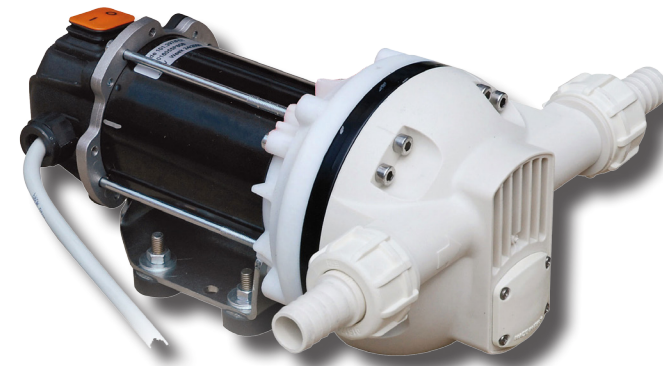


DEF6-PUMP
Installation, Use and Maintenance Manual
(aka M0204 A)



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MADE IN ITALY
Installazione uso e manutenzione **IT**
Installation, use and maintenance **EN**

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2 MACHINE AND MANUFACTURER IDENTIFICATION

CODE PRODUCT: P1224V
MODEL: DEF6
TECHNICAL DATA: 12/24V DC, 2000 RPM, 1.8 BAR, 12/24V DC, 2000 RPM, 1.8 BAR, 12/24V DC, 2000 RPM, 1.8 BAR

AVAILABLE MODELS: 12-24V DC
MANUFACTURER: PIUSI S.p.A., Via Pacinotti Z.I. Rangovino 46029 Suzzara (Mantova) Italy

3 DECLARATION OF CONFORMITY

The undersigned: PIUSI S.p.A. Via Pacinotti c.m.zi.Rangovino 46029 Suzzara - Mantova - Italy

Hereby states under its own responsibility, that the equipment described below:

Description: Dispenser Pump for the transfer of Ad-Blue® - AUS32 - WATER - Antifreeze
Model: Diaphragm pump
Serial number: refer to Lot Number shown on CE plate affixed to product
Year of manufacture: refer to the year of production shown on the CE plate affixed to the product in its conformity with the legal provisions indicated in the directives:

- Machine Directive 2006/42/EC
- Electromagnetic Compatibility Directive 2014/53/EU

The documentation is at the disposal of the competent authority following motivated request at Piusi S.p.A. or following request sent to the e-mail address: doc_tec@piusi.com. The person authorised to compile the technical file and draw up the declaration is Otto Varini as legal representative

Suzzara, 01/11/2015
Otto Varini legal representative

4 MACHINE DESCRIPTION

PUMP MOTOR
Five-chamber positive-displacement diaphragm pump
Brush motor, DC, low tension with intermittent cycle, closed type in protection class IP55 according to CEI-EN 60334-5, directly flanged to the pump body.

4.1 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.

5 GENERAL WARNINGS

Warnings
To ensure operator safety and to protect the dispensing system from potential damage, workers must be fully acquainted with this instruction manual before attempting to operate the dispensing system.

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

ATTENTION
This symbol indicates safe working practices for operators and/or potentially exposed persons.

WARNING
This symbol indicates that there is risk of damage to the equipment and/or its components.

NOTE
This symbol indicates useful information.

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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6 SAFETY INSTRUCTIONS

ATTENTION
Mains - preliminary checks before inst. Maintenance control
You must avoid any contact between the electrical power supply and the fluid that needs to be FILTERED.

FIRE AND EXPLOSION
When flammable fumes are present in the work area, such as gasoline and windshield wiper fluid, be aware that flammable fumes can ignite or explode. To help prevent fire and explosion:
ELECTRIC SHOCK
This equipment must be grounded. Improper grounding, setup or usage of the system can cause electric shock. Turn off and disconnect power cord before servicing equipment. Connect only to a grounded electrical outlets. Use only 3 wire extension cords in accordance with local electrical codes. Extension cords should have a ground lead. Ensure ground prongs are intact on power and extension cords. Do not expose to rain. Store indoors. Never touch the electric plug of socket with wet hands. Do not turn the dispensing system on if the power connection cord or other important parts of the apparatus are damaged, such as the inlet outlet plumbing, dispensing nozzle or safety devices. Replace damaged components before operation. Before each use check that the power connection cord and power plug are not damaged. If damaged, have power connection cord replaced before use by a qualified electrician. The electrical connection between the plug and socket must be kept well away from water. Unsuitable extension leads can be hazardous, in accordance with current regulations. Only extension cords that are labelled for outdoor use and have a sufficient conduction path should be used outdoors. For safety reasons, we recommend that, in principle, the equipment be used only with an earth-leakage circuit breaker (max 30 mA). Electrical connections must use ground fault circuit interrupter (GFCI). Installation operations are carried out with the box open and accessible electrical contacts. All these operations have to be done with the unit isolated from the power supply to prevent electrical shock! Do not operate the unit when fatigued or under the influence of drugs or alcohol. Do not leave the work area while equipment is energized or under pressure. Turn off all equipment when equipment is not in use. Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards. Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not link or over bend hoses or use hoses to pull equipment. Keep children and animals away from work area. Comply with all applicable safety regulations. To avoid severe burns do not touch hot fluid or equipment.

Electrocution or death
This equipment must be grounded. Improper grounding, setup or usage of the system can cause electric shock. Turn off and disconnect power cord before servicing equipment. Connect only to a grounded electrical outlets. Use only 3 wire extension cords in accordance with local electrical codes. Extension cords should have a ground lead. Ensure ground prongs are intact on power and extension cords. Do not expose to rain. Store indoors. Never touch the electric plug of socket with wet hands. Do not turn the dispensing system on if the power connection cord or other important parts of the apparatus are damaged, such as the inlet outlet plumbing, dispensing nozzle or safety devices. Replace damaged components before operation. Before each use check that the power connection cord and power plug are not damaged. If damaged, have power connection cord replaced before use by a qualified electrician. The electrical connection between the plug and socket must be kept well away from water. Unsuitable extension leads can be hazardous, in accordance with current regulations. Only extension cords that are labelled for outdoor use and have a sufficient conduction path should be used outdoors. For safety reasons, we recommend that, in principle, the equipment be used only with an earth-leakage circuit breaker (max 30 mA). Electrical connections must use ground fault circuit interrupter (GFCI). Installation operations are carried out with the box open and accessible electrical contacts. All these operations have to be done with the unit isolated from the power supply to prevent electrical shock! Do not operate the unit when fatigued or under the influence of drugs or alcohol. Do not leave the work area while equipment is energized or under pressure. Turn off all equipment when equipment is not in use. Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards. Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not link or over bend hoses or use hoses to pull equipment. Keep children and animals away from work area. Comply with all applicable safety regulations. To avoid severe burns do not touch hot fluid or equipment.

EQUIPMENT MISUSE
Misuse can cause death or serious injury
Do not leave the work area while equipment is energized or under pressure. Turn off all equipment when equipment is not in use. Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards. Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces. Do not link or over bend hoses or use hoses to pull equipment. Keep children and animals away from work area. Comply with all applicable safety regulations. To avoid severe burns do not touch hot fluid or equipment.

Burn Hazard
Equipment surfaces and fluid that is heated can become very hot during operation.
Toxic Fluid or Fumes Hazard
Read MSDS to know the specific hazards of the fluids you are using. Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines. Prolonged contact with the treated product may cause skin irritation; always wear protective gloves during dispensing.

7 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 AUS32 DEF/Ad-Blue/Antifreeze. 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. Please refer to the safety data sheet for the product

Persons who have suffered electric shock
Please refer to the safety data sheet for the product

NOTE
Please refer to the safety data sheet for the product

8 GENERAL SAFETY RULES

Essential protective equipment characteristics
Wear protective equipment that is:
• suited to the operations that need to be performed;
• resistant to cleaning products.

Personal protective equipment that must be worn
safety shoes;
close-fitting clothing;
protection gloves;
safety goggles;

instructions manual
Prolonged contact with the treated product may cause skin irritation; always wear protective gloves during dispensing. 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. Before each use, check that the network connection cable and power plug are not damaged. Have the network connection cable replaced immediately by a qualified electrician.

Protective gloves
Prolonged contact with the treated product may cause skin irritation; always wear protective gloves during dispensing. 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. Before each use, check that the network connection cable and power plug are not damaged. Have the network connection cable replaced immediately by a qualified electrician.

DANGER
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. Before each use, check that the network connection cable and power plug are not damaged. Have the network connection cable replaced immediately by a qualified electrician.

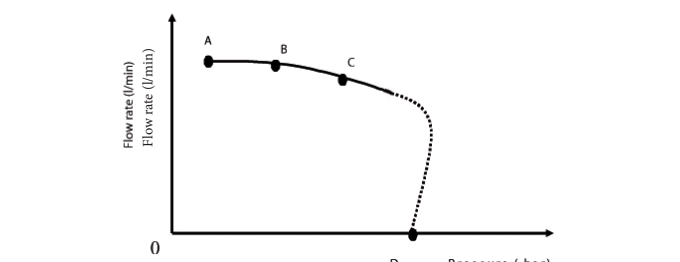
ATTENTION

The electrical connection between the plug and socket must be kept well away from water. Unsuitable extension leads can be dangerous. In accordance with current regulations, only extension cords that are labelled for outdoor use and have a sufficient conduction path should be used outdoors. For safety reasons, we recommend that, in principle, the equipment be used only with an earth-leakage circuit breaker (max 30 mA).

9 TECHNICAL DATA

9.1 PERFORMANCE SPECIFICATIONS
The performance diagram shows flow rate as a function of back pressure.

Functioning Point	Typical Delivery Configuration			Automatic Dispensing Nozzle
	Flow Rate	Voltage (V)	Absorption (A)	
A (Maximum flow rate)	36	12	16	
B (High flow rate)	33	12	17	
C (Normal conditions)	30	12	19	
D (By pass)	0	12	20	Delivery closed



ATTENTION
The curve refers to the following operating conditions:
Fluid: AUS32 - DEF - Ad-Blue® - Antifreeze
Temperature: 20° 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).

10 ELECTRICAL DATA

PUMP MODEL	POWER SUPPLY		CURRENT	
	Current	Voltage (V)	Frequency (Hz)	Max (*) (A)
12V version	DC	12	20	20
24V version	DC	24	10	10

(*) Refers to functioning in by-pass mode.

11 OPERATING CONDITIONS

11.1 ENVIRONMENTAL CONDITIONS

TEMPERATURE
min. +3° F / max. +104° F
min. -5° C / max. +40° C
max. 90%

RELATIVE HUMIDITY
LIGHTING
The environment must conform to directive 89/654/EEC on work environments. In case of non-EU countries, refer to directive EN ISO 12102-2 § 4.8.6.

The temperature limits shown apply to the pump components and must be respected to avoid possible damage or malfunction.

11.2 ELECTRICAL POWER SUPPLY

NOTE
N.B. THE PUMP SHOULD BE POWERED BY A SAFE SOURCE: BATTERY OR POWER SUPPLY 12/24V WITH SAFETY TRANSFORMER. In accordance with the model, the pump must be powered by a direct current line, the nominal values of which are indicated on the table in the paragraph "ELECTRICAL DATA". The maximum acceptable variations from the electrical parameters are:
Voltage: +/- 10% of the nominal value

ATTENTION
Power supply from lines with values that do not fall within the indicated limits could cause damage to the electrical components and reduction of working performance.

11.3 DUTY CYCLE

NOTE
The pumps have been designed for intermittent use and a 20-minute duty cycle under conditions of maximum back pressure. Functioning under by-pass conditions is only allowed for short periods of time (max. 3 minutes).

11.4 PERMITTED AND NON-PERMITTED FLUIDS

FLUIDS PERMITTED	FLUIDS NON-PERMITTED AND RELATED DANGERS
- AUS32 (DEF, AD-Blue®); - WATER - ANTIFREEZE	- DIESEL FUEL - PETROL - INFLAMMABLE LIQUIDS - CORROSIVE CHEMICAL PRODUCTS - SOLVENTS - LIQUIDS WITH VISCOSITY >20 cSt

- OXIDATION OF PUMP
- FIRE
- EXPLOSION
- CORROSION AND INJURY TO PERSONS
- DAMAGE TO GASKET SEALS
- MOTOR OVERLOAD

12 INSTALLATION

ATTENTION
The pump must never be operated before the delivery and suction lines have been connected.

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.
- Always install in an illuminated area.
- Install the pump at a height of min. 80 cm.

12.1 POSITIONING, CONFIGURATIONS AND ACCESSORIES

NOTE
In the case of installation in the open air, proceed to protect the pump by providing a protection roof. The pump can be installed in any position (pump axis vertical or horizontal). The pump must be secured in a stable way using the holes on the bed of the motor and vibration damping devices. THE MOTORS ARE NOT OF THE ANTI-EXPLOSIVE-TYPE. DO NOT install them where inflammable vapours could be present.

ATTENTION
The broad range of pump accessories make it suitable for many different uses, installations and applications. The supporting base can be positioned in different ways. It is the responsibility of the installer to provide the necessary line accessories to ensure the correct and safe operation 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.

ATTENTION
To maximise performance and prevent damage that could affect pump operation, always demand original accessories.

ATTENTION
Length and diameter of pipe, flow rate of dispensed liquid, accessories fitted, can create back pressures above those allowed. In this case, the pump mechanical control (bypass) will trip to reduce the flow rate.

To avoid these problems, system flow resistances must be reduced using shorter and/or larger diameter pipes, as well as line accessories with low resistances (e.g. automatic nozzle for higher flow rates).

NOTE
The delivery pipe must have the following technical characteristics:
- recommended minimum nominal diameter: 3/4"
- recommended nominal pressure: 10 bar

ATTENTION
Diaphragm positive-displacement pumps are self-priming and feature good suction capacity. During the start-up phase, when the suction pipe is empty and the pump is wet, the electric pump unit is able to suck liquid from a maximum vertical distance of 2 mt.

NOTE
Priming time can last a few minutes. We suggest performing priming operations without automatic nozzle and making sure the pump is properly wet.

WARNING
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.

CAVITATION
The pump is able to work with vacuums of up to 0.5 bar at the suction mouth. Over this value, CAVITATION can occur that causes a fall in flow rate and increase in noise levels. It is important to ensure low vacuums at suction mouth by using:
- short pipes with larger or identical diameter to that recommended
- reduce bends to the utmost
- use large-section suction filters
- use foot valves with minimum possible resistance
- keep the suction filters clean because, when they become clogged, they increase the resistance of the system.

WARNING
The vertical distance between the pump and the fluid must fall within the 2 mt. 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 recommended that the pump not be installed at a vertical distance greater than 2 meters.

ATTENTION
If the suction tank is higher than the pump, an anti-siphon valve should be installed to prevent accidental product leaks. Size the installation to contain the back pressures caused by water hammering. It is a good system practice to immediately install vacuum and air pressure gauges 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 suction pipe must have the following technical specifications:
- recommended minimum nominal diameter: 3/4"
- recommended nominal pressure: 10 bar;
- use pipes suitable for low pressure operation (e.g. with metal core)

CHARACTERISTICS OF THE SUCTION PIPES

13 CONNECTIONS

13.1 ELECTRICAL CONNECTIONS

GENERAL WARNING
Comply with the following (not exhaustive) instructions to ensure a proper electrical connection:
1 Before installation and maintenance make sure that power supply to the electric lines has been turned off
2 Use cables with minimum cross-sections, rated voltages and installation types that are suitable for the characteristics indicated in paragraph "ELECTRICAL SPECIFICATIONS".
3 Always close the cover of the terminal strip box before switching on the power supply, after having checked the integrity of the seal gaskets that ensure the IP55 protection grade.
4 ON/OFF switch;
4B Safety fuse against short circuits and overcurrent, 25a fuse for 12v models
4C Safety fuse against short circuits and overcurrent, 15a fuse for 24v models
5 power cable complete of pinners for connection to the battery

ATTENTION
For connection the installer shall have to use a cable of adequate diameter for the cable gland to ensure protection grade IP55.

SPECIFICATIONS
1 Cables with faston connector coupling for connection to the power supply line
2 RED cable: positive pole (+)
3 BLACK cable: negative pole (-)
4 Terminal strip box (protection class IP55 in conformance with the directive EN 60034-5-97) complete of:
4A ON/OFF switch;
4B Safety fuse against short circuits and overcurrent, 25a fuse for 12v models
4C Safety fuse against short circuits and overcurrent, 15a fuse for 24v models

ATTENTION
IT IS THE RESPONSIBILITY OF THE INSTALLER TO CARRY OUT THE ELECTRICAL CONNECTIONS IN COMPLIANCE WITH THE APPLICABLE REGULATIONS. DO NOT INVERT FUSES TO AVOID ANY MOTOR DAMAGE OR MALFUNCTION. 25A FUSE CAN BE FITTED ONLY ON 12V PUMP 15A FUSE CAN BE FITTED ONLY ON 24V PUMP

NOTE
REFER TO THE NORM ISO22241-3 TO MAKE THE SYSTEM SUITABLE FOR USE.

ATTENTION
Wrong connection can cause serious pump damage.

ATTENTION
Before carrying out any connection, refer to the visual indications i.e. arrow on the pump head, to identify suction and delivery.

ATTENTION
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.
Do not use conical threaded fittings, which could damage the threaded inlet or outlet openings of the pump if excessively tightened.
If not already fitted, fit a suction filter.

ATTENTION
Before connecting, make sure that the piping and the suction tank are free of dirt and solid residue that could damage the pump and its accessories.
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.
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