

AMP\* R-CAM 3A Automatic  
Ribbon Cable Assembly Machine  
761900-1

409-5794  
30 JUN 95 Rev B

**AMP**

***customer  
manual***

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**DANGER****SAFETY PRECAUTIONS PREVENT INJURY**

Safeguards are designed into AMP machines to protect operating personnel from most hazards during normal machine operation. However, as with most machinery, certain precautions must be taken by the operator and repairman.

Never insert hands into an installed machine/applicator, or any part of a machine that is operated by electricity or compressed air, without first pulling the machine power cable plug from the outlet receptacle and/or shutting off the compressed air at the line valve and disconnecting the air hose. This will prevent injury in the event that switches or other controls are accidentally activated.

A grounded electrical outlet should always be used to receive the plug on the machine power cable.

To improve clarity, photographs and drawings may not show machine/applicator guards. In some cases, it is impractical to show the variety of guards designed to meet specific safety requirements, as set forth in codes and standards adopted by customers and/or enforced in a given locale.

Though a guard may not be shown, and procedures may not reflect the need for its removal, the guard **must** be in place during normal operation of the machine/applicator.

**TECHNICAL ASSISTANCE CENTER**

**CALL TOLL FREE 1-800-722-1111**  
(CONTINENTAL UNITED STATES AND PUERTO RICO ONLY)

**GENERAL MACHINE POLICY**

All machines remain the property of AMP Incorporated. The customer shall have no title to the machine(s) and his interest shall be limited to the use of said machine(s) for the purpose indicated, during the stated term, at the specified plant.

No major change or modification shall be made without written consent of AMP Incorporated. Spare and component parts are available at nominal prices.

A list of component parts is included in the instructional material or drawings supplied with each machine.

The customer shall be fully responsible for the maintenance of the machine(s) including servicing, repair, and replacement of damaged or broken parts. Each machine shall be returned in usable condition — reasonable wear and tear excepted. Before returning the machine, contact AMP Incorporated, Harrisburg, Pennsylvania requesting instructions for shipping and disposition.

AMP Field Service Engineers are available to provide assistance in the adjustment or repair of the machine when problems arise which your maintenance personnel are unable to correct. Contact AMP Incorporated for applicable fees.

**INFORMATION REQUIRED WHEN CONTACTING AMP INCORPORATED**

AMP Incorporated offers the **Technical Assistance Center** as a means of providing technical assistance when required.

When contacting AMP Incorporated by telephone regarding service to a machine or tool, it is suggested that a person familiar with the device be present with a copy of the manual (and drawings) to receive instructions. Many difficulties can be corrected in this manner.

When calling the Technical Assistance Center, be ready with the following information:

1. Customer name
2. Customer address
3. Person to contact (name, title, telephone number and extension)
4. Person calling
5. Machine or tool number (and serial number if applicable)
6. Product part number (and serial number if applicable)
7. Urgency of request
8. Nature of problem
9. Description of inoperative component(s)
10. Additional information/comments that may be helpful

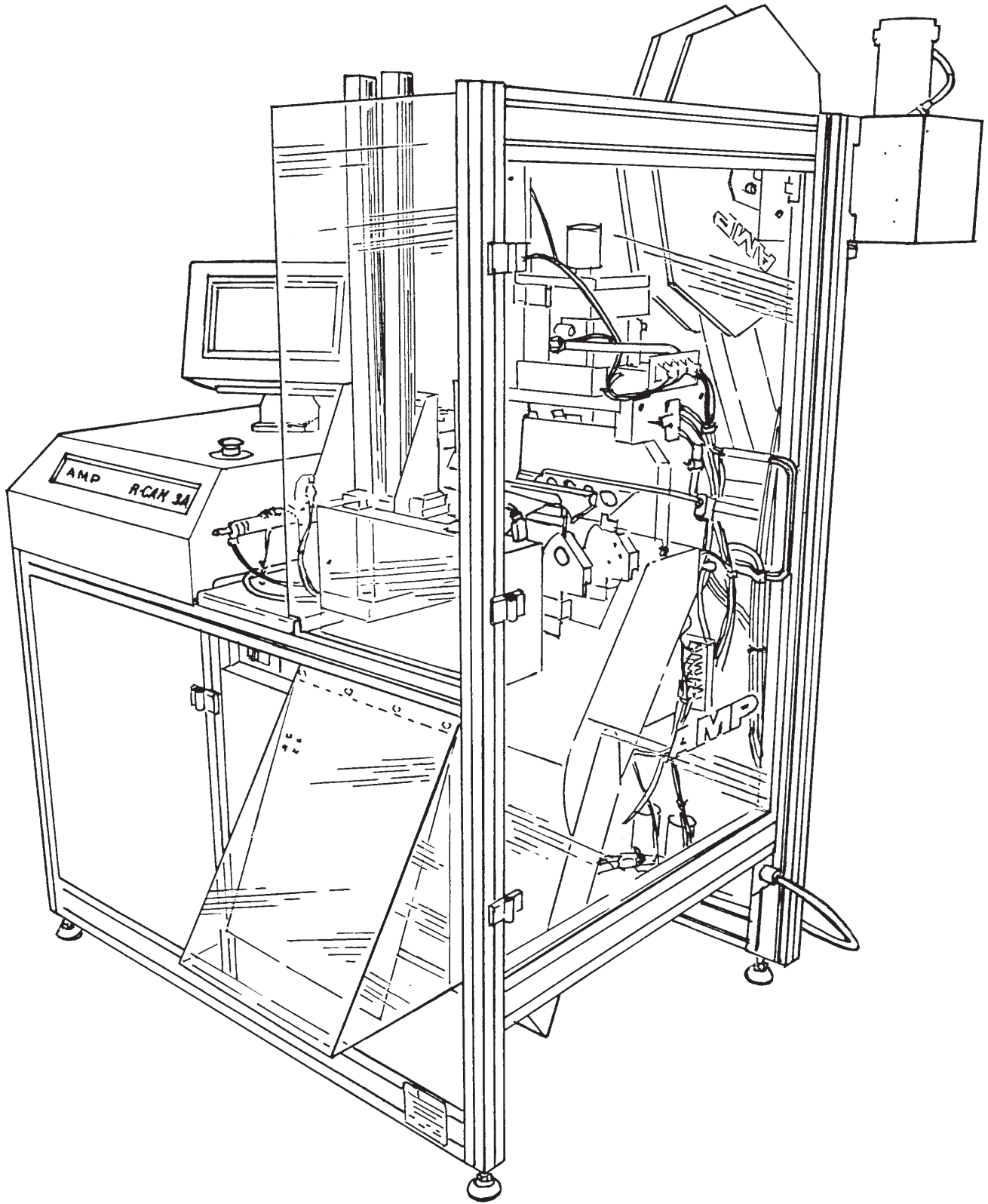


Figure 1

## 1. INTRODUCTION

The AMP R-CAM 3A Automatic Ribbon Cable Assembly Machine 761900-1 (shown in Figure 1) is supplied with tooling to terminate AMP-LATCH\* Novo receptacles and Card Edge connectors onto ribbon cable. Tooling for other connectors can be ordered separately. The machine will produce single- or double-ended cable assemblies ranging in length from 44.2 to 2667 mm [1.74 to 105 inches] and a tail, if desired, up to 1270 mm [50 in.] long.

**NOTE**

*Measurements are in metric units [followed by U.S. customary units in brackets], except for representations of on-screen distances, which are in inches.*

Read this manual thoroughly before operating the machine. The performance of this machine will depend largely upon the use of information contained in this manual.

When reading this manual, pay particular attention to **DANGER**, **CAUTION**, and **NOTE** statements.

**DANGER**

*Denotes an imminent hazard that may result in moderate or severe injury.*

**CAUTION**

*Denotes a condition that may result in product or equipment damage.*

**NOTE**

*Highlights special or important information.*

Reasons for reissue of this manual are provided in Section 11, REVISION SUMMARY.

**CAUTION**

*Electrostatic Discharge (ESD) damage can occur during the handling of static sensitive components. The ESD damage is usually caused by electrostatic discharge from a human body or an object.*

The following practices are recommended to minimize damage due to ESD:

1. The operator must use an ESD floor mat which is properly grounded.
2. The machine should rest on an ESD bench mat.
3. The machine should be grounded to the bench mat by means of a cable connected from the machine base plate to the socket on the bench mat.
4. The operator should be grounded using a wrist strap.
5. All grounding should be to a common ground point.

**NOTE**

*All ESD equipment is customer supplied.*

## 2. DESCRIPTION

### 2.1. Physical Description

The R-CAM 3A machine is a free-standing unit requiring only 110 Vac electrical power and an air supply for operation. See Figure 2 for machine specifications.

The machine will produce single- or double-ended cable assemblies on 28 AWG planar ribbon cable, using tube-loaded connectors. Cable assemblies may have one or two connectors and may be 44.2 to 2667 mm [1.74 to 105 in.] long end-to-end, with a tail up to 1270 mm [50 in.] long.

Cable assemblies will be electrically tested for short circuits, open circuits, and high-voltage failure as they are being made. An integral tester performs this function.

The major operating components of the machine include a feed/shear mechanism, no. 1 and no. 2 connector load stations, a transfer mechanism, two terminators, a cable clamp assembly, no. 1 and no. 2 connector termination modules, and a control cabinet.

The feed/shear mechanism feeds ribbon cable into the machine to programmed lengths and shears it during the machine cycle.

The no. 1 and no. 2 connector load stations feature load towers containing tube-loaded connectors, which are moved into corresponding connector termination modules by the load rams. The cable clamp assembly, which is moved into position by the transfer mechanism, is used on cable assemblies over 152.4 mm [6 in.] in length. The cable clamp pulls the trailing end of the cable into proper position for termination in the no. 2 module.

**Machine Dimensions**

Length (including dereeler) . . . . .	1219 mm [48 in.]
Height . . . . .	1575 mm [62 in.]
Width . . . . .	1219 mm [48 in.]

**Machine Weight (approximate)** . . . . . 286 kg [630 lb.]

**Air Requirements**

Pressure (Min) . . . . .	552 kPa [80 psi]
Capacity (Min) . . . . .	.0038 m <sup>3</sup> /sec [8 scfm]

**Electrical Requirements**

Voltage . . . . .	120 Vac
Frequency . . . . .	50-60 Hz
Circuit . . . . .	Single Phase
Current . . . . .	15 A

**Noise Levels – while machine cycles** ■ . . . . . 80 – 85 db (at operator's position)

**Electronic Tester**

Capacity . . . . .	9- to 64-conductor ribbon cable
Test Voltage (shorts and conductance) . . . . .	5 Vdc
HVT (High Voltage Test) Voltages †	
Receptacle . . . . .	1000 Vdc
Card Edge . . . . .	900 Vdc
HDF . . . . .	1000 Vdc
DIP Plug . . . . .	1000 Vdc
Low Profile . . . . .	800 Vdc
Sensitivity	
Conductance Test . . . . .	Fails if greater than 200 Ohms
Shorts Test . . . . .	Fails if greater than 600 Ohms
HVT . . . . .	Fails if less than 50 M Ohms

**Ambient Operating Environment**

Temperature . . . . .	5° to 40° C [41° to 104° F]
Relative Humidity . . . . .	20 to 90 percent (non-condensing) ‡

■ Typical machine cycles occur every 2 to 3 seconds with each cycle lasting approximately 1 second.

† The test voltages are automatically selected – based upon the current assembly. The connectors dictate the maximum voltage.

‡ Higher relative humidity can cause erroneous HVT failures and possible damage to electronic components within the tester and control system.

*Figure 2*

The modules hold the connectors in position over the cable for termination. The terminators compress the connector housings in the modules to terminate the connector onto the cable.

The operator interface, featuring a touch screen, is used to program and direct all operator-initiated actions on the machine. The touch screen is mounted on a pivoting base, allowing a 270° rotation for ease of use by the operator.

## 2.2. Functional Description

Prior to machine production operation, the following basic requirements must be satisfied:

- power on and air supply connected;
- appropriate connectors loaded into the load towers;
- proper ribbon cable loaded onto the dereeler assembly;
- cable end properly started into the feed/shear unit;
- machine programmed to run a specific cable assembly part number and quantity.

If the cable assembly to be made is, for example, a 203.2 mm [8 in.] jumper assembly, the following machine operation is required: the operator selects the cable assembly part number, goes through a setup procedure and enters a quantity to make. The operator then starts the run.

The actions for a 203.2 mm [8 in.] jumper assembly occur as described in this sequence. The connectors are loaded into the connector modules by the load rams and the modules are moved in front of the feed/shear mechanism. The feed/shear mechanism feeds the cable through the modules and the terminator is activated to terminate the no. 1 connector. When this occurs, two actions are initiated: the pinch roller of the feed/shear mechanism is opened; and the terminated connector is tested for short circuits.

Connector module 1 is then moved to an intermediate position while module 2 moves under the terminator. The pinch roller is closed, and the cable is fed the remaining distance of the programmed length. While this is being done, an arm descends to push slack in the cable downward, creating a "loop" which is increased as the remaining length of the cable is fed through the module 2.

When the programmed length of cable is reached, the cable clamp is activated to grip the cable and maintain it in position while the cable is sheared and the shear is retracted. Connector module 1 pulls the sheared cable through connector module 2 to proper position for termination. The terminator is activated to terminate the no. 2 connector onto the cable. With the terminator closed on the connector, the assembly is tested for open circuits. The terminator and clamp are then opened, and the cable assembly is tested for short circuits and high voltage failure.

If the cable assembly tests good, it is ejected through a chute into a bin for good assemblies. If the cable tests bad, the chute is lowered pneumatically to allow the bad cable assembly to be dropped into an alternate bin for rejected assemblies.

### 3. MACHINE SETUP

#### 3.1. Setup Checklist

1. Make certain that there is enough cable and connectors for the production run.
2. Make certain that the machine is hooked up to acceptable electrical and air supplies. Air and electrical hookups are located at the bottom corner of the machine below the area of the dereeler assembly.
3. Turn main power supply "on." The switch is located on a panel next to the cable assembly eject chute.
4. Make certain that the part number of the cable assembly to be made has been properly programmed on the control unit. Go through the COMPLETE SETUP mode on the touch screen.
5. Press the START box twice. The machine will cycle until the batch is completed, power is interrupted, the machine malfunctions, or cycle is stopped by pressing the STOP box.

#### 3.2. Product Loading/Unloading

Load connectors into the machine as follows:

1. Remove tape, foam, and release tabs from end of connector tube and hold connectors in tube with a fingertip. Then place open end of tube into top of load tower. Make sure that covers and number 1 pin location are properly oriented for the programmed cable assembly.

**NOTE**

*In the event that small connectors do not permit a fingertip in the gap between the load towers, use a pencil or plastic shim to guide the connectors down the towers.*

2. Lower connectors out of tube and onto ram escapements, taking care to keep them evenly stacked.

**DANGER**

*To prevent personal injury, DO NOT place hands, tools, or other objects through the opening in the clear vertical guard adjacent to the load tower.*

Load cable into machine as follows:

**NOTE**

*From the main menu, touch SET UP, enter the access code, touch MACHINE SET UP, touch LOAD NEW CABLE REEL, and follow the directions shown on the display.*

1. Remove tape from end of cable and, using a clean, dry cloth, wipe any dust or contaminants from the first 2 meters [6 ft.] (approx) of the cable.

2. Place reel on axle, noting where the “number 1” wire should be on the programmed cable assembly (to the inside or outside).
3. In the event that a reel has a center hole that is too large for the dereeler axle, reverse the flange and allow the collar of the flange to enter the hole in the paper reel, thereby taking the play out of the reel on the axle. Then place the flange retainer against the flange and lock into place.
4. Cut the cable end at a diagonal (no more than 45°) to facilitate the entry of the cable end through the feed/shear mechanism.

## 4. MACHINE OPERATION

### 4.1. Operation Procedure

With the machine loaded with connectors and cable, and the air and power “on,” proceed as follows:

1. Observe the touch screen of the control unit. The MAIN MENU screen will appear.
2. If the part number to be used has already been created in the EDIT MODE, go to Step 3. If it has not been created, perform the following (a through e):
  - a. Touch EDIT and then CREATE PART NUMBER.

**NOTE**

*The machine will ask for an access code. Touch 1 and then ENTER.*

- b. Give the assembly a name, toggle either 1 or 2 connectors and enter number of conductors. Comment information is optional.

**NOTE**

*To toggle the desired input, simply touch (or keep touching) the box on the screen until the desired input is displayed before touching ENTER to secure that input.*

- c. Enter length from end-to-end and length of tail, if any. Keying plug information is optional.
    - d. Enter the name or number of each connector, toggle the type of each connector and toggle orientation of cover in connector module 2. Polarization information is optional.
    - e. Check the information on the last screen to see that it is correct. If not, go back and change by touching PREVIOUS SCREEN. If information is correct, touch SAVE PART NUMBER.
  3. Touch RUN to bring up RUN MODE screen.
  4. Touch PART NUMBER to obtain directory and scroll part numbers until the desired part number is highlighted. Touch SELECT.

**NOTE**

*Touching SCROLL will run the existing part numbers past the indicator on the screen. Stop scrolling when the desired part number is at the indicator.*

5. Touch COMPLETE SETUP and follow all of the steps which have been outlined in the setup mode screens.
  6. Enter BATCH COUNT.

**NOTE**

*Quantity **must** always be 2 or more.*

7. Touch START twice, Touch STOP after making two or three assemblies. Inspect PREFEED, FINAL DRAG, and OVERALL LENGTH for consistency. If they are consistent but require adjustment, proceed to Step 8. If they do not require adjustment, proceed to Step 9.

**NOTE**

*If the offsets are not consistent, do NOT enter the ADJUST mode. Resolve the inconsistent feeding BEFORE attempting to adjust offsets.*

8. If required, adjust the offsets.
    - a. Touch RETURN and then SETUP. Enter the access code.
    - b. Touch ADJUST OFFSETS and then PRE-FEED OFFSET, FINAL DRAG OFFSET, and, for cables over 203.2 mm [8 in.], OVERALL LENGTH ADJUST.
    - c. Touch RUN, and then touch START twice.

d. The machine will start and then stop, allowing the operator to make any changes by looking into the modules and feeding cable out or back by touching the appropriate box on the screen. Save these values by touching SAVE OFFSET.

e. Touch START twice. Measure overall length of the next cable assembly and then enter it on the screen. The *next* cable the machine runs will have the proper offsets and length.

9. Touch START box twice and machine will run the remainder of the batch.

## 4.2. Main Menu Operation

The MAIN MENU screen appears when the machine is powered up. The AMP logo, and SOFTWARE VERSION appear on the screen as well as the following boxes on the pull down menu: RUN, STEP, MANUAL, EDIT, SET UP, and M.I.S.

### NOTE

*Throughout the text in this section, the screen boxes are printed in capital letters, e.g., RUN.*

### A. Run Mode

Touching this box will cause the machine to request one of the following actions (touch one box):

HOME MACHINE – if machine has not been homed

SKIP HOMING – if the machine has already been homed

RETURN – to return to the main menu

### DANGER

*Mechanisms may move when touching HOME MACHINE.*

### NOTE

*When executing commands which will result in mechanical motions by the machine, two touches on the box (within one second of one another) are required to activate the command. For example: HOME MACHINE requires two touches because machine mechanisms will move; PART NUMBER requires only one touch since no mechanical motion will result. The two-touch system is a safety feature which reduces the chance of accidentally activating the machine when someone is working in the vicinity of the mechanisms.*

The RUN MODE screen will appear and include the following boxes: PART NUMBER, NUMBER IN BATCH, RESET BATCH COUNT, RESET TOTAL COUNT, RETURN, HOME MACHINE, COMPLETE SETUP, AUTO SETUP, START or STOP.

1. PART NUMBER – Touching this box displays the programmed part numbers that the machine memory has stored.

PAGE UP – moves the display up 12 part numbers at a time

PAGE DOWN – moves the display down 12 part numbers at a time

SCROLL UP – moves the display up one part number at a time (the highlighted part number on the display is the one selected)

SCROLL DOWN – moves the display down one part number at a time

INFO – provides a screen of information on the highlighted part number

SELECT – selects the highlighted part number for the production run, RUN MODE screen reappears, and the BATCH COUNT and TOTAL COUNT go to zero

RETURN – returns you to the previous screen

### NOTE

*Any time RETURN is touched on any screen display, it will return you to the previous screen.*

2. NUMBER IN BATCH – Touching this box displays a keypad which allows the operator to select the number of assemblies to be run in a batch and then stop. Use the keypad and touch the digits to correspond to the desired number in the batch.

CLR – clears the entry made in the BATCH box

BKS – backspaces one character at a time when correcting a batch number

ENTER – enters the desired batch number

RETURN – returns you to previous screen

3. RESET BATCH COUNT – Touching this box zeroes the good and bad batch counts.
4. RESET TOTAL COUNT – Touching this box returns the total good and bad batch counters to zero.
5. PRODUCTION RATE – This display indicates the rate at which assemblies are being made per hour when the machine is running.
6. RETURN – Returns you to the previous screen.
7. HOME MACHINE – Touching this box brings up the HOME screen. If the machine has not been homed, touch twice.

**DANGER**

*Mechanisms may move.*

8. COMPLETE SETUP – Touching this box takes the controller into the SETUP MODE. This requires the operator to go through the SETUP procedure screen-by-screen (see Section 6, SETUP PROCEDURE, of this manual for a complete run-through).

**DANGER**

*Machine interlocks are disabled. Mechanisms may move.*

9. AUTO SETUP – Touching this box commands the machine to go through the SETUP MODE automatically. Some operator interaction is required.

**NOTE**

*This mode (AUTO SETUP) is used when the machine has been previously set up for a particular part number (assembly) and then turned off. When turned on, and the same part number is to be run, perform AUTO SETUP.*

10. START – Touching this box will start the machine after it has been set up.

**NOTE**

*Since this starts a machine motion, the box must be touched twice.*

11. STOP – Touching this box once will stop the machine at the completion of its current cycle.

## B. Step Mode

This mode allows the operator to move the machine through a complete cycle one step at a time. There are 31 steps in a machine cycle. Each step is represented by a circle on the display. The highlighted circle indicates the point of the machine cycle.

HOME MACHINE – Touch this box twice if machine has not been homed.

**DANGER**

*Mechanisms may move.*

1. SET STOP POINT – Touching this box will command the machine to stop at a given point in the cycle. A highlighted dot within the circle will indicate a set stop point. The machine will stop at the step following a set stop point in the machine cycle. Select appropriate stop points by touching box. Deselect by touching box again. There is no limit to the number of stop points that can be set.
2. SINGLE STEP – Touching this box will move the machine one step at a time through the cycle.
3. COMPLETE CYCLE – Touching this box will command the machine to go through a complete or remaining portion of a cycle.
4. RETURN – Touching this box will return you to the previous screen.
5. RUN TO STOP POINT – Touching this box will command the machine to run to the first (or next) stop point.

## C. Manual Mode

This mode allows the operator to move the machine mechanisms specific distances and to perform functions of the machine cycle independent of the cycle.

### 1. I/O SCREENS

The INPUT and OUTPUT screens (shown in Figures 3 through 5) are a diagnostic aid which allows the operator or setup person to identify a possible defect or a misadjustment. The screens display a variety of inputs and outputs with a corresponding circle indicating an active function when lit.

**NOTE**

*Screens are shown with the machine in the HOME condition.*

**Manual Mode – Input Board #1 (PCB – 1)**

1	Emergency Stop	<input checked="" type="radio"/>	14	Conn 1 rotated	<input type="radio"/>
2	Spare	<input type="radio"/>	15	Conn 1 ram home	<input type="radio"/>
3	Spare	<input type="radio"/>	16	Conn 1 ram load	<input checked="" type="radio"/>
4	Spare	<input type="radio"/>	17	Module 1 @ load	<input type="radio"/>
5	Spare	<input type="radio"/>	18	Conn 2 retracted	<input checked="" type="radio"/>
6	Spare	<input type="radio"/>	19	Conn 2 rotated	<input type="radio"/>
7	Spare	<input type="radio"/>	20	Conn 2 ram home	<input type="radio"/>
8	Spare	<input type="radio"/>	21	Conn 2 ram load	<input checked="" type="radio"/>
9	Spare	<input type="radio"/>	22	Spare	<input type="radio"/>
10	Spare	<input type="radio"/>	23	Good bin open	<input checked="" type="radio"/>
11	Spare	<input type="radio"/>	24	Good bin closed	<input type="radio"/>
12	Spare	<input type="radio"/>			
13	Conn 1 retracted	<input checked="" type="radio"/>			

INPUT #2

RETURN

Figure 3

**Manual Mode – Input Board #2 (PCB – 2)**

1	Tonker Up	<input checked="" type="radio"/>	14	Spare	<input type="radio"/>
2	Bot term. close	<input type="radio"/>	15	Spare	<input type="radio"/>
3	Bot term. open	<input checked="" type="radio"/>	16	Spare	<input type="radio"/>
4	Bad bin closed	<input checked="" type="radio"/>	17	Interlocks	<input checked="" type="radio"/>
5	Bad bin open	<input type="radio"/>	18	Dereeler jammed	<input type="radio"/>
6	Spare	<input type="radio"/>	19	Out of cable	<input type="radio"/>
7	Top term. open	<input checked="" type="radio"/>	20	Air pressure	<input checked="" type="radio"/>
8	Top term. close	<input type="radio"/>	21	Module 1 @term.	<input checked="" type="radio"/>
9	Shear retracted	<input checked="" type="radio"/>	22	Module 2 @load	<input type="radio"/>
10	Shear extended	<input type="radio"/>	23	Spare	<input type="radio"/>
11	Pinch roller on	<input type="radio"/>	24	Spare	<input type="radio"/>
12	Spare	<input type="radio"/>			
13	Spare	<input type="radio"/>			

OUTPUTS

RETURN

Figure 4

**Manual Mode – Output Board (PCB –3)**

1	Dereeler mtr on	<input checked="" type="radio"/>	14	E-Stop relay 2	<input type="radio"/>
2	Stepper mtrs on	<input checked="" type="radio"/>	15	Cable shear ext	<input type="radio"/>
3	Spare	<input type="radio"/>	16	Conn 1 rotated	<input type="radio"/>
4	Counter pulse	<input type="radio"/>	17	Conn 2 rotated	<input type="radio"/>
5	Mail air on	<input checked="" type="radio"/>	18	Mod 1 clmp clsd	<input type="radio"/>
6	Machine hrtbeat	<input style="border: 1px solid gray;" type="radio"/>	19	Good bin closed	<input type="radio"/>
7	Spare	<input type="radio"/>	20	Bad bin closed	<input checked="" type="radio"/>
8	Spare	<input type="radio"/>	21	Tonker down	<input type="radio"/>
9	Top term. clsd	<input type="radio"/>	22	Cable clmp clsd	<input type="radio"/>
10	Bot term. clsd	<input type="radio"/>	23	Mod 2 index ext	<input type="radio"/>
11	Spare	<input type="radio"/>	24	Pinch roller on	<input type="radio"/>
12	Spare	<input type="radio"/>			
13	E-Stop relay 1	<input checked="" type="radio"/>			

INPUT #1

RETURN

Figure 5

## 2. MOTOR OPERATIONS

The motor operations screen allows the operator to execute commands which activate the machine's motors to perform different functions and make adjustments during the machine cycle in the STEP MODE.

To enter commands in this mode, the operator must first enter the ACCESS CODE. The access code is initially set at "1" by AMP manufacturing. Refer to page 19 of this manual, CHANGE ACCESS CODE, to change the access code.

- CARRIAGE MOTOR

The carriage motor controls the movement of the carriage. Touching this box enables the operator to move the carriage specific distances to correct an error or to make adjustments.

There are 800 steps (increments of movement) per 25.4 mm [1 in.] for the carriage motor (one step equals .032 mm [.0012 in.] of carriage movement). These will be indicated on the display. As with any commands resulting in machine movement, the boxes must be touched twice to execute commands.

**DANGER**

*Machine interlocks disabled. Mechanisms may move.*

- MOVE 1 STEP FORWARD

Touching this box (twice) will move the carriage motor one step forward. By holding your finger on the box after the second touch, the carriage motor will continue to step forward until you lift your finger from the screen.

- MOVE 1 STEP BACKWARD

As with the previous command, touching twice will cause the carriage to move in this direction and continue to do so if contact is maintained with the box.

- MOVE 2.00 INCHES FORWARD

This command allows the operator to move the carriage this distance. The box must be touched twice each time this command is to be executed.

- MOVE 2.00 INCHES BACKWARD

As with the previous command, touching this box allows the carriage motor to be moved this specific distance.

- MOVE A SPECIFIC DISTANCE

Touching this box requests information (*in inches*) before it may be executed. Touch the appropriate boxes for the desired distance to move forward this distance, or touch "-" and the appropriate boxes for the desired distance to move backward this distance. Then touch ENTER to execute the command.

- RETURN TO INITIAL POSITION

Touching this box causes the machine to return to the initial position from any position to which it has been moved in this mode.

- RETURN

Touching this box at any time returns you to the previous screen.

- CABLE FEED MOTOR

Using this command mode allows the operator to move the cable feed motor in the same manner that the carriage motor is moved, with some differences specific to the cable feed function.

There are 160 steps (increments of movement) per 25.4 mm [1 in.] for the cable feed motor (one step equals .157 mm [.0062 in.] of cable movement). These will be indicated on the display. As with any command resulting in machine movement, the boxes must be touched twice to execute commands.

**DANGER**

*Machine interlocks disabled. Mechanisms may move.*

– MOVE 1 STEP FORWARD

Touching this box (twice) will cause the cable feed motor to move one step forward. Maintaining your touch on the box will cause the motor to continue to step forward.

– MOVE 1 STEP BACKWARD

As with the previous command, touching this box will cause the motor to move backward a step at a time.

– RETRACT/EXTEND PINCH ROLLER

Touching this box causes the pinch roller to extend or retract, depending upon which is currently displayed.

**CAUTION**

*With the pinch roller retracted, the possibility of the cable slipping out of the roller area exists. **Check the position of the cable after executing this command to ensure that it has not slipped out.***

– FEED 2.00 INCHES OF CABLE

Touching this box (twice) will cause the cable feed roller to feed 50.8 mm [2 in.] of cable each time the command is executed.

– FEED A SPECIFIC LENGTH

Touching this box will allow the operator to choose a specific cable length to be fed (*in inches*). Touch the appropriate boxes for the desired distance forward, or “–” and the appropriate boxes for the desired distance backward and then touch ENTER.

– RETURN TO INITIAL POSITION

This box enables the operator to return the cable feed motor to its initial position from any position to which it has been moved.

– RETURN

Returns you to the previous screen.

● MODULE 1 LOAD RAM MOTOR (CONNECTOR 1 FEED MOTOR)

Using this screen allows the operator to advance or retract the load ram motor for module 1, thereby positioning a connector in, or clearing a connector from, the ram escapement.

**DANGER**

*Machine interlocks disabled. Mechanisms may move.*

– MOVE 1 STEP FORWARD

Touching this box (twice) will step the ram motor forward one step at a time. Maintaining touch with the screen will cause the motor to continue to step forward.

– MOVE 1 STEP BACKWARD

Touching this box (twice) will step the motor backward one step at a time. Maintaining touch will cause the motor to continue stepping backward.

– RETURN TO INITIAL POSITION

Touching (twice) will result in the motor returning to its initial position from any position to which it has been moved.

– MOVE RAM TO HOME POSITION

Touching this box executes a command which will move the load ram to the home (rest) position.

– RETURN

Touching this box will return you to the previous screen.

- MODULE 2 LOAD RAM MOTOR (CONNECTOR 2 FEED MOTOR)

This screen controls the load ram motor for module 2 in the same manner as MODULE 1 RAM MOTOR. All commands are identical.

- MOVE 1 STEP FORWARD
- MOVE 1 STEP BACKWARD
- RETURN TO INITIAL POSITION
- MOVE RAM TO HOME POSITION
- RETURN

### 3. MACHINE OUTPUTS

This mode allows the operator to see if an output is failing or if a corresponding switch or mechanical motion is out of position. To enter this mode, the ACCESS CODE must be entered. Each output is identified and what it is doing mechanically is described. The term “screen” indicates a grouping of outputs.

**NOTE**

*Commands resulting in mechanical motion require two touches.*

- SCREEN NO. 1

**DANGER**

*Machine interlocks disabled. Mechanisms may move.*

- MOVE TONKER UP/DOWN  
The “tonker” (the arm which descends to tap the cable and cause it to form a downward loop on longer cable assemblies) is either up (rest position) or down.
- CLOSE/OPEN TOP TERMINATOR  
The top terminator is either up (rest position) or down.
- CLOSE/OPEN BOTTOM TERMINATOR  
The bottom terminator is either down (rest position) or up.
- EXTEND/RETRACT SHEAR  
The cable shear is either extended or retracted (rest position).
- FEED CABLE  
The cable feed mechanism is either active or at rest.
- CLOSE/OPEN CABLE CLAMP  
The cable clamp is either closed or open (rest position).
- RETRACT/EXTEND PINCH ROLLER  
The pinch roller is either retracted or extended (rest position).
- CLOSE MODULE 1 CLAMP  
The first module clamp is either closed or open (rest position).
- RETURN  
Touching this box returns you to the previous screen.

- SCREEN NO. 2

**DANGER**

*Machine interlocks disabled. Mechanisms may move.*

- ROTATE/PICK UP CONNECTOR #1  
The connector for the first module is either rotated into position in the ram escapement or picked up.

– LOAD/HOME CONNECTOR #1 RAM

The connector is either loaded into the first module (ram extended) by the ram or the ram is retracted (home).

– ROTATE/PICK UP CONNECTOR #2

The connector for the second module is either rotated into position in the ram escapement or picked up.

– LOAD/HOME CONNECTOR #2 RAM

The connector is either loaded into the second module (ram extended) by the ram or the ram is retracted (home).

– TURN OFF/ON DEREELER MOTOR

The dereeler motor is either off (de-energized) or on (energized).

– TURN OFF/ON MAIN AIR

The main air supply is either off or on (within the machine).

**NOTE**

*This does not turn the external air supply to the machine off and on.*

**DANGER**

*Other mechanisms may move when main air supply is turned off or on.*

– RETURN

Touching this box returns you to the previous screen.

● SCREEN NO. 3

**DANGER**

*Machine interlocks disabled. Mechanisms may move.*

– MOVE CARRIAGE 6.00 INCHES/MOVE CARRIAGE TO HOME POSITION

Touching this box will cause the carriage to move 152.4 mm [6 in.]. Touching it again will cause it to move back to its home position.

– EXTEND/RETRACT INDEX

Touching this box either extends or retracts the index cylinder (module 2).

– CLOSE/OPEN GOOD BIN DIVIDER

This box controls the opening and closing of the “good” (acceptable cable assemblies) bin divider door.

– CLOSE/OPEN BAD BIN DIVIDER

This box controls the opening and closing of the “bad” (rejected cable assemblies or rejected partial cable assemblies) bin divider door.

– RETURN

Touching this box will return you to the previous screen.

#### 4. CONTINUITY TESTING

The continuity testing mode is used to solve problems in the testing system and can be used to check a completed cable assembly. The SHORT, OPEN, and HVT tests can be executed in this mode.

● SHORT TEST

In the RUN and STEP modes, this test is conducted after the termination of the first and second connectors when the press is opened and the shorting header in module 2 is removed.

Touching the SHORT box will execute the test and will display the status of all 64 test points. When no cable assembly is attached to the test header in module 1 all lines should indicate no shorts.

- OPEN TEST

The Open Test is conducted in the RUN and STEP modes. This test is conducted when the press is closed and the shorting header is inserted into the second connector of the assembly.

Touching the OPEN box will execute this test and will display the status of all 64 test points. When no cable assembly is attached to the test header in module 1, all lines should indicate open.

- HVT TEST

In the RUN and STEP modes, this test is conducted after the last connector is terminated, and only on those assemblies which have passed the previous OPEN and SHORT tests. The HVT test in these modes is a fast gang test that does not report which conductors had failed but only that the assembly had failed. The HVT test when executed in the MANUAL mode will perform the fast HVT and indicate its result, and then the slow test that will report which conductors had failed.

Touching the HVT box will execute both tests and will display the status of all 64 test points. When no cable assembly is attached to the test header in module 1, all lines should indicate no failures. If the system fails HVT, disconnect the ribbon cable from the tester and perform the test to determine if it is the cable or the tester. HVT failures can occur if any contaminants are on the sheared end of the test cable or within tooling module 1 around the test header. Tooling module 1 inserts must be kept as clean as possible.

**CAUTION**

*Do not defeat machine interlocks.*

**DANGER**

*A danger may exist for persons with pacemaker implants or other heart-related devices. Do not execute HVT test when the test probes or end of cable assembly are in contact with the machine frame. Do not execute this test when the assembly has not been sheared from the reel of cable.*

## D. Edit Mode

This mode allows the operator to create new part numbers, modify existing part numbers or delete stored part numbers. To enter this mode, the ACCESS CODE must first be entered by touching the appropriate digits on the keypad and then touching ENTER.

### 1. CREATE PART NUMBER

Touching this box will allow the operator to create a new part number which will be stored in the machine memory (up to 150 part numbers may be stored).

- ENTER PART NUMBER (FIRST SCREEN)

Enter the desired letters/numbers by touching the keypad. If numbers are displayed, touch "show letters" to display letters. If letters are displayed, touch "show numbers" to display numbers. To enter the desired letter (of the three in each box), locate and touch the box containing the desired letter. Touch "FIRST" for the first character, "SECOND" for the second character, or "THIRD" for the third character. Continue to do this until you have imprinted the desired part number on the screen and then touch ENTER.

**NOTE**

*Use the underline character ( ) to indicate a space.*

- NEXT SCREEN OF EDIT PART

- CONNECTORS:

Select the desired number of connectors per assembly by touching the box. If 0 connectors are selected, this part number will cause the machine to FEED, MEASURE, AND CUT cable. When a part number is FEED AND CUT assembly, the remainder of the Edit Mode will not prompt for connector specific information. If this part number is selected in the RUN MODE, COMPLETE SETUP for this assembly will correctly prompt the operator to set the machine up for CABLE FEEDING AND CUTTING.

- CONDUCTORS:

Select the desired number of conductors by touching the appropriate boxes. A minimum of 9 through a maximum of 64 is available.

– COMMENT:

The operator may elect to enter a comment of up to 40 characters maximum (for example, the company name for which the assembly is being made or a location code for the load towers).

● NEXT SCREEN OF EDIT PART

– CONVERT TO METRIC

The operator may elect to use metric dimensions on the part number to be made. If this is the case, touch this box. The machine will convert to metric dimensions for the cable assembly.

– LENGTHS

The machine will ask for the assembly length (outside to outside) and for a pre-feed tail length if desired.

– KEY PLUG #1

If the cable assembly has a keying plug, touch the screen to enter the location.

– KEY PLUG #2

If the cable assembly has a second keying plug, touch the screen to enter the location.

● NEXT SCREEN OF EDIT PART

Module 1 and 2 connector information is entered on this screen:

– NAME

The part number for the connector is entered here.

– STYLE

Select the connector style by touching one of the following which corresponds to the connector to be used: receptacle, low-profile, card edge, HDF, DIP plug.

**NOTE**

*Selection of the connector style determines the test voltage of the tester in the machine. See Figure 2 for specifications of the tester.*

– COVER

Touch this box to select connector cover orientation (up or down). **NOTE:** The connector in module 1 cannot be changed, and is always “cover down.”

– POLARIZATION

Touching one of the boxes indicates the polarization of the connectors to be run: None – Lead End – Trail End. Polarization is only available for receptacle and low-profile connectors.

● NEXT SCREEN OF EDIT PART

CHECKLIST:

– SHOW ERRORS

Touch this box to see incomplete data.

– SAVE PART NUMBER

Touch this box to save the part number just created.

● ADDITIONAL EDITING FUNCTIONS:

– PREV SCREEN

Touch this box to call up the previous screen.

– MAIN MENU

Touch this box to return to the main menu without saving the part.

## 2. MODIFY PART NUMBER

Select the desired part number from the list by scrolling up or down until the desired number is highlighted. Touch SELECT and then continue by using the functions of this Section (EDIT MODE) to change (modify) the part number.

## 3. DELETE PART NUMBER

The operator may select a part number from the list to delete by scrolling up or down until the desired part number is highlighted and touching DELETE.

**NOTE**

*When the DELETE box is touched, a second DELETE box is offered. This second DELETE box must be touched within one second to prevent accidental deletions.*

## E. SET UP MODE

This mode allows the operator to set up the machine for a production run by making mechanical adjustments and going through a checklist of items prior to starting the run.

### 1. ADJUST OFFSETS

This screen indicates adjustments (mechanical or otherwise) that may be required for making acceptable cable assemblies:

- SET PREFEED OFFSET

If highlighted, the machine will stop at the appropriate part of the machine cycle and will allow the operator to make the desired change.

**NOTE**

*Remember to select the SAVE OFFSET box before exiting this screen.*

- SET FINAL DRAG OFFSET

If highlighted, the machine will stop at the appropriate part of the machine cycle and will allow the operator to make the desired change.

**NOTE**

*Remember to select the SAVE OFFSET box before exiting this screen.*

- ADJUST CABLE LENGTH

This function allows the operator to physically measure the cable length and then enter that value on the screen. The machine will recalculate the difference and adjust to make the desired length.

**NOTE**

*This feature can only be used for cable assemblies 203.2 mm [8 in.] or longer.*

## 2. MACHINE SET UP

This screen offers two options for SET UP and a procedure for loading a new cable reel:

- COMPLETE SET UP

Touching this box takes you through the procedure as described in Section 6, SETUP PROCEDURE, of this manual.

- AUTO SET UP

Touching this box places the machine in the AUTO SET UP mode which takes the machine through the setup procedure with appropriate stops during the sequence which require operator interaction.

- LOAD NEW CABLE REEL

Touching this box takes the operator through a 6-step sequence which requires the operator to touch the screen at the appropriate times during the cable reel changeover.

### 3. SET SOFTWARE PARAMETERS

This sequence steps the operator through a series of steps to set required parameters for the proper functioning of machine software.

- SET TIME

Use the keypad on the screen to set the time, then touch SAVE TIME.

- SET DATE

Use the keypad on the screen to set the date, then touch SAVE DATE.

- CHANGE ACCESS CODE

If the operator desires a change to the access code (initially set at "1"), touch the keypad and enter up to a four-digit number.

**NOTE**

*When changing the access code, it is recommended that a record of the code be provided to supervisory personnel responsible for the machine and, if desired, marked on a piece of tape inside the door of the control cabinet in the event that an operator is not aware of, or does not remember the new code.*

- CARRIAGE PARAMETERS

The carriage parameters are set when the machine is assembled and qualified prior to shipment. AMP recommends that they NOT be changed by the customer. If there are any questions regarding the carriage parameters, contact AMP Incorporated at the Technical Assistance Center number in the front of this manual.

- VELOCITY (381.0 MM/SEC [15.00 IN./SEC] DEFAULT)
- ACCELERATION (3810.0 MM/SEC<sup>2</sup> [150.00 IN/SEC<sup>2</sup>] DEFAULT)

- CABLE FEED PARAMETERS

The cable feed parameters, like the carriage parameters, are preset.

- VELOCITY (889.0 MM/SEC [35.00 IN./SEC] DEFAULT)
- ACCELERATION (8890.0 MM/SEC<sup>2</sup> [350.00 IN/SEC<sup>2</sup>] DEFAULT)

- FEED RAM #1 PARAMETERS

The feed ram parameters are preset at AMP Incorporated.

- VELOCITY (762.0 MM/SEC [30.00 IN./SEC] DEFAULT)
- ACCELERATION (7620.0 MM/SEC<sup>2</sup> [300.00 IN/SEC<sup>2</sup>] DEFAULT)

- FEED RAM #2 PARAMETERS

- VELOCITY (762.0 MM/SEC [30.00 IN./SEC] DEFAULT)
- ACCELERATION (7620.0 MM/SEC<sup>2</sup> [300.00 IN/SEC<sup>2</sup>] DEFAULT)

- ADDITIONAL PARAMETERS

These parameters are used for troubleshooting the machine. These values should not be changed unless you are instructed to do so by AMP Incorporated.

- GOOD RAM DELTA (DEFAULT 10)
- BAD RAM DELTA (DEFAULT 30)

The good and bad ram deltas provide a window in steps in which the connector load rams (when loading a connector) can sense the load position of the ram. This parameter is preset.

– LOAD RAM TIME DELAY (DEFAULT 0)

This function provides a delay in hundredths of seconds after the connector drop(s) are down, but before the connector load rams extend. If the load rams repeatedly extend a short distance into the connector drop and an error occurs, try increasing the delay by a few hundredths of a second.

– DISABLE/ENABLE CABLE TESTING

Touch this box to disable or enable cable testing. If the testing is disabled, a warning is placed on the STEP MODE and RUN MODE screens.

– OPENS TEST TIME DELAY (DEFAULT 0)

This delay occurs after the terminating unit is closed on the second connector but before the OPENS test. The terminating unit closed sensor could be made a short time before the complete end of the cylinder stroke, thus causing the tester to perform the OPENS test before the shorting probes are fully seated into the second connector. If false indications of opens occur in the run mode and a manual mode test is initiated and passes with no opens, this is an indication that the delay might be required.

– SHORTS TEST TIME DELAY (DEFAULT 10 [0.1 SECONDS])

This delay occurs after the terminating unit opens but before the SHORTS test. The terminating unit open sensor could be made a short time before the complete end of the cylinder stroke, thus causing the tester to perform the shorts test before the shorting probes are removed from the second connector. Additionally, the module might open more slowly than the terminating unit, depending upon the springs installed and the number of contacts being tested. If false indications of shorts occur in the run mode and a manual mode test is initiated and passes with no shorts, this is an indication that the delay might need to be increased.

– CABLE FEED DELAY (DEFAULT 0)

This function provides a delay (in hundredths of a second) between when the tonker arm comes down and when the cable is fed. If the cable does not form a downward loop, this delay might be required.

#### 4. SET BAD CABLE LIMITS

This function allows the operator to set limits on the number of unacceptable cables produced in a batch before stopping the machine to determine the cause.

- SET NUMBER OF CONSECUTIVE BAD CABLES

The operator may enter a number of unacceptable cable assemblies that may be produced before stopping the machine (for example: 3).

- SET PERCENTAGE OF BAD CABLES

The operator may enter a percentage of allowable unacceptable cable assemblies in a batch before stopping the machine (for example: 2%).

#### F. M.I.S. Machine Information Service

This mode allows the operator to access and command the machine to provide certain information on the display or on a printer attached to the machine.

##### 1. PRINT EVENT LOG

Touch this box to command the printer to provide a hard copy of the past events, starting with the most recent. Select the desired number of events up to the maximum of 999.

##### 2. PRINT PRODUCTION TOTALS

Touch this box to print a hard copy of the production totals for a given time period.

##### 3. PRINT BATCH INFO / DISABLE BATCH INFO

Touch this box to command the printer to provide a hard copy of the running batch information, or touch again to disable the print batch information, thereby stopping the machine from printing running batch information.

#### 4. PRINTER PARAMETERS

The following boxes allow the operator or setup person to match the serial communication parameters of the machine to those of the printer.

- BAUD RATE  
300, 600, 1200, 2400, 4800, 9600
- LENGTH  
7 or 8 bits
- PARITY  
NONE, ODD, EVEN
- STOP BITS  
1 or 2

#### 5. DISPLAY EVENT LOG

This screen allows the operator to review the event log (the last 1000 events that have occurred on the machine) by touching the appropriate boxes as follows:

- PAGE BACKWARD IN TIME
- SCROLL 100 EVENTS BACK
- PAGE FORWARD IN TIME
- SCROLL 100 EVENTS FORWARD
- RETURN

#### 6. DISPLAY PRODUCTION TOTALS

This screen allows the operator to display information regarding the machine's current production as follows:

GOOD ASSEMBLIES	FAILED SHORTS TEST
FAILED OPENS TEST	FAILED HVT TEST
TOTAL BAD	PERCENTAGE GOOD
TOTAL CONNECTORS	

- RESET COUNTS

Touching this box will reset all counts (totals) to zero. It is not part number specific. Current time and date will be saved.

- RETURN

Touch this box to return to previous screen.

**5. TOOLING CHANGEOVER**

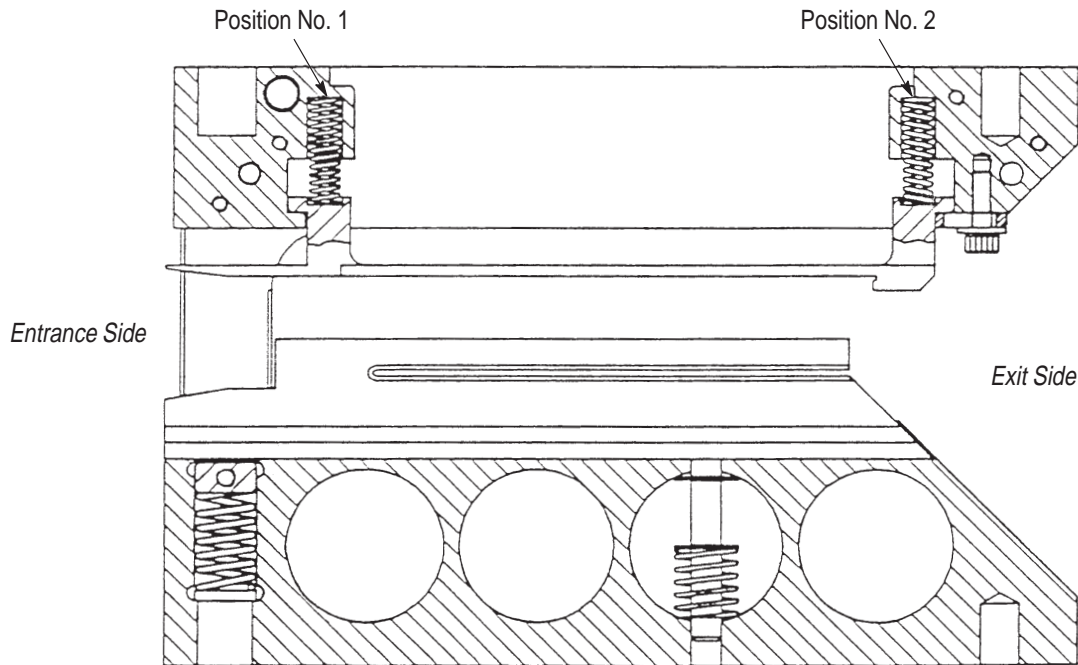
Running different connector styles requires changing the tooling in the connector modules and the ram escapements. The tooling for the modules includes the test probes and cable assembly for the continuity tester, which must also be changed for the different connector styles and sizes.

When changing connector styles, the tooling should be removed and replaced generally as follows:

1. Open the door of the machine, allowing access to the connector modules, carriage assembly, and continuity tester. The safety interlock of the door will be broken, thereby disabling the machine.
2. Using the latches provided on the tester connector, disconnect the "C cable" (the cable that connects module 1 to the testing unit) from the tester.
3. Pull the clevis pin which releases the clamp cylinder from the module.
4. Lift module 1 (and its attached test cable) out of the carriage and place it on a workbench.
5. Snap the probe unit out of the module. It is retained by two ball detents and has a recess to lift on.
6. Place the module on the bench, with the four large holes down, and release the cover insert by depressing the spring shaft (located in the second hole) and sliding the insert out of the module.
7. Remove the housing insert from the module by loosening the hex screw on the end of the module sufficiently to slide the metal retainer forward and then lift the insert from the module.

**CAUTION** *There are two springs which support the housing insert. Take care to note their position. One spring is heavier than the other. The correct orientation of these springs depends on the connector type and size being run. See Figure 6.*

CONNECTOR SIZE (Number of Contacts)	SPRING TYPE AND POSITION FOR CONNECTOR SIZE ♦					
	RECEPTACLES		CARD EDGE		HDF	
	POSN NO. 1	POSN NO. 2	POSN NO. 1	POSN NO. 2	POSN NO. 1	POSN NO. 2
10-14	Light	Light	Light	Heavy	Light	Heavy
15-30	Light	Heavy	Light	Heavy	Light	Heavy
34-64	Heavy	Heavy	Light	Heavy	Light	Heavy



♦ Refer to drawing for Spare Parts Kit 679175, supplied with the machine, for spring part numbers.

Figure 6

8. After removing the housing insert, make certain that the springs are in their proper locations and install the proper insert for the connector style you will be terminating:
  - a. Place the insert in the module with the recesses for the springs over the springs in the module.
  - b. Slide the metal retainer back over the end of the insert and securing it with the hex screw.
  - c. Pick the module up and examine the underside of the insert to make sure that the springs are properly seated in the recesses. If they are not, use a probe (such as a small screwdriver) to align and seat them properly.
9. Place the module on the bench, depress the spring shaft sufficiently to allow entry past that point in the slot and slide the cover insert in the slot. The spring shaft will latch in the insert to secure it. If the insert has been installed backwards, the spring shaft will not engage or will engage when the insert has only been installed one third of its length.
10. Install the probe unit in the module by aligning it in the opening and pressing it in until the ball detents engage.
11. Lift module 2 out of the carriage and place it on the workbench.

**NOTE**

*It may be necessary to slide the cable clamp out of the way on the carriage to allow the removal of module 2. Simply pull the clamp away from the module and hold it against its spring until the module is removed, then allow it to return to its original position.*

12. Repeat Steps 5 through 9 for module 2.
13. Re-install the modules in the carriage in a reverse of removal.
14. If the ram escapements need to be changed, perform the following:
  - a. Remove any remaining connectors.
  - b. Lift the ram escapements out of their respective platforms by lifting them clear of the actuating arms.
  - c. Install the proper ram escapements in their respective platforms by laying them in position over the actuating arms.
15. Position the load towers by taking a connector of the size and type to be run and adjusting the gap between the towers.

**NOTE**

*The towers are designed to accommodate all connector widths by increments of 2.54 mm [.100 in.]. After installing one tower, place the connector in the tower slot (note that the towers must be oriented for particular connectors) and place the other tower in the position closest to the required spacing. If the correct spacing cannot be achieved, move both towers to the left or right by one slot, thereby closing or opening the gap by 2.54 mm [.100 in.] until the correct spacing is obtained.*

16. After the load towers, ram escapements, and connector modules have been installed, the tooling must be aligned as follows:
  - a. Close the door of the machine and follow Section 6, SETUP PROCEDURE, noting that the tooling changes, where specified in that procedure, have been made.
  - b. Adjust load station no. 1 by releasing the locking lever located beneath the load tower/ram escapement platform and pulling or pushing the platform until it is aligned with the tooling in the module. Lock the platform down by turning the locking lever clockwise after visual examination shows that it is properly aligned.
  - c. Adjust load station no. 2 by releasing the lock on the thumbwheel of the jack beneath the load tower/ram escapement platform and then turning the thumbwheel to adjust the height of the platform until visual inspection determines that the ram escapement is level with the module tooling. Lock the jack in position with the thumbwheel lock.

## 6. SETUP PROCEDURE

Setting up the R-CAM 3A Machine for a production run requires not only programming of a part number and quantity to be run, but some tooling changes and adjustments in some cases. Enter the SET UP mode and proceed as follows:

1. Remove connector modules and install proper tooling for each module. Note that the first module must be cover down. (See Section 5.)
2. Replace modules.
3. Place the dereeler direction switch to the neutral position. Load the cable through the feed/shear unit, press the ENGAGE ROLLER box twice, place the dereeler direction switch to the correct position.
4. Install (or remove) the cable clamp.
5. Home the carriage motor by touching the HOME CARRIAGE box twice.

**DANGER**

*Mechanisms may move.*

6. Feed cable through the feed/shear unit by touching the FEED CABLE box twice to start feeding and again to stop feeding.
7. If different connectors are to be used for this assembly, remove the old connectors.
8. Install correct ram escapements in both load stations.
9. Place the load towers into the slots as required.
10. Load AMP tube-loaded connectors only.
11. Rotate a connector into position for module 1 by touching the ROTATE CONNECTOR box twice.
12. If necessary, rotate a connector into position for the module 2 load ram by touching the ROTATE CONNECTOR box twice.
13. Allow module 2 to move against module 1 by touching EXTEND INDEX box twice.
14. Move module 1 to its load position by touching the MOVE TO LOAD POSITION box twice.
15. Adjust load station no. 1 to module 1 and lock down the station.

**NOTE**

*The position indicator ("○") will become filled in (solid) when the module is moved to position. A final visual adjustment is required for correct positioning.*

16. Adjust load station no. 2 to the proper height.

**NOTE**

*Adjustment requires a visual inspection to determine correct height. The height is adjusted by unlocking and turning the thumbwheel of the jack located below the load station until proper height is achieved. After desired height is achieved, the thumbwheel is locked in position.*

17. Shear the cable by touching the SHEAR CABLE box twice. Check that the scrap cable is removed.
18. Push the connectors into the modules by touching the LOAD CONNECTORS box twice.
19. Retract the connector load rams by touching the RETRACT RAMS box twice.
20. Retract the connector rotate cylinders by touching the RETRACT ROTATE CYLINDERS box twice.
21. Check to see if the connectors were properly loaded. If not, touch the PREVIOUS STEP box to go to Step 11, and reload connectors.
22. The setup for the R-CAM 3A Machine is now complete, and the machine is ready for a production run.

## 7. ADJUSTMENTS

### 7.1. Feed Adjustment

To adjust for incorrect cable lengths when the actual measured length of the cable differs from the programmed length, perform the following:

1. Go to SET UP menu on the touch screen.
2. Touch ADJUST OFFSET.
3. Touch PREFEED OFFSET, FINAL DRAG OFFSET, and/or OVERALL LENGTH ADJUST.

In the run mode, the machine will stop, allowing the operator to adjust either end of the cable length by moving the cable feed motor or the carriage motor one step at a time, either forward or backward. The machine door may be opened to view cable locations.

4. When cable is at the desired location, touch SAVE OFFSET.
5. If OVERALL LENGTH ADJUST has been chosen, measure overall cable length end-to-end and enter that amount in the key pad which will be displayed automatically.

**NOTE**

*To adjust cable length on assemblies shorter than 203.2 mm [8 in.], use the EDIT mode to modify the programmed length as necessary.*

### 7.2. Cable Registration Adjustment

In case of misregistration (cable not aligned with the flutes in the connector housing and cover), the following adjustment must be performed:

1. Loosen the locknut on the side of the tooling module base.
2. Turn the screw clockwise to move the connector away from the no. 1 conductor of the cable or counterclockwise to move the connector toward the no. 1 conductor (one-half turn of the screw equals .41 mm [.016 in.] of movement in the module.
3. Tighten the locknut.
4. Cycle the machine and examine the connector(s) for correct cable registration. If misregistration still exists, repeat Steps 1 through 3 until registration is correct.

**NOTE**

*To evaluate cable registration on failed connectors, remove connector cover and view cable registration in contact slots with a magnifying glass or microscope.*

### 7.3. Cable Feed Adjustment

In case of cable stubbing (cable not feeding through modules and connectors), the following adjustment must be performed:

1. Push EMERGENCY STOP ("E" Stop) button.
2. Use a hex wrench to adjust the spring plungers located under the tooling module bases in the carriages.
3. If the cable is being deflected upward, lower the spring plungers; if being deflected downward, raise the spring plungers.

**NOTE**

*Adjust the number 2 module FIRST. Check cable clamp and adjust if necessary. Then, adjust the number 1 module.*

**CAUTION**

*Each tooling module has two spring plungers. They must be raised or lowered in equal amounts to keep the modules "square" on the carriage.*

### 7.4. Diagnosing Testing Problems

This section deals with diagnosing problems which may arise in conjunction with messages displayed by the tester.

#### A. Machine Indicating SHORT Conductors on Assembly

1. Check registration of cable within the connectors. Adjust tooling modules to align if necessary.
2. Damaged header in module 1. Inspect and replace if necessary.

3. With no test cable attached to the test header in module 1, execute a SHORT test. All lines should indicate no shorts. If shorts appear, check test cable and the tester (without any cables attached) for shorts. If the problem still exists, contact AMP Incorporated at the Technical Assistance Center number in the front of this manual.

**B. Machine Indicating OPEN Conductors on Assembly**

1. Damaged header in module 1. Inspect and replace if necessary.
2. Damaged shorted test probes in module 2. Inspect and replace if damaged.
3. If the terminating cylinder extend switch is made prematurely, the tester will see this as “opens” because the test is performed before the shorting probes enter the connector.
4. Intermittent or failed test leads. Disconnect the test cable from the test header in module 1. Attach a completely shorted 64-position header to the test cable and execute an OPEN test. All lines should indicate no opens. If open lines correspond to the lines indicated when a cable assembly was run, check the test cable for opens. If the problem still exists, contact AMP Incorporated at the Technical Assistance Center number in the front of this manual.

**C. Machine Indicating HVT Failure on Assembly**

1. Check registration of cable within the connectors. Adjust tooling modules to align. To evaluate cable registration on failed connectors, remove connector cover and view cable registration in contact slots with a magnifying glass or microscope.

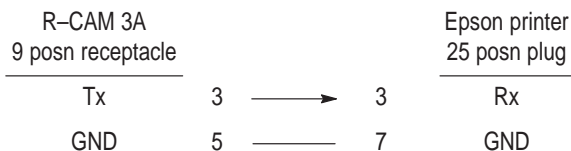
**NOTE** *If horizontal module alignment is performed and no change is detected:*  
 A. Check for excessive material on the edges of the ribbon cable. This may tend to move the connector when the cable is fed.  
 B. Try a different module spring combination to better control connector movement during termination.

2. Damaged header in module 1. Inspect and replace if damaged.
3. Check module 1 tooling inserts and the sheared end of the test cable for dirt and contaminants. If they are dirty, clean them with a non-residue spray cleaner such as tuner cleaner.
4. Excessive humidity conditions may cause HVT failures.
5. With no test cable attached to the test header in module 1, execute a high-voltage test (HVT). All lines should indicate no failures. If failures appear, check the test cable and the tester (without the cables attached) for failures. High voltage failures are not always easily identified by looking at a cable assembly. Any slight misregistration in the cable may cause a cable to fail the high voltage test. Abusive handling of the test cable can also cause high voltage failures. If the problem still exists, contact AMP Incorporated at the Technical Assistance Center number in the front of this manual.

**7.5. Printer Specifications**

The printer must be a serial printer with a buffer that prints ASCII characters. There are no handshake lines from the printer, therefore the R-CAM 3A will send characters whether a printer is attached or not. When printing production totals, or machine log entries, and the printer is not correctly attached or is off line, touch ABORT for a few seconds to stop the transmission of characters. Correct the printer problem and try printing again.

The communication parameters for the R-CAM 3A and the attached printer must match. The cable configuration may change from printer to printer. The signal lines are indicated below. The cable shown is for an Epson ⌘ printer with a serial adapter.



⌘Trademark of Seiko Epson Kabushiki Kaisha

The mating connector for the R-CAM 3A serial port is:

205203-3	Receptacle, 9 posn.
205089-1	Socket (machine screw) or
66569-3	Socket (solder cup)
205729-1	Cable Clamp

The mating connector for the Epson serial printer port is:

207464-1	Plug, 25 posn.
205090-1	Pin (machine screw) or
66570-3	Pin (solder cup)
205718-1	Cable Clamp

## 8. MAINTENANCE

### 8.1. Perform Weekly

Remove modules, examine test probes (replace if damaged), and clean debris from tooling. Wipe the entire machine clean and oil the following items using a light machine oil such as "3-In-One" or "Starrett":

1. Module slides (4) – located on sides of tooling modules.
2. Tooling base guide posts (4) – located underneath tooling modules passing through carriages.
3. Ball screw (1) – located underneath base plate attached to transfer motor.
4. Carriage slide (1) – attached to underside of base plate.
5. Cable clamp slide (1) – located next to base plate attached to carriages.
6. Cable clamp guide keys (2) – located on cable clamp holding the two sliding members together.
7. Press guide posts (4) – located on sides of press assemblies and are attached to press blades.

### 8.2. Perform Monthly

1. Remove shear die and clean debris from around the cable return plate. Cable return plate may be removed for more thorough cleaning by removing the two 1/4-inch diameter shoulder bolts which are accessed from under the base plate. Be careful not to lose the two springs which push up against the cable return plate. Very lightly oil the sliding surfaces before re-assembling.
2. Clear the two in-line air filters of excess fluid by pushing sideways on the manual flex-drain located at the bottom of the filter bowls. It shuts off automatically when released. If the filter elements are dirty and air pressure drops below 483 kPa [70 psi], replace them with new elements as follows:

5-micron (closest to air supply)...FRP-95-034....AMP part no. 985678-1  
 0.01-micron (next to 5-micron).....MTP-95-548....AMP part no. 16855-1

## 9. SENSOR ADJUSTMENTS

### 9.1. Input Board No. 1 (PCB-1)

NO.	SENSOR NAME	SENSOR TYPE
1	Emergency Stop Input made when relay contact is closed.	Relay contact (K313)
13	S113 Connector No. 1 Retracted Sensor is made when the cylinder is fully retracted.	Magnetic Hall effect (853048-1)
14	S114 Connector No. 1 Rotated Sensor is made when the cylinder is fully extended.	Magnetic Hall effect (853048-1)
15	S115 Connector No. 1 Rack Home Sensor is made when the rack is in front of it. When the rack is at home, the sensor is not made.	Proximity (983300-1)

16	S116 Connector No. 1 Ram Loaded	Proximity (983300-1)
	Sensor is made at rest and breaks when the unit moves 4.75 to 6.35 mm [.187 to .250 in.].	
17	S117 Module No. 1 Load Position	Proximity (983300-1)
	Sensor is made when module No. 1 is at the connector load position.	
18	S118 Connector No. 2 Retracted	Magnetic Hall effect (853048-1)
	Sensor is made when the cylinder is fully retracted.	
19	S119 Connector No. 2 Rotated	Magnetic Hall effect (853048-1)
	Sensor is made when the cylinder is fully extended.	
20	S120 Connector No. 2 Rack Home	Proximity (983300-1)
	Sensor is made when the rack is in front of it. When the rack is at home, the sensor is not made.	
21	S121 Connector No. 2 Ram Loaded	Proximity (983300-1)
	Sensor is made at rest and breaks when the unit moves 4.75 to 6.35 mm [.187 to .250 in.].	
23	S123 Good Bin Open	Magnetic Hall effect (853048-1)
	Sensor is made when the cylinder is fully extended.	
24	S124 Good Bin Closed	Magnetic Hall effect (853048-1)
	Sensor is made when the cylinder is fully retracted.	

## 9.2. Input Board No. 2 (PCB-2)

NO.	SENSOR NAME	SENSOR TYPE
1	S201 Tonker Up	Magnetic Hall effect (853048-1)
	Sensor is made when the tonker is up and clear of the tooling module.	
2	S202 Bottom Terminator Closed	Magnetic Hall effect (853047-1)
	Sensor is made when the terminator is fully extended. Adjust with module under terminator and connector in module.	
3	S203 Bottom Terminator Open	Magnetic Hall effect (853047-1)
	Sensor is made when the terminator is full retracted.	
4	S204 Bad Bin Closed	Magnetic Hall effect (853048-1)
	Sensor is made when the cylinder is fully extended.	
5	S205 Bad Bin Open	Magnetic Hall effect (853048-1)
	Sensor is made when the cylinder is fully retracted.	
7	S207 Top Terminator Open	Magnetic Hall effect (853047-1)
	Sensor is made when the terminator is full retracted.	
8	S208 Top Terminator Closed	Magnetic Hall effect (853047-1)
	Sensor is made when the terminator is fully extended. Adjust with module under terminator and connector in module.	
9	S209 Shear Retracted	Magnetic Hall effect (853046-1)
	Sensor is made when the cylinder is fully retracted. Sensor must be adjusted with the cylinder disconnected from the shear blade.	

10	S210 Shear Extended	Magnetic Hall effect (853046-1)
	Sensor is made when the cylinder is fully extended. Sensor must be adjusted with the cylinder disconnected from the shear blade.	
11	S211 Pinch Roller On	Magnetic Hall effect (853048-1)
	Sensor is made when the pinch roller is fully engaged.	
17	S217 Magnetic Interlock	Magnetic Reed Switch (932841-1)
	Switch is made when the door is closed (magnet is present).	
18	S218 Dereeler Jammed	Proximity (983300-1)
	Sensor is made when the dereeler dancer travels to the top limit of travel.	
19	S219 Out Of Cable	Proximity (983300-1)
	Sensor is made when the dereeler dancer travels to the bottom limit of travel.	
20	S220 Air Pressure Switch	Diaphragm (932810-1)
	Switch is made above 414 kPa [60 psi].	
21	S221 Module No. 1 Under Terminator	Proximity (983300-1)
	Sensor is made when module No. 1 is under the terminator. Adjust sensor until the distance between module No. 1 and the clamp is approximately .51 mm [.020 in.] when the machine is at home.	
22	S222 Module No. 2 Load Position	Proximity (983300-1)
	Sensor is made when module No. 2 is at its load position.	

### **General Sensor Types and Conditions**

PROXIMITY:	Senses when metal is in the target area. When metal is present, the corresponding LED is turned on. Optimum sensing distance is approximately .51 mm [.020 in.], but the maximum sensing distance is 2.03 mm [.080 in.].
MAGNETIC:	Senses when a magnetic field is present. All cylinders have an internal magnet at the piston. When the magnetic field is present, the corresponding LED is turned on.
DIAPHRAGM:	Switch closes when air pressure is present (above 414 kPa [60 psi]). When the switch is closed, the corresponding LED is turned on.

### **9.3. Potentiometer Adjustments**

Potentiometer R2 (dereeler motor speed control)

Raise the lower dancer so that the switch S2 is just unmade. Loosen the potentiometer mounting screws and rotate it until the dereeler does not move, but by raising the dancer an additional 25.4 mm [1 in.], it begins to move. Refer to electrical assembly drawing 764372 (sheet 5 of 7, item 14) for component location.

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## 10. MACHINE ERROR MESSAGES

### 10.1. Load Station No. 1 Assembly

*The connector 1 drop retracted switch was made before the connector 1 drop was retracted.*

Sensor S113 was made prior to retracting the cylinder. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor.

*The connector 1 drop did not retract properly.*

Sensor S113 was not made within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor. Adjustments might be required.

*The connector 1 drop extended switch was made before the connector 1 drop was extended.*

Sensor S114 was made prior to extending the cylinder. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor.

*The connector 1 drop did not extend properly.*

Sensor S114 was not made within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor. Adjustments might be required.

*The connector 1 load ram did not home properly.*

Sensor S115 should not be made when the rack is at Home. Check to see if Connector no. 1 motor is energized. Check sensor by using Manual Mode I/O Screens. Adjustments might be required.

*The connector 1 load ram did not return to its home position properly.*

Sensor S115 should not be made when the rack is at Home. Check to see if Connector no. 1 motor is energized. Check sensor by using Manual Mode I/O Screens. Adjustments might be required.

*The connector 1 load ram did not load a connector properly.*

Sensor S116 was either unmade before the load ram fully extended or the sensor was not unmade within the allocated time for this motion. Check to see if connector no. 1 motor is energized. Check sensor by using Manual Mode I/O Screens.

*The module 1 load station is too far forward for this assembly.*

Sensor S117 was made and then unmade during the positioning of module 1. Adjustments to the load station required.

*Neither connector load ram loaded a connector properly.*

As above, but neither load ram loaded a connector properly.

*Neither connector load ram returned to its home position properly.*

As above, but neither load ram returned to its home position properly.

### 10.2. Load Station No. 2 Assembly

*The connector 2 drop retracted switch was made before the connector 2 drop was retracted.*

Sensor S118 was made prior to retracting the cylinder. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor.

*The connector 2 drop did not retract properly.*

Sensor S118 was not made within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor. Adjustments might be required.

*The connector 2 drop extended switch was made before the connector 2 drop was extended.*

Sensor S119 was made prior to extending the cylinder. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor.

*The connector 2 drop did not extend properly.*

Sensor S119 was not made within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor. Adjustments might be required.

*The connector 2 load ram did not home properly.*

Sensor S120 should not be made when the rack is at Home. Check to see if connector no. 2 motor is energized. Check sensor by using Manual Mode I/O Screens. Adjustments might be required.

*The connector 2 load ram did not return to its home position properly.*

Sensor S120 should not be made when the rack is at Home. Check to see if connector no. 2 motor is energized. Check sensor by using Manual Mode I/O Screens. Adjustments might be required.

*The connector 2 load ram did not load a connector properly.*

Sensor S121 was either unmade before the load ram fully extended or the sensor was not unmade within the allocated time for this motion. Check to see if connector no. 2 motor is energized. Check sensor by using Manual Mode I/O Screens.

*Neither connector load ram loaded a connector properly.*

As above, but neither load ram loaded a connector properly.

*Neither connector load ram returned to its home position properly.*

As above, but neither load ram returned to its home position properly.

### 10.3. Feed/Shear Assembly

*The cable shear retracted switch was made before the cable shear was retracted.*

Sensor S209 was made prior to retracting the cylinder. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor.

*The cable shear did not retract properly.*

Sensor S209 was not made within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor. Adjustments might be required.

*The cable shear extended switch was made before the cable shear was extended.*

Sensor S210 was made prior to extending the cylinder. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor.

*The cable shear did not extend properly.*

Sensor S210 was not made within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor. Adjustments might be required.

*The pinch roller engaged switch was unmade before the pinch roller was retracted.*

Sensor S211 was not made prior to retracting the cylinder. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor.

*The pinch roller did not retract properly.*

Sensor S211 was not unmade within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor. Adjustments might be required.

*The pinch roller engaged switch was made before the pinch roller was engaged.*

Sensor S211 was made prior to extending the cylinder. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor.

*The pinch roller did not engage properly.*

Sensor S211 was not made within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor. Adjustments might be required.

### 10.4. Terminator Assembly

*The bottom press closed switch was made before the bottom press was closed.*

Sensor S202 was made prior to extending the cylinder. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor.

*The bottom press did not close properly.*

Sensor S202 was not made within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor. Adjustments might be required.

*The bottom press open switch was made before the bottom press was opened.*

Sensor S203 was made prior to retracting the cylinder. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor.

*The bottom press did not open properly.*

Sensor S203 was not made within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor. Adjustments might be required.

*The top press open switch was made before the top press was opened.*

Sensor S207 was made prior to retracting the cylinder. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor.

*The top press did not open properly.*

Sensor S207 was not made within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor. Adjustments might be required.

*The top press closed switch was made before the top press was closed.*

Sensor S208 was made prior to extending the cylinder. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor.

*The top press did not close properly.*

Sensor S208 was not made within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor. Adjustments might be required.

## **10.5. Transfer and Cable Clamp Assembly**

*Module 1 did not move to load position as it should.*

Sensor S117 was not made within the allocated time for this motion. Check to see if the Carriage motor is energized. Check sensor by using Manual Mode I/O Screens. Adjustments might be required.

*The good bin divider open switch was made before the good bin divider was opened.*

Sensor S123 was made prior to extending the cylinder. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor.

*The good bin divider did not open properly.*

Sensor S123 was not made within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor. Adjustments might be required.

*The good bin divider closed switch was made before the good bin divider was closed.*

Sensor S124 was made prior to retracting the cylinder. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor.

*The good bin divider did not close properly.*

Sensor S124 was not made within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor. Adjustments might be required.

*The tonker did not move up as it should.*

Sensor S201 was not made within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor. Adjustments might be required.

*The tonker did not move down as it should.*

Sensor S201 was not unmade within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor. Adjustments might be required.

*The bad bin divider closed switch was made before the bad bin divider was closed.*

Sensor S204 was made prior to extending the cylinder. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor.

*The bad bin divider did not close properly.*

Sensor S204 was not made within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor. Adjustments might be required.

*The bad bin divider did not open properly.*

Sensor S205 was not made within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor. Adjustments might be required.

*The bad bin divider open switch was made before the bad bin divider was opened.*

Sensor S205 was made prior to retracting the cylinder. Check sensor by using Manual Mode I/O Screens and observing the LED on the sensor.

*The carriage motor did not home properly.*

Sensor S221 (module no. 1 under press) should not be made when the carriage is Homed. Check to see if the Carriage motor is energized. Check sensor by using Manual Mode I/O Screens. Adjustments might be required.

*Module 1 did not move under the press as it should.*

Sensor S221 was not made within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens. Adjustments might be required.

*The module 2 under press switch was un-made before the module 2 index was retracted.*

Sensor S222 was not made prior to retracting the cylinder. Check sensor by using Manual Mode I/O Screens.

*The module 2 index did not retract properly.*

Sensor S222 was not unmade within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens. Adjustments might be required.

*The module 2 under press switch was made before the module 2 index was extended.*

Sensor S222 was made prior to extending the cylinder. Check sensor by using Manual Mode I/O Screens.

*The module 2 index did not extend properly.*

Sensor S222 was not made within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens. Adjustments might be required.

*Module 2 did not move from under the press as it should.*

Sensor S222 was not unmade within the allocated time for this motion. Check sensor by using Manual Mode I/O Screens. Adjustments might be required.

## 10.6. High Voltage Cable Tester

*The cable did not pass the short circuit test.*

The short test on the cable failed.

*The cable did not pass the open circuit test.*

The open test on the cable failed.

*The cable did not pass the high potential test.*

The HVT test on the cable failed.

*The tester did not pass the relay test.*

The tester failed the internal relay test. Contact AMP Incorporated immediately at the Technical Assistance Center number on page 1.

*The single character output command to the cirris unit timed out before receiving the echoed character.*

Serial communication problem to the cable tester. Check the cabling to the tester, power to the tester, and check to see that the tester power is turned on ('Learn Then Test'). Observe where in the machine cycle the error occurred. Power the machine off and back on to try to communicate with the unit again. Contact AMP Incorporated at the Technical Assistance Center number on page 1 if error persists.

*The cirris unit timed out before receiving the string result for the cable test*

Serial communication problem to the cable tester. See above.

*The cirris unit did not echo back the command correctly.*

Serial communication problem to the cable tester. See above.

*The response message from the cirris unit was not received correctly or the cirris did not perform the command properly.*

Serial communication problem to the cable tester. See above.

*The cirris unit has returned the following error code:*

Cable tester has reported an internal failure. Record the error, verify the error with that on the display of the tester and report it to AMP Incorporated at the Technical Assistance Center number on page 1.

### NOTE

If the error returned is SDxPyz (where x, y, and z are numbers and/or letters), disconnect the test 'C' cable from the tester and re-apply power. If the error no longer occurs, check the 'C' cable for shorts and check the first tooling module for bent header pins. If the error persists, the Scanner Daughter board P/N 768337-1 inside the tester may be the problem. Contact AMP Incorporated.

*Cirris communication overrun error. The R-CAM did not read the character from the UART prior to the next character.*

Cycle power on the R-CAM and try running again. If error persists, contact AMP Incorporated at the Technical Assistance Center number on page 1.

*Cirris communication framing error. The R-CAM did not receive a valid Stop Bit from the cirris unit.*

Cycle power on the R-CAM and try running again. If error persists, contact AMP Incorporated.

*The cirris unit did not understand the character correctly or it experienced a UART error.*

Cycle power on the R-CAM and try running again. If error persists, contact AMP Incorporated.

## 10.7. Miscellaneous

*Emergency stop was hit – Machine halted.*

Emergency Stop was hit (input 101). All machine motion has been stopped and all outputs and motors have been de-energized. Twist the palm button to release it. The machine will have to be homed.

*The machine's interlocks have been opened – Machine halted.*

Sensor S217 had been unmade. Interlocked door has been opened. All machine motion has been stopped and all outputs and motors have been de-energized. The machine will have to be homed. If a malfunction is suspected, check sensor by using Manual Mode I/O Screens. Adjustments might be required.

*The dereeler has jammed – Machine halted.*

Sensor S218 was made. All machine motion has been stopped and all outputs and motors have been de-energized. The machine will have to be homed. If a malfunction is suspected, check sensor by using Manual Mode I/O Screens. Adjustments might be required.

*There is not enough cable left to run another assembly.*

Sensor S219 was made and the calculated remaining amount of cable has been processed. Change cable reel at this time. For a malfunction, check sensor by using Manual Mode I/O Screens. Adjustments might be required.

*The air pressure has dropped – Machine halted.*

Sensor S220 had been unmade. Air pressure has fallen below 60 psi. All machine motion has been stopped and all outputs and motors have been de-energized. The machine will have to be homed. If a malfunction is suspected, check sensor by using Manual Mode I/O Screens. Adjustments might be required.

*You must return the machine to its last position.*

When exiting the manual mode, the machine was left in such a state that it cannot be run. Return to the manual mode and change any highlighted conditions.

*You must choose a part number before the machine may be run.*

Touch PART NUMBER box and select a part number to run.

*This cable assembly is too short for the machine to adjust its length.*

Adjust Cable Length in the setup mode was selected. It can only adjust cables that are equal to or greater than 203.2 mm [8.00 in.].

*The interlocks must be closed before the machine is allowed to run.*

Please close the interlocked door. Motion is not allowed until the door is closed.

*EEPROM location ???h was not written correctly.*

*Should be:                ??h.*

*Currently is: ??h.*

In verifying the write to EEPROM, a wrong value was read. This error should be reported to AMP Incorporated at the Technical Assistance Center number on page 1.

### 10.8. Machine Interference Errors (Manual Mode)

*The connector 1 load ram must be retracted.*

Requested motion cannot occur until this interference has been removed.

*The connector 2 load ram must be retracted.*

Requested motion cannot occur until this interference has been removed.

*The module 2 index must be retracted.*

Requested motion cannot occur until this interference has been removed.

*The pinch roller must be engaged in order to feed cable.*

Cable cannot be fed until the pinch roller has been engaged. Use the Manual Mode Outputs to turn on the pinch roller.

*The tonker must be moved to its up position.*

Requested motion cannot occur until this interference has been removed.

*There must be a module in position in order to close the press.*

A module must be under the press so that it can be closed.

*The top press must be opened.*

Requested motion cannot occur until this interference has been removed.

*The bottom press must be opened.*

Requested motion cannot occur until this interference has been removed.

### 10.9. Control System Initialization Errors

*The connector 1 motor controller chip did not initialize properly.*

Fatal control system initialization error. Report this error to AMP Incorporated immediately at the Technical Assistance Center number on page 1.

*The connector 2 motor controller chip did not initialize properly.*

Fatal control system initialization error. Report this error to AMP Incorporated immediately at the Technical Assistance Center number on page 1.

*The carriage motor controller chip did not initialize properly.*

Fatal control system initialization error. Report this error to AMP Incorporated immediately at the Technical Assistance Center number on page 1.

*The cable feed motor controller chip did not initialize properly.*

Fatal control system initialization error. Report this error to AMP Incorporated immediately at the Technical Assistance Center number on page 1.

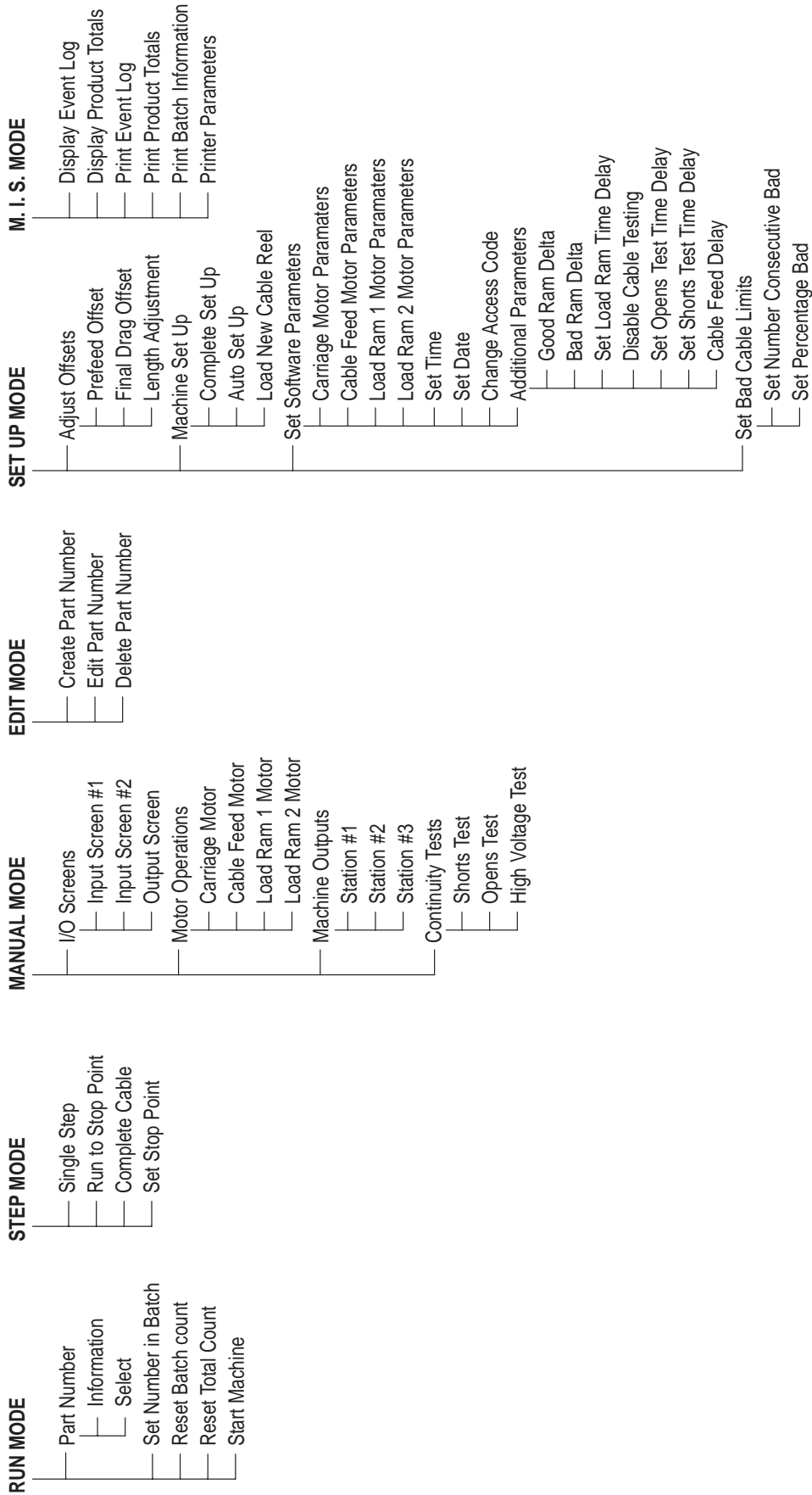


Figure 7

**11. REVISION SUMMARY**

Since the previous release, the following changes and additions were made to this document:

Per EC 0150-3346-95:

- Added caution concerning Electrostatic Discharge (ESD) damage
- Added noise level values in Figure 2
- Added DANGER statement in Section 3, Paragraph 3.2, Step 2, concerning vertical guard located adjacent to the load tower

Per EC 0990-0252-93:

- Updated format
- Changed revision status from Rev A to Rev B