BIANCO NXT controls

812522 BIA-DRIVEPRO-22
812523 BIA-DRIVEPRO-37

BIANCO NXT 2 YEAR WARRANTY

1. Introduction

Congratulations on your new BIA DRIVE PRO

The controller at the heart of the system accepts 230V single phase input power. It converts this to 240V 3 phase output power to drive a Tesla 240V 3 phase borehole motor with a range of multi-stage pump wet-ends to cover a wide range of pressure and flow requirements.

The system conserves energy by only operating the pump at the speed required to maintain set-point pressure. It is great for applications with variable demand.

The Controller is prewired and mounted in a weather resistant enclosure with independent fan cooling The kitset includes a 1" stainless manifold to make adding a pressure vessel easy and with ports for the pressure transducer and pressure gauge to get you up and running swiftly.

The BIA DRIVE VFD controller features a handy setup wizard to make system programming a breeze.

The full colour 100 x 55mm touch-screen interface ensures this Drive is simple to navigate for rapid access to clear, concise, system information. Displaying plain language fault codes and protection notices so you're always informed and in control.

- Variable frequency output for constant pressure control
- Minimise wasted energy and reduce the need for large pressure tanks
- 'Soft-starting' for low motor start current
- Trip history (last 3 messages)
- 25 plain language fault messages
- Provides protection from: dry run, high and low voltage, input and output short circuits, high and low water pressure, input and output phase failure, high temperature and sensor faults

DRIVEPRO Bore Pump Kit

- Variable Frequency pump controller in steel cabinet with cooling fan and circuit breaker.
- Stainless steel manifold.
- Pressure transducer
- Pressure gauge
- Installation manual.

Supplied separately as part of DRIVEPRO Borehole Pump Kit:

- DAB Borehole Pump, with up to 2.2 kW **3ph 240V** motor.
- 18 litre pressure tank.

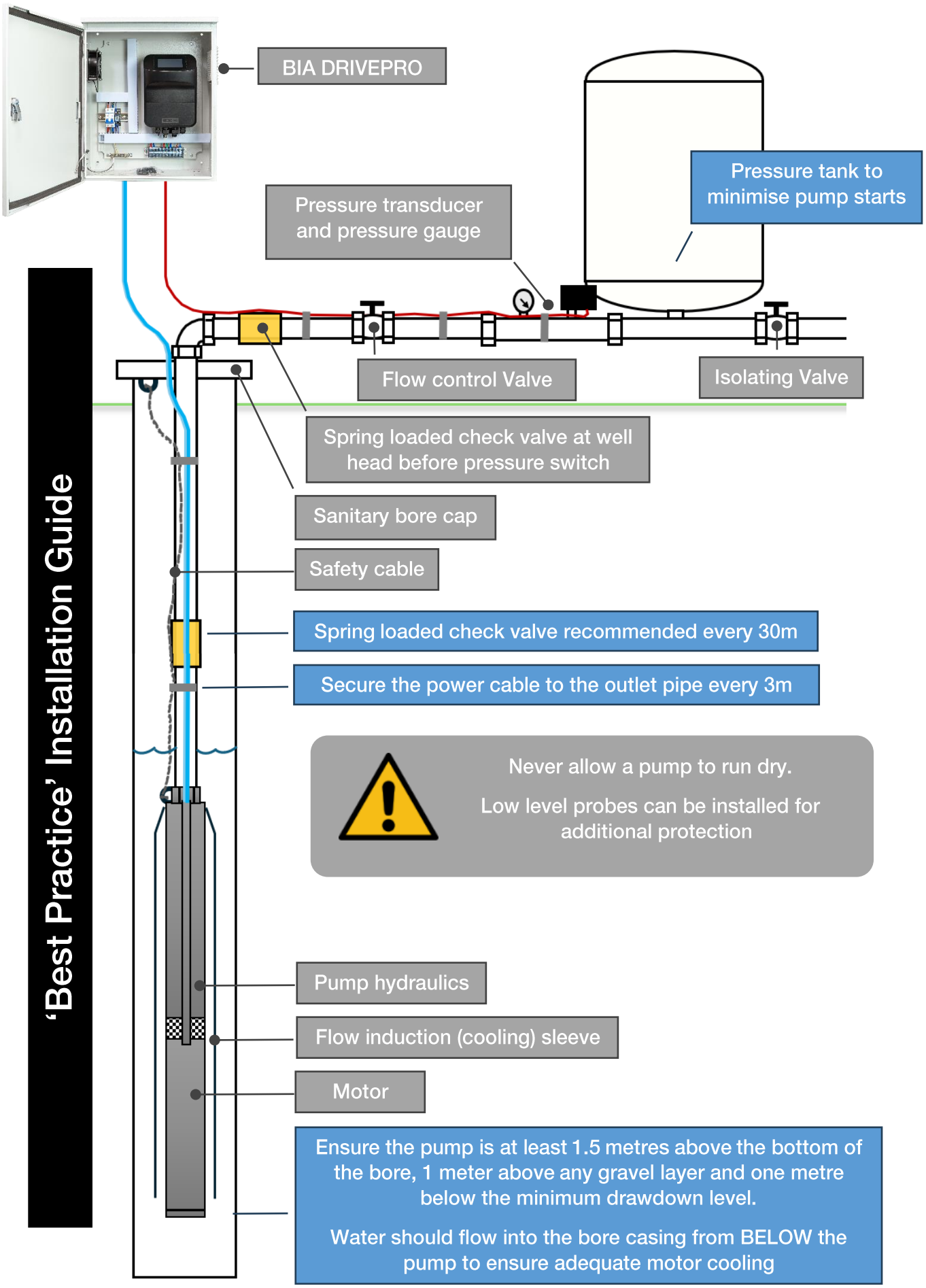
Part Number	Item Code	Voltage In	Voltage Out	kW	A	Protection
BIA-DRIVEPRO-22	812522	1 Phase 230V in	3 phase 230V out	2.2	10	IP54
BIA-DRIVEPRO-37	812523			3.7	17	

Part Number	Item Code	Description
BIA-VMS-10BAR-TRAN	811953	10bar pressure transducer
BIA-VMS-16BAR-TRAN	811954	16bar pressure transducer
BIA-VMS-25BAR-TRAN	811955	25bar pressure transducer

2. Contents

3. Symbols used in this manual

	Warning - Electrical safety
	Warning – Potential consequences of use outside of intended application(s). Includes environmental condition warnings.
	Mandatory warning
	Warning to disconnect power
	Read carefully

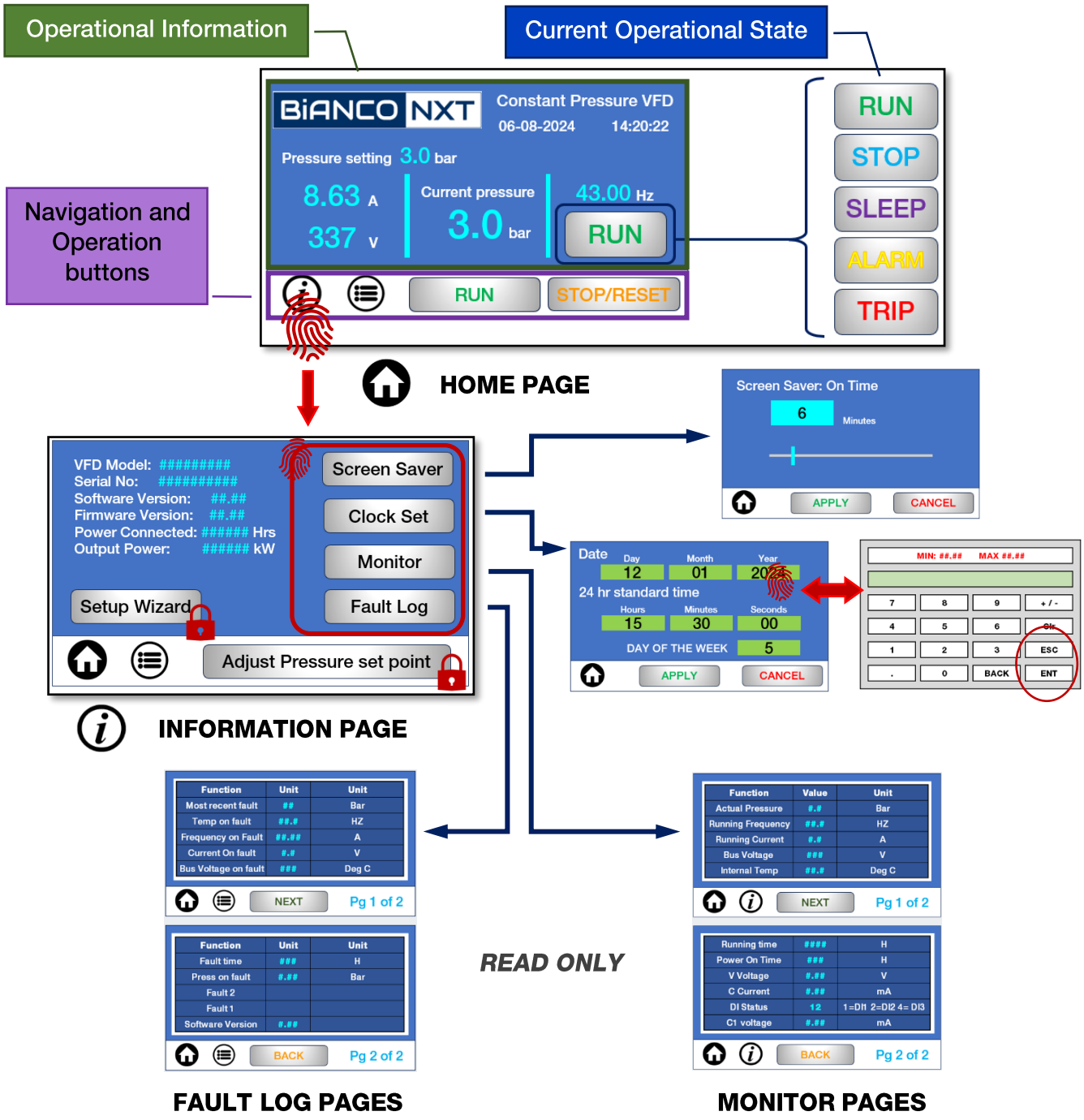

'Best Practice' Installation Guide
BIA DRIVEPRO
Pressure tank to minimise pump starts
Pressure transducer and pressure gauge
Flow control Valve
Isolating Valve
Spring loaded check valve at well head before pressure switch
Sanitary bore cap
Safety cable
Spring loaded check valve recommended every 30m
Secure the power cable to the outlet pipe every 3m
Never allow a pump to run dry.
Low level probes can be installed for additional protection
Pump hydraulics
Flow induction (cooling) sleeve
Motor
Ensure the pump is at least 1.5 metres above the bottom of the bore, 1 meter above any gravel layer and one metre below the minimum drawdown level.
Water should flow into the bore casing from BELOW the pump to ensure adequate motor cooling

4. User Interface

The user interface provides access to three key groups of information:
User, Installer and Programmer.

User Level: No password required

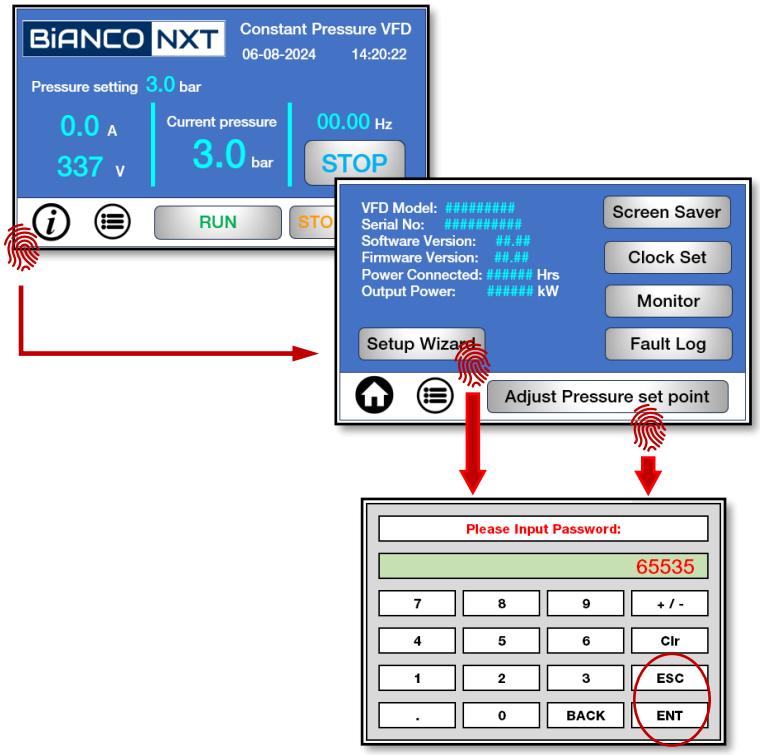
- Display screen summarises current operating conditions. Greater detail easily accessible.
- The screen saver duration can be set; the date and time can be altered and the fault log (last 3 faults) viewed.
- User screens are especially useful for monitoring system operation and diagnosing faults.



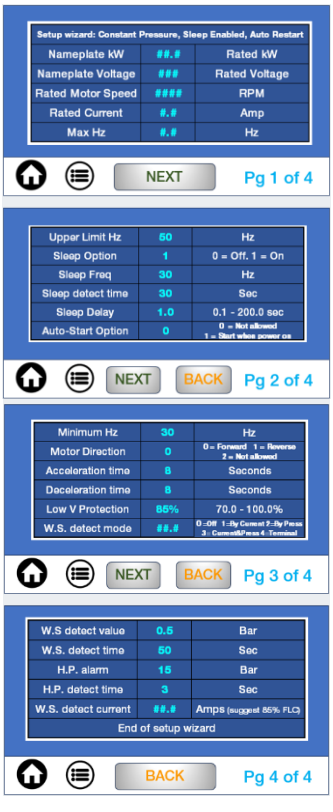
4a. User Interface and Programming Quick Guide con't

Installer Level: Password required

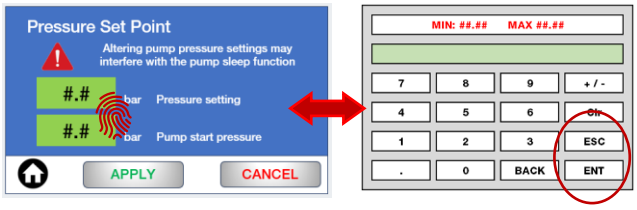
Access to the Setup Wizard and start / operational pressure set points.



Setup Wizard



Altering pressure settings



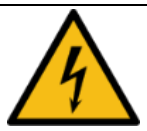
The Set-up wizard enables a fast, simple means to program an BIA DRIVE for the first time.

The Wizard assumes the following configuration is desired:

- Constant Pressure
- Sleep Enabled
- Auto-restart enabled

The Setup Wizard also serves as an alternative short-cut to alter the most common settings without having to access and navigate the Programmer Level pages.

5. Warnings and Cautions

	Read the manual carefully before starting
	Prior to starting installation or maintenance the controller must be disconnected from the power supply. Allow 5 minutes for the internal electronics to discharge before opening the cover
	Any changes or modification to the wiring must be carried out by competent, skilled and suitably qualified personnel only.
	A qualified electrician should correctly size and install circuit breakers to protect the power supply. The fitment of additional surge protection is recommended.
	Never open the cover while controller is connected to electrical supply. Disconnect and allow 5 minutes for the internal electronics to discharge before opening the cover
	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.
	Ensure the controller is a suitable size for the pump motor Size according to the amperage required (P1 power)
	Avoid installing the BIA DRIVEPRO where it could experience the following conditions: i. Where there is significant vibration and/or mechanical shock. ii. Where it could be exposed to corrosive liquids or gasses, or to flammable materials, solvents etc. iii. Extreme heat and cold. Operating range 0ºC - 40ºC. iv. Protect the controller from rain, moisture, humidity or dust

6. Operating Conditions

Install out of direct sunlight and in a location free from dust, corrosive gases, inflammable gases, oil mist, steam and/or water droplets.

Environmental Temperature -10ºC to +40ºC.

Derate 4% output capacity every 1 ºC above 40 ºC up to a maximum of 50ºC

Humidity ≤95%RH, no water condensation.

Vibration <5.9m / S2(0.6G)

Altitude Lower than 1000m. Derate 1% capacity every 100m height increase over 1000m

7. Wiring

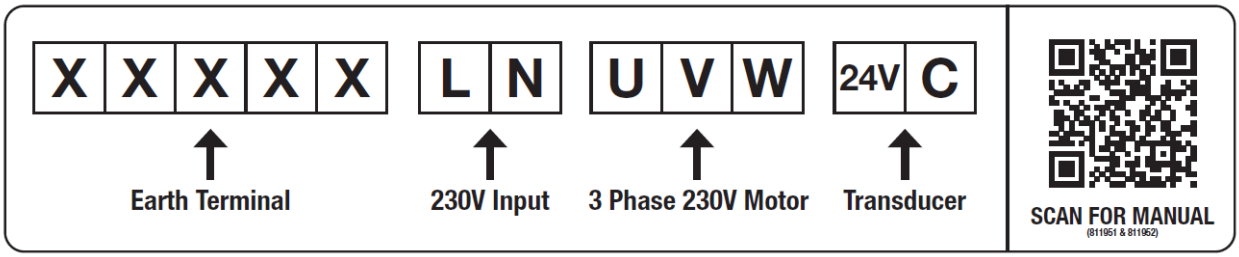
Power must be off for at least 10 minutes and isolated before wiring and inspection to avoid the risk of electric shock.

Ensure high voltage wiring terminals are connected tightly to avoid damage on the device due to loose connections or arcing.

Take care than no foreign objects are left inside the drive i.e. wire fragments, solder, metal, etc which could cause a short circuit and damage the drive.

Always use an electrical outlet that is protected by Residual Current Device (RCD) Safety Switch with a trip current of 30mA or less. A Safety switch is required by Australian/New Zealand Standard AU/NZS 60335.1-20

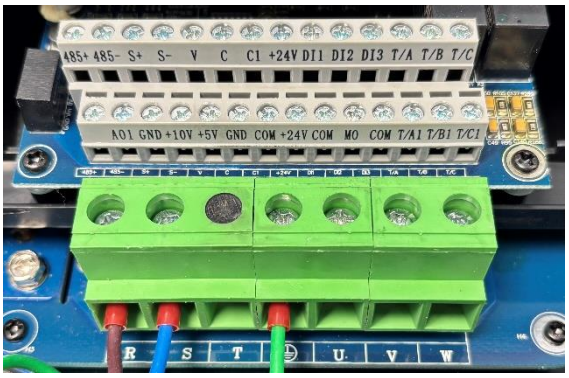
- Install with a suitably rated circuit breaker
- All wiring must be carried out by a suitably qualified technician.



The DRIVE-PRO cabinets include a pre-wired terminal strip

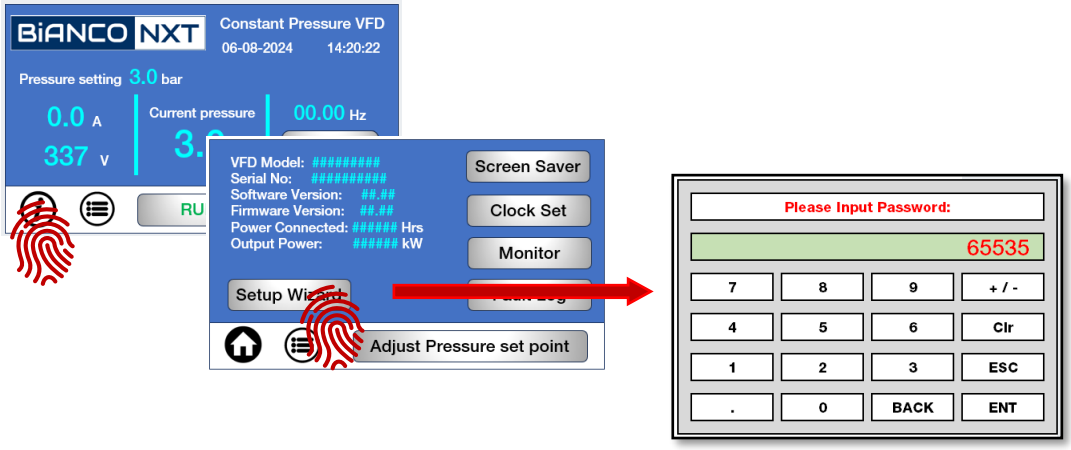
- Connect the incoming power supply
- Connect the wiring to the pump motor
- Connect the pressure transducer

To access the terminals inside the DRIVE, the lower front cover must be removed .



8. Setup quick guide – Setup Wizard (4-20mA input)

As the bare minimum, **EVERY** Drive requires programming via the Set-Up Wizard.



Setup wizard: Constant Pressure, Sleep Enabled, Auto Restart		
Nameplate kW	##.#	Rated kW
Nameplate Voltage	###	Rated Voltage
Rated Motor Speed	####	RPM
Rated Current	#.#	Amp
Max Hz	#.#	Hz

Upper Limit Hz	50	Hz
Sleep Option	1	0 = Off. 1 = On
Sleep Freq	30	Hz
Sleep detect time	30	Sec
Sleep Delay	1.0	0.1 - 200.0 sec
Auto-Start Option	0	0 = Not allowed 1 = Start when power on

Minimum Hz	30	Hz
Motor Direction	0	0 = Forward 1 = Reverse 2 = Not allowed
Acceleration time	8	Seconds
Deceleration time	8	Seconds
Low V Protection	85%	70.0 - 100.0%
W.S. detect mode	##.#	0 =Off 1=By Current 2=By Press 3= Current&Press 4=Terminal

W.S detect value	0.5	Bar
W.S. detect time	50	Sec
H.P. alarm	15	Bar
H.P. detect time	3	Sec
W.S. detect current	##.#	Amps (suggest 85% FLC)
End of setup wizard		

In most cases, tuning the setup wizard is all that is required.

Check and alter every setting as necessary.

For information regarding advanced tuning, consult the full BIA-DRIVE manual

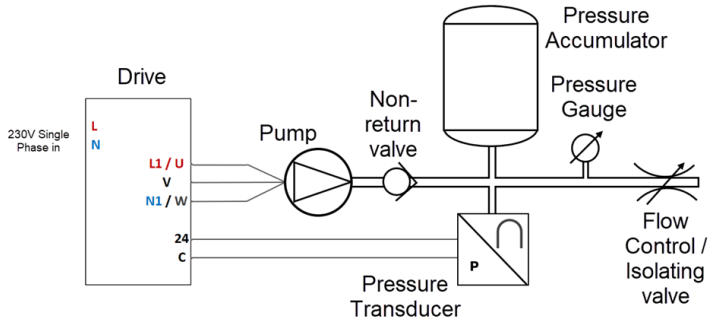
Scan the QR code below or click on the image to access the full manual

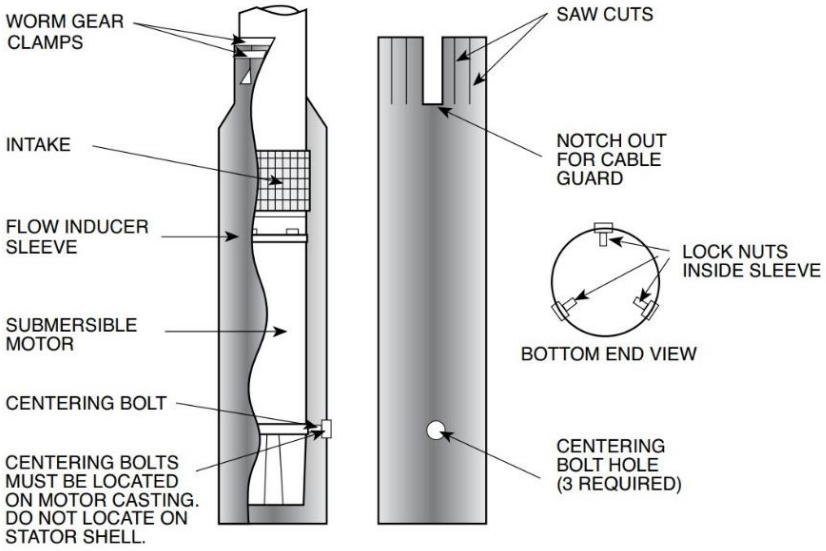
Bore motors with Kingsbury type thrust bearings: Set acceleration / deceleration to 0.1sec

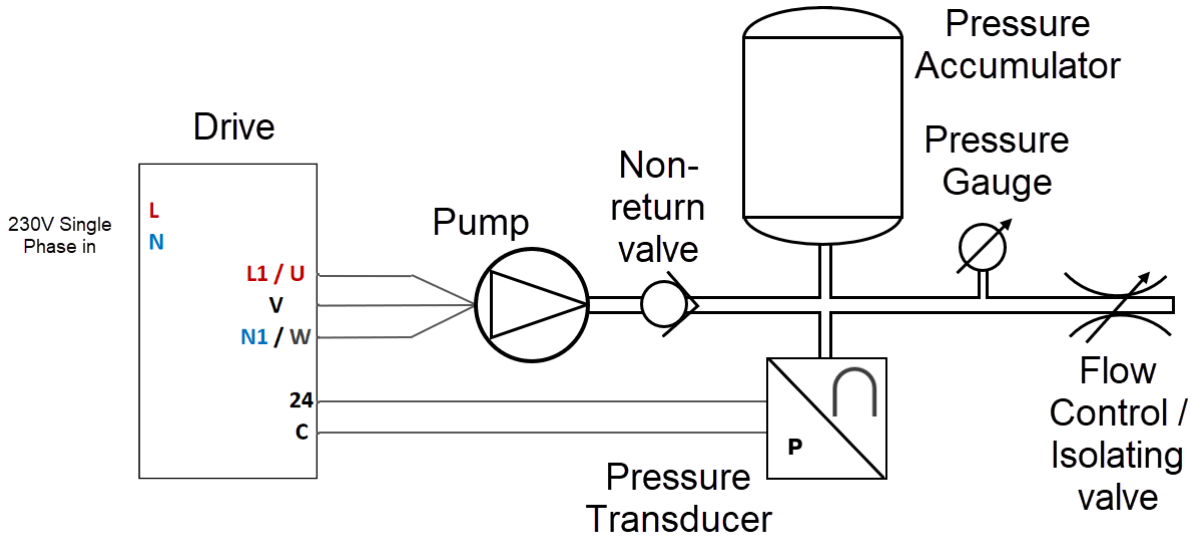
9. Ensuring bore motor cooling

A flow inducer sleeve is recommended to ensure greater than 76mm/sec water velocity across the motor to ensure adequate cooling.

A flow rate greater than 48lpm when installed in a 6” (152mm) casing will achieve this requirement.







10. Pressure Tank Pre-charge

Pressure tank pre-charge must never be lower than 2/3 of the maximum system pressure

Should the calculated value be significantly less than the cut-in pressure, set the pre-charge 20kpa lower than the pump start pressure

CUT OUT PRESSURE	CUT IN PRESSURE							
	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
2.5	1.30	1.80	Green cells - precharge is 20kpa below cut in pressure					
3.0	1.66	1.80	2.30	Blue cells - pre-charge is 66.6% of cut out pressure				
3.5	2	1.80	2.30	2.80				
4.0	2.33	2.33	2.33	2.80	3.30			
4.5	2.66	2.66	2.66	2.80	3.30	3.80		
5.0	3	3	3	2.80	3.30	3.80	4.30	
5.5	3.33	3.33	3.33	3.33	3.30	3.80	4.30	4.80
6.0			3.66	3.66	3.66	3.80	4.30	4.80
6.5			4	4	4	4	4.30	4.80
7.0			4.33	4.33	4.33	4.33	4.33	4.80
8.0			4.99	4.99	4.99	4.99	4.99	4.99
9.0				5.66	5.66	5.66	5.66	5.66

Tank pre-charge greater than 5 bar

Where the system pressure requires pre charge pressure greater than 5 bar the following procedure must be followed to prevent damage to the diaphragm

1. Set the gas pre-charge of the tank to 5 bar
2. Install the tank into the system.
3. Fill the system with water to equalise both system and pre-charge pressure at 5 bar
4. Add additional gas pre-charge pressure towards the desired total in steps not exceeding 3 bar per step
5. Should the maximum 3 bar (per step) gas pressure be reached, add additional system water to equalise both system and pre-charge pressures .
6. Repeat steps 3 to 5 until the desired pre-charge is reached.

Emptying a tank that has a pre-charge over 5 bar,

1. Ensure there is some water in the tank.
2. Isolate the tank from the system (close isolation valve) ensuring no additional water can get into the tank (shut off the pump and / or any water supply).
3. Release air from tank until 3 bar (44 psi) tank / air pressure is remaining.
4. Open a drain valve and afterwards the isolation valve to drain the tank.

CAUTION: Make sure that the system pressure is never lower than 5 bar below pre-charge. If system pressure needs to be lowered, the tank should be isolated or emptied as previously described

BIA-BPT-18	811171	10bar 18L pressure tank
BIA-VMS-18L-25BAR	811957	25bar 18L pressure tank
BIA-VMS-30BAR-PGAUGE	811960	30bar pressure gauge
BIA-VMS-25BAR-PSWITCH	811956	25bar pressure switch

The default pressure tank supplied is rated for a Maximum of 10 bar pressure

(5.5 bar Max pre-charge)

11. Periodic Maintenance

Operation can suffer if the controller suffers over-heating. Ambient temperature should be maintained in the range 0-40 deg C and humidity between 20 to 90%.

Over the life of the controller, a build-up of dust or dirt can result in the controller operating at a higher temperature than normal.

The controller should be installed where airborne dust is minimised.

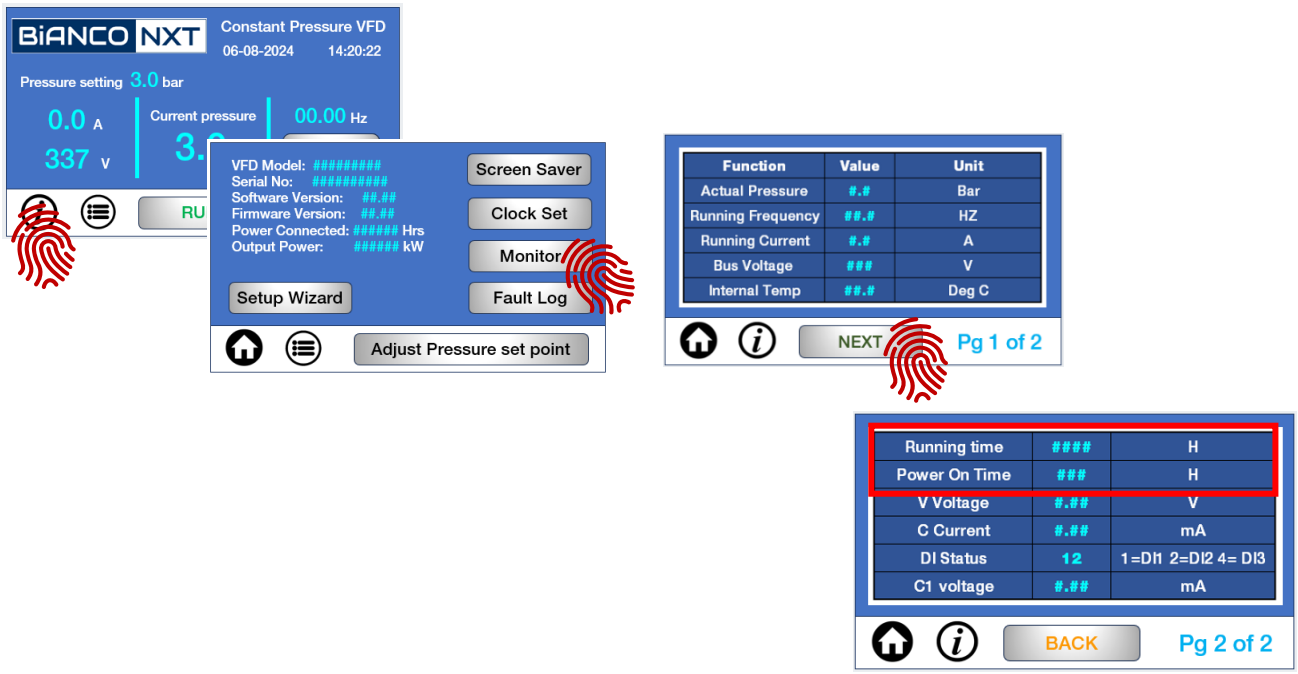
The cover should be removed periodically and vacuum or low pressure air used to remove any build-up of dust or dirt especially on the PCB's, on the fans and on the cooling plate/heatsink fins.

While the cover is removed, check the control terminal screws are tight.

The BIA CRIVEPRO controllers are fitted with cooling fans to assist with controlling temperature. If the operation of the fan is compromised or the fan has failed, abnormal operation may result.

- Fans and capacitors are considered wearing parts.
- Expected fan life = 20,000 hours running.
- Expected capacitor life = 30 – 40,000 hrs running,
- Abnormal appearance, colour or smell indicates that the capacitor should be replaced

<u>Checking operating hours:</u>



12. Minimising EMI (Electromagnetic Interference)

EMI Refers to unwanted electromagnetic signals or noise generated by the VFD or external sources, which can interfere with the proper functioning of electronic devices. VFDs, due to their rapid switching (e.g., in the IGBTs), can be significant sources of EMI, which can disrupt nearby sensitive equipment.

- To minimise the effect of EMI for signal conductors it is recommended to use Twisted Pair and Sheilded cable.

- Alternately, use single conductors and twist to provide a balanced capacitance and inductive coupling thus cancelling out differential mode interferance.

Installing sheilded power cable is the most effective means to alleviate EMI problems. The cable's sheild forces the noise current to flow directly back to the VFD before it gets back into the power network or takes other undesirable and unpredicable high frequency paths. Unlike signal wiring, the sheilding on the motor cable should be terminated at both ends

- If sheilded cable is not availible then conductors plus ground in a conduit will provide some degree of protection.

Of all of the methods to mitigate EMC (Electromagnetic Compatibility) issues, grounding is the most effective and least costly. The importance of good grounding cannot be overstated.

The ground wire should be big (>3.5mm2) and short.

13. Technical Specifications

Input & Output Parameters
• Start Frequency: 0.01-10.00Hz • Input Voltage: 220VAC±15%,380V±15% • Input Frequency Range 50/60Hz, fluctuation±5% • Output Voltage ~ 0 to Rated input voltage • Output Frequency ~ 0-200Hz
Function: Variable speed, Constant pressure Water supply
Control Mode: V/F control (constant torque)
• Starting Torque ~ 0.5Hz±100% • Speed Adjustable Range ~ 1:100 • Speed-holding precision ~ ±1.0% • Overload Capability ~ 150% rated current for 60s;180% rated current for 1s • Acceleration/deceleration Time ~ 0.1-3600s

14. Alarm Codes and Solutions

Common alarm codes and Solutions

Alarm Description	Possible Reasons	Solutions
Low Flow Prot	1. Low inlet flow. 2. Drive's power is bigger than that of pump, Water pressure below 0.5 bar. 3. Low water press. set too high.	1. Increase incoming water 2. Low flow detect mode set 2 3. Decrease low water protection current
H.P. Prot	1. Actual pressure exceeds 15bar 2. Sensor malfunction, the readout exceeds 15 bar	1. Actual pressure exceeds 15bar 2. Sensor malfunction, the readout exceeds 15 bar
L.P. Prot	1. Pressure below 0.5 bar 2. Pressure below 0.5 bar while pump rotates reversely. 3. Water consumption is bigger than outlet flow. 4. Low press alarm set too high	1. Remove the air in the pump. 2. Adjust rotation direction. 3. Increase the inlet flow 4. Replace with bigger size pump or reduce water consumption. 5. Lower the alarm set value
Low Cur. Prot	1. Incoming water shortage. 2. Drive's power is bigger than that of pump. 3. Low water detecting current is set high	1. Increase incoming water 2. Low flow detect mode set 2 3. Decrease low water protection current

Faults and Trouble Shooting

Fault Type	Possible Reasons	Solutions
O/P SCC	1. short circuit or connected to ground 2. Overload	1. Inspect wiring 2. Contact factory
Accel OC	1. Short acceleration time 2. High Torque boost or V/F curve is not applicable	1. Increase acceleration time 2. Lower torque boost, Increase volt, Adjust V/F curve
Decel OC	Short deceleration time	Increase deceleration time
Run OC	Load sharply change	Reduce load fluctuation
SWOC	Software Overcurrent	Alter PID values
Internal Fault	Hardware problems	Contact factory
GND Fault	1. Drive or motor output is connected to ground 2. Drive input connected to output	1. Inspect wiring 2. Inspect motor aging problems.
Accel OV	1. High input voltage 2. Frequent switching on and off	Inspect the power and Voltage
Decel OV	1. Short decel. time 2. Abnormal input voltage.	1. Increase decel. time 2. Inspect power voltage 3. Reinstall brake resistor
Run OV	1. Abnormal input voltage. 2. Feedback energy	1. Inspect power 2. Reinstall brake resistor

Faults and Trouble Shooting Con't

Underload Prot	1. Drive output virtual wiring 2. No load	1. Inspect wiring 2. Inspect load
Drive OL	1. Excessive electrical load 2. Short acceleration time 3. High torque increase or V/F curve not applicable 4. Low Grid voltage	1. Reduce load or replace with a higher output drive 2. Increase accel. time 3. Lower torque. Increase voltage, adjust V/F curve. 4. Check grid voltage
Motor OL	1. Too big load 2. Too short acceleration time 3. Protection value is too small 4. Torque increases too high or V/F curve not applicable	1. Reduce load or replace with a higher output drive 2. Increase acceleration time 3. Increase overload protection value 4. Lower torque. Increase voltage to adjust V/F curve
Current detection fault	1. Damage of detecting device or circuit fault 2. Auxiliary power problems	Contact Factory
Low Volt Run	1. Abnormal input voltage 2. Big load in power grid	1. Inspect power voltage 2. Detach electricity supply
Open Terminal	External devices fault, input signal exist	Inspect the signal and its related devices
Closed Terminal	External devices fault, input signal exist	Inspect the signal and its related devices
Drive overheat	1. Dust 2. High envir. temp. 3. Fan damaged	1. Clean up air duct 2. Lower carrier frequency 3. Replace fan
I/P phase loss	1. Input voltage phase loss 2. Input voltage is too low	1. Check input wires connection 2. Check grid phase loss
O/P Phase loss	Bad correction of drive to motor	Inspect wiring
Storage Faults	Hardware Fault	Contact Factory
Running time reaches set time	Running time reaches set time	Contact factory
Sensor Fault	1. PID signal is off 2. Sensor is broken 3. Sensor setting problem	1. Check feedback channel 2. Check sensor has fault or not. 3. Check if the feedback signal complies with setting
Comm Fault	Data sending or receiving is incorrect	1. Check wiring 2. Contact manufacturer
Interfere fault	Improper operation caused by the surrounding EMI	Use absorption circuit to eliminate the surrounding interference

30. 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 unrepaired.

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** .....

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