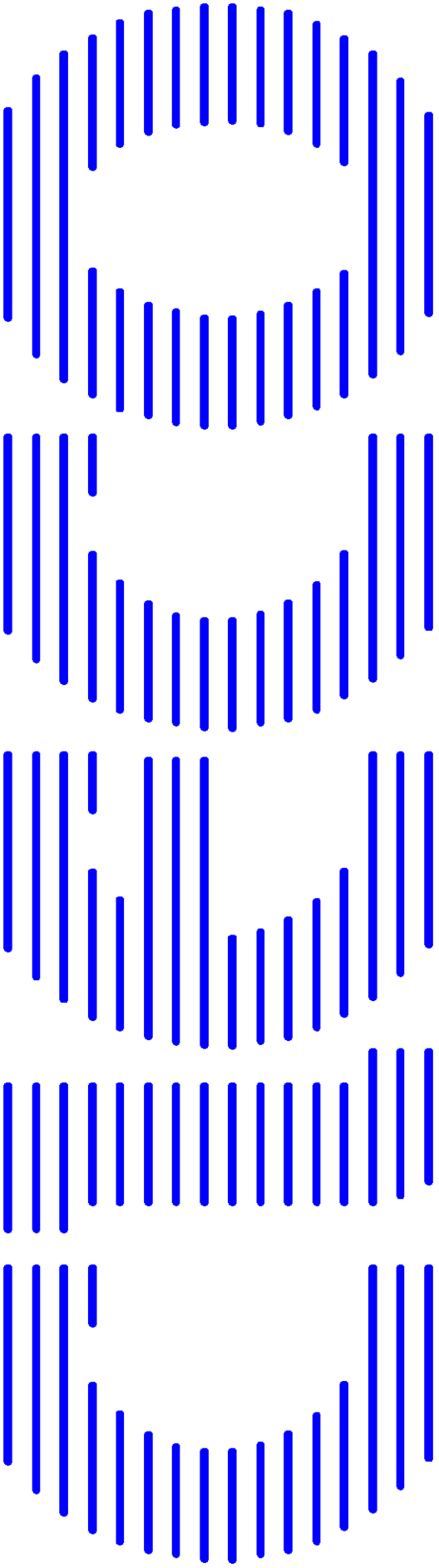
RamMaster

Programming and Installation Manual
V4.0



INTRODUCTION

Read and follow the directions carefully to ensure proper installation and operation. The following list shows the steps to take to install and configure the RamMaster correctly.

1. Read the entire manual to become familiar with how it operates.
2. Install the transducer (see pages 12-13 of this manual). Follow the directions closely. Improper transducer installation can cause malfunctions or damage. Use grounded metal conduit for the transducer cable. (Note: the position decreases as the magnet moves away from the blue transducer head.)

   NOTE: Transducer brackets and mounting vary for each press. It is the customers responsibility to fabricate brackets and to mount the transducer according to the transducer instructions (page 12-13). The only limitation is space.
3. Install the RamMaster (*see wiring diagram*).
4. Configure the RamMaster (*page 2*).
5. Test the outputs in the jog function to make sure the outputs are wired correctly.
6. The RamMaster is ready for normal use.

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CONFIGURING THE RamMaster

Before the RamMaster can be used, it must be configured properly.

There are four steps in the configuration process:

1. Programming the scale factor. (*This is done by CIECO if the transducer was shipped with the control*)
2. Program the RamMaster to display actual shut height.
3. Set the low safety limit.
4. Set the high safety limit.

MENU/ FUNCTION	DESCRIPTION
PGM SCALE	Each transducer has a different scale factor. The RamMaster scale must be set for the particular transducer it is wired to. This is done at CIECO if the control and transducer were sold as a package and shipped together. If the transducer was purchased separately or switched in the field, the correct scale must be field set.
SET SHUT-HEIGHT	Sets the absolute position of the ram so that the control displays the actual position of the ram adjustment
PGM L LIMIT	Sets the absolute minimum travel of the transducer. The ram must be adjusted to the low limit before performing this function.
PGM H LIMIT	Sets the absolute maximum travel of the transducer. The ram must be adjusted to the high limit before performing this function. ***CAUTION: Take special care in wiring the relay outputs to the ram motor. Ram movement must correspond with the control outputs. If they do not, the AUTO SET function will not work properly and the high/low limits will be ignored; resulting in possible damage to the press***
RETURN	Returns to normal operation of the RamMaster.

CONFIGURATION PROGRAMMING

Getting into the configuration program

1. Turn power off
2. Press the menu key and hold.
3. Turn power on while depressing Menu Key. “PGM SCALE” will be shown on the display.

Programming the Scale Factor

4. Press the **FUNCTION** key (Red LED on). The scale will be factory set if the control and transducer were purchased as a package. If so, go to step 10.
5. Press **ENTER**. The top line will read “SCALE=” and the scale setting. The bottom line will read the scale setting. Make sure the serial # below matches with the transducer serial # before using the scale shown below.

   Transducer Serial# _____

   4Transducer Scale _____

5a. **To calculate the scale factor** for a transducer, use the following formula:

SCALE = 8.9285714 / gradient (gradient is found on the label adhered to the transducer head)

Example: 8.9285714 / 9.0636 = .985102

6. Press the **FUNCTION** key so that the red LED is off. A blinking cursor will appear on line two. This means that the number keys are enabled on the keypad.
7. Use the number leys to enter the correct scale.
8. Once the correct scale has been keyed in, press the **FUNCTION** key so that the red LED is on. The blinking cursor will disappear.
9. Make sure the scale is correct. Press **ENTER** to save the new scale.

Set shut height offset

10. Press the **MENU** key to go to the next function which is **SET SHUT HEIGHT**. The ram must be adjusted to a known position before this step can be performed.
11. Press **ENTER**. Line one will display the position (not the correct position). Line two will display all zeros.
12. Press the **FUNCTION** key (red LED off). A blinking cursor will appear on line two.
13. Use the number keys to enter what the position of the ram actually is in inches.
14. Press the **FUNCTION** key (red LED on).
15. If line two is correct, press **ENTER** to set the actual position. Line one will now display the actual position.

Set low safety limit

16. Press the **MENU** key to bring up **PGM L LIMIT**. The ram must be adjusted to a known position before this step can be performed.
17. Press **ENTER** to display the low limit function. The low limit set point will be displayed on line one. Line two will show the actual position.
18. After adjusting the ram to the low limit position, press **ENTER** to save the position as the low limit. The position will move up to line one in the display.

Set high safety limit

19. Press the **MENU** key to bring up **PGM H LIMIT**. The ram must be adjusted to the high limit position before continuing with this function.
20. Press **ENTER** to display the high limit function. The high limit set point will be displayed on line one. Line two will show the actual position.
21. After adjusting the ram to the high limit position, press **ENTER** to save the position as the high limit. The position will move up to line one of the display.
22. Press the **MENU** key until **RETURN** is displayed.
23. Press **ENTER** to go to normal RamMaster operation.

RamMaster FUNCTIONS

MENU/FNCT	DESCRIPTION
MONITOR RAM	Will continuously check the actual ram adjustment with programmed shut height (set point) of the ram. If the actual position of the ram should drift past the set point, ± from the programmed tolerance, the fault output will de-energize and the tolerance output will energize.
SELECT NEW JOB	Selects the job number for the next die/job. If the job number selected is a die that has been used before and the correct parameters were saved, the name and programmed shut height for that die will be recalled from memory.
PGM TOLERANCE	Is used to set the tolerance of the programmed shut height. The number entered will be how far the actual position of the ram is allowed to drift past the programmed shut height in either direction while in **MONITOR RAM** function only. The tolerance is NOT saved under a job number, but is applied to all job numbers.
JOG	Will adjust the position of the ram to any point within the high and low limits. As the operator jogs the ram and the programmed shut height is reached, the ram motor will automatically stop. The display will read, **SET** or **DRIFTED**, for two seconds depending on weather or not the ram drifted past the programmed shut height. After two seconds have elapsed, the screen will return to display the actual shut height and the jog function is returned to normal operation. The press is enabled after the ram is adjusted, although if the press is running while adjusting the ram, the program will automatically jump to monitor mode.
SAVE SHUT HEIGHT	Is used to save the shut height in EEPROM memory under the job number that is currently in use. If you wish to save the shut height under a different job number, you must ***first*** select the desired job number in the **PGM NEW JOB**.
AUTO SET	Will automatically position the ram to the programmed shut height. If the ram drifts past the programmed shut height during auto set, the RamMaster will continue to position the ram correctly by pulsing the ram motor to the programmed shut height. If five unsuccessful passes occur, the auto set function will abort. When the auto function is finished, it will automatically jump to motor mode.
PGM DIE NAME	Allows alpha-numeric entry of a die name and saves it under the job number that is currently in use. If you wish to save the die name under a different job number, you must ***first*** select the desired job number in the **PGM NEW JOB** function.

KEYPAD

NAME	DESCRIPTION
FUNCTION	Toggles red LED on or off, which activates top or bottom half of the keys. LED on, top half activated (blue). LED off, bottom half activated (white).
MENU	(Function LED on) toggles through the menu selections. The menu selections are as follows: **MONITOR RAM** **SELECT NEW JOB** **AUTO SET** **JOG** **SAVE SHUT HEIGHT** **DIE NAME** **PGM TOLERANCE**
ENTER	(Function LED on) is a multi-function key used to select a function that was brought up using the menu key. Saves data in any function the requires data to be saved. Starts motion in the **JOG** and **AUTO SET** functions.
CURSOR	(Function LED on) is used to move the cursor in **JOG, AUTO SET** and **DIE NAME** functions.
SPECIAL	(Function LED off) toggles through special characters in the **DIE NAME** function. Special characters are as follows: "blank space" **- . : + / # & ( ) " = %** Selects inner or outer die.
# KEYS	(Function LED off) are used to enter numeric data in the **SELECT NEW JOB**, **DIE NAME** and **PGM TOLERANCE** functions.
A-Z KEYS	(Function LED on) are used to enter an alphabetical die description in the **DIE NAME** functions.
KEYSWITCH ENABLE / DISABLE	The key switch in the **enable** position, permits any legal operation of the RAMMASTER. When the key switch is in the **disabled** position, all functions can be viewed but cannot be changed. The **JOG** and **AUTO SET** are **disabled**. Monitor mode is unaffected by the key switch.

ASSIGNING A JOB # TO A NEW DIE

A. First, select a job number that is not already being used.

1. Press the **FUNCTION** key so that the red LED is on, enabling the top half of the keys.
2. Toggle the MENU key until **SELECT NEW JOB** appears on the screen.
3. Press **ENTER** to display the job function.

The current job number will be displayed to the left side of the screen on lines one and two.
The job name will be on line 1, on the right side of the screen.
The programmed shut height will be displayed on line two, to the right of the screen.

NOTE: Be aware that if the job number has never been programmed, the job name will be a line of black squares and the programmed shut height will be an arbitrary number.

4. Press the **FUNCTION** key so that the red LED is off enabling bottom half of the keys.
5. A blinking cursor will appear on the job number of line two. This means the number keys are enabled. Use the number keys to enter the job number you wish to use for the new die. Job numbers available range from 1 to 155 (1-310 optional).
6. When the desired job number is entered, press the function key so that the red LED is on, enabling the top half of the keys.
7. Press **ENTER** to save the job number. The new job number on the bottom line will move to the top line. This is now the current working job.

B. Program the job NAME.

1. Press the **FUNCTION** key so the red LED is on, enabling the top half of the keys.
2. Toggle the MENU key until **DIE NAME** appears on the screen.
3. Press **ENTER** to display the die name function. The current job number will be displayed in the upper left-hand corner of the screen. The job name will be on lines one and two on the right.
4. With the red function LED on, the letter and **CURSOR** keys are enabled. Each letter key has several letters on it. Toggling a letter key will toggle through the letters at the space where the cursor is located. When the selected letter is reached, press the cursor key to move one position to the right to select the next letter for that position.
5. To enter numbers for the die name, press the **FUNCTION** key so the red LED is off. Now the number and **SPECIAL** keys are enabled.

When a number key is pressed, that number will appear on the screen in the same space as the cursor. The cursor will then automatically move one space to the right.

The SPECIAL key, when toggled, will display a combination of special characters where the cursor is located. (Make sure the red function LED is off) Special characters are as follows: "blank space" ***- . : + / # & ( ) " = %.*** *To move the cursor, press the FUNCTION (red LED on). Press CURSOR key to move the cursor over one space to the right.*

C. Set the shut height using the JOG function:

CAUTION: After the job function has been initiated once, the fault output will be energized.

1. Press the **FUNCTION** key so that the red LED is on.
2. Toggle the **MENU** key until **JOG** is displayed on the screen.
3. Press **ENTER** to display the jog junction. The current job number will be displayed in the upper left hand corner of the screen. The actual ram position will be displayed to the right of line one. The programmed shut height (which at this point is an arbitrary number **if** a valid shut height has not yet been saved) will be displayed to the right of line two.
4. On the left side of line two, there will be <**U _D**> displayed with a blinking cursor in the center. Use the CURSOR key to position the blinking cursor over one of the two. With the cursor set on the **U**, the numbers will count up while jogging the ram. While the cursor is on the **D**, the numbers will count down while jogging the ram. ***(CAUTION: Make sure the ram adjustment is moving according to the above description. If it does not, the relays are wired incorrectly and damage may result if not corrected!)***
5. Start to job the ram by pressing ENTER. NOTE: Releasing the ENTER key will stop the ram. Adjust the ram to the desired position.

D. Once the ram is set to the correct position, the shut height must be saved under the current job number:

1. Press the **FUNCTION** key so that the red LED is on.
2. Toggle the **MENU** key until ***SAVE SHUT HEIGHT*** appears on the screen.
3. Press **ENTER** to display the ***PGM SHUT HEIGHT*** function. The programmed shut height will be displayed on the line labeled PGM=. The actual position will be on line two labeled POS=. the current job number will be displayed on line two in the lower left-hand corner.
4. Make sure that the actual shut height is correct for that die. If this is correct, press **ENTER**. The display will ask again, press **ENTER** again. The shut height will be saved as the programmed shut height under the current job number. This will be automatically recalled from the job memory for future use.

SETTING UP A DIE THAT HAS A JOB ALREADY ASSIGNED

A. Select the job number:

1. Press the **FUNCTION** key so that the red LED is on.
2. Toggle the **MENU** key until **SELECT NEW JOB** appears on the screen.
3. Press **ENTER** to display the **PGM NEW JOB** function.

   The current job number will be displayed to the left of lines one and two.
   The job name will be displayed to the right of line one.
   The programmed shut height for that job will be displayed to the right of line two.

4. To enable the number keys, press the **FUNCTION** key so the red LED turns off. A blinking cursor will appear on the job number in line two.
5. Use the number keys, enter the correct job number.
6. When the correct job number is displayed, press the **FUNCTION** key to turn on the red LED. The top half of the keys are now enabled.
7. With the key-switch in the enabled position, press **ENTER** to save the new job number. The new job number on the bottom line will move up to the top line. The new job name and programmed shut height will be recalled and displayed to the right. If a job number is entered that is greater than what is available, line two will return the display to the current job number.

B. Set the Actual shut height in the AUTO SET function

NOTE: The jog function can also be used to bring the ram to the pre-programmed shut height.

1. Press the **FUNCTION** key to turn on red LED, enabling top half of keys.
2. Toggle the **MENU** key until **AUTO SET** appears on the screen.
3. Press **ENTER** to display the auto set function.

   *The actual shut height will be displayed on line one labeled **POS=.***
   *The programmed shut height will be displayed on line two labeled **PGM=.***
   The job number will be to the far left of line two
   *There will be a blinking cursor next to the word **GO?***

4. Press the **CURSOR** key to move the blinking cursor over to the **G** in **GO**.
5. With key in the enabled position, press **ENTER** then release (***PRESS ANY KEY TO STOP***). The ram will automatically be adjusted to the programmed shut height. While in auto, the actual shut height display will be replaced by the word **WORKING**. Should the ram drift past the pre-programmed shut height while “working”, the up and down outputs will automatically set and pulse to the programmed shut height. The RamMaster will continue to position the ram correctly with decreasing pulse outputs. After five unsuccessful passes, the auto set function stops trying and shuts off.

TROUBLESHOOTING

PROBLEM	CAUSE / SOLUTION
1 FAULT	Lost contact with the transducer. There is a bad cable connection. The magnet has been removed from the transducer. The magnet is at the last 2” of the transducer. The transducer is plugged into the wrong port. Electrical noise causing malfunctions. Make sure there are no high power lines running close to the control, transducer or transducer cable.
2 Cannot get into the **JOG** or **AUTO** features	The brake solenoid input is at 110 VAC. The press is running (ram movement disabled). Key switch is in the disabled position.
3 Cannot save any data or move the ram	Key switch is in the disabled position. Put the key switch in the enable position.
4 Auto set moved the ram past the high or low limit	The outputs are wired incorrectly.
5 Fault relay is de-energized OR **LOW TOLERANCE/ HIGH TOLERANCE**	Actual shut height is past the programmed shut height and has exceeded the allowable programmed tolerance. Adjust the ram to the correct shut height. Lost contact with transducer. See **FAULT.** Actual shut height is past the programmed shut height and has exceeded the allowable programmed tolerance.
6 Keypad does not work	Make sure the function LED is in the correct state for the part of the keypad you wish to use. Also, check the enable key switch if your trying to save data. (See problem #3 above)
7 Unable to run the press because the fault output is de-energized	If **FAULT** is displayed, see FAULT above Go into the monitor mode to reset the outputs If the display reads **H** or **L TOLERANCE**, see above.

SPECIFICATIONS

RamMaster Controller

- ◊ DIMENSIONS: 7.2” X 4.3” X 4.5” Panel Mounted
- ◊ INPUT: 100 – 130 VAC, 56/60 Hz 35W (optional 220VAC)
- ◊ ACCURACY: + .001”
- ◊ OPERATION TEMPERATURE: 23 TO 131 F (0 TO 50 C)
- ◊ JOBS: 155 standard 310 optimal
- ◊ TYPE OF OUTPUTS:

  Sink transistor

  Vmax = 30V (15V standard)

  Logic 0: 1.7V @ 100mA

  Logic 1: .01mA leakage @ 30V
- ◊ BRAKE INPUT: 100 – 130VAC

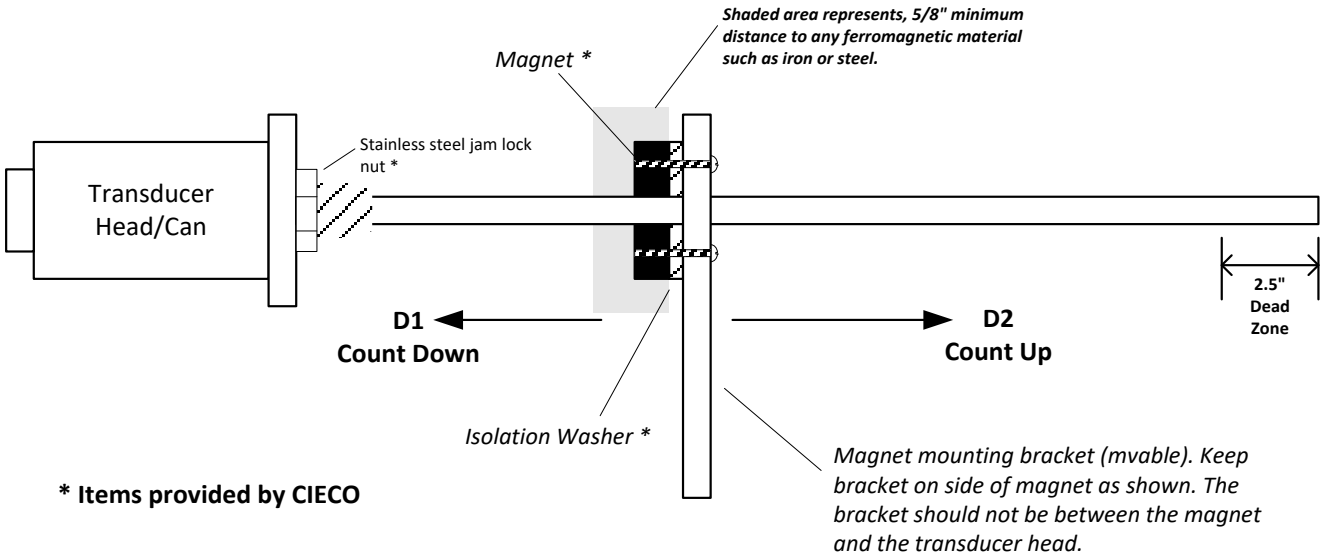
Linear Transducer

- ◊ POWER: + 15VDC Supplied by RamMaster
- ◊ NULL SPACE: 2 in.
- ◊ LENGTHS: 6” to 40” (in increments of 1”)
- ◊ HEAD ENCLOSURE:2.13 in. high and 1.75 in. diameter
- ◊ NON-LINEARITY: less than .05% of full stroke
- ◊ REPEATABILITY: + .001% of full stroke
- ◊ OPERATING TEMPERATURE: -40 to 150 F (-40 to 66 C)

Solid State Output Relays

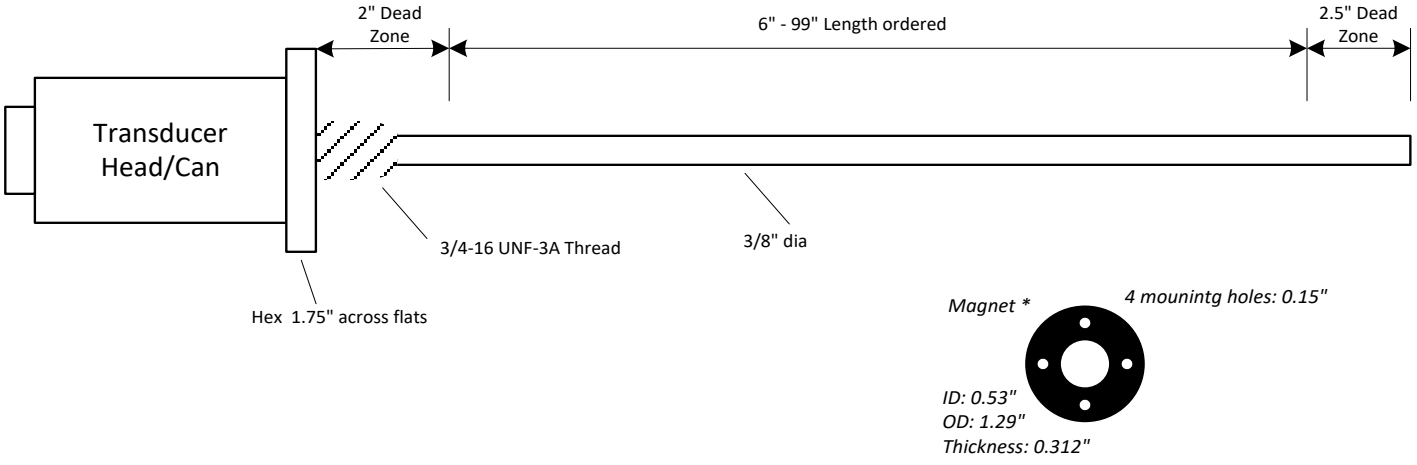
- ◊ G40AC15 (black AC type) 120VAC @ 3A max

LINEAR TRANSDUCER

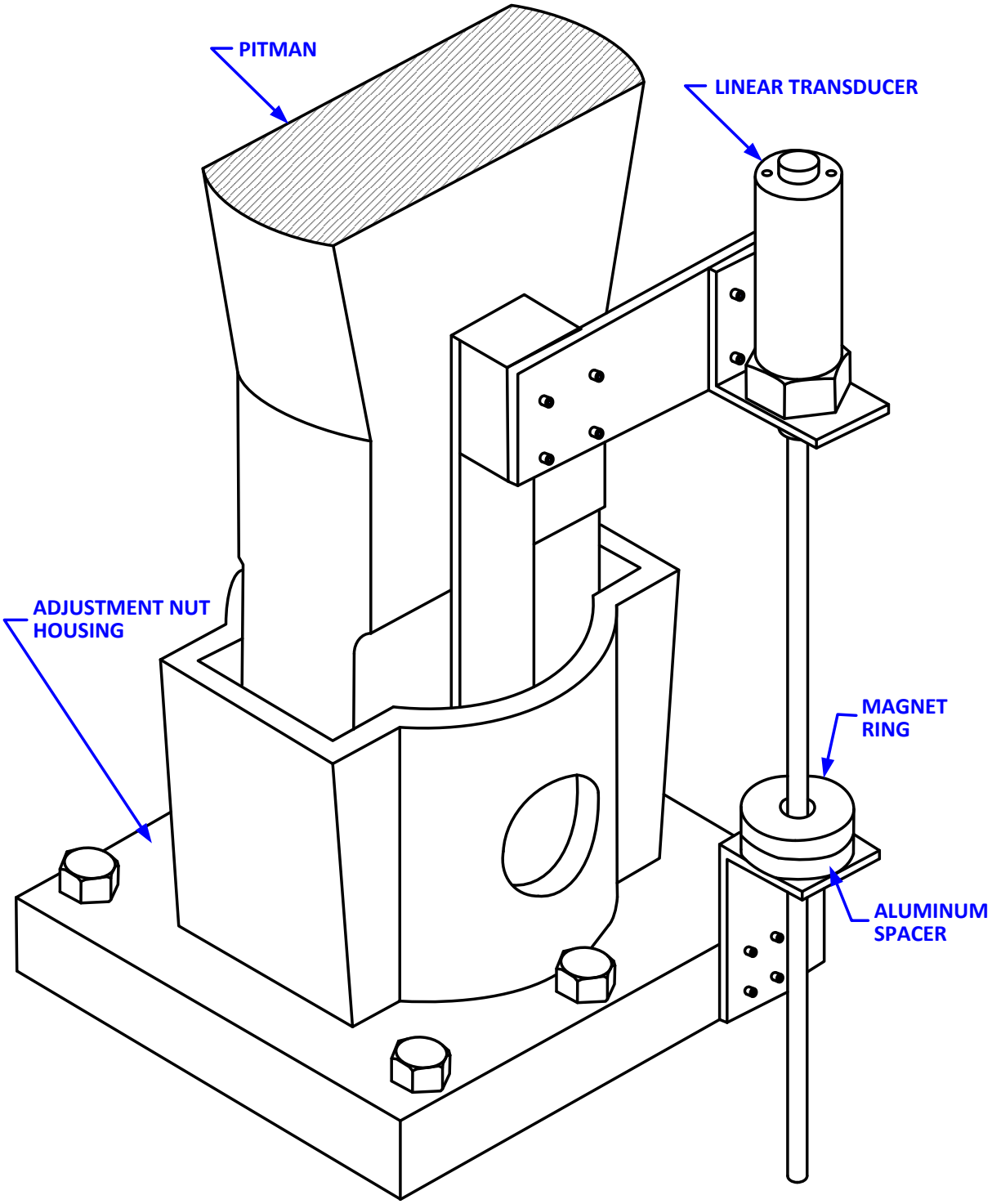


Use the 3.4” (19 mm), 16 UNF thread of the transducer to mount it at the selected location. Install the permanent magnet over the LDT rod. Mount the permanent magnet to the movable device whose displacement will be measured.

NOTE: The magnet must not contact ferromagnetic materials (such as iron or steel). Therefore, use the supplied isolation washer and stainless steel machine screws to isolate the magnet bracket from the magnet. (See Figure 1 above)



Transducer Mounting



RELAY OUTPUTS

Fault relay:

The fault relay is normally energized and should be wired to the stop circuit of the press. (E-Stop or Top Stop) The fault output will de-energize when:
RamMaster loses contact with the transducer.
The magnet is removed from the transducer or in the dead zone.
The shut height fails outside the programmed tolerance in the monitor mode.
Auto set is initiated.

The fault relay is reset or energized when:
The RamMaster is turned on while the shut height is within the programmed tolerance.
The JOG function is initiated
The ENTER key is pressed in the monitor mode and the shut height is within the programmed tolerance. This can also be done to quickly reset an H or L TOLERANCE fault if the shut height has been returned to within tolerance.
Entering into the monitor mode will reset a tolerance fault provided the shut height is within tolerance.
See troubleshooting (FAULT)

Tolerance relay:

The tolerance relay is normally de-energized and is energized only when the shut height falls outside the programmed tolerance in the monitor mode. It can be wired to a beacon or alarm.

The tolerance relay is rest when:
See B1 through B4 of the Fault relay

D1 and D2 relays:

The direction relays energize in the JOG and AUTO set functions only. They are used to move the ram adjust motor in the appropriate direction. See page 11, figure A for the relation between D1 and D2 and the transducer (*also see the wiring diagram*).

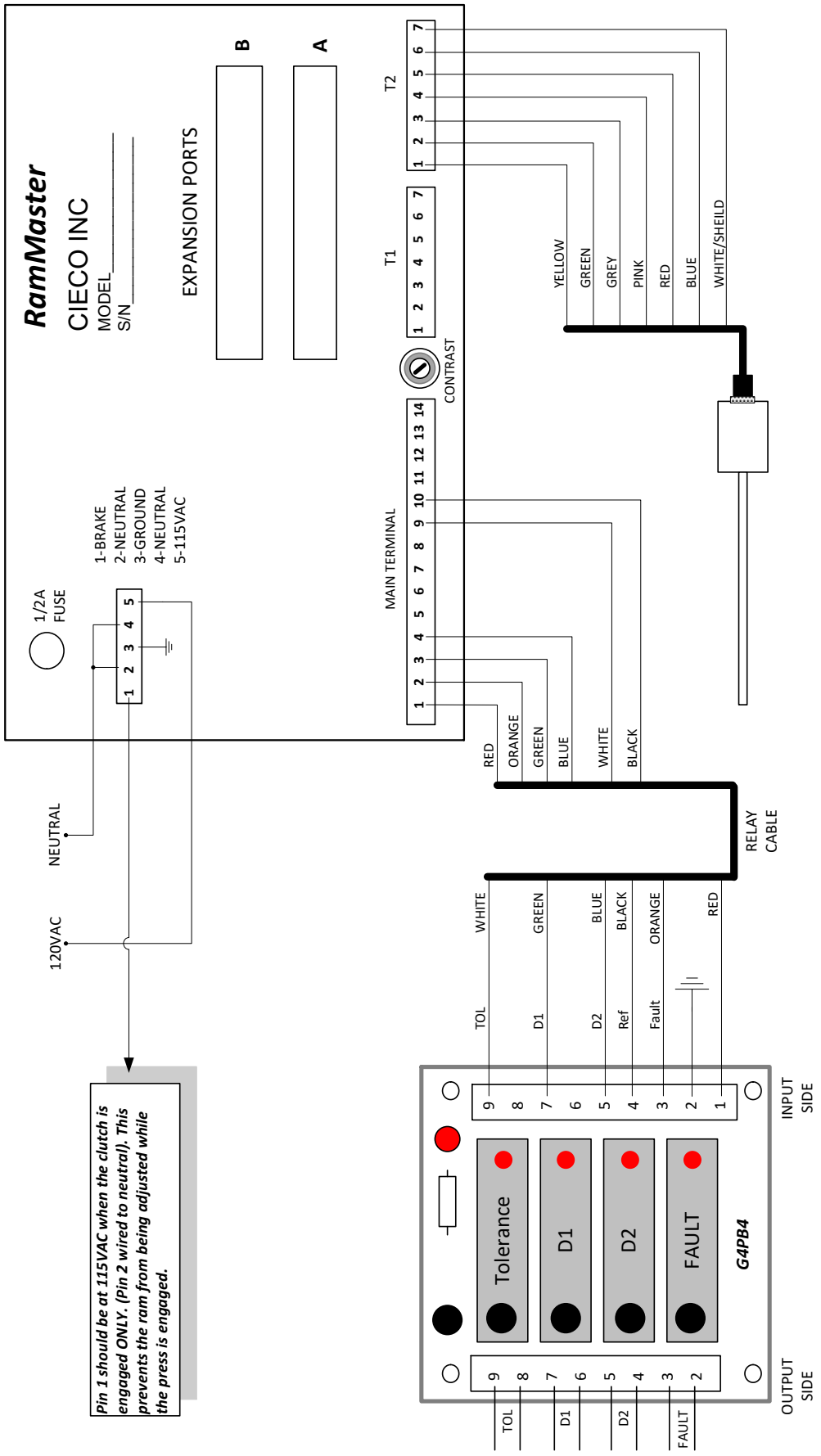
CAUTION: Correct wiring is vital for proper auto set operation! Incorrect wiring may result in damage to the press!

BRAKE SOLENOID INPUT (BSI)

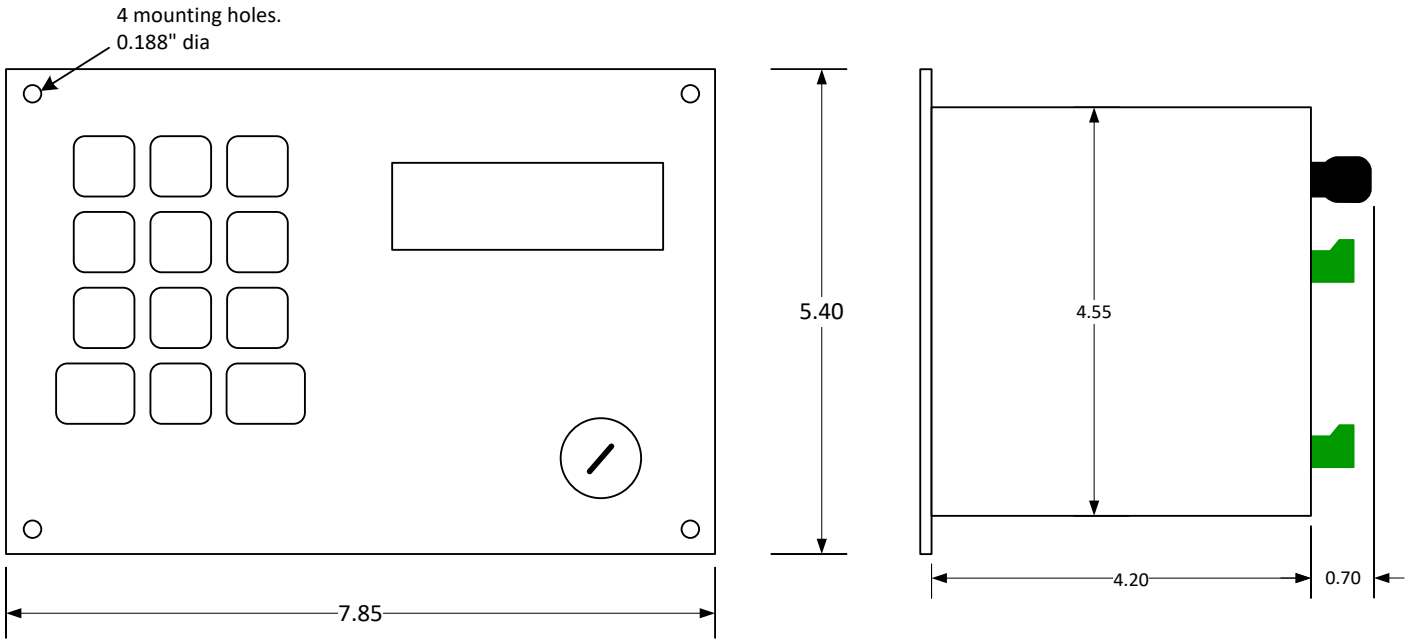
The brake solenoid input should be at 110VAC any time the clutch is engaged to run the press. When the press is not running, the BSI should be at 0V. the BSI is used to tell the RamMaster when the press is running.

CAUTION: Damage to the press may occur if the BSI is not connected!

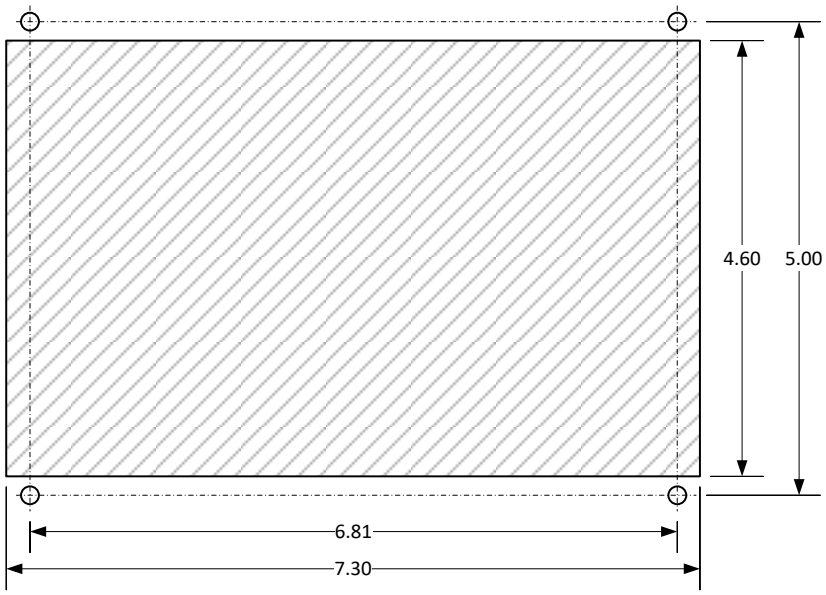
WIRING SCHEMATIC



RamMaster dimensions



Cutout Dimensions



RamMaster

PROGRAMMING QUICK REFERENCE GUIDE