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## INTRODUCTION

The TTM-HS2, TTM-HS2V, or TTM-HSTS injection mold press is microprocessor controlled to provide exceptional reliability.

It is recommended that the production engineer read the entire manual and become familiar with the overall machine operation.

Any machine subjected to continuous production work may develop malfunctions. If the Trouble Shooting Section doesn't solve your problems, simply call our number.

### **MACHINE INSPECTION**

After uncrating, visually inspect machine for possible shipping damages. If damage is found, notify your carrier immediately. The machine should be stored in a dry area of the plant until installation. A plastic tarp to cover is recommended.

## MACHINE PLACEMENT AND LEVELING

The machine has 1/2" diameter mounting holes at the bottom of each leg. Anchor bolts or leveling devices may be used through the holes, if needed.

#### HYDRAULIC FLUID

Each machine has been thoroughly tested at the factory under actual operating conditions. However, prior to shipping, the hydraulic oil was drained.

The OIL FILLER CAP is located at the rear of the machine. Add approximately 30-50 gallons of ANTI-WEAR HYDRAULIC OIL with an ISO grade rating of 46-68.

The dual function OIL GUAGE measures both oil level and oil temperature. It is located at the front lower left side of the machine.



#### POWER REQUIREMENTS

#### DOMESTIC:

This machine can be connected to any of the following:

208v or 240v, 30 amp 3 phase service with ground and neutral.

208v or 240v, 30 amp 3 phase service with ground and optional 3 KVA transformer.

480v, 15 amp 3 phase service with ground and optional 3KVA transformer.

NOTE: If Neutral is not available, a 3KVA transformer is required.

If optional transformer was not ordered with machine, then refer to the figure below for proper wiring. Wiring should be performed by a qualified individual who is familiar with all local electrical codes for standard industrial installation.



#### INTERNATIONAL:

When hooked up to a 3 KVA transformer, this machine will operate at 380 volt 3 phase 50 cycles electrical service.

## ELECTRICAL INSTALLATION

Electrical installation should be performed by a qualified individual who is familiar with all local electrical codes for standard industrial installation.

#### **INSTALLATION WITH 3KVA TRANSFORMER**

If your machine has the optional 3KVA transformer and your 3 phase service is either 208v, 240v, 480v, or 380v international:

- 1) Connect the 3 phase to the top of the disconnect
- 2) The primary of the transformer should be wired for 208 volts, 240 volts, 480 volts, or 380 volts, depending on your service.
- 3) The secondary of the transformer should be wired for 120 volts.
- 4) The motor controller heaters should be: W61 for a 208v or 240v connection, W53 for a 480v connection, W\_ for a 380v international connection.
- 5) Connect ground to cabinet.
- 6) Follow the procedures on "Testing Electrical Installation"



## ELECTRICAL INSTALLATION (continued)

#### INSTALLATION WITH 240V AND NEUTRAL

If your machine does not have the 3KVA transformer option and your 3 phase service is 240 volts with neutral:

TOP OF DISCONNECT 1) Connect the "B" phase 0 0 0 with the highest voltage in reference to neutral (typically 208v) to the top center terminal of the disconnect. 30 AMP ЗΧ 2) Connect the remaining phases to the two 5 AMP outside terminals. THREE SMALL FUSES 3) Connect neutral to the 12 20 AMP gauge white wire in the ~ 20 AMP  $^{\circ}$ disconnect cabinet. 이이 00 4) The motor controller MOTOR CONTROLLER ~ heaters should be W61. HEATERS 0 3X 5) Connect ground to cabinet 6) Follow the procedures on

#### INSTALLATION WITH 208V AND NEUTRAL

"Testina

Installation"

If your machine DOES NOT have the 3KVA transformer option and your 3 phase service is 208 volts with neutral:

1) Connect the 3 phase to the top of the disconnect

Electrical

- 2) Connect neutral to the 12 gauge white wire in disconnect cabinet.
- 3) The Motor controller heaters should be W61.
- 4) Connect ground to cabinet.
- 5) Follow the procedures on "Testing Electrical Installation"

## TESTING ELECTRICAL INSTALLATION

- 1) **On initial power up** it is necessary to do the following. On power up, hold down the " CI " button until six lower dashes appear. Release the " CI " button. Press the " CI " button until six upper dashes appear. Release the " CI " button.
- 2) Measure the voltage from neutral and the three small fuses. It should measure between 110v and 120v. If not, remove power from machine and refer to troubleshooting section.
- Jog the motor by alternately pressing the Motor START and motor STOP Buttons. Motor rotation should be clockwise when looking at the fan end of the motor. If not, turn off the power going to the machine and reverse both outside wires connected to the top of the disconnect.

## HEAT EXCHANGER FOR OIL COOLING

The heat exchanger should be connected to a water-cooling system if the oil temperature exceeds 120 degrees Fahrenheit. Refer to this section - Hydraulic Fluid for temperature gage.



## BARREL CYLINDER INSTALLATION (OPTION)

- 1) Position the BARREL CYLINDER on the TOP PLATE such that the CYLINDER SHAFT lines up with the threaded hole.
- 2) Tighten the CYLINDER SHAFT onto the TOP PLATE with a 13/16 open-end wrench. Make sure that the notches on the bottom of the BARREL CYLINDER PLATE line up with the GUIDE RODS.
- 3) Now install and tighten the two 5/16 screws through the BARREL CYLINDER PLATE and into the end of the GUIDE RODS.



## SHOT SIZE SENSOR INSTALLATION WITH OPTIONAL BARREL CYLINDER (HS2V or HSTS only)

1) Carefully unpack the SHOT SIZE SENSOR.



- 2) Attach the SHOT SIZE SENSOR to the BARREL CYLINDER PLATE, with two 10/32 screws and washers, aligning the marks on the SHOT SIZE SENSOR PLATE with the bottom edge of the BARREL CYLINDER PLATE
- 3) Attach the cable to the SHOT SIZE SENSOR.



# SHOT SIZE SENSOR INSTALLATION WITHOUT OPTIONAL BARREL CYLINDER (HS2V or HSTS only)

1) Carefully unpack shot size sensor.

2) Mount top shot size sensor plate to the top guide rods with supplied screws.

Sensor is to the rear of the machine and spring is positioned downward.



## WATER MANIFOLD WITH ROTATING UNION (OPTION)

DO NOT USE SOLID PIPE when installing water lines from molds to water ports. Only use FLEXIBLE HOSE. Do not install hose taut, and do not use any exterior bracing which would prevent the housing from rotating. DO NOT LET WATER DOWN INTO THE TABLE MECHANISM.



Connect a water feed to the hose labeled FEED, and a water drain to the hose labeled DRAIN.

**WARNING:** Do not turn the water on until the water union is connected to the necessary device.

When disconnecting device from water union,

- 1) Turn off water.
- 2) Relieve pressure from water lines.
- 3) Blow out water lines. This is necessary to prevent water from leaking down into the table mechanism.
- 4) Disconnect water lines from device.

#### Section 2 - SYSTEM COMPONENTS

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## MACHINE COMPONENTS

## **OPERATING CONTROLS**

The machine's power source is controlled by the MAIN POWER ON/OFF LEVER located on the lower control box.



The machine's START/STOP operating controls are grouped in a separate sturdy housing. (See figure below).



MOTOR START activates the hydraulic motor.

CYCLE START activates one or more predefined machine functions, (i.e. table rotation, screw operation, barrel purging, etc.)

CYCLE STOP deactivates all machine functions and operations.

EMERGENCY STOP / MOTOR STOP turns off the hydraulic motor. Note: Pressing this button during a table cycle will cause the table to backup resulting in table misalignment.

TTM-(HS2/HS2V/HSTS)

## HYDRAULIC CONTROLS

The hydraulic valves and gauges are grouped at the front of the machine. Each machine is shipped with hydraulic settings calibrated for a "typical" operation. Adjustment is normally not necessary. (Figure shows front panel removed)





VIEWED FROM RIGHT SIDE OF MACHINE WITH PANEL REMOVED

## HYDRAULIC CONTROLS (For HS2 only)





#### VIEWED FROM RIGHT SIDE OF MACHINE WITH PANEL REMOVED

## FLOW CONTROLS

Located on the screw motor at the rear of the machine is a HYDRAULIC FLOW CONTROL KNOB. Turning this knob in a counter clockwise direction increases the speed of the injection screw. Turning the knob clockwise decreases the speed.

See Figure below:



For HS2V or HSTS

For HS2



## LOCATION OF OIL FILTER AND HEAT EXCHANGER



## ROTARY MOLD TABLE

The ROTARY MOLD TABLE is divided into 12 areas or positions, referred to as TABLE POSITIONS, where one or more molds may be mounted. These TABLE POSITIONS are fixed, correlate to hour numbers on a clock dial, and rotate as the table rotates (normally in a counterclockwise direction). Each TABLE POSITION has pre-drilled holes for mold mounting and mold knockout pins.



#### MACHINE POSITION vs. TABLE POSITION

An important difference must be made between TABLE POSITION as defined above and MACHINE POSITION, which refers to the *location of equipment on the machine or location of the rotating mold* when standing directly in front of the machine.



For example:

The barrel or injection position is referred to as MACHINE POSITION 12

- The sprue trimmer position is referred to as MACHINE POSITION 11
- 3 The standard mold knockout position is referred to as MACHINE POSITION 7
- The optional mold knockout position is referred to as MACHINE POSITION 3

The rotary table with a mold mounted on any TABLE POSITION may rotate, stop, and resume rotating to any one of the 12 MACHINE POSITIONS.

## CONTROL PANEL

The Control Panel shown below consists of two TEMPERATURE CONTROLLERS and two keyboards, the MAIN KEYBOARD, the VARIABLE KEYBOARD (HS2V or HSTS only).



## TEMPERATURE CONTROLLERS

The three solid-state digital TEMPERATURE CONTROLLERS located on the Control Panel are used to accurately regulate the temperature of the barrel, and the material inside the barrel.

The barrel is divided into three zones; top, middle, and bottom. The upper temperature controller regulates the temperature of the top barrel zone; the middle controller for the middle barrel zone, and the lower controller regulate the temperature of the bottom zone.

Pressing the "UP" arrow on the temperature controller panel will raise the temperature setting. Pressing the "DOWN" arrow will lower the temperature setting.

For more information, refer to the temperature controller manual.

## MAIN KEYBOARD



#### STATUS INDICATOR LIGHTS



The batteries are tested only when the main power to the machine is turned on. Indicates that the batteries may need charging. Refer to Section 5 for more information.



Indicates when ACTUAL COUNTER 13 has reached or passed the PRESET COUNTER 13 setting.



Indicates a processor controller failure or an EEPROM memory failure. Refer to section 5 for more details.



Indicates that the heat was turned off automatically by HEATER WATCHDOG timer. If turning off to soon, refer to section 5.



Indicates that the table failed to turn to next position. For more information refer to section 5.

#### MODE INDICATOR LIGHTS



Indicates that the data being displayed, in the left four digits, is the present value. This light must be on in order to enter new data.



Indicates that the data being displayed, in the left four digits, is the actual value. This light must be on in order to view a timer counting down.



Indicates that the data being displayed in the left two digits is the timer number and the right four digits is the timer setting.



Indicates that the data being displayed in all six digits is counter data, either actual or preset. The position value is displayed in the cancel preset display on the variable keyboard.



Before Version 63... Not used with this machine operational mode code. Version 63.. and after Indicates Individual Overall Timers are selected

## DIGITAL DISPLAY WHILE IN TIMER OR FUNCTION MODE



## DIGITAL DISPLAY WHILE IN COUNTER MODE



## FUNCTION KEYS



Indicates when on, that the machine is in continuous cycle. When off and not in shuttle mode will stop table one position before mold that was molded on previous rotation of table. In shuttle mode will stop table when mold is out at the reload position.



Used to specify Machine Position 1 if the Ring Sensor is by-passed. If the ring sensor is by-passed, turning this Function Key on and cycling the table one position will specify the position that comes under the barrel position one. Used for variable model machines only.



Not used with this machine operational mode code.



When on, pressing cycle start will cause the table mechanism to move one tooth at a time. Thereby allowing the table to be realigned.



When on, pressing cycle start will cause the screw to be activated if it has not already stopped at shot size.



When on will enable the trimmer function to operate automatically depending on the TABLE settings. Refer to section 5 for more details.



When on will put machine in shuttle mode. Refer to section 3 for more details. Can be use to back up table if needed.



When on will enable the knockout function to operate automatically depending on the TABLE settings. Refer to section 5 for more details.



Press to turn on heat. Light will light. Press again to turn off heat. Light will go out. Will turn off when heater watchdog timer times out.



When on, pressing cycle start will cause injection to occur. When released injection will stop and screw cycle will start.

## MODE KEYS



Press to select preset mode



Press to select actual mode



Pressing will cause single increment of data.



Pressing will cause single decrement of data.



Pressing will clear display of data, clear error data and save new data to EEPROM.



Pressing will clear new data being entered. Use with counter function, for clearing.



Selects Timer mode. Use to reset selection of other functions.



Selects counter mode.



Not used with this machine operational mode code.



Pressing will enter new data into memory. Controller will not use new data unless this button is pressed.



Pressing will put timer number in to a temporary memory stack for later recall. Pressing again will remove timer number from stack. A total of ten numbers can be stored. Used with MR button. Pressing CLR will clear stack.



Pressing will recall a previous stored timer number. Each time this button is pressed the next previous stored timer number is recalled.



While displaying data, pressing will decrement timer or function number. Refer to section 5 for more details.



While displaying data, pressing will increment timer or function number. Refer to section 5 for more details.

SF

Shift Function. Pressing will shift to other functions and bank selection. Pressing again will return to normal.

## FUNCTION KEYS WHILE IN SF MODE



When on will enable the unloader 1 function to operate automatically. Refer to section 5 for more details.



When on will enable the unloader 2 function to operate automatically. Refer to section 5 for more details.



When on will enable the unloader 3 function to operate automatically. Refer to section 5 for more details.



When on, pressing cycle start will cause automatic purge to start. Pressing cycle stop will terminate function. Machine operational mode code not set to enable this function. Refer to section 5 for more details.

## MODE KEYS WHILE IN SF MODE



Pressing this key will allow current bank data to be copied to another. After this key press the number representing the other bank



Shift Function. Pressing will return to normal mode.

## DIGITAL DISPLAY WHILE IN SF MODE



## VARIABLE KEYBOARD (HS2V or HSTS only)





Pressing any of the 12 TABLE POSITION KEYS will cause the corresponding lights to turn ON or OFF. When the light is ON, it indicates that the TABLE POSITION is now included in the MOLDING CYCLE. When the light is OFF, it indicates that the table position is excluded from the molding cycle.



The DIGITAL DISPLAY to the right of CANCEL PRESENT displays the table position which is presently under the injection nozzle (machine position 12).

Pressing CANCEL PRESENT will remove the mold presently located under the injection nozzle from the molding cycle. The corresponding table position light will also turn off.

## VARIABLE KEYBOARD (HS2V or HSTS only)

NEXT

The DIGITAL DISPLAY to the left of CANCEL NEXT, displays the next table position selected to rotate to the injection nozzle (i.e. machine position 12).

Pressing CANCEL NEXT will remove the next scheduled table position from the molding cycle; and it's corresponding table position light will turn off.



RESET SHOT is a status indicator light. When ON, it warns that the current Shot Size parameter settings are incompatible with the amount of material available in the barrel.



Pressing STANDBY will place the molding cycle, trimmer, and knockout feature on temporary hold. The table will rotate but will not allow molding, trimmer, or knockout to take place. Pressing STANDBY again will turn off the light and allow for normal operations to resume.



Pressing SHOT SIZE displays, in centigrams, the amount of plastic available to be injected. The smallest increment is 1 centigram for a 1 oz screw & barrel. And the smallest increment is 2 centigrams for a 2 oz screw & barrel. It is measured from the point where the screw is completely down.



Pressing 2ND STAGE displays, in centigrams, the point in the injection stroke where the second stage pressure and the injection speed change occurs. For example, if Shot Size is set at 2,000 and 2ND STAGE is set at 1,000; then the Second Stage pressure and speed will occur halfway through the injection stroke. When not using two stage injection, 2ND STAGE can be set at zero.



Pressing 1ST PRESS displays, in PSI, the initial injection pressure being used.



Pressing 2ND PRESS displays, in PSI, the second stage injection pressure being used. Note: 2nd Pressure is activated when the 2nd Stage setting is reached.



Pressing 1ST SPEED displays a relative number for the 1st Stage injection speed (0-4000). A setting of 4000 is full open injection speed, and a setting of 0 is stop.



Pressing 2ND SPEED displays a relative number for the 2nd Stage injection speed (0-4000). A setting of 4000 is full open injection speed, and a setting of 0 is stop.

Note: 2nd Speed is activated when the 2nd Stage setting is reached.

## VARIABLE KEYBOARD (HS2V or HSTS only)



Pressing BACK PRESSURE displays, in PSI, the amount of back pressure exerted on the reciprocating screw. (Note: A 0-100 setting is available. The machine has a built in back pressure load of approximately 35 lbs.



This key is used to control table direction, mold shuttling, mold knockout and sprue trimmer operation. There may be instances where these operations need to be selectively activated at certain table positions and turned off at other positions.
# SHOT SIZE SENSOR (HS2V or HSTS only)

The shot size sensor is mounted to the top of the guide rods on the rear of the machine. This sensor is used in conjunction with "SHOT SIZE" and "2ND STAGE". When injecting the sensor controls "2ND STAGE".



# PRESSURE TRANSDUCER (HS2V or HSTS only)

The pressure transducer is mounted on the left size of the machine on the INJECTION CYLINDER.

It is used for CLOSE LOOP CONTROL of injection pressure.



# SPRUE TRIMMER

The optional sprue trimmer uses an air cylinder with a tool steel blade to remove plastic residue left at the top of the mold fill hole.



# WATER MANIFOLD WITH ROTATING UNION (OPTION)

The WATER MANIFOLD located in the center of the table allows for proper mold cooling. Do not use any exterior bracing which would prevent the housing from rotating.



#### Section 3 - SETUP PROCEDURES

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### HOW TO INSTALL MOLDS

The figure below shows the Rotary Table layout clearance for mounting molds. Note the smaller mold mounting hole located between the two KNOCKOUT HOLES.

Position the mold on the table with the hinge toward the center of the table. Fasten molds securely to the table with a  $10/32 \times 3/4$ " flathead screw going through the bottom of the table and into the mold.



# TABLE DIMENSIONS AND CLEARANCE

# HOW TO ALIGN ROTARY TABLE

After mold installation it is usually necessary to precisely align the table so that the nozzle will be directly over each mold fill hole. The table is driven by a rack and gear mechanism. To rotate the table in a counter-clockwise direction follow this procedure:

#### HS2V or HSTS only

- 1) PRESS the "STANDBY " button on the Variable Keyboard
- 2) PRESS the " MT " function key on the Main Keyboard
- 3) PRESS the " CYCLE START " operating control button to advance the table one gear tooth.
- 4) Continue pressing and releasing " CYCLE START " until the table advances to the desired position.
- 5) Once the mold fill hole is properly positioned under the nozzle, PRESS the " MT" function key to disable the function. The table is now aligned.

#### HS2 only

- 1) Pull up all skip pins.
- 2) PRESS the " MT " function key on the Main Keyboard
- 3) PRESS the " CYCLE START " operating control button to advance the table one gear tooth.
- 4) Continue pressing and releasing " CYCLE START " until the table advances to the desired position.
- 5) Once the mold fill hole is properly positioned under the nozzle, PRESS the " MT" function key to disable the function. The table is now aligned.
- 6). Reset skip pins. **NOTE:** Do not push a skip pin down while it is in the 12 o'clock machine position, as this will break the skip micro switch.

### HOW TO MANUALLY OPERATE THE KNOCKOUT FEATURE

- 1) Press the "KO " function key on the Main Keyboard (it's light should glow).
- 2) Again press the "KO " key twice within one second (i.e. toggle this key on and off quickly) to actuate the knockout pins and eject the molded part.

Note: If the steps above fail to operate the Knockout Feature, check the setting of the Manual Key Trim & KO timer (Appendix A - Auxiliary). It may be set for too short of a delay.

### HOW TO ADJUST KNOCKOUT PINS

Two adjacent Knockout Pins automatically or manually eject molded parts. The two Knockout pins are located beneath the table at Machine Position 7. They should be adjusted to move upward to a correct height through two Knockout Holes at the position around the periphery of the table. This motion will push the mold Knockout Plate upward, thus ejecting the part.

The procedure to adjust the Knockout, with cylinders above main plate, follows:

- 1). On one of the tie rods on one of the two cylinders you will find a screw, holding a reed switch. Loosen screw.
- 2). Slide reed switch up or down to new position.
- 3). Re tighten screw.
- 4) Manually operate the knockout function to check your adjustment.

The procedure to adjust the Knockout, with cylinder below main plate, follows:

- 1) Turn Hydraulic Motor ON
- It is necessary to temporarily rotate the table out of alignment. Press the MT key. Then press the CYCLE START button until one of the two knockout holes is over the slot in the end of the Knockout Cylinder Shaft. Turn Hydraulic Motor OFF.
- 3) With a large screwdriver, turn the slotted shaft to adjust the pin travel height. Turning the shaft clockwise will raise the pins, and turning the shaft counter clockwise will lower them (Two turns = 1/8" height change). **CAUTION:** Care must be taken that the knockout pins are not raised too high as this could interfere with the table rotation.
- 4) Realign table. Press CYCLE START until both knockout pins are visible through the next two open knockout holes. Press MT to turn off light.
- 5) Manually operate the knockout function to check your adjustment.

#### HOW TO ADJUST TIMERS

This machine has many timers, which could need adjusting. They are selected by pressing the key labeled TMR and then two appropriate numbers and P (preset). The left two digits on the main keyboard will display timers 00 to 99. Thirteen (13) is used to set all 12 *injection off* timers to the same setting. The right 4 digits will be the current setting. A new value is entered by pressing the appropriate number keys and then pressing ENT.

Refer to Appendix A for listing of timers.

Example 1: To set time of 4.0 sec. at all 12 *table positions* (INJECTION OFF), then the key strokes would be as follows:



The display should be showing

13004.0)

Example 2: To set time of 3.0 sec. at *table position* 2 (INJECTION OFF), then the key strokes would be as follows:



The display should be showing [2203.0]

Example 3: To set time of 20.0 sec. in timer number 00 (OVERALL), then the key strokes would be as follows:



The display should be showing

Example 4: To set time of 0.6 sec. in timer number 23 (KNOCKOUT OFF), then the key strokes would be as follows:



TTM-(HS2/HS2V/HSTS)

#### HOW TO ADJUST INDIVIDUAL OVERALL TIMERS

Software version number beginning with 63 has individual overall timers. They are selected by pressing the key labeled TMR and then two appropriate numbers (1-13), P (preset) and TBL. Or TMR and then TBL will take you to 13. The left two digits on the main keyboard will display timers 1 to 13. Thirteen (13) is used to set all 12 *individual overall* timers to the same setting. The right 4 digits will be the current setting. A new value is entered by pressing the appropriate number keys and then pressing ENT. For individual overall timers to work, timer 00 must be set to zero.

Refer to Appendix A for listing of timers.

Example 1: To set time of 15.0 sec. at all 12 *table positions* (INDIVIDUAL OVERALL), then the key strokes would be as follows:

130 15.0



The display should be showing

Example 2: To set time of 30.0 sec. at *table position* 2 (INDIVIDUAL OVERALL), then the key strokes would be as follows:



TTM-(HS2/HS2V/HSTS)

# HOW TO ADJUST SHOT SIZE (HS2V or HSTS only)

This machine has a shot size setting. It is selected by pressing the key labeled SHOT SIZE. The left two digits on the main keyboard will display 13 or any *table position* 1 through 12. Thirteen (13) is used to set all 12 *table positions* to the same setting. The right 4 digits will be the current setting. A new value is entered by pressing the appropriate number keys and then pressing ENT.

Example 1: To set shot size of 2500 centigrams at all 12 *table positions*, then the keystrokes



Example 2: To set shot size of 1200 centigrams at *table position* 2, then the keystrokes would be as follows:



#### HOW TO ADJUST SHOT SIZE (HS2 only)

This machine has a shot size setting. Refer to the following procedure:

- 1). Be sure machine is up to the proper operating temperature.
- 2). Rotate table so a purge block is under the barrel.
- 3). Press and hold the Cycle Start button.
- 4). While still holding Cycle Start button press the Screw button and release the Cycle Start button. The screw will remain in the down position.

- 5). Now the COURSE ADJUSTMENT nut can be loosed to change the angle on the switch shaft.
- 6). Re-tighten the COURSE ADJUSTMENT
- 7). If fine adjustments are needed, use the FINE ADJUSTMENT screw. Do not force this adjustment. If more travel is need readjust the COURSE ADJUSTMENT nut.
- 8). Press Cycle Start button to reset screw.
- 9). Turn off Screw light.



# HOW TO ADJUST 2ND STAGE (HS2V or HSTS only)

This machine has a 2ND stage setting. It is selected by pressing the key labeled 2ND STAGE. The left two digits on the main keyboard will display 13 or any *table position* 1 through 12. Thirteen (13) is used to set all 12 *table positions* to the same setting. The right 4 digits will be the current setting. A new value is entered by pressing the appropriate number keys and then pressing ENT.

Example 1: To set 2nd stage of 900 centigrams at all 12 *table positions*, then the keystrokes would be as follows:



Example 2: To set 2nd stage of 800 centigrams at *table position* 2, then the keystrokes would be as follows:



# HOW TO ADJUST INJECTION PRESSURE (HS2V or HSTS only)

This machine has two injection pressure settings. The first is selected by pressing the key labeled **1ST PRESS** and the second by pressing the key label **2ND PRESS**. The left two digits on the main keyboard will display 13 or any *table position* 1 through 12. Thirteen (13) is used to set all 12 *table positions* to the same setting. The right 4 digits will be the current setting. A new value is entered by pressing the appropriate number keys and then pressing ENT.

Example 1: To set 1st pressure of 1200 lbs at all 12 *table positions*, then the keystrokes would be as follows:





# HOW TO ADJUST INJECTION PRESSURE (HS2 only)

This machine has an injection pressure setting. Remove the front panel at the base of the machine to gain access to the adjustment.

- 1). On the INJECTION PRESSURE ADJUSTMENT loosen the jam knob.
- 2). Rotate table so a purge block is under the barrel.
- 3). Turn on Purge. Press and hold the Cycle Start button.
- 4). Turn the knob clockwise to increase pressure. Turn the knob counter-clockwise to decrease pressure. Refer to Injection gauge for pressure reading.
- 5). Release Cycle Start.
- 6). Tighten jam knob.

INJECTION PRESSURE ADJUSTMENT



## HOW TO ADJUST BACK PRESSURE (HS2V or HSTS only)

This machine has a back pressure setting. It is selected by pressing the key labeled **BACK PRESS**. The left two digits on the main keyboard will display 13 or any *table position* 1 through 12. Thirteen (13) is used to set all 12 *table positions* to the same setting. The right 4 digits will be the current setting. A new value is entered by pressing the appropriate number keys and then pressing ENT.

Example 1: To set back pressure of 50 lbs at all 12 *table positions*, then keystrokes would be as follows:



Example 2: To set back pressure of 25 lbs at *table position* 1, then the keystrokes would be as follows:



# HOW TO ADJUST INJECTION SPEED (HS2V or HSTS only)

This machine has two injection speed settings. The first is selected by pressing the key labeled **1ST SPEED** and the second by pressing the key label **2ND SPEED**. The left two digits on the main keyboard will display 13 or any *table position* 1 through 12. Thirteen (13) is used to set all 12 *table positions* to the same setting. The right 4 digits will be the current setting. A new value is entered by pressing the appropriate number keys and then pressing ENT.

Example 1: To set 1st speed of 850 at all 12 *table positions*, then the keystrokes would be as follows:



Example 2: To set 1st speed of 450 at *table position* 2, then the keystrokes would be as follows:



The display should be showing



Example 1: To set 2nd speed of 1000 at all 12 table positions, then the keystrokes would be as



# HOW TO ADJUST INJECTION SPEED (HS2 only)

This machine has an injection speed control. It is a flow control on the right side of the machine. This control has six (6) colored band and graduations on the knob to help is setting of this valve.

Turning the knob clockwise will decrease injection speed, less bands showing.

Turning the knob counter-clockwise will increases injection speed, more bands showing.



# HOW TO ADJUST SCREW SPEED

- This machine has a screw speed control. It is a flow control on the screw motor located at the rear of the machine. This control has six (6) colored band and graduations on the knob to help in setting of this valve.
- Turning the knob clockwise will decrease screw speed, less bands showing.
- Turning the knob counter-clockwise will increase screw speed, more bands showing.



# HOW TO ADJUST PRESET COUNTERS (HS2V or HSTS only)

This machine has preset counters. The left two digits on the variable keyboard (CANCEL PRESENT) will display 13 or any *table position* 1 through 12. Thirteen (13) is used to set all 12 *table positions* to the same setting. The 6 digits in the main keyboard will be the current setting. A new value is entered by pressing the appropriate number keys and then pressing ENT.

Example 1: To preset counter value of 1000 at all 12 *table positions* and main counter 13, then the keystrokes would be as follows:



Example 2: To set a preset count of 500 at *table position* 2, then the keystrokes would be as follows:



The variable display should be showing



And the main display should be showing

When the *actual counter 13* has reached or passed the *preset counter 13* the CTR PRE LED will light. To turn off CRT PRE either clear *actual counter 13* or reset *preset counter 13*.

When an individual *actual counter* (1-12) has reached or passed the *preset counter*, the light on the variable keyboard that corresponds to the counter will start to blink. To stop the light from blinking either clear the *actual counter* or reset the *preset counter*.

## HOW TO ADJUST PRESET COUNTERS (HS2 only)

This machine has preset counters. The 6 digits in the main keyboard will be the current setting. A new value is entered by pressing the appropriate number keys and then pressing ENT.

Example 1: To preset counter value of 1000 at all 12 *table positions* and main counter 13, then the keystrokes would be as follows:





And the main display should be showing

000500

When the *actual counter 13* has reached or passed the *preset counter 13* the CTR PRE LED will light. To turn off CRT PRE either clear *actual counter 13* or reset *preset counter 13*.

# HOW TO DISPLAY ACTUAL COUNTERS (HS2V or HSTS only)

This machine has actual counters. The left two digits on the variable keyboard (CANCEL PRESENT) will display 13 or any *table position* 1 through 12. Thirteen (13) is used to set all 12 *table positions* to the same value. The 6 digits in the main keyboard will be the current value.

Example 1: To display overall counter value the key strokes would be as follows:

TMR	]→	СТ
-----	----	----

The variable display should be showing

CANCEL PRESENT	Ξ

And the main display should be showing the total current value of all mold cycles.

Example 2: To display individual counter for *table position* 6, then the keystrokes would be as follows:



And the main display should be showing the total current value of *table position* 6 mold cycles.

### HOW TO DISPLAY ACTUAL COUNTERS (HS2 only)

This machine has actual counters. The 6 digits in the main keyboard will be the current value.

Example 1: To display overall counter value the key strokes would be as follows:

TMR	þ	СТ
-----	---	----

The main display should be showing the total current value of all mold cycles.

Example 2: To display individual counter for *table position* 6, then the keystrokes would be as follows:



And the main display should be showing the total current value of *table position* 6 mold cycles.

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### HOW TO DISPLAY TIMERS - PRESET OR ACTUAL MODE

This machine has many timers, which can be displayed. They are displayed by pressing the key labeled TMR and then two appropriate numbers and P (preset) or A (actual). The left two digits on the main keyboard will display timers 00 to 99. The right 4 digits will be the current setting.

Refer to Appendix A for listing of timers.

Example 1: To display Overall timer (00) in preset mode, then the keystrokes would be as follows:



The left two digits should be displaying

And the right four digits will be displaying the current value of the Overall Timer in the preset mode.

Example 2: To display Knockout off (23) in actual mode, then the keystrokes would be as follows:



The left two digits should be displaying



And the right four digits will be displaying the current value of the Knockout off Timer in the actual mode.

#### HOW TO CLEAR COUNTER

Before version 63...

To clear all counters, use the following keystrokes:



The display will zero out and a new count will begin with the next mold cycle.

To clear individual counter enter the number of that *table position*, for example *table position* 3 and use the following key strokes:



The display will zero out and a new count will begin with the next mold cycle of this *table position*.

#### Version 63... and after

To clear all counters, use the following keystrokes:



The display will zero out and a new count will begin with the next mold cycle.

To clear individual counter enter the number of that *table position*, for example *table position* 3 and use the following key strokes:



The display will zero out and a new count will begin with the next mold cycle of this *table position*.

# HOW TO ADJUST TABLE MODE CODES

This machine has table mode codes, which could need adjusting. They are selected by pressing the key labeled TABLE. The left two digits on the main keyboard will display 13 or any *table position* 1 through 12. Thirteen (13) is used to set all 12 *table positions* to the same setting. The right 4 digits will be the current setting. A new value is entered by pressing the appropriate number keys and then pressing ENT. A new setting must be added to or subtracted from the current setting.

#### Refer to Appendix B for listing of TABLE MODE CODES.

Example 1: To set code to 371 (default setting) at all 12 *table positions* then the keystrokes would be as follows:



Example 2: Assuming a current setting of 371. To set a code that would cause the cycle to stop at *table position* 4, then the keystrokes would be as follows:



The display should be showing  $[\Box 44]$ 

Example 3: Assuming a current setting of 371. To set a code that would cause the knockout not to operate at *table position* 10, then the keystrokes would be as follows:



# HOW TO SELECT MOLDING POSITIONS



Pressing any of the 12 TABLE POSITION KEYS will cause the corresponding lights to turn ON or OFF. When the light is ON, it indicates that the TABLE POSITION is now included in the MOLDING CYCLE. When the light is OFF, it indicates that the table position is excluded from the molding cycle.

#### HOW TO SET MACHINE TO SHUTTLE

This machine has the ability to shuttle one mold into molding position and then back out to the 3 O'clock machine position. The following procedure will explain how this is accomplished:

1) Choose the location of mold. For example use table position 4. The keystrokes would be:



 Now the best table position that would be under barrel while reloading, would be a table position 90 degrees before the mold, which for this example would be table position 1. The keystrokes would be:



- 3) Set the machine in STANDBY.
- 4) Index table to one position past the position used in step 2.
- 5) Press the SHUTTLE button on.
- Press CYCLE START and then CYCLE STOP once. The table will back up one position. And the mold will be at the 3 O'clock machine position, ready to be reloaded.
- 7) After reloading press **CYCLE START** and the mold will index under barrel, go through molding cycle and then return.

The **Overall timer** (00) controls how long the mold is in the molding cycle. And **Shuttle load timer** (25) controls how long the mold is at machine location 3 O'clock, unless the **AUTO** is off and then the **CYCLE START** will have to be pressed to continue cycle.

### HOW TO USE TIMER/FUNCTION SETTINGS LOCK

The timer/function lock allows for control over who changes the timer/function settings. The factory setting of the code is 1234. Timer number 63 is use to store the code.

If the machine has logic board 2 or 1 (LB1 or 2) then DIP switch number 2 on the logic board must be open or off.

If the machine has logic board 3 (LB3) then DIP switch number 5 on the logic board must be open or off.

If the machine has a logic board 4 (LB4) then the DIP switch number 7 on the logic board must be open or off.

How to unlock timers:

Call up any timer except timer 63, then enter the code. The example keystrokes would be:



Note: As the numbers 1,2,3 or 4 are pressed the display will blank out from right to left; indicating that a number has been pressed. The timer/function settings are now unlocked.

How to lock: Just press

CLR	
SAVE	

How to change the code:

First unlock as above

Call up timer 63 P (Version 63... and after, also press CI) Enter new code number.

Example: Using new code of 4321, the keystrokes would be: Before version 63...



Now the new code is set.

# HOW TO ADJUST OPERATIONAL AND TEST MODE CODES

Before version 63...

This machine has mode codes, which should not need adjusting. There may be certain conditions where they could be adjusted. They are selected by pressing the key labeled TMR and then two appropriate numbers and P (preset). The left two digits on the main keyboard will display 95 to 99. The right 4 digits will be the current setting. A new value is entered by pressing the appropriate number keys and then pressing ENT. A new setting must be added to or subtracted from the current setting.

Refer to Appendix C for listing of MODE CODES.

Example 1: Assuming a current setting of 400.0 in location 99. To add a code that would bypass the Heater Interlock, from the Appendix C the code would be .1. Then the keystrokes would be as follows:



The display should be showing [994]

(99400.)

Then press



Example 2: Assuming a current setting of 0.0 in position 96. To add a code that would engage the Ring Sensor filter, from the chart in Appendix C, the code would be .2. Then the keystrokes would be as follows:



The display should be showing







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#### HOW TO ADJUST OPERATIONAL AND TEST MODE CODES

Version 63... and after

This machine has mode codes, which should not need adjusting. There may be certain conditions where they could be adjusted. They are selected by pressing the key labeled TMR and then two appropriate numbers. Then key P (preset) and key CI. The left two digits on the main keyboard will display 20 to 99. The right 4 digits will be the current setting. A new value is entered by pressing the appropriate number keys and then pressing ENT. A new setting must be added to or subtracted from the current setting.

Refer to Appendix C for listing of MODE CODES.

Example 1: Assuming a current setting of 400.0 in location 99. To add a code that would bypass the Heater Interlock, from the Appendix C the code would be .1. Then the keystrokes would be as follows:



Then press



Example 2: Assuming a current setting of 0.0 in position 96. To add a code that would engage the Ring Sensor filter, from the chart in Appendix C, the code would be .2. Then the keystrokes would be as follows:



Then press



TTM-(HS2/HS2V/HSTS)

### ADJUST TEMPERATURE CONTROLLERS

Pressing the "UP" arrow on the temperature controller panel will raise the temperature setting. Pressing the "DOWN" arrow will lower the temperature setting. Refer to Athena temperature controller manual for more details.

#### HOW TO USE MEMORY BANKS

This machine has five memory banks of data. Each banks contains molding parameters, timer and counter settings. New data is only saved to a bank when the CLR button is pressed, the motor is turned off or a different bank is selected.

To display the current bank the SF button must be pressed. The far right digit represents the current bank number. Pressing SF again will return display to normal.

To select a different bank:

- 1). Press SF
- 2). Press a different number (1-5) than the one showing
- 3). Press SF

To copy data from one bank to another:

- 1). Press SF
- 2). Press the down arrow
- 3). Press a different number than the one showing
- 4). Press SF

The data in the original bank will be copied into the new bank

#### HOW TO REBOOT

It is sometimes necessary to clear temporary memory. If the machine is off for more than three weeks it should be rebooted. If the machine is turned on and the display has unusual symbols, it is best to reboot. To reboot do the following:

- 1). On power up, hold down the " CI " button until six lower dashes appear.
- 2). Release the " CI " button
- 3). Press the " CI " button until six upper dashes appear
- 4). Release the "CI " button

#### HOW TO ADJUST RELIEF VALVES

There are two relief valves on this machine. Both are for directing pressure spikes to the tank. If these valves are adjusted wrong or are not working right they will cause a loss of pump pressure. The MAIN PRESSURE RELIEF VALVE is located on the right end of the manifold closest to the manifold. The CLAMP RELIEF VALVE is located 2nd from the right end 2nd valve out from the manifold. The following explains how to adjust these valves.

For MAIN PRESSURE RELIEF VALVE:

- 1) Loosen the JAM NUT and turn STUD all the way clockwise (highest pressure).
- 2) Place pump in high pressure.
- 3) Check pump pressure.
- 4) Adjust STUD counter-clockwise until the pump gauge starts to drop.
- 5) Turn STUD one turn clockwise and tighten JAM NUT.

For CLAMP RELIEF VALVE:

1) Loosen the JAM NUT and turn STUD all the way clockwise (highest pressure).

- 2) Check Clamp pressure.
- 3) Adjust STUD counter-clockwise until the clamp gauge starts to drop.
- 4) Turn STUD one turn clockwise and tighten JAM NUT.



### HOW TO ADJUST CLAMP PRESSURE

Remove the front panel at the base of the machine to gain access to the necessary Hydraulic Controls and refer to the figure below.

To INCREASE Clamp Pressure:

- 1) On the CLAMP RELIEF VALVE loosen the JAM NUT and turn the STUD all the way clockwise. This is the highest pressure setting.
- On the CLAMP REDUCING VALVE loosen the JAM NUT and adjust the STUD to the desired pressure (maximum pressure of 500 lbs for standard clamp bar and 600 lbs for forked clamp bar). Tighten the JAM NUT.
- 3) On the CLAMP RELIEF VALVE adjust the STUD counter clockwise until the clamp gauge starts to drop.
- 4) Then turn STUD one turn clockwise and tighten JAM NUT.
- NOTE: If the CLAMP RELIEF VALVE is adjusted wrong or is not working properly, a loss of pump pressure will occur. This will result in the pump being unable to maintain the normal high pressure setting (typically 1800 lbs).

To DECREASE Clamp Pressure:

- 1) On the CLAMP REDUCING VALVE, loosen the JAM NUT and adjust the STUD to the desired pressure.
- 2) Tighten the JAM NUT.



### HOW TO SETUP MACHINE WITH A NEW MOLD.

- 1). Turn on the standby light.
- 2). Chose a table position. Mount mold to table using 10/32 X 5/8" flathead screw.
- 3). Turn on the heat. Allow heat to raise to the proper temperature.
- 4). Set injection speed, both stages to maximum.
- 5). Purge out one shot.
- 6). If injection cylinder rods fail to reach bottom of stroke, increase pressure. Return to step 7.
- 7). Compare purge with volume of mold cavity. If cavity looks smaller, set shot size smaller. If cavity looks bigger, set shot size larger. It is better to have a smaller shot size and to slowly to increase shot size. Then repeat purge.
- 8). Adjust overall timer to 10.0 sec. This setting could be changed later.
- 9). Select the mold position on the variable keyboard.
- 10). Turn off the standby light.
- 11). The following steps depend on whether or not the mold can be injected into with out the production part in place. If it can't then proceed to WITH A PART
- 12). With mold empty, start the cycle so the mold will rotate under nozzle. The machine should go through a molding cycle.
- Notice the movement of the injection cylinder rods; they should come to a full stop before the screw starts to turn. If this doesn't happen, increase the injection off timer (13).
- 14). When the mold comes out in front of machine, stop cycle.
- 15). Open mold and determine how well the cavity filled. Bear in mind that if the mold takes an insert, this part will reduce the amount of material needed to fill the cavity.
- 16). If injection cylinder rods fail to reach within 1/4 inch of bottom increase pressure.
- 17). If short shot, increase shot size and try again. It is best to maintain some shot size cushion.
- 18). If to much flash, decrease shot size and try again.

The whole purpose is to fill the cavity well enough but not completely, but to leave room for the production insert. Once this is done the production insert can be used. Now you can fine tune the settings to fill out the cavity.

WITH A PART

- 1). Insert a part in the mold.
- 2). Start the cycle so the mold will rotate under nozzle. The machine should go through a molding cycle.
- Notice the movement of the injection cylinder rods; they should come to a full stop before the screw starts to turn. If this doesn't happen, increase the injection off timer (13).
- 4). When the mold comes out in front of machine, stop cycle.
- 5). Open mold and determine how well the part filled.
- 6). If injection cylinder rods fail to reach within 1/4 inch of bottom increase pressure.
- 7). If short shot, increase shot size and try again. It is best to maintain some shot size cushion.
- 8). If to much flash, decrease shot size and return to step 1.

### HOW TO MANUALLY OPERATE THE SPURE TRIMMER FEATURE

- 1) Press the "TRIM " function key on the Main Keyboard (it's light should glow).
- 2) Again press the "TRIM " key twice within one second (i.e. toggle this key on and off quickly) to actuate the sprue trimmer.
  - Note: If the steps above fail to operate the Sprue Trimmer Feature, check the setting of the Manual Key Trim & KO timer. It may be set for too short of a delay.
## HOW TO AUTO TUNE TEMPERATURE CONTROLLERS

It is best to auto tune all zones separately from each other.

There have been three different temperature controller models use in the IPC machine. You have to determine which one you have.

#### ATHENA 6050 B

- 1). Press the INDEX button until the light next to "HC" glows.
- 2). Set the parameter "HC" to 15.
- 3). Press the INDEX button until the light above AUTO TUNE glows.
- 4). Press the TUNE button.
- 5). Press the INDEX button one more time to bring the display back to normal.
- 6). Turn the HEAT on.
- 7). Set Timer 30 to "999.9"
- 9). When auto tuning has been completed, reset Timer 30 to previous setting. (Typical 240.0)

#### ATHENA 6075 B

- 1). Index to "HC" and enter "15".
- 2). Index to "CC" and enter "15"
- 3). Index to "CD" and change the value from 8 to 14
- 4). Index to "AT" and enter "01"
- 5). Press STANDBY and the press TUNE
- 6). Turn the HEAT on.
- 7). Set Timer 30 to "999.9"
- 8). When auto tuning has been completed, change "CD" back to "8"
- 9). Reset Timer 30 to previous setting. (Typical 240.0)

# HOW TO AUTO TUNE TEMPERATURE CONTROLLERS

## ATHENA XT16



Note: Actual temperature should be at least 10 degrees below set point.

- 1). Holding the MODE KEY for 3 seconds will put controller in Standby mode.
- 2). Continue holding the MODE KEY will start the auto tune mode,
- 3). Turn the HEAT on.
- 4). Set Timer 30 to "999.9"
- 5). When auto tuning has been completed, reset Timer 30 to previous setting. (Typical 240.0)

# HOW TO AUTOMATICALLY SCAN MOLDING PARAMETERS

To automatically scan the molding parameters, press the following keystrokes:



Any of the following functions can then be sleeted by pressing the function button:

SHOT SIZE 2ND STAGE 1ST PRESSURE 2ND PRESSURE BACK PRESSURE TABLE 1ST SPEED 2ND SPEED

Now as the table rotates the selected parameter values will be displayed.

To stop the scan press "CLR".

# Section 4 - OPERATING PROCEDURES

Startup Procedure	4-1
Material Purging	4-3
Shutdown Procedure	4-3

## STARTUP PROCEDURE

Assuming that all necessary settings have been made (Section 5), follow these steps to put the machine into an automatic production cycle:

- 1). Turn the power on. Refer to Section 2 OPERATING CONTROLS.
- 2). Turn the heat on. Refer to Section 2 MAIN KEYBOARD.
- 3). Turn the pump on by pressing MOTOR START button. Refer to Section 2 Operating Controls. This allows the hydraulic oil to warm up.
- 4). Wait for heat to come up to proper operating temperature.
- 5). Proceed to RUNNING PROCEDURE.

# SAFETY

WARNING: BEFORE MACHINE IS TURNED ON, FOR PERSONNEL AND MACHINE SAFETY YOU MUST VERIFY THE FOLLOWING SAFETY ITEM ARE IN PLACE AND FUNCTIONAL:

- 1. ANY UNCOVERED KNOCKOUT HOLES MUST HAVE THE GREEN SAFETY PLUGS INSTALLED.
- 2. THE SAFETY FLAG MUST ABLE TO TURN OFF MOTOR.
- 3. THE SAFETY FLAG SHOULD BE ADJUSTED TO TRIP IF MOLD IS OPEN.
- 4. ALL GUARDS MUST BE IN PLACE. THEY ARE AS FOLLOWS:
  - a) **BARREL GUARD.**
  - b) LEFT AND RIGHT CYLINDER GUARDS.
  - c) SCREW GUARD.
  - d) CLAMP GUARD.
  - e) **TABLE GUARD.**
  - f) KNOCKOUT GUARD. IF KNOCKOUT IS NOT INSIDE TABLE GUARD AND IS NOT THE DUAL CYLINDER TYPE.

FAILURE TO HEED THESE PRECAUTIONS MAY CAUSE BODILY HARM AND/OR MACHINE DAMAGE.

### **RUNNING PROCEDURE**

- 1). Insert part properly into mold.
- 2). Press the CYCLE START button. Refer to Section 2 Operating Controls.
- 3). If TRIMMER OPTION present proceed to step 5.
- 4). When mold rotates out from frame you may have to trim material off of top of mold (sprue bushing).
- 5). If RAMP OPTION present proceed to step 7.
- 6). Open mold before the knockout location.
- 7). If mold doesn't use knockout proceed to step 9.
- 8). After knockout has operated...
- 9). Remove molded part.
- 10). To continue, return to step 1.
- 11). To stop cycle anytime press CYCLE STOP. Refer to Section 2 Operating Controls.

### MATERIAL PURGING

To purge do the following steps:

- 1). Press the STANDBY button so the light remains on.
- 2). Using the CYCLE buttons, rotate the table so the purge block is under the nozzle.
- 3). Press the PURGE button so the light remains on.
- Press the CYCLE START button. This will cause the machine to inject material onto the purge block. Release the CYCLE START button. This will cause the screw cycle to start.
- 5). When finished with purging, turn off the purge and standby light.

### SHUTDOWN PROCEDURE

To stop production do the following steps:

- 1). Turn off the heat. Refer to Section 2 MAIN KEYBOARD.
- 2). If material is of the type that could burn it is best to purge out a quantity of material, in order to lower the material temperature.
- 3). Stop the pump by pressing the MOTOR STOP button. Refer to Section 2 Operating Controls.
- 4). Turn off the power. Refer to Section 2 Operating Controls and Heater/ Stuffer Control Box.

# Section 5- MAINTENANCE PROCEDURES

Greasing the Table	5-1
Greasing the Upper Frame	5-2
Oil Filter	5-3
Cleaning The Nozzle	5-4
Screw or Barrel Removal and Cleaning	5-5
Control Panel	5-9
Battery Replacement	5-9

# **GREASING THE TABLE**

There are 3 GREASE FITTINGS that should be lubricated with good quality industrial grade grease: once a month for 1-shift operations.



The end of the rack should be greased: once a month for 1-shift operations.

- 1. Remove the three screws for top of table.
- 2. Knock the two dowel pins through table.
- 3. Remove table.
- 4. Grease then end of rack.
- 5. Replace table, dowel pins and screws.

# **GREASING THE UPPER FRAME**



There are 11 grease fittings on the upper frame. Ten (10) are found from the back of machine and one (1) from the front.

# **OIL FILTER**

The spin-off OIL FILTER is located on the left side, as seen from front, of the hydraulic power unit. Replace it every 4 months for one-shift operations. To remove, just turn counter-clockwise as viewed from bottom of filter.



## **CLEANING THE NOZZLE**

After prolonged use, the NOZZLE may develop a leak of drool, indication that cleaning is necessary.

- **CAUTION**: All necessary safety precaution should be in effect before proceeding. E.G. Gloves and safety glasses. During the following procedure it is possible for hot material to spray out.
  - 1. It is first necessary to bring system heat almost up to molding temperature.
  - 2. Unscrew the nozzle assembly (body and plunger) from the end cap.
  - 3. Remove the nozzle die spring from up inside the end cap.
  - 4. Clean all material from nozzle, separating the nozzle plunger and nozzle body. Clean parts thoroughly with wire brush or emery cloth. Be sure the nozzle plunger will slide freely up and down in the nozzle body.
  - 5. Clean nozzle die spring. Or replace spring, if weak.
  - 6. Place spring on nozzle assembly and then replace in end cap.



# SCREW OR BARREL REMOVAL AND CLEANING

The following shows the components that must be disassembled in order to remove the screw. If possible purge through a purging compound or polypropylene material.

Preliminary Procedure

1). Remove INJECTION CYLINDER and SCREW MOTOR GUARDS. Fig. 1



2). Remove the TOP PLATE by removing the 4 SCREWS holding the TOP PLATE to UPPER FRAME. Fig. 2 & 3



- Holding SCREW MOTOR, remove the 2 SCREWS holding the motor to the motor plate. Fig. 4
- 4). Slip off DRIVE BELT and place motor on floor or on a table.



5) Remove 2 STRIPPER BOLTS AND SPRINGS. Fig. 5



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- 6). Remove 2 CLIPS from rear of clevis pins. Fig. 6
- 7). Remove 2 CLEVIS PINS. Fig. 6
- 8). Remove BAR. Fig 6.



- **NOTE:** The barrel must be hot enough to melt the molding material.
- **CAUTION:** All necessary safety precaution should be in effect before proceeding. E.G. Gloves and safety glasses. During the next steps it is possible for hot material to spray out.
- If the molding material was successfully purged, continue with SCREW REMOVAL PROCEDURE. If molding material is burnt follow BARREL AND SCREW REMOVAL PROCEDURE.

For removing barrel continue with BARREL AND SCREW REMOVAL PROCEDURE.

#### SCREW REMOVAL PROCEDURE

- 1). Remove NOZZLE ASSEMBLY and spring. Fig. 1 Refer to CLEANING THE NOZZLE for more details.
- 2). Unplug bottom Heater band and remove bottom THERMOCOUPLE. Fig. 1
- 3). Remove END CAP (held by 6 Screws). Fig. 1
- 4). Pull up and out, the MOTOR PLATE and Screw together. If the Screw hangs up, you should push the assembly back down and allow it to heat up more. Fig. 8 If this doesn't work you may have to continue with BARREL AND SCREW REMOVAL PROCEDURE.
- Clean all parts with copper gauze, silicon jell and brass putty knife. Propane heat can also be used as long as care is used not to overheat screw; as this could warp it.
- 6). Reassemble.





#### BARREL AND SCREW REMOVAL PROCEDURE

- 1). Turn off heat.
- 2). Remove NOZZLE ASSEMBLY and spring. Fig. 1 Refer to CLEANING THE NOZZLE for more details.
- 3). Unplug bottom Heater band and remove bottom THERMOCOUPLE. Fig. 1

MOTOR PLATE

- 4). Remove end cap (held by 6 Screws). Fig. 1
- 5). Loosen set screw on COLLAR. Fig. 2
- 6). Slide COLLAR down and remove PIN from under former collar position. Fig. 2
- 6). Lift off the MOTOR PLATE assembly. Fig. 2
- 7). Put a SPACER between UPPER PLATE AND LOWER PLATE. Fig. 3
- 8). Remove 4 SCREWS from two SPRING CUPS. Fig. 3

- 9). Remove 2 SCREWS and SPRING RETAINER from end of guide rods. Fig. 4
- 9). Allow barrel to cool down.
- 10). Remove thermocouples and heater bands.
- 11). Clean off surface of barrel.





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12). Remove barrel by pulling up on UPPER PLATE with barrel still attached. Fig. 5



- 15). Push out screw from lower end of barrel. It may be necessary to fasten a special tool to the bottom of the barrel in order to remove the screw.
- 16). Clean all parts with copper gauze, silicon jell and/or brass putty knife. Propane heat can also be used as long as care is used not to overheat screw; as this could warp it.
- 17). Reassemble.

## CONTROL PANEL

Periodically clean the membrane keyboard. Use a mild detergent. DO NOT USE SOLVENTS.

## **BATTERY REPLACEMENT**

Approximately every year the batteries may need to be replaced. To replace the batteries use the following procedure:

- Make note of which Bank the machine is in. Refer to Section 3 - How to Use Memory Banks.
- 2). Turn off machine.
- 3). Open up the rear wire way cover.
- 4). Remove old batteries.
- 5). Install new batteries, noting proper polarity.
- 6). REBOOT. Refer to Section 3 How to Reboot
- If any problems are encountered refer to section 6 Testing Batteries and Charger.

# Section 6-TROUBLESHOOTING

General Information	6-1
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## **GENERAL INFORMATION**

- When working on the hydraulics of this machine, you must relieve the pressure in the system. This can be accomplished by manually operating the clamp direction valve a few times.
- Water or coolant must be kept out of the table assembly, because if it is not it will cause the Ring Sensor to short out and the Main Gear Bearing to seize up.

## **FUSE REPLACEMENT**

### WARNING: THE POWER MUST BE OFF BEFORE PROCEEDING.

CAUTION: Any fuse replacements must be of the same type and amperage as those removed. Otherwise, permanent damage to circuitry may result.

The following figures should help in the replacement of fuses:





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## **TESTING BATTERIES AND CHARGER**

How to test for proper batteries and charger:

- WARNING: 120 VOLTS IS PRESENT DURING THE FOLLOW PROCEDURE.
- 1). Open up the rear wire way cover. The battery pack is in the bottom of wire way.
- 2). Check voltage across battery pack with power on. Typically should be greater the 5.5 volts.
- 3). Check voltage across battery pack with power off. Should be less than voltage found in step 1.
- 4). If step 2 and 3 failed unplug battery pack.
- 5). Check voltage across battery pack. If less than 5.0 volts recharge or replace batteries.
- 6). Check voltage across the terminal of the plug on end of cable with power on. Should be greater than voltage found in step 2.
- 7). If step 6 failed replace Display Driver Board that is connected to the Main Keyboard.
- Note: The charger is located on the Display Driver Board that is connected to the Main Keyboard.

# **TESTING THE MATERIAL CHECK VALVE**

If erratic shots are encountered, they could be caused by a broken or stuck open material check valve (refer to as three piece)

The following will help determine if this is the case:

- 1). The heat should be at proper operating temperature.
- 2). Using the MT function, single step the table so a bare area of the top of one mold is lined up with the nozzle.
- 3). Turn on the PURGE light.
- 4). Press PURGE. The barrel should move down on top of mold, but the screw should not move downward. If the screw drops down or turns more than 1/2 turn, then the material check valve could be broken or stuck open.

Refer to section 5 - Screw Removable and Cleaning

# **HEATER FUNCTIONS**



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**Troubleshooting 6-5** 





Troubleshooting 6-7







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Troubleshooting 6-10





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Troubleshooting 6-17




TERMINALS	VOLTAGES			
	SHOT SIZE AT BOTTOM	TERM 4 OPEN	TERM 5 OPEN	TERM 6 OPEN
4 TO 5	10 VDC	10 VDC	0 VDC	0 VDC
5 TO 6	0 VDC	0 VDC	0 VDC	10 VDC
4 TO 6	10 VDC	10 VDC	10 VDC	10 VDC









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Troubleshooting 6-27











#### **INPUT BOARD TEST**

WARNING: THIS TEST REQUIRES THE POWER TO BE LEFT ON. THERE WILL BE 110 VAC PRESENT ON THE TERMINALS OF THE TEMPERATURE CONTROLLERS, THE INPUT BOARD, AND THE OUTPUT BOARD. CARE MUST BE TAKEN TO ENSURE SAFETY OF PERSONNEL WHEN PERFORMING THIS TEST.

STEP 1: TURN MAIN POWER OFF.

STEP 2: ON LOGIC BOARD (LB4) PLACE DIP SWITCH NUMBER 4 IN THE CLOSED

OR ON POSITION.

STEP 3: TURN MAIN POWER ON. (ALL LEDS WILL LIGHT MOMENTARILY, THEN GO

OUT)

STEP 4: PRESS NUMBER 7 ON THE KEYBOARD. (A 7 WILL BE DISPLAYED IN THE

LEFT DIGIT OF THE MAIN DISPLAY AND THE KO FUNCTION KEY WILL

LIGHT)

STEP 5: TURN THE MOTOR ON BY PRESSING THE MOTOR START BUTTON.

OBSERVE THE FOLLOWING LEDS RESPOND AS SHOWN WHEN THE

LISTED ACTUATING MECHANISMS ARE OPERATED IN THE STATED

MANNER.

LED	INPUT CHANNEL	MECHANISM	OPERATION
HOME	1	CYCLE START SWITCH	ON WHEN PRESSED
AT	2	RACK MICRO SWITCH	ON WHEN PRESSED
MT	3	NOT USED	
SCREW	4	HEAT INPUT	****
TRIM	5	CYCLE STOP SWITCH	OFF WHEN PRESSED
SHUTTLE	6	UPPER LIMIT SWITCH	OFF WHEN PRESSED
КО	7	PUMP RUNNING	ON WHEN PUMP ON

\*\*\*\* = TO TEST THIS CHANNEL, PUT A JUMPER FROM TERMINAL 9 OF THE OUTPUT BOARD TO TERMINAL 4 OF THE INPUT BOARD AND OBSERVE AN ON SCREW LED WHILE THE PUMP IS RUNNING.

## OUTPUT BOARD TEST

WARNING: THIS TEST REQUIRES THE POWER TO BE LEFT ON. THERE WILL BE 110 VAC PRESENT ON THE TERMINALS OF THE TEMPERATURE CONTROLLERS, THE INPUT BOARD, AND THE OUTPUT BOARD. CARE MUST BE TAKEN TO ENSURE SAFETY OF PERSONNEL WHEN PERFORMING THIS TEST.

STEP 1: TURN POWER OFF. REMOVE THE CENTER AND RIGHT 30 AMP FUSE

FROM THE MOTOR CONTROLLER CABINET.

STEP 2: ON LOGIC BOARD (LB4) PLACE DIP SWITCH NUMBER 4 TO THE CLOSED

POSITION.

STEP 3: TURN POWER ON.

STEP 4: AFTER SCREEN CLEARS PRESS NUMBER 4. (A 4 WILL BE DISPLAYED IN

THE LEFT DIGIT)

STEP 5: TURN MOTOR ON. THE MOTOR WILL NOT START, BUT YOU SHOULD

HEAR THE MOTOR RELAY CLICK AS IT IS ACTIVATED.

THE FOLLOWING IS A LIST OF LIGHTS AND THEIR TEST FUNCTIONS:

KEY	OUTPUT .
F1	RACK SOLENOID
F2	RACK PULL BACK SOLENOID
F3	CLAMP SOLENOID
F4	BARREL SOLENOID
F5	HEAT ENABLE OUT
F6	KNOCKOUT SOLENOID
F7	PRESSURE SOLENOID
F8	SILICONE PAST STUFFER/LOADER SOLENOID
0 (zero)	TRIMMER SOLENOID

AFTER TEST IS DONE.

STEP 1: TURN POWER OFF. REPLACE THE CENTER AND RIGHT 30 AMP FUSE

FROM THE MOTOR CONTROLLER CABINET.

STEP 2: ON LOGIC BOARD (LB4) PLACE DIP SWITCH NUMBER 4 TO THE OPEN

POSITION.

STEP 3: TURN POWER ON.

0 (ZERO)

- IF THE MACHINE USES SKIP PINS IN THE TABLE TO SELECT THE MOLDING STATIONS, THIS IS THE INJECTION SIDE OF THE DUAL SOLENOID VALVE ON THE FAR RIGHT SIDE OF THE MANIFOLD.
- \*\* THERE IS NO SOLENOID ASSOCIATED WITH THIS FUNCTION; YOU WILL NEED TO MEASURE THE VOLTAGE ON THE BACK OF THE TEMPERATURE CONTROLLER SOCKET TO NEUTRAL. (THE WHITE WIRE IS NEUTRAL.) FOR ATHENA CONTROLLER MODELS 6050 AND 6075, THE HEAT ENABLE IS ON TERMINAL 2.
- \*\*\* IF THE MACHINE USES SKIP PINS IN THE TABLE TO SELECT MOLDING STATIONS, THIS IS THE SCREW SIDE OF THE DUAL SOLENOID VALVE ON THE FAR RIGHT SIDE OF THE MANIFOLD.
- STEP 8). IF ANY OF THE FUNCTIONS FAIL IN THIS TEST, IT WILL BE NECESSARY TO TEST THE VOLTAGE OUTPUT AT THE OUTPUT BOARD FOR 115 VAC WHEN THE LED IS ILLUMINATED FOR THE FUNCTION BEING TESTED. (REFER TO PAGE 6.4-3 FOR THE PIN LOCATION ON THE FRONT OF THE OUTPUT BOARD. CONNECT THE LEADS OF A MULTIMETER SET UP TO TEST FOR 120 VAC BETWEEN THE PIN BEING TESTED ON THE OUTPUT BOARD AND PIN 11 ON THE INPUT BOARD.)
- STEP 9). IF THE VOLTAGE IS PRESENT ON THE PIN, BUT THE SOLENOID DOESEN'T CLICK, YOU WILL NEED TO TROUBLE SHOOT THE WIRING BETWEEN THE OUTPUT BOARD AND THE SOLENOID.
- STEP 10). IF THE VOLTAGE IS NOT PRESENT, OBSERVE WHETHER THE LED FOR THE FUNCTION UNDER TEST IS ILLUMINATED. IF IT IS ILLUMINATED, TEST THE FUSES ON THE OUTPUT BOARD AND REPLACE ANY THAT DO NOT HAVE CONTINUITY. IF ALL FUSES ARE GOOD, THE CRYDOM RELAY IS BAD AND MUST BE REPLACED. IF THE LED ON THE OUTPUT BOARD IS NOT ILLUMINATED WHEN THE LED ON THE KEYPAD CORRESPONDING TO THAT FUNCTION IS ILLUMINATED, EITHER THE LOGIC BOARD OR THE OUTPUT BOARD IS DEFECTIVE; DETERMINATION OF WHICH ONE IS BAD MAY BE MADE BY SWAPPING THE BOARDS ONE AT A TIME WITH A KNOWN GOOD BOARD. IF YOU DO NOT HAVE ANOTHER MACHINE TO SWAP THE BOARDS FROM TO TEST, OR IF YOU DO NOT HAVE A SPARE LOGIC OR OUTPUT BOARD, IT WILL BE NECESSARY TO RETURN THE BOARDS TO IPC TO DETERMINE THE DEFECTIVE ONE.
- STEP 11). WHEN THE TEST IS COMPLETE, TURN THE MAIN POWER SWITCH TO THE OFF POSITION.
- STEP 12). REPLACE THE TWO FUSES REMOVED IN STEP 2 ABOVE.
- STEP 13). RETURN DIP SWITCH 4 ON THE LOGIC BOARD TO THE OPEN OR OFF POSITION.
- STEP 14). CLOSE THE DOORS TO BOTH BOXES AND TURN THE MAIN POWER SWITCH TO THE ON POSITION.

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## HOW TO TEST THE IPC KEYPADS

WARNING: THIS TEST REQUIRES THE POWER TO BE LEFT ON. THERE WILL BE 120 VAC PRESENT ON THE TERMINALS OF THE TEMPERATURE CONTROLLERS, THE INPUT BOARD, AND THE OUTPUT BOARD. CARE MUST BE TAKEN TO ENSURE THE SAFETY OF ALL PERSONNEL WHEN PERFORMING THIS TEST!

1. OPEN THE TOP CONTROL BOX (THE BOX WITH THE KEYPADS ON IT)

2. IF YOUR MACHINE IS A STANDARD VERSION OF THE IPC INJECTION MOLDING MACHINE, YOU WILL HAVE ONLY ONE LONG KEYPAD LOCATED ON THE LEFT SIDE OF THE DOOR. THIS IS THE VARIABLE KEYPAD.

3. IF ONE OR MORE OF THE FUNCTIONS ON ONE OF THE KEYPADS DOESN'T WORK, YOU MAY TEST THE KEYPAD ITSELF IN THE FOLLOWING MANNER.

- A. LOCATE THE DISPLAY BOARD ON THE INSIDE OF THE DOOR THAT CORRESPONDS TO THE KEYPAD IN QUESTION.
- B. UNPLUG THE SMALL RIBBON CABLE THAT COMES OUT FROM UNDER THE DISPLAY BOARD AND CONNECTS TO THE 'L' SHAPED PINS ON THE BOARD.
- C. USE THE MATRIX DRAWING TO DETERMINE WHICH PINS OF THE PLUG THE BUTTON (S) THAT DOESN'T WORK USE. EX: ON THE VARIABLE, THE STANDBY BUTTON DOESN'T WORK. STANDBY IS CONNECTED TO THE ROW WITH SHOT SIZE, 1, AND 2, AND THEY ALL GO TO PIN 6 OF THE PLUG. STANDBY IS ALSO CONNECTED TO THE COLUMN WITH CANCEL NEXT, TABLE, 1<sup>st</sup> SPEED, 2<sup>nd</sup> SPEED, AND A BLANK BUTTON AND THEY ALL GO TO PIN 4 OF THE PLUG. NOTE: THE VARIABLE PLUG COUNTS FROM RIGHT TO LEFT.
- D. TAKE A SMALL PIECE OF WIRE, AND WITH THE POWER ON, MOMENTARILY TOUCH TWO 'L' SHARED RINS CONCERNED WITH THE ELINCTION BEING TESTED (C/

TWO 'L' SHAPED PINS CONCERNED WITH THE FUNCTION BEING TESTED (CARE MUST BE TAKEN NOT TO TOUCH ANY OTHER PINS.)

- E. OBSERVE THE LED FOR THE FUNCTION. IT SHOULD TOGGLE ON AND OFF AS YOU TOUCH THE PINS.
- F. IF THE LED DOES TURN ON AND OFF, THE KEYPAD IS BAD AND MUST BE REPLACED.
- G. IF THE LED DOES NOT WORK, THE PROBLEM IS EITHER ON THE DISPLAY DRIVER BOARD, THE DISPLAY BOARD ITSELF (A BAD LED), OR THE LARGE RIBBON CABLE CONNECTING THE DISPLAY BOARD TO THE DISPLAY DRIVER BOARD.
- H. IF THE MACHINE IS A VARIABLE VERSION, THERE ARE TWO IDENTICAL DISPLAY DRIVER BOARDS IN THE FIRST TWO SLOTS OF THE CARD RACK. THE ONLY DIFFERENCE IS IN THE 5 POLE DIP SHUNT ON THE FRONT LEFT CORNER OF THE BOARDS.
- I. TO DETERMINE IF THE DISPLAY DRIVER BOARD IS BAD, DO THE FOLLOWING:
- J. TURN MAIN POWER OFF.
- K. MARK THE RIBBON CABLES ON THE TWO BOARDS AS TO WHICH ONE IS FOR THE TOP AND WHICH ONE IS FOR THE BOTTOM.
- L. REMOVE THE RIBBON CABLES.
- M. REMOVE THE TWO DISPLAY DRIVER BOARDS AND LOCATE THE DIP SHUNTS.
- N. NOTE WHICH BOARD HAS ONLY ONE TRACE BROKEN; THIS IS THE DRIVER FOR THE LARGE KEYPAD.

O.NOTE THE ORIENTATION OF THE DIP SHUNTS IN THEIR RESPECTIVE SOCKETS.

- P. USE A SMALL SCREWDRIVER TO CAREFULLY PRY THE SHUNTS UP UNTIL THEY CAN BE REMOVED FROM THE KEYBOARD.
- Q. PLACE EACH SHUNT IN THE OPPOSITE BOARD FROM WHICH IT WAS REMOVED, OBSERVING THE PROPER ORIENTATION.
- R. REPLACE THE BOARDS IN THE CARD RACK ENSURING THAT THE BOARD WITH ONE TRACE BROKEN IS IN THE SAME SLOT AS BEFORE (TOP SLOT).
- S. REPLACE THE RIBBON CABLES ON THE PROPER BOARDS (THE ONE FROM THE VARIABLE BOARD GOES TO THE DRIVER WITH 3 BROKEN TRACES.)
- T. RE-TEST THE KEYPAD IN QUESTION AS DESCRIBED ABOVE.
- U. IF THE FUNCTION NOW WORKS, THE DISPLAY DRIVER IS BAD AND MUST BE REPLACED OR REPAIRED.
- V. IF THE FUNCTION STILL WILL NOT WORK, THE ONLY PART LEFT IS THE RIBBON CABLE, AND IT IS THE PROBABLE CAUSE OF THE PROBLEM.

4. IF THE PROBLEM IS ON THE MAIN OR LARGE KEYPAD, THE PROCEDURE IS THE SAME FOR TESTING:

EX: HEAT WILL NOT WORK.

- A. REMOVE THE SMALL RIBBON CABLE FROM THE DISPLAY BOARD.
- B. USE THE MATRIX TO DETERMINE THE TWO PINS TO JUMPER (IN THIS EX. THEY ARE 2 AND 9.)
- C. NOTE: THIS PLUG COUNTS FROM TOP TO BOTTOM
- D. JUMPER PINS 2 AND 9 MOMENTARILY.
- E. IF THE HEAT CAN BE TURNED ON AND OFF LIKE THIS, THE KEYPAD IS BAD.
- F. IF IT STILL DOESN'T WORK, AND THE MACHINE IS A VARIABLE, PROCEED AS DESCRIBED FOR TESTING THE DRIVER BOARD IN THE PREVIOUS EXAMPLE
- G. IF THE MACHINE IS A STANDARD VERSION, THE MOST LIKELY CAUSE OF THE PROBLEM IS THE DISPLAY DRIVER BOARD.

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## HOW TO TEST POWER SUPPLIES

WARNING: THIS TEST REQUIRES THE POWER TO BE LEFT ON WHILE THE MAIN DISCONNECT BOX DOOR IS OPEN. THERE WILL BE 120 VAC ON VARIOUS TERMINALS IN THE BOX. CARE MUST BE TAKEN TO ENSURE SAFETY OF PERSONNEL WHEN PERFORMING THIS TEST.

- 1. TURN THE MAIN POWER SWITCH TO THE OFF POSITION.
- 2. OPEN THE DOOR TO ALLOW ACCESS TO THE POWER SUPPLIE. (ON MACHINES BUILT BEFORE JANUARY 1996, THE POWER SUPPLIES ARE LOCATED IN THE SMALL SQUARE BOX MOUNTED TO THE BOTTOM OF THE ALLEN BRADLEY DISCONNECT BOX; ON MACHINES BUILT AFTER JANUARY 1996, THE POWER SUPPLIES ARE MOUNTED INSIDE THE MAIN CONTROL BOX.)
- NOTE: THERE ARE TWO POWER SUPPLY PANELS IN THE TTM-HS2V MACHINES. THERE IS A 24 VDC POWER SUPPLY PANEL AND A TRIPLE OUTPUT LINEAR POWER SUPPLY PANEL THAT HAS THE 5 VDC AND THE +/- 12 VDC POWER SUPPLIES ON IT. THE TRIPLE OUTPUT POWER SUPPLY IS APPROXIMATELY 10 INCHES LONG AND IS MOUNTED IN A VERTICAL MANNER ON THE RIGHT SIDE OF THE POWER SUPPLY/MAIN CONTROL BOX. THE 24 VDC POWER SUPPLY IS APPROXIMATELY 5.5 INCHES LONG AND IS MOUNTED TO THE LEFT OF THE TRIPLE OUTPUT SUPPLY.
- 3. ON MACHINES BUILT BEFORE JANUARY 1996, LOCATE THE THREE PIN MOLEX CONNECTOR THAT IS USED ON EACH OF THE POWER SUPPLIES.
- 4. UNPLUG THE CONNECTOR OF THE POWER SUPPLY TO BE TESTED.
- 5. TURN THE MAIN POWER SWITCH TO THE ON POSITION.
- 6. MEASURE THE OUTPUT VOLTAGE AT THE PLUG OR THE TERMINAL LUGS ON THE POWER SUPPLY ITSELF (UNLOADED CONDITION).
- IF THE VOLTAGE IS MORE THAN .5 VOLTS OFF (EITHER +.5 OR -.5 VDC), LOCATE THE VOLTAGE ADJUSTMENT POTENTIOMETER LOCATED ON THE PC BOARD FOR THE AFFECTED POWER SUPPLY AND ADJUST THE VOLTAGE TO THE NOMINAL RATED VOLTAGE.
- 8. IF THE MACHINE WAS BUILT AFTER JANUARY 1996, LOCATE THE TWO LONG GRAY CONNECTORS ON THE WHITE MAIN PANEL TO THE IMMEDIATE LEFT OF THE 24 VDC POWER SUPPLY.
- 9. UNPLUG THE LEFT SIDE OF THE PLUGS TO ISOLATE THE POWER SUPPLIES FROM THEIR INDIVIDUAL CIRCUITS.
- 10. TURN THE MAIN POWER SWITCH TO THE ON POSITION.
- 11. CHECK FOR THE PROPER VOLTAGE ON THE TERMINAL LUGS OF THE INDIVIDUAL POWERSUPPLIES.
- 12. TURN THE MAIN POWER SWITCH TO THE OFF POSITION.
- 13. RE-INSTALL ANY PLUGS REMOVED AND TURN THE MAIN POWER SWITCH ON.
- 14. RE-CHECK THE VOLTAGE OUTPUT OF THE AFFECTED POWER SUPPLY AT THE TERMINAL LUGS.
- 15. IF THE VOLTAGE DROPS OFF MORE THAN SHOWN IN THE FOLLOWING CHART, THERE IS EXCESSIVE LOADING ON THE CIRCUIT OF THAT POWER SUPPLY, AND THE PROBLEM MUST BE LOCATED AND CORRECTED.

POWER SUPPLY	VOLTAGE DROP

.2 VDC
.48 VDC
.96 VDC

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## HOW TO REPLACE AND ALIGN THE RING SENSOR

#### NOTE: FAILURE TO FOLLOW THESE PROCEDURES AND STANDARD SAFETY PRACTICES MAY RESULT IN BODILY INJURY AND/OR DAMAGE TO THE MACHINE AND MAY VOID THE WARRANTY.

- 1. TO REPLACE THE RING SENSOR IT WILL BE NECESSARY TO REMOVE THE TABLE FROM THE RING GEAR.
  - A. REMOVE ALL MOLDS
  - B. IF THE MACHINE HAS A WATER MANIFOLD, REMOVE THE THREE 5/16-18 CAP HEAD SCREWS HOLDING IT TO THE TABLE. REMOVE THE MANIFOLD.
  - C. IF THE MACHINE IS EQUIPPED WITH AIR LOGIC, REMOVE THE AIR MANIFOLD BY REMOVING THE TWO 10-32 CAP HEAD SCREWS. LIFT THE MANIFOLD AS HIGH AS IT WILL GO AND UNSCREW THE AIR ROTARY UNION WITH AN 11/16" OPEN END WRENCH.
  - D. DRIVE THE TWO 5/16" DOWEL PINS OUT THE BOTTOM OF THE GEAR.
  - E. REMOVE THE TABLE.
- 2. ENSURE THE PUMP IS OFF.
- 3. LIFT THE GEAR OFF OF THE CENTER BEARING.
- 4. CLEAN THE SILICONE SEALANT FROM THE SCREW HOLES ON THE SENSOR, AND REMOVE THE SCREWS.
- 5. TURN THE MAIN POWER SWITCH LOCATED ON THE MAIN DISCONNECT BOX TO THE OFF POSITION.
- 6. OPEN THE TOP CONTROL BOX BY LOOSENING THE TWO SCREW-CLAMPS ON THE RIGHT SIDE OF THE DOOR.
- 7. LOCATE THE CORD CONNECTOR WHERE THE RING SENSOR CABLE ENTERS THE TOP BOX BY FOLLOWING THE CABLE FROM THE RING SENSOR TO THE BOX.
- LOCATE THAT SAME CONNECTOR ON THE INSIDE OF THE BOX AND FOLLOW THE CORD TO THE CARD RACK WHERE IT IS CONNECTED TO THE RING SENSOR INPUT BOARD. (THIS BOARD IS USUALLY THE 4<sup>th</sup> BOARD DOWN FROM THE TOP).
- 9. REMOVE THE RING SENSOR INPUT BOARD FROM THE CARD RACK BY PULLING IT STRAIGHT TOWARDS YOU.
- 10. REMOVE THE RING SENSOR PLUG FROM THE BOARD.
- 11. LOOSEN AND REMOVE THE STAR NUT ON THE CORD CONNECTOR WHERE IT ENTERS THE TOP BOX.
- 12. PULL THE CABLE THROUGH THE NUT AND OUT OF THE BOX. (THE PLUG ON THE END OF THE CABLE WILL FIT THROUGH THE NUT AND THE HOLE AND DOES NOT NEED TO BE REMOVED IN ORDER TO REMOVE THE CABLE).
- 13. PUSH THE PLUG ON THE NEW RING SENSOR THROUGH THE HOLE IN THE SIDE OF THE BOX AND THE NUT ON THE INSIDE OF THE BOX.
- 14. TIGHTEN THE NUT.
- 15. IF YOUR RING SENSOR HAS THE FOUR SENSORS COVERED WITH WHITE OUT AND A SMALL "X" DRAWN ON THE FACE OF THEM, THEN PROCEED TO STEP 16; IF NOT THEN DO THE FOLLOWING:
  - A. PAINT THE FACE OF THE SENSORS WITH WHITE CORRECTION FLUID (WHITE-OUT)
  - B. WHEN THE WHITE-OUT IS DRY, USE A STRAIGHT EDGE TO DRAW AN "X" ON THE FACE OF EACH SENSOR BEING CAREFUL TO GO FROM CORNER TO CORNER.
- 16. LAY THE NEW RING SENSOR IN THE PROPER POSITION ON THE SUBPLATE

WITH THE CABLE POSITIONED AWAY FROM THE CENTER BEARING AND THE FOUR SMALL X'S UP.

- 17. START THE TWO 6-32 BUTTON HEAD SCREWS IN THE TAPPED HOLES, BUT DON'T TIGHTEN THEM.
- 18. LOCATE THE THREE SMALL HOLES IN THE ALUMINUM RING THAT IS MOUNTED TO THE BOTTOM OF THE MAIN GEAR. (THESE ARE THE ALIGNMENT HOLES)
- 19. CAREFULLY PLACE THE MAIN GEAR BACK ON THE MACHINE IN SUCH A MANNER THAT THE ALIGNMENT HOLES ARE OVER THE TOPS OF THREE OF THE SENSORS.
- 20. ENSURE THAT THE RACK HAS FULLY ENGAGED THE MAIN GEAR BY PUSHING THE RIGHT END OF THE RACK CYLINDER AWAY FROM YOU AS FAR AS
- POSSIBLE. 21. USE A SMALL FLASHLIGHT TO LOOK DOWN IN THE HOLES.
- 22. REACH UNDER THE GEAR AND MOVE THE SENSOR UNTIL THE THREE X'S ARE CENTERED IN THE HOLES.
- 23. WHEN THE SENSOR IS POSITIONED PROPERLY, HAVE SOMEONE LIFT THE MAIN GEAR FROM THE MACHINE WHILE FIRMLY HOLDING THE SENSOR DOWN. IF THE SENSOR MOVES, IT WILL BE NECESSARY TO GO THROUGH THE ALIGNMENT PROCEDURE AGAIN AS THE SENSOR WILL ONLY COUNT PROPERLY IF IT IS ALIGNED.
- 24. TIGHTEN THE TWO 6-32 SCREWS DOWN FULLY.
- 25. REPLACE THE MAIN GEAR AND RECHECK THE ALIGNMENT OF THE SENSOR TO VERIFY THAT IT DIDN'T MOVE WHILE TIGHTENING.
- 26. PLUG THE 12 POSITION CONNECTOR ON THE RING SENSOR INPUT BOARD IN THE CARD RACK AND REINSERT THE CARD INTO IT'S PROPER SLOT IN THE RACK
- 27. PULL ENOUGH OF THE CABLE FOR THE RING SENSOR THROUGH THE CABLE CONNECTOR TO NEATLY DRESS THE CABLE TO THE BACK OF THE BOX AND REINSERT IT IN THE PLASTIC CABLE HOLDER.
- 28. TIGHTEN THE NUT ON THE OUTSIDE OF THE CABLE CONNECTOR TO HOLD THE CABLE TIGHT.
- 29. TURN THE MAIN POWER ON AND START THE MOTOR.
- 30. TEST THE RING SENSOR BY ROTATING THE MAIN GEAR AND OBSERVING THE READ OUT IN THE CANCEL PRESENT WINDOW OF THE SMALL KEYPAD ON THE TOP CONTROL BOX. THE NUMBERS SHOULD COUNT IN THE NORMAL FASHION.
- 31. STOP THE TABLE AND PLACE THE MACHINE IN THE SHUTTLE MODE BY PRESSING THE SHUTTLE BUTTON ON THE MAIN KEYPAD.
- 32. PRESS CYCLE START AND OBSERVE THE CANCEL PRESENT WINDOW.
- 33. IF EITHER TEST DOES NOT COUNT CORRECTLY, FORWARD, OR SHUTTLE; THE ALIGNMENT PROCEDURES WILL NEED TO BE REPEATED.
- 34. IF BOTH TESTS WORK PROPERLY, TURN THE PUMP OFF AND REMOVE THE MAIN GEAR.
- 35. SEAL THE SENSOR WITH CLEAR RTV SILICONE ENSURING THAT IT IS SPREAD THIN ON TOP TO ALLOW THE ALUMINUM TO CLEAR WITHOUT RUBBING.
- 36. REPLACE THE GEAR.
- 37. REPLACE THE TABLE AND ANY ACCESSORIES AND MOLDS IN THE REVERSE ORDER IN WHICH THEY WERE REMOVED.
- 38. CLOSE THE TOP CONTROL BOX DOOR AND TIGHTEN THE TWO SCREW CLAMPS.

### HOW TO TEST THE RING SENSOR AND RELATED SOFTWARE

BEFORE BRINGING THE HEAT UP ON THE BARREL PERFORM THE FOLLOWING TESTS:

- 1. TURN THE STANDBY LIGHT ON THE CIRCULAR KEYPAD ON AND SET TIMER 96 AS FOLLOWS: TMR 9 6 P O ENT CLR/SAVE
- 2. CYCLE THE TABLE ONE FULL REVOLUTION; NOTING THE DISPLAY IN THE CANCEL PRESENT WINDOW FOR EACH STOP. (PLEASE WRITE THE NUMBER OBSERVED AT EACH STOP OF THE TABLE ON THE DASHES BELOW.)
- 3. TURN THE STANDBY LIGHT ON THE CIRCULAR KEYPAD OFF
- 4. CYCLE THE TABLE ONE FULL REVOLUTION; NOTING THE DISPLAY IN THE CANCEL PRESENT WINDOW FOR EACH STOP.
- 5. CALL UP TIMER 98 AND ENTER A VALUE OF 4 IN THE TENS COLUMN EX: TMR 9 8 P 4 0 0 ENT CLR/SAVE; IF THERE IS A 2 IN THE HUNDREDS COLUMN, THEN THE KEYSTOKES WILL BE: TMR 9 8 P 2 4 0 0 ENT CLR/SAVE.
- 6. REPEAT STEPS 1 THROUGH 4 AND RECORD THE RESULTS:

STANDBY LIGHT ON:

STANDBY LIGHT OFF:

- 7. CALL UP TIMER 98 AND ENTER THE FOLLOWING VALUE: TMR 98P200ENT CLR/SAVE
- IF THE TIMER HAS A 2 IN THE HUNDREDS COLUMN, ENTER THE FOLLOWING: TMR 9 8 P 2 0 0 ENT CLR/SAVE
- 8. TURN THE MAIN POWER SWITCH TO THE OFF POSITION
- 9. IF THE MACHINE HAS AN ALLEN BRADLEY TYPE OF DISCONNECT (IT HAS A KNIFE TYPE SWITCH THAT IS FLIPPED UP AND DOWN TO TURN THE MACHINE ON AND OFF); OPEN THE WIREWAY BOX (THE LONG THIN BOX ON THE BACK)
- 10. IF THE MACHINE HAS AN ABB TYPE OF DISCONNECT (IT HAS A ROTARY DISCONNECT SWITCH), OPEN THE BIG DOOR.
- 11. IN EITHER STYLE BOX, LOCATE THE TERMINAL STRIP WITH VARIOUS COLORED WIRES ON ONE SIDE AND BLACK AND WHITE WIRES ON THE OTHER.
- 12. LOCATE TERMINAL POSITIONS 3 AND 8 AND INSTALL A JUMPER WIRE BETWEEN THEM.
- 13. WITH THE STANDBY LIGHT ON; CYCLE THE TABLE AROUND ONE FULL TURN NOTING THE CANCEL PRESENT READING FOR EACH STOP.
- 14. TURN THE STANDBY LIGHT OFF AND REPEAT STEP 13
- 15. NOTE THE NUMBER THAT APPEARS IN THE CANCEL/PRESENT WINDOW WHEN THE MOLD IS UNDER THE BARREL (THIS MAY BE DIFFERENT THAN IT WAS AS THE MACHINE IS USING AN INTERNAL COUNTER RATHER THAN THE RING SENSOR FOR THIS TEST)
- 16. SELECT ONLY THE STATION NOTED IN STEP 15 BY TURNING THAT LIGHT ON TURN THE HEAT ON, AND WHEN THE BARREL IS "UP TO TEMP" TRY SHOOTING THE MOLD.

#### HOW TO BYPASS THE RING SENSOR

- 1. TURN THE MAIN POWER SWITCH TO THE OFF POSITION.
- 2. OPEN THE DOOR TO THE MAIN CONTROL BOX AND LOCATE THE TERMINAL STRIP AT THE LEFT SIDE OF THE BOX. (IF THE MACHINE WAS PURCHASED PRIOR TO JANUARY 1996, THE TERMINAL STRIP IS LOCATED INSIDE THE "WIREWAY BOX" MOUNTED ON THE REAR OF THE ALLEN BRADLEY DISCONNECT BOX.)
- 3. USE A 6" LONG PIECE OF 20 ÁWG WIRE TO PLACE A JUMPER BETWEEN TERMINALS 3 AND 8 OF THE TERMINAL STRIP.
- IF YOUR MACHINE WAS BUILT AFTER JANUARY 1996, STRIP THE WIRE BACK ABOUT 1/2" AND TWIST IT. ENSURE THAT ALL THE STRANDS GO INTO THE TERMINAL.
- 5. USE A SMALL STRAIGHT SCREWDRIVER TO PUSH INTO THE SQUARE OPENING OF THE TERMINAL BESIDE THE ROUND HOLE THAT THE WIRE IS TO BE PLACED IN.
- 6. PRESS THE SCREWDRIVER IN UNTIL YOU FEEL A SMALL CLICK.
- 7. PLACE THE WIRE FULLY INTO THE ROUND HOLE, AND THEN REMOVE THE SCREWDRIVER.
- 8. TUG GENTLY, BUT FIRMLY ON THE WIRE TO ENSURE THAT IT IS BEING HELD PROPERLY BY THE TERMINAL.
- IF YOUR MACHINE WAS BUILT PRIOR TO JANUARY 1996, STRIP THE WIRE BACK ABOUT ½" AND BEND IT AT APPROXIMATELY 90 DEGREES ABOUT ¾" BACK FROM THE END.
- 10. USE A SMALL STRAIGHT SCREWDRIVER TO LOOSEN THE SCREWS IN THE PROPER TERMINALS.

IF THERE ARE WIRES IN EITHER TERMINAL, CARE MUST BE TAKEN TO ENSURE THEY REMAIN IN THE TERMINAL.

- 11. CLOSE THE DOOR TO THE BOX.
- 12. TURN THE MAIN POWER SWITCH TO THE ON POSITION.
- 13. ENSURE THAT THE STANDBY LED ON THE TOP RIGHT OF THE SMALL (VSP) KEYPAD IS ILLUMINATED.
- 14. CALL UP TIMER 98, NOTE THE VALUE IN IT, AND ADD 20.0 TO THE VALUE IN THE TIMER.

EX: IF THE TIMER HAS 2000.0 IN IT, ENTER THE FOLLOWING KEYSTROKES: TMR 98 P 2 2 0 0 ENT CLR/SAVE THIS BYPASSES THE RING SENSOR AND FORCES THE MACHINE TO USE AN INTERNAL SOFTWARE COUNTER TO KEEP TRACK OF THE STATIONS.

- 15. START THE PUMP BY PRESSING THE MOTOR START BUTTON.
- 16. POSITION THE TABLE SO THAT THE NORMAL POSITION 1 IS AT THE 1 O, CLOCK POSITION AND PRESS CYCLE STOP. (THIS IS THE POSITION ON THE TABLE THAT, IF THE RING SENSOR WERE WORKING CORRECTLY, WOULD READ 1 IN THE CANCEL/PRESENT WINDOW OF THE VSP KEYPAD WHEN IT IS UNDER THE BARREL.)
- 17. TURN THE HOME LED ON AND THE AUTO LED OFF.
- 18. PRESS THE CYCLE START BUTTON AND ALLOW THE TABLE TO MOVE ONE STATION. (THERE IS NO NEED TO PRESS THE CYCLE STOP BUTTON, AS THE MACHINE WILL ONLY CYCLE ONE STATION PER PRESS WITH THE AUTO LED TURNED OFF.)
- 19. ENSURE THAT THE CANCEL/PRESENT WINDOW ON THE TOP LEFT CORNER OF THE VSP KEYPAD READS 1.
- 20. TURN THE HOME LED OFF AND THE AUTO LED ON.

21. CYCLE THE TABLE AROUND ONE FULL REVOLUTION TO ENSURE THAT IT IS COUNTING CORRECTLY.

NOTE: WHILE THE BATTERY PACK WILL NORMALLY KEEP THE MEMORY INTACT AND YOU WILL NOT NEED TO RE-HOME THE TABLE AFTER SHUTTING THE MACHINE DOWN OVERNIGHT, IT IS POSSIBLE FOR SOME UNFORESEEN OCCURRENCE TO CAUSE THE TABLE TO LOSE ITS HOME. IT IS RECOMMENDED THEAT YOU CYCLE THE TABLE ONE FULL REVOLUTION TO ASCERTAIN WHETHER IT IS STILL COUNTING CORRECTLY. IF NECESSARY, JUST FOLLOW STEPS 15 THROUGH 21 TO HOME THE TABLE. IF THE REASON FOR BYPASSING THE RING SENSOR WAS BECAUSE IT WAS DEFECTIVE, AND A NEW ONE WAS NOT READILY AVAILAVLE, WHEN THE NEW SENSOR IS INSTALLED, REMOVE THE JUMPER BETWEEN TERMINALS 3 AND 8 AND RETURN TIMER 98 TO THE VALUE NOTED IN STEP 14 ABOVE.

# Section 7 - APPENDICES

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MOLDING CYCLE TIMERS				
TIMER NAME	TIMER NUMBER	STARTED BY	RESULTS OF TIMING OUT	TYPICAL VALUE
OVERALL (CLAMP OFF)	00	RACK MICRO AND MOLDING CYCLE SELECTED	STARTS RESTART TIMER CLAMP SOLENOID OFF	10-30 NOTE 1
CLAMP ON	17	RACK MICRO AND MOLDING CYCLE SELECTED	CLAMP SOLENOID ON	0.0
INJECTION ON	14	RACK MICRO AND MOLDING CYCLE SELECTED	STARTS INJECTION OFF TIMER INJECTION SOLENOID ON	0.5
INJECTION OFF	01-12 13	INJECTION ON TIMER	STARTS SCREW ON TIMER INJECTION SOLENOID OFF	5-10 NOTE 1
SCREW ON	18	INJECTION OFF TIMER	STARTS SCREW OFF TIMER SCREW SOLENOID ON	0.0
SCREW OFF	19	SCREW ON TIMER	SCREW SOLENOID OFF NOTE 2	25.0
RESTART	55	OVERALL TIMER	STARTS RACK ON IN NORMAL STARTS RACK OFF IN SHUTTLE	0.1

NOTE 1: The timers setting would depend on the production requirements.NOTE 2: This is not a normal time out. It is used to backup the shot size sensor. This could indicate that the machine is out of material.

Injection cycle and screw cycle equal molding cycle.

TABLE TIMERS				
TIMER NAME	TIMER NUMBER	STARTED BY	RESULTS OF TIMING OUT	TYPICAL VALUE
RACK ON	51	CYCLE START OR AUTO CYCLE RESTART	STARTS RACK FAULT AND RACK MICRO DEBOUNCE TIMER RACK SOLENOID ON	0.1
RACK OFF	52		STARTS RACK FAULT AND RACK MICRO DEBOUNCE TIMER	0.1
CCW		LEFT RACK PULLBACK TIMER	RACK SOLENOID OFF	
CW		RIGHT RACK PULLBACK TIMER	RACK SOLENOID ON	
RACK FAULT	50	RACK ON OR RACK OFF TIMER	TABLE FAULT LIGHT ON	2.5
RIGHT RACK PULLBACK	53	RIGHT MICRO SWITCH	CYCLE STOP OR AUTO CYCLE RESTART	0.0
CCW			RACK PULLBACK SOLENOID OFF	
CW			RACK PULLBACK SOLENOID ON	
LEFT RACK PULLBACK	54	LEFT MICRO SWITCH	START RACK OFF TIMER RACK	0.0
CCW			RACK PULLBACK SOLENOID ON	
CW			RACK PULLBACK SOLENOID OFF	
RACK MICRO DEBOUNCE	56	RACK ON OR RACK OFF TIMER	ENABLE RACK MICRO SWITCH	0.5
RACK MICRO BYPASS TIMER	59	RACK ON OR RACK OFF TIMER NOTE 1	STARTS RIGHT RACK PULLBACK OR LEFT RACK PULLBACK TIMER	1.5

CCW - NORMAL DIRECTION CW - REVERSE DIRECTION - SHUTTLE

NOTE 1: This timer is only used if the bypass code has been entered. Refer to Appendix C.

AUXILIARY TIMERS				
TIMER NAME	TIMER NUMBER	STARTED BY	RESULTS OF TIMING OUT	TYPICAL VALUE
TRIMMER ON	20	RACK MICRO AND TRIMMER SELECTED	STARTS TRIMMER OFF TIMER TRIMMER SOLENOID ON	0.0
TRIMMER OFF	21	TRIMMER ON	TRIMMER SOLENOID OFF	0.1
KNOCKOUT ON	22	RACK MICRO AND KNOCKOUT SELECTED	STARTS KNOCKOUT OFF TIMER KNOCKOUT SOLENOID ON	0.0
KNOCKOUT OFF	23	KNOCKOUT ON	KNOCKOUT SOLENOID OFF	0.7
SHUTTLE LOAD TIMER	25	RIGHT RACK MICRO IN SHUTTLE	AUTO CYCLE RESTART STARTS RACK ON TIMER	10-20 NOTE 1
MANUAL KEY TRIM & KO	83	TRIMMER OR KNOCKOUT KEYSTROKE	DISABLE MANUAL OPERATION OF KNOCKOUT OR TRIMMER NOTE 2	6.0
UNLOADER 1 ON NOTE 3	34	RACK MICRO AND UNLOADER 1 SELECTED	STARTS UNLOADER 1 OFF TIMER UNLOADER 1 SOLENOID ON	0.0 NOTE 1
UNLOADER 1 OFF	35	UNLOADER 1 ON	UNLOADER 1 SOLENOID OFF	0.1 NOTE 1
UNLOADER 2 ON NOTE 3	36	RACK MICRO AND UNLOADER 2 SELECTED	STARTS UNLOADER 2 OFF TIMER UNLOADER 2 SOLENOID ON	0.0 NOTE 1
UNLOADER 2 OFF NOTE 3	37	UNLOADER 2 ON	UNLOADER 2 SOLENOID OFF	0.7 NOTE 1
UNLOADER 3 ON NOTE 3	38	RACK MICRO AND UNLOADER 3 SELECTED	STARTS UNLOADER 3 OFF TIMER UNLOADER 3 SOLENOID ON	0.0 NOTE 1
UNLOADER 3 OFF NOTE 3	39	UNLOADER 3 ON	UNLOADER 3 SOLENOID OFF	0.1 NOTE 1
UNLOADER RESET	44	KNOCKOUT OFF, UNLOADER 1 OFF, UNLOADER 2 OFF OR UNLOADER 3 OFF	WILL ALLOW THE TABLE TO ROTATE	0.5

NOTE 1: The timer setting would depend on the production requirements. NOTE 2: When keystroked, timer starts. If keystroked again before timing out will cause function to cycle.

NOTE 3: These functions are option equipment and are normal installed at the factory.

TABLE REALIGNMENT TIMERS				
TIMER NAME	TIMER NUMBER	STARTED BY	RESULTS OF TIMING OUT	TYPICAL VALUE
REALIGN RACK OFF	88	RING SENSOR TRIPPED	RACK SOLENOID OFF	0.5
REALIGN RPB ON	89	RING SENSOR TRIPPED	STARTS REALIGN RPB OFF TIMER RACK PULLBACK SOLENOID ON	0.5
REALIGN RPB OFF	84	REALIGN RPB ON TIMER	STARTS RESTART TIMER RACK PULLBACK SOLENOID OFF	1.0
SINGLE STEP RACK OFF	85	RACK ON TIMER	RACK SOLENOID OFF	0.6
SINGLE STEP RPB ON	86	RACK ON TIMER	RACK PULLBACK SOLENOID ON	0.6
SINGLE STEP RPB OFF	87	SINGLE STEP RPB ON TIMER	STARTS RESTART TIMER RACK PULLBACK SOLENOID TIMER	1.2

NOTE: The timers in this chart are based on a 1/60th. of a second time base; e.g., a setting of 0.1 = 0.016666 seconds. Multiply settings by 0.016666 for actual time.

MISCELLANEOUS TIMERS				
TIMER NAME	TIMER NUMBER	STARTED BY	RESULTS OF TIMING OUT	TYPICAL VALUE
BLINK 1	93	BLINK 2 TIMER	STARTS BLINK 2 TIMER MOLDING POSITION SELECTION LIGHT OFF <b>NOTE 1</b>	2.0
BLINK 2	94	BLINK 1 TIMER	STARTS BLINK 1 TIMER MOLDING POSITION SELECTION LIGHT ON <b>NOTE 1</b>	2.0
CHECK SCREW OFF	91	SHOT SIZE SENSOR TRIPPED	SET ERROR CODE AND/OR CAUSE PUMP TO TURN OFF	0.3
CHECK SCREW ON	92	SCREW UP ON TIMER	SET ERROR CODE AND/OR CAUSE PUMP TO TURN OFF	0.3
HEATER INTERLOCK RESET	31	HEATER WATCHDOG TIMER HEAT OFF	RESETS HEATER INTERLOCK	240.0
HEATER INTERLOCK SET	32	CYCLE OFF TOP TEMPERATURE CONTROLLER	ENABLE HEATER WATCHDOG TIMER RELEASE INTERLOCK	4.0 NOTE 2
HEATER WATCHDOG	30	HEATER INTERLOCK SET AND TEMP. CONTROLLER OPEN	STARTS HEATER INTERLOCK RESET TIMER HEAT OFF & HEAT FAULT LIGHT ON	240.0
KEY DEBOUNCE	90	NUMBER KEY STROKE	PREVENT MULTIPLE NUMBER	1.0
PRESSURE ON	33	RACK MICRO AND MOLDING CYCLE SELECTED	HIGH PRESSURE SOLENOID ON PUMP ON	0.0

NOTE 1: If single actual counter has reached preset counter setting then the operation will occur. NOTE 2: This value may have to be changed; depending on how the temperature controllers' auto tuned.

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TIMER LISTING BY NUMBERS				
TIMER NUMBER	TIMER NAME	TIMER TYPE		
00	OVERALL	MOLDING CYCLE		
01-12 13	INJECTION OFF	MOLDING CYCLE		
14	INJECTION ON	MOLDING CYCLE		
17	CLAMP ON	MOLDING CYCLE		
18	SCREW ON	MOLDING CYCLE		
19	SCREW OFF	MOLDING CYCLE		
20	TRIMMER ON	AUXILIARY		
21	TRIMMER OFF	AUXILIARY		
22	KNOCKOUT ON	AUXILIARY		
23	KNOCKOUT OFF	AUXILIARY		
25	SHUTTLE LOAD TIMER	AUXILIARY		
30	HEATER WATCHDOG	MISCELLANEOUS		
31	HEATER INTERLOCK RESET	MISCELLANEOUS		
32	HEATER INTERLOCK SET	MISCELLANEOUS		
33	PRESSURE ON	MISCELLANEOUS		
34	UNLOADER 1 ON	AUXILIARY		
35	UNLOADER 1 OFF	AUXILIARY		
36	UNLOADER 2 ON	AUXILIARY		
37	UNLOADER 2 OFF	AUXILIARY		
38	UNLOADER 3 ON	AUXILIARY		
39	UNLOADER 3 OFF	AUXILIARY		
44	UNLOADER RESET	AUXILIARY		
50	RACK FAULT	TABLE		
51	RACK ON	TABLE		
52	RACK OFF	TABLE		
53	RIGHT RACK PULLBACK	TABLE		
54	LEFT RACK PULLBACK	TABLE		
55	RESTART	MOLDING CYCLE		
56	RACK MICRO DEBOUNCE	TABLE		
59	RACK MICRO BYPASS TIMER	TABLE		
63	SECURITY CODE	REFER TO SECTION 3		
83	MANUAL KEY TRIM & KO	AUXILIARY		
84	REALIGN RPB OFF	TABLE REALIGNMENT		
85	SINGLE STEP RACK OFF	TABLE REALIGNMENT		
86	SINGLE STEP RPB ON	TABLE REALIGNMENT		
87	SINGLE STEP RPB OFF	TABLE REALIGNMENT		
88	REALIGN RACK OFF	TABLE REALIGNMENT		
89	REALIGN RPB ON	TABLE REALIGNMENT		
90	KEY DEBOUNCE	MISCELLANEOUS		
91	CHECK SCREW OFF	MISCELLANEOUS		
92	CHECK SCREW ON	MISCELLANEOUS		
93	BLINK 1	MISCELLANEOUS		
94	BLINK 2	MISCELLANEOUS		

To use this chart: Find the box that has the required functions. Then follow over to the far left column. This number will be use in the corresponding column in the display. Refer to Sections 3 - How to Adjust Table Mode Codes.

This table data is used to control clamp, knockout, trimmer and table shuttle. There may be cases where these functions need to be selectively activated ant certain table positions, and turned of f at other table positions. For normal molding with the use of the trimmer and knockout operation, a setting of 371 is required. The following chart shows the specific codes for each digit on the TABLE display:

TABLE MODE CODES								
	1000'S	100'S	10'S	1'S				
1	CHANGE TABLE DIRECTION TO CW	ENABLE MOLDING	ENABLE CLAMP	MOLDING POSITION SELECTED				
2	CHANGE TABLE DIRECTION TO CCW	ENABLE CCW MOLDING	ENABLE KNOCKOUT	POSITION MOLDED NOTE 1				
3	CHANGE TABLE DIRECTION	ENABLE MOLDING ENABLE CCW MOLDING	ENABLE CLAMP ENABLE KNOCKOUT	MOLDING POSITION SELECTED POSITION MOLDED NOTE 1				
4	STOP CYCLE	ENABLE CW MOLDING	ENABLE TRIMMER	(R.B.) 3 <sup>rd</sup> STAGE, 6 LB/SEC. TMR 24				
5	CHANGE TABLE DIRECTION TO CW STOP CYCLE	ENABLE MOLDING ENABLE CW MOLDING	ENABLE CLAMP ENABLE TRIMMER	MOLDING POSITION SELECTED (R.B.) 3 <sup>rd</sup> STAGE, 6 LB/SEC. TMR 24				
6	CHANGE TABLE DIRECTION TO CCW STOP CYCLE	ENABLE CW & CCW MOLDING	ENABLE KNOCKOUT ENABLE TRIMMER	POSITION MOLDED <b>NOTE 1</b> (R.B.) 3 <sup>rd</sup> STAGE, 6 LB/SEC. TMR 24				
7	CHANGE TABLE DIRECTION STOP CYCLE	ENABLE MOLDING ENABLE CW & CCW MOLDING	ENABLE CLAMP ENABLE KNOCKOUT ENABLE TRIMMER	MOLDING POSITION SELECTED POSITION MOLDED <b>NOTE 1</b> (R.B.) 3 <sup>rd</sup> STAGE, 6 LB/SEC. TMR 24				

# NOTE 1: Indicates that the position has undergone a molding cycle. Use to enable the trimmer and knockout.

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		TMR 9	5 P		
	N	MACHINE POS	SITION	NOTE: AUXILIARY EQUIPMENT IS NOT RE LOCATABLE. THIS SETTING WAS SET AT THE FACTORY AND THEREFORE THIS	
	100'S	10'S	1'S	.1's	SETTING SHOULD NOT BE CHANGE.
	KNOCKOUT	UNLOADER 3	UNLOADER 2	UNLOADER 1	DEFAULT SETTING: 543.2
1		11	11	11	
2		10	10	10	FACTORY SETTING:
3	9	9	9	9	
4	8	8	8	8	
5	7	7	7	7	
6	6	6	6	6	
7	5	5	5	5	
8	4	4	4	4	
9	3	3	3	3	
		UNL		-BARREL 12 1	
OUTSIDE VALUES MACHINE POSITION					
		UNLOAE	DER 2 <b>y</b>	NCTION POSITION	
		UNL	OADER 3	8 4 5 7 KOUT	<sup>8</sup> 4 <sup>7</sup> 5 6

TMR 96 P								
	100'S	10'S	1'S	.1's				
1	ENABLE KNOCKOUT LIMIT SENSOR	DISABLE AUX, EQUIP. FROM USING SHIFT REGISTER	INVALID SETTING	ENABLE LONG AUTO PURGE				
2	INVALID SETTING	DISABLE DATA SAVE WITH MOTOR OFF	INVALID SETTING	ENABLE RING FILTER				
3	INVALID SETTING	DISABLE AUX, EQUIP. FROM USING SHIFT REGISTER DISABLE DATA SAVE WITH MOTOR OFF	INVALID SETTING	ENABLE LONG AUTO PURGE ENABLE RING FILTER				
4	ENABLE UNLOCK BANK SELECTION	INVALID SETTING	INVALID SETTING	ENABLE MOLD SAFETY MICRO				
5	ENABLE KNOCKOUT LIMIT SENSOR ENABLE UNLOCK BANK SELECTION	INVALID SETTING	INVALID SETTING	ENABLE LONG AUTO PURGE ENABLE MOLD SAFETY MICRO				
6	INVALID SETTING	ALID SETTING INVALID SETTING		ENABLE RING FILTER ENABLE MOLD SAFETY MICRO				
7	INVALID SETTING	INVALID SETTING	INVALID SETTING	ENABLE LONG AUTO PURGE ENABLE RING FILTER ENABLE MOLD SAFETY MICRO				

FACTORY SETTING: \_\_\_\_\_
	TMR 97 P				
	100'S	10'S	1'S	.1's	
1	INVALID SETTINGS	DISABLE VSP KEYBOARD, ENABLE TABLE FUNCTION THROUGH TBL KEY	ENABLE DUAL SHUTTLE	ENABLE FOUR STATION	
2	INVALID SETTING	INVALID SETTING	ENABLE STANDARD	ENABLE PLUNGER	
3	INVALID SETTING	INVALID SETTING	ENABLE STANDARD ENABLE DUAL SHUTTLE	INVALID SETTING	
4	INVALID SETTING	INVALID SETTING	ENABLE TRIMMER BOARD	ENABLE SIX STATION	
5	INVALID SETTING	INVALID SETTING	ENABLE DUAL SHUTTLE ENABLE TRIMMER BOARD	INVALID SETTING	
6	INVALID SETTING	INVALID SETTING	ENABLE STANDARD ENABLE TRIMMER BOARD	ENABLE PLUNGER ENABLE SIX STATION	
7	INVALID SETTING	INVALID SETTING	ENABLE STANDARD ENABLE DUAL SHUTTLE ENABLE TRIMMER BOARD	INVALID SETTING	

NOTE: Dual shuttle requires different flag limit switch and a new flag limit switch on left side of upper frame. Check with factory for more details.

	TMR 98 P				
	100'S	10'S	1'S	.1's	
1	ENABLE COUNTER LOCK OVERRIDE	ENABLE TESTING OF RING SENSOR <b>NOTE 1</b>	ENABLE PUMP OFF WITH HEAT FAULT	ENABLE AUTO PURGE	
2	ENABLE 1 OZ SCREW	ENABLE BYPASS OF RING SENSOR <b>NOTE 2</b>	ENABLE PUMP OFF WITH TIMER 19 TIMING OUT	ENABLE INJECTION VALVE FAIL-SAFE CLOSED	
3	ENABLE 1 OZ SCREW ENABLE COUNTER LOCK OVERRIDE	ENABLE TESTING OF RING SENSOR <b>NOTE 1</b> ENABLE BYPASS OF RING SENSOR <b>NOTE 2</b>	ENABLE PUMP OFF WITH HEAT FAULT ENABLE PUMP OFF WITH TIMER 19 TIMING OUT	ENABLE AUTO PURGE ENABLE INJECTION VALVE FAIL-SAFE CLOSED	
4	ENABLE CLEAR ERRORS	INVALID SETTING	INVALID SETTING	DISABLE ZERO VSP	
5	ENABLE CLEAR ERRORS ENABLE COUNTER LOCK OVERRIDE	INVALID SETTING	INVALID SETTING	ENABLE AUTO PURGE ENABLE INJECTION VALVE FAIL-SAFE CLOSED	
6	ENABLE CLEAR ERRORS ENABLE 1 OZ SCREW	INVALID SETTING	INVALID SETTING	DISABLE ZERO VSP ENABLE INJECTION VALVE FAIL-SAFE CLOSED	
7	ENABLE CLEAR ERRORS ENABLE COUNTER LOCK OVERRIDE ENABLE 1 OZ SCREW	INVALID SETTING	INVALID SETTING	ENABLE AUTO PURGE DISABLE ZERO VSP ENABLE INJECTION VALVE FAIL-SAFE CLOSED	

NOTE 1: CANCEL PRESET will display current value of ring sensor channel that is being turned on by magnet. The values should 1, 2, 4 & 8.NOTE 2: Will not use ring sensor, but will use a software counter. Needs a skip micro switch and

skip pins.

	TMR 99 P				
	100'S	10'S	1'S	.1's	
1	ENABLE TEST HIGH PRESSURE	ENABLE TEST KNOCKOUT	ENABLE CLAMP WITH PURGE	ENABLE HEATER	
2	ENABLE WAIT FOR KNOCKOUT	ENABLE TEST CLAMP	INVALID SETTING	ENABLE BYPASS LEFT RACK MICRO	
3	ENABLE TEST HIGH PRESSURE ENABLE WAIT FOR KNOCKOUT	ENABLE TEST KNOCKOUT ENABLE TEST CLAMP	INVALID SETTING	ENABLE HEATER INTERLOCK OVERRIDE ENABLE BYPASS LEFT RACK MICRO	
4	ENABLE WAIT FOR SCREW	ENABLE TEST TRIMMER	INVALID SETTING	ENABLE BYPASS RIGHT RACK MICRO	
5	ENABLE TEST HIGH PRESSURE ENABLE WAIT FOR SCREW	ENABLE TEST TRIMMER ENABLE TEST KNOCKOUT	INVALID SETTING	ENABLE BYPASS RIGHT RACK MICRO ENABLE HEATER INTERLOCK OVERRIDE	
6	ENABLE WAIT FOR KNOCKOUT ENABLE WAIT FOR SCREW	ENABLE TEST TRIMMER ENABLE TEST CLAMP	INVALID SETTING	ENABLE BYPASS RIGHT & LEFT RACK MICRO	
7	ENABLE WAIT FOR KNOCKOUT ENABLE WAIT FOR SCREW ENABLE TEST HIGH PRESSURE	ENABLE TEST TRIMMER ENABLE TEST KNOCKOUT ENABLE TEST CLAMP	INVALID SETTING	ENABLE BYPASS RIGHT & LEFT RACK MICRO ENABLE HEATER INTERLOCK OVERRIDE	

	TMR 97 A							
	100'S 10'S 1'S .1's							
1	RING SENSOR CHANNEL 4 SHORT	RING SENSOR CHANNEL 1 SHORT	RING SENSOR CHANNEL 4 OPEN	RING SENSOR CHANNEL 1 OPEN				
2	INSUFFICIENT DATA	RING SENSOR CHANNEL 2 SHORT	TWO SEQUENTIAL ZERO'S INPUTTED	RING SENSOR CHANNEL 2 OPEN				
3	RING SENSOR CHANNEL 4 SHORT INSUFFICIENT DATA	RING SENSOR CHANNEL 1 SHORT RING SENSOR CHANNEL 2 SHORT	RING SENSOR CHANNEL 4 OPEN TWO SEQUENTIAL ZERO'S INPUTTED	RING SENSOR CHANNEL 1 OPEN RING SENSOR CHANNEL 2 OPEN				
4	NOT USED	RING SENSOR CHANNEL 3 SHORT	ALL 12 POSITION INPUTTED ZERO'S	RING SENSOR CHANNEL 3 OPEN				
5	NOT USED	RING SENSOR CHANNEL 1 SHORT RING SENSOR CHANNEL 3 SHORT	RING SENSOR CHANNEL 4 OPEN ALL 12 POSITION INPUTTED ZERO'S	RING SENSOR CHANNEL 1 OPEN RING SENSOR CHANNEL 3 OPEN				
6	NOT USED	RING SENSOR CHANNEL 2 SHORT RING SENSOR CHANNEL 3 SHORT	TWO SEQUENTIAL ZERO'S INPUTTED ALL 12 POSITION INPUTTED ZERO'S	RING SENSOR CHANNEL 2 OPEN RING SENSOR CHANNEL 3 OPEN				
7	NOT USED	RING SENSOR CHANNEL 1 SHORT RING SENSOR CHANNEL 2 SHORT RING SENSOR CHANNEL 3 SHORT	RING SENSOR CHANNEL 4 OPEN TWO SEQUENTIAL ZERO'S INPUTTED ALL 12 POSITION INPUTTED ZERO'S	RING SENSOR CHANNEL 1 OPEN RING SENSOR CHANNEL 2 OPEN RING SENSOR CHANNEL 3 OPEN				

# NOTE: BOLD PRINT INDICATES ERRORS THAT WILL CAUSE THE MACHINE NOT TO OPERATE PROPERLY.

	TMR 98 A				
	100'S	10'S	1'S	.1's	
1	UNABLE TO ZERO PRESSURE	BOOT OF TIMERS	NOT USED	RACK FAILED TO MOVE TO RIGHT	
2	UNABLE TO ZERO SPEED	CHECKSUM ERROR	NOT USED	RACK FAILED TO MOVE TO LEFT	
3	UNABLE TO ZERO PRESSURE UNABLE TO ZERO SPEED	BOOT OF TIMERS CHECKSUM ERROR	NOT USED	RACK FAILED TO MOVE TO RIGHT RACK FAILED TO MOVE TO LEFT	
4	SCREW DID NOT REACH BOTTOM OF STROKE	RESTART BY LB WATCHDOG	EEPROM BURN ERROR	RACK FAULT TIMER TIMED OUT	
5	UNABLE TO ZERO PRESSURE SCREW DID NOT REACH BOTTOM OF STROKE	BOOT OF TIMERS RESTART BY LB WATCHDOG	NOT USED	RACK FAILED TO MOVE TO RIGHT RACK FAULT TIMER TIMED OUT	
6	UNABLE TO ZERO SPEED	CHECKSUM ERROR RESTART BY LB WATCHDOG	NOT USED	RACK FAILED TO MOVE TO LEFT RACK FAULT TIMER TIMED OUT	
7	UNABLE TO ZERO PRESSURE UNABLE TO ZERO SPEED SCREW DID NOT REACH BOTTOM OF STROKE	BOOT OF TIMERS CHECKSUM ERROR RESTART BY LB WATCHDOG	NOT USED	RACK FAILED TO MOVE TO RIGHT RACK FAILED TO MOVE TO LEFT RACK FAULT TIMER TIMED OUT	

	TMR 99 A				
	100'S	10'S	1'S	.1's	
1	NOT USED	NOT USED	SCREW FILTER ACTIVE	SCREW TURNED OFF BY COMPARATOR	
2	NOT USED	NOT USED	TMR 19 TIMER TIMED OUT	SCREW DID NOT TURN OFF	
3	NOT USED	NOT USED	SCREW FILTER ACTIVE TMR 19 TIMER TIMED OUT	SCREW TURNED OFF BY COMPARATOR SCREW DID NOT TURN OFF	
4	NOT USED	NOT USED	NOT USED	SCREW DID NOT TURN ON	
5	NOT USED	NOT USED	NOT USED	SCREW TURNED OFF BY COMPARATOR	
6	NOT USED	NOT USED	NOT USED	SCREW DID NOT TURN OFF SCREW DID NOT TURN ON	
7	NOT USED	NOT USED	NOT USED	SCREW TURNED OF BY COMPARATOR SCREW DID NOT TURN OFF SCREW DID NOT TURN ON	

## FUSE AND RELAY LOCATIONS



RELAY BOARD IN BOTTOM CABINET

# OUTPUT BOARD CONNECTOR AND LED DESIGNATION



## INPUT BOARD CONNECTOR DESIGNATION



## TRIMMER BOARD CONNECTOR AND LED DESIGNATION (OPTION)



## VARIABLE SHOT SIZE SPEED & PRESSURE BOARD CONNECTORS



## **RING SENSOR INPUT BOARD CONNECTOR**



# FUSE AND RELAY LOCATIONS



MOTOR CONTROLLER



# INPUT BOARD CONNECTOR DESIGNATION



# TRIMMER BOARD CONNECTOR AND LED DESIGNATION (OPTION)



To use this chart: Find the box that has the required functions. Then follow over to the far left column. This number will be use in the corresponding column in the display. Refer to Sections 3 - How to Adjust Table Mode Codes.

This table data is used to control clamp, knockout, trimmer and table shuttle. There may be cases where these functions need to be selectively activated ant certain table positions, and turned of f at other table positions. For normal molding with the use of the trimmer and knockout operation, a setting of 371 is required. The following chart shows the specific codes for each digit on the TABLE display:

	TABLE MODE CODES							
	1000'S 100'S 10'S 1'S							
1	CHANGE TABLE DIRECTION TO CW	ENABLE MOLDING	ENABLE CLAMP	MOLDING POSITION SELECTED				
2	CHANGE TABLE DIRECTION TO CCW	ENABLE CCW MOLDING	ENABLE KNOCKOUT	POSITION MOLDED NOTE 1				
3	INVALID SETTING	ENABLE MOLDING ENABLE CCW MOLDING	ENABLE CLAMP ENABLE KNOCKOUT	MOLDING POSITION SELECTED POSITION MOLDED NOTE 1				
4	STOP CYCLE	INVALID SETTING	ENABLE TRIMMER	INVALID SETTING				
5	CHANGE TABLE DIRECTION TO CW STOP CYCLE	INVALID SETTING	ENABLE CLAMP ENABLE TRIMMER	INVALID SETTING				
6	CHANGE TABLE DIRECTION TO CCW STOP CYCLE	INVALID SETTING	ENABLE KNOCKOUT ENABLE TRIMMER	INVALID SETTING				
7	INVALID SETTING	INVALID SETTING	ENABLE CLAMP ENABLE KNOCKOUT ENABLE TRIMMER	INVALID SETTING				

NOTE 1: Indicates that the position has undergone a molding cycle. Use to enable the trimmer and knockout.

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MOLDING CYCLE TIMERS						
TIMER NAME	TIMER NUMBER	STARTED BY	RESULTS OF TIMING OUT	TYPICAL VALUE		
OVERALL	00	RACK MICRO AND MOLDING CYCLE SELECTED	STARTS RESTART TIMER CLAMP SOLENOID OFF	10-30 NOTE 1		
CLAMP ON	17	RACK MICRO AND MOLDING CYCLE SELECTED	CLAMP SOLENOID ON	0.0		
INJECTION ON	14	RACK MICRO AND MOLDING CYCLE SELECTED	STARTS INJECTION OFF TIMER INJECTION SOLENOID ON	0.5		
INJECTION OFF	01-12 13	INJECTION ON TIMER	STARTS SCREW ON TIMER INJECTION SOLENOID OFF	5-10 NOTE 1		
SCREW ON	18	INJECTION OFF TIMER	STARTS SCREW OFF TIMER SCREW SOLENOID ON	0.0		
SCREW OFF	19	SCREW ON TIMER	SCREW SOLENOID OFF NOTE 2	25.0		
RESTART	55	OVERALL TIMER	STARTS RACK ON IN NORMAL STARTS RACK OFF IN SHUTTLE	0.1		

NOTE 1: The timers setting would depend on the production requirements.NOTE 2: This is not a normal time out. It is used to backup the shot size sensor. This could indicate that the machine is out of material.

Injection cycle and screw cycle equal molding cycle.

			TABLE	TIMERS	
TIM	ER NAME	TIMER NUMBER	STARTED BY	RESULTS OF TIMING OUT	TYPICAL VALUE
RAG	CK ON	51	CYCLE START OR AUTO CYCLE RESTART	STARTS RACK FAULT AND RACK MICRO DEBOUNCE TIMER RACK SOLENOID ON	0.1
RAC	CK OFF	52		STARTS RACK FAULT AND RACK MICRO DEBOUNCE TIMER	0.1
	CCW		LEFT RACK PULLBACK TIMER	RACK SOLENOID OFF	
	CW		RIGHT RACK PULLBACK TIMER	RACK SOLENOID ON	
RAC	CK FAULT	50	RACK ON OR RACK OFF TIMER	TABLE FAULT LIGHT ON	2.5
rig Pul	HT RACK LBACK	53	RIGHT MICRO SWITCH	CYCLE STOP OR AUTO CYCLE RESTART	0.0
	CCW			RACK PULLBACK SOLENOID OFF	
	CW			RACK PULLBACK SOLENOID ON	
LEF PUL	T RACK LBACK	54	LEFT MICRO SWITCH	START RACK OFF TIMER RACK	0.0
	CCW			RACK PULLBACK SOLENOID ON	
	CW			RACK PULLBACK SOLENOID OFF	
RAC DEE	CK MICRO BOUNCE	56	RACK ON OR RACK	ENABLE RACK MICRO SWITCH	0.5
RAC BYF TIM	CK MICRO PASS ER	59	RACK ON OR RACK OFF TIMER NOTE 1	STARTS RIGHT RACK PULLBACK OR LEFT RACK PULLBACK TIMER	1.5

CCW - NORMAL DIRECTION CW - REVERSE DIRECTION - SHUTTLE

NOTE 1: This timer is only used if the bypass code has been entered. Refer to Appendix C.

AUXILIARY TIMERS						
TIMER NAME	TIMER NUMBER	STARTED BY	RESULTS OF TIMING OUT	TYPICAL VALUE		
TRIMMER ON	20	RACK MICRO AND TRIMMER SELECTED	STARTS TRIMMER OFF TIMER TRIMMER SOLENOID ON	0.0		
TRIMMER OFF	21	TRIMMER ON	TRIMMER SOLENOID OFF	0.1		
KNOCKOUT ON	22	RACK MICRO AND KNOCKOUT SELECTED	STARTS KNOCKOUT OFF TIMER KNOCKOUT SOLENOID ON	0.0		
KNOCKOUT OFF	23	KNOCKOUT ON	KNOCKOUT SOLENOID OFF	0.7		
SHUTTLE LOAD TIMER	25	RIGHT RACK MICRO IN SHUTTLE	AUTO CYCLE RESTART STARTS RACK ON TIMER	10-20 NOTE 1		
MANUAL KEY TRIM & KO	83	TRIMMER OR KNOCKOUT KEYSTROKE	DISABLE MANUAL OPERATION OF KNOCKOUT OR TRIMMER NOTE 2	6.0		
UNLOADER 1 ON NOTE 3	34	RACK MICRO AND UNLOADER 1 SELECTED	STARTS UNLOADER 1 OFF TIMER UNLOADER 1 SOLENOID ON	0.0 NOTE 1		
UNLOADER 1 OFF	35	UNLOADER 1 ON	UNLOADER 1 SOLENOID OFF	0.1 NOTE 1		
UNLOADER 2 ON NOTE 3	36	RACK MICRO AND UNLOADER 2 SELECTED	STARTS UNLOADER 2 OFF TIMER UNLOADER 2 SOLENOID ON	0.0 NOTE 1		
UNLOADER 2 OFF NOTE 3	37	UNLOADER 2 ON	UNLOADER 2 SOLENOID OFF	0.7 NOTE 1		
UNLOADER 3 ON NOTE 3	38	RACK MICRO AND UNLOADER 3 SELECTED	STARTS UNLOADER 3 OFF TIMER UNLOADER 3 SOLENOID ON	0.0 NOTE 1		
UNLOADER 3 OFF NOTE 3	39	UNLOADER 3 ON	UNLOADER 3 SOLENOID OFF	0.1 NOTE 1		
UNLOADER RESET	44	KNOCKOUT OFF, UNLOADER 1 OFF, UNLOADER 2 OFF OR UNLOADER 3 OFF	WILL ALLOW THE TABLE TO ROTATE	0.5		

NOTE 1: The timer setting would depend on the production requirements. NOTE 2: When keystroked, timer starts. If keystroked again before timing out will cause function to cycle.

NOTE 3: These function are option equipment and are normal installed at the factory.

	TABLE REALIGNMENT TIMERS						
TIMER NAME	TIMER NUMBER	STARTED BY	RESULTS OF TIMING OUT	TYPICAL VALUE			
REALIGN RACK OFF	88	RING SENSOR TRIPPED	RACK SOLENOID OFF	0.5			
REALIGN RPB ON	89	RING SENSOR TRIPPED	STARTS REALIGN RPB OFF TIMER RACK PULLBACK SOLENOID ON	0.5			
REALIGN RPB OFF	84	REALIGN RPB ON TIMER	STARTS RESTART TIMER RACK PULLBACK SOLENOID OFF	1.0			
SINGLE STEP RACK OFF	85	RACK ON TIMER	RACK SOLENOID OFF	0.6			
SINGLE STEP RPB ON	86	RACK ON TIMER	RACK PULLBACK SOLENOID ON	0.6			
SINGLE STEP RPB OFF	87	SINGLE STEP RPB ON TIMER	STARTS RESTART TIMER RACK PULLBACK SOLENOID TIMER	1.2			

NOTE: The timers in this chart are based on a 1/60 th. of a second time base; e.g., a setting of 0.1 = 0.016666 seconds. Multiply settings by 0.016666 for actual time.

MISCELLANEOUS TIMERS						
TIMER NAME	TIMER NUMBER	STARTED BY	RESULTS OF TIMING OUT	TYPICAL VALUE		
HEATER INTERLOCK RESET	31	HEATER WATCHDOG TIMER HEAT OFF	RESETS HEATER INTERLOCK	240.0		
HEATER INTERLOCK SET	32	CYCLE OFF TOP TEMPERATURE CONTROLLER	ENABLE HEATER WATCHDOG TIMER RELEASE INTERLOCK	4.0 NOTE 2		
HEATER WATCHDOG	30	HEATER INTERLOCK SET AND TEMP. CONTROLLER OPEN	STARTS HEATER INTERLOCK RESET TIMER HEAT OFF & HEAT FAULT LIGHT ON	240.0		
KEY DEBOUNCE	90	NUMBER KEY STROKE	PREVENT MULTIPLE NUMBER	1.0		
PRESSURE ON	33	RACK MICRO AND MOLDING CYCLE SELECTED	HIGH PRESSURE SOLENOID ON PUMP ON	0.0		

NOTE 1: If single actual counter has reached preset counter setting then the operation will occur. NOTE 2: This value may have to be changed; depending on how the temperature controllers' auto tuned.

TIMER LISTING BY NUMBERS					
TIMER NUMBER	TIMER NAME	TIMER TYPE			
00	OVERALL	MOLDING CYCLE			
01-12 13	INJECTION OFF	MOLDING CYCLE			
14	INJECTION ON	MOLDING CYCLE			
17	CLAMP ON	MOLDING CYCLE			
18	SCREW ON	MOLDING CYCLE			
19	SCREW OFF	MOLDING CYCLE			
20	TRIMMER ON	AUXILIARY			
21	TRIMMER OFF	AUXILIARY			
22	KNOCKOUT ON	AUXILIARY			
23	KNOCKOUT OFF	AUXILIARY			
25	SHUTTLE LOAD TIMER	AUXILIARY			
30	HEATER WATCHDOG	MISCELLANEOUS			
31	HEATER INTERLOCK RESET	MISCELLANEOUS			
32	HEATER INTERLOCK SET	MISCELLANEOUS			
33	PRESSURE ON	MISCELLANEOUS			
34	UNLOADER 1 ON	AUXILIARY			
35	UNLOADER 1 OFF	AUXILIARY			
36	UNLOADER 2 ON	AUXILIARY			
37	UNLOADER 2 OFF	AUXILIARY			
38	UNLOADER 3 ON	AUXILIARY			
39	UNLOADER 3 OFF	AUXILIARY			
44	UNLOADER RESET	AUXILIARY			
50	RACK FAULT	TABLE			
51	RACK ON	TABLE			
52	RACK OFF	TABLE			
53	RIGHT RACK PULLBACK	TABLE			
54	LEFT RACK PULLBACK	TABLE			
55	RESTART	MOLDING CYCLE			
56	RACK MICRO DEBOUNCE	TABLE			
59	RACK MICRO BYPASS TIMER	TABLE			
63	SECURITY CODE	REFER TO SECTION 3			
83	MANUAL KEY TRIM & KO	AUXILIARY			
84	REALIGN RPB OFF	TABLE REALIGNMENT			
85	SINGLE STEP RACK OFF	TABLE REALIGNMENT			
86	SINGLE STEP RPB ON	TABLE REALIGNMENT			
87	SINGLE STEP RPB OFF	TABLE REALIGNMENT			
88	REALIGN RACK OFF	TABLE REALIGNMENT			
89	REALIGN RPB ON	TABLE REALIGNMENT			
90	KEY DEBOUNCE	MISCELLANEOUS			

		TMR 9	5 P		
	г	MACHINE POS	SITION		NOTE: AUXILIARY EQUIPMENT ARE NOT RE LOCATABLE. THIS SETTING WAS SET AT THE FACTORY AND THEREFORE THIS
	100'S	10'S	1'S	.1's	SETTING SHOULD NOT BE CHANGE.
	KNOCKOUT	UNLOADER 3	UNLOADER 2	UNLOADER 1	DEFAULT SETTING: 543.2
1		11	11	11	EACTORY SETTING
2		10	10	10	
3	9	9	9	9	_
4	8	8	8	8	
5	7	7	7	7	_
6	6	6	6	6	
7	5	5	5	5	
8	4	4	4	4	_
9	3	3	3	3	
		UNL		ER- 11	BARREL 12 1
	C	OUTSIDE VALL MACHINE POS	IES ITION	`10 <sub>2</sub>	
		UNLOAE	DER 2 — 9	) 3 U F	UNCTION POSITION
		UNL	OADER 3	8 <sup>4</sup> 7 «оит	<sup>8</sup> 4 <sup>7</sup> 5 65

# TMR 96 P

	100'S	10'S	1'S	.1's
1	ENABLE KNOCKOUT LIMIT SENSOR	DISABLE AUX, EQUIP. FROM USING SHIFT REGISTER	INVALID SETTING	ENABLE LONG AUTO PURGE
2	INVALID SETTING	DISABLE DATA SAVE WITH MOTOR OFF	INVALID SETTING	ENABLE RING FILTER
3	INVALID SETTING	DISABLE AUX, EQUIP. FROM USING SHIFT REGISTER DISABLE DATA SAVE WITH MOTOR OFF	INVALID SETTING	ENABLE LONG AUTO PURGE ENABLE RING FILTER
4	ENABLE UNLOCK BANK SELECTION	INVALID SETTING	INVALID SETTING	ENABLE MOLD SAFETY MICRO
5	ENABLE KNOCKOUT LIMIT SENSOR ENABLE UNLOCK BANK SELECTION	INVALID SETTING	INVALID SETTING	ENABLE LONG AUTO PURGE ENABLE MOLD SAFETY MICRO
6	INVALID SETTING	INVALID SETTING	INVALID SETTING	ENABLE RING FILTER ENABLE MOLD SAFETY MICRO
7	INVALID SETTING	INVALID SETTING	INVALID SETTING	ENABLE LONG AUTO PURGE ENABLE RING FILTER ENABLE MOLD SAFETY MICRO

	TMR 97 P					
	100'S	1'S	.1's			
1	INVALID SETTINGS	DISABLE VSP KEYBOARD, ENABLE TABLE FUNCTION THROUGH TBL KEY	ENABLE DUAL SHUTTLE	INVALID SETTING		
2	INVALID SETTING	INVALID SETTING	ENABLE STANDARD	ENABLE PLUNGER		
3	INVALID SETTING	INVALID SETTING	ENABLE STANDARD ENABLE DUAL SHUTTLE	INVALID SETTING		
4	INVALID SETTING	INVALID SETTING	ENABLE TRIMMER BOARD	ENABLE SIX STATION		
5	INVALID SETTING	INVALID SETTING	ENABLE DUAL SHUTTLE ENABLE TRIMMER BOARD	INVALID SETTING		
6	INVALID SETTING	INVALID SETTING	ENABLE STANDARD ENABLE TRIMMER BOARD	ENABLE PLUNGER ENABLE SIX STATION		
7	INVALID SETTING	INVALID SETTING	ENABLE STANDARD ENABLE DUAL SHUTTLE ENABLE TRIMMER BOARD	INVALID SETTING		

NOTE: Dual shuttle requires different flag limit switch and a new flag limit switch on left side of upper frame. Check with factory for more details.

	TMR 98 P						
	100'S	10'S	1'S	.1's			
1	ENABLE COUNTER LOCK OVERRIDE	INVALID SETTING	ENABLE PUMP OFF WITH HEAT FAULT	ENABLE AUTO PURGE			
2	INVALID SETTING	ENABLE BYPASS OF RING SENSOR <b>NOTE 1</b>	ENABLE PUMP OFF WITH TIMER 19 TIMING OUT	INVALID SETTING			
3	INVALID SETTING	INVALID SETTING	ENABLE PUMP OFF WITH HEAT FAULT ENABLE PUMP OFF WITH TIMER 19 TIMING OUT	INVALID SETTING			
4	ENABLE CLEAR ERRORS	INVALID SETTING	INVALID SETTING	INVALID SETTING			
5	ENABLE CLEAR ERRORS ENABLE COUNTER LOCK OVERRIDE	INVALID SETTING	INVALID SETTING	INVALID SETTING			
6	INVALID SETTING	INVALID SETTING	INVALID SETTING	INVALID SETTING			
7	INVALID SETTING	INVALID SETTING	INVALID SETTING	INVALID SETTING			

NOTE 1: Will not use ring sensor, but will use a software counter. Needs a skip micro switch and skip pins. This setting is nessary for a standard machine.

	TMR 99 P					
	100'S	10'S	1'S	.1's		
1	ENABLE TEST HIGH PRESSURE	ENABLE TEST KNOCKOUT	ENABLE CLAMP WITH PURGE	ENABLE HEATER		
2	ENABLE WAIT FOR KNOCKOUT	ENABLE TEST CLAMP	INVALID SETTING	ENABLE BYPASS LEFT RACK MICRO		
3	ENABLE TEST HIGH PRESSURE ENABLE WAIT FOR KNOCKOUT	ENABLE TEST KNOCKOUT ENABLE TEST CLAMP	INVALID SETTING	ENABLE HEATER INTERLOCK OVERRIDE ENABLE BYPASS LEFT RACK MICRO		
4	ENABLE WAIT FOR SCREW	ENABLE TEST TRIMMER	INVALID SETTING	ENABLE BYPASS RIGHT RACK MICRO		
5	ENABLE TEST HIGH PRESSURE ENABLE WAIT FOR SCREW	ENABLE TEST TRIMMER ENABLE TEST KNOCKOUT	INVALID SETTING	ENABLE BYPASS RIGHT RACK MICRO ENABLE HEATER INTERLOCK OVERRIDE		
6	ENABLE WAIT FOR KNOCKOUT ENABLE WAIT FOR SCREW	ENABLE TEST TRIMMER ENABLE TEST CLAMP	INVALID SETTING	ENABLE BYPASS RIGHT & LEFT RACK MICRO		
7	ENABLE WAIT FOR KNOCKOUT ENABLE WAIT FOR SCREW ENABLE TEST HIGH PRESSURE	ENABLE TEST TRIMMER ENABLE TEST KNOCKOUT ENABLE TEST CLAMP	INVALID SETTING	ENABLE BYPASS RIGHT & LEFT RACK MICRO ENABLE HEATER INTERLOCK OVERRIDE		

	TMR 98 A					
	100'S	10'S	1'S	.1's		
1	NOT USED	BOOT OF TIMERS	NOT USED	RACK FAILED TO MOVE TO RIGHT		
2	NOT USED	CHECKSUM ERROR	NOT USED	RACK FAILED TO MOVE TO LEFT		
3	NOTUSED	BOOT OF TIMERS CHECKSUM ERROR	NOT USED	RACK FAILED TO MOVE TO RIGHT RACK FAILED TO MOVE TO LEFT		
4	NOT USED	RESTART BY LB WATCHDOG	EEPROM BURN ERROR	RACK FAULT TIMER TIMED OUT		
5	NOT USED	BOOT OF TIMERS RESTART BY LB WATCHDOG	NOT USED	RACK FAILED TO MOVE TO RIGHT RACK FAULT TIMER TIMED OUT		
6	NOT USED	CHECKSUM ERROR RESTART BY LB WATCHDOG	NOT USED	RACK FAILED TO MOVE TO LEFT RACK FAULT TIMER TIMED OUT		
7	NOT USED	BOOT OF TIMERS CHECKSUM ERROR RESTART BY LB WATCHDOG	NOT USED	RACK FAILED TO MOVE TO RIGHT RACK FAILED TO MOVE TO LEFT RACK FAULT TIMER TIMED OUT		

	TMR 99 A						
	100'S	10'S	1'S	.1's			
1	NOT USED	NOT USED	NOT USED	NOT USED			
2	NOT USED	NOT USED	TMR 19 TIMER TIMED OUT	NOT USED			
3	NOT USED	NOT USED	NOT USED	NOT USED			
4	NOT USED	NOT USED	NOT USED	NOT USED			
5	NOT USED	NOT USED	NOT USED	NOT USED			
6	NOT USED	NOT USED	NOT USED	NOT USED			
7	NOT USED	NOT USED	NOT USED	NOT USED			

## MODIFICATION NECESSARY TO USE THE NEW BOSCH BOARD (PL6-PQ)

In order to use the new Bosch Board (PL6-PQ) it is necessary to make a couple of changes to the wiring in the top cabinet.

- 1. Power off.
- 2. Open top cabinet.
- Locate the terminal strip with the LVDT and Pressure Sensor cables connected.
- 4. Disconnect the wire coming from the pressure cable and going to terminal strip number 6.
- 5. Connect this wire to terminal number 10.
- 6. Ensure that the other wire going to terminal strip number 6 is reconnected.
- 7. Connect a new wire from terminal strip 10 to the terminal number z6 of the Bosch Socket.
- 8. Make the appropriate dip switch changes stated below.







0 off	5 off	10 off	15 off
1 on	6 on	11 off	16 on
2 on	7 on	12 off	KP = 11
3 on	8 off	13 off	KI = 5
4 on	9 on	14 off	KD = 5

## MODIFICATION NECESSARY TO USE THE NEW BOSCH BOARD (PL6-PQI)

In order to use the new Bosch Board (PL6-PQI) it is necessary to make the changes stated for the PL6-PQ above and also make these additional changes to the wiring in the top cabinet.

- 1. Power off.
- 2. Open top cabinet.
- Locate the terminal strip with the LVDT and Pressure Sensor cables connected.
- Disconnect the wire coming from the terminal strip number 7 (Purple).
- Disconnect the corresponding end from the Bosch Socket, terminal strip Z14 (purple).
- Run an 18 AWG purple wire from the terminal strip number 7 to the Bosch Socket terminal strip B16.
- 7. Make the appropriate dip switch changes stated below.



0 on	5	off	10	off	15	off
1 off	6	on	11	off	16	on
2 on	7	on	12	off	KP = '	11
3 on	8	off	13	off	KI = 5	5
4 on	9	on	14	off	KD = :	5

### VSP CALIBRATION 1 (NEW AND OLD BOSCH BOARD)

- 1. Turn main power to the machine off with the main disconnect switch.
- 2. Open the top electrical cabinet.
- 3. Locate the VSP Board (It is the board with five three position plugs).
- 4. Remove the VSP Board without disconnecting the plugs from the front (You may need to remove any wire clamps or ties to have enough slack).
- 5. Insert the card extender in the slot you removed the VSP Board from and seat it in the edge connector at the back of the card rack.
- 6. Install the VSP Board on the end of the card extender. Pay close attention to your slack of the wires, relieving any taunt wires anyway you can.
- 7. Use a rubber or elastic bungee strap to hold the electrical door in the full open position. This is necessary to ensure the temperature controllers do not come in contact with you.
- 8. Put DIP switch 4 on the LB4 Logic Board in the closed or on position.

## WARNING: THERE WILL BE 120 VAC PRESENT IN THE CONTROL BOX AFTER THE NEXT STEP.

### ALL SAFETY PRECAUTIONS MUST BE OBSERVED TO PREVENT SERIOUS INJURY AND/OR

## DEATH OF MAINTENANCE PERSONAL!!!

- 9. Turn main power to the machine on.
- 10. Press 0 (Zero) on the main keypad and observe that the display reads 0 (Zero).
- 11. Connect a multi-meter, set to read DCV, to pin 6 of the IC chip just above potentiometer 25 in the drawing, and ground which can be obtained at the top end of the large capacitor on the top right of the board as indicated.
- 12. Adjust potentiometer 25 to obtain a reading of 0.00 VDC on pin 6.
- 13. Repeat this procedure for each of the IC chips in this row, adjusting the potentiometer adjacent to the chip to obtain the correct voltage.
- 14. Press CLR/SAVE on the main keypad.
- 15. Press 1 (One) on the main keypad
- 16. Next you will adjust IC chips 2, 4, and 6 for 10 VDC at pin 6 by adjusting potentiometers 26, 30, and 34 respectively.
- 17. The final adjustments are on the 14 pin IC chip (LM330) that lies between potentiometers 40 and 38.
- 18. Locate pin numbers 7, 9, and 11 adjusting potentiometers 40, 38, and 39 to obtain 100 mVDC +/- 5 mVDC at these pins.
- 19. Press CLR/SAVE on the main keypad.

- 20. Put DIP switch 4 on the LB4 Logic Board in the open or off position.
- 21. The board must now be calibrated to the machine for pressure and shot size by using the VSP Calibration 2 procedure for the appropriate Bosch Board.



### VSP CALIBRATION 2 (NEW BOSCH BOARD) PL6-PQ & PL6PQI

### SET-UP

1. The DIP switches on the Bosch Board should be set according to that specific Bosch Board.

Ensure the pump pressure is set approximately to the following values: Low = 700 pounds High = 1800 pounds

- 2. Turn off the power.
- 3. Place VSP Board on the card extender.
- 4. Turn on the power.
- 5. Go to bank 4. SF 4 SF
- 6. Set Shot Size and 2<sup>nd</sup> Stage to 0 (Zero).
- 7. Set First and Second Pressures to 300. \*\*\*Use pressures that are not close to your max high and low for easier adjustment reading.
- 8. Set First and Second Speeds to 4000.
- 9. Set Back Pressure to 0 (Zero).
- 10. Go to bank 5. SF 5 SF
- 11. Set Shot Size and 2<sup>nd</sup> Stage to 0 (Zero).
- 12. Set First and Second Pressures to 1400. \*\*\*Use pressures that are not close to your max high and low for easier adjustment reading.
- 13. Set First and Second Speeds to 4000.
- 14. Set Back Pressure to 0 (Zero).
- 15. Close the flow control to the screw completely off to ensure that it does not turn.
- 16. Ensure the machine is in Standby.
- 17. Bring heats to set point.
- 18. Locate purge block under nozzle.
- 19. Turn on the purge light, and purge the machine (the screw should stay down).

#### SET THE SHOT SIZE SENSOR

20. With the screw bottomed out from step 19, loosen the two screws that hold the small vertical black bracket to the large trapezoidal shaped bracket.

- 21. Using a square to ensure the sensor is square to the machine, adjust the sensor up or down until it just barely touches the frame of the machine with the hardened steel ball on the end of the rod.
- 22. Tighten the two screws down securely, and scribe a line on both sides of the small bracket where it contacts the large one for a reference.

CALIBRATE THE VSP BOARD TO THE MACHINE

- 23. Turn the top reducing valve on the far right side of the manifold (injection) all the way in (fully clockwise).
- 24. Turn DIP switch 4 on the Bosch Board off.
- 25. Connect meter to 0V (Ground) and Qmax (Positive) (10VDC) on the Bosch Board (see illustration at right)
- 26. With the Purge LED illuminated, press and hold the Cycle Start button. Adjust Max speed (refer to drawing of the Bosch Board) to obtain a Negative 10 VDC (-10) reading on meter.
- 27. Press and hold the Cycle Start button and adjust pot 30 for 3.75 VDC at pins 2 & 3 of the 15 pin connector on the front of the VSP Board. Refer to drawing next page.
- 28. Turn DIP switch 4 on the Bosch Board on.
- 29. Press and hold the Cycle Start button and adjust the potentiometer labeled Pressure gain (refer to drawing of the Bosch Board) to obtain 1400 pounds on the injection pressure gauge.
- 30. Go to bank 4. SF 4 SF
- 31. Press and hold the Cycle Start button and adjust potentiometer labeled Zero pressure (refer to drawing of the Bosch Board) for 300 pounds on the injection pressure gauge.
- 32. Go to bank 5. SF 5 SF
- 33. Recheck for 1400 pounds of pressure again.
- 34. If it is not at 1400, return to step 29. Repeat until both pressures are correct.
- 35. If it is not at 300, return to step 31. Repeat until both pressures are correct.

ADJUST VSP SHOT SIZE

36. Go to bank 5. SF - 5 - SF



37. Set the Shot Size to:

1 ounce screw = 2835 2 ounce screw = 5670

38. Set timer 98 to:

1 ounce = 200.0 2 ounce = 000.0

Note: Make sure to save these values.

39. Open the screw flow control.

Ensure the screw is fully up by performing the following procedure:

- 40. Press the Cycle Start button to purge the barrel, (since the screw is already fully down, there will only be 1/4 to 3/4 inch of downward travel of the barrel).
- 41. When you release the Cycle Start button, the screw will turn and travel up.
- 42. Start turning pot 34 clockwise while screw is coming up, the screw will eventually stop once your pot 34 adjustment and the screw height are the same.



- 43. Once the screw stops, back pot 34 counter-clockwise a 1/4 turn and then tap Cycle Start.
- 44. Repeat this until the screw stops at its highest position, ram bar about ½ inch from the top plate.
- 45. If the safety switch has been moved, using a 5/32 Allen wrench, adjust the switch so that it will trip just before the screws highest position.
- Note: The pot is turned counter clockwise to raise the screw height, and clockwise to lower it.

#### ADJUST ZERO SPEED

- 46. With heats on and up to temperature.
- 47. Set the Second Speed to 0 (Zero).
- 48. Set Shot Size to 2000
- 49. Set 2<sup>nd</sup> Stage to 1000
- 50. Purge the machine
- 51. Adjust Zero Speed (refer to drawing of Bosch Board) to stop movement of the screw once second stage is reached.
- 52. If the screw initially stops when it reaches the second stage setting, to ensure proper calibration of the Zero Speed function, continue holding the machine in purge, and back off the Zero Speed adjustment on the Bosch Board until the screw just begins to move.
- 53. Continue adjusting and purging until the screw stops moving down into the barrel.
  - NOTE: The screw Zero Speed adjustment can be affected by type of material, condition of material, and temperature of the material.

END

- 54. Shut the machine down.
- 55. Remove the card extender and reinsert the VSP Board in the machine.

#### VSP CALIBRATION 2 (OLD BOSCH BOARD)

SET-UP

- Ensure the pump is set approximately to the following values: Low = 700 pounds High = 1800 pounds
- 2. Place VSP Board on the card extender.
- 3. Turn on the power.
- 4. Go to bank 4. SF 4 SF
- 5. Set Shot Size and 2<sup>nd</sup> Stage to 0 (Zero).
- 6. Set First and Second Pressures to 300. \*\*\*Use pressures that are not close to your Max High and low for easier adjustment reading.
- 7. Set First and Second Speeds to 4000.
- 8. Set Back Pressure to 0 (Zero).
- 9. Go to bank 5. SF 5 SF
- 10. Set Shot Size and 2<sup>nd</sup> Pressure to 0 (Zero).
- 11. Set First and Second Pressures to 1400. \*\*\*Use pressures that are not close to your Max High and Low for easier adjustment reading.
- 12. Set First and Second Speeds to 4000.
- 13. Set Back Pressure to 0 (Zero).
- 14. Close the flow control to the screw completely off to ensure that it does not turn.
- 15. Ensure the machine is in Standby.
- 16. Bring heats to set point.
- 17. Locate purge block under nozzle.
- 18. Turn on the purge light, and purge the machine (the screw should stay down).

SET THE SHOT SIZE SENSOR

- 19. With the screw bottomed out from step A-18, loosen the two screws that hold the small vertical black bracket to the large trapezoidal shaped bracket.
- 20. Using a square to ensure the sensor is square to the machine, adjust the sensor up or down until it just barely touches the frame of the machine with the hardened steel ball on the end of the rod.
- 21. Tighten the two screws down securely, and scribe a line on both sides of the small bracket where it contacts the large one for a reference.

#### CALIBRATE THE VSP BOARD TO THE MACHINE

- 22. Turn the top reducing valve on the far right side of the manifold (injection) all the way in (fully clockwise).
- 23. Press and hold the Cycle Start Button and adjust the potentiometer 30 on the VSP Board (See Diagram) to obtain 1400 pounds in the injection pressure gauge.
- 24. Go to bank 4. SF 4 SF
- 25. Press and hold the Cycle Start button and adjust the second potentiometer from the left on the Bosch Board for 300 pounds on the injection pressure gauge.
- 26. Go to bank 5. SF 5 SF
- 27. Recheck for 1400 pounds of pressure.
- 28. If it is not at 1400, adjust the third potentiometer from the right on the VSP Board again.
- 29. Go to bank 4. SF 4 SF
- 30. Recheck for 300 pounds of pressure.
- 31. If it is not 300, adjust the second potentiometer from the left on the Bosch Board again.
- 32. Keep repeating steps 2 10 until both pressure are accurate.

ADJUST VSP SHOT SIZE

- 33. Go to bank 5. SF 5 SF
- 34. Set the Shot Size to:

1 ounce screw = 28352 ounce screw = 5670

35. Set timer 98 to:

1 ounce = 200.0 2 ounce = 000.0

Note: Make sure to save these values.

36. Open the screw flow control.

Ensure the screw is fully up by performing the following procedure:

- 37. Press the Cycle Start button to purge the barrel, (since the screw is already fully down, there will only be 1/4 to 3/4 inch of downward travel of the barrel).
- 38. When you release the Cycle Start button, the screw will turn and travel up.
- 39. Start turning pot 34 clockwise while screw is coming up, the screw will eventually stop once your pot 34 adjustment and the screw height are the same.


- 40. Once the screw stops, back pot 34 counter-clockwise a 1/4 turn and then tap Cycle Start.
- 41. Repeat this until the screw stops at its highest position, ram bar about ½ inch from the top plate.
- 42. If the safety switch has been moved, using a 5/32 Allen wrench, adjust the switch so that it will trip just before the screws highest position.
- Note: The pot is turned counter clockwise to raise the screw height, and clockwise to lower it.

## ADUST ZERO SPEED

- 56. With heats on and up to temperature.
- 57. Set the Second Speed to 0 (Zero).
- 58. Set Shot Size to 2000
- 59. Set 2<sup>nd</sup> Stage to 1000
- 60. Purge the machine
- 61. Adjust the potentiometer on the far right bottom of the Bosch Board to stop movement of the screw once second stage is reached.
- 62. If the screw initially stops when it reaches the second stage setting, to ensure proper calibration of the Zero Speed function, continue holding the machine in purge, and back off the potentiometer adjustment on the Bosch Board until the screw just begins to move.
- 63. Continue adjusting and purging until the screw stops moving down into the barrel.
  - NOTE: The screw Zero Speed adjustment can be affected by type of material, condition of material, and temperature of the material.

. END

- 64. Shut the machine down.
- 65. Remove the card extender and reinsert the VSP Board in the machine.







