Robot Operational Manual Packet

ABSOLUTE ROBOT | 92 GARDNER STREET | WORCESTER, MA | 01610

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Please carefully read Operational
Manual prior to equipment operation.

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Preface

Dear Valued Customer,

At Absolute Robot Inc., we appreciate your business and look forward to helping you efficiently automate your success. The automated fabrication and design of this robot is suitable for heavy-type operations, designed for customers seeking to increase efficiency.

The purpose of this Operation User Manual is to thoroughly outline and describe the corresponding and necessary safety, installation, operation, and maintenance of your robot. As such, please read this manual carefully, before operating your robot to ensure the proper safety measures are being taken.

To ensure all safety measures are taken before, during, and after robot's operation, prior to installation, please check the robot and its respective components on the provided "Parts List" for any damage that may have incurred during transit. If there are any missing or damaged parts, please contact ARI customer service immediately. See the following "Guarantee" for further outlined details.

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Guarantee

Prior to your robot arriving at your facility, it will have been thoroughly inspected and tested by our engineering team to ensure operational success.

Please visually check the robot's exterior for any possible damage, which may have been caused during transit and then carefully remove all packaging and robot parts. If you find damage that occurred during transit, please take the following listed actions:

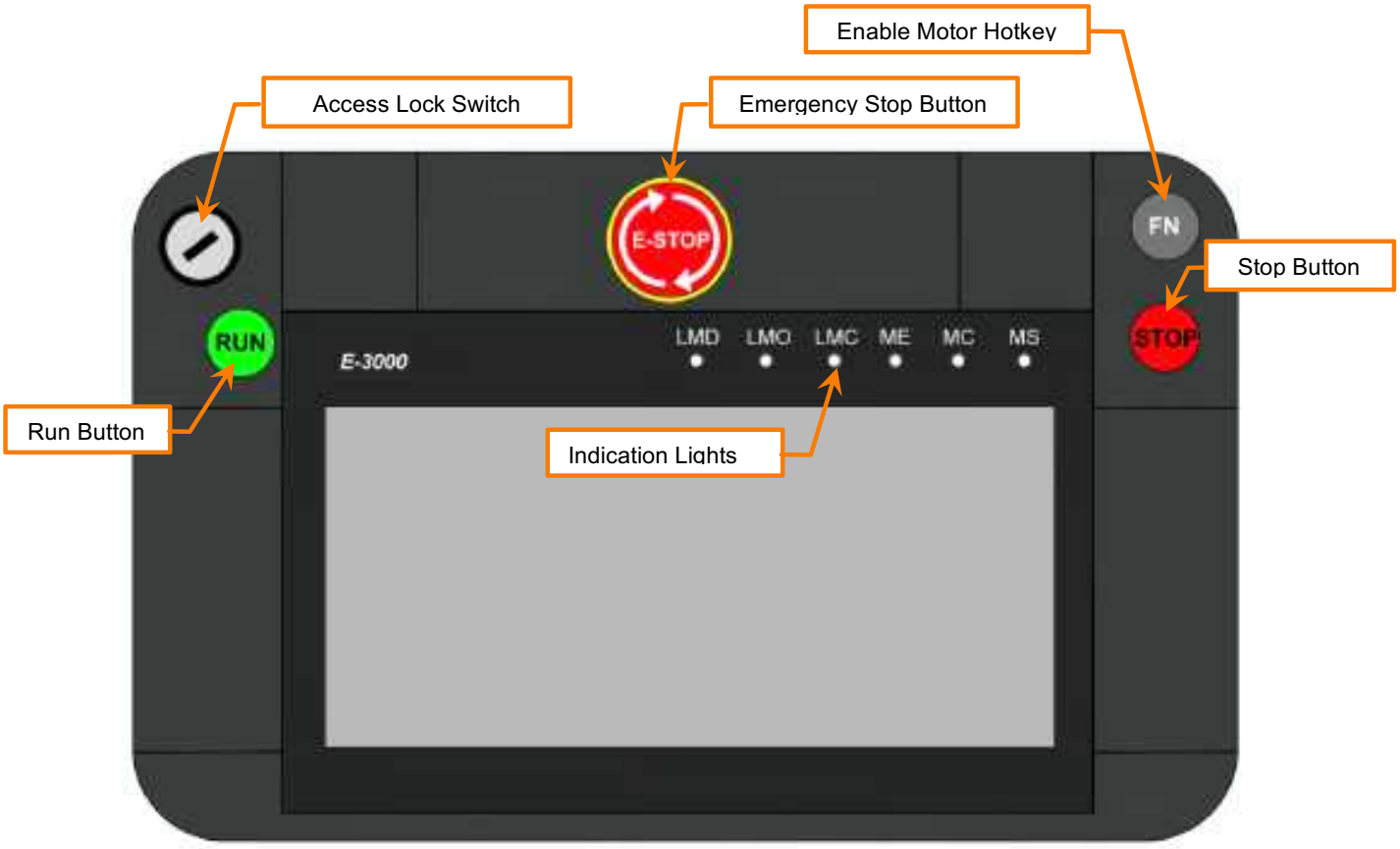
a. Notify the Transportation Company or your sales distributor immediately.
b. File a "Damaged Goods" claim to the corresponding Transportation Company.
c. Retain the damaged goods for inspection. **Do not** send the damage parts back **unless** directly instructed to do so.

1.0 Controller Description

Controller Description is outlined to describe and illustrate the robot's main Controller System, its respective buttons and its variety of automation-related necessary functions.

Pictured below is the robot's controller of "HMI" which houses the robot's controlling screen, buttons and components necessary for the Robot User to control and automate the robot's programmed and un-programmed actions. Below are the following components of the controller.

- Run Button
- Lock Switch
- Emergency Stop Button
- Motor Enable Hotkey
- Stop Button
- I/O Indication Lights



HMI Controller

1.1 Emergency Stop Button

Press the E-Stop button if an emergency occurs at any point during operation to immediately cease all operations.

WARNING

I. **If the "Emergency Switch" is pressed, it can cause a malfunction. DO NOT press the switch unless it is an extreme emergency**
II. **After the emergency situation has been cleared, the equipment can only be restarted.**
III. **Before restarting, make sure the area is safe and all personnel are clear of the working area.**

****Failure to follow these instructions may cause injury****

1.2 Robot Enable Switch

Pictured below is the "Robot Enable Switch" which is flipped on to enable robot operation. When the switch is flipped off, the robot forces all enable signals to the IMM. If the operator needs to move the IMM in manual or setup modes, the Robot Enable Switch must be in the off position.

Robot Enable Switch

Note: The Robot Enable Switch may only be turned off when the robot's vertical arm (Z-Axis) is green and it is at its 0.0 position.

1.3 Safety Switch

Below is the Safety of "Dead Man Switch". This switch is located on the back left-hand side of the robot's HMI.

Lightly press the Safety Switch when operating the robot in Manual or Teach modes or when the below warning is displayed.

Safety Switch

Press Safety Switch Screen

1.4 Run Button 

The Run Button is the green button located on the front of the robot's HMI 

The Run Button is used to initiate the "Autorun" and "Testrun" operating modes. In mode "Testrun" or "Autorun," when the Controller's screen system prompts the following:

Press down the green "Run Button" 

and the robot will start the "Autorun" or "Testrun" mode.

1.5 Stop Button 

The Stop Button is the red button located on the front of the robot's HMI  .

The Stop Button can execute three (3) different functions:

1. During "Autorun" mode, the Stop Button will stop the robot's automatic cycle.
2. The Stop Button clears robot alarms after the alarm has been acknowledged.
3. The Stop Button acts as a shortcut to the robot's Main Screen.

1.6 Lock Switch 

When the corresponding Controller Key is removed, the robot's automations and/or functions **cannot** be revised by any parameters of the Controller, at which time the Controller is considered "Locked" wherein operations are protected with a password. Removal of the key brings the robot to Access Level "0" by default.

1.7 Indication Lamp

Figure 1.1E: Indication Lamp

As pictured above in Figure 1.1E, the LED signal lights represent whether an input or output is present. If the signal is present, the LED will illuminate.

Robot Inputs	Robot Outputs
LMD: Safety Door	ME: Enable Ejectors
LMO: Mold Opened	MC: Enable Mold Close
LMC: Mold Closed	MS: Enable Cycle

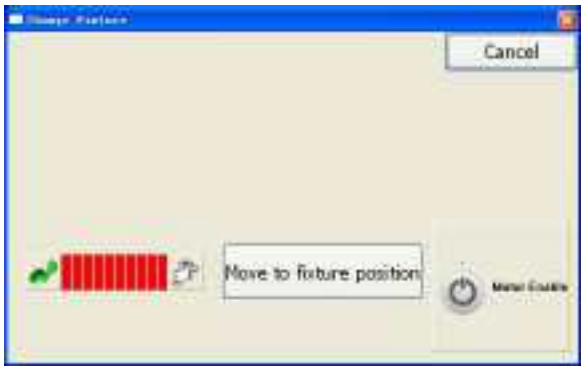
1.8 Motor Enable Hotkey

Pictured below, is the Motor Enable Screen. To turn on the robot's motors, select the Motor Enable Hotkey, then select the "Motor Enable" soft key. This will allow the servo drives to send power to their respective motors.

When enabling the robot's motors, verify that the global speed indictor is at its maximum position to enable a full range of operating speed.

To Exit the Enable Motor Screen select "Cancel"

Figure 1.1F: Language Hotkey



WARNING

Make sure work area is clear of all personnel and area is deemed safe prior to enabling the robot's motor power.

2.0 System Start and Stop

This System Start and Stop Section attempts to outline and describe the starting and stopping of the automated system.

WARNING

To ensure proper safety precautions, make sure no personnel is within the stroke range when starting the robot. The robot user must follow these safety precautions:

1. **Do not start system when or if there is someone or something in designated work area.**
2. **Do not start system when or if there are signs of faulty equipment.**

Note: Failure to follow the three steps may lead to a production accident, resulting in serious injury.

2.1 Start System

1. To power on your robot, make sure the main disconnect is closed or “ON”.

2. Select the green start button on the remote start/stop switch.

3. When the robot has finished initializing, the “Initialization Complete” prompt will display on the pendant screen select “Ack” for acknowledge.

4. Now select the key symbol  located at the top of the robot pendant display and enter your designated level of access password.

5. Next, select the “FN” button  and select “Enable Motor” to turn the robot’s servo motors on. When finished, select “Cancel”.

6. Next, we need to select “Reset”  to reset the robot and bring it to its start position. When the robot has been successfully reset, four blue arrows will appear at the top of the robot pendant display 

7. After the robot has been reset, verify there is a green house  at the top of the pendant display, indicating the robot is at its start point or home position.

8. You are now ready to upload your desired program and initiate an automatic cycle between the robot and the IMM.

2.2 Shutdown System

a. Stop the Auto Cycle between the IMM & robot.

b. Once the robot or IMM has stopped, select the stop key on the robot pendant to exit the “Autorun” mode on the robot.

c. If you intend to use your IMM without the robot, go into manual and traverse the robot outward so the robot is no longer above the mold area.

d. Once the robot is in the desired location, select the “FN” key, then de-select “Enable Motor” to de-energize the axis motors.

e. With the robot’s motor power off, the robot user may now power down the robot by pressing the remote start/stop switch. The main disconnect switch may remain in the “On” or “Closed” position when the robot is off.

Main Disconnect

Start/Stop Switch

WARNING

If the main disconnect switch is in the “On” position, there is still live power on the line and load side of that main disconnect, even when the robot is off.

If the main disconnect switch is in the “Off” position, there is still live power on the line side of the main disconnect, even when robot is off.

3.0 Emergency Stop and Release

Section 1.3 Emergency Stop and Release attempts to outline and describe the necessary methodology of an emergency stop and emergency release. This function is an 'Emergency State' function and is ***only*** to be used in an apparent dangerous situation. If the machine or robot is running normally, do not use this function.

WARNING

If a dangerous situation is about to occur or has already occurred, quickly use/press the emergency stop switch to immediately stop the robot.

Failure to heed these instructions may lead to product failure or injury.

3.1 Emergency Stop Operation Method

Section 1.3A Emergency Stop Operation Method outlines and describes the necessary methodology for an Emergency Operational Stop. This robot is equipped with an "Emergency Stop Button," as pictured below This button is to be pressed, in case of an emergency. The Emergency Stop button is located on the front of the HMI.

Emergency Stop Button

When the "Emergency Stop Button" is pressed, an alarm will sound. All the motors will power off and vacuum and gripper circuits will open.

WARNING

I. **If the "Emergency Stop button" is pressed, it can cause a malfunction. DO NOT press the switch unless it is an extreme emergency**
II. **After the emergency situation has been cleared, the robot needs to be reset**
III. **Before resetting the robot, make sure the area is safe and all personnel are clear of the working area.**

****Failure to follow these instructions may cause injury****

3.2 Emergency Stop Release Method

1. Relieve the robot's Emergency Stop situation by turning the E-Stop button clockwise and pulling up.

2. Per ANSI regulations, when the robot's E-Stop is activated, the robot will force the user to reboot the robot. To reboot, turn the robot off, wait three seconds, and turn the robot on. When the robot is finished booting, sign into your designated level of user access, and enable the robot's servomotors by hitting the "FN" or "Lang" key 

.

3. You may now reset the robot.

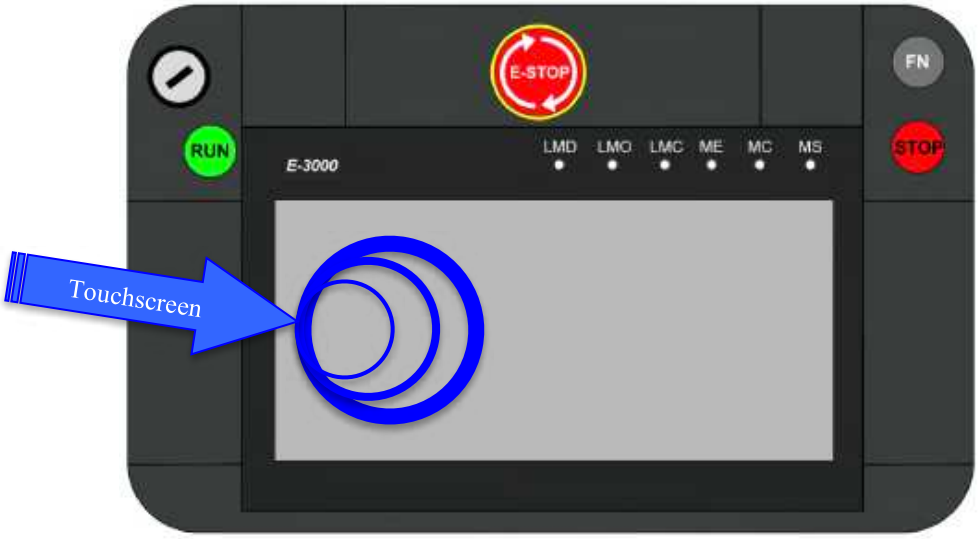
4. Verify you are at your home position  .

5. Once the robot is reset, disable the robot, and activate the IMM's automatic cycle. Once the IMM's clamp is closed, re-enable the robot and press "Autorun"  . After the "Autorun" soft key has been pressed, select the green Run Button. Now your robot and IMM are in automatic cycle.

4.0 Screen Description

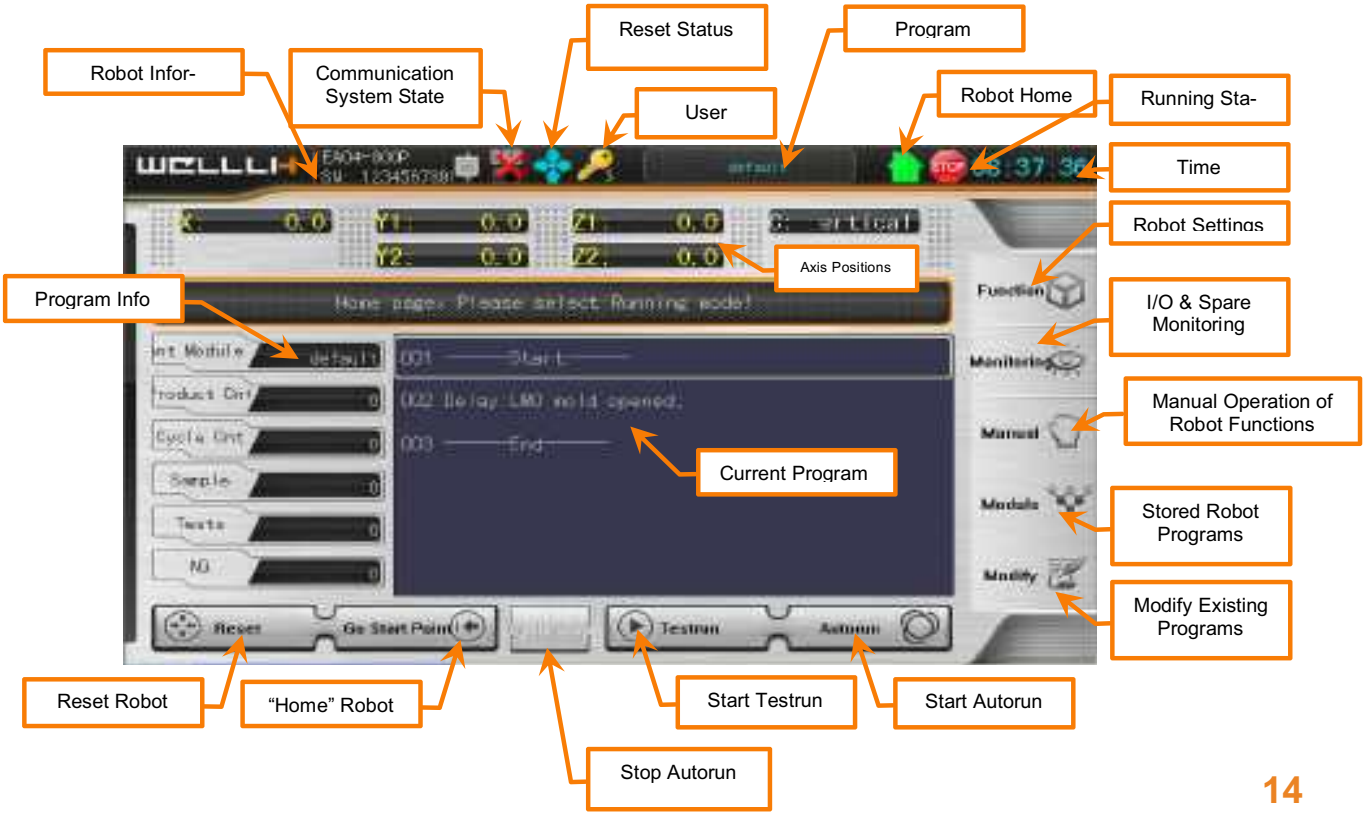
Section 1.4 Screen Description illustrates the robot software's variety of screen displays and their respective functions.

Please note this screen is a touchscreen, simply touch the screen for a response.



4.1 Home Page and Passwords

After the system robot's software finishes initializing, the robot's homepage will become present on the HMI's Touchscreen Display



4.1A Robot User Levels of Access:

Level 0: Default password – Robot user can reset, view program, and can start/stop auto-run.

Level 1: Robot user can operate in manual, teach program, and modify. (Password: 9999)

Level 2: Robot user can change the special set, production control, and subprogram design.
(See Administrator for Password).

Level 3: Robot user can enter Advanced Set in the Function Set.
(See Administrator for Password).

Level S: Same at level 3 but you can alter program software. Level “S” also allows for "jumping” over program lines in the teach menu.
(See Administrator for Password).

4.2 Reset Button 

Resetting your robot allows the robot to find its actual positions. Once it’s positions are found, it will return to its 0.0 position or its Startpoint value in the “Mould Set” Tab in the Function Menu.

The robot will need to be reset for the following reasons:

a. During robot start-up
b. After an alarm has been cleared
c. After your axis origin has been altered

To Reset Your robot, follow the instructions below:

1. Make sure your robot is powered on, the robot user is signed in  and the robot’s motor power is enabled.
2. Select the reset button 
3. Your robot will now reset. Once the reset is complete, the robot will be at its Axis 0.0 or Startpoint position.

Helpful Hint: If the robot alarms and displays “Not in Safe Position”, this is an indication that one or several of the critical robot Axis’ (Z, C, or A) are not at their “0” position. This alarm is purposefully there to reduce the risk of a crash. To relieve this alarm, go into manual and manually return these Axis’ to their home positions. Once the critical Axis’ are home, you may now select “Reset” and your robot will continue with its reset.

4.3 Startpoint Button 

Before the robot can begin operation, the robot must be at its startpoint. The robot must also be at its startpoint in order to enter the Teach Menu. To bring the robot to its startpoint, select the “Go to Startpoint” softkey.

4.4 Testrun Button 

Testrun allows the Robot User to activate their robot program to operate at real-time production speeds without the cycling of the IMM. The Testrun function is useful because it allows the robot user to make changes in the “Modify” Tab then those changes can be illustrated in the Testrun function.

To activate the Testrun function:

a. Verify the robot is at its startpoint.
b. Select “Testrun”
c. Hold the safety switch on the back of the HMI.
d. Press down the “Run Button” to confirm Testrun activation.
e. To exit the Testrun mode, select the “Stop Button”.

Note: The “Testrun” mode **cannot** replace the “Autorun” mode.

4.5 Autorun Button

Autorun allows the Robot User to activate the robot’s automatic cycle in conjunction with the IMM.

To activate the Autorun function:

a. With the robot standing by at it’s start point, verify that the program that is intended to be ran is present at the top of the robot’s pendant display.
b. **THE IMM MUST BE PUT INTO AUTO BEFORE THE ROBOT.**
c. Before putting the IMM into Auto, be sure the enable output signals are present on the robot’s HMI. If these signals are not present, cycle the “Robot Use” switch to refresh the robot’s enable output signals.
d. Now place the IMM in semi or automatic cycle.
e. Once the IMM is in an Auto mode, select “Autorun”.
f. After “Autorun” has been selected, select the green “Run” key to confirm “Autorun” initiation.

5.0 The Function Menu

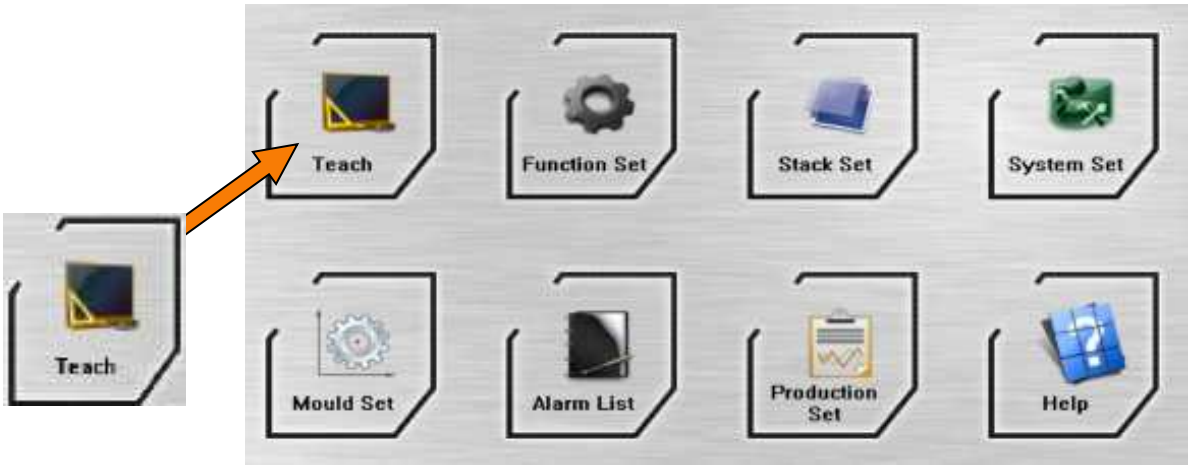
The Function Tab on the robot's Main Screen allows the Robot User to access the Function Menu. In the Function Menu, the Robot User to access various robot settings and create programs in the Teach Function.

From the Main Screen, press the "Function" Tab on the left-hand side of the screen. After selecting the "Function" Tab, the following display will appear as seen below.

Once the Function Tab has been selected, the following display will appear on the HMI:

5.1 Teach

Section 2.1 describes the proper way for the Robot User to create a new program using the Teach Function in the Function Menu.



To Enter The "Teach Function":

1. Select the "Teach" tab in the Function Menu.
2. After, a pop-up will appear and it will ask the Robot User if they would like to "create a new program?"; select "Ok" or "No".
    a. By selecting "No" the Robot User will be directed to the Teach Menu to edit the current program that is open on the Main Screen.
    b. By selecting "Ok" the Robot User will be asked to input a name for their new program, then they will be directed to the Teach Menu.
3. After inputting your desired program name select "Ok". The following Teach Menu will appear as displayed in Figure 2.3:

Figure 2.3: The Teach Menu

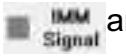
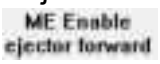
5.1A To Edit an Existing Program:

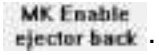
1. Press the respective “No” option appearing in the pop-up window.
2. Modify the parameters of the action instructed selected, by pressing “Modify” 
3. Delete the action instruction selected, by pressing “Delete” 
4. To move the Outlined Box Up or Down, select the “Previous”  and “Next” 

5.1B Creating A New Program:

1. Go to “Function”  , then “Teach” 
2. To Create a New Program, select “Ok”
3. Select “Axis Motion” on the right  , select desired axis to move. Hold the safety button, move the desired axis using the + or − . Save movement by selecting 
4. Hold the safety button then press  to move passed the 

Note: Movements after this step will be the part removal sequence.

5. Position robot in mold close to moveable platen, turn on vacuum circuits by selecting  ring robot vacuum cups into part contact. In this position, the robot can now safely control the ejector/core functions. This option is utilized by selecting  and activating  .
6. At this point, you can click on the previous Y-axis and Z-axis motions to adjust and align to the End of Arm Tool (EOAT) to the moveable platen. To adjust the previous steps, click on the appropriate axis motion. Use minor adjustments in the displayed menu. After adjustments are made, select “Save”

7. Next, Enable the ejectors back  . Move the robot out of the mold area, return the Z-axis to the zero position. Now the robot user is ready to traverse the X-Axis out over the part-drop area.

Note: Movements after this step will be the part deposit sequence.

8. Once the X-Axis is in the part-drop area, the X-Axis values will be displayed in **amber**. This indicates to the robot user that we are in a safe position to deposit the parts.

9. After the parts are deposited, bring all the Axis back to their 0.0 position and verify the last line in your program is “End” 

Note: Movements after this step will be for testing the newly created robot program.

10. Once your program has been created, exit the Teach Menu, your program will be saved automatically.

11. Now reenter the Teach Menu and step-through the entire program to verify the taught lines are being executed as intended.

12. Once the program step-through has been completed, put the robot into “Testrun” mode  . Testrun will allow your robot to operate at its set real-time operating speed without IMM motion.

13. If changes need to be made to the program after monitoring the robot’s Testrun cycle. From the robot’s Main Screen, select “Modify”  and make your program adjustments accordingly.

Helpful Hint:

When creating a new program, it is easiest for the Robot User to place the part on the mold’s ejector pins. Then, select “Manual” on the Robot’s Main Screen and manually move the robot so it is in position to remove the part off the ejector pins while at this point. At this point, take note of the Y-Axis and Z-Axis values. These will be the points to program to when creating a new program in the Teach Interface.

5.1C Axis Motion

The Axis Motion Tab in the Teach Menu is where the robot user will input all the robot's axis motions into the robot's program.

When the Axis Motion Tab is selected, the following screen will appear on the HMI:

To insert an axis motion into the program:

a. Select the Axis you would like to move from the drop-down menu  from the Axis Selection Bar 
b. Hold Down the Safety Switch until the red pencil turns green.
c. Now move the axis to its desired location.
d. Once the robot is in its desired location, select "Save" 

Helpful Hint:

When getting accustomed to creating programs, do not change the delay or speeds on any of the axis motions. Wait until after you have test-ran your program in the "Testrun" Function on the robot's main screen. Then, if there is a need to change a delay time or action speed, select the "Modify" tab on the main screen to make those changes. After the changes are complete, the Robot User can go back into "Testrun" to view the recent changes.

5.1D Vacuum Grip

The Vacuum Grip Tab in the Teach Menu is for adding Gripper, Vacuum, and Spare Outputs into your robot's program.

When the Vacuum Grip Tab is selected, the following screen will appear on the HMI.

To insert a Gripper, Vacuum, or Spare Output into the program:

1. Select [+] to add a Gripper, Vacuum, or Spare Output. The following screen will appear on the HMI:

2. Click on the output you would like to add into your robot program.
3. Select "On" [On] to turn on the output.
4. Then select "Confirm" [Confirm]
5. To have multiple outputs activate at once, select [+] again and follow the previous steps.
6. Once your desired outputs are "On", select "Save" [S]

5.1E Stack Motion

The Stack Motion Tab in the Teach Menu is for adding part palletization stacks into your robot's program.

Note: The Stack Motion Tab should be selected after the robot program has extracted the part for the mold's cavity and the Z-Axis is back at its 0.0 position.

When the stack motion tab is selected, the following display will appear on the HMI.

To Insert a Stack Motion into The Program:

1. Precondition: The Stack Motion Tab should be selected after the robot program has extracted the part for the mold's cavity and the Z-Axis is back at its 0.0 position and is **green**.
2. Select "Stack Motion"  then click on the "Stack Param" dropdown  and select 1-5 as desired. We will modify these parameters in the next step. Save the step after selecting the Stack Parameter you wish to use.

3. Select "Axis Motion" and move the X-Axis to the location of the first stack. Be sure the X-Axis values are **amber**, indicating the robot is in the part-drop area prior to starting your stack. Save the step, this step should be highlighted in green when it is saved into your program.

4. Select "Stack Motion"  again. This time, select "Modify"  Click the "Start Pos." under the X,Y, and Z Axis' then click on "OK." This will save the current X/Y/ Z Axis positions as the start of the stack

5. Next select the quantity of the parts you would like to stack in that Axis direction.

6. For product spacing, enter how far (mm) you would like to move that part in each Axis.

7. Select "Direction", and enter direction the parts will be stacking, either P- (Towards 0.0 position) or P+ (Away from 0.0 position).

8. Now select the "Back" button and "Save"  the step to complete the Stack Motion function.

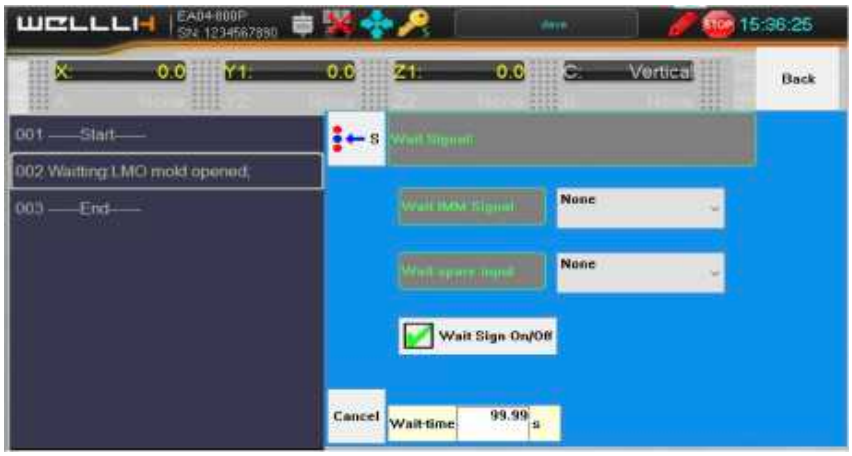
9. The robot user can now program the robot deposit the parts and return to its start position to complete the program.

Note: If you are depositing stacks on a conveyor that is interfaced with the robot, please update the "Production Set" Menu appropriately. The "Production Set" Menu is in the Function Menu.

5.1F Wait Signal

The Wait Signal Tab in the Teach Menu is for adding various wait signals into your robot's program. The Wait Signal is inserted into a program to allow for the robot to "wait" until the selected IMM Signal or Spare Input Signal is present to continue with its program.

When the Wait Signal tab is selected, the following display will appear on the HMI.



There are 2 types of wait signals available; IMM Input Signals and Spare Input Signals.

IMM Input Signals	Spare Input Signals	
- LMO Mold Open	- LP1 Spare 1	- LG2 Gripper 2 Check
- LMC Mold Close	- Spare 2	- LG3 Gripper 3 Check
- LMF Ejector Back	- Spare 3	- LG4 Gripper 4 Check
- LMR Ejector Forward	- Spare 4	- LG5 Gripper 5 Check
- LMT2 Core Pull Back	- Spare 5	- Spare 12
- LMG2 Core Set Forward	- Spare 6	- Spare 13
- Spare 12	- Spare 7	- Spare 14
- Spare 13	- Spare 8	- Spare 15
- Spare 14	- Check Grip & Vacuum	
- Spare 15	- Z1 Down Standby	
- Core Puller 5 Back	- Z2 Down Standby	
- Core Puller 5 Forward	- LV1 Vacuum Check	
- Core Puller 6 Back	- LV2 Vacuum Check	
- Core Puller 6 Forward	- LV3 Vacuum Check	
- LMDG Reject Part	- LV4 Vacuum Check	
- LMN Middle Mold Signal	- LG1 Gripper 1 Check	

To Insert a Wait Signal into The Program:

1. Select the desired IMM/Spare Input Wait Signal to add into your Program.

2. Select "Save" 

5.1G IMM Signal

The IMM Signal Tab in the Teach Menu is for adding various IMM Enable signals into your robot's program. The IMM Signal is inserted into a program to allow for the robot to send an output or enable signal to the IMM. This function is important for enabling IMM ejectors forward and back, as well as core puller functions and Mold Close control.

When the IMM Signal tab is selected, the following display will appear on the HMI.

To Insert an IMM Signal into The Program:

1. Select the desired IMM Enable Signal to add into your Program.
2. Select "Save" 

5.1H Label & Jump

The Label Tab in the Teach Menu allows for the Robot User to reference different locations throughout the program. Labels are used in conjunction with the Jump command.

Note: It is necessary to be signed into Level “S” User Access to allow for the Robot User to use the Jump Up & Jump Down Arrows.

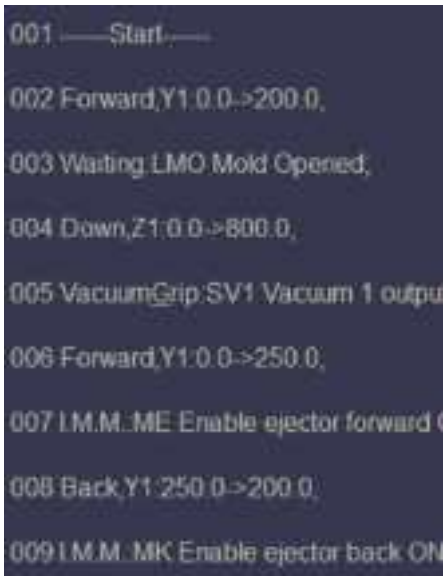
To Insert Label & Jump Into Your Program:

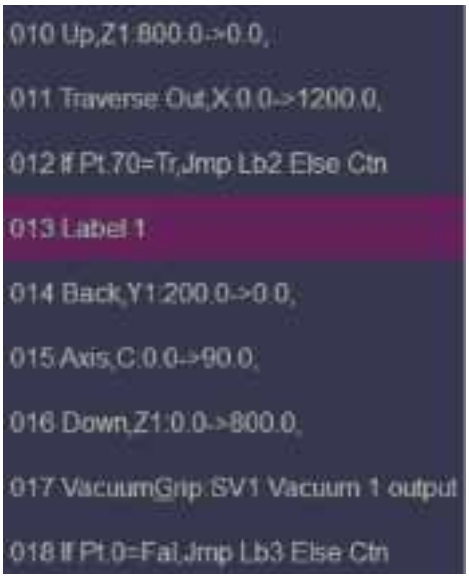
1. Hold the safety button then press to step through the program until you’ve reached the point you wish to add a Label or Jump command. Or, if you are signed into User Level “S” you can use the Jump arrows to move your Selection Box to its proper location.
2. Select Label to add a place marker or Jump to add in an “IF” statement.
3. The Label option (below) allows for Label 0 through 10000 to be placed anywhere in the program. Labels may be used to mark the beginning of a robot sequence for picking a part, placing a part, or anywhere during the program sequences.
4. Below is the Jump command menu. Jump command allows you to compare IO, overall Product Count or specific Counters that have been added to the robot program.
5. Using IO Port, select the desired IO. In the example, we are using IO 1 which correlates to LME1 IMM Emergency Stop. For a complete list of the IO ports, see Operator’s Manual.
6. After that, select whether the signal should be on or off.
7. Then select what Label the robot should jump to. If the Label selected is not in the current program, the robot will respond with the selected “If Time Out” response.
8. Under the “If Time Out” dropdown, you can have the robot continue, alarm, exit automatic mode, etc. Select the desired reaction.

Label Function

Jump Function

5.1I Jump Example:





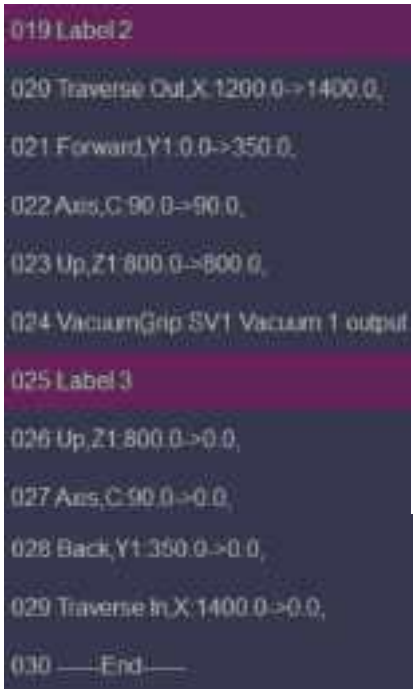
9. Steps 001 through 011 is the robot sequence of removing parts from the mold and proceeding to the initial drop position.

10. Step 012 Jump Command – If INPUT 70 (Spare Input) is True (ON), Jump to Label 2. If the Signal is False (OFF), the robot will continue to Label 1.

11. Label 1 marks the beginning of robot sequence to drop parts in are 1.

12. Label 2 Marks the start of robot sequence for drop position 2.

13. Label 3 marks the start of robot sequence to return to the home position.

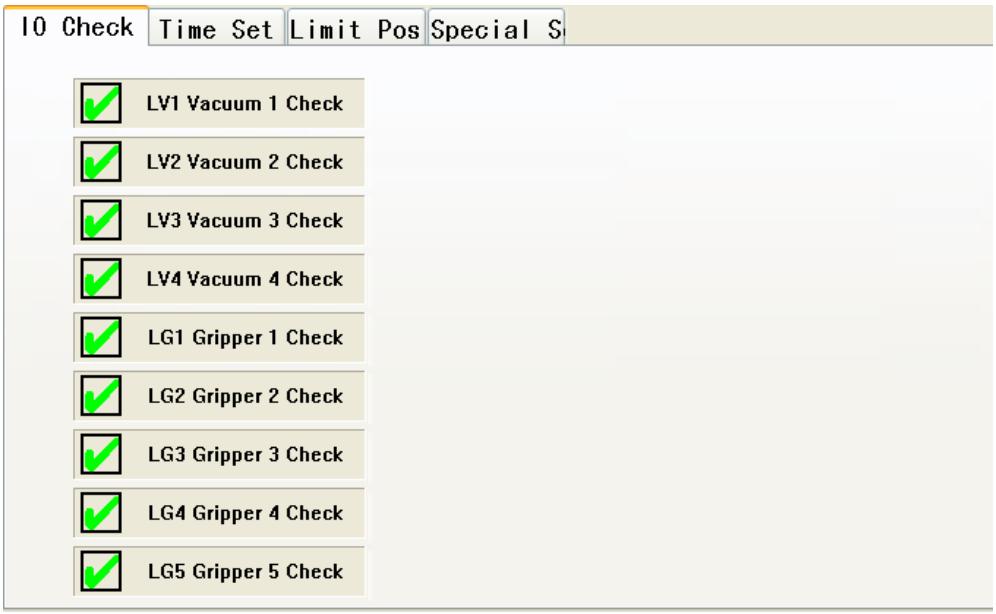


5.2 Function Set

Function Set is where various program-related settings are located as well as your robot's software limit positons. To enter Special Set, Select Set Tab in the Function Menu

Once the Robot User selects the Special Set Tab, The following I/O page will appear:

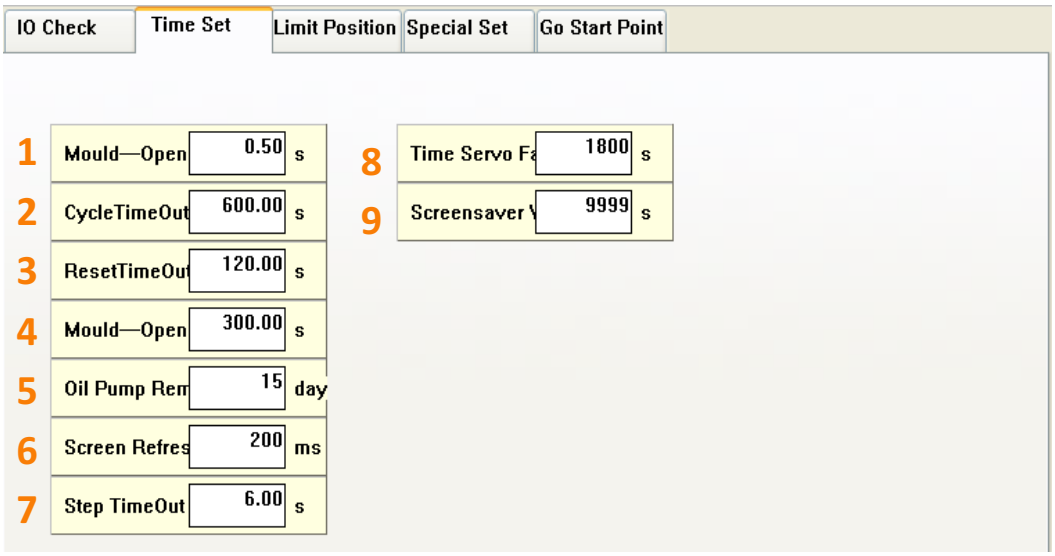
5.2A I/O Check Tab



 Confirmation signal required for Autorun.

 Confirmation signal not required for Autorun

5.2B TimeSet



The Time Sets For Various Robot Inputs & Functions.

Note:

1. **Mold-Open Delay**: This is the delay time from when the mold open signal becomes present to when robot continues with its program.

2. **Cycle Timeout**: When the cycle time is more than the set time, the system will stop and an alarm will sound.

3. **Reset Timeout**: If the robot resets more than the set time limit, the system will stop and an alarm will sound.

4. **Mold-Open Timeout**: The time limit of the mold-open in “Autorun,” if this action takes longer than the set time, the system will stop and alarm.

5. **Oil Pump Remind**: This is a set reminder to let the Robot User know the last time the robot’s axis was lubricated.

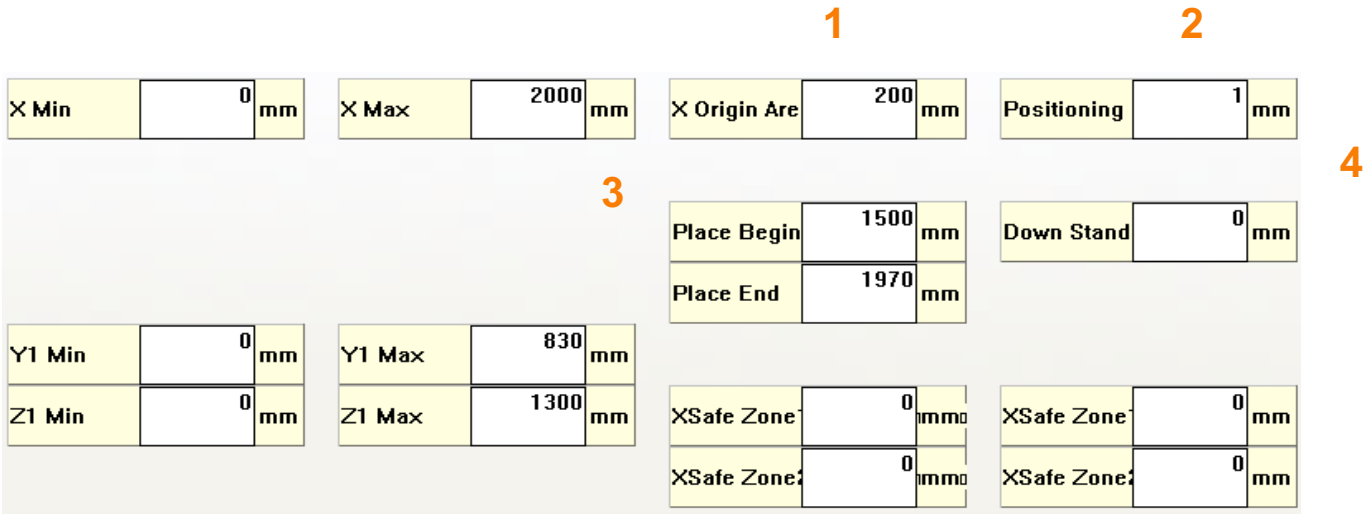
6. **Screen Refresh**: The refresh frequency time of the HMI display.

7. **Step Timeout**: The max amount of time the robot will wait for an action to complete in teach. If the action takes longer to complete than the set time, the system will stop and an alarm will sound.

8. **Servo dormancy**: If servo stops more than this set time, it will enter dormant state automatically.

9. **Screensaver Wait:** Wait time until screensaver becomes present on the HMI display.

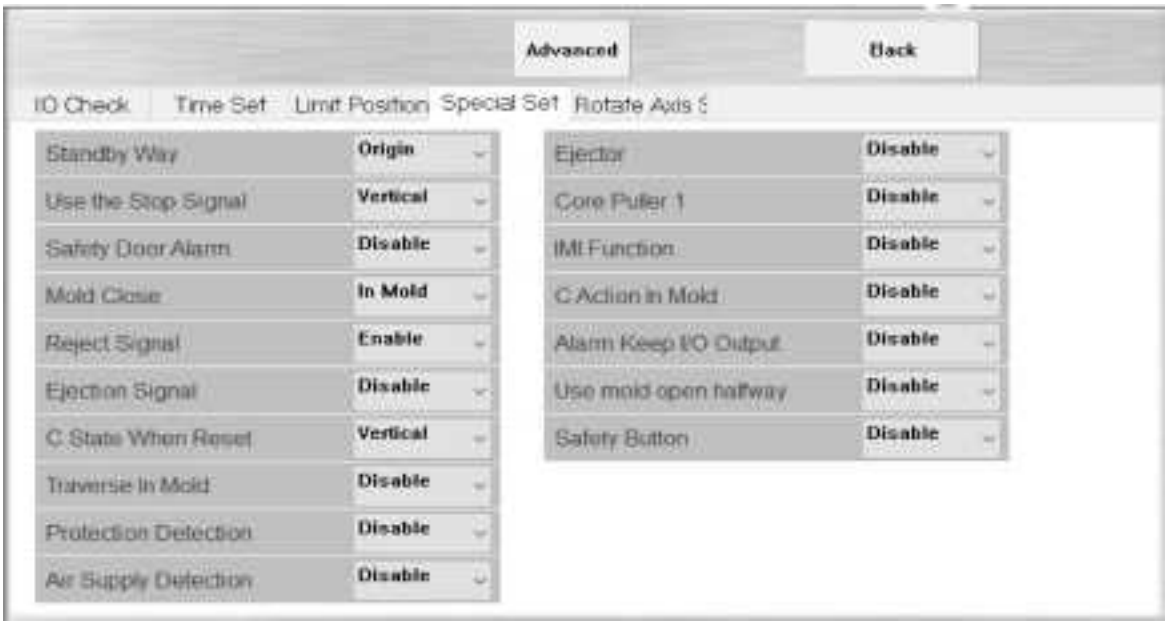
5.2C Limit Position



1. **X origin area:** Length of home position flag
2. **Positioning accuracy:** When the current position is within 1mm to target position, the robot will be in place and start next action, if not the robot will alarm
3. **Placed area**: It is the software limit of part-drop area
4. **Down standby Distance**: The Z axis will move down this distance to wait Mold open. It must open the Down Standby function.

5.2D Special Set

The Special Set Menu allows the Robot User to change various robot function and robot program settings. The four most important settings the Robot User will need to know are outlined in green below.



Special Set Settings

1. **Mold Close**:
   a. **In Mold**: Mold will close automatically when the Z-Axis returns to 0.0
   b. **Out Mold:** Mold will close automatically when the robot enters the part-drop area
   c. **Manual:** The Robot User will need to insert the Mold Close Enable signal into the program for the mold to close.

2. **Ejector**: It is the output signal “enable ejector”
   a. **Enable**: The robot will control IMM ejector functions
   b. **Disable**: The IMM will control the ejector functions

3. **Core Puller**: It is the output signal “enable core function”
   c. **Enable**: The robot will control IMM core functions
   d. **Disable**: The IMM will control the core functions

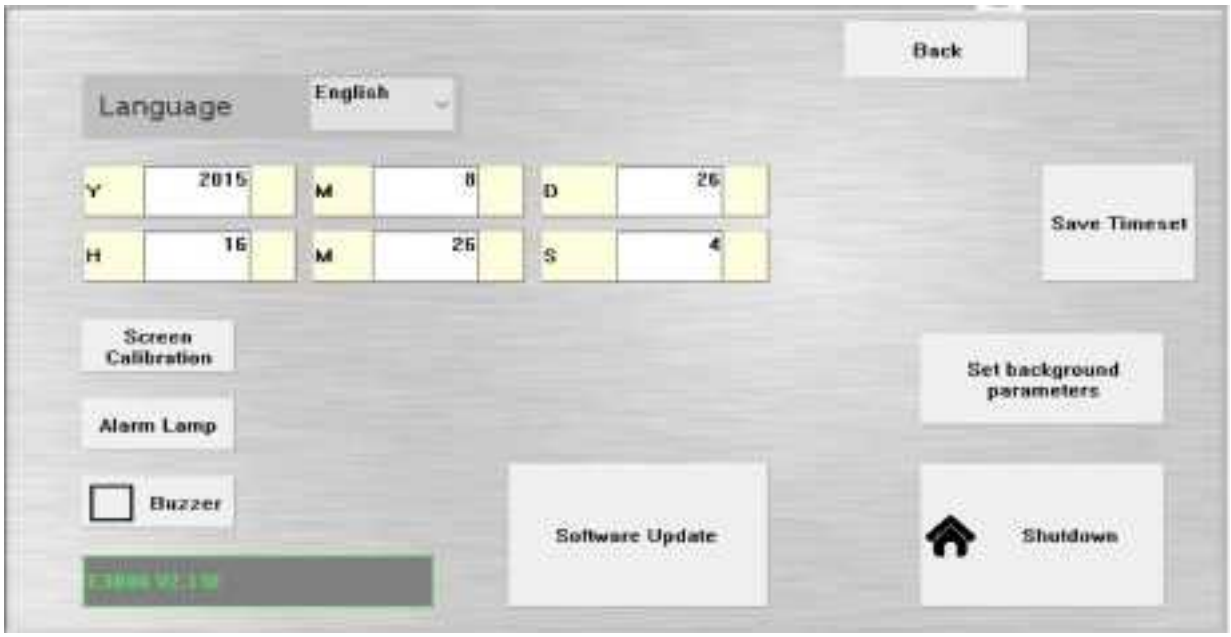
4. **IMI Function:** The In-Mold insert function, allow Z-Axis arm to move down with vacuum and grip signal.

5.3 System Set

The System Set tab in the Function Set Menu allows the robot user to change the robot's time and date display, calibrate the HMI touchscreen, turn the alarm on/off, and update robot's software.

Once the Robot User selects the Special Set Tab, the following page will appear.

Figure 1.5G-1



The Robot User may change date and time settings, and calibrate screens. All other possible functions should be executed with the help of ARI Service.

5.4 Mould Set

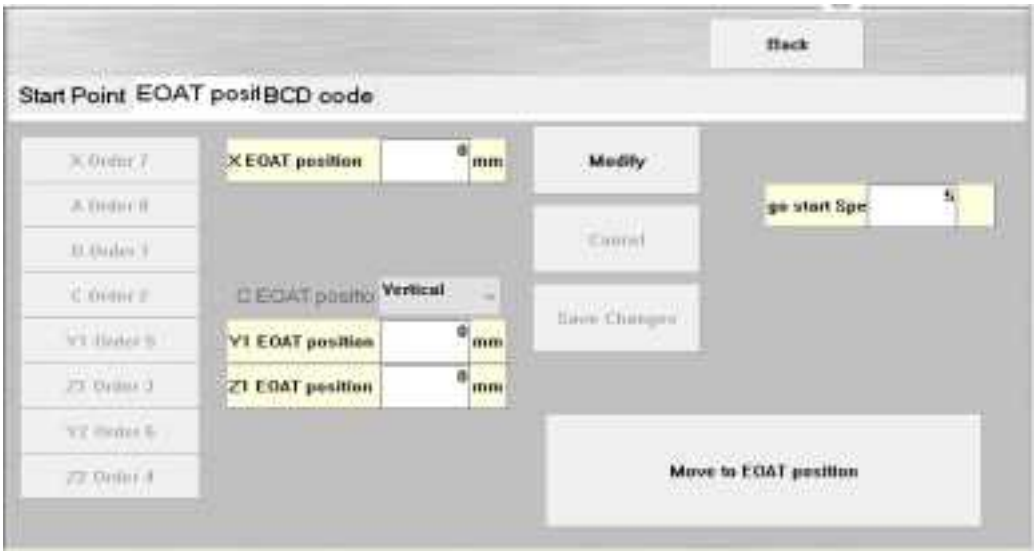
The Mould Set tab in the Function Menu allows the robot user to alter the robot's start positions. It also allows the Robot User to input a EOAT alteration position.

When the Mould Set tab is selected, the following display will appear on the HMI.

Having a startpoint other than 0.0 for any of the axis might be necessary depending on the type of mold installed in the IMM. For example, if the mold has a tall core stack on top of the mold, the Robot User would want to change the X-Axis startpoint so the robot does not collide with the core stack.

If the Robot User would like the robot to return to its startpoint (other than 0.0) the following option must be ENABLED

The Robot User may also input an EOAT alteration position. This allows the Robot User to move the robot to a dedicated position where he EOAT can be altered or changed.



5.5 Alarm List

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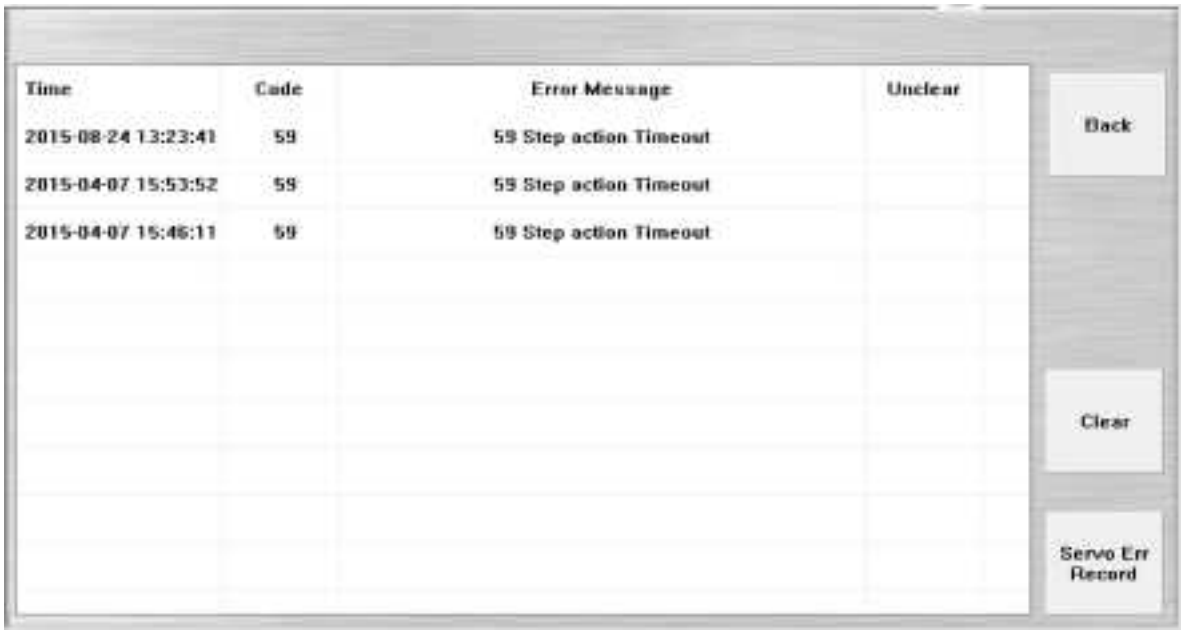
The Alarm List tab in the Function Menu allows the Robot User to view and clear robot alarm messages. This robot's alarm list can save up to 128 alarm messages. The Robot User can only clear alarm messages if they are signed into level "S".

When the Alarm List Tab is selected, the following display will appear on the HMI.



5.6 Production Set

The Production Set Tab allows the robot user to control the conveyor output signal when a conveyor is interfaced with the robot.

When the Production Set Tab is selected, the following display will appear on the HMI.

1. **Product Output:** Input a value to control the amount of products being extracted. When the limit has been reached, the robot will alarm

2. **Transfer Qty:** The conveyor will index once the transfer quantity value has been met. If you are stacking parts on a conveyor, it is important to make sure the transfer quantity matches the amount of parts in that particular stack.

3. **Transfer Time:** This is how long the conveyor output will remain “On”.

4. **Samplings:** If set as a given number, system will take out a sample to setting position every cycle.

5. **Defectives:** If the amount of defective parts has reached the set point, the system will alarm and stop. You can set the placed position of defective parts. (Note: You should open the check of defective signal in Special Set.

6. **Tests:** In Autorun, the test cycle number and put the product to setting position.

To manually turn on the conveyor select 

and the conveyor will move until the transfer time has been met.

6.0 Monitor

The Monitor Tab is used for monitoring specific operational and automation signals.

When the Monitor Tab is selected, the following display will appear on the HMI.

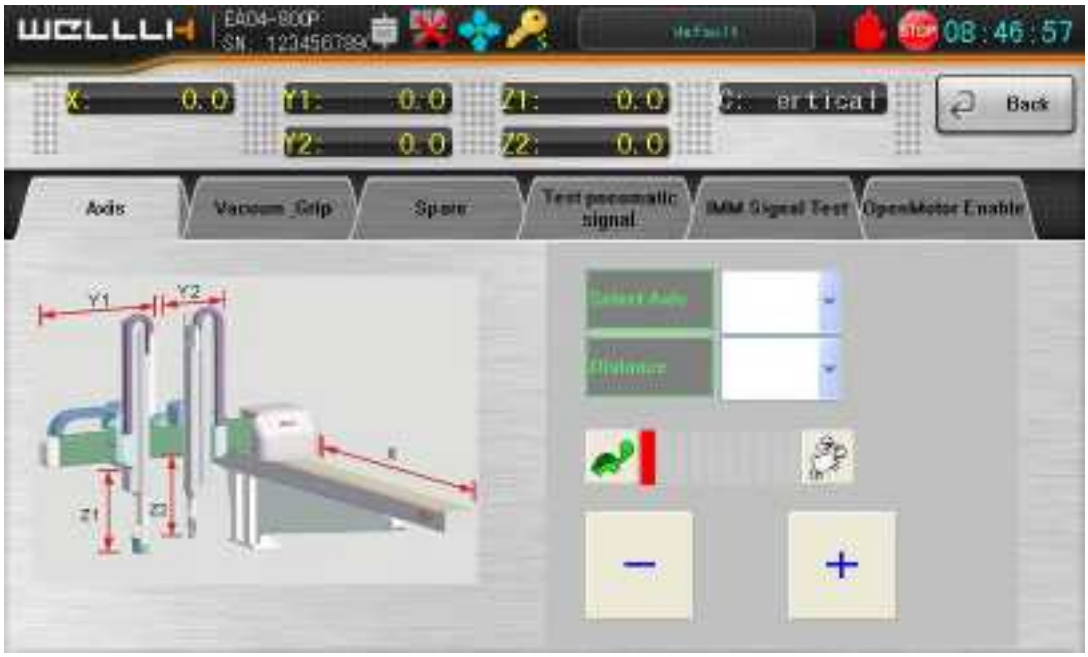
Here the Robot User can view various I/O signals from the robot, IMM, and any spare or auxiliary interfaced equipment. Robot outputs are shaded in grey and robot outputs are shaded in pink.

When a signal becomes activated, the grey square next to the signal will turn green.

7.0 Manual

The Manual Tab allows the Robot User to manually move all the robot's axis, turn on/off vacuum and gripper circuits, turn on/off any spare output signals, and allows the Robot User to clear over-stroke alarms.

When the Manual Tab is selected, the following display will appear on the HMI:



WARNING

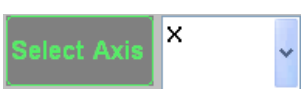
Prior to operation, please confirm nobody is in the robot work area

Failure to ensure these safety measures, may lead to production accident, and/or very serious injury. Please take notice.

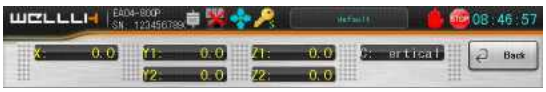
Please refer to the following three (3) outlined steps taken to ensure proper technique:

7.1 Manual Axis Operation:

1. Select the Axis you would like to move in the dropdown menu or click the axis coordinate on the top of the screen.



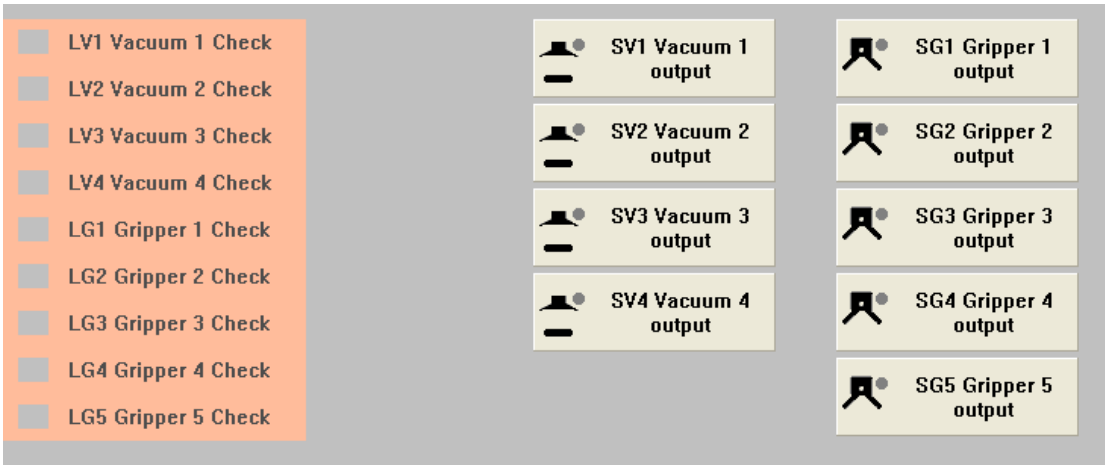
OR



2. Set Distance by selecting the best option provided by the dropdown menu (pictured to the right) or by manual input. The axis can only move the distance cited, so be diligent to press the “move button” every time. The distance “0” is unlimited movement.

3. To set the speed at which the axis is running, look to the display screen to see an image like the one pictured to the right. The less number of red bars displayed = a slower running axis, while the more red bars displayed = a faster running axis.

7.2 Manual Vacuum & Grip Operation

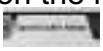


1. Select the Vacuum or Gripper output button to turn on the designated vacuum/gripper circuit.
2. If an input is triggered, a green light will appear next the respective signal in the pink input box on the left side of the HMI display.

4.3 Relieving Axis Over-Stroke Alarms

An axis minimum/maximum alarm becomes present when the robot over-strokes one of its axis' limits. This alarm is generated when the robot axis' min/max sensors travel over their respective flags. This condition can occur when the robot is moved in manual prior to resetting the robot. This condition may also occur if your axis' soft limits are greater than the available stroke of that axis.

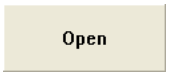
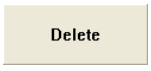
Please use the following procedure to clear your axis min/max alarm:

1. When the min/max alarm is present, select "Know" and hit the red "Stop" button to clear the alarm.
2. Once the alarm is cleared, please select the "FN" or "Lang" key to enable the robot's motors.
3. Once the motors re-enabled, select the "Manual" tab on the robot's main screen. Once in manual, select the "Open Enable Motor" tab. 
4. Once the "Open Enable Motor" tab has been selected, select the "Open Enable Motor" soft key. 
5. Once the soft key has been pressed, you will notice the axis value colors on the top of the HMI will go from yellow to grey/white.
6. Now while still in the Manual Function, select "Axis" and move your axis in the direction in which you need to move to relive the alarm.
7. Once the axis has been moved, select the "Reset" key located at the bottom of the robot's main screen.
8. After resetting the robot, ensure the robot is at its home position and then resume normal robot operations.

5.0 Program

The Program Tab allows the robot user to open existing programs, copy, rename, and delete programs as well as upload and download programs to a USB thumb drive.

When the Program Tab is selected, the following display will appear on the HMI:

- Select where you would like to save or load your robot program 
- Open the selected program to set as the current program 
- Create a new program and label its corresponding name 
- Save program selected as a different name (used to copy programs) 
- Delete the Local program selected. 

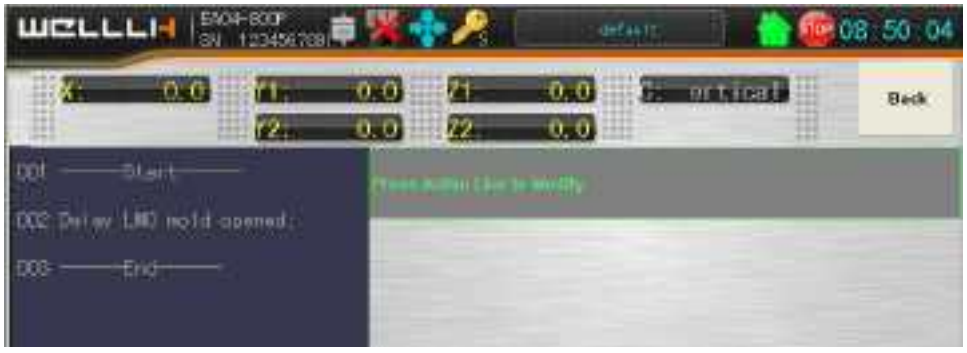
Helpful Hint:

When creating a new program, it is easiest for the Robot User to select the “Teach Tab” instead of creating a new program in the “Program Tab”.

6.0 Modify

Selecting the Modify Tab allows the Robot User to modify program lines of the current open program. The robot user can modify the program while the robot is stationary or in Autorun mode.

When the Modify Tab is selected, the following display will appear on the HMI:



Modifying The Open Robot Program

1. Select the program line you would like to modify by selecting that particular program line.

2. The robot user now has the option to modify that program line.

3. To increase decrease delay times, select the Delay setting and input your desired delay time. 

4. To increase/decrease axis positions, select the position setting and modify the axis position by 1mm or .1mm at a time. 

5. To increase/decrease speeds of that program line, select the speed setting and adjust it accordingly. 

6. When the modifications are finished, select Save. 

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7.0 Robot Alarm Troubleshooting Guide

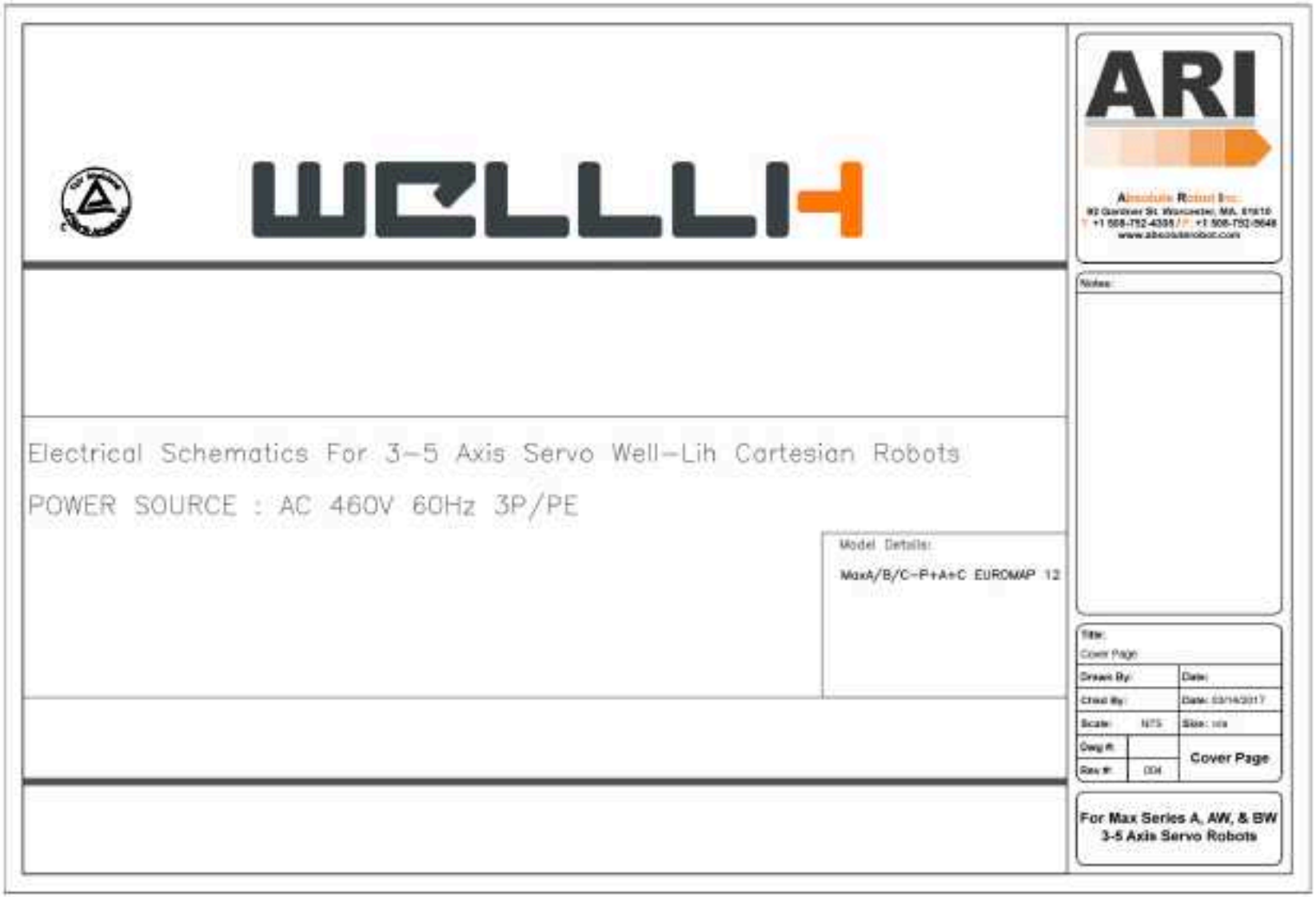
No.	Name	Detail	Failure Type	Cause	Corrective Action
0	X: Z-axis is not at origin	When the function of "Traverse In Mold" is Enabled, X axis can't move to out of Origin area	Operation error	When the function of "Traverse In Mold" is Enabled, X axis can't move to out of Origin area if Z axis is not at the Origin.	Move X Axis back to origin
1	X: Z-axis is not at origin and forbiding Traverse In Program	When the axis is not at the Origin, function of "Traverse In Mold" is Enabled, X axis can't move if Z axis is not at the Origin.	Operation error	When the function of "Traverse In Mold" is Enable, X axis can't move if Z axis is not at Origin.	Disable the traverse in Module or open the Traverse In Module
2	X: No mold opened signal	When IN standby, and out of Mold, robot doesn't allow X axis to move if the Mold opened signal is not received.	No Mold opened signal	1. Contact the IMM service 2. Relay board LMO has poor contact 3. 10P cable contact 20# poor contact 4. Main board can not receive the 5. No mold open signal from the IMM	1. Check with service engineer 2. Change Board 3.Change board 4. Change the Main board cable 5. Check the IMM
3	Z: C axis Horizontal, Forbid fall down.	When C Action In Mold is disabled, the action is disabled	Operation error	When C Action in Mold is disabled, forbids the arm to fall down if action is disabled	please move the C to vertical 2. Set the C Action
4	Z: Safety Door not open, Forbid fall down.	When robot is in horizontal position and the safety door is open the robot z axis can not operate	No safety door signal	1. The relay on the IMM 2. Relay board LMD poor contact 3. 26 pin cable contact number 15 has a poor connection 4. Main board can not receive the 5. IMM safety door is not closed	1. Check relay replace if bad 2. Change the relay board. 3. Change 26 pin cable 4. Change Main board 5. Check the IMM
5	Z: X Axis position mistake, forbid fall down.	X axis not at origin	Operation error	The X axis is not at origin or place area. This prevents Z axis from moving.	Move X Axis to origin or product placed area at first, then try to move
6	Z: No mold open signal,Forbid fall down.	No mold open signal from the IMM	IMM error	1. Contact the IMM service 2. Relay board LMO has poor contact 3. 26 Pin cable contact number 20 has a poor connection 4. Main board can not receive the 5. No mold open signal from the IMM	1. Check with service engineer 2. Check the connection if its good then change Board 3. Check the connection if its good then change board 4. Change the Main board cable 5. Check the IMM
7	Target position beyond the stroke	The robot over traveled	Operation error	The drop area is beyond the stroke of the robot	Reset the target position
8	The outut of Vacuum and Grip, Forbid fall down.	If the Vacuum and Gripper output is turned on, and there is no part found the robot will inhibit Z from falling	Operation error	The robot vacuum check or gripper check is on and the vaccum or gripper signal is activated but there is no part.	Check the output signal, if no signal check the part vs gripper/suction cups.
9	C Vertical: no mold open signal	When in Standby way you get a no mold open signal	No Mold opened signal	1. Contact the IMM service 2. Relay board LMO has poor contact 3. 26 Pin cable contact number 20 has a poor connection 4. Main board can not receive the 5. No mold open signal from the IMM	1. Check with service engineer 2. Check the connection if its good then change Board 3. Check the connection if its good then change board 4. Change the Main board cable 5. Check the IMM
10	Controller test fail to communicate with the main board	The controller is not getting a signal from the CPU	No main board return signal	1. Communication fault between the controller and the CPU 2. Main board is damaged 3. There is no 5v power to the main board	1. Check the communication line between the controller and main 2. Replace the main board 3. Check the fuses if OK then change the power supply if no power present
11~14	Vacuum X haven't return signal.	Vacuum X has no signal from the vacuum cups	No return signal	1. Vacuum leak between the cups and the part. 2. Vacuum leak in air lines. 3. Part too heavy for the vacuum.	1. Check for vacuum leaks 2. Check the airlines for leaks. 3. May need to get larger vacuum cups.
15~19	Gripper X haven't return signal.	Gripper X has no signal from the grippers	No return signal	1. Gripper did not grab the part. 2. Gripper signal has a loose connection.	1. Check the part and gripper 2. Check the signal of the gripper in the manual section of the teach pad.
20	Reserved	Reserved	Reserved	Reserved	Reserved
21	X Max limit	X exceeded the max limit position	Prompt message	X axis moved to the Max limit	Please move X axis within the limit

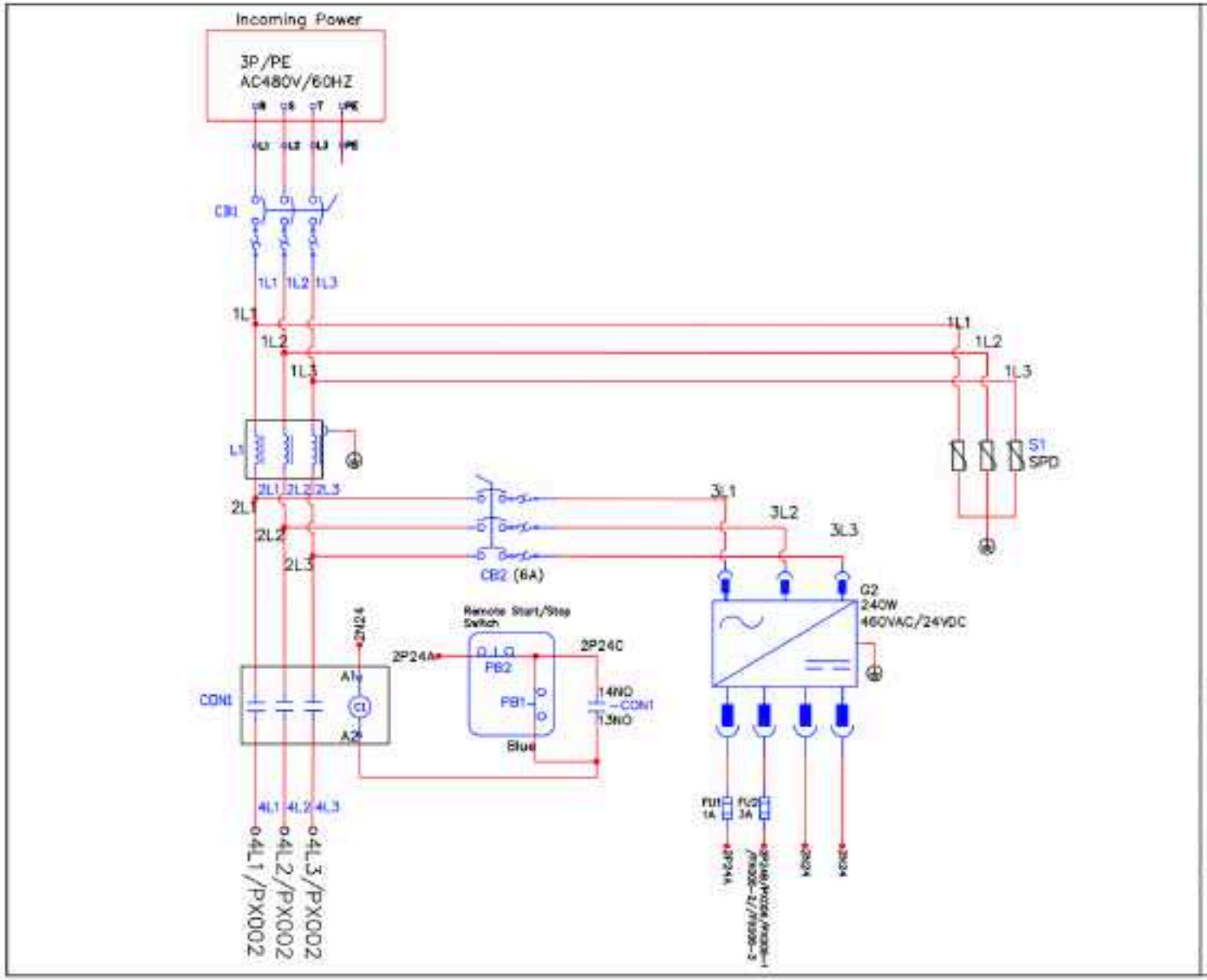
No.	Name	Detail	Failure Type	Cause	Corrective Action
22	A Max limit	A exceeded the max limit position	Prompt message	A axis moved to the Max limit	Please move A axis within the limit
23	B Max limit	B exceeded the max limit position	Prompt message	B axis moved to the Max limit	Please move B axis within the limit
24	C Max limit	C exceeded the max limit position	Prompt message	C axis moved to the Max limit	Please move C axis within the limit
25	Y1 Max limit	Y1 exceeded the max limit position	Prompt message	Y1 axis moved to the Max limit	Please move Y1 axis within the limit
26	Z1 Max limit	Z1 exceeded the max limit position	Prompt message	Z1 axis moved to the Max limit	Please move Z1 axis within the limit
27	Y2 Max limit	Y2 exceeded the max limit position	Prompt message	Y2 axis moved to the Max limit	Please move Y2 axis within the limit
28	Z2 Max limit	Z2 exceeded the max limit position	Prompt message	Z2 axis moved to the Min limit	Please move Z2 axis within the limit
29	X Min limit	X exceeded the min limit position	Prompt message	X axis moved to the Min limit	Please move X axis within the limit
30	A Min limit	A exceeded the min limit position	Prompt message	A axis moved to the Min limit	Please move the A axis within the limit
31	B Min limit	B exceeded the min limit position	Prompt message	B axis moved to the Min limit	Please move B axis within the limit
32	C Min limit	C exceeded the min limit position	Prompt message	C axis moved to the Min limit	Please move C axis within the limit
33	Y1 Min limit	Y1 exceeded the min limit position	Prompt messag	Y1 axis moved to the Min limit	Please move Y1 axis within the limit
34	Z1 Min limit	Z1 exceeded the min limit position	Prompt message	Z1 axis moved to the Min limit	Please move Z1 axis within the limit
35	Y2 Min limit	Y2 exceeded the min limit position	Prompt message	Y2 axis moved to the Min limit	Please move Y2 axis within the limit
36	Z2 Min limit	Z2 exceeded the min limit position	Prompt message	Z2 axis moved to the Min limit	Please move Z2 axis within the limit
37	Reserved	Reserved	Reserved	Reserved	Reserved
38	Reserved	Reserved	Reserved	Reserved	Reserved
39	Reserved	Reserved	Reserved	Reserved	Reserved
40	Reserved	Reserved	Reserved	Reserved	Reserved
41	Robot Emergency Stop Button is Pressed	The estop on the pendant has been depressed	Prompt message	Check the emergency stop button	Please reposition Emergency Stop Button
42	The emergency stop of IMM is Pressed	The estop on the IMM has been depressed	Prompt message	1. Check the emergency stop button on the IMM. 2. Check for 24 volt power on the relays	1. Please reposition the Emergency Stop Button 2. Change the power supply or the relays
43	Wait timeout of mold-open signal	The robot did not receive the mold open signal	Prompt message	1. Contact the IMM service 2. Relay board LMO has poor contact 3. 26 Pin cable contact number 20 has a poor connection 4. Main board can not receive the 5. No mold open signal from the IMM	1. Contact the IMM service 2. Check the connection if its good then change Board 3. Check the connection if its good then change board 4. Change the Main board cable 5. Check the IMM
44	no injection signal	This function is not used in the USA	Not used		
45	Discover the Reject products	The robot received a reject signal from the machine	Prompt message	Received defective part signal from the IMM	Check the settings on the IMM.
46	Try to start the motor without power-on	Moter not energized	Operation error	Turn on the drives	Turn on the drives
47	Axis position abnormal	The position of one of the axis is wrong	Machine Error	Axis position has a bad with signal	Please check the arm fault and reset robot
48	Pneu axis position abnormal	The pneumatic axis is in the wrong position	Machine Error	1. There is no signal from the pneumatic axis 2. The signal is not received on the 3. The robot axis is not correct	1.Check air supply 2. Check the sensor. 3. Put the axis in the correct position
49	Can't Reset because of no mold open signal.	Mold open signal missing from the IMM	No Mold open signal	1. Contact the IMM service 2. Relay board LMO has poor contact 3. 26 Pin cable contact number 20 has a poor connection 4. Main board can not receive the 5. No mold open signal from the IMM	1. Check with service engineer 2. Check the connection if its good then change Board 3. Check the connection if its good then change board 4. Change the Main board cable 5. Check the IMM
50	No robot Automatic Run signal	The machine does not have the automatic signal	No Automatic Run signal	1. IMM robot function not on 2. Contact the IMM service 3. Check the relay board LMO has a poor contact 4. 26 Pin cable contact number 20 has a poor connection signal	1. Enable robot use on the IMM 2. Contact the IMM service 3. Check the connection if its good then change Board 4. Check the connection if its good then change board 5. Change the Main board cable

No.	Name	Detail	Failure Type	Cause	Corrective Action
51	Z1 axis is not at the origin	Z1 axis is not at the origin position	Operation error	Z1 axis is out of position	In manual move the Z axis up then press the home position button
52	Y1 axis is not at the origin	Y1 axis is not at the origin position	Operation error	Y1 axis is out of position	Press the home position button
53	X axis is not at the standby position	X axis is not at the origin position	Operation error	X axis is out of position	Press the home position button
54	Z2 axis is not at the origin	Z2 axis is not at the origin position	Operation error	Z2 axis is out of position	In manual move the Z axis up then press the home position button
55	Y2 axis is not at the origin	Y2 axis is not at the origin position	Operation error	Y2 axis is out of position	Press the home position button
56	C axis is not at the standby position	C axis is not at the origin position	Operation error	C axis is out of position	Press the home position button
57	Reset timeout	While resetting the robot timed	Prompt message	Robot took too long to reset	Adjust the reset speed or time
58	Cycle timeout	Cycle time is longer than the timer settings	Prompt message	Cycle time is greater than the setpoint	Adjust the autorun speed and or the timeout time
59	Step action Timeout	Step time is longer than the step timer settings	Prompt message	Step time is greater than the setpoint	Adjust the step run timeout time
60	The Safety Door open in Autorun	The IMM safety door was opened during the run cycle	Prompt message	The Safety Door open is opened on the IMM	Close the safety door on the IMM
61	Mold open signal interrupt	Finish open Mold but robot don't receive the mold open signal	Machine Error	IMM did not send the mold open signal	Check that the mold open reached its position on the IMM
62	Ejector back Timeout	IMM ejectors did not reach their back position	Prompt message	IMM fault ejectors did not retract in time	Check eject retract timer
63	Disenable function of C action in mold	When C Action in Mold is disable, try to move C axis in Mold area	Operation error	C axis action is disabled	Enable C action in mold function
64	reserved	Reserved	Reserved	Reserved	Reserved
65	There is no standby signal and Z axis isn't at Origin	When down Standby is enable, Z axis can not move	Machine Error	The macine is not at it home position	Reset robot
66	Reserved	Reserved	Reserved	Reserved	Reserved
67	Robot nouse, Please press the use/nouse switch to enable robot.	The robot is in no use function	Operation error	When Use Switch is Off, try to reset robot	Toggle the Use Switch and reset robot
68	Robot must be nouse at safety position and IMM safe	Arm is not in a safe position	Operation error	1. Try to turn off Use Switch	Move arm to safety position and turn off the toggle switch
				2. Z axis arm is down	2. Move the Z axis in manual to the 0 position
69	X axis Start position signal is abnormal	X axis is not in the proper start position	Operation error	Check the start position	Reset the robot or press return to home position
			Origin or placed position abnormal	1. Sensor position wrong 2. I/O board SR1H has poor contact 3. I/O board LR1H has poor contact 4. 25 Pin Cable poor contact	1. Rewire the sensoor 2. Check for a poor connection. If still a problem replace the I/O board 3. Check for a poor connection. If still a problem replace the I/O board 4. Rewire or replace the 25 pin connector cord
			Machine Error	Servo response is slow	Adjust the servo parameter
70	Pneumatic axis motion Overtime	A or C axis did not move in time	Prompt message	Pneumatic axis motion time is greater than STE time	1. Check the cylinder to make sure it moves freely 2. Increase the STE time.
71	X axis product placed signal is abnormal	X axis product place signal is not correct	Signal abnormal	1. Sensor position is wrong 2. I/O board LP3 has poor contact 3. 25P Cable has poor contact	1. Adjust the sensor position 2. Check for a poor connection. If still a problem replace the I/O board 3. Rewire or replace the 25 pin connector cord
			Machine Error	1. Servo response is slow	Adjust the servo parameter
72	X axis origin signal is abnormal	X axis origin signal is not correct	Signal abnormal	1. Sensor abnormal 2. I/O board LZ1 has poor contact 3. 25P Cable has a poor connection 4.Main board is not receiving the	1. Rewire the sensoor 2. Check for a poor connection. If still a problem replace the I/O board 3. Change 26 pin cable 4. Change Main board

No.	Name	Detail	Failure Type	Cause	Corrective Action
73	Z axis origin signal is abnormal	Z axis origin signal is not correct	Signal abnormal	1. Sensor abnormal 2. I/O board IZ1 has poor contact 3. 25P Cable has a poor connection 4.Main board is not receiving the	1. Rewire the sensor 2. Check for a poor connection. If still 3. Change 26 pin cable 4. Change Main board
			Machine Error	Servo response time is slow	Adjust the servo parameter
74	Product placed and origin signal exist together on X axis	Product placed and x axis signal exist at the same time	Machine Error	1. The signal wiring is wrong 2. Product placed or origin sensor has a short circuit	Check the circuit
75	C axis horizontal signal interrupt	C axis did not receive the horizontal signal	Machine Error	1. Lost the air pressure 2. Part is too heavy for the C axis 3. C axis moves too slow 4. Main board can not receive the signal	Check circuit fault
76	C axis vertical signal interrupt	C axis did not receive the vertical signal	Machine Error	1. Lost the air pressure 2. Part is too heavy for the C axis 3. C axis moves too slow 4. Main board can not receive the signal	Check circuit fault
77	Stack Number shouldn't be Zero.	Stack value is set to 0	Operation error	1. The robot received the wrong add to stack signal 2. The wrong action occurred 3. Sensor and part did not teach correctly abnormal stack end	1. Check the robot stack settings 2. Check the robot for a fault 3. Adjust the sensor and the metal plate
78	Reset unfinished, please check the shake of axes.	Reset abnormal	Machine Error	1. The robot did not finish the reset function 2. The reset function took too long 3. One of the Axises are outside the limits	1. Check which axis did not finish the reset 2. Adjust the reset timer or increase the reset speeds 3. Adjust the offset values
79	Not teach stack end mark	Missing the stack end command	Operation error	The teach step is abnormal the stack end not reached	Add the end mark in program
80	Not teach Check place product end mark	Missing the product end command	Operation error	The teach step is abnormal the product end mark not reached	Add the end mark in program
81	Teach check place product abnormally	The product drop area is not correct	Operation error	Check the drop area settings so they are within the drop area limits	Check the sampling and test settings for proper X axis settings
82	Stack position Not locate product placed	The product place area is outside the limits	Operation error	Stack position did not locate product place value	Reprogram the product place value within the limits
83	Servo driver alarm	Servo drive has a fault	Operation error	Servo drive error	Check the servo drive code and call service
84	Communication test fail with servo, please Power on again	Controller sent the signal to servo, but it did not receive return signal	No servo return signal	1. Communication fault between the 2. Servo address is wrong 3. Servo delay time is not correct	1. Check the communication cable 2. Check the servo address 0C00 3. Check the servo delay time
85	Not allow to down without middle—mold signal	Z not allowed to go down without the mid mold signal from the IMM	No middle mold signal given	1. Relay board not getting the signal 2. IMM not giving the signal 3. Main board is not receiving the 4. The position of the sensor signal is not correct	1. Rewire the sensor 2. Check the IMM to make sure the signal is activated 3. Change the main board 4. Adjust the position of the sensor
86	Not receive the mold closed signal	Don't receive the mold close signal from IMM	No Mold closed signal	1. Signal circuit fault 2. Check the IMM for mold close signal	1. Check circuit fault 2. Check the contact or IMM service
87	The motion segments controled by servo are	Servo drive has a fault	Prompt message	The signal for the servo is creating a fault	Check the circuit fault
88	Mold opened and mold closed signal exist together	System receive Mold opened and Mold closed signal at the same time	Machine Error	IMM signal is shorted out	Check wiring
89	non Defined Err Happen, please contact with The Server	Unknow error occurred	Prompt message	Contact service robot has an unknown error	Call service

No.	Name	Detail	Failure Type	Cause	Corrective Action
90	X axis Not In Product Placed Area when Stand out of Program	X axis is not in the proper start position	Operation error	X axis Not In Product place area during standby	Standby must be at Product Placed Area
91	Limited Distance Set Wrong	The setting for the limits are not correct	Operation error	Check the limit position	Change the set of Software limits
92	Trying Dangerous Action or motor fault, Please Reset Robot	The action being performed is not safe	Machine Error	The action is not safe to perform	Reset the robot
93	IMM Sign Output TimeOut	Robot don't receive return signal from the IMM	No IMM output	Check the IMM signal	Contact the IMM service department
94	Low air pressure, please check the air supply.	Robot did not receive the signal for the air pressure	Air pressure under 0.4Mpa	1. Air line is too small 2. Air pressure is too low	1. Change the air line 2. Increase the air pressure
			Circuit fault	I/O board is not getting AIR Pressure signal	Turn on the air or Change the I/O board
			Sensor fault Main Board	1. Sensor Fault 2. Main board did not receive the signal	1. Clean Sensor circuit or Change Sensor 2. Change main board
95	Not allow to down When has Grip or Vacuum On	Z axis is not allowed to move over mold when the vacuum or gripper is on	Operation error	The signal is on.	Turn off the vacuum and/or gripper signal prior to going into the mold
96	Motor position arrive limited data bit, please	Servo drive has a fault	Operation error	Contact service robot has an unknown error	Contact the Service department
97	Motor is not power on.	System did not receive the Motor power on signal	Prompt message	Voltage too low	Check power
98	Protective Door is opened	IMM door is not closed	Prompt message	Check the IMM door	Close the safety door on the IMM


WELLLIH
ARI
Electrical Schematics For 3-5 Axis Servo Well-Lih Cartesian Robots
POWER SOURCE : AC 460V 60Hz 3P/PE
Model Details:
MaxA/B/C-P+A+C EUROMAP 12
Notes:
Title:
Cover Page
Drawn By:
Date:
Check By:
Date: 03/14/2017
Scale: NTS
Size: n/a
Dwg #:
Rev #: 004
Cover Page
For Max Series A, AW, & BW
3-5 Axis Servo Robots



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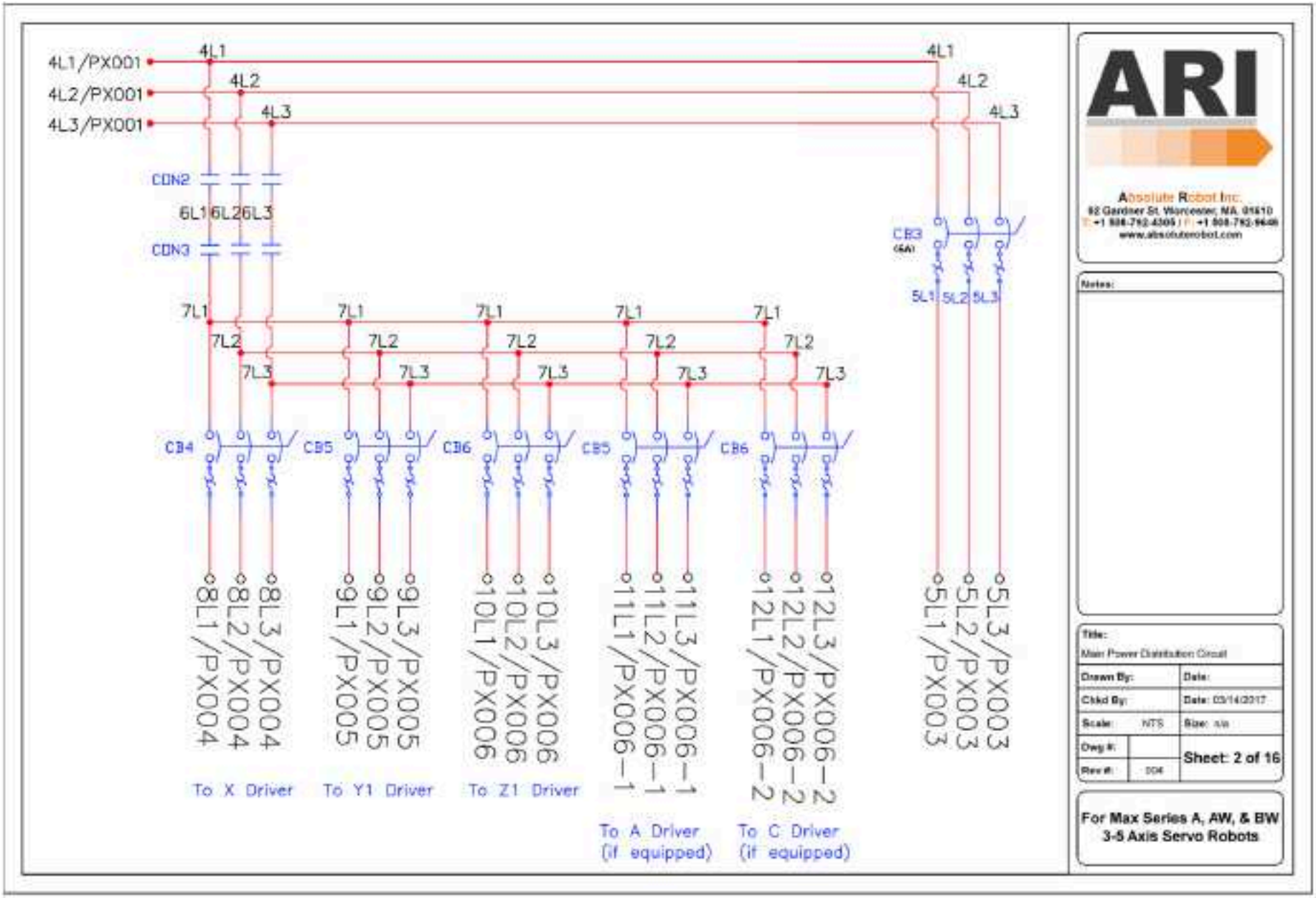
Notes:

Title: Main Power	
Drawn By:	Date:
Chkd By:	Date: 03/14/2017
Scale: NTS	Size: n/a
Dwg #:	Sheet: 1 of 16
Rev #: 004	

For Max Series A, AW, & BW 3-5 Axis Servo Robots



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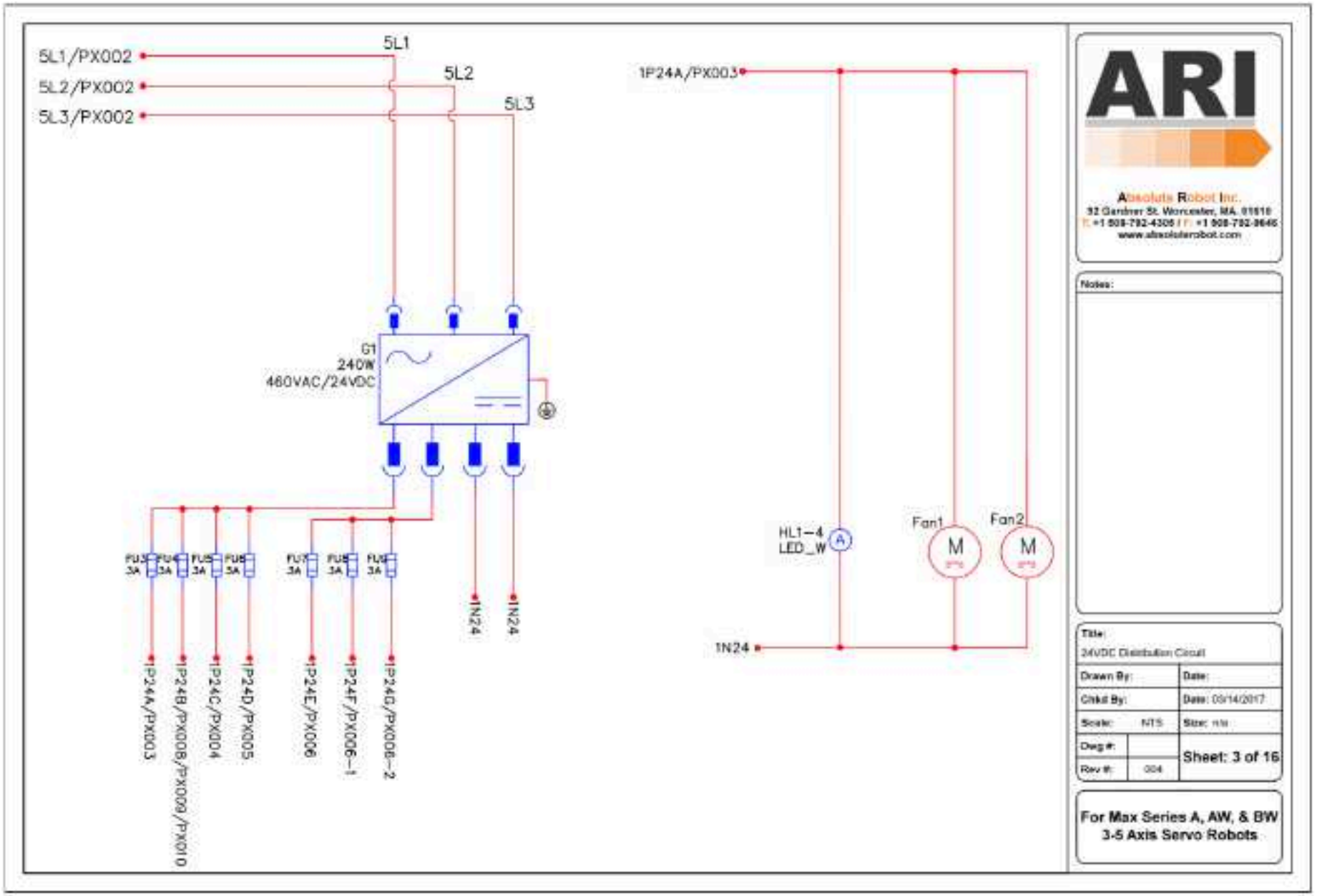
Notes:

Title: Main Power Distribution Circuit	
Drawn By:	Date:
Chkd By:	Date: 03/14/2017
Scale: NTS	Size: n/a
Dwg #:	Sheet: 2 of 16
Rev #: 004	

For Max Series A, AW, & BW 3-5 Axis Servo Robots


5L1/PX002
5L2/PX002
5L3/PX002
5L1
5L2
5L3
G1
240W
460VAC/24VDC
FU3 3A
FU4 3A
FU5 3A
FU6 3A
FU7 3A
FU8 3A
FU9 3A
1N24
1N24
1P24A/PX003
1P24B/PX008/PX009/PX010
1P24C/PX004
1P24D/PX005
1P24E/PX006
1P24F/PX006-1
1P24G/PX006-2
1P24A/PX003
HL1-4
LED_W
A
Fan1
Fan2
M
M
1N24
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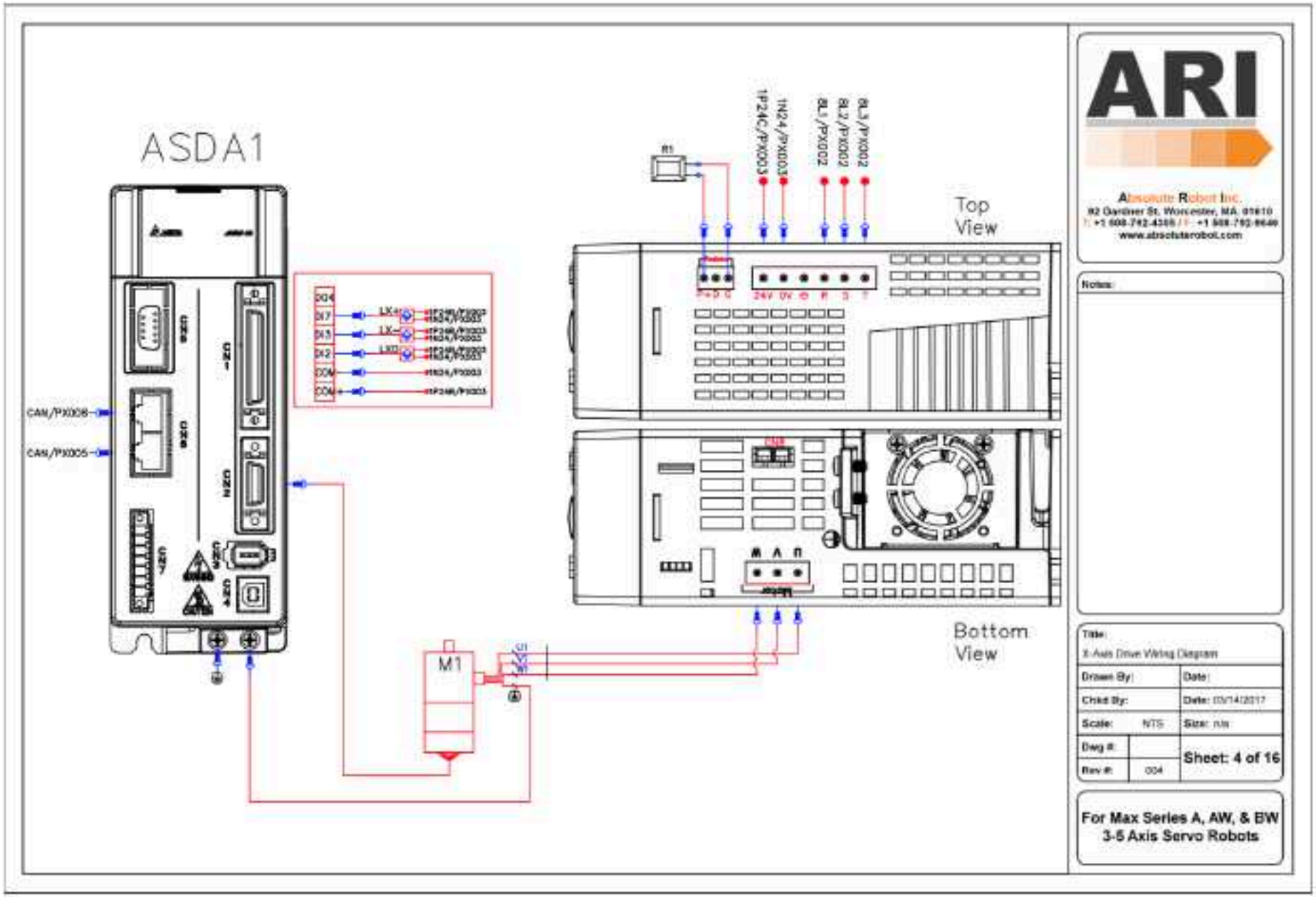
Notes:
Title:
24VDC Distribution Circuit
Drawn By:
Date:
Chkd By:
Date: 03/14/2017
Scale: NTS
Size: n/a
Dwg #:
Rev #: 004
Sheet: 3 of 16
For Max Series A, AW, & BW
3-5 Axis Servo Robots


ASDA1
CAN/PX006
CAN/PX005
M1
Top View
Bottom View
1P24C/PX003
1N24/PX003
BL1/PX002
BL2/PX002
BL3/PX002
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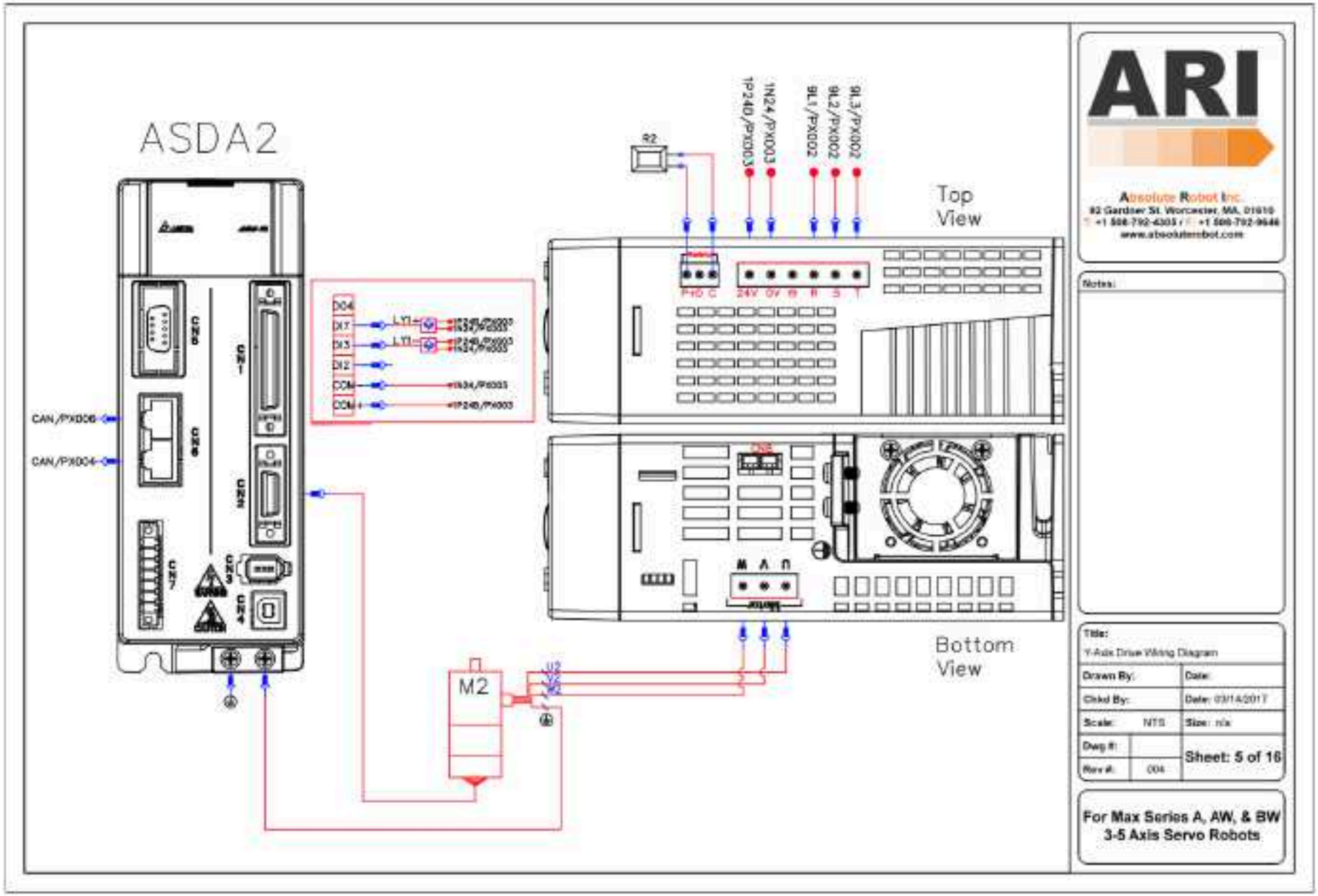
Notes:
Title:
X-Axis Drive Wiring Diagram
Drawn By:
Date:
Chkd By:
Date: 03/14/2017
Scale: NTS
Size: n/a
Dwg #:
Rev #: 004
Sheet: 4 of 16
For Max Series A, AW, & BW
3-5 Axis Servo Robots


ASDA2
CAN /PX006
CAN /PX004
M2
Top View
Bottom View
1P240 /PX003
1N24 /PX003
9L1 /PX002
9L2 /PX002
9L3 /PX002
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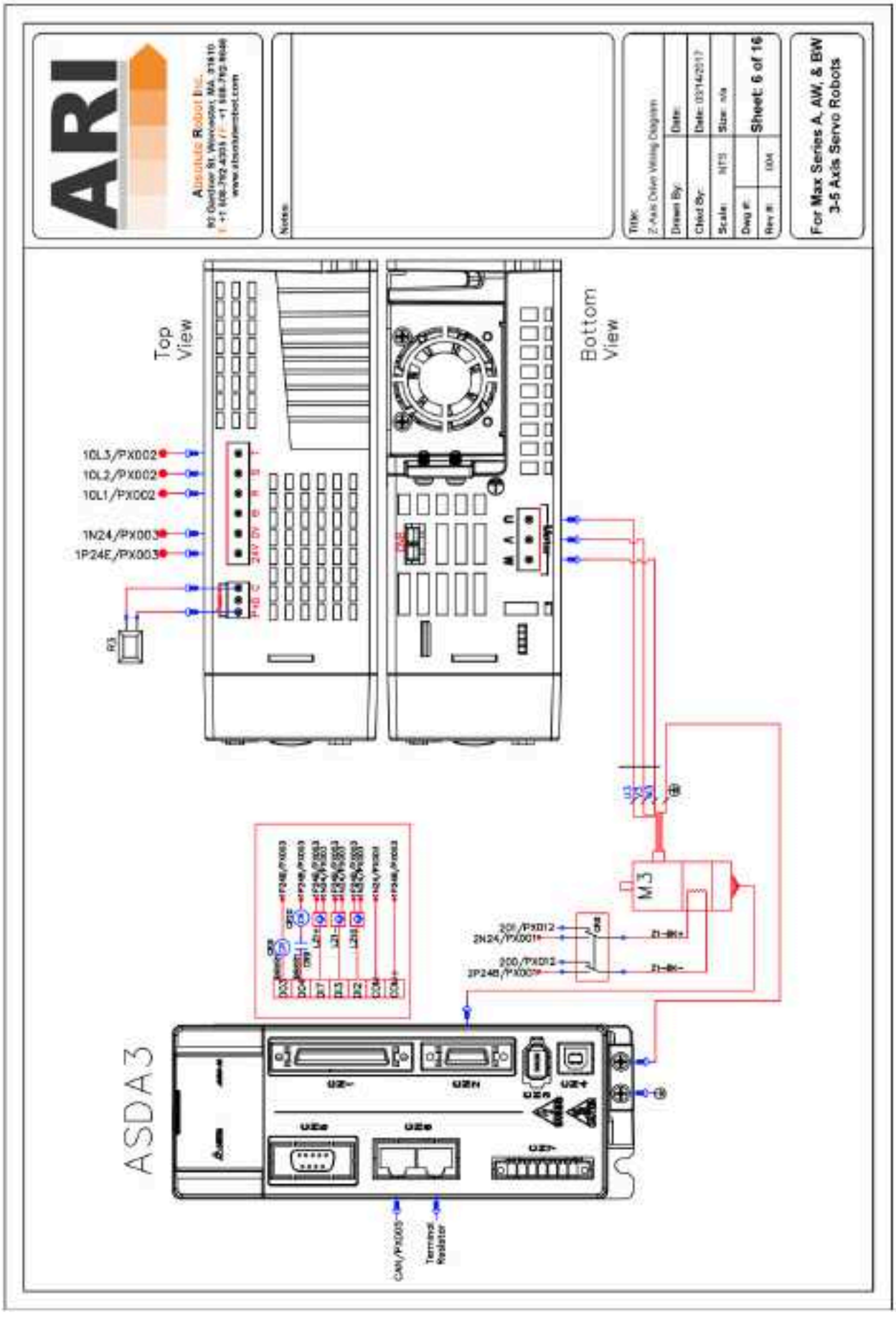
Notes:
Title:
Y-Axis Drive Wiring Diagram
Drawn By:
Date:
Chkd By:
Date: 03/14/2017
Scale: NTS
Size: n/a
Dwg #:
Rev #: 004
Sheet: 5 of 16
For Max Series A, AW, & BW
3-5 Axis Servo Robots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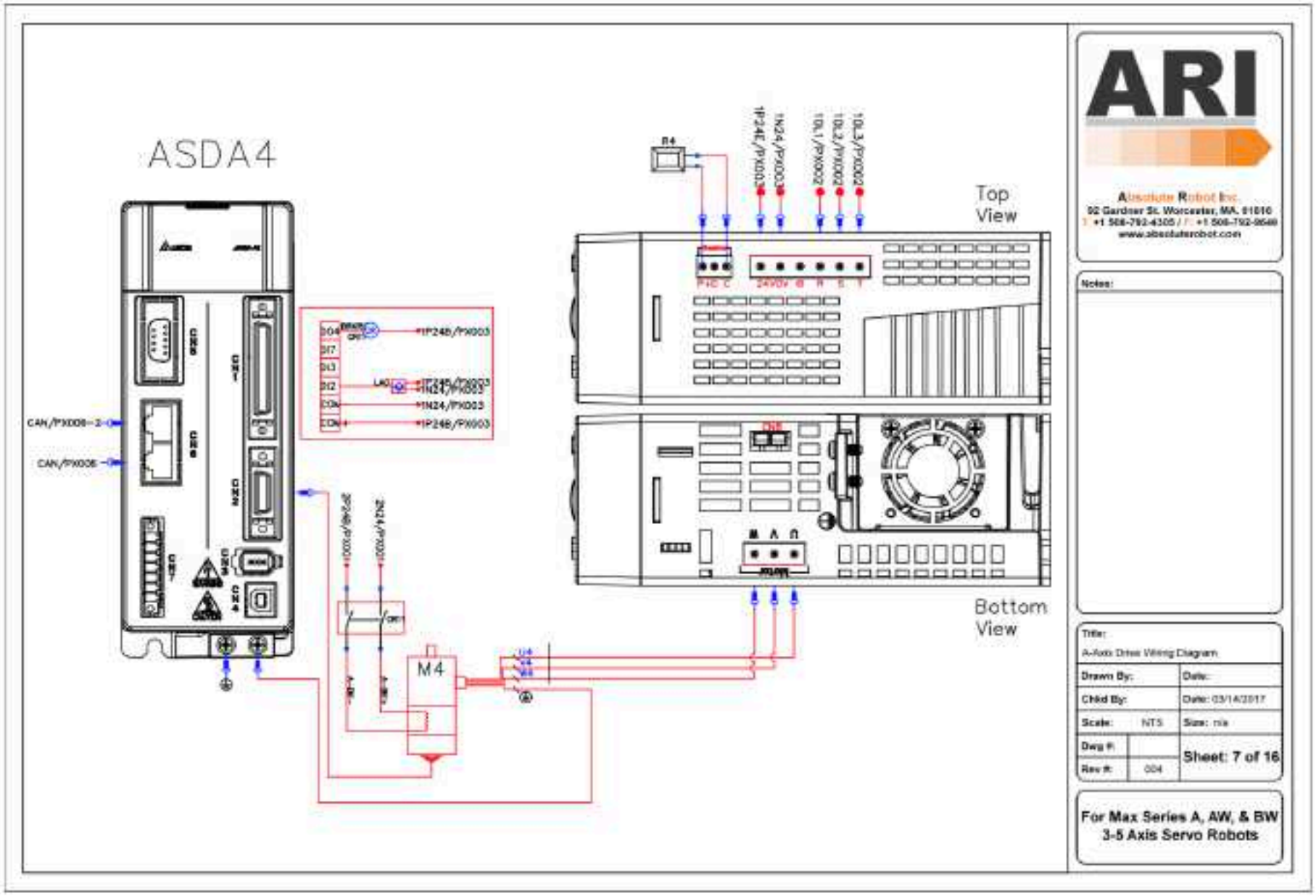
Notes:
Title:
Z-Axis Drive Wiring Diagram
Drawn By:
Date:
Chkd By:
Date: 03/14/2017
Scale:
Size: n/a
Dwg #:
Sheet: 6 of 16
Rev #:
For Max Series A, AW, & BW
3-5 Axis Servo Robots
Top View
Bottom View
1DL3/PX002
1DL2/PX002
1DL1/PX002
1N24/PX003
1P24E/PX003
M3
ASDA3
CAN/PX003
Terminal Resistor


ASDA4
CAN/PX008
CAN/PX008
M4
Top View
Bottom View
ARI
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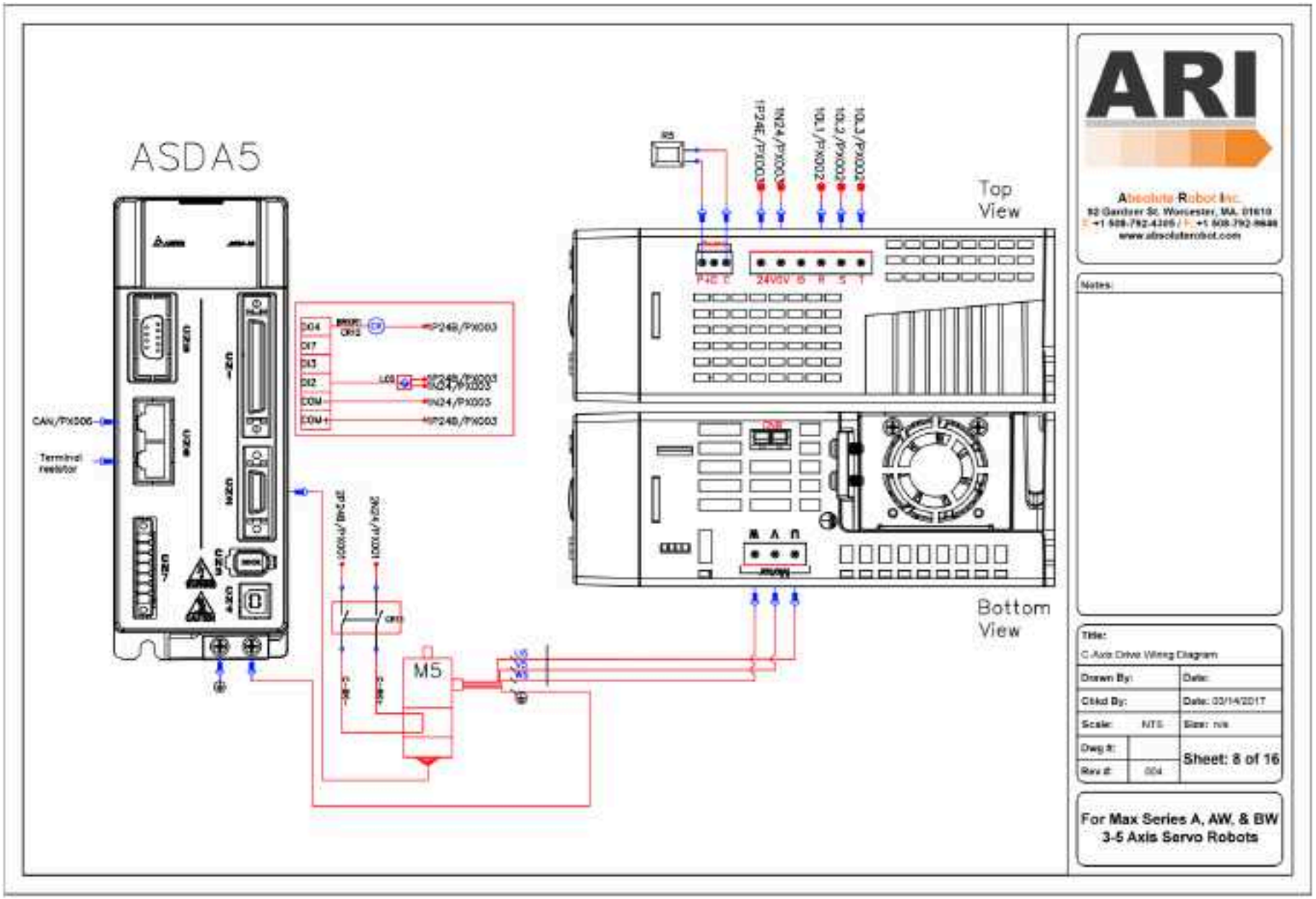
Notes:
Title:
A-Axis Drive Wiring Diagram
Drawn By:
Date:
Chkd By:
Date: 03/14/2017
Scale: NTS
Size: n/a
Dwg #:
Rev #: 004
Sheet: 7 of 16
For Max Series A, AW, & BW
3-5 Axis Servo Robots


ASDA5
CAN/PX006
Terminal resistor
M5
Top View
Bottom View
ARI
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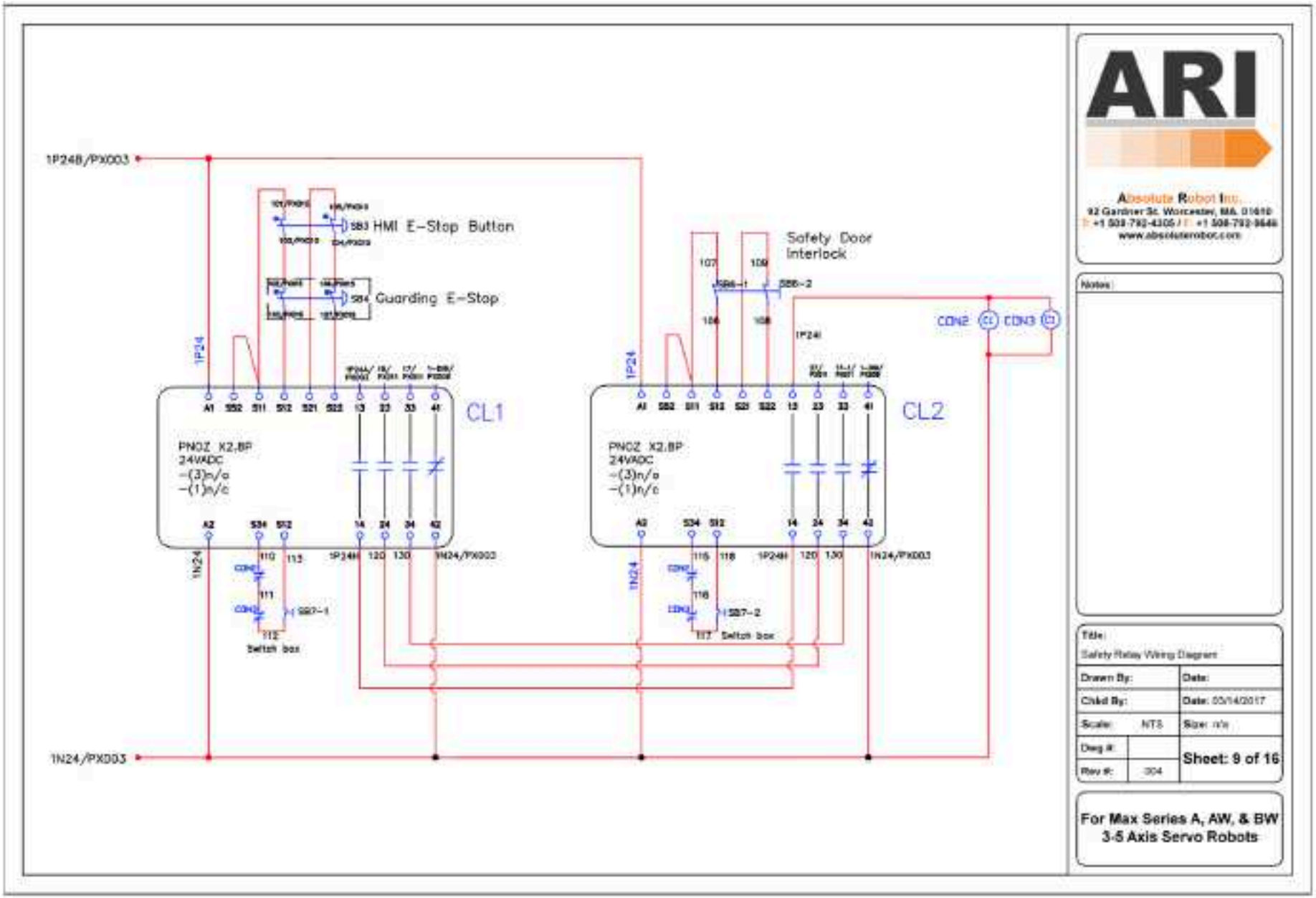
Notes:
Title:
C-Axis Drive Wiring Diagram
Drawn By:
Date:
Chkd By:
Date: 03/14/2017
Scale: NTS
Size: n/a
Dwg #:
Rev #: 004
Sheet: 8 of 16
For Max Series A, AW, & BW
3-5 Axis Servo Robots



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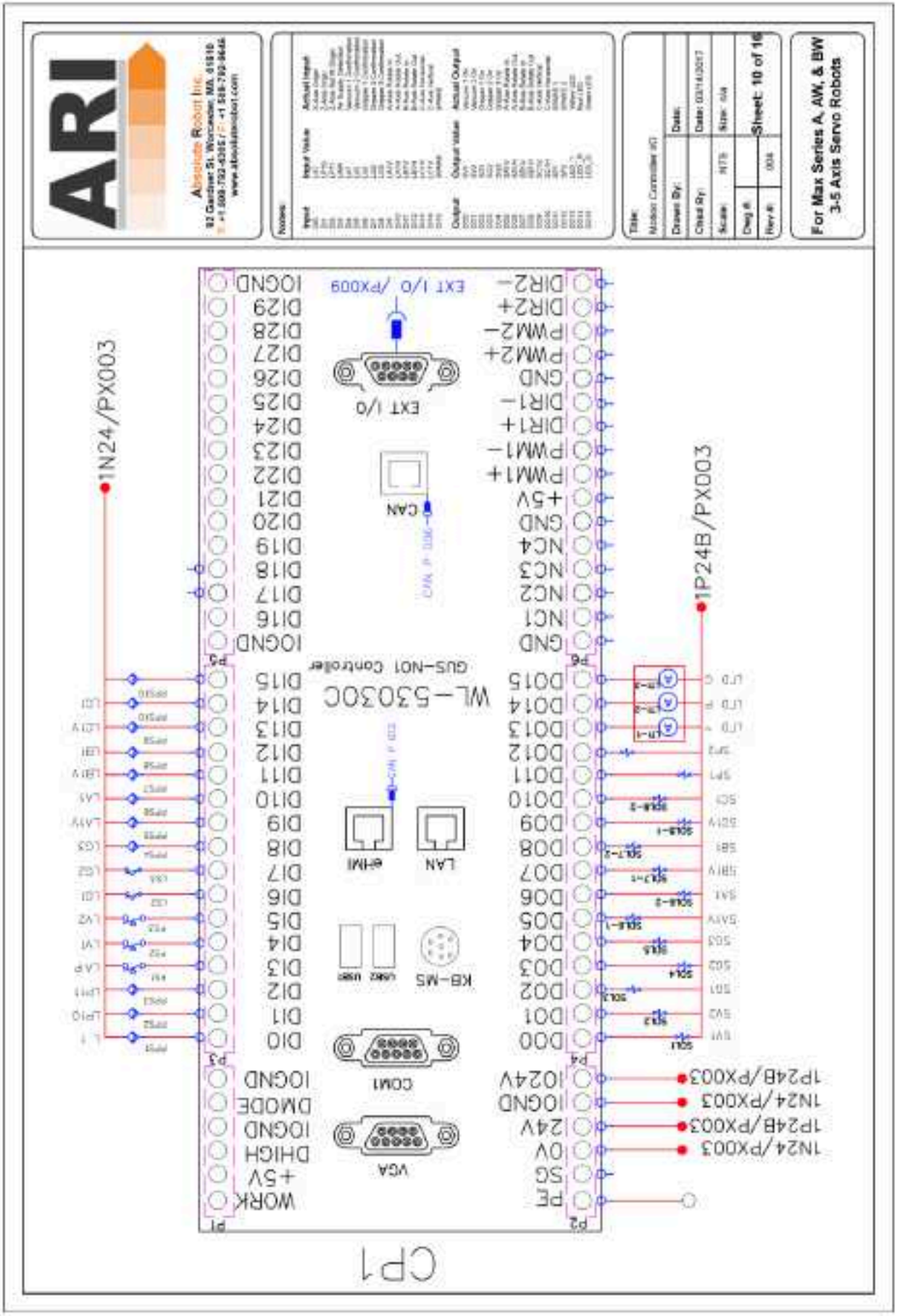
Notes:

Title:
Safety Relay Wiring Diagram

Drawn By:	Date:
Chkd By:	Date: 05/14/2017
Scale: NTS	Size: n/a
Dwg #:	Sheet: 9 of 16
Rev #: 004	

For Max Series A, AW, & BW
3-5 Axis Servo Robots


ARI
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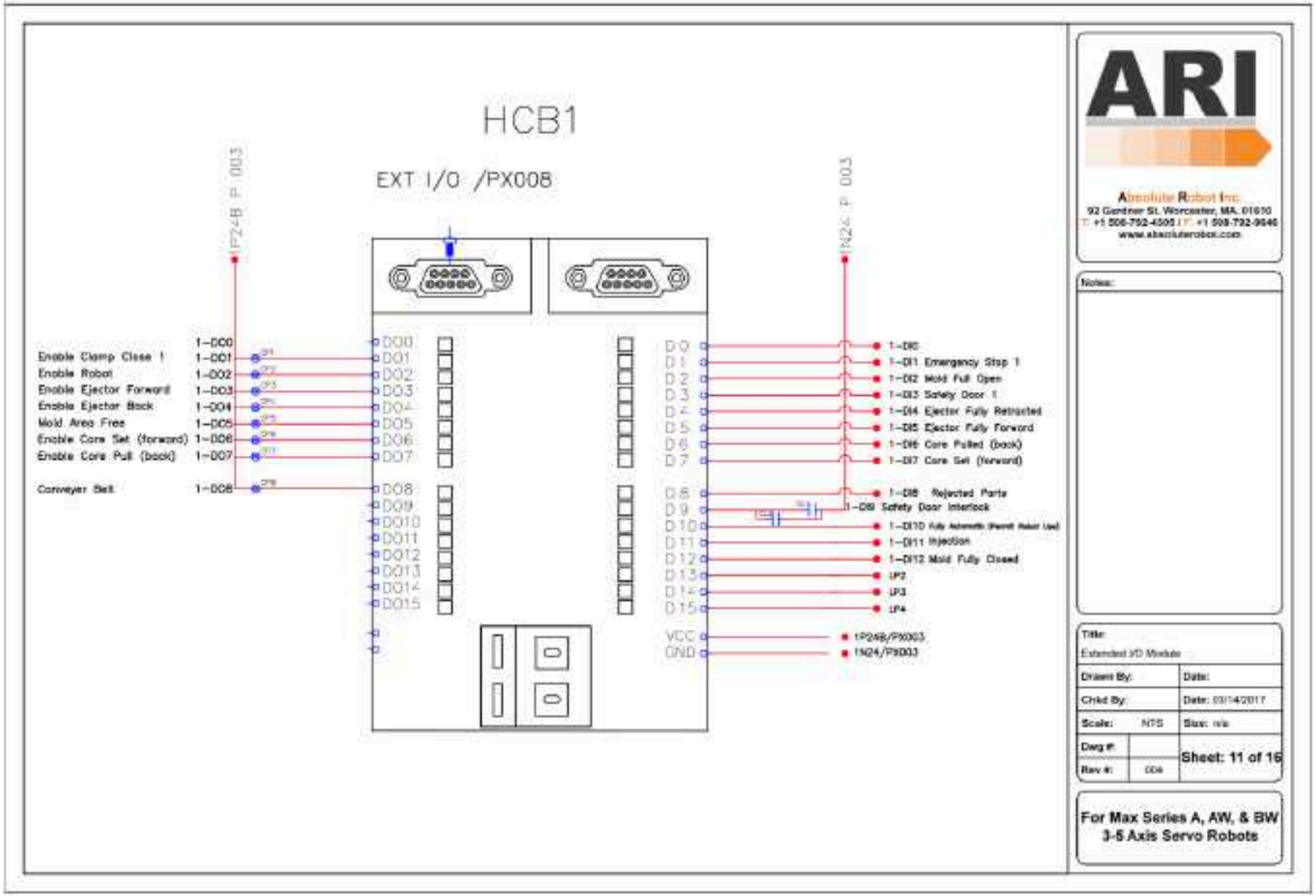
For Max Series A, AW, & BW
3-5 Axis Servo Robots
Sheet: 10 of 16
CP1
WL-530300
GUS-N01 Controller
1N24/PX003
1P24B/PX003
EXT I/O /PX009
EXT I/O
CAN
eHMI
LAN
USB1
USB2
KB-MS
COM1
VGA
P1
P2
P3
P4
P5
P6


HCB1
EXT I/O /PX008
1P24B P 003
1N24 P 003
Enable Clamp Close 1
Enable Robot
Enable Ejector Forward
Enable Ejector Back
Mold Area Free
Enable Core Set (forward)
Enable Core Pull (back)
Conveyer Belt
1-DO0
1-DO1
1-DO2
1-DO3
1-DO4
1-DO5
1-DO6
1-DO7
1-DO8
DO0
DO1
DO2
DO3
DO4
DO5
DO6
DO7
DO8
DO9
DO10
DO11
DO12
DO13
DO14
DO15
D0
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
D14
D15
VCC
GND
1-DI0
1-DI1 Emergency Stop 1
1-DI2 Mold Full Open
1-DI3 Safety Door 1
1-DI4 Ejector Fully Retracted
1-DI5 Ejector Fully Forward
1-DI6 Core Pulled (back)
1-DI7 Core Set (forward)
1-DI8 Rejected Parts
1-DI9 Safety Door Interlock
1-DI11 Injection
1-DI12 Mold Fully Closed
1P2
1P3
1P4
1P24B/P3003
1N24/P3003
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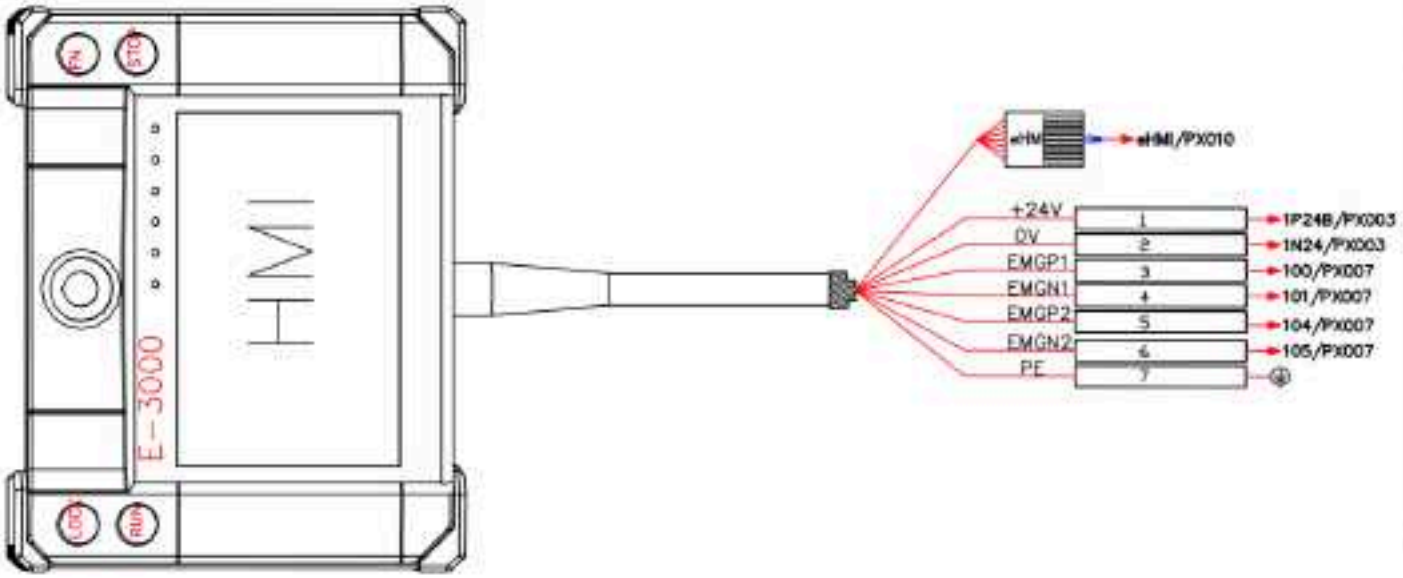
Notes:
Title:
Extended I/O Module
Drawn By:
Date:
Chkd By:
Date: 03/14/2017
Scale: NTS
Size: n/a
Dwg #:
Rev #: 004
Sheet: 11 of 16
For Max Series A, AW, & BW
3-6 Axis Servo Robots



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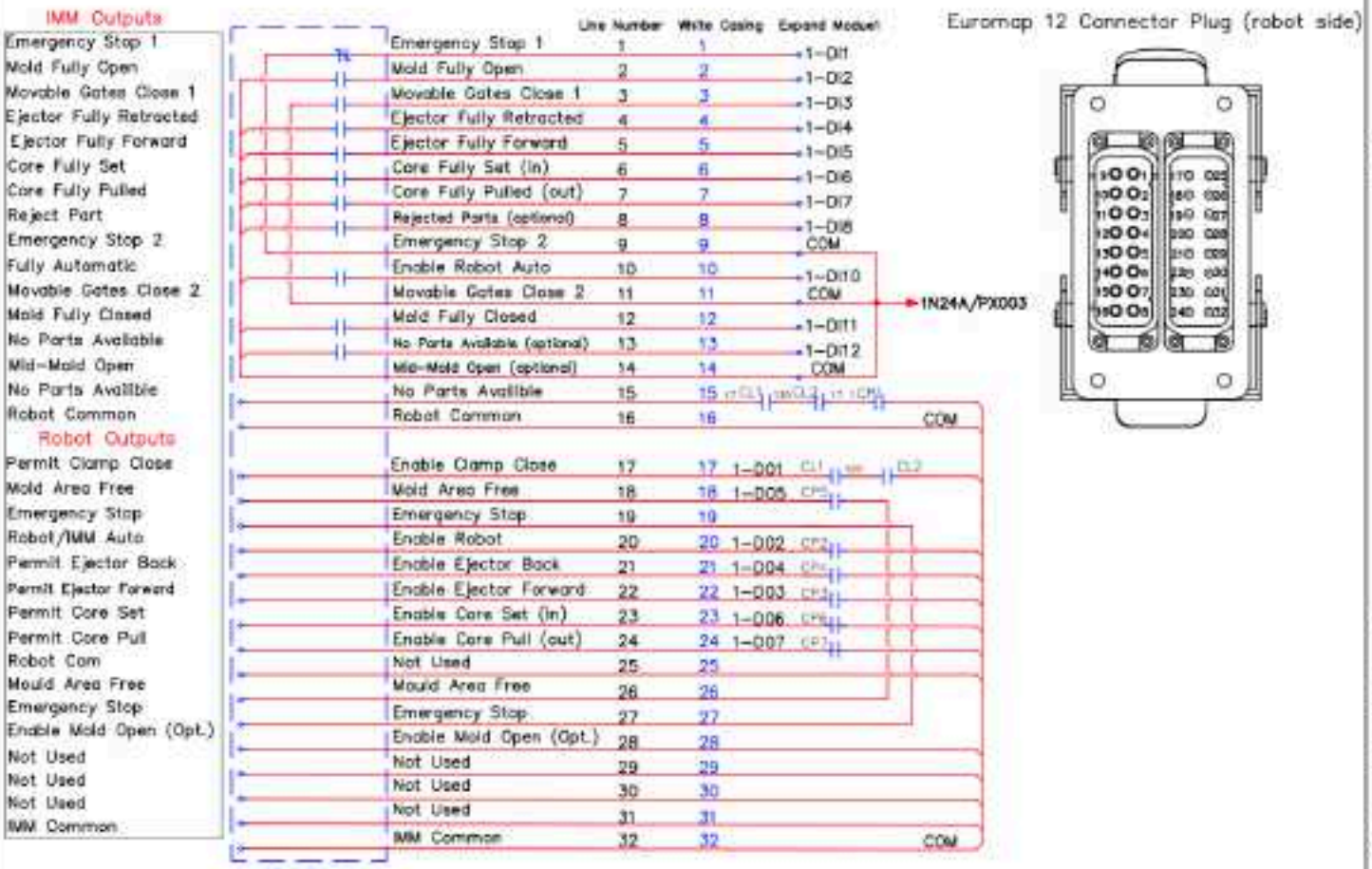
Notes:

Title: HMI/Pendant Control Wiring	
Drawn By:	Date:
Chkd By:	Date: 02/14/2017
Scale: NTS	Size: n/a
Dwg #:	Sheet: 12 of 16
Rev #: 004	

For Max Series A, AW, & BW
3-5 Axis Servo Robots

Euromap 12 robot/IMM Interface



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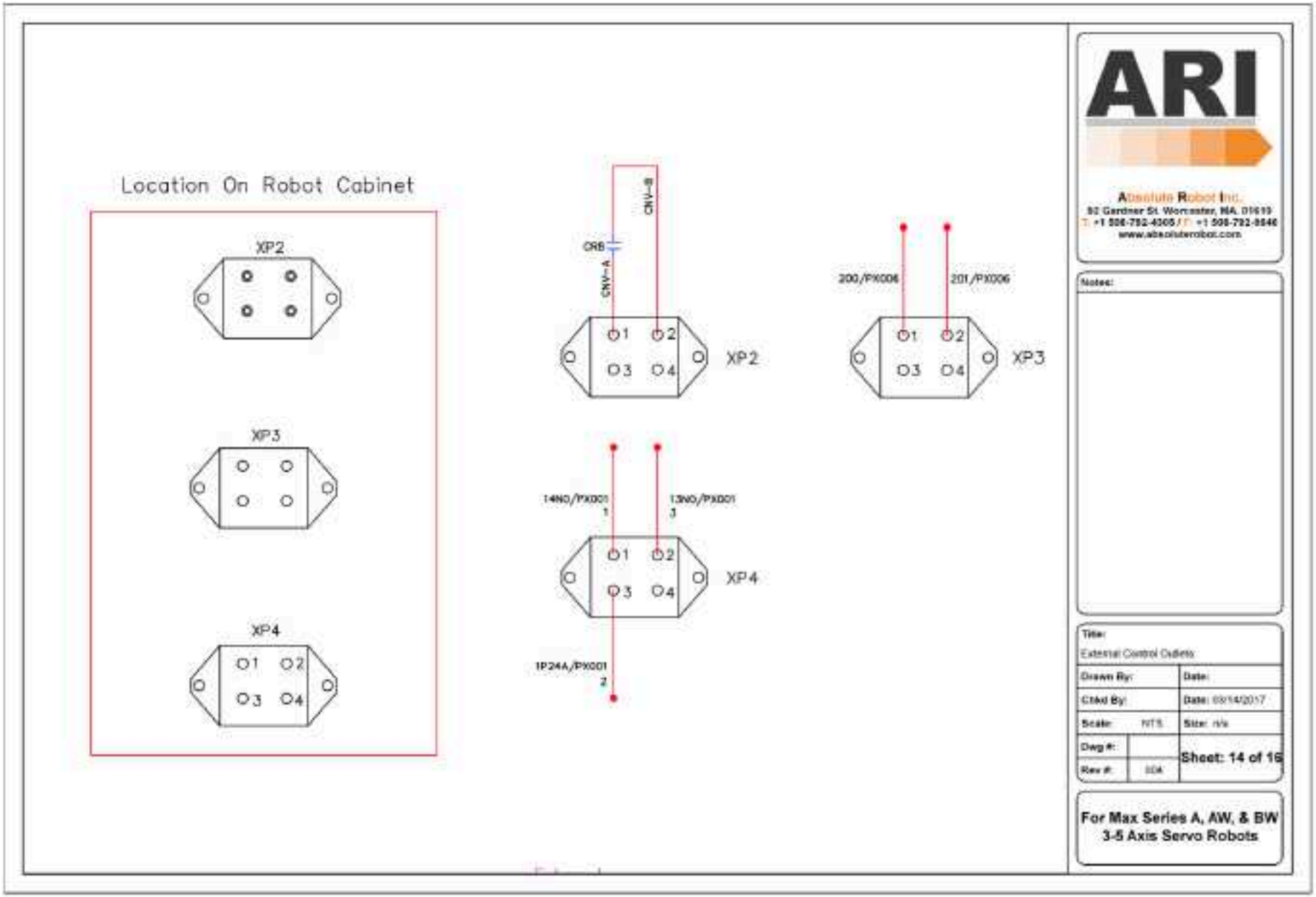
Notes:

Title: E13 Robot/IMM Interface

Drawn By:	Date:
Chkd By:	Date: 03/14/2017
Scale: NTS	Size: n/a
Dwg #:	Sheet: 13 of 16
Rev #: 004	

For Max Series A, AW, & BW 3-5 Axis Servo Robots


Location On Robot Cabinet
XP2
XP3
XP4
CNV-B
ORB
CNV-A
1
2
3
4
XP2
200/PX006
201/PX006
XP3
14NO/PX001
1
13NO/PX001
3
XP4
1P24A/PX001
2
ARI
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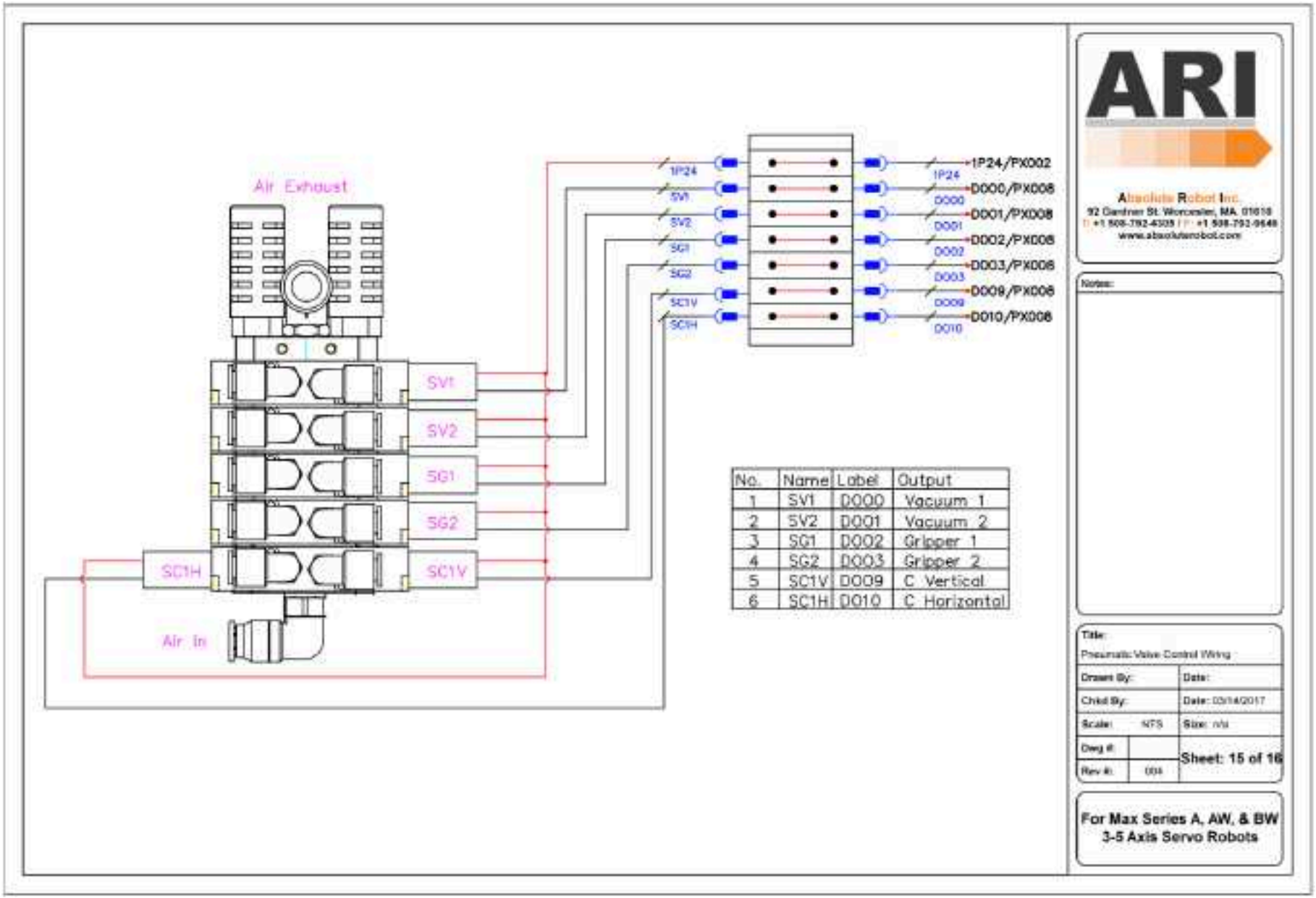
Notes:
Title:
External Control Outlets
Drawn By:
Date:
Chkd By:
Date: 03/14/2017
Scale: NTS
Size: n/a
Dwg #:
Rev #:
004
Sheet: 14 of 16
For Max Series A, AW, & BW
3-5 Axis Servo Robots



No.	Name	Label	Output
1	SV1	D000	Vacuum 1
2	SV2	D001	Vacuum 2
3	SG1	D002	Gripper 1
4	SG2	D003	Gripper 2
5	SC1V	D009	C Vertical
6	SC1H	D010	C Horizontal

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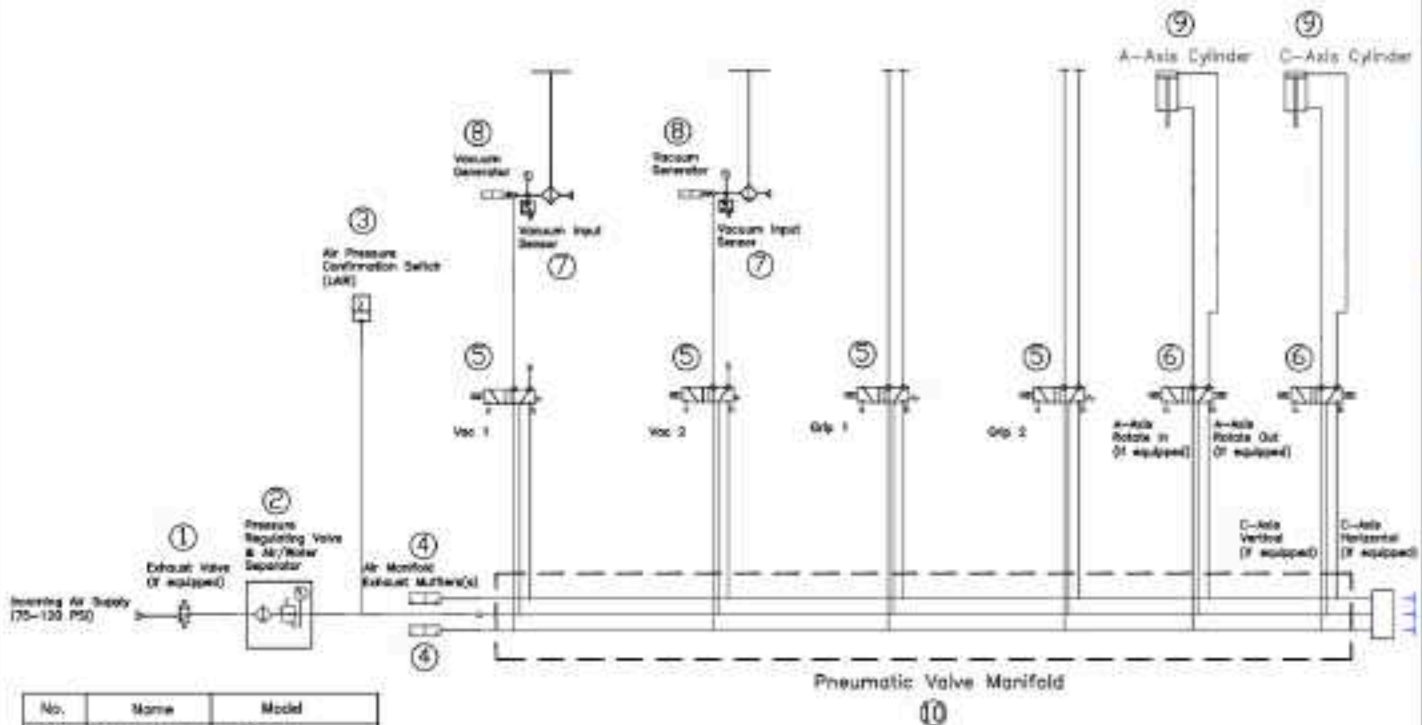
Notes:

Title:
Pneumatic Valve Control Wiring

Drawn By:	Date:
Chkd By:	Date: 03/14/2017
Scale: NTS	Size: n/a
Dwg #:	Sheet: 15 of 16
Rev #: 004	

For Max Series A, AW, & BW
3-5 Axis Servo Robots



No.	Name	Model
①	Exhaust Valve	VHS40-03
②	Pressure Regulator	AW40-03BDE-R-B
③	Air Pressure Confirmation	QYSH001
④	Silencer	SN200-02
⑤	1-Way Valve (Vac & Grip)	VUVG-L14-M52-AT -G18-1P3
⑥	2-Way Valve (A & C Axis)	VUVG-L14-B52-T -G18-1P3
⑦	SMC Vacuum Pressure Sensors	ZSE30AF-C6L-N-M0B
⑧	Venturi Vacuum Generator	SBP-15-02-SDA
⑨	A/C-Axis Air Cylinder(s)	PPRH-40WL
⑩	Air Manifold	VUVB3412-SH-WL -ModBW10-P

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Notes:

Title: Pneumatic Line Schematic			
Drawn By:		Date:	
Chkd By:		Date: 03/14/2017	
Scale:	NTS	Size: n/a	
Dwg #:		Sheet: 16 of 16	
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For Max Series A, AW, & BW 3-5 Axis Servo Robots

ROBOT MAINTENANCE AND SERVICE INTERVALS

INSPECTION ITEMS	DESCRIPTION OF INSPECTION & RECOMMENDED ACTION	RECOMMENDED INTERVALS FOR INSPECTION			
		DAILY	MONTHLY	6 MONTHS	1 YEAR
END OF ARM TOOLING	CHECK CONNECTIONS AND COMPONENT OPERATION, CLEAN & REPLACE DEFECTIVE COMPONENTS AS NEEDED	☑			
ROBOT AIR FILTER	CHECK & REPLACE AS NEEDED FOR PROPER AIR FLOW IN ROBOT CABINET	☑			
ROBOT PENDANT	CHECK FOR PHYSICAL DEFECTS, LOOSE CONNECTIONS & PROPER OPERATION, REPLACE AS NEEDED	☑			
ROBOT PNEUMATIC CIRCUIT	CHECK FOR LEAKAGE, REPLACE AS NEEDED	☑			
HARDWARE-NUTS & BOLTS	CHECK FOR LOOSE OR BROKEN CONNECTIONS, TIGHTEN & REPLACE AS NEEDED	☑			
ROBOT CONTROLLER FAN	CHECK FAN FOR NOISE & OPERATION, VERIFY GOOD AIR FLOW IS PRESENT, SEE FILTER PROCESS IF AIR FLOW IS WEAK. REPLACE IF LOW OUTPUT IS DETERMINED & FILTERS ARE CLEAN		☑		
AXIAL BEARINGS & ROLLERS	CHECK FOR PHYSICAL DEFECTS (GALLING, SCORING, METAL FLAKES OR WEAR SPOTS) & PROPER MOVEMENT (NO ELLIPTICAL ECCENTRIC MOTIONS) CHECK FOR EXCESS NOISE, VIBRATION & PROPER LUBRICATION IS PRESENT. CLEAN & LUBRICATE AS NEEDED. REPLACE ANY WORN COMPONENTS AS NEEDED		☑		
LINEAR BEARINGS & RAILS	CHECK FOR PHYSICAL DEFECTS (METAL CHIPS, BURS, SCORING OR WEAR SPOTS) AND PROPER MOVEMENTS (NO PLAY IN LATERAL MOTIONS) CHECK FOR EXCESS NOISE, VIBRATION & PROPER LUBRICATION IS PRESENT. CLEAN & LUBRICATE AS NEEDED, REPLACE ANY WORN COMPONENTS AS NEEDED		☑		
GEAR & RACK COMPONENTS *C SERIES ROBOTS	CHECK FOR PHYSICAL DEFECTS (METAL CHIPS, WORN GEAR TEETH OR EXCESSIVE WEAR) & PROPER MOVEMENTS (NO PLAY IN LATERAL MOTIONS), CHECK FOR EXCESS NOISE, VIBRATION & PROPER LUBRICATION IS PRESENT. CLEAN & LUBRICATE AS NEEDED, REPLACE ANY WORN COMPONENTS AS NEEDED		☑		
ROBOT CONTROLLER CABINET	CHECK FOR LOOSE CONNECTIONS OR TERMINALS, TIGHTEN ALL CONNECTIONS & CLEAN CABINET OF DEBRIS		☑		
DRIVE BELTS	CHECK BELTS FOR WEAR, DEFECTS, ALIGNMENT & TENSION, ADJUST TO SPECS PER ROBOT. REPLACE AS NEEDED		☑		
HOSES & DRAG CHAIN ASSY	CHECK FOR LEAKS, WEAR AREAS, BULGES & DEBRIS. REPLACE AS NEEDED			☑	
PNEUMATIC CYLINDERS	CHECK FOR AIR LEAKAGE, WORN SEALS, LUBRICANT SEEPAGE & OPERATION. REPLACE AS NEEDED.			☑	
ELECTRICAL COMPONENTS	CHECK ALL ELECTRICAL COMPONENTS, RELAYS & ELECTRIC CABLES FOR LOOSE CONNECTIONS, OPERATION & DEFECTS. REPLACE AS NEEDED				☑
LUBRICATION SYSTEM	CHECK FOR PROPER OPERATION & REFILL LUBRICANT FEED SYSTEM				☑

PLEASE CONTACT ARI SERVICE FOR TROUBLESHOOTING

AND REPAIR ASSISTANCE

Thank you

Dear Valued Customer,

At Absolute Robot, we sincerely appreciate your business and we look forward to fulfilling your future automating needs.

Sincerely,

The Entire ARI Team

Contact Us

Absolute Robot Inc.

Absolute Robot has a dedicated team of individuals who will work to solve your automation needs. Whether you have a question about one of our series of robots or would like to find out how we can help with your unique injection molding process, please send us an email or give us a call, one of our team members will be able to answer all your questions.

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