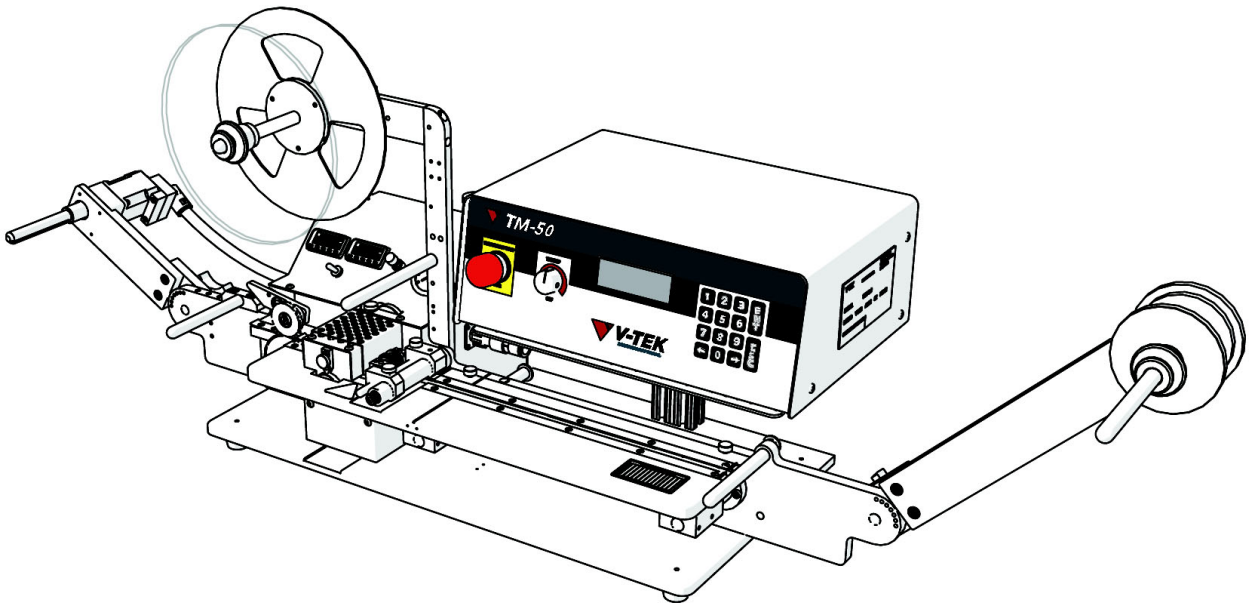
V-TEK INTERNATIONAL



TM-50

Manual Taping Machine

User's Guide

User's Guide # 61573674

V-TEK, Inc.
751 Summit Avenue
Mankato, MN 56001
(P) 507-387-2039
www.vtekusa.com

EC Declaration of Conformity

Manufacturers Name: V-TEK Inc.
Manufacturers' Address: 751 Summit Avenue
Mankato, MN 56001 USA

Declare that the machinery described below complies with applicable health and safety requirements of Part 1 of Annex 1 of the Machinery Directive 2006/42/EC and EMC Directive 2004/108/EC. Confidential technical documentation has been compiled in accordance with Part A of Annex VII of Machinery Directive 2006/42/EC and is available to European national authorities on written request only. If a request is received documentation will be delivered on a CD or by post.

Description: Taping & Inspection Machines.
Model Number: TM 50 Standard, XL, OEM, and I3.
Specification: For 8-72mm Width Tape, Up to 120mm for XL
Serial Number/s: 201XXXXXXX

The following standards have either been referred to or been complied with in part or in full as relevant:

EN ISO 12100:2010	Safety of machinery -	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN ISO 13849-1:2008	Safety of machinery -	Safety Related Parts of Control Systems – Part 1 General Principals for Design
EN ISO 13732-1:2008	Safety of machinery -	Ergonomics of the thermal environment - Methods for the assessment of human responses to contact with surfaces
EN 614-1:2006+A1:2009	Safety of machinery -	Ergonomic design principles - Part 1: Terminology and general principles
EN 614-2:2000+A1:2008	Safety of machinery -	Ergonomic design principles - Part 2: Interactions between the design of machinery and work tasks
EN 953:1997+A1:2009	Machinery Safety -	General requirements for the design and construction of guards
EN 13850: 2008	Safety of machinery -	Emergency-stop equipment, Principals for Design
EN 60204-1:2010	Safety of machinery -	Electrical Equipment of Machines
EN ISO 11202/A1 1997	Acoustics -	Noise emitted by machinery and equipment - Determination of emission sound pressure levels at a work station and at other specified positions.
EN 61000-6-3:2007	EMC -	Generic standards - Emission standard for residential, commercial and light-industrial environments
EN 61000-6-1: 2007	EMC -	Generic standards - Immunity for residential, commercial and light-industrial environments

Full Name of responsible person and place of signing

Christina Hogan

Place V-TEK Inc. **Position** Vice President

Signature **Date** 01/03/2012

EC REP
QNET BV
Hommerterweg 286
6436 AM Amstenrade
The Netherlands

Preface

The TM-50 Taping Machine is built with the following standard features:

- Adjustable track assembly for tape widths 8mm to 72mm
- Independently controlled seal temperature for each side of the cover tape
- Dual stage fully adjustable Heat and PSA sealer assembly
- User-friendly software assures ease of setup and operation
- Software controlled advance movement of carrier tape (2mm to 144mm pitch)
- Current operating parameters and count are saved at power down and restored at power up

The intended use of the TM-50 Taping Machine is to produce taped reels of individually sealed and consistently orientated components. Use of this equipment in any other way is not recommended.

This User's Guide describes how to setup and operate the TM-50 Taping Machine. This manual should be read and thoroughly understood before operating the machine.

Theory of Operation

The TM-50 routes carrier tape from a feed reel through an adjustable track for manual placement of parts or electrical components. Once the operator has filled all of the carrier tape pockets in the loading area with parts, a foot pedal is used to advance the tape to a sealer assembly.

If the TM-50 was purchased with the optional *Extended Software Package*, a sensor detects jams in tape, empty pockets and low carrier tape supply as the tape advances. Before the part reaches the sealer assembly, a 2D vision system inspects the part in-tape for mark and orientation.

Once the carrier tape reaches the TM-50 sealer assembly, a cover tape is applied. The part is then sealed in the pocket with either a Heat Seal or Pressure Sensitive Application (PSA). When the sealing process is complete, the finished tape is routed onto a take-up reel.

Machine Details

Operating Temperature

0 Degrees Celsius to + 60 Degrees Celsius

Although all of the components used on the machine will withstand the temperature range of 0 degrees Celsius to +60 degrees Celsius, such temperature may decrease the life of some of the components. The recommended rating is 0 degrees Celsius to +50 degrees Celsius.

Humidity

5% to 90% non-condensing

Physical Specifications

Baseplate dimensions: 23 inches (58 cm) Width; 12 inches (30 cm) Depth

Overall Dimensions
15 inches (38 cm) Height; 55 inches (140 cm) Width; 18 inches (46 cm) Depth

Weight
65 pounds (29.25 kg)

Power Required

- 115/230 VAC, 50-60 Hz
- Compressed air, 80 PSIG
- 1.1 Amp, 120 Volts; .6 Amp, 220 Volts

Placement Speed

500 to 5000 units per hour, dependent on component size and operator skills

Controls

- Tension adjust for proper take-up reel tension
- Seal pressure (pneumatic) adjustment
- Seal temperature (range 30 degrees to 240 degrees Celsius)
- Seal dwell time (0.25 to 1.0 seconds)
- Tape pitch advance adjustment
- Tape speed adjustment
- Jog forward/reverse adjustment
- Power ON/OFF
- Start/Stop
- Batch size preset
- Seal head ON/OFF

Fuse

- 250V, 1 amp (x2)

Intended Use

The intended use of the TM-50 Taping Machine is to produce taped reels of individually sealed and consistently orientated components. It is designed to accommodate a full range of electronic devices. Use of this equipment in any other way is not recommended.

Suitable carrier and sealing tapes include any conductive or non-conductive tapes with feed-holes that are pitched at 4 mm. Tapes must operate in a temperature range from 135-155° Celsius with a pressure range from 40-60 psi and dwell time between 250-400 milliseconds. The TM-50 can accommodate tape widths from 8mm to 72mm.

Tape advance speed is set on the machine's controller and can be set at any speed from 5-250 random units. Feed rates can vary from 500 to 5000 units per hour dependent on component size and the skill of the operator who is filling the pockets.

Operating Environment

The TM-50 is designed to be operated in a temperature controlled, light, industrial setting. The machine should be installed on a flat, dry, stable surface in a well lit area (ambient lighting of 200 to 300 Lux (Lumens/m2).

The recommended climate is between 5 - 90% non-condensing humidity with a room temperature between 0 - 50 degrees Celsius.

> **Note**: Although all of the components used on the machine will withstand the temperature range of 0 to 60 degrees Celsius, such temperature may decrease the life of some of the components.

The intended electrical environment is Pollution Degree 2 and Over Voltage Category II.

Misuse

The TM-50 tape advance should not be activated when parts are being placed in tape, when tape reels are being loaded or replaced, or when jams in tape are being cleared. Although the torque on the Stepper Motor has been limited to reduce the risk of injury, advancing the tape during these tasks may result in pinching or entrapment of fingers.

The user is protected from moving parts and exposure to objects being ejected under pressure by metal enclosures. The TM-50 should never be operated with these enclosures removed.

The user is protected from the TM-50's heat sealer by a metal guards. Operators are cautioned not to touch the heat seal guard or to try to reach underneath the guard while the TM-50 is in operation.

Safety Warning Labels

The following warning labels have been placed in various places on the machine to bring safety issues to the attention of operators and technicians working with or near the machine. It is advised that these warning labels not be removed or obstructed.

Attention
Indicates an adjustment or danger zone requiring attention.

Electrical Hazards
Indicates that hazardous voltage levels are present. Always disconnect power to the machine before removing panels or enclosures with this warning label.

Temperature Hazards
Indicates a hot surface. Use care when working near these surfaces and allow them to cool before performing maintenance.

Mechanical Hazards
Indicates areas where moving parts can cause personal injury if safety precautions are not observed.

Open Book
Refer to Chapter 4 of this manual before performing maintenance on the TM-50.

Contact Information

V-TEK, Inc.
751 Summit Ave
Mankato, MN 56001
TEL: (507) 389-2039
website: http://www.vtekusa.com

For customer service, please refer to the Customer Service Contact Sheet at the back of this manual.

Safety Precautions

General Precautions

Only qualified personnel with the proper technical training, experience working on this type of equipment, and awareness of the possible hazards should perform maintenance on the TM-50.

The TM-50 should be installed on a level and stable surface before any operation or maintenance is performed.

This manual should be read and thoroughly understood before operating the machine.The guidelines provided in the following pages are intended to educate the user about how to operate the TM-50 safely. They contain important information on avoiding potential hazards to the operator and to the equipment.

Observe the following safety precautions when working with the TM-50.

Maintenance

Always disconnect the power source from the machine before removing access panels to perform any maintenance required. Please refer to Chapter 1 and Chapter 4 of this manual for instructions before performing maintenance on the machine.

AC Receptacle

Connect the power cord to the machine before plugging it into an outlet.

Heat Sealer

Caution should be taken when performing maintenance on the sealer. The body of the heat sealer can remain hot for several minutes after it has been shut off. Before servicing, turn the power switch to OFF, turn off the air supply to the machine, and allow the sealer to cool.

Connectors

Dangerous voltage is present. Make sure the machine is turned off and the power cord is disconnected before removing any panels. Do not remove the slide mount rear panel while the power is connected to the machine.

Idler Wheel

Use caution not to pinch fingers in the idler wheel.

TM-50

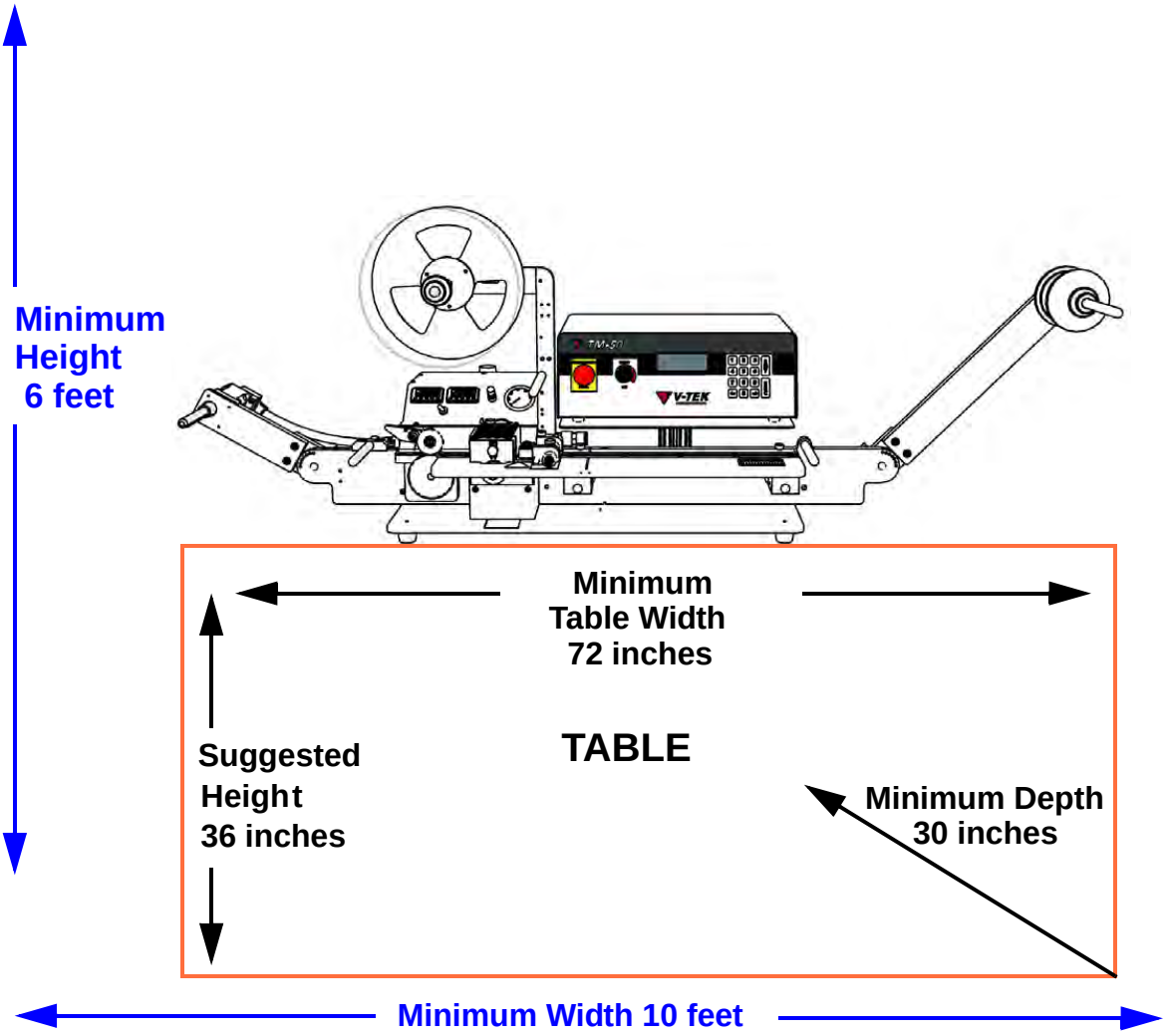
Table of Contents

Chapter 1: Getting Started

Contents

Preparing the Work Area

The TM-50 is a table-top machine which needs to be placed on a flat, stable surface in a well lit area that is a minimum of 6' high x 10' wide x 5'deep (2m x 3m x 1.5m). When positioning the TM-50, choose an area that is not located below overhead gantries, walkways or power lines to ensure objects or liquids cannot be dropped on the machine from overhead.



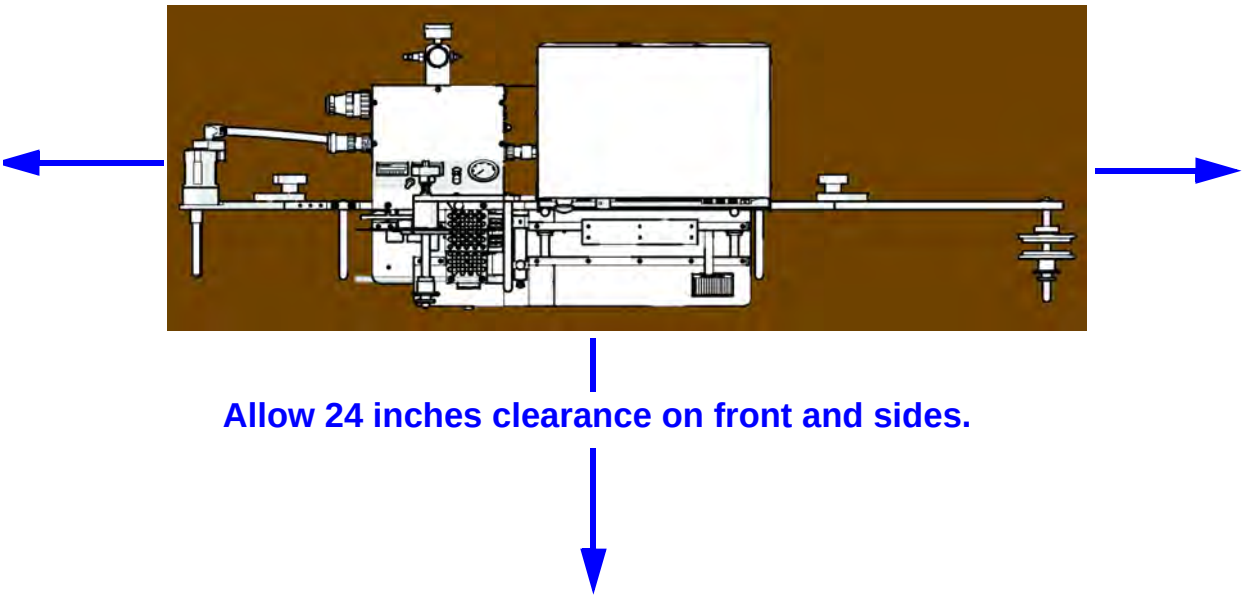
Choose a table that is at least 72" wide by 30" deep to provide sufficient space for the assembled machine when it is fully loaded with a variety of tape reel sizes.

Ideally the table height should be adjustable so the machine height can be easily adjusted to suit operators of varying heights. The objective is to position the TM-50 controls so they are easily accessible for operation and maintenance. The suggested level is 36" (900 mm) above the floor, but this may vary from one operator to another.

The table's working surface should have a slope of no more than 5 degrees and be capable of supporting a load of 65 pounds (30 kg).

When loading, unloading or running the TM-50, the operator should stand in front of the machine controller to assure easy access to all controls and the **Power/Emergency Stop** button. This position also allows the operator to view all parts of the TM-50 while it is in operation.

Allow at least 24” clearance at the front and sides of the machine for easy access and operation. (Pictured in the overhead view below.)



The TM-50 will also require access to a 85-110 PSI air pressure system and a 115/230 VAC, 50-60 Hz power supply. Locate the machine so electrical power cables can be routed away from areas where personnel are expected to move. It is recommended that cables be routed overhead or underground. If cables must be routed over the floor, cover them with rubber ramps.

Assembly Instructions

Unpacking the TM-50

The following items should be included in the shipping crate**:**

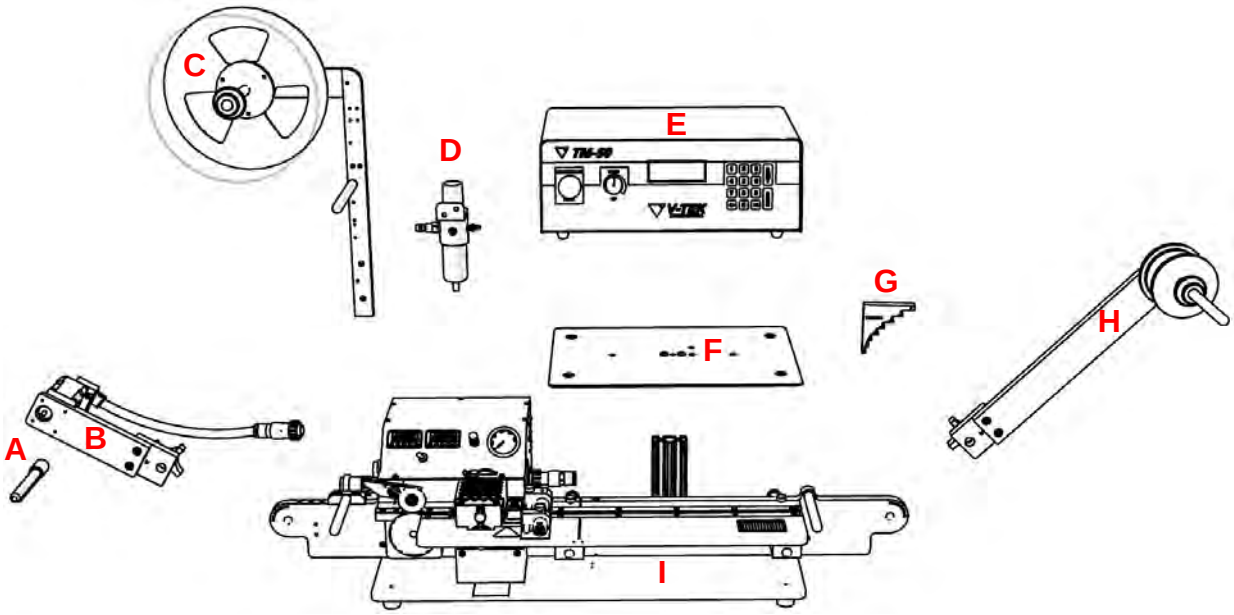


Figure 1.1

A. Take-up Spindle

B. Take-up Motor Assembly

C. Cover Tape Reel Support

D, Air Regulator

E. Controller

F. Controller Baseplate

G. Track Width Guide

H. Feed Reel Support

I. Baseplate Assembly

J. Peripheral Cable (not pictured)

K. Hex Wrench Set (not pictured)

L. Foot Switch (not pictured)

M. AC Power Cord (not pictured)

N. TM-50 User's Guide (not pictured)

Equipment Required

Hex wrenches

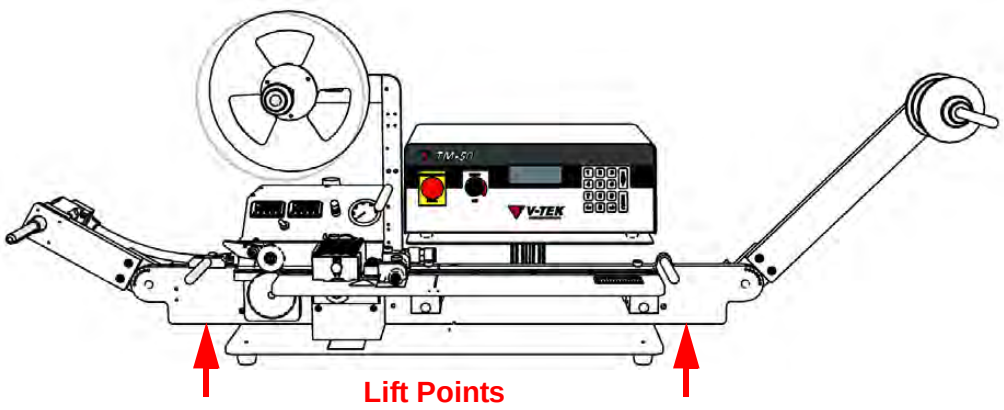
80 PSI air pressure system

Assembling the TM-50

Before the TM-50 is shipped from V-TEK, the machine is disassembled and a support plate attached to the loading track to prevent damage in transit. Follow these instructions to reassemble the machine:

1. Remove items one at a time from the crates and place on a flat, stable surface for assembly.

> **Note:** The baseplate assembly (Item B in the figure above) weighs approximately 50 pounds (23 kg). Use two people to lift the base assembly from the crate and position it in the assembly area. See the illustration below for lift points.



2. Remove and discard protective wrapping from each part.

3. Using a 3/32” hex wrench, remove the (4) 4-40x1/2 SHCS from the *Support Plate* attached to the l*Oading Track*.

4. Remove the *Support Plate*.

5. Insert the (4) 4-40x1/4 FHCS provided into the *Loading Track* where the support plate screws had been and tighten them using a 1/16” hex wrench.

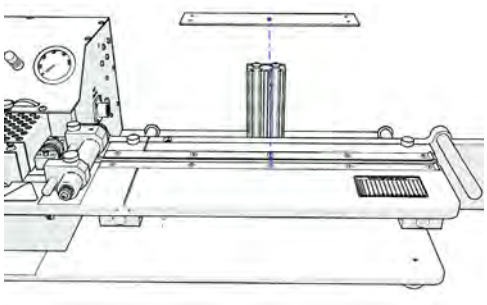


Figure 1.2

6. Using a 3/16" hex wrench, remove the (2) 1/4" SHCS located on the backside of the loading track. Bolt the *Cover Tape Reel Arm* to the *Track Support Bracket*.

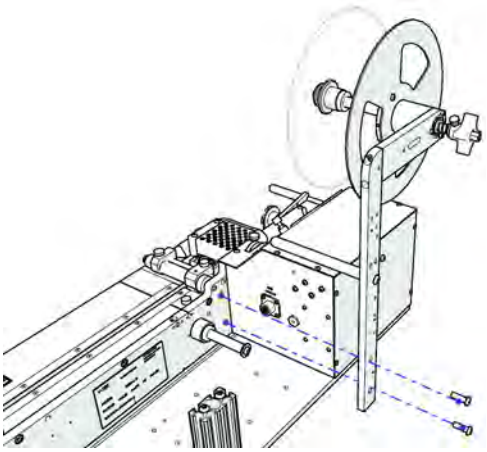


Figure 1.3

7. Attach the *Take-up Spindle* to the *Take-up Motor Assembly* by sliding it on to the pin and tightening the set screw with a 3/32" hex wrench.

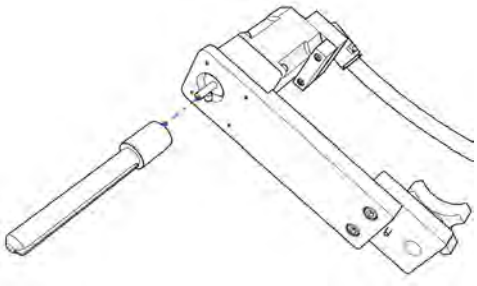


Figure 1.4

8. Remove the black knob from the left side of the *Track Support Bracket*. The *Take-up Support Arm* has a dowel pin which locks into position holes on the *Track Support Bracket*. Slide the t*Ake-up Support Arm* onto the threaded rod, engage the dowel pin into the desired position, and secure it into place with the black knob. Plug the electrical connector into the *Take-up Motor Receptacle*.

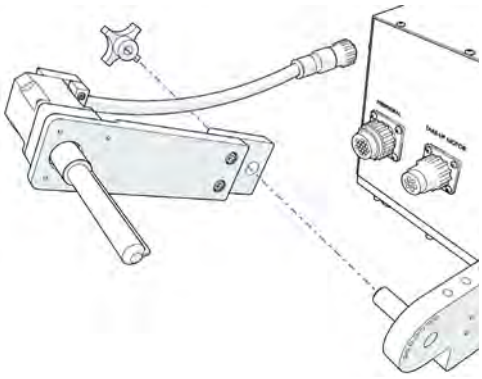


Figure 1.5

9. Remove the black knob from the right side of the *Track Support Bracket*. The *Feed Reel Support Arm* has a dowel pin which locks into position holes on the *Track Support Bracke*t. Slide the *Feed Reel Support Arm* onto the threaded rod, engage the dowel pin into the desired position, and secure it into place with the black knob.

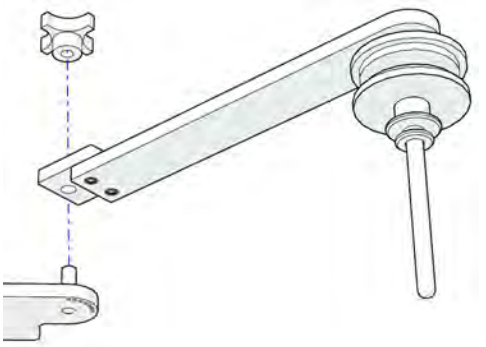


Figure 1.6

> **Note:** If the optional *Vision System* will be installed, skip **Steps 10-14** and proceed to **Step 15: Mounting the Air Regulator**. The *Controller* will be mounted during the Vision assembly procedure.

10. Using a 5/32” hex wrench, remove the 1/4” BHCS from the top of the *Controller Pedestal*. Attach the *Controller Baseplate* to the pedestal using the 1/4” BHCS.

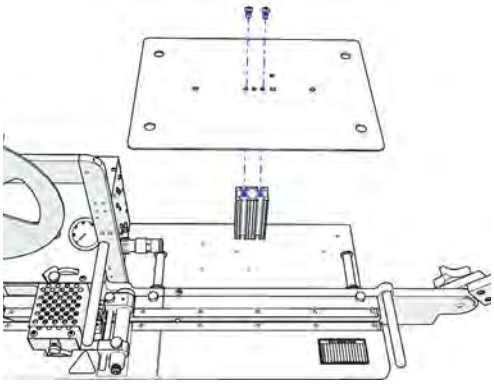


Figure 1.7

11. Place the *Controller* on the *Controller Baseplate*. Engage the four corner holes in the *Controller Baseplate* with the four rubber feet on the bottom of the controller so that it is seated securely.

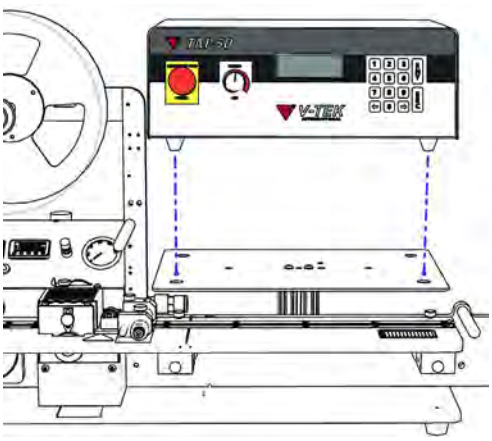


Figure 1.8

12. Connect the *Peripheral Cable* to the right side of the machine and then to the receptacle labeled **PERIPHERAL** on the back of the *Controller*.

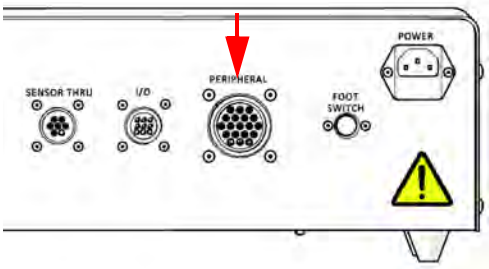


Figure 1.9

13. If a *Foot Switch* was included with the machine, plug it into the receptacle labeled **FOOT SWITCH** on the back of the *Controller*

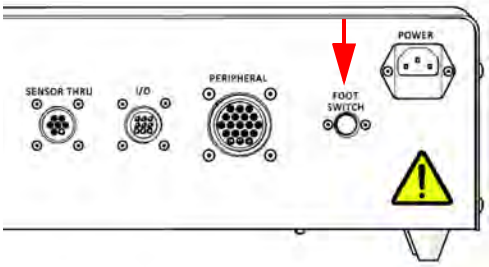


Figure 1.10

14. Plug the *Power Supply Cord* into the receptacle labeled **POWER** on the back of the *Controller*.

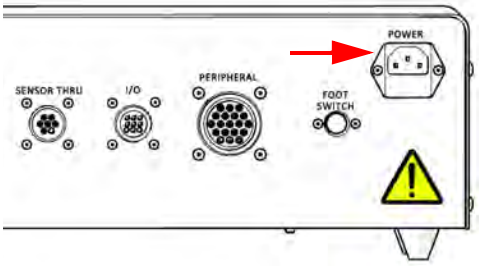


Figure 1.11

15. Install the *Air Regulator* to the back of the sealer controller with the provided screws. Attach the blue air hose to the right side of the *Controller*.

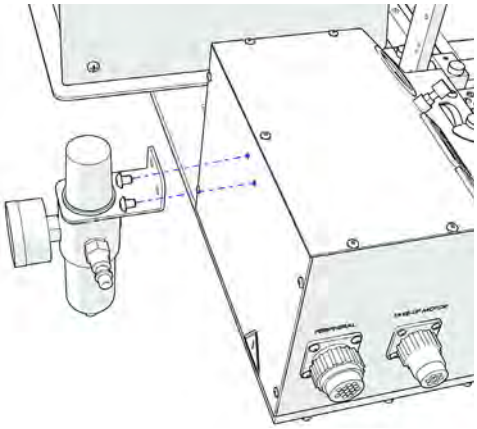


Figure 1.12

16. Connect a 1/4” airline to the *Air Regulator* and set the regulator to 80 psi, if necessary. It can be adjusted by lifting the adjustment knob and turning it. Once it reads 80psi, push the knob back in to lock it into place.

> **NOTE**: An air supply is only necessary for the operation of the heat sealer. Suggested settings are between 85-110 psi.

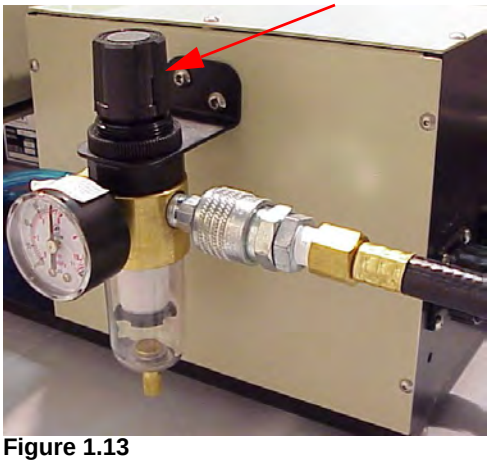


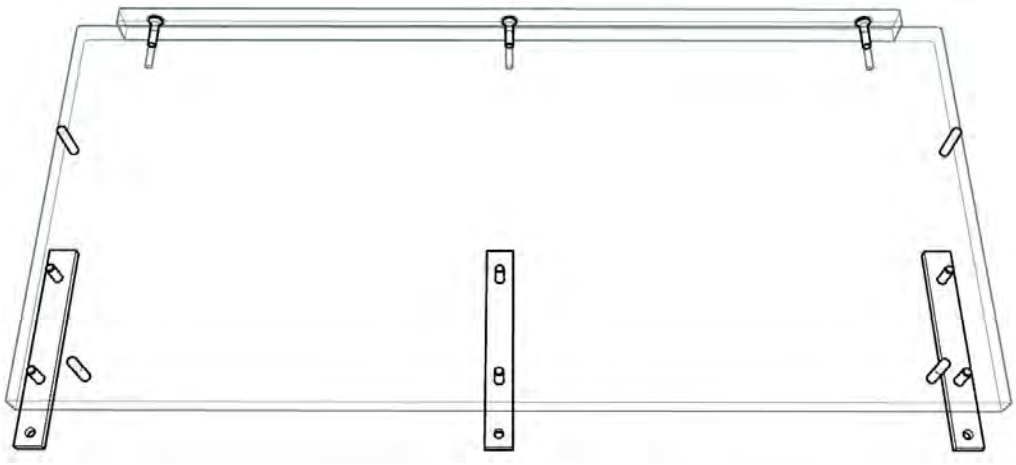
Figure 1.13

17. The fully assembled machine weighs 65 pounds (29.25 kg). If the machine needs to be moved to a different location, use two people to safely lift the machine.

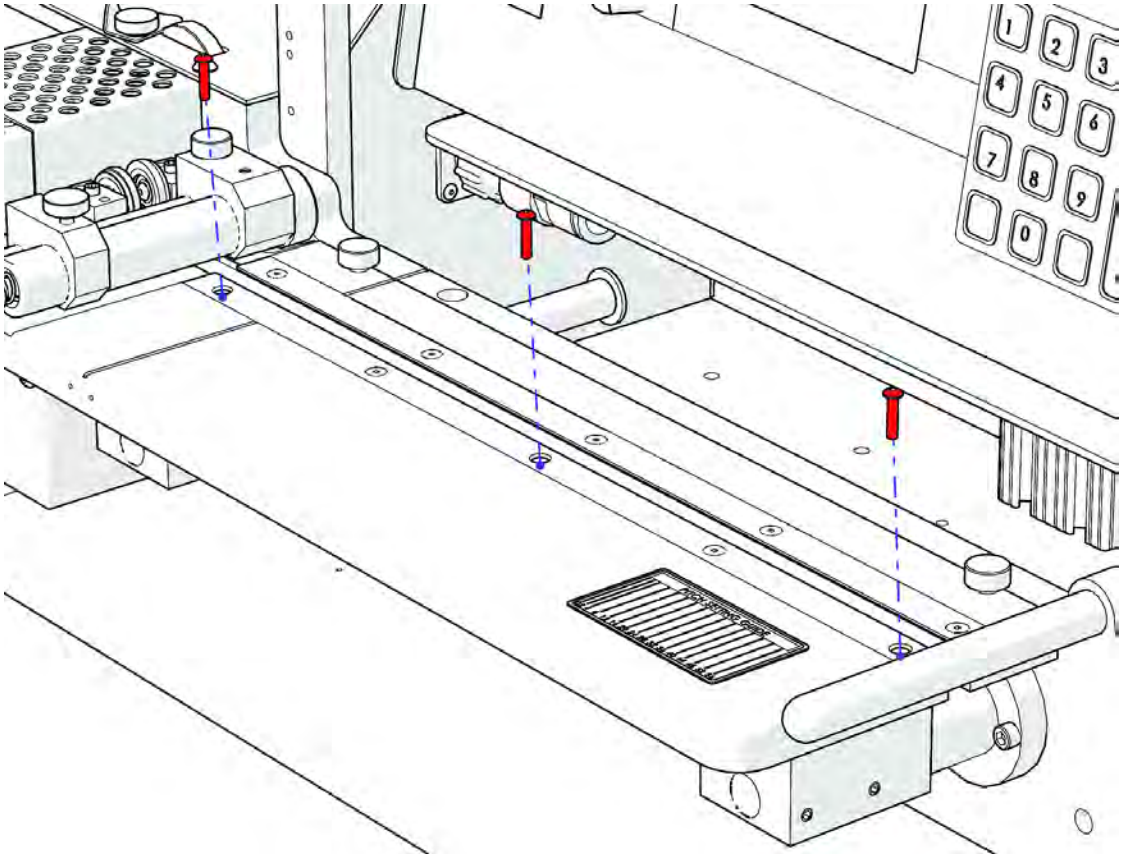
Jedec Tray Holder Option

If the *Jedec Tray Holder* option was purchased, follow the instructions below to attach it to the TM-50.

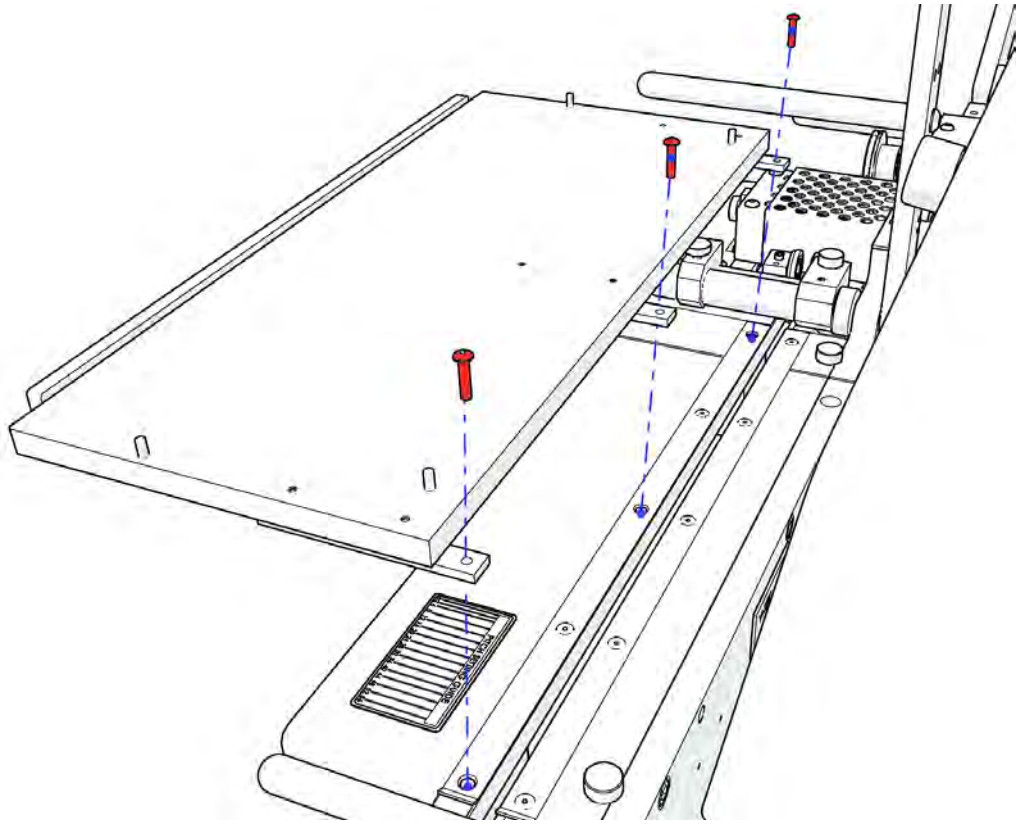
1. Remove the *Jedec Tray Holder* from the shipping crate. Discard the protective shipping wrap.



2. There are five 4-40 x 1/4 FHCS which attach the *Track Cover* to the *Outer Track*. Remove the center screw and the two outside screws. Set aside.



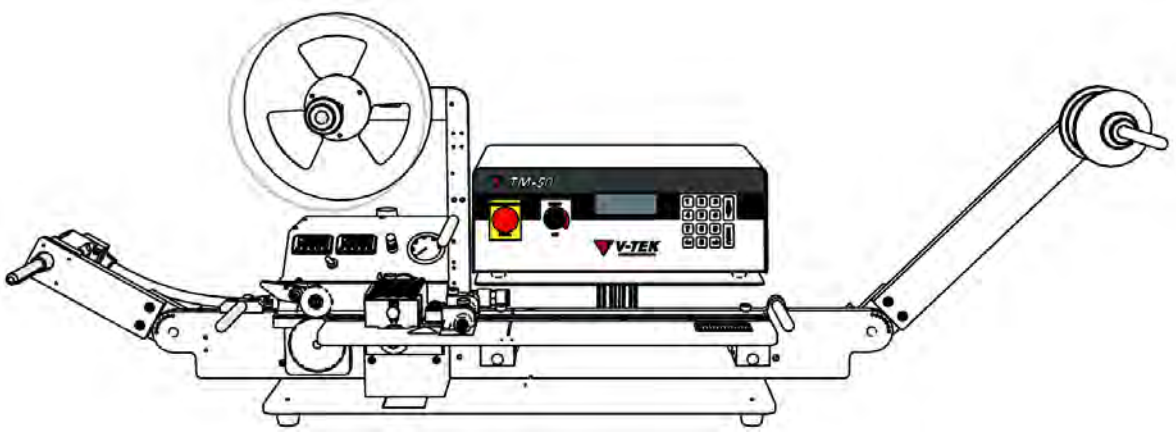
3. Use the (3) 4-40 x 1/2 BHCS which were included with the *Jedec Tray Holder* to attach it to the *Outer Track*.



Note: The *Cover Tape Guide* may make it difficult to attach the *Jedec Tray Holder* when it is fully extended. If the guide is in the way, adjust the width until the *Jedec Tray Holder* can be attached without interference.

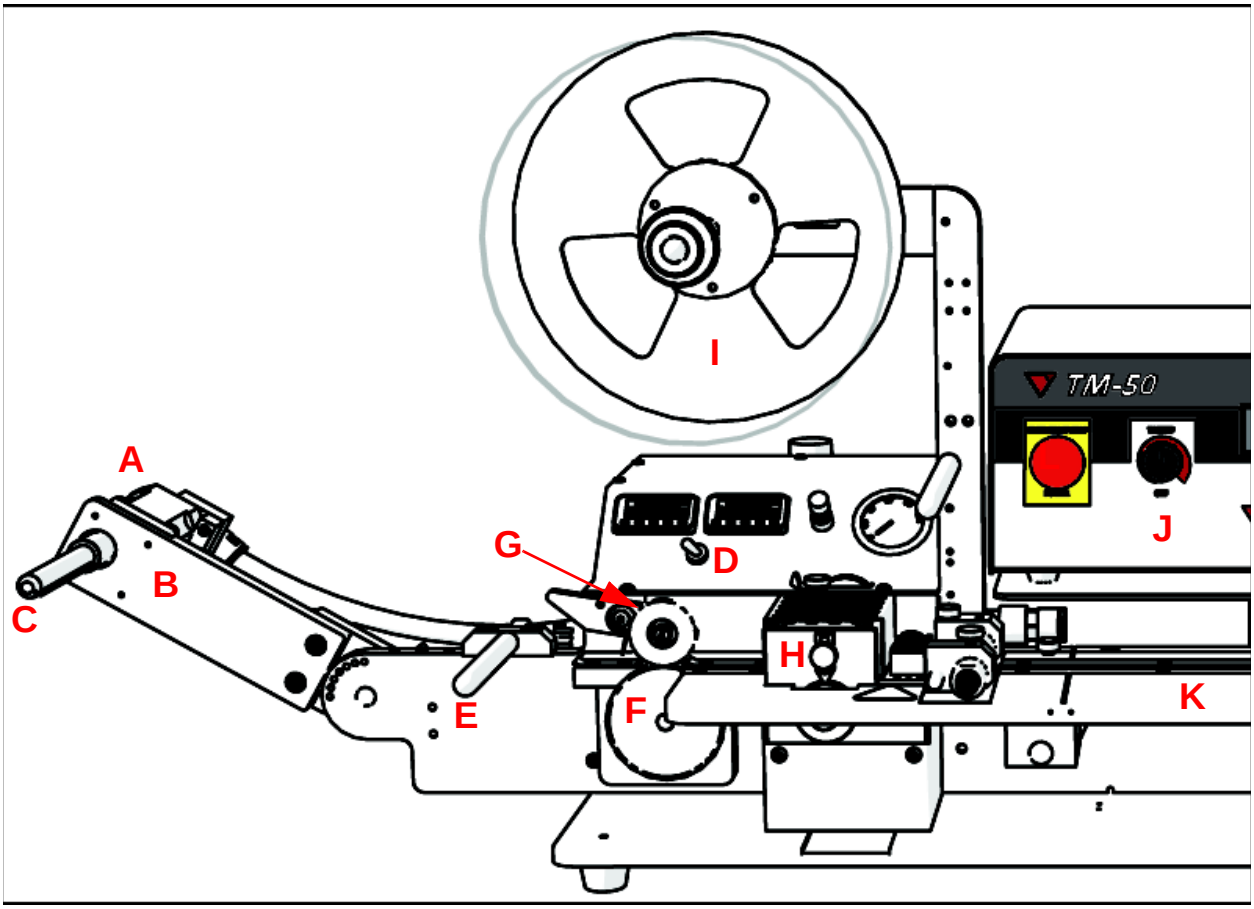
The *Jedec Tray Holder* is now ready to use.

Machine Overview



Before the TM-50 is placed in operation, use the photos in the following section to perform a visual inspection and ensure that it is correctly assembled.

Left Side



A. Take-Up Motor

B. Take-up Arm

C.Take-up Reel Spindle

D. Sealer Controls

E. Rear Tape Guide

F. Drive Sprocket

G. Idler Wheel

H. Sealer

I. Cover Tape Reel

J. Controller

K. Track

L. E-Stop

Sealer Controls

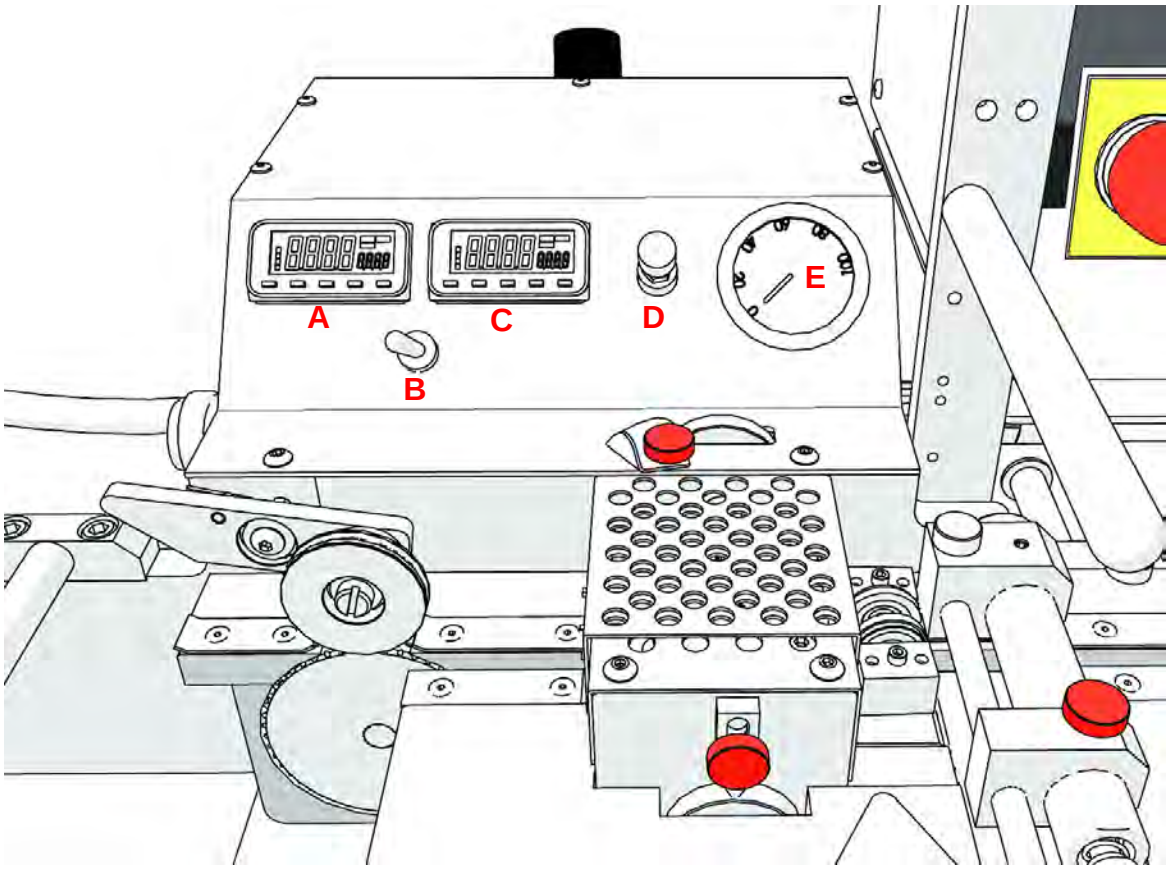


Figure 1.14

A. Inside Seal Temperature Control

B. Heat Seal ON/OFF Switch

C. Outside Seal Temperature Control

D. Heat Seal Pressure Adjuster

E. Pressure Gauge

Seal Position Adjustments

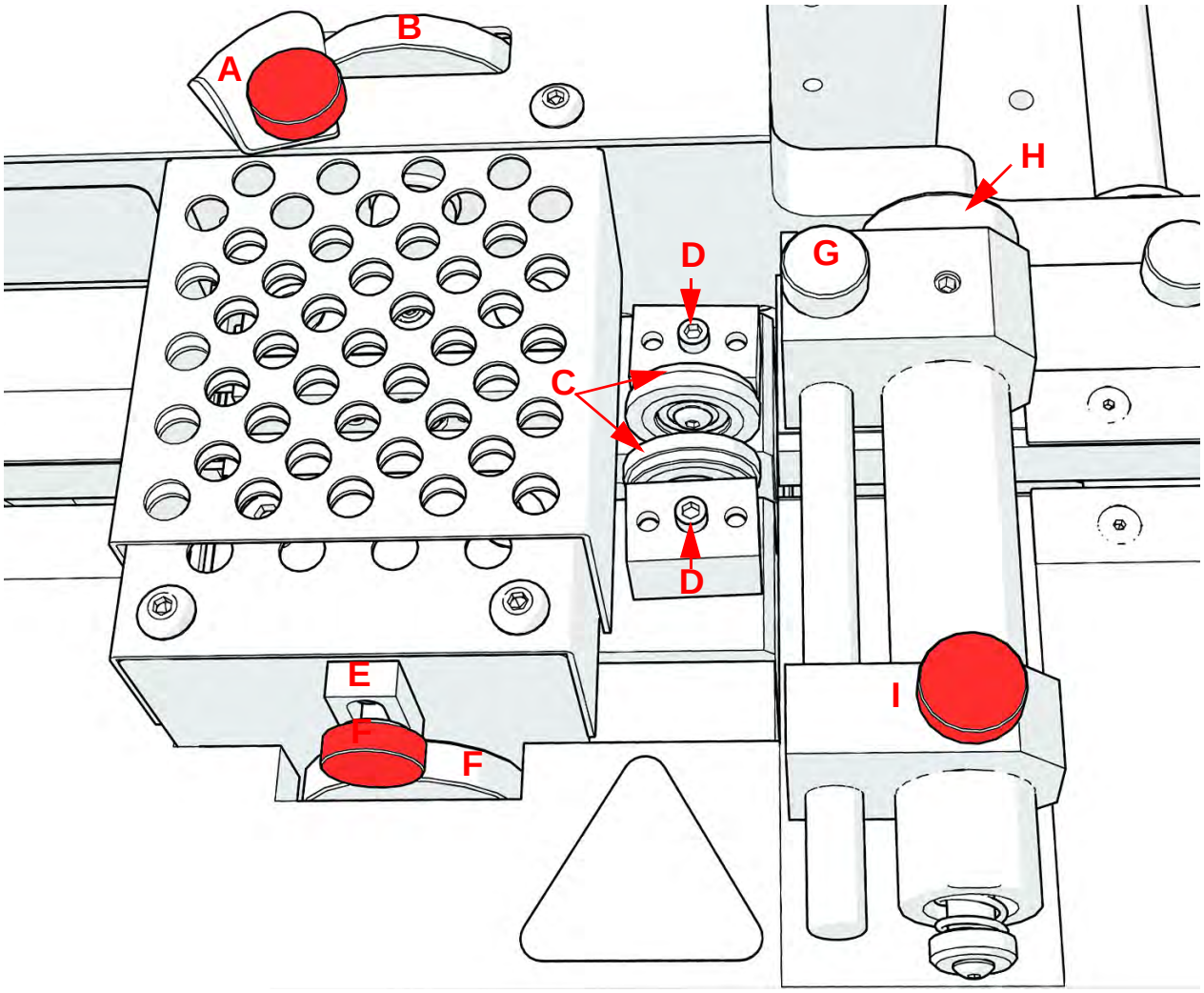


Figure 1.15

A. Inner Seal Position Lock

B. Inner Seal Position Adjuster

C. PSA Seal Rollers

D. PSA Seal Pressure Adjustments

E. Outer Seal Position Lock

F. Outer Seal Position Adjuster

G. Cover Tape Guide Width Thumb Screw

H. Cover Tape Guide Width Inner Adjuster

I. Cover Tape Guide Width Outer Adjuster

Front Side

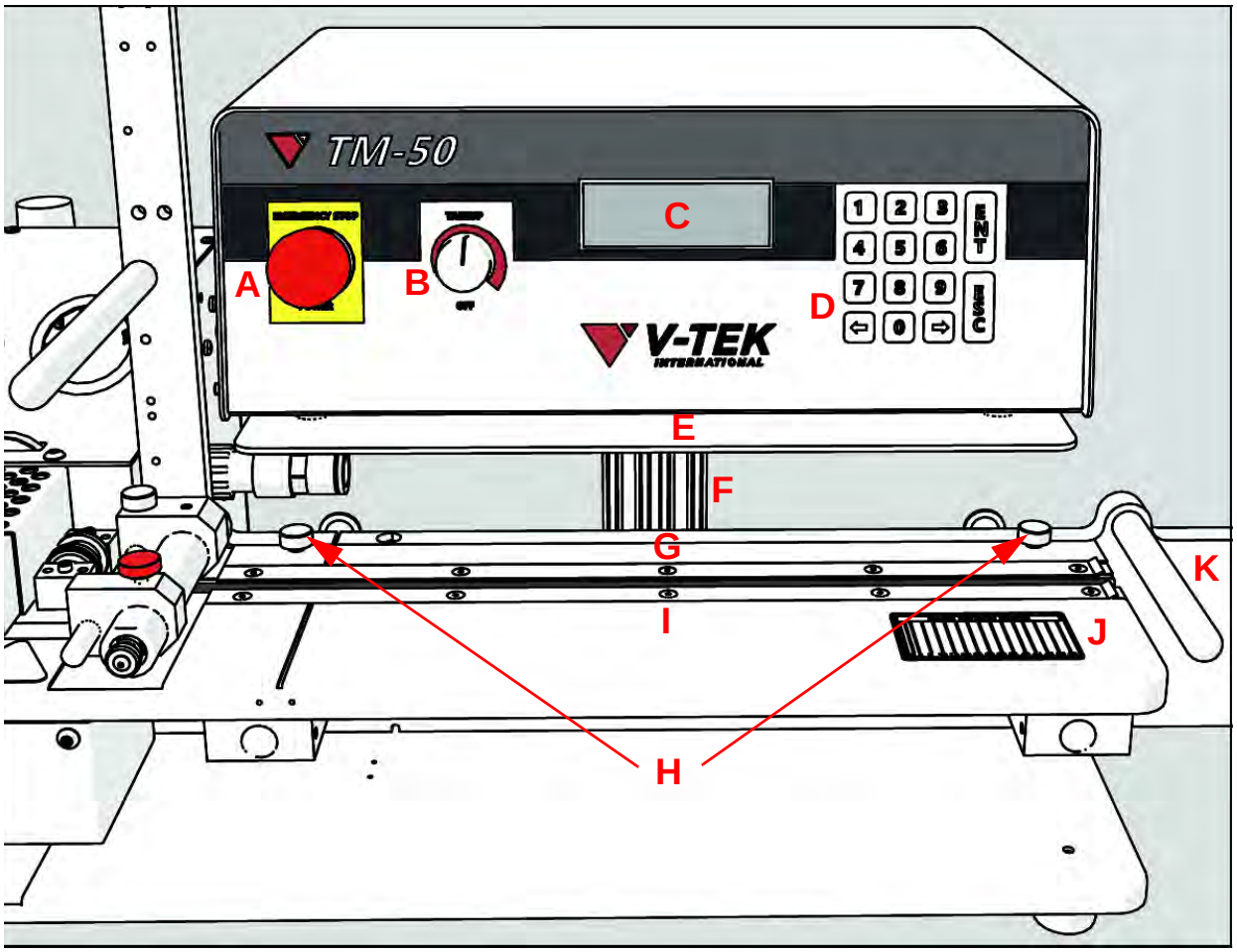


Figure 1.16

A. Power/E-Stop Button

B. Take-up Tension Control

C. LCD Screen

D. Keypad

E. Controller Baseplate

F. Controller Pedestal

G. Inner Loading Track

H. Track Width Lock Knobs

I. Outer Loading Track

J. Pitch Setting Guide

K. Front Tape Guide

Feed Reel Support Arm

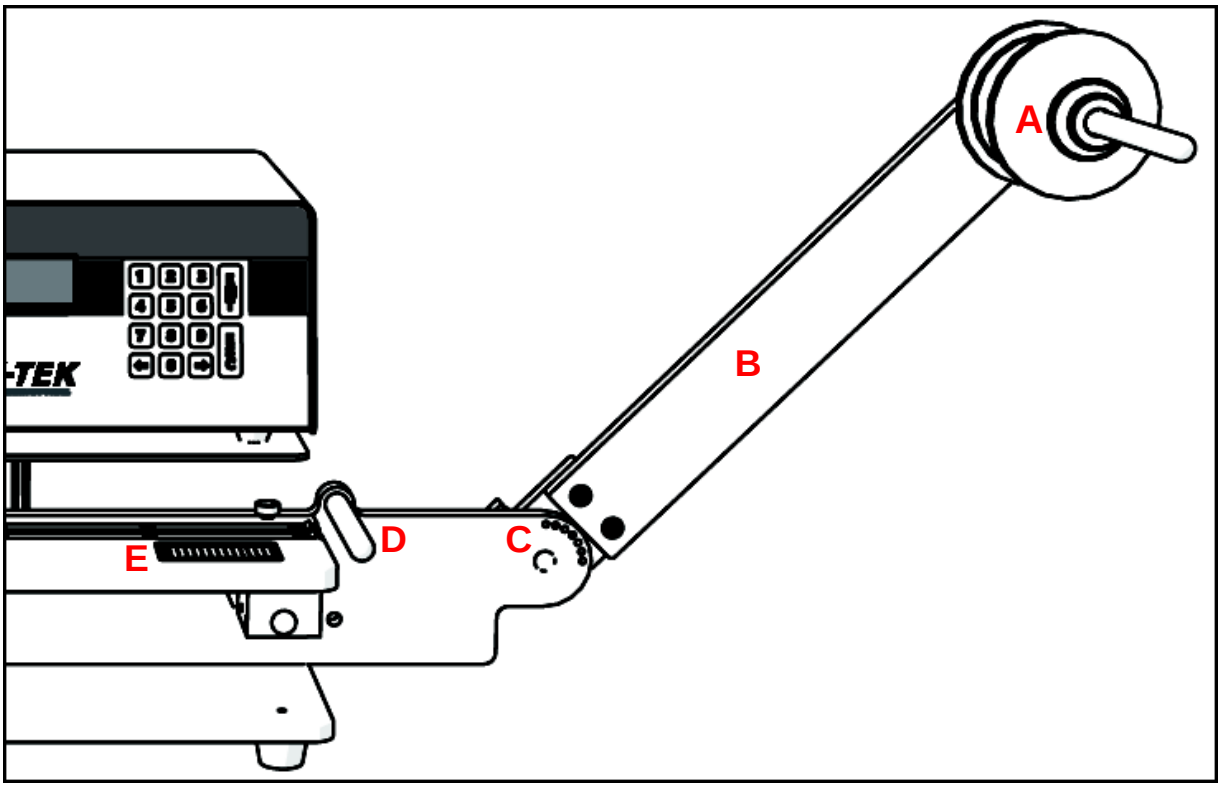


Figure 1.17

A. Reel Lock

B. Feed Reel Support Arm

C. Arm Position Adjustment

D. Front Tape Guide

E. Pitch Setting Guide

Cover Tape Arm

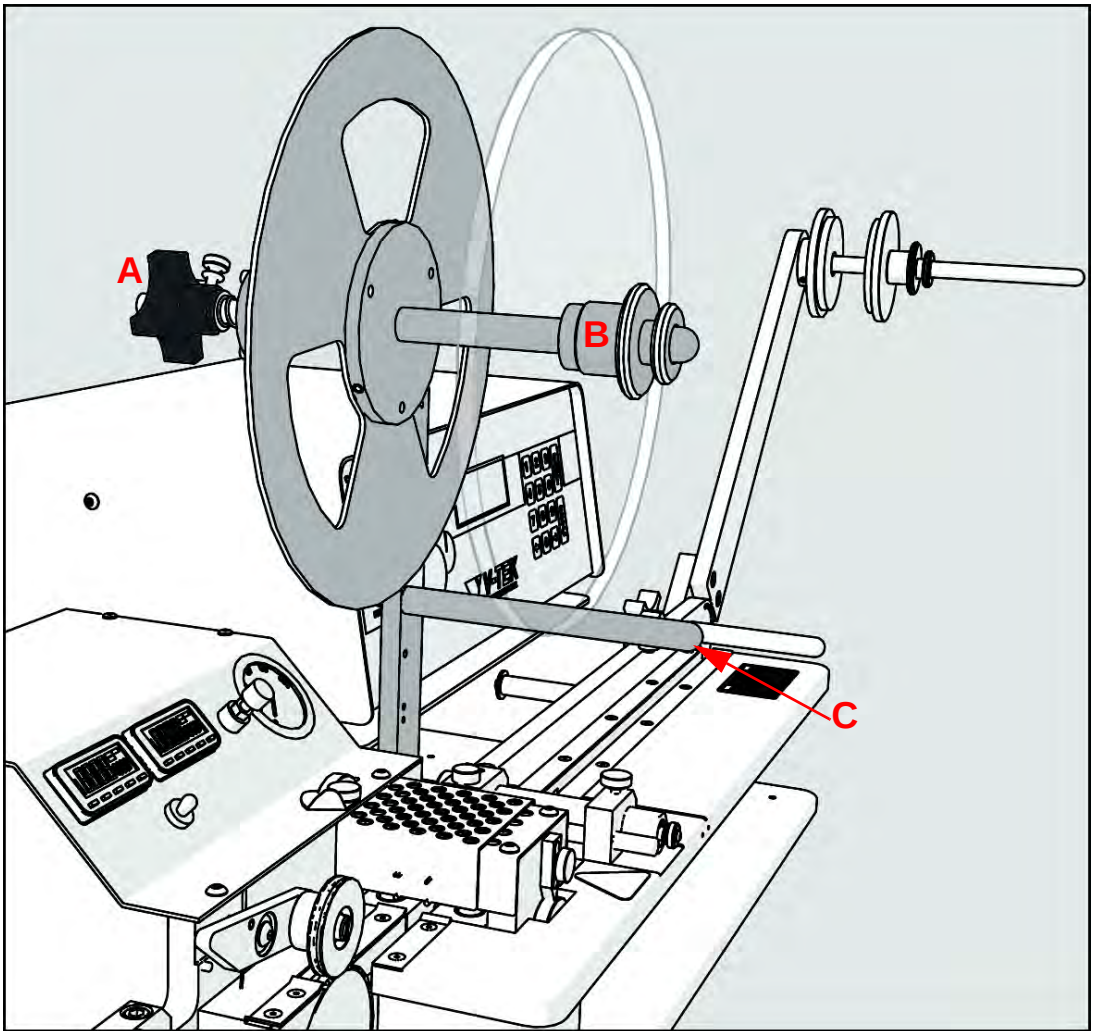


Figure 1.18

A. Tension Adjustment Knob
B. Reel Lock
C. Cover Tape Guide

Serial Plate

Controller Back Panel: Standard TM-50

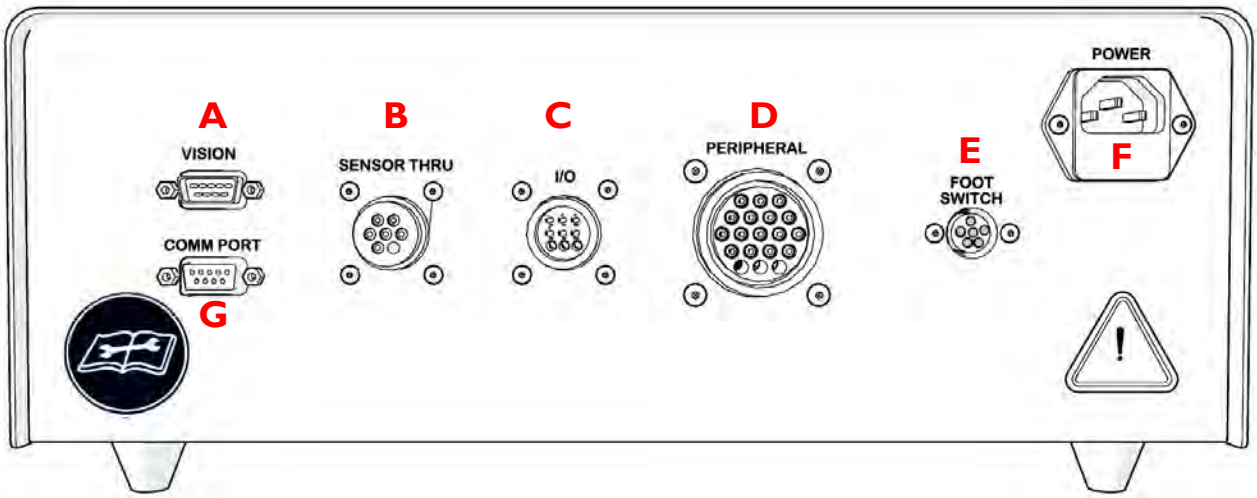


Figure 1.19

A. Vision: Connects the **TM-50** to an optional vision system.

B. Comm Port: Connects the TM-50 to an external host computer.

C. Sensor Pass Through: Allows for direct monitoring of any sensor options that have been purchased.

D. I/O: Connects the **TM-50** to optional auto-feed mechanisms.

E. Peripheral: Connects the **TM-50** controller to the base machine.

F. Foot Switch: Connects the foot switch to the **TM-50** controller.

G. AC Receptacle with Fuses: Fused AC filter holds (2) 2 Amp 5mm x 20mm SLO BLO fuses.

> **Note**: Power off the TM-50 Controller before inserting or removing any cables or cords from the ports on the back of the controller. Failure to power off the controller before making changes may result in damage to the controller and the external device.

Controller Back Panel: Extended Software Option

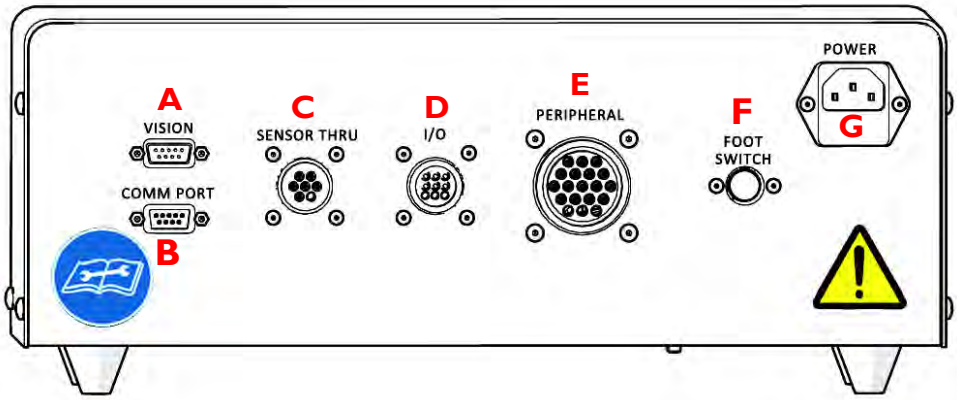


Figure 1.20

Sensors: Extended Software Option

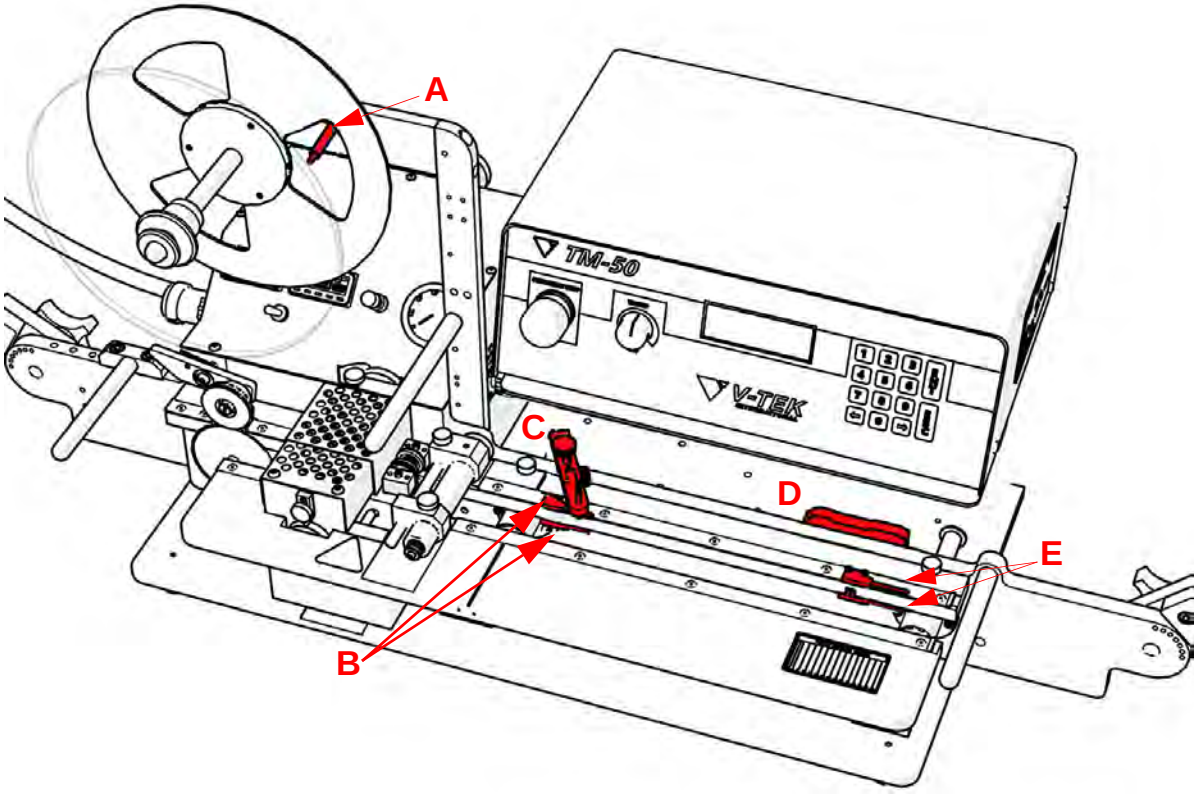


Figure 1.21

A. Low Cover Sensor: The *Low Cover Sensor* detects when the cover tape reel is running low and alerts the user.

B. Tape Jam Sensor: The *Tape Jam Sensor* registers a tape jam whenever something protrudes above the top of the carrier tape pocket. This might be caused by a misplaced part, a pocket that has been loaded with two parts or by a buckle in the tape.

C. Empty Pocket Detector (EPD): The *EPD Sensor* detects when a carrier tape pocket is empty so it can be filled before the cover tape is applied to the carrier tape.

D. Sensor Amplifiers: The *Sensor Amplifiers* are used to adjust sensor settings and sensitivity.

E. Carrier Motion Sensors: The *Carrier Motion Sensor* monitors the movement of the carrier tape to assure it is moving.

Chapter 2: Controller

Contents

The TM-50 Controller

The TM-50 Controller is used to set all the parameters of the TM-50's operation with the exception of the sealer temperature controls and the take-up tension control.

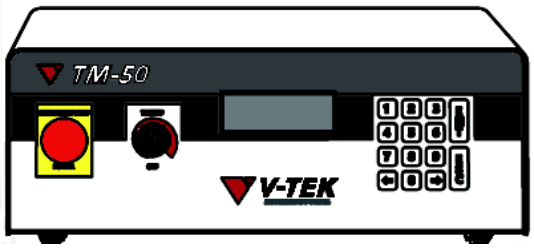


Figure 2.1

The controller uses a simple menu-driven program for changing the current settings and running the machine. This program is displayed on the LCD screen and navigation of the menus and data entry are performed using the keypad to the left of the LCD screen.

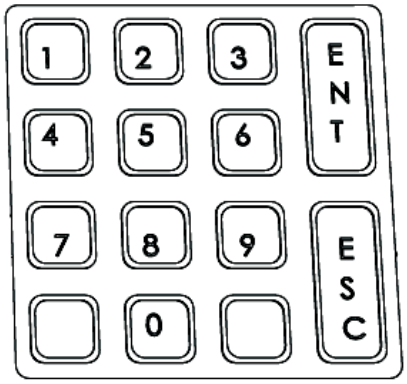


Figure 2.2

The microprocessor stores all settings and the current parts counter value in memory when the machine is powered down and restores them when it is powered up again.

> **Note**: Power off the TM-50 Controller before inserting or removing any cables or cords from the ports on the back of the controller. Failure to power off the controller before making changes may result in damage to the controller and the external device.

Controller Operation

When the TM-50 is powered up, the controller will display an initial welcome screen shown in Figure 2.3.

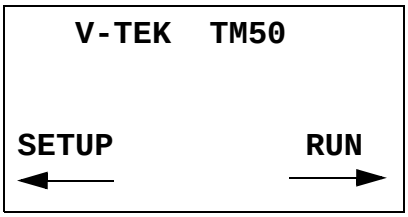


Figure 2.3

From this screen, the operator can choose to begin running the machine immediately or to review and change the machine settings. As the screen indicates, pressing the LEFT ARROW key on the keypad will select the Setup Menu and pressing the RIGHT ARROW key will select Run Mode.

Setup Menu

The Setup Menu consists of eight menu options, seven of which are used to review and change an aspect of the TM-50's operation. These options include: count, pitch, tape advance, speed, sealer dwell, tape jog, and mode. The last option is used to enter Run Mode after setup is complete and the operator is ready to begin a run. The Menu will appear as shown in Figure 2.4.

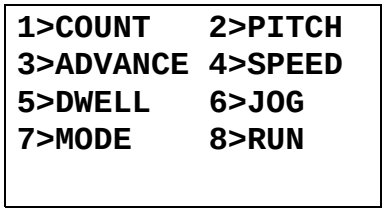


Figure 2.4

An option is selected by pressing the number key on the keypad that is indicated by the Setup Menu screen. Pressing the escape (ESC) key will exit and return to the Setup Menu. Data entry is performed by entering the desired number with the keypad and pressing the enter (ENT) key to enter it.

When a menu option is selected, a new screen will appear. These screens are described below.

Count

The count screen (Figure 2.5) is used to clear the current parts count value to 0 and to set the parts counter STOP value.

```
1>RESET count to 0
2>SET Stop value


                REV 2.xx
```

Figure 2.5

To clear the parts count, press 1 while in this screen. The counter will be set to zero when the Run screen is displayed again.

Press 2 to set a new STOP count. The screen shown in Figure 2.6 will appear.

```
Enter parts count
STOP value then ENT

_______     NOW 2500
```

Figure 2.6

The STOP value sets the point at which the machine will stop and not allow the operator to continue until the counter is reset. This is useful to remind the operator when a reel is completed. The STOP value can be any number from 0 to 999,999. The STOP value currently set is displayed. To enter a new stop value, press 2, insert the number, and press ENT.

> **Note**: If using the Coherix Vision option, set the STOP value at 0 to disable it.

During the operation, the system compares the running parts count to the preset stop value. When the count reaches the stop value, the machine stops and the controller displays a stop message on the Run screen (Figure 2.7).

```
***STOP REACHED***
press ESC to exit

Speed Stop Count
 100  2500  2500
```

Figure 2.7

Pitch

This screen (Figure 2.8) offers eight preset carrier tape pitch choices and an option to enter any other desired pitch, from 2mm to 144mm.

```
Enter desired pitch
(2-144 mm) then ENT
                Now 8
```

Figure 2.8

Figure 2.9

Advance

This screen (Figure 2.10) prompts the user to enter the number of pockets to advance each time the foot switch is pressed or an advance command is sent to the controller using the I/O port.

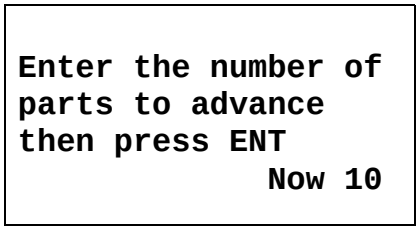


Figure 2.10

The user can choose any value up to the maximum allowed. The maximum is the number of pockets that fit into the length of the loading track. Enter the number of pockets to be advanced and then press ENT. If an invalid value is chosen, the software will ask for another value. Choose a smaller number and press ENT again.

Speed

This screen (Figure 2.11) prompts the user to enter the speed the machine will advance the tape.

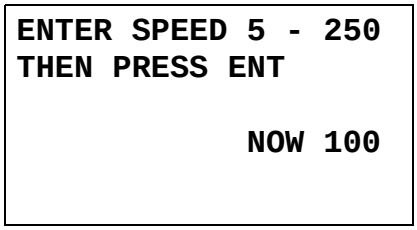


Figure 2.11

Any speed level between 5 and 250 may be entered. A recommended speed for normal operation is generally between 125 and 150.

Entering the desired setting with the keypad and pressing ENT will set the speed choice and return the user to the Setup Menu. If ESC is pressed from this screen before pressing ENT, the speed setting will not be changed.

Dwell

This screen (Figure 2.12) allows the operator to adjust the length of time the heat shoes will remain in contact with the tape during a seal stroke.

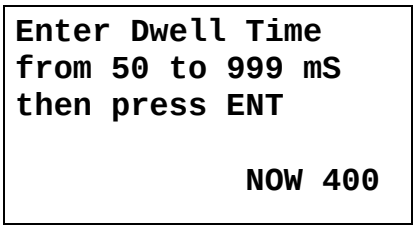


Figure 2.12

Any value between 50 milliseconds and 999 milliseconds may be entered. The longer the shoes remain down on the tape, the stronger the resulting seal will be. A recommended dwell time for normal operation is generally around 300 milliseconds. Enter the dwell time in the space provided and press ENT.

This setting is not applicable when using PSA cover tape.

Jog

This screen (Figure 2.13) is used to adjust the position of the carrier tape in between advances.

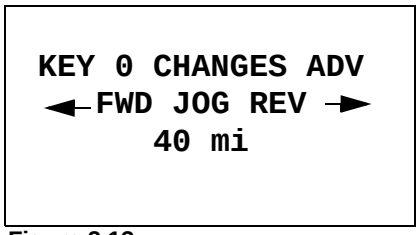


Figure 2.13

This is useful, for example, to line up the carrier pockets with an inspection camera or with a reference point for counting the first and last pocket of a run. The default jog distance is approximately 40 microns (.0016 inches). Pressing the 0 (zero) key will toggle the jog distance from 40 microns to 2 mm increments and back again.

To move the tape, press the arrow key on the keypad pointing in the desired direction. The tape will jog the selected distance each time an arrow key is pressed. When the tape is positioned correctly, press ESC to exit.

Mode

This screen (Figure 2.14) is used to set the sealer type to be used and enable other sensors and options.

```
1>HEAT SEAL*
2>PSA SEAL
3>EPD
4>INTEGRATION
```

Figure 2.14

Heat Seal

When heat seal is selected, the sealer dwell time value is displayed on the Run Screen. The heat seal switch on the sealer controls panel must be turned ON in order for the heat sealer to operate.

PSA Seal

If the system is switched to the PSA mode, the heat seal switch should be turned OFF. The dwell time value will be replaced by the letters PSA on the Run Screen and the temperature alarm is deactivated. Because no dwell time is involved, the TM-50 has greater throughput with a PSA sealer than with a heat sealer since it does not need to pause every few pockets for the sealer shoes to drop.

An asterisk will appear after HEAT SEAL or PSA SEAL to indicate which is currently enabled.

> **Note**: Because no dwell time is involved, the TM-50 has greater throughput with a PSA sealer than with a heat sealer since it does not need to pause every few pockets for the sealer shoes to drop.

Sensors

The TM-50 may have the optional sensors installed for empty pocket detection, low covertape detection, low carrier tape detection, and/or carrier motion detection. Choice 3> toggles the use of the sensors installed to enabled or disabled.

Integration

Pressing 4>INTEGRATION on the MODE screen will bring up the screen shown in Figure 2.27.

```
1>VISION MODE OFF
2>PART MARK*
3>AUTO LdrTrlr*

                -->
```

Figure 2.15

Vision

The Vision option is only active with the Extended Software option.

Part Mark

The Part Mark option is only active with the Extended Software option.

Auto Leader/Trailer

The Auto Leader screen will appear as shown in Figure 2.23.

```
ENTER LEADER LENGTH
mm THEN PRESS ENT
0 and ENT = OFF
          NOW 400
```

Figure 2.16

The automatic leader feature automatically runs out tape for the leader of the next reel once the current reel is completed. This is triggered when the STOP COUNT is reached.

Using the auto leader feature both reduces time spent between finishing a reel and beginning a new and the waste of carrier tape that usually results from manually running out the tape and cutting off reels.

To enable the auto leader, determine the length of leader desired (in millimeters) to follow the last part placed and enter it on this screen. The auto leader feature is disabled when a value of zero (0) is entered.

> **Note**: When determining the leader/trailer length, please note that the final length will be **450 mm** plus the leader/trailer length value that is entered in the controller settings.
>
> 450 mm is the approximate distance from the carrier tape cut point to the center of the placement (or inspection point if the vision option was purchased)..

If a value is entered on this screen, the screen in Figure 2.17 will appear.

```
ENTER TRAILER LENGTH
IN mm THEN PRESS
ENT.

                NOW 200
```

Figure 2.17

Figure 2.17 indicates a typical point of reference to use as a cut point. The machine does not know at what point the operator will cut the carrier tape, therefore, the software uses this value to calculate how much total carrier needs to be run out for the end of the previous reel to reach the point the operator will cut it off.

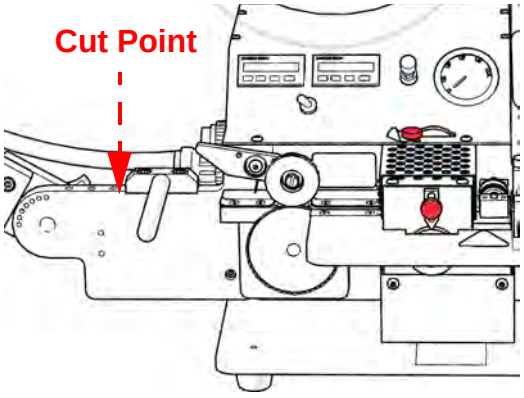


Figure 2.18

Determine the distance required in millimeters and enter the value. The display will return to the MODE Screen.

When the right arrow key is pressed, a second screen of options will appear:

```
1> TAP ADVANCE
2> POWER RECOVERY
3> MANUAL/OEM=OEM
```

Figure 2.19

Tap Advance

When Tap Advance is enabled, the machine will run continuously after the foot switch is pressed and released and will not stop until the foot switch is pressed, held down for a few seconds and released again.

Power Recovery

When Power Recovery is enabled, the machine will remember at what point in an advance it had reached when power is cut. It will then automatically complete that partial advance when it is powered back up and placed into Run Mode.

Manual/OEM Mode

The Manual/OEM option will toggle between the two modes when the 3 key is pressed. When the machine is in OEM mode, it will run according to communication from a system it has been integrated with. When it is in manual mode, it will run manually with a foot switch.

The additional features are now programmed. Press ESC until reaching the setup choice screen, as shown in Figure 2.24.

Run

When RUN is selected, this screen (Figure 2.20) will be displayed and the TM-50 will ready to operate.

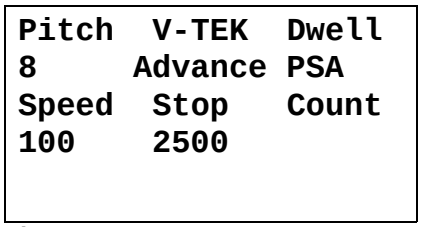


Figure 2.20

The parameters which have been entered are displayed on the screen along with the running parts count. The TM-50 will begin to advance and seal tape when the foot switch is pressed.

Forcing a Seal Stroke

Pressing ENT while in the run screen, or at the power-up screen will cause the sealer head to stamp a single seal, without any advance of the carrier occurring.

Power Recovery

The power recovery feature recovers lost motion in the event of a power loss. When the machine loses power during a tape advance move, the following screen (Figure 2.21) will be displayed when the machine is power again and Run Mode is entered.

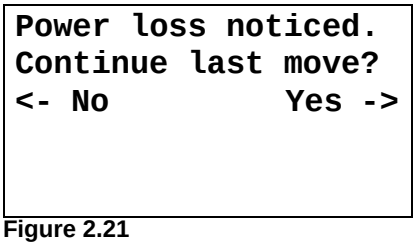


Figure 2.21

Selecting YES will add the lost move to the end of the next advance.

Extended Software Option

The extended TM-50 software option improves on the system control with a number of additional features.

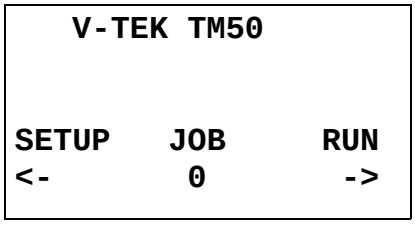


Figure 2.22

The menus found in the extended software for the controller functions the same with the additional features discussed below.

The opening screen, as shown in Figure 2.22, includes an option to choose a previously programmed job configuration. Pressing 0 opens a screen (Figure 2.23) that allows the user to enter a job number from 1-64.

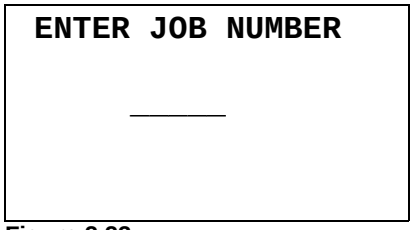
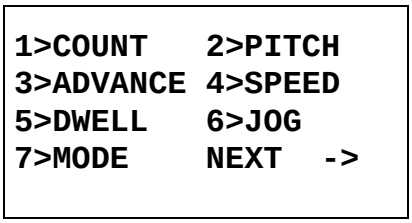


Figure 2.23

The job number chosen must have been fully programmed and saved prior to calling it up. Enter the number and press ENT and the system will immediately enter the run mode with all parameters set.

The initial setup screen is slightly different from that of the standard TM-50 software. It is comprised of a two screen menu shown in the illustration below.

.



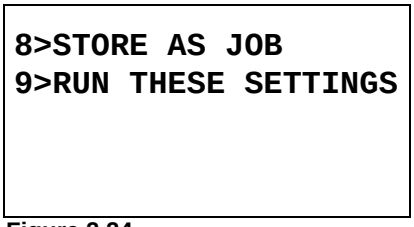


Figure 2.24

Mode

While most of the option screens are unchanged from the standard software menus, the 7>MODE choice allows extended features to be accessed.

Selecting 7>MODE from the setup screen will bring up the menu shown below..

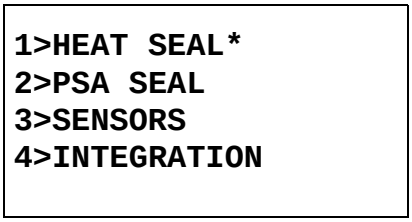


Figure 2.25

Selecting either heat or PSA seal will choose the mode of sealing. An asterisk indicates the mode currently set.

Pressing 3>SENSORS will bring up the screen shown in Figure 2.26.

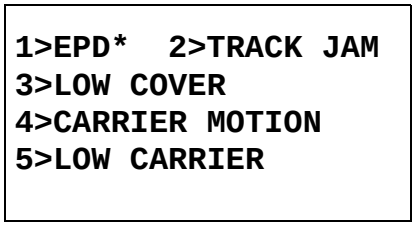


Figure 2.26

These choices allow the user to toggle each of the listed the sensors installed on the machine to ON and OFF. An asterisk indicates the option is turned ON. If the sensors listed are not present on the machine, do not enable them in this software screen.

> **Note**: If the sensors listed are not present on the machine, do not enable them in this software screen.

EPD
EPD is the empty pocket detection system. It is self initializing if turned ON. It will not cause a fault signal until after the first part is seen, or 300mm of carrier tape has passed under it.

Track Jam
The track jam sensor watches for parts that are riding on top of the carrier tape or otherwise not in their pockets properly

Low Cover
The low cover sensor monitors the quantity of cover tape that remains on the reel. It will fault if it becomes too low.

Carrier Motion
The carrier motion sensor monitors the movement of the carrier tape to assure it is moving.

Low Carrier
The low carrier sensor monitors the quantity of carrier tape that remains on the reel. It will fault if it becomes too low.

Integration
Pressing 4>INTEGRATION on the MODE screen will bring up the screen shown in Figure 2.27.

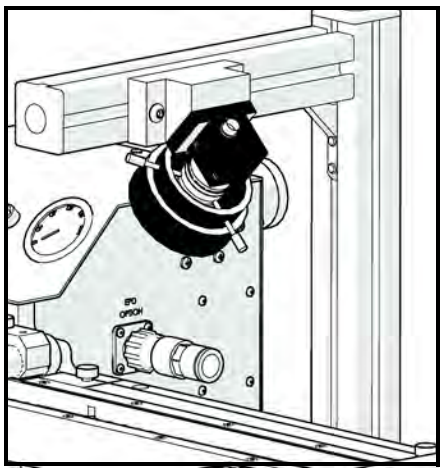
```
1>VISION MODE OFF
2>PART MARK*
3>AUTO LdrTrlr*

                -->
```

Figure 2.27

While most of the option screens are unchanged from the standard software menus, the extended software feature allows the 1>VISION MODE and 2> PART MARK features to be accessed.

Vision
The VISION option enables the TM-50 to control a vision inspection station to inspect parts while the machine is in Run Mode.



When the 1 key is pressed, the display will cycle through three settings: OFF, 1, and 2.

> **Note:** Refer to the vision system user's guide which was provided with the vision system for specific *Vision Mode* settings.
>
> In the absence of a vision system manual, refer to the *Vision Mode Timing* section later in this chapter to determine the correct setting.

The vision inspection will occur at the end of a tape advance. The system cannot inspect components when the carrier tape is in motion. Therefore, the ADVANCE setting must be one pocket per move. Otherwise, the machine will only inspect the last pocket at the end of each tape advance.

> **Note:** The first part placed in tape must be correctly oriented. The vision system is programmed to initiate the job lot upon detection of the first correct part.

Any empty pockets or incorrectly oriented parts will be ignored until the first correctly oriented part is inspected and the job begins.

The vision inspection will always be active in Run Mode when the VISION MODE setting is 1 or 2. Therefore, turn the vision system to the OFF setting if it is not being used in Run Mode. Otherwise, the operator will not, for instance, be able to manually run a leader or trailer in Run Mode with the vision system enabled if the system is set to fail on empty pockets.

Part Mark
Part mark causes a signal to be sent when the carrier is in motion. This is used to signal an inkjet printer to print the part information on the chip in the pocket.

Auto Leader/Trailer
The Auto Leader feature functions the same as it did in the standard software menu.

When the right arrow key is pressed, a second screen of options will appear:

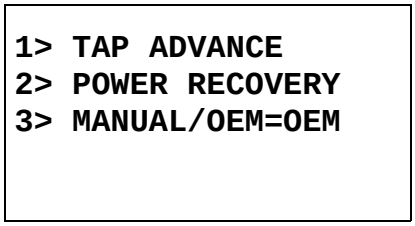


Figure 2.28

Tap Advance
The Tap Advance feature functions the same as it did in the standard software menu.

Power Recovery
The Power Recovery feature functions the same as it did in the standard software menu.

Manual/OEM Mode
The Manual/OEM feature functions the same as it did in the standard software menu.

The additional features are now programmed. Press ESC until reaching the setup choice screen, as shown in Figure 2.29. Choose the NEXT key. The second screen shown will appear.

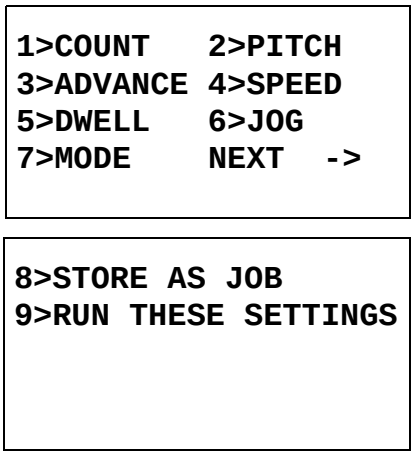


Figure 2.29

The display is now an option to either continue to Run Mode with the chosen settings or to save the settings to a specific job number. Select 8>STORE AS JOB to save the settings as a specific job number. The screen in Figure 2.30 will appear.

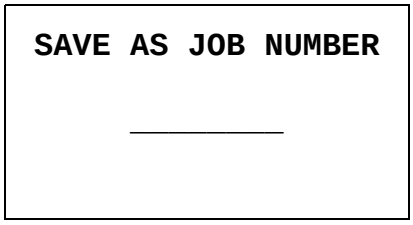


Figure 2.30

Enter a two-digit number between 01-64 as the desired job number. Press ENT to save the job. In the future, the saved settings can quickly be recalled and used by selected the job number to which they have been assigned.

Note: All features not in use (such as sensors not present) must be turned OFF when you save or run the settings from a job number.

Using the Vision Port

It is simple to use a vision system with the TM-50. Connect as indicated in the diagram below. All input and output from this port is open collector/drain. Signals are referenced to the 0V ground pin (DB9-5).

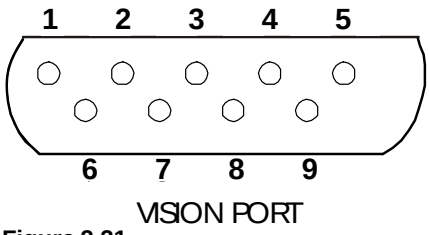


Figure 2.31

Vision I/O Receptacle

1. INPUT: BUSY Signal
2. Not Used
3. INPUT: Part PASS/FAIL Signal
4. OUTPUT: TRIGGER (Start of Test)
5. Signal Ground
6. 24V DC
7. Not Used
8. Not Used
9. Not Used

Note: Beginning with Software Revision 1.74, the TM-50 will respond as indicated below.

Vision Mode 1

1. The TM-50 will pull the TRIGGER signal (DB9-4) low.

2. The TM-50 will now wait until the vision system returns a BUSY signal (DB9-1) by pulling low. This indicates to the TM-50 that the vision has begun a test sequence.

3. Once the BUSY signal is seen, the TM-50 will release the TRIGGER signal.

4. The TM-50 will now wait until the BUSY signal is returned high. When it is returned, the TM-50 will inspect the PASS/FAIL signal (DB9-3) to determine if the part has passed. A logic low on this signal will be interpreted as a FAIL.

Note: A screen will appear if a failure is seen. Correct the problem and then press ENT to retest the part, or press ESC to accept the part, count it, and move on.

It is important to note that if the BUSY signal is not received as indicated in Step 2, the TM-50 will remain in a BUSY state and the TRIGGER signal will remain low. This may occur if there is a vision system failure or if the vision is not turned ON. Correct the problem, then press any key on the keypad, and the TM-50 will release the TRIGGER and move on.

V-TEK recommends the following timing values for *Vision Mode 1.*

Vision Mode 1 Timing

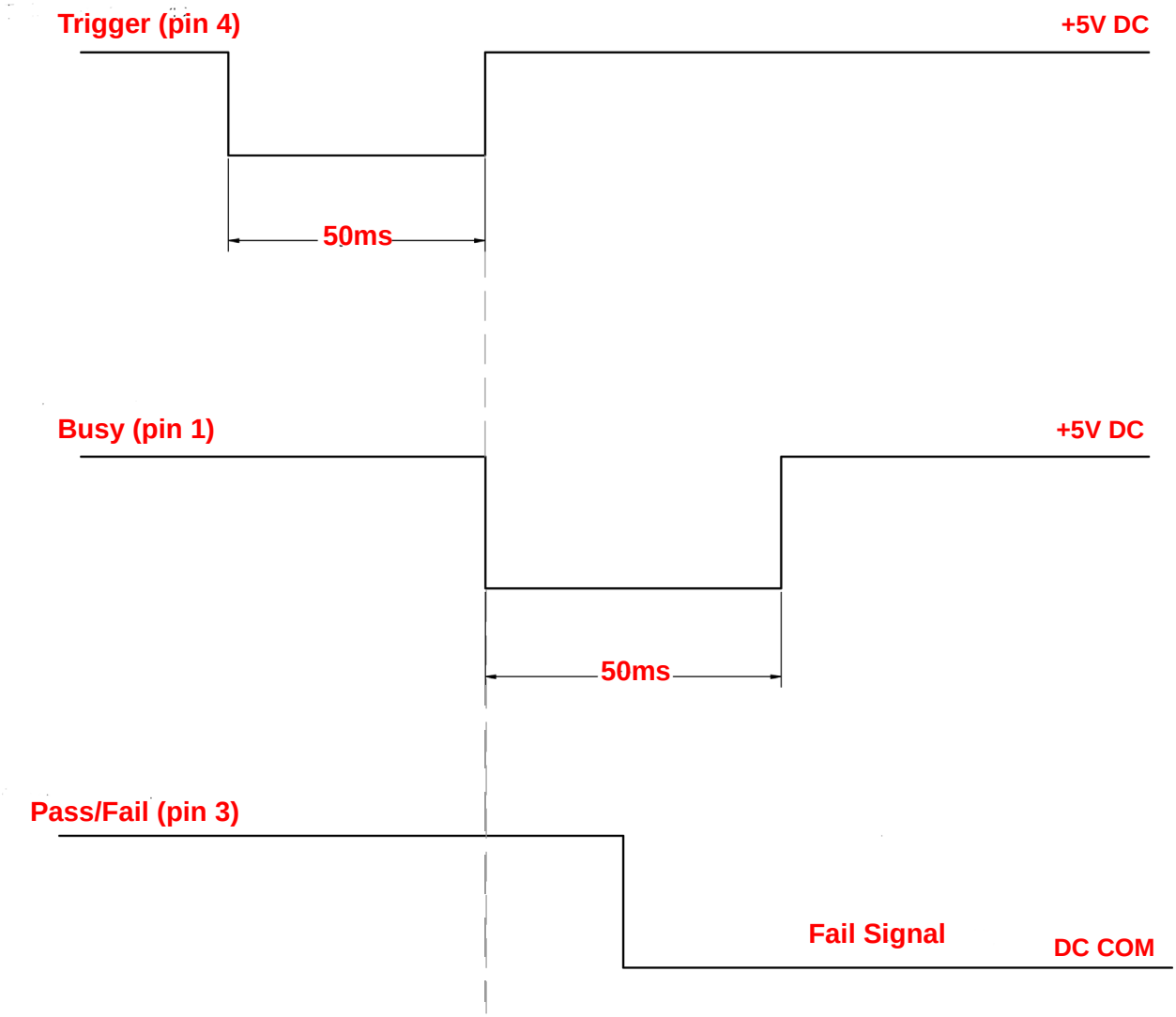


Figure 2.32

Vision Mode 2

DB9-1 is not used as a BUSY signal in this setup to allow Vision Systems without BUSY signals to be integrated. In this instance, identical signals on both DB9-1 and DB9-3 are needed.

1. The TM-50 will pull the TRIGGER signal (DB9-4) low for 10ms.

2. The TM-50 will now start looking at the DB9-1 signal and the DB9-3 signal from the vision system. The TM-50 will search for 100ms time frame.

   - For a PASS condition to occur, DB9-1 and DB9-3 must be pulled low for 100 ms. These signals must begin within the TM-50's search time frame.

   - If no signal is seen in that time period or if only one signal is seen, a part FAIL condition will occur.

3. The TM-50 will now look for the next TRIGGER signal.

Note: A screen will appear if a failure is seen. Correct the problem and then press ENT to retest the part, or press ESC to accept the part, count it, and move on.

The TM-50 will not fail any parts until it has seen the first good part. This prevents failure notices before the first part reaches the camera.

V-TEK recommends the following timing values for *Vision Mode 2* for a PASS condition.

Vision Mode 2 Timing

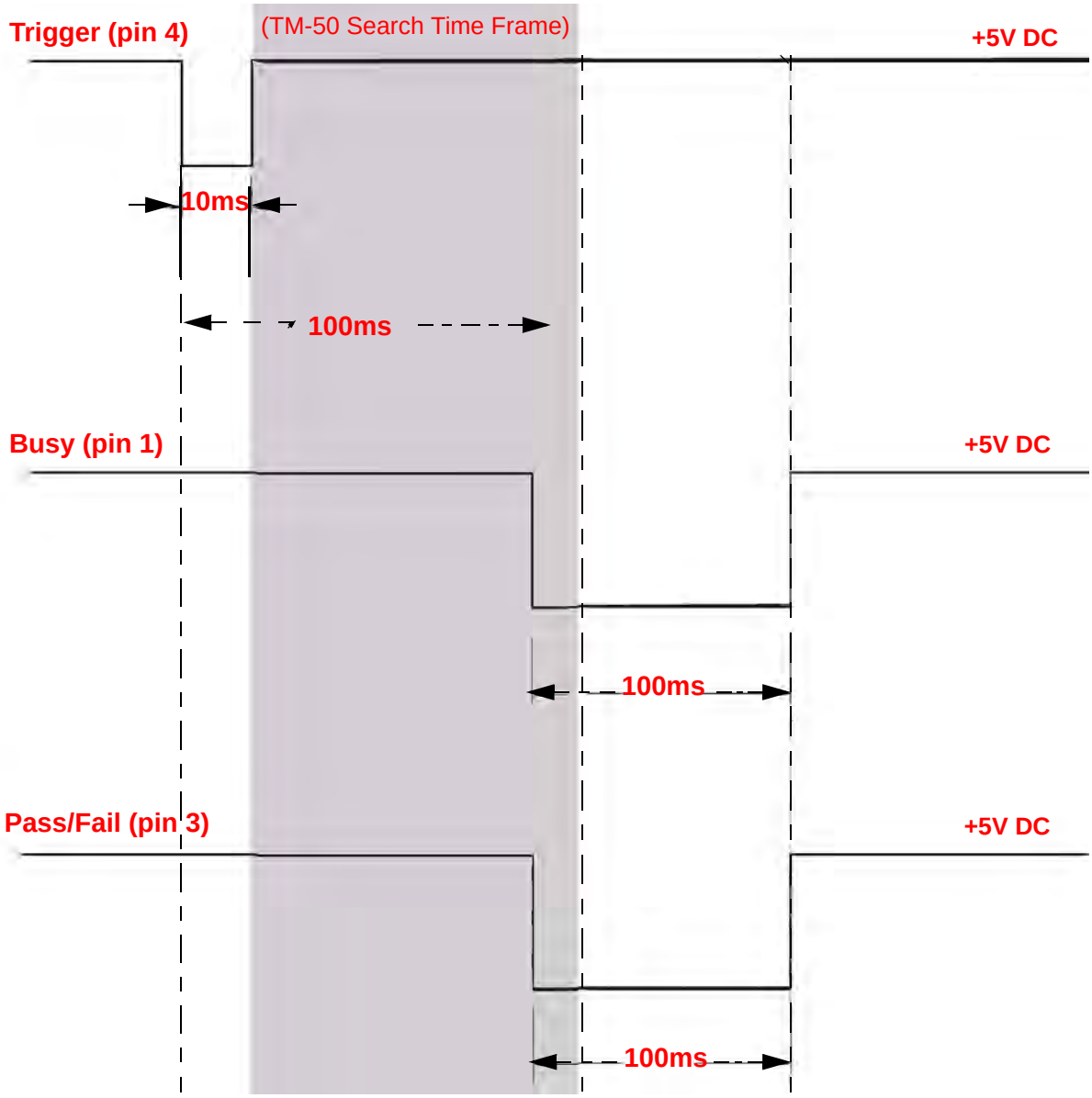


Figure 2.33

Note: If only one *Pass/Fail Line* is used with the vision system, the *Busy Line* (pin 1) and *Pass/Fail Line* (pin 3) can be jumped together.

Vision Hookup Example

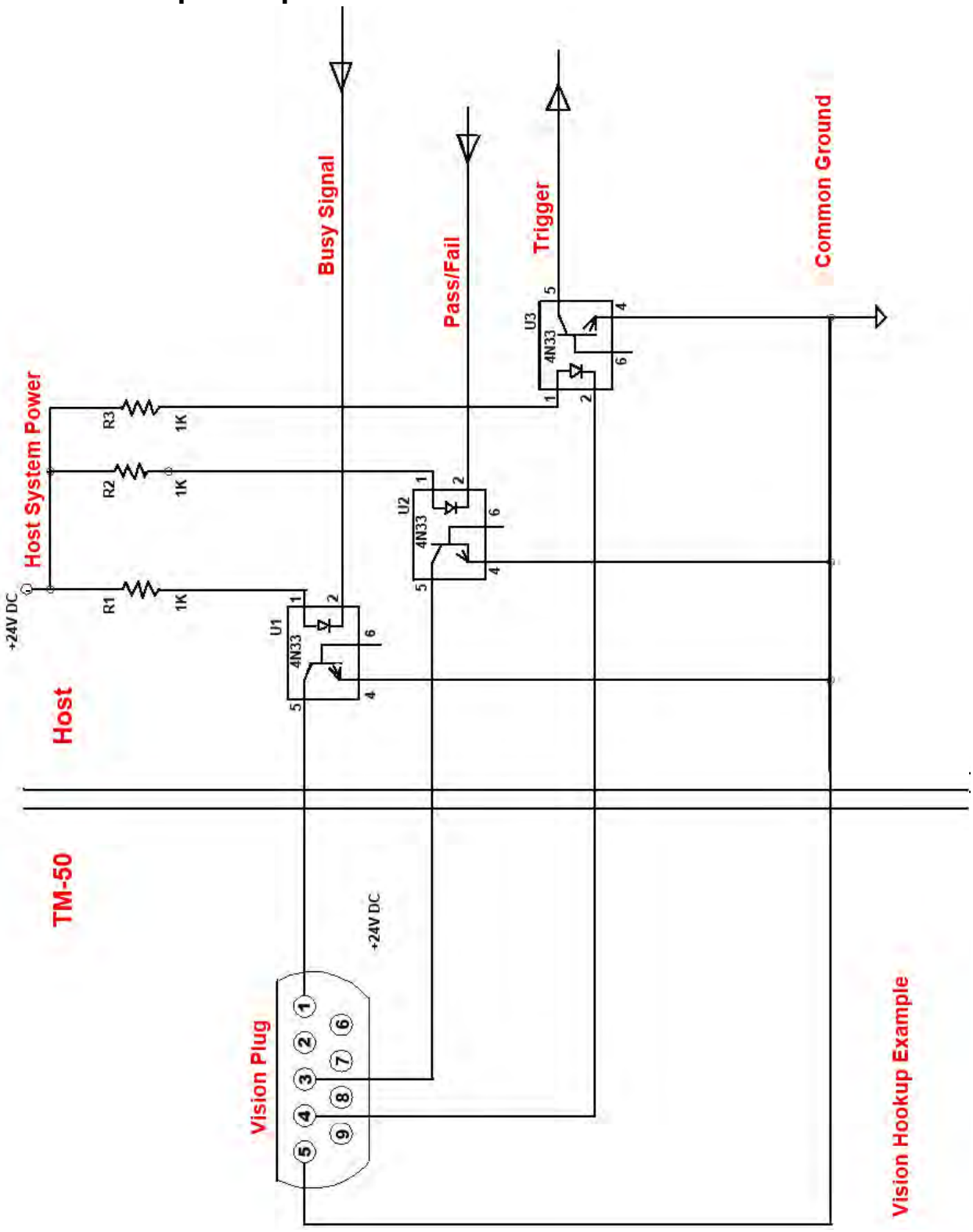


Figure 2.34

Using the Comm Port

If the TM-50 is connected to the serial port of a computer, the computer can call up any of the preprogrammed jobs. Send the number 01--64 to the TM-50 and it will immediately load that job and go into run mode. If the job number is accepted, the TM-50 will return the letters "OK." If it is out of range and not accepted, it will return the letters "NO." These job calls are accepted either at the first power-up screen or when in the run mode. Only at these points will it be recognized. The parameters of the port are 19200 baud, 8 bits, no parity, and 1 stop.

Refer to Figure 2.35 for the following information:

1. NC
2. TX
3. INPUT: RX
4. NC
5. Signal Ground
6. Not used
7. Not used
8. Not used
9. Not used

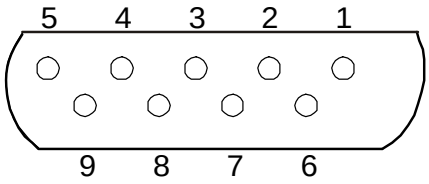


Figure 2.35

Using the Sensor Pass Through

All of the sensors that the TM-50 monitors are also available as passed through outputs. The extended software is not needed for self monitoring. All of the sensors are open collector devices and can easily be interfaced. Refer to Figure 2.36. The pinout of the port is as follows:

1. EPD Signal
2. Track Jam
3. Carrier Motion
4. System Ground (0V)
5. Low Carrier
6. Low Cover
7. Not used

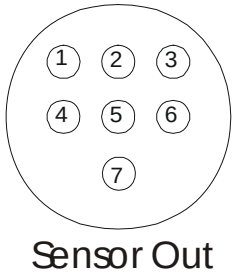


Figure 2.36

Chapter 3: Setup and Operation

Contents

Preparing to Run a Job

The *Quick Setup Guide* below provides a brief outline of the setup steps to get seasoned operators up and running quickly. Detailed, step-by-step instructions follow in the sections ahead.

Quick Setup Guide

1. Connect power and air supply.

2. Check to ensure foot switch, peripheral cable, and optional vision, sensor and communication ports are connected.

3. Turn the TM-50 Controller ON.

4. Load carrier tape.

5. Load cover tape.

6. Load an empty take-up reel.

7. Select Heat or PSA Seal.

8. Setup the Sealer.

9. Perform a Seal Test.

10. Perform a Peel Force Test.

11. Set Tape Advance speed.

12. Create the Trailer.

13. Check the Carrier Tape Alignment.

14. Set the Counter.

15. Run the job.

Caution!
V-TEK® Incorporated takes no responsibility for the safety of the TM-50 if it is used for any purpose other than the intended purpose as specified in this User's Guide.

Setup

1. Ensure the power and compressed air supplies are connected to the machine, as described in Chapter 1..

Note: The air pressure should be set somewhere between 85 psi, the minimum recommended air pressure, and 110 psi, the maximum recommended air pressure.

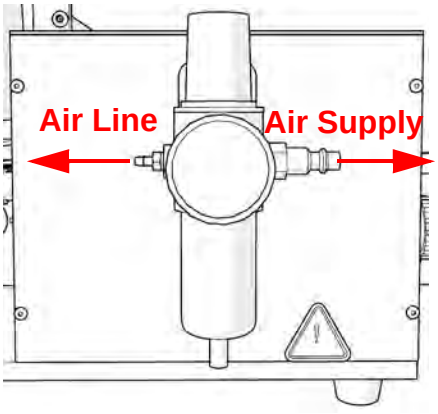


Figure 3.1

2. Ensure the foot switch and peripheral cable are attached to the appropriate ports in the back of the controller

3. Ensure all optional peripheral devices (i.e. vision, sensor, or external controller options) are attached to the appropriate ports in the back of the controller.

Note: The TM-50 Controller must be powered off before inserting or removing any cables or cords from the ports on the back of the controller. Failure to power off the controller before making changes may result in damage to the controller and the external device.

4. Turn the machine on by pulling out the **Power/Emergency Stop** button on the front of the controller.

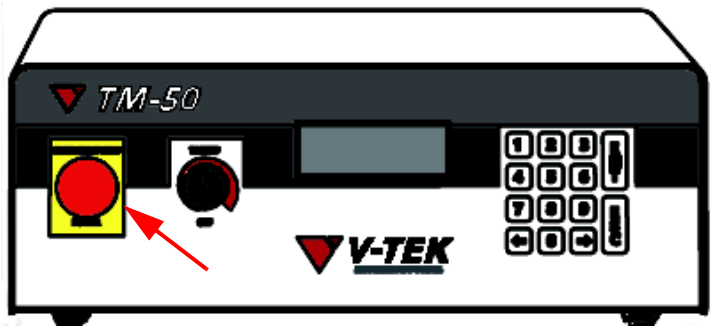


Figure 3.2

Loading Tapes

Set the Tape Controls

1. Turn the take-up reel tension adjust knob on the controller fully counterclockwise to **OFF** to more easily place a new take-up reel onto the take-up spindle.

2. Set the taping job parameters through the controller. (See *Chapter 3: Controller Settings* for detailed instructions on programming the controller.)

Adjust the Width of the Loading Track

1. The two thumb screws located on the loading track secure the outer track into place. To adjust the width of the loading track, first loosen the thumb screws.

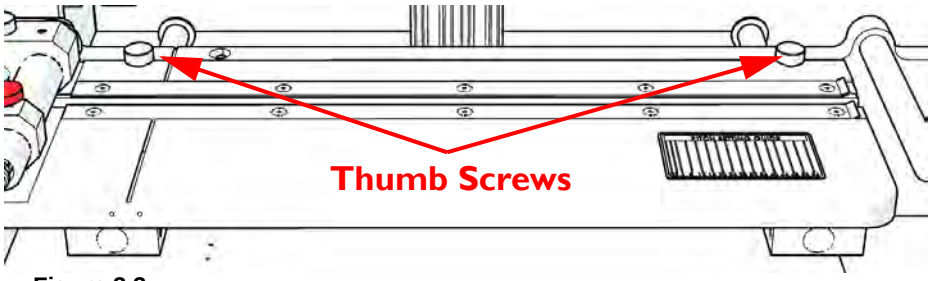


Figure 3.3

2. . A track width gauge is provided with each machine as an aid for setting the loading track width to a predetermined size. Find the width to be set on the gauge and insert it into the loading track, near where the left thumb screw is located.

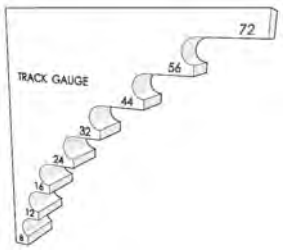


Figure 3.4

3. Push the outer track toward the machine until it is snug with the gauge. Tighten the left thumb screw. Repeat the same process for the right side of the track.

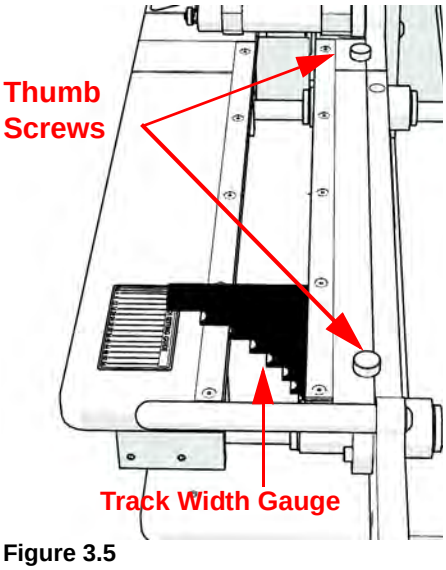


Figure 3.5

Mount the Carrier Tape Reel

1. Remove the carrier tape *QuikLok* from the carrier tape spindle.

> **Note**: To remove the *QuikLok* mechanism from the carrier tape support arm, simply pull the two metal disks apart and slide the *QuikLok* off the spindle.

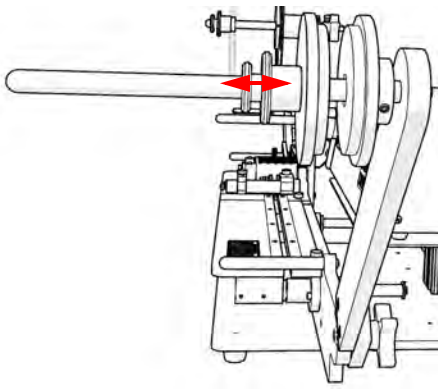


Figure 3.6

2. Mount the bulk carrier tape reel on the spindle so the tape unwinds from the top and the sprocket holes of the carrier tape are on the inside for tape widths less than 32mm. Tapes wider than 32mm have holes on both sides. Usually, the outside holes of these larger carrier tapes are slightly oval in shape.

3. Replace the *QuikLok* and position it so the reel is supported and spins freely on the spindle with little or no drag.

4. Trim the end of the carrier tape so it is clean and straight.

Route the Carrier Tape

1. Guide the carrier tape into the loading track. It should feed through the loading track easily. Lowering the feed reel support arm can reduce drag if the angle at which the carrier enters the loading track is too steep.

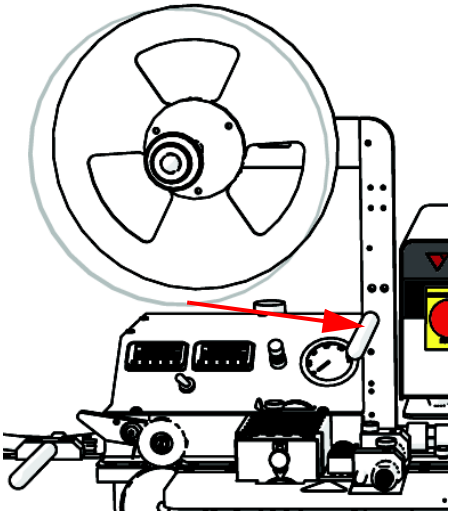
2. Bring the end of the carrier tape past the sealer and engage the sprocket holes on the teeth of the drive sprocket. If the loading track is slightly askew, the carrier tape may not feed to the sprocket easily. If so, readjust the track with the track gauge.

Mechanical Hazard!

Avoid placing fingers between sprocket teeth and carrier tape when the TM-50 is in operation. Pinching or entrapment may occur if safety precautions are not observed.

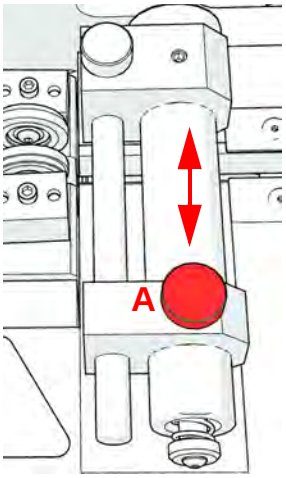
Mount the Cover Tape

1. Remove the cover tape *QuikLok* from the cover tape spindle.

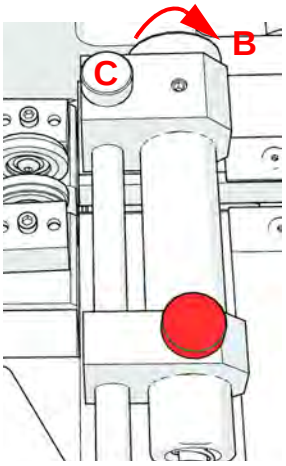


2. Place a reel of cover tape of the correct width to match the carrier tape on the cover tape spindle. The tape should unwind to the right from the bottom of the reel.

3. Set the width of the cover tape guide assembly by loosening the red knob (A) on the assembly and hold the cover tape against the inside of the guide. Slide the outside guide toward the tape until it touches it. Tighten the knob.

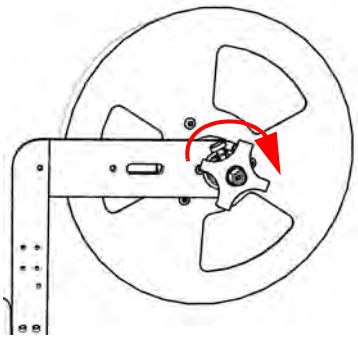


4. The position of the cover tape guide can be adjusted using the *Cover Tape Position Adjuster* **(B)**. Loosen the thumb screw **(C)**, then turn the position adjuster clockwise to move the cover tape position toward the sprocket side of the tape.



5. Using blue tabbing tape, attach the cover tape to the carrier tape. Thread both through the *Cover Tape Guide Sealer Assembly*. Run the machine to advance the carrier and cover tapes through the sealer.

6. Adjust the cover tape tension, turning the *Tension Adjustment Knob* on the back of the *Cover Tape Arm* clockwise (in) to increase tension. The goal is to tighten the cover tape so there is not excess freedom in the tape when it is advanced.



7. Proceed to either the *Heat Seal* or *PSA Seal* instructions which follow.

Mount a Take-up Reel

Mount an empty take-up reel on the take-up reel spindle. The width of the reel must match the width of the carrier tape and its diameter should be large enough to accommodate the number of components in the taping job.

Mechanical Hazard!

Avoid placing fingers between the carrier tape and the Take-up Reel when the TM-50 is in operation. Pinching or entrapment may occur if safety precautions are not observed.

Heat Seal Setup

If a *PSA Seal* is desired, proceed to the next section.

1. If the TM-50 was previously used for PSA seal, loosen the *Seal Roller Pressure Screws* until the sealer rollers are no longer in contact with the tape.

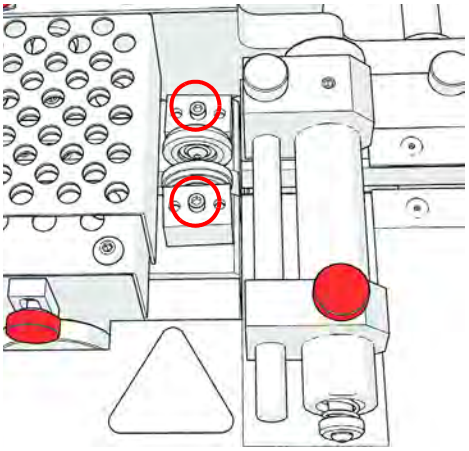


Figure 3.7

2. Make sure the power to the TM-50 is **ON**.

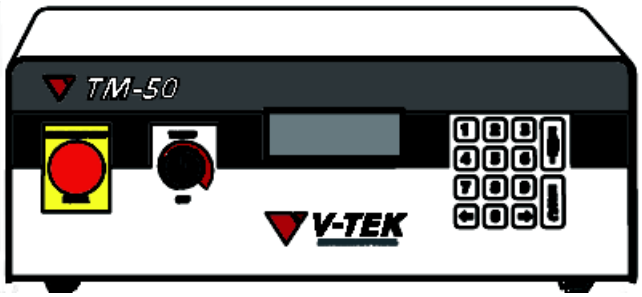


Figure 3.8

3. Turn the heat seal switch **ON**.

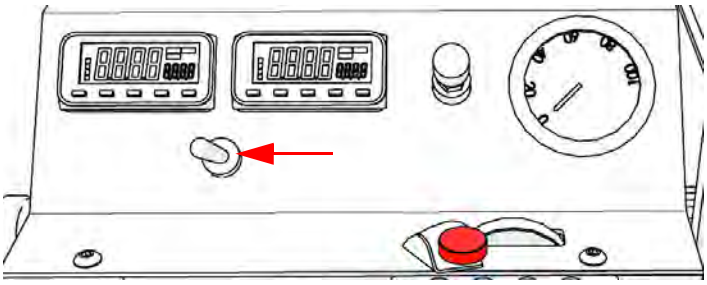


Figure 3.9

4. Set the temperature controls to the appropriate temperature. Refer to the table below or to *Appendix B: Temperature Controller Default Settings*.

CARRIER TAPE TYPE	COVER TAPE TYPE	TEMPERATURE IN CELSIUS	PRESSURE IN PSI	DWELL TIME IN MILLISECONDS
CONDUCTIVE BLACK POLYCARBONATE	STATIC DISSIPATIVE COVER	135-155^{o}	40-60	250-400
NON-CONDUCTIVE CLEAR POLYCARBONATE				
CONDUCTIVE BLACK POLYSTYRENE				

Note: The TM-50 accommodates a wide range of carrier tapes and cover tapes. Settings may vary from one tape product to another.

The settings in the table above are suggested starting points only. The temperature of each shoe can be increased or decreased according to the results of a peel force test.

5. Adjust the heat shoe air pressure to the appropriate setting. The recommended starting point is **50 psi**. Turning the *Pressure Adjust* knob clockwise will increase the pressure, while turning it counterclockwise will decrease the pressure. This setting controls the amount of force applied when the sealer shoes drop.

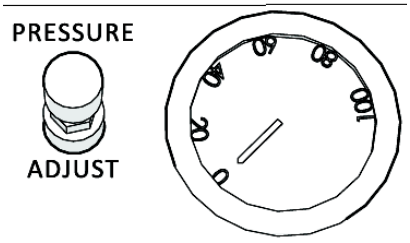


Figure 3.10

Note: Maximum suggested air pressure is 110 psi.

6. Allow the heat sealer to reach its operating temperature before continuing.

Temperature Hazard!

Touching the heat block guard while the Heat Sealer is in operation may result in burns. Use care when working near this area and allow it to cool before performing maintenance.

7. Set the controller parameters need for the current job and then place the machine into *Run Mode*. Refer to the Controller chapter for additional information about setting the controller parameters.

8. Advance the tape using the foot switch.

9. Check the sealed tape for the desired seal position.

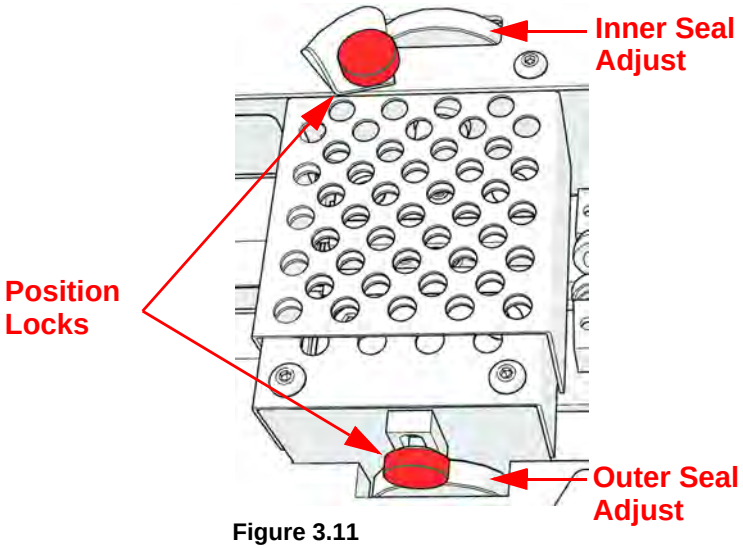


Figure 3.11

Inner Seal Position

The inner seal shoe is adjusted by the inner seal position adjuster. Turning the adjuster clockwise will move the seal away from the operator. Turning the adjuster counterclockwise will move the seal toward the operator. Adjust to the desired position. Once the position has been adjusted, tighten the position lock to secure it.

Outer Seal Position

The outer seal shoe is adjusted by the outer seal position adjuster. Turning the adjuster clockwise will move the seal toward the operator. Turning the adjuster counterclockwise will move the seal away from the operator. Adjust to the desired position and then lock it into place using the position lock knob.

10. Adjust the heat sealer temperature setting until the cover tape adhesive is fused to the carrier tape.

PSA Seal Setup

1. Ensure that the heat seal switch is **OFF**.and the TM-50 Controller is **ON**.

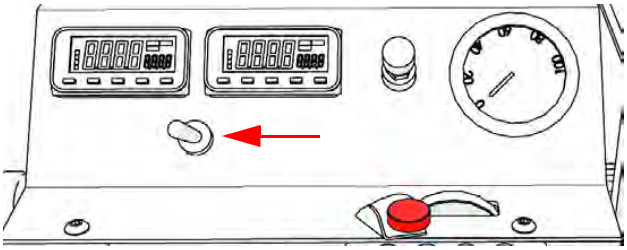


Figure 3.12

2. Open the *Setup Menu* on the LCD screen and select **7>Mode** and then **2>PSA Seal**.

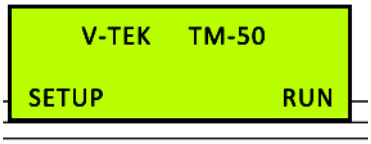


Figure 3.13

3. Press **ESC** to return to the *Setup Menu*. Then select **8>RUN** to place the TM-50 in *Run Mode*.

4. Advance the tape using the foot switch until the carrier tape reaches the sealer assembly.

5. Adjust the inner and outer seal roller position using the white seal position adjuster knobs on either side of the heat sealer. Align the roller position over the strip of adhesive on either side of the PSA cover tape

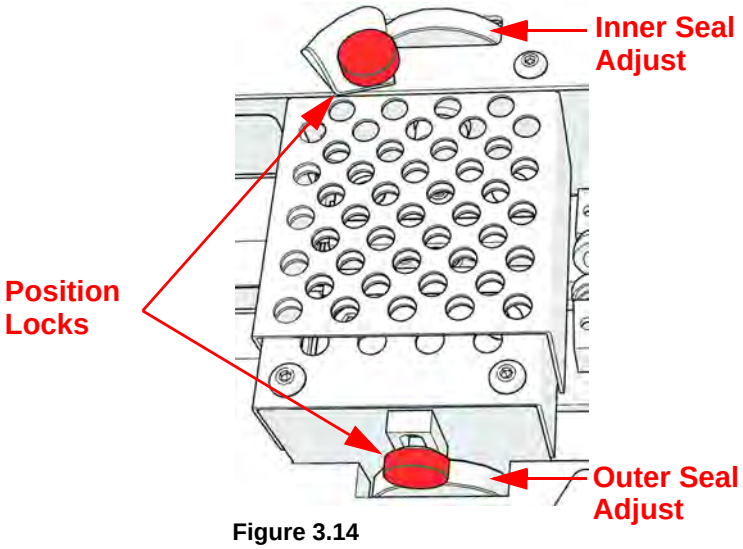


Figure 3.14

6. On the top of each sealer block, there are three holes with a screw in the center hole. While spinning the sealer wheel, turn the screw clockwise until the wheel no longer spins freely, then turn the screw another 1/8 turn.

The wheel should be firmly in contact with the tape. Experience will allow the operator to judge the correct adjustment by feel. Repeat for the other sealer wheel.

> **NOTE**: Excessive roller pressure may cause carrier tape advance problems or elongation of sprocket holes in the carrier tape.

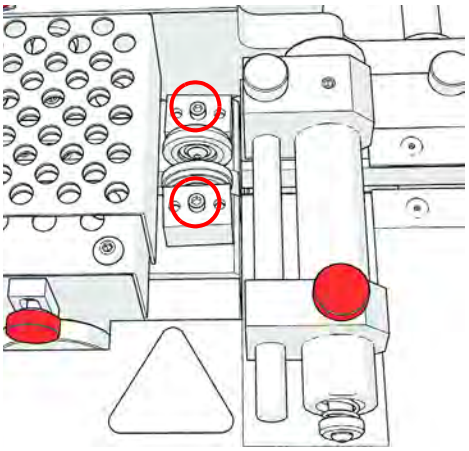


Figure 3.15

7. Adjust the seal roller pressure until the PSA adhesive is firmly adhered to the carrier tape.

Testing Seal Strength

Perform a Test Seal

1. Run the tape through the taping module by pressing the foot switch.

2. As the seal is occurring, watch the alignment of the cover tape with the carrier tape. The cover tape should run exactly in the groove of the cover tape guide and the seal should appear as a solid, consistent line.

3. Adjust the seal positions as described in the sealer setup sections above, if necessary.

Perform a Peel Force Test

For most taping applications, a peel force test is needed to determine the seal characteristics. Perform as many peel force tests as needed while adjusting the sealer controls to obtain the required seal strength.

Instructions for peel force test vary from one manufacturer to another. Follow the manufacturer's instructions for the peel force tester selected to perform the test. A V-TEK *PT-55 Peel Force Tester* is pictured below.

Operation

Once carrier tape and cover tape have been loaded, sealer setup is complete and the controller settings are selected, the TM-50 is ready for operation.

Caution!
V-TEK® Incorporated takes no responsibility for the safety of the TM-50 if it is used for any purpose other than the intended purpose as specified in this User's Guide.

Create the Trailer

Leader/Trailer
Before beginning a production reel, determine how long the trailer and the leader should be. The terms "leader" and "trailer" refer to the lengths of empty carrier tape required at the beginning (leader) and the end (trailer) of the finished reel of placed parts. Therefore, when the reel is being taped on the TM-50, the trailer is the first length of empty carrier tape run before the first part is taped and the leader is the length of empty carrier tape run after the last part is taped.

After the cover tape alignment and any peel force tests are completed, run out enough sealed empty pockets to make the trailer that is required for the current job.

Note: If using the Extended Software Option's *Auto Leader/Trailer* mode to configure leader/trailer length, please note that the final length will be **450 mm** plus the leader/trailer length value that is entered in the controller settings.

450 mm is the approximate distance from the carrier tape cut point to the center of the placement (or inspection point if the vision option was purchased).

Check Carrier Tape Alignment

To ensure an accurate count, select a spot on the loading track as a reference point for the first and last parts counted. Examples of reference points include the edge of the stainless steel carrier tape guide, one of the fastener heads, or the track width lock knob.

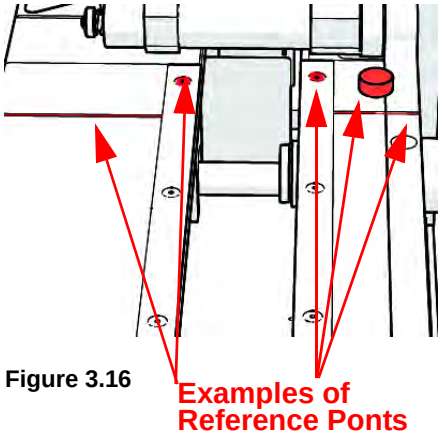


Figure 3.16

Set the Counter

Set the counter STOP value in the controller menu to the batch size to be run, if necessary, and then reset the counter to zero.

Place Components

1. Place components in open carrier pockets until the loading track has been filled. Components may be loaded by tweezer, by hand or by tube depending on the size and type of component and the operator's preference.

   Note: When placing components operators should change positions frequently and take periodic breaks to avoid fatigue and repetitive stress injuries. Consult your employer for guidelines specific to your workplace.

Figure 3.17

2. Manually inspect the placed parts for correct orientation (inspection may be automated with the optional *Extended Software Package* vision system).

   Because the TM-50 can be used to package a wide range of discreet components, specific placement instructions will vary. Consult the component manufacturer for information on correct component orientation and placement.

Figure 3.18

3. When all the open pockets in the loading track have been filled, use the foot switch to advance the carrier tape to the sealer assembly.

   Note: See *Chapter 3: Controller Settings* for details on the **Single Feed** and **Continuous Feed** foot switch options. These can be configured in the *Mode: Integration* section of the controller menu.

   If the *Extended Software Option* was purchased, there is also a **Tap Advance** setting under *Mode: Sensors: Low Carrier: -->* (right arrow key).

Figure 3.19

4. Observe the carrier tape as it advances to confirm it is moving smoothly into the sealer and the cover tape is being positioned correctly. Adjust tape advance speed, seal and cover tape as needed.

5. When the end of the sealed carrier tape reaches the take-up reel, attach it to the reel and set the take-up tension control so that the carrier winds onto the take-up reel but does not apply excessive pressure to the carrier tape.

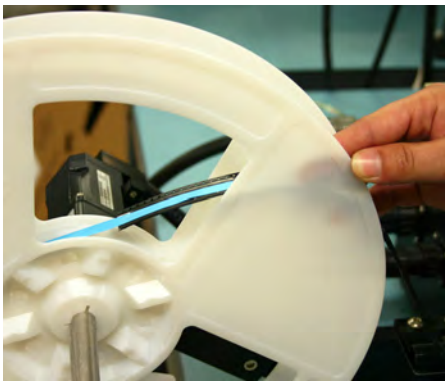


Figure 3.20

6. Once all components have been taped or the batch size has been reached, go to the TM-50 Controller LCD Screen and reset the counter to zero. Then run out the amount of empty carrier tape needed to make the next reel's leader.

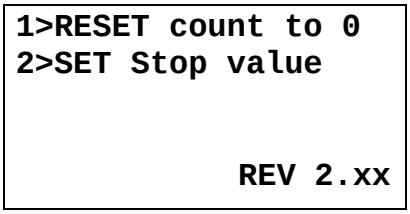
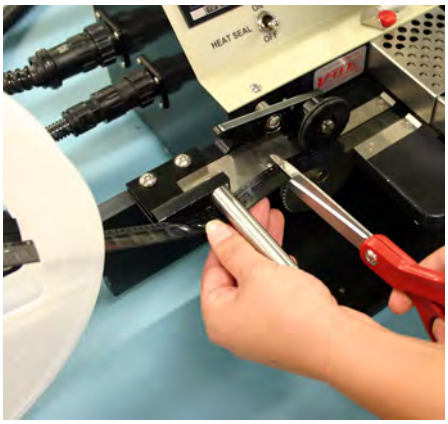


Figure 3.21

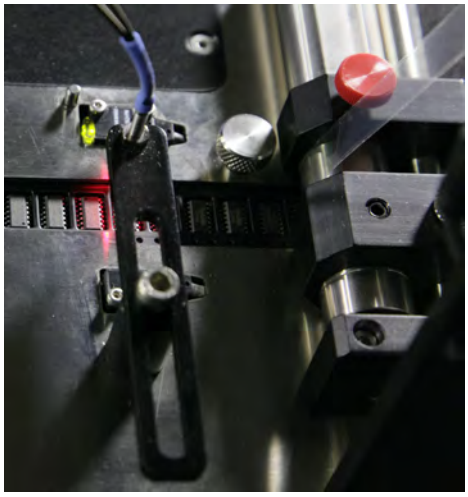
7. Cut the carrier tape and replace the finished take-up reel with a new empty take-up reel.

8. Repeat the above process until the job is completed.



Using the Empty Pocket Detector

Set up EPD



Note: Empty Pocket Detection is not available when using the Vision option.

1. In the Controller Setup Menu, select *Mode*, and then press **3** to enable or disable the EPD Sensor.

2. Position the sensor over an empty pocket and press the **SET** button on the Keyence sensor amplifier. The position of the sensor can be adjusted by moving the support arm into the desired position over the track.

3. Place a component into the pocket the sensor has been position over and press the **SET** button again. The sensor amplifier will then be programmed to differentiate a empty pocket from a pocket with a component placed in it.

The sensor must be reset for each new type of part to be taped.

Note: For more information on the sensor/amplifier, refer to Appendix A: Sensors.

Operation with EPD

Operation with EPD is slightly different than operation without it.

Creating a Trailer

1. Turn the EPD **OFF** by selected the *Mode* option in the controller setup menu, so that it will not fail the empty pockets that will run under it.

2. Without placing any parts, press the foot switch until the trailer is the desired length.

3. Reset the parts count to zero and turn the EPD back **ON**.

Taping Parts

1. Place the first part into the pocket that will next move under the sensor.

2. Press the foot switch once to advance the tape. After the part moves under the sensor, the EPD inspection will be made. Ensure that the *Advance* option is set to **one pocket at a time** in the controller setup menu. Otherwise, the EPD will not function properly.

Completion

When the counter reaches the STOP value set in the controller, the machine will stop. The last part that was counted will be under the sensor. Remove any additional parts in the loading track that may be remaining.

Creating a Leader

1. Turn the EPD **OFF** through by selecting the Mode option in the controller setup menu, so that it will not fail the empty pockets that will run under it.

2. If a STOP value is being used, reset the parts count to zero in the controller.

3. Press the foot switch until the leader is the desired length.

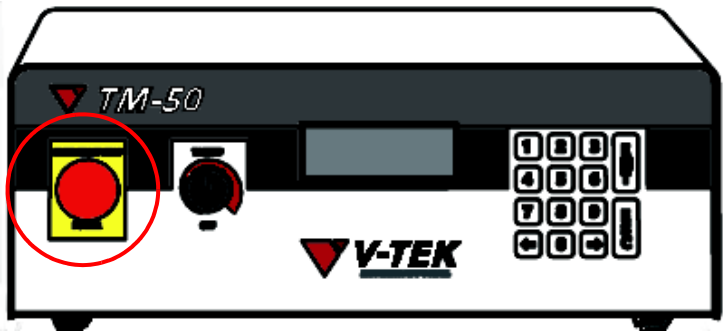
The EPD sensing system works on a scanning system. An empty pocket seen during a tape move will be posted as a failure at the end of the move.

On some machines, the EPD option is turned on through the Operator Interface *Run Mode*. In this case, it is self enabling in operation. The empty pocket test will not accept any fault signals until either the sensor has seen the first valid part, or 300mm of carrier tape have passed without a valid part being seen.

Using E-Stop in Malfunction/Fail Situations

There is one Emergency Stop button located on the front of the TM-50 controller. When the emergency stop is activated, all operations cease. If a jam in tape or some other malfunction occurs, follow the steps below to resolve the failure.

1. Press the red E-Stop button on the front of the controller to power the TM-50 off.



2. Disconnect the air supply.

3. Disconnect the power supply.

4. Resolve the problem.

5. Reconnect the air supply.

6. Reconnect the power supply.

7. Twist the E-Stop/Power button to turn the TM-50 back on.

8. Resume operation.

Chapter 4: Maintenance

Contents

Safe Maintenance Steps

Follow the steps below when performing routine maintenance or cleaning on the TM-50.

1. Turn the TM-50 **OFF**.

2. Disconnect the air supply and place the unplugged air hose so it clearly visible.

3. Disconnect the power supply and place the unplugged power cord so it clearly visible.

4. Remove all carrier and cover tape.

5. Perform cleaning/maintenance as needed.

6. Reload *Taper* carrier tape and cover tape.

7. Reconnect the air supply.

8. Reconnect the power supply.

9. Turn the TM-50 back **ON**.

Maintenance Schedule

The TM-50's simple, low-maintenance design keeps required maintenance to a minimum. The following schedule indicates common maintenance tasks and how frequently they should be performed.

Maintenance Task	Schedule	Materials needed
Heat Sealer	every 40 hours of operation	• 3/32" hex wrench • plastic or brass brush • alcohol
Loading Track	every 160 hours of operation	• small, stiff bristled paint brush
Cover Tape Guide	every 40 hours of operation	• alcohol • cotton swabs
Air Pressure Regulator	every 40 hours of operation	• none
PSA Sealer	every 40 hours of operation	• alcohol • cotton swabs
Fuses	replace as needed	• (2) 2A 5mm x 20mm SLO BLO fuses

Caution!

It is dangerous to service or maintain the TM-50 while it is connected to air and power supplies. Before performing any maintenance tasks, ensure the machine is stationary and disconnect the electrical and pneumatic power supplies placing the unplugged cables in clear view.

Maintenance Instructions

Heat Sealer

Heat Sealer maintenance consists mainly of cleaning built-up debris and adhesive residues from the *Heat Shoes*. It should be cleaned after every 40 hours of operation. To clean the *Heat Shoes*, follow the steps below.

1. Make sure the *Main Power Switch* is **OFF**.

2. Loosen the *Track Width Lock Knobs* and slide the *Loading Tracks* all the way out..

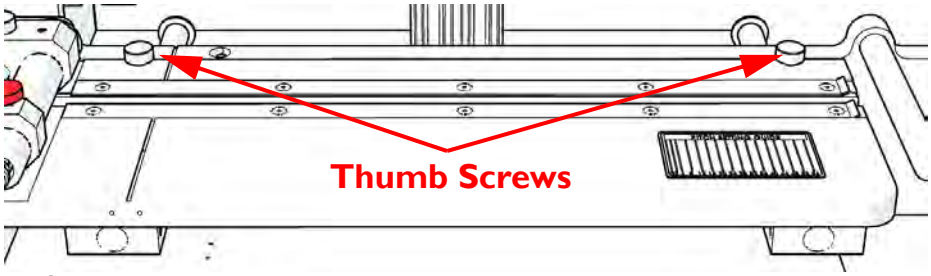


Figure 4.1

3. If the *Sealer Assembly* is still hot, allow it to cool completely before continuing.

4. Using a 3/32" hex wrench, remove the (3) BHCS and the red *Seal Position Adjuster* from the (2) sheet metal covers.

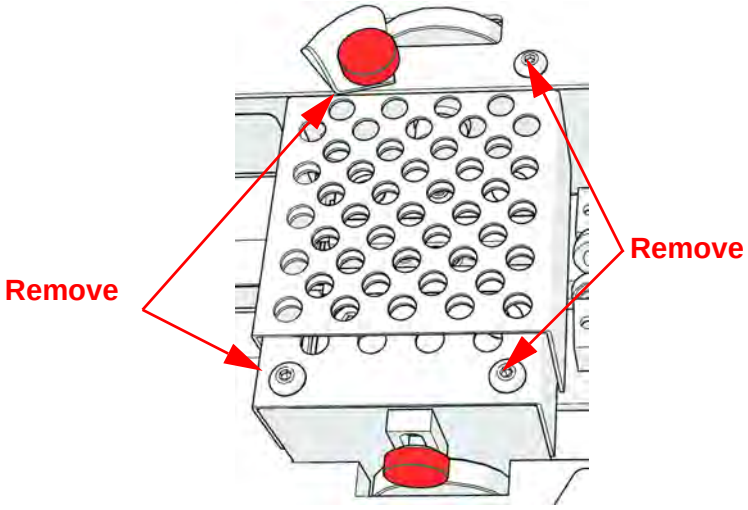


Figure 4.2

5. Clean the residues from the *Heat Shoes* by using a plastic or brass brush soaked in alcohol. **Do not use a steel bristled brush.** If there are some tough spots that will not come clean, the sealer can be heated by plugging it into the *Taping Machine*, and then scraping it with the handle of a wood brush or some other wooden implement.

Note: Do not attempt to use alcohol when the sealer is hot.

Loading Track

The *Loading Track* should be cleared of dust and debris after every 160 hours of operation.

Strip the machine, remove the *Cover Tape Guide*, and brush the dust and debris from the track with a small, stiff bristled paint brush. Excessive build-up of dirt and debris can cause carrier tape jams.

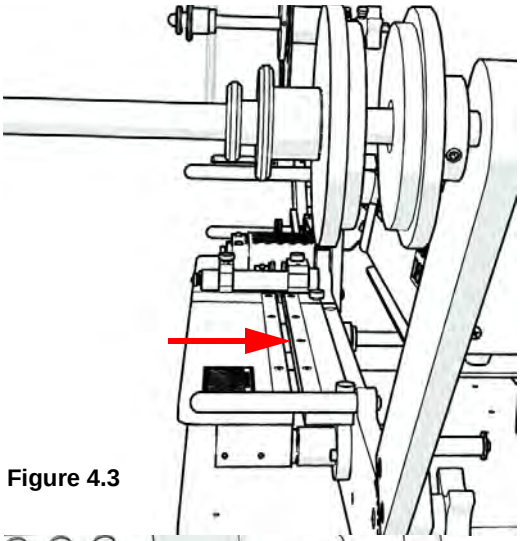


Figure 4.3

Cover Tape Guide

The *Cover Tape Guide* may become coated with adhesive and dirt during taping. It is important to keep the *Tape Groove* clean for proper alignment of the cover tape.

Clean the *Tape Groove* with alcohol and a cotton swab whenever it appears dirty. The recommended cleaning schedule is every 40 hours of operation.

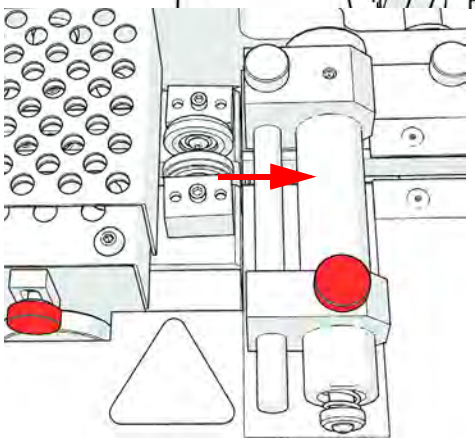


Figure 4.4

Air Pressure Regulator

Inspect the *Air Regulator* for moisture accumulation after every 40 hours of operation. Turn the *Petcock* on the bottom of the *Regulator* clockwise to release the fluid if moisture is present. Tighten the *Petcock* when moisture is gone.

> **Note**: Frequency of moisture build-up will vary with air quality. Check the *Air Pressure Regulator* periodically to determine if fluids need to be released more frequently.
>
> Other than the release of moisture build-up, the TM-50 pneumatic system should not require adjustment or replacement.
>
> Should an issue with the pneumatic system arise, call V-TEK Service for assistance.

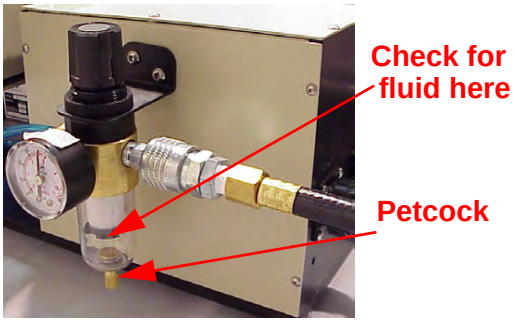
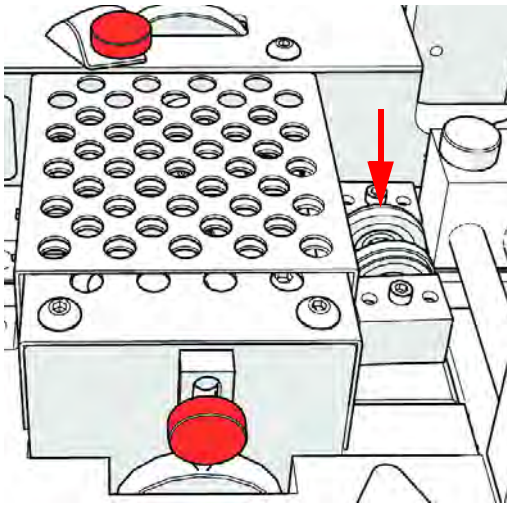


Figure 4.5

PSA Sealer



The adhesive residues should be cleaned from the *Sealer Assembly* every 40 hours of operation.

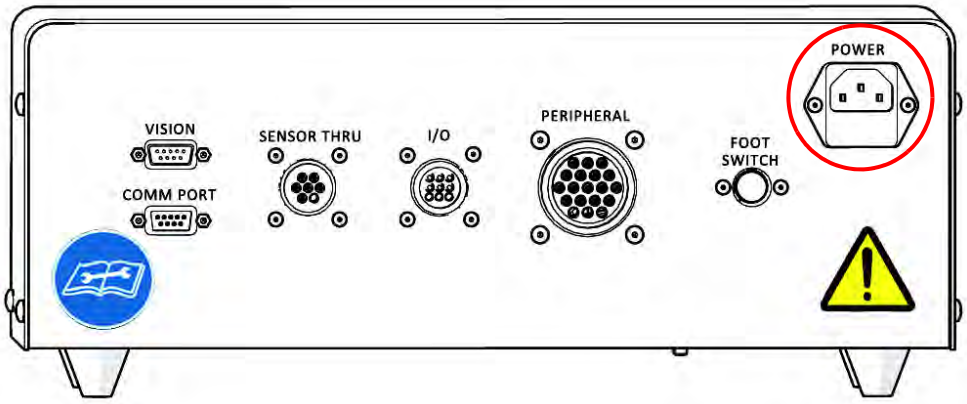
Wipe the entire assembly using a cloth soaked in alcohol. Using a cotton swab soaked in alcohol, clean between the *Sealer Wheels*. Also, clean the entire surface of the black polyurethane wheel.

> **Note**: Do not use solvents other than alcohol when cleaning the black polyurethane wheels.

If during the cleaning process the *Sealer* has become completely out of adjustment, turn the small screw behind the wheel counterclockwise approximately three turns. Slowly turn the screw clockwise while spinning the top wheel. Stop adjusting when the bottom wheel starts spinning with the top wheel.

Fuses

The machine is fused with (2) 2A 5mmx20mm SLO BLO fuses installed in a fuse holder in the *AC Filter*, just beneath the *AC Power Receptacle*. Replace as needed.



Lubrication

No lubrication is required or desired on the TM-50 as all parts are no maintenance in this regard and the use of lubricants could interfere with components.

Electrical Connections

I-O Port (J1)

All output pins of the I-O port (J1) are open collector devices.

The I-O port pins are referenced to the pin 4 ground level.

The receptacle used is an AMP 206705-1 with 66103-4 male pins. The mate would be AMP 206708-1 plug, with 66105-4 socket pins.

When the TM-50 is placed in the RUN mode at the beginning of a job, the control pins will be in the following states:

Pin 5 - End of Job - High Impedance

Pin 3 - Ready/Busy - High Impedance

Pin 2 - Fault - High Impedance

Pin 1 - Advance - Logic High 5VDC

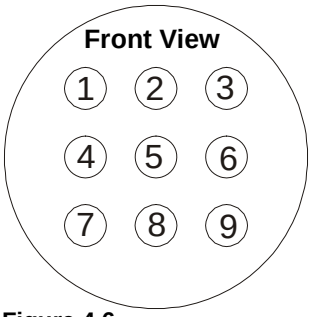


Figure 4.6

The sequence of the handshake controls is as follows:

1. The *Advance* pin is pulled down to a logic low, for no less than 10 milliseconds.

2. The TM-50 will set the ready/busy line low and begin the advance process. The ready/busy line will remain low until the advance is done and the heat sealing dwell time is completed. While the TM-50 is running this process, all advance commands are ignored. Upon completion of the advance/seal sequence, the busy/ready line will return to high and the next advance will be accepted.

3. When the preset stop value is reached, two things happen that can be used as job done indicators.

- The busy/ready pin remains at a logic low.
- The job completed pin switches to a logic low.

Releasing the busy/ready and job completed signals is accomplished by pressing the ESC key, and re-entering the RUN mode.

Interface Information

Input

Pin 1 - external advance signal - a logic low starts advance. Pin 1 is internally pulled up to 5VDC. Use an open collector device to control this pin. Do not exceed 5VDC.

Output

Pin 2 - fault signal - a logic low indicates an empty pocket or other sensor fault

Pin 3 - ready/busy signal - a logic low indicates the machine is busy

Pin 4 - logic common

Pin 5 - end of job - a logic low indicates the desired count has been reached

Pin 6 - start mark signal line (optional)

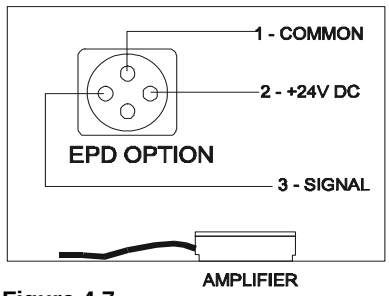


Figure 4.7

EPD Input Port

The figure on the right indicates the power and signal pins that are used by the EPD input port.

I-O Connector Considerations

Pin 1 is the external advance pin. This pin is to be activated by an open collector device. Pin 1 is internally pulled up to 5 VDC.

The fault output is at Pin 2 of the I-O connector. When a fault is detected the output will produce a logic low.

Pins 2,3,5 are open drain mosfets. These are controlled by the TM-50 system. Each pin can sink 200ma.

All active logic signals are logic low. For example, the busy signal will be low while an advance is in progress.

The DC system within the TM-50 is isolated from the AC system. DC ground is not connected to either chassis ground or AC neutral. For safety, connect the control system DC ground to the TM-50 I-O pin 4 DC ground. The control system DC ground should also be isolated from the AC system. However, the control system DC ground may safely be connected to chassis ground, if necessary.

If the AC system used to power the TM-50 is a single phase system, where the neutral leg connects to the chassis ground at the fuse box, DC ground could also be connected to AC neutral without problem.

WARNING! If the AC system used to power the TM-50 is a two phase system, (neither leg connects to chassis ground at the fuse box) only the chassis ground can be used as a DC common. **Connecting DC common to either power leg will result in severe damage to the TM-50.**

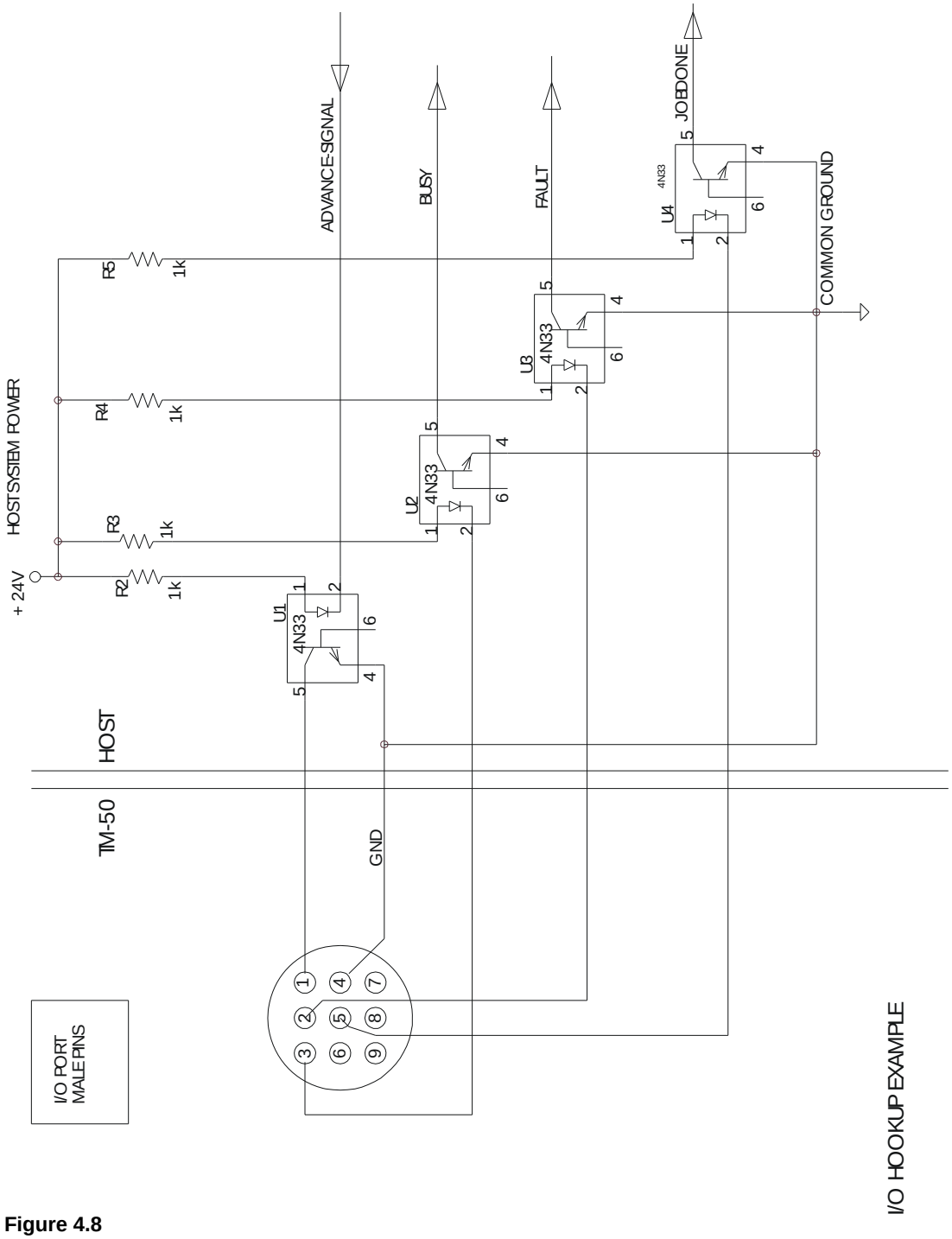

ADVANCE SIGNAL
BUSY
FAULT
JOB DONE
COMMON GROUND
HOST SYSTEM POWER
+ 24V
R5 1k
R4 1k
R3 1k
R2 1k
U1 4N33
U2 4N33
U3 4N33
U4 4N33
HOST
TM-50
GND
I/O PORT MALE PINS
I/O HOOKUP EXAMPLE

Figure 4.8

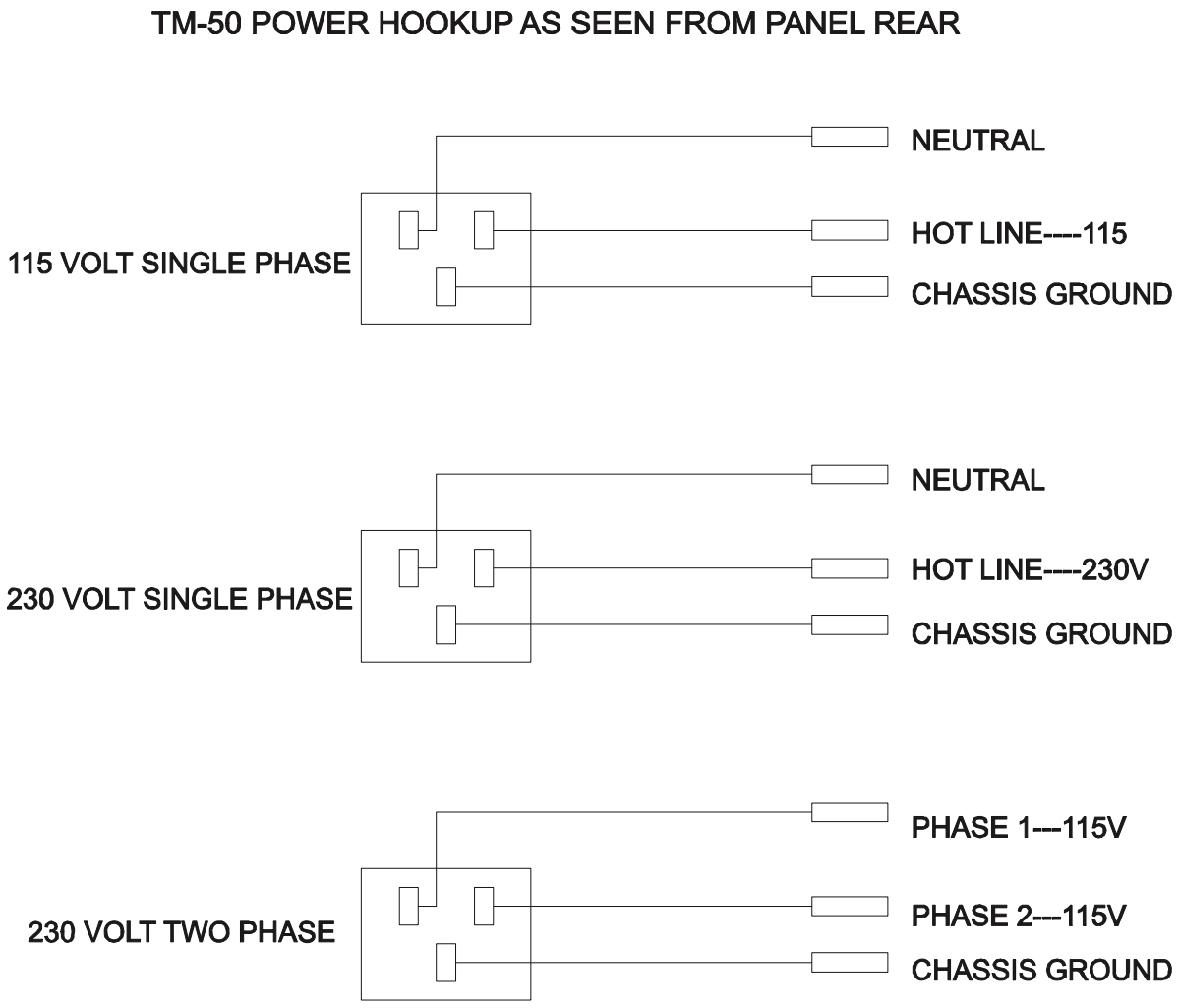
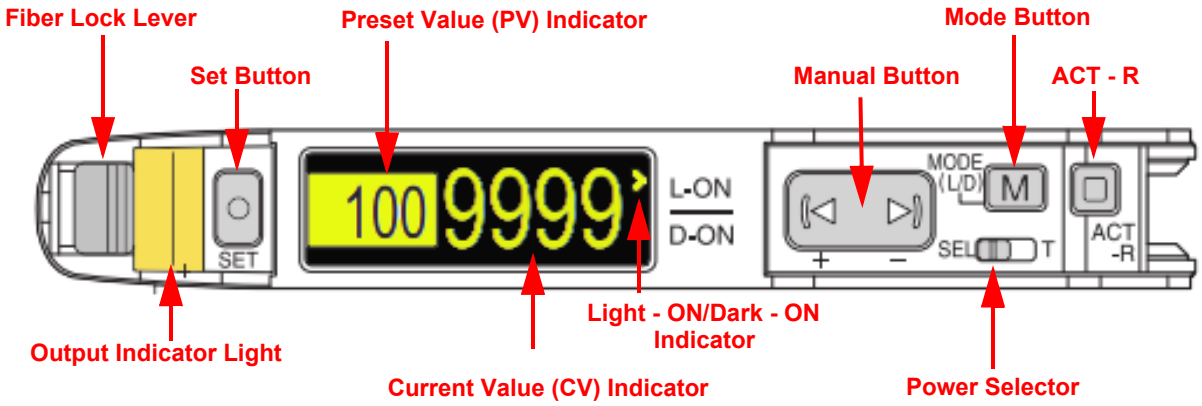

TM-50 POWER HOOKUP AS SEEN FROM PANEL REAR
115 VOLT SINGLE PHASE
NEUTRAL
HOT LINE----115
CHASSIS GROUND
230 VOLT SINGLE PHASE
NEUTRAL
HOT LINE----230V
CHASSIS GROUND
230 VOLT TWO PHASE
PHASE 1---115V
PHASE 2---115V
CHASSIS GROUND

Figure 4.9

Appendix A: Sensors

Keyence FS-N40 Series Sensor Amplifiers

The *Keyence FS-N40 Series* sensor amplifiers (shown below) are used for the taper's Empty Pocket Detector (EPD), Jam in Track Sensor and Low Cover Tape Sensor. They may also be used on the Bowl Input option, which may include Part Present Sensors.



Select the Output Mode

The FS-N40 Sensor Amplifiers can be set to two *Output Modes*: **light-ON** or **dark-ON**. This setting determines under what conditions the sensor is triggered and the *Output Indicator* is lit. In **light-ON** mode, the sensor will be triggered when the Current Value (CV) of detected light from the emitter is higher than the Preset Value (PV). In **dark-ON** mode, the sensor is triggered when the CV of detected light is lower than the PV.

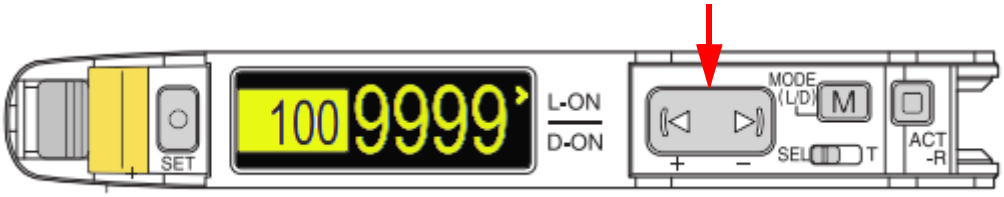
1. Press **Mode (M)** once. The *Current Value* (*CV) Indicator* will display the current mode.

2. Press the **Manual (I< >I)** button to switch the output style. Select **dark-ON**. This mode is used for all TM-50 and TM-500 sensors.

3. Press **Mode** (M) three times. Note that the L/D ON indicator is now set to **D-ON**

Fine Tune the Setting Value (Threshold)

Use the **Manual** (< >) button to adjust the Threshold value as desired:



- Press the left arrow to increase the setting value.
- Press the right arrow to decrease the setting value.
- Hold the button down to make adjustments more quickly.

Locking the Keys

It is sometimes desirable to lock the keys of the sensor amplifiers so that the current settings are not inadvertently changed.

1. Hold down the left side of the **Manual** (< >) button and the **Mode** (M) button simultaneously for at least three seconds.

2. The *CV indicator* will display **Loc** to indicate that the lock is in place.

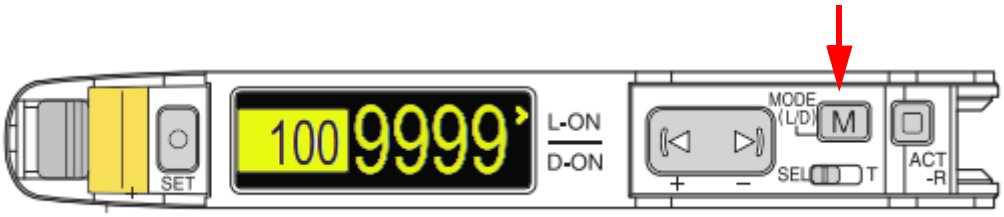
3. Repeat the same procedure to unlock the keys. The display will flash the message **unL**.

Initialization

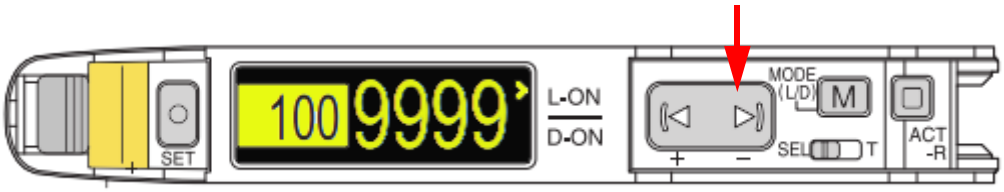
To initialize all the settings and return the sensor to the original factory default settings, follow the procedure below.

1. Hold down **Set** and **ACT-R** simultaneously for at least three seconds.

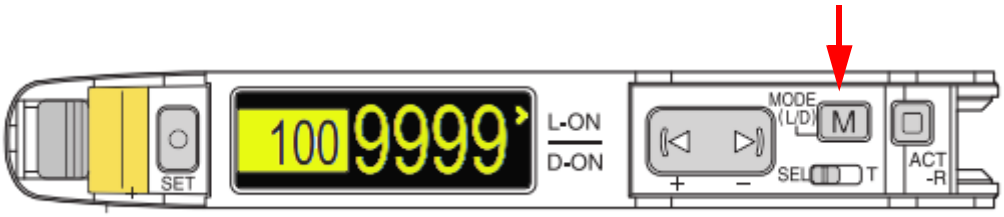
2. Press **Mode** (M) once.



3. Press down the right side of the **Manual** (< >) button once.



4. Press **Mode** (M) once.



Note: Portions of this procedure were provided by:

KEYENCE CORPORATION OF AMERICA
500 Park Boulevard, Suite 200, Itasca,
IL 60143, U.S.A.
Phone: 1-888-KEYENCE (1-888-539-3623)

For detailed instructions, visit *www.keyence.com* and download the *Keyence Digital Fiberoptic Sensor FS-N40 Series Instruction Manual.*

Appendix B: Temperature Controllers

Contents

Omron E5GC Temperature Controller

The Omron E5GC Temperature Controller is used to monitor and maintain a target temperature range for the sealing shoes of the heat sealer. The heat sealer is equipped with two controllers, which control the two sealer shoes (inside and outside) independently. The controllers are set by default to maintain a temperature range equal to the set point +/-10 degrees for their respective sealer shoe. The controller does this by comparing the present value (current temperature) to the set point (target temperature). It turns on the heating element in the sealer shoe whenever the present value drops to 10 degrees below the set point and allows them to cool when the present value rises to 10 degrees above the target temperature.

Adjusting the Set Points

To adjust the set point, simply press the increment or decrement keys (up and down arrows). The green Set Point Display will show the changes and the controller will immediately begin adjusting the temperature of the sealer shoes according to the new range that results. If a large adjustment is required, pressing and holding the up or down arrow keys will increase or decrease the set point quickly.

Default Factory Settings

Refer to the Omron E5GC User's Guide when necessary for more detailed technical information regarding the operation of the termperature controllers. The directions below describe the factory settings set at the time the controllers are installed at V-TEK, Inc.

Operation Level Settings (Figure 1.1)

1. Select the *Run-Stop Settings*, displayed as **r-S**, by pressing the Mode Key. It should be set to **rUn**.
2. Select the *Upper Limit Alarm*, displayed as **AL 1H**. It should be set to **10**.
3. Select the *Lower Limit Alarm*, displayed as **AL 1L**. It should be set to **10**.

Figure 1.1

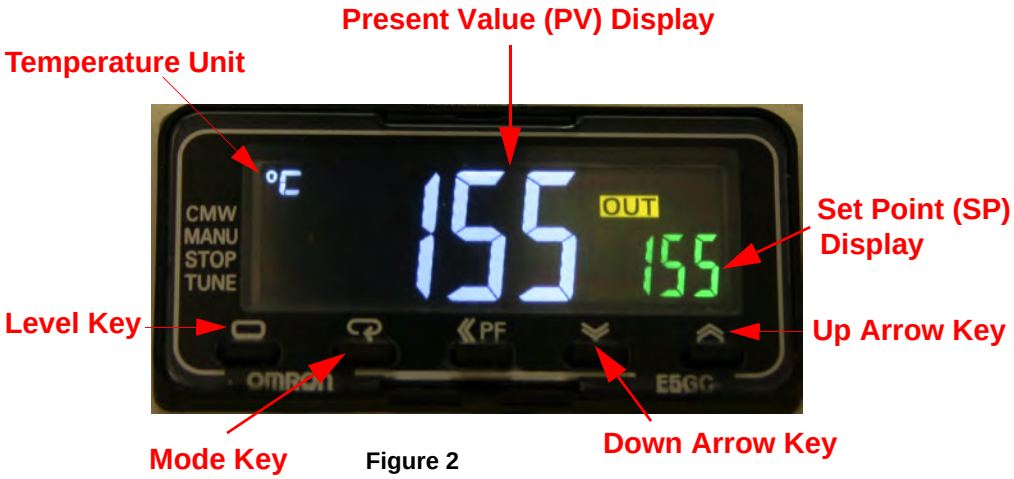


Figure 2

Setting Protection Levels (Figure 1.1)

1. Press and hold the level and mode keys for at least three seconds. The controller will enter *Protect Level*.

2. The first parameter, *Operation/Adjustment Protection*, will read as **oAPt** on the PV display. It should be set to **0**. If not, make adjustments with the Up or Down Arrow Keys.

3. Press the Mode Key. This moves to the *Initial Setting/Communications Protection* parameter, which will read as **iCPt**. It should be set to **1**.

4. Press the Mode Key again. This moves to the *Setting Changes Protection* parameter, which will read as **utPt**. It should be set to **off**.

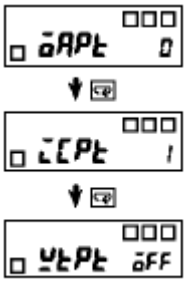


Figure 1.1

Initial Settings (Figure 1.2)

1. Press the Level Key for at least three seconds. The PV display will flash after one second and temperature control will stop. The controller is then in *Initial Settings Level*.

2. The *Input Type* parameter will display as **In-T**. It should be set to **7**. This setting corresponds to the J type thermocouple used in V-TEK sealers.

3. Select the *Temperature Unit* parameter, displayed as **d-u**, by pressing the Mode Key. It should set to **C**, which selects Celsius.

4. Select the *Control Period* parameter, displayed as **CP**, by pressing the Mode Key. It should be set to **5**.

5. Select the *Direct/Reverse Operation* parameter, displayed as **orEu**. It should be set to **or-r**.

6. Select the *PID/On-Off* parameter, displayed as **CntL**. It should be set to **Pid**.

7. Select the *Self-tuning* parameter, displayed as **St**. It should be set to **off**.

8. Select the *Alarm Type* parameter, displayed as **ALt1**. It should be set to **1**.

9. Select the *Set Point High Limiter*, displayed as **sl-H**. It should be set to **850**.

10. Select the *Set Point Low Limiter*, displayed as **sl-L**. It should be set to **-100**.

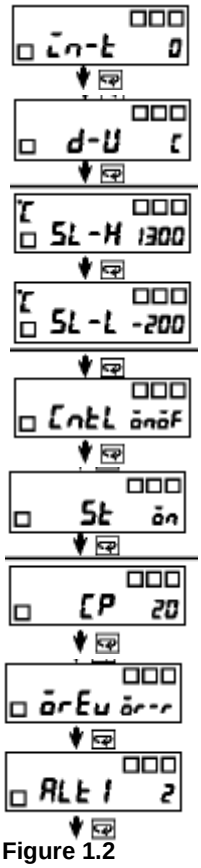


Figure 1.2

Adjustment Level Settings (Figure 1.3)

1. While still in the *Initial Settings Level*, press the Level Key once for less than one second. The controller will enter the *Adjustment Level*.

2. The initial parameter displayed is the *Auto-tuning* parameter, displayed as **At**. It should be set to **off**.

3. Select the *Temperature Input Shift* parameter, displayed as **inS**, by pressing the Mode Key. It should be set to **0.0**.

4. Select the *Proportional Band* parameter, displayed as **P**. It should be set to **20**.

5. Select the *Integral Time* parameter, displayed as **i**. It should be set to **42**.

6. Select the *Derivative Time* parameter, displayed as **d**. It should be set to **7**.

7. Press the Level key again for less than one second. The controller will return to normal operation.

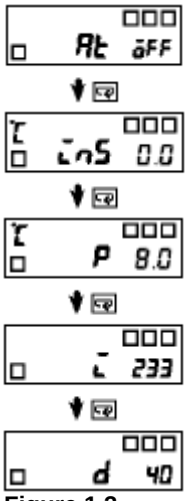


Figure 1.3

Calibration Procedure

Calibrate the temperature controllers as needed, following the steps below:

1. Measure the temperature of the seal shoe at the end of the thermocouple with the temperature probe.

2. If the temperature reading on the controller is different than that of the probe, adjust the temperature input shift value in the *Adjustment Level* of the temperature controller.

   Example: If the controller reading is 140 degrees C and the probe reading is 115 degrees C, set the *Temperature Input Shift Value* at -15 degrees C.

3. Press the Level Key for less than a second. Then select **InS**. Enter **-50** with the up/down arrow keys. If the controller reading is higher than the probe reading, the input shift entry should be a negative number. If the probe is higher, the entry should be a positive number. Re-check both readings and continue to adjust the input shift until the controller and probe readings are within +/- 5 degrees C of each other.

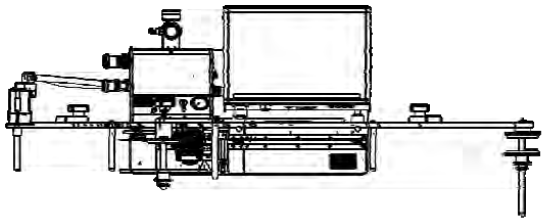
Spare Parts List
TM-50

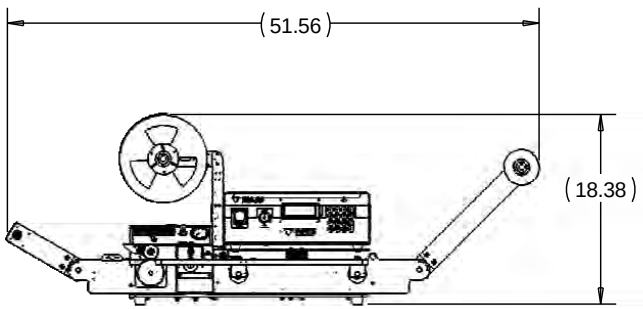
Part Number	Description	Quantity
	Controller	
102035	LCD display	1
103499	Transformer	1
105401	Firmware & chip*	1
109091	Keypad	1
112557	Fuse 2 amp (5x20 mm)	1
150032	AC auto select board	1
152101	Foot switch assembly	1
291963	Tension Control Board Replacement Kit	1
292763	Main Control Board Kit	1
	** Please provide Software Version when ordering.*	
	Base Machine	
105659	Stepper motor/drive	1
105705	Temp-controller	2
105573	Gear head 50:1	1
105695	Take-up motor	1
150045	Step-seal circuit board	1
150050	Solenoid board	1
200029	Sealer air cylinder	2
200030	Sealer air cylinder	2
200603	Sealer air valve	2
200801	Air pressure gauge	1
204055	Drive idler bearing	2
204056	PSA wheel bearing	4
210019	Timing belt	1
212008	Drive idler o-ring	2
219001	Idler Arm Spring	1
244007	Heal seal thermocouple	2
244008	Heat seal heater	2
253780	Take-up reel spindle (72 mm)	1
257999	Take-up reel spindle key (72 mm)	1
260574	Idler arm	1
260576	Drive idler	1
261096	Track setup gauge	1
261122	Heat shoe	2
290603	Upper roller assembly (with bearing)	2
290604	Lower roller assembly (with bearing)	2
292780	Universal Shim Kit & Tape Guide	1

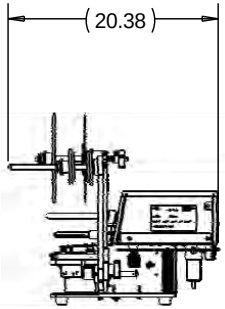
Spare Parts List
TM-50/TM-50XL Sensors

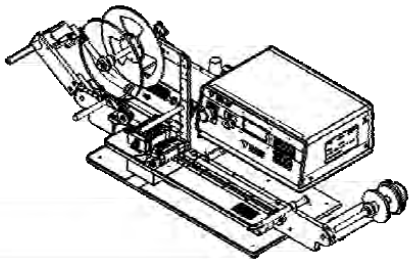
Part Number	Description	Quantity
	EPD Sensor	
104949	FS-N41N Amplifier (new style)	1
104951	FS-V11 Amplifier (old style)	1
104952	FU-35FA Fiber Optic	1
	EPD Black Position Knob	
217022	Black Cap	1
261268	Thumbscrew Knob	1
	Low Cover Tape Sensor	
104949	FS-N41N (new style)	1
104951	FS-V11 Amplifier	1
104952	FU-35FA Fiber Optic	1
	Cross Track Sensor	
105048	EX-11A SUNX Sensor	1
	Carrier in Motion Sensor	
105048	EX-11A SUNX Sensor	1

REVISIONS				
ECO #	REV.	DESCRIPTION	DATE	APPROVED
	A	RELASE		
2664	B	REMOVE PART # 291234, REPLACE WITH PART # 291583	1/2/13	PVO
2747	C	UPDATE DRAWINGS	7/18/13	RH
2806	D	REMOVE PART # 111106	6/18/14	RH









UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES: .XXX ± 0.005
.XX ± 0.010
.X ± 0.015
ANGULAR: MACHINED ± 0.1°
BEND ± 0.5 °
SURFACE: 32

GENERAL NOTES:
- **INTERPRET GEOMETRIC TOLERANCING PER ANSI Y14.5**
- **BREAK ALL SHARP EDGES .010 MAX UNLESS NOTED**
- **CHAMFER ALL HOLES .015 X .015 ±.010 UNLESS NOTED**
- **ALL MATERIALS, COATINGS, & CLEANING PROCESSES MUST RESULT IN RoHS COMPLIANT PART**
- **DO NOT SCALE DRAWING**

	NAME	DATE
DRAWN	RH	10/24/13
ENG APPR.		~

V-TEK

TITLE:

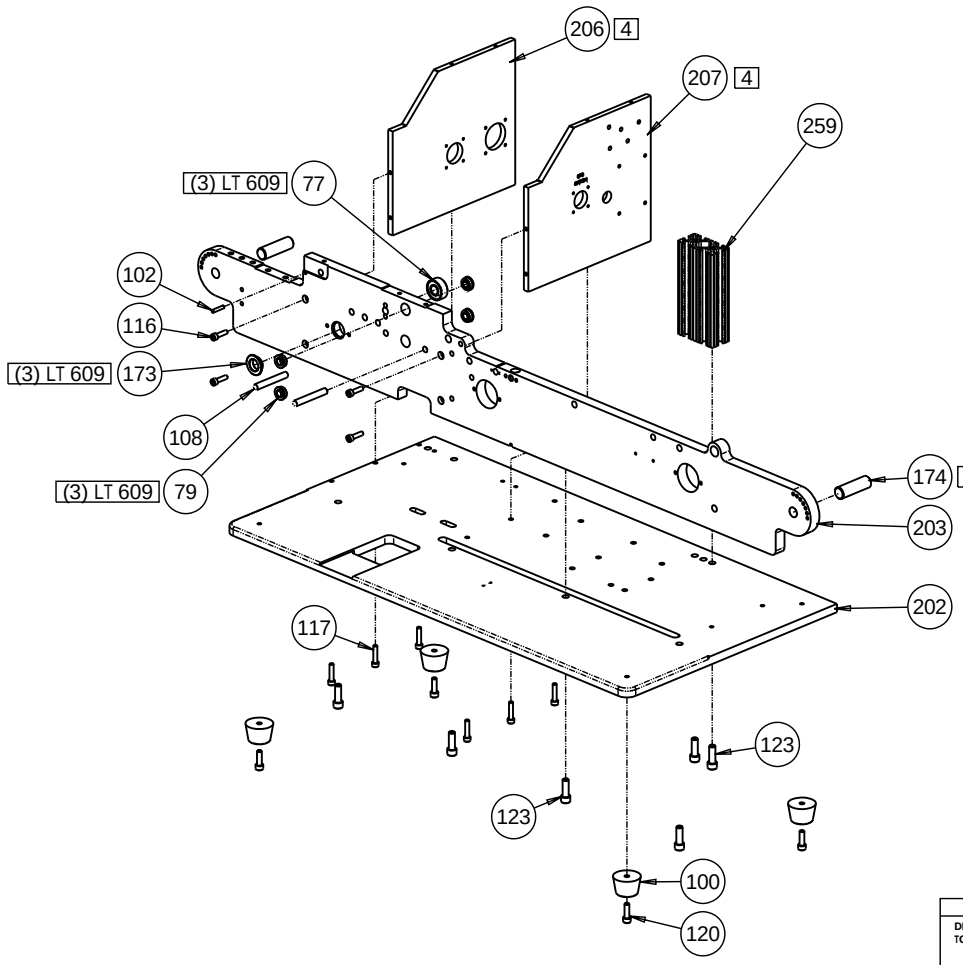
EMETM508-72

MATERIAL

FINISH

SIZE	DWG. NO.	REV
B	EMETM508-72	D

WEIGHT (lbs): 92.5235



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
77	204051	BEARING, 3/8ID X 7/8OD	4
79	204055	BEARING SFR-188ZZEE	9
100	217211	FEET POLY	4
102	219002	1/8 X 5/8 LG. SS DOWEL PIN	1
108	219072	1/4 X 1-3/4 LG. SS DOWEL PIN	2
116	221028	SHCS SS 8-32 x .63 LG	4
117	221029	SHCS SS 8-32 X 3/4	11
120	221045	SHCS SS 10-24 x 5/8	8
123	221063	SHCS SS 1/4-20 X 3/4	16
173	250016	FLANGE BUSHING MODIFICATION	1
174	250075	THREADED ROD, 1/2-13 X 1 5/8"	2
202	261042	BASEPLATE, TM 50	1
203	261043	TRACK SUPPORT BRACKET	1
206	261050	SIDE ENCLOSURE LH, TM50	1
207	261051	SIDE ENCLOSURE RH, TM50	1
259	267136	TM-50 CONTROLLER STANDOFF	1

UNLESS OTHERWISE SPECIFIED:

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.XX ± 0.010
.X ± 0.015
ANGULAR: MACHINED ± 0.1°
BEND ± 0.5 °
SURFACE: 63

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	NAME	DATE
DRAWN	RH	10/24/13
ENG APPR.		~

TITLE:

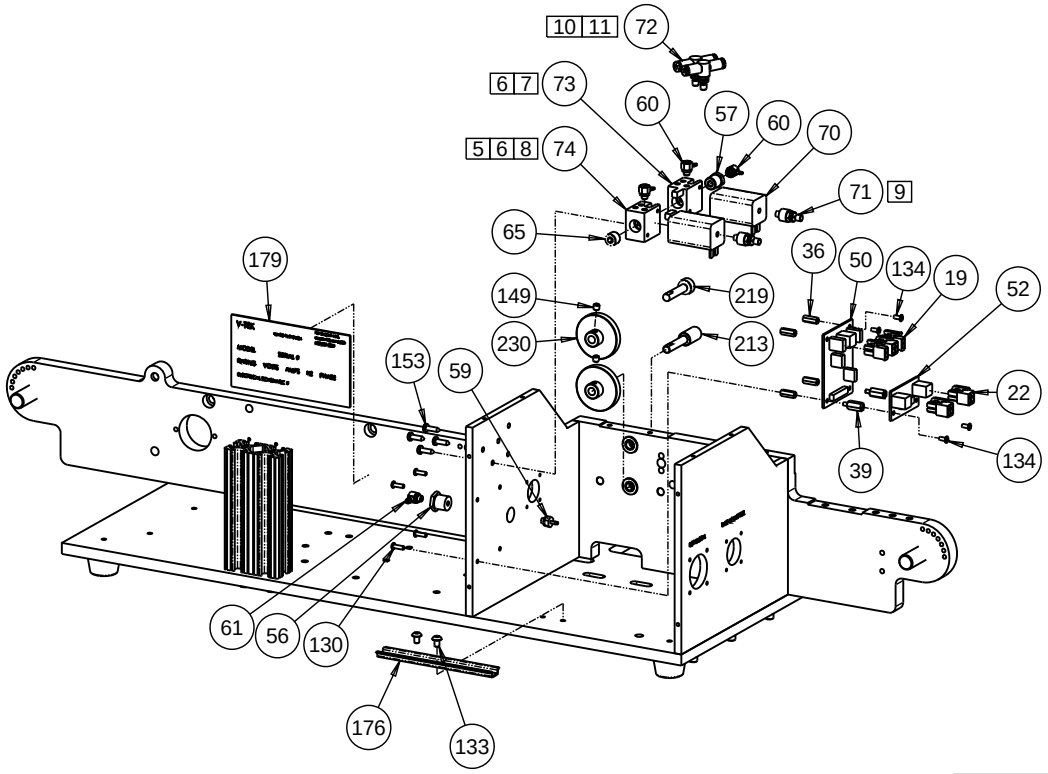
EMETM508-72

MATERIAL

FINISH

SIZE	DWG. NO.	REV
B	EMETM508-72	D

WEIGHT (lbs): 92.5235



ITEM NO.	PART NUMBER	DESCRIPTION	QTY
19	103127	RECEPTACLE MINI FIT JR. 2	7
22	103133	RECEPTACLE MINI FIT JR. 4	8
23	103135	RECEPTACLE MINI FIT JR. 8	1
36	106043	STANDOFF 4-40 1/2"	4
39	106059	STANDOFF HEX M/F 4-40 .500" AL	2
50	150045	BOARD STEP SEAL	1
52	150050	BOARD SOLINOID FOR HEAT SHOE	1
56	200204	AIR FIT 10-32 F X 15/32 BLKHD	1
57	200213	AIR FIT 1/8NPT M X 10-32 F	1
59	200253	10-32 x 1/16 HOSE BARB	2
60	200259	AIR FITTING 10-32 X 1/16 TB ELBOW	7
61	200260	AIR FIT 90 DEG 10-32 X 1/8 TB	1
65	200296	AIR FITTING 1/8 PLUG	2
70	200603	VALVE HUMPHREY MB3E1	2
71	200691	AIR VALVE FLOW CNTRL, MUFFLER	2
72	200692	AIR FLOW CONTROL	2
73	200751	MANIFOLD MZ-1 HUMPHREY	1
74	200751_B	MODIFIED MANIFOLD MZ-1 HUMPHREY	1
129	223010	SS BHCS #4-40 x 5/16	4
130	223011	BHCS SS 4-40 X 3/8	12
133	223033	BHCS SS 8-32 X 1/4	7
134	223033	BHCS SS 4-40 X 1/4	5
149	230023	10-24 X 3/16 STEEL SET SCREW	9
153	236016	PHILLIPS HEAD, TAPPING, 6 X 1/2 SS	4
176	250595	BOWL ASSEMBLY DIN RAIL	1
179	253864	SERIAL NUMBER PLATE - CE	2
213	261060	SHAFT, THREADED ADJUSTER	2
219	261068	SHAFT, IDLER ADJUSTER	1
230	261098	GEAR MODIFICATION, 34T	2

UNLESS OTHERWISE SPECIFIED:

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.XX ± 0.010
.X ± 0.015
ANGULAR: MACHINED ± 0.1°
BEND ± 0.5 °
SURFACE: 63

GENERAL NOTES:
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	NAME	DATE
DRAWN	RH	10/24/13
ENG APPR.		~

TITLE:

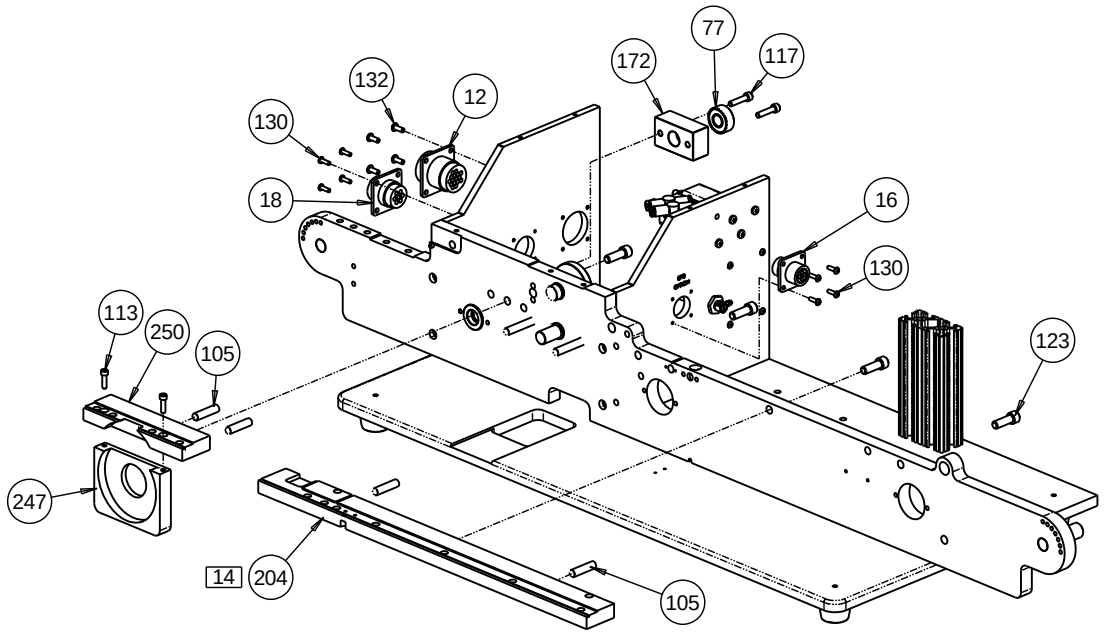
EMETM508-72

MATERIAL

FINISH

SIZE	DWG. NO.	REV
B	EMETM508-72	D

WEIGHT (lbs): 92.5235



ITEM NO.	PART NUMBER	DESCRIPTION	QTY
12	103037	RECEPT AMP 16 PIN AMP	1
16	103058	RECEPT AMP 4 PIN	1
18	103064	RECEPT AMP 7 PIN AMP	2
23	103135	RECEPTACLE MINI FIT JR. 8	1
77	204051	BEARING, 3/8ID X 7/8OD	4
105	219015	1/4 X 1 LG. SS DOWEL PIN	6
113	221015	SHCS SS 6-32 X 1/2	2
117	221029	SHCS SS 8-32 X 3/4	11
123	221063	SHCS SS 1/4-20 X 3/4	16
129	223010	SS BHCS #4-40 x 5/16	4
130	223011	BHCS SS 4-40 X 3/8	12
132	223025	BHCS SS 6-32 X 3/8	8
172	250015	BEARING MOUNT	1
204	261044	Track - Rear - TM50	1
247	266736	SPROCKET GUARD	1
250	266746	SHORT REAR TRACK	1

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.X ± 0.015
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BEND ± 0.5 °
SURFACE: 63

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	NAME	DATE
DRAWN	RH	10/24/13
ENG APPR.		~

V-TEK INTERNATIONAL ROYCE INSTRUMENTS

TITLE:

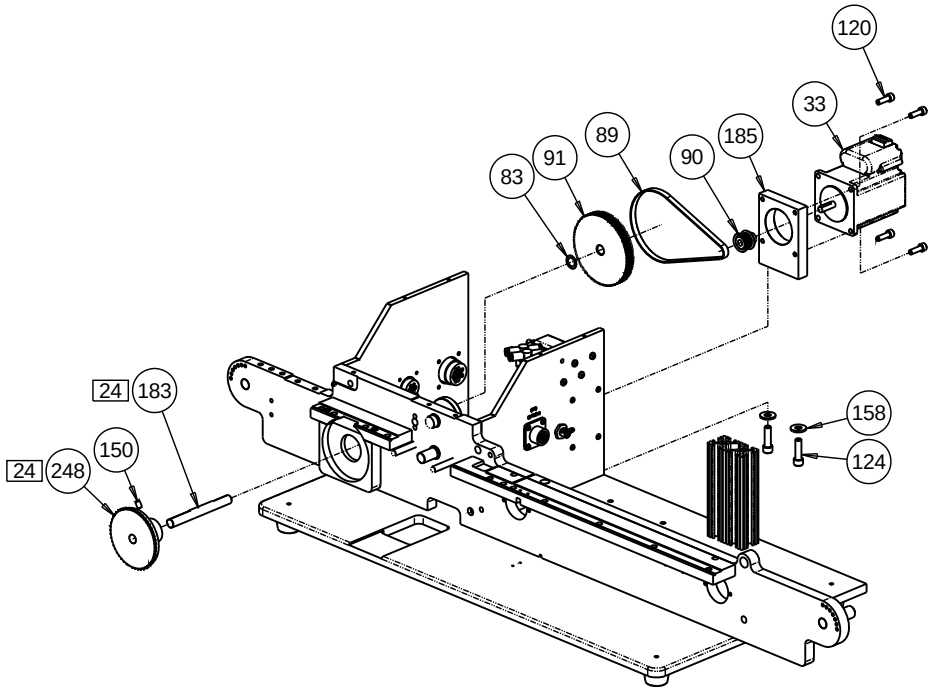
EMETM508-72

MATERIAL

FINISH

SIZE	DWG. NO.	REV
B	EMETM508-72	D

WEIGHT (lbs): 92.5235



ITEM NO.	PART NUMBER	DESCRIPTION	QTY
33	105659	MOTOR, STEPPER IMS-23 (MICRO)	1
83	207025	SHIM, 3/8 ID, 9/16 OD, .010 THICK	1
89	210019	BELT TIMING (TB20UP6-105)	1
90	211013	PULLEY, 24T	1
91	211018	PULLEY, .080 PITCH X 120 GROOVE	1
120	221045	SHCS SS 10-24 x 5/8	8
124	221174	SHCS SS 1/4-20 X 7/8	2
150	230071	10-24 X 5/16 STEEL SET SCREW	5
158	238024	FLAT WASHER, 1/4"	2
183	255590	DRIVE SHAFT	1
185	256607	MOTOR MOUNT	1
248	266737	DRIVE SPROCKET, 50 PIN	1

UNLESS OTHERWISE SPECIFIED:

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.XX ± 0.010
.X ± 0.015
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BEND ± 0.5 °
SURFACE: 63

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	NAME	DATE
DRAWN	RH	10/24/13
ENG APPR.		~

TITLE:

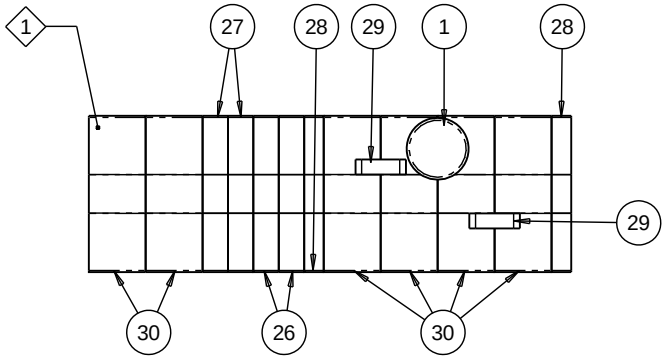
EMETM508-72

MATERIAL

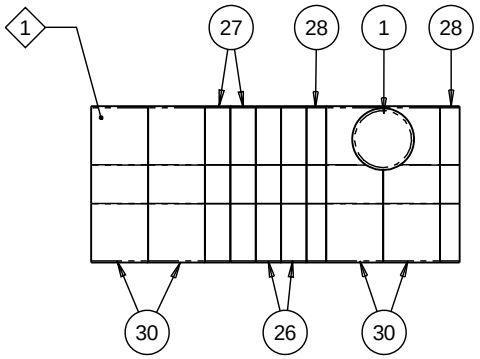
FINISH

SIZE B | DWG. NO. EMETM508-72 | REV D

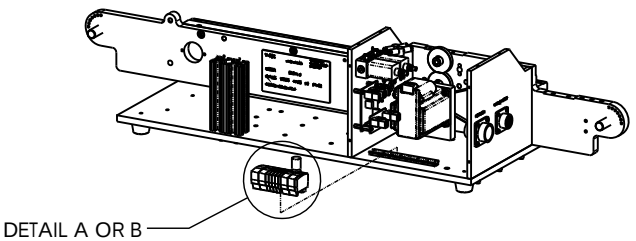
WEIGHT (lbs): 92.5235



DETAIL A
TERMINAL BLOCK WITH FULL
SENSOR PACKAGE
SCALE 1:1



DETAIL B
STANDARD TERMINAL BLOCK
SCALE 1:1



ITEM NO.	PART NUMBER	DESCRIPTION	ON STANDARD	ON SENSOR PACKAGE
1	101078	CAPACITOR, ELEC. 1000UF 35V	1	1
26	104101	TERM BLOCK MINI (SPRING)	2	2
27	104102	TERM GND BLOCK MINI (SPRING)	2	2
28	104103	TERM END CAP MINI (SPRING)	2	2
29	104104	TERM BRIDGE MINI (SPRING)	0	2
30	104106	TERM DBL BLOCK MINI (SPRING)	4	6

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.XX ± 0.010
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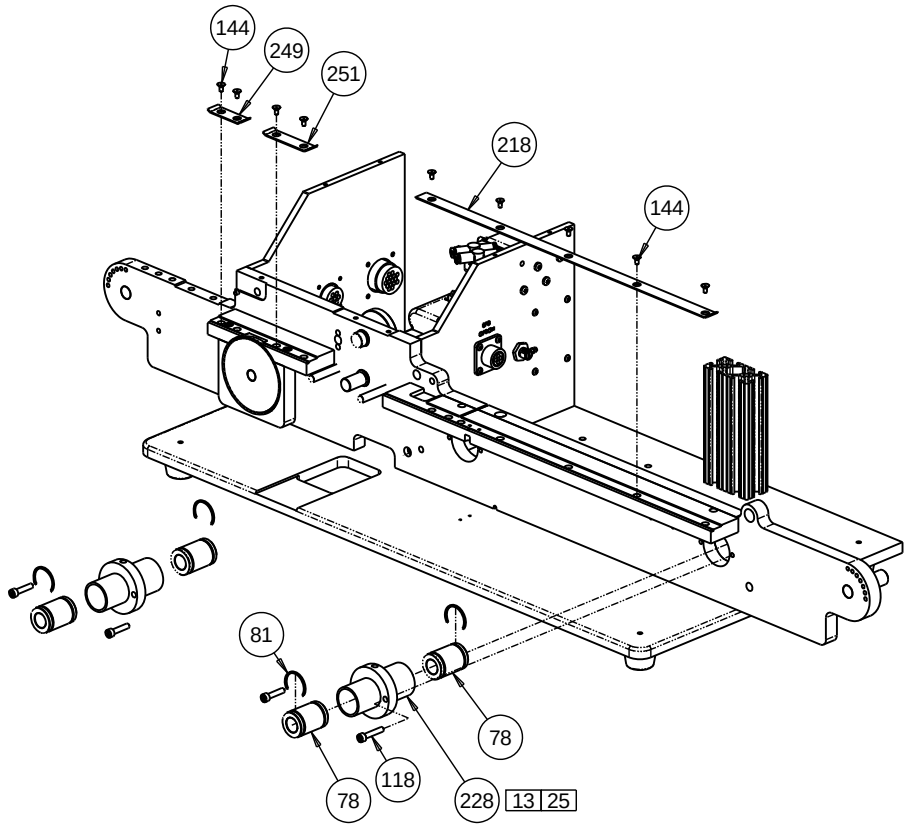
	NAME	DATE
DRAWN	RH	10/24/13
ENG APPR.		~

TITLE:
EMETM508-72

MATERIAL
FINISH

SIZE B | DWG. NO. EMETM508-72 | REV D

WEIGHT (lbs): 92.5235



ITEM NO.	PART NUMBER	DESCRIPTION	QTY
78	204053	BEARING, SIMPLICITY FL08	4
81	204125	RETAINING RING, 7/8" C TYPE	4
118	221030	SHCS SS 8-32 X 3/4	1
144	225001	FHCS SS 4-40 X 1/4	16
218	261065	COVER, TRACK LONG	2
228	261093	TRACK BEARING MOUNT, TM50	2
249	266738	SHORT TRACK COVER	1
251	266747	SHORT TRACK COVER #2	1

UNLESS OTHERWISE SPECIFIED:

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.XX ± 0.010
.X ± 0.015
ANGULAR: MACHINED ± 0.1°
BEND ± 0.5 °
SURFACE: 63

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	NAME	DATE
DRAWN	RH	10/24/13
ENG APPR.		~

TITLE:

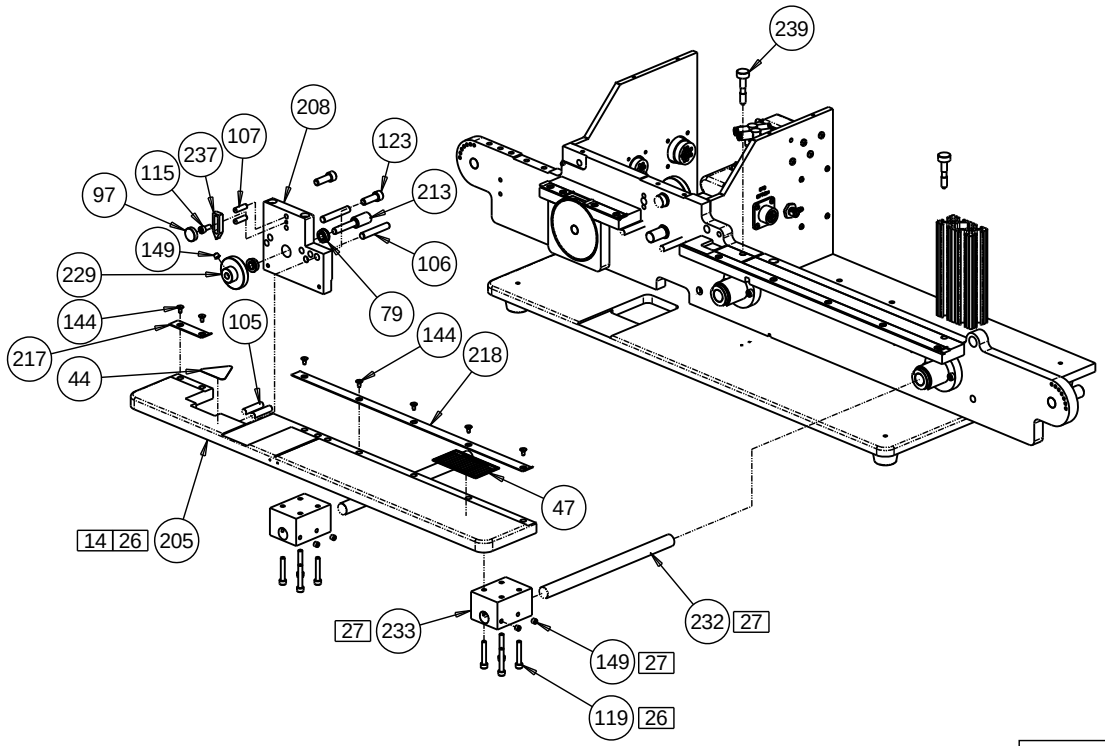
EMETM508-72

MATERIAL

FINISH

SIZE	DWG. NO.	REV
B	EMETM508-72	D

WEIGHT (lbs): 92.5235



ITEM NO.	PART NUMBER	DESCRIPTION	QTY
44	111002	SAFETY STICKER HAND BURN	1
47	111170	PITCH SETTING DECAL	1
79	204055	BEARING SFR-188ZZEE	9
97	217042	KNOB M4 RED	3
105	219015	1/4 X 1 LG. SS DOWEL PIN	6
106	219017	1/4 X 1-1/2 LG. SS DOWEL PIN	2
107	219043	3/16 X 5/8 LG. SS DOWEL PIN	2
115	221026	SHCS SS 8-32 X 3/8	3
119	221031	SHCS SS 8-32 X 1	8
123	221063	SHCS SS 1/4-20 X 3/4	16
144	225001	FHCS SS 4-40 X 1/4	16
149	230023	10-24 X 3/16 STEEL SET SCREW	9
205	261045	TM50 FRONT TRACK	1
208	261052	MOUNT, OUTER ANVIL	1
213	261060	SHAFT, THREADED ADJUSTER	2
217	261064	COVER, TRACK SHORT	1
218	261065	COVER, TRACK LONG	2
229	261097	GEAR MODIFICATION, 30T	1
232	261428	TRACK SHAFT	2
233	261429	TRACK SHAFT MOUNT	2
237	261713	ADJUSTMENT LOCK, POINT	1
239	262674	ADJUSTMENT KNOB 1-1/4"	2

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	NAME	DATE
DRAWN	RH	10/24/13
ENG APPR.		~

TITLE:

EMETM508-72

MATERIAL

FINISH

SIZE	DWG. NO.	REV
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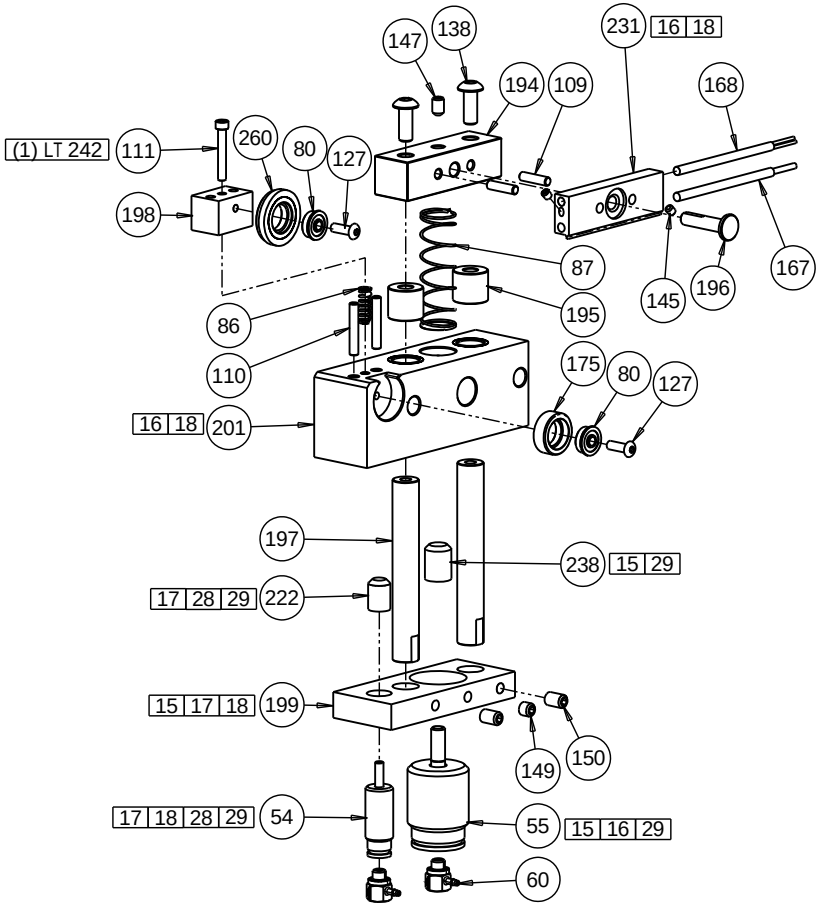
WEIGHT (lbs): 92.5235



OUTER SEALER

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
54	200029	AIR CYLINDER, SMC CJPB-6-10-B	2
55	200030	SMC AIR CYLINDER, CJPB-15-10	2
60	200259	AIR FITTING 10-32 X 1/16 TB ELBOW	7
80	204056	BEARING 1/8 ID X 3/8 DIA FLANGED	4
86	209051	SPRING, STAINLESS STEEL	2
87	209244	SPRING; CUSTOM, SS	2
109	219206	DOWEL CRS .125 DIA X .50 LG.	4
110	219207	DOWEL PIN CRS 1/8 DIA x 3/4 LG	4
111	221005	SHCS SS 4-40 X .75 LG	6
127	223006	BHCS 5-40 X 3/8	4
138	223053	BHCS SS 10-32 X 1/2	4
145	230001	4-40 X 1/8 STEEL SET SCREW	4
147	230018	8-32 X 1/4 STEEL SET SCREW	2
149	230023	10-24 X 3/16 STEEL SET SCREW	9
150	230071	10-24 X 5/16 STEEL SET SCREW	5
167	244007	THERMOCOUPLE	2
168	244008	HEATER, LONG W/SWAGED-IN LEADS	2
175	250159	SEAL ROLLER, LOWER	2
194	260657	HEAT BLOCK	2
195	260666	HEAT BLOCK ISOLATOR	4
196	260669	RETAINING PIN, HEAT SHOE	2
197	261032	SLIDER SHAFT	4
198	261033	UPPER ROLLER MOUNT	2
199	261034	HEAD PLATE	2
201	261036	ANVIL, OUTER	1
222	261075	BUMPER, 5MM CYLINDER	2
231	261122	HEAT SHOE, ADJUSTABLE SEALER	2
238	261753	BUMPER, 5MM CYLINDER	2
260	267573	UPPER SEALL ROLLER	2

UNLESS OTHERWISE SPECIFIED:

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	NAME	DATE
DRAWN	RH	10/24/13
ENG APPR.		~

TITLE:

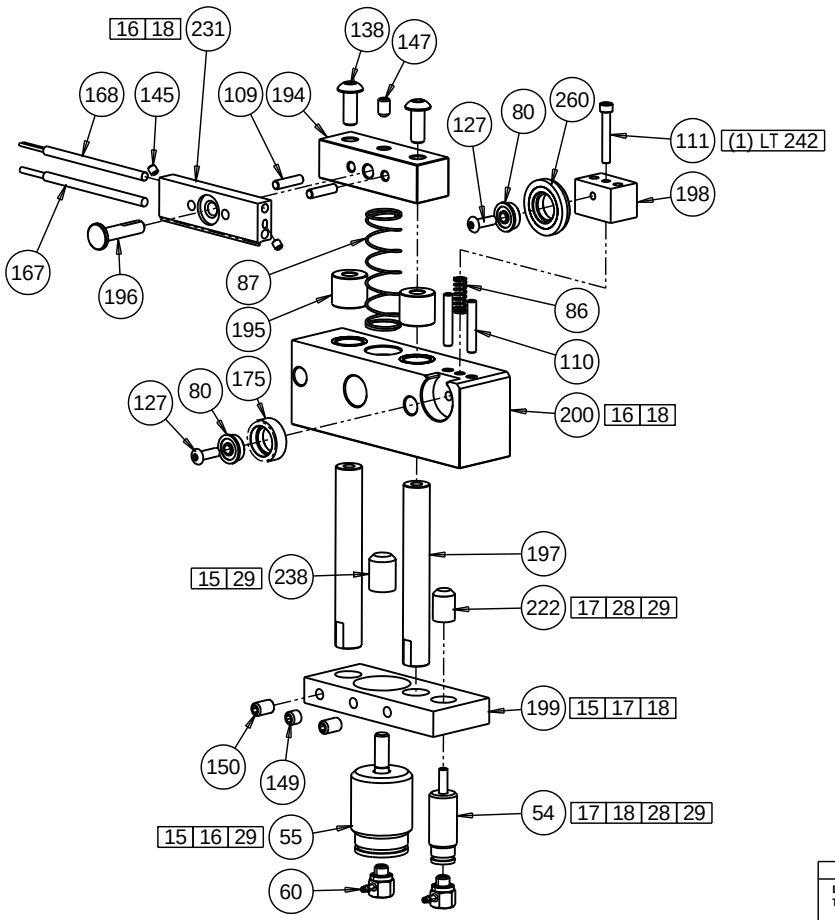
EMETM508-72

MATERIAL

FINISH

SIZE B | DWG. NO. EMETM508-72 | REV D

WEIGHT (lbs): 92.5235



INNER SEALER

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
54	200029	AIR CYLINDER, SMC CJPB-6-10-B	2
55	200030	SMC AIR CYLINDER, CJPB-15-10	2
60	200259	AIR FITTING 10-32 X 1/16 TB ELBOW	7
80	204056	BEARING 1/8 ID X 3/8 DIA FLANGED	4
86	209051	SPRING, STAINLESS STEEL	2
87	209244	SPRING; CUSTOM, SS	2
109	219206	DOWEL CRS .125 DIA X .50 LG.	4
110	219207	DOWEL PIN CRS 1/8 DIA x 3/4 LG	4
111	221005	SHCS SS 4-40 X .75 LG	6
127	223006	BHCS 5-40 X 3/8	4
138	223053	BHCS SS 10-32 X 1/2	4
145	230001	4-40 X 1/8 STEEL SET SCREW	4
147	230018	8-32 X 1/4 STEEL SET SCREW	2
149	230023	10-24 X 3/16 STEEL SET SCREW	9
150	230071	10-24 X 5/16 STEEL SET SCREW	5
167	244007	THERMOCOUPLE	2
168	244008	HEATER, LONG W/SWAGED-IN LEADS	2
175	250159	SEAL ROLLER, LOWER	2
194	260657	HEAT BLOCK	2
195	260666	HEAT BLOCK ISOLATOR	4
196	260669	RETAINING PIN, HEAT SHOE	2
197	261032	SLIDER SHAFT	4
198	261033	UPPER ROLLER MOUNT	2
199	261034	HEAD PLATE	2
200	261035	ANIVL - INNER	1
222	261075	BUMPER, 5MM CYLINDER	2
231	261122	HEAT SHOE, ADJUSTABLE SEALER	2
238	261753	BUMPER, 5MM CYLINDER	2
260	267573	UPPER SEALL ROLLER	2

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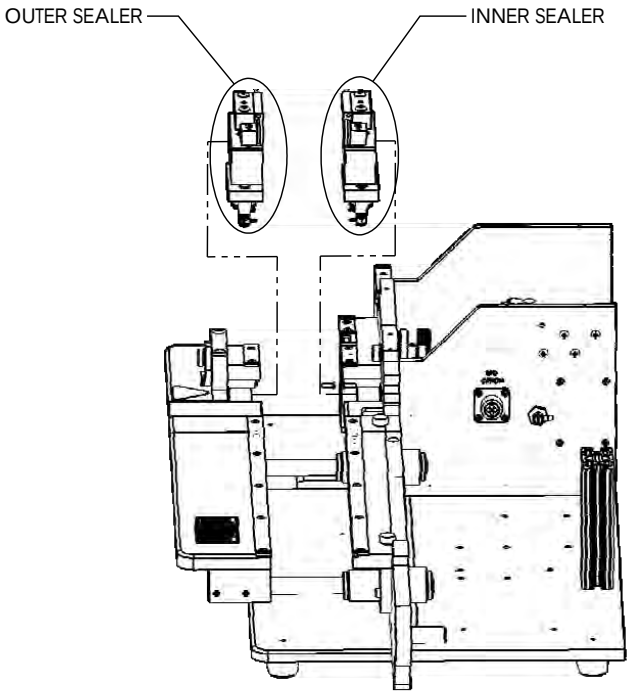
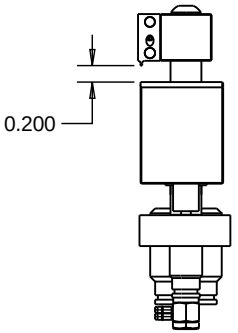
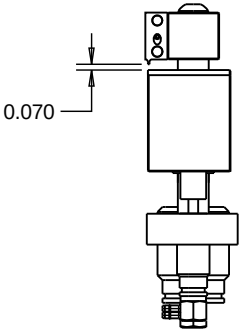




DETAIL C
LARGE CYLINDER SETUP 16
SCALE 1:1



DETAIL D
SMALL CYLINDER SETUP 18
SCALE 1:1

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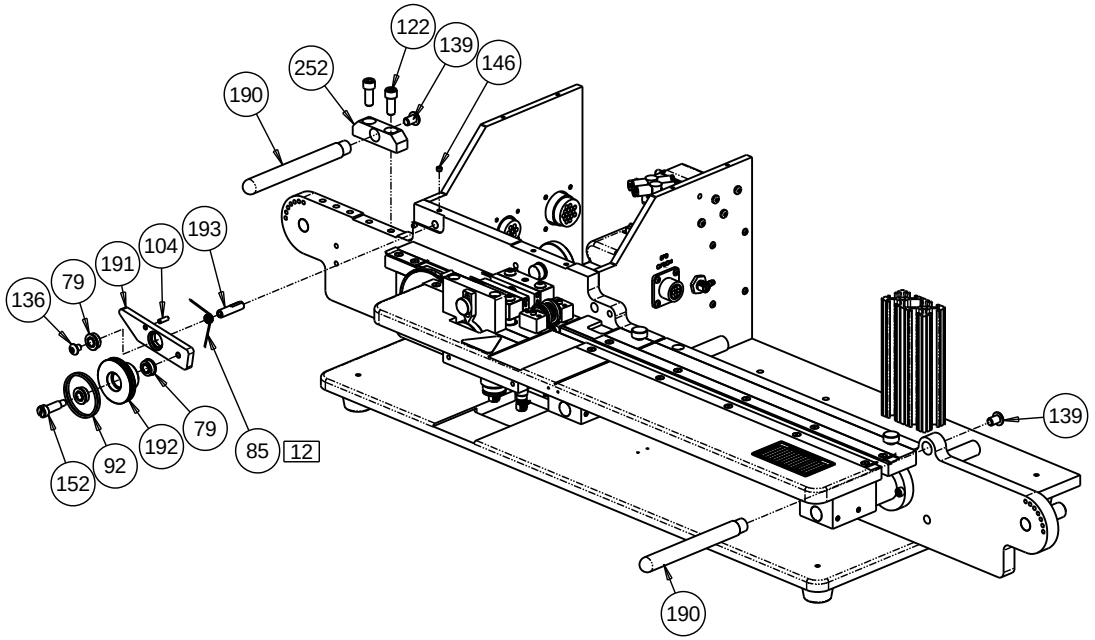
MATERIAL
FINISH

SIZE	DWG. NO.	REV
B	EMETM508-72	D

WEIGHT (lbs): 92.5235
SHEET 11 OF 21



ITEM NO.	PART NUMBER	DESCRIPTION	QTY
79	204055	BEARING SFR-188ZZEE	9
85	209022	SPRING, TORSION RIGHT HAND WOU	1
92	212008	ORING 028 NEOPRENE	2
104	219010	1/8 X 3/8 LG. SS DOWEL PIN	1
122	221062	SHCS SS 1/4-20 X 5/8	2
136	223043	BHCS SS 10-24 X 1/4	3
139	223059	BHCS SS 1/4-20 X 3/8	4
146	230016	8-32 X 1/8 STEEL SET SCREW	1
152	234013	1/4 X 5/8 SLOTTED SHOULDER SCREW	1
190	258574	FRONT GUIDE SHAFT	2
191	260574	IDLER ARM	1
192	260576	DRIVE IDLER	1
193	260577	IDLER ARM SHAFT	1
252	266748	TAPE GUIDE MOUNT	1

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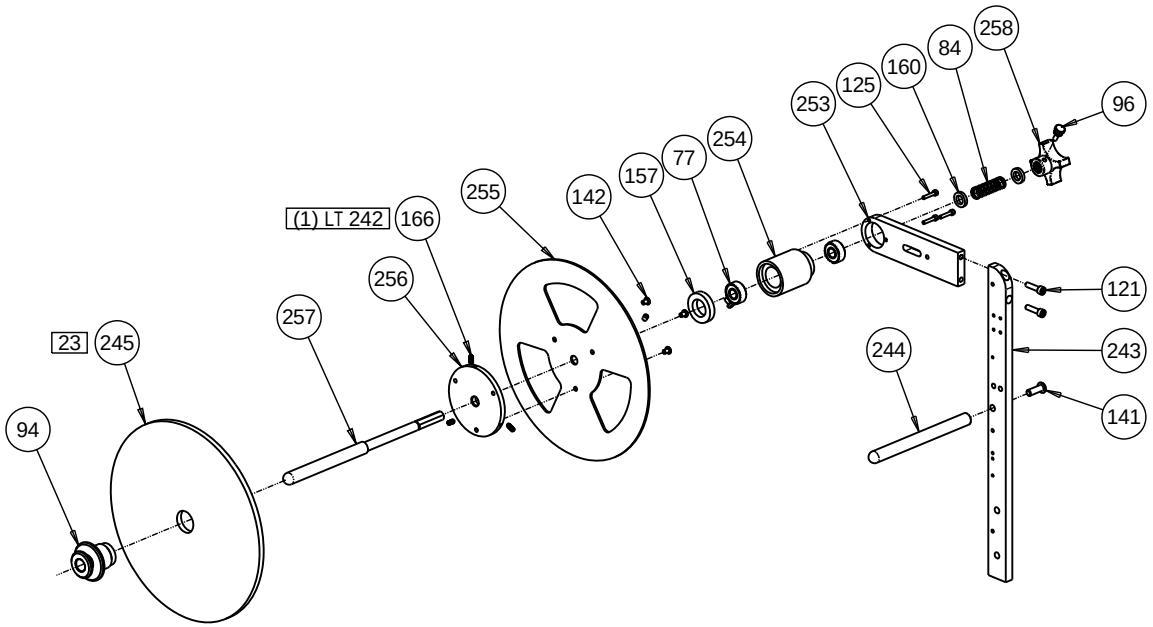

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
77	204051	BEARING, 3/8ID X 7/8OD	4
84	209017	Compression Spring	1
94	216505	QUIKLOC SHAFT COLLAR	1
96	217031	THUMB SCREW	1
121	221052	SHCS SS 10-32 X 3/4	2
125	221714	SHCS SS M3 X 16	3
141	223062	SS BHCS 1/4-20 X 3/4	3
142	223728	BHCS SS M4 X 6	3
157	238011	WASHER, FLAT FELT	1
160	238065	SS SHIM 3/8 ID X 1/8 THICK	2
166	241017	BALL PLUNGER	3
243	265658	COVER TAPE ARM	1
244	265659	GUIDE SHAFT	1
245	265706	COVERTAPE OUTER COVER	1
253	266749	UPPER CT ARM	1
254	266750	CT SPINDLE HUB	1
255	266751	CT BACKING PLATE	1
256	266752	CT HUB	1
257	266753	CT SPINDLE	1
258	266754	CT TENSIONING KNOB	1

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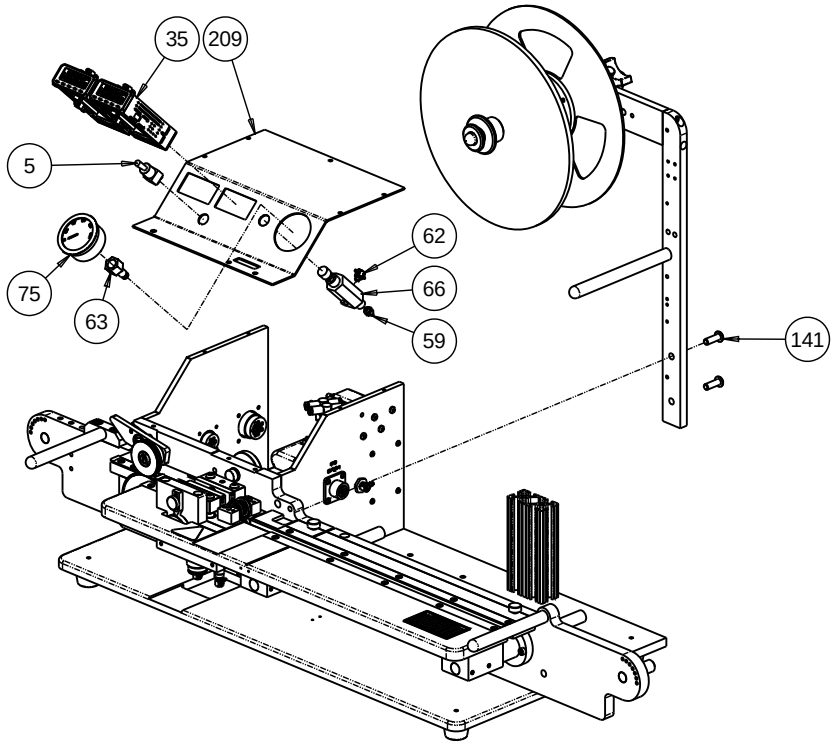

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
5	102547	Switch MTG-206N DPDT	1
35	105705	TEMP CNTRLR 12 VDC OUT	2
59	200253	10-32 x 1/16 HOSE BARB	2
62	200261	AIR FIR 10-32 TEE TO 1/16" TB	1
63	200267	AIR FIT 1/8NPT FEMALE X 1/8TB	1
66	200401	AIR REGULATOR SMC ARJ210-M5	1
75	200801	GUAGE PRESSURE GP-100	1
141	223062	SS BHCS 1/4-20 X 3/4	3
209	261055	PANEL, FRONT-BASE MACHINE	1

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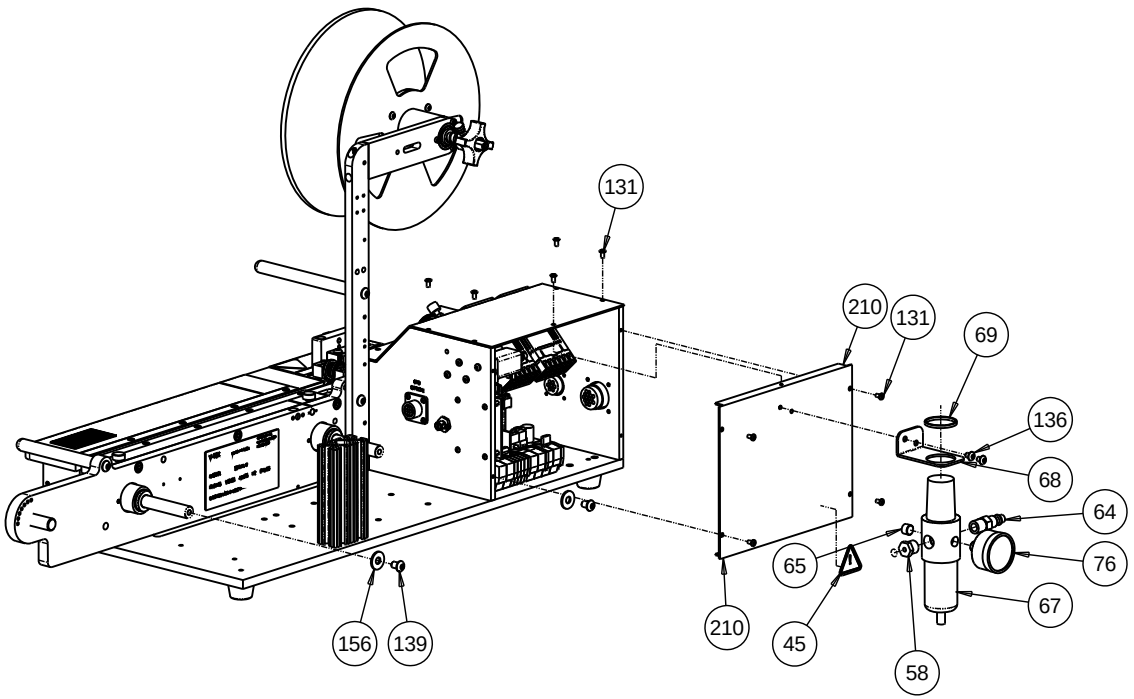

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
45	111004	SAFETY STICKER EX. POINT	2
58	200214	AIR FIT 1/4 NPT M X 10-32 F	1
64	200281	AIR FITTING, 1/4" MALE COUPLER	1
65	200296	AIR FITTING 1/8 PLUG	2
67	200421	REGULATOR AND FILTER WILKERSON	1
68	200445	BRACKET AIR REGULATOR	1
69	200447	AIR REGULATOR PANEL NUT	1
76	200851	GUAGE AIR PRESSURE 0-160	1
131	223024	BHCS SS 6-32 X 1/4	9
136	223043	BHCS SS 10-24 X 1/4	3
139	223059	BHCS SS 1/4-20 X 3/8	4
156	238001	1/4 SS FLAT WASHER	3
210	261056	PANEL, REAR BASE	1

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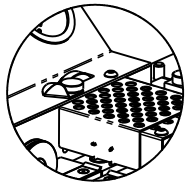
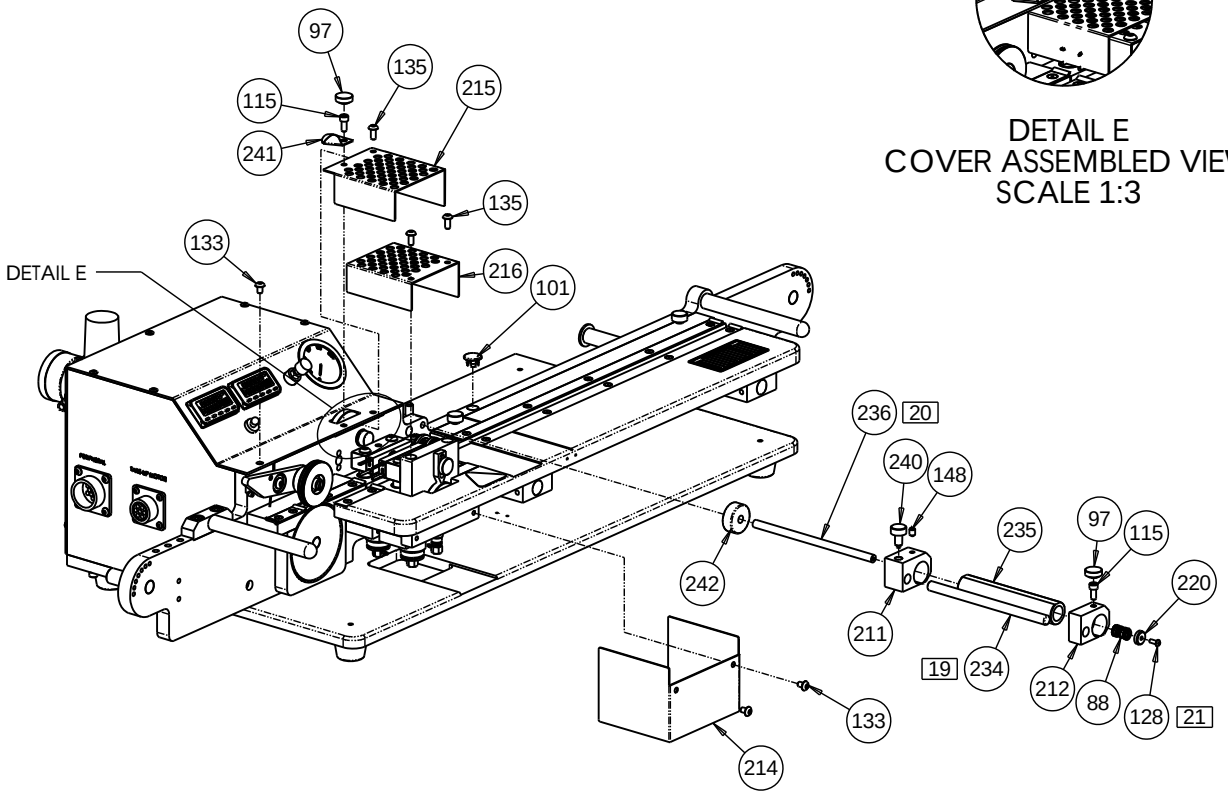


DETAIL E
COVER ASSEMBLED VIEW
SCALE 1:3



ITEM NO.	PART NUMBER	DESCRIPTION	QTY
88	209246	SPRING, .360 DIA	1
97	217042	KNOB M4 RED	3
101	217415	HOLE PLUG 3/8" BLACK	1
115	221026	SHCS SS 8-32 X 3/8	3
128	223010	BHCS SS 4-40 X 5/16	9
133	223033	BHCS SS 8-32 X 1/4	7
135	223034	BHCS 8-32 X 3/8	4
148	230022	10-24 X 1/4 STEEL SET SCREW	2
211	261057	GUIDE, C.T. INNER	1
212	261058	GUIDE, C.T. OUTER	1
214	261061	COVER, SEALER LOWER	1
215	261062	COVER, SEALER INNER	1
216	261063	COVER, SEALER OUTER	1
220	261071	WASHER, C.T. GUIDE ASSEMBLY	1
234	261430	SHAFT, C.T. GUIDE ASSEM	1
235	261431	SHAFT, C.T. GUIDE	1
236	261432	ROD, THREADED, C.T. GUIDE	1
240	262795	ADJUSTMENT KNOB - .500"	1
241	263063	SEAL LOCK, SPROCKET SIDE	1
242	263588	C.T. GUIDE ADJUSTER	1

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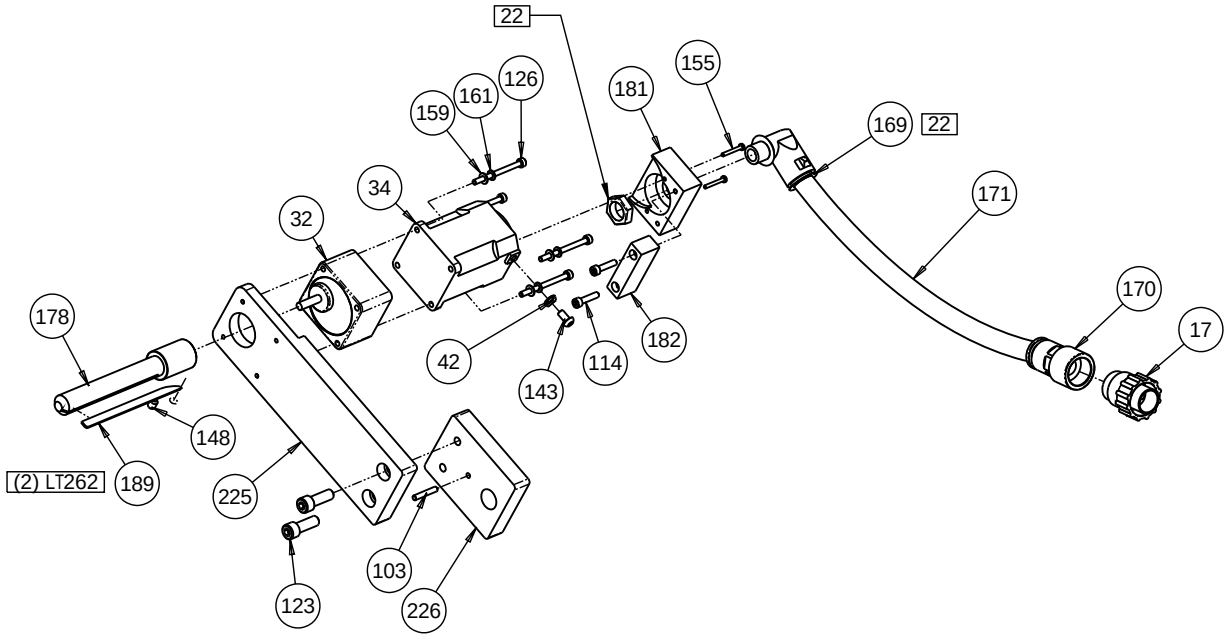

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
17	103063	PLUG AMP 7 PIN	1
32	105573	GEAR HEAD 50:1 OGN50KAV-TEK	1
34	105695	TAKUP MOTOR 0IK1GN-AW3-E1 ROHS	1
42	107001	SOLDER LUG	1
103	219003	1/8 X 3/4 LG. SS DOWEL PIN	2
114	221016	SHCS SS 6-32 x 5/8	2
123	221063	SHCS SS 1/4-20 X 3/4	16
126	221720	SHCS SS M3 X 40	4
143	223729	SS BHCS M4 x 8mm	1
148	230022	10-24 X 1/4 STEEL SET SCREW	2
155	236061	SLOTTED M2 X 16	2
159	238042	M3 SS FLAT WASHER	4
161	238082	M3 ZINC SPLIT LOCK WASHER	4
169	246510	CONDUIT FITTING, 90 DEG	1
170	246511	CONDUIT HOUSING, SIZE 11	1
171	246512	CONDUIT, SIZE 11 (13MM)	1
178	253780	TAKE UP REEL SPINDLE, 72MM	1
181	255339	TAKE-UP MOTOR ELECTRICAL CAP	1
182	255340	TAKE-UP MOTOR ELECT. CAP END	1
189	257999	REEL SPINDLE KEY, 72MM	1
225	261088	TAKE UP MOTOR MOUNT	1
226	261089	REEL EXTENSION ADAPTER	2

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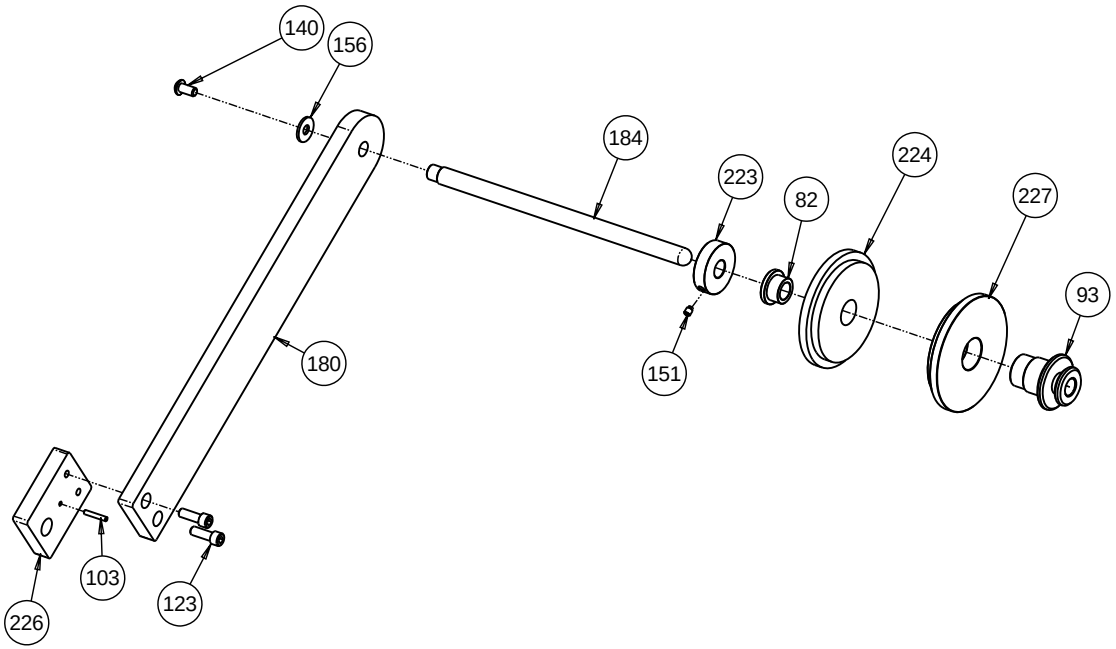

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
82	205016	BUSHING, FLANGED .5 ID, .75 OD, .5 L	1
93	216504	QUIKLOC SHAFT COLLAR	1
103	219003	1/8 X 3/4 LG. SS DOWEL PIN	2
123	221063	SHCS SS 1/4-20 X 3/4	16
140	223060	BHCS 1/4-20 X 1/2	3
151	232012	10-24 X 1/4 BRASS TIP SS SET SCREW	1
156	238001	1/4 SS FLAT WASHER	3
180	254566	FEED REAL ARM	1
184	256087	REEL SUPPORT SHAFT	1
223	261086	COVER TAPE SPINDLE COLLAR	1
224	261087	22" REEL SPACER	1
226	261089	REEL EXTENSION ADAPTER	2
227	261091	22" REEL SPACER	1

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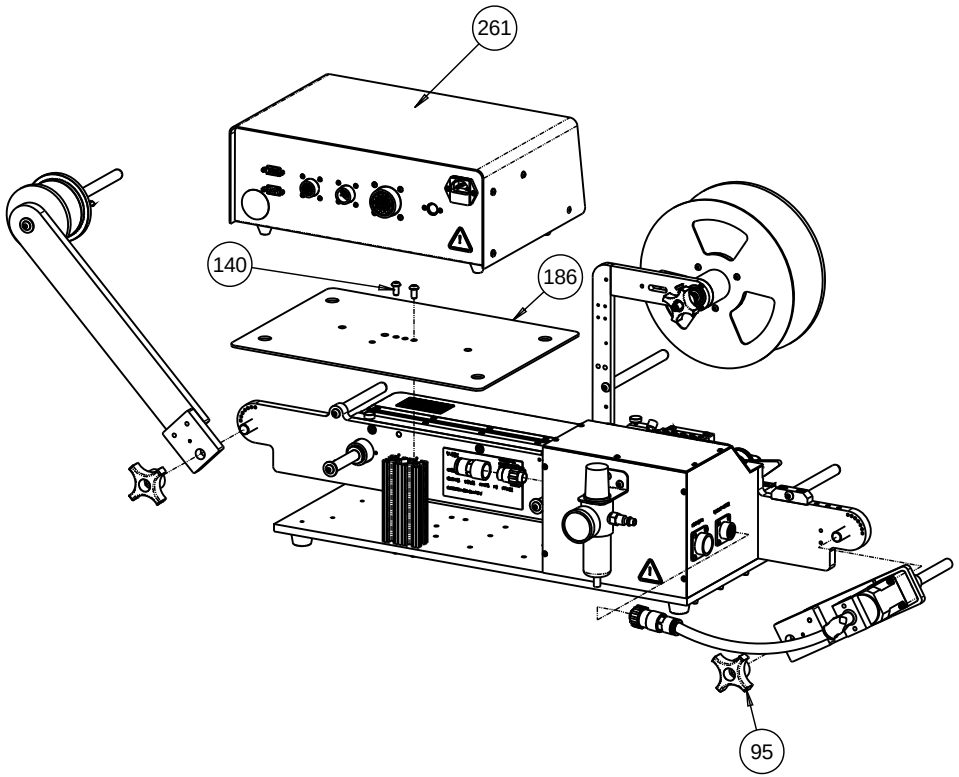

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
95	217007	KNOB, 1/2-13 FOUR LOBE	2
140	223060	BHCS 1/4-20 X 1/2	3
186	256971	CONTROLLER PLATE	1
261	292301	TM-50 CONTROLLER	1

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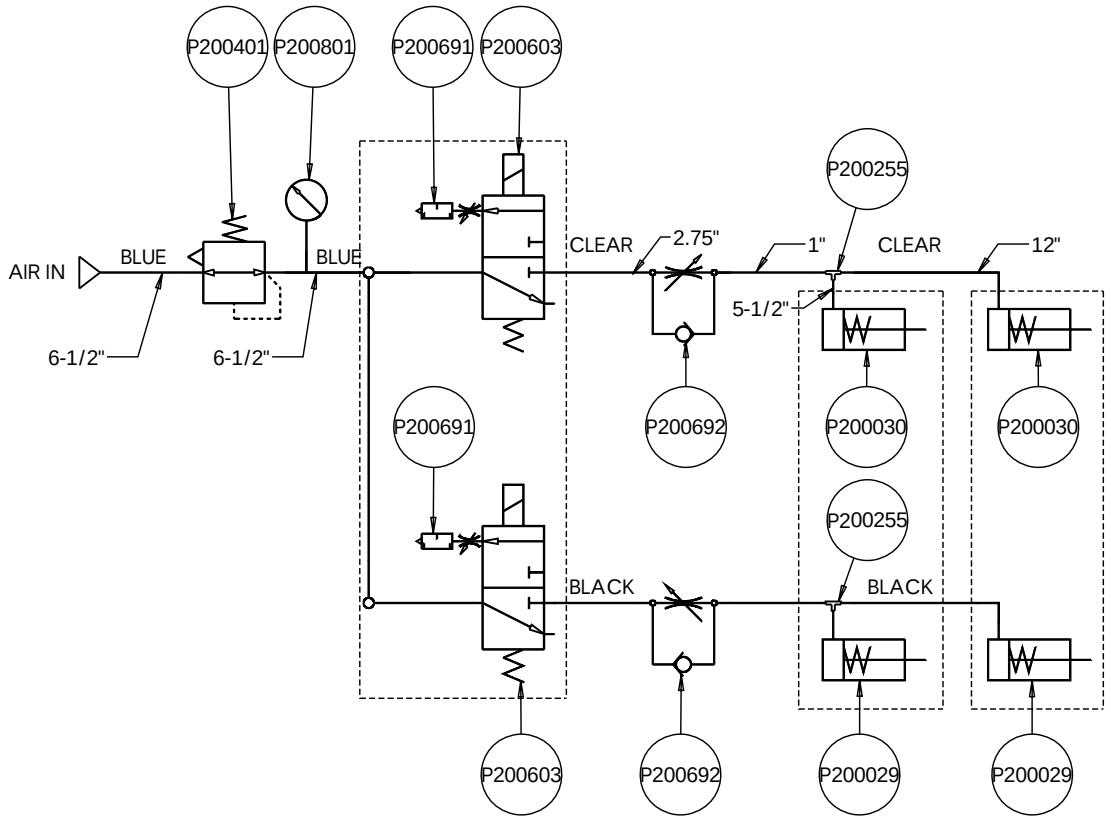


AIR LINE LENGTHS

200304 - TWIN HOSE (CLEAR/BLACK)
- 5-1/2" - INSIDE SEALER TWIN HOSE
- 11" - OUTSIDE SEALER TWIN HOSE
- 2-3/4" - AIR VALVE TO FLOW CONTROL VALVE
- 1" - FLOW CONTROL VALVE TO BRASS TIE

200301 - 6-12" - AIR SUPPLY LINE (LARGE BLUE HOSE)
-NOT SHOWN IN PNEUMATIC DIAGRAM

200302 - 13" - AIR SUPPLY TO AIR VALVE (SMALL BLUE LINE)

200302 - 5-1/2" - AIR REGULAOR TO GUAGE (SMALL BLUE LINE)

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	P200029	AIR CYLINDER, SMC CJPB-6-10-B	2
2	P200030	AIR CYLINDER SMC, CJPB-15-10-H4	2
3	P200255	AIR FIT BARB TEE 1/16 TB	2
4	P200401	AIR REGULATOR SMC ARJ210-M5	1
5	P200603	AIR VALVE MB3E1 1-24 VDC	2
6	P200691	AIR VALVE FLOW CNTRL, MUFFLER	2
7	P200692	AIR FLOW CONTROL	2
8	P200801	GAUGE PRESSURE	1

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES: .XXX ± 0.005
.XX ± 0.010
.X ± 0.015
ANGULAR: MACHINED ± 0.1°
BEND ± 0.5 °
SURFACE: 63

GENERAL NOTES:
- INTERPRET GEOMETRIC TOLERANCING PER ANSI Y14.5
- BREAK ALL SHARP EDGES .010 MAX UNLESS NOTED
- CHAMFER ALL HOLES .015 X .015 ±.010 UNLESS NOTED
- ALL MATERIALS, COATINGS, & CLEANING PROCESSES MUST RESULT IN RoHS COMPLIANT PART
- DO NOT SCALE DRAWING

	NAME	DATE
DRAWN	RH	10/24/13
ENG APPR.		~

TITLE:

EMETM508-72

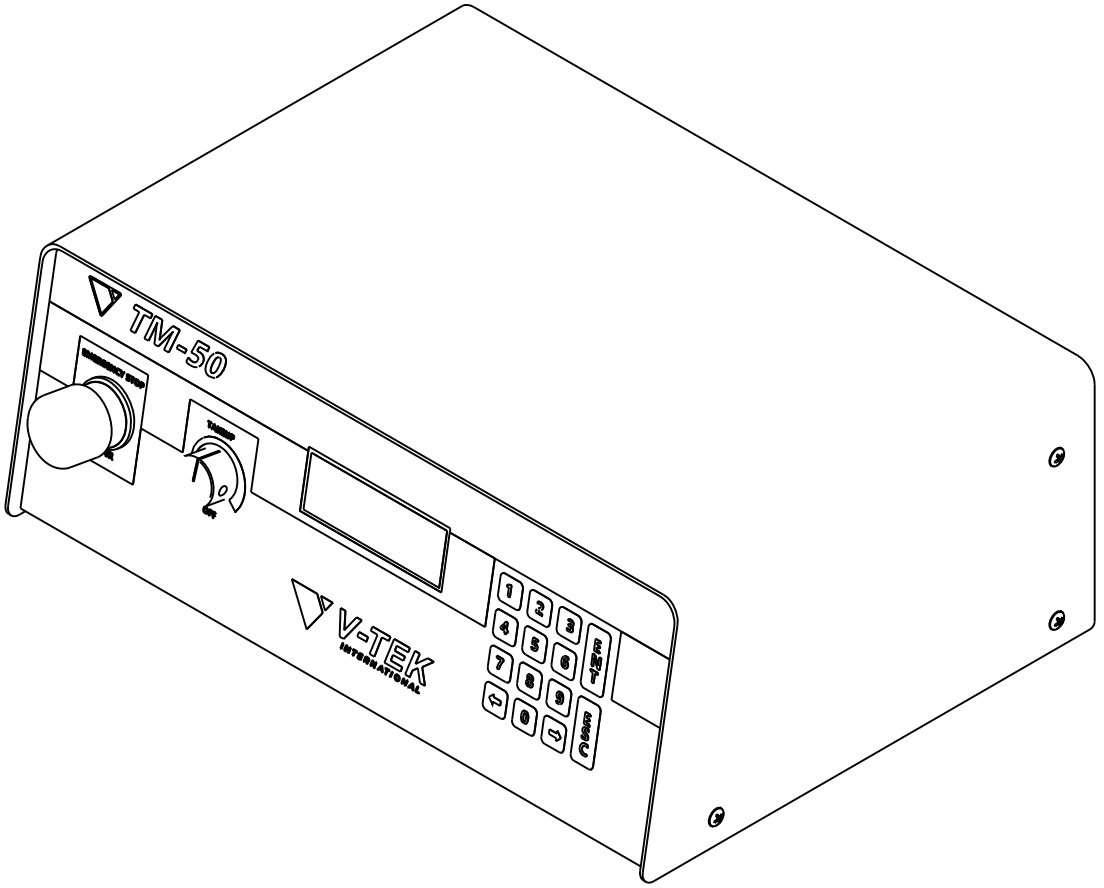
MATERIAL

FINISH

SIZE	DWG. NO.	REV
B	EMETM508-72	D

WEIGHT (lbs): 92.5235

REVISIONS				
ECO #	REV.	DESCRIPTION	DATE	APPROVED
	A	RELEASED	4/3/2017	PVO
2941	B	ADD SERIAL PLATE 253864	5/8/2017	PVO
2938	C	REPLACE 109059 WITH 109091	5/10/2017	PVO
2964	D	ADDED EMETM50SOFTOPTION	10/5/2017	PVO
3031	E	REPLACE 102029 WITH 102035	4/9/2018	PVO
3052	F	ADD (1) 221005, (1) 106049, (1) 106048, AND (2) 3977. REMOVE (1) 106109 AND (1) 223008.	7/10/2018	PVO



UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES: .XXX ± 0.005
.XX ± 0.010
.X ± 0.015
ANGULAR: MACHINED ± 0.1°
BEND ± 0.5 °
SURFACE: 32

GENERAL NOTES:
- INTERPRET GEOMETRIC TOLERANCING PER ANSI Y14.5
- BREAK ALL SHARP EDGES .010 MAX UNLESS NOTED
- CHAMFER ALL HOLES .015 X .015 ±.010 UNLESS NOTED
- ALL MATERIALS, COATINGS, & CLEANING PROCESSES MUST RESULT IN RoHS COMPLIANT PART
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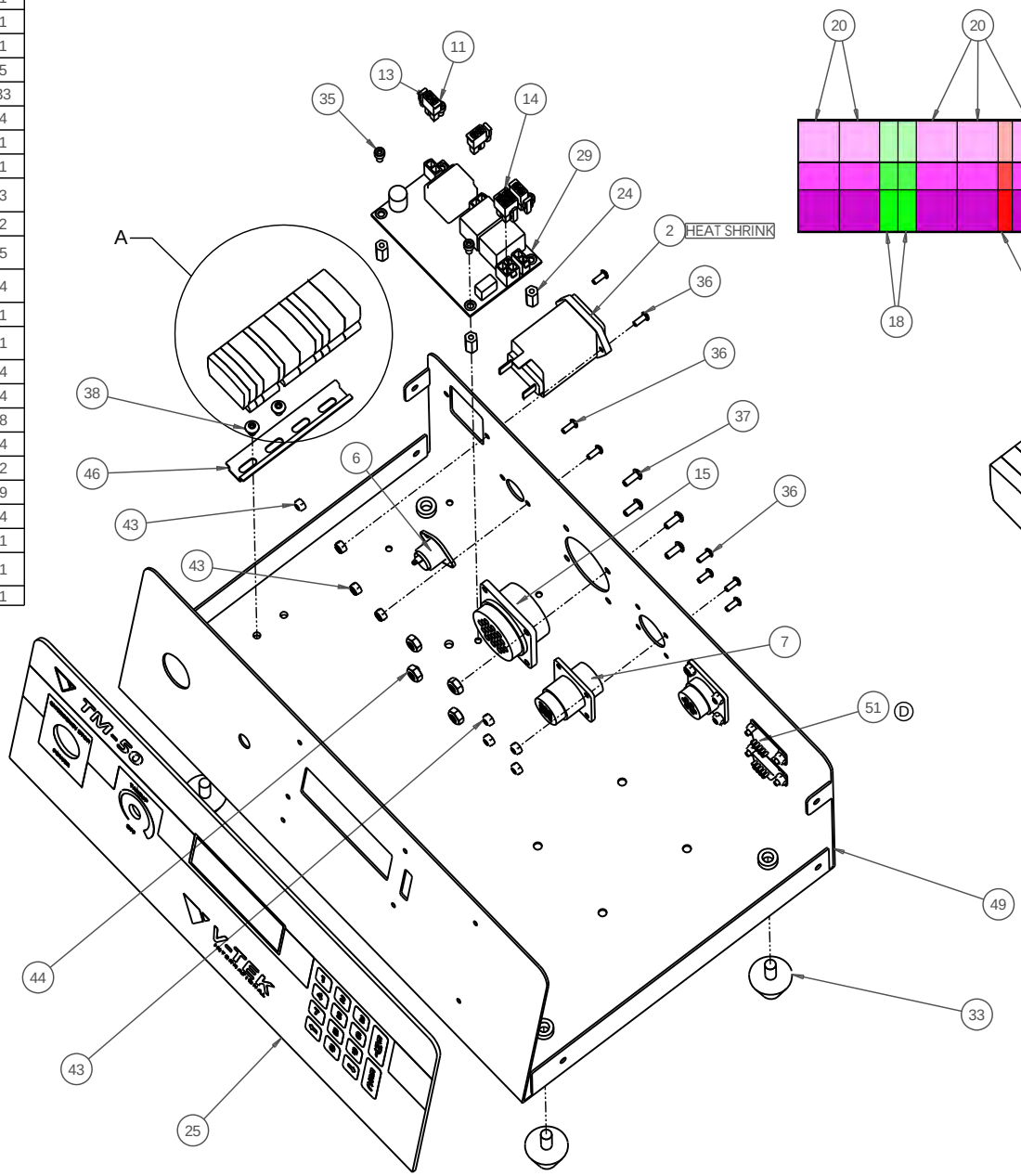
	NAME	DATE
DRAWN	JF	7/11/2016
ENG APPR.	PVO	~

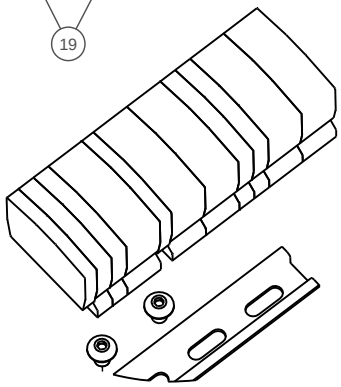
TITLE:

TM-50 CONTROLLER

MATERIAL	SIZE	DWG. NO.	REV
FINISH	C	292301	F
	WEIGHT (lbs): 11.07		SHEET 1 OF 4

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	03977	#4 STAINLESS WASHER	2
2	101908	FILTER AC ENTRY FUSED	1
6	102624	DIN RECEPT	1
7	103031	RECEPT AMP 9 PIN	1
11	103127	RECEPTACLE MINI FIT JR. 2	5
13	103131	RECEPTACLE MINI FIT JR	33
14	103133	RECEPTACLE MINI FIT JR. 4	4
15	103165	RECEPT 19 PIN REV AMP	1
17	104101	TERM BLOCK MINI (SPRING)	1
18	104102	TERM GND BLOCK MINI (SPRING)	3
19	104103	TERM END CAP MINI (SPRING)	2
20	104106	TERM DBL BLOCK MINI (SPRING)	5
24	106105	STAND OFF WHITE .50 LG #6-32	4
25	109091	MEMBRANE SWITCH PAD, TM50, ESD	1
29	150032	AUTO SELECT BOARD, AC115/23	1
33	217208	FEET RUBBER	4
35	221012	SHCS SS 6-32 X 1/4	4
36	223010	BHCS SS 4-40 X 5/16	8
37	223025	BHCS SS 6-32 X 3/8	4
38	223033	BHCS SS 8-32 X 1/4	2
43	239051	4-40 NYLOK NUT	9
44	239052	#8-32 LOCK NUT	4
46	253072	"DIN RAIL BRACKET"	1
49	261073	TM50 ENCLOSURE, LOWER HALF	1
51	EMETM50SOFTOPTION	TM-50 CONTROLLER SOFT OPTION	1





DETAIL A
TERMINAL BLOCK

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES: .XXX ± 0.005
.XX ± 0.010
.X ± 0.015
ANGULAR: MACHINED ± 0.1°
BEND ± 0.5 °
SURFACE: 32

GENERAL NOTES:
- INTERPRET GEOMETRIC TOLERANCING PER ANSI Y14.5
- BREAK ALL SHARP EDGES .010 MAX UNLESS NOTED
- CHAMFER ALL HOLES .015 X .015 ±.010 UNLESS NOTED
- ALL MATERIALS, COATINGS, & CLEANING PROCESSES MUST RESULT IN RoHS COMPLIANT PART
- DO NOT SCALE DRAWING

	NAME	DATE
DRAWN	JF	7/11/2016
ENG APPR.	PVO	~

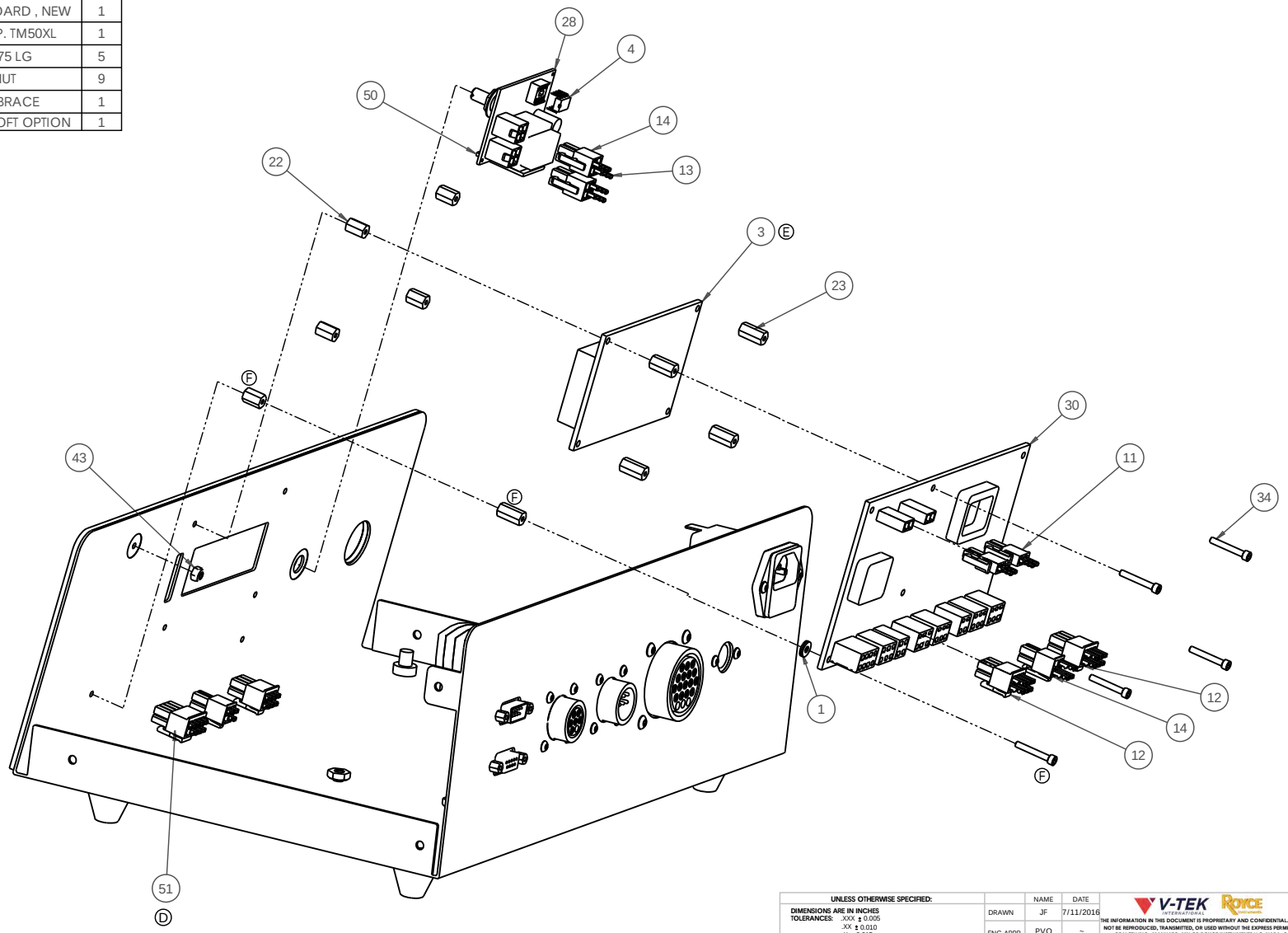
TITLE:
TM-50 CONTROLLER

MATERIAL
FINISH

SIZE C | DWG. NO. 292301 | REV F

WEIGHT (lbs): 11.07 | SHEET 2 OF 4

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	03977	#4 STAINLESS WASHER	2
3	102035	LCD DISPLAY 4X20 BACKLIT ESD	1
4	102275	PIC12C671	1
11	103127	RECEPTACLE MINI FIT JR. 2	5
12	103129	RECEPTACLE MINI FIT JR. 6	2
13	103131	RECEPTACLE MINI FIT JR	33
14	103133	RECEPTACLE MINI FIT JR. 4	4
22	106048	STAND OFF CLEAR .38 LG #4-40	5
23	106049	STAND OFF CLEAR .50 LG #4-40	5
28	150027	TENSION CONTROL BOARD , NEW	1
30	150048	CIRCUIT BRD. COMP. TM50XL	1
34	221005	SHCS SS 4-40 X .75 LG	5
43	239051	4-40 NYLOK NUT	9
50	266651	TAKE-UP BOARD BRACE	1
51	EMETM50SOFTOPTION	TM-50 CONTROLLER SOFT OPTION	1



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.XX ± 0.010
.X ± 0.015
ANGULAR: MACHINED ± 0.1°
BEND ± 0.5 °
SURFACE: 32

GENERAL NOTES:
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	NAME	DATE
DRAWN	JF	7/11/2016
ENG APPR.	PVO	~

TITLE:

TM-50 CONTROLLER

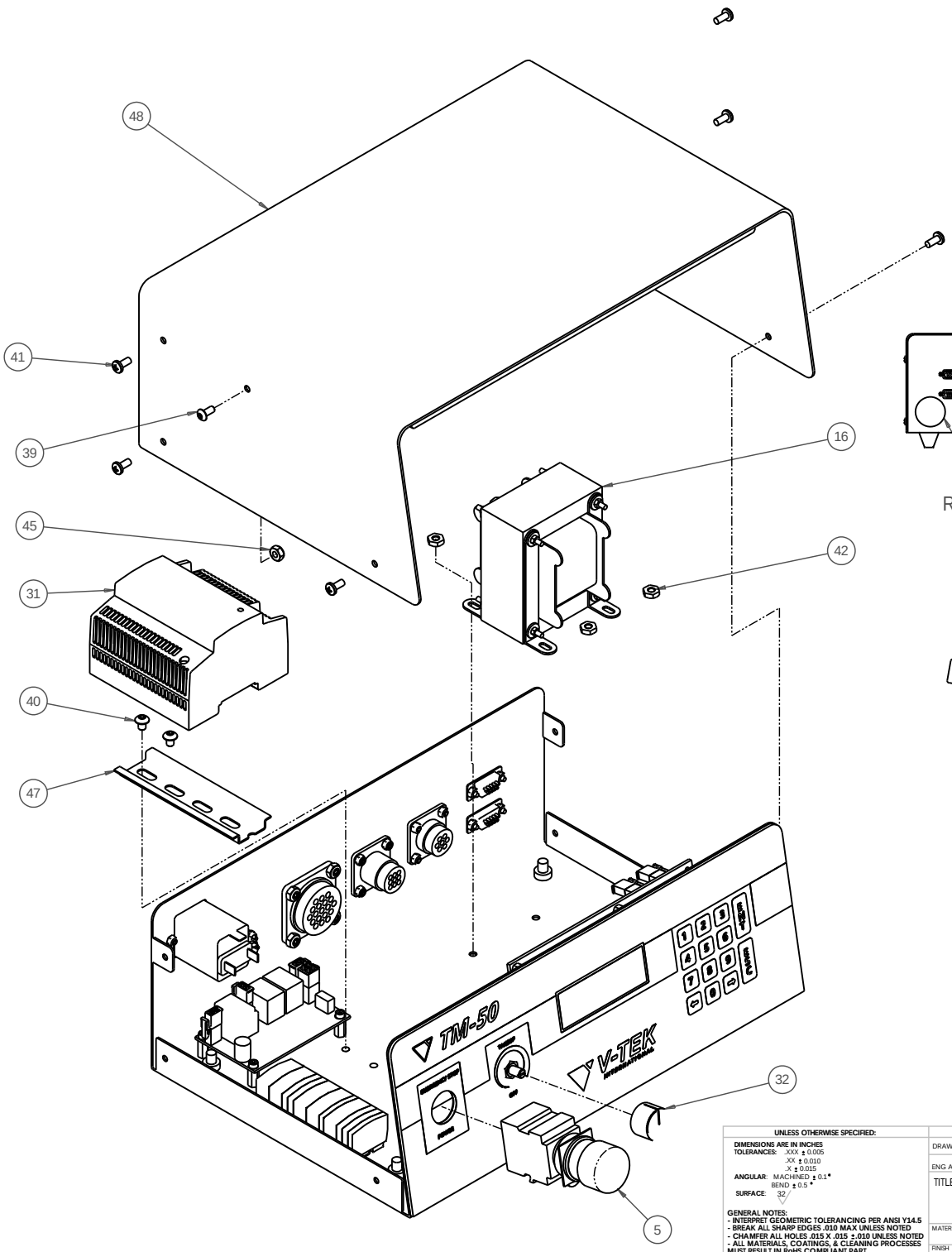
MATERIAL

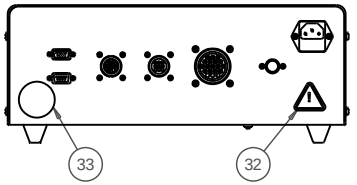
FINISH

SIZE C | DWG. NO. 292301 | REV F

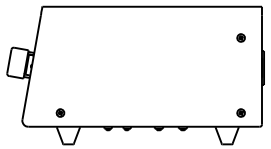
WEIGHT (lbs): 11.07 | SHEET 3 OF 4

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	03977	#4 STAINLESS WASHER	2
5	102607	E-STOP	1
16	103499	TRANSFORMER	1
31	157029	POWER SUPPLY 24 DC 4.2A	1
32	217044	KNOB BLACK	1
34	221005	SHCS SS 4-40 X .75 LG	5
35	221012	SHCS SS 6-32 X 1/4	4
39	223034	BHCS 8-32 X 3/8	1
40	223050	BHCS SS 10-32 X 1/4	2
41	236020	PHMS #8-32 X 3/8	6
42	239005	10-32 SS HEX NUT	4
45	239053	#8-32 LOCK NUT	1
47	257476	TM220-330 Controller DIN Rail (Bottom)	1
48	257744	ENCLOSURE UPPER HALF	1





REAR DECAL LOCATION



SERIAL PLATE LOCATION

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.XX ± 0.010
.X ± 0.015
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BEND ± 0.5 °
SURFACE: 32

GENERAL NOTES:
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	NAME	DATE
DRAWN	JF	7/11/2016
ENG APPR.	PVO	~

TITLE:
TM-50 CONTROLLER

MATERIAL
FINISH

SIZE	DWG. NO.	REV
C	292301	F

WEIGHT (lbs): 11.07
SHEET 4 OF 4

751 Summit Avenue
Mankato, MN USA 56001

Website: www.vtekusa.com
Email: service@vtekusa.com
Phone: (507) 387-2039

For inquiries regarding spare parts, tape and reel supplies, or the service department, please call or write:

Phone: (507) 387-2039

Email: service@vtekusa.com
Please provide the machine model and serial numbers with all inquiries.

NOTES

TM-50 Document List

Section	Description	File Name
Front Cover	Page 1 of 1	61574737.fm
EC Declaration of Conformity	Page 1 of 1	TM-50 DOC.doc
Preface	Pages i-vi	61573817.fm
Table of Contents	Page 1 of 1	61573726.fm
Chapter 1: Getting Started	Pages 1-20	61573928.fm
Chapter 2: Controller	Pages 21-36	61574031.fm
Chapter 3: Setup and Operation	Pages 37-54	61574228.fm
Chapter 4: Maintenance	Pages 55-64	61574323.fm
Appendix A: Sensors	Pages A1 to A-2	61004016.fm
Appendix B: Temp. Controllers	Pages B1 to B-4	61574415.fm
Spare Parts List	Page 1 of 1	61579323.fm
Spare Parts List - Sensors	Page 1 of 1	61608212.fm
Exploded Views	Page 65-76	
Standard TM-50		EMETM508-72.slddrw
TM-50 Controller		292301.slddrw
Service and Parts Contact	Page 1 of 1	61053915.fm
	This document	61573674.fm
Warranty Document	Page 1 of 1	WI201.16 Rev. 5
Back	Page 1 of 1	61666111.fm

EXPRESS WARRANTY, EXCLUSION AND DISCLAIMER OF UNSTATED WARRANTIES AND LIMITATION OF LIABILITY

V-TEK Inc (V-TEK) manufactures equipment for the Royce Instruments and V-TEK International brands. The following warranty applies to both product lines.

1. V-TEK warrants for one year from date of receipt by end user that equipment manufactured by V-TEK will be free of defects in workmanship and materials.
2. All integrated products purchased by V-TEK and integrated on to V-TEK equipment shall be covered in accordance with the manufacturer's pass through warranty and limited in costs equal to the amount of the manufacturer's pass through warranty.
3. V-TEK's obligation under this warranty applies only to the original Customer and commences when V-TEK is notified of name, address of Customer, and date of receipt of equipment.
4. During the warranty period, V-TEK will replace any defective non-consumable parts returned for that purpose to the designated V-TEK Replacement Parts Center or at V-TEK's option, refund original cost of equipment.
5. Authorization to return Articles purchased from V-TEK must be obtained by Customer before return shipping commences.
6. Credit may be granted, less an appropriate restocking charge of 15 to 20% of invoice amount, depending on the reason for the return and condition of the Articles.
7. Returns should always be carefully packed in original shipping carton and sent via ground service. V-TEK does not assume any liability for damage incurred during shipment.
8. For the first 30 days that you own your V-TEK product, V-TEK will be responsible for ground shipments to and from V-TEK's facility in Mankato, MN, U.S.A. or its designate. For the remainder of your warranty V-TEK will pay freight for returning your product to you after its repair.
9. Customer shall bear all charges for customs duty fees or freight above the ground rate or for articles returned which are not defective.
10. Collect shipments will not be accepted.
11. Insurance coverage during shipping is the responsibility of the Customer. V-TEK does not assume any liability for damage incurred during shipment.
12. The warranty applies only to normal use of the equipment and shall be void if V-TEK determines that defects in or failures of the equipment were caused by the Customer's negligence including the lack of proper preventative maintenance, misuse or accident or by unauthorized repair, alteration or installation.
13. This Warranty does not extend to consumable items or mechanical parts subject to normal wear.
14. Customer's exclusive remedy for claims against V-TEK shall be the repair or replacement of defective equipment and parts.
15. Any modification to the standard configuration of this equipment as delivered will void the warranty, unless V-TEK personnel make the modification.

THIS WARRANTY IS EXPRESSLY MADE IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT WILL V-TEK BE LIABLE FOR INCIDENTAL, SPECIAL OR CONSEQUENTIAL PENALTIES OR DAMAGES, INCLUDING LOST PROFITS OR PENALTIES AND/OR DAMAGES FOR DELAY IN DELIVERY OR FAILURE TO GIVE NOTICE OF DELAY EVEN IF V-TEK HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

PASS THROUGH WARRANTIES ARE AVAILABLE FROM THE RESPECTIVE MANUFACTURERS**.**

SERIAL NUMBER:

MODEL:

DATE OF MANUFACTURE:

751 Summit Avenue
Mankato, MN 56001

(507) 387-2039 FAX: (507) 387-2257

www.vtekusa.com
Email: info@vtekusa.com