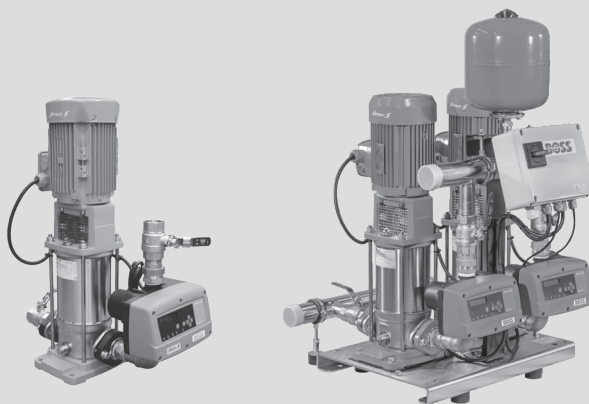




# BOSS<sup>TM</sup>



## BOSS<sup>TM</sup> Multi V 1... & Multi V 2... EC Booster Sets

**EN**      Installation and operating instructions

### For models:

BOSS-1 MultiV 204/EC2 – 1PH **(80460442)**

BOSS-1 MultiV 202/EC2 – 1PH **(80460453)**

BOSS-1 MultiV 404/EC2 – 1PH **(80460464)**

BOSS-1 MultiV 406/EC2 – 1PH **(80460475)**

BOSS-1 MultiV 804/EC2 – 1PH **(80460486)**

BOSS-1 MultiV 806/EC2 – 1PH **(80460497)**

BOSS-2 MultiV 204/EC2 – VFC – 1PH **(80460505)**

BOSS-2 MultiV 206/EC2 – VFC – 1PH **(80460516)**

BOSS-2 MultiV 404/EC2 – VFC – 1PH **(80460527)**

BOSS-2 MultiV 406/EC2 – VFC – 1PH **(80460538)**

BOSS-2 MultiV 804/EC2 – VFC – 1PH **(80460549)**

BOSS-2 MultiV 806/EC2 – VFC – 1PH **(80460560)**





Fig. 2 (Control box supplied with 2 pump model only)

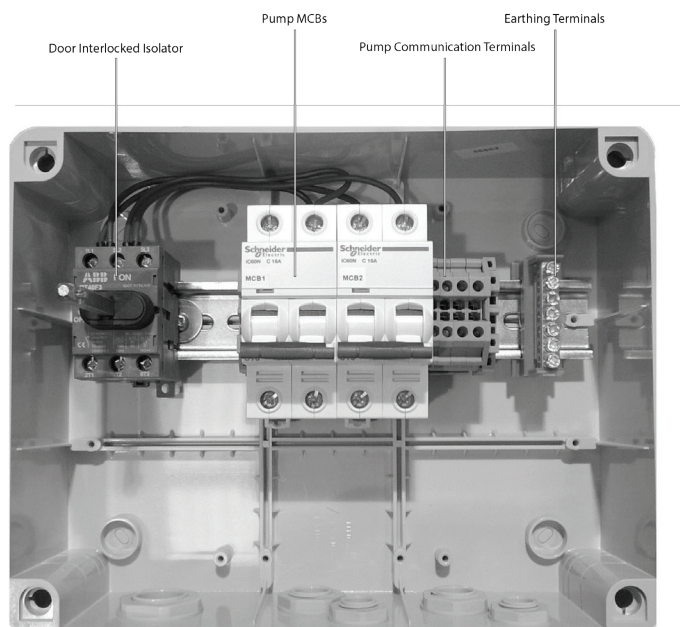


Fig. 3

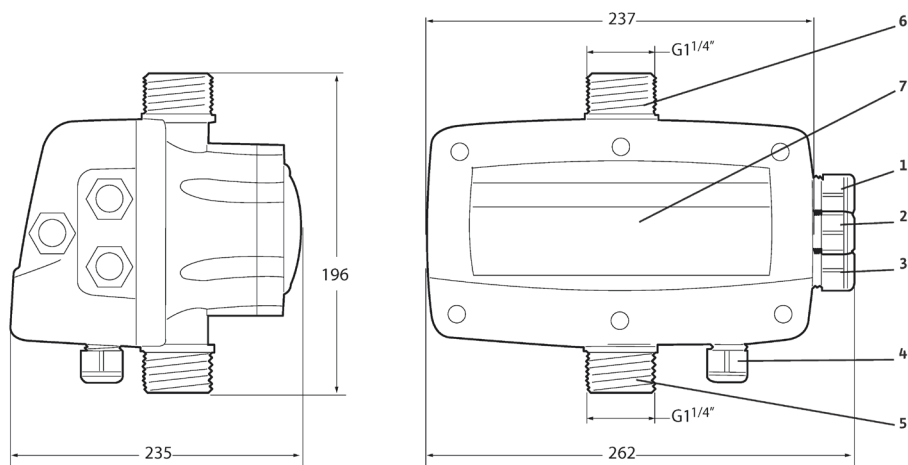




Fig. 4

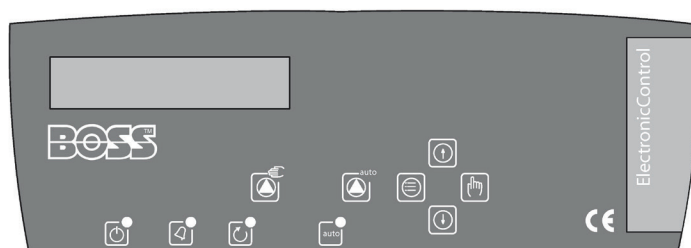


Fig. 5

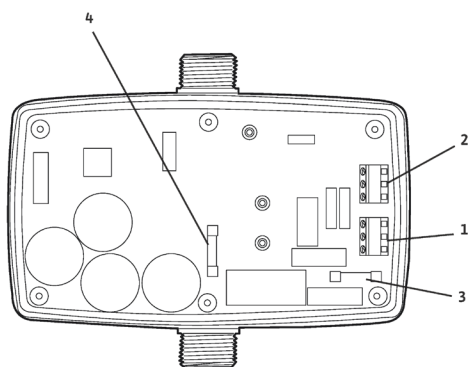


Fig. 6

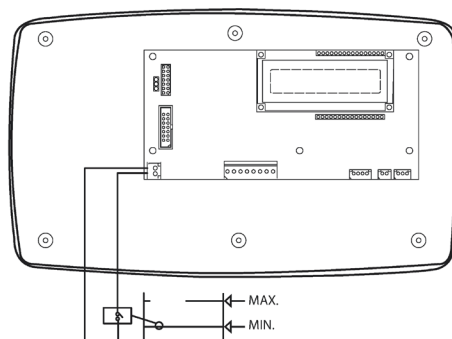
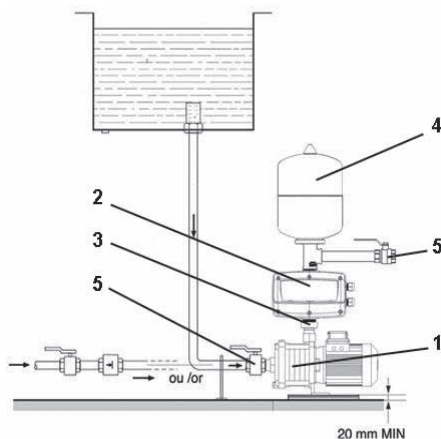


Fig. 7



| Pos. | Description of the components |
|------|-------------------------------|
| 01   | Pump                          |
| 02   | Electro controller            |
| 03   | Check valve                   |
| 04   | Bladder tank *                |
| 05   | Isolation valves              |

\*Bladder tank supplied loose complete with flow through cut off valve. **Install close to controller within 500mm**

**Note:** Installation configuration applies to both horizontal and vertical pump sets.

See back of manual for wiring diagrams





## 1. General

The installation and operating instruction is an integral part of the product and must be kept readily available near the place where the product is installed. Strict adherence to these instructions is a precondition for the installation and proper use of the product. The installation and operating instruction corresponds to the relevant version of the product and the underlying safety standards valid at the time of going to print.

## 2. Safety

This instruction contains important information which must be followed when installing and operating. For this reason, this operating instruction must, without fail, be read by the service technician and responsible operator before installation and commissioning.

Both the general safety instructions in the "Safety precautions" section and those in subsequent sections indicated by danger symbols should be carefully observed.

### 2.1 Symbols used in this operating instruction.



**General symbol for danger**



**Warning of electrical danger**



**REMARK:....**

**Signals:**

**DANGER! Extremely dangerous situation.**  
**The non-observance could cause death or serious injuries.**

**WARNING! The user may suffer from injuries (serious).** The mention of warning involves that **personal (serious) injuries may happen when precautions are not observed.**

**ATTENTION! Damage could be caused to the pump or installation.** The mention of attention is used to indicate that **by ignoring the relevant safety instructions, damage could be caused to the pump or its operation.**

**REMARK! Useful remark for product handling.**  
**Any possible difficulty is mentioned.**

### 2.2 Staff training

The personnel installing the pump must have the appropriate qualification for this work.

### 2.3 Risks incurred by failure to comply with the safety precautions

Failure to comply with the safety precautions could result in personal injury or damage to the pump or installation. It could also invalidate any claims for warranty.

In particular, lack of care may lead to problems such as:

- Failure of important pump or machinery functions
- Failure of the maintenance and repairing process recommended
- Danger to persons due to electrical, mechanical and bacteriol influences
- Material damages

### 2.4 Safety precautions for the operator

Existing regulations for the prevention of accidents must be followed.

Dangers caused by electrical energy are to be excluded. Local or general rules issued by the IDE, VDE, etc. as well as the local electricity supply companies are to be observed.

### 2.5 Safety information for inspection and assembly

The user must ensure that all inspection and installation works are carried out by authorised and qualified specialists who have carefully studied these instructions.

Works on the pump or installation should only be carried out when the machine has stopped and is fully isolated.

### 2.6 Unauthorised modification and manufacture of spare parts

Alterations to the pump or installation may only be carried out with prior manufacturer's consent. The use of original spare parts and accessories authorised by the manufacturer will ensure safety. The use of other spare parts may invalidate claims invoking the liability of BOSS™ for any consequences.

### 2.7 Unauthorised operating methods

The operating safety of the pump or installation supplied can only be guaranteed if it is used in accordance with chapter 4 of the operating instruction. The limiting values given in the catalogue or data sheet must neither be exceeded nor allowed to fall below those specified.

## 3. Transport and storage

The booster is supplied on a pallet and is film





wrapped to protect it against moisture and dust.

- The equipment must be transported by means of authorised load devices
- Transport straps must be placed around the steel base frame
- The manifolds will not withstand loads and should not be used to secure loads in transit

**Attention!** Loading pipes in transit can result in leaks.

When the product is delivered, check for any damage in transit. If any defect is found, inform your BSS agent.

#### Attention!

If the product is installed later on, store it in a dry place. Protect it from impacts and any outside influences (moisture, frost, etc.)

Handle product with care.

## 4. Application

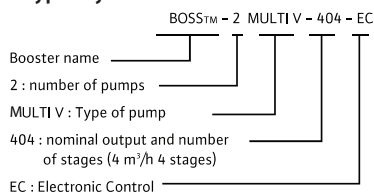
The booster is designed for boosting and maintaining the pressure when the water supply network is not sufficient for required use. It is used for water supply in high-rise apartments, offices and industrial buildings. Non-aggressive clear fluids (potable water, water containing glycol...).

A control box is used to control, monitor and protect the boosting system.

The booster is supplied from a collection tank.

## 5. Product data

### 5.1 Type key



### 5.2 Technical data

- Maximum operating pressure: 8 bars
- Maximum ambient temp.: 0 to +40°C
- Maximum water temp.: +40°C
- Single-phase supply voltage: 230V (±10%)50Hz
- Nominal current: see type plate

### 5.3 Scope of delivery

- Booster
- Installation and operating instruction of the booster

### 5.4 Accessories

#### Included:

- Diaphragm pressure tank (supplied loose on single pump sets)
- Stainless steel endcaps (2 pump units only)

#### As option:

- Flexible connection
- Booster set manifold isolating valves
- Float switch for low water protection
- CAVSA Anti Vacuum Valve

## 6. Description and operation

### 6.1 General Description

The booster is a compact installation. Multi pump sets come piped-up and ready to connect whereas single pump sets require some simple assembly. The relevant instructions or standards must be observed for the connection to the public water supply mains. Regulations from the water companies must be included when appropriate.

### 6.2 Product description

#### 6.2.1 Control box (2 pump sets only)

- Ensure complete automatic operation of the booster
- Tightness, protection class IP55
- External safety and starting switch of the booster.
- Complete with Volt Free Connections

#### Inside (Fig.2)

Main switch with power supply connection terminals. Miniature circuit-breaker



#### 6.2.2 Description of the Electronic Control (Fig.3)

1. Cable gland of the Electronic Control power supply
2. Cable gland of the pump power supply
3. Cable gland of the dry running protection
4. Cable gland of the series connection (as option)
5. Suction
6. Discharge
7. Unit interface





### 6.2.3 Description of the user interface (Fig.4)

|  |                             |  |            |   |
|--|-----------------------------|--|------------|---|
|  | Manual operating            |  | Green led  | ElectronicControl<br>ON                       |
|  | Operating mode<br>Hand/Auto |  | Red led    | Blinking : current error<br>Fix : final error |
|  | Menu                        |  | Yellow led | Pump is working                               |
|  | Enter                       |  | Green led  | ON : Automatic mode<br>OFF : Manual mode      |
|  | Value setting up            |  |            |   |
|  | Value setting down          |  |            |   |

### 6.2.4 Description of the electronic board (Fig.5)

1. Input terminal of the Electronic Control
2. Input terminal of the motor
3. Protection fuse of the Electronic Control input (I: 20A, type: gG, U: 500Vac, breaking capacity I1: 120kA, size 10 x 38mm)
4. Protection fuse of the motor input (I: 20A, type: high speed, U: 690Vac, breaking capacity I1: 100kA, size: 10 x 38mm)

The Electronic Control protects the pump against:

- Dry running
- Over currents
- Too high water temperatures
- Frost
- Short circuits
- Over voltages
- Under voltages

### 6.2.5 Diameter of the manifolds

BOSS 1 Multi V series : threaded valves 1¼" BSP  
BOSS 2 Multi V series : threaded manifolds 2" BSP

In case of defect (such as dry running, over voltage...), the RED LED flashes and the Electronic Control will try to start the pump regularly. After many trials the Electronic Control stops and the RED LED is ON and does not flash anymore.

## 6.3 Product function

### 6.3.1 Operating

The automation of system is ensured by Electronic Control. 1 pump is set to Master for the other. Electronic Control contains an electronic regulation system using pressure and flow sensors and a frequency inverter.

The electronic regulation system maintains a constant pressure in the network whatever the flow is and to minimise the power consumption of the installation (automatic mode). The pressure will be constant according to the set point pressure originally preset.

In hand mode the pump can be tested at maximum speed.

In automatic mode the Electronic Control starts the pump when the installation pressure (NET P) is lower than the set point pressure (P SET) minus the pressure gap set (START DELTA P). The Electronic Control stops after a time period set (TIME BEFORE STOP) when the installation pressure (NET P) has reached the set point pressure (P SET) and when the flow is zero.

### 6.3.3 Electronic Control Setting

After connection to the pump and to the power supply, the Electronic Control will show the model type and the version for 10 seconds. Then it shows the STANDARD display mode. Then the Electronic Control has to be set in accordance to the pump characteristics and to the requirement of the installation, in order to warranty a safe and efficient operation.

Press the MENU button for 3 seconds to set the Electronic Control. The user can navigate in both menu levels, SETTINGS or HISTORIC:

#### SETTINGS:


This level allows the setting of the Electronic Control according to the installation and the pump.

#### HISTORIC:

This level displays the various counts and alarms recorded.




To select a menu level, use the VALUE SETTING UP and VALUE SETTING DOWN buttons. With the ENTER button the new value selected is validated and the next menu is displayed on the screen. With the ENTER button you can exit the SETTINGS (no saving of the last change) or HISTORIC menu and go back to STANDARD display mode (or SERVICE)

 NOTE: the data is saved in a non-volatile memory allowing to save the data even after switching off.





### 6.3.3 Setting menu

| Display                       |                   | Menu Level 1 | Menu Level 2               | Description   |
|-------------------------------|-------------------|--------------|----------------------------|---|
| NET P<br>02.0 bar             | P SET<br>02.0 bar |              |                            | Display in STANDARD mode  |
| F<br>Q<br>50                  | PREF<br>02.0      | PRES<br>02.0 | 1                          | Display in SERVICE mode   |
| MENU                          |                   | SETTINGS     |                            |   |
| LANGUAGE<br>ENGLISH           |                   |              | LANGUAGE                   | Language setting  |
| I MAX PUMP<br>OFF             |                   |              | I MAX PUMP                 | Nominal current setting as mentioned on the identification plate of the pump.   |
| ROTATION SENSE<br>0 HZ        |                   |              | ROTATION SENSE             | Setting of the rotation sense. See the pump identification plate. Push on  to start the pump (at 30hz) and check the rotation sense. |
| MIN SPEED<br>30 HZ            |                   |              | MIN SPEED                  | Define the minimum motor rotation speed.  |
| DRY RUN PROT<br>NO            |                   |              | DRY RUN PROT               | If the installation is provided with a level switch (flow switch or other ones) change No by Yes.   |
| PRESSURE SETTING<br>2.0 BAR   |                   |              | PRESSURE SETTING           | Working pressure setting in the installation.   |
| START DELTA P<br>0.3 BAR      |                   |              | START DELTA P              | Define the starting pressure as: starting pressure = setpoint pressure – start delta P  |
| TIME BEFORE STOP<br>5 S       |                   |              | TIME BEFORE STOP           | Time setting before pump stop when there is no flow.  |
| STANDARD<br>DISPLAY           |                   |              | DISPLAY                    | Define the display mode:<br>– STANDARD: pressure setting (bar) + network pressure (bar)<br>– SERVICE: rotation frequency (Hz) + pressure setting (bar) + network pressure (bar) + flow switch detection (1 or 0)      |
|                               |                   | HISTORIC     |                            |   |
| RUNNING TIME<br>HOURS 26h     |                   |              | RUNNING TIME               | Total pump running hours (H).   |
| PUMP CYCLES<br>30             |                   |              | PUMP CYCLES                | Total number of pump cycles, one cycle includes one start and one stop.   |
| POWER ON<br>30                |                   |              | POWER ON                   | Number of ElectronicControl switching on.   |
| MAX PRESSURE<br>0.0 bar       |                   |              | MAX PRESSURE               | Storage of the maximum pressure reached in the installation (bar).  |
| ALARM COUNT<br>SHT CIRCUIT 15 |                   |              | ALARM COUNT<br>SHT CIRCUIT | Total number of short circuits.   |
| ALARM COUNT<br>OV CURRENT 10  |                   |              | ALARM COUNT<br>OV CURRENT  | Total number of overcurrents.   |
| ALARM COUNT<br>OVERT T° 5     |                   |              | ALARM COUNT<br>OVERT T°    | Total number of exceeding temperatures.   |
| ALARM COUNT<br>DRY RUN 6      |                   |              | ALARM COUNT<br>DRY RUN     | Number of dry running.  |







### 6.3.4 Manual mode

You can access this mode via the OPERATING MODE HAND/AUTO button

The pump starts at maximum frequency. When releasing it the pump slows down to a complete stop.

### 6.3.5 Automatic mode

This mode allows the automatic setting of the pressure whatever the flow is. You can access this mode by pushing the OPERATING MODE HAND/AUTO button. The GREEN LED is on.

### 6.3.6 Fault contact

Individual pump volt free. Terminals com, n/c & n/o found in the "mains box" can be used for an external fault signal, rated at 230V 1A for each individual pump. The contact closes if one of the alarms is activated.

## 7. Installation

### 7.1 Local

Install the booster in a room that provides an easy access, well ventilated and frost-proof environment. Be sure that the dimension of the technical room door is adequate to enter a booster. Adequate space must be provided for maintenance work. An easy access to the installation shall be ensured from at least two sides.

### 7.2 Hydraulic connection



**ATTENTION!** Observe the requirements from the water supply companies and the local rule in force.

- The connection of the suction and delivery manifolds can be made either on the right or left hand sides of the installation. It is recommended to close the ports that are not used with thread caps.
- Valves must be fitted on the manifolds to easily separate the booster if need be.
- The installation must be fitted with the supplied diaphragm pressure tank to be assembled on the delivery manifold.
- The existing pipes must be installed free from stresses. Flexible connecting pipes are recommended for this purpose in order to avoid stresses on the pipe connections and minimise the transmission of vibrations to the building installation.

### 7.3 Electrical connection

**WARNING!** The electrical connection must be performed according to the local regulations by an electrical installation engineer approved by the local authority.



To make the electrical connection, the corresponding installation and operating instructions and attached electrical circuit diagrams must be observed. General points to be considered are listed below: (Fig.8, Fig.9)

- the type of current and voltage of the mains connection must comply with the data on the type plate and the circuit diagram of the control unit.
- as protection measure, the booster must be earthed according to the regulations (i.e according to the local regulations and circumstances); the connections intended for this purpose are identified accordingly (see circuit diagram)

### Power supply cable

The electric supply cable shall be correctly dimensioned according to the total booster power (see type plate).

Connecting the control box to a voltage different from the one mentioned is not possible (see chapter 5.2 Technical data)

NOTE: for further details, an electric diagram is available inside the control box.



### Lack of water protection

An input ON/OFF (250v 2A) (Fig.6) protects the booster against lack of water, a pressure switch (Normally open) or a float switch shall be connected to this input.

NOTE: If low water protection is required, in addition to the electro controllers inbuilt dry-run protection. Use of a float switch or pressure switch would prevent any air being pulled through the set due to low water in tank



**ATTENTION!** Do not apply external voltage to the terminals.





## 8. Commissioning



**ATTENTION!** Never let the booster run as dry over a few seconds. Dry running may damage the mechanical seal.

Before switching on for the first time, check that the customer's wiring has been done correctly, particularly the earthing.



**ATTENTION!** Tighten all the supply terminals before starting the booster.

When switching on the Electrical Control immediately carries out a diagnosis that lasts 10 seconds and will display the model type and software version. The RED LED is on.

In case of a pump at suction, the priming of the pump shall be done manually (manual mode). During the priming step (see operating instruction of the pump) it may drive the pump at its maximum speed.

As soon as the pump is priming on, the Electronic Control can be switched to Automatic mode.



### 8.1 Filling - Cleaning

**Connection to public water supply or on load to a tank**

- Check the water supply origin (adequate water level in the tank).
- Open the booster supply valve to get water inside.
- Open the filling plugs (See O&M for pumps) of the pumps and wait as long as water is getting inside before closing them again.
- Keep the switch on "HAND" to check priming. If need be test the pumps one after the other.

### 8.2 Motor sense of rotation

The electric connection of the pumps to the control box is performed in the factory.

### 8.3 Setting description

Float switch for connection to a tank  
Set the float switch in order to keep a minimum water level about 40cm over the booster inlet port.

Be sure the electric connection is correct by activating the float switch by hand to generate a dry running fault.

### 8.4 Start

The maximum operating pressure in the installation is equal to the pressure at zero flow of the pumps plus the water supply pressure at the booster inlet if need be.

On the Electronic Control position the button of the pumps on "AUTO".

The control box now ensures the automatic operating of the booster.

**ATTENTION!** Do not let the pump operate with delivery valve closed.



## 9. Maintenance

- No particular maintenance is recommended for the booster when operating.
- Motor bearings are greased for life-time
- No maintenance for the mechanical seal when operating.
- In long period of frost and stop of the pump, it is recommended to drain the pump by screwing off the bottom plug.

**ATTENTION!** Fill the pump before any new start.





## 10. Faults and remedies

| Faults                                   | Causes   | Remedies  |
|--|--|---|
| One or two pumps fail to prime           | Air leak at suction  | Check tightness of all suction pipe connections.<br>Check if the tank suction strainer is covered with water  |
|  | Foot-valve strainer not tight or obstructed                      | Check tightness of the valve, replace it if necessary   |
|  | Large losses of head at suction                                  | Calculate the losses of head and make sure they are compatible with the pump NSPH   |
|  | Public water pressure too low or zero                            | If it recurs, it is recommended to use a tank   |
|  | Suction head too high  | Be sure that the minimum water level of the tank is compatible with the NPSH of the pumps   |
|  | Suction piping obstructed or valve on suction manifold closed    | Check valve opening and clean the piping if necessary   |
| One pump fails to run                    | Thermal relay tripped  | The pump "fault" indicator on the control box must be lit. Check the setting of the current   |
|  | Magnetic circuit breaker tripped                                 | Switch it again. If tripping recurs, check the output current of the motor concerned. If this current is much higher than the one mentioned on the motor type plate, the circuit breaker is defective and shall be replaced |
|  | Pump shaft blocked   | Switch off the electric supply of the control box and then check the shaft turns freely. If it is blocked, dismantle the pump   |
|  | Winding fault  | Disconnect the terminal block of the motor concerned. Check the network at the terminals and the stator insulation. Replace the motor if necessary  |
| No delivery pressure                     | Flow higher than booster capabilities                            | Plan to replace the booster by a more adequate one (do not forget to contact us in any case)  |
|  | One or two pumps not primed                                      | Check that the suction strainer does not let air in or the tank filling point is too close from the strainer  |
|  | Public water pressure lower than the minimum pressure planned    | Contact the public water supply company or replace the booster.<br>Contact us   |
|  | A pump is obstructed by particles                                | Have the pump dismantled and cleaned  |
|  | Voltage of the motors too low                                    | Check the voltage on motor terminals  |
| Voltage of the motors too low            | Check the voltage on motor terminals                             | Reset it  |
|  | Installation capacity too low                                    | Add a tank  |
|  | No air inside the tank   | Pressurize the tank or replace the bladder  |
| Tripping frequency of dry running safety | Setting of dry running pressure switch too high                  | Set the pressure switch correctly   |
|  | Drop of the public water supply pressure when starting the pumps | Set the dry running pressure switch to the minimum value. If it recurs, the public water mains is inadequate, check the pressure with the pressure gauge when starting the pumps or contact the public water mains service  |
| Operating automatism device defective    | Wires disconnected   | Check all connections to the terminal block of the control box  |



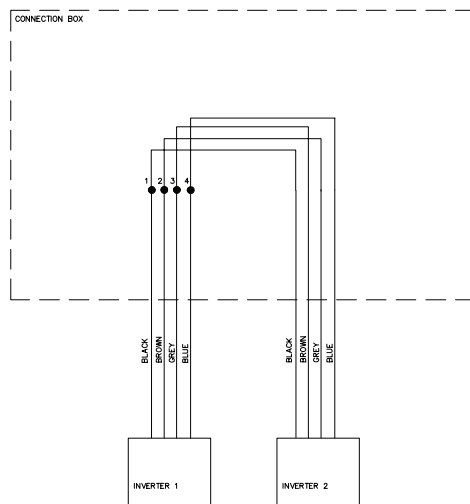


| Fault                    | Controller behaviour  | Remedies  |
|--------------------------|---|---|
| E011<br>DRY RUN          | The controller starts the pump every 30 minutes over 24 hours. If dry running remains, it switches off the pump.            | Check the hydraulic supply.<br><br>If a set point pressure higher than the pressure the pump can deliver is programmed, the controller will consider it as dry running. |
| E021<br>OVERLOAD         | After the alarm detection the controller will try 4 times to start the pump. After these 4 trials the pump is switched off. | Check that the rotor is not locked.<br>Check the input data in the controller.<br>Check the state of the fuses..  |
| E025<br>DISCONNECT MOTOR | Motor supply stop   | Check the motor winding.<br>Check the supply cables.<br>Check the state of the 20A fuses (Fig. 4, Pos. 4).  |
| E040<br>P SENSOR DEFECT  | The controller stops.Q  | Contact the technical service department:   |
| E031<br>OVER T°          | If the temperature is too high, the controller stops and then the pump.   | Check that the water temperature does not exceed 40°C.<br>Check that the ambient temperature does not exceed 50°C.  |
| E023<br>SHT CIRCUIT      | After the alarm detection the controller will try 4 times to start the pump. After these 4 trials the pump is switched off. | Check the motor.<br>If the problem remains, contact the manufacturer.   |
| E071<br>EEPROM           | If the controller detects a defect on its internal memory this error will be displayed.                                     | Contact the technical service department:   |
| E005<br>HIGH VOLTAGE     | If the controller detects an overvoltage, it stops over some seconds and then starts again.                                 | Check the controller supply voltage.  |
| E004<br>LOW VOLTAGE      | If the controller detects an under voltage, it stops over some seconds and then starts again.                               | Check the controller supply voltage.  |
| [WHITE SCREEN]           |   | Check the controller supply voltage.<br>Check the 20A fuses (Fig. 4, Pos. 3).   |

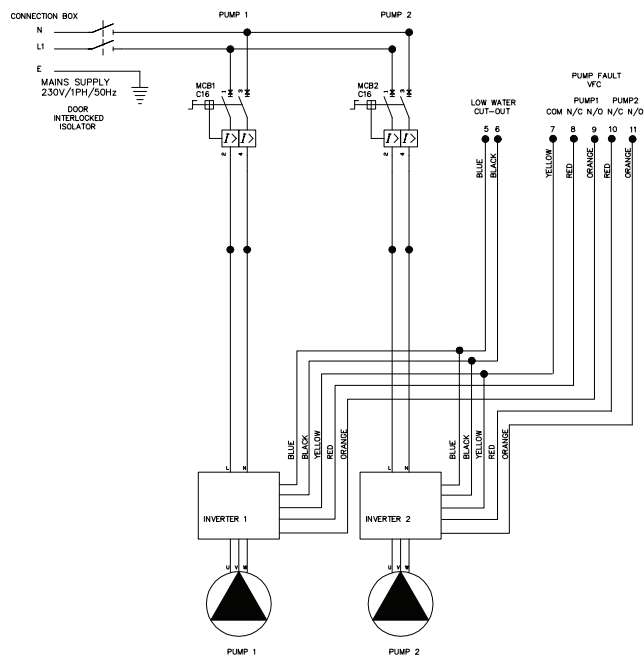




Wiring Diagrams (Fig.8)

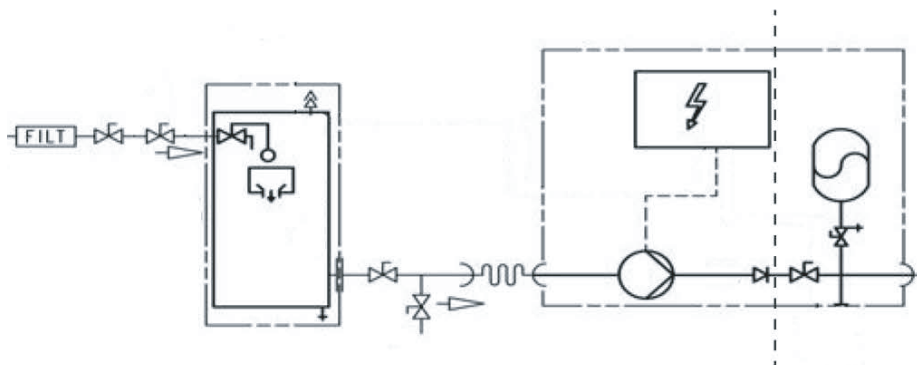


(Fig.9)

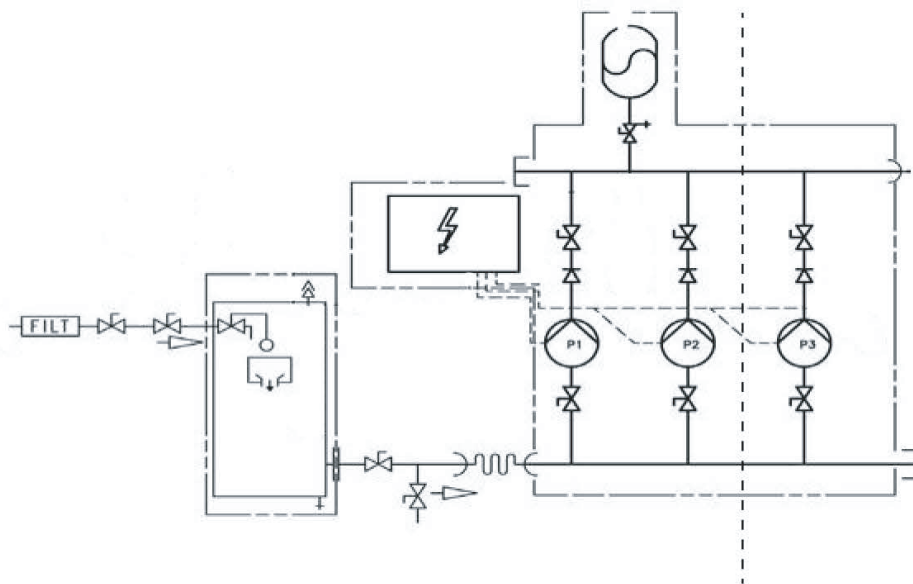




Typical Single Pump Booster Schematic (Fig. 10)



Typical 2/3 Pump Booster Schematic (Fig. 11)





## 11. Spare parts

All spare parts must be ordered through BSS Customer Services.

In order to avoid any mistakes, please specify the name plate data for orders.

Spare parts catalogue is available at [www.bss.co.uk](http://www.bss.co.uk)

**Subject to technical alterations!**





**BOSS™**

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