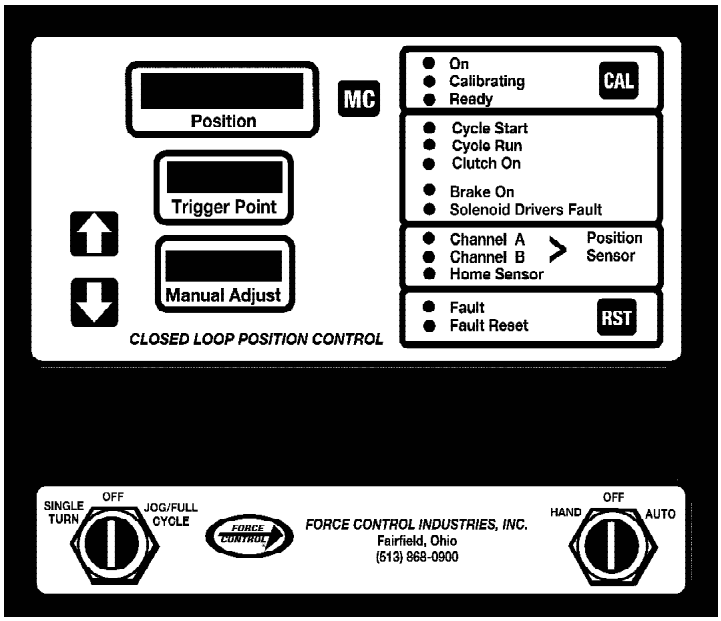
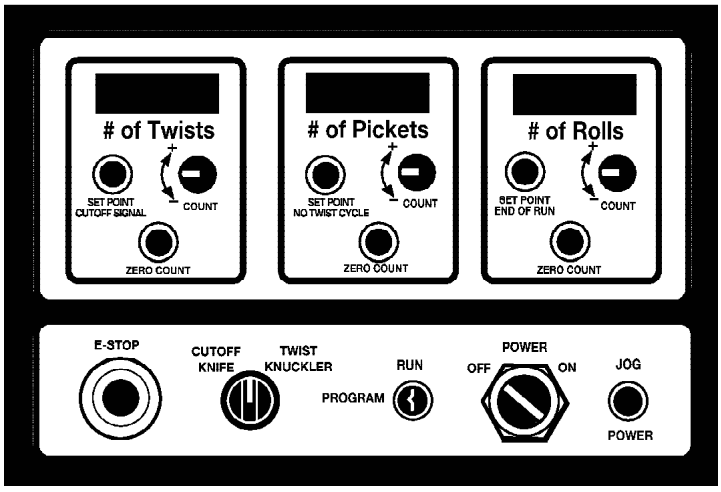
ISO 9001 CERTIFIED

502-PW-002-01

PosiWeave DRIVE and CONTROL OPERATION AND SERVICE MANUAL

WITH 2.X.X SOFTWARE AND DIFFERENTIAL LINE DRIVER (Optical) ENCODER





WARNING - Read this manual before any installation, maintenance and operation.

FORCE CONTROL®

FORCE CONTROL INDUSTRIES, INC.

MANUFACTURERS OF MECHANICAL AND ELECTRICAL POWER TRANSMISSION EQUIPMENT

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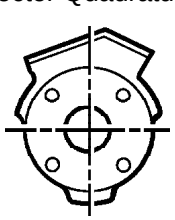
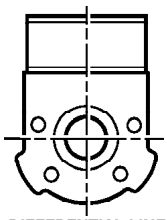
Section 1
SYSTEM DESCRIPTION

The ***PosiWeave* Control** can have several varieties of software. One is a 4.04 Version and the other is a 2.X.X Version (the X designates a number). **This manual is only for the 2.X.X Version.** See manual #502-PW-001-03 for the 4.04 Version. The software version will be displayed in the trigger point window for several seconds when the control is first powered up. It can also be displayed by pushing the Reset Button inside the control on the CPU Board.

There are two different types of Position Encoders used with the *Posidyne* Clutch/Brake. One is an Open Collector Quadrature (Magnetic) Encoder, which uses a 60 tooth pulse gear to determine position. The other is a Differential Line Driver (Optical) Encoder which uses an Optical Disc to determine position. **This manual is only for *PosiWeave* Systems using a Differential Line Driver (Optical) Encoder.** See manual #502-PW-001-03 for a ***PosiWeave* System** using an Open Collector Quadrature Encoder. The Encoder shapes are as follows:



OPEN COLLECTOR
QUADRATURE (Magnetic) ENCODER



DIFFERENTIAL LINE
DRIVER (Optical) ENCODER

1-1 GENERAL DESCRIPTION

The Force Control Industries ***PosiWeave*** Drive Package is used to drive and control a chain link fence weaving machine. The *Posidyne* Clutch/Brake is a Start/Stop device which drives the Twist Bar. It replaces the original clutch and hydraulic stopping system used on many weavers.

The ***PosiWeave*** Control is an electronic controller which controls the *Posidyne* clutch/brake, operation of the Cut-Off, the No-Twist and Stopping the drive upon an E-Stop Signal from limit switches. The number of twists, pickets and rolls are easily programmed into the controller. Manual Adjust buttons are used to position the twist bar for better operation.

There are two types of *Posidyne* Clutch/Brakes which can be used on the weaving machines. One is - **(A) Air Actuated** and the other is - **(B) Hydraulically Actuated.**

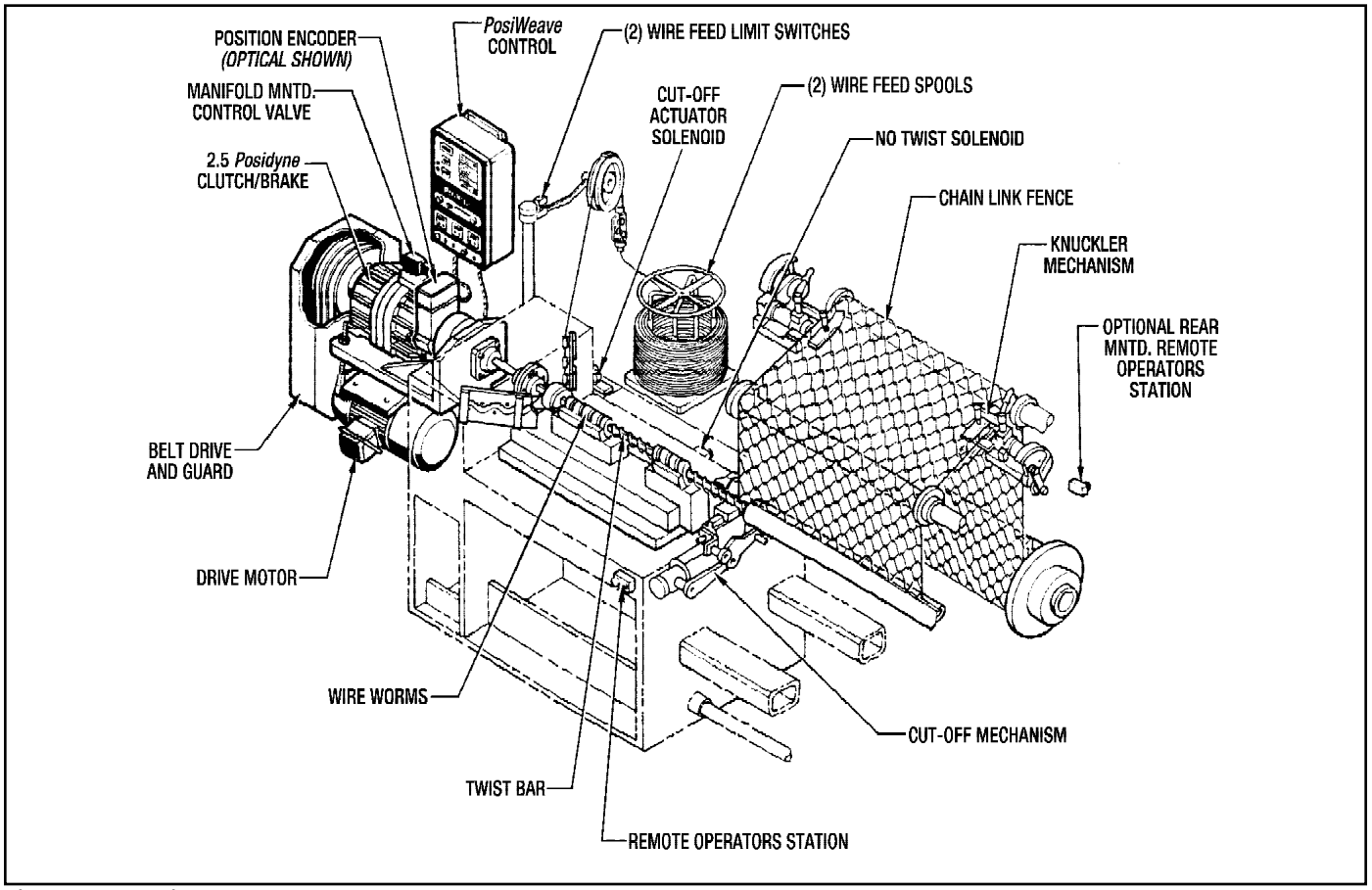


Figure 1.1 - PosiWeave System

A. Air Actuated *PosiWeave* Drive Package.

(See Figure 1.2)

The air actuated *Posidyne* Clutch/Brake is the standard system, which is simple and compact. Very little additional hardware is needed for installation. It does require compressed air at a minimum of 80 PSIG, however only approx. 3 CFM is needed. This can be furnished using a small air compressor on each machine if shop air is not available.

This Drive Package contains:

1. Drive Motor with motor adjusting base.
2. Input belt drive and guard.
3. 2.5 *Posidyne* Clutch/Brake unit with manifold mounted control valve.
4. Positioning Encoder Assembly.
5. Flexible grid-type Coupling and cover.
6. Pneumatic Accumulator Assembly.
7. ***PosiWeave*** Electronic Machine Control.
8. Cut-Off Solenoid Actuator Assembly.
9. Remote Operator Station with E-Stop palm button and Reset/Restart Switch.

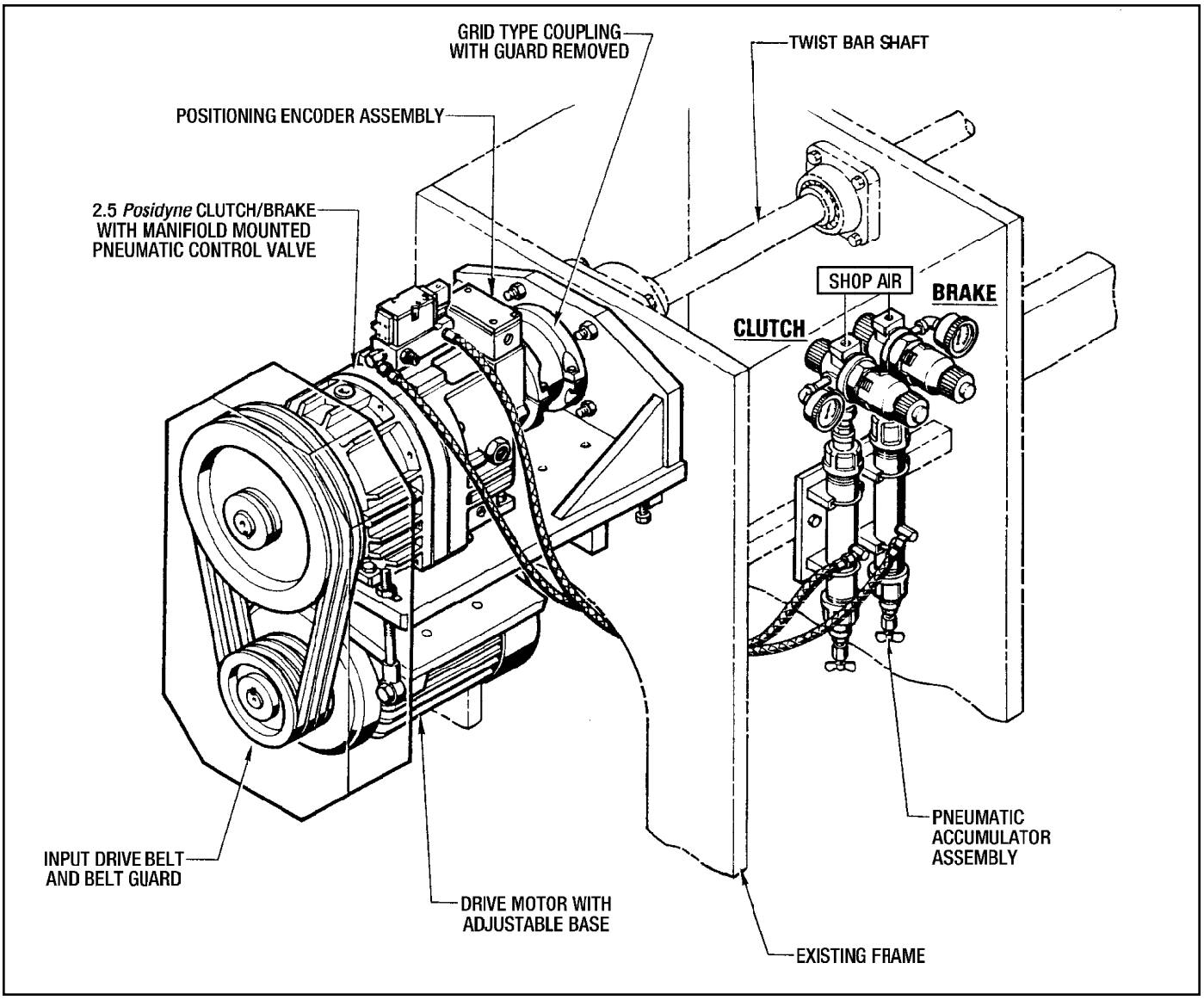


Figure 1.2 - Air Actuated PosiWeave Drive Package

B. Hydraulic Actuated *PosiWeave* Drive Package.

The hydraulic actuated *Posidyne* Clutch/Brake uses the fluid in the sump of the unit as a medium for actuation rather than air. A small hydraulic pump and motor is used to pressurize some of the fluid to a maximum of 300 PSI for actuation purposes. The system includes a pump motor, a full flow regulator to set maximum system pressure, a regulator for each the clutch and brake, a filter and dirty filter indicator. One of the advantages, in addition to not requiring a compressed air supply, is the system filter. During operation of the clutch/brake some of the fluid becomes burned forming carbon particles. Over time these particles causes wear in the friction discs and drive plates. By filtering the fluid it is kept clean for longer unit life. Also harmful water and mineral deposits found in compressed air do not cause valve and regulator problems. *(See Figure 1.3)*

This Drive Package contains:

1. Drive Motor with motor adjusting base.
2. Input belt drive and guard.
3. EH-2.5 *Posidyne* Clutch/Brake unit with side mounted pressure relief valve and control valve.
4. Positioning Encoder Assembly.
5. Flexible grid-type Coupling and Cover.
6. Hydraulic Actuation Motor, Positive Displacement Pump and Filter Assembly.
7. ***PosiWeave*** Electronic Machine Control.
8. Cut-Off Solenoid Actuator Assembly.
9. Remote Operator Station with E-Stop palm button and Reset/Restart Switch.

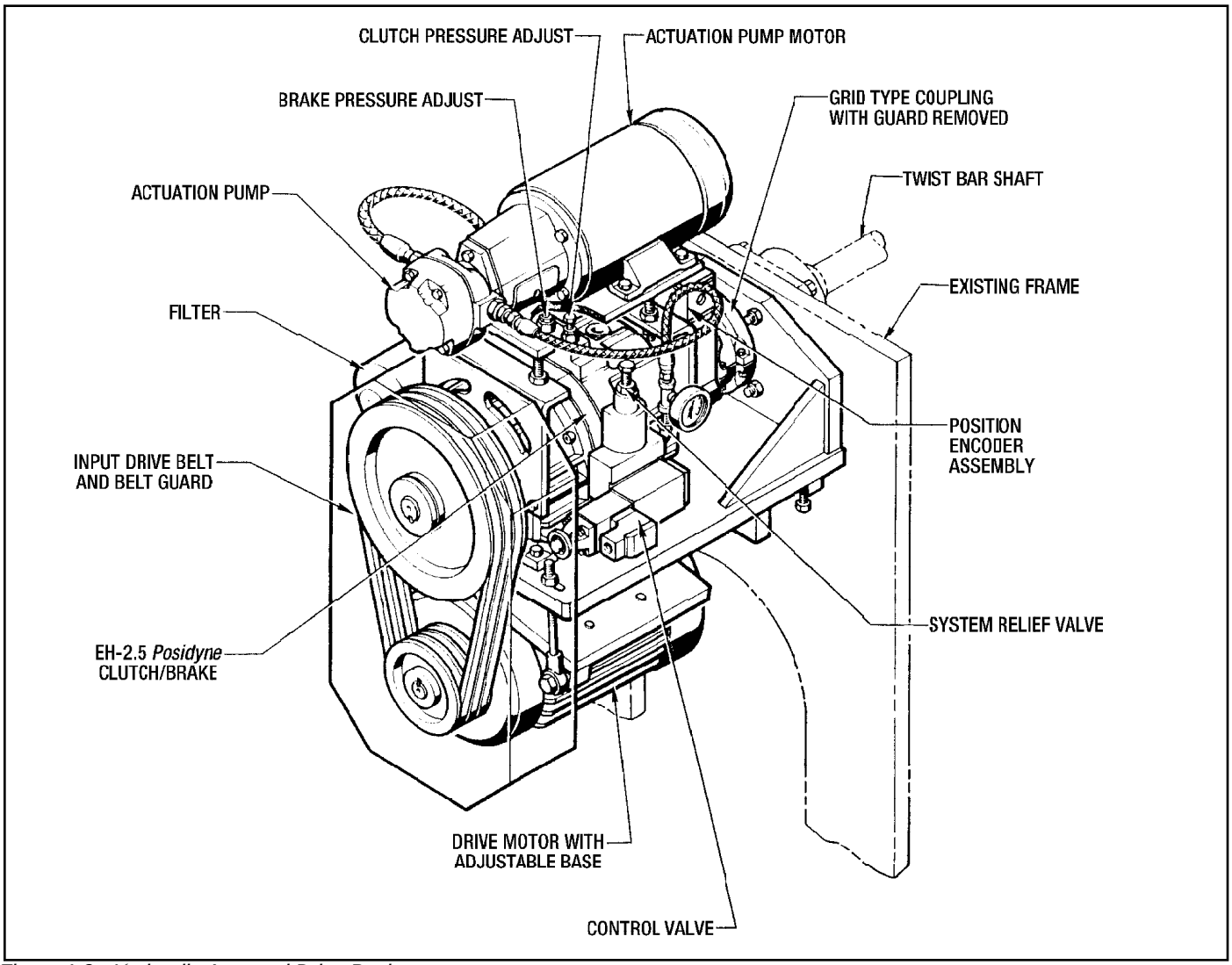


Figure 1.3 - Hydraulic Actuated Drive Package

1-2 *Posidyne* CLUTCH / BRAKE UNIT

The heart of the drive is the 2.5 *Posidyne* Clutch/Brake. The *Posidyne* Clutch/Brake is a multiple disc, Oil Shear clutch/brake which uses automatic transmission fluid to provide both cooling and lubrication of the friction surfaces. A patented fluid circulation system is used to maintain this fluid film on the friction surfaces at all times. *(See Figure 1.4)* By lubricating and cooling the friction surfaces, service life is substantially increased and accuracy improved. The totally enclosed housing also reduces problems associated with dust, dirt and moisture.

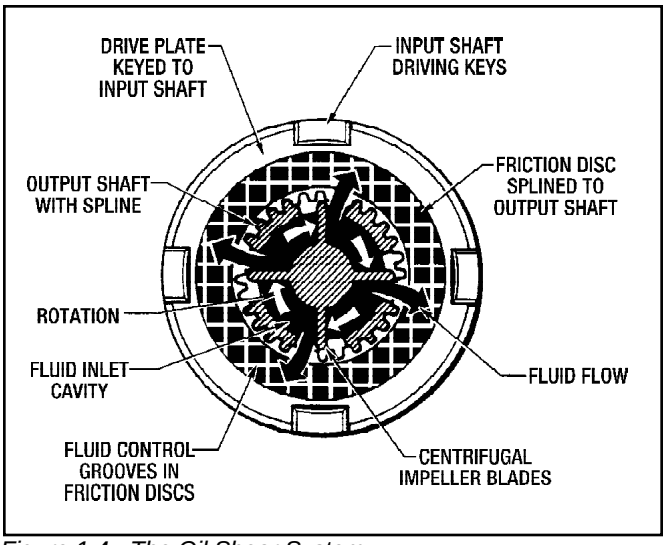


Figure 1.4 - The Oil Shear System

The *Posidyne* Clutch/Brake has a centrally located piston which will engage either the clutch or brake depending on valve position. Air or hydraulic pressure determines the torque that is transmitted through the stack. Pressure is routed to the clutch or brake through a valve assembly mounted on the *Posidyne* Clutch/Brake. **(See Section 7 in the *Posidyne* manual for cross section of the drive).**

NOTE:

For easy removal, the manifold mounted valve and the Positioning Encoders are wired directly to the ***PosiWeave*** control box using Brad Harrison quick disconnect cables. Each connector uses a different number of pins so that they cannot be installed in the wrong location.

When at rest the *Posidyne* Clutch/Brake will be in the neutral position. Neither the clutch or the brake will be engaged.

Torque required to turn the twist bar shaft by hand may be further reduced by manually shifting the main control valve.

CAUTION

This must only be done when the motor is turned Off, Locked Out and not rotating.

1-3 POSITIONING ENCODER ASSEMBLY

A Positioning Encoder Assembly, mounted to the output shaft of the *Posidyne* Clutch/Brake, contains an optical disc with 60 openings around the perimeter and 3 optical photo sensors picking up Channel "A", Channel "B" and Channel "Z" (Home Position).

The photo sensors count the number of openings as the optical disc rotates. The ***PosiWeave*** control multiplies the number of openings by two so one revolution equals 120 pulses. A twist is one revolution. One cycle is the number of twists per picket set on the "Twist Counter". Therefore the total ,number of pulses per cycle would be the number of twists x 120 pulses per revolution.

Example: *10 Twists x 120 Pulses per Revolution = 1200 Pulses per Cycle.* This count is used to stop the twist bar at the end of each cycle. The Positioning Encoder also counts pulses in either direction. This means as long as the control is powered up it will not lose position even while manually turning the Twist Bar.

The optical disc has a single opening which is used as a "Home Position" flag. On original start-up the control will have to be calibrated to relocate the home position. This process takes two (2) indexes of the drive. The control will index one (1) time to determine where the home position is located and how many pulses are required to stop the drive. The next index will set a trigger point to actuate the control valve so that the drive will stop at the home position.

1-4 *PosiWeave* ELECTRONIC CONTROL

The ***PosiWeave*** control is a highly advanced, reliable, and easy to use electronic control designed specifically for the chain link fence weaving machines. It controls all aspects of the machine operation including the cycle, stopping the twist bar in position after the proper number of twists, actuates the cutoff, actuates the no-twist and restarts the cycle. At the end of the preset number of rolls the machine will stop. A roll offset can also be set to stop the machine at a point where the previous roll can be removed. In addition it will accept inputs from jam detection limit switches and stop the machine.

The ***PosiWeave*** control has a digital display for the number of twists, number of pickets and number of rolls. Each item can be set individually. A zero button is included for each setting to quickly re-zero the settings

The ***PosiWeave*** control also has a manual adjust feature which allows the operator to adjust the stop position of the twist bar. This is used if the twist bar is manually twisted to compensate for wire hardness, etc. The twist bar can be adjusted without loosening and moving the coupling.

A quick jog, single turn jog and full cycle jog are all included, as well as an automatic cycle. A key switch is used to restrict access to the program mode if desired

The ***PosiWeave*** also includes the ***CLPC Series II*** error correcting closed loop positioning control which stops the twist bar at exactly the right place every index, even during start-up and with changes in wire sizes or hardness.

When starting the control after the power has been off, a calibration mode is used to synchronize the control with the twist bar. Any offset settings which were used on the last run are maintained. Two calibration indexes will set the bar in position. From then on, as long as the power is not removed from the ***PosiWeave*** control, further calibration is not required, even when resetting from an E-stop error.

Using Zero powered ram technology, all settings for position, number of twists, number of pickets and number of rolls is maintained in the control during periods when power is removed.

1-5 PNEUMATIC SYSTEM (Air Actuated *Posidyne*)

The air supply system consists of (2) accumulator tanks furnished with separate regulators and water drains and a manifold mounted valve. The incoming air supply should be maintained at a minimum of 80 PSIG of clean dry air. With this application the, *Posidyne* Clutch/Brake operates best at a pressure of 35 PSIG for both the Clutch and Brake. One accumulator is for the clutch, the other for the brake. From the accumulator the clutch air and brake air is connected directly to the manifold mounted valve.

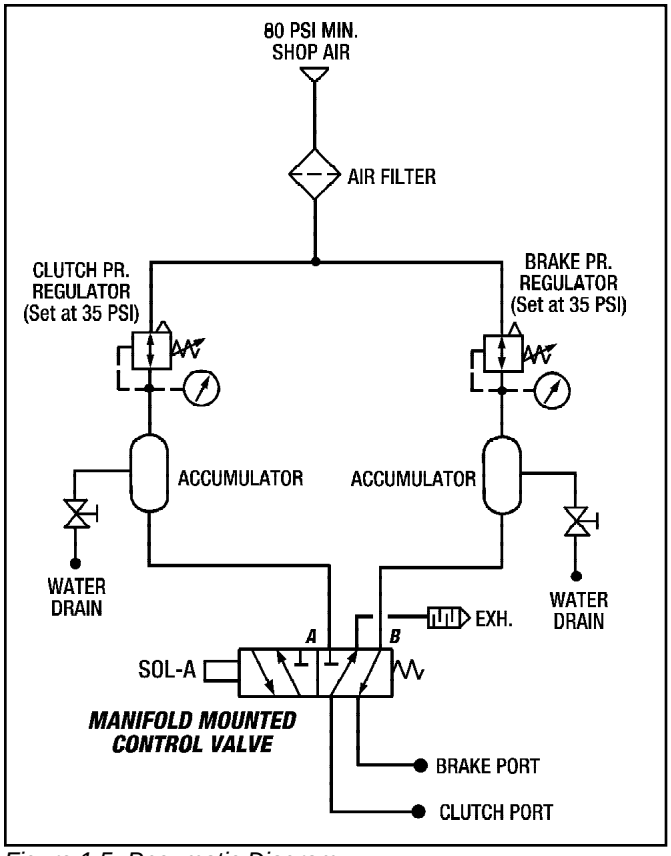


Figure 1.5- Pneumatic Diagram

1-6 HYDRAULIC SYSTEM (Hydraulic Actuated *Posidyne*)

The hydraulic system consists of a positive displacement pump, 1 H.P. motor, solenoid valve for clutch or brake selection, separate regulators for the clutch and brake, a full flow maximum pressure regulator, a spin on filter and a dirty filter indicator.

The system operates using the fluid in the clutch/brake sump which is pumped through the filter, full flow regulator, control valve and into the piston and back into the sump. The hydraulic pump must be running to actuate the clutch or the brake.

The full flow regulator sets the maximum pressure of the hydraulic system. It is set for 125 PSI at the factory and should not need to be changed. The small Sun regulators located on the top of the *Posidyne* set the operating pressure of the clutch and brake. Adjusting this pressure adjusts the torque of the clutch and the brake for smooth operation without excessive slipping. These are normally set to 75 PSI for both the clutch and the brake.

The filter cleans the fluid continuously and should be changed periodically. The vacuum indicator will indicate when the filter element is dirty and should be changed.

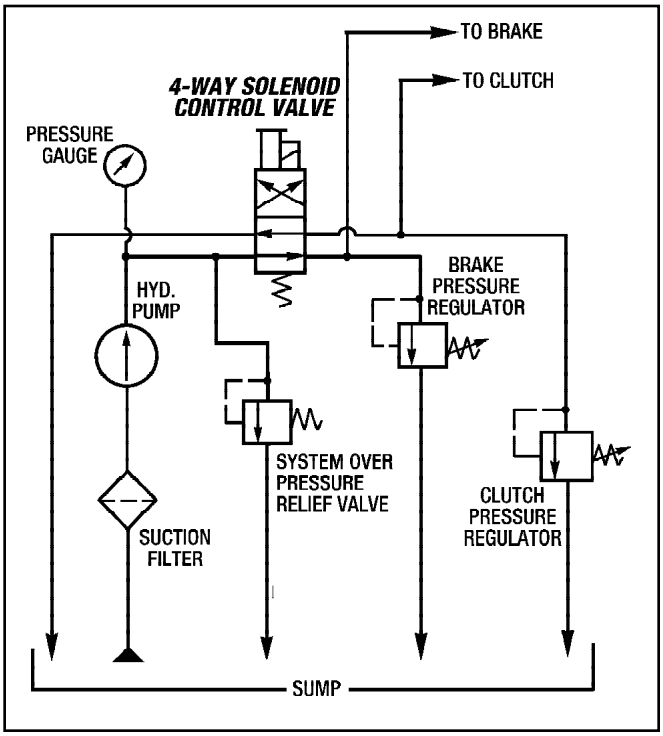


Figure 1.6 - Hydraulic Diagram

Section 2
INSTALLATION

Installation of the ***PosiWeave*** Chain Link Fence Weaving System consists of the following items and steps:

1. Mounting the Drive Base, which consists of the *Posidyne* Clutch/Brake with a Manifold Mounted Control Valve and Positioning Encoder mounted on a base with the Main Drive Motor, Belt Drive, Guards and Coupling.
2. Mounting the Pneumatic Accumulator Tank Assembly. *(Air Actuated Drive only.)*
3. Mounting the Cutoff Actuation Solenoid to the machine.
4. Mounting the ***PosiWeave*** Control Box.
5. Mounting any Remote Operators Stations to the machine.
6. Installing the air supply to the Accumulator Tank Assembly and connecting the hoses from the Accumulators to the Manifold Mounted Control Valve. *(Air Actuated Drive only.)*
7. Wiring the main electrical power to the Drive Motor/ Motors* and the ***PosiWeave*** Control. The ***PosiWeave*** Control to all external components. **(See Electrical Connections.)**

   NOTE: On the Hydraulic Actuated Drive the Actuation Pump Drive Motor must also be wired up.

2-1 INSTALLATION OF DRIVE BASE

(See *Figure 2.1* for Air Actuated Drive)
(See *Figure 2.2* for Hydraulic Actuated Drive)

The Drive Base includes the *Posidyne* clutch/brake, main drive motor with belt drive mounted on a base which mounts on the end frame of the Weaving Machine. A Falk flexible grid type coupling is used to connect the *Posidyne* output shaft to the Twist Bar Shaft. Two jackscrew blocks with jackscrews are furnished to position the base and new longer bearing bolts are also furnished.

1. Remove the existing main belt drive, clutch and main drive motor.

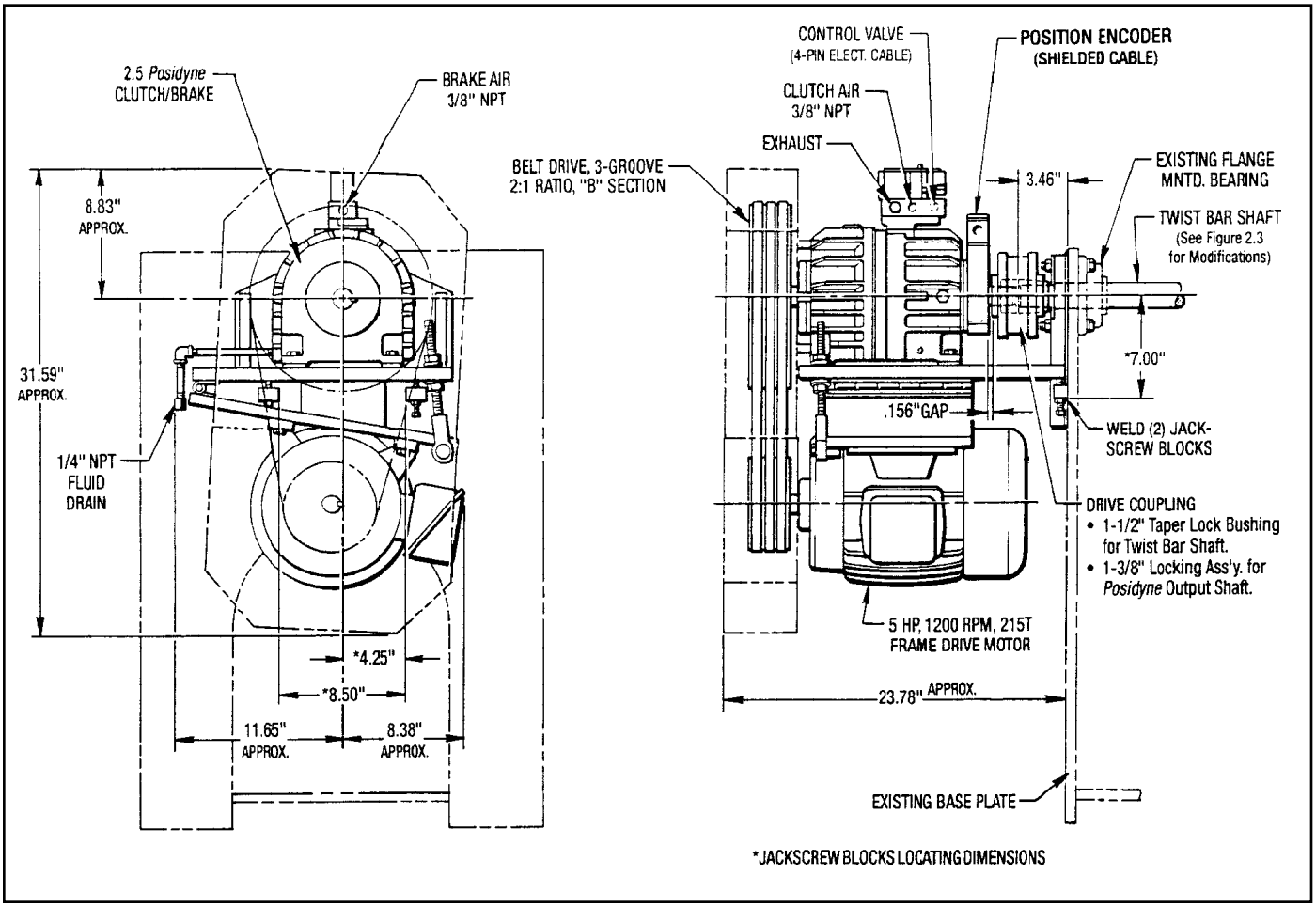


Figure 2.1 - Drive Base Installation (Air Actuated)

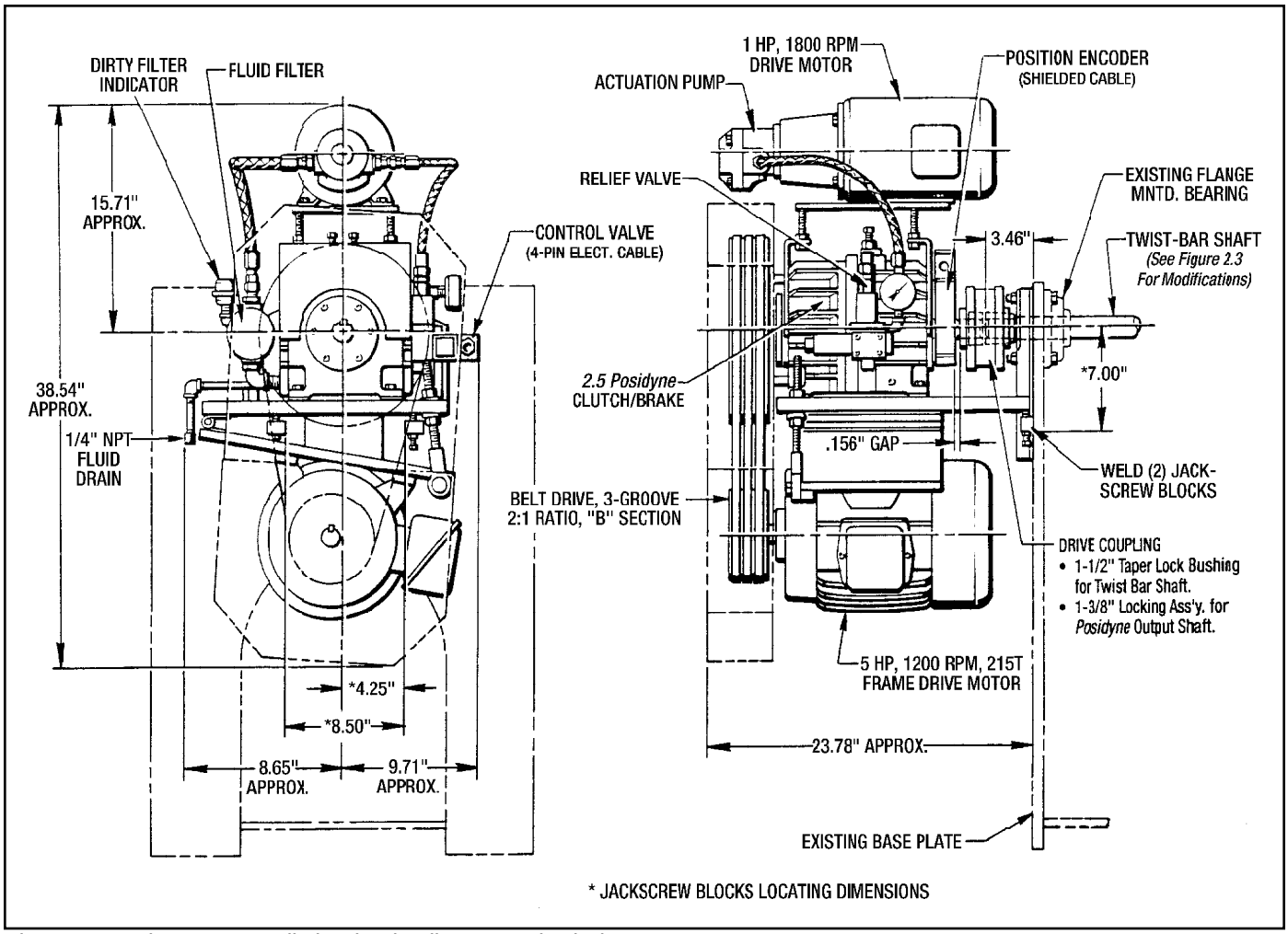


Figure 2.2 - Drive Base Installation (Hydraulic Actuated Drive)

2. Remove the Twist Bar Shaft and modify as shown in Figure 2.3.
3. Replace the Twist Bar Shaft to it's original position and place the R.H. Coupling Seal and Hub on the end of the shaft.

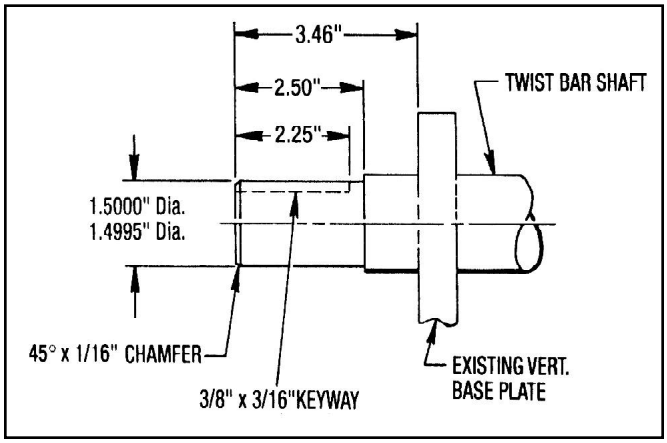


Figure 2.3 - Twist Bar Modifications

4. Remove the existing bearing mounting bolts and install the new longer bearing mounting bolts. *(These bolts are included in the Installation Package.)*
5. Place the L.H. Coupling Seal and Hub onto the *Posidyne* output shaft.
6. Set the Drive Assembly in place on the end frame using the new bearing bolts to position it.
7. Included in the Drive Package are (2) Blocks and Jackscrews which are used for alignment purposes. Weld these (2) Jackscrew Blocks to the existing End Base Plate under the Drive Base. (See *Figure 2.1* for location.)
8. Align the *Posidyne* shaft and twist bar shaft for proper coupling alignment as per manufacturer's specifications.
9. Install the Coupling Grid and Cover as per manufacturers specifications. **Make sure the Coupling Cover does not rub on the Encoder Housing.**

2-2 MOUNTING THE *PosiWeave* CONTROL BOX

(See Figure 2.4)

Mount the ***PosiWeave*** Control Box in a position accessible to the machine operator and within reach of the (2) yellow Brad-Harrison cables. Mounting should be on a solid structure away from heat and vibration using the mounting holes provided. (See *Figure 2-4* for hole size and location.

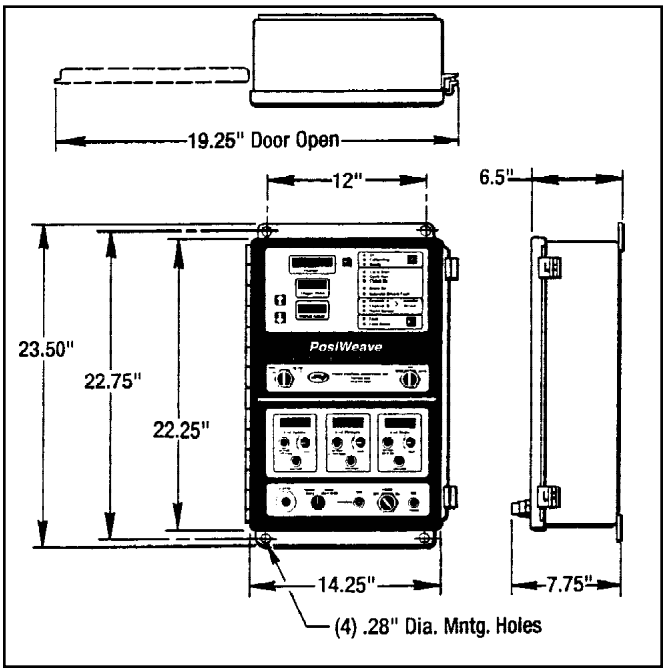


Figure 2.4 - PosiWeave Control Box Mounting

2-3 PNEUMATICS INSTALLATION (Air Operated Drive Only)

Clean dry air is required to operate the *Posidyne* Clutch/Brake. It should be a minimum of 80 PSIG supplied to both regulators. 3/4" O.D. pipe or 1/2" I.D. tubing is recommended. Lubricated air is not required for the *Posidyne* Clutch/Brake.

An Air Accumulator Tank Assembly is furnished with the ***PosiWeave* Drive Package**. The assembly consists of two tanks with individual regulators, pressure gauges and water drain cocks for each tank. This system is used to maintain a full supply of air for quick response of the *Posidyne*.

A. Installation of Accumulator Tanks

1. Mount the assembly in a vertical position with the regulators on top. This assembly should be mounted as close as possible to the *Posidyne.*
2. Connect shop air to each of the regulators on the accumulators as shown in *Figure 1.2.*
3. Connect the accumulators to the manifold mounted control valve located on top of the *Posidyne* from the port near the middle of each tank. (It is not important which tank is used for the Clutch and which is used for the Brake.) Set the air pressure to 35 PSIG. This can be adjusted later if the operation is too harsh or sluggish.

2-4 CUT-OFF ACTUATOR and NO-TWIST ACTUATOR INSTALLATION

A. Cut-Off Actuator *(See Figure 2.5)*

The Drive Package comes with a Cut-Off Actuation Assembly, which is pre-assembled at the factory. This assembly is used to actuate the Cut-Off Clutch. The assembly consists of a Mounting Bar, Solenoid, Cover, Clevis, Crank Arm and a 6 ft. long Electrical Cable.

The installation procedure is as follows:

1. Position the Cut-Off Actuation Assembly into the machine as shown in *Figure 2.5.*
2. Weld the ends of the Mounting Bar to the existing frame members.
3. Clamp the Crank Arm around the Cut-Off Shaft. It must be positioned to allow a 1/2" to 1" gap between the solenoid plunger and housing when pin is engaging clutch cam as shown in *Figure 2.5.*

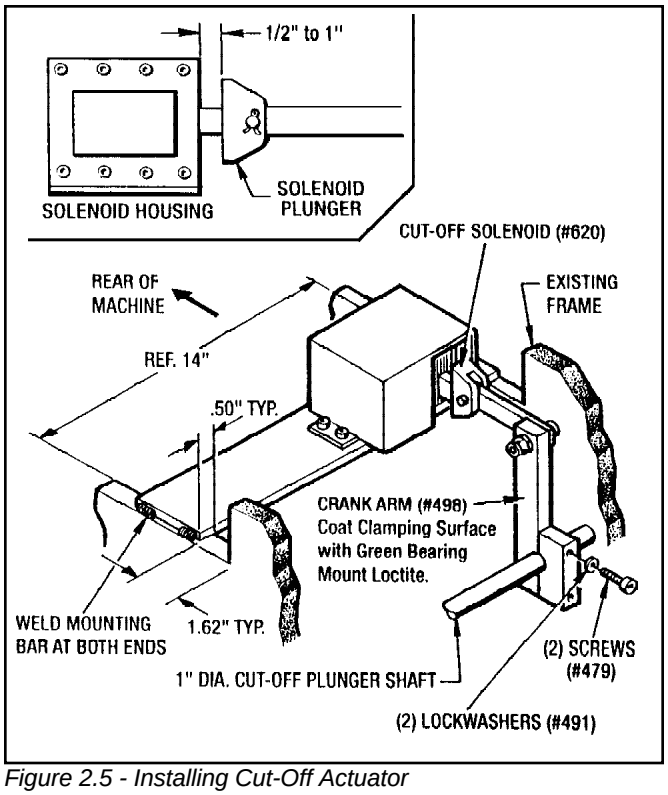


Figure 2.5 - Installing Cut-Off Actuator

B. No-Twist Actuator

The No-Twist Actuator is an existing electric solenoid on the machine. Refer to Section 2-5 for electrical connections.

2-5 ELECTRICAL CONNECTIONS

(See *Figure 2.6* for Pneumatic Actuation without Rear Remote Station)

(See *Figure 2.7* for Pneumatic Actuation with Rear Remote Station)

(See *Figure 2.8* for Hydraulic Actuation without Rear Remote Station)

(See *Figure 2.9* for Hydraulic Actuation with Rear Remote Station)

Electrical connections consist of connecting the main power to the drive motor or motors, to the ***PosiWeave*** control and the ***PosiWeave*** control to all of the external components:

WARNING:

Low voltage wiring (less than 50 volts) should never be in close proximity to high voltage wiring (greater than 50 volts). Failure to do so may cause improper operation.

Low voltage wiring typically consists of encoder, air valve, remote operator station, wire feed and jam limit switches.

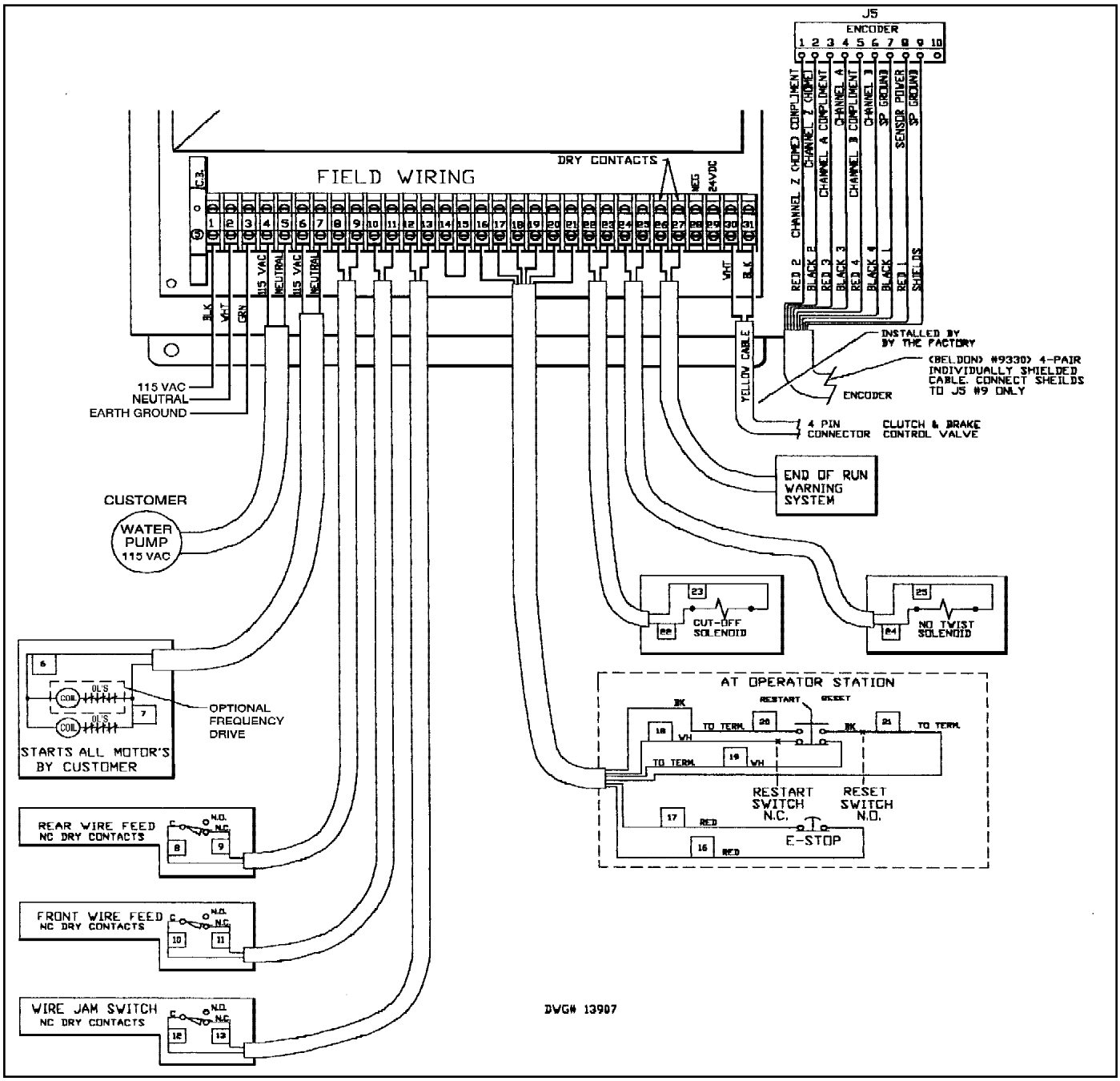


Figure 2.6 - Field Wiring Diagram (Pneumatic Actuation without Rear Remote Station)

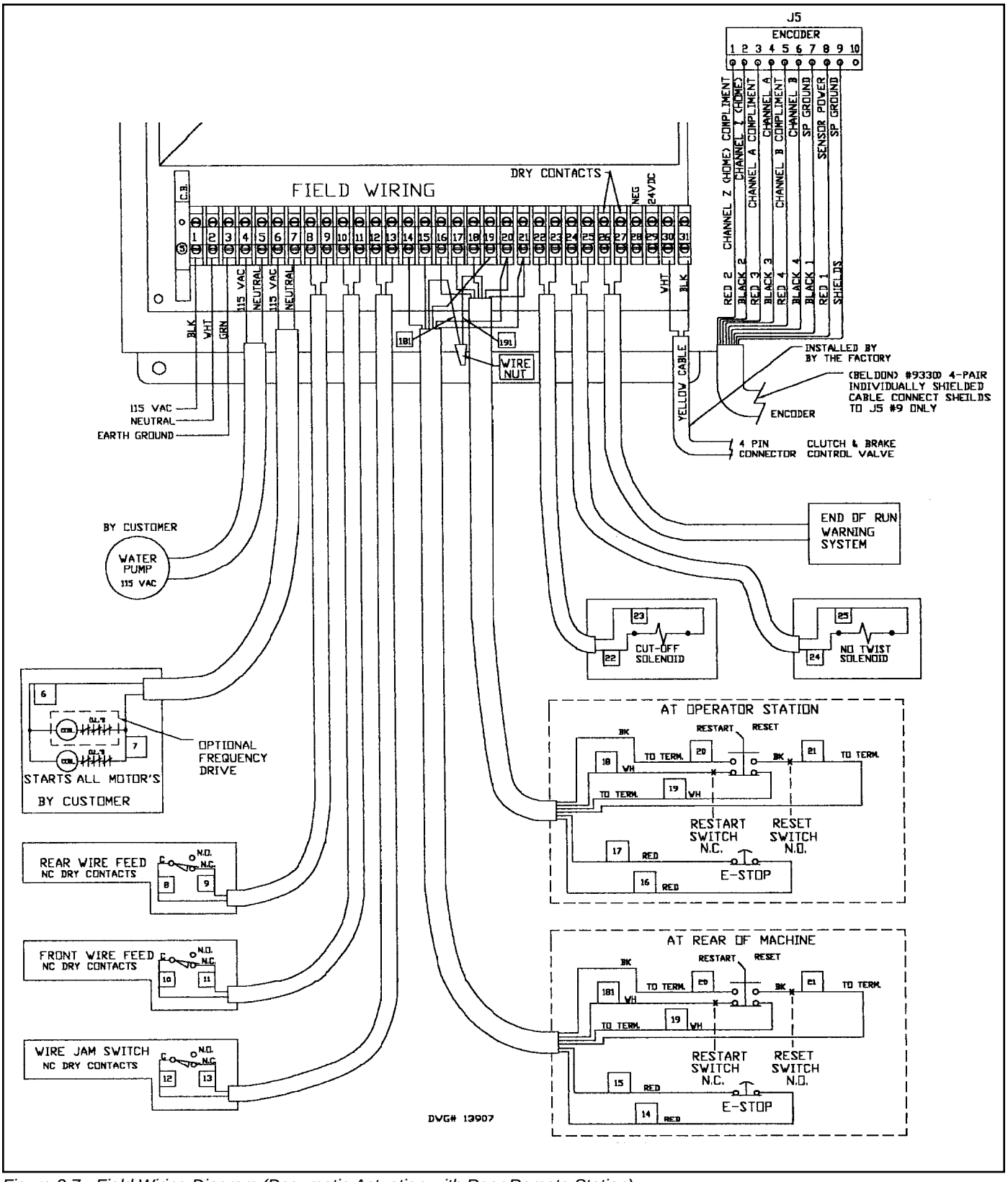


Figure 2.7 - Field Wiring Diagram (Pneumatic Actuation with Rear Remote Station)

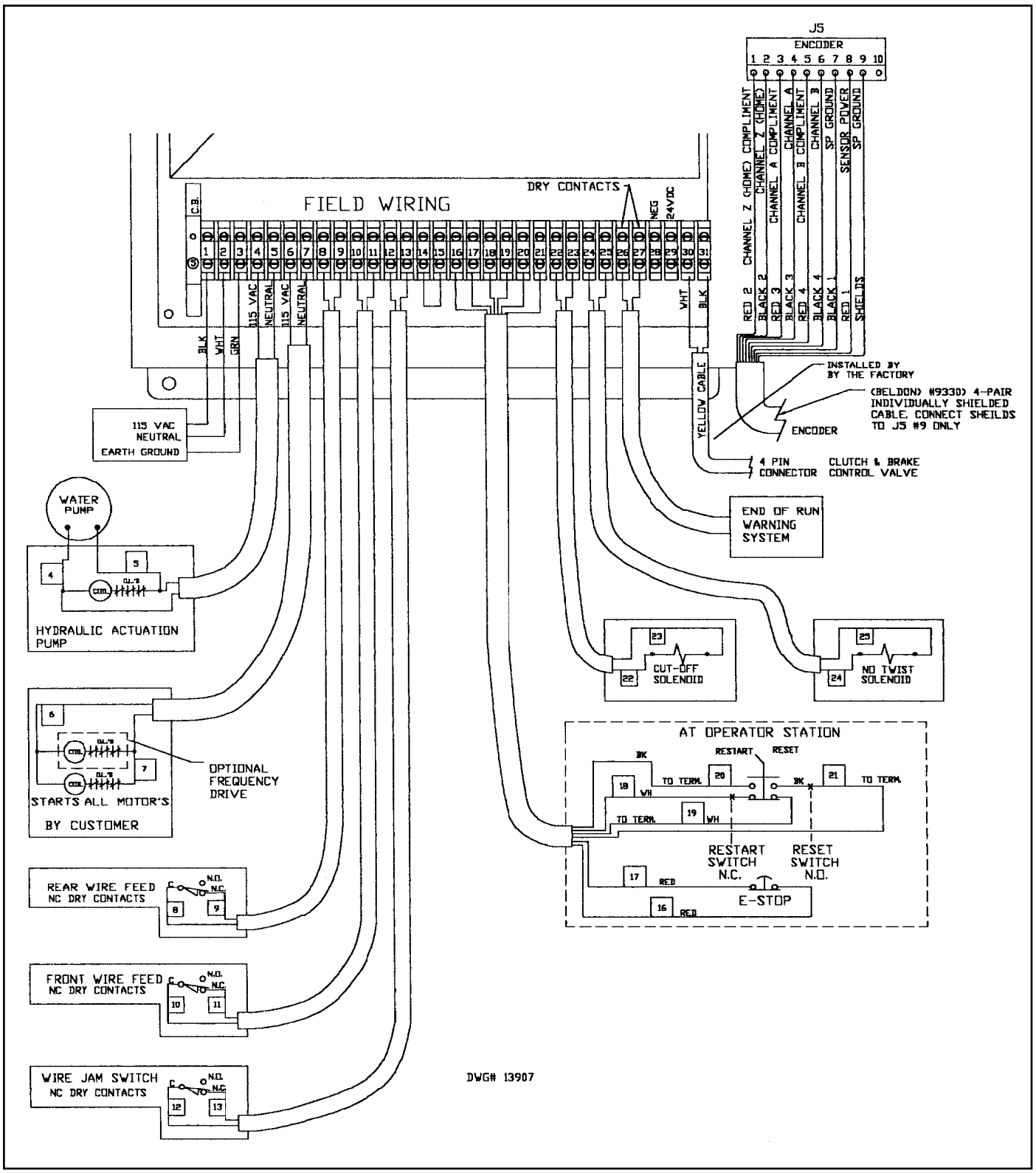


Figure 2.8 - Field Wiring Diagram (Hydraulic Actuation without Rear Remote Station)

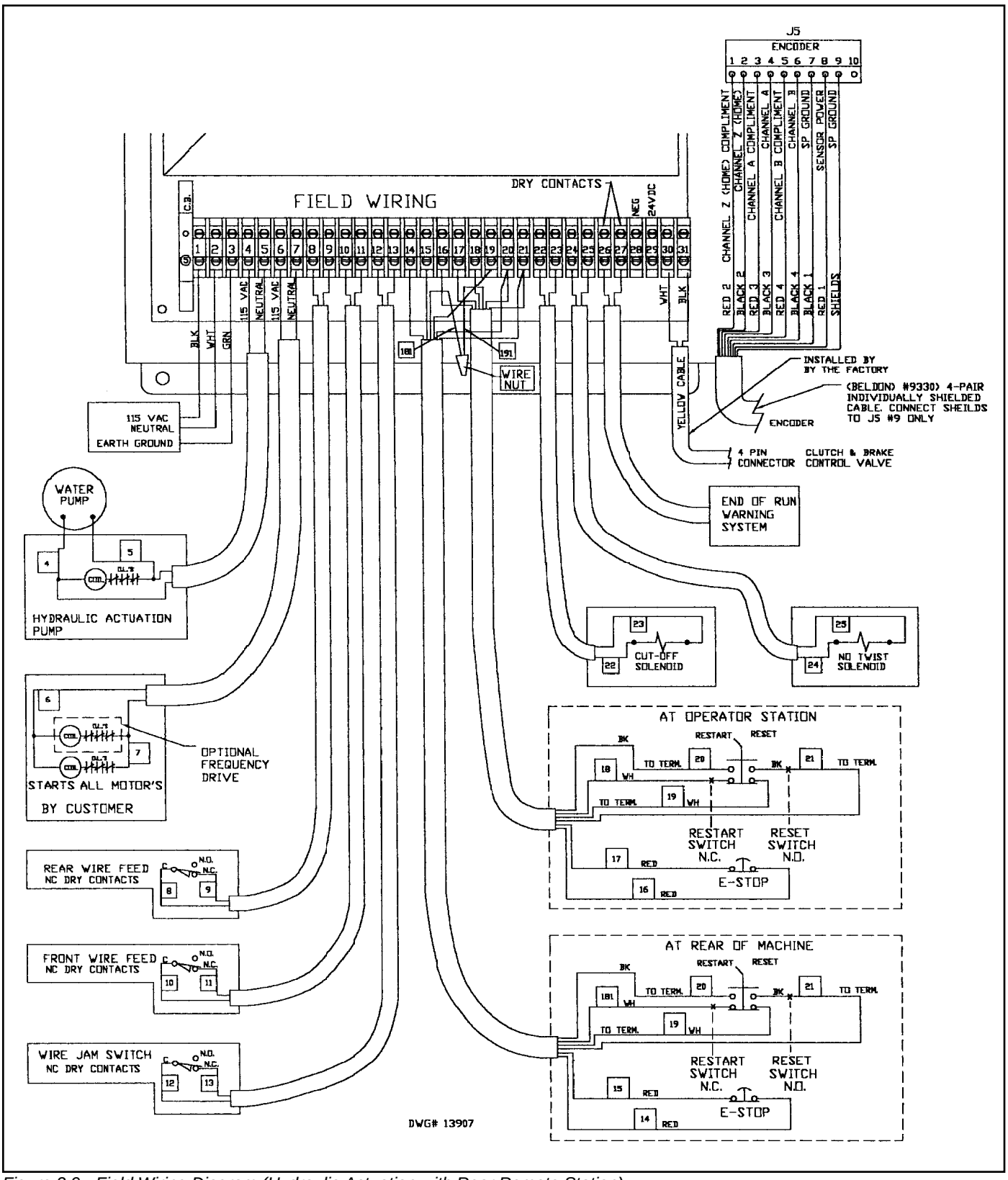


Figure 2.9 - Field Wiring Diagram (Hydraulic Actuation with Rear Remote Station)

A. Main Power to *PosiWeave* Control

The main power to the ***PosiWeave*** Control should be 115 VAC or 230 VAC and 150 Watts. The Input Power Selector must be set to match the input voltage. The Selector is located in the upper left corner of the Internal Power Supply Board *(See Figure 2.10)*. The factory default setting is 115 VAC.

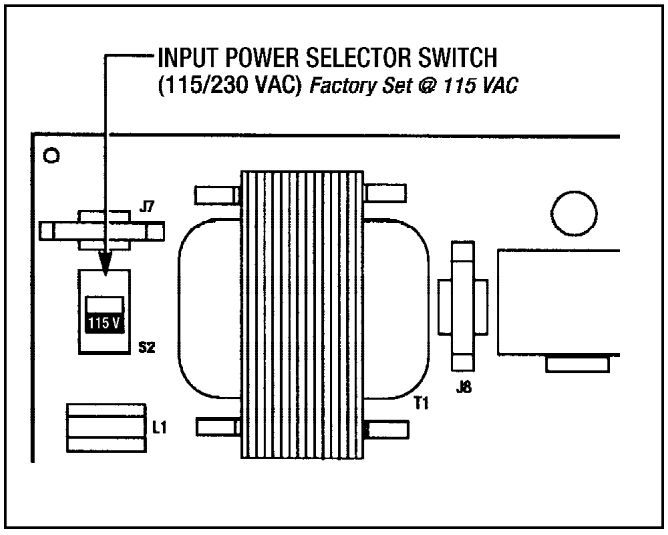


Figure 2.10 - Input Power Selector

The power should be clean and good quality similar to that used for other controllers. A dedicated transformer is recommended to convert 460 VAC, 3 Phase to 115 VAC, Single Phase.

WARNING
The *PosiWeave* Control must be grounded to an earth ground. Not doing so can result in unexpected results due to noise and voltage levels induced from other equipment such as motors.

1. Connect 115 VAC (Black) to terminal (#1) on the Field Terminal Strip.
2. Connect Neutral (White) to terminal (#2) on the Field Terminal Strip.
3. Connect Earth Ground (Green) to terminal (#3) on the Field Terminal Strip.

B. Main Drive Motors

The ***PosiWeave*** Control will control the starting of the Main Drive Motor and the Cut-Off/No Twist Motor through the motor starters. The motor starter coils can be wired in parallel to the control.

NOTE: The motors are interlocked in the ***PosiWeave*** Control to stop when an E-Stop is initiated.

WARNING
The motors are interlocked in the control to shut off in case of an E-Stop for operator safety. This system must not be by passed.

1. Connect 115 VAC (black) from motor starter coil to terminal (#6) on the Field Terminal Strip.
2. Connect Neutral (white) from motor starter coil to terminal (#7) on the Field Terminal Strip.

C. Water Pump Motor to *PosiWeave* Control

The Water Pump Motor is driven directly by the ***PosiWeave*** Control through 115 VAC outputs. It will be turned on when **"Power On/Off"** switch (#1) is turned **"ON"**.

1. Connect 115 VAC (black) from motor conduit box to terminal (#4) on the Field Terminal Strip.
2. Connect Neutral (white) from motor conduit box to terminal (#5) on the Field Terminal Strip.

D. Hydraulic Pump Motor (If Used)

The Hydraulic Pump Motor is controlled by the ***PosiWeave*** Control through the motor starter. It will be turned on when **"Power On/Off"** switch (#1) is turned **"ON"**.

1. Connect 115 VAC (black) from motor conduit box to terminal (#4) on the Field Terminal Strip.
2. Connect Neutral (white) from motor conduit box to terminal (#5) on the Field Terminal Strip.

E. Remote Operators Station (Front) to *PosiWeave* Control

A Remote Operators Station is included with the ***PosiWeave*** Control. It should be mounted on the front of the machine convenient to the operator. Close to the original manual cutoff handle is suggested. It includes an **"E-Stop"** button and a **"Reset/Restart"** switch. A wiring cable is furnished and pre-wired into the Remote Station. It will need to be wired into the ***PosiWeave*** Control.

1. Remove jumper and connect the Remote Operator E-Stop Contacts to terminals (#16) and (#17) on the Field Terminal Strip.
2. Connect the Restart Contacts to terminals (#18) and (#19) on the Field Terminal Strip.
3. Connect the Reset Contacts to terminals (#20) and (#21) on the Field Terminal Strip.

F. Optional Remote Operators Station (Rear) to *PosiWeave* Control

An optional Remote Operators Station can be located at the rear of the machine so the machine can be operated without coming back to the front, Locate this Remote convenient to the operator on the back of the machine.

1. Remove jumper and connect the Remote Operator E-Stop Contacts to terminals (#14) and (#15) on the Field Terminal Strip.
2. Connect the Restart Contacts to terminal (#19) on the Field Terminal Strip and wire (#191) from the Front Remote Station. Wire (#191) is removed from terminal (#19) and connected to wire (#181) from the Rear Remote Station.
3. Connect the Reset Contacts to terminals (#20) and (#21) on the Field Terminal Strip.

G. Wire Jam Limit Switch to *PosiWeave* Control

The Wire Jam Limit Switch is a normally closed switch which opens when a malfunction occurs. It is normally located near the end of the twist bar by the cutoff.

1. Remove jumper and connect to terminals (#12) and (#13) on the Field Terminal Strip.

H. Wire Feed Limit Switch (Front) to *PosiWeave* Control

The Wire Feed Limit Switch is normally located on the front straightener bracket to detect a jam coming off the coil.

1. Remove jumper and connect to terminals (#10) and (#11) on the Field Terminal Strip.

I. Wire Feed Limit Switch (Rear) to *PosiWeave* Control

The Wire Feed Limit Switch is normally located on the rear straightener bracket to detect a jam coming off the coil.

1. Remove jumper and connect to terminals (#8) and (#9) on the Field Terminal Strip.

   NOTE: Additional limit switches or E-Stops can be wired in series with others if necessary.

J. Cut-Off Solenoid to *PosiWeave* Control

The Cut-Off Solenoid is powered by the ***PosiWeave*** Control with 115 VAC, single phase, 60 Hz.

1. Connect to terminals (#22) and (#23) on the Field Terminal Strip.

K. No Twist Solenoid to *PosiWeave* Control

The No Twist Solenoid is powered by the ***PosiWeave*** Control with 115 VAC, single phase, 60 Hz.

1. Connect to terminals (#24) and (#25) on the Field Terminal Strip.

L. End of Run Contacts

The End of Run Contacts are dry contacts used to actuate a horn or light when the end of a run is reached.

1. Connect to terminals (#26) and (#27) on the Field Terminal Strip.

M. *Posidyne* Clutch/Brake Control Valve to *PosiWeave* Control (Air Actuation Only)

The *Posidyne* Clutch/Brake Control Valve is connected to the ***PosiWeave*** Control through a 4-Pin Brad Harrison Cable. This is normally pre-wired at the factory.

1. Connect the (white) wire to terminal (#30) on the Field Terminal Strip.
2. Connect the (black) wire to terminal (#31) on the Field Terminal Strip.
3. The other two wires are not used.

N. Position Encoder Sensor to *PosiWeave* Control

The Optical Position Encoder comes pre-wired with a 12 Ft. Belden, 4-pair, shielded cable which must be customer wired at the job site to Terminal Strip #J5 located on the Power Supply Board in the Control Box. (See Figure 2.6, 2.7, 2.8 or 2.9 for appropriate Field Wiring Diagram.)

Make the following wiring connections to Terminal Strip #J5 located on the Power Supply Board:

WIRE COLOR	FUNCTION	J5 TERMINAL
Red 2	Channel "Z" (Home) Compliment	1
Black 2	Channel "Z" (Home)	2
Red 3	Channel "A" Compliment	3
Black 3	Channel "A"	4
Red 4	Channel "B" Compliment	5
Black 4	Channel "B"	6
Black 1	SP Ground	7
Red 1	Sensor Power	8
Shields	SP Ground	9
-----	Not Used	10

This completes the Installation and Wiring of the *PosiWeave* Control.

Section 3
PosiWeave CONTROL PANEL
FEATURES and FUNCTIONS

The ***PosiWeave*** **Wire Weaving Electronic Machine Control** is a dedicated control when combined with the 2.5 *Posidyne* Clutch/Brake, will transform a traditional Fence Weaving Machine into a user friendly, more reliable and more productive machine. The following is a description of the Control Panel and the functions and features of each control.

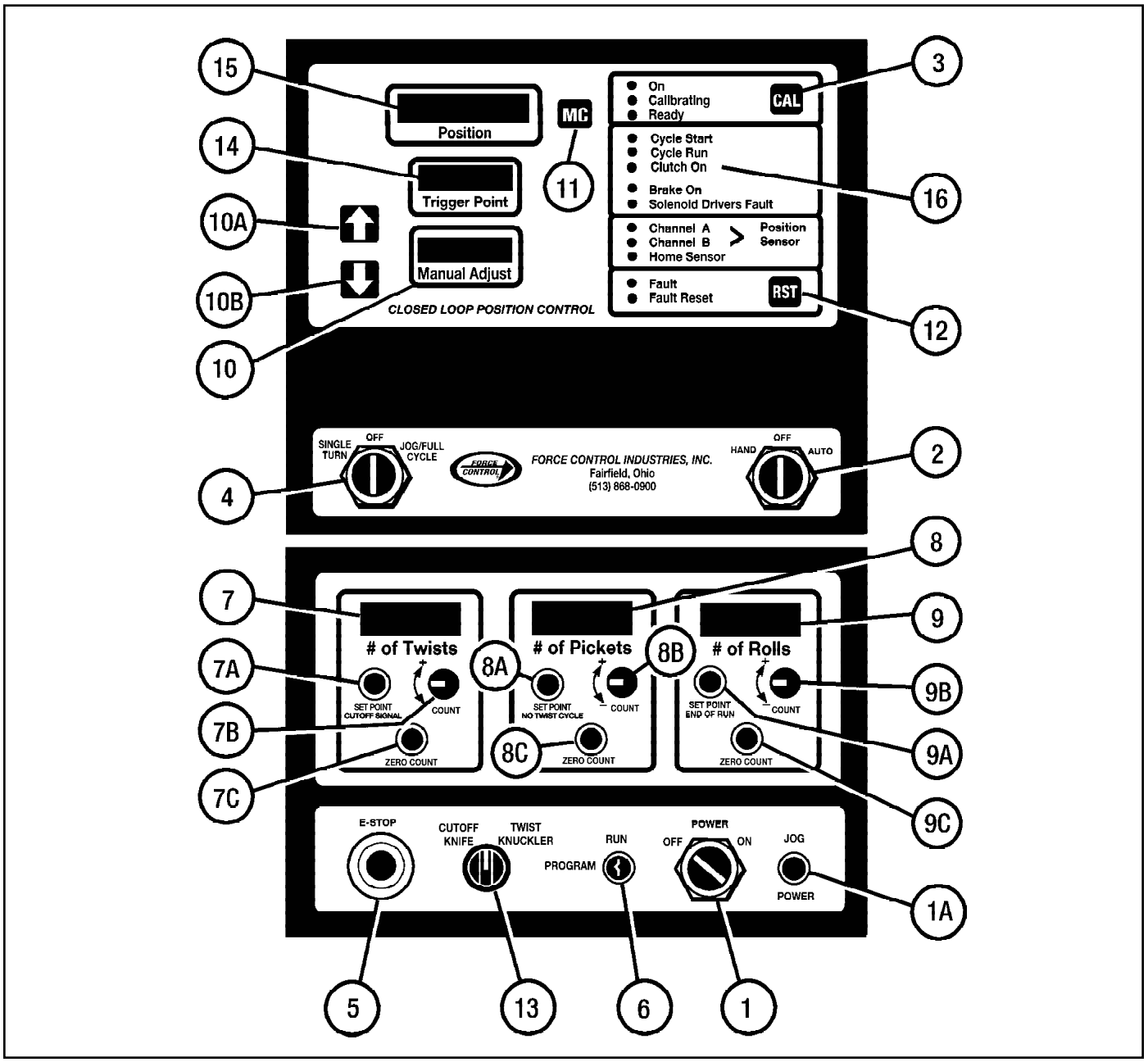


Figure 3.1 - Front PosiWeave Control Panel

3-1 FRONT PANEL CONTROLS

1. "Power" Switch - This switch turns power **ON/OFF** to the control. When the switch is rotated to the **ON** position, the control is powered. The green **Power** button/light (#1A) in the lower right hand corner will become illuminated.

NOTE: When the green **Power** button (#1A) is illuminated and the **HOA Switch** is in the **Hand** mode, pressing this button will engage the *Posidyne* clutch and **"JOG"** or rotate the Twist Bar for as long as the button is pressed. When released, the *Posidyne* brake will set and stop the Twist Bar at random.

2. "HOA" Switch - The **HOA** (**H**and/**O**ff/**A**utomatic) Switch is the main control switch. It lets the operator run the machine in either **Hand** or **Automatic** Mode.

NOTE: The picket and roll counters are disabled when the **HOA** Switch is in the **Hand** mode.

3. "CAL" Button - Under normal circumstances the control is set for **"Force Ready".** (With dip switches #4 and #5 on S2 are set to **"ON"** calibration should not be necessary.) When powered up the control should show the "ON" and "READY" lights lit, and numbers in the displays. If not the "CAL" button is used to calibrate the control. This is normally only required when installing a new board, if dip switch #4 and #5 on S2 are set to **"OFF"**, or if the green **Ready** light is not lit. When pushing this button, the machine will index one or two times and stop. The button needs to be pressed one or two more times until the **Ready** light is illuminated. This procedure teaches the control where the Home Position is and what it takes to stop at this position. The Home position is a point on the output shaft (relates to the key and the home sensor in the Position Encoder.) that is a reference point for positioning of the Twist Bar. Home position is further defined as the position where the Posidyne stops when the Manual Adjust is set to "0" and the Position Display reads "0".

NOTE: The **"HOA"** Switch must be in **"Hand"** position for the **"CAL"** button to function.

4. "JOG" Switch - The **JOG** Switch lets the operator make single diamonds, partial pickets or full pickets. Turning the switch to the left **(Single Turn)** yields a single twist (diamond). Turning the switch to the right **(Jog/Full Cycle)** will make diamonds as long as the switch is maintained in this position. If the switch is maintained long enough it will make a full picket and stop. Regardless of which position is chosen, when the Twist Bar stops, the control is programmed to stop the Twist Bar in the desired position, as entered by the operator with the **Manual Adjust**.

NOTE: On some early Models this switch is spring loaded to "OFF".

5. "E- STOP" - There is an E-Stop button on the ***PosiWeave*** and each Remote Station. This mushroom type button switch will stop the *Posidyne* clutch/brake whenever pressed. The button (only on the ***PosiWeave*** Control) will illuminate when pressed, or if any limit switches located on the machine are tripped.

NOTE: Correct wiring of the limit switches is required in order to make the **E-Stop** functional.

6. "PROGRAM/RUN" Key Switch - This key switch is a lockout switch that only permits increasing the **# of Pickets** and **# of Rolls** preset values when the key is inserted and turned to the **Program** position. (The key cannot be removed when in this position.) When the switch is in the **Run** position the **# of Twists** can be increased or decreased but the **# of Pickets** and the **# of Rolls** can only be decreased and not increased. This is designed to prevent an operator from creating false pickets and rolls. The key is meant to be carried by a supervisor and other authorized personnel.

7. "# of Twists" Counter - This counter is used to set the **# of Twists** (Diamonds) per picket. This relates directly to the **# of revolutions** of the Twist Bar. It can be programmed for any required number of Twists.

To preset the desired **# of Twists**, press and hold the **Set Point** button (#7A). While holding the **Set Point** button, rotate the spring loaded **Count** Switch (#7B) up (+) or down (-) to reach the desired **# of Twists** per picket. Once the **# of Twists** is set, release the **Set Point** button. The number will be locked in. This number defines a full picket, and when in the **AUTO** mode, the control will make this # of Twists and stop. The preset value can be displayed at any time by pressing and holding the **Set Point** button. During normal operation the, **# of Twist** counter will display the relative position of the Twist Bar. The **Zero Count** button (#7C) will reset the count to zero when pressed.

If a jam occurs, damaged diamonds can be removed, and the respective number of diamonds can be added or subtracted to the # of Twists counter. This eliminates the need to complete the full picket. This will reduce the amount of wasted wire. The # of Twists can be increased or decreased by rotating the switch labeled "Count".

NOTE: The **HOA** Switch must be in the **HAND** mode in order to make any adjustments to the counter.

At the end of each full cycle (picket), the control will send a signal to a relay to engage the Cut-Off jaw coupling. This signal is a timed output and is adjustable from .125 to 1.4 seconds. Each time a signal is sent to the Cut-Off mechanism, the Set Point button will illuminate.

Each time a full cycle (picket), and a cut is made, a signal is sent to the **# of Pickets** counter.

CAUTION: The relative number displayed in the counter will be set to zero whenever the Zero Count button is pressed.

8. **"# of Pickets" Counter -** This counter displays the # of Pickets made while the **HOA** Switch is in the **Auto** mode. This counter can be preset for the **# of Pickets** made per roll. It is preset in the same manner as the **# of Twists** described in (#7). All counters are preset, adjusted and increased or decreased in the same manner.

   Once the **# of Pickets** is preset, the counter will display the relative Picket number and will be increased each time a full picket is made. Once the preset # of Pickets is reached, the # of Pickets Counter will reset to zero and will send a signal to the **# of Rolls** counter. Each time a signal is sent to the **# of Rolls** counter, the **Set Point** button will illuminate. The signal is adjustable from .125 to 1.4 seconds. The number in the display can be increased or decreased to account for any pickets that were removed, or added after a jam occurred. To do this the **"Run/Program"** key switch must be turned to **"Program"**.

   CAUTION: The relative number displayed in all counters will be reset to zero whenever the Zero Count button is pushed.

9. **"# of Rolls" Counter -** This counter displays the **# of Rolls** made while the **HOA** switch is in the **Auto** mode. This counter can be preset for the number of rolls per shift or job. It is preset in the same manner as the **# of Twists** described in (#7). All counters are preset, adjusted and increased or decreased in the same manner.

   When this counter is preset to a desired number, the **# of Rolls** counter will stop the machine when this preset number is attained. If the **# of Rolls** counter is set to zero, the display will show the relative number of rolls made during that particular time period. Also an alarm or light can be actuated at the end of a roll.

   CAUTION: The relative number displayed in the counter will be set to zero whenever the Zero Count button is pressed.

   NOTE: All the counters are disabled when the **HOA** switch is in the **Hand** mode.

10. **"Manual Adjust" Display -** This LED displays the amount of rotation the Twist Bar will stop before or after the **Home Position.** This lets the operator manually adjust where the Twist Bar stops. Increasing the **Manual Adjust** stops the bar 3° towards the operator for each count added. Decreasing the **Manual Adjust** stops the bar away from the operator. **Example:** Assume the control finds Home to be at 12:00 o'clock (top dead center). The operator can set the **Stopped Position** of the Twist Bar at 9:00 o'clock, 3:00 o'clock or any where in between. The Increase button (#10A) and the Decrease button (#10B) is used to make this adjustment.

11. **"MC" Button -** This button is used to set the **Max. Count** which is the number of pulses to complete a Single Index or Revolution.

12. **"RST" Button -** This **Reset** button is used to reset errors that may occur during operation. Each type of Error has its own code that is displayed in the **Trigger Point** Window as an **E-1** through **E-84**. See Section 5 for a description of each Error Code. A typical error would be when limit switches trip. The **Fault** LED will illuminate and **E-11** will be displayed in the **Trigger Point** Window. The error can be **Reset** using the **RST** button on the control or the **Reset** button on the Remote Station after the limit switch has been corrected.

    NOTE: Each time the **RST** button is pressed, the **Fault Reset** LED will illuminate.

13. **"CUTOFF - TWIST/KNUCKLE" Switch -** This switch is enabled when the **HOA** switch in the **Hand** mode. When turned to the left, it will send a signal to engage the **CUTOFF Knife**. When turned to the right, it will send a signal **not to Twist or Knuckle**. This switch is spring loaded and will return to the center when released.

14. **"Trigger Point" Window -** In order for the *Posidyne* to stop at the **Home Position**, or a **Manually Adjusted Position**, the control must send a signal to the *Posidyne* Brake at some period before it gets to the desired **Stop Position.** The **Trigger Point** window displays the amount of counts needed for the *Posidyne* to stop at the desired **Stop Position.**

    Example: If the desired **Stop Position** of the Twist Bar is at 12:00 o'clock, the control must send a signal at some period before 12:00 o'clock. For this example, let's say the brake must be applied at 10:00 o'clock so the Twist Bar comes to rest at 12:00 o'clock (assuming clockwise rotation). The distance between 10:00 o'clock and 12:00 o'clock is 25 counts. The **Trigger Point** display will read **25**.

15. **"Position" Window -** This window displays the **absolute position** of the Twist Bar. The Encoder counts 120 counts per revolution of the Twist Bar. If the **# of Twist** is set for 10 (# of diamonds per picket), the control will count to 1200 (10 x 120) counts and stop. While the Twist Bar is rotating, the **Position** window will display the absolute position of the Twist Bar. If the Twist Bar stops anywhere in between, the display will show this position.

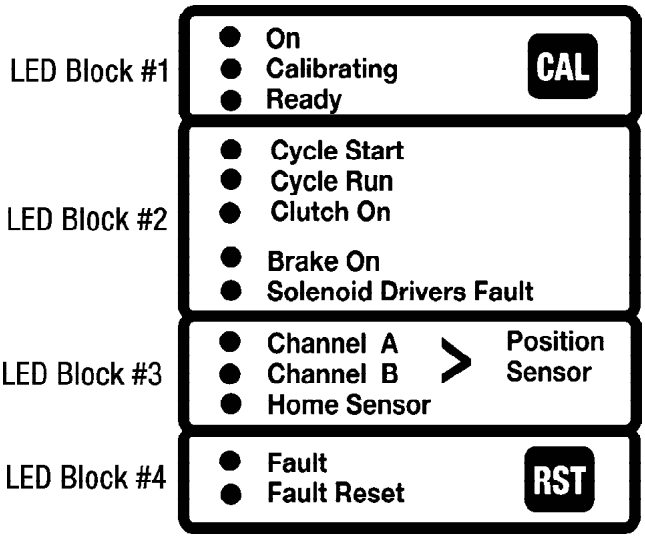
    Example: If the **Position** window reads 480, the

At the end of each full cycle, the Position window should display a count that is equal to the Manual Adjust window, plus or minus 2 counts.

NOTE: If the **Manual Adjust** is set to zero, and the *Posidyne* stops the Twist Bar and the **Position** window reads 0, then this position is defined as **Home Position**.

We recommend that you first run the *Posidyne* with the **Manual Adjus**t set at 25 before installing the Twist Bar. When the **Position** window reads 25, install the Twist Bar in the desired **Stopped Position**. This will make it easier to read the different window displays.

16. LED's - There are several **LED's** mounted on the Front Panel of the ***PosiWeave*** Control. Most of them are used to monitor the Inputs/Outputs of the system. They are broken down into 4 blocks as shown below.



LED BLOCK #1

On - On when power is on to the system and the **HOA** switch is in **"Hand"** or **"Auto"**.

Calibrating - On when ever the unit is calibrating.

Ready - On when the system is calibrated. Note all functions are disabled (except the **"CAL"** button and green **"Jog/Power"** button) when this light is **OFF**.

LED BLOCK #2

Cycle Start - On when input signal to index is present.

Cycle Run - On when index is in process.

Clutch On - On when output signal to engage clutch is present.

Brake On - On when output signal to engage brake is present.

Solenoid Drivers Fault - On when voltage surge occurs, or valve or solenoid is defective.

LED BLOCK #3

Channel A - On when input from **Signal A** of the Position Sensor is present.

Channel B - On when input from **Signal B** of the Position Sensor is present.

Home Sensor - On when input from **Home** Sensor is present. This light may be off when input from the Home Sensor is present. This depends on the "X1" Jumper (#8) setting located on the CPU Board.

LED BLOCK # 4

Fault - On when one of the coded faults is present.

Fault Reset - On when the **RST** button on the control or **Reset** on the Remote Station is pressed.

3-2 INTERNAL CONTROLS

(See Figures 3.2 and 3.3)

A. *PosiWeave* CPU Board

1. #S5 Dip Switch - Used to set Control Mode. The Default Settings are as follows: 1 = ON; 2 = OFF; 3 = OFF; 4 = OFF

2. #S4 Dip Switch - Watchdog Timer. Times out and stops control. Displays E-4 in "Trigger Point" display if cycle is not completed in set time. (Default Setting = 500 Milli-Seconds.) The Default settings are: 1 = OFF; 2 = ON; 3 - ON; 4 = OFF.

3. #S2 and #S3 Dip Switches

A. #S2 Dip Switch - Used to set Calibration Mode - "Force Ready when powered up (Calibration not required) and **Use last known position when powered up.**

Default Setings: 1 = OFF; 2 = OFF; 3 = OFF; 4 = ON; 5 = ON; 6 = OFF; 7 = OFF; 8 = OFF

B. #S3 Dip Switch - Used to set Stall Detection. Stops control if Twist Bar jams before making position. (Will display E-44 Error Code)

Default Setings: 1 = OFF; 2 = OFF; 3 = On; 4 = OFF; 5 = OFF; 6 = OFF; 7 = OFF; 8 = OFF

4. #S1 Dip Switch - Encoder Control. Used to set the resolution of the encoder. Default Setting = X2. Example: (60 ppr pulse disc) X 2 = 120 pulses per revolution.

Default Settings: 1 = ON; 2 = OFF; 3 = OFF; 4 = OFF; 5 = OFF; 6 = ON; 7 = ON; 8 = OFF.

5. "System Reset" Button - Resets the CPU. It must be pushed when any changes are made to the dip switch settings.

6. **"J4" Serial Communications Adapter** - Presently not used. It will be used as a communications port in the future.
7. **LED-1 to LED-7** - not used.
8. **"X1" Jumper** - "Home" Switch Polarity - This determines if the "Home" Switch LED comes on when in "Home" position or goes off when in "Home" position.

   Jumper on upper (2) pins = ON *(Default Setting)*

   Jumper on lower (2) pins = OFF
9. **"X2" Jumper** - Differential or Single Ended Home Switch.

   Jumper on upper (2) pins = Single Ended Home Switch.

   Jumper on lower (2) pins = Differential Home Switch. *(Default Setting)*
10. **"X3" Jumper** - Differential or Single Ended Encoder.

    Jumper on upper (2) pins = Single Ended Encoder.

    Jumper on lower (2) pins = Differential Encoder. *(Default Setting)*
11. **LED11 Over Temperature** - Indicates when this condition exists.
12. **LED12 Low Air Pressure** - Indicates when this condition exists.
13. **LED13 Cal Req** - Indicates when a signal is being received to calibrate.

B. Weaver Board

1. **Cycle Timers** - These (4) Cycle Timers are labeled from left to right: (1) Restart Time; (2) Cut Off Time; (3) No Twist Time; (4) End of Run Time. Each Timer is factory set, but can be changed to suit your requirements. (See **Section 4-3 Setting the Cycle Timers** for this procedure.)
2. **LED-1 (Logic Power Light)** - Indicates when power is on to the Weaver Board.
3. **LED-2 (E-Stop Indicator Light)** - Indicates when an E-Stop or limit switch is open.

C. Power Supply Board

1. **"S2" Input Power Selector** - Selects 115 VAC or 230 VAC for Input Power. Default setting is 115 VAC.
2. **"F12" Fuse** - Slow blow type, 11/2 Amp, 250 Volt. Protects the Encoder Circuits.
3. **"F13" Fuse** - Slow blow type, 11/2 Amp, 250 Volt. Protects all other circuits.
4. **"JP14" Jumper - Encoder Power Level Adjust**. Used to set the power level supplied to the Encoder. Options are 5VDC, 12VDC and 15VDC. ***(Default Setting is 5VDC.)***
5. **LED14 - Encoder Power**. Indicates when power is on to the Encoder.
6. **LED15 - Logic Power**. Indicates when power is on to the CPU Board.
7. **"JP12" Jumper - Over temperature**. This determines N.C. or N.O. operation of Over Temperature Switch. ***(Default Setting is N.C.)***
8. **LED12 - Over Temperature**. Indicates if circuit is normally open or normally closed.

   Light ON = Normally Open
   Light OFF = Normally Closed
9. **"JP13" Jumper - Low Air Pressure.** This determines N.C. or N.O. operation of Low Air Pressure Switch. ***(Default Setting is N.C.)***
10. **LED13 - Low Air Pressure** Indicates if circuit is normally open or normally closed.

    Light ON = Normally Open
    Light OFF = Normally Closed
11. **"SSR1" Solid State Relay** - Used to start the Main Motor and Cut-Off Motor. LED1 indicates circuit is ON. **(NOTE:** "SSR2" to "SSR8" is not used.)
12. **"SSR9" Solid State Relay -** Used to "Cycle/Restart" the control from a Remote Station. LED9 indicates circuit is ON. **(NOTE:** "SSR10" is not used.)
13. **"SSR11" Solid State Relay -** Used to reset the control from a Remote Station. LED11 indicates circuit is ON.
14. **"JP1 to JP11" Jumpers.** These determine N.C. or N.O. operation of the (11) possible solid state relays. ***(Default Setting is N.O.)***
15. **LED1 to LED11 -** Indicates whether relays are N.C. or N.O.

    Light ON = Normally Open
    Light OFF = Normally Closed

D. Lower Relay Panel

1. **Circuit Breaker** - Used to protect all 115 VAC circuits. (Main motor starter, water pump motor and hydraulic actuation pump motor starter.) Total amperage cannot exceed 200 VA.
2. **Restart Cycle Relay** - Used to restart the cycle. Connected to the Restart Timer.
3. **Cut-Off Solenoid Relay** - Used to energize the Cut-Off Actuation Solenoid. Connected to the Cut-Off Timer.
4. **No Twist Solenoid Relay** - Used to energize the No Twist Solenoid. Connected to the No Twist Timer.
5. **End of Run Relay** - Dry contacts. Used to actuate a warning alarm or light at the end of a run. Connected to the End of Run Timer.
6. **E-Stop Relay** - Used to stop the control from the E-Stops or Limit Switches.

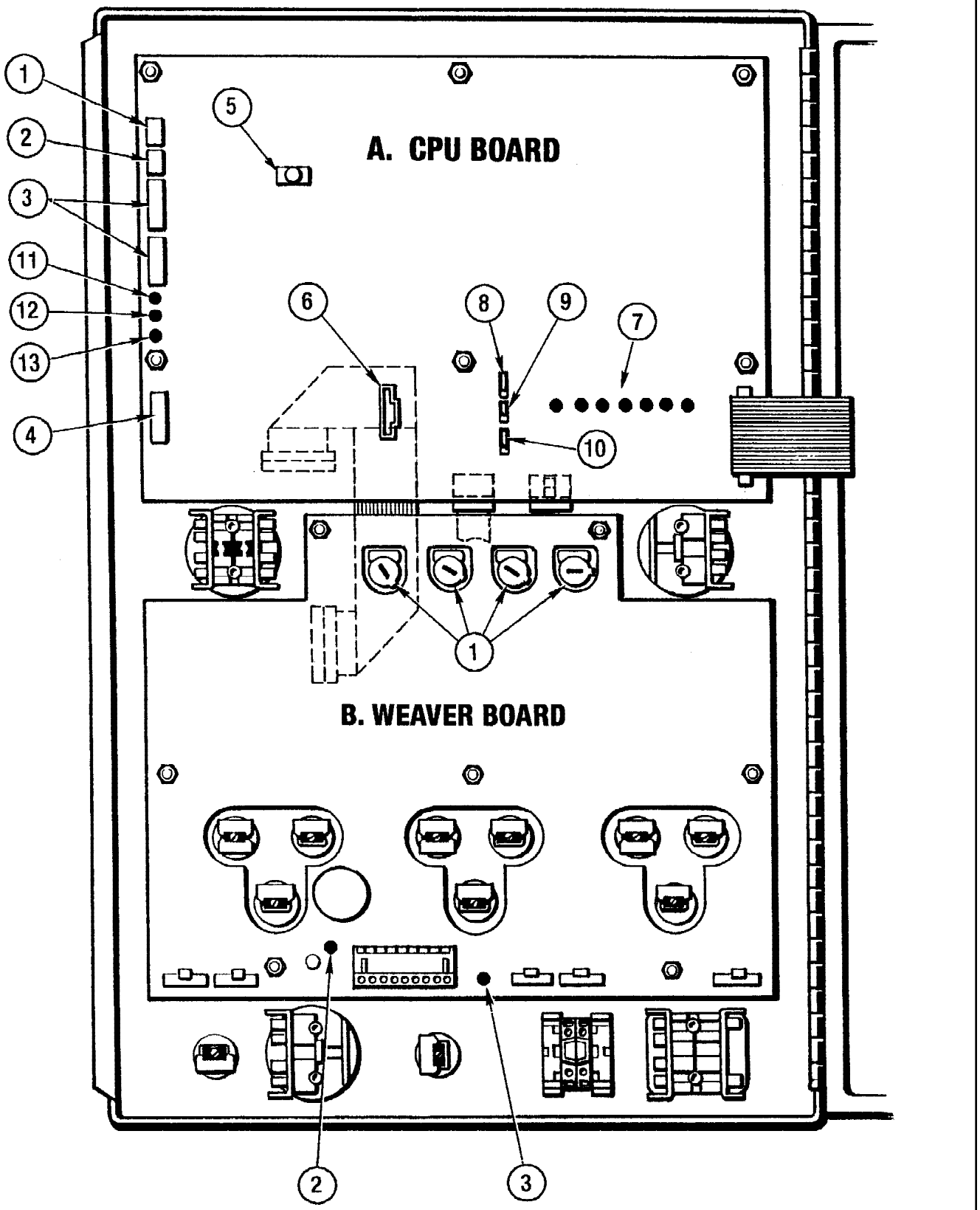


Figure 3.2 - PosiWeave Internal Controls (L.H. Side)

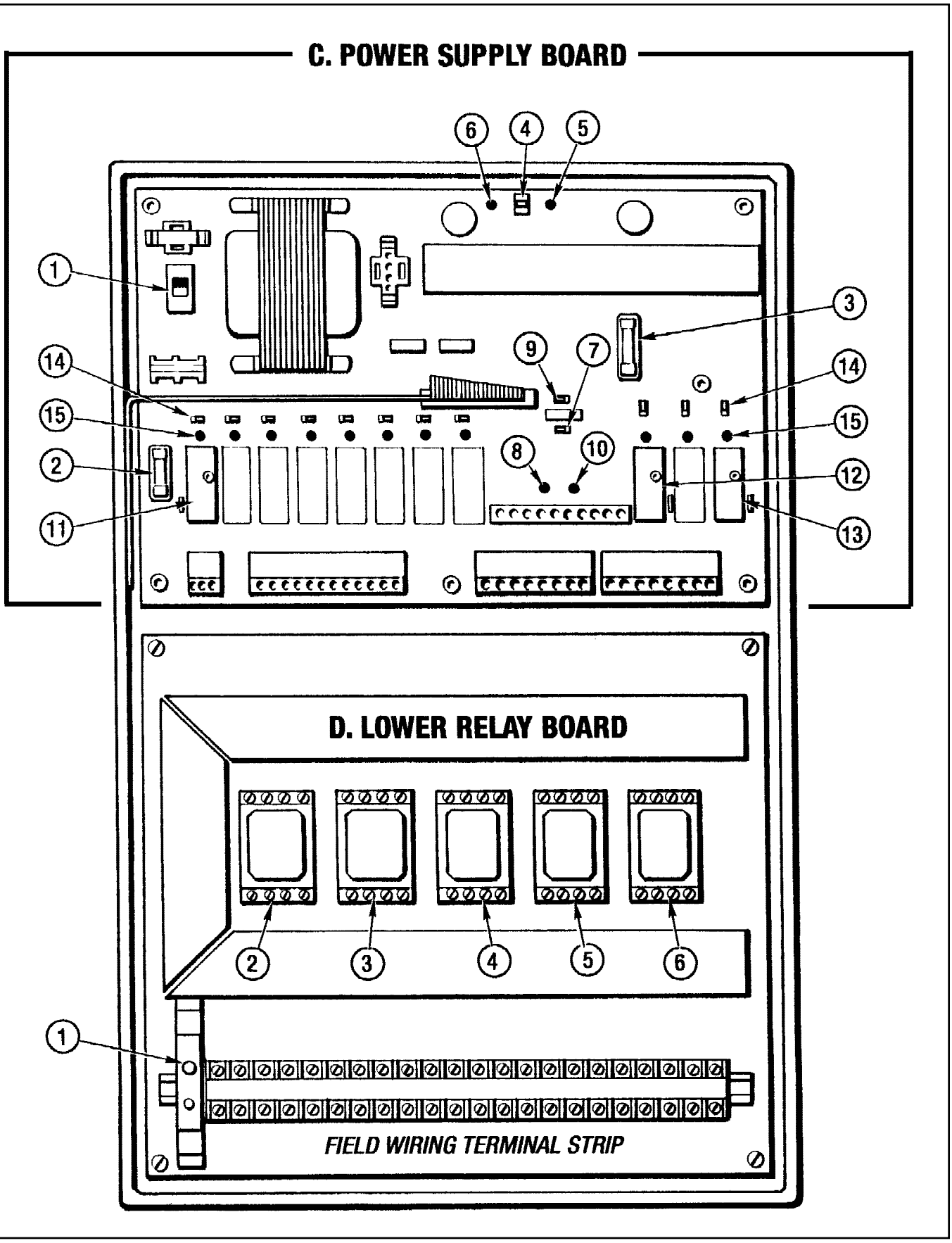


Figure 3.3 - PosiWeave Internal Controls (R.H. Side)

Section 4
SET-UP, START-UP and OPERATION

A feature of this 2.X.X Software allows the control to come up Calibrated using the last known trigger point. Calibration is not normally required when the control is powered up.

> **NOTE:** Dip Switch 4 and 5 on S2 must be set to ON to activate this feature.

If Calibration is required see Section 4-2.

4-1 SETTING MAX COUNT

(See Figure 4.1)

The Max Count should be set to 120. To check the Max Count push the **MC Button** on the front panel. The Max Count will be indicated in the **Position Display**.

To change the Max Count use the **"Up" and "Down" Buttons** plus the **MC Button**. Push and hold the **MC Button** while pushing the **"Up" or "Down" Button** to set the Max Count in the Position Display.

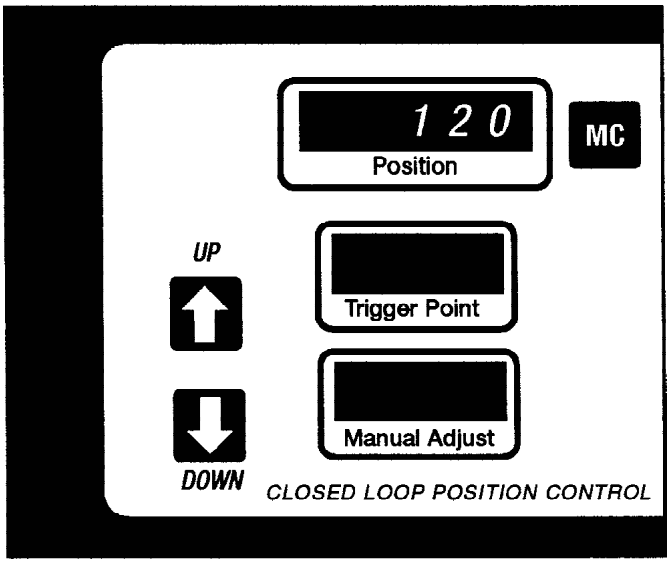


Figure 4.1 - Setting Max Count

4-2 CALIBRATING THE *PosiWeave* CONTROL

(See Figure 4.3)

1. Turn the **"Power"** switch (#1) clockwise to **"On"** position. The **"Power On"** Light (#1A) will come on.
2. Turn the **"H-O-A"** Switch (#2) CCW to **"Hand"** position. The motor should start running and the **"On"** LED will light.

   > **NOTE:** Due to the interlock built into the *PosiWeave* Control the **"H-O-A"** switch (#2) must be in **"Hand"** or **"Auto"** for the motor to run.

3. Press the **"CAL"** button one time. The drive will make one or two revolutions and stop (probably out of position).
4. Press the **"CAL"** button again. The drive will index one revolution and should stop at or near position. The green **"Ready"** LED should come on.
5. Turn the **"Jog"** switch (#4) CCW to **"Single Turn"** and release. This is a spring centered switch and it will return to the **"Off"** position. The bar should turn one revolution and stop in position. If still out of position, jog several times. The bar should stop consistently at the same position. If the bar is in position continue on to **4-2 Programming the *PosiWeave* Control.** If the bar does not stop in position go to step #6.
6. The **Stop Position** can be corrected by adding in a Manual Adjustment. Set the **"Manual Adjust"** (#10) using the **"Increase"** and **"Decrease"** touch-pad buttons (#10A and 10B) to move the bar into the desired position. The **"Increase"** button (#10A) will rotate the bar towards the operator. The **"Decrease"** button (#10B) will rotate the bar away from the operator. Each digit entered will rotate the bar approx. 3°. Jog the bar again to check position. Continue adding in Manual Adjustment until the bar stops in the desired position.

   > **NOTE:** The ***PosiWeave*** should not be operated with a negative Manual Offset.

The *PosiWeave* Control is now calibrated and ready to be programmed for the size fence to be made.

4-3 PROGRAMMING THE *PosiWeave* CONTROL

The ***PosiWeave*** Control has a key operated **"Run/Program"** mode switch (#6) which allows the key to be removed after programming so the settings cannot be changed. The Control must be in the **"Program"** mode to make the following settings. *(See Figure 4.4)*

1. Set "Run/ Program" Mode - Set to **"Program"** allows the *PosiWeave* Control to be programmed.

(a) Insert the key in the **"Run/ Program"** Switch (#6) and turn CW to **"Program".**

2. Set Number of Twists - Sets the number of twists which determines the height of the product before the Cut-Off is actuated.

(a) Push and hold **"Set Point Cutoff"** button (#7A). Turn **"Count"** switch (#7B) CW or CCW to set the number of twists in the **"# of Twists"** display. (#7). Release button (#7A).

(b) If the control has just been calibrated note the number of twists in the **"# of Twists"** display (#7). Push and hold the **"Zero Count"** button (#7C), turn the **"Count"** switch (#7B) CW or CCW to get the number that was previously displayed. This will now have the correct number of twists actually made during calibration.

3. Set Number of Pickets - This will set the number of pickets at which the **"No Twist"** is actuated marking the end of the roll.

(a) Push and hold "Set Point No Twist Signal" button (#8A). Turn "Count" switch CW or CCW to set the number of pickets in the "# of Pickets" display (#8). Release button (#8A).

4. Set Number of Rolls - When this set point is reached the control will stop the machine automatically.

(a) Push and hold **"Set Point End of Run"** button (#9A). Turn the **"Count"** switch (#9B) CW or CCW to set the number of rolls in the **"# of Rolls"** display. Release button (#9A).

5. Set Number of Pickets for Roll Offset - Allows a Set Point to stop the machine when the "No Twist " picket has reached a point where the roll can be removed. If a stop is not desired at this point, set the **"Roll Offset"** to zero.

(a) Double push and hold **"Set Point No Twist"** (#8A). The display will show **". . . . ."** along with any previous number. This indicates the number set is the **Offset Number**. Turn **"Count"** switch (#8B) CW or CCW to set the number of pickets.

NOTE - To determine where this point is, run the machine until the marked picket is in position. Note the **"Number of Pickets"** run. Set the **"Roll Offset"** to this amount.

Turn the "Run/Program" key (#6) to "Run" and remove the key. The Control is now programmed and ready to operate.

4-4 SETTING THE CYCLE TIMERS

(See Figure 4.2)

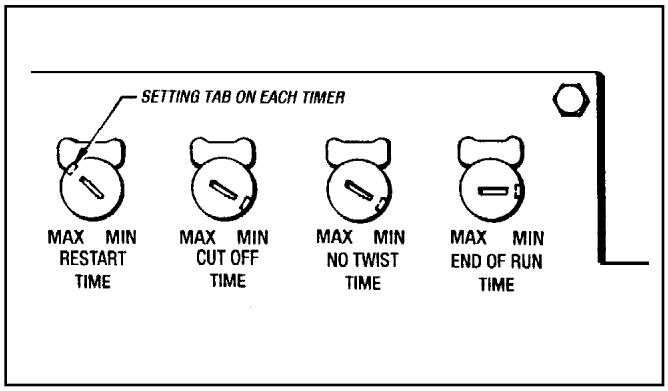


Figure 4.2 - Setting Cycle Timers

There are (4) Cycle Timers in the *PosiWeave* Control located on the backside of the enclosure door. They are labeled from left to right, (1) Restart, (2) Cut-Off, (3) No Twist and (4) End of Run. Each timer is adjustable between .025 and 1.4 Seconds. Fully CCW is minimum and CW is maximum. Total rotation is 270°.

1. Set Restart Timer - This timer sets the time interval between the end of the first cycle and the beginning of the next cycle. This time should be set to maximum (Fully CW) on start-up. This can be reduced, after the machine is running, to the minimum time that will operate the machine properly.

2. Set Cut-Off Timer - This timer is set to allow the Cut-Off Solenoid time to actuate long enough for the Clutch to engage, but release soon enough so the Cut-Off does not make a double cut. To set initially, turn fully CCW, then CW approx. 75° to the 4:00 o'clock position. To check the "ON" time turn the "Cut-Off/ Twist Knuckler" switch (#12) CW. Check the "ON" time of the light in the "Cut-Off Signal" button (#7A).

3. Set No Twist Timer - This timer is set to allow the No Twist Solenoid time to disengage the Twist/Knuckle Cutch for one picket only. If set too long the No Twist will miss two pickets. To initially set turn fully CCW, then CW approx. 75° to the 4:00 o'clock position. To check the "ON" time turn the "Cut-Off/ Twist Knuckler" switch (#12) CW. Check the "ON" time of the light in the "No Twist Signal" button (#8A).

4. Set End of Run Time - This timer is used to set the length of time that a light or buzzer is turned on indicating that a number of rolls have been completed. To set initially turn fully CCW, then CW approx. 45° to the 3:00 o'clock position.

4-5 THREADING THE MACHINE

(See Figure 4.4)

1. Use the green **"Jog/Power"** button to make partial turn jogs for threading the machine.
2. When threaded, the **"Cutoff/Twist Knuckler"** switch (#12) can be turned CCW to **"Cutoff"** position to manually actuate the **Cutoff Knife.**
3. Zero the Twist Count by pushing **Zero Count** switch (#7C).
4. Turning the **"Jog"** switch (#4) CCW to **"Single Turn"** will jog the bar one complete revolution and stop in position. Do this until you are satisfied that the wire is running properly.
5. Turning the **"Jog"** switch (#4) CW to **"Full Cycle"** and holding will turn the bar the number of turns for a complete cycle and stop. Release and turn again and another full picket can be made. Releasing the switch at any time will stop the bar in position. Starting again at this point and holding the switch will complete the picket and stop.
6. Check the number of pickets in the **"# of Pickets"** display. If unusable pickets were made and removed during start up, remove that number by rotating the **"Count"** switch (#8B) CCW once for each picket being

removed.. Pushing the **"Zero Count"** button (#8C) will zero the display. The number of roll can be adjusted the same way.

7. When satisfied that the machine is operating properly, turn the **"H-O-A"** switch CW quickly to **"Auto"**. The drive will now rotate the bar the proper number of twists for a picket, stop, cutoff and restart.

   NOTE: If the drive does not run in **"Auto"** turn the **"H-O-A"** switch back to **"Hand"**, wait for the motor to reach full speed, then turn quickly to **"Auto"**.

The machine should run continuously on its own until the "Roll Offset" or the # of Rolls" are made.

4-6 OPERATION OF THE *PosiWeave*

(See Figure 4.4)

During operation of the machine there are several features which will make operation easier.

1. **Remote Station** - One remote station is included with the *PosiWeave* Control. (See Figure 4.3) Additional remote stations can be added, particularly at the rear of the machine if the operator will be removing rolls.

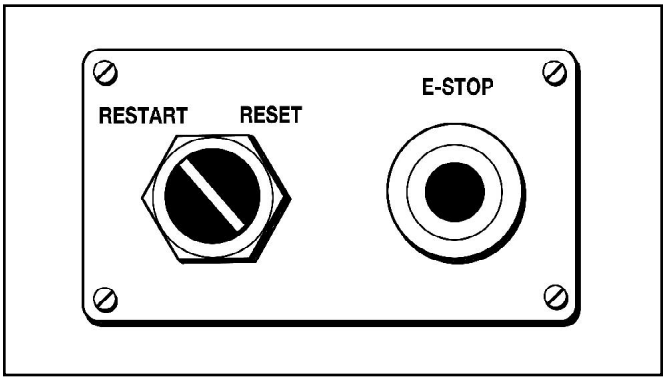


Figure 4.3 - Remote Station

   (a) The remote station consists of an E-Stop button and a rotary switch with **"Reset"** and **"Restart"** positions.

   (1) "Reset" Position - This position resets a fault such as an E-Stop or stop from a jam detection limit switch. This will also restart the motor. If power is turned on while in Reset Position an E-1 Error will occur.

   (2) "Restart" Position - This position starts the machine cycle to run in automatic.

2. **E-Stops -** There is an **E-Stop** button on the *PosiWeave* Control and on each Remote Station.

   (a) The *PosiWeave* Control will stop the machine and shut off the motor when any E-Stop button is pushed. An **"E-11"** will show in the **"Trigger Point"** display (#13), the red **"Fault"** LED will come on and the motor will stop.

   NOTE: Using the **E-Stop** on the remote station is a convenient way to stop and start the machine for any purpose including any impending jams, bad pickets or other problems. Using the **E-Stop** for a stop, rather than the **"H-O-A"** switch assures that the twist bar will stop in position.

   WARNING: Do not use any jam detection limit switches to manually stop the machine.

   (1) Restarting the machine from the *PosiWeave* Control - Pull out the **E-Stop** button (#5), push the **"RST"** touch-pad button (#11) and turn the **"H-O-A"** switch (#2) CCW to **"Hand"** position to restart the motor. The machine may now be jogged. Turn the **"H-O-A"** switch (#2) CW to **"Auto"** for Automatic Operation.

   (2) Restarting the machine from the Remote Station - Pull out the E-Stop button, turn the switch CW to "Reset". The motor should restart. When the motor is up to speed turn the switch CCW to "Restart" and release. The machine should continue in its normal cycle.

   NOTE: The machine should be restarted from the remote station if possible. If starting from the *PosiWeave* Control be sure the Remote Switch is not in the **"Reset"** position. It must be in the **"Restart"** position before the motor can be started.

3. **Wire Feed Jam Detection Stop -** If one of the limit switches on the wire feed senses a jam in the wire the *PosiWeave* Control will stop the machine and shut off the motor. An **"E-11"** fault will show in the **"Trigger Point"** display (#13) and the red **"Fault"** LED will come on.

   First clear the Jam then Restart the machine.

   (a) To Restart the machine from the *PosiWeave* Control push the **"RST"** touch-pad button (#11), turn the **"H-O-A"** switch (#2) CCW to **"Hand"** position to restart the motor. The machine may now be jogged. For Automatic Operation turn the **"H-O-A"** switch to "**Auto"**.

   (b) To Restart the machine from the Remote Station turn the switch CW to **"Reset"**. The motor should start. When the motor is up to speed turn switch CCW to **"Restart".** The machine should continue in its normal cycle.

   NOTE: Normally with this type of a jam the machine can start back in automatic, without losing a picket.

4. **Wire Jam Detection Stop at Cut-Off -** If the limit switch at the Cut-Off senses a jam in the wire the *PosiWeave* Control will stop the machine and shut off the motor. An **"E-11"** will show in the **"Trigger Point"** display (#13) and the red **"Fault"** LED will come on.

(a) First clear the Jam.

(1) If a picket was partially made, and is cleared out, zero the **Twist Counter** (#7) by pushing the **"Zero Twist"** button (#7A).

(2) If a picket was made and cleared out, remove one picket from the **Picket Counter** (#8) by turning the **"Set Count"** switch (#8A) CCW one turn to remove one picket.

(b) Restart the machine.

(1) To Restart the machine from the *PosiWeave* Control push the **"RST"** touch-pad button (#11), turn the **"H-O-A"** switch (#2) CCW to **"Hand"** position to restart the motor. The machine may now be jogged. For Automatic Operation turn the **"H-O-A"** switch to "**Auto"**.

(2) To Restart the machine from the Remote Station turn the switch CW to **"Reset"**. The motor should start. When the motor is up to speed turn switch CCW to **"Restart".** The machine should continue in its normal cycle.

NOTES: Due to the jam you may want to operate in Jog until the machine is operating properly. On the *PosiWeave* Control turn the **"H-O-A"** switch (#2) CCW to **"Hand"** position. Then use the **"Single Turn"** or **"Full Cycle"** jog switch (#4) to jog the machine until ready for Automatic Operation.

Before going to Automatic Operation, check the number of pickets and rolls. Adjust, if necessary, for defective pickets which were removed.

5. Roll Offset - If a setpoint was set in the roll offset section during setup, the machine will stop when this count is reached. The motor will turn off and **"END"** will show in the **"Position"** display.

(a) To Restart the machine from the *PosiWeave* Control push the **"RST"** touch-pad button (#11), turn the **"H-O-A"** switch (#2) CCW to **"Hand"** position to restart the motor. The machine may now be jogged. For Automatic Operation turn the **"H-O-A"** switch to "**Auto"**.

(b) To Restart the machine from the Remote Station turn the switch CW to **"Reset"**. The motor should start. When the motor is up to speed turn switch CCW to **"Restart".** The machine should continue in its normal cycle.

6. End of Roll - When the number of rolls set is completed the machine will stop and **"ROLL"** will show in the **"Position"** display.

(a) To Restart the machine from the *PosiWeave* Control push the **"RST"** touch-pad button (#11), turn the **"H-O-A"** switch (#2) CCW to **"Hand"** position to restart the motor. The machine may now be jogged. For Automatic Operation turn the **"H-O-A"** switch to "**Auto"**.

(b) To Restart the machine from the Remote Station turn the switch CW to **"Reset"**. The motor should start. When the motor is up to speed turn switch CCW to **"Restart".** The machine should continue in its normal cycle.

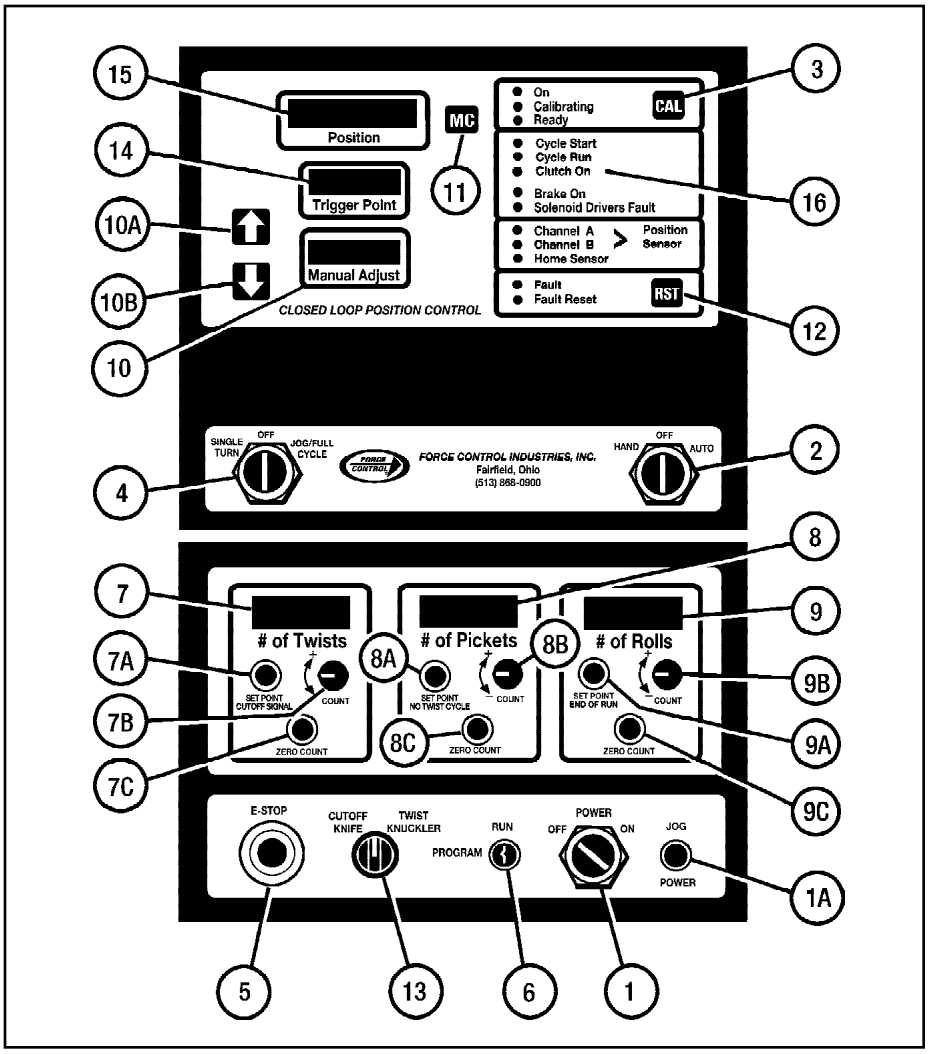


Figure 4.4 - PosiWeave Front Control Panel

Section 5
TROUBLESHOOTING

Troubleshooting of the ***PosiWeave*** system is greatly simplified due to the Indicator Lights and Error Codes built into the control.

Drive Will Not Run

1. **Is the power on to the control?**
   Turn Power on to the control.
   The "Power/Jog" switch should be lit.
2. **Is the main motor running?**
   Start the main motor.
3. **Is the "Ready" light on?**
   If not, the control needs to be calibrated. See Operation - Section 4.
4. **Is there an "Error Code" in the "Trigger Point" display?**

5-1 ERROR CODES

OFL/UFL (Displayed in Trigger Point Display)
Overflow/Underflow in arithmetic for error correction.

Correction:
(a) Swap "A" and "B" channel wires.

Error Code "*E-1*" - Solenoid driver overload. Usually caused by a short in the valve solenoid or wiring. Also control may have been turned on with remote station selector switch set to "Reset".

Correction:
(a) Change remote station selector switch from "Reset" to "Restart".

(b) Check and/or replace wiring.

(c) Check and /or replace valve or solenoid.

2. **Error Code "*E-2*"** - (Requires optional Over Temperature Switch in *Posidyne*.) Indicates an over temperature condition in the *Posidyne* Clutch/Brake Unit.

   Correction:
   (a) Check for overheating in the *Posidyne* and correct problem. (See *Posidyne* Service Manual)

3. **Error Code "*E-3*"** - Low air pressure (Requires optional Pressure Transducer in air system.

   Correction:
   (a) Check the air pressure with the optional Low Pressure Switch or Pressure Gauges on the Accumulator and correct any problems. (See *Posidyne* Service Manual)

4. **Error Code *"E-4"*** - Watchdog Timer expired.

   Correction:
   (a) Push "RST" Reset on front control panel.

   (b) If tripping continues, check #S4 Dip Switch settings.

5. **Error Code *"E-5"*** - Count set to equal 1 or 0. (Count cannot equal 1 or 0)

   Correction:
   (a) Reset Max Count to 120.

6. **Error Code *"E-6"*** - The counts required to stop is greater than the total cycle counts.

   Correction:
   (a) Channel A and B of encoder may be backwards. Swap A and B channel wires if necessary.

   (b) Increase the total cycle time or shorten the stopping time to be less than the total cycle.

7. **Error Code *"E-7"*** - High Speed Interrupt (Pulses per Second too high). Maximum allowable counts per second of Pulse Counter is 7200 counts per second.

   Correction:
   (a) Set ratio to 2X.

8. **Error Code *"E-8"* -** Calibration data invalid.

   Correction:
   (a) Control needs to be Re-Calibrated
   (See Section 4-2).

9. **Error Code *"E-9"*** - Mode changed to **OFF** while in motion or calibrating.

   Correction:
   (a) Turn **HOA** Switch to **Hand** or **Auto** Position.

10. **Error Code *"E-10"*** - Twists per Picket = 0

    Correction:
    (a) Reset number of Twists/Pickets.

11. **Error Code *"E-11"* -** Emergency Stop **(E-Stop)** or a Jam Limit Switch has been initiated.

This *E-11 Error Code* will be one of the most common error codes initiated. To clear an E-Stop error code the following procedure should be followed:

Correction:
(a) If the E-Stop button on the Control or Remote Station has been pushed it must be pulled out to be reset.

(b) Remove any wire jammed on the machine, if necessary. If a picket is removed push **"Zero Count"** button on the **"# of Twists"** display to re-zero the number of twists. If it was only a wire feed jam the picket may be ok. and the number of twists may not need to be changed.

(c) Push the **RST** button on the front panel to clear the control. The **"Ready"** Light should come on. If not, the control will need to be re-calibrated. (See Section 4-2).

(d) Turn the **HOA** Switch to **"Hand"**.

(e) **"Jog"** the machine. If the machine is operating correctly the **HOA** switch can be turned to **"Auto"**.

12. Error Code *"E-12"* - Undefined Model selected by Dip Switch.

Correction:
(a) Correct dip switch settings.

13. Error Code *"E-43"* - Stall Detection - Failure to start.

Correction.
(a) Check to be sure machine is not jammed.

(b) Check to be sure motor is running and *Posidyne* input rotating.

(c) Check air supply to control valve.

14. Error Code *"E-44"* - Stall Detection - Stall occurred while clutch was engaged.

Correction.
(a) Check to be sure machine is not jammed.

(b) Check to be sure motor is running and *Posidyne* input rotating.

(c) Check air supply to control valve.

15. Error Code *"E-50"* - Stack Overflow

Correction:
(a) Contact Force Control first then replace CPU board.

16. Error Code *"E-51"* - Stack Under flow

Correction:
(a) Contact Force Control first then replace CPU board.

17. Error Code *"E-52"* - Software Timer 0 Interrupt Request missing.

Correction:
(a) Contact Force Control first then replace CPU board.

18. Error Code *"E-53"* - Software Timer 1 Interrupt Request missing.

Correction:
(a) Contact Force Control first then replace CPU board.

19. Error Code *"E-54"* - Software Timer 2 Interrupt Request missing.

Correction:
(a) Contact Force Control first then replace CPU board.

20. Error Code *"E-55"* - Software Timer 3 Interrupt Request missing.

Correction:
(a) Contact Force Control first then replace CPU board.

21. Error Code *"E-56"* - Power Unsafe, or Manual Reset, or Watch Dog Timer timed out.

Correction:
(a) Reset error.

(b) Contact Force Control first then replace CPU board if problem persists.

22. Error Code *"E-80"* - Software changed, proceed at your own risk. *(E-Prom software was changed from one version to another.)*

Correction:
(a) Push **Reset** button on CPU board.

(b) Re-calibrate.

(c) First contact Force Control then replace CPU board if calibration does not fix problem.

23. Error Code *"E-81"* - Configuration trashed, default loaded.

Correction:
(a) Push **Reset** button on CPU board.

(b) Re-calibrate.

(c) First contact Force Control then replace CPU board if calibration does not fix problem.

24. Error Code *"E-82"* - Counters trashed, set to zero.

Correction:
(a) Push **Reset** button on CPU board.

(b) Re-calibrate.

(c) First contact Force Control then replace CPU board if calibration does not fix problem.

25. Error Code *"E-83"* - Saved position invalid, set to zero.

Correction:
(a) Push **Reset** button on CPU board.

(b) Re-calibrate.

(c) First contact Force Control then replace CPU board if calibration does not fix problem.

26. Error Code *"E-84"* - DIP Switch settings changed.

Correction:
(a) Push **Reset** button on CPU board.

(b) Re-calibrate.

(c) First contact Force Control then replace CPU board if calibration does not fix problem.

5-2 TROUBLE SHOOTING AREAS

Trouble shooting the ***PosiWeave*** is divided into (5) five areas based on the symptoms. The basic areas are:

A. DRIVE WILL NOT INDEX

B. DRIVE STOPS OUT OF POSITION (Same position each time.)

C. DRIVE STOPS OUT OF POSITION (Different position each time.)

D. DRIVE DOES NOT STOP

A. DRIVE WILL NOT INDEX

1. *PosiWeave* "ON" Light not on.

(a) Turn H-O-A switch to "HAND" or "AUTO"

(b) Check main power to control.

(c) Check the AC Fuse and the DC Fuse and replace if necessary.

2. "Ready" Light not on.

(a) Unit not calibrated. Run calibration cycle

(b) If control will not calibrate, continue check list.

3. "Fault" light on and "Error Code" in TRIGGER POINT Display.

(a) Push "RST" button on front control panel. If this does not correct the problem, push the "Fault Reset" button inside front cover. Then push the "RST" button on front control panel again

(b) If this does not clear the Fault, check the Error Codes in Section 4-2.

4. "Solenoid Driver Fault" light on.(Usually caused by a short in the wiring or a valve solenoid failure.) Also control may have been turned on with remote station selector switch set to "Reset".

(a) Change remote station selector switch from "Reset" to "Restart".

(b) Repair or replace solenoid valve or wiring.

5. "Cycle Start" light does not come on when signal is initiated. This indicates that the Control is not receiving a signal from the Start Timer.

(a) Check the timer output and wiring.

(b) Check Fuse #F9.

(c) Be sure correct input relay is installed.

(d) Check to be sure that voltage is being applied to relay.

6. "Cycle Run" light stays on continuously. Drive skips an index in high cycle applications. Indicates a new start signal was received before the drive completed the previous cycle. The control can not receive a new start signal until the previous cycle is complete. The "Cycle Run" light should turn off after each cycle.

To correct this problem:

(a) Reduce the Cycle Rate of the machine.

(b) Speed up the drive to reduce Cycle Time.

(c) Increase air pressure to reduce Cycle Time.

7. Motor not running.

(a) Check the drive motor, relay, fuses, motor starter and interlock. Correct any problem and restart.

8. Clutch does not engage.

(a) Check air pressure. (See All Products Catalog for Torque vs. Pressure Information.)

(b) Check the Solenoid Valve for proper operation and replace if necessary.

(c) Check the air lines for any leaks. Repair leaks or fittings.

(d) Check and drain the water out of the Accumulators.

9. Watchdog Timer times out and shuts off control.

(a) Push "RST" Reset on front panel. If tripping continues check Dip Switch setting.

B. DRIVE STOPS OUT OF POSITION (Same position each time.)

1. Caused by machine not aligned with the Home Position.

(a) Realign with the Home Position.

2. Caused by a setting in the Manual Adjust.

(a) Set Manual Adjust back to zero. **NOTE:** Manual Adjust will remain in the system even if the control is off, and is used when re-calibrated.

C. DRIVE STOPS OUT OF POSITION (Different position each time.)

1. Count or rotation does not equal the correct amount of rotation of the driven machine.

(a) Check count and ratio to assure that the number of revolutions at the Encoder equals the desired degree of rotation of the driven machine.

D. DRIVE DOES NOT STOP

1. Brake does not engage.

(a) Check air pressure. (See All Products Catalog for Torque vs. Pressure Information.)

(b) Check Solenoid Valve for proper operation and replace if necessary.

(c) Check air lines for leaks. Repair leaks or tighten fittings.

(d) Check and drain water out of the accumulators.

2. Brake on - light does not come on.

(a) Call factory.

5-3 COUNTING OR HOME PROBLEMS

A. Checking CLPC Control

Step 1 - Connector J5 Pin 9 to 10 voltage should measure the same as selected by Power Supply Jumper JP14. If voltage does not measure the same, remove the J5 connector and re-measure. If the voltage now is correct, the problem is in the cable or encoder itself.

Step 2 - If Optical encoder is used with an internal home (inside encoder), jumper X2 and X3 should both be set to DIF.

Step 3 - If Optical encoder is used with an external home (proximity switch or photo eye), jumper X2 should be set to SE and X3 should set to DIF.

Step 4 - If using an external home or a Magnetic encoder, JP14 power select should be set to 12V.

Step 5 - If Optical encoder is used with an internal home, JP14 power select should be set to 5V.

Step 6 - If A,B or HOME LEDs do not toggle when encoder is rotated, remove J5 connector and short pin 9 to pin 2. This should cause the home LED to toggle. Short pin 9 to pin 4 and 6. This should cause the A and B LEDs to toggle respectively. (Must have X2 and X3 jumpers set to SE for this test)

B. With Optical Encoder

Step 1 - Remove the encoder circuit board from the housing and pass a screwdriver through the sensor openings. This should make the corresponding LED (A,B or HOME) to toggle on and off

Step 2 - Check to be sure optical sensors are clean and there is no loose debris inside encoder housing. Look at inside of optical sensors for rubbing of encoder disk.

Step 3 - Install encoder circuit board back into housing and check to be sure encoder disk does not rub on sensors when shaft is rotating.

Step 4 - Check encoder symmetry (proper alignment of optical sensors). Very slowly rotate shaft in direction it normally rotates. When A and B encoder lights are off the A light should come on first. Then B light should also come on (A&B lights on). Then the A light should go off (B light on only). The B light should go off (no lights on). The amount of shaft rotation for each event to occur (change in which light(s) are on) should be approximately equal. If it is not approximately equal the circuit board needs to be returned for recalibration. If the sequence is backwards (position display will also count backwards) the A and B wires need to be swapped on J5 connector of power supply board.

Step 5 - Slowly rotate the encoder one full revolution and check position display that correct number of counts for the rotation is displayed.

C. With Magnetic Encoder

Step 1 - Remove the yellow quadrature sensor from the housing and pass a screwdriver over the sensor. This should make the corresponding LED (A or B) toggle on and off.

Step 2 - Remove the home sensor from the housing and pass a screwdriver over the sensor. This should make the Home LED toggle on and off.

Step 3 - Check the encoder housing for debris. Check encoder gear for damage.

Step 4 - Reinstall encoder gear and sensors. Be sure to follow instructions in manual for air gaps of sensors, alignment of home sensor, and alignment of encoder gear.

Step 5 - Slowly rotate the encoder one full revolution and check position display that correct number of counts for the rotation is displayed. If position display counts backwards the encoder A and B wires will need to be swapped.

5-4 STARTING PROBLEMS

A. Checking CLPC Control

Step 1 - When the start cycle input is activated, the LED above the solid state relay should turn on. If it doesn't, check the fuse to the right of the solid state module and/or replace the solid state module.

Step 2 - If the LED from above does light, verify that the Start Cycle LED on the front panel lights. If it does not, the problem is likely to be in the CPU board.

Step 3 - If the Start Cycle LED in the front panel lights, check to see if the Clutch On LED lights. If it does, the problem is likely to be in the air valve, air supply, or mechanical. If is does not, verify that the control has been calibrated (The Ready LED will be lit)

Step 4 - If the control is calibrated and the Clutch On LED does not light, the problem is likely to be in the CPU board.

5-5 CHECKING MEMBRANE SWITCHES IN DOOR OVERLAY

Step 1 - Remove overlay flexible circuit cable connector from CPU board.

One part of the flexible circuit cable near the connector has an area that has been widened. This is pin 1 on the connector.

Typical resistance when a membrane switch is closed is 100 ohms. The maximum closed contact resistance is 200 ohms.

Step 2 - Check each switch with an ohmmeter:

Pin 1 to pin 2 is RST button.
Pin 1 to pin 3 is CAL button.
Pin 1 to pin 4 is MC button.
Pin 1 to pin 5 is Up Arrow button.
Pin 1 to pin 6 is Down Arrow button.

If the closed resistance of any of the switches is over 200 ohms the overlay must be replaced.

5-6 MORE TROUBLESHOOTING FACTS

Drive indexes too far, position display does not match actual position, trigger point is same or lower than usual. ***(Suspect Encoder)***

Drive indexes too far, position display does match actual position, trigger point is higher than usual. ***(Suspect Air Valve)***

Note on Error E7 - A noisy set of contacts within the CLPC 24 VDC circuit path will indicate an E7 Error. Weavers are particularly susceptible since they all use the 24VDC for external interlock logic.

Section 6
GENERAL MAINTENANCE

6-1 VISUAL CHECKS

1. Check for wear and abrasion on all wire cables, hoses and drive belts. Replace if necessary.
2. Check for dirt build-up, loose tension and wear on all drive belts.
3. Check the oil level in the *Posidyne* Clutch/Brake Unit. Fill or drain as required.

(Air Actuated Clutch/Brake Only)

4. Check the air muffler on the control valve to see if it is dirty and plugged. Replace or clean with a suitable solvent as needed. *(See Figure 8.5)*
5. Check the air pressure on the accumulator tank pressure gauges. Adjust if necessary. *(See Figure 8.5)*

(Hydraulic Actuated Clutch/Brake Only)

6. Check the Vacuum Indicator to see if the Filter Element is dirty and clogged. Replace if required. *(See Figure 8.6)*
7. Check the hydraulic pressure to the brake and clutch ports. Adjust if necessary. *(See Figure 8.6)*

6-2 ACCUMULATOR TANKS

(Air Actuated Clutch/Brake Only)

Drain water out of the accumulator tanks daily, or as needed, to keep water out of the system. *(See Figure 8.5)* An automatic drain system can be installed if water is a serious problem. Contact the Force Control factory for specific information.

6-3 DRIVE COUPLINGS

Check the coupling alignment and the coupling locking elements to see if they are tight after the first hour of operation. Then periodically check them weekly or monthly as needed.

6-4 BELTS and PULLEYS

Inspect the drive belts and pulleys weekly for proper tension and any wear. Adjust tension as described in Section 7, if necessary. Check for any build-up of foreign material in the Pulley Grooves or on the V-Belts. **Any foreign material in the pulleys or on the belts will cause position problems and belt breakage.**

6-5 *Posidyne* CLUTCH/BRAKE LUBRICATION

(See Figure 6.1)

1. Check the fluid level in the *Posidyne* daily. The oil level should be at the mid point of the sight gauge with the motor turned off and look clean and red in color.
2. After 2 months of operation drain and refill the unit with new oil. **Mobil ATF 210 (Type F)** is recommended but **Mobil Multi-Purpose ATF** is acceptable. Change the oil every 6 months thereafter. Visually check the Sight Gauge and remove and clean if needed.

CAUTION

Open the disconnects to the Drive Motor before attempting to change the oil.

Do not overfill the Drive Unit. Excess oil will cause the unit to overheat.

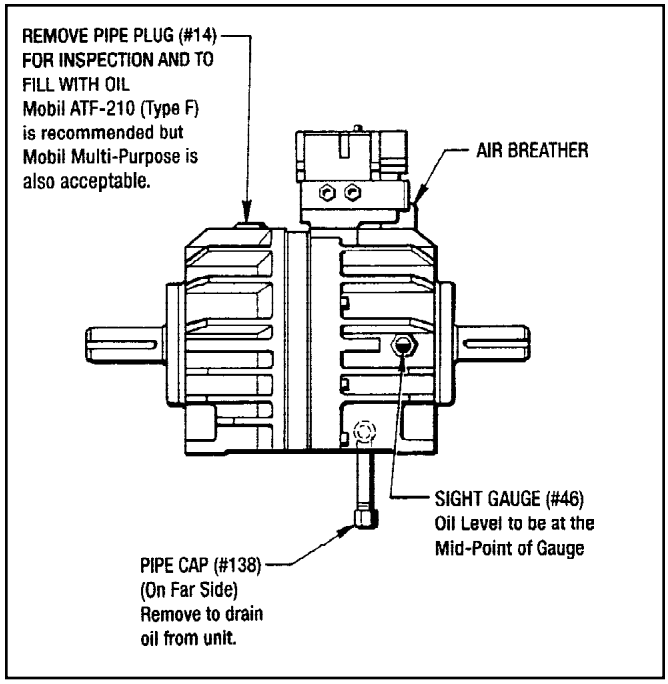


Figure 6.1 - Posidyne Lubrication

Section 7
REPAIR and REPLACEMENT

WARNING
Before attempting any repairs to the *PosiWeave* Drive Unit, shut off all electrical power and turn off the air supply. Lock them out to avoid any possibility of personal injury.

7-1 REMOVING *Posidyne* CLUTCH/BRAKE UNIT and POSITIONING ENCODER ASSEMBLY

1. First disconnect the (2) Air Hoses from the Control Valve (#900) on the Air Actuated Units. *(See Figure 8.5)*
2. Disconnect the Brad-Harrison Cable (#902) from the Control Valve (See Figure 8.5 for Air Actuated Units and Figure 8.6 for Hydraulic Actuated Units). Then disconnect the Brad-Harrison Cable (#259) from the Positioning Encoder Assembly. *(See Figure 8.4)*

A. Removing Belt Guard, Drive Pulley and Drive Belts *(See Figure 8.1)*

1. Take the bottom half of the Belt Guard (#515) off by removing (4) Screws (#474) and (4) Lockwashers (#487) from the sides of the Belt Guard and then sliding it down and out of the top half section.
2. Remove the (6) sheet metal screws from the sides of the top half of the Belt Guard (#515). Pull the front top half section off the back plate.
3. Loosen the belt tension enough so the (3) Drive Belts (#531) can be removed from the pulleys. This is done by loosening the top Nut (#462) and then tightening the bottom Nut (#462). This will raise the Drive Motor up and loosen the belt tension.
4. Take the Pulley (#510) and the Bushing (#526) off the *Posidyne* Input Shaft.
5. Take the Pulley (#519) and the Bushing (#525) off the motor shaft.
6. Remove (4) Screws (#473), (4) Lockwashers (#483), (4) Flat Washers (#486) and (4) Spacers (#580) from the top back plate of the Belt Guard (#515). Then remove the (2) Screws (#475), (2) Flat Washers (#489), (2) Lockwashers (#488) and (2) Nuts (#565). The top back plate can now be taken off the Drive Unit.

B. Coupling Disassembly and Grid Removal
(See Figure 8.1)

1. Take the Coupling Guard (#516) off by removing (4) Screws (#471) and (4) Lockwashers (#485).
2. Remove the Coupling Cover and Grid (#536). A round rod or screw driver that will fit into the open loop ends of the grid is required. *(See Figure 7.1)*. Begin at the open end of the grid section and insert the rod or screw driver into the loop ends. Use the teeth adjacent to each loop as a fulcrum and pry the grid out of the coupling teeth in even gradual stages, proceeding alternately from side to side.

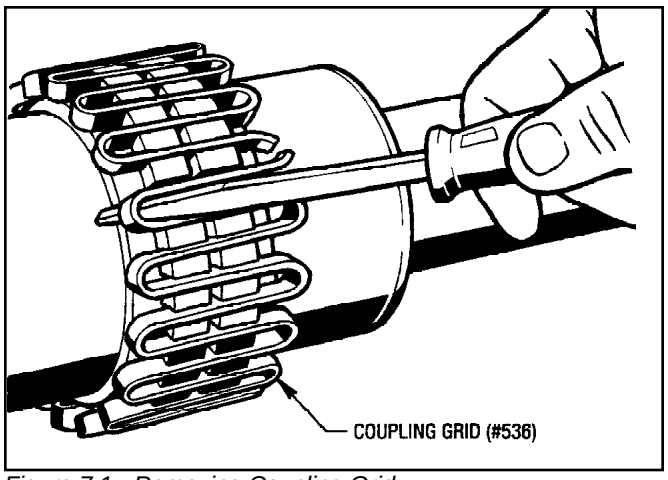


Figure 7.1 - Removing Coupling Grid

Next remove the *Posidyne* hold-down bolts (#468) and (4) Lockwashers (#483). With a soft sling and hoist lift the *Posidyne* off the Mounting Base (#461).

7-2 REMOVAL AND DISASSEMBLY OF DIFFERENTIAL LINE DRIVER ENCODER ASSEMBLY (Optical Encoder)
(See Figures 8.1 and 8.4)

1. The Coupling Hub (#534) and Locking Device (#541) must first be taken off the *Posidyne* output shaft. Loosen the clamping screws in the Locking Device and slide both the Coupling Hub and Locking Device off the output shaft.
2. Take out the (4) Screws (#225) and remove the Top Cover (#372) and the Upper Gasket (#19) from the Upper Enclosure (#18). This gasket is reusable.
3. Pull the Insulator (#373) up and out of the Upper Enclosure (#18).
4. Loosen the (2) captive screws in the Cable Connector (#368) and unplug it from the Circuit Board (#355) *(See Figure 7.2)*

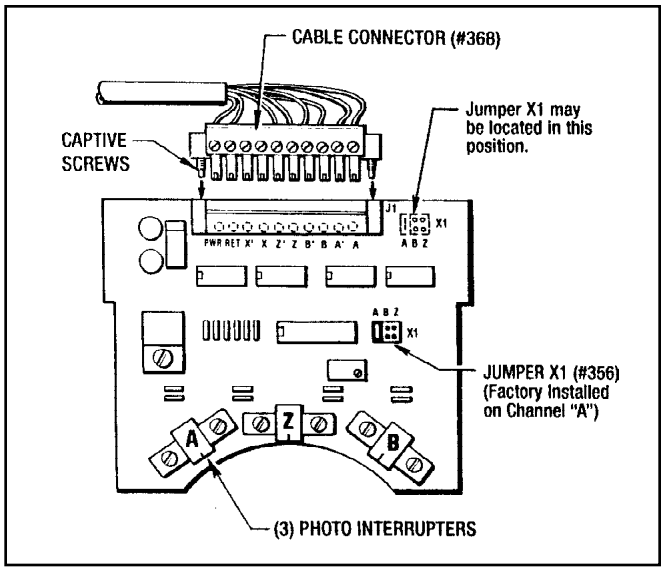


Figure 7.2 - Circuit Board Connector

5. Pull the Cable Grommet (#260), Cable (#259) and Cable Connector (#368) out of the Upper Enclosure (#18).
6. Remove the (2) Cap Screws (#77) and take the Upper Enclosure (#18) and Lower Gasket (#19) off the Disc Housing (#17). This gasket is also reusable.
7. Pull the Circuit Board (#355) straight up and out of the Disc Housing (#17).
8. Remove the (4) Screws (#76) and pull the Disc Housing (#17) off the *Posidyne* mounting face.

CAUTION:
Be careful not to bump or bend the Optical Disc (#186) which is still attached to the output shaft or damage the Dirt Seal (#269) in the Disc Housing (#17).

9. Loosen the Set Screw (#154) and pull the Optical Disc Assembly (#186) off the output shaft.
10. Remove the Key (#234) and the Spacer (#270) from the output shaft.
11. Check the Dirt Seal (#269) in the Disc Housing (#17) and remove it if necessary.

7-3 REASSEMBLY AND INSTALLATION OF DIFFERENTIAL LINE DRIVER ENCODER (Optical Encoder)

(See Figures 8.1 and 8.4)

1. First slide the Spacer (#270) on to the *Posidyne* output shaft as far as it will go. Install Key (#234) and slide the Optical Disc Assembly on to the output shaft butting it up against the Spacer (#270). (See Figure 7.3)
2. Tighten Set Screw (#154) and recheck the Disc Hub position on the output shaft.

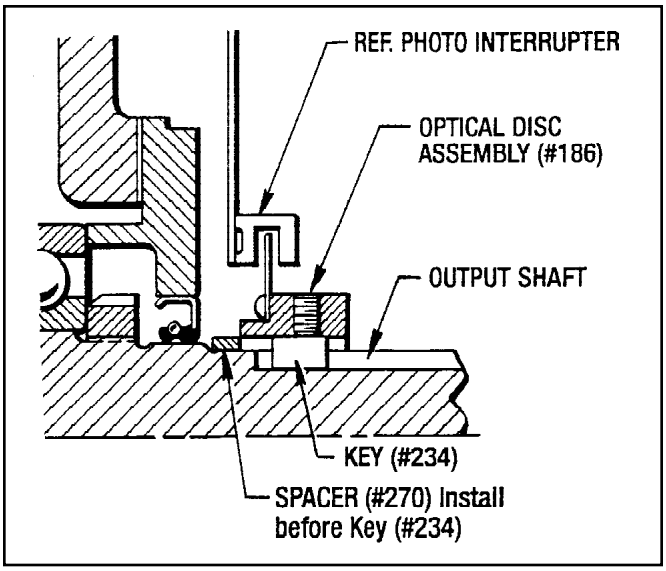


Figure 7.3 - Optical Disc and Hub Positioning

3. Apply a light coat of grease to the Disc Hub where the Dirt Seal (#269) rides.
4. If the Dirt Seal (#269) was removed then install it into the Disc Housing (#17).
5. Slide the Disc Housing (#17) on to the output shaft **being careful not to damage the Dirt Seal (#269) lip on the Optical Hub.** Attach with (4) Screws (#76). **Use Blue Loctite (#242) on the threads**.
6. Place the Gasket (#19) on top of the Disc Housing (#17).
7. Carefully insert the Circuit Board (#355) into the top of the Disc Housing , make sure the (3) Photo Interrupters straddle the Optical Disc. **Be sure that the Optical Disc does not rub the Photo Interrupters.** *(See Figure 7.3)*
8. While holding the Circuit Board (#355) upright slide the Upper Enclosure (#18) down over the Circuit Board (#355) on to the Disc Housing (#17) and Gasket (#19). *(See Figure 7.4)*

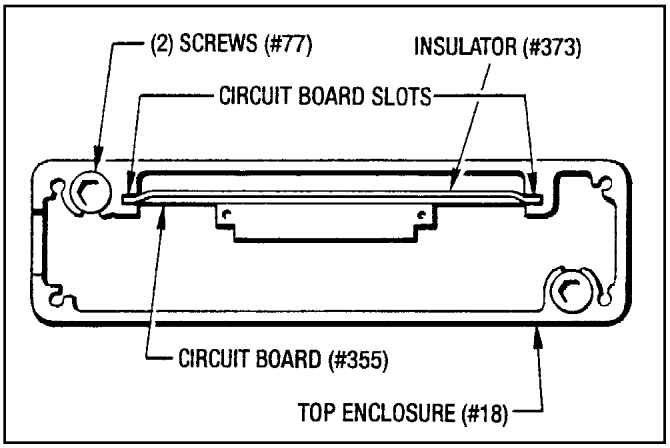


Figure 7.4 - Circuit Board Slots

9. Check the Gasket (#19) to see if it is still in place. Insert the (4) Screws (#77) and tighten down.
10. Slide the Insulator (#373) down an into the Upper Enclosure (#18) behind the Circuit Board (#355) placing the tabs into the circuit board slots. *(See Figure 7.4)*
11. Place the Cable Grommet (#260) and Cable (#259) into the upper slot and plug in the Cable Connector (#368) to the Circuit Board Connector.
12. Place the Top Gasket (#19) on the Upper Enclosure (#18) and attach the Top Cover (#372) with (4) Screws (#225).

7-4 REMOVAL and REPLACEMENT of MANIFOLD MOUNTED PNEUMATIC CONTROL VALVE

(See Figure 8.5)

(Air Actuated Posidyne Clutch/Brake Only)

A. Removal of Control Valve

1. Remove Control Valve (#900) by taking out (2) Screws (#305).
2. Check the (2) Seal Rings (#104) and replace if necessary.
3. Remove the Manifold (#298) by taking out the (4) Screws (#370) and (4) Lockwashers (#151).
4. Remove Gasket (#54) and discard.

B. Replacing the Control Valve

1. Put the Gasket (#54) on the *Posidyne* Output Housing. Use (Permatex #30) gasket sealant. **Use this sparingly and make sure that no sealant gets into the pressure ports.**
2. Attach Manifold (#298) with (4) Screws (#370) and (4) Lockwashers (#151).
3. Attach the Control Valve (#900) to the manifold with (2) Screws (#305). **Make sure the (2) Seal Rings (#104) are in place under the Control Valve and the Locating Tube (#297) is in the proper port of the Manifold (#298).**

7-5 REMOVAL and REPLACEMENT of HYDRAULIC CONTROL and RELIEF VALVES *(See Figure 8.6)*

(Hydraulic Actuation Only)

A. Control Valve

1. Disconnect the Brad-Harrison Cable (#902), if it is still connected, from the Control Valve (#387).
2. Take out (4) Screws (#358) and (4) Lockwashers (#359) and remove the Control Valve (#387).
3. To replace this Control Valve, just simply reverse the above steps.

B. Relief Valves

The System Relief Valve (#388) and the (2) individual Relief Valves (#400) are all cartridge type valves and can easily be replaced by just screwing out the old ones and replacing them with new ones.

7-6 REMOVAL and REPLACEMENT of HYDRAULIC PUMP and DRIVE COUPLING

(Hydraulic Actuation Only)

1. Disconnect Hydraulic Hoses (#170) and (#171) from the Hydraulic Pump (#389).
2. Take the removable cover off of the Mounting Adapter (#148) to gain access to loosen the set screw in the Coupling Hub (#752).
3. Remove the (2) Screws (#357) and (2) Lockwashers (#360) and pull the Hydraulic Pump (#389) out of the Coupling Hub (#752).
4. Take the Mounting Adapter (#148) off the Drive Motor by removing the (4) Screws (#305) and (4) Lockwashers (#360).
5. The Coupling Hubs (#752) and (#747) can now be separated and the Coupling Spider (#748) can be taken out.
6. Loosen the set screw in the Coupling Hub (#747) and pull it off the motor shaft.

Reassembly and Replacement of this Hydraulic Pump and Coupling is, again, just a reversal of the above (6) steps.

If further Disassembly of the *Posidyne* Clutch/Brake Unit is required then the Motor (#222), Mounting Brackets (#153), (#147) and (#149) will have to be removed. Also the Filter (#395) and related hoses and fittings should be removed.

For complete Disassembly and Reassembly instructions on the *Posidyne* Clutch/Brake Unit see manual #502-2.5-001.

7-7 MOUNTING *Posidyne* CLUTCH/BRAKE UNIT

(See Figure 8.1)

1. First the Coupling Hub (#534) and Locking Device (#541) has to be installed on the *Posidyne* output shaft. If the Coupling Hub (#535) and Taper Bushing (#540) was also removed from the Twist Bar Shaft at disassembly, they will also have to be reinstalled. *(See Figure 7.5)*

   Refer to the Manufacturer's Instruction Sheets located at the back of this manual for specific instructions on installation.

2. Set the *Posidyne* Unit on the Mounting Base (#461) with a soft sling and overhead hoist.

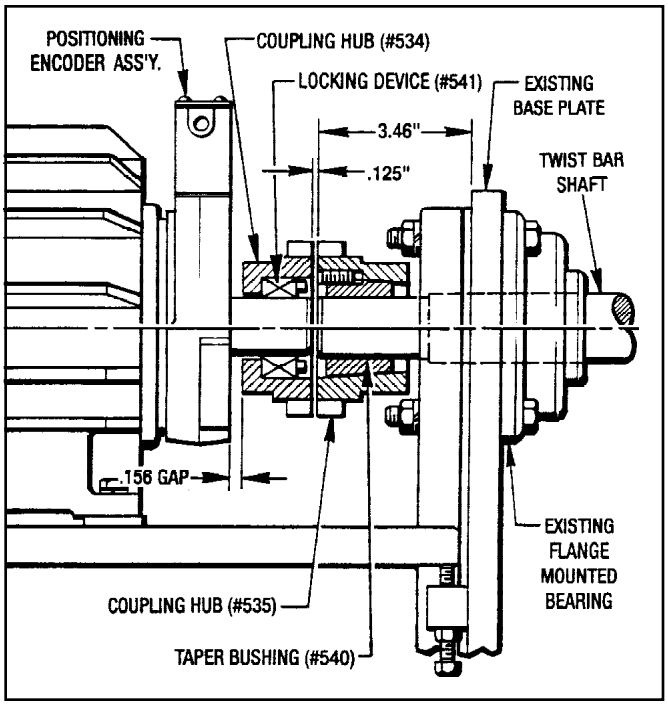


Figure 7.5 - Coupling Installation

NOTE:

Make sure the mounting surfaces are clean and free of any foreign material.

3. Attach the *Posidyne* Unit with (4) Screws (#468) and (4) Lockwashers (#483).
4. Check Coupling Alignment and Position as specified in **Section 2-1 Installation of Drive Base** and as shown in *Figure 7.5.*
5. Attach the Coupling Guard (#516) with (4) Screws (#471) and (4) Lockwashers (#485).

7-8 INSTALLING DRIVE PULLEYS, BELTS and BELT GUARD *(See Figure 8.1)*

1. Attach the top back plate of the Belt Guard (#515) back on the Drive Unit with appropriate spacers, screws, washers and nuts as shown in *Figure 8.1*.
2. Mount the Bushing (#526) and Pulley (#520) onto the *Posidyne* output shaft and the Bushing (#525) and Pulley (#519) onto the motor shaft.

   Be sure the Pulleys are properly aligned with each other. (See *Figure 7.6* for alignment procedure.)
3. Place the (3) Drive Belts (#531) on the Pulleys and re-tighten the belts by lowering the drive motor. This is done by loosening the bottom Nut (#462) and tightening the top Nut (#462). Adjust belt tension to specifications shown in *Figure 7.7.*
4. Mount the front top section of the Belt Guard (#515) to the top back plate with the (6) sheet metal screws located in the side panels.
5. Push the bottom section of the Belt Guard (#515) up and attach with (4) Screws (#474) and (4) Lockwashers (#487).

Reconnect the Brad-Harrison Cables to the Positioning Encoder and the Control Valve.

(Pneumatic Actuated Drive Unit Only)

Connect the (2) air hoses from the Accumulator Tank Assembly to the Manifold Mounted Control Valve.

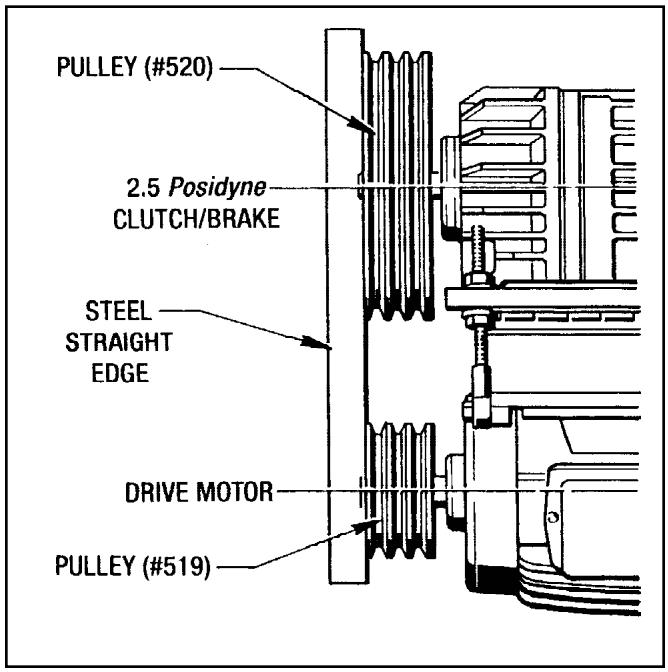


Figure 7.6 - Pulley Alignment

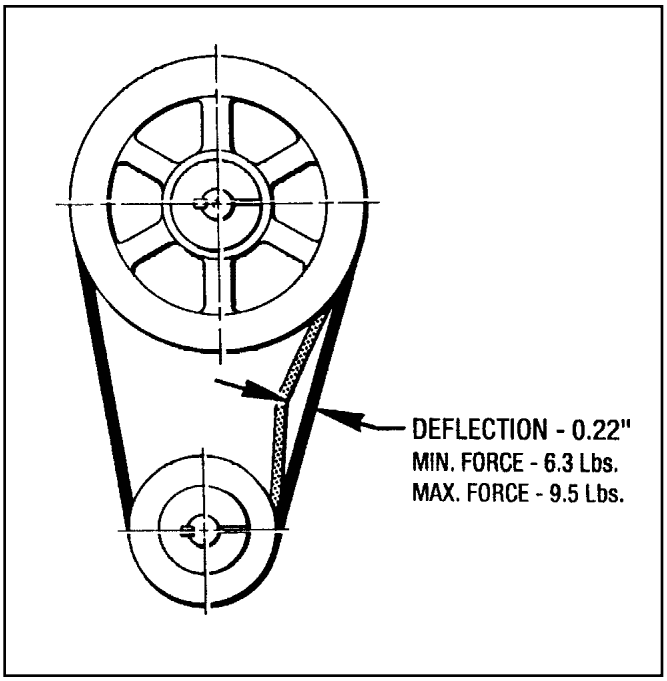


Figure 7.7 - Drive Belt Tension

7-9 REPLACING CIRCUIT BOARDS

(See Figure 7.8)

A. Power Supply Board

1. Disconnect the Terminal Strip Connectors #J1, #J2, #J3, #J4, #J5 and the Flat Wire Connector.

NOTES:

1. Pull down to unplug #J1 to #J4. and pull straight out to unplug #J5.

2. There are release tabs on the ends of the Flat Wire Connector. Pull the tabs out and pull up on the connector to unplug it.

2. Disconnect the Transformer Connector by squeezing the end tabs and pulling it up.
3. Remove the (4) #10-32 Phillips Head Screws from the Transformer and pull it off the board.
4. Take the (6) #10-32 Phillips Head Screws out of the Power Supply Board, leaving the bottom middle screw until last. Remove the Power Supply Board from the control box.

To Reinstall a new Power Supply Board just reverse these steps. Put the bottom middle screw in first and proceed.

B. CPU Board

1. Unplug the Flat Wire Connector from the bottom right hand corner of the CPU Board.
2. Remove the (6) #8-32 Kep-Nuts with a 11/32" Nut Driver.
3. Lift the board off the threaded studs and let it rest on the two large switches. With a small 1/8" screw driver, unplug the Flat Wire Connector on the component side of the CPU Board.
4. Unplug the two remaining Connectors at the bottom of the CPU Board.

NOTES:

1. The connector on the right hand side has a release tab. Push the tab to unplug the connector.

2. The connector on the left is a pull-off type and has no release tabs. **Be very careful not to crimp or bend the green flat wire cable when unplugging this connector.**

5. The CPU Board can now be removed from the control box.

To reinstall a new CPU Board, just reverse the removal procedure.

C. Weaver Board

1. Remove the (7) #8-32 Kep-Nuts with the 11/32" Nut Driver.
2. Starting at the top of the Weaver Board, pull it off of the threaded studs to approx. 6" at the top.
3. With a 1/8" screw driver, unplug the Flat Wire Cable Connector, which is on the component side of the board.
4. Unplug the 10-Pin Connector #J6 from the bottom of the Weaver Board.
5. Rotate the board approx. 90° down and lift up to expose the (5) 8-pin Connectors #J1 to #J5 at the bottom of the board. Each of these connectors has a release tab that has to be squeezed to unplug them.
6. Remove the Weaver Board from the control box.

To reinstall a new Weaver Board, just reverse the removal procedure.

7-10 REPLACING THE SOLID STATE RELAYS AND THE MECHANICAL RELAYS

(See Figure 7.8)

1. The (5) Mechanical Relays located on the Lower Relay Panel has a standard 8-Pin Female Socket Receptacle with a locating keyway. Just pull the old one out and plug in the new one aligning the key with the keyway in the receptacle base.
2. The (3) Solid State Relays #SSR1, #SSR9 and #SSR11 each has a retaining screw to hold it to the circuit board. Loosen this screw and pull straight up to remove the relay.

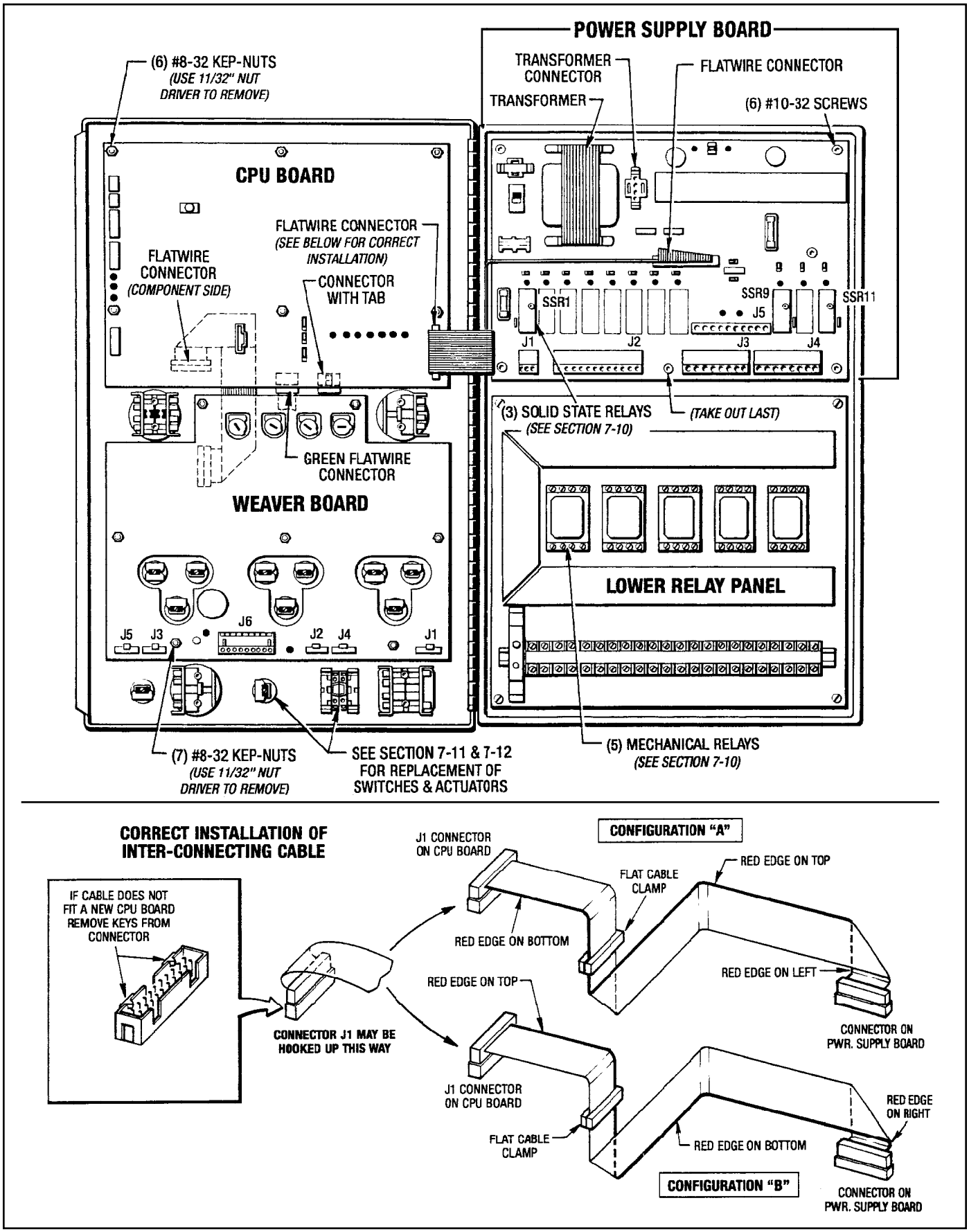


Figure 7.8 - Replacing Circuit Boards

7-11 REPLACING ACTUATORS and SWITCHES

(See Figure 7.9)

The procedure given is for all of the small push button and rotary switches, which also includes the "Run-Program" key switch.

A. Replacing a Burned Out Bulb

There is a small Light Bulb (#20) in the (3) "Set Point" push buttons and also the "Jog- Power" push button/indicator.

1. With a small screw driver pry out the plastic yellow or green cap (#16 or #17).
2. Insert the Bulb Extractor (#20A) over the bulb. Twist and jiggle the bulb until it comes loose.

B. Replacing an Actuator or Switch

1. In the rear of each Switch Actuator there is a locking cam that holds the switches in place. With a small screw driver rotate the cam 90° CCW.
2. Slide the Switch backwards off the Actuator.
3. Take the Locking Nut off the Actuator.
4. Pull the Switch Actuator out the front side of the control panel.

7-12 REPLACING "CUTOFF KNIFE/TWIST KNUCKLER" ROTARY ACTUATOR SWITCH - "D"

(See Figure 7.10 and 8.9)

A. Replacing Switches

1. Place a small screw driver under the top switch locking tab on the Switch Base (#23) and pry down to release the Switch (#24).
2. Pull the switch up and off the bottom locking tab. There are (2) switches and the procedure is the same for both.

   To replace, just push the switch into place. They easily snap into the locking tabs

B. Replacing Switch Base and Actuator

3. To remove the Switch Base (#23) from the Rotary Actuator (#22), insert a 3/16" Dia. screw driver into the metal locking tab located at the top of the Switch Base. **Pry up** with the screw driver.
4. Pull the Switch Base (#23) off the Rotary Actuator (#22).

   CAUTION:

   Do not push down on the screw driver. This can break off the plastic switch locking tabs.

   To install the Switch Base (#23), just push the Switch Base on to the Rotary Actuator barrel. The Switch Base will snap into place.

5. To replace the Rotary Actuator (#22), just remove the locking nut and the square retaining washer. Push the Rotary Actuator out the front of the panel. The Knob (#21) can also be replaced. It just unscrews from the Actuator.

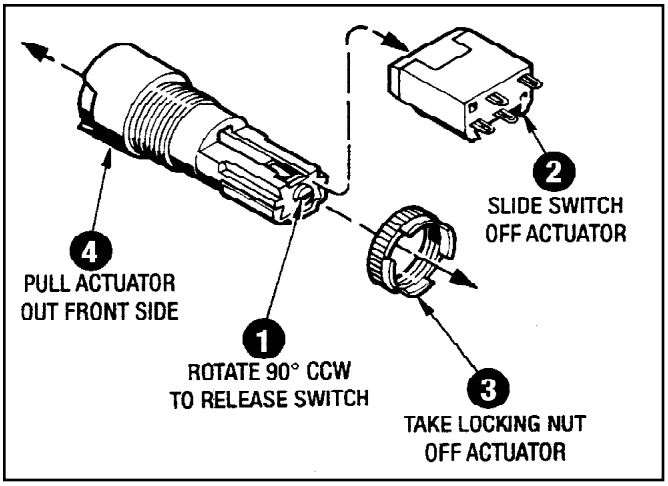


Figure 7.9 - Replacing Actuators and Switches

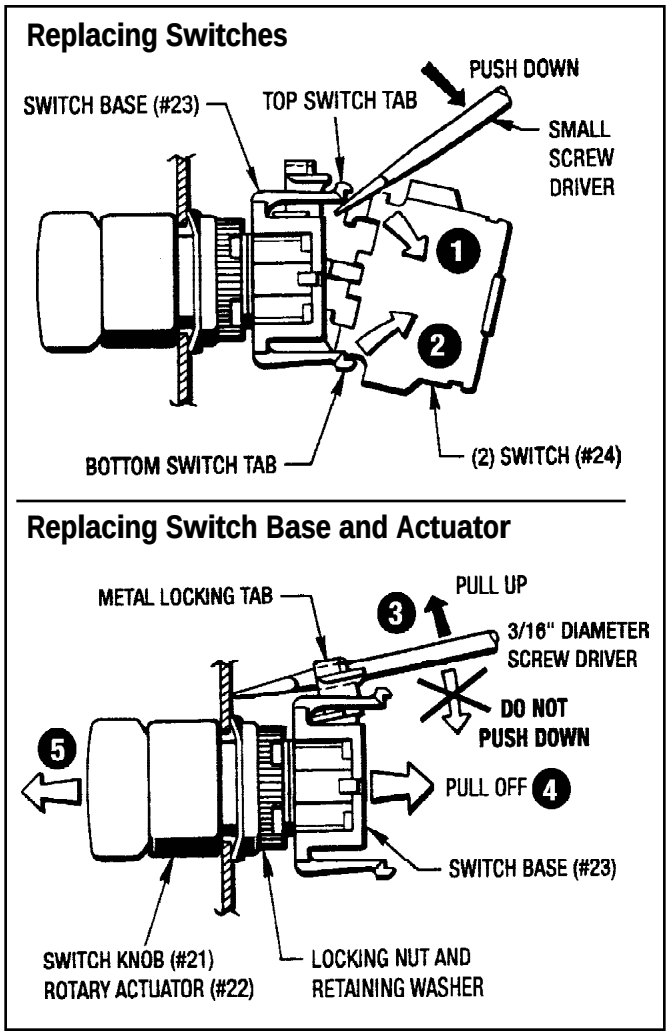


Figure 7.10 - Replacing "Cutoff Knife/Twist Knuckler" Switch

Section 8
ORDERING REPAIR PARTS

8-1 GENERAL INFORMATION

This section illustrates, lists and describes all available Repair Parts for the Force Control *PosiWeave* Drive. Exploded views with numbers are used to identify the various parts in the Drive Unit. These numbers are listed in the parts list along with the part name and quantity used.

8-2 FACTORY RE-BUILD SERVICE

Re-conditioning service is offered by Force Control Industries at the factory. Before returning a unit for this service, be sure to first contact the Force Control Industries Service Sales Dept. for authorization and shipping instructions. Force Control Industries cannot be responsible for units returned to the factory without prior notice or authorization.

Care must be given to the packaging of returned drives. Always protect mounting feet by attaching to a skid. Shipment-damaged drives always delay repairs. When possible, describe the problem experienced on your shipping papers.

SHIPPING ADDRESS:

Force Control Industries, Inc.
3660 Dixie Highway
Fairfield, Ohio 45014
Telephone: (513) 868-0900
Fax: (513) 868-2105

8-3 DRIVE MOTORS

The motors used with these Drive Units are standard and may be repaired or replaced by any qualified motor rebuild facility or supplier.

8-4 ORDERING REPAIR PARTS

When ordering replacement parts, please specify all of the following information:

1. *Posidyne* Drive Model Number. (On name plate located on the drive housing.
2. *Posidyne* Drive Serial Number. (On name plate located on the drive housing.)
3. *PosiWeave* Control Model Number. (On name plate located inside the control box.)
4. *PosiWeave* Control Serial Number. (On name plate located inside the control box.)
5. Software Version Number. (This Number will be briefly displayed in the "Trigger Point" Display when the control is first turned on.)
6. Part Reference Number. (On explode and parts list.)
7. Part Name. (On parts list.)
8. Quantity. (On parts list.)
9. Complete shipping Information.

Failure to include information for items 1 through 9 will only delay your parts order. Unless another method is specified for item 6, parts less than 70 pounds will be shipped United Parcel Service, parts over 70 pounds will be shipped motor freight. Air freight and other transportation services are available, but only if specified on your order

***Posidyne* Name Plate.**

***PosiWeave* Name Plate**

Repair Parts List - Figure 8.1
PosiWeave MAIN DRIVE ASSEMBLY

REF No.	PART NAME	QTY.	REF No.	PART NAME	QTY.
461	Mounting Base	1	488	Lockwasher	6
462	Hex Nut, 5/8"-18	2	489	Flat Washer, 1/4"	2
463	Hex Nut, 1/2"-13	4	505	Motor Base	1
464	Hex Nut, 5/16"-18	2	512	Hinge	1
465	Threaded Rod	1	513	Rod End	1
466	Low Hd. Cap Screw	10	515	Belt Guard	1
467	Hex Hd. Cap Screw	4	516	Coupling Guard	1
468	Hex Hd. Cap Screw	4	517	Bracket	2
469	Hex Hd. Cap Screw	4	518	Jackscrew Block	2
470	Hex Hd. Cap Screw	2	519	Pulley	1
471	Hex Hd. Cap Screw	4	520	Pulley	1
472	Hex Hd. Cap Screw	1	525	Bushing, Pulley	1
473	Hex Hd. Cap Screw	4	526	Bushing, Pulley	1
474	Self Tapping Screw	10	531	Vee Belt	3
475	Soc. Hd. Cap Screw	2	534	Coupling, Hub	1
476	Soc. Hd. Cap Screw	2	535	Coupling, Hub	1
481	Flat Washer, 5/8"	5	536	Coupling Cover and Grid	1
482	Lockwasher, 5/8"	2	540	Taper Bushing	1
483	Lockwasher, 3/8"	12	541	Locking Device	1
484	Lockwasher, 1/2"	4	564	Eye Bolt	2
485	Lockwasher, 1/4"	4	565	Hex Nut, 1/4"-20	4
486	Flat Washer, 3/8"	8	580	Spacer	4
487	Lockwasher, External Tooth	4			

PosiWeave MAIN DRIVE ASSEMBLY

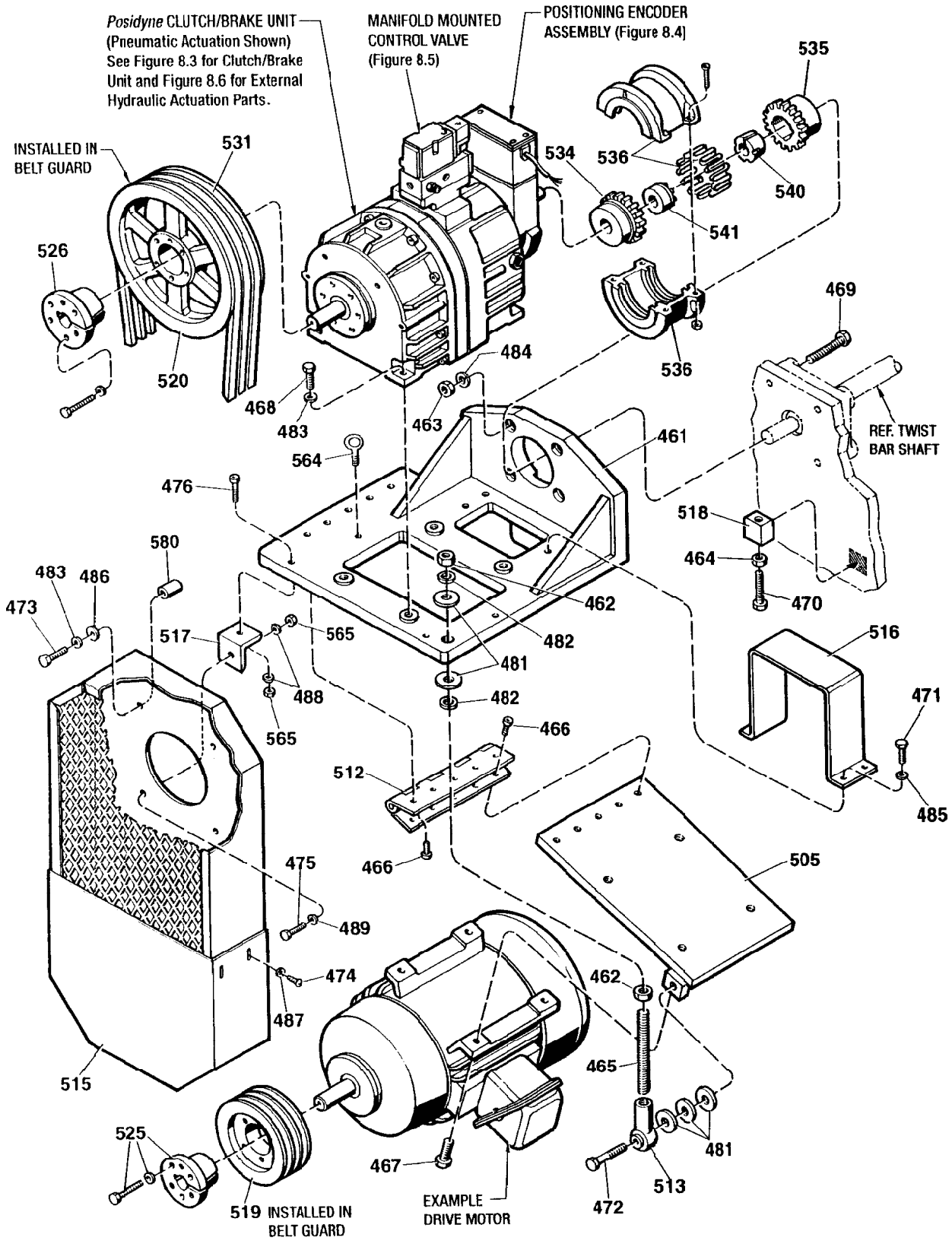


Figure 8.1 - Main Drive Assembly

Repair Parts List - Figures 8.2 & 8.3
2.5 *Posidyne* CLUTCH and BRAKE UNIT
INPUT HOUSING SUB-ASSEMBLY

REF No.	PART NAME	QTY.	REF No.	PART NAME	QTY.
1	Output Shaft	1	*43	Liner, O.D. Sealing	1
2	Input Shaft	1	**45	Breather	1
3	Piston	1	**46	Sight Gauge	1
**5	Thrust Plate, Clutch	1	*51	Gasket	1
7	Bearing Retainer, Input	1	*53	Gasket	1
8	Input Housing	1	*55	Gasket	2
9	Output Housing	1	62	Soc. Hd. Cap Screw	4
11	Piston Retainer	1	63	Soc. Hd. Cap Screw	12
*12	Friction Disc	7	64	Soc. Hd. Cap Screw	4
*13	Drive Plate		68	Dowel Pin	2
	Air Actuated Unit	8	69	Soc. Hd. Cap Screw	10
	Hyd. Actuated Unit	4	72	Pipe Plug	1
14	Pipe Plug, 1" NPT	2	73	Pipe Plug	1
16	Bearing Retainer (Air Actuated Unit)	1	74	Pipe Plug	2
*26	Bearing, Input	1	90	Reducer Bushing	1
*27	Bearing	1	97	Brake Pressure Plate	1
*28	Pilot Bearing	1	122	Dowel Pin	2
30	Roll Pin (Hyd. Actuated Unit)	1	127	Lockwasher	10
*31	Oil Seal	2	128	Lockwasher	4
**34	Locknut	2	136	Pipe Nipple (Air Actuated Unit)	2
*35	Bearing, Output	1	137	Elbow (Air Actuated Unit)	1
*38	Bearing	1	138	Pipe Cap (Air Actuated Unit)	1
*39	O-Ring	2	180	Key, Input Shaft	1
*40	O-Ring	2	*269	Drive Plate (Hyd. Actuated Unit)	4
*42	Liner, I.D. Sealing	2	329	Bearing Retainer (Hyd. Actuated Unit)	1

* - Indicates parts in Minor Overhaul Kit.
** - Indicates parts in Major Overhaul Kit. (Plus all parts in Minor Overhaul Kit)
AR - As Required

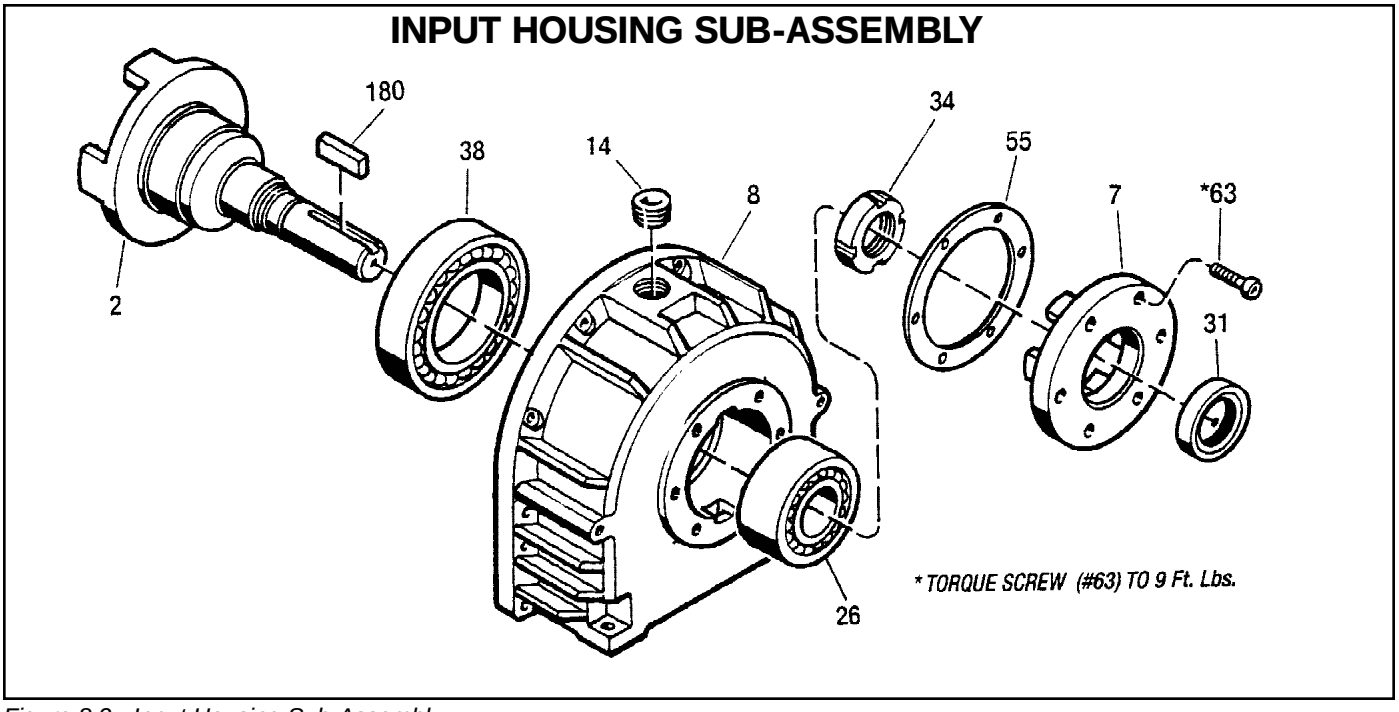


Figure 8.2 - Input Housing Sub-Assembly

2.5 *Posidyne* CLUTCH/BRAKE UNIT

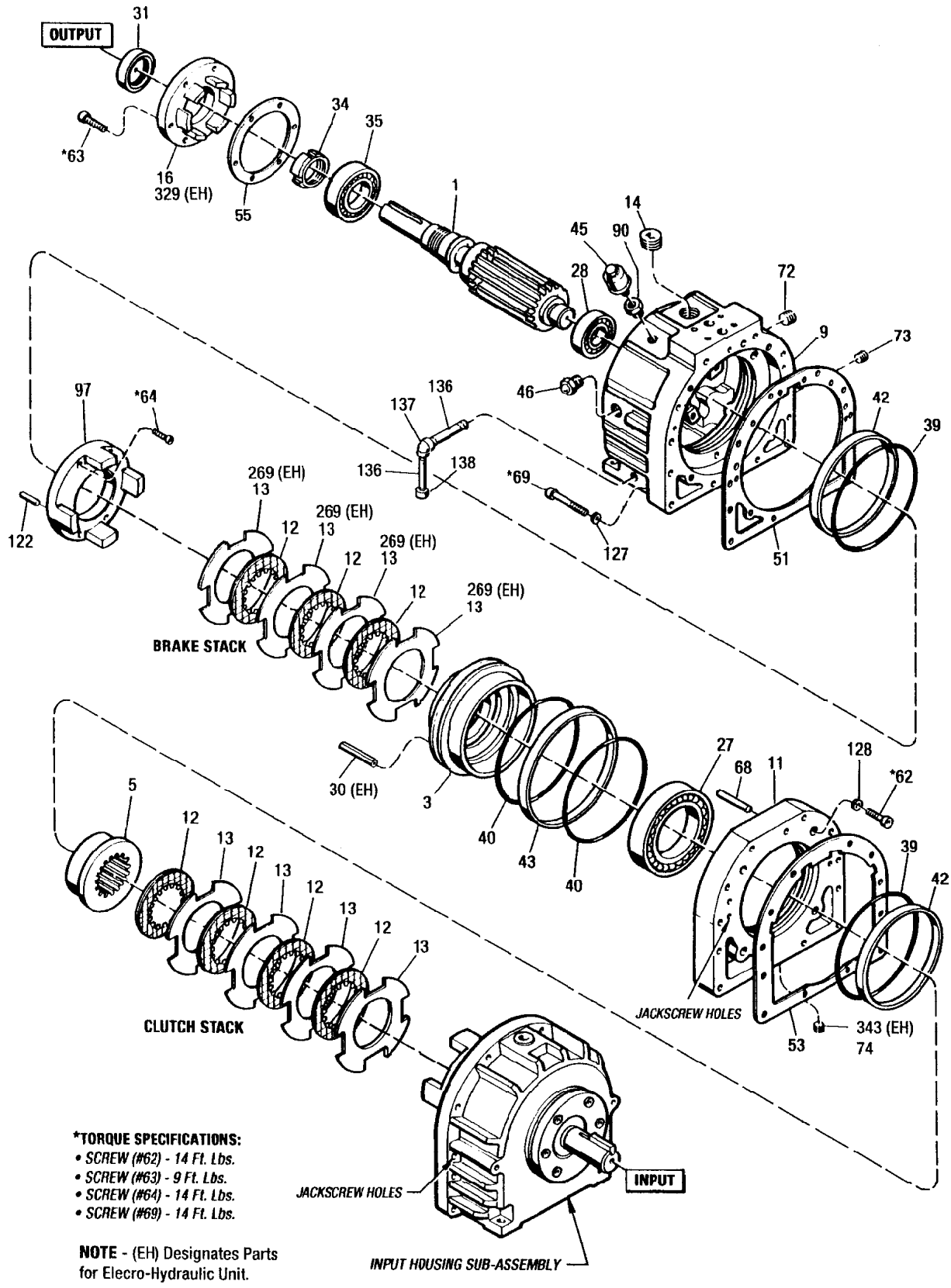


Figure 8.3 - 2.5 Posidyne Clutch and Brake Unit

Repair Parts List - Figure 8.4 (Top)
PosiWeave DIFFERENTIAL LINE DRIVER ENCODER (Optical)

REF No.	PART NAME	QTY.	REF No.	PART NAME	QTY.
17	Disc Housing	1	259	Cable	1
18	Upper Enclosure	1	260	Cable Grommet	1
19	Gasket	2	269	Dirt Seal	1
76	Screw	4	270	Spacer	1
77	Screw	2	355	Circuit Board	1
154	Set Screw	2	356	Jumper	1
186	Optical Disc Assembly	1	368	Cable Connector	1
225	Screw	4	372	Top Cover	1
234	Key	1	373	Insulator	1

Repair Parts List - Figure 8.4 (Bottom)
PosiWeave CUT-OFF ACTUATOR ASSEMBLY

REF No.	PART NAME	QTY.	REF No.	PART NAME	QTY.
479	Soc. Hd. Cap screw, 3/8"	2	506	Base Plate	1
480	Soc. Hd. Cap screw, 1/4"	4	514	Bracket	1
481	Soc. Hd. Cap screw, 1/4"	4	515	Bushing	1
482	Soc. Hd. Cap screw, 5/16"	1	559	Cotter Pin	1
490	Flat Washer, 1/4"	4	562	Clevis Pin	1
491	Lockwasher, 3/8"	2	581	Nut, 5/16", Self Locking	1
492	Lockwasher, 1/4"	8	605	Solenoid Cover	1
493	Lockwasher, 5/16"	2	620	Solenoid	1
494	Flat Washer, 5/16	1	630	Cable	1
498	Crank	1	640	Cable Connector	1

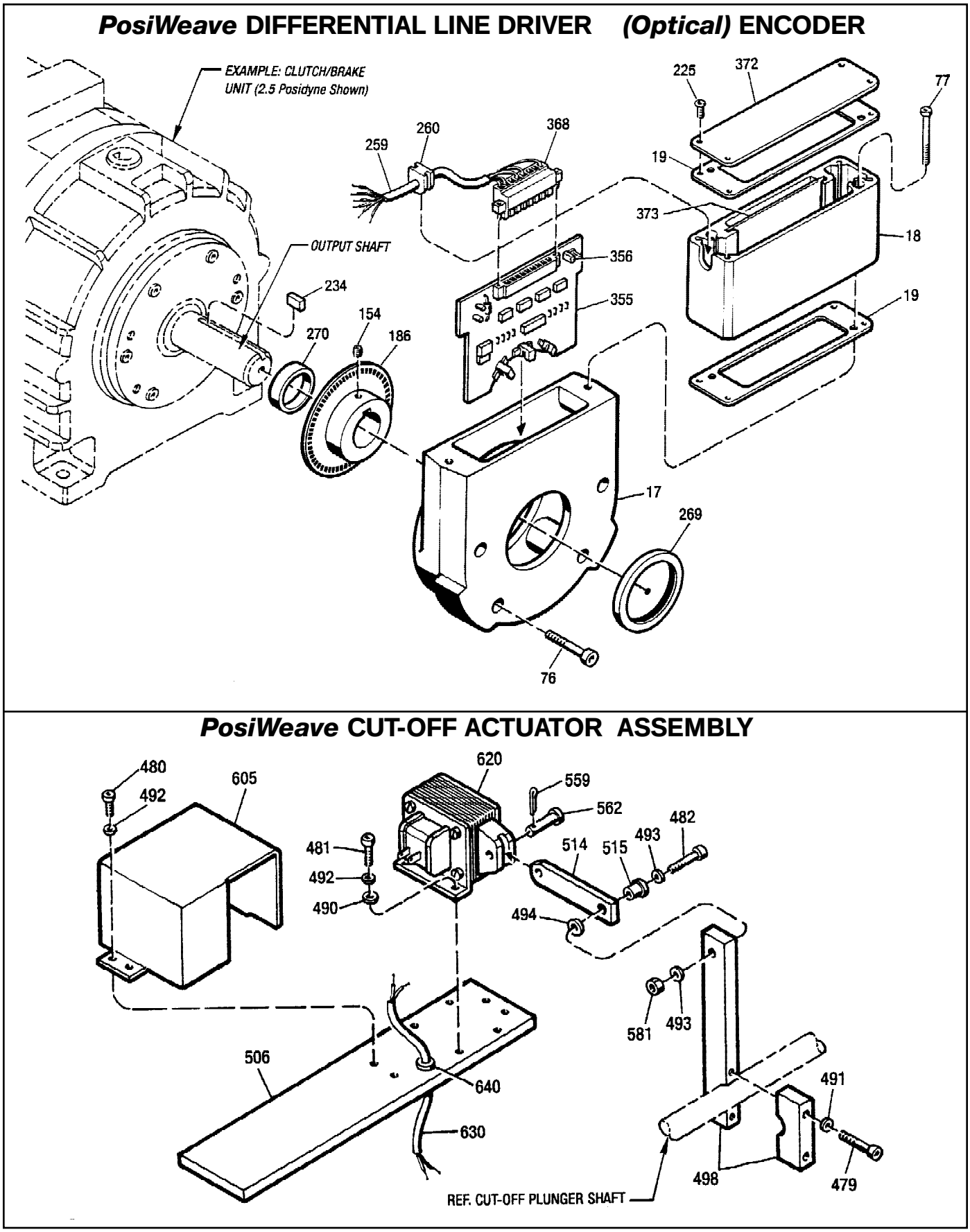


Figure 8.4 - Differential Line Driver Encoder and Cut-Off Actuator Assembly

Repair Parts List (Figure 8.5)
PosiWeave PNEUMATIC ACTUATION

REF No.	PART NAME	QTY.	REF No.	PART NAME	QTY.
*54	Gasket	1	424	Hose Fitting	2
*104	Seal Ring	2	436	Pipe Nipple, 1-1/2" x 10"	2
151	Lockwasher	4	437	Bell Reducer	4
297	Locating Tube	1	438	Reducer Bushing, 1/2" x 3/8"	2
298	Manifold	1	439	Pipe Nipple, 3/8" Close	4
305	Soc. Hd. Cap Screw	2	440	Reducer Bushing, 1/2" x 1/8"	2
370	Soc. Hd. Cap Screw	4	442	Pipe Union, 3/8"	2
401	Drain Cock	2	444	Reducer Bushing, 1/4' x 1/8"	2
405	Regulator	2	445	Pipe Nipple, 1/8" NPT	2
*406	Bronze Muffler	1	446	Pipe Elbow, 1/8" NPT	2
407	Pressure Gauge	2	496	Pipe Clamp	4
410	Hose	2	507	Mounting Base	1
421	90° Swivel Adapter	1	900	Control Valve	1
422	Straight Swivel Adapter	1	901	Receptacle, 4 Pin	1
423	Hose Fitting	2	902	Brad Harrison Cable	1

* - Indicates parts in the Minor Overhaul Kit.

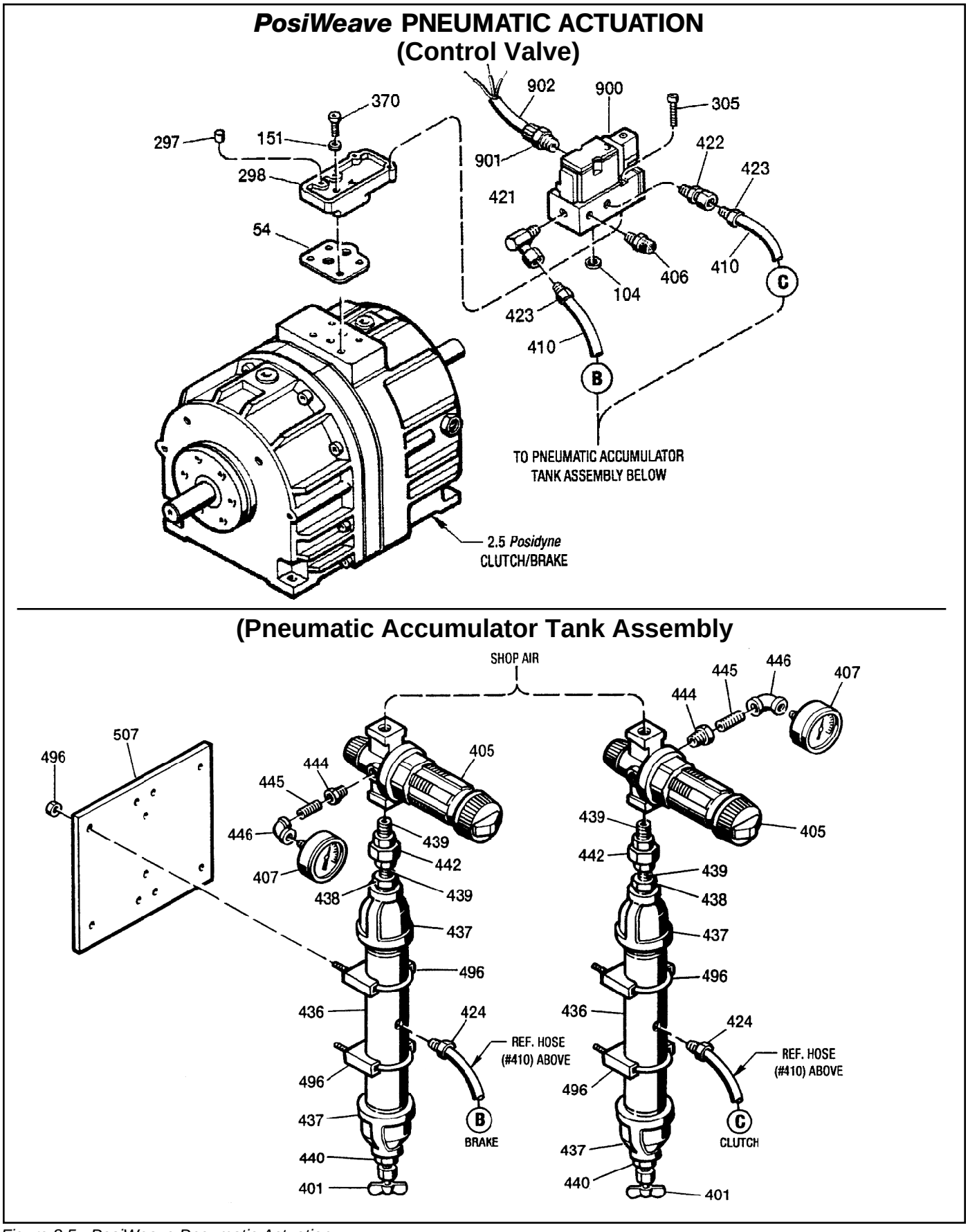


Figure 8.5 - PosiWeave Pneumatic Actuation

Repair Parts List (Figure 8.6)
PosiWeave HYDRAULIC ACTUATION

REF No.	PART NAME	QTY.	REF No.	PART NAME	QTY.
76	Soc. Hd. Cap Screw	4	198	Soc. Hd. Cap Screw	4
*103	O-Ring	1	222	Baldor Motor, 1 H.P.	1
*104	O-Ring	4	254	Threaded Rod	4
105	Valve Manifold	1	255	Flat Hd. Cap Screw	4
131	Pipe Plug, 1/8"	1	257	Lockwasher, 1/2"	8
137	Pipe Plug, 1/4"	1	262	Hex Hd. Cap Screw	4
139	Pipe Plug, 1/8"	2	264	Flat Washer	AR
142	90° Street Elbow, 1/2"	1	305	Hex Hd. Cap Screw	4
143	90° Street Elbow, 1/4"	1	327	Pressure Gauge	2
147	Bracket, Motor Mounting - I.P.	1	357	Hex Hd. Cap Screw	2
148	Mounting Bracket, Pump and Motor	1	358	Soc. Hd. Cap Screw	4
149	Bracket, Motor Mounting - O.P.	1	359	Lockwasher, #10	4
152	Hex Nut, 1/2" - 13	8	360	Lockwasher, 3/8"	6
153	Motor Mounting Base	1	361	Lockwasher, 5/16"	4
156	Pipe Nipple, 1/2" x 3"	1	370	Soc. Hd. Cap Screw	2
165	Bracket, Filter Mounting	1	371	Lockwasher, 1/4"	3
166	Special Pipe Plug	1	373	Soc. Hd. Cap Screw	1
169	Hydraulic Hose	1	387	Control Valve	1
170	Hydraulic Hose	1	388	Relief Valve	1
171	Hose Fitting	1	389	Hydraulic Pump	1
172	Hose Fitting	2	395	Filter Assembly	1
173	Hose Fitting	1	396	Vacuum Indicator	1
174	Swivel Adapter	1	400	Sun Relief Valve	2
175	Swivel Adapter	1	747	Coupling Hub, Motor	1
177	90° Street Elbow, 1/4"	1	748	Coupling Spider	1
178	Reducer Bushing, 3/4" x 1/2"	3	752	Coupling Hub, Pump	1
179	Reducer Bushing, 3/4" x 3/8"	1	901	Receptacle, 4 Pin	1
182	Lockwasher, #10	4	902	Brad-Harrison Cable	1

* - Indicates parts in the Minor Overhaul Kit.
AR - As Required.

PosiWeave HYDRAULIC ACTUATION

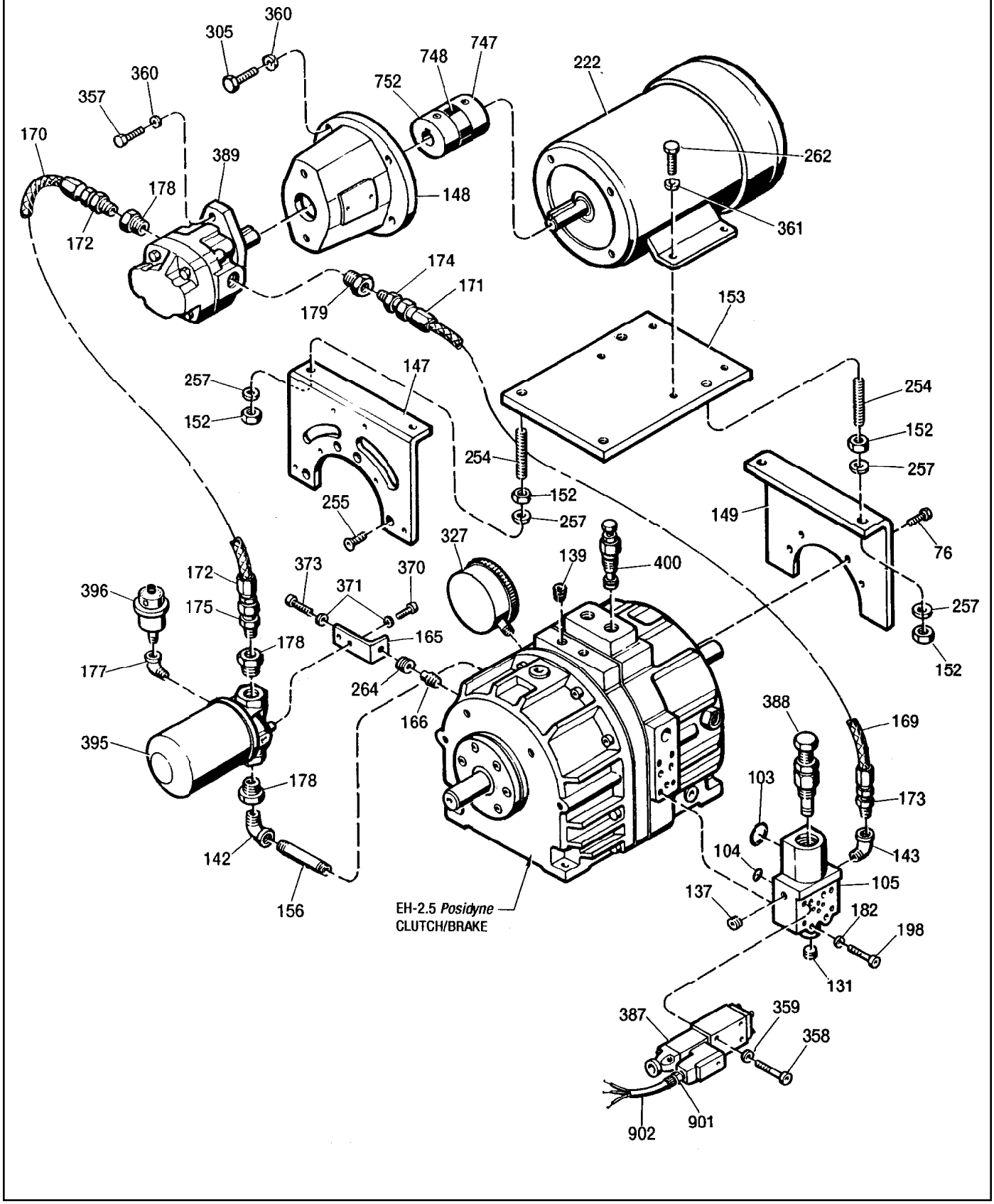


Figure 8.6 - PosiWeave Hydraulic Actuation

Repair Parts List (Figures 8.7 & 8.8)
PosiWeave CONTROL
(Front Panel)
PosiWeave REMOTE STATION

REF No.	PART NAME	QTY	REF No.	PART NAME	QTY
21	Bulb, 24 VDC	2	36	Front Panel Overlay, Top	1
22	H-O-A Switch	1	37	Front Panel Overlay, Bottom	1
23	E-Stop Switch	2	41	Cable, Remote Station	1
24	On-Off Switch	2	42	Cable Fitting, Strain Relief	1
25	Jog Switch	1	500	Remote Station Assembly	1

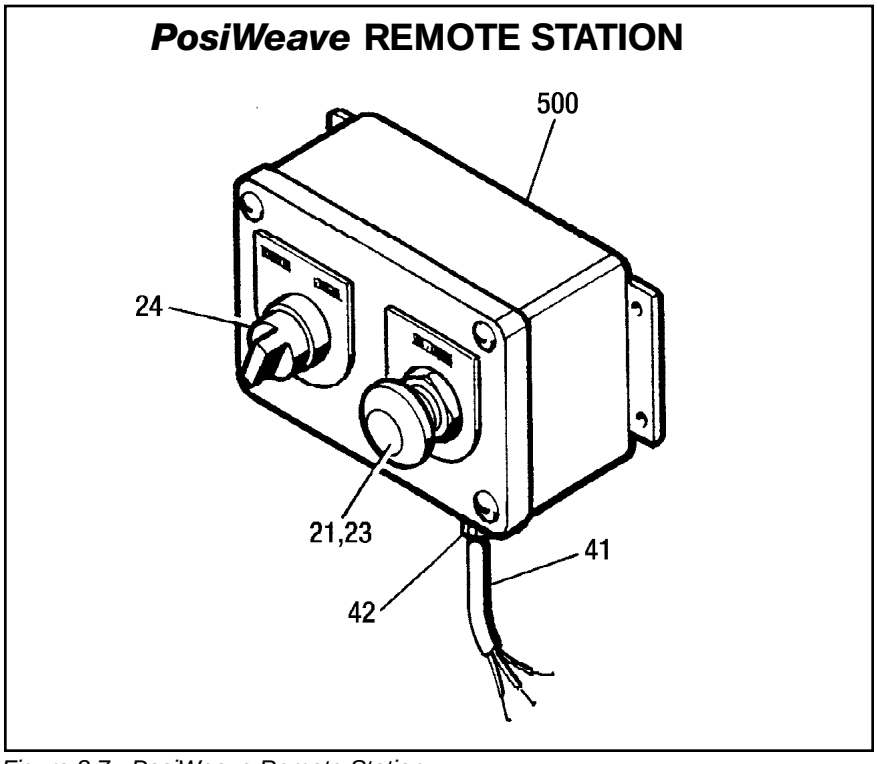


Figure 8.7 - PosiWeave Remote Station

PosiWeave CONTROL
(Front Panel)

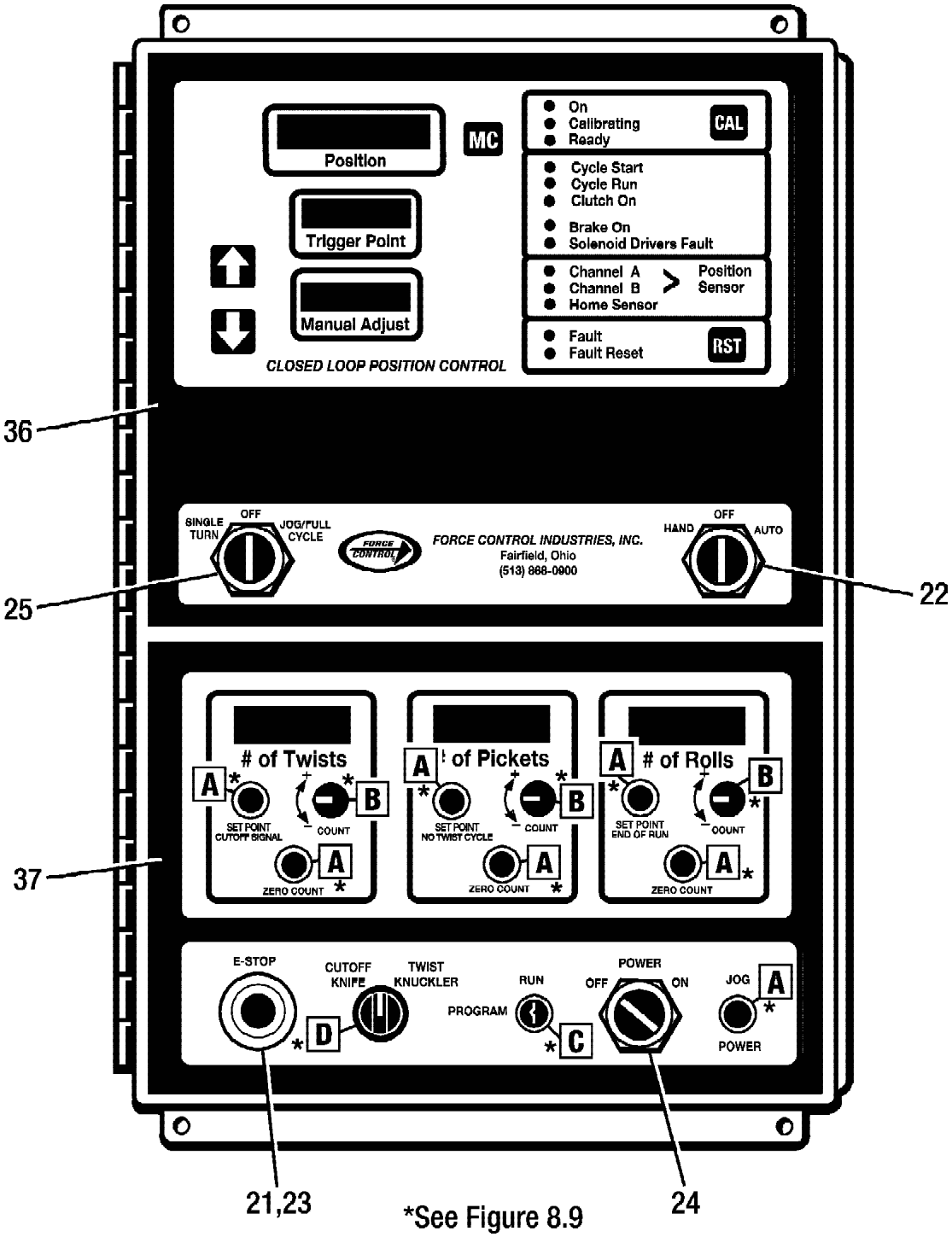


Figure 8.8 - PosiWeave Control (Front Panel)

Repair Parts List
PosiWeave CONTROL
(Switch and Actuator Assemblies)
(CPU Board and Weaver Board)

REF No.	PART NAME	QTY	REF No.	PART NAME	QTY
1	Circuit Board, CPU	1	20A	Bulb Extractor	1
2	Circuit Board, Weaver	1	21	Switch Knob	1
12	Push Button Actuator	7	22	Rotary Actuator	1
13	Rotary Actuator	4	23	Switch Base	1
14	Key Switch Actuator	1	24	Switch	2
15	Switch	16	32	Terminal Strip, 10 Circuit	1
16	Switch Cap, Yellow	6	33	Flat Wire Cable, Pwr. Supply to CPU	1
17	Switch Cap, Green	1	34	Flat Wire Cable, CPU to Weaver	1
18	Switch Bezel	5	35	Removable Jumper	3
19	Key	2	38	Backing Card, CPU Board	1
20	Bulb, 24 VDC, Type T-1-3/4	4	39	Backing Card, Weaver Board	1

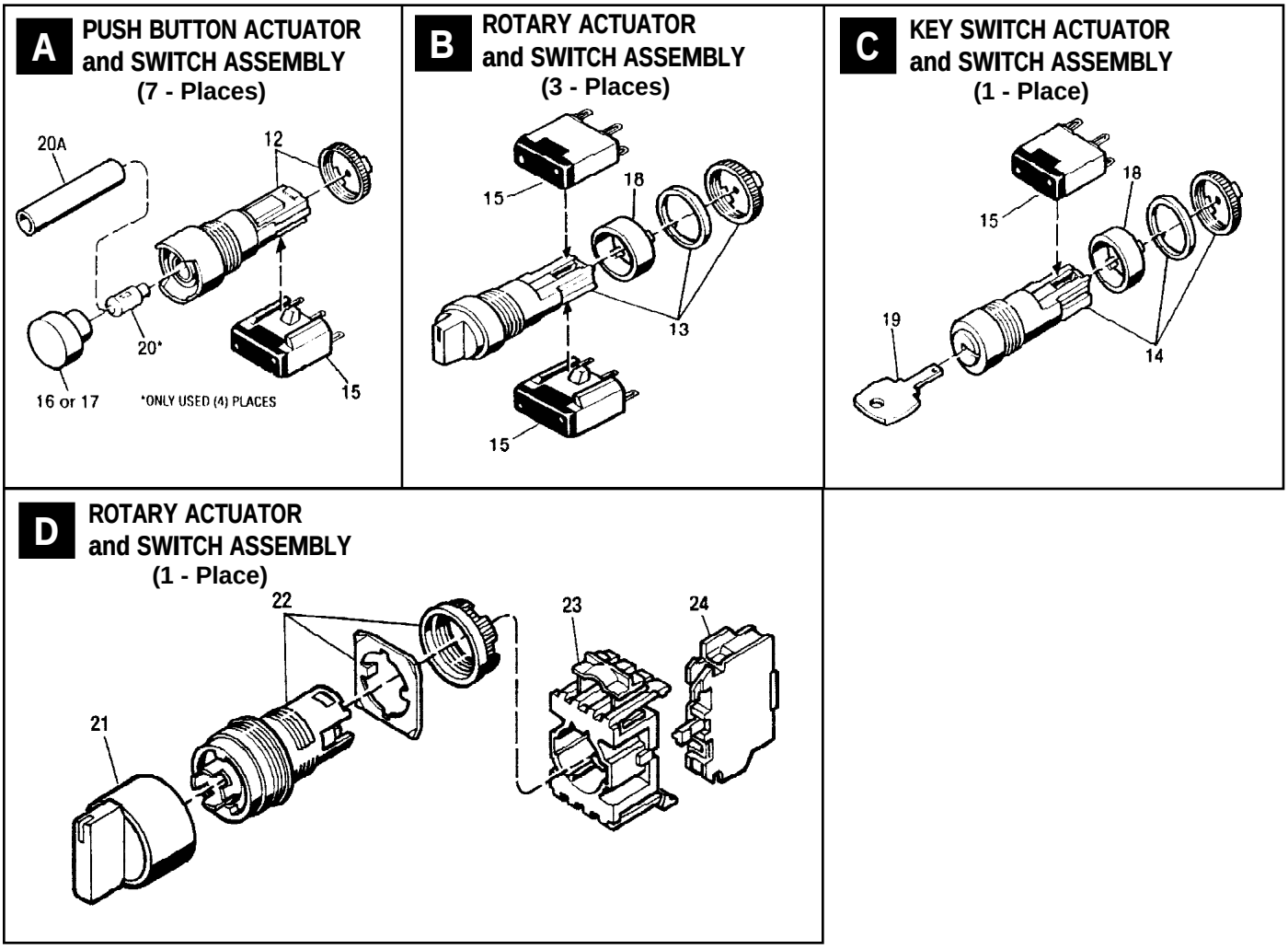


Figure 8.9 - Switch and Actuator Assemblies

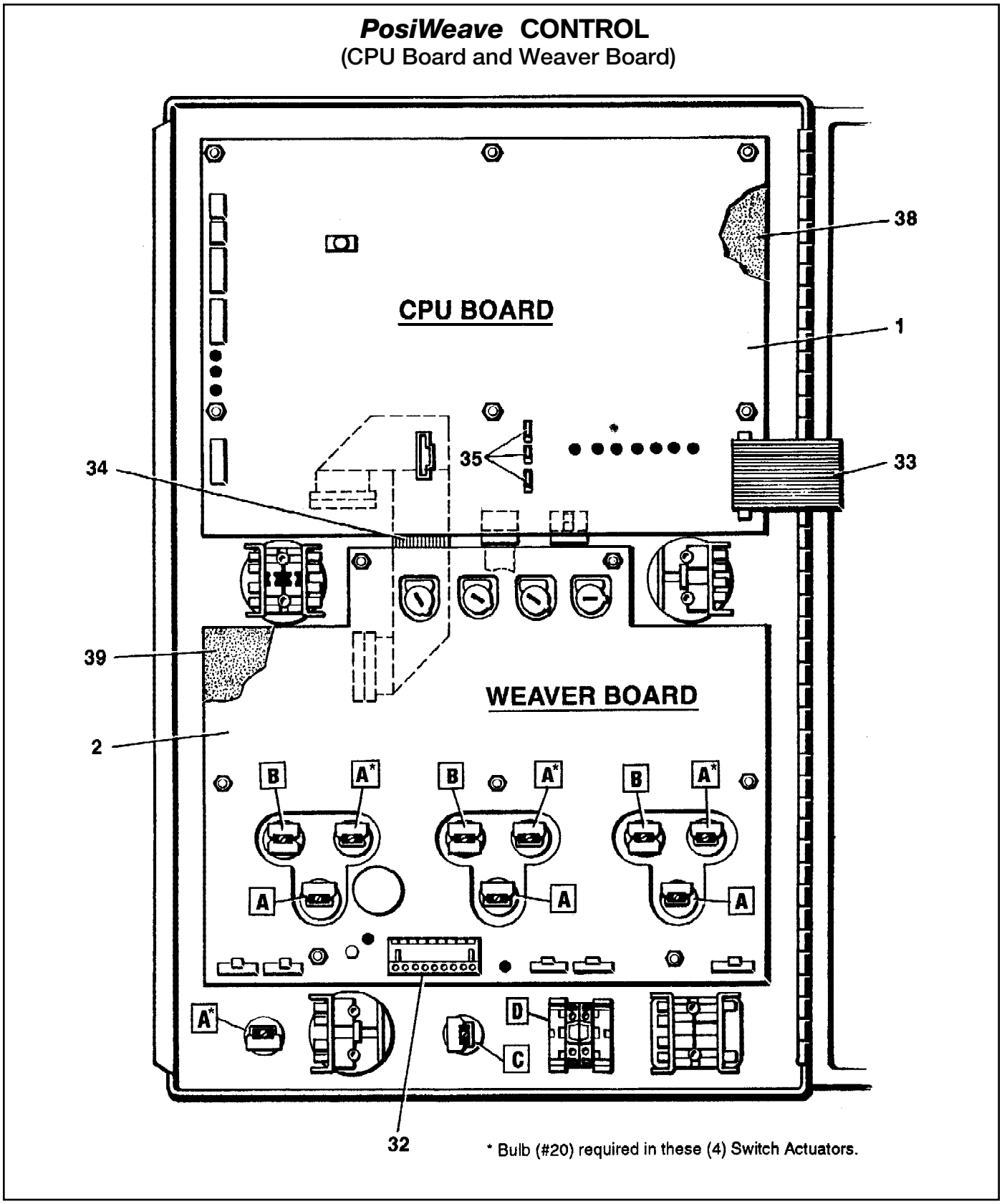


Figure 8.10 - PosiWeave Control (CPU Board and Weaver Board)

Repair Parts List
PosiWeave CONTROL
(Power Supply Board and Lower Relay Panel)

REF No.	PART NAME	QTY	REF No.	PART NAME	QTY
3	Circuit Board	1	26	Circuit Breaker	1
4	Fuse, 1.5 Amp, 250 V	2	27	Transformer	1
5	Fuse, 3 Amp, 250 V, Fast Blow	2	28	Terminal Strip, 3 Circuit	1
6	Fuse, 3 Amp, 250 V, Slow Blow	1	29	Terminal Strip, 16 Circuit	1
7	Mechanical Relay, 24 VDC	5	30	Terminal Strip, 12 Circuit	2
8	Solid State Relay, Input AC (Yellow)	1	31	Terminal Strip, 10 Circuit	1
9	Solid State Relay, Output AC (Black)	1	35	Removable Jumper	14
10	Solid State Relay, Input DC (White)	1	40	Terminal Strip, Field Wiring	1
11	Optional Relay, (Red) (Not Shown)	AR			

AR - As Required

PosiWeave CONTROL

(Power Supply Board and Lower Relay Panel)

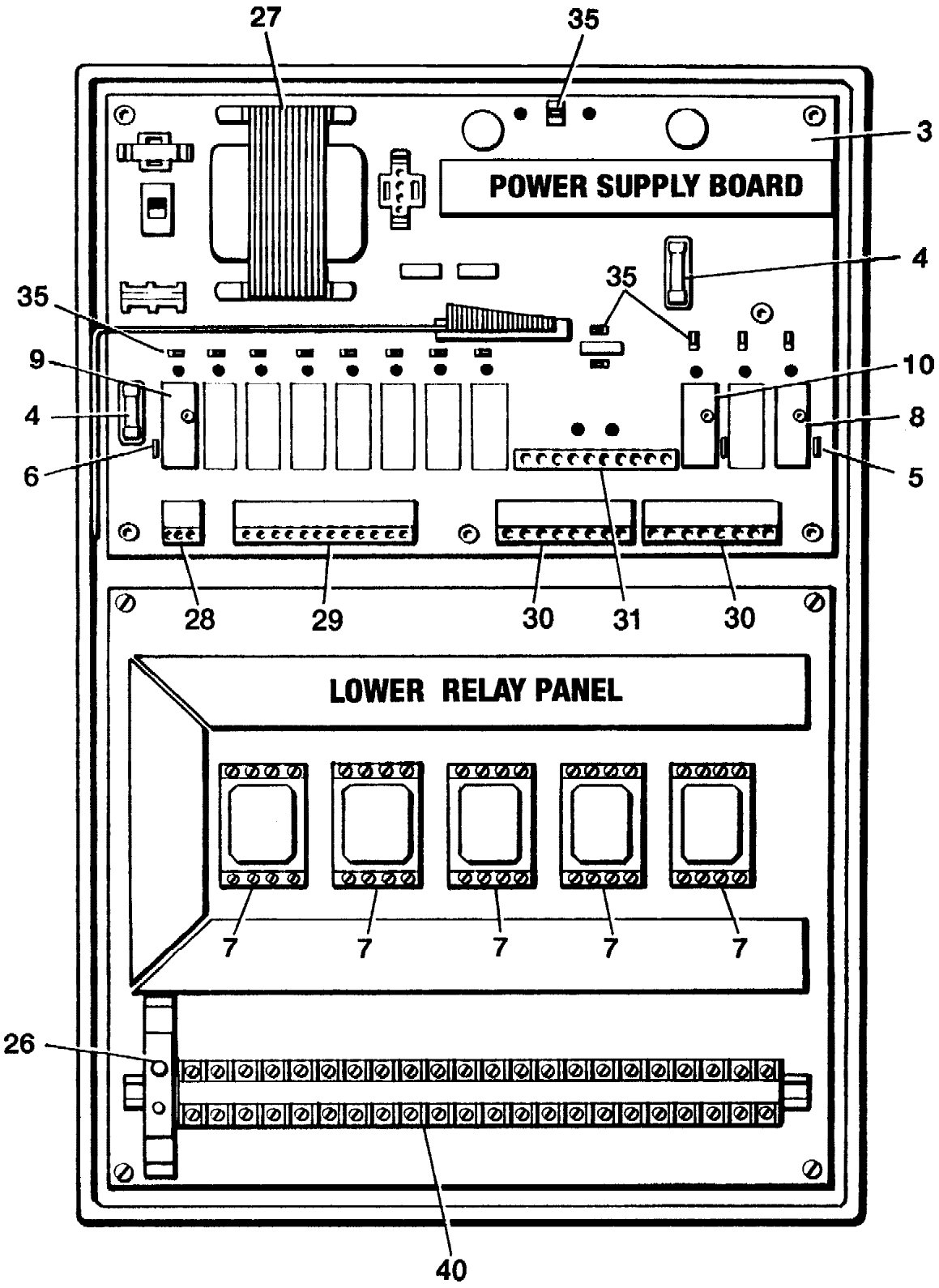
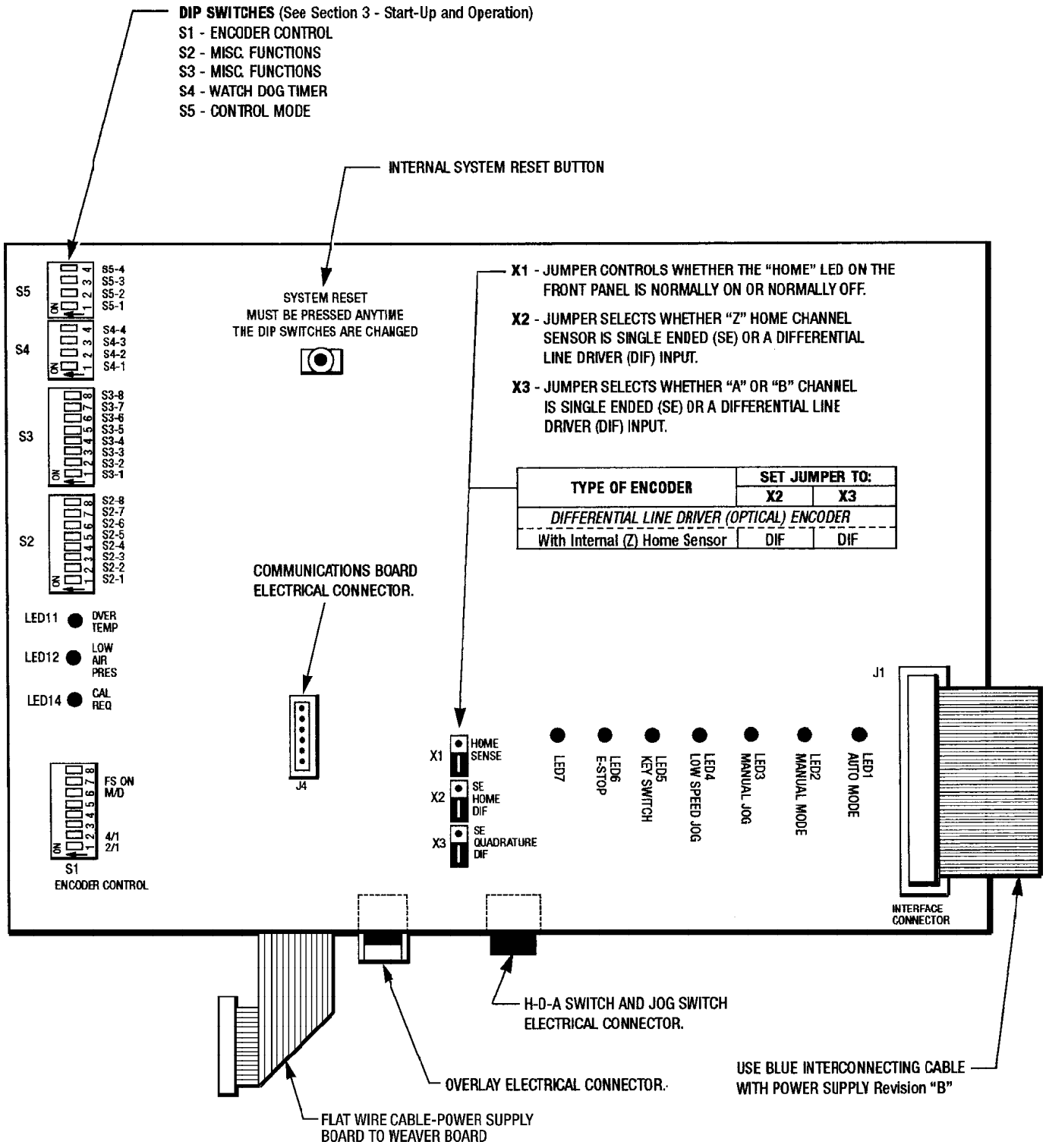
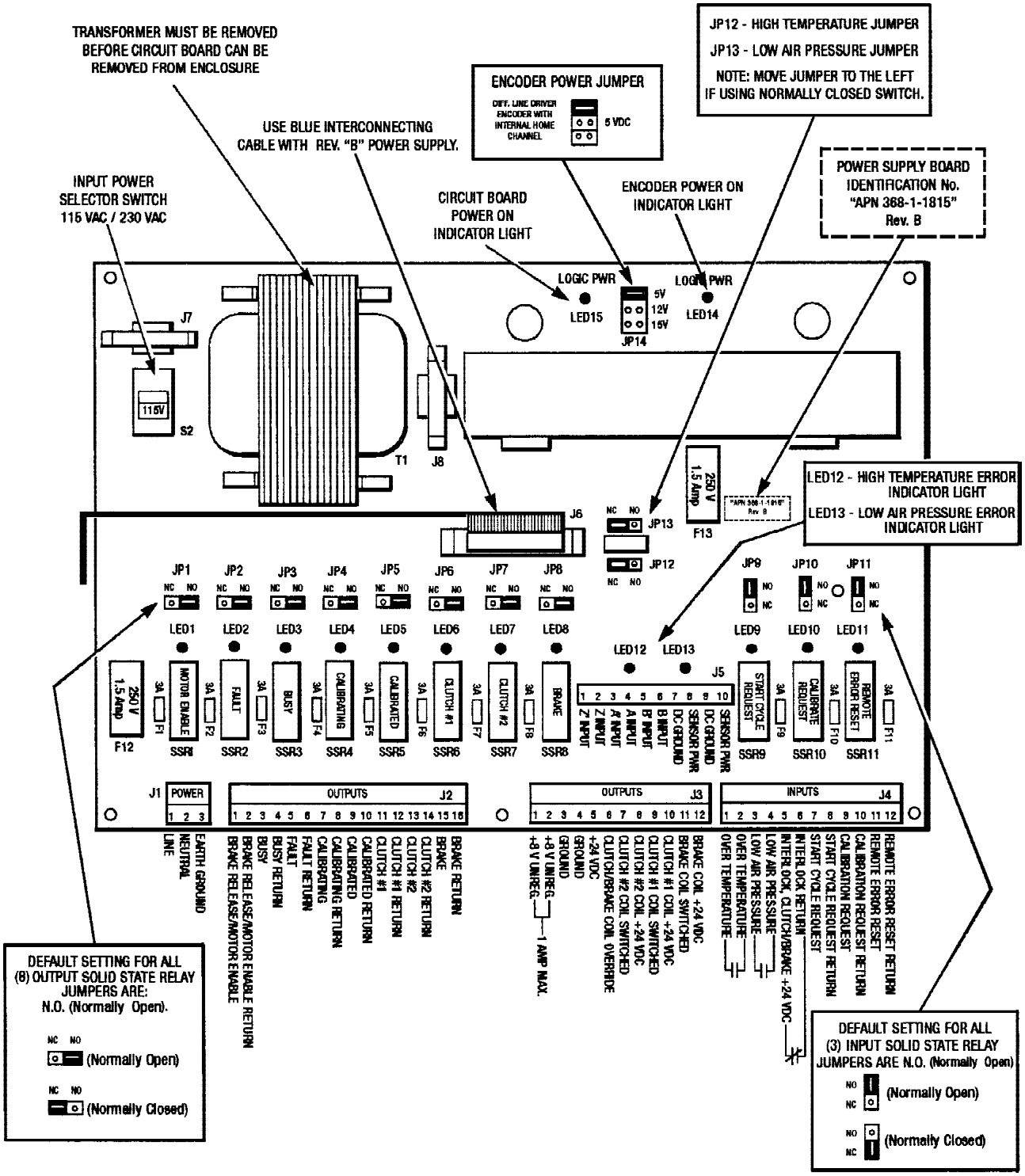


Figure 8.11- Power Supply Board and Lower Relay Panel

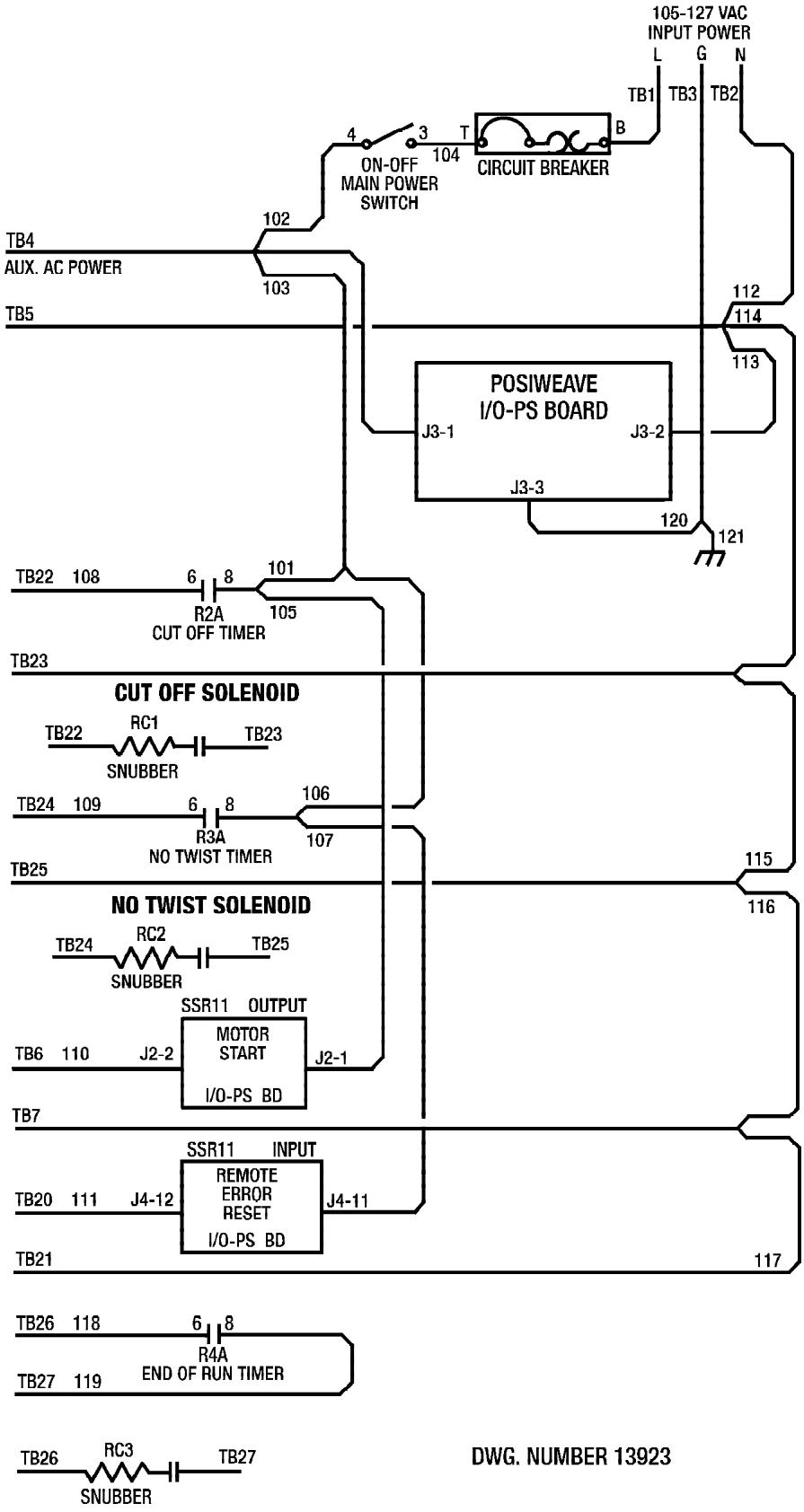
CPU Board
PosiWeave Control



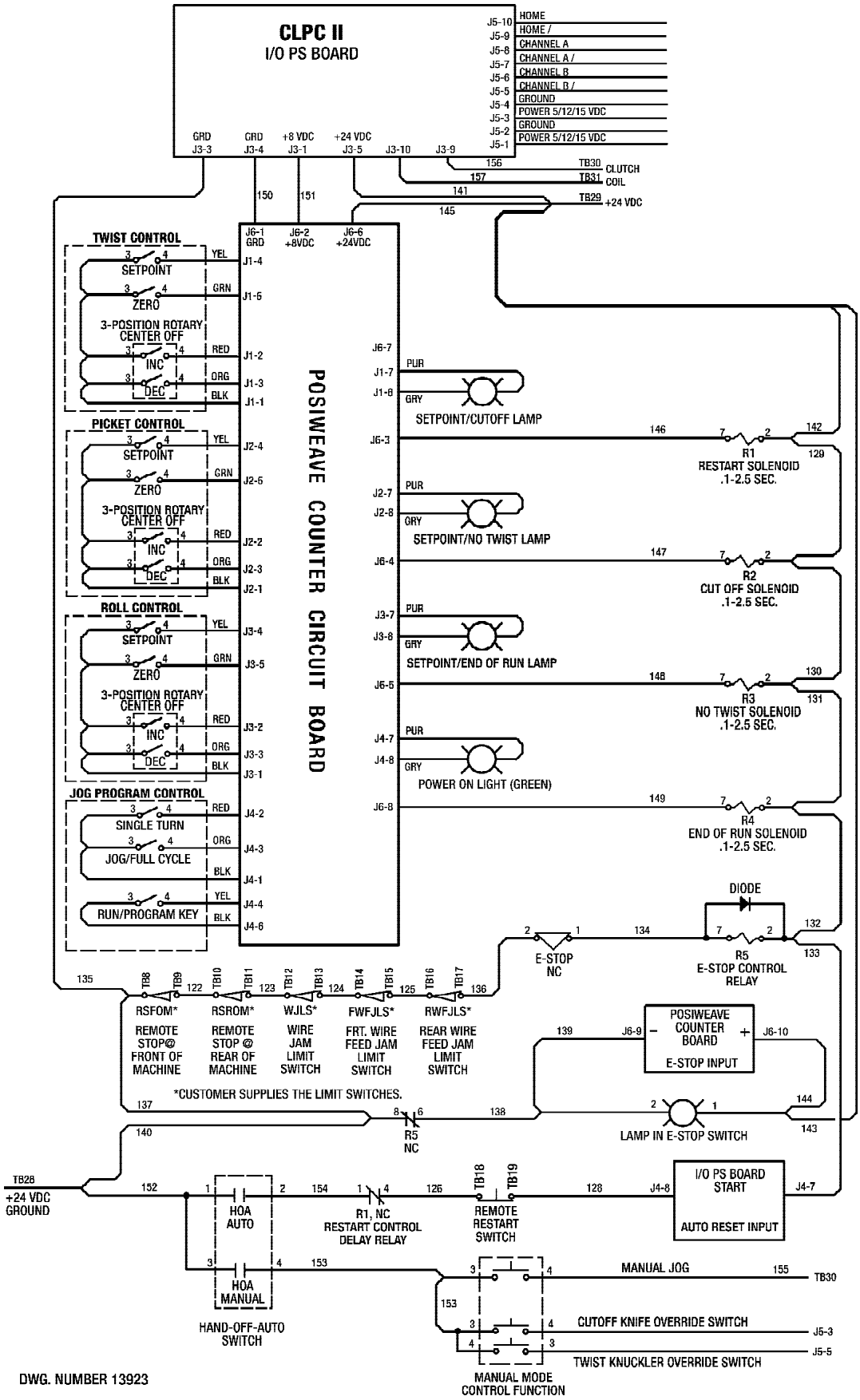
POWER SUPPLY BOARD
PosiWeave CONTROL



AC Circuit - Wiring Diagram



DC Circuits - Wiring Diagram



How To Use This Manual

This manual provides detailed instructions on maintenance, lubrication, installation, and parts identification. Use the table of contents below to locate required information.

Table of Contents

CAREFULLY FOLLOW THE INSTRUCTIONS IN THIS MANUAL FOR OPTIMUM PERFORMANCE AND TROUBLE FREE SERVICE.

INTRODUCTION

This manual applies to Sizes 1020T thru 1140T and 20T thru 140T10 Falk Steelflex Tapered Grid Couplings. Unless otherwise stated, information for Sizes 1020T thru 1140T applies to Sizes 20T thru 140T respectively, e.g. 1020T = 20T, 1100T = 100T, etc. These couplings are designed to operate in either the horizontal or vertical position without modification. Beginning in 1994, these couplings are being supplied with one set of inch series fasteners and one set of metric fasteners. Use either set of fasteners, depending on your preference. Refer to Page 6 for part interchangeability.

The performance and life of the couplings depend largely upon how you install and service them.

CAUTION: *Consult applicable local and national safety codes for proper guarding of rotating members. Observe all safety rules when installing or servicing couplings.*

WARNING: *Lockout starting switch of prime mover and remove all external loads from drive before installing or servicing couplings.*

LUBE FITTINGS

Cover halves have $^1/_8$ NPT lube holes. Use a standard grease gun and lube fitting as instructed on Page 4.

LIMITED END FLOAT

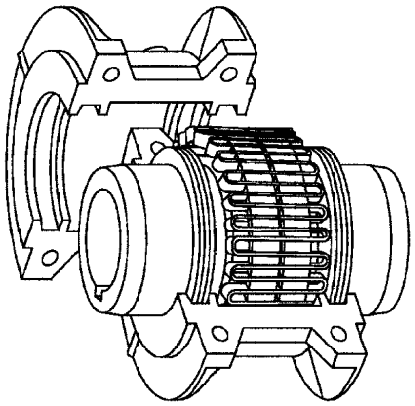
When electric motors, generators, engines, compressors and other machines are fitted with sleeve or straight roller bearings, limited axial end float kits are recommended for protecting the bearings. Falk Steelflex couplings are easily modified to limit end float; refer to Manual 428-820 for instructions.

LUBRICATION

Adequate lubrication is essential for satisfactory operation. Page 2 provides a list of typical lubricants and specifications for general purpose and long term greases. Because of its superior lubricating characteristics and low centrifuge properties, Falk Long Term Grease (LTG) is highly recommended. Sizes 1020T to 1090T10 are furnished with a pre-measured amount of grease for each coupling. The grease can be ordered for larger size couplings.

The use of general purpose grease requires re-lubrication of the coupling at least annually.

TYPE T10 STEELFLEX COUPLING



Long Term Grease (LTG)

The high centrifugal forces encountered in couplings separate the base oil and thickener of general purpose greases. Heavy thickener, which has no lubrication qualities, accumulates in the grid-groove area of Steelflex couplings resulting in premature hub or grid failure unless periodic lubrication cycles are maintained.

Falk Long Term Grease (LTG) was developed specifically for couplings. It resists separation of the oil and thickener. The consistency of Falk LTG changes with operating conditions. As manufactured it is an NLGI #1/2 grade. Working of the lubricant under actual service conditions causes it to become semifluid while the grease near the seals will set to a heavier grade, helping to prevent leakage.

LTG is highly resistant to separation, easily out performing all other lubricants tested. The resistance to separation allows the lubricant to be used for relatively long periods of time.

Steelflex couplings initially lubricated with LTG will not require re-lubrication until the connected equipment is stopped for servicing. If a coupling leaks grease, is exposed to extreme temperatures, excessive moisture, or experiences frequent reversals, more frequent lubrication may be required.

Although LTG grease is compatible with most other coupling greases, the mixing of greases may dilute the benefits of LTG.

USDA Approval

LTG has the United States Department of Agriculture Food Safety & Inspection Service approval for applications where there is no possibility of contact with edible products. (H-2 ratings).

CAUTION: *Do not use LTG in bearings.*

MORE>

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Fax: 414-937-4359 e-mail: falkinfo@falkcorp.com web: www.falkcorp.com

428-110
November 2000
Supersedes 3-98

Specifications — Falk LTG

The values shown are typical and slight variations are permissible.

AMBIENT TEMPERATURE RANGE — -20°F (-29°C) to 250°F (121°C). Min. Pump = 20° F (-7° C).

MINIMUM BASE OIL VISCOSITY — 3300SSU (715cST) @ 100°F (38°C).

THICKENER — Lithium & soap/polymer.

CENTRIFUGE SEPARATION CHARACTERISTICS — ASTM #D4425 (Centrifuge Test) — K36 – 2/24 max., very high resistance to centrifuging.

NLGI GRADE (ASTM D-217) — $^1/_2$

CONSISTENCY (ASTM D-217) — 60 stroke worked penetration value in the range of 315 to 360 measured at 77°F (25°C)

MINIMUM DROPPING POINT — 350°F (177°C) minimum

MINIMUM TIMKEN O.K. LOAD — 40 lbs.

ADDITIVES — Rust and oxidation inhibitors that do not corrode steel or swell or deteriorate synthetic seals.

Packaging

14 oz. (0,4 kg) CARTRIDGES — Individual or case lots of 10 or 60.

35 lb. (16 kg)PAIL, 120 lb. (54 kg) KEG & 400 lb. (181 kg) DRUMS.

General Purpose Grease

Annual Lubrication — The following specifications and lubricants for general purpose grease apply to Falk Steelflex couplings that are lubricated annually and operate within ambient temperatures of 0°F to 150°F (-18°C to 66°C). For temperatures beyond this range (see Table 1), consult the Factory.

If a coupling leaks grease, is exposed to extreme temperatures, excessive moisture or experiences frequent reversals, more frequent lubrication may be required.

Specifications — General Purpose Coupling Lubricants

The values shown are typical and slight variations are permissible.

DROPPING POINT — 300°F (149°C) or higher.

CONSISTENCY — NLGI No. 2 with 60 stroke worked penetration value in the range of 250 to 300.

SEPARATION AND RESISTANCE — Low oil separation rate and high resistance to separation from centrifuging.

LIQUID CONSTITUENT — Possess good lubricating properties equivalent to a high quality, well refined petroleum oil.

INACTIVE — Must not corrode steel or cause swelling or deterioration of synthetic seals.

CLEAN — Free from foreign inclusions.

General Purpose Greases Meeting Falk Specifications

Lubricants listed below are typical products only and should not be construed as exclusive recommendations.

TABLE 1 — General Purpose Greases [H]

Ambient Temperature Range	0°F to 150°F (-18°C to 66°C)	-30°F to 100°F (-34°C to 38°C)
Manufacturer	**Lubricant †**	**Lubricant †**
Amoco Oil Co.	Amolith Grease #2	Amolith Grease #2
BP Oil Co.	Energrease LS-EP2	Energrease LS-EP1
Chevron U.S.A. Inc.	Dura-Lith EP2	Dura-Lith EP1
Citgo Petroleum Corp.	Premium Lithium Grease EP2	Premium Lithium Grease EP1
Conoco Inc.	EP Conolith Grease #2	EP Conolith Grease #2
Exxon Company, USA	Unirex N2	Unirex N2
E.F. Houghton & Co.	Cosmolube 2	Cosmolube 1
Imperial Oil Ltd.	Unirex N2L	Unirex N2L
Kendall Refining Co.	Lithium Grease L421	Lithium Grease L421
Keystone Div. (Pennwalt)	81 EP-2	81 EP-1
Lyondell Petrochemical (ARCO)	Litholine H EP 2 Grease	Litholine H EP 2 Grease
Mobil Oil Corp.	Mobilux EP111	Mobilith AW1
Petro-Canada Products	Multipurpose EP2	Multipurpose EP1
Phillips 66 Co.	Philube Blue EP	Philube Blue EP
Shell Oil Co.	Alvania Grease 2	Alvania Grease 2
Shell Canada Ltd.	Alvania Grease 2	Alvania Grease 2
Sun Oil Co.	Ultra Prestige 2EP	Ultra Prestige 2EP
Texaco Lubricants	Starplex HD2	Multifak EP2
Unocal 76 (East & West)	Unoba EP2	Unoba EP2
Valvoline Oil Co.	Multilube Lithium EP Grease	. . .

★ Grease application or re-lubrication should be done at temperatures above 20°F (-7°C). If grease must be applied below 20°F (-7°C), consult The Falk Corporation.

† Lubricants listed may not be suitable for use in the food processing industry; check with lube manufacturer for approved lubricants.

INSTALLATION OF TYPE T10 STEELFLEX TAPERED GRID COUPLINGS

Installation

Only standard mechanics tools, wrenches, a straight edge and feeler gauges are required to install Falk Steelflex couplings. Coupling Sizes 1020T thru 1090T are generally furnished for CLEARANCE FIT with setscrew over the keyway. Sizes 1100T and larger are furnished for an INTERFERENCE FIT without a setscrew.

CLEARANCE FIT HUBS — Clean all parts using a non-flammable solvent. Check hubs, shafts and keyways for burrs. Do not heat clearance fit hubs. Install keys, mount hubs with flange face flush with shaft ends or as otherwise specified and tighten setscrews.

INTERFERENCE FIT HUBS — Furnished without setscrews. Heat hubs to a maximum of 275°F (135°C) using an oven, torch, induction heater or an oil bath. To prevent seal damage, DO NOT heat hubs beyond a maximum temperatue of 400°F (205°C).

When an oxy-acetylene or blow torch is used, use an excess acetylene mixture. Mark hubs near the center of their length in several places on hub body with a temperature sensitive crayon, 275°F (135°C) melt temperature. Direct flame towards hub bore using constant motion to avoid overheating an area.

MORE>

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November 2000 (.pdf revision)
Supersedes 3-98

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WARNING: If an oil bath is used, the oil must have a flash point of 350°F (177°C) or higher. Do not rest hubs on the bottom of the container. Do not use an open flame in a combustible atmosphere or near combustible materials.

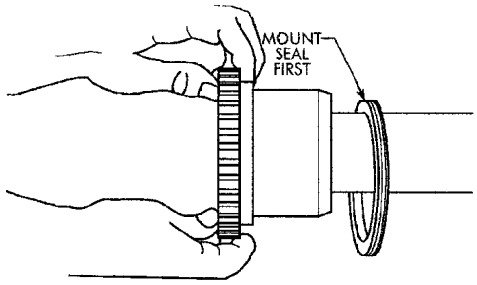
Heat hubs as instructed above. Mount hubs as quickly as possible with hub face flush with shaft end. Allow hubs to cool before proceeding. Insert setscrews (if required) and tighten.

Maximize Performance And Life

The performance and life of couplings depend largely upon how you install and maintain them. Before installing couplings, make certain that foundations of equipment to be connected meet manufacturers' requirements. Check for soft foot. The use of stainless steel shims is recommended. Measuring misalignment and positioning equipment within alignment tolerances is simplified with an alignment computer. These calculations can also be done graphically or mathematically.

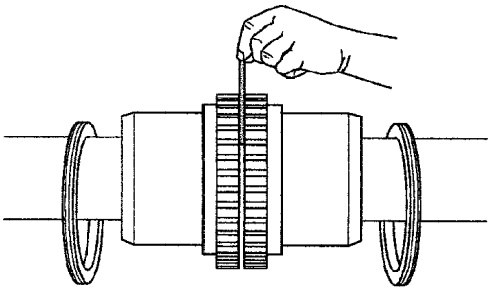
Alignment is shown using spacer bar and straight edge. This practice has proven to be adequate for many industrial applications. However, for superior final alignment, the use of dial indicators (see Manual 458-834 for instructions), lasers, alignment computers or graphical analysis is recommended.

1— Mount Seals And Hubs



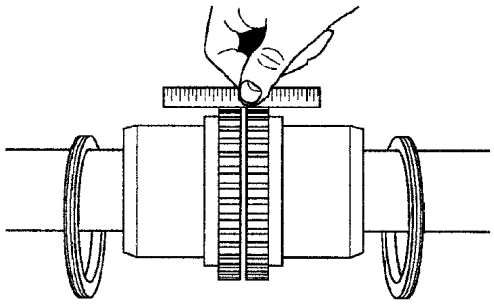
Lock out starting switch of prime mover. Clean all metal parts using a non-flammable solvent. Lightly coat seals with grease and place on shafts BEFORE mounting hubs. Heat interference fit hubs as previously instructed. Seal keyways to prevent leakage. Mount hubs on their respective shafts so the hub face is flush with the end of its shaft unless otherwise indicated. Tighten setscrews when furnished.

2 — Gap and Angular Alignment



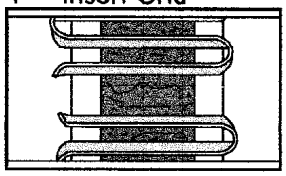
Use a spacer bar equal in thickness to the gap specified in Table 2, Page 5. Insert bar as shown below left, to same depth at 90° intervals and measure clearance between bar and hub face with feelers. The difference in minimum and maximum measurements must not exceed the ANGULAR installation limits specified in Table 2.

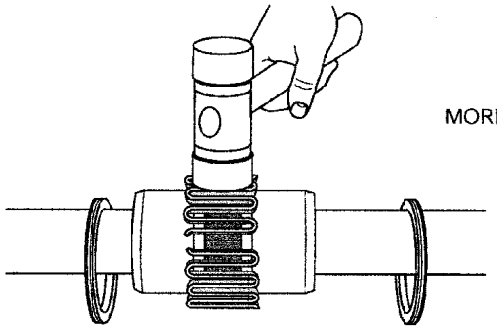
3 — Offset Alignment



Align so that a straight edge rests squarely (or within the limits specified in Table 2) on both hubs as shown above and also at 90° intervals. Check with feelers. The clearance must not exceed the PARALLEL OFFSET installation limits specified in Table 2. Tighten all foundation bolts and repeat Steps 2 and 3. Realign coupling if necessary.

4 — Insert Grid





MORE>

Pack gap and grooves with specified lubricant before inserting grid. When grids are furnished in two or more segments, install them so that all cut ends extend in the same direction (as detailed in the exploded view picture above); this will assure correct grid contact with non-rotating pin in cover halves. Spread the grid slightly to pass over the coupling teeth and seat with a soft mallet.

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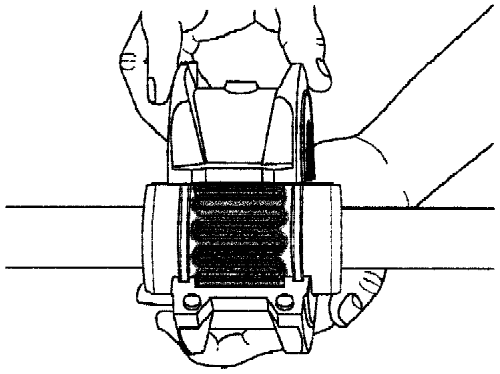
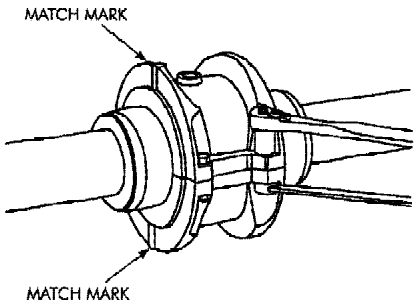
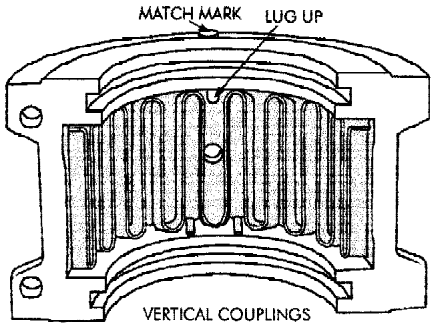
5 — Pack With Grease And Assemble Covers





Pack the spaces between and around the grid with as much lubricant as possible and wipe off excess flush with top of grid. Position seals on hubs to line up with grooves in cover. Position gaskets on flange of lower cover half and assemble covers so that the match marks are on the same side (see above). If shafts are not level (horizontal) or coupling is to be used vertically, assemble cover halves with the lug and match mark



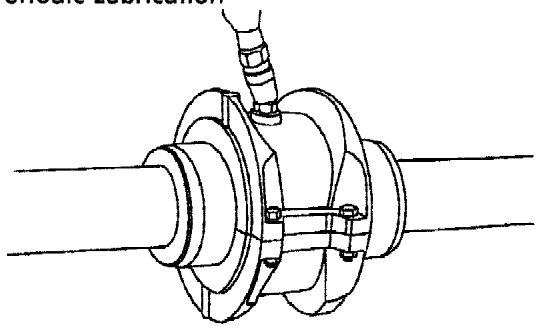
UP or on the high side. Push gaskets in until they stop against the seals and secure cover halves with fasteners, tighten to torque specified in Table 2. Make sure gaskets stay in position during tightening of fasteners. **CAUTION:** *Make certain lube plugs are installed before operating.*

ANNUAL MAINTENANCE

For extreme or unusual operating conditions, check coupling more frequently.

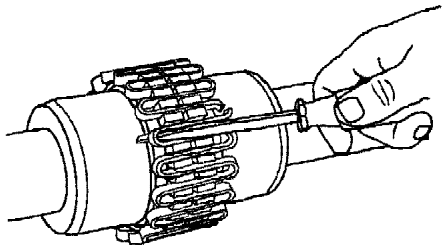
1. Check alignment per steps on Page 3. If the maximum operating misalignment limits are exceeded, realign the coupling to the recommended installation limits. See Table 2 for installation and operating alignment limits.
2. Check tightening torques of all fasteners.
3. Inspect seal ring and gasket to determine if replacement is required. If leaking grease, replace.
4. When connected equipment is serviced, disassemble the coupling and inspect for wear. Replace worn parts. Clean grease from coupling and repack with new grease. Install coupling using new gasket as instructed in this manual.

Periodic Lubrication



The required frequency of lubrication is directly related to the type of lubricant chosen, and the operating conditions. Steelflex couplings lubricated with common industrial lubricants, such as those shown in Table 1, should be relubed annually. The use of Falk Long Term Grease (LTG) will allow relube intervals to be extended to beyond five years. When relubing, remove both lube plugs and insert lube fitting. Fill with recommended lubricant until an excess appears at the opposite hole. **CAUTION:** Make certain all plugs have been inserted after lubricating.

Coupling Disassembly And Grid Removal



Whenever it is necessary to disconnect the coupling, remove the cover halves and grid. A round rod or screwdriver that will conveniently fit into the open loop ends of the grid is required. Begin at the open end of the grid section and insert the rod or screwdriver into the loop ends. Use the teeth adjacent to each loop as a fulcrum and pry the grid out radially in even, gradual stages, proceeding alternately from side to side.

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TYPE T COUPLING INSTALLATION & ALIGNMENT DATA

Maximum life and minimum maintenance for the coupling and connected machinery will result if couplings are accurately aligned. Coupling life expectancy between initial alignment and maximum operating limits is a function of load, speed and lubrication. Maximum operating values listed in Table 2 are based on cataloged allowable rpm.

Values listed are based upon the use of the gaps listed, standard coupling components, standard assemblies and cataloged allowable speeds.

Values may be combined for an installation or operating condition.

Example: 1060T max. operating misalignment is .016" parallel plus .018° angular.

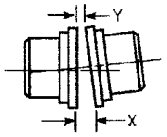
NOTE: For applications requiring greater misalignment, refer application details to Falk.

Angular misalignment is dimension X minus Y as illustrated below.

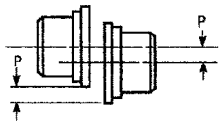
Parallel misalignment is distance P between the hub center lines as illustrated below.

End float (with zero angular and parallel misalignment) is the axial movement of the hubs(s) within the cover(s) measured from "O" gap.

ANGULAR MISALIGNMENT



PARALLEL OFFSET MISALIGNMENT



END FLOAT

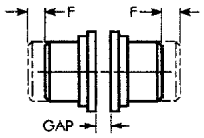


TABLE 2 — Misalignment & End Float

SIZE	Installation Limits						Operating Limits						Cover Fastener Tightening Torque Values		Allow Speed (rpm)	Lube Wt	
	Parallel Offset-P		Angular (x-y)		Hub Gap ± 10%		Parallel Offset-P		Angular (x-y)		End Float Physical Limit (Min) 2 x F						
	Max Inch	Max mm	Max Inch	Max mm	Inch	mm	Max Inch	Max mm	Max Inch	Max mm	Inch	mm	In Series Fasteners (lb-in)	Metric Fasteners (Nm)		lb	kg
1020T	.006	0,15	.003	0,08	.125	3	.012	0,30	.010	0,25	.210	5,33	100	11,3	4500	.06	0,03
1030T	.006	0,15	.003	0,08	.125	3	.012	0,30	.012	0,30	.198	5,03	100	11,3	4500	.09	0,04
1040T	.006	0,15	.003	0,08	.125	3	.012	0,30	.013	0,33	.211	5,36	100	11,3	4500	.12	0,05
1050T	.008	0,20	.004	0,10	.125	3	.016	0,41	.016	0,41	.212	5,38	200	23,6	4500	.15	0,07
1060T	.008	0,20	.005	0,13	.125	3	.016	0,41	.018	0,46	.258	6,55	200	23,6	4350	.19	0,09
1070T	.008	0,20	.005	0,13	.125	3	.016	0,41	.020	0,51	.259	6,58	200	23,6	4125	.25	0,11
1080T	.008	0,20	.006	0,15	.125	3	.016	0,41	.024	0,61	.288	7,32	200	23,6	3600	.38	0,17
1090T	.008	0,20	.007	0,18	.125	3	.016	0,41	.028	0,71	.286	7,26	200	23,6	3600	.56	0,25
1100T	.010	0,25	.008	0,20	.188	5	.020	0,51	.033	0,84	.429	10,90	312	35	2440	.94	0,43
1110T	.010	0,25	.009	0,23	.188	5	.020	0,51	.036	0,91	.429	10,90	312	35	2250	1.1	0,51
1120T	.011	0,28	.010	0,25	.250	6	.022	0,56	.040	1,02	.556	14,12	650	73	2025	1.6	0,74
1130T	.011	0,28	.012	0,30	.250	6	.022	0,56	.047	1,19	.551	14,00	650	73	1800	2.0	0,91
1140T	.011	0,28	.013	0,33	.250	6	.022	0,56	.053	1,35	.571	14,50	650	73	1650	2.5	1,14

TABLE 3 — Coupling Cover Fastener Identification

SIZE	Inch Series Fasteners				METRIC FASTENERS	
	Old Style		New Style			
1020-1070T10		SAE Grade 8 ★		SAE Grade 8	10.9	Property Class 10.9
1080-1090T10		SAE Grade 8		SAE Grade 8	10.9	Property Class 10.9
1100-1140T10		SAE Grade 5		SAE Grade 5	8.8	Property Class 8.8

★ Older style covers, Sizes 1020T10 thru 1070T10 must utilize socket head cap screws and locknuts held by the cover.

PARTS IDENTIFICATION

All coupling parts have identifying part numbers as shown below. Parts 3 and 4 (Hubs and Grids), are the same for both Type T10 and T20 couplings. All other coupling parts are unique to Type T10. When ordering parts, always SPECIFY SIZE and TYPE shown on the COVER.

PARTS INTERCHANGEABILITY

Parts are interchangeable between Sizes 20T and 1020T, 30T and 1030T, etc. except as noted.

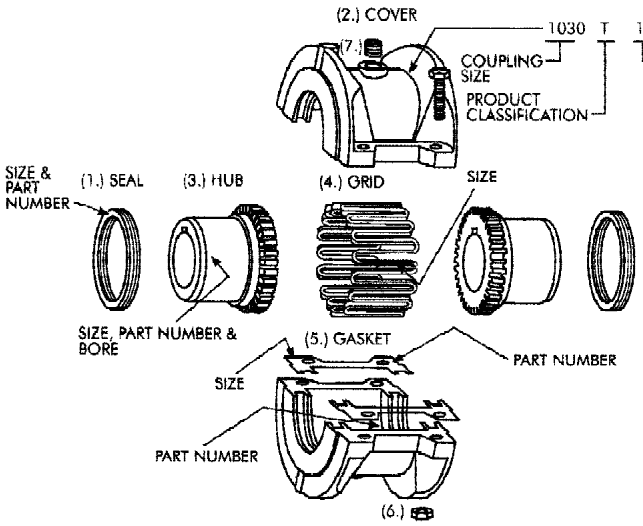
GRIDS — Size 1020T thru 1140T Steelflex couplings use blue grids. Older models, 20T thru 140T, use orange grids.

CAUTION: Blue grids may be used in all applications, but DO NOT substitute orange grids for blue.

COVERS — CAUTION: DO NOT mix cover halves of different designs. Sizes 1020T thru 1070T10 covers have been manufactured in several different two-rib designs and 80T thru 140T covers have been manufactured with two and three ribs.

HARDWARE — Older style covers, Sizes 1020T10 thru 1070T10, utilized socket head cap screws with captured locknuts. The new style covers use hex head cap screws (either inch or metric) and unrestrained locknuts. Specify either inch series SOCKET head or metric series HEX head cap screws when ordering replacement parts.

PART NUMBER LOCATION



PART DESCRIPTION

1. Seal (T10)
2. Cover (T10)
3. Hub (Specify bore and keyway)
4. Grid
5. Gasket (T10)
6. Fasteners (T10) — Coupling may be supplied with one set each of inch series fasteners and metric fasteners.
7. Lube Plug

ORDER INFORMATION

1. Identify part(s) required by name above.
2. Furnish the following information.

   EXAMPLE:
   Coupling Size: 1030
   Coupling Type: T10
   Model: B
   Bore: 1.375
   Keyway: .375 x .187
3. Price parts from Price List 422-110 and appropriate discount sheet.

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INSTALLATION AND REMOVAL INSTRUCTIONS FOR *B-LOC*™ LOCKING ASSEMBLY SERIES B400

Thank you for purchasing a ***B-LOC***™ Keyless Frictional Locking Device. ***B-LOC***™ keyless connectors provide a high capacity, zero-backlash shaft/hub or coupling connection by means of a mechanical interference fit. Please follow these INSTALLATION AND REMOVAL INSTRUCTIONS carefully to ensure proper performance of this ***B-LOC***™ unit.

⚠ WARNING ⚠

When installing or removing ***B-LOC***™ products, always adhere to the following safety standards:

1. Be sure that all power switches are locked out before installing or removing ***B-LOC***™ products.
2. Eye protection is required when installing or removing ***B-LOC***™ products. Please wear safety glasses and protective clothing.

INSTALLATION

(Refer to Figure 1)

B-LOC™ Locking Assemblies are supplied lightly oiled and ready for installation. The frictional torque capacity of these devices is based on a coefficient of friction of 0.12 for lightly oiled screw, taper, shaft and bore contact areas.

Therefore, it is important *not* to use Molybdenum Disulfide (e.g., Molykote, Never-Seeze or similar lubricants) in any Locking Assembly installation.

1. Make sure that locking screw, taper, shaft and bore contact areas are clean and lightly oiled.

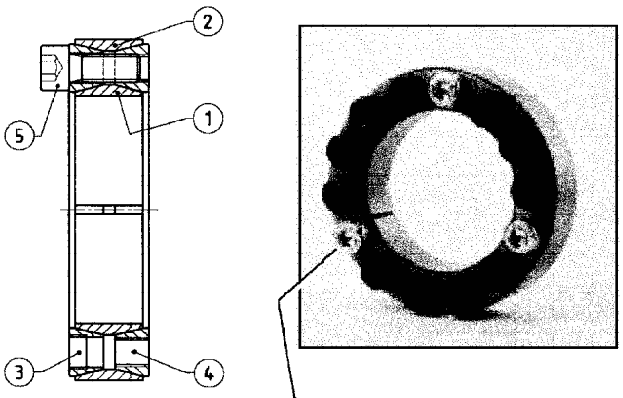


Figure 1

2. Insert Locking Assembly into hub counterbore prior to shaft installation.

3. After confirming correct hub position, hand-tighten three (3) or four (4) equally spaced lockingscrews until initial contact with shaft and hub bore is established.

4. Use torque wrench and set it approximately 5% higher than specified tightening torque M_A. Tighten locking screws in either a clockwise or counterclockwise sequence (it is not necessary to tighten in a diametrically opposite pattern), using only 1/4 (i.e., 90°) turns for several passes until 1/4 turns can no longer be achieved.

5. Continue to apply overtorque for 1 to 2 more passes. This is required to compensate for a system-related relaxation of locking screws since tightening of a given screw will always relax adjacent screws. Without overtorquing, an infinite number of passes would be needed to reach specified tightening torque.

6. Reset torque wrench to specified torque (M_A) and check all locking screws. No screw should turn at this point, otherwise repeat Step 5 for 1 or 2 more passes. It is not necessary to re-check tightening torque after equipment has been in operation.

NOTE: In applications subject to extreme corrosion, the slits in all collars can be sealed with a suitable caulking compound or equivalent.

B-LOC Corporation 26 Gilbert Street Monroe, NY 10950

INSTALLATION OF *B-LOC*™ LOCKING ASSEMBLIES OVER SHAFT KEYWAYS

The Locking Assembly should be positioned so that slits in Locking Assembly collars that contact the shaft are located approximately opposite the keyway. In addition, a locking screw should be centered directly over the keyway.

When tightening locking screws, it is important to follow the installation procedure outlined above, which specifies equal 1/4 turns of each locking screw. Failure to follow these instructions could result in excessive tightening of the screw over the keyway, possibly causing permanent deformation of the Locking Assembly collars. Even after 1/4 turns can no longer be achieved, it is important to continue to use equal turning angles for every screw until the specified tightening torque is reached.

REMOVAL

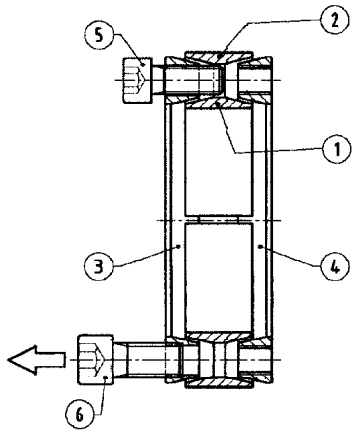


Figure 2

(Refer to Figure 2)

Prior to initiating the following removal procedure, check to ensure that no torque or thrust loads are acting on the Locking Assembly, shaft or any mounted components.

1. Loosen locking screws in several stages by using approx. 1/4 turns, following either a clockwise or counterclockwise sequence.

NOTE: *B-LOC*™ Series B400 Locking Assemblies feature self-releasing tapers, meaning collars should release during Step 1. However, if for some reason the thrust collars jam, a light tap on three (3) equally spaced heads of loosened locking screws will positively release the connection.

2. Hub and Locking Assembly are normally removed together. Removal of Locking Assembly only from deep counterbores is accomplished by inserting pull-off screws (not provided) into threads located under cadmium plated locking screws. These threads are NOT to be used for high pulling forces, as thrust collar is only partially threaded.

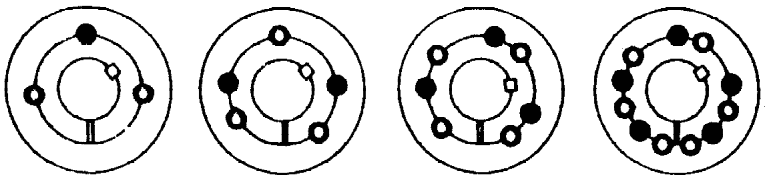
LOCKING SCREW SIZES AND SPECIFIED TIGHTENING TORQUE M_A - B400 LOCKING ASSEMBLIES

Metric Series	Inch Series	M_A ft-lb	S	K	dB
			mm		
20 x 47 to 40 x 65	3/4 to 1-1/2	11	M 6	5	M 8
42 x 75 to 65 x 95	1-5/8 to 2-9/16	26	M 8	6	M10
70 x 110 to 95 x 135	2-5/8 to 3-3/4	51	M10	8	M12
100 x 145 to 160 x 210	3-7/8 to 6	91	M12	10	M14
170 x 225 to 200 x 260	6-7/16 to 8	138	M14	12	M16
220 x 285 to 260 x 325		214	M16	14	M20
280 x 355 to 300 x 375		293	M18	14	M22
320 x 405 to 340 x 425		420	M20	17	M24
360 x 455 to 420 x 515		565	M22	17	M27
440 x 545 to 1000 x 1110		725	M24	19	M30

M_A = Tightening Torque
S = Screw Size
K = Hex Key Size
SDS = Square Drive Size
dB = pull-off thread, located only under cadmium plated screws of front thrust collar

For technical assistance, please call 1-800-865-7756

TAPER-LOCK® Bushings



1008 to 3030 | 3535 to 6050 | 7060 to 10085 | 120100

◎ INSERT SETSCREWS TO INSTALL ● INSERT SETSCREWS TO REMOVE

WARNING

To ensure that drive is not unexpectedly started, turn off and lock out or tag power source before proceeding. Failure to observe these precautions could result in bodily injury.

TO INSTALL

1. Clean shaft, bore of bushing, outside of bushing and hub bore of all oil, paint and dirt. File away any burrs.
2. Insert bushing in hub. Match the hole pattern, not threaded holes (each complete hole will be threaded on one side only). ▲
3. "LIGHTLY" oil setscrews and thread into those half-threaded holes indicated by ◎ on above diagram.

CAUTION

Do not lubricate the bushing taper, bushing bore, hub taper or the shaft. Doing so could result in breakage of the product.

4. Position assembly onto shaft allowing for the small axial movement which will occur during tightening procedure.
5. Alternately torque setscrews to recommended torque setting in chart below.

CAUTION

Do not use worn hex key wrenches. Doing so may result in a loose assembly or may damage screws.

6. To increase gripping force, hammer face of bushing using drift or sleeve. (Do Not Hit Bushing Directly With Hammer.)
7. Re-torque screws after hammering.

CAUTION

Where bushing is used with lubricated products such as chain, gear, or grid couplings be sure to seal all pathways (where lubricatn could leak) with RTV or similar material.

8. Recheck screw torques after initial run-in, and periodically thereafter. Repeat steps 5, 6 and 7 if loose.

TO REMOVE

1. Remove all screws.
2. Insert screws in holes indicated by ● on drawing. Loosen bushing by alternately tightening screws.

Recommended Installation Wrench Torque

Bushing No.	Wrench Torque (Pound-Inches) *	Wrench Torque (Pound-Feet) *
1008, 1108	55	4.6
1210, 1215, 1310	175	14.6
1610, 1615	175	14.6
2012	280	23.3
2517, 2525	430	35.8
3020, 3030	800	66.7
3535	1,000	83.3
4040	1,700	141.7
4545	2,450	204.2
5050	3,100	258.3
6050, 7060, 8065	7,820	651.7
10085, 120100	13,700	1,141.7

▲ If two bushings are used on same component and shaft, fully tighten one bushing before working on the other.

* When installing bushing in sintered steel product (sheave, coupling, etc.) follow torque recommendation shown on product hub if present.

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