Servo Drive and Controller

Installation, Operation, Maintenance, and Parts Manual

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851-732 Rev. B

Table of Contents

Introduction

⚠ CAUTION

Some illustrations may show guards removed. DO NOT operate equipment without guards.

Upon receipt of shipment:

- Compare shipment with packing slip. Contact factory regarding discrepancies.
- Inspect packages for shipping damage. Contact carrier regarding damage.
- Accessories may be shipped loose. See accessory instructions for installation.

The Dorner Limited Warranty applies.

Dorner has convenient, pre-configured kits of Key Service Parts for all conveyor products. These time saving kits are easy to order, designed for fast installation, and guarantee you will have what you need when you need it. Key Parts and Kits are marked in the Service Parts section of this manual with the Performance Parts Kits logo.

Dorner reserves the right to make changes at any time without notice or obligation.

⚠ WARNING

The safety alert symbol, black triangle with white exclamation, is used to alert you to potential personal injury hazards.

⚠ DANGER

SEVERE HAZARD!

KEEP OFF CONVEYORS. Climbing, sitting, walking or riding on conveyor will cause severe injury.

⚠ DANGER

EXPLOSION HAZARD!

- DO NOT OPERATE CONVEYORS IN AN EXPLOSIVE ENVIRONMENT. The electric gearmotor generates heat and could ignite combustible vapors.
- Failure to comply will result in death or serious injury.

⚠ WARNING

Controller must be properly grounded. Failure to properly ground controller may cause injury to personnel.

⚠ DANGER

SEVERE HAZARD!

Hazardous voltage will cause severe injury or death. LOCKOUT POWER BEFORE WIRING.

⚠ WARNING

SEVERE HAZARD!

Exposed moving parts can cause severe injury. DO NOT ATTEMPT ADJUSTMENTS WITH CONVEYOR RUNNING. LOCK OUT POWER before removing guards or performing maintenance.

⚠ WARNING

SEVERE HAZARD!

- Dorner cannot control the physical installation and application of conveyors. Taking protective measures is the responsibility of the user.
- When conveyors are used in conjunction with other equipment or as part of a multiple conveyor system, CHECK FOR POTENTIAL PINCH POINTS and other mechanical hazards before system start-up.
- Failure to comply could result in serious injury.

⚠ DANGER

ELECTRICAL HAZARD!

LOCK OUT POWER BEFORE WIRING. Exposure to high voltage current can cause death or serious injury.

⚠ WARNING

Moving parts can cut or crush. Keep hands clear. INSTALL GUARDING PRIOR TO OPERATION.

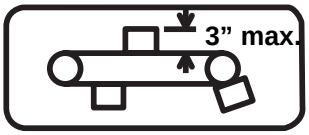
⚠

Due to the wide variety of set ups and applications, point of installation guarding is the responsibility of the end user.

⚠ WARNING

Moving parts can cut or crush.

DO NOT exceed 3” high fixtures.



Product Description

Controller Description

The “stand-alone” model is designed to be used with Dorner’s accessories (push buttons, sensors). The controller is fully assembled and functional – no internal wiring is necessary Figure 1.

Typical Components:

1	Programming Port
2	Main Power Disconnect Switch
3	Power ON Light
4	Power Cord
5	Feedback Cord
6	Motor Power Cord
7	PL1 Input
8	PL2 Input
9	PL3 Input
10	PL4 Input

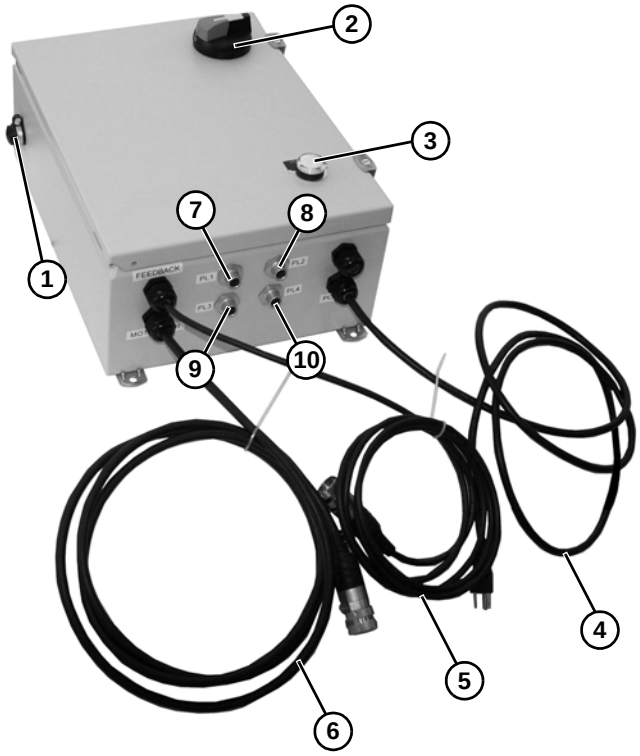


Figure 1

Conveyor Description

Refer to Figure 2 for typical components.

Typical Components:

1	Conveyor
2	Gearmotor Mounting Package
3	Gearmotor
4	Guiding & Accessories
5	Mounting Brackets
6	Return Rollers
7	Support Stand
8	Drive End
9	Idler/Tension End

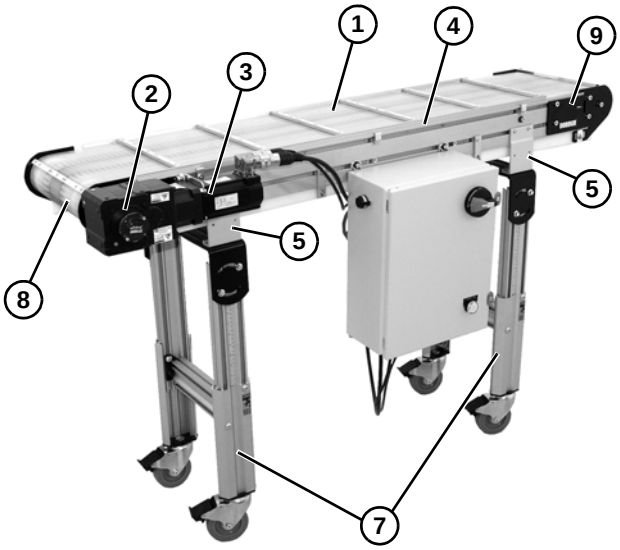


Figure 2

Controller

Model	115V Stand Alone	115V External Control	230V Stand Alone	230V External Control
Part Number	75M-S1-11-3	75M-S2-11-3	75M-S1-21-3	75M-S2-21-3
Input Volts	115	115	230	230
Input Phase	1	1	1	1
Input Hz	60	60	60	60
Continuous Amps Out	3	3	3	3
Peak Amps Out	9	9	9	9
Continuous Watts	1100	1100	1100	1100

Power Requirements

All below at 50/60 Hz:

Model No.	Dorner Servo Drive P/N	Kollmorgen Servo Drive P/N	Input Volts	Input Amps
75M-S1-11-3	826-622	AKD-P00306-NAAN-0000	115	12
75M-S2-11-3				
75M-S1-21-3	826-622	AKD-P00306-NAAN-0000	230	5
75M-S2-21-3				

Gearmotor Compatibility

Dorner Series	Dorner Part No.	Ratio	Rated Torque (in-lb)	Rated RPM @115V	Rated RPM @230V	Motor Manufacturer
2200	22M004PR2B1KW	4:1	79	115	500	Kollmorgren AKM Series
3200	32M008HR2B1KW	8:1	130	187	312	Kollmorgren AKM Series

Installation

Required Tools

- Hex key wrenches:
  4 mm, 5 mm
- Wrenches 8 mm, 10 mm
- Flat-blade screwdriver
- Torque wrench

Controller Mounting

⚠ DANGER

SEVERE HAZARD!

Hazardous voltage will cause severe injury or death. LOCKOUT POWER BEFORE WIRING.

1. Attach controller **(Figure 3, item 1)** to conveyor with two drop-in tee bars **(Figure 3, item 2)** and capscrews **(Figure 3, item 3)**.

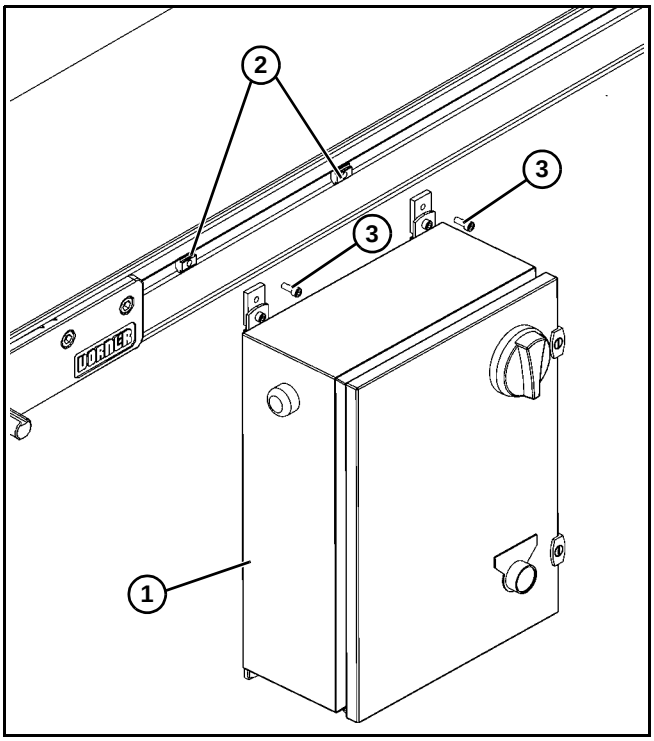


Figure 3

2200 Series Bottom Flush Mount Servo Drive

⚠ WARNING

Exposed moving parts can cause severe injury.

LOCK OUT POWER before removing guards or performing maintenance.

1. Remove two M6 screws **(Figure 4, item 1)** from output shaft side of conveyor.

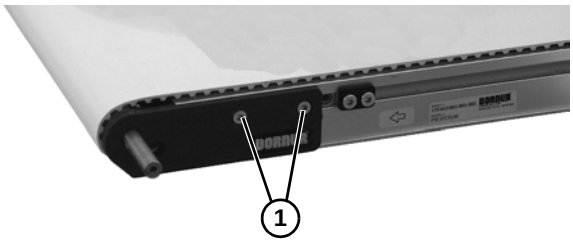


Figure 4

NOTE

You can attach mount assembly either:

- *Flush - using two top holes **(Figure 5, item 1)**, with shaft **(Figure 5, item 2)** in top hole **(Figure 5, item 3)** and low head capscrew **(Figure 5, item 4)** in hole **(Figure 5, item 5)**.*
- *Turned 10° for bottom mount orientation using lower two holes **(Figure 5, item 6)** with shaft **(Figure 5, item 2)** in bottom hole **(Figure 5, item 7)** and low head capscrew **(Figure 5, item 4)** in hole **(Figure 5, item 8).***

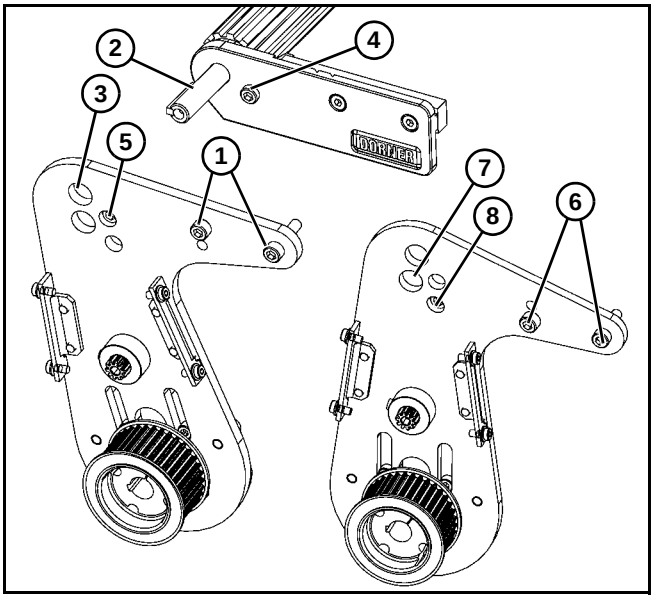
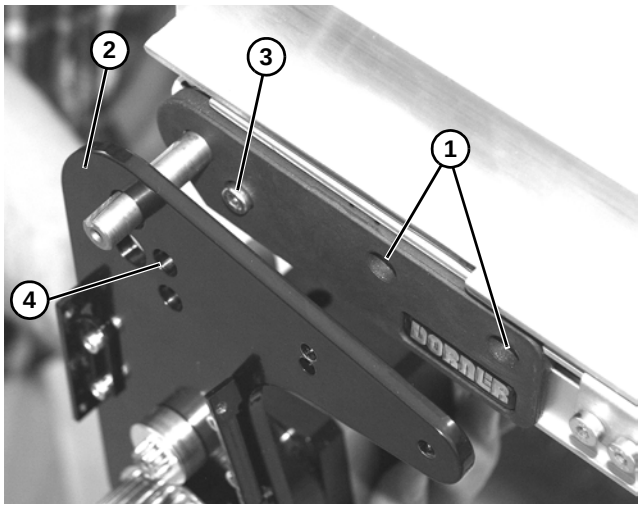


Figure 5

2. Attach servo and mount assembly **(Figure 6, item 2)** to side of conveyor, with bolt head **(Figure 6, item 3)** inside of hole **(Figure 6, item 4)**.



Flush mount shown

Figure 6

3. Secure servo and mount assembly **(Figure 7, item 1)** onto conveyor with two M6 screws **(Figure 7, item 2)**. Tighten M6 screws to 60 in-lb (7 Nm).

⚠ WARNING

Drive shaft keyway may be sharp.
HANDLE WITH CARE.

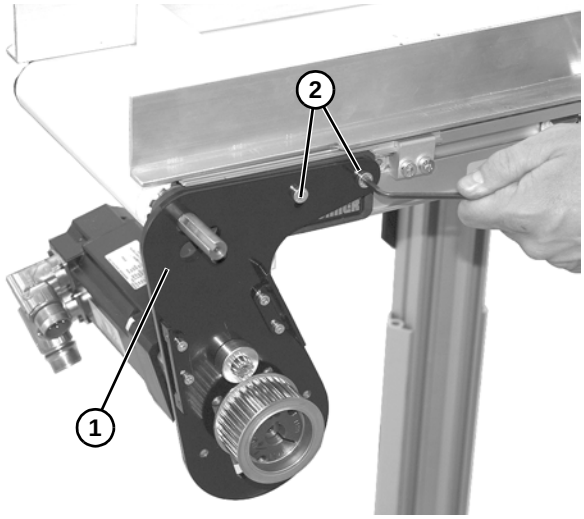


Figure 7

4. Install key **(Figure 8, item 1)**.

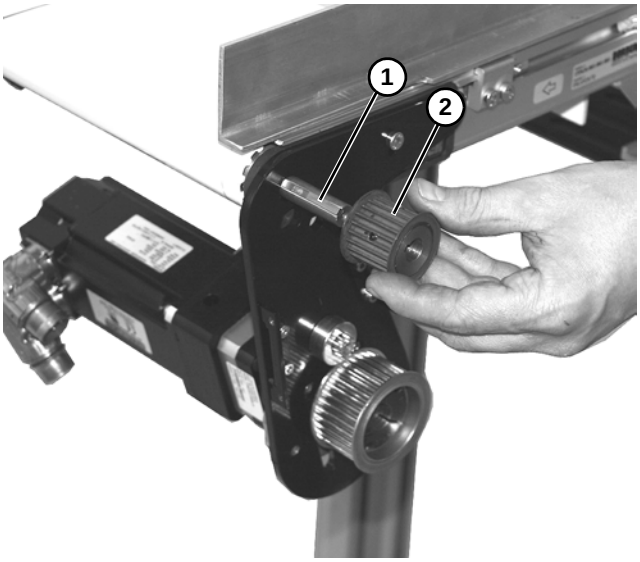


Figure 8

5. Install driven pulley **(Figure 8, item 2)** onto shaft.

6. Using a straight-edge, be certain that driven pulley is flush with drive pulley **(Figure 9, item 1)**. Tighten two set screws **(Figure 9, item 2)** onto shaft.

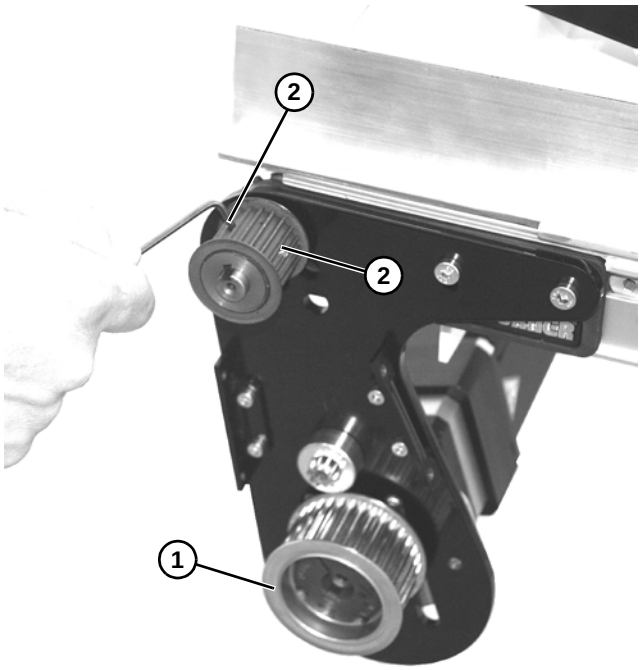


Figure 9

7. Install belt **(Figure 10, item 1)** onto drive pulley **(Figure 10, item 2)** and driven pulley **(Figure 10, item 3)**.

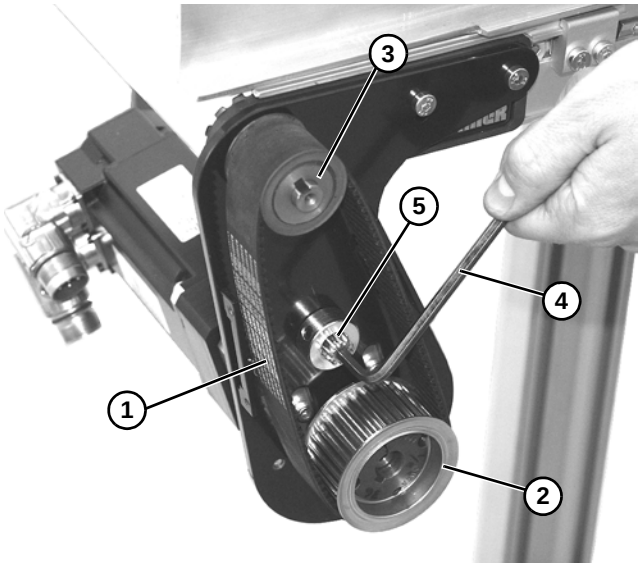


Figure 10

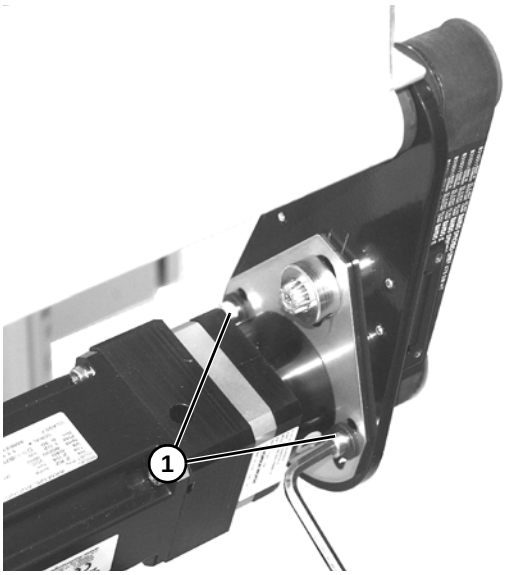


Figure 11

8. Loosen two M8 screws **(Figure 11, item 1)**.
9. Use a hex wrench **(Figure 10, item 4)** to turn tensioner adjustment fitting **(Figure 10, item 5)** to tighten belt.
10. Tighten two M8 screws **(Figure 11, item 1)** to secure belt position.
11. Install cover **(Figure 12, item 1)** with four M6 screws **(Figure 12, item 2).**

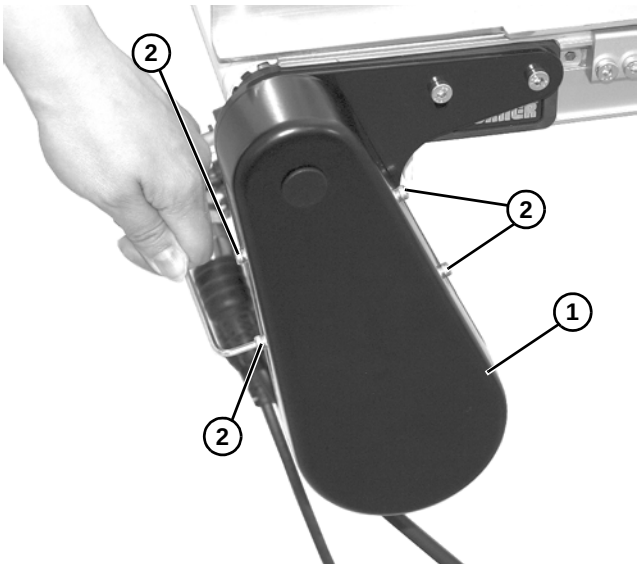


Figure 12

3200 Series Side Mount Servo Drive

⚠ WARNING

Exposed moving parts can cause severe injury.

LOCK OUT POWER before removing guards or performing maintenance.

1. Remove bottom M8 screw **(Figure 13, item 1)** from side of conveyor.

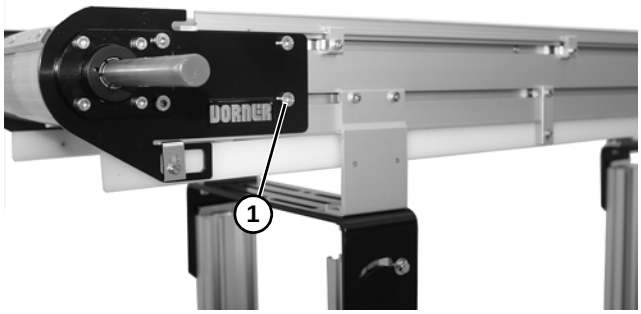


Figure 13

2. Install anti-rotation adjustable rod **(Figure 14, item 1)** onto conveyor with tube spacer **(Figure 14, item 2)** and M8 low head screw **(Figure 14, item 3)**.

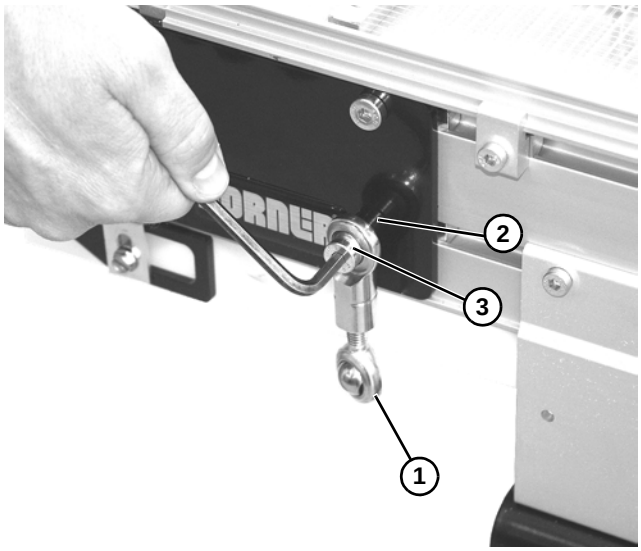


Figure 14

3. Install two spacer plates* **(Figure 15, item 1)** with four M6 hex head screws **(Figure 15, item 1)**.

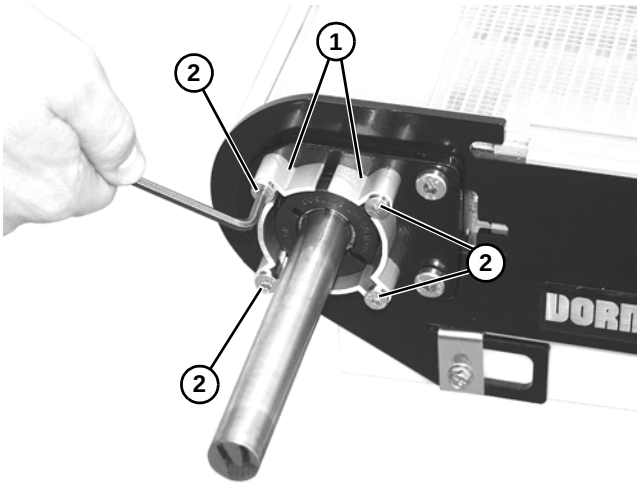


Figure 15

NOTE

**Applicable for old style 3200 Series Conveyors only. New 3200 version 2 Conveyors do not require spacers.*

4. Attach servo assembly **(Figure 16, item 1)** onto shaft **(Figure 16, item 2)**.

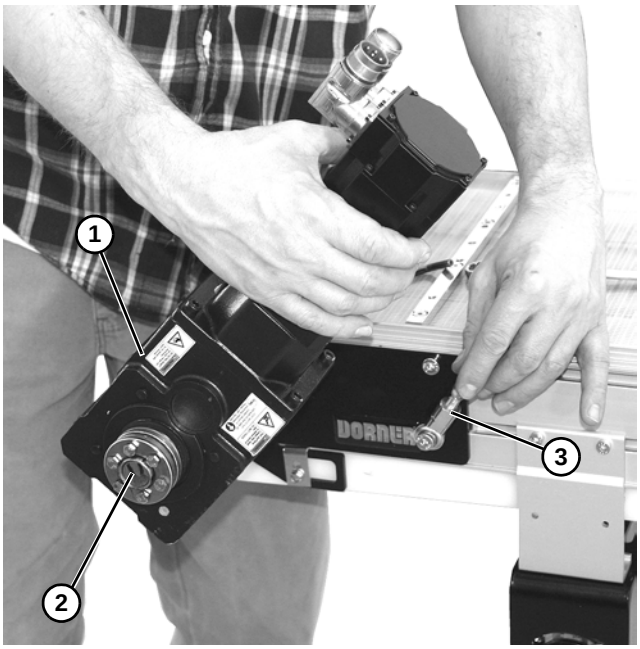


Figure 16

5. Raise servo motor and rotate anti-rotation adjustable rod **(Figure 16, item 3)** fully upward, and then lower servo assembly.

6. Secure top of anti-rotation adjustable rod **(Figure 17, item 1)** onto bracket **(Figure 17, item 2)** on servo motor assembly with socket head bolt **(Figure 17, item 3)**.

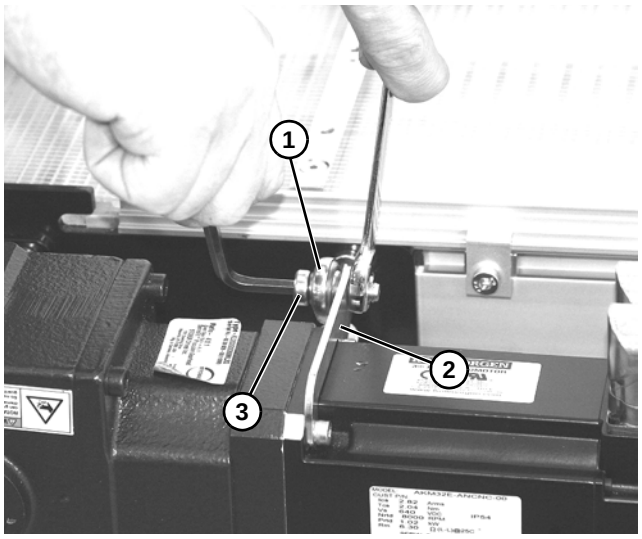


Figure 17

7. Tighten six hex head screws **(Figure 18, item 1)** to secure assembly onto shaft.

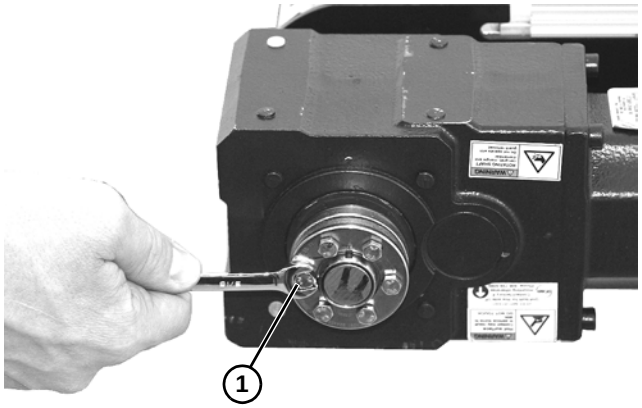


Figure 18

8. Install cover.

Wiring

⚠ DANGER

Hazardous voltage will cause severe injury or death.

LOCKOUT POWER BEFORE wiring.

⚠ WARNING

Exposed moving parts can cause severe injury.

LOCK OUT POWER before removing guards or performing maintenance.

⚠ WARNING

Controller must be properly grounded. Failure to properly ground control box may cause injury to personnel.

NOTE

For electrical wiring or troubleshooting, refer to information provided by controller manufacturer.

1. Make the input power connections through the line connection cord grip. Refer to the manufacturer's manual for terminations inside the VFD controller.

Setting Up Your Application

To properly set up your servo controller for your conveyor, follow procedures below.

1. Determine Your Application Parameters and Hardware Required

(See "1. Determining your Application Parameters and Hardware Required" on page 12.)

I. Incremental Index
II. Incremental Index – Auto Cycling
III. Absolute Index
IV. Registration Index
V. Electronic Gearing
VI. Jog/Continuous Run
VII. Multi-Task Select

2. Wiring Options

(See "2. Wiring Options" on page 22.)

I. Stand Alone Controller, 75M-S1-x1-3
II. Externally-Controlled, 75M-S2-x1-3
III. Sensors

3. Establish Communications with the Drive

(See "3. Establish Communications with the Drive" on page 32.)

I. Configure the drive for the type of IP addressing
II. Connect the Drive to the Programming PC
III. Configure the IP settings in the Programming PC
IV. Check the PC's Taskbar

4. Run the Workbench Software

(See "4. Run the Workbench Software" on page 35.)

I. Load the Workbench software onto the PC
II. Power up the controller
III. Connect to the drive
IV. Configure the Parameters

5. Establishing Your Home Method

(See "5. Establishing your Homing Methods" on page 43".)

I. Homing Methods
II. Programming the Homing Method

6. Setting Digital Inputs and Outputs

(See "6. Setting Digital Inputs and Outputs" on page 46.)

7. Loading Your Motion Profile

(See "7. Loading your Motion Profile" on page 47.)

I. Load Pre-Configured Tasks
II. Customize Tasks/Start New

8. Tuning the Gearmotor/Drive

(See "8. Tuning the Gearmotor/Drive" on page 49.)

9. Running Your Application

(See "9. Running your Application" on page 50.)

10. Save Application File

(See "10. Save Application File" on page 50.)

Operation

1. Determining your Application Parameters and Hardware Required

The Dorner Servo Package can be programmed to move in virtually any application, move or profile. Provided is detailed instructions for typical application moves including:

- I. Incremental Index (See "I. Incremental Index" on page 12.)
- II. Incremental Index – Auto Cycling (See "II. Incremental Index – Auto Cycling" on page 13.)
- III. Absolute Index (See "III. Absolute Index" on page 15.)
- IV. Registration Index (See "IV. Registration Index" on page 16.)
- V. Electronic Gearing (See "V. Electronic Gearing" on page 18.)
- VI. Jog/Continuous Run (See "VI. Jog/Continuous Run" on page 20.)
- VII. Multi-Task Select (See "VII. Multi-Task Select" on page 21.)

For most applications, you will need to calculate/determine the following information. Noting them in the space provided will aide in programming the drive. If assistance is needed in determining this parameter, contact factory.

Motion Type		
Move Distance		inches
Move Speed		inches/second
Acceleration		inches/second^2
Deceleration		inches/second^2

NOTE

The following motion profile examples include detail on parameter and I/O settings. This data will be required in later steps.

I. Incremental Index

Description

In this mode, a conveyor is commanded to move a fixed distance. A switch initiates the move.

Terms/Definitions

Index distance: Distance conveyor travels from start to stop

Required Inputs

Device	Connection	
	Stand-Alone Option	Externally-Controlled Option
Initiate Index Switch	PL2	terminal block - IN3

Special Parameter Settings

Home

(See "II. Programming the Homing Method" on page 45.)

Digital I/O

Digital Input	Mode	Param	Polarity
DIN 3	2 - Start Motion Task	0	Act. High

Motion Tasks:

•Task Number = 0

•Profile = Trapezoidal

•Type = Relative to previous target position

•Position = Index distance

•Velocity = Speed conveyor travels at

•Acceleration = rate conveyor gets up to speed

•Deceleration = rate conveyor slows down

Operation

•Reset Emergency Stop (STO) circuit

•Enable drive

•Apply “Initiate Index” signal to begin indexing.

-Conveyor executes Motion Task

II. Incremental Index – Auto Cycling

Description

In this mode, a conveyor repeatedly moves a fixed distance with programmable dwell. The process starts automatically after the initiate switch is pressed.

Terms/Definitions

Index distance: Distance conveyor travels from start to stop

Cycle: Total time On + Time Dwell

Required Inputs

Device	Connection	
	Stand-Alone Option	Externally-Controlled Option
Initiate Index Switch	PL2	terminal block - IN3

Required Parameter Settings

Home

(See “II. Programming the Homing Method” on page 45.)

Digital I/O

Digital Input	Mode	Param	Polarity
DIN 3	2 - Start Motion Task	0	Act. High

Motion Tasks:

Cycle indexing requires two tasks:

- Motion Task 0 = Initiated by switch
- Motion Task 1 = Initiated by completion of Task 0

Motion Task 0

- Profile = Trapezoidal
- Type = Relative to previous target position
- Position = Index distance
- Velocity = Speed conveyor travels at
- Acceleration = rate conveyor gets up to speed
- Deceleration = rate conveyor slows down
- Following Task = 1
- Start Condition (checked) = Dwell Delay
- Dwell Time = sec

Motion Task 1

- Profile = Trapezoidal
- Type = Relative to command position
- Position = Index distance
- Velocity = Speed conveyor travels at
- Acceleration = rate conveyor gets up to speed
- Deceleration = rate conveyor slows down
- Following Task = 0
- Start Condition (checked) = Dwell Delay
- Dwell Time = sec

Operation

Reset Emergency Stop (STO) circuit

Enable drive

Apply “Initiate Index” signal to begin indexing

- Conveyor executes Motion Task 0
- At end of Motion Task 0, conveyor executes Motion Task 1
- At end of Motion Task 1, tasks dwell timer executes.
- When dwell time done, conveyor returns to Motion Task 0
- Cycle repeats until conveyor disabled

III. Absolute Index

Description

In this mode, a conveyor is commanded to move to a position relative to its homed position. A switch initiates the move.

Terms/Definitions

Index distance: Distance conveyor travels from home position.

Required Inputs

Device	Connection	
	Stand-Alone Option	Externally-Controlled Option
Initiate Index Switch	PL2	terminal block - IN3

Required Parameter Settings

Home

(See “II. Programming the Homing Method” on page 45.)

Digital I/O

Digital Input	Mode	Param	Polarity
DIN 3	2 - Start Motion Task	0	Act. High

Motion Tasks:

- Task Number = 0
- Profile = Trapezoidal
- Type = Absolute
- Position = (Index Position)
- Velocity = Speed conveyor travels at
- Acceleration = rate conveyor gets up to speed
- Deceleration = rate conveyor slows down

Operation

Reset Emergency Stop (STO) circuit

Enable drive

Home conveyor (see “II. Programming the Homing Method” on page 45).

Apply “Initiate Index” signal to begin indexing. (Conveyor executes Motion Task.)

IV. Registration Index

Description

In this mode, a conveyor is commanded to move until a sensor detects a cleat, fixture, or edge of part. A switch initiates the move.

Terms/Definitions

Index distance: Distance conveyor travels from start to stop

Registration sensor: Sensor used to detect cleat, flight, marker, etc.

Registration distance: Distance conveyor travels after actuating registration sensor

Position capture: Defines the registration event

Required Inputs

Device	Connection	
	Stand-Alone Option	Externally-Controlled Option
Initiate Index Switch	PL2	terminal block - IN3
Registration Sensor	PL4	PL4

Required Parameter Settings

Home

(See “II. Programming the Homing Method” on page 45.)

Digital I/O

Digital Input	Mode	Param	Polarity
DIN 2	2 - Start Motion Task	1	Act. High*
DIN 3	2 - Start Motion Task	0	Act. High*

*See “III. Sensors” on page 31 for photosensor polarity considerations.

NOTE

For Dorner Photo Eye Kits set to Active Low.

Position Capture

Position Capture 0

Capture Mode = 4 - Auto armed position

Capture Parameters

Source = 1 - DIN 2

Edge = Rising Edge*

Pre-Condition

Condition = 0 - Trigger edge

Source = 10 - (don’t care)

Edge = 1 - (don’t care)

Motion Tasks

Registration indexing requires two tasks:

- •Motion Task 0 = Move greater than registration distance
- •Motion Task 1 = Move greater than/equal to decel distance (usually 1/3 index distance)

Motion Task 0

- •Task Number = 0
- •Profile = Trapezoidal
- •Type = Relative to command position
- •Position = enter distance value greater than Index Distance (2x index distance is good starting point)
- •Velocity = Speed conveyor travels at
- •Acceleration = rate conveyor gets up to speed
- •Deceleration = rate conveyor slows down
- •Do NOT check Following Task Box.

Motion Task 1

- •Task Number = 1
- •Profile = Trapezoidal
- •Type = Relative to external position
- •Position = registration distance (enter value greater than decel distance)
- •Velocity = Speed conveyor travels at
- •Acceleration = rate conveyor gets up to speed (enter same value as in Task 0)
- •Deceleration = rate conveyor slows down
- •Under the Registration tab:

Constraints = Interrupt Task

Configure

DINx DIN 2

CAPx CAP0

(click on Apply)

Operation

Reset Emergency Stop (STO) circuit

Enable drive.

Home conveyor (see “II. Programming the Homing Method” on page 45).

Apply “Initiate Index” signal to begin indexing:

- •Conveyor executes Motion Task 0 until Registration Sensor turns on
- •Conveyor then executes Motion Task 1, decelerating to a stop

V. Electronic Gearing

Description

In this mode a conveyor (Slave) follows another conveyor (Master) as though linked with a timing belt. This controller is for the Slave.

Terms/Definitions

Master Conveyor: Conveyor that Slave will follow

Slave Conveyor: Conveyor that is following Master

Master Encoder: Encoder mounted to Master conveyor

Required Inputs

Device	Connection	
	Stand-Alone Option	Externally-Controlled Option
Activate Gearing Switch	N/A	terminal block - IN3
Master Encoder	N/A	connector X9*

*Wiring by user

Special Parameter Settings

Electronic Gearing

- In the toolbar, select **2 – Electronic Gearing (Figure 19, item 1)** and **2 – Position Mode (Figure 19, item 2)**.
- Enter all required info about master encoder.

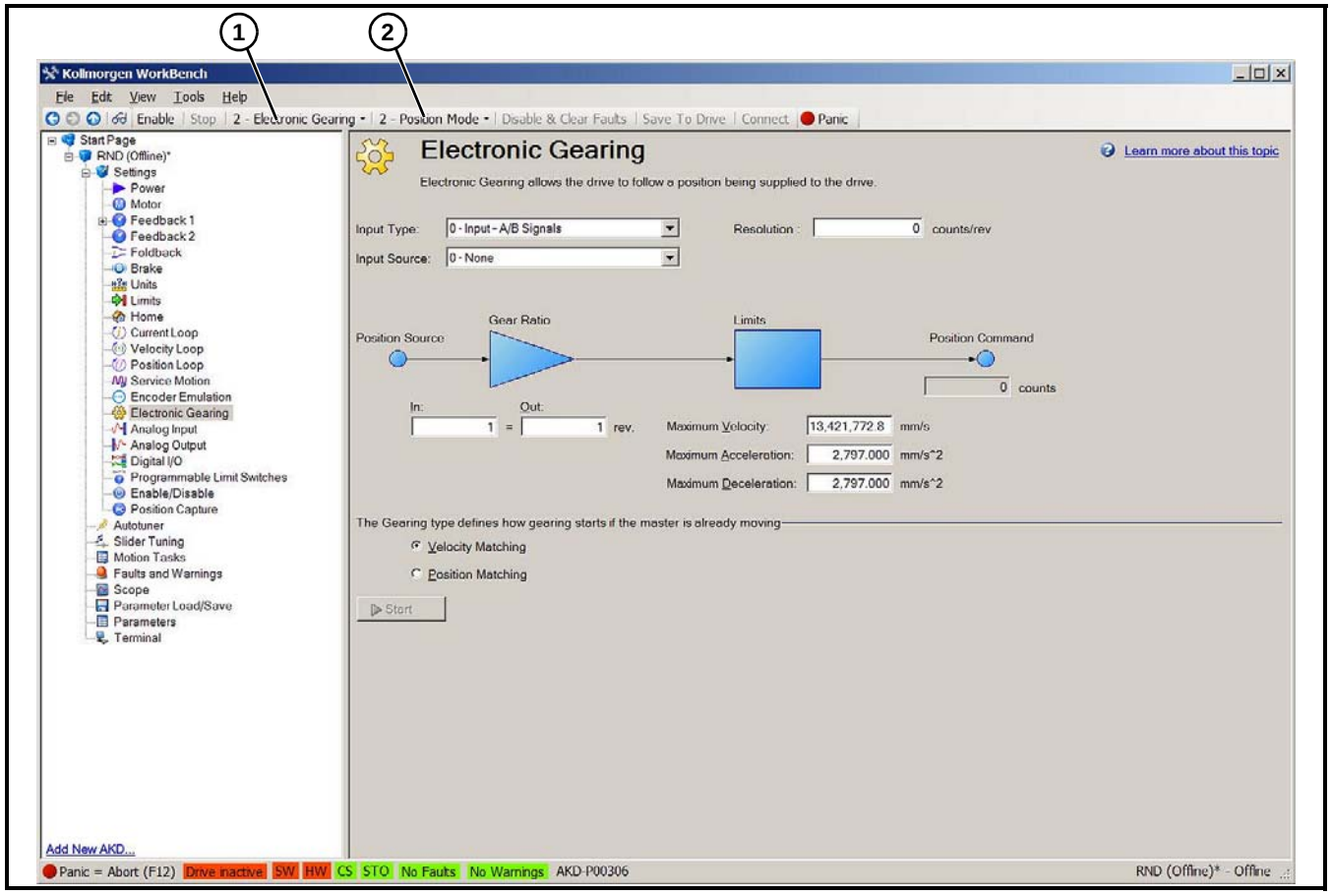


Figure 19

Home

(See “II. Programming the Homing Method” on page 45.)

Digital I/O

Digital Input	Mode	Param	Polarity
DIN 3	16 - Activate Electronic Gearing		Act. High
DIN 4	5 - Start Home		Act. High

Motion Tasks

None required

Operation

Reset Emergency Stop (STO) circuit

Enable drive

Home conveyor (see “II. Programming the Homing Method” on page 45).

Apply “Activate Gearing” signal to begin Electronic Gearing

VI. Jog/Continuous Run

Description

In this mode a conveyor runs as long as the Jog input is on.

Terms/Definitions

Jog: Run continuously with positioning determined by Jog switch on/off.

Required Inputs

Device	Connection	
	Stand-Alone Option	Externally-Controlled Option
Jog Switch	PL2	terminal block - IN3

Required Parameter Settings

Digital I/O

Digital Input	Mode	Param	Polarity
DIN 3	6 - Start Jog	(velocity)	Act. High

Enter the Jog velocity (units/sec) in the Parameter field.

Motion Tasks

None required

Operation

Reset Emergency Stop (STO) circuit

Enable drive

Home conveyor (see “II. Programming the Homing Method” on page 45).

- Homing is not required to jog

Apply “Jog” signal to start conveyor

- Conveyor runs as long as signal is on

VII. Multi-Task Select

Description

In this mode multiple tasks (moves) can be selected.

Terms/Definitions

Multi-Task: Multiple tasks selected via three binary-coded inputs.

Required Inputs

Device	Connection	
	Stand-Alone Option	Externally-Controlled Option
Start Task Switch	N/A	terminal block - IN3
Binary Select 1 Switch	N/A	terminal block - IN4
Binary Select 2 Switch	N/A	terminal block - IN5
Binary Select 4 Switch	N/A	terminal block - IN6

Required Parameter Settings

Home

(See “II. Programming the Homing Method” on page 45.)

Digital I/O

Digital Input	Mode	Param	Polarity
DIN 3	4 - Motion Task Start Selected		Act. High
DIN 4	3 - Motion Task Select Bit		Act. High
DIN 5	3 - Motion Task Select Bit		Act. High
DIN 6	3 - Motion Task Select Bit		Act. High

Enter the Jog velocity (units/sec) in the Parameter field.

Motion Tasks

NOTE

Motion task parameters to be set per application. See Index types on pages 12 through 17 for details.

Program up to eight different tasks. The input coding is as follows:

Task No.	Digital Input State		
	DIN 4	DIN 5	DIN 6
0	OFF	OFF	OFF
1	OFF	OFF	ON
2	OFF	ON	OFF
3	OFF	ON	ON
4	ON	OFF	OFF
5	ON	OFF	ON
6	ON	ON	OFF
7	ON	ON	ON

Operation

Reset Emergency Stop (STO) circuit

Enable drive

Home conveyor (see “II. Programming the Homing Method” on page 45).

Turn on Input DIN 3 to initiate selected task.

2. Wiring Options

I. Stand Alone Controller, 75M-S1-x1-3

⚠ WARNING

Controller must be properly grounded. Failure to properly ground controller may cause injury to personnel.

⚠ DANGER

SEVERE HAZARD!
Hazardous voltage will cause severe injury or death. LOCKOUT POWER BEFORE WIRING.

Wiring Overview

The following depicts typical wiring for this control panel. Dorner accessories are shown.

NOTE

If no E-Stop is required, Jumper Plug 809-323 must be installed into PL1.

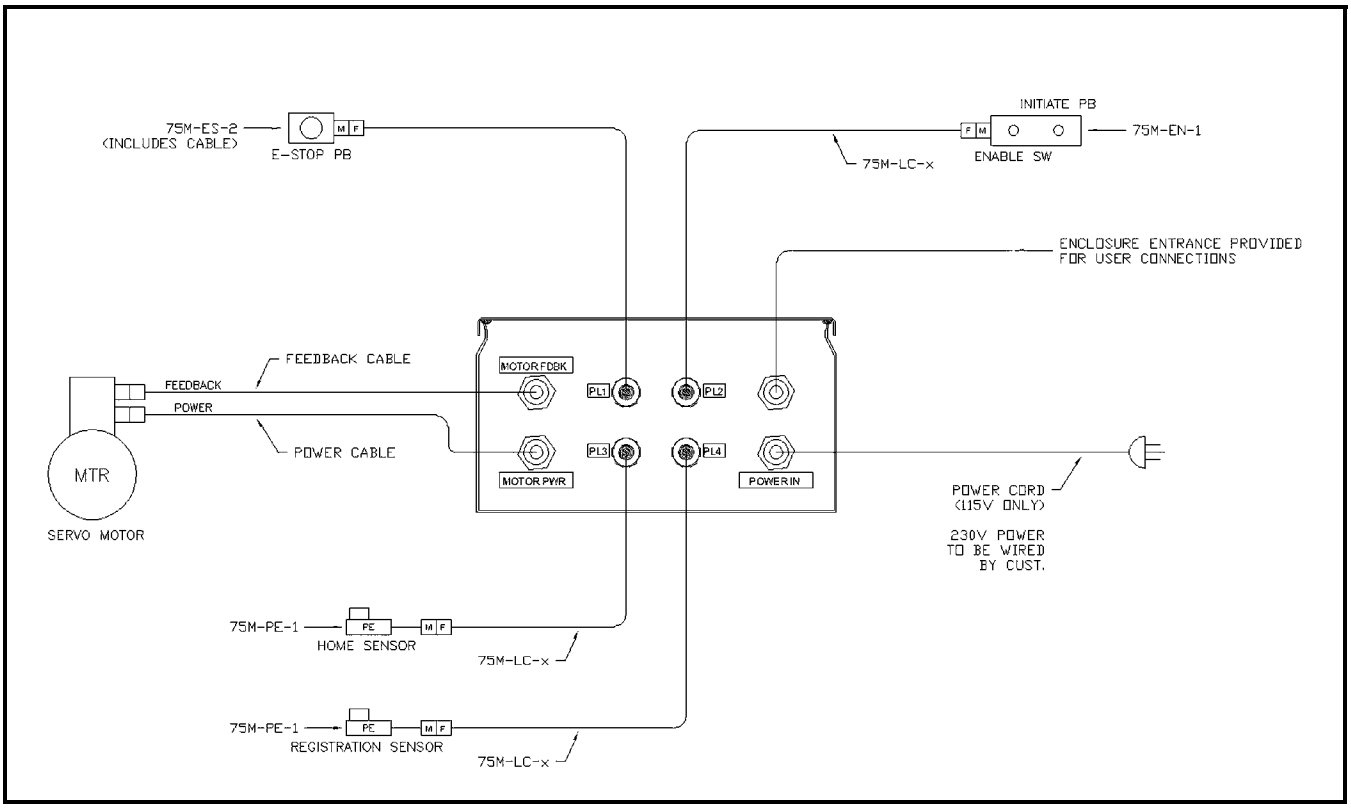


Figure 20

Wiring Steps

1.Connect motor power cable **(Figure 21, item 1)**.

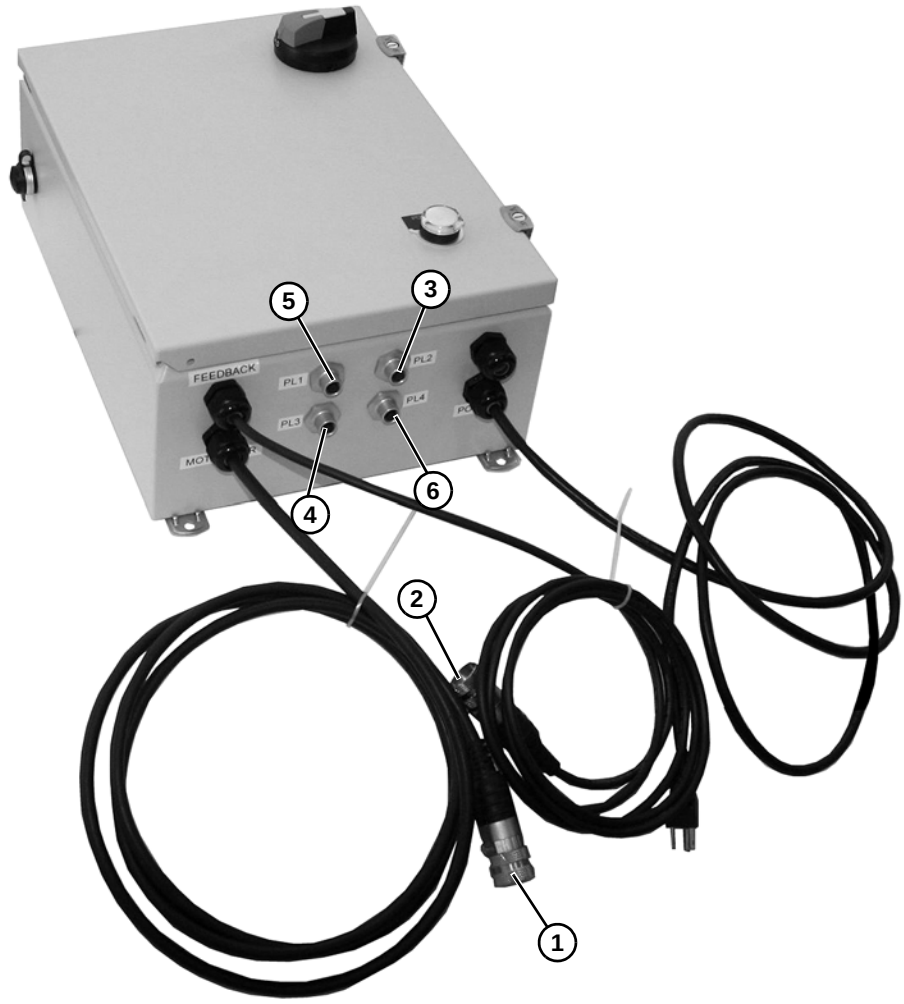


Figure 21

2.Connect motor feedback cable **(Figure 21, item 2)**.

3.Mount Enable Switch with Index Push button station, Dorner P/N **75M-EN-1**.

4.Locate and mount home Photo Eye Kit, Dorner **75M-PE-1**. Connect to PL2 **(Figure 21, item 3)**.

Cable kits for above:

NOTE
If longer cables are needed for kits, order: • *6 feet = Dorner P/N **75M-LC-1*** • *15 feet = Dorner P/N **75M-LC-2***

5.Locate and mount registration photoeye, Dorner PN **75M-PE-1**, or other as required. Connect to PL3 **(Figure 21, item 4)**.

6.If emergency stop is required, mount Dorner Push Button Station **75M-ES-2**, or other as required. Connect to PL1 **(Figure 21, item 5)**. If no emergency stop is used, insert jumper into PL4 **(Figure 21, item 6)**.

7.Do not plug in power cord at this time.

Base Wiring Diagram

This wiring must be completed for all applications/configurations. Minimum connections include input power **(Figure 22, item 1)**, Emergency Stop **(Figure 22, item 2)**, Enable **(Figure 22, item 3)**, and Initiate **(Figure 22, item 4)**.

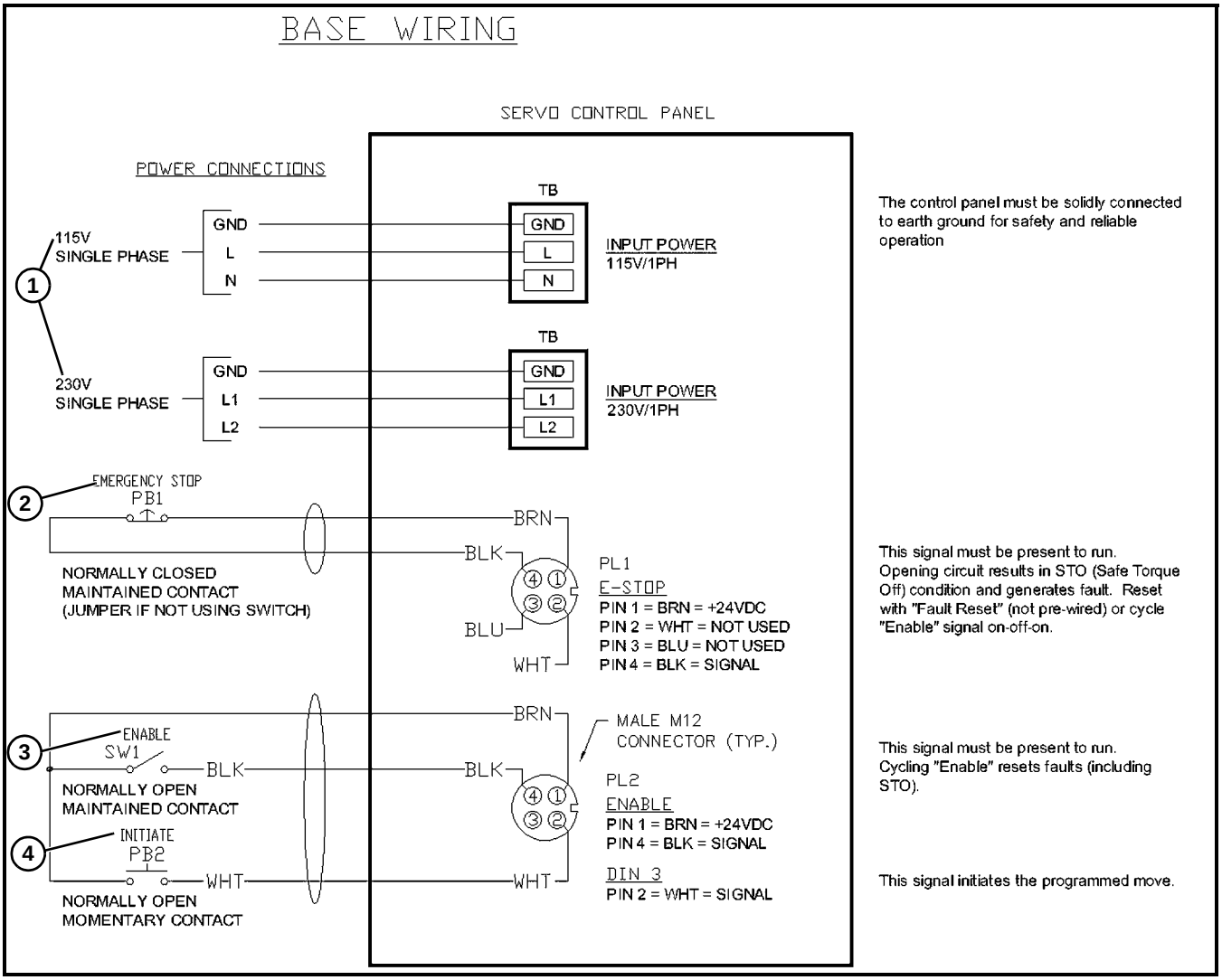


Figure 22

Programmable Output Wiring (If Required)

Outputs are programmable. They may be used to signal the state of the servo drive to another machine, light an indicator, actuate a solenoid, etc. The Dorner default settings are:

- Digital Output 1 (DOUT) turns on when the motion task is complete
- Relay Output (ROUT) turns off when the drive is faulted.

Refer to Kollmorgen user manual for details.

Output Wiring, External Power

Use this diagram to isolate external controller power from Dorner control power. The outputs will be powered from the external controller's power supply.

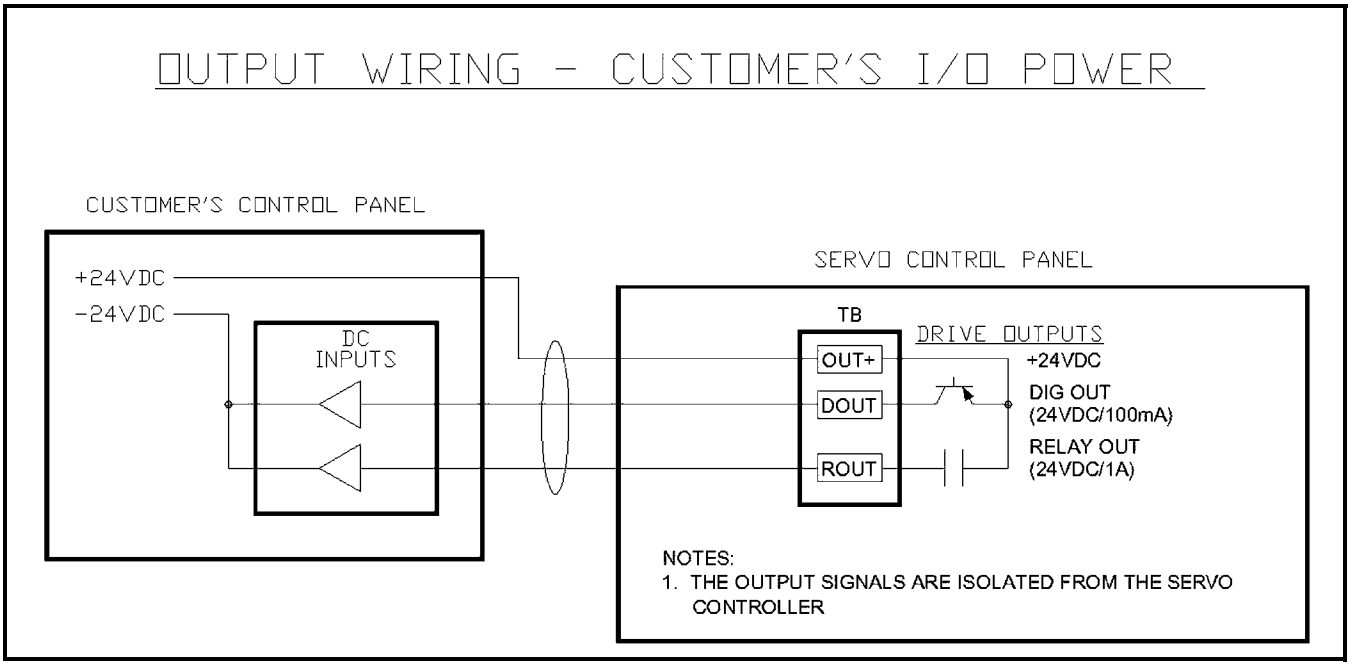


Figure 23

Output Wiring, Internal Power

Use this diagram to isolate Dorner control power from external controller power. The outputs will be powered from the servo controller's power supply.

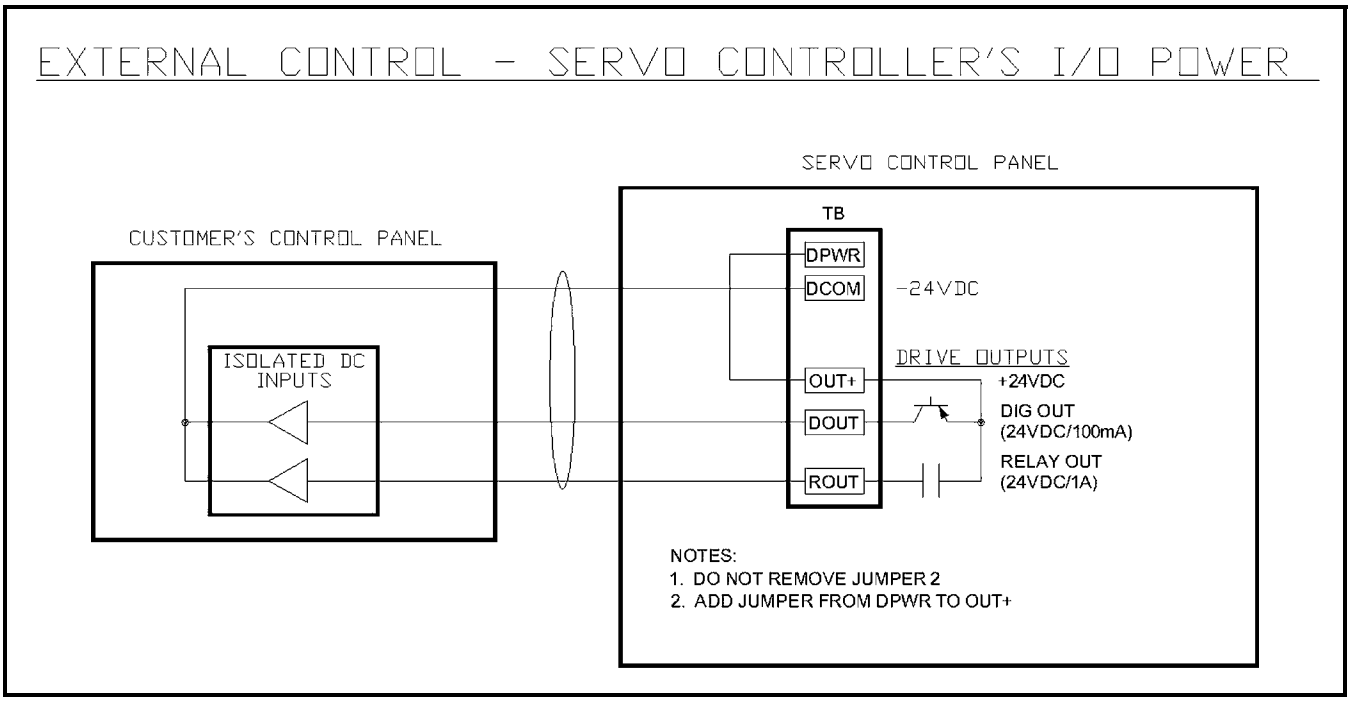


Figure 24

II. Externally-Controlled, 75M-S2-x1-3

⚠ WARNING

Controller must be properly grounded. Failure to properly ground controller may cause injury to personnel.

⚠ DANGER

SEVERE HAZARD!
Hazardous voltage will cause severe injury or death. LOCKOUT POWER BEFORE WIRING.

Follow these diagrams if interfacing Dorner controller to PLC or other customer controls. It is highly recommended that the Home and Registration sensors are wired directly to the servo controller as shown in section "III. Sensors" on page 31. Drive inputs and outputs are pre-wired to the controller's terminal strip. Their function is programmable. Refer to Kollmorgen user manual for details.

Wiring Overview

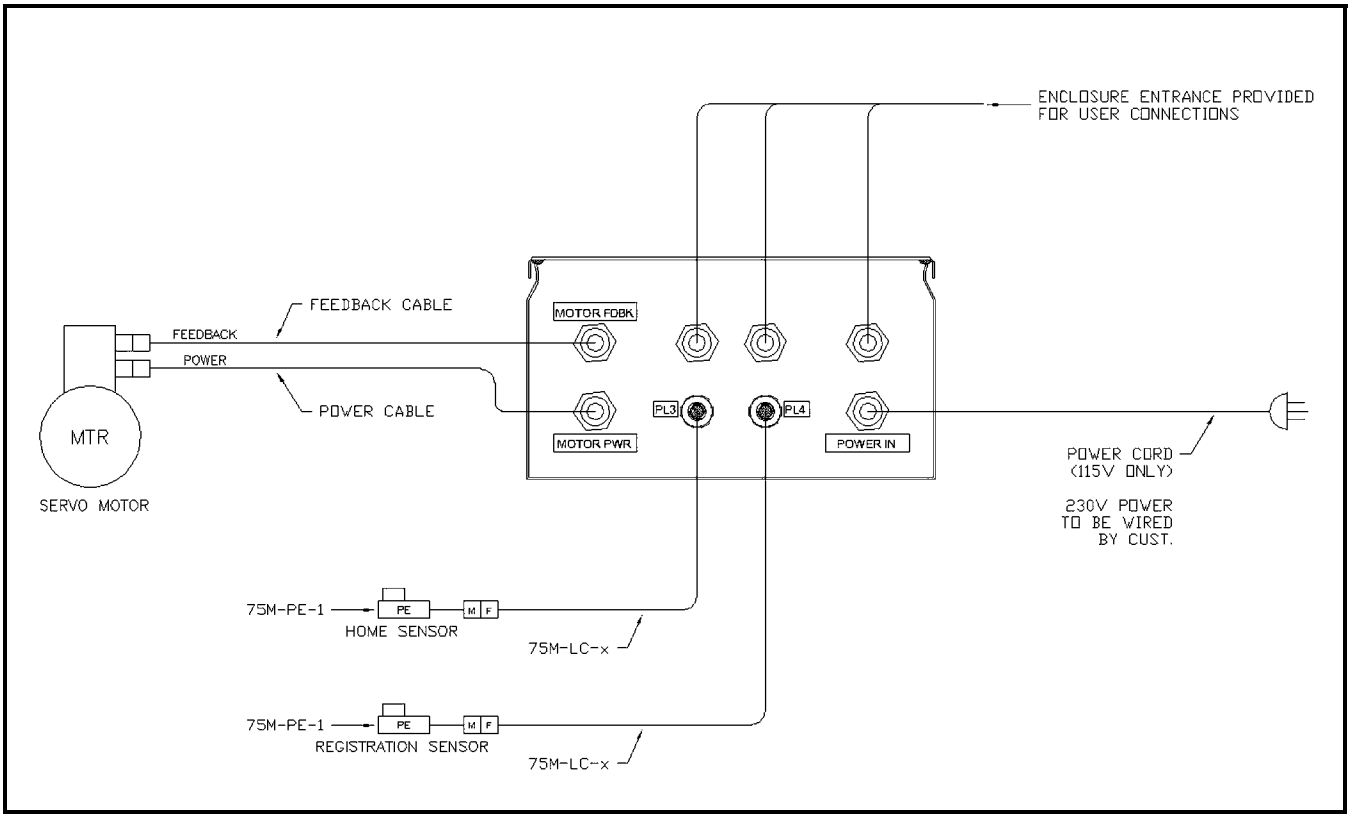


Figure 25

Base Wiring Diagram

This wiring must be completed for all applications/configurations. Minimum connections include input power **(Figure 26, item 1)**, Emergency Stop **(Figure 26, item 2)**, Enable **(Figure 26, item 3)**, and Initiate **(Figure 26, item 4)**.

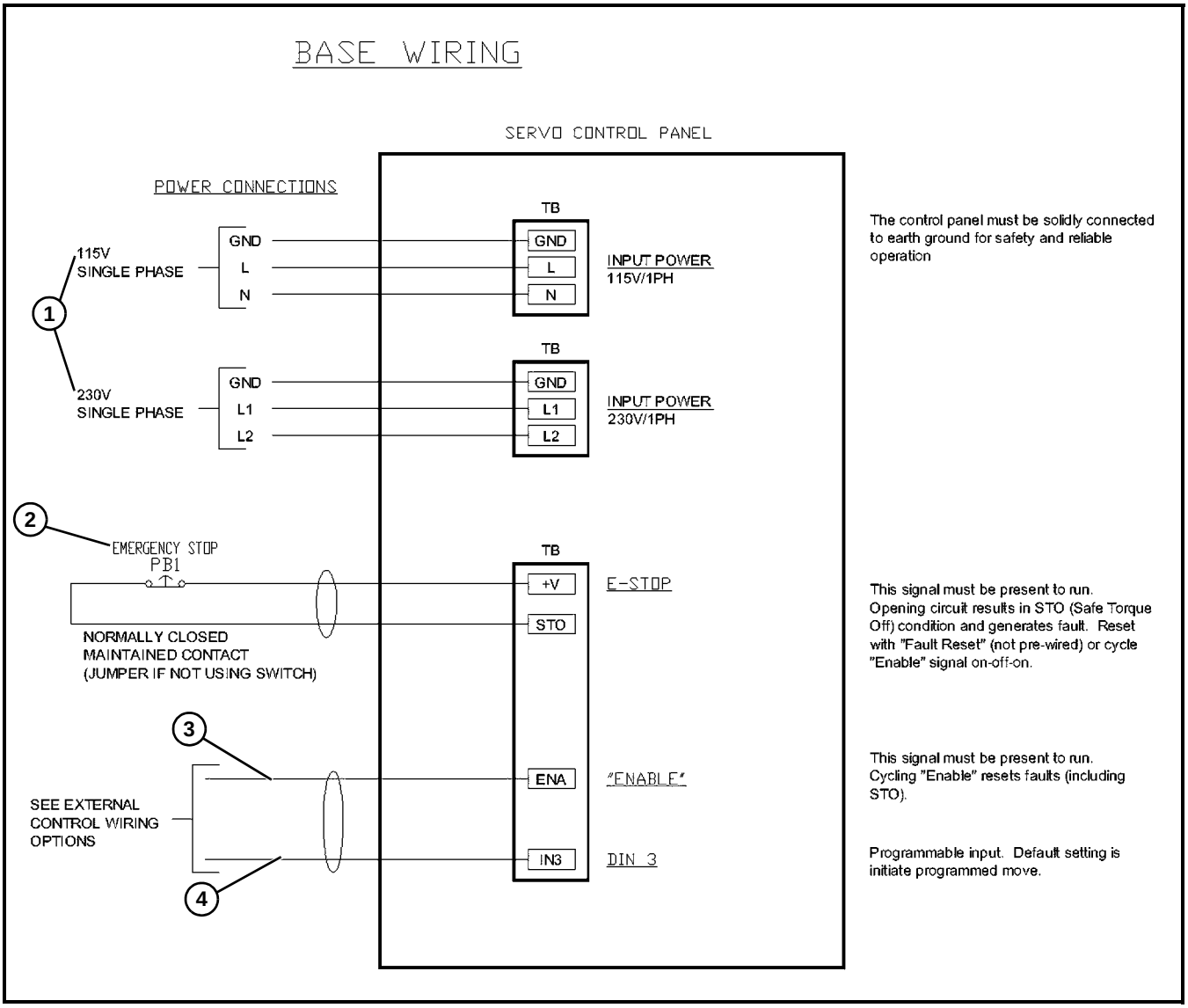


Figure 26

Wiring Steps

1.Connect motion power cable. (See “Wiring Steps” on page 23.)
2.Connect motion feedback cable. (See “Wiring Steps” on page 23.)
3.If using Dorner Home Sensor. (See “Home to Sensor (External Initiate)” on page 44.)
4.If using Dorner Registration Sensor. (See “IV. Registration Index” on page 16.)
5.Connect inputs:

a.If using internal control power for inputs, see “External Control, Internal Power” on page 30.

b.If using external control power for inputs, see “External Control, External Power” on page 28.

External Control, External Power

1.Use this diagram to isolate external controller power from Dorner control power. The Home and Registration sensors (if used) will now also be powered from the external controller's power supply. Connect Home and registration sensors as in section "III. Sensors" on page 31.

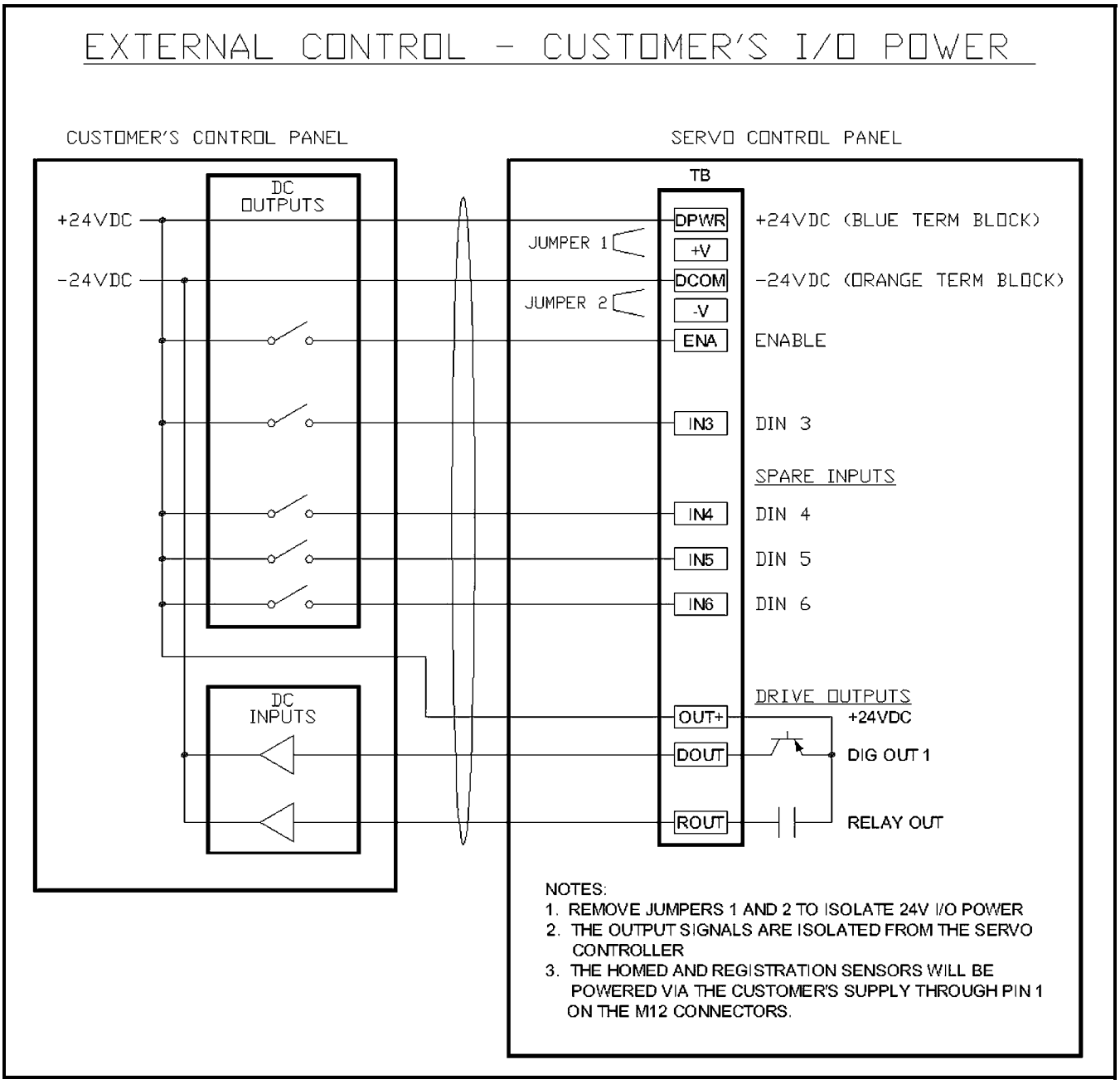


Figure 27

I/O Power Jumpers

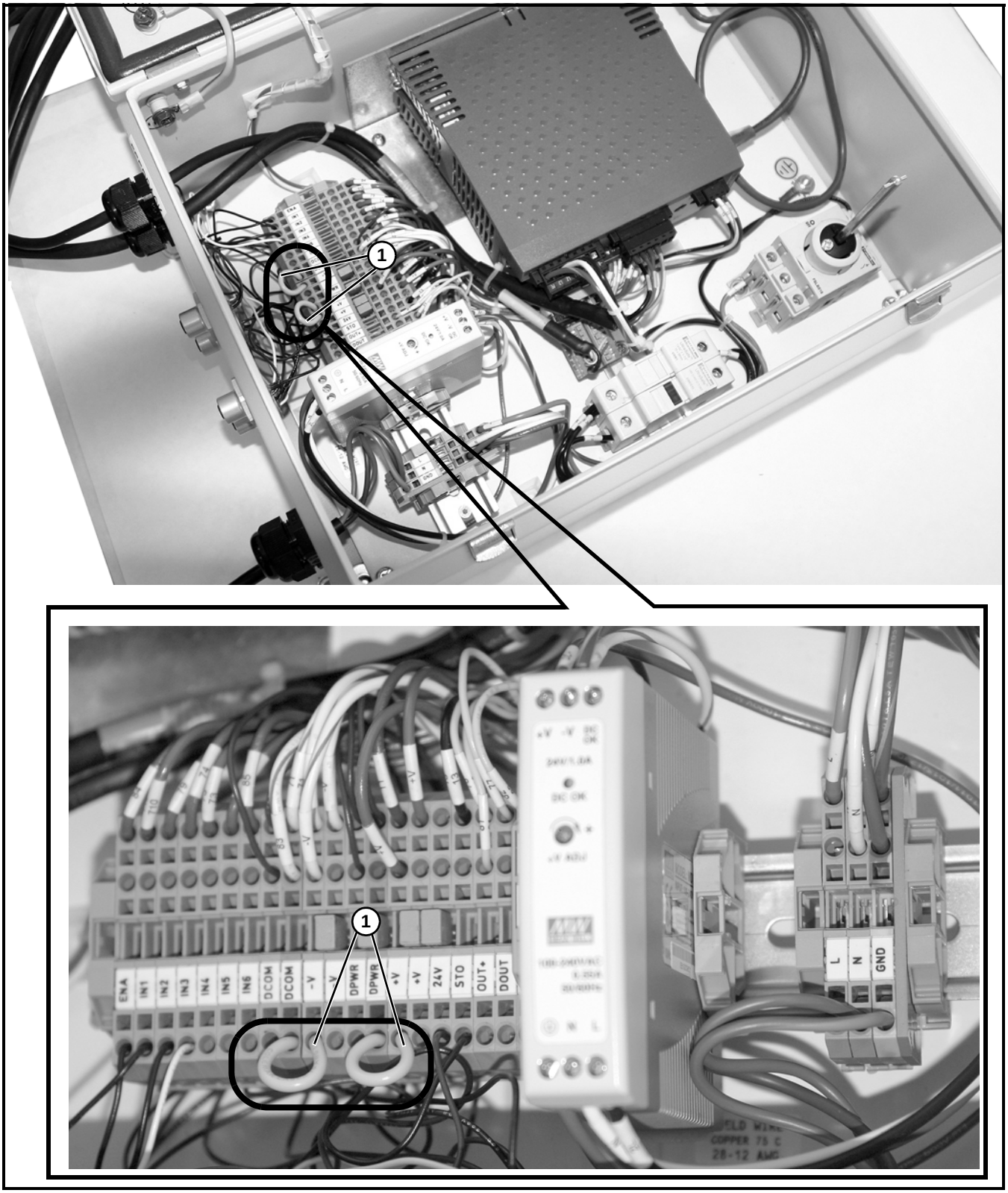


Figure 28

2.Remove the jumpers **(Figure 28, item 1)** indicated in the photograph below to isolate external controller power from servo controller power:

External Control, Internal Power

1.Use this diagram to isolate Dorner control power from external controller. The Home and Registration sensors (if used) will be powered from the servo controller's power supply.

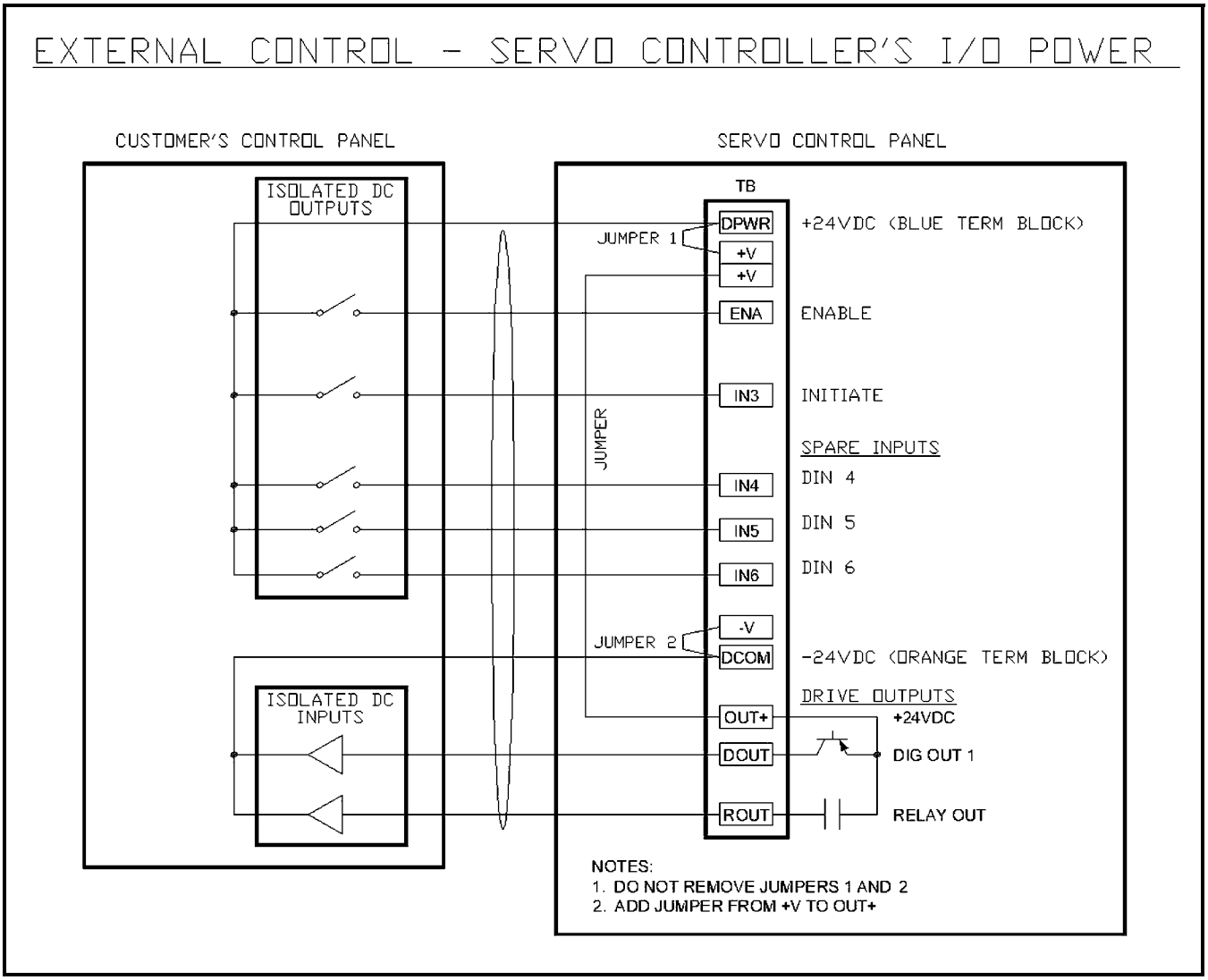


Figure 29

2.Add jumper from **+V (Figure 30, item 1)** to **OUT +** (output) **(Figure 30, item 2)**.

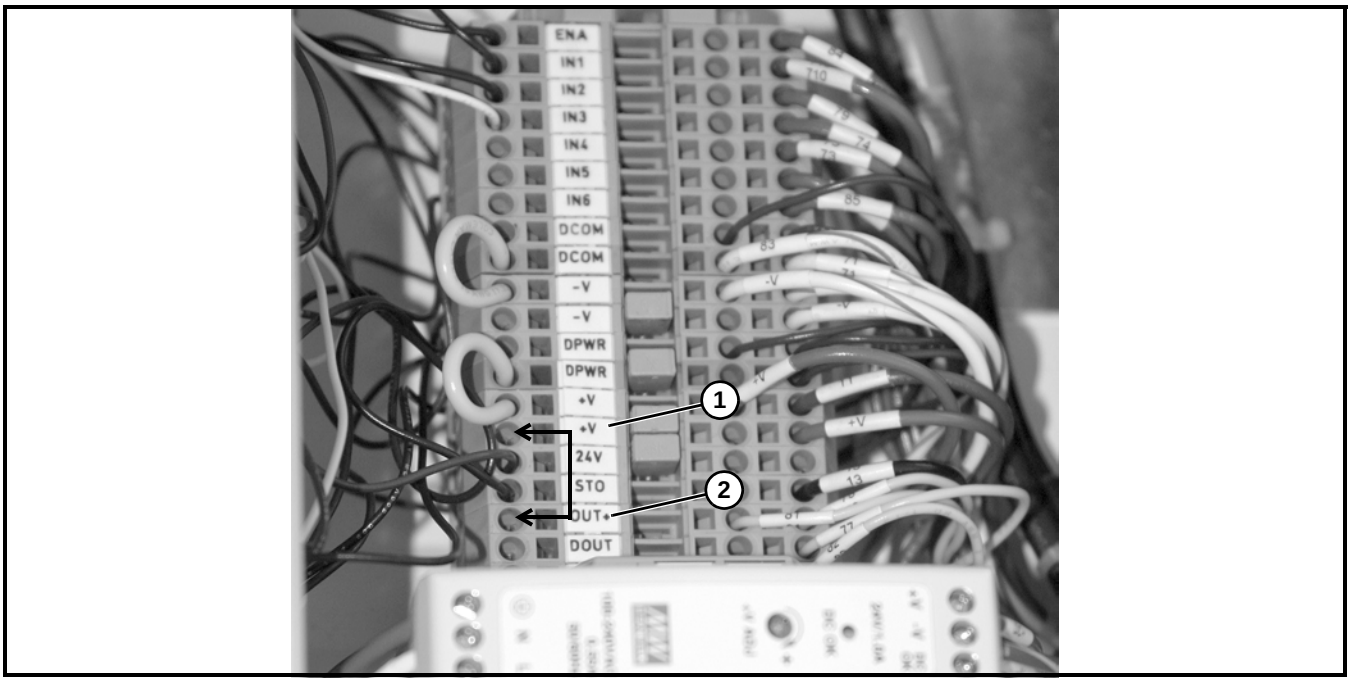


Figure 30

III. Sensors

The servo control panel is wired and programmed for sensors that produce a sourcing (PNP) output. This output must utilize the black wire (pin 4) of any standard M12 cable.

Photosensors in Dorner accessory kits are light-operate, retro-reflective (output on when not blocked). When using Dorner photosensors, the polarity must be set to "Active Low" in the Digital Inputs menu (Refer to "6. Setting Digital Inputs and Outputs" on page 46.).

If using a photosensor that produces a signal when blocked, set the polarity in the Digital Inputs menu to "Active High" (Refer to "6. Setting Digital Inputs and Outputs" on page 46.).

The following is common to stand-alone and external-control models:

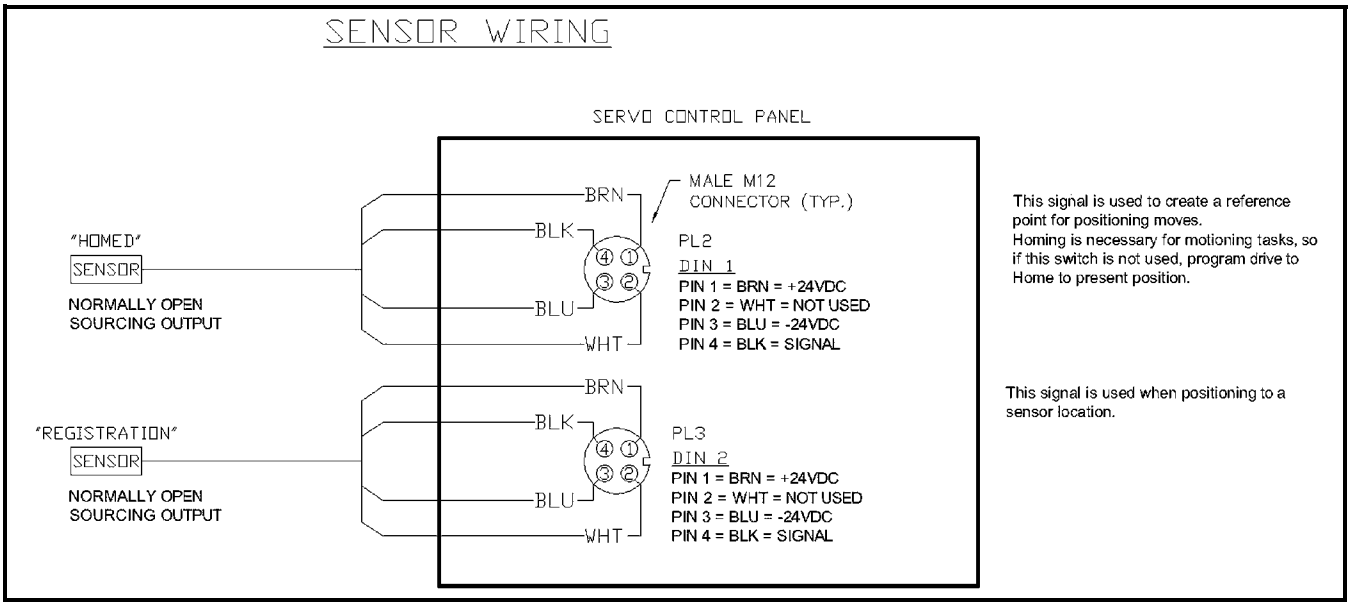


Figure 31

3. Establish Communications with the Drive

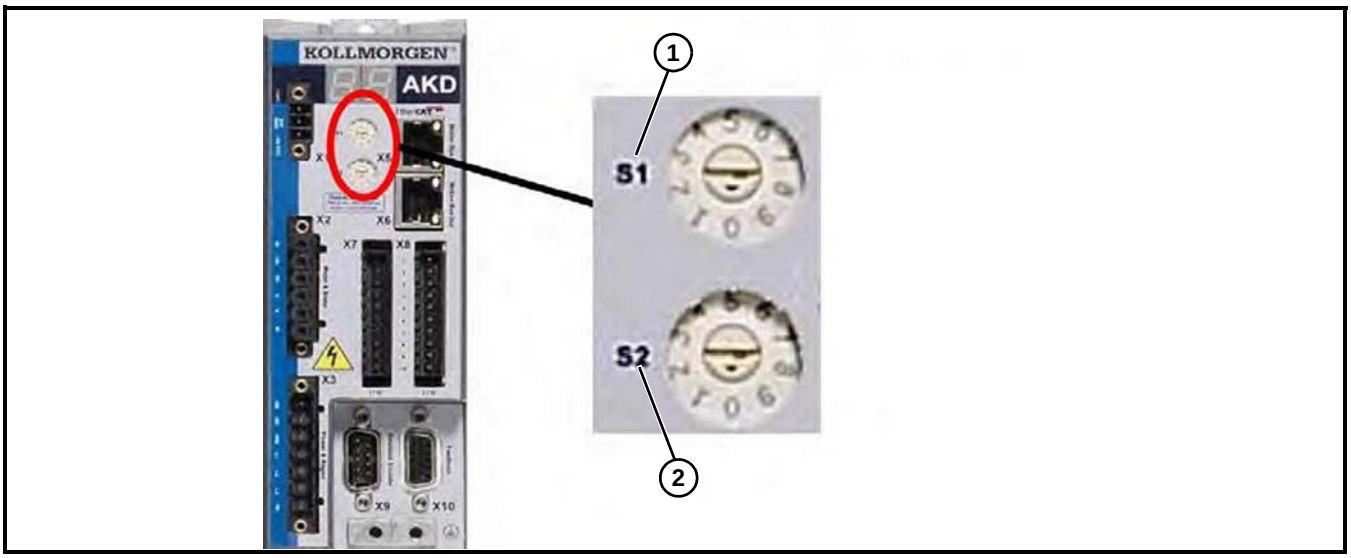
I. Configure the drive for the type of IP addressing

NOTE
Rotary switches S1 and S2 are set to 0 at the factory. The following information is provided for clarification purposes only.

To establish communication between the PC and the drive, you must first set the drive's IP address rotary switches for the type of addressing you wish to use. The choices are Static or Dynamic (DHCP) IP addressing.

NOTE
Do not apply power to the drive at this time.

Dorner recommends dynamic (DHCP) addressing. If static addressing is required, see the Kollmorgen manual for details.



Rotary switches for IP addressing

Figure 32

Dynamic IP addressing (DHCP):

Confirm S1 **(Figure 32, item 1)** and S2 **(Figure 32, item 2)** are set to 0.

II. Connect the Drive to the Programming PC

There are two connection options for establishing communication between the programming PC and drive - direct connection or network connection. There is a port on the side of the Dorner controller that allows connection to the drive without having to open the enclosure door.

Direct Connection

Use a standard Ethernet patch cable (straight) to form a connection between the PC and the drive. You can also use a crossover cable since the drive detects the cable type automatically.

Network Connection

Connect the drive and the PC to a network. The network must include a DHCP server (usually standard in corporate networks). If the network does not have a DHCP server, you can connect using a stand-alone router with a built-in DHCP server. In either case, both the PC and the drive acquire IP addresses automatically.

III. Configure the IP settings in the Programming PC

Dynamic IP addressing (DHCP):

Make sure the IP address rotary switches, S1 and S2, are set to zero.

Configure the PC for DHCP addressing:

In Windows, select **Start**>**Control Panel**>**Network Connections**. Choose the correct network connection for the port over which you will connect to the drive.

Right click on the connection and select **Properties**. Click on **TCP/IP** and then select **Properties** again. Configure the TCP/IP properties as shown below and click **OK**.

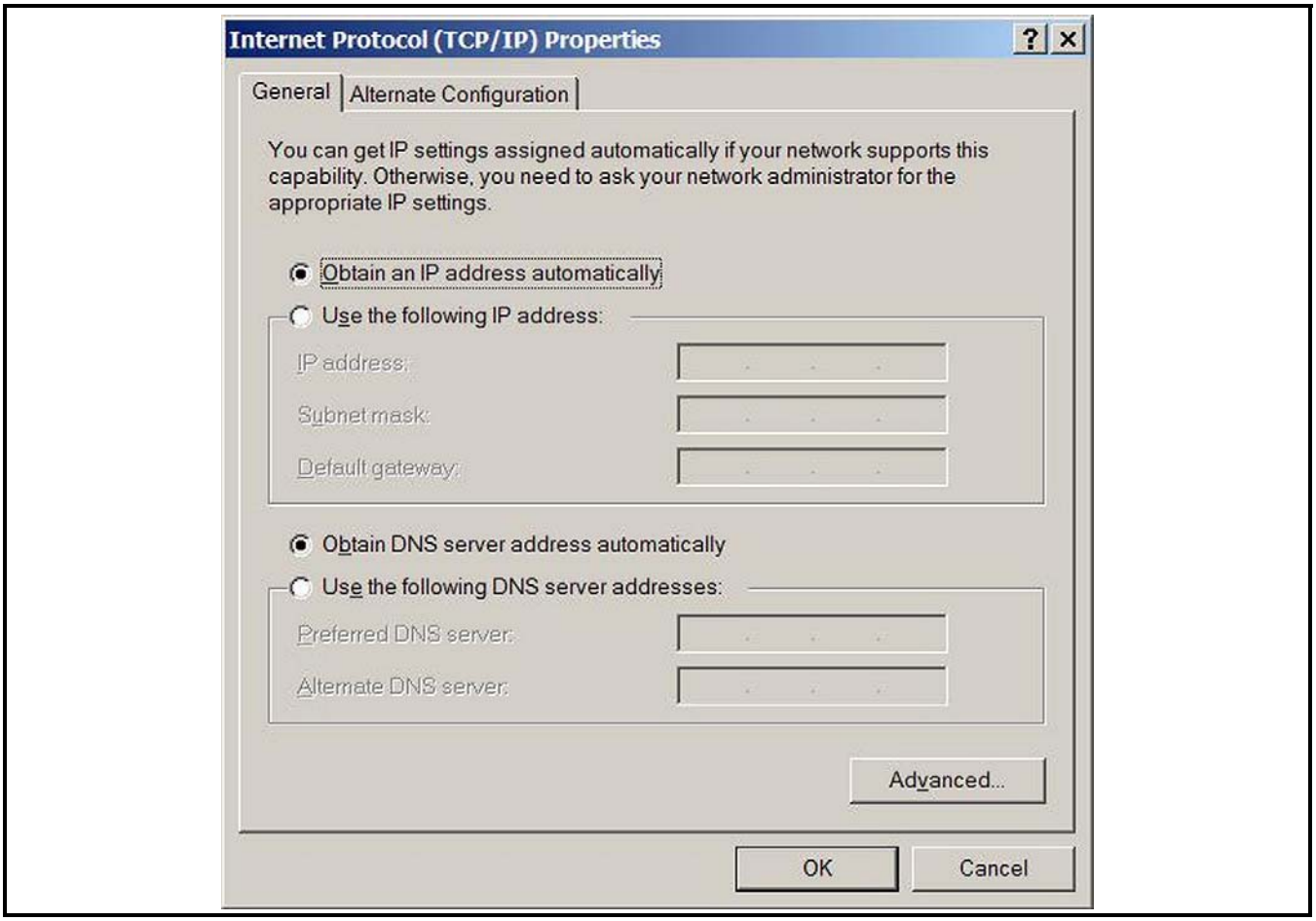


Figure 33

Check the AKD address setting and make sure that S1 and S2 are set to zero.

The connection is now configured to establish a point-to-point direct connection between the AKD and the PC using WorkBench. You can now skip to “4. Run the Workbench Software” on page 35.

The drive will automatically acquire an IP address when Workbench software is activated. This process can take as long as a minute to complete.

IV. Check the PC's Taskbar

While the PC is connecting, your taskbar will show the following acquiring icon designating connection in progress **(Figure 34, item 1)**.

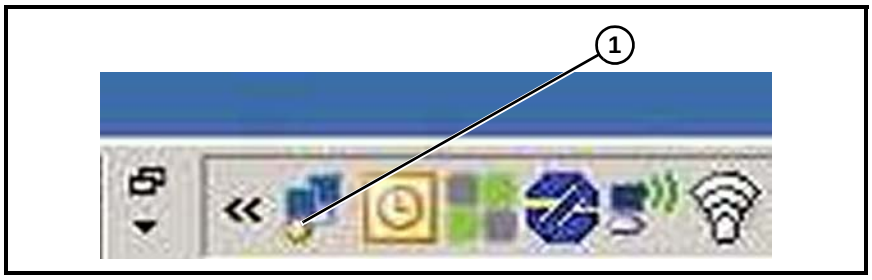


Figure 34

Wait for the drive connection complete icon **(Figure 35, item 1)** to change to the limited functionality icon (this process can take up to one minute).

Figure 35

4. Run the Workbench Software

NOTE
Make sure the programming cable is connected between the PC and programming port of the controller before you turn on controller power.

I. Load the Workbench software onto the PC

Disk is set with controller or can be found on Kollmorgen website. Start the workbench software.

II. Power up the controller

Turn on the controller power.

III. Connect to the drive

Procedural Screens

a. The following window appears:

Click on **Connect (Figure 36, item 1)** under "1. Connect to the drive." This process may take a few minutes.

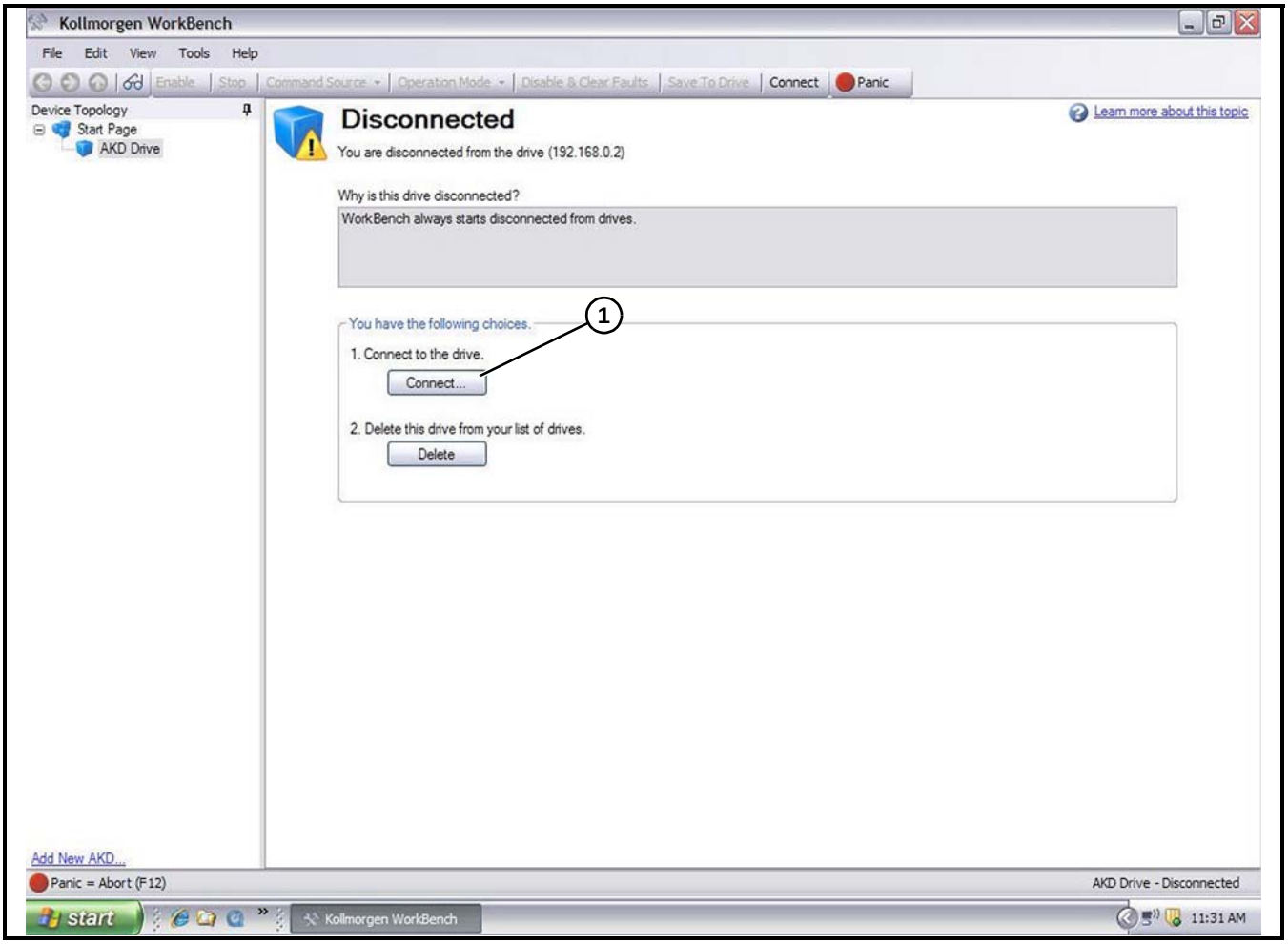


Figure 36

b. If multiple drives are detected, a drive can be uniquely identified using one of the following methods:

1.The **MAC Address (Figure 37, item 1)**of the drive. This is printed on the sticker on the side of the drive.
2.The Name **(Figure 37, item 2)** of the drive. The drive name is set using WorkBench. A new drive defaults to "No_Name."
3.Blinking the display. Select a drive and click **Blink (Figure 37, item 3)** to force the display on the front of the drive to blink on and off for 20 seconds.

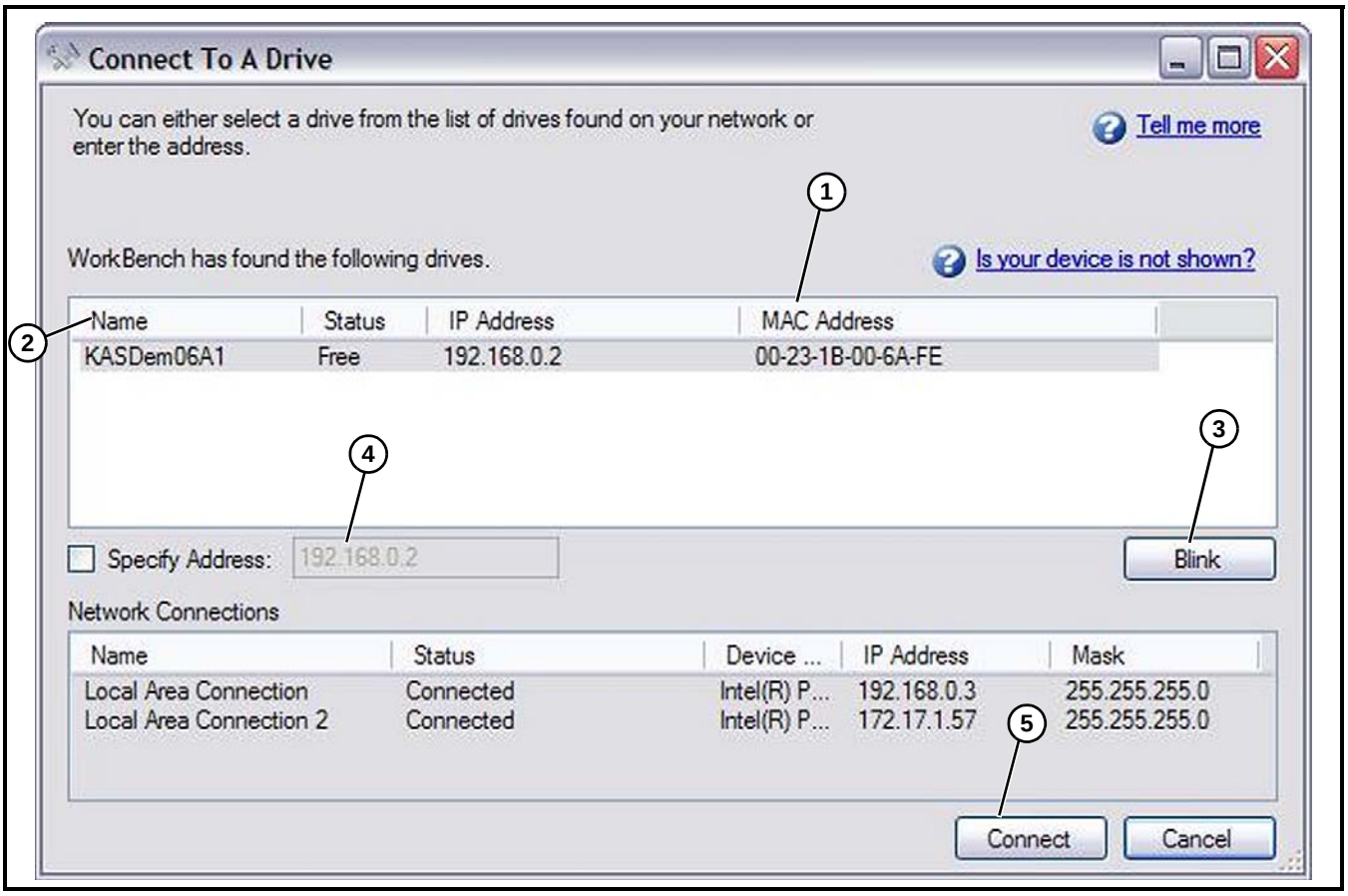


Figure 37

NOTE
*Hint: If the IP Address next to the "Specify Address" box **(Figure 37, item 4)** is the same as the drive you wish to connect to, click on the box next to it. It will speed up the connection time greatly.* *If you can connect to the drive at this point, then skip section "IV. Configure the Parameters" on page 37.*

4. Click on **Connect (Figure 37, item 5)**.

IV. Configure the Parameters

NOTE

The Dorner Servo Control Package comes pre-loaded with the correct settings for the 2200 or 3200 Precision Move conveyor.

The parameter settings shown on page 36 through 41 are all pre-set. The following information is provided for clarification purposes only.

a. Load pre-configured parameters

To load saved parameters into a drive for the first time, click on Tools in the menu bar. Select (drive name) > Load Parameter and then browse for parameter file to be loaded.

- Click on **File**
- Click on **Open** button.
- Click **Save to Drive** on toolbar

b. Confirm Parameter Settings

The following sections illustrates the pre-configured servo controller parameters. No changes should be required to these parameters. If alternate parameters are required, refer to the Kollmorgen factory literature for further details.

AKD Overview

Name: Give the drive a name in field **(Figure 38, item 1)** if it does not already have one.

Drive Model: Do not change field **(Figure 38, item 2)**. When connected, this will fill in automatically.

The Dorner default model is **AKD-P00306-NAAN-0000**.

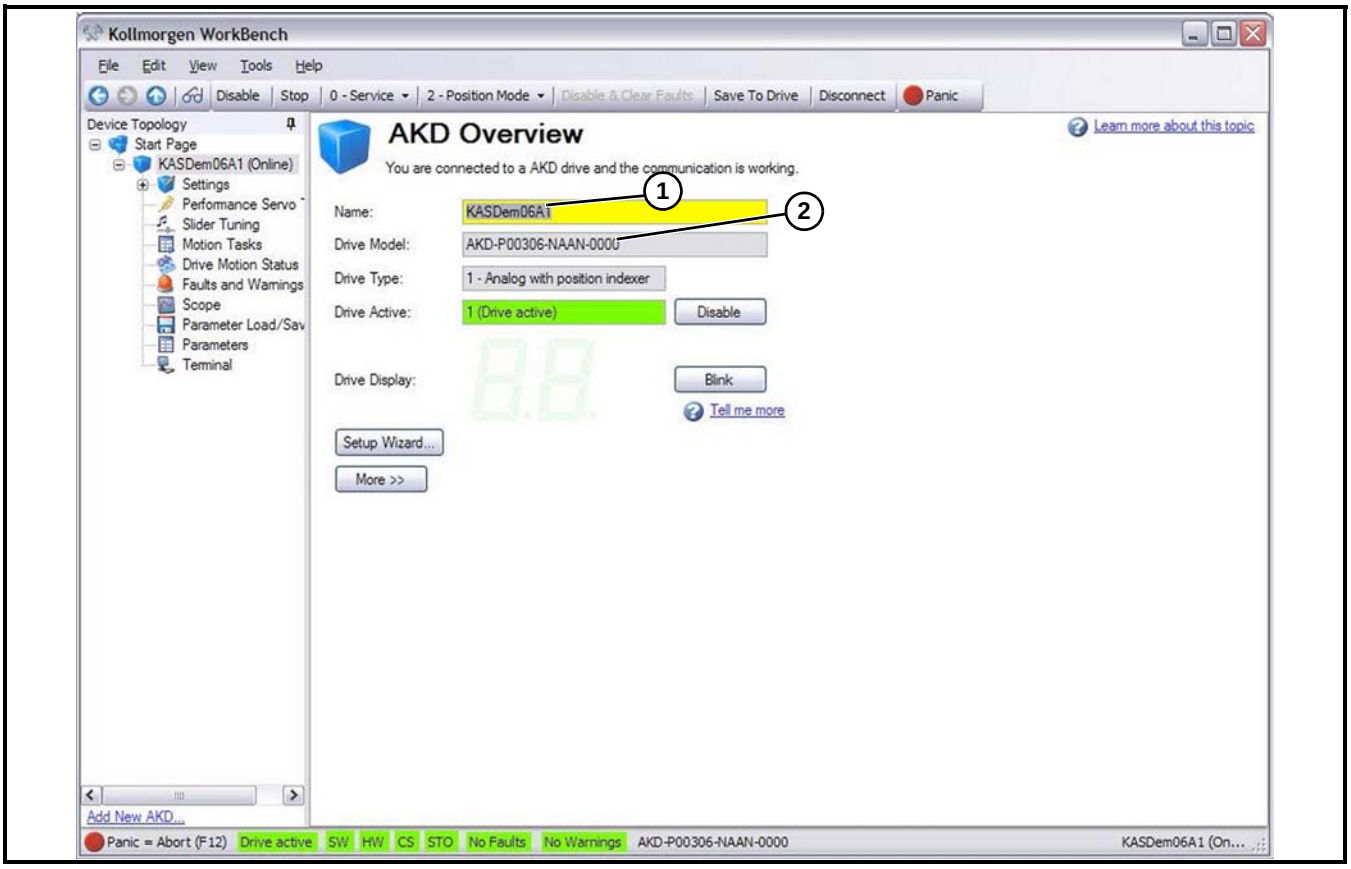


Figure 38

Settings

Command Source = 0 – Service **(Figure 39, item 1)**

Operation Mode = 2 – Position Mode **(Figure 39, item 2)**

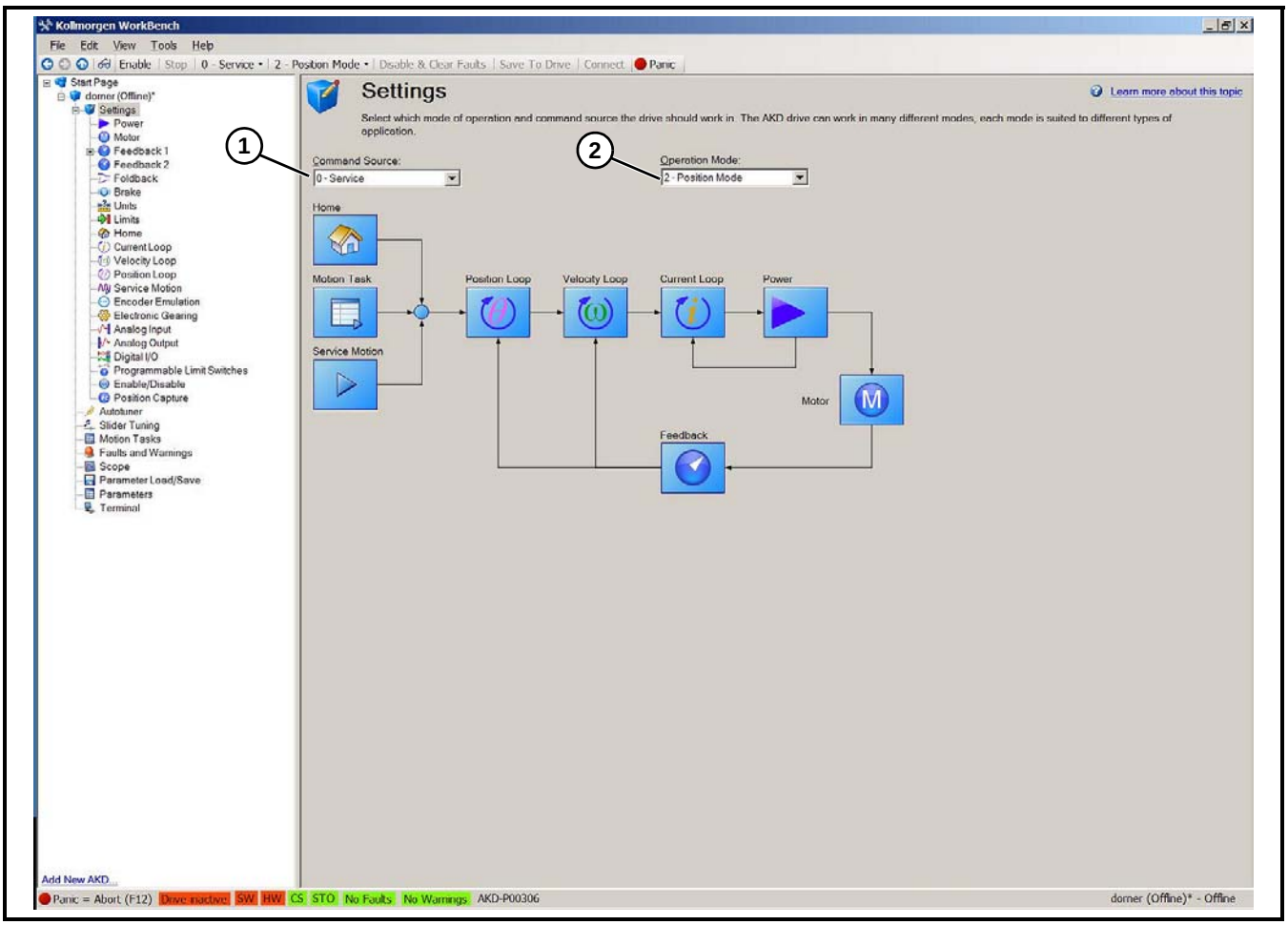


Figure 39

Motor

Motor Name: **Select motor (Figure 40, item 1)** from list. The other fields will fill in automatically.

The Dorner default motor is **AKM-32E-ANCNC-00**.

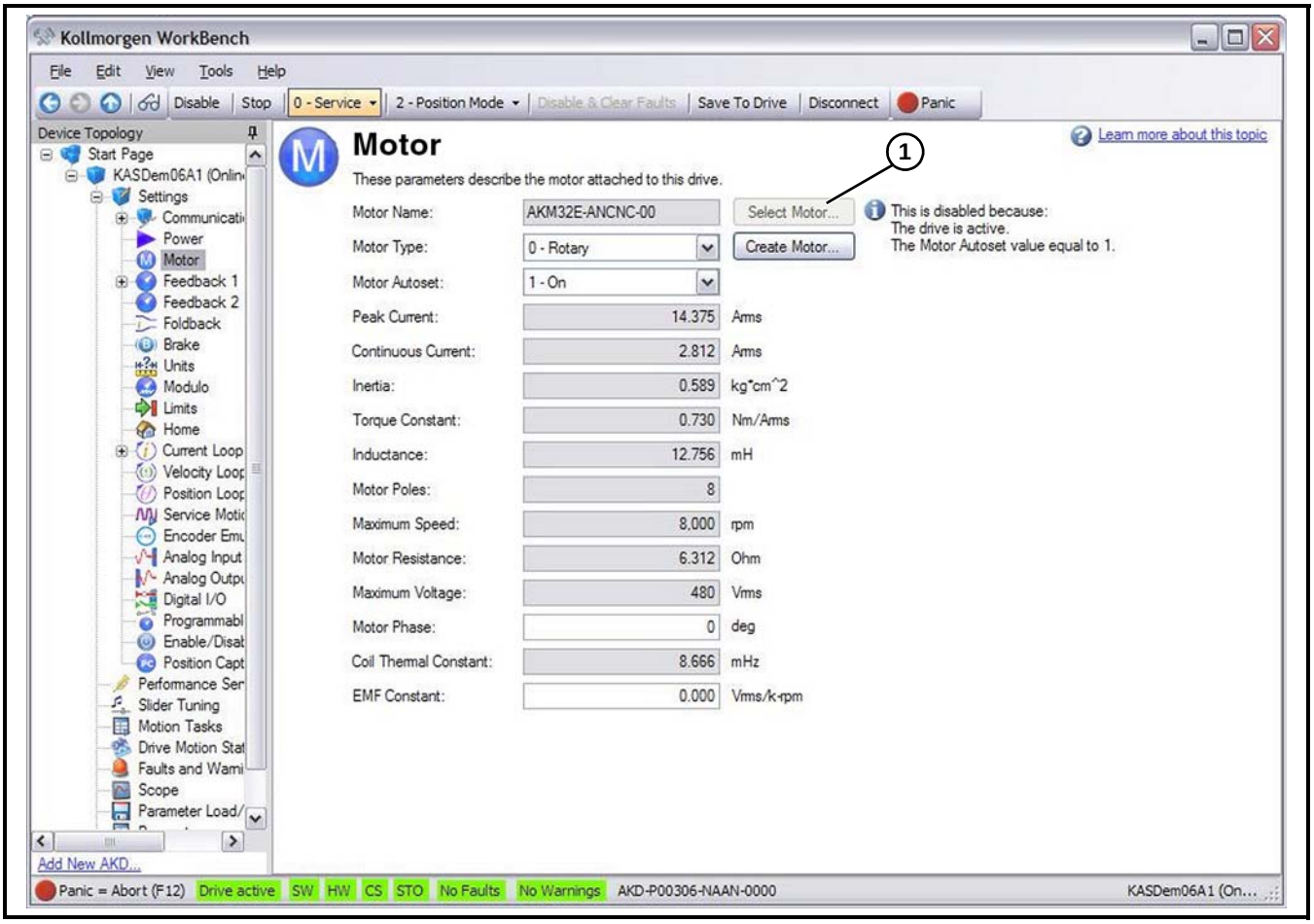


Figure 40

Feedback

Feedback Selection (Figure 41, item 1): Select -1- Auto Identify. The controller will identify the feedback device.

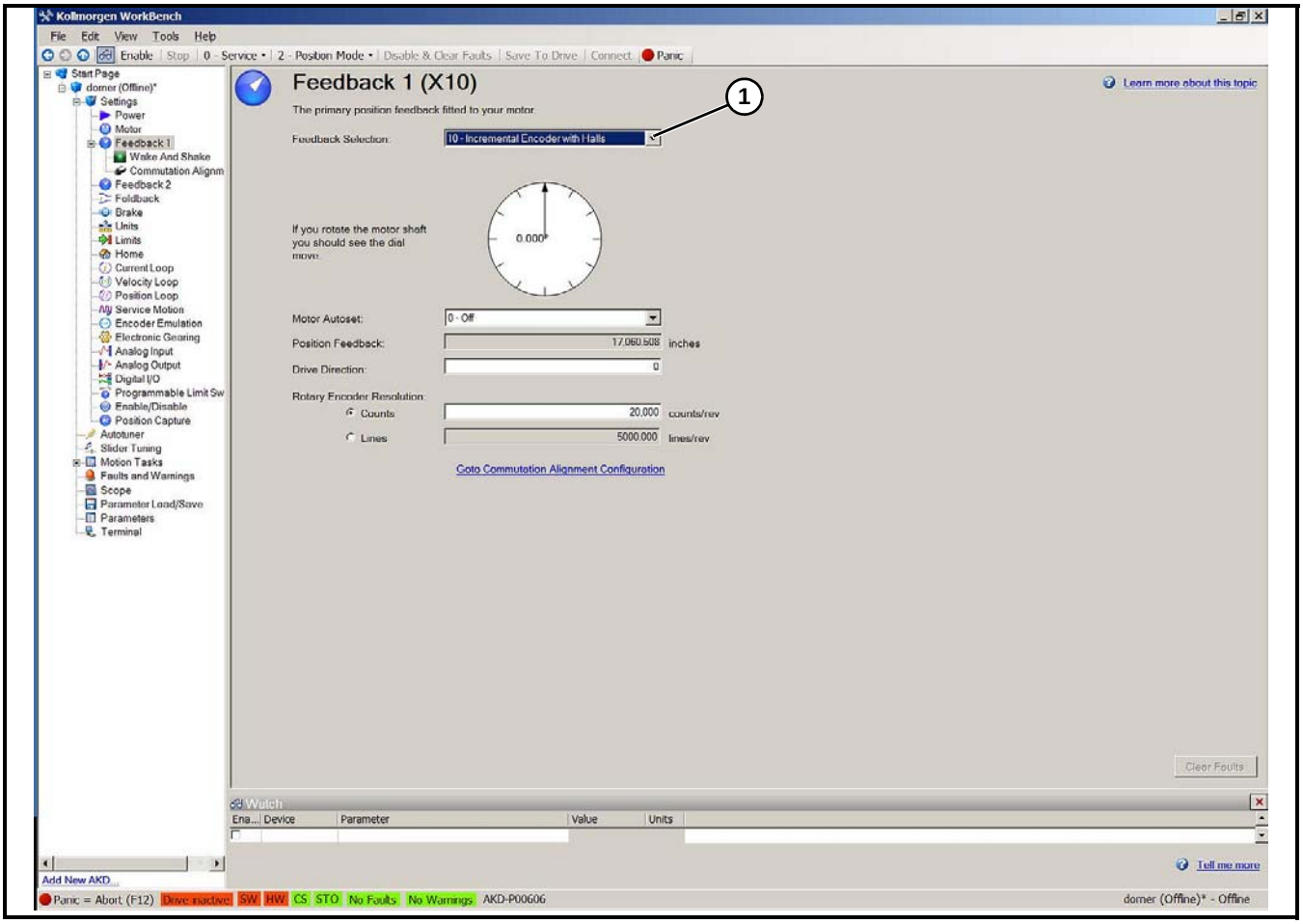


Figure 41

Units

NOTE
The units are dependent on the mechanics of the conveyor and should not be changed from the Dorner settings without factory approval.

Standard Dorner Unit Parameters

NOTE
Enter values for callouts 4, 5, 6, & 7 first.

Unit Parameter	For 3200 Series Precision Move	Bottom Drive	Flush Drive	Callout
		For 2200 Series Precision Move		
Type of Mechanics	**Gear belt linear**	**Gear belt linear**		8
	Turns	**Turns**		9
Motor	8	128	84	1
Load	1	36	36	2
Teeth/Turn	21	12	12	3
____ Tooth =	2	254	254	10
Tooth = _____	1	100	100	11
Position Unit	3 - Custom (mechanics dependent)	3 - Custom (mechanics dependent)		5
Velocity Unit	3 - Custom/s (mechanics dependent)	3 - Custom/s (mechanics dependent)		6
Acceleration Unit	3 - Custom/s^2 (mechanics dependent)	3 - Custom/s^2 (mechanics dependent)		7
Custom Position Unit	in	in		4

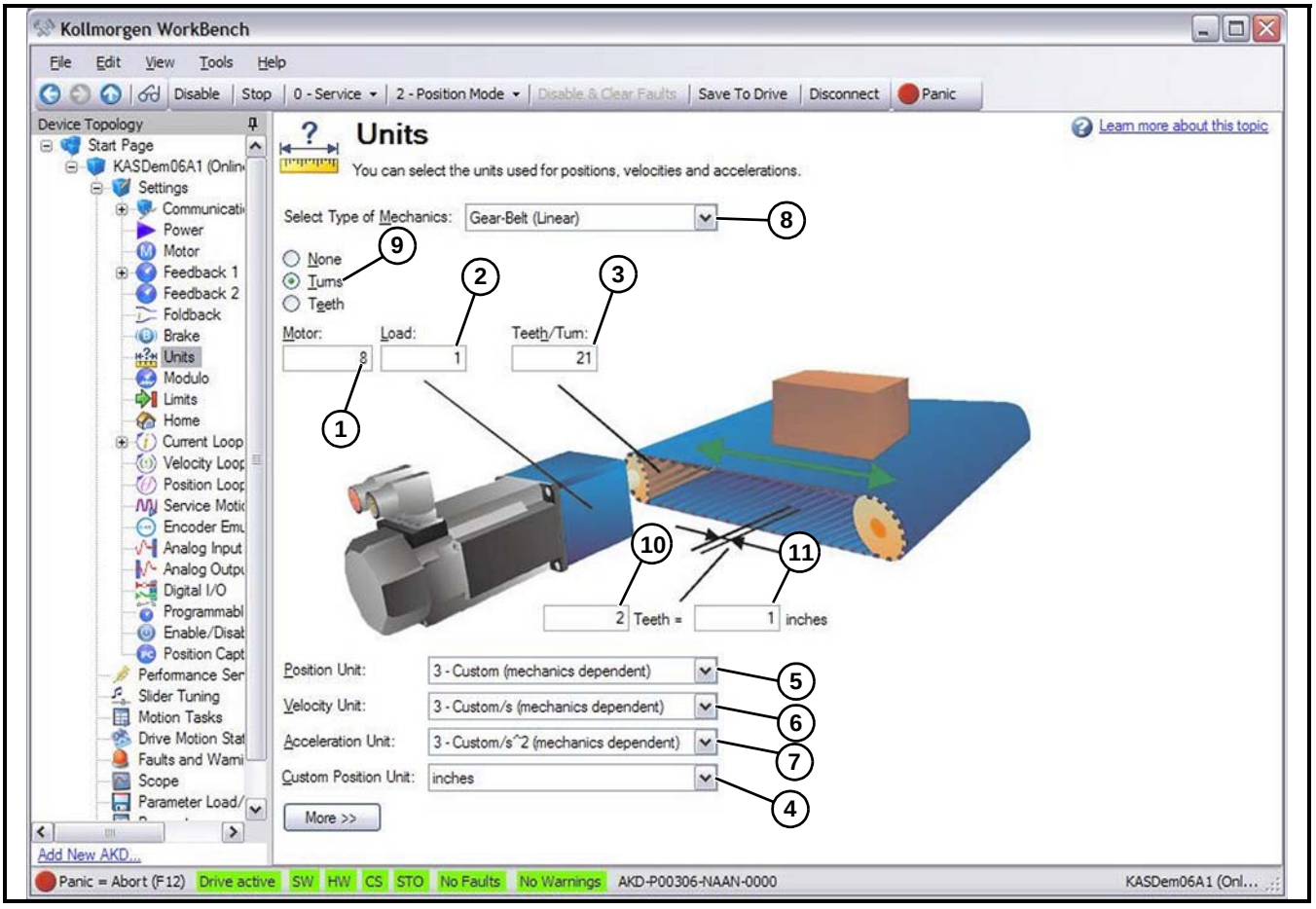


Figure 42

Limits

Current Limits: Leave at default as determined by motor/drive combination.

NOTE
The Velocity, Position, and Acceleration limits are dependent on the mechanics of the conveyor and should not be changed from the Dorner settings w/o factory approval.

Standard Dorner Values:

Spindle Package	Units	Velocity (units/sec)			Position Error (Units)	Acceleration Limits (units/sec2)	
		Positive	Negative	Overspeed		Acceleration	Deceleration
all	inches	65	-65	65	0.01	200 **(Figure 43, item 1)**	400 **(Figure 43, item 2)**

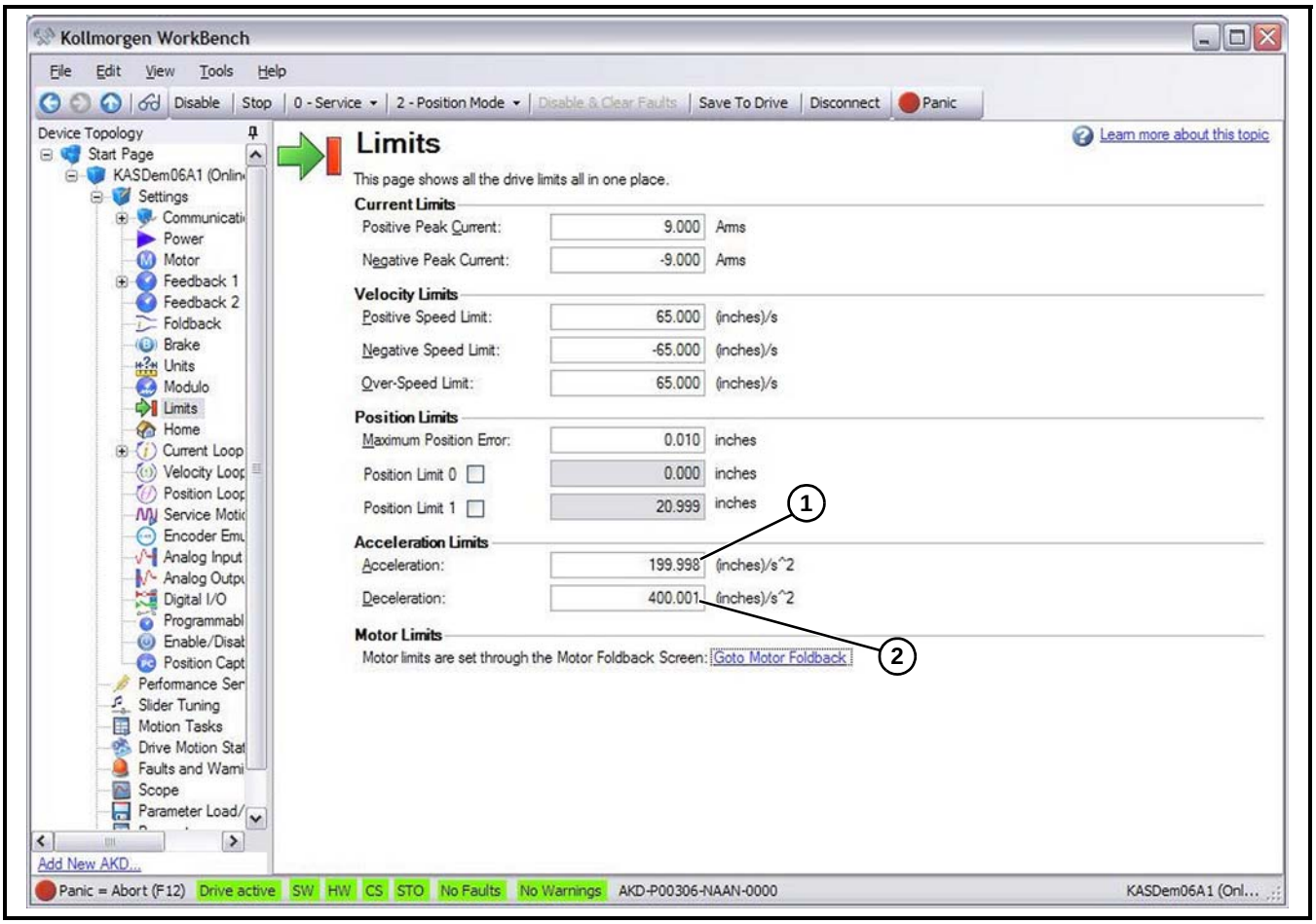


Figure 43

5. Establishing your Homing Methods

There are many other homing routines. The type of conveyor application (see "I. Homing Methods" on page 43) dictates which type of homing sequence to use. Generally:

•A conveyor that moves a programmed distance and has cleats (flights), marks, locating holes, or fixtures will need to be homed to a sensor to establish a reference.

•A conveyor that moves until a sensor is activated (usually by a cleat, fixture, or part) does not require a home sensor. It is preferred to use the standard homing routine and execute an index command to justify the conveyor to the sensor.

NOTE

For applications that require a high degree of accuracy and consistency, it is recommended that a homing sequence be performed periodically through the cycles. For this application external initiate homing is required.

I. Homing Methods

The Dorner Servo Control comes pre-packaged with several methods of homing. The following (2) methods are recommended and cover the majority of applications. For alternative methods, see the Kollmorgen manual.

Home to Sensor (Auto Initiate)

NOTE

This adds a "home to switch" feature to the conveyor. Useful when creating motion tasks relative to a reference point.

Terms/Definitions

Home sensor: Sensor used to establish reference point

Required Inputs

Device	Connection	
	Stand-Alone Option	Externally-Controlled Option
Home Sensor	PL3	PL3

Required Parameter Settings

Home

•Type of homing motion = 4 – Find home input

•Acceleration = 5 in/sec²

•Deceleration = 5 in/sec²

•Direction = 0 – Negative or 1 – Positive

(Direction conveyor travels to find sensor)

•Distance = in

(offset conveyor will be from sensor at end of homing routine)

•Position = 0 in

•Velocity = 5 in/sec

•Set Auto Homing = 1- Enabled

Digital I/O

Digital Input	Mode	Param	Polarity
DIN 1	11 - Home Reference		Act. High*

*See "III. Sensors" on page 31.

Operation

Reset Emergency Stop (STO) circuit

Enable drive

Servo automatically executes homing sequence

Home to Sensor (External Initiate)

NOTE
This adds a "home to switch" feature to the conveyor. Useful when creating motion tasks relative to a reference point. An external switch initiates the homing sequence.

Terms/Definitions

Home sensor: Sensor used to establish reference point

Initiate Home switch: A switch that tells the controller to sequence through the homing routine.

Required Inputs

Device	Connection	
	Stand-Alone Option	Externally-Controlled Option
Initiate Home Switch	N/A	terminal block - IN4
Home Sensor	N/A	PL3

Required Parameter Settings

Home

•Type of homing motion = 4 – Find home input

•Acceleration = 5 in/sec^2

•Deceleration = 5 in/sec^2

•Direction = 0 – Negative or 1 – Positive

-(Direction conveyor travels to find sensor)

•Distance = in

-(offset conveyor will be from sensor at end of homing routine)

•Position = 0 in

•Velocity = 5 in/sec

•Set Auto Homing =

-0- Disabled

-(Requires a signal to initiate Homing routine. Use DIN 4.)

Digital I/O

Digital Input	Mode	Param	Polarity
DIN 1	11 - Home Reference		Act. High*
DIN 4	5 - Start Home		Act. High*

*See "III. Sensors" on page 31 for photosensor polarity considerations

Operation

Reset Emergency Stop (STO) circuit

Enable drive

Apply "Initiate Home" signal to execute homing sequence.

II. Programming the Homing Method

The servo controller must be homed before any motion tasks can execute. The motor can be jogged without homing, however. The standard Dorner configuration is: Use current position.

For Home to Sensor Methods: Refer to the appropriate Homing Method Sheets to fill in the following data.

1.Fill in the **Select the type of homing motion you wish to use: (Figure 44, item 1)**.

•Evaluate each choice and decide which motion is best for the application.

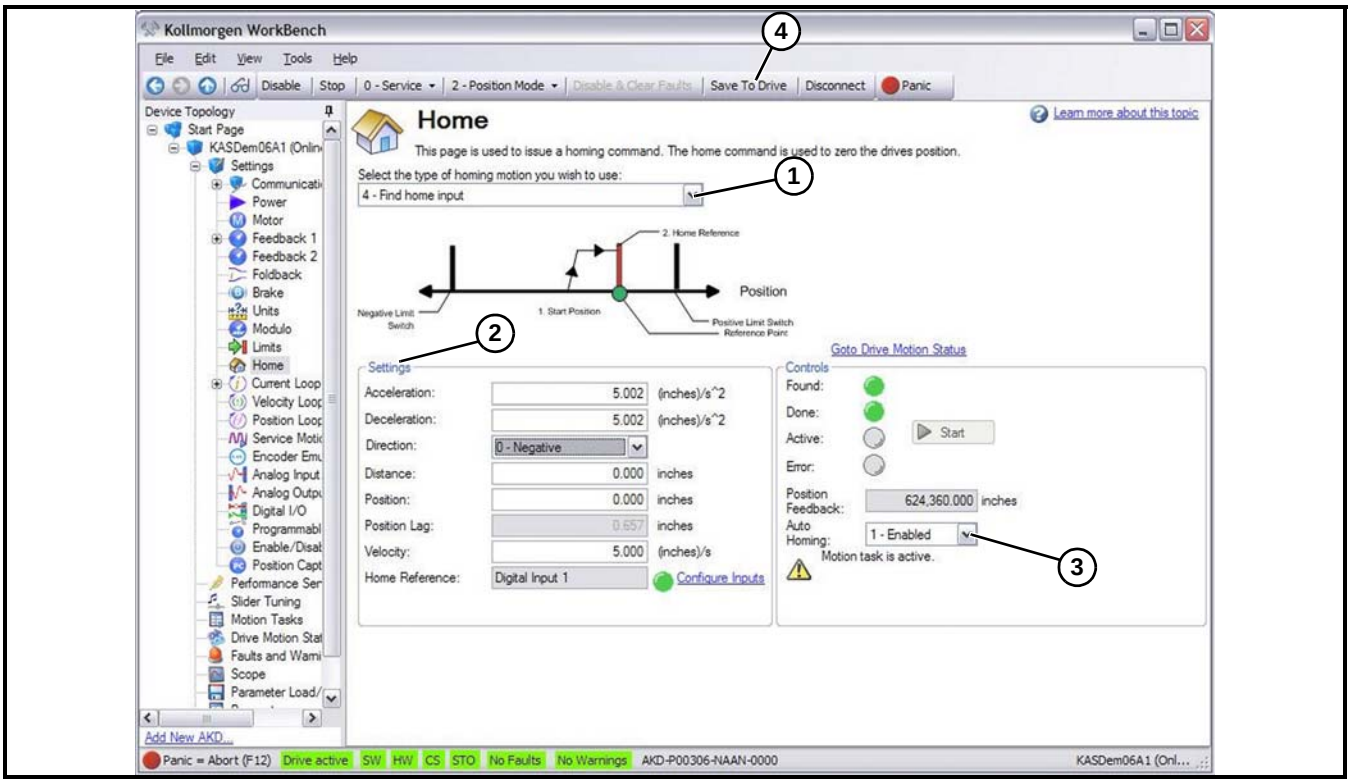


Figure 44

2.Fill in the **Settings (Figure 44, item 2)** Values.

•Use extreme caution. Severe damage to the equipment and/or load may result from incorrect values. Also, take note of which direction the conveyor should move to establish home. The conveyor may move one complete revolution to find the home sensor, so take precautions to prevent loads from being inadvertently discharged.

3.Select the homing initiation.

•Another consideration to take into account is how the homing sequence is initiated. The sequence may be started automatically or by an external switch:

•Set **Auto Homing: (Figure 44, item 3)**:

-1- Enabled (The conveyor will automatically Home after being Enabled.)

-0- Disabled (Requires a signal to initiate Homing routine. Re-program unused digital input for signal (see "II. Programming the Homing Method" on page 45). Select DIN (X) = 5 – Start Home.)

NOTE

When not using the auto home feature, it is up to the end user to decide when to home the conveyor. Generally, a conveyor must be homed:

- *After a power-up*
- *After resetting an E-Stopped condition*
- *After re-enabling the drive*

Homing should be used to re-establish the reference point mechanically. Electronically, the servo drive will consider itself "homed" as long as the power to the drive is maintained.

4.Click **Save To Drive (Figure 44, item 4)**.

6. Setting Digital Inputs and Outputs

1. Click on **Digital I/O (Figure 45, item 1)**.

NOTE
The following chart illustrates the Dorner standard configuration.

Digital Input	Mode	Param ***	Polarity
DIN 1	11 - Home Reference		Act. Low*
DIN 2	2 - Start Motion Task	1	Act. Low*
DIN 3	2 - Start Motion Task	0	Act. High
DIN 4	0 - Off		
DIN 5	0 - Off		
DIN 6	0 - Off		
DIN 7	0 - Off		
Digital Outputs			
DOUT 1	3 - Move Complete		
Fault Relay	0 - Fault Mode**		

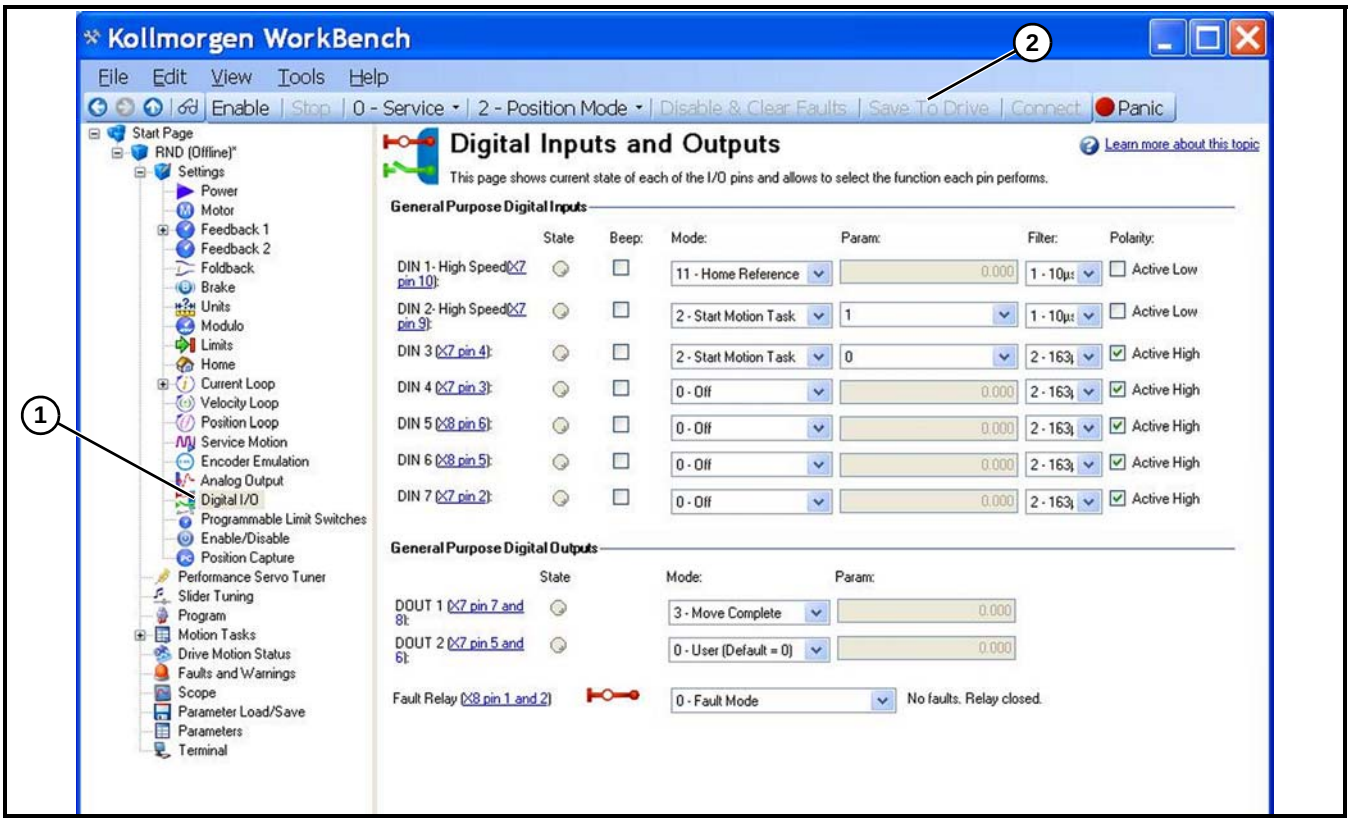


Figure 45

2. Refer to “III. Sensors” on page 31 for sensor wiring. Polarity settings may need to be changed dependent on your wiring method.
3. Refer to your Homing Method in “II. Programming the Homing Method” on page 45. Confirm the setting of the DIN1 and DIN4 based on your application.
4. Refer to your Application parameter method in “1. Determining your Application Parameters and Hardware Required” on page 12. Set parameter for DIN3 through 6 based on your application.
5. Click **Save To Drive (Figure 45, item 2)**.

*Note: For Dorner Photo Eye Kits, set to Active Low.

**Relay is closed with no faults and opens when faulted.

***Note: Parameter inputs can not be entered until task has been created. Complete task and return to Digital I/O screen.

7. Loading your Motion Profile

I. Load Pre-Configured Tasks

After establishing communications, click on Import from File and browse for saved Task (.xml). After importing, click on Save Motion Tasks to Drive.

II. Customize Tasks/Start New

1.Select **Motion Tasks (Figure 46, item 1)** from the Navigation Tree.

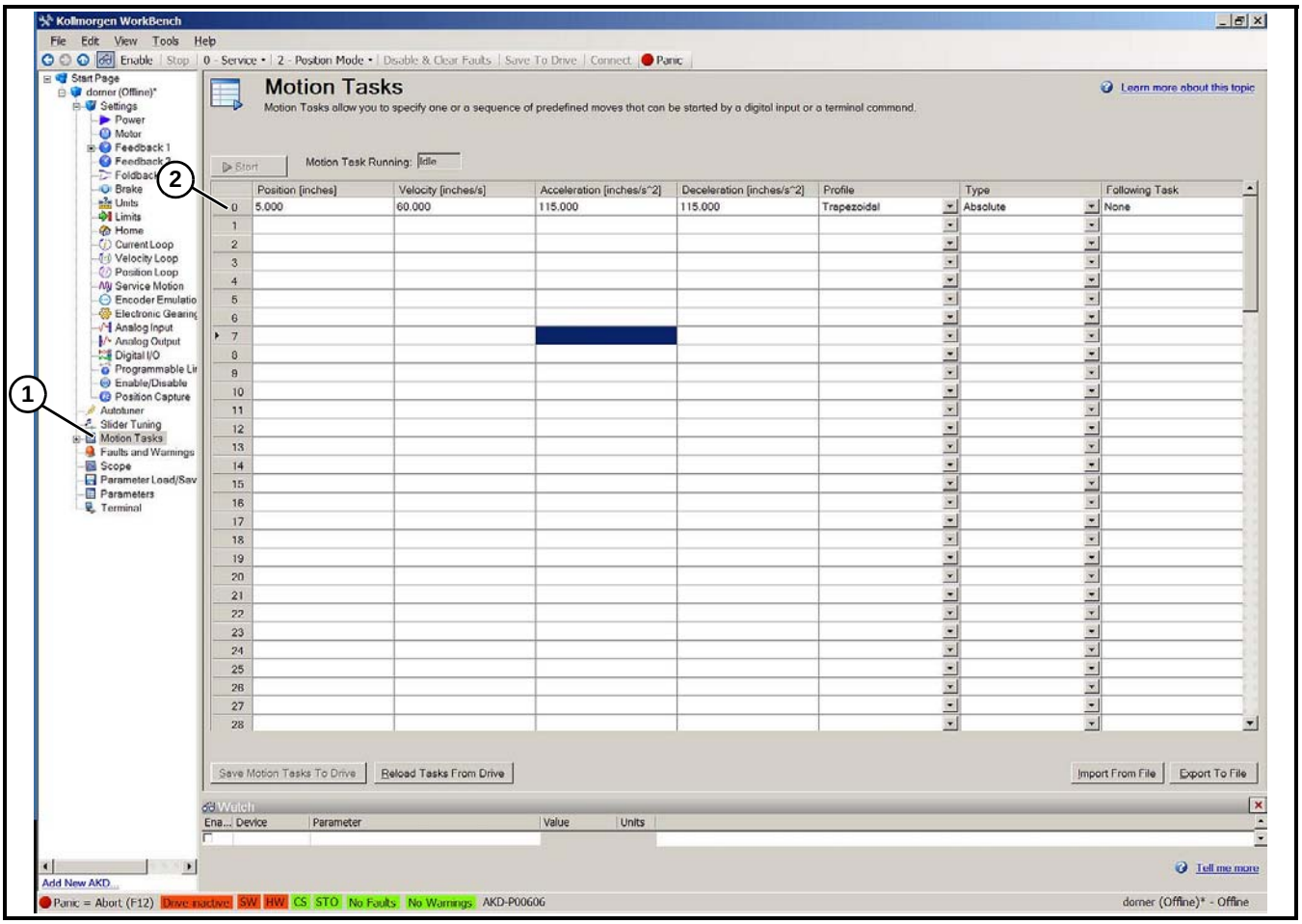


Figure 46

2.Refer to your Application Parameter Method in "1. Determining your Application Parameters and Hardware Required" on page 12. Set your Motion Tasks Parameters based on your Application Method and the Calculated Motion Profile determined in "7. Loading your Motion Profile" on page 47. If application assistance is required contact factory.

3.Double click on task number **(Figure 46, item 2)** to get to this screen (below).

NOTE
Velocity values may be required to be entered as negative values to achieve the proper belt travel direction.

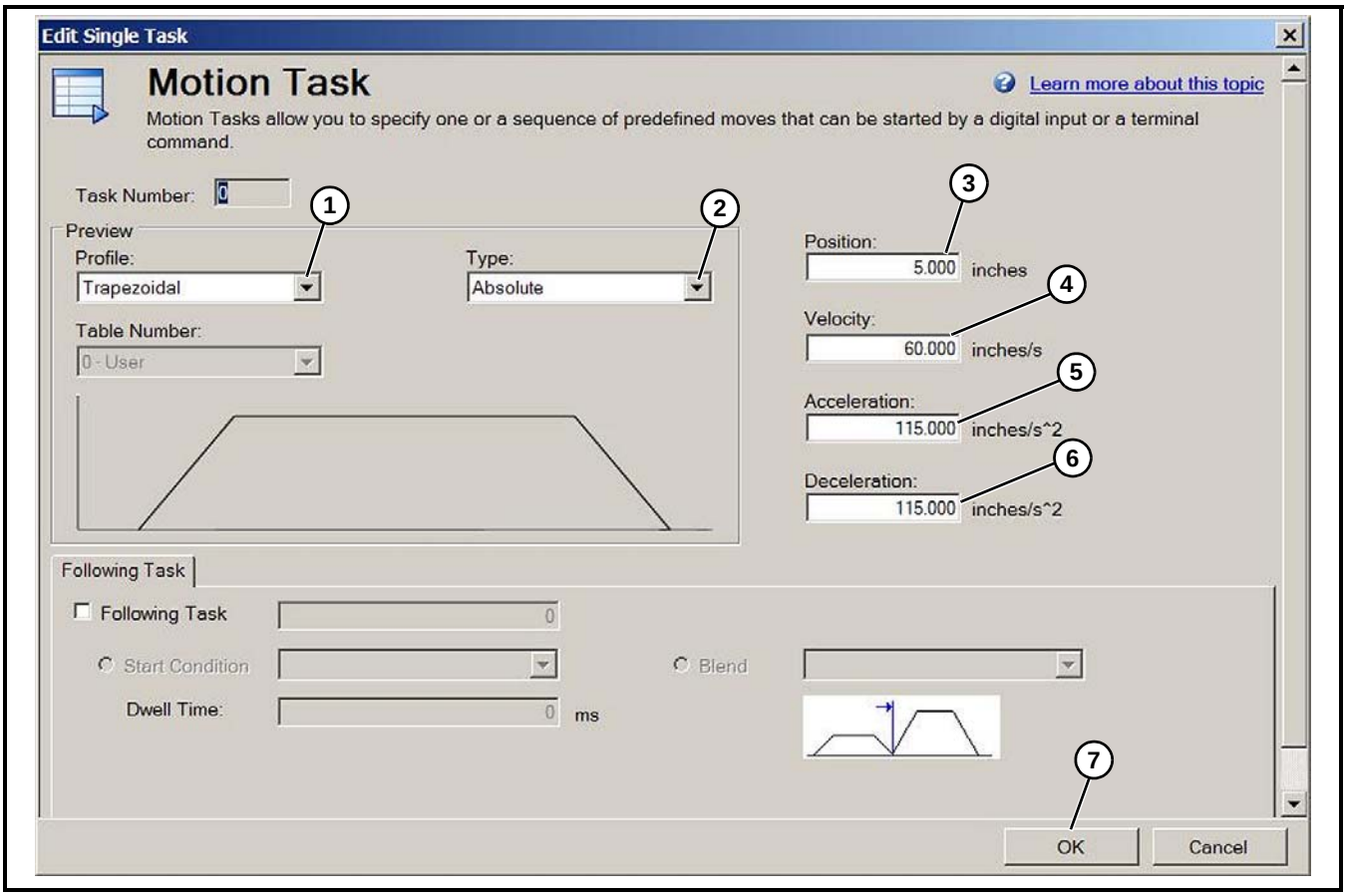


Figure 47

•**Profile: (Figure 47, item 1)** Usually Trapezoidal

•**Type: (Figure 47, item 2)** Per application (see "I. Homing Methods" on page 43).

•**Position: (Figure 47, item 3)** = distance to move

•**Velocity: (Figure 47, item 4)** = Speed conveyor travels at

•**Acceleration: (Figure 47, item 5)** = rate conveyor gets up to speed

•**Deceleration: (Figure 47, item 6)** = rate conveyor slows down

Rate Calculations

NOTE

To create time-based moves, perform the following calculations:

- *Velocity = (position ÷ time to move) x 1.5*
- *Acceleration/Deceleration = Velocity x 3*

(Above is based on equally apportioned trapezoidal move with total acc/dec time = time at max V.)

4. When done, click on **OK (Figure 47, item 7)**.
5. Return to digital I/O screen and enter Param: field as required.
6. Click on **Save to Drive** for changes to take effect.

8. Tuning the Gearmotor/Drive

NOTE
It is highly recommended to use Auto Tuning. For other tuning methods, refer to Kollmorgen user manual for details.

1. Select **Performance Servo Tuner (Figure 48, item 1)** from the Navigation Tree.

NOTE
In order to Auto Tune the servo the maximum position error limit must be temporarily increased. See page 41. Increase the limit to 10. After tuning is complete return the limit to 0.010.

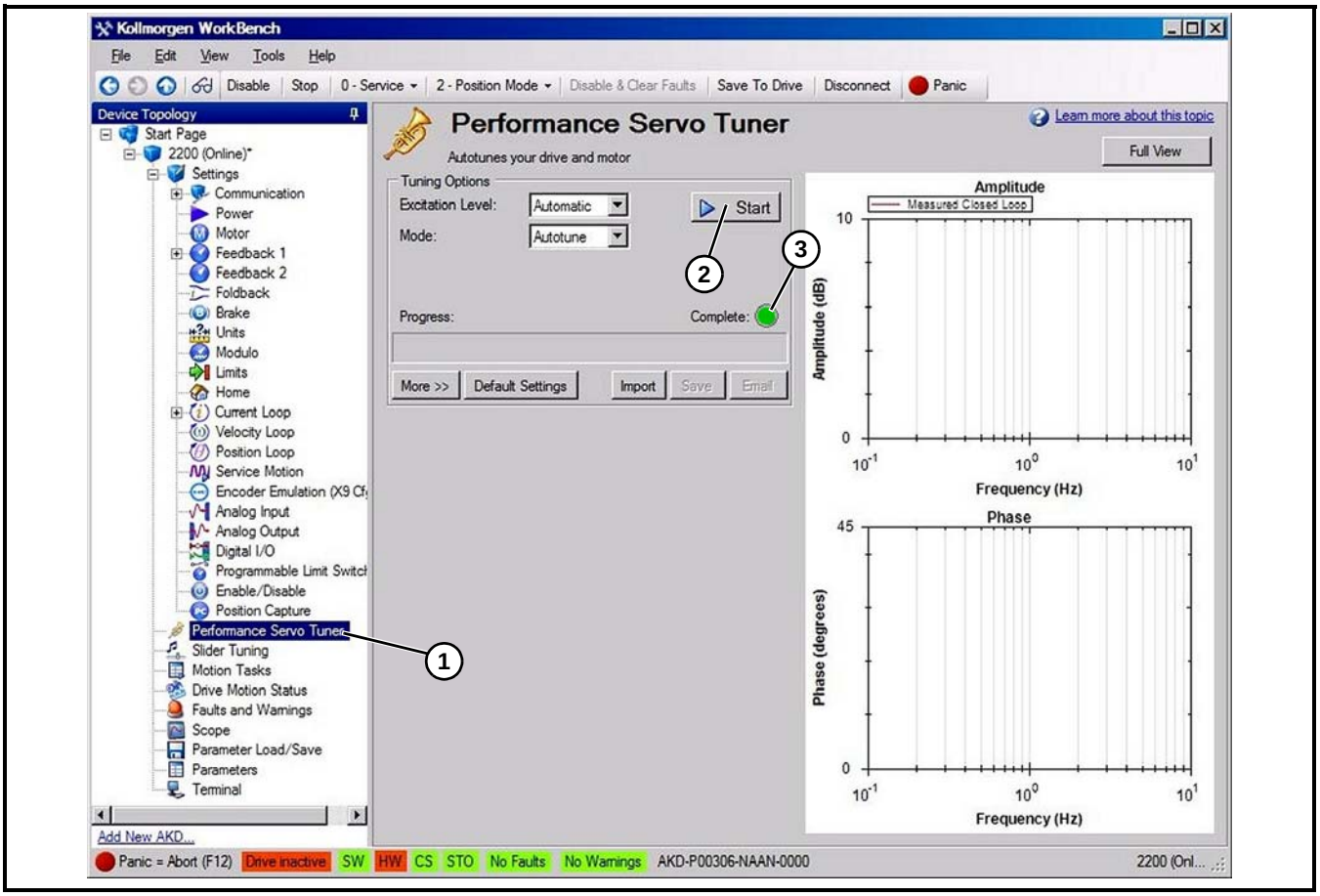


Figure 48

2. Click on start tab **(Figure 48, item 2)** to start the tuning process.

NOTE
The servo gearmotor will run very loud and erratic during the tuning process. This is normal.

3. Once tuning is complete you will see a green light **(Figure 48, item 3)**. Return the Position Error Limit to factory settings as noted above.

Operation

9. Running your Application

⚠ WARNING

Controller must be properly grounded. Failure to properly ground controller may cause injury to personnel.

⚠ DANGER

SEVERE HAZARD!
Hazardous voltage will cause severe injury or death. LOCKOUT POWER BEFORE WIRING.

1. Confirm your conveyor is free from hazards and operators are clear.
2. Confirm your drive is enabled.
3. Initiate your motion profile per your application.
4. Test and confirm your application. The Kollmorgen Workbench software has extensive diagnostic tools such as stop, drive motions stators and faults and warnings. Refer to the Kollmorgen software and manual for details.

10. Save Application File

NOTE

It is highly recommended that a copy of the drive parameters be saved. This file can be re-loaded back to the drive in case of a problem.

1. Click on the parameter load/save toolbar
2. Click **Save to File**. Follow instructions for file location and name.

Required Tools

- Hex key wrenches: 2 mm, 2.5 mm, 3 mm, 5 mm
- Adjustable wrench (for hexagon head screws)
- Straight edge
- Torque wrench

Timing Belt Tensioning (2200 Series)

⚠ WARNING

Exposed moving parts can cause severe injury.

LOCK OUT POWER before removing guards or performing maintenance.

1. Remove four M4 screws **(Figure 49, item 1)** and cover **(Figure 49, item 2).**

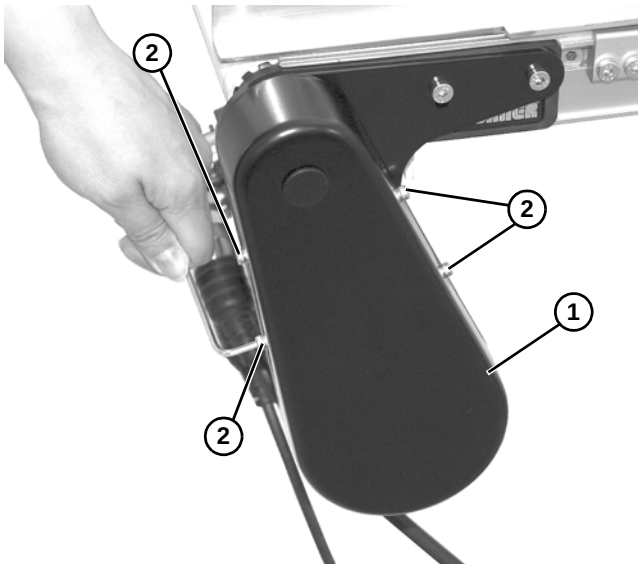


Figure 49

2. Loosen two M6 screws **(Figure 50, item 1)** to loosen belt position.

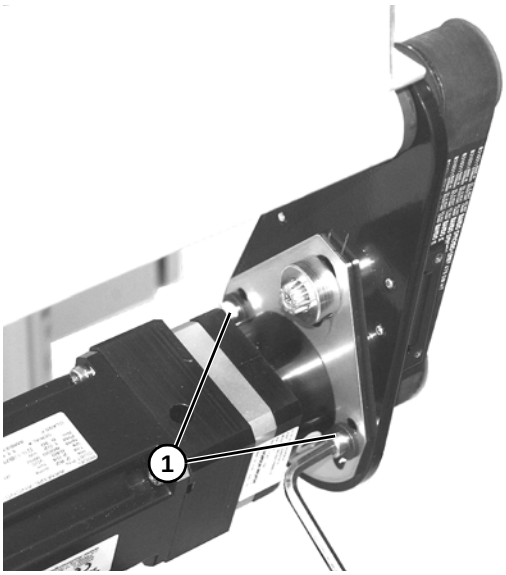


Figure 50

3. Use a hex wrench **(Figure 51, item 1)** to turn tensioner adjustment fitting **(Figure 51, item 2)** to tighten belt **(Figure 51, item 3)**.

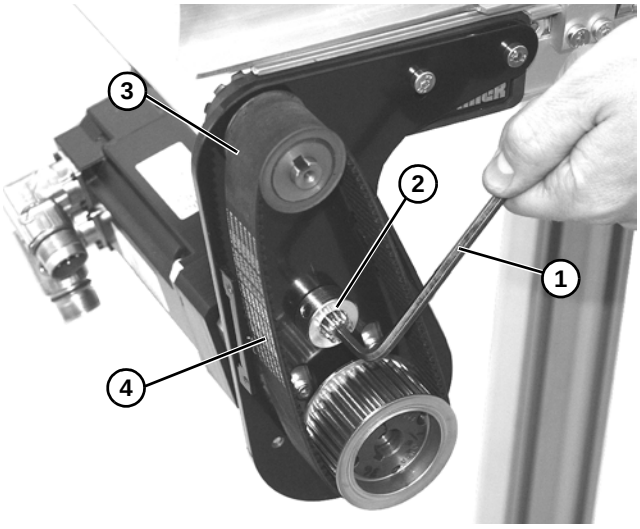


Figure 51

4. Depending on conveyor belt travel (direction A or B), locate timing belt tensioner **(Figure 51, item 2)** as shown. Tension timing belt to obtain 1/8" (3 mm) deflection for 6 lb (3 Kg) of force at timing belt mid-point **(Figure 51, item 4)**. Tighten tensioner screw to 110 in-lb (12 Nm).
5. Install cover **(Figure 49, item 1)** with four (4) screws **(Figure 49, item 2)**. Tighten screws to 14 in-lb (1.6 Nm).

Timing Belt Replacement (2200 Series)

⚠ WARNING

Exposed moving parts can cause severe injury.

LOCK OUT POWER before removing guards or performing maintenance.

1. Remove four (4) screws **(Figure 49, item 2)** and remove cover **(Figure 49, item 1)**.
2. Loosen two M6 screws **(Figure 50, item 1)** to loosen belt position.
3. Remove timing belt **(Figure 52, item 1)**.

NOTE

*If timing belt does not slide over pulley flange, loosen driven pulley set screws **(Figure 52, item 2)** and remove pulley with belt **(Figure 52, item 1)**. For re-installation, see "Timing Belt Replacement (2200 Series)" on page 52 steps 3 through 8 on page 6.*

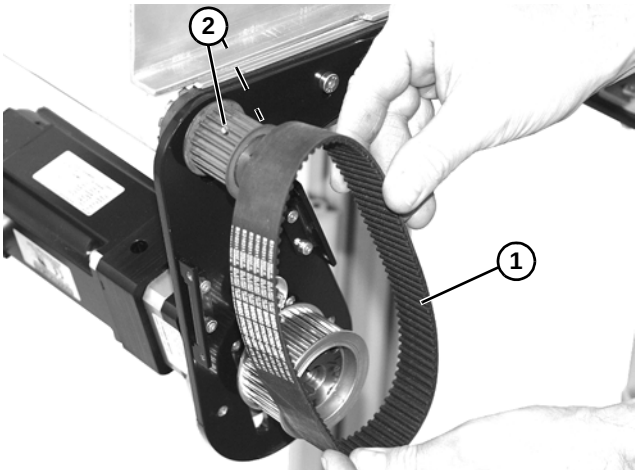


Figure 52

4. Install new timing belt.
5. Depending on conveyor belt travel (direction A or B), locate timing belt tensioner **(Figure 51, item 2)** as shown. Tension timing belt to obtain 1/8" (3 mm) deflection for 6 lb (3 Kg) of force at timing belt mid-point **(Figure 51, item 4)**. Tighten tensioner screw to 110 in-lb (12 Nm).
6. Install cover **(Figure 49, item 1)** with four (4) screws **(Figure 49, item 2)**. Tighten screws to 14 in-lb (1.6 Nm).

Drive or Driven Pulley Replacement (2200 Series)

⚠ WARNING

Exposed moving parts can cause severe injury.

LOCK OUT POWER before removing guards or performing maintenance.

1. Complete steps 1 through 3 of "Timing Belt Replacement (2200 Series)" on page 52.
2. Loosen two set screws **(Figure 53, item 1)** and remove driven pulley **(Figure 53, item 2)**.

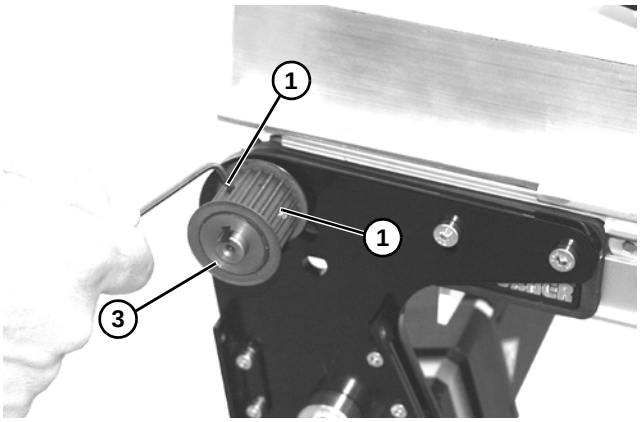


Figure 53

NOTE

*If drive pulley **(Figure 54, item 2)** is replaced, wrap timing belt around drive pulley and complete step 3.*

3. To remove drive pulley, remove taper-lock screws **(Figure 54, item 1)**. Insert one (1) of taper lock screws in remaining hole **(Figure 54, item 2)**. Tighten screw until pulley is loose. Remove pulley and taper hub assembly.

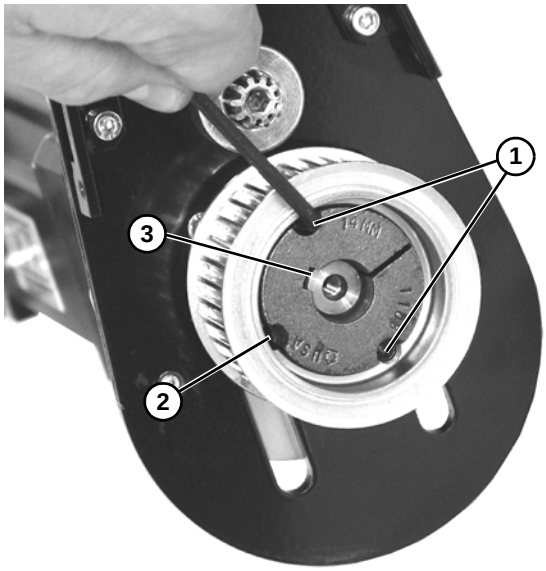


Figure 54

4. Be certain key **(Figure 54, item 3)** is in place on shaft before installing drive pulley. Secure with two taper-lock screws **(Figure 54, item 1)**.
5. Complete steps 4 through 6 of "Timing Belt Replacement (2200 Series)" on page 52.

Motor Replacement

2200 Series Motor

⚠ WARNING

Exposed moving parts can cause severe injury.

LOCK OUT POWER before removing guards or performing maintenance.

⚠ DANGER

Hazardous voltage will cause severe injury or death.

LOCK OUT POWER BEFORE WIRING.

1. Disconnect motor power connector **(Figure 55, item 1)** and feedback connector **(Figure 55, item 2).**

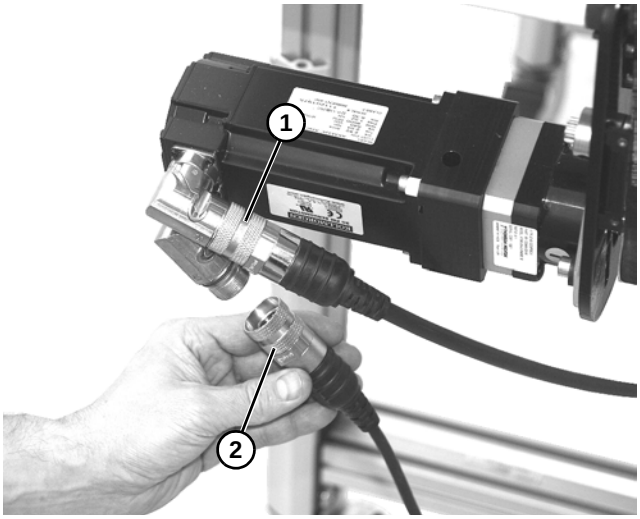


Figure 55

2. Remove four M4 screws **(Figure 56, item 1)** and cover **(Figure 56, item 2).**

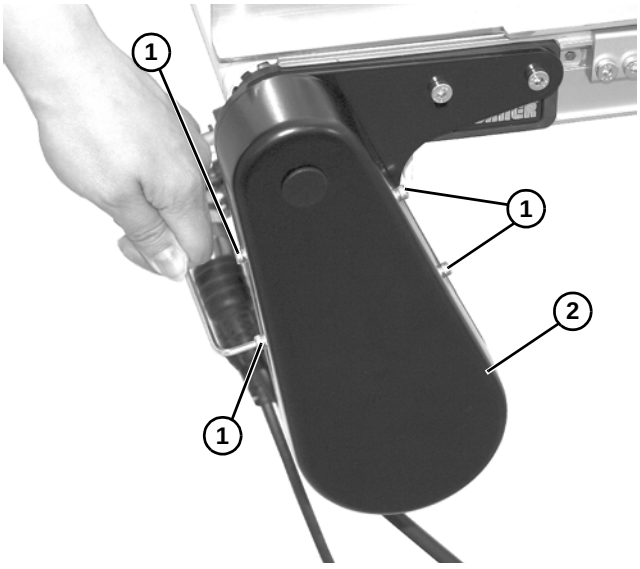


Figure 56

3. Remove drive belt and drive pulley. See steps 1-3 in "Drive or Driven Pulley Replacement (2200 Series)" on page 52.

4. Remove four hex head screws **(Figure 57, item 1)**, and remove motor **(Figure 57, item 2)** from mounting plate **(Figure 57, item 3)**.

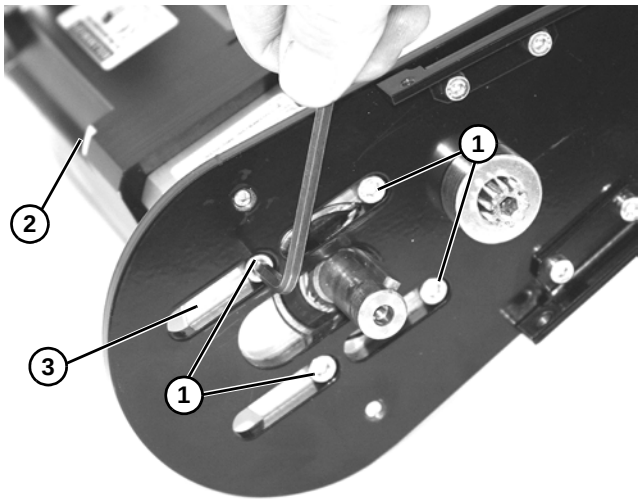


Figure 57

5. To install motor, mount with four hex head screws **(Figure 57, item 1)**.
6. Install driven pulley (complete step 4 of "Drive or Driven Pulley Replacement (2200 Series)" on page 52).
7. Install and tension drive belt (complete steps 4 through 6 of "Timing Belt Replacement (2200 Series)" on page 52).
8. Install cover **(Figure 56, item 2)** with four (4) screws **(Figure 56, item 1)**. Tighten screws to 14 in-lb (1.6 Nm).

3200 Series Motor

⚠ WARNING

Exposed moving parts can cause severe injury.

LOCK OUT POWER before removing guards or performing maintenance.

⚠ DANGER

Hazardous voltage will cause severe injury or death.

LOCK OUT POWER BEFORE WIRING.

1. Disconnect motor power connector **(Figure 55, item 1)** and feedback connector **(Figure 55, item 2).**

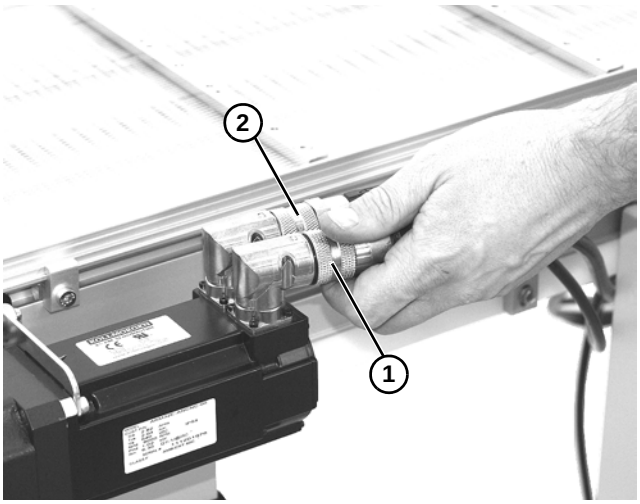


Figure 58

2. Remove cover from assembly **(Figure 59, item 1)**.

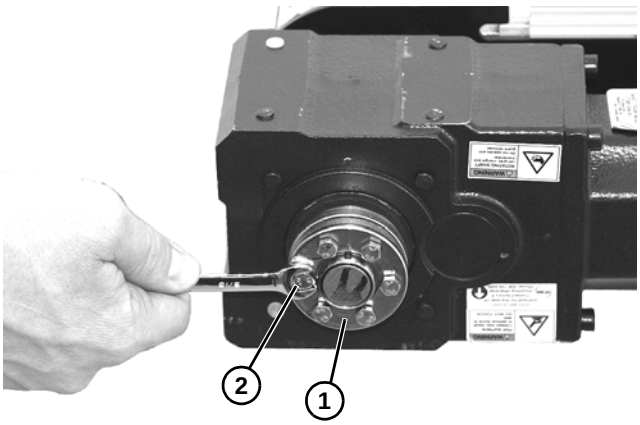


Figure 59

3. Loosen six hex head screws **(Figure 59, item 2)** securing assembly onto shaft.

4. Remove socket head bolt **(Figure 60, item 1)** and nut on top of anti-rotation adjustable rod **(Figure 60, item 2)** securing motor to bracket **(Figure 60, item 3)**.

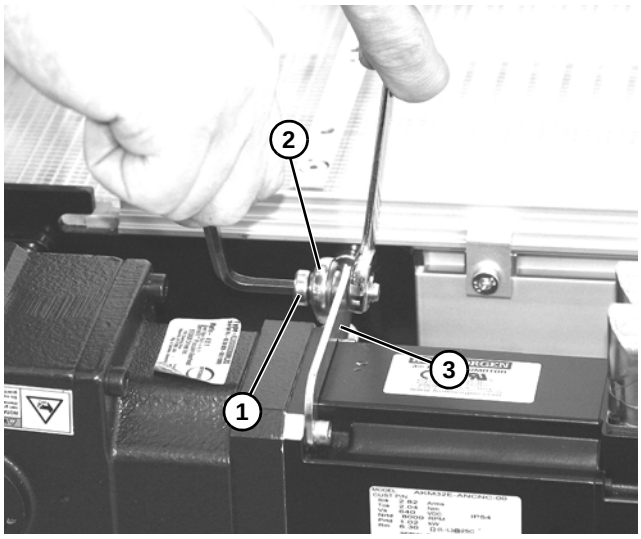


Figure 60

5. Remove servo assembly **(Figure 61, item 1)** from shaft **(Figure 61, item 2)**.

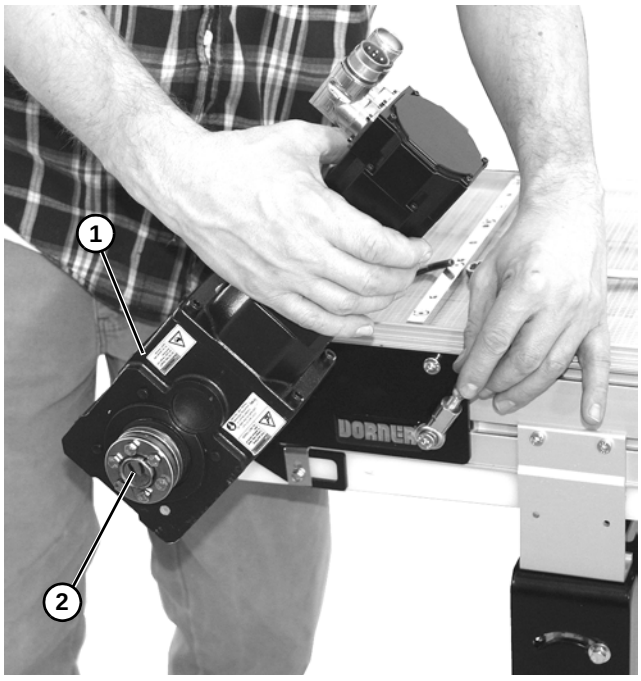


Figure 61

6. Install new servo assembly. Raise servo motor and rotate anti-rotation adjustable rod **(Figure 62, item 1)** fully upward, and then lower servo assembly.

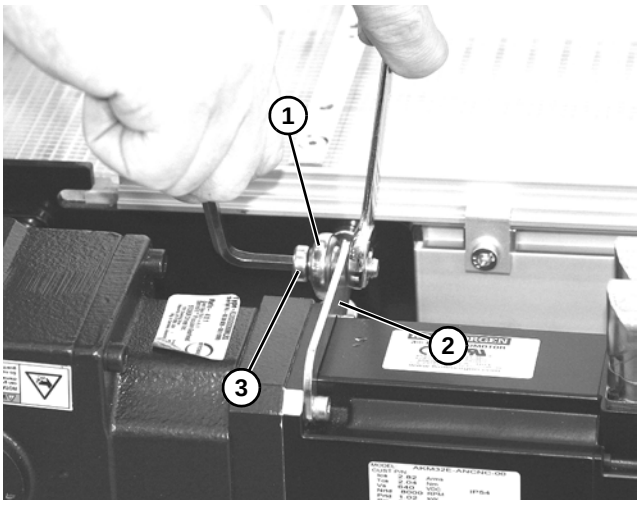


Figure 62

7. Secure top of anti-rotation adjustable rod **(Figure 62, item 1)** onto bracket **(Figure 62, item 2)** on servo motor assembly with socket head bolt **(Figure 62, item 3)** and nut.
8. Tighten six hex head screws **(Figure 63, item 1)** to secure assembly onto shaft.

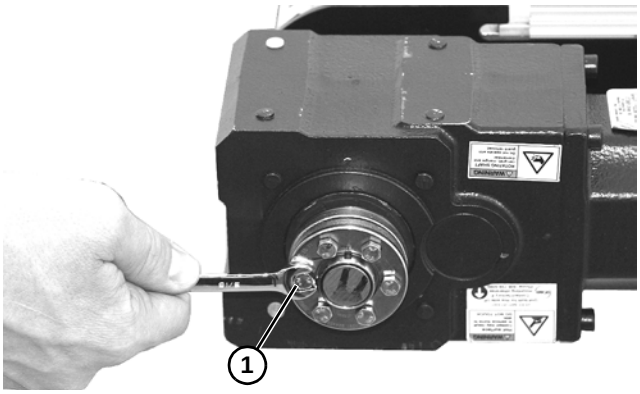


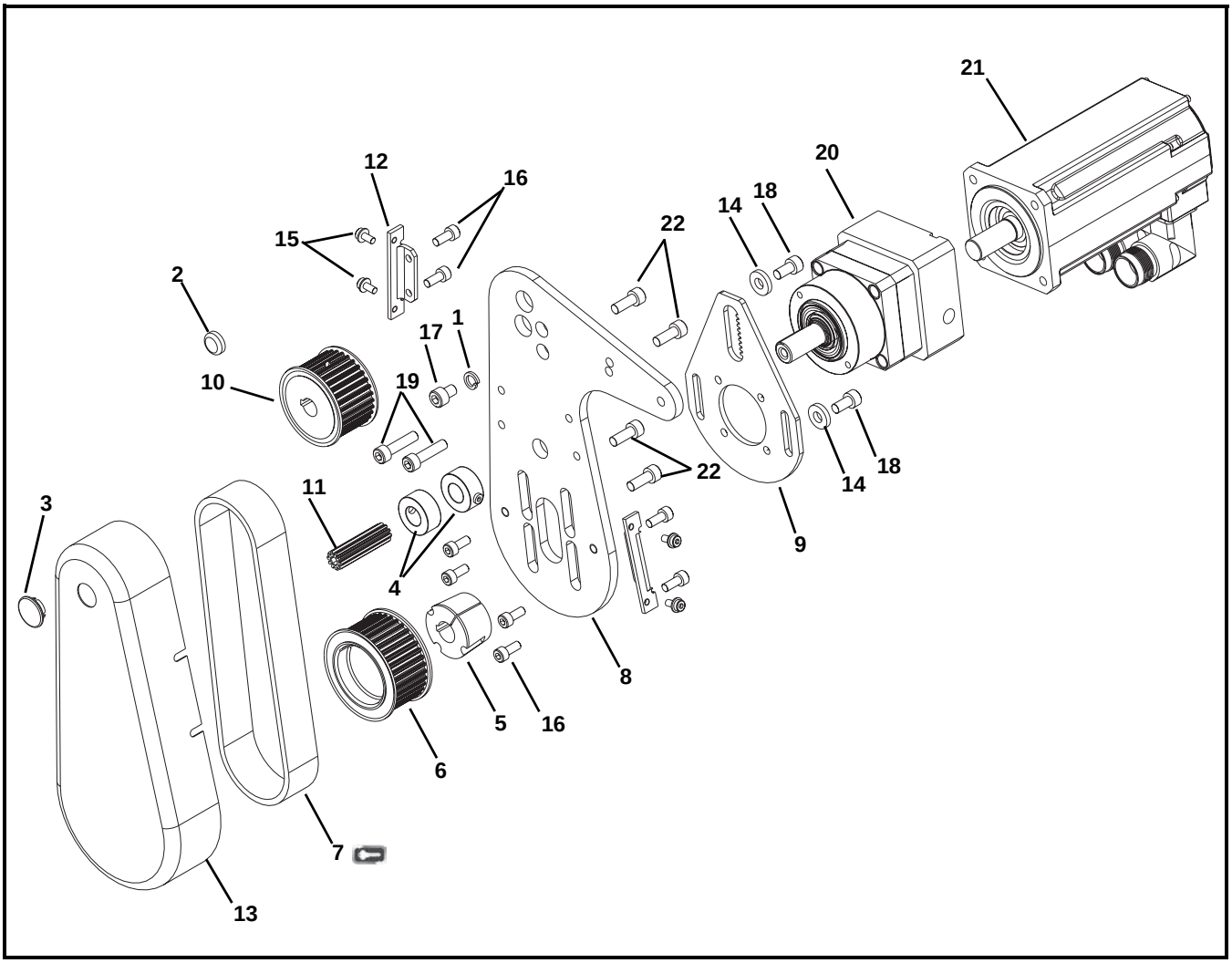
Figure 63

9. Install cover.

Service Parts

NOTE
For replacement parts other than those shown in this section, contact an authorized Dorner Service Center or the factory. Key Service Parts and Kits are identified by the Performance Parts Kits logo . Dorner recommends keeping these parts on hand.

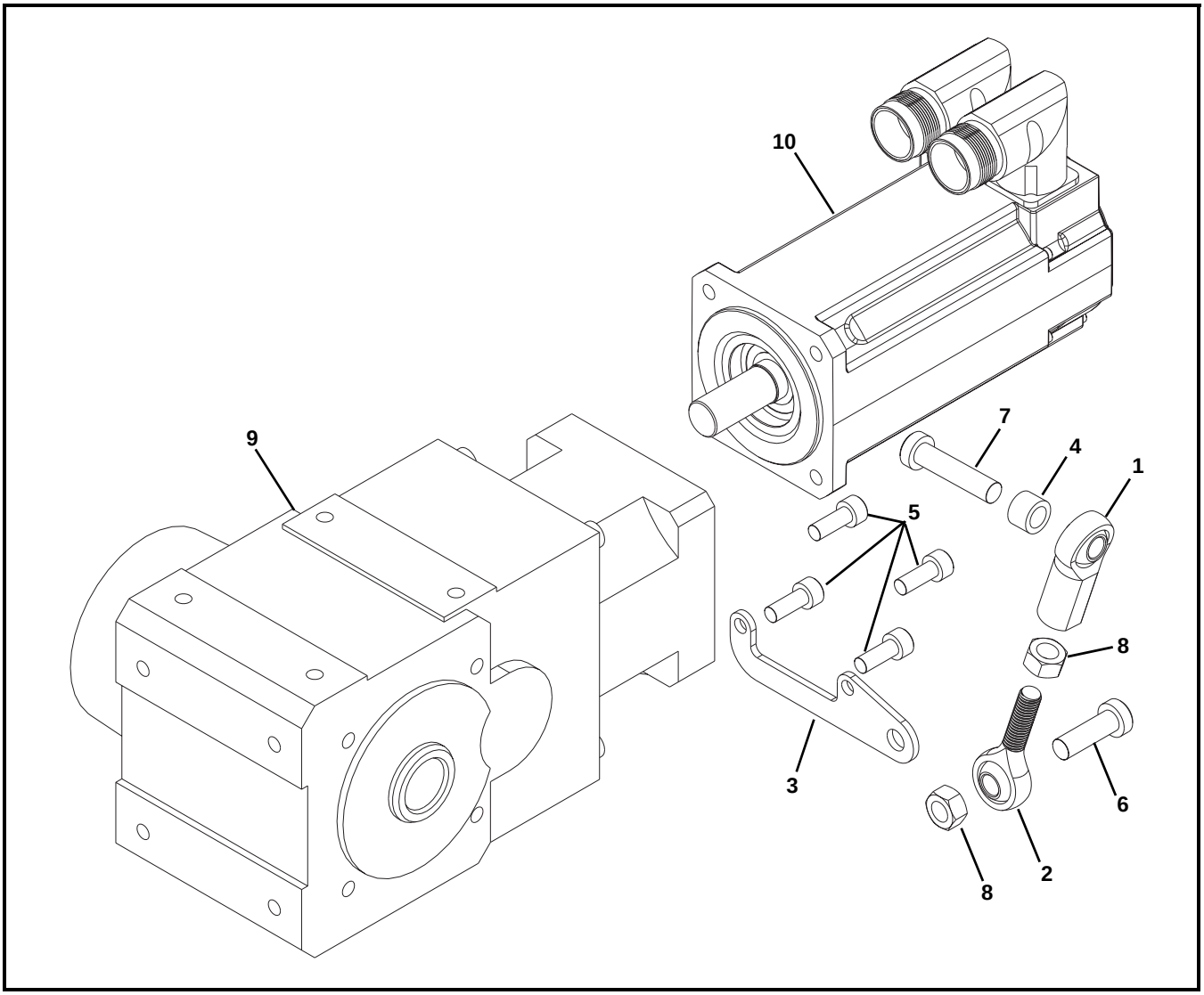
2200 Series Bottom and Flush Mount Servo Drive Assembly



Item	Part Number	Description
1	807-2092	Lock Washer
2	807-2112	Plug (Bottom Mount Only)
3	807-226	Plug
4	807-540	Clamp Collar
5	811-542	Bushing
6	811-547	Drive Pulley, 36 Tooth
7	814-422	Timing Belt, 5 mm - 25 mm - 475 mm
8	202372	Mounting Plate
9	202373	Plate Tensioner
10	202376-32	Driven Pulley, 32 Tooth (Bottom Mount)
	202376-21	Driven Pulley, 21 Tooth (Flush Mount)
11	203003M	Pinion Gear
12	450375M	Mounting Cover Bracket

Item	Part Number	Description
13	450376M	Drive Guard
14	605279P	Washer
15	920481M	Socket Head Screw, M4-0.70 x 8 mm
16	920510M	Socket Head Screw, M5-0.80 x 10 mm
17	920608M	Socket Head Screw, M6-1.00 x 8 mm
18	920612M	Socket Head Screw, M6-1.00 x 12 mm
19	920625M	Socket Head Screw, M6-1.00 x 25 mm
20	820-563	Servo Gear Reducer 80 mm (Used with Servo Motor 826-621)
	820-556	Servo Gear Reducer Nema 34
21	826-621	Servo Motor
22	950512M	Low Head Cap Screw, M5-0.80 x 12 mm

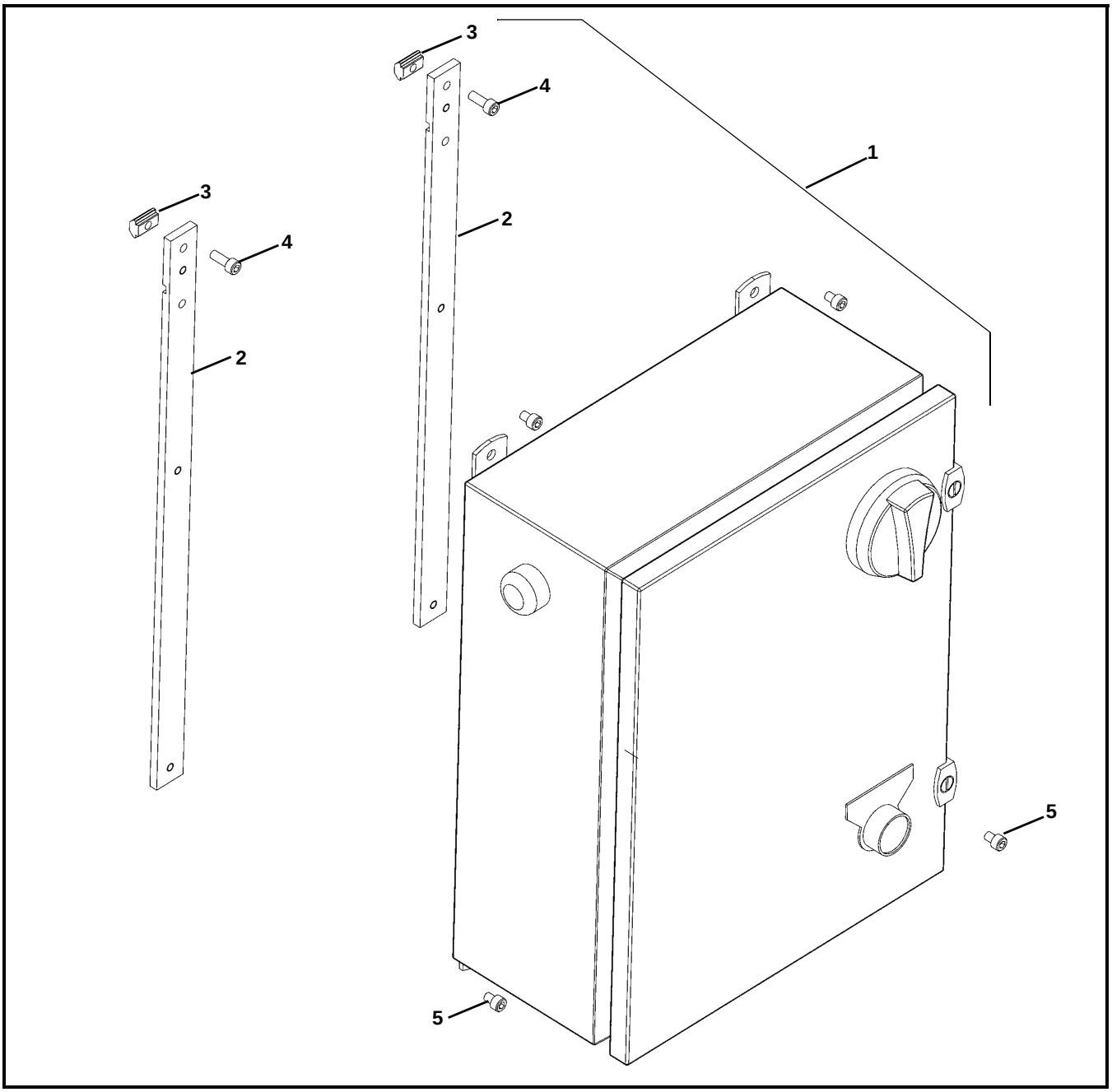
3200 Series Side Mount Servo Drive Assembly



Item	Part Number	Description
1	807-2067	Female Rod End
2	807-2068	Male Rod End
3	350170	Torque Arm (used with Gear Reducer 820-554)
	350279	Torque Arm (used with Gear Reducer 820-555)
4	352317	Tube Spacer
5	920516M	Socket Head Screw, M6-1.00 x 16 mm
6	950825M	Low Head Cap Screw, M8-1.25 x 25 mm
7	950835M	Low Head Cap Screw, M8-1.25 x 35 mm
8	990801M	Hex Nut
9	820-554	Servo Gear Reducer 80 mm (Used with Servo Motor 826-621)
	820-555	Servo Gear Reducer Nema 34
10	826-621	Servo Motor

Service Parts

Controller



Item	Part Number	Description
1	75M-S1-11-3	Stand Alone Controller, 115 volt
	75M-S2-11-3	External Control Controller, 115 volt
	75M-S1-21-3	Stand Alone Controller, 230 volt
	75M-S2-21-3	External Control Controller, 230 volt
2	350127	Mounting Bars
3	639971MK10	Single Drop-in Tee Bar (x10)
4	920616M	Socket Head Screw, M6-1.00 x 16 mm
5	920610M	Socket Head Screw, M6-1.00 x 10 mm

Notes

Return Policy

Returns must have prior written factory authorization or they will not be accepted. Items that are returned to Dorner without authorization will not be credited nor returned to the original sender. When calling for authorization, please have the following information ready for the Dorner factory representative or your local distributor:

1. Name and address of customer.
2. Dorner part number(s) of item(s) being returned.
3. Reason for return.
4. Customer's original order number used when ordering the item(s).
5. Dorner or distributor invoice number (if available, part serial number).

A representative will discuss action to be taken on the returned items and provide a Returned Goods Authorization (RMA) number for reference. RMA will automatically close 30 days after being issued. To get credit, items must be new and undamaged. There will be a return charge on all items returned for credit, where Dorner was not at fault. It is the customer's responsibility to prevent damage during return shipping. Damaged or modified items will not be accepted. The customer is responsible for return freight.

<table>
<tr><th></th><th colspan="8">Product Type</th></tr>
<tr><th></th><th colspan="7">Standard Products</th><th>Engineered to order parts</th></tr>
<tr><th>Product Line</th><th>Conveyors</th><th>Gearmotors & Mounting Packages</th><th>Support Stands</th><th>Accessories</th><th>Spare Parts (non-belt)</th><th>Spare Belts - Standard Flat Fabric</th><th>Spare Belts - Cleated & Specialty Fabric</th><th>Spare Belts - Plastic Chain</th><th>All equipment and parts</th></tr>
<tr><td>1100</td><td colspan="6" rowspan="14">30% return fee for all products except:
50% return fee for conveyors with modular belt, cleated belt or specialty belts</td><td colspan="2" rowspan="15">non-returnable</td><td rowspan="15">case-by-case</td></tr>
<tr><td>2200</td></tr>
<tr><td>2200 Modular Belt</td></tr>
<tr><td>2200 Precision Move</td></tr>
<tr><td>2300</td></tr>
<tr><td>2300 Modular Belt</td></tr>
<tr><td>3200</td></tr>
<tr><td>3200 LPZ</td></tr>
<tr><td>3200 Precision Move</td></tr>
<tr><td>4100</td></tr>
<tr><td>5200</td></tr>
<tr><td>5300</td></tr>
<tr><td>6200</td></tr>
<tr><td>Controls</td></tr>
<tr><td>7200 / 7300</td><td colspan="6">50% return fee for all products</td></tr>
<tr><td>7350</td><td colspan="9" rowspan="4">non-returnable</td></tr>
<tr><td>7360</td></tr>
<tr><td>7400</td></tr>
<tr><td>7600</td></tr>
</table>

Returns will not be accepted after 60 days from original invoice date. The return charge covers inspection, cleaning, disassembly, disposal and reissuing of components to inventory. If a replacement is needed prior to evaluation of returned item, a purchase order must be issued. Credit (if any) is issued only after return and evaluation is complete.

Dorner has representatives throughout the world. Contact Dorner for the name of your local representative. Our Customer Service Team will gladly help with your questions on Dorner products.

For a copy of Dorner's Warranty, contact factory, distributor, service center or visit our website at www.dorner.com.

For replacement parts, contact an authorized Dorner Service Center or the factory.

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