

## INSTALLATION AND OPERATING INSTRUCTIONS

### Series 6850 Hydropak IVS Booster SETS



**Please read all these notes carefully.**

#### **CE CONFORMITIES:**

LVD	BS EN 61010-1
Safety of Machinery	BS EN 292-1
Safety of Machinery	BS EN 292-2
Safety of Machinery	BS EN 60204-1
Electromagnetic compatibility	
EMC emissions	BS EN 55011
Generic immunity	BS EN 50082-2
Harmonic Emissions	BS EN 61000-3-2
Electrostatic discharge	BS EN 61000-4-2
Radiated RF Immunity	BS EN 61000-4-3
Fast transient bursts	BS EN 61000-4-4
Voltage Surges	BS EN 61000-4-5
Conducted RF Immunity	BS EN 61000-4-6

#### **PREFACE**

1. The 6850-Hydropak IVS booster sets are designed for ease of setting and operation
2. All packaged pump systems are pre-wired and fully tested, both hydraulically and electrically prior to dispatch.
3. All parameter data has been entered into the controller in accordance with the system criteria. Once on-site connections have been made, and all pre-checks carried out the system is ready for commissioning.
4. If during commissioning system conditions are found to vary from those set out in the design criteria, the parameters can be easily changed.

#### **INTRODUCTION**

1. This leaflet contains specific information regarding the safe installation and operation of 6850-Hydropak IVS booster sets. These instructions must be read and understood by any one responsible for the installation and maintenance of this equipment.
2. Prior to power being applied, it is essential that all pre-commissioning procedures are carried out in full.
3. Operators and installers must familiarize themselves with the operation and controls of the equipment.

#### **WARNING SYMBOLS**



Safety instruction where an electrical hazard is involved.



Safety instruction where non-compliance would affect safety.



Safety instruction relating to safe operation of the equipment. (ATTENTION)

#### **INSTRUCTIONS FOR SAFE USE**

1. No installation of this equipment should take place until this O&M instruction has been studied and understood by the person responsible.
2. Handling, transportation and installation of this equipment shall only be undertaken with the proper use of lifting gear.
3. The set shall not be used for any purpose other than that for which it was designed and sized.
4. **The set *shall not be operated with the door open and the Door Interlocked Isolator overridden.***



**NOTE:** During normal operation the pumps will only generate pressures sufficient to satisfy system demand. However, abnormal running conditions may cause closed valve pressures to be experienced.

#### **STORAGE**

Store in a dry place. Protect against dirt, damage and frost.

#### **LIMITATIONS**

1. Maximum system working pressure: 10 or 15 bar.
2. Operating pressure:  
Nominal - as shown on pump name plates.  
Maximum - shut valve head of pumps supplied.
3. Electrical supplies: 3 phase, 50 Hz, 400volts.
4. Power supply fluctuation: +/- 10% maximum.
5. Humidity none condensing: 80% RH up to 31°C decreasing linearly to 50% RH at 40°C.
6. Ambient temperature: 5°C to 40°C.

#### **PROTECTION**

The set must be protected from the formation of condensation. If there is a likelihood of condensation forming on or in the control panel then an anti-condensation heater should be fitted. Contact our service department for details.

#### **GENERAL NOTES**

The sets comprise two, three, four or five pumps operating on a duty stand-by or duty, support and stand-by or duty, support, support arrangement. Each unit is set-up for a specific application, any change in the system conditions may necessitate a change in the settings.

## **INSTALLATION**

### **Mechanical**

1. The pump set is intended for use under flooded suction conditions, unless suction lift conditions were specifically included in the order, and should be positioned in such away that it's relationship to the storage tank ensures a positive suction head at full flow.
2. Site the set with sufficient space to the front and rear for maintenance purposes.
3. The set should be installed on a flat and even surface.

### **Electrical**

1. The power supply required is 400 volt +/-10%, 3 phase, 50Hz to suit motors fitted.
2. The incoming supply should be connected to the door interlocked isolator from a local distribution board.
3. Due to the set incorporating inverter drives, should an ELCB relay be used it must be:
  - Suitable for protecting equipment with a direct current content (DC) in the fault current (3-phase bridge rectifier).
  - Suitable for power-up with short charging current to earth.
  - Suitable for a high leakage current.
4. Wire the set VFC and external control systems (see wiring diagram) from the terminals provided using the ferrite beads as instructed.
5. All incoming cable glands should be IP54 rated as a minimum.
6. **THE SET MUST BE EFFICIENTLY EARTHED** ⚠

## **IMPORTANT SAFETY INFORMATION**

1. The voltage on the Hydropak IVS Booster Set is dangerous when it is connected to the mains. Incorrect installation of the set may lead to material damage or serious injury or it may be fatal. Consequently, the instructions in this manual as well as the local rules and safety regulations must be complied with.
2. Touching the electrical parts may be fatal, even after the mains supply has been disconnected, wait at least 4 minutes.
3. The installation must be fused and isolated correctly.
4. Covers and cable entries must be fitted.

### **NB!**



It is the user's or certified electrician's responsibility to ensure correct earthing and protection in accordance with applicable national and local requirements and standards.

### **Safety Regulations**

1. The Hydropak IVS Booster Set must be disconnected from the mains if repair work is to be carried out. Check the mains supply has been disconnected and the necessary time has passed (4 minutes).
2. The correct protective earthing of the equipment must be established, the user must be protected against supply voltage, and the set must be protected against overload in accordance with applicable national and local regulations.
3. RCD's (ELCB relays), multiple protective earthing or earthing can be used as extra protection, provided that local safety regulations are complied with.
4. In case of an earth fault, a DC content may develop in the fault current.
5. If RCD's are used, local regulations must be observed. Relays must be suitable for protection of 3 phase equipment with a bridge rectifier and for a brief discharge on power up.
6. The earth leakage currents are higher than 3.5mA. This means that the Hydropak IVS Booster set requires a fixed, permanent installation as well as reinforced protective earthing.

## **GENERAL FUNCTIONALITY**

1. Each pump is fitted with its own variable speed drive.
2. Pumps are staged in or out as required and all operate at the same speed
3. All running pumps will vary in speed in an attempt to keep the pressure constant.
4. Support pump selection is rotated between all available support pumps on an hours run basis (the least run pumps operating first).
5. If a fault occurs with any support pump then it will be omitted from the duty cycle and the individual pumps 'tripped' indicator will illuminate. The set will continue to operate as normal (where possible, within the limits of the set).
5. If a fault occurs with the duty pump then the variable speed drive will trip and display a 'tripped' indicator. The set will now choose a second pump to act as the duty.
6. When demand is minimal and only the duty pump is running, the set will enter sleep mode and monitor system conditions whilst all pumps are stopped. If demand resumes then pump(s) will automatically start.

## **OPERATION AND SETTING PROCEDURE**

1. Open the water supply valve to the set, then the suction isolating valves on the pumps followed by the delivery isolating valves. The system supply valve should remain closed.
2. Fully vent all the pumps.
3. The Hydropak IVS Booster Set is protected by a Low Water Level Safety Trip and a Remote Stop/ Inhibit. These two conditions need to be satisfied before the set can be operated. Follow the 'Booster Set Protection Procedure' shown opposite before continuing.
4. When the set protection procedure is complete turn disconnect switch to the 'ON' position. The inverter display will show the pressure which should read 0.0 BAR. If the pressure is Bar the inverter display will also flash the low water pressure alarm - "WARNING 65" Feedback Low (FEEDBACK<FDB LOW). This alarm can be ignored initially. When the set is up and running and the system pressure rises above 0.5 Bar the alarm will clear.
5. The pumps can be switched to 'HAND' to check the rotation is correct. The pumps will run at half full speed and stop when the switch is released.
6. Open the system supply valve.
7. Press 'Auto Start' on the VLT8006-Aqua Controller and switch all pumps to 'AUTO' and the necessary pumps will start and pressurise the system using the 'Fill Mode'.
8. The set is now ready for operation.

## **BOOSTER SET PROTECTION PROCEDURE**

### **LOW WATER LEVEL DEVICE**

1. First determine which of the following the booster set is fitted with:
  - a. A Single Break Tank Low Level switch will be evident by the fact that NO selectable Break Tank Selector Switch will be fitted to the exterior of the control panel door.
  - b. Dual Break Tank Low Level Switch will be evident by the presence of a selectable Dual Break Tank Selector Switch fitted to the exterior of the control panel door.
2. For single break tank protection ensure that the customer supplied break tank low water level switch is connected to the terminals numbered **701 & 702** mounted on the terminal rail inside the control panel. This switch should be NORMALLY CLOSED when the break tank level is healthy.
3. For Dual break tank protection ensure that the customer supplied break tank No. 1 low water level switch is connected to the terminals numbered **701 & 702**. Also ensure that the customer supplied break tank No. 2 low water level switch is connected to the terminals numbered **704 & 705**. These terminals are mounted on the terminal rail inside the control panel. Both switches should be NORMALLY CLOSED when the tank levels are healthy.

### **NB!**



The above procedure is designed to ensure that the set does not run dry. It is the user's responsibility to ensure that the Booster Set has a sufficient water supply at all times.

### **REMOTE STOP/INHIBIT**

1. The Hydropak IVS Booster Set is fitted with a Remote Stop/Inhibit feature which holds the set in STANDBY mode until a link is made between terminals **598 & 599**. These terminals are mounted inside the control panel. Until this link is made the Aqua8000 control panel will display "UNIT STANDBY" and will not start.
2. This feature is provided as a means for the Building Management System (BMS) to remotely disable the set via a switch. If this feature isn't required the link must be fitted as described above.

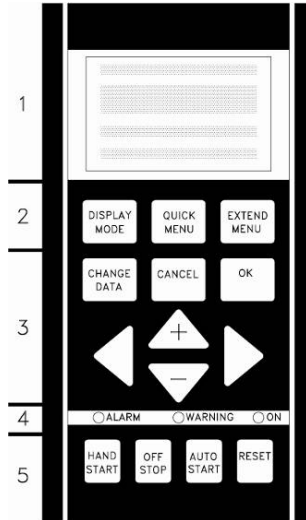
### **INVERTER CONTROL INTERFACE**

#### **General**

The front of the 6850-Hydropak IVS main control panel features a keypad - LCP (Local Control Panel). This is a complete interface for operation and programming of the VLT 8000 and cascade controller.

The functions of the keypad control panel can be divided into five groups:

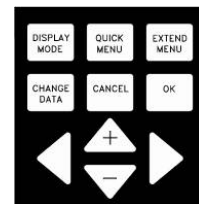
1. Display
2. Keys for changing display mode
3. Keys for changing program parameters
4. Indicator lamps
5. Keys for local operation.



All data are indicated by means of a 4-line alphanumeric display, which, in normal operation, is able to show 4 operating data values and 3 operating condition values continuously. As a supplement to the display, there are three indicator lamps for voltage (ON), warning (WARNING) and alarm (ALARM), respectively. Although factory set, all VLT frequency converter parameters can be changed immediately via the control panel.

### Control keys for parameter Setup

The control keys are divided into functions. This means that the keys between display and indicator lamps are used for parameter Setup, including selecting the display indication during normal operation.



### NB!

All parameters are factory set. Refer to commissioning guide or contact Armstrong before changing settings.



[DISPLAY / STATUS] is used for selecting the indication mode of the display or when returning to the Display mode from either the Quick menu or the Extend menu mode.



[QUICK MENU] gives access to the parameters used for the Quick menu. It is possible to switch between the Quick menu and the Extend menu modes.



[EXTEND MENU] gives access to all parameters. It is possible to switch between the Extend menu and the Quick menu modes.



[CHANGE DATA] is used for changing a setting selected either in the Extend menu or the Quick menu mode.



[CANCEL] is used if a change of the selected parameter is not to be carried out.



[OK] is used for confirming a change of the parameter selected.



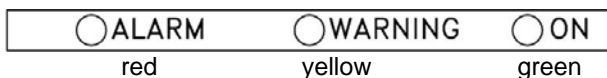
[+/-] is used for selecting parameters and for changing a chosen parameter. These keys are also used to change the local reference. In addition, the keys are used in Display mode to switch between operation variable readouts.



[<>] is used when selecting a parameter group and for moving the cursor when changing numerical values.

### Indicator lamps

At the bottom of the control panel is a red alarm lamp and a yellow warning lamp, as well as a green voltage LED.



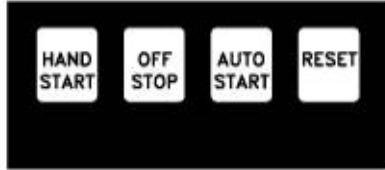
If certain threshold values are exceeded, the alarm and/or warning lamp is activated, and a status or alarm text is displayed.



**NB!** The voltage indicator lamp is activated when the VLT frequency converter receives voltage.

## Local control

Underneath the indicator lamps are keys for local control.



[HAND START] is used if the VLT frequency converter is to be controlled via the control unit (manual override or test).



[OFF/STOP] is used for stopping the pumps in sequence. If the stop function is activated, line 2 will flash. Pressing this button will override the start commands from any TEST/OFF/AUTO switches that are in the AUTO position.



[AUTO START] is used for normal operation of the booster set. Provided the inverter TEST/OFF/AUTO switch on the control panel of the set is in the AUTO position then the pump(s) will start.



[RESET] is used for resetting the VLT frequency converter after an alarm (trip).

## Display mode

In normal operation, any 4 different operating variables can be indicated continuously: 1.1 and 1.2 and 1.3 and 2. The present operating status or alarms and warnings that have arisen are shown in line 2 in the form of a number. In the case of alarms, the alarm in question will be shown in lines 3 and 4, accompanied by an explanatory note. Warnings will flash in line 2, with an explanatory note in line 1. In addition, the display shows the active Setup.



The arrow indicates the direction of rotation; here the VLT frequency converter is driving the pump in an anticlockwise direction (looking from the drive end). The arrow body disappears if a stop command is given or if the output frequency falls below 0.01 Hz. The bottom line gives the status of the VLT frequency converter.

The scroll list on below gives the operating data that can be shown for variable 2 in display mode. Changes are made via the [+/-] keys.

The table below gives the operating data options for the first and second line of the display.

Scroll-list:	Unit:
Resulting reference, %	[%]
Resulting reference, unit	[unit]
Frequency	[Hz]
Frequency	[%]
Motor current	[A]
Power	[kW]
Power	[HP]
Output energy	[kWh]
Hours run	[h]
Used-defined readout	[unit]
Setpoint 1	[unit]
Setpoint 2	[unit]
Feedback 1	[unit]
Feedback 2	[unit]
Feedback	[unit]
Motor voltage	[V]
DC voltage	[V]

Thermal motor load	[%]
Thermal drive load	[%]
Digital input	[BIN]
Analogue input 53	[V]
Analogue input 54	[V]
Analogue input 60	[mA]
Pulse reference	[Hz]
Ext. reference	[%]
Heat sink temp.	[°C]
Free Prog Array	[-]
Comm Opt Warn	[HEX]

Three operating data values can be shown in the first display line, while one operating variable can be shown in the second display line. To be programmed via parameters 007, 008, 009 and 010 Display readout.

### Status Line

The left part of the status line indicates the control element of the VLT frequency converter that is active. AUTO means that control is full pump cascade control is in operation, while HAND indicates that the variable speed pump is in test mode.

OFF means that the VLT frequency converter ignores all control commands and stops the pumps. The centre part of the status line indicates the reference element that is active. REMOTE means that the reference from the control terminals is active, while LOCAL indicates that the reference is determined via the [+/-] keys on the control panel. The last part of the status line indicates the current status, for example "Running", "Stop" or "Alarm".

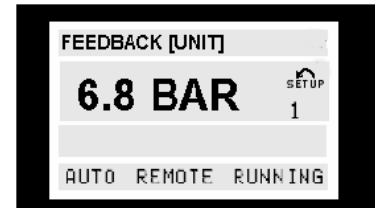


### Display mode I:

The VLT frequency converter offers different display modes. The figure on the next page shows the way to navigate between different display modes.

Below is a display mode, in which the VLT frequency converter is in Auto mode with remote reference and the pressure feedback is 6.8 bar. The text in line 1 gives the operating variable shown in line 2.

Line 2 gives the current system pressure and the active Setup. Line 4 says that the VLT frequency converter is in Auto mode with remote reference, and that the pump is running.



### Display mode II:

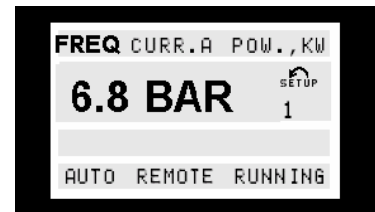
This display mode makes it possible to have three operating data values displayed at the same time in line 1.

The operating data values are determined in parameters 007-010 *Display readout*.



### Display mode III:

This display mode can be generated as long as the [DISPLAY MODE] key is kept depressed. In the first line, operating data names and units of operating data are displayed. In the second line, operating data 2 remains unchanged. When the key is released, the different operating data values are shown.



### Display mode IV:

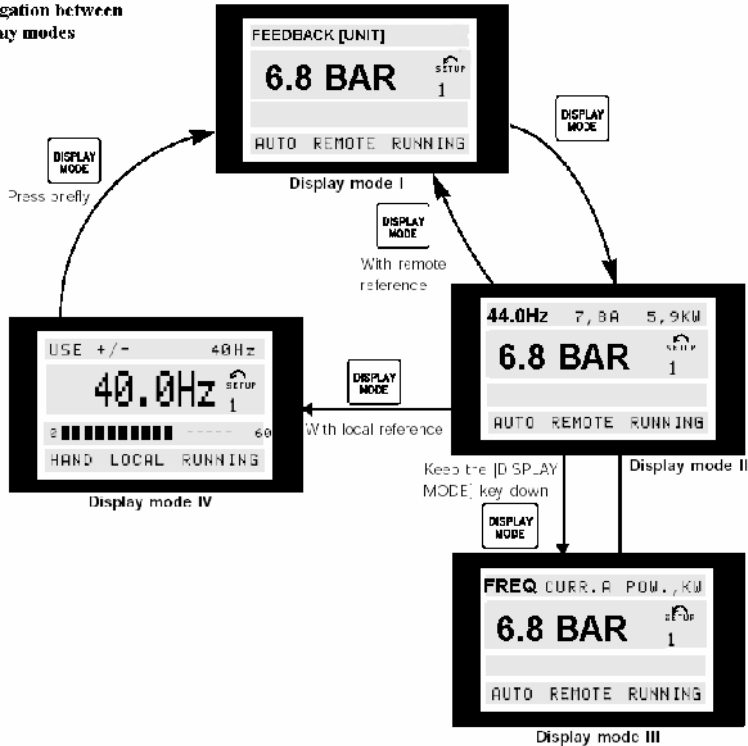
This display mode is only generated in connection with TEST (HAND) operation. In this display mode, the reference is determined via the [+/-] keys and control is carried out by means of the keys underneath the indicator lamps.

The first line indicates the required reference.



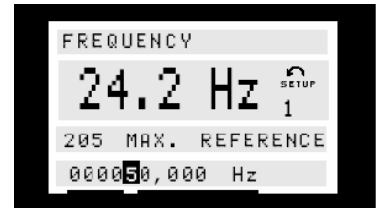
The third line gives the relative value of the present output frequency at any given time in relation to the maximum frequency. The display is in the form of a bar graph.

### Navigation between display modes



### Changing data

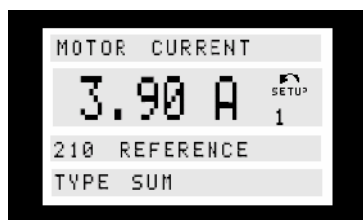
Regardless of whether a parameter has been selected under the Quick menu or the Extend menu, the procedure for changing data is the same. Pressing the [CHANGE DATA] key gives access to changing the selected parameter, following which the underlining in line 4 will flash on the display.



The procedure for changing data depends on whether the selected parameter represents a numerical data value or a functional value. If the chosen parameter represents a numeric data value, the first digit can be changed by means of the [+/-] keys. If the second digit is to be changed, first move the cursor by using the [<>] keys, then change the data value using the [+/-] keys.

The selected digit is indicated by a flashing cursor. The bottom display line gives the data value that will be entered (saved) when signing off by pressing the [OK] button. Use [CANCEL] to cancel the change.

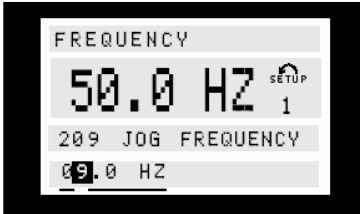
If the selected parameter is a functional value, the selected text value can be changed by means of the [+/-] keys.



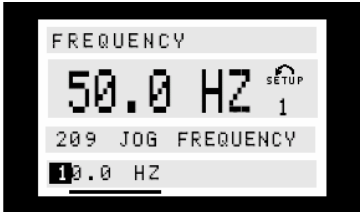
The functional value flashes until signing off by pressing the [OK] button. The functional value has now been selected. Use [CANCEL] to cancel the change.

## Infinitely variable change of numeric data value

If the chosen parameter represents a numeric data value, a digit is first selected by means of the [←>] keys.




Then the chosen digit is changed infinitely variably by means of the [+/-] keys:



The chosen digit is indicated by the digit flashing. The bottom display line shows the data value that will be entered (saved) when signing off with [OK].

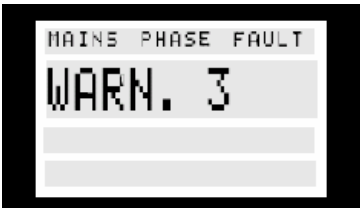
## Quick Menu

The QUICK MENU key gives access to 12 of the most important setup parameters of the drive. However, due to the large number of parameters used for multi-pump boosting applications the extended menu should be used.

 **NB!** The 6850-Hydropak IVS booster set is delivered pre-configured and hence parameter changes should not be required. If setting changes are required then the 6850-HYDROPAK IVS COMMISSIONING INSTRUCTIONS should be consulted.

## WARNINGS AND ALARMS

If the situation occurs where the drive displays a warning then this will be displayed as in the example below.




Warnings can occur without the drive tripping or can be can precede an alarm.

If an alarm occurs then this will be displayed as follows:



When '(RESET)' is displayed in line 1 of the display then the drive can be reset without cycling the power to the drive. If '(TRIP LOCK)' is displayed then the power must be cut and the fault corrected.

 **NB!** If a fault occurs and the problem cannot be rectified then please contact Armstrong service department for technical support.

## SET MAINTENANCE

1. Ensure that the unit is isolated from all electrical supplies and pressure is released before any maintenance work is carried out.





2. Approximately every six months a thorough examination of the installation should be conducted. The set and pump seals should be checked for leakage and motors for bearing noise.
3. Every 2 years the set storage vessel should be stripped down and all parts should be examined, the shell should be checked for any internal corrosion and be replaced if present.  
**NOTE:** this procedure should be written into your Written Scheme of Examination.
4. Motors are generally fitted with sealed for life bearings in which case they require no further attention. Where grease nipples are fitted follow the instructions on the lubrication plate.  
**NOTE:** The use of spare parts not supplied by Armstrong will invalidate the guarantee. The units must be installed and maintained in line with our Operating and Maintenance Manual during the warranty period. Failure to adhere to any of the above will invalidate all guarantees and product responsibility of Armstrong.

## **Break Tank Low Water Level**

The low water level alarm will be activated should the customer supplied break tank level switch trip. The unit will stop running. The Inverter Control Interface will display:

### **ALARM: 60**

#### **Safety Stop (EXTERNAL FAULT)**

The low water level lamp will display on the control panel door. The break tank low water level volt-free contacts and the common alarm volt-free contacts will activate, providing remote alarm signals.

**Note:** This is an alarm. The set will trip and stop all pumps until the water level returns to normal, The unit will then auto reset and operate as normal.

#### **Transducer Failure**

If the signal value of the pressure transducer drops below 50% of the minimum scaling preset in parameter 309 for a period of time greater than the value set in parameter 317, the booster set will trip.

The Inverter Control Interface will display:

### **WARNING/ALARM: 2**

#### **Live Zero Fault (LIVE ZERO ERROR)**

The electrical fault should be corrected and the unit reset procedure, on page 7, should be followed.

#### **Low Water Pressure**

The low water pressure alarm will be activated should the pressure at the transducer drop below the value programmed in parameter 227 of VLT8000aqua controller. The Inverter Control Interface will display:

### **WARNING: 65**

#### **Feedback Low (FEEDBACK < FDB LOW)**

The low water pressure volt-free contacts and the common alarm volt-free contacts will also Activate, providing remote alarm signals.

**Note:** This is a warning only. The set will otherwise operate as normal.

#### **Power Supply Failed**

Should the power supply to the set fail the power supply failed volt-free contacts and the common alarm volt-free contacts will activate, providing remote alarm signals.

#### **Pump Running**

Any pumps that are running during operation, whether in hand or auto, will display that particular pumps' running lamp on the control panel door. The appropriate pump running volt-free contact will also be activated.

#### **Pump Tripped**

Any pumps that are tripped, will display the appropriate pump tripped lamp on the control panel door. Any pumps that are tripped during operation, whether in hand or auto, will display that particular pumps' tripped lamp on the control panel door. The appropriate pump tripped volt-free contact will also be activated, as will the common alarm volt free contact.

## **START PERMISSIVES**

#### **Remote Stop/Inhibit**

The remote stop will be activated should the customer supplied remote stop switch be activated. The unit will stop running. On the bottom line the Inverter Control Interface will display:

#### **Standby**

**Note:** This is a start enable/disable and will prevent the unit from starting if it is not engaged.



## VLT8006-Aqua Controller Parameter Settings

Description	Parameter	AHBP Default Setting	Changed Setting
Language	001	English	
Active Setup	002	Setup 1	
Copying of Setups	003	No Copy	
LCP Copy	004	No Copy	
Max. Value of User-Defined Readout	005	100.00	
Unit for User-Defined Readout	006	No Unit	
Big Display Readout	007	Feedback [Unit]	
Small Display Readout 1.1	008	Frequency [Hz]	
Small Display Readout 1.2	009	None	
Small Display Readout 1.3	010	Hours Run [h]	
Unit of Local reference	011	Hz	
Hand Start on LCP	012	Enable	
OFF/STOP on LCP	013	Enable	
Auto Start on LCP	014	Enable	
Reset on LCP	015	Enable	
Lock for Data Change	016	Not Locked	
Operating State at Power Up, Local Control	017	Auto Restart	
Configuration	100	Closed Loop	
Torque Characteristics	101	AEO Function	
Motor Power, $P_{M,N}$	102	4.00 KW	
Motor Voltage, $U_{M,N}$	103	400 V	
Motor Frequency, $f_{M,N}$	104	50 Hz	
Motor Current, $I_{M,N}$	105	9.00A	
Rated Motor Speed, $n_{M,N}$	106	1420 rpm	
Automatic Motor Adaptation (AMA)	107	Optimise Disable (No AMA)	
Start Voltage of Parallel Motors	108	9.4 V	
Resonance Dampening	109	100%	
High Break-Away Torque	110	Off	
Start Delay	111	0.0 Seconds	
Motor Preheater	112	Disable	
Motor Preheater DC Current	113	50%	
DC Braking Current	114	50%	
DC Braking Time	115	10.0 Seconds	
DC Brake Cut-in Frequency	116	Off	
Motor Thermal Protection	117	ETR Trip 1	
Motor Power Factor	118	0.75	
Load Compensation at Low Speed	119	100%	
Load Compensation at High Speed	120	100%	
Slip Compensation	121	100%	
Slip Compensation Time Constant	122	0.50 Seconds	
Stator Resistance	123	1.1 Ohm	
Stator Reactance	124	60.0 Ohm	
Minimum Output Frequency, $f_{MIN}$	201	20.0 Hz	
Maximum Output Frequency, $f_{MAX}$	202	50.0 Hz	
Reference Site	203	Linked To Hand/Auto	
Minimum Reference, $Ref_{MIN}$	204	0.000	
Maximum Reference, $Ref_{MAX}$	205	17.237 bar	
Ramp-Up Time 1	206	1.0 Seconds	
Ramp-Down Time 1	207	1.0 Seconds	
Automatic Ramp-Up/Down Time	208	Enable	
Jog Frequency	209	25.0 Hz	
Reference Function	210	Sum	
Preset Reference 1	211	0.00%	
Preset Reference 2	212	0.00%	
Preset Reference 3	213	0.00%	
Preset Reference 4	214	0.00%	
Current Limit for Motor Mode, $I_{LIM}$	215	10.0 A	
Frequency Bypass, Bandwidth	216	0 Hz	
Frequency Bypass 1	217	120.0 Hz	
Frequency Bypass 2	218	120.0 Hz	
Frequency Bypass 3	219	120.0 Hz	
Frequency Bypass 4	220	120.0 Hz	
Warning: Low Current, $I_{LOW}$	221	0.0 A	
Warning: High Current, $I_{HIGH}$	222	11.0 A	
Warning: Low Frequency, $f_{LOW}$	223	0.0 Hz	
Warning: High Frequency, $f_{HIGH}$	224	120.0 Hz	
Warning: Low Reference, $Ref_{LOW}$	225	-999,999,999	
Warning: High Reference, $Ref_{HIGH}$	226	999,999,999	
Warning: Low Feedback, $FB_{LOW}$	227	0.50 bar	
Warning: High Feedback, $FB_{HIGH}$	228	999,999,999	
Initial Ramp	229	3.0 Seconds	
Fill Rate	230	5% of Parameter 418	
Filled Setpoint	231	85% of Parameter 418	



## VLT8006-Aqua Controller Parameter Settings

Description	Parameter	AHBP Default Setting	Changed Setting
Terminal 16, Digital Input	300	No Operation	
Terminal 17, Digital Input	301	System Start	
Terminal 18, Digital Input	302	Start	
Terminal 19, Digital Input	303	No Operation	
Terminal 27, Digital Input	304	Safety Interlock	
Terminal 29, Digital Input	305	No Operation	
Terminal 32, Digital Input	306	No Operation	
Terminal 33, Digital Input	307	No Operation	
Terminal 53, Analogue Input Voltage	308	Feedback	
Terminal 53, Minimum Scaling	309	1.0 V	
Terminal 53, Maximum Scaling	310	6.0 V	
Terminal 54, Analogue Input Voltage	311	No Operation	
Terminal 54, Minimum Scaling	312	0.0 V	
Terminal 54, Maximum Scaling	313	10.0 V	
Terminal 60, Analogue Input Current	314	No Operation	
Terminal 60, Minimum Scaling	315	4.0 mA	
Terminal 60, Maximum Scaling	316	20.0 mA	
Time Out	317	10 Seconds	
Function after Time Out	318	Stop	
Terminal 42, Output	319	Output Frequency Pulse	
Terminal 42, Output Pulse Scaling	320	5000 Hz	
Terminal 45, Output	321	Sleep Mode	
Terminal 45, Output Pulse Scaling	322	5,000 Hz	
Relay 1, Output Function	323	Feedback Range Warning	
Relay 01, ON Delay	324	0.0 Seconds	
Relay 01, OFF Delay	325	0.0 Seconds	
Relay 2, Output Function	326	Running	
Pulse Reference, Maximum Frequency	327	5,000 Hz	
Pulse Feedback, Maximum Frequency	328	25,000 Hz	
Terminal 42, Bus Control	364	0	
Terminal 45, Bus Control	365	0	
Reset Function	400	Automatic x 10	
Automatic Restart Time	401	10 Seconds	
Flying Start	402	Disable	
Sleep Mode Timer	403	60 Seconds	
Sleep Frequency	404	Depends on Unit (Hz)	
Wake-Up Frequency	405	Depends on Unit (Hz)	
Boost Set Point	406	1%	
Switching Frequency	407	4.5 Khz	
Interference	408	ASFM	
Function in Case of No Load	409	Warning	
Function at Mains Failure	410	Trip	
Function at Overtemperature	411	Trip	
Trip Delay Overcurrent, ILIM	412	Off	
Minimum Feedback, FBMIN	413	0.000	
Maximum Feedback, FBMAX	414	17.237 bar	
Reference/Feedback Unit	415	bar	
Feedback Conversion	416	Linear	
Feedback Calculation	417	Maximum	
Setpoint 1	418	Depends on Unit (Bar)	
Setpoint 2	419	0.000	
Process PID Control	420	Normal	
Process PID Anti-Windup	421	On	
Process PID Start Frequency	422	30 Hz	
Process PID Proportional Gain	423	3.0	
Process PID Integral Time	424	1.50 Seconds	
Process PID Differentiation Time	425	Off	
Process PID Differentiation Gain Limit	426	5.0	
Process PID Lowpass Filter Time	427	0.50 Seconds	
Motor Alternation Time	433	Off	
Motor Alternation Function	434	Ramp	
Dynamic DC Link Compensation	483	On	
Serial Communications	500 to 556	Display Parameters (Not Changed)	
Technical Functions	600 to 631	Display Parameters (Not Changed)	
Pump Combination	712	Depends on Unit	
Staging Bandwidth	713	1.0%	
Destaging Delay	714	0.0 Seconds	
Staging Delay	715	0.0 Seconds	
Override Bandwidth	716	100% = Off	
Override Timer	717	0.0 Seconds	
Staging Frequency	718	100%	
Destage Time	721	Off	



Description	Parameter	AHBP Default Setting	Changed Setting
Pump Cycling	722	Enabled	
Mode Select	723	Master/Slave Control	
Read Out Parameters	724 to 738	Data Read-Out	
Master/Slave Stage On Frequency Pump 2	739 [1]	50 Hz	
Master/Slave Stage On Frequency Pump 3 (If Fitted)	739 [2]	50 Hz	
Master/Slave Stage On Frequency Pump 4 (If Fitted)	739 [3]	50 Hz	
Master/Slave Stage On Frequency Pump 5 (If Fitted)	739 [4]	50 Hz	
Master/Slave Stage Off Frequency Pump 2	740 [1]	Depends on Unit	
Master/Slave Stage Off Frequency Pump 3 (If Fitted)	740 [2]	Depends on Unit	
Master/Slave Stage Off Frequency Pump 4 (If Fitted)	740 [3]	Depends on Unit	
Master/Slave Stage Off Frequency Pump 5 (If Fitted)	740 [4]	Depends on Unit	
STD Destaging frequency	741	0%	

**Armstrong Holden Brooke Pullen**  
 Wenlock Way  
 Manchester  
 United Kingdom, M12 5JL  
 T: +44 (0) 161 223 2223  
 F: +44 (0) 161 220 9660

**Sales & Service Office**  
 21 Ormside Way  
 Holmethorpe Industrial Estate  
 Redhill, Surrey, RH1 2NT  
 T: +44 (0)173 737 8100  
 F: +44 (0)173 737 8140

**S. A. Armstrong Limited**  
 Bertrand Avenue  
 Toronto, Ontario  
 Canada, M1L 2P3  
 T: (416) 755-2291  
 F: (416) 759-9101



© S.A. Armstrong Limited 2010