
DME, A (2-48 l/h)

Installation and operating instructions

(GB) (D) (F) (I) (E) (P) (GR) (NL) (S) (FIN) (DK)



GB Declaration of Conformity

We, Grundfos Aldos, 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).
Norm, 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 Bassa 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 Försäkrar om överensstämmelse

Vi, Grundfos, försäkrar under ansvar att produkterna DME, som omfattas av denna försäkrar, 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 tilnærmede 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-direktivet (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 προσεγγίσις 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 Overeenkomstigheidverklaring

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:

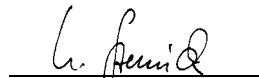
- Machine Richtlijn (2006/42/EC).
Gebruikte normen: EN 809: 1998, EN ISO 12100-1+A1: 2009, EN ISO 12100-2+A1: 2009.
- Laagspannings Richtlijn (2006/95/EC).
Gebruikte norm: EN 60204-1+A1: 2009.
- EMC Richtlijn (2004/108/EC).
Gebruikte normen: EN 61000-6-2: 2005, EN 61000-6-4: 2007.

FI Vaatimustenmukaisuusvakuutus

Me, Grundfos, vakuutamme omalla vastuullamme, että tuotteet DME, joita tämä vakuutus koskee, ovat EY:n jäsenvaltioiden lainsäädännön yhdenmukaistamiseen tähtäviin 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.
- Pienjännitedirektiivi (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.

Pfinztal, 15th July 2010



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

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1. 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 can be fitted either to the end or to the side of the cabinet.

Being equipped with a stepper motor, this dosing pump is unique in its field. The stepper motor offers the possibility of varying the capacity by changing the duration of the dosing stroke.

Furthermore, 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 1:1000.

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

1.1 Applications

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

- Drinking water treatment.
- Wastewater treatment.
- Swimming pool water treatment.
- Boiler water treatment.
- Cooling water treatment.
- Process water treatment.
- Washing systems.



Before beginning installation procedures, these installation and operating instructions should be studied carefully. The installation and operation should also be in accordance with local regulations and accepted codes of good practice.

1.2 Type key

(Cannot be used for pump configuration.)

GB

Example: **DME 2-18 A-PP/E/C-F-3 1 1E F**

Pump range DME ..

Maximum pressure [bar]

Control variant Code

Standard	A
Standard + alarm relay	AR
Standard + Profibus	AP
Standard + GENibus	AG

Dosing head material Code

Polypropylene	PP
PVDF	PV
Stainless steel 1.4401	SS

Gasket material Code

EPDM	E
FKM	V

Valve ball material Code

Ceramics	C
Stainless steel 1.4401	SS

Control panel Code

Front-fitted	F
Side-fitted	S

Voltage Code

1 x 100-240 V, 50-60 Hz	3
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Code Mains plug

F	EU (Schuko)
B	USA, CAN
G	UK
I	AU
E	CH
J	JP

Code Connection, suction/discharge

1	Tubing 6/9 Tubing 4/6 supplied with the pump
2	Tubing 6/9 Tubing 6/12+9/12 supplied with the pump
3	Tubing 4/6
4	Tubing 6/9
5	Tubing 6/12
6	Tubing 9/12
A	Threaded Rp 1/4
B	Threaded Rp 3/8
E	Cementing d.10
F	Cementing d.12

Code Valves

1	Standard valve
2	Spring-loaded valve

2. Technical data

2.1 Mechanical data

	DME 2	DME 8	DME 12	DME 19	DME 48
Maximum capacity without anti-cavitation *1 [l/h]	2.5	7.5	12	18.5	48
Maximum capacity with anti-cavitation *1 [l/h]	1.8	5.6	9	14.5	37
Maximum pressure [bar]	18	10	6	6.2	2.6
Maximum stroke rate per minute [stroke/min.]	180	180	180	151	151
Maximum suction lift during operation [m]	6				
Maximum suction lift when priming with wet valves [m]	1.8	3	3	3	3
Maximum viscosity with spring-loaded valves *2 [mPas]	500	500	500	500	100
Maximum viscosity without spring-loaded valves *2 [mPas]	200	200	200	200	100
Diaphragm diameter [mm]	28	38	42.5	55	77
Liquid temperature [°C]	0 to 50				
Ambient temperature [°C]	0 to 45				
Accuracy of repeatability	±1%				
Sound pressure level [dB(A)]	<70				

*1 Irrespective of counter pressure

*2 Maximum suction lift 1 metre

2.2 Electrical data

		DME 2, 8, 12	DME 19, 48
Supply voltage [VAC]		1 x 100-240	
Maximum current consumption [A]	at 100 V	0.30	0.36
	at 230 V	0.16	0.26
Maximum power consumption P ₁ [W]		18	22
Frequency [Hz]		50-60	
Enclosure class		IP 65	
Insulation class		B	
Supply cable		1.5 m H05RN-F with plug	

2.3 Input/output data

The pump offers various input and output possibilities, 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 4-20 mA input [Ω]	250
Maximum loop resistance in pulse signal circuit [Ω]	350
Maximum loop resistance in level signal circuit [Ω]	350
Signal output	
Maximum load of alarm relay output, at ohmic load [A]	2
Maximum voltage, alarm relay output [V]	250




2.4 Dimensions

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

3. Installation

3.1 Safety instructions



- The 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.

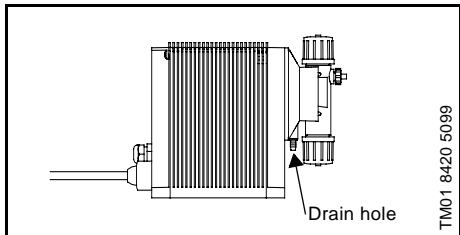
3.2 Installation environment

- 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.

3.3 Installation of pump

- See also the installation example in section 3.4.
- **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.
- **Note:** Tighten the bolts in the dosing head after 2 to 5 operating hours (torque 5 Nm).
- 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.
- 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



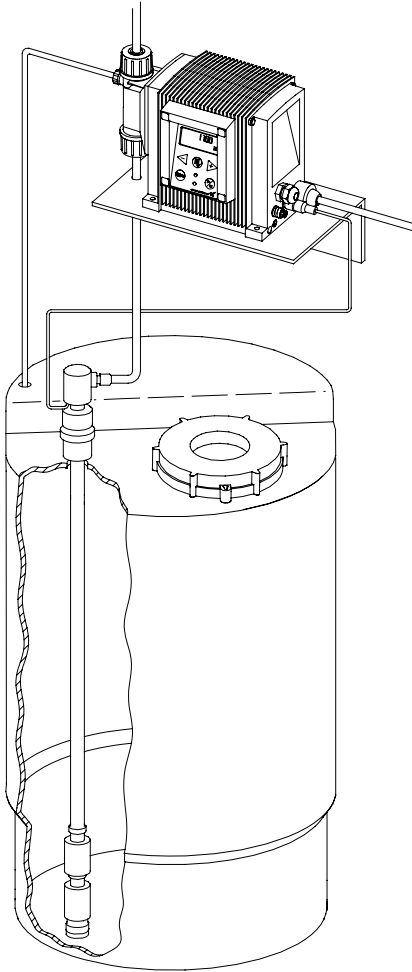
3.4 Installation example

The drawing in fig. 2 shows an installation example.

Fig. 2

GB

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.



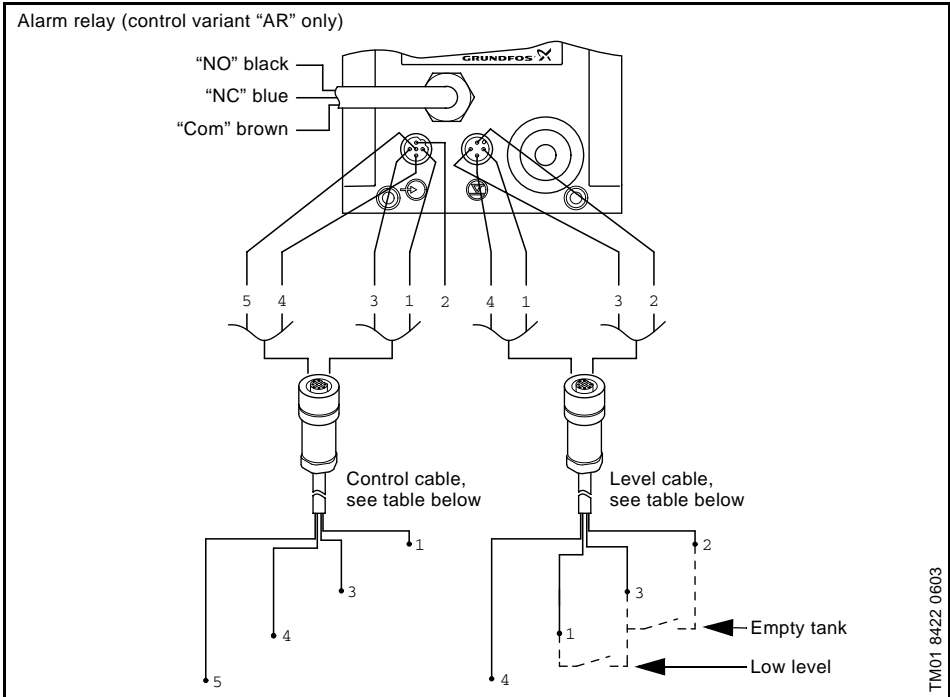
TM01 8421 0204

3.5 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 2.2.
- Do not lay signal cables, if any, together with power cables.

3.6 Connection overview

Fig. 3



Control input:

Number / colour	1 / brown	2 / white	3 / blue	4 / black	5 / grey	Description
Function						
Manual	2		2			
Pulse	1		1			
Pulse + external on/off	1		1 + 2		2	
Analog				-	+	mA signal
Analog + external on/off	2		2	-	+	mA signal
Timer + external on/off	2		2			
Batch	1		1			

1 = Contact for pulse signal

2 = Contact for external on/off

Level input:

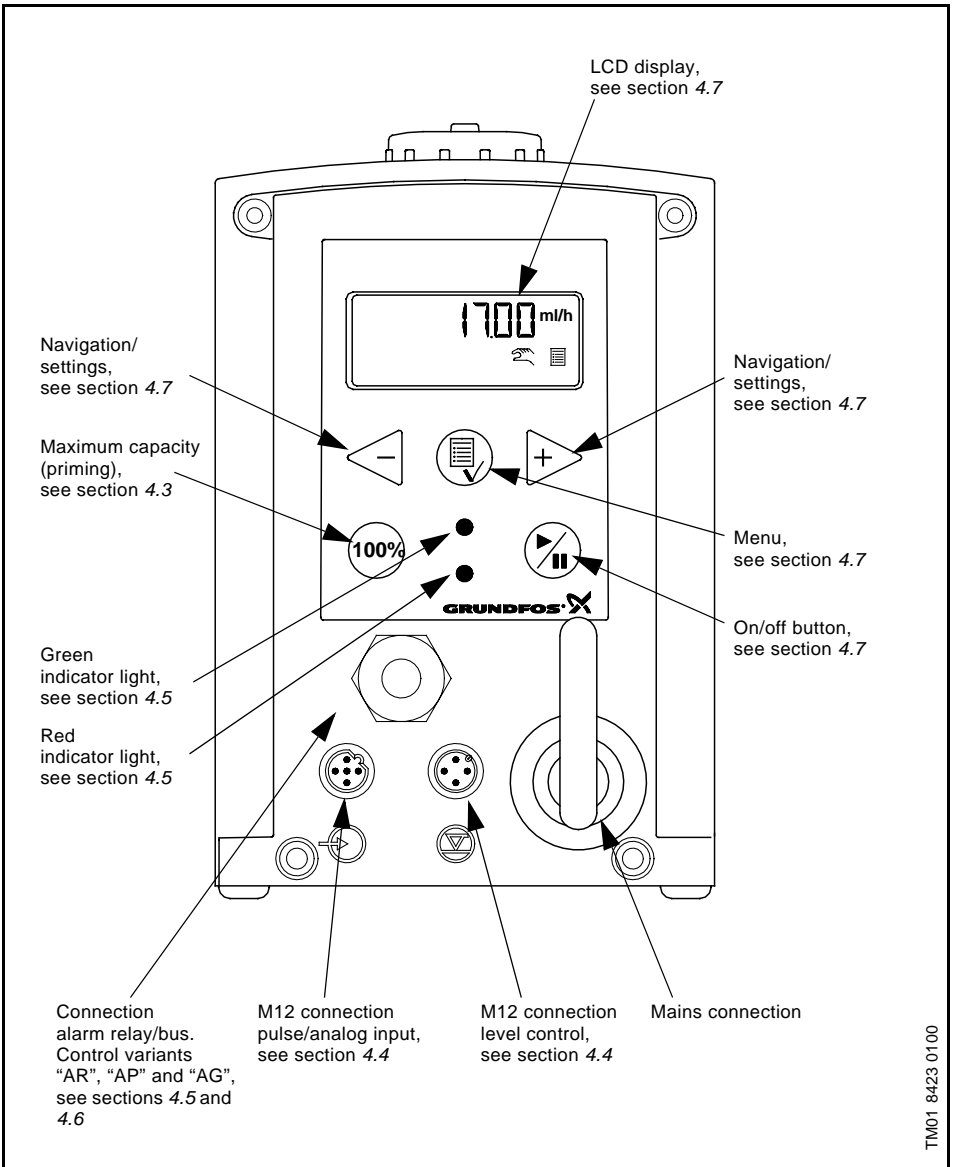
Number / colour	1 / brown	2 / white	3 / blue	4 / black
Function	Low level		Low level	
		Empty tank	Empty tank	
	Low level	Empty tank	Low level + empty tank	
		Dosing monitoring	Dosing monitoring	

4. Functions

4.1 Control panel

Fig. 4

GB




4.2 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 connected to the pulse input. See connection overview in section 3.6.

4.3 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 loosen the vent valve by giving it a 1/8 to 1/4 turn.

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.

4.4 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"> • Red indicator light is on. • Pump running. • Alarm relay activated.*
Lower sensor activated (closed contact)	<ul style="list-style-type: none"> • Red indicator light is on. • Pump stopped. • Alarm relay activated.*

* Control variant "AR" only.

See section 3.6 for connection of the level control unit and alarm output.

4.5 Indicator lights and alarm output

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. 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	Dis-play	Alarm output* ¹
Pump running	On	Off	Normal indication	
Set to stop	Flash-ing	Off	Normal indication	
Pump fault	Off	On	EEPROM	
Supply failure	Off	Off	Off	
Pump run-ning, low chemical level* ²	On	On	Normal indication	
Empty tank* ²	Off	On	Normal indication	
Analog signal < 2 mA	Off	On	Normal indication	
The dosed quantity is too small according to the signal from the dosing monitor* ³	On	On	Normal indication	
Overheat-ing	Off	On	MAX. TEMP.	

*¹ Control variant AR only.

*² Requires connection to level sensors.

*³ Requires activation of the dosing monitoring function and connection to a dosing monitor.

4.6 Fieldbus communication

The pump can be configured for fieldbus applications.

The following bus types are available:

Control variant	Bus type
AP	Profibus
AG	GENIbus

Separate instructions are supplied with each bus type.

4.7 Menu



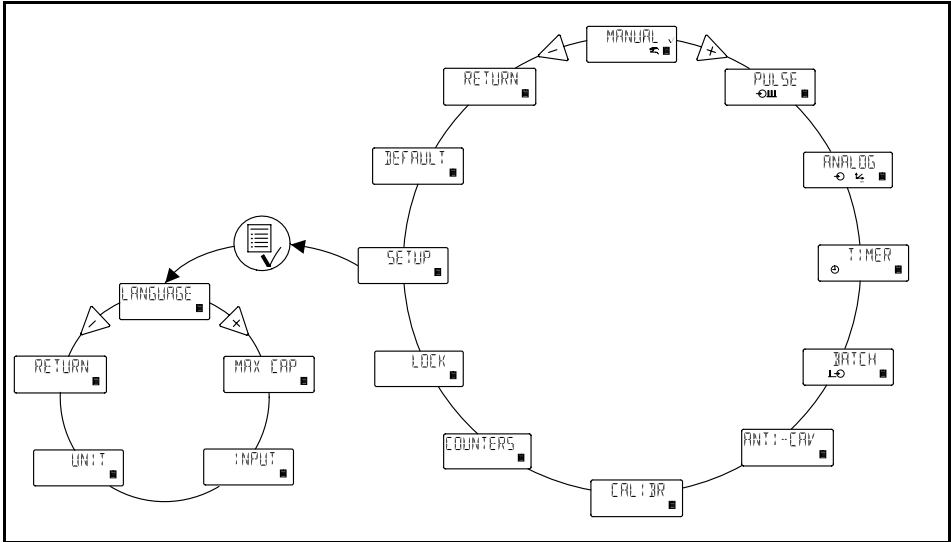
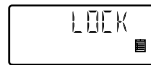
The pump features a user-friendly menu which is activated by pressing the  button. During start-up, all texts will appear in English language. To select language, see section 4.19.

Fig. 5

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.



See section 4.9



See section 4.23



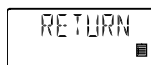
See section 4.10



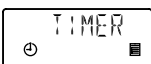
See section 4.17



See section 4.11



See section 4.18



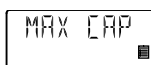
See section 4.12



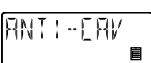
See section 4.19



See section 4.13



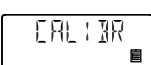
See section 4.15



See section 4.14



See section 4.20



See section 6



See section 4.21



See section 4.16

4.8 Operating modes

Note: The displayed I and ml values are only reliable if the pump has been calibrated to the actual installation, see section 6.

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.

4.9 Manual

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

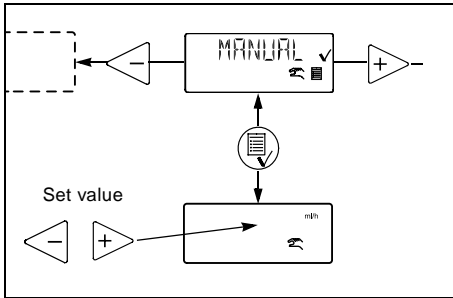
Set the quantity to be dosed in l/h or ml/h. The pump automatically changes over between the measuring units.

Setting range:

- DME 2: 2.5 ml/h - 2.5 (1.8*) l/h
- DME 8: 7.5 ml/h - 7.5 (5.6*) l/h
- DME 12: 12 ml/h - 12 (9*) l/h
- DME 19: 18.5 ml/h - 18.5 (14.5*) l/h
- DME 48: 48 ml/h - 48 (37*) l/h

* The figures in brackets indicate the maximum capacity when the anti-cavitation function is activated.

Fig. 6



4.10 Pulse

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

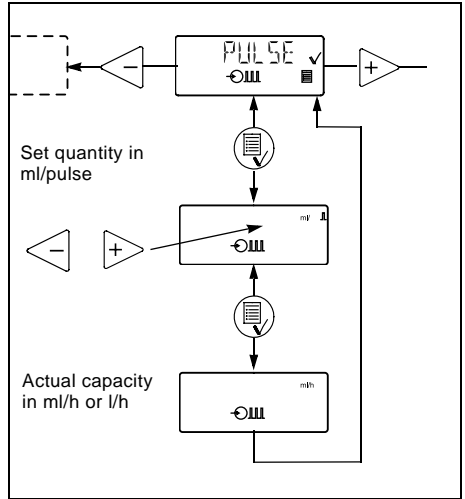
Set the quantity to be dosed per pulse in ml/pulse. The pump adjusts its capacity according to two factors:

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

Setting range:

- DME 2: 0.000018 ml/pulse - 5 ml/pulse
- DME 8: 0.000069 ml/pulse - 15 ml/pulse
- DME 12: 0.000111 ml/pulse - 24 ml/pulse
- DME 19: 0.000204 ml/pulse - 37 ml/pulse
- DME 48: 0.00530 ml/pulse - 96 ml/pulse

Fig. 7



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 the "actual capacity" display will flash.

4.11 Analog

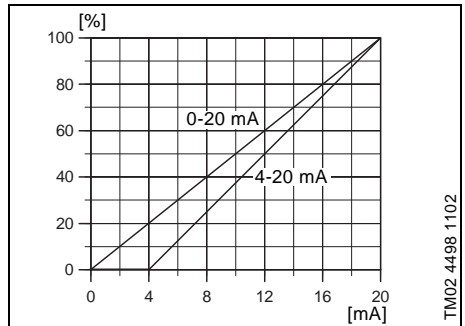
The pump is dosing according to an external analog signal. The dosed quantity is proportional to the input value in mA.

- 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. 8.

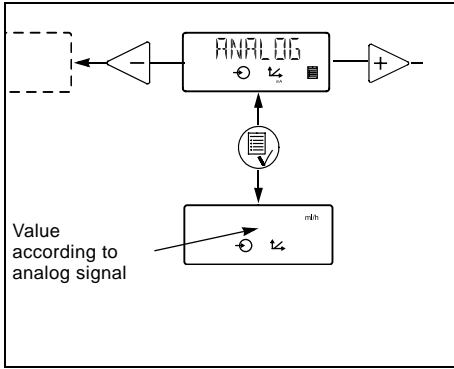
The capacity limitation will influence the capacity. 100% corresponds to the maximum capacity of the pump or the set maximum capacity, see section 4.15.

Fig. 8



TM02 4498 1102

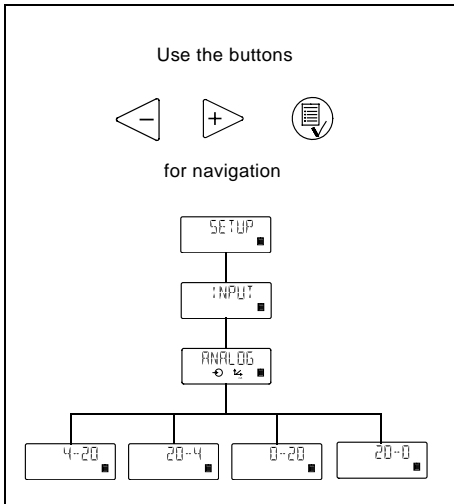
Fig. 9



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. 10:

Fig. 10



4.12 Timer

The pump is dosing the set quantity in batches at the maximum capacity or the set maximum capacity, see section 4.15.

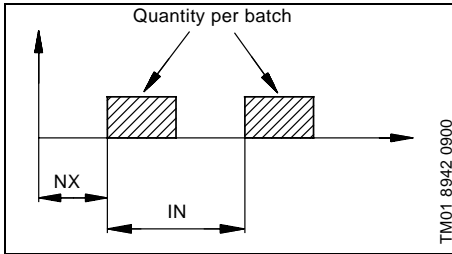
The time until the first dosing "NX" and the following sequences "IN" can be set in minutes, hours and days. The maximum time limit is 9 days, 23 hours and 59 minutes (9:23:59). The lowest acceptable value is 1 minute. The internal timer continues even if the pump is stopped by means of the on/off button, empty tank or stop signal, see fig. 11.

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.

Fig. 11



Setting range:

- DME 2: 0.23 ml/batch - 5 l/batch
- DME 8: 0.69 ml/batch - 15 l/batch
- DME 12: 1.11 ml/batch - 24 l/batch
- DME 19: 2.04 ml/batch - 37 l/batch
- DME 48: 5.3 ml/batch - 96 l/batch

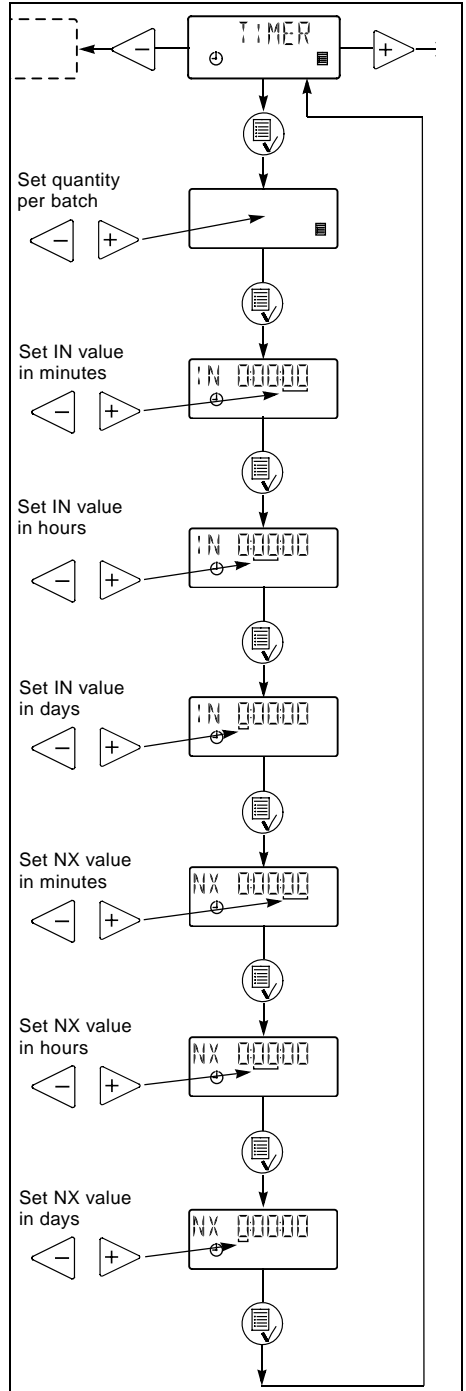
Only values corresponding to complete dosing strokes (according to the calibration factor) can be selected.

Example: If the calibration factor is 23.3 (= 0.233 ml/stroke), the minimum settable value in timer or batch mode will be 0.233 ml -> the next will be 0.466 ml -> the next will be 0.699 ml, 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 setting of timer or batch mode, the pump will automatically recalculate a new amount of dosing strokes per batch and change the display value to the nearest possible value compared to the first one set.

Fig. 12



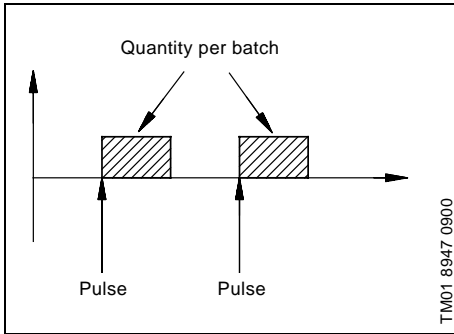
4.13 Batch

The pump is dosing the set quantity in batches at the maximum capacity or the set maximum capacity, see section 4.15.

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.

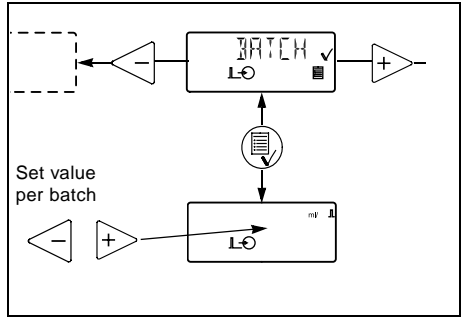
Fig. 13



TM01 8947 0900

The setting range is the same as for Timer, see section 4.12.

Fig. 14



4.14 Anti-cavitation

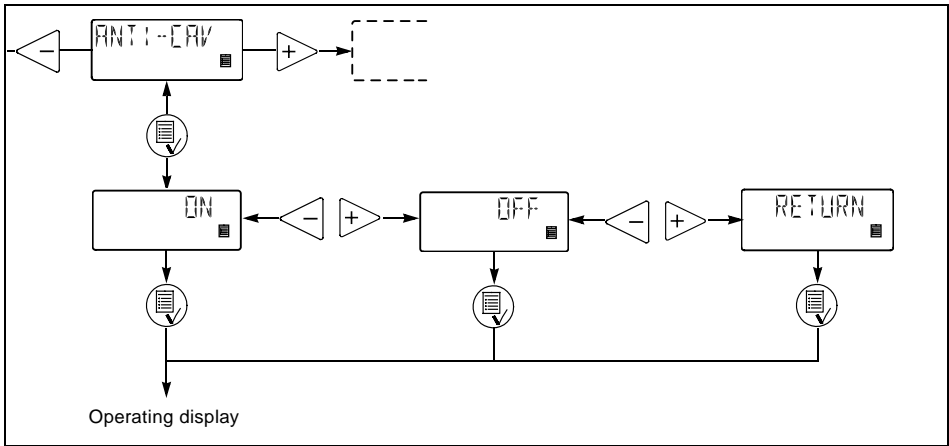
The pump features an anti-cavitation function. When this function is selected, the pump extends and smooths its suction stroke, resulting in softer priming.

The anti-cavitation function is used:

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

The maximum pump capacity is reduced when this function is selected. See section 2.1 *Mechanical data*.

Fig. 15



4.15 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.


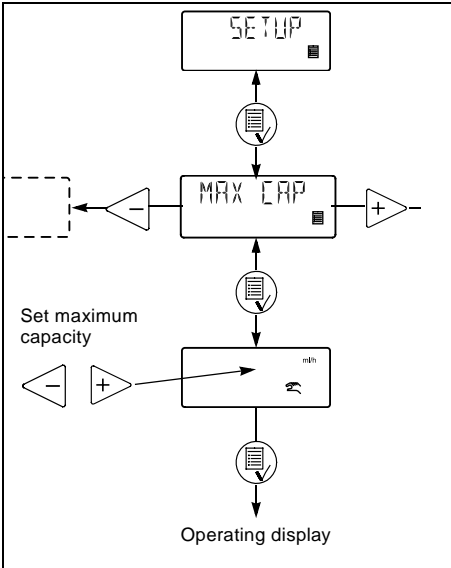
Under normal operating conditions, the pump cannot operate at a capacity which is higher than the one stated in the display. This does not apply to the maximum capacity button , see section 4.3.

Fig. 16

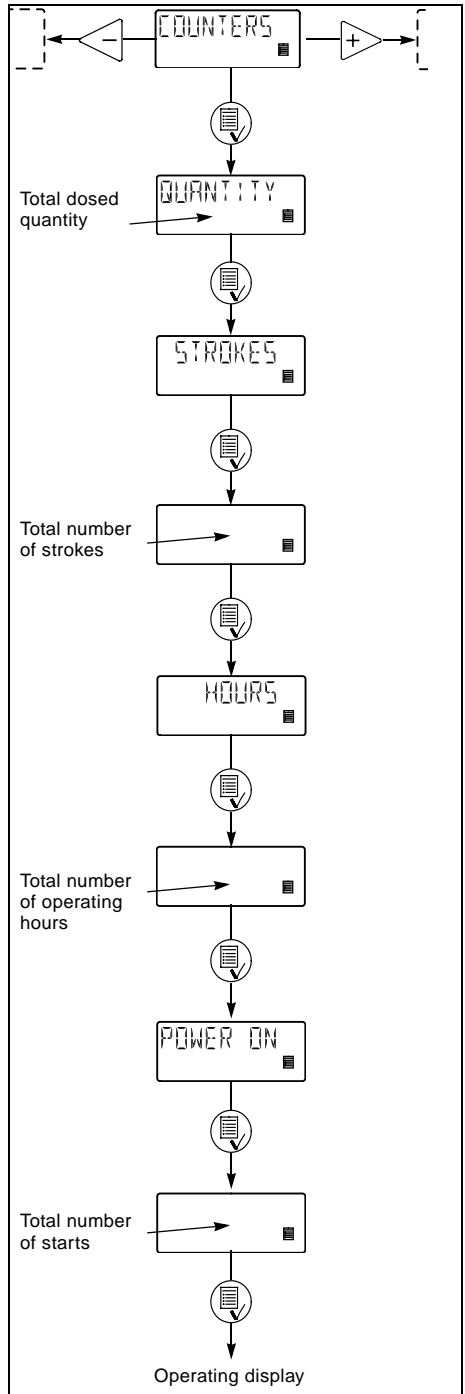


4.16 Counters

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.

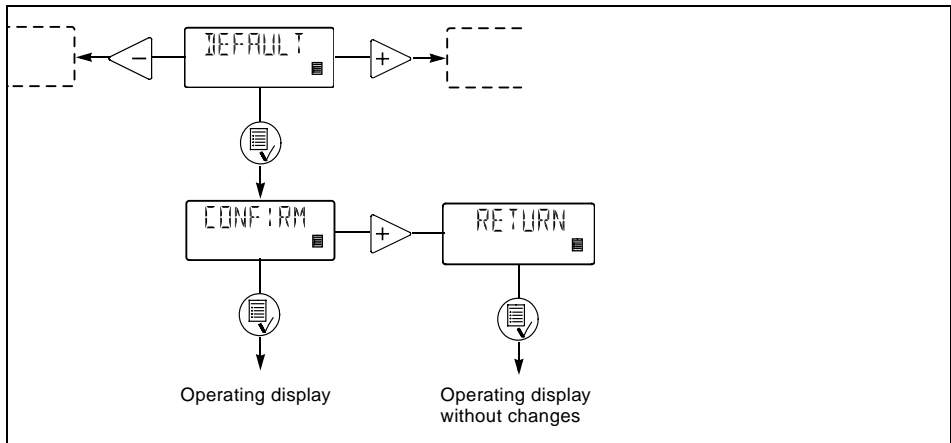
Fig. 17



4.17 Resetting

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

Fig. 18



4.18 Return

Fig. 19



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.

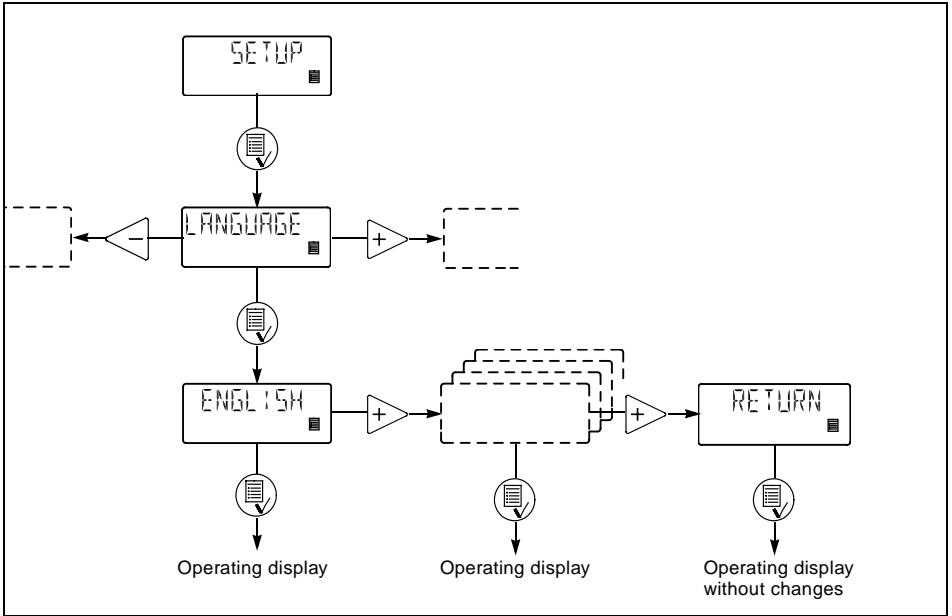
Note: The calibration is also set back to the default setting. This means that a new calibration is required when the "DEFAULT" function has been used.

4.19 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. 20



4.20 Input setup

Fig. 21 shows all possible settings.

The level and stop inputs can be changed from NO (normally open) to NC (normally closed) function. If changed, the inputs must be short-circuited in normal operation.

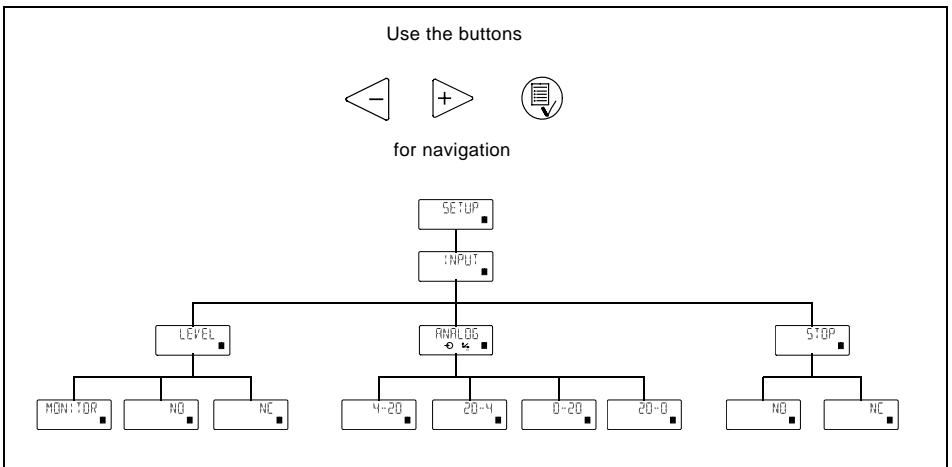
For the analog input, one of the following signal types can be selected:

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

See also section 4.11 Analog.

Change the level input to an input for dosing monitoring as illustrated in fig. 21.

Fig. 21



4.21 Measuring units

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

Metric measuring units:

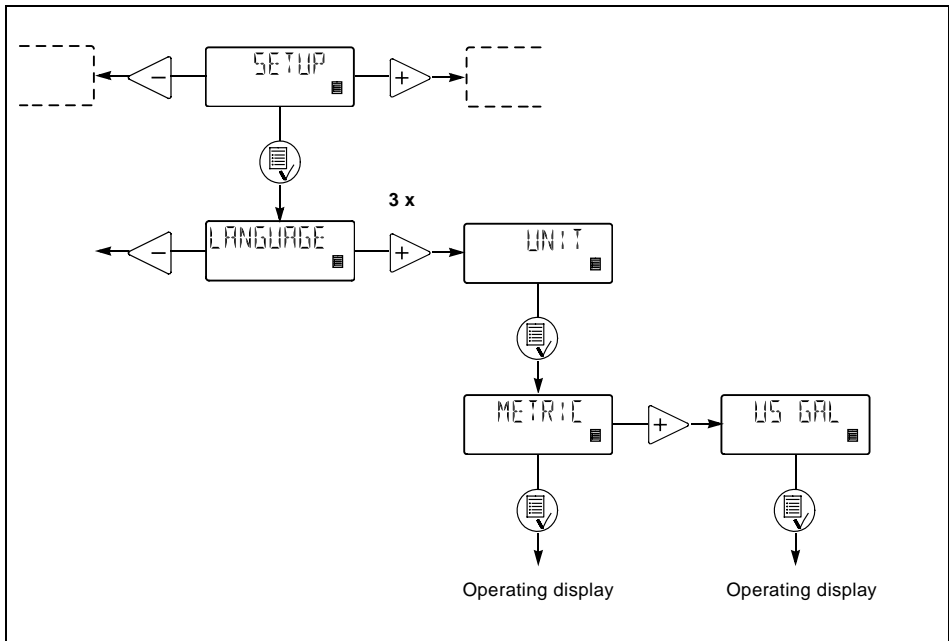
- In **manual and analog modes**, set the quantity to be dosed in litres per hour (l/h) or millilitres per hour (ml/h).
- In **pulse mode**, set the quantity to be dosed in ml/pulse. The actual capacity is indicated in litres per hour (l/h) or millilitres per hour (ml/h).
- For **calibration**, set the 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).

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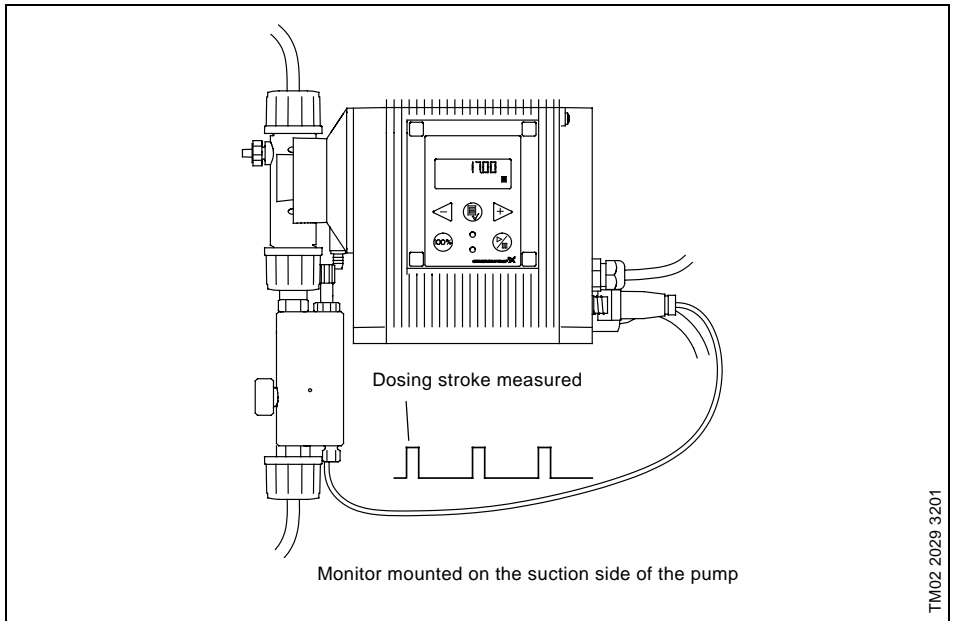
Fig. 22



4.22 Dosing monitoring

A dosing monitor is available as an accessory. Separate instructions are supplied with the monitor.

Fig. 23



The dosing monitor is designed to monitor the dosing of liquids which may cause gas accumulation in the dosing head, thus stopping the dosing process even if the pump is still operating.

For every measured dosing stroke, the dosing monitor gives a pulse signal to the level input so that the pump can compare performed dosing strokes (from internal stroke sensor) with externally measured physical strokes (from the dosing monitor). If an external dosing stroke is not measured together with the internal dosing stroke, this is considered a fault that may have been provoked by empty tank or gas in the dosing head.

4.23 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, "_____" 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 4.12.

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 "_____" . 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 "_____" . 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:


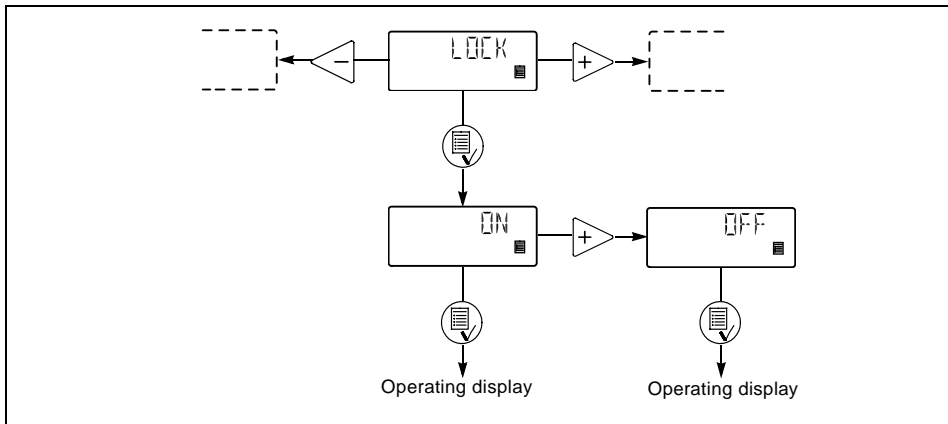






- Priming () button.
- On/off button.
- All external inputs.

Fig. 24







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 "_____" .
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. Unlock 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.

5. Start-up

GB

Step	Action
1	<p>Connect the hoses/pipes:</p> <ul style="list-style-type: none"> • Connect the suction and dosing tubes/pipes to the pump. • Connect a tube to the vent valve, if required, and lead the hose to the tank.
2	<p>Switch on the electricity supply:</p> <ul style="list-style-type: none"> • The display is on. • The green indicator light is flashing (the pump has stopped). • Select language, if required, see section 4.19.
3	<p>Select the operating mode (see section 4.8):</p> <ul style="list-style-type: none"> • Manual. • Pulse. • Analog. • Timer. • Batch.
4	<p>Connect the cables:</p> <ul style="list-style-type: none"> • Connect the control/level cables, if any, to the pump, see section 3.6.
5	<p>Start the pump:</p> <ul style="list-style-type: none"> • Start the pump by pressing the on/off button. • The green indicator light is permanently on.
6	<p>Priming/venting:</p> <ul style="list-style-type: none"> • Press the  button on the pump control panel and let the pump run without a counter pressure. Loosen the vent valve by giving it a 1/8 to 1/4 turn, if required. When the buttons  and  are pressed simultaneously during priming, the pump can be set to run for a specific number of seconds at maximum capacity.
7	<p>Calibration:</p> <ul style="list-style-type: none"> • When the pump has been primed and is running at the right counter pressure, calibrate the pump, see section 6.

If the pump is not operating satisfactorily, see section 9. *Fault finding chart.*

6. 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 three different ways:

- **Direct calibration** (recommended).
The dosed quantity of 100 strokes is measured directly. See section 6.1.
- **Indirect calibration.**
A calibration factor selected from a table is used for the specific installation. This method can be used if it is not possible to carry out a direct calibration. Indirect calibration will never be as accurate as direct calibration. See section 6.2.
- **Check calibration.** See section 6.3.

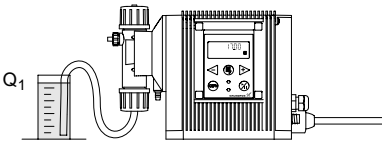
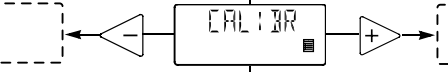

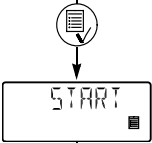
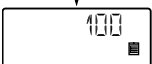


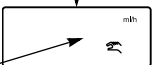

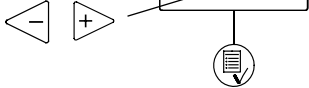
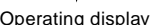
6.1 Direct calibration

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 2: approx. 40 ml DME 19: approx. 500 ml DME 8: approx. 150 ml DME 48: approx. 1000 ml DME 12: approx. 250 ml	
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 4.7.	
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.	

6.2 Indirect calibration

A value from the following table is to be added to the default factory calibration value in the display. To reset the pump to the factory calibration value, activate the "DEFAULT" function, see section 4.17.

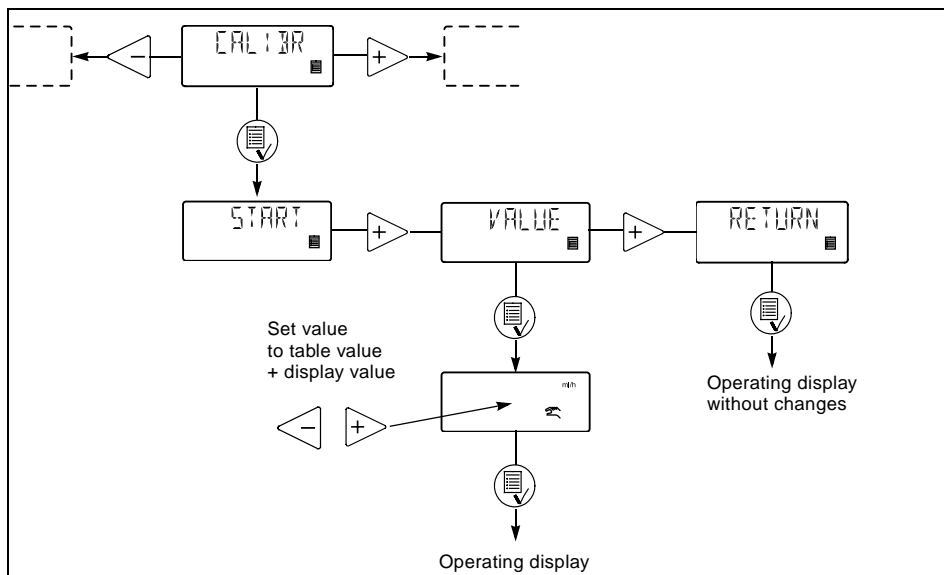
To use the values, the following must be fulfilled:

- The viscosity and density of the liquid to be dosed must not differ considerably from water at 20°C.
- A Grundfos installation kit or corresponding foot valve, injection valve and hose diameter must be used.
- The length of the dosing hose must not exceed 6 metres.
- The suction lift must lie between 0.1 and 1.5 metres.

Pump type	Values to be added to the calibration value at various counter pressures [bar]											
	0-1	1-2	2-3	3-4	4-5	5-6	6-8	8-10	10-12	12-14	14-16	16-18
DME 2	1.4	1.1	0.8	0.5	0.2	-0.2	-0.6	-1.2	-1.8	-2.4	-3.0	-3.6
DME 8	3.5	2.7	2.0	1.2	0.4	-0.4	-1.6	-3.1	-	-	-	-
DME 12	2.1	1.3	0.4	-0.4	-1.3	-2.1	-3.4	-	-	-	-	-
DME 19	18.3	12.2	6.1	0	-6.1	-12.2	-21.4	-	-	-	-	-
DME 48	24.3	8.3	-8.3	-	-	-	-	-	-	-	-	-

Adding the value:

Fig. 25






6.3 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 4.16.
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 4.16.
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 like for indirect calibration, see section 6.2.

7. 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.

8. 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.

9. 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 4.14. Install a pipe/hose with larger cross-section. Fit spring-loaded valves.
	Pump out of calibration.	Calibrate the pump, see section 6.
Pump dosing too little or too much.	Pump out of calibration.	Calibrate the pump, see section 6.
Pump dosing irregularly.	Valves leaking or blocked.	Check and clean the valves.
Leakage from drain hole.	Diaphragm defective.	Install a new diaphragm.
Frequent diaphragm failures.	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, if required. Reduce the dosing stroke by fitting a pulsation dampener.
	Sediment in dosing head.	Clean/flush the dosing head.

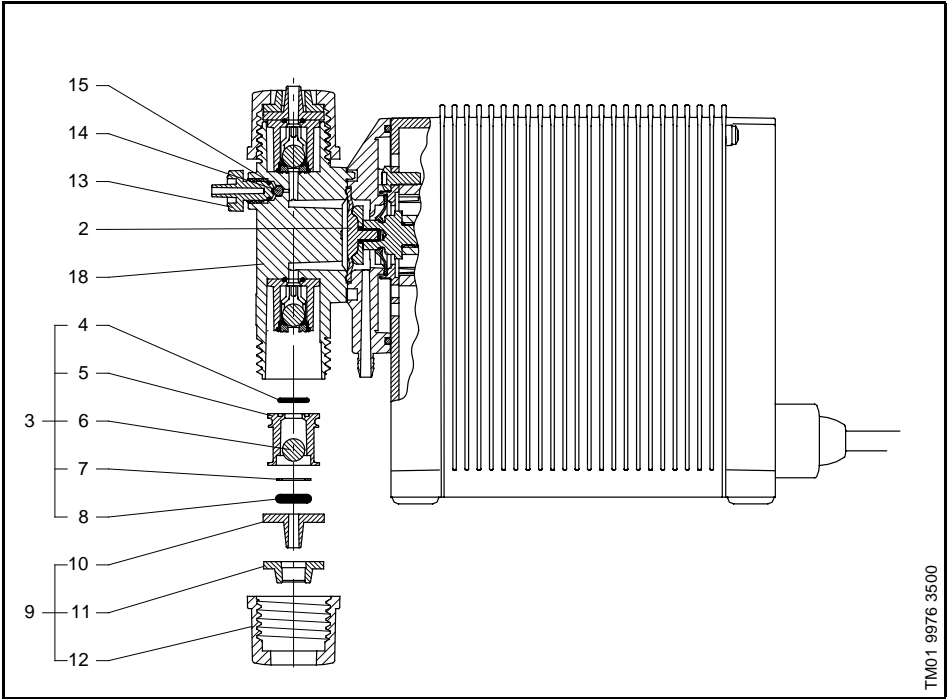
10. Disposal

Disposal of this product or parts of it must be carried out according to the following guidelines:

1. Use the local public or private waste collection service.
2. In case such waste collection service does not exist or cannot handle the materials used in the product, please deliver the product or any hazardous materials from it to your nearest Grundfos company or service workshop.

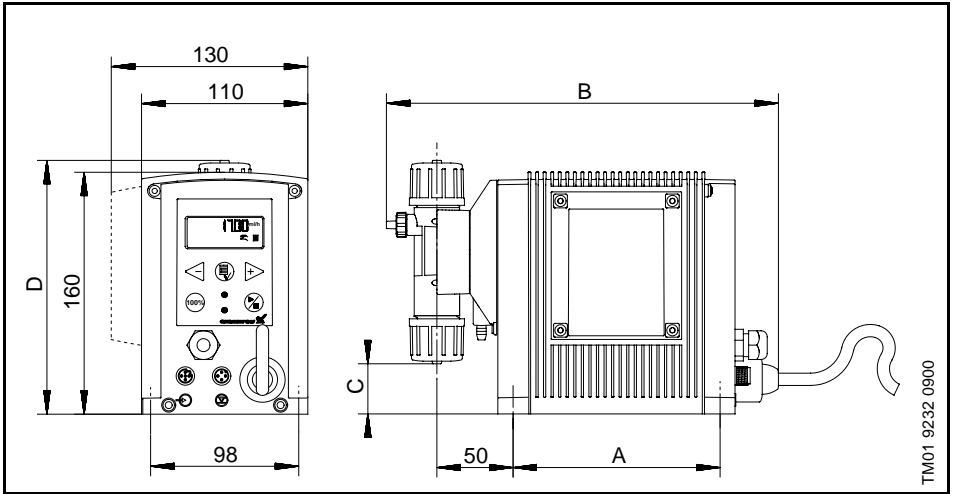
Service kits, DME

Pump size	Valves	Materials dosing head/ gaskets/ valve balls	Product numbers				
			Complete dosing head Pos. 2+3x3+2x9+13+14+15+18	Valves + diaphragm Pos. 2+3 x pos. 3	Diaphragm Pos. 2	Valves 3 x pos. 3	
DME 2	Standard	PP/EPDM/Ceramics	96440665	96441131	96440740	96440705	
		PP/FKM/Ceramics	96446814	96446774	96440740	96446834	
		PVDF/FKM/Ceramics	96440667	96441133	96440740	96440707	
		Stainless steel/FKM/Stainless steel	96440669	96441135	96440740	96440709	
	Spring-loaded	PP/EPDM/Ceramics	96440666	96441132	96440740	96440706	
		PP/FKM/Ceramics	96446815	96446775	96440740	96446835	
		PVDF/FKM/Ceramics	96440668	96441134	96440740	96440708	
		Stainless steel/FKM/Stainless steel	96440670	96441136	96440740	96440710	
DME 8	Standard	PP/EPDM/Ceramics	96440671	96441149	96440743	96440705	
		PP/FKM/Ceramics	96446816	96446780	96440743	96446834	
		PVDF/FKM/Ceramics	96440673	96441151	96440743	96440707	
		Stainless steel/FKM/Stainless steel	96440675	96441153	96440743	96440709	
	Spring-loaded	PP/EPDM/Ceramics	96440672	96441150	96440743	96440706	
		PP/FKM/Ceramics	96446817	96446781	96440743	96446835	
		PVDF/FKM/Ceramics	96440674	96441152	96440743	96440708	
		Stainless steel/FKM/Stainless steel	96440676	96441154	96440743	96440710	
	DME 12	Standard	PP/EPDM/Ceramics	96440659	96441125	96440739	96440705
			PP/FKM/Ceramics	96446812	96446772	96440739	96446834
			PVDF/FKM/Ceramics	96440661	96441127	96440739	96440707
			Stainless steel/FKM/Stainless steel	96440663	96441129	96440739	96440709
Spring-loaded		PP/EPDM/Ceramics	96440660	96441126	96440739	96440706	
		PP/FKM/Ceramics	96446813	96446773	96440739	96446835	
		PVDF/FKM/Ceramics	96440662	96441128	96440739	96440708	
		Stainless steel/FKM/Stainless steel	96440664	96441130	96440739	96440710	
DME 19		Standard	PP/EPDM/Ceramics	96440647	96441137	96440741	96440711
			PP/FKM/Ceramics	96446808	96446776	96440741	96446836
	PVDF/FKM/Ceramics		96440649	96441139	96440741	96440713	
	Stainless steel/FKM/Stainless steel		96440651	96441141	96440741	96440723	
	Spring-loaded	PP/EPDM/Ceramics	96440648	96441138	96440741	96440712	
		PP/FKM/Ceramics	96446809	96446777	96440741	96446837	
		PVDF/FKM/Ceramics	96440650	96441140	96440741	96440722	
		Stainless steel/FKM/Stainless steel	96440652	96441142	96440741	96440724	
	DME 48	Standard	PP/EPDM/Ceramics	96440653	96441143	96440742	96440711
			PP/FKM/Ceramics	96446810	96446778	96440742	96446836
PVDF/FKM/Ceramics			96440655	96441145	96440742	96440713	
Stainless steel/FKM/Stainless steel			96440657	96441147	96440742	96440723	
Spring-loaded		PP/EPDM/Ceramics	96440654	96441144	96440742	96440712	
		PP/FKM/Ceramics	96446811	96446779	96440742	96446837	
		PVDF/FKM/Ceramics	96440656	96441146	96440742	96440722	
		Stainless steel/FKM/Stainless steel	96440658	96441148	96440742	96440724	



TM01 9976 3500

Dimensions



TM01 9232 0900

	DME 2, DME 8, DME 12	DME 19, DME 48
A = [mm]	137	192
B = [mm]	239	294
C = [mm]	36	15
D = [mm]	168	188

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 liquid or water: _____

Chemical, name: _____

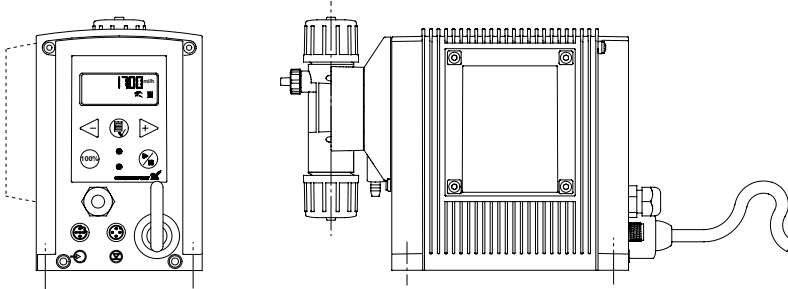
(see pump nameplate)

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.



TM02 8952 1104

Please give a short description of the fault:

Date and signature

Company stamp

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