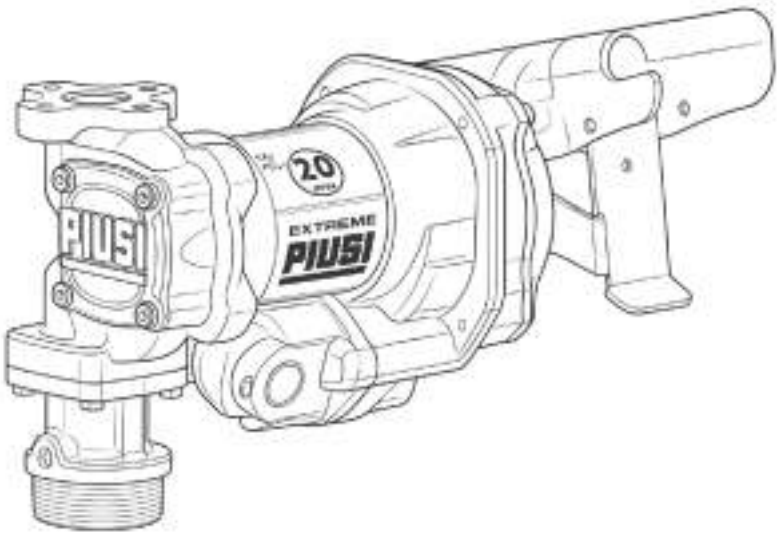
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MADE IN ITALY

Installation, use and maintenance manual

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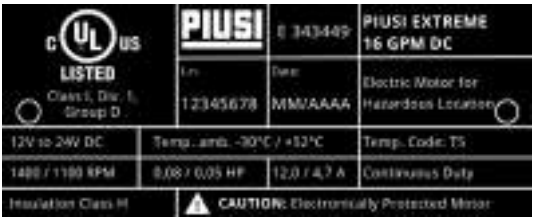
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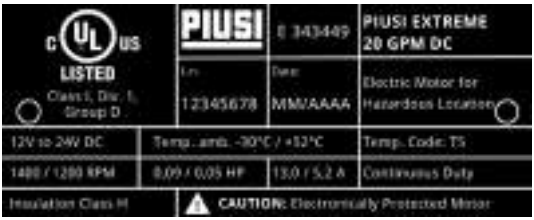
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1 PRODUCT AND MANUFACTURER IDENTIFICATION





Dimensions and shape shown are only for reference

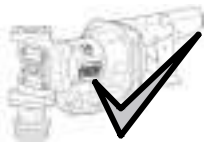
AVAILABLE MODELS:	**PIUSI EXTREME 16 GPM - PIUSI EXTREME 20 GPM**
MANUFACTURER:	PIUSI S.p.A. Via Pacinotti 16/A – z.i. Rangavino 46029 Suzzara - Mantova (Italy)

2 PRODUCT DESCRIPTION

PUMP	SELF-PRIMING, VOLUMETRIC, ROTATING ELECTRIC VANE PUMP, EQUIPPED WITH BY-PASS VALVE.
MOTOR	Brush motor powered by continuous current, low voltage, with continuous cycle, closed type, ip55 protection according to IEC 60034-5, flange-mounted directly to the pump body. ELECTRICAL CONTROL: Pump equipped with electronic control that drives the motor and monitors average current consumption and motor temperature, with input power management between 12/24V.

2.1 DEFINITION OF CLASS AND GROUPS

FOREWORD	Definition of class and groups
CLASS I 	Flammable gases, vapors or liquids
CLASS II 	Combustible dusts
CLASS III 	Ignitable fibers & flyings
GROUP A 	Acetylene
GROUP B 	Flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air that may burn or explode, having either a maximum experimental safe gap (MESG) value less than or equal to 0.45 mm or a minimum igniting current ratio (MIC ratio) less than or equal to 0.40.
GROUP C 	Flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor Mixed with air that may burn or explode, having either a maximum experimental safe gap (MESG) value Greater than 0.45 mm and less than or equal to 0.75 mm, or a minimum igniting current ratio (MIC ratio) Greater than 0.40 and less than or equal to 0.80.
GROUP D 	Flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor Mixed with air that may burn or explode, having either a maximum experimental safe gap (MESG) value Greater than 0.75 mm or a minimum igniting current ratio (MIC ratio) greater than 0.80.

CLASS I **GROUP D**		**CLASS II** **CLASS III** **GROUP A** **GROUP B** **GROUP C**	

2.2 INTENDED USE

PUMP INTENDED USE	**THE DETERMINATION OF THE AREAS (ZONES) IS TO BE CARRIED OUT BY THE USER**
PUMP FORBIDDEN USE	Using the equipment for fluids other than those listed at paragraph "8.4 – Fluids permitted" and for uses other than those described at the item "authorised use" is forbidden.
UNINTENDED USE	Using the system for purposes other than those intended and indicated under "Intended use" is strictly forbidden. All other uses excepting those for which the litre counter was designed and described in this manual shall be deemed "MISUSE", and consequently Piusi S.p.A. disclaims all liability for any injury caused to persons of animals or damage to things or the system itself.

PLANT OPERATION RESTRICTIONS

	IT IS FORBIDDEN:
1	To use the equipment in a construction configuration other than that contemplated by the manufacturer
2	To use the pump with fixed guards tampered with or removed.
3	To use the equipment in places where there is risk of explosion and/or fires classified in the following class : class II and class III and following groups : A , B , C.
4	To integrate other systems and/or equipment not considered by the manufacturer in the application description.
5	To connect the pump up to energy sources other than those contemplated by the manufacturer
6	To use the equipment for purposes other than those indicated by the manufacturer.
7	Do not use in case of lightnings

2.3 HANDLING AND TRANSPORT

Due to the limited weight and dimensions of the pumps, special lifting equipment is not required to handle them. The pumps are carefully packed before dispatch. Check the packing when receiving the material and store in a dry place.

3 GENERAL WARNINGS

Important precautions

To ensure operator safety and to protect the pump from potential damage, workers must be fully familiarized with this instruction manual before performing any operation.

Symbols used in the manual

The following symbols will be used throughout the manual to highlight safety information and precautions of particular importance:

DANGER	**DANGER indicates a hazardous situation which, if not avoied will result in death or serious injury.**
WARNING	**WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury**
NOTICE	**NOTICE is used to address pratices not related to personal injury**

Manual-preservation

This manual should be complete and legible throughout. It should remain available to end users and specialist installation and maintenance technicians for consultation at any time.

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NOTICE	**THIS MANUAL IS VALID ONLY FOR DC PUMPS**
	ALWAYS USE THE CORRECT VOLTAGES TO CONNECT THE PUMPS COMPLIANCE WITH THE SPECIFICATIONS INDICATED 12/24V

⚠ WARNING	• For ground-based refueling only. Do not use in or on the aircraft. • User should consult NFPA 407 Standard for Aircraft Fuel Servicing for safety requirements during ground fuel servicing of aircraft using liquid petroleum fuels. This product has no actual or implied compiance with this standard.
	USE THE PUMP ONLY WITH FLUIDS PERMITTED. DO NOT USE WITH FLUIDS NOT PERMITTED TO AVOID DAMAGING THE PUMP. THE GUARANTEE LAPSES IN CASE OF MISUSE OF THE FLUID.
	DO NOT USE THE PUMP WITH LIQUID FOOD PRODUCTS AND/OR WATER-BASED FLUIDS.
	DO NOT OPERATE THE PUMP DRY TO AVOID DAMAGE.
	Before connection, make sure that the piping and the supply tank are free of dirt and solid residue that could damage the pump and its accessories. NEVER COLLECT THE FLUID FROM THE BOTTOM OF THE TANK SINCE IT MAY CONTAIN IMPURITIES



BEFORE USING THE PUMP SWITCH OFF ALL THE ELECTRONIC DEVICES (I.E. MOBILE PHONES, BEEPERS ETC.)

⚠ WARNING	MOTOR PROTECTED AGAINST OVERLOAD AND OVERHEATING BY ELECTRONIC CONTROLS THAT GUARANTEE CONTINUOUS CYCLE OPERATION BY ADJUSTING THE ROTATION SPEED AND THEREFORE THE FLOW RATE. TURN OFF THE PUMP AND ALLOW IT TO COOL DOWN BEFORE RESUMING FULL OPERATION.
⚠ WARNING	IF THE PUMP REACHES AN EXCESSIVE TEMPERATURE OR OVERLOAD CONDITION, THE MOTOR WILL AUTOMATICALLY SHUT DOWN TO PREVENT DAMAGE. TO RESTORE OPERATION, DISCONNECT THE POWER SUPPLY COMPLETELY – TURNING THE PUMP SWITCH OFF IS NOT SUFFICIENT. REMOVE POWER AT THE SOURCE, ALLOW THE MOTOR TO COOL, AND VERIFY THAT SYSTEM CONDITIONS ARE WITHIN SPECIFIED LIMITS BEFORE RESTARTING.

4 FIRST AID RULES

Contact with the product	In the event of problems developing following EYE/SKIN CONTACT, INHALATION or INGESTION of the treated product, please refer to the SAFETY DATA SHEET of the fluid handled.
Persons who have suffered electric shock	Disconnect the power source, or use a dry insulator to protect yourself while you move the injured person away from any electrical conductor. Avoid touching the injured person with your bare hands until he is far away from any conductor. Immediately call for help from qualified and trained personnel. Do not operate switches with wet hands.
NOTICE	**Please refer to the safety data sheet for the product**
SMOKING PROHIBITED	**DO NOT SMOKE NEAR THE PUMP AND DO NOT USE THE PUMP NEAR FLAMES.**

5 GENERAL SAFETY RULES

USER'S RESPONSIBILITY	**IT IS ESSENTIAL TO GET TO KNOW AND UNDERSTAND THE INFORMATION CONTAINED IN THIS MANUAL.**
	IT IS ESSENTIAL TO GET TO KNOW AND OBSERVE THE SAFETY SPECIFICATIONS FOR FLAMMABLE LIQUIDS.
WARNING	**Ensure that all equipment operators have access to adequate instructions concerning safe operating and maintenance procedures.**
Essential protective equipment characteristics	IN CASE OF CONTACT WITH THE PRODUCT AND FOR GOOD STANDARD OF BEHAVIOUR, wear protective equipment which is: • suited to the operations that need to be performed; • resistant to products used TO DO SO, PLEASE REFER TO THE RELEVANT TECHCNICAL DATASHEETS OF THE FLUID USED.
Personal protective equipment that must be worn	Safety shoes; Close-fitting clothing; Protection gloves; Safety goggles
Necessary safety devices	Instructions manual
Protective gloves	Prolonged contact with the treated product may cause skin irritation; always wear protective gloves during dispensing.
NOTICE	**TO PREVENT ELECTRIC SHOCK AND DETONATION OF SPARKS, ALL PUMPING SYSTEM MUST HAVE PROPER GROUNDING, INCLUDING TANK AND ANY ACCESSORIES.**

⚠ WARNING	**ENFORCE REGULATIONS FOR ELECTRICAL INSTALLATION**
	ALL WIRING AND ELECTRICAL CONNECTIONS MUST BE PERFORMED BY AUTHORIZED AND SUITABLY TRAINED PERSONNEL.
	Never touch the electric plug or socket with wet hands.
	Do not switch the dispensing system on if the network connection cable or important parts of the apparatus are damaged, such as the inlet/outlet pipe, nozzle or safety devices. Replace the damaged pipe immediately.
⚠ WARNING	**The electrical connection between the plug and socket must be kept well away from water.**
	The pump is equipped with current-sensing protection. If it activates turn off the pump immediately.
⚠ WARNING	**The pump is equipped with protection against overheating and overload risks. Should such devices activate, the pump shuts down automatically, but the master switch is not turned off. It is important to disconnect the voltage by operating the power supply switch or disconnector of the installation, which is not supplied with the pump and must be provided as part of the system. The pump restarts after its normal operating conditions have been restored.**
	Failure to observe the above mentioned rules can cause serious accidents

6 TECHNICAL DATA

6.1 PERFORMANCE SPECIFICATIONS

PIUSI EXTREME 20 GPM Functioning Point	Current (A) 12V / 24V	Flow Rate (gpm)	Back Pressure (psi)	Typical delivery configuration				
				12ft hose	18ft hose	Meter	Filter	Dispensing nozzle
Maximum Flow Rate (*)	12,9 / 11,2	20	4	Free Delivery				
Low Pressure System (*)	17,6 / 13,9	18	12	X (1" hose)		X		X (Manual)
Low Pressure System (**)	13 / 5,2	10,8 / 9	7,7 / 5,2	X (1" hose)		X		X (Manual)
High Pressure System (*)	19,7 / 14,8	15	14,5		X (1" hose)	X	X	X (Automatic)
By-Pass (***)	20,0 / 15,4	0	20	Delivery Closed				

PIUSI EXTREME 16 GPM Functioning Point	Current (A) 12V / 24V	Flow Rate (gpm)	Back Pressure (psi)	Typical delivery configuration				
				Function-ing Point	18ft hose	Meter	Filter	Dispensing nozzle
Maximum Flow Rate (*)	12,7 / 11,2	20	4	Free Delivery				
Low Pressure System (*)	16,0 / 12,6	14,5	12	X (3/4" hose)		X		X (Manual)
Low Pressure System (**)	12 / 4,7	10,3 / 8,4	7,7 / 5,1	X (3/4" hose)		X		X (Manual)
High Pressure System (*)	17,4 / 13,0	12	14.5		X (3/4" hose)	X	X	X (Automatic)
By-Pass (***)	19 / 13,4	0	19	Delivery Closed				

(*) Inrush/Starting Current
(**) Continuous Duty at thermal equilibrium after ~1 h Full Load Amps (FLA) Current
(***) By-Pass Current with blocked outlet

WARNING	**The curve refers to the following operating conditions:** **Fluid: PETROL,** **Temperature: 30° C** **Suction conditions: The pipe and the pump position relative to the fluid level is such that a low pressure of 0.3 bar is generated at the nominal flow rate.** **Under different suction conditions higher low pressure values can be created that reduce the flow rate compared to the same back pressure values. To obtain the best performance, it is very important to reduce loss of suction pressure as much as possible by following these instructions:** **• shorten the suction pipe as much as possible** **• avoid useless elbows or throttling in the pipes** **• keep the suction filter clean** **• use a pipe with a diameter equal to, or greater than, indicated (see Installation).**

7 ELECTRICAL DATA

PUMP MODEL	POWER SUPPLY		CURRENT
	Voltage (V)	Frequency (Hz)	Full Load (*) (A)
PIUSI EXTREME 16 GPM	12/24	DC	13/5.2
PIUSI EXTREME 20 GPM	12/24	DC	12/4.7

(*) The value is limited by the electronic control system, which automatically adjusts the motor current within this value.

POWER CORD INPUT	1/2" - 14 NPT
POWER CORD PIUSI EXTREME 16 GPM	Minimum section recommended for cables up to 6 m: 12 AWG. Recommended sheath: SJTOW T105°C uL approved 21179 style.
POWER CORD PIUSI EXTREME 20 GPM	Minimum section recommended for cables up to 6 m: 12 AWG. Recommended sheath: SJTOW T105°C uL approved 21179 style.

8 OPERATING CONDITIONS

8.1 ENVIRONMENTAL CONDITIONS

AMBIENT TEMPERATURE	min. -22°F / max +125°F min. -30°C / max +52°C
FLUID TEMPERATURE	min. -22°F / max +125°F min. -30°C / max +52°C
STORAGE TEMPERATURE	min. -40°F / max. +144°F min. -40°C / max. +62°C
RELATIVE HUMIDITY	max. 90%
LIGHTING	The environment must conform to directive 89/654/EEC on work environments. In case of non-EU countries, refer to directive EN ISO 12100-2 § 4.8.6.
WARNING	**The temperature limits shown apply to the pump components and must be respected to avoid possible damage or malfunction.**

8.2 ELECTRICAL POWER SUPPLY

NOTICE	**The pump must be powered by DC line, the nominal values of which are indicated on the table in the paragraph "I - ELECTRICAL DATA". The maximum acceptable variations from the electrical parameters are: Voltage: +/- 5% of the nominal value**
WARNING	**Power supply from lines with values that do not fall within the indicated limits could cause damage to the ELECTRICAL AND electronic components. If the pump is powered by power converters (AC/DC inverter or DC/DC) without a proper filter, they can damage the components of the electronic board due to voltage peaks above 50V (even if the average value is 12/24V).**

8.3 ELECTRONIC ENGINE CONTROL

NOTICE	**The pump is equipped with a motor driving board, operated by a magnetic switch. The table shows the technical specifications of the motor control card and the magnetic drive.**

Specific	Value
Supply	12 to 24V DC
Type of load	Ohmic inductive
Operating temperature	min. -22°F / max +125°F min. -30°C / max +52°C
Purpose of the control	Protective Control
Control construction	Integrated control
Type of control	Type 2
Degree of pollution	2
Overvoltage Category	Category II

WARNING	**The magnetic switch does not have the function of cutting off the power.**

8.4 DUTY CYCLE

NOTICE	**The pumps have been designed for continuous duty use in conditions of maximum ambient temperature (52 °C - 125°F).**
WARNING	**Functioning under by-pass condition is limited by the electronic controls for a short period of time (within 5 seconds).**
	Dry running time is limited by the electronic controls protection (about 1 minute).

8.5 FLUIDS PERMITTED

WARNING	**THE PUMP CAN BE USED ONLY WITH THE FOLLOWING FLUIDS:** • **DIESEL** • **KEROSENE** • **PETROL** • **PETROL ALCOHOL MIXED MAX 15%** • **AVGAS 100/100LL (pump only)** • **JET A / A1 (pump only)** • **ASPEN 2 / 4** • **Paraffinic HVO/XTL: EN 15940**



THE AVIO-FUELS COMPATIBILITY IS RELATED ONLY TO THE PUMP AND NOT TO OTHER COMPONENTS INCLUDED (Ex. FILTER,COUNTER,NOZZLE,HOSES etc.)

9 INSTALLATION

WARNING	**BEFORE ANY OPERATION, ENSURE TO BE OUT OF POTENTIALLY EXPLOSIVE AREAS**
	The pump must never be operated before the delivery and suction lines have been connected.
	TIGHTEN THE ELECTRICAL BOX TO ENSURE PROTECTION AGAINST THE RISK OF EXPLOSION. THE RIGHT CLAMPING SCREWS COUPLE THAT GRANTS THIS PROTECTION IS 10Nm 7.4 ft lbs
PRELIMINARY INSPECTION	• Verify that all components are present. Request any missing parts from the manufacturer. • Check that the pump has not suffered any damage during transport or storage. • Carefully clean the suction and delivery inlets and outlets, removing any dust or other packaging material that may be present. • Check that the electrical data corresponds to those indicated on the data plate. • Install the pump at a height of min. 80 cm.
WARNING	**IF VALVES IN THE CIRCUIT ARE TO BE INSTALLED, MAKE SURE THEY ARE EQUIPPED WITH OVERPRESSURE SYSTEM.**
	CLEAN THE TANK AND MAKE SURE IT IS WELL-VENTILATED (RECOMMENDED OPENING PRESSURE: 3 psi)
	APPLY THE QUICK COUPLING TO THE TANK CORRECTLY AND SAFELY
WARNING	**DO NOT BLOCK THE DRAINAGE HOLES**

DANGER	**IF THE PUMP IS TO BE INSTALLED IN HAZARDOUS (CLASSIFIED) LOCATION, IT MUST BE INSTALLED BY A LICENSED ELECTRICIAN AND CONFIRM TO NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) CODES 30 AND 70 OR CSA 22.1. YOU AS THE OWNER , ARE RESPONSIBLE FOR SEEING THAT INSTALLATION AND OPERATION OF YOUR PUMP COMPLIES WITH NFPA CODES AS WELL AS ANY APPLICABLE STATE AND LOCAL CODES. RIGID CONDUI MUST BE USED TO INSTALL WIRING. NOTE THAT THE LEAD WIRES ARE FACTORY-SEALED ISOLATING THE MOTOR FROM THE JUNCTION BOX. FAILURE TO FOLLOW THESE WIRING INSTRUCTIONS MAY RESULTS IN DEATH OR SERIOUS INJURY FROM SHOCK, FIRE OR EXPLOSION.**

9.1 POSITIONING, CONFIGURATIONS AND ACCESSORIES

NOTICE	**The pump must be secured in a stable manner.**
WARNING	**It is the installer's responsibility to provide the line accessories necessary for the safe and proper functioning of the pump. The accessories that are not suitable to be used with the previously indicated material could damage the pump and/or cause injury to persons, as well as causing pollution.**
	To maximise performance and prevent damage that could affect pump operation, always demand original accessories.
WARNING	**The installer is responsible for safeguarding the equipment against extreme weather conditions, such as ice or sun exposure, which can lead to high fluid temperatures or impair the proper functioning of the pump.**

9.2 NOTES ON SUCTION AND DELIVERY LINES

DELIVERY

The selection of the pump model must be made taking into account the characteristics of the system.
The combination OF: the length of the pipe, the diameter of the pipe, as well as the accessories installed, could create back pressure that are greater than the maximum predicted pressure, thereby causing the pump's electronic controls to intervene and reducing the dispensed flow considerably.
In these cases, to guarantee correct operation of the pump, it is necessary to reduce the resistance of the system using pipes that are shorter or that have a greater diameter, as well as line accessories with smaller resistances (e.g. an automatic dispensing nozzle with greater flow rate capacity).

SUCTION

Self-priming pumps are characterized by excellent suction capacity.
During the start-up phase, when the suction pipe is empty and the pump is wet with the fluid, the electric pump unit is able to suck liquid from a maximum vertical distance of 2m. It is important to note that it could take up to 1 minute for the pump to prime and that the presence of an automatic dispensing nozzle on the delivery side will prevent the air trapped during the installation from being released and, therefore, prohibiting the proper pump priming. For this reason, it is always advisable to prime the pump without an automatic delivery nozzle, verifying the proper wetting of the pump.
Always install a foot valve to prevent the suction pipe from being emptied and to keep the pump wet at all times. In this way, the pump will always start up immediately the next times it is used. When the system is in operation, the pump can operate with back pressures of up to 0.5 bars on the suction inlet; beyond this point, the pump may begin to cavitate resulting in a drop of the flow rate and an increase in the noise levels of the system.
In light of this, it is important to guarantee small back pressures on the suction side, by using short pipes with diameters that are equal to or larger than those recommended, reducing bends to a minimum, and using filters with a large cross-section and foot valves with minimum possible resistance on the suction side. It is very important to keep the suction filters clean because, when they become clogged, they increase the resistance of the system.
The vertical distance between the pump and the fluid must be kept as short as possible, and it must fall within the 2m maximum required for priming. If the distance is greater, a foot valve must be installed to allow the suction pipes to fill up and the diameter pipes must be larger. It is however recommended that pump not be installed if the vertical distance is greater than 3m.

WARNING	**If the reservoir tank is higher than the pump, an anti-siphon valve should be installed to prevent accidental fuel leaks. Dimension the installation in order to control the back pressures due to water hammering**
	It is a good system practice to install vacuum and air pressure gauges right at the inlets and outlets of the pump, which allow verification that operating conditions are within anticipated limits. To prevent the suction pipes from being emptied when the pump stops, a foot valve should be installed.
	THE INSTALLER IS RECOMMENDED TO INSTALL A SUCTION FILTER.

10 CONNECTIONS

10.1 ELECTRICAL CONNECTIONS

EN

WARNING	**THE PRODUCT IS DESIGNED TO BE POWERED EXCLUSIVELY BY A BATTERY WITHIN THE SPECIFIED VOLTAGE RANGE (12V TO 24V).** **DO NOT CONNECT TO A BATTERY CHARGER, STARTER, AC-DC POWER SUPPLY CONVERTER, ETC.**
WARNING	**BEFORE ANY OPERATION, ENSURE TO BE OUT OF POTENTIALLY EXPLOSIVE AREAS**
	IT IS THE INSTALLER'S RESPONSIBILITY TO CARRY OUT THE ELECTRICAL CONNECTIONS IN COMPLIANCE WITH THE RELEVANT STANDARDS.
	FOR INSTALLATION IN UNCLASSIFIED AREAS, THE SUPPLIED POWER CORD AND CABLE GLAND MAY BE USED. **THESE COMPONENTS HAVE NOT BEEN EVALUATED AS PART OF THE UL LISTED EQUIPMENT AND ARE NOT INTENDED FOR USE IN HAZARDOUS (CLASSIFIED) LOCATION.**
	Do not attempt to power the pump from vehicle wiring smaller than 12 AWG such as the cigarette lighter wire because these thin wires could overheat and cause a fire.
	Branch circuit rating: 40A fuse **Electrical connection should ONLY be performed in compliance with all local,state, and national electrical codes (NFPA 70),the Flammable and Combustible Liquids Code (NFPA 30) or the Automotive and Marine Service Station Code (NFPA 30A), as appropriate for the intended use of the pump.** **Threaded rigid conduit, sealed fittings, and conductor seal should be used where applicable and as defined by these codes**
	Comply with the following (not exhaustive) instructions to ensure a proper electrical connection:

- During installation and maintenance make sure that power supply to the electric lines has been turned off.
- Use cables with minimum sections, rated voltages and installation type that are suitable for the characteristics indicated in paragraph "1 - ELECTRICAL DATA" and the installation environment.
- Always make sure that the cover of the terminal strip box is closed before switching on the power supply, after having checked the integrity of the seal gaskets that ensure the IP55 protection grade. For those screws use a 10 nm clamping couple

DANGER	**Voltage drop in wiring varies depending on the distance from the battery to the pump and the gauge of the wire used. If the distance is greater than the supplied 18' 12 AWG power cable*, refer to local, state, and national electrical codes to ensure the wire is of the correct size for this application. The following chart is to be used as a reference and is not a substitute for electrical codes:**

	Maximum Linear Distance (FT) of Stranded Copper Wire Length by Gauge				
AWG	10	8	6	4	2
FT	27'	44'	69'	110'	175'

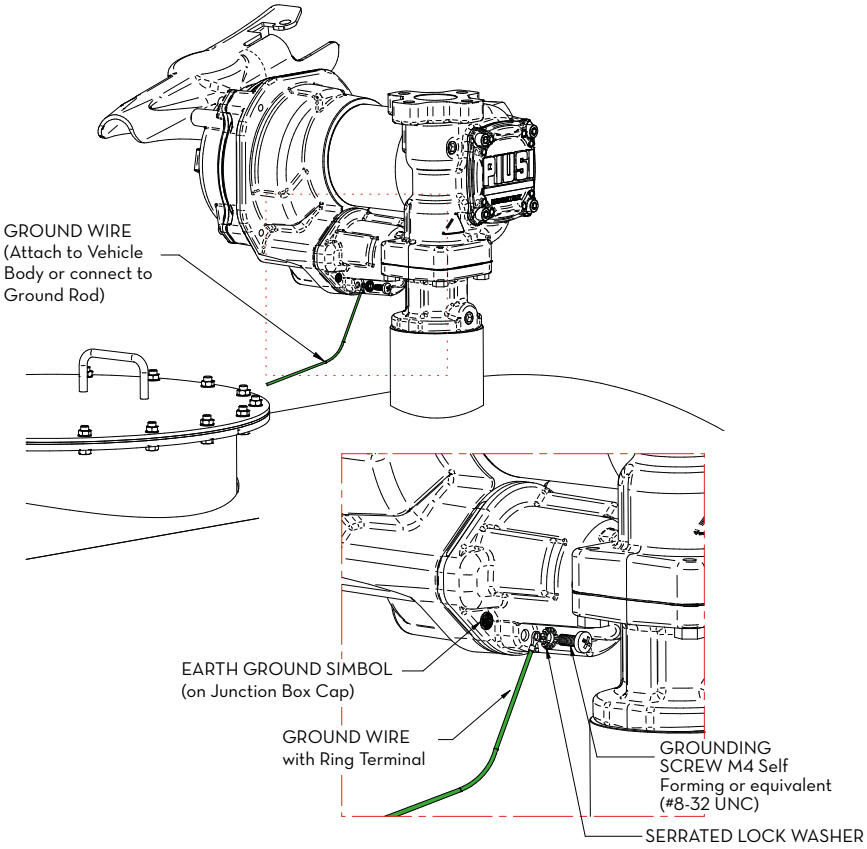
WARNING	**All motors are equipped with a grounding terminal. Make sure all the plant is properly grounded.**
	BE SURE TO USE A CABLE GLAND, WITH SUFFICIENT PROTECTION GRADE (Exd)
	The internal grounding terminal shall be used as the equipment grounding means and that the external terminal is only a supplemental bonding connection where local authorities permit or require such a connection.
NOTICE	**IN THE EVENT OF INSTALLATION IN ZONES WHICH ARE NOT CLASSIFIED, IT IS SUFFICIENT TO OBSERVE THE MINIMUM SAFETY STANDARDS ALREADY MENTIONED IN THIS MANUAL.**
	- THE OWNER HAS THE RESPONSIBILITY TO VERIFY THAT ALL THE LOCAL AND NATIONAL REGULATIONS HAVE BEEN OBSERVED. - MAKE SURE THAT THE CABLE CONNECTING THE BATTERY IS PROTECTED FROM HEAT SOURCES AND SHARP EDGES. INSTALL THE FUSE CLOSER TO THE BATTERY.
WARNING	**FAILURE TO OBSERVE THE ABOVE MENTIONED RULES CAN CAUSE SERIOUS ACCIDENTS**

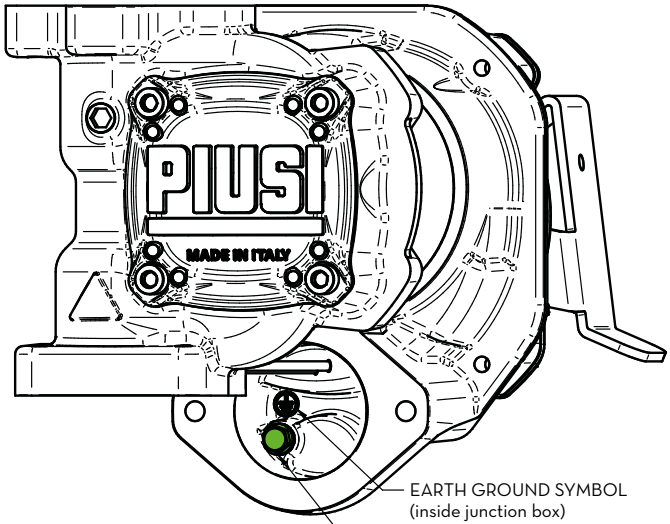
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10.1.1 GROUNDING INSTRUCTION BEFORE DC WIRING

The pump must be electrically grounded either to the vehicle frame (for mobile tanks) or to a ground rod (for stationary tanks).

For mobile applications:	• Remove the factory-installed green grounding screw located on the junction box cover. • Insert this screw through the eyelet of the supplied green grounding wire and securely fasten it back to the junction box. • Strip the insulation from the other end of the wire and firmly bond the bare conductor to the vehicle or trailer frame.
For stationary tanks:	• Connect a ground wire to both the tank and a ground rod. • The grounding wire length may need to be extended beyond the supplied wire.



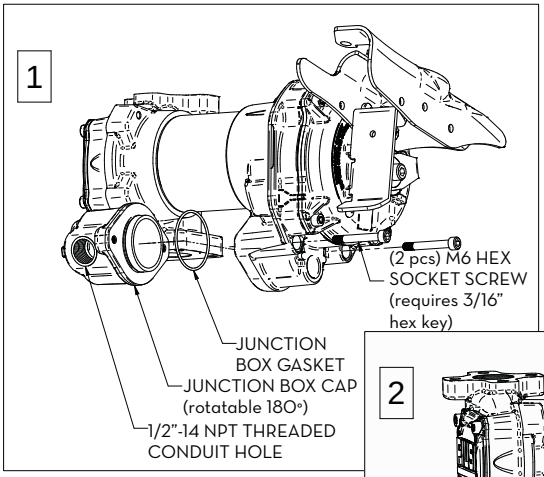


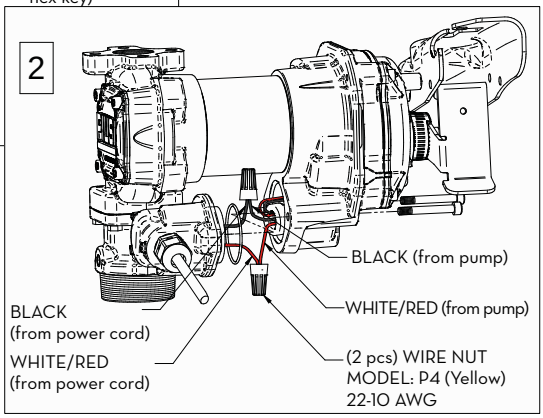
WARNING **There is also a ground cable connection inside the junction box.**

10.1.2 DC POWER CABLE CONNECTION

1. Remove the junction box cap by loosening the two M6 hex socket screws on the rear using a 3/16" hex key.
2. Install the cable gland or rigid conduit into the 1/2"-14 NPT threaded hole on the junction box.
3. Pass the furnished power supply cable through the cable gland/conduit and secure it properly.
4. Using the supplied wire nuts, connect the pump wires to the power supply wires, matching the colors.

WARNING	**Ensure no bare wire is exposed beyond the wire nuts. Fold the wires neatly inside the junction box and reinstall the cap, making sure the gasket is in place and the screws are fully tightened.**





10.1.3 FUSE INSTALLATION FOR PUMP PROTECTION

Mobile Tank Connection to Vehicle Battery System:

1. Disconnect the pump from power suppply before starting any electrical work. This prevents accidental fuel discharge when power is applied.
2. Route the pump supply cables toward the vehicle's battery, securing them properly and protecting them from sharp edges, heat sources, or any potential damage.
3. Confirm that the vehicle uses a negative (-) ground system (common in most vehicles).
   - Red/White wire from the pump connects to the positive (+) battery terminal.
   - Black wire from the pump connects to the negative (-) battery terminal.
4. The pump is supplied with a 40 A fuse and fuse holder for protection.
   - Connect the fuse holder to the red wire using the two wire nuts provided.
   - Position the fuse holder as close to the battery as possible, outside hazardous areas.
5. Use the third wire nut provided to connect the black wire from the pump to the battery's negative terminal (common ground).

Stationary Tank Connection to DC Power Source:

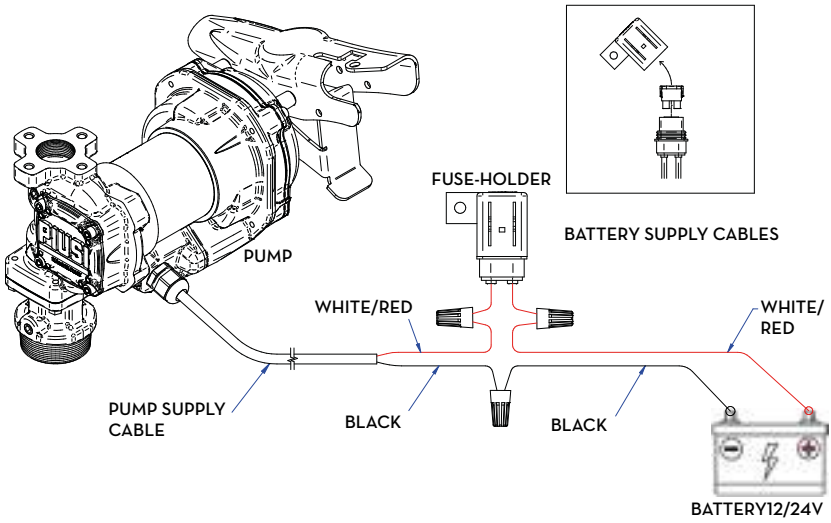
1. Disconnect the pump from power suppply before starting any electrical work.
2. Identify the DC power supply (12V or 24V) and confirm its polarity. The positive (+) terminal will supply power, while the negative (-) terminal serves as the ground.
3. The pump is supplied with a 40 A fuse and fuse holder for protection.
   - Connect the fuse holder to the red wire using the two wire nuts provided.
   - Position the fuse holder as close to the power source as possible, outside hazardous areas.
4. Use the third wire nut provided to connect the black wire from the pump to the negative terminal of the power source.
5. Ensure the 40 A fuse is correctly installed in the holder. Check that all connections are tight and corrosion-free.

⚠ WARNING

Inspect all wiring for proper routing, avoiding sharp edges, heat sources, and areas where mechanical damage could occur. Confirm compliance with local and national electrical codes.
The installation is now complete.

The fuse holder must be located outside hazardous areas and as close to the power source as possible.
Always use the supplied wire nuts for secure connections.

Ensure the circuit can handle the pump's power demand to avoid overheating or electrical failure.



BATTERY CLAMPS	Minimum electrical ratings: 12/24V, 50Amp. Check for a strong clamping force.
WARNING	**NOT FOR USE IN HAZARDOUS LOCATION** **Battery clamps are forbidden in hazardous location (due to the possible electrical sparks)**

10.2 PIPING CONNECTIONS

NOTICE	**The pump PIUSI EXTREME 16GPM is provided with 3/4"NPT outlet and 1" NPT inlet** **The pump PIUSI EXTREME 20GPM is provided with 1"NPT outlet and 1" NPT inlet**
FOREWORD	Before carrying out any connection, refer to the visual indications i.e. arrow on the pump head, to identify suction and delivery.
WARNING	**Wrong connection can cause serious pump damage.** **Make pipe joints tight with gasoline-resistant pipe compound.**
PRELIMINARY INSPECTION	• Before connection, make sure that the piping and the suction tank are free of dirt and solid residue that could damage the pump and its accessories. NEVER COLLECT THE FLUID FROM THE BOTTOM OF THE TANK SINCE IT MAY CONTAIN IMPURITIES • Before connecting the delivery pipe, partially fill the pump body, from delivery side, with the liquid that needs to be pumped in order to facilitate priming.
WARNING	**Use anti-seize on 2" bung adaptor when installing on aluminum tanks**
NOTICE	**Ensure the nozzle GPM is rated at, or grater than, the rating of the pump.**

11 INITIAL START-UP

FOREWORD

- Check that the quantity of fluid in the suction tank is greater than the amount you wish to transfer.
- Make sure that the residual capacity of the delivery tank is greater than the quantity you wish to transfer.
- Make sure that the piping and line accessories are in good condition.

NOTICE	**THIS PUMP IS NOT PROVIDED FOR FURTHER REGULATION OF DELIVERY AND PRESSURE**
WARNING	**Fluid leaks can damage objects and injure persons.**
NOTICE	• **Never start or stop the pump by connecting or cutting out the power supply.** • **Prolonged contact with some fluids can damage the skin. The use of goggles and gloves is recommended.**

IF THE PUMP DOES NOT PRIME

Depending on the system characteristics, the priming phase can last from several seconds to a few minutes. If this phase is prolonged, stop the pump and verify:

- that the pump is not running completely dry (fill with fluid from the delivery line);
- that the suction pipe guarantees against air infiltration;
- that the suction filter is not clogged;
- that the suction height is not higher than 2 mt.
- that all air has been released from the delivery pipe.

AT THE END OF THE INITIAL START-UP

When priming has occurred, verify that the pump is operating within the anticipated range, in particular:

- that under conditions of maximum back pressure, the power absorption of the motor stays within the values shown on the identification plate;
- that the delivery back pressure does not exceed the maximum back pressure for the pump.

12 EVERY DAY USE

USE PROCEDURE

1	If flexible pipes are used, attach the ends of the piping to the tanks. In the absence of an appropriate handle, solidly grasp the delivery pipe before beginning dispensing.
2	Before starting the pump make sure that the delivery valve is closed (dispensing nozzle or line valve)
3	Turn the ON/OFF switch on
4	Open the delivery valve, solidly grasping the pipe
5	While dispensing, do not inhale the pumped product
6	If any pumped fluid leaks out during dispensing, take all steps necessary to ensure the leaked fluid is cleaned up and safe as specified on the product technical sheet.
7	Close the delivery valve to stop dispensing
8	When dispensing is finished, turn off the pump

⚠ WARNING	**THE WORKING OPERATIONS MUST ALWAYS BE GUARDED BY THE OPERATOR.**
	In case of a power break, switch the pump off immediately.
	Should any sealants be used on the suction and delivery circuit of the pump, make sure that these products are not released inside the pump.
	Foreign bodies in the suction and delivery circuit of the pump could cause malfunctioning and breakage of the pump components.

⚠ WARNING	**The screws class used for the assembly of explosion-proof enclosures must be of quality higher or equal to 8.8 (ISO 898-1)**
	Flameproof joints are not intended to be repaired

13 MAINTENANCE

Safety instructions

The PUMP IS DESIGNED AND CONSTRUCTED TO require a minimum of maintenance.
Before carrying out any maintenance work, DISCONNECT THE PUMP from any electrical and hydraulic power source.
During maintenance, the use of personal protective equipment (PPE) is compulsory.
In any case always bear in mind the following basic recommendations for a good functioning of the pump

WARNING	**BEFORE ANY OPERATION, ENSURE TO BE OUT OF POTENTIALLY EXPLOSIVE AREAS FOR SAFETY REASONS IT'S NOT ALLOWED TO DISASSEMBLE THESE PARTS : (1) BOTTOM (2) MOTOR PIPE (3) PUMP BODY** **FOR SAFETY REASONS IT IS FORBIDDEN TO REMOVE THE PARTS "BOTTOM PLATE" (1), "MOTOR TUBE" (2) AND "PUMP BODY" (3).**

Authorised maintenance personnel	All maintenance must be performed by qualified personnel. Tampering can lead to performance degradation, danger to persons and/or property and may result in the warranty and UL/ATEX CERTIFICATION being voided.
Measures to be taken	Check that the labels and plates found on the dispensing system do not deteriorate or become detached over time.
ONCE A WEEK:	• Check that the pipe connections are not loose to prevent any leaks; • Check and keep the filter installed on the suction line clean.
ONCE A MONTH:	• Check the pump body and keep it clean and free of any impurities; • Check that the electrical supply cables are in good condition.

14 NOISE LEVEL

Under normal operating conditions, noise emission of all models does not exceed 74 dB at a distance of 1 metre from the electric pump.

15 PROBLEMS AND SOLUTIONS

For any problems contact the authorised dealer nearest to you.

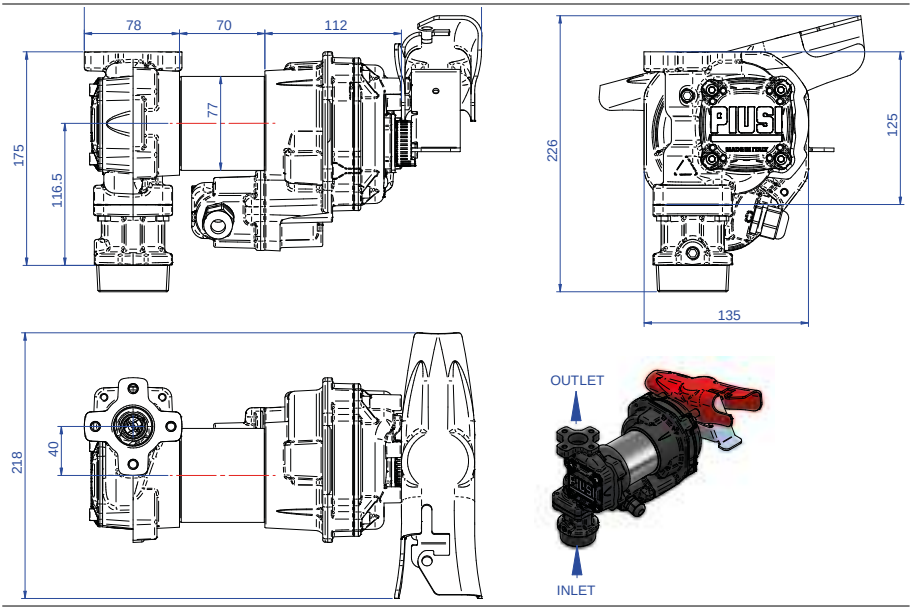
PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
THE MOTOR IS NOT TURNING	Lack of electric power	Check the electrical connections and the safety systems.
	Rotor jammed	Check for possible damage or obstruction of the rotating components.
	Motor problems	Contact the Service Department
	Supply wires polarity (+/-) are inverted	Make sure that the electrical connections comply with the connection diagram
	Overcurrent/Overvoltage protection	Check if the supply voltage is in within range 10-30V
THE MOTOR TURNS SLOWLY WHEN STARTING	Low voltage in the electric power line	Bring the voltage back within the specified range
LOW OR NO FLOW RATE	Low level in the suction tank	Refill the tank
	Foot valve blocked	Clean and/or replace the valve
	Filter clogged	Clean the filter
	Excessive suction pressure	Lower the pump with respect to the level of the tank or increase the cross-section of the piping
	High loss of head in the delivery circuit (working with the by-pass open)	Use shorter piping or of greater diameter
	By-pass valve blocked	Dismantle the valve, clean and/or replace it
	Air entering the pump or the suction piping	Check the seals of the connections
	A narrowing in the suction piping	Use piping suitable for working under suction pressure
	Low rotation speed	Check the voltage at the pump. Adjust the voltage and/or use cables of greater cross-section
	The suction piping is resting on the bottom of the tank	Raise the piping

INCREASED PUMP NOISE	Cavitation occurring	Reduce suction pressure
	Irregular functioning of the by-pass	Dispense until the air is purged from the by-pass system
	Presence of air in the fluid	Verify the suction connections
LEAKAGE FROM THE PUMP BODY	Seal damaged	Check and replace the seal
THE PUMP DOES NOT PRIME THE LIQUID	Suction circuit blocked	Remove the blockage from the suction circuit
	Malfunction of foot valve fitted on suction circuit	Replace foot valve
	The suction chambers are dry	Add liquid from pump delivery side
	The pump chambers are dirty or blocked	Remove the blockages from the suction and delivery valves
THE PUMP TURNS OFF AFTER 1 MINUTE	Dry running protection	If the pump is transferring liquid but stops after 1 minute, contact technical assistance
THE SWITCH LEVER IS BLOCKED	Dust/dirt under the knob	Open and clear the knob
	Damaged spring	Open the knob and replace the spring
THE SWITCH IS NOT WORKING	The magnets are damaged (corroded/broken) or missing	Open the knob and replace the magnets
	Electronic board is damaged	Contact the service department

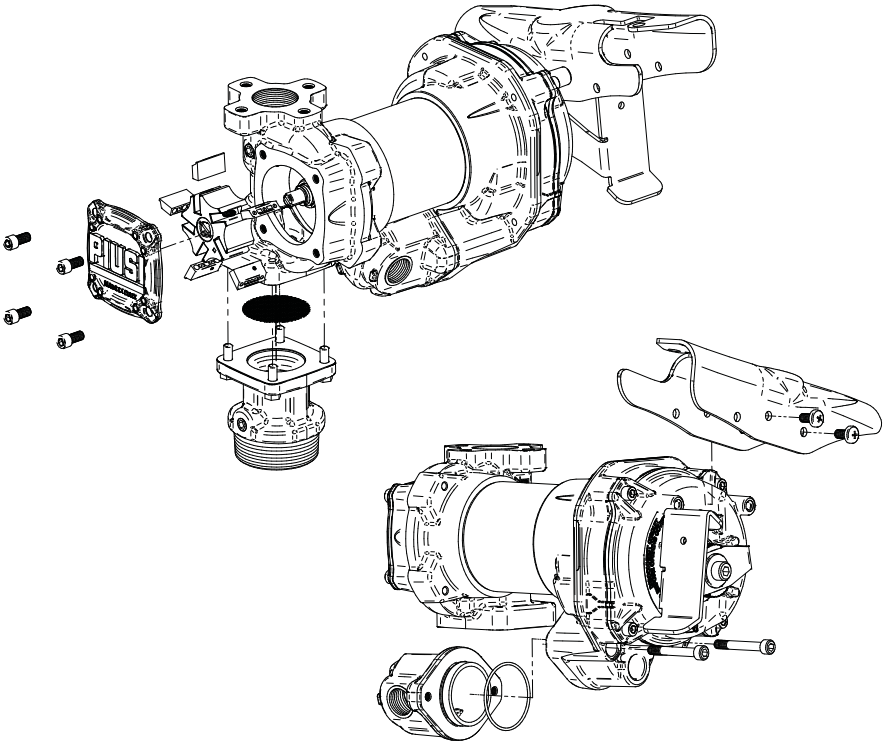
16 DEMOLITION AND DISPOSAL

Foreword	If the system needs to be disposed, the parts which make it up must be delivered to companies that specialize in the recycling and disposal of industrial waste and, in particular:
Disposing of packing materials	The packaging consists of biodegradable cardboard which can be delivered to companies for normal recycling of cellulose.
Metal Parts Disposal	Metal parts, whether paint-finished or in stainless steel, can be consigned to scrap metal collectors.
Miscellaneous parts disposal	Other components, such as pipes, rubber gaskets, plastic parts and wires, must be disposed of by companies specialising in the disposal of industrial waste.

17 DIMENSIONS



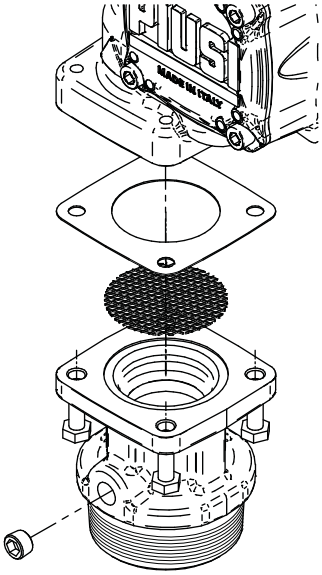
18 EXPLODED VIEWS



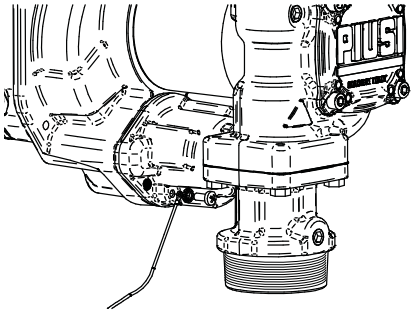
19 ASSEMBLY

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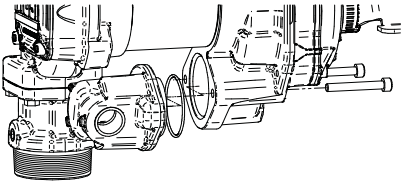
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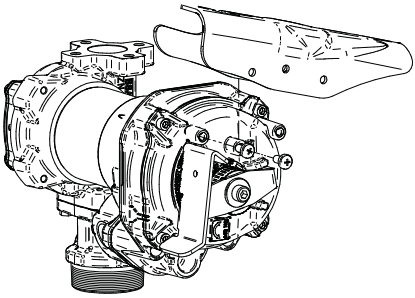
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