



**CoreStar
TrackDrive-200 (TD-200)
Reference Manual**



EddyVision Rev 7.0

2/22/2012

CoreStar International Corp

1044 Sandy Hill Rd
Irwin, PA 15642-4700

Phone: 1-724-744-4094
Fax: 1-724-744-4093
24/7 Support: 1-888-533-9403
Web : www.corestar-corp.com
Email : support@corestar-corp.com

TECHNICAL SUPPORT

Around the Clock Technical Support is available on all of our software and hardware products. For technical assistance call the main office number during business hours (8:00 a.m. to 5:00 p.m. EST), and call our dedicated twenty-four hour emergency technical support hotline for after hours help.

Before calling for help please read the product documentation carefully. Technical support is also available via Email and Fax.

NOTES:

1. Technical support does not include expert consulting.
2. A general familiarity with Windows and MS Explorer is expected on the part of the user.
3. CoreStar cannot be held responsible for the reliability of the customer's PC system. Assistance in resolving customer PC issues may be referred to the user's IT department.
4. Technical support does not include PC system configuration or debugging. This function is best performed by the customer's IT department.

5. GENERAL SOFTWARE USE AGREEMENT

In return for payment of the applicable fee, CoreStar International Corporation grants the Customer license to utilize the software, subject to the following conditions:

6. USING, COPYING, AND MODIFYING SOFTWARE

- Customer may use the software on any one computer that operates with a CoreStar hardware key.
- Customer may copy software as required to support normal media reliability requirements.
- Customer may use software only as provided.
- Customer may not reverse assemble or de-compile the software.

7. COPIES

- Customer may make unlimited copies of the software for archival purposes.
- Customer agrees that no warranty, installation or training is provided by CoreStar International for any copies made by Customer unless otherwise agreed by CoreStar International.
- All copies of the software must bear the copyright notice(s) contained in or on the original.

8. OWNERSHIP

- Customer agrees that it does not have any title or ownership of the software.
- Customer acknowledges and agrees that the software is copyrighted and protected under the United States and International copyright laws.

9. TRANSFER OF RIGHTS IN SOFTWARE

- Customer may transfer rights in the software to a third party only if written consent is granted by CoreStar International Corp.
- Customer may transfer rights in the software to a third party only as part of the transfer of all rights and only if Customer obtains the prior agreement of the third party to be bound by the terms of this License Agreement.
- Upon such a transfer, Customer agrees that its rights in the software are terminated and that it will either destroy its copies or deliver them to the third party.
- Upon such a transfer, Customer agrees that it must also transfer the hardware key.

10. SUB-LICENSING AND DISTRIBUTION

- Customer may not sub-license the software or distribute copies or adaptations of the software to the public in physical media or by telecommunication without the prior written consent of CoreStar International.

11. TERMINATION

- CoreStar International may terminate this software license for failure to comply with any of these terms provided CoreStar International has requested Customer to cure the failure and Customer has failed to do so within thirty (30) days of such notice.

12. UPDATES AND UPGRADES

- ❑ Customer agrees that the software does not include updates and upgrades which may be available from CoreStar International under a separate support agreement.

13. EXPORT CLAUSE

- ❑ Customer agrees not to export or re-export the software or any copy or adaptation in violation of the US Export Administration regulations or other applicable regulation.

14. RESPONSIBILITY

- ❑ The customer is responsible for the hardware key. If this key is lost CoreStar International will not replace it.

15. LIABILITY

- ❑ In no event shall CoreStar International be held liable under any circumstances for loss of profits or other contingent, consequential, or special damages arising out of the use of or inability to use CoreStar products even if CoreStar International Corp. has been advised of the possibility of such damages.

16. ERRATA

- ❑ EddyVISION 32 release 6.5 runs only on Windows XP Pro SP 2 or higher, Windows Vista, and Windows 7;
- ❑ EddyVISION 32 release 6.5 makes use of a three (3) button mouse; certain features are not available to users with a two (2) button mouse;
- ❑ EddyVISION 32 release 6.5 requires at least 64meg of ram, 1024x768 pixel display, a 200MHz Pentium-type processor, and a 10Gb hard drive with at least 100Mb free space.

SOFTWARE WARRANTY

CoreStar International Corporation's line of software products are provided "as is" without warranty of any kind, either expressed or implied, including any implied warranties of merchantability and fitness for a particular purpose. The entire risk as to quality and performance of CoreStar's software is assumed by the customer.

Neither CoreStar nor anyone else who has been involved in the creation, production, or delivery of CoreStar software products shall be liable for any direct, indirect, consequential, or incidental damages arising out of the use of, or inability to use CoreStar software, even if CoreStar or its agents or licensees have been advised, know or should have known of the possibility of such damages.

CoreStar does warrant to the customer that the medium on which the CoreStar software is recorded is free from defects in material and workmanship under normal use and service for a period of 90 days from date of shipment. CoreStar's entire liability and the Customer's exclusive remedy shall be replacement of the medium not meeting CoreStar's limited warranty. If failure of the medium has resulted from accident or abuse, CoreStar shall have no responsibility to replace medium under the warranty.

HARDWARE WARRANTY

CoreStar International Corporation offers a one-year warranty on all of its hardware products. The warranty period is one year from the date of shipment to the original purchaser. CoreStar manufactured hardware products are warranted to be free from defects in material or manufacture when used under normal operating conditions. Liability is limited to servicing or replacing defective parts, except those items that would require periodic replacement due to normal wear during use.

In no event shall CoreStar be liable under any circumstances for loss of profits or other contingent, consequential, or special damages. Units are to be returned transportation prepaid by the buyer, and returned to buyer freight collect.

This warranty shall not apply to products which have been subjected to misuse, improper installation, repair, alteration, neglect, accident, inundation, fire or operation outside published maximum ratings. On OEM equipment, the OEM warranty will be applied and honored from date of shipment.

Consumable items such as probes, cables, splitters, belts, and conduit are not covered by this warranty. Items that require replacement due to normal wear and tear are also not covered by this warranty.

SAFETY

This instrument is an instrument of protection Class I and is designed for a continuous use operating condition. The enclosure has an IP20 protection rating for indoor use only. Before applying power, verify that the correct safety precautions are taken (see the following warnings). In addition, note the external markings on the instrument.



Hazard symbol referring to the instruction manual: the product is marked with this symbol when it is necessary for you to refer to this instruction manual in order to protect yourself against personal injury or to protect against damage to the product.

WARNINGS

- Carefully read the instructions contained in this manual prior to powering on the instrument.
- Keep this manual in a safe place for further reference.
- Follow the operation procedures.
- Respect the safety warnings on the instrument and in this manual.
- Before turning on the instrument, you must connect the protective earth terminal of the instrument to the protective conductor of the (mains) power cord. The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. You must not negate the protective action by using an extension cord (power cables) without a protective conductor (grounding). Grounding one conductor of a two conductor outlet is not sufficient protection.
- Whenever it is likely that the ground protection is impaired, you must make the instrument inoperative and secure it against any unintended operation.
- The instrument must be connected only to a power source corresponding to the type indicated on the instrument.
- Power plug used shall be of the non-locking type to facilitate ease of disconnection from power source.
- Equipment should be positioned in a way that it is not difficult to operate the disconnecting device.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Do not install substitute parts or perform any unauthorized modification to the instrument.

Table of Contents

Overview & Specifications	1
Assembling the TD-200	2
Setting the Computer's IP Address	10
Configuring Screen for OMNI-200 and TD-200 with Auto Acquisition	11
Setting the TD-200's IP Address	13
Communicating with the TD-200	15
Calibrating Motor and Poly Encoders	17
Slip Detect and Air Assist	19
Torque Limits	20
Acquisition Software Control of TD-200	21
Auto Acquisition	22
PUSHER CONFIG QUICK REFERENCE	24
Disassembling the TD-200	26
Removing the Belt and Lower Roller Plate	27
APPENDIX A: Assembly Drawings	A
APPENDIX B: Electrical Drawings	B

Overview & Specifications

OVERVIEW

The CoreStar TrackDrive-200 is an automated probe pusher/puller system used for eddy current tubing examinations. The unique belt drive and air assisted lower roller plate reduces probe slippage. The torque motor eliminates the need for a mechanical clutch and provides the spool with the necessary amount of torque to keep the probe on the spool. In the OMNI-200-TIP (tester in pusher model), the need for a reference probe, extension cables, and slip ring is eliminated. This portable system is designed for indoor use. Prior to using this equipment, CoreStar recommends reading this entire manual.

SYSTEM SPECIFICATIONS

Power:	108-132 VAC, 50/60 Hz, 2400 W maximum
Environmental:	32-113°F (0 to 45°C) operating range, -4 – 158°F (-20 to 70°C) storage
Altitude:	Up to 2,000 m
Humidity:	Maximum of 80% non-condensing
Interface:	Single 10/100 Ethernet connection
Mechanical:	Main Drive: 13"L x 14"W x 8"H (33.0 x 35.6 x 20.3 cm) 46.0 lbs. (20.9 kg) Take-up Drive: 12"L x 14"W x 13"H (30.5 x 35.6 x 33.0 cm) 27.0 lbs. (12.3 kg) OMNI-200 Spool: 12.5" Diameter x 4"W (31.8 x 10.2 cm) 6.0 lbs. (2.7 kg) Drive Control Pod: 22"L x 7.5"W x 4"H (55.9 x 19.1 x 10.2 cm) 13.0 lbs. (5.9 kg)
Other:	Pollution degree 2

TD-200 SPECIFICATIONS

Speed:	0.1 to 100 inches/second (.25 to 254 cm/second)
Encoders:	Main Drive and Take-up spool

OMNI-200 SPECIFICATIONS

Frequency Range:	20 Hz to 2.5 MHz
Drive Voltage:	0-20 Vpp 300 ma protected
RPC Motor Output:	0-10 Volt 1.5 Amp protected
System Gain:	-22 to 20 dB adjustable in 6 dB steps
Preamp Gain:	1-700 adjustable
Frequency Generators:	4 multiplexed or simultaneous
Channel Capacity:	Simultaneous mode 32 Multiplexed mode 128 Context mode 512
Sample Rate:	Samples/Second mode – 100 to 40,000 s/s

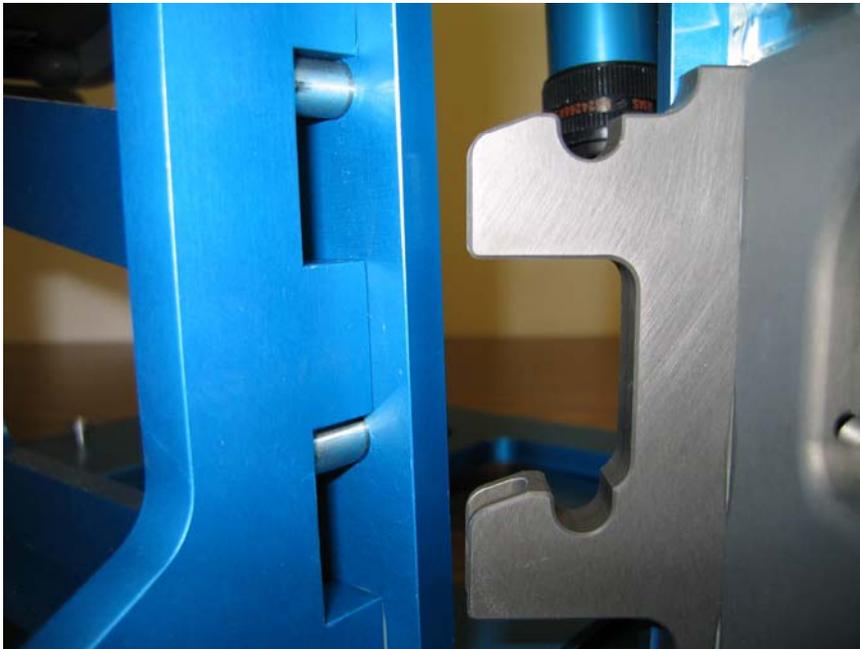
Assembling the TD-200

The TD-200 consists of three major parts: Drive assembly, Take up assembly, and Control Box. The TD-200 is easily assembled by following the steps below:

- Put the take up assembly latch into the upright position.

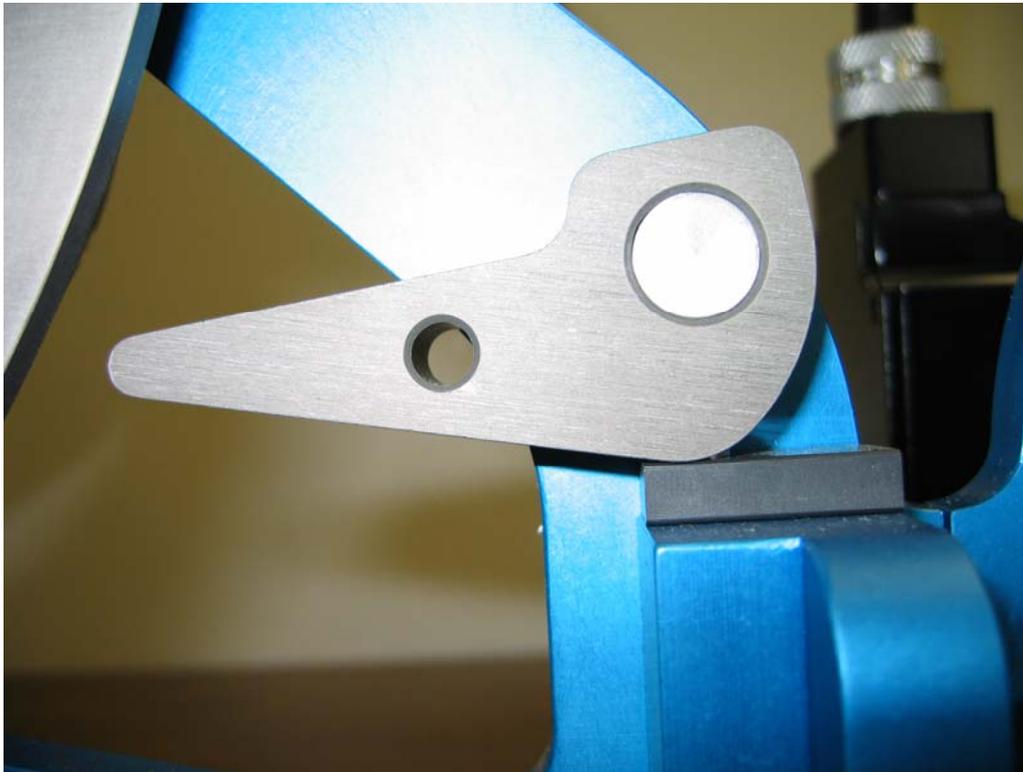


- Lift the take up assembly and place it so the pins of the latch rest in the support of the drive assembly. When done correctly, the bases of both assemblies should be equal in height from the surface.





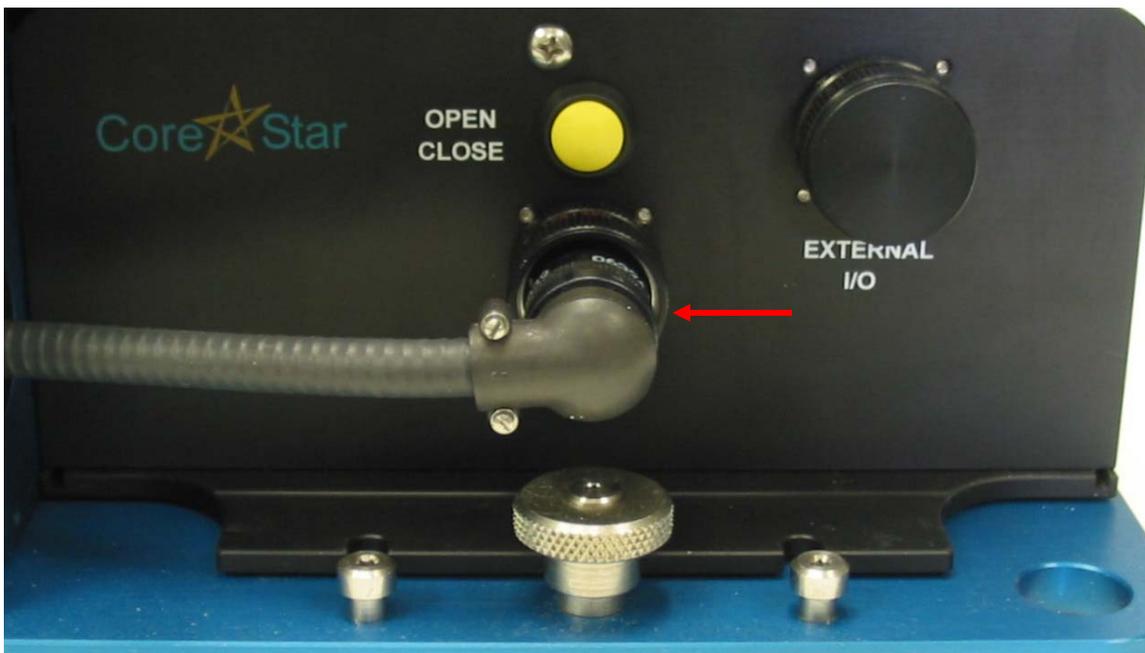
- Move to latch to the locked position.



- ❑ Move and secure the latch locking safety mechanism so that the spool latch can not come unlocked.



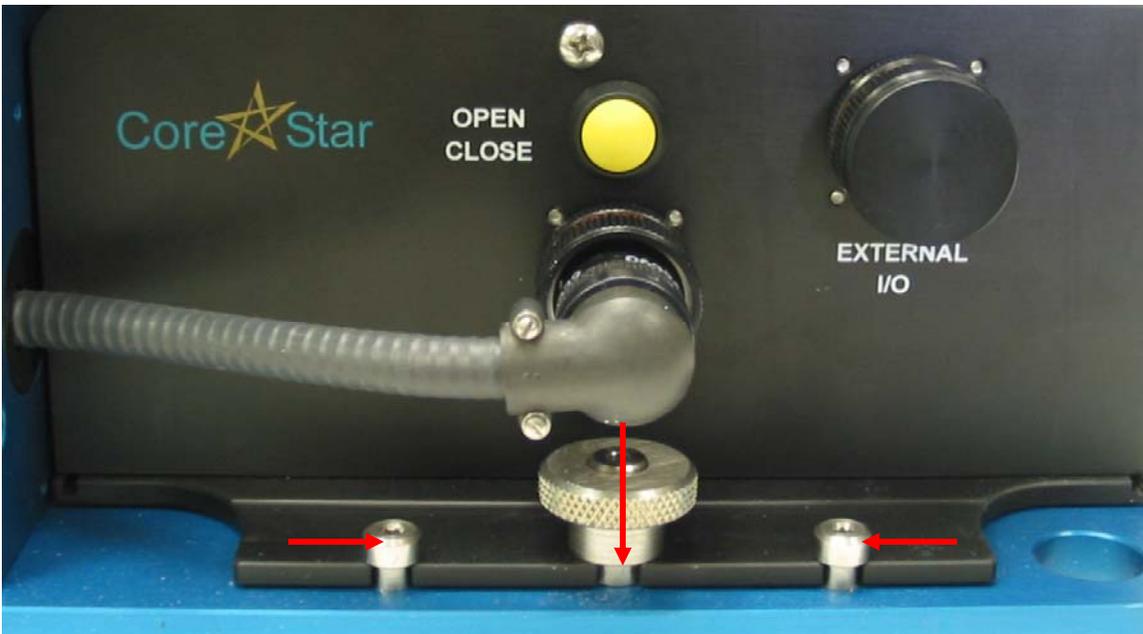
- ❑ Place control box on unit and connect the air/encoder cable.



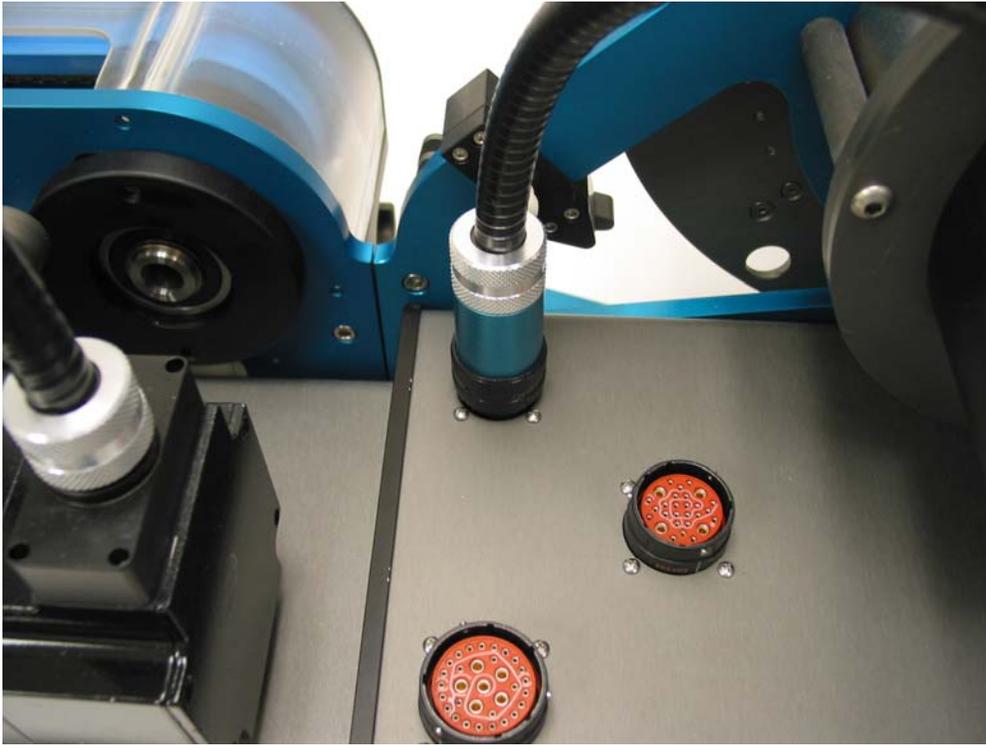
- Lift control the box lock up.



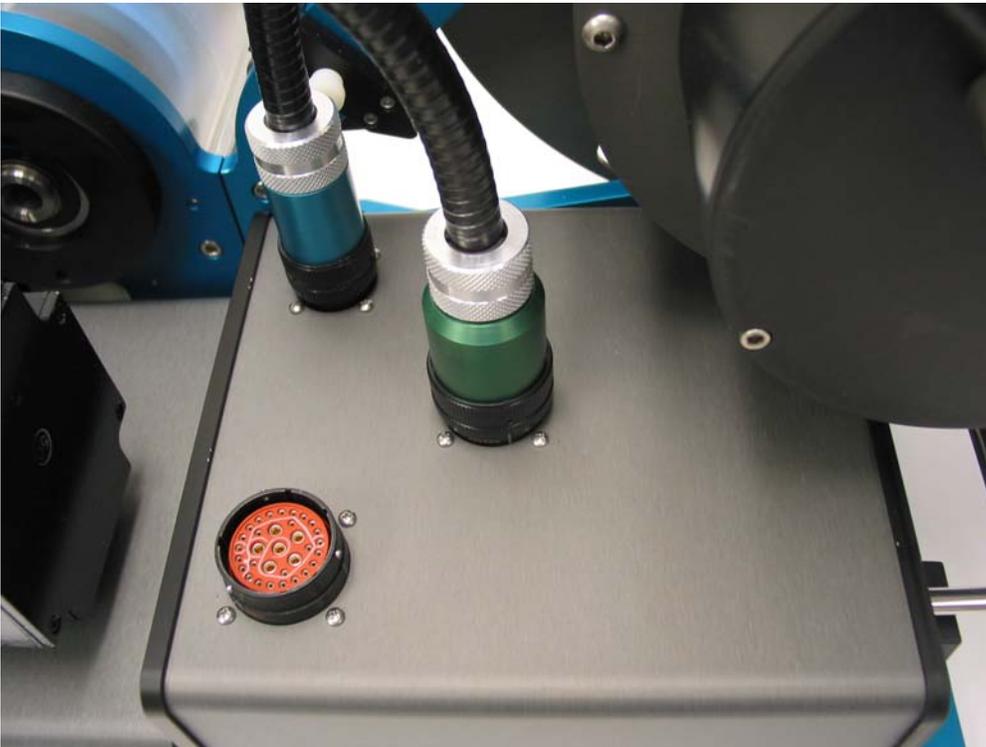
- Slide the control box into place and lower the control box lock.



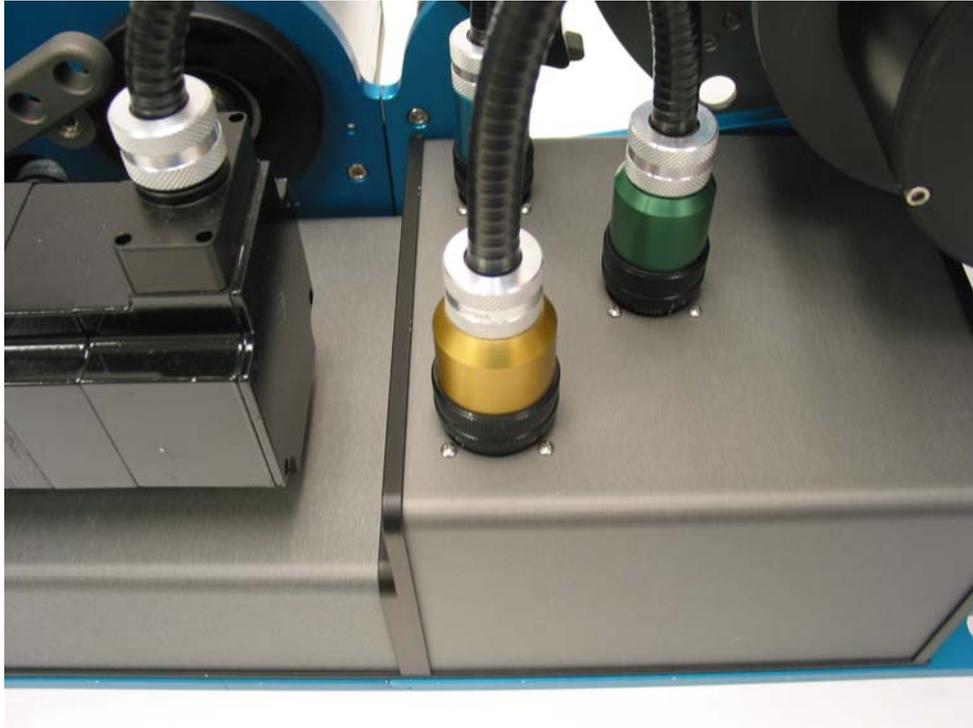
- ❑ Connect the take up motor connector (blue) to the control box.



- ❑ Connect the drive motor connector (green) to the control box.



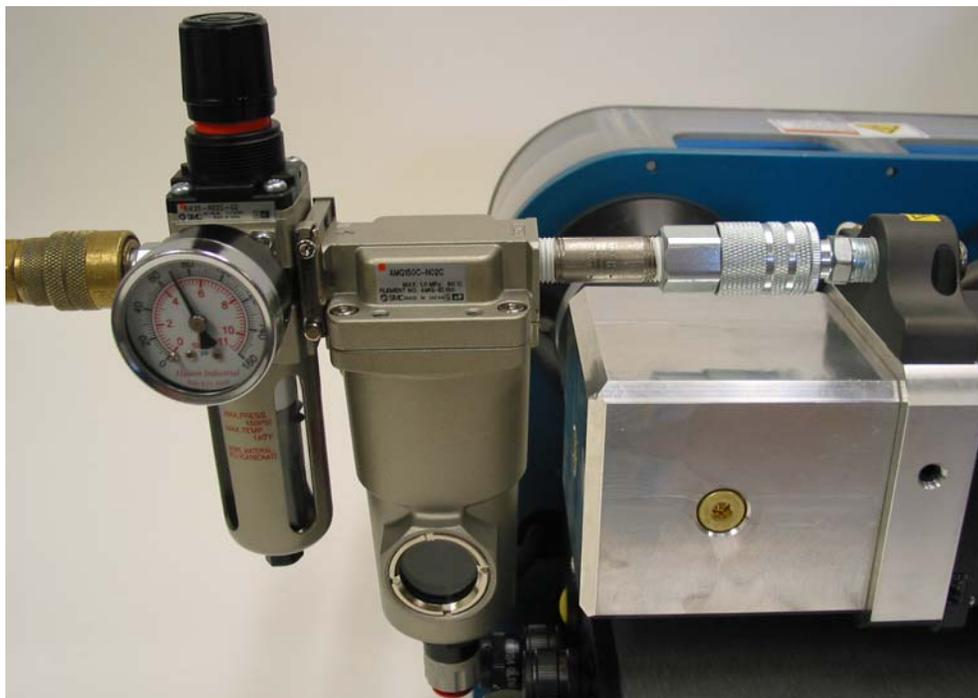
- For OMNI-200-TIP models, connect the tester connector (gold) to the control box.



- Connect air line to coupler on top of the drive motor.



This is the input air supply for the TD-200. Input air should be dry, filtered, and not exceed a pressure of 70 psi. The open/close function of the lower roller plate and slip management features depend on air. The TD-200 will not operate without air.



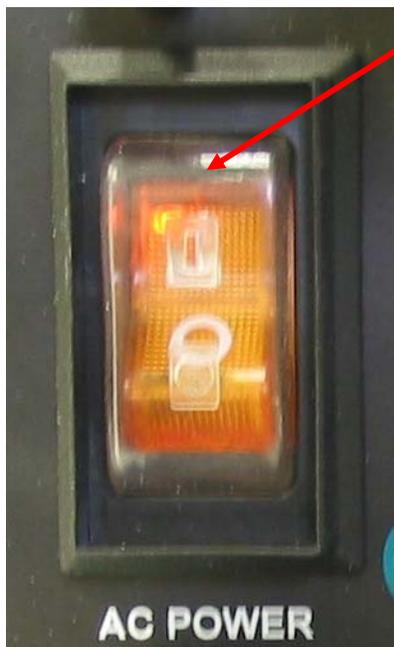
- Connect the power cord.



Connect the power cord to the control box prior to plugging into the main power. It is recommended to use the supplied ELCI and/or emergency stop at the main power. Do not remove this connection when energized. Prior to performing any repairs, always disconnect main power supply. This connection is not intended to be the main power disconnection.

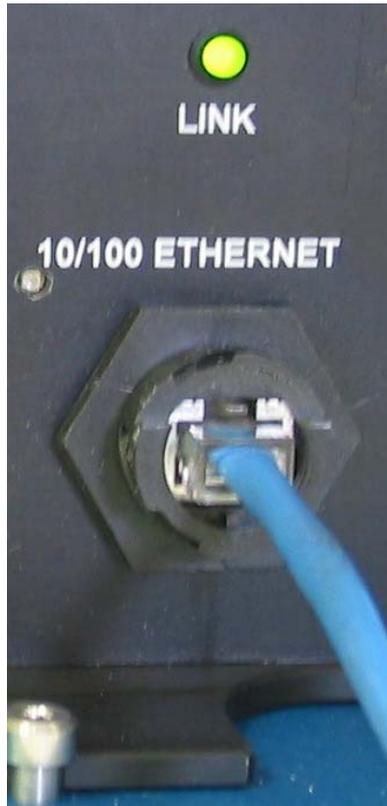


- Turn unit ON.



ON

- ❑ Connect CAT 5 patch cable to the network port on the control box. Green LED should light up when proper connection is established.



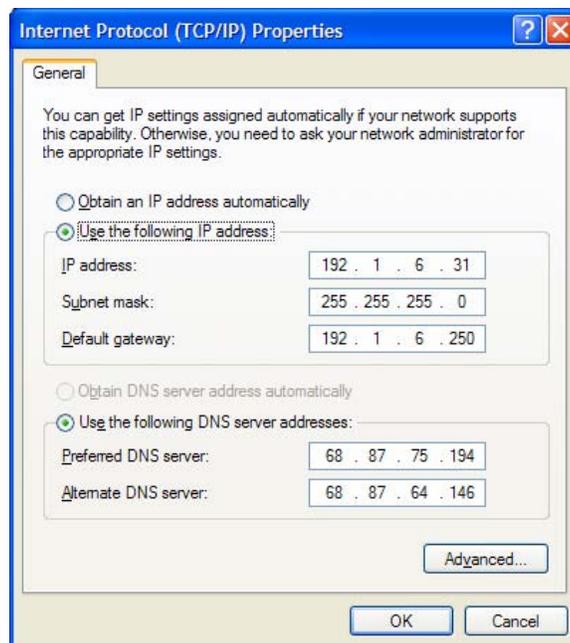
- ❑ To manually open and close the track, press the open/close button on the control box front panel.



Setting the Computer's IP Address

The computer must have a static IP address in order to communicate with CoreStar products. To set an IP address in Windows XP, do the following:

- ❑ Select the start **menu**.
- ❑ From the start **menu**, select **Settings > Control Panel**.
- ❑ From the **Control Panel**, open Network **Connections**.
- ❑ In the **Network Connections** window, right click on **Local Area Connection** and select **Properties**.
- ❑ In the **Local Area Connection Properties** window, scroll down and open **Internet Protocol (TCP/IP)**.
- ❑ From the **Internet Protocol (TCP/IP) Properties** window, select **Use the following IP address** and enter a valid **IP address** and **Subnet mask**.



- **NOTE:** Default gateway and DNS server settings are not required to operate CoreStar equipment.
- ❑ Select **OK** in **Internet Protocol (TCP/IP) Properties**.
- ❑ Select **OK** in **Local Area Connection Properties**.
- ❑ Close the **Network Connections** window.

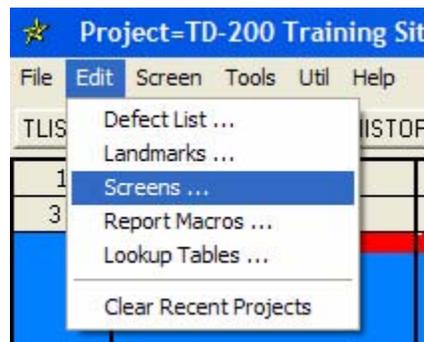
Configuring Screen for OMNI-200 and TD-200 with Auto Acquisition

The CoreStar EddyVision32 Acquisition and Analysis software allows for up to sixteen (16) customized screen layouts. Listed below is a brief description of how to setup function key F5 for an OMNI-200 tester and a TrackDrive-200 pusher with auto acquisition enabled.

- ❑ Open the CoreStar EddyVision32 Acquisition and Analysis software.



- ❑ Open a valid project.
- ❑ Select **Edit > Screens**.



- ❑ From the **Screen Param** window, do the following:
 - In the **Function Key** dropdown, select **F5**.
 - For the **Screen Name** type in "OMNI/TD-200 AUTO ACQ".
 - The **Screen Type** should be set to **Standard**.
 - Ensure the following **Components** are selected:
 - **Strips** (Enables strip charts to be seen on the display)
 - **Liss** (Enables lissajous to be seen on the display)
 - **Test** (Displays the buttons needed for acquisition)
 - Enter the desired number of **Strip Charts** in the **Count** field.
 - The **Strip Charts Frac** field specifies the desired percentage of screen space to consume.
 - In the **Lissajous** section, select the number of **Rows** and **Cols** that are desired.
 - **NOTE:** The **Frac** field in **Lissajous** is dependent on the **Frac** field in **Strip Charts**.
 - As desired select the following **Lissajous** options:
 - **Use Meas** (This recommended setting shows the signal measurement info on the screen)
 - **Use Btns** (This optional setting will display the analysis defect code, file number, expanded strip chart scale, signal advance, and voltage setting buttons)
 - **Use Exp** (This optional setting shows the expanded strip chart for each lissajous)
 - **Cscans** settings can be ignored because they are for RPC analysis screens.
 - Ensure the following options are set or enabled in the **Acquisition** field:
 - **Auto ACQ** (This setting enables auto acquisition)

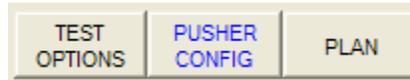
- The recommended setting for **Plan Rows** is 10
- **Tester** should be set to **OMNI-200**
- **Pusher** should be set to **TrackDrive-200**
- The **Compare** and **Auto** fields can be ignored because they are used for analysis functions.

- Select **OK** to save settings.

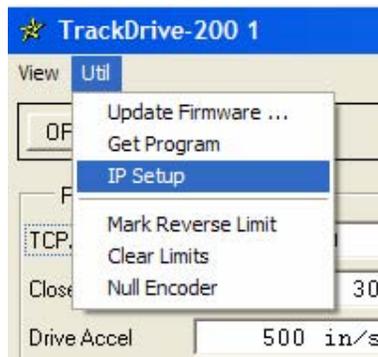
Setting the TD-200's IP Address

The TrackDrive-200 (TD-200) must have a valid static IP address to properly communicate with the CoreStar software. The TD-200's IP address must conform to the IP settings that are defined on the computer. In this example, the computer is set to 192.1.6.31 with a subnet mask of 255.255.255.0. A valid IP address for this network would be 192.1.6.xxx. The value for xxx must be a number between 1 and 254. Also, the value for xxx must not already exist on the network. To set the TD-200's IP address, do the following:

- Select **PUSHER CONFIG** from the acquisition window.



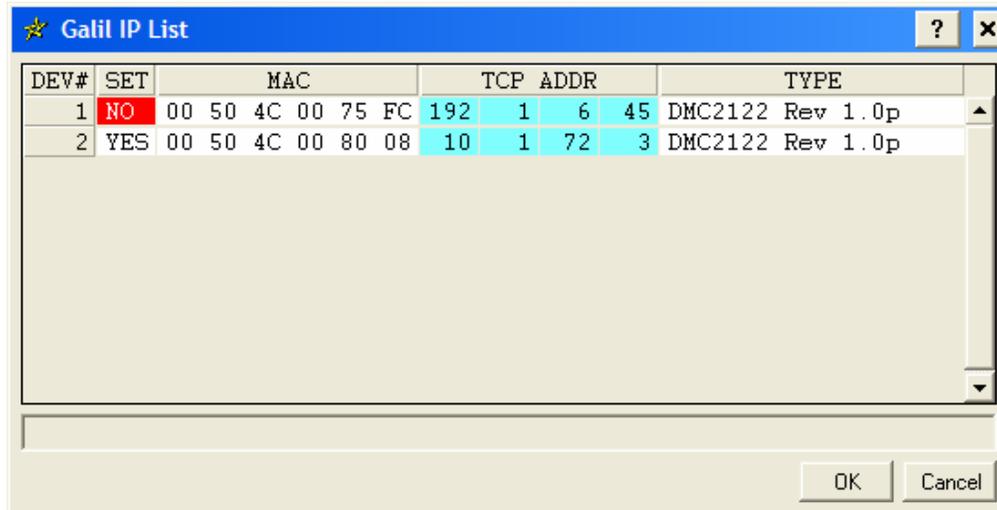
- In the **TrackDrive-200** config window, select **Util > IP Setup**.



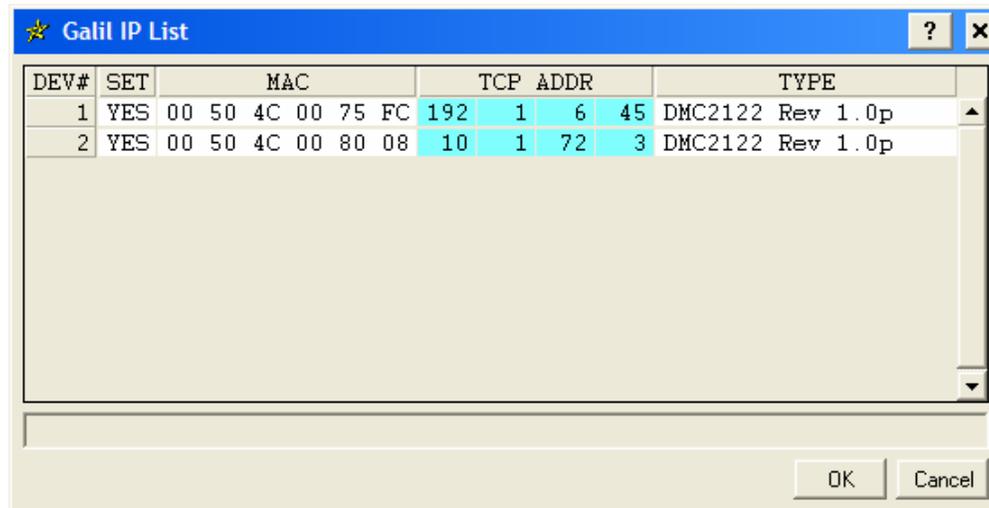
- From the **Galil IP List** window, identify the pusher in which the address should be changed. In this example, the pusher with MAC ID '00 50 4C 00 75 FC' needs the address set to 192.1.6.45 because the current address of 192.1.6.31 is the same address of the computer being used.

DEV#	SET	MAC	TCP ADDR	TYPE
1	YES	00 50 4C 00 75 FC	192 1 6 31	DMC2122 Rev 1.0p
2	YES	00 50 4C 00 80 08	10 1 72 3	DMC2122 Rev 1.0p

- Click on the part of the IP Address that needs changed.
 - Left click will increment and Right click will decrement by 1.
 - Shift + L/R click will increment/decrement by 10.
 - Ctrl + L/R click will increment/decrement by 100.
 - Middle click will reset to 0.



- Once the IP address is set to the desired value, click on the red field in the set column that displays "NO". This value will display "YES" once the address has been set. Select **OK** to close the Galil IP list window.



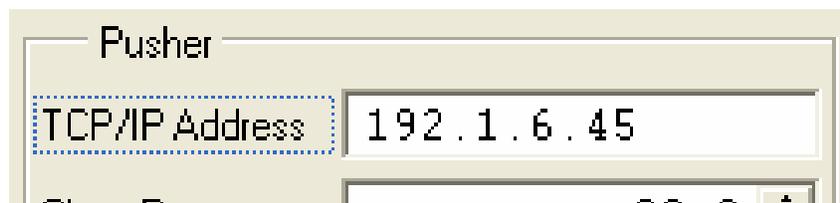
Communicating with the TD-200

In this example, the TD-200 with an IP address of 192.1.6.45 will be communicated with. Do the following:

- With the unit powered on and network cable connected, ensure the green LED is on.



- From the **PUSHER CONFIG** window, set the **TCP/IP Address** to the desired value of IP address of the TD-200 to be controlled. If the value is unknown, refer to 'Setting the TD-200's IP Address' section of this guide.



- ❑ Select the **CLOSE** button to begin communication with the TD-200. If proper communication is established, the track will close on the pusher and feedback will begin to scroll in the center of the pusher config screen.

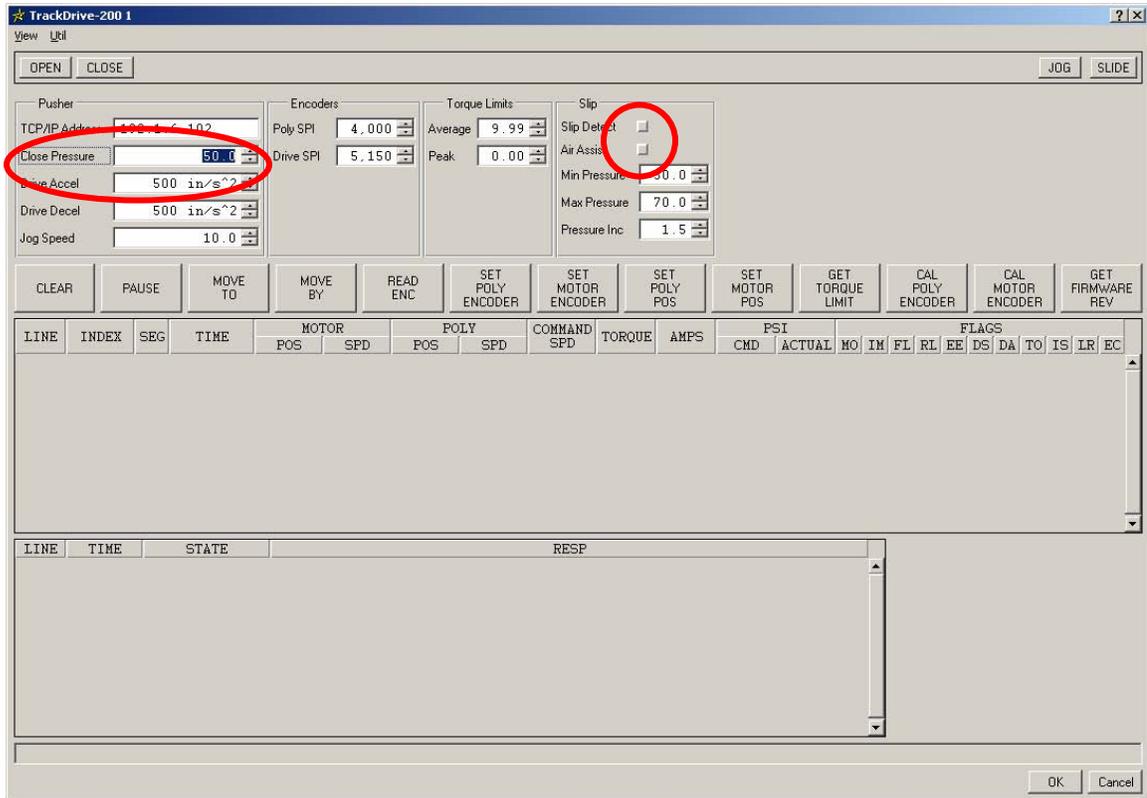
The screenshot shows the TrackDrive-200 1 software interface. The 'CLOSE' button is highlighted with a red circle. The interface is divided into several sections:

- Configuration Section:** Includes fields for Pusher (TCP/IP Address: 192.1.6.45, Close Pressure: 30.0, Drive Accel: 500 in/s², Drive Decel: 500 in/s², Jog Speed: 10.0), Encoders (Poly SPI: 2,374, Drive SPI: 5,134), Torque Limits (Average: 9.99, Peak: 0.00), and Slip (Slip Detect, Air Assist, Min Pressure: 30.0, Max Pressure: 70.0, Pressure Inc: 1.5).
- Control Buttons:** CLEAR, PAUSE, MOVE TO, MOVE BY, READ ENC, SET POLY ENCODER, SET MOTOR ENCODER, SET POLY POS, SET MOTOR POS, GET TORQUE LIMIT, CAL POLY ENCODER, CAL MOTOR ENCODER, GET FIRMWARE REV.
- Data Table:** A table with columns: LINE, INDEX, SEG, TIME, MOTOR (POS, SPD), POLY (POS, SPD), COMMAND (SPD), TORQUE, AMPS, PSI (CMD, ACTUAL), MO, IM, FL, RL, EE, DS, DA, TO, IS, IR, EC. The table contains 10 rows of data from line 17 to 26.
- RESP Area:** A large empty text area for feedback, with 'LINE', 'TIME', 'STATE', and 'RESP' labels above it.
- Footer:** 'OK' and 'Cancel' buttons.

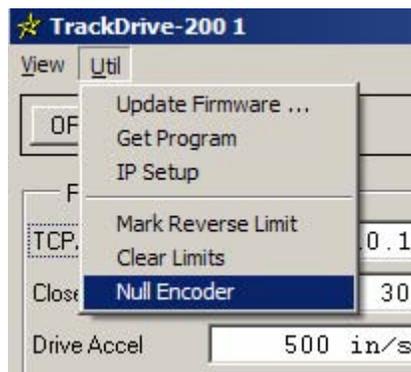
Calibrating Motor and Poly Encoders

The motor and poly encoders must be properly calibrated to ensure proper operation of the TD-200. To calibrate, do the following:

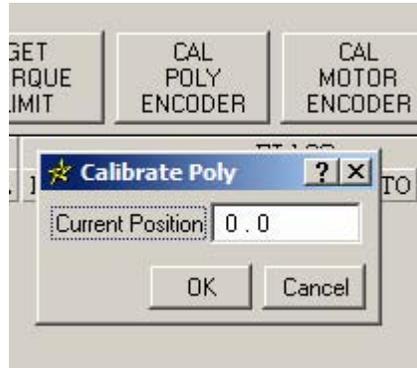
- ❑ In **PUSHER CONFIG** set the “Close Pressure” to **50.0** and disable both “Air Assist” and “Slip Detect”. This is done to reduce any slippage that may occur while jogging forward. **Slippage will result in an improperly calibrated pusher.**



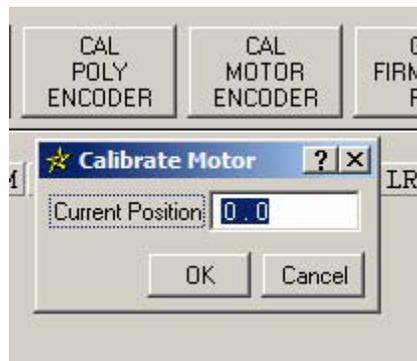
- ❑ Close the track and verify that the pressure is approximately 50.0 PSI.
- ❑ Position the probe to the zero point of scale (tube end).
- ❑ In **PUSHER CONFIG**, select **Util > Null Encoder**.



- ❑ Jog the probe to the desired end of scale point (tube end, ubend, etc...). Jog slowly (10 inches per second) to avoid any slippage.
- ❑ In **PUSHER CONFIG**, select **CAL POLY ENCODER** and enter the distance traveled by the probe. Once complete, ensure that the “**Poly SPI**” is approximately **4,000**.



- ❑ In **PUSHER CONFIG**, select **CAL MOTOR ENCODER** and enter the distance traveled by the probe. Once complete, ensure that the “**Drive SPI**” is approximately **5,150**.

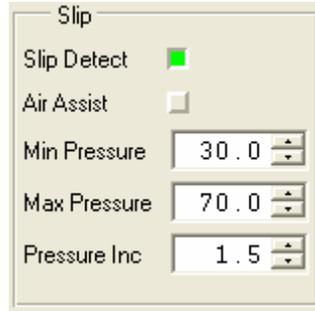


- ❑ Lower the “**Close Pressure**” and enable “**Slip Detect**” and/or “**Air Assist**” as desired.
- ❑ Motor and Poly calibration is now complete.

Slip Detect and Air Assist

Slip detect and air assist are part of the TD-200's slip management system. The system monitors the poly encoder and motor encoder. In the case that the motor encoder is moving faster, slip management will begin. Both options can be used at the same time if desired. If both options are turned off, the pusher will ignore slipping.

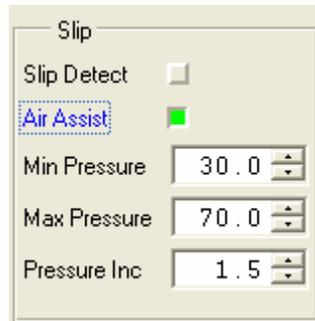
Slip Detect – This option will slow the speed of the pusher down when slipping is detected. Once the speed has been lowered, the system will attempt to return to the operating speed.



The screenshot shows a control panel titled "Slip". It contains the following elements:

- Slip Detect**: A checkbox that is checked (indicated by a green square).
- Air Assist**: A checkbox that is unchecked (indicated by an empty square).
- Min Pressure**: A numeric input field with a value of 30.0 and up/down arrows.
- Max Pressure**: A numeric input field with a value of 70.0 and up/down arrows.
- Pressure Inc**: A numeric input field with a value of 1.5 and up/down arrows.

Air Assist – This option will prevent slipping by adjusting the air pressure on the track. When the unit begins to slip, the pressure will increase up to the **Max Pressure** in increments of the **Pressure Inc** value. When the belt is not slipping, the air pressure will decrease until the **Min Pressure** is obtained or slipping occurs.



The screenshot shows the same control panel titled "Slip". In this configuration:

- Slip Detect**: A checkbox that is unchecked (indicated by an empty square).
- Air Assist**: A checkbox that is checked (indicated by a green square).
- Min Pressure**: A numeric input field with a value of 30.0 and up/down arrows.
- Max Pressure**: A numeric input field with a value of 70.0 and up/down arrows.
- Pressure Inc**: A numeric input field with a value of 1.5 and up/down arrows.

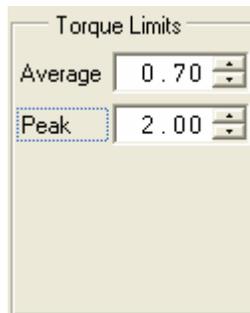
Torque Limits

The TD-200 can limit the amount of torque used by the drive motor. There are two settings that control the torque profile.

Average – This is the max value of torque that can be applied while the pusher is running. A value of 9.99 indicates the maximum torque setting.

Peak – This value represents the initial “peak” torque that is allowed during startup. A value of 0.00 indicates that this feature is turned off. When this feature is used, the value should be high enough to ensure that the pusher has enough torque for initial startup.

If the settings in the illustration shown below were used, the torque value would initially peak to 2.00 and stay below 0.70 while running.



The image shows a software interface titled "Torque Limits". It contains two input fields, each with a numeric value and a small up/down arrow icon. The "Average" field is set to "0.70" and the "Peak" field is set to "2.00". The "Peak" field is highlighted with a dashed blue border.

The default **Average** setting of 9.99 and **Peak** setting of 0.00 are recommended because they will provide the maximum amount of torque available.

Acquisition Software Control of TD-200

The CoreStar acquisition software provides full control of the TD-200. Listed below are the descriptions of the pusher controls.

JOG SPD – Sets the jog speed in inches.

PUSH SPD – Sets the push speed in inches.

ACQ SPD – Sets the acquire speed in inches.

JOG – Left click and hold will jog forward until the mouse button is released. Right click and hold will jog reverse until the mouse button is released. Holding Shift + Left Click and drag will perform a SLIDE.

CONFIG (AUTO ACQUIRE) – Auto acquisition configuration.

SLIDE – This slide feature allows for precise movement of the probe. Hold Shift + Left Click on JOG and drag to perform the slide function. The probe will move when the mouse is moved.

PUSH – Left click once to push forward and click again to stop. Right click once to pull reverse and click again to stop.

ACQUIRE – Left click to begin acquiring data at the acquire speed. Left click again to stop acquiring data. Right click while acquiring data to perform a screen balance. Shift + Left Click will record a standard run “999 999”.

AUTO ACQUIRE – Performs desired auto acquisition action. The mouse clicks are the same as acquire.



TESTER OFF	CONFIG
JOG	6.00
PUSH	24.00
ACQUIRE	24.00
AUTO ACQUIRE	CONFIG

Auto Acquisition

The CoreStar software is capable of automatically acquiring data with the TD-200. Auto acquire can operate based on air signal or based on a specified distance.

Disable ACQUIRE – This option disables the ACQUIRE button.

Air Channel – Channel that looks for air. An air signal is any signal that exceeds a balance of 75%. Setting this value to a lower frequency absolute channel will prevent errors from occurring.

Pulse Width – Width of the air signal in data points. A higher value will prevent errors from occurring and ensure the tube end signal does not get clipped.

Full Auto – When enabled, auto acquisition occurs every time the probe is inserted into the tube.

Using Guide Tube – Only enable when a metal guide tube is being used. If the probe is in the guide tube, auto acquire will look for air first and then the tube. If the probe is in air, auto acquire will begin once in the tube.

Must Start In Tube – Probe coils must be inside the tube prior to the start of auto acquisition.

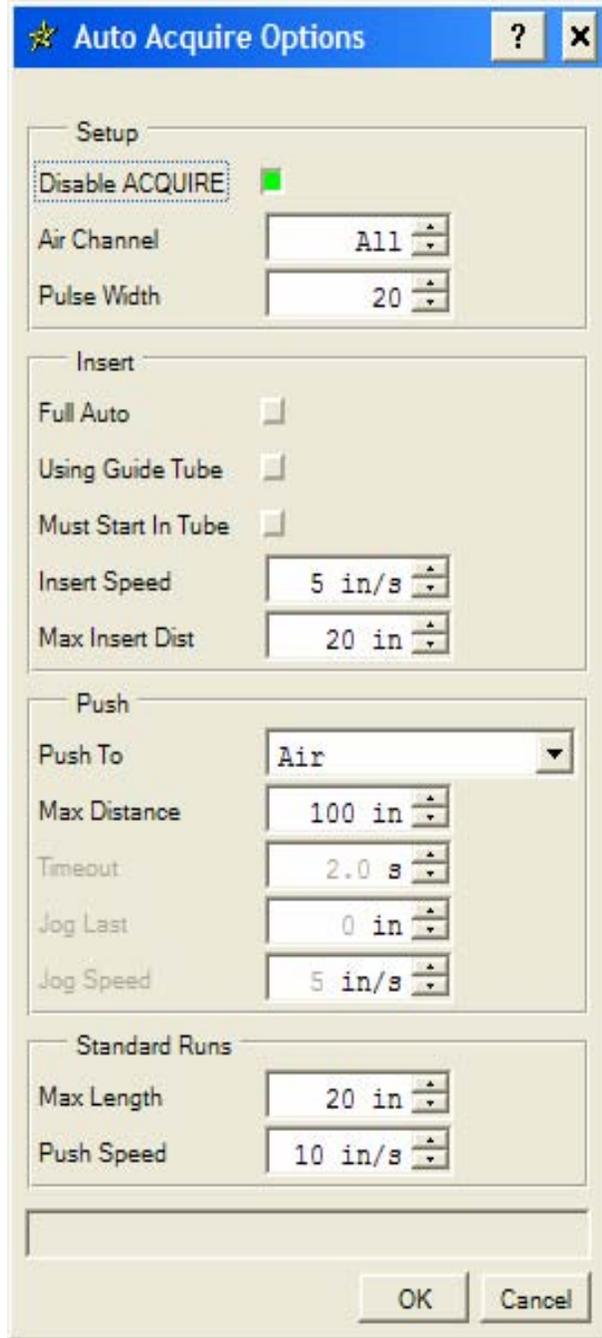
Insert Speed – Speed in which the probe moves when searching for a tube end.

Max Insert Dist – Maximum distance probe will move when searching for a tube end.

Standard Run Max Length – Maximum distance probe will travel to find the cal standard(s) tube end. This value should be set to a length greater than the standard's length.

Standard Run Push Speed – Speed in which the probe pushes through the standard when performing an auto standard run.

Push modes of operation are discussed on next page.



Auto Acquire Options

Setup

Disable ACQUIRE

Air Channel: All

Pulse Width: 20

Insert

Full Auto

Using Guide Tube

Must Start In Tube

Insert Speed: 5 in/s

Max Insert Dist: 20 in

Push

Push To: Air

Max Distance: 100 in

Timeout: 2.0 s

Jog Last: 0 in

Jog Speed: 5 in/s

Standard Runs

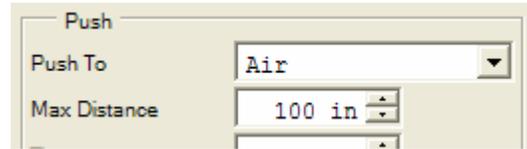
Max Length: 20 in

Push Speed: 10 in/s

OK Cancel

Push To – Air

- Once an air signal is found, the system will begin to acquire.
- **Max Distance** – The system aborts if this distance is traveled by the probe.



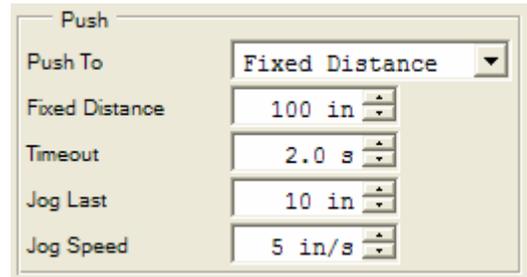
Push

Push To: Air

Max Distance: 100 in

Push To – Fixed Distance

- **Fixed Distance** – Desired travel distance of probe.
- If an air signal is obtained before this distance, the system will begin to acquire.
- **Timeout** – Additional time allowed before aborting.
- **Jog Last** – Probe will begin to jog at the **Jog Speed** for the specified distance. In the example to the right, after 90 inches, the probe will jog at 5 in/s for 10 inches.



Push

Push To: Fixed Distance

Fixed Distance: 100 in

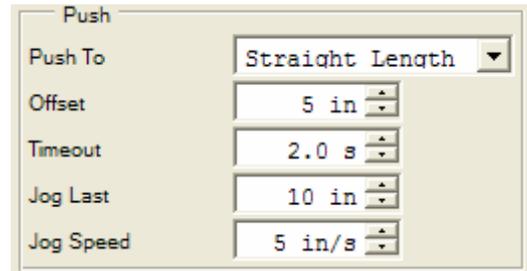
Timeout: 2.0 s

Jog Last: 10 in

Jog Speed: 5 in/s

Push To – Straight Length, Over Ubend, & Tube Length

- These three modes use the component file information to determine the distance required.
- **Straight length** will only acquire the straight length of the component.
- **Over ubend** will acquire the straight length plus the ubend length of the component.
- **Tube Length** will acquire the entire length of the ubend plus both straight lengths.
- If an air signal is obtained before this distance, the system will begin to acquire.
- **Offset** – This value allows for compensation due to probe handler, component file, or manufacturing variations. For example, if the length was 100 and the probe handler pulls the conduit back 5 inches, an offset of 5 inches will move the probe 105 inches.
- **Timeout, Jog Last, and Jog Speed** all have the same function as described in the fixed distance section above.



Push

Push To: Straight Length

Offset: 5 in

Timeout: 2.0 s

Jog Last: 10 in

Jog Speed: 5 in/s

PUSHER CONFIG QUICK REFERENCE

BUTTONS:

OPEN – opens the track when pressed
CLOSE – closes the track when pressed
JOG – left click jogs forward and right click jogs reverse
SLIDE – left click and drag mouse to make precision movements
CLEAR – clears feedback from screen
PAUSE – pauses feedback on screen
MOVE TO – moves pusher to a desired poly (probe) position
MOVE BY – moves the poly the specified distance
READ ENC – reads the poly and motor encoders
SET POLY ENCODER – a value of 0 will null the poly encoder
SET MOTOR ENCODER – a value of 0 will null the motor encoder
SET POLY POS – defines a position of the poly
SET MOTOR POS – defines a position of the motor
GET TORQUE LIMIT – get the set average and peak limits
CAL POLY ENCODER – used to calibrate the poly encoder
CAL MOTOR ENCODER – used to calibrate the motor encoder
GET FIRMWARE REV – retrieves the firmware date

SETTINGS:

TCP/IP Address – enter the TCP/IP address of the probe pusher in this location
Close Pressure – pressure applied to the belt when the close button is pressed
Drive Accel – acceleration rate of the pusher
Drive Decel – deceleration rate of the pusher
Jog Speed – speed the pusher will move when JOG is pressed in the config window
Poly SPI – number of poly encoder counts per inch (4,000 is the recommended setting)
Drive SPI – number of motor encoder counts per inch (5,150 is the recommended setting)
Average Torque Limit – This is the maximum amount of continuous torque to be applied by the motor. The default value of 9.99 is the maximum setting.
Peak Torque Limit – This is the maximum amount the pusher will peak to during initial startup. The default value of 0.00 will disable this feature.
Slip Detect – When enabled, the speed decreases when slipping and increases when traction is gained.
Air Assist – When enabled, the belt pressure will increase when slipping and decrease when not slipping.
Min Pressure – Minimum operating pressure when running with air assist.
Max Pressure – Maximum operating pressure when running with air assist.
Pressure Inc. – During air assist, pressure increases/decreases at this rate.

FLAGS:

- MO** – Motor On
- IM** – In Motion
- FL** – Forward Limit
- RL** – Reverse Limit
- EE** – Error Exceeded
- DS** – Do Slip Detection
- DA** – Do Air Enhanced
- TO** – Track Open
- IS** – Is Slipping
- LR** – Left or Right
- EC** - Poly Encoder is Connected
- TW** – Torque Motor Overload Warning
- TR** – Torque Motor Ready

RECOMMENDED SETTINGS*

Pusher		Encoders		Torque Limits		Slip	
TCP/IP Address	192.1.6.45	Poly SPI	4,000	Average	9.99	Slip Detect	<input checked="" type="checkbox"/>
Close Pressure	30.0	Drive SPI	5,150	Peak	0.00	Air Assist	<input checked="" type="checkbox"/>
Drive Accel	500 in/s ²					Min Pressure	30.0
Drive Decel	500 in/s ²					Max Pressure	70.0
Jog Speed	10.0					Pressure Inc	1.5

* Some users prefer to operate with slip detect disabled. This may cause unnecessary belt wear.

Disassembling the TD-200

The TD-200 comes apart into three main pieces: drive assembly, take up assembly, and control box. Please refer to the previous section on *Assembling the TD-200* for pictures. The following steps are necessary to disassemble the TD-200:

- ❑ Turn off power.
- ❑ Remove CAT 5 patch cable.
- ❑ Remove air line.
- ❑ Disconnect drive motor cable.
- ❑ Disconnect take up motor.
- ❑ Disconnect air/encoder cable.
- ❑ Lift up on the electronics box lock and remove the electronics box.
- ❑ Move take up latch locking safety device so that the latch is able to be unlocked.
- ❑ Move the take up latch into the unlocked position.
- ❑ Lift up on the take up assembly and pull away from the drive assembly.

Removing the Belt and Lower Roller Plate



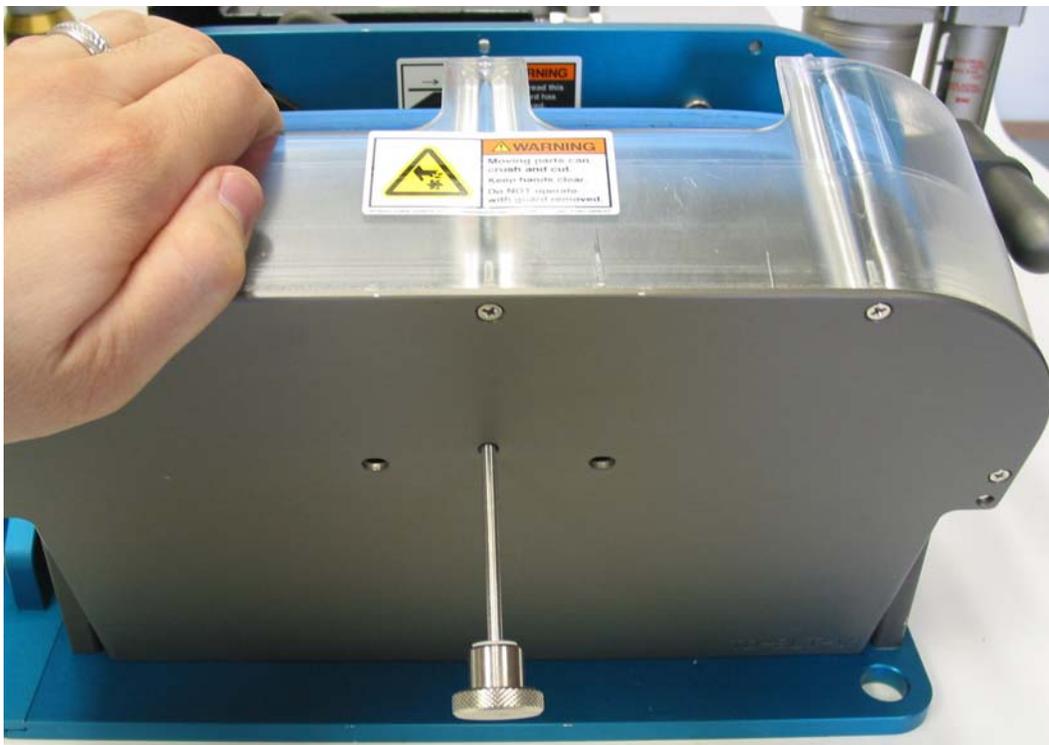
Always ensure the unit is powered down prior to replacing or removing the belt. Never operate the unit without the safety cover in place. Never place an object inside the safety cover while they unit is in operation. Doing so may result in personal or equipment damage.



Operators must be trained prior to removing protective belt guard. Ensure lower roller air pressure is released and power is disconnected before removing belt guard.

The belt can easily be removed and replaced on the TD-200. The belt replacement procedure is the exact opposite of the removal. Once the belt is removed, access to the poly encoder roller and the lower roller plate is possible. Do the following to remove the belt and lower roller plate:

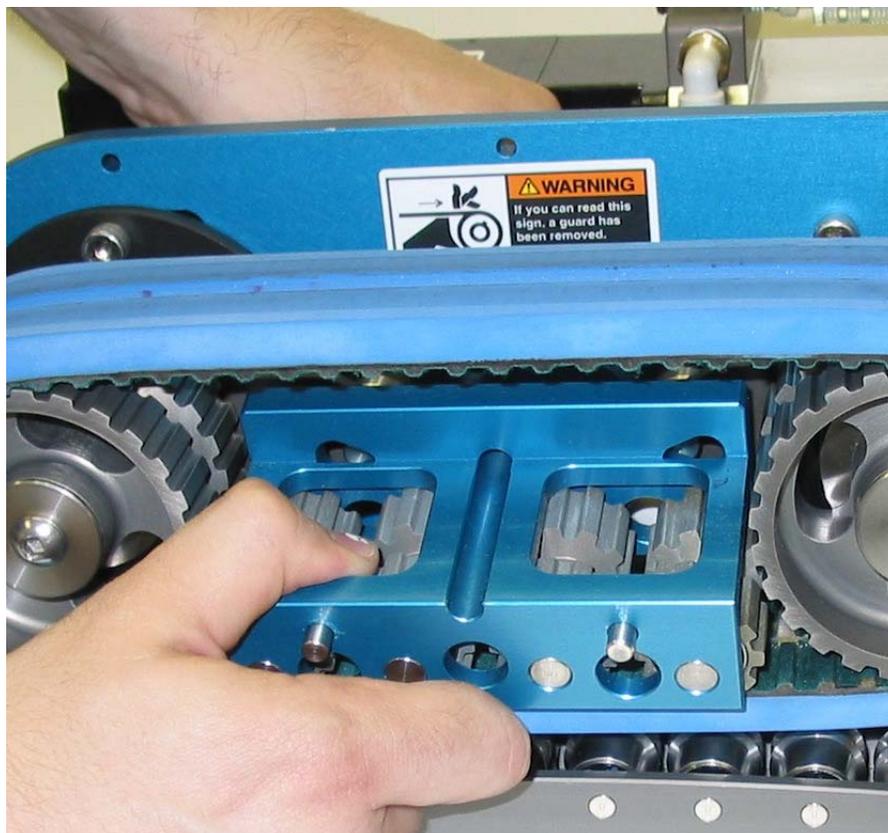
- ❑ Remove the safety cover by unscrewing the front screw and pulling away from the unit. The front screw is captive and is not intended to be removed from the cover assembly.



- Gently press down on the belt tensioning handle to loosen the upper rollers.



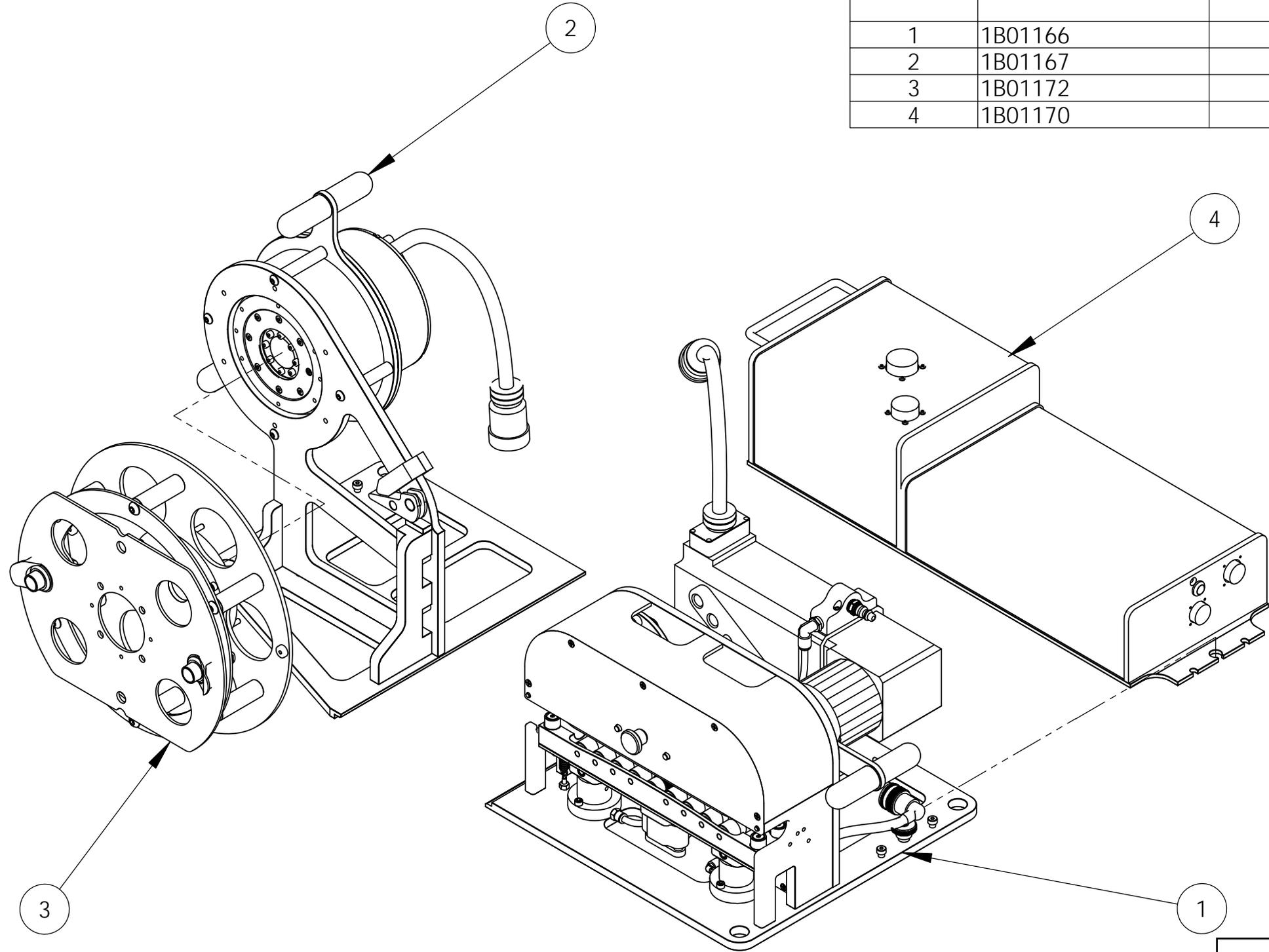
- While pressing down on the belt tensioning handle, remove the upper roller by pressing down and pulling away from the pusher.



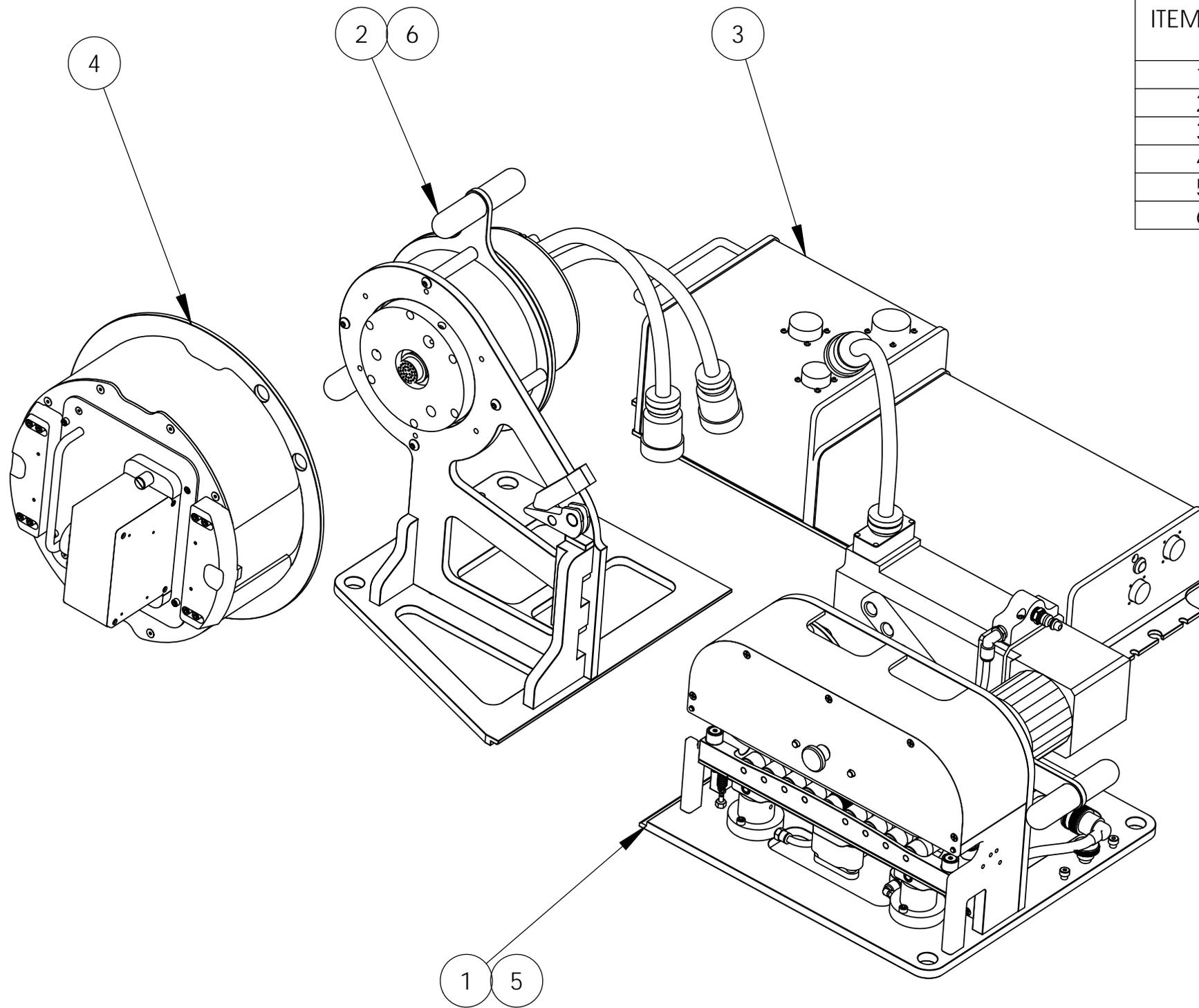
APPENDIX A: Assembly Drawings

- TD-200 TRACK DRIVE
- OMNI-200-TIP TESTER IN PUSHER
- PUSHER DRIVE
 - PUSHER DRIVE FRAME
 - PNEUMATIC SYSTEM
 - PLATEN WITH ENCODER
 - JUNCTION BOX
 - LOWER ROLLER
 - CAM HANDLE
 - DRIVE MOTOR
 - DRIVE SPROCKET
 - IDLER SPROCKET
 - UPPER ROLLER
 - GEAR BOX WITH AIR MANIFOLD
 - SAFETY COVER
- TAKEUP
 - TAKEUP FRAME
 - TORQUE MOTOR
 - CONNECTOR HOUSING / MOTOR SUPPORTS
 - INTERCONNECTION CABLES
- TD-200 SPOOL
- TIP SPOOL
 - SPOOL HOUSING
 - PROBE MODULES
 - TESTER
 - SLIP RING
- CONTROL BOX
 - COVER PLATES
 - FRAME / ELECTRICAL COMPONENTS

ITEM NO.	PART NUMBER	DESCRIPTION	G01 QTY. LEFT (BLUE)	G02 QTY. RIGHT (GOLD)
1	1B01166	PUSHER DRIVE	1	1
2	1B01167	TAKEUP	1	1
3	1B01172	TD-200 SPOOL	1	1
4	1B01170	CONTROL BOX	1	1



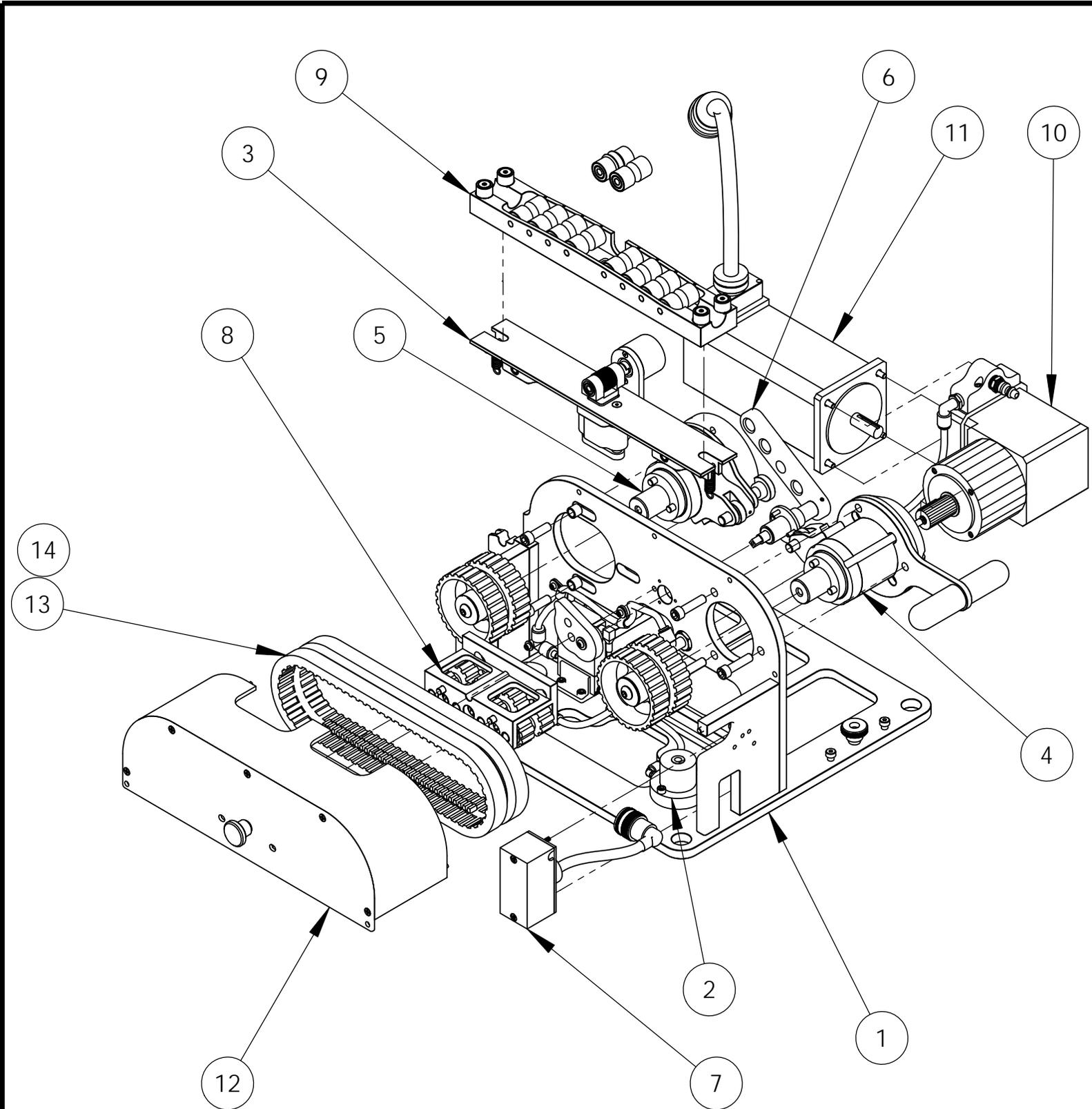
**TD-200
TRACK DRIVE**



ITEM NO.	PART NUMBER	DESCRIPTION	G01 QTY. LEFT (BLUE)	G02 QTY. RIGHT (GOLD)
1	1B01166G01	PUSHER DRIVE ASSEMBLY LEFT	1	-
2	1B01167G01	TAKE UP ASSEMBLY LEFT	1	-
3	1B01170G02	CONTROL BOX ASSEMBLY	1	1
4	1B01171G01	TIP SPOOL	1	1
5	1B01166G02	PUSHER DRIVE ASSEMBLY RIGHT	-	1
6	1B01167G02	TAKE UP ASSEMBLY RIGHT	-	1

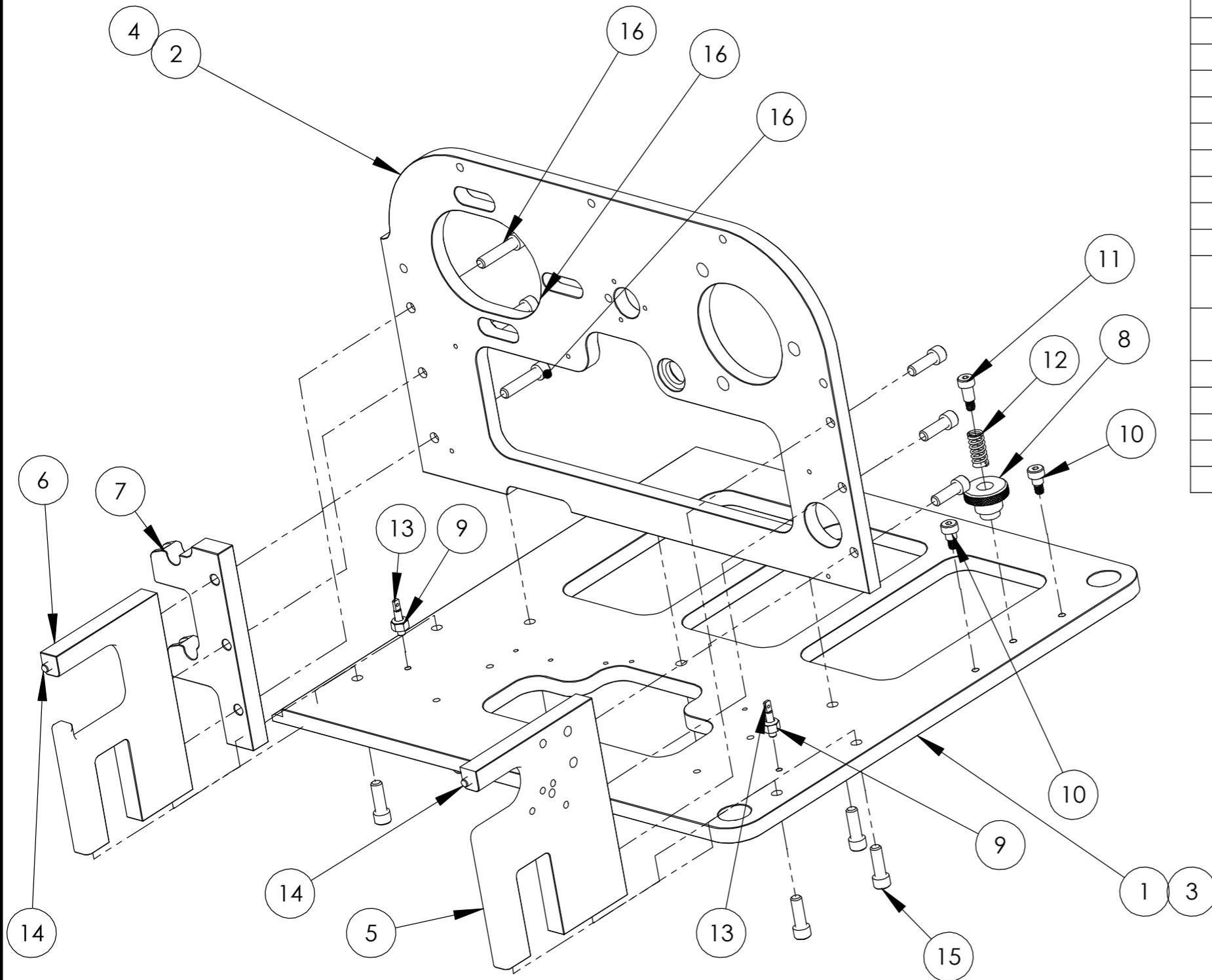
MODEL SHOWN IS LEFT HAND TESTER IN PUSHER
 RIGHT HAND IS MIRROR IMAGE.

**OMNI-200-TIP
 TESTER IN PUSHER**



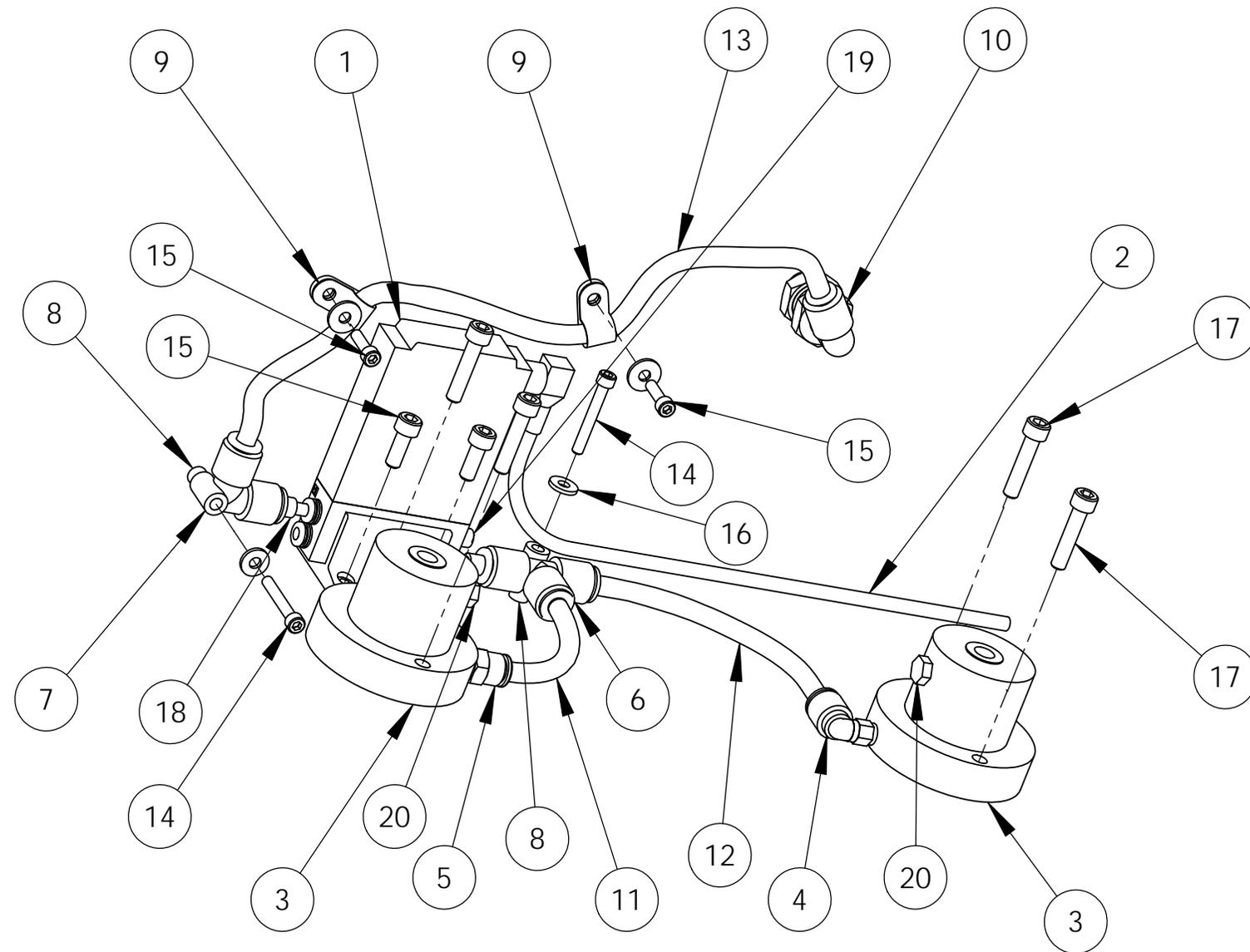
ITEM NO.	PART NUMBER	DESCRIPTION	G01 QTY. LEFT (BLUE)	G02 QTY. RIGHT (GOLD)
1	1B01173	PUSHER DRIVE FRAME	1	1
2	1B01174	PNEUMATIC SYSTEM	1	1
3	1B00920	PLATEN WITH ENCODER	1	1
4	1B00925	DRIVE SPROCKET	1	1
5	1B00926	IDLER SPROCKET	1	1
6	1B01180	CAM HANDLE	1	1
7	1B00921	JUNCTION BOX	1	1
8	1B00927	UPPER ROLLERS	1	1
9	1B00922	LOWER ROLLERS	1	1
10	1B00928	GEAR BOX WITH AIR MANIFOLD	1	1
11	1B00924	PUSHER DRIVE MOTOR	1	1
12	1B00929	SAFETY COVER	1	1
13	1B01166H13	V-BELT (BOP STYLE)	A/R	A/R
14	1B01166H14	U-CHANNEL BELT (S/G STYLE)	A/R	A/R

**TD-200 / OMNI-200-TIP
PUSHER DRIVE**



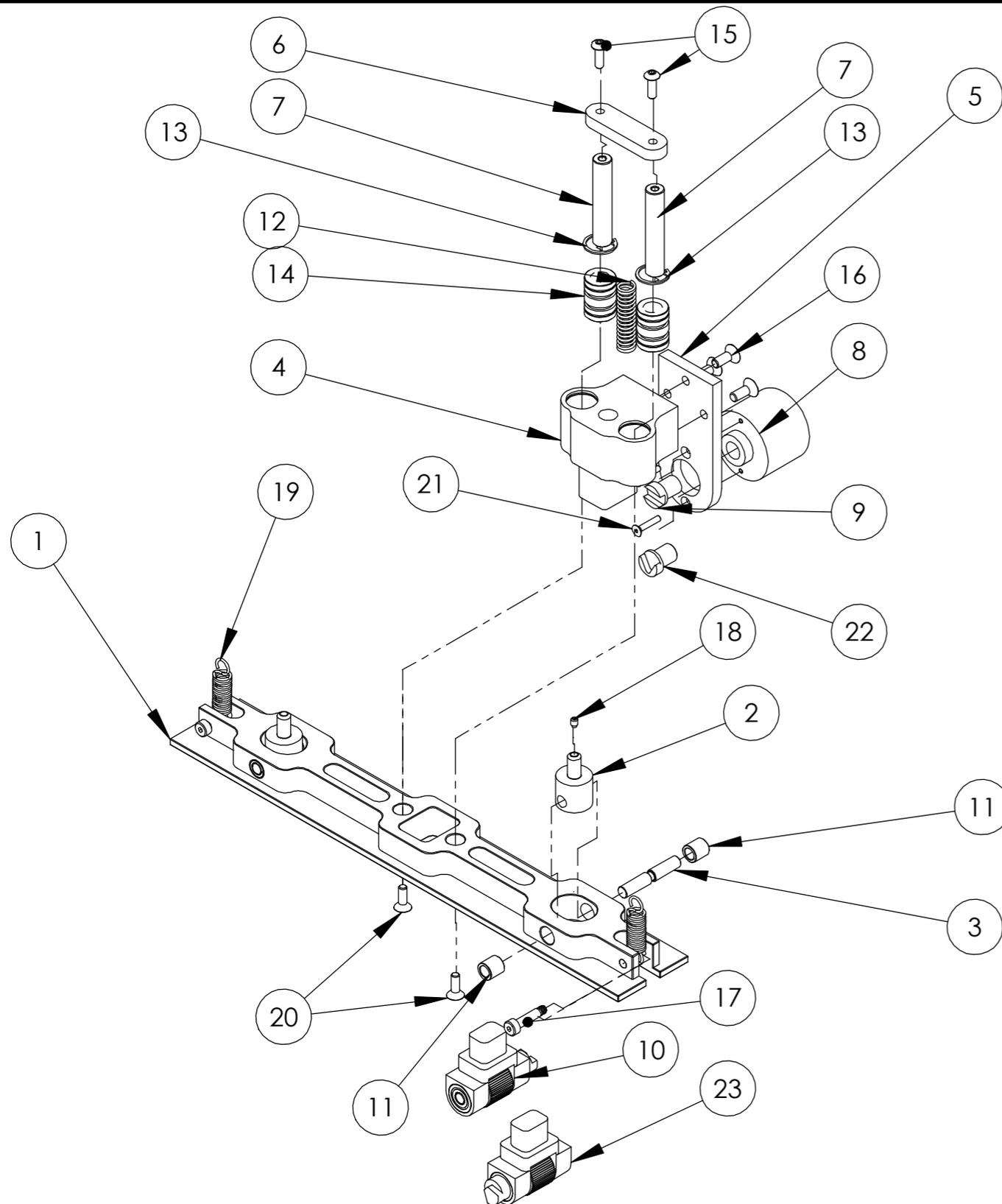
ITEM NO.	PART NUMBER	DESCRIPTION	GO1 QTY. BLUE	GO2 QTY. GOLD
1	1B01173H01	DRIVE BASE PLATE LEFT (BLUE)	1	-
2	1B01173H02	DRIVE UPRIGHT LEFT (BLUE)	1	-
3	1B01173H03	DRIVE BASE PLATE RIGHT (GOLD)	-	1
4	1B01173H04	DRIVE UPRIGHT RIGHT (GOLD)	-	1
5	1B01173H05	DRIVE END PLATE FRONT	1	1
6	1B01173H06	DRIVE END PLATE REAR	1	1
7	1B01173H07	DRIVE LATCH	1	1
8	1B01173H08	CONTROL BOX RELEASE KNOB	1	1
9	1B01173H09	8-32 NYLOK NUT SST	2	2
10	1B01173H10	1/4" SHOULDER SCREW 3/16" L, 10-32 THREAD	2	2
11	1B01173H11	1/4" SHOULDER SCREW 3/8" L, 10-32 THREAD	1	1
12	1B01173H12	LOCKING SPRING	1	1
13	1B01173H13	SPRING CONNECTOR STUD	2	2
14	1B01173H14	PIN ASME B18.8.2 - 0.1875x0.625	2	2
15	1B01173H15	HX-SHCS 0.25-20x1.0x0.75-N	10	10
16	1B01173H16	HX-SHCS 0.25-20x1.0x1.0-N	3	3

**PUSHER DRIVE
FRAME**



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	1B01174H01	REMOTE AIR REGULATOR	1
2	1B01174H02	REGULATOR CABLE "L"	1
3	1B01174H03	AIR CYLINDER	2
4	1B01174H04	90 DEGREE CYLINDER TO TUBE FITTING	1
5	1B01174H05	STRAIGHT CYLINDER TO TUBE FITTING	1
6	1B01174H06	TUBE TEE QUICK CONNECT	1
7	1B01174H07	TUBE 90 DEGREE QUICK CONNECT	1
8	1B01174H08	.250 OD x .188 Nylon Spacer	2
9	1B01174H09	TUBING LOOM	2
10	1B01174H10	TUBE BULKHEAD 90 DEGREE QUICK CONNECT	1
11	1B01174H11	LEFT CYLINDER SUPPLY TUBE	1
12	1B01174H12	RIGHT CYLINDER SUPPLY TUBE	1
13	1B01174H13	INLET SUPPLY TUBE	1
14	1B01174H14	6-32 X 1 SHCS SST	2
15	1B01174H15	6-32 X 1/2 SHCS SST	4
16	1B01174H16	REGULAR FW 0.138	4
17	1B01174H17	10-32 X 7/8 SHCS SST	4
18	1B01174H18	ADAPTER	2
19	1B01174H19	BREATHER	1
20	1B01174H20	MUFFLER	2

**PUSHER DRIVE
PNEUMATIC SYSTEM**

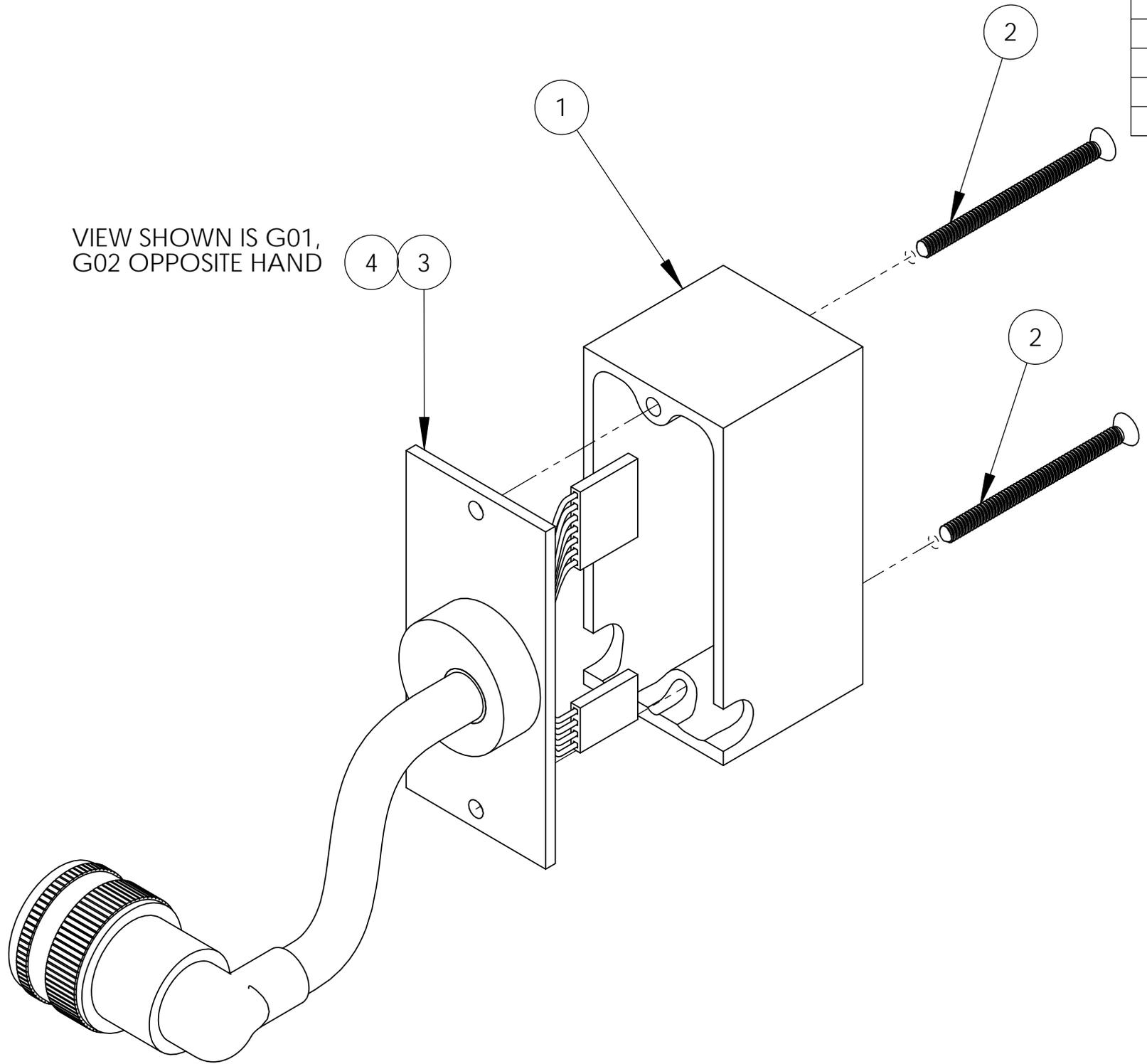


ITEM NO.	PART NUMBER	DESCRIPTION	G01 QTY	G02 QTY
1	1B00920H01	PLATEN PLATE	1	1
2	1B00920H02	PLATEN PIVOT	2	2
3	1B00920H03	PIVOT SHAFT	2	2
4	1B00920H04	ENCODER BEARING MOUNT	1	1
5	1B00920H05	ENCODER UPRIGHT	1	1
6	1B00920H06	ENCODER SLIDE RETAINER	1	1
7	1B00920H07	ENCODER SHAFTS (TEFLON)	2	2
8	1B00920H08	ENCODER	1	1
9	1B00920H09	ENCODER COUPLER FEMALE	1	-
10	1B00920H10	ENCODER ROLLER ASSEMBLY	1	-
11	1B00920H11	PIVOT SHAFT BUSHING	4	4
12	1B00920H12	COMPRESSION SPRING	1	1
13	1B00920H13	SNAP RING	2	2
14	1B00920H14	ENCODER HOUSING LINEAR BEARING	2	2
15	1B00920H15	SCREW SBHCSCREW 0.164-32x0.5	2	2
16	1B00920H16	SCREW SCHCSCREW 0.19-32x0.5 SST	3	3
17	1B00920H17	PLATEN SHOULDER BOLT	2	2
18	1B00920H18	SET SCREW SSHDOGSKT 0.138-32x0.1875	2	2
19	1B00920H19	EXTENSION SPRING	2	2
20	1B00920H20	SCREW SCHCSCREW 0.164-32 X.5 SST	2	2
21	1B00920H21	SCREW SCHCSCREW 0.112-40 X .5 SST	2	2
22	1B00920H22	"V" ENCODER COUPLER FEMALE	-	1
23	1B00920H23	WEDGE ROLLER ASSEMBLY	-	1

NOTE: TO ORDER "V" ROLLER AND COUPLING
 G01: SLOTTED ROLLER ENCODER ASSEMBLY
 G02: "V" SLOTTED ROLLER ENCODER ASSEMBLY

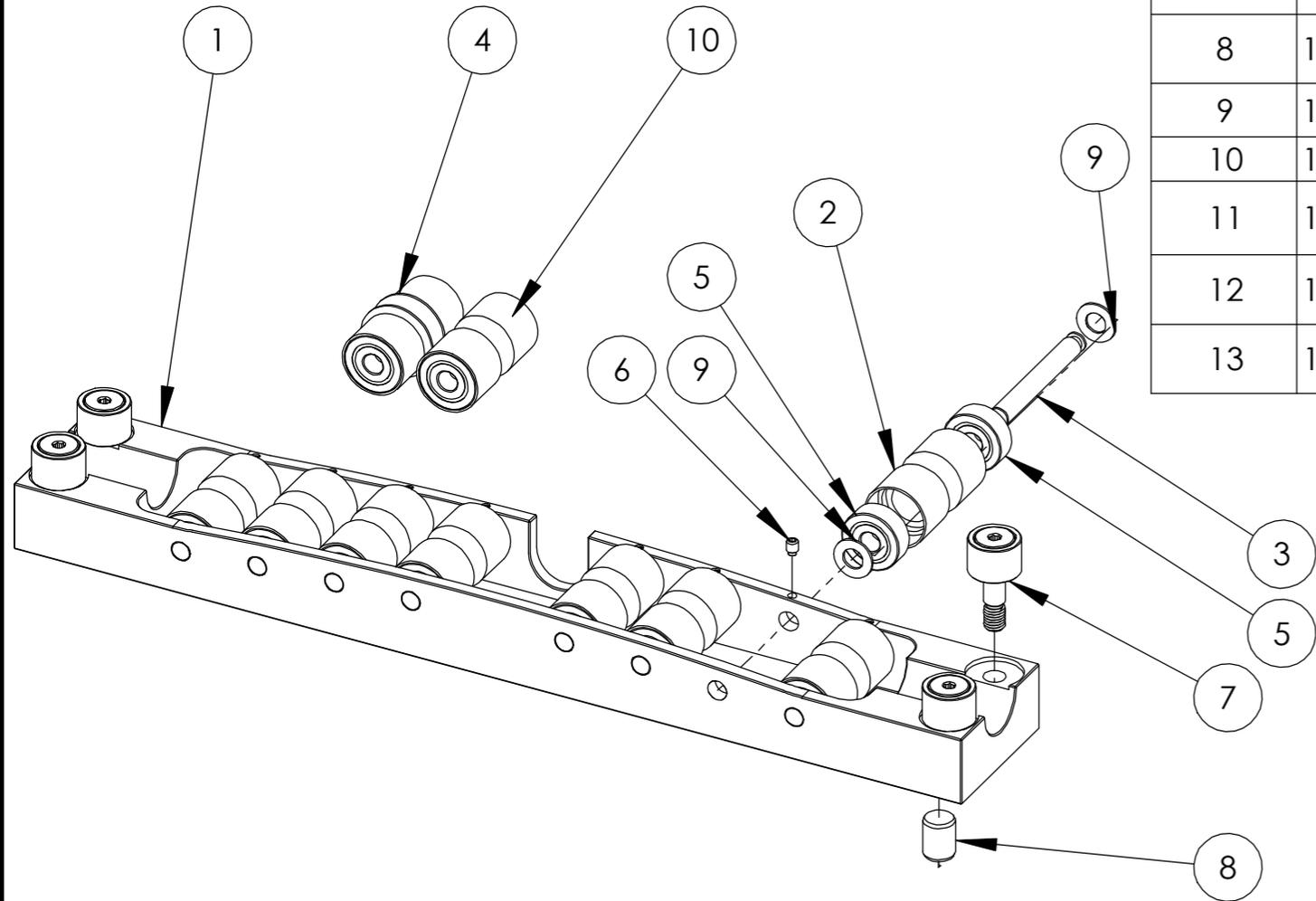
**PUSHER DRIVE
 PLATEN WITH ENCODER**

ITEM NO.	PART NUMBER	DESCRIPTION	G01 QTY. LEFT (BLUE)	G02 QTY. RIGHT (GOLD)
1	1B00921H01	JUNCTION BOX	1	1
2	1B00921H02	6-32X2.0 FHPHCS	2	2
3	1B00921H03	ADAPTER PLATE AND CABLE	1	-
4	1B00921H04	ADAPTER PLATE AND CABLE	-	1



**PUSHER DRIVE
JUNCTION BOX**

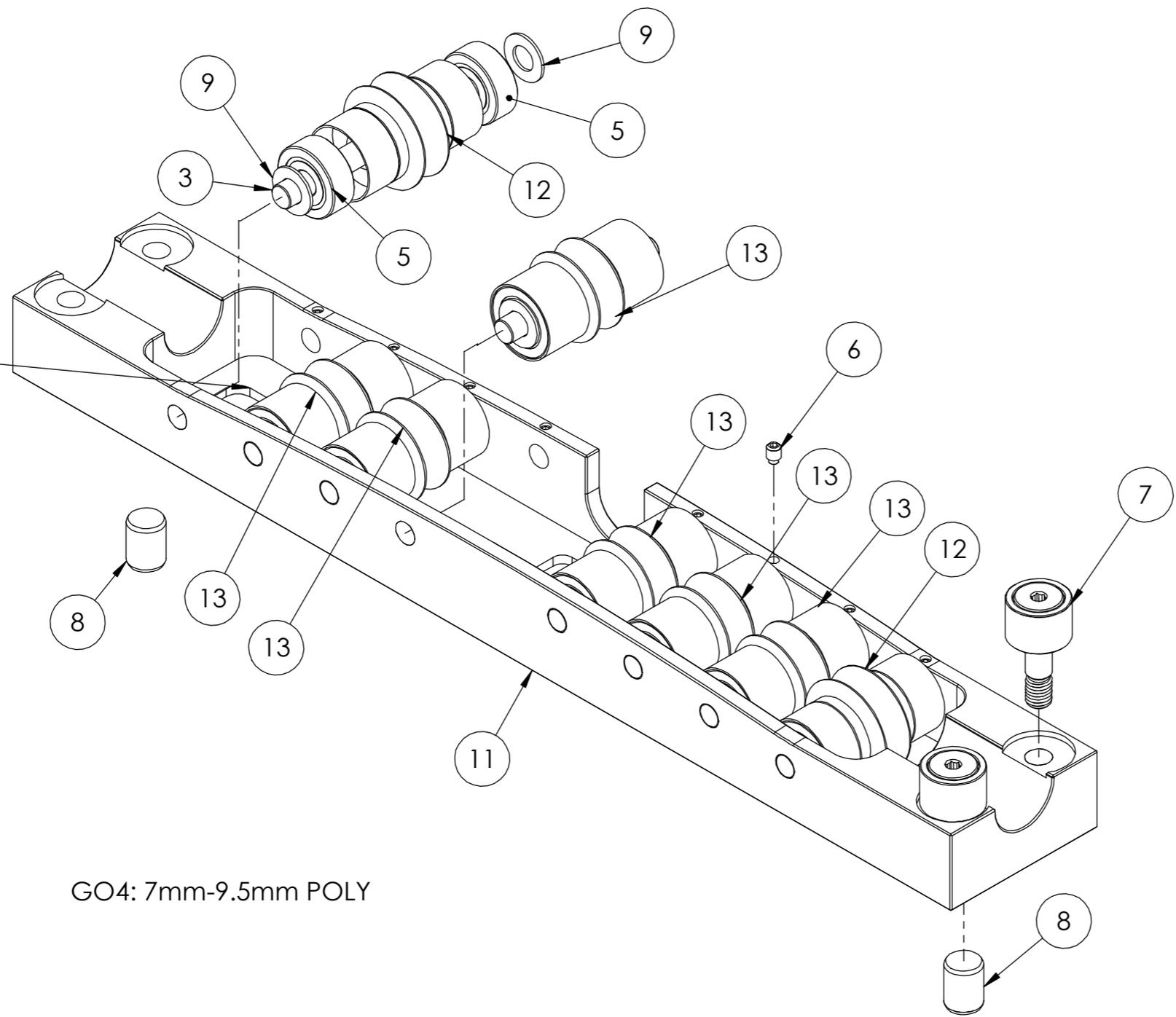
ITEM NO.	PART NUMBER	DESCRIPTION	QTY./GR 01 3/8" POLY	QTY./GR 02 5/16" POLY	QTY./GR 03 7/16" POLY	QTY./GR 04 7mm-9.5mm POLY
1	1B00922H01	LOWER ROLLER PLATE	1	1	1	-
2	1B00922H02	3/8 LOWER ROLLER	8	-	-	-
3	1B00922H03	LOWER ROLLER SHAFT	8	8	8	8
4	1B00922H04	5/16 LOWER ROLLER	-	8	-	-
5	1B00922H05	LOWER ROLLER BEARING	16	16	16	16
6	1B00922H06	SET SCREW SSHDOGSKT 0.138- 32x0.1875 SST	8	8	8	8
7	1B00922H07	CAM FOLLOWER	4	4	4	2
8	1B00922H08	DOWEL PIN ASME B18.8.2 - 0.375x0.5	2	2	2	2
9	1B00922H09	DELRIN FLAT WASHER	16	16	16	16
10	1B00922H10	7/16 LOWER ROLLER	-	-	8	-
11	1B00922H11	LOWER ROLLER PLATE (7-9.5mm)	-	-	-	1
12	1B00922H12	LOWER ROLLER (7-9.5mm)	-	-	-	2
13	1B00922H13	LOWER ROLLER(7-9.5mm)	-	-	-	6



G01: 3/8" POLY
G02: 5/16" POLY
G03: 7/16" POLY
G04: 7mm-9.5mm POLY

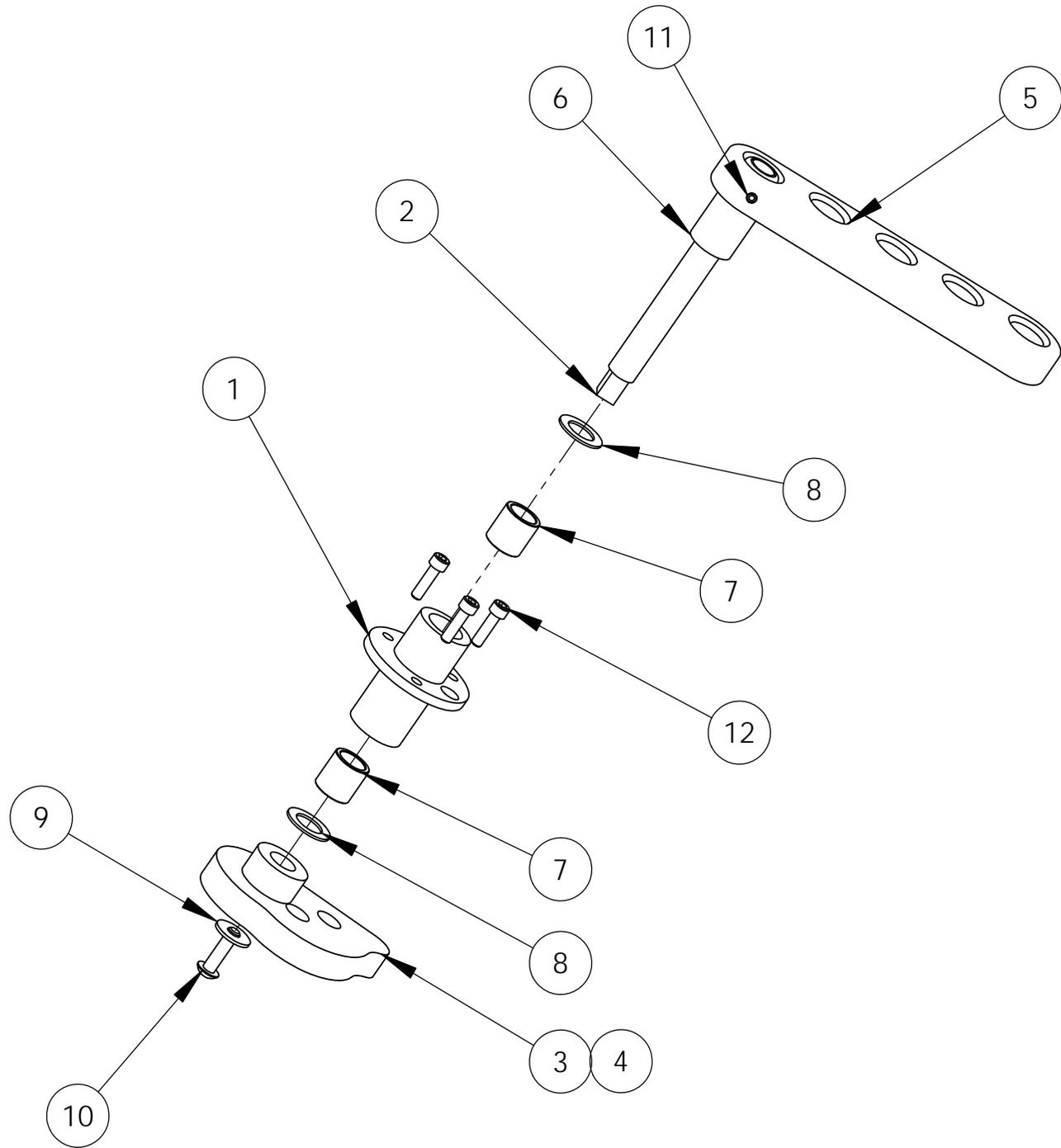
**PUSHER DRIVE
LOWER ROLLER**

ROLLER SLOT BOTH SIDES



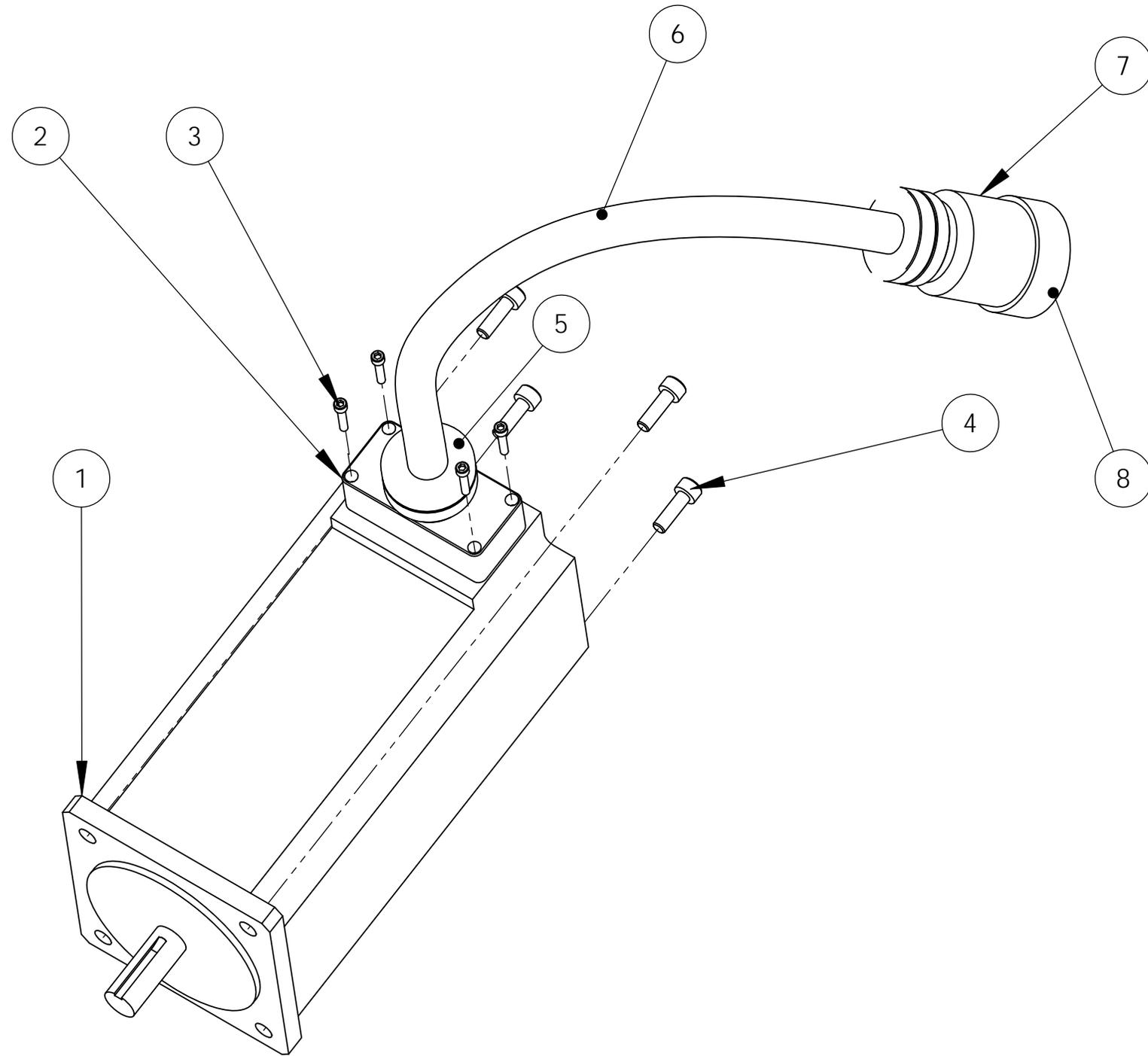
GO4: 7mm-9.5mm POLY

**PUSHER DRIVE
LOWER ROLLER GROUP 4**



ITEM NO.	PART NUMBER	DESCRIPTION	QTY./G01	QTY./G02
1	1B01180H01	CAM HANDLE BUSHING HUB	1	1
2	1B01180H02	CAM HANDLE SHAFT	1	1
3	1B01180H03	CAM LEFT BLUE	1	-
4	1B01180H04	CAM RIGHT GOLD	-	1
5	1B01180H05	CAM HANDLE	1	1
6	1B01180H06	CAM HANDLE HUB	1	1
7	1B01180H07	CAM HANDLE HUB BUSHING	2	2
8	1B01180H08	DELRIN WASHER	2	2
9	1B01180H09	REGULAR FW 0.164	1	1
10	1B01180H10	SBHCSCREW 0.164-32x0.625-SST	1	1
11	1B01180H11	SPS 0.125x1 SST	1	1
12	1B01180H12	HX-SHCS 0.138-32x0.5x0.5-SST	3	3

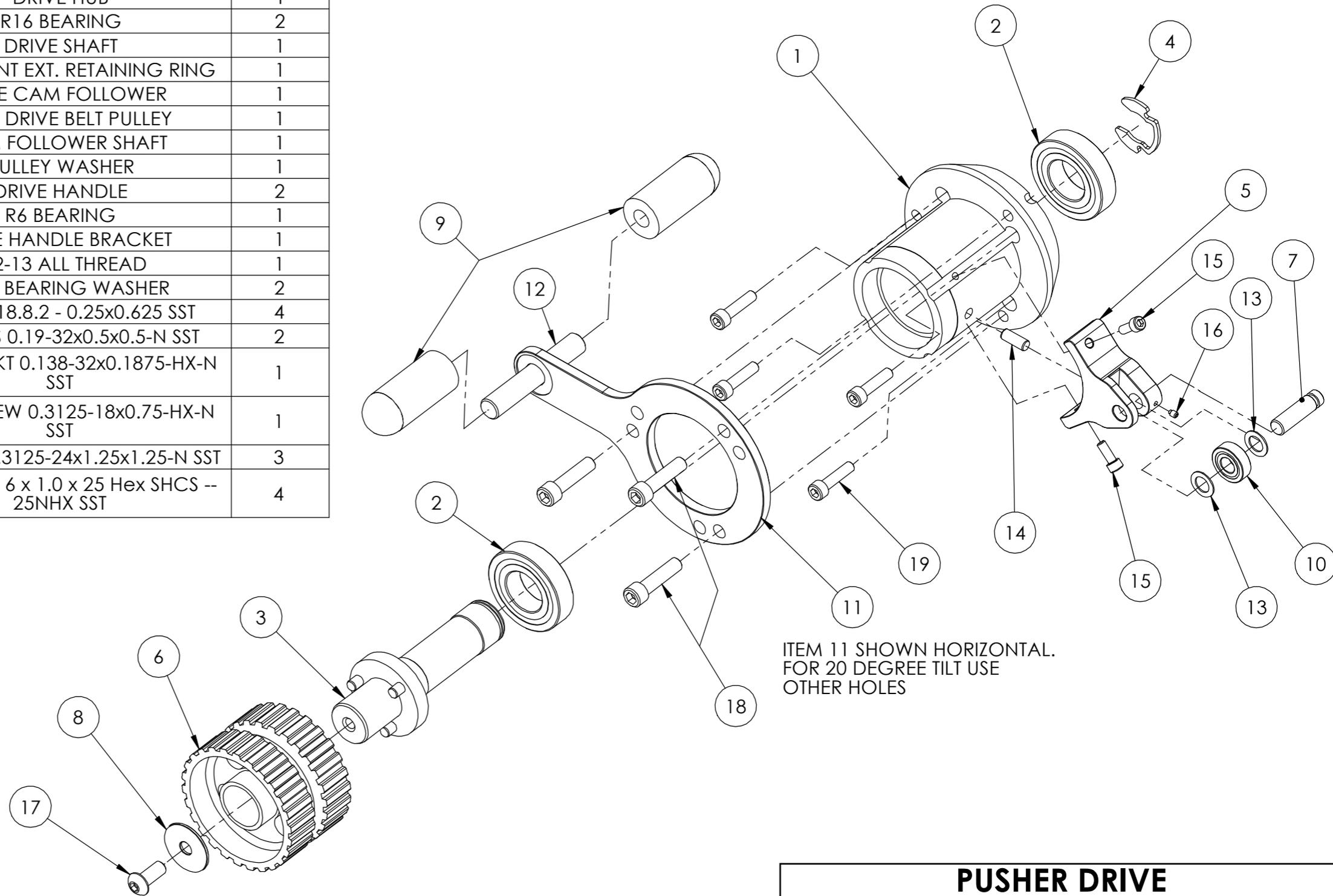
**PUSHER DRIVE
CAM HANDLE**



ITEM NO.	PART NUMBER	DESCRIPTION	QTY./G01
1	1B00924H01	PUSHER DRIVE MOTOR	1
2	1B00924H02	DRIVE MOTOR CONDUIT ADAPTER	1
3	1B00924H03	HX-SHCS 0.112-40x0.5625x0.5625-N SST	4
4	1B00924H04	B18.3.1M - 5 x 0.8 x 16 Hex SHCS - 16NHX	4
5	1B00924H05	CONNECTOR COLLAR	1
6	1B00924H06	CABLE - PUSHER DRIVE MOTOR	1
7	1B00924H07	BACKSHELL	1
8	1B00924H08	CONNECTOR	1

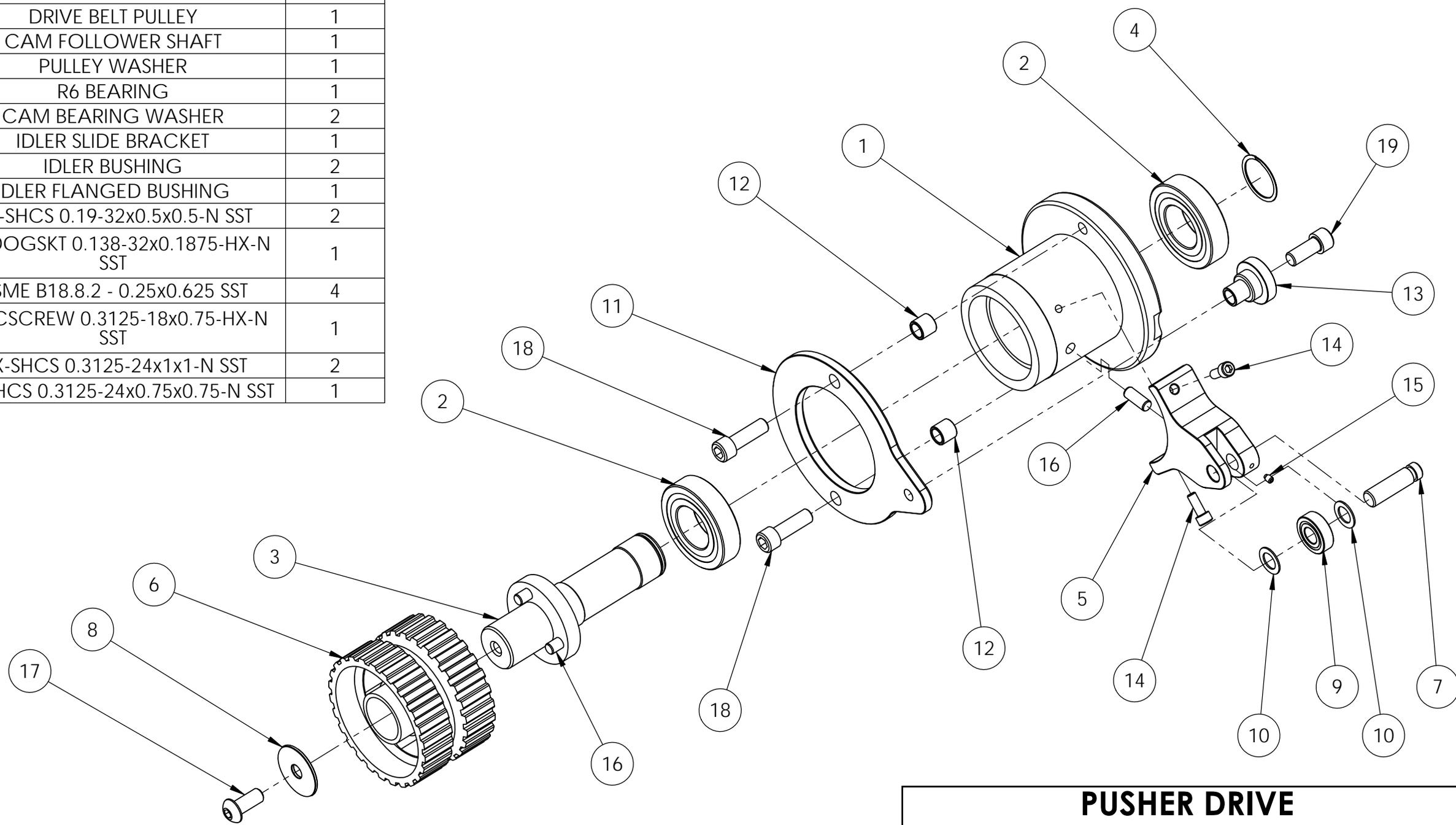
**PUSHER DRIVE
MOTOR**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	1B00927	DRIVE HUB	1
2	1B00925H02	R16 BEARING	2
3	1B00925H03	DRIVE SHAFT	1
4	1B00925H04	SIDE MOUNT EXT. RETAINING RING	1
5	1B00925H05	DRIVE CAM FOLLOWER	1
6	1B00925H06	MAIN DRIVE BELT PULLEY	1
7	1B00925H07	CAM FOLLOWER SHAFT	1
8	1B00925H08	PULLEY WASHER	1
9	1B00925H09	DRIVE HANDLE	2
10	1B00925H10	R6 BEARING	1
11	1B00925H11	DRIVE HANDLE BRACKET	1
12	1B00925H12	1/2-13 ALL THREAD	1
13	1B00925H13	CAM BEARING WASHER	2
14	1B00925H14	ASME B18.8.2 - 0.25x0.625 SST	4
15	1B00925H15	HX-SHCS 0.19-32x0.5x0.5-N SST	2
16	1B00925H16	SSHDOGSKT 0.138-32x0.1875-HX-N SST	1
17	1B00925H17	SBHCSCREW 0.3125-18x0.75-HX-N SST	1
18	1B00925H18	HX-SHCS 0.3125-24x1.25x1.25-N SST	3
19	1B00925H19	B18.3.1M - 6 x 1.0 x 25 Hex SHCS -- 25NHX SST	4



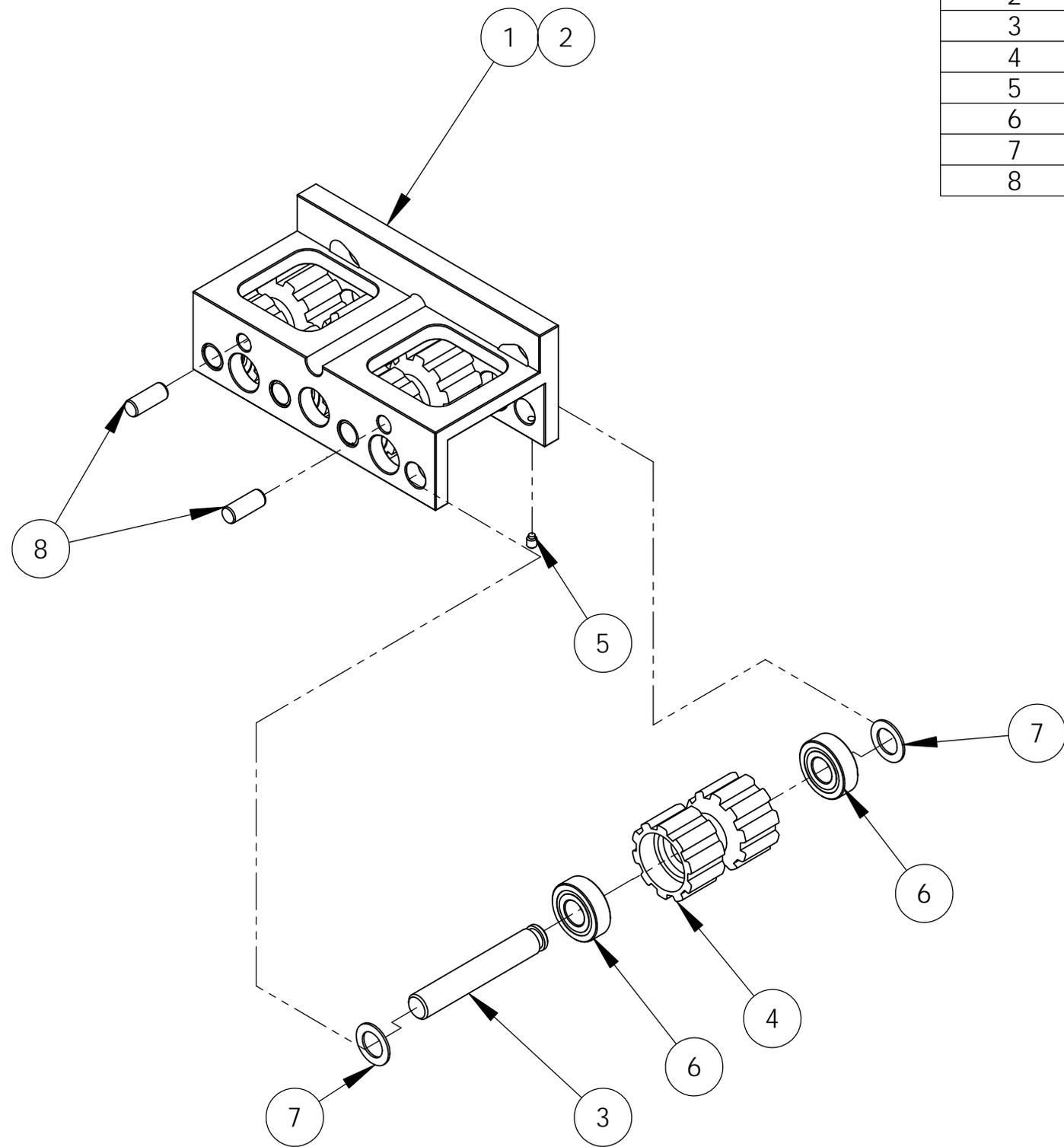
**PUSHER DRIVE
DRIVE SPROCKET**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	1B00926H01	IDLER HUB	1
2	1B00926H02	R16 BEARING	2
3	1B00926H03	IDLER SHAFT	1
4	1B00926H04	SPIRIAL SNAP RING	1
5	1B00926H05	IDLER CAM FOLLOWER	1
6	1B00926H06	DRIVE BELT PULLEY	1
7	1B00926H07	CAM FOLLOWER SHAFT	1
8	1B00926H08	PULLEY WASHER	1
9	1B00926H09	R6 BEARING	1
10	1B00926H10	CAM BEARING WASHER	2
11	1B00926H11	IDLER SLIDE BRACKET	1
12	1B00926H12	IDLER BUSHING	2
13	1B00926H13	IDLER FLANGED BUSHING	1
14	1B00926H14	HX-SHCS 0.19-32x0.5x0.5-N SST	2
15	1B00926H15	SSHDOGSKT 0.138-32x0.1875-HX-N SST	1
16	1B00926H16	ASME B18.8.2 - 0.25x0.625 SST	4
17	1B00926H17	SBHCSCREW 0.3125-18x0.75-HX-N SST	1
18	1B00926H18	HX-SHCS 0.3125-24x1x1-N SST	2
19	1B00926H19	HX-SHCS 0.3125-24x0.75x0.75-N SST	1

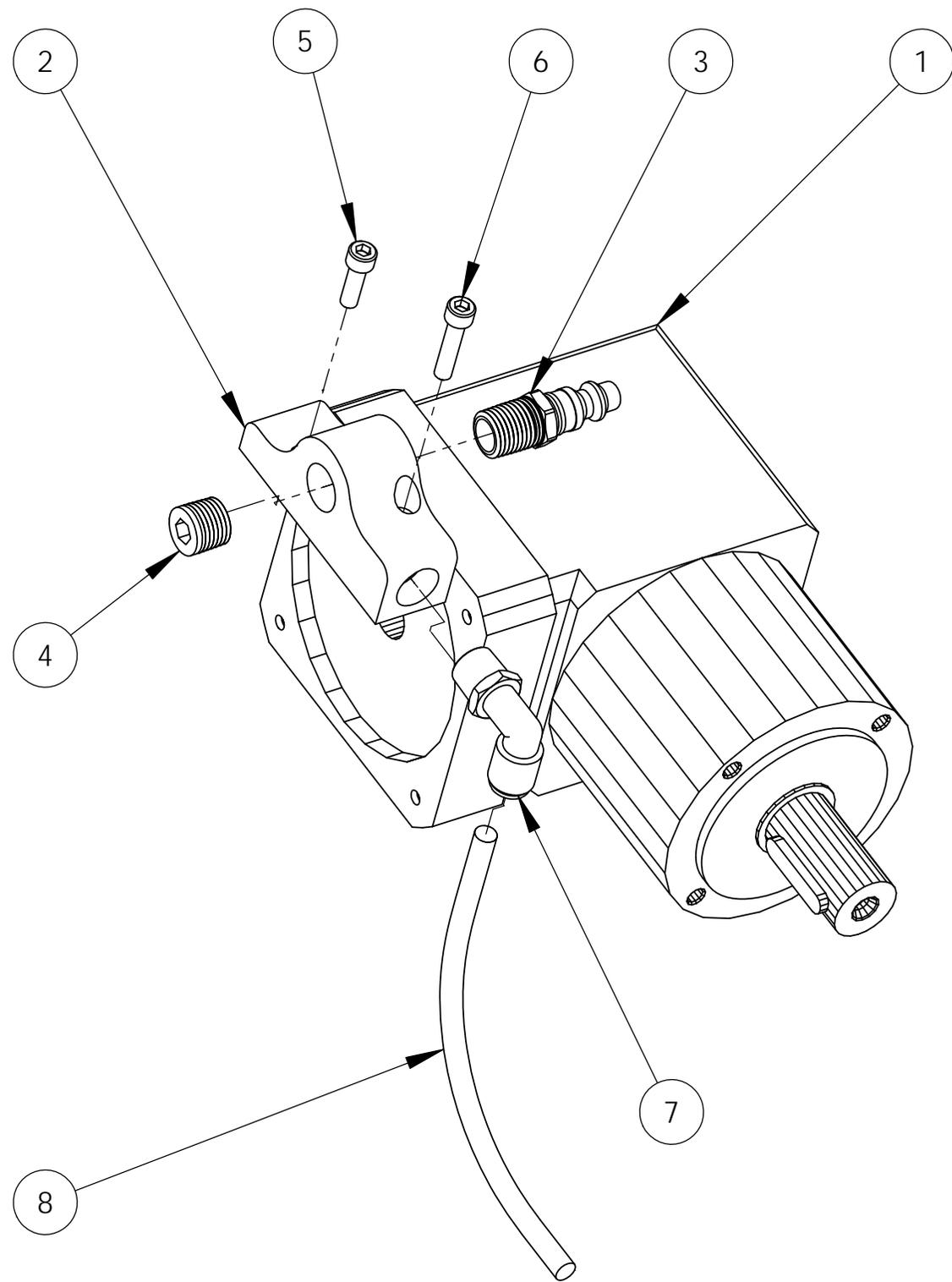


**PUSHER DRIVE
IDLER SPROCKET**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY./GO1	QTY/G02
1	1B00927H01	UPPER ROLLER HOUSING LEFT BLUE	1	-
2	1B00927H02	UPPER ROLLER HOUSING RIGHT GOLD	-	1
3	1B00927H03	UPPER ROLLER SHAFT	4	4
4	1B00927H04	UPPER ROLLER	4	4
5	1B00927H05	SSHDOGSKT 0.138-32x0.1875-SST	4	4
6	1B00927H06	R6 UPPER ROLLER BEARING	8	8
7	1B00927H07	DELFIN WASHER 3/8 ID	8	8
8	1B00927H08	ASME B18.8.2 - 0.25x0.625 SST DOWEL PIN	2	2



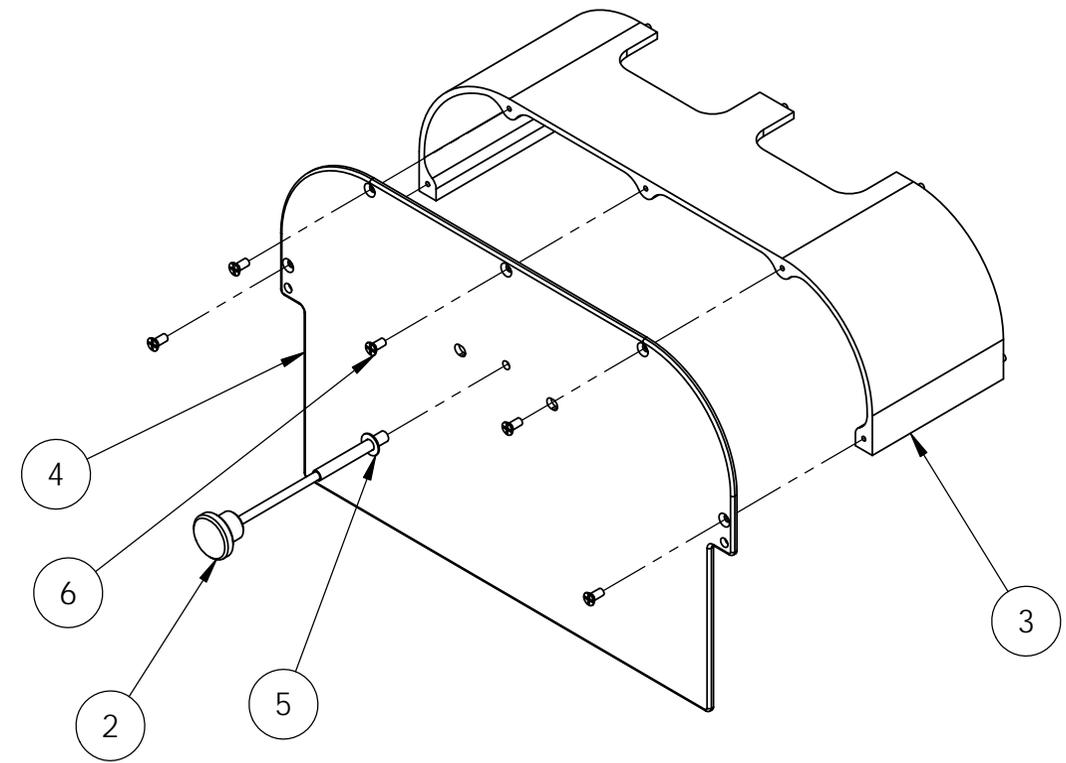
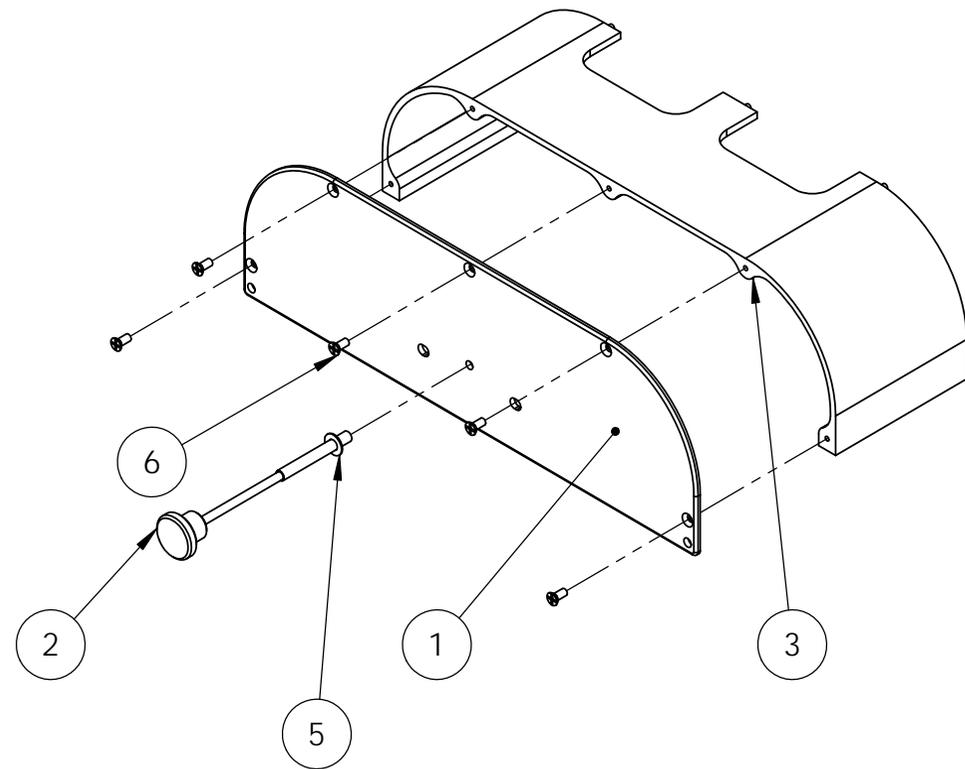
**PUSHER DRIVE
UPPER ROLLER**



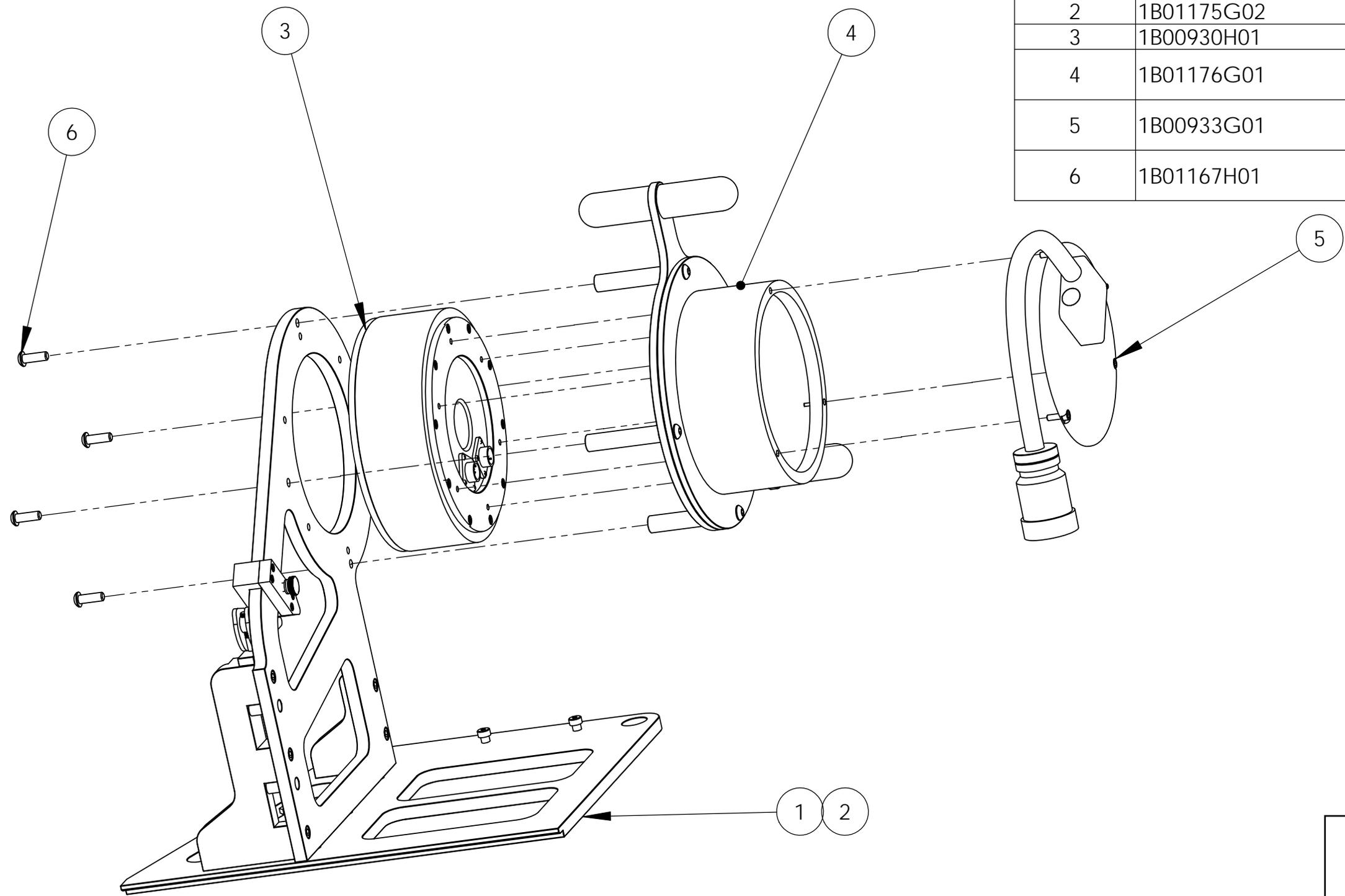
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	1B00928H01	90 DEGREE GEAR BOX	1
2	1B00928H02	AIR MANIFOLD	1
3	1B00928H03	ANSI T3.20.14 FITTING (1/4")	1
4	1B00928H04	ANSI B1.10.1 PIPE PLUG (1/4")	1
5	1B00928H05	HX-SHCS 0.19-32X0.625 -SST	1
6	1B00928H06	HX-SHCS 0.19-32X0.875 -SST	1
7	1B00928H07	90 SWIVEL 1/4" TUBE	1
8	1B00928H08	1/4" TUBE WITH 5 MICRON FILTER	1

**PUSHER DRIVE
GEAR BOX WITH AIR MANIFOLD**

ITEM NO.	PART NUMBER	DESCRIPTION	Group 01/QTY.	Group 02/QTY.
1	1B00929H01	BELT COVER PLATE	1	-
2	1B00929H02	THUMB SCREW	1	1
3	1B00929H03	BELT COVER	1	1
4	1B00929H04	BELT COVER PLATE EXTENDED	-	1
5	1B00929H05	DELRIN WASHER	1	1
6	1B00929H06	#6 FHPH X 3/8 SHEET METAL SCREW	5	5

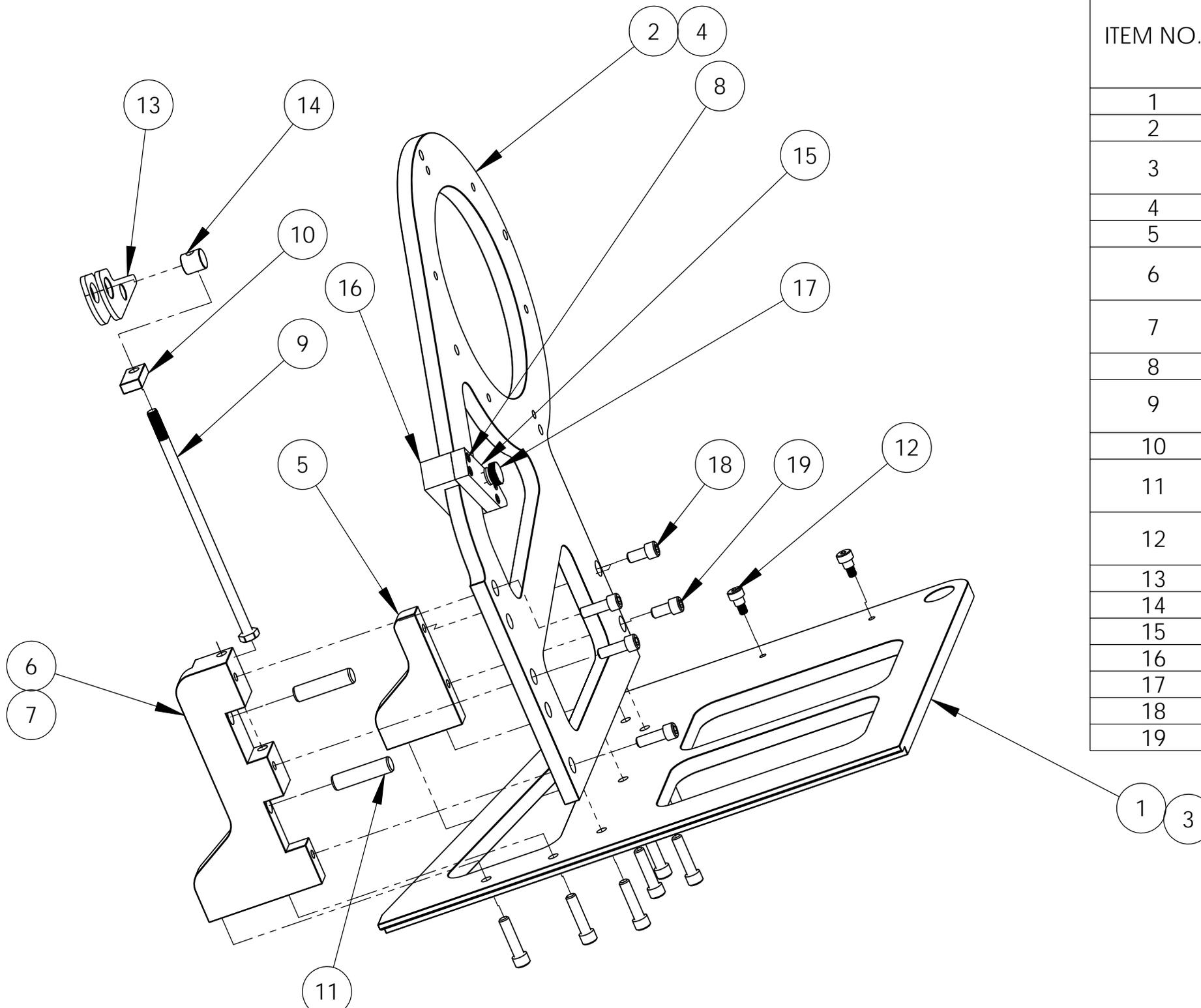


**PUSHER DRIVE
SAFETY COVER**



ITEM NO.	PART NUMBER	DESCRIPTION	G01 QTY. LEFT (BLUE)	G02 QTY. RIGHT (GOLD)
1	1B01175G01	TAKEUP FRAME LEFT (BLUE)	1	-
2	1B01175G02	TAKEUP FRAME RIGHT (GOLD)	-	1
3	1B00930H01	TAKEUP TORQUE MOTOR	1	1
4	1B01176G01	TAKEUP CONNECTOR HOUSING AND MOTOR SUPPORTS	1	1
5	1B00933G01	TAKEUP INTERCONNECTING CABLES	1	1
6	1B01167H01	BUTTON HEX HEAD CAP SCREW 1/4"-20 Thread, 3/4" SST	4	4

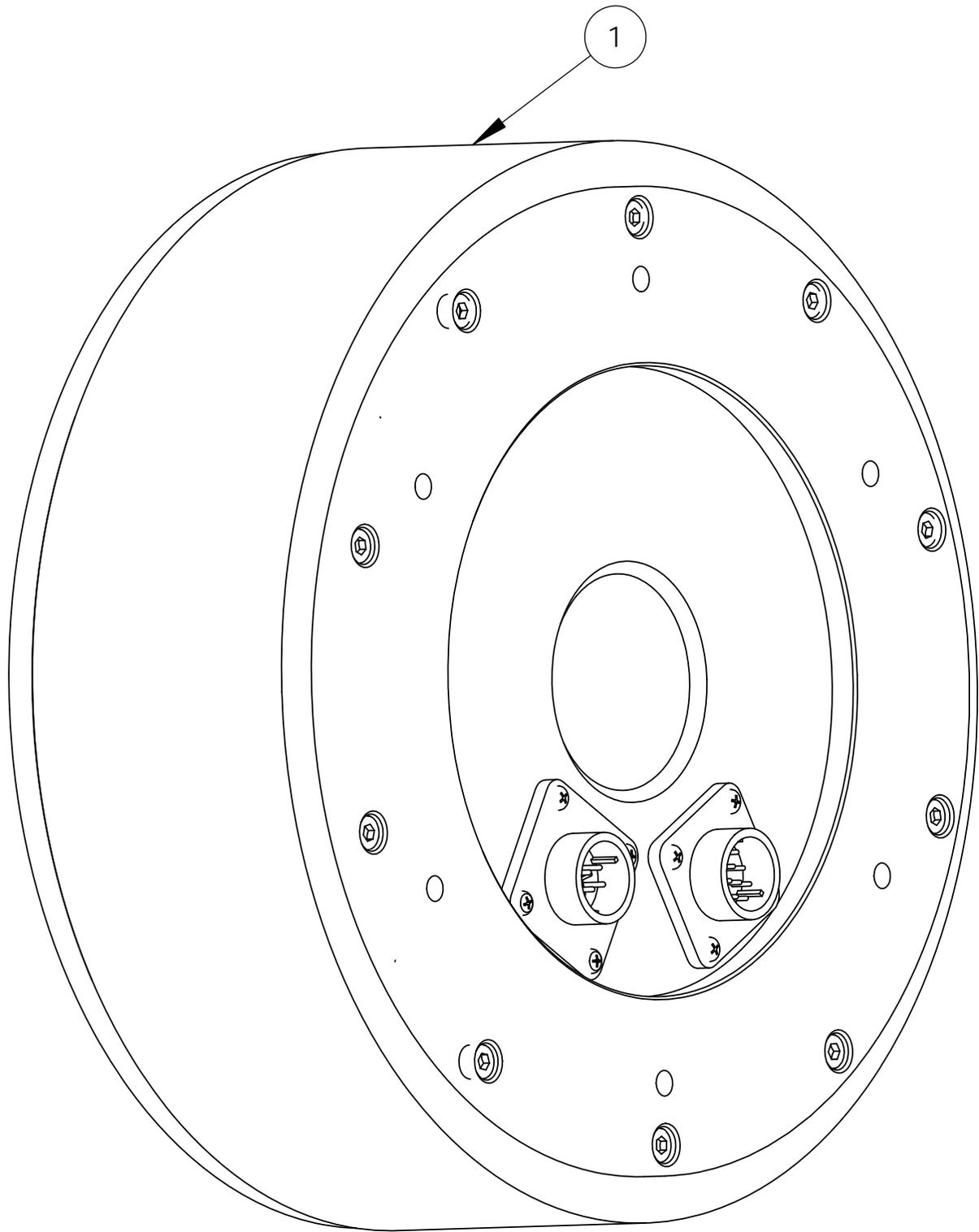
**TD-200 / OMNI-200-TIP
TAKEUP**



ITEM NO.	PART NUMBER	DESCRIPTION	G01 QTY. LEFT (BLUE)	G02 QTY. RIGHT (GOLD)
1	1B01175H01	TAKEUP LEFT BASEPLATE (BLUE)	1	-
2	1B01175H02	TAKEUP LEFT UPRIGHT (BLUE)	1	-
3	1B01175H03	TAKEUP RIGHT BASEPLATE (GOLD)	-	1
4	1B01175H04	TAKEUP RIGHT UPRIGHT (GOLD)	-	1
5	1B01175H05	TAKEUP UPRIGHT SUPPORT	1	1
6	1B01175H06	TAKEUP LATCH BRACKET LEFT (BLUE)	1	-
7	1B01175H07	TAKEUP LATCH BRACKET RIGHT (GOLD)	-	1
8	1B01175H08	HX-SHCS 0.138-32x0.5x0.5-N SST	4	4
9	1B01175H09	Hex Head Cap Screw 1/4"-28 Thread, 6" SST	1	1
10	1B01175H10	TAKEUP LATCH BEARING PLATE	1	1
11	1B01175H11	DOWEL PIN ASME B18.8.2 - 0.375x1.5 SST	2	2
12	1B01175H12	1/4" SHOULDER SCREW 3/16" L, 10-32 THREAD	2	2
13	1B01175H13	TAKEUP LATCH HANDLE	1	1
14	1B01175H14	TAKE UP LATCH HANDLE PIVOT	1	1
15	1B01175H15	SAFETY CLAMP TOP	1	1
16	1B01175H16	SAFETY CLAMP BOTTOM	1	1
17	1B01175H17	THUMB SCREW	1	1
18	1B01175H18	1/4"-20 X 0.5 SHCS SST	1	1
19	1B01175H19	1/4"-20 X 3/4" SHCS SST	11	11

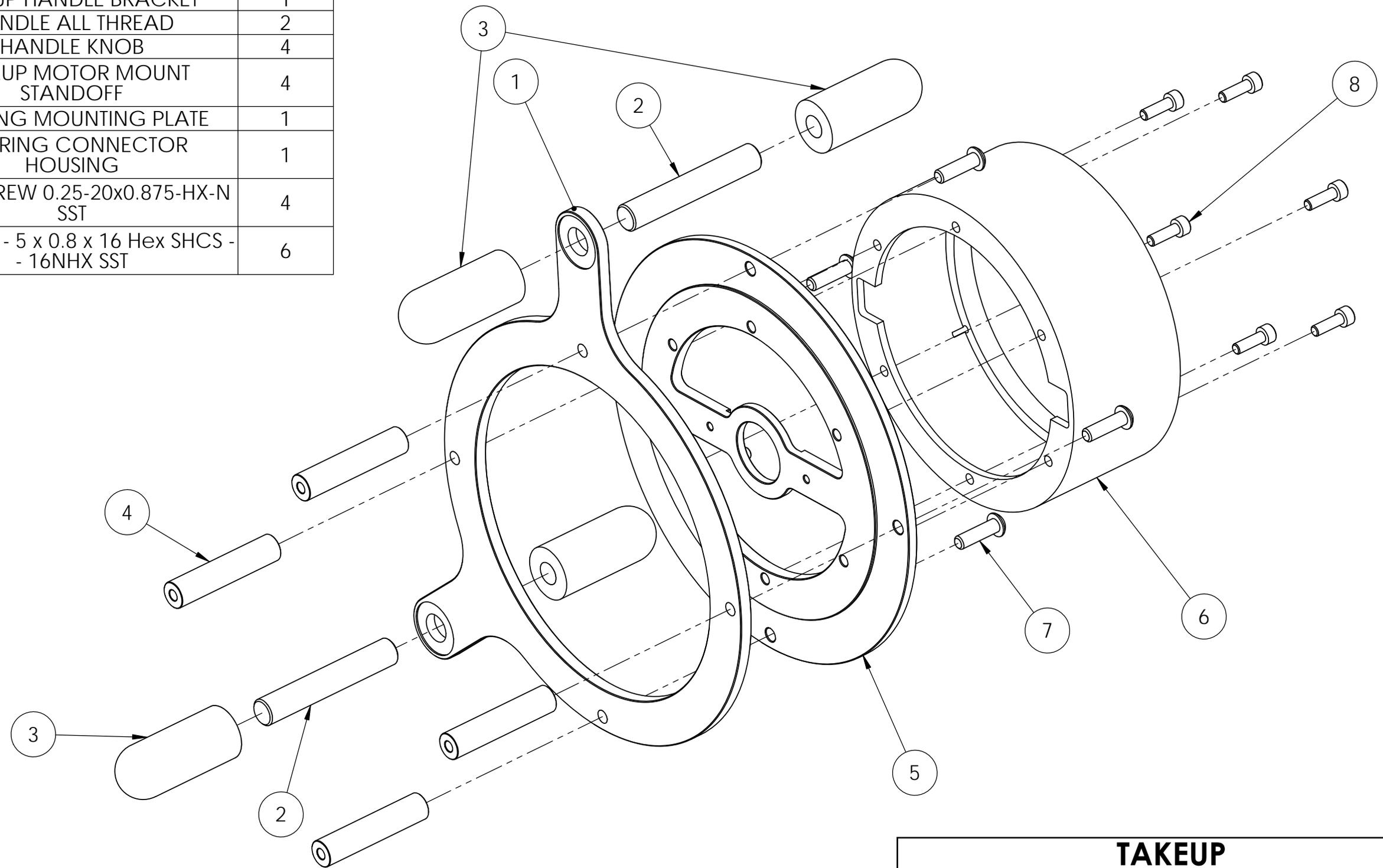
**TAKEUP
FRAME**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	1B00930H01	TAKEUP TORQUE MOTOR	1



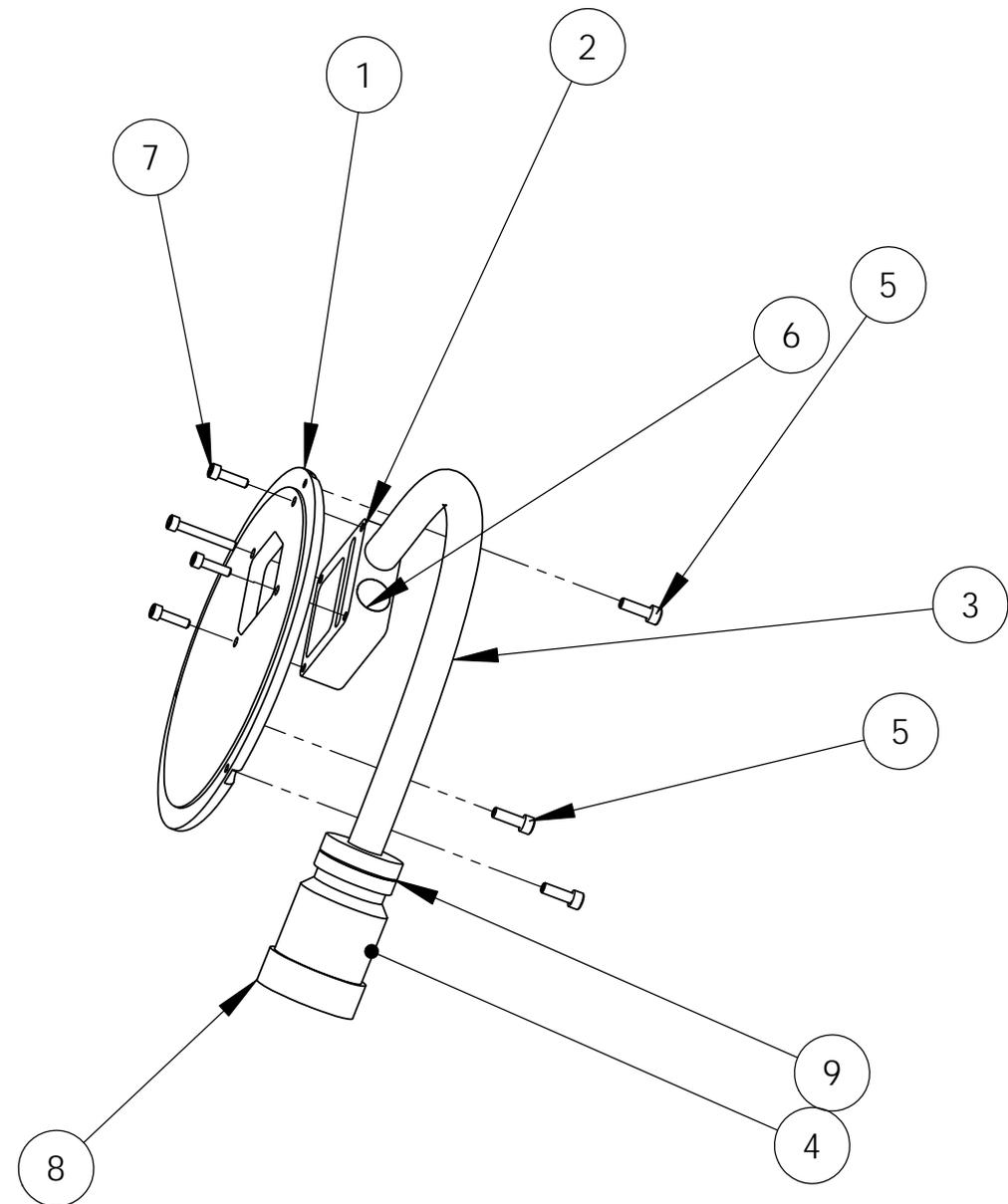
**TAKEUP
TORQUE MOTOR**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	1B01176H01	TAKEUP HANDLE BRACKET	1
2	1B01176H02	HANDLE ALL THREAD	2
3	1B01176H03	HANDLE KNOB	4
4	1B01176H04	TAKEUP MOTOR MOUNT STANDOFF	4
5	1B01176H05	SLIP RING MOUNTING PLATE	1
6	1B01176H06	SLIP RING CONNECTOR HOUSING	1
7	1B01176H07	SBHCSCREW 0.25-20x0.875-HX-N SST	4
8	1B01176H08	B18.3.1M - 5 x 0.8 x 16 Hex SHCS - - 16NHX SST	6

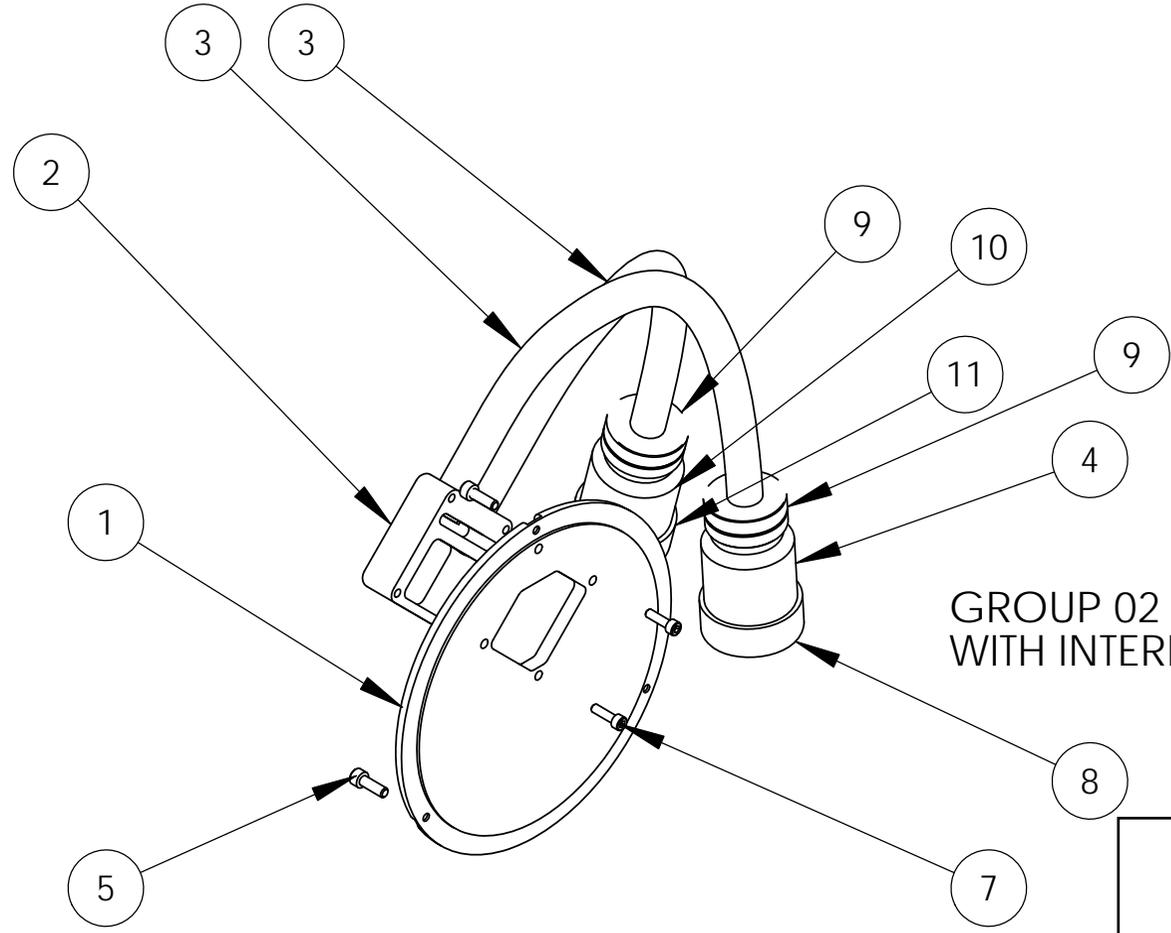


**TAKEUP
CONNECTOR HOUSING / MOTOR
SUPPORTS**

ITEM NO.	PART NUMBER	DESCRIPTION	G01 QTY. TD-200	G02 QTY. OMNI TIP
1	1B00933H01	SLIP RING HOUSING COVER	1	1
2	1B00933H02	CONDUIT ADAPTER	1	1
3	1B00933H03	CONDUIT CABLE - TAKE UP MOTOR & SLIP RING	1	1
4	1B00933H04	TAKEUP MOTOR BACKSHELL - BLUE	1	1
5	1B00933H05	HX-SHCS 0.164-32X0.5X0.5-N SST MODIFIED-CAPTIVE	3	3
6	1B00933H06	CONDUIT CONNECTOR PLUG	1	-
7	1B00933H07	8-32 SHCS X .5 LG SST	4	4
8	1B00933H08	TAKEUP MOTOR CONNECTOR	1	1
9	1B00933H09	CONDUIT STRAIN RELIEF	1	1
10	1B00933H10	SLIP RING BACKSHELL GOLD	-	1
11	1B00933H11	SLIP RING CONNECTOR	-	1

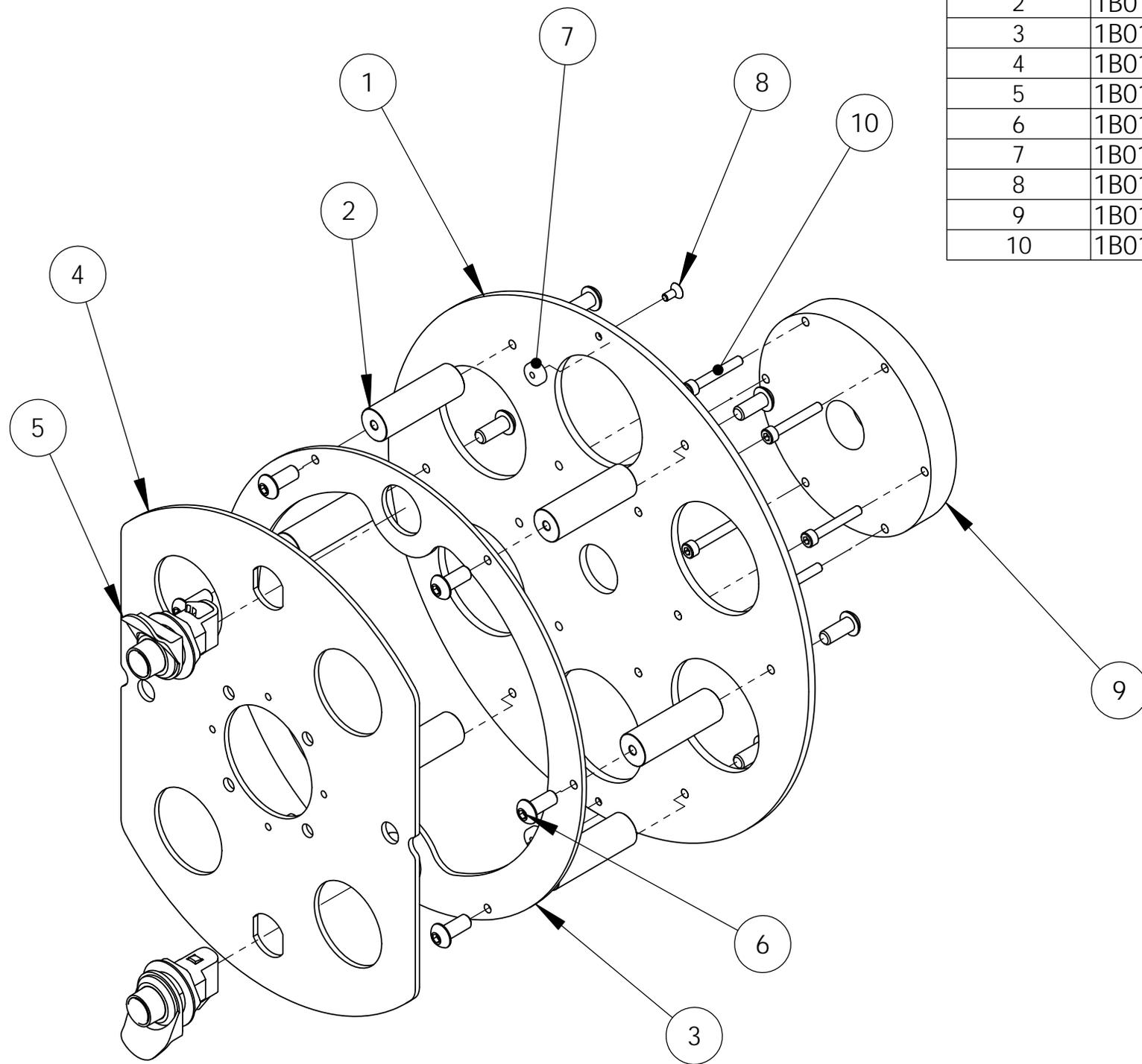


GROUP 01 TRACK DRIVE 200
BALANCE OF PLANT STYLE
NO INTERNAL SLIP RING



GROUP 02 OMNI 200 TESTER IN PUSHER STYLE
WITH INTERNAL SLIP RING

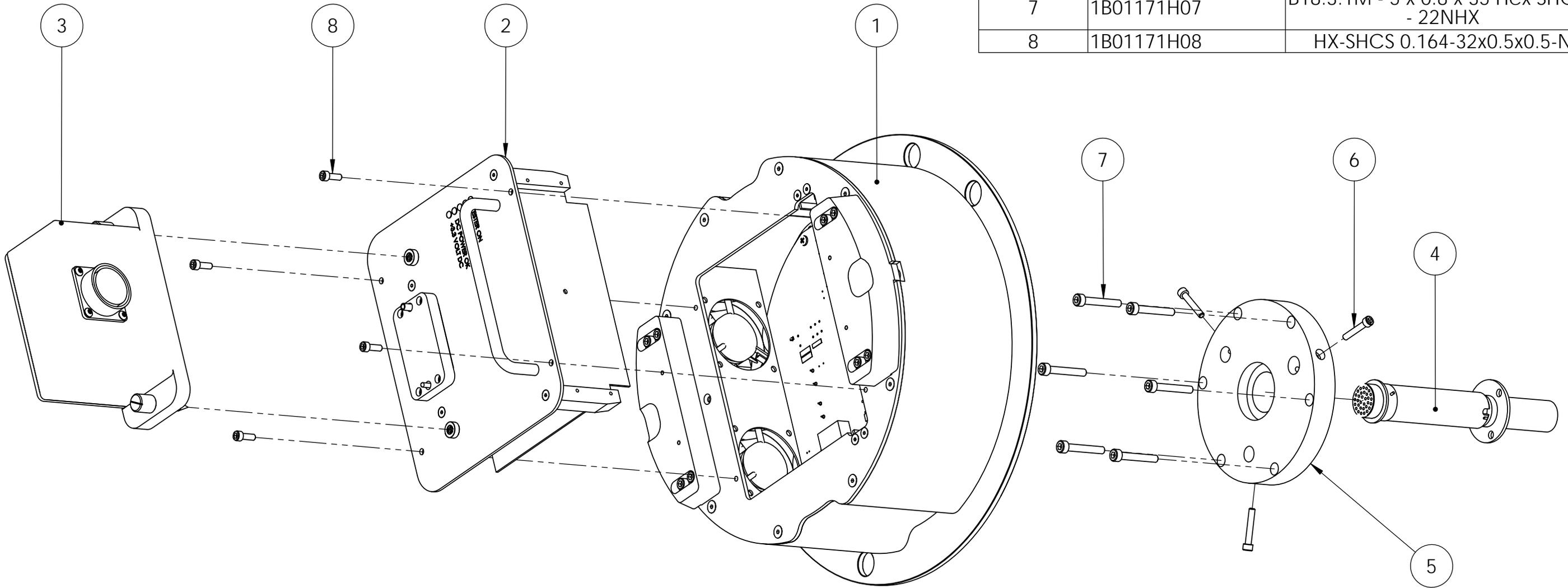
**TAKEUP
INTERCONNECTION CABLES**



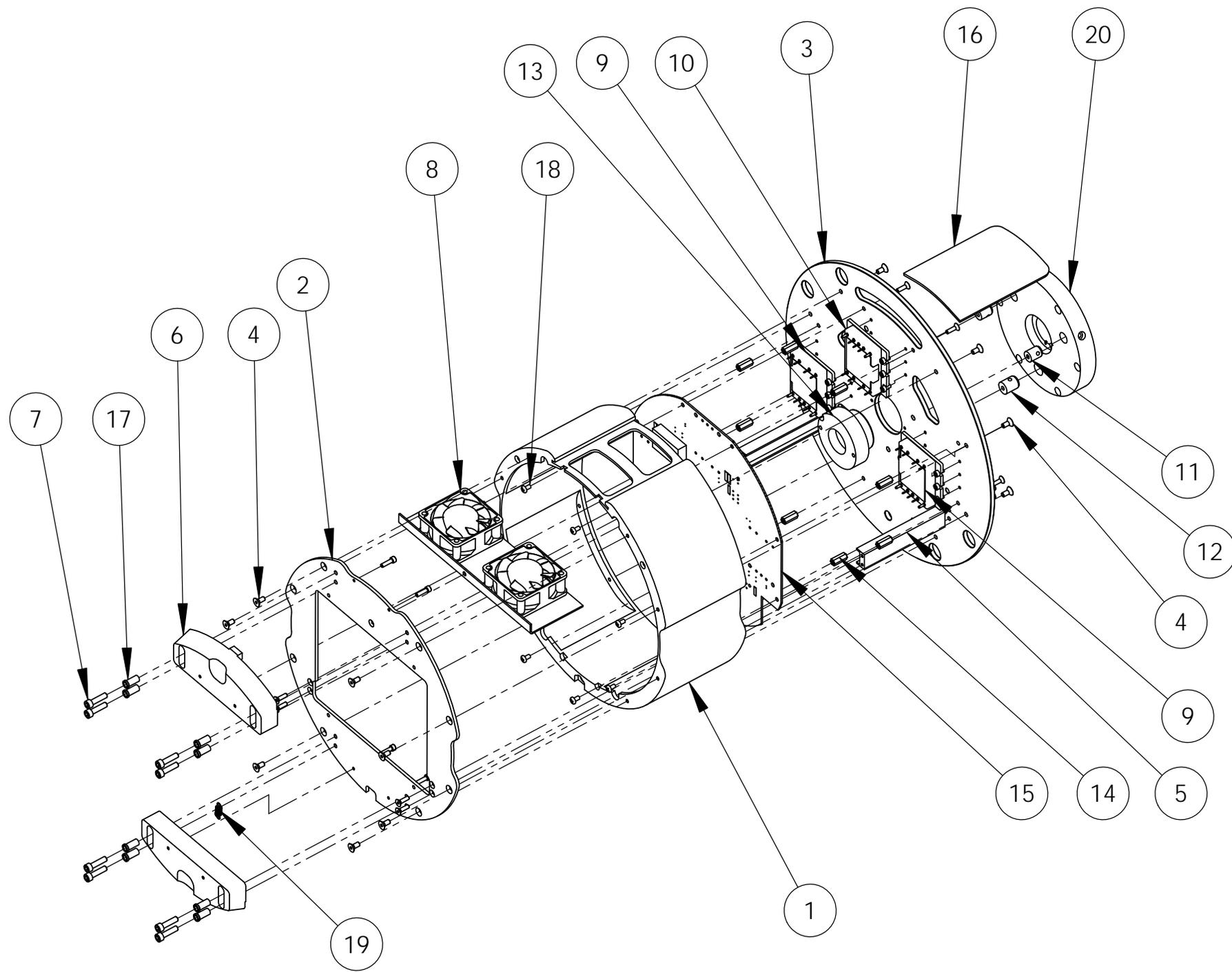
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	1B01172H01	NON TESTER SPOOL BACK PLATE	1
2	1B01172H02	NON TESTER SPOOL STANDOFF	6
3	1B01172H03	NON TESTER SPOOL LATCH PLATE	1
4	1B01172H04	NON TESTER SPOOL COVER	1
5	1B01172H05	PUSH LATCH	2
6	1B01172H06	SBHCSCREW 0.19-32x0.625	12
7	1B01172H07	SPOOL LOCATING PIN	2
8	1B01172H08	SHCHCSCREW 0.164-32x0.375x0.375	2
9	1B01172H09	TAKEUP SPOOL ADAPTER W/O SLIP	1
10	1B01172H10	B18.3.1M - 5 x 0.8 x 35 Hex SHCS -- 22NHX	6

**TD-200
SPOOL**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	1B00936G01	SPOOL	1
2	1B01177G01	TESTER	1
3	1B00937G01- G07	PROBE MODULE	1
4	1B00931G01	SLIP RING	1
5	1B00936H20	TAKEUP SPOOL ADAPTER W/SLIP	1
6	1B01171H06	HX-SHCS 0.164-32x1x1-N	3
7	1B01171H07	B18.3.1M - 5 x 0.8 x 35 Hex SHCS - - 22NHX	6
8	1B01171H08	HX-SHCS 0.164-32x0.5x0.5-N	4



**OMNI-200-TIP
TESTER IN PUSHER SPOOL**

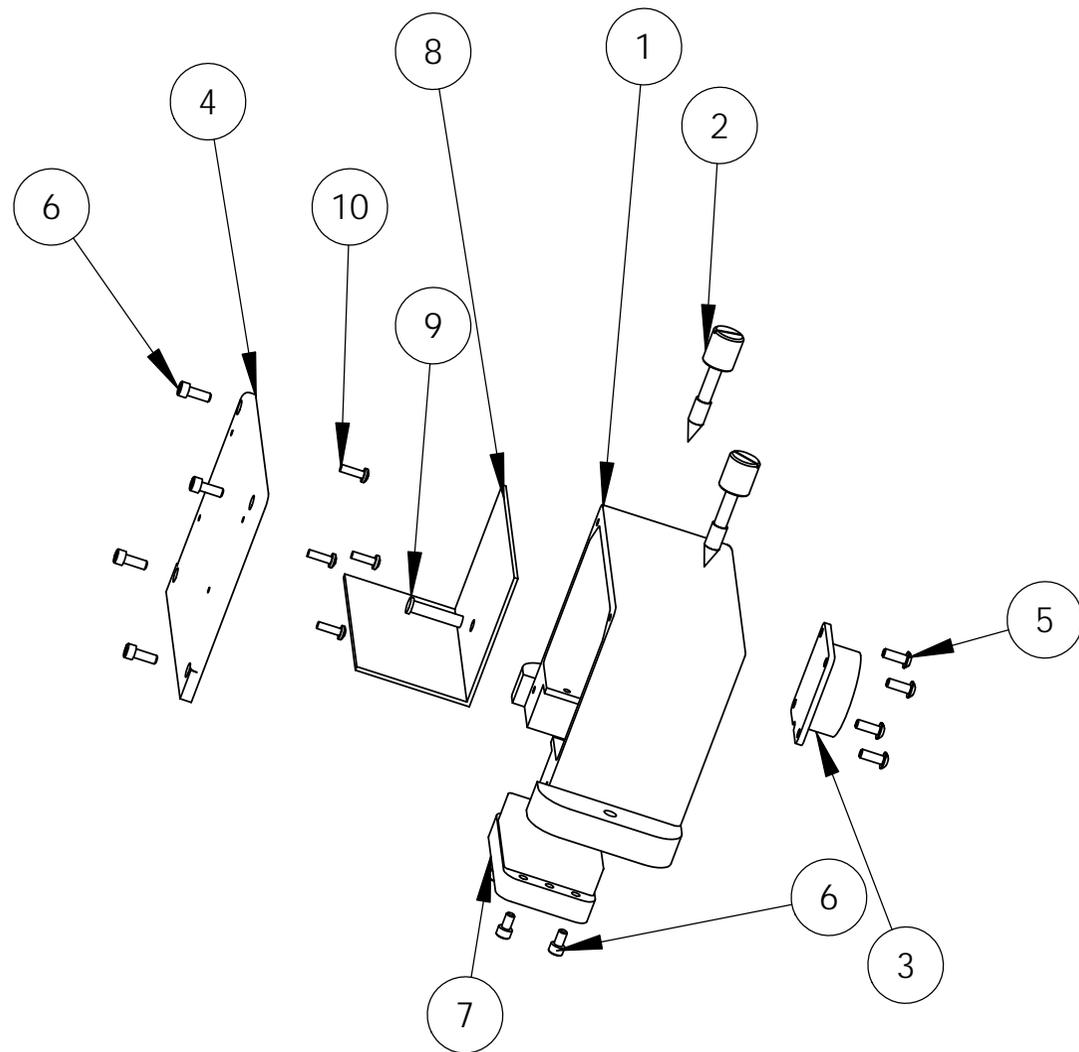


ITEM NO.	PART NUMBER	DESCRIPTION	G01 QTY.
1	1B00936H01	SPOOL HOUSING	1
2	1B00936H02	SPOOL FRON PLATE	1
3	1B00936H03	SPOOL POWER SUPPLY BACK PLATE	1
4	1B00936H04	SCHCSCREW 0.138-32x0.5x0.5-HX-N	16
5	1B00936H05	TESTER MODULE RAIL	2
6	1B00936H06	SPOOL LATCH	2
7	1B00936H07	HX-SHCS 0.138-32x0.25x0.25-N	12
8	1B00936H08	FAN ASSEMBLY	1
9	1B00936H09	15V BRICK	2
10	1B00936H10	24V BRICK	1
11	1B00936H11	7/16" SPOOL LOCKING PIN	2
12	1B00936H12	1/2" SPOOL LOCKING PIN	1
13	1B00936H13	POWER SUPPLY CONNECTOR HUB	1
14	1B00936H14	BOARD STANDOFF	8
15	1B00936H15	SPOOL POWER SUPPLY BOARD	1
16	1B00936H16	SPOOL FILTER	1
17	1B00936H17	SPOOL LATCH BUSHING	8
18	1B00936H18	CR-PHMS 0.138-32x0.25x0.25-N	16
19	1B00936H19	EXTENSION SPRING	4
20	1B00936H20	TAKEUP SPOOL ADAPTER W/SLIP	1

ITEM 20 SHOWN FOR INFORMATION ONLY. NOT PART OF THIS SUB-ASSEMBLY.

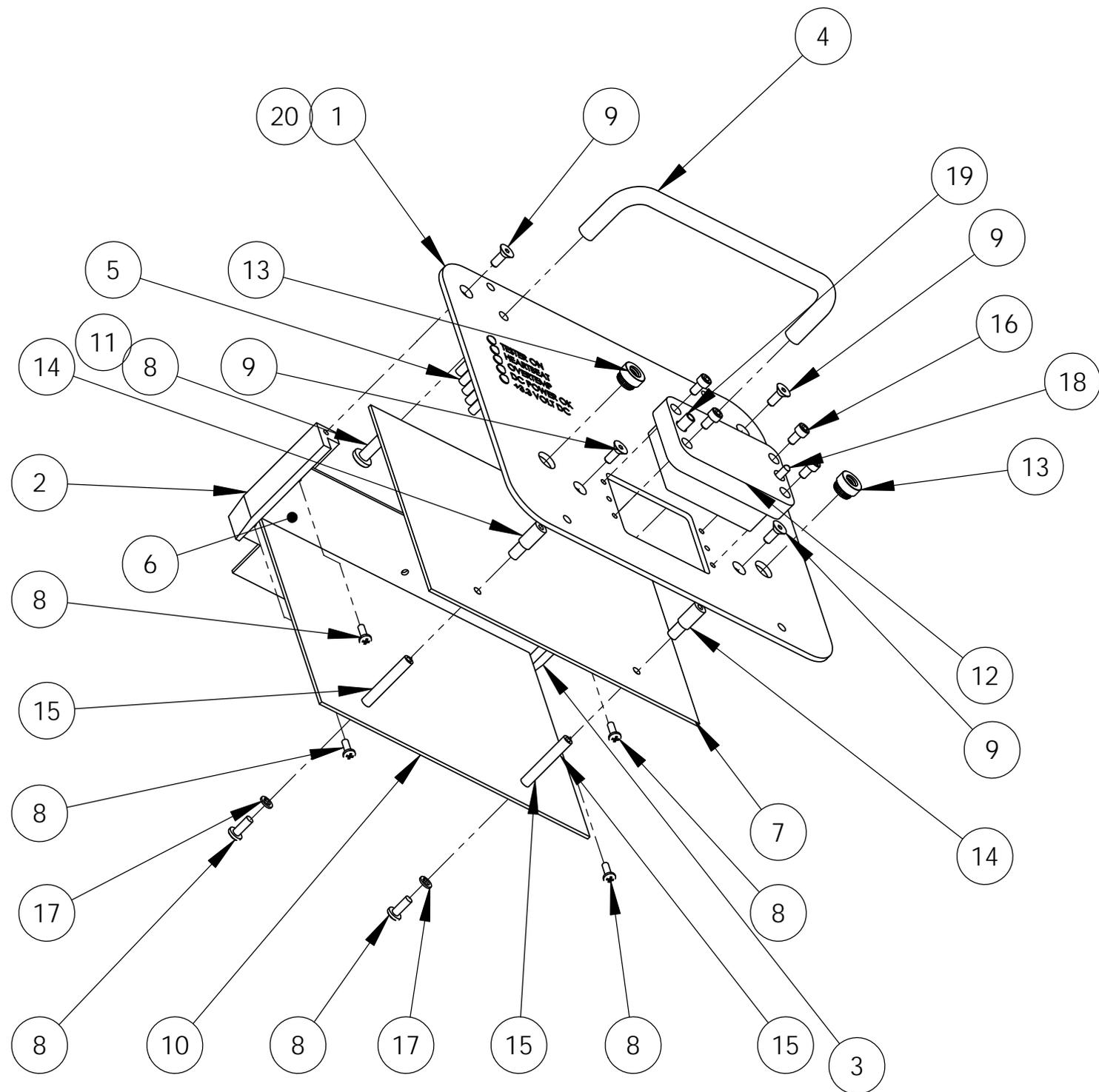
TIP SPOOL HOUSING

ITEM NO.	PART NUMBER	DESCRIPTION	G01/QTY	G02/QTY	G03/QTY	G04/QTY	G05/QTY	G06/QTY	G07/QTY
1	1B00937H01	MODULE HOUSING	1	1	1	1	1	1	1
2	1B00937H02	MODULE CAPTIVE SCREW	2	2	2	2	2	2	2
3	1B00937H03	MODULE CONNECTOR	1	1	1	1	2	1	1
4	1B00937H04	MODULE COVER PLATE	1	1	1	1	1	1	1
5	1B00937H05	SBHCSCREW 0.138-32x0.375-HX	4	4	4	4	4	4	4
6	1B00937H06	HX-SHCS 0.138-32x0.25x0.25-N	8	8	8	8	8	8	8
7	1B00937H07	MODULE MAIN CONNECTOR	1	1	1	1	1	1	1
8	1B00937H08	PROBE TYPE BOARD SET	1	1	1	1	1	1	1
9	1B00937H09	CONNECTOR PLUNGER	1	1	1	1	2	1	1
10	1B00937H10	CR-PHMS 0.112-40x0.375x0.375-N	12	8	8	8	8	8	8



- GROUP 01 - BLUE BOBBIN HIGH SPEED RPC MODULE ASSEMBLY
- GROUP 02 - GOLD SMART ARRAY MODULE ASSEMBLY
- GROUP 03 - GREEN X-PROBE MODULE ASSEMBLY
- GROUP 04 - RED I-PROBE MODULE ASSEMBLY
- GROUP 05 - BRONZE SAX 1/2 MODULE ASSEMBLY
- GROUP 06 - PURPLE STS/S10 MODULE ASSEMBLY
- GROUP 07 - GRAY CALIBRATION MODULE

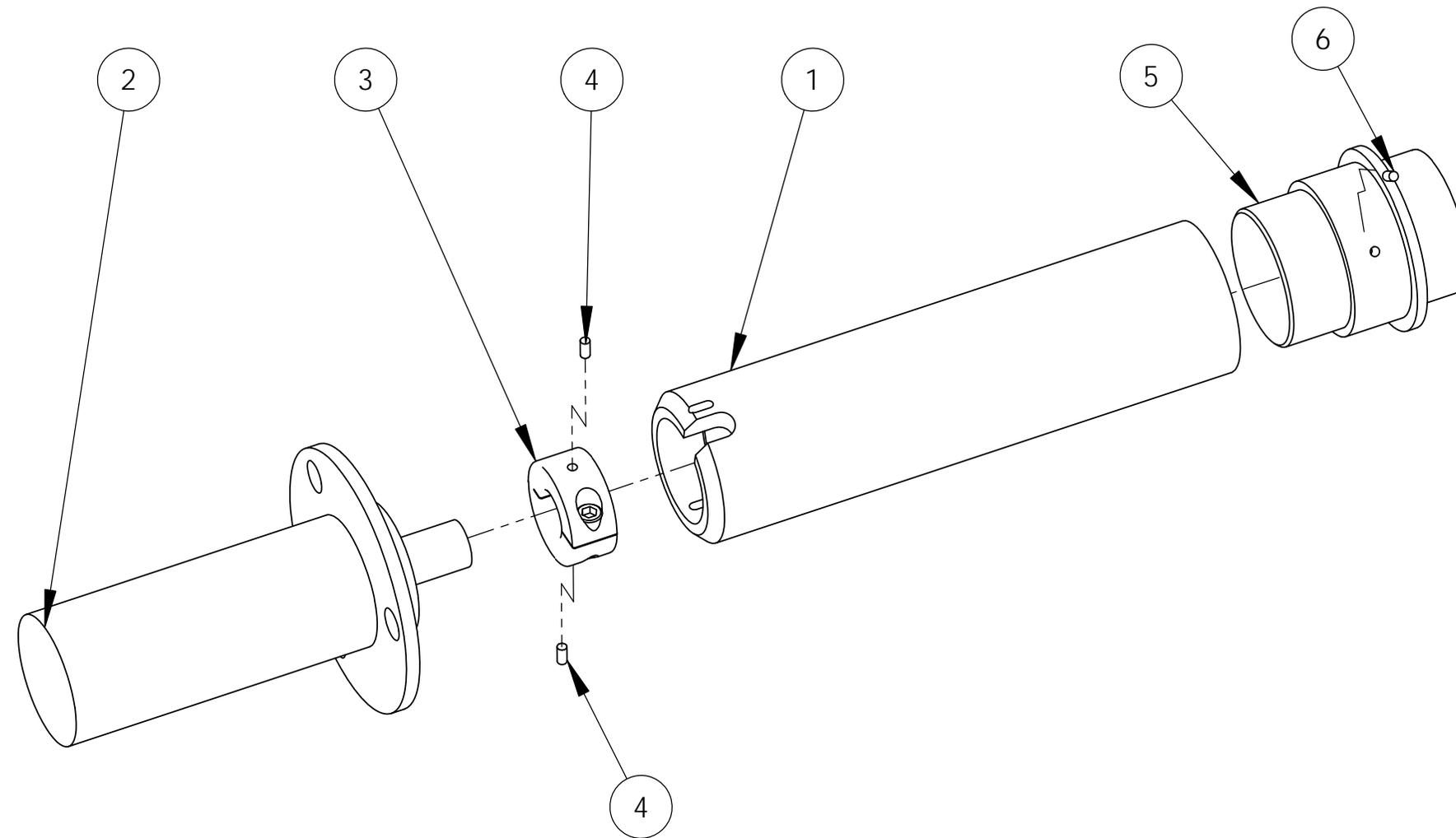
**TIP SPOOL
PROBE MODULES**



ITEM NO.	PART NUMBER	DESCRIPTION	G01 QTY.	G02 QTY.
1	1B01177H01	TESTER FRONT PLATE BLACK	1	-
2	1B01177H02	TESTER MODULE GUIDE RIGHT	1	1
3	1B01177H03	TESTER MODULE GUIDE LEFT	1	1
4	1B01177H04	HANDLE	1	1
5	1B01177H05	LED LIGHT TANSMISSION ROD	5	5
6	1B01177H06	TRACK DRIVE BACKPLANE BOARD	1	1
7	1B01177H07	TRACK DRIVE PROBE MODULE BOARD	1	1
8	1B01177H08	CR-PHMS 0.19-32x0.5x0.5-N	8	8
9	1B01177H09	SCHCSCREW 0.138-32x0.375x0.375-HX-N	4	4
10	1B01177H10	OMNI-200 PROCESSOR CARD	1	1
11	1B01177H11	REGULAR LW 0.190	2	2
12	1B01177H12	MODULE MAIN CONNECTOR	1	1
13	1B01177H13	PRESS NUT	2	2
14	1B01177H14	BRASS STANDOFF	2	2
15	1B01177H15	BRASS LOWER STANDOFF	2	2
16	1B01177H16	HX-SHCS 0.138-32x0.25x0.25-N	4	4
17	1B01177H17	REGULAR LW 0.138	2	2
18	1B01177H18	MALE ALIGNMENT PIN	1	1
19	1B01177H19	FEMALE ALIGNMENT PIN	1	1
20	1B01177H20	TESTER FRONT PLATE GOLD	-	1

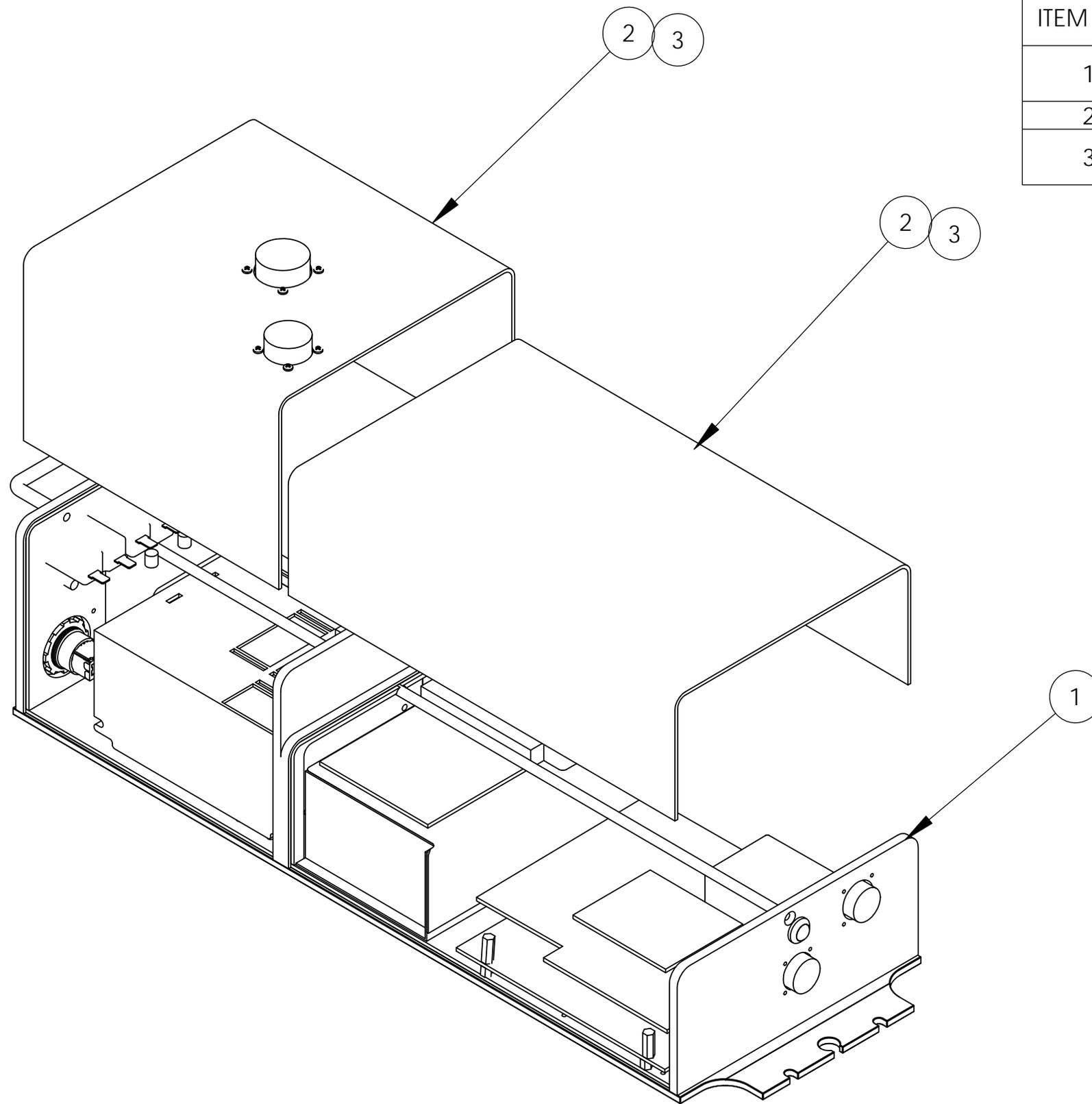
**TIP SPOOL
TESTER**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY./G01
1	1B00931H01	SLIP RING CARTRIDGE HOUSING	1
2	1B00931H02	SLIP RING	1
3	1B00931H03	SHAFT COLLAR MODIFIED	1
4	1B00931H04	GUIDE PINS	2
5	1B00931H05	FEMALE CONNECTOR	1
6	1B00931H06	LOCKING PIN	1



**TIP SPOOL
SLIP RING**

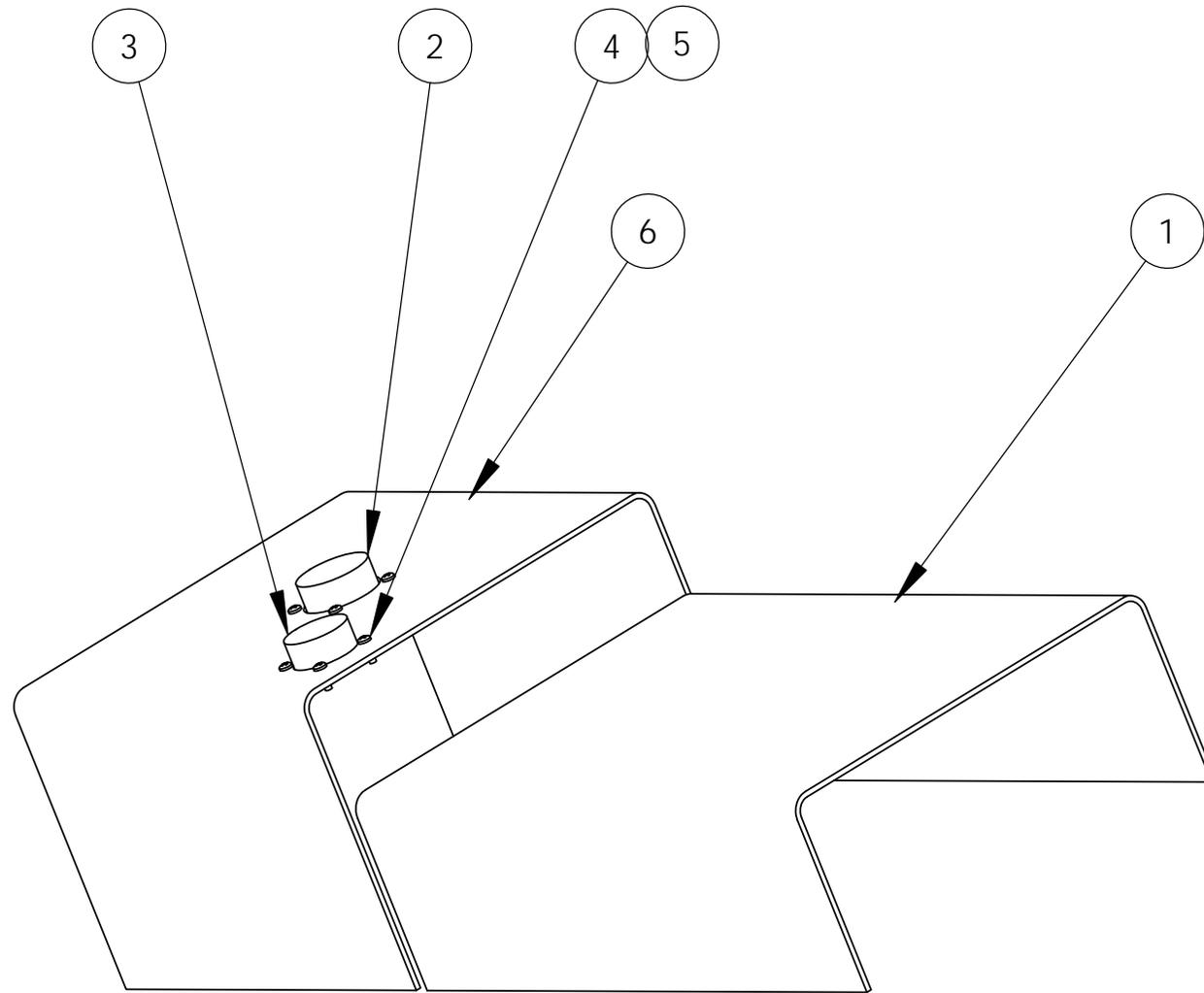
ITEM NO.	PART NUMBER	DESCRIPTION	G01 QTY. TD-200	G02 QTY. OMNI-TIP
1	1B00935G01	CONTROL BOX FRAME AND ELECTRONICS	1	1
2	1B00935H14	TD-200 CONTROL BOX COVERS	1	-
3	1B00934G02	OMNI-TIP CONTROL BOX COVERS (3-HOLE)	-	1



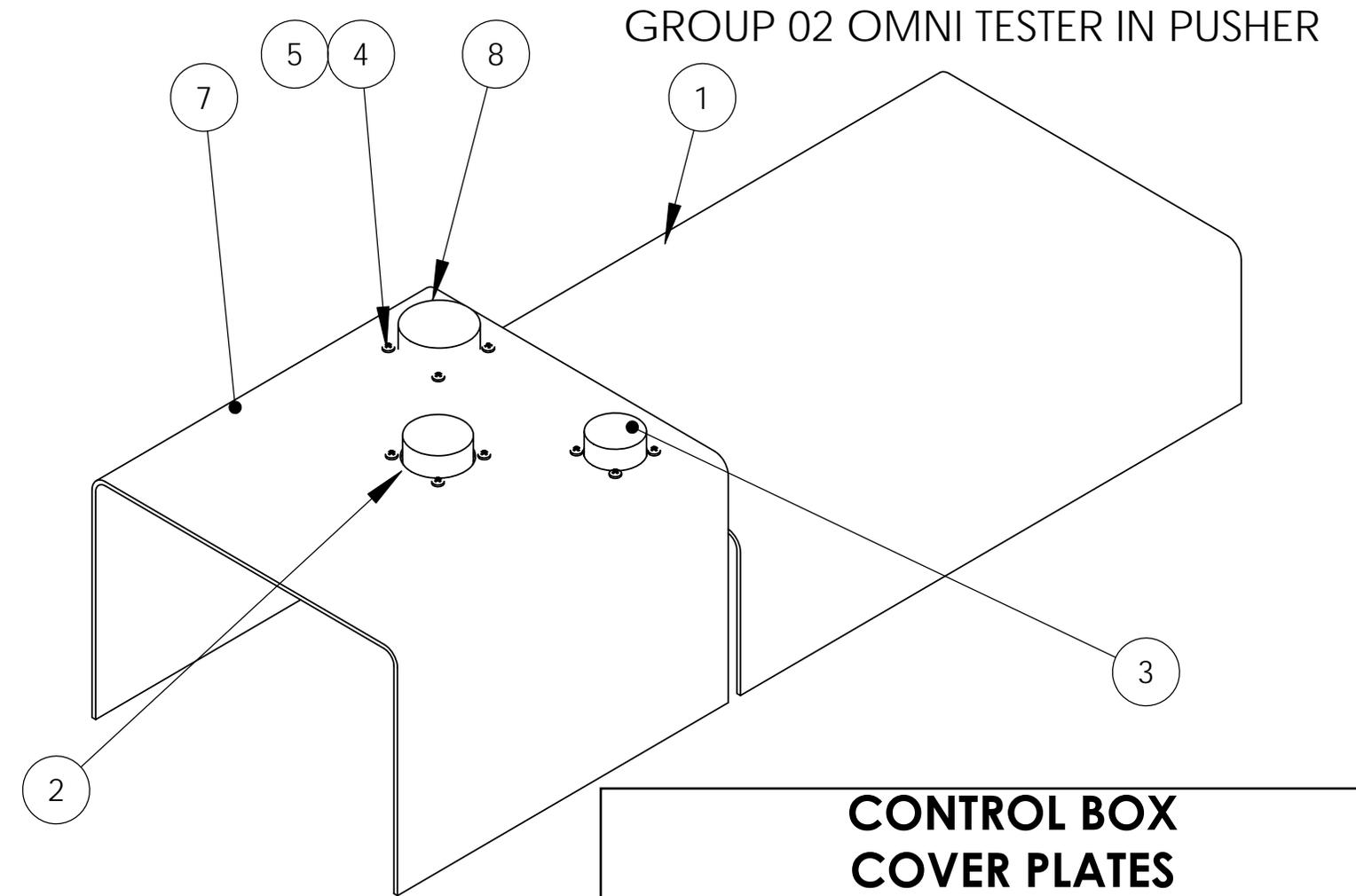
VIEW SHOWN WITH COVER REMOVED FOR CLARITY.

**TD-200 / OMNI-200-TIP
CONTROL BOX**

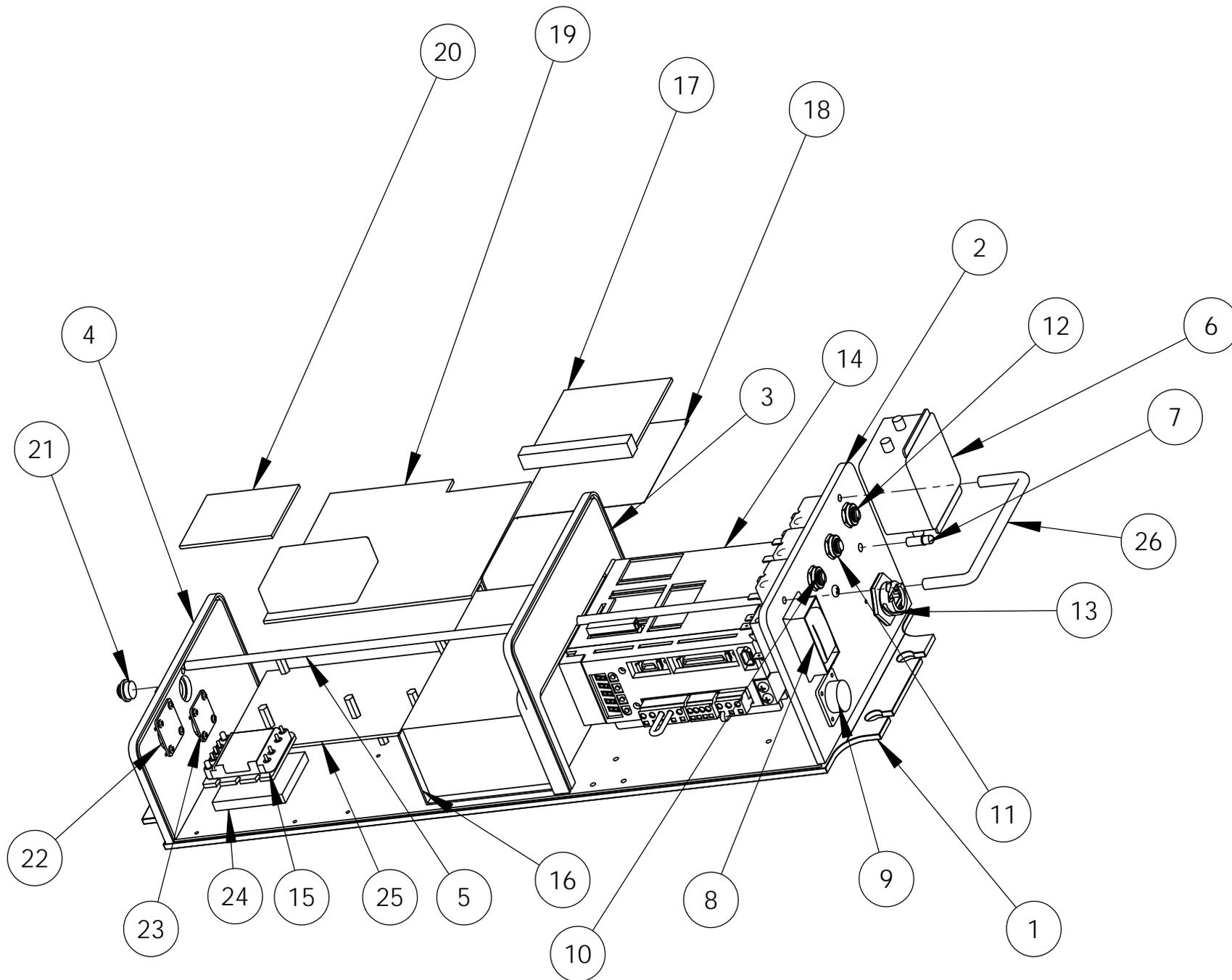
ITEM NO.	PART NUMBER	DESCRIPTION	G01 QTY. TD-200	G02 QTY. OMNI-TIP
1	1B00934H01	FRONT COVER	1	1
2	1B00934H02	DRIVE MOTOR BULKHEAD CONNECTOR	1	1
3	1B00934H03	TORQUE MOTOR BULKHEAD CONNECTOR	1	1
4	1B00934H04	CR-PHMS 0.112-40x0.375x0.375-N	8	12
5	1B00934H05	MSHXNUT 0.112-40-S-N	8	12
6	1B00934H06	REAR COVER	1	-
7	1B00934H07	REAR COVER	-	1
8	1B00934H08	OMNI 200 TESTER BULKHEAD CONNECTOR	-	1



GROUP 01 TRACK DRIVE 200



**CONTROL BOX
COVER PLATES**

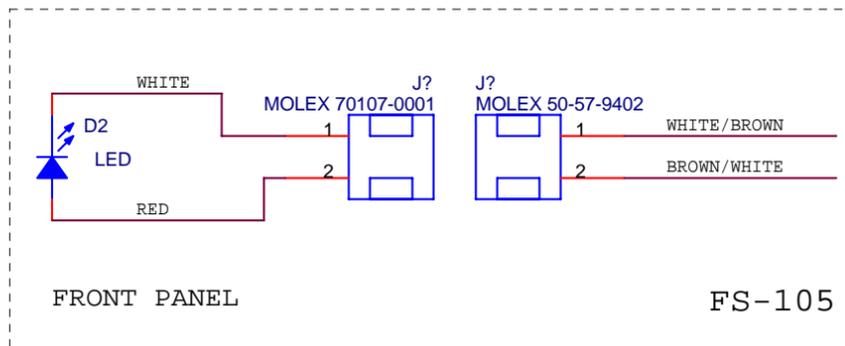
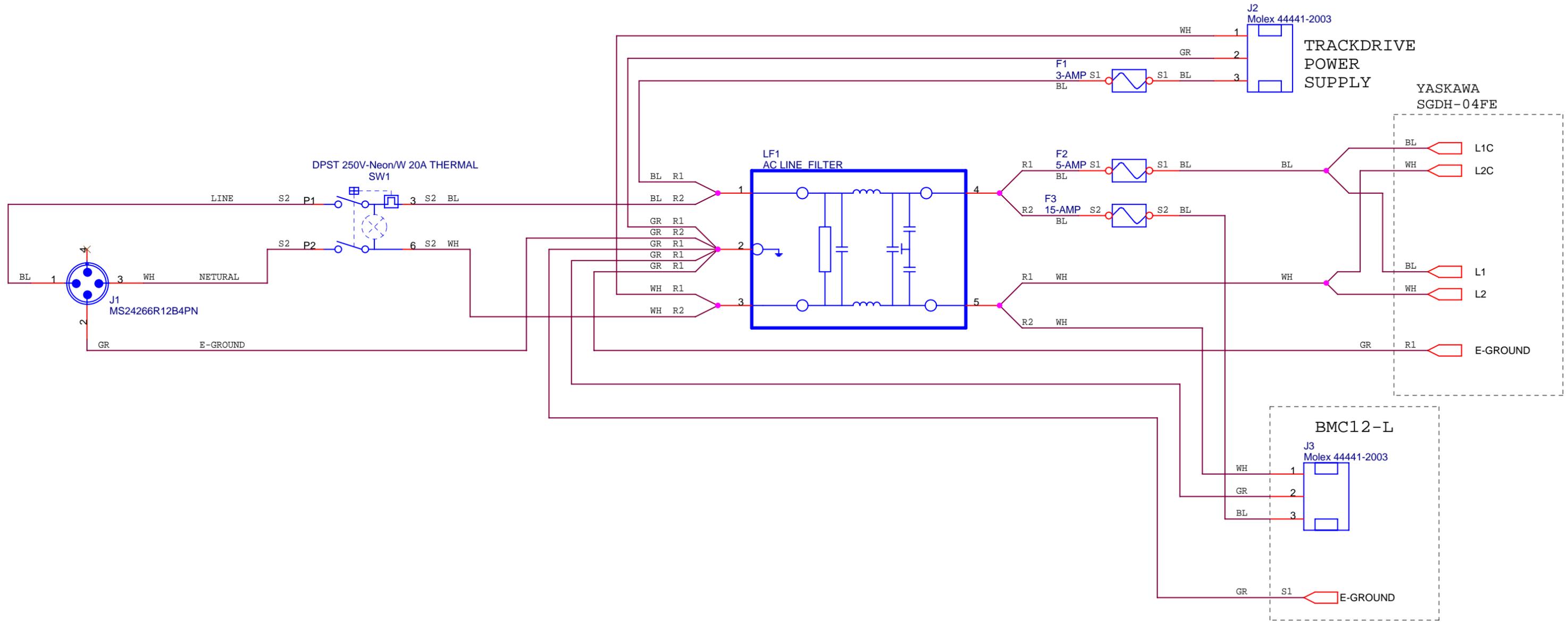


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	1B00935H01	CONTROL BOX BASEPLATE	1
2	1B00935H02	CONTROL BOX REAR PLATE	1
3	1B00935H03	CONTROL BOX INTERMEDIATE PLATE	1
4	1B00935H04	CONTROL BOX FRONT PLATE	1
5	1B00935H05	CONTROL BOX SUPPORT ROD	1
6	1B00935H06	RFI FILTER	1
7	1B00935H07	ETHERNET CONNECT LED	1
8	1B00935H08	POWER SWITCH WITH COVER	1
9	1B00935H09	4 PIN POWER BULKHEAD CONNECTOR	1
10	1B00935H10	CIRCUIT BREAKER 15A DRIIVE MOTOR	1
11	1B00935H11	CIRCUIT BREAKER 5A TORQUE MOTOR	1
12	1B00935H12	CIRCUIT BREAKER 3A OMNI-200 TESTER	1
13	1B00935H13	ETHERNET JACK	1
14	1B00935H14	TORQUE MOTOR AMP	1
15	1B00935H15	FARM 300V POWER SUPPLY	1
16	1B00935H16	PUSHER DRIVE MOTOR CONTROLLER	1
17	1B00935H17	ETHERNET SWITCH	1
18	1B00935H18	ETHERNET SWITCH BRACKET	1
19	1B00935H19	TRACK DRIVE POWER SUPPLY	1
20	1B00935H20	DB-28040-5V DAUGHTER BOARD	1
21	1B00935H21	AIR TOGGLE SWITCH	1
22	1B00935H22	AUX I/O BULKHEAD CONNECTOR	1
23	1B00935H23	AIR/ENCODER BULKHEAD CONNECTOR 12 PIN	1
24	1B00935H24	FARM SPACER	1
25	1B00935H25	GALIL DM2123 BOARD	1
26	1B00935H26	HANDLE	1

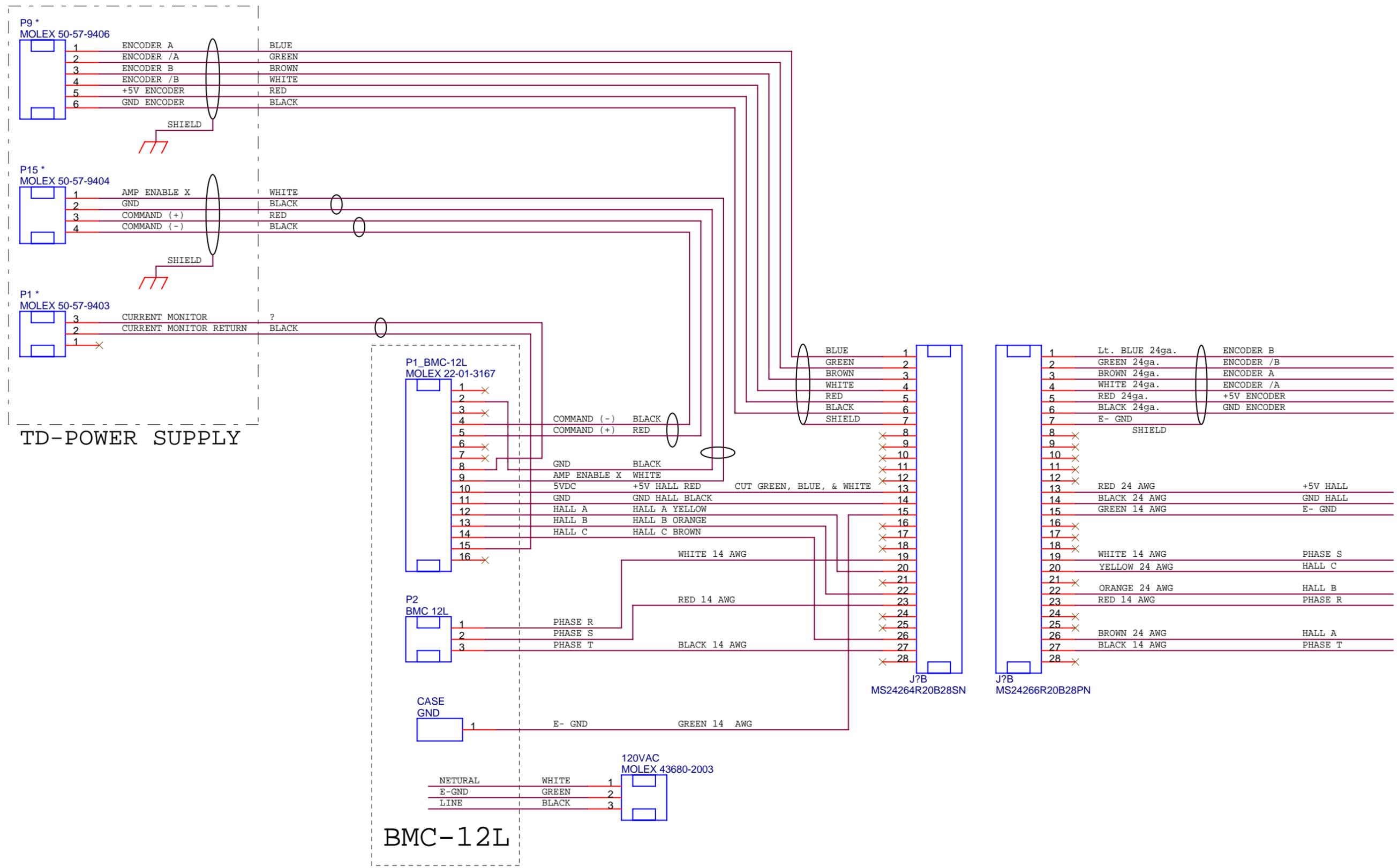
**CONTROL BOX
FRAME / ELECTRICAL COMPONENTS**

APPENDIX B: Electrical Drawings

- AC WIRING
- DRIVE MOTOR
- TORQUE MOTOR
- OMNI-200
- POLY ENCODER / AIR REGULATOR
- EXTERNAL POLY ENCODER



AC WIRING



DRIVE MOTOR

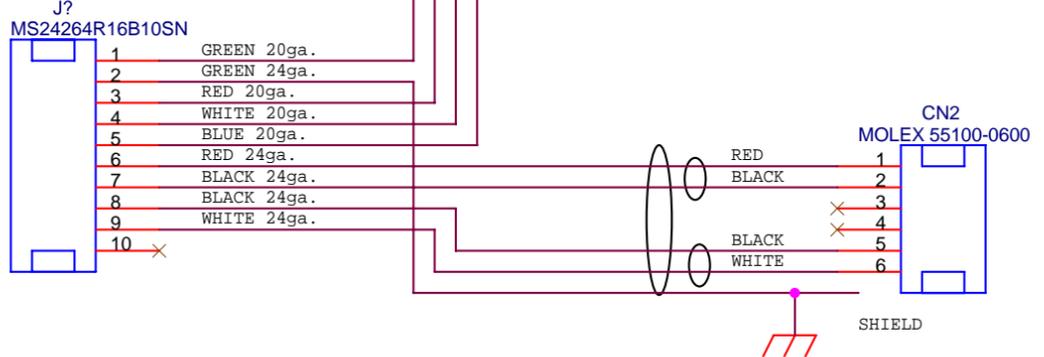
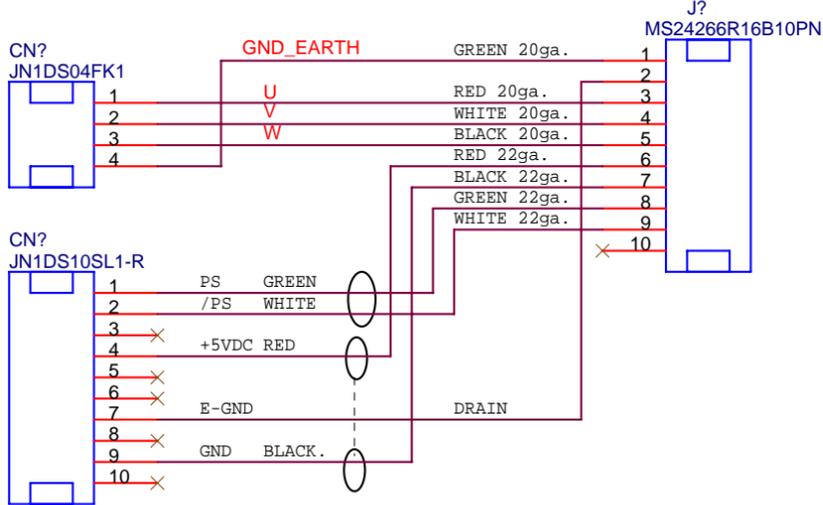
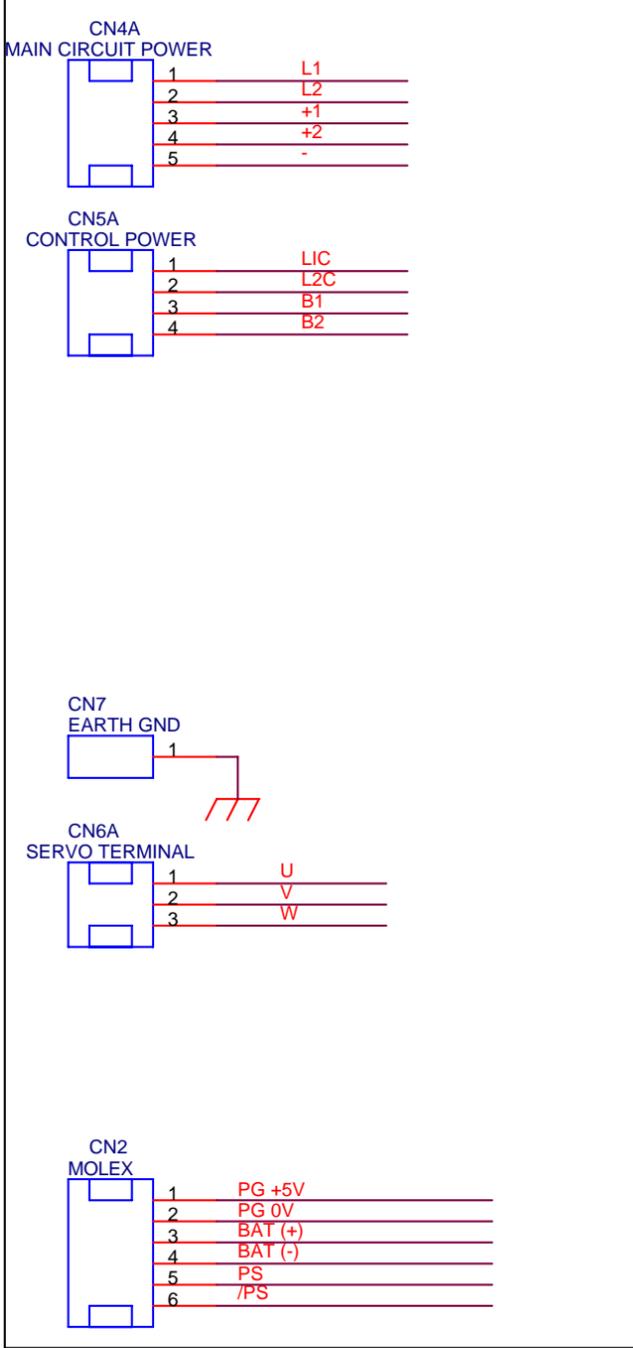
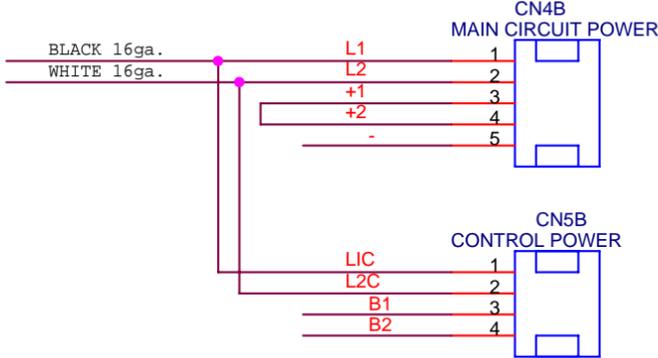
YASKAWA SGDh-04FE

P12
MOLEX 50-57-9410

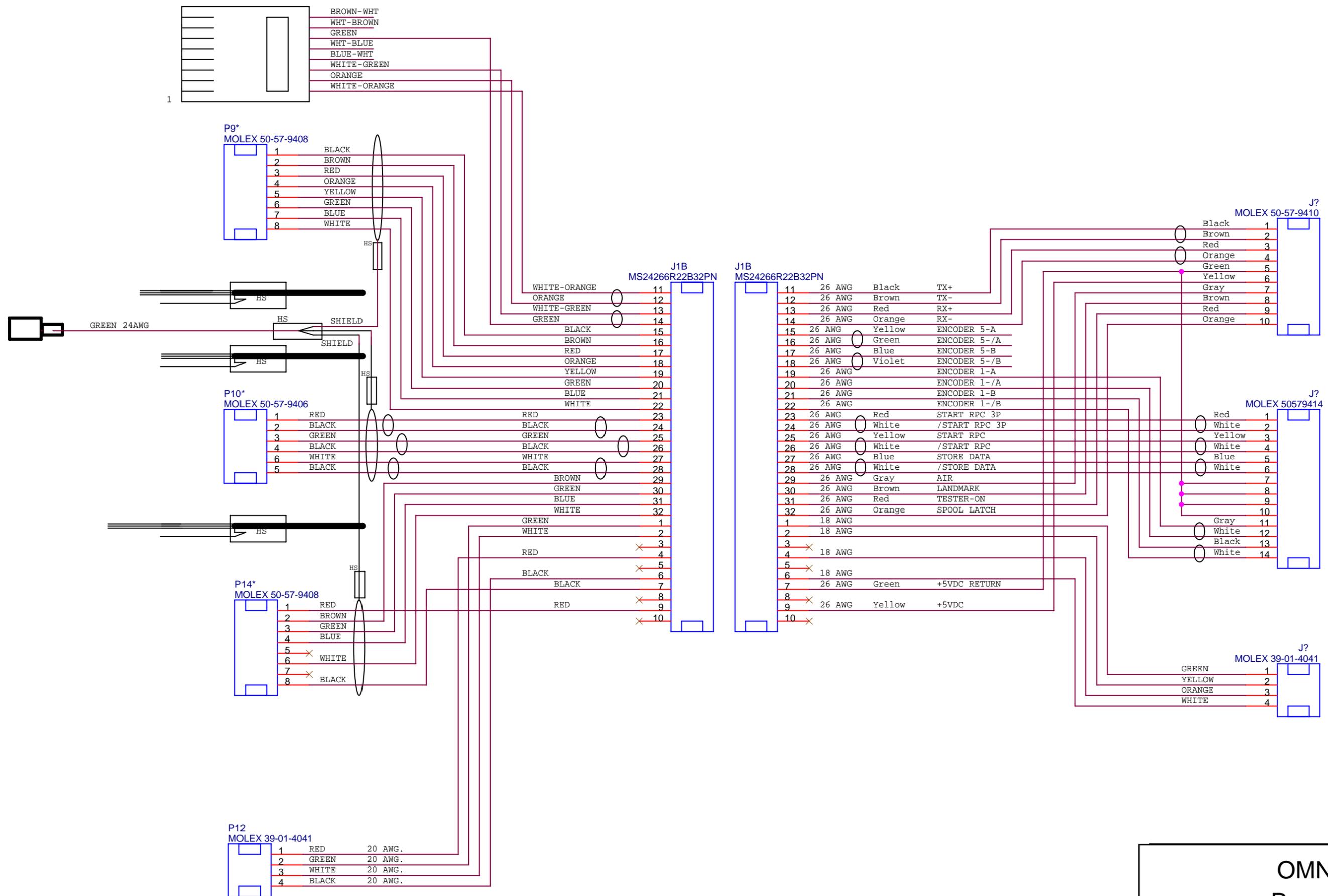
1		
2	/WARN	RED
3	/S-RDY	ORANGE
4	MOTOR COMMAND Y	BROWN
5	TORQUE/VELOCITY	GREEN
6	TORQUE LIMIT	BLUE
7	ALM-RST	YELLOW
8	12VDC	WHITE
9	GND	BLACK
10		

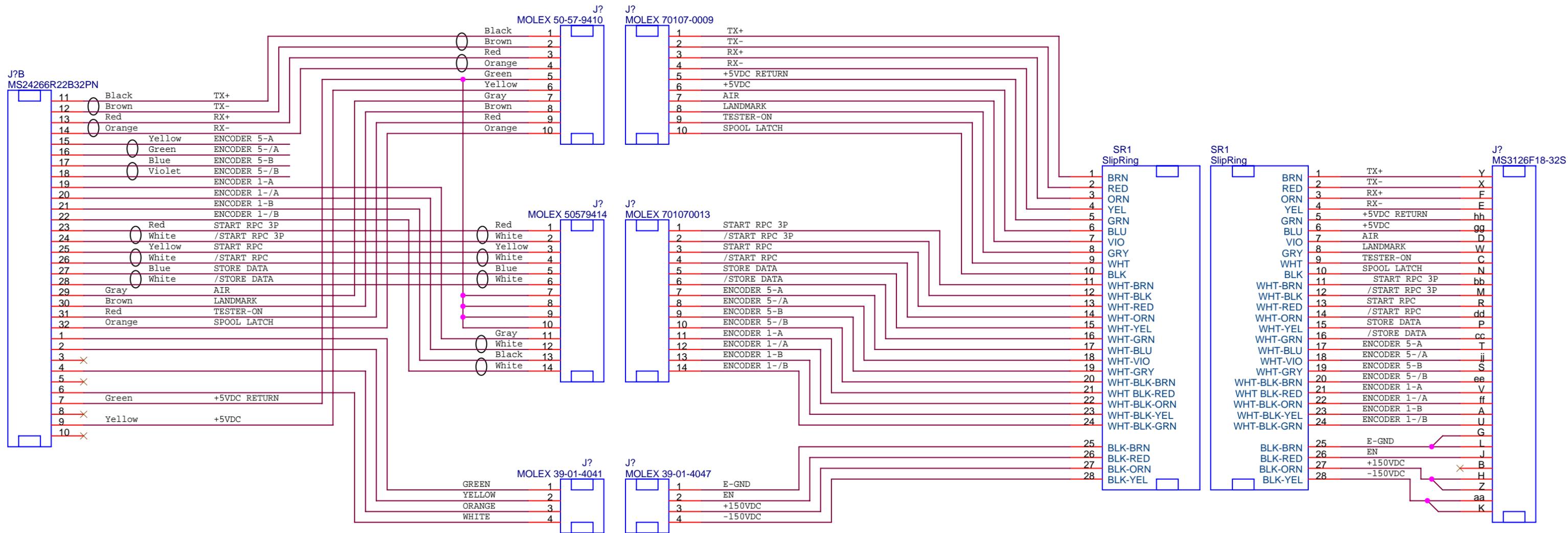
CN1
3M 10150-300VE

1	SG	
2	SG	
3		
4	V-REF+	
5	SG	
6		
7		
8	T-REF+	
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25	/COIN+	
26	/COIN-	
27		
28		
29	/S-RDY+	
30	/S-RDY-	
31		
32		
33		
34		
35		
36		
37		
38		
39		
40	/S-ON	
41		
42	P-OT	
43	N-OT	
44		
45		
46		
47	+15-24VDC	
48		
49		
50		



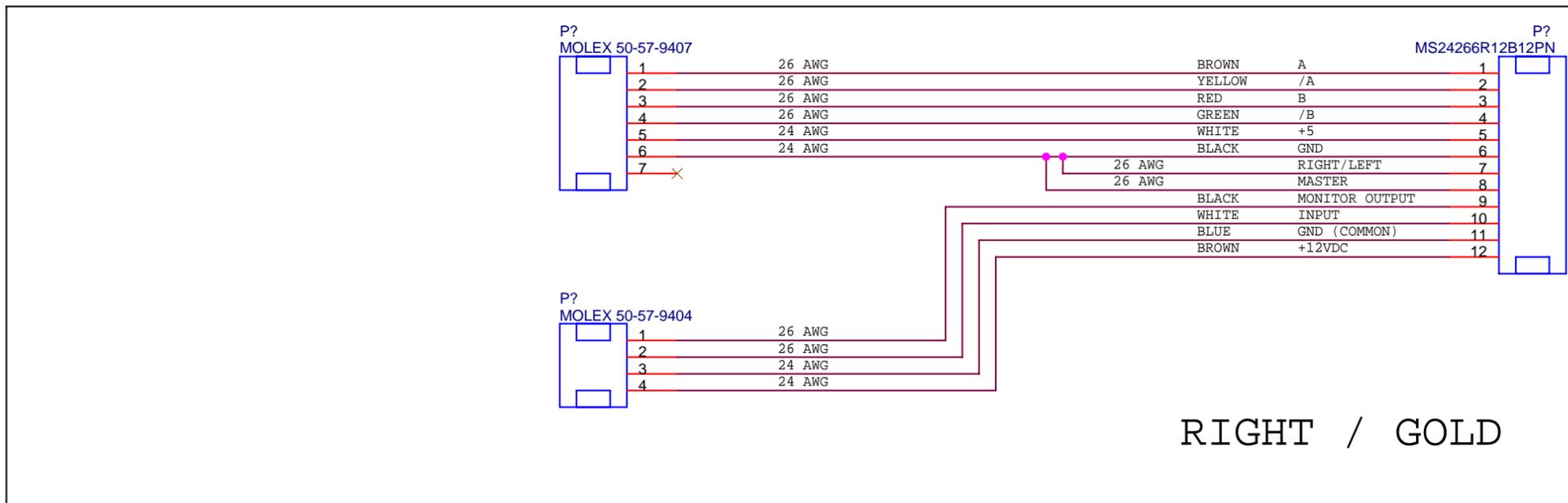
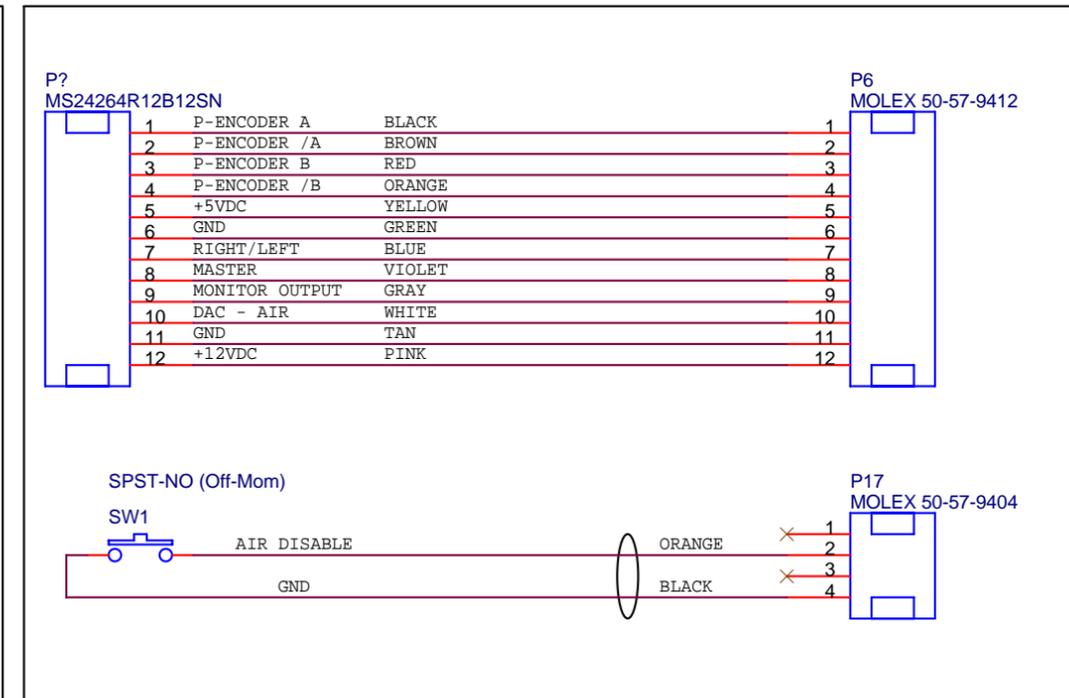
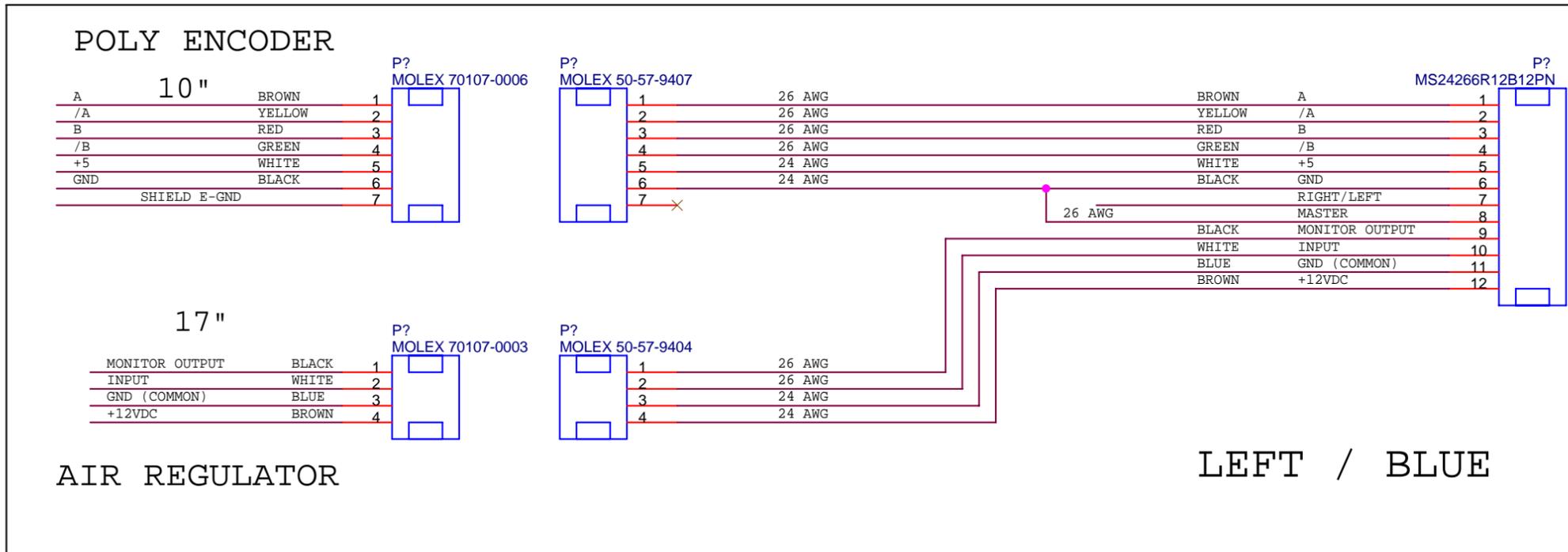
TORQUE MOTOR





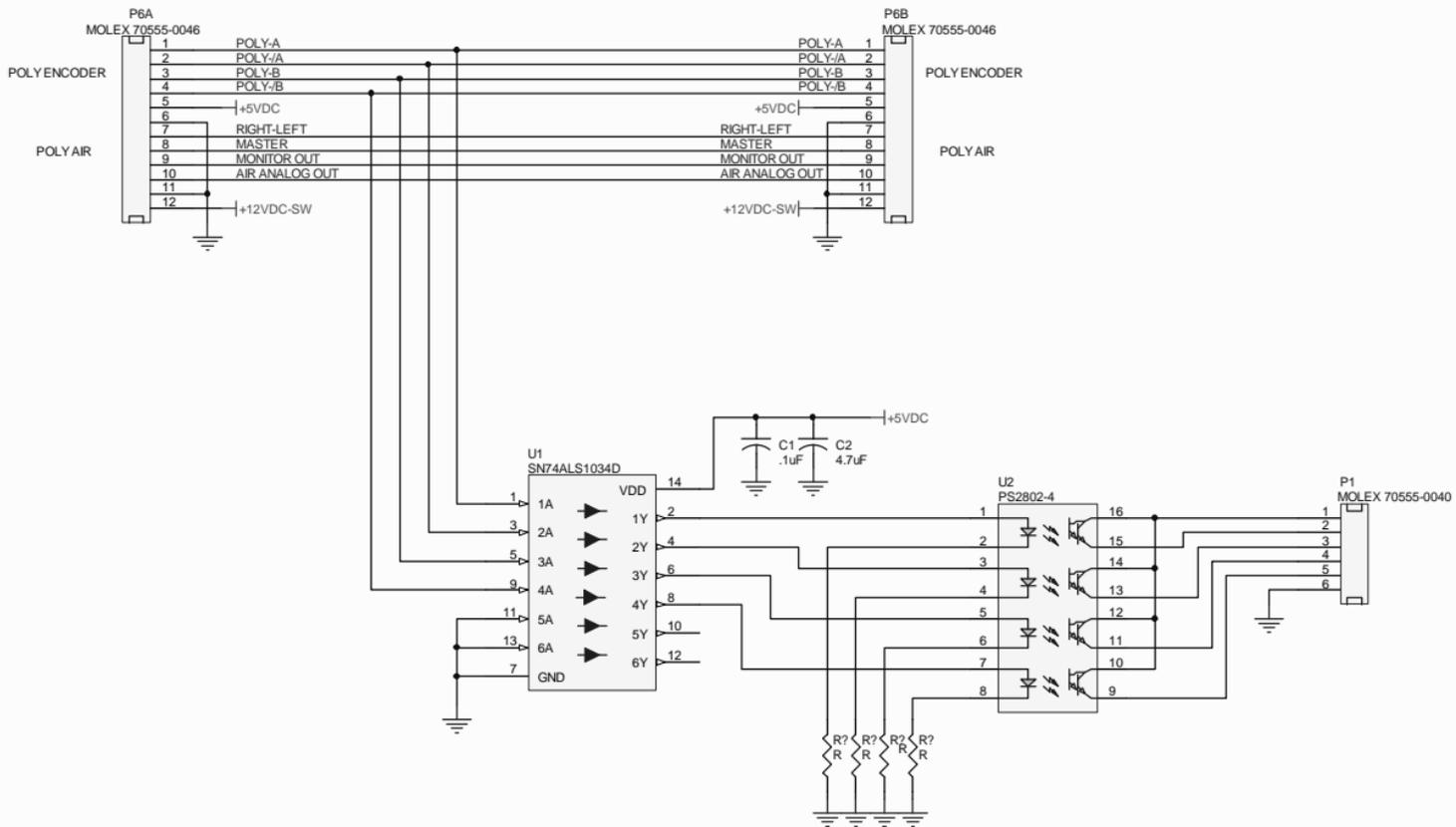
TRACK DRIVE-200 FRAME

TRACK DRIVE-200 CONTROL BOX



MASTER	RIGHT / LEFT	MODE
1	1	ENCODER DISCONNECTED
0	1	LEFT (BLUE)
0	0	RIGHT (GOLD)

POLY ENCODER / AIR REGULATOR

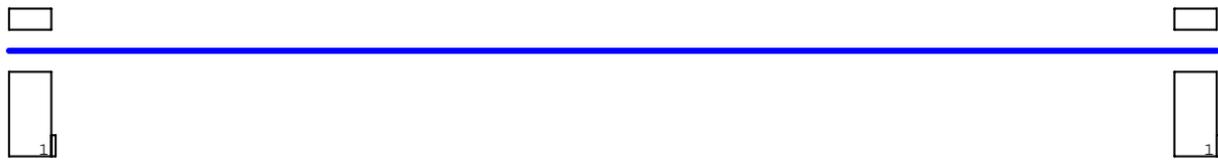


EXTERNAL POLY
ENCODER

J1 TD-200 POWER SUPPLY
FCI 71600-050LF

RED STRIPE PIN 1

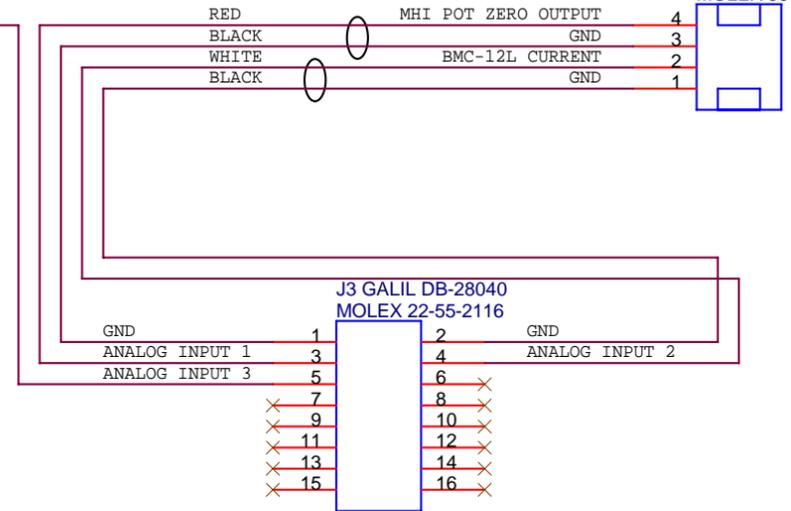
J1 GALIL DB-28040
FCI 71600-050LF



P8 TD-200 POWER SUPPLY
MOLEX 50-57-9402



P2 TD-200 POWER SUPPLY
MOLEX 50-57-9404



1	2
3	4
5	6
7	8
9	10
11	12
13	14
15	16

TOP VIEW
LOAD J3 PINS 6-16 W/SOCKETS

DB-28040-5V INTERFACE