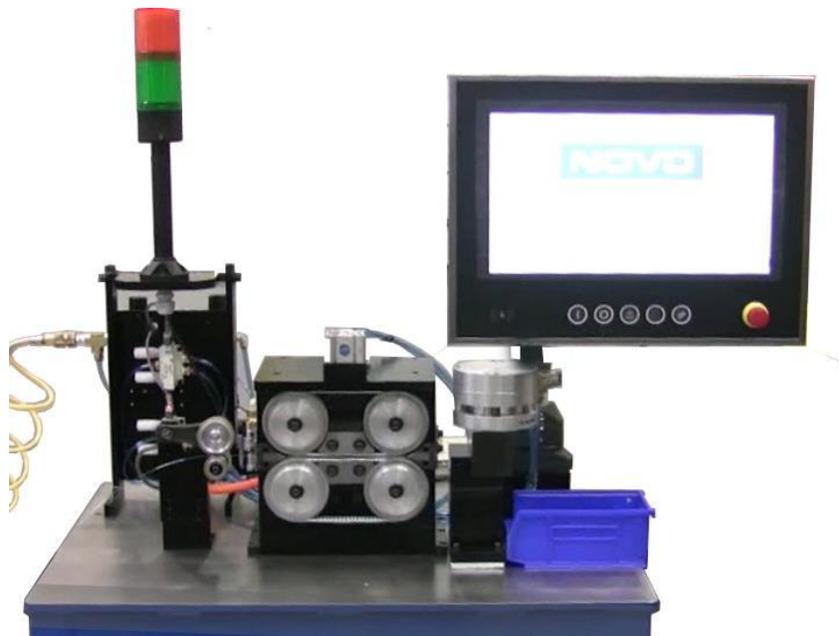




**Dual Belt Drive (Tractor) Feed  
Generic Servo and Options Manual**

**SERVO QUILL ON QUILL CUT TO LENGTH**

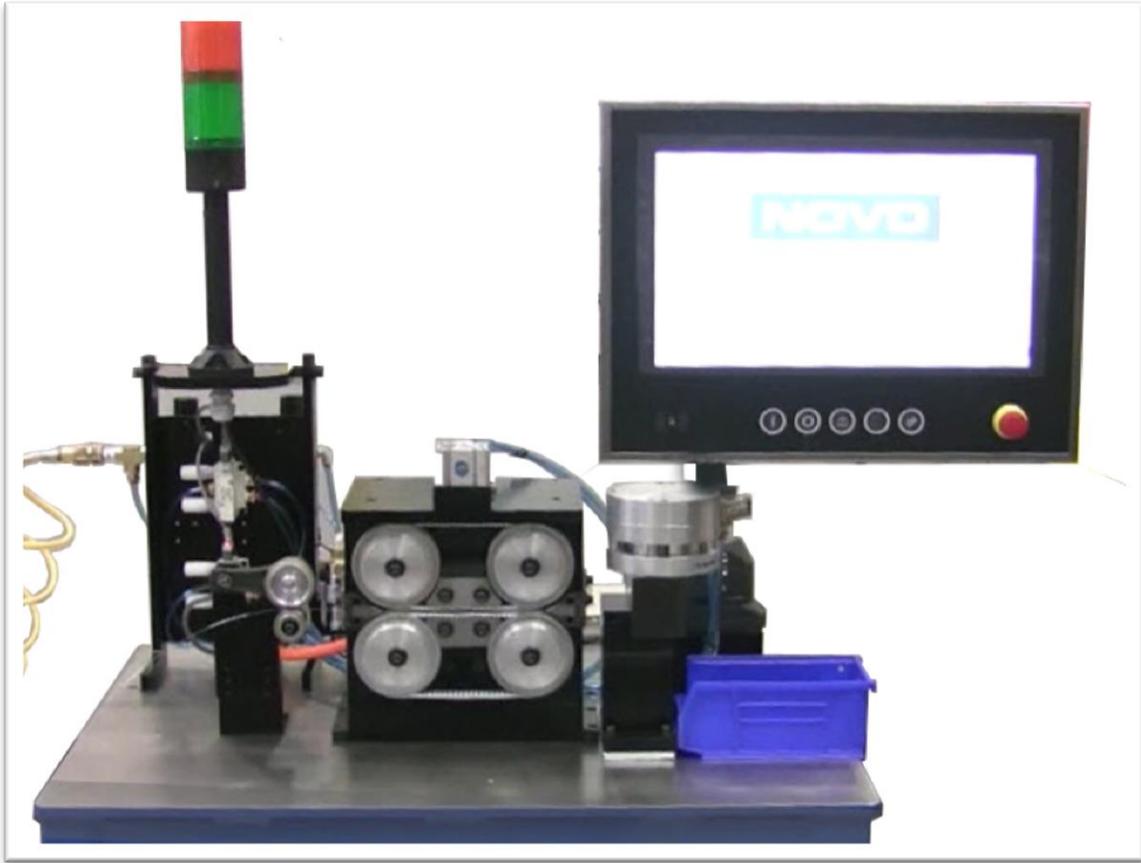


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## **Power On & Confirmation of Settings:**

**General** – The power input point for the TAK Servo System is located in the main utility cabinet and channeled to the operating devices and operator interface. Power requirement is dependent on system design and customer request. TAK default build requirements are 120VAC or 208/220 VAC 3Ph on a 20A circuit. Upon first power up of the system the Operator Interface Screen will display any system fault messages and wait until the faults are corrected.

*Due to the extreme versatility of this feed system and software all instructions are written to convey the most general operation of the system. Many options and add-on features are available and not described or addressed in this manual but personal assistance is available from Novo on all features or applications.*

**Warning - Be sure to check all program settings for the current job before allowing the Servo System to proceed with any operations!**

## System Operation;

### Threading up the Servo System:

1. Check to be sure that the power is “**On**” by observing the disconnect handle on the control panel and there is 80 psi of air pressure supplied to all points of the system.
2. From any of the main startup screens “**Reset**” all error/alarm messages & then proceed to the “**setup**” screen.
3. If this feature is used, alternately press the drive roll (material) clamping “**Open or Close**” screen button and observe that the top rolls move from open to closed and leave the rolls in the up or “**open**” position. If the system is a manual closure, move the clamping mechanism open & closed to check for proper operation.
4. **NOTE: When doing any setup functions especially with a remote encoder option be sure to place the unit in “Setup” by selecting it with the key switch on the front panel. Failure to do this might result in motion of the drive belts if the encoder wheel is turned.**
5. **Place the unit in “Setup” mode.**
6. Remove the lexan interlocking cover in front of the drive rolls.
7. Move the wire out sensor arm to the open or “up” position.
8. Remove any remaining wire from the system by carefully pulling it back ( towards the wire straightener ) out of the servo drive section of the system.
9. If required attach/load a new spool/coil of material to the system payoff.
10. It may be necessary to file a “nose” on the wire prior to trying to thread it through the system. Any burr or other deformity may cause the wire to get “hung up” during the threading process since each of the tooling pieces ( guides, drive rolls, quills, etc. ) are machined to precise tolerances.
11. If a wire straightener has not been set up for the wire diameter then the procedures outlined for the straightening device should be followed before proceeding to the next step. If any other optional equipment has been provided with the system please read all manuals or instructions for them. If manuals are not immediately available or have been misplaced please go to the TAK website at [takenterprises.com](http://takenterprises.com) where you will be able to find manuals and drawings for systems and options.
12. When used, check the TAK wire straightener “offset values” to ensure that nothing has “migrated” since the run of wire through the system.
13. Proceed to thread the wire through the straightener by hand feeding the wire an inch or so at a time.
14. Continue with feeding the wire through the drive guides, between the drive belts and on into the system cutter head or other attached devices.
15. Once the wire is through the system, activate the drive clamping (manual or by button) to “**close**” so that the upper drive belts come down onto the wire and adjust the pressure as required.
16. If the wire did not “hang up” during threading then you can continue to feed it forward or reverse through the system using the “**jog**” functions until it is observed in a starting position for the process being performed.
17. Recheck the wire path all the way back to the payoff spool to ensure that the wire is free to be fed.
18. Rotate the wire out sensor arm down to ride on the wire entering the feed unit.
19. Jog the material forward and make a couple test cuts to assure correct operation. Use the cut button on the setup screen to activate the cutter output.

**Replace the lexan interlocking cover and switch the unit to “Run” mode.**

***The system is now ready to produce.***

# Operator Input Screen



**Item #1:** Operator input touch screen.

**Item #2:** System E-Stop.

## Power Up Default Main Screen:

This is the main opening screen that is displayed upon powering up the system. From here all the screen tabs aligned across the top of the screen are available by touching the appropriate tab button.

**This tab bar containing the buttons is consistent in action across all screens.**



**MAIN:** Pressing this button will take you to this screen from other screens.

**RUN:** Pressing this button will bring you to the run screen where it is possible to monitor and activate the system to produce parts.

**SETUP:** Pressing this button will bring you to the setup screen where it is possible to set some of the system operational parameters to activate the system to produce parts.

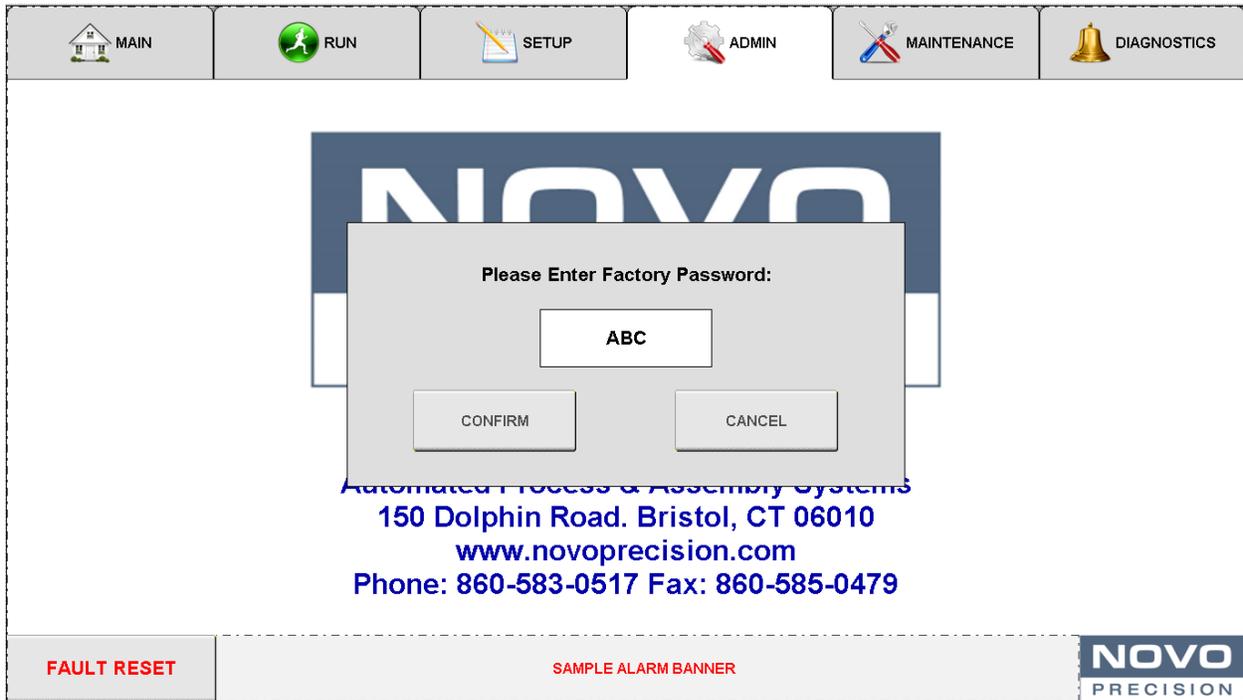
**ADMIN:** Pressing this button will bring you to the admin screen where it is possible to set some of the critical system operational parameters to activate and tune the system. This screen is password protected for setup & supervisory personnel.

**MAINTENANCE:** Pressing this button will bring you to the maintenance screen where it is possible to set some of the system operational parameters.

**ALARMS:** Pressing this button will bring you to the alarm screen where it is possible to monitor and review the system errors that have occurred.

# Admin Screen Section:

The admin screen is only accessible by passcode entry. After pressing the admin tab button on any screen you will be presented with a keypad to enter the security code. The values and entry fields on the admin screens are critical to the operation of the system and are protected by security code entry. Security codes are supplied under separate cover and are available from Novo at any time.



# Admin “Settings” Screen

## Winder Option

MAIN	RUN	SETUP	ADMIN	MAINTENANCE	DIAGNOSTICS			
SETTINGS	DISPLAY	NETWORK	AXIS SETUP BASIC	AXIS SETUP MOTOR	AXIS SETUP LIMITS	AXIS SETUP TUNING	SYSTEM	
MAINTENANCE COUNTER SET <input type="text" value="0"/>		SERVO IN-POSITION TIME <input type="text" value="0"/> ms		REMOTE ENCODER <input type="button" value="OFF"/>		<div style="border: 2px solid yellow; padding: 5px;">           REMOTE ENCODER DIAMETER:  <input type="text" value="0.000000"/> in             WHEEL DIAMETER:  <input type="text" value="0.000000"/> in   <input type="button" value="APPLY SETTINGS"/> </div>		
MAINTENANCE COUNTER 40000000		LIFE COUNTER 40000000		WIND / BEND <input type="button" value="OFF"/>				
<input type="button" value="RESET"/>		<input type="button" value="RESET"/>		<input type="button" value="WIND/BEND SETTINGS"/>				
				<input type="button" value="SYSTEM RESTART"/>				
<input type="button" value="FAULT RESET"/>			SAMPLE ALARM BANNER					

The values and fields on this screen are only accessible after the proper security code has been entered. This also opens up the ability to navigate between system setup sub tabs.

**Maintenance Counter:** The value shown in this field shows the part count total since the last “Reset” was performed.

**Life Counter:** The value shown in this field shows the part count total since the last “Reset” was performed by direction from the factory or by TAK factory personnel. Any entry in this field is also security code protected separate from any published codes.

**SERVO In-Position time:** This field entry will delay the step following the index move so that the servo has time to settle out if necessary.

**Wheel Diameter:** This entry field is where the actual drive wheel diameter is entered and is solely critical to the proper length feeding operation.

1. Pressing the “Apply Settings” button is required for the system to accept the entry.
2. The area box containing the buttons will flash until the “Apply Settings” is pressed.
3. The color of this box is an indication of which measurement method is being used, either English (Green) or Metric (Red). This choice is detailed in the instructions on the maintenance screen.

**Remote Encoder:** This button will engage the remote encoder when used to manage feed lengths of difficult materials.

**Remote Encoder Wheel Diameter:** This entry field is where the actual encoder wheel diameter is entered and is solely critical to the proper length feeding operation.

1. Pressing the “Apply Settings” button is required for the system to accept the entry.
2. The area box containing the buttons will flash until the “Apply Settings” is pressed.
3. The color of this box is an indication of which measurement method is being used, either English (Green) or Metric (Red). This choice is detailed in the instructions on the maintenance screen.

**System Restart:** This button will warm reboot the control system.

## Winder Option

**“Option” Wind/Bend:** This button allows the user to enable the servo wind/bend mechanism on the machine. If this is OFF, the machine is used as a standard Feed and Cut machine. If this is ON, the machine has the capability to perform winds and/or bends based on the WIND/BEND SETTINGS

**“Option” Wind/Bend Settings:** This button shows a popup with inputs for all of the possible winding settings.

The screenshot shows a control interface with a top navigation bar containing buttons for MAIN, RUN, SETUP, ADMIN, MAINTENANCE, and DIAGNOSTICS. A central popup window titled 'WIND/BEND SETTINGS' is displayed, featuring an 'APPLY SETTINGS' button at the top. The settings are organized into two columns: 'FEED LENGTH #1' through 'FEED LENGTH #4' and 'BEND ANGLE #1' through 'BEND ANGLE #4'. The 'FEED SPEED' is set to 0.00 in/s, and the 'BEND SPEED' is set to 0.0 %/s. A 'PART LENGTH' is set to 0.000 in. A red 'CLOSE' button is located at the bottom right of the popup. The background interface includes a 'FAULT RESET' button and a 'SAMPLE ALARM BANNER'.

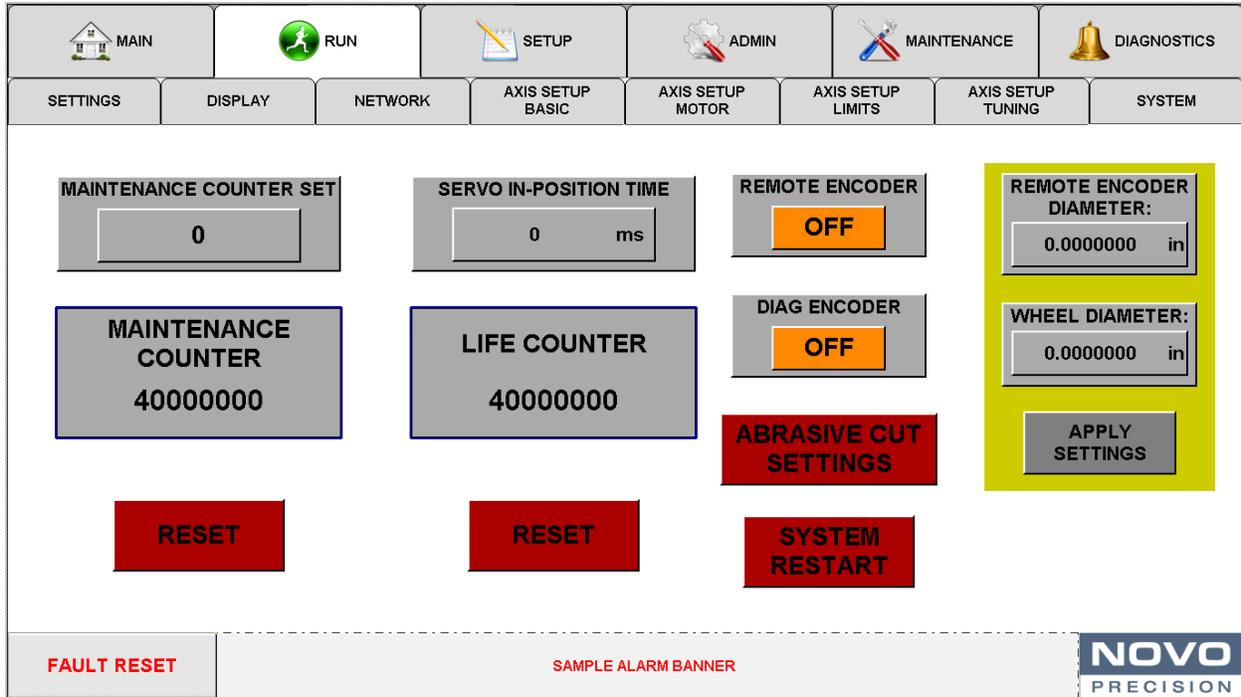
**Feed Length #N:** These inputs correspond to the feed length of each segment of a bent part.

**Bend Angle #N:** These inputs correspond to the bend angle of each bend between segments of a bent part.

**Bend Speed:** Corresponds to the rotational speed of the bend/wind.

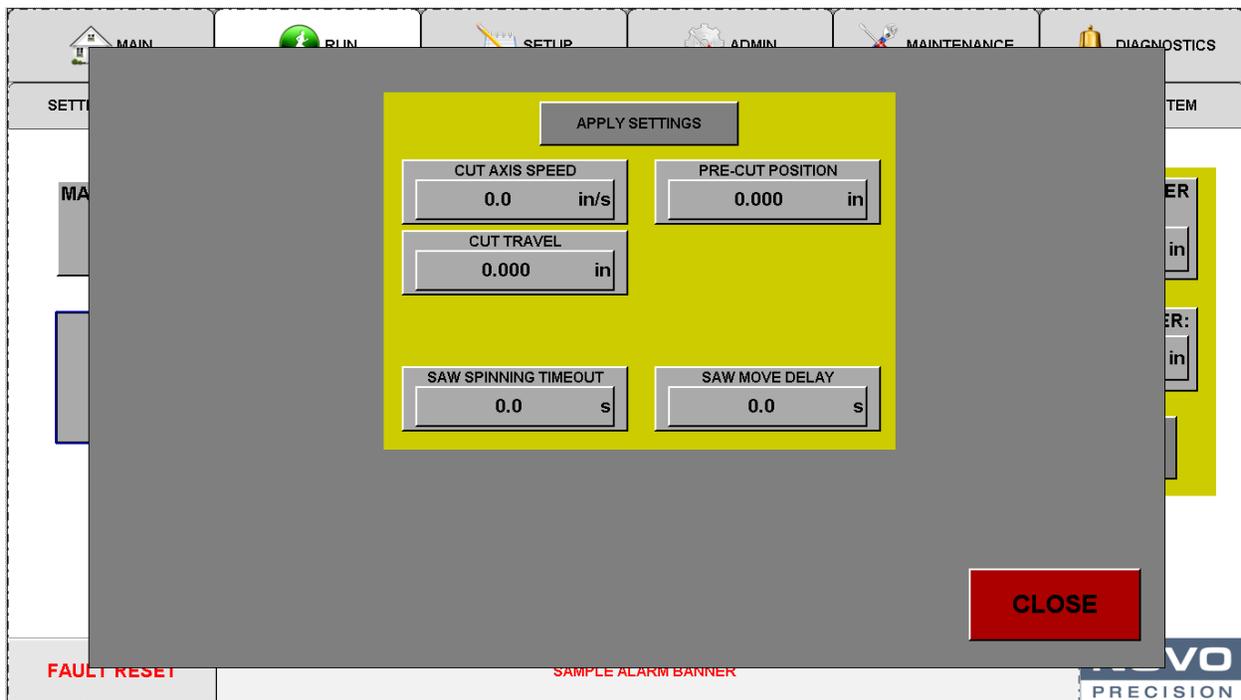
**Part Length:** Corresponds to the part length of the part.

# Abrasive Cut Option



**Diag Encoder:** This button will enable the diagnostic upstream encoder to monitor any extrusion.

**Abrasive Cut Settings:** This button will show the popup below which gives the admin the ability to change the Abrasive Cut parameters.



**Cut Axis Speed:** Speed of the axis moving the cutting wheel into place.

**Pre-cut Position:** Position where the axis should be prior to starting the cut sequence.

**Cut Travel:** Distance the axis will move during the cut sequence.

**Saw Spinning Timeout:** The time after the saw motor turns on before it is determined whether it is spinning or throw an error.

**Saw Move Delay:** The time after the saw motor is spinning before beginning the move into the path of the wire.

**Apply Settings:** Apply the abrasive cut settings that have changed.

## Chamfer Option

The screenshot shows a control interface with a top navigation bar containing icons for MAIN, RUN, SETUP, ADMIN, MAINTENANCE, and DIAGNOSTICS. Below this is a sub-menu bar with options: SETTINGS, DISPLAY, NETWORK, AXIS SETUP BASIC, AXIS SETUP MOTOR, AXIS SETUP LIMITS, AXIS SETUP TUNING, and SYSTEM. The main content area is divided into several sections:

- MAINTENANCE COUNTER SET:** A numeric input field showing '0'.
- SERVO IN-POSITION TIME:** A numeric input field showing '0' with 'ms' to its right.
- REMOTE ENCODER:** A toggle button set to 'OFF'.
- DIAG ENCODER:** A toggle button set to 'OFF'.
- CHAMFER SETTINGS:** A prominent red button.
- MAINTENANCE COUNTER:** A numeric display showing '40000000'.
- LIFE COUNTER:** A numeric display showing '40000000'.
- SYSTEM RESTART:** A red button.
- REMOTE ENCODER DIAMETER:** A numeric input field showing '0.0000000 in'.
- WHEEL DIAMETER:** A numeric input field showing '0.0000000 in'.
- APPLY SETTINGS:** A grey button.
- NO CHAMFER:** A grey button.
- RESET:** Two red buttons, one under the Maintenance Counter and one under the Life Counter.

At the bottom, there is a 'FAULT RESET' button on the left, a 'SAMPLE ALARM BANNER' in the center, and the 'NOVO PRECISION' logo on the right.

**Chamfer Settings:** This button will show the popup below with the settings for the chamfer sequence.

**No Chamfer:** This will set the machine back to a feed and cut sequence without chamfering.

# Chamfer Option

APPLY SETTINGS	
TRANSPORT SPEED 0.0 in/s	PRE-CHAMFER POSITION 0.000 in
CHAMFER POSITION 0.000 in	CHAMFER SPEED 0.0 RPM
CHAMFER FEED SPEED 0.000 in/min	CHAMFER FEED LENGTH 0.000 in
PRE-CHAMFER FEED LENGTH 0.000 in	CHAMFER PAUSE TIME 0.00 s

FAULT RESET      SAMPLE ALARM BANNER      VO PRECISION

**Transport Speed:** Speed that the chamfer unit moves in and out of the wire line of travel.

**Pre-Chamfer Position:** Position where the chamfer unit sits while wire feeds and the unit is not chamfering.

**Chamfer Position:** Position on the transport axis where the chamfer unit sits to chamfer wire.

**Chamfer Speed:** Rotational speed of the chamfer unit.

**Chamfer Feed Speed:** Wire feed speed during the chamfer part of the sequence.

**Chamfer Feed Length:** Distance the wire will be fed during the chamfer process.

**Pre-Chamfer Feed Length:** Distance the wire should be fed after the previous cut to prepare for chamfering process.

**Chamfer Pause Time:** Time delay after chamfer feed length is reached where the chamfering is still being performed.

**Apply Settings:** Apply the chamfer settings that have changed.

## Admin "Display" Screen

MAIN	RUN	SETUP	ADMIN	MAINTENANCE	DIAGNOSTICS		
SETTINGS	DISPLAY	NETWORK	AXIS SETUP BASIC	AXIS SETUP MOTOR	AXIS SETUP LIMITS	AXIS SETUP TUNING	SYSTEM

DATE & TIME

MONTH 0	DAY 0	YEAR 0
HOUR 0	MINUTE 0	SECOND 0

BRIGHTNESS

<b>FAULT RESET</b>	SAMPLE ALARM BANNER	<b>NOVO</b> PRECISION
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This screen gives the ability to set the date and time as well as the screen brightness.

## Admin "Network" Screen

MAIN	RUN	SETUP	ADMIN	MAINTENANCE	DIAGNOSTICS		
SETTINGS	DISPLAY	NETWORK	AXIS SETUP BASIC	AXIS SETUP MOTOR	AXIS SETUP LIMITS	AXIS SETUP TUNING	SYSTEM

CONFIG MODE

**STATIC**

IP ADDRESS

0	.	0	.	0	.	0
---	---	---	---	---	---	---

SUBNET MASK

0	.	0	.	0	.	0
---	---	---	---	---	---	---

GATEWAY

0	.	0	.	0	.	0
---	---	---	---	---	---	---

INA NODE

0
---

SET

<b>FAULT RESET</b>	SAMPLE ALARM BANNER	<b>NOVO</b> PRECISION
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This screen allows for the viewing and setting of the IP address of the PLC. **WARNING:** If this IP address is changed, there is a chance that remote connection through the eWON will not be possible!

## Admin “Axis Setup” Basic Screen

MAIN	RUN	SETUP	ADMIN	MAINTENANCE	DIAGNOSTICS		
SETTINGS	DISPLAY	NETWORK	AXIS SETUP BASIC	AXIS SETUP MOTOR	AXIS SETUP LIMITS	AXIS SETUP TUNING	SYSTEM
<div style="border: 1px solid gray; padding: 5px; text-align: center;"> <b>Axis Selection</b>  <div style="border: 1px solid gray; padding: 5px; display: inline-block;"> <b>FEED WIND</b> </div> </div>			<b>ACCELERATION</b> <input type="text" value="0.0"/> °/s²	<b>HOME OFFSET</b> <input type="text" value="0.00"/> °	<b>JOG INCREMENT</b> <input type="text" value="0.00"/> °	<b>DECELERATION</b> <input type="text" value="0.0"/> °/s²	<b>JOLT TIME</b> <input type="text" value="0"/> ms
			<b>JOG SPEED LOW</b> <input type="text" value="0.00"/> °/s	<b>JOG SPEED HIGH</b> <input type="text" value="0.00"/> °/s			
<b>FAULT RESET</b>			SAMPLE ALARM BANNER				

This screen allows for the setting of motion parameters. The acceleration and deceleration are the same here as on the Maintenance screen, but the rest of the parameters have to do with the Jogging or homing of the machine.

## Admin “Axis Setup Motor” Screen

MAIN	RUN	SETUP	ADMIN	MAINTENANCE	DIAGNOSTICS			
SETTINGS	DISPLAY	NETWORK	AXIS SETUP BASIC	AXIS SETUP MOTOR	AXIS SETUP LIMITS	AXIS SETUP TUNING	SYSTEM	
<div style="border: 1px solid gray; padding: 5px; text-align: center;"> <b>Axis Selection</b>  <div style="border: 1px solid gray; padding: 5px; display: inline-block;"> <b>FEED WIND</b> </div> </div>			<b>UNITS...</b> <input type="text" value="16487"/>	<b>COUNT DIRECTION</b> <input type="button" value="STANDARD"/>	<b>COMMUTATION OVERRIDE</b> <input type="button" value="DISABLED"/>	<b>...PER MOTOR REV</b> <input type="text" value="12"/>	<b>ENCODER CHECK</b> <input type="button" value="ENABLED"/>	<b>COMMUTATION OFFSET</b> <input type="text" value="0.0000"/> rad
			<b>TEMPERATURE MODEL</b> <input type="button" value="ENABLED"/>					
<b>FAULT RESET</b>			SAMPLE ALARM BANNER					

This screen allows the administrator to setup the motor parameters necessary for each axis of motion. These have been commissioned according to the delivered machine. These include the gear ratio for the motion of each axis. This would need to be updated with the introduction of a new gear box.

### Admin “Axis Setup Limits” Screen

MAIN	RUN	SETUP	ADMIN	MAINTENANCE	DIAGNOSTICS		
SETTINGS	DISPLAY	NETWORK	AXIS SETUP BASIC	AXIS SETUP MOTOR	AXIS SETUP LIMITS	AXIS SETUP TUNING	SYSTEM

**Axis Selection**

**FEED**

**WIND**

VELOCITY LIMIT

0.00 %/s

ACCEL/DECEL LIMIT

0.0 %/s<sup>2</sup>

LAG ERROR LIMIT

0.00 °

SOFTWARE LIMIT -

0.00 °

SOFTWARE LIMIT +

0.00 °

**FAULT RESET**

SAMPLE ALARM BANNER

**NOVO**  
PRECISION

This screen allows the administrator to adjust the limits of the axes.

### Admin “Axis Setup Tuning” Screen

MAIN	RUN	SETUP	ADMIN	MAINTENANCE	DIAGNOSTICS		
SETTINGS	DISPLAY	NETWORK	AXIS SETUP BASIC	AXIS SETUP MOTOR	AXIS SETUP LIMITS	AXIS SETUP TUNING	SYSTEM

**Axis Selection**

**FEED**

**WIND**

POSITION GAIN

0.0 Hz

SPEED GAIN

0.0000 A-s/rev

SPEED FILTER

0.0000 ms

SPEED INTEGRATER

0.00 ms

TORQUE - LOAD

0.000000 Nm

TORQUE - POSITIVE

0.000000 Nm

TORQUE - NEGATIVE

0.000000 Nm

SPEED TORQUE GAIN

0.000000 Nms

AUTO TUNE

AUTO TUNE

PRESS AUTO TUNE TO BEGIN

INERTIA

0.0000000000 kg-m<sup>2</sup>

NOTCH FILTER

DISABLED

NOTCH FREQUENCY

0 Hz

NOTCH BANDWIDTH

0 Hz

**FAULT RESET**

SAMPLE ALARM BANNER

**NOVO**  
PRECISION

This screen allows for the administrator to adjust the tuning values of each axis and perform an autotune on an axis. This could be helpful for a motor replacement in the future.

## Admin “System Master” Screen

The screenshot displays the Admin “System Master” screen with the following elements:

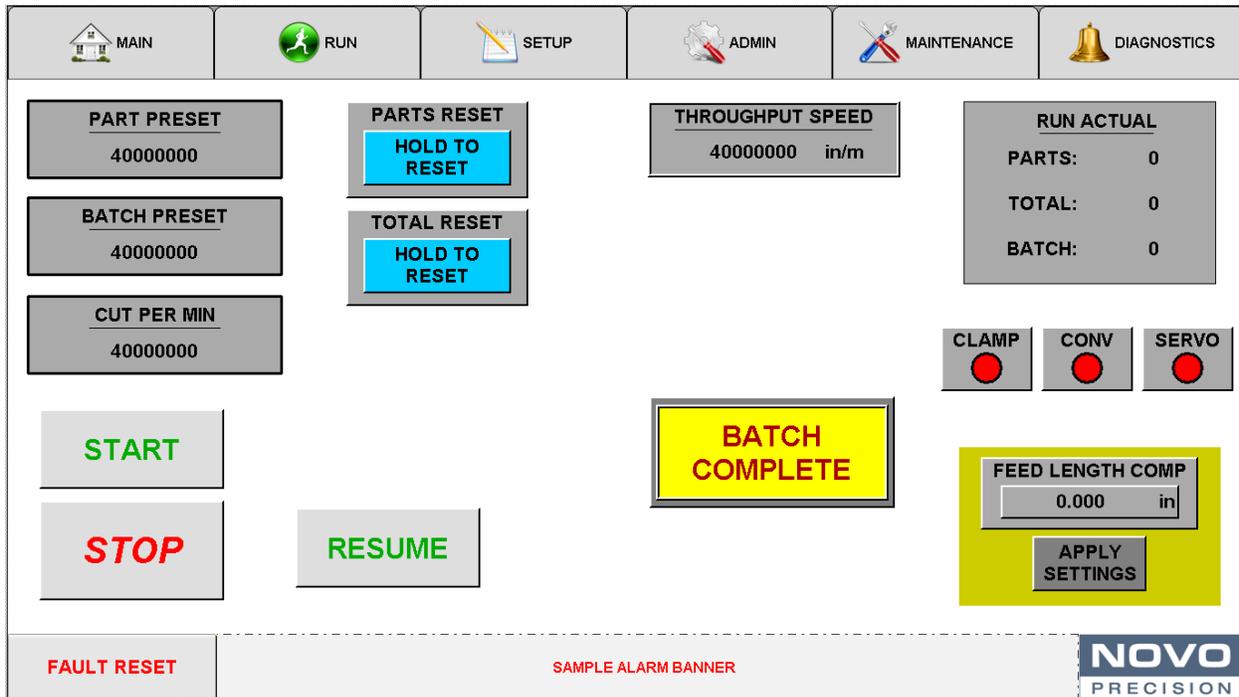
- Navigation Tabs:** MAIN (house icon), RUN (green circle with person), SETUP (notepad icon), ADMIN (gear icon), MAINTENANCE (wrench icon), and DIAGNOSTICS (bell icon).
- Sub-Menu Tabs:** SETTINGS, DISPLAY, NETWORK, AXIS SETUP BASIC, AXIS SETUP MOTOR, AXIS SETUP LIMITS, AXIS SETUP TUNING, and SYSTEM.
- System Information:** A box labeled “FIRMWARE VERSION” containing the text “Base::ARsim by SSwindells 2012.04.11 10:45 AM”.
- Control Buttons:** “RESTART SYSTEM”, “IMPORT SYSTEM SETTINGS”, “EXPORT SYSTEM SETTINGS”, and “RESTORE DEFAULTS”.
- Monitoring Displays:** “MAINS VOLTAGE” showing “0 V” and “3-PHASE MONITORING” showing “ENABLED” in a green box.
- Footer:** A “FAULT RESET” button on the left, a “SAMPLE ALARM BANNER” in the center, and the “NOVO PRECISION” logo on the right.

This screen allows the administrator the ability to set the expected line voltage coming into the drives. It also allows for an import or export of the machine data which can be exported to USB. This will typically be done to pull parameters from one machine to another.

## Run Screen

The following screens listed under the heading of “Run Screen” will show various sub screens and message popups depending on the options purchased with the system.

On this screen, the basic monitoring will be done while running. All features on this page will enable the operator to monitor the job setup and part production while running.



**Part Preset:** This section shows the quantity of parts required as set on the setup screen. *Not used on system without batching*

**Batch Preset:** This section shows the quantity of batches required as set on the setup screen. *Not used on system without batching*

**Cut Per Min:** When the system is running, this section shows the running speed of the system in “Cuts Per Minute”.

**Parts Reset & Total Reset:** These buttons will clear the corresponding counts in the actual run. These must be held for 2 seconds to take.

### Run Actual:

1. **Parts:** This section shows the current quantity of parts produced in the current batch.
2. **Total:** This section shows the total parts produced in the current run since the last “total reset” found on the setup screen.
3. **Batch:** This section shows the current quantity of batches produced in the current run.

**Throughput Speed:** This is an indicator showing the actual throughput speed in the current running condition based on set feeds & speeds.

# Run Screen

**Feed Length Comp.:** This section consists of a couple different functional components.

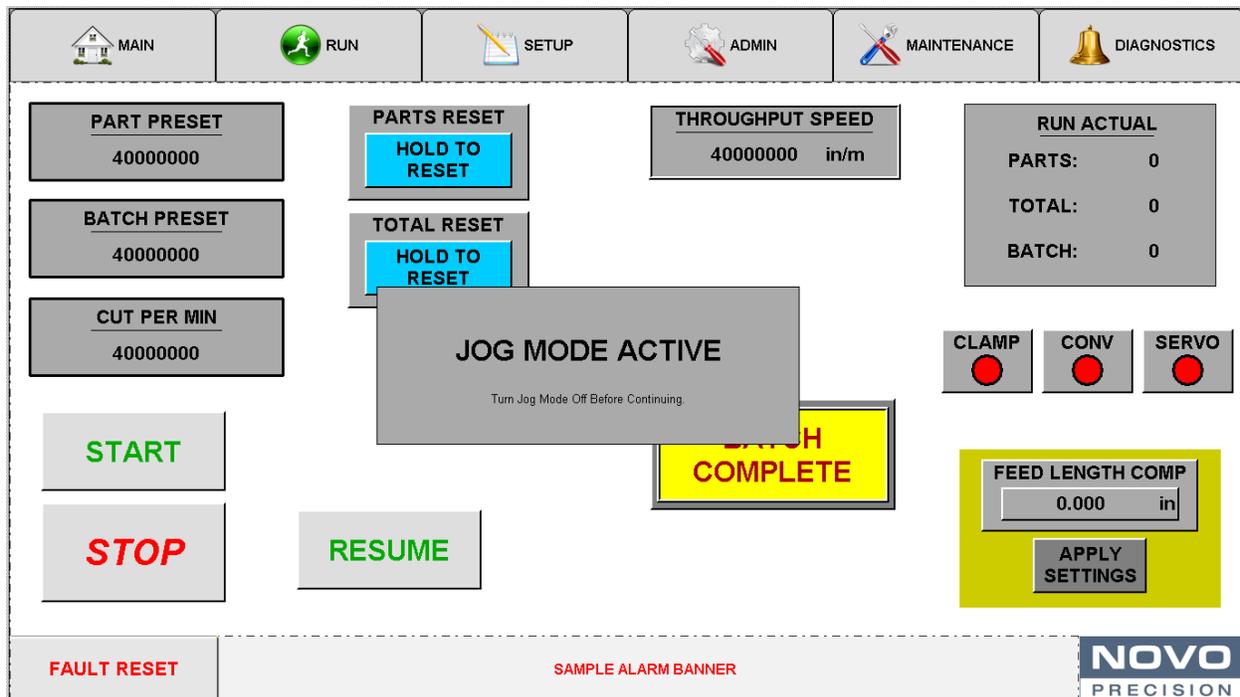
1. This entry button and pop-up keypad will either add (+) or (-) the entered dimension from the length of each produced part to compensate for variations in materials or feeding conditions.
2. Pressing the “Apply Settings” button is required for the system to accept the entry.
3. The area box containing the buttons will flash until the “Apply Settings” is pressed.
4. The color of this box is an indication of which measurement method is being used, either **English (Green)** or **Metric (Red)**. This choice is detailed in the instructions on the maintenance screen.

**Clamp Indicator:** This indicator is a run verification of the material clamp condition as set on the setup screen. This indicator needs to be green for the system to operate.

**Servo Indicator:** This indicator is a run verification of the servo enable condition as set on the admin screen. This indicator needs to be green for the system to operate.

**Conveyor engaged:** When the conveyor options are enabled there is another indicator visible showing that it is active. This hidden indicator is between the (2) existing indicators when inactive. *Not used on system with downstream pick instead of conveyor.*

**Jog Mode Active:** A popup is shown when on Run screen if Jog Mode is active. This prevents any button to be pressed on the Run screen other than the Tabs at the top to change pages.



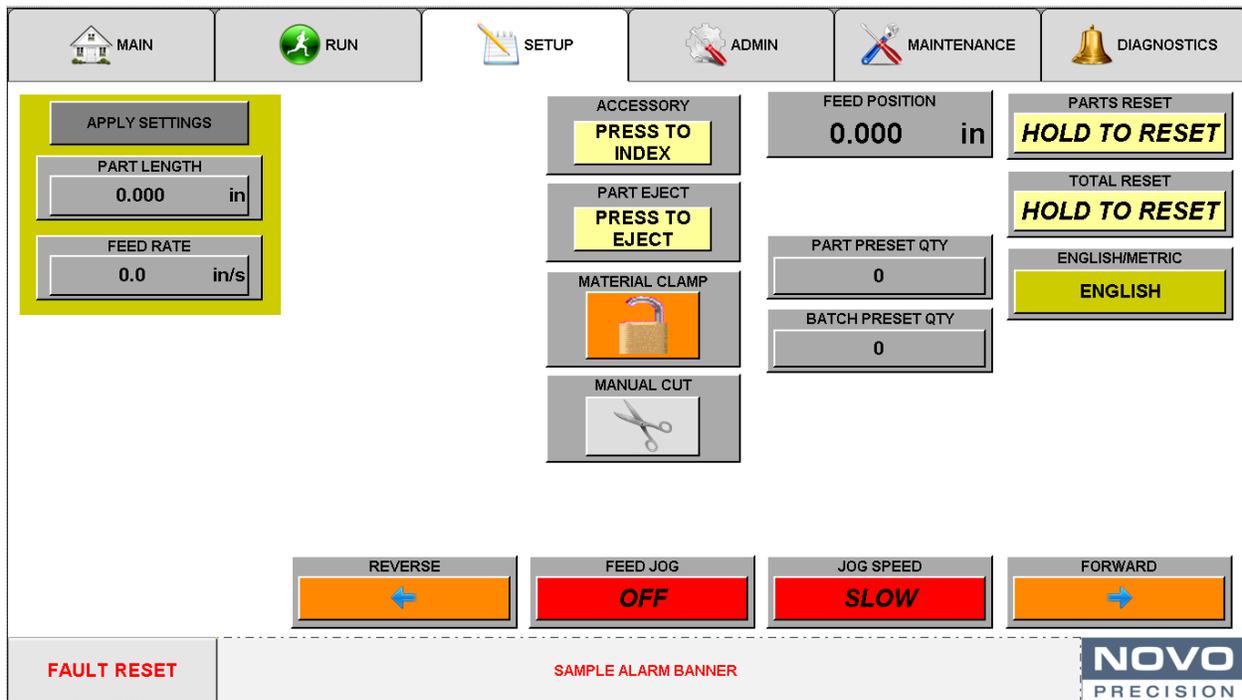
# Run Screen

**Run Complete:** A popup is shown when a run has been completed indicating how many parts and how many batches were produced. This popup prevents any other action without the OK button being pressed.

The screenshot displays the 'Run Screen' interface with a central 'RUN COMPLETE' popup. The interface is organized into several sections:

- Navigation Bar:** Includes icons and labels for MAIN, RUN, SETUP, ADMIN, MAINTENANCE, and DIAGNOSTICS.
- Control Panels:** On the left, there are panels for 'PART PRESET' (40000000), 'BATCH PRESET' (40000000), and 'CUT PER MIN' (40000000). On the right, there is a 'RUN ACTUAL' panel showing 'PARTS: 0', 'TOTAL: 0', and 'BATCH: 0'. Below these are three indicator lights labeled 'CLAMP', 'CONV', and 'SERVO', all of which are currently red.
- Buttons:** A 'START' button (green text), a 'STOP' button (red text), and a 'RESUME' button (green text) are located in the lower-left area. A 'FEED LENGTH COMP' panel shows '0.000 in' with an 'APPLY SETTINGS' button below it.
- Popups:** A central 'RUN COMPLETE' popup displays 'Total Parts: 0' and 'Number of Batches: 0' with an 'OK' button. Other partially visible popups include 'PARTS RESET' with a 'HOLD TO RESET' button and 'TOTAL RESET' with a 'HOLD TO RESET' button.
- Footer:** A 'FAULT RESET' button is on the left, a 'SAMPLE ALARM BANNER' is in the center, and the 'NOVO PRECISION' logo is on the right.

## Setup Screen Section:



On this screen the operator will set the operating parameters for producing the parts as required for the job. The first series of entry buttons down the left side of the screen are also enclosed in an area box of a color indicating the measurement method used and chosen on the maintenance screen. If any entries are changed or new values are entered in any of these fields, the boxed area will flash until the “Apply Settings” button is pressed.

**Part Length:** This button will pop up a keypad to be used to enter the desired Part Length.

**Feed Position:** This field monitors the distance of material fed in any feed cycle and is cleared upon a cut activation.

**Winder Position:** This field monitors the winder position. *Not shown in systems with wind/bend disabled.*

**Part Preset:** This field is where the operator will input the quantity of parts required for the job run.

**Batch Preset:** This field is where the operator will input the quantity of batches required for the job run.

**Part Reset:** This button will reset the part count to zero by holding it for at least 5 seconds

**Total reset:** This button will reset the total part count to zero by holding it for at least 5 seconds.

**Manual Cut:** This will activate an output that is defaulted to the cutting head. ( If equipped) This manual cut button will only work if the system is in a stopped/waiting state. This means that a manual cut can't be performed in a “paused” system condition.

# Setup Screen

**Material:** This will activate an output that is defaulted to the drive roll clamping. (if equipped) This button is required to be activated under all conditions or the system will not run. This is a safety feature designed to make sure the system will not run if the material is not clamped by the feed rolls when using a pneumatic or hydraulic clamping system.

**Alarm Reset:** This button will reset the system after fixing an alarm condition. The following is a listing of default alarms but not limited to these conditions depending on system integration requirements. A press of the “Reset” button on the face of the control panel is required to continue running.

1. A safety system violation.
2. A loss of air pressure signal.
3. A material out signal.
4. A cut home signal. (used only in the sensor cut mode)
5. A cut away signal. (used only in the sensor cut mode)
6. A material snag signal. (If equipped)
7. A remote device signal. (If equipped)
8. The “At Maintenance Count” value is reached.
9. A Servo alarm on either lane.

**Feed Jog/Winder Jog:** This button will engage/disengage the jog function on the selected lane. *Winder Jog is not available when Wind/Bend is disabled.*

**Jog Speed:** This button will give the operator a choice of a fast or slow jog speed on the selected lane.

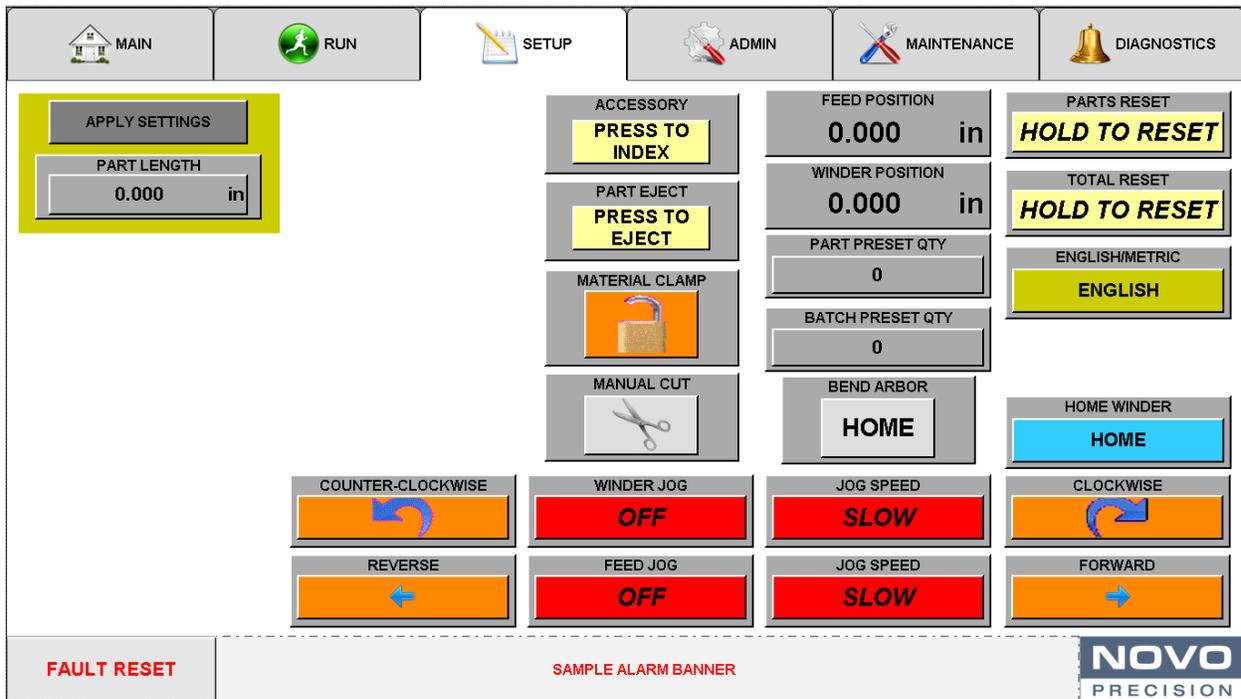
**Jog Forward/Clockwise:** This button will jog the machine in the forward direction on the selected lane.

**Jog Reverse/Counter-Clockwise:** This button will jog the machine in the reverse direction on the selected lane.

**Accessory:** Pressing this button will advance the conveyor or other group retaining equipment to the next open section. This button is only available if the conveyor has been enabled on the accessory screen. This function is meant to be used with a compartmented conveyor or segmented batch collection equipment using a single sensor. When enabled, the control will look for the sensor input at the end of a batch, engage the conveyor output and then disengage when it see the same sensor input again. The system will then be ready to produce the next batch. *Not compatible with Wind/Bend.*

**Part Eject:** Pressing this button will advance the material a distance input on the accessory screen to eject the previously cut part from the exit guiding system when used with the dumping stacker type equipment. This length is subtracted from the next part length so the feed will compensate to the correct length for the first part of the next feed. This eject feed is required to get the material away from the cutting & exit guide system so the parts can rotate without interference. *Not compatible with Wind/Bend.*

## Setup Screen Winder Option



On this screen the operator will set the operating parameters for producing the parts as required for the job. The first series of entry buttons down the left side of the screen are also enclosed in an area box of a color indicating the measurement method used and chosen on the maintenance screen. If any entries are changed or new values are entered in any of these fields, the boxed area will flash until the “Apply Settings” button is pressed.

**Part Length:** This button will pop up a keypad to be used to enter the desired Part Length.

**Feed Position:** This field monitors the distance of material fed in any feed cycle and is cleared upon a cut activation.

**Home Winder:** This button will set the current position of the winder as its Zero. *Not shown in systems with wind/bend disabled.*

**Bend Arbor Home/Away:** This button will trigger the change in state of the solenoid driving the bend arbor into and out of the path of the wire. *Not shown in systems with wind/bend disabled.*

**Winder Position:** This field monitors the winder position. *Not shown in systems with wind/bend disabled.*

**Part Preset:** This field is where the operator will input the quantity of parts required for the job run.

**Batch Preset:** This field is where the operator will input the quantity of batches required for the job run.

**Part Reset:** This button will reset the part count to zero by holding it for at least 5 seconds

**Total reset:** This button will reset the total part count to zero by holding it for at least 5 seconds.

**Manual Cut:** This will activate an output that is defaulted to the cutting head. ( If equipped) This manual cut button will only work if the system is in a stopped/waiting state. This means that a manual cut can't be performed in a "paused" system condition.

**Material:** This will activate an output that is defaulted to the drive roll clamping. (if equipped) This button is required to be activated under all conditions or the system will not run. This is a safety feature designed to make sure the system will not run if the material is not clamped by the feed rolls when using a pneumatic or hydraulic clamping system.

**Alarm Reset:** This button will reset the system after fixing an alarm condition. The following is a listing of default alarms but not limited to these conditions depending on system integration requirements. A press of the "Reset" button on the face of the control panel is required to continue running.

1. A safety system violation.
2. A loss of air pressure signal.
3. A material out signal.
4. A cut home signal. (used only in the sensor cut mode)
5. A cut away signal. (used only in the sensor cut mode)
6. A material snag signal. (If equipped)
7. A remote device signal. (If equipped)
8. The "At Maintenance Count" value is reached.
9. A Servo alarm on either lane.

**Feed Jog/Winder Jog:** This button will engage/disengage the jog function on the selected lane. *Winder Jog is not available when Wind/Bend is disabled.*

**Jog Speed:** This button will give the operator a choice of a fast or slow jog speed on the selected lane.

**Jog Forward/Clockwise:** This button will jog the machine in the forward direction on the selected lane.

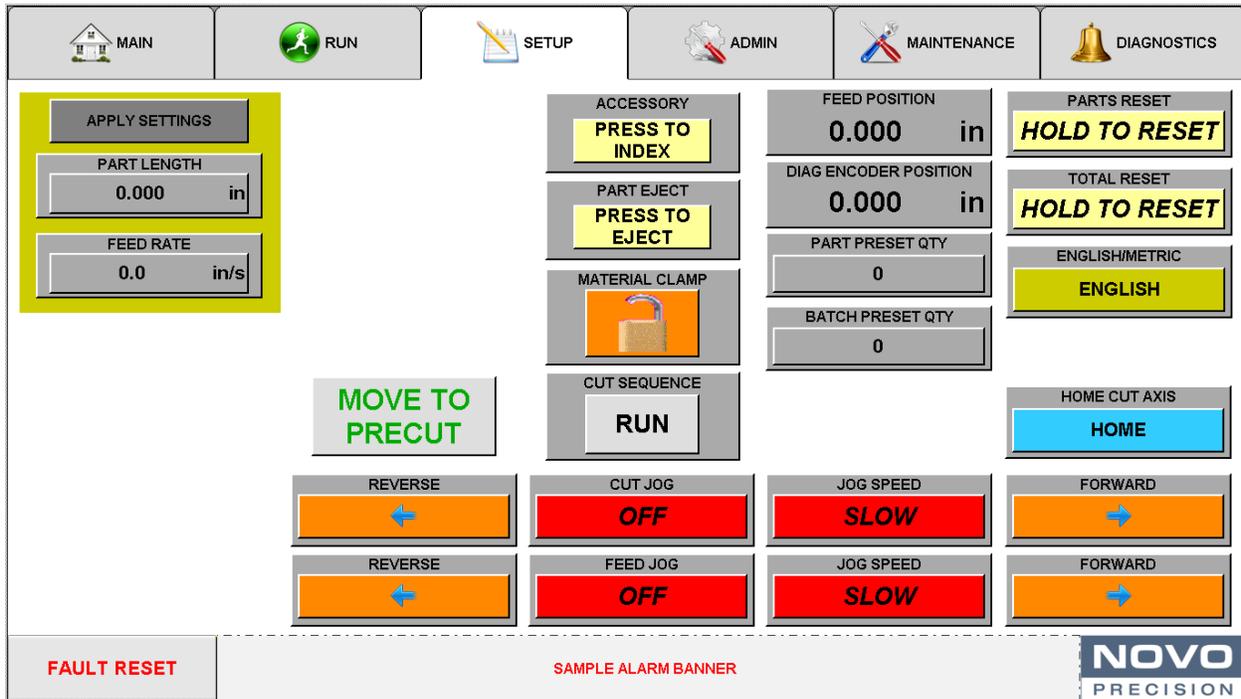
**Jog Reverse/Counter-Clockwise:** This button will jog the machine in the reverse direction on the selected lane.

**Accessory:** Pressing this button will advance the conveyor or other group retaining equipment to the next open section. This button is only available if the conveyor has been enabled on the accessory screen. This function is meant to be used with a compartmented conveyor or segmented batch collection equipment using a single sensor. When enabled, the control will look for the sensor input at the end of a batch, engage the conveyor output and then disengage when it see the same sensor input again. The system will then be ready to produce the next batch. *Not compatible with Wind/Bend.*

**Part Eject:** Pressing this button will advance the material a distance input on the accessory screen to eject the previously cut part from the exit guiding system when used with the dumping stacker type equipment. This length is subtracted from the next part length so the feed will compensate to the correct length for the first part of the next feed. This eject feed is required to get the material away from the cutting & exit guide system so the parts can rotate without interference. *Not compatible with Wind/Bend.*

# Setup Screen

## Abrasive Cut Option



**Cut Jog:** This button will engage/disengage the jog function on the selected lane. *Cut Jog is not available when Abrasive Cut is disabled.*

**Move To Precut:** Pressing this button will move the cut axis to the pre-cut position. *Not available when Abrasive Cut is disabled.*

**Diag Encoder Position:** This field monitors the position of the upstream diagnostic encoder. *Not shown in systems with abrasive cut and diag encoder disabled.*

**Cut Sequence:** This will run the abrasive cut sequence by turning the saw on and moving into wire path to cut wire. *Not shown when Abrasive Cut option is disabled.*

**Home Cut Axis:** This button will perform the homing procedure for the abrasive cut axis. *Not shown when Abrasive Cut option is disabled.*

# Setup Screen Chamfer Option

MAIN	RUN	SETUP	ADMIN	MAINTENANCE	DIAGNOSTICS
APPLY SETTINGS PART LENGTH 0.000 in FEED RATE 0.0 in/s	HOME CHAMFER TRANSPORT <b>HOME</b> MOVE TO PRECHAMFER MANUAL CUT	ACCESSORY PRESS TO INDEX PART EJECT PRESS TO EJECT MATERIAL CLAMP	FEED POSITION 0.000 in TRANSPORT POSITION 0.000 in PART PRESET QTY 0 BATCH PRESET QTY 0	PARTS RESET <b>HOLD TO RESET</b> TOTAL RESET <b>HOLD TO RESET</b> ENGLISH/METRIC <b>ENGLISH</b>	
	REVERSE 	CHAMFER JOG <b>OFF</b>	JOG SPEED <b>SLOW</b>	FORWARD 	
	REVERSE 	TRANSPORT JOG <b>OFF</b>	JOG SPEED <b>SLOW</b>	FORWARD 	
	REVERSE 	FEED JOG <b>OFF</b>	JOG SPEED <b>SLOW</b>	FORWARD 	
<b>FAULT RESET</b>	SAMPLE ALARM BANNER			<b>NOVO</b> PRECISION	

**Move To Prechamfer:** This button will move the transport axis into the pre-chamfer position. *Not available when Chamfer is disabled.*

**Home Chamfer Transport:** This button will perform the homing procedure for the transport axis. *Not available when Chamfer is disabled.*

**Chamfer/Transport Jog:** This button will engage/disengage the jog function on the selected lane. *Not available when Chamfer is disabled.*

# Accessory Screen

MAIN	RUN	SETUP	ACCESSORY	MNTNCE	ALARMS
ACCESSORY FUNCTION SETUP					
CONVEYOR DUMPING STACKER		POST FEED 0.0 s	CD - STACKER DISABLED		
COMPARTMENTED CONVEYOR		CONVEYOR DISABLED		FEED SPEED 0.0 in/s	
EJECTION FEED COMP		FEED LENGTH 0.000 in	4D - STACKER DISABLED		
(4) POSITION DUMPING STACKER		FEED SPEED 0.0 in/s		FEED LENGTH 0.000 in	
EJECTION FEED COMP		PNEUMATIC BEND DISABLED			
PNEUMATIC BEND		DISABLED			
 FAULT RESET		SAMPLE ALARM BANNER			

On this screen is where the operator can enable or disable accessory functions of attached equipment. *This screen is not applicable with systems including bending and winding*

## Conveyor Dumping Stacker:

**Conveyor:** This button will enable a conveyor with a dumping option. The actual conveyor speed is controlled on the conveyor unit.

**Post Feed Time:** This time entry will pop up a keypad to enter the conveyor over run time desired to pull the previous part from the cut & guiding section prior to the dumping action.

**Compartmented Conveyor:** This button will enable the conveyor described on the "Setup" page.

**Conveyor:** This button will enable the compartmented conveyor. The actual conveyor index speed is controlled on the conveyor unit.

**Feed Length:** The feed length entry will pop up a keypad to enter the over feed desired to eject the previous part from the cut & guiding section.

**Feed Speed:** The feed speed entry will pop up a keypad to enter the feed speed desired to eject the previous part from the cut & guiding section.

## 4 position Compartmented Dumping Stacker:

**Stacker:** This button will enable the 4 position dumping stacker. The actual rotation speed is controlled on the dumping unit.

**Feed Length:** The feed length entry will pop up a keypad to enter the over feed desired to eject the previous part from the cut & guiding section.

**Feed Speed:** The feed speed entry will pop up a keypad to enter the feed speed desired to eject the previous part from the cut & guiding section.

**Pneumatic bending option:** This button will enable the Pneumatic Bending option. *On machines with Wind/Bend Enabled, this changes the bend to a pneumatic bend. This SHOULD NOT BE ENABLED TOGETHER.*

## Maintenance Screen Section:

On the maintenance screen it is possible to enter values that regulate the speed and time required for the system to produce a feed. Other field button choices will regulate the operation of the system. Access to the accessory screen is also made available in the tabs at the top of this screen.

The screenshot displays the Maintenance Screen interface. At the top, there are six tabs: MAIN (house icon), RUN (green person icon), SETUP (pencil icon), ACCESSORY, MAINTENANCE (wrench and screwdriver icon), and DIAGNOSTICS (bell icon). The MAINTENANCE tab is active. Below the tabs, there are several control panels:

- CUT DWELL TIME:** 0 ms
- CUT WIDTH:** 0.000 in
- FORM COMP:** 0.000 in
- PAUSE MODE TIME:** 0.0 s
- ACCELERATION:** 0.0 in/s<sup>2</sup>
- DECELERATION:** 0.0 in/s<sup>2</sup>
- AUDIBLE:** SONIC ALERT OFF (red background)
- CUT MODE:** TIMED (green background)
- ENGLISH/METRIC:** ENGLISH (yellow background)
- PAUSE MODE:** PART PAUSE

At the bottom, there is a **FAULT RESET** button on the left, a **SAMPLE ALARM BANNER** in the center, and the **NOVO PRECISION** logo on the right. A large yellow **APPLY SETTINGS** button is centered in the middle of the screen.

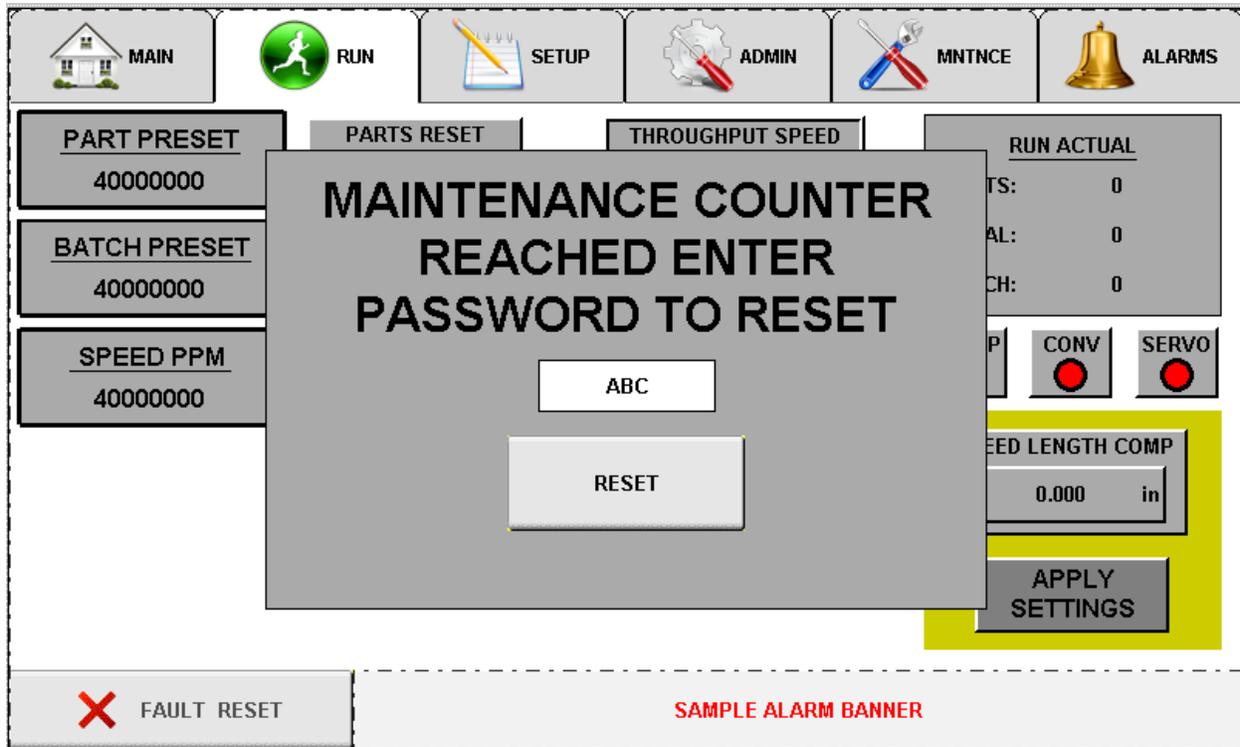
**Cut Dwell Time:** The time entry in this field will regulate the output time that the default cutter output will stay active. Any changes to these fields will cause a popup keypad to be available to enter the changes. Depending on the features ordered with the system, TAK will set all settings for optimum performance where possible. Please record these settings prior to entering new ones.

**Acceleration:** The entry in this field will control the speed at which the system will ramp up to speed. A smaller number will create a slow ramp and a large number will generate a fast ramp. This setting will be variable depending on the application or materials used in the system. If a high (short) ramp value is used in conjunction with a high feed rate on the setup screen it will possibly kick out the servo control and a reset will be necessary on the “Admin” screen.

**Deceleration:** The entry in this field will control the speed at which the system will ramp down to stop. A smaller number will create a slow ramp and a large number will generate a fast ramp. This setting will be variable depending on the application or materials used in the system. If a high (short) ramp value is used in conjunction with a high feed rate on the setup screen it will possibly kick out the servo control and a reset will be necessary on the “Admin” screen.

**Cut Width:** If the system is designed with tooling that removes a section of material from the part feed, by entering the width of the cut in this field, the system will compensate for this loss automatically and deliver the part to the correct length. If a length is entered here on a system with no section removal, the part will be incorrect.

**Maintenance Counter Set:** The value entered in this field will generate a warning message when the count shown in the maintenance counter reaches this set value.



**Apply Settings:**

1. Pressing the “Apply Settings” button is required for the system to accept a new entry.
2. The area box containing the buttons will flash until the “Apply Settings” is pressed.
3. The color of this box is an indication of which measurement method is being used, either English (Green) or Metric (Red).

**Audible Alarm:** If the system is equipped with this feature, this button will toggle to turn on or off the sonic alarm.

**Cut Mode:** This button will toggle the timed and sensed modes of the system.

1. **Timed:** This will cause the default cutter output to activate based on the time entered in the “Cut Dwell Time” entry field.
2. **Sensored:** This mode requires the cut head output to be monitored by (2) sensors to control the action of the cut head or other processes to use a “Home-Away-Home” sequence.

**English/Metric:** This button will toggle the English and Metric modes of the system. The box enclosures shown around buttons on various screens will be green for English and red for metric.

**Pause Mode:** This mode button is used to choose between pausing the system;

1. “Post Part” where after the cutter action on each part produced, the system will dwell the time entered in the “Pause Mode Time” field.

2. "Post Batch" where after the last cutter action on each batch produced, the system will dwell the time entered in the "Pause Mode Time" field.
3. When the "Pause Mode Time" field is at "0" the unit will run without pause at either condition.

## Diagnostics Screen Section:

This screen includes sub tabs for all machine diagnostics.

### Diagnostics Alarms Screen

ALARMS	ALARM HISTORY	I/O	SAFE I/O	AXIS DATA																																																																																																														
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">%m/%d/%Y %l:%M:%S%p</td> <td style="width: 10%;">012</td> <td style="width: 10%;">AlarmText</td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> </tr> <tr> <td>%m/%d/%Y %l:%M:%S%p</td> <td>012</td> <td>AlarmText</td> <td></td> <td></td> </tr> </table>					%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText			%m/%d/%Y %l:%M:%S%p	012	AlarmText		
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<b>FAULT RESET</b>	SAMPLE ALARM BANNER			<b>NOVO</b> PRECISION																																																																																																														

This screen shows all active machine alarms.

### Diagnostics Alarm History Screen

Timestamp	Status	Text
%m/%d/%Y %l:%M:%S%p	012	AlarmText

This screen shows history of alarms with up to 4000 entries.

### Diagnostics I/O Screen

Module	Input/Output	Status	
X20 DI 9371	[SPARE]	Grey	
	Loop Pause	Green	
	Conveyor Flight	Green	
	[SPARE]	Grey	
	[SPARE]	Grey	
	[SPARE]	Grey	
	X20 DO F322	Alarm Relay	Green
		[SPARE]	Grey
		Cycle Run	Green
		Cycle Pause	Green
Stack Green		Green	
Stack Red		Green	
Air Brake		Green	
[SPARE]		Grey	
[SPARE]		Grey	
[SPARE]		Grey	
X20 DI F322	Wire Out	Green	
	Bend Arbor Away	Green	
	Bend Arbor Home	Green	
	Snag Sensor	Green	
	Remote Resume	Green	
	Remote Pause	Green	
	Remote Stop	Green	
	Remote Start	Green	
	Air OK	Green	
	[SPARE]	Grey	

This screen shows the current state of all IO modules and their inputs/outputs.

## Diagnostics Safe I/O Screen

This screen shows the current status of all Safety IO points.

## Diagnostics Axis Data Screen

Axis Selection	POSITION	ERROR ID	DRIVE ENABLE
FEED WIND	0.00 °	0	0
	SPEED 0.0 %/s	CURRENT 0.00 A	POSITIVE LIMIT SWITCH 0
	LAG ERROR 0.00 °	CURRENT (PEAK) 0.00 A	NEGATIVE LIMIT SWITCH 0
	TRIGGER 1 0	TRIGGER 2 0	HOME SWITCH 0

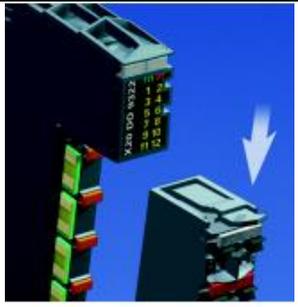
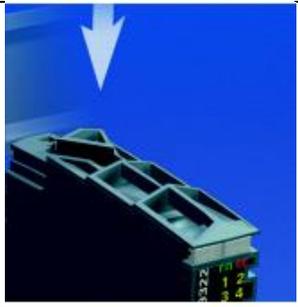
This screen shows the data for each of the servo axes.

# Hardware Change Instructions:

**Servo Drives:** The B&R Servo Drives are able to be changed out with a new part without any programming necessary. The firmware on the drives will be compared with the expected firmware by the PLC upon a hardware change and the correct firmware will be loaded if it is not already on the drive. These drives are therefore capable to swap and power back on the system.

1. Remove all connectors from the drive, and unscrew the two screws holding it in place on the backpanel.
2. Once the Drive is off of the backpanel and disconnected, remove the plug in modules from the bottom front of the drive.
3. Place these plug in modules in the same slots on the new drive.
4. Mount the new drive in place.
5. Connect all connectors.

**IO Modules:** The IO modules in the panel are easily changeable as well. The following documents the procedure:

<p>Remove the terminal block by pressing the tab at the top of the block. Removal of wires from the terminal block is not necessary.</p>	
<p>Press the triangular module release at the top of the IO module while pulling the module straight out. The module will not come out until the terminal block 'hook' has been unhooked from the backplane module.</p>	
<p>Reinstall the new module in the reverse order.</p>	

**HMI Panel:** To replace the HMI panel, follow the procedure below:

1. Remove all connectors from the HMI panel.
2. Remove the CF Card from the HMI panel.
3. Unmount the HMI panel from the enclosure.
4. Mount the new HMI panel into the enclosure.
5. Place the CF Card into the new HMI panel.
6. Reconnect all connectors to the new HMI panel.

The CF Card contains all software, firmware and operating system for the HMI panel and the rest of the hardware on the system. Therefore, there is no configuration or programming necessary when replacing hardware modules.



# Installation/Sharpening of square quills:

If your purchased unit was ordered with square quills or you have added this option to an existing machine, the following instructions and included drawings will guide you thru the removal, sharpening & replacement of the quill sets.

**ATTENTION:** Remove the air supply and shut off the power to the unit. The following instructions make reference to item numbers shown in drawings in the user manual and this addendum.

## **DISASSEMBLY:**

1. Remove the (2) screws holding the cutter cylinder to the cutter body.
2. Lay the cylinder to the side out of the way. There is no need to disconnect the air lines from the cylinder.
3. Remove the (2) screws holding the cutter body assembly to the base.
4. You will observe that the gas spring under the cutter assembly will push the assembly up appr. .06 from the seated position, this is normal.
5. Remove the cutter arm cover from the cutter body.
6. Remove the cutter quill body block from the cutter body.
7. Remove the stationary quill from the cutter body.
8. Remove the traveling quill from the quill body block.

## **SHARPENING:**

The cutting quills are marked and are possibly different lengths. The stationary quill will have the smaller wire hole and will be shorter in length than the traveling quill. One face is closer to the alignment pin, this face will be the cutting end (surface "A") and the other will have a tapered entry or exit depending which quill is being sharpened.

When sharpening the cutting quills be sure to keep the alignment pin in its groove and the (2) halves square and aligned in a "V" block or other fixture.

1. Grind the cutting face until the worn/dull section of the shape is gone.
2. Lap the face of the quills until the surface is smooth and grind lines are gone.
3. Use a small piece of brass or wood with fine lapping compound and very lightly remove the sharp edge around the shape or hole.

## **RE-ASSEMBLY:**

*Please refer to the enclosed addendum drawing.*

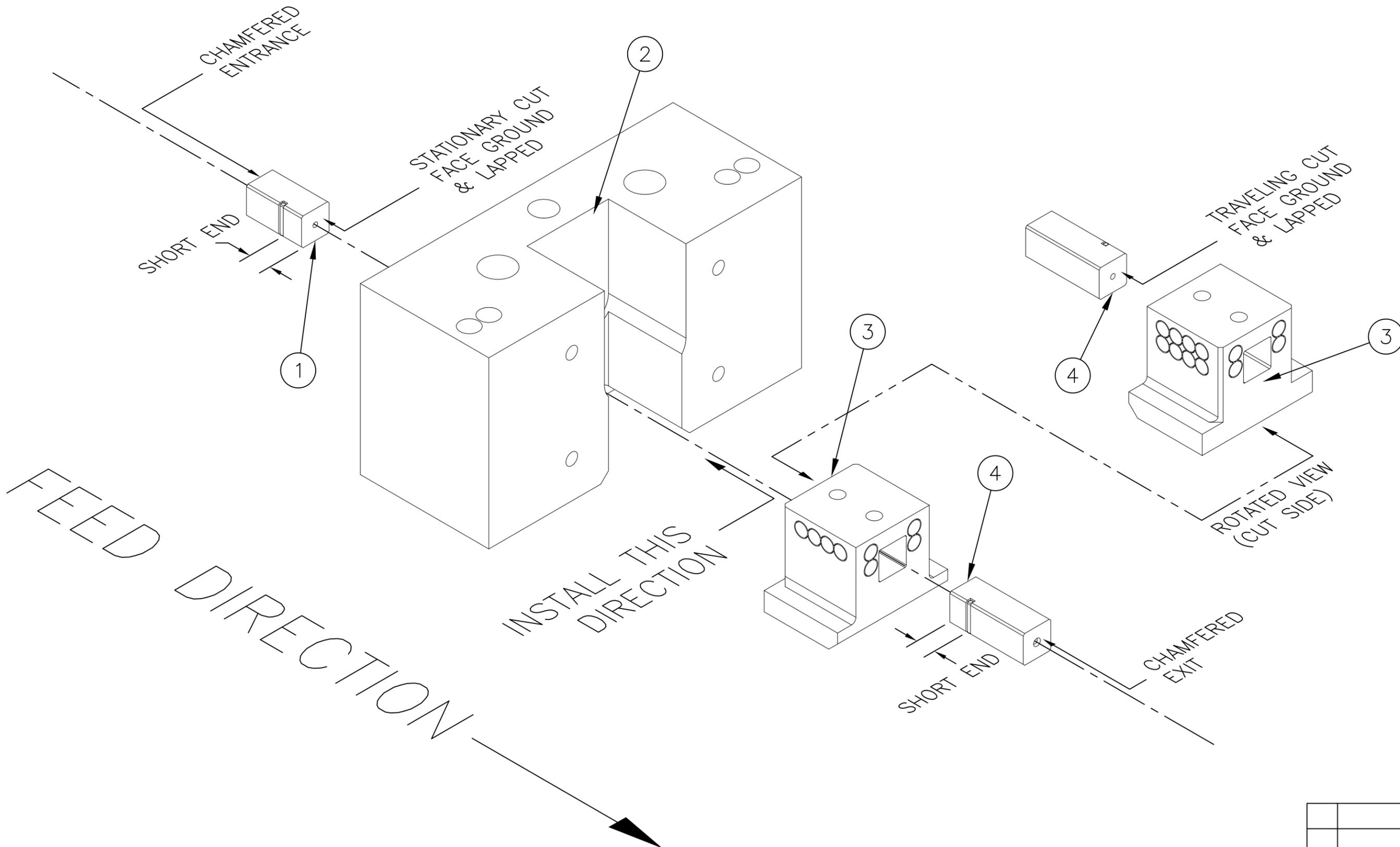
1. Most but not all square quills are manufactured in (2) halves. Orient the quills so that the (2) halves are on top and bottom, place the split line in the horizontal position.
2. Place the stationary quill into the cutter body with the just sharpened face (surface "A" #1) flush with the inner cutter body face (surface "B" #2) as shown then adjusted as follows.
3. The face of this quill (surface "A" #1) **must be placed flush** with the inside surface of the cutter body (surface "B" #2) and tightened into place. A block or a dial indicator



## Installation/Sharpening of square quills:

- placed into the traveling quill groove can be used to assure that the quill is not sticking out or depressed below the surface (surface “B” #2).
4. Place the traveling quill into the traveling quill body block with the just sharpened face (surface “A” #4) flush with the traveling quill block face (#3) this face is also identified by the chamfers on (2) of the vertical edges.
  5. This is the quill that needs be adjusted to provide the correct amount of clearance to achieve the “break” required for the material being cut. This clearance value will have to be determined by the operator by experimentation. The correct value will give a cut with a clean square surface with no burr. If the clearance is set too tight, tool edge life will be shortened and if set too large the material will have burrs or not cut off correctly.
  6. The best method of setting this clearance is to use a dial indicator that has a resolution of .0001 inch.
  7. Place the traveling quill body block on a surface plate or other suitable surface with the cutting face (surface “A” #3 & #4) facing up.
  8. Indicate the face of the quill (surface “A” #4) and place it below the face (#3) of the traveling quill block a predetermined amount that was recorded previously or at a point you wish to use to evaluate a cut.
  9. Slide the traveling quill body block back into the cutter body groove as shown with the sharpened faces of the quills facing each other.
  10. Replace the cutter arm cover.
  11. Place the cutter assembly back over the gas spring and tighten in place.
  12. Replace the cut cylinder and tighten in place.
  13. Re-initialize the unit and proceed making trial cuts to verify cut quality.

This instruction is very similar across the complete SF&C line of machines, independent of the quill or material shape or size.



REV	ECN	CHG BY	DATE



TOLERANCE UNLESS OTHERWISE STATED		CAD		DRAWING / PART NO.	
± 3"	FRACT +/- 1/16	DWN	DPC	PART NAME	
± 0.0003	.X ± .032	CHK		SQUARE CUT ALIGNMENT	
± 0.0002	.XX ± .015	SCALE		CUSTOMER	
± 0.0005	.XXX ± .005	DATE	10/25/2018		
± 0.0005	.XXXX ± .005				



# SHARPENING PROCEDURE

## For QUILL ON QUILL Type

### Straighten, Feed & Cut Off Machine

**NOTE:** Wire hole cutting edge, and any surface leading to wire hole cutting edge should be free of all tool marks and/or grinding lines. (Figures 1, 2 & 3)

**Step 1:** Grind *Traveling Quill*

Grind end (A) of Quill (opposite wire exit side) flat and perpendicular to body (B) within .0002. Remove enough material to clean and acquire sharp edge for the full diameter of the wire hole.

See Fig #1

**NOTE:** After grinding, surface (A) must be lapped to remove any grinding lines and to ensure longevity. (Step 3)

**Step 2:** Grind *Stationary Quill*

Grind end (A) of quill (opposite wire entry side) flat and perpendicular to body (B) within .0002. Remove enough material to clean and acquire sharp edge for the full diameter of the wire hole.

See Fig #1

**Step 3:** *Lapping Procedure*

- a. Use diamond lapping compound to remove all grinding lines.
- b. Radius or break the wire hole cutting edge approx. .002 **for hard wire only.**

## Quill on Quill Setting Procedure

### **Step 1:** *Stationary Quill*

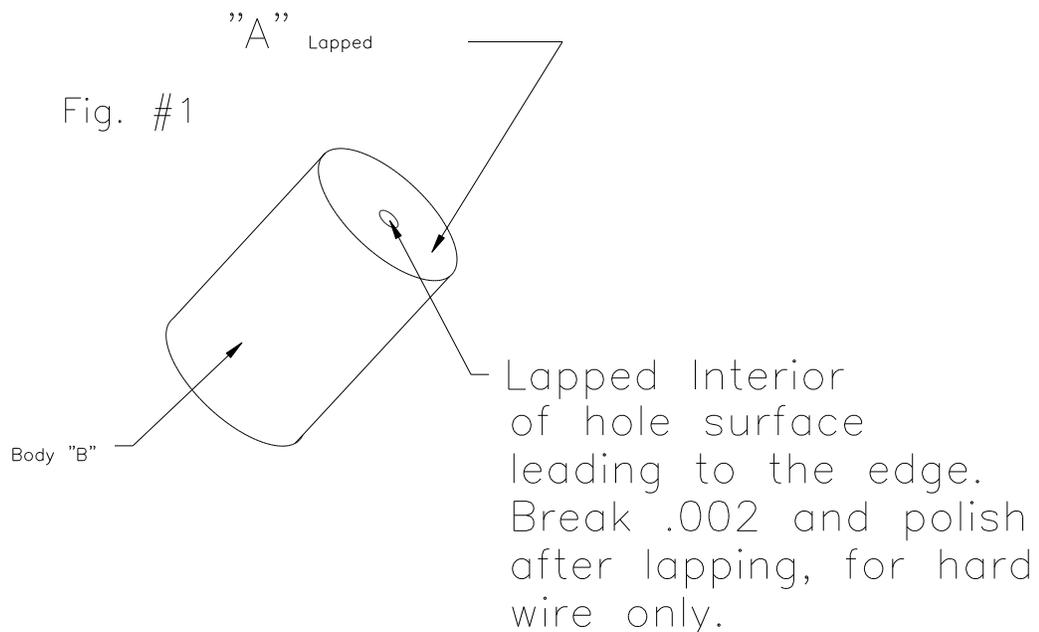
Set *stationary quill* with surface (A) (Fig 1) flush to surface (B). (Fig 2) Do not extend above surface (B). Use appropriate shim grind rings to set surface (A) of the *stationary quill* flush to surface (B) of the *cutter body*.

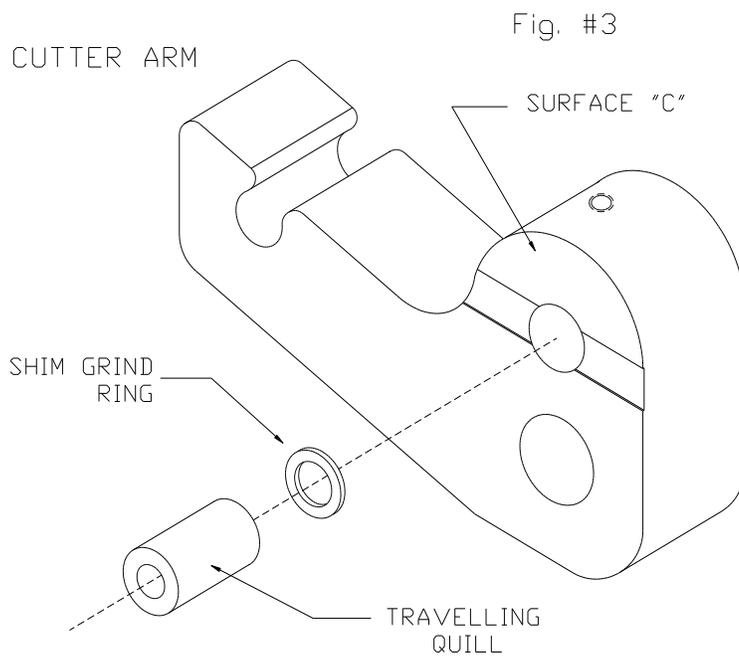
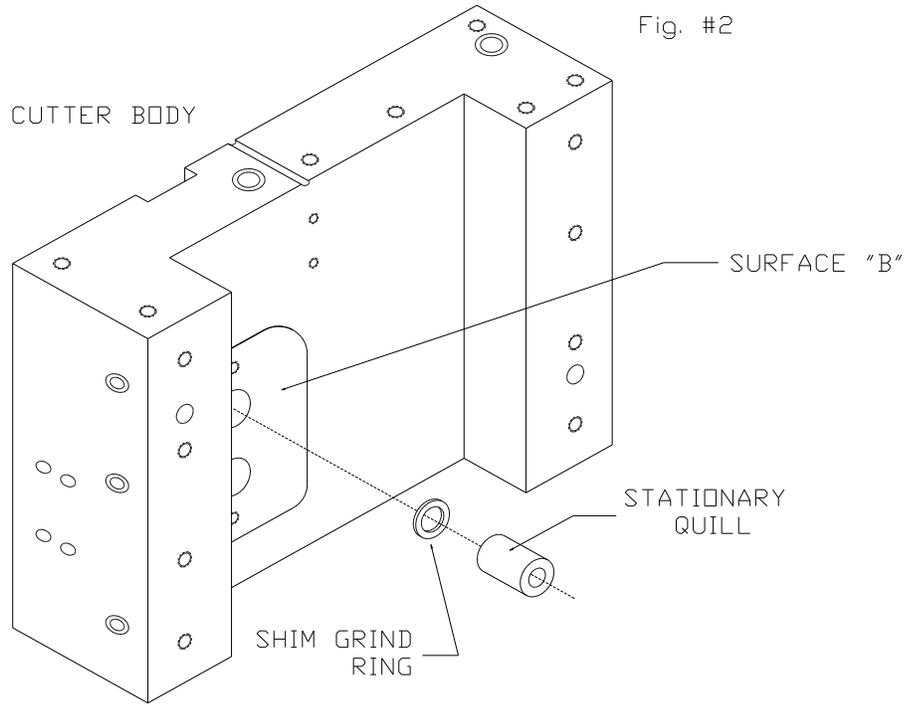
### **Step 2:** *Traveling Quill*

Set *traveling quill* with surface (A) (Fig 1) flush or below the *cutter arm* surface (C) (Fig 3) do not extend out from surface (C). Use appropriate shim grind rings to set surface (A) of the *travelling quill* flush or below surface (C) of the *cutter arm*.

**NOTE:** Properly set quills should have clearance between surface (A) on *stationary quill* and surface (A) on *traveling quill* dependent on the wire type and hardness.

### **Illustrations:**

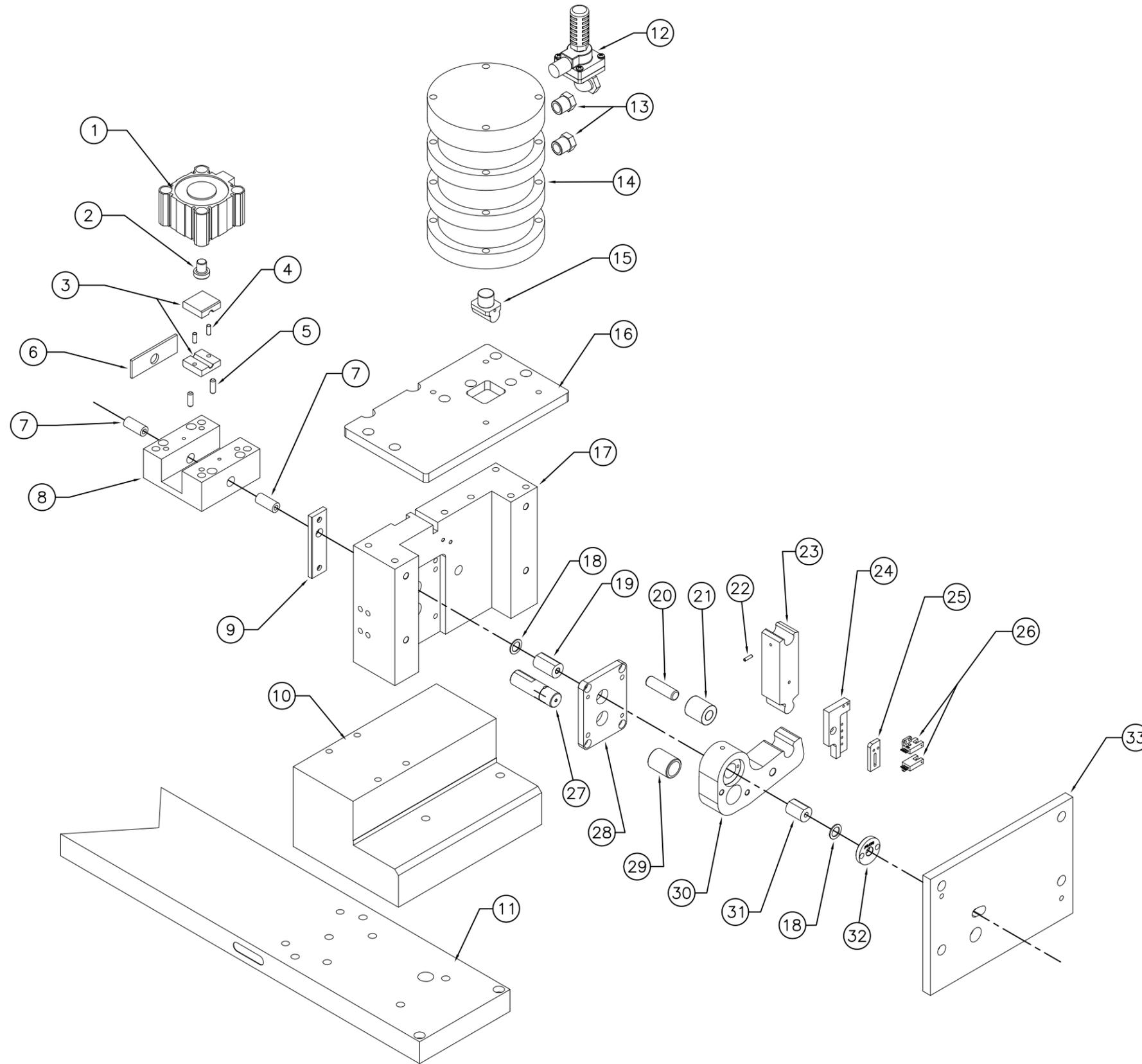






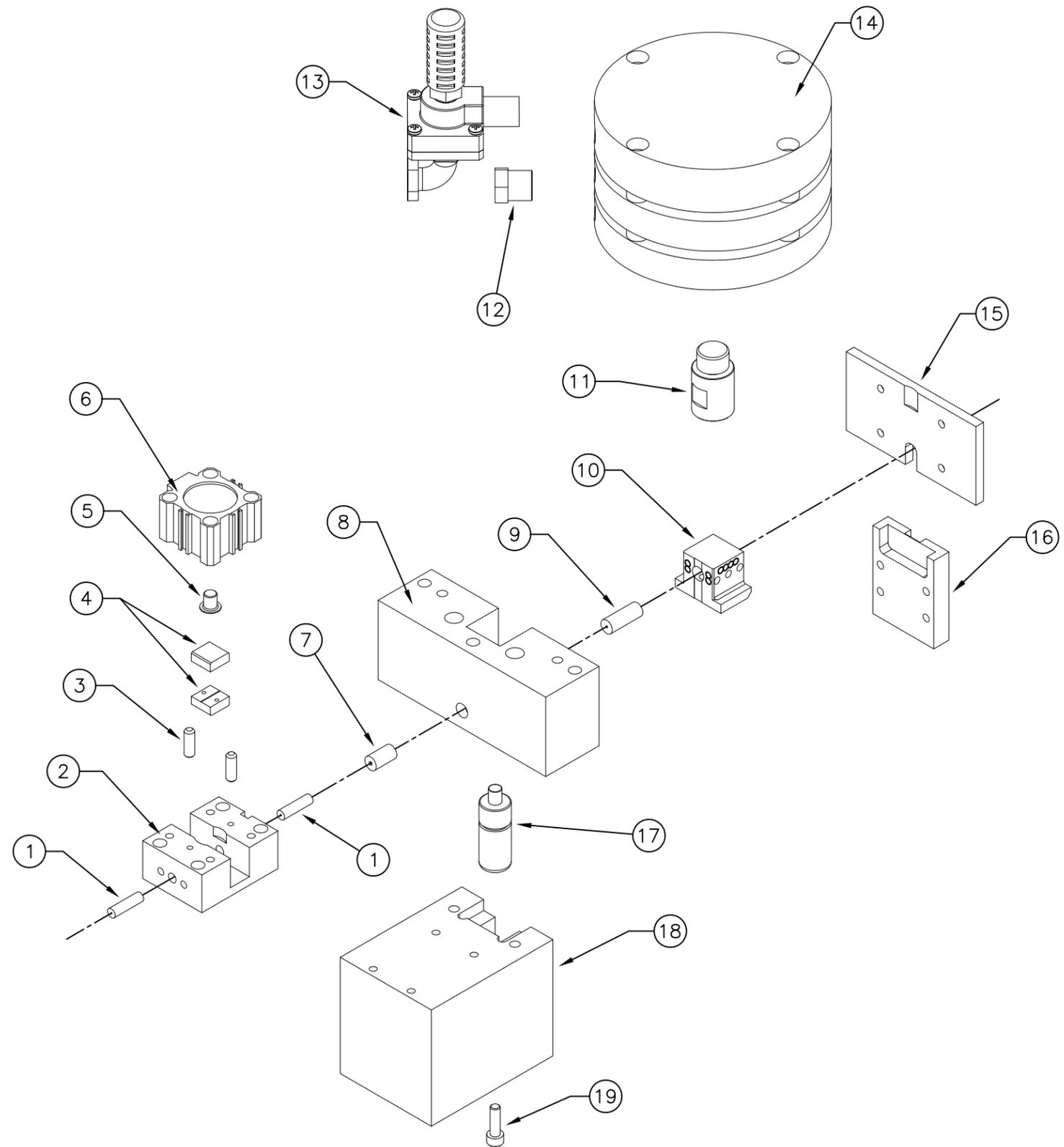
### PART LISTING

#	PART NUMBER	DESCRIPTION	QTY.
1	9400-512	63mm GRIPPER CYLINDER	1
2	4000-077	63mm GRIPPER PIN	1
3	4004-6XX	GRIPPER	2
4	9020-022	INTERNAL GRIPPER SPRING	2
5	9007-041	GRIPPER DOWEL PIN	2
6	4004-113	GRIPPER WEAR PLATE	1
7	4004-5XX	FEED GUIDE	2
8	4004-103	GRIPPER BODY	1
9	4004-132	QUILL BACKER PLATE	1
10	4004-129	CUTTER BASE	1
11	4004-4XX	MAIN BASE PLATE	1
12	9402-009	EXHAUST DUMP VALVE	1
13	9404-038	BREATHER	2
14	9400-531	CUTTING CYLINDER	1
15	4010-205	CYLINDER PIVOT	1
16	4004-136	CYLINDER ADAPTER PLATE	1
17	4004-159	CUTTER BODY	1
18	9008-002	ADJUSTMENT WASHER	2
19	4004-7XX	STATIONARY QUILL	1
20	9007-058	Ø0.50 X 1.75 DOWEL	1
21	4004-173	STOP SLEEVE	1
22	9007-020	Ø0.125 X 0.50 DOWEL	1
23	4004-134	CUTTER ARM LINK	1
24	4004-193	SENSOR BRACKET	1
25	4004-194	LOWER SENSOR ADJUSTER	1
26	9100-024/025	UPPER/LOWER SENSORS	2
27	4004-137	CUTTER ARM SHAFT	1
28	4004-163	CUTTER ARM BACKING PLATE	1
29	9311-006	OILITE BUSHING	1
30	4004-160	CUTTER ARM	1
31	4004-8XX	TRAVELING QUILL	1
32	4004-135	TRAVELING QUILL BACKER	1
33	4004-131	CUTTER ARM COVER	1



REV	ECN	CHG BY	DATE

	TOLERANCE UNLESS OTHERWISE STATED ± 3" FRACT +/- 1/16 ± 0.0003 .X ± .032 ± 0.0002 .XX ± .015 ± 0.0005 .XXX ± .005 ± 0.0005 .XXXX ± .0005		CAD DWN GDH CHK SCALE DATE 082207	DRAWING / PART NO. #4 SF&C PART NAME GENERIC 4H CUTTER HEAD CUSTOMER



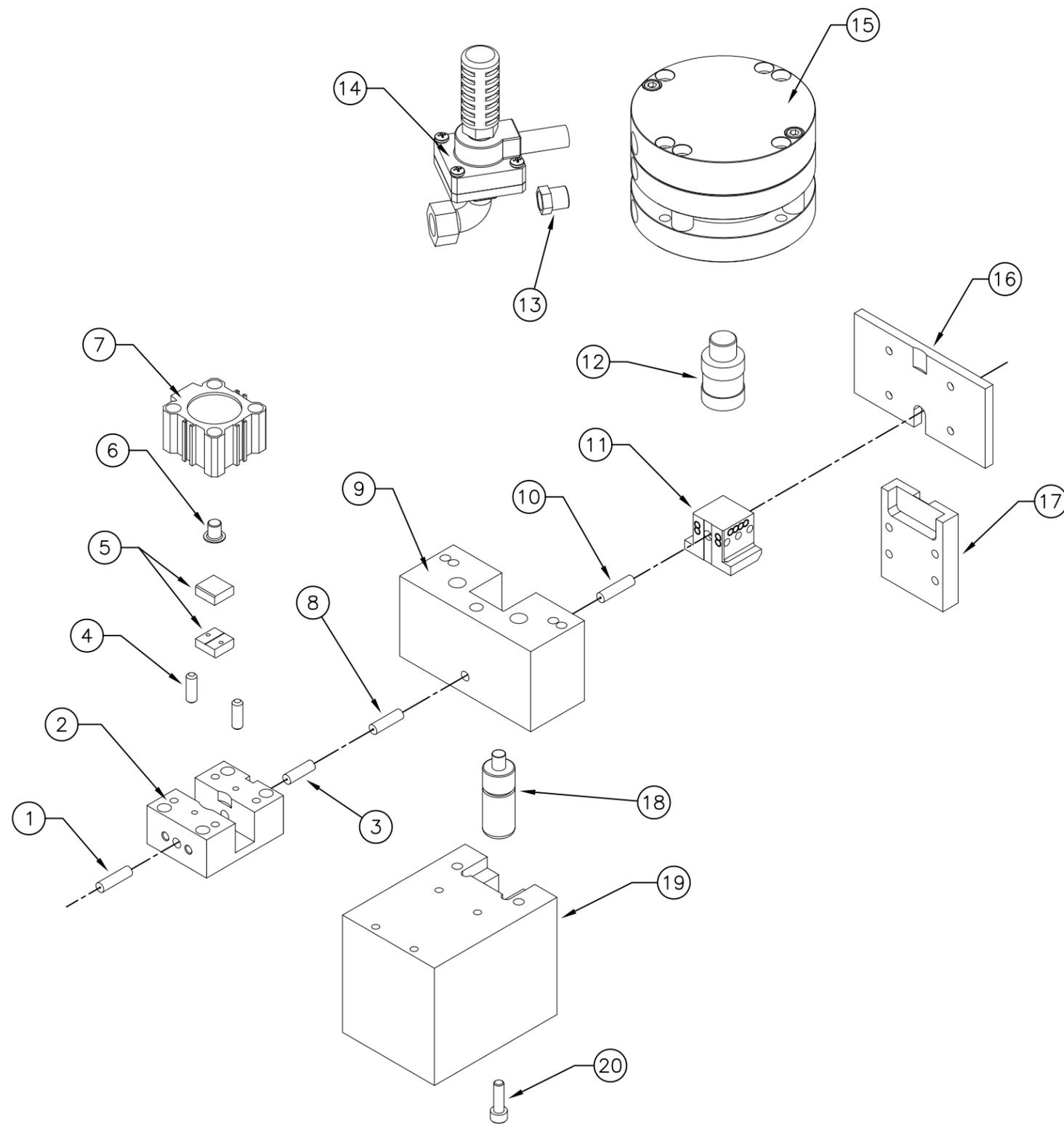
### PART LISTING

#	PART NUMBER	DESCRIPTION	QTY.
1	4000-7XX	FEED GUIDE	2
2	4001-405	GRIPPER BODY	1
3	9007-039	GRIPPER DOWEL PIN	2
4	4001-8XX	GRIPPER	2
5	4000-074	32mm GRIPPER PIN	1
6	9400-509	32mm GRIPPER CYLINDER	1
7	4003-2XX	STATIONARY QUILL	1
8	4003-418	CUTTER BODY	1
9	4003-3XX	TRAVELING QUILL	1
10	4003-427	QUILL BODY BLOCK	1
11	4002-438	CYLINDER EXTENDER	1
12	9404-038	BREATHER	1
13	9402-009	EXHAUST DUMP VALVE	1
14	9400-526	CUTTING CYLINDER	1
15	4002-079	CUTTER BODY COVER	1
16	4002-428	GAS SPRING COVER	1
17	9020-500	GAS SPRING	1
18	4002-427	CUTTER BASE (GAS STYLE)	1
19	900M-041	M6-1 X 20mm SHCS	1

REV	ECN	CHG BY	DATE



TOLERANCE UNLESS OTHERWISE STATED		CAD		DRAWING / PART NO.	
± 3"	FRACT +/- 1/16	DWN	KPL	#3 SF&C	
± 0,0003	.X ± .032	CHK		PART NAME	
± 0,0002	.XX ± .015	SCALE		GENERIC #3 QQ	
± 0,0005	.XXX ± .005	DATE 5/22/03		CUTTER HEAD	
± 0,0005	.XXXX ± .005			CUSTOMER	



### PART LISTING

#	PART NUMBER	DESCRIPTION	QTY.
1	4000-7XX	REAR FEED GUIDE	1
2	4001-405	GRIPPER BODY	1
3	4000-8XX	FRONT FEED GUIDE	1
4	9007-039	GRIPPER DOWEL PIN	2
5	4001-8XX	GRIPPER	2
6	4000-074	32mm GRIPPER PIN	1
7	9400-509	32mm GRIPPER CYLINDER	1
8	4001-2XX	STATIONARY QUILL	1
9	4002-432	CUTTER BODY	1
10	4001-4XX	TRAVELING QUILL	1
11	4002-426	QUILL BODY BLOCK	1
12	4001-463	CYLINDER EXTENDER	1
13	9404-008	BREATHER	1
14	9402-004	EXHAUST DUMP VALVE	1
15	9400-521	CUTTING CYLINDER	1
16	4002-079	CUTTER BODY COVER	1
17	4002-428	GAS SPRING COVER	1
18	9020-500	GAS SPRING	1
19	4002-427	CUTTER BASE (GAS STYLE)	1
20	900M-041	M6-1 X 20mm SHCS	1

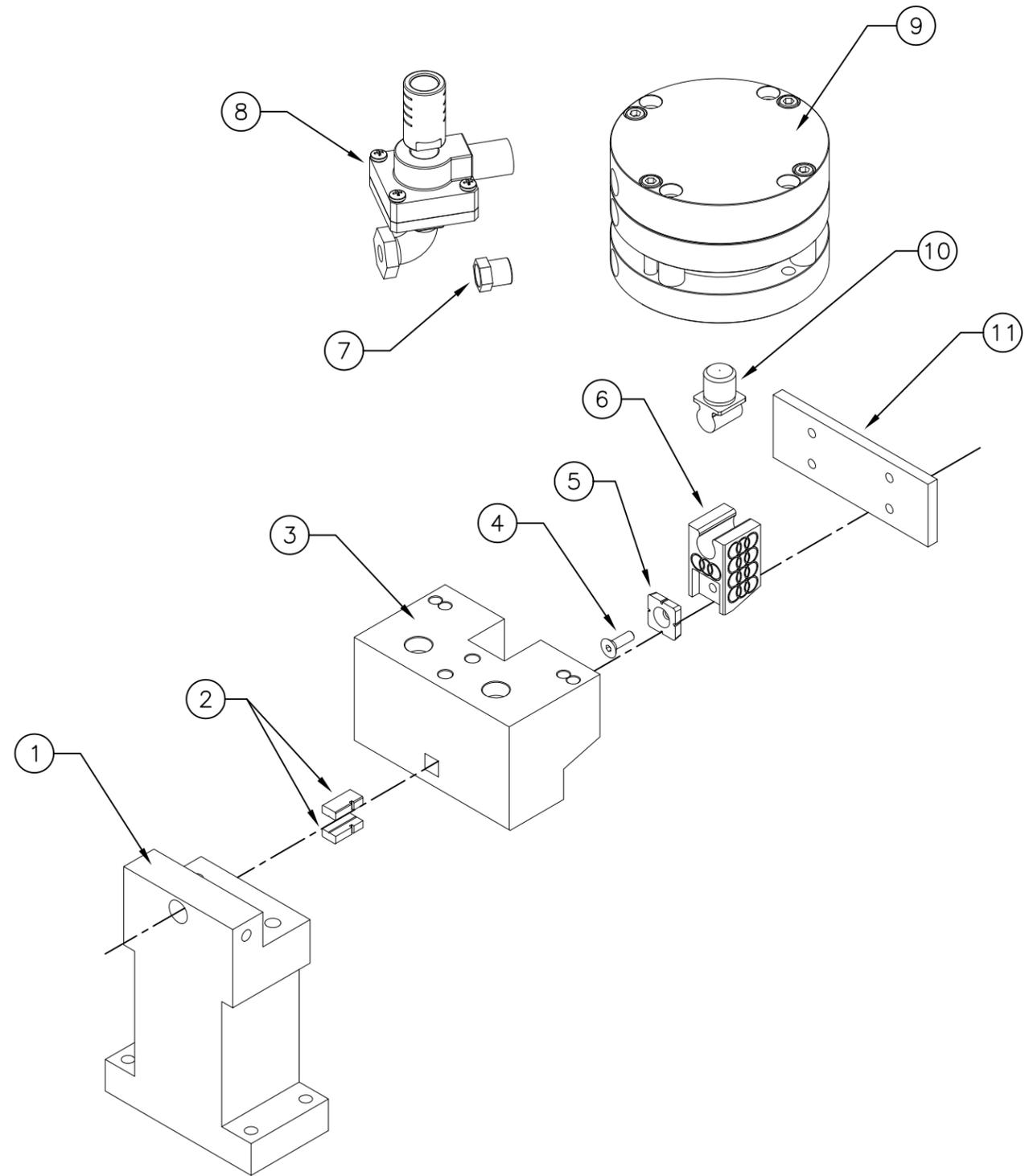
REV	ECN	CHG BY	DATE



TOLERANCE UNLESS OTHERWISE STATED	
± 3"	FRACT +/- 1/16
± 0.0003	.X ± .032
± 0.0002	.XX ± .015
± 0.0005	.XXX ± .005
± 0.0005	.XXXX ± .0005

CAD	DRAWING / PART NO.
DWN GDH	#2 SF&C
CHK	PART NAME
SCALE	GENERIC #2 QQ
DATE 120413	CUTTER HEAD
	CUSTOMER

REDRAWN	DPC	10/29/2018
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### PART LISTING

#	PART NUMBER	DESCRIPTION	QTY.
1	6100-358	OVERHANG CUTTER BASE	1
2	4002-5XX	SQUARE QUILL BLANKS	1
3	4002-497	SQUARE OVERHANG CUTTER BODY	1
4	9001-076	#10-32 X 3/4 FHCS	1
5	4002-1XX	CUTTING BLADE BLANK	1
6	4002-484	OVERHANG CUTTER BLOCK	1
7	4004-008	BREATHER	1
8	4002-004	EXHAUST DUMP VALVE	1
9	9400-521	CUTTING CYLINDER	1
10	4002-461	CYLINDER PIVOT	1
11	4002-485	OVERHANG CUTTER COVER	1

REV	ECN	CHG BY	DATE



TOLERANCE UNLESS OTHERWISE STATED		CAD	DRAWING / PART NO.
± 3"	FRACT +/- 1/16	DWN DPC	#2 SF&C
± 0.0003	.X ± .032	CHK	PART NAME
± 0.0002	.XX ± .015	SCALE	SQUARE #2 OVERHANG CUTTER HEAD
± 0.0005	.XXX ± .005	DATE 10/25/2018	CUSTOMER
± 0.0005	.XXXX ± .005		

## DRAWING INDEX

DRAWING NUMBER	DESCRIPTION
1	TITLE SHEET, BILL OF MATERIAL & DRAWING INDEX
2	SCHEMATIC, INCOMING 208VAC POWER DISTRIBUTION & 24VDC POWER
3	SHEET RESERVED FOR FUTURE USE
4	SCHEMATIC, SAFETY RELAY & E-STOPS
5	INTERLOCK BYPASS ENTRY (KEYED SELECTOR)
6	SCHEMATIC, SD600 SERVO DRIVE
7	SHEET RESERVED FOR FUTURE USE
8	PLC RACK TOPOLOGY AND HMI COMMUNICATION
9	SCHEMATIC, POWERLINK MODULE & POWER SUPPLY MODULE
10	SCHEMATIC, DIGITAL INPUT & DIGITAL OUTPUT MODULES
11	SCHEMATIC, X2X MODULE & X67 DETAIL
12	SHEET RESERVED FOR FUTURE USE
13	MAIN ENCLOSURE LAYOUT
14	MAIN PANEL LAYOUT & TBI TERMINAL DETAIL
15	OPERATOR MATERIAL DETAILS
16	SHEET RESERVED FOR FUTURE USE
17	INTERCONNECT CABLE DETAILS
18	BILL OF MATERIAL
19	SHEET RESERVED FOR FUTURE USE
20	SHEET RESERVED FOR FUTURE USE

## DEVICE SYMBOL LEGEND

SYMBOL	DESCRIPTION
BC	BULKHEAD CONNECTOR
C	CONTACTOR
CB	CIRCUIT BREAKER
CR	CONTROL RELAY
DCD	DC DRIVE
DISC	DISCONNECT SWITCH
DS	DOOR SWITCH
E	ELECTRICAL ENCLOSURE
EPB	EMERGENCY STOP PUSHBUTTON
ER	EMERGENCY STOP RELAY
EF	EXHAUST FAN
FB	FUSE BLOCK
FU	FUSE
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GS	GUARD SWITCH
H	SIGNAL HORN
HMI	HUMAN TO MACHINE INTERFACE
ID	INPUT/OUTPUT MODULE
IM	PLC INPUT MODULE
JB	JUNCTION BOX
KS	KEY SWITCH
LIN	LINMOT MOTION CONTROLLER
LR	LINE REACTOR
LT	LIGHT
M	MOTOR
MS	MOTOR STARTER
MSF	MOTOR STARTER FORWARD
MSR	MOTOR STARTER REVERSE
DC	OPTO COUPLER
OM	PLC OUTPUT MODULE
DTB	OPTICAL TOUCH BUTTON
PB	PUSHBUTTON
PC	PERSONAL COMPUTER
PDB	POWER DISTRIBUTION BLOCK
PE	PHOTO EYE
PLC	PROGRAMMABLE LOGIC CONTROLLER
PRX	PROXIMITY SWITCH
PS	PRESSURE SWITCH OR POWER SUPPLY
REC	RECEPTACLE
RID	REMOTE I/O COMMUNICATION
SR	SAFETY RELAY
SS	SELECTOR SWITCH
SSR	SOLID STATE RELAY
SV	SOLENOID VALVE
SW	OPERATOR SWITCH
SD	SERVO OR STEPPER DRIVE
T	TRANSFORMER
TB	TERMINAL BLOCK
TS	TEMPERATURE SWITCH
TS-X	TERMINAL STRIP (X DENOTES NUMBER)
UPS	UNINTERRUPTABLE POWER SUPPLY
VFD	VARIABLE FREQUENCY DRIVE
VS	VACUUM SENSOR

## WIRING STANDARDS

DESCRIPTION	WIRE COLOR
POWER	BLK
AC CONTROL CIRCUITS, 120VAC	RED
NEUTRAL, GROUNDED CIRCUIT CONDUCTOR	WHT
24VDC CONTROL CIRCUIT	BLU
24VDC CONTROL CIRCUIT COMMON (GND OR NOT)	WHT/BLU
CIRCUIT SUPPLIED FROM EXTERNAL POWER SOURCE	YEL
EQUIPMENT GROUNDING CONDUCTOR - INSULATED	GRN/YEL

DESCRIPTION	MINIMUM GAUGE
POWER CIRCUITS	14
LIGHTING AND CONTROL CIRCUITS ON MACHINE	16
CONTROL CIRCUITS WITHIN ENCLOSURE	18
ELECTRONIC PROGRAMMABLE CONTROL I/O IN WIREWAY	24
ELECTRONIC PROGRAMMABLE CONTROL I/O WITHIN ENCL	26
POWER EARTH GROUND - I.E., CHASSIS GROUND, ETC.	18

### IMPORTANT NOTES

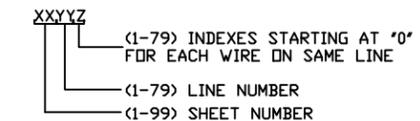
SIGNAL WIRING DUCTS SHALL CONTAIN LOW VOLTAGE, DC CONTROL WIRING (24VDC) AND BELOW. POWER WIRING DUCTS SHALL CONTAIN ALL POWER AND CONTROL WIRING 120VAC AND ABOVE.

ALL WIRES AND CABLES SHALL BE LABELED AT EACH END WITH WIRE NUMBER ASSIGNED AS PER ELEMENTARY DIAGRAMS.

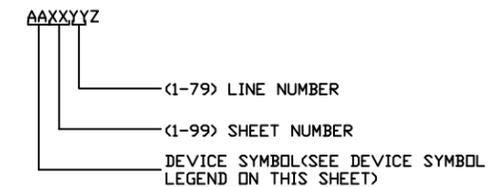
WIRE LABELS SHALL HAVE COMPLETE WIRE NUMBER DISPLAYED ON SINGLE LINE. WIRE NUMBER TO BE REPEATED ON THREE OR MORE LINES.

ALL PANEL DEVICES SHALL BE LABELED WITH ADHESIVE LABEL SHOWING DEVICE CODE

### WIRE LABEL DESIGNATOR



### DEVICE LABEL DESIGNATOR



B3	07/02/18	AS-BUILT MODIFICATIONS	J.P.A.	M.G.	G.H.
B2	04/03/18	SCHNEIDER TO ABB CONVERSION	J.P.A.	M.G.	G.H.
B1	02/22/17	AS-BUILT MODIFICATIONS	J.P.A.	M.G.	G.H.
A2	12/15/16	RELEASED FOR SHOP FABRICATION	J.P.A.	M.G.	G.H.
A1	12/08/16	RELEASED FOR ENGINEERING APPROVAL	J.P.A.	M.G.	G.H.
REV	DATE	REVISION RECORD	DRAWN	CHECK	APRVD

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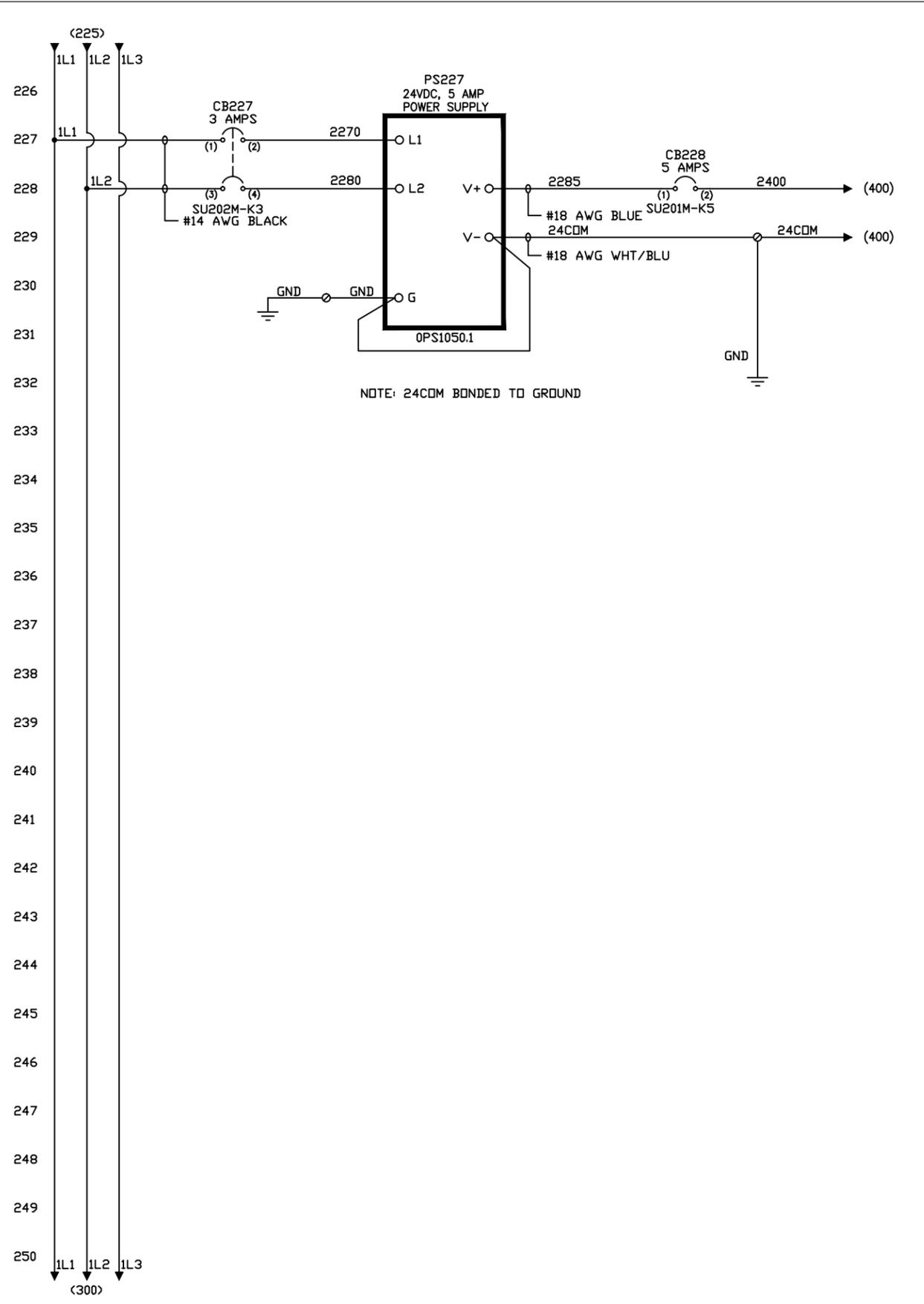
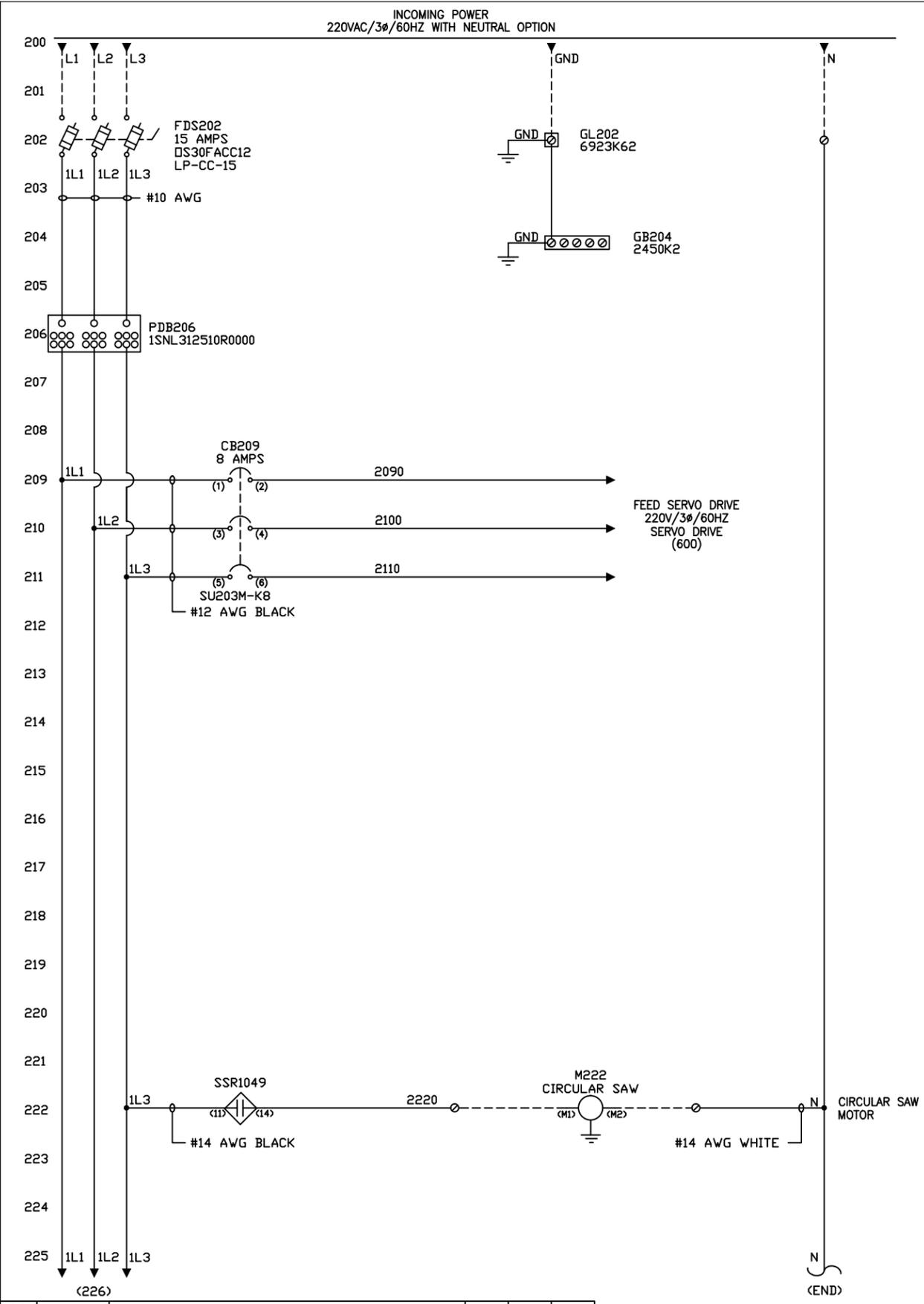
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Automation Solutions INTEGRATED ACTION AUTOMATION & CONTROLS, INC.

10 LARSEN WAY, NORTH ATTLEBORO, MA 02763

CUSTOMER AND LOCATION:	NOVO PRECISION LLC 150 DOLPHIN ROAD BRISTOL, CT 06010	INSTALLATION NO. <b>CP16-0511JPA</b>
TITLE:	TRACTOR & 2 ROLL SERVO FEEDER ELECTRICAL SCHEMATIC & LAYOUT	SHEET 01 of 20
		REV. B3



NOTE: 24CDM BONDED TO GROUND

REV	DATE	REVISION RECORD	DRAWN	CHECK	APRVD
B3	07/02/18	AS-BUILT MODIFICATIONS	J.P.A.	M.G.	G.H.
B2	04/03/18	SCHNEIDER TO ABB CONVERSION	J.P.A.	M.G.	G.H.
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A2	12/15/16	RELEASED FOR SHDP FABRICATION	J.P.A.	M.G.	G.H.
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**Automation**  
 Take Control

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10 LARSEN WAY, NORTH ATTLEBORO, MA 02763

CUSTOMER AND LOCATION: NOVO PRECISION LLC  
 150 DOLPHIN ROAD  
 BRISTOL, CT 06010

TITLE: TRACTOR & 2 ROLL SERVO FEEDER  
 ELECTRICAL SCHEMATIC & LAYOUT

INSTALLATION NO.	
CP16-0511JPA	
SHEET	REV.
02 of 20	B3

300 (250)  
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 (326)

RESERVED FOR FUTURE USE

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RESERVED FOR FUTURE USE

B3	07/02/18	AS-BUILT MODIFICATIONS	J.P.A.	M.G.	G.H.
B2	04/03/18	SCHNEIDER TO ABB CONVERSION	J.P.A.	M.G.	G.H.
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A2	12/15/16	RELEASED FOR SHOP FABRICATION	J.P.A.	M.G.	G.H.
A1	12/08/16	RELEASED FOR ENGINEERING APPROVAL	J.P.A.	M.G.	G.H.
REV	DATE	REVISION RECORD	DRAWN	CHECK	APRVD

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 10 LARSEN WAY, NORTH ATTLEBORO, MA 02763

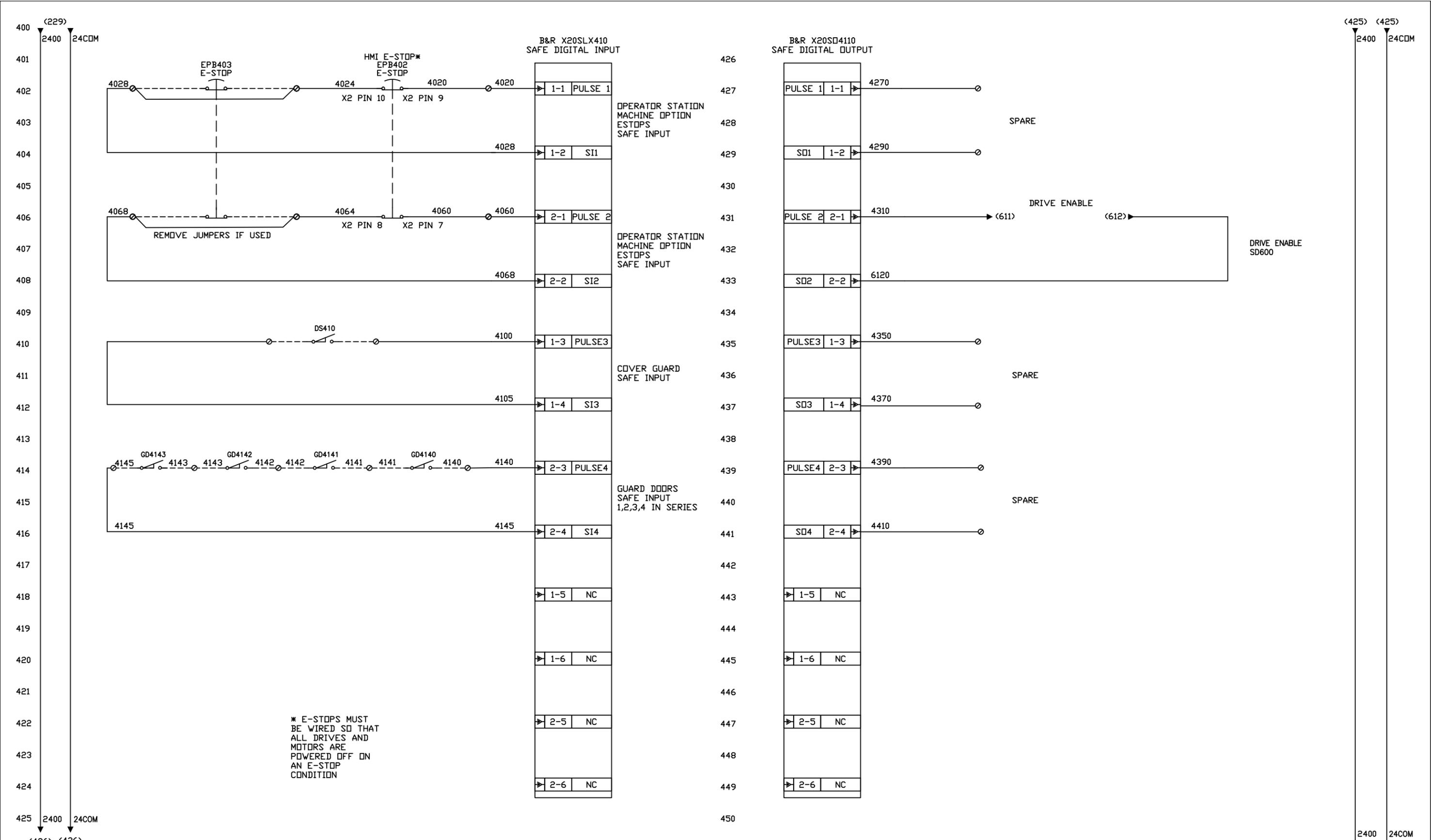
CUSTOMER AND LOCATION:  
 NOVO PRECISION LLC  
 150 DOLPHIN ROAD  
 BRISTOL, CT 06010

TITLE:  
 TRACTOR & 2 ROLL SERVO FEEDER  
 ELECTRICAL SCHEMATIC & LAYOUT

INSTALLATION NO.  
 CP16-0511JPA

SHEET  
 03 of 20

REV.  
 B3



REV	DATE	REVISION RECORD	DRAWN	CHECK	APRVD
B3	07/02/18	AS-BUILT MODIFICATIONS	J.P.A.	M.G.	G.H.
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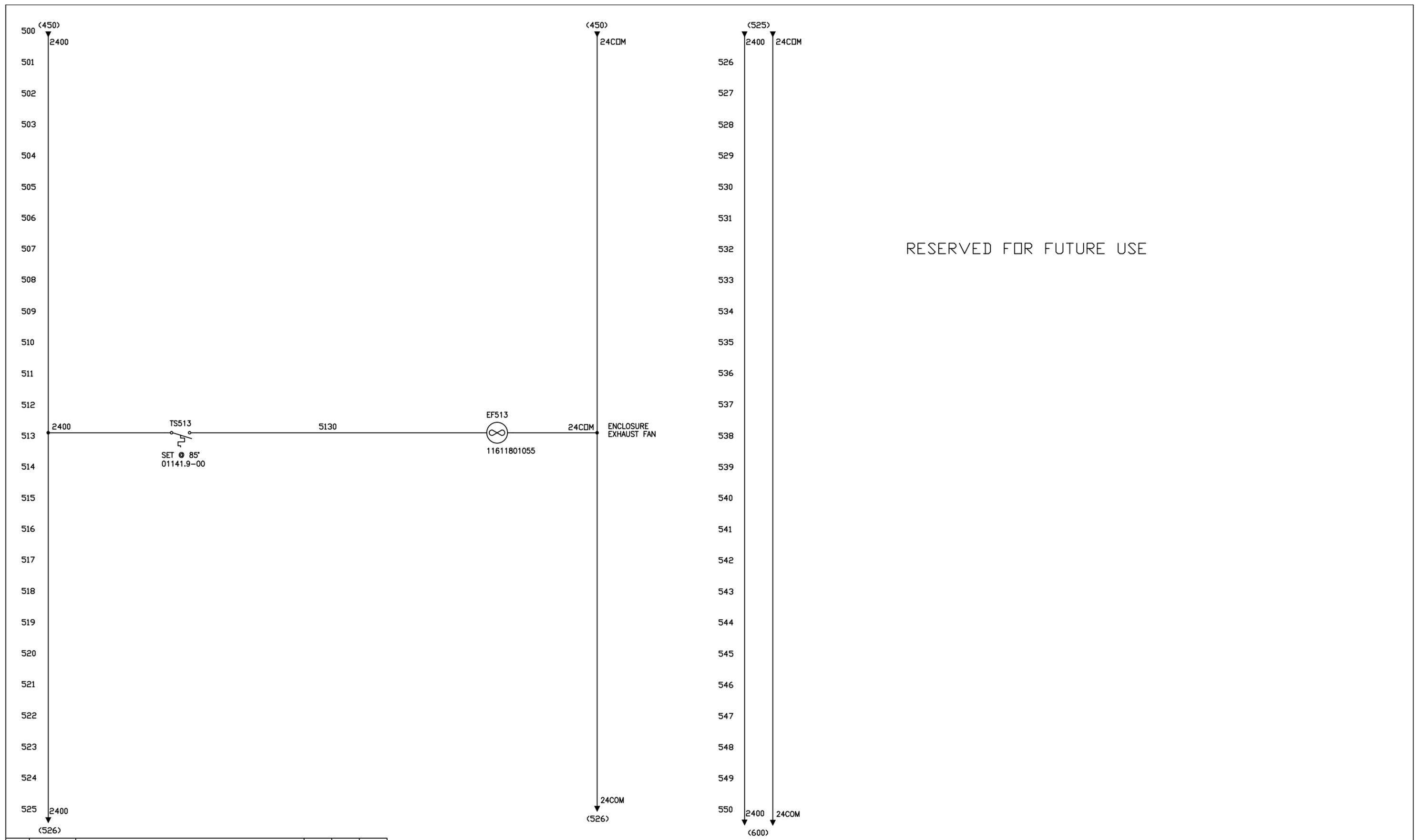
AutomationSolutions INTEGRATED ACTION AUTOMATION & CONTROLS, INC.

10 LARSEN WAY, NORTH ATTLEBORO, MA 02763

CUSTOMER AND LOCATION:  
 NOVO PRECISION LLC  
 150 DOLPHIN ROAD  
 BRISTOL, CT 06010

TITLE:  
 TRACTOR & 2 ROLL SERVO FEEDER  
 ELECTRICAL SCHEMATIC & LAYOUT

INSTALLATION NO. CP16-0511JPA	SHEET 04 of 20	REV. B3
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REV	DATE	REVISION RECORD	DRAWN	CHECK	APRVD
B3	07/02/18	AS-BUILT MODIFICATIONS	J.P.A.	M.G.	G.H.
B2	04/03/18	SCHNEIDER TO ABB CONVERSION	J.P.A.	M.G.	G.H.
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A2	12/15/16	RELEASED FOR SHOP FABRICATION	J.P.A.	M.G.	G.H.
A1	12/08/16	RELEASED FOR ENGINEERING APPROVAL	J.P.A.	M.G.	G.H.

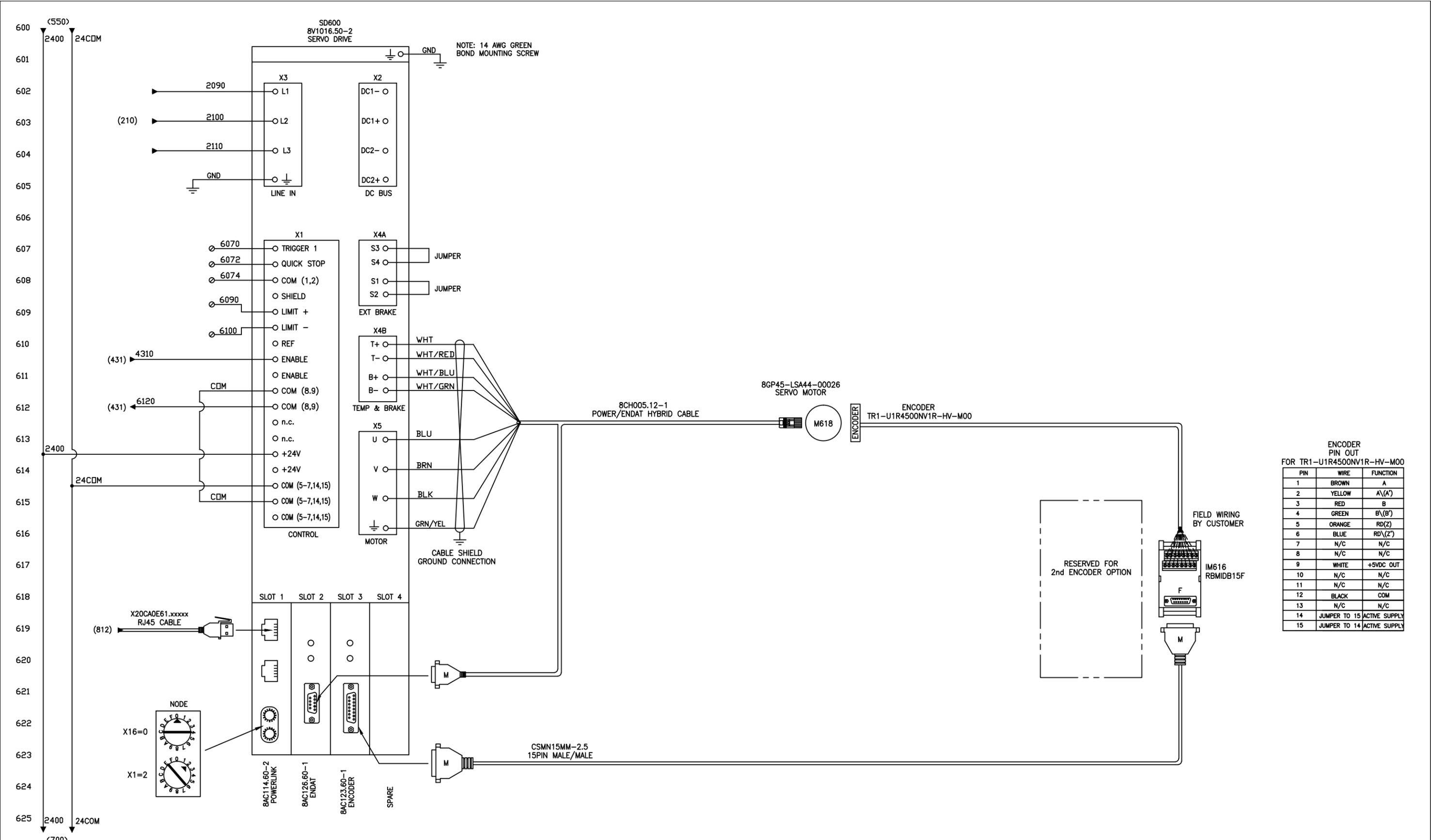
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10 LARSEN WAY, NORTH ATTLEBORO, MA 02763

CUSTOMER AND LOCATION: NOVO PRECISION LLC  
 150 DOLPHIN ROAD  
 BRISTOL, CT 06010

TITLE: TRACTOR & 2 ROLL SERVO FEEDER  
 ELECTRICAL SCHEMATIC & LAYOUT

INSTALLATION NO.		SHEET	REV.
CP16-0511JPA		05 of 20	B3



ENCODER  
PIN OUT  
FOR TR1-U1R4500NV1R-HV-M00

PIN	WIRE	FUNCTION
1	BROWN	A
2	YELLOW	A'(A')
3	RED	B
4	GREEN	B'(B')
5	ORANGE	RD(Z)
6	BLUE	RD(Z')
7	N/C	N/C
8	N/C	N/C
9	WHITE	+5VDC OUT
10	N/C	N/C
11	N/C	N/C
12	BLACK	COM
13	N/C	N/C
14	JUMPER TO 15	ACTIVE SUPPLY
15	JUMPER TO 14	ACTIVE SUPPLY

REV	DATE	REVISION RECORD	DRAWN	CHECK	APRVD
B3	07/02/18	AS-BUILT MODIFICATIONS	J.P.A.	M.G.	G.H.
B2	04/03/18	SCHNEIDER TO ABB CONVERSION	J.P.A.	M.G.	G.H.
B1	02/22/17	AS-BUILT MODIFICATIONS	J.P.A.	M.G.	G.H.
A2	12/15/16	RELEASED FOR SHOP FABRICATION	J.P.A.	M.G.	G.H.
A1	12/08/16	RELEASED FOR ENGINEERING APPROVAL	J.P.A.	M.G.	G.H.

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**Automation**  
 Take Control

AutomationSolutions INTEGRATED ACTION AUTOMATION & CONTROLS, INC.

10 LARSEN WAY, NORTH ATTLEBORO, MA 02763

CUSTOMER AND LOCATION: NOVO PRECISION LLC  
 150 DOLPHIN ROAD  
 BRISTOL, CT 06010

TITLE: TRACTOR & 2 ROLL SERVO FEEDER  
 ELECTRICAL SCHEMATIC & LAYOUT

INSTALLATION NO.  
**CP16-0511JPA**

SHEET 06 of 20  
 REV. B3

700 (625)  
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RESERVED FOR FUTURE USE

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RESERVED FOR FUTURE USE

B3	07/02/18	AS-BUILT MODIFICATIONS	J.P.A.	M.G.	G.H.
B2	04/03/18	SCHNEIDER TO ABB CONVERSION	J.P.A.	M.G.	G.H.
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REV	DATE	REVISION RECORD	DRAWN	CHECK	APRVD

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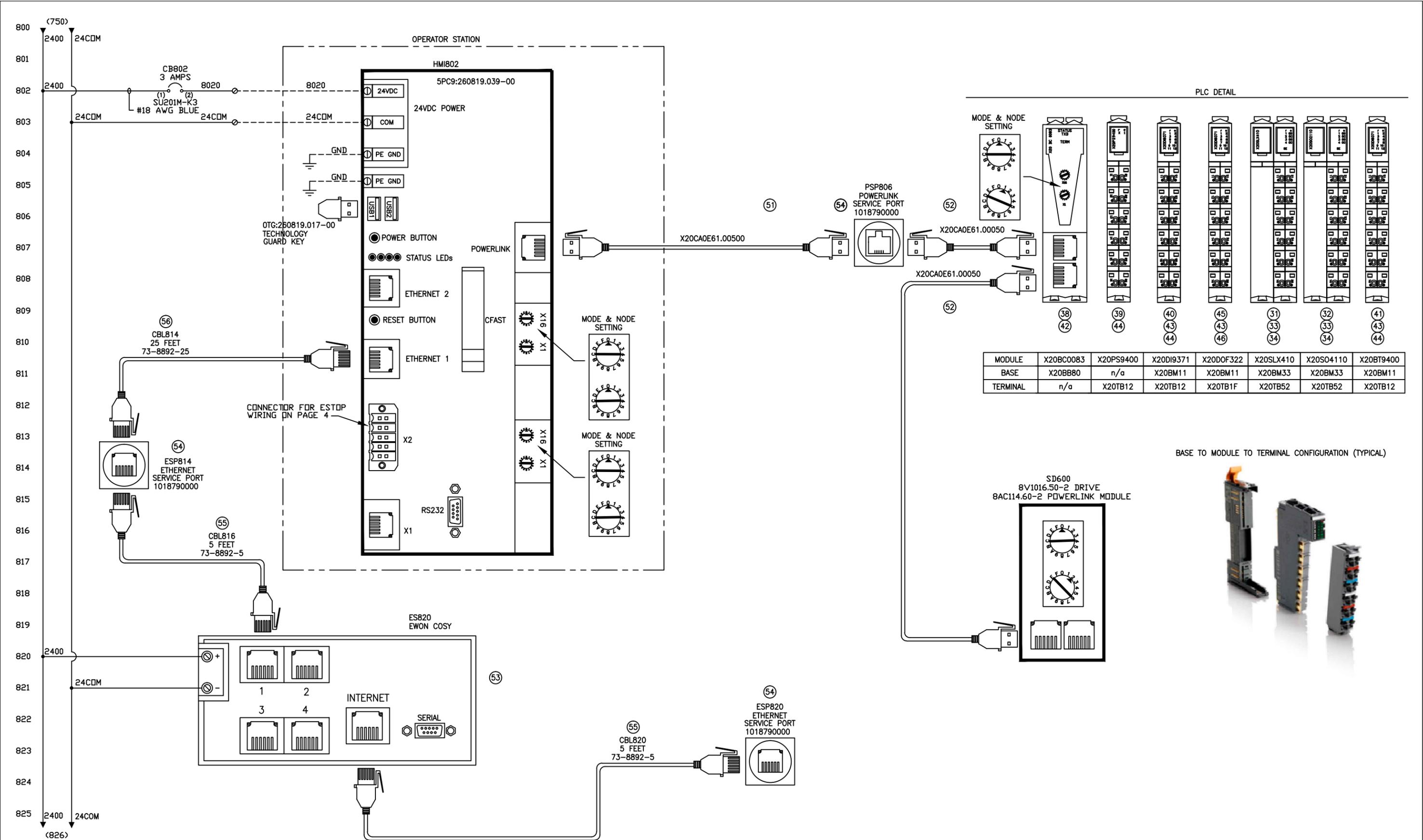
Automation Solutions INTEGRATED ACTION AUTOMATION & CONTROLS, INC.  
 10 LARSEN WAY, NORTH ATTLEBORO, MA 02763

CUSTOMER AND LOCATION: NOVO PRECISION LLC  
 150 DOLPHIN ROAD  
 BRISTOL, CT 06010

TITLE: TRACTOR & 2 ROLL SERVO FEEDER  
 ELECTRICAL SCHEMATIC & LAYOUT

INSTALLATION NO. CP16-0511JPA

SHEET 07 OF 20 REV. B3



REV	DATE	REVISION RECORD	DRAWN	CHECK	APRVD
B3	07/02/18	AS-BUILT MODIFICATIONS	J.P.A.	M.G.	G.H.
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COMPANY CONFIDENTIAL

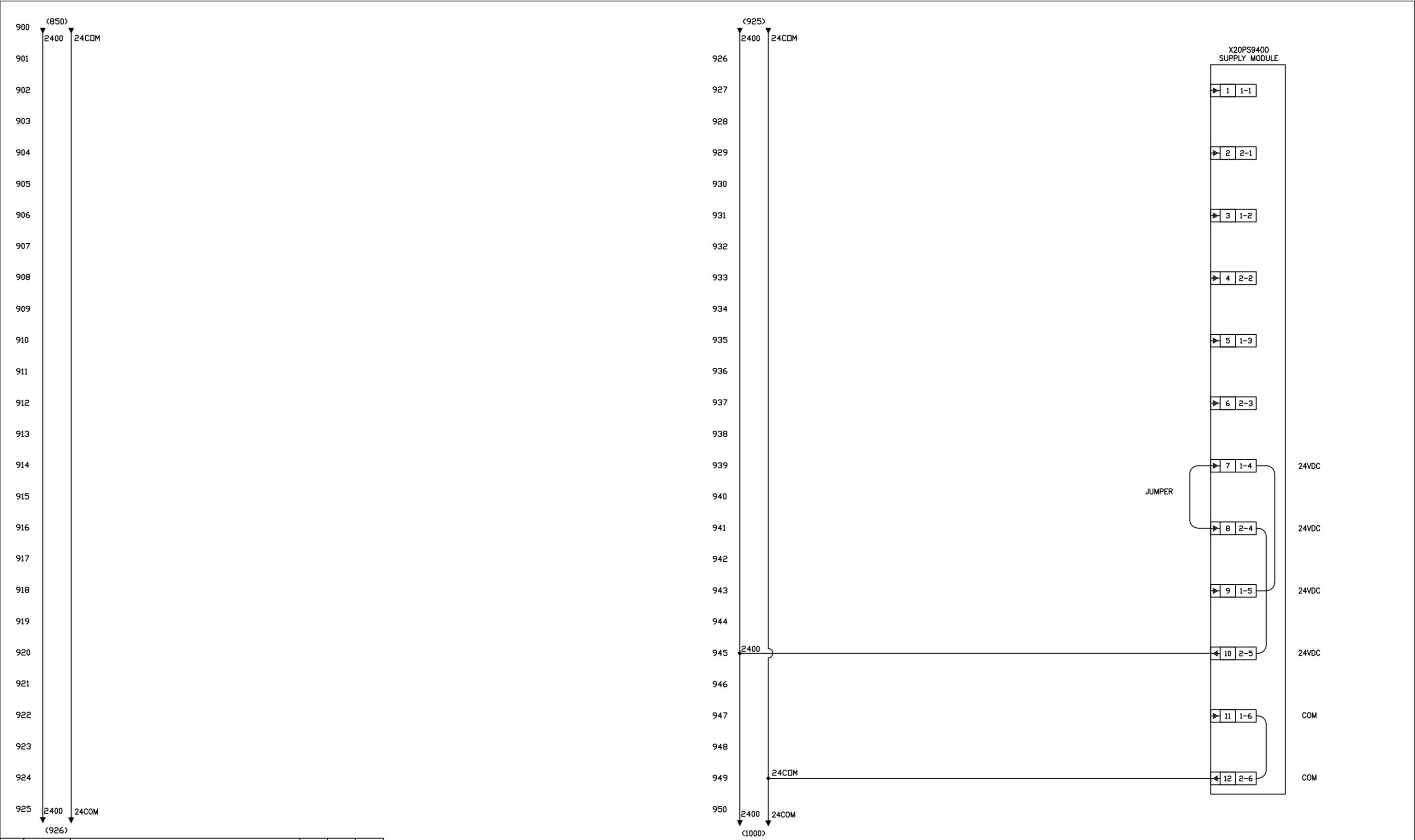
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**Automation**  
Take Control

AutomationSolutions INTEGRATED ACTION AUTOMATION & CONTROL, INC.

10 LARSEN WAY, NORTH ATTLEBORO, MA 02763

CUSTOMER AND LOCATION:		INSTALLATION NO.
NOVO PRECISION LLC 150 DOLPHIN ROAD BRISTOL, CT 06010		CP16-0511JPA
TITLE:	TRACTOR & 2 ROLL SERVO FEEDER ELECTRICAL SCHEMATIC & LAYOUT	SHEET REV. 08 of 20 B3



B3	07/02/18	AS-BUILT MODIFICATIONS	J.P.A.	M.G.	G.H.
B2	04/03/18	SCHNEIDER TO ABB CONVERSION	J.P.A.	M.G.	G.H.
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REV	DATE	REVISION RECORD	DRAWN	CHECK	APRVD

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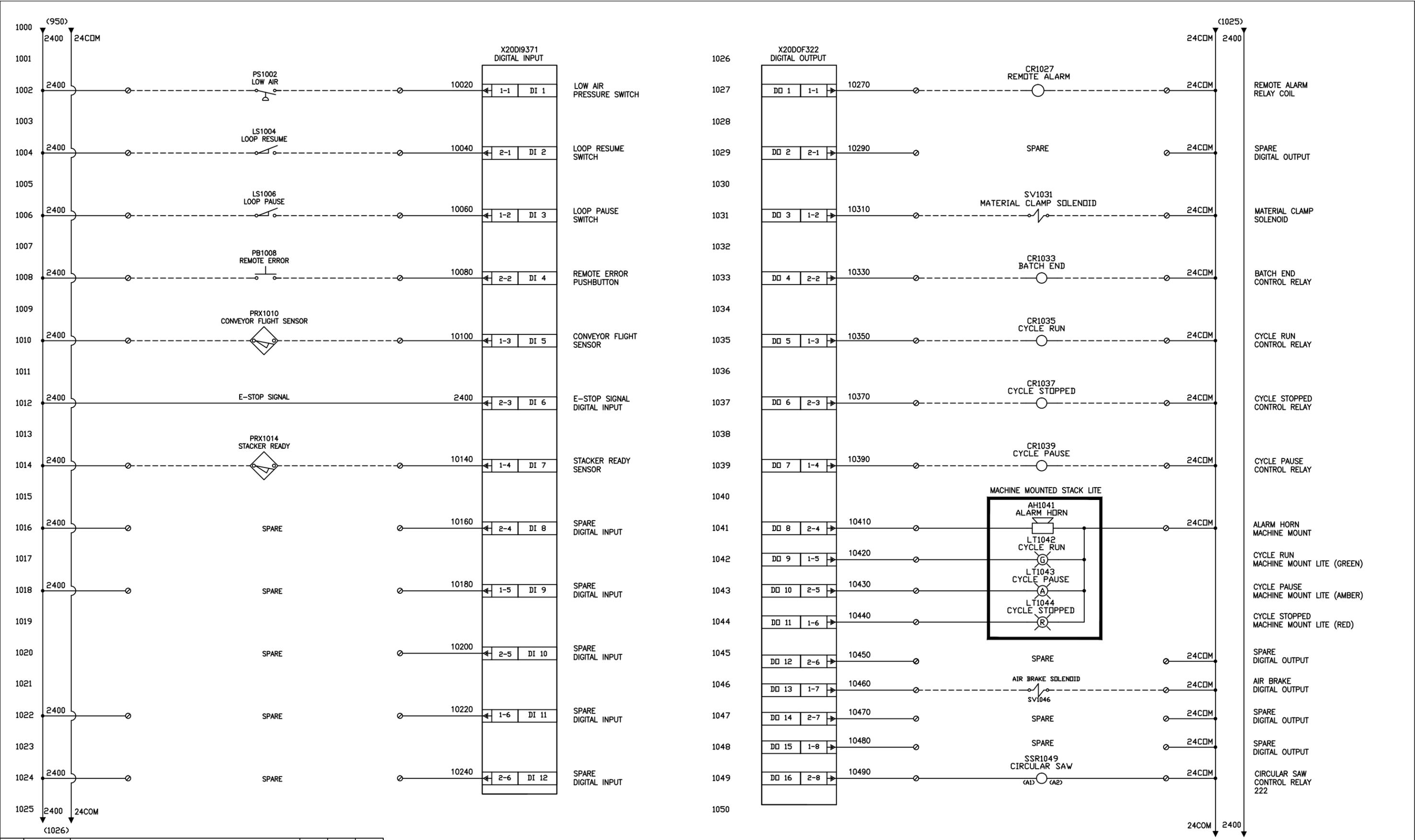
Automation Solutions INTEGRATED ACTION AUTOMATION & CONTROLS, INC.  
 10 LARSEN WAY, NORTH ATTLEBORO, MA 02763

CUSTOMER AND LOCATION: NOVO PRECISION LLC  
 150 DOLPHIN ROAD  
 BRISTOL, CT 06010

TITLE: TRACTOR & 2 ROLL SERVO FEEDER  
 ELECTRICAL SCHEMATIC & LAYOUT

INSTALLATION NO. CP16-0511JPA

SHEET 09 OF 20 REV. B3



REV	DATE	REVISION RECORD	DRAWN	CHECK	APRVD
B3	07/02/18	AS-BUILT MODIFICATIONS	J.P.A.	M.G.	G.H.
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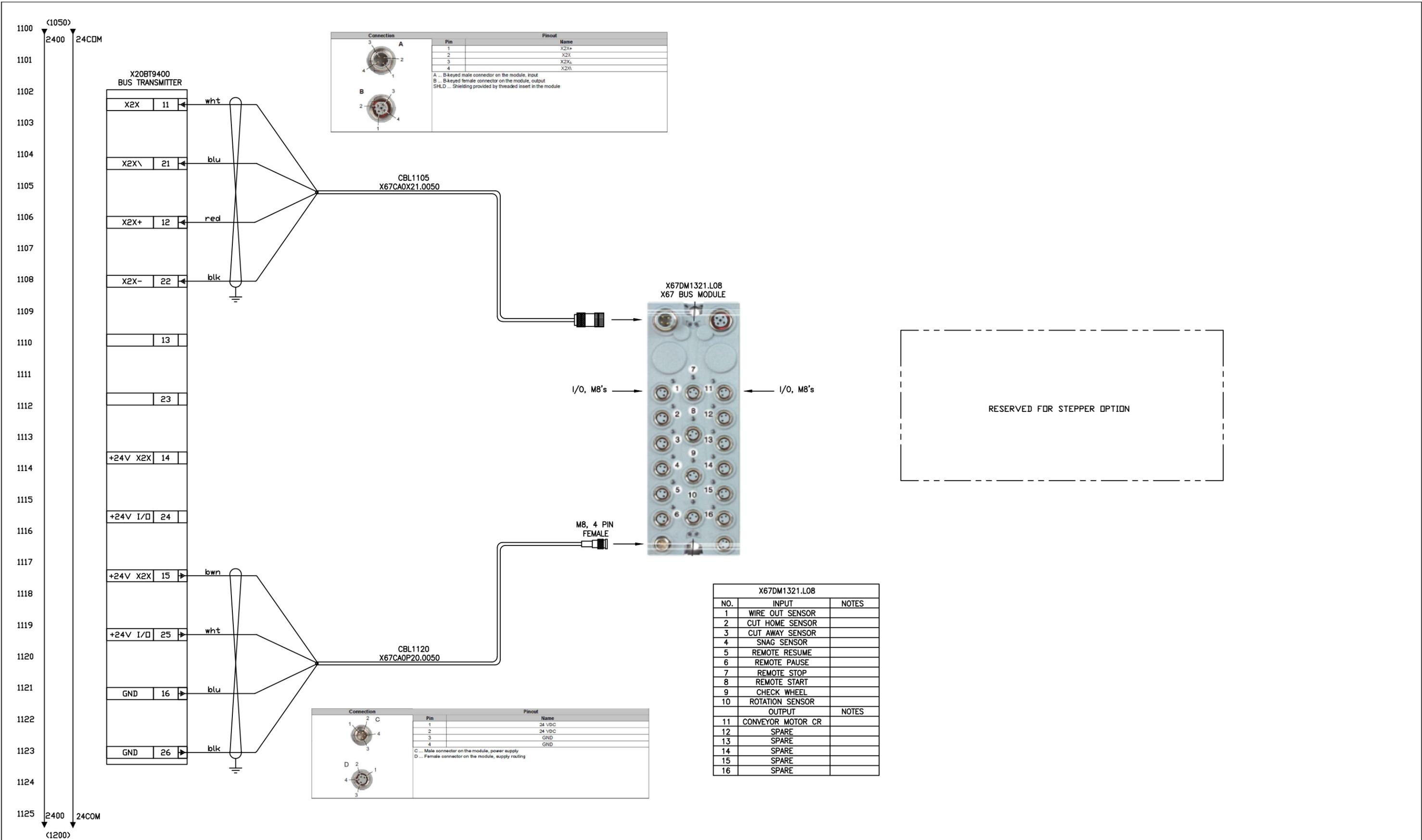
**Automation**  
 Take Control

Automation Solutions INTEGRATED ACTION AUTOMATION & CONTROLS, INC.  
 10 LARSEN WAY, NORTH ATTLEBORO, MA 02763

CUSTOMER AND LOCATION:  
 NOVO PRECISION LLC  
 150 DOLPHIN ROAD  
 BRISTOL, CT 06010

TITLE:  
 TRACTOR & 2 ROLL SERVO FEEDER  
 ELECTRICAL SCHEMATIC & LAYOUT

INSTALLATION NO.	
CP16-0511JPA	
SHEET	REV.
10 OF 20	B3



REV	DATE	REVISION RECORD	DRAWN	CHECK	APRVD
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 150 DOLPHIN ROAD  
 BRISTOL, CT 06010

TITLE: TRACTOR & 2 ROLL SERVO FEEDER  
 ELECTRICAL SCHEMATIC & LAYOUT

INSTALLATION NO.	
CP16-0511JPA	
SHEET	REV.
11 OF 20	B3

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RESERVED FOR FUTURE USE

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RESERVED FOR FUTURE USE

B3	07/02/18	AS-BUILT MODIFICATIONS	J.P.A.	M.G.	G.H.
B2	04/03/18	SCHNEIDER TO ABB CONVERSION	J.P.A.	M.G.	G.H.
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Automation Solutions INTEGRATED ACTION AUTOMATION & CONTROLS, INC.  
 10 LARSEN WAY, NORTH ATTLEBORO, MA 02763

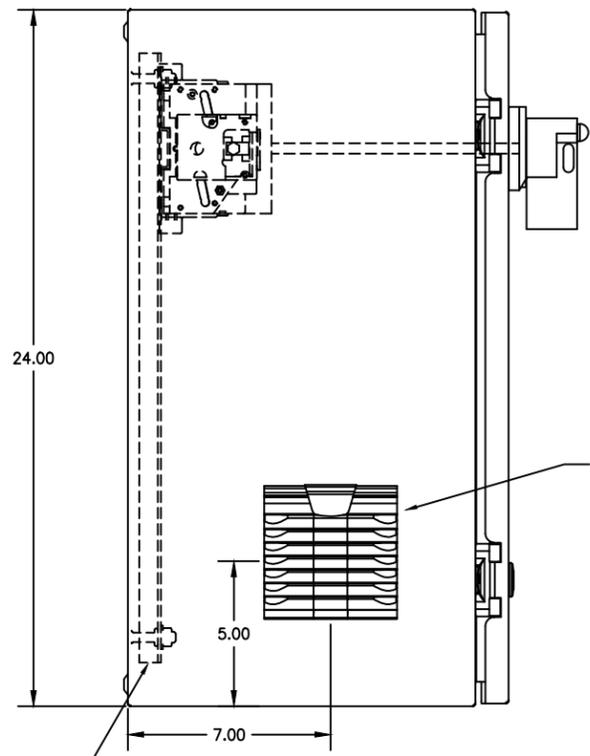
CUSTOMER AND LOCATION: NOVO PRECISION LLC  
 150 DOLPHIN ROAD  
 BRISTOL, CT 06010

TITLE: TRACTOR & 2 ROLL SERVO FEEDER  
 ELECTRICAL SCHEMATIC & LAYOUT

INSTALLATION NO. CP16-0511JPA

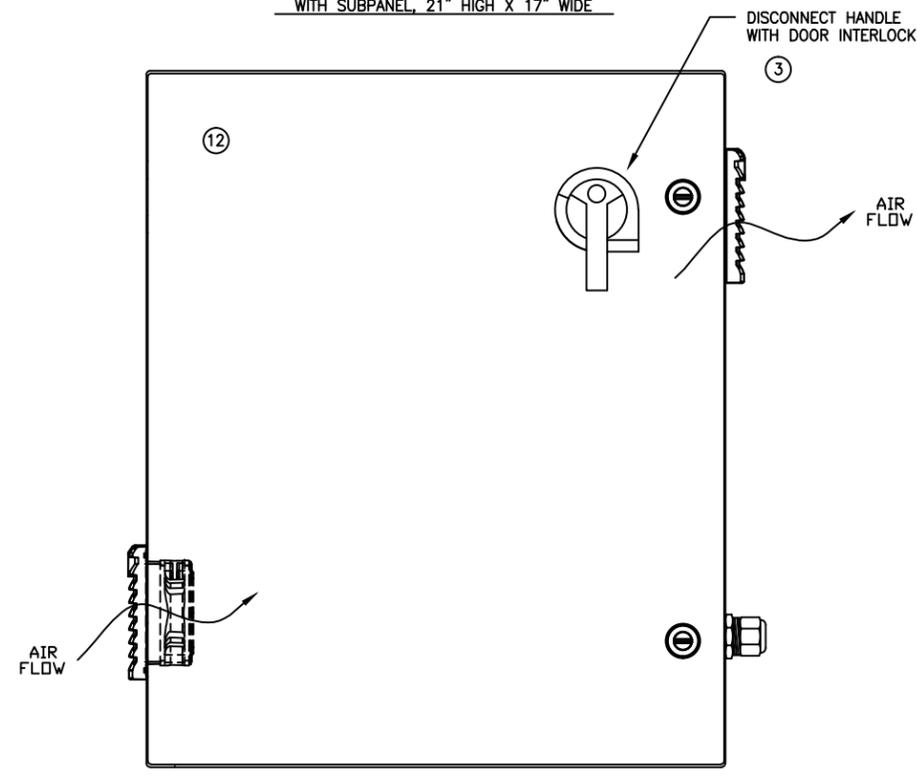
SHEET 12 OF 20  
 REV. B3

NEMA 12 ENCLOSURE  
24" HIGH X 20" WIDE X 12" DEEP  
WITH SUBPANEL, 21" HIGH X 17" WIDE

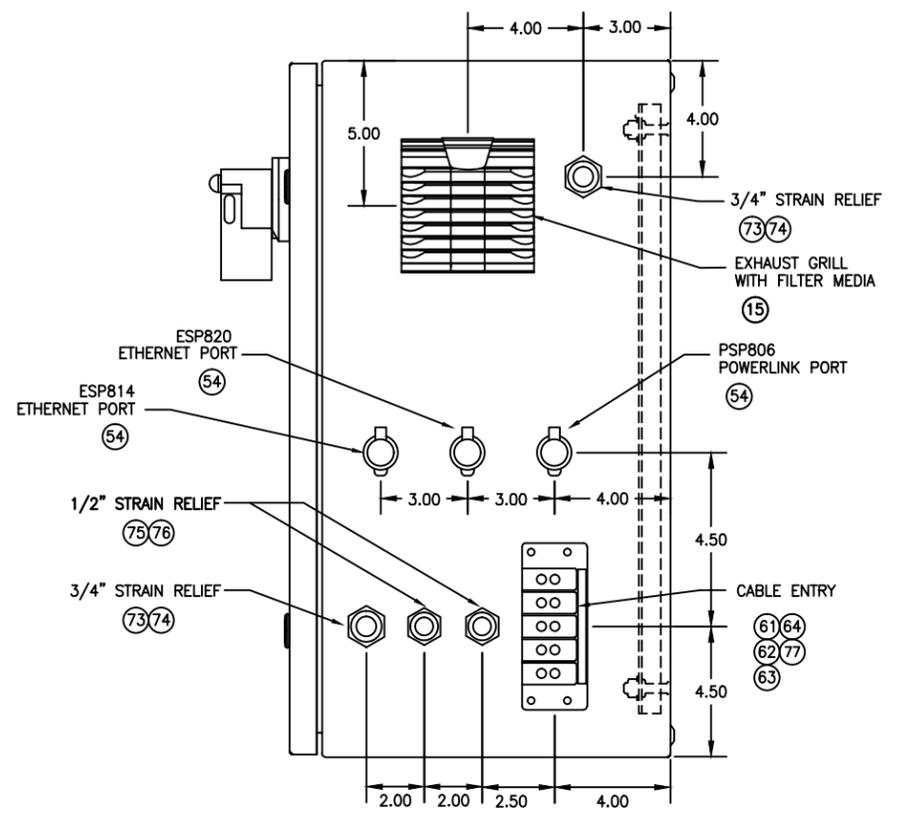


LEFT SIDE VIEW

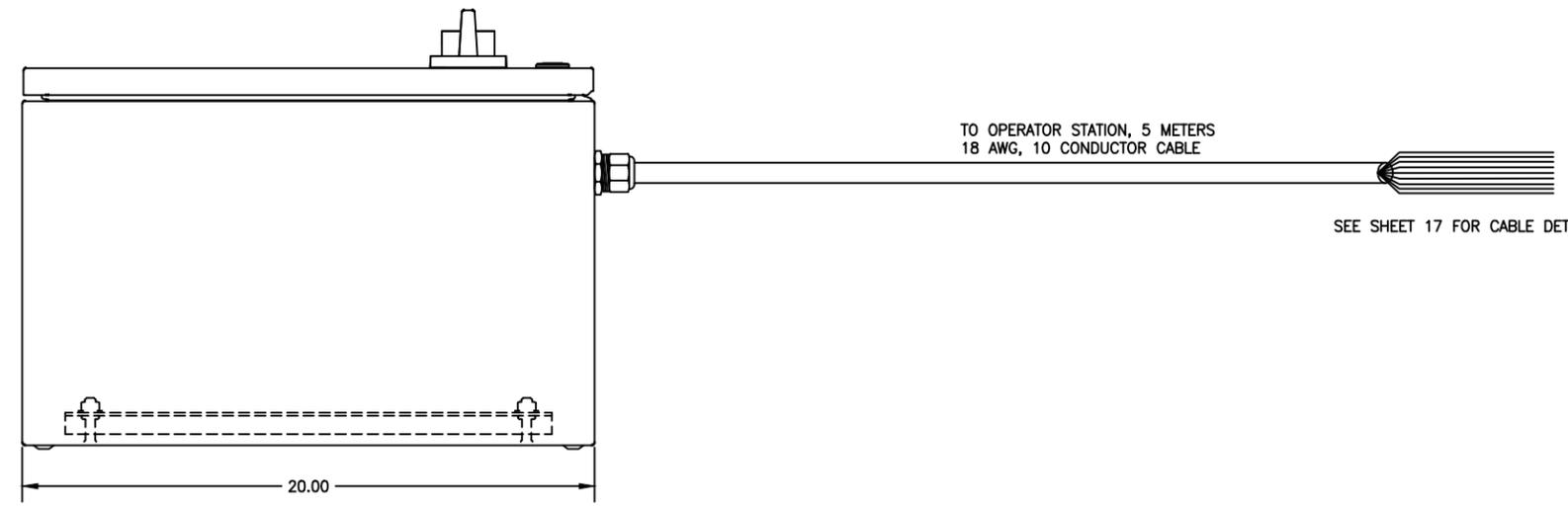
LOCATION OF SUBPANEL  
WHEN SECURELY MOUNTED



FRONT VIEW



RIGHT SIDE VIEW



BOTTOM VIEW

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10 LARSEN WAY, NORTH ATTLEBORO, MA 02763

CUSTOMER AND LOCATION:  
NOVO PRECISION LLC  
150 DOLPHIN ROAD  
BRISTOL, CT 06010

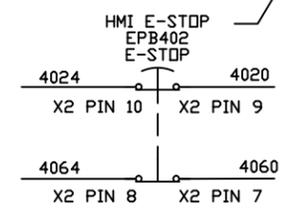
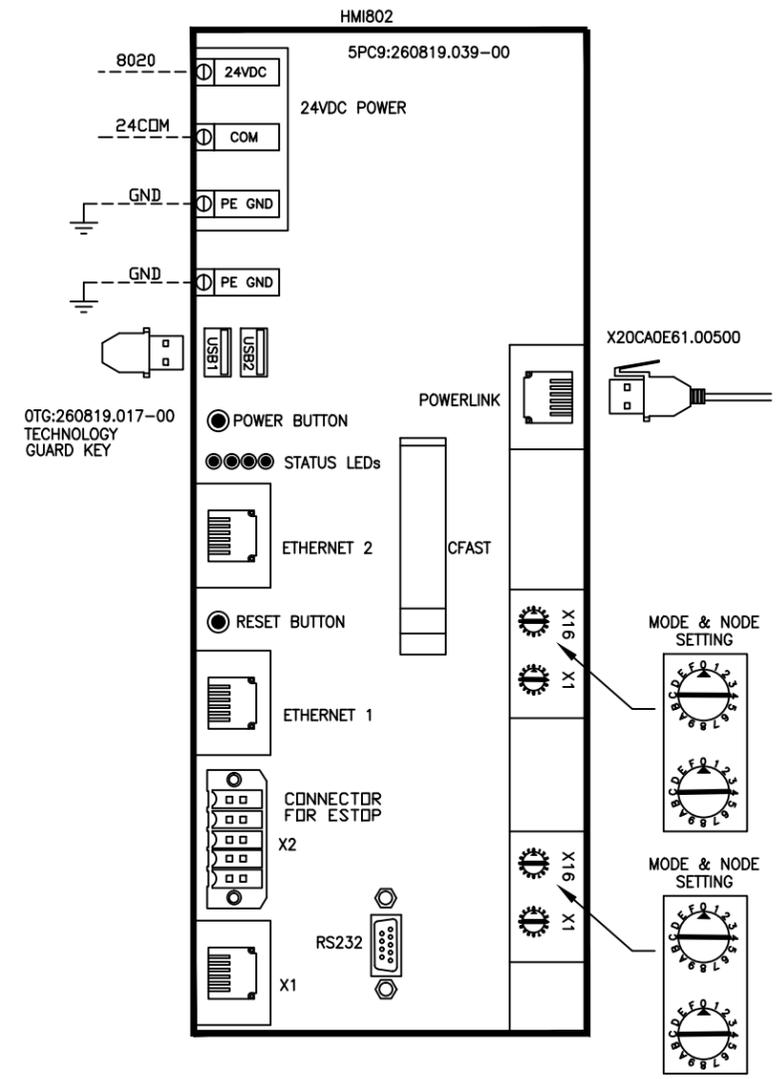
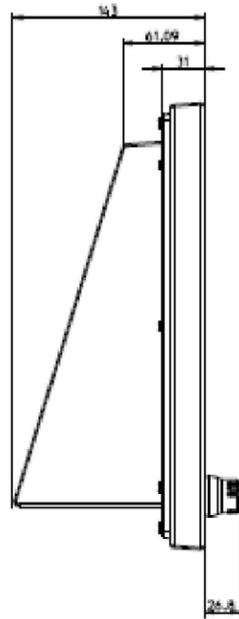
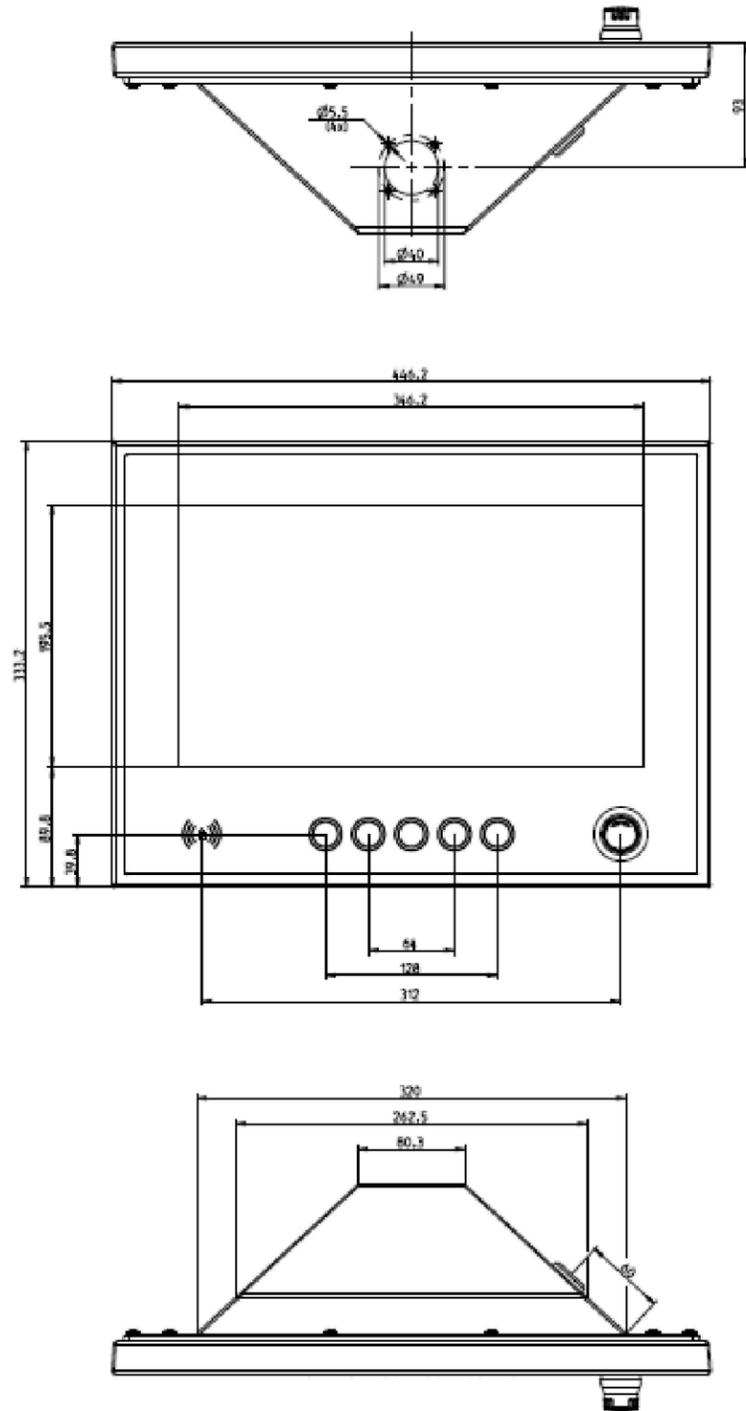
TITLE:  
TRACTOR & 2 ROLL SERVO FEEDER  
ELECTRICAL SCHEMATIC & LAYOUT

INSTALLATION NO.  
CP16-0511JPA

SHEET  
13 OF 20

REV.  
B3





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AutomationSolutions INTEGRATED ACTION AUTOMATION & CONTROLS, INC.

10 LARSEN WAY, NORTH ATTLEBORO, MA 02763

CUSTOMER AND LOCATION: NOVO PRECISION LLC  
 150 DOLPHIN ROAD  
 BRISTOL, CT 06010

TITLE: TRACTOR & 2 ROLL SERVO FEEDER  
 ELECTRICAL SCHEMATIC & LAYOUT

INSTALLATION NO. CP16-0511JPA

SHEET 15 OF 20 REV. B3

RESERVED FOR FUTURE USE

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Automation Solutions INTEGRATED ACTION AUTOMATION & CONTROLS, INC.

10 LARSEN WAY, NORTH ATTLEBORO, MA 02763

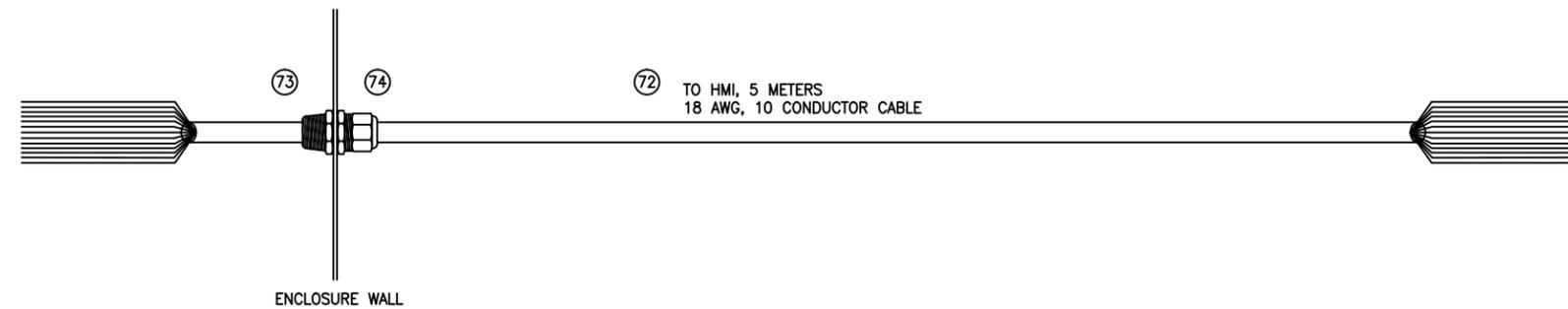
CUSTOMER AND LOCATION:	NOVO PRECISION LLC 150 DOLPHIN ROAD BRISTOL, CT 06010
TITLE:	TRACTOR & 2 ROLL SERVO FEEDER ELECTRICAL SCHEMATIC & LAYOUT

INSTALLATION NO.	CP16-0511JPA
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MAIN PANEL TO I/O HMI INTERCONNECT

TB1 LOCATED IN  
MAIN CONTROL PANEL

4020	Ø	4020
4024	Ø	4024
4060	Ø	4060
4064	Ø	4064
8020	Ø	8020
24COM	Ø	24COM
GND	Ø	GND
SPARE	Ø	SPARE
SPARE	Ø	SPARE
SPARE	Ø	SPARE



B3	07/02/18	AS-BUILT MODIFICATIONS	J.P.A.	M.G.	G.H.
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**Automation**  
Take Control

AutomationSolutions INTEGRATED ACTION AUTOMATION & CONTROLS, INC.

10 LARSEN WAY, NORTH ATTLEBORO, MA 02763

CUSTOMER AND LOCATION: NOVO PRECISION LLC  
150 DOLPHIN ROAD  
BRISTOL, CT 06010

TITLE: TRACTOR & 2 ROLL SERVO FEEDER  
ELECTRICAL SCHEMATIC & LAYOUT

INSTALLATION NO. CP16-0511JPA

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BILL OF MATERIAL

ITEM	Rev	Qty Each	Manufacturer	Part #	MATERIAL DESCRIPTION	Supplier
<b>Incoming Power &amp; Protection Components</b>						
1		1	ABB	OS30FACC12	30 Amp Fused Disconnect Switch (CC Fuse) 6mm	I-Automation
2		1	ABB	OHY80L6	Nema 4/12 Disconnect Handle, Red/Yel, 6mm Open	I-Automation
3		1	ABB	OMP6X430	16.9" Length Disconnect Shaft 6x6mm	I-Automation
4		3	Bussmann	LP-CC-15	15 Amp 600 Volt Time Delay Fuse	I-Automation
5		3	ABB	1SNL312510R0000	DBL125 Distribution Block (2 to 6 point) 125 Amp M	I-Automation
6		0				I-Automation
7		1	McMaster Carr	6923K62	Copper Ground Lug With Set Screw (1/4" Stud Hole)	I-Automation
8		1	McMaster Carr	2450K2	Ground Bus With 6 Points	I-Automation
9						
10						
11						
<b>Enclosure &amp; Cooling Components</b>						
12		1	Eurobex	5412 ES242012	Nema 4/12 24" x 20" x 12" Deep Enclosure	I-Automation
13		1	Eurobex	01141.9-00	32 to 140 Degrees F Thermostat NO Contact	I-Automation
14		1	Pfannenberg	11611801055	5" 24vdc Exhaust Fan With Filter & Grill	I-Automation
15		1	Pfannenberg	11710001055	5" Exhaust Filter & Grill	I-Automation
16						
17						
18						
<b>Drives &amp; Circuit Protection</b>						
19		1	ABB	SU203M-K8	3 Pole 8 Amp 480 vac UL489 Circuit Breaker	I-Automation
20		1	B & R	8V1016.50-2	Drive, Servo Acopos 0.7KW	I-Automation
21		1	B & R	8AC114.60-2	ACOPOS POWERLINK V2 interface	I-Automation
22		1	B & R	8AC126.60-1	ACOPOS EnDat 2.2 Interface	I-Automation
23		1	B & R	8AC123.60-1	ACOPOS incremental/SSI encoder interface	I-Automation
24						
25						
26						
<b>24vdc Control</b>						
27		1	ABB	SU202M-K3	2 Pole 3 Amp 480 vac UL489 Circuit Breaker	I-Automation
28		1	B & R	0PS1050.1	Powersupply, 1Phase, 24VDC, 5A	I-Automation
29		1	ABB	SU201M-K5	1 Pole 5 Amp 480 vac UL489 Circuit Breaker	I-Automation
30		3	Weidmuller	1127170000	24vdc Solid State Relay 24vdc Control 2 Amp	I-Automation
31		1	B & R	X20SLX410	X20 SafeLOGIC, 4xI, 24V, 2xCAT4	I-Automation
32		1	B & R	X20SO4110	X20 Safe Digital 4xO, 24V, 0.5A	I-Automation
33		2	B & R	X20BM33	X20 Bus safety 25mm, Power Bus connection	I-Automation
34		2	B & R	X20TB52	X20 terminal block safety, 12x	I-Automation
35						
36						
37						
<b>I/O Components</b>						
38		1	B & R	X20BC0083	X20 Bus Controller POWERLINK V1/V2	I-Automation
39		1	B & R	X20PS9400	X20 BC Power Feed, 24V, Bus Supply	I-Automation
40		1	B & R	X20DI9371	X20 Digital 12xI, 24V, Sink, 1 Wire	I-Automation
41		1	B & R	X20BT9400	X20 Bustransmitter, Power Feed, X67 Supp	I-Automation
42		1	B & R	X20BB80	X20 Bus Controller Base	I-Automation
43		3	B & R	X20BM11	X20 Bus Module with Power Bus connection	I-Automation
44		3	B & R	X20TB12	X20 standard terminal block 12x	I-Automation
45		1	B & R	X20DOF322	X20 Digital 16xO, 24V 0.5A, Source, 1 W	I-Automation
46		1	B & R	X20TB1F	X20 Terminal block 16x	I-Automation
47						
48						

ITEM	Rev	Qty Each	Manufacturer	Part #	MATERIAL DESCRIPTION	Supplier
<b>Communications Components</b>						
49						
50		1	ABB	SU201M-K3	1 Pole 3 Amp 480 vac UL489 Circuit Breaker	I-Automation
51		1	B & R	X20CA0E61.00500	EPL connection cable RJ45 to RJ45, 5,00m	I-Automation
52		2	B & R	X20CA0E61.00050	EPL connection cable RJ45 to RJ45, 0,50m	I-Automation
53		1	Ewon	EC5140-00-Q1	Ethernet Router	I-Automation
54		3	Weidmuller	1018790000	Ethernet Hub With Dust Cap	I-Automation
55		2	Cinch	73-8892-5	Cat6 RJ45 Ethernet Cable 5 Foot Blue	I-Automation
56		1	Cinch	73-8892-25	Cat6 RJ45 Ethernet Cable 25 Foot Blue	I-Automation
57						
58						
<b>Ancillary Items, Rail &amp; Wireway</b>						
59		220	AIS	Misc-Shop-Charge	Floorstock, Wire, Crimps, Tie Wraps etc.	I-Automation
60		24	Iboco	T1E-1540G (NI)	1.5" x 4" Wireway With Cover (gray)	I-Automation
61		1	MurrPlastik	87121020	KDL/E 24/10 Cable Entry Housing	I-Automation
62		4	MurrPlastik	87121216	KDT/ZE06 0.24 to 0.28 Grommet (each)	I-Automation
63		4	MurrPlastik	87121224	KDT/ZE10 0.39 to 0.43 Grommet (each)	I-Automation
64		4	MurrPlastik	87121266	BTK/E Dummy Grommet Blank (each)	I-Automation
65		2	Weidmuller	0514500000	Din Rail (two meter length)	I-Automation
66		40	Weidmuller	1021500000	WDK2.5 Double Level Terminal Block	I-Automation
67		3	Weidmuller	1036300000	WDK2.5PE Double Level Ground Terminal Block	I-Automation
68		4	Weidmuller	1054460000	10 Pt. Terminal Jumper	I-Automation
69		2	Weidmuller	1059100000	WDK Terminal End Barrier	I-Automation
70		2	Weidmuller	1061200000	Terminal Rail Anchor	I-Automation
71		1	Weidmuller	Ferrules (ni)	Assorted Insulated Ferrules (12, 10, 8 & 6 awg)	I-Automation
72		20	Lutze	A3081812	18 Awg 12 Conductor (incl ground) Cable	I-Automation
73		2	Lutze	FPNPT34G	3/4" Cable Strain Relief	I-Automation
74		2	Lutze	LPNPT34G	3/4" Strain Relief Locknut	I-Automation
75		2	Lutze	FPNPT12G	1/2" Cable Strain Relief	I-Automation
76		2	Lutze	LPNPT12G	1/2" Strain Relief Locknut	I-Automation
77		5	MurrPlastik	87121212	KDT/ZE04 0.16 to 0.20 Grommet (each)	I-Automation
78		1	L-Com	CSMN15MM-2.5	Deluxe Molded D-Sub Cable, DB15 Male / Male, 2.5	I-Automation
79		1	L-Com	RBMIDB15F	Interface Module, DB15 Female	I-Automation
80						
81						
82						
83						
84						
85						

B3	07/02/18	AS-BUILT MODIFICATIONS	J.P.A.	M.G.	G.H.
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 BRISTOL, CT 06010

TITLE: TRACTOR & 2 ROLL SERVO FEEDER  
 ELECTRICAL SCHEMATIC & LAYOUT

INSTALLATION NO.  
**CP16-0511JPA**

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B3	07/02/18	AS-BUILT MODIFICATIONS	J.P.A.	M.G.	G.H.
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INSTALLATION NO.	CP16-0511JPA
SHEET	19 of 20
REV.	B3

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## **Basic Troubleshooting List.**

This list is intended to guide you to some common solutions and all the following checks should be read and or tried prior to contacting technical support. The proper function of this machine depends upon, but not limited to, the following (4) categories. **NOTICE:** Any attempt to access or modify inner components or modify the operation of the basic machine without the express consent or direction of technical support will result in restrictions stated in the disclaimer shown elsewhere in this manual.

### **Basics:**

1. Check for proper air supply and recommended 80 PSI pressure.
2. Check for proper electrical connection.
3. Check that all components are in their proper place and secured correctly.
4. Check that the safety cover is on and in the proper position.

### **Pneumatics:**

**Q:** Will the machine make a complete cycle ?

**A:**

1. Check for proper air supply and recommended 80 PSI supply pressure.

**Q:** Where in the cycle does the machine stop?

**A:**

1. Check that all components are in their proper place and secured correctly.
2. Check for binding in the machine or on the wire line.
3. Check for proper sensor operation by referring to electrical section.

**Q:** Does the machine cycle but not cut?

**A:**

1. Check for proper 80 PSI air supply and recommended 70/80 PSI cutter pressure.
2. Manually check the function of the cut-off cylinder air valve by depressing the small button located on the valve or the button on the operator screen.

**Q:** Does the machine cycle but not feed?

**A:**

1. Check for proper 80 PSI air supply and recommended drive wheel pressure.
2. Manually check the function of all the air valves by depressing the small button located on each valve.
3. Check for proper gripper operation by referring to mechanical section.

**Q:** Does the machine deform the wire during feeding?

**A:**

1. Reduce or adjust the air pressure on the grip / drive rolls.

**Q:** Does the machine feed correctly for the first few pieces then feed erratic?

**A:**

1. Check for proper 80 PSI air supply and recommended system pressures.
2. Check and increase supply air line size if necessary.
3. Check for proper drive wheel operation by referring to mechanical section.
4. Check to be sure that the exhaust is not restricted at all ports.

**Q:** Does the machine feed correctly then start feeding short?

**A:**

1. Check for proper 80 PSI air supply and recommended drive wheel pressure.
2. Check and increase supply air line size if necessary.
3. Check for proper drive wheel operation by referring to mechanical section.
4. Check to be sure that the exhaust is not restricted at all ports.

**Q:** Does the machine run correctly then stop?

**A:**

1. Check error messages on screen for indicated condition.
2. Check the safety cover interlock.

## **Electronics:**

**Q:** Was the machine running before the problem, or did the problem arise when turning on the machine.?

**A:**

1. Check for proper electrical connection.
2. Check the fuse inside the control box if you suspect power problem.
3. Check the safety cover interlock.
4. If the screen is backlit and the display is functional, assume the control power is OK

**Q:** Why won't the system produce the correct length piece?

**A:**

1. Check to be sure that the drive wheels are not slipping and ensure that the system supply pressure is at 80 PSI
2. Ensure that the wire diameter is within the proper size and tolerance range.

## **Mechanical:**

**Q:** Will the machine make a complete cycle ?

**A:**

1. Verify that there are no excessive back pressures in the wire decoiling system.
2. If the machine stops during the cycle, check for binding through out the system.

**Q:** Does the machine cycle but not cut?

**A:**

1. Verify the operation of the cutter head.

**Q:** Does the machine cycle but not feed?

**A:**

1. Check that all components are in their proper place and secured correctly.
2. Verify the operation of the drive rolls / grippers and cylinders.
3. Check for material variation.

## **Disclaimer**

*NOVO PRECISION ASSUMES NO RESPONSIBILITY FOR NEITHER INJURY OF PERSON OR PRODUCT OR ANY LIABILITY RESULTING FROM THE PURCHASE OF PRODUCTS SOLD WITH THE INTENTION OF MODIFYING OR ATTACHING TO EXISTING EQUIPMENT. ANY EQUIPMENT MODIFIED FROM THE ORIGINAL CONFIGURATION STATED ON THE PURCHASE ORDER OR CONSIDERED AS MODIFIED CONFIGURATION BY NOVO, WILL NOT BE COVERED BY ANY GUARANTY OF OPERATION OR FUNCTION. ANY SUPPORT FOR THE MODIFIED EQUIPMENT WILL BE DETERMINED BY NOVO ON AN INDIVIDUAL INCIDENT BASIS.*



### **WARNING**

This equipment offers various means of operating or controlling machines. The operator must not be in or near the point-of-operation of the machine, or the operating parts of any equipment installed on the machine, or bodily injury could result. The end customer (EMPLOYER) must post adequate warning signs onto the machine with proper warnings for his machine and the specific application to which the machine and equipment are being applied.

OSHA Sections 1910.147, 1910.211, 1910.212 and 1910.217 contain installation information on the distance between danger points and point-of-operation guards and devices. No specific references have been made to which paragraph of OSHA 1910.147, 1910.211, 1910.211, 1910.217 or any other applicable sections because the paragraphs may change with each edition of the publications of OSHA provisions.

All equipment manufactured by Novo Precision is designed to meet the construction standards of OSHA in effect at the time of sale, but the end customer (EMPLOYER) installs the equipment so the end customer (EMPLOYER) is responsible for installation, use, application, training and maintenance, as well as adequate signs on the machine onto which the equipment will be installed.

Remember, OSHA says that the end customer (EMPLOYER) must use operating methods designed to control or eliminate hazards to operating personnel.

It shall be the responsibility of the end customer (EMPLOYER) to establish and follow a program of periodic and regular inspections of his machine to insure that all their parts, auxiliary equipment and safeguards are in a safe operating condition and adjustment. Each machine should be inspected and tested no less than weekly to determine the condition of the machine. Necessary maintenance or repair of both shall be performed and completed before the machine is operated. The end customer (EMPLOYER) shall maintain records of these inspections and maintenance work performed.

It is not the responsibility of Novo Precision to provide notification to the user of this equipment concerning future changes in State or Federal laws, or construction standards.

### **SAFETY PROGRAM**

Accident free operation will result from a well developed, management sponsored and enforced safety program.

Of vital importance to any successful program is the proper selection of guards and devices. However, there is no safety device that will bring "automatic" safety to your operation.

Of equal importance to this proper selection of the guard and the device is the training of your personnel. Each person must be trained as to the operation of the guard or safety device, highlighting why they have been provided on the equipment. Rules for safe operating should be written and enforced at all times. A final major concern of an effective safety program is regularly scheduled inspection and maintenance of all of the equipment.

To ensure continued safety at all times, top management, line supervisors, safety engineers and all employees must assume their proper share of the responsibility in the program. Only as a group, one that knows your own operation and its problems, can you carry out an effective safety program.

To assist you in the development of and continued use of safety programs, many safety minded groups have made guidelines available to you. However, you must know when and how to apply these guidelines.

The manufacturer provides information to assist you in properly adjusting and maintaining your equipment.

There is no short cut to proper safety, therefore it is recommended that you comply with their recommendations at all times.