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Installation and Maintenance Manual



Gemco 1996 Ram-Set

Automatic Press Shut Height Controller

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Preface

This manual provides a system description, installation, maintenance and trouble shooting instructions for the Gemco 1996 Ram-Set automatic shut height controller.

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Chapter 1: General Description

The standard 1996 Ram-Set consists of a transducer, transducer cable termination kit, controller, and output module.

The transducer device is a magnetostrictive linear displacement transducer (LDT for short). The LDT consists of a fixed guide tube assembly attached to an electronics package, and a non-contacting magnet assembly that moves up and down the guide tube. The magnet position is precisely sensed by the guide tube electronics. The guide tube assembly is attached to a fixed member of the slide, typically at the Pitman arm. The magnet assembly is attached to a moving portion of the slide.

The output signal of the LDT is transmitted through the cable termination kit. The kit consists of strain relief fittings at the transducer connection point, flexible cable between the transducer, and a J box mounted on the crown of the press. The J box has quick disconnect fittings for the flexible cable and cable running to the controller.

The controller and output modules accept slide position information from the LDT, programming information, and energize outputs to accurately position the slide to any customer selected die number.

1.1 Controller Features and Functions

The controller is housed in an all metal case that can be panel mounted. The controller consists of a mother board, which contains all keypad interface components, a CPU board, and a power supply board.

The Ram-Set controller is the "brain" of the Ram-Set system. It provides the operator interface and microprocessor to carry out all programmed directions. The following features are found on the Ram-Set faceplate:

Display - A six (6) digit L.E.D. read-out will show current shut height position, programming details, and while in automatic operation the display will show shut height movement.

Programming Keys - There are three sets of programming keys on the Ram-Set faceplate. The largest group contains numbers from 0-9 for entering programming data. A "C/CE" or clear key will remove any erroneous programming mistakes, and an "ENT" or enter key for entering programming data into the controller memory.

The second group of keys contains a "DIE #" key used to enter customer selected die numbers into the Ram-Set memory. An "F" or function key is used as a precursor to let the Ram-Set controller know that new programming data is being entered. The key must be depressed before any programming function is entered. "Jog up" and "Jog down" keys are used to manually adjust the press shut height. The keyswitch must be in the "Jog" mode to enable the "Jog up/Jog down" keys.

The last key is the "Stop" key. This will automatically disable the drive relays when the system is in the automatic mode and a drive sequence has been initiated.

Mode Select Keyswitch - This four (4) position keyswitch allows customer selection of several modes.

"Auto" - This mode is used when the customer desires to drive to a new pre-programmed shut height.

"Prog" - This is a program mode. In this mode calibration data and die number/shut height values can be entered.

"Jog" - Jog mode enables the "Jog up/Jog down" keys, allowing manual adjustment of the shut height.

"Standby" - The standby key should be used while the press is in operation. It locks out all automatic and manual movement, as well as programming features.

Located on the rear of the unit is a (14) fourteen terminal connector which interfaces with the output module, provides the 115VAC input, and also provides four auxiliary outputs. A (6) six terminal connector for transducer input and a D9 connector for RS485 communication are also located on the rear of the unit.

1.2 Output Board Features and Functions

The output board is the press/Ram-Set interface. It contains the relays used to connect to the press shut height controls.

"Up/Down Relays" - These triple pole relays should be tied into the appropriate Ram-adjust motor starter.

"In-Position Relay" - This relay will energize when the customer programmed shut height is achieved. The controller allows programming of a +/- value at which the "in-position" relay will stay energized. The output of this relay could be used for visual indication or as an interface to the press control alerting the user to possible slide drift.

"Run Relay" - This relay energizes when the mode select keyswitch is positioned in the "standby" mode. The relay is usually tied into the same circuit as the existing press run-interlock switch. The objective is to let the press controls receive positive feedback that slide adjustment is no longer possible.

The output module accepts 115VAC to operate the relays and provide an auxiliary 24VDC output. Terminals are provided for the 115VAC power input, an auxiliary input, relay inputs from the controller, and the relay outputs.

Chapter 2: Installation Instructions

Introduction

This section describes the installation and wiring of a standard Ram-Set controller, output module and transducer. Changes to these instructions should be made as necessary if special options and/or equipment are used.

The controller and output module should be installed in an area free of water spray, corrosive gases, flying chips or other foreign matter. The operating temperature should be between 32 and 125 degrees Fahrenheit, with less than 95% relative humidity.

2.1 Mechanical Installation

Mounting the Transducer

The proper mounting of the Ram-Set transducer assembly is critical to ensure the systems' accuracy. A universal transducer mounting and cable termination kit can be provided with each system. The kit contains all hardware needed to complete mounting. When designing your own LDT mounting brackets, see Drawing D-0211000-D.

Using existing press controls, jog ram up to its maximum up position. Bypass up safety limit switch if necessary. Refer to Drawing D-0211000-D 1996 Ram-Set Transducer Installation for the following installation instructions.

Mounting steps:

1. Brackets for both the transducer and magnet assembly should be fabricated at time of installation. The brackets should be slotted as shown in the transducer installation drawing.

   The transducer bracket should be mounted to a fixed member of the slide, and the magnet assembly bracket to a movable portion of the slide. If mounting to a round surface, use v-block construction on the brackets.

It is important to note the following dimensional minimum requirements when designing the brackets:

A. An 8" minimum clearance is required from the bottom of the crown to the top of the transducer mounting bracket (at the point of transducer connection), when the press is at top dead center.

B. A 2.625" minimum gap is needed between the top of the transducer mounting bracket and the top of the magnet assembly bracket.

C. Make sure the transducer guide tube has clearance when the slide adjustment is fully down.

D. A tolerance of .001" per foot must be held between the side of the magnet assembly bracket and an imaginary perpendicular line intersecting the guide tube.

D. A tolerance of .001" per foot must be held between the side of the magnet assembly bracket and an imaginary perpendicular line intersecting the guide tube.

E. Check all other points for possible obstructions. The brackets should be affixed to the press with 3/8-16 socket head cap screws.

2. Attach the taping plate for weld block anchor on or near the transducer mounting bracket. The mating half with elbow assembly will act as a strain relief for the transducer cable.

3. Mount the supplied junction box to the crown of the press in an area free from obstruction. The flexible cable from the junction box runs through the elbow assembly to the transducer. Run conduit from the junction box to the controller. **Note**: Transducer wires only in this conduit. A maximum transducer cable length of 30 ft. is recommended. Consult factory on cable lengths greater than 30 ft.

Mounting the Controller

Note: Panel cutouts, mounting holes, and sizes for each component are shown in the rear of the 1996 catalog section (page 6).

The controller should be mounted in the appropriate panel cutout and securely bolted into place using the (4) four 3/16" diameter mounting holes.

The output module is normally mounted inside the same enclosure, but can be mounted up to 30 feet from the controller. A 8 foot cable is provided standard.

It is always good design practice to mount the controller and output module in the enclosure as far away from the motor starters and control relays as possible to minimize the effects of electromagnetic interference (EMI).

Interconnecting wiring also should be routed to minimize EMI coupling.

Note: In instances where the Ram-Set is being mounted directly on the press, care should be taken to isolate the controller and output boards from shock load and vibration.

2.2 Electrical Installation

Introduction

The Ram-Set is designed for use in an industrial environment and incorporates extensive transient suppression circuitry. However, the same general installation rules should be followed that are used on all micro-processor based equipment. Incoming AC lines should be from a clean power source and lines carrying computer level signals should not be routed in the same conduit as high voltage, transient producing circuits like variable speed drives, welders or DC switching circuits.

Installation

Disconnect existing press controls and re-wire press control per Drawing E-0204800, 1996 Ram-Set General Wiring Diagram. Please note that the typical press control wiring shown on this diagram is general in nature and may be modified to accommodate each particular application.

Attach the pre-wired plug on the transducer cable to the transducer. Connect the second set of plugs inside the junction box and lastly, connect the transducer cable end to the (6) six place connector on the rear of the controller.

The AC line voltage, 115VAC 60HZ, should be connected to the appropriate terminals on the controller and output module. Complete and/or check the interface wiring between the controller and output module.

Calibration

1. **Mode Select**: Insert the mode select key into the keyswitch and turn to the "program" mode. With power on, the following sequences should be followed:

2. **Initialize**: The initialization code clears the Ram-Set memory. The initialization code should be entered prior to calibration to eliminate possible unwanted data.

F - 3 - 9 - 1 - ENT

After initialization, proceed as follows:

3. This unit has been set up to work in inches or millimeters. The operator can select between working with inches (to 1/1000 of an inch) or millimeters (to 1/100 of a millimeter).

F - 2 1 - ENT 0 or 1

0 = Millimeter
1 = Inch

Default is inch mode (1).

When millimeter mode is selected, all programmable values are entered as millimeters except the wire speed. The wire speed is still entered in inches per microsecond (i.e. the wire speed printed on the transducer's can). This value will be converted into millimeters internally.

The default and maximum values in the inch mode for the altered functions are:

Function Number	Description	Default Value	Range
	Position		0 to 9899.99 in
8	System offset	48.000 in	0 to 99.999 in
11	Slow-down entry point	0.050 in	0 to 0.259 in
12	Upper limit	48.999 in	0 to 99.999 in
13	Lower limit	0.000 in	0 to 99.999 in
18	Ram "In Position" window	0.010 in	0 to 0.099 in

Any time the readout mode is changed, some of the system's parameters will be reset and all of the die will be cleared to reflect the new mode. The default and maximum values in the millimeter mode for the altered functions are:

The default and maximum values in the millimeter mode for the altered functions are:

Function Number	Description	Default Value	Range
	Position		0to9699.99mm
8	System offset	9789.99 mm	0 to 2600.00 mm
11	Slow-down entry point	1.27 mm	0 to 7.00 mm
12	Upper limit	1300.00 mm	0 to 2600.00 mm
13	Lower limit	0.00 mm	0 to 2600.00 mm
18	Ram "In Position" window	0.254 mm	0 to 3.00 mm

4. **Wire Speed**: Enter the transducer wire speed. The wire speed number can be obtained from the transducer data plate. Because each transducer has its own unique wire speed, it is imperative the proper wire speed is entered. Incorrect wire speed data will affect the system's accuracy.

F - 9 - ENT - Wire Speed # - ENT

5. **Count Direction**: Establish proper count direction. The standard mounting position of the transducer is with the rod end down. The top end of the transducer then indicates the upper-most position of the press slide. **In cases where inverted counting may be desired, proceed as follows:** (otherwise skip step)

F - 1 - 0 - ENT 0 or 1 ENT

0 = decreasing value from top to bottom (standard)
1 = increasing value from top to bottom (inverted)

6. **Press Type**: Select the type of press: (if applicable)

F - 2 - 0 - ENT 0, 1 or 2 ENT

0 = single action (standard)
1 = double action (inner slide)
2 = double action (outer slide)

Note: If option 1 or 2 is picked, the 110VAC from the slide gap switch must be connected to Ram-Set per Wiring Diagram E-0204800-C.

7. **Offset**: With keyswitch in program position, depress jog-up key. Jog past the upper mechanical overtravel limit to the upper maximum mechanical position. Determine this value (measure or use press manufacturers data) and enter value into Ram-Set offset. This will assure a consistent measurement format even when changes are made.

F - 8 - ENT - Max. Value - ENT

Note: Please also note that offset can be set any known slide position.

8. **Upper Limit**: The electronic limits of the Ram-Set should be used in conjunction with the existing press mechanical overtravel limits. To set the upper electronic limit, jog the slide down past then back to the existing slide upper limit switch. Read the Ram-Set display and program this value as the electronic upper limit setting.

F - 1 - 2 - ENT - Value - ENT

9. **Lower Limit**: Jog slide to existing press mounted lower limit switch. Read the Ram-Set display and program this value as the Ram-Set lower electronic limit setting.

F - 1 - 3 - Value - ENT

10. **Slow Dwell**: The slow dwell settings are the method the Ram-Set uses to precisely position the slide. These time based dwells (on/off) are attached to the up/down output relays, and are enabled in the auto mode when the slide enters the slow down zone. The amount of time the on/off dwells should be enabled varies from system to system, but the idea is to enable the on dwell long enough to energize the slide adjust motor starter, and the off dwell long enough for the slide to coast to a stop.

Slow dwell can be programmed from .01 to 9.99 seconds. A good typical value for the time on a dwell is .40 seconds.

F - 1 - 4 - ENT - Time On # - ENT

Program time off for slow dwell. This function, more than any other, determines the repeatability of the automatic positioning. It is typically set at .60 seconds.

F - 1 - 5 - ENT - Time Off # - ENT

11. **Slow Down Setpoint**: Set the deceleration distance or slow down entry point. This is the point at which the system will begin to pulse the output to the Ram adjust motor starters. It is designed such that the system will drive toward the setpoint from below in all cases. If the ram is above the setpoint, the system will drive below the setpoint by the width of the down setpoint, stop for 3 seconds, and drive up to the programmed shut height. This method serves two purposes: one, to take the backlash out of the ram adjust system; and two, to gain consistency in adjustment by driving at the setpoint in one direction at all times.

F - 1 - 1 - ENT - Value - ENT

12. **Drift Window**: Establish an acceptable drift window. If the slide moves outside of this window, the In Position relay denergizes. Typically 0.010 to 0.020 inch.

F - 1 - 8 - ENT - Value - ENT

Note: In any cases where F - 3 - 9 - 1 - ENT is used, steps one (1) through eleven (11) will be erased from memory and will have to be repeated.

The calibration steps are now completed and the system is ready for programming.

Chapter 3: Programming and Operating Instructions

Programming Dies:

1. **Programming New Die #'s and Shut Height Values**:

   A. Select "Prog" mode on keyswitch

   B. Depress F - 1 - ENT

   C. Depress DIE # - Die code # - ENT

   D. Enter shut height and depress ENT

   E. *Optional Counter Balance Entry
   Enter counter balance value (1-16) and depress ENT

   The counter balance value will generate a (4) four binary output from the rear of the Ram-Set proportional to the programmed value. The binary output will interface to Gemco Series 2200 to automatically adjust the press counter balance.

   Note: It is important that shut height value entered has been pre-tested with die in press prior to entry.

   To program new die #'s and shut heights at this point, simply start at step C.

2. **Operating in Auto Mode**: This function allows the retrieval of existing programmed dies and their associated shut heights.

   A. Keyswitch in auto mode.

   B. Depress DIE # - Die code # - ENT. The programmed optional counter balance will now appear on the display for 3 seconds then it will display the shut height value.

   C. Verify that shut height value and counter balance value correspond to the selected die.

   D. Depress ENT. This will enable the drive sequence. The drive sequence will remain active until the shut height drive mechanism moves the slide to the programmed value.

   E. Select "Standby" mode on keyswitch. The auto adjust sequence is now complete.

3. **Operating in Jog Mode**: This function allows the customer to manually jog the slide using the Ram-Set keys.

   A. Keyswitch in job mode.

   B. Depress appropriate "Jog up" or "Jog down" key on unit for appropriate motion.

4. **Clear All Die #'s and Positions**: This function lets you clear all die numbers and shut height values without affecting the other functions. Simply select "PROG" mode and depress: F - 7 - 5 - 3 - ENT.

   This will remove all die numbers and position values.

5. **Remove a Specific Die # and Position**: To remove a specific die, select "PROG" mode and depress: F - 100 - ENT - DIE # - SPECIFIC DIE # - ENT.

   The specific die selected and associated shut height value are now deleted.

6. **Review All Programmed Dies and Positions**: This is a read-only function. It provides a review of all existing programmed die numbers *optional counter balance values and position values. In any mode depress: F - 1 - 7 - ENT.

   The lowest die number will appear in the display followed by it's optional counter balance value then by it's corresponding position. By pressing "ENT" the remaining die(s), optional counter balance(s) and shut height(s) will be displayed in numerically increasing order.

7. **Ram "In Position" Window**: This function puts an "In Position" window around each selected die position. It compensates for small positional variations due to shock, temperature, etc. To use this function, select "PROG" mode and depress: F - 1 - 8 - ENT - WINDOW ± VALUE - ENT.

   When in the "AUTO" mode the Ram will move to the center of the window before stopping.

8. **Jogging with System Errors**: Should the transducer and/or cable become disabled, or it is desired to move the ram beyond it's electronic limits this function allows the "JOG" keys to operate the slide in the manual mode. To access select "JOG" mode and depress: F - 5 - 5 - 5 - ENT.

   The manual jog keys will now activate the slide motors even though the display may not be providing position feedback or the ram may be beyond it's limits.

   Note: Extreme care must be taken when operating in this mode. This mode will be reset when the selector switch is rotated out of the jog mode.

9. **Counter Balance Override**: Function #200 was added to allow for a counter balance override value. The counter balance override value, once programmed in the PROG mode, is implemented instantly. Once a new die has been selected in the AUTO mode, the new die's programmed counter balance value is implemented. The current counter balance value can be viewed through Function #200 in any mode.

   Example:

   In PROG mode:

   • enter the override counter balance value in Function #200 as 2.

   <F> <2> <0> <0> <ENT>
   <2> <ENT>

   • enter die #1's position at 42.000 and set the counter balance to 10.

   <F> <1> <ENT>
   <DIE #> <1> <ENT>
   <4> <2> <0> <0> <0> <ENT>
   <1> <0> <ENT>

   In AUTO mode:

   • enter a die number.

   <DIE #> <1> <ENT> <ENT>

Once the die number is selected and <ENT> has been depressed, the preprogrammed counter balance value and shut height value for that die # will be displayed to be verified. Depressing <ENT> again will confirm and enable a drive to the selected shut height and the counter balance for that die will be implemented.

Upon system initialization, the counter balance override value is set to zero. If power is shut down, once power is restored, the last counter balance utilized before shut down is implemented and displayed.

3.1 RS485 Protocol and Interface

The RS485 option provides the user with the mechanism to establish a communication link between the 1996 Ram-Set and any remote system incorporating RS485 capability. The remote system could be a programmable controller, or any computer based operating system.

Through use of this communication link, all Ram-Set functions can be monitored or changed. Up to 32 systems, including the host computer can be tied into this link.

System Protocol
The Ram-Set is factory set for 9600 baud rate, 8 bit word length, 1 stop bit, parity off, and parity even.

To change baud rate:

F - 2 - 3 - 2 - ENT - Value - ENT

The following baud rates are available: 150, 300, 600, 1200, 2400, 4800, or 9600.

The remaining protocol information is entered by:

F - 2 - 3 - 3 - ENT - Value - ENT

The value is a (4) four digit code relating to parity odd/even, parity enable/disable, bit data, transmit with or without leading zeros omitted.

X X X X

0 = even parity, 1 = odd parity

0 = disable parity, 1 = enable parity

7 = seven bit data, 8 = eight bit data

0, 1 and 2 transmits 4, 5, 6 characters with leading zeros omitted
4, 5 and 6 transmits 4, 5, 6 characters without leading zeros omitted

Each Ram-Set must have it's own unique address location from 00 to 99.

F - 2 - 3 - 4 - Value - ENT

The host computer (bus master) must have an address on the same format as the Ram-Set. Program by:

F - 2 - 3 - 5 - Value - ENT

Note: The address functions are only accessible through the keypad. (F-232, 233, 234, 235).

Serial programming follows the keypad entry format.

Example: To enter die number 1 and shut height of 10.000: STXZmmF1ED1E0000EEOT. To access data through the serial port, the ENQ ($05) character must proceed entries.

Example: STXZmmENQF1ED1EEOT would cause the Ram-Set to return STXZbbACKF001D001 : 10000EOT.

If commands are strung together in the same transmission, ENQ must precede each function that data is being requested from:

Command Symbols

D	($44)	Represents the die # key
E	($45)	Represents the ENT key
F	($46)	Represents the F key
K	($4B)	Used to request a program dump
L	($4C)	Used to request a decimal position
P	($50)	Used to request a transducer position
:	($3A)	Precedes returned function data
=	($3D)	Requested data is unavailable

After the Ram-Set has successfully received a message, it will transmit the following:

A. If no data was requested and no data errors occurred, it will transmit STXZmmACKEOT where mm is the last address.

B. If data was requested, it will transmit STXZmm ACK (requested data) EOT.

C. If an error occurred, it will transmit STXZmmNAK00xEOT.

The “x” in the above transmission represents an error code. The codes are detailed below:

Error Codes

1: Transmission error, over-run, framing or parity error
2: Receiver buffer overflowed (256 characters max.)
3: Data format error (check control characters)
4: Data error (check data limits)
5: Signal error (function 8 offset can’t be entered)

Pinout of D9 to any RS485 terminal

Host D9		Ram-Set D9
1	GND	1
2	Data	2
3	Data	3
4	Data	4
5	Data	5

Chapter 4: Maintenance and Trouble Shooting

The following procedures are intended as an aid to isolate system malfunctions down to field replaceable elements. These elements include; controller, output module, transducer and interconnecting wiring.

Preliminary Checks

Check System connections at the transducer, junction box, controller and output module to ensure that all connectors and wires are secure. A slight tug on each wire at the controller is recommended. Verify that all wiring to the controller and output board is in agreement with the data plates.

Check input power to the controller and output board. Input voltage should be from 105 to 125VAC. Verify line fuse on output board has not blown.

Malfunction Analysis

Problem: Unit powers up with EE POS

Cause: There are several probably causes for this error message. To check system for cause, depress F - 1 - 6 - ENT. This causes the unit to display a trouble flag, shown below:

EE0001 = Signal loss
EE0010 = Lower limit exceeded
EE0100 = Upper limit exceeded
EE1000 = Slide gap interference fault or loss of 110 V.A.C. on slide gap interference input.
EE0000 = All are correct

Note: If more than one error exists, a combined error message will be displayed. Ex.: a slide gap interference fault and lower limit exceeded fault occur at the same time, an error flag of EE1010 shows.

To trouble shoot flags:

1. EE0001 - Shows that a transducer signal loss has occurred. Check all transducer connections. If all connections are made, check circuit integrity (see transducer information sheet).

2. EE0010 - Lower limit exceeded. The electronic lower limit has been exceeded. Putting the keyswitch in the Jog Mode and moving the slide out of this zone (jog up) will reset this fault.

3. EE0100 - Upper limit exceeded. The electronic upper limit has been exceeded. Putting the keyswitch in the Job Mode and moving the slide out of this zone (jog down) will reset this fault.

4. EE1000 - The slide gap interference switch has been activated. Depending on which slide is being monitored, a jog move will have to be made to bring slide out of the slide gap interference zone. Or 110 V.A.C. has been lost on slide gap
interference switch when F - 20 - ENT is set for option 1 or 2.

Problem: Unit reads EEEEEE

Cause: This is due to a programming error. Depress the clear (C/CE) key. Now reprocess sequence. If EEEEEE's persist, check diagnostic code.

Problem: Outputs will not operate or continuously stay on.

Cause: Output interface wire(s) disconnected, output driver blown, CPU problem or blown fuse on output module. Check all wire connections and output fuse. If check out proceed as follows:

A. To check up and down relays put keyswitch in jog mode. With a digital volt meter check between GND and up/down terminals on output board. There should be a presence of 25 to 28VDC across these terminals. Depress the up/down button of keypad, the output voltage should drop to around .7VDC. If no voltage is present across GND and up/down terminals, the driver outputs from the controller are blown or an internal processor error has occurred.

B. To check "run" contact put keyswitch in stand-by mode. Check voltage across GND and run terminals on output board. (See (A) for cause of errors).

C. To check "in position" contact put keyswitch in stand-by mode. Depress the die # key (which will display last used die number and shut height), jog system to this shut height. The in position, L.E.D. on keypad will light. Now check voltage between GND and in position terminal on output board. (See (A) for cause of error).

Problem: Ram-Set controller display blank and outputs not operating.

Cause: Fuse blown inside Ram-Set controller. Remove back plate and examine fuse on power supply board.

Problem: Controller displays meaningless data. Outputs may or may not operate properly.

Cause: Controller mounted in a high shock and/or vibration environment causing intermittent connections.

Problem: Controller operating in a high electrical noise environment.

Cause: Improperly connected cable shield or high power AC wiring running in same conduit with transducer cable. It is always a good practice to isolate programmer wiring from other machines.

Note: Malfunctions due to the above can usually be cleared by removing, and then reconnecting power to the controller. The cause of such problems can be determined and eliminated. If removal and reconnection of power does not correct the problem, a controller failure has occurred. If the outputs are operating properly, the failure is most likely in the display section. If outputs do not operate properly, the failure is most likely in the CPU section.

Chapter 5: Programming and Function Charts

Password Function Number	Initialization Description	Value	Range
1	Program new die #'s and positions	N/A	Up to 5 digits
753	Clear all die #'s and positions	N/A	N/A
8	System offset	48 In. Max. Pos.	0 to 99.999 inch
9	Transducer calibration (wire speed)	9.040 in/sec.	1.000 to 65.000 in/sec.
10	Up/down counting direction	0 (Up)	0=Up; 1=Down
11	Slow-down entry point	0.050 inch	0 to .259 inch
12	Upper limit	48.999 inch	0 to 48.999 inch
13	Lower limit	0.000 inch	0 to 24.999 inch
14	Time-on for slow dwell	0.40 sec.	0 to 9.99 second
15	Time-off for slow dwell	0.40 sec.	0 to 9.99 second
16	Trouble flags	N/A	N/A
17	Review all programmed dies & positions	N/A	N/A
18	Ram "In Position" window	.010 inch	0- to .099 inch
19	Software number	N/A	N/A
21	Inches/mm	1	0 or 1
100	Remove a specific die # and position	N/A	N/A
200	Counter balance override	0	0 to 15
268	Diagnostics (Function #268)	N/A	N/A
391	Initialization	N/A	N/A
555	Jogging with system errors (Function #555)	N/A	N/A

Note: If an attempt is made to enter too large a value, the display will show EEEEE4. If this value is too small, the display will show EEEEE3. Example: Entering a ram position outside of the upper and lower limits.



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