



BIA-iPROTECT

Single-Phase Pump Control and Protection module PN 802697

Installation and Operation Manual



1. Introduction

Thank you for choosing a Bianco iCon iPROTECT Intelligent Pump Controller.

An iPROTECT provides significant protection for direct start (DOL), single phase pumps from 0.37kW – 2.2kW with PSC MOTORS (Permanent-Split Capacitor) with start and run windings). It also offers a number of control and operation modes to suit a variety of applications.

The controller is easy to set up with a push button calibration for over and under-load. The iPROTECT also allows for dry-run protection without float switches or probes.

The LCD screen displays the pump running state and provides the user a wealth of useful information.

The iPROTECT is particularly useful where there is the need to control and protect single pump installations managing the automatic operation by a variety of switching methods.



2. Contents

1. Introduction	2
2. Contents	2
3. Technical Specifications	3
4. Warnings and Cautions	3
4. Display	4
5. Operation and Programming - navigation.....	5
6. Program Parameters.....	6
7. Drainage Mode - Electrical Connections; floats or probes	8
8. Drainage Mode – Control via Pump Float	9
9. Drainage Mode – LCD running state images	9
10. Transfer Mode - Electrical Connections; floats or probes.....	10
11. Transfer Mode - LCD running state images.....	11
12. Boosting Mode - Electrical Connections; floats or probes	12
13. Boosting Mode - LCD running state images.....	13
14. Bore Pumps - Connecting 2 wire and 3 wire bore pumps.....	14
15. Communication link – RS485.....	15
16. Fault messages – possible causes and solutions.....	18
17. Warranties – Terms and Conditions	19

3. Technical Specifications

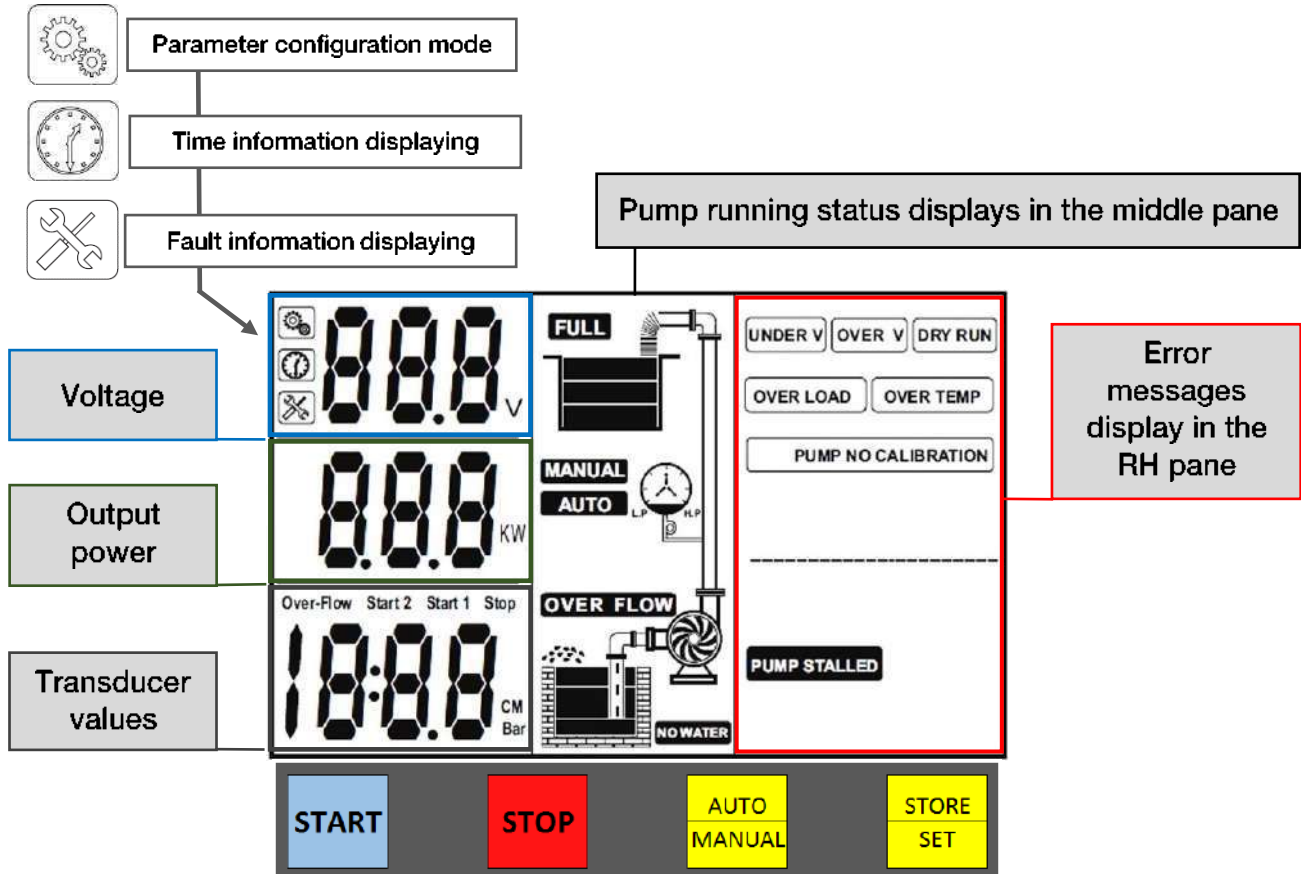
Controller Modes	Automatic or Manual pump operation. Liquid level control via float switch, level transducer or pulse electrode probes. Pressure control via pressure switch or transducer.
Protection functions:	Dry run (underload), Overload, Pump Stalled, Transient surge, Under voltage, Over voltage, Repeated start, Over temperature, Short circuit
Input Voltage	230V +5% -10%
Rated output power	0.37 – 2.2kW P2 power (rated up to 25A input)
Working temp	-25 to +55 deg C 20% to 90% relative humidity, non-condensing
Enclosure	250mm tall, 197mm wide, 115 deep. 1.6kg. IP54
Trip response times (set)	Open phase – Less than 2 sec Short circuit – less than 0.1 sec
Trip Voltage (User adjustable)	Over voltage – 115% of rated input voltage default Under voltage – 80% of rated input voltage default
Trip response times (User adjustable)	Dry run (Under-load) 6 sec Overload 5 sec Under Voltage Less than 5 sec Over voltage Less than 5 sec
Recovery times	Dry run (Under-load) 30 min default Overload 30 min default Under Voltage 5 min – non adjustable Over voltage 5 min – non adjustable
RS485 Technical interface	RS485 Bus Interface: asynchronous semi duplex 1200,2400,4800,9600 bps (default 9600bps) MODBUS protocol (RTU)
Alarms	Internal audible alarm only. External alarm connection unsupported

4. Warnings and Cautions

	Please read the manual fully and carefully before starting. Retain the manual for future reference.
	This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

4. Display

The iProtect display provides a real time indication of the operational mode and the current state of the controller, including real-time voltage/load and any error messages.

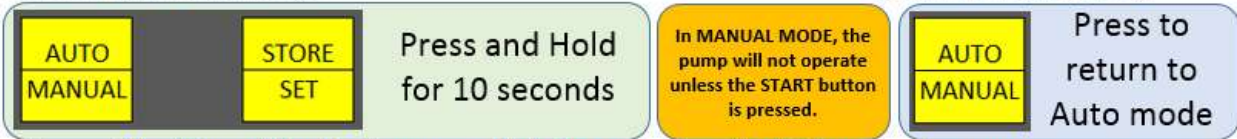


Drainage	Boosting	Transfer
ON <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 Control by floats or probes	ON <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 Control by pressure switch	ON <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 Control by floats or probes
ON <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 Control by level transducer	ON <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 Control by pressure transducer	ON <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 Control by level transducer

Function switch located upper right-hand side of main board. Cycle power after changing.

5. Operation and Programming - navigation

Switching to manual mode



Returning to Auto mode

After 30 sec without button-press activity the controller will exit the parameter menu



Erasing a calibration.



The display will flash **PUMP NO CALIBRATION**

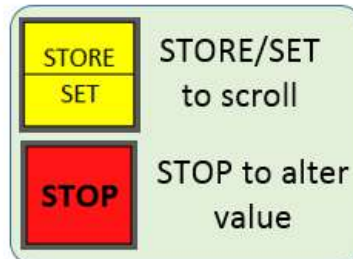
! Following new pump fitment or any system alterations a fresh pump calibration should be performed. Auto Pump Calibration requires water in the system to achieve real-world operating conditions. If pumps are calibrated without water, overload and pump stalled errors may occur later.

Auto pump calibration.

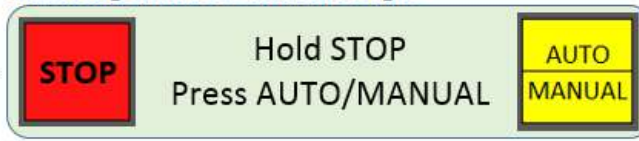
Allow the pump to run and settle into its 'normal' operating state before saving the calibration



Accessing the Parameter menu



Accessing the Last 5 error messages



Use the Auto/Manual button to scroll



View the accumulated running time









Parameter 007 is the controller power delivery (P1) in kW. Pump nameplate values are often P2 shaft power.

In situations where it isn't possible to run the pump to achieve a real-world calibration, a nominal value requires calculation to enter at 007:

Multiply 230V by nameplate amperage = Wattage. Enter as kW

6. Program Parameters

001 001			<p>The controller ID</p> <p>Range 0 - 254 Default = 1</p>
002 004			<p>RS 485 Speed</p> <p>01 = 1200 bps 02 = 2400 bps 03 = 4800 bps 04 = 9600 bps</p> <p>Range 0 - 4 Default 4 = 9600 bps</p>
003 006 ^s		DRY RUN	<p>Dry run protection trip response time in seconds (S)</p> <p>Range 0 seconds – 60 seconds Default value 6 seconds</p>
004 030 ^m		DRY RUN	<p>Recovery time for dry run protection in minutes (M)</p> <p>Range 0 - 254 minutes Default value is 30 minutes</p>
005 005 ^m		OVERLOAD	<p>Overload trip response time in minutes (M)</p> <p>Range 0 - 60 minutes Default value is 5 minutes</p>
006 002 ^m		UNDER V OVER V	<p>Under / Over voltage trip response time in minutes (M)</p> <p>Range 0 – 60 minutes Default value is 2 minutes</p>
007 _v 019 _w			<p>Rated power output to the pump</p> <p>Range 0 – 3.0kW Default setting is 3.00kW</p> <p>Button Press calibration saves the running value to this location</p>
008 070 _%		DRY RUN	<p>The trip response ratio of the dry-running (underload) protection as a percentage of the rated current</p> <p>Range 0 – 95% Default setting is 70%</p> <p>Control by means of a float attached directly to the pump: set to 0%</p>

<p>009 125[%]</p>		<p>The trip response ratio of the Overload Protection as a percentage of the rated current.</p> <p>Range 0 – 170% Default setting is 125%</p>
<p>010 200[%]</p>		<p>The trip response ratio of the Pump-Stalled Protection as a percentage of the rated current.</p> <p>Range 0 – 240% Default setting is 200%</p> <p><i>A pump-stalled event is a 'critical error' and has no auto-restart time</i></p>
<p>011 176^v</p>		<p>The trip voltage of the Under Voltage Protection (V)</p> <p>Range 0 – 295V Default setting is 176V</p>
<p>012 253^v</p>		<p>The trip voltage of the Over Voltage Protection (V)</p> <p>Range 0 – 295V Default setting is 253V</p>
<p>013 240^h</p>		<p><i>Note: Only Applicable to Drainage Mode</i> Anti-seize parameter.</p> <p>In auto mode, if pump has not run for XX hours, controller will run the pump for 3 seconds.</p> <p>Range 0 – 254 hours Default setting is 240 hours.</p>
<p>014 000</p>		<p>Setting for locking panel into AUTO.</p> <p>000 - allows switching between auto and manual using AUTO/MANUAL key only (No lock-out).</p> <p>001 - allows switching between auto and manual using both AUTO/MANUAL + STORE/SET keys at the same time for 10 seconds.</p>
<p>015 004^s</p>		<p><i>015 applies to 'pressure boosting with pressure transducer' ONLY.</i></p> <p>Cut off time delay function.</p> <p>Range 1 - 120 seconds Default setting is 4 seconds</p>

Parameters 016 – 019 are mode specific.

If a replacement pump is installed, the previous calibration should be removed and a new calibration performed.



Consult White International prior to changes to parameters 001 to 015.

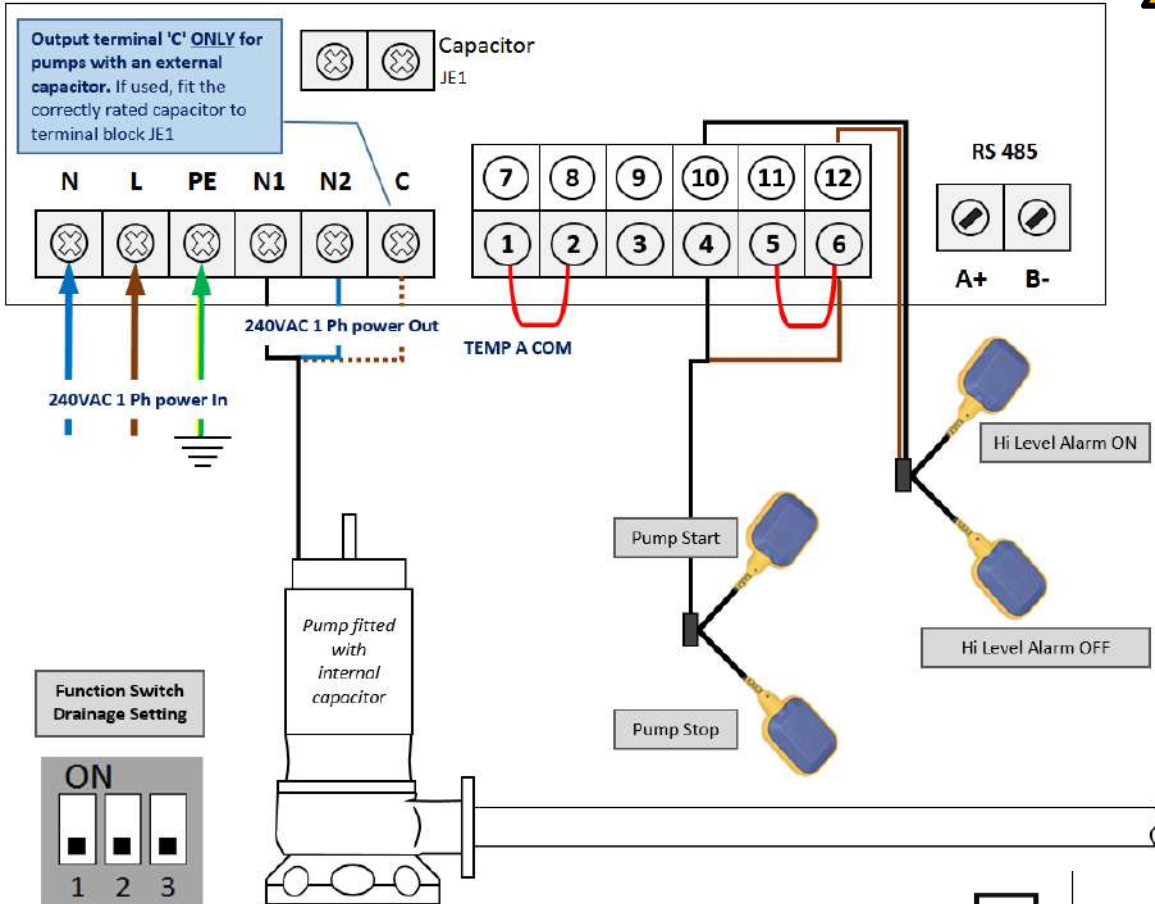
Changes without consulting White International may void your pump warranty.

7. Drainage Mode - Electrical Connections; floats or probes

The controller is rated IP54. It should be installed vertically where it has excellent ventilation away from direct sunlight or exposure to adverse weather. Installation inside a separate open fronted enclosure is suggested.

Any electrical alterations or additional connections should be carried out by a suitably qualified technician. Ensure suitably rated circuit breakers are installed.

Isolate the controller before opening the cover to access the low voltage circuit connections.

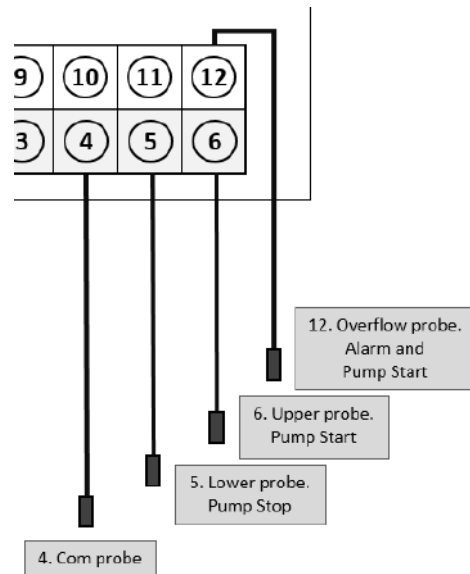


When operating a pump with its own float fitted, tie the float in the upward (permanently on) position.

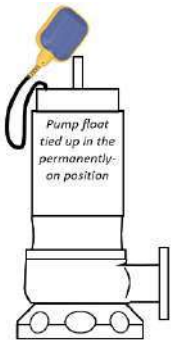
Terminals 1 and 2 are for connection to motor thermal protection. If not available leave the jumper wire in.

Terminals A+ and B- are for MODBUS communication (RS485).

Probes are not recommended for use with black water or contaminated liquids.



8. Drainage Mode – Control via Pump Float



Even when using pumps with floats permanently attached, to achieve maximum pump protection and control, use control floats or probes wired to the iProtect.



Disable the pump float by tying it in the upward (on) position.

The iProtect monitors current. While supplying power to the pump should the pump float switch the pump off the current drops to zero. The controller interprets this as less than the underload response value. (Default setting for dry run protection is 70% of normal run current)

This in turn causes a 'Dry Run' error, and the controller will initiate the dry-run recovery time countdown before attempting to start the pump again. (Default setting 30 min Parameter 004)

If the installer's preference is to use the float attached to the pump as the method of pump control, the dry run parameter MUST be disabled.



Enter the programming menu and set parameter 007 to 0%

With the dry run parameter inactive the controller still provides protection against overload, locked rotor, under voltage and over voltage conditions. Additional benefits to the user are the anti-seize function, accumulated run time and the last 5 error record.

Connecting an external alarm device

Connection of an external alarm device directly to the iProtect is not currently supported.

9. Drainage Mode – LCD running state images

Pump calibration: (see pg 5)

Switch to manual mode   10 sec.

Start the pump 


Allow the pump to reach a stable power.

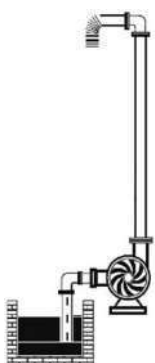
Press  to store. Press  to exit.



There is no water at the source.

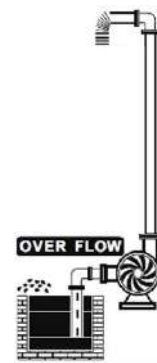
The pump will not run.

Related to  als 4, 5 and 6



There is sufficient water at the source for the float or probes to send a run state signal

The pump starts and runs.



The controller is receiving a high level signal. The alarm will sound.

The pump will run if the controller is in Auto mode

Related to terminals 10 and 12

Ensure the controller is set to AUTO MODE when finished

10. Transfer Mode - Electrical Connections; floats or probes

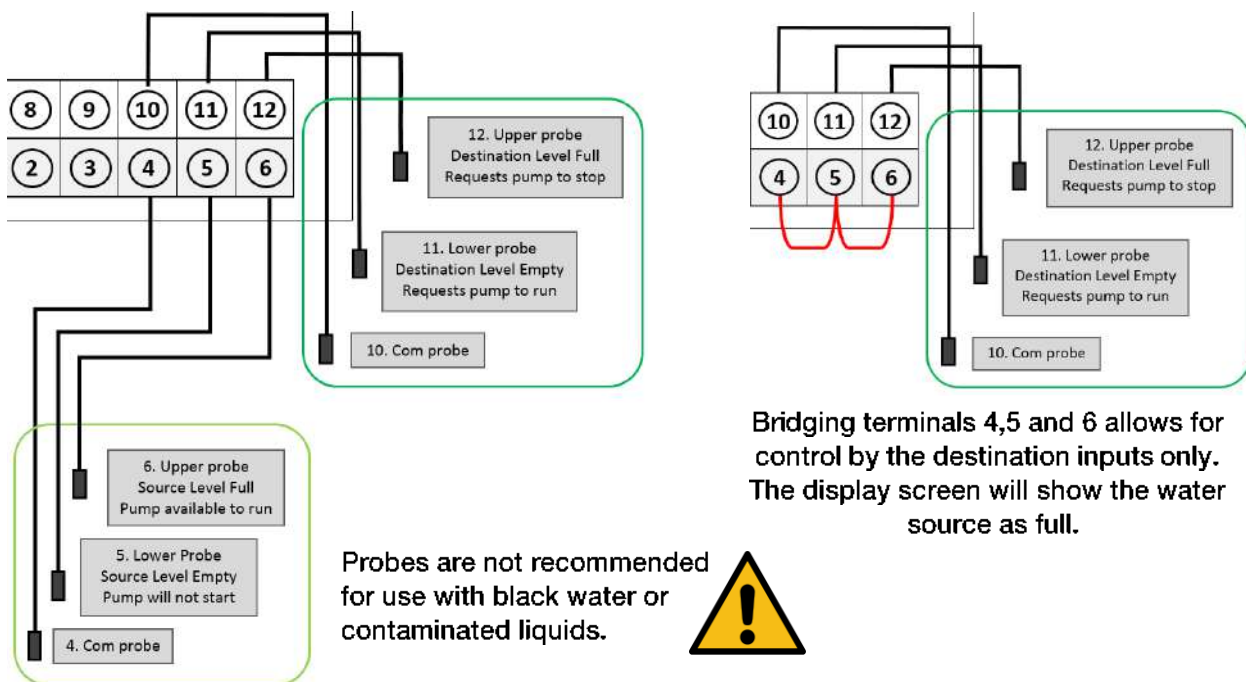
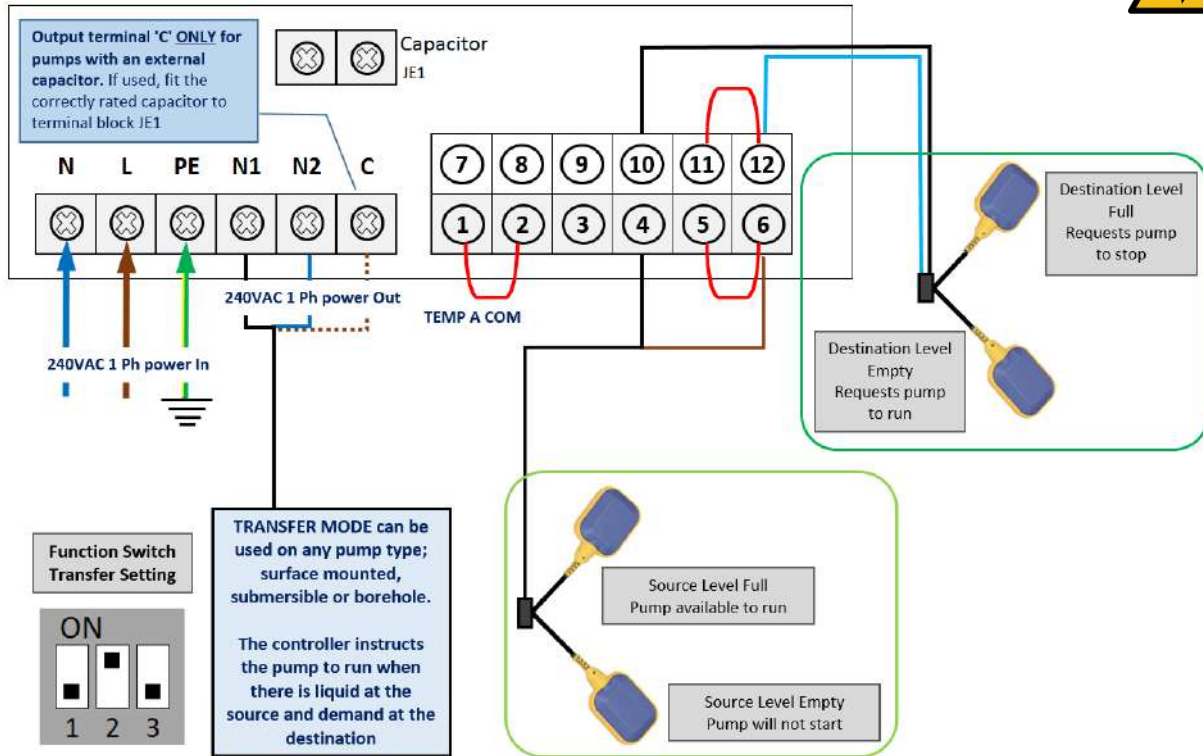
The controller is rated IP54. It should be installed vertically where it has excellent ventilation away from direct sunlight or exposure to adverse weather. Installation inside a separate open fronted enclosure is suggested.



Any electrical alterations or additional connections should be carried out by a suitably qualified technician. Ensure suitably rated circuit breakers are installed.



Isolate the controller before opening the cover to access the low voltage circuit connections.



11. Transfer Mode - LCD running state images

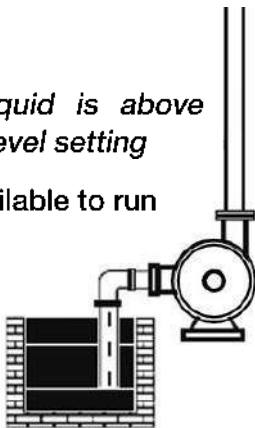
Source liquid is below the low-level setting.

The pump will not run.



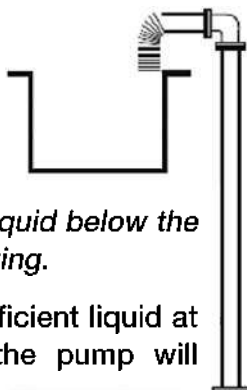
Source liquid is above the high-level setting

Pump available to run



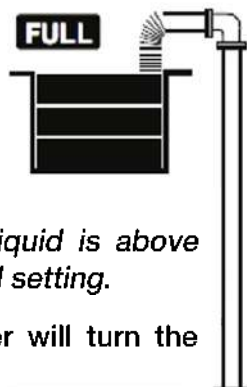
Destination liquid below the low-level setting.

If there is sufficient liquid at the source the pump will start



Destination liquid is above the high-level setting.

The controller will turn the pump off



Pump calibration: (see pg 5)



Switch to manual mode

AUTO	STORE
MANUAL	SET

 10 sec.

Start the pump

START

Allow the pump to reach a stable power.

Press

STORE	SET
-------	-----

 to store. Press

AUTO	MANUAL
------	--------

 to exit.

The iProtect has a reliable automatic stop function against pump dry-run.

When used with pumps where it is inconvenient to install source floats or probes, the installer can fit jumpers between terminals 4,5 and 6.

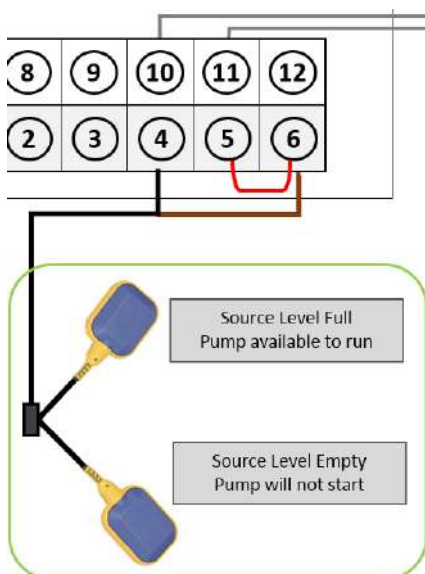
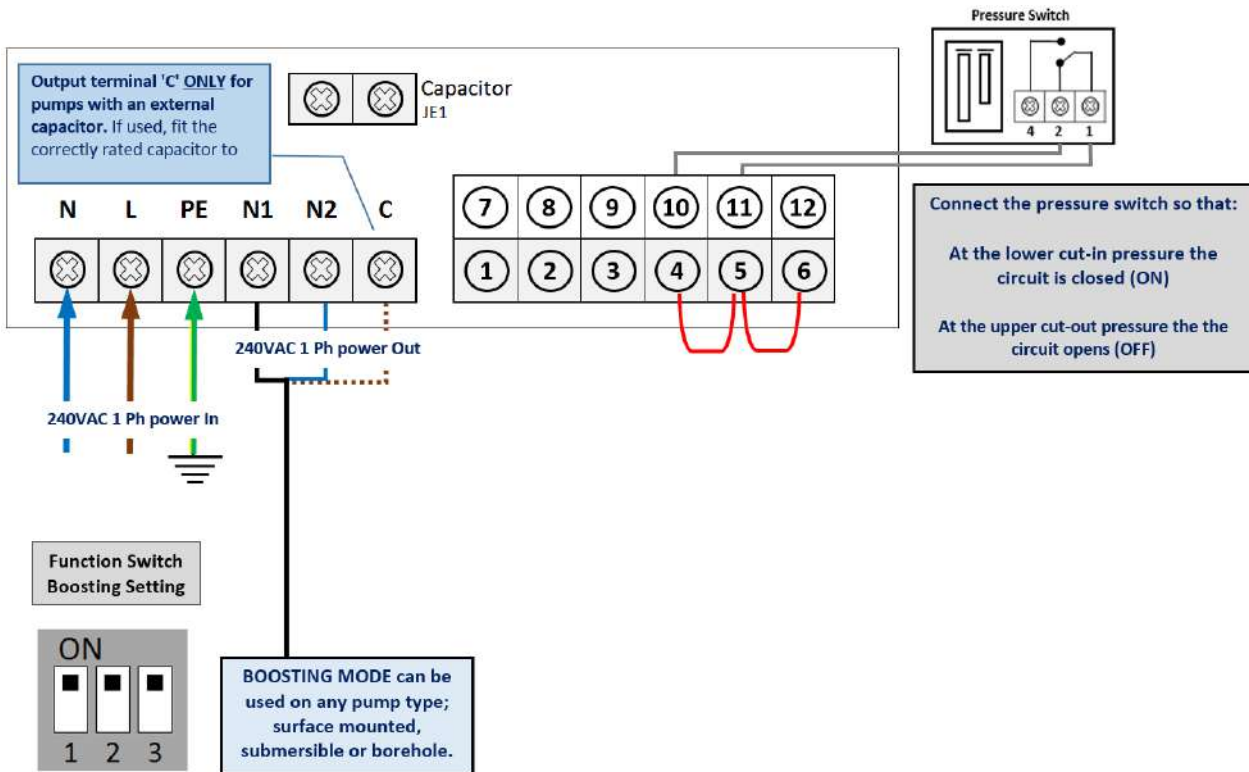
Ensure the controller is set to AUTO MODE when finished

12. Boosting Mode - Electrical Connections; floats or probes

The controller is rated IP54. It should be installed vertically where it has excellent ventilation away from direct sunlight or exposure to adverse weather. Installation inside a separate open fronted enclosure is suggested.

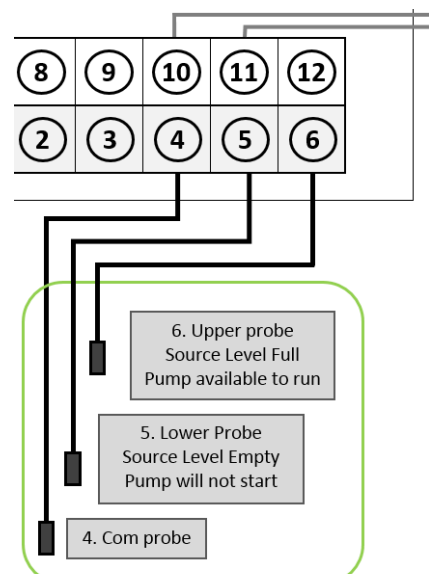
Any electrical alterations or additional connections should be carried out by a suitably qualified technician. Ensure suitably rated circuit breakers are installed.

Isolate the controller before opening the cover to access the low voltage circuit connections.



Fitting floats or probes to register the pump inlet source liquid level will achieve the maximum protection against pump dry-running.

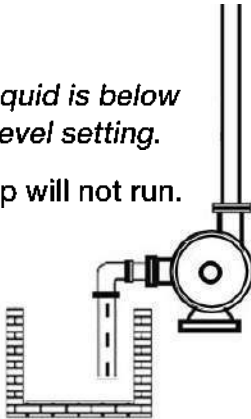
The under-load function of the iPROTECT also acts as a reliable automatic stop function against pump dry-running. Jumpers can be fitted between terminals 4,5 and 6 if preferred



13. Boosting Mode - LCD running state images

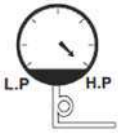
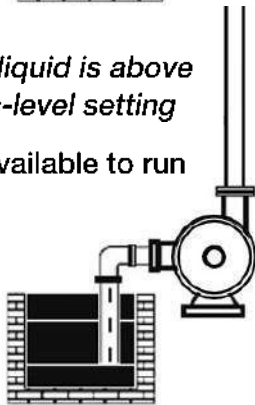
Source liquid is below the low-level setting.

The pump will not run.



Source liquid is above the high-level setting

Pump available to run



The Pressure switch is registering line pressure above the cut-out pressure. The switch circuit is open

If there is sufficient liquid at the source the pump will start



The Pressure switch is registering line pressure below the cut-in pressure. The switch circuit is closed

If there is sufficient liquid at the source the pump will start

Pump calibration: (see pg 5)

Switch to manual mode   10 sec. 

Start the pump 

Allow the pump to reach a stable power.

Press  to store. Press  to exit.

When the iProtect is used in BOOSTING MODE and the pump is controlled by a pressure switch, ensure that a suitably sized pressure vessel is installed in the system.

A Pressure vessel sized properly and set with the correct pre-charge pressure is intended to prevent the pump from starting more than 30 times per hour (20 times per hour for bore pumps)

Pressure tank pre-charge should be set to 66% of full system pressure

In BOOSTING mode, terminals 10 and 11 are the main control inputs.

Circuit closed = ON. Circuit open = OFF.

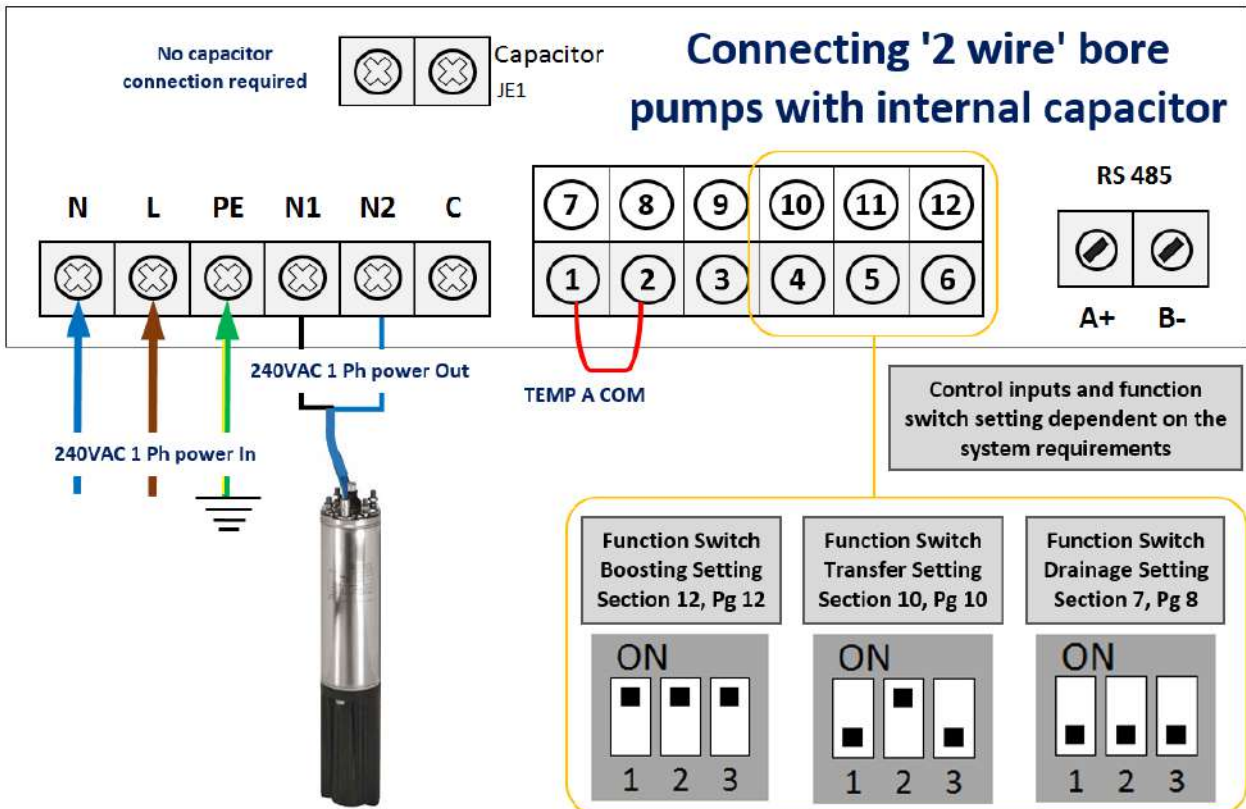
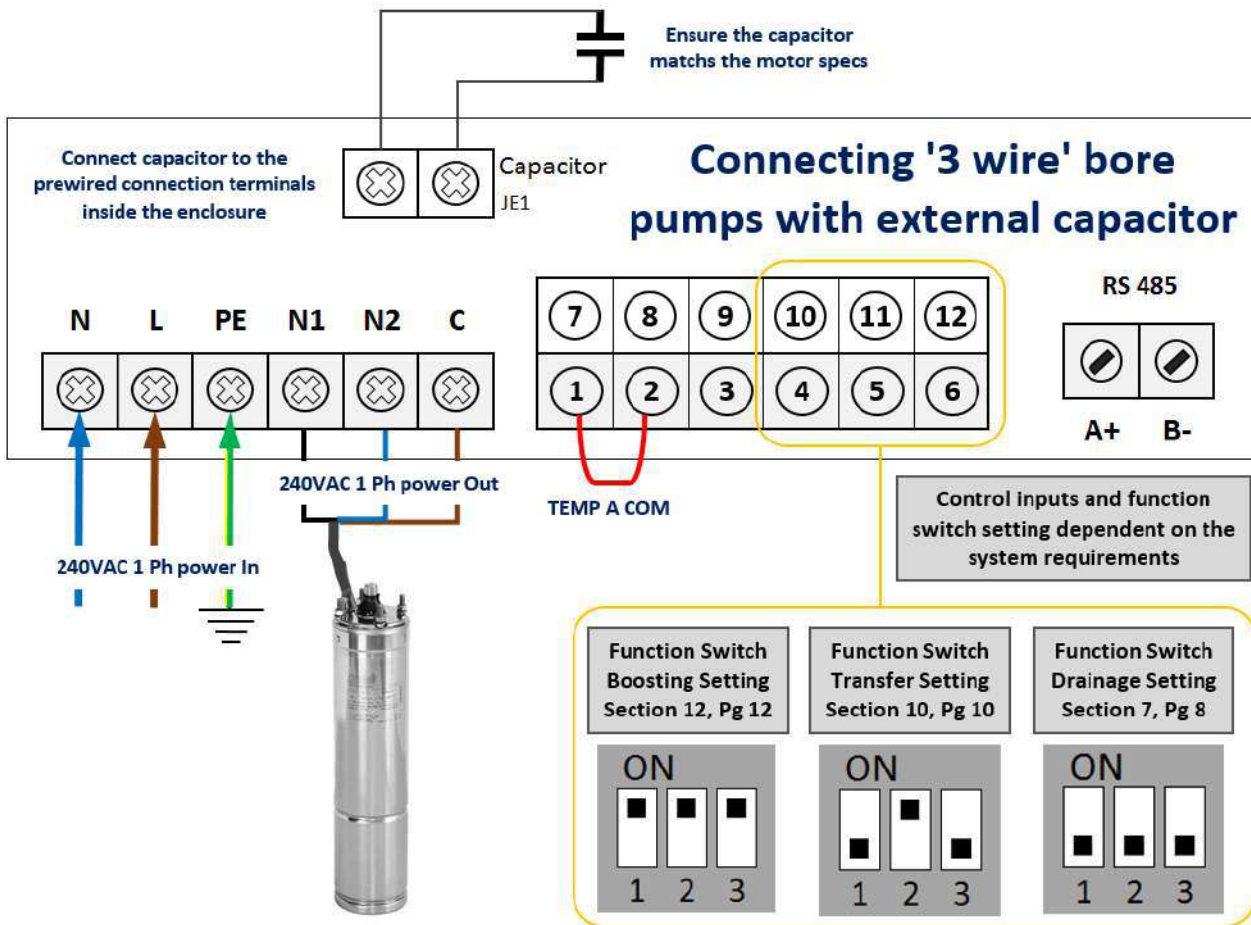
The user can exploit this knowledge to control the pump with an external device such as a timer or connection to an irrigation control unit. A relay may be necessary.

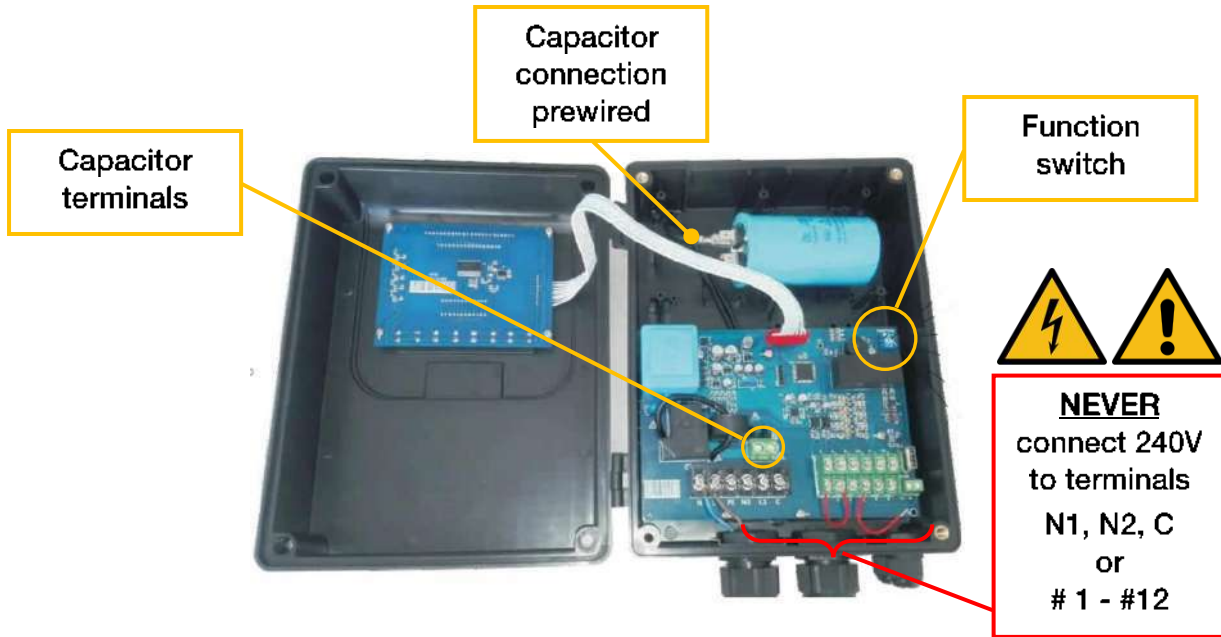


Never connect 240V supply to control terminals 1 – 12 or to N1, N2 or C

Ensure the controller is set to AUTO MODE when finished

14. Bore Pumps - Connecting 2 wire and 3 wire bore pumps





15. Communication link – RS485

The control panel has a communication interface. The wire communication distance is less than 1200 metres.

For those installations or environments which require a longer distance communication, users can use RS485 extender, wireless communication or GSM units.

Please contact [White International](#) for more information.

Technical data	
Physical interface	RS485 Bus Interface: asynchronous semi duplex
Data format	1 start bit, 8 data bit, 1 stop bit, no verify 1 start bit, 8 data bit, 2 stop bit, no verify Default: 1 start bit, 8 data bit, 1 stop bit, no verify
Baud rate	1200,2400,4800,9600 bps (default 9600bps)
Communication address	Setting range of controller address: 1-126 127: broadcast address, host computer broadcasting, slave machine response forbidden
Protocol type	MODBUS protocol (RTU)
Rated input voltage for SC	AC 240V/50Hz, single phase
Installation data	
Wire communication distance	1200 metres max by shield twisted pair cable (STP) for RS485 & CAN 5000 metres max by STP and RS485 extender
STP	STP-120U one pair 20AWG for RS485 & CAN
RS485 extender	5000 metres (9600bps)

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16. Fault messages – possible causes and solutions

Fault Message	Possible Cause	Solutions
Flashing PUMP NO CALIBRATION Parameter 007 or perform the auto calibration sequence	Pump calibration has not been completed.	See Pg 6 for calibration instructions.
Flashing DRY RUN Parameter 004 and 008	Water level in the well/sump is below pump intake, pump stops running. Broken outlet pipe	iPROTECT will attempt to restart the pump every 30 minutes until water level restored.
Flashing OVER LOAD Parameter 005 and 009	Pump running amps greater than calibrated running amps, pump is in overload protection state. Pump damage, dragging impeller or bearing, possible clogging. Pump calibrated without water or with a nominal kW value	iPROTECT will attempt to restart the pump every 30 minutes until running amps restored to normal. Inspect and/or repair pump. Erase previous calibration and recalibrate with water.
Flashing PUMP STALLED Parameter 010	Pump running amps greater than 200% of calibrated running amps Pump Stalled protection is especially useful for pumps with cutting or macerating mechanisms	Cut off power supply, inspect, repair or replace pump.
Flashing UNDER V Parameter 011	Voltage is lower than the calibrated voltage. The pump is in under voltage protection state.	iPROTECT will attempt to restart the pump every 5 minutes until normal voltage is restored.
Flashing OVER V Parameter 012	Voltage is higher than the calibrated voltage. The pump is in the over-voltage protection state.	iPROTECT will attempt to restart the pump every 5 minutes until normal voltage is restored.
Flashing REPEATED START	Pump starts more than 5 times per minute. <i>It is less likely that this could occur in drainage or transfer mode unless there is a wiring fault.</i>	Check pressure switch settings are correct for application. Check pressure tank pre-charge pressure and condition of diaphragm. Check the volume of sump is not too small.
Flashing OVER TEMP	The jumper on temperature protection terminals has been removed. Pump motor temperature high and pump thermal switch in open state (if connected).	Reinstall jumper on temperature protection terminals. Wait until pump motor temperature reduces. Investigate cause for Overheating.

17. Warranties – Terms and Conditions

This warranty is given in addition to the consumer guarantees found within the Australian Competition and Consumer Act 2010 (Cth) for goods purchased in Australia and the Consumer Guarantees Act 1993 NZ for goods purchased in New Zealand:



1) White International Pty Ltd / White International NZ Ltd (White International) warrant that all products distributed are free from defects in workmanship and materials, for their provided warranty period as indicated on the top or opposite side of this document. Subject to the conditions of the warranty, White International will repair any defective products free of charge at the premises of our authorised service agents throughout Australia and New Zealand if a defect in the product appears during the warranty period. If you believe that you have purchased a defective product and wish to make a claim under this warranty, contact us on our Sales Hotline on 1300 783 601, or send your claim to our postal address or fax line below and we will advise you as to how next to proceed. You will be required to supply a copy of your proof of purchase to make a claim under this warranty.

2) This warranty excludes transportation costs to and from White International or its appointed service agents and excludes defects due to non-compliance with installation instructions, neglect or misuse, inadequate protection against the elements, low voltage or use or operation for purposes other than those for which they were designed. For further information regarding the suitability of your intended application contact us on our Sales Hotline on 1300 783 601. If you make an invalid claim under this warranty, the original product will be sent back to you unrepai red.

3) This warranty refers only to products sold after the 1st January 2012, and is not transferable to another product type and only applies to the original owner, purchaser or end user, and is in addition to the consumer guarantees found within the Competition and Consumer Act 2010 (Cth) for goods purchased in Australia and the Consumer Guarantees Act 1993 (NZ) for goods purchased in New Zealand.

4) Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure. **2 YEAR WARRANTY**

5) To the fullest extent permitted by law, White International excludes its liability for all other conditions or warranties which would or might otherwise be implied at law. To the fullest extent permitted by law, White International's liability under this warranty and any other conditions, guarantees or warranties at law that cannot be excluded, including those in the Competition and Consumer Act 2010 (Cth), is expressly limited to: (a) in the case of products, the replacement of the product or the supply of equivalent product, the payment of the cost of replacing the product or of acquiring an equivalent product or the repair of the product or payment of the cost of having the product repaired, is at the discretion of White International or a 3rd party tribunal elected under the Competition and Consumer Act 2010 (Cth) for goods purchased in Australia and the Consumer Guarantees Act 1993 (NZ) for goods purchased in New Zealand; and

6) To the fullest extent permitted by law, this warranty supersedes all other warranties attached to the product or its packaging.

7) In the case of services, supplying the services again or the payment of the cost of having the services supplied again, is at the discretion of White International or a 3rd party tribunal elected under the Competition and Consumer Act 2010 (Cth) for goods purchased in Australia and the Consumer Guarantees Act 1993 (NZ) for goods purchased in New Zealand. 8) Our warranty commences from the date of purchase of the above-mentioned pumps. Proof of purchase is required before consideration under warranty is given.

Record your date of purchase in the space below and retain this copy for your records.

Date of Purchase **Model Purchased**



www.whiteint.com.au
www.whiteint.co.nz

1300 783 601
0800 509 506

Please always refer to our website for further technical information & new product innovations

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