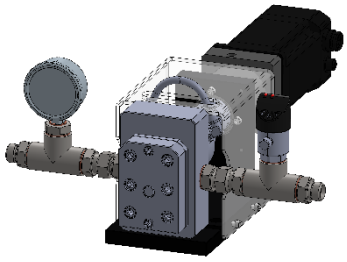
DAVtech

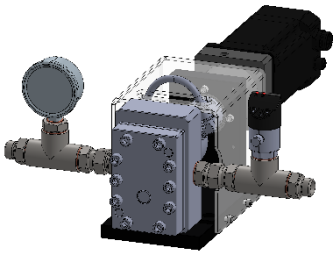
PARTS, SYSTEMS AND AUTOMATIONS FOR FLUID DISPENSING

USE AND MAINTENANCE MANUAL

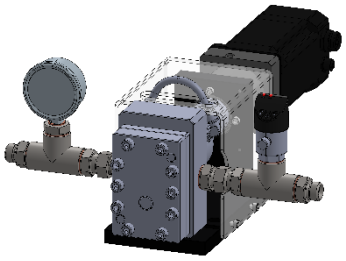
GP GEAR PUMP



GP-06



GP-2



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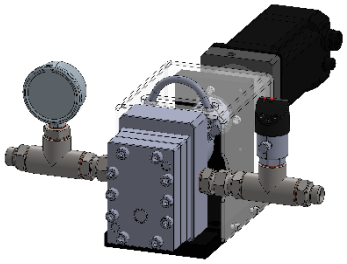
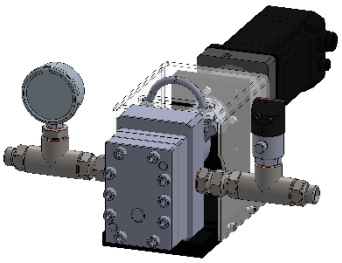


GP-10



GP-20

COD.: **DTVI_GP_2440**
REV.: **00**
DATE: **30/09/2024**

TRANSLATED FROM ORIGINAL
Read carefully before use!

EN

Summary

1 GENERAL INFORMATION

This manual contains information regarding the installation, use, maintenance and end of life of the component and provides indications for the most suitable behavior for correct operation. This manual has been designed to be simple and as straightforward as possible, with a subdivision into chapters and sub-chapters that allows you to find any information you need quickly. In addition, the manual begins by giving a general description of the contents, then an overview of the component, to arrive at aspects of safety, transport, installation and use and finally to the end of life. If you have any doubts about the interpretation or reading of this document, please contact the manufacturer.

DAV Tech declines any responsibility relating to improper use of the component. Observe the specifications in this manual.

Read this manual before handling the component or performing any action on it.

The manual is an essential safety requirement and must accompany the component throughout its life cycle.

It is the task of the end user to optimize the functionality of the component, always considering the purpose for which it was built.

You are asked to keep this manual, together with the attached documentation, in good condition, legible and complete. In addition, it must be stored in the vicinity of the component or, in any case, in a place accessible and known to all personnel who use the component itself or who must perform maintenance or inspection interventions. If the manual deteriorates or is no longer complete, a copy must be requested from the manufacturer, indicating the code of the manual and the revision.

The manual is intended for personnel who use the component (operators), who perform maintenance on it (maintenance technicians), and for personnel who must perform checks or inspections. The manufacturer is not liable for damage to the component caused by personnel who have not followed the instructions in the manual.

If you have any doubts about the correct interpretation of the information contained in this manual, please contact the manufacturer.

GUARANTEE

During the design phase, a careful choice of materials and components to be used in the project was made and they were subjected to regular testing before delivery. All elements have been designed and manufactured with an adequate degree of safety, such as to be able to withstand stresses greater than those of normal use.

The warranty is valid for a period of 12 months from the date of commissioning and in any case no longer than 15 months from the date of delivery. Work carried out during the warranty period does not extend the warranty period in any way.

The manufacturer is not liable for defects due to normal wear and tear of parts which, by their nature, decay.

1.1 Symbology

Below are the symbols that are used to give a greater impact to the importance of the concept you want to give.

ATTENTION!
Refers to a warning that could lead to minor damage (minor injuries, damage to the component requiring maintenance work).

DANGER!
It refers to a major event that could cause major damage (death, permanent injury, irreversible breakage of the component).

NOTE. Indicate relevant information or insight.

OBLIGATION. It indicates a task that must be performed, related to both the component and the manual.

REFERENCE. Links to an external document that is important to view

In addition, the list of symbols is integrated with that of the personnel responsible for using the component and its function, together with other symbols used within the manual.

Operator
A (qualified) person capable of operating the component, adjusting, cleaning, starting or resetting the component. The operator is not authorized to perform maintenance.

Mechanical maintenance technician
Qualified technician able to carry out mechanical, adjustment, maintenance and routine repair work described in this manual. He is not authorized to carry out interventions on electrical systems in the presence of voltage.

Electrical maintenance technician
Qualified technician able to carry out electrical, adjustment, maintenance and routine repair work described in this manual. It can work in the presence of voltage on electrical cabinets and junction boxes. He is not authorized to carry out interventions on the mechanical side.

Manufacturer's technician
Qualified technician made available by the manufacturer to carry out operations of a complex nature in particular situations, or in any case as agreed with the customer.

1.2 Reference standards

The reference standards and directives of this manual are the following:

Directives

- 2006/42/EC – Machinery Directive;

1.3 Declaration of incorporation (Annex II B DIR. 2006/42/EC)

Manufacturer's name: **DAV Tech Srl**
Address: Via G. Ravizza, 30, .36075, Montecchio Maggiore (VI)

DECLARES THAT THE ALMOST MACHINE

Component: GP-06, GP-2, GP-4, GP-10, GP-20
Model: Gear pump
Year: 2024
Intended use: Volumetric gear feeding system

COMPLIES WITH THE INCORPORATION PROVISIONS OF DIRECTIVE 2006/42/EC

The technical documentation has been drawn up in accordance with Annex VII B, as required by the following:

- Machinery Directive 2006/42/EC of the European Parliament and Council of 17 May 2006

IT ALSO DECLARES THAT:

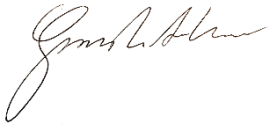
- Undertakings are undertaken to provide, in response to a properly substantiated request from the national authorities, relevant information on this partly completed machine;
- The technical file was prepared by Andrea Grazioli, via Ravizza, 30, Montecchio Maggiore (VI), IT.

This quasi-machine cannot be used until the machinery on which it will be used is declared compliant with regulation 2006/42/EC.

Montecchio Maggiore, 30 September 2024

The legal representative

Andrea Grazioli



1.4 Glossary

The following are the most used terms within this manual with their meanings.

TERM	DEFINITION
Enable	Term that defines the act of preparing (enabling) an action. The action will be triggered as soon as the criteria are met, which consequently leads to the activation of the enabled action.
Active	The action that is performed instantaneously when the control is activated.
Human controls	This defines those commands that, used for manual operations, must be kept activated for the action to be performed. When the command is released, the action stops.
Two-hand controls	Human-controlled controls require two manual controls to be operated simultaneously to perform an action.
P.P.E.	Personal protective equipment. They include all the items necessary to ensure the protection of personnel from possible accidental damage (safety shoes, gloves, helmet, and more).
Display	It is used to display information. It can be in any shape and size, even touch screen.
Manufacturer	Natural or legal person who designed and manufactured the component covered by this manual.
HP	High Pressure. An acronym that indicates high pressure.
Icon	A small image that represents a command, a function or even a document or an operating program, which appears on a computer screen. When selected by the user, it initiates the function or program it symbolizes.
Joystick	Lever manipulator used in control panels.
N.A.	Not Applicable, i.e. it indicates that it is a field that does not apply to this manual and that it cannot be integrated into the component.
Operator panel	A control station where the machine control instruments are located
P.I.	Possible Implementation, i.e. it is currently absent from the component described in this manual, but it is possible to make an addition and implement it.
Screen	Interface system between man and component. Screenshots are the images displayed on the operator panel that allow the user to receive and provide information to the management software.
Push-button panel	Composition of buttons and selectors that allow you to act directly on the behavior of the component.
Keyboard	Keyboard only (stand-alone element) or in addition to a display (keys only, no selectors or other)
Touch screen	Touch screen that allows the user to interact with a graphic interface using their fingers or objects.

1.5 Service and manufacturer contact details

For any reason relating to the use, maintenance or request of spare parts, the customer must contact the manufacturer (or the service center if present) directly, specifying the identification data of the component.

The customer can make use of the technical and commercial support of local agents or importers, who are in direct contact with the company DAV Tech Srl.

Company name	**DAV Tech Srl**
Postal address	Via Ravizza, 30, 37065, Montecchio Maggiore (VI) – (IT)
Telephone	+39 0444 574510
Fax	+39 0444 574324
email	davtech@davtech.it
Website	www.davtech.it

2 PRESENTATION AND OPERATION

In this manual we want to deepen the functions of the GP gear pump, which has been designed to feed a pressure-time dosing system by being fed by a pressure-time system with fluids of various viscosities. That is, this dosing system is used to convert a pressure-time feeding system into a volumetric feeding system.

In other words, the function of this component is:

CONVERTING A PRESSURE-TIME DOSING SYSTEM INTO A VOLUMETRIC DOSING SYSTEM

Intended use is the use described in the chapter below, while improper use is considered any other use that is not described in this manual, with products of different material and format from those for which it was built.

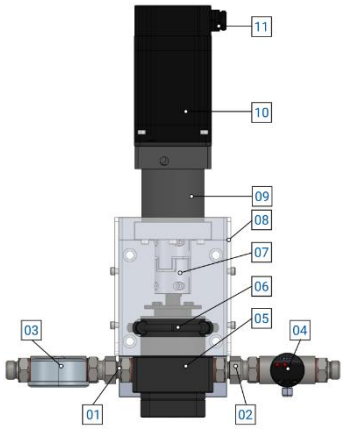


Figure 01 – GP detail

No.	DESCRIPTION
01	Fluid inlet
02	Fluid output
03	Analog Pressure Gauge (Input)
04	Digital Transducer (Output)
05	GP Pump Body
06	Leakage control tube
07	Elastic coupling
08	Protective casing
09	Reducer
10	Electric motor
11	Motor connectors

Before using a certain type of fluid, it is necessary to check that:

- The viscosity of the fluid is compatible with the characteristics of the component;
- The characteristics of the fluid meet the desired requirements;
- The technical data sheet of the fluid provided by the manufacturer contains all the information regarding the product such as viscosity, applications, drying times and storage;
- The fluid storage time has not been exceeded;
- The fluid packages are tightly sealed.

If it is necessary to use several fluids with the same component, each part of the system must be thoroughly cleaned to prevent residues from the previous processing from affecting the processing to be performed.

SPECIAL VERSIONS

This component can have both analog and digital pressure gauges, both incoming and outgoing, according to customer requests and if there are other pressure gauges within the plant. It is advisable to have the digital pressure gauge mounted at the outlet, to check the outlet pressure through a special control system.

OPERATION

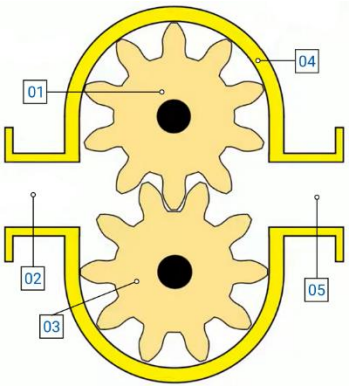


Figure 02 – GP internal section

No.	DESCRIPTION
01	Drive gear
02	Fluid inlet
03	Idle gear
04	Container
05	Fluid output

This type of pump works with the method of external gears, i.e. there are two gears, one controlled by the motor (engine) and the other support (neutral), controlled by the movement of the other gear. The size of the gears varies according to the size of the pump, allowing a certain volume to be delivered with each complete revolution of the gears themselves. If necessary, a larger gearbox (i=10) can be implemented to increase the torque applied by the motor.

For minimum working pressures, please refer to Chapter 2.2.

This component cannot operate autonomously. To ensure that it dispenses the product, it must be connected to a power source, which can be a tank, a pump or other, depending on the system and the customer's needs.

ATTENTION!
It is recommended to connect the pumps to the sources indicated in this manual in chapter 2.2. Connecting them to other sources or products with features not listed in this manual may break them.

To better adjust this component, the size of the same "cc/rev" is written on the front plate of the pump and the correct reduction factor "i" is written on the reducer, which must be set to the software on the controller (K pump and Reducer) so that the pump delivers the precise amount of fluid that is written in this manual.

ATTENTION!
These settings are adjusted by the manufacturer's technicians and should not be changed after the event, unless the manufacturer's technicians recommend it.

Below we want to explain how GP pumps work.

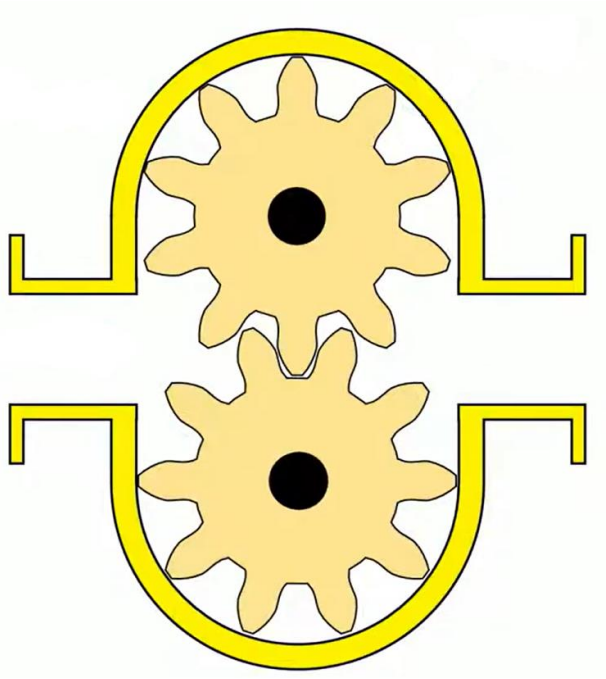


Figure 03 – Resting phase

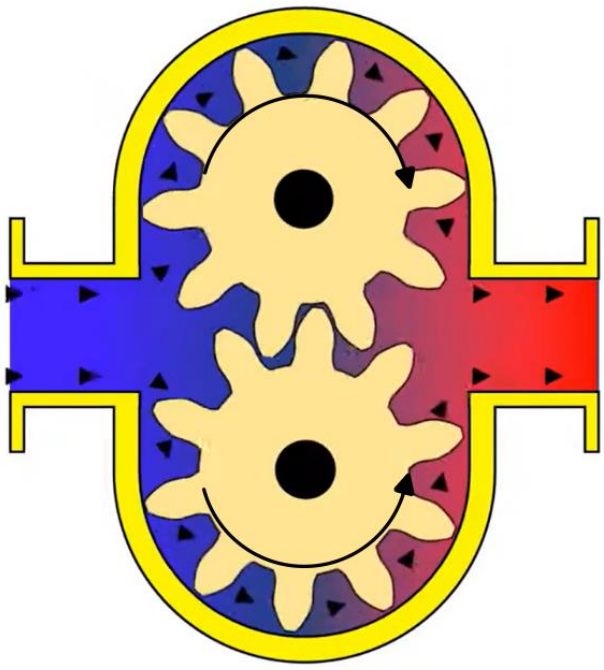


Figure 04 – Work phase

The inlet fluid is pushed by the pressure of the upstream supply system, which can be a pressure plate pump, a diaphragm pump or a pressurized tank; therefore, the inlet fluid has a pressure equal to that leaving the fuel system (without considering the pressure drop). From here, the fluid enters the gear pump and, in case it is at rest, stops at the inlet. When the electric motor is controlled, the gears begin to rotate and carry the fluid to the outside of the gears themselves, filling the "chambers" that form the gears and the fluid is accompanied towards the exit hole. When the gears cross, the fluid does not pass through the gears, since the gap is almost non-existent (they are designed to be almost perfectly coupled); then, the fluid is pushed outwards, with a flow rate that is equal to that reported in chapter 2.2.

Ideally, the gear pump could generate much higher pressure at the outlet (if the motor rotated very fast), creating a high flow rate and consequently excessive pressure for the downstream system; To avoid this, a digital pressure transducer is placed at the outlet of the pump, verifying, in real time, that the outlet pressure remains below a certain threshold.

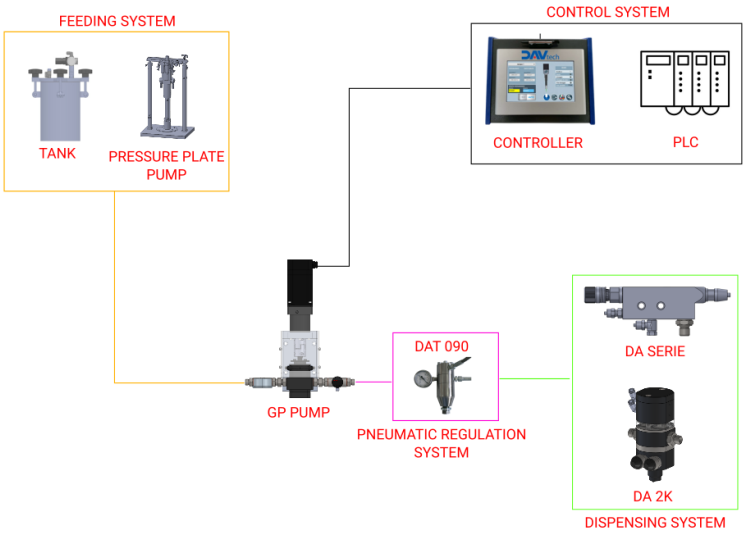
DANGER!
If the pressure generated at the outlet is too high, there is a risk of damaging the downstream circuit.

ATTENTION!
If the flow rate inlet to the GP pump is lower than the required flow rate at the outlet of the pump itself, a cavitation phenomenon (generation of air in the fluid) could be created

USEFUL TIPS

ATTENTION!
The parameters shown are indicative. Always ask for advice from technicians during the design phase to have an application suitable for your use

- Maintain a minimum pressure at the inlet of the pump (recommended by the manufacturer's technicians), otherwise there is a risk of having little fluid coming from the fuel system and you risk cavitating the pump;
- Always check the maximum outlet pressures of the system, which can be given either by the maximum pressure that can be tolerated by the dosing valve (depending on its configuration), or by the maximum sealing pressure of the pipes;
- Use the "K pump" parameter and the "Reducer" reduction parameter corresponding to the pump used. Change these parameters only on the advice of the manufacturer's technicians;
- This component can operate either through a dedicated controller (GP EVO Controller) or within a machine that has a dedicated driver (GP Driver). In both cases, it cannot function without a dedicated control system.

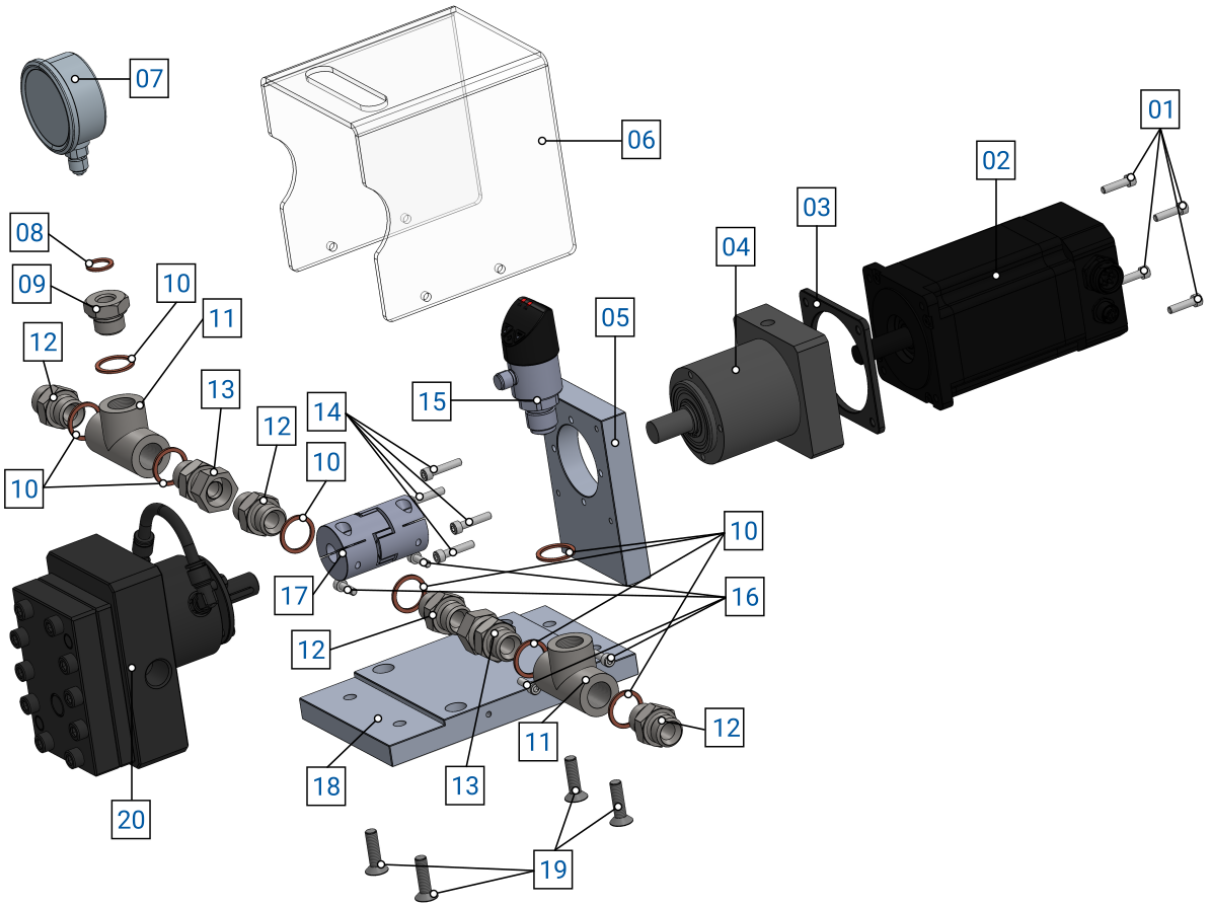


COLOR	MEANING
VIOLET	Pressure regulation
YELLOW	Fluidic power supply
GREY	Controllers
GREEN	Dosing systems
RED	Notes

Figure 05 – Connection example

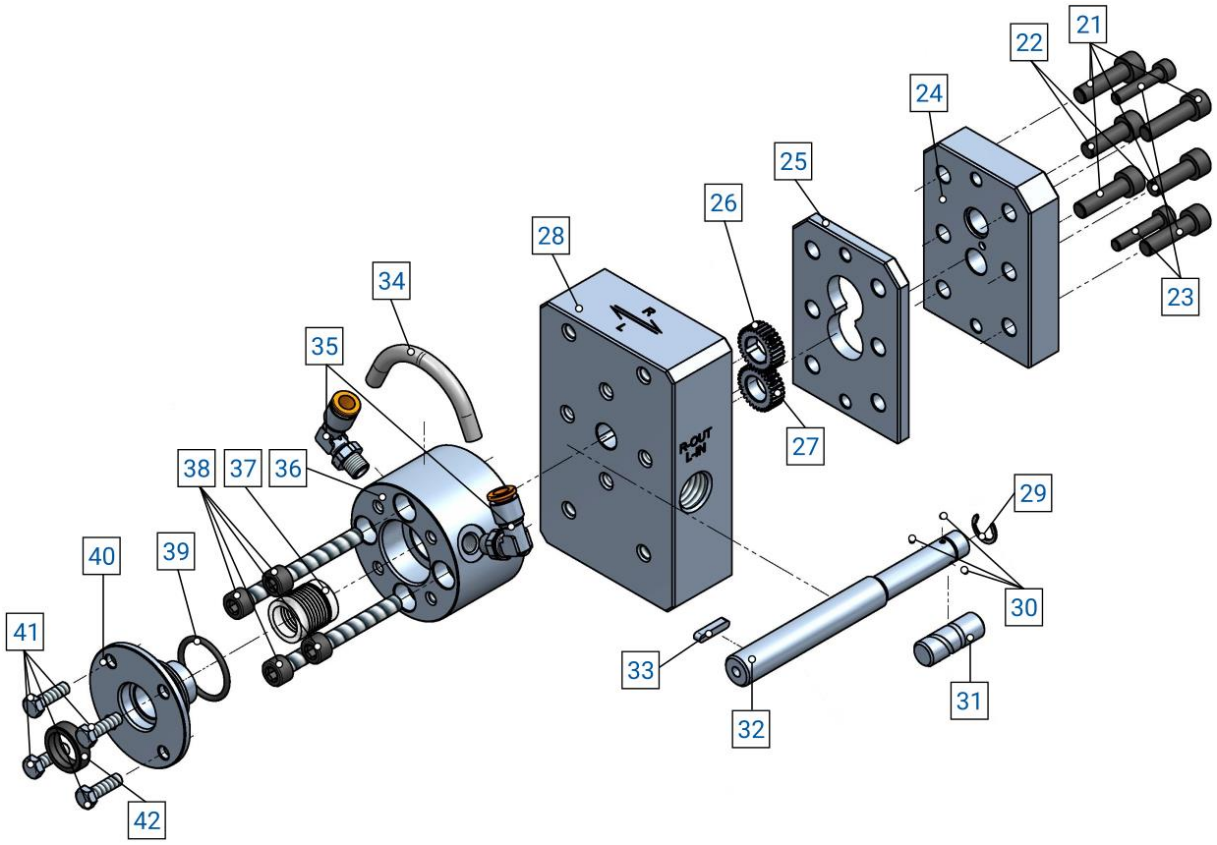
2.1 Exploded

The following is a list of the main parts with part numbers.

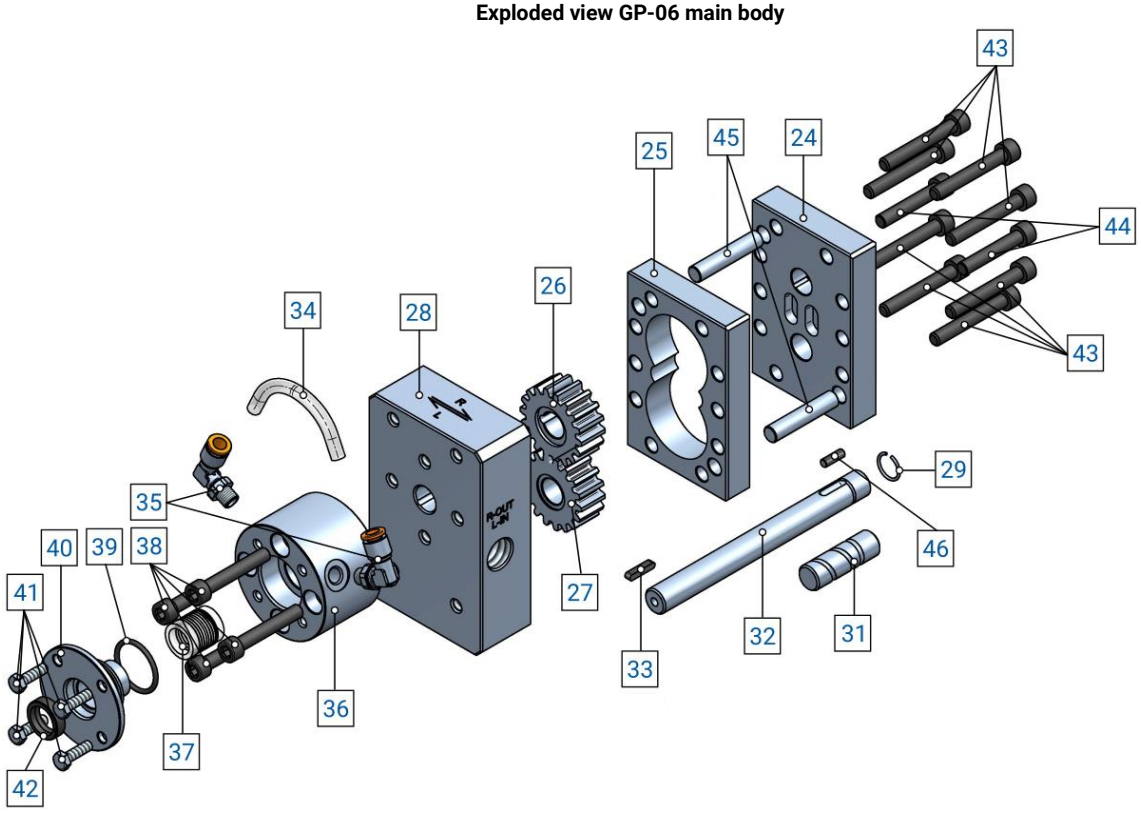


No.	Description	Var.	Code	Variant details
01	SCREW ISO 4762 M5X20	-	TCEI M5X20	-
02	ELECTRIC MOTOR	-	M86SH118-TO0512P24C	-
03	ENGINE SPACER	-	080618502418	-
04	PLANETARY REDUCER 1:5	-		-
-	-	04.a	SGP11070005S01	Planetary gearbox 1:5
-	-	04.b	SGP1107001012SM286100000	Planetary gearbox 1:10
05	MOTOR BRACKET	-	270418512418	-
-	-	05.a	270418512418	NEMA34 82.25 Motor Bracket for GP-06, GP-2, GP-4
-	-	05.b	231118507418	NEMA34 87.5 Motor Bracket for GP-10, GP-20
06	GP SHAFT GUARD	-	050919500000	-
07	FLUIDIC PRESSURE GAUGE 160 BAR 1/4" GAS	-	MAN160-14	-
08	COPPER WASHER 1/4" GAS	-	RR1_4	-
09	REDUCTION HP M 1/2" GAS – F 1/4" GAS	-	ADM12FG14	-
10	COPPER WASHER 1/2" GAS	-	RR1_2	-
11	T FITTING HP FFF 1/2" GAS	-	ATFF12	-
12	HP M 1/2" GAS ADAPTER – M 1/2" GAS	-	ADNIP12	-
13	HP M 1/2" GAS ADAPTER – F SWIVEL 1/2" GAS	-	ADMFG12	-
14	SCREW ISO 4762 M5X25	-	TCEI M5X25	-
15	DIGITAL PRESSURE TRANSDUCER	-	PSD-4	-
16	SCREW ISO 4762 M5X16	-	TCEI M5X16	-
17	ELASTIC COUPLING	-	CPJC40-RD-14-16	-
18	PUMP BASE PLATE	-	270418522418	-
19	SCREW ISO 10642 M5X8	-	TSPEI M5X8	-
20	MAIN BODY	-	-	-
-	-	20.a	GP06	GP-06 Main Body
-	-	20.b	GP2	GP-2 Main Body
-	-	20.c	GP4	GP-4 Main Body
-	-	20.d	GP10	GP-10 Main Body
-	-	20.e	GP20	GP-20 Main Body

Below, however, the main body for the various models is exploded.



Exploded view GP-06 main body



Exploded view GP-2, GP-4, GP-10, GP-20 main body

No.	Description	Var.	Code	Variant details
21	SCREW M8X30 UNI 5931 TCCE	-	2E29F306	-
22	SCREW M8X25 UNI 5931 TCCE	-	2E29F256	-
23	SCREW M6X30 UNI 5931 TCCE	-	2E29E306	-
24	VL805 OUTER PLATE	-	-	-
-	-	24.a	CPE100000000Y	Outer plate for GP-06
-	-	24.b	CPE1V80000001	Outer plate for GP-2, GP-4
-	-	24.c	CPE1X00000002	Outer plate for GP-10, GP-20
25	VL899 GEAR PLATE	-	-	-
-	-	25.a	CPN1V60000003	Gear Plate for GP-06
-	-	25.b	CPN1002000002	Gear Plate for GP-2
-	-	25.c	CPN1004000003	Gear Plate for GP-4
-	-	25.d	CPN1010000002	Gear Plate for GP-10
-	-	25.e	CPN1020000003	Gear Plate for GP-20
26	DRIVING GEAR	-	-	-
-	-	26.a	CRE1V60000003	Driving gear for GP-06
-	-	26.b	CRE1002000004	Driving gear for GP-2
-	-	26.c	CRE10040I0001	Driving gear for GP-4
-	-	26.d	CRE10100I0001	Driving gear for GP-10
-	-	26.e	CRE10200I0001	Driving gear for GP-20
27	DRIVEN GEAR	-	-	-
-	-	27.a	CR01V60000003	Driven gear for GP-06
-	-	27.b	CR01002000001	Driven gear for GP-2
-	-	27.c	CR01004000001	Driven gear for GP-4
-	-	27.d	CR01010000001	Driven gear for GP-10
-	-	27.e	CR01020000001	Driven gear for GP-20
28	VL805 BACKING PLATE	-	-	-
-	-	28.a	CPI1X00000002	Backing Plate for GP-06
-	-	28.b	CPS1V80000001	Backing Plate for GP-2, GP-4
-	-	28.c	CPS1X00000001	Backing Plate for GP-10, GP-20
29	RETAINING RING	-	-	-
-	-	29.a	ZX71H134	Nickel Plated Ø13 Retaining Ring for GP-06
-	-	29.b	ZX71A162	UNI 7433-A-16 Ring for GP-2, GP-4, GP-10, GP-20
30	DRAG BALL 3/32" HRC = 63	-	ZX69A042	-
31	FIXED PIN	-	-	-
-	-	31.a	CNP100000000I	Fixed pin Ø 13 L36 for GP-06
-	-	31.b	CNP1000000003	Fixed pin Ø 16 L38 for GP-2
-	-	31.c	CNP1000000004	Fixed pin Ø 16 L44 for GP-4
-	-	31.d	CNP1020000001	Fixed pin Ø 16 L50 for GP-10
-	-	31.e	CNP1000000000	Fixed pin Ø16 L60 for GP-20
32	DRIVE SHAFT	-	-	-
-	-	32.a	CAM7V60200002	Drive shaft for GP-06
-	-	32.b	CAM7003200004	Drive shaft Ø16X153 for GP-2
-	-	32.c	CAM7004200002	Drive Shaft PL2L2B 200-016 L157 for GP-4
-	-	32.d	CAM7010200003	Drive shaft PL2L2B 200-016 L164 for GP-10
-	-	32.e	CAM7020200003	Drive shaft for GP-20
33	KEY B 4X4X20 UNI6604-69	-	2E98C202	-
34	HOSE FOR LEGRIS FITTINGS Ø8X6	-	ZY50B001	-
35	SWIVEL ELBOW FITTING 1/8" GAS	-	ZY64B070	-
36	HUB FOR STUFFING BOX	-	CMOZ00000000D	-
37	PACKAGE V-SHAPED COLLARS 16/22-H25 PL2 STANDARD	-	COLLAR-GP	-
38	M8X50 SCREW UNI5931 12.9 TCCE	-	2E29F506	-
39	GASKET OR3112 VITON 2.62X28.25	-	05021V3112	-
40	STUFFING BOX	-	CSTZ00000000A	-
41	SCREW M6X20 UNI 5739 ZINC. TE	-	2E33E207	
42	RING SM 16247 VITON Ø16X24X7	-	05051V1602	
43	SCREW	-	-	-
-	-	43.a	2E29F406	M8X40 UNI 5931 TCCE screw for GP-2 pump
-	-	43.b	2E29F456	M8X45 UNI 5931 TCCE screw for GP-4 pump
-	-	43.c	2E29F556	M8X55 UNI 5931 TCCE screw for GP-10 pump
-	-	43.d	2E29F656	M8X65 UNI 5931 TCCE screw for GP-20 pump
44	SCREW			
		44.a	2E29F356	M8X35 UNI 5931 TCCE screws for GP-2 pump
		44.b	2E29F406	M8X40 UNI 5931 TCCE screw for GP-4 pump
		44.c	2E29F456	M8X45 UNI 5931 TCCE screw for GP-10 pump
		44.d	2E29F556	M8X55 UNI 5931 TCCE screw for GP-20 pump
45	CENTERING PIN	-	-	-
-	-	45.a	CNP100000000V	Centering pin Ø10X36 for GP-2 pump
-	-	45.b	CNP100000000A	Centering pin Ø10X39 for GP-4 pump
-	-	45.c	CNP100000001E	Centering pin for GP-10 pump
-	-	45.d	CNP100000000U	Centering pin Ø10X54 for GP-20 pump
46	SHAFT KEY	-	-	-
-	-	46.a	CHV4000000009	Shaft key Ø5 h10X5.8 for GP-2 pump
-	-	46.b	CHV4000000006	Shaft key Ø5X7.5 for GP-4 pump
-	-	46.c	CHV400000000H	GP-10 Pump shaft key
-	-	46.d	CHV400000003T	Shaft key Ø5 h10X23 for GP-20 pump

2.2 Technical data

All the technical characteristics concerning the component of this manual are indicated below.

SPECIFICATIONS						
Description	**UdM**	**Values**				
Model	\	GP-06	GP-2	GP-4	GP-10	GP-20
Activation	\	Electric				
Electrical Characteristics						
Engine type	\	HT Bipolar Hybrid Stepper				
Maximum current	A	6				
Fluid characteristics						
Minimum inlet fluid pressure	bar	Variable according to the type of fluid used				
Maximum outlet fluid pressure	bar	150				
Type of connections (inlet/outlet)	GAS	F 1/2"				
Working temperature of the fluid	°C	0 ÷ 130				
Nominal flow rate	cc/rev	0.6	2	4	10	20
Mechanical characteristics						
Maximum rotation speed	rpm	150				
Shaft diameter	mm	16				
Materials used	\	Martensitic stainless steel				

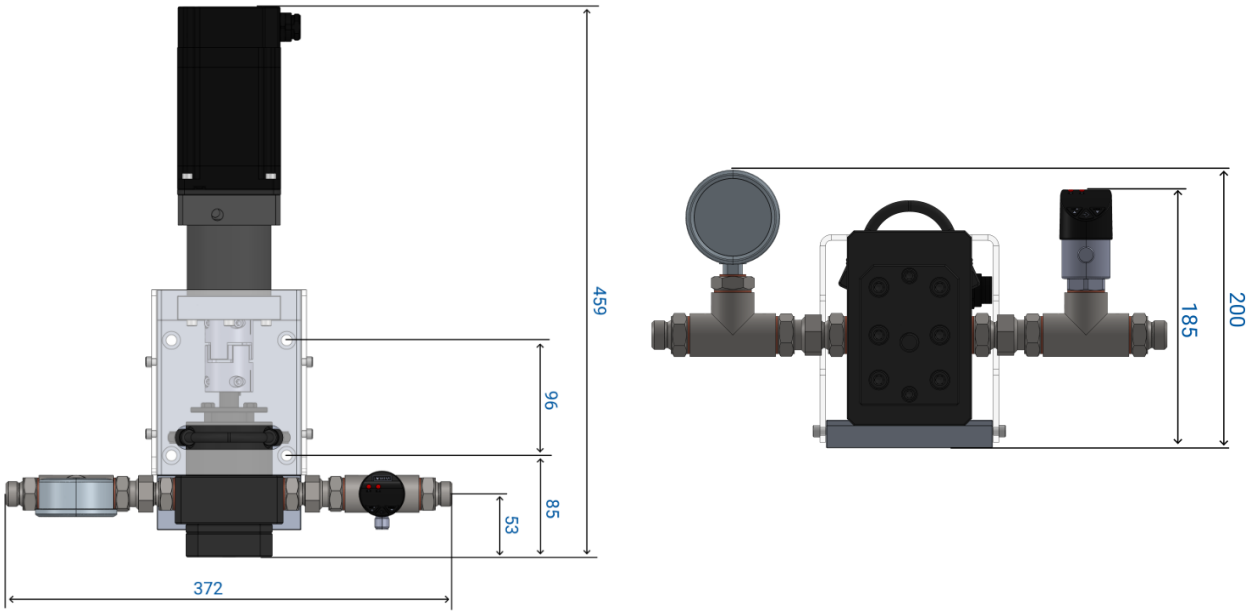
(1) Variable according to the type of fluid used

ENVIRONMENTAL CHARACTERISTICS		
Description	**UdM**	**Values**
Working Ambient Temperature	°C	5 ÷ 45
Storage Ambient Temperature	°C	-20 ÷ 55
Permissible non-condensing humidity	%	5 ÷ 90

USABLE FLUIDS
Silicones
Glues
Grease
Resins
Oils
Various products with various viscosities, approximately 1-10^6 cPs (contact the manufacturer for more information)

DIMENSIONAL AND WEIGHT CHARACTERISTICS		
Description	**UdM**	**Value**
Component length (min ÷ max)	mm	372
Component depth (min ÷ max)	mm	~ 459
Component height (min ÷ max)	mm	185 ÷ 200
Component weight	kg	15 ÷ 20

Component



You can request the 3D of the component in the desired version from the manufacturer without any obligation.

3 SAFETY

The following is a list of warnings regarding the component covered by this manual. Please read carefully before proceeding to the next chapters.

DANGER!
Before operating the component or performing any action on it, read this manual carefully.

DANGER!
Do not use the component while under the influence of drugs or other substances that may impair attention and reaction ability.

DANGER!
Operators must only perform operations or interventions that are within the competence of the role and qualification assigned.

FIRE/EXPLOSION HAZARD!
This component is not designed to work in an ATEX environment.

DANGER!
Be very careful when servicing the component, especially when disassembling components that have pressure springs inside.

ATTENTION!
Modifications to the component must not be made to achieve performance other than that for which it was designed and built, unless authorized by the manufacturer.

ATTENTION!
Avoid introducing foreign bodies, even small ones, into the pneumatic system, which could cause the system to malfunction and compromise the safety of the machine.

The component may only be used by trained and authorized operators and for the sole purpose for which it was designed and manufactured.

The component is manufactured in compliance with the technical safety standards in force at the time of its construction.

3.1 Component Safety Devices

ATTENTION!
The replacement of component safety components is reserved exclusively for the manufacturer's technicians. This operation must be carried out in compliance with the manufacturing specifications of the same.

The safety devices must be kept in working order. Use only original spare parts when replacing safety components.

Safety devices are all those components (both mechanical and electrical) installed to ensure that personnel can work safely and in compliance with the regulations in force at the time of construction. Despite this, staff are required to maintain an appropriate level of attention while in the vicinity of the component.

Some of these devices can be fixed and mobile barriers, emergency buttons, electromechanical devices, signage plates and more, depending on the type, design and risk analysis of the component itself. The symbols used for some of the safety devices are listed below.

Symbol	Meaning	Presence
	**Emergency button:** It is a button that, when pressed, removes power from the motors, securing the work area	NO
	**Fixed guards:** These are devices that are designed to be static, for example doors that need a key to be opened. They typically do not need to be connected to alarms or lock component functions as they can only be accessed via key or another unlocking device.	YES
	**Interlocked movable guards:** These are devices that are used to protect the operator while they are closed. If they are opened while the machine is running, there is an alarm that goes off and the torque is removed from the motors.	NO
	**Safety labels:** These are labels placed in places where there is a danger and caution is recommended.	NO
	**Valve air interceptor:** it is a device capable of maintaining air in a certain place even if there is no line air	NO
	**Pneumatic disconnector:** This is a device used to regulate the pressure of the incoming air and, if necessary, remove it (in case of interventions or problems)	NO
	**Electrical disconnector:** It is positioned just outside the electrical panel and is used to remove the torque from the motors and the voltage from the entire system	NO
	**Beacons:** This is a device that indicates the status of the component. It is indicated in this chapter because it is also used to indicate alarm states.	NO
	**Acoustic signals:** These are devices that are used to alert personnel of a particular event (it can be an error or even the end of the cycle, depending on the settings)	NO

3.1.1 Static signaling devices

These are all those devices that are used to signal the presence of a danger to the operator or maintenance technician. In general, static signaling devices can be labels or signs. There are no static signaling devices in this component.

3.1.2 Guards (fixed and mobile interlocked)

These are all those devices that are used to secure personnel by closing/blocking certain areas of the component, to prevent there from being problems with involuntary crushing.

The following devices are present in this component:

- Fixed guard: 1 device given by the protective casing (chapter 2.1 number 06);

3.1.3 Electrical and pneumatic disconnecting devices

These are all those devices that are used to interrupt the electrical or pneumatic flow in emergencies or if maintenance needs to be carried out. Pneumatic disconnecting devices are used to remove air from the system, but the power supply is maintained; while the electrical disconnecting devices are used to de-energize the system.

There is no electrical or pneumatic disconnecting device in this component

3.1.4 Emergency stop devices

These are all those devices that are used to interrupt the operation of the component instantaneously, removing torque from the motors and deactivating the auxiliary circuits.

There is no emergency stop device in this component.

3.1.5 Signaling devices (light and sound)

These are those devices that signal certain states of the component to the staff. These reports can be made in two ways:

- Luminous: through indications of lights of various colors positioned in such a way as to be visible even from a distance;
- Acoustic: by means of sound indications.

In this component there are no types of lighting devices or even acoustic devices.

3.2 Free useful spaces

These are those spaces that must be respected during the installation of the component and serve to allow the passage of personnel safely, as well as allowing maintenance and cleaning operations to be carried out safely.

No special useful space is required for this component, as it is adapted to the work environment and fixed on a workbench. It is recommended to keep about 40cm of space for each side of the component itself.

3.2.1 Risk areas and residual risk

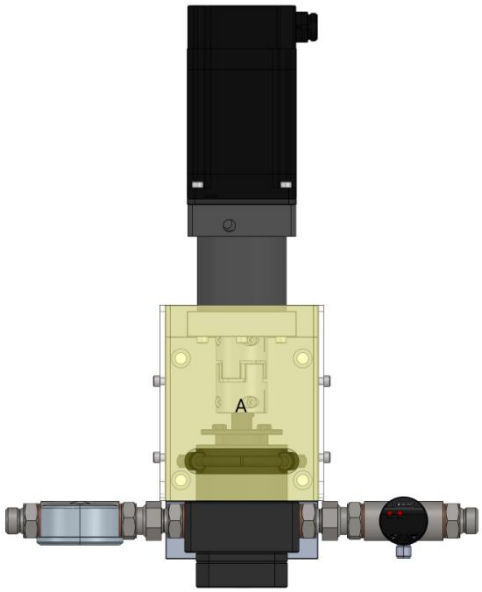
These are areas whose danger has not been completely removed, and it is recommended that the staff pay particular attention when they are near those areas. Some methods that remove the risk can be the presence of two-hand controls or guards on the doors of the moving areas and on the doors of the electrical cabinet.

AREAS AT RISK

N.A.

RESIDUAL RISK AREAS

These are areas where risks remain even if appropriate safety measures have been taken to reduce them.



In this case there is only one residual risk area, given by the area under the protective casing (A)

ATTENTION!
Risk of crushing. Be careful if the component is moving and the guard is opened.

4 TRANSPORT AND HANDLING

Once you have received the goods, you must check that the packaging is intact and that there is an exact correspondence with the material ordered.

ATTENTION!
The original configuration of the component must not be changed. The manufacturer is not liable for damage caused by inappropriate use of the component.

ATTENTION!
If the packaging is not intact, contact the manufacturer immediately, also sending photos of the condition of the packaging. Do not open it until you have notified the manufacturer.

5 INSTALLATION

The installation of the component is carried out by the customer. If necessary, you can contact the manufacturer to have a specialist technician help you.

The component has been designed to be used in line between a pressure/time dosing system and a pressure/time supply system, to be able to perform volumetric dosing. In addition, it is equipped with 4 through holes placed on the base plate of the component in which M8X20 screws must be used.

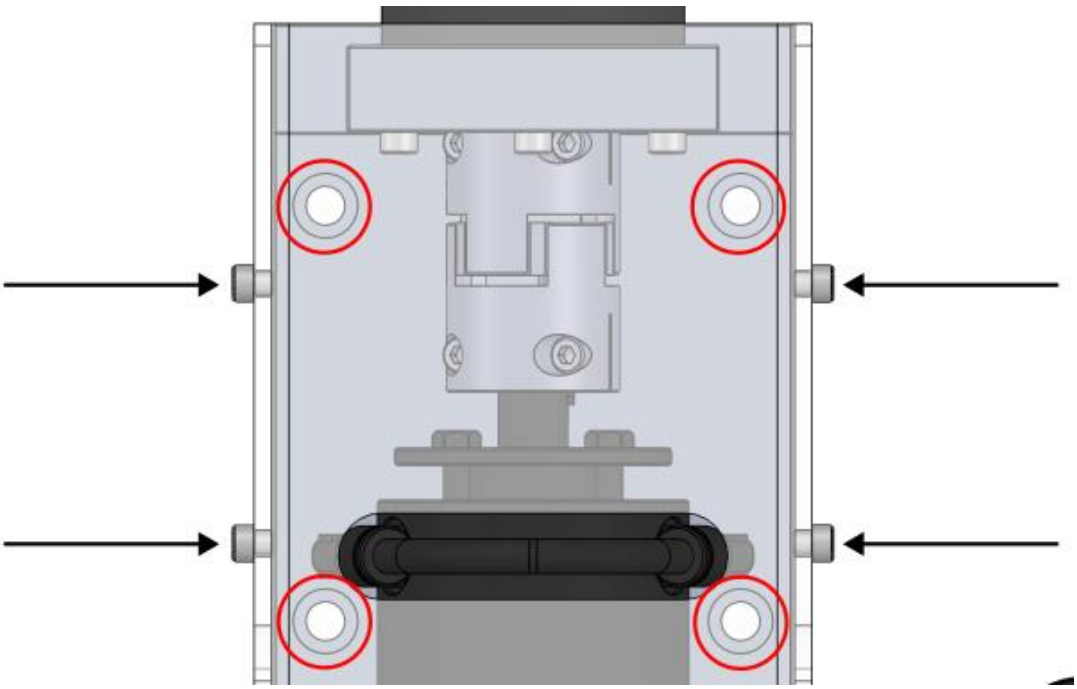
It is recommended that you perform a component check before beginning the installation. If it is evidently damaged, please contact the manufacturer.

ATTENTION!
Please remove the packaging with the utmost care. If damage is caused to the component, the manufacturer is not liable.

Dispose of the packaging correctly, considering the different nature of the components and following the regulations in force in the country.

5.1 Positioning

To be able to position the component, the shaft protection of the component must be removed by unscrewing the 4 side screws of the protection itself (see arrows). Once removed, you have access to the Ø9mm through holes, on which you must use 4 M8X20 screws, as shown in the following image.



5.2 Connections

In this chapter, we want to explain the connection method that must be used for the component. The following types of connection are provided:

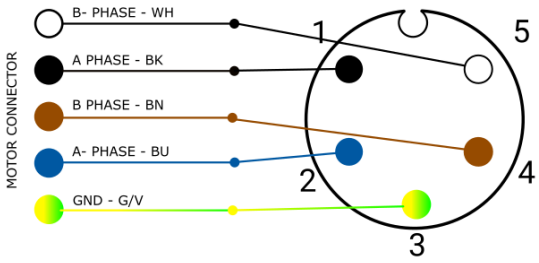
- Electrical connection;
- Fluidic connection;

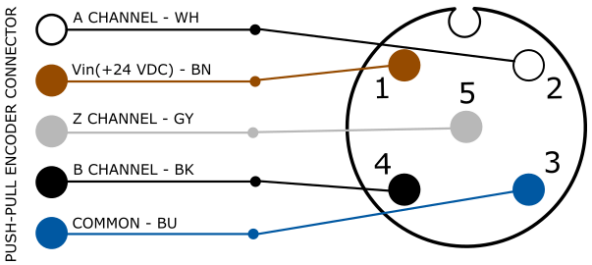
5.2.1 Electric

Authorized personnel		**PPE to wear**					
Component status	Installed control system						
Power Values	See chapter 2.2						
Necessary preparations	N.A.						
Materials needed	N.A.						
Equipment needed	N.A.						

The electricity connection is at the expense of the customer.

To make the electrical connection, the electrical cable (which must comply with the specifications given in chapter 2.2) must be connected to the appropriate connectors, which must be connected to the controller in the direction of connection. Here's an outline of what connector pins do:





The encoder cable is of the M12 5-pin M type, while the motor cable is 7/8 5-pin M

5.2.2 Fluidic

Authorized personnel		**PPE to wear**	    
Component status	Component installed and shut down		
Connection diameter	See chapter 2.2		
Necessary preparations	N.A.		
Materials needed	N.A.		
Equipment needed	N.A.		

The fluidic connection is the responsibility of the customer.

To make the fluidic connection, the appropriate hose (which can be armored, PTFE or other variants, depending on the specific application) must be brought to the inlet and outlet of the component. Care must be taken to install the pipe arriving from the fluidic supply system at the inlet, while the pipe going to the dosing system is at the outlet.

ATTENTION!
If the inlet and outlet are reversed, the pump can work the same, just remember to change the appropriate parameter within the control system and reverse the two pressure switches, since otherwise they would always go into error.

DANGER!
A high-pressure hose must be used at the pump outlet because of the pressure generated by the pump itself, especially in the event of obstructions.

5.3 Commissioning

The commissioning of the component is carried out once the positioning and connection of the connections has been completed. Before commissioning the component, the following checks must be carried out:

- Check that the connections have been connected correctly;
- Check that the component is free of dirt or residues of various kinds;

ATTENTION!
If even one of the above points does not comply, commissioning must not be carried out. Commissioning should only be carried out when all points have been successfully completed.

6 SOFTWARE

N.A.

7 PROCEDURE

N.A.

8 MAINTENANCE

Maintenance interventions are all those activities that must be performed on the component which, if carried out correctly, allows it to have a longer life. In general, maintenance is divided into two groups:

- **Ordinary maintenance**, which are interventions on a regular basis or that can be carried out by the customer's staff, are the most important activities as they allow the component to be kept in good working condition;

ATTENTION!
Ordinary maintenance must be carried out in the manner and timing indicated in the following chapters.

- **Extraordinary maintenance**, i.e. all those interventions that are not regularly carried out or that have not been planned, or interventions that cannot be carried out by the Customer. They can also arise from the lack of routine maintenance.

ATTENTION!
Extraordinary maintenance work must be carried out together with the manufacturer's specialized technicians.

Regarding attendance, it must be considered that:

- **When necessary:** Operation to be carried out when the need to be carried out is seen;
- **Each component start or job end:** Indicates a daily period, in general. This can imply every 24 hours (i.e. at the beginning of the shift of every day, or the end of the shift of every day), or even more frequently, depending on the application;
- **Long pause:** Indicates a period approximately greater than an hour;
- **Each drum change:** Indicates each time the fuel system (tank, drum, cartridge or other) is changed;
- **Each mixer disassembly:** Indicates that each time the mixer is replaced, a certain operation must be performed;
- **Weekly:** Indicates a period equal to seven calendar days;
- **Monthly:** Indicates a period equal to one calendar month;
- **Semi-annual:** Indicates a period equal to six calendar months;
- **Yearly:** Indicates a period equal to one calendar year.

ATTENTION!
The times given below are indicative as they depend on how the component is used. Follow the variations suggested by the technicians.

Assigned	Description	Frequency	Chapter
	Oil check on transparent pipe (No.06 Figure 01 chapter 2) [1]	Each component start or end of work	\
	Perform a surface cleaning of the component	Every machine start-up or end of work	\
	Check for leaks near the elastic joint (No.17 chap. 2.1) of the component	Every machine start-up or end of work	\
	Replacing component seals	Annual	8.1
	Cleaning the inside of the main body	Annual	8.1

[1] If the hose is drained of oil, or if the oil is dirty, i.e. it is not transparent, the seals of the component must be replaced

ATTENTION!
Only use soft brushes or cotton cloths for cleaning.

8.1 Replacing the Component Seals

Assigned	Periodicity	Materials and equipment
	Annual	• 3mm, 4mm, 6mm Allen key; • 10mm wrench; • Torque wrench with 6mm socket at 32 Nm.

PPE to wear

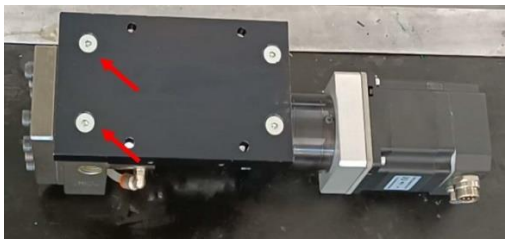
ATTENTION!
Before performing this procedure, you must relieve pressure from the system and disconnect the air connection.

This procedure is used to perform the replacement of the component seals only. If it is necessary to disassemble and reassemble the pump completely, the manufacturer must be asked for the appropriate application note.

01

Loosen the two screws of the coupling on the pump side, to allow the pump shaft to slide freely.

02



Remove the screws (No.19 ch. 2.1) that hold the main body (No.20 ch. 2.1) to the pump base plate (No. 18 ch. 2.1). Once this is done, slide off the main pump body.

03

Putting on a rag or container, remove the Legris fitting pipe (No.34 chap. 2.1), to remove the oil inside the pipe itself.

04

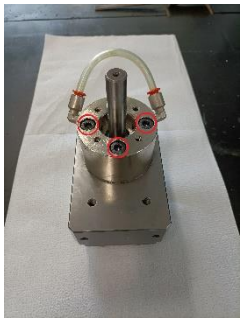
Unscrew the 4 screws (No.41 chap. 2.1) that hold the stuffing box (No.40 chap. 2.1) under pressure with the hub for the stuffing box (No. 36 chap. 2.1). Pay attention to any oil left inside the chamber.

05

N.A.

Remove the stuffing box by lifting it with the help of a screwdriver so that enough force is used to raise it. Once raised, remove the SM Viton ring (No. 42 ch. 2.1) with the help of a flat screwdriver being careful not to scrape the surface of the component.

06



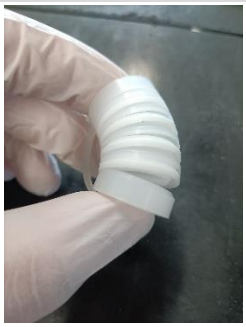
Remove the 4 screws (No.38 chap. 2.1) so that the stuffing hub can be lifted (No. 36 chap. 2.1)

07

N.A.

The V-collar package (No. 37 chapter 2.1) can be either on the newly removed component or on the drive shaft and can be either lip held (if new version) or PTFE rope (if old version). In any case, remove them.

08



Place the V-shaped collars on the drive shaft two by two, paying attention to the direction of the lip, i.e. the V-shaped part must be placed towards the main body of the pump. Common grease can be used to facilitate the insertion of the same.

09

N.A.

Insert the stuffing hub in the same position in which you removed it in step 06 and apply the screws (No.38 chap. 2.1) pulling them up to 32Nm.

10

N.A.

Place the new SM Viton ring removed in step 05 in its position. To fix it in its seat, use a vice so that the ring can be locked inside the filler.

WARNING!
Do not use grease or oil to slide the ring into the seat, otherwise it will continue to come out of the seat.

11

N.A.

Place the stuffing box in its position and secure it with the appropriate screws, removed in step 04, until resistance is perceived, due to the V-collars. Don't go any further.

The measurement between the stuffing box and the stuffing hub must be between 3 and 5 mm

12

Insert the hose into one of the two fittings and, using the other fitting, fill the hose with petroleum jelly oil or equivalent, if it is white or transparent. The level is correct when both the air bubble and the oil can be seen from both sides of the hose.

Proceed to close the pump by following steps 02 and 01 in reverse.

9 TROUBLESHOOTING

This chapter deals with the most common problems that may arise when using the component of this manual.

ATTENTION!

Once the operator has found a problem or assumes that there is a problem, they must call the technician in charge of maintenance. Maintenance should always be performed by a specialized and qualified technician.

DEFECT	CAUSE	SOLUTION
There is inlet pressure but no outlet pressure	The electric motor is not receiving power	Check the engine connection
	The electric motor has rotational peaks	Check the encoder connection
	The fluidic inlet and outlet connections were exchanged	Swap fluidic tubes
		Change settings to controller
	Input and output sensors exchanged	Check the correct match between sensor and pipe type
	Main body gears are locked	Perform an internal cleaning of the main body
The transparent control tube has no oil in it	The internal seals of the main body are worn	Perform seal replacement
	The oil hose is not properly secured	Check the hose for damage
	The outer plate is not properly fixed (No.40 chapter 2.1)	Pull the locking screws (No.41 chapter 2.1)
The transparent control tube has dirty oil inside it	The internal seals of the main body are worn	Perform seal replacement
Losses from fluidic attacks	Fittings are not tightened tightly	Check the tightness of fluidic connections
Low flow rate or low pressure despite set speed	The pump is not properly supplied at the inlet	Make sure there is a suitable inlet flow rate
	Air enters the inside of the hose connection	Check connections
	Worn pump	Inspect and possibly overhaul the pump
	Blocked filter (if present)	Inspect the filter, clean it, or change it
Uneven dosing, outgoing air bubbles	The pump is not properly supplied at the inlet	Make sure there is a suitable inlet flow rate
	Air enters the inside of the hose connection	Check connections
	Worn pump	Inspect and possibly overhaul the pump
Drive shaft locked	The temperature of the fluid is lower than the operating temperature	Increase the temperature of the fluid until it reaches the working temperature
	Gears stuck due to product	Inspect and possibly overhaul the pump
		Remove pressure and move the spring joint by hand (No. 17 chapter 2.1)
	Difference between inlet and outlet pressure too high	Reduce the inlet pressure to the pump
Abnormal noises during operation	Cavitations in pump	Increase the pump supply pressure
	Speeds too high for the viscosity of the fluid	Decrease the working speed
	Blocked filter (if present)	Clean the filter
	Air bubbles inside the fluid	Remove air bubbles from the fluidic circuit

10 END OF LIFE

End-of-life refers to all those activities that put the component out of service. End-of-life activities can be:

- **Storage,** i.e. when the component is placed inside the warehouse for an unspecified period waiting for a third party to buy the component;
- **Dismantling,** i.e. when the component has reached the end of work period, whether it is due to age, obsolescence or faults that cannot be repaired, or that it is possible to repair but it is worth buying a new component.

If installation is not planned soon, the component can remain packaged and must be stored in a sheltered and preferably closed place. The ambient temperatures to be observed are given in chapter 2.2.

On the other hand, for the dismantling and consequent scraping of the component or its parts, the different nature of the various components must be considered, and a differentiated scrapping must be carried out. We recommend that you commission specialist companies for this purpose and must always observe the applicable laws on waste disposal.