

# PREDATOR XS

## TURNTABLE STRETCH WRAPPER

SERIAL NUMBER:

Please refer to the serial number in all correspondence with Highlight or any Highlight Distributor. This identifies your machine and will help in our ability to quickly and efficiently respond to your needs.

**HIGHLIGHT**  
INDUSTRIES, INC.

OPERATION MANUAL NUMBER: PREDXS-F/ FEB 2008

2694 Prairie St SW • Grand Rapids, MI 49519  
616-531-2464 • 800-531-2465 • fax 616-531-0506  
[www.highlightindustries.com](http://www.highlightindustries.com)

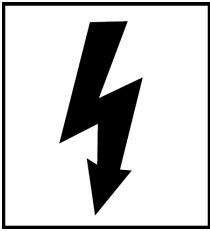


# SAFETY MESSAGES

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For the best result with the Predator Turntable Stretch Wrapper, carefully read this manual and all of the warning labels attached to the equipment before installing and operating it, and follow instructions exactly. Keep this manual handy for quick reference.

## Definitions and Symbols



### High Voltage!

This symbol indicates high voltage. It calls your attention to items or operations that could be dangerous to you or other persons operating the equipment. Read the message and follow the instructions carefully.



### Warning

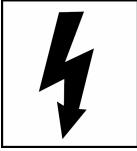
This symbol indicates a potentially hazardous situation which, if not avoided, can result to bodily injury, or serious damage to the product.



### Notes

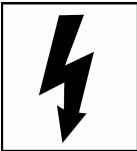
This symbol indicates an area or subject of special merit, emphasizing the equipment's capabilities, common errors in operation or maintenance, or other special instructions that can provide benefits to users.

## General Precautions – Read These First!



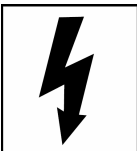
### **HIGH VOLTAGE!**

Motor control equipment and electronic controllers are connected to hazardous line voltages. When servicing drives and controllers, there may be exposed components with housings or protrusions at or above line potential. Extreme care should be taken to protect against shock.



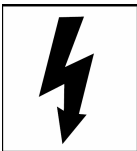
### **HIGH VOLTAGE!**

The user is responsible for conforming to all applicable code requirements with respect to grounding all requirements. Do NOT use extension cords to operate the equipment.



### **HIGH VOLTAGE!**

Disconnect AC input power before checking components, performing maintenance, cleaning up, and when the machine is not in use. Do NOT connect or disconnect wires and connectors while power is applied to circuit.



### **HIGH VOLTAGE!**

Wiring work should be carried out only by qualified personnel. Otherwise, there is a danger of electric shock or fire.



### **WARNING**

Loose clothing must NOT be worn while the machine is in operation. Stay clear of moving parts while the machine is running.

# INTRODUCTION

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## Welcome

Congratulations on your purchase of *Predator* Turntable Stretch Wrapper! Designed for the high volume industrial user the Predator will stretch wrap any load to the maximum stretch level of any film with full independent control of the film force. This allows even light unstable loads to be wrapped at the lowest possible cost and the maximum load holding force.

## Limited Warranty

*Highlight Industries, Inc.* warrants its Predator manufactured by it, and sold pursuant to this order, will be of merchantable quality, free from defects in material and workmanship as determined at the date of shipment, by generally recognized, applicable and accepted practices and procedures in the industry, for a period of three (3) years from the Highlight invoice date, under normal use and service.

When the Purchaser gives Highlight written notice of any alleged defect within the applicable warranty period, Highlight will, at its option repair or replace the same free of charge F.O.B. its manufacturing plant, installation not included. Equipment replaced under the warranty shall have the same warranty as new equipment but does not extend the warranty of the original equipment.

Satisfaction of this warranty, consistent with other provisions herein, will be limited to the replacement or repair or modification of, or issuance of a credit for, the equipment involved, at Highlight's option.

Highlight neither assumes nor authorizes any person to assume for it any other obligation in connection with the sale of Highlight's equipment.

This warranty shall not apply to any equipment which has been repaired or altered by unauthorized personnel in any way so as to, in the judgment of Highlight, affect serviceability, or which has been subjected to misuse, negligence, accident, or to equipment made by Highlight which has been operated in a manner contrary to Highlight's instructions.

In no event regardless of the cause, shall Highlight be liable for penalties or penalty clauses of any description or any damages resulting from loss of profits, use of products or for any incidental indirect or consequential damages, even if advised of the possibility of such damages. This limitation of Highlight's liability will apply regardless of the form of action, whether in contract or tort, including negligence. Any action against Highlight must be brought within twelve (12) months after cause of action accrues.

"This warranty in lieu of all other warranties whether expressed, implied or statutory including implied warranties of merchantability of fitness or extends only to the buyer or customer purchasing from Highlight Industries, Inc or an authorized distributor."

## About This Document

The purpose of this manual is to provide you with information necessary to install, operate, troubleshoot and maintain the Predator Turntable Stretch Wrapper. The audience for this manual should have knowledge of basic mechanical and electronic components, standard electrical wiring practices and schematics symbols.

To guarantee safe operation of the equipment, carefully observe the safety messages at the beginning of and throughout this manual. Keep this operating manual handy and distribute to all users for reference.

## Application Assistance

If any assistance is desired, contact the distributor from whom you have purchased the unit, or call the number listed on the bottom page of this manual. To receive quick and proper technical support for the equipment you have purchased, please be prepared to provide the following information:

1. Machine serial number
2. Date of purchase
3. Symptoms of any problem

# REVISION HISTORY TABLE

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No.	Revision Comment	Date of Issue	Operation Manual No.
	<i>Initial Release</i>	November 2005	PREDXS
1.	<i>Revision A</i> Added Drive Adjustment section Modified drive board potentiometer settings. Other minor corrections throughout	February 2006	PREDXS-A
2.	<i>Revision B</i> Changed format, added page numbers.	September 2006	PREDXS-B
3.	<i>Revision C</i> New carriage and turntable design	January 2007	PREDXS-C
4.	<i>Revision D</i> New optional height detection method	April 2007	PREDXS-D
5.	<i>Revision E</i> Added optional scale package	June 2007	PREDXS-E
6.	<i>Revision F</i> Removed Q60 information Added Ultrasonic information	February 2008	PREDXS-F





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Predator XS Turntable Stretch Wrapper Operation Manual

# General System Information

# SYSTEM SPECIFICATIONS

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## Machine Dimensions

	Low Profile	High Profile
Length (inch)	116	121
Width (inch)	65	88
Height (inch)	92	93
Turntable Diameter (inch)	65	48 Octagon (58 Diagonal)
Turntable Height from Floor (inch)	3 ¼	13 ½
Wrapping Height (inch)	80	70
Operation Space (inch)	125 x 70 x 100	
Maximum Load Size (inch)	56 x 56 x 80	
Approximate Shipping Weight (lbs)	1220	1500

## Electrical Specifications

- 120 VAC, 60 Hz, Single-phase, 15 AMP
- NEMA-12 rated electrical panel
- Operating temperature: +32°F to +110°F
- Lockable disconnect switch
- JIC wiring standard
- Programmable Logic Controller (PLC) with input/output diagnostic lights

## Turntable System

- **Low Profile:** ½ HP 3-phase AC motor, ½ HP AC frequency drive
- **High Profile:** ¾ or 1 HP 3-phase AC motor, 1 HP AC frequency drive
- 20-30 loads per hour (spiral)
- 12 RPM turntable maximum speed
- 4,000 lbs turntable maximum load capacity

## Film Carriage/Elevator System

- ½ HP 3-phase AC motor, ½ HP AC frequency drive
- Adjustable raise and lower speeds
- Automatic height detection photoelectric sensor

## Film Delivery System

- ¼ HP 3-phase AC motor, ½ HP AC frequency drive
  - Adjustable film force
  - 200% / 250% average pre-stretch level
  - 10" diameter roll capacity
  - 20" height roll capacity
  - OPTIONAL pre-stretch ratio of 230% / 300%
- Requirements:

Part Number	Description	Number of Teeth
301339	Drive Gear	17
301340	Lower Fixed Gear	46
301341	Upper Fixed Gear	42
301342	Slip Gear	46/42



### NOTE

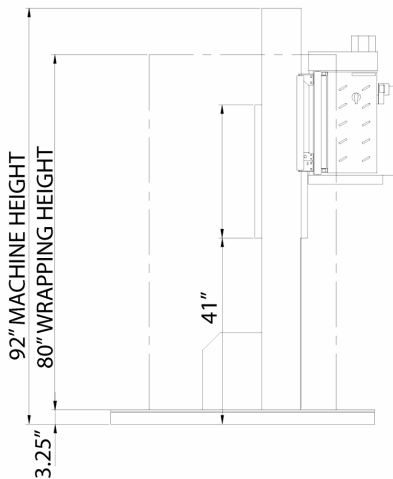
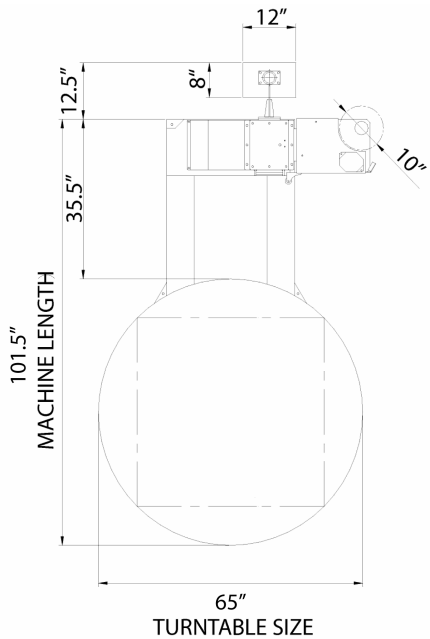
Actual measured pre-stretch level may vary depending on film type (thickness) and film force applied to the load.

# SYSTEM OVERVIEW PRINTS



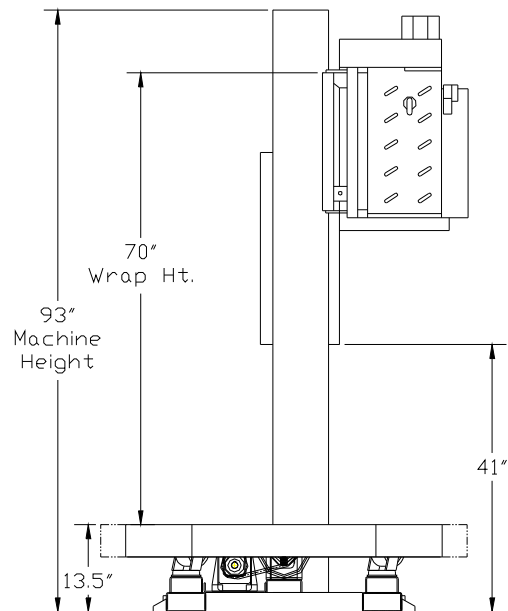
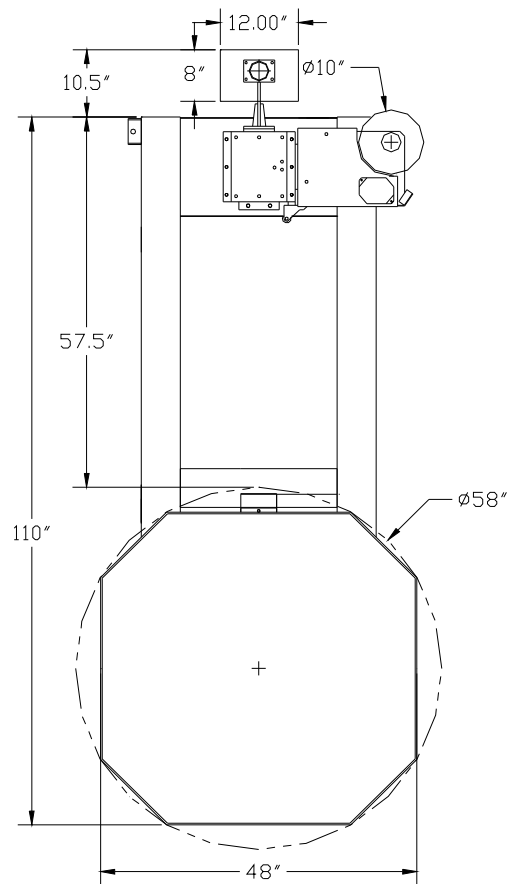
**NOTE**

Shown below are STANDARD assembly drawings. It may not reflect your purchased system, especially when optional items are added. Refer to assembly drawings shipped inside the electrical enclosure for more detail information.



*Exhibit 1-1: Predator XS Low Profile Overview Layout*

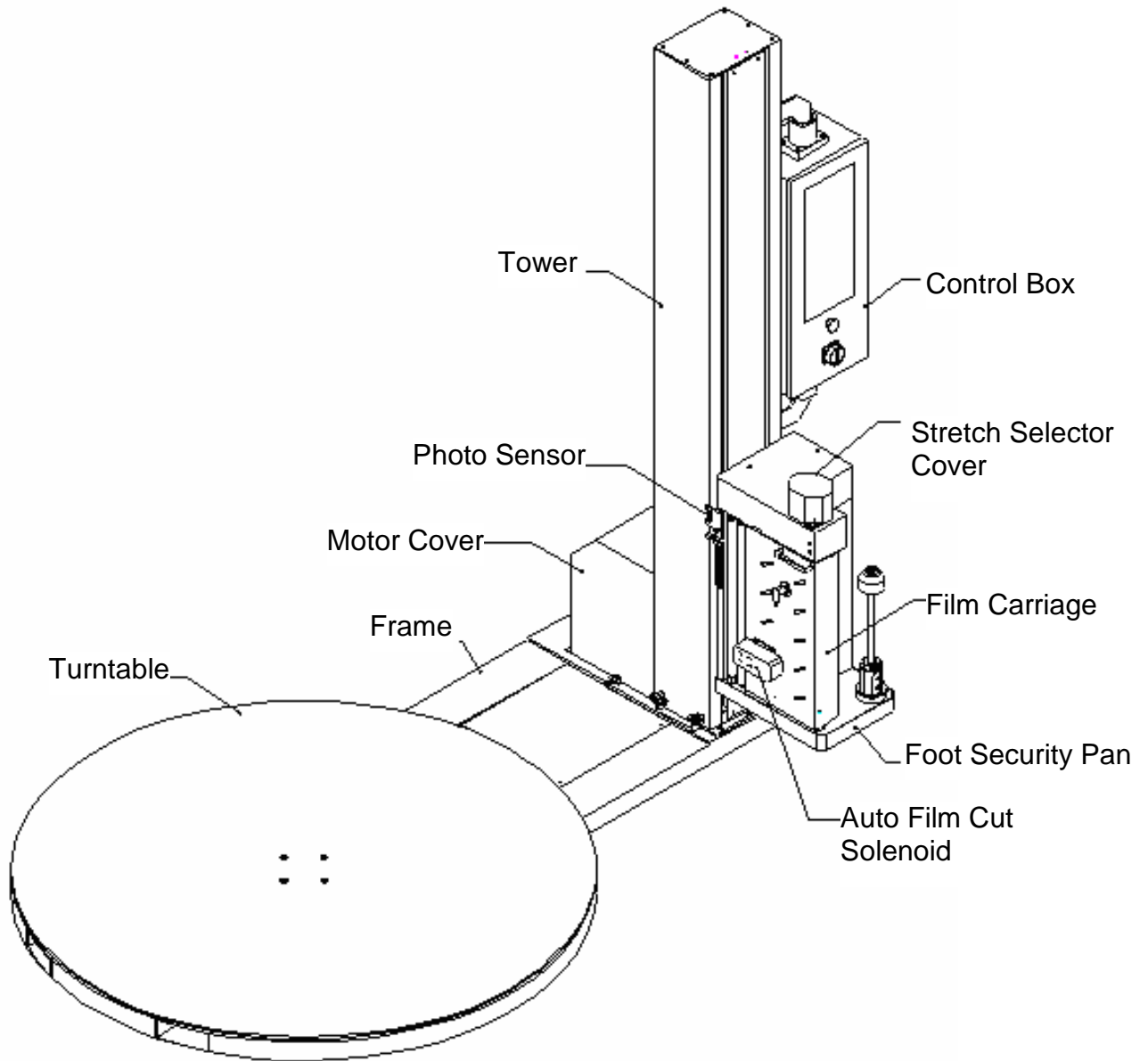




*Exhibit 1-2: Predator XS High Profile Overview Layout*

# SYSTEM DESCRIPTION

Shown below is the machine description.



*Exhibit 1-3: Predator XS Low Profile Machine Description*

HIGHLIGHT INDUSTRIES, INC.

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Predator XS Turntable Stretch Wrapper Operation Manual

# Installation & Adjustments

# MACHINE PLACEMENT

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## Receiving and Inspections

The Predator Turntable Stretch Wrapper has gone through quality control tests at the factory before shipment. Upon receiving, please do the following:

1. Inspect the entire machine for visual damage during shipment. If found, immediately report this damage to the truck line. *Highlight Industries, Inc.* has taken every precaution during the packaging and loading of this equipment. However, it is YOUR RESPONSIBILITY to inspect for damage before installation.
2. Make sure the part or serial number indicated on the machine corresponds with the part number of your order.

## Positioning of the Machine

Place the Predator Turntable Stretch Wrapper close to an area where you will be wrapping your pallet loads. Make sure that there is sufficient room to load/unload the machine and that you do not stretch the wiring cable. Remember, you will need to provide electrical service to a 120 VAC, 15-Amp outlet.

## Floor Weight Bearing/Stress Tolerance

The floor must be able to bear the weight of the machine, the weight of the maximum load, plus a safety factor. The floor must also be able to tolerate the stress of the machine's operation. If the fork trucks will operate on the same weight bearing area, add the weight of the trucks to the weight bearing stress tolerance requirements.

The Predator can be installed on any type of floor constructions that meets the weight bearing and stress tolerance requirements.

**WARNING**

The Predator must be anchored securely to the floor, using the type of anchor recommended for your floor.

# MACHINE SET-UP

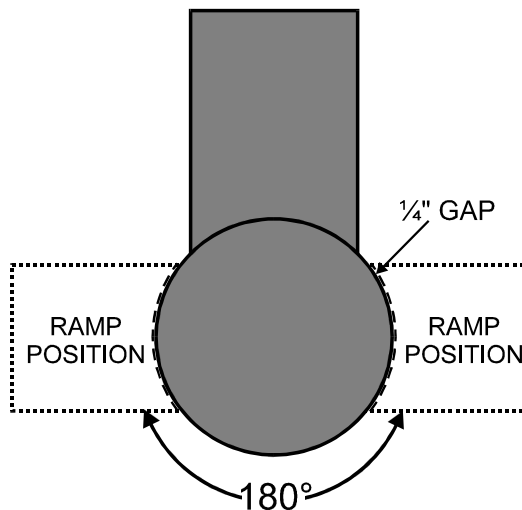
It is very important to read all instructions before undertaking any of these steps. The following steps should help achieving a safe and quick machine set-up.

1. Place skidded machine close to the designated wrap area. Remove all shipping fasteners holding the machine to the pallet. The machine may be crated with the tower tilted down with the motor cover front carriage roller removed for shipping purpose.

**WARNING**

It is very important that the system be leveled.  
Uneven floor will cause premature turntable support roller failure.

2. Place forks of the forklift through the tubes provided at the rear base of the module, remove the machine from these skids, and place it at the designated wrap area.
3. If the OPTIONAL ramp (Part Number #600086) is purchased:  
Select a ramp position as illustrated below. The ramp can be positioned anywhere in a 180° rotation around the front of the turntable. There should be a 1/4" gap between the turntable and the ramp. The ramp should be fully supported by the floor. Both the ramp and the machine should be lagged to the floor.



*Exhibit 2-1: Ramp Positioning for Predator XS Low Profile*

## Power and Safety Wiring Checks

1. Using a voltage meter, check the AC voltage coming to the system to insure proper voltage is present.
2. Make sure the “E-STOP” button is pressed in. Turn the disconnect switch to ON position.
3. Pull the “E-STOP” button on the operator panel out. Power should be applied to the frequency drives, operating touch-panel, photoelectric sensors, switches, and LED’s.
4. Press the “E-STOP” button. Make sure all machine power is completely removed when the “E-STOP” is depressed. Pull the “E-STOP” button out to resume.
5. Open the film carriage door. Make sure all machine power is completely removed when the carriage door is open. Close the film carriage door to resume.
6. Open the electrical control box. Make sure all machine power is completely removed when the electrical control box is open. Close the electrical control box to resume.
7. Trip the carriage foot security bar. Make sure all machine power is completely removed when the carriage foot security bar is tripped. Clear the bar to resume.

## PLC’s Input Module Checks

1. Open the electrical control box, and insert the key latch onto the safety door switch.
2. Depress push buttons and activate selector switches on the operator panel, check for each corresponding input lights on the front face of PLC.
3. Block the “Product Height Detection” photoelectric sensor (located on the film carriage), check for corresponding input light on the front face of PLC.
4. Trigger magnetic proximity and limit switch sensors, check each corresponding input lights on the front face of the PLC.

**WARNING**

Do NOT remove or modify the fixed upper and lower limit switch stops.

5. Remove the key latch, and close the electrical control box to resume.

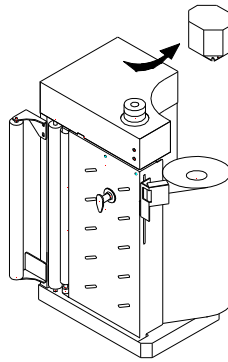
# PRE-STRETCH ADJUSTMENT

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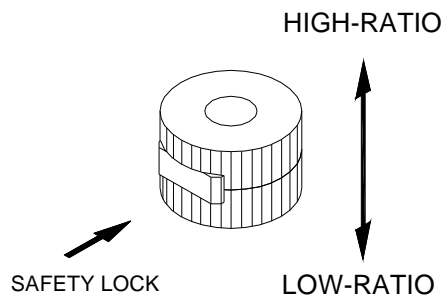
## Pre-Stretch Percentage Change

To change the pre-stretch percentage, follow the procedure below:

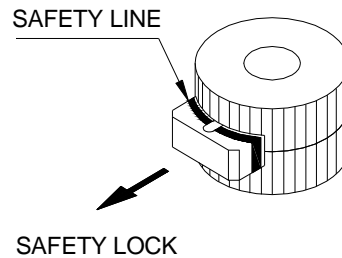
1. Turn the main disconnect switch off.
2. Remove the knob cover on the film carriage.



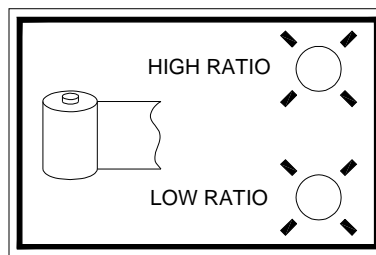
3. Push the safety lock and slide the knob to change the pre-stretch percentage. Lift the knob for the high percentage, or lower the knob for low percentage. Standard percentages are 200% (low) and 250% (high).



4. To insure safety and correct operation of the stretch gears, check the following items:
  - a) The safety line is back to its home position following the profile of the knob.



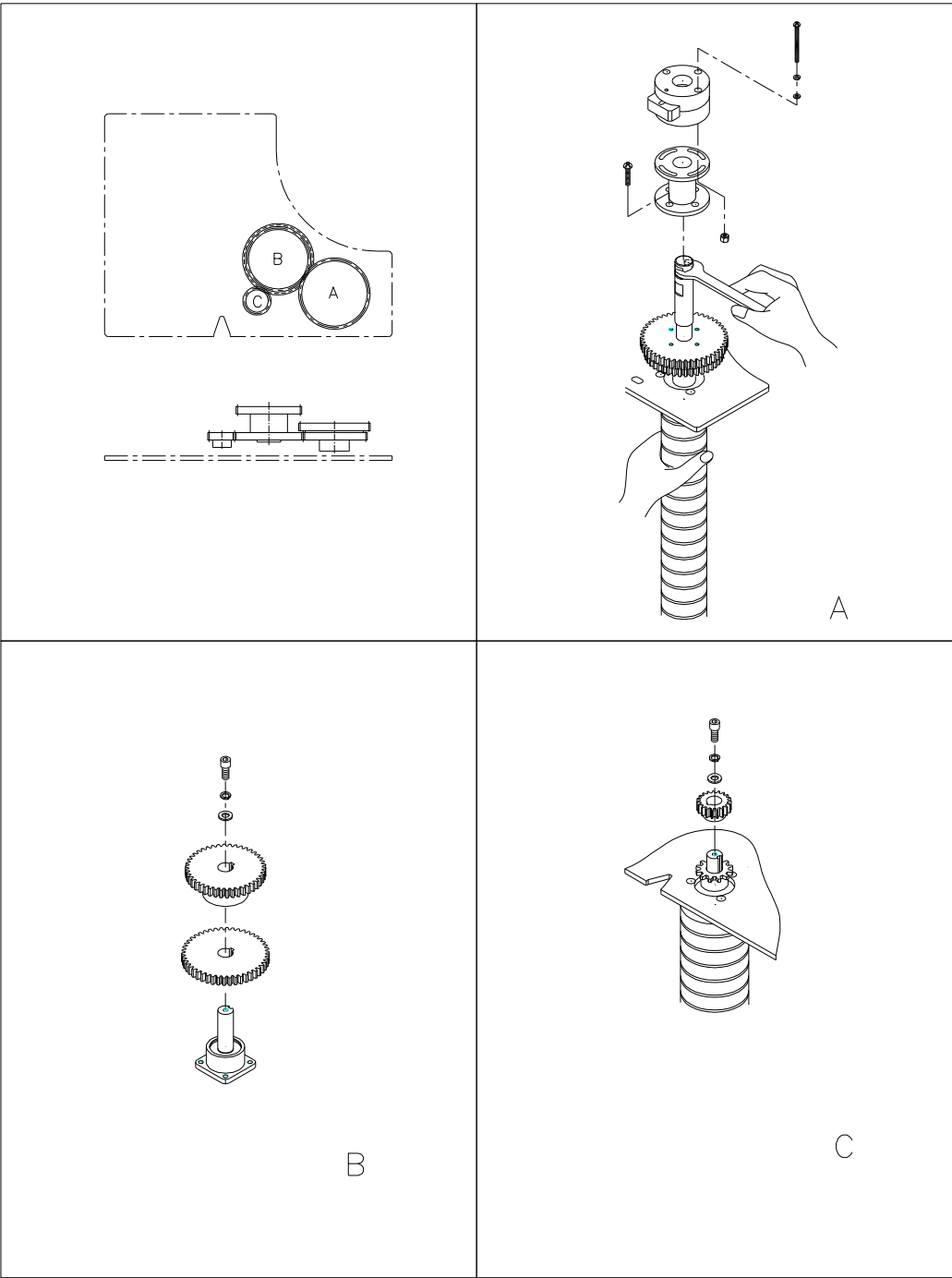
- b) The light indicates the selected pre-stretch percentage.





# Replacing Pre-Stretch Percentage Gear Set

To swap the pre-stretch percentage gear set, follow the illustration below:



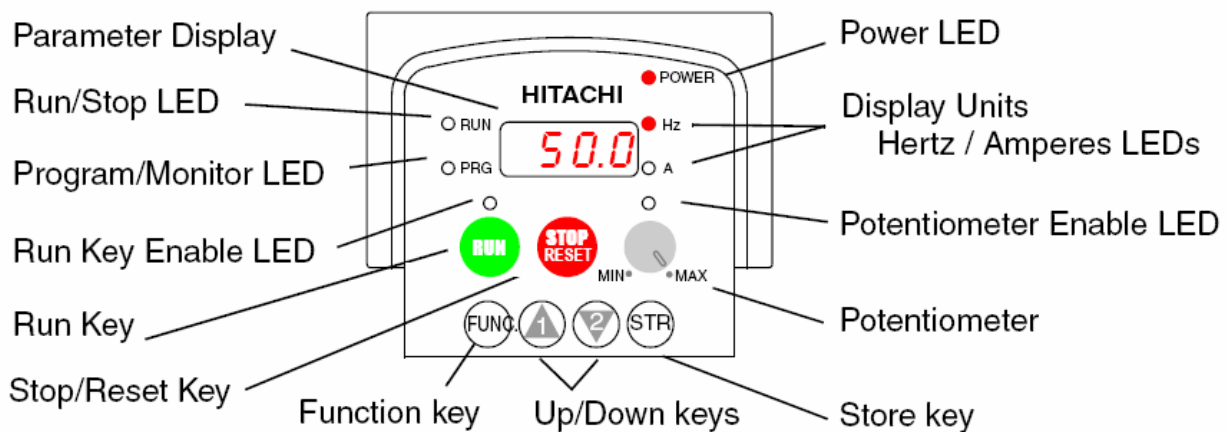
*Exhibit 2-2: Pre-Stretch Percentage Gear Set Swap*

# FREQUENCY DRIVE

An electronic frequency motor drive is a device that controls the 3-phase AC induction motor's speed by varying the frequency of the power sent to the motor. The Predator Turntable Stretch Wrapper uses Hitachi® L100-Series Adjustable Frequency Drives.

## Hitachi AC Drive Digital Keypad Description

The digital keypad includes the displays panel and the keypad. The display panel provides the parameter display and shows the operation status of the AC drive. The keypad provides programming and control interface.



*Exhibit 2-3: Description of Hitachi AC Drive Digital Keypad*

1. **Run/Stop LED:** ON when the inverter output is ON and the motor is developing torque (Run Mode), and OFF when the inverter output is OFF (Stop Mode).
2. **Program/Monitor LED:** This LED is ON when the inverter is ready for parameter editing (Program Mode). It is OFF when the parameter display is monitoring data (Monitor Mode).
3. **Run Key Enable LED:** ON when the inverter is ready to respond to the Run key. OFF when the Run key is disabled.
4. **Run Key:** Press this key to run the motor (the Run Enable LED must be ON first). Parameter F004, Keypad Run Key Routing, determines whether the Run key generates a Run FWD or Run REV command.
5. **Stop/Reset Key:** Press this key to stop the motor when it is running (uses the programmed deceleration rate). This key will also reset an alarm that has tripped.

6. Potentiometer: Allows an operator to directly set the motor speed when the potentiometer is enabled for output frequency control.
7. Potentiometer Enable LED: ON when the potentiometer is enabled for value entry.
8. Parameter Display: A 4-digit, 7-segment display for parameters and function codes.
9. Display Units, Hertz/Amperes: One of these LED's will be ON to indicate the units associated with the parameter display.
10. Power LED: This LED is ON when the power input to the inverter is ON.
11. Function Key: This key is used to navigate through the lists of parameters and functions for setting and monitoring parameter values.
12. Up/Down Keys: Use these keys alternately to move up or down the lists of parameter and functions shown in the display, and increment/decrement values.
13. Store Key: When the unit is in Program Mode and you have edited a parameter value, press the Store key to write the new value to the EEPROM.

## Hitachi AC Drive Keypad Navigational Map

The front panel keypad is used to navigate to any parameter or function. The diagram below shows the basic navigational map to access to these items.

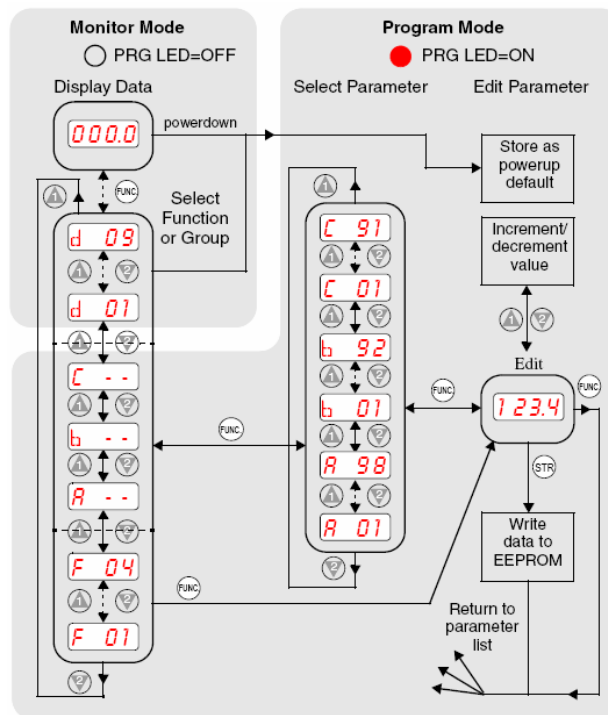


Exhibit 2-4: Navigation of Hitachi AC Drive Digital Keypad

## Hitachi AC Drive Fault Detection

The microprocessor in the AC frequency drive detects a variety of fault conditions and captures the event, recording it in a history table. The inverter output turns off or “trips” similar to the way a circuit breaker trips due to over-current condition. Most faults occur when the motor is running (refer to illustration below). However the frequency drive could have an internal fault and trip in Stop mode. In either case, fault can be cleared by pressing the Stop/Reset key.

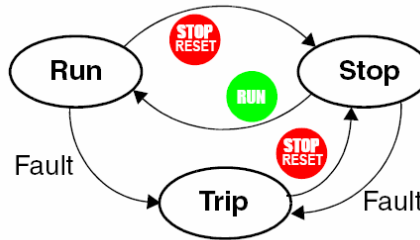


Exhibit 2-5: Fault Detection of Hitachi AC Drive

## Hitachi AC Drive Error Codes and Troubleshooting

An error code will appear on the display automatically when a fault causes the inverter to trip. The following tables lists the cause associated with the error.

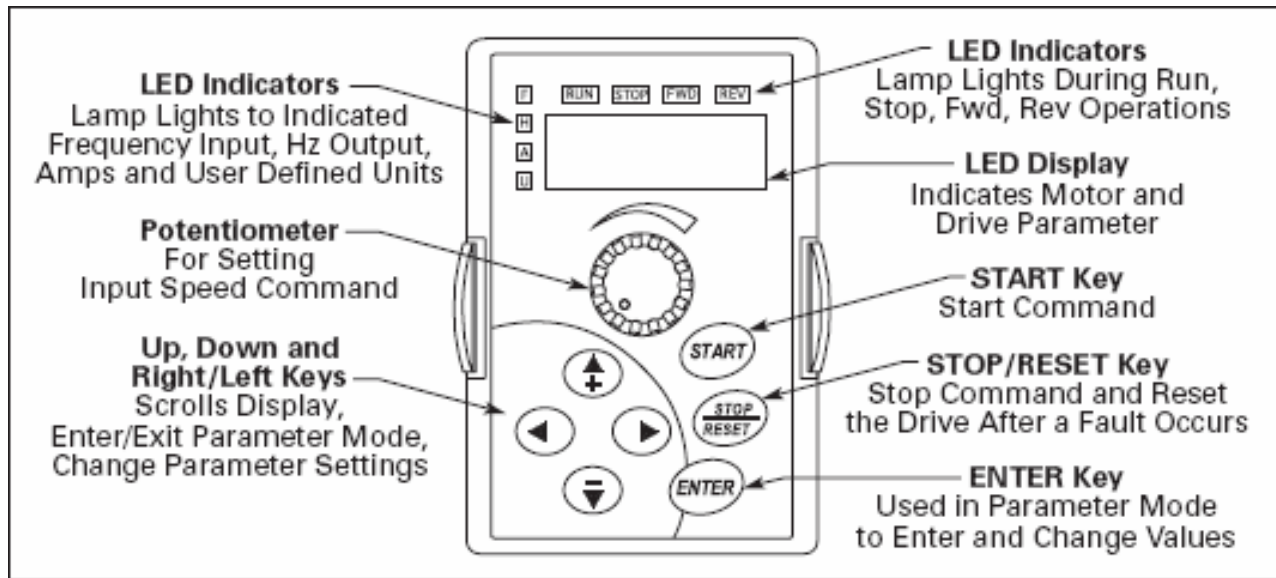
Error Code	Name	Cause(s)
E01	Over current event while at constant speed	The inverter output was short-circuited, or the motor shaft is locked or has a heavy load. These conditions cause excessive current for the inverter, so the inverter output is turned OFF.  The dual-voltage motor is wired incorrectly.
E02	Over current event during deceleration	
E03	Over current event during acceleration	
E04	Over current event during other conditions	
E05	Overload protection	When a motor overload is detected by the electronic thermal function, the inverter trips and turns OFF its output.
E14	Ground fault	The inverter is protected by the detection of ground faults between the inverter output and the motor during power up tests. This feature protects the inverter and does not humans.
E21	Inverter thermal trip	When the inverter internal temperature is above the threshold, the thermal sensor in the inverter module detects the excessive temperature of the power devices and trips, turning the inverter output OFF.

## **OPTIONAL High Profile Turntable**

Predator XS with high profile turntable utilizes Cutler-Hammer® MVX9000 Adjustable Frequency Drive to be used with the ¾ HP turntable motor.

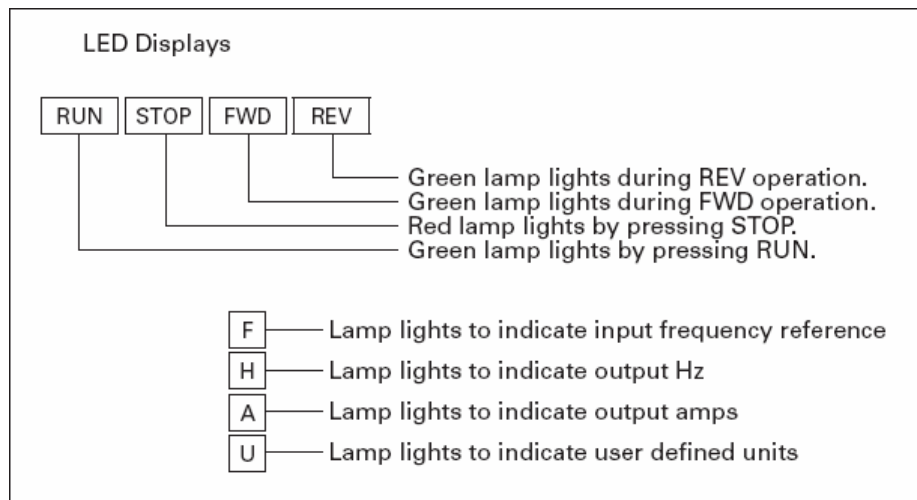
### ***Cutler-Hammer AC Drive Digital Keypad Description***

The digital keypad includes the displays panel and the keypad. The display panel provides the parameter display and shows the operation status of the AC drive. The keypad provides programming and control interface.








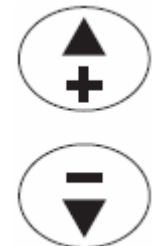

*Exhibit 2-6: Description of Cutler Hammer AC Drive Digital Keypad*

### ***Cutler-Hammer AC Drive LED Indicators***



*Exhibit 2-7: Explanation of the LED Indicators on Cutler-Hammer AC Drive*

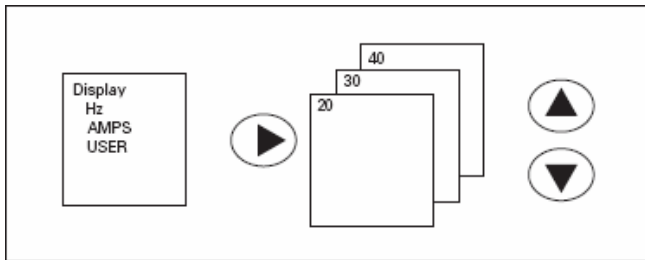
## Cutler-Hammer AC Drive Keypad Operators

	<p><b>START</b> This button operates as Start button for normal operation.</p>
	<p><b>ENTER</b> This button in the parameter edit mode is used to enter the programming mode and enter the parameter selection.</p> <ul style="list-style-type: none"> <li>• Used for parameter edit confirmation, acceptance (confirmation) of the edited parameter value with exit from parameter edit mode.</li> </ul>
	<p><b>STOP/RESET</b> This button has two integrated operations. The button operates as Stop button for normal operation. In the parameter edit mode it is used to cancel previous action and back-up one step, and in fault mode it is used to reset the fault.</p> <p><b>STOP</b></p> <ul style="list-style-type: none"> <li>• Motor STOP from the panel; active control place has to be selected at "Panel"</li> </ul> <p><b>RESET</b></p> <ul style="list-style-type: none"> <li>• Used for active fault resetting</li> <li>• In programming mode press RESET key to cancel previous action and back up one step</li> </ul>
	<p><b>LEFT Arrow</b></p> <ul style="list-style-type: none"> <li>• Navigation button, movement to left</li> <li>• In display mode, enter parameter group mode</li> <li>• In parameter edit mode, exits mode, back up one step</li> <li>• Cancels edited parameter (exit from a parameter edit mode)</li> </ul>
	<p><b>RIGHT Arrow</b></p> <ul style="list-style-type: none"> <li>• Navigation button, movement to right</li> <li>• Enter parameter group mode</li> <li>• Enter parameter mode from group mode</li> </ul>
	<p><b>UP and DOWN Arrows</b></p> <ul style="list-style-type: none"> <li>• Move either up or down the group list in order to select the desired group menu.</li> <li>• Move either up or down the parameter list in order to select the desired parameter in the group.</li> <li>• Increasing/decreasing of reference value on the keyboard (when selected).</li> </ul>
	<p><b>SPEED POT</b></p> <ul style="list-style-type: none"> <li>• Increase/decrease reference value on the keypad (when selected)</li> </ul>

## Cutler-Hammer AC Drive Display Messages

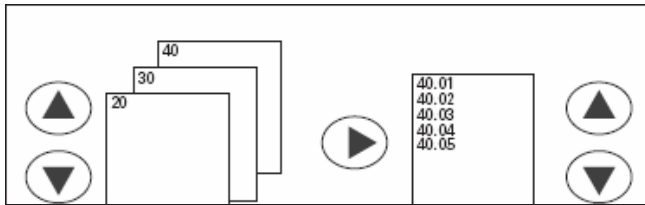
	The AC Drive Input Frequency Reference.
	The Actual Operation Frequency at the output terminals T1, T2, and T3.
	The output current present at the output terminals T1, T2, and T3.
	The value of the user defined units.
	The output voltage present at the output terminals T1, T2, and T3.
	The temperature of the unit.
	The AC Drive forward run status.
	The AC Drive reverse run status.
	Parameter group selection.
	The specific parameter selection.
	“End” displays for approximately 1 second if input has been accepted. After a parameter value has been set, the new value is automatically stored into memory.
	“Err” displays if the input is invalid.

## Cutler-Hammer AC Drive Parameter Settings



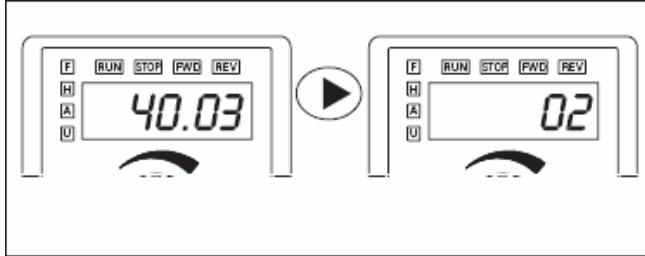
### Page Groups

Parameters are grouped in a page arrangement. Each page will contain a list of the parameters associate with that group. Move into the page groups from the display menu by using the right arrow key.



### Parameter Groups

Select the desired parameter group by using the up and down keys. Once the parameter group is located, use the right arrow key to enter the group. Use the up and down keys to scroll the parameters on that page.

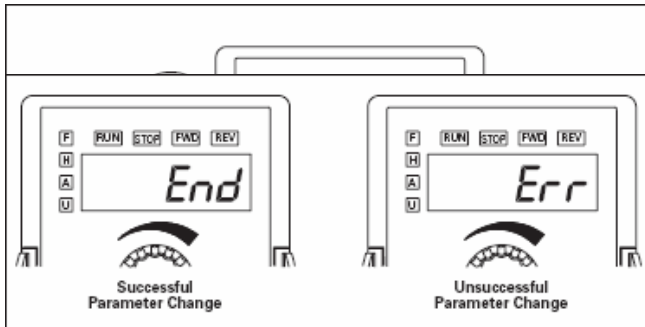


### Parameters

Once the parameter has been located, use the right arrow key to view the parameter setting.

### Programming Mode

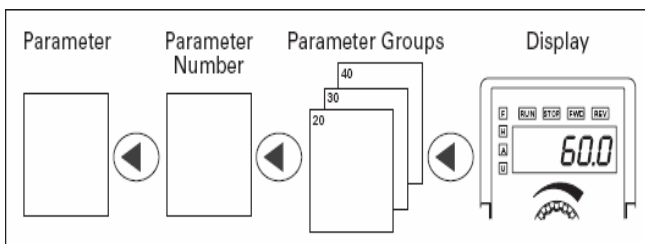
Use the ENTER key to enter the programming mode. The displayed parameter will flash indicating the parameter can be changed.



### Parameter Changes

Use the up and down keys to change the parameter setting. Press ENTER to enter the new parameter setting.

If the parameter change is successful, the keypad will display the end (End) message and return to the parameter number display. If the parameter change is unsuccessful the keypad will display an error (Err) message, the parameter will not be changed, and the parameter number will again be displayed.



### To Exit Programming Mode

Pressing left arrow backs out of Parameter Mode and returns you to Display Mode.



## Cutler Hammer AC Drive Error Codes and Troubleshooting

The AC drive has a comprehensive fault diagnostic system that includes several different alarms and fault messages. Once a fault is detected, the corresponding protective functions will be activated. The following faults are displayed as shown on the AC drive digital keypad display.



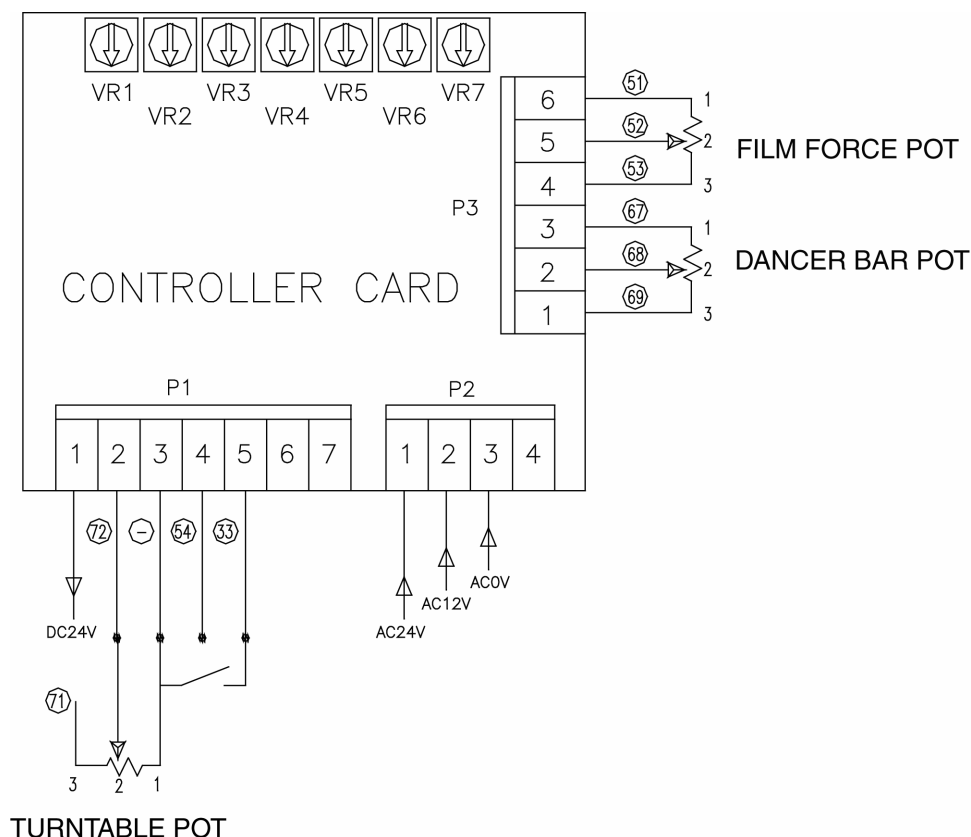
### NOTE

Faults can be cleared by resetting at the keypad.

Fault Name	Fault Descriptions	Corrective Actions
<b>OC</b>	The AC drive detects an abnormal increase in current.	<ol style="list-style-type: none"> <li>1. Check the wiring connections between the AC drive and motor for possible short circuits.</li> <li>2. Check for excessive loading conditions at the motor.</li> </ol>
<b>OH</b>	The AC drive temperature sensor detects excessive heat.	<ol style="list-style-type: none"> <li>1. Make sure the ambient temperature falls within the specified temperature range.</li> <li>2. Remove any foreign objects from the heat-sink, and check for possible dirty heat-sink fins.</li> </ol>
<b>OL</b>	The AC drive detects excessive drive output current.	Check if the motor is overloaded.
<b>OL1</b>	Internal electronic overload trip.	<ol style="list-style-type: none"> <li>1. Check for possible motor overload.</li> <li>2. Check electronic thermal overload setting.</li> </ol>
<b>OL2</b>	Motor overload	Reduce the motor load.

# FILM FEED CONTROLLER CARD

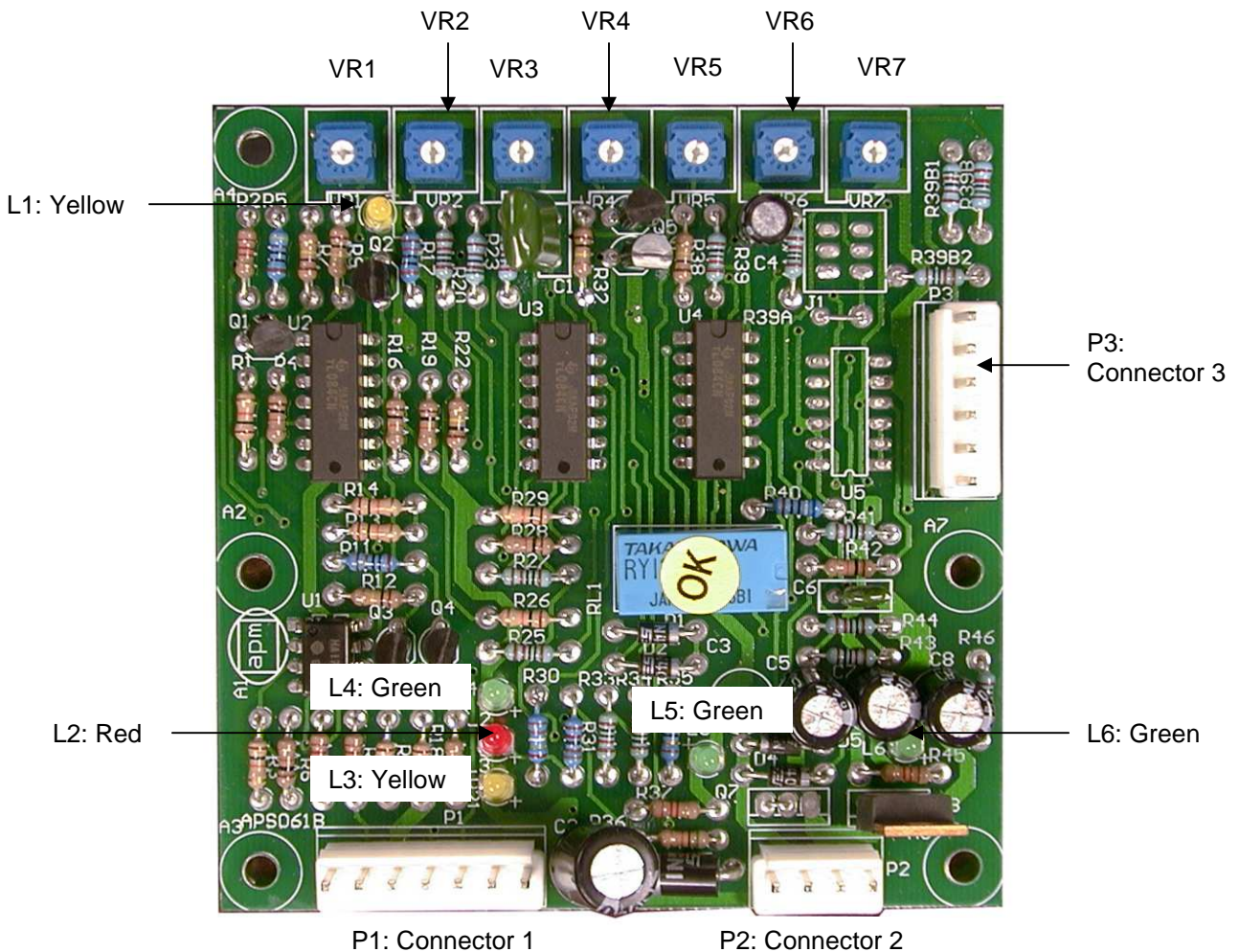
The film feed (delivery) controller card regulates the speed of the pre-stretch motor to determine the amount of film force applied to a product. The card receives inputs from three variables: the “Film Force” potentiometer dial, located on the operator panel; the dancer bar potentiometer, located underneath the carriage cover, and the turntable speed reference from the frequency drive.



*Exhibit 2-8: Schematic of the Film Feed Controller Card*

## Film Feed Controller Card Description

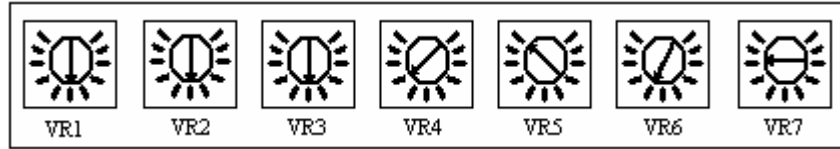
The layout of the film feed controller card is shown below.



*Exhibit 2-9: Description of the Film Feed Controller Card*

1. VR1, VR2, and VR3 do not have any functions.
2. VR4 determines the maximum speed of the pre-stretch motor. Recommended setting is 70%.
3. VR5 sets the pre-stretch motor speed in manual feeding. Turn clockwise to increase; counter-clockwise to decrease. Recommended setting is 100%; or max out.
4. VR6 is the “tight” film tension adjustment to achieve the best linear control from the dancer bar. Turn clockwise to increase; counter-clockwise to decrease. Recommended setting is 60%.

5. VR7 is the “loose” film tension adjustment to achieve the best linear control from the dancer bar. Turn clockwise to increase; counter-clockwise to decrease.  
Recommended setting is 80%.

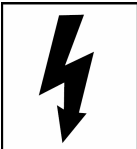


*Exhibit 2-10: Recommended Settings for the Film Feed Controller Card Trim Pots*

6. L1 (yellow) and L3 (yellow) are indicators for VR6 and VR7. The higher the settings, the brighter the lights will be. This should be used for reference only.
7. L2 (red) is an indicator for the pre-stretch motor. The faster the motor is turning, the brighter the light will be. The light will be solid on when the pre-stretch motor is not in operation. This should be used for reference only.
8. L4 (green) indicates the 24 VDC output from the film delivery board. The light should be on as long as power is supplied to the machine.
9. L5 (green) and L6 (green) indicate the 120 VAC input to the film delivery board. The light should be on as long as power is supplied to the machine. lost

## Replacing the Film Feed Controller Card

To replace the film feed controller card, perform procedure below in sequence.



### **HIGH VOLTAGE!**

Wiring work should be carried out only by qualified personnel. Otherwise, there is a danger of electric shock or fire.

1. Set trim pots VR1 through VR6 as recommended above.
2. Remove power from the machine.
3. Remove the old film feed controller card by disconnecting the three wire harness plugs and loosening the four stand-off screws.
4. Place the new card in position, and fasten the four stand-off screws. Reconnect the three wire harness plugs.

5. Switch the machine disconnect to ON position, and latch the electrical control box door security switch. Use extra caution when working inside the panel with the machine power on.
6. Check if green lights (L4, L5, and L6) on the card are all on. This indicates that the voltages to and from the card are correct.
7. Using a voltage meter, perform the following tests once the card is installed.
  - 7.1. Inspect the "Film Force" speed potentiometer:
    - 7.1.1. Check the resistance between wire #51 and #53 on the "Film Force" speed potentiometer connection the on back side of the main operator panel. The resistance should be 5K $\Omega$ .
    - 7.1.2. Check the resistance between wire #51 and #52 and turn the "Film Force" dial. The resistance should increase as the dial is turned clockwise, and decrease as it is turned counter-clockwise.
    - 7.1.3. Check the resistance between wire #51 and #53 on connector P3. The resistance should be 5K $\Omega$ .
    - 7.1.4. Check the resistance between wire #51 and #52 and turn the "Film Force" potentiometer dial. The resistance should increase as the dial is turned clockwise, and decrease as it is turned counter-clockwise.
  - 7.2. Inspect the dancer bar speed potentiometer dial:
    - 7.2.1. Locate the dancer bar speed potentiometer on top of the carriage. Check the resistance between wire #67 and #69 on the potentiometer connection. The resistance should be 5K $\Omega$ .
    - 7.2.2. Check the resistance between wire #67 and #68 on the dancer bar potentiometer connection. The resistance should be about 1.1K $\Omega$  with the dancer bar at home position and increase as the dancer bar is extended.
    - 7.2.3. Check the resistance between wire #67 and #69 on connector P3. The resistance should be 5K $\Omega$ .
    - 7.2.4. Check the resistance between wire #67 and #68 on connector P3. The resistance should be about 1.1K $\Omega$  with the dancer bar at home position and increase as the dancer bar is extended.
  - 7.3. Check the voltage between wire #AC0V and wire #AC12V on connector P2. It should read around 12 VAC.
  - 7.4. Check for continuity between wire #72 and (-) on connector P1.
  - 7.5. Run the turntable in Manual mode, and check for continuity between wire #72 and #54.
  - 7.6. Run the turntable in Manual mode, and check the voltage between wire (A) and #72 on connector P1. It should read around 9 VDC with the turntable at full speed and approach 0 VDC as the turntable is slowed down.

# Optional Height Detection Sensor

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The optional ultrasonic sensor may be purchased to replace the standard height detection photoelectric sensor.

## Ultrasonic Sensing Concept

Ultrasonic sensors emit and receive sound at frequencies above the range of human hearing (ultrasound; about 20 kHz). They sense objects by measuring the time it takes to reflect the ultrasound waves from the object's surface and back to the receiver transducer, or by detecting an object's presence when it interrupts the transmission of sound from the emitter to an opposed receiver. Unlike infrared photoelectric sensing, which is based on an object's opacity or reflectivity to light, ultrasonic sensing depends on object's density—it's ability to reflect or block sound. This makes ultrasonic sensing practical for detection of clear materials and other objects that are difficult to detect with photoelectric sensors.

# Optional Scale Package

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The optional scale package allows the user to quickly measure the weight of a package placed on the machine. To operate correctly and efficiently the scale needs to be configured with the correct settings. Below are instructions on how to configure the scale and the settings that are pre-programmed by Highlight Industries, Inc.

## Setting Configuration

Step 1: Turn the scale display over and turn off the scale power.

Step 2: Remove the two small screws holding a small plate on the back of the scale.

Step 3: Flip the switch under the plate to the right.

Step 4: Turn the scale power back on.

Step 5: Press the “PRINT / >>” button until the desired setting appears on the screen.

Step 6: Press the “ZERO” button to enter the parameter set-up.

Step 7: Press the “PRINT / >>” button until the display reads the correct setting and press the “SET / NET” button.

Step 8: Turn the power back off, flip the switch under the plate to the left, and turn the power back on.

Step 9: Replace the screws on the back cover and retighten the scale swivel grips on the side.

Step 10: The scale is now ready to use.

## Current Settings:

F1 = 5000

F2 = 100

F3 = 3

F4 = 100

F5 = 1

F6 = 8

F7 = 2%

F8 = 1

F9 = 1

F10 = 0

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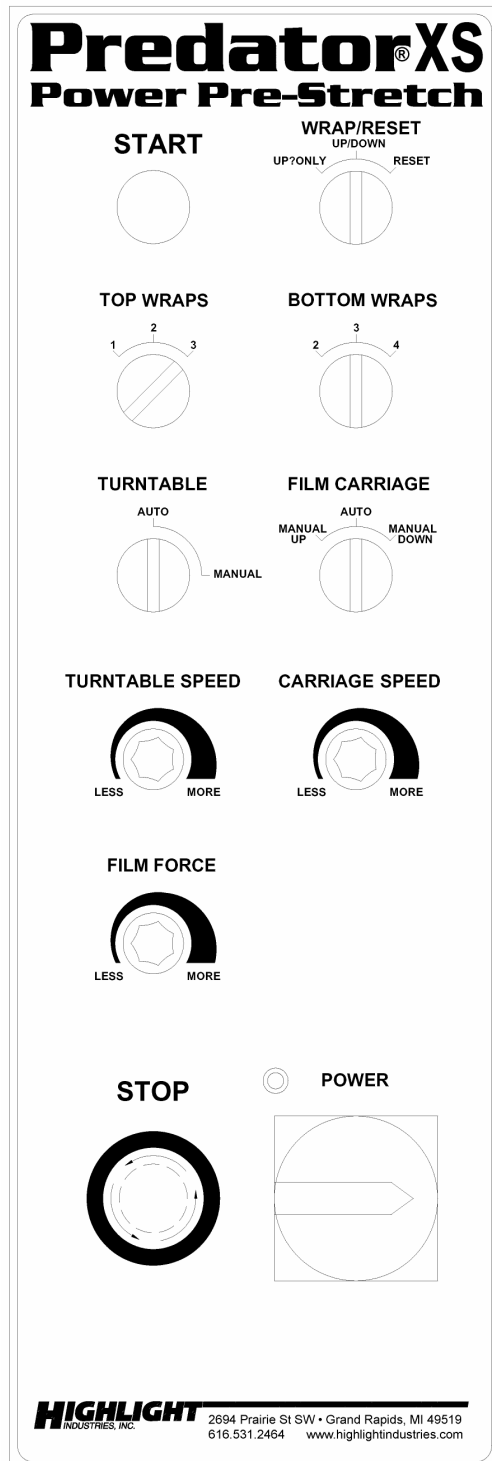
Predator XS Turntable Stretch Wrapper Operation Manual

# Operation Instructions



# OPERATOR CONTROLS

The operator panel for Predator XS is shown and described as follows:



## START

The “Start” button initiates all operations, in automatic or manual modes. When the system is in automatic mode, the button LED stays on until the wrapping cycle is complete. In manual mode, the button LED flashes until the operation is stopped.

## WRAP/RESET

Switch to “Reset” and press the “Start” button to clear any operation. The film carriage will lower to the bottom limit switch and the turntable will return to its home position.

Switch to “Up Only” to select automatic *single wrap* mode. Press the “Start” button to begin cycle. The film carriage will begin applying the bottom wraps, travel upwards to top of the product, apply top wraps, and then stops. Press the “Start” button again to lower the film carriage to the bottom limit switch.

Switch to “Up/Down” to select automatic *double wrap* mode. Press the “Start” button to begin cycle. The film carriage will begin applying the bottom wraps, travel upwards to top of the package, apply top wraps, and travel downwards to finish cycle.

## TOP WRAPS

Switch to the desired number of rotations for applying wraps to the top of the product.

## BOTTOM WRAPS

Switch to the desired number of rotations for applying wraps to the bottom of the product.

## TURNTABLE

To run an automatic mode, switch to “Auto” and press the “Start” button. To jog the turntable manually, switch to “Manual” and press the “Start” button. To stop the turntable, switch to “Auto”, or press the “Stop” button.

**FILM CARRIAGE**

To run an automatic mode, switch to “Auto” and press the “Start” button. To raise or lower the film carriage manually, switch to “Manual Up” or “Manual Down”, and press the “Start” button. To stop, switch to “Auto”, or press the “Stop” button.

**TURNTABLE SPEED**

The “Turntable Speed” potentiometer dial determines the speed of the turntable in both automatic and manual modes. Turn clockwise to increase, counter-clockwise to decrease. Adjusting this will affect the film overlap. The maximum turntable speed is 12 rotation-per-minute (RPM).

**CARRIAGE SPEED**

The “Carriage Speed” potentiometer dial determines the speed of the turntable in both automatic and manual modes. Turn clockwise to increase, counter-clockwise to decrease. Adjusting this will affect the film overlap.

**FILM FORCE**

The “Film Force” potentiometer dial determines the amount of film tension applied to the load in a wrapping cycle. Turn clockwise to increase, counter-clockwise to decrease. The best product wrapping and proper dancer bar response is achieved when the dancer bar is set to between half and two thirds of its full extension. This gives the proper force to load setting and allows a good proportion of the spring return travel on the dancer bar to be used when the turntable slows down at the end of cycle.

**STOP**

The “STOP” button cuts machine operation and removes power to frequency drives. In the event this button is pressed during the course of operation, it is necessary to pull this button fully out to reset the machine.

**WARNING**

If the “STOP” button is depressed while the turntable is rotating, the turntable will NOT stop immediately, but rather it will coast and decelerate to a stop.

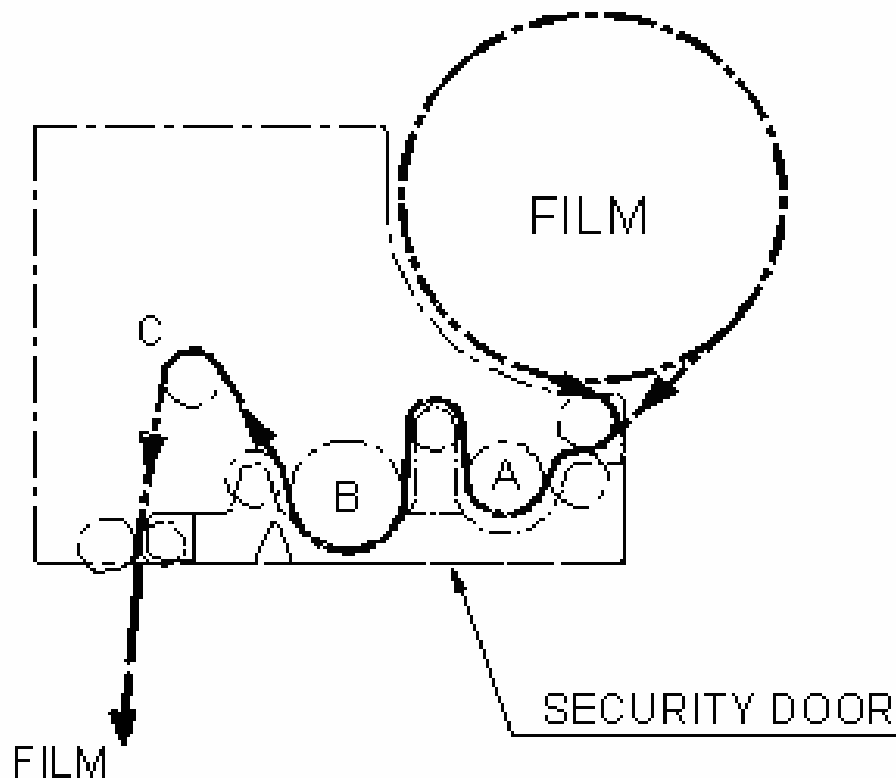
**POWER INDICATOR LIGHT**

The LED indicates that power is supplied to the machine.

# FILM LOADING

Follow procedure below to thread film onto the carriage:

1. Rotate the handle and open the film carriage.
2. Pull six (6) feet of film off the film roll.
3. Follow the diagram below and “thread” the 6-foot film tail all the way through the rollers.
4. Close the film carriage and rotate the handle in the opposite direction to lock.
5. Attach the film securely to the pallet. Tying the end of the film in a knot often helps to secure the film to the pallet.



*Exhibit 3-1: Film Threading Diagram*

# MACHINE OPERATION

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## Normal System Start-Up

After the machine has been positioned and supplied with proper voltage, you are ready to begin operation. Read thoroughly and follow these steps to operate your system:

1. Place product on the turntable
2. Make sure the turntable is at home position.
3. Make sure the film carriage is situated at the max down position.
4. Thread the film as instructed, and attach it to the product.
5. Set the desired numbers for top and bottom wrap counts.
6. Select the “Up Only” or “Up/Down” wrapping mode.
7. Turn the “Turntable” and “Film Carriage” selector switches to Auto position.
8. Press the “Start” button to initiate cycle.

## Stop Condition

Follow procedure below in the event of emergency.

1. Press the “STOP” button. This cancels the current wrapping cycle and immediately stops the system.
2. Correct the problem.
3. Pull the “STOP” button out, and then perform normal system start-up procedure.

**NOTE**

After pressing the “E-STOP” button, wait for at least 60 (sixty) seconds before pulling the button back out. This will allow the frequency drives to completely go off.

## Applying Reinforcement Wraps

Automatic operation can be paused in order to apply reinforcement wraps to an additional top sheet or corner boards on the product. Follow the procedure below.

1. Press the “Start” button as normal to initiate cycle.
2. As the carriage travels up, switch the “Turntable” selector from Auto to Manual. Both the turntable and the film carriage will pause.
3. Apply the top sheet or corner boards to the product.
4. Press the “Start” button to resume cycle. Leave the “Turntable” selector switch in Manual position. The turntable will now rotate in Manual mode.
5. Once the reinforcement wraps have been applied, switch the “Turntable” selector switch from Manual to Auto. The turntable will pause.
6. Press the “Start” button again to complete the automatic operation.

If the “Turntable” selector is switched from Auto to Manual while the carriage is traveling down, the carriage will travel back up and apply the top wraps before completing the wrap cycle. This to ensure the top sheet applied during the manual operation is properly wrapped into the product.

## Automatic Film Cut

The automatic film cut feature is always enabled in the automatic mode. On the last wrap revolution, the puncture solenoid, located on the film carriage, engages, tearing a small hole in the film. The powered film feed motor stops to allow the film force-to-load to increase the turntable rotates to its home position. The punctured film is stretched, until eventually cut.

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Predator XS Turntable Stretch Wrapper Operation Manual

# Maintenance

# PREVENTIVE MAINTENANCE

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As with all machinery, proper attention and maintenance is the key to long component life, maximum performance, and safe operation. By spending a few minutes reading and following these preventive measures, you should reduce the downtime and prolong the life of your system.

It is important to understand that these maintenance schedules are minimum recommendations. *Highlight Industries, Inc.* cannot possibly know, evaluate or advise the various trades in all schedules of periodic maintenance. Accordingly, anyone who maintains or services a stretch wrap machine must first satisfy himself/herself as to the schedules of preventive maintenance based on cycling operation and environmental locations.

**WARNING**

All maintenance operations require the equipment to be powered down and locked out for personnel safety.

## Lock-out/ Tag-out Procedures

Be sure that anyone performing any type of maintenance on this equipment is familiar with and is adhering to the lock-out/tag-out procedures set forth by the General OSHA or the State OSHA guidelines.

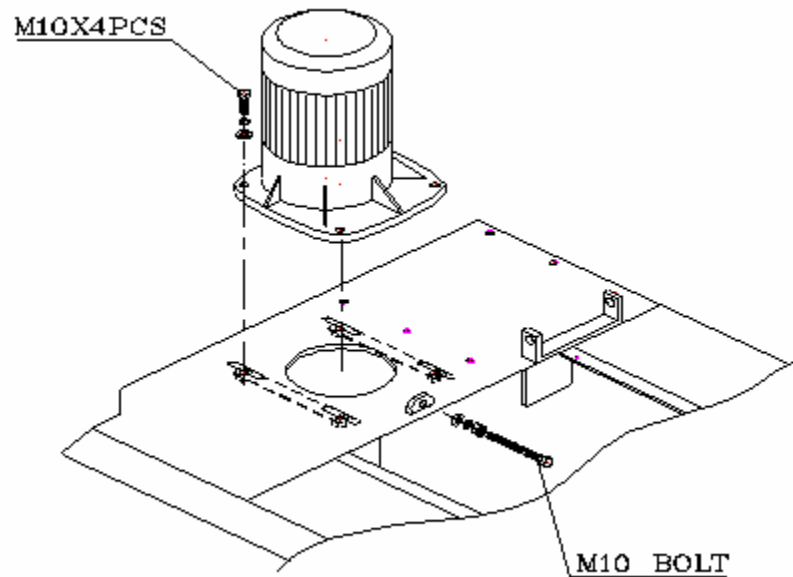
## Visual Checks

Visual checks should be conducted at least once per month:

1. Keep the machine and surrounding area as clean as possible, especially near moving components.
2. Check for loose hardware, especially set screws located in: sprocket hubs, bearing hubs, and flanges.
3. Check for oil leaks around the speed reducers.
4. Check for dry seals at the bearings.
5. Check for chain wear and proper tension on the power roller stretch sprockets. The correct amount of chain tension can be checked by pulling the chain taut and having 3/8" slack.
6. Check for loose electrical connections and for frayed cords and cables. Replace immediately any damaged cords and cables.

## Turntable Belt Adjustment

Refer to figure below to adjust the turntable belt. First, loosen the four motor flange (M10) screws. Turn the (M10) bolt on the adjuster tab until the belt is tensioned. Retighten the four motor flange screws.

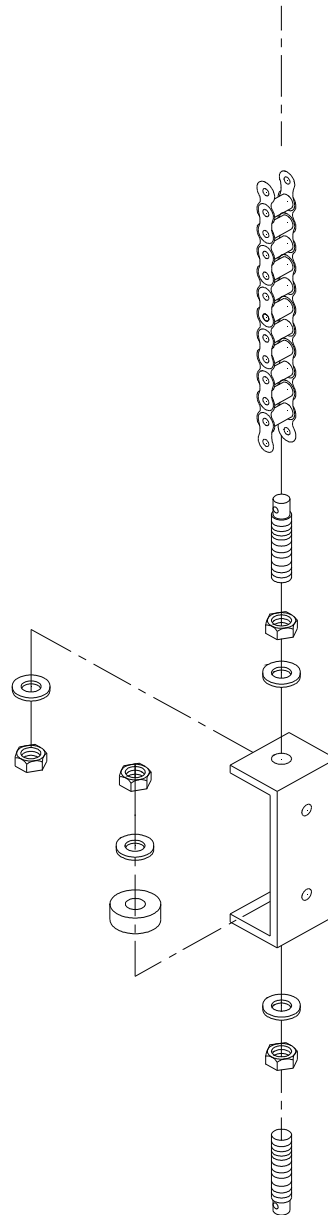


*Exhibit 4-1: Turntable Belt Adjustment*

## Film Carriage Lift Chain Adjustment

Refer to figure below to adjust the film carriage lift chain. First, loosen nut (M12) on the adjustment bracket. Turn the bottom bolt until desired tension is achieved. Retighten nut (M12). Note that the driving chain and adjustment bracket should be parallel with the moveable pulley base.





*Exhibit 4-2: Film Carriage Lift Chain Adjustment*

## Sprocket and Chains

All sprockets should be inspected for wear, and chains should be checked for proper tension and lubrication on a periodic basis. Failure to do so will lead to premature sprocket failure. Any general-purpose chain lube should be sufficient for lubrication. Replace chain guards when preventative maintenance is complete.

# MAINTENANCE SCHEDULE TABLE

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Part	Schedule	Service With
Turntable Reducer	Sealed, lubricated with premium lubricant. No maintenance required.	N/A
Film Carriage Reducer	Sealed, lubricated with premium lubricant. No maintenance required.	N/A
Film Delivery Reducer	Sealed, lubricated with premium lubricant. No maintenance required.	N/A
All pivot bearings	N/A	N/A

**NOTE**

Refer to Electrical and Mechanical component's Operations Manuals shipped inside the enclosure for additional maintenance information.

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Predator XS Turntable Stretch Wrapper Operation Manual

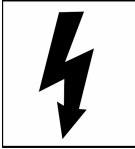
# Troubleshooting

# TROUBLESHOOTING GUIDE

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**WARNING**

Make sure that only qualified personnel will perform inspection, troubleshooting, and part replacement.

**HIGH VOLTAGE!**

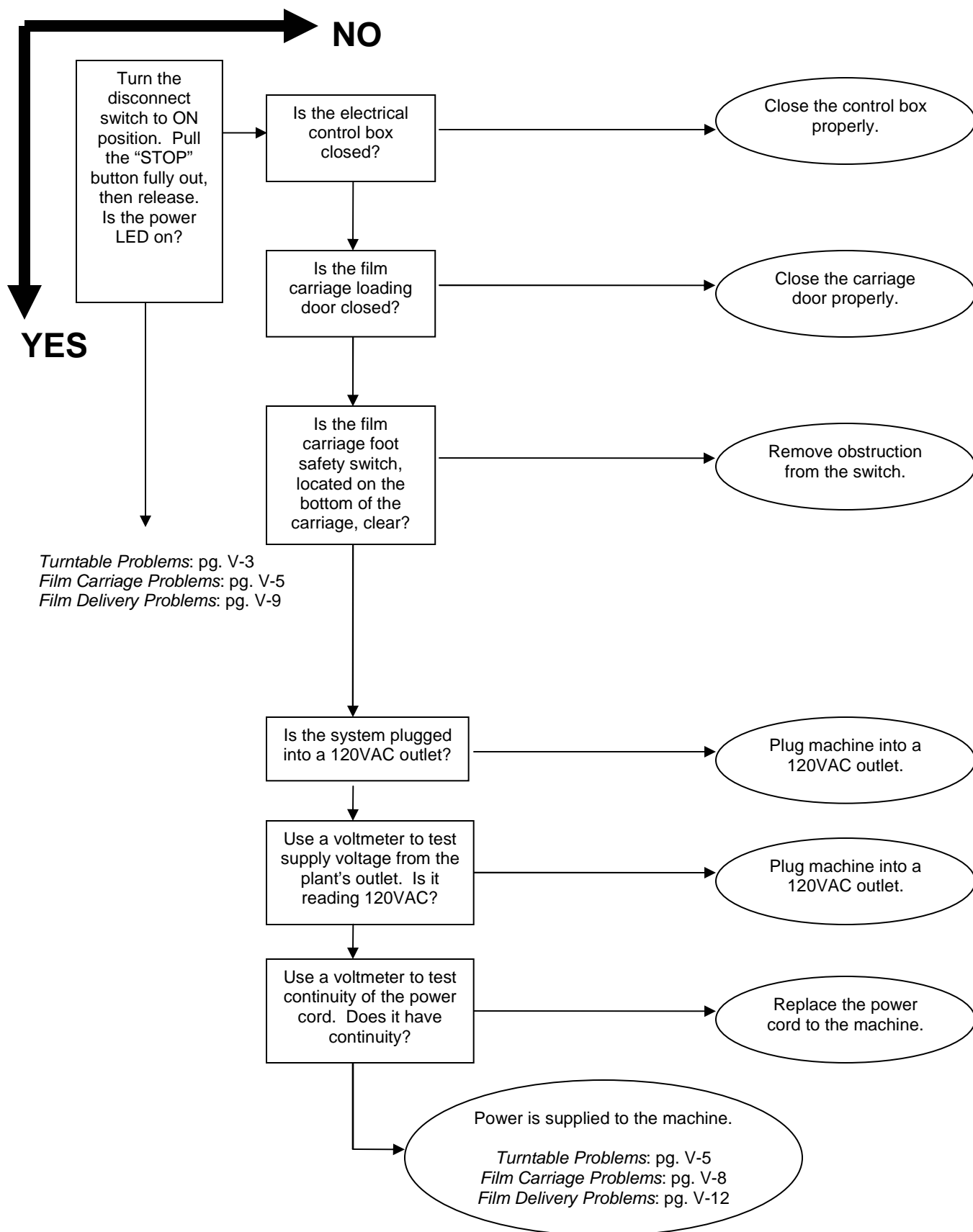
Disconnect all power including external control power that may be present before servicing the frequency drive controllers. WAIT for 3 (three) minutes for the DC bus capacitors to discharge. The frequency drive controller' display and/or LED's are not accurate indicators of the absence of DC bus voltage.

The diagrams in this section will guide you in identifying typical problems while operating the Predator Turntable Stretch Wrapper, and provide you with corresponding solution(s). Problems are divided in reference to the machine functions: power, turntable, film carriage, and film delivery.

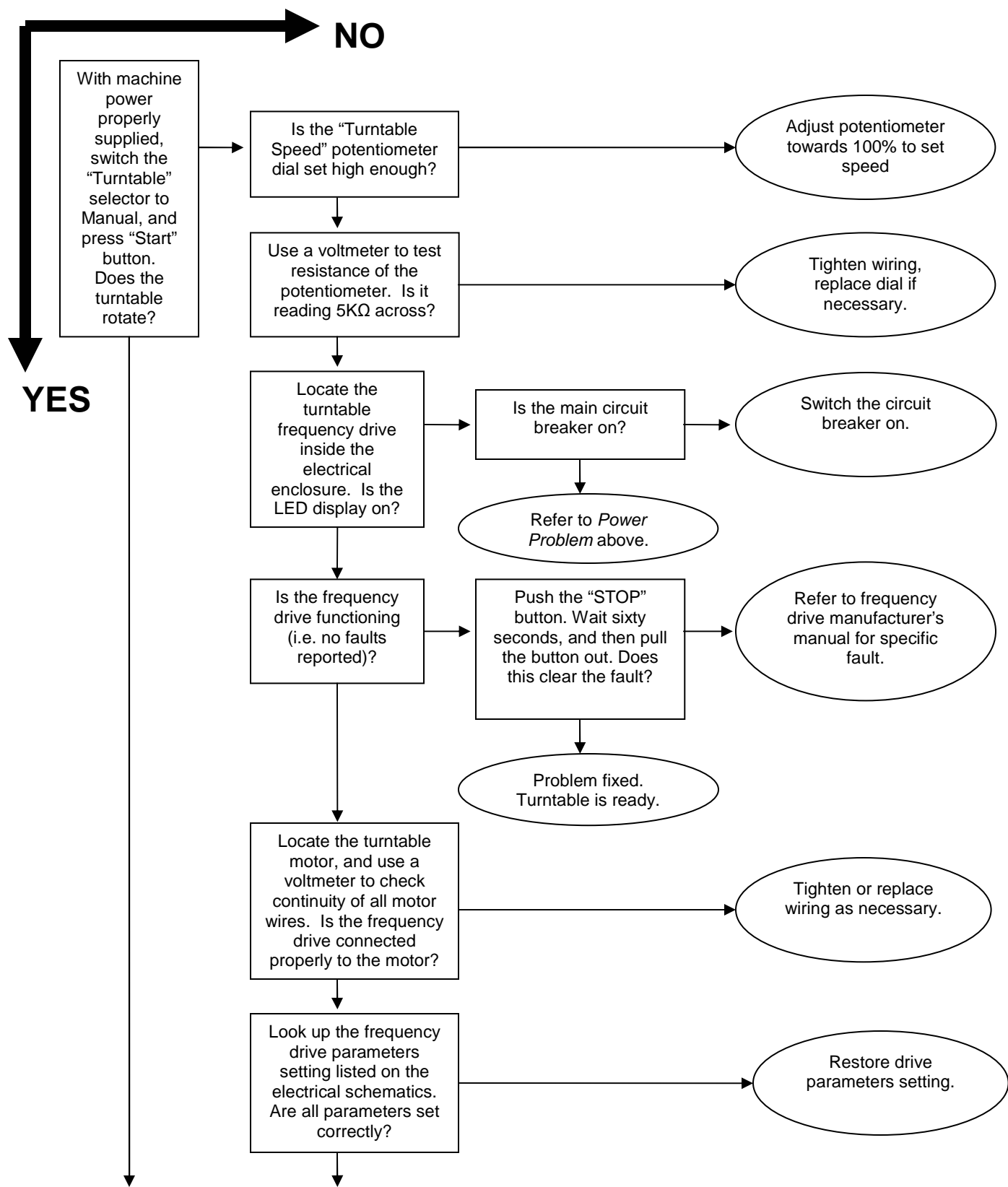
If further assistance is required, contact the distributor from whom you have purchased the equipment, or call the number listed on the bottom page of this manual. To receive quick and proper technical support, please be prepared to provide the following information:

1. Machine serial number
2. Date of purchase
3. Symptoms of any problem

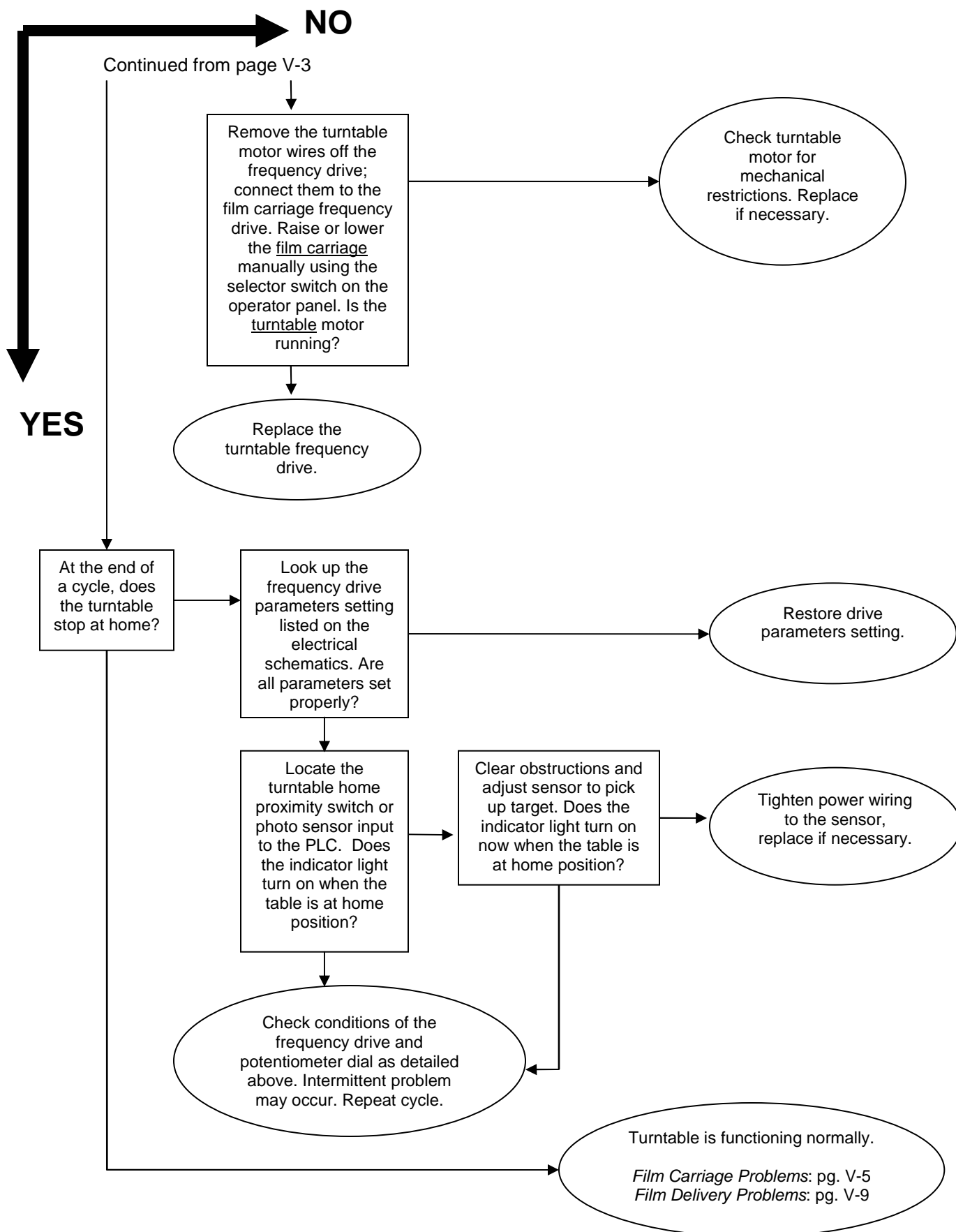
## Power Problem



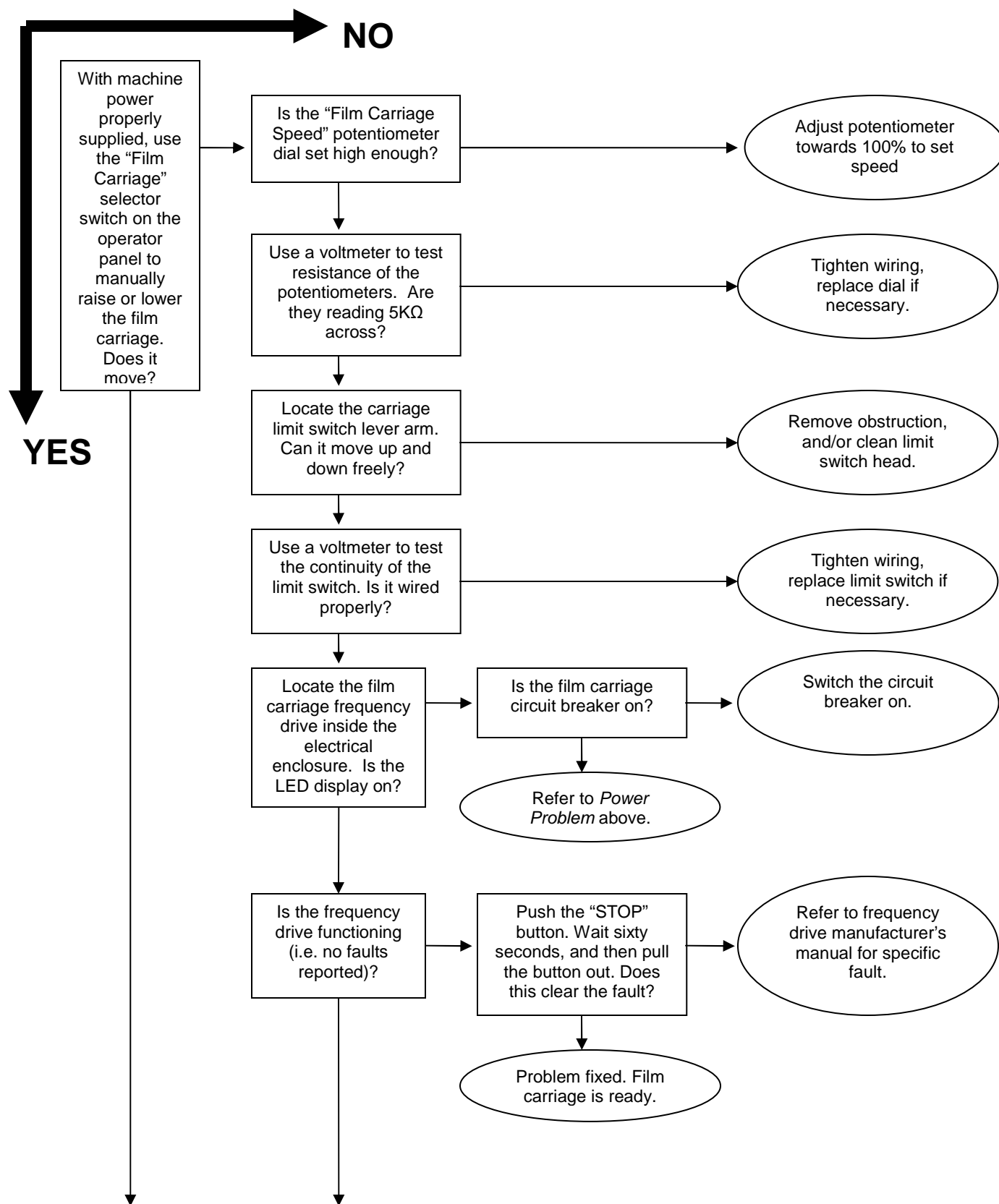
## Turntable Problem



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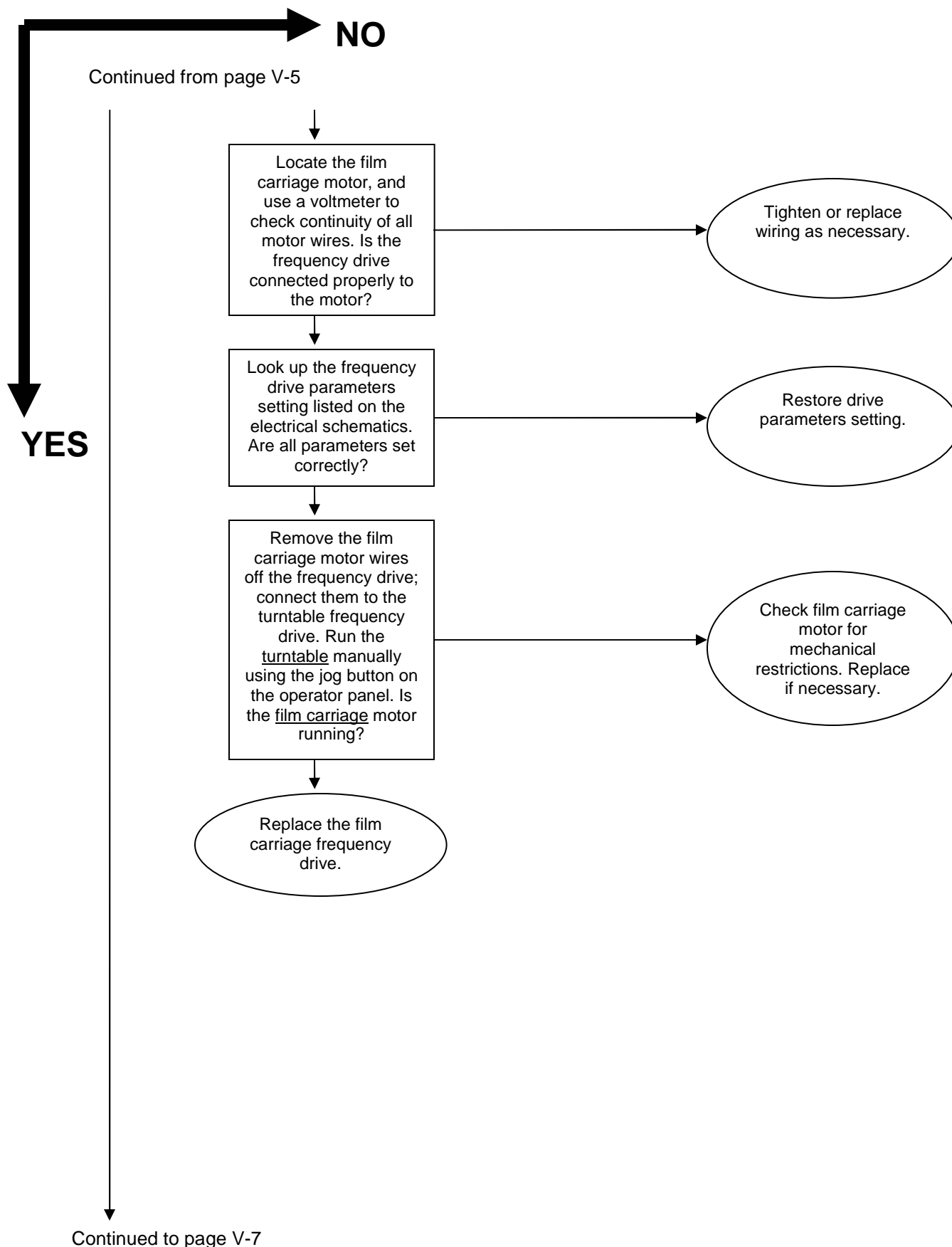


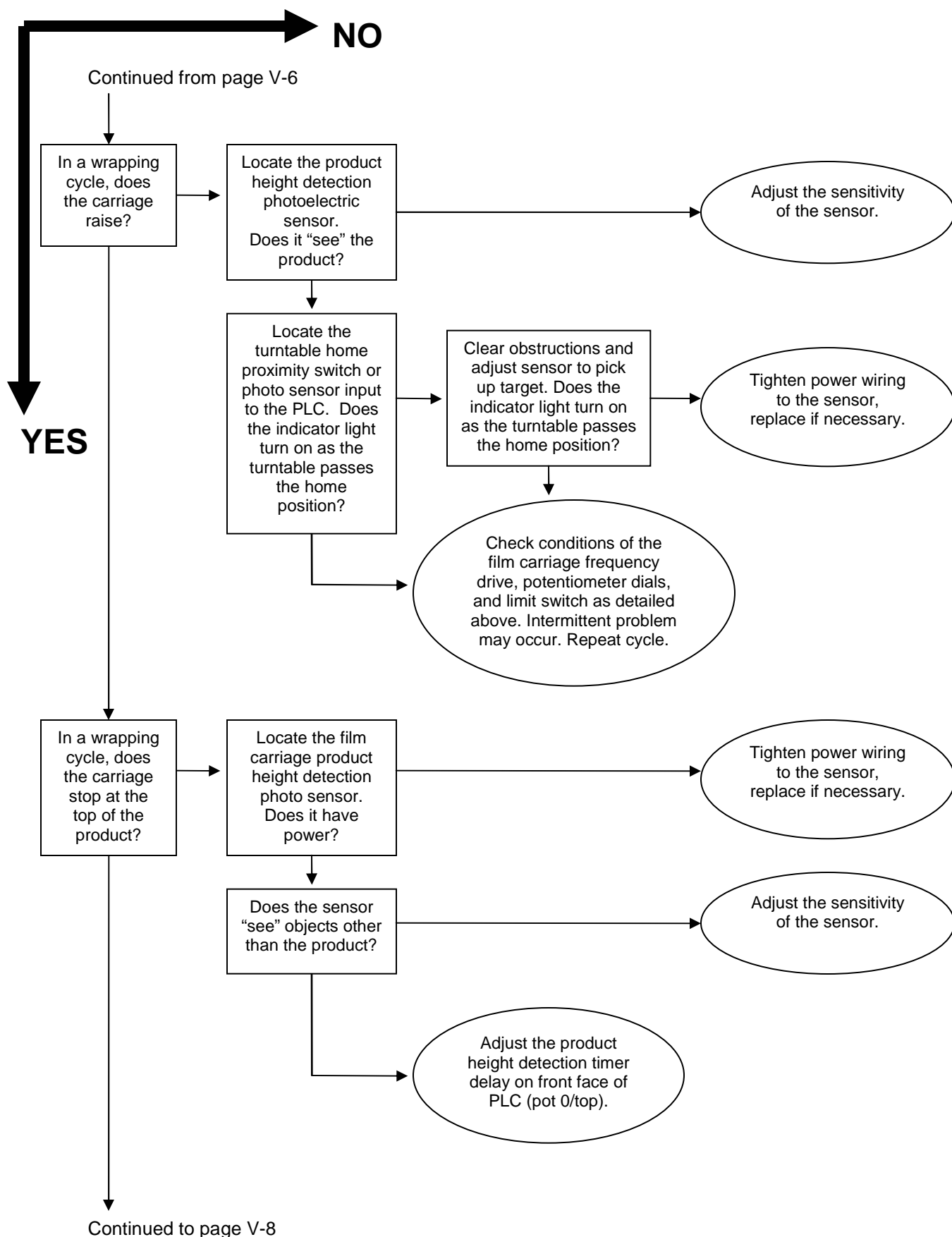
## Film Carriage Problem

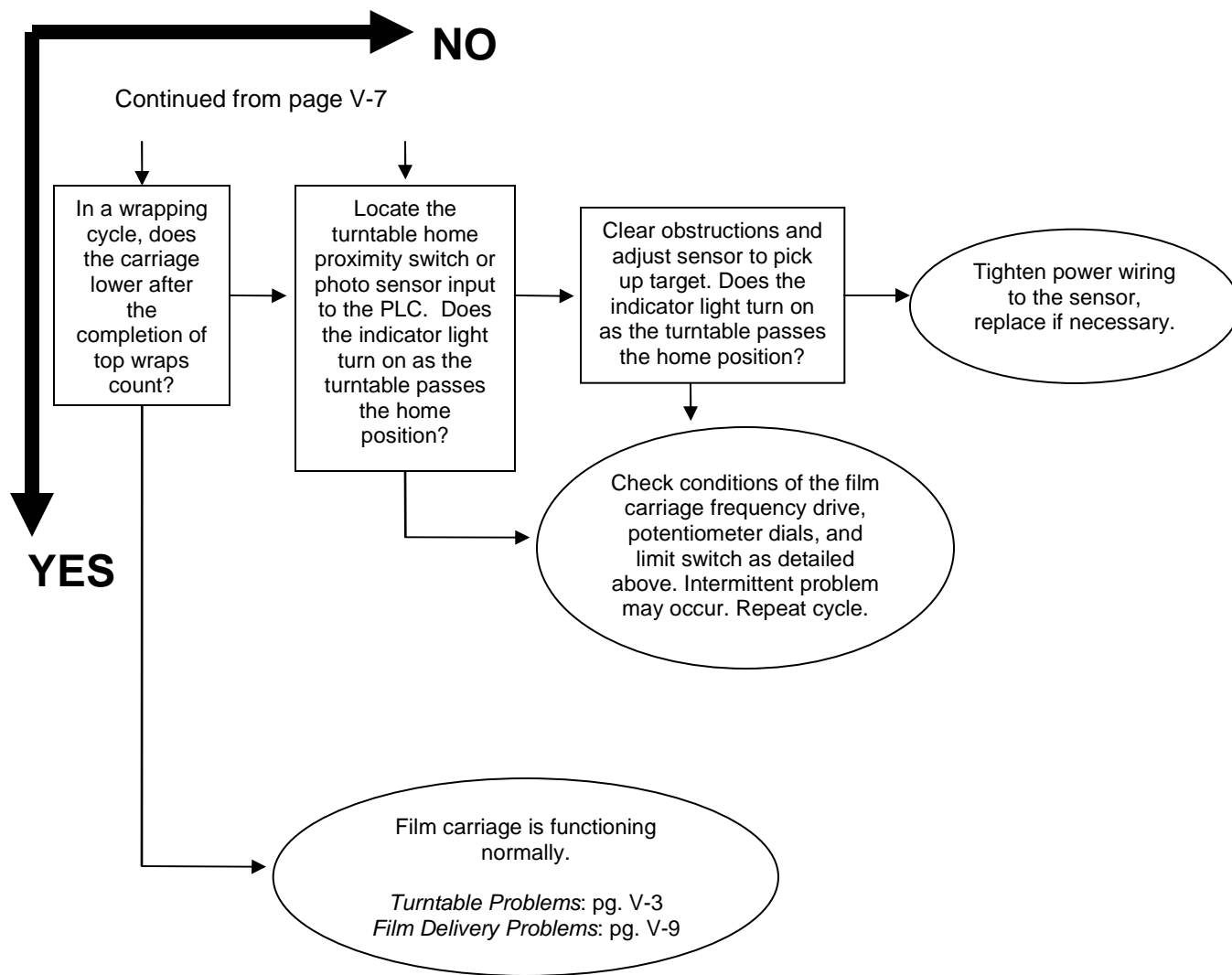


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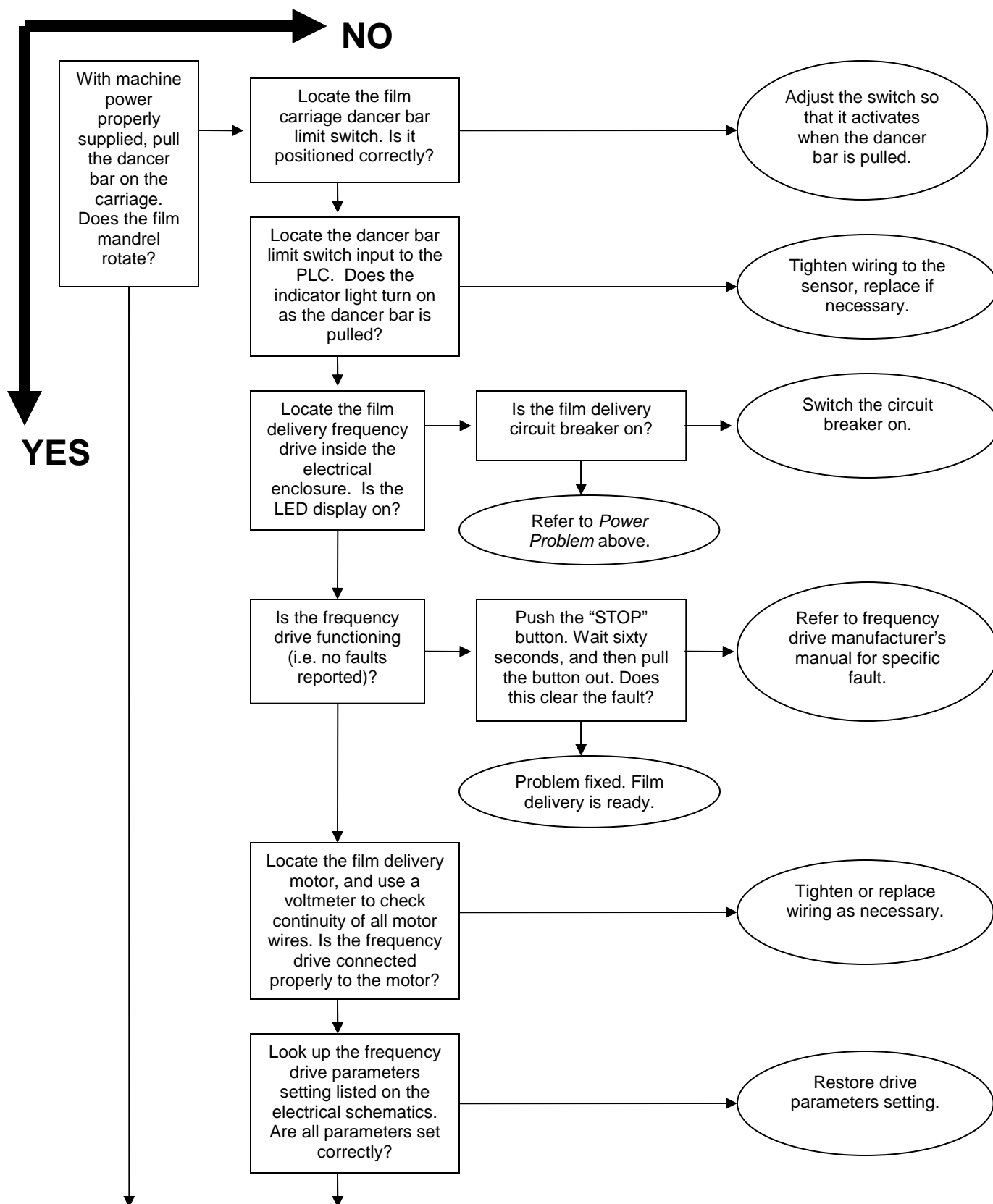




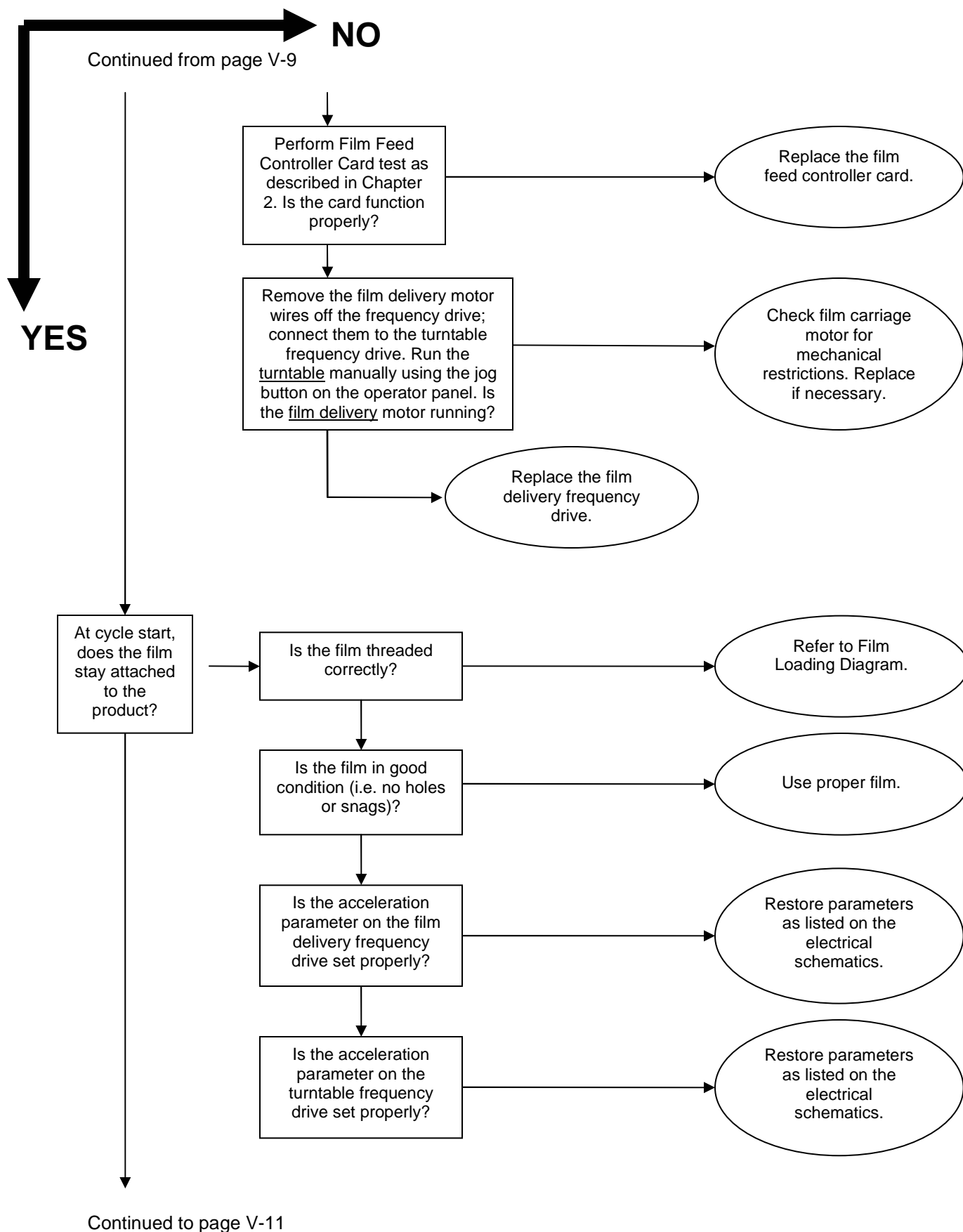


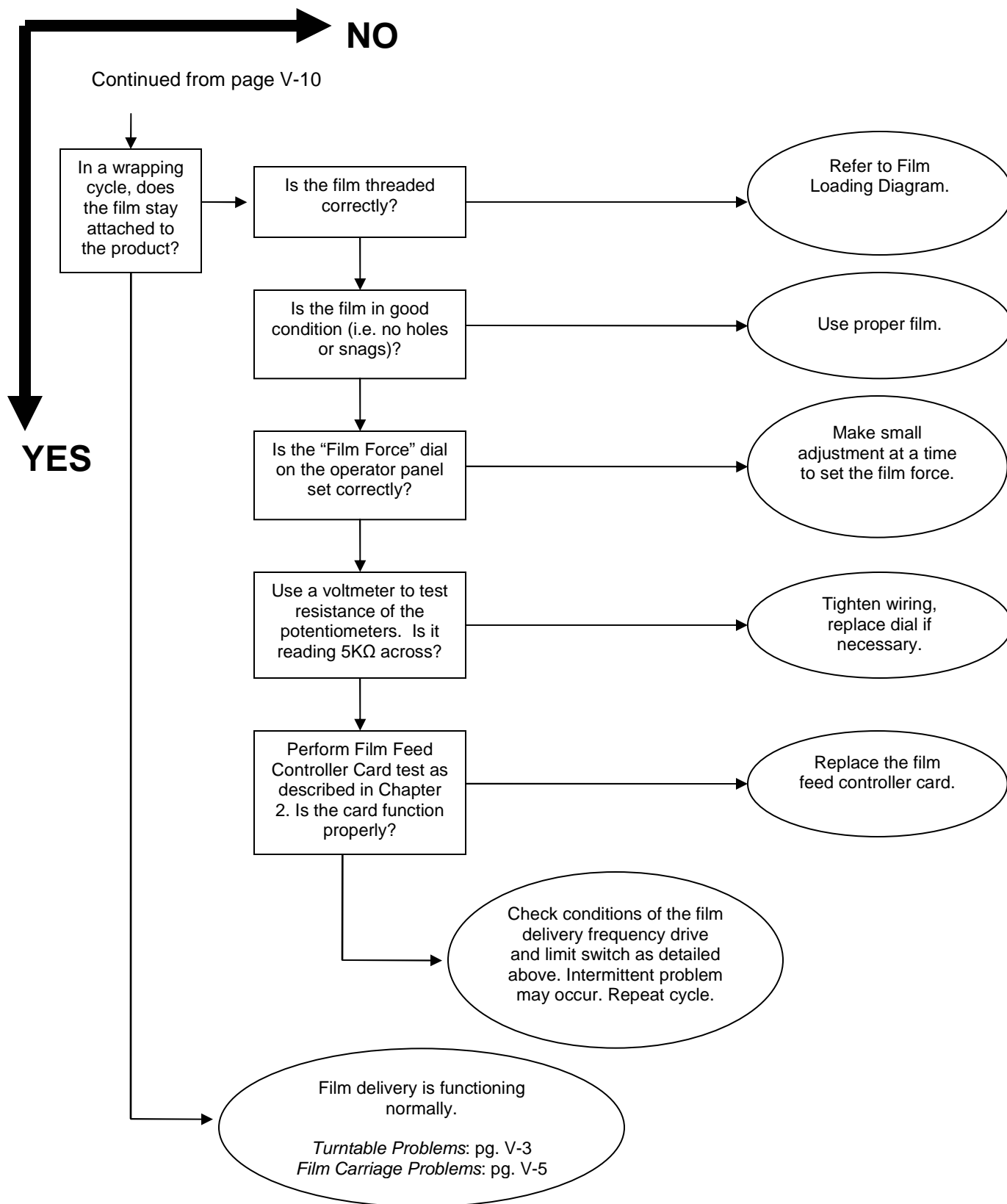


## Film Delivery Problem



Continued to page V-10





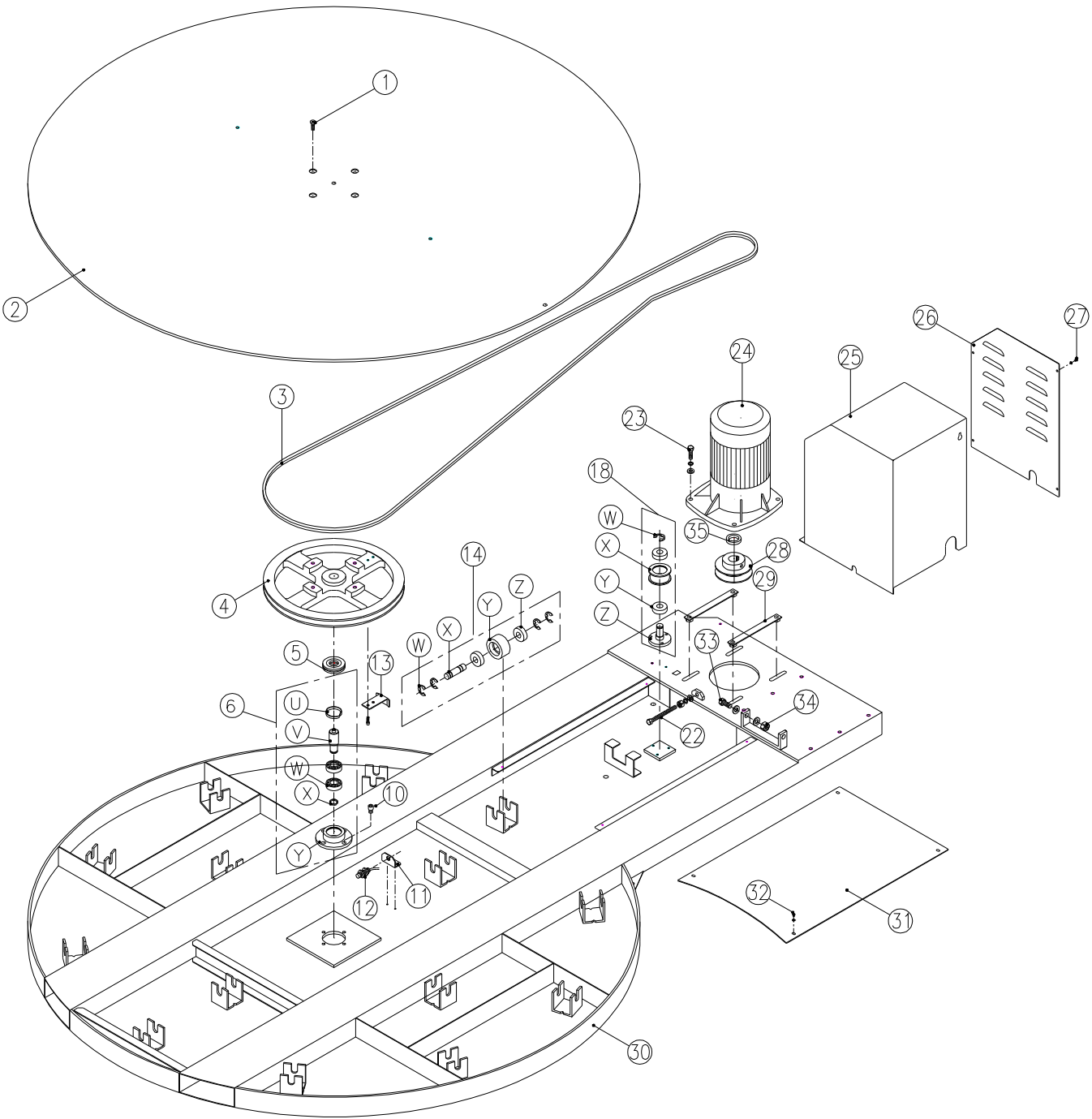
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Predator XS Turntable Stretch Wrapper Operation Manual

# Technical Reference

# Turntable Frame Assembly





## Turntable Frame Parts List



### NOTE

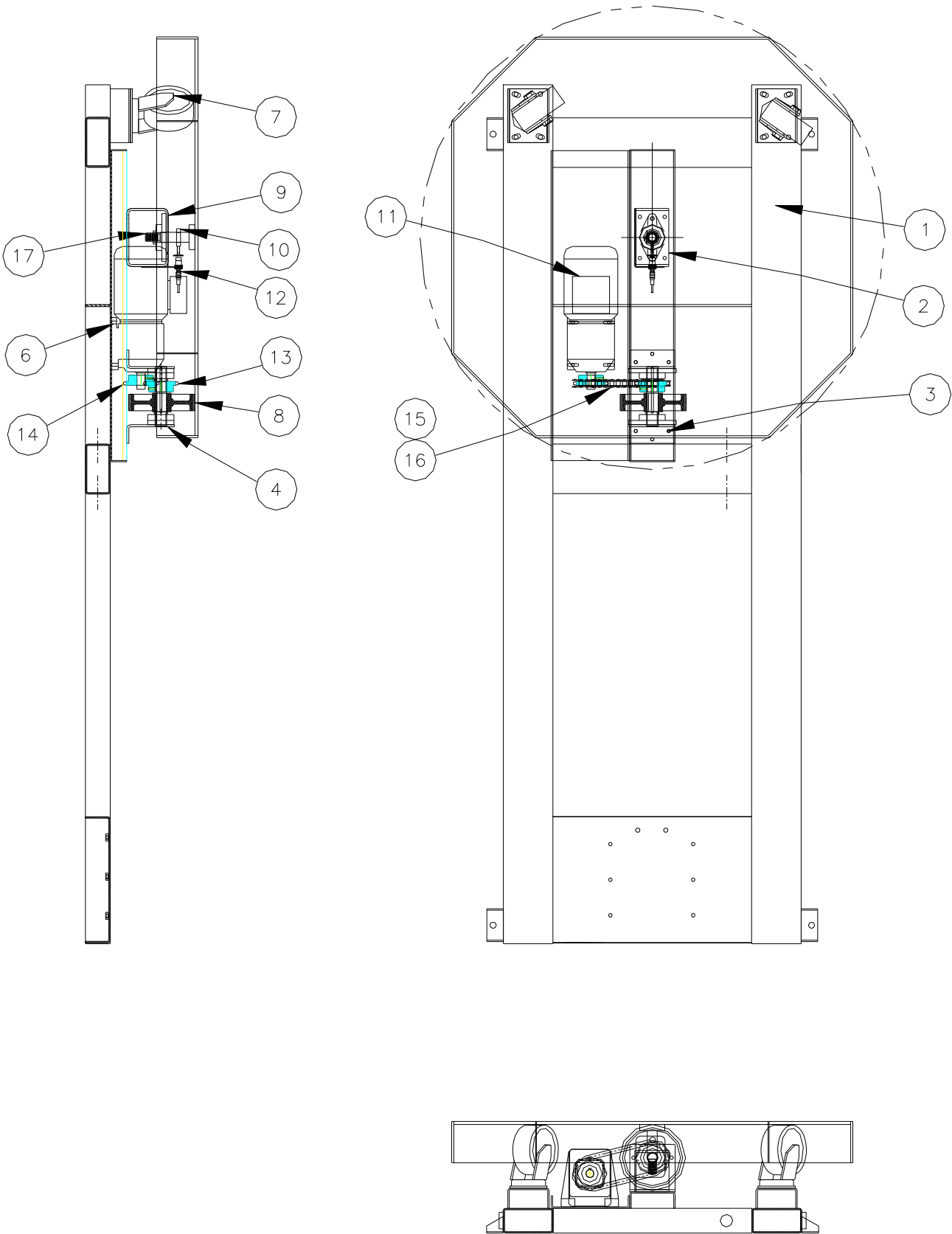
Although all parts are shown in the part list, some may not be available individually. Selected parts must be purchased in assembly.

Parts available in inventory are highlighted. Non-highlighted parts may have longer lead times.

No.	Sub No.	Part Number	Description	Quantity
1		200627	FHCS, M10 x 20L	4
2		500460	TURNTABLE TOP, 65" DIA (1.65M)	1
3		300772	BELT, 154"	1
4		500752	CENTER PULLEY, NEW STYLE	1
5		303703	THRUST BEARING, BELT PULLEY	1
6		700058	KING POST ASSEMBLY	1
	U		SNAP RING, 42mm INTERNAL	
	V		CENTER SHAFT, BELT PULLEY	
	W		BEARING, 6004ZZ	
	X		SNAP RING, 42mm INTERNAL	
	Y		BEARING SEAT, BELT PULLEY	
10		200078	SHCS, M6 x 16L	4
11		500461	SENSOR SEAT	1
12		403556	PROXIMITY SENSOR, (PM12-04N)	1
13		500462.2	BRACKET, PROX DETECTION	1
14		700060	CAM FOLLOWER ASSEMBLY	14
	W		SNAP RING, 17mm EXTERNAL	
	X		SHAFT, FOR CAM FOLLOWER	
	Y		PLASTIC HOUSING, FOR CAM FOLLOWER	
	Z		BEARING, 6203ZZ	
18		700601	BELT RETURN ROLLER ASSEMBLY	1
	W		SNAP RING, 17mm EXTERNAL	
	X		BELT IDLER PULLEY	
	Y		BEARING, 6203ZZ	
	Z		SHAFT, BELT PULLEY	
22		200628	HEX HEAD TAP BOLT, M10 x 60L	1
23		200629	HHCS, M10 x 35L	4
24		300773	GEARMOTOR, TURNTABLE DRIVE	1
25		600088	MOTOR COVER (BOX) WELDMENT	1
26		500463	MOTOR BOX COVER PLATE	1
27		200851	PAN HEAD MACHINE SCREW, M4 x 10L	4
28		500464	PULLEY, TURNTABLE MOTOR DRIVE	1
29		600089	FIXED NUT WELDMENT	2

30		600090	TURNTABLE FRAME WELDMENT	1
31		500465	FRAME COVER PLATE	1
32		200154	PAN HEAD MACHINE SCREW, M4 x 6L	4
33		200630	HHCS, M12 x 35L	2
34		200140	NUT, M12	2
35		500759	SPACER, FOR TT MOTOR PULLEY	1

# **OPTIONAL High Profile Turntable Frame Assembly**



## **OPTIONAL High Profile Turntable Frame Parts List**



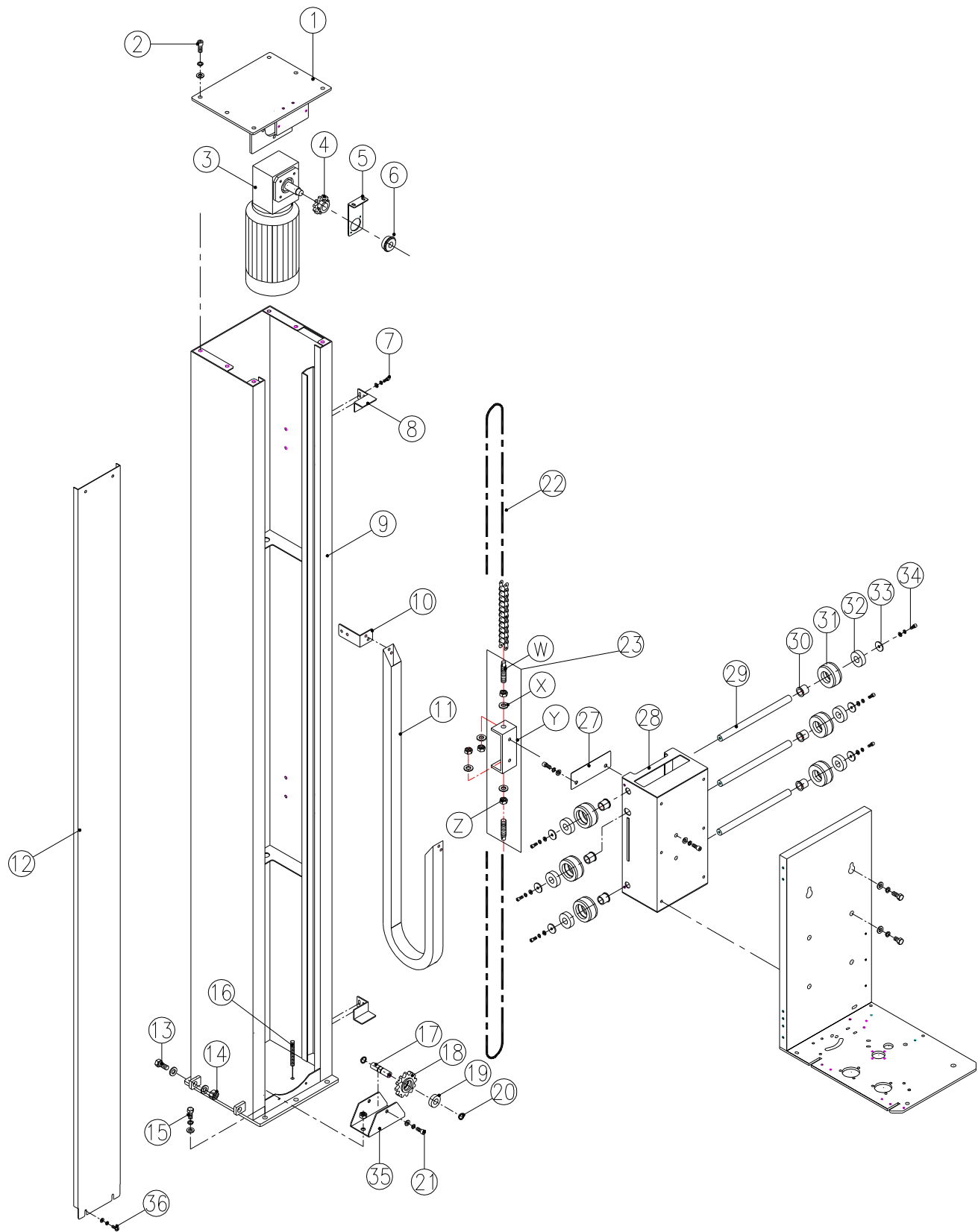
### **NOTE**

Although all parts are shown in the part list, some may not be available individually. Selected parts must be purchased in assembly.

Parts available in inventory are highlighted. Non-highlighted parts may have longer lead times.

No.	Sub No.	Part Number	Description	Quantity
1		600094	Frame Weldment	1
2		645414	Pivot Brace Weldment	1
3		535492.2	Support Bracket	2
4		525027	Drive Shaft, 1-3/16" Dia.	1
6		645944	Reducer Bolt Plate Weldment	2
7		305163	Swivel Caster	2
8		305024.2	Drive Caster	1
9		300506	Bearing, 2-Bolt Flange, 1-3/16"	3
10		645384	Proximity Sensor Trip Weldment	1
11		301021	Gearmotor, ¾ HP, 28.59:1	1
12		403061	Proximity Sensor, NPN	1
13		300505	Sprocket, 60BS16 x 1-3/16" Bore	1
14		305684	Sprocket, 60BS16 x 1" Bore	1
15		305171	Chain, #60-1	2'
16		305176	Master Link, #60-1	1
17		200277	Nut, Jam, Nyloc, 1"	1
N/S		535237.2	Tilt Bracket (110" Tower Only)	1

# Tower Assembly



## Tower Part List



### NOTE

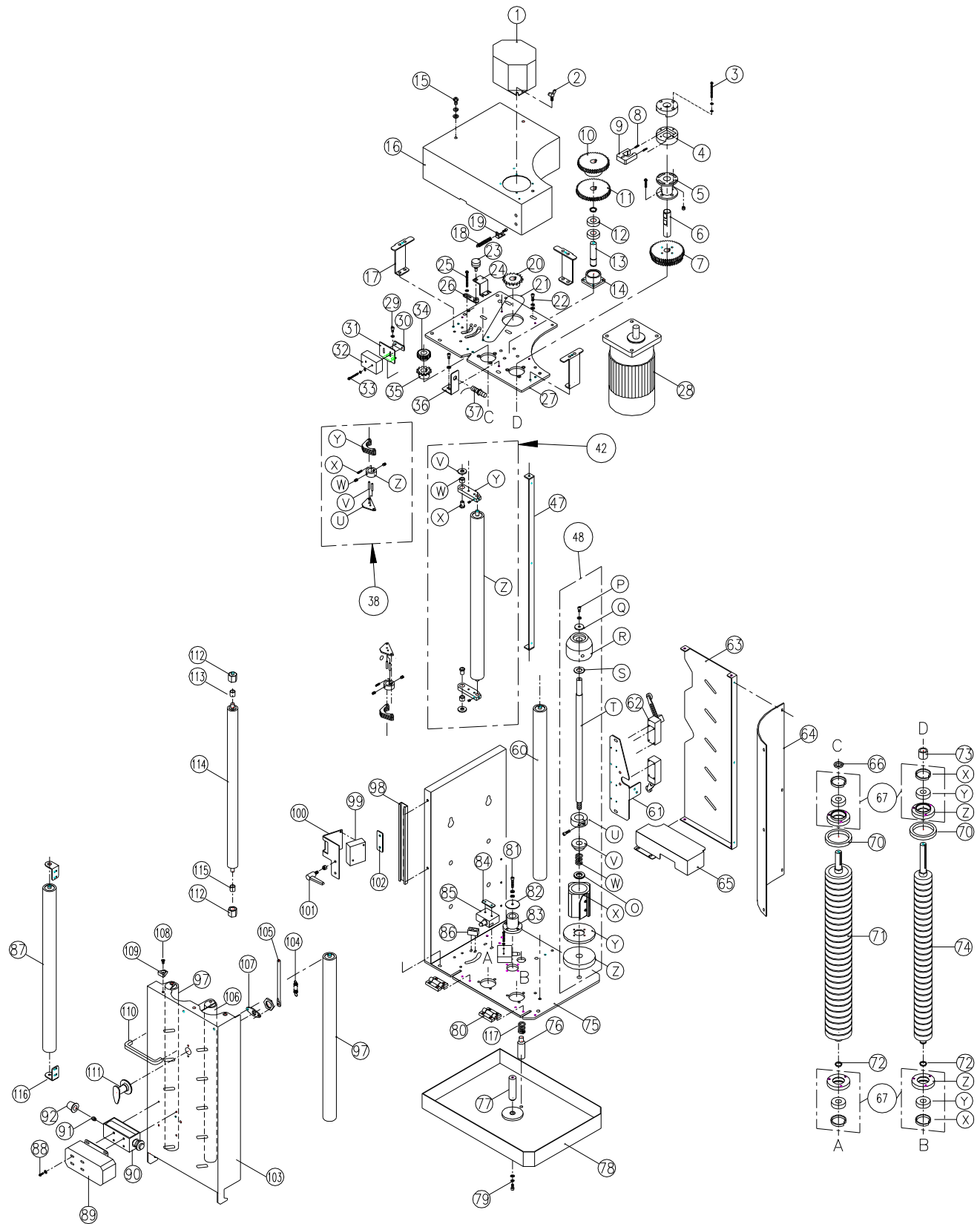
Although all parts are shown in the part list, some may not be available individually. Selected parts must be purchased in assembly.

Parts available in inventory are highlighted. Non-highlighted parts may have longer lead times.

No.	Sub No.	Part Number	Description	Quantity
1		600091	TOWER COVER WELDMENT	1
2		200090	SHCS, M10 x 25L	4
3		300774	GEARMOTOR, CARRIAGE LIFT	1
4		300775	SPROCKET, DRIVEN	1
5		300776	BRACKET, GEARMOTOR SUPPORT	1
6		300020	BEARING, 6202-NR	1
7		200631	SHCS, M5 x 8L	4
8		500466	BRACKET, LIMIT TRIP	2
9		600092	TOWER WELDMENT, 80"	1
10		500467	BRACKET, E-CHAIN MOUNT	1
11		300777	E-CHAIN	1
12		500468	COVER PLATE, 80" TOWER	1
13		200630	HHCS, M12 x 35L	2
14		200140	NUT M12	2
15		200090	SHCS, M10 x 25L	6
16		200632	THREADED ROD, M10 x 60L	2
17		500469	SHAFT, IDLER SPROCKET	1
18		300778	SPROCKET, IDLER	1
19		300017	BEARING 6002ZZ	1
20		300008	SNAP RING, 15mm EXTERNAL	2
21		200084	SHCS, M8 x 20L	1
22		300029	CHAIN	1
23		700063	CHAIN ATTACHMENT ASSEMBLY	
	W		CHAIN TENSION SHAFT	
	X		WASHER, M12	
	Y		CHAIN ADJUST SEAT	
	Z		NUT M12	
27		500470	BRACKET, CARRIAGE LIFT	1
28		600093	CARRIAGE TROLLEY WELDMENT	1
29		500471	GUIDE WHEEL SHAFT	3
30		500472	SPACER, INNER	6
31		500473	GUIDE WHEEL	6
32		305300	BEARING, 6203	6
33		500474	SPACER, OUTER	6

34		200078	SHCS, M6 x 16L	6
35		500475	BRACKET, LOWER IDLER SPROCKET	1
36		200633	SHCS, M6 x 10L	4

## Film Carriage/Elevator Assembly





## Film Carriage/Elevator Part List



### NOTE

Although all parts are shown in the part list, some may not be available individually. Selected parts must be purchased in assembly.

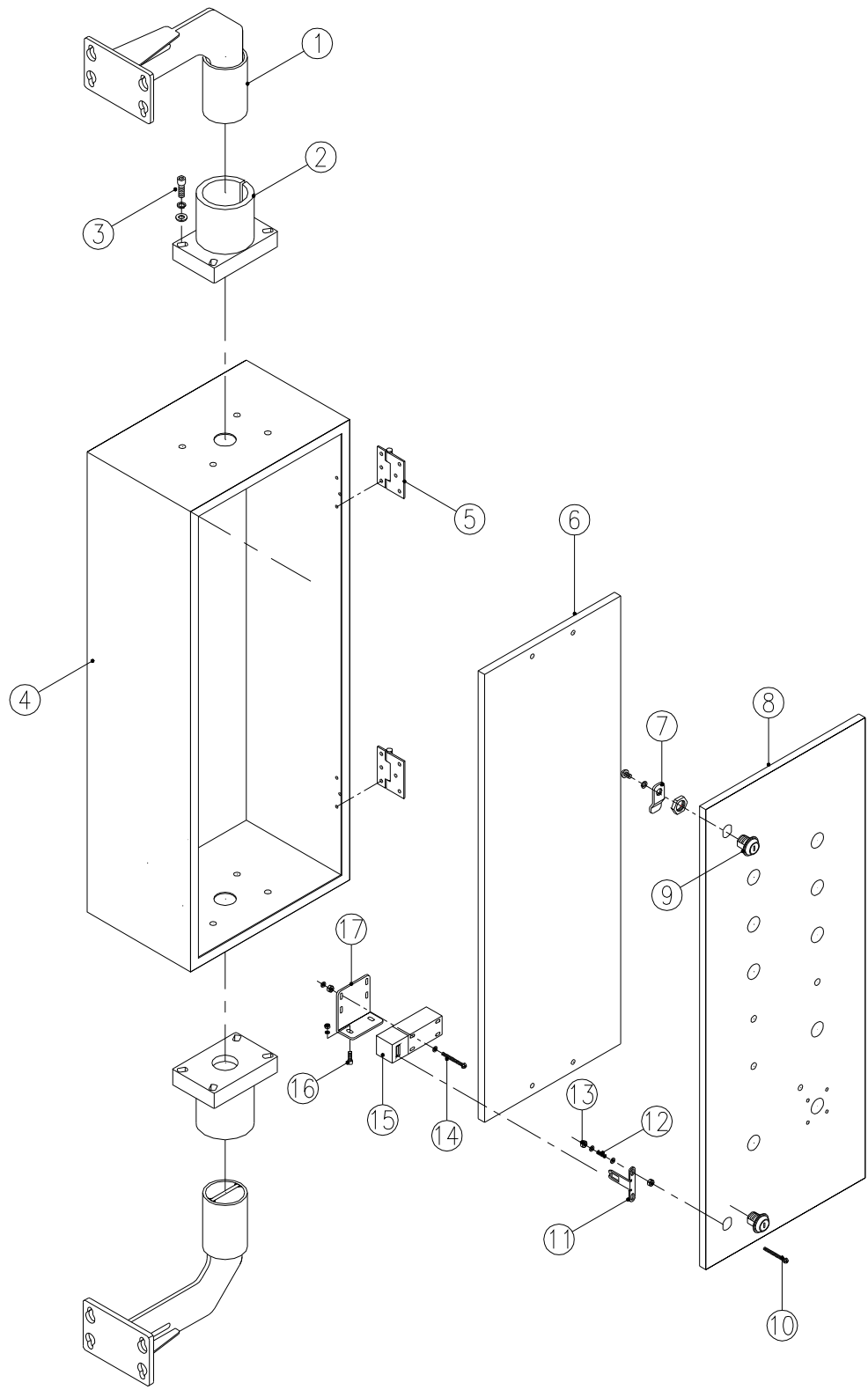
Parts available in inventory are highlighted. Non-highlighted parts may have longer lead times.

No.	Sub No.	Part Number	Description	Quantity
1		600095	STRETCH KNOB COVER	1
2		200636	WING NUT, M5 x 12L	2
3		200766	MACHINE SCREW, M4 x 50L	4
4		500661	STRETCH KNOB HALF	2
5		500662	GEAR PULL ADAPTER	1
6		500663	GEAR POSITIONING SHAFT	1
7		301346	SLIP GEAR, 47T/44T, 200% / 250%	1
8		301365	SPRING	2
9		500684	SAFETY BUTTON	1
10		301345	FIXED GEAR 41T, 200% / 250%	1
11		301344	FIXED GEAR 44T, 200% / 250%	1
12		300807	BEARING, 6003ZZ	2
13		500685	FIXED GEAR SHAFT	1
13a		300017	SNAP RING, STW-17, 17mm Ext.	2
14		500686	BEARING SEAT	1
14a		301842	SNAP RING, RTW-35, 35mm INT.	2
14b		200802	SHCS, M6 x 16L & S.W & W	4
15		200633	SHCS, M6 x 10L	3
16		600096	CARRIAGE TOP COVER	1
17		500674	CARRIAGE COVER BRACKET	3
18		500047	SPRING	2
19		500673	SPRING SEAT	2
20		500019	SPROCKET, 17T	1
21		300846	CHAIN, inc. MASTER	1
22		204833	SHCS, M8 x 30L	4
23		408117	POTENTIOMETER, 5K	1
24		500675	POTENTIOMETER BRACKET	1
25		200635	MACHINE SCREW, M5 x 45L	1
26		600160	POTENTIOMETER ARM	1
27		500671	CARRIAGE TOP PAN	1
28		301358	GEARMOTOR, SV-A10	1
29		200078	SHCS, M6 x 16L	2
30		500669	LIMIT SWITCH BRACE	1
31		500672	LIMIT SWITCH MNT BRACKET	1

32		400637	LIMIT SWITCH, TZ-7110	1
33		200106	MACHINE SCREW, M4 x 35	2
34		301343	GEAR, DRIVE, 19T, 200% / 250%	1
35		301359	SPROCKET, 12T	1
36		500670	PROX MOUNT BRACKET	1
37		403556	PROXIMITY SENSOR, PM12-04N	1
38		700074	DANCER STOP ASSEMBLY	2
	U		PLATE	
	V		PIN, 4MM x 16L	
	W		SPRING	
	X		SET SCREW, M6 x 10L	
	Y		BLOCK	
	Z		RING	
42		700479	DANCER BAR ASSEMBLY	1
	V		RING	
	W	301369	BEARING HK 1010	
	X		SWINGING BAR SHAFT	
	Y		DANCER BAR ARM	
	Z		DANCER BAR ROLLER ASSEMBLY	
47		500689	SUPPORT BRACKET	1
48		700466	FILM HOLDER ASSEMBLY	1
	O	300026	BEARING, NTB1730	
	P	200078	SHCS, M6 x 16L	
	Q	500474	THRUST BUSHING, UPPER	
	R		FILM CORE HOLDER (UPPER)	
	S		THRUST BUSHING, LOWER	
	T		FILM HOLDER SHAFT	
	U		CLAMP COLLAR	
	V		SPRING SEAT	
	W	500113	SPRING	
	X		FILM CORE HOLDER (LOWER)	
	Y	500694	BRAKE DISC	
	Z	500695	FRICTION SEAT	
60		700476	ROLLER ASS'Y, REAR	1
61		500664	LIMIT SWITCH MOUNT BRACKET	1
62		400639	LIMIT SWITCH, TZ-8108	2
63		600665	CARRIAGE PLATE, REAR	1
64		500666	ACRYLIC COVER	1
65		600159	TERMINAL COVER	1
66		500698	SPACER, SMALL	2
67		700481	BEARING SEAT ASSEMBLY	4
	X		SNAP RING, 42mm, INTERNAL	
	Y		BEARING	
	Z		BEARING SEAT	
70		500700	PROTECTION RING	1
71		600098	PRE-STRETCH ROLLER, LARGE	1

72		300009	SNAP RING, 17mm, EXTERNAL	2
73		500699	SPACER, LARGE	1
74		600099	PRE-STRETCH ROLLER, SMALL	1
75		600173	CARRIAGE FRAME	1
76		500677	SENSOR PLUNGER	1
77		500678	SECURITY PAN SHAFT	1
78		600097	FOOT SECURITY PAN	1
79		200084	SHCS, M8 x 20L	1
80		301360	HINGE, CARRIAGE DOOR	2
81		200078	SHCS, M6 x 16L	1
82		500676	SAFE PLATE	1
83		301363	LINEAR BUSHING	1
84		500669	LIMIT SWITCH BRACE	2
85		400637	LIMIT SWITCH, TZ-7110	2
86		500048	BLOCK	2
87		700505	ROLLER ASS'Y	1
88		200851	MACHINE SCREW, M4 x 10L	4
89		600176	PUNCTURE SOLENOID COVER BRACKET	1
90		300719	PUNCTURE SOLENOID 24 VDC, TAU-1585	1
91		300720	PUNCTURE TIP	1
92		500761	PUNCTURE GUARD	1
97		700474	ROLLER ASS'Y, DOOR – OUTER	2
98		500762	SENSOR MOUNT TRACK	1
99		400643	PHOTO SENSOR, A3R-2MX	1
100		500764	PHOTO EYE BRACKET	1
101		700506	HANDLE, PHOTO EYE BRACKET	1
102		500763	PHOTO SENSOR SLIDE PLATE	1
103		600175	CARRIAGE DOOR	1
104		301364	SPRING	1
105		500682	DOOR LOCK BOLT	1
106		700475	ROLLER ASS'Y, DOOR – INNER	1
107		500683	LOCK MOUNT PLATE	1
108		200634	FHCS, M6 x 10L	1
109		500057	SECURITY KEY	1
110		500667	HANDLE BAR	1
111		301361	KNOB, DOOR LOCK	1
112		500765	CLUTCH ROLLER MOUNT	2
113		301369	CLUTCH BEARING, UPPER	1
114		700507	CLUTCH ROLLER	1
115		301370	CLUTCHING BEARING, LOWER	1
116		500760	ROLLER BRACKET	2
117		301814	SPRING, FOOT SECURITY PAN RETURN	1

# Control Box Assembly



## Control Box Part List



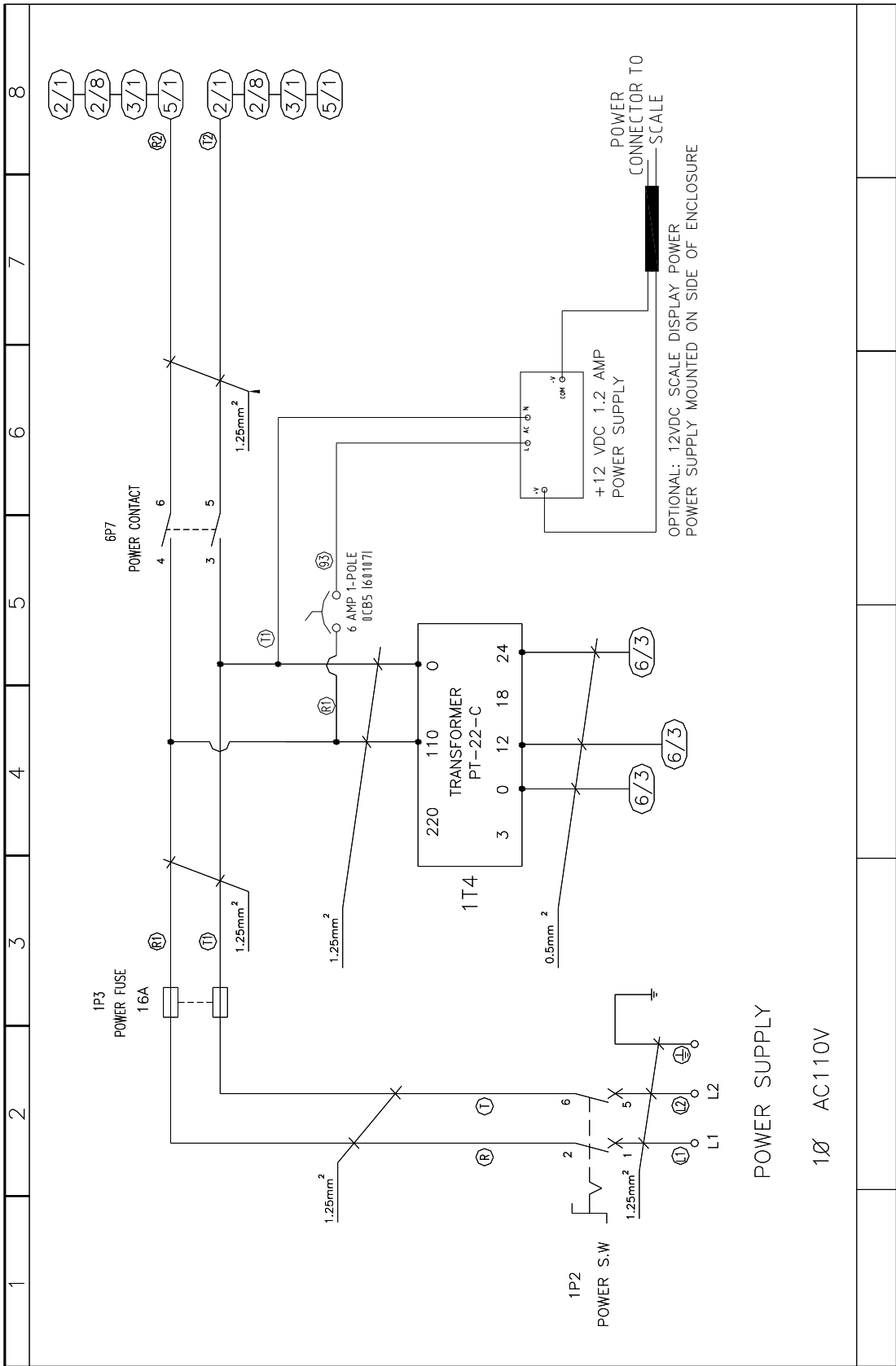
### NOTE

Although all parts are shown in the part list, some may not be available individually. Selected parts must be purchased in assembly.

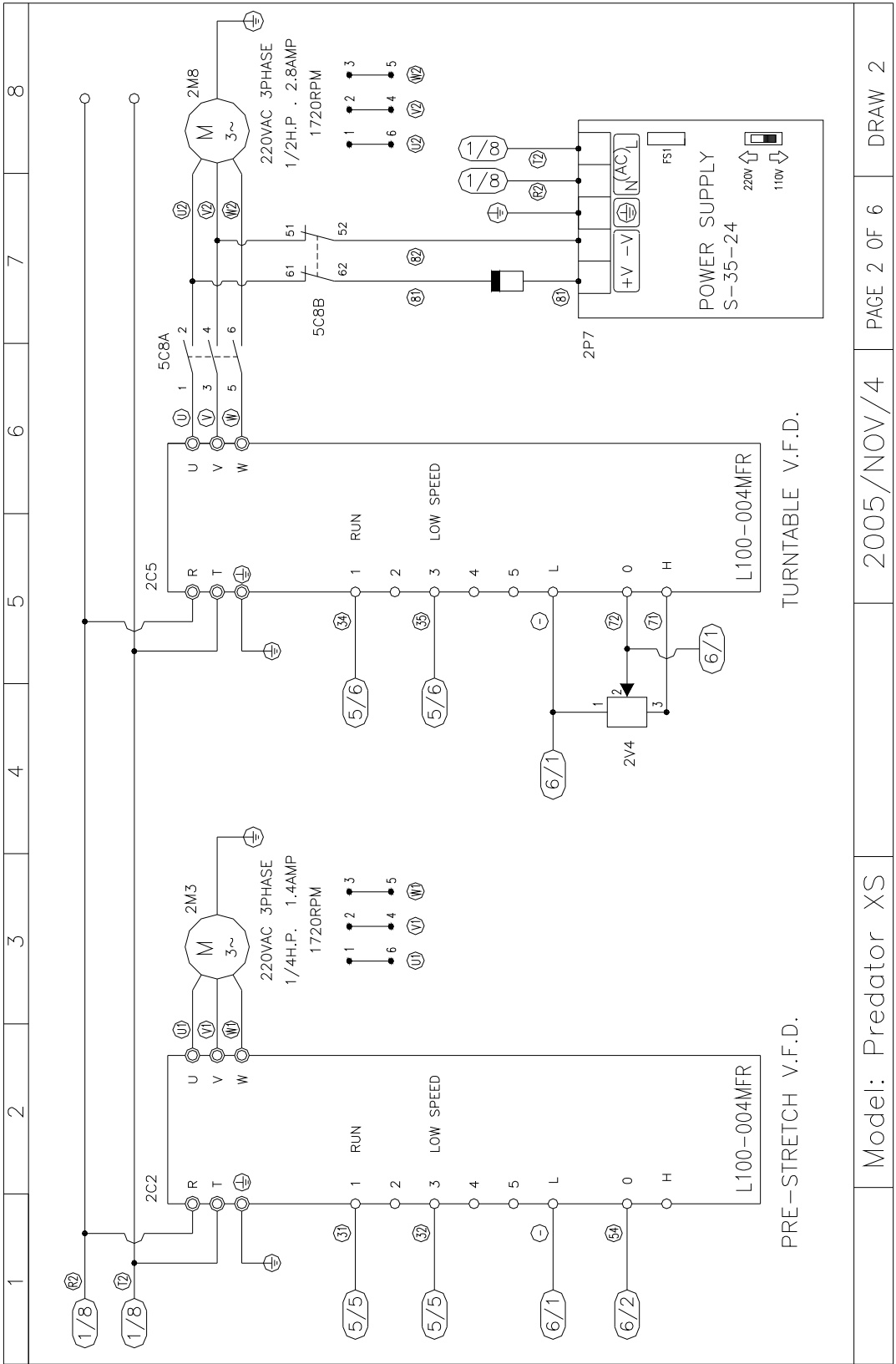
Parts available in inventory are highlighted. Non-highlighted parts may have longer lead times.

No.	Sub No.	Part Number	Description	Quantity
1		600152	SUPPORT BRACKET	2
2		600153	MOUNT BRACKET	2
3		200086	SHCS, M8 x 40L	8
4		600154	ELECTRICAL BOX	1
5		500106	HINGE	2
6		500479	SUBPANEL	1
7		300048	LOCK PLATE	2
8		600155	ELECTRICAL BOX DOOR	1
9		300041	LOCK, W/ KEY	2
10		200124	PHILLIPS SCREW, M4 x 25L	1
11		500080	KEY, SAFETY SWITCH	1
12		500016	SPRING	2
13		200788	NUT, NYLOC, M4	2
14		200106	MACHINE SCREW, M4 x 35L	4
15		400644	SAFETY SWITCH	1
16		200101	MACHINE SCREW, M4 x 12L	2
17		500105	SECURITY SWITCH BRACKET	1

# Electrical Schematics



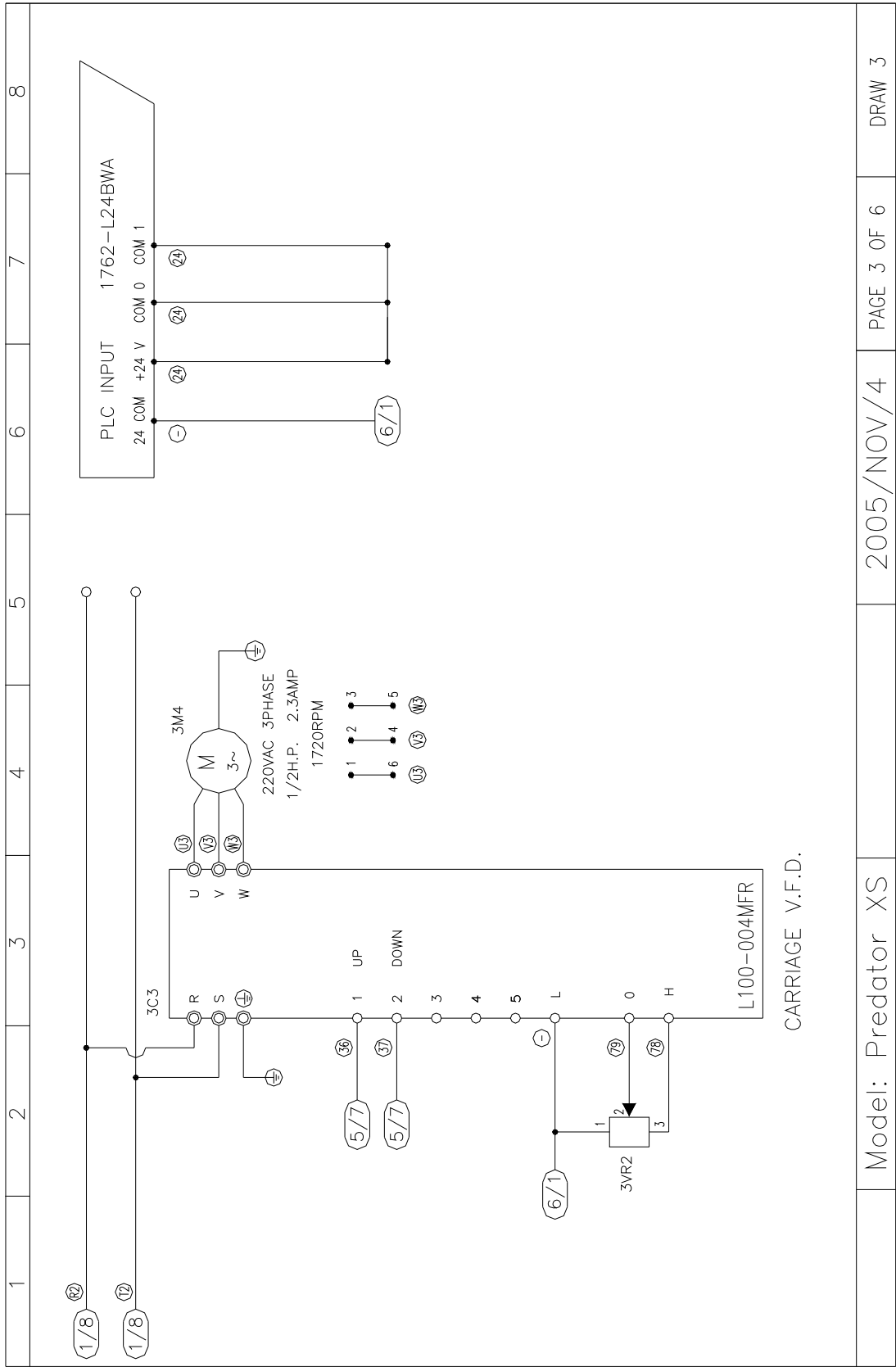
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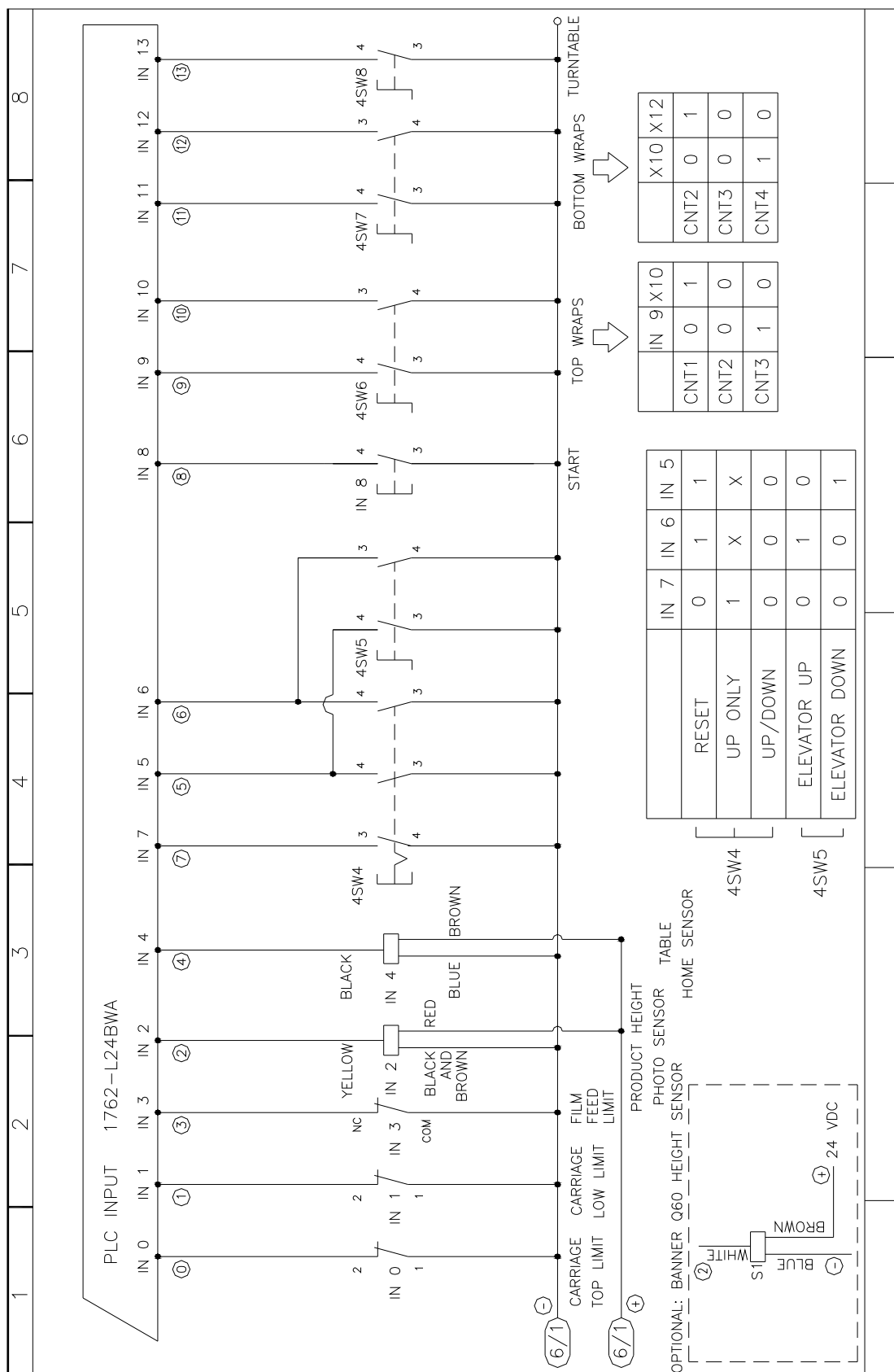




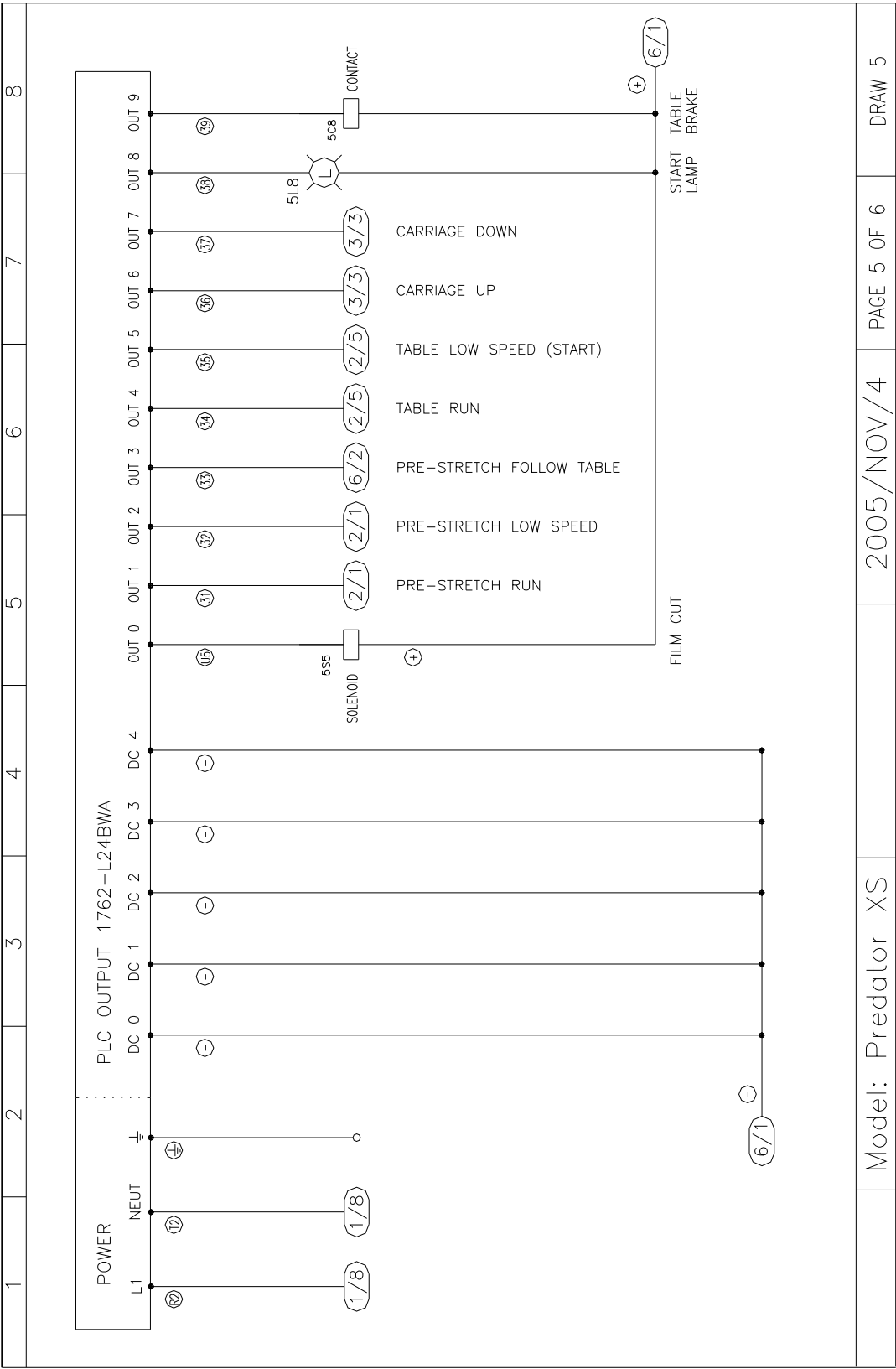
# Electrical Schematics (Continued)



## Electrical Schematics (Continued)



# Electrical Schematics (Continued)



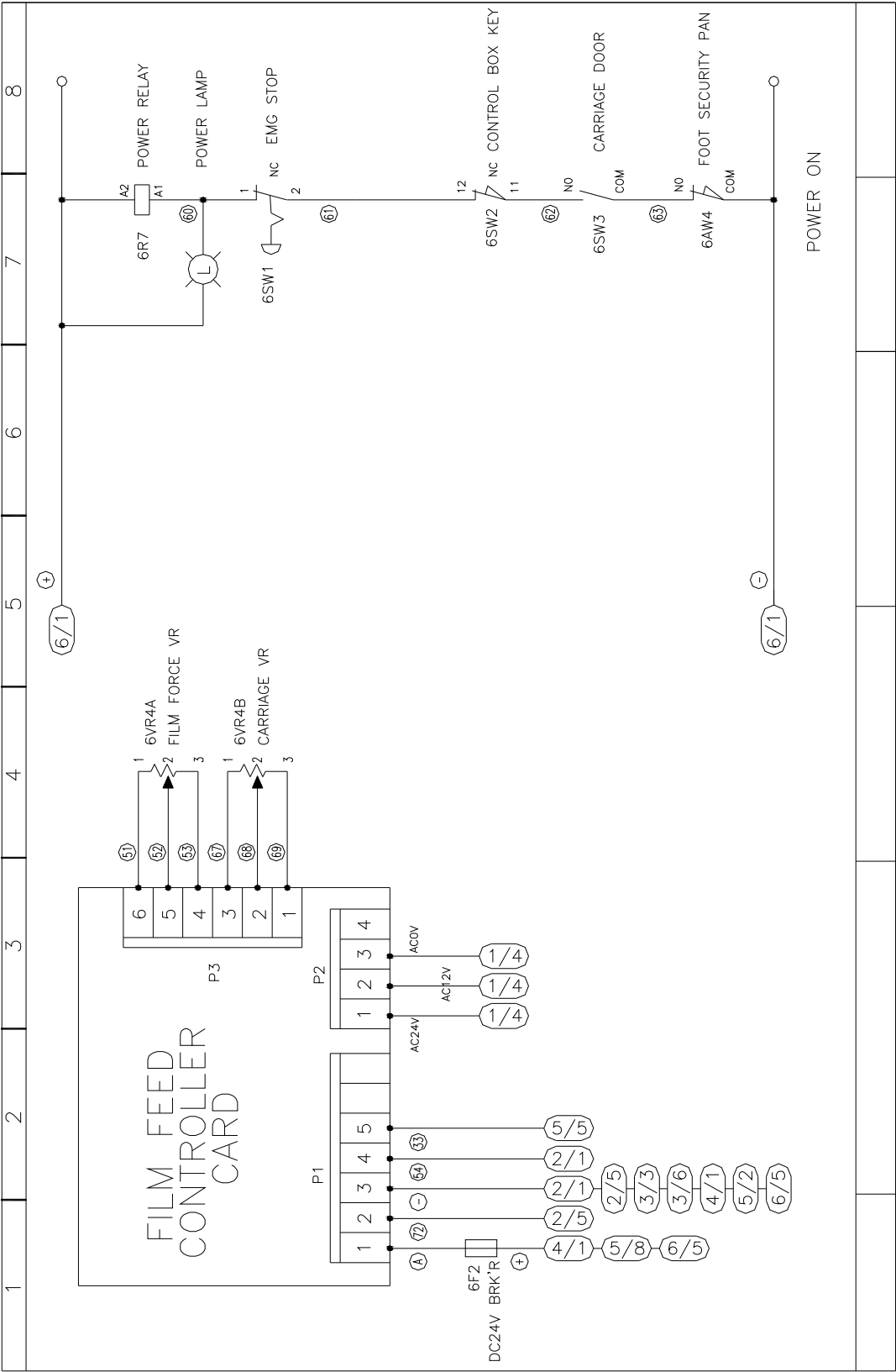
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2005/NOV/4

Model: Predator XS

# Electrical Schematics (Continued)



# AC Frequency Drive Settings

DRV-3C3 – CARRIAGE LIFT MOTOR (1/2 HP)			
MODE	DESCRIPTION	FACTORY SETTING	CURRENT SETTING
F001	Output Frequency Setting	0.0	*
F002	Acceleration Time (Seconds)	10.0	2.0
F003	Deceleration Time (Seconds)	10.0	0.2
A001	Frequency Control Method	00	01
A002	RUN SOURCE COMMAND	02	01
A003	Base Frequency Setting	60.0	*
A004	Maximum Frequency Setting	60.0	*
A005	At Terminal Selection For Speed Ref	00	50.0
A011	Pot./D-L Output Active Start Range Hz	00	*
A012	Pot./D-L Output Act End Freq Range Hz	00	*
A013	Pot./D-L Output Act End Freq Range Hz	00	*
A014	Pot./D-L Analog Inp Min Ref Val %	0.0	*
A015	Pot./D-L Analog Inp Max Ref Val %	0.0	*
A016	Pot./D-L Analog Input Strt Freq Ref	01	*
A021	Multi Speed Frequency Setting	5	20
A042	Manual Start Torque Boost	5.0	*
A044	V/F / Senseless Vect Selection	02	*
A051	DC Braking Enable	00	*
A052	DC Braking Start Freq (Hz)	0.5	*
A054	DC Braking Force (0 to 100%)	0.0	*
A055	DC Braking Hold Time (0.0 to 60.0 Sec)	0.0	*
A061	Output Frequency Upper Limit (Hz)	0.0	*
A062	Output Frequency Lower Limit (Hz)	0.0	*
B001	Auto Restart Option Select (00 to 03)	00	*
B002	Allowable Und Volt Pwr Failure Time	1.0	*
B005	Number of Restart times Default =16	00	*
B022	Overload Restriction Setting	1.5	*
B023	Deceleration Rate At Overload Set (Sec)	30.0	*
B083	PWM Carrier Frequency (KHz)	5.0	*
B085	Country Code For Startup (set to US)	02	*
B090	Dynamic Brake Usage Ratio (%)	00	*
B092	Cooling Fan Control	00	*
B095	Dynamic Braking Control	00	*
B096	Dyn Brake Activation Level (Buss Volt)	360	*
B140	Overcurrent Trip Suppress (Disab/Enab)	00	*
C001	Terminal (1) Function Setting (FWD)	00	*
C002	Terminal (2) Function Setting (REV)	01	*
C003	Terminal (3) Function Setting (AT)	16	*
C004	Terminal (4) Function Setting (USP)	13	*
C005	Terminal (5) Func 2ACELs 2DECELs (2CH)	09	*
C006	Terminal (6) Func Set INV RESET (RS)	18	*
C026	Relay Output Active State (AL)	05	*
C036	Relay Output Alarm Active State (NC.)	01	*

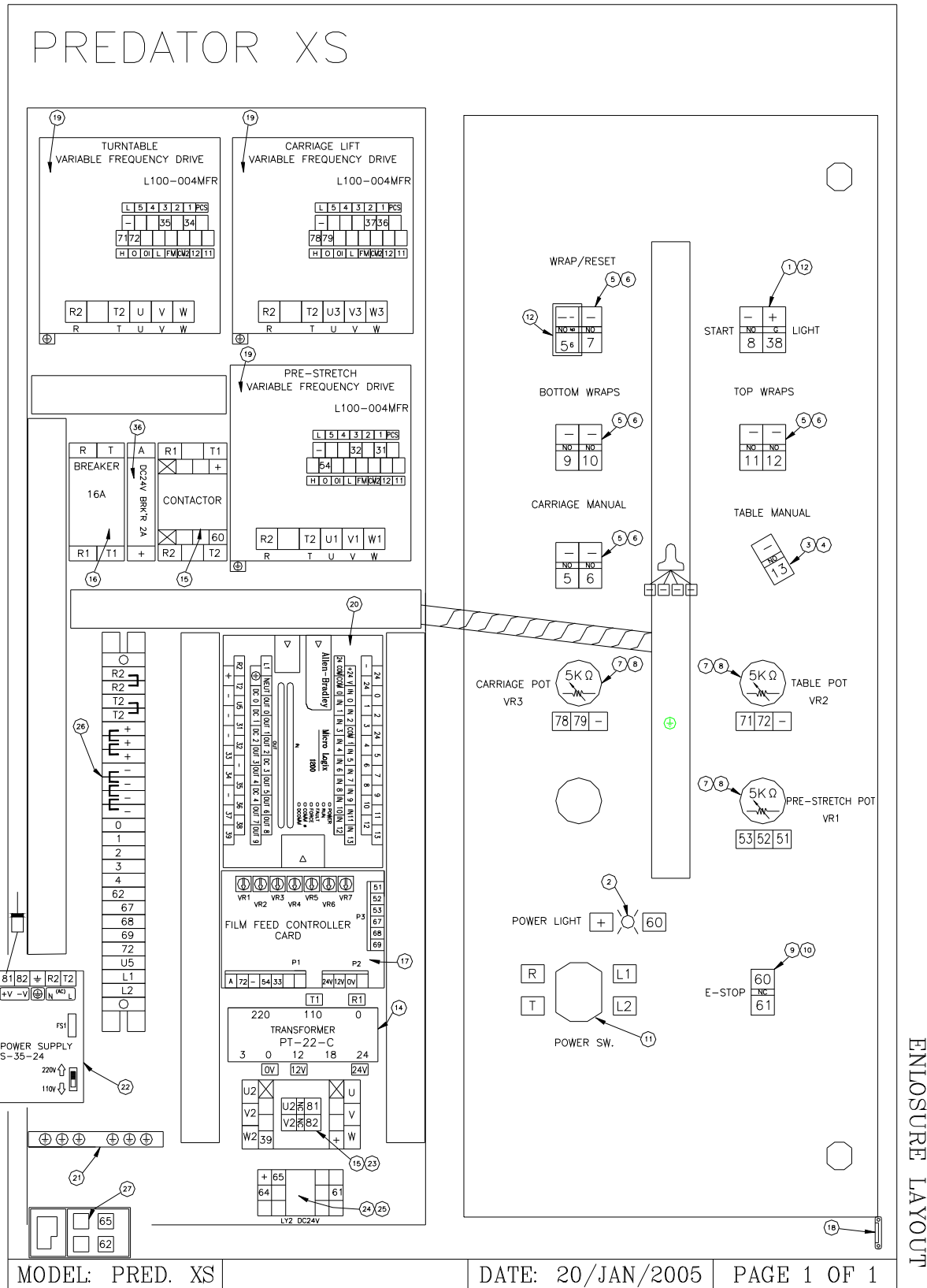
DRV-2C5 – TURNTABLE (1/2 HP)			
MODE	DESCRIPTION	FACTORY SETTING	CURRENT SETTING
F002	Acceleration Time (Seconds)	10.0	2.5
F003	Deceleration Time (Seconds)	10.0	2.5
A001	Frequency Control Method	00	01
A002	RUN SOURCE COMMAND	02	01
A003	Base Frequency Setting	60.0	*
A004	Maximum Frequency Setting	60.0	60.0
A005	At Terminal Selection For Speed Ref	00	*
A011	Pot./D-L Output Active Start Range Hz	00	x
A012	Pot./D-L Output Act End Freq Range Hz	00	*
A013	Pot./D-L Analog Inp Min Ref Val %	0.0	*
A014	Pot./D-L Analog Inp Max Ref Val %	0.0	*
A015	Pot./D-L Analog Input Strt Freq Ref	01	*
A021	Multi Speed Frequency Setting	5	20
A042	Manual Start Torque Boost	5.0	*
A044	V/F / Senseless Vect Selection	02	*
A051	DC Braking Enable	00	*
A052	DC Braking Start Freq (Hz)	0.5	*
A054	DC Braking Force (0 to 100%)	0.0	*
A055	DC Braking Hold Time (0.0 to 60.0 Sec)	0.0	*
A061	Output Frequency Upper Limit (Hz)	0.0	*
A062	Output Frequency Lower Limit (Hz)	0.0	*
B001	Auto Restart Option Select (00 to 03)	00	x
B002	Allowable Und Volt Pwr Failure Time	1.0	*
B005	Number of Restart times Default =16	00	*
B022	Overload Restriction Setting	1.5	*
B023	Deceleration Rate At Overload Set (Sec)	30.0	*
B083	PWM Carrier Frequency (KHz)	5.0	*
B085	Country Code For Startup (set to US)	02	*
B090	Dynamic Brake Usage Ratio (%)	00	*
B092	Cooling Fan Control	00	x
B095	Dynamic Braking Control	00	*
B096	Dyn Brake Activation Level (Buss Volt)	360	*
B140	Overcurrent Trip Suppress (Disab/Enab)	00	*
C001	Terminal (1) Function Setting (FWD)	00	*
C002	Terminal (2) Function Setting (REV)	01	*
C003	Terminal (3) Function Setting (AT)	16	02
C004	Terminal (4) Function Setting (USP)	13	*
C005	Terminal (5) Func 2ACELs 2DECELs (2CH)	09	*
C006	Terminal (6) Func Set INV RESET (RS)	18	*
C026	Relay Output Active State (AL)	05	*
C036	Relay Output Alarm Active State (NC.)	01	*

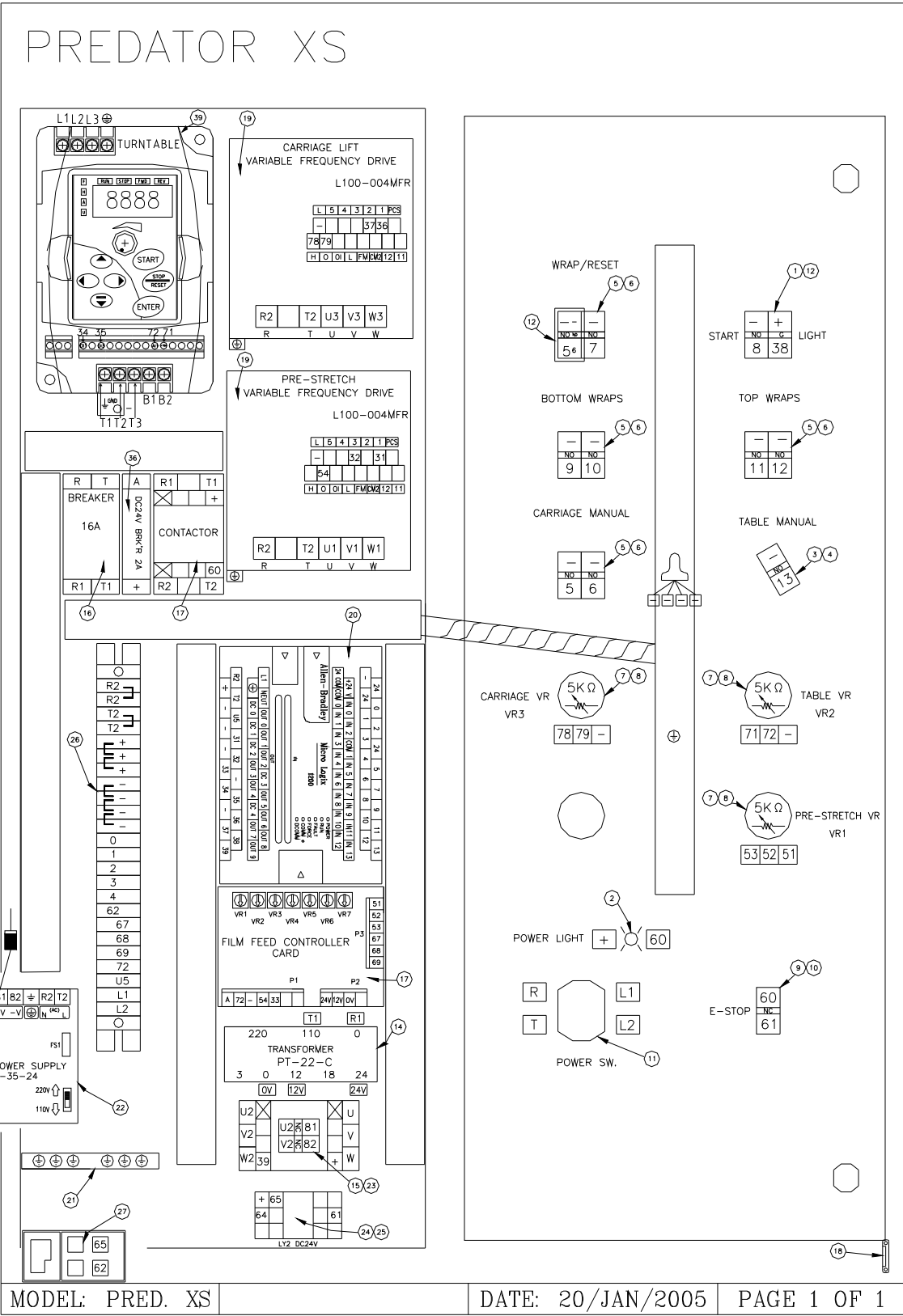
DRV-2C2 – PRE-STRETCH MOTOR (1/4 HP)			
MODE	DESCRIPTION	FACTORY SETTING	CURRENT SETTING
F002	Acceleration Time (Seconds)	10.0	.5
F003	Deceleration Time (Seconds)	10.0	.5
A001	Frequency Control Method	00	01
A002	RUN SOURCE COMMAND	02	01
A003	Base Frequency Setting	60.0	*
A004	Maximum Frequency Setting	60.0	170.0
A005	At Terminal Selection For Speed Ref	00	*
A011	Pot./D-L Output Active Start Range Hz	00	x
A012	Pot./D-L Output Act End Freq Range Hz	00	*
A013	Pot./D-L Analog Inp Min Ref Val %	0.0	*
A014	Pot./D-L Analog Inp Max Ref Val %	0.0	*
A015	Pot./D-L Analog Input Strt Freq Ref	01	*
A021	Multi Speed Frequency Setting	5	35
A042	Manual Start Torque Boost	5.0	*
A044	V/F / Senseless Vect Selection	02	*
A051	DC Braking Enable	00	*
A052	DC Braking Start Freq (Hz)	0.5	*
A054	DC Braking Force (0 to 100%)	0.0	*
A055	DC Braking Hold Time (0.0 to 60.0 Sec)	0.0	*
A061	Output Frequency Upper Limit (Hz)	0.0	*
A062	Output Frequency Lower Limit (Hz)	0.0	*
B001	Auto Restart Option Select (00 to 03)	00	x
B002	Allowable Und Volt Pwr Failure Time	1.0	*
B005	Number of Restart times Default =16	00	*
B022	Overload Restriction Setting	1.5	*
B023	Deceleration Rate At Overload Set (Sec)	30.0	*
B083	PWM Carrier Frequency (KHz)	5.0	*
B085	Country Code For Startup (set to US)	02	*
B090	Dynamic Brake Usage Ratio (%)	00	*
B092	Cooling Fan Control	00	x
B095	Dynamic Braking Control	00	*
B096	Dyn Brake Activation Level (Buss Volt)	360	*
B140	Overcurrent Trip Suppress (Disab/Enab)	00	*
C001	Terminal (1) Function Setting (FWD)	00	*
C002	Terminal (2) Function Setting (REV)	01	*
C003	Terminal (3) Function Setting (AT)	16	02
C004	Terminal (4) Function Setting (USP)	13	*
C005	Terminal (5) Func 2ACELs 2DECELs (2CH)	09	*
C006	Terminal (6) Func Set INV RESET (RS)	18	*
C026	Relay Output Active State (AL)	05	*
C036	Relay Output Alarm Active State (NC.)	01	*

VI-23

# Electrical Sub-Panel Layout

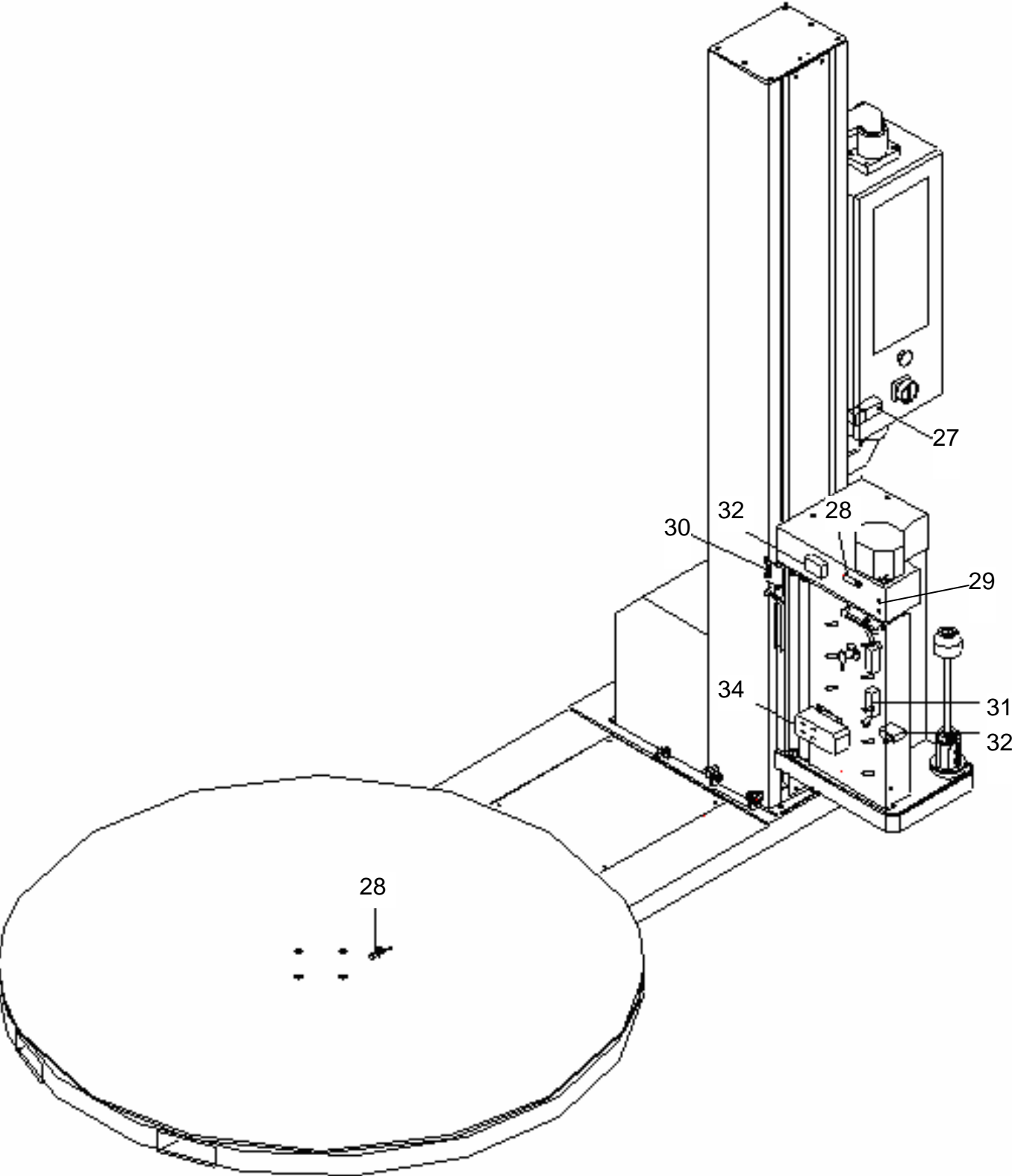


# Electrical Sub-Panel Layout for OPTIONAL High Profile Turntable

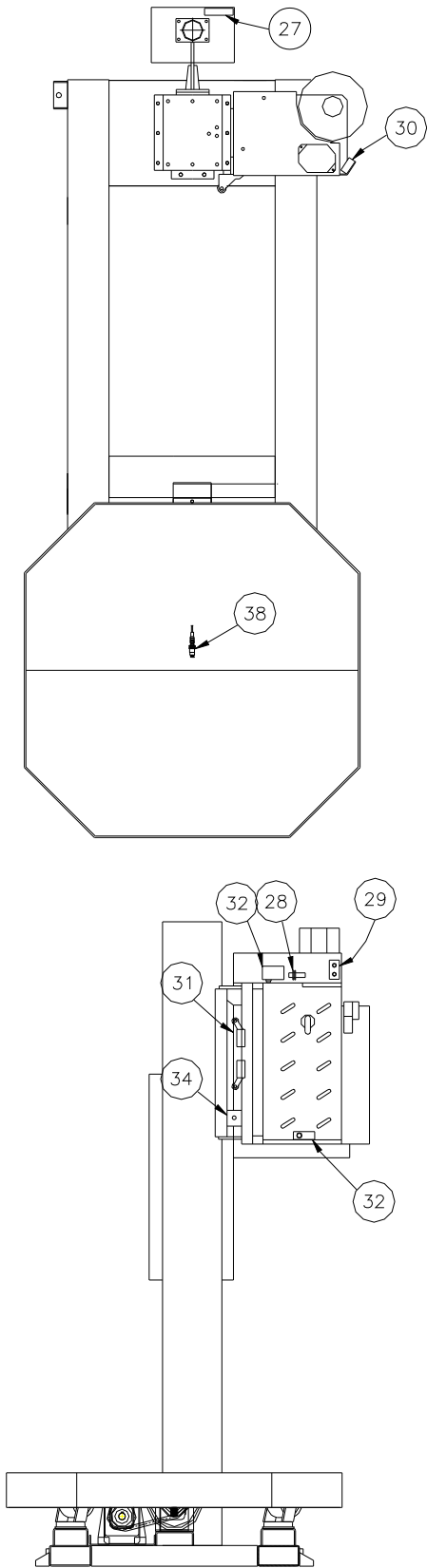




# Electrical Sensors Layout



# Electrical Sensors Layout for OPTIONAL High Profile Turntable



## Electrical Part List



### NOTE

Although all parts are shown in the part list, some may not be available individually. Selected parts must be purchased in assembly.

Parts available in inventory are highlighted. Non-highlighted parts may have longer lead times.

No.	Sub No.	Part Number	Description	Quantity
1a		400610	Auto RUN GREEN LAMP ~ BASE	1
1b		400611	Auto RUN GREEN LAMP ~ LAMP	1
1c		400609	Auto RUN GREEN LAMP ~ COVER	1
2		400608	POWER LAMP	1
3		400618	SELECTOR SWITCH, 2 POSITION	1
4		400615	CONTACT BLOCK, 1x NO	1
5		400619	SELECTOR SWITCH, 3 POSITION	4
6		400617	CONTACT BLOCK, 2x NO	4
7		400620	KNOB (BLACK)	3
8		400649	POTENTIOMETER, 5K	3
9		400613	EMERGENCY SWITCH	1
10		400616	CONTACT BLOCK, 1x NC	1
11		400621	DISCONNECT SWITCH	1
12		400614	CONTACT BLOCK, 1x NO	1
14		403557	TRANSFORMER, TR-80VA	1
15		403172	CONTACTOR	2
16		403561	BREAKER, C60A2PC16A	1
17		400658	FILM FEED CONTROLLER	1
18		500080	KEY FOR SAFETY SWITCH	1
19		403481	AC DRIVE, ½ HP, HITACHI	3
20		403103	PLC, A-B MICROLOGIX	1
21		403563	TERMINAL POST	1
22		403564	POWER SUPPLY, S-35-24	1
23		403565	AUX. CONTACT BLOCK	1
24		400630	RELAY LY2, DC24V	1
25		400628	RELAY BASE, LY2, PTF-08A	1
26		400607	TERMINAL STRIP, TB6P	1
27		400644	SECURITY SWITCH XCSPA791	1
28		403556	PROX SENSOR PM12-04N	2
29		403566	STRETCH % INDICATOR BOARD	1
30		400643	PHOTO SENSOR, A3R-2MX	1
31		400639	LIMIT SWITCH, TZ-8108	2
32		400637	LIMIT SWITCH, TZ-7110	3
34		300719	SOLENOID (TAU-1585 DC24V)	1

35		400608	GREEN LAMP 916L,DC24V	2
36		403559	BREAKER, C60N1PC2A	1
37		403560	RELAY R23 24V-2P	1

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# Part List

# RECOMMENDED SPARE PARTS

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The table below lists the recommended spare parts.

Part Number	Description	Quantity
300772	DRIVE BELT, 154"	1
403556	T.T. HOME & STRETCH % PROX.	1
700060	T.T. CAM FOLLOWER ASS'Y	6
408117	DANCER BAR POTENTIOMETER	1
400637	CARRIAGE SAFETY LIMIT SWITCH	1
400639	CARR. UPPER/LOWER LIMIT SWITCH	1
300719	AUTO PUNCTURE SOLENOID	1
400643	LOAD HT. DETECTION PHOTO EYE	1
400644	CONTROL BOX SAFETY SWITCH	1
500080	CONTROL BOX SAFETY KEY	1
400618	SELECTOR SWITCH, 2 POSITION	1
400619	SELECTOR SWITCH, 3 POSITION	1
400620	POTENTIOMETER KNOB	1
400649	POTENTIOMETER, 5K	1
400613	E. STOP SWITCH	1
400621	MAIN DISCONNECT SWITCH	1
400658	FILM FEED CONTROLLER CARD	1
403172	CONTACTOR	1
403481	AC DRIVE, ½ HP, HITACHI	1

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Notes

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