ADVANCED WORKHOLDING PUMP
MACHINE INTERFACE CONTROL ETHERNET
HMI INTERFACE

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PL5595-MCE-HMI, REV. D, I.A.W. ECN 5249

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PUMP MODEL No._____

PUMP SERIAL NO._____

IN SERVICE DATE_____

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SECTION I

INTRODUCTION

1.0 Overview - The Vektek AWP HMI (Human Machine Interface) is specifically developed for use with the Vektek Advance Workholding Pump and CNC machine control systems. This system provides a seamless integration and communication interface between the Vektek AWP workholding pump and the CNC machine via an Ethernet cable connected directly to Input/Output stations mounted in the CNC machine control enclosure. Built into the Vektek AWP HMI is a custom Web Server App that provides a complete and intuitive user interface to the Vektek AWP for setup and control of all hydraulic workholding functions. All the required clamping and unclamping functions for hydraulic workholding are controlled and monitored inside the Vektek AWP PLC, allowing for significant simplification of CNC part programming requirements to achieve a high level of automation control and monitoring.

2.0 Configuration and Function – The Vektek AWP HMI is easily configured for the PLC address Hostname and Port to be compatible with the fixed CNC machine local area network IP address. The Machine Alarms and Door Close IO can also be enabled for added safety and protection. The mapping of all required Vektek AWP PLC parameters to the Input/Output Station and CNC machine has been pre-engineered so no additional programming is necessary. This includes the Basic CNC Machine Interface, Job Number Interface, and Fixture Number Interface functionality.

3.0 Requirements –*Important: It is highly recommended to install and use the correct version of Google Chrome browser for the CNC machine Windows version installed for the display of Vektek AWP Web Visualization screens. See Section III 9.0 for details. In browser settings, turn off "Show bookmarks bar" to prevent screen scaling and display issues.*

4.0 The Vektek AWP HMI is compatible with all 3-phase power versions of the AWP which include 1-HP high-pressure models, 2-HP high-pressure models, and the 2-HP low-pressure models. Reference documents are available for each and are listed in the operations manual.

4.1 Manual/Parts List for Vektek Advance Workholding Pump (Included with AWP)

- 4.1.1 PL5576
- 4.1.2 PL5595
- 4.1.3 PL5596
- 4.1.4 MPLV4595
- 4.1.5 MPLV4576

SECTION II

PRELIMINARY AND SAFETY INFORMATION

FAILURE TO HEED THE FOLLOWING INFORMATION WILL VOID WARRANTY

Preliminary Information

1. Most malfunctions in new equipment are the result of improper set-up and operation. Please read and fully understand the entire enclosed information before proceeding with installation and operation. Order of installation should be followed as stated to insure a complete and safe equipment function.

2. Visually inspect all components for shipping damage and correct configuration. Report any damage found to the carrier or factory immediately.

3. Qualified personnel may connect the AWP enclosure to the power source according to wiring diagram in AWP Manual/Parts list, Section V. Power supply must be of the same electrical rating or equipment damage may occur.

4. Do not connect AWP to CNC machine via Ethernet cable until after all application installations are complete. Then Ethernet connections can be made, and final setup of applications can be completed

SECTION III

APPLICATION INSTALLATION

1.0 Windows Internet Explorer browser may not function properly with Vektek AWP Web Visualization Screens. Switching delays and lockups may occur with this IE browser. It is highly recommended to install and use the correct version of Google Chrome browser for the CNC machine Windows version installed for display of these screens on a PC or CNC machine. If using the HMI supplied with the AWP, no update is required as it is already using the correct Chrome browser interface.

1.1 The Google Chrome Standalone browser installation files are available upon request.
- 1.1.1 ChromeStandaloneSetup32.exe
- 1.1.2 ChromeStandaloneSetup64.exe

1.2 If connected to the Internet, use the link below to download and install the latest Google Chrome browser version as required for the PC or CNC machine Windows operating system.
- 1.2.1 https://www.google.com/chrome/downloads/

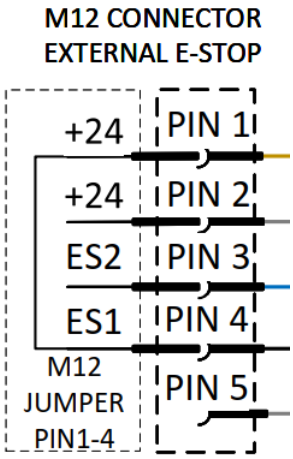
2.0 IO Station installation in the CNC machine is required to connect the AWP to the CNC machine via Ethernet cable. This allows for connection and communication of all inputs and outputs between the CNC machine M-Code relays and AWP. Basic, Job #, and Fixture # IO Stations are added as required to enable full system status and clamp/unclamp functionality. Connection of each IO Station to 24 VCD power supply in the CNC machine control cabinet is required. See Section VII 8.a. for IO Station wiring connections.

2.1 Basic IO Station is included with all AWP installations to allow for system status, pallet present, clamp/unclamp commands, and clamp/unclamp acknowledgements. Connect and enable only those inputs and outputs that are required for the fixture workholding application in the CNC machine. See Section 12.3 for Basic IO Station Configuration Input/Output assignments.

2.2 Job # IO Station can be added for calling clamp/unclamp commands after the pallet has left the load area and is in the machining area during the machining process. Up to 15 Jobs can be programmed in the AWP PLC and called from the CNC machine program. Intermediate PRV valve control to reduce clamping pressure for finish pass machining is a good example of the use of Job functionality. Unclamping individual clamps to machine where the clamp arm contacted the work piece is another example. Connect and enable only those inputs and outputs that are required for the fixture workholding application in the CNC machine. See Section 12.7 for Job IO Station Configuration Input/Output assignments.

2.3 Fixture # IO Station can be added for calling the fixture clamp and unclamp programs from the CNC machine program. Up to 15 Fixtures can be called from the AWP PLC memory after they have been created and saved. Connect and enable only those inputs and outputs that are required for the fixture workholding application in the CNC machine. See Section 12.13 for Fixture IO Station Configuration Input/Output assignments.

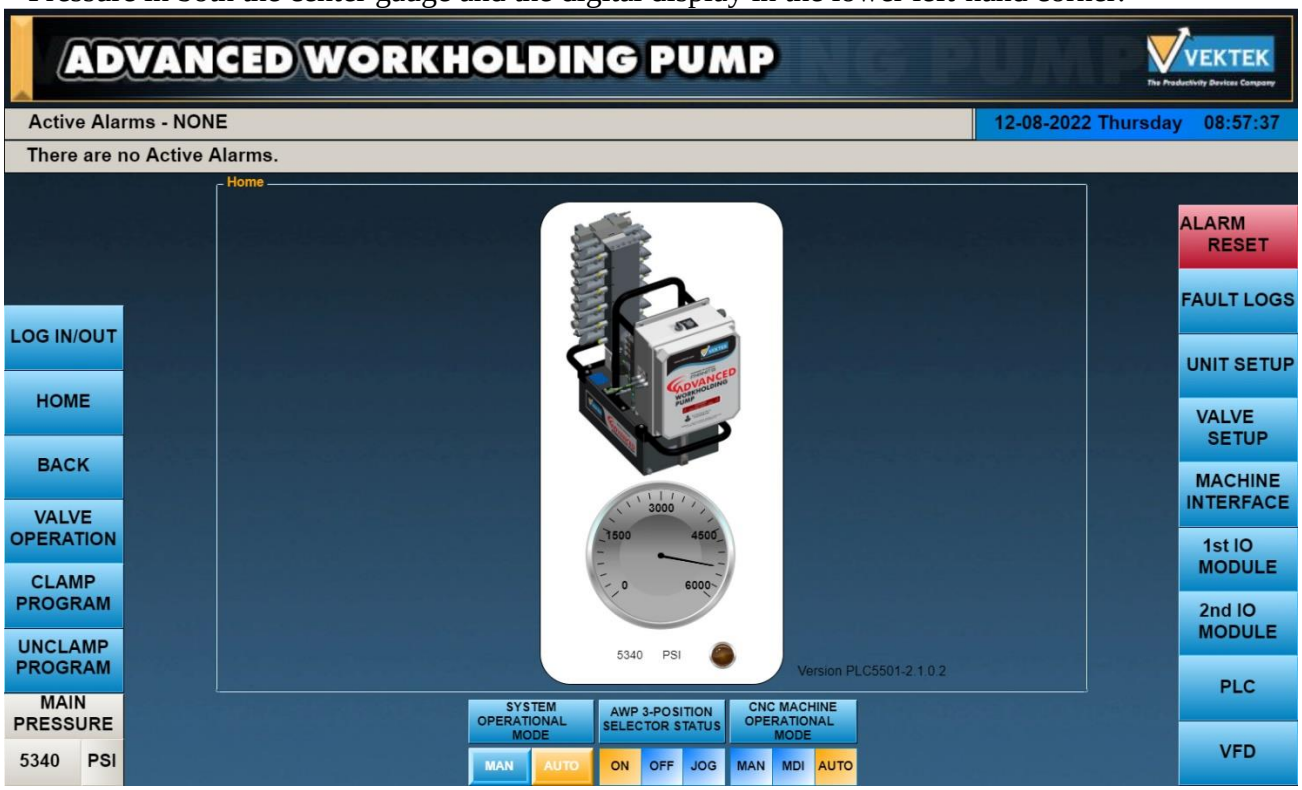
3.0 Emergency Stop installation between the CNC machine and the AWP is accomplished by connecting the M12 cable from the AWP Emergency Stop port on the enclosure to the CNC machine emergency stop relay. By-directional E-Stop communication is possible if both the CNC machine and AWP wire sets are connected. The AWP is shipped with a jumper connector installed on the Emergency Stop M12 port Pin 1 and Pin 4 for CNC machine E-Stop so the AWP will operate by default. Pin 2 and Pin 3 can be connected to send AWP E-Stop signal from the AWP to CNC machine if required.



SECTION IV

APPLICATION OPERATIONS

1.0 The AWP Web Server Application (WSA) is accessed via the Chrome browser window embedded in the HMI or CNC control system screen. This includes a touch screen interface to allow the operator to navigate the application screens by selecting the vertical column of buttons on the left or the right side the application window. At startup, the application begins at the **HOME** screen as shown below. The Alarms banner is displayed at the top of the screen to show any Active Alarms or NONE and includes a short and long description. This screen also displays the Main System Pressure in both the center gauge and the digital display in the lower left-hand corner.



1.1 The **SYSTEM OPERATIONAL MODE** is located at the bottom left center of the **HOME** screen. Select the mode to activate the system control desired.

1.1.1 **MAN** mode is used for manual control of the valves during initial setup of the part fixture or other hydraulic system.

1.1.2 **AUTO** mode is used for automatic control of the valves by the CNC machine and will start in this operational mode if the CNC Machine Operation Mode is set to **AUTO.**

1.2 **AWP 3-POSITION SELECTOR STATUS** is located at the bottom center of the Home Screen. This indicates the switch status of **ON, OFF, JOG** depending on the actual position of the selector switch on top of the AWP enclosure.

1.2.1 Turn switch to **ON** to enable the pump motor to run.

1.2.2 Turn switch to **OFF** to disable the pump motor from running.

1.2.3 Turn and hold the switch to **JOG** to turn the pump motor to prime the pump.

1.3 **CNC MACHINE OPERTION MODE** is located at the bottom right center of the **HOME** screen. This indicates the current mode status of the CNC machine, either **MAN, MDI,** or **AUTO**.

2.0 The LOG IN/OUT screen is located just above the HOME screen button. This screen allows for access and control of the setup and diagnostic system of the AWP. There are 3 levels of access to the AWP control systems as described below.

2.1 OPERATOR – No password protection.

2.1.1 The Operator has view and operation control of the application screens that are accessed using the vertical buttons on the left side of the screen.

2.1.2 The Operator has view only capability of those setup and diagnostic screens that are accessed using the vertical buttons on the right side of the screen.

2.2 ADMINISTRATOR – User created password protection.

2.2.1 The Administrator has full view and operational control of all application screens accessed using the vertical buttons on the left and right side of the screen.

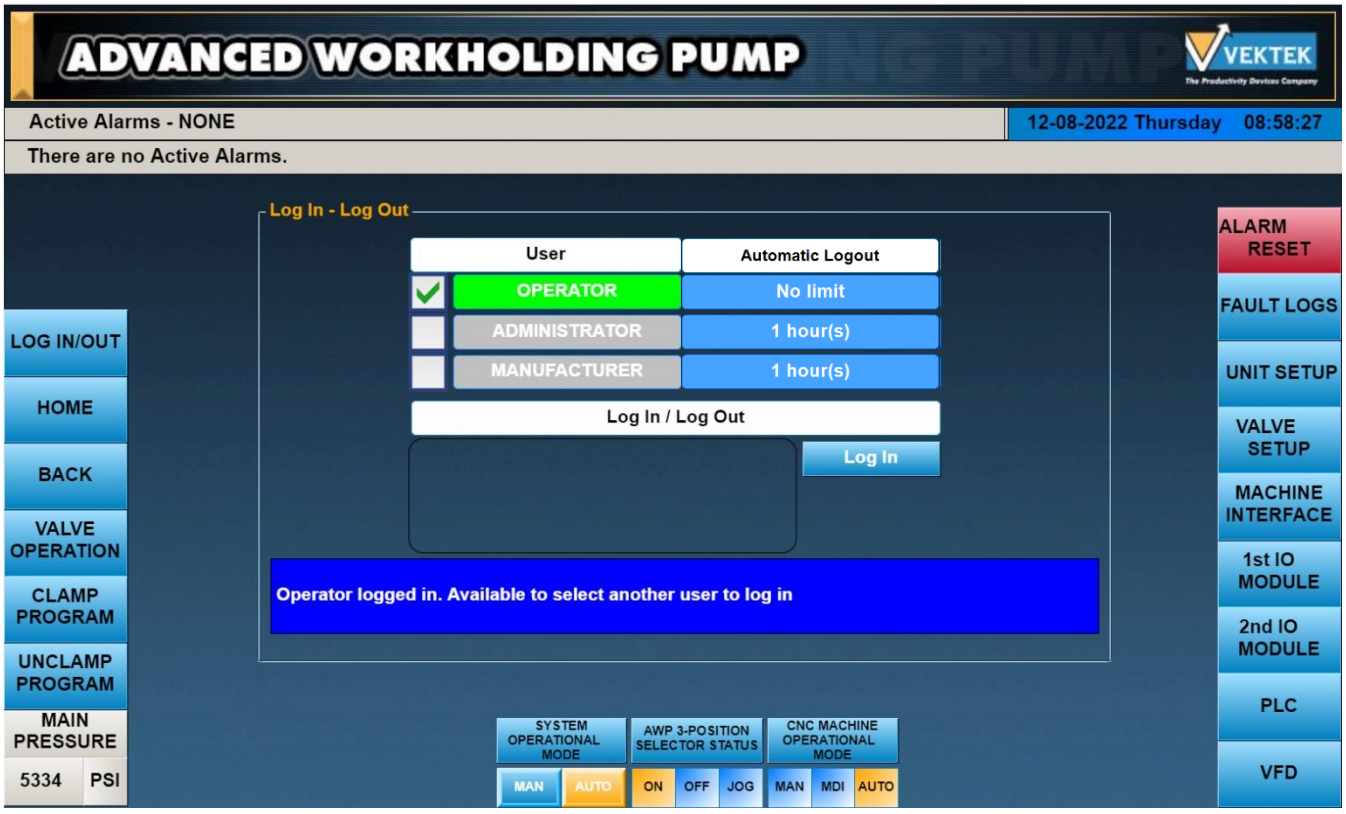
2.2.2 Exception: The Administrator does not have setup access to the Drive Type parameter on the VFD screen. This is reserved for the Manufacturer level access.

2.2.3 Automatic Logout of the Administrator will occur after the programmable time value shown. This value can be edited after initial login from 1 hour to 9 hours in 1-hour increments depending on the estimated time to complete any changes.

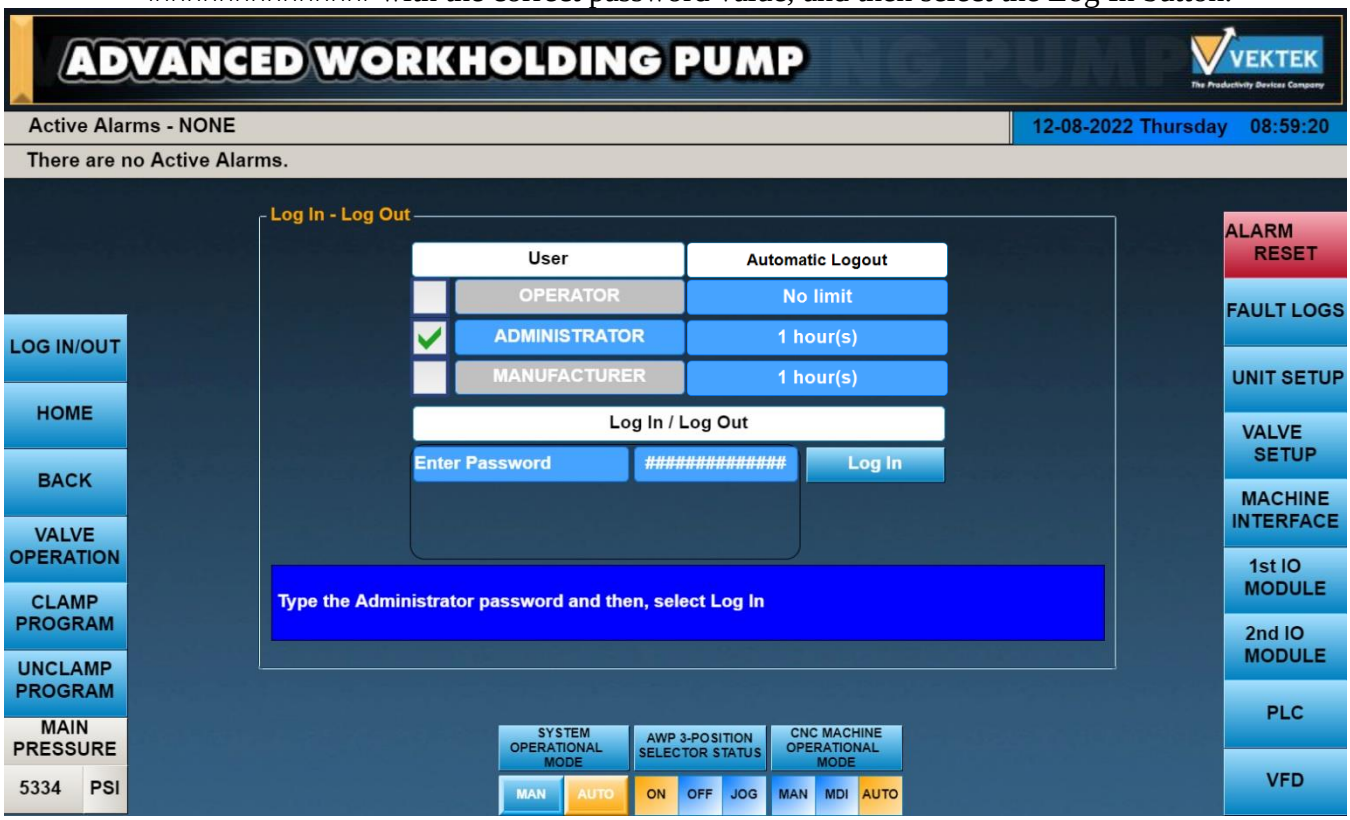
2.3 . MANUFACTURER – Vektek created password protection.

2.3.1 The Manufacturer has full view and operational control of all application screens accessed using the vertical buttons on the left and right side of the screen.

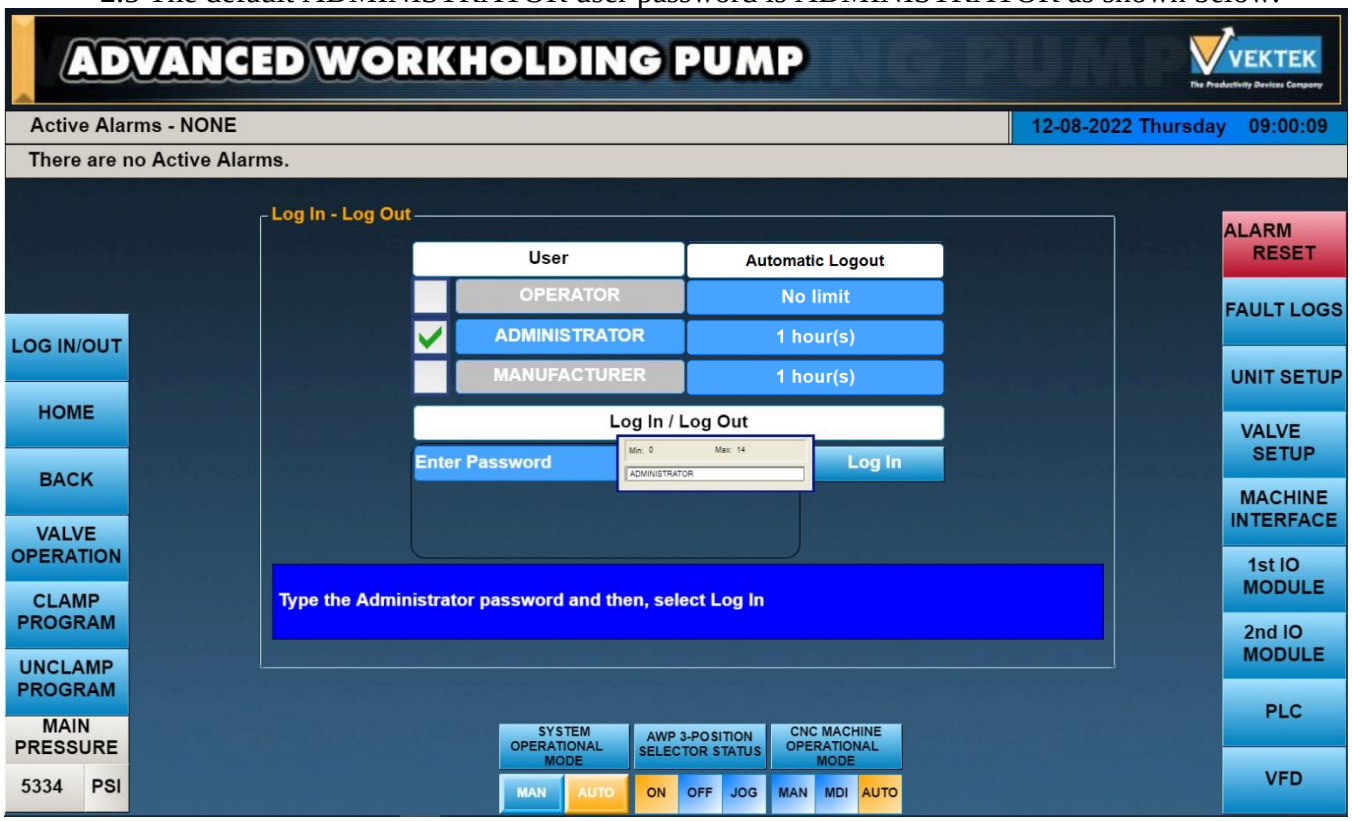
2.3.2 Automatic Logout of the Manufacturer will occur after the programmable time value shown. This value can be edited after initial login from 1 hour to 9 hours in 1-hour increments depending on the estimated time to complete any changes.



2.4 Administrator user access is granted by selecting the check box to the left of the User ADMINISTRATOR. The user is prompted to select the Enter Password field, edit the ############### with the correct password value, and then select the Log In button.

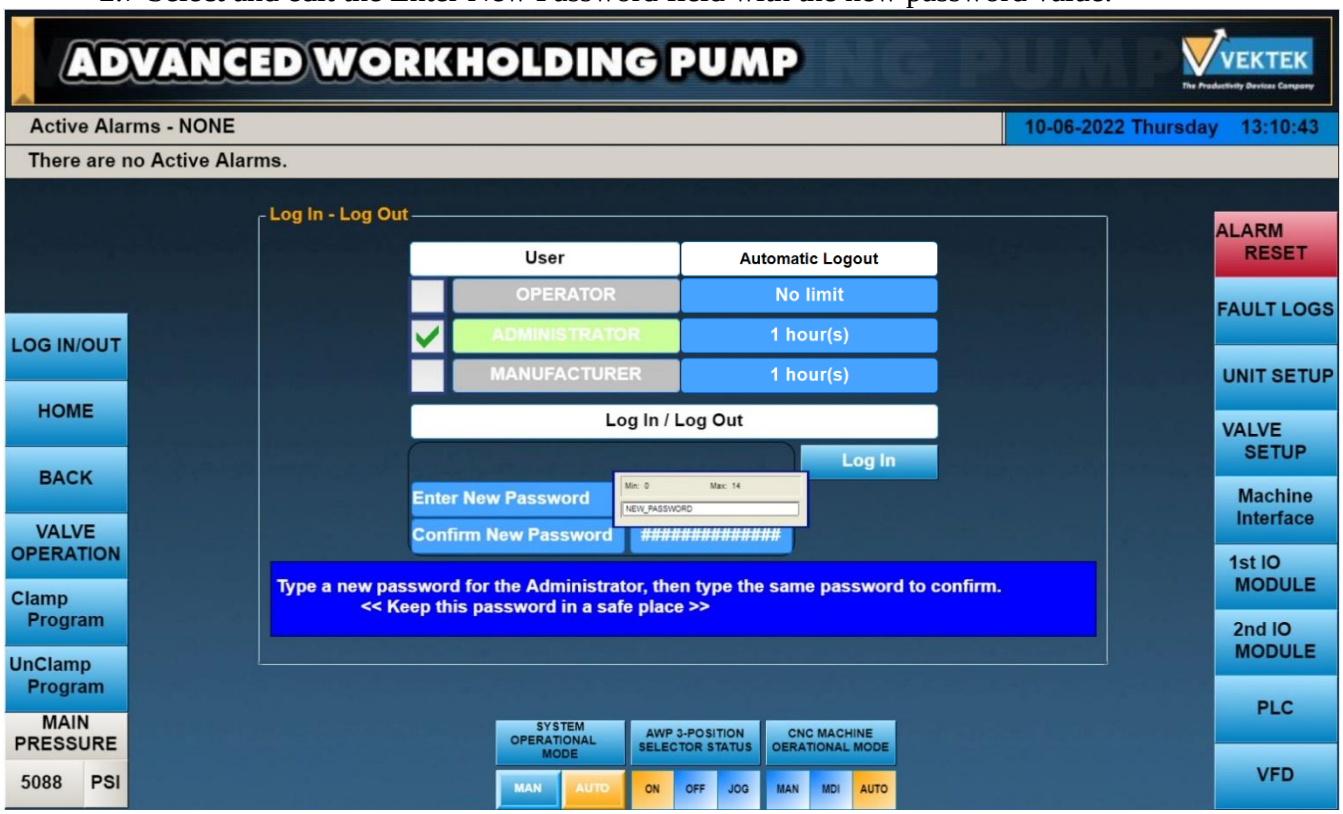


2.5 The default ADMINISTRATOR user password is ADMINISTRATOR as shown below.

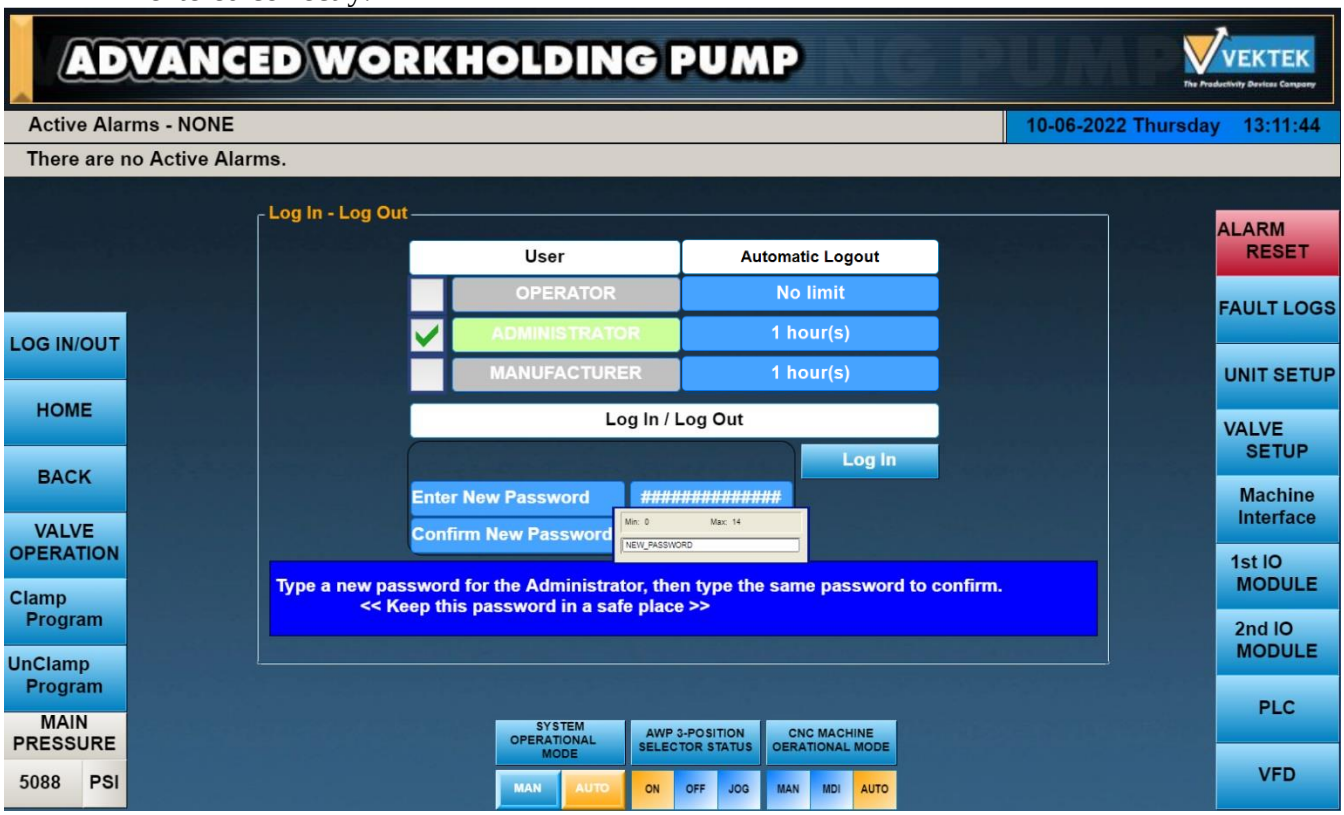


2.6 After entering the password ADMINISTRATOR for the first time or after it has been reset, a new password must be entered twice for accuracy.

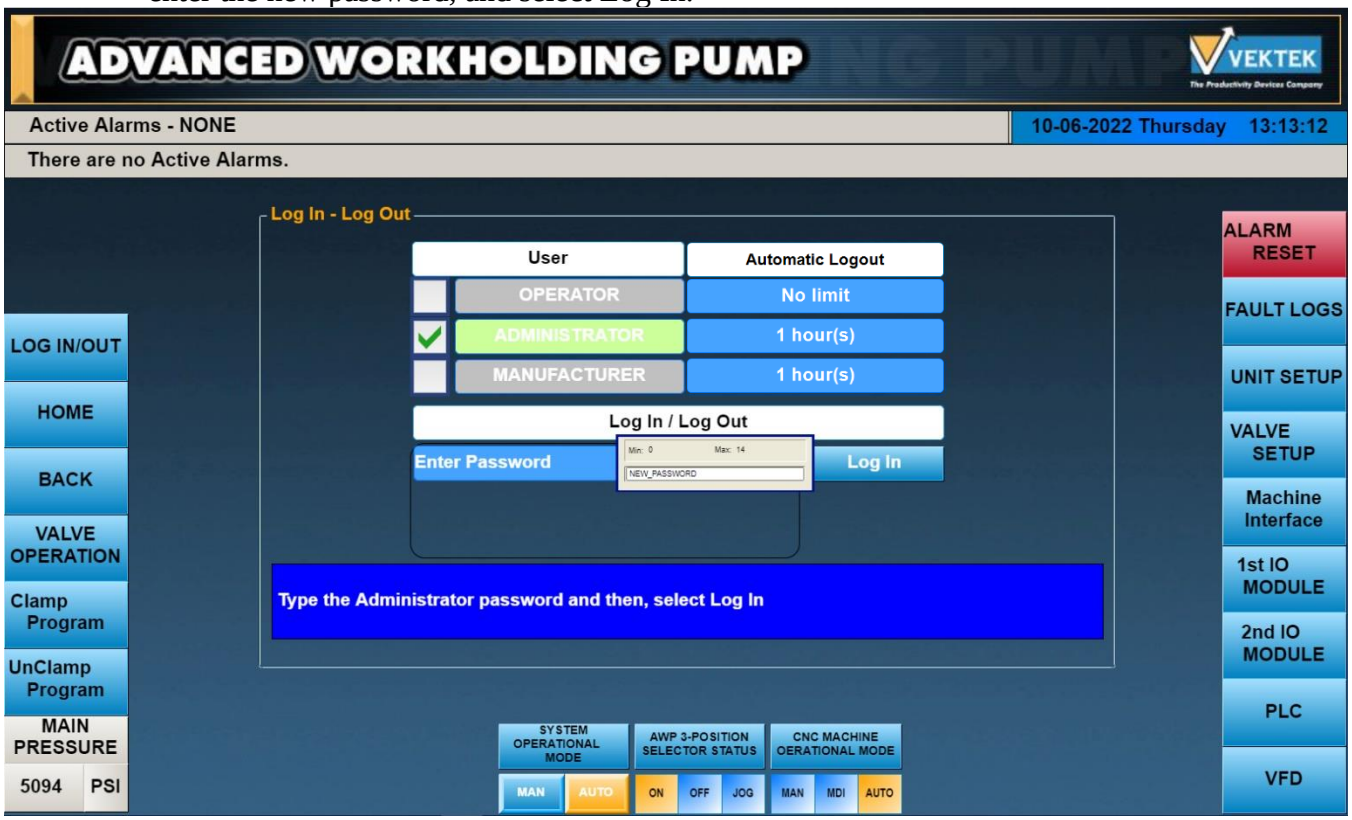
2.7 Select and edit the Enter New Password field with the new password value.



2.8 Select and edit the Confirm New Password field ############### with the same value. If the same value is not entered in both fields, the process will not be completed until it is entered correctly.



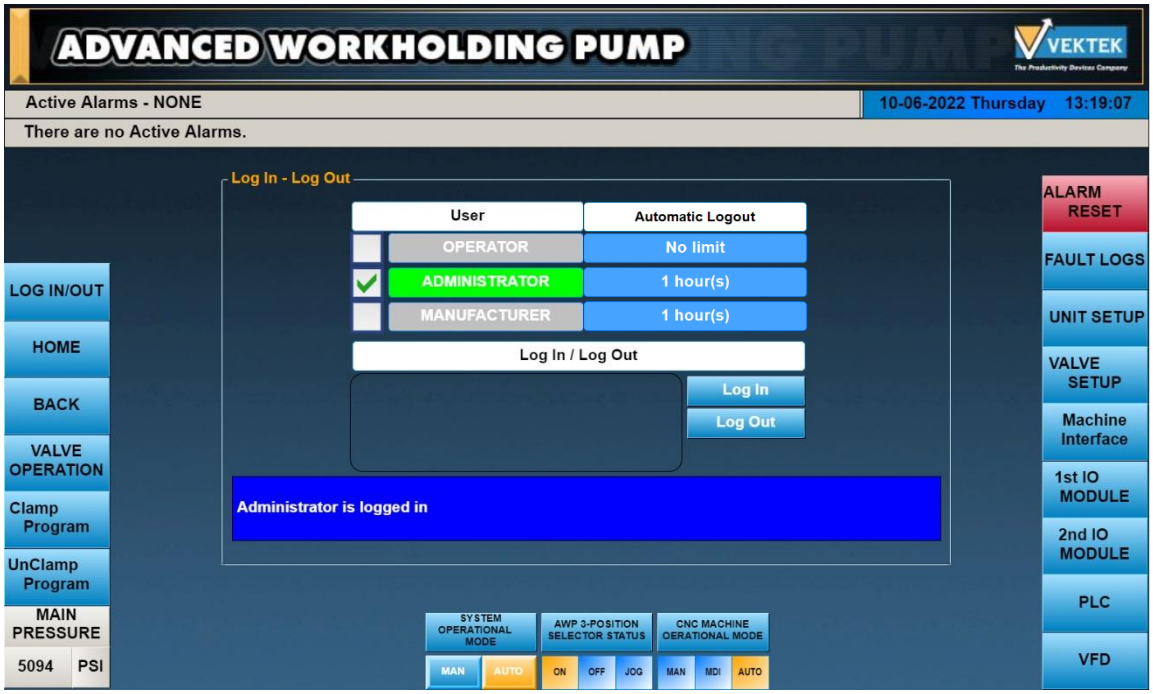
2.9 To complete the login in process, select and edit the Enter Password field ###############, enter the new password, and select Log In.



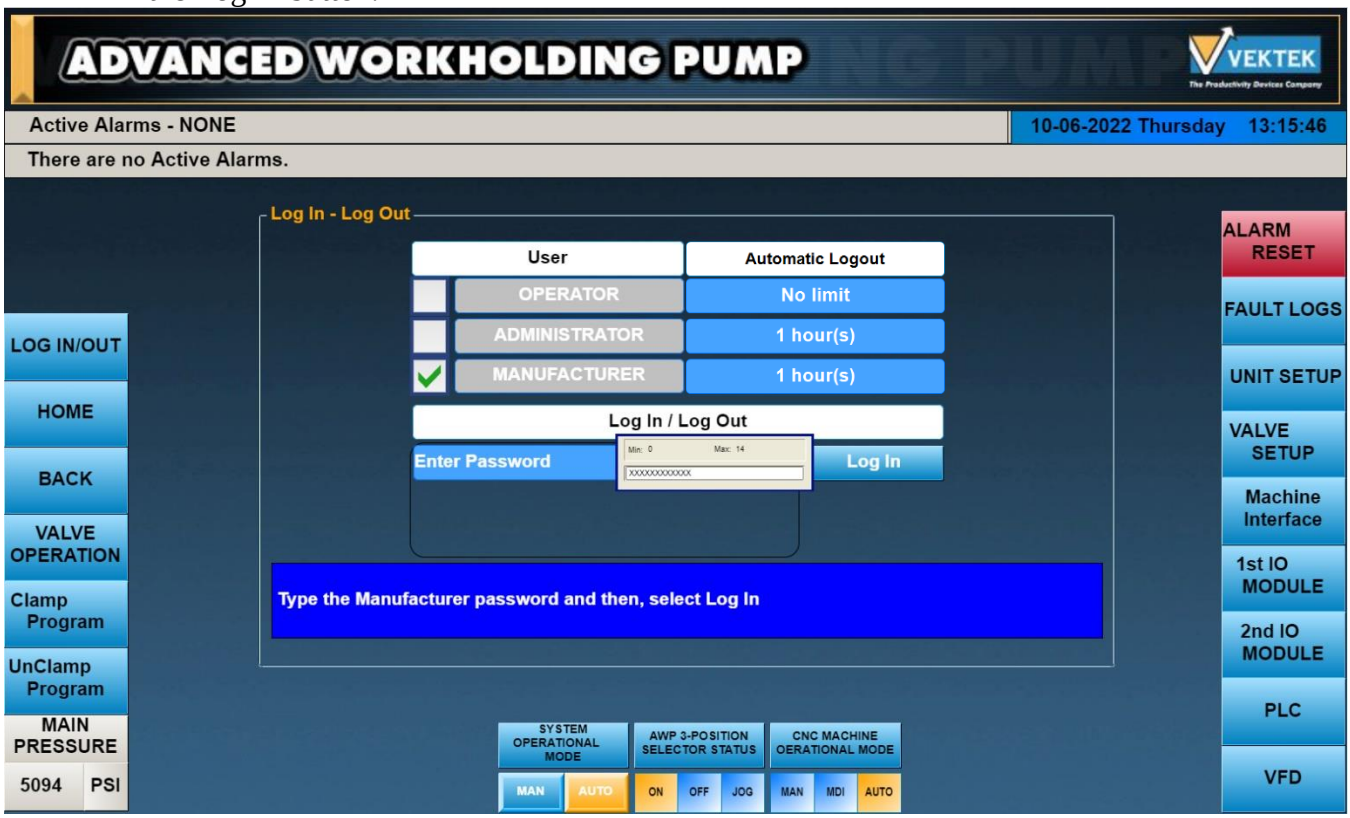
2.10 Administrator user access is available for the programmable time value before this access times out. When all setup is complete, the Administrator access can be stopped by selecting the Log Out button on screen.

2.11 ***Important:*** **Write the new Administrator password down here or keep in a safe place for future reference. _____ (maximum of 14 characters)**

2.12 The Administrator Password can be reset in the event of it being lost or forgotten. Please contact Vektek Customer Support for assistance in resetting this password.

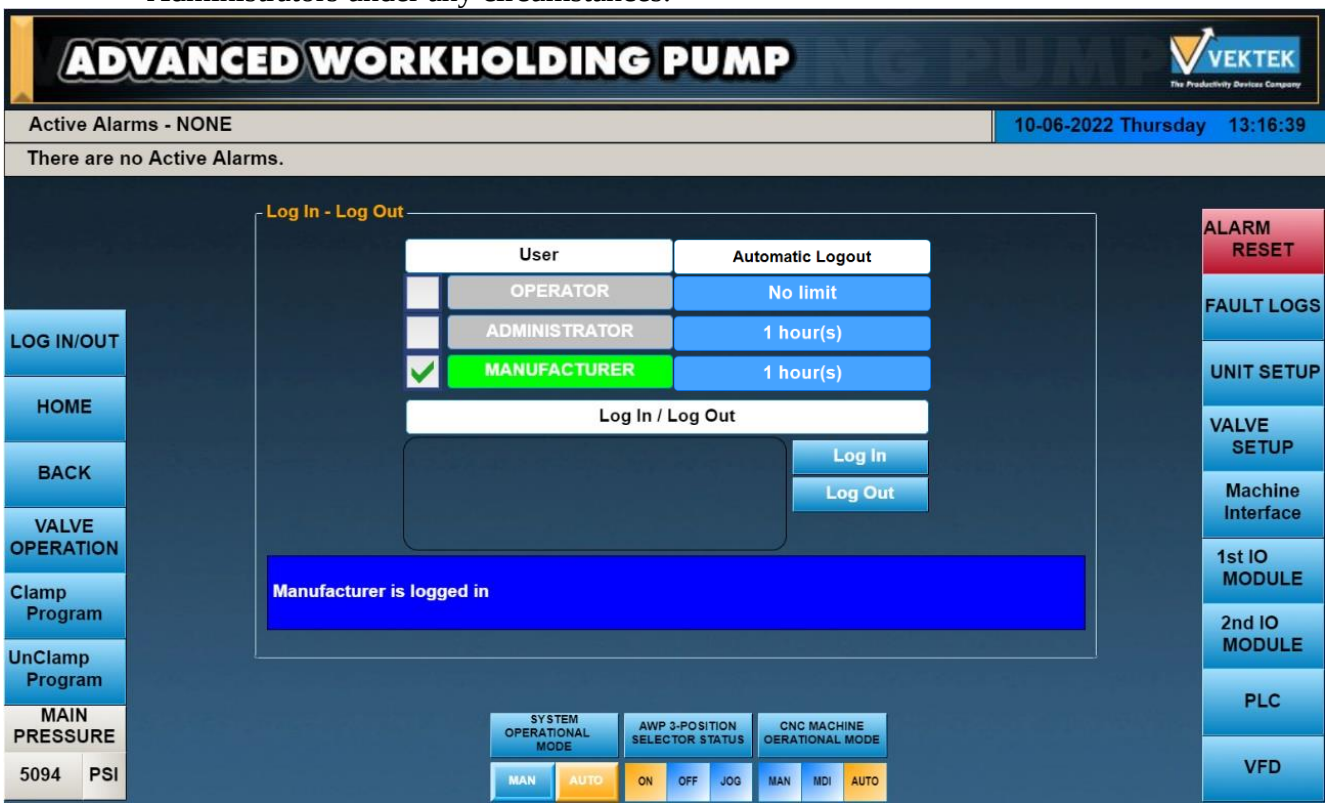


2.13 Manufacturer user access is granted by selecting the check box to the left of the User MANUFACTURER. After selecting this level, the user is prompted to select the Enter Password field, edit the ############### with the correct password value, and then select the Log In button.



2.14 Manufacturer level access is now available for the programmable time value before this access times out. When all setup is complete, the Manufacturer access can be stopped by selecting the Log Out button on screen.

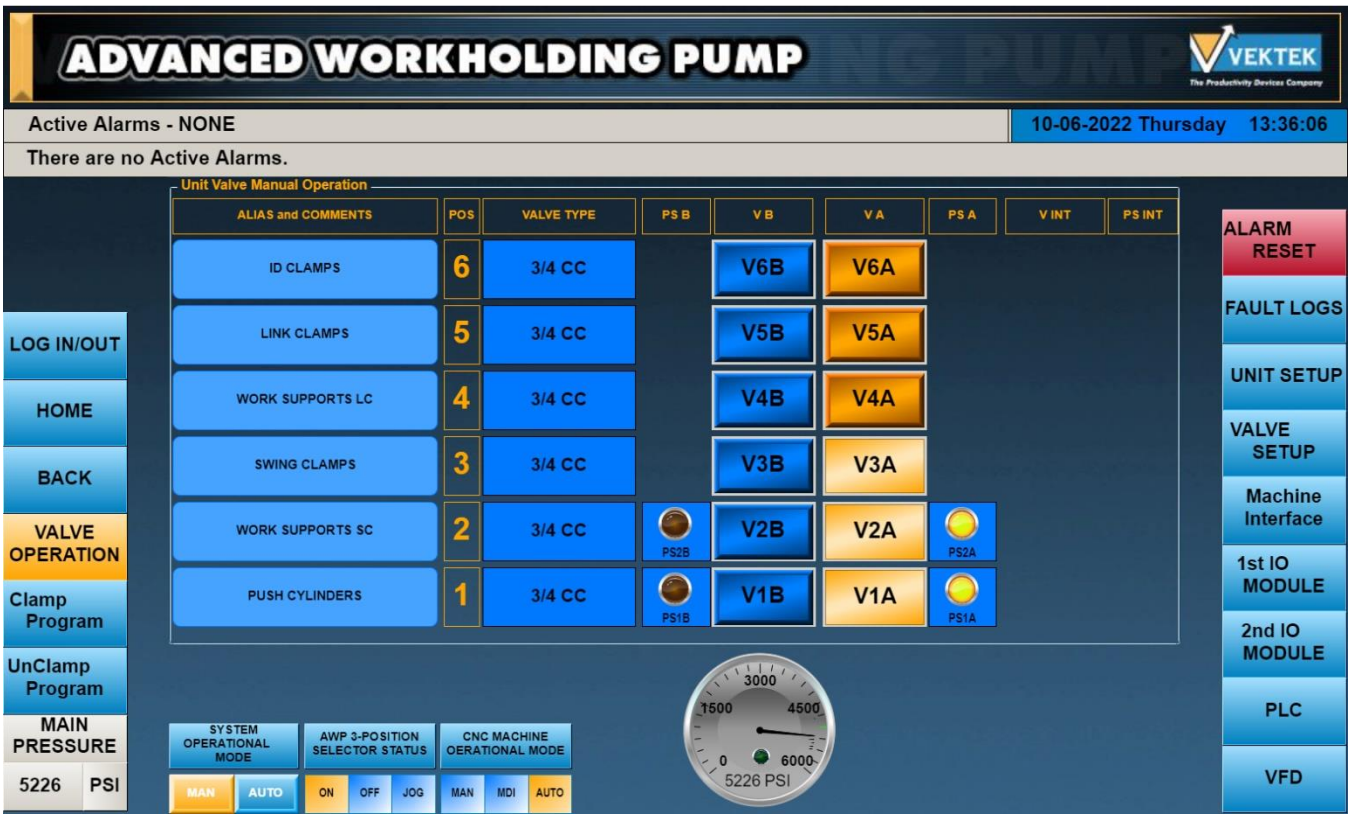
2.15 ***Important:*** The Manufacturer level password is protected and can only be used by authorized Vektek personnel. This password will not be disclosed to customer Operators or Administrators under any circumstances.



3.0 **BACK** button can be selected at any time to return to the previous application screen.

4.0 **VALVE OPERATION** screen allows manual control of all valve circuits during part fixture setup or during CNC machine malfunction. Select the **MAN** button at the lower left of the screen to enable manual valve control. Select individual valve solenoid buttons as needed to initiate hydraulic pressure in that circuit. Each button will light up to indicate that it is active when selected. Selecting the button again will de-activate the valve solenoid. Acknowledgement pressure switch lights are activated when the hydraulic pressure in the circuit reaches the pressure switch set point SP1 value that has been programmed in the pressure switch parameters. The lights will de-active when pressure drops below the set point SP1 value.

Important: *Manual valve control is enabled if the **AWP 3-POSITION SELECTOR STATUS** is in the **ON** or **OFF** position. When in the **ON** position, normal valve and circuit pressurization can be achieved. When in the **OFF** position, valves can be activated and de-activated repeatedly to dump all pressure in the valve circuit. Activating and de-activating all valves in the hydraulic system repeatedly will dump all pressure in all valve circuits and the pump manifold as shown on the main pressure switch mounted to the manifold. Power can then be removed from the pump to allow for maintenance and disconnection of components in the hydraulic circuit.*

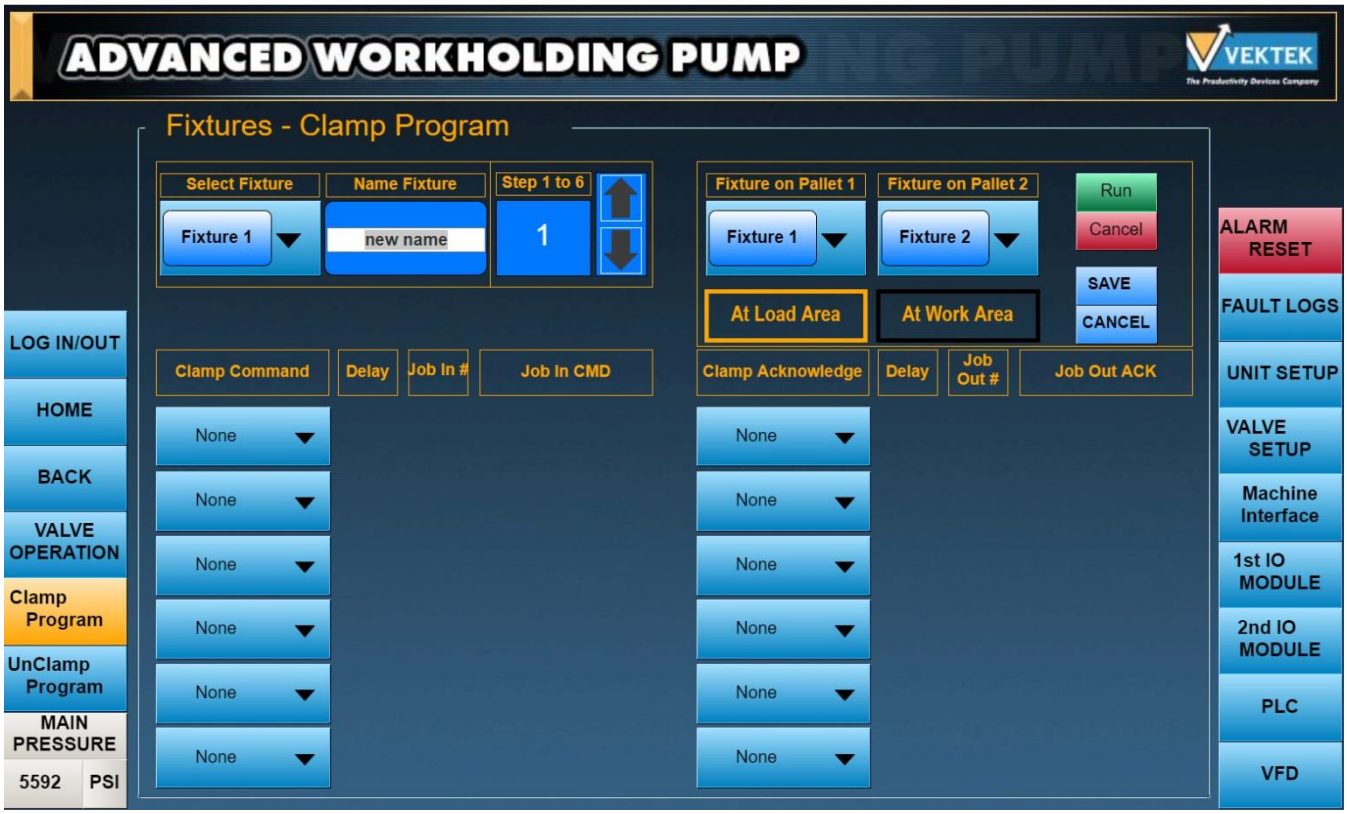


5.0 **Fixtures - Clamp Program** is accessed by selecting the button just below the Valve Operations button on all screens. This screen allows for programming, saving, recall, and control of the programs on Fixture on Pallet 1 and Fixture on Pallet 2 for 1 - 15 unique Part Fixtures. For each Part Fixture, up to 6 steps with 6 command/acknowledge per step for a total of 36 discreet sequences in the clamping process are possible.

5.1 Select Fixture 1 in Select Fixture drop-down menu, and in Fixture on Pallet 1 drop-down menu.

5.2 Fixture on Pallet 1, Fixture 1 is At Load Area as shown based on Input from CNC Machine.

5.3 Select "new name" from Name Fixture field and enter the Fixture 1 Part # to be clamped.
5.3.1 Up to 12 alpha/numeric characters or spaces in name.
5.3.2 Select SAVE button to retain value or CANCEL button to return to previous value.

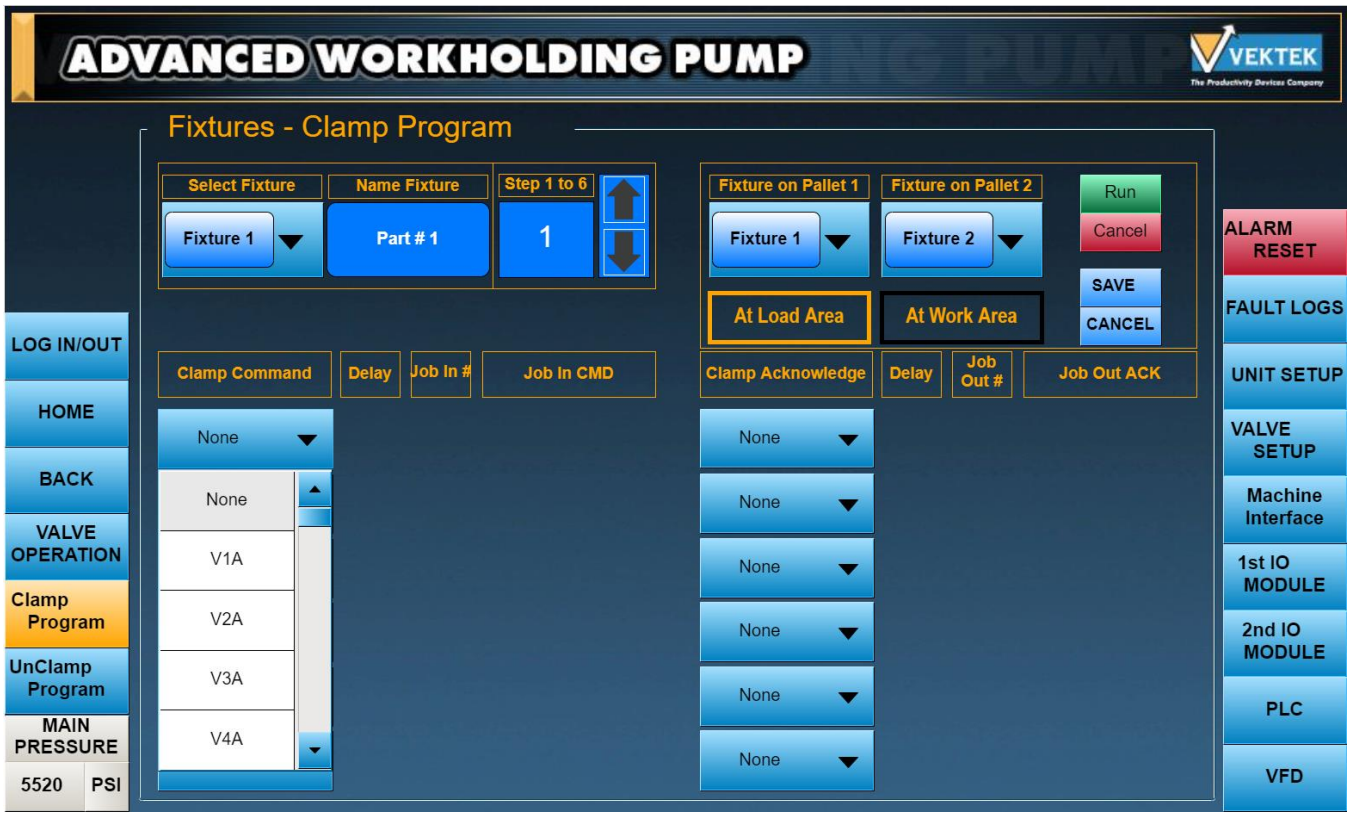


5.4 Available Clamp Command Values / Clamp Acknowledge Values

- 5.4.1 V1A = Valve 1 A Port / PS1A = Pressure Switch 1 A Port
- 5.4.2 V2A = Valve 2 A Port / PS3A = Pressure Switch 2 A Port
- 5.4.3 V3A = Valve 3 A Port / PS3A = Pressure Switch 3 A Port
- 5.4.4 V4A = Valve 4 A Port / PS4A = Pressure Switch 4 A Port
- 5.4.5 V5A = Valve 5 A Port / PS5A = Pressure Switch 5 A Port
- 5.4.6 V6A = Valve 6 A Port / PS6A = Pressure Switch 6 A Port
- 5.4.7 V1B = Valve 1 B Port / PS1B = Pressure Switch 1 A Port
- 5.4.8 V2B = Valve 2 B Port / PS3B = Pressure Switch 2 A Port
- 5.4.9 V3B = Valve 3 B Port / PS3B = Pressure Switch 3 A Port
- 5.4.10 V4B = Valve 4 B Port / PS4B = Pressure Switch 4 A Port
- 5.4.11 V5B = Valve 5 B Port / PS5B = Pressure Switch 5 A Port
- 5.4.12 V6B = Valve 6 B Port / PS6B = Pressure Switch 6 A Port
- 5.4.13 V1INT = Interm Valve 1 A Port / PSINT1A = Pressure Switch Interm 1 A Port
- 5.4.14 V2INT = Interm Valve 2 A Port / PSINT2A = Pressure Switch Interm 2 A Port
- 5.4.15 V3INT = Interm Valve 3 A Port / PSINT3A = Pressure Switch Interm 3 A Port
- 5.4.16 V4INT = Interm Valve 4 A Port / PSINT4A = Pressure Switch Interm 4 A Port
- 5.4.17 V5INT = Interm Valve 5 A Port / PSINT5A = Pressure Switch Interm 5 A Port
- 5.4.18 V6INT = Interm Valve 6 A Port / PSINT6A = Pressure Switch Interm 6 A Port
- 5.4.19 Job In = Job Input # 0-15 / Job Out = Job Output # 0-15
- 5.4.20 Delay = Delay Time (seconds) / Delay = Delay Time (seconds)
- 5.4.21 Send Clamped
- 5.4.22 End Program
- 5.4.23 Turn All Off

5.5 Select Clamp Command from left-hand drop-down menu. Use scroll bar if needed for selection.

5.5.1 Select SAVE button to retain value or CANCEL button to return to previous value.

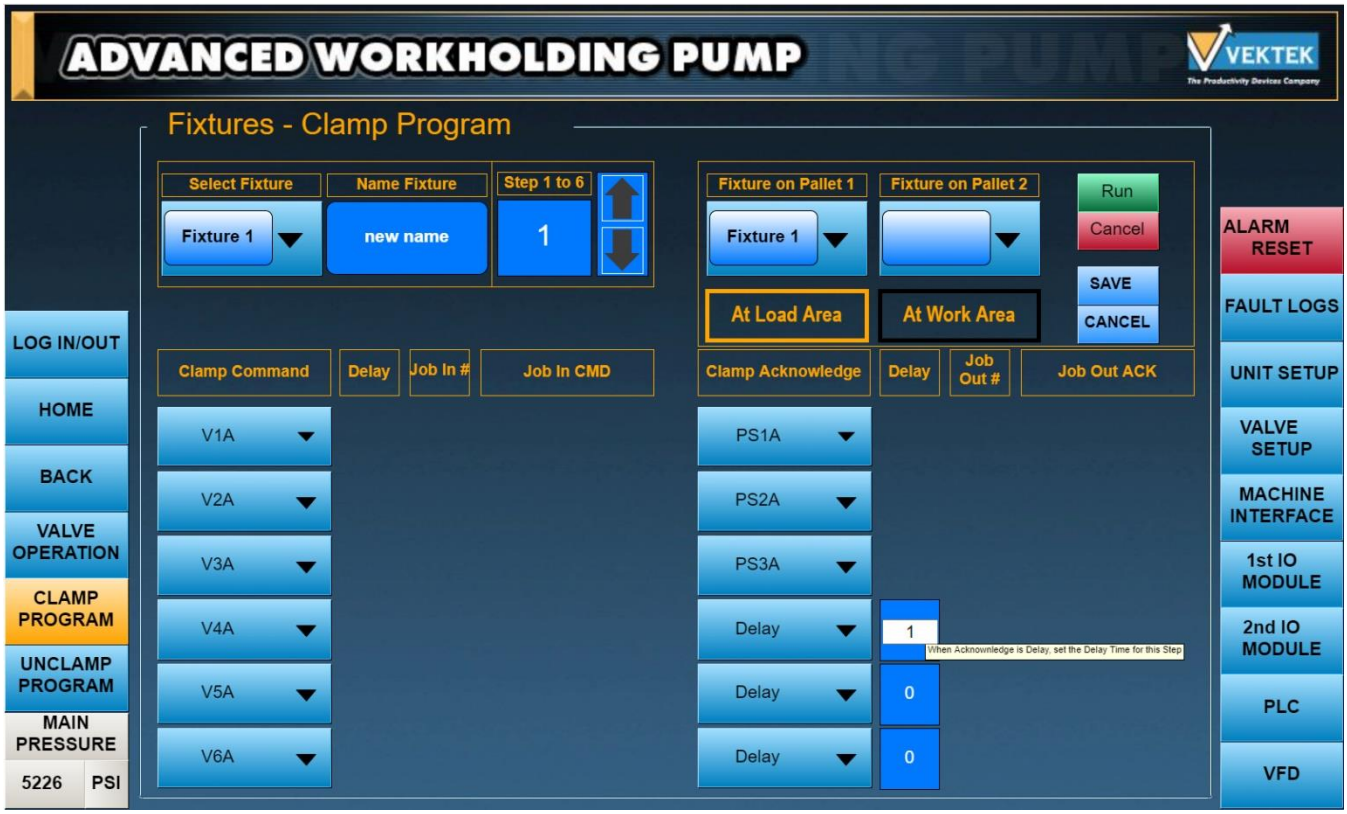


5.6 Select Clamp Acknowledge from right-hand drop-down menu. Use scroll bar if needed for selection.

5.7 If Clamp Acknowledge is set to None, the program will proceed immediately to the next Clamp Command.
5.7.1 Select SAVE button to retain value or CANCEL button to return previous value.

5.8 Delay timers can be used to separate Clamp Commands or used in the absence of Pressure Switch Acknowledgements. They provide the same functionality as a dwell in the CNC program to allow the clamping sequence to perform exactly as needed. An Example would be to use delays to sequence push cylinders, then work supports, and finally clamps so the part is positioned, supported, and clamped consistently as needed.

5.9 If Delay Clamp Command or Delay Clamp Acknowledge are selected, edit the delay time value by selecting the number and a keyboard will pop up to enter the desired time in seconds. Select Enter on the keyboard to enter the time value.
5.9.1 Select SAVE button to retain value or CANCEL button to return previous value.



5.10 If more sequences are needed, Select Up Arrow to move program to Step 2 - 6.

5.11 Fixture 2-15 are programmed in the same manner as Fixture 1.

5.12 Select Send Clamped Command from right-hand drop-down menu at the end of the clamping sequences but before Job sequences to send clamped signal to CNC machine.

5.13 A Job In is a Clamp Command that can be called from the CNC part program after the Fixture is moved to the At Work Area and the CNC part machining has begun.

5.13.1 Select the Job In Clamp Command from the left-hand drop-down menu as needed for each sequence. Then edit the Job In value by selecting the number and a keypad will pop up to select the desired number from 0-15. Select OK on the keypad to enter this value.

5.13.2 Select the Job In CMD from the center drop-down menu to control the valve sequence as needed. See section 5.3 for available commands.

5.14 A Job Out is a Clamp Acknowledge that can be called from the CNC part program after the Fixture is moved to the At Work Area and the CNC part machining has begun. It works in conjunction with the Job In functionality.

5.14.1 Select the Job Out Clamp Command from the left-hand drop-down menu as needed for each sequence. Then edit the Job Out value by selecting the number and a keypad will pop up to select the desired number from 0-15. Select OK on the keypad to enter this value.

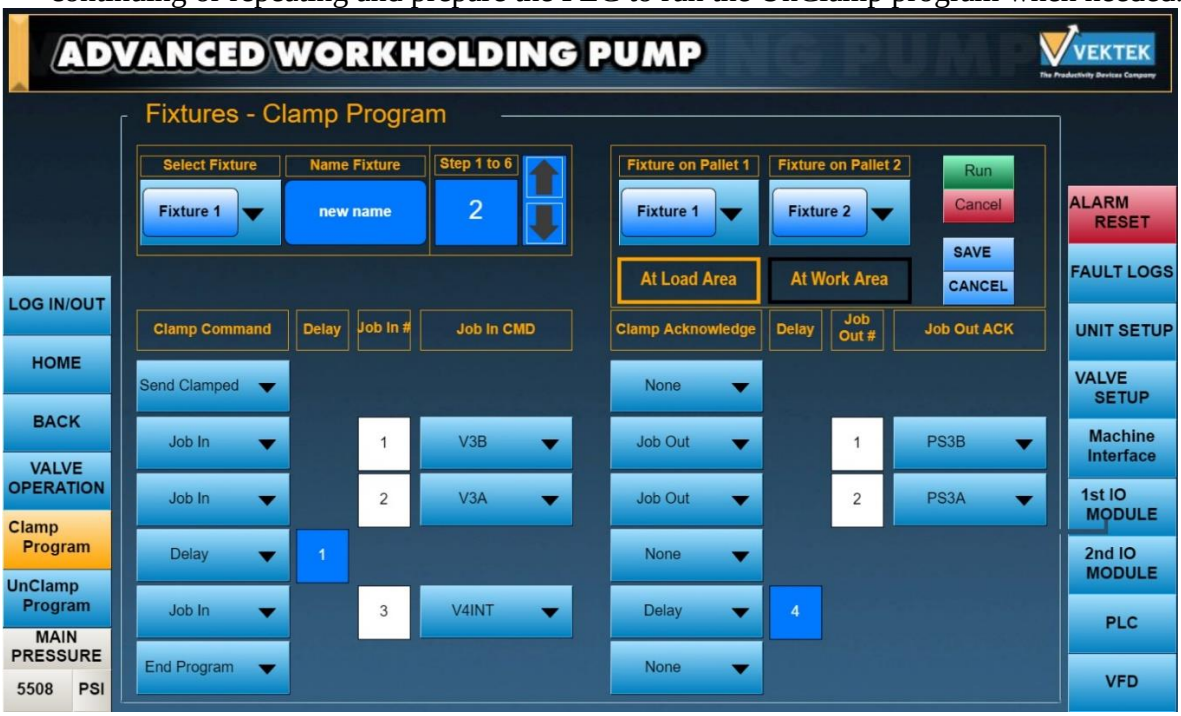
5.14.2 Select the Job Out ACK from the right-hand drop-down menu to acknowledge the valve sequence as needed. See section 5.3 for available acknowledge values.

5.14.2.1 PS acknowledgements can be physical or emulated depending on the Valve Setup configuration for each circuit. If emulated, a delay can be set in the Valve Setup, Valve Parameters 1 screen for each circuit.

5.15 Edit the Delay time value by selecting the number and a keypad will pop up to select the desired time in seconds. Select OK on the keypad to enter the time value.

5.15.1 Select SAVE button to retain value or CANCEL button to return previous value.

5.16 Select End Program from the left-hand drop-down menu to prevent the program from continuing or repeating and prepare the PLC to run the UnClamp program when needed.

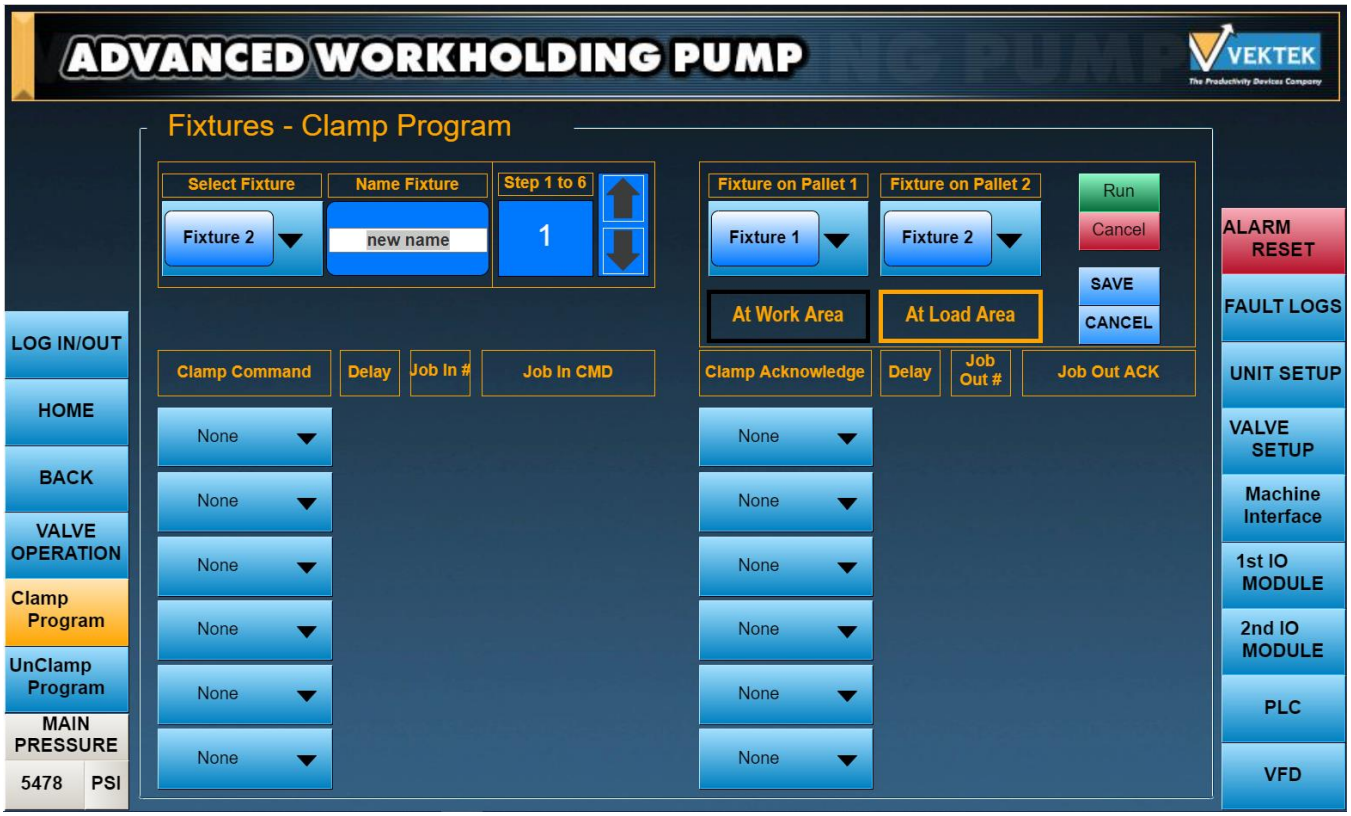


5.17 Select Fixture 2 in Select Fixture drop-down menu and in Fixture on Pallet 2 drop-down menu.

5.18 Fixture on Pallet 2, Fixture 2 is At Load Area as shown based on Input from CNC Machine.

5.19 Select “new name” from Name Fixture field and enter Fixture 2 Part # to be clamped.
5.19.1 Up to 12 alpha/numeric characters or spaces in name.
5.19.2 Select SAVE button to retain value or CANCEL button to return to previous value.

5.20 Fixture on Pallet 2, Fixture 2-15 are programmed in the same manner as Fixture 1 on Pallet 1. See Section 5.1 – 5.16 for instructions.

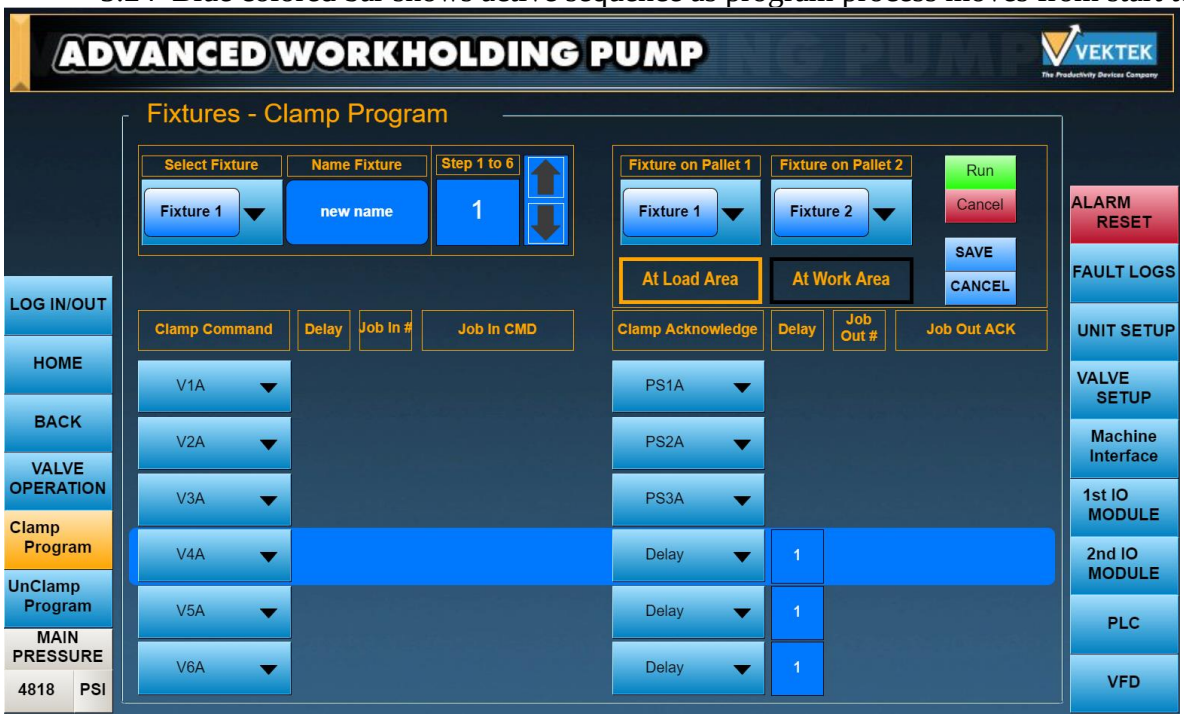


5.21 Select green Run button to manually run the Fixture Clamp program from the start to the End of Program to test the Clamp Command and Clamp Acknowledge sequences before running the program from the CNC Machine part program using M-Code commands.

5.22 Select orange “Confirm to run program for fixture on load area“ to start program.
5.22.1 Orange field will disappear after 5 seconds if not selected to confirm program start.

5.23 Select red Cancel button to cancel the program in process and return to the start.

5.24 Blue colored bar shows active sequence as program process moves from start to end.



5.25 Clamp Program for Auto-Coupler Valve Types is a custom configuration specifically designed for use with the Vektek Auto-Coupler system during the Fixture Clamp cycle. See Valve Setup Section 11.14 for configuration of this valve type. Below are examples of the steps with commands and acknowledgements typically used to run a complete Auto-Coupler Clamp Program with Slide and Lock Valves with proximity switches.

5.25.1.1 Clamp Program Step 1 configured as follows:

5.25.1.1.1 (Remove all Commands in Step 1 if used with Unclamp Program)

5.25.1.2 Slide Retract Proximity Switch - PS3B (PS#3)

5.25.1.3 Lock Retract Proximity Switch - PS4B (PS#1)

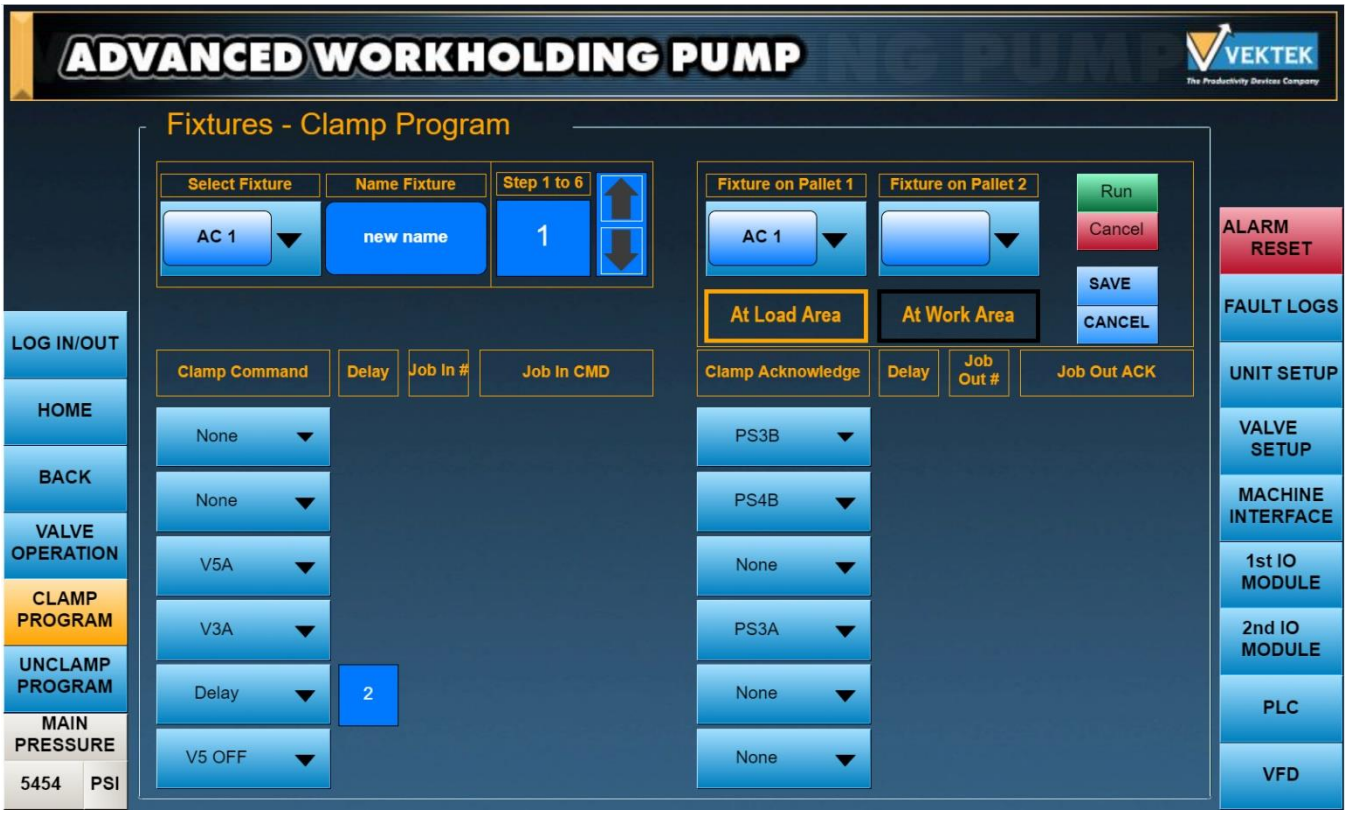
5.25.1.4 Air Blow Valve ON - V5A

5.25.1.5 Slide Extend Valve - V3A

5.25.1.6 Slide Extend Proximity Switch – PS3A (PS#4)

5.25.1.7 Delay Air Blow Off – Program as required for debris removal.

5.25.1.8 Air Blow Valve Off - V5 OFF



5.25.2 Clamp Program Step 2 configured as follows:

5.25.2.1 Lock Extend Valve - V4A

5.25.2.2 Lock Extend Proximity Switch - PS4A (PS#2)

5.25.2.3 Slide Extend & Lock Extend - PSINT4 (optional PS#5)

5.25.2.4 Clamp 1 Valve - V1A On (fixture clamps)

5.25.2.5 Pressure Switch Acknowledge - PS1A

5.25.2.6 Clamp 2 Valve - V2A On (more fixture clamps if required)

5.25.2.7 Pressure Switch Acknowledge - PS2A (if required)

5.25.2.8 Clamp 1 Valve - V1 Off with Delay timer (fixture clamps)

5.25.2.9 Clamp 2 Valve - V2 Off with Delay timer (more fixture clamps if required)

5.25.3 Clamp Program Step 3 configured as follows:

5.25.3.1 Lock Retract Valve - V4 OFF

5.25.3.2 Lock Retract Proximity Switch - PS4B (PS#1)

5.25.3.3 Slide Retract Valve - V3 OFF

5.25.3.4 Slide Retract Proximity Switch - PS3B (PS#3)

5.25.3.5 Send Clamped signal to CNC Machine with Delay timer to turn off after 1 second (program length of time as required for CNC Acknowledgement relay requirements)

5.25.3.6 End Program Command to terminate Clamp Program and allow start of Unclamp program when required.

6.0 **Fixtures - Unclamp Program** is accessed by selecting the button just below the Clamp Program button on all screens. This screen allows for programming, saving, recall, and control of the programs on Fixture on Pallet 1 and Fixture on Pallet 2 for 1 - 15 unique Part Fixtures. For each Part Fixture, up to 6 steps with 6 command/acknowledge per step for a total of 36 discreet sequences in the unclamping process are possible.

6.1 Select Fixture 1 in Select Fixture drop-down menu, and in Fixture on Pallet 1 drop-down menu.

6.2 Fixture on Pallet 1, Fixture 1 is At Load Area as shown based on Input from CNC Machine.

6.3 Select “new name” from Name Fixture field and enter Fixture 1 Part # to be clamped.
6.3.1 Up to 12 alpha/numeric characters or spaces in name.
6.3.2 Select SAVE button to retain value or CANCEL button to return to previous value.

6.4 Available UnClamp Command Values / UnClamp Acknowledge Values

6.4.1 V1A = Valve 1 A Port / PS1A = Pressure Switch 1 A Port
6.4.2 V2A = Valve 2 A Port / PS3A = Pressure Switch 2 A Port
6.4.3 V3A = Valve 3 A Port / PS3A = Pressure Switch 3 A Port
6.4.4 V4A = Valve 4 A Port / PS4A = Pressure Switch 4 A Port
6.4.5 V5A = Valve 5 A Port / PS5A = Pressure Switch 5 A Port
6.4.6 V6A = Valve 6 A Port / PS6A = Pressure Switch 6 A Port
6.4.7 V1B = Valve 1 B Port / PS1B = Pressure Switch 1 A Port
6.4.8 V2B = Valve 2 B Port / PS3B = Pressure Switch 2 A Port
6.4.9 V3B = Valve 3 B Port / PS3B = Pressure Switch 3 A Port
6.4.10 V4B = Valve 4 B Port / PS4B = Pressure Switch 4 A Port
6.4.11 V5B = Valve 5 B Port / PS5B = Pressure Switch 5 A Port
6.4.12 V6B = Valve 6 B Port / PS6B = Pressure Switch 6 A Port
6.4.13 V1INT = Interm Valve 1 A Port / PSINT1A = Pressure Switch Interm 1 A Port
6.4.14 V2INT = Interm Valve 2 A Port / PSINT2A = Pressure Switch Interm 2 A Port
6.4.15 V3INT = Interm Valve 3 A Port / PSINT3A = Pressure Switch Interm 3 A Port
6.4.16 V4INT = Interm Valve 4 A Port / PSINT4A = Pressure Switch Interm 4 A Port
6.4.17 V5INT = Interm Valve 5 A Port / PSINT5A = Pressure Switch Interm 5 A Port
6.4.18 V6INT = Interm Valve 6 A Port / PSINT6A = Pressure Switch Interm 6 A Port
6.4.19 Job In = Job Input # 0-15 / Job Out = Job Output # 0-15
6.4.20 Delay = Delay Time (seconds) / Delay = Delay Time (seconds)
6.4.21 Send UnClamped
6.4.22 End Program
6.4.23 Turn All Off

6.5 Fixture Unclamp Program Command/Acknowledge sequences are programmed in the same manner as Fixture Clamp Programs.

6.6 Select Send Unclamped Command from right-hand drop-down menu at the end of the unclamp sequences but before Job or other sequences to send unclamped signal to CNC machine.

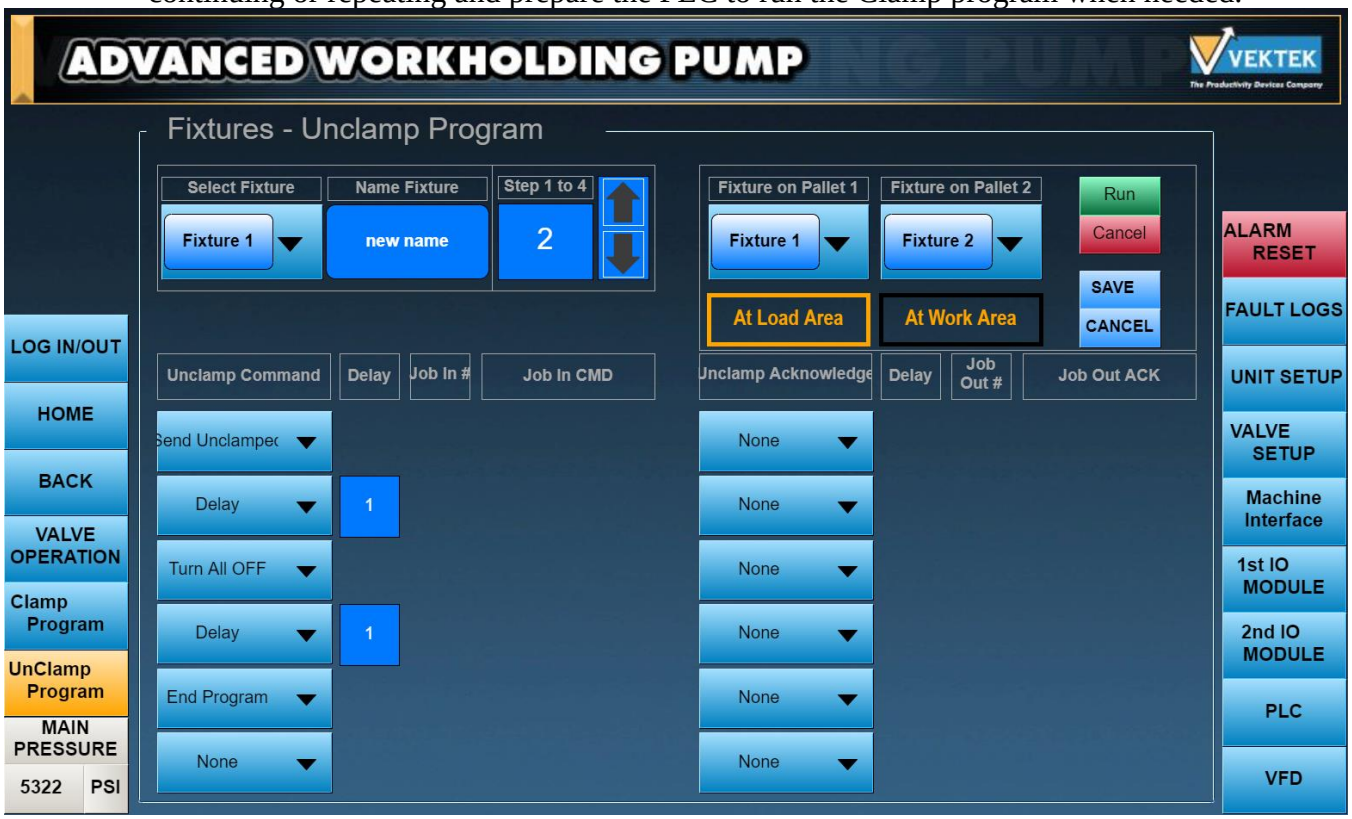
6.7 Select Turn All OFF command before End Program Command to ensure all valve solenoids are off and de-energized.

6.7.1 Typical for Closed Center Valves.

6.7.2 Pressure Block Center Valves may be required to stay on.

6.7.3 Program according to specific valve and fixture requirements.

6.8 Select End Program from the left-hand drop-down menu to prevent the program from continuing or repeating and prepare the PLC to run the Clamp program when needed.



6.9 Unclamp Program for Auto-Coupler Valve Types is a custom configuration specifically designed for use with the Vektek Auto-Coupler system during the Fixture Unclamp cycle. Below are examples of the steps with commands and acknowledgements typically used to run a complete Auto-Coupler Unclamp Program with Slide and Lock Valves with proximity switches.

6.9.1 Unclamp Program Step 1 configured as follows:

6.9.1.1 Slide Retract Proximity Switch - PS3B (PS#3)

6.9.1.2 Lock Retract Proximity Switch - PS4B (PS#1)

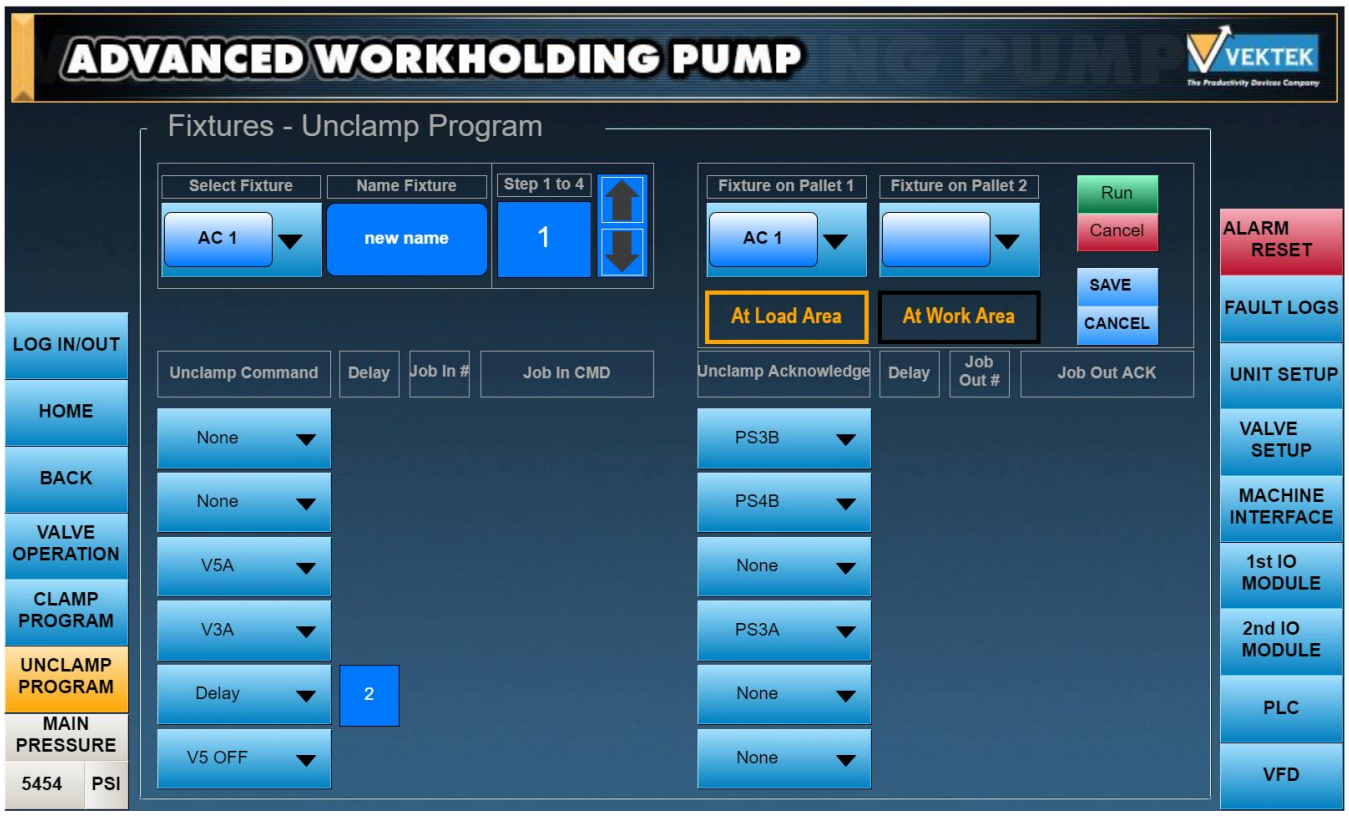
6.9.1.3 Air Blow Valve ON - V5A

6.9.1.4 Slide Extend Valve - V3A

6.9.1.5 Slide Extend Proximity Switch – PS3A (PS#4)

6.9.1.6 Delay Air Blow Off – Program as required for debris removal.

6.9.1.7 Air Blow Valve Off - V5 OFF



6.9.2 Unclamp Program Step 2 configured as follows:

6.9.2.1 Lock Extend Valve - V4A

6.9.2.2 Lock Extend Proximity Switch - PS4A (PS#2)

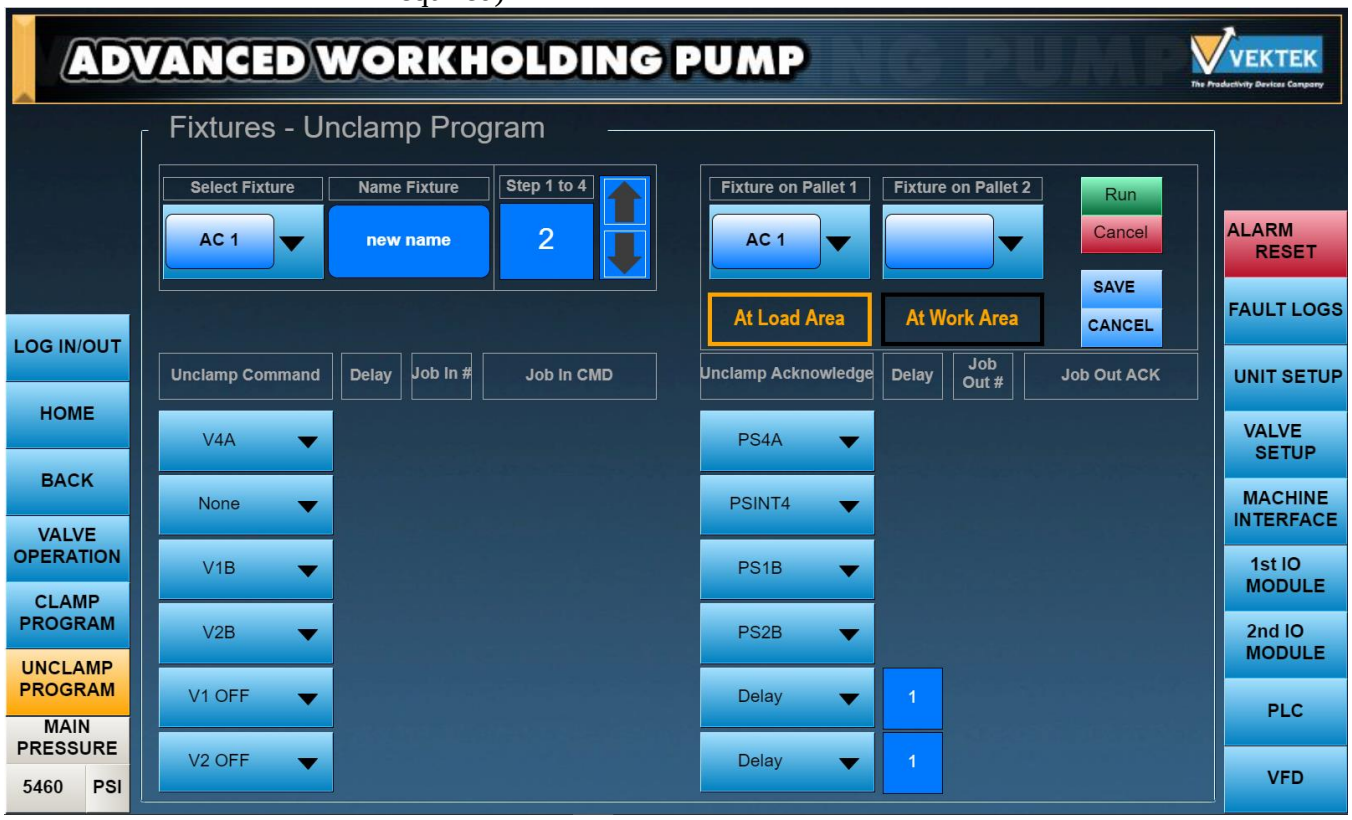
6.9.2.3 Slide Extend & Lock Extend - PSINT4 (optional PS#5)

6.9.2.4 Unclamp 1 Valve - V1B On (fixture clamps)

6.9.2.5 Unclamp 2 Valve - V2B On (more fixture clamps if required)

6.9.2.6 Unclamp 1 Valve - V1 OFF with Delay timer (fixture clamps)

6.9.2.7 Unclamp 2 Valve - V2 OFF with Delay timer (more fixture clamps if required)



6.9.3 Unclamp Program Step 3 configured as follows:

6.9.3.1 Lock Retract Valve - V4 OFF

6.9.3.1.1 (Remove or None if used with Clamp Program)

6.9.3.2 Lock Retract Proximity Switch - PS4B (PS#1)

6.9.3.2.1 (Remove or None if used with Clamp Program)

6.9.3.3 Slide Retract Valve - V3 OFF

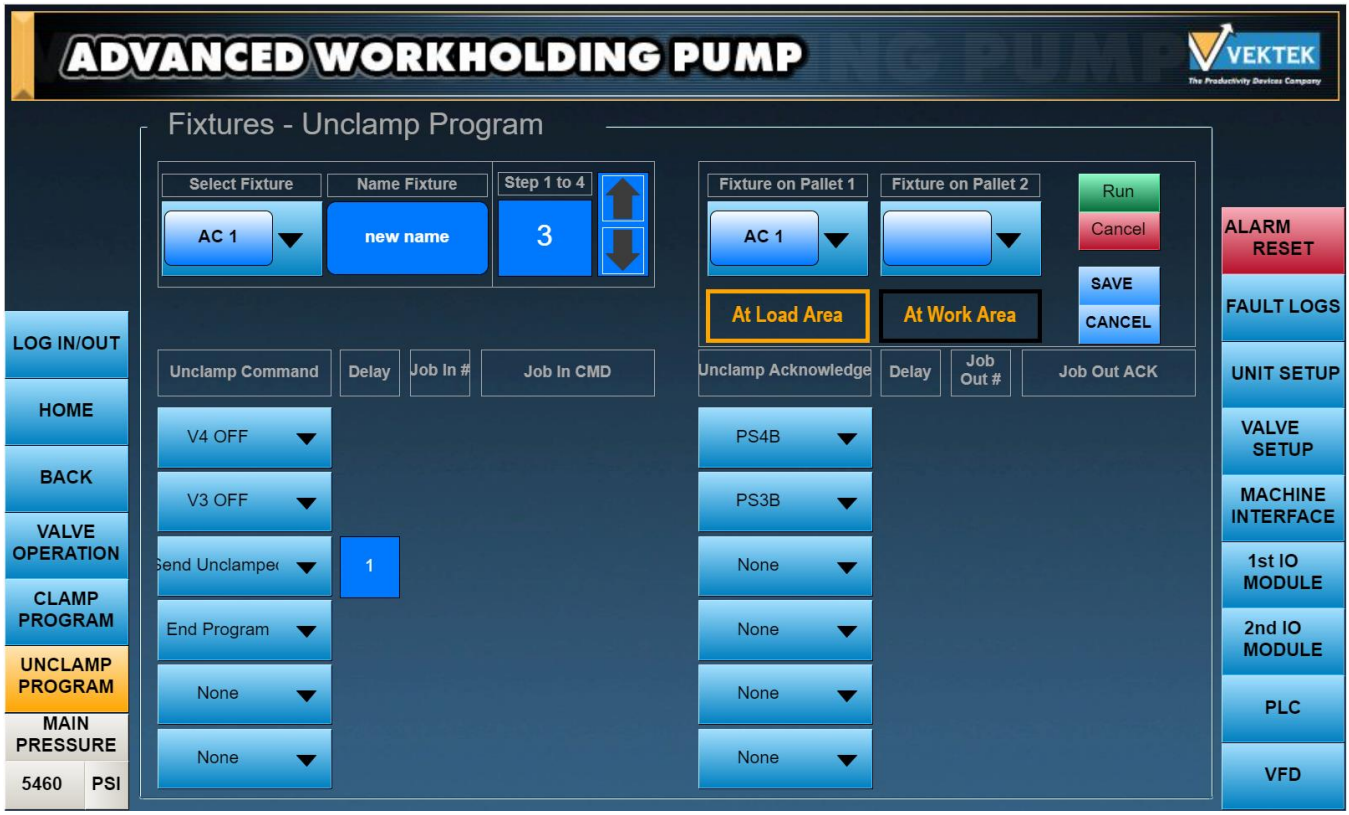
6.9.3.3.1 (Remove or None if used with Clamp Program)

6.9.3.4 Slide Retract Proximity Switch - PS3B (PS#3)

6.9.3.4.1 (Remove or None if used with Clamp Program)

6.9.3.5 Send Unclamped signal to CNC Machine with Delay timer to turn off after 1 second (program length of time as required for CNC Acknowledgement relay requirements)

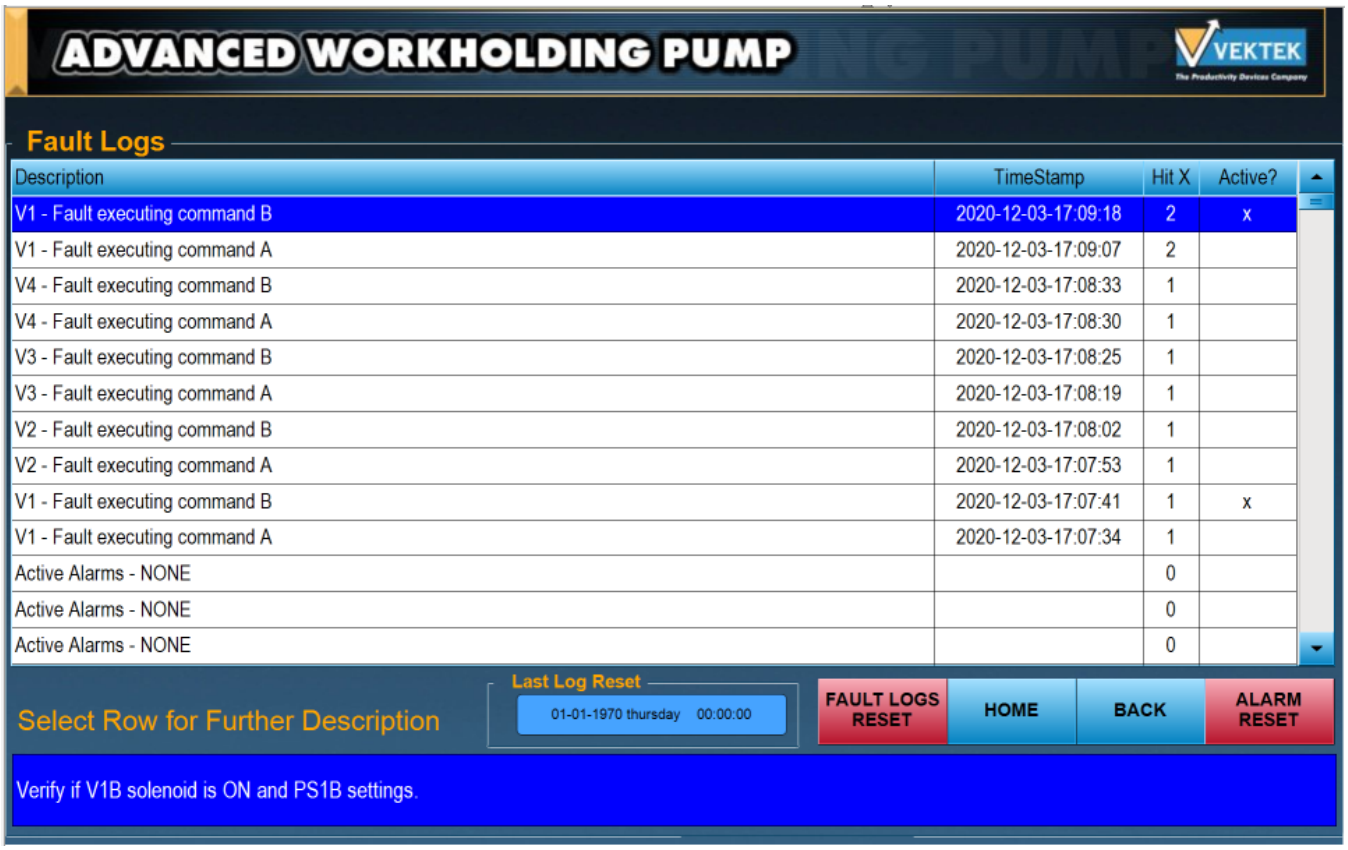
6.9.3.6 End Program Command to terminate Unclamp Program and allow start of Clamp program when required.



7.0 **MAIN PRESSURE** is the system pressure on the main manifold pressure switch and is displayed on the lower left field of all screens real time.

8.0 **ALARM RESET** button is located at the upper right of all screens. Select this button to reset all AWP alarms after the issue that caused the alarm has been corrected.

9.0 **FAULT LOGS** button is located at the upper right, just below **ALARM RESET** button. Select this button to open the Fault Logs file to review all active and inactive faults. Each fault can then be selected to show the long description at the bottom of the screen. Each fault type can be found in the Trouble Shooting section of this manual along with a more detailed description of each, the typical cause, and the resolution of the fault. The **Time Stamp** of each fault is recorded as shown along with the **Hit X** (number of times the fault has occurred), and **Active?** marked with an **X** if the fault is still active. After resolving the cause of each fault, and selecting the **ALARM RESET**, the fault log can be cleared of past faults by selecting the **FAULT LOGS RESET** button at the bottom of the screen. Select **HOME** or **BACK** button to return to the previous screen and normal operation.



10.0 **UNIT SETUP and Status** screen is used to setup the base unit parameters and monitor the system status for Ethernet communications and sensors throughout the AWP.

10.1 **Pressure Unit** parameter can be set to **PSI** or **Bar** and these units will be reflected on all screens where pressure is displayed.

10.2 **Feedback** parameter can be set to **UNIT SETUP** or **DIGITAL PS SIGNAL** as preferred by the operator.

10.2.1 **UNIT SETUP** parameter allows for all main system pressure values to be set on this screen by the operator. The parameter values in the main manifold pressure switch are ignored.

10.2.1.1 **Pressure Switch Analog End of Scale** should be set to the same value as the Analog End Value parameter (AEP) in the manifold mounted pressure switch. Refer to the pressure switch specifications.

10.2.1.1.1 High-Pressure – 6000 PSI or 400 Bar

10.2.1.1.2 Low-Pressure – 1500 PSI or 100 Bar

10.2.1.2 **Maximum System Pressure (Alarm)** can be set to any value in the operating range of the pump. An Alarm will be generated in the ALARMS AND MESSAGES field if this value is achieved in the system pressure. This will allow the operator to determine the cause of the system pressure that exceeded the programmed value and correct it before damage is caused to any hydraulic system component.

10.2.1.2.1 High-Pressure – 1500-6000 PSI or 100-400 Bar

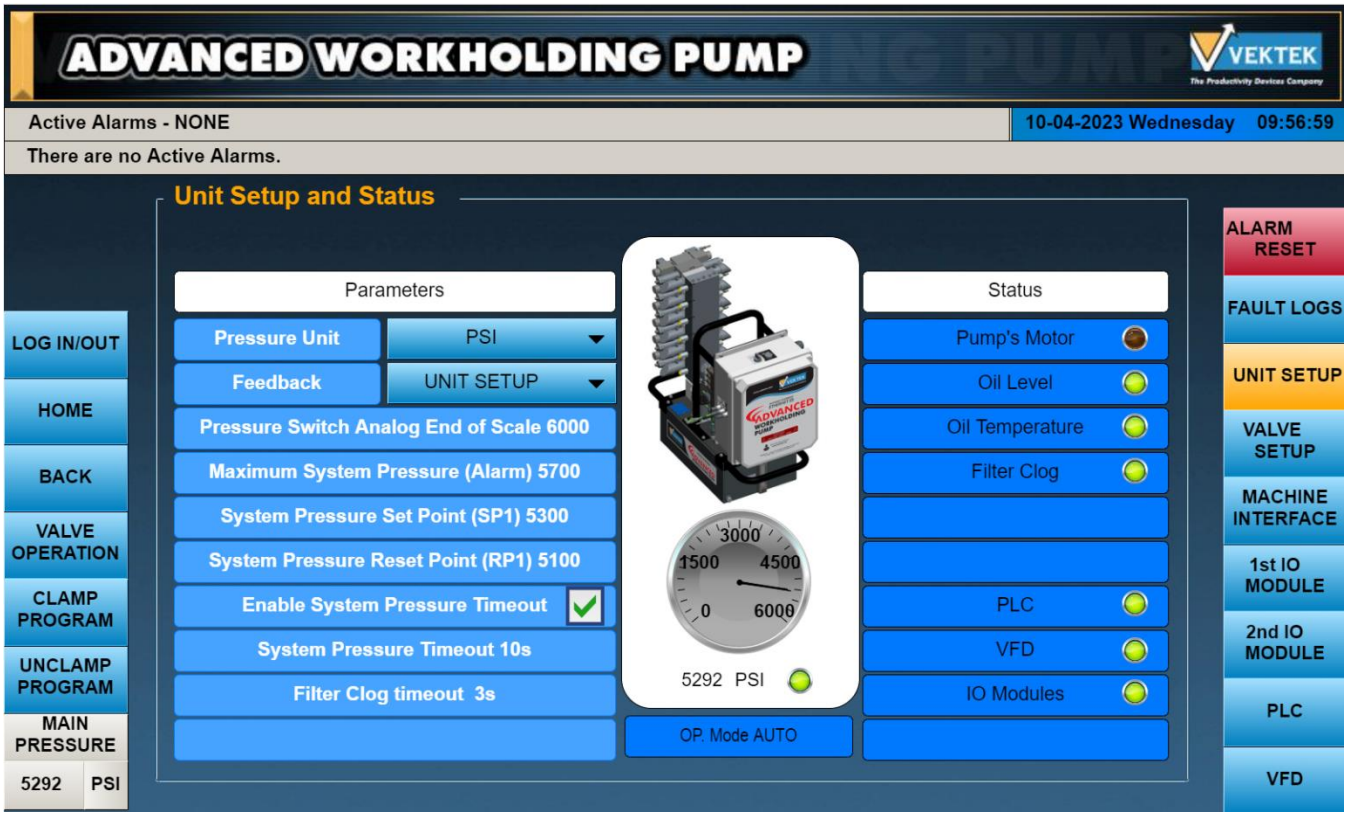
10.2.1.2.2 Low-Pressure – 300-1500 PSI or 20-100 Bar

10.2.1.3 **System Pressure Set Point (SP1)** can be set to any value from in the operating range of the pump.

10.2.1.3.1 High-Pressure – 1500-5000 PSI or 100-350 Bar

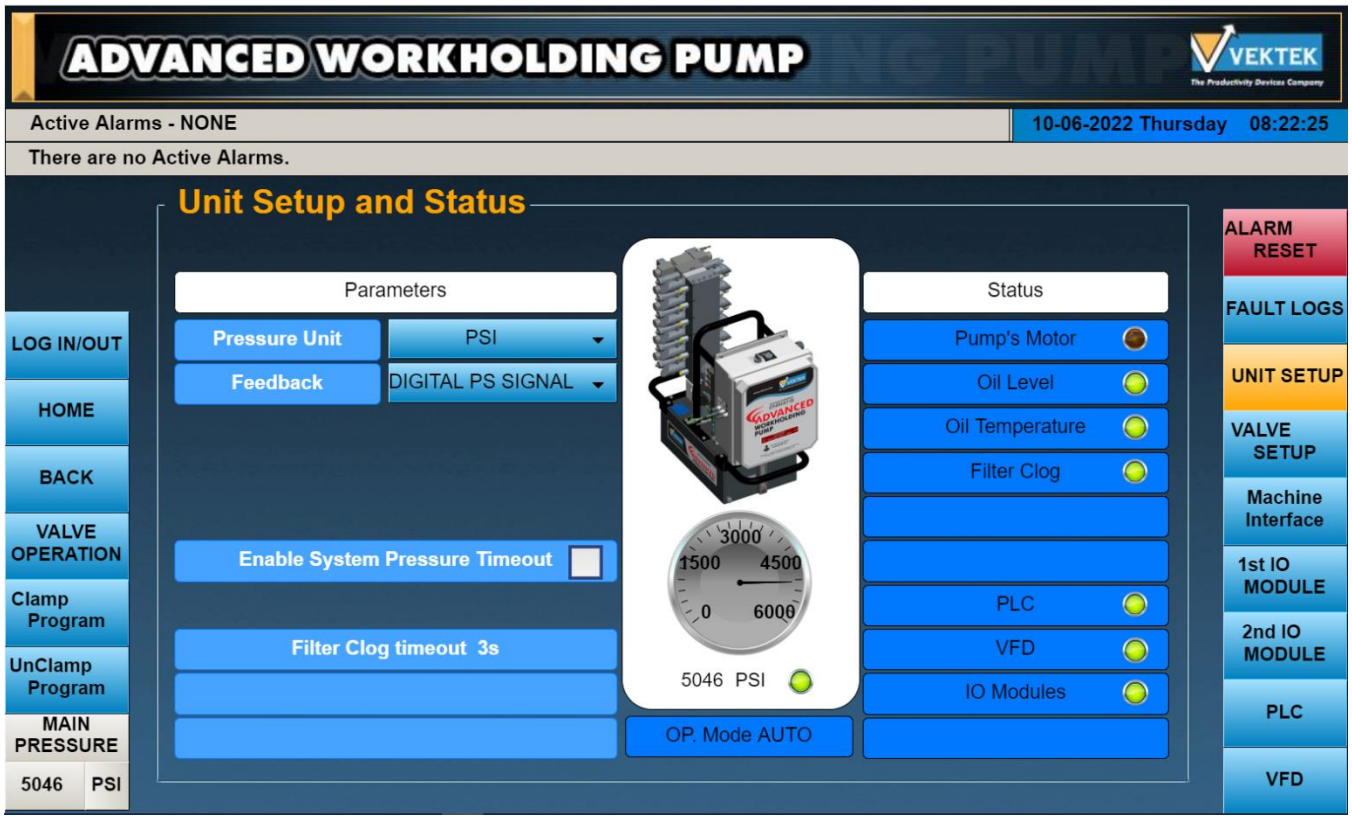
10.2.1.3.2 Low-Pressure – 300-1500 PSI or 20-100 Bar

10.2.1.4 **System Pressure Reset Point (RP1)** can be set to any value a minimum of 10 PSI or 0.7 Bar below the SP1 value. ***Important:*** *It is recommended to allow at least 10% below the SP1 value to avoid nuisance cycling of the pump motor.*



10.2.2 **DIGITAL PS SIGNAL** parameter allows for all main system pressure values to be set on the main manifold pressure switch. (For pressure switch setting instruction IS7075 see AWP Parts List Manual, Appendix C). Maximum System Pressure (Alarm), System Pressure Set Point, and System Pressure Reset Point are all hidden from the operator, so they are ignored.

10.2.3 **Pressure Unit** parameter has been set to **Bar** and **MAIN PRESSURE** is now displayed in BAR units also.



10.3 **Unit Status** can be monitored for each of the AWP systems and sensors.

10.3.1 **Pump Motor** light is activated if motor is activated and turning.

10.3.2 **Level** light is activated if the oil level sensor falls below the minimum allowable level of approximately 1 gallon (3.7 liters).

10.3.3 **Temperature** light is activated if the oil temperature sensor exceeds 150° F (65° C).

10.3.4 **Filter Clog** light is activated if the return-line filter sensor exceeds 72 PSI (5 Bar).

10.3.5 **PLC** light is activated if the Programmable Logic Controller is powered and active.

10.3.6 **VFD** light is activated if the Variable Frequency Drive is powered and active.

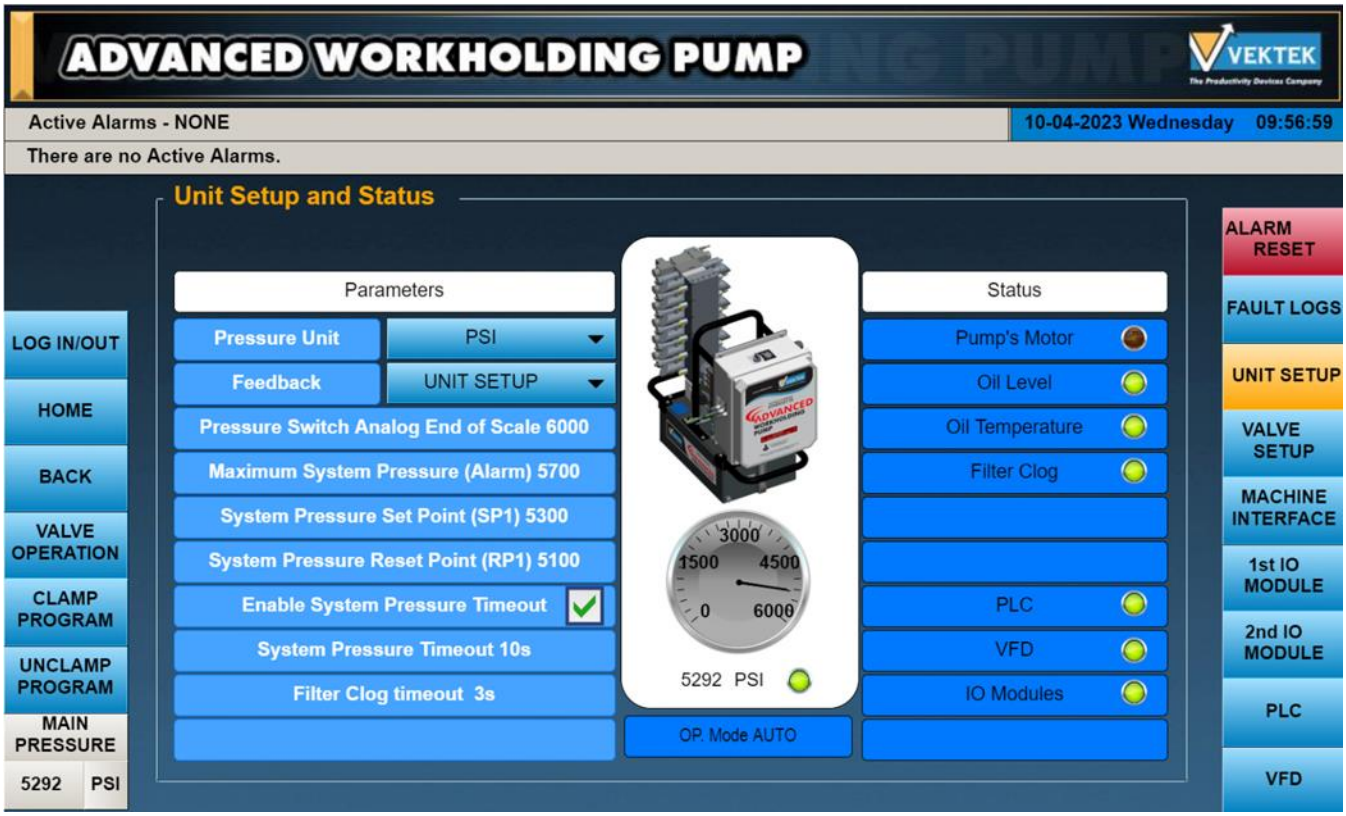
10.3.7 **IO Modules** light is activated if the IO Modules 1 and 2 are powered and active.

10.3.8 **OP. MODE** indicates the active **System Operational Mode** as **Manual** or **Auto**.

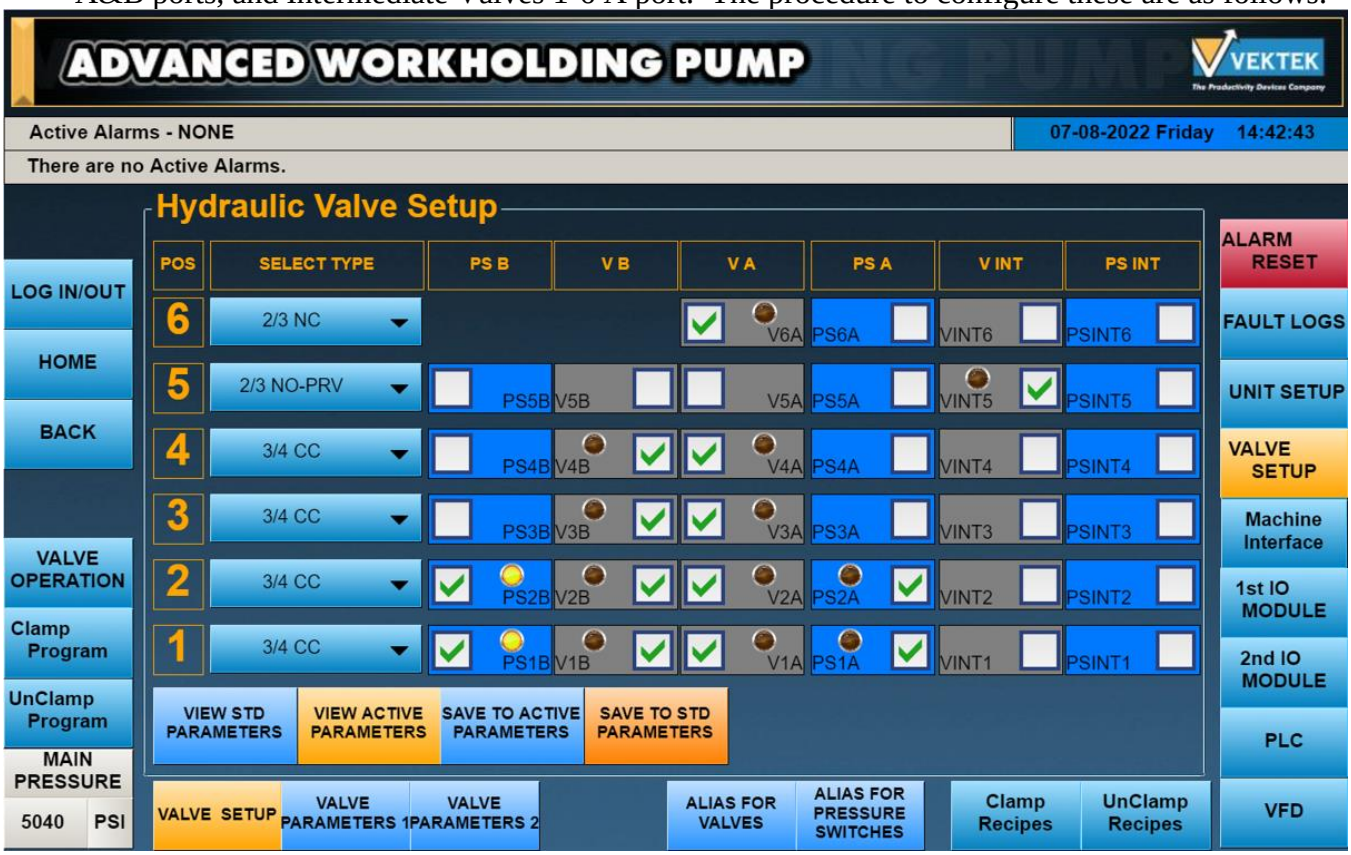
10.3.9 **Pressure Gauge** indicates the System Pressure on the main manifold pressure switch and the light is activated if the System Pressure Set Point (SP1) has been reached.

10.4 **Enable System Pressure Timeout** can be checked to allow the **System Pressure Timeout** value to be set to fault if the system pressure on the manifold pressure switch is not met in the allotted time period. This function need not be enabled for the typical workholding application with this on-demand pump but is available if need for the atypical application. Unchecking will disable this function and hide the System Pressure Timeout value from being set.

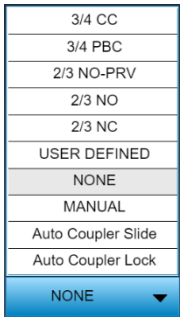
10.5 **Filter Clog Timeout** can be set to any value from 1-10 seconds. The default value is set to 3 seconds for most applications. A clogged return line filter will cause the sensor to trip and after the timeout value is reached will indicate the Filter Clog alarm to the Unit Status. The value can be increased to avoid nuisance tripping of the alarm for hydraulic systems with large return flow volumes. ***Important:*** *Setting too high a value can defeat the purpose of the Filter Clog sensor and allow unfiltered oil to bypass the filtration system.*



11.0 **VALVE SETUP** screen is used to configure all Valves 1-6 A&B ports, Pressure Switches 1-6 A&B ports, and Intermediate Valves 1-6 A port. The procedure to configure these are as follows.



11.1 **SELECT TYPE** of valve for each valve position 1-6 A&B ports from the drop-down list. The default configuration appears for each of the valve types that can be selected. If there is no valve to be configured for a valve position, select NONE.



11.2 If the valve type needed is not listed or if independent control of valve A & B ports are needed, select **USER DEFINED** and check the appropriate valve boxes for A&B ports and required pressure switches. ***Important:*** *Independent control of valve solenoids allow for both A&B ports to be activated at the same time. This is not allowed for all other solenoid operated valve types in the PLC program.*

11.3 **Check** Pressure Switch boxes for each position 1-6 A&B ports as needed.

11.4 **Check** Intermediate Valve **2/3 NO-PRV** for each position 1-6 as needed. It is recommended to us a separate position even though these are mounted under another valve.

11.5 **SAVE TO STD PARAMETERS** button must be selected to save the initial standard setup before leaving this screen.

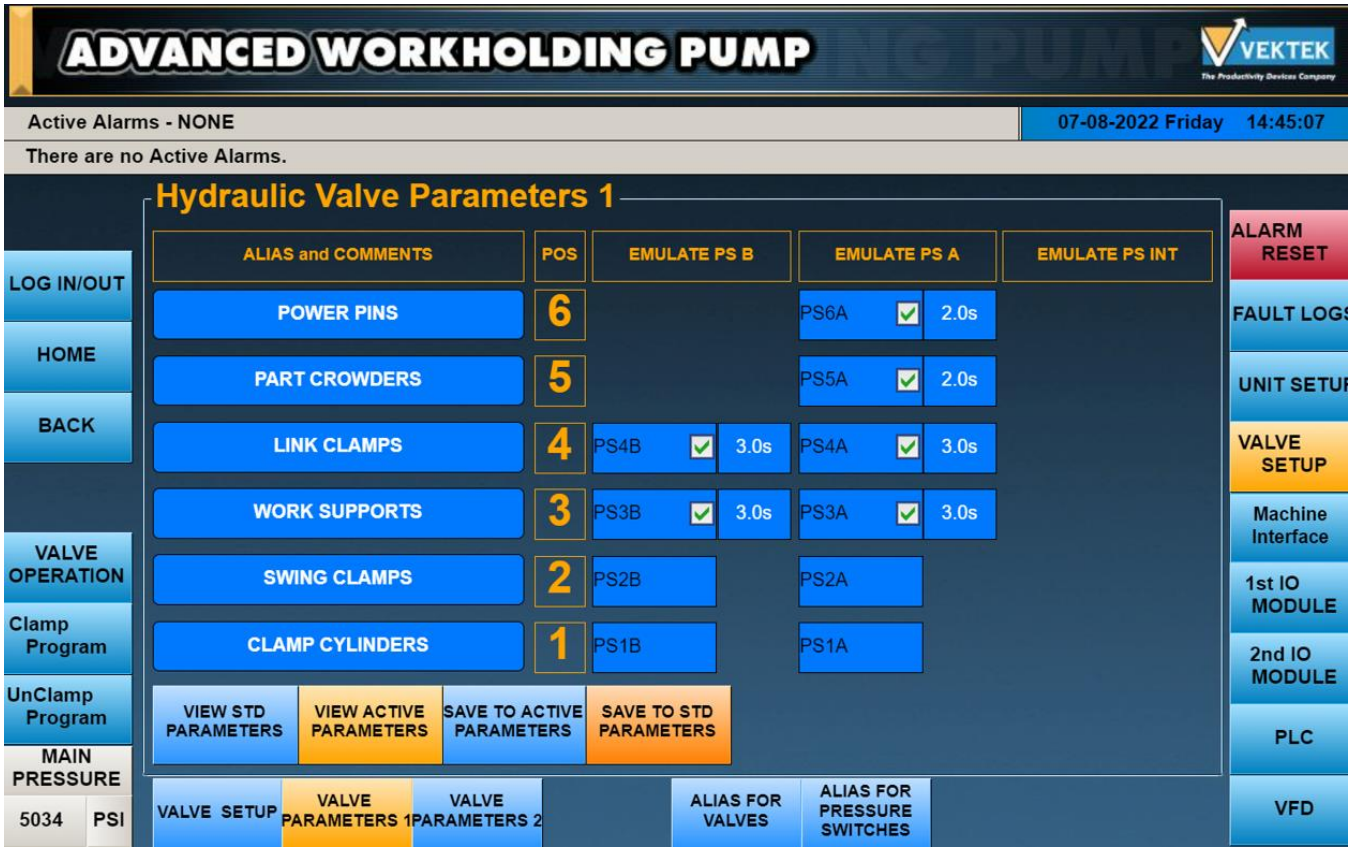
11.6 **SAVE TO ACTIVE PARAMETERS** button must be selected to save any changes made after the initial standard setup before leaving this screen.

11.7 **VIEW STD PARAMETERS** button can be selected to view the initial Standard Parameters setup. To permanently return to this setup, select **SAVE TO STD PARAMETERS** button again.

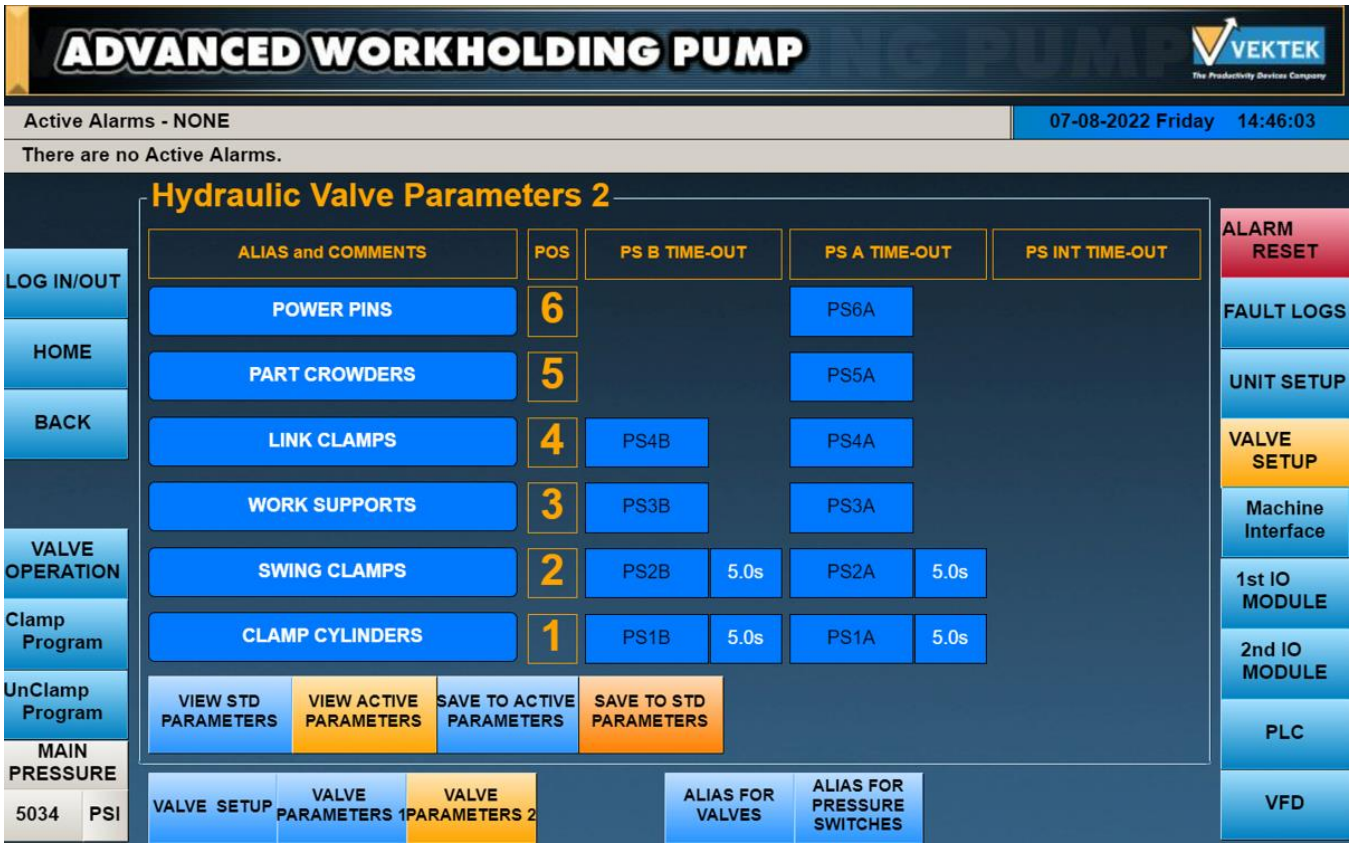
11.8 **VIEW ACTIVE PARAMETERS** button can be selected to view the last saved Active Parameters. To permanently return to this setup, select **SAVE TO ACTIVE PARAMETERS** button again.

11.9 ***Important:*** *Leaving the Setup screen before selecting either **SAVE TO** button will result in the loss of any setup changes made.*

11.10 **VALVE PARMAMETERS 1** screen is used to setup timer emulation of pressure switches when they are not configured for any valve position. This will allow an acknowledgement signal to be sent back to the CNC machine after a programmed amount of time according to the requirements of the circuit. Small volume circuits will need less time and large volume circuits will need more time to before sending the acknowledgement signal. The timer for each emulation of pressure switch position must be checked and the value can be adjusted as needed in 0.1 increments during fixture setup. Minimum value is 0.1 seconds and there is no limit to the maximum value. Select each timer emulation value and enter all 3 digits of the value needed. **SAVE TO ACTIVE PARAMETERS** button must be selected to save any changes made to the timer emulation values.



11.11 **VALVE PARMAMETERS 2** screen is used to setup the pressure switch PS A Time-Out, PS B Time-Out, or PS INT Time-Out value when a physical pressure switch is configured for any position. If a pressure switch does not reach it's programmed Set Point (SP1) value after valve actuation and in the allotted time, the pressure switch acknowledgement will not be sent back to the CNC machine and an Alarm message will be sent to the Alarm field indicating the cause of the alarm. The Part Program will not be allowed to continue to the next program line, stopping the CNC process.

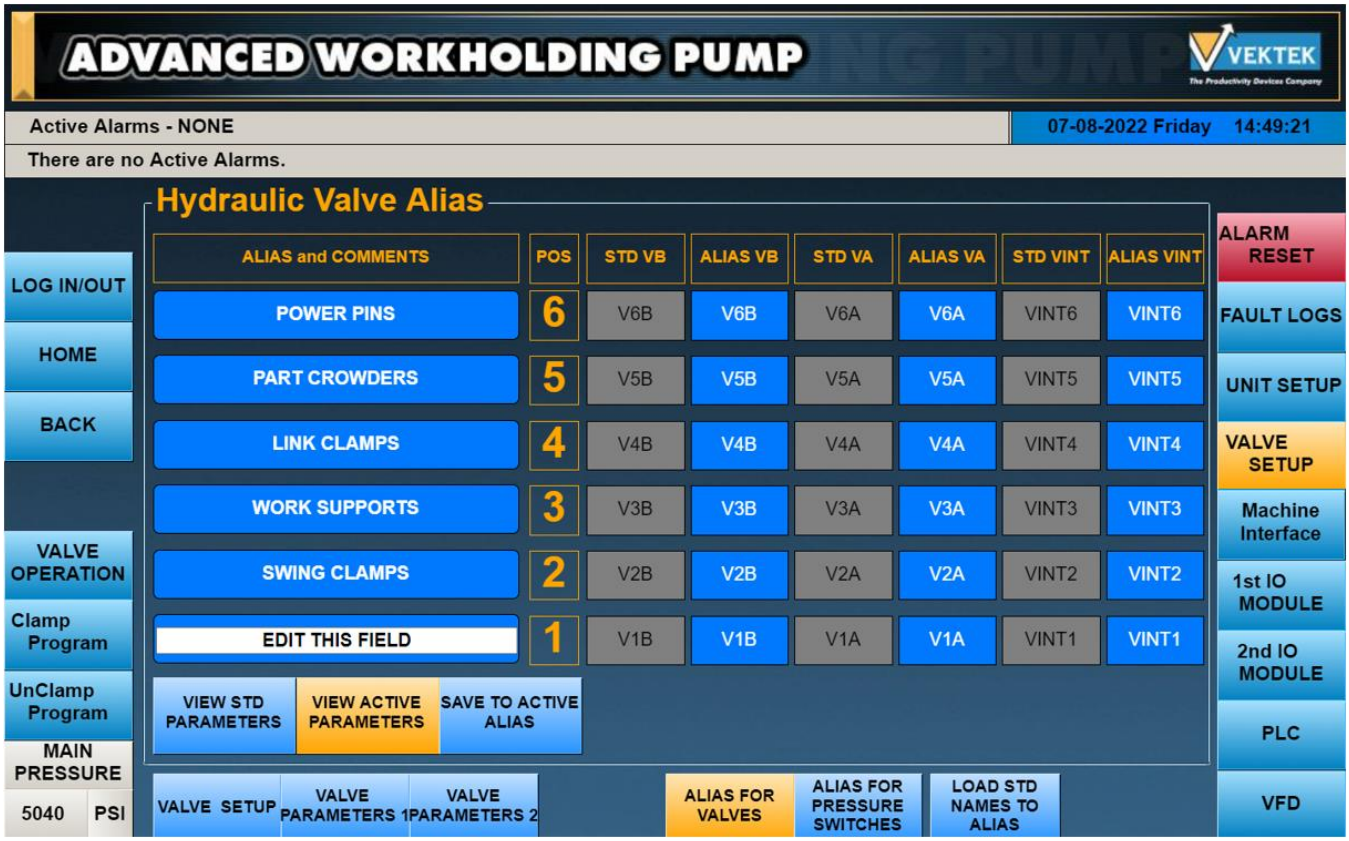


11.12 **ALIAS FOR VALVES** screen is used to setup the operator names for each valve circuit position. Fields with white text can be edited by selecting each and typing in the new name. They can be any alpha/numeric string up to 34 characters. Descriptive names can be very helpful during part fixture setup and troubleshooting of valve circuits.

11.12.1 **LOAD STD NAMES TO ALIAS** button can be used to load the default standard name values to each of the **ALIAS** name values for your convenience.

11.12.2 **SAVE TO ACTIVE ALIAS** button must be selected to save any changes made to the Valve Alias screen.

11.12.3 ***Important:*** *Valve Standard names will be used to configure all IO Module Output Names. Alias names cannot be used for IO Module Output Names.*

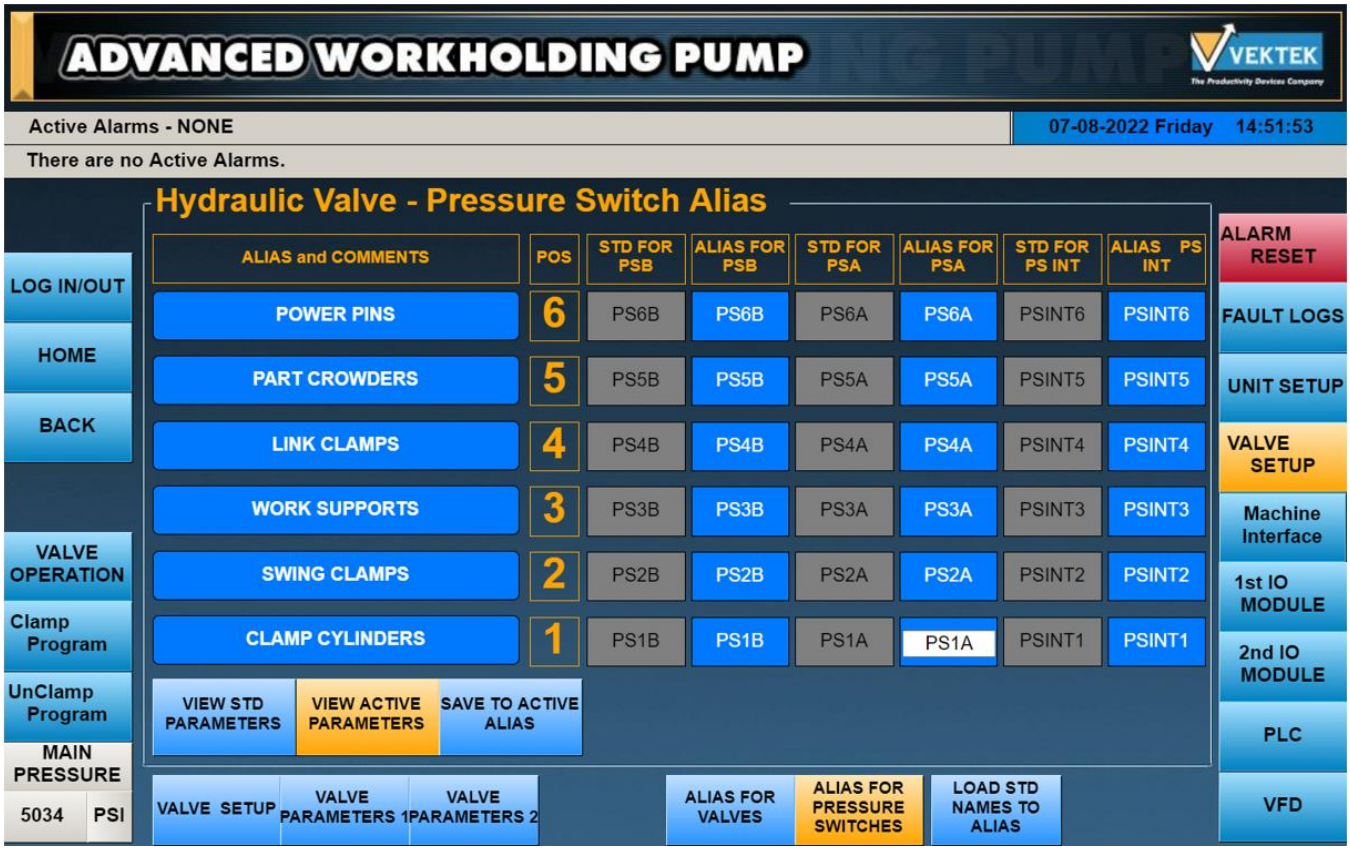


11.13 **ALIAS FOR PRESSURE SWITCHES** screen is used to setup the operator names for each pressure switch circuit position. Fields with white text can be edited by selecting each and typing in the new name. They can be any alpha/numeric string up to 34 characters. Descriptive names can be very helpful during part fixture setup and troubleshooting of valve circuits.

11.13.1 **LOAD STD NAMES TO ALIAS** button can be used to load the default standard name values to each of the **ALIAS** name values for your convenience.

11.13.2 **SAVE TO ACTIVE ALIAS** button must be selected to save any changes made to the Valve Alias screen.

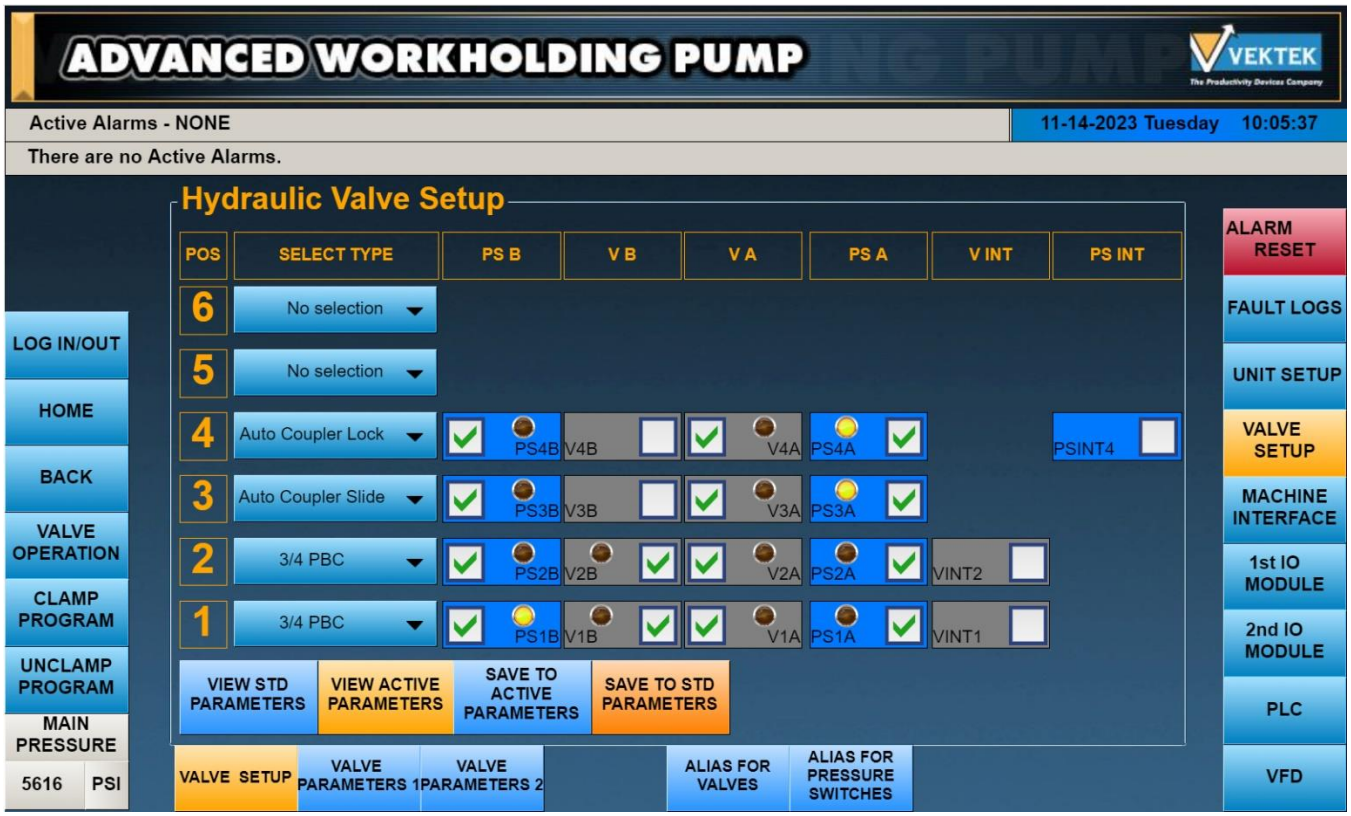
11.13.3 ***Important:*** *Pressure Switch Standard names will be used to configure all IO Module Output Names. ALIAS names cannot be used for IO Module Output Names.*



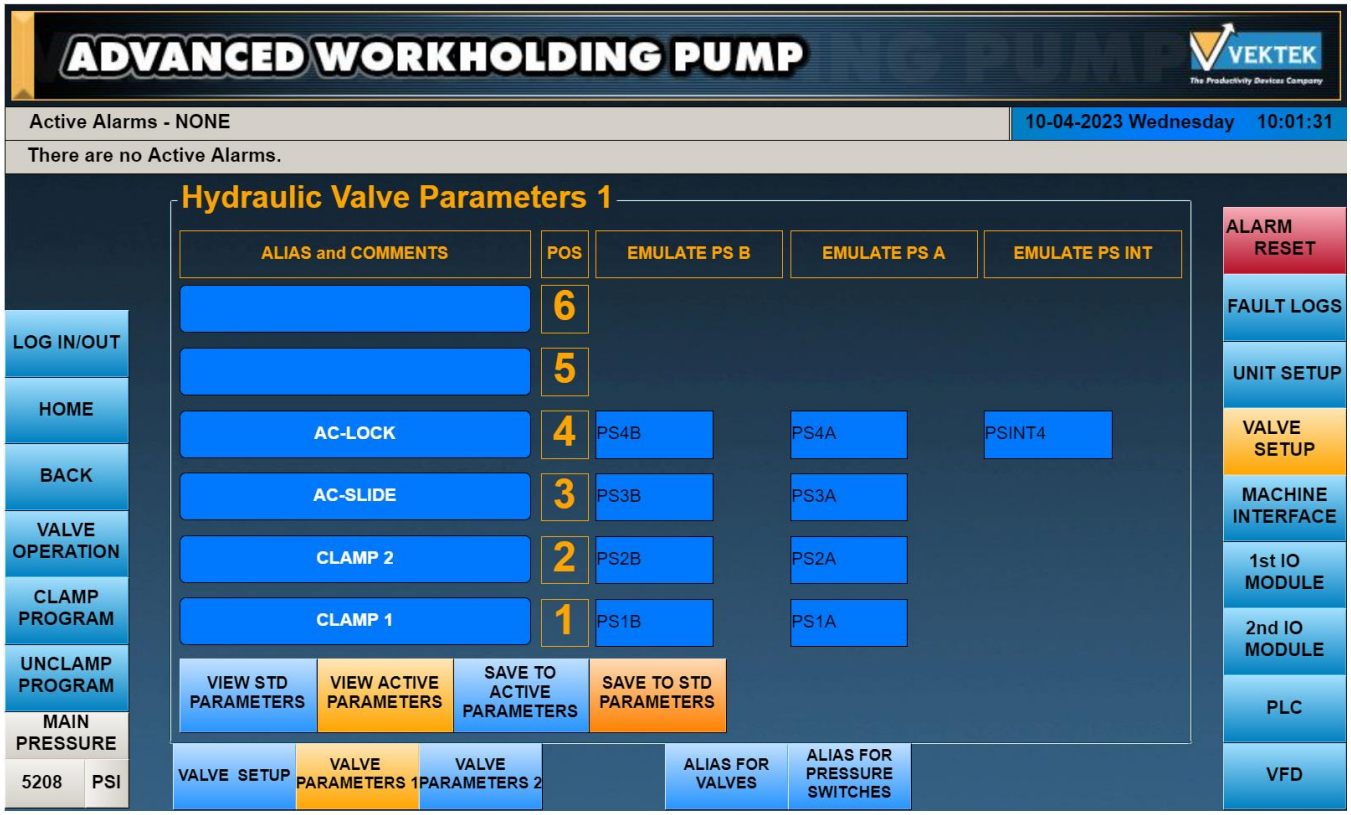
11.14 Valve Setup for Auto-Coupler Valve Types is a custom configuration specifically designed for use with the Vektek Auto-Coupler system during the Fixture Clamp/Unclamp cycle. Below are examples of the configuration typically used to set up Auto-Coupler system with Slide and Lock Valves with all proximity switches. It should be noted that Auto-Coupler proximity switches are independent of the valves that they are programmed with on the same line. The Valve does not have to be On to acknowledge the status of the proximity switch. Or in the case of single solenoid vales that do not have the B side configured but use the VxOFF command, it does not need to be active to acknowledge the status of the proximity switch. Thes sequence of the proximity switches and their time-out period that is programmed with each controls the alarm status.

11.14.1 Valve Setup Configuration as shown with 2 hydraulic clamping circuits, pressure switches on all 4 ports and Auto-Coupler Slide and Lock pneumatic valves with all 5 proximity switches enabled.

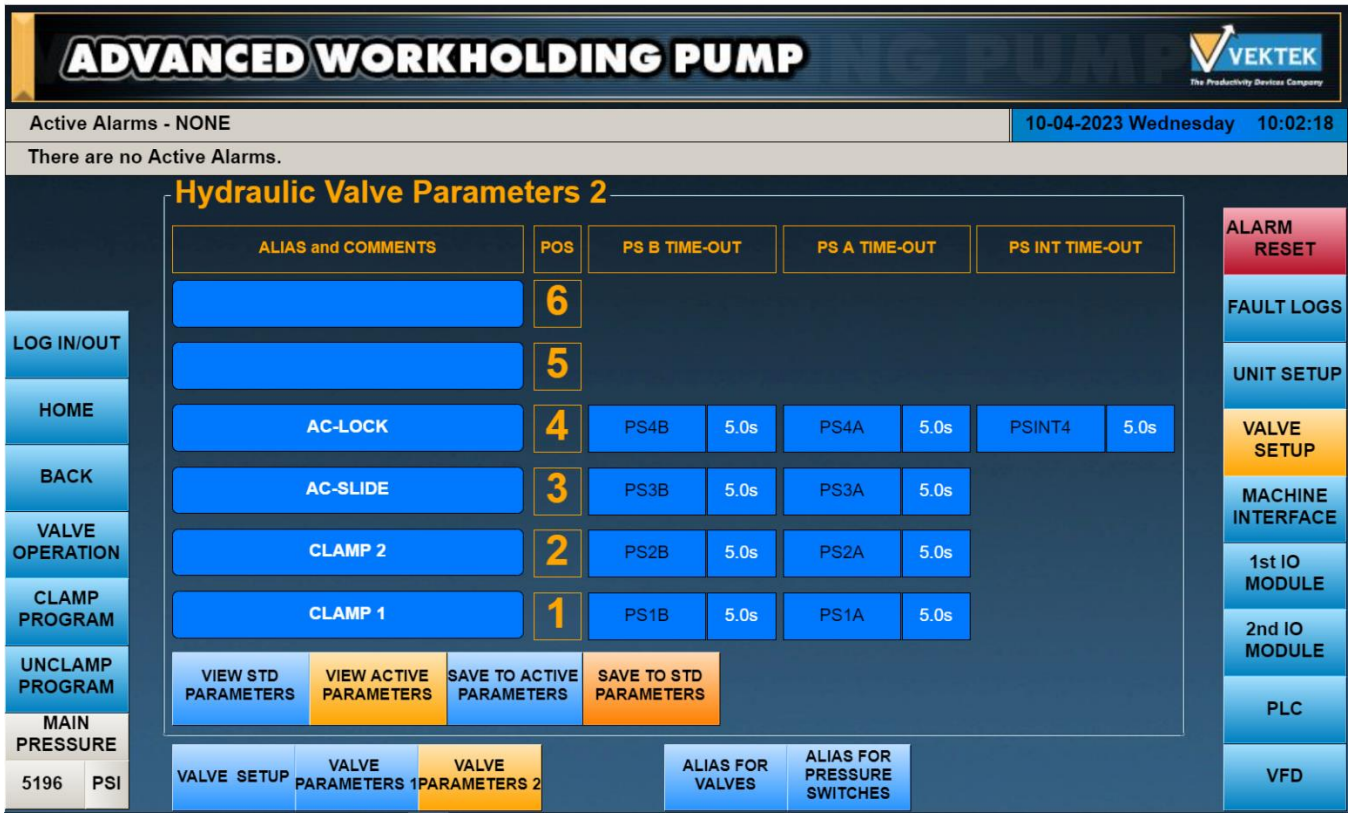
11.14.1.1 Clamp 1 Valve V1 (fixture clamps)
11.14.1.2 Clamp 2 Valve V2 (more fixture clamps if required)
11.14.1.3 Slide Extend Valve V3A (single solenoid valve, double optional)
11.14.1.4 Lock Extend Valve V4A (single solenoid valve, double optional)
11.14.1.5 Slide Extend Proximity Switch PS3A (PS#4)
11.14.1.6 Lock Extend Proximity Switch PS4A (PS#2)
11.14.1.7 Slide Extend & Lock Extend PSINT4 (optional PS#5)
11.14.1.8 Lock Retract Proximity Switch PS4B (PS#1)
11.14.1.9 Slide Retract Proximity Switch PS3B (PS#3)



11.14.2 Valve Parameters 1 Configuration shown with 2 hydraulic clamping circuits, pressure switches on all 4 ports with no pressure switch emulation required, and Auto-Coupler Slide and Lock pneumatic valves with all 5 proximity switches.



11.14.3 Valve Parameters 2 Configuration shown with 2 hydraulic clamping circuits, pressure switches on all 4 ports programmed with 5 second time-out and Auto-Coupler Slide and Lock pneumatic valves with all 5 proximity switches programmed with 5 second time-out. Adjust time-out value on each as required for size of hydraulic circuit and pneumatic pressure/flow requirements.



12.0 Machine Interface screen is used to configure and monitor status of each of the CNC Machine IO Stations. Use and configuration of each IO Station is as follows:

12.1 1st Station Machine Interface Basic is required for all AWP HMI installations. This provides all the needed and optional inputs and outputs for the CNC Machine and AWP.

12.2 Manual configuration of this module is accomplished I.A.W. IS5506. Once connected to the AWP, all inputs and outputs are configured automatically.

12.3 Configuration of the Machine to AWP inputs are displayed on the right-hand side and require Administrative or Manufacturer Log In to make changes. Check box to enable or uncheck box to disable each input.

I0 – Alarm Active is used to monitor CNC Machine alarm status to prevent AWP function while alarm is active.

I1 – Ready is used to monitor the CNC Machine On status and inform the AWP if it is ready to operate. If enabled and the CNC Machine is not ready to operate, an alarm indicating this status will be displayed in the AWP alarm banner and commands from the CNC Machine will be ignored.

I2 – Door Closed is used to monitor the CNC Machine load station door status. If enabled and the CNC Machine load station door is opened, an alarm indicating this status will be displayed in the AWP alarm banner and commands from the CNC Machine will be ignored.

I3 – In Manual Mode is used to monitor the CNC Machine Mode status in MAN. All AWP functions are still enabled.

I4 – In Auto Mode is used to monitor the CNC Machine Mode status in AUTO. All AWP functions are still enabled.

I5 – In MDI Mode is used to monitor the CNC Machine Mode status in MDI. All AWP functions are still enabled.

I6 – Clamp Command is used to monitor the CNC Machine status when a Clamp Command is sent to the AWP and for diagnostics.

I7 – Unclamp Command is used to monitor the CNC Machine status when a Unclamp Command is sent to the AWP and for diagnostics.

I8 – Pallet 1 – In the Load Area is used to monitor the CNC Machine status when Pallet 1 is at the load area and the selected fixture program for Pallet 1 Clamp Command/Acknowledge and Unclamp Command/Acknowledge are enabled in the AWP.

I9 – Pallet 2 – In the Load Area is used to monitor the CNC Machine status when Pallet 2 is at the load area and the selected fixture program for Pallet 2 Clamp Command/Acknowledge and Unclamp Command/Acknowledge are enabled in the AWP.

O10 – Not Used

O11 – AWP ON – No Active Fault is used to inform the CNC Machine of AWP Fault status.

O12 – Pallet 1 – Clamped is used to inform the CNC Machine of the completion of the AWP clamp sequences by sending the Pallet 1 Clamp Acknowledge signal.

O13 – Pallet 1 - Unclamped is used to inform the CNC Machine of the completion of the AWP unclamp sequences by sending the Pallet 1 Unclamp Acknowledge signal.

O14 – Pallet 2 – Clamped is used to inform the CNC Machine of the completion of the AWP clamp sequences by sending the Pallet 2 Clamp Acknowledge signal.

O15 – Pallet 2 - Unclamped is used to inform the CNC Machine of the completion of the AWP unclamp sequences by sending the Pallet 2 Unclamp Acknowledge signal.

12.2 Status of AWP to Machine outputs are displayed on the left and can be used for diagnostics purposes also.

12.3 Enable IO Module box must be checked to activated the module functions and require Administrative or Manufacturer Log In to make changes. Check box to enable or uncheck box to disable IO Module.

12.4 Select NEXT MODULE button to display the additional module screens for configuration and status.

12.5 2nd Station Machine Interface- Job Selection is optional for AWP HMI installations. This provides the optional inputs and outputs for the Job number functionality in clamp and unclamp programs. Using 4 bits, with 0-15-bit values allows for up to 16 unique Job numbers to be sent by the CNC Machine and received by the AWP.

12.6 Manual configuration of this module is accomplished I.A.W. IS5506. Once connected to the AWP, all inputs and outputs are configured automatically.

12.7 Status of AWP to Machine inputs are displayed on the left-hand side and outputs on the right-hand side and can be used for diagnostics purposes also.

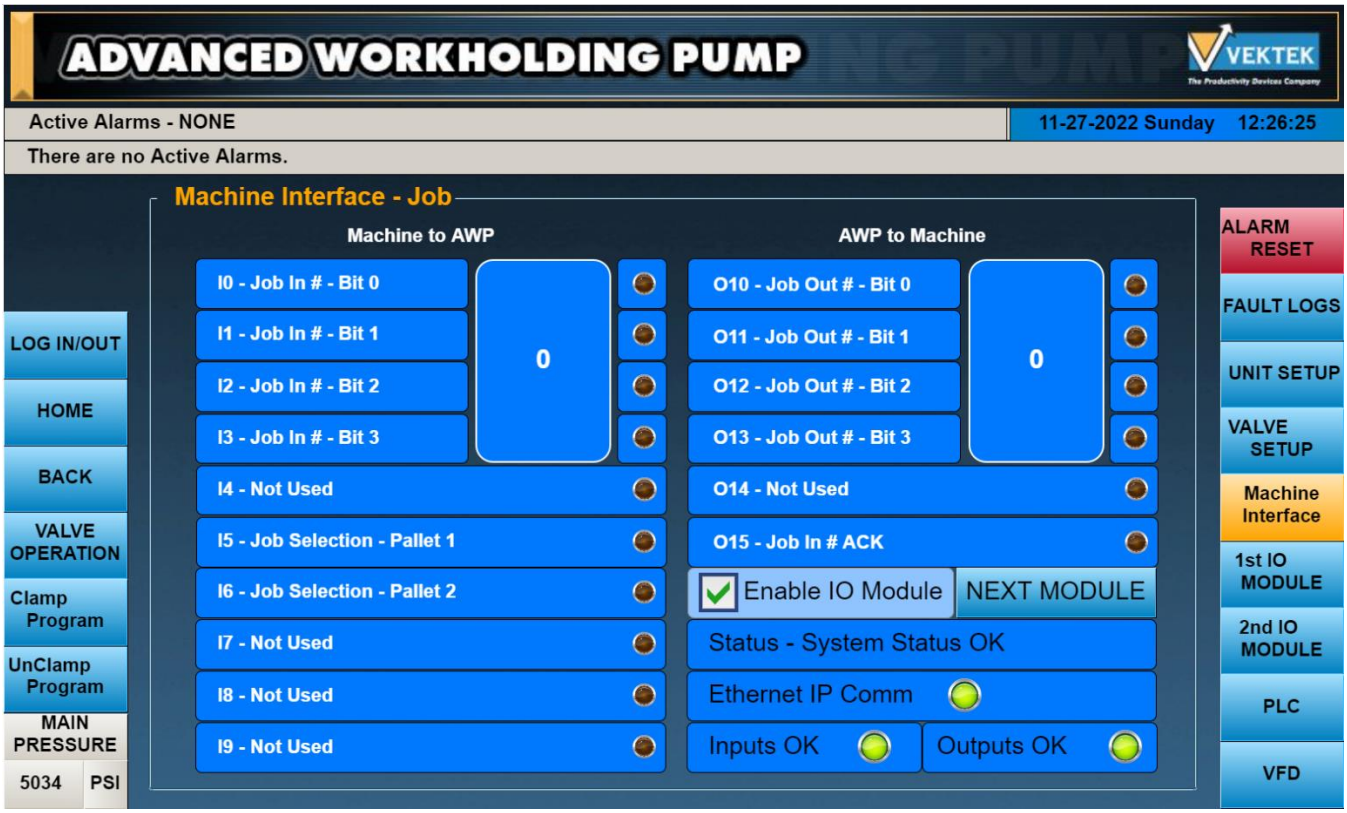
I0 – Job In # – Bit 0
I1 – Job In # – Bit 1
I2 – Job In # – Bit 2
I3 – Job In # – Bit 3
I4 – Not Used
I5 – Job Selection - Pallet 1
I6 – Job Selection - Pallet 2
I7 – Not Used
I8 – Not Used
I9 – Not Used
O10 – Job Out # – Bit 0
O11 – Job Out # – Bit 1
O12 – Job Out # – Bit 2
O13 – Job Out # – Bit 3
O14 – Not Used
O15 – Job In # ACK

12.8 Enable IO Module box must be checked to activate the module functions and require Administrative or Manufacturer Log In to make changes. Check box to enable or uncheck box to disable IO Module.

12.9 Select NEXT MODULE button to display the Fixture module screen for configuration.

12.10 Four Bit Numbers are converted from Binary to Decimal as shown below.

Job Number – Decimal to Binary				
Decimal	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1



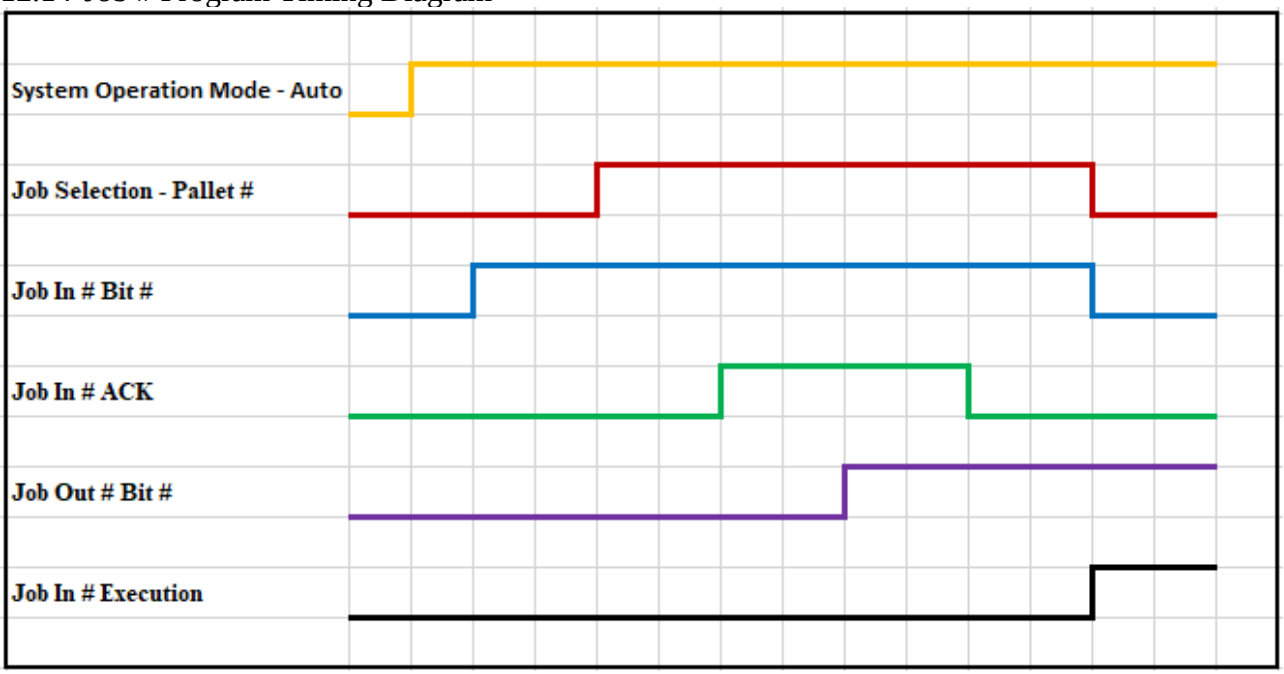
12.11 CNC Machine Programs can use M-Codes to call user-defined macros named for each Decimal Job Number. These macros are written to control the outputs for each of the AWP inputs shown above and must be persistent when sent to the M-Code Relays to accurately send a discrete binary number to the AWP. After receiving the Job Number in binary form, the AWP in turn sends the Job Number Acknowledge signal in binary form back to the CNC Machine Controller. Then the CNC Machine Program should reset all persistent Job Number Outputs to zero values to prepare it to receive the next Job Number. It is recommended to not use Job Number 0 so this value is used for reset.

12.12 See Job Number table in Section 12.10.

12.13 Program CNC Machine according to these steps for Job Selection.

12.13.1 Set System Operation Mode to Auto.
12.13.2 Set Job Selection – Pallet 1 and Pallet 2 on I5 and I6 to 0 (Off).
12.13.3 Set Job In # Bit # in Binary or Decimal as required.
12.13.4 Set Job Selection – Pallet 1 or Pallet 2 on I5 or I6 to 1 (On).
12.13.5 O15 – Job In # ACK will turn On when confirmed and then Off.
12.13.6 O10 - O13 – Job Out # – Bit # will turn On when confirmed.
12.13.7 Set Job Selection – Pallet 1 or Pallet 2 on I5 or I6 to 0 (Off).
12.13.8 Set Job In # Bit # in Binary or Decimal back to 0 (Off).
12.13.9 Job In # will be executed in Clamp or Unclamp Program.

12.14 Job # Program Timing Diagram



12.11 3nd Station Machine Interface- Fixture Selection is optional for AWP HMI installations. This provides the optional inputs and outputs for the Fixture number functionality in clamp and unclamp programs. Using 4 bits, with 1-15-bit values allows for up to 15 unique Fixture numbers to be sent by the CNC Machine and received by the AWP.

12.12 Manual configuration of this module is accomplished I.A.W. IS5506. Once connected to the AWP, all inputs and outputs are configured automatically.

12.13 Status of AWP to Machine inputs are displayed on the left-hand side and outputs on the right-hand side and can be used for diagnostics purposes also.

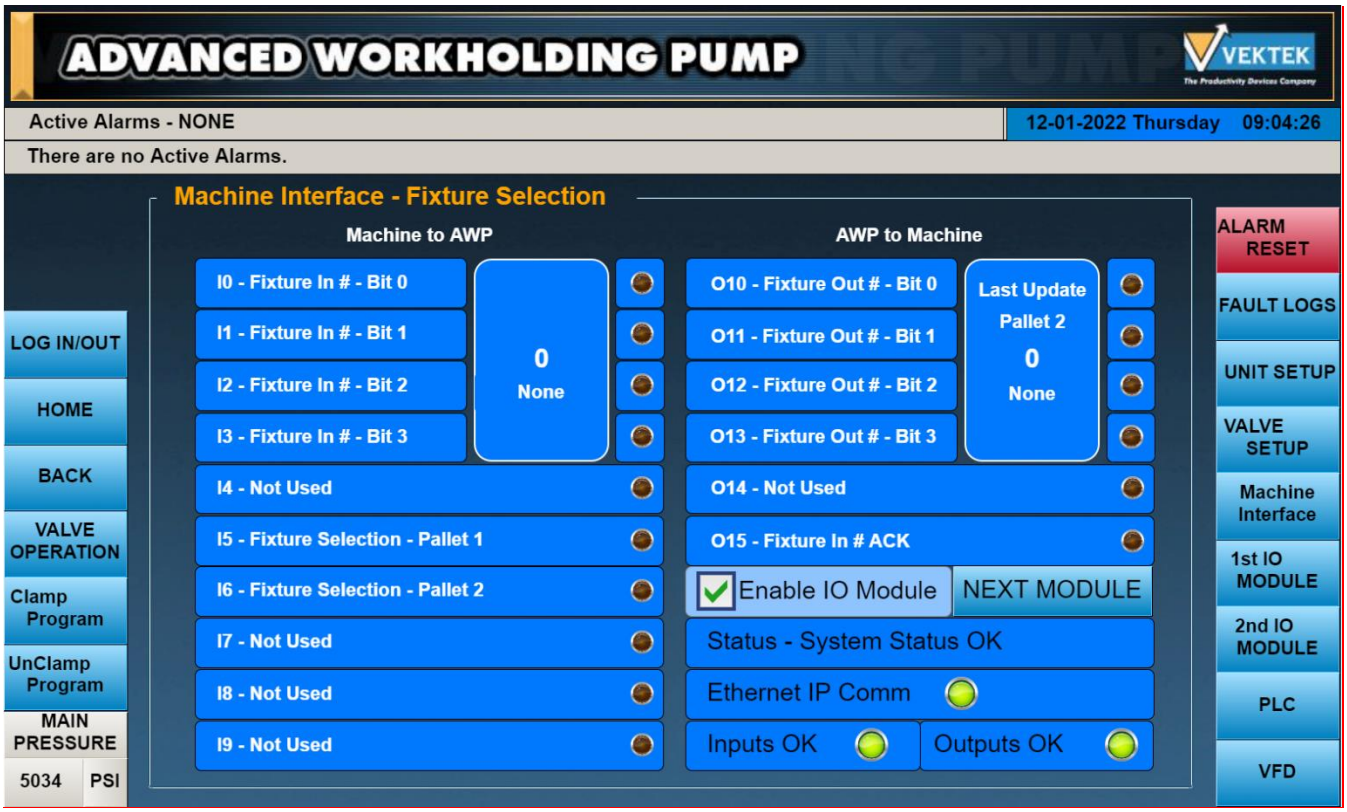
I0 – Fixture In # – Bit 0
I1 – Fixture In # – Bit 1
I2 – Fixture In # – Bit 2
I3 – Fixture In # – Bit 3
I4 – Not Used
I5 – Fixture Selection - Pallet 1
I6 – Fixture Selection - Pallet 2
I7 – Not Used
I8 – Not Used
I9 – Not Used
O10 – Fixture Out # – Bit 0
O11 – Fixture Out # – Bit 1
O12 – Fixture Out # – Bit 2
O13 – Fixture Out # – Bit 3
O14 – Not Used
O15 – Fixture In # ACK

12.14 Enable IO Module box must be checked to activate the module functions and require Administrative or Manufacturer Log In to make changes. Check box to enable or uncheck box to disable IO Module.

12.15 Select NEXT MODULE button to display the Basic module screen for configuration.

12.16 Four Bit Numbers are converted from Binary to Decimal as shown below. Do not use 0.

Fixture Number – Decimal to Binary				
Decimal	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1



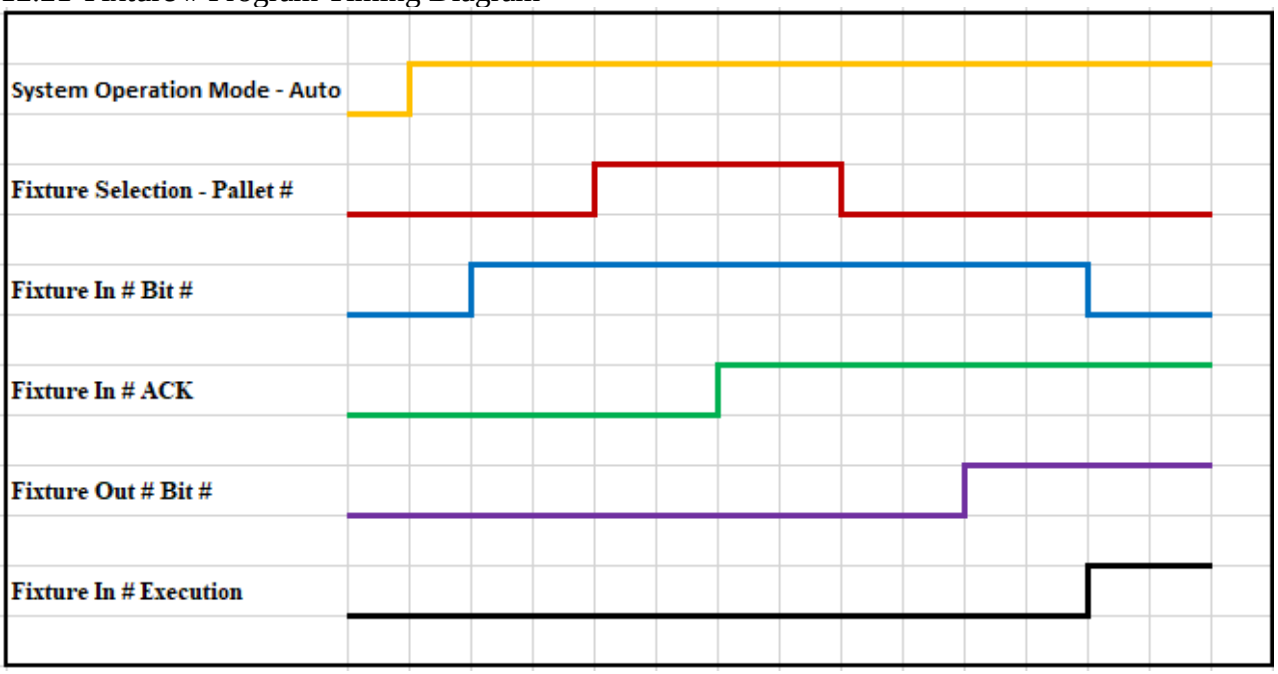
12.18 CNC Machine Programs can use M-Codes to call user-defined macros named for each Decimal Fixture Number. These macros are written to control the outputs for each of the AWP inputs shown above and must be persistent when sent to the M-Code Relays to accurately send a discrete binary number to the AWP. After receiving the Fixture Number in binary form, the AWP in turn sends the Fixture Number Acknowledge signal in binary form back to the CNC Machine Controller. Then the CNC Machine Program should reset all persistent Fixture Number Outputs to zero values to prepare it to receive the next Fixture Number. It is recommended to not use Fixture Number 0 so this value is used for reset.

12.19 See Fixture Number table in Section 12.17.

12.20 Program CNC Machine according to these steps for Fixture Selection.

12.20.1 Set System Operation Mode to Auto.
12.20.2 Set Fixture Selection – Pallet 1 and Pallet 2 on I5 and I6 to 0 (Off).
12.20.3 Set Fixture In # Bit # in Binary or Decimal as required.
12.20.4 Set Fixture # Selection – Pallet 1 or Pallet 2 on I5 or I6 to 1 (On).
12.20.5 O15 – Fixture In # ACK will turn On when confirmed.
12.20.6 Set Fixture Selection – Pallet 1 or Pallet 2 on I5 or I6 to 0 (Off).
12.20.7 O10 - O13 – Fixture Out # – Bit # will turn On when confirmed.
12.20.8 Set Fixture In # Bit # in Binary or Decimal back to 0 (Off).
12.20.9 Fixture In # will be executed in Clamp or Unclamp Program.

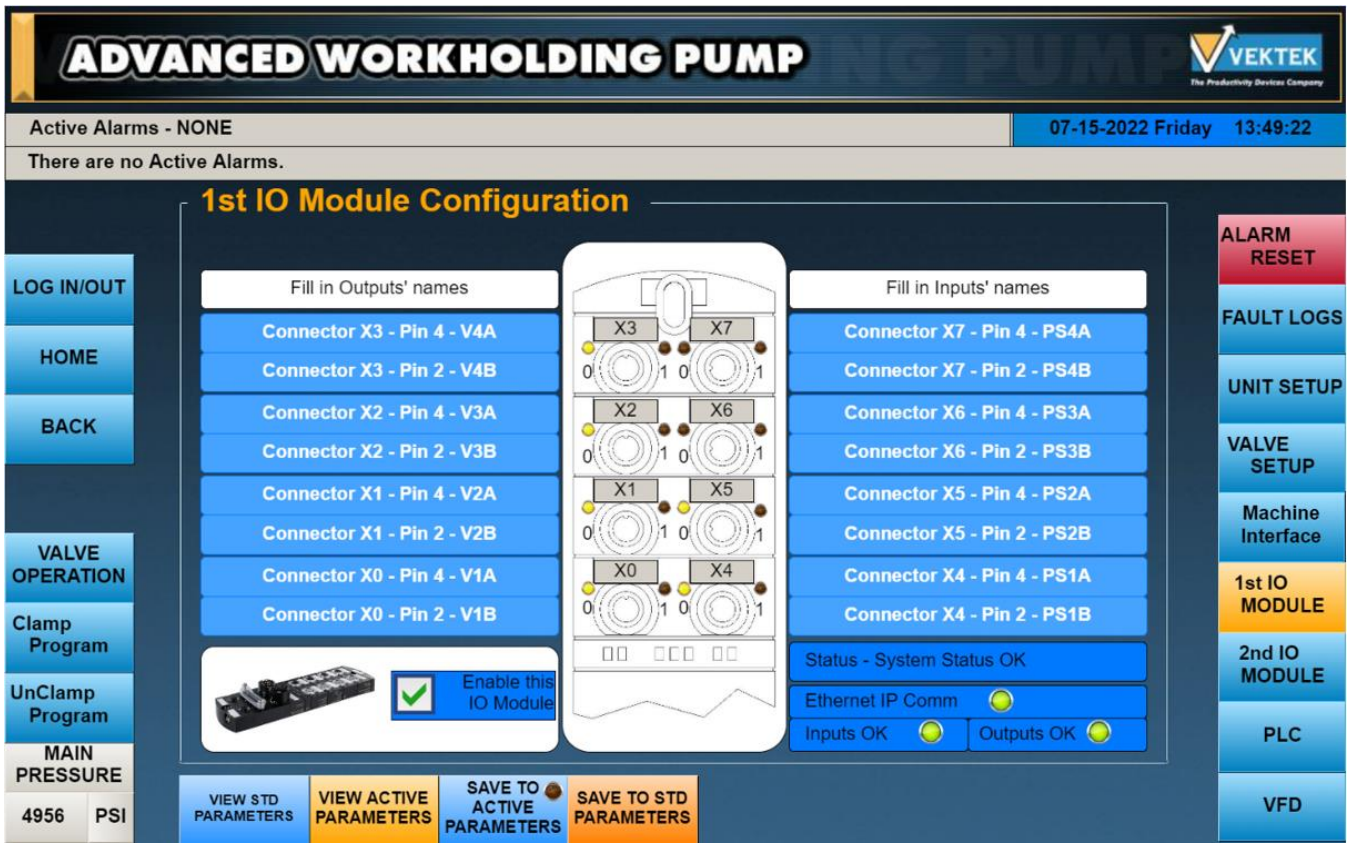
12.21 Fixture # Program Timing Diagram



13.0 **1ST IO MODULE** screen is used to setup all Valves and Pressure Switches to the appropriate Input/Output Connector Port Pin for positions 1-4. ***Important:*** *Pin 4 is used for A port and Pin 2 is used for B port per industry standards.* Fields with white text can be edited by selecting each and typing in the new value.

13.11 **Outputs** are configured to send output signals from the PLC using the following Standard Name syntax. (substitute _ with position number 1,2,3,4)
13.11.1Valves – V_A or V_B
13.11.2Valves Intermediate, 2/3 NO-PRV – VINT_ (always port A)

13.12 **Inputs** are configured to receive input signals from sensors to the PLC using the following Standard Name syntax. (substitute _ with position number 1,2,3,4)
13.12.1Pressure Switches Valve – PS_A or PS_B
13.12.2Pressure Switches Intermediate – PSINT_ (always port A)



13.3 **SAVE TO STD PARAMETERS** button must be selected to save the initial standard setup before leaving this screen.

13.4 **SAVE TO ACTIVE PARAMETERS** button must be selected to save any changes made after the initial standard setup before leaving this screen.

13.5 **VIEW STD PARAMETERS** button can be selected to view the initial standard parameters setup. To permanently return to this setup, select **SAVE TO STD PARAMETERS** button again.

13.6 **VIEW ACTIVE PARAMETERS** button can be selected to view the last saved Active Parameters. To permanently return to this setup, select **SAVE TO ACTIVE PARAMETERS** button again.

13.7 **Enable this IO Module** box must be checked to activate this IO Module for communications with the PLC.

13.8 **SAVE TO ACTIVE PARAMETERS** button must be selected to save any changes made after the initial standard setup before leaving this screen.

13.9 ***Important:*** *Leaving the Setup screen before selecting either* ***SAVE TO*** *button will result in the loss of any setup changes made.*

14.0 2ND IO MODULE screen is used to setup all Valves and Pressure Switches to the appropriate Input/Output Connector Port Pin for positions 5-8. ***Important:*** *Pin 4 is used for A port and Pin 2 is used for B port per industry standards.* Fields with white text can be edited by selecting each and typing in the new value.

14.1 Outputs are configured to send output signals from the PLC using the following Standard Name syntax. (substitute _ with position number 5,6,7,8)

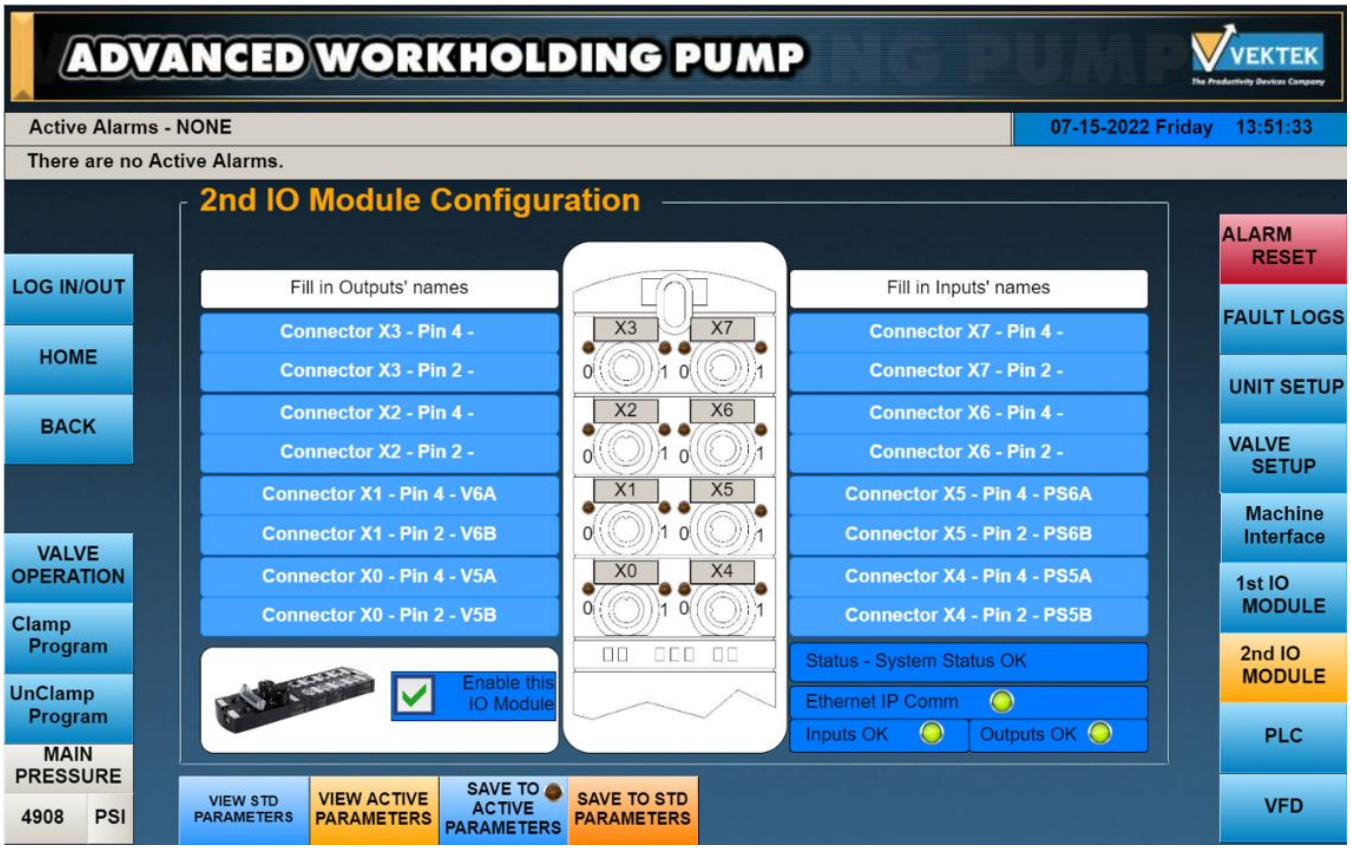
14.1.1 Valves – V_A or V_B

14.1.2 Valves Intermediate, 2/3 NO-PRV – VINT_ (always port A)

14.2 Inputs are configured to receive input signals from sensors to the PLC using the following Standard Name syntax. (substitute _ with position number 5,6,7,8)

14.2.1 Pressure Switches Valve – PS_A or PS_B

14.2.2 Pressure Switches Intermediate – PSINT_ (always port A)



14.3 SAVE TO STD PARAMETERS button must be selected to save the initial standard setup before leaving this screen.

14.4 SAVE TO ACTIVE PARAMETERS button must be selected to save any changes made after the initial standard setup before leaving this screen.

14.5 VIEW STD PARAMETERS button can be selected to view the initial standard parameters setup. To permanently return to this setup, select **SAVE TO STD PARAMETERS** button again.

14.6 VIEW ACTIVE PARAMETERS button can be selected to view the last saved Active Parameters. To permanently return to this setup, select **SAVE TO ACTIVE PARAMETERS** button again.

14.7 Enable this IO Module box must be checked to activate this IO Module for communications with the PLC.

14.8 SAVE TO ACTIVE PARAMETERS button must be selected to save any changes made after the initial standard setup before leaving this screen.

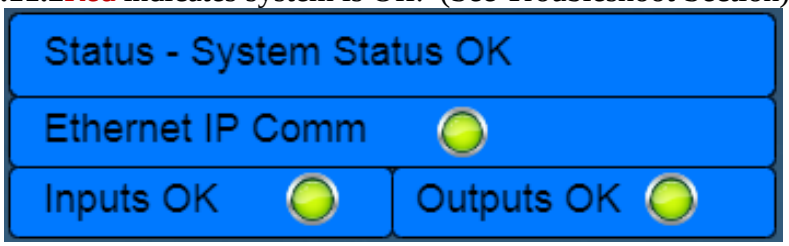
14.9 ***Important:*** *Leaving the Setup screen before selecting either* ***SAVE TO*** *button will result in the loss of any setup changes made.*

14.10*Important:* *Valves and Pressure Switches can be configured on the same IO Module or either IO Module as the AWP configuration requires, provided the M12 cable connections made are correct for the IO Module configuration and setup. The IO Modules can be configured in any combination of valves mounted to the pump manifold or mounted on a remote manifold provided they do not exceed the maximum number of 6 positions when combined. This also allows for up to 12 pressure switches when connected via M12 "Y" connector to the Input ports on both IO Modules. The AWP THINC Application has been pre-programmed to accommodate any possible combination within these configurations.*

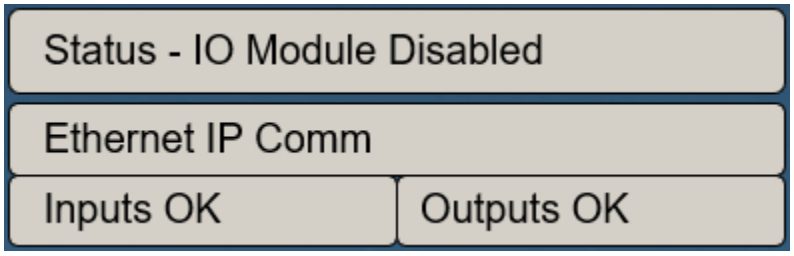
14.11 System Status of IO Module is shown at the lower right of the screen with Ethernet IP Comm, Inputs OK, and Outputs OK lights.

14.11.1 Green indicates system is On for normal operation.

14.11.2 Red indicates system is Off. (See Troubleshoot Section)



14.12 If IO Module is not used, the **Enable this IO Module** box is left unchecked, and system is disabled.



15.0 **PLC** screen is used for Controller Monitoring and Status Monitoring.

15.1 Parameters

15.1.1 CPU – IP Address – Controller IP Address (does not change)

15.1.2 Modbus TCP – IP Address - TM4ES4 IP Address (may change)

15.1.3 Modbus RTU Address – VFD RTU Address (does not change)

15.1.4 Date and Time – Set in Controller CPU

15.2 Status of Ethernet Communications.

Green indicates system is On for normal operation.

Red indicates system is Off. (See Troubleshoot Section)

15.2.1 Ethernet IP light indicates normal communications with the IO Modules.

15.2.2 Modbus TCP light indicates normal communications with the TM4ES4 switch.

15.2.3 PLC/CNC Comm light indicates normal communications with the CNC machine.

15.2.4 Modbus RTU light indicates normal communications with the VFD.

15.2.5 Comms Error number indicates the communication errors that have occurred.

15.2.6 Operation Error number indicates the operation errors that have occurred.

15.3 CPU Status lights indicate the operational status of each of the controller systems.

15.3.1 PWR – Power – Green – On power applied - Off power is removed.

15.3.2 RUN – Machine Status – Green – Controller running valid application.

15.3.3 ERR – Error – Red - On, Operating System - Fast Flash, Internal – Slow Flash, Minor Error

15.3.4 I/O – Input/Output – Red – On, device error on embedded I/O, serial line 1 or 2, SD Card, TM4 Bus

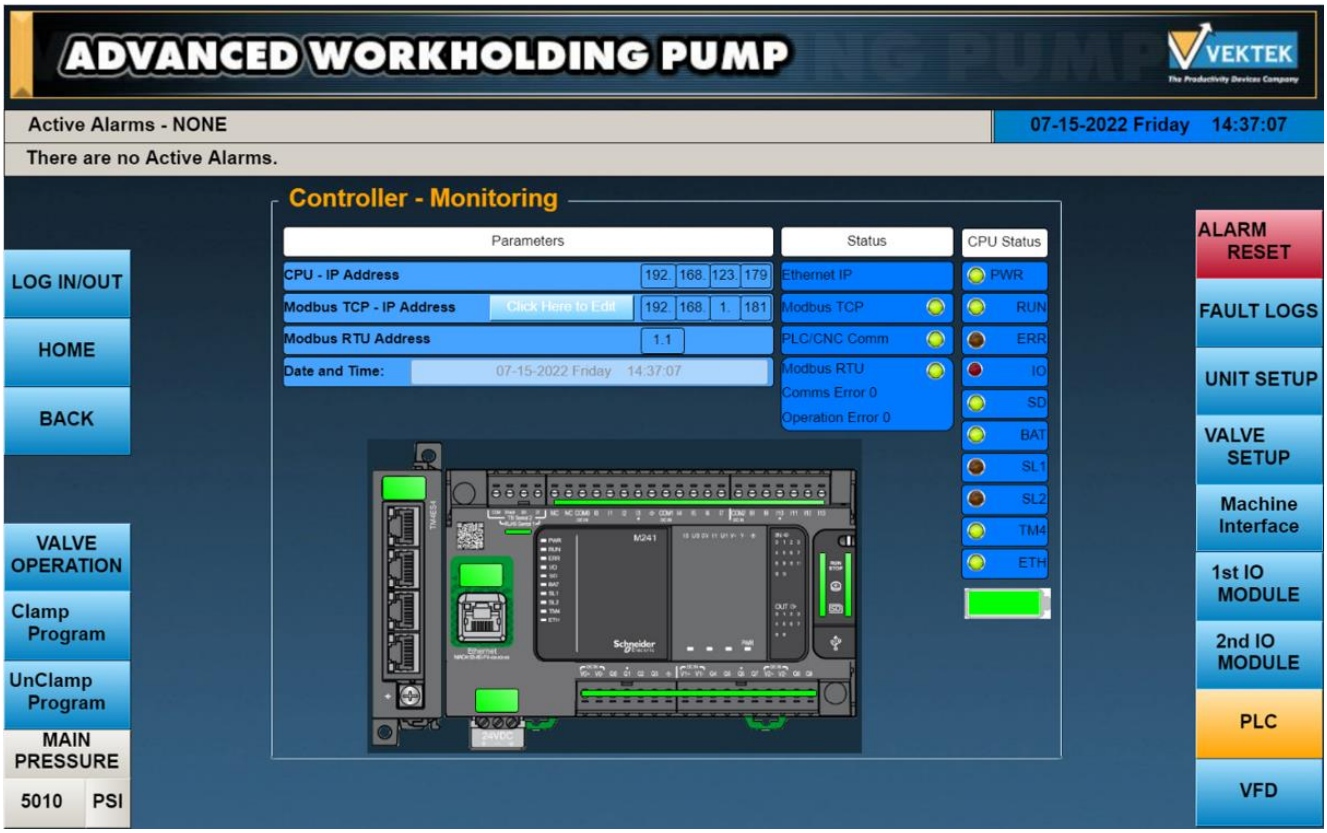
15.3.5 SD – SD Card – Green – On, SC Card is being accessed – Off, no access

15.3.6 BAT – Battery – Green – On, Battery Ok
Red – On, battery needs replaced – Flashing, battery charge low

15.3.7 SL1 – Serial Line 1 – Green – On, active communication – Off, no communication

15.3.8 SL1 – Serial Line 2 – Green – On, active communication – Off, no communication

15.3.9 TM4 – Error on TM4 bus – Green – On, device Ok – Red – On, device



15.4 Modbus TCP-IP Address – If connecting directly to the CNC Control System API, edit the AWP IP Address to be compatible with CNC machine network.

Important: CNC machine must be set to a fixed IP Address in order to maintain communication with the AWP.

Important: If connect the CNC machine M-code relays to the supplied Turck IO Station, do not edit the AWP IP Address. Administrator or Manufacturer access to the AWP PLC is then possible using the default AWP IP Address.

15.4.1 Method 1 If CNC browser is connected to AWP and the change is **inside** the CNC Network, Subnet Mask, and Gateway.

15.4.1.1 Use CNC browser to access Vektek AWP Home screen using the default URL.

15.4.1.1.1 http://192.168.1.181:8080/vektek.htm

15.4.1.2 Select LOG IN/OUT button on upper left-hand side of screen.

15.4.1.3 Log in as Administrator to enable access to PLC screen settings.

15.4.1.3.1 See Section IV 2.0. for procedure.

15.4.1.4 Select **PLC** button on the lower right-hand side of the screen.

15.4.1.5 Select **Click here to Edit** button to open TM4ES4 Communication/Switch Module configuration screen.

15.4.1.6 Edit AWP IP Address to the following values.

15.4.1.6.1 IP Address: 192.168.1.zzz (zzz to be any value between 1-254 that does not conflict with other machine IP Addresses on the network)

15.4.1.6.2 Subnet Mask: 255.255.255.0 (set to same value as CNC machine)

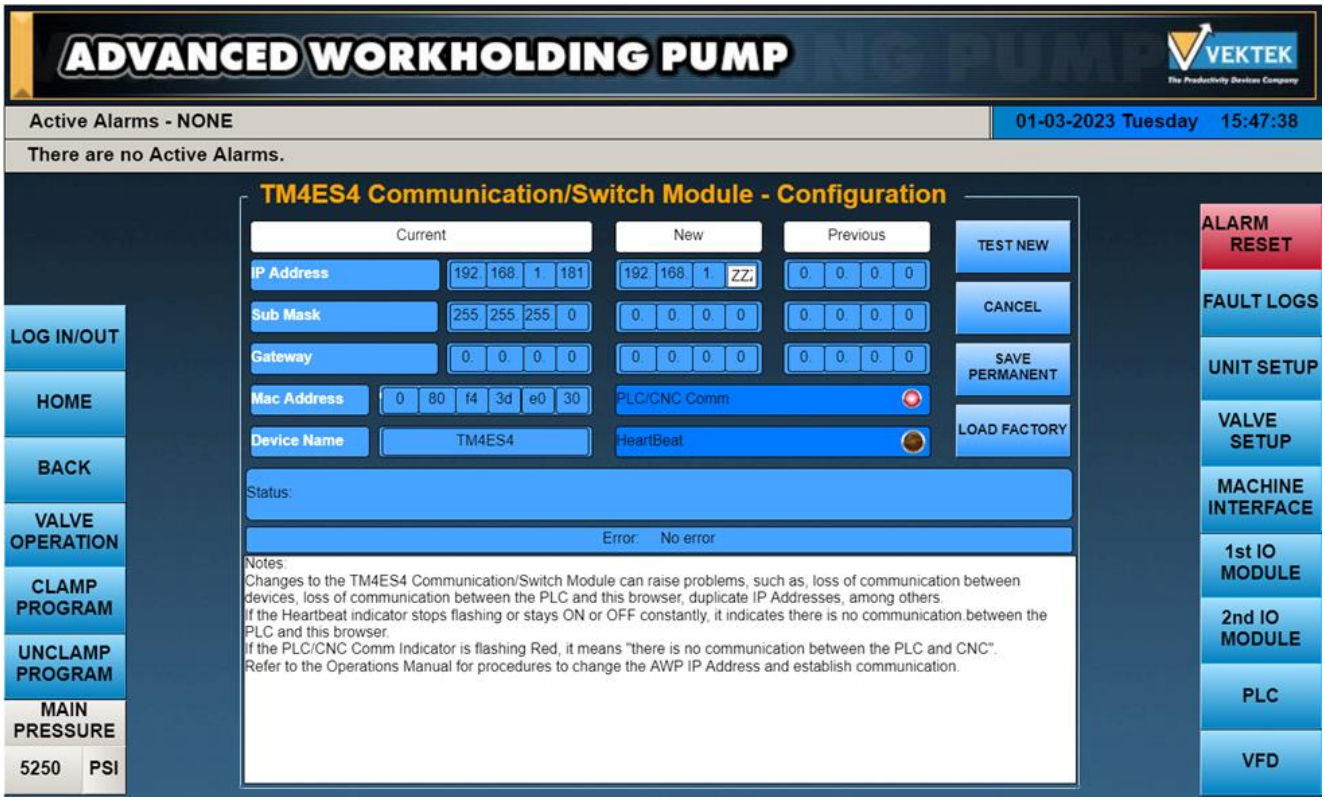
15.4.1.6.3 Gateway: 0.0.0.0 (set to same value as CNC Machine)

15.4.1.7 Select the **TEST NEW** button. Browser connection will be lost.

15.4.1.8 Edit browser URL to new IP Address, enter and refresh browser window, and confirm the Status is DONE.

15.4.1.8.1 http://192.168.1.zzz:8080/vektek.htm

15.4.1.9 Select the **SAVE PERMANENT** button to complete the process. Button will light up and when complete and will go out to confirm the Status is DONE.



15.4.2 Method 2 If separate PC browser is connected to AWP and the change is **outside** the Network, Subnet Mask, and Gateway.

15.4.2.1 Connect PC via Ethernet cable to TM4ES4 switch port.

15.4.2.2 Set PC IP Address to the following values.

15.4.2.2.1 IP Address: 192.168.1.179 (179 can be any value between 1-255 that does not conflict with other machine IP Addresses on the network)

15.4.2.2.2 Subnet Mask: 255.255.255.0 (set to same value as AWP)

15.4.2.2.3 Gateway: 0.0.0.0 (set to same value as AWP)

15.4.2.3 Open PC browser window and enter the new URL value for AWP Home screen.

15.4.2.3.1 http://192.168.1.181:8080/vektek.htm

15.4.2.4 Select LOG IN/OUT button on upper left-hand side of screen.

15.4.2.5 Log in as Administrator to enable access to PLC screen settings.

15.4.2.5.1 See Section IV 2.0. for procedure.

15.4.2.6 Select **PLC** button on the lower right-hand side of the screen.

15.4.2.7 Select **Click here to Edit** button to open TM4ES4 Communication/Switch Module configuration screen.

15.4.2.8 Edit the new AWP IP Address to values compatible with the CNC machine.

15.4.2.8.1 IP Address: www.xxx.yyy.zzz (Set Octet 1, 2, 3 to the same values as the CNC and set Octet 4 to any value between 1-255 that does not conflict with other machine IP Addresses on the network)

15.4.2.8.2 Subnet Mask: 0.0.0.0 (Set to the same value as CNC)

15.4.2.8.3 Gateway: 0.0.0.0 (set to same value as CNC Machine)

15.4.2.9 Select the **TEST NEW** button. Browser connection will be lost.

15.4.2.10 Set PC IP Address to the following values.

15.4.2.10.1 IP Address: www.xxx.yyy.zzz (Set Octet 1, 2, 3 to the same values as the CNC and set Octet 4 to any value between 1-255 that does not conflict with other machine IP Addresses on the network)

15.4.2.10.2 Subnet Mask: 255.255.255.0 (set to same value as AWP)

15.4.2.10.3Gateway: 0.0.0.0 (set to same value as AWP)

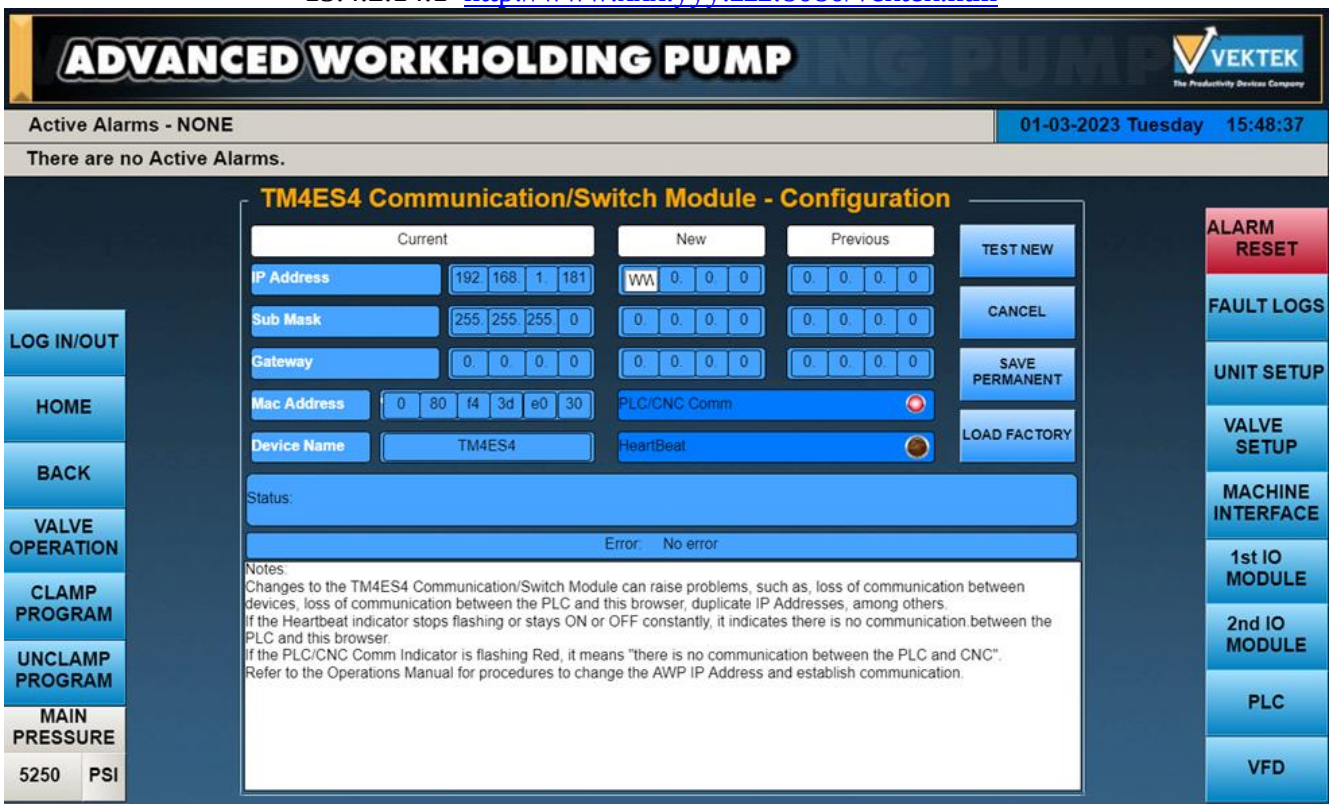
15.4.2.11 Edit browser URL to new IP Address, enter and refresh browser window, and confirm the Status is DONE.

15.4.2.12 http://www.xxx.yyy.zzz:8080/vektek.htm

15.4.2.13 Select the **SAVE PERMANENT** button to complete the process. Button will light up and when complete and will go out to confirm the Status is DONE.

15.4.2.14 Use CNC browser to access Vektek AWP Home screen using the new URL.

15.4.2.14.1 http://www.xxx.yyy.zzz:8080/vektek.htm



15.5 PLC Input Assignments

15.5.1 I0 - Fault Reset
15.5.2 I1 – Pump JOG
15.5.3 I2 – Pump ON
15.5.4 I3 – E-Stop 1 from CNC
15.5.5 I4 – Not Used
15.5.6 I5 – Power Supply ON
15.5.7 I6 – VFD Circuit Breaker
15.5.8 I7 – System Pressure Switch SP1 – HNC – Hysteresis Normally Closed
15.5.9 I8 – VFD Fault
15.5.10 I9 – System Pressure Switch SP2 – FNO – Window Normally Open
15.5.11 I10 – Filter Clog Sensor
15.5.12 I11 – Oil Level Switch
15.5.13 I12 – Oil Temperature Switch
15.5.14 I13 – Not Used

15.6 PLC Output Assignments

15.6.1 Q0 – Enclosure Fault Light
15.6.2 Q1 – VFD LI4 External Fault
15.6.3 Q2 – Not Used
15.6.4 Q3 – VFD LI3 Fault Reset
15.6.5 Q4 – IO Module Power Relay to Valves
15.6.6 Q5 – Not Used
15.6.7 Q6 – VFD LI2 Enable Run
15.6.8 Q7 – Not Used
15.6.9 Q8 – VFD LI1 System Pressure Switch Emulation SP1
15.6.10 Q9 – E-Stop 2 – VFD Class A Alarm Active – Dry Contact to CNC

16.0 **VFD** screen is used for Variable Frequency Drive setup and status monitoring. Any changes to these parameters should be done at the factory or by qualified service personnel and is password protected. Use the LOG IN/OUT screen to have the appropriate access.

16.4 Parameters

16.4.1 Maximum Frequency default setting is 60 Hz. Setting range is 20-60 Hz.

16.4.2 Drive Type – ***Important: Manufacturer password protected parameter.***

16.4.2.1 ATV12 – 200-240 VAC

16.4.2.2 ATV320 – 380-500 VAC, 525-600 VAC

16.5 Status – PID

16.5.1 PID Set Point – Default is 84% (5000 PSI / 6000 PSI)

16.5.2 PID Feedback – Display valve as a percentage of current system pressure

16.6 Status – Digital Inputs

16.6.1 Fast Stop (LI1 low) - yellow light indicates Fast Stop signal active (Pressure Switch SP1)

16.6.2 Freewheel Stop (LI2 low) - yellow light indicates Freewheel Stop signal active (3-position switch OFF)

16.6.3 Fault Reset (LI3 high) – Red light indicates Fault Reset signal is active (Select Alarm Rest button)

16.6.4 External Fault (LI4 low) – Red light indicates External Fault signal is active (Oil Level, Oil Temp, or Return-line Filter)

16.6.5 VFD Circ Breaker (status) – Green light indicates Ok or Off if breaker tripped.

16.7 Status – Digital Outputs

16.7.1 VFD Fault Active (R1B high) – Red light indicates VFD Fault is active

16.8 VFD Display (Center)

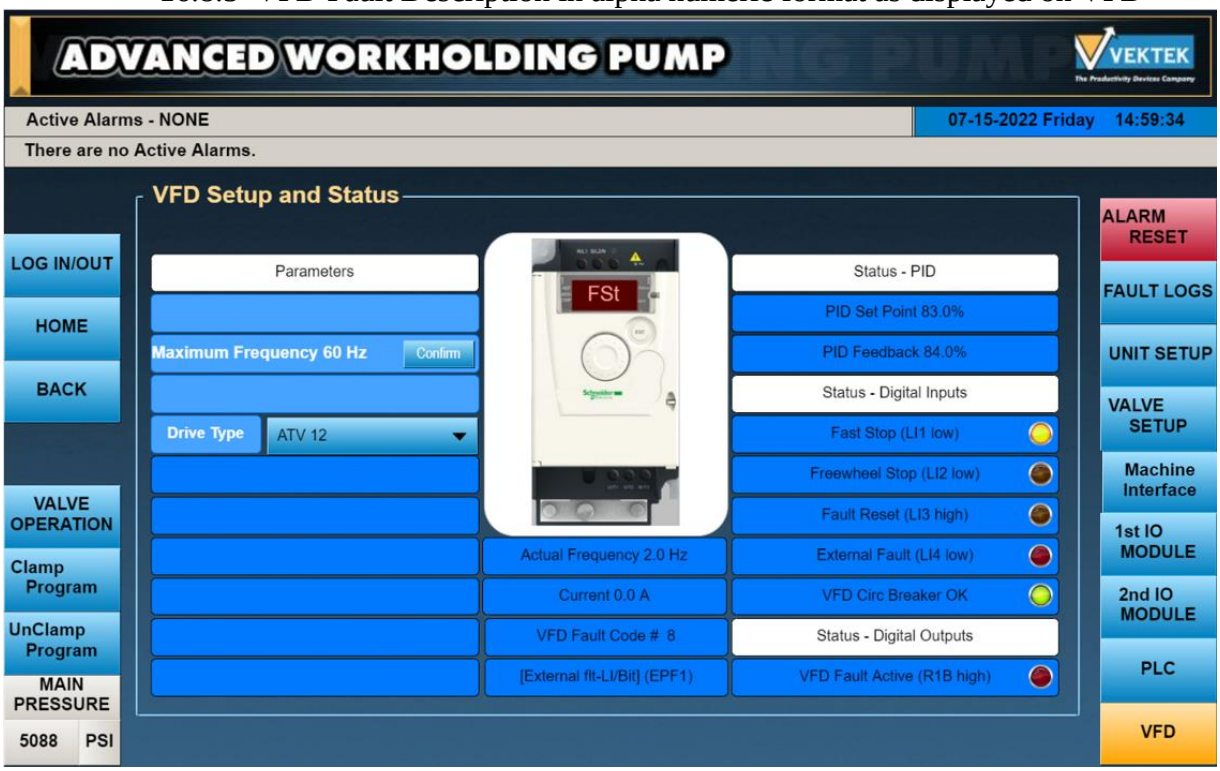
16.8.1 LED status display as shown on VFD

16.8.2 Actual Frequency - Hz

16.8.3 Current (motor) - Amps

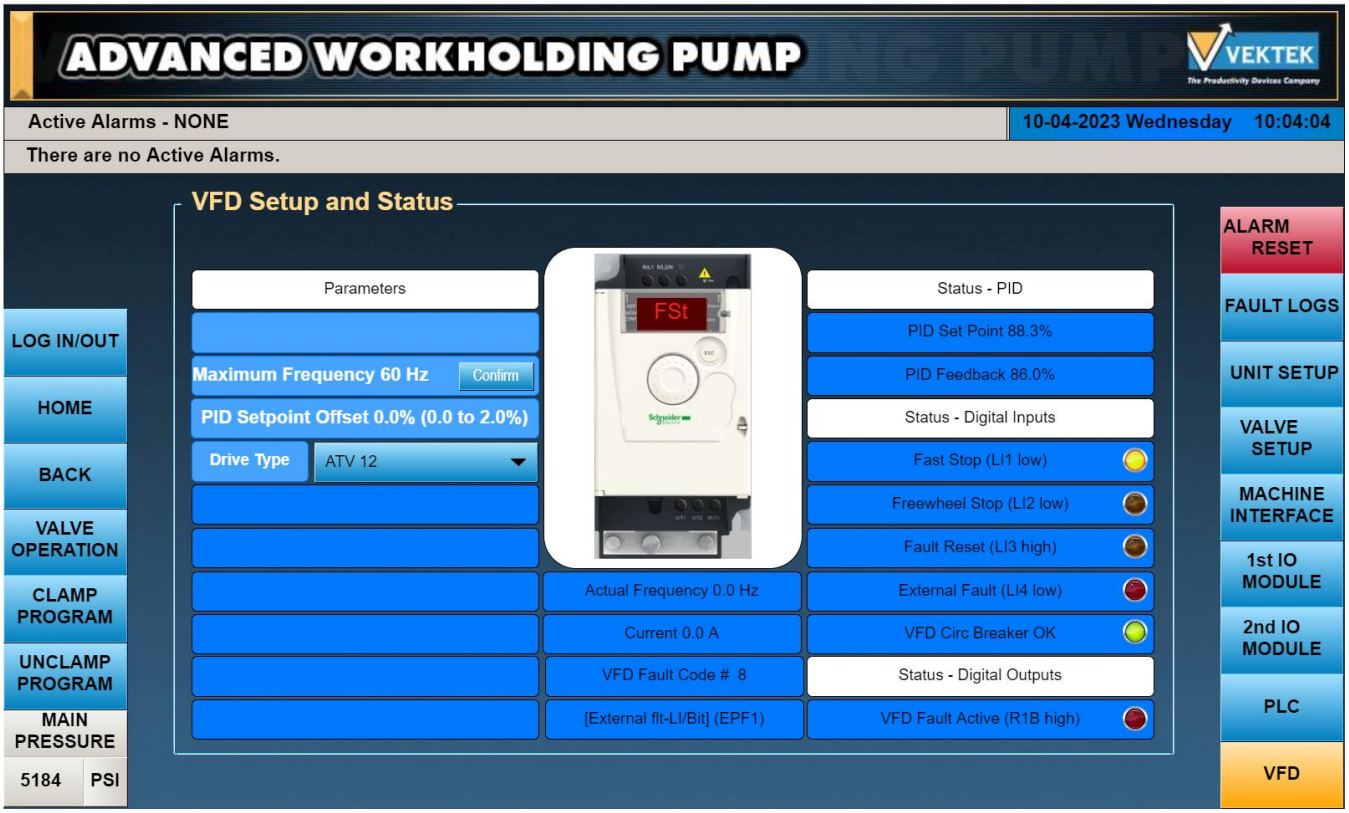
16.8.4 VFD Fault Code in numerical format. (last recorded fault)

16.8.5 VFD Fault Description in alpha numeric format as displayed on VFD



16.9 PID Setpoint Offset

16.9.1 Manufacturer level access is required to show and edit the PID Setpoint Offset parameter in the VFD setup screen. This can be edited as required between 0.0-2.0% offset of the PID Set Point value to ensure the motor/pump will reach the Set Point value entered on the Unit Setup screen for systems with low-pressure and/or low-volume during initial pressurization. This will be set and tested before shipment.



17.0 **SD Card Procedure** is used to update the PLC application to the latest version of PLC5500. Updates will be sent to the customer upon request or at the recommendation of Vektek Customer Support and Engineering. Reconfiguration of AWP settings may be required after application installation is complete.

17.1 Remove power from the AWP and PLC in preparation for PLC updates.

17.2 Remove AWP enclosure lid to have access to PLC.

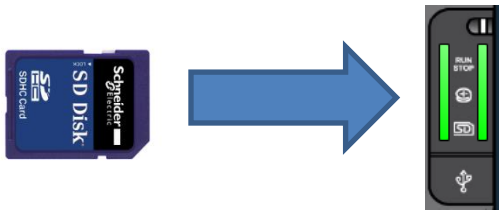
17.2.1 ***Important**: Removal of electrical enclosure lid to be done by qualified personnel only.*

17.3 Prepare SD Card for installation of files.

17.3.1 SD Card must be cleaned and formatted FAT or FAT32 and labeled.

17.3.2 SD Card must have appropriate files for upgrade copied to it as provided by Vektek.

17.4 Open SD Card slot cover and insert prepared SD Card with updated PLC5500 application and related files. Inset notch down and label facing right. Push unit it clicks.



17.5 Restore power to the AWP and PLC.

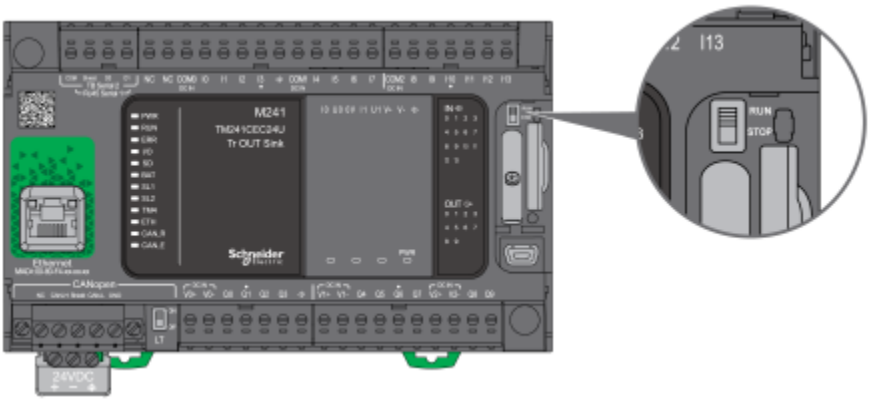
17.6 Installation starts and SD LED is flashing during application download.

17.6.1 If the SD LED (green) is ON, and the ERR LED (red) flashes regularly, the download ended successfully.

17.6.2 If the SD LED (green) is OFF, and the ERR and I/O LEDs (red) flash regularly, an error is detected.

17.6.3 If the RUN LED (green) is ON, the application is running correctly.

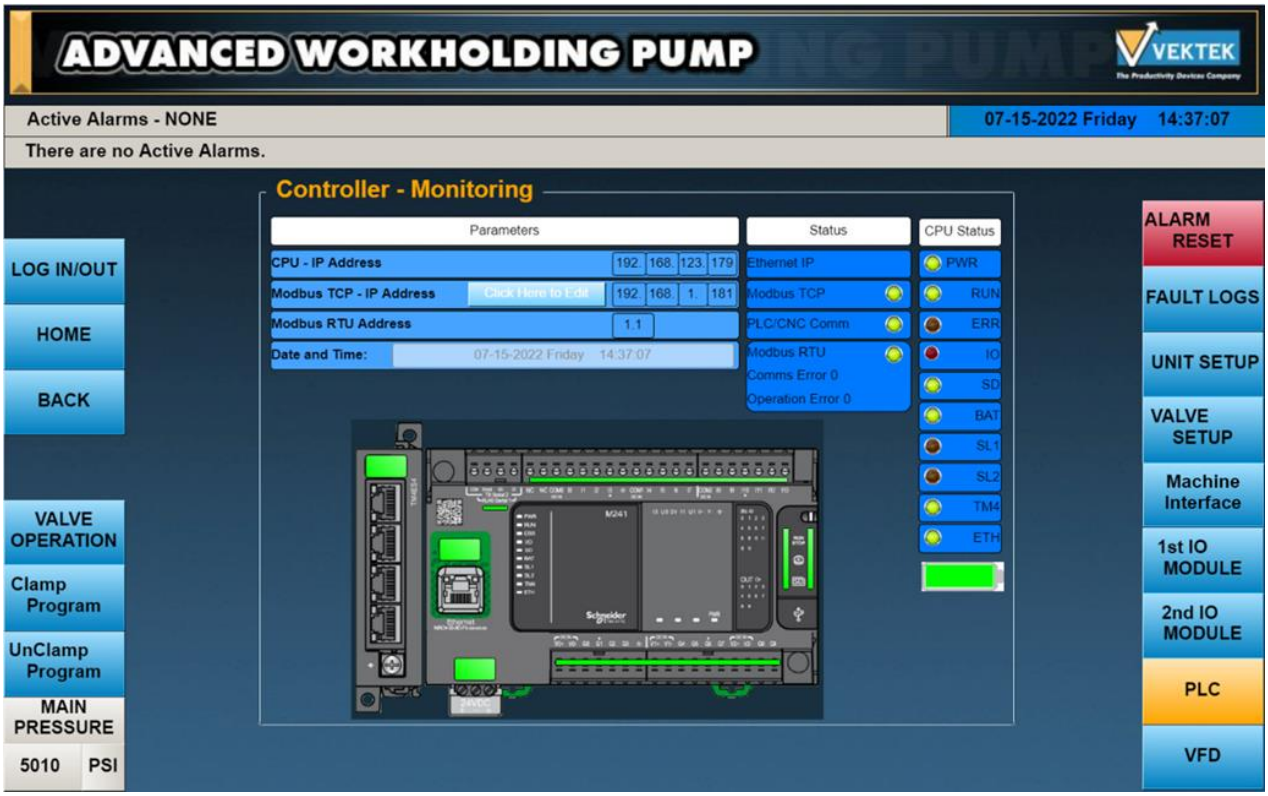
17.6.4 If the RUN LED (green) is FLASHING, the application is loaded but stopped. Switch the Run/Stop hardware switch to Stop and then back to Run to Start the application.



17.7 Remove SD Card after new application download is complete.

17.8 Cycle power to AWP PLC to complete the new application installation process.

17.8.1 PWR and RUN LED (green) should be solid ON indicating PLC is active and application running.



SECTION V

TROUBLESHOOTING

1. **ALARMS**
   - 1.1. **Active Alarms – NONE** shown after selection of **ALARM RESET** button from top of right-hand vertical menu.
     - 1.1.1. There are no Active Alarms.
   - 1.2. **External E-Stop** is displayed when the CNC machine E-Stop has been activated.
     - 1.2.1. Alarm Class A
     - 1.2.2. Emergency stop actuated on CNC machine.
     - 1.2.3. Verify and reset CNC machine E-STOP buttons.
     - 1.2.4. Select **ALARMS RESET** button after it has been reset.
   - 1.3. **24VDC Voltage LOW** is displayed when the power supply voltage to the PLC is below the minimum value.
     - 1.3.1. Alarm Class B
     - 1.3.2. Verify AWP 24 power supply voltage. Auxiliary contact for Power Supply Output Voltage Level is less than 21.6VDC.
     - 1.3.3. PLC may or may not function if auxiliary output is OFF.
     - 1.3.4. Check power supply breaker and rest switch if needed.
     - 1.3.5. Check power supply output voltage and if low, adjust voltage or replace power supply if faulty.
     - 1.3.6. Select **ALARM RESET** button after cause of alarm has been corrected.
   - 1.4. **VFD – Circuit breaker OFF** is displayed if the breaker has tripped off.
     - 1.4.1. Alarm Class B
     - 1.4.2. Verify AWP VFD circuit breaker status or other possible current overload causes to AWP or fixture.
     - 1.4.3. Check for any fault code on VFD panel.
     - 1.4.4. Select **ALARM RESET** button after cause of alarm has been corrected.
     - 1.4.5. If breaker trips again, further diagnostics of internal wiring and VFD function is required.
     - 1.4.6. Replacement of VFD or motor may be necessary.
   - 1.5. **VFD General FAULT** is displayed if the VFD has faulted.
     - 1.5.1. Alarm Class B
     - 1.5.2. Verify details on VFD display
     - 1.5.3. Cross reference fault code in AWP Parts List/Manual Appendix A or B. Follow diagnostics and remedy for fault code as stated in manual.
     - 1.5.4. Select **ALARM RESET** button after cause of alarm has been corrected.
   - 1.6. **Main system pressure above MAXIMUM** is displayed.
     - 1.6.1. Alarm Class C
     - 1.6.2. Check external Over-Pressure-Relief-Valve on pump manifold and adjust as necessary.
     - 1.6.3. The pump manifold Over-Pressure Relief Valve may need to be re-adjusted to a value lower than the parameter value to avoid nuisance tripping of the alarm.
     - 1.6.4. Correct the cause of the system pressure exceeding the parameter value.
     - 1.6.5. Select **ALARM RESET** button after cause of alarm has been corrected.

1.7. **Main system pressure - Failed to reach pressure switch set point SP1** is displayed.
  1.7.1. Alarm Class B
  1.7.2. AWP System Pressure did not reach Set Point 1 within timeout setting. Verify hydraulic circuit, valves, fixture, and piping. Adjust System Pressure Timeout setting as required or disable if necessary.
  1.7.3. Correct the cause of the low system pressure. Typical causes are oil leaks in valves, or plumbing.
  1.7.4. If no leaks are found, other possible causes are over-pressure relief valve adjustment, blockages in pump pressure line, high-pressure filter, or manifold check valve.
  1.7.5. If no causes are found, pump rotating group may need service.
  1.7.6. Select **ALARM RESET** button after cause of alarm has been corrected.
1.8. **Main system - Filter clog pressure HIGH** is displayed if the return-line filer is clogged.
  1.8.1. Alarm Class C
  1.8.2. AWP filter needs to be replaced.
  1.8.3. Refer to AWP Parts List Manual for part number and instructions on Filter Replacement.
  1.8.4. Select **ALARM RESET** button after cause of alarm has been corrected.
1.9. **Main system - Oil level LOW** is displayed if the oil level falls below the oil level switch minimum.
  1.9.1. Alarm Class C
  1.9.2. The AWP reservoir needs to be refilled. Refer to the AWP Part List Manual for part number and instructions on refilling the reservoir.
  1.9.3. Check oil level sight glass to confirm if oil level is below Add Oil arrow. If so, fill reservoir with Vektek Hydraulic Fluid 65-0010-01 or approved equivalent.
  1.9.4. Do not over-fill reservoir.
  1.9.5. Select **ALARM RESET** button after cause of alarm has been corrected.
1.10. **Main system - Oil temperature HIGH** is displayed if the oil temperature exceeds 150 ° F.
  1.10.1. Alarm Class C
  1.10.2. Verify hydraulic circuit, check for external leaks, and fixture component internal leaks.
  1.10.3. Typical causes of high oil temperature are oil leaks in valves or plumbing.
  1.10.4. Check external Over-Pressure-Relief-Valve on pump manifold and adjust as necessary.
  1.10.5. Select **ALARM RESET** button after cause of alarm has been corrected.
1.11. **PLC – System Machine RUN** light is displayed to show system status.
  1.11.1. Controller **RUN** light status
    1.11.1.1. Green/ON - Controller running a valid application
    1.11.1.2. Green/Flashing – Controller valid application program is stopped
    1.11.1.3. Green/1 Flash – Controller application is paused
    1.11.1.4. Green/Off – Controller not programmed
  1.11.2. Cycle incoming power source OFF and back ON by flipping breaker switches or disconnecting and reconnecting power source. Wait until controller program is completely loaded and monitor the status of Controller RUN light. If Green/ON, normal operation has resumed.
1.12. **AWP PLC - Controller ERROR** is displayed if the Controller is not running properly.
  1.12.1. Alarm Class B
  1.12.2. Controller **ERR** light status
    1.12.2.1. Red/On – Operating system error detected
    1.12.2.2. Red/Fast Flashing – Internal error detected
    1.12.2.3. Red/Slow Flashing – Minor error or no application detected
  1.12.3. Refer to the Operations Manual for further information.

1.12.4. Cycle incoming power source OFF and back ON by flipping breaker switches or disconnecting and reconnecting power source. Wait until controller program is completely loaded and monitor the status of Controller RUN light.
1.12.4.1. If Green/ON, normal operation has resumed.
1.12.4.2. If Red/On, Red/Fast Flashing, Red/Slow Flashing is displayed, contact Vektek Customer Support for guidance.
1.12.5. Select **ALARM RESET** button after cause of alarm has been corrected.
1.13. **AWP PLC - IO ERROR** is displayed if there are controller input/output device errors.
1.13.1. Alarm Class B
1.13.2. Controller **I/O** light status
1.13.2.1. Red/On is displayed if device errors on embedded I/Os, serial line1 or 2, SD card, cartridge, TM4 bus, or Ethernet port are detected.
1.13.3. Verify information on PLC screen. Verify which IO group is faulty.
1.13.4. Select **ALARM RESET** button after cause of alarm has been corrected.
1.14. **AWP PLC - SD Card ERROR** is displayed if there is an SD Card status change.
1.14.1. Alarm Class D
1.14.2. Controller **SD** light status
1.14.2.1. Green/On is displayed if the SD card is being accessed.\
1.14.3. Verify SD Card, format it, replace it.
1.14.3.1. Format SD Card to FAT or FAT32 only.
1.14.3.2. Add label via PC using File Explorer, Removable Disk, Properties, General tab
1.14.4. Select **ALARM RESET** button after cause of alarm has been corrected.
1.15. **AWP PLC - Battery Voltage LOW** is displayed if battery is not working properly.
1.15.1. Alarm Class D
1.15.2. Controller **BAT** light status
1.15.2.1. Red/On – Indicates that the battery needs to be replaced
1.15.2.2. Red/Flashing – Indicates that the battery charge is low
1.15.3. Replace battery.
1.15.4. Select **ALARM RESET** button after cause of alarm has been corrected.
1.16. **AWP PLC - Serial Line 1 Modbus RTU Communication to VFD ERROR**
1.16.1. Alarm Class B
1.16.2. Controller **SL1** light status
1.16.2.1. Green/On indicates the status of Serial Line 1
1.16.2.2. Green/Off indicates no serial communication
1.16.3. Review cable between the PLC and VFD. If the VFD was recently installed, update all parameters, including those related to Modbus RTU Communication.
1.16.4. Select **ALARM RESET** button after cause of alarm has been corrected.
1.17. **AWP PLC - Serial Line 2 Modbus TCP Communication ERROR - Not Used**
1.18. **AWP PLC - TM4ES4 Bus ERROR is** displayed if there is an error on the TM4 switch
1.18.1. Alarm Class B
1.18.2. Controller **TM4** light status
1.18.2.1. Red/On indicates that an error has been detected on the TM4 bus.
1.18.2.2. Red/Off indicates that NO error has been detected on the TM4 bus.
1.18.3. Verify TM4ES4 module connection to the PLC, PWR status green LED is On, and Ethernet connection status green LED is On.
1.18.4. Select **ALARM RESET** button after cause of alarm has been corrected.

1.19. **AWP PLC – Ethernet IF1 error detected – PLC CPU Ethernet Port 1**
  1.19.1. Alarm Class B
  1.19.2. PLC Fault. Power cycle the PLC. If necessary, replace the PLC.
  1.19.3. Select **ALARM RESET** button after cause of alarm has been corrected.
1.20. **AWP PLC - Ethernet Port to I/O Module STATUS** is displayed if there is a connection error.
  1.20.1. Controller **ETH** light status
    1.20.1.1. Green/On indicates the Ethernet port is connected and the IP Address is defined
    1.20.1.2. Green/3 Flashes indicates the Ethernet port is Not connected.
    1.20.1.3. Green/4 Flashes indicates the IP Address is already in use.
    1.20.1.4. Green/5 Flashes indicates the module is waiting for BOOTP or DHCP sequence.
    1.20.1.5. Green/6 Flashes indicates that the configured IP Address in not valid.
1.21. **IO Module 0 - Communication error - Ethernet IP**
  1.21.1. Alarm Class B
  1.21.2. Verify Ethernet cables between the PLC Ethernet Port 1 and this IO Module. If this is a new IO Module, verify this IO Module DIP switch configuration.
  1.21.3. Check communication cables inside and outside enclosure for proper connection.
  1.21.4. Check power cable to IO Module.
  1.21.5. See Section VI for IO Module Configuration procedure.
  1.21.6. Select **ALARM RESET** button after cause of alarm has been corrected.
1.22. **IO Module 1 - Communication error - Ethernet IP**
  1.22.1. Alarm Class B
  1.22.2. Verify Ethernet cables between the PLC Ethernet Port 1 and this IO Module. If this is a new IO Module, verify this IO Module DIP switch configuration.
  1.22.3. Check communication cables inside and outside enclosure for proper connection.
  1.22.4. Check power cable to IO Module
  1.22.5. See Section VI for IO Module Configuration procedure.
  1.22.6. Select **ALARM RESET** button after cause of alarm has been corrected.
1.23. **AWP**/CNC **– Modbus TCP Communication ERROR** is displayed if Ethernet communication is lost between the PLC, TM4ES4 switch, and the CNC Machine.
  1.23.1. Alarm Class B
  1.23.2. Verify Ethernet cables between AWP and CNC machine.
  1.23.3. Check communication cables inside and outside enclosure for proper connection.
  1.23.4. Select **ALARM RESET** button after cause of alarm has been corrected.
1.24. **AWP PLC - Ethernet IP communication ERROR** is displayed if Ethernet communication is lost between the PLC and IO modules.
  1.24.1. Alarm Class B
  1.24.2. Verify Ethernet cables between the PLC and IO Modules
  1.24.3. Check communication cables inside and outside enclosure for proper connection.
  1.24.4. Select **ALARM RESET** button after cause of alarm has been corrected.
1.25. **V Missing conditions to execute command A** is displayed if after receiving a command from the CNC machine, the pump PLC cannot complete the command. Typical causes for this fault are the following:
  1.25.1. Alarm Class B
  1.25.2. AWP SYSTEM OPERATION MODE has not been set to MAN or AUTO
  1.25.3. AWP 3-POSITION SELECTOR SWITCH STATUS has not been set to ON
  1.25.4. CNC MACHINE OPERATION MODE has not been set to AUTO or MDI
  1.25.5. CNC MACNINE DOOR is not Closed.

1.26. **V FAULT executing command A** is displayed if after component actuation, the A Port pressure switch Set Point 1 (SP1) value is not met, and acknowledgement not sent within the programmed PS Time-Out value. The PS Time-Out value can be increased to allow more time to meet the pressure switch Set Point 1 value. If fault still occurs, typical causes are oil leaks in valves or plumbing in that circuit.

1.26.1. Alarm Class B

1.27. **V FAULT executing command B** is displayed if after component actuation, the B Port pressure switch Set Point 1 (SP1) value is not met, and acknowledgement not sent within the programmed PS Time-Out value. The PS Time-Out value can be increased to allow more time to meet the pressure switch Set Point 1 value. If fault still occurs, typical causes are oil leaks in valves or plumbing in that circuit.

1.27.1. Alarm Class B

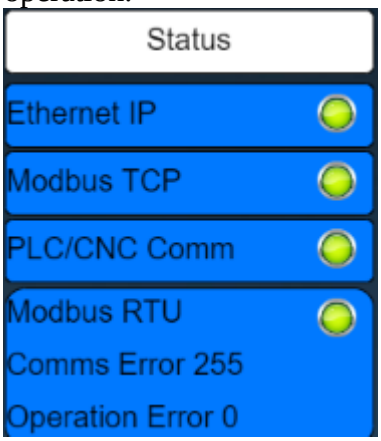
1.28. **V FAULT executing command INT** is displayed if after component actuation, the INT Port pressure switch Set Point 1 (SP1) value is not met, and acknowledgement not sent within the programmed PS Time-Out value. The PS Time-Out value can be increased to allow more time to meet the pressure switch Set Point 1 value. If fault still occurs, typical causes are oil leaks in valves or plumbing in that circuit.

1.28.1. Alarm Class B

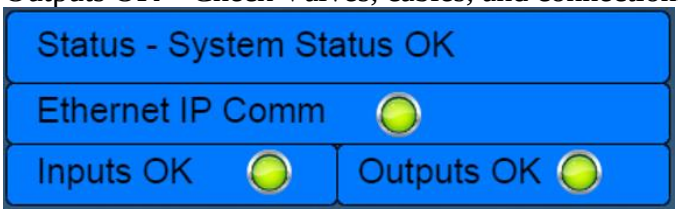
1.29. **V Acknowledgement A and B at the same time** is displayed if the pressure switch Set Point 1 (SP1) value on A Port and B Port are both met at the same time. This indicates simultaneous full pressure on both sides of the valve circuit and is unacceptable. Typical causes of this issue would be a stuck valve solenoid or a blockage in one or both sides of the circuit. Service of valve solenoids may be required.

1.29.1. Alarm Class B

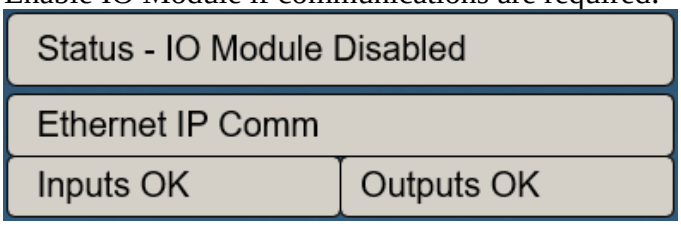
2. **Controller - Monitoring Status Communication Lamps**
   2.1. Green indicates system is On for normal operation of Unit Communications.
   2.2. Red indicates system is Off and needs attention to restore operation of Unit Communications.
      2.2.1. Ethernet IP – Check Ethernet cable and connections from PLC Ethernet connection to IO modules for normal operation
      2.2.2. Modbus TCP – Check connection from PLC to TM4 Switch for normal operation
      2.2.3. PLC/CNC Comm – Check Ethernet cable and connections from PLC to TM4 Switch to CNC for normal operation
      2.2.4. Modbus RTU – Check Ethernet cable and connections from PLC to VFD for normal operation.



3. **IO Module Setup Communication Lamps**
   3.1. Green indicates system is On for normal operation of IO Modules.
   3.2. Red indicates system is Off and needs attention to restore power and/or operation of IO Modules.
      3.2.1. Ethernet IP Comm – Check Ethernet cable and connections from M12 enclosure connector to IO Module for normal operation.
      3.2.2. Inputs OK – Check Pressure Switches, cables, and connections for normal operation.
      3.2.3. Outputs OK – Check Valves, cables, and connections for normal operation

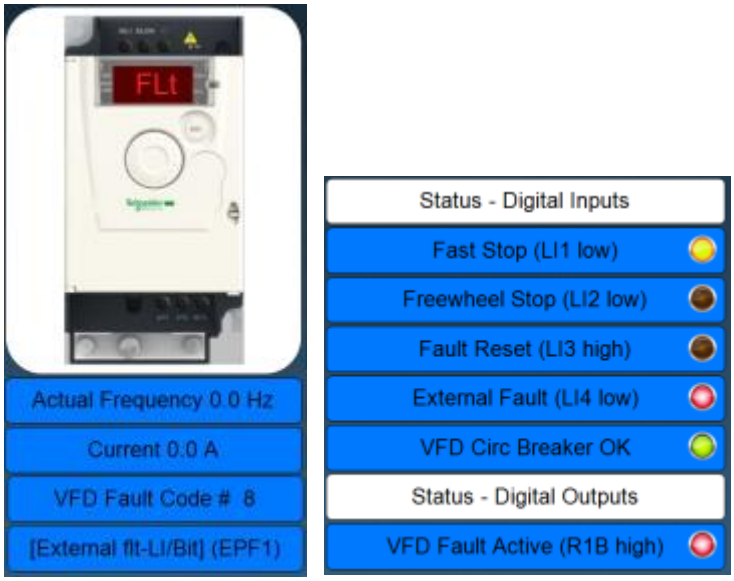


      3.2.4. Enable IO Module if communications are required.



4. **VFD Status Communication Lamps** for diagnostics and trouble shooting.
   4.1. Status Digital Inputs
      4.1.1. Fast Stop (LI1 low) - yellow light indicates Fast Stop signal active. (Pressure Switch SP1 signal)
      4.1.2. Freewheel Stop (LI2 low) - yellow light indicates Freewheel Stop signal active. (3-Position Switch OFF signal)
      4.1.3. Fault Reset (LI3 high) – Red light indicates Fault Reset signal is active. (Select Alarm Rest button)
      4.1.4. External Fault (LI4 low) – Red light indicates External Fault signal is active. Check Unit Setup and Status screen to determine which sensor status lamp is no longer illuminated Green for a specific fault.
         4.1.4.1. Oil Level – Add suitable hydraulic oil to reservoir above oil level fill line.
         4.1.4.2. Oil Temp – Caused by oil leak and continuous running pump motor. Find and correct cause of oil leak and allow oil temperature to cool to below 100°F (38°C) before restarting AWP.
         4.1.4.3. Return-line Filter is clogged. Replace with new filter part no. 31050018.

   4.2. **Status – Digital Outputs**
      4.2.1. VFD Fault Active (R1B high) – Red light indicates VFD Fault is active. Read fault code on VFD Fault Description or VFD display before powering down.
      Important: Removal of electrical Enclosure lid to be done by qualified personnel only.



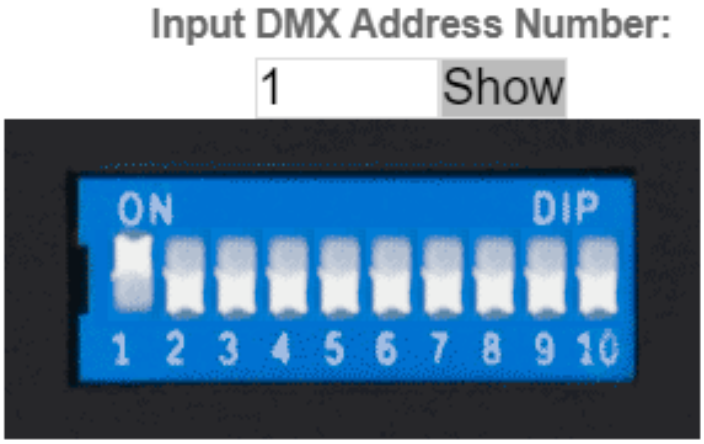
5. If Command signal from CNC machine does not result in completion of command at AWP.
   5.1. Check if AWP 3-POSITION SELECTOR STATUS on HOME screen is switched to On.
   5.2. Check if SYSTEM OPERATION MODE on HOME screen is set to AUTO.
   5.3. Check if CNC MACHINE OPERATION MODE on HOME screen display is AUTO.
   5.4. Check communication in AWP THINC APP Log file.
      5.4.1. Error Connecting to CNC
      5.4.2. Error Connecting to PLC
      5.4.3. Error Connecting to MirrorData
      5.4.4. Error Initializing Cmachine and CVariables:
6. If Acknowledgment Signal from AWP does not result in completion of Command at CNC machine
   6.1. Check communication in AWP THINC APP Log file. (same as above)
7. System Status lights on IO Module is Red or Off.
   7.1. Check connections of IO Module cable from AWP enclosure.
   7.2. Check connections of IO Power cable from AWP enclosure.
   7.3. Check IO Modul screen, System Status lights.

SECTION VI

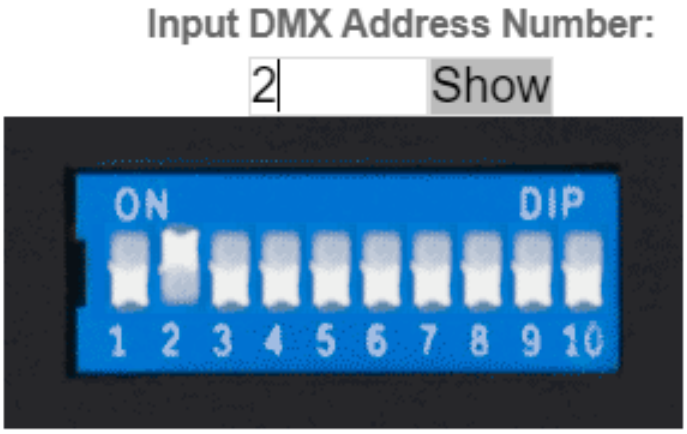
IO Module Configuration

1. Set IO Module IP address to default value.
   a. Set DIP switch 10 to On and power IO Module Off and On.
   b. Set DIP switch 10 to Off and power IO Module Off and On.

2. Set DIP switch to **1** for IO Module 0 (IP Address 192.168.123.1)
   a.

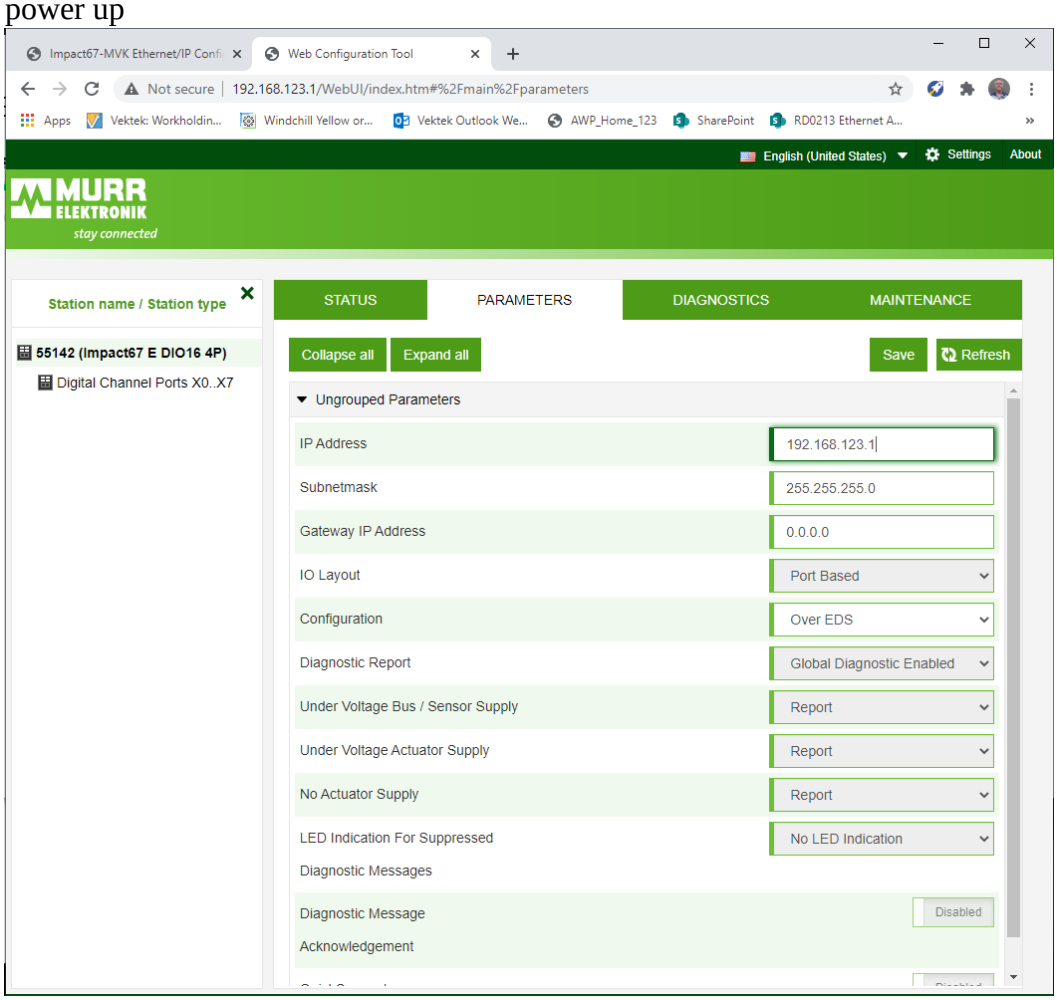


3. Set DIP switch to **2** for IO Module 1 (IP Address 192.168.123.2)
   a.



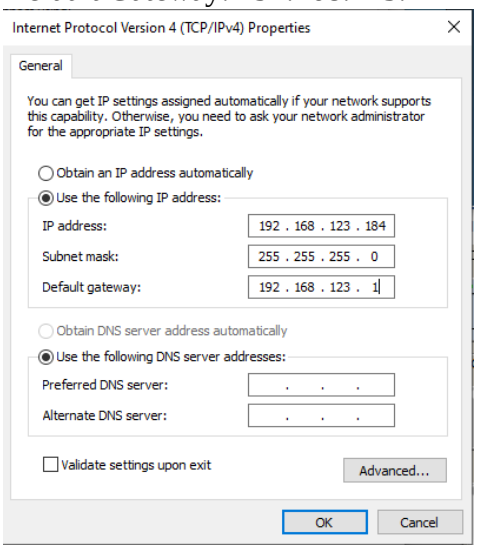
4. Connect Date Cable direct to IO Module data port (program 1 IO module at a time)
5. Set PC network IP Address to fixed 192.168.1.xxx
6. Open a web browser and type in the default IP Address 192.168.1.1 into the URL field.

7. After Web Configuration Tool starts, enter new IP Address
    a. 1-4 valve IO Module 0 = 192.168.123.1
    b. 5-6 valve IO Module 1 = 192.168.123.2
8. Change Configuration parameter to Over EDS so it will load correct parameters from PLC on power up

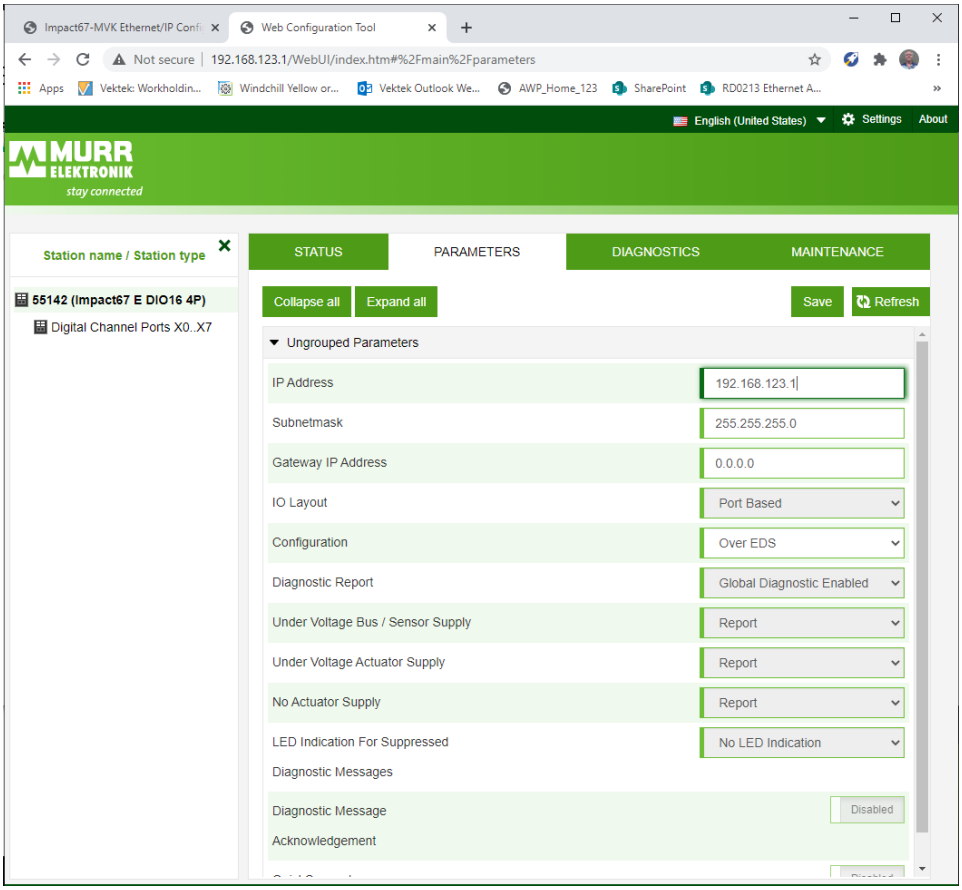


9. Select SAVE

10. Power down IO Module and Power up.
11. To check settings of IO Module, set PC network properties as follows.
    a. IP Address: 192.168.123.xxx (3rd octet must be change to .123. to match IO Modules) (xxx can be any number that does not conflict on the existing network)
    b. Subnet Mask: 255.255.255.0
    c. Default Gateway: 192.168.123.1



12. Open a web browser and enter the new IP Address in the URL field.
    a. 1-4 valve IO Module 0 = 192.168.123.1
    b. 5-6 valve IO Module 1 = 192.168.123.2



SECTION VII

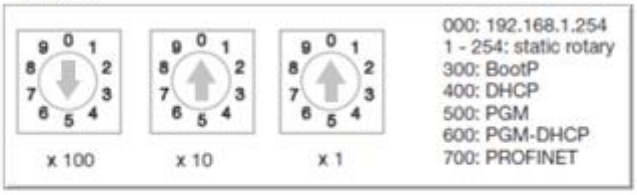
CNC IO Station Configuration

IS5506

1. All new part and replacement part IO Modules will need to be configured before shipment to the customer. It is necessary to know whether the IO Station will be used in Basic, Job #, or Fixture # Input/Output mode and configured accordingly. Use the following configuration instructions for Vektek Part No. 85595580 (Turck Part No. FEN-16DXP).
2. Set the station rotary switch x100 to 5, x10 to 0, and x1 to 0 to enable PGM programmable mode.

FEN20-16DXP

➤ Three rotary switches of the FEN20-16DXP provide various modes of operation, as seen below.



Modes of Operation

Based on the position of the switches, the device performs the following operation:

000	Restore IP address
300	BOOTP mode client
400	DHCP mode client
500	PGM programmable mode
600	PGM-DHCP mode
700	PROFINET mode
900	Device Recovery Mode (F_reset)
1-254	Static IP address

NOTE
The general rule of handling rotary switches when selecting mode of operation is:
- Set the rotary switches to the desired position
- Cycle power to the station
- Proceed with intended operation as explained hereafter

Restore Mode (000)

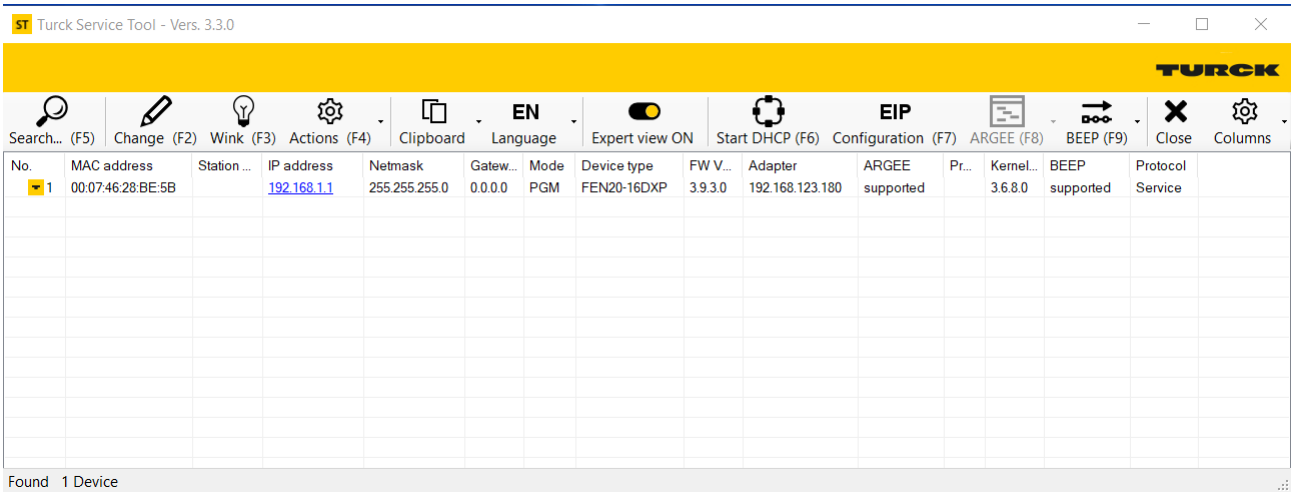
➤ The Restore IP address mode restores the IP address to the default value. When switches are set at 000, the device is capable to:
- Respond to PING command,
- Respond to Turck Service tool
- Run device Webserver

➤ The device cannot be connected to a PLC and it does not respond to any connection request.

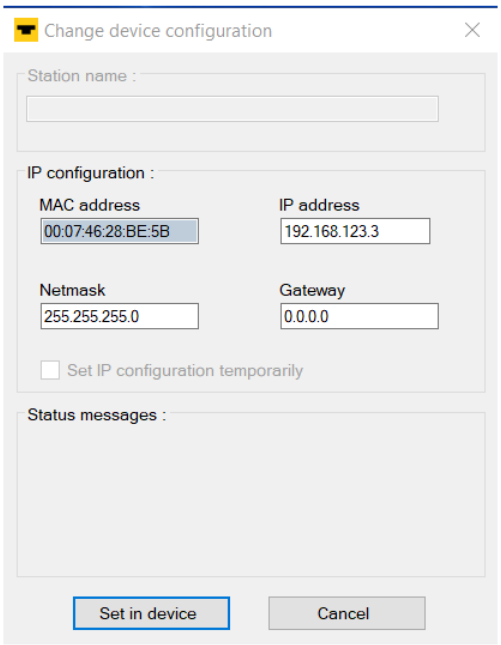
Default IP Address
The factory default setup when switches are set to "000" position:

IP address	192.168.1.254
Subnet	255.255.255.0
Gateway	0.0.0.0

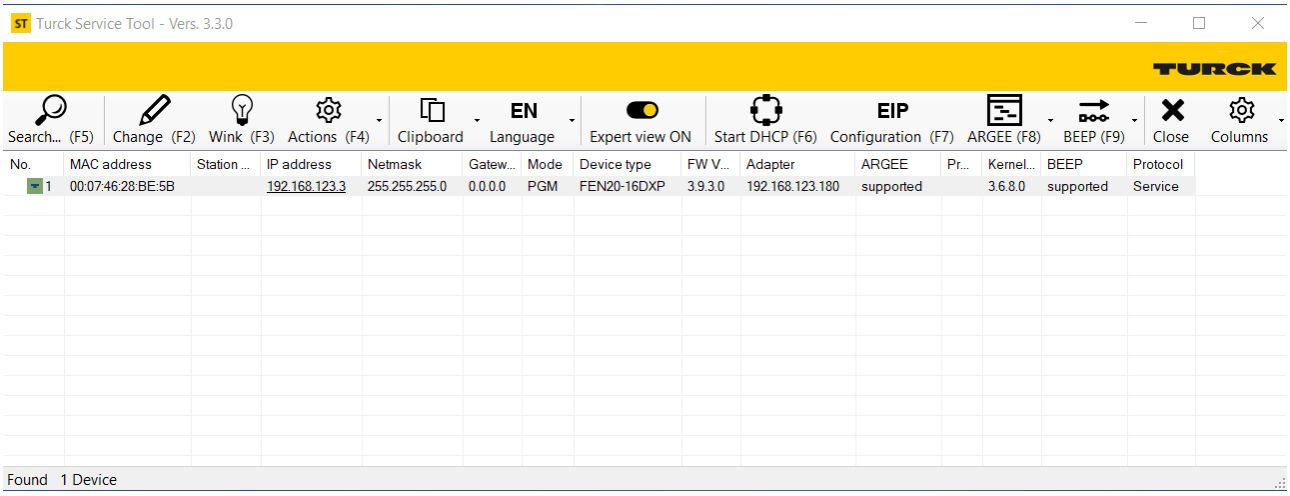
3. Connect PC to Turck IO Station via Ethernet cable and start Turck Service Tool.
   Set PC IP Address to fixed 192.168.1.xxx
   Select the Search button to display the connected station.
   Select Turck IO Station Line No and select the Change button.



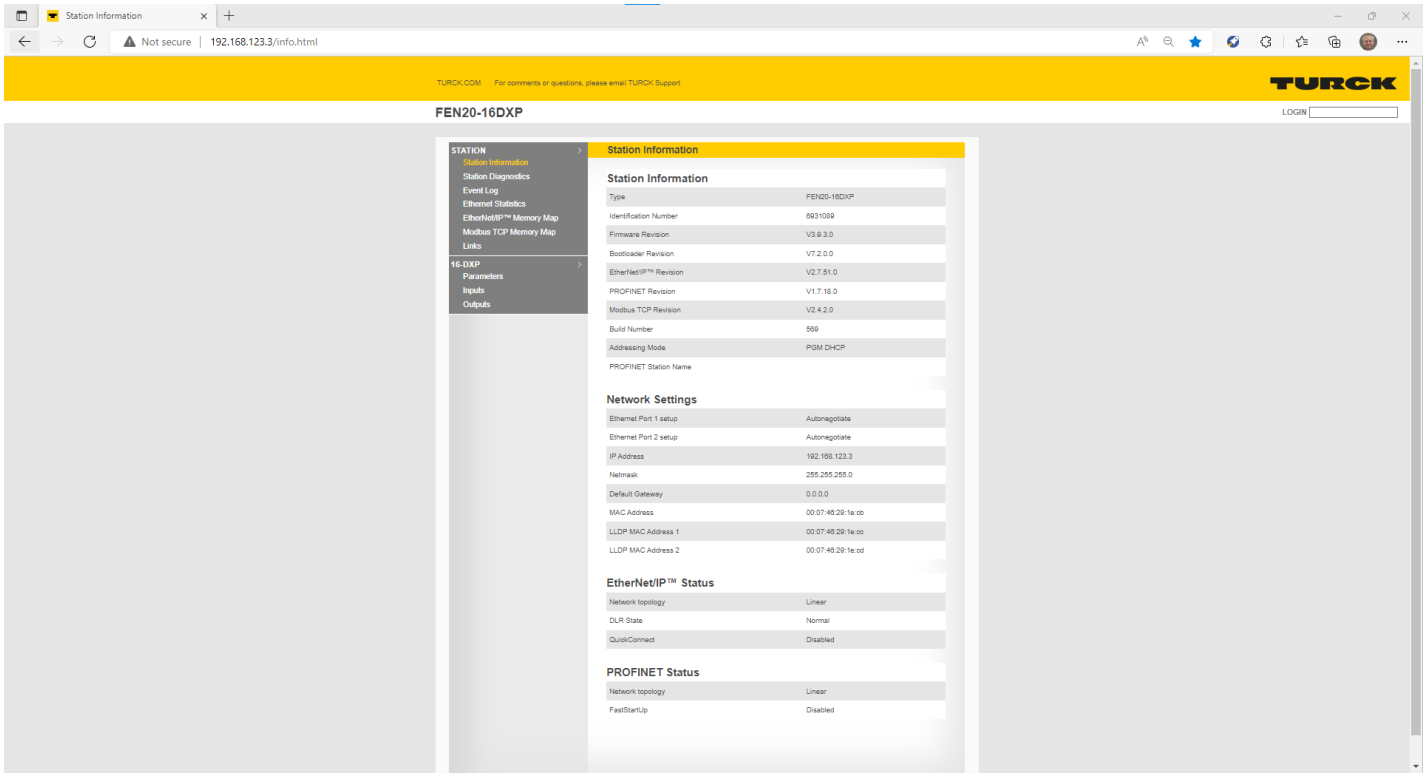
4. Select IP Address field and set to one of the following depending on configuration.
   a. 1st Station Basic – 192.168.123.3
   b. 2nd Station Job # – 192.168.123.4
   c. 3rd Station Fixture # – 192.168.123.5



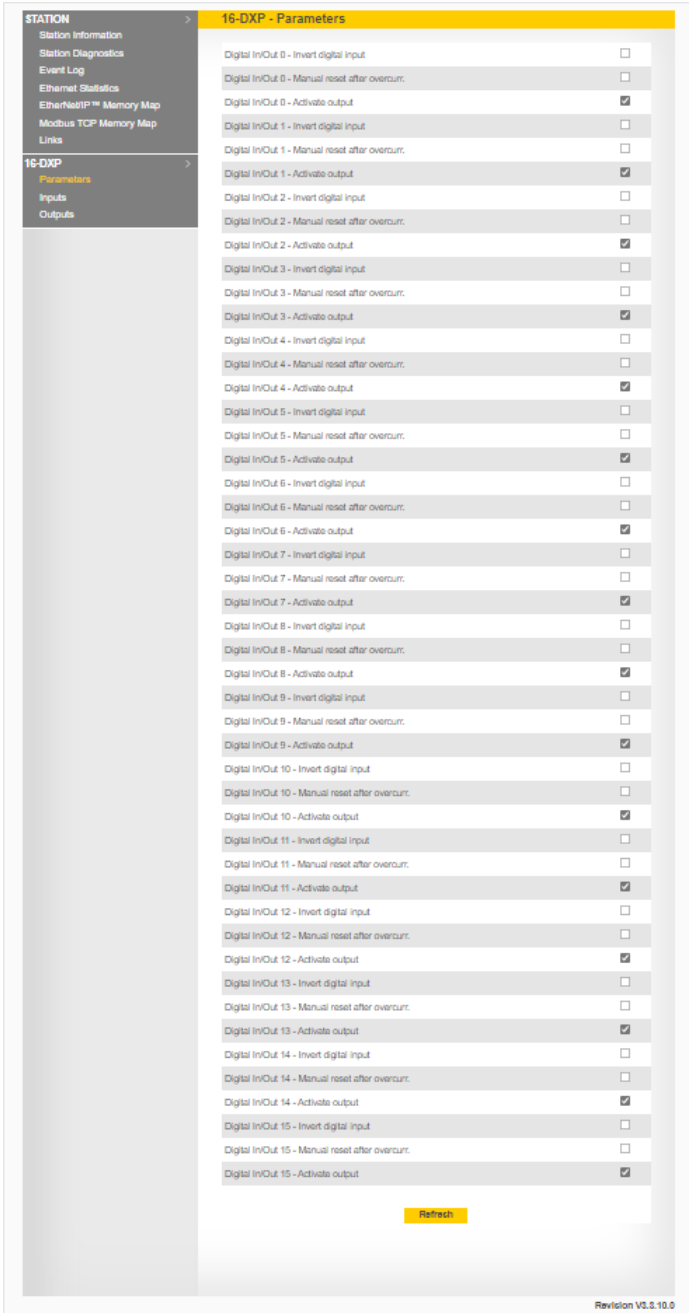
5. Select the Set in device button and the results are displayed in the updated Turck Service Tool.



6. Open a web browser and type in the default IP Address 192.168.123.X into the URL field. Select the LOGIN field on the right side of the web page and enter the word “password”.
   a. 1st Station Basic – 192.168.123.3
   b. 2nd Station Job # – 192.168.123.4
   c. 3rd Station Fixture # – 192.168.123.5



7. IO Station Parameter Assignment for 16 DXP Parameters
    a. Do not check boxes to Invert digital input
    b. Do not check boxes for Manual reset after overcurrent
    c. Check boxes as shown to activate as inputs or outputs as required.
    Inputs and outputs are configured automatically by PLC when connect to AWP.



d. IO Station Parameter Assignment is programmed by the PLC automatically upon connection and power up. No additional programming is required.

1st IO Station Basic Parameter Assignments
I0 – CNC Machine Class B Alarm Active
I1 – CNC Machine On No Fault
I2 – CNC Machine Door Closed
I3 – CNC Machine in Manual Mode
I4 – CNC Machine in Auto Mode
I5 – CNC Machine in MDI Mode
I6 – CNC Machine Clamp
I7 – CNC Machine Unclamp
I8 – CNC Machine Pallet 1 Present Load Area
I9 – CNC Machine Pallet 2 Present Load Area
O10 – Not Used
O11 – AWP Unit On, No Active Fault
O12 – AWP Pallet 1 Clamped
O13 – AWP Pallet 1 Unclamped
O14 – AWP Pallet 2 Clamped
O15 – AWP Pallet 2 Unclamped

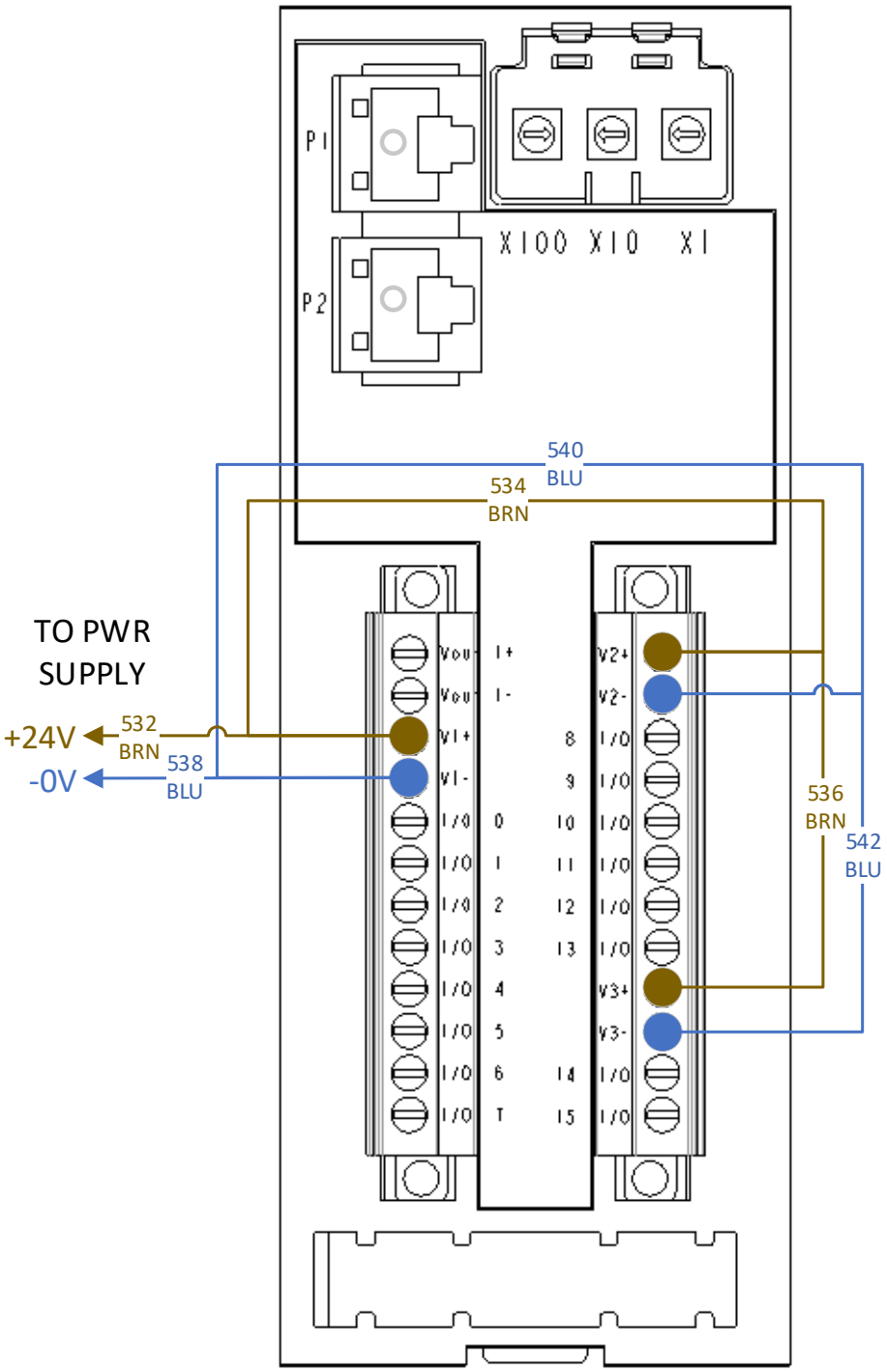
e. 2nd IO Station Job # Parameter Assignments

I0 – Job # - Bit 0
I1 – Job # - Bit 1
I2 – Job # - Bit 2
I3 – Job # - Bit 3
I4 – Not Used
I5 – Job Selection Pallet 1
I6 – Job Selection Pallet 2
I7 – Not Used
I8 – Not Used
I9 – Not Used
O10 – Job # ACK Bit 0
O11 – Job # ACK Bit 1
O12 – Job # ACK Bit 2
O13 – Job # ACK Bit 3
O14 – Not Used
O15 – Job # ACK

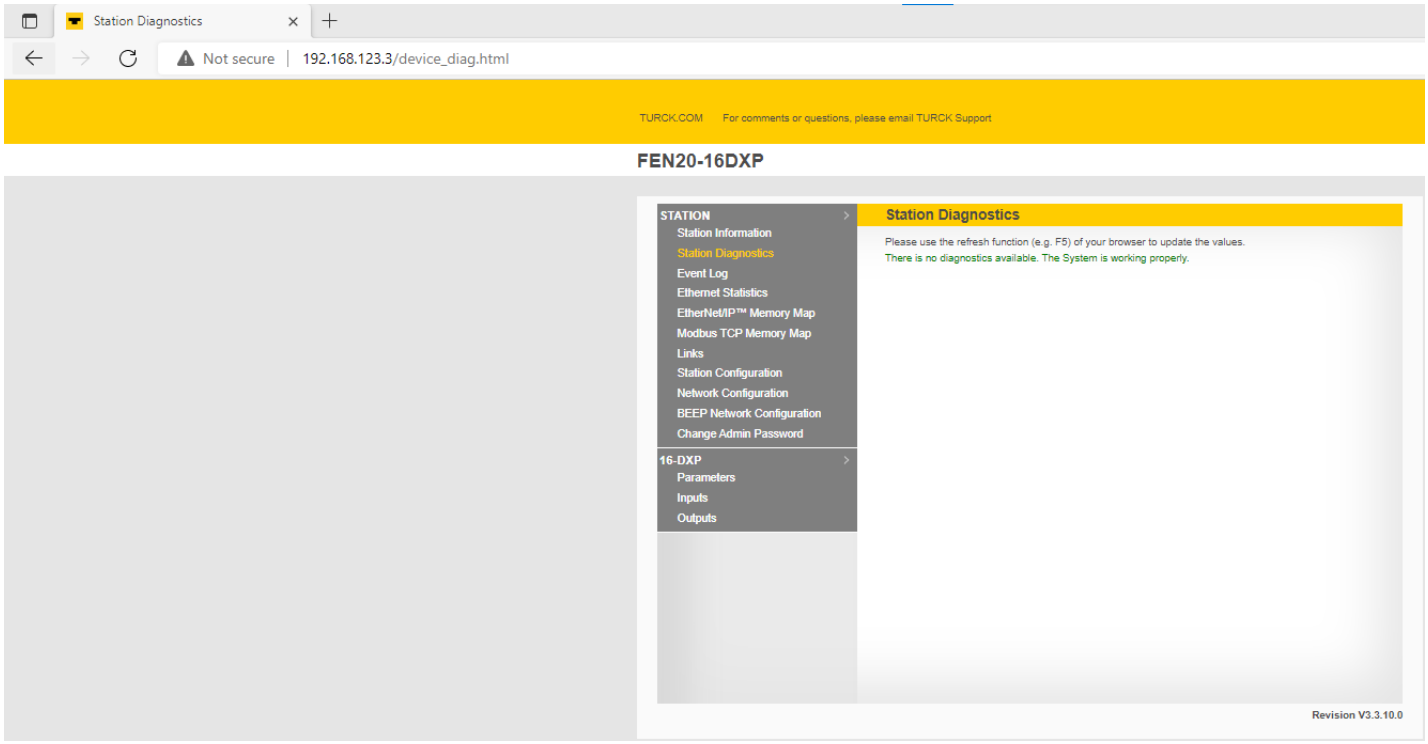
f. 3r[d] IO Station Fixture # Parameter Assignments

I0 – Fixture # - Bit 0
I1 – Fixture # - Bit 1
I2 – Fixture # - Bit 2
I3 – Fixture # - Bit 3
I4 – Not Used
I5 – Fixture Selection Pallet 1
I6 – Fixture Selection Pallet 2
I7 – Not Used
I8 – Not Used
I9 – Not Used
O10 – Fixture # ACK Bit 0
O11 – Fixture # ACK Bit 1
O12 – Fixture # ACK Bit 2
O13 – Fixture # ACK Bit 3
O14 – Not Used
O15 – Fixture # ACK

8. IO Module Connection Diagram
    a. See EN5511 for wiring requirements as shown below.



9. Confirm system operation by selecting Station Diagnostics and verify the System is working properly.



SECTION VIII

GLOSSARY

1.0 A – A Port
2.0 ACK - Acknowledge
3.0 APP – Application
4.0 AUTO - Automatic
5.0 AWP – Advanced Workholding Pump
6.0 B – B Port
7.0 CMD – Command
8.0 CNC – Computer Numerical Control
9.0 CPU – Central Processing Unit
10.0 INT – Intermediate (Valve)
11.0 IO – Input Output
12.0 MAN- Manual
13.0 MDI – Manual Data Entry
14.0 PID – Proportional Integral Derivative (Calculation used in VFD to anticipate pressure switch set point for stopping pump motor)
15.0 PLC – Programmable Logic Controller
16.0 POS – Position
17.0 PS – Pressure Switch
18.0 PSI – Pounds per Square Inch
19.0 V – Valve
20.0 VAC – Volts Alternating Current
21.0 VFD – Variable Frequency Drive
22.0 WSA - Web Server Application