TM42 TERMINATION PRESS
Use with Molex T2, and all Terminator Dies
Instruction Manual

- Description
- Operation
- Maintenance
WARNING

NEVER USE THIS MACHINE WITHOUT THE GUARDS OR SAFETY DEVICES THAT ARE INTENDED TO PREVENT HANDS FROM REMAINING IN THE DIE SPACE. RUNNING THIS MACHINE WITHOUT GUARDS, UNDER ANY CIRCUMSTANCES, CAN CAUSE SERIOUS INJURY.

NEVER LIFT THIS PRESS WITHOUT THE AID OF MECHANICAL LIFTING DEVICES. SEVERE BACK OR OTHER INJURIES CAN RESULT.

NEVER OPERATE, SERVICE, OR ADJUST THIS MACHINE OR INSTALL APPLICATOR DIES WITHOUT PROPER INSTRUCTION AND WITHOUT FIRST READING AND UNDERSTANDING THE INSTRUCTIONS IN THIS MANUAL.

NEVER SERVICE THIS MACHINE WHILE IT IS CONNECTED TO ANY ELECTRICAL POWER SOURCE. DISCONNECT POWER BY UNPLUGGING THE PRESS FROM ITS POWER SOURCE.

NEVER INSTALL OR REMOVE TERMINATOR DIES WITH THE FLYWHEEL IN MOTION OR THE MOTOR RUNNING.

NEVER INSTALL OR REMOVE TERMINATOR DIES OR SERVICE THIS MACHINE WITHOUT MANUALLY CYCLING THE PRESS TO VERIFY THAT THE CLUTCH CONTROL COLLAR IS IN THE LOCKED POSITION (PAST TOP DEAD CENTER). BLOCK THE PRESS RAM IN THE FULL UP POSITION IF A DEFECTIVE CLUTCH IS SUSPECTED.


CAUTION MOLEX CRIMP SPECIFICATIONS ARE ONLY VALID WHEN USING MOLEX TERMINALS AND MOLEX APPLICATORS AND TOOLING.

WORK SAFELY AT ALL TIMES

For Service, Contact Your Local Molex Sales Office

Molex Application Tooling Group
1150 E. Diehl Road
Naperville, Illinois 60563
Tel: 630-969-4550
Fax: 630-505-0049
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Section 1

General Description

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General Description

1.1 Description

The 69002-5000 (240V AC Version) and the 69002-5001 (120V AC Version) TM42 Termination Machine is an electrically operated, single-cycle, flywheel press. It is designed to provide an effective method of terminating a wide range of Molex side-feed crimp terminals to pre-stripped discrete wire and cable.

Production flexibility is obtained through the use of interchangeable modular terminator dies. These dies are inexpensive because, unlike a modular applicator, all crimp height and terminal feed adjustments are located in the press. The TM42 is ideally suited for mid-volume, semi-automatic operation.

The TM42 will complete one crimping cycle with each depression of the foot pedal. Safe operation is provided by an interlock switch that renders the press inoperative if the safety guard is removed.

1.2 Features

- Utilizes Molex TM40, TM42, T2, and FFC Terminator Dies.
- Independent conductor and insulation adjustments with position reference indicators.
- Bench-mounted unit requires electrical power only. Meets OSHA safety and noise standards. European CE rated.
- Quick-release tooling for fast and simple changeover.
- Ability to remove upper crimp tooling without removing lower die.
- Ideal for mid-volume, and semi-automatic applications.
- 38.1 mm Stroke, No ram adjustment required.
- Meets ISO Standards.
- Flexible external work light.
- Universal feed adjustment to accept Molex side-feed terminals.
- Totally enclosed for operator safety, including a power interlock switch for the front guard with "GUARD OPEN" indicator light.
- Resettable counter for accurate batch-counting.
- Modular solid-state controls. Power cord and foot pedal plug in easily.

1.3 Technical Specifications

1.3.1 Dimensions with reel mounted

<table>
<thead>
<tr>
<th></th>
<th>Width: 540.00mm (21.30&quot;)</th>
<th>Depth: 330.00mm (13.00&quot;)</th>
<th>Height: 1,150.00mm (45.00&quot;)</th>
</tr>
</thead>
</table>

(Without reel mounted)

<table>
<thead>
<tr>
<th></th>
<th>Width: 330.00mm (13.00&quot;)</th>
<th>Depth: 330.00mm (13.00&quot;)</th>
<th>Height: 914.00mm (36.00&quot;)</th>
</tr>
</thead>
</table>

Weight

100kg (220 lbs.) Unpacked
110kg (242 lbs.) Gross

Power Requirements

69002-5001 120V AC, 1Ph, 60 Hz, 5.8/2.9 Amp
Note: Press shipped setup for 120V service.

69002-5000 240V AC, 1Ph, 50 Hz, 3.8 Amp
European CE Rated.

Production Rate

2500 terminations per hour maximum, depending on operator skill and wire length.
Flywheel rotation: 210 RPM.

Processing Capability

Up to 4.0mm² of copper conductor in solid or stranded wire.

Sound Level

Operator will be exposed to less than 85 DB.

1.4 Delivery Check

After removing the packaging band, the top and sides of the box should lift off easily. Make sure the following items are included in this package.

<table>
<thead>
<tr>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main press body</td>
<td>1</td>
</tr>
<tr>
<td>Reel support assembly</td>
<td>1</td>
</tr>
</tbody>
</table>
Two cartons are included that contain the following:

**Carton 1**
- 69002-5715 Foot switch assembly 1

**Carton 2**
- Power cord 1
  - 69018-6237 (for 69002-5001)
  - OR
  - 62500-0113 (for 69002-5000)
- 69002-5547 Hand rest 1
- 69002-5099 TM42 instructions manual 1
- 69002-5560 Shim 1
- 69001-0106 Feed finger crank 1
- 69018-8235 10mm hex wrench 1

* For International applications, the power cord/plug may need to be replaced or adapted with the appropriate connection.

### 1.5 Tools

The following tools may be needed for setup and adjustment of the TM42 press and terminator die.

- Metric hex wrench set
- English hex wrench set (for older terminator die set designs)
- Large and small standard screwdriver
- Adjustable wrench
- Needle nose pliers
- Crimp micrometer
- Eye loupe (10x)
- Wire stripper/cuter
Section 2

Installation

2.1 Lifting/ Mounting
2.2 Reel Support
2.3 Foot Pedal and Power Connection
2.4 Hand Rest
2.5 Safety and Work Area Check
2.6 Bolster Shim Installation and Removal
**CAUTION:** To avoid serious injury support the ram in the upper position with a hardwood wedge (approximately 1 7/8" high).

When changing tooling or working on the clutch, a block should be inserted under the ram (See Illustration below). This also pertains when the guards are taken off. The block supports the ram and the tooling, if block is not inserted the ram can fall suddenly and cause serious injury.

When procedure is complete be sure to remove the block prior to cycling the Press.

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**2.1 Lifting/ Mounting**

**WARNING:** The TM42 press weighs over 100 kg. (220 lbs.) and is NOT intended to be lifted by an individual. The guarding is not attached to provide support for lifting purposes. Mechanical lifting devices should be used. A person lifting the press can sustain severe back or other injuries.

Lifting hooks are provided on each side of the press (See Figure 2-1). A heavy-duty chain, rope, cable, or belt can be used with loops, links, or rings on each end that can securely attach to the lifting hooks. An electric, hydraulic, or mechanical crane should be used to lift the press. Lift the press up approximately 12.0mm (0.50") and verify that the press is well balanced. Upon verification, the press can be lifted onto a sturdy workbench. Access to the back of the machine is required for manual cycling. A minimum 25.00mm (1.00") thick wooden bench top will offer quiet vibration-free operation. TM42 should be attached to the table with (2) 12.0mm bolts and washers. For marking the tabletop (See Figure 2-2), or use the removable template at the back of the manual. Drill the clearance holes for the 12.0mm bolts and secure the press to the table. Bolts are not supplied by Molex.
2.2 Reel Support Assembly

Install the reel support assembly by inserting the support tube in the hole located on the left side of the top cover.

2.3 Foot Pedal and Power Connection

Connect the 4-pin plug for the foot pedal in the rear of the press control assembly. Turn the Locking Ring clockwise until tight. Connect the power cord plug to the socket in the back of the control assembly. Use a grounded electrical outlet as the power source. Two fuses are located in the fuse drawer directly above the power socket. To replace the fuses, use a small screwdriver to open the fuse drawer, remove damaged fuses and replace.

2.4 Hand Rest

Attach the hand rest with one M6 x 10.0mm BHCS located at the front center of the press (See Figure 2-1).

2.5 Safety and Work Area Check

Check that the work area is well lighted. Adjust the work light for best visibility.

Check that the work area is clean and free of debris.

Check that no tools have been left in the machine or work area. Never operate in areas of excess moisture or water. Check that all safety guards are in place. NEVER operate this press without press guards in place. The guard indicator light is located on the front of the press control assembly (See Figure 2-3).

Check that the crimping position is ergonomic for the operator’s size. A bend height of 762.00 to 813.00mm (30.00 to 32.00”) will provide operator comfort, and allows both feet to rest on the floor. The foot...
pedal should be placed in a comfortable position. Check that the press position is located approximately 150.00mm (6.00") from the edge of the bench. A chair or stool with adjustable height and backrest should be provided for maximum comfort and back support for the operator. Observe where the emergency stop button is on the control panel (See Figure 2-3).

CAUTION: Molex recommends that the operator and observers wear eye protection when the press is in operation or being serviced.

2.6 Bolster Shim Installation and Removal

CAUTION: Before installing any tooling in this press, determine the presence or absence of the .50mm (.020") shim. This shim is in addition to the .25 mm (.010") that should always be present. The TM42 is shipped from the factory for operation with U.S. designed terminator dies (order numbers 11-40-2XXX, 6384X-XXXX, or 6385X-XXXX.

When using European designed tooling (order number 69001-XXXX), an additional .50mm (.020") Shim (P.N. 69002-5560), supplied with the unit must be added between the bolster plate and the press frame to set the shut height. Do not remove the .250mm (.010") shim.

WARNING: Failure to install the shim 69002-5560 for European tooling may result in a nonfunctional terminator die

Refer to Section 3 for setup, manual cycling, and operation before attempting any crimp terminations under power. If the press is running, push the emergency stop button located on the front of the press control assembly. The motor and flywheel will stop. The work light will still operate. Remove the press guards by removing the (2) M10 BHCS (See Figure 2-4) located on the front bolster plate, and loosen (1) on each side. Once removed, the guard interlock switch will disconnect power to both the motor and clutch.

Remove the push rod from the hole on the right side of the bolster plate. If necessary, remove any tooling, and then remove (2) M10 SHCS attaching the bolster plate to the press frame.

Lift the bolster plate away from the locating dowels by placing a screwdriver in the (2) lifting slots on the underside of the bolster plate. Remove or install the .50mm (.020") spacer and verify the presence of the .250mm (.010") spacer.

Position the bolster plate on the locating dowels and refasten with the (2) M10 SHCS. Replace the push rod. Follow the tooling setup procedures in Section 3.
CAUTION: Always manually cycle the press before restoring power to the machine.
Section 3

Setup and Operation

3.1 Termination Die Set Installation and Removal
3.2 Loading the Terminal Strip
3.3 Punch and Anvil Alignment
3.4 Feed Finger Adjustment
3.5 Forward Feed Adjustment
3.6 Back Stroke Adjustment
3.7 Manually Cycling Press
3.8 Conductor Crimp Punch Adjustment
3.9 Insulation Crimp Punch Adjustment
3.10 Operation
3.1 Termination Die Set Installation and Removal

3.1.1 Termination Die Removal

1. Power down the press by pressing the emergency stop button located on the front of the control panel.
2. Remove the press guards by removing the (2) M10 BHCS (See Figure 1-4) located on the front bolster plate, and loosen (1) on each side.
   **NOTE:** Once removed, the guard interlock switch will disconnect power to both the motor and clutch. The work light will still operate if the unit is still connected to the power source.
3. Set both the conductor and insulation indicators to a reference setting of “1” (See Figure 3-3).
4. Loosen the M5 BHCS and remove the right locating plate.
5. Lift the feed finger clear and slide the terminator die out of the press.
6. Remove the punches, nose holddown, rear striker, and center carrier cutoff tooling.
7. The terminator die is best stored in its original container.

![Diagram of TM42 Press and Termination Die](image-url)
3.1.2 Termination Die Installation

Before any die is installed make sure the cover alignment procedure and the track adjustment procedure, (when applicable) have been completed. See the appropriate terminator die instruction manual for these procedures.

1. Power down the press and remove the guards as described in Section 3.1.1, steps 1 and 2.

2. Not all terminator dies have contact nose hold down, rear strikers, or center carrier cutoff tooling. If present on the terminator die, attachment points are located behind the punches either in the front of or on the bottom of the ram (See Figure 3-1). Refer to the assembly drawing supplied with each individual terminator die for parts supplied with that terminator.

3. Fit the (2) punches in the opening on the underside of the ram. The conductor punch should be positioned in the rear (See Figure 3-1). A click will be heard when the punch retaining/release pin engages.

4. Set both the conductor and insulation indicators to a reference setting of “1” (See Figure 3-3).

5. The front striker slides in front of the punches and is attached with a screw through the hole in the punch plate.

6. Make sure the bolster plate is clean and free of debris.

7. Lift the feed finger clear and slide the terminator die onto the left locating plate.

8. Attach the right locating plate and tighten the M5 BHCS.

3.2 Loading the Terminal Strip

**CAUTION:** The specified terminal is printed on the setup sheet supplied with the terminator die. Do not use any terminal not indicated on that setup sheet.

1. Power down the press and remove the guards as described in Section 3.1.1, steps 1 and 2.

2. Remove the pull pin and outer hub on the press reel support.

3. Remove all tape on the edge of the reel.

4. Place the terminal reel on the exposed shaft so the terminal strip comes off the reel in proper orientation.

5. Place the outer hub back on the shaft and lock in position so there is enough tension so that the reel does not freely rotate and unwind the terminals. The tension should be loose enough that a light pull on the terminals will rotate the reel.

6. Place the pull pin back on the end of the shaft. This will prevent the hub from falling off should the hub locking screw become loose.

7. Unwind the terminal strip under the terminal guide (See Figure 3-4). Be careful not to distort the terminals or the strip while feeding the terminals into the terminator die.

8. Most terminator dies do not have any track adjustment features. For this type, lift both the drag and anti-back-up pins located on the front of the terminator die. This will allow the terminals to slide freely through the terminator die track (See Figure 3-5).
9. For track adjustment type terminator dies rotate the drag cam until the drag frame is fully raised (See Figure 3-6). This will allow the terminal to slide freely through the terminator die track.

10. Load the terminal strip under the rear cover plate until the first terminal comes to rest centered above the anvil (See Figure 3-7).

11. Release the terminal drag and anti-backup pins for non-adjustment terminators, or rotate the drag cam to engage the terminal drag frame on the track adjustment style dies.

CAUTION: Terminals and terminal carrier strips may have sharp edges that can scratch or cut. Use caution while handling terminals.

12. To remove the terminal strip, raise the terminal drag and/or anti-back-up finger. Lift the feed finger and pull the terminal carrier strip back using needle nose pliers until disengaged from the terminator track. If preferred, cut the terminal carrier strip and pull it through the terminator die.

3.3 Punch and Anvil Alignment

The following procedure will align the punch and anvil profiles.

1. Power down the press and remove the guards as described in Section 3.1.1, steps 1 and 2.
2. With a terminal in position over the anvils, slightly loosen the front and/or back anvil mounting screws (See Figure 3-8) and center carrier cut-off tooling when applicable (See Figure 3-1).
3. Slowly hand cycle the ram of the press to the bottom of its stroke.
3.4 Feed Finger Adjustment

1. Power down the press and remove the guards as described in Section 3.1.1, steps 1 and 2.
2. Loosen the terminal feed finger shaft locking screw (M4) and slide the feed finger shaft in or out (See Figure 3-9).

3. Position the feed finger to pick up the best feeding position. This may differ from terminal to terminal. Typically, terminals are fed via carrier strip holes or by the tab between the insulation terminal section and the carrier strip.
4. With a small screwdriver, rotate the feed finger shaft CW to increase or CCW to decrease spring tension on the feed finger. Tighten the feed finger shaft locking screw to lock the feed finger in position. (See Figure 3-10)
5. Cycle the press by hand (See Section 3.7) to be certain that the feed finger transfers the next terminal to be aligned over the anvil.
6. Check that all other parts slide and engage without any interference.
7. Repeat this procedure several times.
8. If a manual cycle cannot be completed, or the terminal is not positioned over the anvil, refer to Sec 3.4 to 3.7.

3.5 Forward Feed Adjustment

A forward or backstroke feed adjustment may be necessary if the terminal is not centered over the anvil during the manual cycle.

1. Power down the press and remove the guards as described in Section 3.1.1, steps 1 and 2.
2. To check the forward feed position, the terminal being crimped should be positioned exactly over the anvil and the ram in the up position.
3. Loosen the M6 forward feed adjustment lock screw located on the top of the punch plate (See Figure 3-11).
4. Rotate the forward feed adjustment wheel to center the terminal over the anvil.
5. After adjusting the forward feed position of the terminal, tighten the M6 forward feed adjustment lock screw.
6. For future reference, document the feed position on the forward feed adjustment indicator.

### 3.6 Back Stroke Feed Adjustment

1. The feed finger requires over-travel on the backstroke to pick up the next position on the loaded terminal strip.
2. Manually cycle the press 180 degrees to the bottom dead center position.
3. With the press in the down position, loosen the M6 hex jam nut (See Figure 3-12).
4. Adjust the M6 back feed adjustment screw to change the backstroke position of the feed finger.
5. After the stroke is adjusted, tighten the M6 hex jam nut.
6. Verify the forward stroke position readjust if necessary.

### 3.7 Manually Cycling the Press

CAUTION: By disengaging the actuator (See Figure 4-2) the ram will be free to move. The weight of the ram can result in downward motion. Use caution to ensure that the area under the ram is clear of fingers and hand tools. The machine guard should be in place.

1. Power down the press by pressing the emergency stop button located on the front of the control panel.
2. Release the clutch by inserting a screwdriver through the access hole to trip the locked actuator (See Figure 3-13).
3. Insert the 10mm hex wrench through the hole in the center of the rear cover and engage it in the socket in the press flywheel (See Figure 3-14).
4. Rotate the press flywheel to move the ram as desired.

WARNING: Never insert anything through this hole while the press is under power.

### 3.8 Conductor Crimp Punch Adjustment

1. With the guards in place, insert a stripped length of specified wire into the terminal and terminate the wire under power. Refer to the terminal specification sheet supplied with the terminator die.
2. Examine the quality of the initial conductor crimp and measure the crimp height (See Appendix A: Crimp Terminations).
3. Power down the press and remove the guards as described in Section 3.1.1, steps 1 and 2.
3.9 Insulation Crimp Punch Adjustment

1. Place a stripped length of wire into the terminal and terminate under power.

2. Examine the quality of the initial insulation (See Appendix A, Crimp Terminations).

3. Power down the press and remove the guards as described in Section 3.1.1, steps 1 and 2.

4. Rotate the insulation adjusting screw to obtain the required insulation crimp height. Each increment in the reference window represents approximately .2.00mm (.0078") for a total adjustment of 1.60mm (.063"). The "1" setting, on the Insulation Adjustment Indicator, equates to the largest crimp height and the "8" setting is the smallest (See Figure 3-16).

5. Repeat the above steps until the desired insulation crimp height is obtained.

NOTE: Due to the large variety of insulation wall thickness, material, and durometers, Molex does not specify insulation crimp height. The insulation crimp height should be inspected, measured, and documented as a quality indicator for all wire types and sizes.

3.10 Operation

1. Check that all setup procedures were followed and that the terminations are meeting specification.

2. Verify the machine was manually cycled before operating under power.
3. With guards in place, turn on the press by pressing the run button on the front of the press control assembly. The motor starts and the run light comes on. Pressing the Emergency Stop button disconnects power to the motor and the clutch. The run light goes off.

**NOTE:** To fully remove power to the press, unplug the power cord from the press control assembly.

4. Place the pre-stripped wire through the slot in the guard above the terminal and touch the wire stop (See Figure 3-17).

5. Press the foot pedal down once and release. The press will cycle once. Keep the foot raised or remove it from the foot pedal to prevent unwanted crimp cycles.

**CAUTION:** Call maintenance immediately if the press cycles more than once. Do not operate the press. (See Section 4.5 Clutch Unit.)

7. The press is set up to have a terminal over the anvil before beginning the crimp cycle. During the crimp cycle, but after the wire is terminated, the operator should make a slight rightward motion of the crimped wire/terminal. This rightward motion should take place during the upward cycle of the press. This will prevent the next indexing terminal from being tangled during the upward cycle of the press.

8. Be sure to remove the crimped terminal out of the slot in the guard before the next termination.

9. Periodically check the terminations for crimp height and visual attributes described in Appendix A: Crimp Terminations, and Appendix B: Statistical Process Control.
Section 4

Maintenance and Clutch Unit Service

4.1 Cleaning

4.2 Lubrication

4.3 Perishable Parts

4.4 Spare Parts

Maintenance Record Form

4.5 Clutch Unit Service/ Adjust and Repair

4.6 Oiler
4.1 Cleaning

**WARNING:** Disconnect the power cord from the power source during all maintenance operations.

For efficient operation, the TM42 press should be cleaned daily with a soft bristle brush to remove any carrier strip debris and terminal plating dust from the tooling area. For continuous operation, this may have to be done more frequently.

When it is necessary to change a terminator die, use caution removing any debris from tapped holes in the press base where the applicator mounts. Debris can prevent tooling from being properly locked into position.

**CAUTION:** Cleaning using compressed air is not recommended. Chips can wedge in the tooling and/or cause injury.

**NOTE:** Do not use solvents to clean the guards. Window cleaner and a soft cloth should be used. If the guarding becomes scratched or scuffed, replacement may be necessary.

**Lubrication**

(Excluding clutch assembly) All bearing areas are pre-lubricated and sealed for life.

An example of a maintenance chart is shown below. Copy and use this chart to track the maintenance of your TM42 Press or use this as a template to create your own schedule or use your company’s standard chart, if applicable.

**Preventive Maintenance Chart**

**Daily:** Clean. See Section 4.1.

**As Required:** Lubricate. See Section 4.2)

<table>
<thead>
<tr>
<th>CHECK SHEET</th>
<th>MONTH</th>
<th>YEAR</th>
<th>Days of the Week</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Week</strong></td>
<td><strong>Daily Cycles</strong></td>
<td><strong>Daily Clean</strong></td>
<td><strong>MON</strong></td>
<td><strong>TUE</strong></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleaning</td>
<td>25,000</td>
<td>Yes</td>
<td></td>
<td>Soft Brush Industrial Degreaser</td>
</tr>
<tr>
<td>Reapply oil</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inspect all tooling, feed fingers etc. for wear</td>
<td>25,000</td>
<td>Yes</td>
<td></td>
<td>Replace if signs of wear.</td>
</tr>
</tbody>
</table>

Schedule should be adjusted up or down depending on usage. Molex recommends that a log of preventive maintenance be kept with the press.
4.3 Perishable Parts
Perishable parts are those parts that come into contact with the product and may wear over time. The customer is responsible for maintaining these parts and Molex recommends that they keep at least one set in stock at all times. There are no perishable parts on the TM42 press. However there are perishable parts on the termination die sets. Refer to the instructions that come with the dies.

4.4 Spare Parts
Spare parts are available to support the TM42 Termination Machine. Moving and functioning parts can be damaged or malfunction. Molex recommends that the customer keep some or all of them in stock to reduce down time. These parts are identified in the Parts List in Section 5.

4.5 Clutch Unit Service Adjust/Repair

**CAUTION:** Disconnect power cord from power source during all maintenance.

4.5.1 Operational Check 1

1. Remove the rear cover of the TM-42 unit. Verify that the clutch control collar is in the locked position (See Figure 4-2). Insert the 10mm hex wrench into the socket head cap screw. This screw is located in the center of the flywheel (See Figure 4-1). This screw is spring loaded to prevent being left in the unit.
2. Attempt to rotate the hex wrench clockwise. If the unit will not turn, it is functioning properly.
3. Next rotate the input hub/flywheel clockwise by hand. The input hub/flywheel should be free to rotate. During this portion of the operational check, the black spring housing should not rotate (See Figure 4-1).
4. If the unit fails operational check 1, the clutch unit has failed internally or the actuator is not functioning properly and the clutch unit must be replaced.

**CAUTION:** By disengaging the actuator (See Figure 4-2) the ram will be free to move. The weight of the ram can result in downward motion. Use caution to ensure that the area under the ram is clear of fingers and hand tools. The machine guard should be in place.

4.5.2 Operational Check 2

1. Verify that the clutch control collar is unlocked (See Figure 4-2). The crankshaft, input hub/flywheel, and black spring housing should rotate freely with the 10mm wrench moving the ram down and up.
2. After 360 degrees of clockwise rotation, the actuator will engage the clutch control collar and rotation will stop. This is normal operation.
3. If rotation with the 10mm wrench is not possible and the actuator is disengaged, the clutch unit is demonstrating early signs of failure and must be replaced.
4.5.3 Removing the Clutch Unit

**WARNING:** This procedure should be followed to ensure compliance with safety instructions. Molex cannot accept liability in the event of a subsequent accident caused by clutch failure when improperly serviced by the customer.

See Figure 4-4 for the following steps.

1. Power down the press and remove the guards as described in Section 3.1.1, steps 1 and 2.
2. Support the ram in the upper position with a hardwood wedge (approximately 1 7/8" high) (See Figure 4-3).
3. Remove the terminal reel support arm and the top and rear covers, separate connector from counter.
4. Disconnect leads from solenoid.
5. Leave the V-belt in a position to support weight when removing and replacing the flywheel.
6. Remove the Flywheel Bearing Retainer Screw and washer from the end of the crankshaft.
7. Remove (3) M6 x 40 LG SHCS from the Flywheel.
8. Remove the flywheel. The inner race of the flywheel may stay on the crankshaft when the flywheel is removed.
9. Remove the 5.0mm x 35 LG spiral pin from the clutch and crankshaft using a drive punch.
10. Remove the (3) M6 x 16 LG SHSS (socket head shoulder screw) from the clutch plate.
11. Pull the clutch/solenoid assembly from the crankshaft. This may require pry bars to push from the rear side of the clutch plate. If the inner race of the flywheel remained on the crankshaft, it will be pushed off before the solenoid/clutch assembly.
12. Determine if the inner race for the flywheel can be reused or be replaced.

4.5.4 Installing of Clutch Unit.

**Note:** The (3) M6 x 16 LG SHSS (socket head shoulder screw) used to mount the clutch plate permit free axial and radial movement around the crankshaft. This allows the friction surfaces to be in perfect alignment for the wrap-up function of the springs. Free movement of the unit is necessary because the brake hub is rigidly attached to the clutch plate and any restrictions could result in malfunction and possible damage to the springs.

See Figure 4-4 for the following steps.

1. Slide the solenoid/ clutch assembly onto the crankshaft.
2. Replace (3) M6 x 16 LG SHSS
3. Secure the clutch to the crankshaft by inserting a new 5mm x 35 LG spiral pin.
4. Adjust the clutch timing. See Section 4.5.5, Solenoid/ Clutch Assembly Adjustment.
5. Slide the inner race onto the crankshaft followed by the flywheel.
6. Replace the (3) M6 x 40 LG SHCS in the flywheel.
7. Replace the Flywheel Bearing Retainer Screw and washer in the end of the crankshaft.
8. Reconnect the leads for the clutch solenoid.
9. Replace the V-Belt.
10. Replace rear & top covers and the reel support assembly.
11. Remove the hardwood wedge from under the ram.
12. Replace front guard.

4.5.4 Solenoid/Clutch Assembly Adjustment.

**CAUTION:** By disengaging the actuator (See Figure 4-2) the ram will be free to move. The weight of the ram can result in downward motion. Use caution to ensure that the area under the ram is clear of fingers and hand tools. The machine guard should be in place.
1. Remove the rear cover of the TM-42 unit.
2. Locate the retaining ring in front of the clutch control collar, (see Figure 4-1). Using a regular tip screwdriver, unseat the ring from its groove and slide it towards the flywheel.
3. Insert the 10mm hex wrench into Flywheel Bearing Retainer Screw. Hold the wrench firmly and release the clutch control collar by lifting up the actuator (See Figure 4-5). The crankshaft, input hub/ flywheel, and black spring housing are now free to rotate.

4. Remove the rear cover of the TM-42 unit.
5. Locate the retaining ring in front of the clutch control collar, (see Figure 4-1). Using a regular tip screwdriver, unseat the ring from its groove and slide it towards the flywheel.
6. Insert the 10mm hex wrench into Flywheel Bearing Retainer Screw. Hold the wrench firmly and release the clutch control collar by lifting up the actuator (See Figure 4-5). The crankshaft, input hub/ flywheel, and black spring housing are now free to rotate.

4. Rotate the 10mm hex wrench clockwise observing the rams down and up motion. When the ram has traveled a complete down and up motion, hold the position of the ram just past top dead center (this is when the ram has traveled to the full up position and starts its descent downward).
5. Now observe the relationship of the control collar to the actuator (See Figure 4-5), if the control collar is butted up against the actuator, no adjustment is required.
6. If the control collar stops short of the actuator, pull the control collar back towards the flywheel and reposition the collar to the new setting. The control collar use spline teeth to control the engagement.
7. Replace the retaining ring to lock the control collar in position.
8. Verify proper clearance for radial movement of the solenoid/ clutch assembly. Check the gap between the solenoid/ clutch mounting plate and the M6 stop screw located on the upper left hand corner. If the gap is more or less than the recommended .25.00mm (.010") loosen the M6 nut and adjust the screw to the appropriate gap.

4.5.6 Solenoid/ Clutch Assembly Lubrication

The clutch has sintered metal components that have been impregnated with bearing infusion oil No. 33 for permanent lubrication, by the manufacturer. When the machine is subjected to continuous heavy duty operation, operates in high temperature, or in less than clean environments, the bearing oil may be washed out or the assembly may become polluted with foreign matter. Flushing in a lighter bearing infusion oil as used in manufacturing can restore efficiency. If this process proves ineffective, the solenoid/clutch assembly should be replaced.

**CAUTION**: Never use solvents to clean sintered metal parts.

4.6 Oiler

4.6.1 Description
The wick action oiler is included as an option to lubricate the products as they enter and are fed through tooling to ensure smooth, trouble free operation. The oiler applies a thin coat of oil to the terminals for proper feed and better release from termination punches. The oiler is primarily used for terminals with gold plating. To avoid contamination when shipped and during setup, the oiler is shipped from the factory with no lubricant oil.

4.6.2 Adjustments

4.6.2.1 Oiler Position
Adjust the position of the oiler unit using the mounting screw that attaches the oiler to the guard assembly. Simply loosen the screw and slide the unit to the desired position and tighten the screw. The unit can be removed and placed on the right side of the guard assembly for rear feed applications.

4.6.2.2 Oiler Wick

Adjust the height of the oiler wick by pulling up or pushing down on the wick to the appropriate height. The wick can be moved using pliers or simply grab it with your fingers.

4.6.3 Maintenance

4.6.3.1 Filling The Reservoir
While firmly holding the Lid, screw the Jar (Oil Reservoir) counter clockwise until it is removed. Fill the Jar with the desired lubricant oil and replace the Lid.

4.6.3.2 Replacing The Wick
While firmly holding the Lid, screw the Jar (Oil Reservoir) counter clockwise until it is removed. Feed a new Wick up into the tube until it protrudes from the top end of the tube and replace the lid.

Package Of (25) Wicks: Molex Part No: 63890-0727

4.6.3.3 Lubricant Oil
Recommended oil: Transdraw B-19
Vendor: Sure Lubricants Inc.
356 South Lively Boulevard
Elk Grove Village, IL 60007-2010
Phone: 888-787-3582
Fax: 847-956-6655
E-mail: surelub@aol.com

4.6.3.4 Adding a new oiler on an older press.

If your TM42 Presses was produced before 1996, it did not include provisions to mount an oiler.

To install a Terminal Oiler Part No. 63890-0720 to your press you will need to add a mounting hole. Locate this hole on the left side of the frame, with the front of press facing you, under the track.

1. Use the following procedure to install the oiler.
2. Drill 4.20mm (.165") diameter x 17.00mm (.62") deep in location shown in the figure below.
3. Tap M6-1.0 x 12.00mm (.47") deep.
4. Use a M6 BHCS and M6 flat washer to secure oiler onto frame.
Section 5

5.1 Parts Lists
5.2 Assembly Drawings
5.3 Electrical Schematics
5.4 Troubleshooting
The following pages contain the Parts Lists and Assembly Drawings for the TM42 Terminator Machine. Here are several tips to help you better understand and use this material.

1. The “**Item**” number in the Parts List matches the number in the balloon on the assembly drawing immediately following that list.
2. The “**Order No.**” is the number to use if ordering that particular item.
3. The “**RSP**” appearing at the end of some description columns means this item is a **Recommended Spare Part**.
4. The “**Req’d.**” number is the quantity of that particular part required per assembly and is also the quantity Molex recommends the user keep on hand if this is a **Recommended Spare Part**.

### Parts List

<table>
<thead>
<tr>
<th>Item</th>
<th>Order No.</th>
<th>Description</th>
<th>Required</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>11-14-0185</td>
<td>Lifting Hook</td>
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<td>11-40-0218</td>
<td>Locating Plate</td>
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</tr>
<tr>
<td>3</td>
<td>REF</td>
<td>Domestic Parts Kit (TM42)</td>
<td>REF</td>
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<td>4</td>
<td>11-41-0264</td>
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<td>Serial Number Plate CE Nameplate</td>
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<td>Bolster Plate Shim (USA) (Shipped with Press)</td>
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<td>Support Tube Weldment</td>
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<td>8</td>
<td>69001-0105</td>
<td>Straight Feed Finger</td>
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<td>69001-0106</td>
<td>Angled Feed Finger</td>
<td>RSP 1</td>
</tr>
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<td>69002-5004</td>
<td>Bolster Plate Assembly</td>
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<td>69002-5005</td>
<td>Adjusting Cam Assembly</td>
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<td>69002-5013</td>
<td>Disc Assembly</td>
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<td>69002-5073</td>
<td>TM42 Main Wiring Harness</td>
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<td>15</td>
<td>69018-6052</td>
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<td>RSP 1</td>
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<td>16</td>
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<td>Flywheel Bearing Retainer</td>
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<td>69002-5524</td>
<td>Feed Lever</td>
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<td>30</td>
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<td>Feed Arm Spring</td>
<td>RSP 1</td>
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Order No 69002-5099 Release Date: 08-08-02
Revision: G Revision Date: 03-17-05
**Components for 240Volt Version**

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<tbody>
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<td>Power Cord (240V)</td>
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<tr>
<td>2</td>
<td>690185021</td>
<td>240V AC 50 Hz Motor</td>
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<td>3</td>
<td>690186238</td>
<td>Light Bulb (240V) 25 Watt</td>
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<td>4</td>
<td>690186239</td>
<td>Fuse (5.0 – AMP)</td>
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**Hardware**

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<td>3/8 x 3/8LG BSP Plug</td>
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<td>5 mm x 35 LG Spirol Pin</td>
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<td>4</td>
<td>6 mm x 16LG Shldr Screw</td>
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</tr>
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<td>5</td>
<td>M10 x 16LG BHCS</td>
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<td>6</td>
<td>M10 x 16LG SHCS</td>
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<td>7</td>
<td>M3 Hex Nut - Full</td>
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<td>M3 x 6LG SHCS</td>
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<td>M4 x 8LG BHCS</td>
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</table>
5.2 Assembly Drawings

- **Figure 5-1**

- M6 X 12LG SET SCREW
- M8 HEX NUT (2)
- M8 WASHER (2)
- M6 X 60LG SET SCREW
- M6 HEX NUT
- M8 X 50LG STUD (4)
- M5 X 12LG BHCS (2)
- M6 X 30LG SET SCREW
- M6 X 12LG SET SCREW
- M6 HEX NUT
- M6 JAM NUT
- M6 X 40LG SET SCREW
- M6 X 25LG BHCS
- M8 X 50LG STUD (4)
- M10 X 16LG BHCS (4)
- 3/8 X 3/8LG BSP PLUG
- M6 X 12LG SET SCREW
- M6 HEX NUT
- M8 WASHER (2)
5.2 Assembly Drawings (continued)

Figure 5-2

63800-8397: CONVERSION CABLE REQUIRED WHEN USING FOOTSWITCH 63800-8394 WITH CONTROL ASSEMBLY 69002-5710
5.2 Assembly Drawings (continued)

Figure 5-3

*5mm DIA. X 35LG SPIROL PIN

Figure 5-4

** THESE PARTS ARE INCLUDED IN ASSEMBLY
5.2 Assembly Drawings (continued)
## 5.3 Electrical Schematic

<table>
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<th>Item No.</th>
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<tbody>
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<td>Controls Assembly (TM-42) REF</td>
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<td>69002-5712</td>
<td>Control PCB Assembly</td>
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<td>69018-6271</td>
<td>120V 25 Watt Bulb</td>
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<td>240V 50 Watt Bulb</td>
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<td>120V 1/3 HP Motor</td>
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<td>8 Amp (120V) 5 x 20mm SB Fuse</td>
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<td>Guard Open Red LED Assembly</td>
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<td>Counter - 7 Digit (Non-Resetable)</td>
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<td>Blank-PCB</td>
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<td>31</td>
<td>69018-6220</td>
<td>Power Entry Module</td>
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Electrical Schematic
## 5.4 Troubleshooting

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<th>Cause</th>
<th>Solution</th>
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<td>Power/ Power cord failure.</td>
<td>Check power supply.</td>
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<td>Loose connection.</td>
<td>Refer to control schematic.</td>
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<tr>
<td>Power cord not properly plugged in or cord damaged.</td>
<td>Check condition of cord and repair or replace as required. Check to be sure it is securely plugged in on both ends.</td>
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<td>Guard interlock switch disengaged.</td>
<td>Install guard.</td>
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<td>Fuse blown.</td>
<td>Replace</td>
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<tr>
<td>On/ Off switch failure.</td>
<td>Replace</td>
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<td>Motor thermal overload.</td>
<td>Push reset button on motor.</td>
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<td>Belt too tight.</td>
<td>Adjust motor mount.</td>
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<tr>
<td>Motor Failure.</td>
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<td>Motor will not run.</td>
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<td>Belt slipping/ broken.</td>
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<td>Drive pulley loose.</td>
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<tr>
<td>Loose electrical connection.</td>
<td>Refer to control schematic and repair.</td>
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<td>Foot switch connection.</td>
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<tr>
<td>Faulty Foot switch.</td>
<td>Check connection/ Replace.</td>
<td></td>
</tr>
<tr>
<td>Faulty counter.</td>
<td>Check connection/ Replace.</td>
<td></td>
</tr>
<tr>
<td>Clutch/ Solenoid failure.</td>
<td>See Section 4.5</td>
<td></td>
</tr>
<tr>
<td>Press Control Assembly failure.</td>
<td>Unplug counter.</td>
<td></td>
</tr>
<tr>
<td>Flywheel fails to rotate (motor runs).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Out of adjustment</td>
<td>See Section 4.5.</td>
<td></td>
</tr>
<tr>
<td>Clutch component failure</td>
<td>Adjust/ Replace.</td>
<td></td>
</tr>
<tr>
<td>Flywheel rotates press will not cycle.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solenoid sticks</td>
<td>Check/ Replace. See Section 4.5.</td>
<td></td>
</tr>
<tr>
<td>Shorted leads in foot switch.</td>
<td>Replace</td>
<td></td>
</tr>
<tr>
<td>Broken clutch screw</td>
<td>Check/ Replace.</td>
<td></td>
</tr>
<tr>
<td>Press double/ multi-cycles.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No terminal feed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spirol pin broken.</td>
<td>Replace. See Ram assembly in Section 5.</td>
<td></td>
</tr>
<tr>
<td>Ram drops from top dead center.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broken clutch pin.</td>
<td>Check/ Replace.</td>
<td></td>
</tr>
<tr>
<td>Faulty clutch spring.</td>
<td>Check/ Replace</td>
<td></td>
</tr>
<tr>
<td>Broken tooling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improper tooling installation.</td>
<td>Replace and refer to Section 2. Make necessary corrections.</td>
<td></td>
</tr>
</tbody>
</table>
For more information use the Quality Crimping Handbook (Order No. 63800-0029)
APPENDIX A

CRIMP TERMINATIONS

A.1 Conductor Brush and Terminal Position
A.2 Conductor Bell mouth and Terminal Cut-off Tab
A.3 Conductor Crimp Height Measurement
A.4 Insulation Crimp
A.5 Pull Force Testing
### A.1 Conductor Brush and Terminal Position

<table>
<thead>
<tr>
<th><strong>Figure A-1</strong></th>
<th><strong>Figure A-2</strong></th>
<th><strong>Figure A-3</strong></th>
<th><strong>Figure A-4</strong></th>
</tr>
</thead>
</table>

#### A-1 Optimum Crimp Setup

- The insulation edge should be centered in the middle of the transition area. The conductor brush should extend past the conductor crimp and not extend into the contact area.

#### A-2 Insulation Under Conductor Crimp, Good Conductor Brush Length

- **Cause:** Strip length too short.
- **Solution:** Verify strip length specification and adjust as necessary.

#### A-3 Insulation Under Conductor Crimp, Long Conductor Brush Length

- **Cause:** Wire stop position incorrect.
- **Solution:** Adjust wire stop to center the insulation in the transition area.

#### A-4 Insulation Under Conductor Crimp, Short or No Conductor Brush Length

- **Cause:**
  1. Strip length too short
  2. Wire stop position incorrect
- **Solution:**
  1. Verify strip length specification and adjust as necessary.
  2. Adjust wire stop to center the insulation in the transition area.
A-5  Insulation Edge Centered in the Transition Area, Conductor Brush Too Long

**Cause:**
1) Strip length too long.
2) Irregular wire cut-off or wire strands pulled from insulation bundle.

**Solution:**
1) Verify strip length specification and adjust as necessary. Readjust wire stop for bench applications
2) Check for worn stripping blades.

A-6  Insulation Edge in the Center of Transition Area, Conductor Brush Too Short

**Cause:** Strip length too short.

**Solution:** Verify strip length specification and adjust as necessary. Readjust wire stop for bench applications.

A-7  Insulation Edge Under Insulation Crimp Form, Good or Long Conductor Brush Length

**Cause:** Strip length too long.

**Solution:** Verify strip length specification and adjust as necessary. Adjust the wire stop.

A-8  Insulation Edge Under Insulation Crimp Form, Short or No Conductor Brush Length

**Cause:**
1) Wire stop position incorrect.
2) Verify operator’s placement ability, or crimp rate.

**Solution:**
1) Adjust the wire stop to center the insulation in the transition area.
2) Operator training, reduce crimping rate.

A.2  Conductor Bell Mouth and Terminal Cutoff Tab

A-2.1  Optimum Crimp Setup

Tooling was set up to produce conductor bell mouth to nominal specification, and/ or approximately 1x to 2x terminal material thickness. The cutoff tab is approximately 1x terminal material thickness.

A-2.2  Excessive Bell mouth, Cutoff Tab Flush With Insulation Crimp

**Cause:**
1) Terminal tooling position.
2) Camber in the terminal strip.

**Solution:**
1) Verify pull force.
2) Adjust terminal track into the applicator.
**A-2.3 No or Small Bell mouth, Long Cutoff Tab**

**Cause:**
1) Terminal to tooling position.
2) Camber in the terminal strip.

**Solution:**
1) Verify pull force.
2) Adjust terminal track towards operator.

**A-2.4 Excessive Bell mouth, Good Cutoff Tab**

**Cause:**
1) Check for worn conductor punch tooling.
2) Check for correct conductor punch tooling.

**Solution:** Replace tooling if necessary.

**A-2.5 Excessive Cutoff Tab, Good Conductor Bell mouth**

**Cause:**
1) Check for worn cutoff tooling.
2) Check for correct cutoff tooling.

**Solution:** Replace tooling if necessary.

### A.3 Crimp Height Measurement

**NOTE:** Conductor height should be measured with a blade type micrometer or a caliper.

**CAUTION:** Care must be taken not to measure the extrusions.

#### A.3.1 Crimp height off target

**Cause:**
1) Changed wire type, stranding or vendor.
2) Changed insulation color or durometer.
3) Changed crimp tooling.
4) Changed crimping press (Shut-height)
5) Changed press type (Manufacturer)
6) Changed terminal reel (Lot code)
7) Changed tooling set-up.
8) Damaged or worn tooling.

**Solution:** Adjust tooling back to target (Refer to Section 2.8 & 2.9)

#### A.3.2 Crimp height variability too high

**Cause:**
1) Wire variability.
2) Terminal variability.
3) Damaged, loose or worn tooling.
4) Measurement error *.
5) Terminal spring back too great **.
6) Cut or missing wire strands.

**Solution:**
1 or 2) Inspect incoming product for variability.
3) Tooling replacement or tightening.
4) Gauge capability analysis.
5) Tooling crimp height adjustment.
6) Stripping process adjustment.
**Most common cause of crimp height variability**

**A.4 INSULATION CRIMP**

**A.4.1 Preferred Insulation Crimp**

It is preferred that the insulation crimp completely surrounds the outside diameter of the insulation. The terminal should hold on to the wire as firmly as possible without cutting through to the conductor strands. It should be noted that a preferred crimp only occurs in a small portion of the full insulation range a terminal can accommodate. A preferred insulation crimp is recommended for high vibration or movement applications.

An overlap insulation crimp is normally only developed for high vibration or movement applications where the wire diameter is near the lower terminal specification limit.

**A.4.2 Acceptable Insulation Crimp**

A terminal is normally specified to cover a wide range of insulation wall thickness over a range of wire sizes. Within this specified range, an insulation crimp may not completely surround the wire or fully hold the full diameter of the wire. This condition will still give an acceptable insulation crimp for most applications.

a) A large insulation crimp should firmly grip at least 88% of the wire.

b) A smaller insulation crimp should firmly grip at least 50% of the wire and firmly hold the top of the wire.

**A.4.3 Marginal Insulation Crimp**

An insulation diameter near the maximum and minimum specification of a terminal may cover less than what is normally considered acceptable. These strain reliefs should only be used on applications that have low vibration or movement.

a) An insulation crimp that covers less than 88% of a large insulation diameter.

**Cause:** Not enough terminal grip length.

**Solution:**
1) Evaluate if the same terminal is available in a different wire range.
2) Try crimping the wire one setting tighter. This will embed the terminal more into the insulation. The insulation wall thickness is normally enough; therefore cutting strands is not a worry. Terminal insulation grips kicking back away.
from the terminal or slight insulation bulging may be noticed. Evaluate the terminal loaded into a housing for acceptability

b) An insulation crimp that covers less than 50% of a small insulation diameter.

**Cause:** Too much terminal grip.

**Solution:**
1) Find out if the same terminal is available in a different wire range.
2) Find out if overlapping crimp tooling is available.

### A.4.4 Marginal Insulation Crimp

Insulation diameters that are small, thin-walled insulated wire. A loose crimp ensures no strand damage and offers insulation containment. Insulation crimps that pierce through the insulation will offer more strain relief. In some cases insulation terminal grips will push the strands to the side. Yet, there is always the possibility that a wire strand could be nicked. In severe cases, a wire strand may be cut. Careful application evaluation is needed for both of these cases.

**Cause:**
1) Crimp tooling adjustment.
2) Wire diameter variability.

### A.5 PULL FORCE TESTING

#### A.5.1 Pull Force Procedure

Wire connectors and soldering lugs for use with copper conductors. (Per UL486A October 8, 1991) UL Section 12 Pullout Test.

12.1 The connectors subjected to the static heating test or security test shall be subjected to a direct pull of the value specified for one minute. Only those conductors that have been subjected to the security test are to be subjected to the pullout test. The connector is acceptable if it does not become separated from the conductor or conductors after completion of the test.

12.2 For an insulated connector in which the insulation is assembled to the connector during installation, the test should be conducted with the insulation in place if it is always supplied with the connector by the manufacturer. Otherwise, the test should be conducted without the insulation assembled to the connector. Breaking or tearing of the insulation of an insulated connector is acceptable in the pullout test. The pull is to be exerted by means of a tension testing machine or equivalent, so that there will be no sudden application of force or jerking during the test.

The following is the procedure Molex uses for the qualification of pull force:

1. Cut wire length approximately 150mm (6.0") long.
2. Strip one end to 13mm (.50"), or long enough so no wire insulation is under the insulation grip.
3. Terminate the appropriate terminal to the wire to the nominal crimp height.
4. Visually inspect the termination for bell mouth, wire brush, and cut strands.
5. Set pull tester to 25.4mm (1.0") per minute. For most applications, a higher rate will not have a significant impact on the data.
   Verify higher pull rates with data taken at 25.4mm (1.0") per minute.
6. Knot the non-terminated end of the wire.
7. Regardless of pull tester type, both wire and terminated end must be securely clamped. (Note: Clamp terminal contact interface, do not clamp conductor crimp.)
8. Activate pull test.
9. Record a minimum of 25 readings of maximum pull force. After the application has been qualified, a minimum of 5 pull force measurements should be done to confirm each setup.
10. Compare lowest reading to minimum pull force specification.

A.5.2 Pull Test Problems

A.5.2.1 Wire breaks before conductor grip pull force low

Material Evaluation
Cause: Wire material properties, and/ or coatings.
Solution: Test non-terminated wire for breaking strength.

Stripping Evaluation
Cause: Cut or nicked strands from stripping operation.
   1) Wire being manually stripped.
   2) Poor automatic stripping cutoff.
   3) Worn strip tooling.
Solution: 1) Switch to semiautomatic or automatic wire stripping machine.
           2) Correct stripping machine setup.

A.5.2.2 Wire pulls out of conductor grip, crimp height good

Material Evaluation
Cause: 1) Terminal material thickness too small.
        2) Terminal serration depth/ form.
        3) Terminal plating thickness.
        4) Gold plating application.
Solution: 1) Evaluate a new terminal.
           2) Or 3) Contact terminal manufacturer.
           4) Evaluate selective Gold application.

Stripping Evaluation
Cause: Wrong strip length, poor conductor brush.
Solution: Adjust strip length.

<table>
<thead>
<tr>
<th>Conductor Size</th>
<th>Pullout Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWG</td>
<td>mm²</td>
</tr>
<tr>
<td>30</td>
<td>0.05</td>
</tr>
<tr>
<td>28</td>
<td>0.08</td>
</tr>
<tr>
<td>26</td>
<td>0.13</td>
</tr>
<tr>
<td>24</td>
<td>0.20</td>
</tr>
<tr>
<td>22</td>
<td>0.324</td>
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<tr>
<td>20</td>
<td>0.519</td>
</tr>
<tr>
<td>18</td>
<td>0.823</td>
</tr>
<tr>
<td>16</td>
<td>1.31</td>
</tr>
<tr>
<td>14</td>
<td>2.08</td>
</tr>
<tr>
<td>12</td>
<td>3.31</td>
</tr>
<tr>
<td>10</td>
<td>5.261</td>
</tr>
<tr>
<td>9</td>
<td>8.367</td>
</tr>
</tbody>
</table>

Figure A-5.0 Pull Force Testing
APPENDIX B

TERMS AND CONDITIONS

B.1  LEASE NEW

B.2  BUY NEW

B.3  “EC” DECLARATION OF CONFORMITY
Molex distributes their Harness Assembly Tools and Machines through several different plans:

1. **Lease New** -------------- The customer may lease a new machine or tool for a prearranged period of time.

2. **Buy New** -------------- The customer may purchase a new machine or tool outright,

The terms and conditions, including warranties, vary with each plan. The following pages list the generic parts of these plans.

**NOTE:** Not all tooling is available through these plans. i.e.: Some tooling is for purchase only and some is for lease only. Contact your local Molex Sales Engineer for additional information.
MOLEX EQUIPMENT LEASE TERMS AND CONDITIONS

ARTICLE I
OWNERSHIP OF EQUIPMENT

1.01 ALL EQUIPMENT is owned by LESSOR. No right, title or interest in the EQUIPMENT shall pass to LESSEE other than, conditioned upon LESSEE’S performance hereunder, the right to maintain possession and use of the EQUIPMENT.

ARTICLE II
SERVICE OF EQUIPMENT

2.01 LESSOR will provide LESSEE with instructions as to the set up, operation and maintenance of the equipment and, at LESSEE’S expense, an inventory of recommended perishable tooling.

2.02 LESSOR will service the EQUIPMENT (except for minor repairs and/or maintenance) to the extent provided for in the succeeding paragraphs.

2.03 If, during the first ninety (90) days after LESSEE received possession of the EQUIPMENT, the EQUIPMENT fails to perform in a satisfactory manner (except by reason of LESSEE’S misuse or negligence), LESSOR will repair the EQUIPMENT, at no cost for parts and labor, as soon as possible after notification.

2.04 After the first ninety (90) days of LESSEE’S possession, should the EQUIPMENT fail to operate satisfactorily (except by reason of LESSEE’S misuse or negligence), LESSOR will supply LESSEE with all the required perishable parts at the current standard selling price as soon as possible after notification. Spare parts will continue to be provided on a no-charge basis throughout the term of the lease. Should LESSEE be unable to repair the equipment, LESSOR will repair the inoperable equipment as soon as possible after notification.

2.05 By definition, perishable parts are those items that come in contact with the product media during the termination process. The media, normally, would be terminals, wire, connectors, cable, and the like. Examples of perishable parts are: punches, anvils, insertion blades, connector/terminal guides, etc. Where-in examples of spare parts are: motors, solenoids, valves, cylinders, et al.

2.06 If LESSOR cannot repair the EQUIPMENT as stated in paragraphs 2.03 and 2.04 hereof, LESSOR will replace the EQUIPMENT or any portion thereof, as soon as possible.

2.07 LESSOR cannot be responsible for the quality of connectors or terminals other than those of LESSOR. Accordingly, notwithstanding paragraphs 2.03 and 2.04 and/or 2.06 hereof, LESSOR reserves the right to charge LESSEE the cost of labor and/or parts for repairing EQUIPMENT which is applying connectors or terminals other than LESSOR’S.

2.08 LESSOR cannot be responsible for any modifications performed by LESSEE on the EQUIPMENT or the performance of the EQUIPMENT when used in association with machine components not supplied by LESSOR. Accordingly, notwithstanding paragraphs 2.03, 2.04, and/or 2.06 hereof, LESSOR reserves the right to charge LESSEE the cost of labor, and/or parts for the repairing the EQUIPMENT modified by LESSEE or used in association with machine components not supplied by LESSOR.

ARTICLE III
WARRANTIES AND REMEDIES

3.01 In case of breach of warranty by LESSOR, LESSEE’S sole remedy shall be repair, or, at LESSOR’S option, replacement of the EQUIPMENT.
3.02 Under no circumstances shall LESSEE be entitled to any special or consequential damages for any action or non-action taken by LESSOR in connection with furnishing or servicing the EQUIPMENT.

**ARTICLE IV**

**LESSEE’S OBLIGATIONS**

4.01 General - LESSEE shall use the EQUIPMENT in a careful manner, shall comply with all the laws relating to its possession, use, and maintenance and shall be responsible for keeping the EQUIPMENT in good repair, condition and working order and will not modify the EQUIPMENT without the prior written consent of LESSOR.

4.02 Inspection - LESSEE shall permit LESSOR to inspect the EQUIPMENT and any pertinent records concerning the EQUIPMENT during LESSEE’S business hours.

4.03 Insurance - LESSEE shall provide, maintain, and pay for insurance against loss, theft, damage, and destruction of the EQUIPMENT. LESSEE shall also provide, maintain, and pay for public liability insurance, both personal injury and property damage, covering the EQUIPMENT in form and amount satisfactory to LESSOR.

4.04 Liens - LESSEE shall keep the EQUIPMENT free and clear of all levies, liens and encumbrances caused by LESSEE and shall not permit the EQUIPMENT to become a fixture on any premises.

4.05 Taxes - LESSEE shall pay all charges and taxes, which may now or hereafter be imposed upon the leasing, rental, possession, or use of the EQUIPMENT. LESSOR shall have the right to invoice LESSEE any such taxes that it has paid.

4.06 Risk of loss - LESSEE assumes and shall bear the entire risk of loss, theft, destruction, and damage to the EQUIPMENT from any and every cause whatsoever from the date of delivery until return of the EQUIPMENT to LESSOR’s plant excepting only that damage directly attributable to LESSOR’s negligence. In the event of damage, LESSEE shall, as soon as possible, replace or repair the EQUIPMENT.

4.07 Indemnification - LESSEE shall indemnify, hold harmless, and (at LESSOR’s option but at LESSEE’S expense) defend LESSOR against any and all claims, actions, liabilities, losses, damages, and expenses including attorney’s fees, arising out of LESSEE’S breach of its obligations under this Agreement.

**ARTICLE V**

**TERMINATION**

5.01 Either party hereto may terminate this Agreement for nonperformance under any provision hereof within 10 days after the complaining party has made written demand therefore.

5.02 LESSOR, at its sole discretion, may terminate this Agreement in the event of LESSEE’S bankruptcy, receivership, insolvency, assignment for the benefit of creditors or similar action or condition relating to LESSEE or LESSOR’S property.

5.03 Upon termination of this Agreement for any reason except LESSOR’s breach, LESSEE, at its expense, will return the EQUIPMENT in as good condition as received less normal wear, tear and depreciation to one of LESSOR’s facilities situated in Illinois that shall be designated by LESSOR.
ARTICLE VI
MISCELLANEOUS

6.01 All notices hereunder shall be in writing and mailed to the respective parties, by registered or certified mail, at the address set forth in the preamble on the face of this Agreement.

6.02 This Agreement cannot be varied except by a writing signed by authorized agents of the parties. The definition of EQUIPMENT may be enlarged with the written consent of the parties. Any additional items, which become EQUIPMENT, shall be fully governed by this Lease Agreement.

6.03 This Agreement shall be governed by the Laws of the State of Illinois.

6.04 Any provision herein held unenforceable by a court of competent jurisdiction shall not affect any other provision herein and may be modified by such court so that it becomes reasonable and enforceable and, as modified, will be enforced as any other provision.
MOLEX EQUIPMENT SALES TERMS & CONDITIONS

ARTICLE 1
SERVICE OF EQUIPMENT

1.01 SELLER will provide BUYER instructions as to the setup, operation, and maintenance of the EQUIPMENT and an inventory of suggested perishable tooling, if ordered, at BUYER’S expense.

1.02 SELLER will service the EQUIPMENT (except for minor repairs and/or maintenance) to the extent provided for in the succeeding paragraphs.

1.03 If, during the first thirty (30) days after BUYER received possession of the EQUIPMENT, the EQUIPMENT fails to perform in a satisfactory manner (except by reason of BUYER’S misuse or negligence), SELLER will repair the EQUIPMENT, at no cost for parts and labor, as soon as possible after notification.

1.04 If, during the first year after BUYER received possession of the EQUIPMENT, the EQUIPMENT fails to perform in a satisfactory manner (except by reason of the BUYER’S misuse or negligence), SELLER will repair the EQUIPMENT, at no cost for spare parts and labor, as soon as possible after notification. The replacement of perishable parts during the remaining eleven (11) months of the warranty is the responsibility of the BUYER.

1.05 By definition, perishable parts are those that come into contact with the product media during the termination process. The media, normally, would be terminals, wire, connectors, cable, and the like. Examples of perishable parts are: punches, anvils, insertion blades, connector/terminal guides, etc. Wherein examples of spare parts are: motors, solenoids, valves, cylinders, et. al.

1.06 If SELLER cannot repair the EQUIPMENT as stated in Paragraphs 1.03 and 1.04 hereof, SELLER will replace the EQUIPMENT, or any portion thereof, still under warranty.

1.07 After the first year of BUYER’S possession, should EQUIPMENT fail to operate satisfactorily, SELLER will supply BUYER with all the required parts at the current standard selling price, as soon as possible after notification. Should BUYER be unable to repair the EQUIPMENT, SELLER will repair the inoperable EQUIPMENT, as soon as possible after notification, at then current service charges.

1.08 SELLER cannot be responsible for the quality of the connectors or terminals other than those of the SELLER. Accordingly, notwithstanding Paragraphs 1.03, 1.04, 1.06, and/or 1.07 herein, SELLER reserves the right to charge BUYER the cost of labor and/or parts for repairing EQUIPMENT which is applying connectors or terminals other than SELLER’S.

1.09 SELLER cannot be responsible for any modifications performed by the BUYER on the EQUIPMENT or the performance of the EQUIPMENT when used in association with machine components not supplied by the SELLER. Accordingly, notwithstanding Paragraphs 1.03, 1.04, 1.06 and/or 1.07 hereof, SELLER reserves the right to charge BUYER the cost of labor and/or parts for repairing the EQUIPMENT modified by the BUYER or used in association with machine components not supplied by SELLER.

ARTICLE 11
WARRANTIES AND REMEDIES

2.01 In case of breach of warranty by SELLER, BUYER’S sole remedy shall be repair, or at SELLER’S option, replacement of the EQUIPMENT.

2.02 Under no circumstances shall BUYER be entitled to anyspecial or consequential damages for any action or non-action taken by SELLER in connection with furnishing or servicing the EQUIPMENT.
EC Declaration of Conformity

We hereby declare that the following product is in conformity with the requirements of the following EC Directives:

Product: TM42 Crimp Machine
Type: 69002-5001, 69002-5000

This product is designed and manufactured in accordance with the following standards:

EMC:
- EMI (Electromagnetic Interface): EN50081-1
- Conducted/ Radiated: EN 55011 level B
- EMS (Electromagnetic Susceptibility):
  - Immunity EN 50082-1 EN 50082-2


Manufacturer:
- Name: Molex Application Tooling Group
- Address: 1150 E. Diehl Rd.
  Naperville, IL 60563 USA
- Date: April 4 1996
- Signed: __________________________
- Typed Name: Steven F. Wright
- Title: Director of Engineering

Representative in EU:
- Name: Molex Interconnect AG
- Address: Luchthavenweg 38
  5657 EB Eindhoven,
  The Netherlands

Order No 69002-5099 Release Date: 08-08-02
Revision: G Revision Date: 03-17-05
Molex Application Tooling Group
1150 E. Diehl Road
Naperville, IL, 60563
Tel: 630-969-4550
Fax: 630-505-0049

Far East North Headquarters
Yamato, Kanagawa, Japan
Tel: 81-462-65-2324
Fax: 81-462-65-2366

Far East South Headquarters
Jurong, Singapore
Tel: 65-268-6868
Fax: 65-265-6044

European Headquarters
Munich, Germany
Tel: 49-89-413092-0
Fax: 49-89-401527

Corporate Headquarters
2222 Wellington Court
Lisle, IL, 60532, U.S.A
Tel: 1-800-78MOLEX
Fax: 630-969-1352

Visit our Web site at http://www.molex.com