Clean Water
Booster Sets

POWERBOOST

PRO Range O&M Manual

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General

Introduction

It is the responsibility of the installer and owner to read and fully understand these instructions before installing, commissioning or operating the unit. Only suitably trained or qualified personnel must carry out installation and servicing.

Compliance with the operating instructions is of vital importance to ensure reliability and a long service life of the product and to avoid risk.

- Make yourself familiar with the content.
- Accurately follow the direction and instructions.
- Keep this manual with a logbook in a fixed place near the product which can be accessed by relevant personnel.

Modification or alterations of the product supplied are only permitted after consultation with the supplier of the set. The working limits of the booster set must not be exceeded

Delivery and Handling

The weight and size of the Powerboost unit may require the aid of lifting equipment and must be handled in a safe manner. The unit must be lifted only by the base and not the pipe work, pumps or vessel.

Inspection

On delivery, the Powerboost unit should be inspected thoroughly and any damage reported to the supplier as soon as possible. This should be confirmed in writing within 48 hours.

Applications

The Powerboost unit should not be installed in areas that are classified as hazardous or where there is a risk of an explosion or harm to people. The manufacturer does not accept responsibility if the unit is used to pump liquids other than clean water unless suitability has previously been agreed in writing. The unit is designed for a gravity fed flooded suction pump from a storage tank or reservoir. For units with storage tanks a distance further than five metres away, please consult supplier.

Your attention is drawn to the 'Health and Safety' section of this manual. It is IMPERATIVE that you read these instructions BEFORE working on or using this unit.

Site Storage

Should a Powerboost unit need to be stored before installation, it should be in a safe place away from moisture, dust and frost.

Warranty

All mechanical components of the Powerboost unit are covered by a 12 month warranty against manufacturing defects. In case of failure please contact the relevant technical department on one of the following:

ROI	094 963 3500
NI	028 9181 8347
UK	01543 415200

Health & Safety

(Important - Please Read This Before Starting Any Work on the Unit.)

The user's attention is drawn to the following:

As with all site work, the dangers of working with water and electricity pose severe threats to health if obvious and fundamental precautions are not taken.

1. The appropriate sections of this manual must be read before working on the equipment
2. Only suitably trained or qualified personnel must carry out installation and servicing.
3. Normal safety precautions must be taken, and appropriate procedures observed to avoid accidents.
4. Users are responsible for complying with all local health and safety legislation while in possession of the booster set equipment.

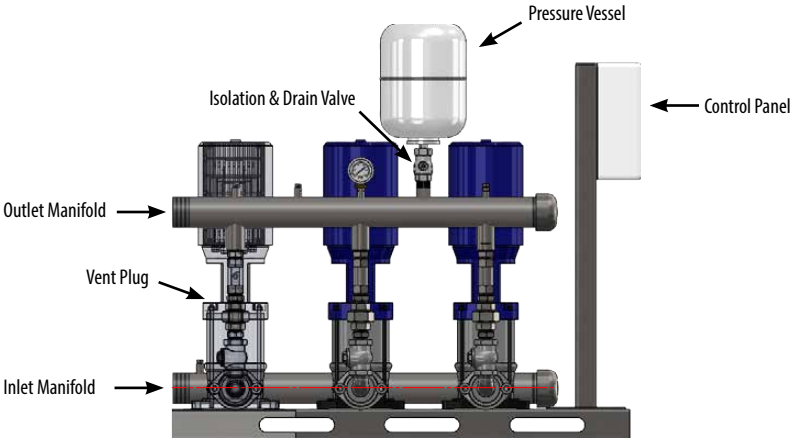
Only authorized trained personnel are allowed to connect the installation electrically in accordance with the local regulations.

- Make sure that the panel specifications correspond with the main power supply.
- Connect the installation, using interruptible connections (connector/plug).

Refer to your local supplier for technical advice or product information.

Installation Pre-Check

Every care has been taken to ensure that your booster set has arrived complete. Please visually check to ensure that no damage has occurred during transportation. It is the responsibility of the client to make suction and delivery connection to the booster system.



Before any installations are made please ensure the water line is isolated at its entry point and all electrical and mechanical works are carried out by a competent person. Your booster set will be pre-assembled on a stainless-steel skid which will need to be fixed in place using the bolt holes provided. The following is advised for installation as a minimum:

- Place and install the booster set on level, stable surface in a dry and frost-free room
- Make sure that sufficient air can reach the cooling fans
- The booster set should be positioned in a way that allows maintenance from all sides
- Install a shut off valve on the supply and delivery pipework
- In the case of particles being present in the water, insert a filter on the supply line
- Ensure supply and discharge pipes are connected correctly

Electrical connections

Only authorized trained personnel are allowed to connect the installation electrically in accordance with the local regulations.

- Make sure that the panel specifications correspond with the main power supply.
- Connect mains power supply to panel
- Connect low level float in storage tank, if required

The **POWER**BOOST units have provision for an external level switch input and a volt free general alarm output (BMS connection). Connections for these features are made within the main wiring distribution board as per the wiring diagrams.

PRO E

Information on electrical connections for PRO E sets can be found on pages 8 and 9 of the wiring diagrams supplied with the sets.

PRO S

Information on electrical connections for PRO S sets can be found on pages 5 and 6 of the wiring diagrams supplied with the sets.

Initial Set Up & Operation

The booster set has been pre-assembled and programmed prior to being supplied to you. Once all mechanical and electrical connections have been made the following steps should be followed before the unit is powered up.

1. Fully close all isolation valves on the outlet side and inlet side of the booster set
2. Ensure there is sufficient water in the supply tank
3. Open vent screw at the top of each pump
4. Gradually open all isolation valves on the inlet side of the booster set and fully de-aerate the pumps
5. When there are no more air bubbles present, close the inlet valves. Close the vent screw, then fully open the inlet valve
6. Control panel is now ready to power up
7. Check the main discharge valve after the outlet manifold is closed and all other valves are fully open
8. Turn on the mains isolating switch
9. Start up pumps
10. Slowly open the discharge valve on the booster unit to gradually fill the delivery main
11. Once water is flowing from the nearest outlet, check the pipe work around the set for leaks
12. Working away from the set, open each outlet in turn until water flows to purge air from the system
13. When all the air has been purged, close all outlets. The pump set will shut off after building up pressure in the system
14. Please see the relevant Pro-E or Pro-S controls instructions for guidance on how to change the pressure settings of your booster unit if required

Pressure Vessel

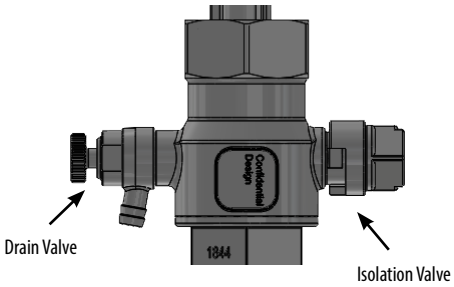
The air pre-charge in the pressure vessel should be set 65% of the pre-set working pressure for maximum effectiveness. It is recommended to check the tank air pressure every 4-6 months.

The vessel can be charged with an air source via an inlet valve. The pressure can be checked using a suitable pressure gauge. Air can be added or released as required in order to adjust the percentage of pressure.

In order to check the air pressure in the vessel, it is necessary to release the pressure in the vessel

To do this:

1. The isolation valve below the vessel must first be closed
2. The drain valve is opened to release water pressure
3. The air pressure is tested with a suitable gauge at the air valve
4. Add or release air depending on the pressure reading
5. When the pressure has been adjusted, close the drain valve and open the isolation valve to return the set to service



PRO E Working Controls (230V/1PH Input)

LCD Display

Name	Function
RUN	VFD Operation
STOP	VFD Stop
PAR1	Parameter 1
PAR2	Parameter 2
SENSOR	Sensor Alarm
VFD	VFD Alarm
PUMP	Pump Alarm

LCD Colour

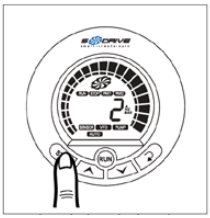
BLUE
Operation Mode

PURPLE
Stop Mode

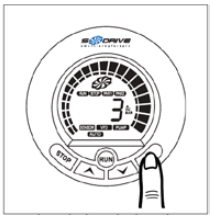
RED
Fault Mode

Start-Up Procedure

Master Inverter
(Pump 1)



Slave Inverter
(Pump 2)



Slave Inverter
(Pump 3)

1. Turn on mains isolator on distribution board.
2. Turn on MCB for each of the pumps.
3. On the master inverter, 'Pump No. 1', press "RUN" to start the pump.
4. On the slave inverter, 'Pump No. 2', press "RUN" to start the pump.
5. For 3 pump sets, repeat step 4. on 'Pump No. 3'.
6. To stop one of the pumps at any time, press "STOP" on the inverter for that pump.

Pressure Set

Setting the pressure on the INJ-4500 is simple and easy.

1. Go to the master inverter on the set (Pump 1).
2. Hold down the up button for 2 seconds.
3. Change the default value to your desired pressure using up or down button.
4. Press the back button to complete the pressure setting.

Alarm Interface Description

- Press ⌄ & ⌃ button simultaneously to check alarm logs.

Display	Alarm	Reason	Countermeasures
	Over Current	Over-current on the inverter/Abnormal operation of the motor/Short of the motor's output line	If problem repeats / Check the pump/ motor
	Low Voltage	Low-voltage on the inverter	Check the input voltage
	Over Voltage	Over-voltage on the inverter, when excessive voltage is inputted to the inverter	Check the input voltage
	Over Load	Overload on the inverter / Abnormal operation of the motor/pump	Check the pump/ motor
	Communication Fail	Master and slave are communication fail	Check communication ine
	Err of sensor	Sensor fail to connect	Check the connection of the sensor / Change the sensor
	Stop for low current	When the water level of the tank is low / When air enters the pumps	Check the tank / Remove air from the pump
	Low pressure	When the pressure in the pumps drops below the set "Low press"	Lower the "Low press" / Adjust the setting for pump operation

Master Changeover

For failure of master drive, master pump will auto-changeover. When the SEN(sensor) error occurs, the following steps should be taken to isolate the failure and manually change one of the slave inverters to act as the master.

1. Stop all operation of the VFD's.
2. On the master pump, press down the 'STOP' button for 3 seconds, and change the setting mode to Manual Mode.
3. The other slave pumps will indicate a COM error once step 2 is completed. Change of the VFD's interconnected to the MASTER from AUTO to Manual Mode.
4. Once the sensor connection is confirmed, the next lead pump (2nd VFD) should be changed from Manual Mode to AUTO mode.This is done by pressing the STOP button for a duration of 3 seconds. This will then change the Master to the second pump.

Distribution Pressure Alarms

A pressure switch is fitted on the discharge manifold of the PRO E 230V/3PH Input sets. This monitors the pressure in the distribution system.

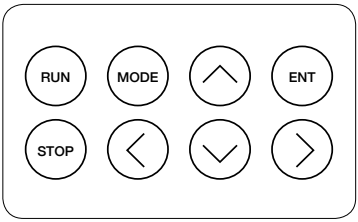
If the pressure falls below the pre-set value, an alarm is generated to notify users of the failure in the pressure system.

If the pressure exceeds or maintains the pre-set value, an output is generated to notify users of the health of the pressure system.

All outputs are available for BMS connection in the distribution board.

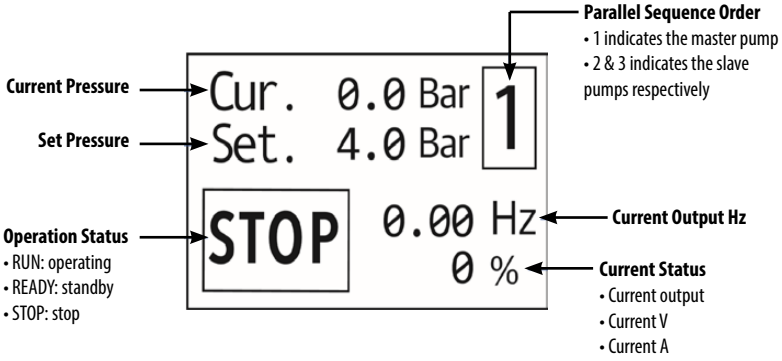
PRO E Working Controls (400V/3PH Input)

Keypad



Name	Function
RUN	System Run
STOP	1. System Stop 2. Master pump set-up (automatic mode) *Press the "STOP" button for a duration of 2-3 seconds to set up the master pump*
UP/DOWN	Up/down to select parameters Quick pressure bar can be set-up by holding down either the up or down button
LEFT/RIGHT	Setting the parameter value
MODE	Entering the parameter menu & existing parameter setting
ENTER	Confirm parameter setting

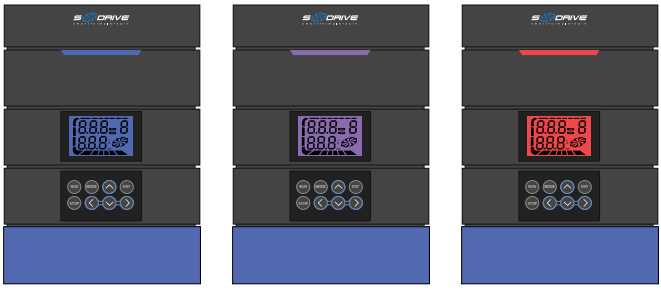
LCD Display



LCD Colour

The back-light on the LCD is an indication of the system status.

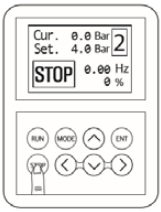
- Blue indicates that the system is in operation
- Purple indicates ready/stop
- Red indicates system alarm



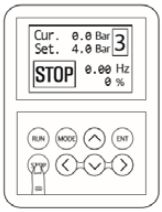
Operation is blue | Stop is purple | Alarm is red

Start-Up Procedure

Master Inverter
(Pump 1)



Slave Inverter
(Pump 2)



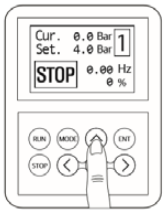
Slave Inverter
(Pump 3)

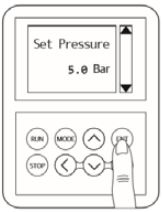
1. Turn on mains isolator on distribution board.
2. Turn on MCB for each of the pumps.
3. On the master inverter, 'Pump No. 1', press "RUN" to start the pump.
4. On the slave inverter, 'Pump No. 2', press "RUN" to start the pump.
5. For 3 pump sets, repeat step 4. on 'Pump No. 3'.
6. To stop one of the pumps at any time, press "STOP" on the inverter for that pump.

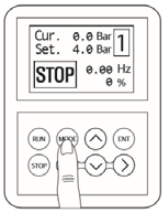
Pressure Set

Setting the pressure on the INJ-4000S is simple and easy.

1. Go to the master inverter on the set (Pump 1)
2. Press the "UP" button for 3 seconds
3. Press the "ENT" button to enter the parameter, change the default value using "UP" or "DOWN" button
4. Save the value using the "ENT" button. Return to the main screen using the "MODE" button



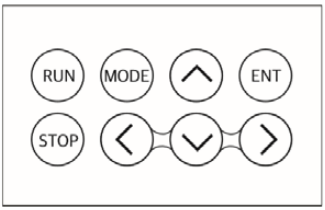


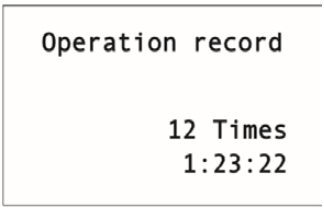


Operation Record

Monitor and observe the operation of the set easily.

- Press the < button for 3 seconds.
- This checks the operation system power on time and operating hour.





Alarm Interface Description

- Press ⌄/⌃ simultaneously to check the alarm log
- Records 32 alarm logs. The cumulative number of record alarm types and alarm generatior pressure.
- Press ⌄/⌃ to see cumulative record
- Press **MODE**/**ENT** to return to main screen

Alarm Logs

Display	Content	Default
	Fuse Open Trip	Return the product back to your local distributor
	Over Heat Trip	Check the fan condition of the inverter
	Over Current (Arm Short)	Check if the motor power corresponds with the motor output power or increase the accel. time.
	External Trip	Return the product back to your local distributor
	Over Voltage Trip	Check input voltage. Check if the required breaker is within the specific limits
	Over Current Trip	Check if the motor power corresponds with the motor output power or increase the acceleration time
	NTC Trip	Return the product back to your local distributor
	Input Phase Trip	Check the input wiring. Check the magnetic contact on the input side
	Output Phase Trip	Check the output wiring. Check the magnetic contact on the output side
	Ground Phase Trip	Check the output wiring. Reduce the load or operation frequency
	V.F.D. Overload Trip	Check if the inverter corresponds with the motor capacity indicated on the motor nameplate
	Overload Trip	Check if the motor is overloaded
	Safety	Displayed when at least one of the two safety input signals is off
	Low Voltage	Check the input power

	65 E-Thermal Trip 66 Underload Trip 67 Option Card Fail 68 Motor Fail Trip 69 External Brake Trip 70 IO Board Fail 71 Pre PID Fail 72 Parameter Write Error 74 FAN Trip 75 PTC (Thermal Sensor) Trip 77 MC Fail Trip	Contact Powerboost Technical Team

Booster System Alarm

Display	Content	Default
	Communication Error	Check the connection between the master and slave pump
	Sensor Error	Check the sensor connection or replace the sensor to a new sensor
	Low Current Stop	Check if the water tank is filled with water. Check if the air enters the pump
	Low Pressure Stop	Check sensor condition and low water level
	Low-Level Stop by External Input	Check the inlet and outlet manifold.
	Anti-Freezing Error by External Input	Contact your local distributor.

Master Changeover

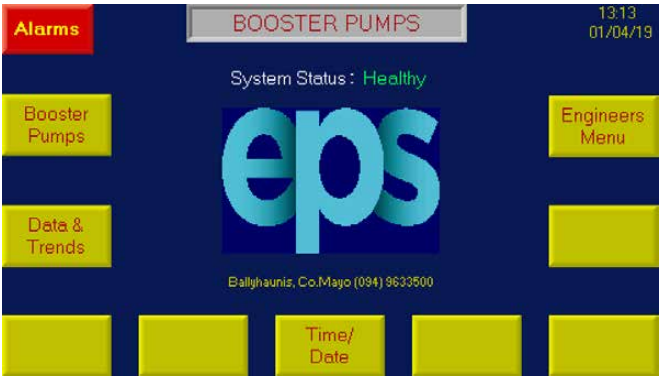
For failure of master drive, master pump will auto-changeover. When the SEN(sensor) error occurs, the following steps should be taken to isolate the failure and manually change one of the slave inverters to act as the master.

1. Stop all operation of the VFD's.
2. On the master pump, press down the 'STOP' button for 3 seconds, and change the setting mode to Manual Mode.
3. The other slave pumps will indicate a COM error once step 2 is completed. Change of the VFD's interconnected to the MASTER from AUTO to Manual Mode.
4. Once the sensor connection is confirmed, the next lead pump (2nd VFD) should be changed from Manual Mode to AUTO mode.This is done by pressing the STOP button for a duration of 3 seconds. This will then change the Master to the second pump.

PRO S Working Controls

Start Up Procedure

Power up control panel, main menu screen should appear as in image below.



Main menu screen will have 7 main options to choose from:

- Alarms
- Booster Pumps
- Pump Set points
- Settings
- Data and Trend
- No Flow Set point
- Pump Control

To start up booster set, select “Booster Pumps” option from the main menu.

Pumps will be pre-set in “OFF MODE” i.e. “Hand” by supplier.

The pressure set point has been set as per customers details

To switch pumps into auto, press “Hand” icon as circled in figure 2 below on each pump to toggle between hand and auto. Once auto is displayed on screen below pumps, pumps will run automatically.

Slowly open the common valve on the discharge outlet to the system allowing water to be pumped into the system ensuring pump is delivering water. If not, prime pumps again, change over to standby pump and check to see that it is pumping.

Delivery main should be filled gradually by throttling discharge valve on booster unit..

Standard Operation

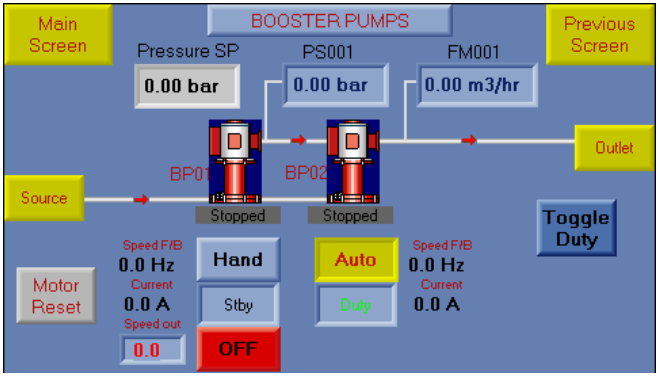
The working pressure is a pre-set parameter which has been set as per your requirements during placement of order. This can be found on your commissioning sheets enclosed or on the commissioning label inside the door of the panel.

When a booster pump is in duty it is shown in a green colour, when pump is in stand-by mode or off it is shown in grey.

Additionally tripped it is shown in a red colour. "Toggle Duty" can be pressed to alternate the duty/ assist arrangement between booster pump 1 and 2. (This is described in greater detail in section below).

Should any pumps go into fault; the motor reset button will reset all faults.

The status of each pump is always indicated in text directly underneath the pump icon.



Pressure Set Point

This value can be changed within the "Pressure SP" option on the booster pumps main screen.

Should it be required to change the booster set operating pressure simply:

1. Press the "Pressure SP" value box on the booster set page.
2. Input the new pressure on the numerical box and press enter.
3. You will now see the new operating pressure in the Pressure SP box.

*NOTE: Do not exceed the design pressure of the pump set

Pump Duty Selection

The "Toggle Duty" button is used to manually change the duty/standby arrangement of the booster set. Therefore take booster pump 1 (BP01) as the duty pump and booster pump 2 (BP02) as the standby pump, by pressing the "Toggle Duty" button this will manually toggle duty to BP02 and BP01 will become standby.

Additionally, the booster set has been pre-programmed to automatically alternate duty/standby orientation at a preset time interval.

In the event of booster pump 1 (BP01) tripping, the stand-by pump booster pump 2 (BP02) will become duty and start pumping. If both pumps continue to trip please contact EPS breakdown service.

Motor Reset

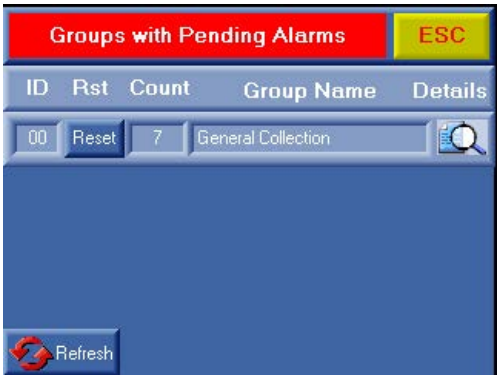
In the event that any pump goes into fault, simply pressing the "Motor Reset" button will reset the fault.

Alarms

To view any current alarms with your booster set press the alarm icon on the top left hand side of the HMI on the home page. This will bring you into groups with pending alarms. See fig. 3 above.

Press reset icon to erase any alarms that are not active. Press the magnifying glass icon to view active alarms and times of activation.

Please contact your supplier with any alarms that will not reset.

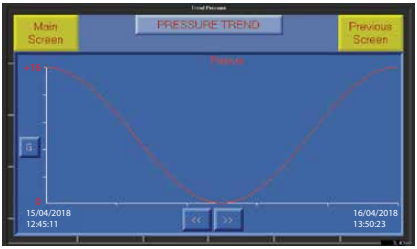


Data and Trends

This page allows the user to view trends on pressure and flow and view the total flow which has gone through the flow meter (if applicable).

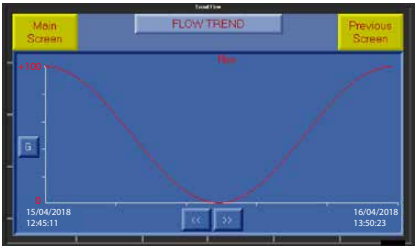
Pressure Trend

This screen displays a trend of the discharge pressure for the booster set.



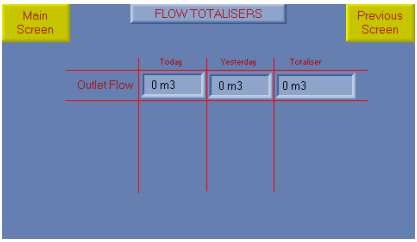
Flow Trend

This screen displays a trend of the flow from for the booster set (if applicable).



Flow Totaliser

This screen displays a table with the total outlet flow.



DECLARATION OF CONFORMITY

We, EPS Group
of Mallow Business and Technology Park
Quartertown
Mallow
Co Cork P51 AC94
Telephone: +353 (22) 31200
Email: info@epswater.ie

in accordance with the following CE Directives:

See Table 1 for list of relevant CE Directives.

Hereby declare that:

Equipment: *Powerboost Cube, Flow, Pro E, Pro S Range*

Model : *See overleaf for complete range of models.*

Is in conformity with the applicable of the following documents by in section from the individual components' manufacturers:

See Table 1, for list of standards.

I hereby declare that the equipment above has been designed and assembled to comply with the relevant section of the above referenced specifications. The unit complies with all applicable Essential Requirement of the Directives.

The Technical Construction File is maintained at:

EPS Group
Knox St,
Pollnacroaghy,
Ballyhaunis,
Co. Mayo. F35 WK50
Telephone: (094) 963 3500
Email: Info@epswater.com

CE

Signed:

T Buckley

Name: Tadhg Buckley

Position: Regional Director

Place of issue: Ballyhaunis Office

Date of issue: 27/09/2021

Complete Range of Model & Part Numbers

Component	EPS Part Number
CUBE	(1020835)
Powerboost FLOW	(1029550 – 1037498)
Powerboost PRO E	(1021268 – 1101897)
Powerboost PRO S	(1021563 – 1102217)

Product Range	EU Directive	Standard / Regulation
POWERBOOST Cube	2014/30/EU; 2006/42/EC; 2001/65/EC;	EN 809+A1/C1:2010 EN 60204-1:2006 IEC 60204-1:2006 IEC 61000-6-1:2007 IEC 61000-6-3/A1:2011 IEC 61000-3-2 IEC 61000-3-12
POWERBOOST FLOW CR 80/100/200	2014/42/EU; 2014/35/EU; 2014/35/EU; 2009/125/EU; 2011/65/EU; 2014/547/EU;	EN 60335-1 EN 60034-1
POWERBOOST Flow Baseplate and Manifolds		ISO 9001:2015
POWERBOOST Flow Controls Steadypress	2014/35/EU; 2014/30/EU; 2011/65/EC; 2012/19/EU;	EN 60331-1 EN 55014-1 EN 55014-2
Powerboost PRO DPV6 -25 Pump Range	2014/34/EU; 2014/30/EU; 2011/65/EU;	EN 809 ISO 12100 WRAS NO :1707365
Powerboost PRO Baseplate and Panel Sand - Aqua Design		ISO 9001:2015
Powerboost PRO E Controls and Panel Box (Injung Drive)	2014/30/EU; 2014/35/EU;	EN 61800-3:2004 + A1:2012 EN 61800-5-1:2007

Powerboost PRO DPV6 -60 Pump Range	2014/35/EU; 2014/30/EU; 2011/65/EC; 2012/19/EU;	EN809 ISO 12100 WRAS NO :1707365
Powerboost PRO S Controls and Panel Box (Invertek Drive)	2014/30/EU; 2014/35/EU; 2011/65/EC;	EN 61800-3:2004 + A1:2012 EN 61800-5-1:2007
Danfoss Pressure Transmitter	2014/34/EU; 2014/30/EU; 2011/65/EU;	EN 60079-0:2012 +A11: 2013 EN 60079-15: 2010;
Tredwell control Panels	2006/95/EU; 2004/108/EU;	ISO 9001:2015
Powerboost PRO S Axiom Panel	2006/95/EU; 2004/108/EU;	IEC 61439:1/2
PowerBoost Unitronics drive	2006/95/EU; 2014/35/EU; 2004/108/EU; 2014/30/EU; 2011/65/EU;	EN61131-2:2007 EN50581:2012
Rubber Gaskets		BS6920-1:2000/2014 WRAS NO :1701547
Pipe Fitting, Valves, Valbrass, Shortts, Petrochem, GWS	2011/65/EC; REACH 1907/2006	UNI EN 12165 (BrassCW617N) UNI EN 12164 (Brass CW614N) AISI 316 ISO228, ISO7/1, ISO 4144, ISO 9001:2015 PED 97/23/CE ATSM A182 & A182M, ATSM A351, SME SA182 & SA182M MSS SP-114 AD2000
Pressure Gauge -Valbrass		EN 837-1
Pressure Vessel - GWS	2014/68/EU;	EN 13831:2007
Thread Sealant		WRAS NO: 1308522 Valbrass (December 2023) WRAS NO: 1812525 Delta (December 2023)
Nuts & Bolts - TR Fasteners	2011/65/EC; REACH 1907/2006	Din125 Din933 Din934

Table 1; List of Directives & Standards

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