

Operating instructions  
**Gear pumping  
unit AD-M**

**INDEX**

	<b>Page</b>
1. General .....	2
2. Safety .....	2 – 4
A Pump type .....	5
B Number of outlets .....	5
C Inspection .....	5
D Kinds of drive .....	5
E Reservoir .....	6
F Accessories .....	7
3. Design .....	7 – 8
4. Principle of operation .....	8
5. Specification .....	9
6. Start-up .....	10
7. Installation .....	11 – 13
8. Maintenance .....	13
9. Fault finding .....	14
10. Plates .....	15
11. Manufacturer's declaration .....	16



## 1. General

Prior to start up, we recommend to read these operating instructions carefully as we do not assume any liability for damages and operating troubles which result from the nonobservance of these operating instructions!

Any use beyond the applications described in these operating instructions is considered to be not in accordance with the product's intended purposes. The manufacturer is not to be held responsible for any damages resulting from this: the user alone bears the corresponding risk.

As to figures and indications in these operating instructions we reserve the right to make technical changes which might become necessary for improvements.

The copyright on these operating instructions is kept reserved to the company DELIMON. These operating instructions are intended for the erecting, the operating and supervising personnel. They contain regulations and drawings a technical nature which must not – completely or partially - be distributed nor used nor communicated to others without authorization for competition purposes.

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## 2. Safety

These operating instructions contain fundamental instructions which are to be observed during erection, operation and maintenance. Therefore it is absolutely necessary for the fitter and the competent qualified staff/user to read these operating instructions before installation and start-up. The operating instructions must be available at all times at the place of use of the machine/system.

Not only the general safety instructions stated under this main point "safety" are to be observed, but also the other specific safety instructions stated under the other main points.

### 2.1 Identification of safety warnings in the operating instructions

The safety warnings contained in these operating instructions which, if not observed, may cause dangers to people, are specially marked with general danger symbols



safety sign according to DIN 4844-W9, warning about a danger spot ,  
in case of warning about electric voltage with



safety sign according to DIN 4844-W8, warning about dangerous electric voltage.  
In case of safety instructions which, if not observed, may cause damage to the machine and its function, the word

#### ATTENTION

is inserted.

Instructions that are directly attached to the machine, as for example

- rotational direction arrow
  - identifications for fluid connections
- must be observed at all events and maintained in a fully legible condition.

- Note: There is an increased skid risk in case of spilled/leaked out lubricants. They are to be removed at once properly.



Safety sign according to DIN 4844-2, W28, warning about skid risk.

## 2. Safety (continuation)

### 2.2 Personnel qualification and training

The operating, maintaining, inspecting and erecting personnel must have the appropriate qualification for such work. Area of responsibility, competence and supervision of the personnel have to be regulated by the user. If the personnel do not have the necessary knowledge, they have to be trained and given instructions. This can be effected, if necessary, by the manufacturer/supplier on behalf of the user of the machine. Furthermore, the user has to make sure that the contents of the operating instructions are fully understood by the personnel.

### 2.3 Dangers in case of nonobservance of the safety instructions

The nonobservance of the safety instructions may result in hazards to persons, to the environment and to the machine. The nonobservance of the safety instructions may lead to the loss of any claims for damages. In detail, the nonobservance may for instance lead to the following hazards:

- Failure of important functions of the machine/system
- Failure of prescribed methods for maintenance and repair
- Hazard to persons by electrical, mechanical and chemical influences
- Hazard to the environment by the leakage of dangerous substances

### 2.4 Safety conscious working

The safety instructions stated in these operating instructions, the existing national regulations as to the accident prevention as well as possible internal working, operating and safety rules of the user are to be observed.

### 2.5 Safety instructions for the user/operator

- If hot or cold machine parts lead to dangers, these parts have to be protected against touch.
- Protection against touch for moving parts (e. g. coupling) must not be removed when the machine is in operation.
- Leakages (e. g. from the shaft seal) of hazardous goods to be delivered (e. g. explosive, toxic, hot) are to be removed in such a way that there is no danger to persons and environment. Legal rules are to be observed.
- Hazards caused by electrical power are to be excluded (for details please refer for instance to the rules of the VDE and the local power supply companies).

### 2.6 Safety instructions for maintenance, inspection and installation work

The user has to take care that all the maintenance, inspection and installation work is executed by authorized and qualified skilled personnel who have informed themselves adequately by thoroughly studying the operating instructions.

Basically, work on the machine is only to be carried out during shut-down. It is obligatory to observe the shut-down procedure described in the operating instructions.

Pumps or pump aggregates that deliver media being hazardous to health have to be decontaminated. Immediately after completion of the work, all safety and protective equipments have to be reinstalled and/or reactivated.

- Advice: When working with compressed air, do wear glasses.



(DIN 4844-G1 – Use breathing mask)

- Advice: Observe EC-Safety Data Sheet for consumable materials and additives used and use personal protective equipment.



(DIN 4844-G4 – Use breathing mask)

Before recommissioning, observe the points stated in section “initial start-up”.

### 2.7 Unauthorized conversion and manufacture of spare parts

Conversion or modifications to the machine are only permitted when agreed with the manufacturer. Original spare parts and accessories authorized by the manufacturer serve to ensure safety. The use of other parts may render the liability for consequential losses null and void.

## 2. Safety (continuation)

### 2.8 Unacceptable modes of operation

The operational reliability of the machine supplied is only guaranteed if the machine is used in accordance with its intended purposes as per section 1 - General - of the operating instructions. The limiting values specified in the data sheet must on no account be exceeded.

### 2.9 Guidelines & standards

#### Guidelines

1. Machines 98/37/EG
2. Low voltage 73/23/EWG
3. EMV 89/336/EWG

#### Standards

EN Reference	ISO Reference	acc. to guideline
• DIN EN 982, 9.96	(ISO 4413, 8.98)	(1.)
• DIN EN 983, 9.96	(ISO 4414, 8.98)	(1.)
• DIN EN 1050, 1.97	(ISO 14121, 2.99)	(1.)
• DIN EN ISO 1200-1 and -2, 4.04		(1.)
• DIN EN 60204-1, 11.98	(IEC 60204-1, 5.00)	(2.)
• DIN EN 60947-5-1, 2.05	(IEC 60947-5-1, 11.03)	(2.)
• DIN EN 61000-6-2, 8.02	(IEC 61000-6-2, 1.05)	(3.)
• DIN EN 61000-6-3, 8.02	(IEC 61000-6-3, 1.05)	(3.)
• DIN EN 61000-6-4, 8.02	(IEC 61000-6-4, 1.05)	(3.)

### 3.0 Notes on environmental protection and waste disposal

In correct operation with lubricants, the components are subject to the special requirements set by environmental legislation.

The general requirements for lubricants are specified in the respective safety data sheets.

Used lubricants are hazardous forms of waste and therefore require special supervision in the sense of § 41 paragraph 1 sentence 1 and paragraph 3 no. 1 of KrW-/AbfG (Closed-Loop Waste Management Act).

Used oils must be handled in compliance with AltölV (Waste Oil Ordinance).

The devices or components contaminated with lubricant must be disposed of by a certified waste management company.

Records of proper waste management must be filed in conformance to NachwV (Ordinance on Waste Recovery and Disposal Records).

## GENERAL PRODUCT CHARACTERISTICS

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- Gear pump technique
- Lubricant: oil, liquid grease
- Discharge pressure max. 30 bars
- Surface signal grey RAL 7004

### A. PUMP TYPE ADM

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### B. NUMBER OF OUTLETS / DELIVERY RATE

---

1 outlet

Delivery rate 0.06 l/min, 0.12 l/min, 1.0 l/min, 1.2 l/min and 2.0 l/min

### C. INSPECTION

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Stage A

### D. KINDS OF DRIVE

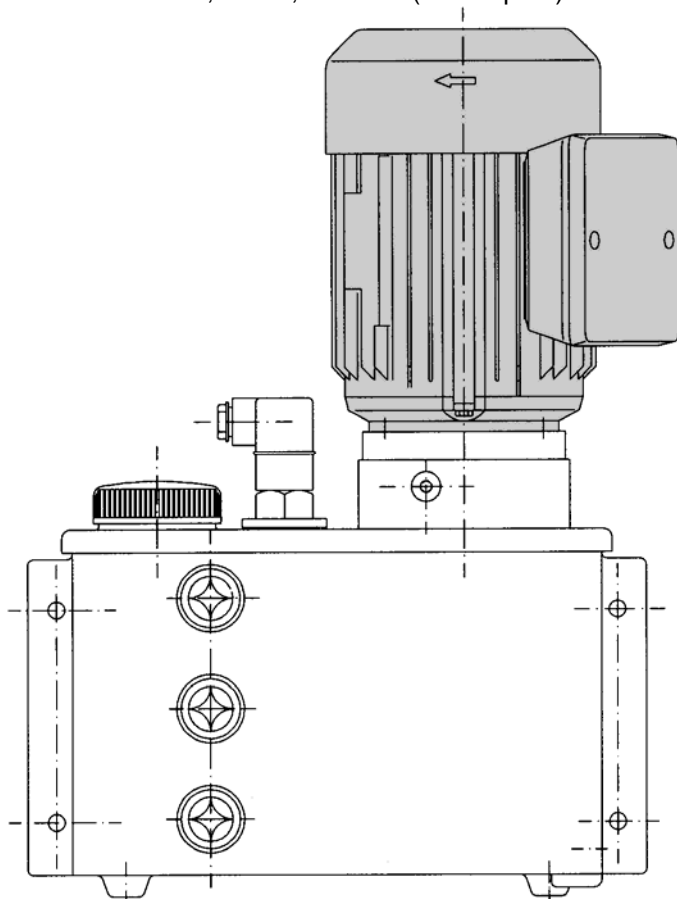
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Three-phase A.C. motor 400/460V, 50/60 Hz, 0.18 kW (3000 / 3600 r.p.m.)

Three-phase A.C. motor 400/460V, 50/60 Hz, 0.18 kW (1500 / 1800 r.p.m.)

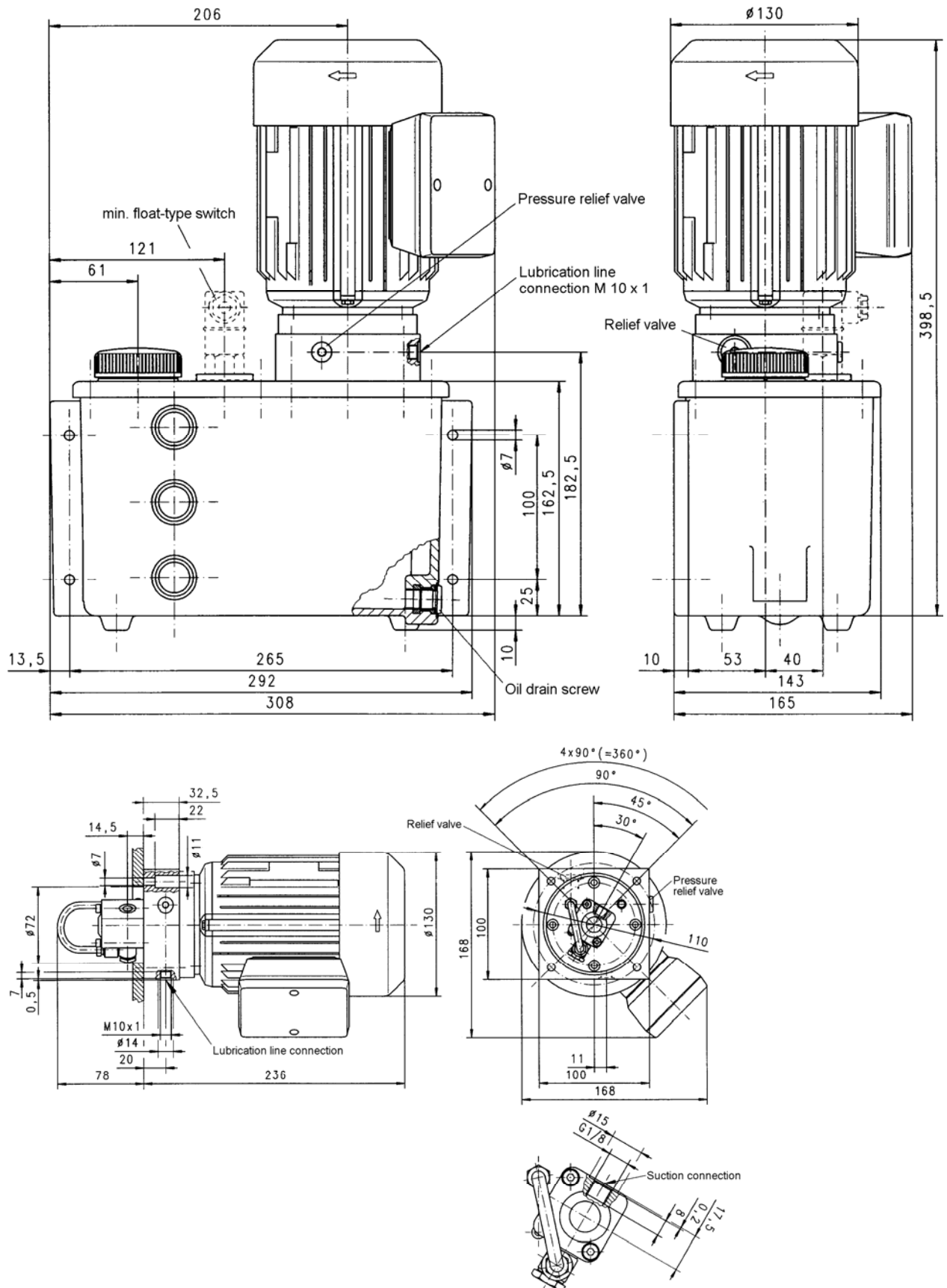
Three-phase A.C. motor 500V, 50 Hz, 0.18 kW (1500 r.p.m.)

A.C. motor 230V, 50 Hz, 0.18 kW (3000 r.p.m.)



## E. RESERVOIR

without  
4 litres, plastic  
12 litres, aluminium



## F. ACCESSORIES

without

Float-type switch for 4 litres, 2 switching points 24 V DC

Float-type switch for 4 litres, 2 switching points 250 V AC

Float-type switch for 12 litres switching point 160 mm

Float-type switch for 12 litres switching point 175 mm

Suction filter

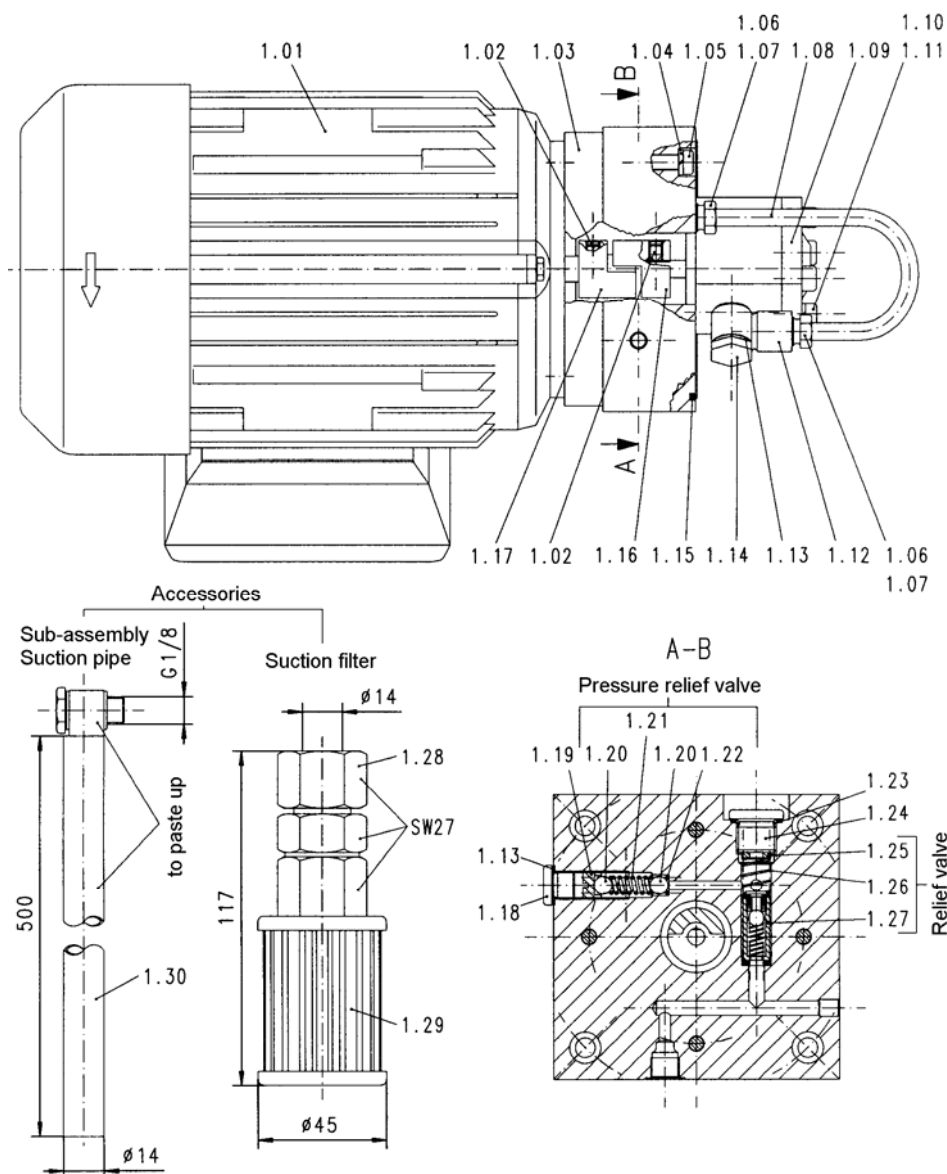
(separate data sheets will be included to the consignment).

## 3. Design

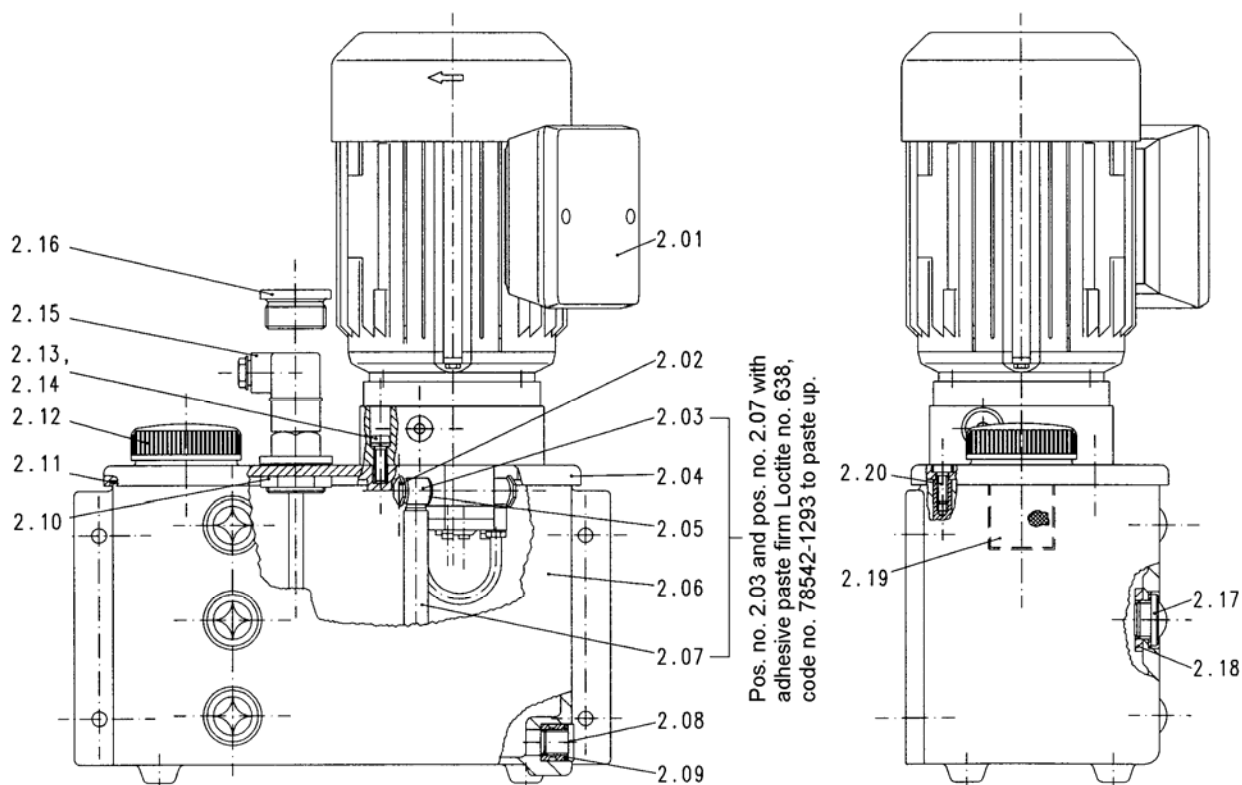
The gear pump consists of an A.C. motor or a three-phase A.C. motor. (item no. 1.01), a flange (item no. 1.03) with integrated relief valve (item nos. 1.25 to 1.27) and pressure relief valve (item no. 1.20 to 1.22) as well as of a gear pump (item no. 1.09). A suction filter (item no. 1.29) with screw joint (item no. 1.28) as well as a suction pipe (item no. 1.30) can be delivered as accessories.

The gear pumping unit consists of the above mentioned gear pump (item no. 2.01) with suction pipe (item no. 2.07) and a tank (item no. 2.06). The tank (item no. 2.06) is provided with 3 sight-feed glasses (item no. 2.17) for the visual control of the level in the tank (Pos. 2.06).

Alternatively, we can also deliver the gear pumping unit with a float-type switch (item no. 2.15) for the electrical control of the min. filling level.



### 3. Design (continuation)



### 4. Principle of operation

After the electric current supply has been switched on, the gear pump starts immediately delivering lubricant. The integrated pressure relief valve (item no. 1.20 to 1.22) opens at a pressure of more than 3 MPa (30 bar) and thus prevents the gear pump from being overloaded.

After the electric current supply has been switched off, a residual pressure of 0.08 MPa (0.8 bar) is maintained – via the relief valve (item no. 1.25 to 1.27) - in the lubricant line.

The running and pause time of the gear pump/the gear pumping unit depends on the number of metering elements (number of lubrication points), the line length, the viscosity of the lubricant etc. The pressure increase and decrease can be monitored by a pressure switch (does not belong to the extent of supply), which is installed at the end of the lubricant line.



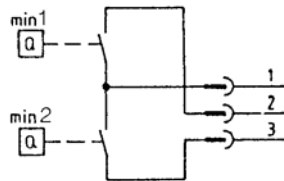
## 5. Specification

Output volume : ..... 0.06; 0.12; 1.0; 1.2; 2.0 Liter/min  
 Feed pressure : ..... 3 MPa ( 30 bar)  
 Discharge pressure : ..... 0.08 MPa (0.8 bar)  
 Reservoir volume : ..... 4 and 12 liters  
 Suction height : ..... 500 mm  
 Usable lubricants based on mineral oils :  
     oil ..... 21 to 1800 mm<sup>2</sup>/s<sup>-1</sup>, service viscosity  
     liquid grease ..... please consult us  
 Ambient temperature : ..... - 20° C to + 60° C  
 Pressure connection : ..... M 10 x 1 - Ø 6 for pipe male fitting acc. to DIN 3871 and olive acc. to DIN 3862  
 Suction connection : ..... G 1/8  
 Motor data :  
     Three-phase A.C. motor ..... 3/AC 230V/400V 50/60Hz 0.91A/0.52A 0.18kW  
     Three-phase A.C. motor ..... 3/AC 400V/460V 50/60Hz 0.52A/0.51A 0.18kW  
     Three-phase A.C. motor ..... 3/AC 500V 50Hz 0.46A 0.18kW  
     A.C. motor ..... 3/AC 230V 50Hz 1.5 A 0.18kW

### Float-type switch 4 liters

Type of contact : ..... 2 NO contact (reed contact)  
 Switching voltage : ..... 48V, DC AC / 250V, DC AC  
 Constant current : ..... max. 0.5 A  
 Switching capacity : ..... 10VA / 30VA  
 Utensil socket : ..... 4 x 90° rotatable (pin-and-socket connector A DIN 43650)

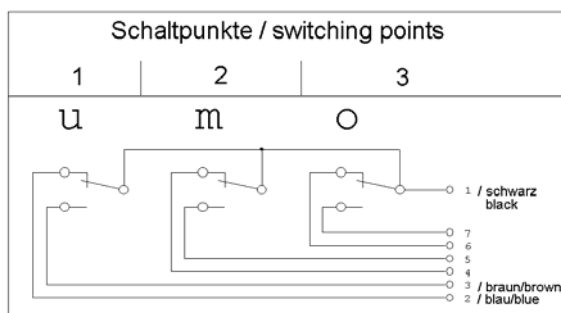
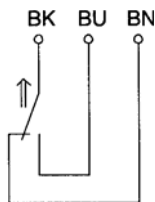
### Switching symbol :



### Float-type switch 12 liters

Type of contact : ..... 1 NO (reed contact)  
 Switching voltage : ..... 250V, DC AC  
 Constant current : ..... 1.0A  
 Switching capacity : ..... 60VA  
 Switching function : ..... change-over switch  
 Mode of connection : ..... clamping border in the connection head

### Switching symbol :



## 6. Start-up

The gear pump can be installed in horizontal or vertical position into an existing tank with a drill hole of Ø 72 mm.

4 screws M6 are required to fix the gear pump to the tank (for the measurements for the fixing holes please refer to the dimensioned drawing of gear pump AD-M on page 6).

### ATTENTION

During installation, take care of a perfect fit of the O-ring (item no. 1.15).

Mount the gear pumping unit in horizontal position only to an even surface using 4 screws M6 (for the measurements for the fixing holes please refer to the dimensioned drawing of gear pumping unit AD-M on page 6).

Gear pump and gear pumping unit should be installed at a place of easy access. This has the following advantages:

- Optimal line lengths, that means the shortest possible distances to the lubrication points and/or lubricant distributors.
- Gear pumping unit is easy to fill.
- Good visibility of the oil level in the tank (item no. 2.06) of the gear pumping unit.



The electrical connections of the gear pump and the gear pumping unit have to be made by qualified staff only. The electric rules have to be observed.

### ATTENTION

- Install lubricant line with an inclination from the gear pump and/or the gear pumping unit and avoid syphons – so-called sags –, e. g. when bypassing obstacles. In such syphons, air inclusions will accumulate which cannot be eliminated when the lubricant line is vented.
- Take care that the lines are clean and free from chips or other impurities.
- For the filling of the gear pumping unit, the filling strainer (item no. 2.19) must not be removed. Use clean oil only and avoid all kinds of impurities. Dirt particles are the most frequent cause of failures and damages.
- Let gear pump and gear pumping unit run until oil escapes without air bubbles from the lubricant line connection. Only after this, connect lubricant line.
- Gear pump and gear pumping unit must not be operated with a delivery pressure > 3 MPa (30 bar).

## 7. INSTALLATION

The user has to take care that all kinds of maintenance inspectional and assembly works are carried out by authorized and qualified specialists who have informed themselves sufficiently by studying the operating instructions thoroughly.



For all kind or works to be carried out at the machine or system, the machine or system must imperatively be out of operation. The procedure for stopping the machine or system described in the operating instructions must by all means be observed.

During the disassembly and assembly of the gear pump/the gear pumping unit, take care of cleanliness because dirt particles might cause failures and damages.

### Installation of the gear pump



- Shut down machine or system according to the relevant instructions.



- Disconnect motor (item no. 1.01) from the current supply by qualified staff.
- Carefully loosen lubricant line from lubricant line connection at the flange (Pos. 1.03).

#### ATTENTION

Lubricant escapes as there is a residual pressure of 0.08 MPa (0.8 bar) in the lubricant line.

- Remove the four fixing screws (were provided by the customer), which connect the flange (Pos. 1.03) with the tank (will be provided by the customer).
- Pull gear pump out of the tank.
- Remove O-ring (Pos. 1.15) from the groove at the flange (item no. 1.03).
- Remove possibly existing suction pipe (item no. 1.30) from the suction connection of the gear pump (Pos. 1.09).
- Remove possibly existing suction filter (item no. 1.29) by loosening the screw joint (item no. 1.28) from the suction pipe (item no. 1.30).
- Remove pipe (item no. 1.08) by loosening male fitting (Pos.1.06) from gear pump (item no. 1.09).
- Remove ring connection piece (item no. 1.12) by loosening hollow screw (item no. 1.14) from gear pump (item no. 1.09).
- Remove the four cheese-head screws (Pos. 1.05) and the motor (Pos. 1.01) from the flange (item no. 1.03).
- Loosen headless pin (item no. 1.02) to remove coupling (item no. 1.17) from the shaft of the motor (item no. 1.01).
- Loosen the two cheese-head screws (item no. 1.11) to remove gear pump (item no. 1.09) from flange (item no. 1.03).

#### ATTENTION

The cheese-head screws (item no. 1.11) have a hexagon socket of wrench size accross flats 3 and can thus be distinguished from the cheese-head screws of the gear pump (item no. 1.09) having a hexagon socket of wrench size accross flats 4.

- Loosen headless pin to remove coupling (item no. 1.16) from the shaft of the gear pump (Pos. 1.09).
- For the disassembly of the relief valve (item no. 1.25 to 1.27) loosen screw plug (item no. 1.24) in the flange (item no. 1.03) and remove it.
- After this, pull the disk (item no. 1.25), the spring (item no. 1.26) and the valve (item no. 1.27) out of the bore hole.
- For the disassembly of the pressure relief valve (item no. 1.20 to 1.22), loosen screw plug (item no. 1.18) in the flange (item no. 1.03) and remove it.

After this, unscrew the screw (Pos. 1.19) from the flange (item no 1.03) and pull the balls (item no. 1.20), the compression spring (item no. 1.21) and the USIT-ring (item no. 1.22) out of the bore hole.

## 7. Installation (continuation)

### Installation of the gear pump (continuation)

- Clean parts in Naphtha or petroleum ether. *Not the motor* (item no. 1.01).
- Check parts of damages.
- Replace all parts and seals by new ones.
- Reassemble gear pump in reverse order.

#### ATTENTION

When installing the valve (Pos. 1.27) into den flange (item no. 1.03), take care of the correct position of the valve (item no. 1.27). (For this, please see spare parts drawing of gear pump AD-M on page 8).

When mounting the gear pump (item no. 1.09) to the flange (item no. 1.03), please take care of the correct position of the pressure connection (marked with "P") and suction connection (marked with "S"). (For this, please see dimensioned drawing of gear pump AD-M on page 4).

- Mount gear pump back into the tank and/or the system.



- Connect motor to the current supply by qualified staff.



- Take care of the correct rotational direction of the motor; rotational direction = clockwise with look on the fan blade.

#### ATTENTION

- Deaerate gear pump.

After deaeratin of the gear pump, the pressure relief valve (item no. 1.20 to 1.22) has to be set to a pressure of 3 MPa (30 bar) by turning the screw (item no. 1.19) clockwise and/or anticlockwise.

After this, commission lubrication system again.



- Dispose of oil remnants and cleanser according to rule.

### Installation of of Gear Pumping Unit AD-M



- Shut down machine or system according to the relevant instructions.



- Disconnect motor (item no. 1.01) and, if available, float-type switch (item no. 2.15) from the current supply by qualified staff.
- Carefully loosen lubricant line from the lubricant line connection at the flange (item no. 1.03).

#### ATTENTION

Lubricant escapes as there is a residual pressure of 0.08 MPa (0.8 bar) in the lubricant line.

- Remove the four cheese-head screws (were provided by the customer), with which the aggregate is fixed to a surface, and take the aggregate from the surface.
- Remove screw plug (item no. 2.08) and drain oil tank (Pos. 2.06).
- Remove screw-type cap (item no. 2.12) and pull filling strainer (item no. 2.19) out of the connection piece on the cover (item no. 2.04).

## 7. Installation (continuation)

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### Installation of of Gear Pumping Unit AD-M (continuation)

- Remove the six cheese-head screws (item no. 2.20) and take cover (item no. 2.04) from the tank (item no. 2.06).
- Remove sealing (item no. 2.11) from the underside of the cover (item no. 2.04).
- If required, the oil sight-feed glasses (Pos. 2.17) can be dismantled for cleaning or exchange purposes by removing the pipe nut (item no. 2.18) from the tank (item no. 2.06).
- Remove counternut lock nut (Pos. 2.10) and float-type switch (item no. 2.15) or screw plug (item no. 2.16) – depending on the version – from the cover (item no. 2.04).
- Loosen the four cheese-head screws (item no. 2.13) and remove gear pump (item no. 2.01) from the cover (item no. 2.04).
- Disassemble gear pump (item no. 2.01) as described under point 11.1 in this chapter.
- Clean parts in naphtha or petroleum ether.
- Check parts for damages.
- Replace all parts and seals with new ones.
- Reassemble gear pumping unit in reverse order.
- Remount gear pumping unit to the machine and/or into the system.



- Connect motor and float-type switch to the current supply by qualified staff.



- Take care of the correct rotational direction of the motor; rotational direction = clockwise with look on the fan blade.

<b>ATTENTION</b>
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- Deaerate gear pump and, after this, recommission the lubrication system.



- Dispose of oil remnants and cleanser according to rule.

## 8. Maintenance

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The gear pump/the gear pumping unit require little maintenance only, and there are no further measures necessary to keep them ready for operation.

The following points should be observed:

- When the gear pumping unit is filled, the filling strainer (item no. 2.19) must *not* be removed.
- After several fillings of the tank (item no. 2.06), the filling strainer (Pos. 2.19) should be cleaned.
- When filling the gear pump/the gear pumping unit, use clean lubricant only. Avoid all kinds of impurities as dirt particles are the most frequent cause of failures and damages.
- Different kinds of lubricant must not be mixed.
- For the cleaning of the gear pump/the gear pumping unit, do not use any aggressive agents, but Naphtha or petroleum ether only.

## 9. Fault finding

Failure	Possible cause	Elimination
During the deaeration of the gear pump, there are air bubbles in the lubricant over a longer period of time, or a heavy noise development indicates that the gear pump sucks in air.	Suction pipe (item no. 1.30 or item no. 2.03 and item no. 2.07) leaky.	Remove suction pipe according to "INSTALLATION OF THE GEAR PUMP" and clean it. Loosen pipe from ring connection piece by heating. Carefully clean both parts from adhesive remnants and impurities and glue them together according to the instructions of the adhesive producer with adhesive of the company LOCITE no. 638. Alternatively, one can order and install a new suction pipe.
	Gear pump (item no. 1.09) leaky (e.g. shaft seal damaged) and/or defective.	Remove gear pump (item no. 1.09) according to "INSTALLATION OF THE GEAR PUMP" and exchange it. (It is recommended to carry stand-by pumps in stock. By the installation of spare parts, one cannot achieve the original performance).
All lubrication points are not supplied with lubricant.	Gear pump does not deliver lubricant:	
	Filling level has fallen below the min. value (tank is empty).	Refill lubricant and proceed to deaeration as described under "START-UP".
	Filling level has fallen below the min. value (tank is empty). Float-type switch signalizes "full".	Remove float-type switch and check its functioning. Exchange it, if necessary. After this, proceed to deaeration as described under "START-UP".
	Voltage supply to the motor is interrupted.	Check voltage supply.
	Wrong voltage.	Check voltage.
	Electric connection of the motor polarized in the wrong way.	Check rotational direction of motor (rotational direction = clockwise with the look on the fan blade).
	Pressure relief valve adjusted wrongly and/or leaky.	Dismantle pressure relief valve according to "INSTALLATION OF THE GEAR PUMP" and clean parts. Check USIT-ring (item no. 1.22) for damages, exchange it, if necessary. Reinstall pressure relief valve. Connect a pressure gauge to the lubricant line connection and set pressure relief valve to a pressure of 3 Mpa (30 bar) by turning the screw (item no. 1.19) clockwise and/or anticlockwise while the motor is running.
One of several lubrication points is not supplied with lubricant.	Relief valve is defective and/or leaky.	Remove relief valve according to "INSTALLATION OF THE GEAR PUMP" and clean parts. Check valve (item no. 1.27) for damages, exchange it, if necessary. Re-install relief valve taking care of the correct position of the valve (item no. 1.27).
	Lubricant line from the gear pump to the metering elements is squeezed, clogged or interrupted.	Check lubricant line for damages and exchange it, if necessary.
	Metering element is defective or clogged.	Dismount metering element and check it according to the pertaining operating instructions. Exchange it, if necessary.
	Lubricant line from the metering element to the lubrication point is squeezed, clogged or interrupted.	Check lubricant line for damages. Exchange it, if necessary.

Premature wear of the moving parts and the seals mainly results from polluted lubricant.

Failures in the system can particularly occur, when the lubricant lines have not been vented perfectly.

## 10. Plates

Name plate 110 x 60 mm (75511-1531)



**DELIMON®**

**Zentralschmierung** *Für reibungslose Bewegung*  
**Centralized Lubrication** *For smooth motion*

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BIJUR FARVAL LUBESITE DELIMON-DELICO LUBRICATION

Type plate 110 x 60 mm (75511-1321)



**DELIMON®**

Artikel-Nr. Code no.		
Fabrik-Nr. Serial no.	Betriebsdruck max. Operating pressure	
Baujahr Year of manufacture	Fördervolumen Feed volume	
Übersetzung Ratio		

www.delimon.de 75511-1321 Tel: +49 211 7774 0

## Manufacturer's declaration

This manufacturer's declaration as to the fulfilment of the requirements according to the

- **EC machine guideline 98/37/EG**

is only valid in connection with the installation/operating instructions and the relating data sheet, both being valid for the product.

We,



Company	Address	Telephone
DELIMON GmbH	Arminstraße 15 40227 Düsseldorf	+49 211 77 74 0

hereby declare on our sole responsibility that all products supplied by us and being relevant to guidelines and which this declaration refers to, conform to the mentioned standards and that they, if necessary, were released by a competent authority.

### Applied, harmonized standards:

See valid installation/operating instructions with relating data sheet

We declare that this consignment comprises an incomplete machine and that the commissioning of the same remains prohibited until it has been determined that the machine into which the machine in question shall be installed, complies with the above mentioned regulations.

January 12, 2005		
Datum	ppa. Doris Dietzel Plant Manager	i.V. Andreas Wons Direktor Entwicklung & Konstruktion