

ELECTRIC PUMPS UNITS FOR
WATER LIFTING AND
PRESSURISATION

USE AND MAINTENANCE MANUAL

Table of contents

Declaration of conformity	pag. 3	6. Start-up, running, checks	10
1. General information	4	6.1. Start-up	10
1.1. Symbols	4	6.2. Electric board controls	10
1.2. Generality	4	6.3. Regulations and calibrations	11
1.3. Identification of the units	5	6.4. Maintenance	11
2. Systems description	5	7. Out of service	11
2.1. Functioning principle	6		
2.2. Use and counterindications	6		
2.3. Use limits	7		
3. Safety regulations	7	Attachments	
4. Information on overhead noise	8	I. Instruction manual of the pumps	
5. Installation	8	II. Instruction manual of the electric board	
5.1. Handling	8		
5.2. Assembly and dismantling	8		
5.3. Hydraulic connections	9		
5.4. Electrical connections	9		

Declaration of conformity

of type A (according to Directive 2006/42/EC attachment II)

PENTAX S.p.A., with office in Viale dell'Industria n. 1
37040 Veronella (VR) - Italy

DECLARES

that the "Booster set" pressurisation units are compliant with the prescriptions of Directives:

- 2006/42/EC and subsequent amendments (Machinery Directive)
- 2014/35/UE and subsequent amendments (Low Voltage Directive)
- 2014/30/UE and subsequent amendments (Electro-magnetic Compatibility Directive)

Veronella (Vr), 03 March 2016

The Legal Representative


Gianluigi Pedrollo

1. General information

1.1. Symbols



Symbol indicating the instructions of the manual relating to safety. The non-compliance with these instructions exposes to health risks.



Symbol indicating the instructions of the manual relating to electrical safety. The non-compliance with these instructions exposes to electrical risks.

ATTENTION

Wording indicating the main warnings for correct system installation, functioning and management. However, for a correct use of the system for its entire life-span, all instructions and indications supplied in this manual must be complied with.

1.2. Generality

Check that the material received corresponds to that in the transport document and that it is not damaged.



To work safely and obtain the best results, before starting the system remember to read all the instructions contained in this manual and in the attached documentation.

The manual and the attached documentation constitute integrating part of the system and must be kept with care and be consulted by those in charge of use and maintenance of the system.

No part of this documentation can be reproduced without the written authorisation by the manufacturer.

Given the quick technical progress, the not strictly standard production and the company continuous improvement policy, the units may be subject to amendments by the manufacturer without prior notice.

The non compliance with all indications supplied in this manual, an improper use of or unauthorised amendments made to the system void any form of responsibility by the manufacturer for eventual damages to persons, animals or things.

1.3. Identification of the units

Every unit is provided with an identification plate similar to that shown in fig. 1, on which the following is reported:

- Trademark, denomination and manufacturer address
- Unit type
- Month/year of manufacture
- Serial (N./Ref.)
- Total power
- Pressure switches calibration

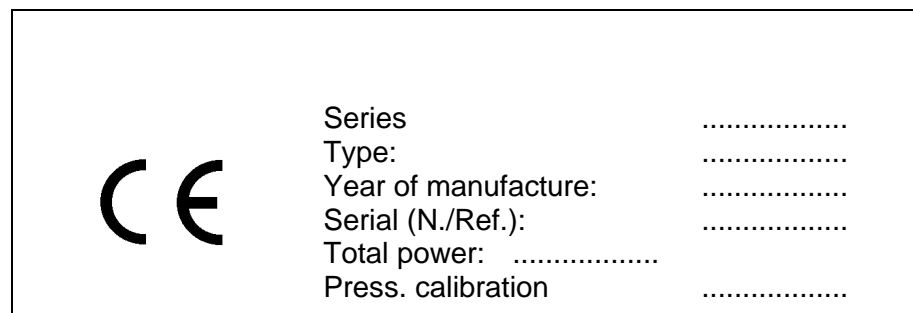


fig. 1

2. Systems description

The pressurisation unit is composed by:

- identical motor-driven pumps connected in parallel, single-phase or three-phase, with horizontal or vertical axis, with sequential start-up with cyclical inversion, in variable number from 1 to 3 and chosen according to the requested features
- steel full port intake and flow collectors, threaded (or flanged) and galvanised
- steel, galvanised unit base and support for electric board
- one check valve for each pump, assembled at intake
- ball valves with inlet for each pump one assembled at intake and one at flow
- a coupling stub pipe for each pump assembled at intake and provided with threaded hole for the connection of eventual air feeder
- rubber anti-vibrating supports with metal core
- manometer with radial connection
- electric board in IP 55 plastic box

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- pre-calibrated pressure switches (one per pump) assembled on the flow collector and directly connected to the electric board
 - heat protection electric cables of fire-retardant type, connected to the equipment and to the board
 - UPON REQUEST: can be supplied separately membrane tanks (20, 24 litres)

ATTENTION

For a correct use, at least one autoclave reservoir must be installed in the system.

ATTENTION

ALL UNITS:

- ARE BUILT IN COMPACT EXECUTION TO ENABLE THEIR USE IN REDUCED SPACES ALSO
- ARE REALISED USING HIGH QUALITY COMPONENTS
- ARE COMPLETELY ASSEMBLED AND TESTED IN FACTORY
- TO FUNCTION THEY MUST FIRSTLY BE CONNECTED TO THE HYDRAULIC SYSTEM AND TO THE POWER SUPPLY LINE.

2.1. Functioning principle

In static position with system pressurised, the contacts of the pressure switches result open and the system in stand-by. Upon decreasing of the pressure due to water request, pressure switch number one closes the contact and starts the first motor-driven pump. If the performances supplied by the same are sufficient for maintaining an adequate pressure, the motor-driven pump works until no water flow request and stops. If, on the contrary, other utilities are used and the pressure decreases further, the second pressure switch closes the contact and starts the second motor-driven pump and so on for other eventually available units. Upon stabilising of the pressure, the contacts of the pressure switches open and the motor-driven pumps stop with reverse order to start-up. The electric board changes the starting order of the motor-driven pumps at the beginning of every new cycle, so as to obtain a balanced share of the work times. The protection of the motor-driven pumps against the disconnection and the dry start, is assured by a float on the intake tank, to be connected by the user to the contacts envisioned on the electric board.

2.2. Use and counterindications

The units in standard execution are designed and built for the pressurised maintenance of the water systems using clear water from collection tank.

ATTENTION

The standard execution units are not suitable for:



- the dry running
- the pumping of liquids different from clear, clean, chemically and mechanically non aggressive water
- the pumping of liquids with temperature above 40°C
- the pumping of flammable liquids
- the functioning in places classified at risk of explosion
- the functioning in places without ventilation, in that they do not guarantee the ventilation of the motors and facilitate the forming of condensation
- the functioning with too frequent start-ups and switch-offs (approximately from 5 to 30 start-ups every hour, at regular intervals, per individual pump. The greater the power of the pumps, the lower the number of start-ups admitted). For further information please contact the manufacturer.
- the functioning at altimetric level, approximately above 1000 m (can vary depending on the type of motors used). For further information please contact the manufacturer.
- the functioning with ambient temperatures above 40°C

2.3. Use limits

- working pressure depending on the type of pump (see booklet) and use limits of the membrane reservoirs
- minimum intake pressure depending on the NPSH value requested by the pump and load losses (with safety margin of 0.5/1.0 metres)
- the maximum pressure at intake summed to the maximum pressure of the pump must be lower than the working pressure

3. Safety regulations

The "Booster set" units, if correctly installed, function in automatic mode and do not therefore present particular or significant risks linked to their normal use.



The handling, installation, maintenance, eventual repair and dismissal of the units described in this manual must be carried out by qualified staff that has read and understood the content of this manual and the eventual attached documentation. The running of the units can also be carried out by unqualified staff.



Remove voltage by disconnecting from the electric power supply before carrying out any maintenance or repair operations on the units. Place the protection switches upstream of the system in position off or remove the plug from the power supply socket.



In case of fire in the electric equipment, do not use water to put it out.



The units use motor-driven pumps with mechanical parts in motion fully protected against accidental contacts, by means of suitable sumps. Every responsibility is declined in case of damages to persons, animals or things caused by the removal of or tampering with said devices.



The pressurisation unit is an automatic system, therefore the pumps can start without warning. It is therefore necessary to pay maximum attention before any intervention.

4. Information on overhead noise

For information on the power and acoustic pressure level, refer to that reported on the instruction booklet of the pumps.

5. Installation

Do not disperse the packaging materials in the environment, but keep to the regulations in force on the disposal of waste.

5.1. Handling

The units are delivered in cardboard packages on appropriate pallets and can therefore be transported by means of lifting trolley or pallet truck.



It is necessary to verify that the maximum capacity of the hoisting mean is compatible with the weight of the unit.

In case of handling from above (crane, bridge crane, forklift) it is necessary to hook the unit by passing suitable belts from underneath the pumps, in front and behind the fixing points on the base, in order to avoid the possibility of capsizing. Proceed cautiously to avoid accidental impacts.

5.2. Assembly and dismantling

The units are delivered fully assembled and do not therefore require any assembly operation, if not for additional requested accessories.

Verify that the positioning is on a flat and regular surface, act at supporting the weight of the unit and sufficiently spacious to allow the carrying out of use and maintenance operations in safe conditions.

For every dismantling intervention that should be necessary, pre-emptively proceed to the hydraulic and electrical insulation of the components to be dismantled.

ATTENTION

Remember that for every dismantling and assembly operation it is a good rule to check and, if necessary, replace, the gaskets and to fasten the flanges proceeding progressively for nuts diametrically opposite.

5.3. Hydraulic connections

The installation of the units described in this manual must be carried out by qualified staff that has read and understood the content of this manual and the eventual attached documentation.

In carrying out the hydraulic connections verify that:

- the sections of the intake and flow piping are equal or greater than those of the collectors or stub pipe or, however, such to avoid a too high speed of the flow (it is preferable to remain below 2 m/sec.).
- the intake and flow piping is perfectly aligned with the collectors of the inserted unit
- the intake piping has the lowest possible number of bends and section variations and is as short as possible

ATTENTION

We recommend overlapping anti-vibrating elastic joints to eliminate any misalignment and to reduce the propagation of the vibrations.

ATTENTION

We recommend installing a float switch (the electric board is already prepared for the connection) to prevent dry running.

ATTENTION

In case of water withdrawal from well or, however, above water level, we recommend mounting a bottom valve with filter on to the intake piping.

In case of withdrawal from reservoir or collection tank, this must be dimensioned according to the maximum water request point and to the supply possibility of the water system.

5.4. Electrical connections



The electric connections must be carried out by qualified staff, following the electric layouts and applying the state-of-the-art rules.



Verify that the electric power supply system is provided with an efficient earthing system. The yellow-green earth conductors must be connected to the electric boards before the other conductors whereas, during the disconnection phase, they must be the last to be removed.

ATTENTION

Verify the correspondence between voltage and frequency of the electric power supply network and the plate data of the motor-driven pumps.

6. Start-up, running, checks

6.1. Start-up

Before starting the unit, verify that the motor shafts of the motor-driven pumps rotate freely.

ATTENTION

In case of three-phase motor-driven pumps, verify that the rotation direction corresponds to that indicated by the arrows placed on the pump bodies or on the fan covers; on the contrary, invert the connections of two phases of the electric power supply cable.

Perform the full priming of the pumps by carrying out the following operations:

1. Loosen the cap on the intake collector.
2. Open all collectors motor-driven pumps connection valves.
3. Completely fill with water.
4. Close the cap.
5. Open the motor-driven pumps priming caps and carry out similar operation.
6. Close the caps and the flow valves.
7. Start the pumps from the electric board with manual control.
8. Slowly open the flow valves so as to eliminate the trapped air bubbles (if necessary, stop the pumps and repeat the priming operation, to fill the spaces left empty by the air).
9. Eventually repeat the manual start-up operations a few times for a short time to allow the bleeding of the trapped air.
10. Completely open the flow valves and switch to automatic functioning of the pumps, by acting on the selector switches on the electric board.

6.2. Electric board controls

1 Voltage presence warning light

2 Level alarm warning light

3,4 Motors on warning lights

5,6 Motors in protection warning lights

7,8 Switches and automatic position warning lights

9, 10 Stop buttons

11,12 Manual functioning buttons

ATTENTION

All information regarding the electric board, descriptions, regulations, procedures and indications are reported in the specific use and maintenance booklet provided.

6.3. Regulations and calibrations

The units are calibrated and tested before delivery. Should adjustments to regulations of the electric boards or pressure switches be necessary, the same must be carried out by qualified staff. Pressure switches calibration procedure: remove the lid to access the regulating nuts - act on calibration nut "P" to regulate the connection pressure also called minimum pressure (a clockwise rotation increases the value, vice-versa, an anti-clockwise rotation decreases the value) - act on nut " ΔP " to regulate the pressure differential (a clockwise rotation increases the calibration differential and, consequently, fixed the connection pressure, also the stop pressure value also called disconnection or maximum pressure).

6.4. Maintenance

The pressurisation units do not require *routine* maintenance, whereas the eventual interventions of *extraordinary* maintenance, that should be necessary in case of fault, must only be carried out by experienced staff.

7. Out of service

In case of placing a unit out of service, ensure to hydraulically and electrically insulate the same before proceeding to the dismantling.

Do not disperse materials forming part of the system in the environment; keep to the local legal dispositions with regard to disposal, recovery, re-use, recycling of the materials.