LUBRICATION PUMP VEG

Operating instructions

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CONTENTS

1 PURPOSE OF PRODUCT

This document serves as a user guide for proper manipulation, storage, installation, commissioning, operation and maintenance of the product:

Lubrication pump VEG

It is a product in standard design. Individual products are identified and provided with a nameplate, bearing the code number, year of manufacture and serial number.

2 APPLICATION

Lubrication pump VEG is used as a source of pressure lubricant for multi-line central lubrication systems. Due to a highly a variable number of outlets and in combination with progressive distributors, the lubrication pumps are also recommended for application in large circuits, i.e. for circuits with several tens of lubricated points. Lubrication pumps VEG are usually used for permanent and regular lubrication of various machines, mechanical technologies and equipment.
Lubrication pumps VEG are available in optional designs, i.e. without lubricant reservoir or with lubricant reservoir of 6, 8, 12, 15, 30, 63 and 100 litres; the reservoir is made of sheet steel. The number of outlets can be selected from 1 to 20. Nominal output is 3 cm^3/min./outlet with a possibility of continuous regulation up to 1.2 do 3 cm^3/min./outlet or with the number of outlets from 1 to 12, nominal dose of lubricant is 14.5 cm^3/min./outlet with a possibility of regulation from 0 to 14.5 cm^3/min./outlet. The dose of lubricant can also be regulated by an electric motor with a frequency converter, changing the nominal speed of the electric motor and thus the volume of lubricant to be delivered. Standard electric motors are 230/400V and 500V; for other voltages consult the supplier.

3 DESCRIPTION

3.1 DESCRIPTION OF LUBRICATION PUMP CONFIGURATION

Overall configuration of the lubrication pump VEG is presented as No.1. No.2. No.3 and No.4. annexes. The lubrication pump consists of a pump body and a lubricant reservoir put on the top of the body. Working units are mounted round the perimeter of the lubricator base body in the quantity according to the lubrication pump design, however 20 units max. In case of a lower number of working units, the free openings in the lubricator pump base will be plugged up with plugs. The electric motor is attached to the body through the flange. In order to improve suction of the lubricant into dosing units, the unit is equipped with a wiping and tilting device which is tilted according to running direction (CW – CCW). The lubricant reservoir can be equipped with maximum and minimum level signalization for both oil and grease versions. The body is equipped with shoes with 10.5 mm diam. holes for the attachment of the lubrication pump to the base and with an M16x1.5 tapped hole for lubricant refilling.

3.1.1 LUBRICATION PUMP VEG BASE (dose 1.2-3 cm³/min./outlet)

The lubricator base consists of a cast iron body (1) with a shaft (2) mounted eccentrically on ball bearings, which is close-coupled with a worm wheel (4). The support ring (3), in the recess of which support parts of working unit pistons are put, revolves freely round the eccentric shaft (2). The spiral worm (5), supported on conical bearings, is fitted with a connecting piece (7) into which the shaft of the electric motor mounted on the flange (6) is inserted. The worm gear set area is sealed with a git seal and filled with 0.5 litre of SAE 80W gearbox oil. The oil is filled through the filler hole (9) and drained after removing the cap (10). The transmission ratio between the spiral worm (5) and the worm gear (4) i = 48:1.

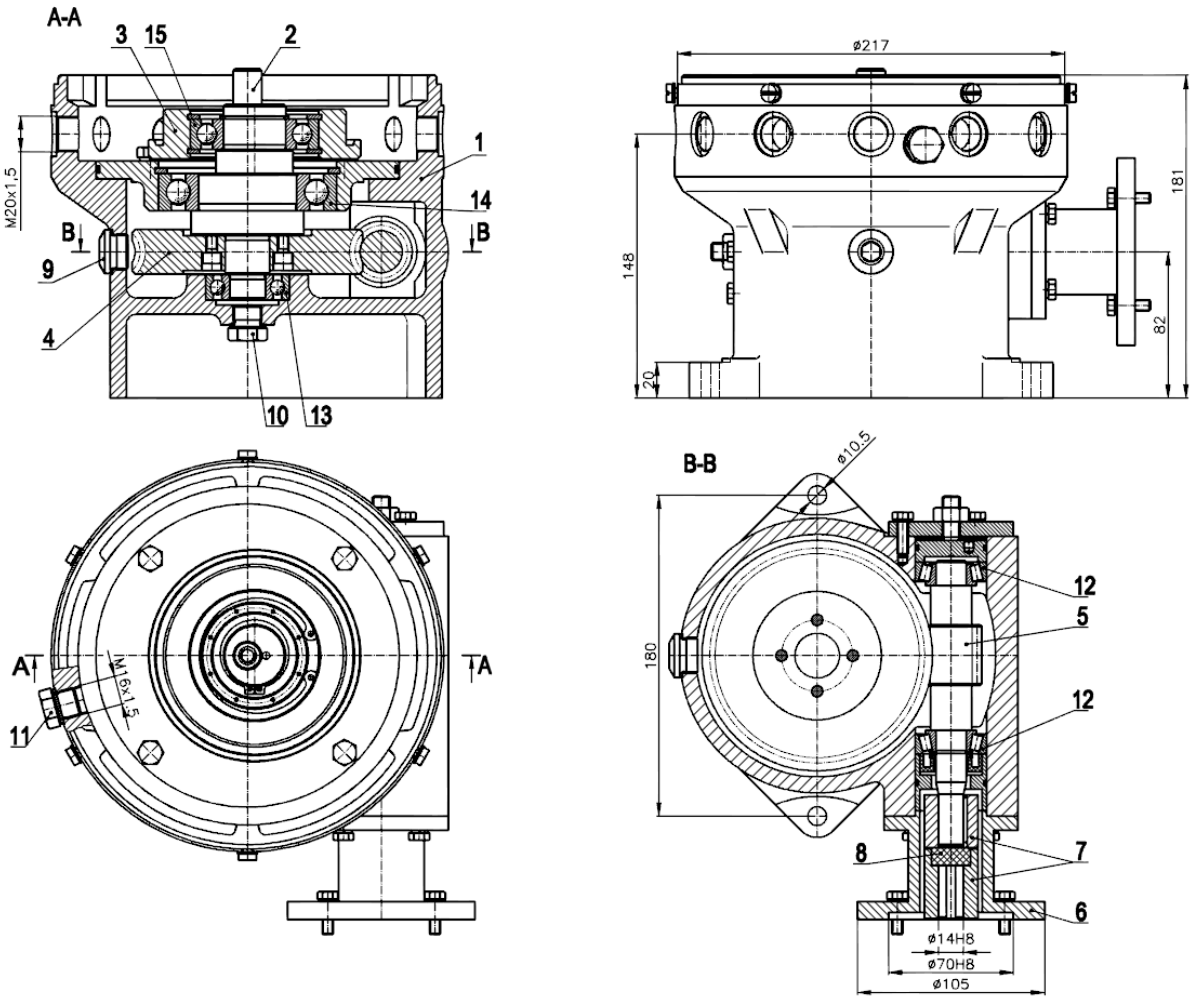


Figure 1 Lubrication pump VEG base

Table Description of lubrication pump base

Pos.	Name
1	Body
2	Eccentric shaft
3	Support ring
4	Worm wheel
5	Spiral worm
6	Flange
7	Connecting piece
8	Block

Pos.	Name
9	Plug
10	Plug
11	Plug
12	Bearing 30203
13	Bearing 6204
14	Bearing 6211 2RS
15	Bearing 6207

3.1.2 LUBRICATION PUMP VEG BASE (dose 0-14.5 cm³/min./outlet)

The lubricator base consists of a cast iron body (1) with a shaft (2) mounted eccentrically on ball bearings, which is close-coupled with a worm wheel (4) and equipped with a circular cam (14). A support ring (3), in the recess of which support parts of the working unit pistons are put, revolves freely round the circular cam (14). The spiral worm (5), supported on conical bearings, is fitted with a connecting piece (7) into which the shaft of the electric motor mounted on the flange (6) is inserted. The worm gear set area is sealed with a git seal and filled with 0.5 litre of SAE 80W gearbox oil. The oil is filled through the filler hole (9) and drained after removing the cap (10). The transmission ratio between the spiral worm (5) and the worm gear (4) i = 48:1.

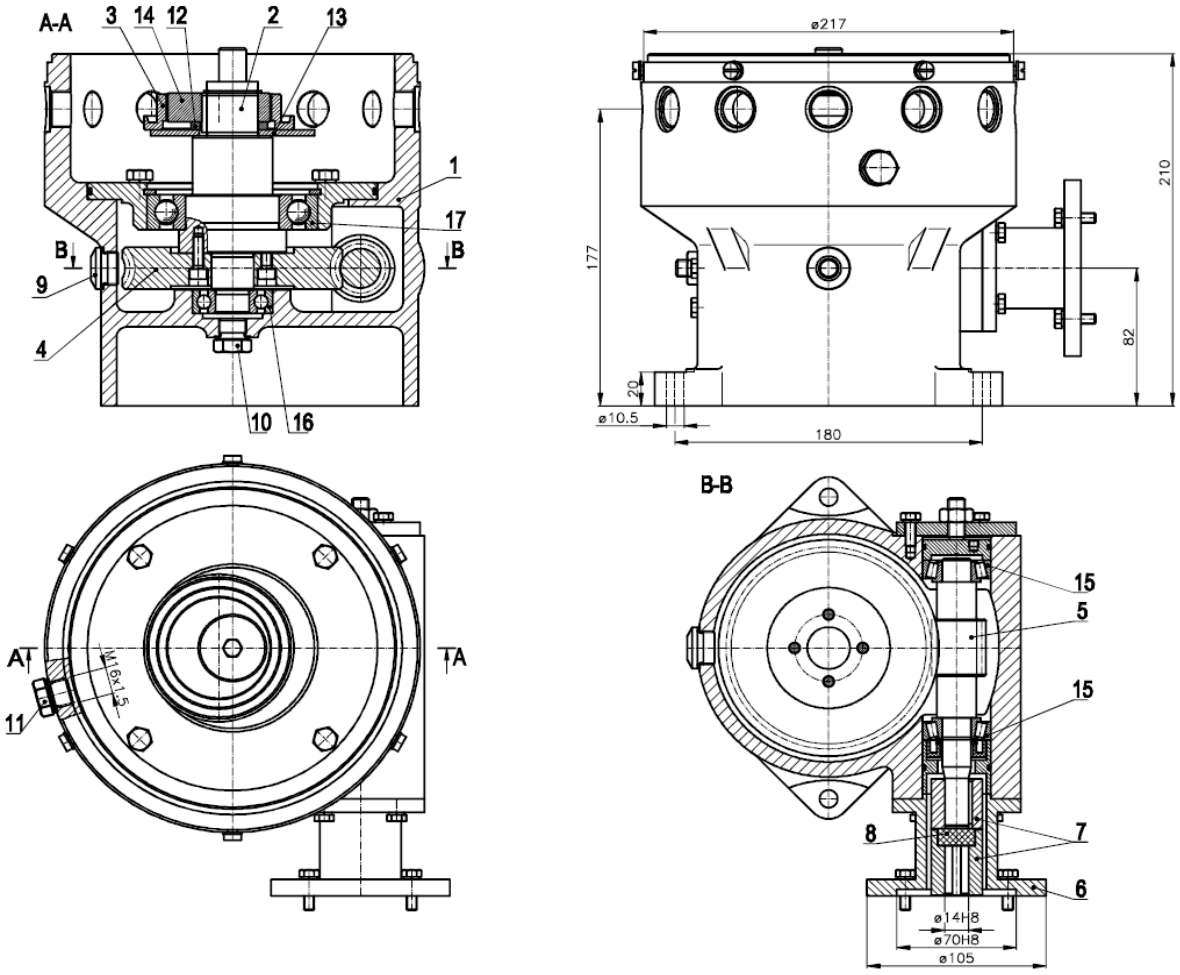


Figure 2 Lubrication pump base

Table Description of lubrication pump base

Pos.	Name
1	Body
2	Shaft
3	Support ring
4	Worm wheel
5	Spiral worm
6	Screw
7	Connecting piece
8	Block
9	Plug

Pos.	Name
10	Plug
11	Plug
12	Spacer ring
13	Support ring
14	Circular cam
15	Bearing 30203
16	Bearing 6204
17	Bearing 6211 2RS

3.1.3 WORKING UNIT VEG (dose 1.2-3 cm³/min./outlet)

Working unit configurations are given in Annex No.9. The working unit is made up of a complete cylinder (1), consisting of a working cylinder, working piston and regulating piston that are mutually matched together with maximum precision. An eye (5) and a connection with a non-return valve (4) are mounted on the complete insert (2). An adjusting screw (6) to adjust the dose is coupled to the regulating piston through a spring. The position of the screw (6) is locked by means of slots in the screw and a steel ball. (Adjustment and regulation of a working unit dose is presented in Chapter 11.1)

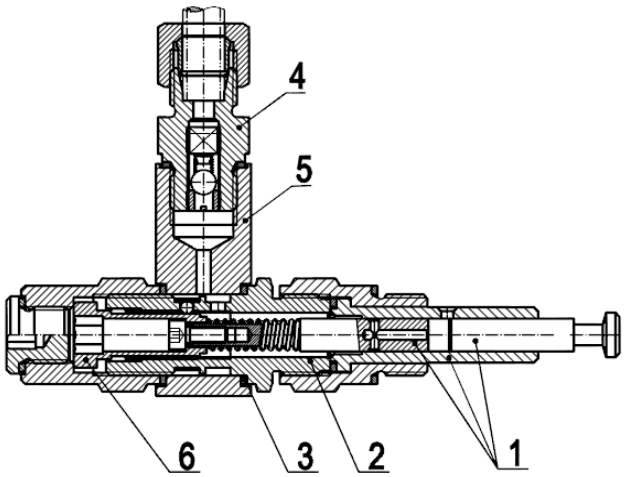


Figure 3 Description of working unit

3.1.4 WORKING UNIT VEG 150 - G1/4 (dose 0-14.5 cm³/min./outlet)

Working unit configurations are given in Annex No.10. The working unit is made up of a complete cylinder (1), consisting of a working cylinder, working piston and regulating piston that are mutually matched together with maximum precision. The eye (4) is mounted on the bushing (2) and sealed using O-rings (10). In the eye (4) there is a spring-suspended cone (5), which along with the sealing ring (7), makes up the non-return valve. In the bushing (2) there is the adjusting screw (3) coupled to the regulating piston. The adjusting screw is locked in the required position using a lock nut (8). When installing the working unit, it is important that the pushing section of the working piston (2) fits into the recess in the support ring (2). If it be to the contrary, these parts may get damaged. (Adjustment and regulation of a working unit dose is presented in Chapter 11.2)

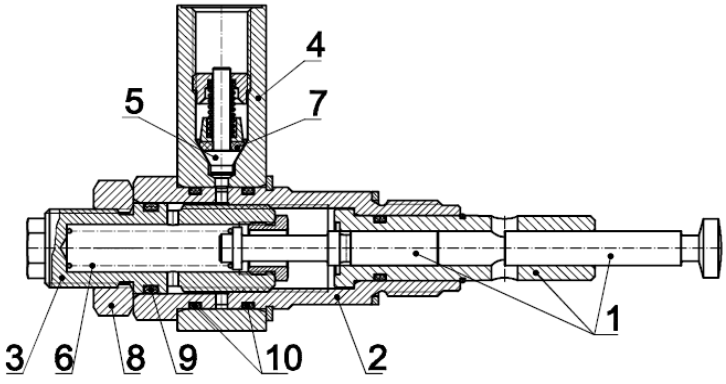


Figure 4 Description of working unit 150 - G 1/4

3.2 SUMMARY OF RESERVOIRS

Reservoirs are made of steel sheet and with various capacities, see Figure No.5. It is possible to fill the reservoir after uncovering the top cover; purity of the lubricant must be ensured. We recommend filling through the filling hole in the body of the device.

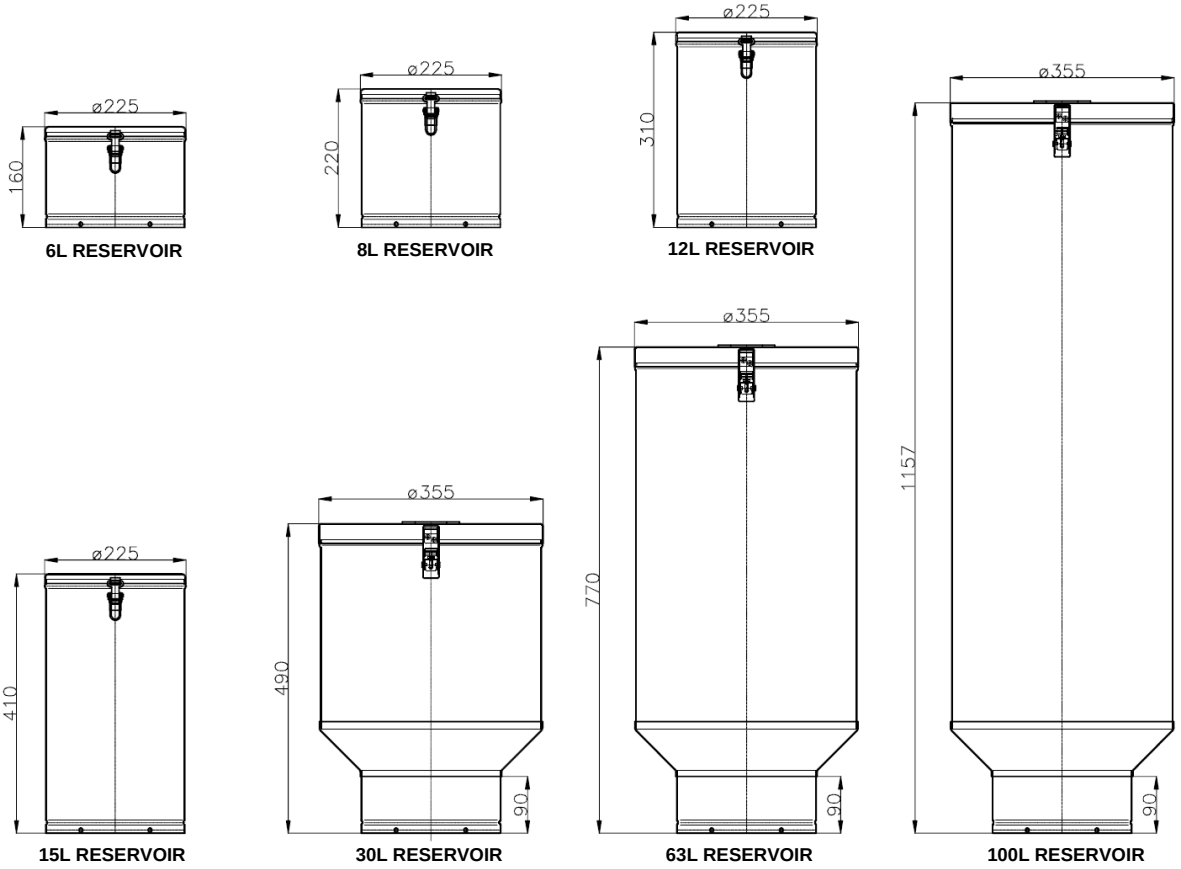


Figure 5 Summary of reservoirs for lubrication pump VEG

3.3 LEVEL SIGNALIZATION

3.3.1 SINGLE-POINT LEVEL METER (MICROSWITCH)

It indicates the minimum (maximum) level in the grease reservoir. It responds as soon as the lubricant gets in touch with the switching area. You will find the wiring diagram in Annex No.11.

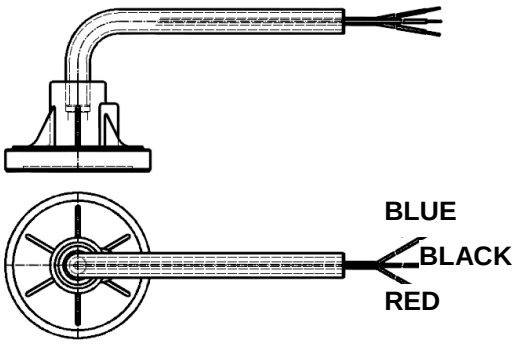


Figure 6 Single-point level meter (micro switch)

3.3.2 FLOAT LEVEL METER

It indicates the minimum (maximum) level in the oil reservoir. It is a hydraulic electrical element giving information on required states of a fluid in the reservoir; in some case, it controls another switching element (contactor, relay) to ensure the required height of fluid in the reservoir. The description of the float level meter is shown in Figure No.7. You will find the wiring diagram in Annex No. 7.

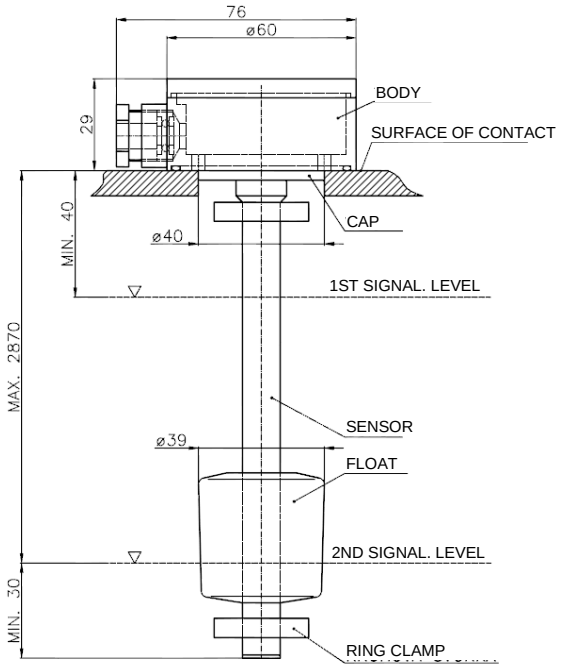


Figure 7 Float level sensor

3.3.3 ULTRASONIC LEVEL METER UB2000

It is used both for grease and oil reservoirs. The level meter is noted for two independent switching outputs (min. max. levels), extremely small insensitivity zone, learning input, adjustable spray width (sensitivity), various operating modes, temperature compensation and selectable switching or opening outputs. On the front lateral face there is a membrane keyboard with two programming keys A1 and A2. Next to the membrane keyboard there is a window with LEDs (2x yellow, red, green). On the rear lateral face there is a connector-socket into which the M12x1 connector is connected. Ultrasonic signals are transmitted to and received from the level meter from a white wheel on the lower face through the hole in the reservoir top cover. The adjustment is described in Annex No.8.

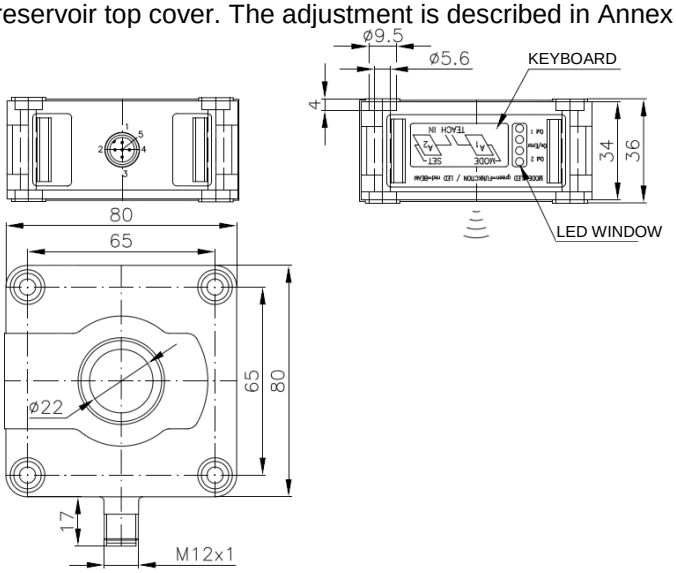


Figure 8 Ultrasonic sensor UB 20000

4 LUBRICATION PUMP OPERATION

After activation of the electric motor, the eccentric shaft is driven through the spiral worm and worm wheel whereas the shaft operates the pumping unit piston by means of the ring. While the piston is radially inserted to the centre of the eccentric shaft, suction through the opening in the working cylinder of the pumping unit takes place whereas in the opposite direction, the lubricant is discharged. After the suction opening is closed, the working piston starts pushing the lubricant with the regulating piston before as far as the place where the piston bypass edge gets at the working cylinder hole edge. Simultaneously, the spring is being compressed. In this place, the lubricant starts flowing round the tapered diameter of the regulating piston into the complete insert/bushing and through the eye to the connection with the valve. As the working piston reaches the extreme discharge position given by the maximum eccentric shaft position, lubricant delivery is brought to an end. The working piston is pulled back into the suction position by the ring, the spring moves the regulating piston and along with the valve ball/cone, the lubricant path into the outlet is closed by them.

The adjustment of lubricant dose on the working unit is described and shown in Chapter 11. The pressure needed for lubrication of a particular lubricated place is indicated by the pressure gauge.

5 TECHNICAL DATA

Table 1 Technical parameters

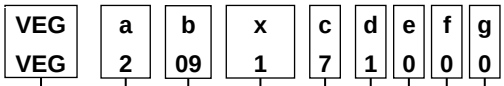
Maximum pressure		300 bar
Working pressure		250 bar
Nominal delivered quantity		3 cm^3/min./outlet 14.5 cm^3/min./outlet
Range of nominal charge regulation		1.2 to 3 cm^3/min./outlet 0 to 14.5 cm^3/min./outlet
Lubricant container capacity		0, 6, 8, 12, 15, 30, 63, 100 dm^3
Number of outlets		1 to 20 outlet screw union M16x1.5 mm, for TR 10 mm (1.2 to 3 cm^3/min./outlet) 1 to 12 outlet screw union G ¼“, for TR 10mm (0 to 14.5 cm^3/min./outlet)
Electric motor		230/400V, 1.05 A; 500V, 0.84A; 50Hz; 0.37kW
Nominal voltage for signalization		24V DC, 2A
Lubricant	grease	max. NLGI - 2
	oil	min. 50 $mm^2 . s^{-1}$
Temperature of working environment		- 25 to 40^0C
Weight		35 kg (according to design)

NOTE:
Outlets, positions in the lubrication pump body, are usually fitted with dosing units in clockwise direction and into the opposite positions on grounds of fluency of the lubrication pump operation. In case that mounting of particular positions is required, the supplier should be informed by specification of the numbers of positions that should be equipped with the dosing unit (see the dimensional drawing). Optionally, the standard design of lubrication pump VEG can be fitted with safety valves with lubricant drain and with a possibility of working pressure adjustment. At the same time, the safety

valve serves as a protective element, preventing the working pressure of the lubricant in the lubrication circuit from exceeding the value adjusted by the adjusting screw. This pressure value adjusted can be checked visually on the pressure gauge connected. In case that only selected outlets (working units) are equipped with safety valves, it is necessary to specify the numbers of positions of outlets mounted in this way in your purchase order (see the dimensional drawing).
Reservoirs with the least 6-litre capacity can only be equipped with a float level meter.

EXAMPLE OF DESIGNATION: VEG 2091 - 7 - 100 - 0
Lubrication pump VEG with lubricant reservoir and 12 dm^3 capacity, 9 outlets, with nominal delivery quantity 3 cm^3/min/outlet, ultrasonic signalization for minimum and maximum levels in reservoir, electric motor 230/400V – 50 Hz, ordinary working environment, standard design of drive, without safety valves.

6 CATALOGUE DESIGNATION



Lubrication pump type designation

type of lubrication pump ---------- VEG

Lubricant container capacity

without reservoir ---------- 0
6 dm^3 ---------- 1
12 dm^3 ---------- 2
30 dm^3 ---------- 3
63 dm^3 ---------- 4
8 dm^3 ---------- 5
15 dm^3 ---------- 6
100 dm^3 ---------- 7

Number of outlets (working units)

from 1 ---------- 01
2 ---------- 02
3 ---------- 03
to
20 ---------- 20

Lubricant dose

3 cm^3/min/outlet (1 to 20 outlets) ---------- 1
14.5 cm^3/min/outlet (1 to 12 outlets) ---------- 2

MIN and MAX lubricant level signalization

without signalization ---------- 0
with MIN - grease signalization (micro-switch) ---------- 1
with MIN and MAX - oil signalization (float) ---------- 3
with MIN - oil signalization ---------- 4
with MIN and MAX - grease, oil signalization (ultrasonic) ---------- 7

Electric motor operating voltage

230/400V, 50 Hz ---------- 1
500V, 50 Hz ---------- 2
other voltage (specification in PO) ---------- 9

Working environment

ordinary ---------- 0
MWDr / Wda ---------- 1

Drive design

standard ---------- 0
explosionproof ---------- 1

Bypass valve at outlets

none ---------- 0
all ---------- 1
selected outlets (specification in purchase order) ---------- 2

7 DIMENSIONAL DRAWING

7.1 VEG 1-10 OUTLETS (dose 1.2-3 cm³/min./outlet)

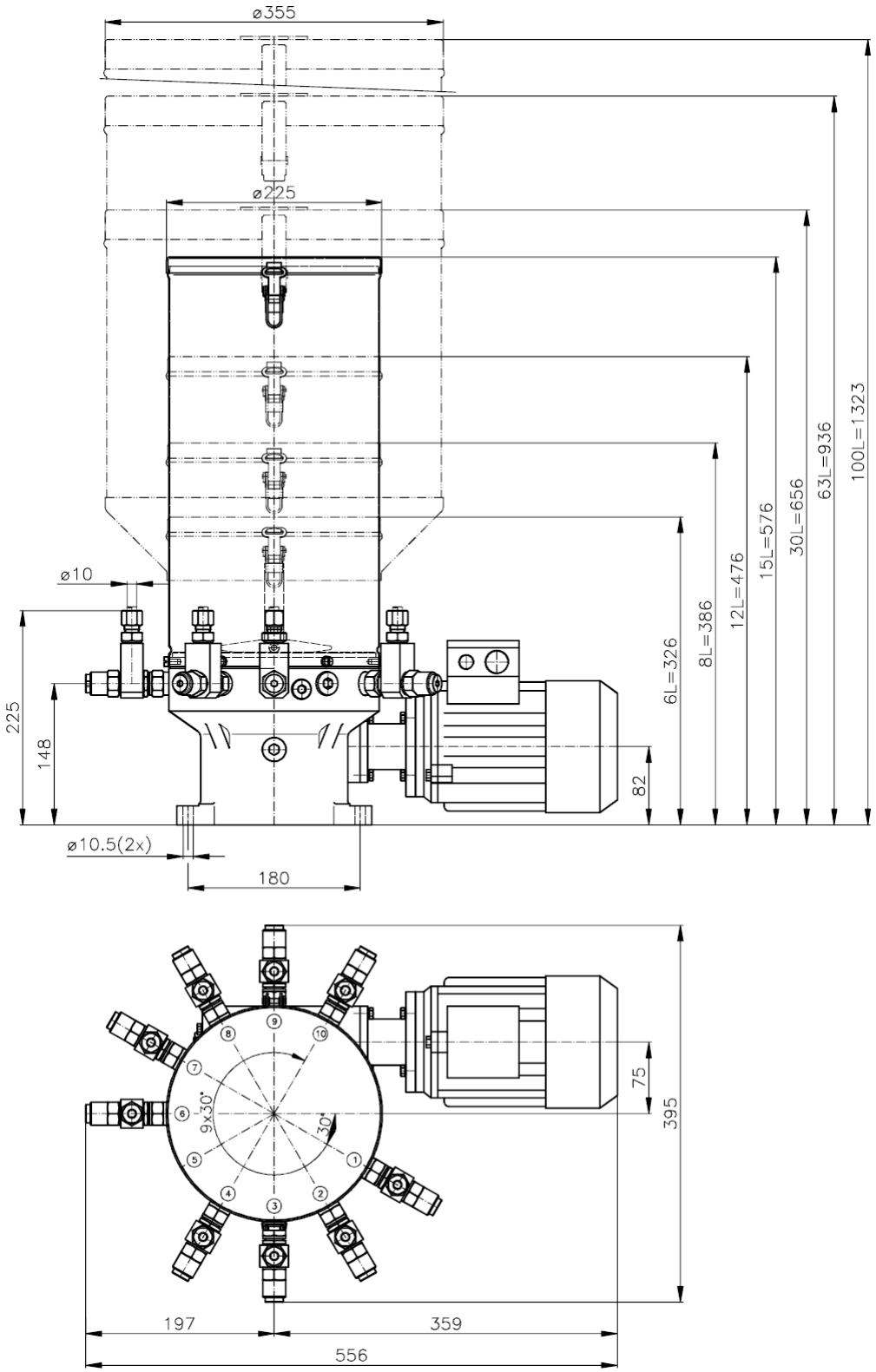


Figure 9 Dimensional drawing VEG - 10 outlets

7.2 VEG 1-20 OUTLETS (dose 1.2-3 cm³/min./outlet)

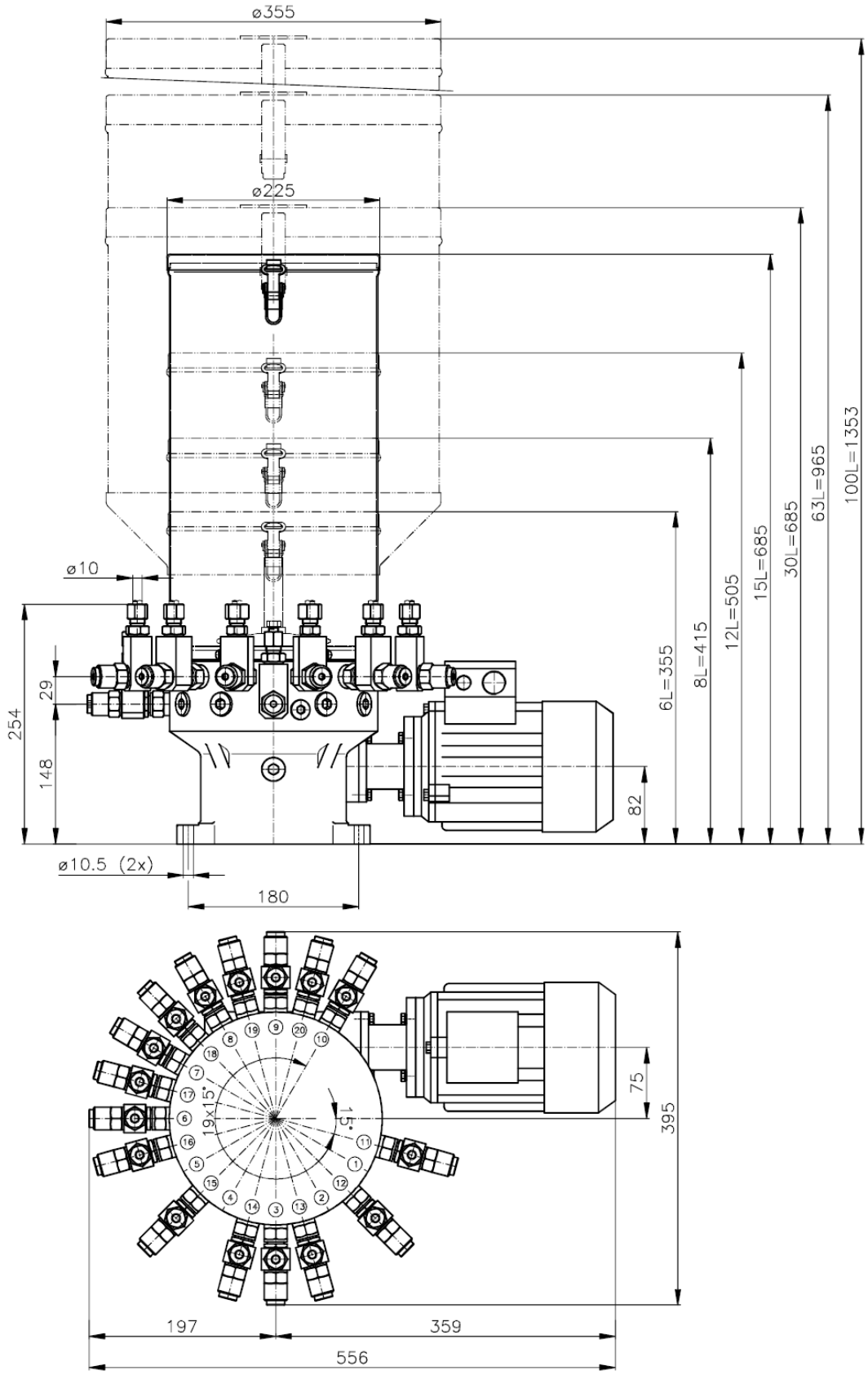


Figure 10 Dimensional drawing VEG - 20 outlets

7.3 VEG 1-12 OUTLETS (dose 0-14.5 cm³/min./outlet)

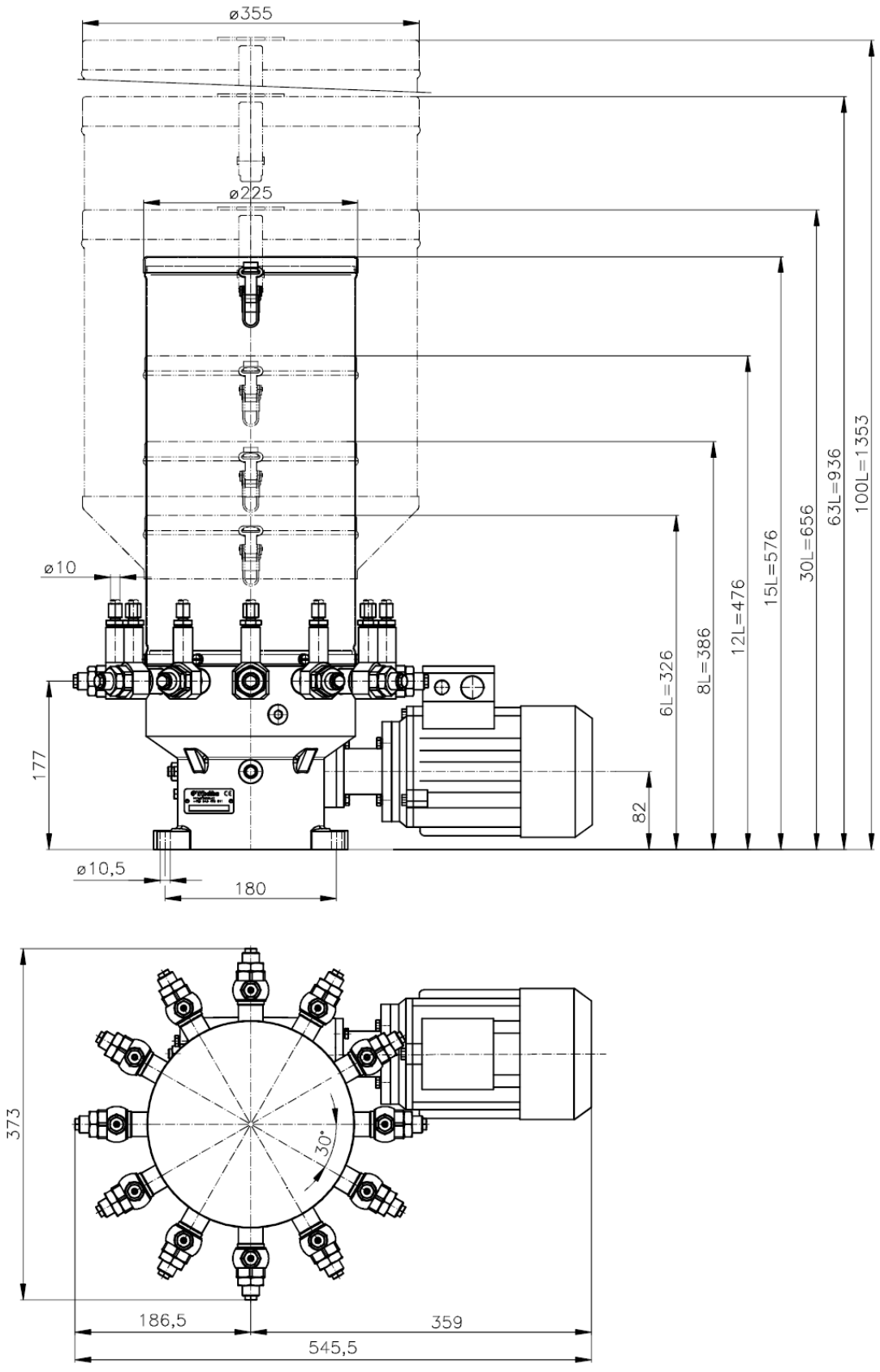


Figure 11 Dimensional drawing VEG - 12 outlets

7.4 VEG 1-12 OUTLETS WITHOUT RESERVOIR (dose 0-14.5 cm³/min./outlet)

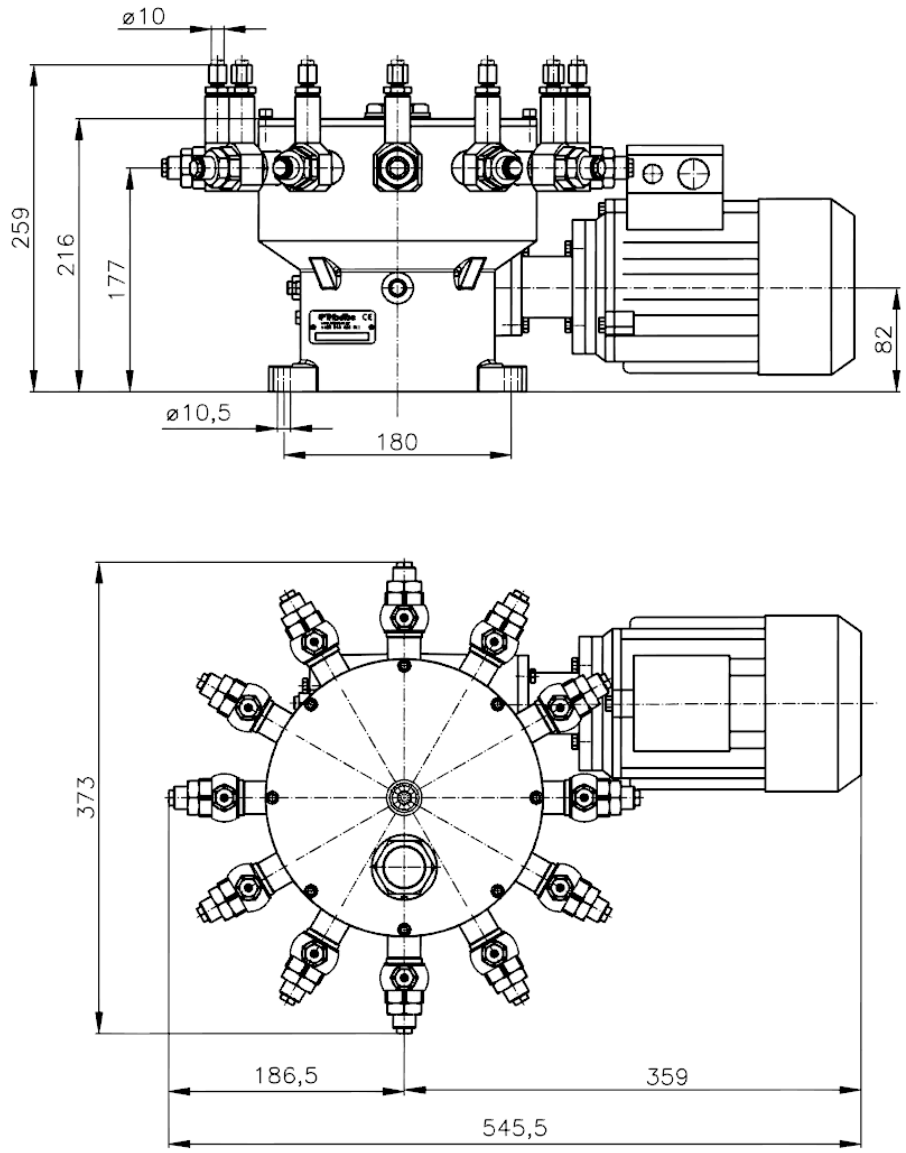


Figure 12 Dimensional drawing VEG - 12 outlets without reservoir

8 HYDRAULIC DIAGRAM

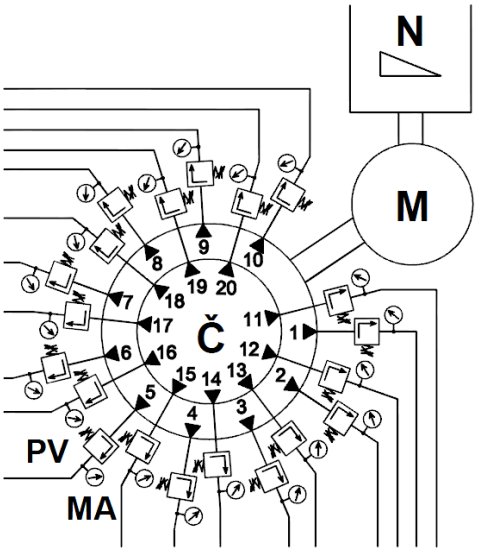


Figure 13 Hydraulic diagram

Table Description of hydraulic diagram

M	Motor
No.	Pump
PV	Bypass valve
MA	Pressure gauge
N	Reservoir

9 INSTALLATION AND PUTTING INTO OPERATION

The lubrication pump is installed in vertical position. It is recommended to put the lubrication pump on a raised pedestal or any other elevated basement intended for easier adjustment, checks and maintenance (not included in delivery) to which it is attached using the footings provided with two Ø10.5 mm holes for screws. It is necessary to ensure a sufficient clearance round the lubrication pump for execution of adjustment and maintenance.

10 WIRING DIAGRAM, ELECTRICAL CONNECTION

Electrical connection may only be carried out by an authorized person qualified for work on electrical equipment.

10.1 ELECTRIC MOTOR CONNECTION

The electric motor is connected to power according to relevant standards.

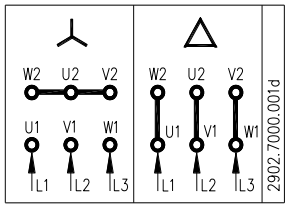


Figure 14 Basic design

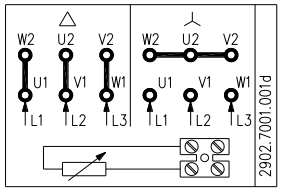


Figure 15 Design with 3 thermistors

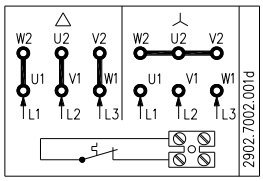


Figure 16 Design with thermo contacts

10.2 WIRING OF LEVEL METERS

- You will find the float level meter wiring diagram in Annex No.7.
- You will find the grease level meter wiring diagram (micro-switch) in Annex No.7.
- You will find the ultrasonic level meter wiring diagram and adjustment in Annex No.8/1 – 8/3.

11 ADJUSTMENT OF WORKING PARAMETERS

11.1 ADJUSTMENT OF LUBRICANT DOSE ON WORKING UNIT (1, 2-3 cm³/min)

1. Switch off the lubrication pump electric motor.
2. Unscrew the plug from position 4. (Socket screw key 6HR 6.)
3. Turn the position 1 screw clockwise until it hits the stop. Maximum dose is adjusted in this position 3 cm³/min. (Socket screw key 6HR 8.) The screw pos.1 has 4 circumferential grooves per 90° into which the locking steel ball fits. Lead of the screw thread pos.1 is 1 mm.
4. By turning the screw pos.1 counter-clockwise, the lubricant dose will be reduced.
5. Adjust the required lubricant dose according to graph 1, by turning the screw pos.1 counter-clockwise by a relevant angle.
6. After the required lubricant dose value is adjusted, screw in the plug pos. 4 back.

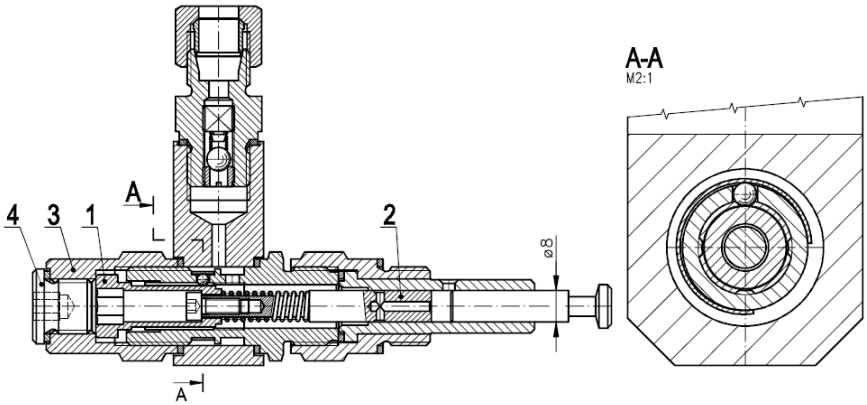
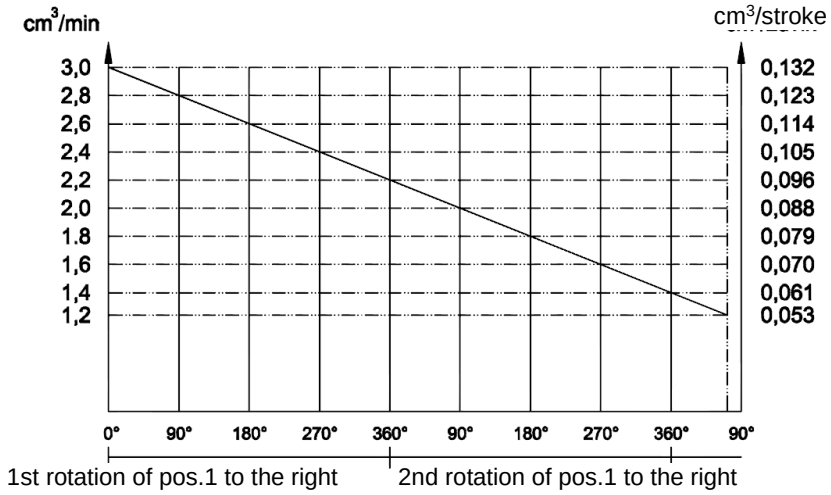


Figure 17 Working unit VEG

The lubricant dose values in cm³ /min. shown in Graph 1 are valid for the electric motor nominal speed 1370 rpm. The maximum dose 3 cm³/min is set by the manufacturer.



Graph 1 Adjustment of lubricant dose quantity on working unit

11.2 ADJUSTMENT OF LUBRICANT DOSE ON WORKING UNIT (0-14.5 cm³/min)

1. Loosen the safety nut (2); the working unit body (1) must be held simultaneously.
2. Do not unscrew the safety nut completely, just loosen it by 1/2 turn at the most.
   Keep the position of the loosened nut (2) while operating the adjusting screw (3) at the same distance from the working unit (1), namely by 1/2 turn max. The initial position for adjustment of a dose is when the adjusting screw (3), after screwing up, hits to the safety nut (2) according to detail D. By doing this, the maximum lubricant dose is adjusted. By screwing (in clockwise direction) the adjusting screw (3), you are reducing the lubricant dose value per one stroke of the working unit. For determination of the required lubricant dose use Graph 2 and read the appropriate setting of L (mm) dimension or the number of turns of the adjusting screw (3).
3. After adjustment of the required lubricant dose value, lock the adjusting screw (3) of the working unit by tightening the lock nut (2).

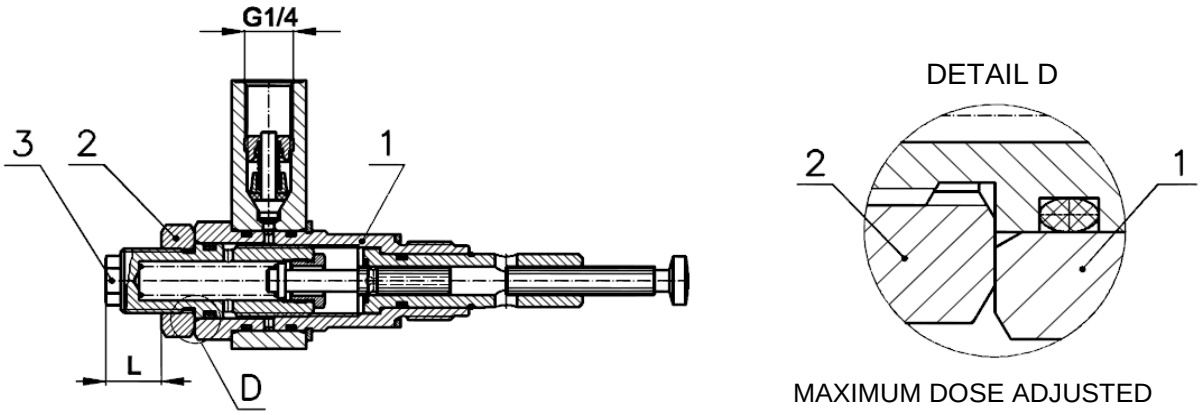
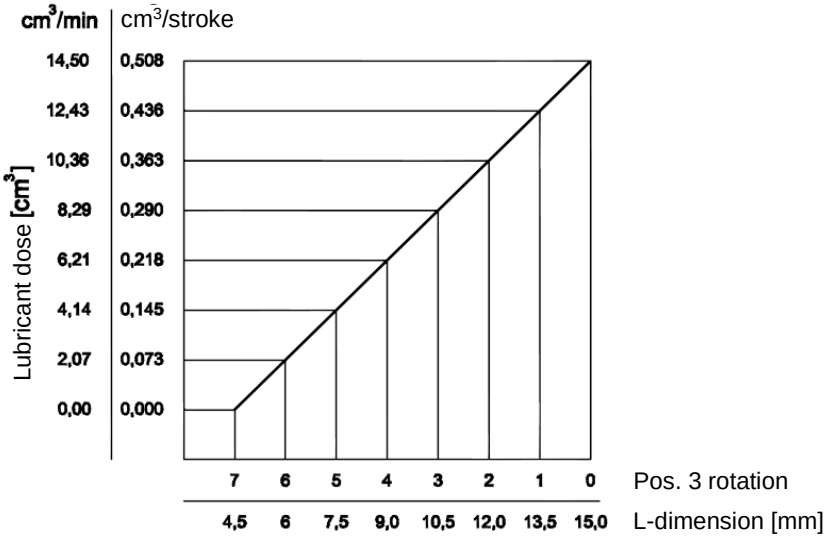


Figure 18 Working unit VEG 150-G1/4

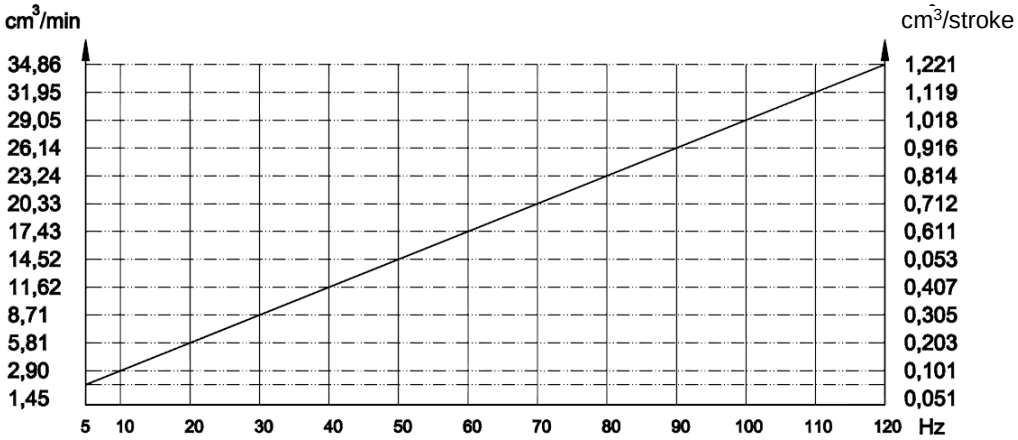
Lubricant dose values in cm³/min indicated in Graph 2 are valid for electric motor nominal speed 1370 rpm. The working unit is adjusted by the manufacturer to the maximum dose 14.5 cm³/min., i.e. it is screwed to L=15 mm. The values of L-dimension must be adjusted with good accuracy, especially for low lubricant doses.



Graph 2 Adjustment of lubricant dose on working unit VEG 150-G1/4

11.3 VALUE OF LUBRICANT DOSE WHEN FREQUENCY CONVERTER IS USED

When the combination of electric motor and frequency converter is used, the electric motor must be equipped with additional cooling due to motor overheating at low speed. The relation of the dose of working unit VEG 150-G1/4 adjusted to a maximum value of 14.5 cm³/min per frequency of current is illustrated in Graph 3. The dimensions of the lubrication pump with electric motor and additional cooling is illustrated in Figure 19.



Graph 3 Value of dose in relation to frequency of current

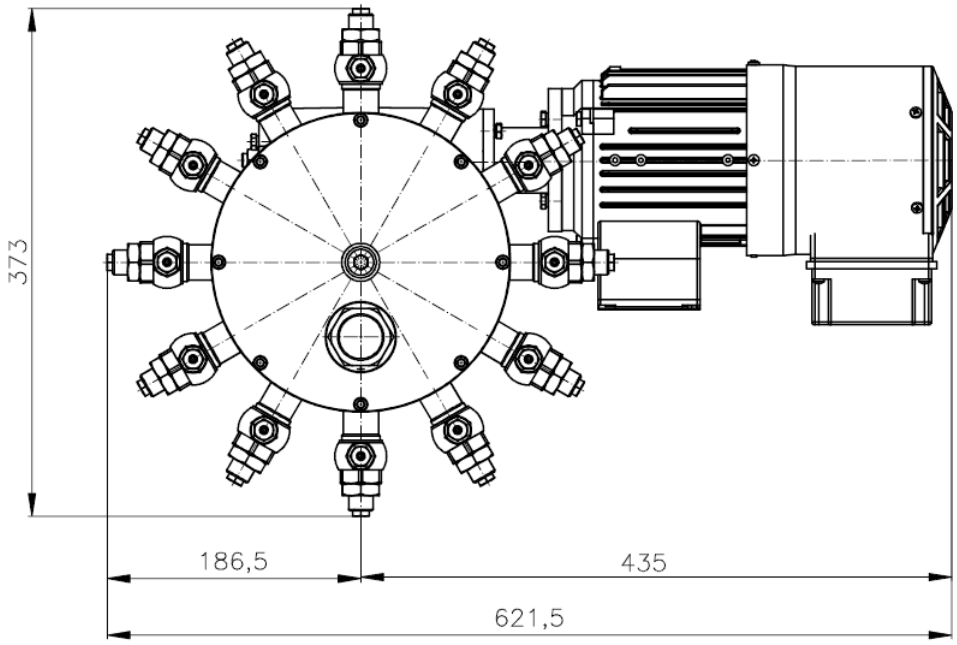


Figure 19 Electric motor with additional cooling

11.4 ADJUSTMENT OF PRESSURE ON BZV RELIEF VALVE

1. Switch off the lubrication pump electric motor
2. Loosen the lock nut pos. 3
3. Screw in the closed nut pos. 2 to achieve the L-length, corresponding to the required pressure illustrated in Graph No. 4.
4. Use the lock nut pos. 3 to lock the closed nut position

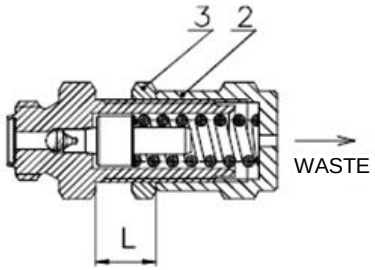
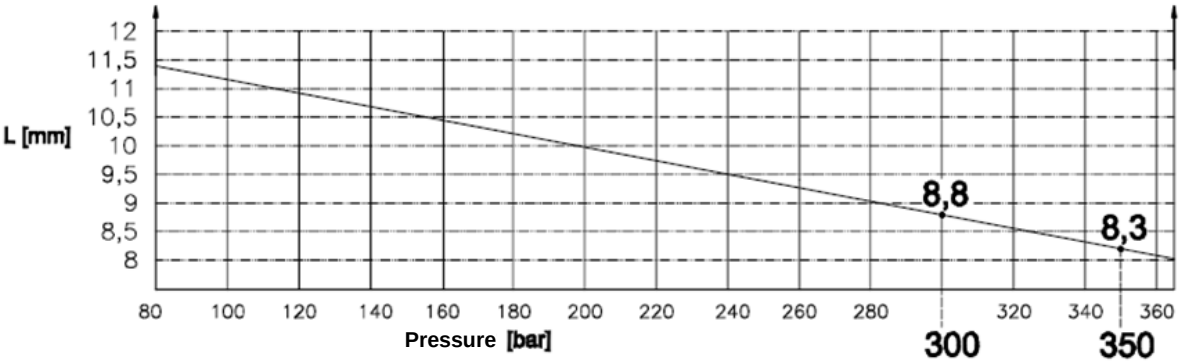


Figure 20 Relief valve



Graph 4 Adjustment of pressure on BZV relief valve

NOTE:
Pressure tolerance ±10 bar
Recommended relief pressure is 300 bar

12 BASIC ADJUSTMENT

Table 2 Basic adjustment

PARAMETER	VALUE
Working pressure	250 bar
Pressure of BZV relief valve	300 bar
Delivered quantity	3; 14.5 cm^3/min / outlet (according to working unit type)

13 MAINTENANCE AND CONTROL

Repairs, cleaning and other work on lubrication pump must be carried out in de-energized state. The lubricant must be refilled so that its abundance at least in the space of lubricator body is ensured. If it be to the contrary, proper operational function of the lubrication pump cannot be guaranteed, namely

the observance of nominal dose due to inhomogeneity of the lubricant and penetration of air into the dosing working unit. The recommended method for lubricant refilling is through the tapped hole on the lubrication pump body. The lubricant can also be refilled right into the reservoir after uncovering the cap. It is essential to care about the purity of the lubricant to be topped up. During continuous operation, it is recommended to check the connection to the lubrication circuit piping for tightness once a month.

14 ACCESSORIES

The lubrication pumps VEG do not require any special accessories for installation, operation or maintenance.

15 WORK SAFETY

Electrical connection of the lubrication pump must be executed professionally and applicable safety precautions must be adhered to. The customer is liable for correct and professional installation.

The lubrication pump VEG may be operated and its operating parameters adjusted solely by authorized persons who are duly informed and trained in such activities.

16 STORAGE AND TRANSPORT

For storage of the product, the customer must adhere to environmental conditions according to combination of classes IE11 as per ČSN EN 60721-3-1 (temperature range +5°C to +40°C, relative humidity range 5 to 85 %) and for transport, the conditions of combination of classes IE21 as per ČSN EN 60721-3-2 (temperature range -25°C to 60°C, relative humidity 75 %). The customer is responsible for storage of the product after delivery.
Lubrication pump VEG is transported as bulk cargo. The products must be placed on a vehicle so that mechanical loading by stacking, damaging by shocks and weather effects during transportation can be avoided. Loading and unloading must be carried out carefully, avoiding fall and mechanical damage of the shipment.

17 QUALITY WARRANTY

TRIBOTEC guarantees that all products manufactured by TRIBOTEC will be free of material and workmanship defects on the date of sale from TRIBOTEC to the original buyer of these products.

With the exception of any special, extended or limited warranty published by TRIBOTEC, any product confirmed by TRIBOTEC as defective will be repaired or replaced by TRIBOTEC for a period of six (6) months from the date of sale.

This warranty is only valid in the event that the products are installed, operated and maintained in compliance with the written instructions and requirements contained in this document.

This warranty does not cover and TRIBOTEC will not be liable for product's normal wear and tear. The company will not be liable for defects on the product, its damage or wear and tear caused by the following:

1. defective installation (unless implemented directly by TRIBOTEC),
2. misuse, i.e. use and operation under other than specified operating conditions,
3. using for other purposes than recommended,
4. abrasion (detrition),
5. pollutants or chippings,
6. corrosion caused by installation in other than recommended working environment,
7. inadequate or unsuitable maintenance,
8. damage due to negligence, accident or by malicious damage,
9. using spare parts not delivered by TRIBOTEC,
10. additional installation of parts and components not delivered or not approved by TRIBOTEC,
11. incompatibility of a TRIBOTEC product with devices, accessories or materials not delivered by TRIBOTEC, or by their incorrect design, production, installation or maintenance.

TRIBOTEC covers the items sold by TRIBOTEC, whether as part of the product or separately, but not manufactured by TRIBOTEC (such as electric motor, switches, relays, pressure gauges, etc.) with the guarantee period covering the complete product at its expense in full, except the cases TRIBOTEC advised the customer of in this document or in the purchase contract. In such cases, TRIBOTEC will provide the buyer with reasonable co-operation in submitting complaints regarding the components or parts in question to the manufacturer.

THIS WARRANTY IS THE EXCLUSIVE WARRANTY AND REPLACES ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

TRIBOTEC will not be responsible for indirect, incidental damages and losses or consequential damages and losses caused by Force Majeure, resulting from the fact that TRIBOTEC has supplied the products.

18 FAULTS AND THEIR ELIMINATION

Table 3 Faults and their elimination

FAULT	PROBABLE CAUSE	REMEDY
Lubrication pump does not supply any lubricant	- Lack of lubricant in reservoir	- Refill the lubricant reservoir
Lubrication pump does not supply lubricant for required pressure - low pressure	- Low bypass pressure adjusted	- Re-adjust the required pressure using the nut on the bypass valve
Lubrication pump does not supply the required dose size	- Complete cylinder got damaged by impurities in lubricant	- Replace the working unit

Motor is running, enough lubricant in reservoir, but the lubrication pump does not supply any lubricant to the output	- Air in working unit	- Let the lubrication pump run until air bubbles are forced out

FAULT	PROBABLE CAUSE	REMEDY
Pump motor is not working	- No current consumed by pump motor	- Check the supply voltage of the pump motor - Check the feeder cables; if faulty, replace them - Check the starting circuit-breaker
Ultrasonic level meter UB2000 does not indicate MIN/MAX levels	- Level meter incorrectly adjusted - Level meter sensor is dirty	- Adjust the level meter according to Annex No.12 - Clean the sensor

19 ANNEXES

No.1 Overall configuration of lubrication pump VEG 10-outlet
No.2 Overall configuration of lubrication pump VEG 20-outlet
No.3 Overall configuration of lubrication pump VEG 12-outlet
No.4 Overall configuration of lubrication pump VEG 12-outlet without reservoir
No.5 Working unit VEG (1,2 – 3 cm^3/min.)
No.6 Working unit VEG 150 - G1/4 (0-14.5 cm^3/min.)
No.7 Working unit VEG (1.2-3 cm^3/min.)
No.7 Wiring of float level meter and grease level meter (micro switch)
Spare part catalogue