but the control panel is unlocked, the control panel will be locked automatically if it is not operated for 2 minutes.

The locking function can also be reactivated by selecting "ON" in the "LOCK" menu. The previously entered code will then appear and must be re-entered by pressing the  button four times. The code can also be changed.

The control panel can be unlocked either by means of the selected code or the factory code 2583.

The following buttons and inputs are still active when the panel is locked:

- Priming (-button).
- On/off button.
- All external inputs.

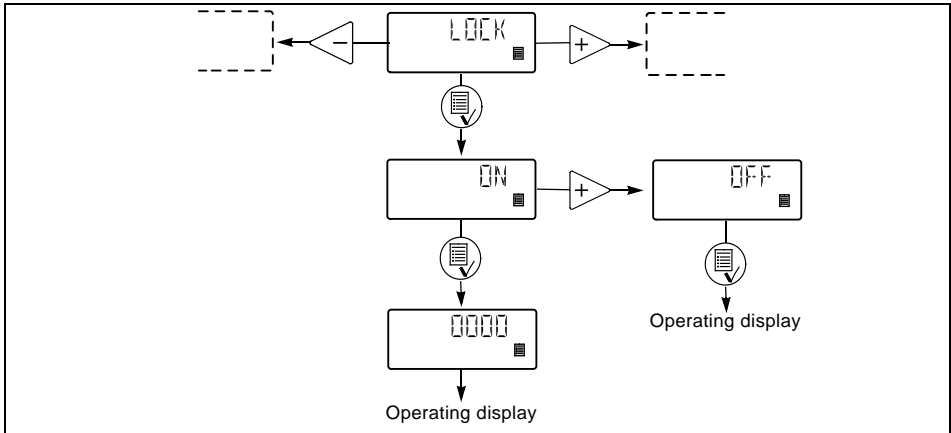












Fig. 25

### Activating the locking function and locking the control panel:

1. Select "LOCK" in the menu.
2. Select "ON" by means of the buttons  and  and confirm with .
3. Enter or re-enter a code by means of the buttons ,  and .




The locking function has now been activated and the control panel is locked.

### Unlocking the control panel (without deactivating the locking function):

1. Press  once. "LOCKED" appears in the display for 2 seconds, followed by "0000".
2. Enter the code by means of the buttons ,  and \*.

The control panel has now been unlocked and will automatically be locked again if the control panel is not operated for 2 minutes.

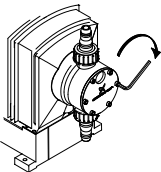
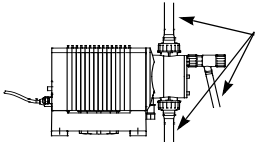
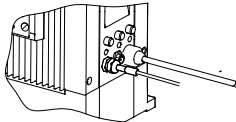
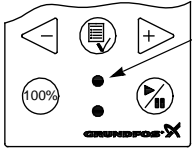
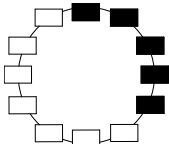
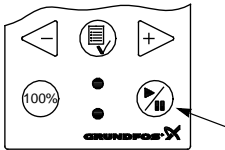
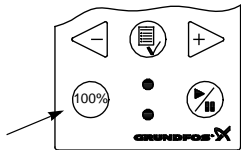
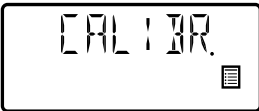
### Deactivating the locking function:

1. Select "LOCK" on the control panel as described above.
2. Select "LOCK" in the menu.
3. Select "OFF" by means of the buttons  and  and confirm with .

The locking function has now been deactivated and the control panel is unlocked.

\* The panel can always be unlocked with code 2583.

## 6. Start-up

Step	Action	
1		<p><b>Prior to start-up, retighten the dosing head screws:</b></p> <ul style="list-style-type: none"> <li>• Cross-tighten the screws to 5.5 Nm (+ 0.5/- 0 Nm).</li> </ul>
2		<p><b>Connect the hoses/pipes:</b></p> <ul style="list-style-type: none"> <li>• Connect the suction and dosing tubes/pipes to the pump.</li> <li>• Connect a tube to the vent valve, if required, and lead the hose to the tank.</li> </ul>
3		<p><b>Connect the cables:</b></p> <ul style="list-style-type: none"> <li>• Connect the control/level cables, if any, to the pump, see section 4.6.</li> </ul>
4		<p><b>Switch on the electricity supply:</b></p> <ul style="list-style-type: none"> <li>• The display is on.</li> <li>• The green indicator light is flashing (the pump has stopped).</li> <li>• Select language, if required, see section 5.20.</li> </ul>
5		<p><b>Select the operating mode</b> (see section 5.9):</p> <ul style="list-style-type: none"> <li>• Manual.</li> <li>• Pulse.</li> <li>• Analog.</li> <li>• Timer.</li> <li>• Batch.</li> </ul>
6		<p><b>Start the pump:</b></p> <ul style="list-style-type: none"> <li>• Start the pump by pressing the on/off button.</li> <li>• The green indicator light is permanently on.</li> </ul>
7		<p><b>Priming/venting:</b></p> <ul style="list-style-type: none"> <li>• Press the 100% button on the pump control panel and let the pump run without a counter pressure. Open the vent valve, if required. When the buttons 100% and &gt;&gt; are pressed simultaneously during priming, the pump can be set to run for a specific number of seconds at maximum capacity.</li> </ul>
8		<p><b>Calibration:</b></p> <ul style="list-style-type: none"> <li>• When the pump has been primed and is running at the right counter pressure, calibrate the pump, see section 7.</li> </ul>

If the pump is not operating satisfactorily, see section 10. *Fault finding chart.*

## 7. Calibration

It is important that the pump is calibrated after installation to ensure that the correct value (ml/h or l/h) appears in the display.

The calibration can be carried out in two different ways:

- **Direct calibration.**  
The dosed quantity of 100 strokes is measured directly. See section 7.1.
- **Check calibration.** See section 7.2.

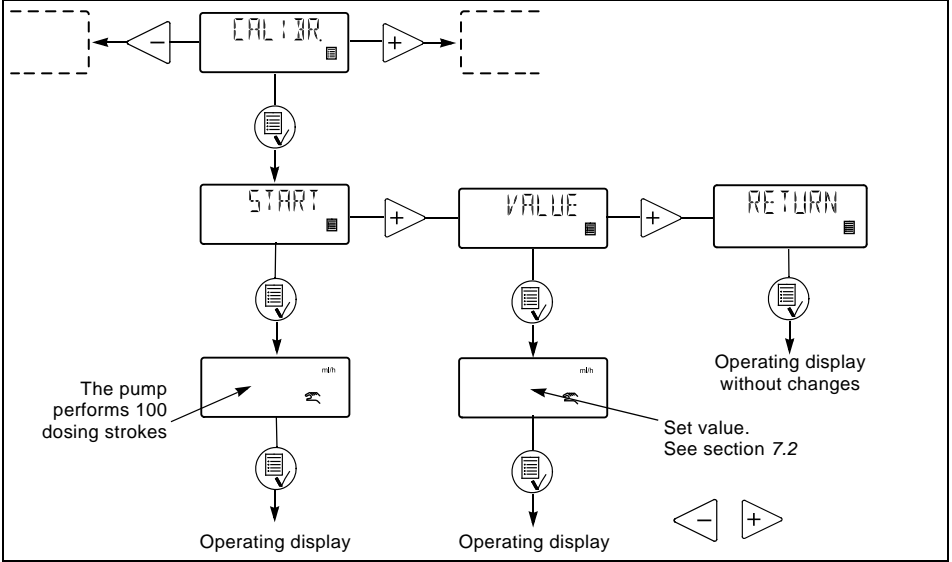


Fig. 26

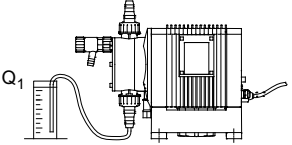
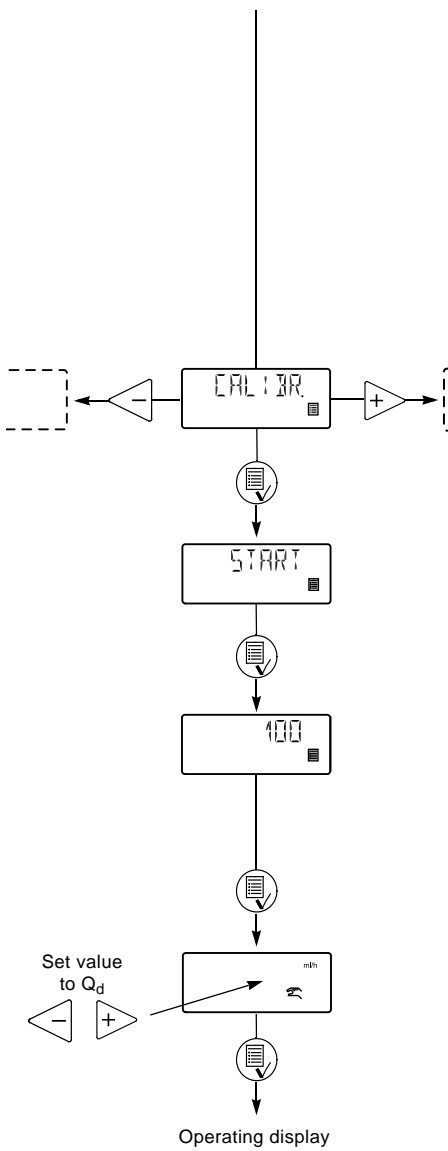

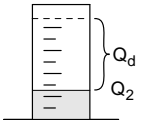

### 7.1 Direct calibration

Before calibration, make sure:

- that the pump is installed with foot valve, injection valve, etc. in the existing system.

- that the pump is running at the counter pressure it is supposed to operate at (adjust the counter pressure valve, if required).
- that the pump is operating with the correct suction lift.

To carry out a direct calibration, proceed as follows:




Action	Pump display
1. Prime the dosing head and the suction tubing.	
2. Stop the pump. The green LED is flashing.	
3. Fill a graduated glass with dosing liquid, $Q_1$ . DME 60: approx. 1.5 l DME 150: approx. 2.5 l DME 375: approx. 6 l DME 940: approx. 14 l	
4. Read and note the quantity $Q_1$ .	
5. Place the suction tubing in the graduated glass. 	
6. Go to the calibration menu, see section 5.8.	
7. Press the  button twice.	
8. The pump is performing 100 dosing strokes.	
9. The factory-calibration value appears in the display.	
10. Remove the suction tubing from the graduated glass and read $Q_2$ . 	
11. Set the display value to $Q_d = Q_1 - Q_2$ .	
12. Confirm with the  button.	
13. The pump is now calibrated and returns to the operating display.	Operating display

## 7.2 Check calibration

In check calibration, the calibration value is calculated by reading the consumption of chemical in a specific period and comparing this with the number of dosing strokes performed in the same period.

This calibration method is very accurate and especially suitable for check calibration after long periods of operation or if direct calibration is impossible. The calibration can for instance be carried out when the chemical tank is replaced or filled.

To carry out a check calibration, proceed as follows:

1. Stop the pump by pressing the  button.
2. Read the counter and note the number of dosing strokes, see section 5.17.
3. Read and note the quantity in the chemical tank.
4. Start the pump by pressing the  button and let it run for at least 1 hour. The longer the pump is operating, the more accurate the calibration will be.
5. Stop the pump by pressing the  button.
6. Read the counter and note the number of dosing strokes, see section 5.17.
7. Read and note the quantity in the chemical tank.
8. Calculate the dosed quantity in ml and the number of dosing strokes performed during the operating period.
9. Calculate the calibration value as follows:  
(dosed quantity in ml/dosing strokes) x 100.
10. Set the calculated value in the calibration menu.

## 8. Maintenance

The pump is maintenance-free. However, it is recommended to keep the pump clean.

The dosing pump is produced according to the highest quality standards and has long life. The pump incorporates wear parts such as diaphragm, valve seat and valve balls.

To ensure long life and to reduce the risk of disturbance of operation, visual checks should be carried out regularly.

It is possible to order dosing heads, valves and diaphragms in materials which are suitable for the specific liquid to be pumped. See the product numbers at the end of these instructions.

## 9. Service

Before returning the pump to Grundfos for service, the **safety declaration** at the end of these instructions must be filled in by authorized personnel and attached to the pump in a visible position.

**Note:** If a pump has been 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, it must be ensured that the pump is free from substances that can be injurious to health or toxic. If the pump has been used for such substances, the pump must be cleaned before it is returned.

If proper cleaning is not possible, all relevant information about the chemical must be provided.

If the above is not fulfilled, Grundfos can refuse to accept the pump for service. Possible costs of returning the pump are paid by the customer.

The safety declaration can be found at the end of these instructions (only in English).

**Note:** The replacement of the supply cable must be carried out by an authorised Grundfos service workshop.



## 10. Fault finding chart

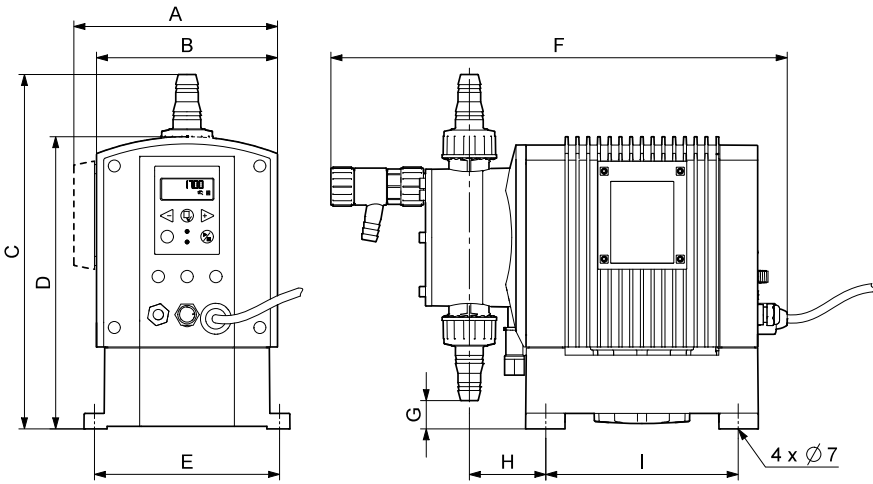
Fault	Cause	Remedy
The dosing has stopped or the output is too low.	Valves leaking or blocked.	Check and clean valves.
	Valves incorrectly installed.	Remove and fit valves. Check that the arrow on the valve casing is pointing in the liquid flow direction. Check that all O-rings have been fitted correctly.
	Suction valve or suction pipe/hose leaking or blocked.	Clean and seal the suction pipe/hose.
	Suction lift too high.	Install the pump in a lower position. Install a priming tank.
	Viscosity too high.	Select the anti-cavitation function, see section 5.15.
		Install a pipe/hose with larger cross-section. Fit spring-loaded valves.
Pump out of calibration.	Calibrate the pump, see section 7.	
Pump dosing too little or too much.	Pump out of calibration.	Calibrate the pump, see section 7.
Pump dosing irregularly.	Valves leaking or blocked.	Check and clean the valves.
Leakage from drain hole.	Diaphragm defective.	Install a new diaphragm.
	Diaphragm not fastened properly.	Install a new diaphragm and ensure that the diaphragm is fastened properly.
	Counter-pressure too high (measured at the pump discharge port).	Check the system. Check the injection valve.
Frequent diaphragm failures.	Sediment in dosing head.	Clean/flush the dosing head.

## 11. Disposal



This product and all its associated parts must be disposed of in an environmentally friendly manner. Use appropriate waste collection services. If there is no such facility or the facility refuses to accept the materials used in the product, the product can be sent to the nearest Grundfos company or Grundfos service centre.

Dimensions



TM02 7062 2503

	DME 60	DME 150	DME 375	DME 940
A = [mm]	176	176	238	238
B = [mm]	198	198	218	218
C = [mm]	331	345	471	496
D = [mm]	284	284	364	364
E = [mm]	180	180	230	230
F = [mm]	444	444	540	539
G = [mm]	41	28	31	6
H = [mm]	74	74	95	95
I = [mm]	187	187	246	246

# Safety declaration

Please copy, fill in and sign this sheet and attach it to the pump returned for service.

We hereby declare that this product:

Product type: \_\_\_\_\_

Model number: \_\_\_\_\_

No media or water: \_\_\_\_\_

A chemical solution, name: \_\_\_\_\_

(see pump nameplate)

is free from hazardous chemicals, biological and radioactive substances.

## Fault description

Please make a circle around the damaged part.

In the case of an electrical or functional fault, please mark the cabinet.

Please give a short description of the fault:

\_\_\_\_\_  
Date and signature

\_\_\_\_\_  
Company stamp

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