Users Guide

Innovative

Adjustment

Solutions

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Contents

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Chapter 1: Warnings and Safety

1.1.1 General Precautions

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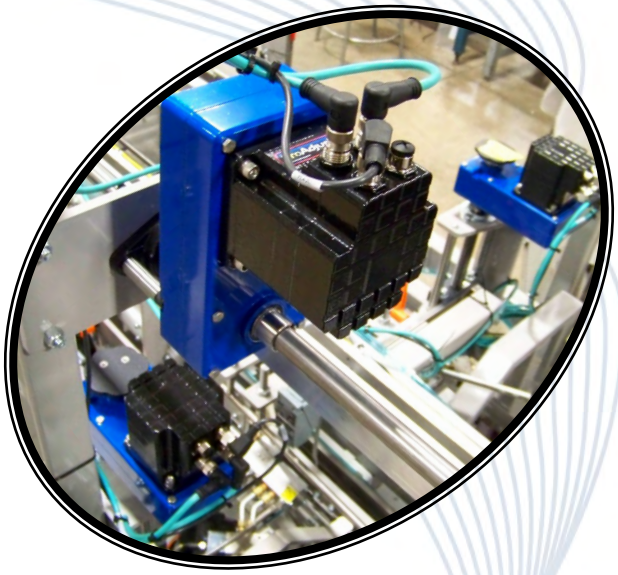
1.1.1 General Precautions

SAFE OPERATION & MAINTENANCE

This section supplements all safety instructions prescribed by your company, general accident prevention regulations, and government safety regulations. All information in this section and the rest of this manual pertain to anyone in the immediate vicinity of the equipment who is operating, observing, troubleshooting, or performing maintenance. These people should all be "Qualified Personnel". Only "Qualified Personnel" should operate this machinery.

QUALIFIED PERSONNEL



"Qualified Personnel" are thoroughly trained individuals who understand this equipment and its safe operation, maintenance, and repair. These individuals are physically capable of performing the required tasks discussed in all the manuals, familiar with all safety rules and regulations, and trained to perform all tasks related to the equipment. It is the responsibility of plant management to see that its personnel meet these requirements.

DO NOT allow anyone except "Qualified Personnel" to operate or maintain this automatic equipment. Improperly trained personnel can result in injury to people and damage to the machinery.

DO NOT operate this equipment for any reason unless all guarding is in place and all control interlocks are functioning properly. Machine guards are for personnel protection. In the event of machine modification that creates a pinch point be sure to add guarding for safety of all personnel.

DO NOT remove guarding or alter any of the guarding in any way.

DO NOT attempt to alter or modify any part of the system without following Lockout/ Tagout procedures.

Note: All non-qualified personnel should maintain a safe distance from the equipment at all times.

General Precautions

SAFETY CHECKS

Always Adhere To The Following Safety Checks:

WARNING: Test the operation of all guard doors and guard systems at the beginning of every shift/operator change.

WARNING: Test the operation of all emergency stop push buttons at the beginning of every shift/operator change.

WARNING: Do not perform any maintenance and/or repair of equipment until the main air and electrical power are locked out and tagged out.

LOCKOUT / TAGOUT

As with all automated equipment, Lockout / Tagout of hazardous energy sources is required for safe maintenance of the equipment. The following are general Lockout/ Tagout guidelines for the isolation of hazardous energy sources on this equipment. They are provided to guide you in the creation of a Lockout / Tagout procedure that is compliant with all local, federal, and plant laws and guidelines.

A Lockout / Tagout procedure establishes the minimum requirements for the Lockout / Tagout of machinery. It ensures that the machinery is isolated from all potentially hazardous energy; that disconnects, valves, switches, etc. are locked and tagged before servicing the machinery; and that unexpected energizing, start up, or release of stored energy cannot cause personal injury or machinery damage.

WARNING: Every Lockout / Tagout situation requires assessment of the Lockout / Tagout requirements by a knowledgeable, trained employee authorized to perform this Lockout / Tagout. Under no circumstances should unqualified employees perform Lockout / Tagout procedures on this equipment. Injury or death may result!

In-house facility lockable devices must be in place to cut electrical power to all parts of the ProAdjust System. These in-house devices must be in place in addition to the power disconnect that the ProAdjust System has.

General Precautions

These Cautions Apply to Personnel Working On All Areas of the Machinery

- **Always** follow Lockout / Tagout procedures while performing any maintenance.
- **Dress Safely,** contain long hair, avoid wearing jewelry, neckties, or loose clothing that could become entangled in the machinery.
- **DO NOT** operate, troubleshoot, or maintain this equipment while under the influence of any type of drug (medication), alcohol, or illegal substance.
- **Observe** all safety warnings and notices on the machinery and in this manual.
- **DO NOT** use flammable or toxic cleaning fluids such as gasoline, alcohol, benzene, or ether when cleaning or maintaining this equipment.
- **Always** replace fuses with the exact type and rating supplied with the machinery when it shipped from the factory.

1.2.1 Warning Labels

	NOTE – ELECTRICAL LOCK OUT POINT: Lock out electrical equipment before performing maintenance on machine. Failure to observe may result in serious injury or death.
	GROUND SYMBOL – This label can be found at the Main Panel Incoming Safety Ground.
	CAUTION: ELECTRICAL SHOCK HAZARD. ELECTRICAL VOLTAGE PRESENT IN THIS AREA. Do not open panels without following your company's Lock Out / Tag Out procedures and all applicable government regulations.
	DANGER: Hazardous Voltage will cause severe injury or death. Turn off power and lock out before service. Potential Arc-Flash hazards exist while working on this energized equipment.

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Chapter 2: ProAdjust at a Glance

2.1.1 ProAdjust System Overview

2.2.1 ProAdjust Equipment Overview

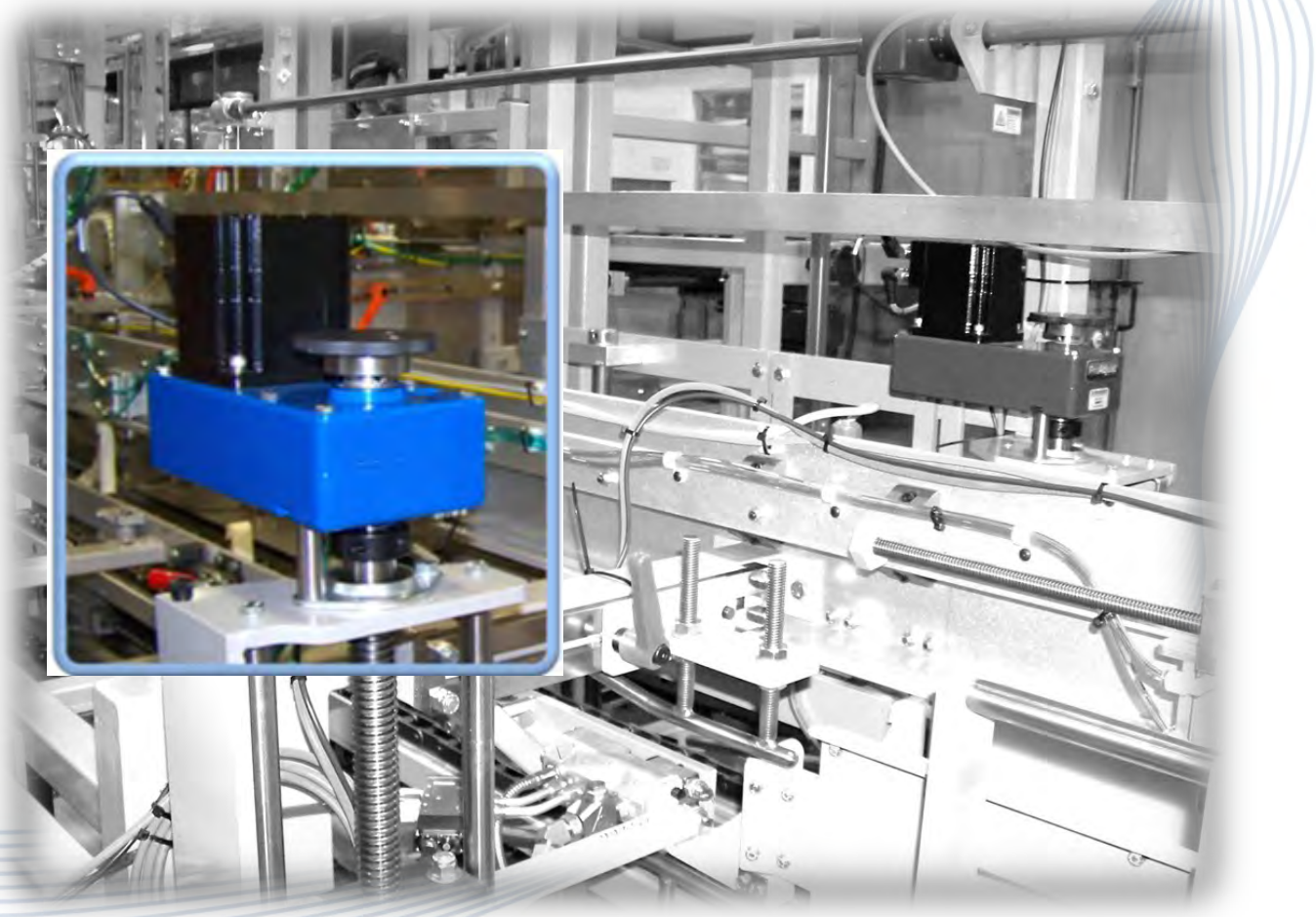
2.3.1 ProAdjust Equipment Overview (Optional)

Users Guide

2.1.1 ProAdjust System Overview

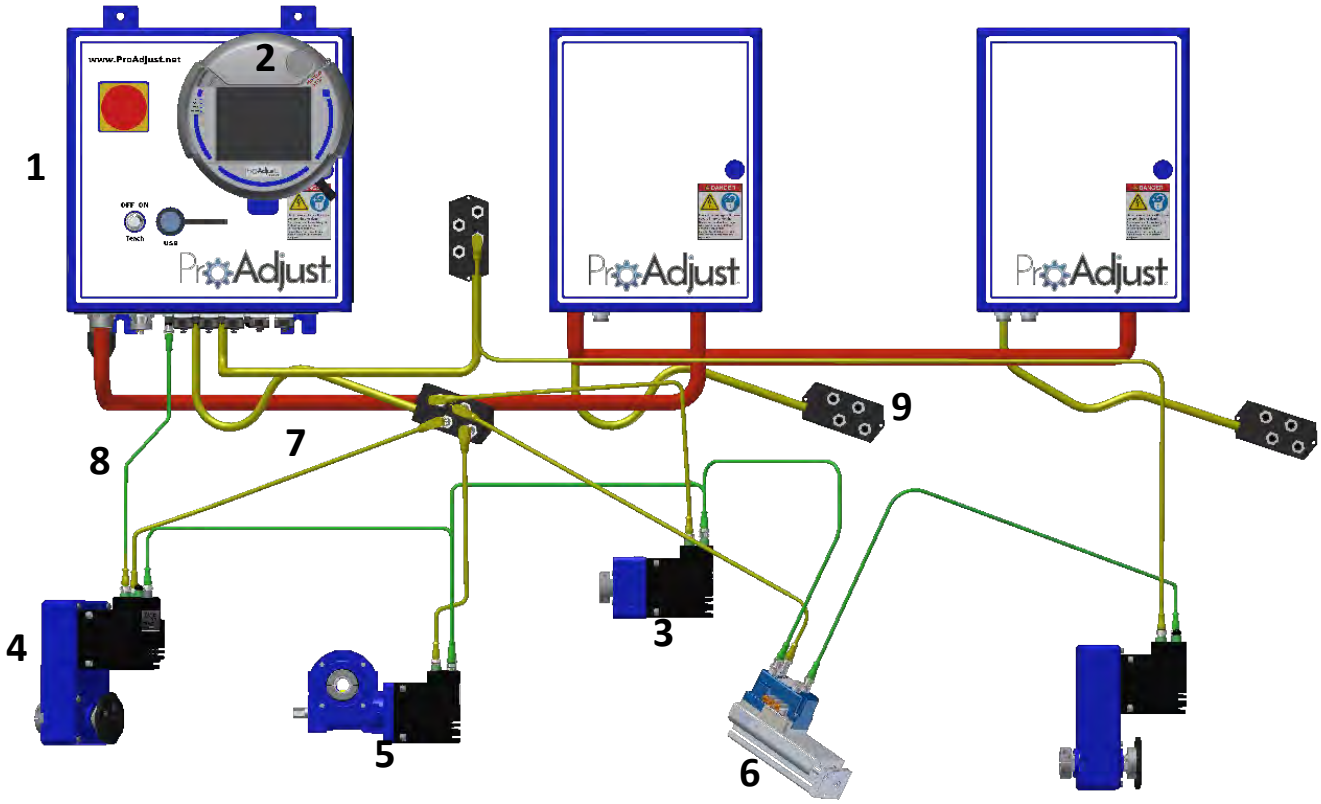
Welcome to ProAdjust

ProAdjust is an automatic machinery adjustment system that can be installed on any piece of equipment, to provide quick and repeatable positioning of multiple adjustment points. The system can be installed alongside an existing piece of equipment (with electrical tie-ins to an existing safety circuit). Or it can be integrated into the control of the host machine so that the adjustment recipe is defined by the host machine's current recipe.



2.2.1 ProAdjust Equipment Overview

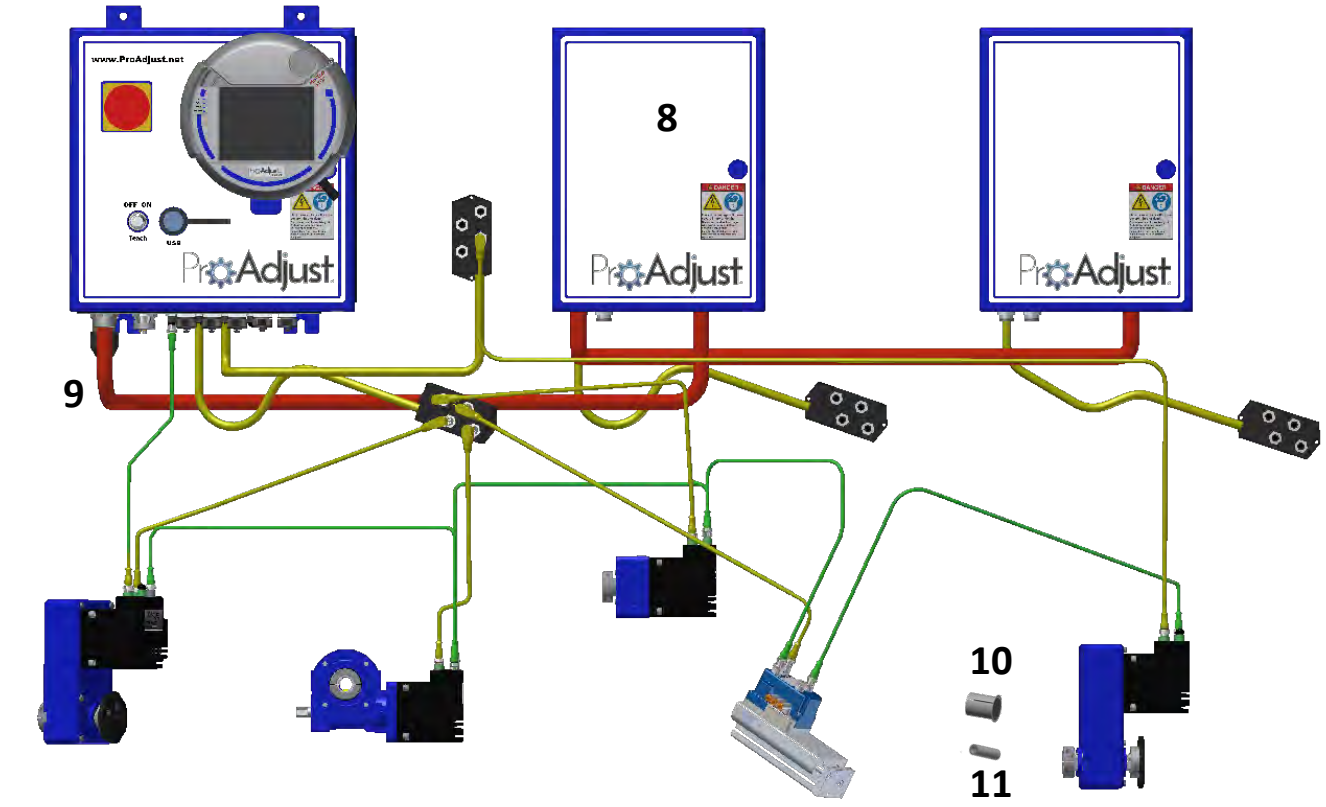
This is a list of the necessary components that make up a working ProAdjust System.



1. Base Power Enclosure
2. Teach Pendant
3. PRO-D01 Drive Power Pack
4. PRO-D03 Drive Power Pack
5. PRO-D07 Drive Power Pack
6. PRO-A04 Air Power Pack
7. Power Cable
8. Interface Cable
9. Power Distribution Cable

2.3.1 ProAdjust Equipment Overview (Optional)

This is a list of the optional components that make up a complete ProAdjust System.



8. (Optional) Expansion Power Enclosure
9. (Optional) Expansion Power Cable
10. (Optional) Reducer Bushing
11. (Optional) Anti-rotation Pins

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Chapter 3: Application Selection

Users Guide

3.1.1 ProAdjust Configuration

1) To select the correct ProAdjust equipment that should be used for your application, you will need to start with identifying the number and type of power packs you will need. (See torque chart in Section 3.2.6)
2) Next determine the number of Power Distribution Cables you need. Each Power Distribution cable will supply power for a maximum combination of 4 Drive Power Packs.
3) Each drive power pack that is used will require an Interface Cable and a Power Pack Cable. Determine the lengths required of each of these cables based on your application.
4) (Optional) Next determine the number of Expansion Enclosures you need. The Base Power Enclosure will handle up to 20 Drive Power Packs.

Note: The Expansion Enclosure will handle up to 8 Drive Power Packs.

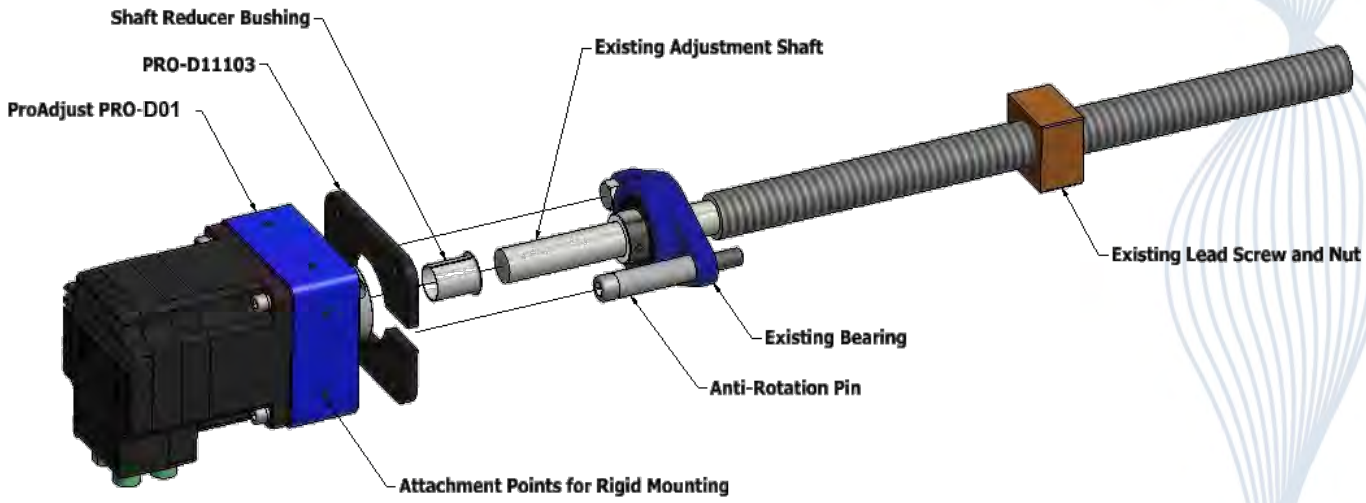
5) If your system exceeds 20 Drive Power Packs, then calculate the number of Expansion Power Enclosures needed by subtracting 20 from the number of Drive Power Packs in your system. Divide the result by 8 and round up to the nearest whole number. (Max drive power pack axes = 200)
6) Also select the size and quantity of Shaft Reducer Bushings for the Drive Power Packs that you have selected for your application. (See Section 6.2.1 for sizes available)

Example: A system with 32 Drive Power Packs will require 1 Base Power Enclosure plus 2 Expansion Power Kits. Additionally, 32 Interface Cables, 32 Power Pack Cables and 8 Power Distribution Cables are needed.

3.2.1 Mechanical Installation Details

All of the ProAdjust Power Packs are designed for use in a typical shaft mount application. This is accomplished by adding a new threaded shaft and nut attached to the machine adjustment point or utilizing an existing adjustment shaft already installed on the machine.

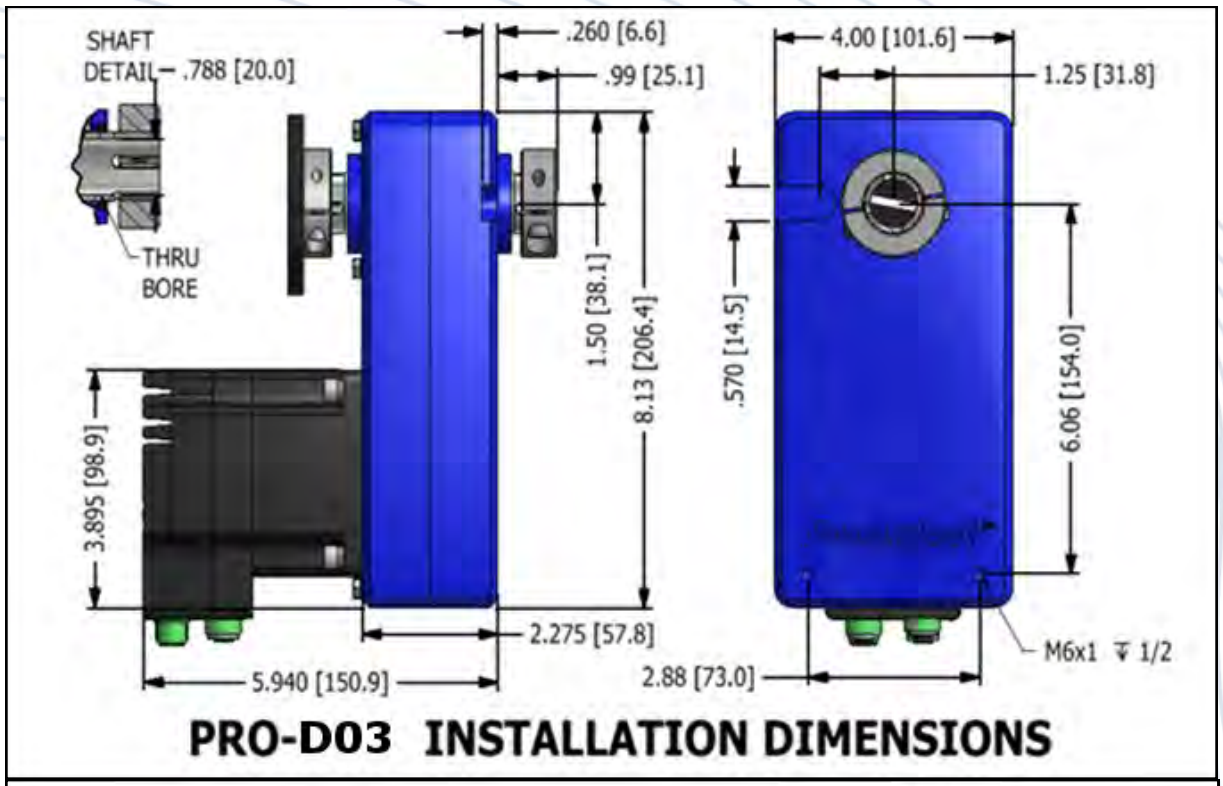
A typical installation is shown below utilizing the PRO-D01 Drive Power Pack. The same design can be implemented using any of the Power Packs Available.



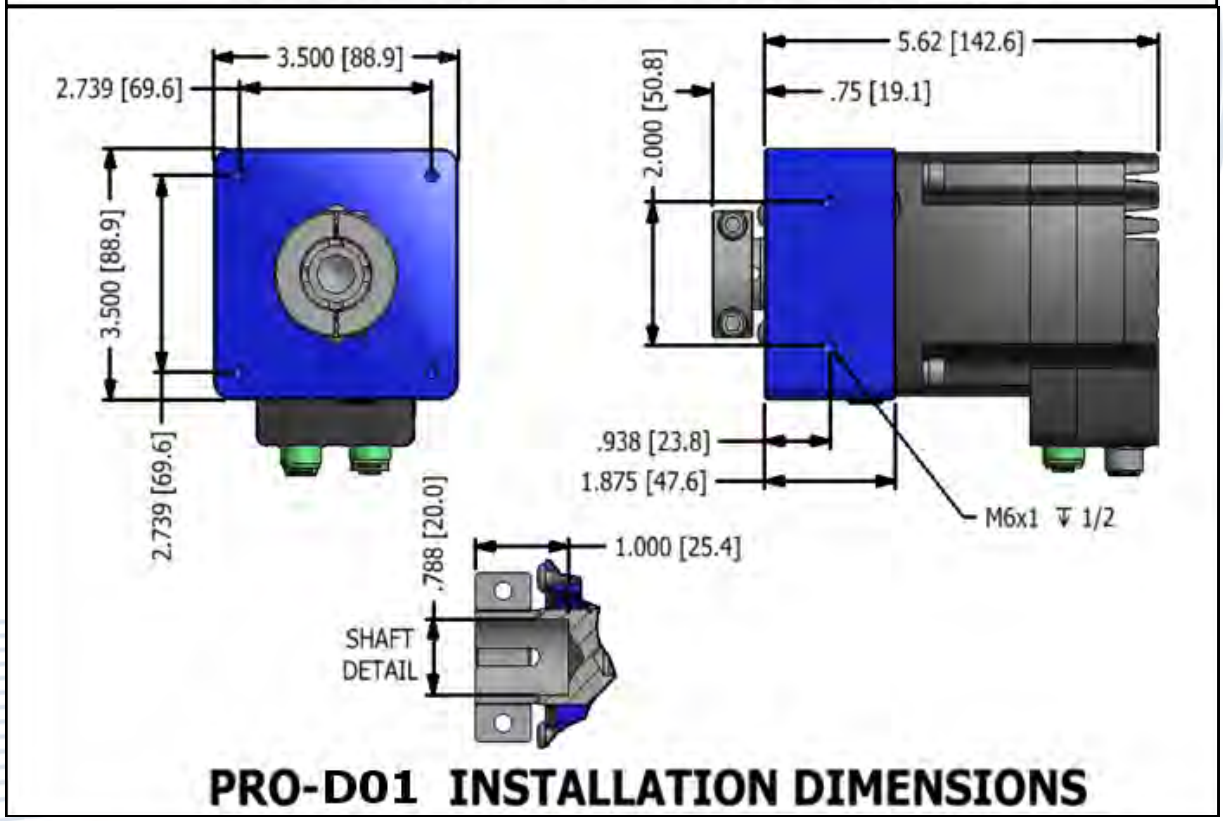
TYPICAL ProAdjust PRO-D01 APPLICATION

Mechanical Installation Details

Use the listed dimensions to ensure that the appropriate ProAdjust drive will physically fit your application.



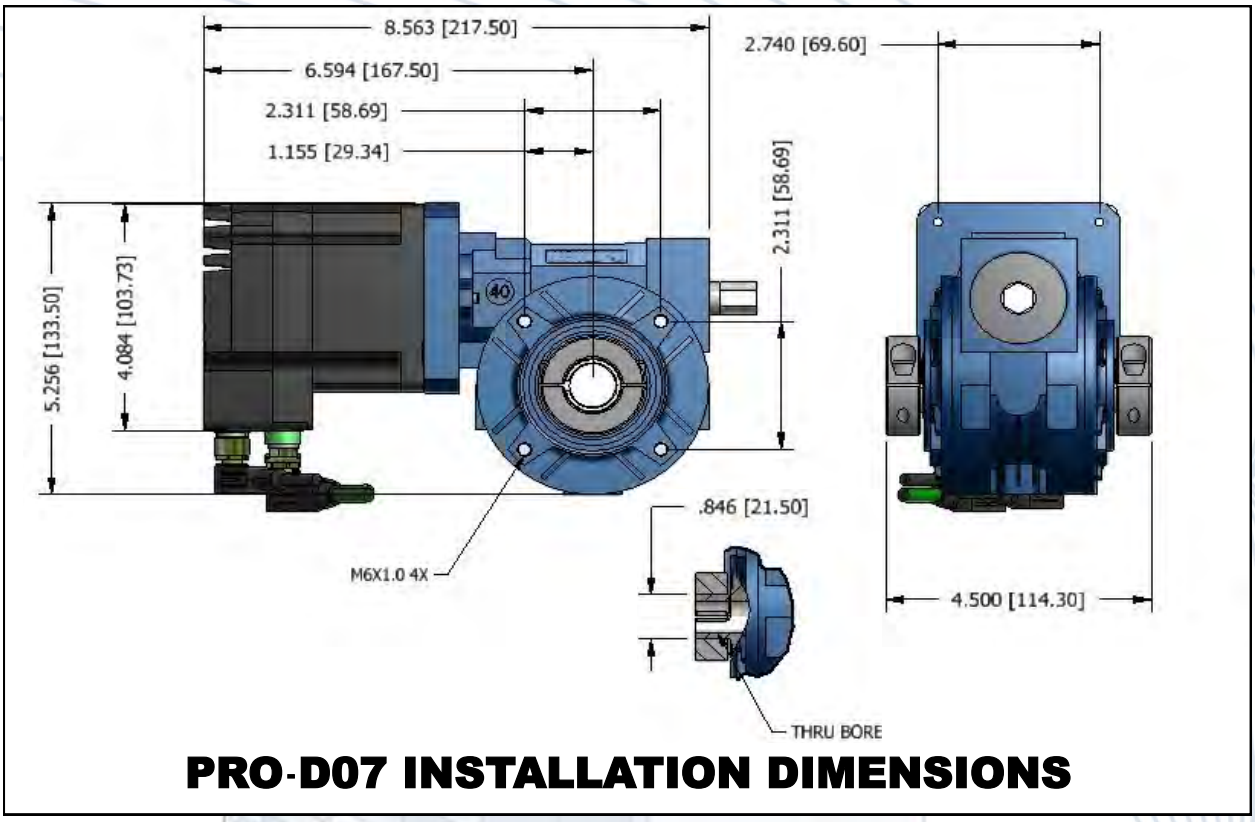
PRO-D03 INSTALLATION DIMENSIONS



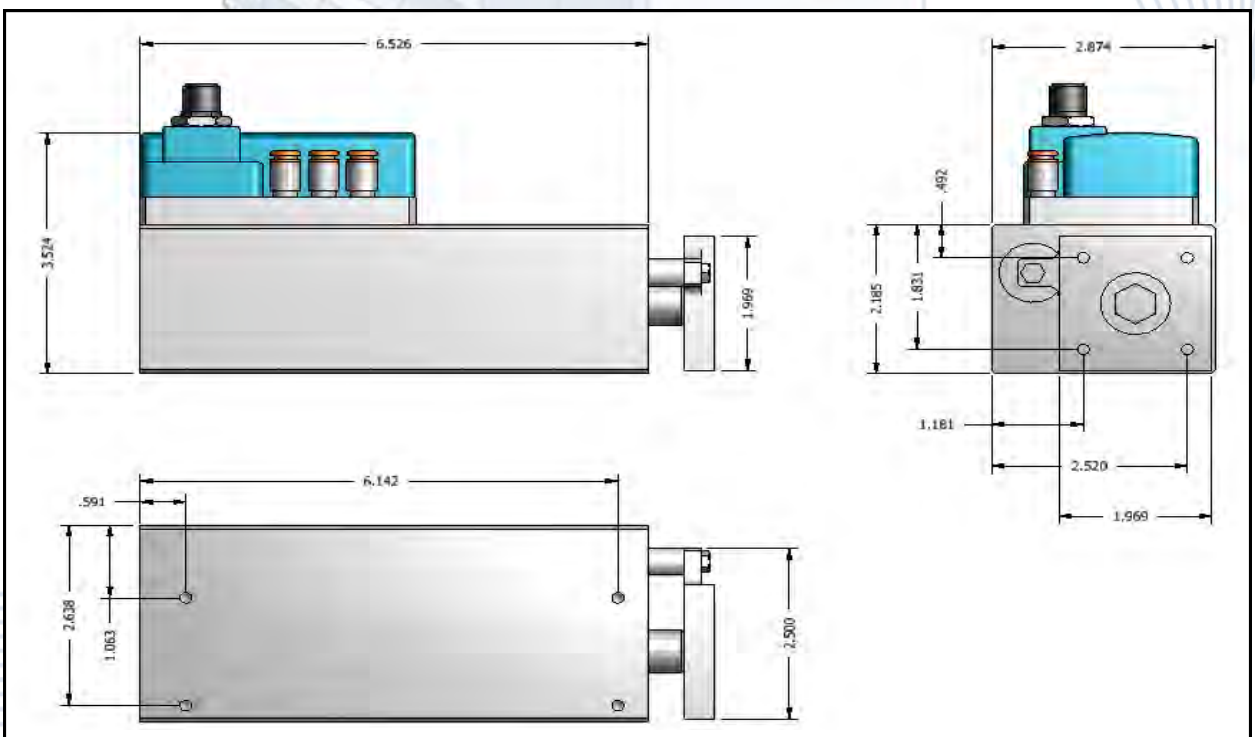
PRO-D01 INSTALLATION DIMENSIONS

Mechanical Installation Details Continued

Use the listed dimensions to ensure that the appropriate ProAdjust drive will physically fit your application.



PRO-D07 INSTALLATION DIMENSIONS



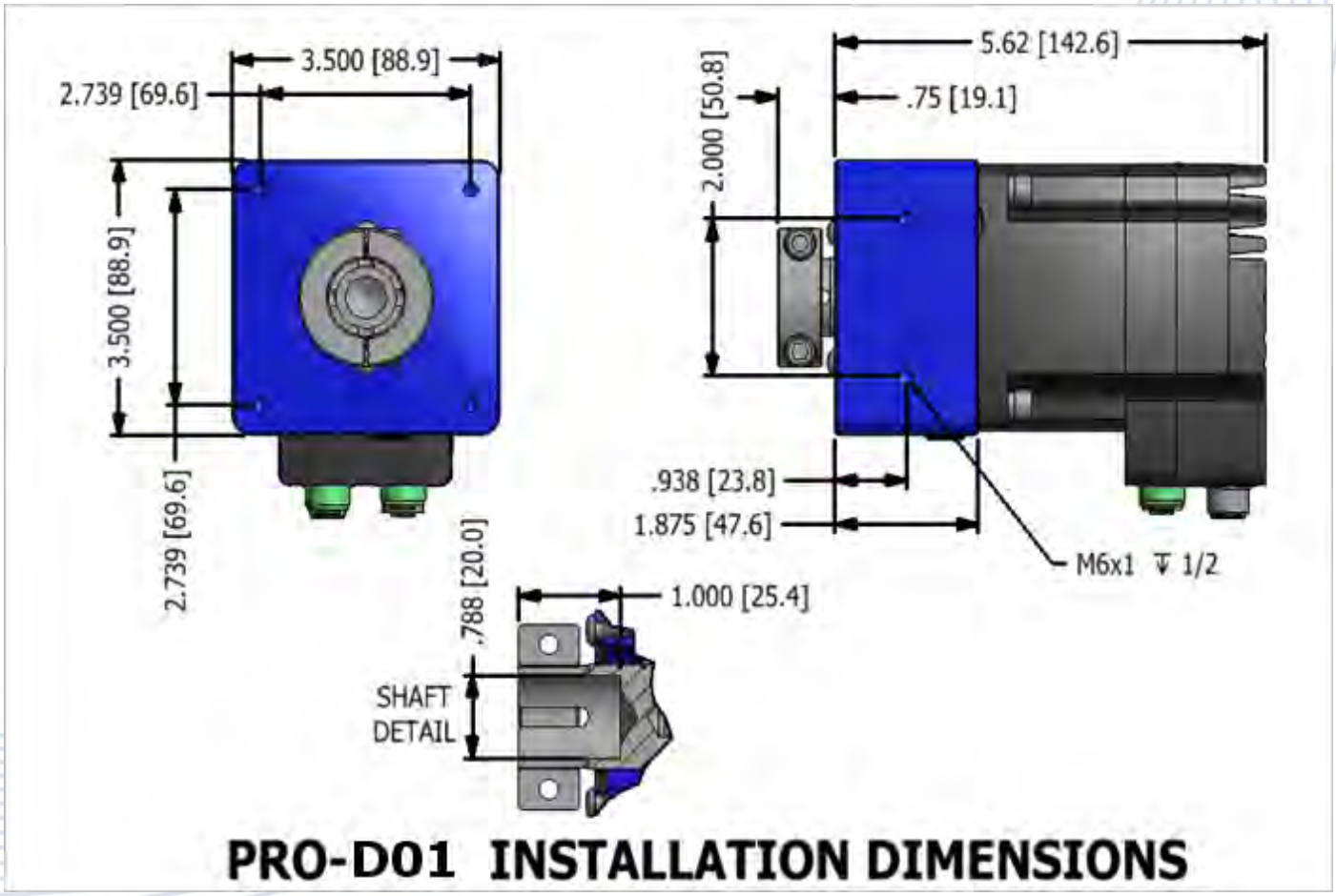
PRO-A04 INSTALLATION DIMENSIONS

3.2.2 ProAdjust Drive Power Pack (PRO-D01)

- The Drive Power Pack (PRO-D01) is a drive motor assembly that is designed to replace hand crank handles on lead screw type adjustment mechanisms at torques of up to 18.8 in-lb., 2.12 Nm for rotary adjustments.
- The assembly allows numerous mounting configurations, with attachment points on the sides and face of the housing. A shaft mount face adapter (Part# PRO-D11103, See Catalog Components Section 6.2.1) is available for applications where a shaft supported installation can be used.

> **Note:** An anti-rotation pin must be used with this to prevent rotation of the drive motor assembly when the shaft mount face adapter is utilized. (See Catalog Components in Section 6.2.1)

- The Power Pack includes an internal bearing to handle radial and axial loads. A shaft coupling system provides a simple method of connecting to existing adjustment lead screws. A variety of shaft reducer bushings are available in SAE and metric diameters up to 3/4 in. or 20mm. (Part# PRO-Bxx or PRO-BxxMM)



PRO-D01 INSTALLATION DIMENSIONS

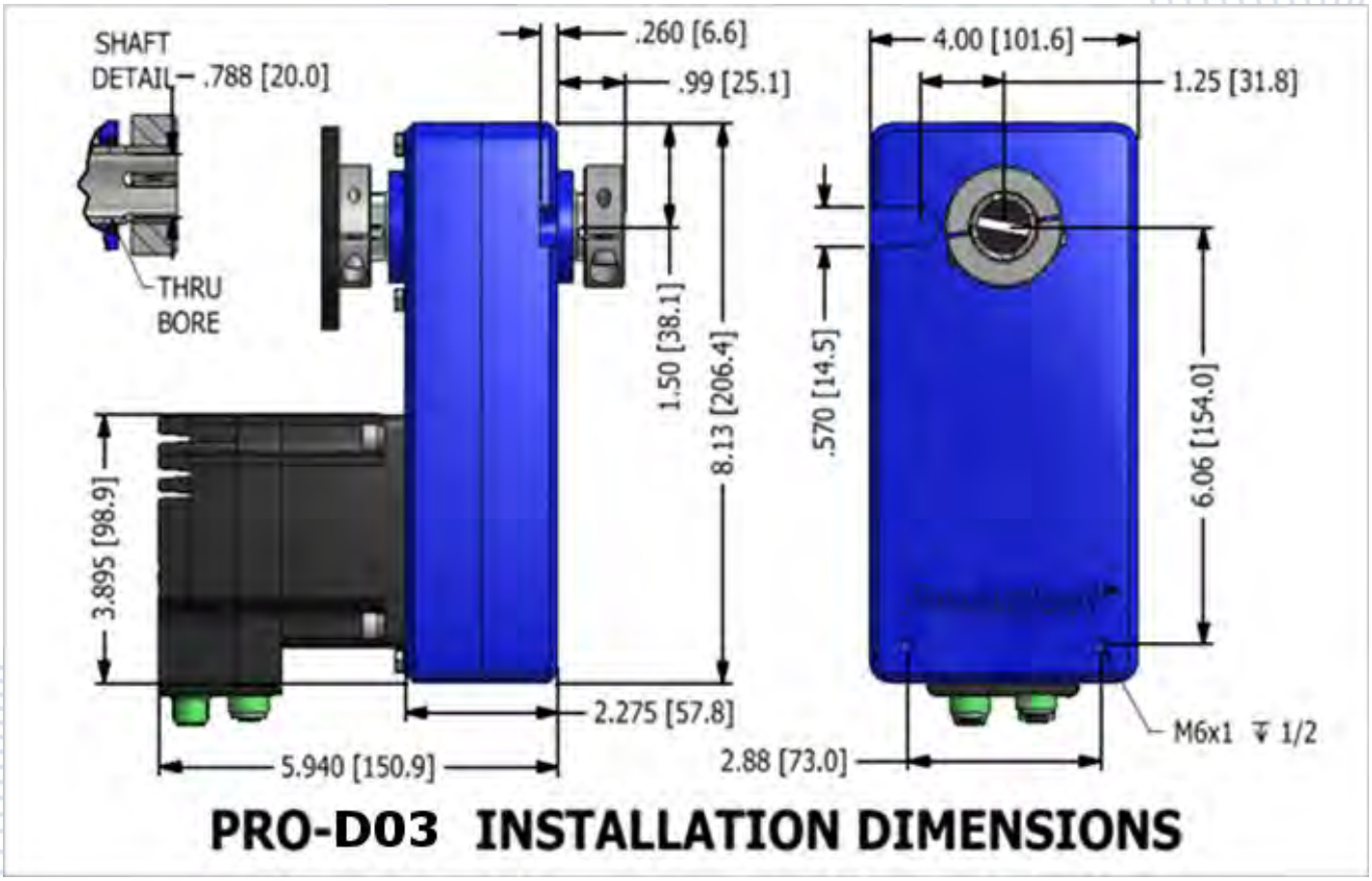
3.2.3 ProAdjust Drive Power Pack (PRO-D03)

- The Drive Power Pack (PRO-D03) is a drive motor assembly that is designed to replace hand crank handles on lead screw type adjustment mechanisms at torques of up to 49.1 in-lb., 5.55 Nm for rotary adjustments.
- The assembly allows numerous mounting configurations, with attachment points on the face of the housing. The shaft supported installation method is also available without the need for a face adapter due to the anti rotation pin notch cut into the face of the gear box.

Note: An anti-rotation pin must be used in shaft supported installations to prevent rotation of the drive motor assembly.

- The Power Pack features a shaft coupling system to provide a simple method of connecting to existing adjustment lead screws. A variety of shaft reducer bushings are available in SAE and metric diameters up to 3/4 in. or 20mm. (Part numbers PRO-Bxx or PRO-BxxMM)

Note: The Power Pack is intended for rotational loading only. An external Bearing should be used to carry axial or thrust loads.

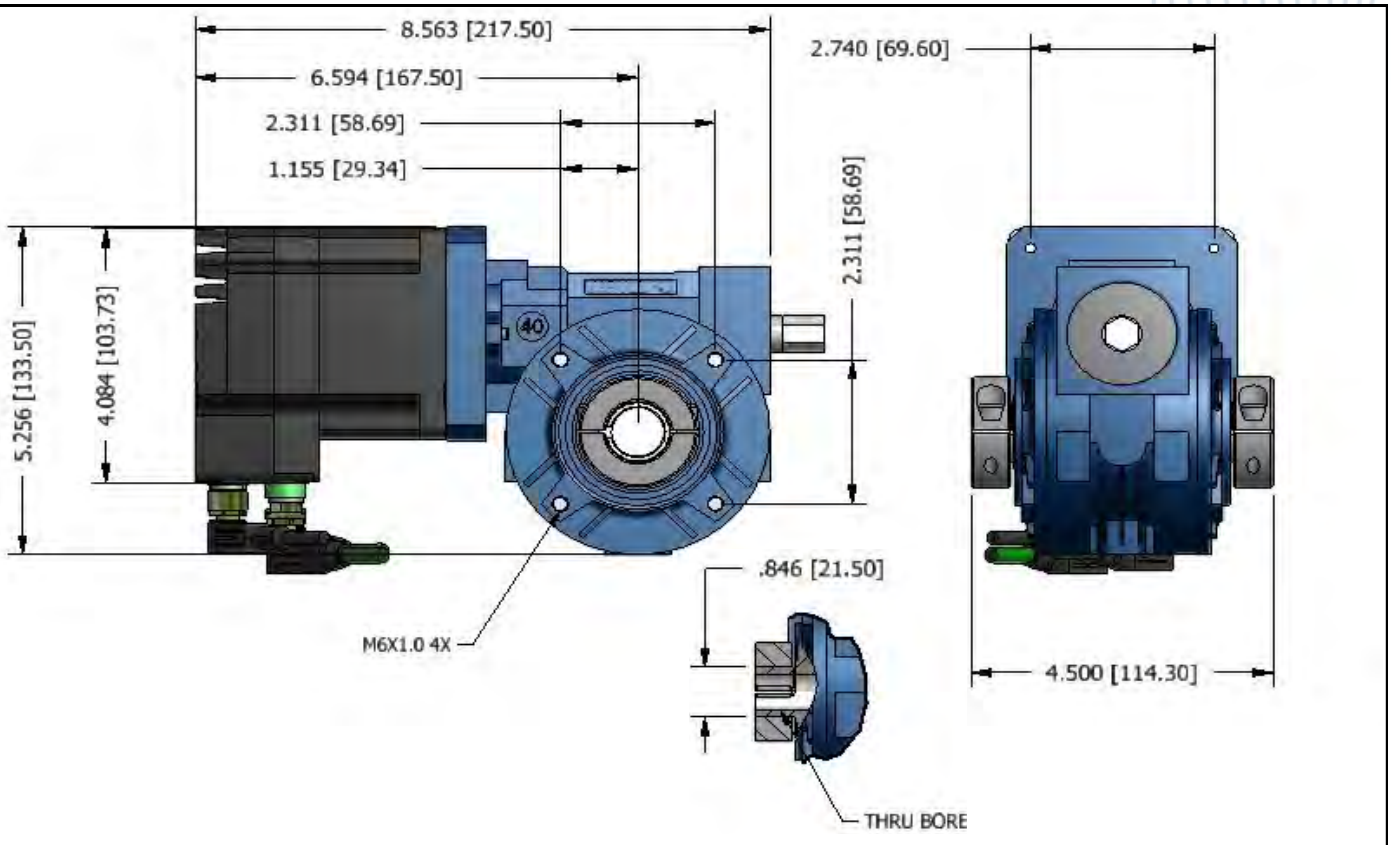


PRO-D03 INSTALLATION DIMENSIONS

3.2.4 ProAdjust Drive Power Pack (PRO-D07)

- The Drive Power Pack (PRO-D07) is a drive motor assembly that is designed to replace hand crank handles on lead screw type adjustment mechanisms at torques of up to 119.0 in-lb., 13.45 Nm for rotary adjustments.
- The assembly allows numerous mounting configurations, with attachment points on the face of the housing.
- The Power Pack features a shaft coupling system to provide a simple method of connecting to existing adjustment lead screws. A variety of shaft reducer bushings are available in SAE and metric diameters up to 3/4 in. or 20mm. (Part numbers PRO-Bxx or PRO-BxxMM)

Note: The Power Pack is not intended to carry high axial or thrust loads, an external bearing should be used to carry such loads.

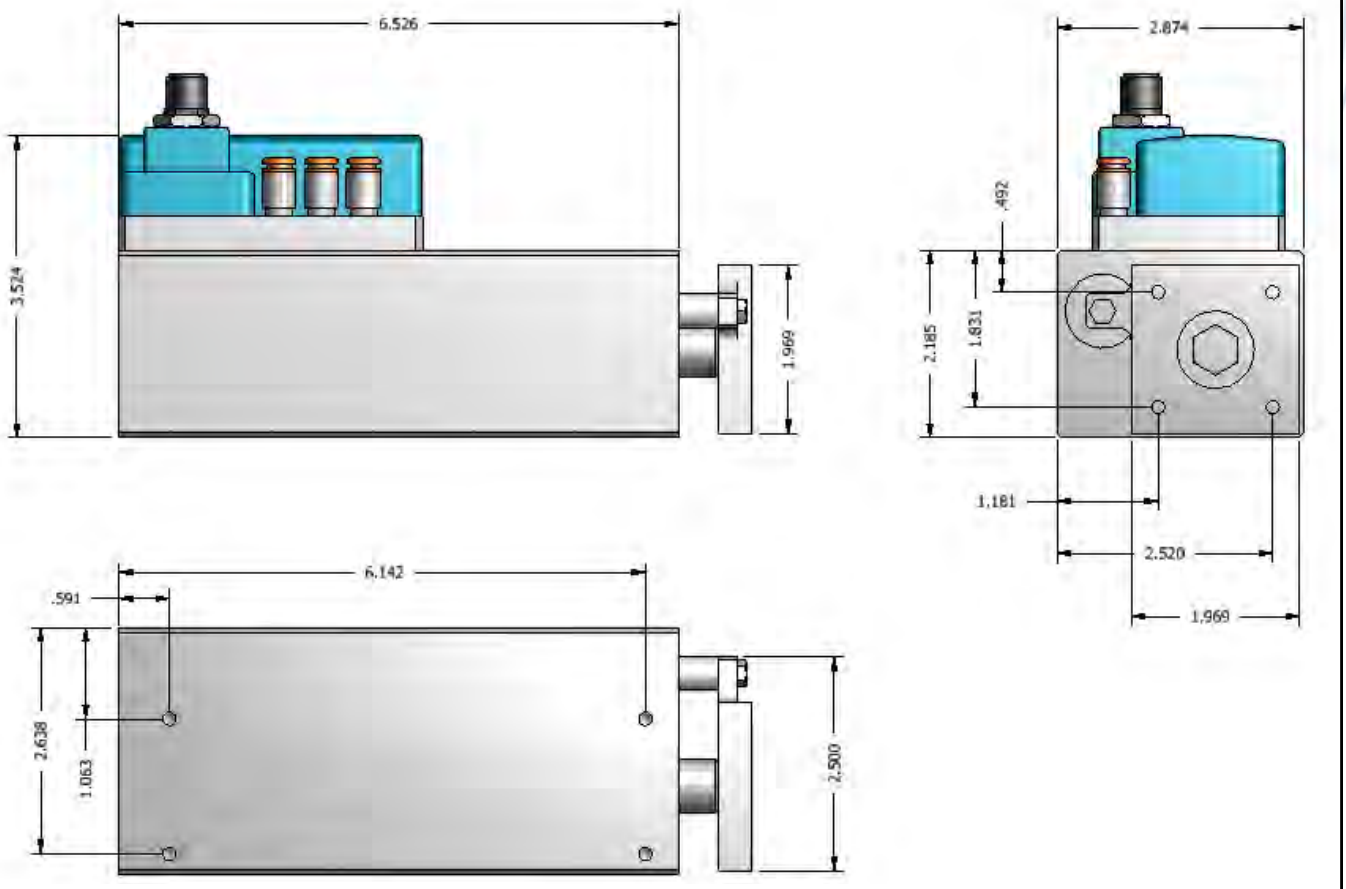


PRO-D07 INSTALLATION DIMENSIONS

3.2.5 ProAdjust Air Power Pack (PRO-A04)

- The Air Power Pack (PRO-A04) is a cylinder assembly that is designed to replace slide type adjustment mechanisms at forces of up to 249 Force lb. The assembly allows numerous mounting configurations, with attachment points on the base of the housing.
- The Air Power Pack features a face mounting system to provide a simple method of connecting to existing slide adjustments.

Note: The Air Power Pack is not intended to carry high vertical loads on a horizontal mounted configuration, and an external bearing and shaft should be used to carry such loads.

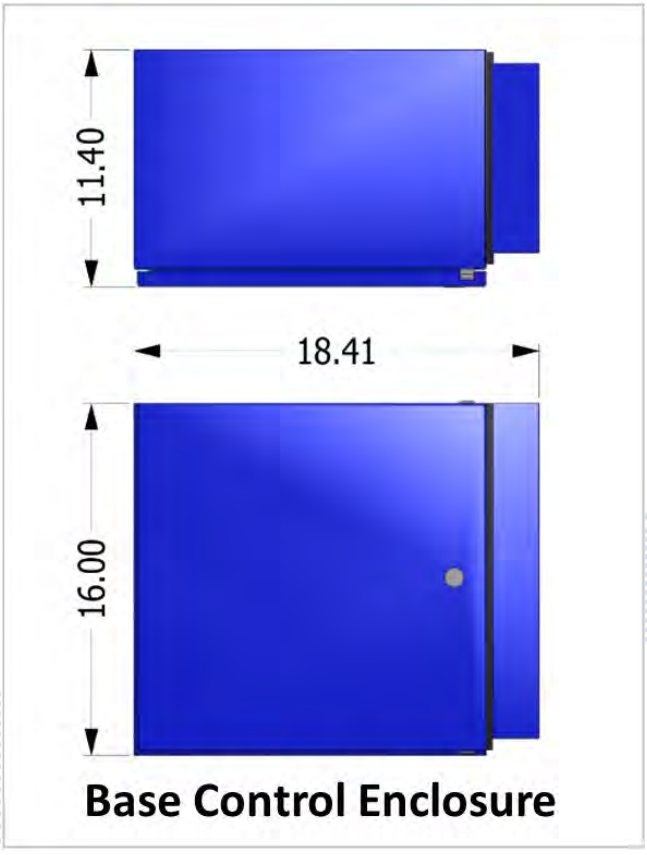


PRO-A04 INSTALLATION DIMENSIONS

3.2.6 ProAdjust Base Enclosure

- ProAdjust Base Enclosure provides control, communication, and power supply for the ProAdjust system. It also includes a portable wired teach pendant and quick disconnect interface for the Power Packs.
- ProAdjust Base Enclosure is designed for simple installation and universal application. Quick disconnects are provided to simplify connection, and reduce wire terminations and potential errors.

Note: The ProAdjust Base Enclosure is limited to a maximum of 20 adjustment axes. Additional axes can be powered by the addition of a ProAdjust Expansion Enclosure, up to a maximum of 450 axes.



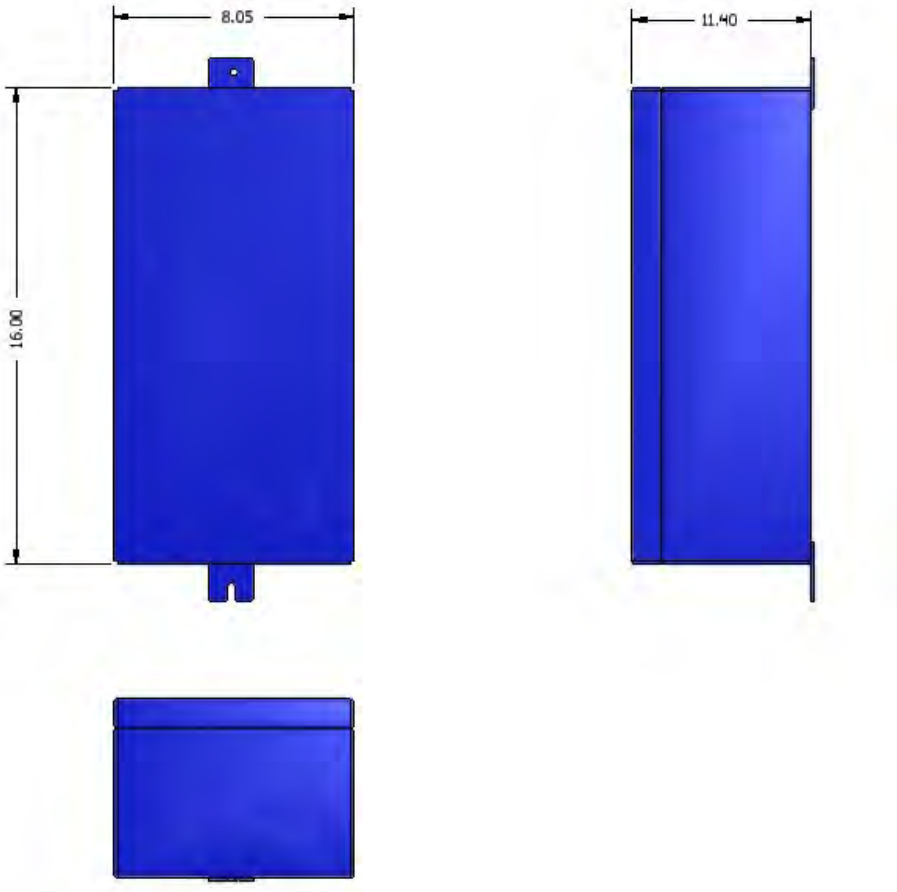
Base Control Enclosure

3.2.7 ProAdjust Expansion Enclosures

- ProAdjust Expansion Enclosure provides power supply for the ProAdjust system when additional adjustment axes are required.

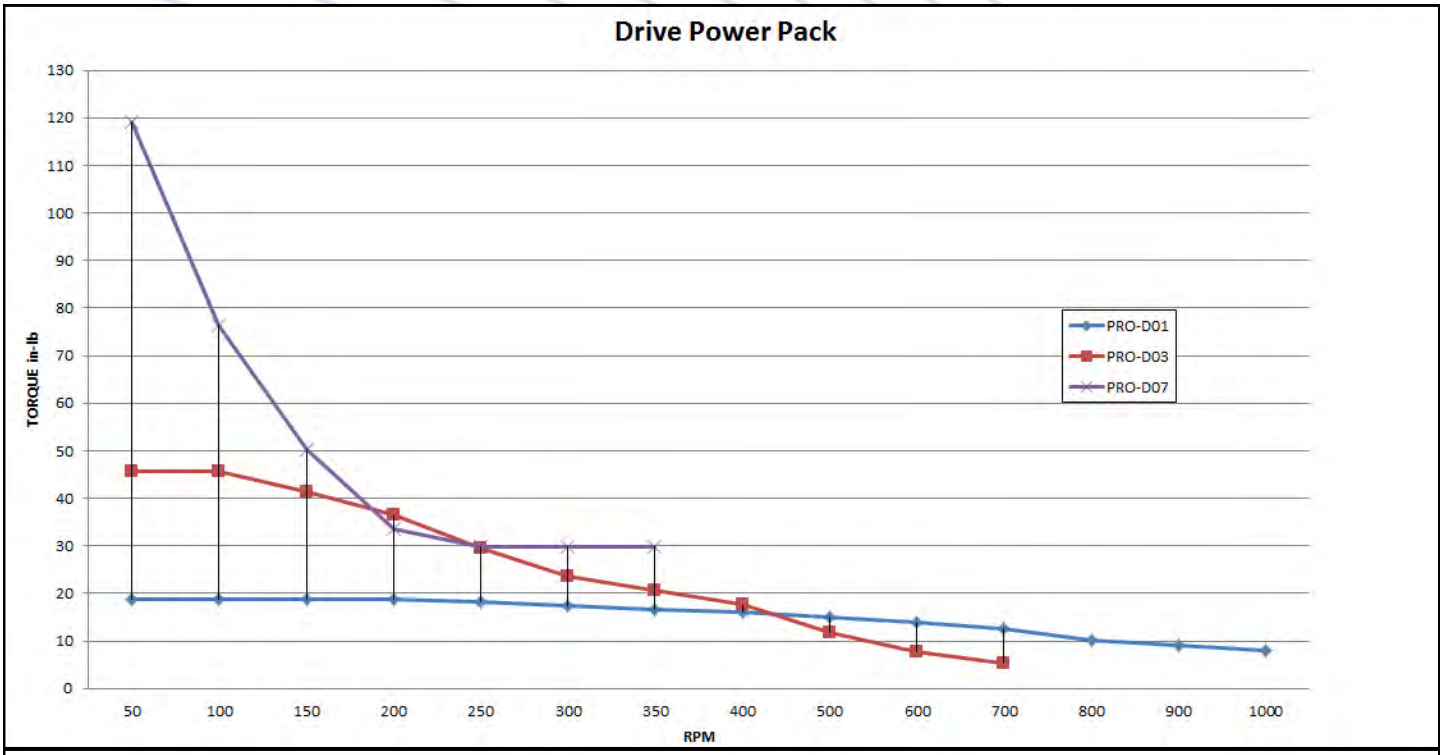
- ProAdjust Expansion Enclosure is designed for simple installation and universal application. Quick disconnects are provided to simplify connection, and reduce wire terminations and potential errors. The Expansion Enclosure must be wired to the Base Enclosure for supply

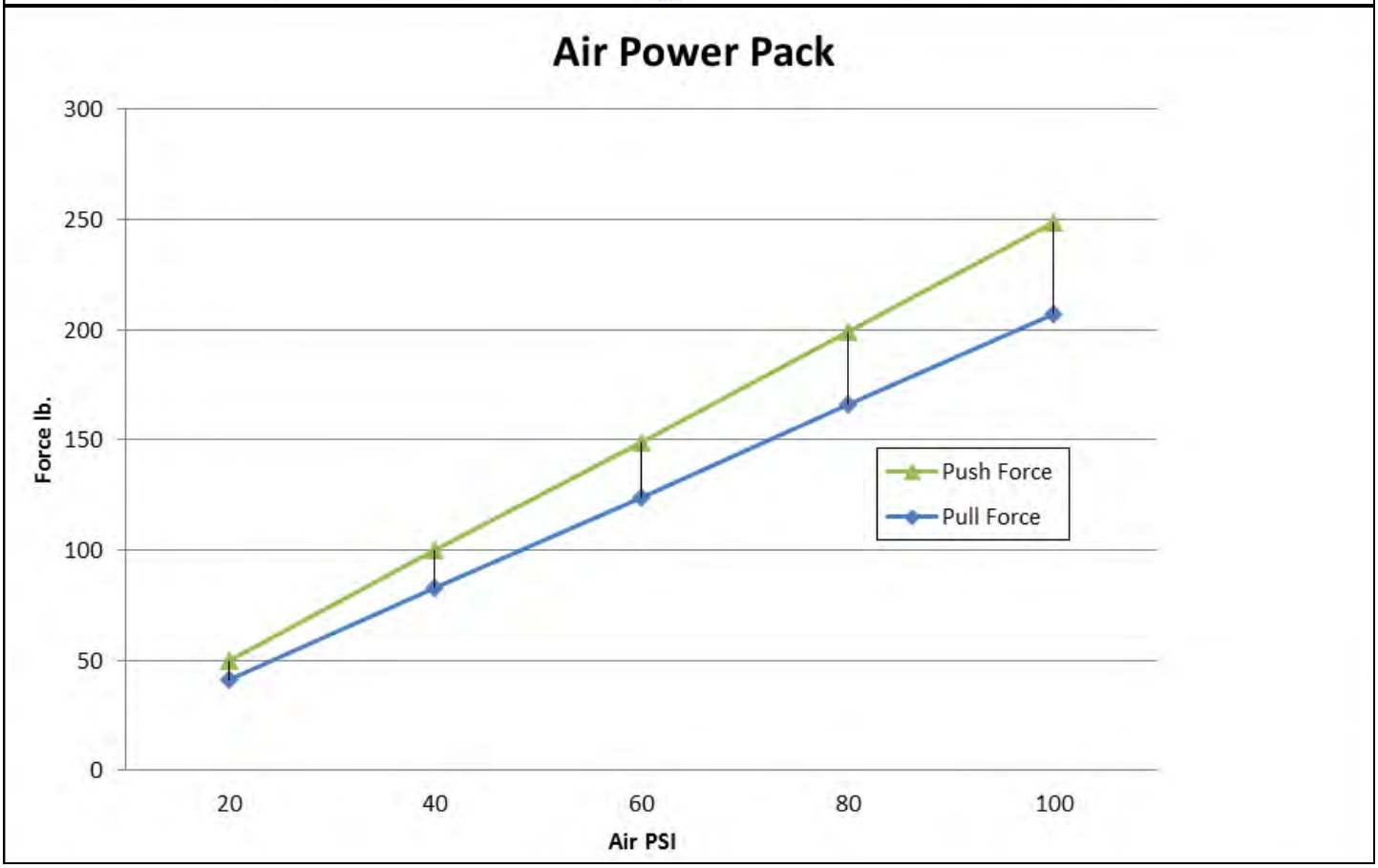
Note: ProAdjust Expansion Enclosure is limited to a maximum of 8 adjustment axes. Additional axes can be powered by the addition of another ProAdjust Expansion Enclosure, up to a maximum of 200 axes.



Expansion Power Enclosure

3.2.8 ProAdjust Detailed Specifications





ProAdjust System Specifications

Construction and Finish:	Enclosure: Painted Drive Power Packs: Powder coat, anodize, and stainless steel
Visual Display:	Corded remote touchscreen color display
Machinery Power:	480V 3 phase 60Hz or 400V 3 phase 50 Hz
Ambient Temperature of Equipment Location:	0^{o} to 40^{o} C, 5% to 95% relative humidity, non-condensing Power Pack IP Rating = IP66 Control Panel IP Rating = IP66 Cable Connection IP Rating = IP67 Teach Pendant IP Rating = IP54
Air Pressure:	50-90 PSI
Drive Power:	80V DC
Maximum Adjustment Points:	50 Dive Packs, 185 Air Packs
Maximum/Standard Output Shaft Diameter:	3/4-inch (20 mm) diameter hollow shaft
System Duty Cycle:	Up to 2 fifteen minute adjustments per hour

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Chapter 4: Installation Guide

Users Guide

4.1.1 ProAdjust Drive Power Pack (PRO-D01) Installation

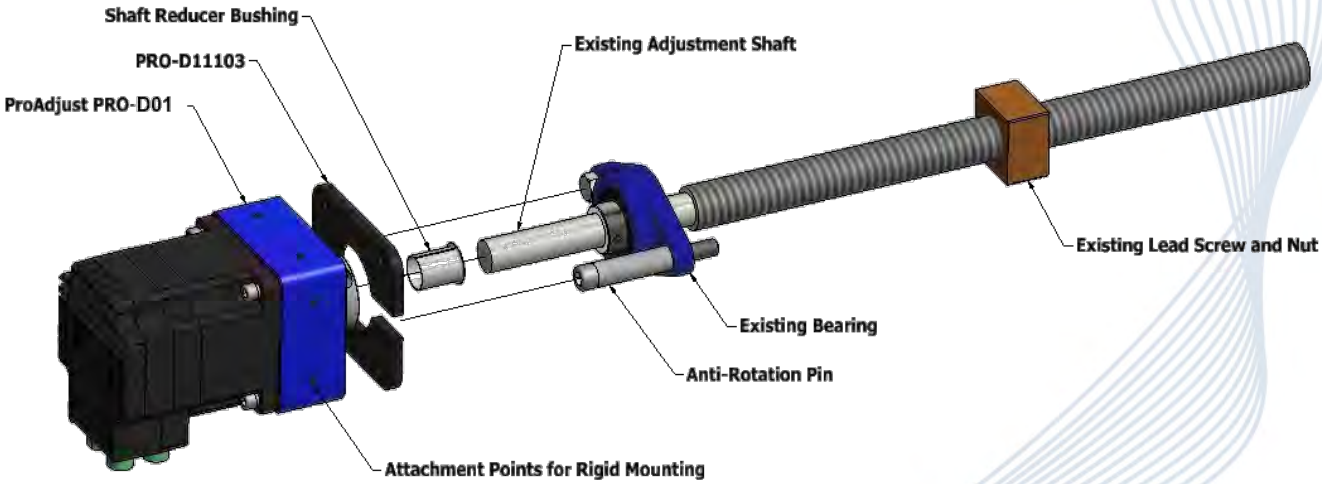
Step 1: Remove the Drive Power Pack from its shipping container.

Step 2: Where necessary, insert the proper shaft reducer bushing into the hollow 20mm output shaft. The specifically engineered reducer bushings are available in a wide range of sizes from ProAdjust.net.

Step 3: To use the most common installation method (shaft supported installation), install an (optional) anti-rotation pin sized to fit over the bearing mounting bolt. Anti-rotation pins are available in a wide range of sizes from ProAdjust.net.

Step 4: Install the PRO-D01 with Shaft Reducer Bushing onto the end of the existing lead screw.

Step 5: Connect each ProAdjust Drive Power Pack according to the instructions under ProAdjust System Wiring. (Section 6.1.3)

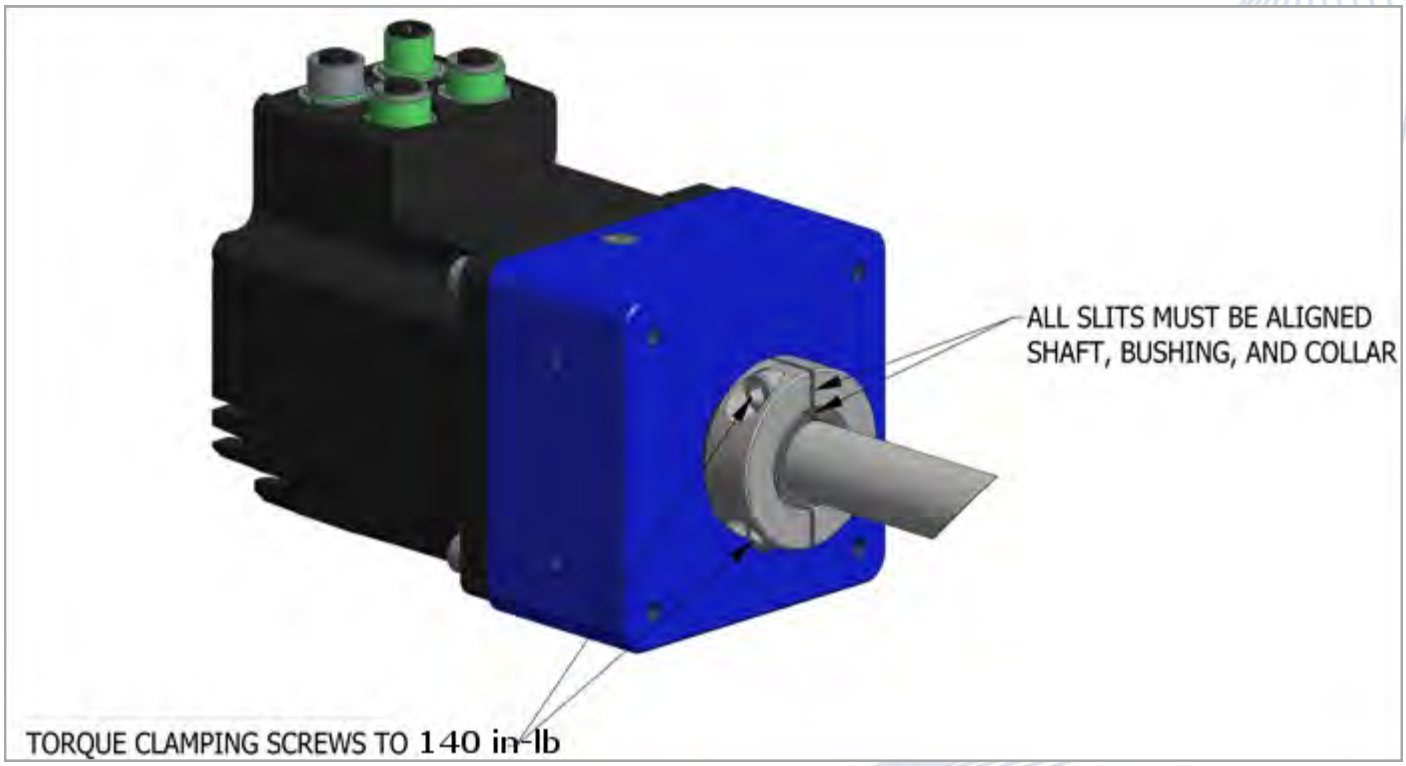


TYPICAL ProAdjust PRO-D01 APPLICATION

ProAdjust Drive Power Pack (PRO-D01) Installation

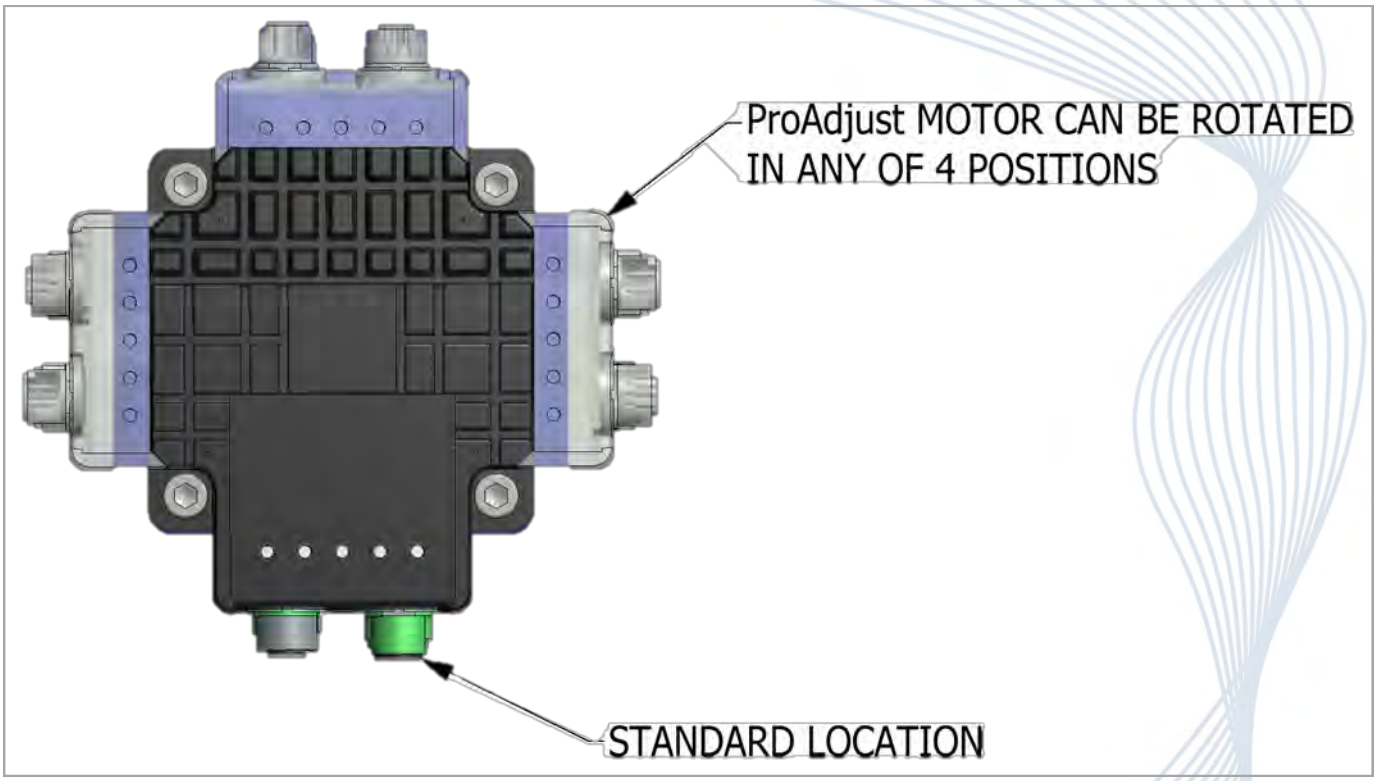
Note:

- For a successful installation, the shaft should be a minimum of 1 inch in length, free of oils, contaminants, burrs and tolerance at nominal dimension +0.000/-0.002 inches. The surface finish should be a minimum of 32 micro inch. (If the shaft does not meet these standards, please replace shaft or use Loctite 641 on the shaft at the collar mounting location.)
- Installer should take care to align slots in the shaft, bushing, and collar for proper installation. The collar face should be flush with the end of the output shaft.



ProAdjust Drive Power Pack (PRO-D01) Installation

- The ProAdjust motor can be rotated in any of four directions by simply removing the four mounting screws, rotating the motor, and reinstalling the screws. It is not necessary to remove the motor from the housing.
- If the motor is removed from the housing, ensure the sealing O-ring is seated properly in its groove. The M6 mounting screws should be re-torqued to 40in-lb with the application of Anti-Seize.



4.2.1 ProAdjust Drive Power Pack (PRO-D03) Installation

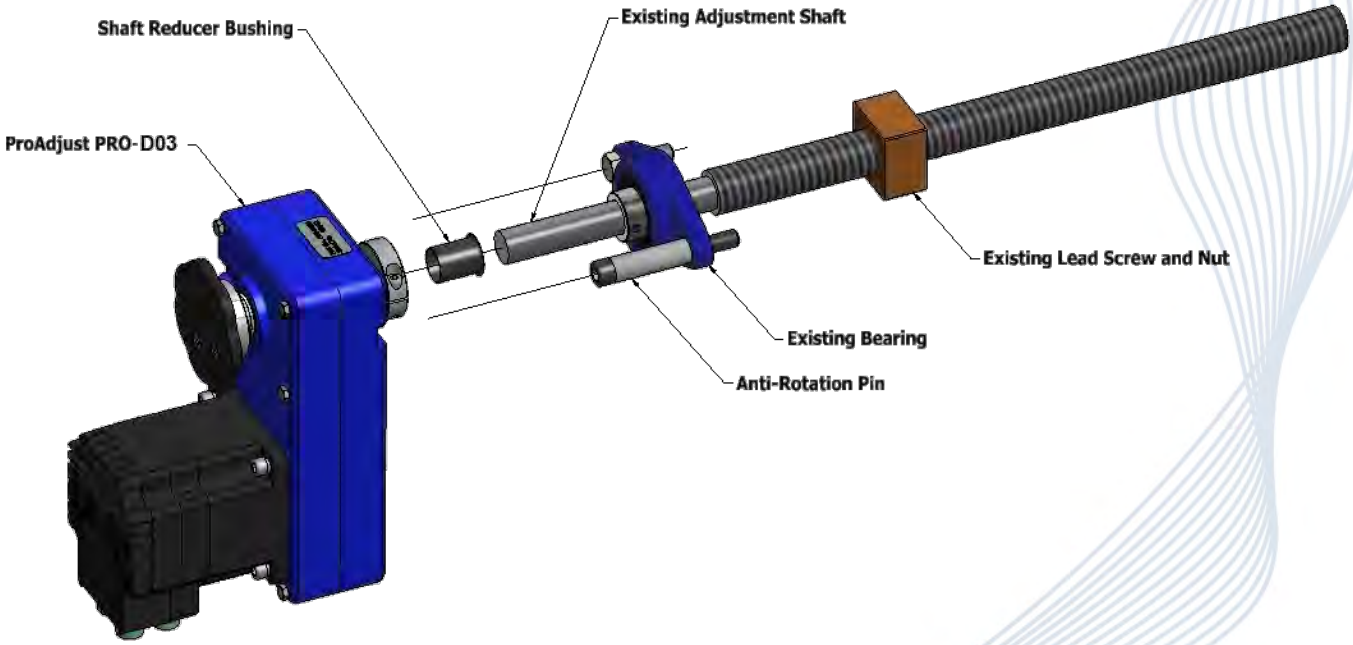
Step 1: Remove the Drive Power Pack from its shipping container.

Step 2: Where necessary, insert the proper shaft reducer bushing into the hollow 20mm output shaft. The specifically engineered reducer bushings are available in a wide range of sizes from ProAdjust.net.

Step 3: To use the most common installation method (shaft supported installation), install an anti-rotation pin on an existing bearing mounting hole. Anti-rotation pins are available in a wide range of sizes from the manufacturer.

Step 4: Install the hollow output shaft onto the existing adjustment shaft.

Step 5: Connect each ProAdjust Drive Power Pack according to the instructions under ProAdjust System Wiring. (Section 6.1.3)



TYPICAL ProAdjust PRO-D03 APPLICATION

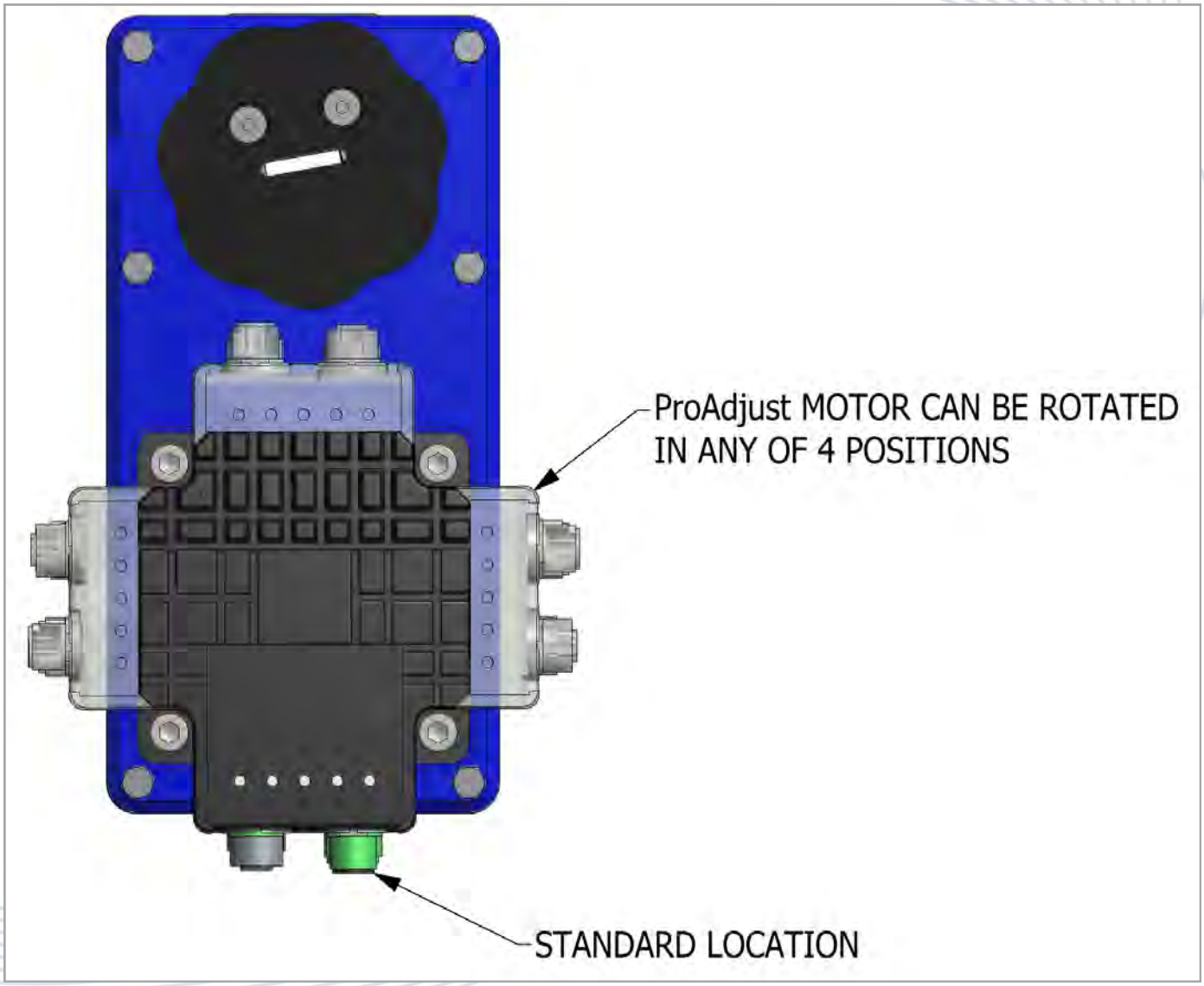
ProAdjust Drive Power Pack (PRO-D03) Installation

Note:

- For a successful installation, the shaft should be a minimum of 1 inch in length, free of oils, contaminants, burrs and tolerance at nominal dimension +0.000/-0.002 inches. The surface finish should be a minimum of 32 micro inch. (If the shaft does not meet these standards, please replace shaft or use Loctite 641 on the shaft at the collar mounting location.)
- Installer should take care to align slots in the shaft, bushing, and collar for proper installation. The collar face should be flush with the end of the output shaft.

ProAdjust Drive Power Pack (PRO-D03) Installation

- The ProAdjust Motor can be rotated in any of four directions by simply removing the four mounting screws, rotating the motor, and reinstalling the screws. It is not necessary to remove the motor from the housing.
- If the motor is removed from the housing, ensure the sealing O-ring is seated properly in its groove. The M6 mounting screws should be re-torqued to 40in-lb.



4.3.1 ProAdjust Drive Power Pack (PRO-D07) Installation

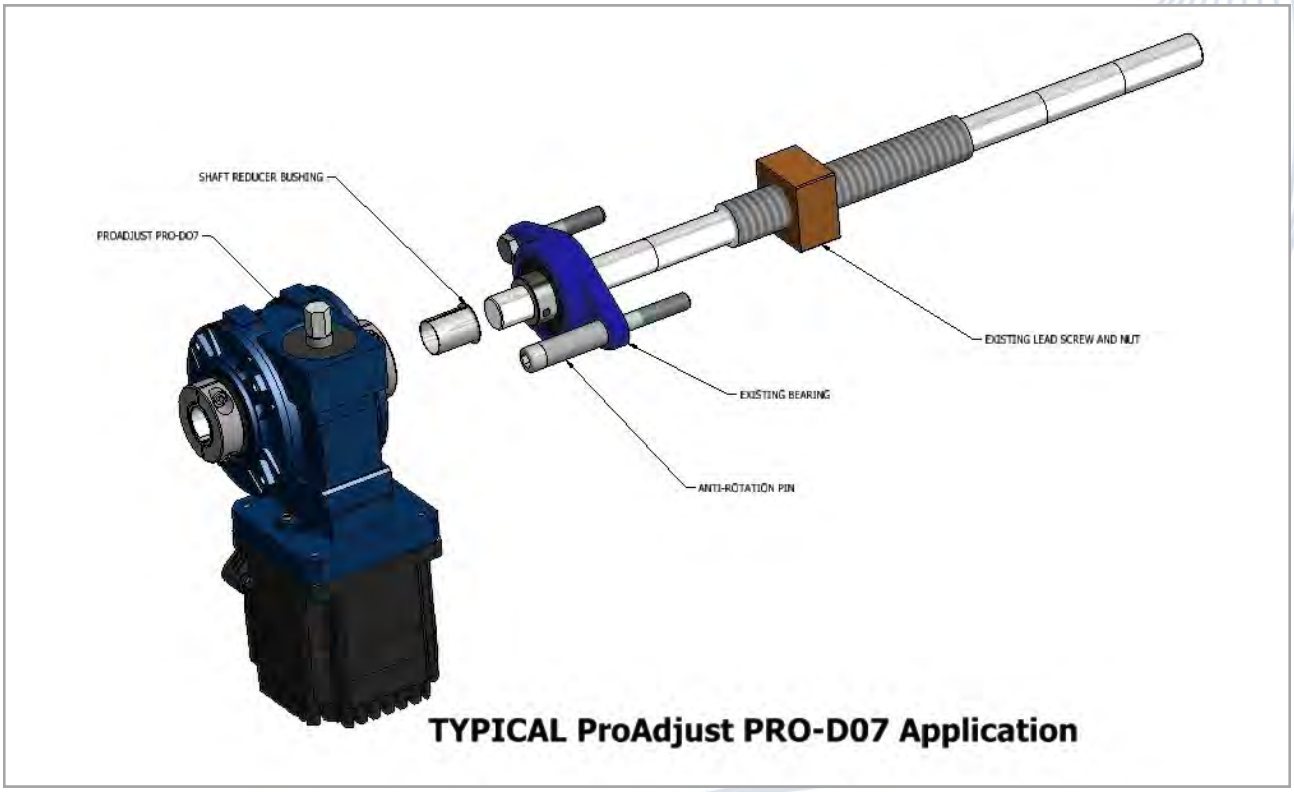
Step 1: Remove the Drive Power Pack from its shipping container.

Step 2: Where necessary, insert the proper shaft reducer bushing into the hollow 20mm output shaft. The specifically engineered reducer bushings are available in a wide range of sizes from ProAdjust.net.

Step 3: To use the most common installation method (shaft supported installation), install an anti-rotation pin on an existing bearing mounting hole. Anti-rotation pins are available in a wide range of sizes from ProAdjust.net.

Step 4: Install the hollow output shaft onto the existing adjustment shaft.

Step 5: Connect each ProAdjust Drive Power Pack according to the instructions under “ProAdjust System Wiring”. (Section 6.1.3)

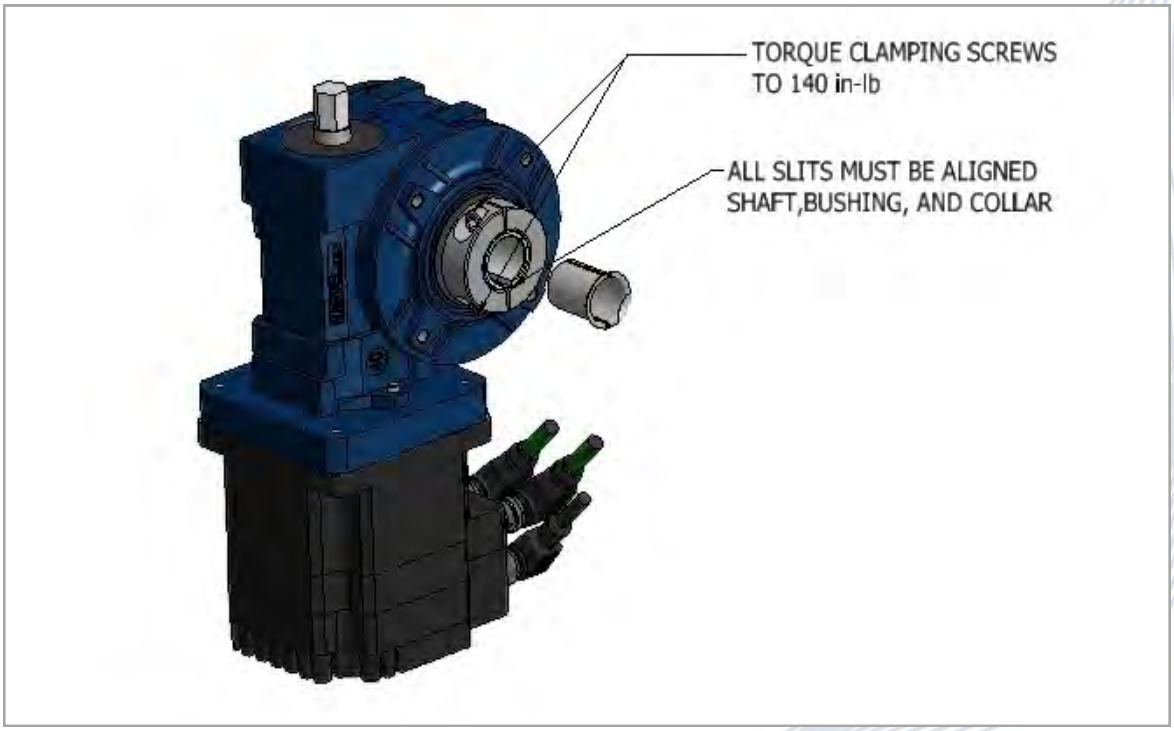


TYPICAL ProAdjust PRO-D07 Application

ProAdjust Drive Power Pack (PRO-D07) Installation

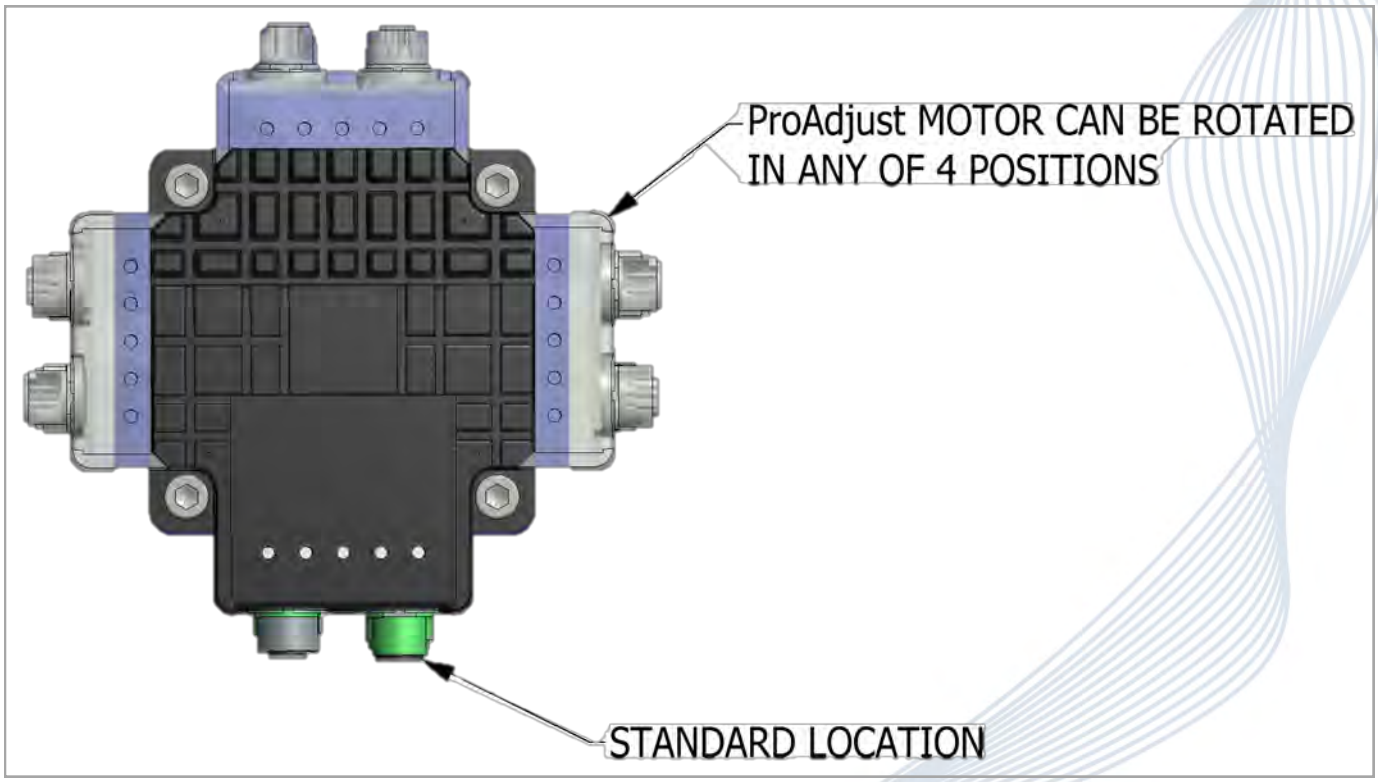
Note:

- For a successful installation, the shaft should be a minimum of 1 inch in length, free of oils, contaminants, burrs and tolerance at nominal dimension +0.000/-0.002 inches. The surface finish should be a minimum of 32 micro inch. (If the shaft does not meet these standards, please replace shaft or use Loctite 641 on the shaft at the collar mounting location.)
- Installer should take care to align slots in the shaft, bushing, and collar for proper installation. The collar face should be flush with the end of the output shaft.



ProAdjust Drive Power Pack (PRO-D07) Installation

- The ProAdjust Motor can be rotated in any of four directions by simply removing the four mounting screws, rotating the motor, and reinstalling the screws. It is not necessary to remove the motor from the housing.
- If the motor is removed from the housing, ensure the sealing O-ring is seated properly in its groove. The M6 mounting screws should be re-torqued to 40in-lb.



4.4.1 ProAdjust Air Power Pack (PRO-A04) Installation

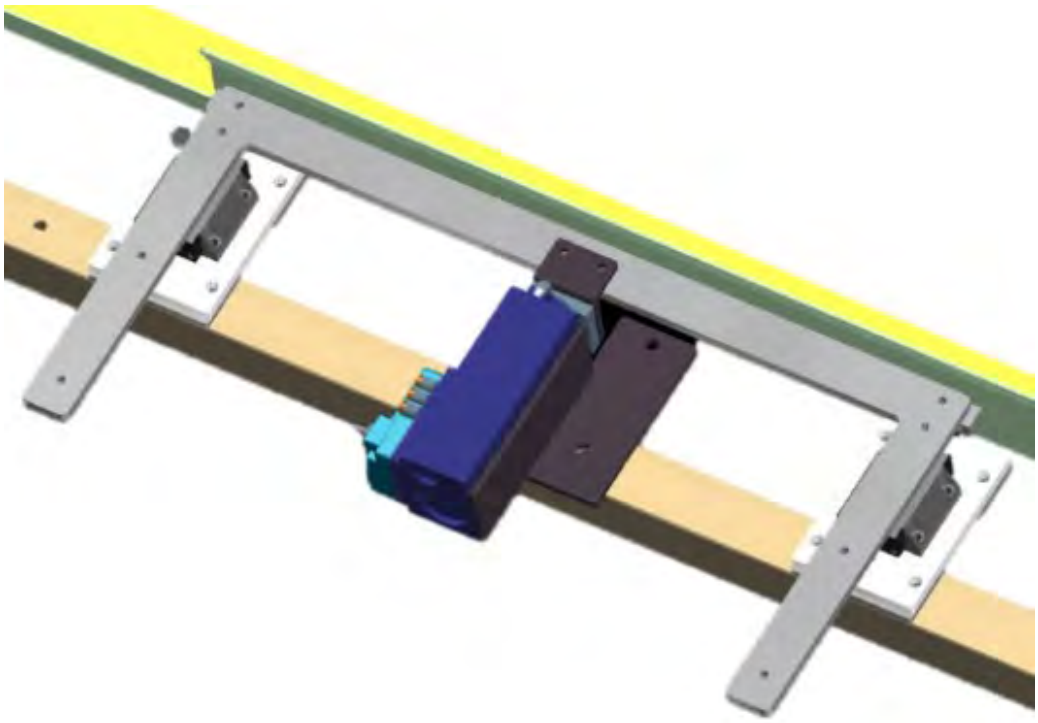
Step 1: Remove the ProAdjust Air Power Pack from its shipping container.

Step 2: When necessary, attach the mounting plate to the end of the cylinder.

Step 3: Attach the ProAdjust Air Power Pack to the machine using the most common method (4 x 10/32 holes located on the bottom).

Step 4: Install the mechanism to be adjusted to the mounting plate on the end of the cylinder.

Step 5: Connect each ProAdjust Air Power Pack according to the instructions under “ProAdjust System Wiring”.

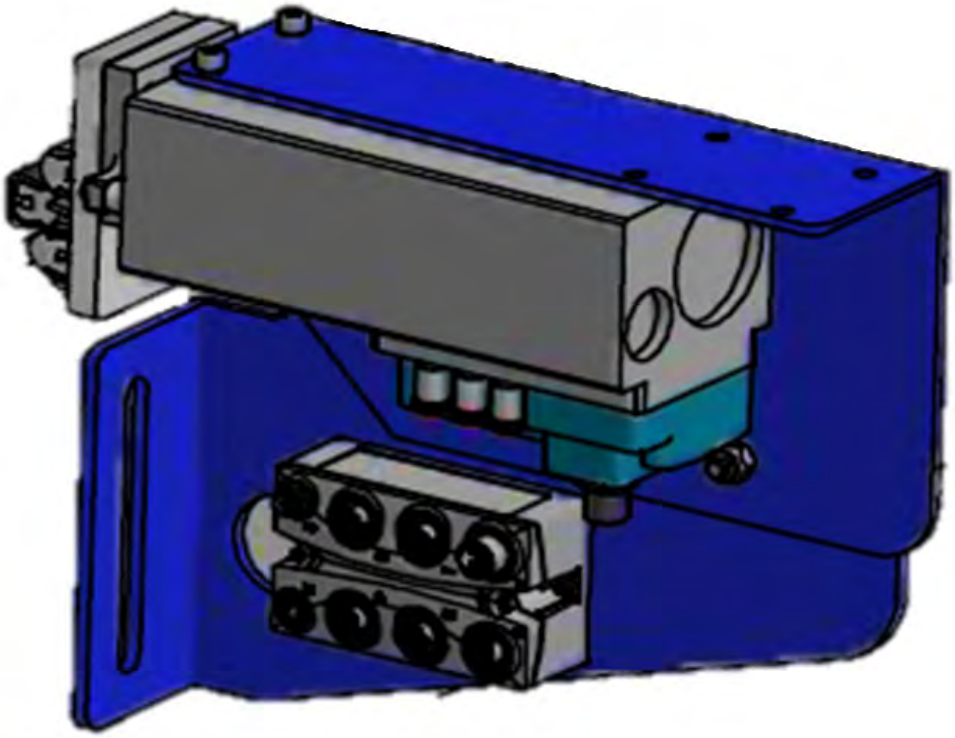


ProAdjust PRO-A04 INSTALLATION

ProAdjust Air Power Pack (PRO-A04) Installation

Note:

- For a successful installation, air quality must be clean, dry, non lubricated air.
- Max air pressure must not exceed 90 PSI.
- Operating temperature is 0° to 40° C.
- Air Power Pack is rated for IP65.



TYPICAL ProAdjust PRO-A04 INSTALLATION

4.5.1 ProAdjust Base Enclosure Installation

1) The Base Enclosure should be installed in an accessible location outside the machine guarding. The enclosure should not be installed in a high traffic area where it could be susceptible to damage.

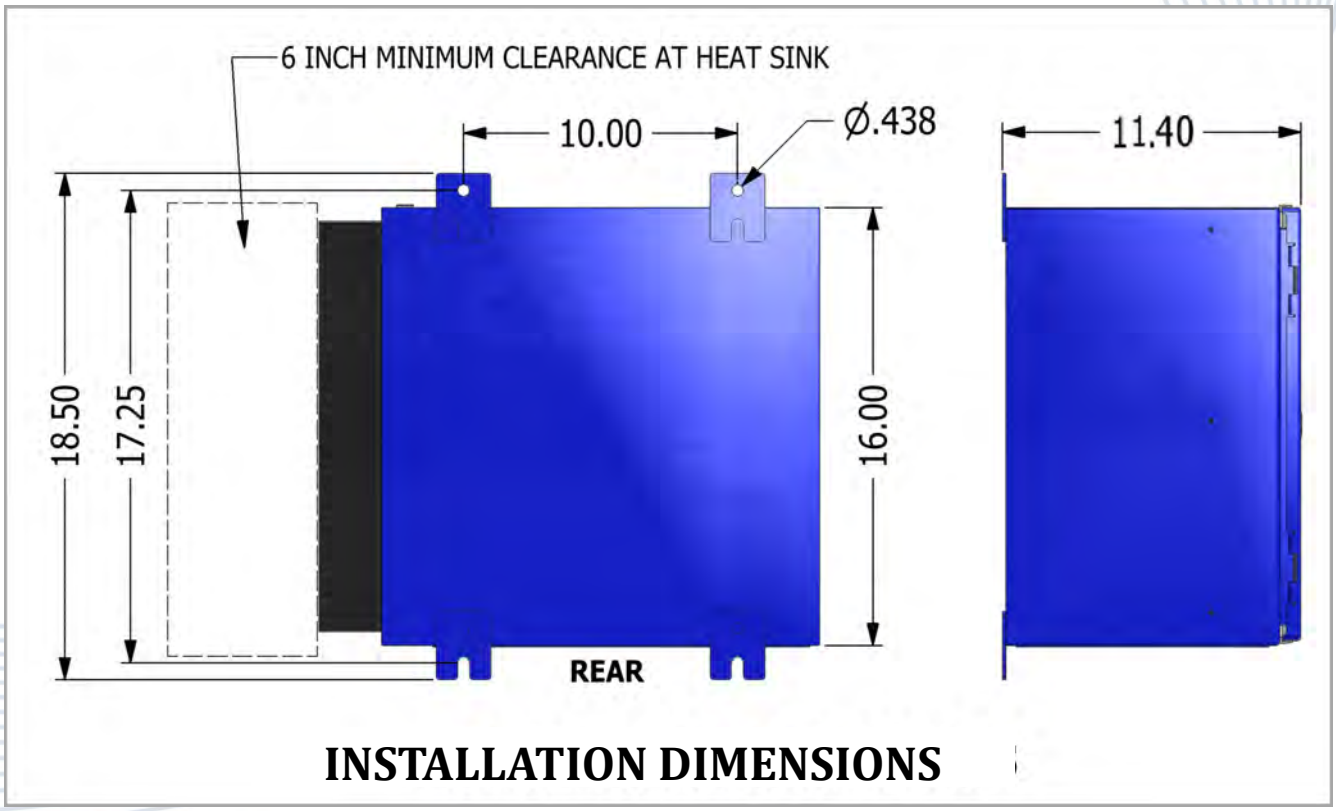
2) Mount the base enclosure to the machine frame by use of 3/8” bolts through the holes provided on the rear of the enclosure.

3) The enclosure must be electrically bonded to the machine frame.

4) Provide 480V 3-phase 60Hz (or 400V 3-phase 50Hz) power to the ProAdjust system. (Wiring Diagram Section 6.1.3)

5) Connect the power distribution blocks to the provided connector on the enclosure.

6) Connect the Interface Cable to the provided connector on the enclosure. The interface connection is done in a Daisy Chain configuration where each motor connects to the next.



INSTALLATION DIMENSIONS

4.6.1 ProAdjust Expansion Enclosure Installation (Optional)

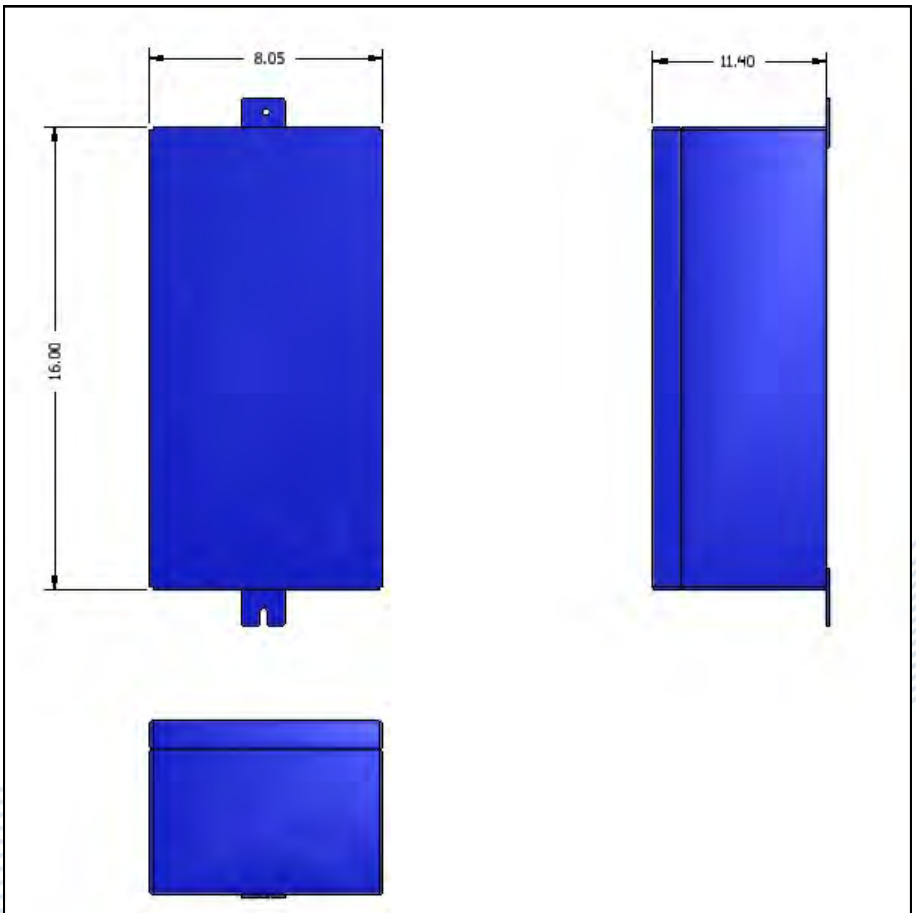
1) The Expansion Enclosure can be installed in any accessible location . The enclosure should not be installed in a high traffic area where it could be susceptible to damage.

2) Mount the Expansion Enclosure to the machine frame by use of 3/8” bolts through the holes provided on the mounting tabs of the enclosure.

3) The enclosure must be electrically bonded to the machine frame, via mounting bolts or grounding strap connected to the machine frame.

4) Provide 480V 3-phase 60Hz (or 380V 3-phase 50Hz) power from the ProAdjust Base enclosure using the supplied cable.

5) Connect the Power Distribution Cable(s) to the provided connector on the enclosure.



INSTALLATION DIMENSIONS

4.7.1 ProAdjust System Wiring

1) Plan out the system before you begin the installation. To keep the Drive Power Pack Cables to the four connecting motors as short as possible choose the most centralized location for each power distribution block . Avoid high traffic locations where the distribution cable will be susceptible to damage.

2) Drill holes as needed, and mount the distribution block to the machine frame.

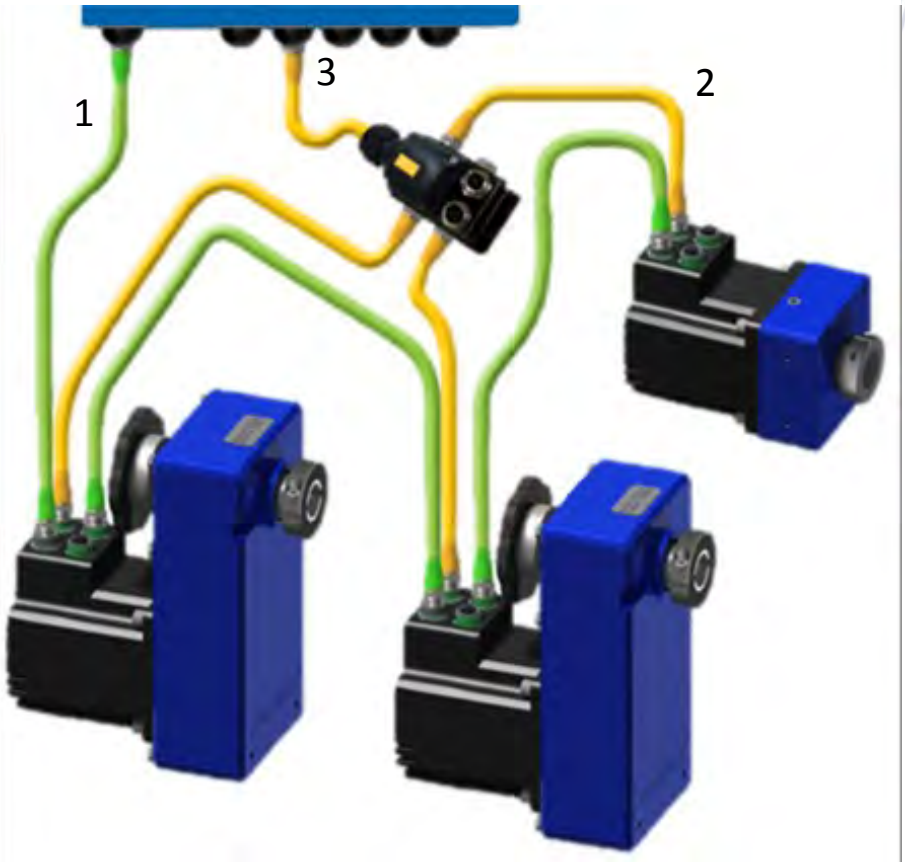
3) Connect the power distribution cable(s) to the provided connector(s) on the Base or Expansion Enclosure. Excess cable should be neatly coiled and secured with tie wraps or a similar method.

4) Connect each motor to the power distribution cable(s) using the Power Pack Cable.

5) Connect the Interface Cable to the provided connector on the enclosure. The interface connection is done in a serial configuration where each motor connects to the next.

Note: The distribution block is part of the Power Distribution Cable.

1) Interface Cable
2) Power Cable
3) Power Distribution cable



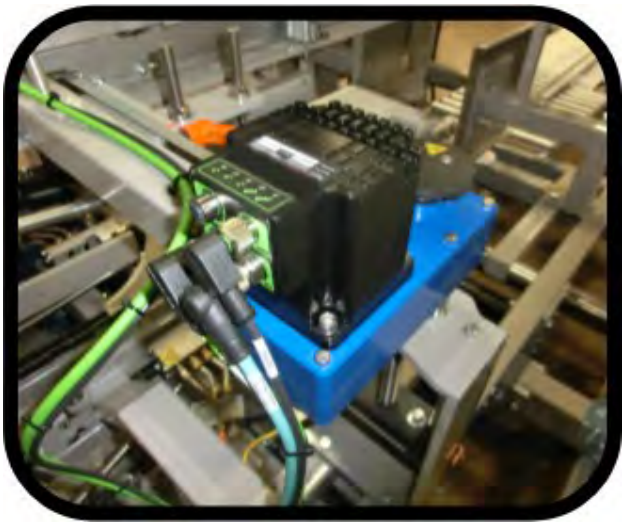
ProAdjust System Wiring

Main Power Enclosure

- EIP = Customer Ethernet Connection
- Interface = Power Pack Communication
- INT-A = Analog Module Connection
- INT-D = Digital Module Connection
- PD1-5 = Power Distribution Ports

Note:

- Power distribution cables are available in lengths of 1, 3, and 6 meters.
- Power pack power cables are available in lengths of 1, 3, and 6 meters.
- Interface cables are available in lengths of 1, 3, 6, and 9 meters.



Note: When possible avoid routing ProAdjust cables with other machine cables.

ProAdjust®

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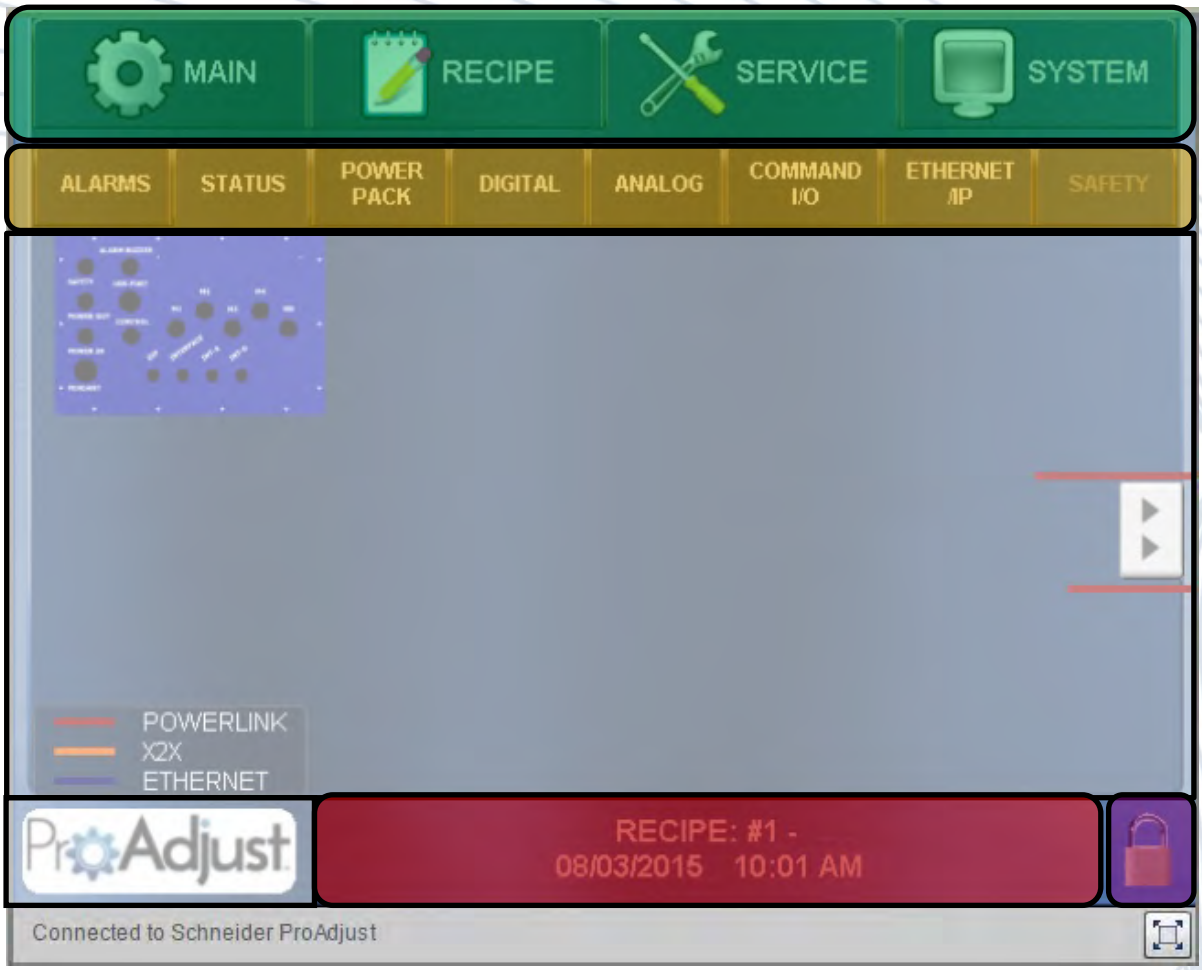
Chapter 5: Initial Setup and Quick Start Setup Guide

Users Guide

5.1.1 General Interface Overview

The interface is organized into four main areas, accessible by the four tabs along the top of the interface; certain areas additionally have sub-tabs:



#1 — Main Tab Bar

#2 — Sub-Tab Bar

#3 — Screen Content

#4 — Alarm/Status Banner

#5 — Login Button

Main Screen: Normal operation of the machine is performed from this screen. When logged in as operator there are no options other than *Start Adjustment.* To Jog or Modify positions user must be logged in as Master User, Technician, or Integrator.

The main screen contains three areas:

Axis control: The drop down list selects which axis is to be controlled manually when the manual buttons on the main screen are pressed. The recipe position field is the position the axis will move to for the currently loaded recipe; this value can be changed by direct entry or by using the 'Copy to Recipe' button to copy the current axis position into the recipe. The target position field allows entry of a position to send the axis directly to a non-recipe position: enter the value in the field then press the "Move to Target Position" button.

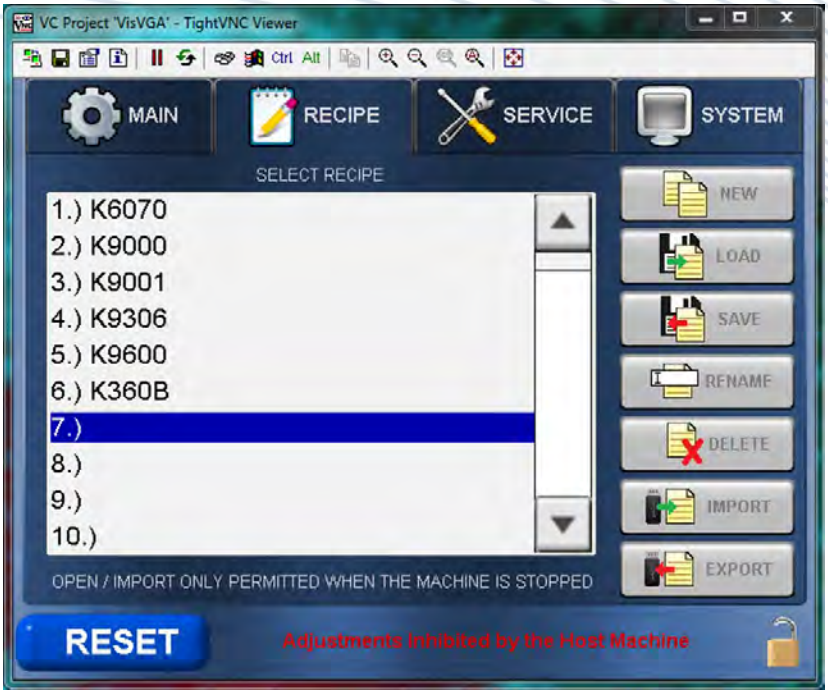
System Control: When the start adjustment button is pressed the system will move all axes to their retract positions, in the retract order, followed by moving all axes, in the adjust order, to the recipe positions of the currently loaded recipe.

Jog Control: Use the forward/back buttons to jog the axis selected in the axis control drop-down list. Toggle the hand-wheel button to enable hand-wheel control of the selected axis. Jogging can only be performed while on the main screen.

Recipe Screen:

Recipe: A Recipe is a file associated to a set of saved machine adjustment positions.

The recipe screen allows management of the system's recipe files. Supervisor login or higher is required to create/save/rename/delete any recipe. Loading of recipes can be performed by any login level.



New: Creates a new recipe in the selected recipe slot and is only available when an empty slot is selected.

Load: Loads the selected recipe into the active recipe and is only available when the selected slot contains a recipe.

Save: Saves the changes that have been made to the active recipe, into the recipe file of the selected recipe.

Rename: Renames the selected recipe.

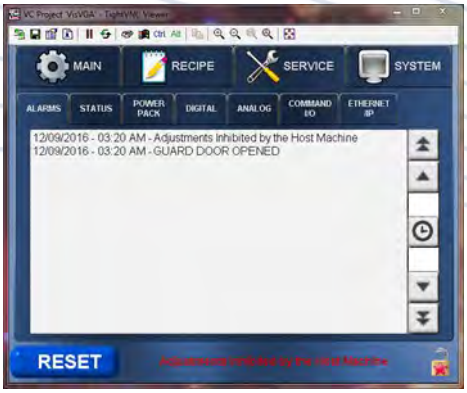
Delete: Deletes the selected recipe.

Import: Import backed-up recipes from USB thumb drive or local storage.

Export: Export backed-up recipes to USB thumb drive. Recipes can also be backed up to the local storage area when logged in as OEM.

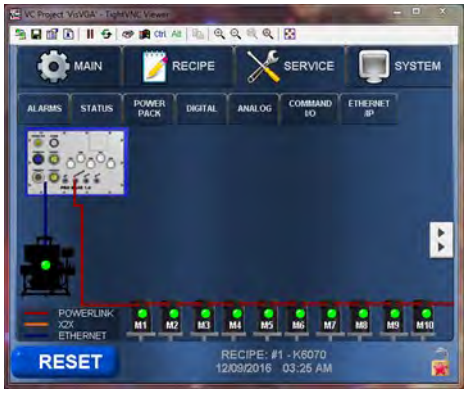
Service Screens:

The service screens display detailed information about the system's health. This area is primarily used to display data to the user. The service screens are divided into the following sub-tabs.



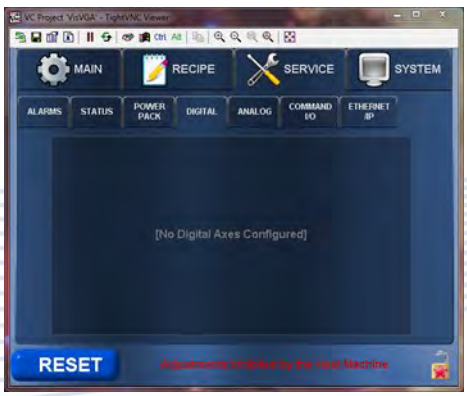
Alarms: Active system alarms are displayed on this page. A history of all recent alarms can also be accessed by toggling the clock button.

Note: All alarms are listed in the troubleshooting section of this manual under (Diagram P3).



Status: Displays the network status of all devices in the ProAdjust system's device network.

Power Pack: Displays detailed information about each configured Power Pack.



Digital: Displays detailed information about each configured digital axis. Each module in the drop down list contains up to two signals (sensors) for each axis.

Service Screens continued:

Analog: Displays detailed information about each configured analog axis. Each module in the drop down list contains signals for two axes.

Command IO: Displays the status of all local I/O points (for use with 'Discrete I/O' remote control mode).

Ethernet/IP: Displays the status of values being sent and received from the Ethernet /IP host system (for use with 'Ethernet/IP' remote control mode).

System Screens:

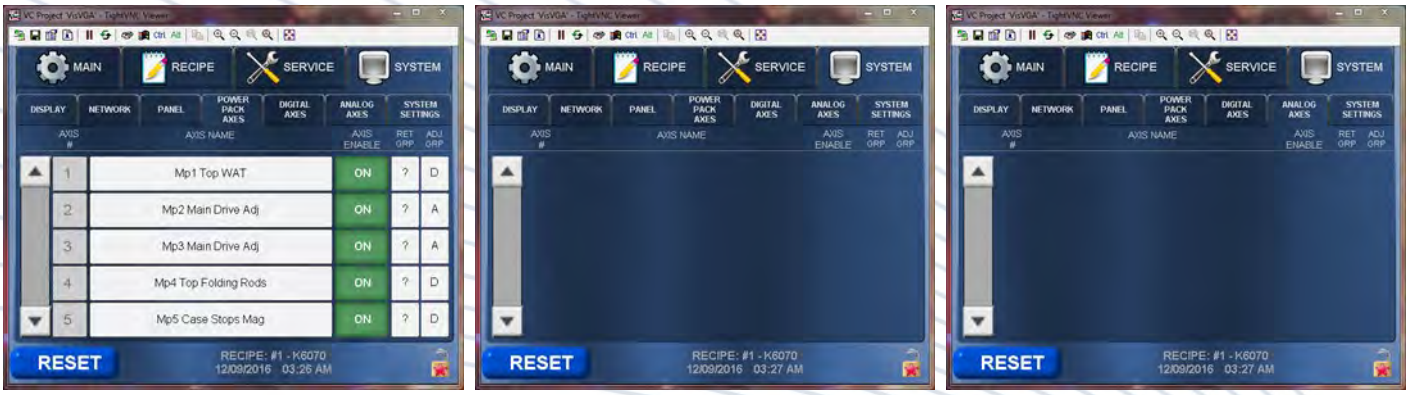
The system screens allow configuration of the system. This area is primarily for the user to enter data into the system. The service screens are divided into the following sub-tabs.

Display: Allows adjustment of all screen display settings including time/date, display units, and display language (future). Supervisor login is required for all settings on this screen.

Network: Allows adjustment of all network settings including IP address, Subnet Mask, Gateway, and setting of the IP address where the Ethernet/IP Master (host machine) is located.

Panel: The panel shows how many panels are currently set up on the system and the remaining current available from that panel.

System Screens: (Continued)



<u>Stepper/Digital/Analog Axes Screens:</u> Allows axes to be enabled/disabled (when logged in as supervisor or above). Allows addition, configuration, and setup of retract and adjust order (when logged in as OEM). Enter Axis by touching name when logged in as Integrator.

<u>System Settings:</u> Displays the system firmware version and allows setting of remote control mode. The system settings (number of axes, axis names, axis configuration data, etc.) can also be imported/exported from USB and local backup. Image above on left is shown logged in as operator, master user, or technician. Image above on the right is shown logged in as integrator.

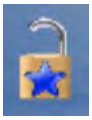
5.1.2 Logging In and Out of the System

There are multiple login levels:

Locked fields are displayed as ‘greyed-out’ and require a higher login level to edit.

Login via Screen

Press the lock icon in the lower right corner of any screen then select the user, enter the corresponding password from the table below, and press login. To log out, open the login popup from the lower right and press the log out button. Any logged-in user will be logged out automatically after 10 minutes of inactivity.

Login Level	Permissions	Default Password	Login Icon
Operator (Logged Out)	• Execute Recipe Files.	N/A	
Technician	• Adjust Current Recipe but Cannot Save Recipe • Make Minor Adjustments to Power Pack Positions • Enable/Disable Axis, Replace Power Packs • Set Actual Position	7034	
Master User	• All operator/technician permissions plus ability save recipe changes to memory, USB backup. • Key Switch on the Teach Pendant also enables this level.	3413	
Integrator	• Add New Panels, Add Power Packs, Adjust Power Pack Settings, Adjust Groups/Pauses, Adjust System Settings/IP Settings.	5370	

Login via Key Switch

Insert the key and rotate in either direction to login as Master User; the key switch must be returned to center in order to log out.

Screensaver

After 5min of inactivity the screen will enter screensaver mode to prevent any image burn-in effects from forming on the LCD display. The screen saver can be exited by touching anywhere on the screen.

5.1.3 Adding Power Packs or Groups to the System

The initial setup must be performed once, in order to customize the ProAdjust system to match the host machine's layout. When the initial setup procedure is completed, the values will be backed-up for easy recovery.

Note: ***Be sure all personnel are clear of all axis before any adjustments or movements are made.***

1) **Disconnect all network cables from the power packs, then power-on the system.**
2) **Add an additional Power Pack by** logging in as Integrator (See 5.2.2) and pressing the "Add New" button on the "System—>Power Pack" Screen. The order that axes are added should match the order of the network cable runs; add the first drive power pack in the network first.

Note: Choose a new axis group if you have multiple axis that need to move simultaneously.

Note: The axis should be named to match its function/location (i.e. Infeed Width).

3) **Enter the configuration page**, while still logged in as OEM by touching the name of the newly created axis.

Note: Displayed units (in/mm) can be changed on the 'System—>Display' page.

4) **Enter the axis scaling value in (revs/in)** This value is the number of revolutions the Power Pack will need to turn in order to move the axis one inch. To obtain this value multiply the pitch of the ball-screw by the ratio of the gearbox and the ratio of any other drive components (ratio of sprockets on a chain drive, ratio of teeth on a timing belt drive, etc.)

5) **Enter the Gear Box and RPM for the Gear Box.** These values are the speed the axis will move while jogging and going to set positions. (RPM is the output RPM of the Power Pack and takes into account the reduction of the gear box)

6) **Configure the axis following error limit.** The axis following error limit is the maximum distance that the axis is allowed to deviate from it's set position before an error occurs. This will stop the motor from running if an obstruction is encountered. This value should be set as low as practical (i.e. 0.25"), however too small of a value may cause nuisance errors during acceleration.

7) **Set the upper limit to a large positive value (i.e. 50in or 1000mm) and the lower limit to a large negative value** (i.e. -50in or -1000mm). These are arbitrary numbers that will be fine tuned in later steps.

8) **Setup the run and standby currents for the power pack .** The run current is the amount of current applied when the motor is actively moving, and will be determined by the amount of load on the axis. The standby current is the amount of current applied any time the motor is ON and holding position. The standby current will typically be much lower than the run current. (.6A Standby Current and 4A Run Current is a good starting point, but depending upon your application it may need to be increased or decreased)

A) Run Current: 0.1 - 8amps; Standby Current 0.1 – 8 amps

9) **Press done and then turn the axis on,** by toggling the ON/OFF button next to the axis being configured.

10) Now that the initial setup has been performed for the new drive, you can now move onto “Adding Power Packs to the Network”. (Next Section)

5.1.4 Adding a Power Packs to the Network

Note: Power Packs ship with a fixed network address. Do not connect more than one un-configured Power Pack to the network at a time. Otherwise there is no way to determine which Power Pack is being configured.

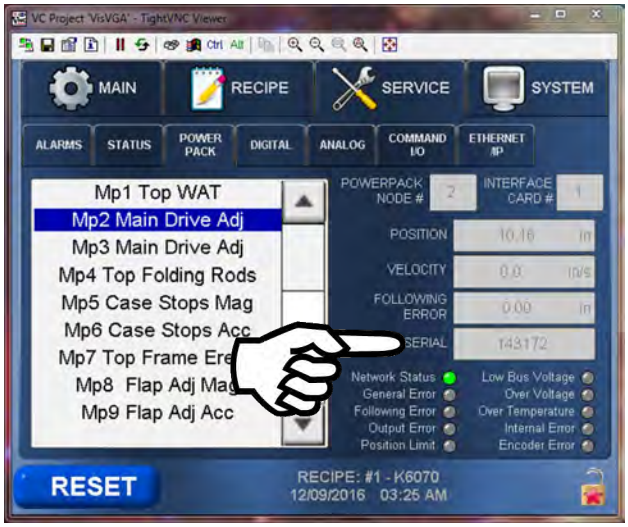
1) **Connect the network cable** between the ProAdjust cabinet and first drive power pack.

2) After a short delay, a new axis popup will appear on the screen. If a list appears, **select the newly-connected axis in the list and press OK; otherwise just press OK.**

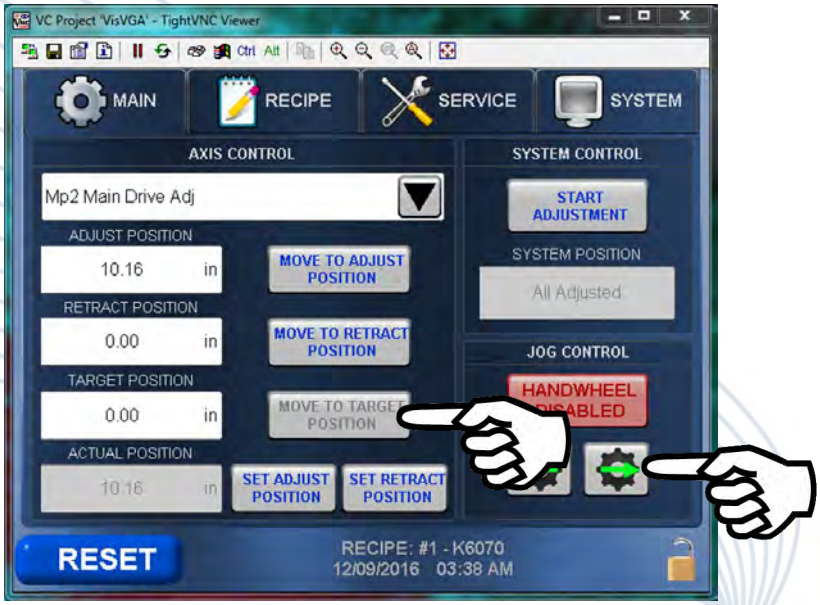
or

4) After the Power Pack resets, **verify that the Power Pack network status indicator for the new axis is green** on the ‘Service—>Status’ screen. Also, the serial number displayed on the ‘Service—>Stepper’ screen for the new axis should match the serial number for the newly connected Power Pack.

3) The system will assign the network address of the Power Pack to correspond to the axis number. The Power Pack will reset during this process, taking up to 30sec.



Jogging A Power Pack



Teach Mode Key Switch: enables the use of the dead man switches on the back side of the teach pendant. The dead man switches by pass the guard door circuit to allow the technician the ability to get as close to the adjustment as needed for setup purposes.

Jogging: Select the axis from the drop down menu in the Main Tab. Then use one of the following 3 methods to jog an axis.

1) Use the arrows in the lower right hand corner of the screen.

2) Use the Jog Wheel at the top of the teach pendant (HANDWHEEL ENABLE button needs to be green).

3) Type in the destination position in the “MOVE TO TARGET POSTION” box and press the button for the selected power pack to move to the new position.

5.1.5 Setup of Drive Power Pack Direction, Positions, Limits

Note: The axis direction, retract position, and scaling settings are interrelated. Changes should always be performed in the order shown. If an earlier parameter needs to be changed (scaling, direction) then the later parameters (retract position, limits) will need to be reconfigured. ***Be sure all personnel are clear of all axis before any adjustments or movements are made.***

1) **Verify the axis is safe to move, then jog the axis** from the 'Main' screen via the momentary jog pushbuttons or the hand wheel to the desired "retract position". The Retract Position is the position that the axis will retract to before moving to the next "Adjust Position". The axis must be positioned as accurately as possible. Make note of the actual axis direction and the direction of displayed position value. If the direction is correct, go to next step; otherwise change the direction in the axis configuration. Changing direction will cause the motor to reset, losing communication temporarily.

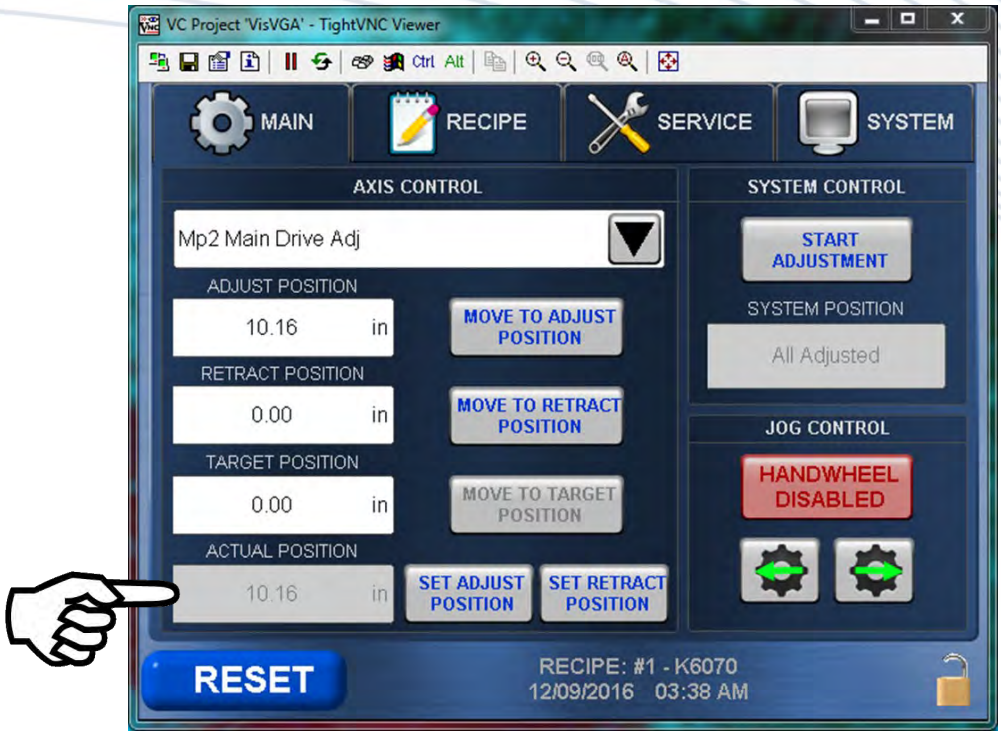
Setup of Drive Power Pack Direction, Positions, Limits

Note: The position shown on the screen will not match this physical position, this will be synchronized in the upcoming steps.

Note: On the back of the Teach Pendant are two switches, they are referred to as dead-man switches. By pressing and holding either of the switches, they will by-pass the guard door relays and will allow movement of the drives for the ease of setting up the axis. Use extreme caution when doing this!! (The Teach Mode Switch on the front of the panel will need to be turned On)

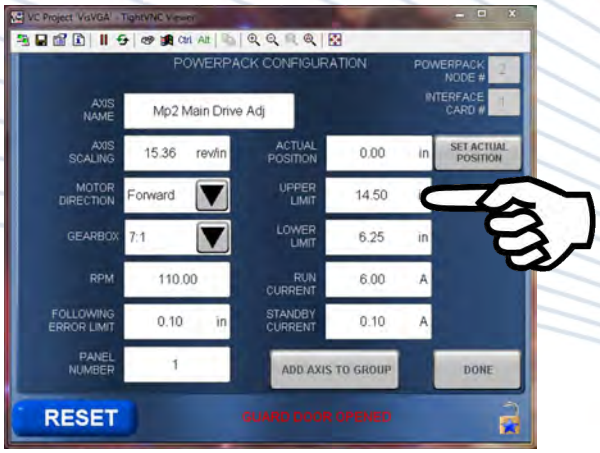
2) On the axis configuration page, **measure and enter the physical axis position into the SET ACTUAL POSITION field, and press set actual position button. This will update the actual position on the main screen to match the value entered.**

3) The Drive Power Pack will then reset, go to the ‘Main’ screen and **jog the axis to several different positions.** Verify that the on screen position matches the physical position.

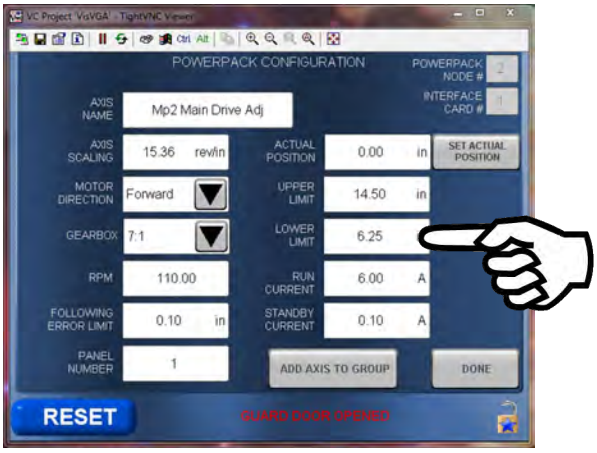


Problem	Incorrect Setting
The difference between physical and displayed position grows and shrinks as the axis moves to different positions.	Axis Scaling
A constant difference exists between physical and displayed position.	Actual Position
The physical and displayed positions move in opposite directions.	Motor Direction

4) **Jog the axis to its physical positive limit.** When this position is reached, measure and enter the actual position value displayed on the 'Main' screen into the upper limit field of the motor configuration.



5) **Jog the axis to its physical negative limit.** When this position is reached, measure and enter the actual position value displayed on the 'Main' screen into the negative limit field of the motor configuration.



6) Repeat all steps in "Initial Setup" for all Drive Power Packs in the system.

Note: After the limits are set, the recipe position configured for the axis is likely to be outside of the axis's limit range, triggering an alarm. Adjust the recipe value to within the axis's limit range to clear the alarm. (Main Tab)

5.1.6 Analog Axis Capabilities

ProAdjust is able to control any device that uses 4-20ma analog input/feedback for the control circuit. The system can accommodate both active and passive devices that run on a 24Vdc circuit.

This allows a multitude of positioning devices to be setup easily using the standard Analog Axis setup procedure in the following section of the user manual.

5.1.6 Adding Analog Axes to the System

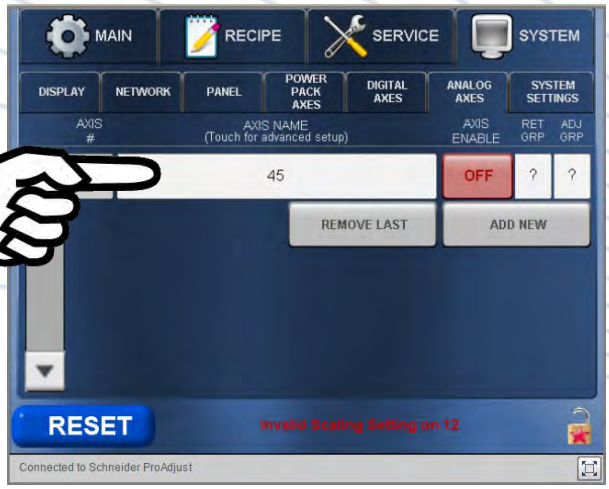
Initial Setup

The initial setup must be performed once, in order to customize the ProAdjust system to match the host machine's layout. When the initial setup procedure is completed, the values will be backed-up for easy recovery.

1) **Disconnect all input and output cables from the analog modules, then power-on the system.**
2) **Add an additional Analog axis by** logging in as Integrator (See 5.2.2) and pressing the "Add New" button on the "System—>Analog Axes" Screen. The order that axes are added should match the order of the I/O cable runs; add the first axis in line to the first module.

Note: The axis should be named to match its function/location (i.e. Infeed Width).

3) **Enter the configuration page**, while still logged-in as OEM by touching the name of the newly created axis.



Note: Displayed units (in/mm) can be changed on the 'System—>Display' page.

4) **Type.** Verify that the module and cylinder that is being utilized is a (ma) signal device. The ProAdjust system will automatically assign the device an input and output port on the appropriate analog module and can be seen by going to Service—>Analog and selecting the available modules.

5) **Setup the output axis scaling.** This value is the distance the cylinder will move in relation to the amount of voltage or amperage of the signal. To obtain this value, divide the total length of the cylinder by the amount of the signal. Example: 4in stroke cylinder utilizing the 4-20ma signal will move .25in for every 1.0ma applied. Therefore the axis scaling value is .25 in/ma

6) **Setup the input axis scaling.** This is best setup by copying the same settings that are used for the output axis scaling. This setting only needs to be changed if the cylinder is accurately moving to its location physically but the encoder feedback does not match. Then you would adjust the input axis scaling so that the encoder feedback matched the physical location of the adjustment.

7) **Enter in the zero offset.** This value is used to correct the zero position of the cylinder. Example: If during movement, the cylinder is consistently off of its physical position by the same amount every time, you would make an adjustment to the zero offset to correct the physical position.

8) **Configure the in position window.** This setting is the allowable limit of variation from the adjustment point. This value should be set as low as practical (i.e. 0.25”), however too small of a value may cause nuisance errors during movement.

9) **Set the upper limit to the cylinder max stroke length and the lower limit to the cylinder min stroke length “physically allowable”**. This will allow jogging and manual movement without damaging the axis or mechanisms.

10) **Input and output polarity.** This setting is used to change the direction of the adjustment in relation to the scaling. Standard will be the typical setting used.

11) **Jog Increment.** This setting is used when manually jogging the cylinder with the jog wheel. (.25in) or (6.35mm) would be a typical adjustment.

12) **In position time out.** (10s) would be a normal setting for this variable. If the system is unable to reach the adjustment in (10s), then the machine will stop motion on a fault.

13)**Press done and then turn the axis on,** by toggling the ON/OFF button next to the axis being configured.

5.1.7 Adding Analog Axes to the Network

1) **Once the new analog axes have been added to the system, it will be assigned an input and output port on the modules.**

2) Plug the appropriate device into the corresponding ports.

3) You must type the recipe position into the recipe position window. This is an arbitrary value to bring the recipe value within the upper and lower limits, so that jogging is allowed.

4) You can now enable the jog wheel and move the analog axis to verify that your changes were successful.

5.1.8 Setup of Analog Axis Direction, Positions, and Limits

Note: The axis scaling, polarity and zero offset are inter-related. Changes should always be performed in the order shown. If an earlier parameter needs to be changed (scaling) then the later parameters (offset) will need to be reconfigured.

1) **Verify the axis is safe to move then jog the axis** from the 'Main' screen via the hand wheel. Make note of the actual axis direction and the direction of displayed position value. If the direction is correct, go to next step; otherwise change the direction in the axis configuration by changing the polarity feature (shown below).

2) The axis scaling can be determined by the relationship between the stroke of the cylinder and transducer. The input and output should typically match. (See Section 5.1.4)

3) The Zero offset should be changed so that the actual position being displayed on the teach pendant matches the actual measured cylinder position on the machine.

4) On the axis configuration page, enter the upper and lower limits of the axis. This should be the stroke of the cylinder. (Example: 4in Cylinder = Upper Limit 4, Lower Limit 0)

5) The Jog Increment, In Position Window and In Position Timeout should now be set. The Jog Increment is how much you want the axis to move for every “click” of the jog wheel Typically .1in. The In Position Window is the accuracy of the axis, Typically .5in. If the axis is outside of the In Position Window, an alarm message will be displayed after the In Position Timeout (timer) has completed.

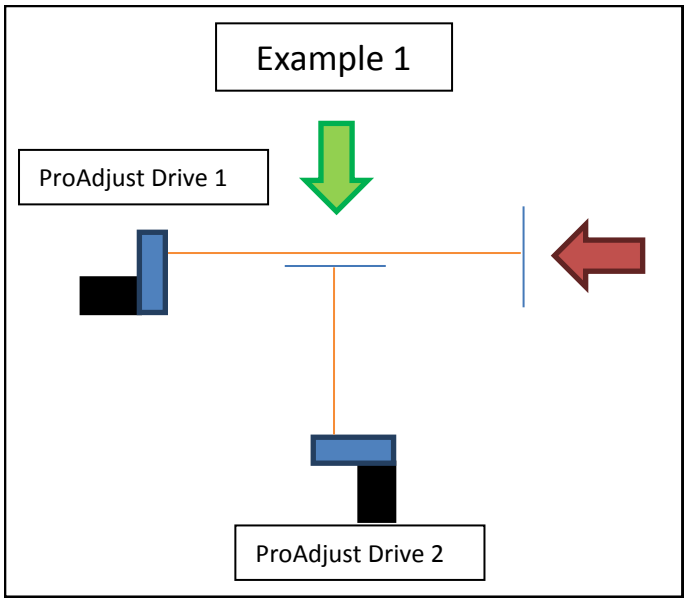
Problem	**Incorrect Setting**
The difference between physical and displayed position grows and shrinks as the axis moves to different positions.	Axis Scaling
A constant difference exists between physical and displayed position.	Zero Offset
The physical and displayed positions move in opposite directions.	Polarity

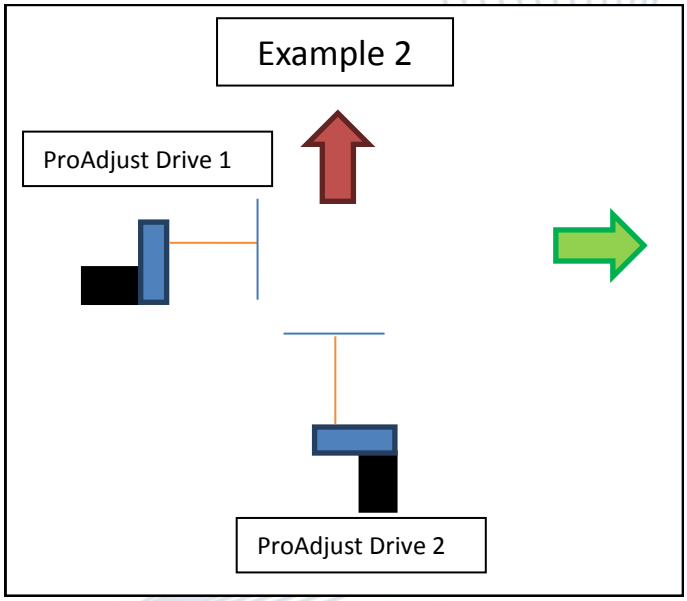
5.1.9 ProAdjust Retract/Adjust Sequencing

In order to avoid collisions during the change over process some power packs may need to retract before other power packs on the system can travel to their new adjust position. This section of the manual describes how to set the axis up into Adjust and Retract Groups to ensure that an axis do not collide during a change over.

Example 1: When (Opening) the machine size, ProAdjust Power Pack 2 must move first, so that ProAdjust Power Pack 1 can move without causing a collision.

Note: All Power Packs need to be placed into an Adjust Group. They do not need to be in a Retract Group. So if there are no collisions present in your system, the power packs only need to be placed in Adjust Groups.





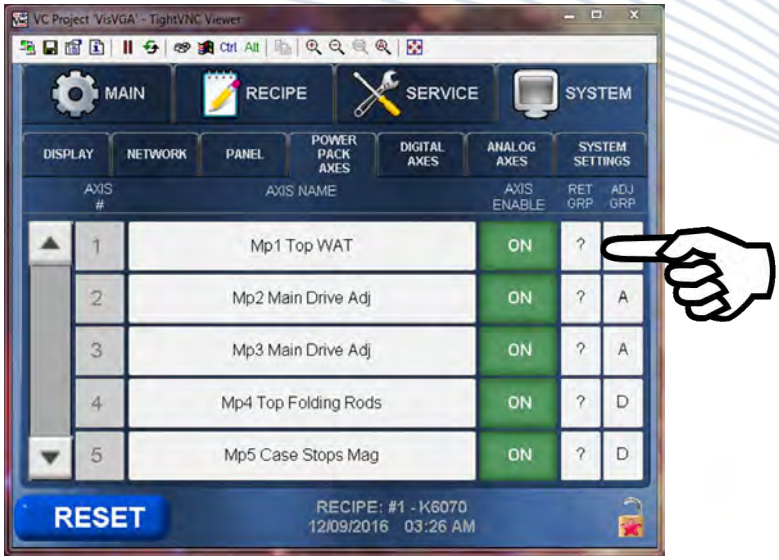
Move First

Move Second

ProAdjust Axis Hierarchy

In order for ProAdjust to know the order in which the Axis need to move the Axes will be placed into Groups.

The axis Groups will be refered to as “Retract Groups - RETGRP” A,B,C,D..., and “Adjust Groups—ADJGRP” A,B,C,D…



When the “Move to Recipe Position” button is pushed the axes in the “Retract Groups” will move to their retract position in order of ranking. A group will move first, B Group Second, and so on until all groups with axis saved with in them have retracted.

Once the axis have reached their “Retract Postions” they will begin moving to their “Adjust Positions” in order of ranking. A group will move first, B group second, and so on until all groups with axes saved with in them have moved to their adjustment position.

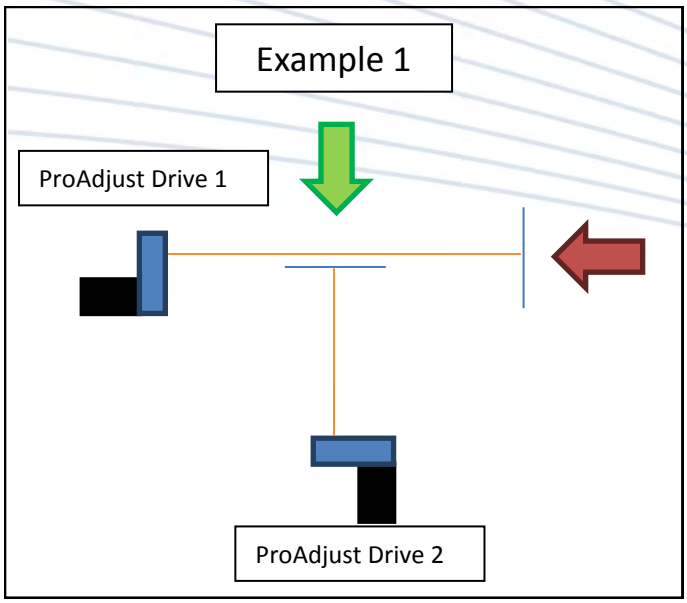
Note: If the axis does not interfere with any other axis or pieces with in the machine it does not need to be added to a “Retract or Adjust Group”. If the axis is not grouped it will move directly from one Recipe Position to the next with out retracting.

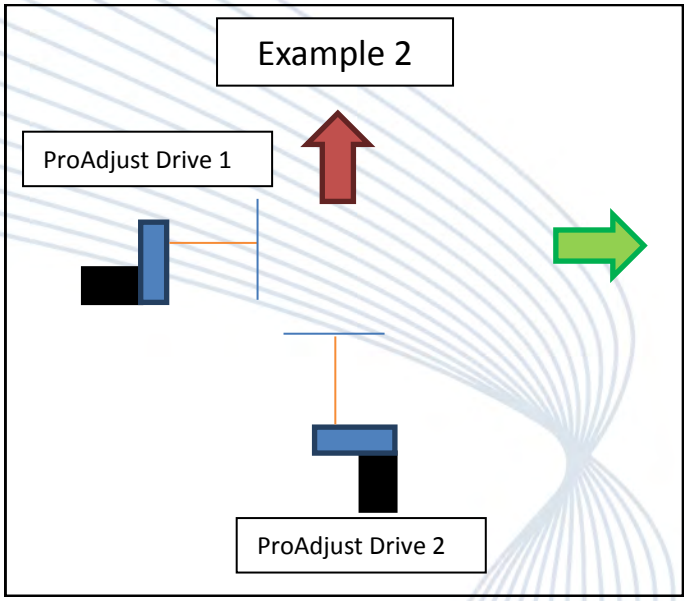
ProAdjust Axis Hierarchy

Move First

Move Second

- Create a list in the order that the ProAdjust drives need to move for both (Opening) and (Closing) of the machine.





- See Diagram P4 in the back of the manual for a copy of this page.

Axis #	Axis Name	Re-tract Group	Adjust Group	Machine Section	Required Torque in -lb	PowerPack Type (D01,D03,D07, Other)	Power Cable Length meter	Interface Cable Length meter

Power Distribution:

Box 1 Cable length: Axis attached:
Box 2 Cable length: Axis attached:
Box 3 Cable length: Axis attached:
Box 4 Cable length: Axis attached:
Box 5 Cable length: Axis attached:

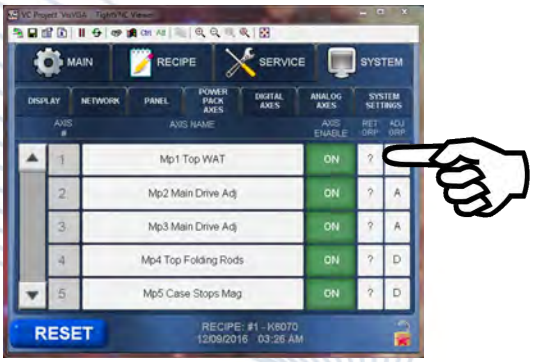
ProAdjust Axis Hierarchy

NOTE: Axes have to be in an adjust group but do not have to be in retract group.

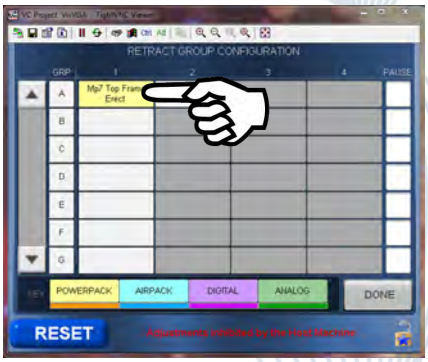
After the groups have been chosen, enter the order into the system as follows:

1) **Log in as Integrator**.

2) On the 'System—>_____ Axes' Page, **press the 'Ret Grp' value** next to any axis to configure the retract groups.



3) **Select the first slot in the first (A) group**.



4) **Select the desired axis from the worksheet in the list and select**.

5) **Continue until all axes have been positioned into their correct locations**, repeat the procedure for the adjust groups by choosing 'adj grp' on the axis setup screen.

- To replace an axis, touch the slot and select a different axis.

5.2.1 Master System Communications

Master System Communication

There are three methods of remote-controlling the ProAdjust System, the Remote control mode setting is located on the 'System—>System Settings' Screen.

Local: System adjustments are only initiated from the ProAdjust Main Screen. Commands from the discrete I/O and Ethernet/IP interfaces are ignored.

Discrete I/O: In discrete I/O mode, the system sends/receives commands via the digital input/outputs at the system CPU. An overview of connections, including live input/output status can be found on the 'Service—>Discrete I/O' screen.

Ethernet/IP: In Ethernet/IP mode, the system sends/receives commands via the Ethernet/IP protocol using the Ethernet connection to the CPU. Live input/output status of the data can be found on the 'Service—>Ethernet/IP' screen.

(See Sample Ladder Logic on ProAdjust.net)

Definitions of Inputs and Outputs

Outputs

Ready: This is a signal sent to the host machine that the ProAdjust system is ready and functioning properly.

Fault: This is a signal sent to the host machine that the ProAdjust system is faulted and requires operator intervention.

Change Over Active: This is a signal sent to the host machine that the ProAdjust system is currently in the process of changing sizes.

In Position: This is a signal sent to the host machine that the ProAdjust system is in the position that it belongs.

Act Recipe Bit #: These 6 outputs are a binary output to the host machine to signal what product the ProAdjust system is currently setup on.

Inputs

Motion Stop OK: This signal is received from the safety relays and motion stop switch indicating that none of these devices are in a fault status.

Start Change Over: This signal is received from the host machine and is used to start the change over process.

Master Ready: This signal is received from the host machine and indicates that the host machine is ready for adjustments to take place.

Set Recipe Bit #: These 6 inputs are a binary input from the host machine to signal what product the ProAdjust system is supposed to setup on.

5.2.2 System Integration

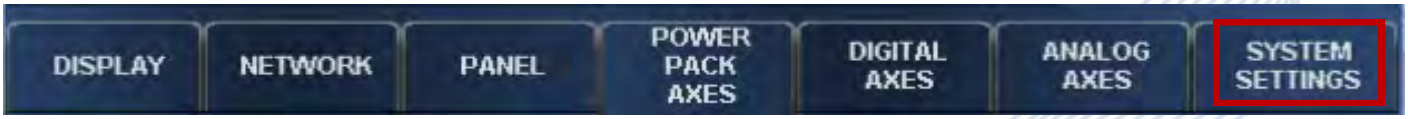
Integration Steps for Discrete I/O

1. Wire the Inputs and Outputs of the ProAdjust system into the existing system using (Diagram : P1) located in the troubleshooting section of this manual.

NOTE: The inputs and outputs work on 24V DC.

2. Once the system has been properly wired, turn the system on and select the “SYSTEM” tab,

then select the “SYSTEM SETTINGS” tab.



If the system is currently locked, log in as OEM by clicking on the lock icon in the lower right hand corner of the screen. Log in info is in section 5.1.2. When in OEM it will be indicated by an open lock with a red star.

3. Select the drop down menu and select “Discrete IO”.

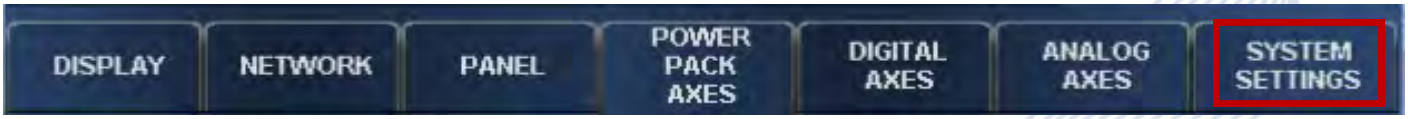
Once Discrete IO has been selected, the system will need to be reset by touching the reset button to clear any faults.

Integration Steps for Ethernet / IP

The Ethernet / IP configuration offers enhanced capabilities over the discrete I/O.

1. Once the Ethernet cables have been connected between the ProAdjust System and the existing machine, turn the system on and select the “SYSTEM” tab,

then select the “SYSTEM SETTINGS” tab.



If the system is currently locked, log in as OEM as indicated by an open lock with a red star.

2. Select the drop down menu and select “Ethernet/IP”.

Once Ethernet/IP has been selected, the system will need to be reset by touching the reset button to clear any faults.

3. Next you will need to enter in the IP addresses of the original machine that you are trying to connect to and if need be, you will need to change the existing IP address of the ProAdjust system.

ProAdjust IP Address

Original Machine IP Address

NOTE: The (IP ADDRESS) is the IP address of the ProAdjust system and the (ETHERNET IP MASTER ADDRESS) is the IP address of the original machine that you are trying to connect to.

4. After setting up your new ProAdjust IP Address you will need to change the address that the Teach Pendant address to match. Please follow the steps on the following page to change the address on the teach pendant.

Configuring the Display Pendant IP Address:

The CPU communicates to the display pendant via Ethernet. Consequently, if the IP address of the CPU is modified, the pendant must be configured to search for the CPU at its new IP address as follows:

1) **Power cycle the system** and shortly after the Pendant Display Screen turns on **press and hold the stop button** on the upper right of the teach pendant.
2) **Continue holding the membrane button** until the system boots to a login prompt.
3) **Press the 'SIP' button** to open the on-screen keyboard.
4) **Enter '1234' as the password** and log in.
5) **Press the Start button and select 'Network Connections'** from the 'Settings' menu.
6) **Open the SMSC911X1** Ethernet device.
7) **Change the IP address** of the display pendant such that it's on the same subnet as the CPU.
8) **Open the B&R VNC Viewer** on the system desktop and enter the new CPU IP address.
9) **Open the control panel** from the start menu.
10) **Open the 'Configuration Manager'**.
11) **Press the 'Save Changes to Registry' button**.
12) **Reboot the system**.

5.2.3 Advanced Topics

Reassigning a Drive Power Pack's Network Address

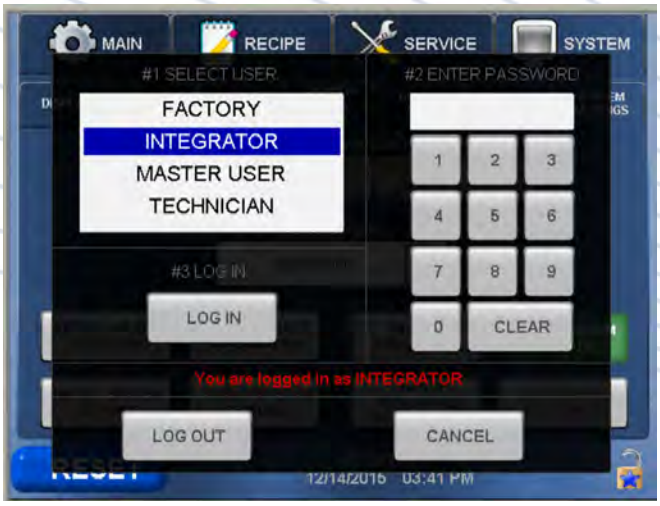
The network address number of the Drive Power Pack is assigned based upon the axis it is linked with during initial setup. Drive Power Packs can also be manually re-assigned as follows:

1) **Log in as OEM** (Section 5.1)
2) On the 'System—>System Settings' screen **press the 'Change Stepper Node Number' button.**

3) **Enter the network number of the Drive Power Pack to be reassigned in the top field.** This Drive Power Pack must be in the network with an OK network status.
4) **Enter the network location where this Drive Power Pack should be re-assigned to;** or enter 239 to make the Drive Power Pack appear as a replacement motor. (239 is the Factory Default)
5) **Press OK**, the Drive Power Pack will restart, after the restart is complete the Drive Power Pack will appear at the new network location and will inherit the settings of the axis related to that location. The retract position teach procedure will need to be performed to synchronize the motor to the new location.

Password Change

If there is a need to change the passwords on the system, it is possible by:

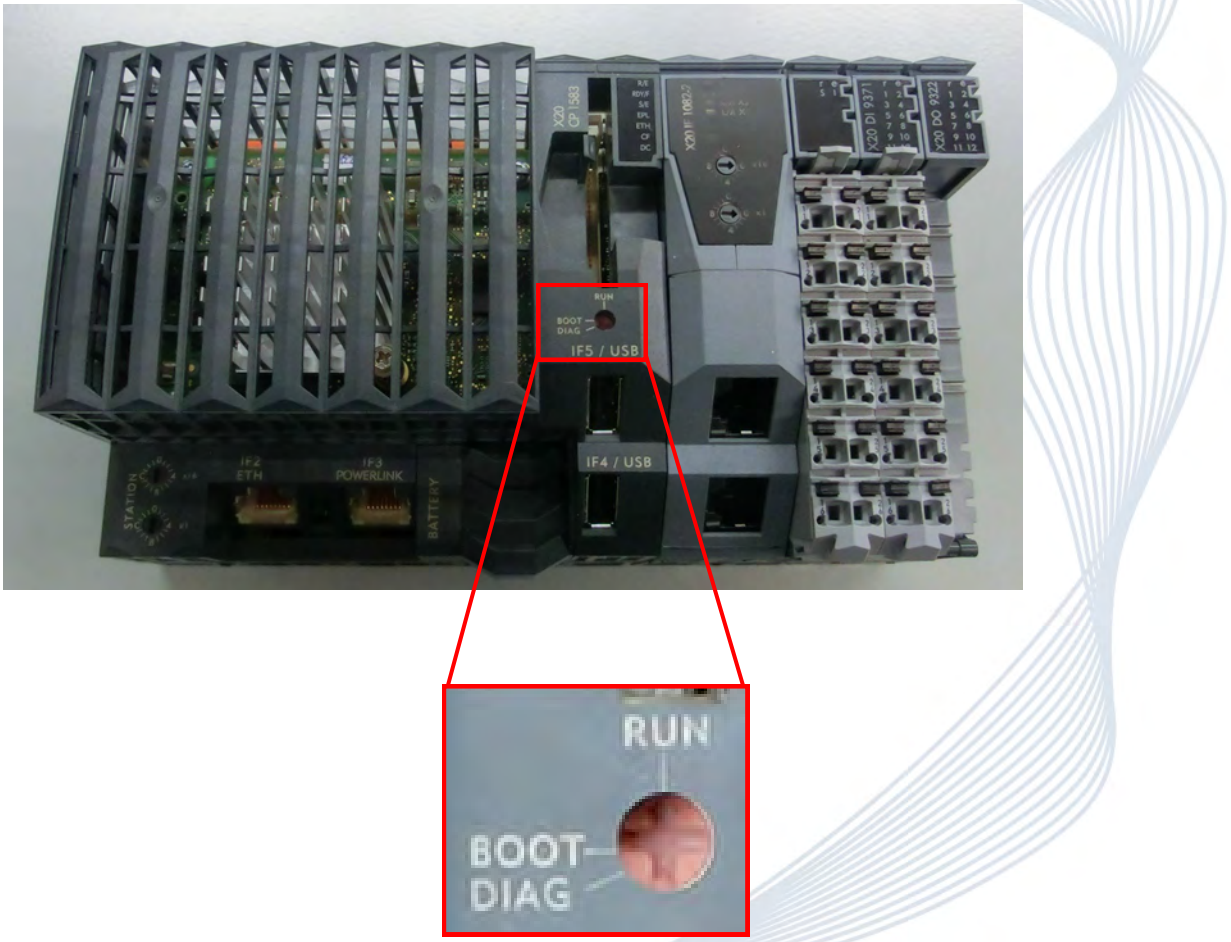


1) Log in as Integrator.
2) Open System Tab -> System Settings Tab
3) Use the Change Passwords Button to open up a pop up screen showing the current passwords.
4) Change the passwords to your desired number combination and click OK.

**** If the integrator password is lost please call ProAdjust Service to schedule a service call.**

CPU IP Address Recovery Mode:

If the CPU's IP address has been inadvertently re-configured and the address is unknown, the IP address can be reset by setting the CPU mode switch (lower edge on the front of the CPU) one click to the right of 'RUN' and power cycling the system. This will reset the CPU's IP address to 192.168.0.1. IP address recovery mode must be exited by changing the mode switch back to 'RUN' in order for changes to the IP address to be accepted by the system.

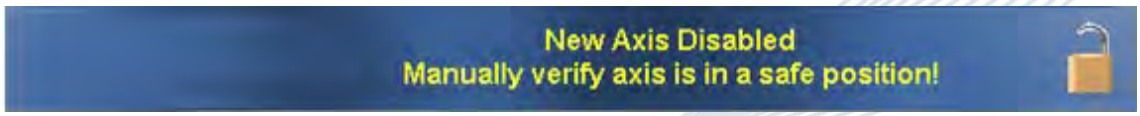


5.2.4 Disabling an Axis

If an axis fails for any reason, all axes in the system will stop with an error. This prevents damage to the machine by not allowing any axis to move out-of-sequence. However, in the event that an axis error occurs that cannot be quickly recovered, it will be necessary to disable the axis to allow operation of the rest of the system until the failed axis can be repaired.

1) Log in as Technician
2) On the Axis Configuration Screen in the 'System' area, find the failed axis.
3) Toggle the failed axis' 'Axis Enable' setting from 'ON' to 'OFF'.

When an axis is disabled, all errors on the axis will be ignored, allowing operation of the rest of the system to continue. The following warning will be present on the screen. When the axis is repaired, re-enable by toggling the axis enable back to 'ON'.



CAUTION: When an axis is disabled it will no longer move during the auto adjust sequencing. Prior to running an adjust sequence the axis must be manually moved using it's hand adjustment knob to a position that will not interfere with the other axes' movement.

ProAdjust®

Innovative
Adjustment
Solutions

Chapter 6: Maintenance

6.1.1 Frequently Asked Questions

6.1.2 ProAdjust Troubleshooting

6.1.3 ProAdjust System Wiring

6.2.1 ProAdjust Catalog Components

6.3.1 Warranty

Users Guide

6.1.1 Frequently Asked Questions

If the system loses power, are recipes/settings lost?

No. All recipes and system settings are stored on the system's Compact Flash card. Unsaved changes to the current recipe are even retained during a power loss via the system's memory/clock battery.

If the memory/clock battery fails, are the recipes/settings lost?

No, the recipes/settings are stored on the system's Compact Flash card. Only unsaved changes to the current recipe will be lost if the system also loses power and, the clock setting will not function properly.

Where is the memory/clock battery? How is it replaced? How often? What type?

The clock battery is under a ridged panel at the bottom of the ProAdjust CPU; slide this panel straight down to access the battery. The battery life varies based upon many factors but will typically last 5+ years in normal operation. The battery type is CR2477N.

If the Compact Flash card fails, are recipes/settings lost?

Yes. Although this is an extremely rare occurrence, Compact Flash cards can fail. Any time a new recipe is created it is recommended to make a backup via USB after the recipe has been proven/tested. The USB backups can then be uploaded to secure/redundant company network storage. The Compact Flash card also stores the operating system for the ProAdjust; contact ProAdjust for a replacement CF card containing the ProAdjust operating system.

Frequently Asked Questions

If the CPU fails, are recipes/settings lost?

No, everything is stored on the Compact Flash card. If the CPU fails, replace the CPU and install the Compact Flash card from the old CPU into the new CPU. The new CPU will load all values except IP address, Time/Date, and any unsaved recipe changes on the current recipe.

Can the USB port on the pendant be used to backup/restore recipes?

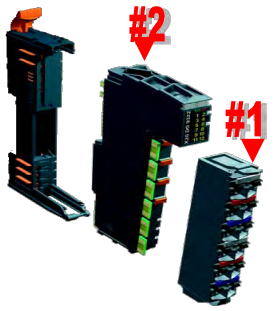
No. Use the USB port on the ProAdjust main cabinet or the USB port on the CPU inside the ProAdjust main cabinet.

What are the membrane keys on the pendant used for?

The membrane keys on the pendant are not used. Since the pendant is a touchscreen device, interactive keys are instead displayed on each screen as needed; providing a more user-friendly interface.

How are IO modules removed from the CPU?

The IO modules consist of three parts: Base module, IO module, and terminal block. First remove the terminal block by pressing the light grey tab at the top (#1) and rotating the terminal block downwards. Once the terminal block is rotated downwards, the bottom can be unhooked from the base module. To remove the IO module, press the triangular button at the top of the module (#2) and pull the IO module straight out from the base module. The base module can remain in place. Reassembly is the reverse of disassembly.



Frequently Asked Questions

How much power does the ProAdjust system use?

The least amount of power that a 20 axes ProAdjust system will consume is 336 watts, this number is calculated when all of the drives are set to their minimum holding or running current and is not actively making an adjustment. The most amount of power that a 20 axes ProAdjust system will consume is 2758 watts, this number is calculated when all of the drives are set to their maximum holding or running current and the system is making an adjustment.

Current Setting	Drive Consumption	# Drives running	# Drives Holding	Controller Consumption	Total System Consumption	Lowest and Highest Setting and Descriptions
0.1	7.7 watts	0	20	182 watts	336 watts	.1 is lowest in stand by
0.6	46 watts	0	20	182 watts	1102 watts	.6 is highest in stand by
0.1	7.7 watts	4	16	182 watts	336 watts	.1 is lowest in running mode
6	460 watts	4	16	182 watts	2758 watts	6 is highest in running mode

What preventative maintenance should I perform on my system?

All of the mechanisms of the machine should be kept clean and free of any foreign material.

6.1.2 ProAdjust Troubleshooting

Problem	Solution
The motor stalls (buzzes without moving) or a following error occurs when a move is attempted.	Verify no mechanical bind exists (during setup) Increase Run current Decrease velocity Increase acceleration
Motor drifts out of position and/or following error occurs when motors are not moving.	Increase standby current
An axis generates an over-temperature fault when standing still.	Decrease standby current
Display Pendant does not load screens from CPU.	Check Ethernet connections Verify IP address has not changed Use IP address recovery mode and reset IP addresses on pendant
The difference between physical and displayed position grows and shrinks as the axis moves to different positions.	Incorrect Axis Scaling, Follow the procedure in chapter 5.1.3 to correct.
A constant difference exists between physical and displayed position.	Incorrect Retract Position, Follow the procedure in chapter 5.1.3 to correct.
The physical and displayed positions move in opposite directions.	Incorrect Motor Direction, Follow the procedure in chapter 5.1.3 to correct.
An axis has failed and system wont function.	A failed axis can be bypassed, please Review “Disabling an Axis” in chapter 5, for more information.

Status Button:

The status button on the lower left corner of every screen changes based on the current status of the machine.

Condition	Appearance
Axis Moving	
Alarm Active	

Alarm/Status Banner:

System alarms are divided into three different levels:

1) **Warning:** Warning level alarms appear in yellow in the alarm banner. Warning level alarms alert the user to important information but do not stop the system from operating or require a reset.

2) **Critical:** Critical level alarms appear in orange in the alarm banner. Critical level alarms alert the user that the system was unable to process a request. The alarm must be reset to continue.

3) **Fatal:** Fatal level alarms appear in red in the alarm banner. Fatal level alarms alert the user that the system is experiencing a hardware failure or incorrect setup of basic system parameters. The condition must be fixed and the alarm reset to continue.

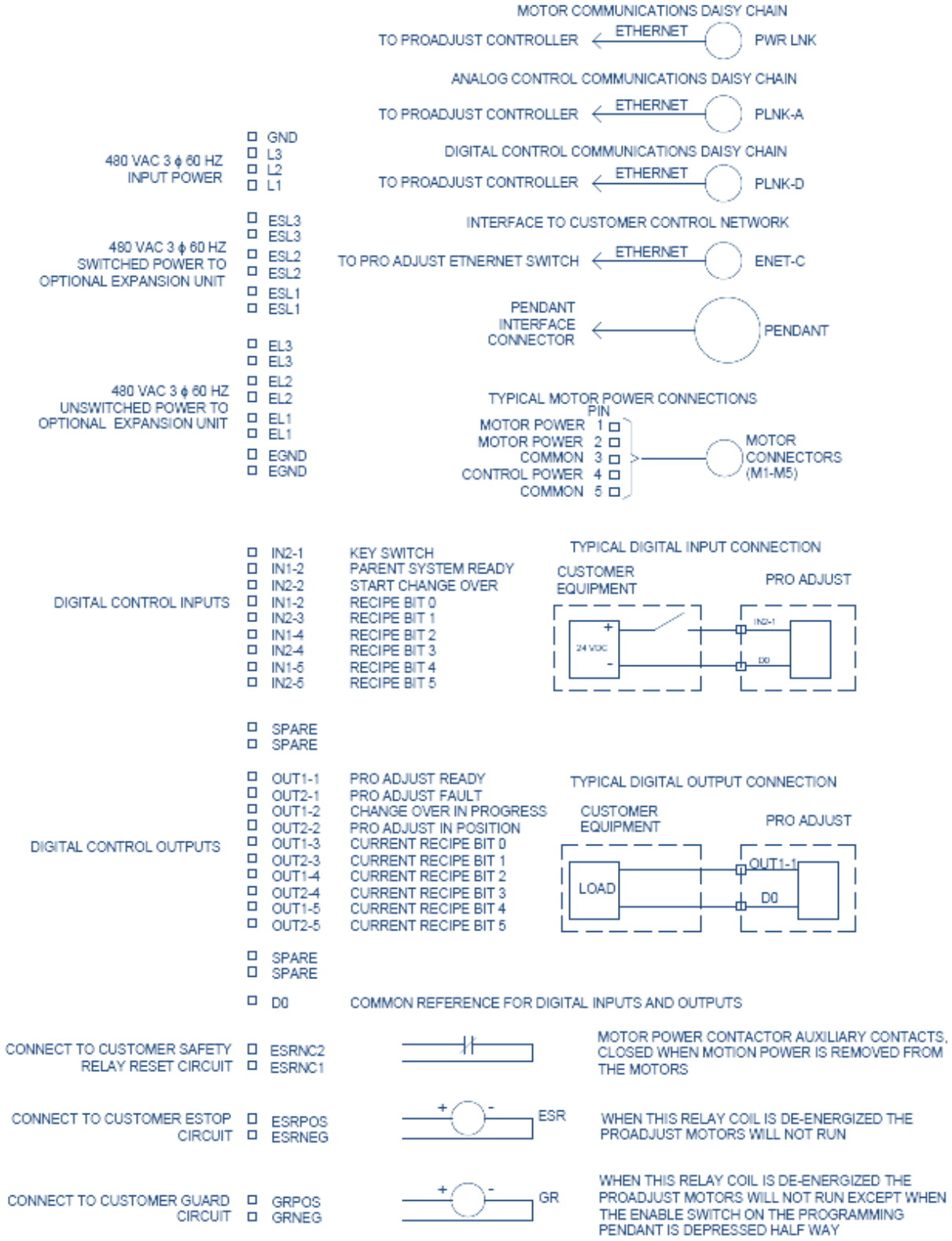
When multiple alarms are active the alarms will be displayed in series, with each alarm in the active list displayed for several seconds. When no alarms are active the alarm banner displays the date/time and current recipe. Touching the alarm banner at any time short-cuts to the alarm page.

Alarm Messages:	Brief Description:
Current Recipe Not Saved	Current Recipe Not Saved
Master System Requested Invalid Recipe (# {InvalidRecReq})	The Recipe that has been requested by the Original machine is not a valid recipe on the ProAdjust System
MOTION STOP PRESSED	Motion Stop Pressed
Master System Not Ready	The original machine has signaled to the ProAdjust system that it is not ready
Motor Error on {StepMotorErr1}	There is an error on (Motor Listed)
Motor Error on Multiple Other Axes	There is more than one axis that has errors
Unexpected Motor Found at Node {Unexpected1}	Unexpected Motor has been found at (Motor Listed), most likely the result of a new motor being installed
Multiple Other Unexpected Motors Found	Several unexpected motors have been found, most likely the result of multiple new motors being installed at once
Communication Lost to {MissingMotor1} Motor	Communication lost to (Motor Listed)
Communication Lost to Multiple Other Motors	Communication lost to multiple motors
Communication Lost to {MissingDigModule1} Digital Module	Communication lost to (Module Listed) Module
Communication Lost to Multiple Other Digital Modules	Communication Lost to Multiple Other Digital Modules
Communication Lost to {MissingAnaModule1} Analog Module	Communication Lost to (Module Listed) Analog Module
Communication Lost to Multiple Other Analog Modules	Communication Lost to Multiple Other Analog Modules
Too many Stepper Axes Configured!	The limit of stepper axes has been reached (200 different axes)
Too many Digital Axes Configured!	The limit of digital axes has been reached
Too many Analog Axes Configured!	The limit of analog axes has been reached
Invalid Velocity Setting on {InvalidVelocity1}	Velocity setting on (Motor Listed) is out of the range, usually only occurs when a new motor is installed
Invalid Velocity Setting on Multiple Other Axes	Velocity setting on multiple axes is out of the range, usually only occurs when a new motor is installed
Invalid Acceleration Setting on {InvalidAccel1}	Acceleration setting on (Motor Listed) is out of the range, usually only occurs when a new motor is installed
Invalid Acceleration Setting on Multiple Other Axes	Acceleration setting on multiple axes is out of the range, usually only occurs when a new motor is installed
Invalid Scaling Setting on {InvalidScaling1}	Scaling setting on (Motor Listed) is out of the range, usually only occurs when a new motor is installed
Invalid Scaling Setting on Multiple Other Axes	Scaling setting on multiple axes is out of the range, usually only occurs when a new motor is installed
Invalid Lag Error Limit Setting on {InvalidJogInc1}	Following Error on (Motor Listed) is out of the range, usually only occurs when a new motor is installed (Default
Invalid Lag Error Limit Setting on Multiple Other Axes	Lag setting on multiple axes is out of the range, usually only occurs when a new motor is installed
Invalid Pos/Neg Limit Setting on {InvalidLimits1}	Pos or Neg limit is out of range on (Motor Listed), usually only occurs when a new motor is installed
Invalid Pos/Neg Limit Setting on Multiple Other Axes	Pos or Neg limit is out of range on multiple axes, usually only occurs when a new motor is installed
Invalid Run Current Setting on {InvalidRunCurrent1}	The run current is either too high or low on (Motor Listed), usually only occurs when a new motor is installed

Alarm Messages:	Brief Description:
Invalid Run Current Setting on Multiple Other Axes	The run current is either too high or low on multiple axes, usually only occurs when a new motor is installed
Invalid Standby Current Setting on {InvalidStandbyCurrent1}	The standby current is either too high or low on (Motor Listed), usually only occurs when a new motor is installed
Invalid Standby Current Setting on Multiple Other Axes	The standby current is either too high or low on multiple axes, usually only occurs when a new motor is installed
{AxNotInAdjGrp1} is not in any Adjust Group	(Motor Listed) Is not currently being used in any of the motor adjustment groups
Multiple Other Axes are not in any Adjust Group	There are multi axes that are not currently being used in any of the motor adjustment groups
{AxNotInRetGrp1} is not in any Retract Group	(Motor Listed) Is not currently being used in any of the motor retract groups
Multiple Other Axes are not in any Retract Group	There are multi axes that are not currently being used in any of the motor adjustment groups
{AxisTimedOut1} did not reach set position	(Motor Listed) did not reach the set position in time
Multiple other axes did not reach set position	Multiple motors did not reach the set position in time
Invalid InPositionWindow Setting on {InvalidInPosWindow1}	The (Motor Listed) is trying to reach an un reachable position
Invalid InPositionWindow Setting on Multiple Other Axes	Several Motors are trying to reach an un reachable position
Invalid Timeout Setting on {InvalidTimeout1}	Clock timed out for movement on (Motor Listed)
Invalid Timeout Setting on Multiple Other Axes	Clock timed out for movement on multiple motors
Scaling/Limits/Offset Combination on {InvalidAnaSetup1} Exceeds +/-10V	The combination of scaling, limit, and offset for the (Motor Listed) exceeds +/- 10v
Scaling/Limits/Offset Combination on Multiple Other Axes Exceed +/-10V	The combination of scaling, limit, and offset for multiple motors exceed +/- 10v
Feedback Error on {FeedbackError1}	Feedback error on (Motor List)
Feedback Error on Multiple Other Axes	Feedback error on multiple axes
Digital Feedback Implausible on {DigImplausible1}	Digital Feedback Implausible on (Input Listed)
Digital Feedback Implausible on Multiple Other Axes	Digital Feedback Implausible on Multiple Other Axes
{StepDisabled1} Disabled\nManually verify axis is in a safe position!	(Motor Listed) Disabled, please verify that the axis is in a safe position or re-enable the axes
Multiple Other Stepper Axes Disabled\nManually verify these axes are in safe positions!	Multiple axes are disabled, please verify that the axis is in a safe position or re-enable the axes
{AnaDisabled1} Disabled\nManually verify axis is in a safe position!	(Axes Listed) Disabled, please verify that the axis is in a safe position or re-enable the axes
Multiple Other Analog Axes Disabled\nManually verify these axes are in safe positions!	Multiple axes are disabled, please verify that the axis is in a safe position or re-enable the axes
{DigDisabled1} Disabled\nManually verify axis is in a safe position!	(Axes Listed) Disabled, please verify that the axis is in a safe position or re-enable the axes
Multiple Other Digital Axes Disabled\nManually verify these axes are in safe positions!	Multiple axes are disabled, please verify that the axis is in a safe position or re-enable the axes
Communication to X20IF1082-2 lost	Communication to X20IF1082-2 lost
Communication to X20DI9371 lost	Communication to X20DI9371 lost
Communication to X20DO9322 lost	Communication to X20DO9322 lost
Communication to Digital BC lost	Communication to Digital BC lost
Communication to Analog BC lost	Communication to Analog BC lost

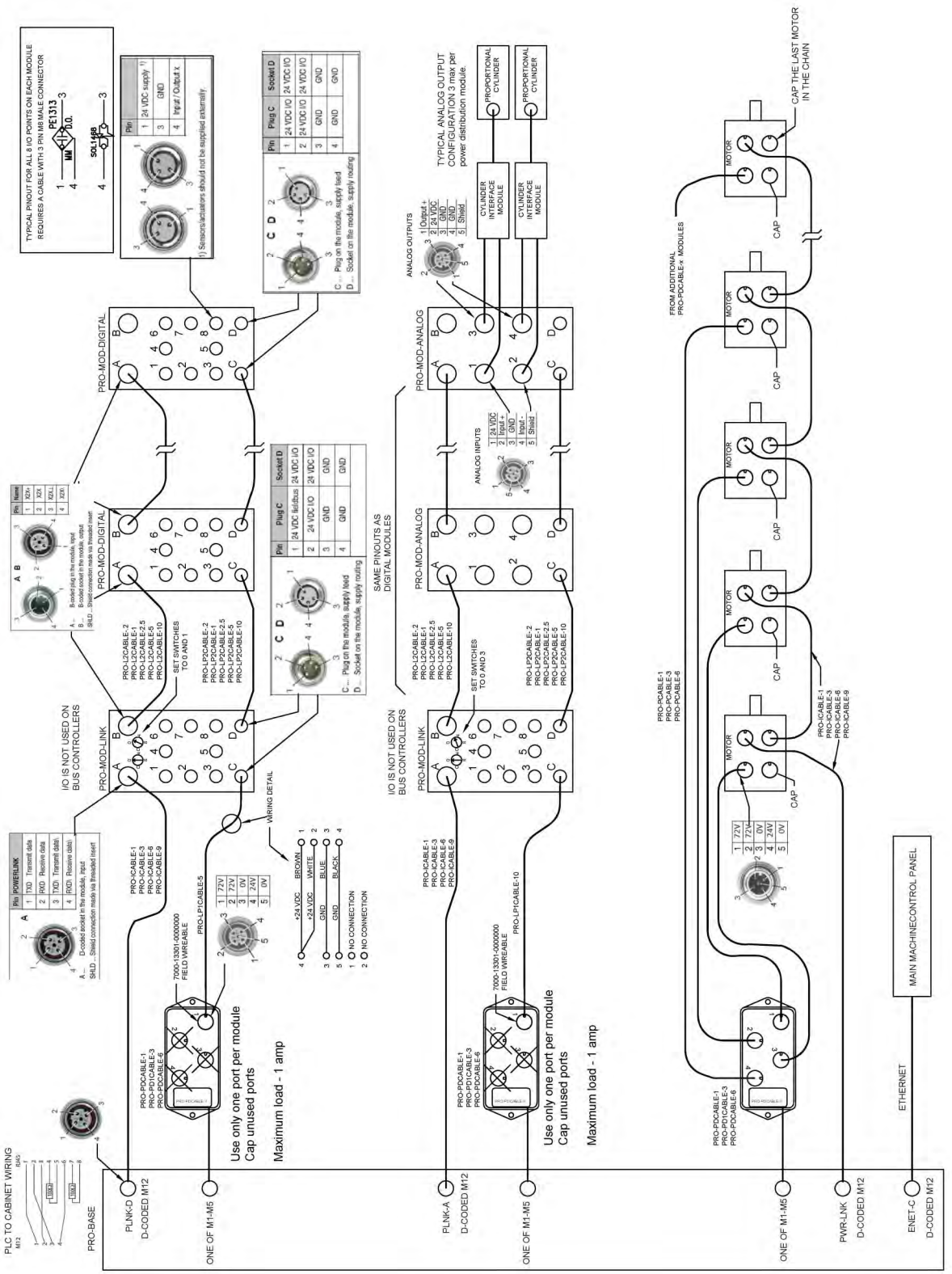
Alarm Messages:	Brief Description:
Recipe Position Outside Limits on {StepRecErr1}	The recipe is asking (Motor Listed) to move outside of its limits
Recipe Position Outside Limits on Multiple Stepper Axes	The recipe is asking multiple motors to move outside of the limits
Recipe Position Outside Limits on {AnaRecErr1}	The recipe is asking (Analog Axes) to move outside of its limits
Recipe Position Outside Limits on Multiple Analog Axes	The recipe is asking multiple Axes to move outside of the limits
Output Error on Changeover Active Digital Output	Output Error on Changeover Active Digital Output
Output Error on Fault Digital Output	Output Error on Fault Digital Output
Output Error on In Position Digital Output	Output Error on In Position Digital Output
Output Error on Ready Digital Output	Output Error on Ready Digital Output
Output Error on Act Recipe Bit 0 Digital Output	Communication error on output to the main machine
Output Error on Act Recipe Bit 1 Digital Output	Communication error on output to the main machine
Output Error on Act Recipe Bit 2 Digital Output	Communication error on output to the main machine
Output Error on Act Recipe Bit 3 Digital Output	Communication error on output to the main machine
Output Error on Act Recipe Bit 4 Digital Output	Communication error on output to the main machine
Output Error on Act Recipe Bit 5 Digital Output	Communication error on output to the main machine

6.1.3 ProAdjust System Wiring



Note: To see full size Connection Diagram please visit the ProAdjust website. www.ProAdjust.net

ProAdjust Axis Wiring Diagram



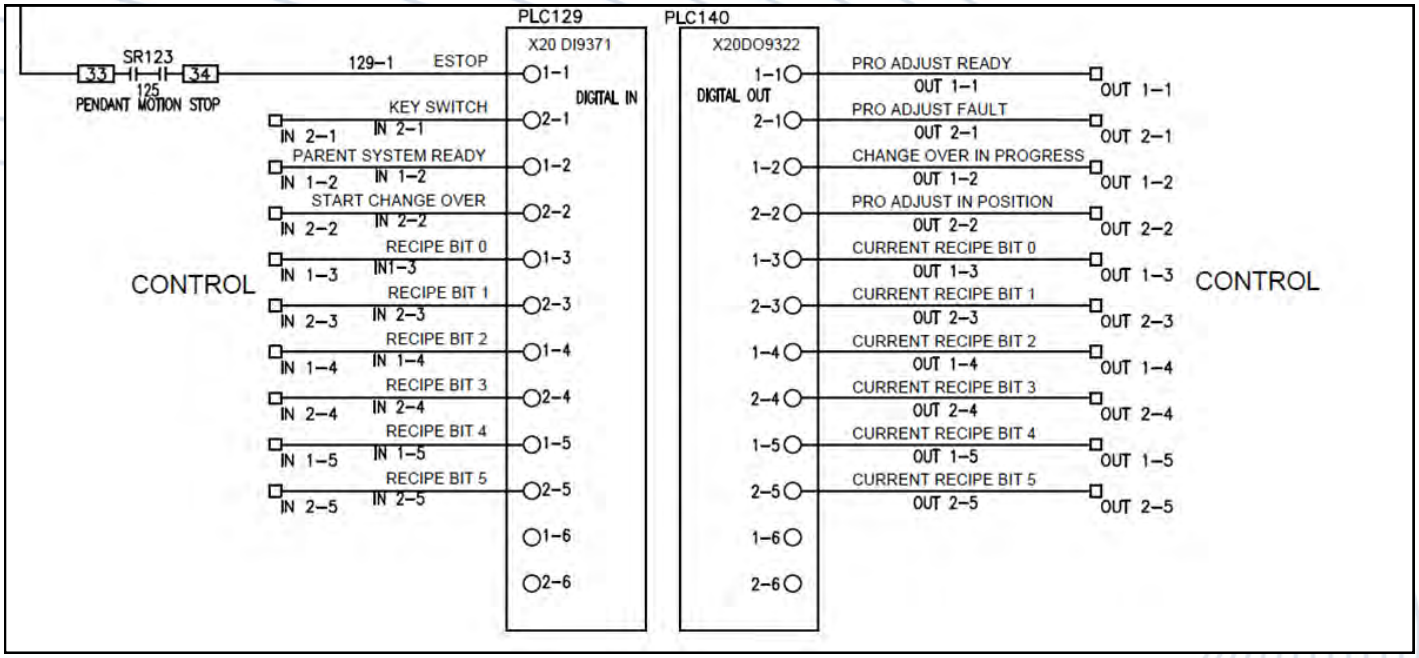
Note: To see full size Connection Diagram please visit the ProAdjust website. www.ProAdjust.net

Electrical Schematic for I/O modules:

-The input card receives signals using 24V DC (+) power.

-The output card delivers 24V DC (+) signals.

Diagram : **P1**



Electrical Schematic for the Guard Interface, E-Stop Interface and Motor Contactor Feedback:

-The Guard Interface is used to tie the original machine guard circuit into the ProAdjust system.

-The E-Stop Interface is used to tie the original machine E-Stop circuit into the ProAdjust system.

-The Motor Contactor Feedback Interface is used to send a signal to the original machine, to show that the motors are inoperable.

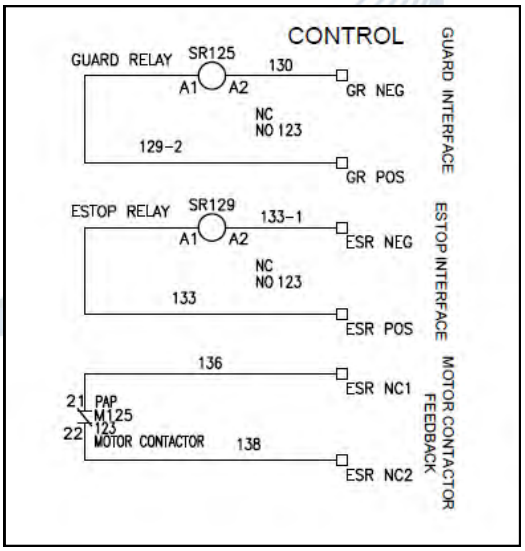
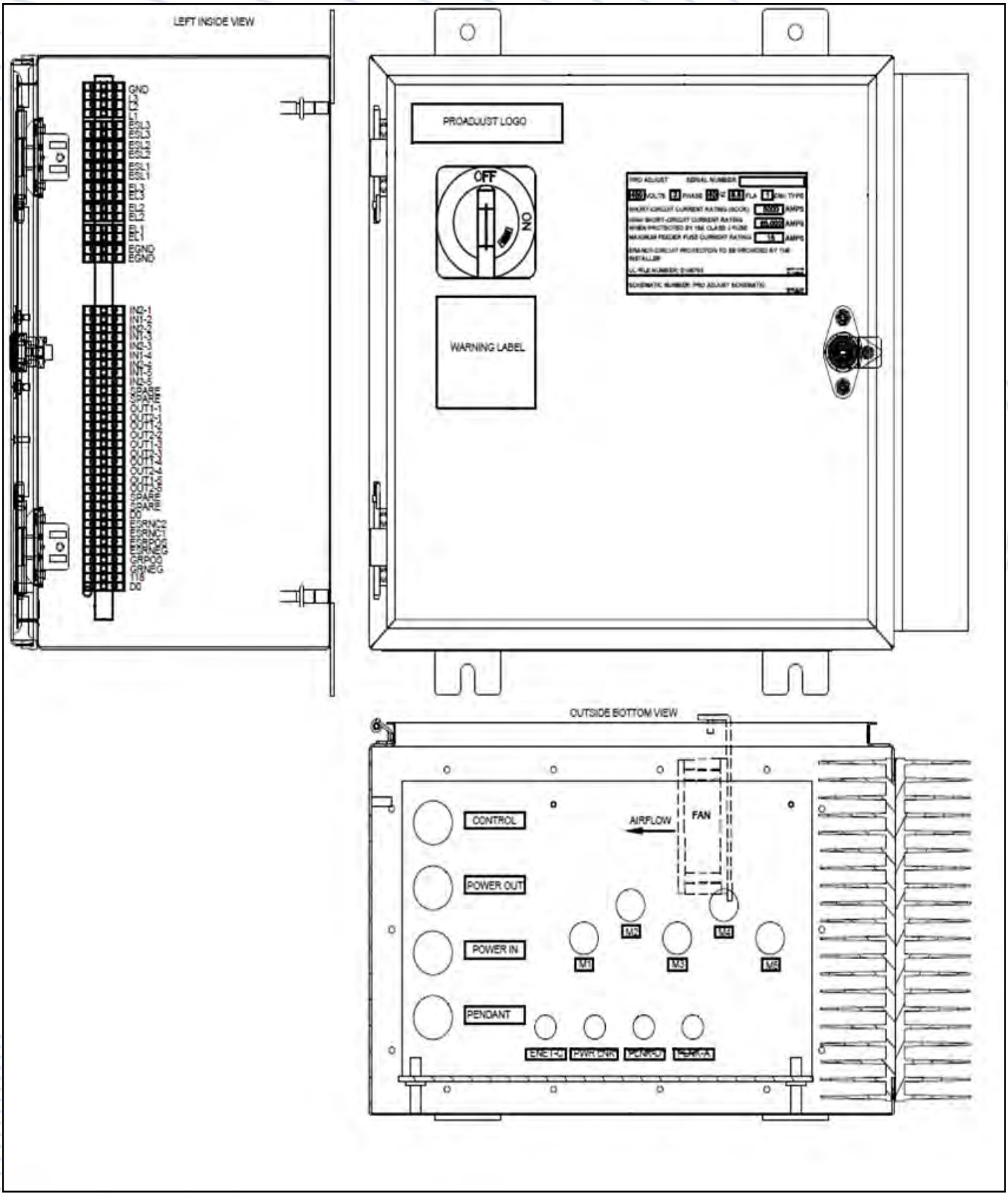


Diagram : **P2**

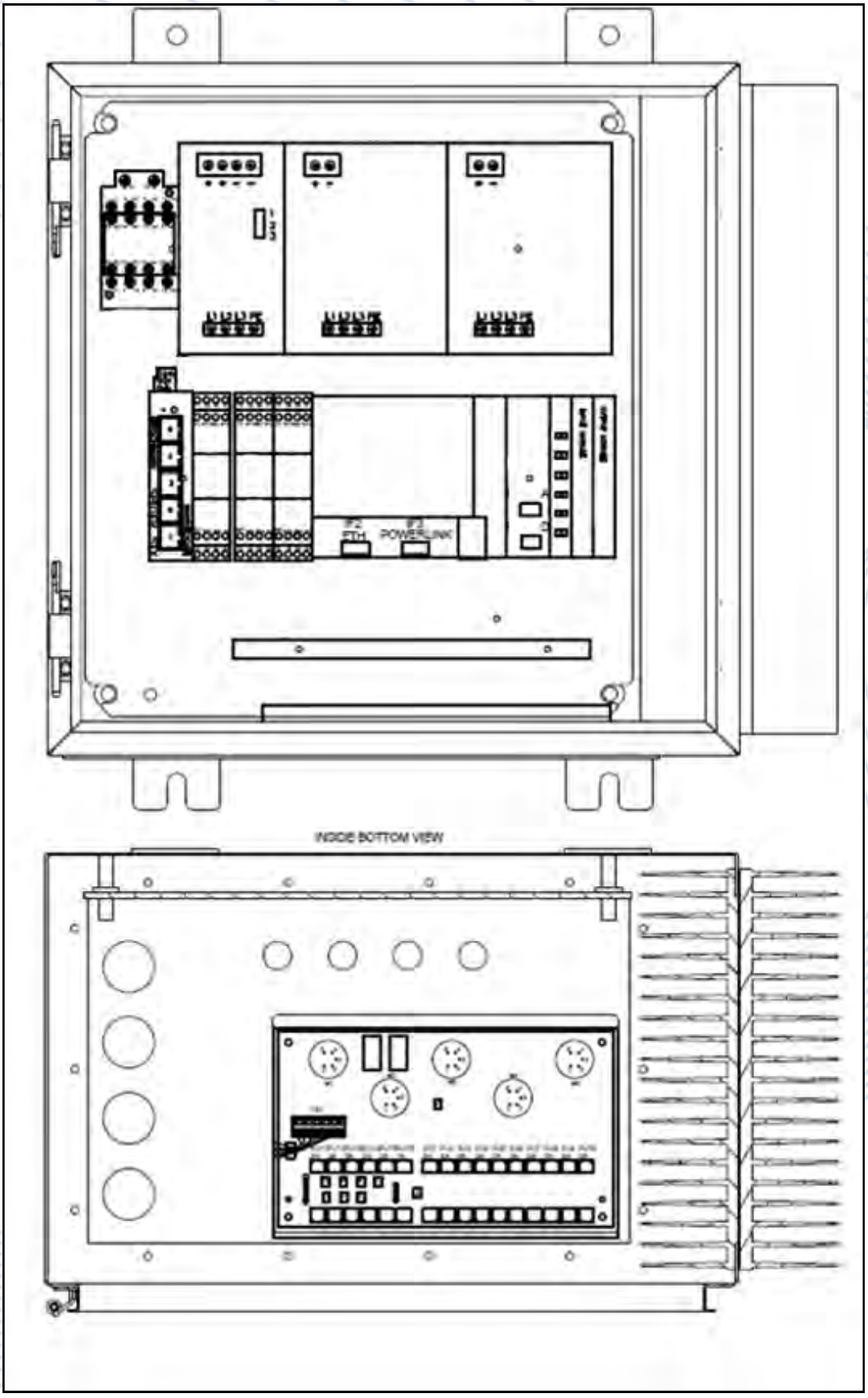
Electrical Schematics for Troubleshooting:

ProAdjust Panel Layout



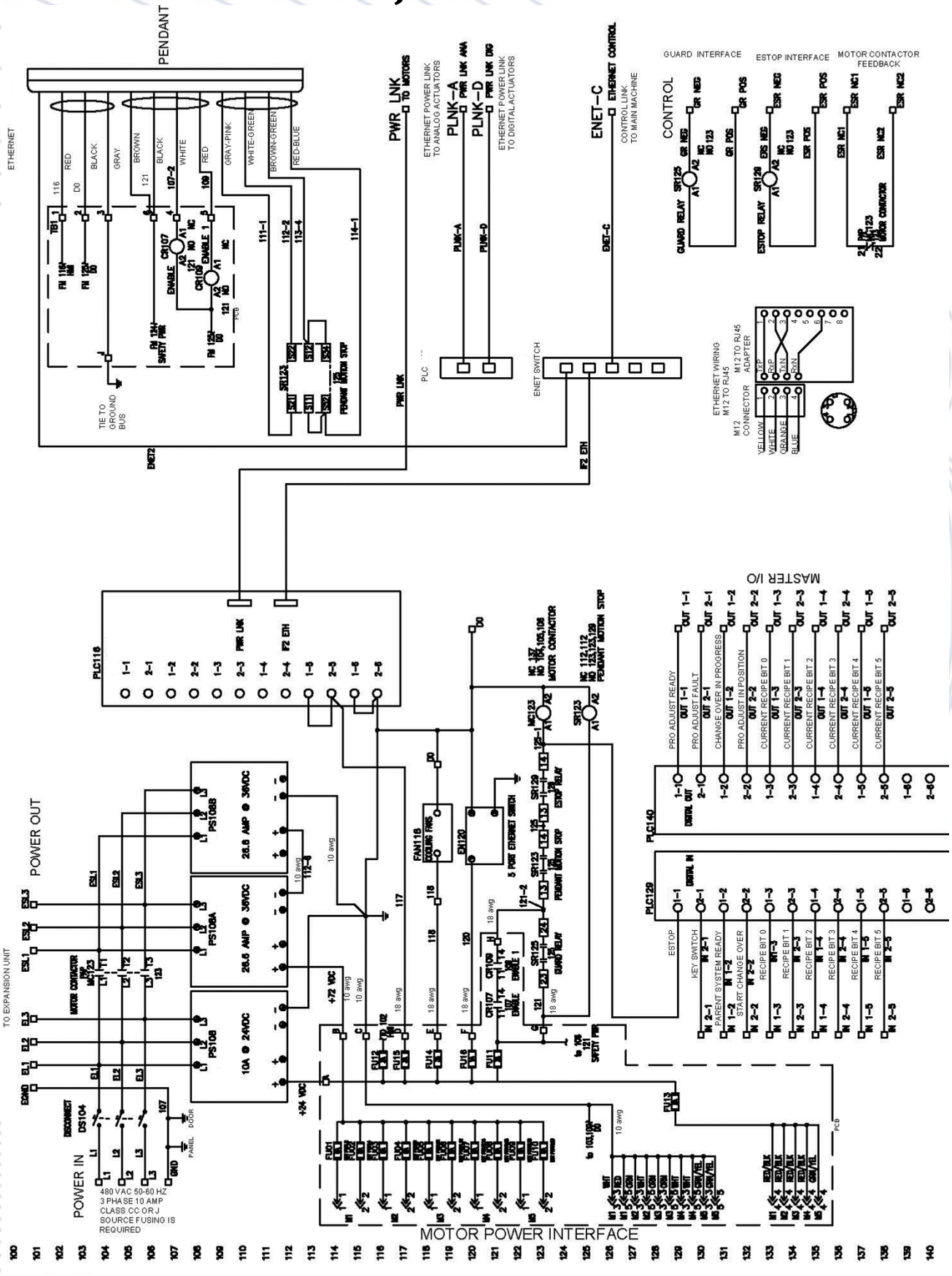
Electrical Schematics for Troubleshooting:

ProAdjust Panel Layout (Cont.)



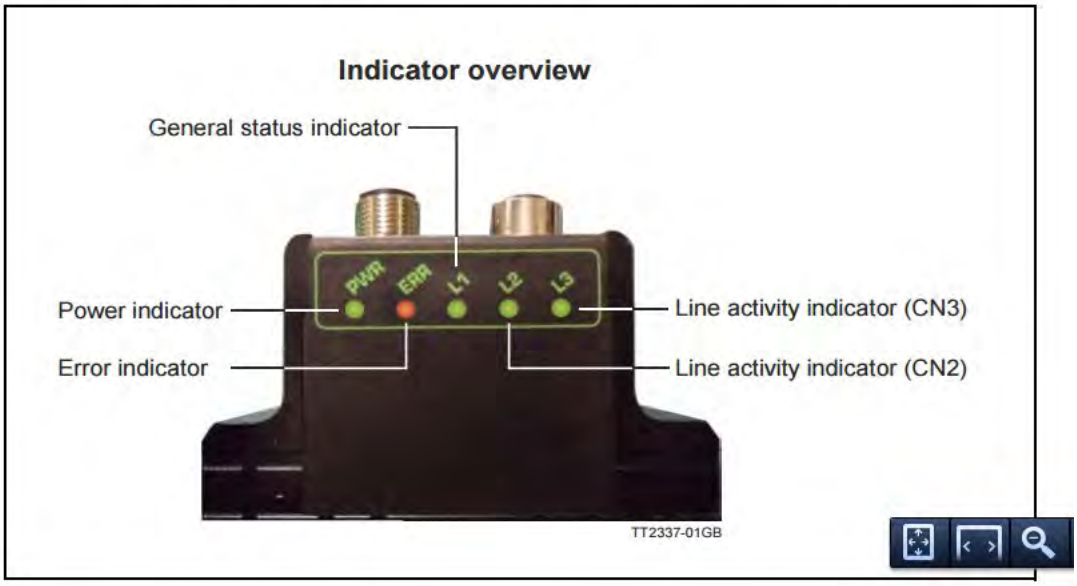
Electrical Schematics for Troubleshooting:

ProAdjust Schematic



Motor Status LED

The ProAdjust Power Packs are equipped with LED status lights to indicate the state of the drive. Below is a description of the various states of the LED's.

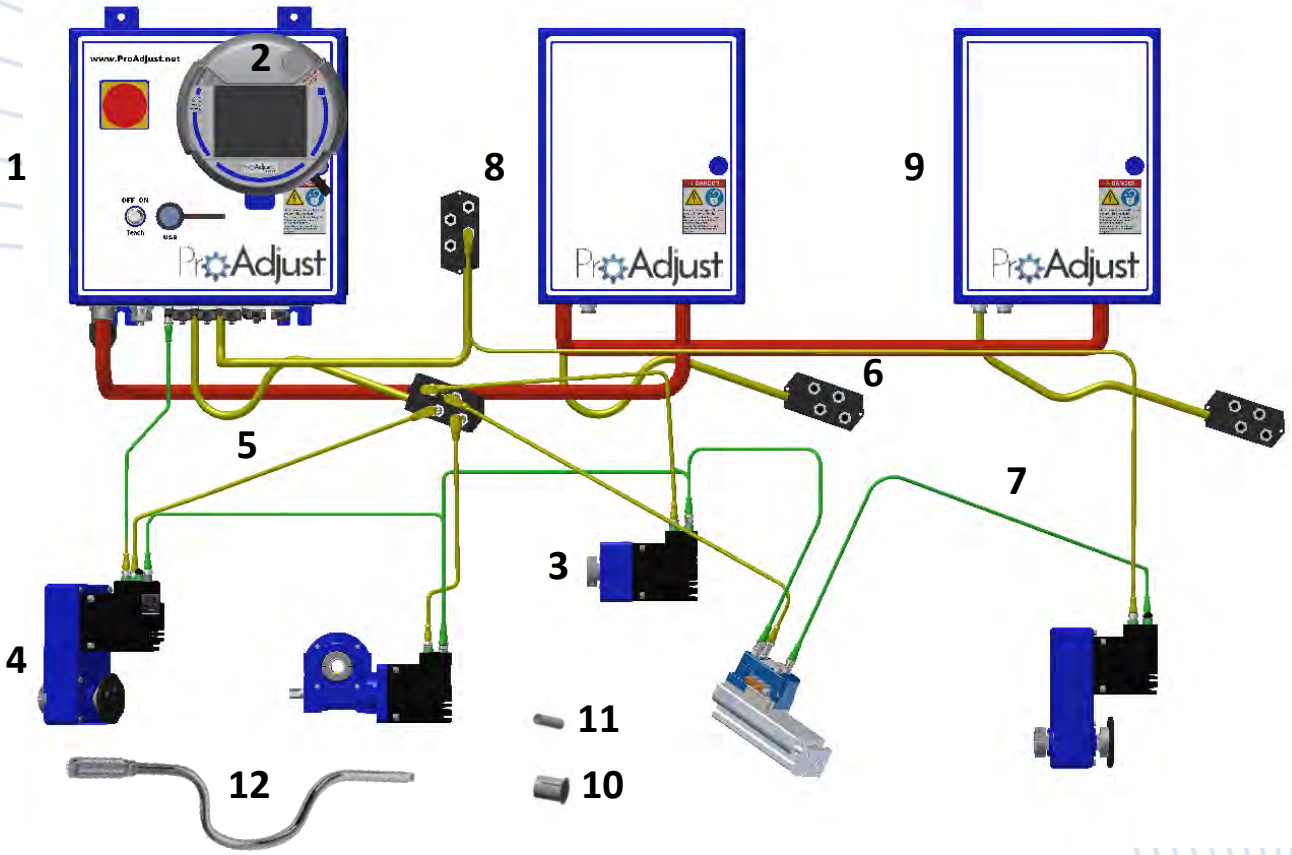


LED indicator descriptions

LED Text	Colour	Constant off	Constant on	Blinking	Single flash	Double flash	Triple flash	Flickering
L1	Green	NMT_CS_ NOT_ ACTIVE	NMT_CS_ OPERA-TIONAL	NMT_CS _STOPP ED	NMT_CS _PREOP ERATION AL1	NMT_CS _PREOP ERATION AL2	NMT_CS _READY _TO_OP ERATE	NMT_CS_B ASIC_ ETHERNET
L2	Green	No valid Ethernet connection.	Ethernet is connected.	-	-	-	-	Activity on line CN2
L3	Green	No valid Ethernet connection.	Ethernet is connected.	-	-	-	-	Activity on line CN3
ERR	Red	No error	Error					Booting error
PWR	Green	Power is not applied.	Power is ap-plied to both motor and module.					Power is applied to module but no communi-cation with motor.

Notes:
Blinking: Flashing with equal on and off periods of 200ms (2.5Hz). **Single flash:** Repeating on for 200ms and off for 1s. **Double flash:** Two flashes with a period of 200ms followed by 1s off period. **Triple flash:** Two flashes with a period of 200ms followed by 1s off period.**Flickering:** Rapid flashing with a period of approximately 50ms (10 Hz).

6.2.1 ProAdjust Catalog Components



ProAdjust Catalog Components			
For current listing, please contact your local ProAdjust sales rep or contact 315-676-2731			
Part Name	**Part Number**	**Drawing Reference**	**Description**
ProAdjust Starter Kit	PRO-STARTKIT	1+2	Includes: Base Power Enclosure, Teach Pendant
ProAdjust Expansion Kit	PRO-EXPANDKIT	8+9+5	Includes: Expansion Power Enclosure, Expansion Power Enclosure Cable, Power Expander Cable 3 Meters
Base Power Enclosure	PRO-BASE	1	Supplies DC power and Ethernet communication to Power Modules
Teach Pendant	PRO-TP	2	Teach pendant HMI for controlling recipes and jogging system
Power Distribution Cable 1 Meters	PRO-PDCABLE-1	5	Distributes power to up to four (4) Drive Power Packs from Power Enclosure
Power Distribution Cable 3 Meters	PRO-PDCABLE-3	5	Distributes power to up to four (4) Drive Power Packs from Power Enclosure
Power Distribution Cable 6 Meters	PRO-PDCABLE-6	5	Distributes power to up to four (4) Drive Power Packs from Power Enclosure

ProAdjust Catalog Components

Part Name	Part Number	Drawing Reference	Description
ProAdjust Air Pack	PRO-A04		4” Stroke—Positional Controlled Air Cylinder
ProAdjust Power Pack	PRO-D07		Power transmission module - High Torque
ProAdjust Power Pack	PRO-D03	4	Power transmission module - Medium Torque
ProAdjust Power Pack	PRO-D01	3	Power transmission module - Standard Torque
Power Pack Cable 1 Meters	PRO-PCABLE-1	6	Provides power from Power Expander Cable to one (1) Power Pack
Power Pack Cable 3 Meters	PRO-PCABLE-3	6	Provides power from Power Expander Cable to one (1) Power Pack
Power Pack Cable 6 Meters	PRO-PCABLE-6	6	Provides power from Power Expander Cable to one (1) Power Pack
Power Pack Cable Custom	PRO-CABLE-CUSTOM	6	Provides power from Power Expander Cable to one (1) Power Pack
Reducer Bushing 12mm	PRO-B12MM	10	Transitions output shaft from 20 mm to 12mm diameter
Reducer Bushing 13mm	PRO-B13MM	10	Transitions output shaft from 20 mm to 13mm diameter
Reducer Bushing 15mm	PRO-B15MM	10	Transitions output shaft from 20 mm to 15mm diameter
Reducer Bushing 16mm	PRO-B16MM	10	Transitions output shaft from 20 mm to 16mm diameter
Reducer Bushing 18mm	PRO-B18MM	10	Transitions output shaft from 20 mm to 18mm diameter
Reducer Bushing 1/2"	PRO-B08	10	Transitions output shaft from 20 mm to 1/2" diameter
Reducer Bushing 5/8"	PRO-B10	10	Transitions output shaft from 20 mm to 5/8" diameter
Reducer Bushing 3/4"	PRO-B12	10	Transitions output shaft from 20 mm to 3/4" diameter
Reducer Bushing - Custom	PRO-B-CUSTOM	10	Transitions output shaft from 20 mm to Custom diameter
Interface Cable 1 Meters	PRO-ICABLE-1	7	Communication connection between two (2) Power Packs
Interface Cable 3 Meters	PRO-ICABLE-3	7	Communication connection between two (2) Power Packs
Interface Cable 6 Meters	PRO-ICABLE-6	7	Communication connection between two (2) Power Packs
Interface Cable 9 Meters	PRO-ICABLE-9	7	Communication connection between two (2) Power Packs
Interface Cable Custom	PRO-ICABLE-CUSTOM	7	Communication connection between two (2) Power Packs
Expansion Power Enclosure	PRO-EXPAND	8	Provides power for up to eight (8) additional power modules
Expansion Power Enclosure Cable	PRO-EXPAND-CABLE	9	Replacement cable for power cable supplied with Expansion Kit

Accessories:

Anti-Rotation Pins

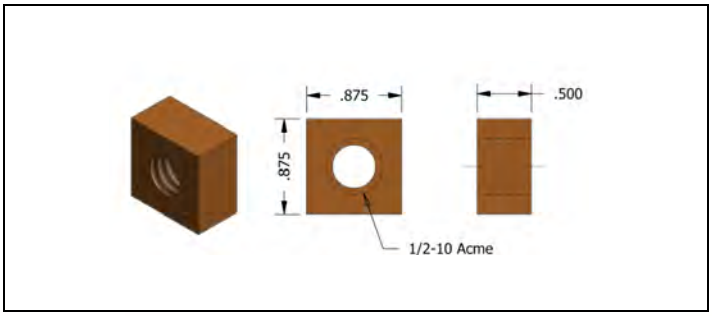
Part Name	Part Number	Drawing Reference	Description
Anti-Rotation Pin .266 ID x 0.875	PRO-P4X0.875	11	.266 inch ID Anti-Rotation Pin (Counter Bore) x 0.875 Long
Anti-Rotation Pin .266 ID x 1.187	PRO-P4X1.187	11	.266 inch ID Anti-Rotation Pin (Counter Bore) x 1.187 Long
Anti-Rotation Pin .266 ID x 1.375	PRO-P4X1.375	11	.266 inch ID Anti-Rotation Pin (Counter Bore) x 1.375 Long
Anti-Rotation Pin .266 ID x 1.687	PRO-P4X1.687	11	.266 inch ID Anti-Rotation Pin (Counter Bore) x 1.687 Long

ProAdjust Catalog Components

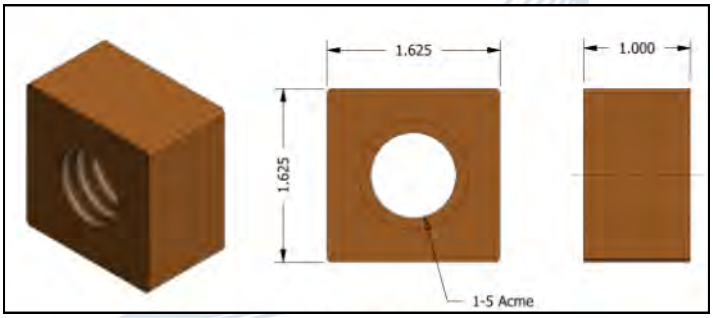
Part Name	Part Number	Drawing Reference	.328 inch ID Anti-Rotation Pin (Through Hole)
Anti-Rotation Pin .328 ID x 0.875	PRO-P5X0.875	11	.328 inch ID Anti-Rotation Pin (Counter Bore) x 0.875 Long
Anti-Rotation Pin .328 ID x 1.187	PRO-P5X1.187	11	.328 inch ID Anti-Rotation Pin (Counter Bore) x 1.187 Long
Anti-Rotation Pin .328 ID x 1.375	PRO-P5X1.375	11	.328 inch ID Anti-Rotation Pin (Counter Bore) x 1.375 Long
Anti-Rotation Pin .328 ID x 1.687	PRO-P5X1.687	11	.328 inch ID Anti-Rotation Pin (Counter Bore) x 1.687 Long
	PRO-P6X(L)		**.391 inch ID Anti-Rotation Pin (Through Hole)**
Anti-Rotation Pin .391 ID x 0.500	PRO-P6X0.500	11	.391 inch ID Anti-Rotation Pin (Counter Bore) x 0.500 Long
Anti-Rotation Pin .391 ID x 0.875	PRO-P6X0.875	11	.391 inch ID Anti-Rotation Pin (Counter Bore) x 0.875 Long
Anti-Rotation Pin .391 ID x 1.125	PRO-P6X1.125	11	.391 inch ID Anti-Rotation Pin (Counter Bore) x 1.125 Long
Anti-Rotation Pin .391 ID x 1.187	PRO-P6X1.187	11	.391 inch ID Anti-Rotation Pin (Counter Bore) x 1.187 Long
Anti-Rotation Pin .391 ID x 1.625	PRO-P6X1.625	11	.391 inch ID Anti-Rotation Pin (Counter Bore) x 1.625 Long
Anti-Rotation Pin .391 ID x 1.687	PRO-P6X1.687	11	.391 inch ID Anti-Rotation Pin (Counter Bore) x 1.687 Long

Acme Shafts and Nuts Nylon			
½”- 10 Acme	404-0810	n/a	6ft Section of ACME Shaft
1”-5 Acme	404-1605	n/a	6ft Section of ACME Shaft
½”-10 Acme	PRO-N10101	n/a	.875 Square x .500 Thick ACME Nut
1”-5 Acme	PRO-N10102	n/a	1.625 Square x 1.000 Thick ACME Nut

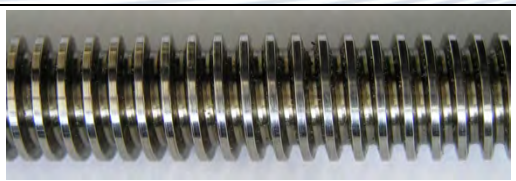
PRO-N10101



PRO-N10102



404-0810



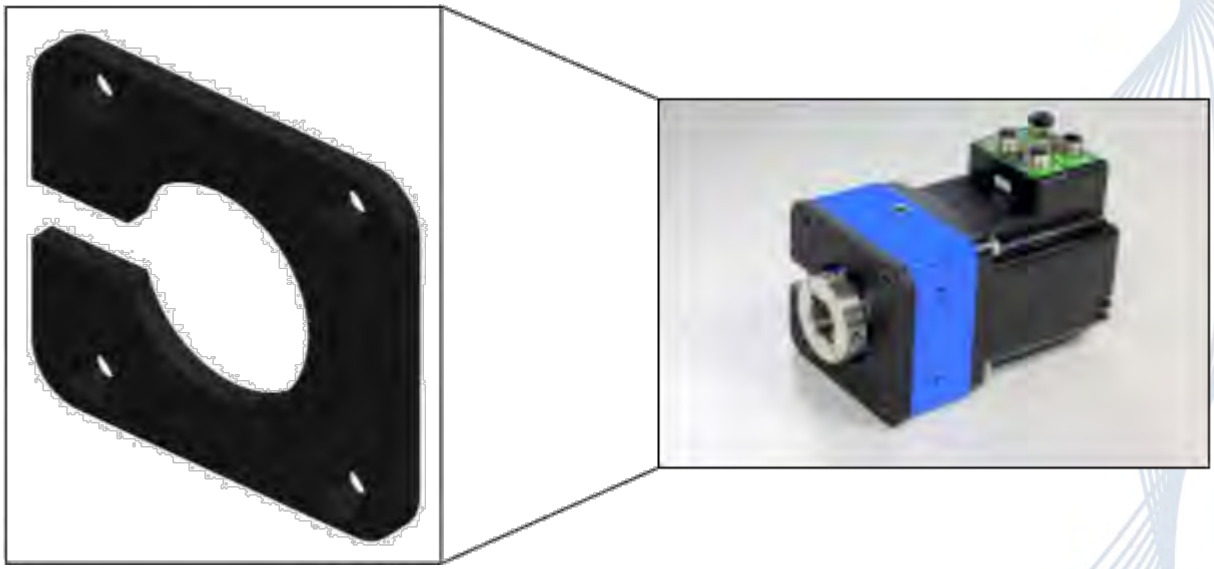
404-1650

ProAdjust Catalog Components

Other Accessories			
Part Name	**Part Number**	**Drawing Reference**	**Description**
Shaft Mount Adapter (For D01 only)	PRO-D11103	n/a	Adapt the D01 drive to shaft supported. Provides slot for anti-rotation pin (For PRO-D01 Only)
Speed Adjust Handle	PRO-SPWRENCH	12	Allows for quick manual adjustment of a ProAdjust Drive

Shaft Mount Adapter (For D01 Only)

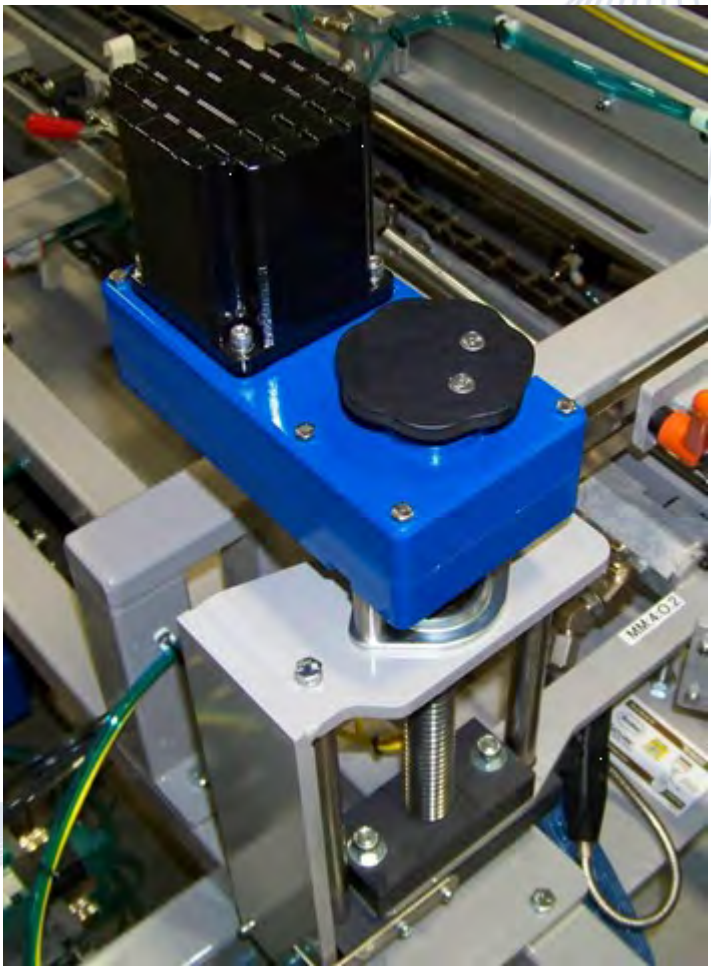
The Shaft Mount Adapter is used to convert the Drive Power Pack from a fixed side mount, to a shaft mount configuration.



6.3.1 Warranty

All equipment of the Seller's manufacture is guaranteed against defective materials and workmanship for a period of three (3) year commencing at date of shipment. The Seller shall be released of all obligations under its warranty in the event the machine, as it was sold, has been subject to neglect, improper storage, accident, misuse or improper operation, or if repairs or modifications are made by persons other than the Seller unless such repairs are made with the Seller's prior consent. Seller agrees to replace or repair, free of charge (excluding labor charges), EXW Seller's plant, any part or parts which fail within said period, provided that any such defect occurs under normal operating conditions and provided further that there has been proper maintenance of the machine by Buyer.

Note: For detailed warranty information, please refer to the ProAdjust Terms and Conditions of Sale that was included with the purchase of your ProAdjust System.



ProAdjust Installation Data Collection Sheet **Job #_____**

Axis #	Axis Name	Retract Group	Adjust Group	Machine Section	Required Torque in -lb	PowerPack Type (D01,D03,D07 , Other)	Power Cable Length meter	Interface Cable Length meter

Power Distribution:

Box 1 Cable length: Axis attached:
Box 2 Cable length: Axis attached:
Box 3 Cable length: Axis attached:
Box 4 Cable length: Axis attached:
Box 5 Cable length: Axis attached:

ProAdjust®

Innovative Adjustment Solutions

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Phone (315)-676-2731