

## BOSS™ 1-3HELIX V....

### EN Installation and operating instructions

80460601	BOSS 1HELIX V406
80460612	BOSS 1HELIX V408
80460623	BOSS 1HELIX V605
80460634	BOSS 1HELIX V608
80460645	BOSS 1HELIX V1004
80460656	BOSS 1HELIX V1006
80460667	BOSS 2HELIX V406
80460678	BOSS 2HELIX V408
80460689	BOSS 2HELIX V605
80460708	BOSS 2HELIX V608
80460719	BOSS 2HELIX V1004
80460730	BOSS 2HELIX V1006
80460741	BOSS 3HELIX V406
80460752	BOSS 3HELIX V408
80460763	BOSS 3HELIX V605
80460774	BOSS 3HELIX V608
80460785	BOSS 3HELIX V1004
80460796	BOSS 3HELIX V1006

	<b>Page</b>
<b>1) General</b>	3
<b>2) Safety Instructions</b>	
2.1 Symbols and Signals	3
2.2 Risks Incurred by Failure to Comply	3
2.3 Operator Safety Precautions	3
2.4 Inspection and assembly	3
2.5 Modification and Spare Parts	3
2.6 Unauthorised Operation	3
<b>3) Transport and Storage</b>	
3.1 Storage	3
3.2 Transport	4
<b>4) Description and Operation</b>	
4.1 Description of the control Device	4
4.2 Operation Modes	4
4.2.1 Automatic Mode (1 & 2 pump only)	4
4.2.2 Manual Mode (1 & 2 pump only)	4
4.2.3 Automatic Mode (3 pump only)	4
4.2.4 Manual Mode (3 pump only)	4
4.3 Operating Features	4
4.3.1 Fault Contacts	4
4.3.2 Low Water Cut Protection	4
4.3.3 Dry Run Protection	5
4.3.4 Master Slave Function (2 & 3 pump only)	5
<b>5) Installation</b>	
5.1 Local	5
5.2 Hydraulic Connections	5
5.3 Electrical Connections	5
<b>6) Commissioning</b>	
6.1 Commissioning	5
6.2 Maintenance	5
<b>7) Warranty</b>	5
<b>8) Figures</b>	
Figure 1 Control Box (2 and 3 pump only)	6
Figure 2 Electronic Control Drive	6
Figure 3 Speedcentre	7
Figure 4 Pump Schematics	7
Figure 5.1 Wiring Schematic (1 pump)	8
Figure 5.2 Wiring Schematic (2 pump)	9
Figure 5.3 Wiring Schematic (3 pump)	10
<b>9) Tables</b>	
Table 1 Setting Menu (Drives)	11
Table 2 Setting Menu (Speedcentre)	11
Table 3 Drive Fault Codes and Troubleshooting	12
Table 4 Booster Troubleshooting	13
Table 5 Booster Maximum Current (I max)	13
<b>10) Spares Parts</b>	14

## 1 General

The BOSS™ booster set is an automated pressure boosting systems. Consisting of 1 to 3 vertical pumps with in-line water cooled inverters with integrated flow and pressure sensors, in conjunction with a Speedcentre control box.



NOTE – Speedcentre only in use on 3 pump version

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



ATTENTION - Installation and commissioning by qualified personnel only!

## 2 Safety

Any works carried out on the BOSS™ booster sets must be completed by a qualified person. Failure to comply to any of the information in this manual may cause potential hazards to people and the environment and may void warranty. 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" section and those in subsequent sections indicated by danger symbols should be carefully observed.

### 2.1 Symbols and Signals

General symbols:



**DANGER!** Extremely dangerous situation. The non-observation 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.



NOTE: Useful remark for product handling. Any possible difficulty is mentioned.

### 2.2 Risks Incurred by Failure to Comply

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 bacterial influences
- Material damages

### 2.3 Operator Safety Precautions

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.

### 2.4 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 shall only be carried out when the machine has stopped and is fully isolated.

### 2.5 Modification and Spare Parts

Modifications to the booster set are prohibited and will void the warranty. Manufacturer authorised spare parts must be used otherwise warranty may be void. The use of other spare parts may invalidate claims revoking the liability of BOSS™ for any consequences.

### 2.6 Unauthorised Operation

The operating safety of the pump or installation supplied can only be guaranteed if it is used in accordance with the operating manual. The limiting values given in the catalogue or data sheet must not be exceeded nor allowed to fall below those specified.

## 3 Transport and Storage

### 3.1 Storage

Booster sets must always be transported by pallet and moved with appropriate lifting equipment. Sets must be stored in a dry environment between -5 °C to +55 °C.

ATTENTION! If the product is to be installed at a later date, store it in a dry place. Protect it from impacts and any outside influences (moisture, frost, etc.) Handle product with care.



### 3.2 Transport

The booster must be transported on a pallet and film wrapped to protect it against moisture and dust. When the product is delivered, check for any damage in transit. If any defect is found, inform your BSS agent within 72 hours.

- 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

## 4 Description and Operation

### 4.1 Description of Control Device

The automation of the system is ensured by the Electronic Control. Electronic Control contains an electronic regulation system using pressure and flow sensors and a frequency inverter. 3 pump sets also use a Speedcentre control panel in conjunction with the inverters.

### 4.2 Operation Modes

#### 4.2.1 Automatic Mode (1 & 2 Pump Only)

You can access this mode by pressing the Operating Mode Auto button (Table 1) on the drive - see NOTE below. In automatic mode the Electronic Control maintains a constant pressure in the system by varying the speed of the pumps to meet the demand. The pressure will be constant according to the pre-determined pressure set point. 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.



NOTE - AUTO Button only needs to be pressed on pump one. If a second drive is present then they will communicate between the two drives. The master pump will have a solid green light and the slave pump will have a flashing green light

#### 4.2.2 Manual Mode (1 & 2 Pump Only)

You can access this mode by holding down the Manual Operating button (Table 1) on the drive. The pump starts at maximum frequency. When released the pump slows down to a complete stop.

### 4.2.3 Automatic Mode (3 Pump Only)

All controls and settings on a 3 pump set are done via the Speedcentre controller (Fig.3) and are communicated to the drives. Settings can be entered into the Speedcentre from the main screen by pressing the menu button (Table 3.). To start automatic mode press the Auto button this will do a search for the pumps then initiate automatic mode. The Speedcentre starts the pump when the installation pressure is lower than the set point pressure minus the pressure gap set. The Speedcentre stops after a time period set when the installation pressure has reached the set point pressure and when the flow is zero.

DANGER! If power is lost during automatic mode and pressure in the system drops, on return of the power the pumps will run to meet system pressure. To avoid hammer effect in the system BSS recommend you install a BOSS Cava Valve Product Code: 80470075



#### 4.2.4 Manual Mode (3 Pump Only)

You can access this mode by pressing the OK button (Fig.2) on the Speedcentre this will do a search for the pumps then you will be able to select each pump manually. Select a pump by pressing OK and that pump will run at full speed until OK is pressed again to stop the pumps.

NOTE – Only one pump at a time can be run in manual mode



## 4.3 Operating Features

### 4.3.1 Fault Contacts

Terminals for individual pump volt free contacts found in the “mains box” (Fig.1). Normally open and normally closed contact per pump can be used for an external fault signal and are rated at 230V 1A. The contacts change state if any alarm is activated.

NOTE – Speed centre also has one set of N/O and N/C volt free contacts 230V 1A(3 pump set only)



### 4.3.2 Low Water Protection

Terminals for the low water cut out switch can be found in the “mains box” (Fig.1). An 18v DC input protects the booster against lack of water via either a pressure switch or a float switch (not supplied) and will activate within 3 seconds of the switch operating. This can be turned off from the within the drive menu.

WARNING! Low water protection terminals linked out as factory standard. Do not apply external voltage to the terminals.



### 4.3.3 Dry Run Protection

If air is present in the pumps after a set time the internal dry run protection will operate. Once operated the controller will automatically try to restart every 30 minutes over a 24 hour period. If the problem still exists, the pump will be switched off.



NOTE – This is protection for the mechanical seal of the pumps if air has already entered the system. We recommend that a low water cut out switch is used to prevent this from happening.

### 4.3.4 Master/Slave Function (2 & 3 pump only)

Drives will automatically cycle the master slave pumps. This will occur once the set has been running and the master pump comes to a complete stop.

## 5 Installation

### 5.1 Location

Install the booster in a room that provides easy access, is well ventilated and a frost free environment. Adequate space must be provided for maintenance work. Easy access to the installation shall be ensured from at least two sides.

### 5.2 Hydraulic Connections

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 provided. Valves must be fitted on the manifolds to easily isolate the booster if need be. The booster must be fitted with the supplied diaphragm pressure tank to be fitted on the discharge 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.



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

### 5.3 Electrical Connections

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.5)

- The incoming mains connection must comply with local regulations.
- As a 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)

DANGER! The electrical connection must be performed according to the local regulations by a qualified electrical engineer approved by the local authority



## 6 Commissioning

### 6.1 Commissioning

We recommend that you have the system commissioned by BOSS™ customer service before switching it on for the first time. Unit must only be placed into operation once installation has been confirmed as correct, pumps vented and all settings including expansion vessel pre charge has been checked. The onsite wiring must be checked before initial commissioning, the pumps and the pipe system must be flushed completely, filled and bled, if necessary. For BSS commissioning contact BSS aftersales on Email: [aftersales@bssgroup.com](mailto:aftersales@bssgroup.com) Ph: 0870 8503886.

DANGER! Risk of fatal injury! Tighten all connection terminals prior to commissioning!



### 6.2 Maintenance

The pump bearings are maintenance free. To guarantee maximum operating safety at the lowest possible operating costs, we recommend taking out a maintenance contract. The gas pressure in the diaphragm pressure vessel is to be checked every 6 months

ATTENTION! Any maintenance must be completed by a trained and competent person. Any damage to the booster could void warranty if this is not adhered to.



Note – Lockable control panel isolator and lockable ball valves must be used in conjunction with safe lock out tag out practices to ensure safe maintenance procedures are adhered to



## 7 Warranty

For any questions regarding warranty terms or claims please contact BSS Aftersales

Email: [aftersales@bssgroup.com](mailto:aftersales@bssgroup.com) Ph: 0870 8503886

8) Figures

Fig. 1 - Control box (2 and 3 pump only)

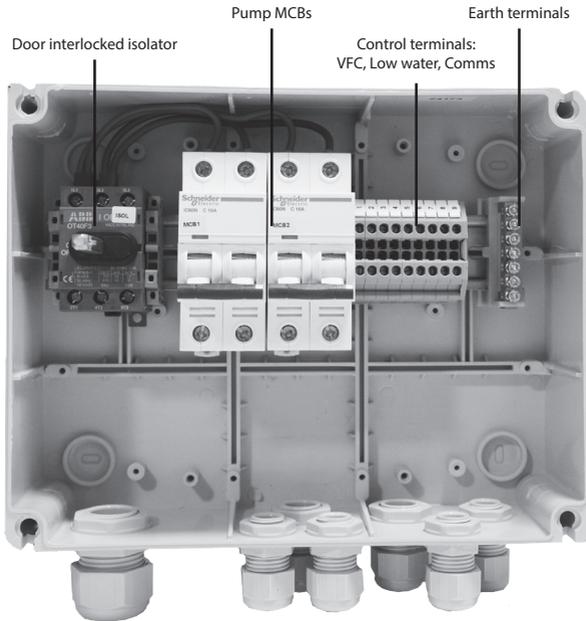
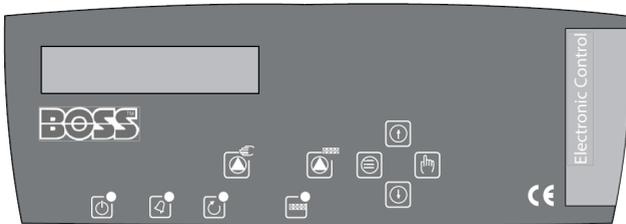


Fig. 2 - Electronic Control Drive



- |   |                  |   |                        |              |
|---|------------------|---|------------------------|--------------|
|  | Manual Mode      |  | Inverter On            | (Green LED)  |
|  | Automatic Mode   |  | Alarm                  | (Red LED)    |
|  | Menu             |  | Pump Running           | (Yellow LED) |
|  | Enter            |  | Pump in Automatic Mode | (Green LED)  |
|  | Value Setting Up |  | Value Setting Down     |              |

Fig. 3 - Speedcentre (3 pump only)



Fig. 4 - Pump Schematics

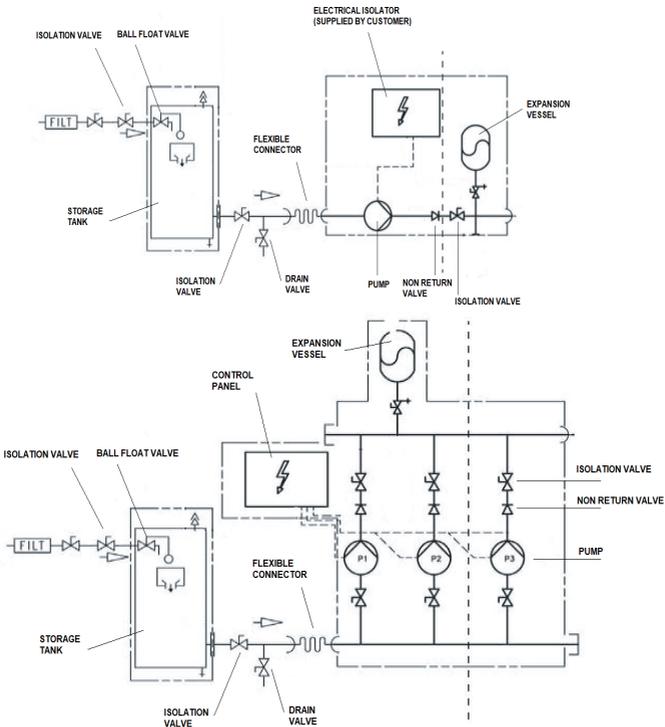


Fig. 5.1 - Wiring Schematics - 1 Pump System

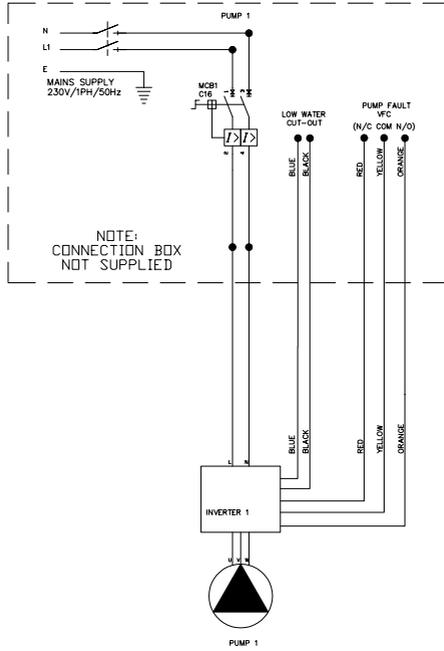


Fig. 5.2 - Wiring Schematics - 2 Pump System

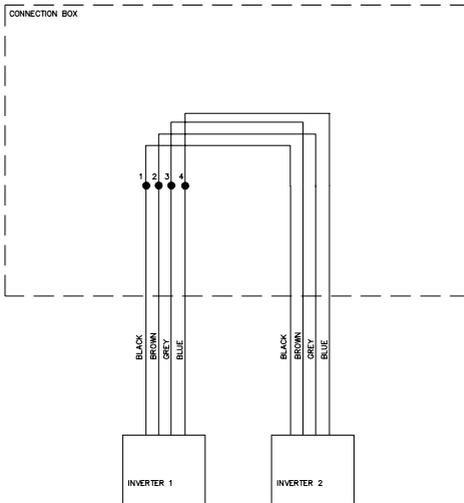
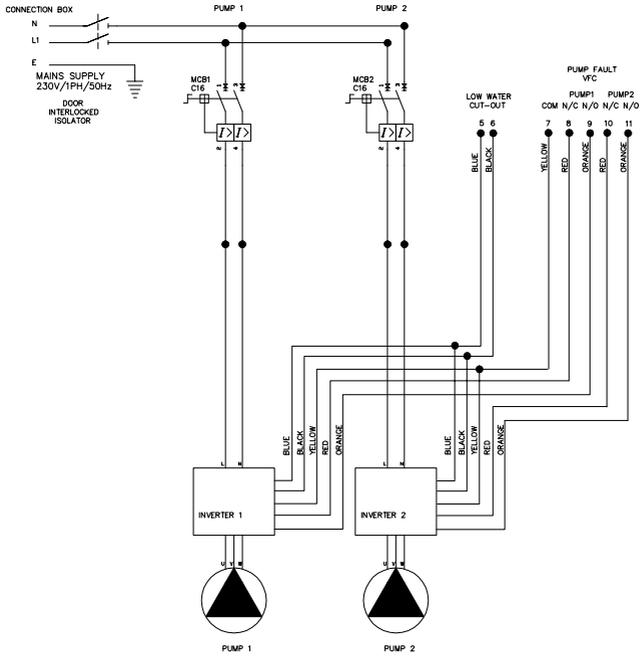


Fig. 5.3 - Wiring Schematics - 3 Pump System

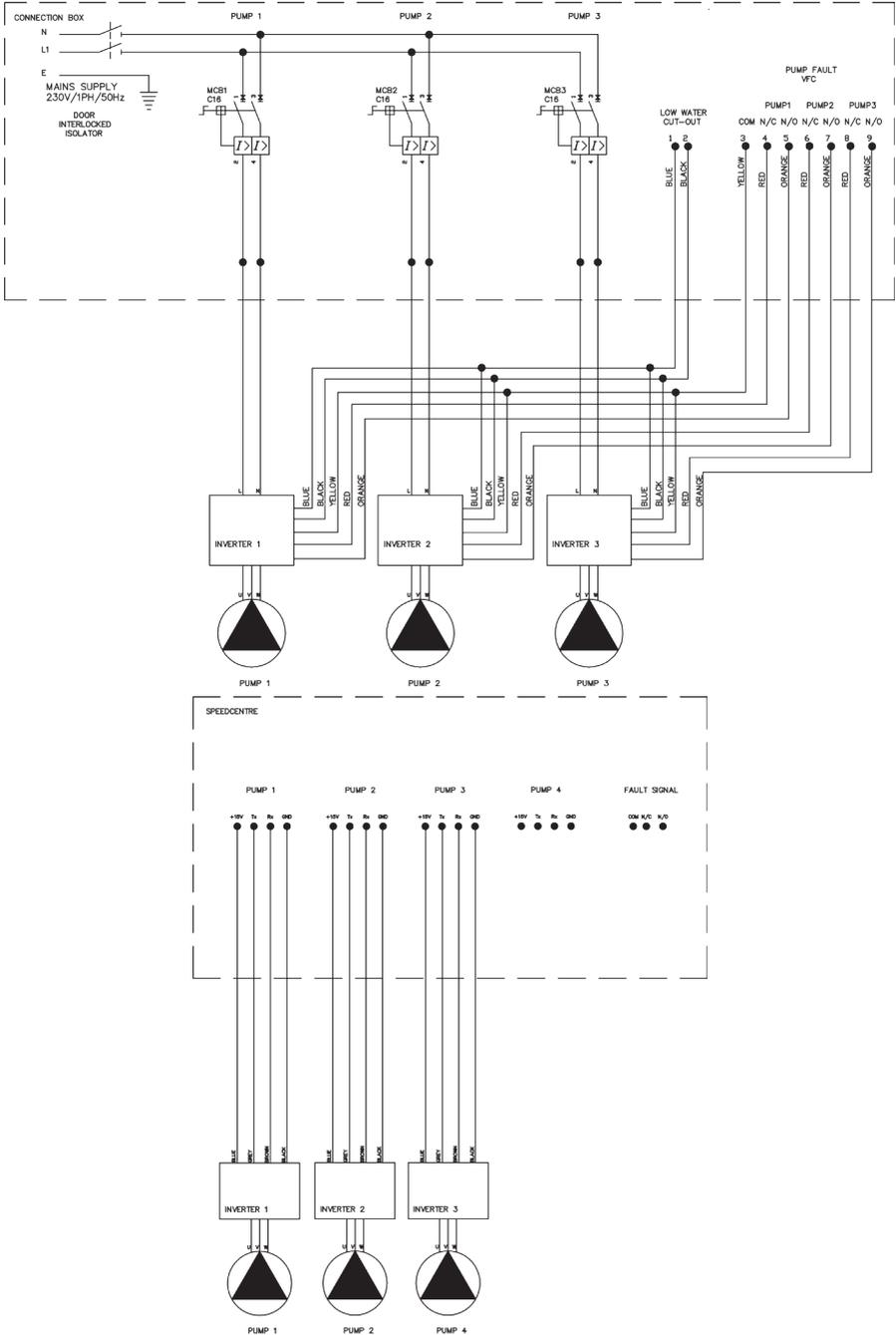


Table 1 - Settings Menu (Hold down menu button to access)

MENU	SETTINGS	FACTORY	UNIT
Language	Language select	English	
I max	Set the maximum current rating of the pumps	*	Amps
Rotation Sense	Change the rotation of the motors	Clockwise	
Min Speed	Minimum running speed of the motor	15	Hz
Dry Run Prot	Turn on or off the dry running protection	Yes	
Pressure Setting	System pressure that you want the booster to achieve	**	Bar
Start Delta	Difference in pressure before the pumps start	0.3	Bar
Time Before Stop	Time the pumps will run once the pressure has been reached at no flow	15	Sec
MENU	HISTORIC		
Running Time	Total pump running hours		Hrs
Pump Cycles	Total number of pump cycles (one cycle = one run and stop)		
Power On	Number of times the drive has been powered on		
Max Pressure	Maximum pressure of the installation		Bar
Short Circuit	Total number of short circuit alarms		
Over Current	Total number over current alarms		
Over Temp.	Total number of over temperature alarms		
Dry Run	Total number of dry run alarms		

\*Dependant on motor size

\*\* Dependant on booster type (see test sheet)

Table 2 - Settings Menu Speedcentre (Press MENU button to access menu)

MENU	SETTINGS
	System Pressure Set Point
	System Stop Timer (once setpoint is reached)
	Start Delta

NOTE: Press ENTER to scroll through the MENU and UP & DOWN arrows to change values

Table 3 - Drive Fault Codes & Troubleshooting

ERROR CODE	BOOSTER BEHAVIOUR	TROUBLESHOOT
E011 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.  If a set point pressure higher than the pressure the pump can deliver is programmed, the controller will consider it as dry running.
E021 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 the state of the fuses..	Check that the rotor is not locked.  Check the input data in the controller
E025 DISCONNECT MOTOR	Motor will not start.	Check the motor winding.  Check the supply cables.  Check that the I <sub>max</sub> is not set to off in the menu (Table 2)
E040 P SENSOR DEFFECT	The controller stops.	Contact the technical service department.
E031 OVER T°	If the temperature is too high, the controller will stop the motor from running.	Check that the water temperature does not exceed 40°C.  Check that the ambient temperature does not exceed 50°C.
E023 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 connections and windings. If the problem remains contact the manufacturer.
E071 EEPROM	If the controller detects a defect on its internal memory this error will be displayed.	Contact the technical service department.
E005 HIGH VOLTAGE	If the controller detects an overvoltage, it stops over some seconds and then starts again.	Check the controller supply voltage.
E004 LOW VOLTAGE	If the controller detects an under voltage, it stops the pumps.	Check the controller supply voltage.
[WHITE SCREEN]	No function and nothing on the screen.	Check the controller supply voltage and circuit breakers in (Fig 1).  Check the 20A fuses

Table 4 - Booster Troubleshooting

SYMPTOM	CAUSES	TROUBLESHOOT
One pump fails to run	Suction piping obstructed or valve on suction manifold closed	Check valve opening and clean the piping if necessary
	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 is higher than the booster capability	Plan to replace the booster by a more adequate one (do not forget to contact us in any case)
	Pumps not primed	Check that the suction strainer does not let air in or the tank filling point is too close from the strainer
	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	Voltage to terminals too low.	Check the voltage on motor terminals,
Tripping frequency of dry running safety	Installation capacity too low	Increase tank size
	No air inside the vessel	Pressurize the tank or replace the bladder
	Setting of dry running pressure switch too high	Set the pressure switch correctly

Table 5 - Booster Maximum Current (I max)

1 PUMP SET		Max Current	2 PUMP SET		Max Current	3 PUMP SET		Max Current
BOSS 1HELIX V406	80460601	5.5 A	BOSS 2HELIX V406	80460667	10.0 A	BOSS 3HELIX V406	80460741	14.5 A
BOSS 1HELIX V408	80460612	6.7 A	BOSS 2HELIX V408	80460678	12.6 A	BOSS 3HELIX V408	80460752	18.1 A
BOSS 1HELIX V605	80460623	6.7 A	BOSS 2HELIX V605	80460689	12.6 A	BOSS 3HELIX V605	80460763	18.1 A
BOSS 1HELIX V608	80460634	9.9 A	BOSS 2HELIX V608	80460708	19.1 A	BOSS 3HELIX V608	80460774	29.3 A
BOSS 1HELIX V1004	80460645	9.2 A	BOSS 2HELIX V1004	80460719	17.8 A	BOSS 3HELIX V1004	80460785	26.3 A

## 10 Spare Parts

		BOSS Booster Art. No.																		
Spare part Art. No.	Part Description	80460601 BOSS 1Helix V406	80460612 BOSS 1Helix V408	80460623 BOSS 1Helix V605	80460634 BOSS 1Helix V608	80460645 BOSS 1Helix V1004	80460656 BOSS 1Helix V1006	80460667 BOSS 2Helix V406	80460678 BOSS 2Helix V408	80460689 BOSS 2Helix V605	80460708 BOSS 2Helix V608	80460719 BOSS 2Helix V1004	80460730 BOSS 2Helix V1006	80460741 BOSS 3Helix V406	80460752 BOSS 3Helix V408	80460763 BOSS 3Helix V605	80460774 BOSS 3Helix V608	80460785 BOSS 3Helix V1004	80460796 BOSS 3Helix V1006	
	Pumps																			
80460804	HELIX V406-1/16/E/S/400-50-RAL3000	●						●						●						
80460815	HELIX V408-1/16/E/S/400-50-RAL3000		●						●						●					
80460826	HELIX V605-1/16/E/S/400-50-RAL3000			●						●						●				
80460837	HELIX V608-1/16/E/S/400-50-RAL3000				●						●						●			
80460848	HELIX V1004-1/16/E/S/400-50-RAL3000					●						●						●		
80460859	HELIX V1006-1/16/E/S/400-50-RAL3000						●						●						●	
	Inverter																			
80460870	ACSON VST06A	●	●	●																
80460881	ACSON VST10A				●	●	●													
80460892	ACSON MASTER MT6A-F						●	●	●				●	●	●					
80460900	ACSON MASTER MT10A-F										●	●	●				●	●	●	
	Non-return Valve																			
80460911	1 1/2" NON RETURN VALVE HOUSING					●	●					●	●					●	●	
80460922	1 1/2" NON RETURN VALVE					●	●					●	●					●	●	
80460933	1 1/4" NON RETURN VALVE HOUSING			●	●				●	●					●	●				
80460944	1 1/4" NON RETURN VALVE			●	●				●	●					●	●				
	Expansion Vessel																			
80460955	XT8P EXPANSION VESSEL	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Control Panles																			
80460966	CONTROL PANEL - BOSS BOOST 2P							●	●	●	●	●	●							
80460977	CONTROL PANEL - BOSS BOOST 3P													●	●	●	●	●	●	
80460988	3 PUMP CONTROLLER SPEEDCENTRE													●	●	●	●	●	●	

For all spares orders or enquiries please contact BSS Pumps at

Email: pumps@bssgroup.com Ph: 0870 6092101



## EC - Declaration of conformity

Herewith, we declare that **Boss Helix Booster** of the series **BOSS 1-3Helix V40\***  
**BOSS 1-3Helix V60\***  
**BOSS 1-3Helix V100\***

(The serial number is marked on the product site plant)  
in its delivered state complies with the following relevant provisions:

<b>EC-Machinery Directive</b>	<b>2006 / 42 / EC</b>
<b>Low Voltage Directive</b>	<b>2014 / 35 / EU</b>
<b>Electromagnetic Compatibility Directive</b>	<b>2004 / 108 / EC</b>
<b>WEEE Directive</b>	<b>2012 / 19 / EU</b>
<b>ROHS Directive</b>	<b>2015 / 863 / EU</b>

*As well as following harmonized standards*

	<b>EN 809:1998 +A1:2009</b>
	<b>EN60204-1 +A1 2009</b>
	<b>EN61000-6-3:2007 +A1:2011</b>
	<b>EN61000-6-2:2005</b>

If the above mentioned series are technically modified without our approval, this declaration shall no longer be applicable

Authorized representative for the completion of the technical documentation:

**Lee Tebbatt**  
**Managing Director**  
**27<sup>th</sup> August 2019**

**WILO UK**  
**Centrum 100**  
**Second Avenue**  
**Burton-Upon-Trent**  
**DE14 2WJ**

**BOSS™**