



INSTRUCTION MANUAL

Electro-Mechanical Operated
Double Diaphragm Pumps
(DME Series Pumps)
Ver. 8.4

Models: DME 15 R., Z..

DME 20 A., B., C., S..

DME 25 A., B., C., H., R., S., Z..

DME 40 A., B., C., H., R., S., Z..

DME 50 A., B., C., H., R., S., Z..

DME 80 A., B., H., R., S..

(also for DME Pumps with ATEX Certificate)

Date of manufacture:

Serial no.:



Management
System
ISO 9001:2015

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DECLARATION OF CONFORMITY

Directive 2006/42/EC, Annex II A

Company: **DELLMECO LTD**

Address: **Świerkowa 2
83-330 Glinicz
POLAND**

declares under our sole responsibility, that the product:

Product name: **Electro-Mechanical Operated Double Diaphragm Pumps**

Models: **DME series**

Referred to in this declaration complies with relevant provisions of the following directives:

- | | |
|---|-------------------|
| - EC Machinery Directive | 2006/42/EG |
| - EC Electromagnetic Compatibility Directive | 2014/30/EG |
| - EC Low Voltage Directive | 2014/35/EG |

Applied harmonized standards:

EN 809:1998

Pumps and pump units for liquids — Common safety requirements

EN ISO 12100-1:2003

Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology

EN ISO 12100-2:2003

Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles

EN ISO 13850:2008

Safety of machinery — Emergency stop — Principles for design

EN ISO 13857:2008

Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs

EN 61000-6-2:2005

Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments

EN 61000-6-4:2007

Electromagnetic compatibility (EMC) — Part 6-4: Generic standards — Emission standard for industrial environments

EN 60204-1:2006

Safety of Machinery — Electrical equipment of machines Part 1: General requirements

Date: **January 1st 2015**



K. Ziemann

Managing Director

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1. Introduction

DELLMECO DME (Electro-Mechanical Operated Double Diaphragm Pump) is a positive-displacement pump that transfers fluids by means of diaphragms operated by linear mechanism, which is being moved by electric motor. The casing in contact with the fluid is made of PE conductive (R...), PTFE conductive (Z...), Aluminium (A.), AISI 316 (S.), Cast Iron (C.), or AISI 316L (H., Hygienic Stainless Steel). This pump is designed for the pumping of liquids, highly viscous and solid substance-containing media, as well as fluidizable powders.

DELLMECO DME Pumps consist of two pump housings located opposite each other. The diaphragms that separate drive and liquid areas from side housings, include a built-in metal core which ensures an optimum service life of diaphragm.

A linear drive, located between pump housings, converts the rotating motion of the drive machine into oscillating one through a crank. The directly linked diaphragms are moving there and back with a constant stroke, and they never undergo a tipping motion due to special design. With each revolution of the crank the medium contained in the pump housing is alternatively pumped out of the housing and sucked into the opposite pump housing. When the upward motion switches to discharge motion and vice versa, the other housing assumes the suction or discharge function. Every pump housing has ball valves or cylindrical valves (available for DME Plastic Pumps only) on the suction and discharge sides. These valves work independently and are available in various versions, which makes it possible to optimize the shearing and solid substance non-sensitivity, as well as to select valve material with chemically required properties depending on the medium.

2. For safe operation

This document contains information indispensable for maintaining safe, proper and efficient operation of this product. In the sections below you will find a description of the duties of the DME Pump operator. For safety and legal reasons, they must be unconditionally fulfilled. Any damage arising through neglect of the information contained in these Operating Instructions will be the responsibility of the operators and users. The information contained in these Operating Instructions is designed for the persons operating the DME Pump. These persons should've possessed basic mechanical, electric and hydraulic knowledge.

Any person transporting, mounting, operating, maintaining, repairing, or disposing the DME Pump with equipment, must become familiar with the complete contents of these Operating Instructions and understand it. If you fail to understand some information in these Operating Instructions or lack some information, contact DELLMECO Ltd before starting the respective activities.

The DME Pump operator is responsible for the permanent availability of these Operating Instructions in the course of pump operation. Keep the Operating Instructions near the DME Pump operation. In the event that these Operating Instructions are lost or become unusable, you can download a new copy from DELLMECO website.

Read this document carefully before using the pump particularly the "warnings and cautions". Get familiar with all operating procedures. This document must be kept handy for future reference.

3. Warnings and cautions

The meanings of warning and caution symbols are given below. Be sure to remember their meanings.



WARNING: ignoring the warning and operating the product in an improper manner can result in danger of serious bodily injury or death.



CAUTION: ignoring the warning and operating the product in an improper manner can result in danger of personal injury or property damage.



This symbol means a "DON'T", and will be followed by an explanation on what you must not do.



This symbol means a "DO", and will be followed by an explanation on what you must do in a specified situation.

4. Operating caution and safety instruction

This chapter is designed for users, fitters and operators of the DELLMECO DME Pump. You will find important safety instructions here to be followed in operating the DME Pump. The safety instructions contained in this chapter are of general nature. Further safety instructions are given in the subsequent chapters. You must unconditionally respect these instructions as they are valid in addition to those mentioned here.

The DME Diaphragm Pump described here has been designed in accordance with the state of science, engineering and with safety rules. Sources of danger have been eliminated as far as possible through design solutions, or appropriate safety devices have been installed. Nevertheless, residual dangers may arise during the operation of this machine, which cannot be avoided through design solutions. However, these dangers can be avoided through careful behavior and compliance with the following safety instructions. For this reason, use the DME Diaphragm Pump only in accordance with the rules. An interaction with other systems and additional influences at the place of DME Pump operation may generate further dangers, which are not mentioned here.

Unauthorized modifications, attachments to and rearrangements of the DME Pump, are not permitted. Modifications require a permission from DELLMECO Company.

Before using this product:



WARNING

- Ø DO NOT operate the pump if:
 - Pump is not installed correctly.
 - Any guards are missing or incorrectly installed
 - The suction and/or discharge piping is not connected.
- ! DO NOT place fingers or any other parts of the body into pump's connection ports, or into any part of drive shaft if there is any possibility of the shaft is being rotated. Severe injury will occur. Stay clear from any rotating elements of pump device (electric motor, transmission gear), if they're exposed.
- ! All electrical connections must be installed only by qualified electrician, according to local safety regulations. Use only original fuses of prescribed current capacity.
- ! All electrical equipment must be inspected on regular basis. All defects of electrical equipment (loose connections or damaged lines) must be immediately eliminated. Use only voltage-insulated tools.
- Ø DO NOT attempt any maintenance or disassembly of the pump or pump unit without first ensuring that:
 - The pump is fully isolated from the power source (electric).
 - The pumping chambers, relief valve and inlet/outlet connections are depressurized and purged.
 - Pump's components allow to reach a safe handling temperature.
- ! All parts to be tightened must be checked before running the pump. Check regularly that the screws and other parts fit firmly and are tightened properly.
- ! Maximum discharge pressure for DME Series Pump **CAN NOT EXCEED 6 bar**. If the discharge pressure increases above the limit value, this may cause damage to the pump, or even a severe, possibly fatal accident.



WARNING

Ø DO NOT exceed the pump's rated pressure, speed or temperature, or change the system/duty parameters from those for which the pump was originally supplied, without confirming its suitability for the new duty. Otherwise, the following results may follow: damage to the pump, or even a severe, possibly fatal accident.



Some fluid may remain inside the pump and inside the connected piping after shutting down the pump, or if the pump is left unused for a prolonged period.

Therefore, be sure to purge the system of fluid and clean the pump before prolonged disuse.

The fluid remaining in the connected piping, as well as in the pump itself, may expand because of freezing or heat, which may cause damage to the pump or/and piping, and lead to leakage of the fluid.



Before using this pump, get fully familiar with the precautions regarding the fluid to be pumped, and verify the corrosion resistance of the parts that will come into contact with the fluid. NEVER use the pump with any fluid against which it does not have sufficient corrosion resistance, or with a fluid that poses a risk of explosion. If you are unable to verify the corrosion resistance, please contact with DELLMECO Office. Using this product with any fluid against, which the parts in contact with the fluid do not have sufficient corrosion resistance, may result in damaging the product or leakage of fluid.



A device must be incorporated into the pump, system, or drive, to prevent the pump exceeding its stated duty pressure. Do not allow the pump to operate with a closed/blocked discharge unless a pressure relief device is incorporated. If an integral relief valve is incorporated into the pump, do not allow re-circulation through the relief valve for extended periods.

Ø DO NOT attempt to dismantle a pressure relief valve which has not had the spring pressure relieved, or it is mounted on a pump that is operating. Serious personal injury or death and/or pump damage may occur.



DME Pump is not originally equipped into a pushbutton switch with differential pressure control. Pushbutton switch must be assembled to the pump or installation obligatorily by a customer. DELLMECO DME Series Pump can be equipped by supplier with such safety device, but only on customer's request.



CAUTION

Ø Use only genuine DELLMECO parts when replacing component parts of this product.



In case of pumping a hazardous fluid (hot, flammable, strong acid, etc.) with this pump, protective measures (install a pit, a protection box, sensors, etc.) must be provided in consideration of possible leakage of fluid. Warning signs must be displayed at necessary places. Leakage of fluid may cause fire or accident.



In case a diaphragm gets damaged, fluid penetrates the internal side of diaphragm chamber and, together with air, is being pushed out to the opposite chamber through an air hose. That may cause incorrect operation and finally damage of the pump. When using the hose, make sure to use a model with appropriate corrosion resistance for the fluid to be pumped.

4.1. Organizational measures

To ensure a safe operation, the operators and the personnel must take organizational measures and be taught their duties.

Operator duties:

- Make sure that the personnel has understood and fulfills all safety instructions, in particular the information provided in these Operating Instructions.
- Ensure compliance with all local labor protection, accident prevention, environmental protection regulations, etc.
- Make sure that instruction and banning posters are placed in rooms, at entrances and on the DME Pump. Always hold such posters in readable condition.
- Prepare operating instructions.
- Make sure that these Operating Instructions are always available at the workplace.
- Make sure that all safety devices are installed and serviceable during operation.

Selection and qualification of the personnel

- Make sure that only properly trained, educated and reliable personnel works with the DME Pump. The personnel must be knowledgeable about appropriate professional terms and working procedures.
- Specify the personnel competence requirements for all works to do.
- Make sure that the personnel to be trained or instructed, as well as the personnel possessing general education only, operates DME Pump under permanent supervision of an experienced person.
- The works on mechanical and electrical units may only professional personnel trained for these purposes.

Personnel duties:

- Before operating the DME Pump, get familiar with the Operating Instructions, in particular with the chapter on safety. This is particularly true for the personnel which only occasionally operates the DME Pump, e.g. during maintenance.
- Operate the pump only in faultless condition.
- Never use any working procedures that are doubtful from the safety viewpoint!
- Observe accident prevention instruction in their last version during all works.
- Use personal protective means where prescribed and required.
- Immediately inform the supervisor of the changes and irregularities arising during operation. When necessary, immediately stop the DME Pump.

4.2. Safety devices on the pump (available on request – options)

1. Pressure gauge (option code PG)
2. Pushbutton switch for differential pressure control (option code PBS);
3. Contact pressure gauge (option code CPG);
4. Diaphragm monitoring (option code DM);
5. Frequency inverter (option code FI);
6. Stroke counting (option code SCE);
7. Diaphragm pressure averager with pushbutton (option code DPA);
8. Additional cooling system (option code ACS);
9. Electric control box – for PBS option (option code CB);
10. Flange connections (option code FE, FEM);
11. Back flushing system (option code BFE);
12. Trolley for pump (option code T);
13. ATEX Certificate.

For more information, please refer to Chapter 13 – DELLMECO DME Pumps Optional Equipment.

4.3. Safety instruction to certain operation stages

Transportation

Use only lifting devices and weight handling fixtures that:

- are appropriate or prescribed,
- possess sufficient load-carrying capacity,
- are technically faultless.

Only experienced persons may fasten weights and instruct crane operators. A competent instructor must be within operator's visual range or in speaking contact with him.

Before transporting heavy machine parts in buildings, make sure that the load-carrying capacity of the building is sufficient along the entire transportation route.

Mounting

Works on piping may only be carried out by authorized professional personnel, as an improper mounting or disassembly of piping may cause cracks.

Remove shipping fasteners for immediately before installation of individual parts.

Fastening elements and gaskets are mainly disposable elements. They must be replaced at every mounting operation, otherwise the fastening or sealing function is not guaranteed anymore. Immediately dispose used fastening elements and gaskets in accordance with current regulations, to avoid confusion with new ones.

Putting in operation

Before putting in operation, make sure that nobody can be put in danger by the pump to be started up. Perform prescribed inspections and tests.

Operation

Operate the installation only when all protective devices and safety devices, e.g. removable protective devices, emergency switch, soundproofing elements or exhaust devices, are available and serviceable. Do not touch hot surfaces - some units of the DME Diaphragm Pump may become hot during operation and cause burns.

Wear hearing protection devices when staying at the running pump. Otherwise, there's a risk of hearing damage through DME Diaphragm Pump's operation noise.

Immediately bring the DME Diaphragm Pump to a standstill if you have noticed unusual changes in operating behavior, which you cannot interpret.

Completely switch off the DME Pump (including voltage supply) before any maintenance or repair works and protect it against unauthorized or accidental restart. Wait until the DME Pump comes to a complete standstill and remove safety devices only after that.

Carry out prescribed tests during standstill and keep records of them.

When using solvents to remove grease or lubricants, you must ensure sufficient supply of fresh air, due to some solvents develop vapors that are harmful for health.

DME pumps are characterized by a particularly compact and robust design. Although a considerable number of components, the pump is very service friendly and easy to install and to connect. To be installed, the pumps need no additional components such as e.g. a ground plate. Pipe connections can be rotated 180 degrees, which provides a high degree of flexibility.

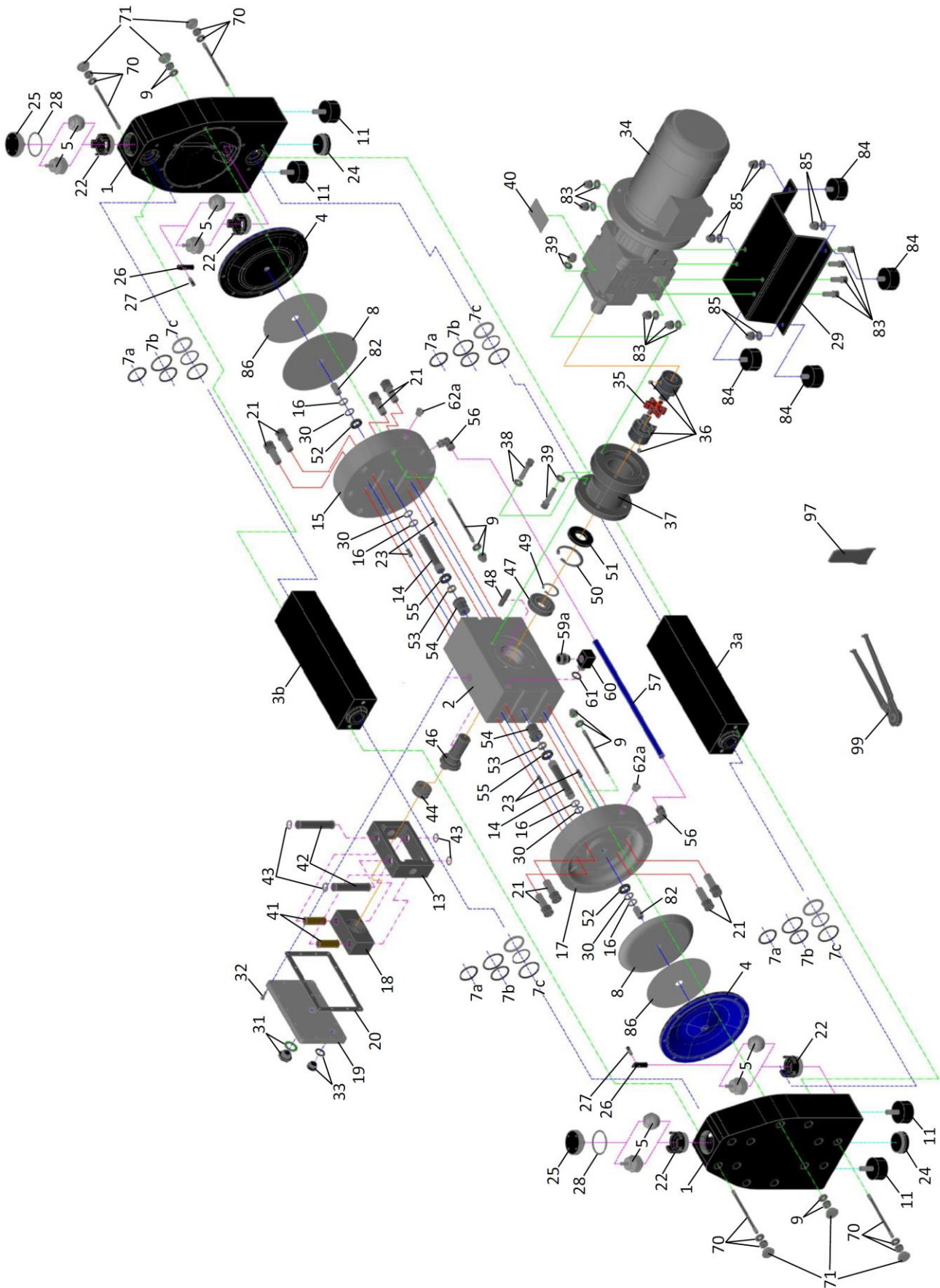
Pumps are protected against dry operation and self-sucking. DME pump cannot be damaged even by operation without medium for a long period of time. To suck, the pumps don't have to be filled, they can suck dry.

Due to a linear characteristic curve and electric drive, pump capacity can be frequency-regulated (variable frequency drive unit required) from 70 % (with additional cooling system, option ACS) to 140% (at 50 Hz it gives a scope of regulation from 35 to 70 Hz). When used with various drive units, the pump work does not depend upon the direction of rotation of the relevant engine and develops full capacity in both directions of rotation.

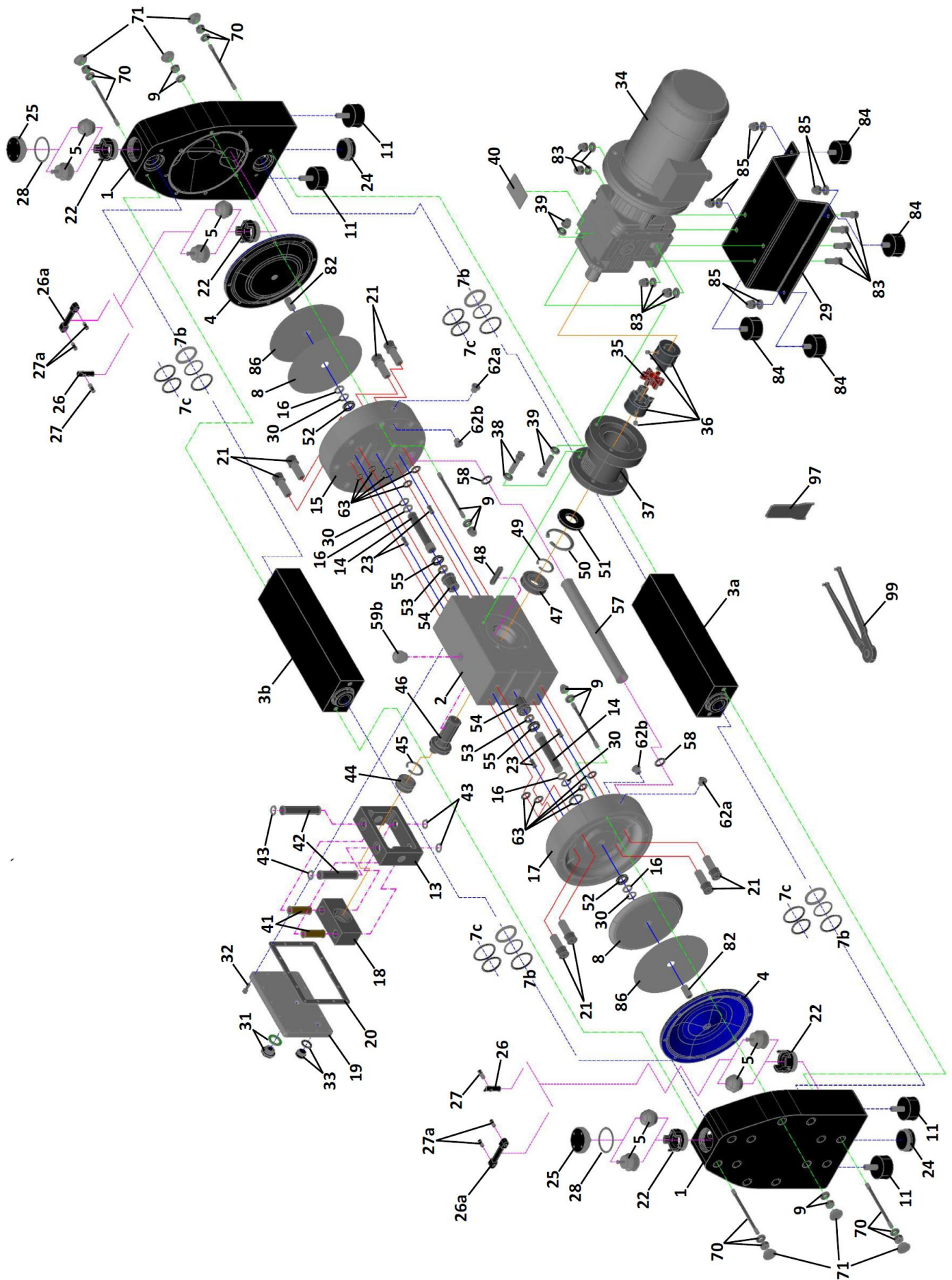
Due to a computer-aided design of the pumps, internal pump spaces and valves are shaped so as to achieve a high efficiency. A high value has also been put on easy maintenance and handling.

5. Names of parts and materials

5.1. DME 15, 25 R., Z.. Plastic Series Diaphragm Pump – exploded view



5.2. DME 40, 50 R., Z.. and DME 80 R.. Plastic Series Diaphragm Pump – exploded view



DME Plastic Series Pumps – list of spare parts

Item	Q-ty	Part name	Material	DME 15	DME 25	DME 40	DME 50	DME 80
1.	2	Pump housing	PE c. + AISI 304	2 15 01E 21	2 25 01E 21	2 40 01E 21	2 50 01E 21	2 80 01E 21
			PTFE c. + AISI 304	2 15 01E 24	2 25 01E 24	2 40 01E 24	2 50 01E 24	-
2.	1	Central housing (with Recoil® inserts)	Alu + AISI 304	1 15 11E 00	1 25 11E 00	1 40 11E 00	1 50 11E 00	1 80 11E 00
3a.	1	Suction port (with Recoil® inserts)	PE c. + AISI 304	2 15 31E 21	2 25 31E 21	2 40 31E 21	2 50 31E 21	2 80 31E 21
			PTFE c. + AISI 304	2 15 31E 24	2 25 31E 24	2 40 31E 24	2 50 31E 24	-
3b.	1	Discharge port (with Recoil® inserts)	PE c. + AISI 304	2 15 31E 21	2 25 30E 21	2 40 30E 21	2 50 30E 21	2 80 30E 21
			PTFE c. + AISI 304	2 15 31E 24	2 25 30E 24	2 40 30E 24	2 50 30E 24	-
4.	2	Diaphragm	TFM/PTFE	1 15 50 05	1 25 50 05	1 40 50 05	1 50 50 05	1 80 50 05
			EPDM	1 15 50 08	1 25 50 08	1 40 50 08	1 50 50 08	1 80 50 08
			NBR	1 15 50 10	1 25 50 10	1 40 50 10	1 50 50 10	1 80 50 10
			TFM/PTFE/PFA	1 15 50 00	1 25 50 00	1 40 50 00	-	-
5.	4	Ball valves	PTFE	1 15 60 23	1 25 60 23	1 40 60 23	1 50 60 23	1 80 60 23
			EPDM	1 15 60 08	1 25 60 08	1 40 60 08	1 50 60 08	1 80 60 08
			NBR	1 15 60 10	1 25 60 10	1 40 60 10	1 50 60 10	1 80 60 10
			AISI 316	1 15 60 52	1 25 60 52	1 40 60 52	1 50 60 52	-
	4	Cylinder valves	Polyurethane	1 15 60 07	1 25 60 07	1 40 60 07	1 50 60 07	-
			PE	2 15 56 20	2 25 56 20	2 40 56 20	2 50 56 20	-
			PTFE	2 15 56 23	2 25 56 23	2 40 56 23	2 50 56 23	-
7a.	4	Sealing inlet/outlet set	EPDM	2 15 70 08	-	-	-	-
			NBR	2 15 70 10	-	-	-	-
			FKM (Viton®)	2 15 70 09	-	-	-	-
			FEP-FKM ⁽¹⁾	2 15 70 04 ⁽¹⁾	-	-	-	-
7b.	4	Sealing inlet/outlet set	EPDM/EPDM	-	2 25 70 08	2 40 70 08	2 50 70 08	2 80 70 08
			NBR/NBR	-	2 25 70 10	2 40 70 10	2 50 70 10	2 80 70 10
			FKM/FKM	-	2 25 70 09	2 40 70 09	2 50 70 09	-
			FEP-FKM/FEP-FKM ⁽¹⁾	-	2 25 70 04	2 40 70 04	2 50 70 04	2 80 70 04 ⁽¹⁾
7c.	4	Sealing inlet/outlet set	PTFE-c./FKM	-	2 25 73 16	2 40 73 16	2 50 73 16	-
			PTFE-c./EPDM ⁽¹⁾	-	2 25 73 17 ⁽¹⁾	2 40 73 17 ⁽¹⁾	2 50 73 17 ⁽¹⁾	-
8.	2	Diaphragm support disc	Aluminium	9 15 253 60	9 25 253 60	9 40 253 60	9 50 253 60	9 80 253 60
9.	1	Housing bolts, complete set ⁽²⁾	AISI 304	2 15 42E 50	2 25 42E 50	2 40 42E 50	2 50 42E 50	2 80 42E 50
11.	4	Pump housing shock absorber	NR/Si37	1 15 69 06	1 25 69 06	1 40 69 06	1 40 69 06	1 80 69 06
13.	1	Piston housing	Carbon steel	9 15 021 54	9 25 021 54	9 40 021 54	9 50 021 54	9 80 021 54
14.	2	Diaphragm shaft	Alloy steel	1 15 41E 58	1 25 41E 58	1 40 41E 58	1 50 41E 58	1 80 41E 58
15.	1	Diaphragm chamber, left	PA	9 15 802 39 ⁽³⁾	9 25 802 39 ⁽³⁾	9 40 802 39	9 50 802 39	9 80 802 39
			Aluminium (for ATEX)	9 15 802 60 ⁽³⁾	9 25 802 60 ⁽³⁾	9 40 802 60	9 50 802 60	9 80 802 60
16.	4	Diaphragm chamber seal	PTFE-PPS	1 15 85 18	1 25 85 18	1 40 85 18	1 50 85 18	1 80 85 18
17.	1	Diaphragm chamber, right	PA	9 15 902 39 ⁽³⁾	9 25 902 39 ⁽³⁾	9 40 902 39	9 50 902 39	9 80 902 39
			Aluminium (for ATEX)	9 15 902 60 ⁽³⁾	9 25 902 60 ⁽³⁾	9 40 902 60	9 50 902 60	9 80 902 60
18.	1	Piston	Carbon steel	9 15 022 54	9 25 022 54	9 40 022 54	9 50 022 54	9 80 022 54
19.	1	Central housing cover	Aluminium	9 15 911 60	9 25 911 60	9 40 911 60	9 50 911 60	9 80 911 60
20.	1	Central housing cover seal	PTFE	9 15 370 23	9 25 370 23	9 40 370 23	9 50 370 23	9 80 370 23
21.	8	Diaphragm chamber mounting bolt	AISI 304	9 15 43E 50	9 25 43E 50	9 40 43E 50	9 50 43E 50	9 80 43E 50
22.	4	Valve seat	PE c.	2 15 54 21	2 25 54 21	2 40 54 21	2 50 54 21	2 80 54 21
			PTFE c.	2 15 54 24	2 25 54 24	2 40 54 24	2 50 54 24	-
23.	4	Chamber locating pin	AISI 304	9 15 163 50	9 25 163 50	9 40 163 50	9 40 163 50	9 80 163 50
24.	2	Plug lower	PE c.	2 15 59 21	2 25 59 21	2 40 59 21	2 50 59 21	2 80 59 21
			PTFE c.	2 15 59 24	2 25 59 24	2 40 59 24	2 50 59 24	-
25.	2	Plug upper	PE c.	2 15 055 21	2 25 055 21	2 40 055 21	2 50 055 21	2 80 055 21
			PTFE c.	2 15 055 24	2 25 055 24	2 40 055 24	2 50 055 24	-
26.	2	Valve stopper	PE c.	2 15 39 21	2 25 39 21	2 40 39 21	2 50 39 21	-
			PTFE c.	2 15 39 24	2 25 39 24	2 40 39 24	2 50 39 24	-
26a.	4	Valve stopper, horizontal	PE c.	-	-	-	-	2 80 39 21
27.	2	Bolt, valve stopper	PE c.	2 15 38 21	2 25 38 21	2 40 38 21	2 50 38 21	-
			PTFE c.	2 15 38 24	2 25 38 24	2 40 38 24	2 50 38 24	-
27a.	4	Bolt, valve stopper horizontal	PE c.	-	-	-	-	2 80 38 21
28.	2	Plug upper sealing	FEP/FKM ⁽⁴⁾	2 15 78 04	2 25 78 04	2 40 78 04	2 50 78 04	2 80 78 04
			EPDM	2 15 78 08	2 25 78 08	2 40 78 08	2 50 78 08	2 80 70 08
			NBR	2 15 78 10	2 25 78 10	2 40 78 10	2 50 78 10	2 80 78 10
29.	1	Pump drive stand	Structural steel	9 15 504 47	9 25 504 47	9 40 504 47	9 50 504 47	9 80 504 47
30.	4/8**	O-ring, diaphragm chamber seal	NBR	1 15 85 10	1 25 85 10**	1 40 85 10	1 50 85 10	1 80 85 10
31.	1	Oil level indicator with seal, set	Diverse	9 15 366 00	9 15 366 00	9 40 366 00	9 40 366 00	9 40 366 00
32.	1	Central housing cover bolt, set	AISI 304	9 15 44E50	9 25 44E50	9 40 44E50	9 50 44E50	9 80 44E50
33.	1	Oil drain plug with seal, set	PE c./NBR	9 15 466 00	9 15 466 00	9 15 466 00	9 15 466 00	9 15 466 00
34.	1	Pump drive (motor with gearbox)	diverse	9 15 920 00	9 25 920 00	9 40 920 00	9 50 920 00	9 80 920 00
35.	1	Flexible coupling element	diverse	9 15 105 00	9 25 105 00	9 40 105 00	9 50 105 00	9 80 105 00
36.	1	Jaw coupling, complete set	diverse	9 15 205 00	9 25 205 00	9 40 205 00	9 50 205 00	9 80 205 00
37.	1	Coupling cover, complete	diverse	9 15 268 00	9 25 268 00	9 40 268 00	9 50 268 00	9 80 268 00
38.	4	Mounting bolt (to c. housing), set ⁽⁵⁾	AISI 304	9 15 144 50	9 25 144 50	9 40 144 50	9 50 144 50	9 80 144 50
39.	4	Mounting bolt (to mono-block), set ⁽⁶⁾	AISI 304	9 15 244 50	9 25 244 50	9 40 244 50	9 50 244 50	9 80 244 50
40.	1	DELLMECO label	Diverse	1 15 094 00	1 25 094 00	1 40 094 00	1 50 094 00	1 80 094 00

Item	Qty	Part name	Material	DME 15	DME 25	DME 40	DME 50	DME 80
41.	2	Piston sleeve	Bronze	9 15 122 86	9 25 122 86	9 40 122 86	9 50 122 86	9 80 122 86
42.	2	Piston mandrel	Carbon steel	9 15 222 54	9 25 222 54	9 40 222 54	9 50 222 54	9 80 222 54
43.	4	Piston mandrel circlip	Diverse	9 15 129 00	9 25 129 00	9 40 129 00	9 50 129 00	9 80 129 00
44.	1	Piston bearing	Diverse	9 15 76 00	9 25 76 00	9 40 76 00	9 50 76 00	9 80 76 00
45.	1	Piston bearing circlip	Diverse	-	-	9 15 429 00	9 25 429 00	-
46.	1	Eccentric shaft	Carbon steel	1 15 13E 54	1 25 13E 54	1 40 13E 54	1 5013E 54	1 80 13E 54
47.	1	Eccentric shaft bearing	Diverse	9 15 176 00	9 25 176 00	9 40 176 00	9 50 176 00	9 80 176 00
48.	1	Parallel key	Diverse	9 15 39E 00	9 25 39E 00	9 40 39E 00	9 50 39E 00	9 80 39E 00
49.	1	Shaft bearing circlip, internal	Diverse	9 15 329 00	9 25 329 00	9 40 329 00	9 50 329 00	9 80 329 00
50.	1	Shaft bearing circlip, external	Diverse	9 15 429 00	9 25 429 00	9 40 429 00	9 50 429 00	9 80 429 00
51.	1	Main drive shaft seal	Diverse	9 15 273 00	9 25 273 00	9 40 273 00	9 50 273 00	9 80 273 00
52.	1	Diaphragm shaft hub seal, set	Diverse	9 15 373 00	9 25 373 00	9 40 373 00	9 50 373 00	9 80 373 00
53.	2	Central housing sleeve gasket	PTFE/PPS	1 15 88E 18	1 25 88E 18	1 40 88E 18	1 50 88E 18	1 80 88E 18
54.	2	Central housing sleeve	Bronze	1 15 12E 86	1 25 12E 86	1 40 12E 86	1 50 12E 86	1 80 12E 86
55.	1	Central housing hub seal, set	Diverse	9 15 473 00	9 25 473 00	9 40 473 00	9 50 473 00	9 80 473 00
56.	2	Rotary male, elbow	Diverse	1 15 67 00	1 15 67 00	1 40 67 00	-	-
57.	1	Air hose/Air tube ⁽⁵⁾	Diverse/Aluminium ⁽⁷⁾	1 15 267 00	1 25 267 00	1 40 267 00	1 50 267 60 ⁽⁷⁾	1 80 267 60 ⁽⁷⁾
58.	2	Air tube sealing, O-ring	EPDM	-	-	-	3 20 70 08	3 20 70 08
59a.	1	Oil refill/vent plug	Diverse	9 15 66E 00	9 15 66E 00	-	-	-
59b.	1	Oil refill/vent plug	Diverse	-	-	9 40 66E 00	9 40 66E 00	9 40 66E 00
60.	1	Oil refill plug adapter	PE c.	9 15 97E 21	9 15 97E 21	-	-	-
61.	1	Adapter O-ring	NBR	1 15 85 10	1 15 85 10	-	-	-
62a.	2	Diaphragm chamber plug	Diverse	9 15 67E 00	9 25 67E 00	9 40 67E 00	9 40 67E 00	-
62b.	2	Diaphragm chamber plug	Diverse	-	-	-	-	9 40 67E 00 ⁽⁸⁾
63.	2	Diaphragm chamber ext. seals, set	EPDM	-	-	-	9 50 70E 08	9 80 70E 08
70.	1	Inlet/outlet bolts, complete set ⁽⁹⁾	AISI 304	9 15 444 50	9 25 444 50	9 40 444 50	9 50 444 50	9 80 444 50
71.	1	Pump housing plug set	PE	2 15 58E 20	2 25 58E 20	2 40 58E 20	2 50 58E 20	2 80 58E 20
82.	2	Shaft allen pin screw	AISI 304	1 15 540 50	1 25 540 50	1 40 540 50	1 50 540 50	1 80 540 50
83.	4	Pump drive mounting bolt, set ⁽¹⁰⁾	AISI 304	9 15 344 50	9 25 344 50	9 40 344 50	9 50 344 50	9 80 344 50
84.	4	Pump stand shock absorber	NR/St37	1 15 69 06	1 25 69 06	1 25 69 06	1 40 69 06	1 80 69 06
85.	4	Shock absorber mounting bolt, set ⁽¹¹⁾	AISI 304	1 15 544 50	1 25 544 50	1 40 544 50	1 50 544 50	1 80 544 50
86.	2	Diaphragm disc washer	TFM/PTFE	9 15 73E 05	9 25 73E 05	9 40 73E 05	9 50 73E 05	9 80 70E 05
97.	1	Valve seat key	AISI 304	1 15 254 50	1 25 254 50	1 40 254 50	1 50 254 50	1 80 254 50
99.	1	Upper/lower plug key	Diverse	1 08 58 00				

Explanation of symbols:

⁽¹⁾ – standard in-/outlet sealing execution for Plastic Series Pump with TFM/PTFE diaphragms (depending on the pump size)

⁽²⁾ – complete set of housing bolts with nuts and washers required per 1 pump (in-/outlet bolts not contained – refer to Item 70 in the above chart)

⁽³⁾ – diaphragm chamber with Recoil® inserts

⁽⁴⁾ – standard upper plug sealing execution for Plastic Series Pump with TFM/PTFE diaphragms

⁽⁵⁾ – set consists of: allen bolts (4 pcs) and washers (4 pcs); required per 1 pump

⁽⁶⁾ – set consists of: allen bolts (4 pcs), covered nuts (4 pcs) and washers (8 pcs); required per 1 pump

⁽⁷⁾ – Aluminium air tube available only for DME 50 and DME 80 Plastic Series Pumps

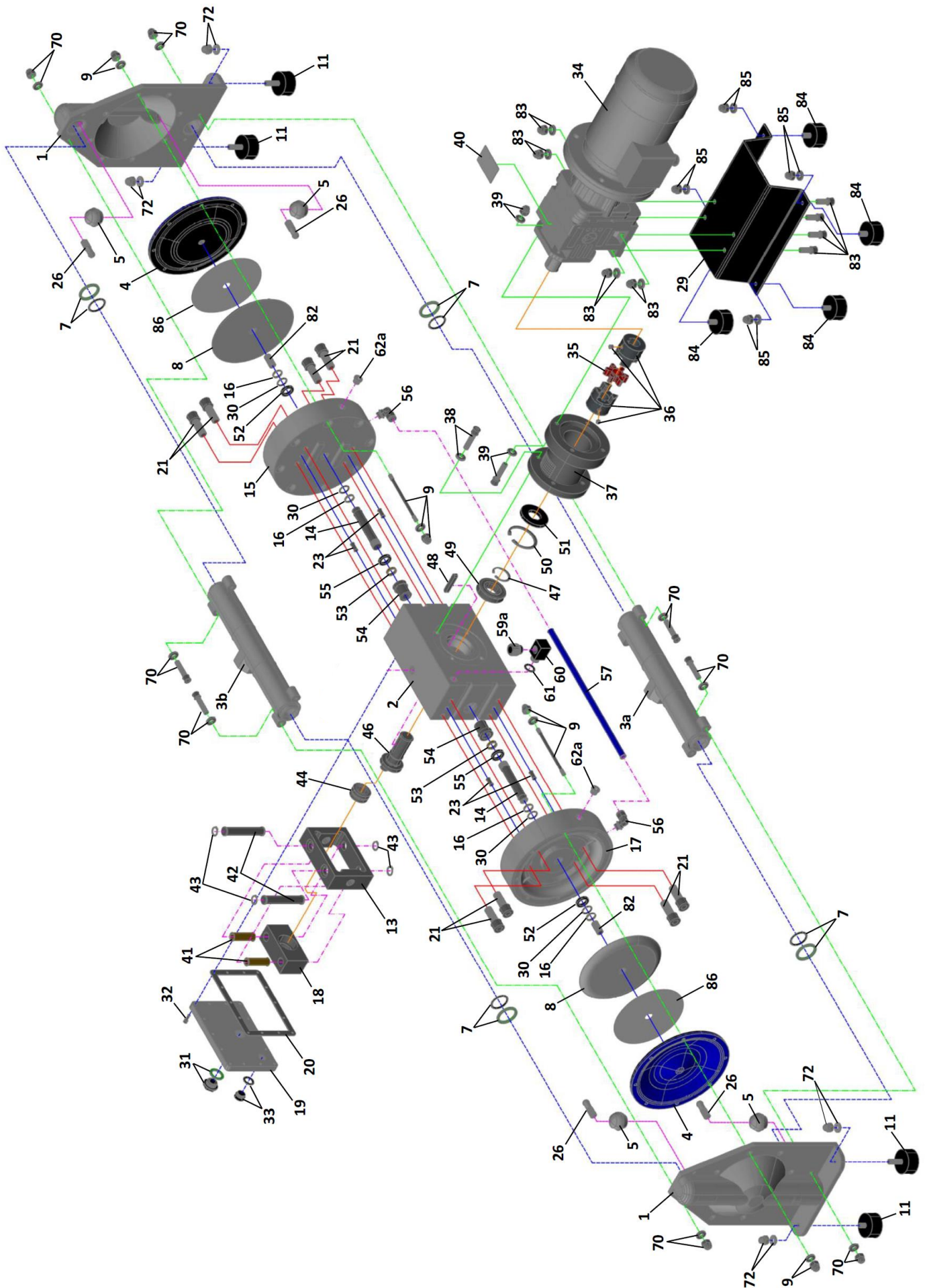
⁽⁸⁾ – in DME 80 Plastic Series Pumps diaphragm chamber plug is located on the back of diaphragm chamber

⁽⁹⁾ – complete set of in-/outlet bolts, with nuts and washers for 1 pump (housing bolts not contained – refer to Item 9 in the above chart)

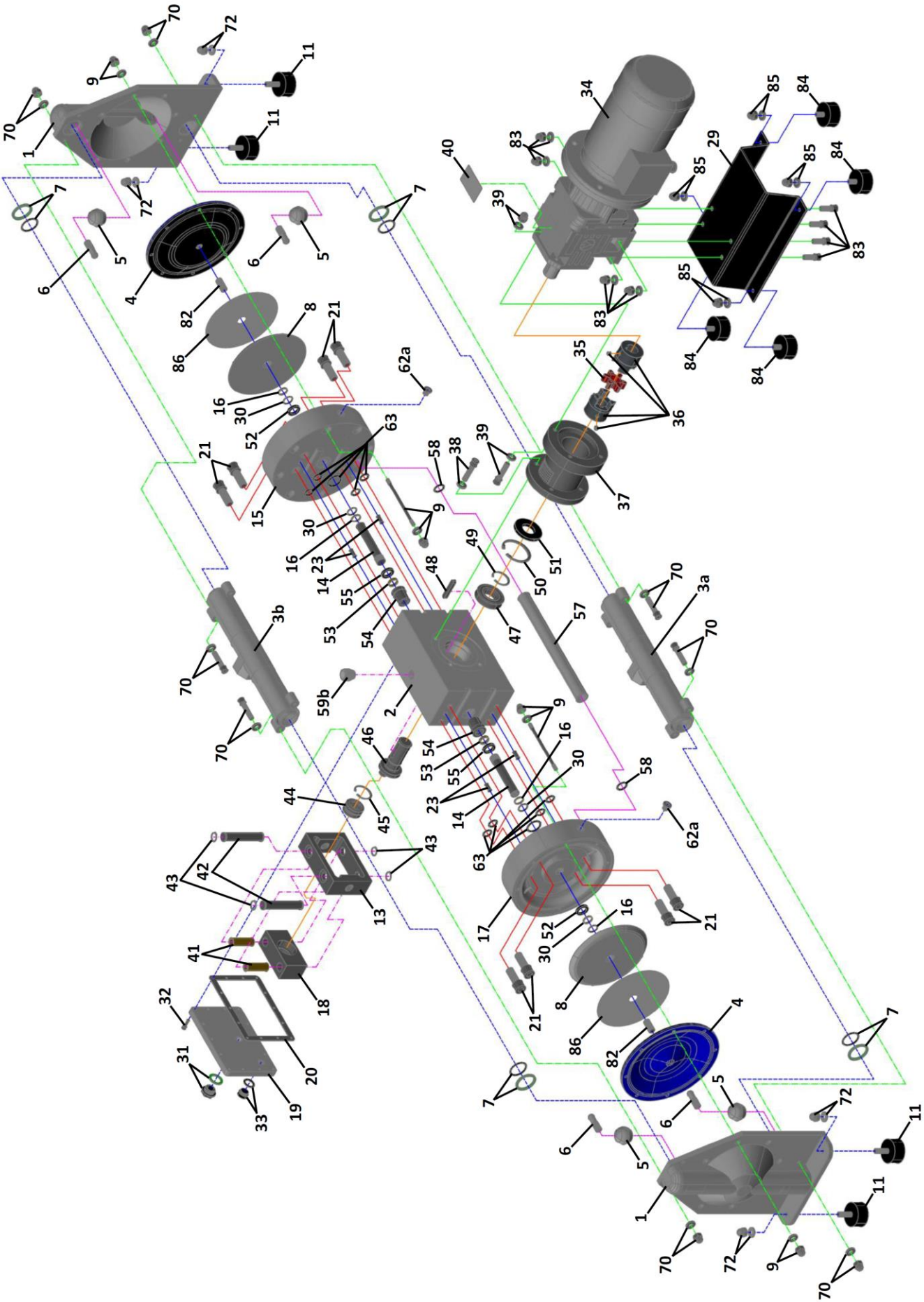
⁽¹⁰⁾ – set consists of: allen bolts (4 pcs), nuts (4 pcs) and washers (8 pcs); required per 1 pump

⁽¹¹⁾ – set consists of: covered nuts (4 pcs) and washers (4 pcs); required per 1 pump

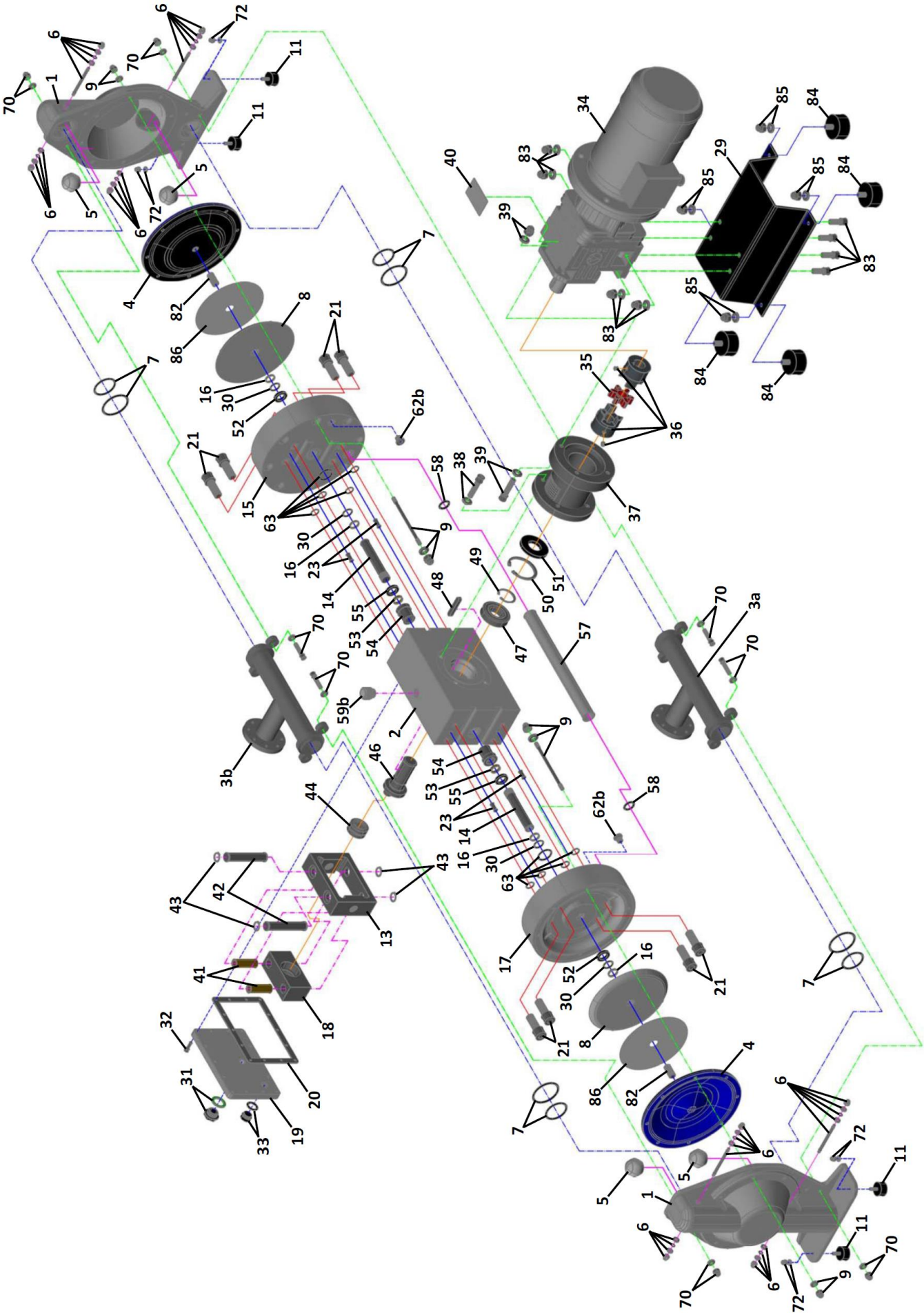
5.3. DME 20, 25, 40 A., C., S.. Metal Series Diaphragm Pump – exploded view



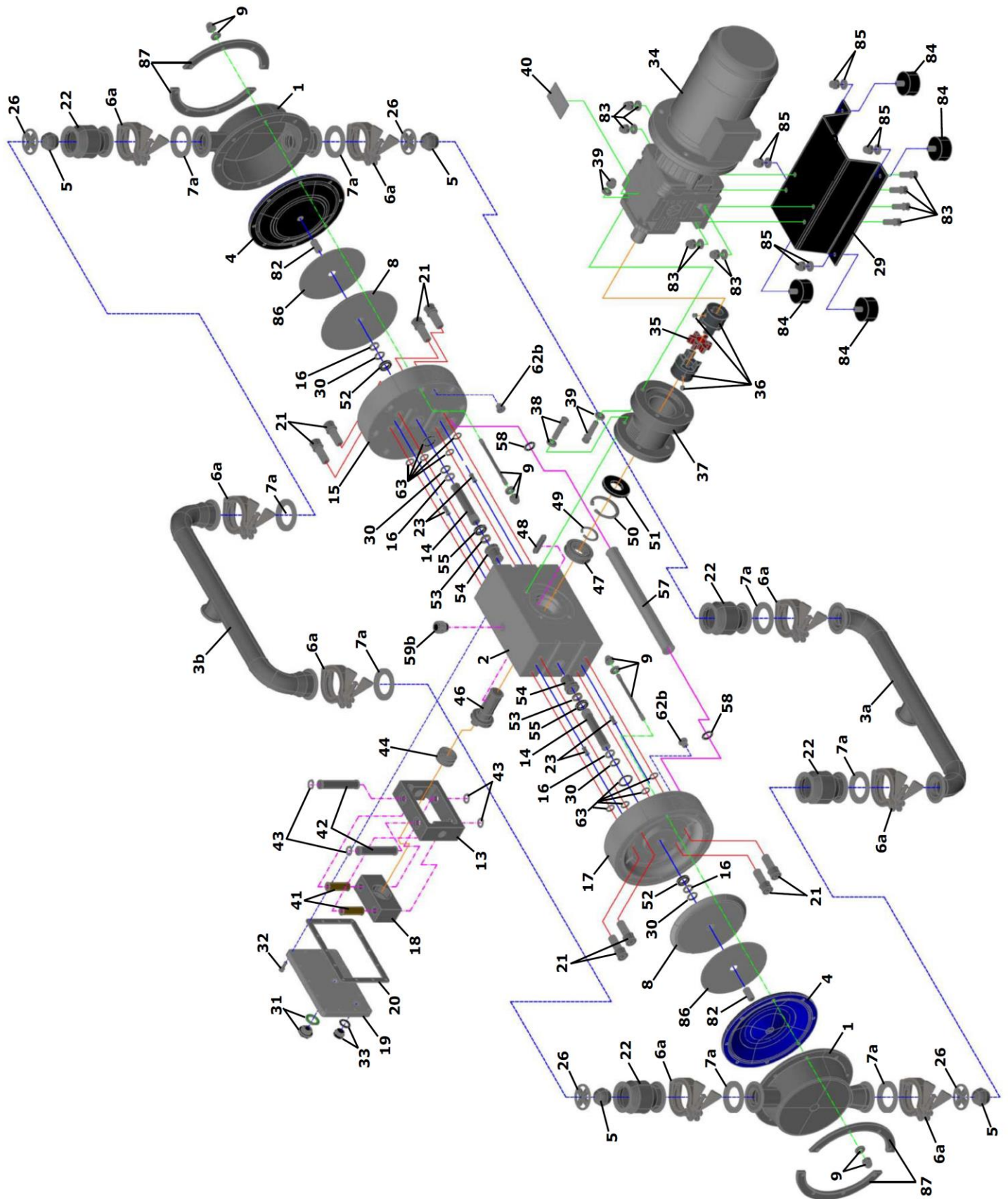
5.4. DME 50 A., C., S.. Metal Series Diaphragm Pump – exploded view



5.5. DME 80 A., B.. Metal Series Diaphragm Pump – exploded view



5.6. DME 80 S.. Metal Series Diaphragm Pump – exploded view



DME Metal Series Pumps – list of spare parts

Item	Q-ty	Part name	Material	DME 20	DME 25	DME 40	DME 50	DME 80 A..	DME 80 S..
1.	2	Pump housing	AISI 316/AISI 316L*	3 20 01E 52	3 25 01E 52	3 40 01E 52	3 50 01E 52	-	5 80 01E 53*
			Alu	3 20 01E 60	3 25 01E 60	3 40 01E 60	3 50 01E 60	3 80 01E 60	-
			Alu, PTFE coated	3 20 01E 61	3 25 01E 61	3 40 01E 61	3 50 01E 61	3 80 01E 61	-
			Cast Iron	3 20 01E 65	3 25 01E 65	3 40 01E 65	3 50 01E 65	-	-
2.	1	Central housing (with Recoil® inserts)	Alu + AISI 304	1 15 11E 00	1 25 11E 00	1 40 11E 00	1 50 11E00	1 80 11E 00	1 80 11E 00
3a.	1	Suction port	AISI 316/AISI 316L*	3 20 31E 52	3 25 31E 52	3 40 31E 52	3 50 31E 52	3 80 31E 52	5 80 31E 53*
3b.	1	Discharge port	AISI 316/AISI 316L*	3 20 30E 52	3 25 30E 52	3 40 30E 52	3 50 30E 52	3 80 30E 52	5 80 30E 53*
4.	2	Diaphragm	TFM/PTFE	1 15 50 05	1 25 50 05	1 40 50 05	1 50 50 05	1 80 50 05	1 80 50 05
			EPDM	1 15 50 08	1 25 50 08	1 40 50 08	1 50 50 08	1 80 50 08	1 80 50 08
			NBR	1 15 50 10	1 25 50 10	1 40 50 10	1 50 50 10	1 80 50 10	1 80 50 10
			TFM/PTFE/PFA	1 15 50 00	1 25 50 00	1 40 50 00	-	-	-
5.	4	Ball valves	PTFE	1 15 60 23	1 25 60 23	1 40 60 23	1 50 60 23	1 80 60 23	4 80 60 23
			EPDM	1 15 60 08	1 25 60 08	1 40 60 08	1 50 60 08	1 80 60 08	4 80 60 08
			NBR	1 15 60 10	1 25 60 10	1 40 60 10	1 50 60 10	1 80 60 10	4 80 60 10
			AISI 316	1 15 60 52	1 25 60 52	1 40 60 52	1 50 60 52	-	-
6.	4	Ball valve stopper	Polyurethane	1 15 60 07	1 25 60 07	1 40 60 07	1 50 60 07	-	-
			AISI 304 (A.. Pump)	3 20 39 50	3 25 39 50	3 40 39 50	3 50 39 50	3 80 139 50	-
			AISI 316 (S.. Pump)	5 20 39 52	5 25 39 52	5 40 39 52	5 50 39 52	-	-
6a.	8	Clamp (DME 80 S.. Pump only)	AISI 304	-	-	-	-	-	4 80 36 50
7.	4	Sealing in-/outlet set (O-ring with seal plate)	EPDM ⁽¹⁾	3 20 70 08	3 25 70 08	3 40 70 08	3 50 70 08	3 80 70 08	-
			NBR	3 20 70 10	3 25 70 10	3 40 70 10	3 50 70 10	3 80 70 10	-
			FKM (Viton)	3 20 70 09	3 25 70 09	3 40 70 09	3 50 70 09	-	-
			FEP/FKM ⁽²⁾	3 20 70 04	3 25 70 04	3 40 70 04	3 50 70 04	-	-
7a.	8	Clamp sealing (DME 80 S.. Pump only)	PTFE	-	-	-	-	-	4 80 70 23
			EPDM	-	-	-	-	-	4 80 70 08
			NBR	-	-	-	-	-	4 80 70 10
8.	2	Diaphragm support disc	Aluminium	9 15 253 60	9 25 253 60	9 40 253 60	9 50 253 60	9 80 253 60	9 80 253 60
9.	1	Housing bolts, Alu, CI Pumps, set ⁽³⁾	AISI 304	3 15 42E 50	3 25 42E 50	3 40 42E 50	3 50 42E 50	3 80 42E 50	-
	1	Housing bolts, AISI 316 Pump, set ⁽³⁾	AISI 304	5 15 42E 50	5 25 42E 50	5 40 42E 50	5 50 42E 50	-	4 80 42E 50
11.	4	Pump housing shock absorber	NR/St37 (A.., B.., C..)	1 15 69 06	1 25 69 06	1 25 69 06	1 40 69 06	1 80 69 06	-
			NR/A2 (only S..)	1 15 69 52	1 25 69 52	1 25 69 52	1 40 69 52	-	-
13.	1	Piston housing	Carbon steel	9 15 021 54	9 25 021 54	9 40 021 54	9 50 021 54	9 80 021 54	9 80 021 54
14.	2	Diaphragm shaft	Alloy steel	1 15 40E 58	1 25 40E 58	1 40 40E 58	1 50 40E 58	1 80 40E 58	1 80 40E 58
15.	1	Diaphragm chamber, left	PA	9 15 802 39 ⁽⁴⁾	9 25 802 39 ⁽⁴⁾	9 40 802 39	9 50 802 39	9 80 802 39	9 80 802 39
			Aluminium	9 15 802 60 ⁽⁴⁾	9 25 802 60 ⁽⁴⁾	9 40 802 60	9 50 802 60	9 80 802 60	9 80 802 60
16.	4	Diaphragm chamber seal	PTFE-PPS	1 15 85 18	1 25 85 18	1 40 85 18	1 50 85 18	1 80 85 18	1 80 85 18
17.	1	Diaphragm chamber, right	PA	9 15 902 39 ⁽⁴⁾	9 25 902 39 ⁽⁴⁾	9 40 902 39	9 50 902 39	9 80 902 39	9 80 902 39
			Aluminium	9 15 902 60 ⁽⁴⁾	9 25 902 60 ⁽⁴⁾	9 40 902 60	9 50 902 60	9 80 902 60	9 80 902 60
18.	1	Piston	Carbon steel	9 15 022 54	9 25 022 54	9 40 022 54	9 50 022 54	9 80 022 54	9 80 022 54
19.	1	Central housing cover	Aluminium	9 15 911 60	9 25 911 60	9 40 911 60	9 50 911 60	9 80 911 60	9 80 911 60
20.	1	Central housing cover seal	PTFE	9 15 370 23	9 25 370 23	9 40 370 23	9 50 370 23	9 80 370 23	9 80 370 23
21.	8	Diaphragm chamber mounting bolt	AISI 304	9 15 43E 50	9 25 43E 50	9 40 43E 50	9 50 43E 50	9 80 43E 50	9 80 43E 50
22.	4	Ball valve seat (DME 80 S.. only)	AISI 316L	-	-	-	-	-	4 80 54 53
23.	4	Chamber locating pin	AISI 304	9 15 163 50	9 25 163 50	9 40 163 50	9 40 163 50	9 80 163 50	9 80 163 50
26.	4	Ball valve stopper (DME 80 S.. only)	AISI 316L	-	-	-	-	-	4 80 39 53
29.	1	Pump drive stand	Alloy steel	9 20 604 47	9 25 604 47	9 40 604 47	9 50 604 47	9 80 704 47	9 80 804 47
30.	4/8**	O-ring, diaphragm chamber seal	NBR	1 15 85 10	1 25 85 10**	1 40 85 10	1 50 85 10	1 80 85 10	1 80 85 10
31.	1	Oil level indicator with seal, set	Diverse	9 15 366 00	9 15 366 00	9 40 366 00	9 40 366 00	9 40 366 00	9 40 366 00
32.	1	Central housing cover bolt, set	AISI 304	9 15 44E 50	9 25 44E 50	9 40 44E 50	9 50 44 E50	9 80 44E 50	9 80 44E 50
33.	1	Oil drain plug with seal, set	PE c./NBR	9 15 466 00	9 15 466 00	9 15 466 00	9 15 466 00	9 15 466 00	9 15 466 00
34.	1	Pump drive (motor with gearbox)	diverse	9 15 920 00	9 25 920 00	9 40 920 00	9 50 920 00	9 80 920 00	9 80 920 00
35.	1	Flexible coupling element	diverse	9 15 105 00	9 25 105 00	9 40 105 00	9 50 105 00	9 80 105 00	9 80 105 00
36.	1	Jaw coupling, complete set	diverse	9 15 205 00	9 25 205 00	9 40 205 00	9 50 205 00	9 80 205 00	9 80 205 00
37.	1	Coupling cover, complete	diverse	9 15 268 00	9 25 268 00	9 40 268 00	9 50 268 00	9 80 268 00	9 80 268 00
38.	1	Mounting bolt (to c. housing), set ⁽⁵⁾	AISI 304	9 15 144 50	9 25 144 50	9 40 144 50	9 50 144 50	9 80 144 50	9 80 144 50
39.	1	Mounting bolt (to monoblock), set ⁽⁶⁾	AISI 304	9 15 244 50	9 25 244 50	9 40 244 50	9 50 244 50	9 80 244 50	9 80 244 50
40.	1	DELLMECO label	Diverse	1 15 094 00	1 25 094 00	1 40 094 00	1 50 094 00	1 80 094 00	1 80 094 00
41.	2	Piston sleeve	Bronze	9 15 122 86	9 25 122 86	9 40 122 86	9 50 122 86	9 80 122 86	9 80 122 86
42.	2	Piston mandrel	Carbon steel	9 15 222 54	9 25 222 54	9 40 222 54	9 50 222 54	9 80 222 54	9 80 222 54
43.	4	Piston mandrel circlip	Diverse	9 15 129 00	9 25 129 00	9 40 129 00	9 50 129 00	9 80 129 00	9 80 129 00
44.	1	Piston bearing	Diverse	9 15 76 00	9 25 76 00	9 40 76 00	9 50 76 00	9 80 76 00	9 80 76 00
45.	1	Piston bearing circlip	Diverse	-	-	9 15 429 00	9 25 429 00	-	-
46.	1	Eccentric shaft	Carbon steel	1 15 13E 54	1 25 13E 54	1 40 13E 54	1 50 13E 54	1 80 13E 54	1 80 13E 54
47.	1	Eccentric shaft bearing	Diverse	9 15 176 00	9 25 176 00	9 40 176 00	9 50 176 00	9 80 176 00	9 80 176 00
48.	1	Parallel key	Diverse	9 15 39E 00	9 25 39E 00	9 40 39E 00	9 50 39E 00	9 80 39E 00	9 80 39E 00
49.	1	Shaft bearing circlip, internal	Diverse	9 15 329 00	9 25 329 00	9 40 329 00	9 50 329 00	9 80 329 00	9 80 329 00
50.	1	Shaft bearing circlip, external	Diverse	9 15 429 00	9 25 429 00	9 40 429 00	9 50 429 00	9 80 429 00	9 80 429 00
51.	1	Main drive shaft seal	Diverse	9 15 273 00	9 25 273 00	9 40 273 00	9 50 273 00	9 80 273 00	9 80 273 00
52.	1	Diaphragm shaft hub seal, set	Diverse	9 15 373 00	9 25 373 00	9 40 373 00	9 50 373 00	9 80 373 00	9 80 373 00

Item	Q-ty	Part name	Material	DME 20	DME 25	DME 40	DME 50	DME 80 A..	DME 80 S..
53.	2	Central housing sleeve gasket	PTFE/PPS	1 15 88E 18	1 25 88E 18	1 40 88E 18	1 50 88E 18	1 80 88E 18	1 80 88E 18
54.	2	Central housing sleeve	Bronze	1 15 12E 86	1 25 12E 86	1 40 12E 86	1 50 12E 86	1 80 12E 86	1 80 12E 86
55.	1	Central housing hub seal, set	Diverse	9 15 473 00	9 25 473 00	9 40 473 00	9 50 473 00	9 80 473 00	9 80 473 00
56.	2	Rotary male, elbow	Diverse	1 15 67 00	1 15 67 00	1 40 67 00	-	-	-
57.	1	Air hose/Air tube ⁽⁷⁾	Diverse/Aluminium ⁽⁷⁾	1 15 267 00	1 25 267 00	1 40 267 00	1 50 267 60 ⁽⁷⁾	1 80 267 60 ⁽⁷⁾	1 80 267 60 ⁽⁷⁾
58.	2	Air tube sealing, O-ring	EPDM	-	-	-	3 20 70 08	3 20 70 08	3 20 70 08
59a.	1	Oil refill/vent plug	Diverse	9 15 66E 00	9 15 66E 00	-	-	-	-
59b.	1	Oil refill/vent plug	Diverse	-	-	9 40 66E 00	9 40 66E 00	9 40 66E 00	9 40 66E 00
60.	1	Oil refill plug adapter	PE c.	9 15 97E 21	9 15 97E 21	-	-	-	-
61.	1	Adapter O-ring	NBR	1 15 85 10	1 15 85 10	-	-	-	-
62a.	2	Diaphragm chamber plug	Diverse	9 15 67E 00	9 25 67E 00	9 40 67E 00	9 40 67E 00	-	-
62b.	2	Diaphragm chamber plug	Diverse	-	-	-	-	9 40 67E 00 ⁽⁸⁾	9 40 67E 00 ⁽⁸⁾
63.	2	Diaphragm chamber ext. seals, set (DME 50 size only)	EPDM	-	-	-	9 50 70E 08	9 80 70E 08	9 80 70E 08
70.	1	Inlet/outlet screws, complete set ⁽⁹⁾	AISI 304	9 15 444 50	9 25 444 50	9 40 444 50	9 50 444 50	9 80 444 50	-
72.	4	Shock absorber mounting set	Zinc-plated steel	1 15 45 48	1 15 45 48	1 25 45 48	1 40 45 48	1 80 45 48	-
			AISI 304	1 15 45 50	1 25 45 50	1 25 45 50	1 40 45 50	-	-
82.	2	Shaft allen pin screw	AISI 304	1 15 540 50	1 25 540 50	1 40 540 50	1 50 540 50	1 80 540 50	1 80 540 50
83.	1	Pump drive mounting bolt, set ⁽¹⁰⁾	AISI 304	9 15 344 50	9 25 344 50	9 40 344 50	9 50 344 50	9 80 344 50	9 80 344 50
84.	4	Pump stand shock absorber	NR/St37	1 15 69 06	1 15 69 06	1 25 69 06	1 40 69 06	1 80 69 06	1 80 69 06
85.	1	Shock absorber mounting bolt, set ⁽¹¹⁾	AISI 304	1 15 544 50	1 25 544 50	1 40 544 50	1 50 544 50	1 80 544 50	1 80 544 50
86.	2	Diaphragm disc washer	TFM/PTFE	9 15 73E 05	9 25 73E 05	9 40 73E 05	9 50 73E 05	9 80 73E 05	9 80 73E 05
87.	4	Side housing reinforcement ring (DME 80 S.. only)	AISI 304	-	-	-	-	-	4 80 529 50

Explanation of symbols:

⁽¹⁾ – standard in-/outlet sealing execution for Aluminium Series Pump with TFM/PTFE or EPDM diaphragms

⁽²⁾ – standard in-/outlet sealing execution for AISI 316 (Industrial) Series Pump with TFM/PTFE diaphragms

⁽³⁾ – complete set of housing bolts with nuts and washers for 1 pump (in-/outlet allen bolts not contained – refer to Item 70 in the above chart)

⁽⁴⁾ – diaphragm chamber with Recoil® inserts

⁽⁵⁾ – set consists of: allen bolts (4 pcs) and washers (4 pcs); required per 1 pump

⁽⁶⁾ – set consists of: allen bolts (4 pcs), covered nuts (4 pcs) and washers (8 pcs); required per 1 pump

⁽⁷⁾ – Aluminium air tube available only for DME 50 and DME 80 Metal Series Pumps

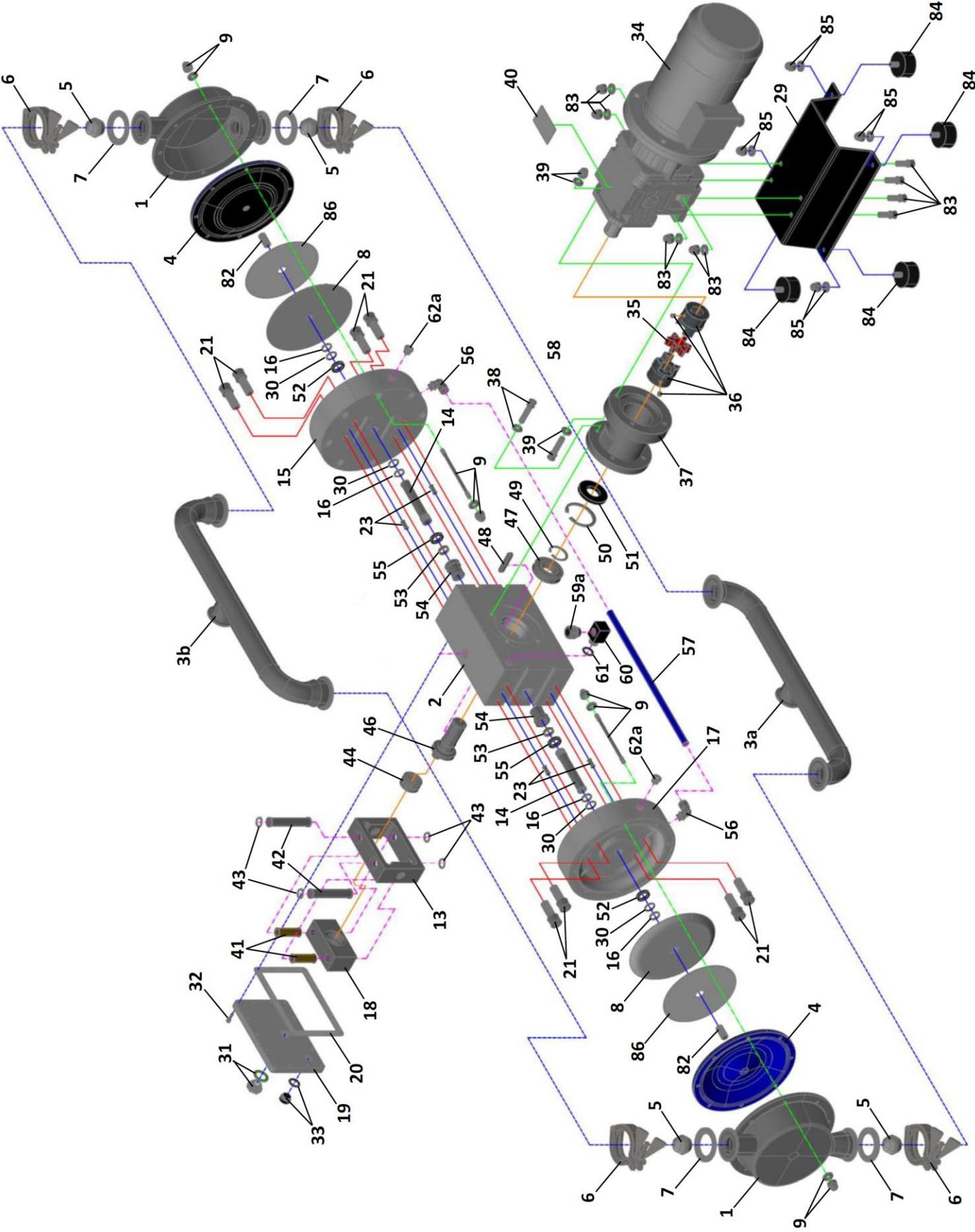
⁽⁸⁾ – in DME 80 Metal Series Pumps diaphragm chamber plug is located on the back of each diaphragm chamber

⁽⁹⁾ – complete set of in-/outlet allen bolts, with nuts and washers for 1 pump (housing bolts not contained – refer to Item 9 in the above chart)

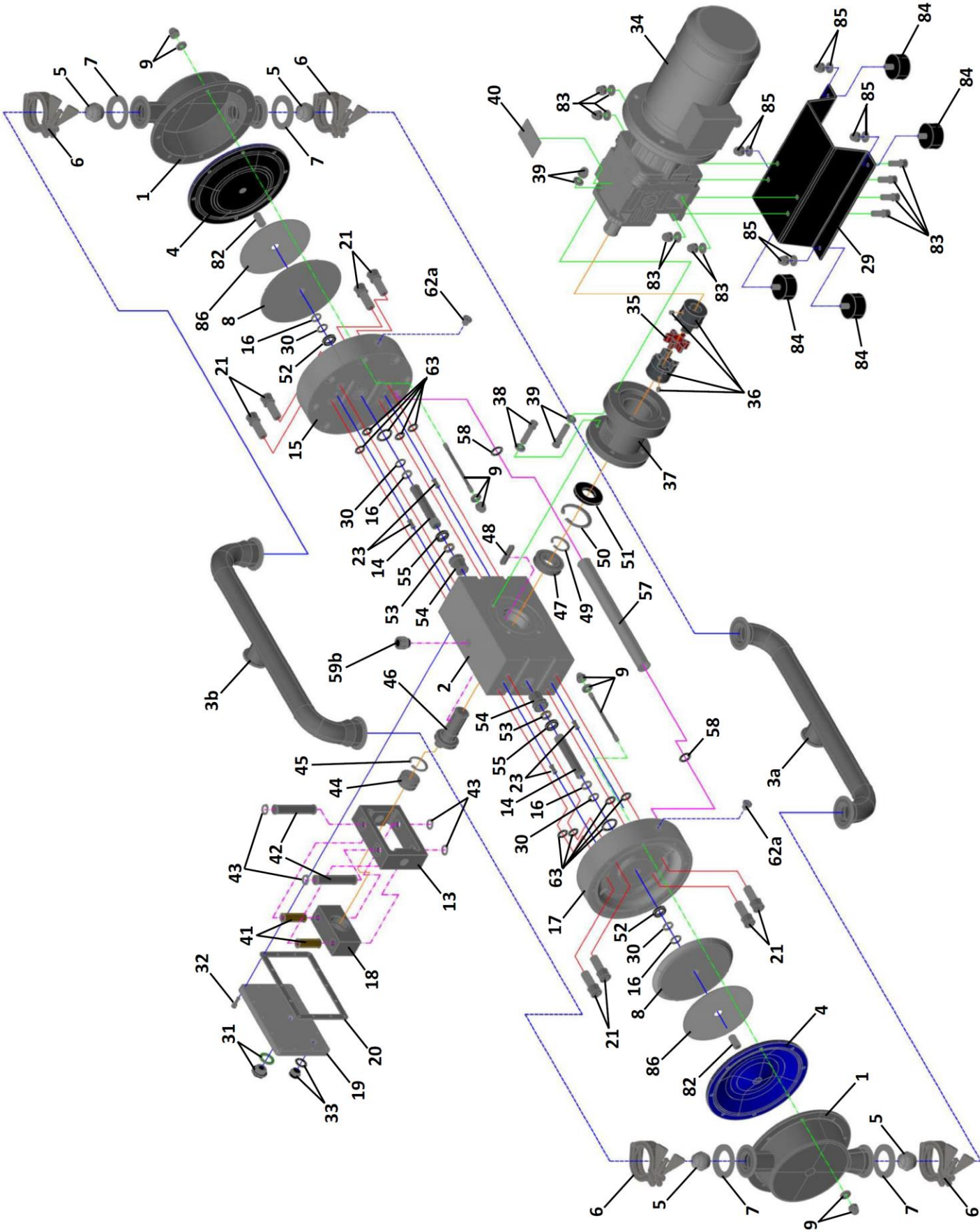
⁽¹⁰⁾ – set consists of: allen bolts (8 pcs), covered nuts (8 pcs) and washers (8 pcs); required per 1 pump

⁽¹¹⁾ – set consists of: covered nuts (4 pcs) and washers (4 pcs); required per 1 pump

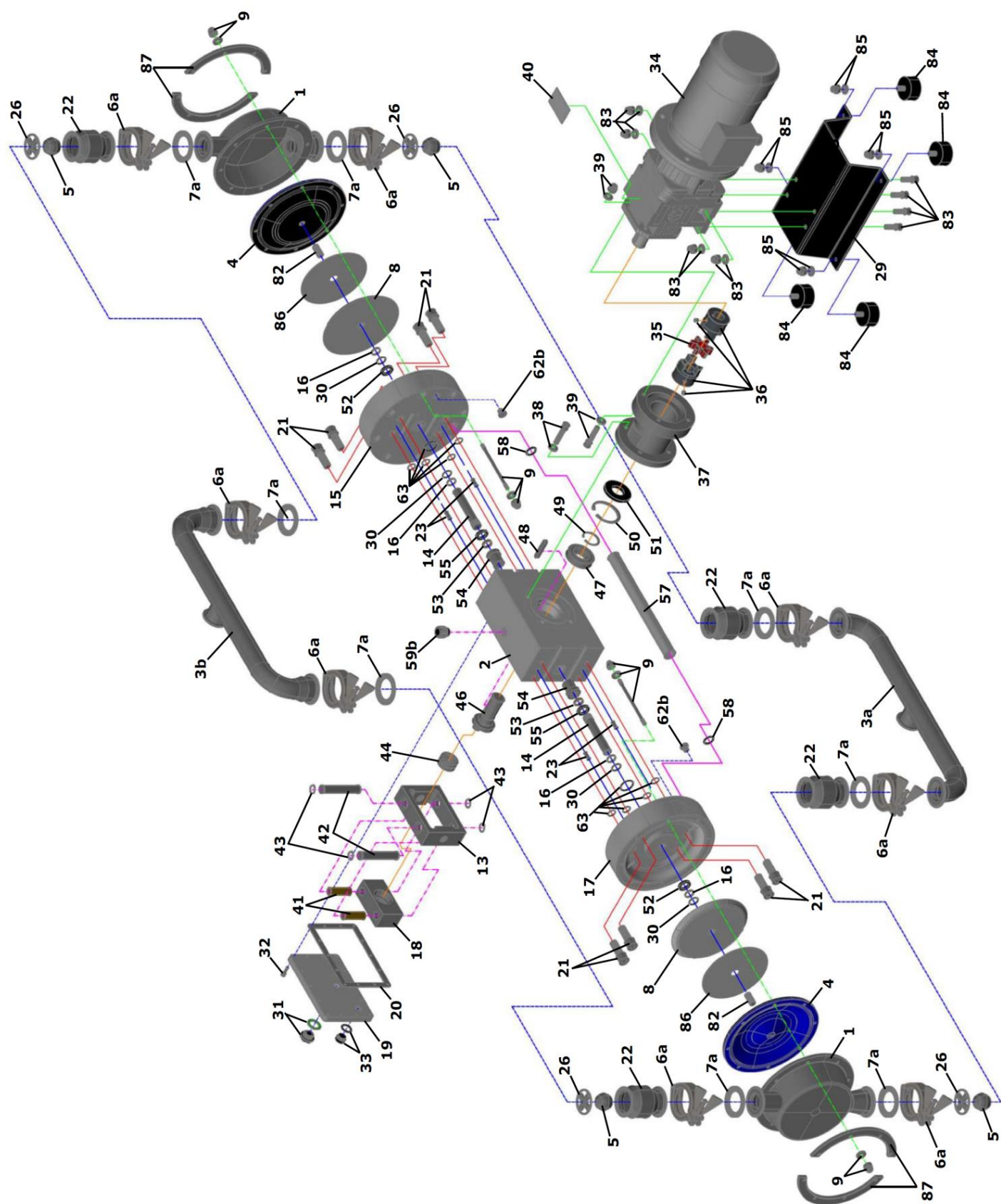
5.7. DME 25, 40, 50 H.. Hygienic Series Diaphragm Pump – exploded view



5.8. DME 65 H.. Hygienic Series Diaphragm Pump – exploded view



5.9. DME 80 H.. Hygienic Series Diaphragm Pump – exploded view



DME Hygienic Series Pumps – list of spare parts

Item	Q-ty	Part name	Material	DME 25	DME 40	DME 50	DME 65	DME 80
1.	2	Pump housing	AISI 316L	4 25 01E 53	4 40 01E 53	4 50 01E 53	4 65 01E 53	4 80 01E 53
2.	1	Central housing (with Recoil inserts)	Alu + AISI 304	1 15 11E 00	1 25 11E 00	1 40 11E 00	1 50 11E00	1 80 11E 00
3a.	1	Suction port, DIN	AISI 316L	4 25 30E 53	4 40 30E 53	4 50 30E 53	4 65 30E 53	4 80 30E 53
		Suction port, SMS	AISI 316L	4 25 31E 53	4 40 31E 53	4 50 31E 53	4 65 31E 53	4 80 31E 53
		Suction port, Tri-Clamp	AISI 316L	4 25 32E 53	4 40 32E 53	4 50 32E 53	4 65 32E 53	4 80 32E 53
3b.	1	Discharge port, DIN	AISI 316L	4 25 33E 53	4 40 33E 53	4 50 33E 53	4 65 33E 53	4 80 33E 53
		Discharge port, SMS	AISI 316L	4 25 34E 53	4 40 34E 53	4 50 34E 53	4 65 34E 53	4 80 33E 53
		Discharge port, Tri-Clamp	AISI 316L	4 25 35E 53	4 40 35E 53	4 50 35E 53	4 65 35E 53	4 80 35E 53
4.	2	Diaphragm	TFM/PTFE	1 15 50 05	1 25 50 05	1 40 50 05	1 50 50 05	1 80 50 05
			EPDM	1 15 50 08	1 25 50 08	1 40 50 08	1 50 50 08	1 80 50 08
			NBR	1 15 50 10	1 25 50 10	1 40 50 10	1 50 50 10	1 80 50 10
			TFM/PTFE/PFA	1 15 50 00	1 25 50 00	1 40 50 00	-	-
5.	4	Ball valves	PTFE	1 15 60 23	1 25 60 23	1 40 60 23	1 50 60 23	4 80 60 23
			EPDM	1 15 60 08	1 25 60 08	1 40 60 08	1 50 60 08	4 80 60 08
			NBR	1 15 60 10	1 25 60 10	1 40 60 10	1 50 60 10	4 80 60 10
			AISI 316	1 15 60 52	1 25 60 52	1 40 60 52	1 50 60 52	-
			Polyurethane	1 15 60 07	1 25 60 07	1 40 60 07	1 50 60 07	-
6.	4/8*	Clamp	AISI 304	4 25 36 50	4 40 36 50	4 50 36 50	4 65 36 50	4 80 36 50*
7.	4/8**	Clamp sealing	PTFE	4 25 70 23	4 40 70 23	4 50 70 23	4 65 70 23	4 80 70 23**
			EPDM	4 25 70 08	4 40 70 08	4 50 70 08	4 65 70 08	4 80 70 08**
			NBR	4 25 70 10	4 40 70 10	4 50 70 10	4 65 70 10	4 80 70 10**
			FKM	4 25 70 09	4 40 70 09	4 50 70 09	4 65 70 09	4 80 70 09**
			Silicone	4 25 70 11	4 40 70 11	4 50 70 11	4 65 70 11	4 80 70 11**
8.	2	Diaphragm support disc	Aluminium	9 15 253 60	9 25 253 60	9 40 253 60	9 50 253 60	9 80 253 60
9.	1	Housing bolts, set ⁽¹⁾	AISI 304	4 25 42E 50	4 40 42E 50	4 50 42E 50	4 65 42E 50	4 80 42E 50
13.	1	Piston housing	Carbon steel	9 15 021 54	9 25 021 54	9 40 021 54	9 50 021 54	9 80 021 54
14.	2	Diaphragm shaft	Alloy steel	1 15 40E 58	1 25 40E 58	1 40 40E 58	1 50 40E 58	1 80 40E 58
15.	1	Diaphragm chamber, left	PA	9 15 802 39 ⁽²⁾	9 25 802 39 ⁽²⁾	9 40 802 39	9 50 802 39	9 80 802 39
			Aluminium	9 15 802 60 ⁽²⁾	9 25 802 60 ⁽²⁾	9 40 802 60	9 50 802 60	9 80 802 60
16.	4	Diaphragm chamber seal	PTFE-PPS	1 15 85 18	1 25 85 18	1 40 85 18	1 50 85 18	1 80 85 18
17.	1	Diaphragm chamber, right	PA	9 15 902 39 ⁽²⁾	9 25 902 39 ⁽²⁾	9 40 902 39	9 50 902 39	9 80 902 39
			Aluminium	9 15 902 60 ⁽²⁾	9 25 902 60 ⁽²⁾	9 40 902 60	9 50 902 60	9 80 902 60
18.	1	Piston	Carbon steel	9 15 022 54	9 25 022 54	9 40 022 54	9 50 022 54	9 80 022 54
19.	1	Central housing cover	Aluminium	9 15 911 60	9 25 911 60	9 40 911 60	9 50 911 60	9 80 911 60
20.	1	Central housing cover seal	PTFE	9 15 370 23	9 25 370 23	9 40 370 23	9 50 370 23	9 80 370 23
21.	8	Diaphragm chamber mounting bolt	AISI 304	9 15 43E 50	9 25 43E 50	9 40 43E 50	9 50 43E 50	9 80 43E 50
22.	4	Valve ball seat	AISI 316L	-	-	-	-	4 80 54 53
23.	4	Chamber locating pin	AISI 304	9 15 163 50	9 25 163 50	9 40 163 50	9 40 163 50	9 80 163 50
26.	4	Ball valve stopper	AISI 316L	-	-	-	-	4 80 39 53
29.	1	Pump drive stand	Structural steel	9 25 804 47	9 40 804 47	9 50 804 47	9 65 804 47	9 80 804 47
30.	4/8***	O-ring, diaphragm chamber seal	NBR	1 15 85 10	1 25 85 10***	1 40 85 10	1 50 85 10	1 80 85 10
31.	1	Oil level indicator with seal, set	Diverse	9 15 366 00	9 15 366 00	9 40 366 00	9 40 366 00	9 40 366 00
32.	1	Central housing cover bolt, set	AISI 304	9 15 44E50	9 25 44E50	9 40 44E50	9 50 44E50	9 80 44E50
33.	1	Oil drain plug with seal, set	PE c./NBR	9 15 466 00	9 15 466 00	9 15 466 00	9 15 466 00	9 15 466 00
34.	1	Pump drive (motor with gearbox)	diverse	9 15 920 00	9 25 920 00	9 40 920 00	9 50 920 00	9 80 920 00
35.	1	Flexible coupling element	diverse	9 15 105 00	9 25 105 00	9 40 105 00	9 50 105 00	9 80 105 00
36.	1	Jaw coupling, complete set	diverse	9 15 205 00	9 25 205 00	9 40 205 00	9 50 205 00	9 80 205 00
37.	1	Coupling cover, complete	diverse	9 15 268 00	9 25 268 00	9 40 268 00	9 50 268 00	9 80 268 00
38.	4	Mounting bolt (to c. housing), set ⁽³⁾	AISI 304	9 15 144 50	9 25 144 50	9 40 144 50	9 50 144 50	9 80 144 50
39.	4	Mounting bolt (to monoblock), set ⁽⁴⁾	AISI 304	9 15 244 50	9 25 244 50	9 40 244 50	9 50 244 50	9 80 244 50
40.	1	DELLMECO label	Diverse	1 15 094 00	1 25 094 00	1 40 094 00	1 50 094 00	1 80 094 00
41.	2	Piston sleeve	Bronze	9 15 122 86	9 25 122 86	9 40 122 86	9 50 122 86	9 80 122 86
42.	2	Piston mandrel	Carbon steel	9 15 222 54	9 25 222 54	9 40 222 54	9 50 222 54	9 80 222 54
43.	4	Piston mandrel circlip	Diverse	9 15 129 00	9 25 129 00	9 40 129 00	9 50 129 00	9 80 129 00
44.	1	Piston bearing	Diverse	9 15 76 00	9 25 76 00	9 40 76 00	9 50 76 00	9 80 76 00
45.	1	Piston bearing circlip	Diverse	-	-	9 15 429 00	9 25 429 00	-
46.	1	Eccentric shaft	Carbon steel	1 15 13E 54	1 25 13E 54	1 40 13E 54	1 50 13E 54	1 80 13E 54
47.	1	Eccentric shaft bearing	Diverse	9 15 176 00	9 25 176 00	9 40 176 00	9 50 176 00	9 80 176 00
48.	1	Parallel key	Diverse	9 15 39E 00	9 25 39E 00	9 40 39E 00	9 50 39E 00	9 80 39E 00
49.	1	Shaft bearing circlip, internal	Diverse	9 15 329 00	9 25 329 00	9 40 329 00	9 50 329 00	9 80 329 00
50.	1	Shaft bearing circlip, external	Diverse	9 15 429 00	9 25 429 00	9 40 429 00	9 50 429 00	9 80 429 00
51.	1	Main drive shaft seal	Diverse	9 15 273 00	9 25 273 00	9 40 273 00	9 50 273 00	9 80 273 00
52.	1	Diaphragm shaft hub seal, set	Diverse	9 15 373 00	9 25 373 00	9 40 373 00	9 50 373 00	9 80 373 00
53.	2	Central housing sleeve gasket	PTFE/PPS	1 15 88E 18	1 25 88E 18	1 40 88E 18	1 50 88E 18	1 80 88E 18
54.	2	Central housing sleeve	Bronze	1 15 12E 86	1 25 12E 86	1 40 12E 86	1 50 12E 86	1 80 12E 86
55.	1	Central housing hub seal, set	Diverse	9 15 473 00	9 25 473 00	9 40 473 00	9 50 473 00	9 80 473 00
56.	2	Rotary male, elbow	Diverse	1 15 67 00	1 15 67 00	1 40 67 00	-	-
57.	1	Air hose/Air tube ⁽⁵⁾	Diverse/Aluminium ⁽⁵⁾	1 15 267 00	1 25 267 00	1 40 267 00	1 50 267 60 ⁽⁵⁾	1 80 267 60 ⁽⁵⁾

Item	Q-ty	Part name	Material	DME 25	DME 40	DME 50	DME 65	DME 80
58.	2	Air tube sealing, O-ring	EPDM	-	-	-	3 20 70 08	3 20 70 08
59a.	1	Oil refill/vent plug	Diverse	9 15 66E 00	9 15 66E 00	-	-	-
59b.	1	Oil refill/vent plug	Diverse	-	-	9 40 66E 00	9 40 66E 00	9 40 66E 00
60.	1	Oil refill plug adapter	PE c.	9 15 97E 21	9 15 97E 21	-	-	-
61.	1	Adapter O-ring	NBR	1 15 85 10	1 15 85 10	-	-	-
62a.	2	Diaphragm chamber plug	Diverse	9 15 67E 00	9 25 67E 00	9 40 67E 00	9 40 67E 00	-
62b.	2	Diaphragm chamber plug	Diverse	-	-	-	-	9 40 67E 00 ⁽⁶⁾
63.	2	Diaphragm chamber ext. seals, set	EPDM	-	-	-	9 50 70E 08	9 80 70E 08
82.	2	Shaft allen pin screw	AISI 304	1 15 540 50	1 25 540 50	1 40 540 50	1 50 540 50	1 80 540 50
83.	4	Pump drive mounting bolt, set ⁽⁷⁾	AISI 304	9 15 344 50	9 25 344 50	9 40 344 50	9 50 344 50	9 80 344 50
84.	4	Pump stand shock absorber	NR/A2	1 15 69 52	1 25 69 52	1 25 69 52	1 40 69 52	1 80 69 52
85.	4	Shock absorber mounting bolt, set ⁽⁸⁾	AISI 304	1 15 544 50	1 25 544 50	1 40 544 50	1 50 544 50	1 80 544 50
86.	2	Diaphragm disc washer	TFM/PTFE	9 15 73E 05	9 25 73E 05	9 40 73E 05	9 50 73E 05	9 80 73E 05
87.	4	Side housing reinforcement ring (DME 80 H.. only)	AISI 304	-	-	-	-	4 80 529 50

Explanation of symbols:

⁽¹⁾ – complete set of housing bolts with nuts and washers required per 1 pump

⁽²⁾ – diaphragm chamber with Recoil® inserts

⁽³⁾ – set consists of: allen bolts (4 pcs) and washers (4 pcs); required per 1 pump

⁽⁴⁾ – set consists of: allen bolts (4 pcs), covered nuts (4 pcs) and washers (8 pcs); required per 1 pump

⁽⁵⁾ – Aluminium air tube available only for DME 65 and DME 80 Hygienic Series Pumps

⁽⁶⁾ – in DME 80 Hygienic Series Pumps diaphragm chamber plug is located on the back of diaphragm chamber

⁽⁷⁾ – set consists of: allen bolts (4 pcs), covered nuts (4 pcs) and washers (8 pcs); required per 1 pump

⁽⁸⁾ – set consists of: covered nuts (4 pcs) and washers (4 pcs); required per 1 pump

6. Installation and mounting



CAUTION



When installing accessories prevent any foreign matter from getting into the product.
Otherwise malfunction of the pump may follow.

6.1. Installing the DME Pump

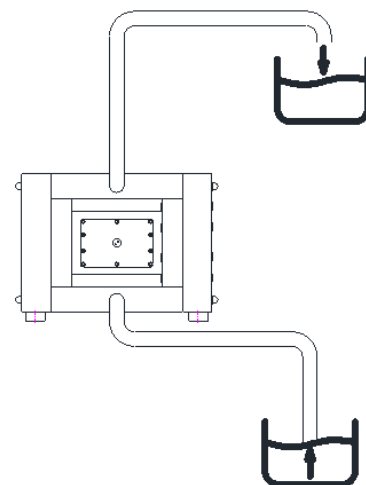
Decide where the pump is to be installed and secure a site. The DME Pump installation place have to meet the following requirements:

- The suction lift should be kept as short as possible.
- Sufficient space around the pump for maintenance must be provided. Free space required for the mounting and disassembly of the pump and the unit – at least 0.5 m up to 1.0 m (for all DME pump sizes) on all sides.
- The pump can be operated without fastening to a foundation. However, in the event that a fastening is provided, the fastening must be stress-free and must be made at the pump or engine support only. In that case use the cushions on the pump base. The tied-down bolts should be tightened from time to time, to secure the pump.

TYPES OF INSTALLATION

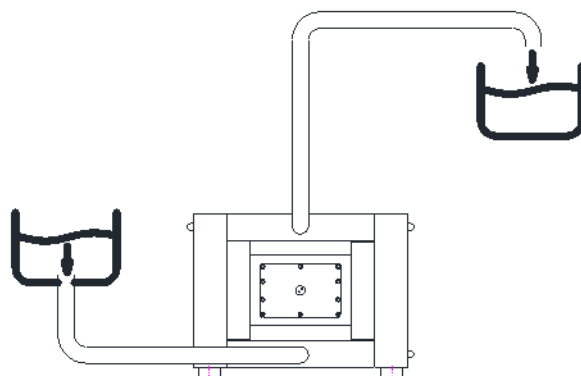
SELF PRIMING APPLICATION

Suction lift capability may vary depending on the construction materials and application parameters. The range is from 3 meters dry to 8 meters in a primed condition (values calculated for pumping water at 20 degrees Celsius).

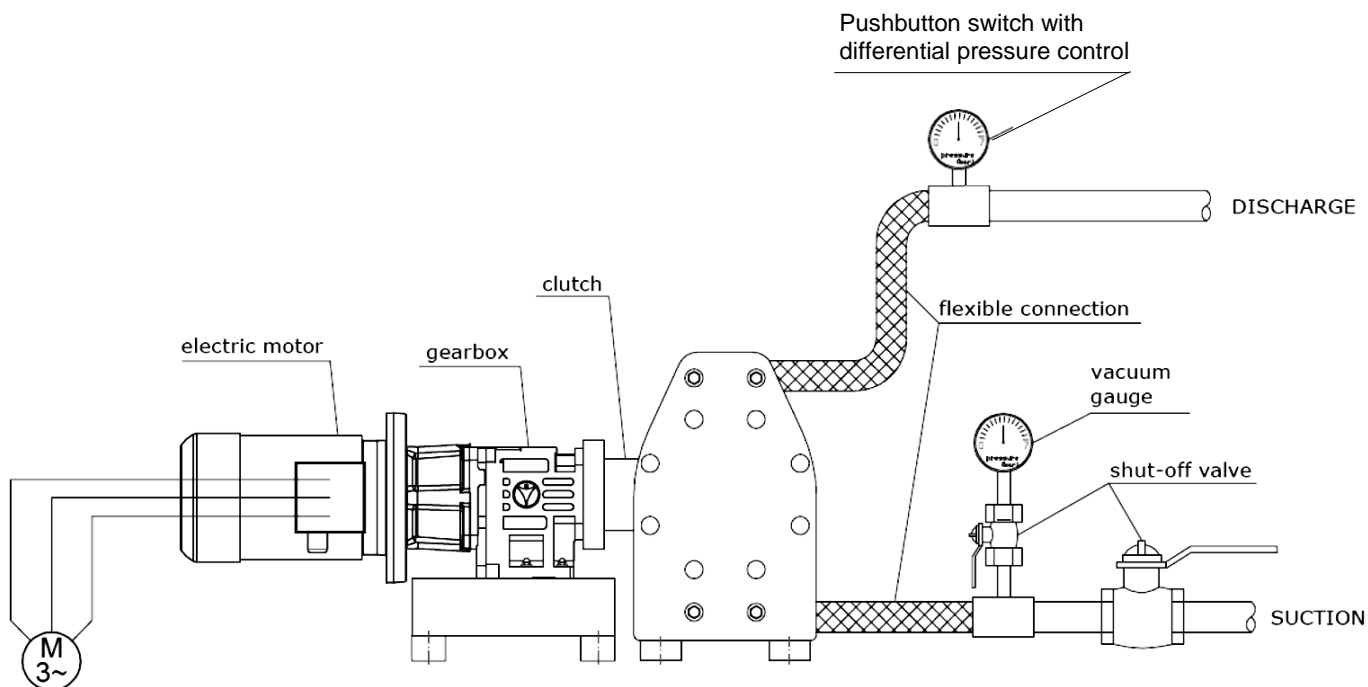


POSITIVE SUCTION HEAD

Common as a method of drawing off the bottoms of holding tanks and clarifiers. Optimum inlet pressure should be kept at 0.2-0.3 bar.



PUMP INSTALLATION APPEARANCE



CAUTION



Recommended maximum discharge head is 5.5 bar. Please do not exceed 6 bar, otherwise malfunction of the pump may follow.



Shut-off valve on the suction side can be closed only after the DME pump is completely stopped. Before start-up of the DME Pump, make sure that the suction valve is completely opened. DO NOT close and/or throttle the valve while the pump is working.



DO NOT install closing and/or throttling valve on the discharge side. Any attempt of closing/throttling the flow while the pump is still working will result in the pump's damage (diaphragms break). Before start-up of the DME Pump make sure that the suction (inlet) valve is completely opened.

6.2. Mounting the DME Pumps



CAUTION

- ! Examine all parts for transport damages at receipt. Immediately inform the shipping company in writing of the found damages.
- ! Examine individual parts for damages in detail. Immediately inform the manufacturer in writing if any damages have been found.
- ! Vibration generated by pump operation should be absorbed. Take it into consideration when mounting it.
- ! The running pump may generate noise. Its level will depend upon conditions of use (kind of fluid being pumped, discharge pressure).
- ! Install a cushioned pressure gauge (range up to 0.6 MPa or 1.0 MPa) on the discharge side to measure a pressure ratio. A vacuum gauge (range: -0.1 to +0.1 MPa) is also recommended in the suction line.
- ! In the event that a cut-off device is located in the discharge line, or there is a possibility that a discharge line is added, a safety device must be provided (e.g. a pressure switch with differential pressure control, contact pressure gauge, etc.).
- ! A suction flow stabilizer is advisable in the event that:
 - suction line is longer than 3 meters
 - suction head is longer than 3 meters
- ! In the event that the medium to be pumped is slightly gas-emitting, a positive head must be created at the suction side of the pump.
- ! In the event that pumping is carried out to a pressure line or against a pressure control valve, an air valve must be installed in the discharge line.
- ! DME Series Pumps are not intended to be working in total or partial submersion.



WARNING

- ! The end of the hose must be equipped with a pit, a protection box, etc. (in case the diaphragm gets damaged and a leakage of the fluid follows).
- ! Pump exhaust should be directed to a safe place, away from people, animals and food.



CAUTION



Before putting the pump into operation as well as after some hours of pumping, the housing bolts have to be fixed according to the torque data of the following schedule, as the elements of construction “settle”. Fixing all these parts is necessary as well after longer periods of stoppage, at extreme temperature variations, after transport and dismantling the pump.

Electro-mechanical Operated Double diaphragm Pumps (DME Series) – torque data				
Series		Size and model	Torque value [Nm]	
			Housing bolts	Valve stoppers
Plastic	PE c.	DME 15 R..	8	-
		DME 25 R..	13	-
		DME 40 R..	17	-
		DME 50 R..	22	-
		DME 80 R..	24	-
	PTFE cond.	DME 15 Z..	7	-
		DME 25 Z..	11	-
		DME 40 Z..	15	-
DME 50 Z..		19	-	
Metal	Alu, Cast Iron	DME 20 A.., DME 20 C..	8	7*
		DME 25 A.., DME 25 C..	13	7*
		DME 40 A.., DME 40 C..	17	8*
		DME 50 A.., DME 50 C..	22	8*
		DME 80 A..	25	10
	AISI 316	DME 20 S..	8	7*
		DME 25 S..	13	7*
		DME 40 S..	17	8*
		DME 50 S..	22	8*
		DME 80 S..	40	-
Hygienic	AISI 316L	DME 25 H..	10	-
		DME 40 H..	14	-
		DME 50 H..	17	-
		DME 65 H..	22	-
		DME 80 H..	40	-
*- Loctite 243 threadlocker required for valve stoppers assembling				

6.3. Connecting the ground wire

- a) When installing the conductive pump, be sure to connect the ground wire at the specified position.
- b) Ground wires should be connected to peripheral equipment and piping as well.
- c) Use 2.0 mm² minimum ground wire.



WARNING



Ground wires must be connected to the piping and any other peripheral equipment. When operating the pump make sure it is properly grounded. Otherwise friction between the parts and abrasion caused by some fluids flowing inside the casing may generate static electricity. In addition it may cause fire or electric shock, depending on the type of fluid being pumped and the installation environment (such as gases in the air or the surrounding mixtures).

6.4. Electric connections



WARNING



Only appropriately educated professional personnel may carry out with any electric works!



Keep the terminal plan in the distribution cabinet!

Install electric connections between the three-phase motor, frequency converter and control devices according to the terminal plan supplied.

6.5. Before you start the pump

- 1) Connect a hose to the valve on the suction-port side and to the discharge-port side of the pump.
- 2) Connect a hose on the suction-side intake and the discharge-port side to the respective vessels.
- 3) Check oil level in the crankshaft mechanism via the transparent plug (plug location on the picture below).

Required amount of oil for different sizes of DME Series Pumps in the below chart:

Pump model	Crankshaft oil type	Estimated oil amount, [ml]
DME 15 Plastic, DME 20 Metal, DME 25 Hygienic	GM Dexos2 5W-30	100
DME 25 Plastic, DME 25 Metal, DME 40 Hygienic		150
DME 40 Plastic, DME 40 Metal, DME 50 Hygienic		450
DME 50 Plastic, DME 50 Metal, DME 65 Hygienic		500
DME 80 Plastic, DME 80 Metal, DME 80 Hygienic		1100



Oil level in the crankshaft mechanism cannot exceed the red dot located in the centre of the transparent oil indicator plug!



CAUTION

- ! A hose must be flexible to absorb pump vibration. The hose must be grounded.
- ! There must be NO external force on any connection part of the pump. Be especially careful not to have the pump support part of the weight of the hose and the piping.
- ! Use a sturdy hose that will not collapse under the strong suction of the pump. The hose must be of more than sufficient pressure rating.
- ! Use a hose of a diameter the same as or larger than the pump's ports. If the diameter of a hose is smaller, it will affect the pump's performance or cause its malfunction.
- ! This product has been inspected using clean water.
- ! When you using the hose and pit etc., make sure to use a model with appropriate corrosion resistance for the fluid to be pumped.

7. Operation



CAUTION

- ! Before starting the pump, check that all piping is properly connected.
- ! Before starting the pump, check that **all the bolts are securely tightened**.
- ! Check that suction valve is completely opened.



CAUTION



Starting the electrical motor causes running pump run at maximum capacity (depending on the actual frequency rate).

7.1. Pump capacity regulation

It can be realized only by means of the frequency converter (optional equipment). After running the electric motor, pump without frequency converter works with maximum capacity.



CAUTION



The permissible suction flow speed can vary depending upon the viscosity and specific gravity of the fluid, the suction stroke and other factors.



If fluid is not discharged after you start the pump, or if you hear an abnormal noise or notice any irregularity, shut down the pump immediately.

7.2. Shutdown

Cut off electrical motor power supply. DME Pump will be shut down immediately.



CAUTION



The pump can be shut down with the medium inside. However DO NOT leave the pump in this condition for many hours without supervision - there is a risk of a leak from the pump or piping, and fluid may continue flowing out of the position of leakage.



When the pump is shut down while pumping slurry, particulate matter contained in the slurry will be deposited and get stuck inside the out chamber. Therefore after finishing work the pump must be purged of the remaining fluid. Otherwise when starting the pump again, the diaphragm may get damaged and the centre rod may bend.



CAUTION



Keep a vessel below the relief valve for any drain off.



Be careful! - Fluid under pressure will gush out the moment you open the valve.



If the pump is to be unused for a prolonged period, purge and clean it.

8. Method of cleaning



WARNING

- ! Make sure that voltage is not supplied to the electrical motor BEFORE you start cleaning the pump.
- ! Make sure that the pump is not pressurized BEFORE you start cleaning the pump.

- 1) Remove the hose from the suction side of the pump.
- 2) Remove the hose from the discharge side, and attach different hoses to the suction side and the discharge side for cleaning.
- 3) Be ready with a vessel with cleaning solution, the kind appropriate for the type of fluid pumped. Next connect the suction-side and the discharge-side hoses of the pump.
- 4) Start the pump and let the cleaning solution circulate for sufficient cleaning.
- 5) Flush with clean water.
- 6) Remove the hose from the suction side of the pump, run the pump for a while to purge the pump of remaining fluid as much as possible.



CAUTION

- ! Be extremely careful when removing piping - the fluid will gush out.

9. Daily check

Before starting pump operation, conduct the following check procedures every day. In case there appears any irregularity, do NOT start running the pump until the cause of the irregularity has been determined and corrective measures have been taken.

- a) Make sure that there is no leakage of fluid from any connection part or the pump.
- b) Make sure that there are no cracks in the pump casing or piping.
- c) Check the tightness of every bolt of the pump.
- d) Make sure that the connection parts of the piping and peripheral equipment are not loose.
- e) Make sure that any parts of the pump that are to be replaced at regular intervals have been changed.
- f) Make sure that inlet and outlet valves are completely opened.

10. Possible problems

10.1. Pump does not run

Cause	Action to take
Electrical engine power supply doesn't start.	Check the power supply, or three phase voltage connections.
Motor connection or power supply interrupted.	Check the electrical connection of the motor, and/or power supply.
The fluid piping is clogged with sludge.	Check and clean the fluid piping.
The pump is clogged with sludge.	Disassemble the casing, check and clean.
Solid substances are depositing during still stand.	Flush or drain the pump.
Bearings damaged in the diaphragm drive.	Bearings need to be replaced – send pump for repair.
Coupling jaw damage.	Check the coupling jaw and replace components.

10.2. Pump runs, but does not suck in the fluid

Cause	Action to take
The suction lift or discharge head is long.	Confirm the piping configuration and shorten the length.
The suction line is completely or partially blocked.	Clean the suction line.
Permissible suction capacity is exceeded.	Increase fluid level or lower the pump.
The pump is clogged with sludge.	Disassemble the casing, check and clean.
The fluid level on the suction side enables air suction or air emission.	Increase fluid level.
Solid substances are depositing during still stand.	Flush or drain the pump.
Solid substance contents and/or grain size is too high.	Install a coarse filter before the pump.
The balls and valve seats are worn out or damaged.	Disassemble the pump, check and replace parts.
The valve ball is jammed due to solid substances in guides.	Insert heavier balls, reduce ball diameters.
Diaphragm damage.	Disassemble the pump, check and replace component.

10.3. Pump runs, but fluid does not come out

Cause	Action to take
The suction lift or discharge head is long.	Confirm the piping configuration and shorten the length.
The discharge-side fluid piping (including the strainer) is clogged with sludge.	Check and clean the fluid piping.
The pump is clogged with sludge.	Disassemble the casing, check and clean.
The balls and valve seats are worn out or damaged.	Disassemble the pump, check and replace parts.

10.4. Pumping capacity or pressure value is not achieved, pump pumps not uniformly

Cause	Action to take
The suction line is completely or partially blocked.	Clean the suction line.
Permissible suction capacity is exceeded.	Increase fluid level or lower the pump.
The fluid level on the suction side enables air suction or air emission.	Increase fluid level.
Solid substances are depositing during still stand.	Flush or drain the pump.
Solid substance contents and/or grain size is too high.	Install a coarse filter before the pump.
The balls and/or valve seats are worn out.	Disassemble the pump, replace parts.
The valve ball is jammed due to solid substances in guides.	Insert heavier balls, reduce ball diameters.
Diaphragm damage.	Disassemble the pump, check and replace component.

10.5. Pump works loudly

Cause	Action to take
The suction line is completely or partially blocked.	Clean the suction line.
Permissible suction capacity is exceeded.	Increase fluid level or lower the pump.
Too high revolution.	Decrease revolution down to allowable value.
Bearings damaged in the diaphragm drive.	Bearings need to be replaced – send pump for repair.

10.6. Pump does not operate anymore

Cause	Action to take
The suction line is completely or partially blocked.	Clean the suction line.
Permissible suction capacity is exceeded.	Increase fluid level or lower the pump.
Solid substances are depositing during still stand.	Flush or drain the pump.
Solid substance contents and/or grain size is too high.	Install a coarse filter before the pump.
The valve ball is jammed due to solid substances in guides.	Insert heavier balls, reduce ball diameters.
Diaphragm damage.	Disassemble the pump, check and replace component.

10.7. Irregular noise

Cause	Action to take
The pump is clogged with sludge with particles of larger than the permissible diameter.	Disassemble the casing, check and clean.

10.8. Irregular vibration

Cause	Action to take
Connection parts and pump mounting are loose.	Check each connection part and tighten the bolts.

If any of the above mentioned causes do not apply to your problem, contact your dealer or our office.

11. Returning the product for servicing

If you want to return the product for servicing, copy the **Trouble-Reporting Sheet**, fill it out giving the details of the problem and conditions of operation, and send it by e-mail to your dealer or our office.

- 1) Get an acceptance from your dealer or our office.
- 2) Clean the pump.
- 3) Return the product in the same package as when it was first shipped from the factory.

Trouble-Reporting Sheet

Your information will be most helpful in our efforts to improve our service as well as checking into causes of troubles and irregularities. We kindly request you therefore to fill out the following sheet carefully and send it to your dealer or our office. Thank you.

Company	Name of person in charge
Address	Department
	Telephone
	E- mail
MODEL	Year of manufacturing
Period of use	Serial No.
Operating conditions *Indoor * Outdoor	Date of Purchase
Frequency of operation * Continuous * Intermittent _____ Hours/day/week/month	Name of Dealer _____ Type of fluid pumped _____
Discharge pressure _____ bar Discharge volume _____ l/min. Suction side _____ m Suction side diameter _____ m Discharge side _____ m	Specific gravity _____ Viscosity _____ cP Fluid temperature _____ *C/*F Slurry: *YES Density _____ wt% Particulate diameter _____ mm *NO
Problem	
Draw a summary drawing of application (size, length of piping, and component parts)	



WARNING



It is the end-user responsibility to thoroughly wash and clean the pump to prevent any damages caused by accidental liquid leaks.



CAUTION



Be sure to maintain the transport safety by preventing any liquid leaks from the pump.

12. Main body specification

12.1. Main specification



CAUTION

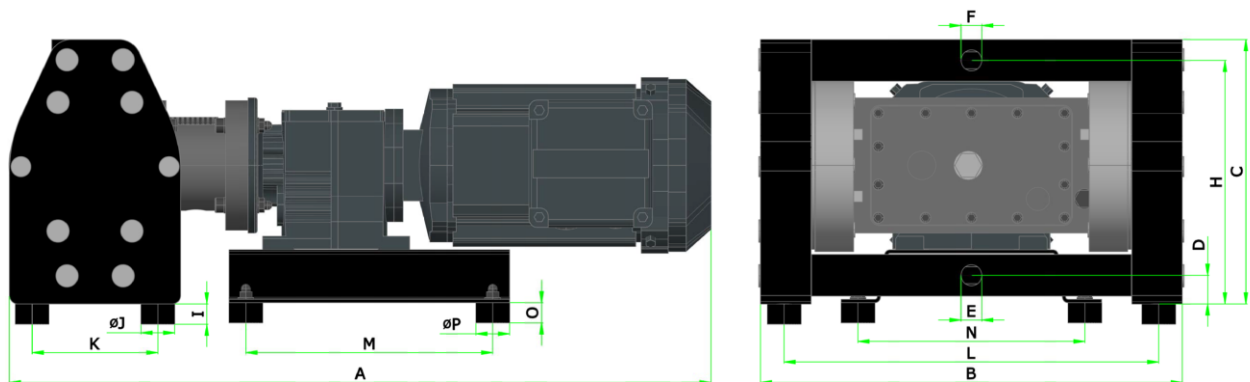


Due to constant improvement or modification of our products, dimensions given can be changed without prior information. Please contact your dealer or our office for details.



Gearmotor unit can be selected in accordance with customer's request (in a limited scope). However, this may change the final appearance and dimensions of the DME Pump. Before the purchase, please request for the dimensional drawing to confirm the DME Series Pump's compliance with your requirements. **Estimated tolerance of the dimensions on the assembled pump is ± 3 mm.**

12.2. Appearance and dimensions – DME Plastic Series (PE conductive, PTFE conductive)



Pump size	A	B	C	D	E (suction)	F (discharge)	H	I	øJ	K	L	M	N	O	øP
DME 15 R., Z..	625	376	235	25	G ½"	G ½"	217	18	30	112	334	220	202	18	30
DME 25 R., Z..	739	474	312	35	G 1"	G 1"	287	28	40	140	407	200	229	28	40
DME 40 R., Z..	819	595	426	42	G 1 ½"	G 1 ½"	388	30	60	190	507	280	288	28	40
DME 50 R., Z..	1046	686	540	40	G 2 ½"	G 2"	485	30	60	280	582	420	356	30	60
DME 80 R..	1266	926	800	87	G 3"	G 3"	690	40	75	395	841	645	542	40	75

DME Plastic Series Technical Data

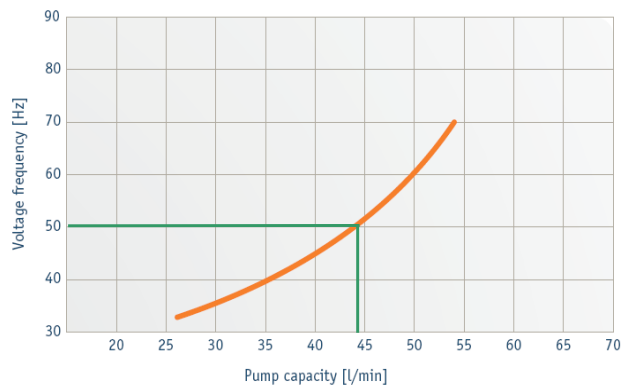
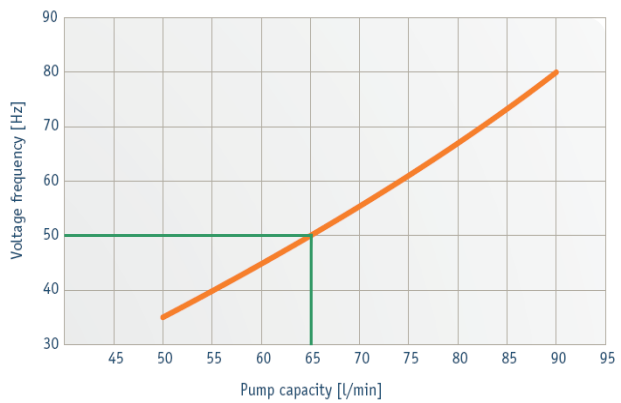
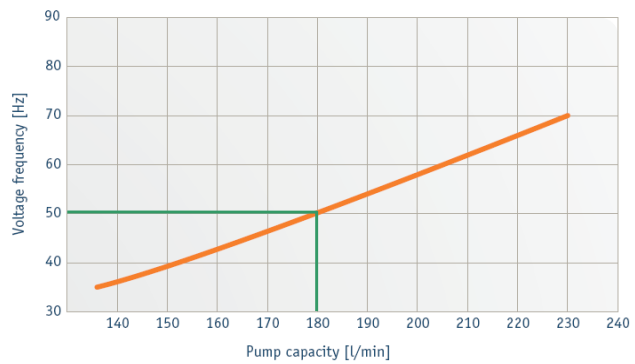
DELLMECO DME Pump Size - Plastic	15	25	40	50	80
Maximum capacity [l/min] at 50 Hz	44	65	183	400	790
Maximum entry frequency [Hz]	140% (e.g. max. 70 Hz at 50 Hz power-line frequency)				
Electric motor power [kW]	0.75	1.5	2.2	5.5	9.2
Nominal suction port size [in.]	G 1/2"	G 1"	G 1 1/2"	G 2 1/2"	G 3"
Nominal discharge port size [in.]	G 1/2"	G 1"	G 1 1/2"	G 2"	G 3"
Suction lift dry [m WC]	3.0				4.0
Suction lift wet [m WC]	8.0				
Max. diameter solids [mm]	4	7	10	12	15
Temperature limits [°C] – PE cond.	70				
Temperature limits [°C] – PTFE cond.	110 (120 for a short period of time)				-
Weight – PE cond. [kg]	45	70	140	205	460
Weight – PTFE cond. [kg]	60	95	175	270	-
Material of pump housing	PE conductive (R..), PTFE conductive (Z..)				PE conductive (R..)
Diaphragm options	EPDM, NBR, TFM, TFM/PFA			EPDM, NBR, TFM	
Valve balls	EPDM, NBR, PTFE, AISI 316, PU (Polyurethane)				EPDM, NBR, PTFE
Cylinder valves	PE, PTFE				-
O-rings	EPDM, FEP-FKM, NBR, PTFE c. + EPDM, PTFE c. + FKM				

DME Plastic Series Pumps sealing specification

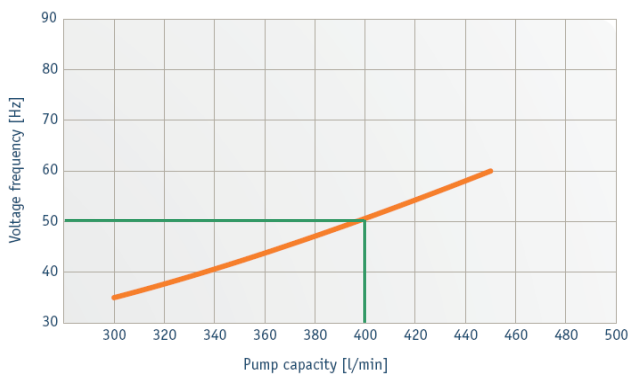
DELLMECO DME Plastic Pump	Diaphragm material	Upper plug sealing material	Lower plug sealing material	In-/outlet sealing material (standard execution)	In-/outlet sealing material (optional execution, available on demand)
DME 15 RE_, DME 15 ZE_	EPDM	EPDM	PTFE skived tape	EPDM	N/A
DME 15 RN_, DME 15 ZN_	NBR	NBR		NBR	N/A
DME 15 RT_, DME 15 ZT_	TFM/PTFE	FEP-FKM		FEP-FKM	N/A
DME 25 RE_, DME 25 ZE_	EPDM	EPDM		EPDM + EPDM	N/A
DME 25 RN_, DME 25 ZN_	NBR	NBR		NBR + NBR	N/A
DME 25 RT_, DME 25 ZT_	TFM/PTFE	FEP-FKM		PTFE cond. + EPDM + EPDM	PTFE cond. + FKM + FKM, FKM + FKM, FEP-FKM + FEP-FKM
DME 40 RE_, DME 40 ZE_	EPDM	EPDM		EPDM + EPDM	N/A
DME 40 RN_, DME 40 ZN_	NBR	NBR		NBR + NBR	N/A
DME 40 RT_, DME 40 ZT_	TFM/PTFE	FEP-FKM		PTFE cond. + EPDM + EPDM	PTFE cond. + FKM + FKM, FKM + FKM, FEP-FKM + FEP-FKM
DME 50 RE_, DME 50 ZE_	EPDM	EPDM		EPDM + EPDM	N/A
DME 50 RN_, DME 50 ZN_	NBR	NBR		NBR + NBR	N/A
DME 50 RT_, DME 50 ZT_	TFM/PTFE	FEP-FKM		PTFE cond. + EPDM + EPDM	PTFE cond. + FKM + FKM, FKM + FKM, FEP-FKM + FEP-FKM
DME 80 RE_	EPDM	EPDM		EPDM + EPDM	N/A
DME 80 RN_	NBR	NBR		NBR + NBR	N/A
DME 80 RT_	TFM/PTFE	FEP-FKM		FEP-FKM + FEP-FKM	N/A

DME Plastic Series Flow Characteristics

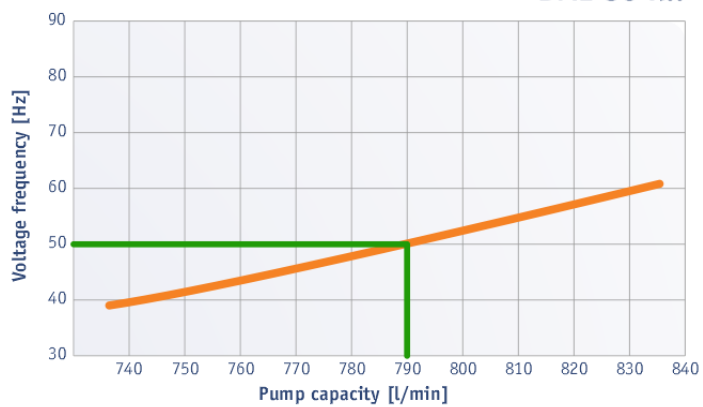
DME 15 R(Z)..

[illegible][illegible]

**DME 50 R(Z)..
DME 50 R(Z)..**

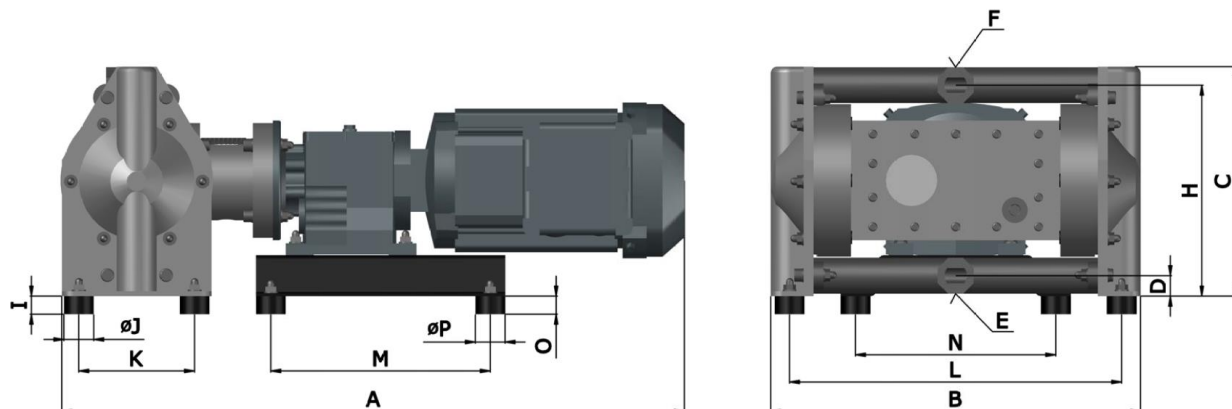


DME 80 R..

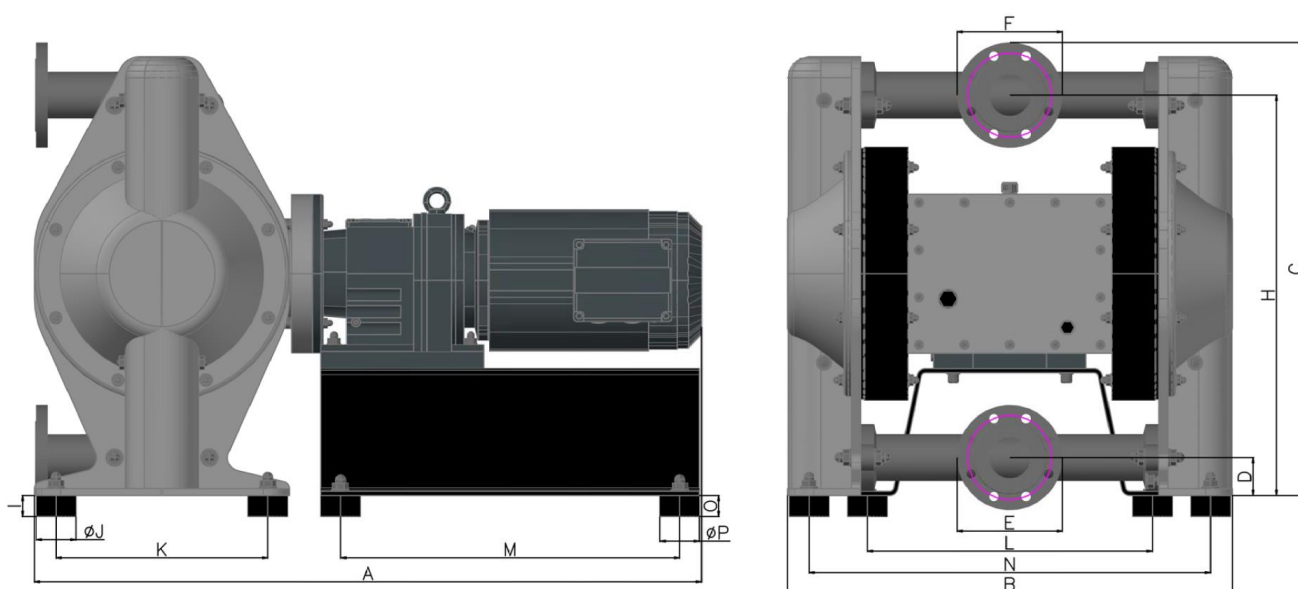


12.3. Appearance and dimensions – DME Metal series (Aluminium, Cast iron, AISI 316)

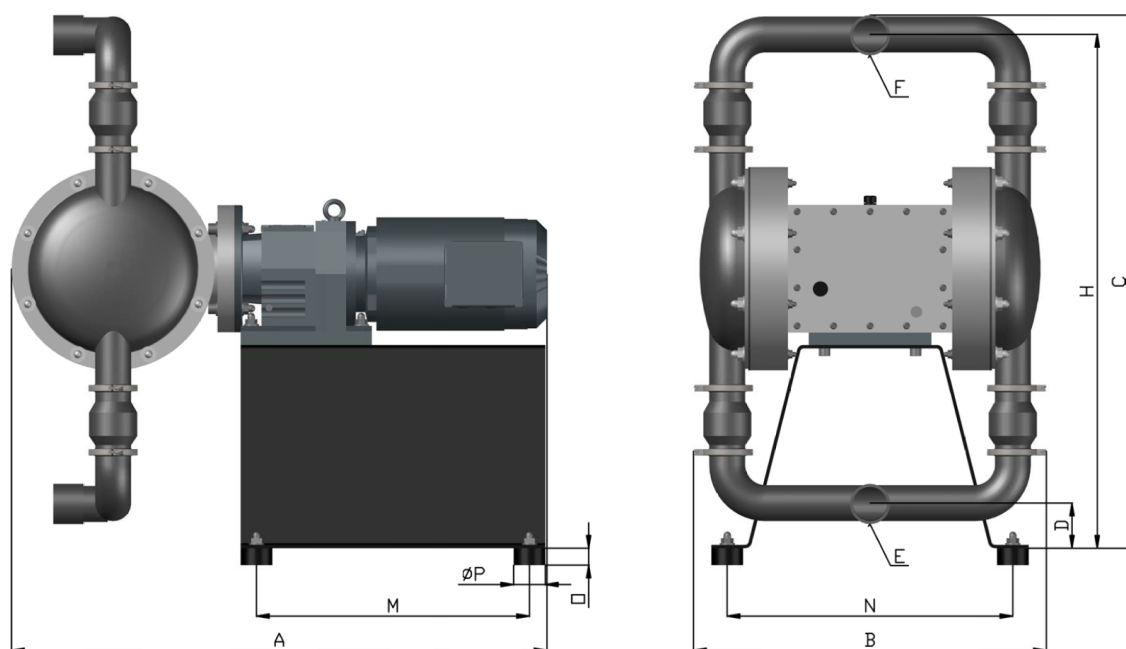
DME 20 A.., B.., C.., S.. to DME 80 A.., B.. – main dimensions:



DME 80 A.., B.. – main dimensions



DME 80 S.. – main dimensions



Alu, CI, Alu + PTFE	A	B	C	D	E (suction)	F (discharge)	H	I	øJ	K	L	M	N	O	øP
DME 20 A.., C.., B..	624	371	230	21	G ¾"	G ¾"	212	18	30	116	333	220	201	18	30
DME 25 A.., C.., B..	739	448	306	27	G 1"	G 1"	280	28	40	160	408	200	229	28	40
DME 40 A.., C.., B..	825	547	417	34	G 1 ½"	G 1 ½"	382	28	40	220	493	280	288	28	40
DME 50 A.., C.., B..	1045	652	544	48	G 2 1/2"	G 2"	501	30	60	282	586	420	356	30	60
DME 80 A.., B..	1268	846	861	72	DN80 PN16 DIN 2278		760	40	75	403	763	525	510	40	75

AISI 316	A	B	C	D	E (suction)	F (discharge)	H	I	øJ	K	L	M	N	O	øP
DME 20 S..	624	371	230	21	G ¾"	G ¾"	212	18	30	118	341	220	201	18	30
DME 25 S..	739	448	306	29	G 1"	G 1"	282	28	40	160	408	200	229	28	40
DME 40 S..	823	547	412	34	G 1 ½"	G 1 ½"	380	28	40	213	497	280	288	28	40
DME 50 S..	1043	646	540	46	G 2 ½"	G 2"	495	30	60	286	582	420	356	30	60
DME 80 S..	1266	834	1266	107	G 3"	G 3"	1211	×	×	×	×	645	675	40	75

DME Metal Series Technical Data

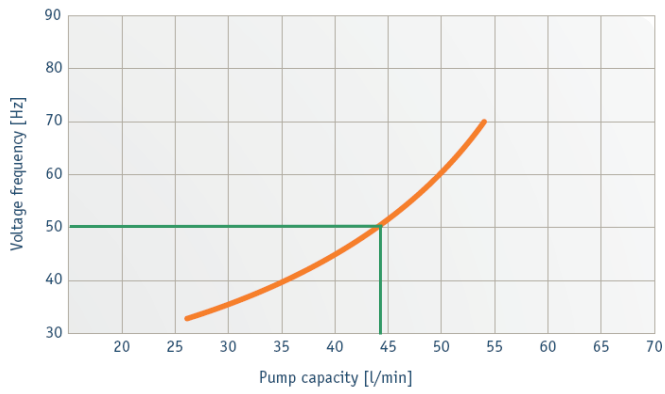
DELLMECO DME Pump Size - Metal	20	25	40	50	80 A., B..	80 C..	80 S..
Maximum capacity [l/min] at 50 Hz	44	65	183	400	790		
Maximum entry frequency [Hz]	140% (e.g. max. 70 Hz at 50 Hz power-line frequency)						
Electric motor power [kW]	0.75	1.5	2.2	5.5	9.2		
Nominal suction port size [in.]	G 3/4"	G 1"	G 1 1/2"	G 2 1/2"	DN80, PN10/16		G 3"
Nominal discharge port size [in.]	G 3/4"	G 1"	G 1 1/2"	G 2"	DN80, PN10/16		G 3"
Suction lift dry [m WC]	3.0	4.0	4.0	5.0	5.0		
Suction lift wet [m WC]	8.0						
Max. diameter solids [mm]	4	7	10	12	15		
Temperature limits – Aluminium	with NBR, EPDM diaphragms: 70°C (80°C for a short period of time) with TFM/PTFE diaphragms: 110°C (120°C for a short period of time)						
Temperature limits – Cast Iron							
Temperature limits – AISI 316							
Weight – Aluminium [kg]	35	60	115	200	415	-	-
Weight – Cast iron [kg]	45	79	145	237	-	510	-
Weight – AISI 316 [kg]	48	85	155	260	415	-	375
Material of pump housing	Aluminium, Aluminium + PTFE, Cast Iron, AISI 316				Alu, Alu + PTFE	Cast Iron	AISI 316L
Diaphragm options	NBR, EPDM, TFM, TFM/PFA			NBR, EPDM, TFM			
Valve balls	NBR, EPDM, PTFE, AISI 316, PU (Polyurethane)				NBR, EPDM, PTFE		
O-rings	NBR, EPDM, FEP-FKM, FKM						NBR, EPDM, PTFE, FKM

DME Metal Series Pumps sealing specification

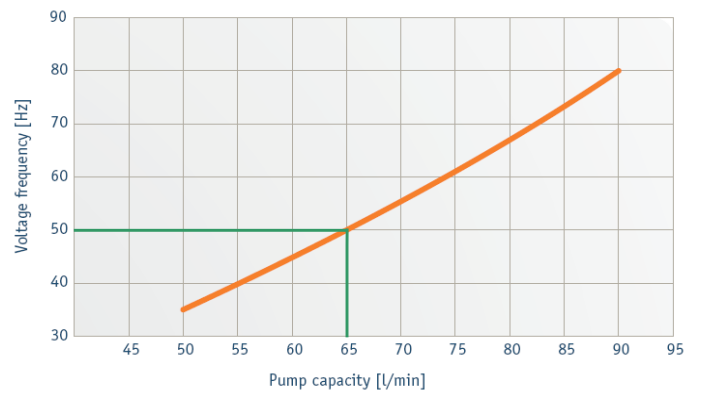
DELLMECO DME Metal Pump	Diaphragm material	In-/outlet sealing material (standard execution)	In-/outlet sealing material (optional execution, available on demand)
DME 20 AE_, DME 20 BE_, DME 20 CE_	EPDM	EPDM + KLINGERSIL	N/A
DME 20 SE_	EPDM	EPDM + KLINGERSIL	N/A
DME 20 AN_, DME 20 BN_, DME 20 CN_	NBR	NBR + KLINGERSIL	N/A
DME 20 SN_	NBR	NBR + KLINGERSIL	N/A
DME 20 AT_, DME 20 BT_, DME 20 CT_	TFM/PTFE	EPDM + KLINGERSIL	FEP-FKM + KLINGERSIL, FKM + KLINGERSIL
DME 20 ST_	TFM/PTFE	FEP-FKM + KLINGERSIL	FKM + KLINGERSIL
DME 25 AE_, DME 25 BE_, DME 25 CE_	EPDM	EPDM + KLINGERSIL	N/A
DME 25 SE_	EPDM	EPDM + KLINGERSIL	N/A
DME 25 AN_, DME 25 BN_, DME 25 CN_	NBR	NBR + KLINGERSIL	N/A
DME 25 SN_	NBR	NBR + KLINGERSIL	N/A
DME 25 AT_, DME 25 BT_, DME 25 CT_	TFM/PTFE	EPDM + KLINGERSIL	FEP-FKM + KLINGERSIL, FKM + KLINGERSIL
DME 25 ST_	TFM/PTFE	FEP-FKM + KLINGERSIL	FKM + KLINGERSIL
DME 40 AE_, DME 40 BE_, DME 40 CE_	EPDM	EPDM + KLINGERSIL	N/A
DME 40 SE_	EPDM	EPDM + KLINGERSIL	N/A
DME 40 AN_, DME 40 BN_, DME 40 CN_	NBR	NBR + KLINGERSIL	N/A
DME 40 SN_	NBR	NBR + KLINGERSIL	N/A
DME 40 AT_, DME 40 BT_, DME 40 CT_	TFM/PTFE	EPDM + KLINGERSIL	FEP-FKM + KLINGERSIL, FKM + KLINGERSIL
DME 40 ST_	TFM/PTFE	FEP-FKM + KLINGERSIL	FKM + KLINGERSIL
DME 50 AE_, DME 50 BE_, DME 50 CE_	EPDM	EPDM + KLINGERSIL	N/A
DME 50 SE_	EPDM	EPDM + KLINGERSIL	N/A
DME 50 AN_, DME 50 BN_, DME 50 CN_	NBR	NBR + KLINGERSIL	N/A
DME 50 SN_	NBR	NBR + KLINGERSIL	N/A
DME 50 AT_, DME 50 BT_, DME 50 CT_	TFM/PTFE	EPDM + KLINGERSIL	FEP-FKM + KLINGERSIL, FKM + KLINGERSIL
DME 50 ST_	TFM/PTFE	FEP-FKM + KLINGERSIL	FKM + KLINGERSIL
DME 80 AE_, DME 80 BE_	EPDM	EPDM + EPDM	N/A
DME 80 SE_	EPDM	EPDM	N/A
DME 80 AN_, DME 80 BN_	NBR	NBR + NBR	N/A
DME 80 SN_	NBR	NBR	N/A
DME 80 AT_, DME 80 BT_	TFM/PTFE	EPDM + EPDM	N/A
DME 80 ST_	TFM/PTFE	PTFE	FKM

DME Metal Series Flow Characteristics

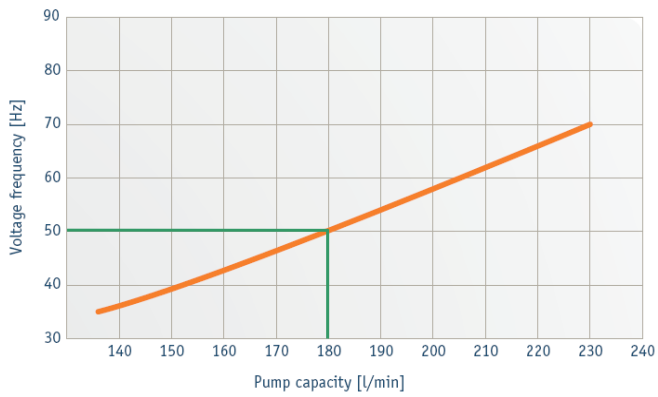
DME 20



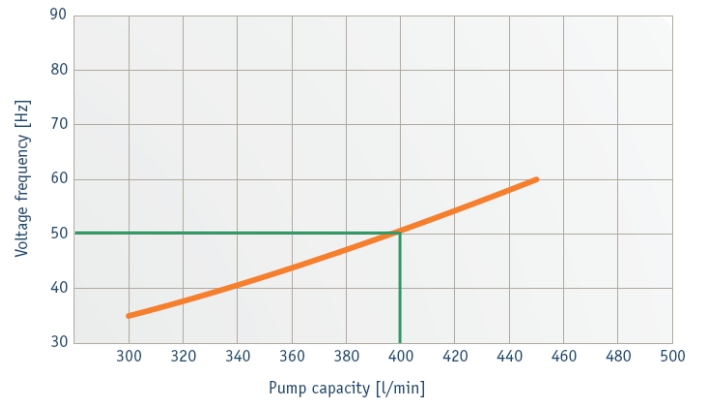
DME 25



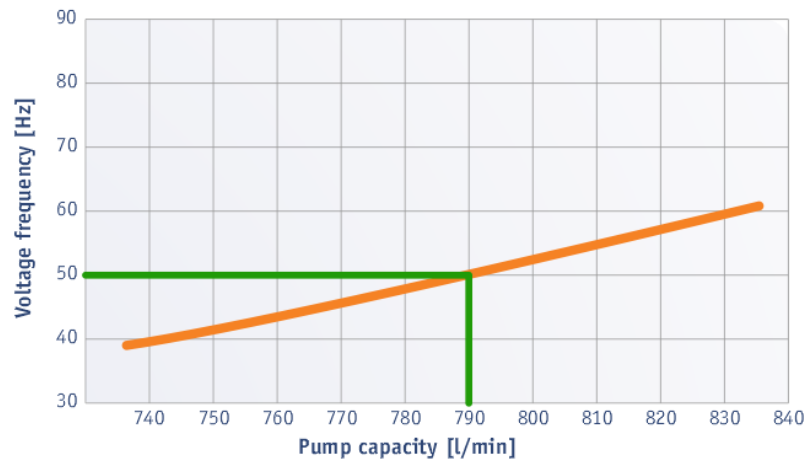
DME 40



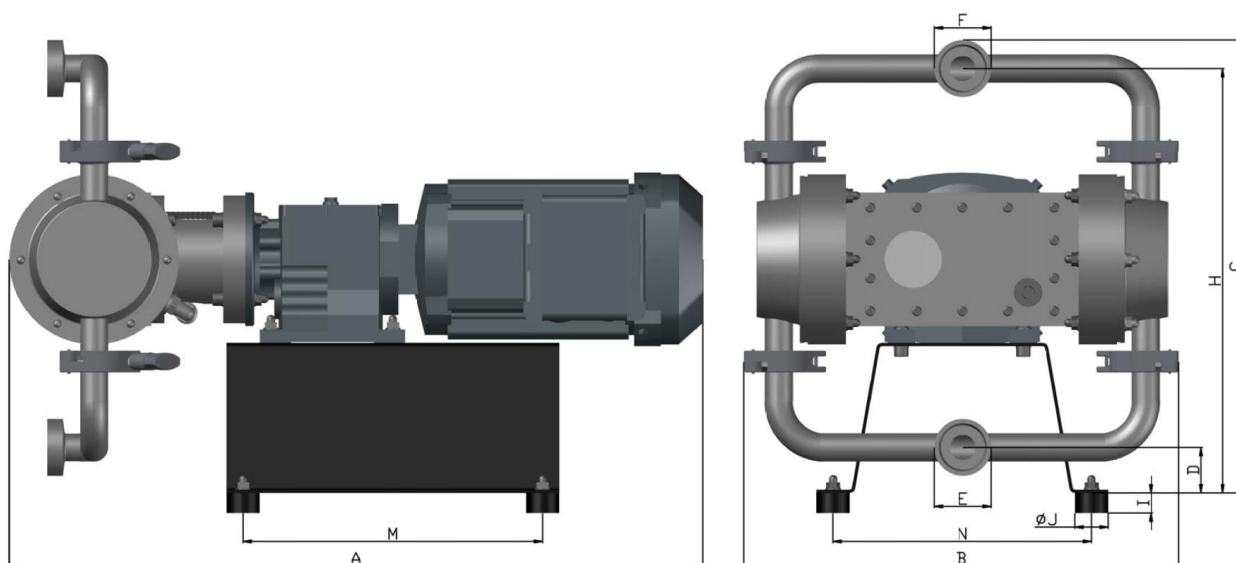
DME 50



DME 80



12.4. Appearance and dimensions – DME Hygienic series (AISI 316L)



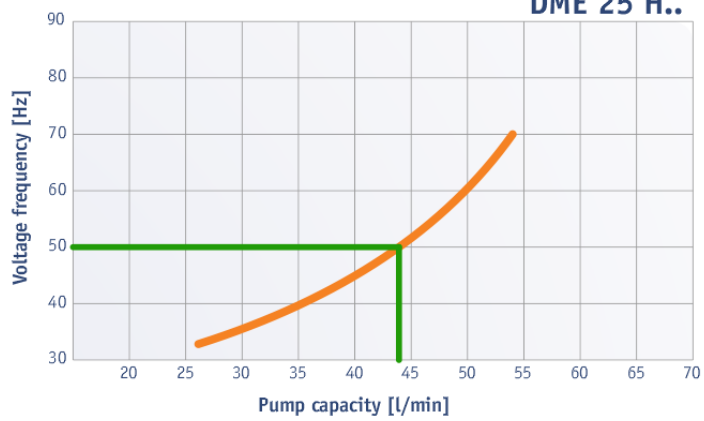
	A	B	C (max)	D	E F			H	I	øJ	M	N
					DIN 11851 (standard)	Tri-Clamp DIN 32676 (option)	SMS 1145 (option)					
DME 25 H..	625	392	408	41	Rd 52 x 1/6"	ø50.5	Rd 40 x 1/6"	382	18	30	220	202
DME 40 H..	739	481	469	65	Rd 65 x 1/6"	ø50.5	Rd 60 x 1/6"	436	28	40	200	249
DME 50 H..	819	568	639	61	Rd 78 x 1/6"	ø61	Rd 70 x 1/6"	600	28	40	280	310
DME 65 H..	1044	661	880	83	Rd 95 x 1/6"	ø94	Rd 85 x 1/6"	832	30	60	420	425
DME 80 H..	1266	834	1266	105	Rd 110 x 1/4"	ø106	Rd 98 x 1/6"	1211	40	75	645	675

DME Hygienic Series Technical Data

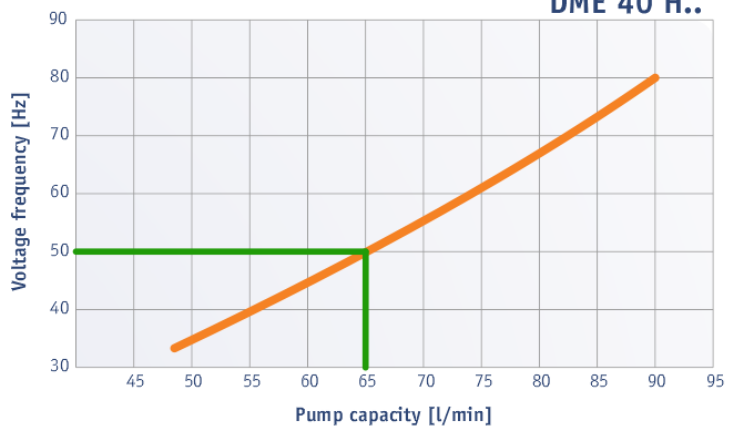
DELLMECO DME Pump Size - Hygienic	25	40	50	65	80
Maximum capacity [l/min] at 50 Hz	44	65	183	400	790
Maximum entry frequency [Hz]	140% (e.g. max. 70 Hz at 50 Hz power-line frequency)				
Electric motor power [kW]	0,75	1,5	2,2	5,5	9,2
Nominal port size (acc. to DIN 11851)	DN 25	DN 40	DN 50	DN 65	DN80, PN10/16
Optional connections	Tri-Clamp, SMS, RJT, JIS, ANSI				
Suction lift dry [m WC]	3.0				
Suction lift wet [m WC]	8.0				
Max. diameter solids [mm]	4	7	10	12	15
Temperature limits – AISI 316L	with NBR, EPDM diaphragms: 70°C (80°C for short period of time) with TFM/PTFE diaphragms: 110°C (120°C for short period of time)				
Weight – AISI 316L [kg]	35	70	120	196	375
Material of pump housing	AISI 316L				
Diaphragm options	NBR, EPDM, TFM, TFM/PFA			NBR, EPDM, TFM	
Valve balls	NBR, EPDM, PTFE, AISI 316				NBR, EPDM, PTFE
Clamp seals (DIN 32676)	Silicone, PTFE, EPDM ,NBR				

DME Hygienic Series Flow Characteristics

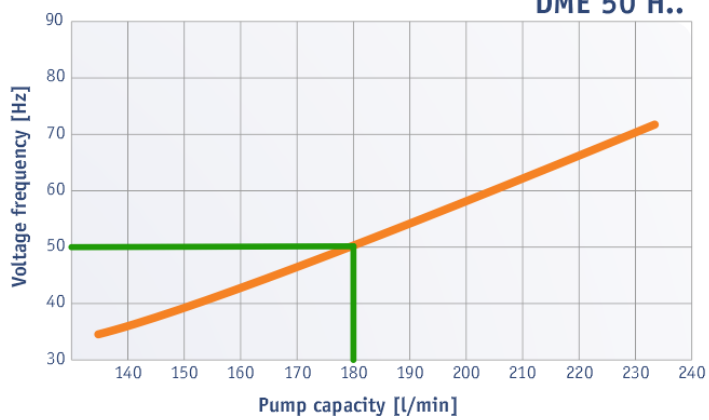
DME 25 H..



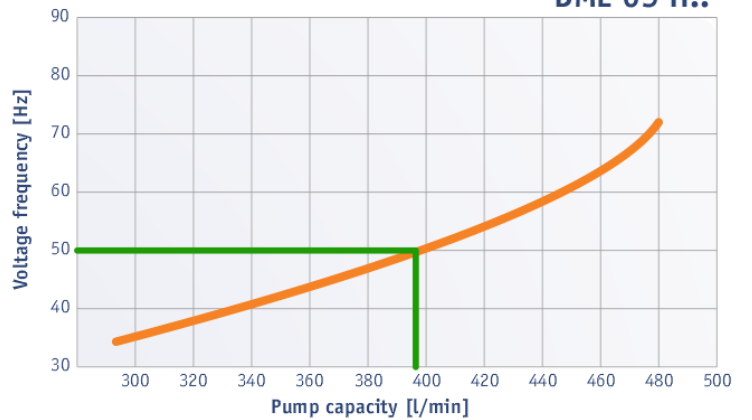
DME 40 H..



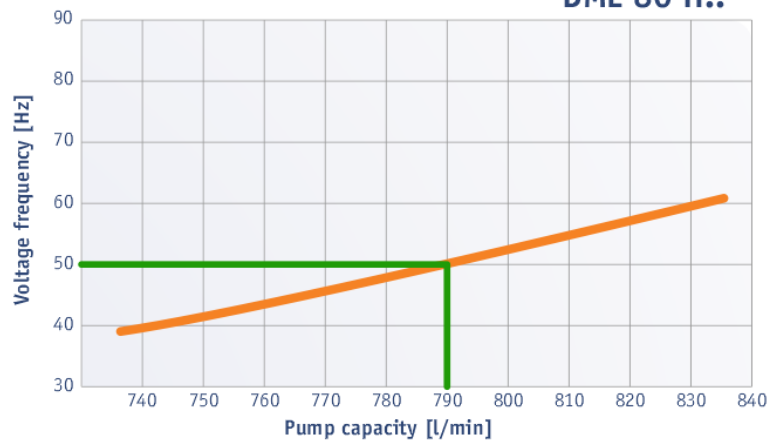
DME 50 H..



DME 65 H..



DME 80 H..



12.5. Pump code

DME 25 RTS – DM	
DME - Dellmeco Electro-Mechanical Double Diaphragm Pump 25 - Discharge port dimension, DN	DM – Optional equipment
R - Housing material: R - PE conductive Z – PTFE conductive A – Aluminium C – Cast Iron H – Hygienic Stainless Steel (AISI 316L) S – Industrial Stainless Steel (AISI 316)	FI – Frequency Inverter ACS – Additional Cooling System DPAP – Diaphragm pressure averager with pushbutton – PE pumps DPAT – Diaphragm pressure averager with pushbutton – PTFE pumps DPAS – Diaphragm pressure averager with pushbutton – Metal pumps PG – Pressure gauge CPG – Contact pressure gauge PBS1 – Pushbutton switch for differential pressure control (1 - 10 bar) PBS2 – Pushbutton switch for differential pressure control (0.8 - 6 bar), ATEX CB – Control box for PBS1, PBS2 (Pushbutton switch...) option DM1 – Diaphragm monitoring, NAMUR, ATEX DM2 – Diaphragm monitoring with controller SCE1 – Stroke sensor, ATEX SCE2 – SCE1 plus stroke counter SCE3 – SCE2 with ATEX FE7 – Flange connections PN10 DIN 2576, PE conductive FE7.1 – Flange connections PN10 DIN 2576, PTFE conductive FEM7 – Flange connections PN10 DIN 2576, metal FE8 – Flange connections ANSI 150 RF-SO, PE conductive FE8.1 – Flange connections ANSI 150 RF-SO, PTFE conductive FEM8 – Flange connections ANSI 150 RF-SO, metal FE9 – Flange connections PN16 DIN 2277/2278, PE conductive FE9.1 – Flange connections PN16 DIN 2277/2278, PTFE conductive FEM9 – Flange connections PN16 DIN 2277/2278, metal BFE1 – Back flushing system, hand operated, EPDM seals BFE2 – Back flushing system, hand operated, PTFE seals BFE4 – Back flushing system, pneumatic, EPDM seals BFE5 – Back flushing system, pneumatic, PTFE seals T – Pump trolley BS – Bare-shaft option (DME Pump without drive unit*) ATEX – Explosion-proof certificate (not available for DME Pumps with BS Option)
T - Diaphragm material: E - EPDM N - NBR T - TFM/PTFE F – TFM/PTFE/PFA	
S - Material and type of valve: E - EPDM, ball valve N - NBR, ball valve S - AISI 316, ball valve T - PTFE, ball valve U - Polyurethane, ball valve F - PTFE, cylinder valve (Plastic Pump Series only) P - PE, cylinder valve (Plastic Pump Series only) C - Ceramic, ball valve	

*- drive unit consists of three components: gearmotor, coupling jaw and pump drive stand

13. Optional equipment for DELLMECO DME Pumps

**Additional information to the operating and installation instructions
ought to be studied before installing the pump**

For special requirements DELLMECO DME Pumps of the Plastic and Metal Series can be furnished with several optional equipment. The pump code informs, which of these are included in the pump.

13.1. Frequency Inverter (Option code FI)

Variable Frequency Drive – for pump's capacity easy regulation (by changing output voltage frequency to vary the speed of a connected induction motor that drives DELLMECO DME Diaphragm Pump). Frequency inverter is very competitive in its price and shows an upgraded functional strength. User-friendly interface, extended inverter ranges, superb torque competence and small size provides an optimum use environment.

13.2. Additional Cooling System (Option code ACS)

In case of decreasing voltage frequency less than 70% of standard power-line frequency, an additional cooling system must be assembled to the driving motor, otherwise motor damage can occur due to increasing temperature of winding inside the electric motor. ACS unit works independently of the actual speed of electric motor, which is forced by the already installed VFD unit.

13.3. Diaphragm Pressure Averager with pushbutton switch (Option codes: DPAR, DPAZ, DPAS)

Diaphragm pressure averager with pushbutton switch prevents from pressure surplus and protects the measuring device from aggressive media. Available in plastic (DPAR – PE conductive pumps version, DPAZ – PTFE conductive pumps version) and metal (DPAS – Metal pumps version) design.

13.4. Pressure Gauge (Option code PG)

Pressure gauge indicator is a simple measurement device for outlet (discharge) pressure controlling. It is strongly recommended to install pressure gauge indicator to measure the pressure ratio. Gauge execution – carbon steel or stainless steel (depends on the pumped liquid properties).



13.5. Contact pressure gauge (Option code CPG)

Wherever the process pressure has to be indicated locally, and, at the same time, circuits are to be made or broken, the contact pressure gauge (switch gauge) can be used. Switch contacts make or break an electric control circuit dependent upon the position of the instrument pointer (actual value pointer).

The instrument pointer moves freely across the entire scale range, independent of the setting. Switch contacts consisting of several contacts can also be set to a single set point. Contact actuation is made when the actual value pointer travels beyond or below the desired set point.

Applications:

- control and regulation of industrial processes
- monitoring of plants and switching of electric circuits
- for gaseous and liquid aggressive media (not highly viscous or crystallizing)
- process industry: chemical, petrochemical, power plants, mining, on- and offshore, environmental technology, machine building and general plant construction.

Special features:

- high reliability and long service life
- up to 4 switch contacts per instrument
- also available with liquid-filled case for high dynamic pressure loads or vibrations
- gauges with magnetic or inductive contacts (for use in hazardous areas with ATEX approval).



13.6. Pushbutton switch for differential pressure control (Option code PBS1, PBS2)

Pressure switch pneumatic that interrupts the pump's electric circuit, when the set value of pressure is being reached (break contact switching function). Also available execution with ATEX Certificate.

DELLMECO DME pump can be delivered with this device attached to fully equipped junction box (a qualified electrician help to proper connect of the wires to the supply network). Additional technical information on demand. Pump can be prepared with a special connector for this option, which is located at the top side of the discharge (outlet) connection. It's covered with a small plug and marked with a label. The connection thread is G 1/4". Setting range: 1-10 bar (PBS1), or 0.8-6 bar with ATEX Certificate (PBS2).



13.7. Control Box (Option code CB) – for PBS1, PBS2 options

Ready-to-use control box equipped with circuit breakers (separately for power supply wires and motor wires) in case of increasing discharge pressure value.

13.8. Diaphragm Monitoring (Option code DM)

Although DELLMECO DME diaphragm pumps with integrated metal core are designed for an optimum service life, the diaphragm remains a wear part. If it breaks, liquid can leak into the center housing and possibly penetrate the pump causing pump irregular work, or even its damage. This can be prevented simply and effectively with the diaphragm rupture control - Diaphragm Monitoring (option code DM).

A capacitive diaphragm sensor is mounted in the diaphragm chamber of the pump and it registers any liquid approaching the sensor, no matter whether the liquid is conductive, or not. Hence, a fast reaction to a damage of diaphragm becomes possible.

The diaphragm monitoring system is available in two variations:

- 1) DM1 – diaphragm sensor (NAMUR), also available for explosion-proof area (ATEX)
- 2) DM2 – diaphragm monitoring system complete with sensor and controller.

13.9. Stroke Counting (Option code SCE1, SCE2, SCE3)

A sensor is installed in the diaphragm chamber to count the strokes. The diaphragm movement is scanned without contact by this sensor: a safe form of monitoring totally independent of external influences and the pump's mode of operation. The issued sensor pulses can be output to existing detectors or to a stroke counter, which can also be supplied on request. When the preset value is reached, the stroke counter outputs a signal which can then be processed further, for instance in order to shut down the pump via a solenoid valve.

The stroke counting system is available in three variations:

- SCE1 Stroke sensor (NAMUR), also for explosion-proof zone
- SCE2 Stroke counting system complete with sensor and stroke counter
- SCE3 Stroke counting system complete with sensor, stroke counter and controller for explosion-proof zone

In case only the sensor is included (code SCE1), it has to be connected to an existing controller with NAMUR inlet. For flammable and/or explosive applications an explosion-proof device is required (code SCE3). An intrinsically safe controller has to be installed between the sensor and the counter. The wiring diagram and technical data can be found on the electric units themselves. For further details, please refer to the data delivered by the manufacturers of the components. The controllers have to be installed in a suitable cabinet (or Control box – see p. 13.7).

13.10. Flange Connections (Option code FE4, FE4.1, FE7, FE7.1, FE8, FE8.1, FE9, FE9.1)

This version offers the possibility to use flange connectors according to: JIS B2220 10K (option **FE4, FE4.1**), PN10 DIN 2576 (option **FE7, FE7.1**), ANSI 150 RF-SO (option **FE8, FE8.1**), or PN16 DIN 2277/2278 (option **FE9, FE9.1**). Other types of flange available on request.

13.11. Back Flushing System (Option code BFE1, BFE2, BFE3)

A pump equipped with the back flushing system (ball lift system) can be emptied along with an inclining discharge line while being installed within the plant. It consists of a bypass-system in the side housings which can be activated by manual valves (code BFE1, BFE2) or pneumatically (code BFE4, BFE5).

Pneumatic flushing system (code BFE4, BFE5) requires minimum air pressure 3 bar (valve is not attached to this option).

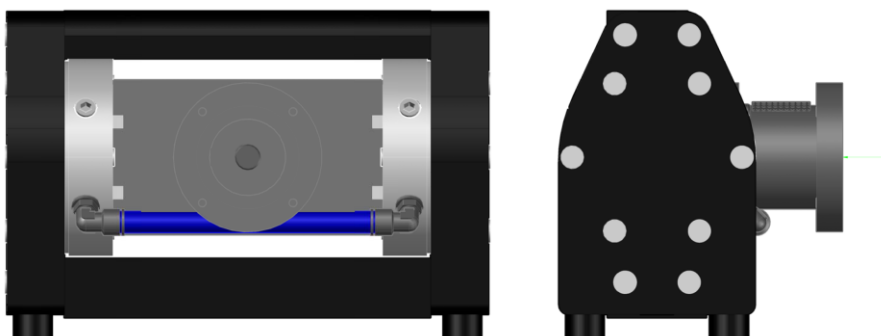
Side housing O-rings are made of EPDM (code BF1, BF4) or PTFE (code BF2, BF5).

13.12. Pump Trolley (Option code T)

Using this device you can make your DELLMECO DME Pump mobile. The trolley is available for all pump sizes. For more information please contact our Sales Department (office@dellmeco.com).

13.13. Bare-Shaft (Option code BS)

DME Series Pump with Bare-Shaft (BS) option means the pump is supplied without the drive unit (i.e., no electric motor, coupling jaw and gearbox) – please refer to the below picture of Plastic DME 15 R.-BS Pump:



In this case the drive unit has to be assembled by the customer in accordance with DELLMECO guidelines and local safety regulations. However, DME Pump with BS Option cannot be provided with ATEX certification – even if the drive unit is assembled by the customer in compliance with all explosion-proof requirements.

13.14. ATEX Certificate (Option code ATEX)

Plastic DME Pumps manufactured in conductive PE and conductive PTFE can be adapted for installation and use in potentially explosive atmospheres. This feature ensures the pump can safely transfer inflammable solvents, alcohols and other volatile liquids without the danger of static electricity build-up (through grounding of non-metallic pumps).

This also applies to all our DELLMECO Metal Series DME Pumps (made from Aluminium, Aluminium coated with PTFE, Cast Iron, AISI 316 Industrial and AISI 316L Hygienic).

An appropriate combination of selected materials with the explosion-proof drive unit makes DELLMECO DME Series Pumps suitable to work in explosive gas and dust environments without the risk of spark formation.

In the case of the DME Pump supplied with ATEX certification the final dimensions may vary from standard versions (DME Series Pumps equipped with non-ATEX drive units) because the drive unit is specially designed for ATEX environments. This is certified by the supplier and can only be assembled by DELLMECO.

It should also be noted that when an ATEX certificate is provided for the drive unit only and the customer adds the pump, then the certificate is not valid for the complete unit. Only DELLMECO can provide the ATEX certificate for the complete pump and drive unit.

CE  II 2G IIB T4...T3 Gb

14. Active Pulsation Dampener for DME Series Pumps

14.1. Main specification

DELLMECO DME Active Pulsation Dampeners are specially designed to be used along with DELLMECO Electro-Mechanical Operated Double Diaphragm Pumps of all Plastic, Metal and Hygienic range. A general aspect to be considered is that a pulsation dampener decreases the total capacity of the system depending on the point of operation.

DME Pump is driven by gearmotor unit, but PDEM Pulsation Dampener still has to be supplied with compressed air. In this case, there is no possibility of self-regulation of the PD unit – in the case of any changes in the pump's working conditions, PD has to be adjusted manually (by increasing or decreasing the air supply pressure)

Before putting a DELLMECO pulsation dampener into operation, make sure, that the materials of construction are resistant to the chemical to be pumped. To check this, the exact dampener code is required. This code, as well as the serial number, can be found in the following. Besides, these data are noted on the identification plates on the dampener itself.

Example of the Pulsation Dampener type code:

PDEM	15	R	E	R
				<u>Material of dampener head:</u> R - PE conductive
			<u>Diaphragm material:</u>	E - EPDM T - TFM/PTFE N - NBR
		<u>Material of dampener housing:</u>		A - Aluminium H - AISI 316L R - PE conductive S - AISI 316 Z - PTFE conductive
	<u>Size, nominal connection size:</u>	<u>Plastic Series:</u> 15: G 1/2", 25: G 1", 40: G 1 1/2", 50: G 2", 80: G 3" <u>Metal Series:</u> 20: G 3/4", 25: G 1", 40: G 1 1/2", 50: G 2", 80: G 3" <u>Hygienic Series:</u> <u>DIN 11851:</u> 25: DN25, 40: DN40, 50: DN50, 65: DN65, 80: DN80 <u>TC DIN 32676:</u> 25: ø50.5, 40: ø50.5, 50: ø64, 65: ø91, 80: ø106 <u>DIN 11851:</u> 25: 1", 40: 1 1/2", 50: 2", 65: 2 1/2", 80: 3"		

DELLMECO Pulsation Dampener for DME Series Pump

Air supply connection:

Plastic Series: PDEM 15-25: R 1/8", PDEM 40-50: R 1/4", PDEM 80: R 1/2"
Metal Series: PDEM 20-25: R 1/8", PDEM 40-50: R 1/4", PDEM 80: R 1/2"
Hygienic Series: PDEM 25-40: R 1/8", PDEM 50-65: R 1/4", PDEM 80: R 1/2"

Max. operating pressure: 5 bar

Max. operating temperature: for PE conductive dampener housing: 70°C
for the remaining dampener housing: 110°C

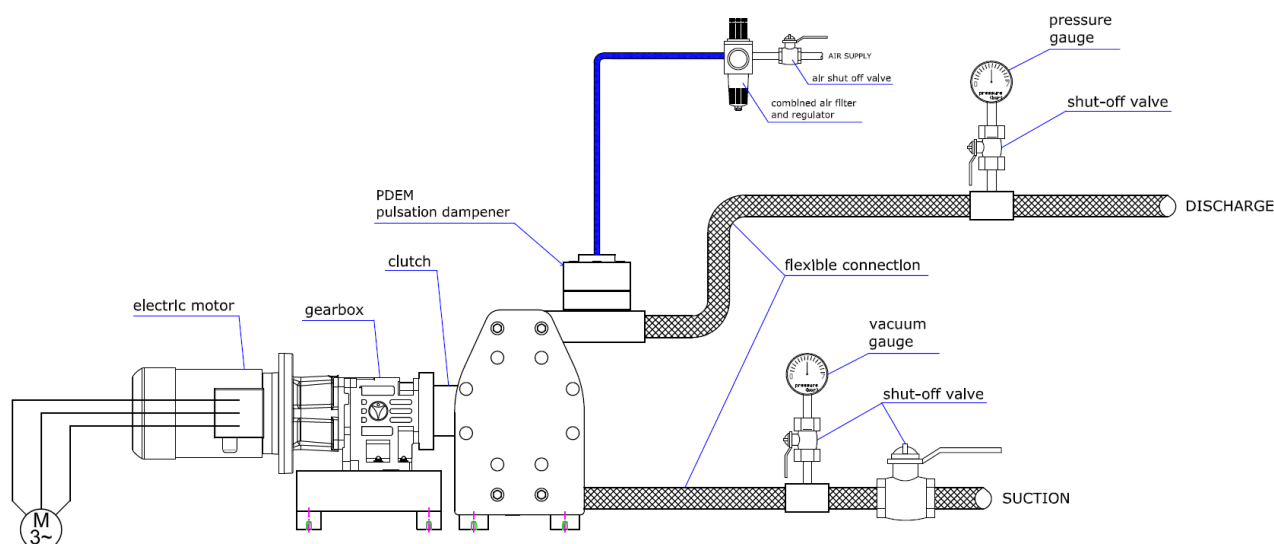
For inflammable liquids as well as for applications in explosion protected areas, all PDEM dampeners may be used. It is not necessary to ground the dampener separately while the dampener is connected directly to the pump, which is conductive and has to be grounded itself.

In general, DME Pump and PDEM Pulsation Dampener are dispatched separately. The DELLMECO PDEM Pulsation Dampener can easily be attached to a pump at any time in the future by changing the discharge port. The use of a Pulsation Dampener of the series PDEM reduces the capacity of the complete system in dependence of the point of operation.

Exceeded tightening may damage the thread. Besides, a correct positioning of the O-ring [95] within the groove has to be ensured.

Before connecting the pump, take the yellow blind plugs out of air inlet which is located on the top of the damper head [91]. For correct operation, the dampener absolutely needs an air-supply of its own, which has to be taken from the external source, because DME Pump and PDEM Pulsation Dampener cannot be connected to the same air pressure (DME Pump is not supplied with air pressure). The driving air has to be oil-free, dry and clean. An empty dampener has to be driven slowly (compressed air supply valve has to be opened gradually). PDEM dampeners have to be manually regulated for all changing operating conditions.

PDEM PULSATION DAMPENER INSTALLATION APPEARANCE



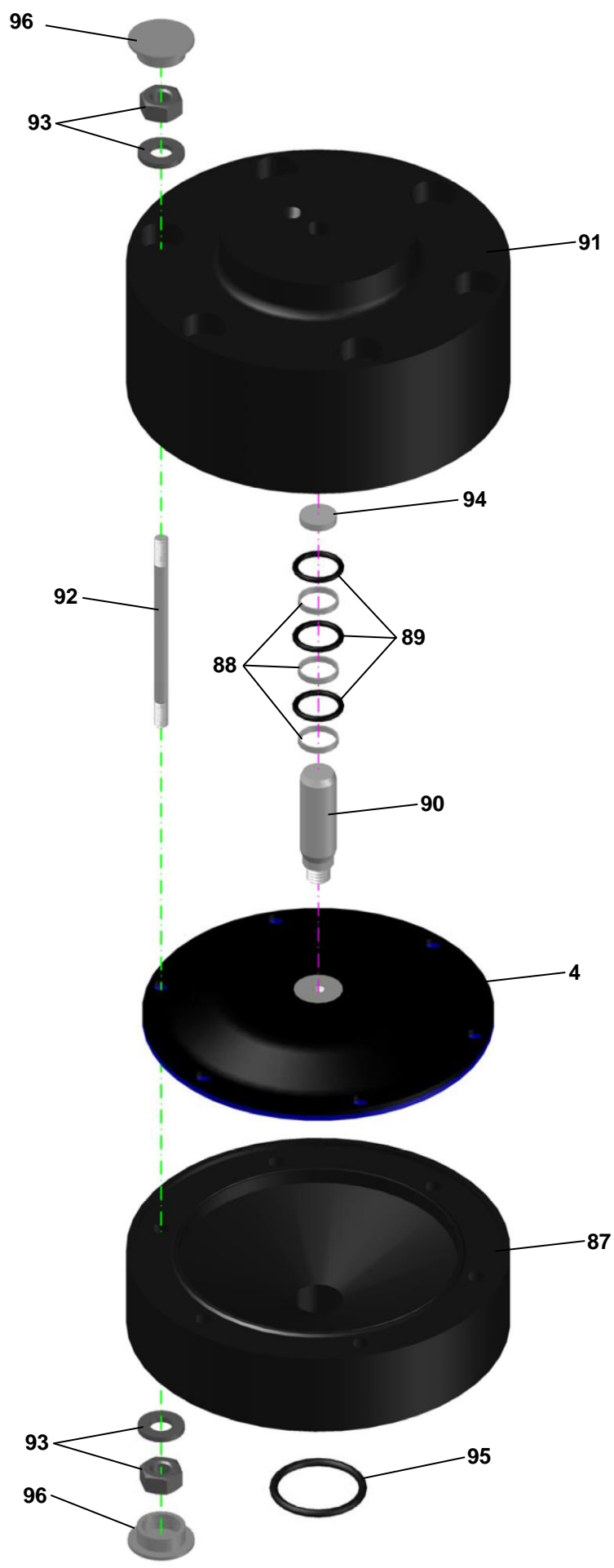
CAUTION

- ! Before putting the pulsation dampener into operation as well as after some hours of operating, the housing bolts [92] have to be tightened carefully, as the elements of construction tend to "settle". Fixing the bolts is necessary as well after longer periods of stoppage, at extreme temperature variations, transport and after dismantling.
- ! Before starting to disassemble the pump, take care that pump and dampener have been emptied and rinsed. Further, both have to be cut off from any energy on the inlet and outlet (product) side. If pump and dampener are being deported from the plant, a reference about the delivered liquid has to be attached.
- ! Please respect the relevant additional security advices if the pump and the dampener have been used for aggressive, dangerous or toxic liquids.
- ! Before putting the pump and the dampener back into operation, the tightness of both (i.e. housing bolts) has to be checked.
- ! DME Series Pump with installed PDEM Pulsation Dampener obligatorily has to be equipped with safety device (Push-Button Switch or Pressure Relief Valve). For more information, please refer to Chapter 4 (page 6).

Disassembly instructions

Remove plugs [96], then unscrew housing bolts [92] carefully. After that, all parts can be removed. Unscrew the diaphragm [4] from the actuator shaft [90]. A re-assembly of used piston rings [88] nad O-rings [89] is impossible; they have to be replaced including the O-rings [89] underneath. To assemble new piston rings [88] carefully shape them like kidneys with locking ring pliers and insert them into the grooves. Next, completely press the rings into the grooves using some round tool.

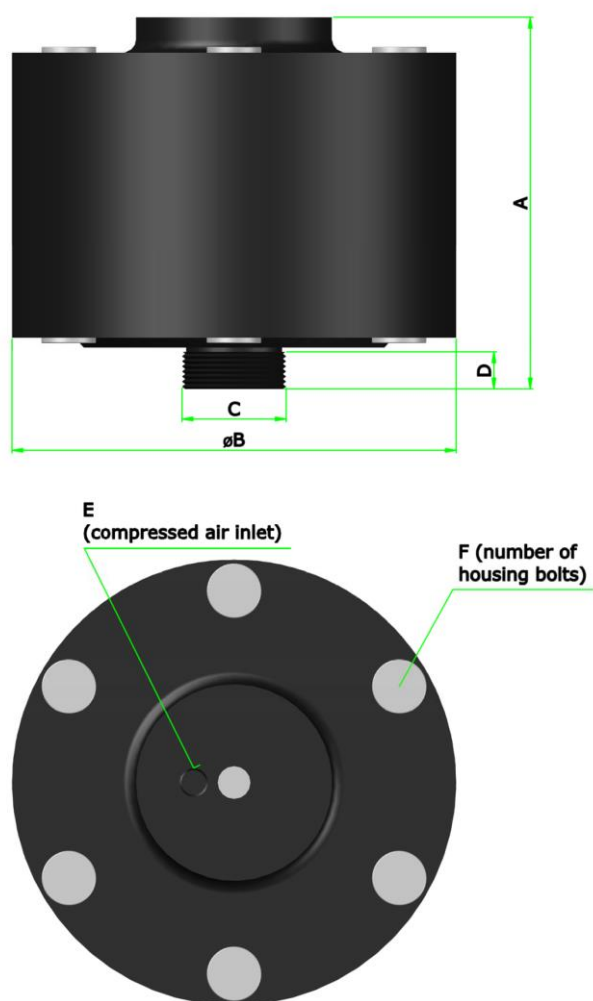
14.2. PDEM Plastic Series Pulsation Dampener – exploded view



Spare parts list, PDEM Plastic Series Pulsation Dampener

Damper size:				PDEM 15	PDEM 25	PDEM 40	PDEM 50	PDEM 80
Pos.	Quantity	Description	Material	Part no.	Part no.	Part no.	Part no.	Part no.
4.	1	Diaphragm	EPDM	1 10 50 08	1 15 50 08	1 25 50 08	1 40 50 08	1 50 50 08
			TFM / PTFE	1 10 50 05	1 15 50 05	1 25 50 05	1 40 50 05	1 50 50 05
			NBR	1 10 50 10	1 15 50 10	1 25 50 10	1 40 50 10	1 50 50 10
			TFM/PTFE/PFA	1 10 50 00	1 15 50 00	1 25 50 00	1 40 50 00	-
87.	1	Dampener housing	PE conductive	8 15 001 21	8 25 001 21	8 40 001 21	8 50 001 21	8 80 001 21
			PTFE conductive	8 15 001 24	8 25 001 24	8 40 001 24	8 50 001 24	-
88.	3	Piston ring	PPS/PTFE, PE*	1 08 90 18	1 15 85 22*	1 25 85 22*	1 40 85 22*	1 80 85 22*
89.	3	O-ring	NBR	1 08 82 10	1 15 85 10	1 25 85 10	1 40 85 10	1 80 85 10
90.	1	Actuator shaft	PET, AISI 304*	8 08 40 30	8 25 40 30	8 40 40 50*	8 50 40 50*	8 80 40 50*
91.	1	Dampener head	PE conductive	8 10 203 21	8 25 203 21	8 40 203 21	8 50 203 21	8 80 203 21
92.	4/ 6** / 8***	Housing bolt	AISI 304	8 15 542 50	8 25 542 50**	8 40 542 50**	8 50 542 50***	8 80 542 50***
93.	8/ 12** / 16***	Nut (DIN 934) with washer, cpl	AISI 304	1 10 045 50	1 25 045 50**	1 40 045 50**	1 50 045 50***	1 80 045 50***
94.	1	Muffler	PE	8 08 99 20	8 25 99 20	8 40 99 20	8 50 99 20	8 80 99 20
95.	1	Dampener housing O-ring	FEP/FKM	2 15 70 04	3 25 70 04	8 40 79 04	2 40 78 04	2 80 78 04
			EPDM	2 15 70 08	3 25 70 08	8 40 79 08	2 40 78 08	2 80 78 08
96.	8/ 12**/ 16***	Housing bolt plug	PE	8 10 058 20	8 25 058 20**	8 40 058 20**	8 50 058 20***	8 80 058 20***

PDEM Pulsation Dampeners for Plastic Series Pumps – appearance and dimensions



DME Plastic Series Pulsation Dampeners – main dimensions					
Dimension	PDEM 15 R.. PDEM 15 Z..	PDEM 25 R.. PDEM 25 Z..	PDEM 40 R.. PDEM 40 Z..	PDEM 50 R.. PDEM 50 Z..	PDEM 80 R..
A	98	138	170	216	287
øB	110	156	204	273	365
C	BSPP ½"	BSPP 1"	BSPP 1 ½"	BSPP 2"	BSPP 3"
D	13	18	17	30	36
E	R ⅛"	R ⅛"	R ¼"	R ¼"	R ½"
F	4	6	6	8	8

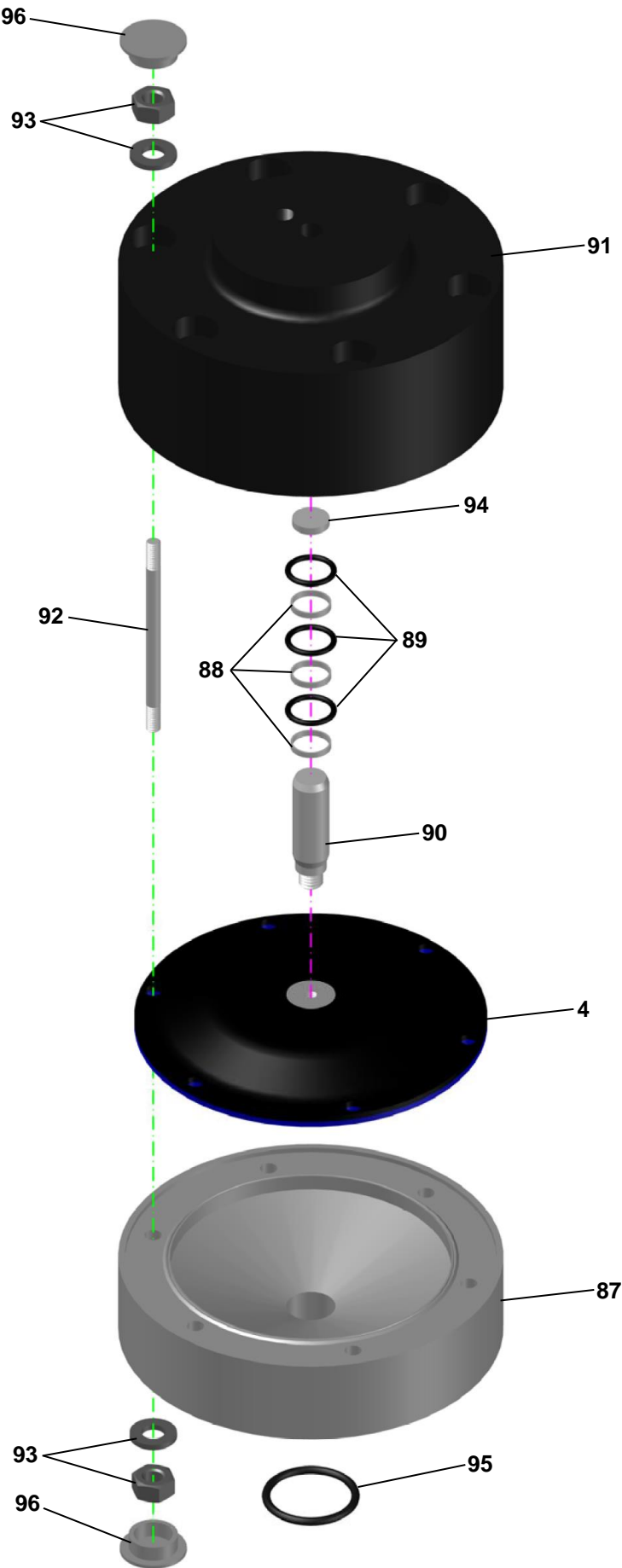
Head material: PE conductive

Housing material (in contact with medium): PE conductive (PDEM xx R..), PTFE conductive (PDEM xx Z..)

Diaphragm material available: EPDM, NBR, TFM/PTFE, TFM/PTFE/PFA

ATEX compliance: EEx II 2GD IIB Tx ("Tx" – depends on the gearmotor's ATEX properties)

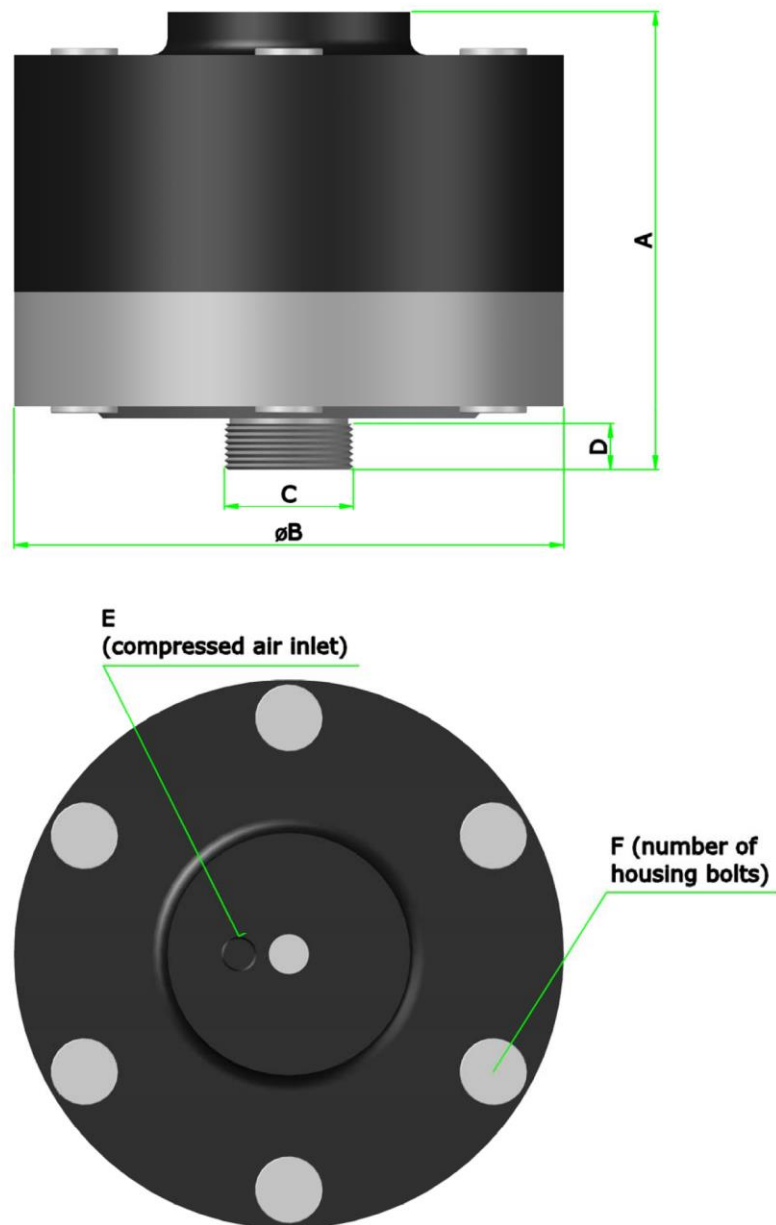
14.3. PDEM Aluminium Series Pulsation Dampener – exploded view



Spare parts list, PDEM Aluminium Series Pulsation Dampener

Damper size:				DM 20	DM 25	DM 40	DM 50	DM 80
Pos.	Quantity	Description	Material	Part no.	Part no.	Part no.	Part no.	Part no.
4.	1	Diaphragm	EPDM	1 10 50 08	1 15 50 08	1 25 50 08	1 40 50 08	1 50 50 08
			TFM / PTFE	1 10 50 05	1 15 50 05	1 25 50 05	1 40 50 05	1 50 50 05
			NBR	1 10 50 10	1 15 50 10	1 25 50 10	1 40 50 10	1 50 50 10
			EPDM/TFM/PFA	1 10 50 00	1 15 50 00	1 25 50 00	1 40 50 00	-
87.	1	Dampener housing	Aluminium	8 20 01 60	8 25 01 60	8 40 01 60	8 50 01 60	8 80 01 60
88.	3	Piston ring	PPS/PTFE, PE*	1 08 90 18	1 15 85 22*	1 25 85 22*	1 40 85 22*	1 80 85 22*
89.	3	O-ring	NBR	1 08 82 10	1 15 85 10	1 25 85 10	1 40 85 10	1 80 85 10
90.	1	Actuator shaft	PET, AISI 304*	8 08 40 30	8 25 40 30	8 40 40 50*	8 50 40 50*	8 80 40 50*
91.	1	Dampener head	PE conductive	8 10 203 21	8 25 203 21	8 40 203 21	8 50 203 21	8 80 203 21
92.	4/ 6** / 8***	Housing bolt	AISI 304	8 15 42 50	8 25 42 50**	8 40 42 50**	8 50 42 50***	8 80 42 50***
93.	8/ 12** / 16***	Nut (DIN 934) with washer, cpl	Zinc plated steel	1 10 045 48	1 25 045 48**	1 40 045 48**	1 50 045 48***	1 80 045 48***
94.	1	Muffler	PE	8 08 99 20	8 25 99 20	8 40 99 20	8 50 99 20	8 80 99 20
95.	1	Dampener housing O-ring	FEP/FKM	2 15 70 04	3 25 70 04	8 40 79 04	2 40 78 04	2 80 78 04
			EPDM	2 15 70 08	3 25 70 08	8 40 79 08	2 40 78 08	2 80 78 08
96.	8/ 12** / 16***	Housing bolt plug	PE	8 10 058 20	8 25 058 20**	8 40 058 20**	8 50 058 20***	8 80 058 20***

PDEM Pulsation Dampeners for Aluminium Series Pumps – appearance and dimensions



DME Aluminium Series Pulsation Dampeners – main dimensions					
Dimension	PDEM 20 A..	PDEM 25 A..	PDEM 40 A..	PDEM 50 A..	PDEM 80 A..
A	98	138	170	216	287
øB	110	156	204	273	365
C	BSPP ½"	BSPP 1"	BSPP 1 ½"	BSPP 2"	BSPP 3"
D	13	18	17	30	36
E	R ⅛"	R ⅛"	R ¼"	R ¼"	R ½"
F	4	6	6	8	8

Head material: PE conductive

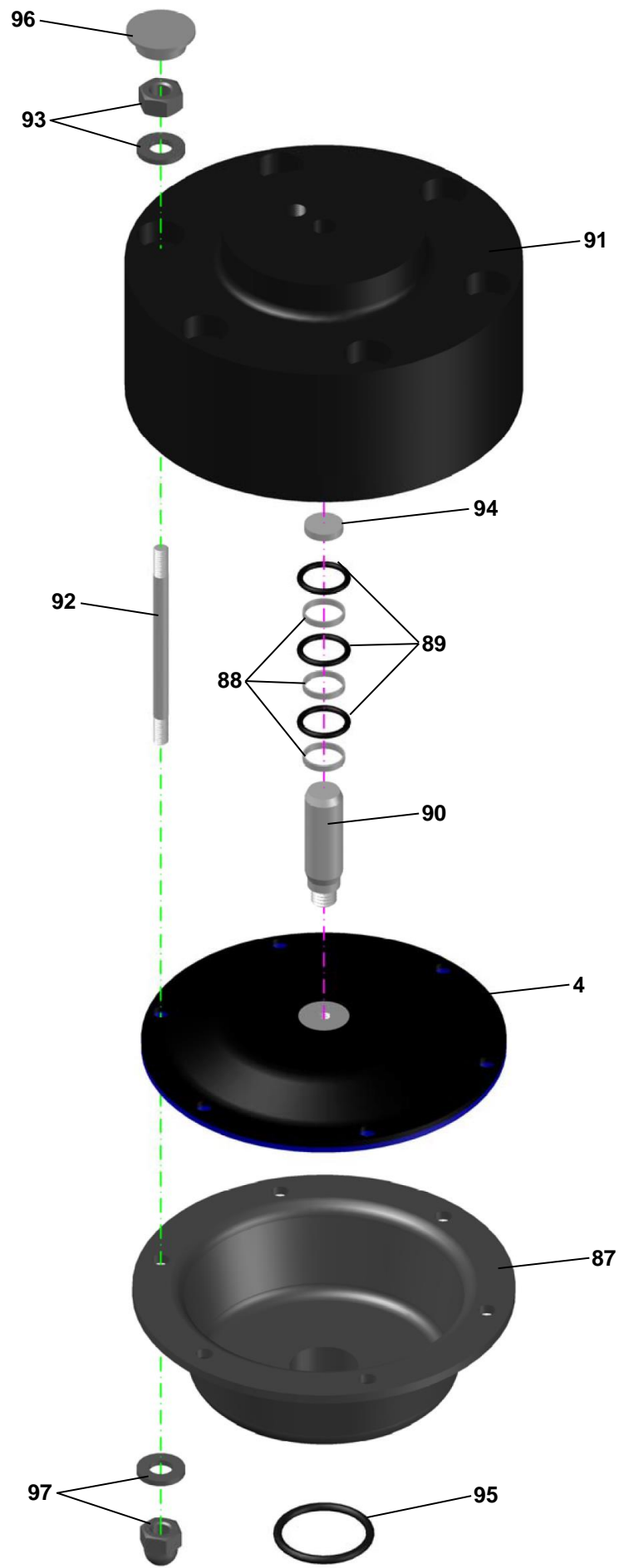
Housing material (in contact with medium): Aluminium (PDEM xx A..)

Diaphragm material available: EPDM, NBR, TFM/PTFE, TFM/PTFE/PFA

DME Cast Iron Pumps have to be equipped with PDEM xx S.. (AISI 316 version) units

ATEX compliance: EEx II 2GD IIB Tx ("Tx" – depends on the gearmotor's ATEX properties)

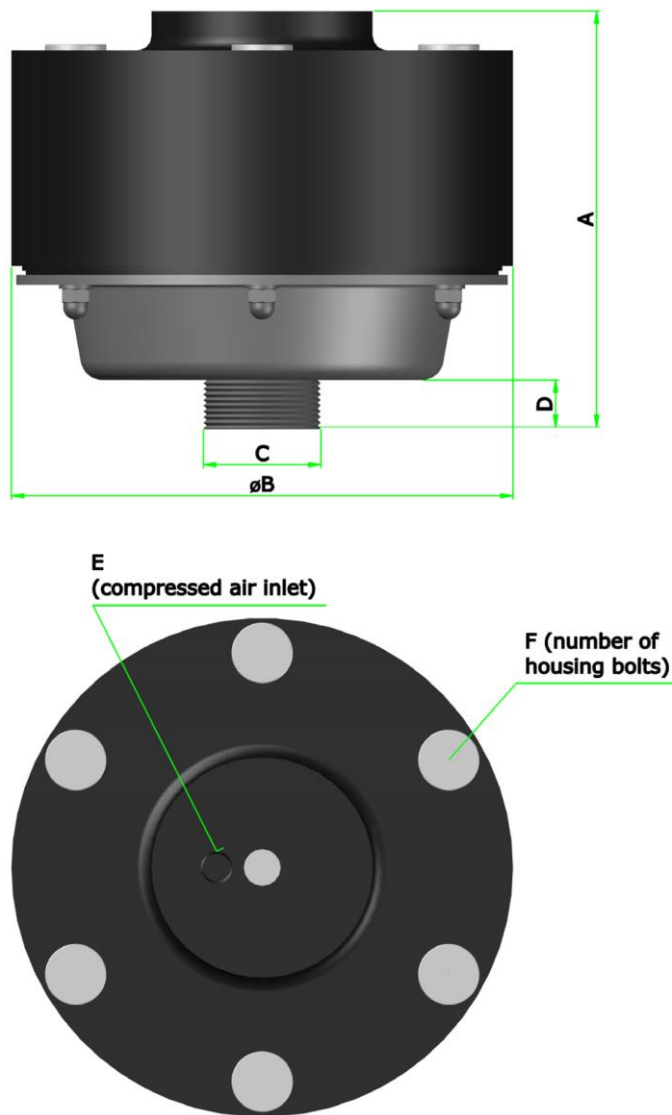
14.4. PDEM Industrial (AISI 316) Series Pulsation Dampener – exploded view



Spare parts list, PDEM Industrial (AISI 316) Series Pulsation Dampener

Damper size:				DM 20	DM 25	DM 40	DM 50	DM 80
Pos.	Quantity	Description	Material	Part no.	Part no.	Part no.	Part no.	Part no.
4.	1	Diaphragm	EPDM	1 15 50 08		1 25 50 08	1 40 50 08	1 50 50 08
			TFM / PTFE	1 15 50 05		1 25 50 05	1 40 50 05	1 50 50 05
			NBR	1 15 50 10		1 25 50 10	1 40 50 10	1 50 50 10
			EPDM/TFM/PFA	1 15 50 00		1 25 50 00	1 40 50 00	-
87.	1	Dampener housing	AISI 316L	8 20 01 53	8 25 01 53	8 40 01 53	8 50 01 53	8 80 01 53
88.	3	Piston ring	PE	1 15 85 22		1 25 85 22	1 40 85 22	1 80 85 22
89.	3	O-ring	NBR	1 15 85 10	1 15 85 10	1 25 85 10	1 40 85 10	1 80 85 10
90.	1	Actuator shaft	PET, AISI 304*	8 25 40 30	8 25 40 30	8 40 40 50*	8 50 40 50*	8 80 40 50*
91.	1	Dampener head	PE conductive	8 25 203 21	8 25 203 21	8 40 203 21	8 50 203 21	8 80 203 21
92.	6* / 8**	Housing bolt	AISI 304	8 25 742 50*	8 25 742 50*	8 40 742 50*	8 50 742 50**	8 80 742 50**
93.	4/ 6** / 8***	Nut (DIN 934) with washer, cpl	AISI 304	1 25 045 50	1 25 045 50**	1 40 045 50**	1 50 045 50***	1 80 045 50***
94.	1	Muffler	PE	8 25 99 20	8 25 99 20	8 40 99 20	8 50 99 20	8 80 99 20
95.	1	Dampener housing O-ring	FEP/FKM	2 15 70 04	3 25 70 04	8 40 79 04	2 40 78 04	2 80 78 04
			EPDM	2 15 70 08	3 25 70 08	8 40 79 08	2 40 78 08	2 80 78 08
96.	4/ 6** / 8***	Housing bolt plug	PE	8 28 058 20	8 25 058 20**	8 40 058 20**	8 50 058 20***	8 80 058 20***
97.	4/ 6** / 8***	Nut (DIN 1587) with washer, cpl	AISI 304	1 25 145 50	1 25 145 50**	1 40 145 50**	1 50 145 50***	1 80 145 50***

PDEM Pulsation Dampeners for Industrial (AISI 316) Series Pumps – appearance and dimensions



DME Industrial (AISI 316) Series Pulsation Dampeners – main dimensions					
Dimension	PDEM 20 S..	PDEM 25 S..	PDEM 40 S..	PDEM 50 S..	PDEM 80 S..
A	141	141	171	230	280
øB	156	156	204	273	365
C	BSPP ¾"	BSPP 1"	BSPP 1 ½"	BSPP 2"	BSPP 3"
D	18	18	20	32	36
E	R ⅛"	R ⅛"	R ¼"	R ¼"	R ½"
F	6	6	6	8	8

Head material: PE conductive

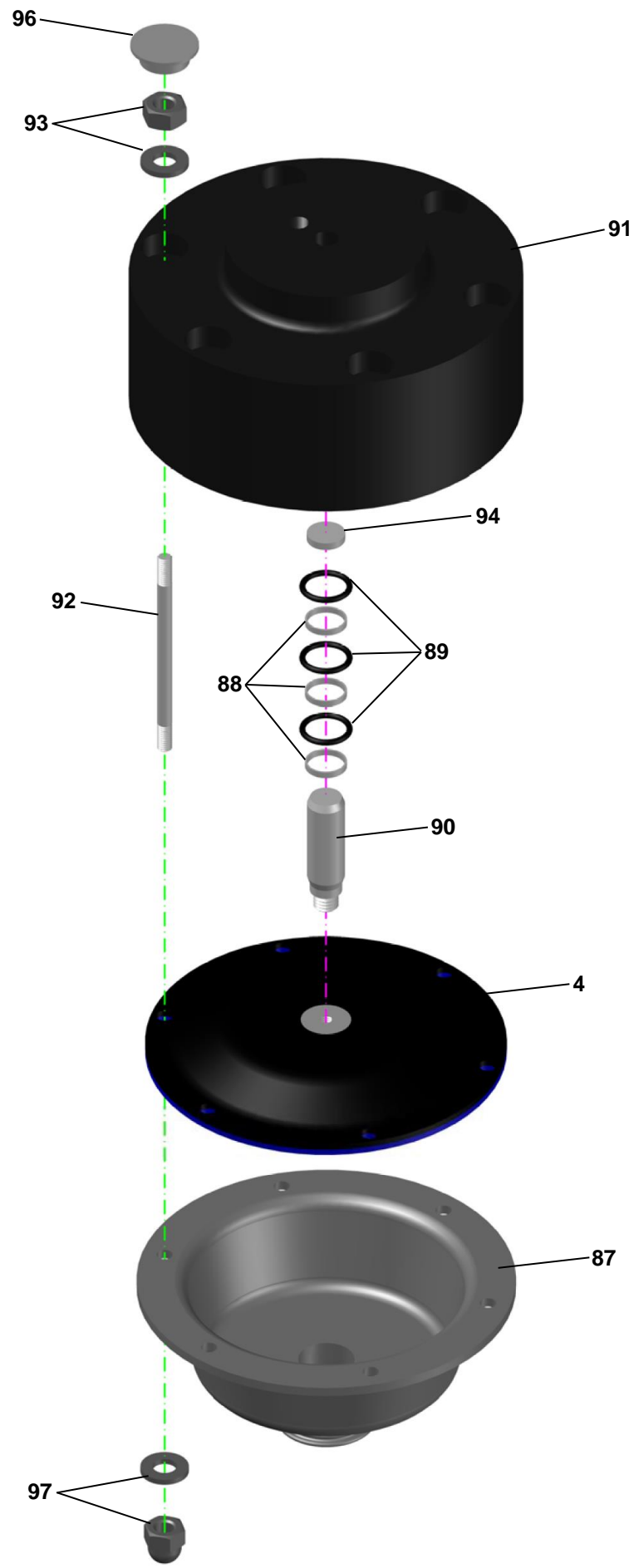
Housing material (in contact with medium): AISI 316L (PDEM xx S..)

Diaphragm material available: EPDM, NBR, TFM/PTFE

DME Cast Iron Pumps have to be equipped with PDEM xx S.. (AISI 316 version) units

ATEX compliance: EEx II 2GD IIB Tx ("Tx" – depends on the gearmotor's ATEX properties)

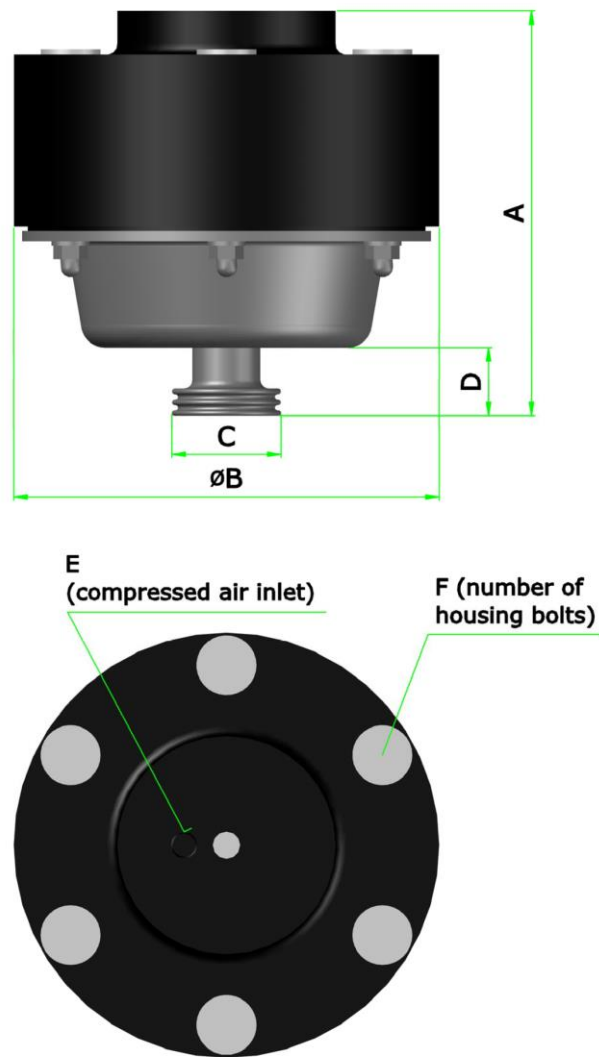
14.5. PDEM Hygienic (AISI 316L) Series Pulsation Dampener – exploded view



Spare parts list, PDEM Hygienic (AISI 316L) Series Pulsation Dampener

Damper size:				DM 20	DM 25	DM 40	DM 50	DM 80
Pos.	Quantity	Description	Material	Part no.	Part no.	Part no.	Part no.	Part no.
4.	1	Diaphragm	EPDM	1 15 50 08	1 15 50 08	1 25 50 08	1 40 50 08	1 50 50 08
			TFM / PTFE	1 15 50 05	1 15 50 05	1 25 50 05	1 40 50 05	1 50 50 05
			NBR	1 15 50 10	1 15 50 10	1 25 50 10	1 40 50 10	1 50 50 10
			EPDM/TFM/PFA	1 15 50 00	1 15 50 00	-	-	-
87.	1	Dampener housing	AISI 316L	8 25 01 53	8 25 01 53	8 40 01 53	8 50 01 53	8 80 01 53
88.	3	Piston ring	PE	1 15 85 22	1 15 85 22	1 25 85 22	1 40 85 22	1 80 85 22
89.	3	O-ring	NBR	1 15 85 10	1 15 85 10	1 25 85 10	1 40 85 10	1 80 85 10
90.	1	Actuator shaft	PET, AISI 304*	8 25 40 30	8 25 40 30	8 40 40 50*	8 50 40 50*	8 80 40 50*
91.	1	Dampener head	PE conductive	8 25 203 21	8 25 203 21	8 40 203 21	8 50 203 21	8 80 203 21
92.	6* / 8**	Housing bolt	AISI 304	8 25 742 50*	8 25 742 50*	8 40 742 50*	8 50 742 50**	8 80 742 50**
93.	4/ 6** / 8***	Nut (DIN 934) with washer, cpl	AISI 304	1 25 045 50	1 25 045 50**	1 40 045 50**	1 50 045 50***	1 80 045 50***
94.	1	Muffler	PE	8 25 99 20	8 25 99 20	8 40 99 20	8 50 99 20	8 80 99 20
95.	1	Dampener housing O-ring	FEP/FKM	2 15 70 04	3 25 70 04	8 40 79 04	2 40 78 04	2 80 78 04
			EPDM	2 15 70 08	3 25 70 08	8 40 79 08	2 40 78 08	2 80 78 08
96.	4/ 6** / 8***	Housing bolt plug	PE	8 28 058 20	8 25 058 20**	8 40 058 20**	8 50 058 20***	8 80 058 20***
97.	4/ 6** / 8***	Nut (DIN 1587) with washer, cpl	AISI 304	1 25 145 50	1 25 145 50**	1 40 145 50**	1 50 145 50***	1 80 145 50***

PDEM Pulsation Dampeners for Hygienic (AISI 316L) Series Pumps – appearance and dimensions



DME Hygienic (AISI 316L) Series Pulsation Dampeners – main dimensions						
Dimensions		PDEM 25 H..	PDEM 40 H..	PDEM 50 H..	PDEM 65 S..	PDEM 80 H..
A	DIN 11851	152	152	178	228	285
	Tri-Clamp	148	148	170	217	269
	SMS 1145	144	157	182	233	277
øB		156	156	204	273	365
C	DIN 11851	Rd 52 x 1/6"	Rd 65 x 1/6"	Rd 78 x 1/6"	Rd 95 x 1/6"	Rd 110 x 1/4"
	Tri-Clamp	ø50.5	ø50.5	ø64	ø91	ø106
	SMS 1145	40 x 1/6"	60 x 1/6"	70 x 1/6"	85 x 1/6"	98 x 1/6"
D	DIN 11851	28	28	29	30	45
	Tri-Clamp	24	24	21	19	29
	SMS 1145	20	33	33	35	37
E		R 1/8"	R 1/8"	R 1/4"	R 1/4"	R 1/2"
F		6	6	6	8	8

Head material: PE conductive

Housing material (in contact with medium): AISI 316L

Diaphragm material available: EPDM, NBR, TFM/PTFE

ATEX compliance: EEx II 2GD IIB Tx ("Tx" – depends on the gearmotor's ATEX properties)

Standard in-/outlet connection is in accordance with DIN 11851

Tri-Clamp connection (option) in accordance with DIN 32676

SMS (thread male) connection (option) in accordance with SMS 1145 standard

15. Limited warranty

This product is shipped to customers only after meeting strict inspection standards. If an abnormality occurs during normal operation in accordance with the operating instructions and other operating cautions within the warranty period (12 months after date of purchase) that can be attributed to a manufacturing defect, the defective parts of this product will be serviced or the product will be replaced free of charge. However, this warranty will NOT cover compensation for incidental damage or any malfunction listed below.

1. Warranty period

This warranty is valid for 12 months after the date of purchase.

2. Warranty

If, during the warranty period, any of the material of the genuine parts of this product or the workmanship of this product is found defective, and is so verified by our company, the servicing cost will be fully covered by our company.

3. Exclusion

Even during the warranty period, this warranty DOES NOT cover the following:

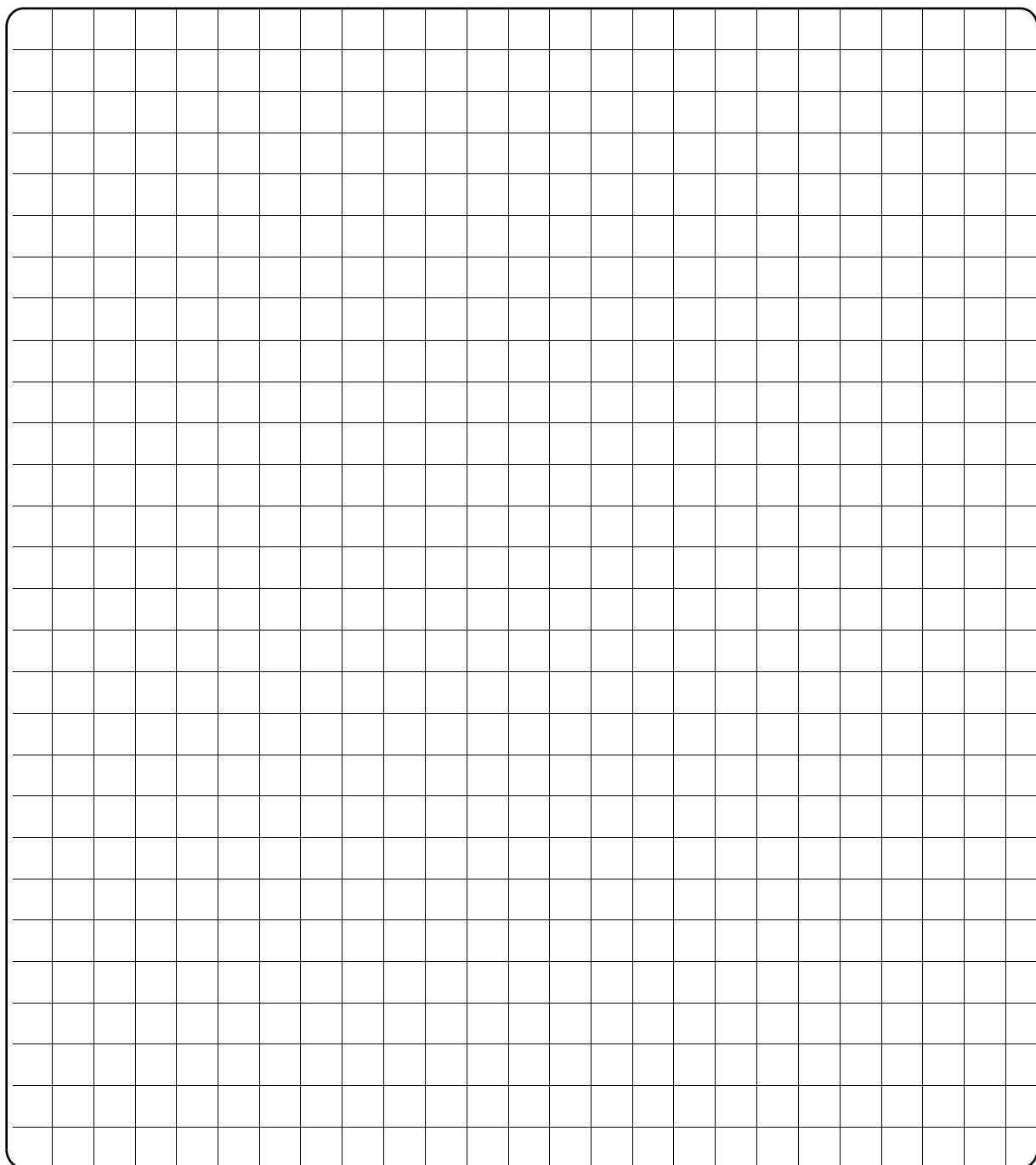
- 1) Malfunction caused by the use of parts other than manufacturer-specified genuine parts.
- 2) Malfunction caused by misuse or operating errors, or lack of storage or maintenance care.
- 3) Malfunction caused by the use of a fluid that may cause corrosion, inflation or dissolution of the component parts of the product.
- 4) Irregularity caused by a repair made by other than our firm, our regional office, dealer or authorized service personnel.
- 5) Malfunction caused by a modification of the product by other than authorized service personnel.
- 6) Wear and tear of parts that must be regularly replaced in the course of normal operation, such as diaphragms, valve seats, balls, valves, O-rings, bearings, etc.
- 7) Malfunction and/or damage due to transportation, moving or fall of the product after purchase.
- 8) Malfunction and/or damage due to fire, earthquake, flood or other force majeure.
- 9) Malfunction caused by the use of a fluid that causes excessive abrasion.
- 10) Malfunction of pump's drive unit (mono block) caused by inappropriate connection, voltage supply, overload, insufficient cooling or any type of impermissible modification by other than authorized service personnel.

Furthermore, this warranty does not cover the rubber parts, or other parts that are subject to wear in normal operation, used in this product and its accessories.

4. Parts

Parts for this product will be kept available for 5 years after discontinuation of production. Once 5 years have elapsed after close of production, availability of parts for this product cannot be guaranteed.

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