

## PUMP CONTROL

# OWNER'S OPERATION & COMMISSIONING MANUAL

Matelec HydroTOUCH Multipump Controller  
Specifications



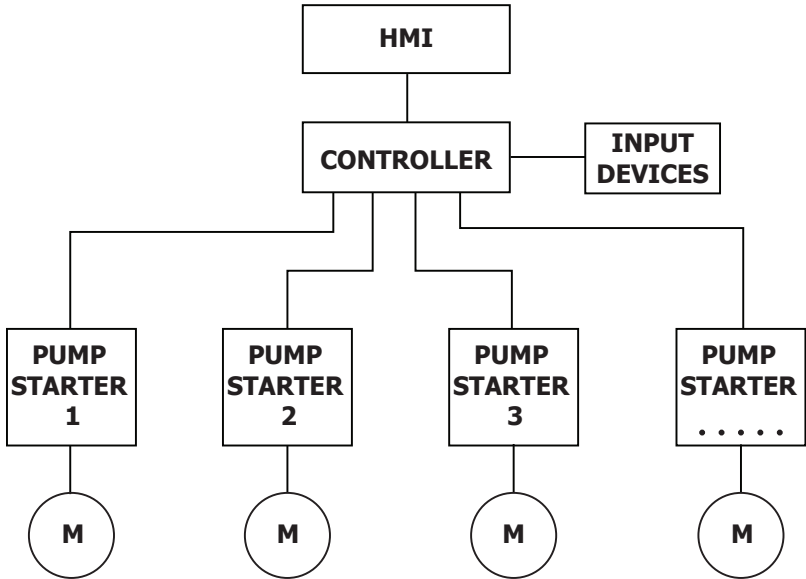
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## 2. Overall Solution

Electrically the system is composed of three main components: the controller, pump starters and Human Machine Interface (HMI). The following diagram depicts the basic layout:



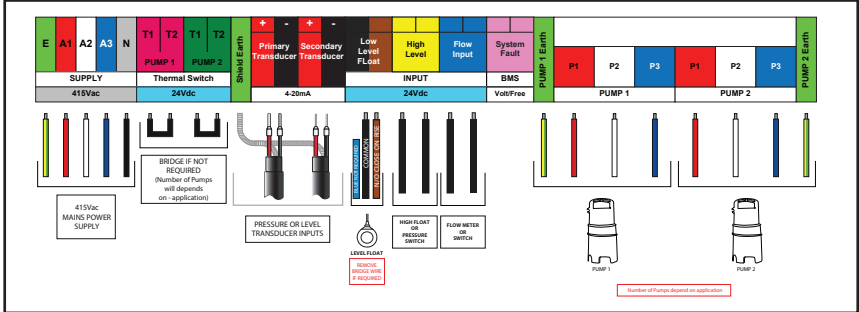
The HydroTOUCH has been designed to be a flexible solution for all aspects of feedback controlled pumps. Whether this is constant pressure, constant temperature or proportional level, the HydroTOUCH can be configured to suit. The number of pumps can be anywhere from 1-12.

# 3. Commissioning

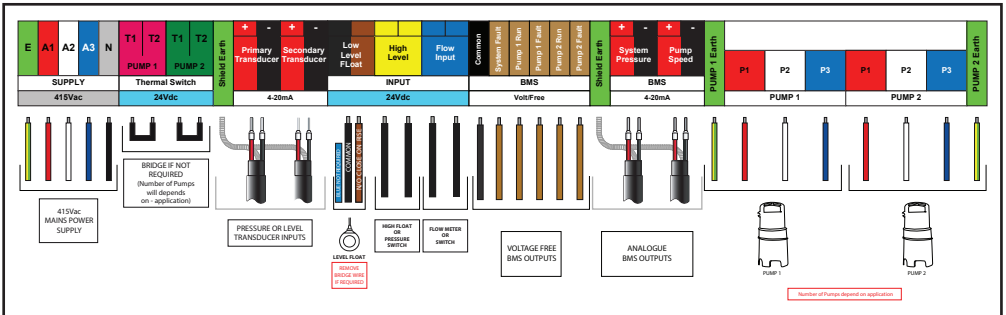
## 3.1 CONNECTIONS



### Standard Connections



### Optional Connections



The HydroTouch is flexible and configurable for level transducers, flow meters and custom BMS signals. These options come standard and only need to be enabled in the wizard for use.

### 3.2 LOGIN

After the power, probes and pumps have been connected the HydroTOUCH is ready for commissioning. On initial power up, the HydroTOUCH will request the setup wizard be run to configure the system to suit site requirements. Once the wizard has been fully completed and saved the configuration will be stored into memory. If at any time site conditions change the setup wizard can be run again from the main menu. This will open up all the previously saved settings which can be further adjusted to suit any changes to site conditions.

There are two levels of access.

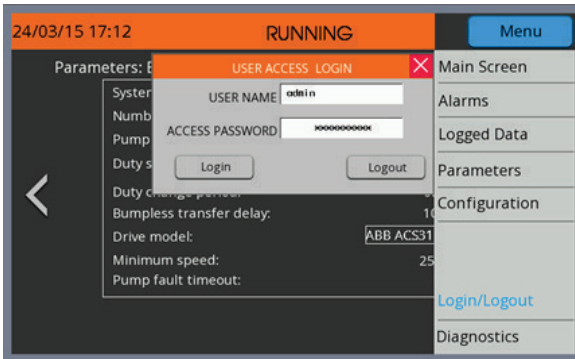
For onsite pump control and resetting faults, login using:

**User Name: user , Password : 1234**

For full access to the wizard, parameter list and resetting log data, login using:

**User Name: admin , Password : 5555**

Note: User names must be set as **lower case**.



To log in press on the user access box and enter 'admin' then press on the password box and enter '5555'. Once logged in the user can access all settings without having to reenter the password. After 10 minutes of inactivity the user will automatically be logged out requiring them to login again to adjust any more parameters. The login is not required to view the system status.

HYDROTOUCH LOGIN ACCESS			
	NO LOG	USER LOG	ADMIN LOG
View Main Page/Overview/Logs	X	X	X
Mute Audible Alarm	X	X	X
Change Setpoint (Overview Page)	X	X	X
Reset Active Faults	X	X	X
System mode select Auto/Off	X	X	X
Pump View/Disable/Auto/Manual		X	X
Manual Override		X	X
Edit Parameters			X
Factory Reset (Diagnostics)			X
Reset Logged Data			X
Clear Fault History			X
Rotation Test			X
Run Wizard			X

### 3.3 EASY SETUP WIZARD

During the easy setup wizard you will be prompted to enter all the relevant information to configure the system. Some of the important features that must be set correctly in the wizard are listed below.

#### - Pump 1 Mode

The first pump can be configured as a main pump, jacking pump or a mixer. If setup as a main pump it will be duty cycled with all other pumps. If setup as a jacking pump it will always be the first pump to start and if it can't keep up with demand the main pumps will start. In mixer mode the mixer will start before the pumps for the set delay. Both the jacking pump and mixer can be setup to switch off once the main pumps start.

#### - Pump Rotation

The pump rotation simulation is to allow the user to check the rotation of the pumps. Once the start button is pressed the controller will run one pump at a time slowly so that they can be checked for correct rotation. If the rotation is incorrect ensure that power is isolated to the pump before changing the wiring.

#### - Additional Functionality

In addition to the standard operation there are other functions that can be enabled or disabled. **See section 5 for more details on these functions.**

#### - System Protections

Once the wizard is finished press the save button to save the configuration. The system is configured ready to go. On the main screen the toggle switch is to be used to turn the system into auto position to start running. If site conditions change the wizard can be rerun to further tune the system. Also if fine adjustment is required the extensive parameter list can be accessed via the main menu.

### 3.4 MOTOR DATA - THERMAL OVERLOAD

The full load current (FLC) is written on the name plate of the pump and is required to be set correctly for pump protection. If this value is not entered correctly then there is potential that the pumps may be damaged.



FIGURE 1

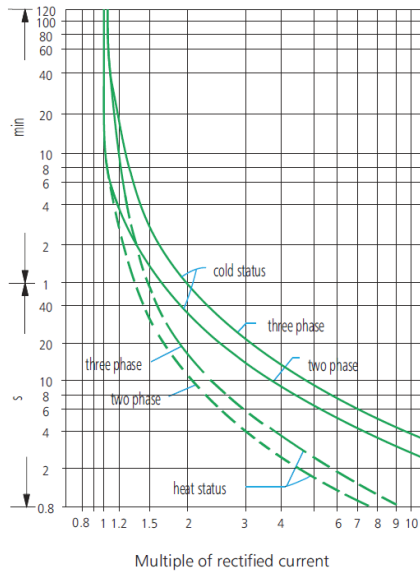
THREE PHASE			
CAT. NO.	JM3550		
SPEC.	35F84W7		
FRAME	56J	SER.	F1295
H.P.	1 1/2	TE	
VOLTS	208-230/460		
AMPS	7.6/2.3		
HZ	50		

FIGURE 2

The thermal overload is designed to open the starting circuit and thus cut the power to the motor in the event of the motor drawing too much current from the supply for an extended time. The overload relay has a normally closed contact which opens due to heat generated by excessive current flowing through the circuit.

## Trip Curves

As for thermal relay time-current characteristic curve, please see below graph:



The current sensing circuits can measure a maximum of 11x the full load current and thus the minimum trip time is limited to approximately 2.5 seconds as shown in the above plot. In the case of a lower overload setting (for example, 10A) the system can react proportionally to even higher multiples of the full load current. A multiple of 50x FLA will cause the overload to occur within 30ms; the shortest reaction time possible.

Key times to trip are:

Multiple of Overload Setting for 3PH and Heat Status	Trip Time
1x	Will not trip
1.05x	Approx. 8 Minutes
1.5x	Approx. 55 Seconds
5x	Approx. 2.7Seconds
10x	Instantaneously

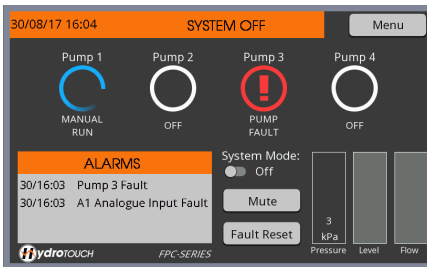
## Cooldown

By nature of their construction, bimetallic strip based overloads have an automatic cool-down time after a trip event before the overload can be reset. When an overload condition results in the unit switching off the pump the unit will simulate the cool-down. The time for bimetallic strip cool down determines on surrounding the ambient temperature and on the multiple of rectified current, during the cool-down period it will not be possible to reset the overload fault for that pump. Most of the time there will have been a sufficient period of time elapsed between the alarm triggering and a technician arriving on site that the cool-down timer will have elapsed any way.



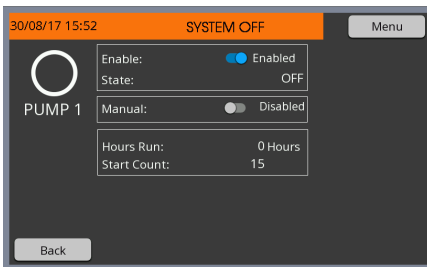
# 4. Operation

## 4.1 MAIN SCREEN



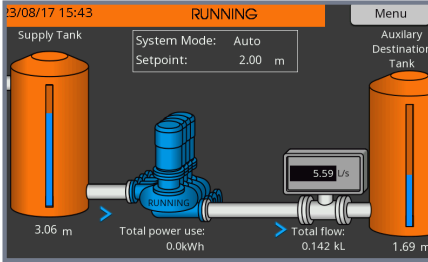
The main screen shows how the system is operating and the status of faults, pumps and sensors. All elements can be touched to gain further information from this screen. The menu in the top right corner gives access to further screens for parameter adjustment, to view logged data or past faults or to rerun the wizard if site conditions have changed.

## 4.2 PUMP SCREEN



By pressing on any pump further pump controls and information can be obtained like pump status, run hours and number of starts. If a pump needs to be disabled and taken out of operation or even run in a manual mode for testing this is the screen where this is achieved. It is by simply pressing on the toggle switches to choose the operation required. The back button in the bottom left corner will take you back to the main screen.

### 4.3 OVERVIEW SCREEN



The overview screen is a handy tool to monitor the entire system operation. For ease of use, it will be automatically configured depending on what is set during the easy setup wizard.

### 4.4 ALARM SCREEN



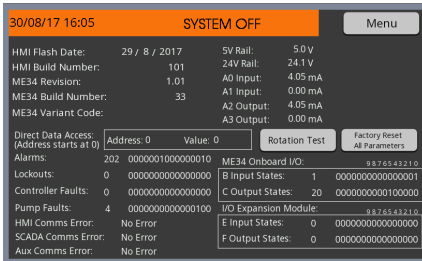
Pressing on the current alarms table will bring up the full alarms screen. This screens keeps a log of all past faults with an accurate time and date stamp. This can be a helpful tool in diagnosing what is going on with the system without having to be available 24/7. The back button will take you back to the main screen.

## 4.5 LOGGED DATA SCREEN



The logged data screen can be accessed through the main menu. On this page you will find access to trend graphs for power, pressure, flow and tank level. Usage graphs for total monthly power and water usage. Run timers for each pump and counters for system event information.

## 4.6 DIAGNOSTIC SCREEN



For fault finding and testing the diagnostic screen can be a useful tool. This screen is located at the bottom of the menu list. In this screen a competent user can diagnose communication faults, test pump rotation and even restore all the parameters to factory default if the user so wishes. The menu will give access back to the main screen.

## 4.7 WIZARD MENU STRUCTURE

**START**

29/01/16 08:56 SYSTEM OFF

Wizard: Set Time and Date

Current Time:   :

Current Date:  /  /

Dsp. | Month | Year

Cancel Wizard  Next

15/09/17 16:54 SYSTEM INIT

Wizard: Pumps

Pump 1 mode:  |  |  |

Mixer pump start delay:  Secs

Main pumps:  (The maximum number of pumps including jacking pump or mixer)

Pump limit:  (The maximum number of pumps allowed to run simultaneously)

Cancel Wizard  Back Next

29/05/16 14:49 SETUP WIZARD

Initial pump configuration settings have been saved.

Press "OK" to proceed to pump rotation test.

Cancel Wizard

29/01/16 08:59 SETUP WIZARD

Wizard: Pump Rotation Test

Each pump will be operated in sequence to show the rotation direction.

WARNING: Isolate pumps before changing pump wiring to reverse rotation

Pumps off

WARNING: Pump Comms Fail

30/08/17 16:15 SETUP WIZARD

Wizard: Installation Type

Pressure Control:  (The system controls the pressure based on this input signal)

Level Control:  (The system controls the level based on this input signal)

Temperature Control:  (The system controls the temperature based on this input signal)

Cancel Wizard  Back Next

**PRESSURE CONTROL**

31/08/17 09:02 SETUP WIZARD

Wizard: Pressure Setup

Pressure transducer units:  (Unit type that the transducer is measured in)

Pressure transducer range:  kPa (The full scale range value of the pressure transducer)

Setpoint:  kPa (The setpoint pressure)

Duty start step:  kPa (Difference from setpoint at which the duty pump is started)

Standby start step:  kPa (Difference from setpoint to return each step of the amount from the duty start level)

Cancel Wizard  Back Next

31/08/17 09:04 SETUP WIZARD

Wizard: Pressure Setup

Pump cycle protection:  Disabled (If the pump level is higher than within basic rock flow, the pump will be locked out)

Maximum flow protection:  Enabled (If all available pumps are running for 10 minutes then a flow limit will be imposed and the system locked out)

Anti-Seize protection:  Enabled (If a pump has been setting for 7 days then the pump will run for 5 seconds to prevent pump seizure)

Supply float low level alarm:  Disabled (A high level fault set below the tank low level alarm)

Supply low level protection:  Disabled (A high level fault set below the tank low level alarm)

Cancel Wizard  Back Next

**LEVEL CONTROL**

31/08/17 09:44 SETUP WIZARD

Wizard: Level Setup

Tank level units:  (Unit type that the level is measured in)

Level transducer range:  m (The full scale range value of the level transducer)

Level control operation:  (Select whether the controller will empty or fill the tank)

Setpoint:  m (The setpoint level)

Duty start step:  m (Difference from setpoint at which the duty pump is started)

Standby start step:  m (Difference from setpoint to return each step from the duty start level)

Cancel Wizard  Back Next

31/08/17 09:45 SETUP WIZARD

Wizard: Level Setup

Supply float low level alarm:  Enabled (A high level fault set below the tank low level alarm)

Supply low level protection:  Enabled (A high level fault set below the tank low level alarm)

Supply transducer low level alarm:  Disabled (A high level fault set below the tank low level alarm)

Supply transducer low threshold:  m (The setpoint level)

High level Alarm:  Enabled (A high level fault set above the tank high level alarm)

High level threshold:  m (The setpoint level)

High level protection:  Disabled (A high level fault set above the tank high level alarm)

Cancel Wizard  Back Next

**TEMP. CONTROL**

31/08/17 09:53 SETUP WIZARD

Wizard: Temperature Setup

Temperature units:  (Unit type that the temperature is measured in)

Temperature transducer range:  °C (The full scale range value of the temperature transducer)

Setpoint:  °C (The setpoint temperature)

Duty start step:  °C (Difference from setpoint at which the duty pump is started)

Standby start step:  °C (Difference from setpoint to return each step from the duty start level)

Cancel Wizard  Back Next

31/08/17 10:05 SETUP WIZARD

Wizard: Temperature Setup

Temperature control operation:  (Select whether the controller will heat or cool the system)

Duty change period:  Mins (How long the controller will run the duty pump will alternate to the next available pump)

Cancel Wizard  Back Next

31/08/17 09:05 SETUP WIZARD

Wizard: Pressure Setup

High pressure protection:  Enabled  
 The high pressure protection using the feedback signal is enabled. High pressure fault will be triggered.

High pressure threshold: 800 kPa

Low pressure protection:  Enabled  
 The low pressure protection using the feedback signal is enabled. If the pressure drops below this level the system will shut down and the pressure fault will be triggered.

Low pressure threshold: 93 kPa

Pipe fill protection:  Disabled  
 On low pressure starting the system only allows 1 pump to run to slowly build up pipe pressure before entering to normal operation.

Cancel Wizard Progress Back Next

29/01/16 09:15 SETUP WIZARD

Wizard: Analog Input A1 Setup

Secondary analog input A1 assign: Unused  
 Pressure Backup Tank Level

If using a level transducer set to tank level or level & feedback pressure transducer assign to secondary feedback.

A1 level transducer units: m (9)

A1 level transducer range: 4.00 m

A1 low level protection:  Disabled  
 If the low level protection is disabled, the low level fault will not be triggered when a low level is detected.

Cancel Wizard Progress Back Next

31/08/17 09:07 SETUP WIZARD

Wizard: Mains Bypass and Tank Fill Setup

Mains bypass enable:  Enabled  
 Enabling mains bypass will assign A1 input to control the bypass output. Also any system lockout fault or system off state will control the bypass output state.

Mains tank fill enable:  Disabled  
 When tank fill enable is enabled by operation, emergency stop input A1 is assigned to tank level.

Cancel Wizard Progress Back Next

31/08/17 09:46 SETUP WIZARD

Wizard: Level Setup

Pump cycle protection:  Disabled  
 If the pump is started and stopped up within 5sec more than 10 times, the pump will be locked out.

Maximum flow protection:  Disabled  
 If all available pumps are running for 10 minutes, their max flow flow will be triggered and the system will be locked out.

Anti-Size protection:  Enabled  
 If a pump has been sitting idle for 7 days then the pump will run for 4 seconds to prevent pump seizure.

Cancel Wizard Progress Back Next

05/10/18 10:29 SETUP WIZARD

Wizard: Analog Input A1 Setup

Secondary analog input A1 assign: Unused  
 Level Backup Auxiliary Level

If using a level transducer set to tank level or level & feedback pressure transducer assign to pressure backup.

A0 & A1 level transducer range: 4.00 m

Flow to tank is 1 transducer through the tank. Temp. Adjusting this value will adjust both ranges.

Supply transducer low level alarm:  Disabled  
 The low level protection will be disabled when the low level alarm is disabled.

Cancel Wizard Progress Back Next

05/10/18 10:30 SETUP WIZARD

Wizard: Tank Fill Setup

Mains tank fill enable:  Enabled  
 Enabling mains tank fill will assign A1 input to control the tank level output. Also any system lockout fault or system off state will control the tank level output state.

Top up start level: 1.00 m

Top up stop level: 2.00 m  
 Note: Stop level must be higher than start level.

Cancel Wizard Progress Back Next

09/05/16 16:42 SETUP WIZARD

Wizard: Constant Temperature Setup

High temperature protection:  Enabled  
 Enabling high temperature protection using the feedback signal.

High temperature threshold: 80°C  
 If the constant temperature exceeds this level a high temperature fault will be triggered.

Low temperature alarm:  Enabled  
 Enabling low temperature alarm using the feedback signal. Note that this does not shut down the system.

Low temperature threshold: 30°C  
 If the constant temperature falls below this level a low temperature fault will be triggered.

Cancel Wizard Progress Back Next

31/08/17 10:06 SETUP WIZARD

Wizard: Analog Input A1 Setup

Secondary analog input A1 assign: Unused  
 Temperature Backup Tank Level Aux. Temperature

A1 level transducer units: m (9)

A1 level transducer range: 4.00 m

A1 low level protection:  Enabled  
 The low level protection will be enabled when a low level is detected.

A1 low level protection threshold: 0.30 m

Cancel Wizard Progress Back Next

05/10/18 10:27 SETUP WIZARD

Wizard: Flow Meter Setup

Flow input assign: Pulse Meter (1)  
 Input SS will be assigned to the selected device.

Low flow alarm enable:  Enabled  
 Enabling low flow alarm will assign the selected device to the low flow alarm.

Flow protection type: System Fault (1)  
 The flow protection type will be assigned to the selected device.

Low flow threshold: 1.00 Usec  
 If the flow protection time while a pump is running is a low flow alarm will be triggered.

Flow sensor litres per pulse: 1.0

Flow sensing range: 50.00 Usec  
 The flow sensing range will be assigned to the selected device.

Cancel Wizard Progress Back Next

09/05/16 16:42 SETUP WIZARD

Wizard: Constant Temperature Setup

High temperature protection:  Enabled  
 Enabling high temperature protection using the feedback signal.

High temperature threshold: 80°C  
 If the constant temperature exceeds this level a high temperature fault will be triggered.

Low temperature alarm:  Enabled  
 Enabling low temperature alarm using the feedback signal. Note that this does not shut down the system.

Low temperature threshold: 30°C  
 If the constant temperature falls below this level a low temperature fault will be triggered.

Cancel Wizard Progress Back Next

05/10/18 10:33 SETUP WIZARD

Wizard: Auxiliary Temperature Alarms Setup

High auxiliary temperature alarm:  Enabled  
 Enabling high auxiliary temperature fault detection.

High temperature threshold: 90.0°C  
 If the constant temperature exceeds this level a high auxiliary temperature fault will be triggered.

Low auxiliary temperature alarm:  Enabled  
 Enabling low auxiliary temperature fault detection.

Low temperature threshold: 40.0°C  
 If the constant temperature falls below this level a low auxiliary temperature fault will be triggered.

Cancel Wizard Progress Back Next

29/01/16 09:17 SETUP WIZARD

Wizard: Assign Digital BMS

C0 output assign: General Fault (28)

C1 output assign: Error (0)

C2 output assign: Controller Fault (27)

C3 output assign: Jacking Board (1)

C4 output assign: Jacking Board (1)

C5 output assign: General Fault (28)

C6 output assign: Pump 1 Fault (6)

C7 output assign: Pump 2 Fault (5)

C8 output assign: Pump 3 Fault (6)

C9 output assign: Pump 4 Fault (7)

Cancel Wizard Progress Back Next

29/01/16 09:17 SETUP WIZARD

Wizard: Assign Analog BMS

A2 output signal: Mirror Speed (4)  
 The output will provide a copy of the system output signal.

A3 output signal: Mirror Feedback (0)  
 The output will provide a copy of the feedback signal currently in use.

Cancel Wizard Progress Back Next

END

# 5. Functions

## 5.1 APPLICATION SELECTION

The HydroTOUCH has been designed for three different control operations Pressure, Level and Temperature. The basic function of the three operations are laid out below.

1. **'Constant Pressure'** is based around a 4-20mA pipe mounted pressure transducer as the feedback source. The HydroTOUCH uses proportional start/stop control to maintain a set pressure in the system. As the pressure drops the *duty start step* from the *setpoint* the first pump will start. If the pressure continues to drop, each standby pump will start another *standby start step* below the previous pumps start level. As the pressure gets closer to the setpoint the pumps will switch off in the order in which they turned on. Once the pump pressure reaches the *setpoint* for the *sleep delay* the system will go to sleep.
2. **'Proportional Level'** is based around a 4-20mA level transducer submerged in a tank or pit as the feedback source. The HydroTOUCH uses proportional start/stop control to maintain a set level in the tank or pit. In level operation there are two modes, 'fill' and 'empty', which work opposite to one other. 'Empty' will start pumps as the level rises to keep a tank empty whereas 'fill' will start pumps as level falls to try and fill the tank. In both modes when the level goes beyond the *duty start step* from the *setpoint* the duty pump will wakeup from sleep. If the level continues to go the *standby start step* past the *duty start step* the first standby pump will start. Each additional *standby start step* increment will start an additional standby pump. As the level gets closer to the setpoint the pumps will switch off in the order in which they turned on. Once the tank or pit level reaches the *setpoint* for the *sleep delay* the system will go to sleep.
3. **'Constant temperature'** is based around a 4-20mA temperature transducer as the feedback source. For temperature recirculation generally this transducer will be installed in the return line. In temperature operation there are two modes, 'heat' and 'cool', which work opposite to one other. 'Cool' will start pumps as the temperature rises to maintain a lower temperature whereas 'heat' will start pumps as temperature falls to try and maintain a higher temperature. In both modes if the temperature continues to go the *standby start step* past the *duty start step* the first standby pump will start. Each further *standby start step* increment will start an additional standby pump. As the temperature gets closer to the setpoint the pumps will switch off in the order in which they turned on. Once the temperature reaches the *setpoint* only one pump will continue to operate to maintain the setpoint. The default temperature parameters set by the wizard there is no sleep state, the system is manually switched on and off via the touch screen or via a digital input. However sleep can be enabled when the temperature setpoint is reached by changing the *sleep entry mode* = 'setpoint based'.

## 5.2 PUMP 1 MODE

The HydroTOUCH controller is can configure the first pump to be a main pump, jacking pump or a mixer. If setup as a main pump it will be duty cycled with all the other pumps. If setup as a jacking pump it will always be the first pump to start and if it can't keep up with demand the main pumps will start. In mixer mode the mixer will start before the main pumps for the *mixer 1 pump start delay*. Both the jacking pump and the mixer can be setup to switch off once the main pumps start with the *jacking pump 1 turn off = 'enabled'* and *mixer 1 turn off = 'enabled'*. Also the overlap time to ensure a smooth transition can be adjusted with the *jacking pump 1 turn off delay* and *mixer 1 turn off delay*.

## 5.3 PUMP LIMITING

Some applications have electrical or plumbing limitations that restrict a high flow rate but extra pumps are desired for redundancy in the event of a pump fault. The *pump limit* parameter specifies the maximum number of pumps that can operate simultaneously. Pump limiting is also enforced in manual mode so that no more than the specified number of pumps can be operated manually.

## 5.4 PUMP ANTI-SEIZE

For systems that have extensive pump idle times the anti-seize feature will run the pump for 6 seconds every 7 days if the pump has not run. Every pump has an individual pump idle timer to ensure each pump is prevented from seizing and not started if it has run within the 7 day period.

## 5.5 MAINS WATER BYPASS

For systems supplying water from a storage tank a mains water bypass output can be configured to supply water when the pumping system is out of water or in a fault condition. This is enabled and disabled through the setup wizard by turning on 'mains bypass enabled'. The wizard will automatically change the B0 digital input from a low level alarm to mains water changeover. If a level transducer is being used for the low level detection then the 'A1 low level protection' needs to be set to inhibit. This will trigger a low level

## 5.6 MAINS TANK TOP UP

For systems drawing a water supply from a storage tank there can be times when the normal inflow of rain water or treated water does not keep up with the demand. In these cases a mains water valve can be controlled to maintain a minimum water level in the supply tank to ensure no loss of supply. This feature is enabled via the tank *top up control enable* parameter in the parameter list. The turn on and turn off levels are set via the *top up on threshold* and *top up off threshold* respectively

## 5.7 UV LAMP CONTROL

To ensure water quality is high some installations require UV filtering. To prolong life of the UV lamps they can be switched off when appropriate via the '*UV supply output*', based on the *UV supply mode* parameter. The three UV modes are 'Constant', 'Rain Water' and 'Pump Run'. In 'constant' mode the UV supply output is permanently activated. In 'rain water' mode the UV supply output is activated when operating in rain water. This is generally used in conjunction with the mains water bypass function. In 'pump run' mode UV supply output will turn on at the same time as a pump is running. Once the UV activation condition subsides the UV supply output will remain active for *UV supply off delay* before switching off. If the UV activation condition returns prior to this time then the UV supply timer will be reset.

## 5.8 LOW FLOW DETECTION

The HydroTOUCH has two options for low flow detection either a digital flow switch or a pulse input flow meter. The flow switch or flow meter is automatically assigned in the setup wizard to digital input B5. This can be manually changed in parameter list if need be. If a digital flow switch is selected the flow switch must close on flow and open when there is no flow. If a pulse flow meter is selected the *litres per pulse* will need to be scaled the same as the flow meter pulse output. Also the *low flow threshold* will need to be set above the point where the low flow alarm and protection are required. If the flow meter is being used for logging usage and trend only then the *low flow alarm enable = 'disabled'*. Both options can be configured for three protection methods if the *low flow alarm* is enabled, none, system or pump. In no protection the low flow condition will activate an alarm but no pump or system shutdown will occur. If system protection is selected any pump has to be running for the *low flow fault delay* without the *low flow threshold* being reached or the flow switch contact closing. If this is the case the whole system will shutdown requiring a manual reset. If pump protection is selected the same logic applies but only the running pump/s will be faulted and any available standby pumps will be started to try and achieve flow.

## 5.9 TRANSDUCER REDUNDANCY

If the system is supplying a critical application a backup transducer can be assigned for the feedback signal to ensure if a failure or error occurred with the feedback signal the system will seamlessly changeover and continue normal operation. To enable this feature through the wizard select the 'backup' option for the *secondary analogue input assign*. This will monitor the two 4-20mA inputs and if one fails then it will trigger an A0 or A1 analogue input fail fault and automatically swap to the healthy transducer. Also if the difference between the two transducers is outside the threshold an A0 or A1 discrepancy fault will be triggered and the fail safe transducer will be used as the feedback signal.

## 5.10 ASSIGNING DIGITAL INPUTS

The 6x digital inputs can be assigned during the wizard setup procedure or through the parameter list to many different functions. Some of the functions that are compatible with digital inputs are alarms, system lockout, system enable, external mute, mains water changeover and alternative setpoint. The parameter functions that can be controlled from a digital input will have a drop-down box to select the input to assign to that function. Care must be taken when assigning the inputs as a single input can be assigned to multiple functions which may not operate as desired.

## 5.11 ASSIGNING OUTPUTS

The 10x digital relay and 2x analogue 4-20mA (passive) outputs can be assigned during the wizard setup procedure or through the parameter list to nearly 70 different outputs. The digital outputs are divided into two groups of five volt free outputs so that one bank can be used for controls and the other free for volt free BMS signals or both banks for either function. An expansion module can be used for additional digital outputs.

## 5.12 SYSTEM OVERRIDE

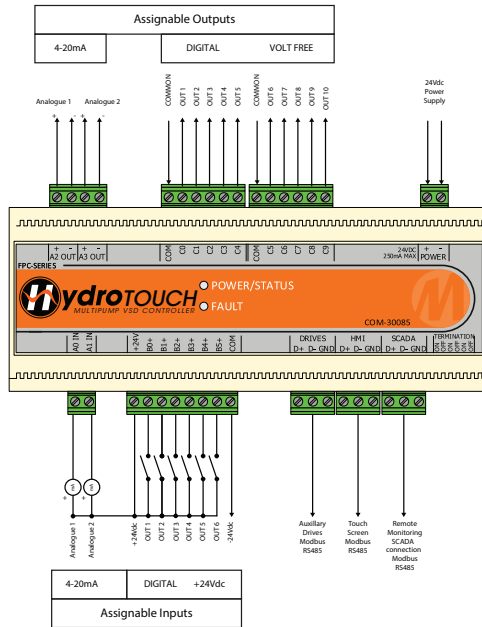
The HydroTOUCH is packed full of protection features to ensure the equipment and supply system are not damaged by any potential faults. In some applications the water supply is critical and these protections may need to be overridden temporarily to get the water supply back up and running immediately. Once a fault locks out the system the user can still go to put a pump into manual operation, at this point a pop up warning notifies the user of the potential risks which then must be acknowledged to run the pump manually. Once this is pressed a system override button appears on the main screen with a count-down timer, default 15 minutes, showing how long the override will be in effect. After this time the system will return to normal operation. The button on the main screen can be pressed if this feature needs to be ceased prior to this timer lapsing.

## 5.13 MAINTAIN MINIMUM LEVEL

The HydroTOUCH has the ability, in level empty mode, to automatically pump the tank down to maintain a minimum water level in the tank. The max idle period, default 4 hours, is used to start the pump if the level has risen above the setpoint/ stop level but has not yet reached the wakeup/ start level.



## 5.14 HYDROTUCH CONNECTIONS



# 6. Fault Diagnosis

## 6.1 SYSTEM FAULTS

Fault	Cause	Remedy
Pump Fault	Thermal Overload has triggered a fault	-Check overload and check pumps running amps
No Pumps Available	There are no available pumps to operate in auto	-Ensure pump faults are reset -Ensure available pumps are not disabled
Analogue input fail (A0 or A1)	Analogue reading is outside of the 4-20mA acceptable reading - Transducer not connected - Broken or loose connection	-Check sensors connections -Check sensor is passive 'loop powered' -Replace sensor if faulty
No feedback Fault	There is no available transducer to operate the system - Transducer not connected - Broken or loose connection	-Check the primary and/or backup transducer connections -Check sensor is passive 'loop powered' -Replace sensor if faulty
Low Flow Fault	The flow switch or flow meter has detected a low condition for the 'low flow' delay time.	-Check if pump has flow -Check if pump has prime -Check flow switch or flow meter connection.
High Pressure Fault	System Pressure has gone above the acceptable level - System overshoot -Incorrect parameter settings	-Check 'High pressure threshold' parameter is set adequately above the setpoint pressure -Ensure a backup high pressure switch is 'open to fault' or input is bridged if not required -Investigate cause of high pressure event

## 6.1 SYSTEM FAULTS

Fault	Cause	Remedy
Low Pressure Fault	System Pressure has gone below the acceptable level - Burst pipe - Pump loss of prime -Incorrect parameter settings	-Check 'Low pressure threshold' parameter is set correctly -Investigate cause of low pressure event
High Level Fault	Tank level analogue input has gone above 'high level threshold' or assigned high level input has received a close contact	- Inspect the level in the tank/pit - Check 'high level threshold' parameter is set correctly - Test float switch input - Check input assignment
Low Level Fault	Tank level analogue input has gone below 'low level threshold' or assigned low level input has received a close contact	- Inspect the level in the tank/pit - Check 'low level threshold' parameter is set correctly - Test float switch input - Check input assignment
Pipe Fill Fail	The system pressure has not got above the 'pipe fill threshold' within the allocated time - Inadequate speed for head pressure - Open pipe	- Ensure there is no demand for water /all taps shut - Increase the 'pipe fill speed' parameter
Pump Cycle Fault	The system has woken too quickly for the 'pump cycle fault threshold' counter - Inadequate sleep boost set - Small flow or leaks in pipe work	- Increase the sleep boost pressure - Inspect pipe work for leaks - Inspect pressure vessel for correct setting - Ensure check valves are shutting upon entering sleep
[2] PLC No Response	Communication between the touch screen and the HydroTOUCH module has been lost.	-Check touch screen plug is in COM 2 and in firmly -Check HydroTOUCH HMI plug is in firmly with no loose wires. -Check that the second termination jumper is in the off position
Max Flow Fault	The maximum number of pumps were running continuously for the max flow fault delay. Possible causes are burst pipe, loss of prime or no water available.	-Check the cause for all pumps running. If normal operation extend the timer or disable the protection. -Fix hydraulic faults
Backup Discrepancy (AOO or AI)	A backup analogue input has been assigned and the input readings read different values.	-Check AO or AI for faulty reading on diagnostic screen and recalce sensor -Check the AO or AI offset are set correctly and adjust if error is only slight.
Auxiliary Comms Failed	Communication between the HydroTOUCH module and the expansion module has failed.	-Check cable connections -Check baud rate and parity are the same -Check expansion module has power.

In addition to the above some digital inputs can be configured for auxiliary equipment faults such as UV's and filters.

# 7. Wizard Parameters List

PAGE	PARAMETERS	MATELEC DEFAULT	USER SETTING
1 Pumps	Pump 1 Mode	Main Pump	
	Jacking 1 Pump Turn off enable	Disabled	
	Jacking Pump Turn off delay	10 Seconds	
	Mixer Pump Start Delay	30 Seconds	
	Number of Pumps	4	
	Pump Limit	12	
<b>Constant Pressure</b>			
2 Pressure Setup	Pressure Transducer Units	Kpa	
	Pressure Transducer Range Setpoint	1000Kpa	
	Duty Start Step	500Kpa	
	Standby Start Step	50Kpa	
		125Kpa	
3 Constant Pressure Setup	Pump Cycle Protection	Disabled	
	Maximum Flow Protection	Disabled	
	Anti-Seize Protection	Disabled	
	Supply Float Low Level Alarm	Enabled	
	Supply Low Level Protection	Enabled	
4 Constant Pressure Setup	High Pressure Protection	Disabled	
	High Pressure Threshold	800Kpa	
	Low Pressure Protection	Disabled	
	Low Pressure Threshold	250Kpa	
	Pipe Fill Protection	Disabled	
5 Constant Pressure Setup	Secondary Analogue Input A1 Assign	Unused	
	A1 Level Transducer Units	meters	
	A1 Level Transducer Range	4.0m	
	A1 Low Level Protection	Disabled	
	A1 Low Level Protection Threshold	0.3m	
6 Constant Pressure Setup	Mains Bypass Enabled	Disabled	
	Mains Tank Fill Enable	Disabled	
	Top Up Start Level	1.0m	
	Top Up Stop Level	2.0m	
<b>Proportional Level</b>			
7 Constant Level Setup	Tank Level Units	meters	
	Level Transducer Range	4.0m	
	Level Control Operation	Fill	
	Setpoint	2.0m	
	Duty Start Step	0.2m	
	Standby Start Step	0.5m	
8 Constant Level Setup	Supply Float Low Level Alarm	Enabled	
	Supply Low Level Protection	Enabled	
	Supply Transducer Low Level Alarm	Disabled	
	Supply Transducer Low Threshold	0.3m	
	High Level Alarm	Disabled	
	High Level Threshold	3.5m	
9 Constant Level Setup	High Level Protection	Disabled	
	Pump Cycle Protection	Disabled	
	Maximum Flow Protection	Disabled	
	Anit-Seize Protection	Disabled	
10 Constant Level Setup	Secondary Analogue Input A1 Assign	Unused	
	A0 & A1 Level Transducer Range	4.0m	
	Supply Transducer Low Level Alarm	Disabled	
	Supply Transducer Low Threshold	0.3m	

PAGE	PARAMETERS	MATELEC DEFAULT	USER SETTING
<b>Proportional Level</b>			
11 Constant Level Setup	Mains Tank Fill Enable	Disabled	
	Top Up Start Level	1.0m	
	Top Up Stop Level	2.0m	
<b>Constant Temperature</b>			
12 Constant Temp. Setup	Temperature Units	Celcius	
	Temperature Transducer Range	100.0°C	
	Setpoint	50.0°C	
	Duty Start Step	5.0°C	
	Standby Start Step	12.5°C	
13 Constant Temp. Setup	Temperature Control Operation	Heat	
	Duty Change Period	60 Min	
14 Constant Temp. Setup	High Temperature Protection	Disabled	
	High Temperature Threshold	90°C	
	Low Temperature Alarm	Disabled	
	Low Temperature Threshold	40°C	
15 Constant Temp. Setup	Secondary Analogue Input A1 Assign	Unused	
	A1 Level Transducer Units	meters	
	A1 Level Transducer Range	4m	
	A1 Low Level Protection	Disabled	
	A1 Low Level Protection Threshold	0.3m	
16 Constant Temp. Setup	High Aux Temperature Protection	Disabled	
	High Aux Temperature Threshold	90°C	
	Low Aux Temperature Alarm	Disabled	
	Low Aux Temperature Threshold	40°C	
17 Flow Meter Setup	Flow Input Assign	Unassigned	
	Low Flow Alarm	Disabled	
	Low Flow Protection Type	None	
	Low Flow Threshold	1.0L/Sec	
	Flow Sensor Litres per Pulse	1	
	Flow Sensing Range	50.0 L/Sec	
18 Assign Digital BMS	C0 Output Assign	Pump 1 Run	
	C1 Output Assign	Pump 2 Run	
	C2 Output Assign	Pump 3 Run	
	C3 Output Assign	Pump 4 Run	
	C4 Output Assign	Rains/Mains	
	C5 Output Assign	General Fault	
	C6 Output Assign	Common Pump Run	
	C7 Output Assign	Common Pump Fault	
	C8 Output Assign	Low Level	
	C9 Output Assign	High Level	
19 Analogue	A2 Output Signal	Mirror A0	
	A3 Output Signal	Mirror A1	