SAVE THIS IN YOUR MANUAL

# INSTALLATION NOTICE

All backgauges are factory preset to a tolerance of +/- .002" from the programmed dimension. AC line variations from site to site may necessitate fine tuning the system at installation by adjusting the rate of the low speed.

This can be accomplished by moving the clamp on the 2 ohm resistor located on the P.C. board inside the black cover at the rear of the backgauge (see drawing on reverse side).

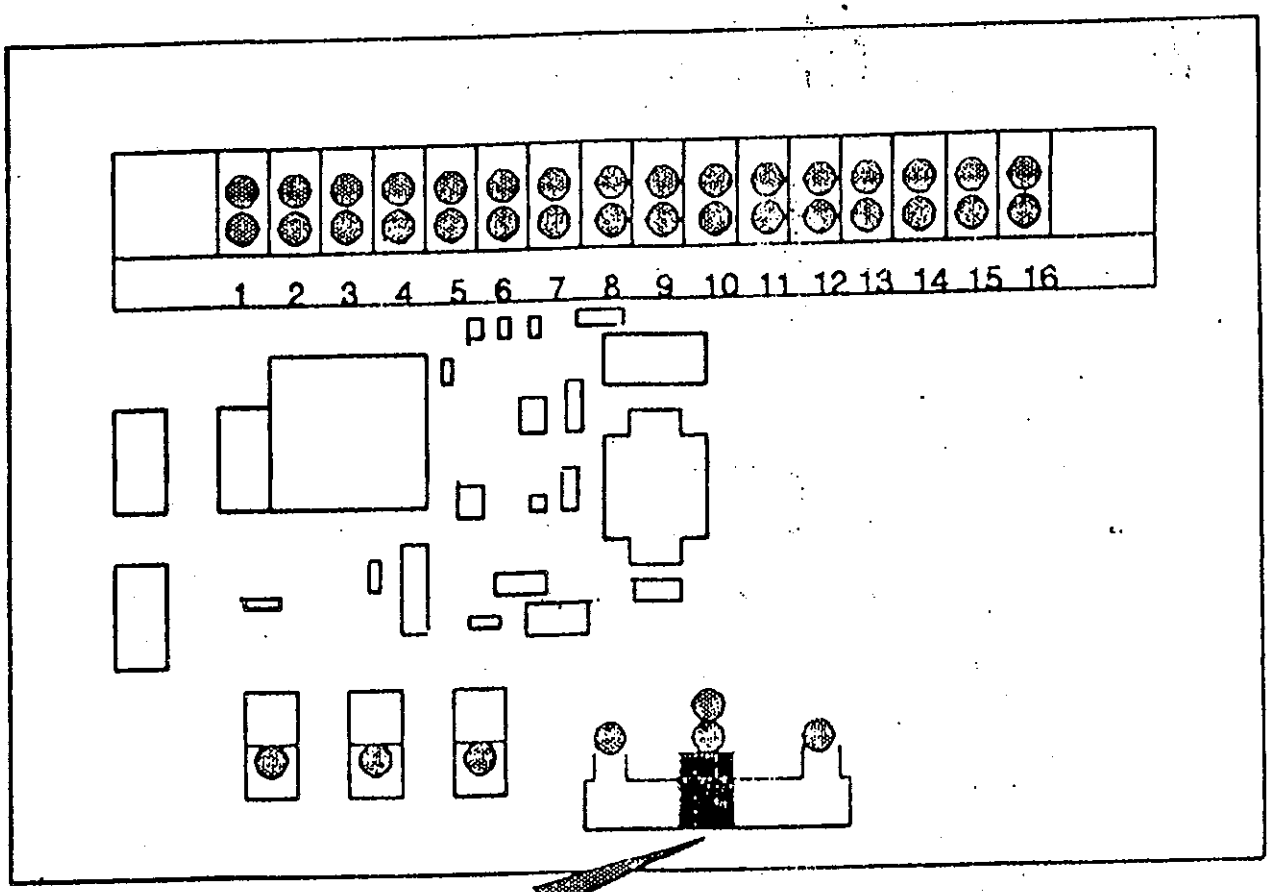
1. IMPORTANT: Disconnect AC power an wait for resistor to cool down.

2. Loosen the screw on the resisitor clamp.

3. If backgauge is positioning less than the programmed position by more than .002", you are overshooting so move clamp 1/8" in the slow direction to reduce the slow speed (i.e. 2.000 is programmed, gauge positions at 1.992).

4. If position of gauge is greater than the programmed position by more than .002", you are undershooting so move clamp 1/8" in the fast direction to increase the slow speed (i.e. 2.000 is programmed, gauge positions at 2.008).

# G2404 MOTOR DRIVE BOARD




SLOW ⟷ FAST

SLIDE ADJUSTMENT RESISTOR CLAMP

TO IMPROVE ACCURACY OF GAUGE MOVE SLIDE ADJUSTMENT CLAMP. NOTE THAT WHEN YOU ARE LOOKING AT THIS BOARD IN THE FIELD THE ACTUAL POSITION OF THE BOARD MAY BE DIFFERENT THAN THIS DRAWING.

# TABLE OF CONTENTS

# INSTALLERS MUST READ BEFORE STARTING UP SYSTEM.

## INSTALLATION & SET-UP NOTES

The *CNC 99* has the flexibility to handle different types of pressbrakes in different ways so it is necessary to check some codes to make sure your system is configured properly.

To use this checklist, determine whether you have a Rigid Rail system (backgauge castings marked AUTOGAUGE U.S.A.) or a G24 system (backgauge castings marked AUTOGAUGE G24).

Then determine whether you have a 1-axis (backgauge only), a 2-axis Category 1 (linear scale), or a 2-axis Category 2 or 5 (servo motor). Go through the checklist for your particular system.

Look for notes that apply to the particular brake you are retrofitting before you start the installation. Other checkpoints must be done after power is applied to the system but before running.

A slide switch located behind the magnetic instruction card is often referred to in order to change the codes. Familiarize yourself with this switch. Changes are made with this switch moved to the right (CODE) position and locked in when the switch is moved to the left (RUN) position.

## ☐ ALL SYSTEMS:

Check to see which system your control is set up for. Move the slide switch to the **CODE** position. Press the **RAM HGT** Button.

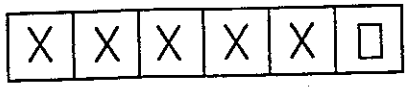
If the right two digits are "0" "0", the system is programmed as a single axis.

| | | | | | |
|---|---|---|---|---|---|
| X | X | X | X | ☐ | ☐ |

If the right most digit is "1" - "9" and the digit next to it is "0", then the system is programmed as a Two Axis Category 1 Linear Scale.

| | | | | | |
|---|---|---|---|---|---|
| X | X | X | X | ☐ | X |

If the right most digit is "0" and the digit next to it is "1" - "9", then the system is programmed as a Two Axis Category 2 or Category 5 Servo System.




☐ **Check electrical connections.**

On Rigid Rails make sure jumper is connected from motor package to drive rail and brake cable is connected to both drives. Follow Rigid Rail set up instructions to make sure both drives are in sync on dual drive systems.

☐ **Check compatibility of *CNC 99* control to backgauge mechanical assembly by checking backgauge scale factor.**

Move slide switch to **CODE** position. - 9 should appear in the job window. Press **FLANGE**. Check the second digit from right. For G24B backgauge (casting embossed AUTOGAUGE G24) - code should be "0". For Rigid Rail backgauge (casting embossed AUTOGAUGE U.S.A.) - code should be "1".

To change: Press **FLANGE** until second digit from right blinks. Press **C**. Enter **0** or **1**.

Return switch to **RUN** and re-calibrate all axes position codes 2 - 9 not used.

☐ **Check polarity of ram switch or auto advance relay by cycling the ram in the automatic mode.**

If gauge moves at the wrong time, change polarity of ram switch as follows:

TO CHANGE POLARITY OF RAM SWITCH - Lift up magnetic instruction card and move indented switch to **CODE** position (right position). -9 should appear in the job window. Now press the **FLANGE** button until the 3rd window from the right is blinking. Push **C**. The letter "C" will appear in the window blinking. You may now enter either **0** or **1**. Move indented switch back to **RUN** position and re-calibrate all axes and polarity change has been completed.

# FOR CATEGORY 1 LINEAR SCALE RAM AXIS SYSTEMS

☐ **Check to see which mode ram axis is in.**

Press **BEND, 0, -, -, DEPTH.**
Press = to toggle between OFF, LPA or POS modes.
Ram axis off - should read OFF.
Ram axis on - should read POS.
Lowest Position Attained - should read LPA.

☐ **Check ram axis code.**

Move slide switch to **CODE.**
Press **RAM HGT** button.
Last digit on right should be a 1 - 8 (usually 1).
Second digit from right must be "0".
To change, press **RAM HGT** until correct digit blinks.
Press **C** to clear.
Enter correct number.
Move slide switch to **RUN** and re-calibrate all axes.

☐ **Check ram scale factor.**

Move slide switch to **CODE.**
Press **DEPTH** button.
Scale factor should read -9 001.023.
To change, press **C.**
Enter correct number.
Move slide switch to **RUN** and re-calibrate all axes.

☐ **Check Auto Advance Mode-** The backgauge will advance in the automatic mode two different ways: Internal or External.

**Internal -** When ram axis is turned on, the backgauge advance should take place on the upstroke of the ram at the flat metal calibrate point. When ram axis is off the advance should take place at the top of stroke when the Automec top of stroke relay is energized or the Automec external ram switch is contacted.
**External -** The backgauge will advance at top of stroke when the Automec top of stroke relay is energized or the Automec external ram switch is contacted, REGARDLESS of whether the ram axis is on or off.

TO CHANGE FROM INTERNAL ADVANCE TO EXTERNAL ADVANCE (or vice versa ) - Move slide switch to **CODE** position. Press **FLANGE** button until 3rd digit from right is flashing. Press **C** to erase. For external advance Press **1**. For internal advance press **3**. Then check polarity by cycling the ram with the ram axis turned off. If backgauge moves at the wrong time change the polarity of the ram switch as follows: If you used **1** for external advance, change it to **0**. If you used **3** for internal advance, change it to **2**.

## FOR CATEGORY 2 OR 5 SERVO RAM AXIS SYSTEMS

☐ **Check to see which mode ram axis is in.**

Press **BEND**, **0**, **-**, **-**, **DEPTH**.
Press **=** to toggle between OFF and POS modes.
Ram axis off - should read OFF.
Ram axis on - should read POS.

☐ **Check ram axis code.**

Same procedure as described in Category 1 linear scale section except last digit on right must be "0".
Second digit from right must be "1" - "9".

☐ **Check ram scale factor.**

Same procedure as described in Category 1 linear scale section except scale factor will be factory set to each pressbrake. (See packing list for correct scale factor for your system.)

Accurpress:

1. Make sure you follow Automec 1-page calibration procedure for Accurpress RC-1 control if brake is so equipped.

2. On some Accurpresses the ram can be slowed on the upstroke approximately ¼" to ½" before the top of stroke to dampen the shock.
To enable this feature:
Move the slide switch to **CODE** . Press **RAM HGT** until 3rd digit from right blinks. Press **C** to clear. Enter digit 1 - 9 (1 means ram will slow .100" from top). Move slide switch back to **RUN** .

## Hydrapower:

Automec supplies a micro switch which should be permanently mounted at the maximum top of stroke position. Under certain conditions the ram will ascend past the Hydrapower top of stroke switch so this Automec switch serves as a back up.

## Cinn:

Automec supplies a micro switch to provide an automatic advance of the backgauge if ram axis is turned off. When the ram axis is turned on the advance of the backgauge can come from either the linear scale or the external micro switch (see Auto Advance mode page 3).

## Niagara:

Some Niagaras are provided with a function called "Anti-whip" or "Anti-backbend" which is an extra slow speed which activates about ¼" above the bottom of bend to insure ram repeatability. The Automec CNC 1000 uses only one slow speed relay so that relay must be used to activate the Anti whip. The other slow down (approach), which takes place before starting the bend, must be set manually using the pressbrake limit switch. ***FOR CNC 99*** - The ***CNC 99*** is equipped with two slow speed relays so one is wired to the Anti-whip and one is wired to the approach slow down. The approach slowdown is programmed in the RAM HGT button at BEND 00 of each program. The Anti-whip is set by sliding the mode switch to **CODE**. Press **HGT** button until last digit on the right blinks. Press **C** to clear digit. Enter proper digit 1 - 9 (2 means Anti-whip will engage .200" above bottom of stroke).

## Pacific:

Some Pacifics are equipped with the "Anti-whip" function (see Niagara).

# SYSTEM DESCRIPTION

The *CNC 99* is a one or two axis backgauge system for pressbrakes consisting of a programmable control, a motorized mechanical backgauge, a ram mounted auto advance switch, interconnecting cable, and mounting hardware. *CNC 99* is available in 3 mechanical sizes depending on the size of the pressbrake. The *CNC 99/A*, with a 3′ gauge bar, is a single drive for brakes up to 4′ between the sideframes. The *CNC 99/B* is a dual drive (3′ wide) with a 7′ gauge bar for brakes up to 9′ between the sideframes. The *CNC 99/HD* is a heavy duty dual drive (6′ wide) with an 11′ gauge bar for pressbrakes up to 14′. Gauge bars can be trimmed to size as required at installation.

The control can store 99 jobs with up to 30 bends each. Bends can be preformed one dimension at a time using the manual mode or sequentially in the automatic mode as the backgauge repositions after each ram cycle.

A retract/delay can be programmed between sequential bends to allow the operator time to reposition the workpiece. A positive or negative offset (or bend allowance) can be programmed for each job to apply to all bends within that job.

Systems are set up 3 different ways:

1. **Single Axis** - X-axis backgauge only (page 13).

2. **Two Axis Cat 1** - X-axis backgauge with Y-axis control for pressbrakes using a linear scale to control the ram axis (page 20).

3. **Two Axis Cat 2/5** - X-axis backgauge with Y-axis ram control for pressbrakes using a DC servo motor to control the ram axis (page 25).

**FOLLOW THE OPERATION PROCEDURE FOR YOUR PARTICULAR SYSTEM ONLY.**

# DISPLAY FUNCTIONS

1. **JOB** — Jobs 00 to 99 can be stored in memory for recall at a later time. Battery back-up will hold jobs for 30 days in the event of power outage.

2. **BEND** — Bends 01 to 30 can be stored for each job.

3. **RET** — A retract/delay of up to 9 seconds can be programmed between bends to allow for repositioning of the workpiece.

4. **FLANGE** — Flange dimension from centerline of die to 24.000" can be programmed.

5. **+**
6. **-**
7. **=** — Calculator keys are used to add to or subtract from a dimension. They are also used to advance through bends when programming in the data mode.

8. **STOP** — Emergency stop stops all axes from running, but leaves system calibrated. Press any key on top row to leave stop mode.

9. **CLEAR** — Clears a parameter or a complete job depending on which function is illuminated.

10. **INCH/MM** — Converts inches to millimeters and millimeters to inches. The decimal point lines up with the "INCH" or "MM" nomenclature on the front panel.

11. **RAM DEPTH** — Ram depth dimensions from calibration point to 4.000" can be programmed (2 axis systems only).

12. **RAM HGT** — Ram height dimension can be programmed from calibration point to 19.9" (2 axis systems only).

FIG. 5S

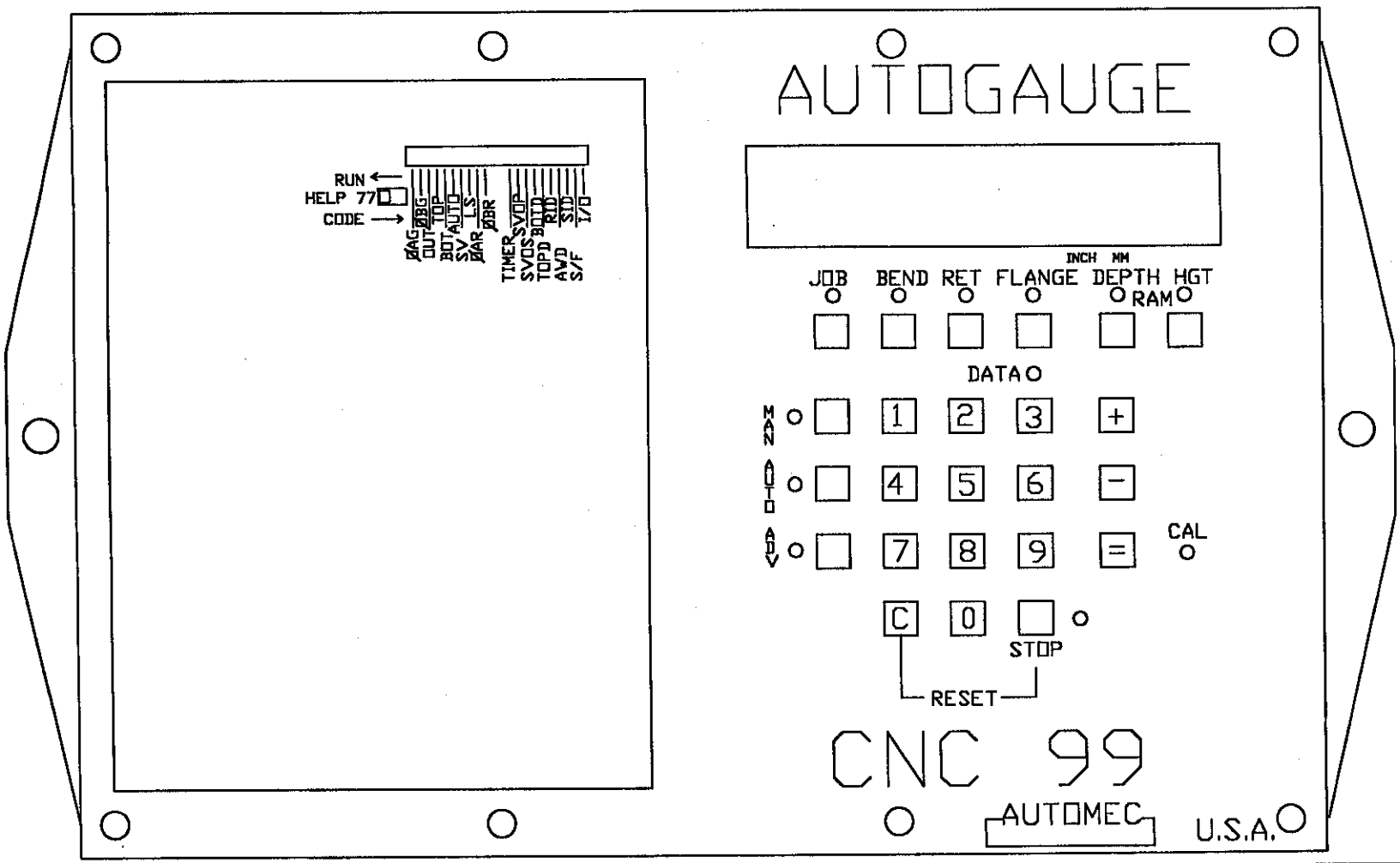
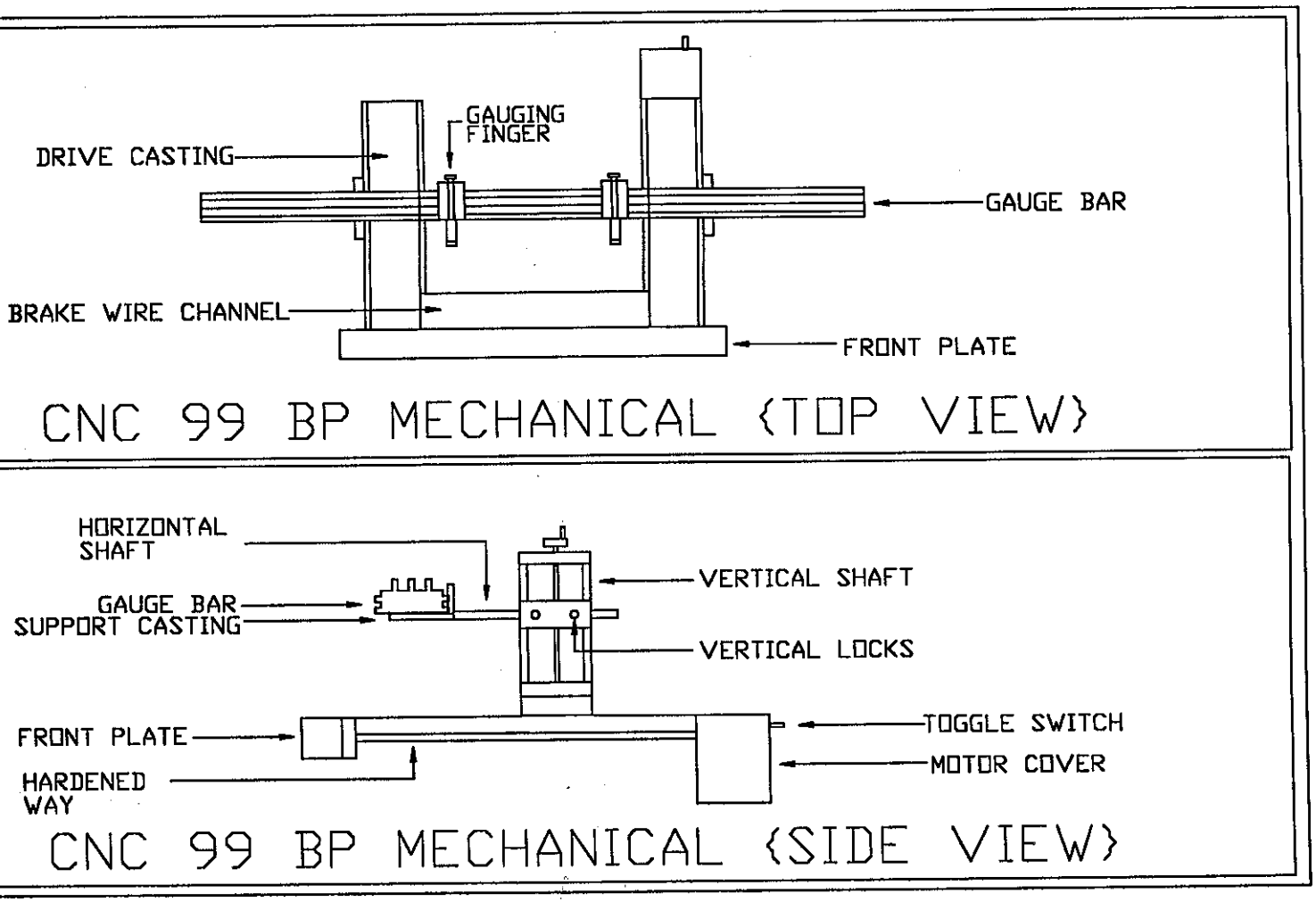

RUN
HELP 77
CODE
ØAG
OUT
ØBG
TOP
BOT
AUTO
SV
LS
ØAR
ØBR
TIMER
SVOS
SVDP
TOPD
BOTD
RTD
AWD
STD
S/F
T/D
AUTOGAUGE
INCH MM
JOB
BEND
RET
FLANGE
DEPTH
HGT
RAM
DATA
MAN
AUTO
ADV
1
2
3
+
4
5
6
−
7
8
9
=
CAL
C
0
STOP
RESET
CNC 99
AUTOMEC
U.S.A.

FIG.V


DRIVE CASTING
GAUGING FINGER
GAUGE BAR
BRAKE WIRE CHANNEL
FRONT PLATE
CNC 99 BP MECHANICAL (TOP VIEW)
HORIZONTAL SHAFT
GAUGE BAR SUPPORT CASTING
VERTICAL SHAFT
VERTICAL LOCKS
FRONT PLATE
TOGGLE SWITCH
MOTOR COVER
HARDENED WAY
CNC 99 BP MECHANICAL (SIDE VIEW)

# CALIBRATION PROCEDURE

TO CALIBRATE BACKGAUGE:

1. PRESS [FLANGE], [BEND], [0], [-]
   [-1 02.000] APPEARS IN THE DISPLAY
2. PRESS [MAN], [ADV] AND GAUGE MOVES TO 2.000"

TO SELECT RAM AXIS MODE: (WHERE APPLICABLE)

1. PRESS [BEND], [0], [-], [-], [DEPTH]
2. PRESS [=] TO TOGGLE BETWEEN OFF, POS OR LPA MODES

TO CALIBRATE RAM:

1. PRESS [DEPTH], [BEND], [0], [-]
2. PRESS [MAN] THEN POSITION PRESSBRAKE RAM TO CALIBRATION POSITION
3. PRESS [ADV]
   [-1 -00.000] APPEARS IN THE DISPLAY

TO RESET:

PRESS [C] AND [STOP] SIMULTANEOUSLY

RESET CANCELS ALL CALIBRATION

Fig. U

# OPERATING MODES

There are 3 operating modes; Data Entry, Manual, and Automatic.

**Data Entry** - Signified by a yellow L.E.D. illuminated in the top row of the display. This mode is used for entering data, changing data, or viewing the memory of the control. The backgauge will not move in this mode.

**Manual** - Signified by a green L.E.D. illuminated next to the MAN key. This mode is used for advancing the backgauge to single position. MANUAL can be used for single bend jobs or during set-up when trial bends are desired without backgauge movement on each ram cycle. The backgauge will only move when the ADV key is pressed.

**AUTO (Automatic)** - Signified by a green L.E.D. illuminated next to the AUTO key. This mode is used for multiple bend sequences when a backgauge movement is desired after each ram cycle.

# RAM AXIS MODES

Some systems are set up as a single X-axis backgauge so it is not necessary to turn the ram axis off. However, if the system is set up as a 2-axis (X - Y), the ram axis must be turned off in order to run as a single axis.

The OFF mode for the ram axis shuts off the ram axis. This may be used if the operator wants to use the manual depth stops of the pressbrake without using the Automec ram axis. The operator may also want to use this mode if the Automec ram axis fails and he still wants to run as a single axis rather than being completely down. For the most part, this mode is primarily used for diagnostic reasons.

**TO PROGRAM OFF MODE:**

1. Press **BEND** .
2. Press **0** .
3. Press **-** .
4. Press **-** .
5. Press **DEPTH** .
6. Press **=** until -2 _____ OFF appears in the display window. The depth mode is now turned off and you now have single axis operation only.

If system should lose ram axis due to memory loss or component failure, the following procedure will reactivate ram axis.

**TO REACTIVATE RAM DEPTH AXIS:**

1. Move the indented switch under the magnetic card to the code position.

2. Press **HGT** . The second right hand digit should not be "0". If the second right hand digit is "0" follow steps 3, 4 and 5.

3. Continue to press **HGT** until the second right hand digit is flashing.

4. Press **C** .

5. Press **1** . Ram axis should now be operational.

# CALIBRATION OF BACKGAUGE

1. Make sure toggle switch at rear of backgauge is in "ON" position. 110 VAC powers the machine.

2. Loosen (4) locking bolts on horizontal slider rods (see **Fig. F**) and push gauge bar as close as possible to the vertical height assembly.

3. Establish which gauging surface will be used (workblocks or gauging finger) and affix to the gauge bar. Spread gauging surfaces as far apart as possible for the die width being used. When using adjustable gauge fingers, be sure both fingers are adjusted to the same length.

4. Carefully clamp the reference bars in the die at locations opposite the 2 gauging surfaces. The 2.000 stamped on the reference bars should be closest to the gauge bar. **NOTE:** With mechanical pressbrakes, it is best to bring ram to bottom of stroke and shut brake off. Then clamp the reference bars by adjusting the pitman screws connected to the ram.

5. Loosen the vertical lock adjustments and adjust gauge bar height to match height of reference bars.

6. Press **BEND** then press **0** .

   Press **-** until -1 2.000 appears in display.

   Press **MAN** then **ADV** . Gauge will go to 2.000".

7. Push gauging surfaces against reference bar and lock horizontal and vertical lock bolts.

8. Remove reference bars.

# SINGLE AXIS OPERATION PROCEDURE

(Job numbers 00 - 99 are available to store programs.)

1. Press **JOB** and enter selected JOB # (00 - 99).

2. Press **C** then **=** . This will clear the job presently in memory at that job location.

3. Press **BEND, 1, FLANGE** and enter first bend dimension up to 24.000 inches. Digits will register from right to left and decimal point will be placed automatically. Pressing **C** when the flange L.E.D. indicator is lit will clear out only the flange leaving the rest of the memory intact.

4. Press **BEND, 2, FLANGE** and enter 2nd BEND dimension.

5. Repeat step 4 etc. for additional bends.

6. Up to 30 bends can be programmed for each job. The job is automatically stored in memory and will remain there until erased. Memory will hold data for 30 days using battery back-up.

# PROGRAMMING OFFSETS (Bend Allowance)

An offset (or bend allowance) can be programmed for any job with one entry. The offset up to +/- .999" will be added to or subtracted from all bends in the job.

**TO PROGRAM:**

1. Press **JOB** and enter the JOB # (00 - 99) where you want the offset.

2. Press **BEND**, **0**, and **FLANGE** . Then press **+** or **-** and enter the desired offset.

3. Press **BEND**, **1**, **MAN** or **AUTO** and **ADV** . Backgauge will move to programmed dimension plus or minus the amount of offset. The resulting value will be displayed in the flange window when in the Manual or Automatic mode.

# TO PROGRAM A RETRACT

A retract with delay can be programmed between bends allowing the operator time to reposition the workpiece. The backgauge will retract towards the rear travel of 24", dwell the required time, and then automatically move to the next dimension programmed. The delay will occur before positioning at the dimension programmed for a particular bend stop. For example, if BEND 1 was 8.000" and BEND 2 was 1.000", the retract programmed at Bend 2 would occur after the 8.000" dimension and before the 1.000" dimension. If a short retract of 1 or 2 seconds is programmed, the backgauge will not reach the 24" limit and will reverse somewhere short of 24".

**TO PROGRAM:**

1. Press **BEND** and enter the BEND # (01 - 30) you want the delay to occur before.

2. Press **RET** and enter delay time of 1 to 9 seconds. "SEC" will be displayed after your choice as a reminder that you are entering retract data.

# TO CHANGE A BEND DIMENSION

Dimensions can be changed either by clearing the complete dimension and re-programming or changing incrementally.

**TO CLEAR AND RE-PROGRAM:**

1. Press **BEND** and enter the BEND # (01 - 30) you want to change.
2. Press **FLANGE**, **C**, and enter the new dimension.
3. Press **MAN** or **AUTO** then **ADV** . Gauge will go to new dimension.

**TO CHANGE INCREMENTALLY:**

1. Press **BEND** and enter the BEND # (01 - 30) you want to change.
2. Press **FLANGE** . Press **+** or **-** and enter the incremental change. Press **=** .
3. Press **MAN** or **AUTO** then **ADV** . Gauge will go to new dimension.

**NOTE:** The **+** and **-** keys can also be used to index up or down through JOB numbers or BEND numbers. Pressing **JOB** or **BEND** followed by **+** or **-** will sequence the display up or down.

# INCH/MM CONVERSION

1. Press **BEND**, **0**, and **-** until -2 appears in the display window.

2. Pressing **=** will cause decimal point to move to the In or MM designator.

# TO RECALL AND RUN A JOB

Programmed jobs can be recalled from memory and run in either the Manual or Automatic modes.

1. Press **JOB** and enter selected JOB # (00 - 99).
2. Proceed to Manual or Automatic modes.

**MANUAL MODE:**

1. Press **BEND** and enter the starting BEND # (01 - 30).
2. Press **MAN** .
3. Press **ADV** to sequence through bends. Gauge will advance to each bend position in sequence.

**AUTOMATIC MODE:**

1. Press **BEND** and enter the starting BEND # (01 - 30).
2. Press **AUTO** and **ADV** . Gauge will advance to starting bend and will then automatically advance to the next bend after each ram cycle.

**NOTE:** Gauge will not advance if a zero dimension is programmed.

# PROGRAMMING EXAMPLE (Single Axis)

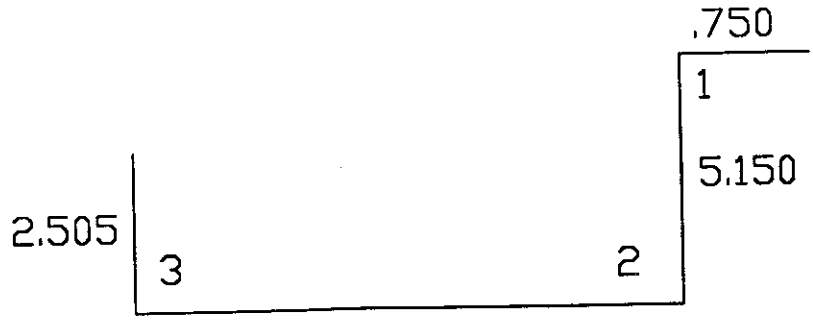



FIG. 40

Assume outside dimensions, 16GA Aluminum and bend allowance of .045" from chart.

1. Press **JOB, 1, C,** and **=** to clear out previous JOB # 1 from memory.

2. Press **BEND, FLANGE, 7, 5, 0 .**

3. Press **BEND, 2, FLANGE, 5, 1, 5, 0 .**

4. Press **BEND, 3, FLANGE, 2, 5, 0, 5 .**

5. Press **BEND, 0, FLANGE, -, 4, 5 .**

6. Press **BEND, 1, AUTO, ADV .**

# *CNC 99* CATEGORY 1 RAM AXIS OPERATION PROCEDURE

Indented switch under the magnetic card should be in the run position unless otherwise advised.

**TO TURN ON DEPTH MODE (Ram Axis):**

1. Press **BEND** .
2. Press **0** .
3. Press **-** .
4. Press **-** .
5. Press **DEPTH** .
6. Press **=** until -2 _____ POS (position) appears in the display window. The depth mode (ram axis) is now operational.

**CALIBRATION OF RAM AXIS:** (ALWAYS SET PRESSBRAKE BOTTOM LIMIT SWITCH WITH PUNCH AND DIE IN PLACE BEFORE OPERATING SYSTEM. SET SWITCH TO ALLOW FOR THE DEEPEST BEND BUT NOT DEEP ENOUGH TO ALLOW A PUNCH/DIE COLLISION. BE SURE TO ALLOW FOR MATERIAL THICKNESS.)

1. Press **BEND** .
2. Press **0** .
3. Press **-** , at this point -1 should appear in the left hand side of the display window.
4. Press **DEPTH** .
5. Press **MAN** .
6. Place a piece of material to be bend across the female die and jog the ram to move the male punch to just touch the material.

This will be your calibration point.

7. Press **ADVANCE** . The display window will now have a position of 00.000 and the ram will be calibrated. The CAL light should now be illuminated.

**TO PROGRAM RAM DEPTH:**

1. Press **JOB** then enter JOB # (00 - 99).
2. Press **BEND** then enter BEND #(01 - 30).
3. Press **DEPTH** .
4. Press **DEPTH** then enter dimension up to 4.000".
5. Repeat this procedure for each active BEND # within the program.

**TO PROGRAM TOP OF STROKE FOR RAM:**

1. Press **JOB** then enter JOB # (00 - 99).
2. Press **BEND** then enter BEND # (01 - 30).
3. Press **HGT** then enter number up to 19.9".
4. Repeat this procedure for each active BEND # within the program.

**TO PROGRAM SLOW SPEED FOR DEPTH MODE (Ram Axis):**

1. Press **JOB** then enter JOB # (00 - 99).
2. Press **BEND** .
3. Press **0** .
4. Press **HGT** .
5. Enter desired slow speed dimension up to 1.9".

**TO PROGRAM RAM OFFSET:**

1. Press **BEND** .
2. Press **0** .
3. Press **DEPTH** .
4. Press **+** or **-** .
5. Enter desired offset up to .099".

**TO PRESET ANTI WHIP FEATURE:**

1. Move the indented switch under the magnetic card to the CODE position.
2. Press **HGT** until the digit on the far right is flashing.
3. Press **C**.
4. Enter desired anti whip of .001 to .008. This is done by pressing any number 1 - 8. Pressing 9 turns the anti whip off.
5. When you have finished programming the anti whip, be sure to move the indented switch under the magnetic card back to the run mode.

# *CNC 99* CATEGORY 1 2-AXIS PROGRAMMING EXAMPLE

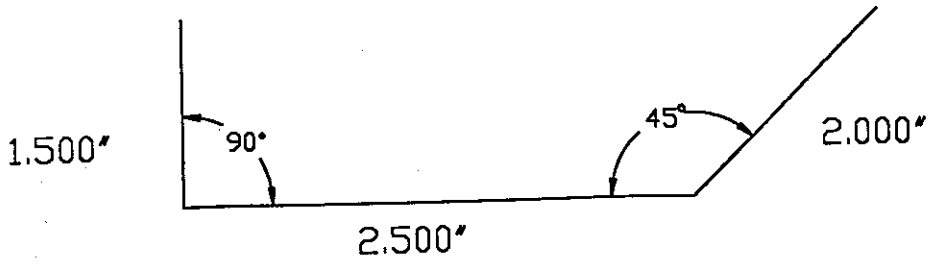



FIG. 44

For this example:

The depth for a 45° angle = .060".

The depth for a 90° angle = .120".

The ram depth height (top of stroke) will be 3.0" above calibration point.

The slow speed will be set at .3" above calibration point.

1. Calibrate backgauge (see page 11).
2. Set pressbrake bottom limit switch with punch and die in place before operating system. Set switch to allow for the deepest bend but not deep enough to allow a punch/die collision. Be sure to allow for material thickness.
3. Calibrate ram depth axis.
4. Press **JOB, 1, C, =** . This will clear out any previous job #1 from memory.
5. Press **JOB, 1** (this indicates JOB #).
6. Press **BEND, 1** (this indicates the 1st BEND #).
7. Press **FLANGE, 1, 5, 0, 0** (this sets the 1st FLANGE dimension).

8. Press **DEPTH, 1, 2, 0** (this sets the 1st ram DEPTH dimension).
9. Press **HGT, 3, 0** (this sets the TOP OF STROKE for the ram for BEND #1).
10. Press **BEND, 2** (this identifies the 2nd BEND #).
11. Press **FLANGE, 2, 0, 0, 0** (this sets the 2nd FLANGE dimension).
12. Press **DEPTH, 6, 0** (this sets the 2nd ram DEPTH dimension).
13. Press **HGT, 3, 0** (this sets the TOP OF STROKE for the ram for BEND #2).
14. Press **BEND, 0, HGT, 3** (this sets the SLOW SPEED for the ram).
15. Press **BEND, 1, FLANGE, AUTO, ADV** (this initiates the AUTOMATIC OPERATING MODE and advances the gauge to the first programmed position). Each time the ram is cycled in this Automatic mode the gauge will automatically advance to the next programmed position.

# *CNC 99* CATEGORY 2/5 RAM AXIS OPERATING PROCEDURE

Indented switch under the magnetic card should be in the RUN position unless otherwise advised.

**PROGRAM AND CALIBRATE BACKGAUGE AS PER PAGES 11 and 12.**

**TO TURN ON DEPTH MODE (Ram Axis):**

1. Press **BEND** .
2. Press **0** .
3. Press **-** .
4. Press **-** .
5. Press **DEPTH** .
6. Press **=** until -2 _____ POS (position) appears in the display window. The depth mode (ram axis) is now operational.

**CALIBRATION OF RAM AXIS:**

1. Press **BEND** .
2. Press **0** .
3. Press **-** . At this point -1 should appear in the left hand side of the display window.
4. Press **DEPTH** .
5. Press **MAN** .
6. Place a piece of material to be bent across the female die and jog the ram to move the male punch to just touch the material. This will be your calibration point. To jog the ram into position, press the **+** or **-** pushbutton depending which way you

want to jog the ram. To jog the ram at a faster speed, press + or - along with the = pushbutton to get the rough position and then use the + or - pushbuttons by themselves for fine positioning.

7. Press **ADVANCE** . The display window will now have a position of 00.000 and the ram will be calibrated. The CAL will stay illuminated until you transfer to the run or data mode.

**TO CALIBRATE RAM AXIS MANUALLY:**

1. Press **STOP** and **CLEAR** simultaneously to RESET.
2. Press **BEND** .
3. Press **0** .
4. Press **DEPTH** .
5. Press **MAN** .

   Position ram by turning handwheel (where available) and when you get to the correct calibrate position, press **ADVANCE** . You are now calibrated and ready to enter your DEPTH dimensions.

**TO PROGRAM RAM DEPTH:**

1. Press **JOB** and enter JOB # (00 - 99).
2. Press **BEND** and enter BEND # (01 - 30).
3. Press **DEPTH** .
4. Press desired DEPTH dimension up to 4.000".
5. Repeat steps 2-4 for each active BEND number within the program.

**RE-CALIBRATION:**

Once the system has been calibrated and advanced to the first bend, the system may be manually re-calibrated at the station as follows. While the motor is in position at a bend, pressing **CLEAR** will free up the motor and the ADVANCE LED will flash indicating that there is no control over the servo motor.

The servo system and ram may now be re-adjusted to a new calibration point. Once a new calibration point has been established, press = to re-calibrate the servo.

Push **ADVANCE** to reposition at the bend.

# PROGRAMMING RAM OFFSETS

An offset can be programmed for any job with one entry. The offset up to +/- .99" will be added or subtracted from all depths in the job.

**TO PROGRAM:**

1. Press **JOB** and enter the JOB # (00 to 99) where you want the offset.
2. Press **BEND**, **0**, and **DEPTH** . Then press **+** or **-** and enter the desired offset up to .099".
3. Press **BEND**, **1**, **MAN**, or **AUTO ADV** . The ram will move to the programmed dimension plus or minus the amount of offset. The resulting depth value will be displayed in the flange window when in the Manual or Automatic mode.

# *CNC 99* CATEGORY 2/5 2-AXIS PROGRAMMING EXAMPLE

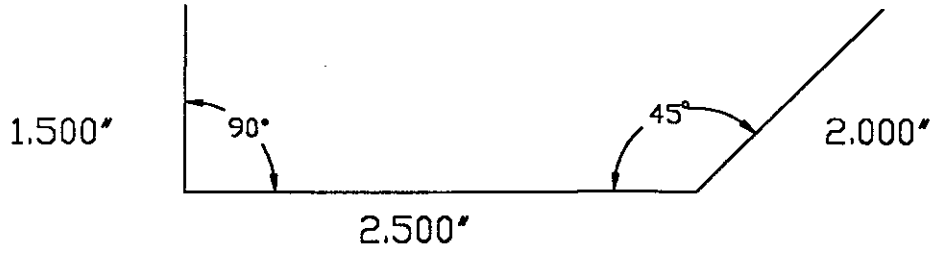



FIG. 44

For this example:

The depth for a 45° angle = .060".

The depth for a 90° angle = .120".

1. Calibrate backgauge (see page 11).
2. Calibrate ram depth axis.
3. Press **JOB, 1, C, =** . This will clear out any previous JOB #1 from memory.
4. Press **JOB, 1** (this identifies JOB #).
5. Press **BEND, 1** (this identifies the 1st BEND #).
6. Press **FLANGE, 1, 5, 0, 0** (this sets the 1st FLANGE dimension).
7. Press **DEPTH, 1, 2, 0** (this sets the 1st ram DEPTH dimension).
8. Press **BEND, 2** (this identifies the 2nd BEND #).
9. Press **FLANGE, 2, 0, 0, 0** (this sets the 2nd FLANGE dimension).
10. Press **DEPTH, 6, 0** (this sets the 2nd ram DEPTH dimension).
11. Press **BEND, 1, FLANGE, AUTO, ADV** (this initiates the AUTOMATIC OPERATING MODE and advances the gauge to the first programmed position). Each time the ram is cycled in this Automatic mode the gauge will automatically advance to the next programmed position.

# HELP & FAILURE CODES

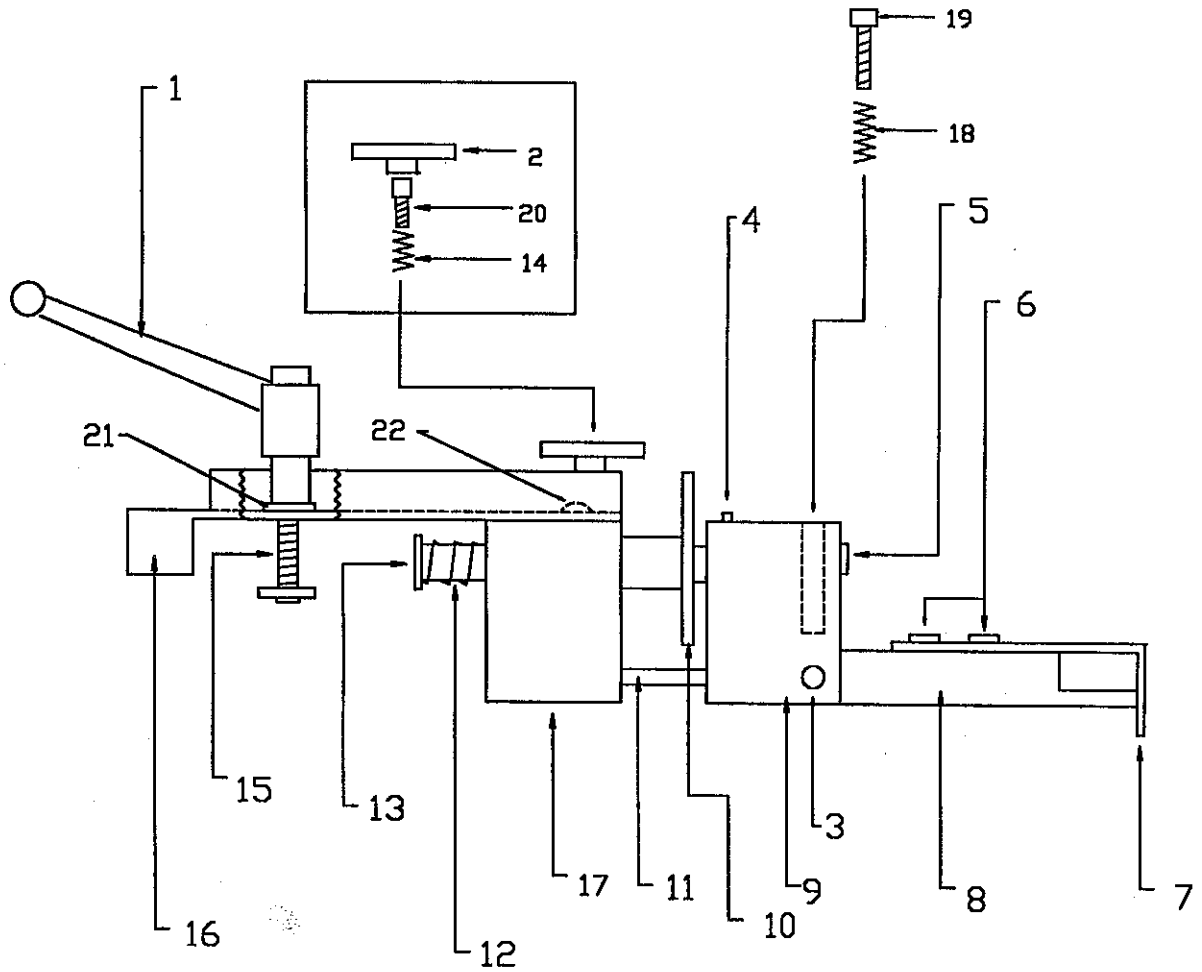
| | |
|---|---|
| FAIL 00 | **BACKGAUGE** TIMED OUT |
| FAIL 10 | **R/C TIMER** TIMED OUT |
| FAIL 18 | **SERVO** TIMED OUT |
| FAIL 20 | **0** KEY STUCK |
| FAIL 21 | **1** KEY STUCK |
| FAIL 22 | **2** KEY STUCK |
| FAIL 23 | **3** KEY STUCK |
| FAIL 24 | **4** KEY STUCK |
| FAIL 25 | **5** KEY SUCK |
| FAIL 26 | **6** KEY STUCK |
| FAIL 27 | **7** KEY STUCK |
| FAIL 28 | **8** KEY STUCK |
| FAIL 29 | **9** KEY STUCK |
| FAIL 30 | **=** KEY STUCK |
| FAIL 31 | **CLEAR** KEY STUCK |
| FAIL 32 | **+** KEY STUCK |
| FAIL 33 | **-** KEY STUCK |
| FAIL 34 | **MANUAL** KEY STUCK |
| FAIL 35 | **AUTO** KEY STUCK |
| FAIL 36 | **ADVANCE** KEY STUCK |
| FAIL 37 | **BEND** KEY STUCK |
| FAIL 38 | **FLANGE** KEY STUCK |
| FAIL 39 | **JOB** KEY STUCK |
| FAIL 40 | **STOP** KEY STUCK |
| FAIL 41 | **RET** KEY STUCK |
| FAIL 42 | **DEPTH** KEY STUCK |
| FAIL 43 | **HGT** KEY STUCK |
| FAIL 44 | **TWO OR MORE KEYS** STUCK IN THE SAME ROW |
| FAIL 65 | BOTH **TOP AND BOTTOM** SWITCHES ACTIVE |
| HELP 00 | BACKGAUGE ON INLIMIT SWITCH |
| HELP 01 | BACKGAUGE ON TOP SWITCH |
| HELP 21 | FLANGE IS MINUS |
| HELP 22 | FLANGE GREATER THAN 24.000" (36.000" 50.000") |
| HELP 23 | FLANGE MINUS OFFSET IS MINUS |
| HELP 24 | FLANGE OFFSET IS GREATER THAN .099" |
| HELP 25 | DEPTH OFFSET GREATER THAN .099" (2ND AXIS ONLY) |
| HELP 26 | RAM HEIGHT GREATER THAN 19.9" (2ND AXIS ONLY) |
| HELP 27 | RAM SLOW POINT GREATER THAN 1.9" (2ND AXIS ONLY) |
| HELP 28 | RET GREATER THAN 9 SEC |
| HELP 29 | DEPTH IS ABOVE CAL POINT (2ND AXIS ONLY) |
| HELP 30 | HGT IS BELOW CAL POINT (2ND AXIS ONLY) |
| HELP 31 | DEPTH IS BELOW 4" (2ND AXIS ONLY) |
| HELP 32 | DEPTH IS BELOW PROGRAMMED BOTTOM (2ND AXIS ONLY) |
| HELP 33 | FLANGE PLUS OFFSET IS GREATER THAN 24.00" |
| HELP 70 | ATTEMPTED TO ENABLE BOTH THE SERVO AND LINEAR SCALE |
| HELP 78 | NO ANGLE OR BACKGAUGE PROGRAMMED |
| HELP 79 | DIAGNOSTIC MODE ENABLED |

TO ENTER THE DIAGNOSTIC MODE PRESS **STOP** THEN PRESS AND HOLD **0** FIRST THEN **JOB** AND THEN RELEASE BOTH.

# AUTOGAUGE PARTS LIST

1. Casting Left 10020L
2. Casting Right 11002R
3. Front Plate SK1036/B
4. End Cap SK51585
5. Brake Wire Channel 11073/B
6. Hardened Way
7. Roll Pin 3116 X 2
8. Ball Screw 11026/E
9. Ball Nut R-605
10. Ball Nut Plate 11037/C
11. Ball Nut Block 47702/701
12. Brake Armature EC-17B-½
13. Brake Disc. EC-17B-½
14. Bearing Retainer 11044/A
15. Bearing 55501
16. THD Shaft Collar TCL-720-A
17. Coupling, Rigid 47706
18. Rear Plate 11004/E
19. Rear Plate Cover 11035/A
20. Carriage Plate 11078/A
21. Ball Bushing SPR 12OPN
22. Ball Bushing P.B. 11050/B
23. Extender 11076/C
24. Right Angle Drive CROWN 814
25. Connecting Rod 11011/G
    (Specify length or type)
26. Rod Support 11010/D
27. Coupling Flexible CHJP1
28. Motor Bodine 42D
29. Motor Bracket 11003/G
30. Motor Cover 11015/C
31. Cover Block 11019/B
32. Encoder LBL-017-200
33. Limit Switch BA 2R A2
34. Drive Belt 120XL37
35. Drive Sprocket 18XL037 X ½
36. Driven Sprocket 11030/B
37. Motor Drive Board G2404
38. Power Resistor
39. Circuit Breaker 112-205-101
45. Slow Speed Resistor VP25KA
46. Mount. Hardware 3/8-16 X 1½
47. Mount. Hardware X 3/4
48. Mount. Hardware Cont. Box
49. Mount. Hardware 5/8-11 X 3"
50. Work Block 11087/A
53. Reference Block 2" 11055/A
55. Ram Switch RSC
56. Ram Switch Rod SK 021185
58. Gauge Bar Support 11066/A
59. Slider Rod 11086/A
60. Tee Bolt (3/8-16) T3-3 X 1½
61. Gauge Bar S.E.
62. Hand Wheel 11059/B
63. Top Clamp 47718
64. Shaft 11071/B
65. Lead Screw 11072/B
66. Elevation Block 47720
67. Bottom Clamp 47719
68. Washer (2) 7/16 X 3/4 X 062

# FIG. AA

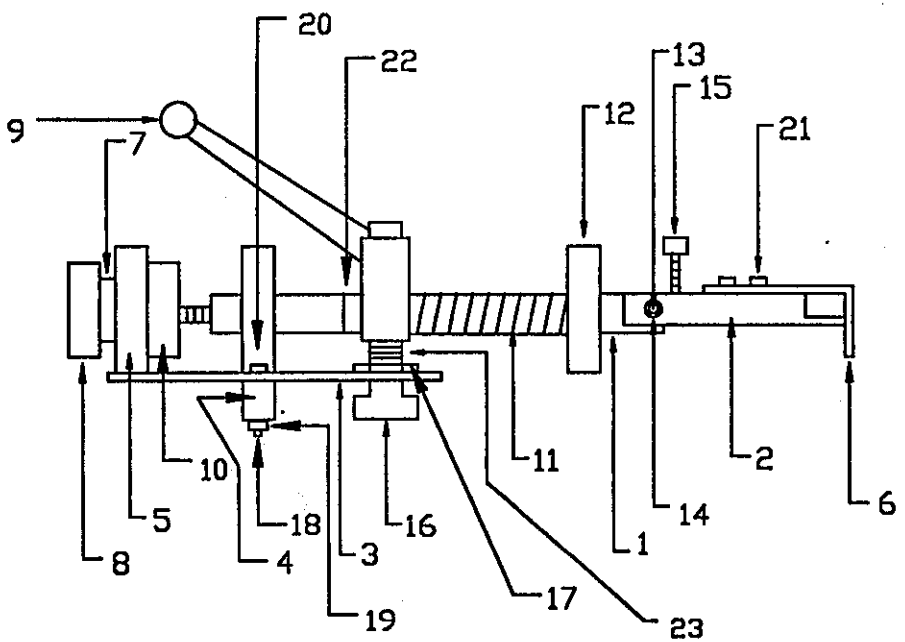



## GF-9 PARTS LIST

| ITEM # | PART # | DESCRIPTION |
|---|---|---|
| 1 | 28042 | RATCHET HANDLE |
| 2 | 99-724-7 | TEE KNOB |
| 3 | 1/4x1 1/2 | DOWEL PIN |
| 4 | 10-32x1/4 | SET SCREW |
| 5 | 1684 | HOLE PLUG |
| 6 | 1/4-20x3/8 | SCREW BHSH (2) |
| 7 | 47713 | TIP ADAPTER |
| 8 | 99071 | FLIP FINGER |
| 9 | 99075 | SLIDE BLOCK |
| 10 | 99074 | ADJ. DIAL |
| 11 | 1/4x1 3/4 | DOWEL PIN |
| 12 | 12015 | SPRING |
| 13 | 99073 | ADJ. SCREW |
| 14 | 07007 | SPRING |
| 15 | 99076 | TEE BOLT |
| 16 | 99070 | MTG. PLATE |
| 17 | 99072 | FIXED BLOCK |
| 18 | 06044 | SPRING |
| 19 | 10-32x1 1/4 | SCREW (SHCS) |
| 20 | 1/4-20x5/8 | SCREW (SHCS) |
| 21 | 3/8" WASHER | HEFTY |
| 22 | 1/4x20x1/2" | FLANGED BHSH (2) |

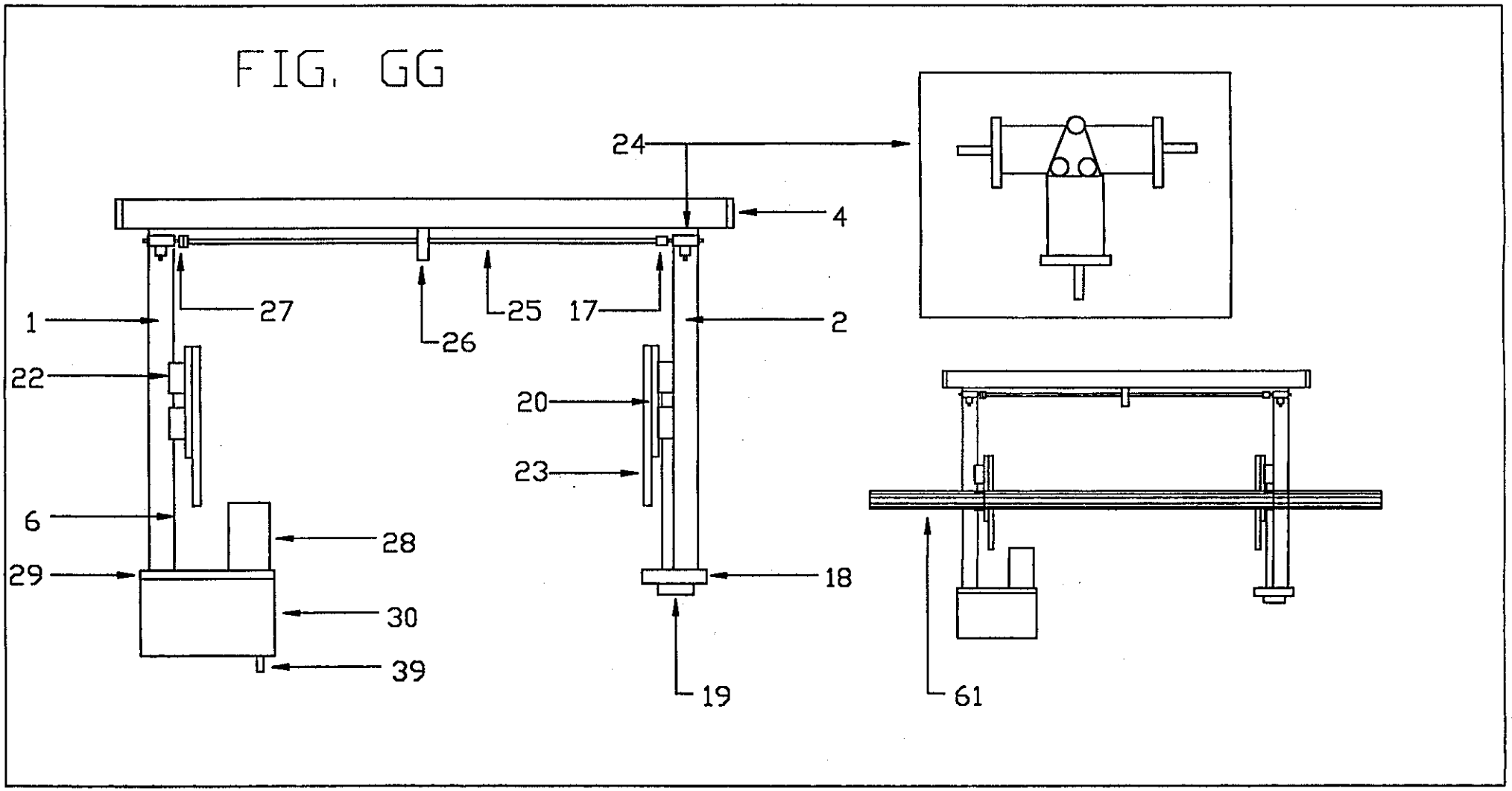
# FIG. BB

## GF-8 PARTS LIST



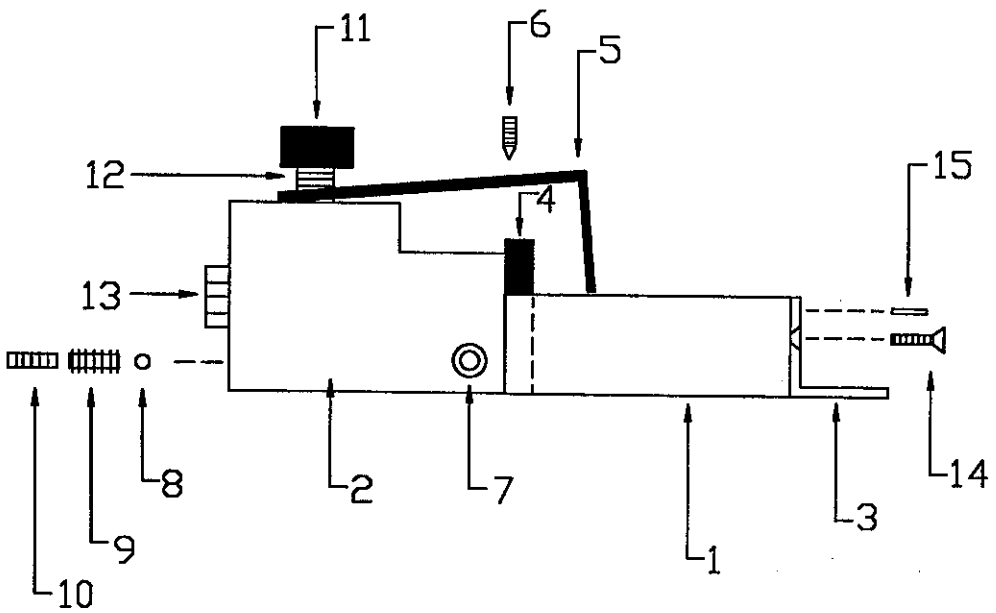

| GF-8 PARTS LIST | | |
|---|---|---|
| ITEM # | PART # | DESCRIPTION |
| 1 | 47704/A | FINGER ROD |
| 2 | 47703 | FLIP FINGER |
| 3 | 47821 | FINGER PLATE |
| 4 | 47822 | FINGER KEY 1/2x5/8x3 |
| 5 | 47705 | SHAFT COLLAR(MACHINED) |
| 6 | 47713 | TIP ADAPTER |
| 7 | 17W10625B | FLAT WASHER |
| 8 | CL-11-KHS | KNURLED HEAD SCREW |
| 9 | 28042 | RATCHET HANDLE |
| 10 | CL-1-KN | KNURLED NUTS |
| 11 | SC-3X1X094 | SPRING |
| 12 | SC-12-F | SHAFT COLLAR |
| 13 | .250x1 1/4 | SOCKET SET SCREW |
| 14 | 6100-25 | LOCK RING |
| 15 | 10-32 FINEX1 | CAP SCREW (PATCH) |
| 16 | 1/2-13 | TEE NUT |
| 17 | 1/2" SAE | WASHER FLAT |
| 18 | 1/4-20x1 1/4 | HALF DOG |
| 19 | 1/4-20 | HEX NUT |
| 20 | 1/4-20x5/8 | BUTTON HEAD CAP SCR. |
| 21 | 1/4-20x3/8 | BUTTON HEAD CAP SCR. |
| 22 | 2000-7S-ST | SNAP RING |
| 23 | 1/2-13x1 1/2 | SOCKET SET SCREW |

FIG. GG



# FIG. RR

## GF-1 PARTS LIST




| ITEM | DESCRIPTION | PART # |
|---|---|---|
| 1 | 3" FLIP FINGER | 11070/B |
| 2 | FINGER BLOCK | 11069/A |
| 3 | FINGER TIP | 11081/B |
| 4 | KNURLED NUT | CLOKN |
| 5 | VIBRATION DAMPER | 041084/A |
| 6 | ADJUST. SCREW | 11082/A |
| 7 | SHOULDER SCREW | 1/4x3/4 |
| 8 | BALL | .156 DIA. |
| 9 | SPRING | HP033 |
| 10 | SET SCREW | 10-32x3/16 |
| 11 | CAP SCREW(SOCKET) | 10-32x7/8 |
| 12 | SPRING | HP-185 |
| 13 | CAP SCREW(HEX) | 1/4-20x1 3/4 |
| 14 | CAP SCREW/FLT.HEAD | 6-32x1/4 |
| 15 | ROLL PIN | 3/32x1/4 |

FIG. HH

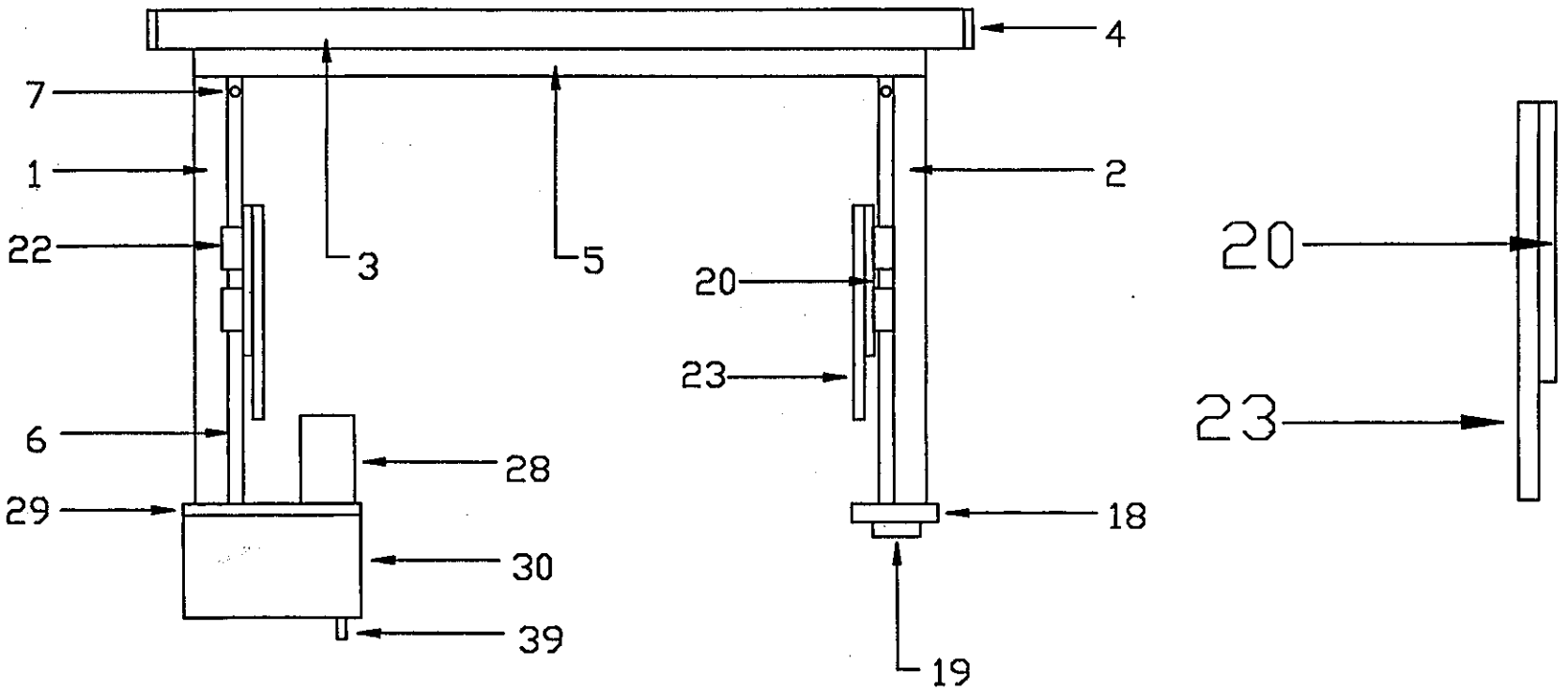
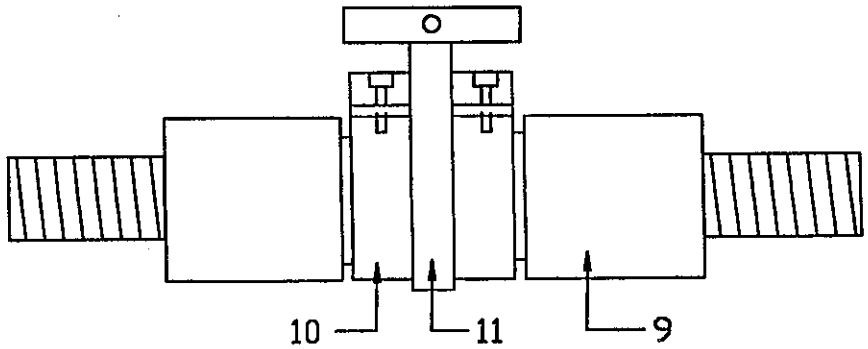


FIG. II

BALL NUT ASSEMBLY




BRAKE ASSEMBLY

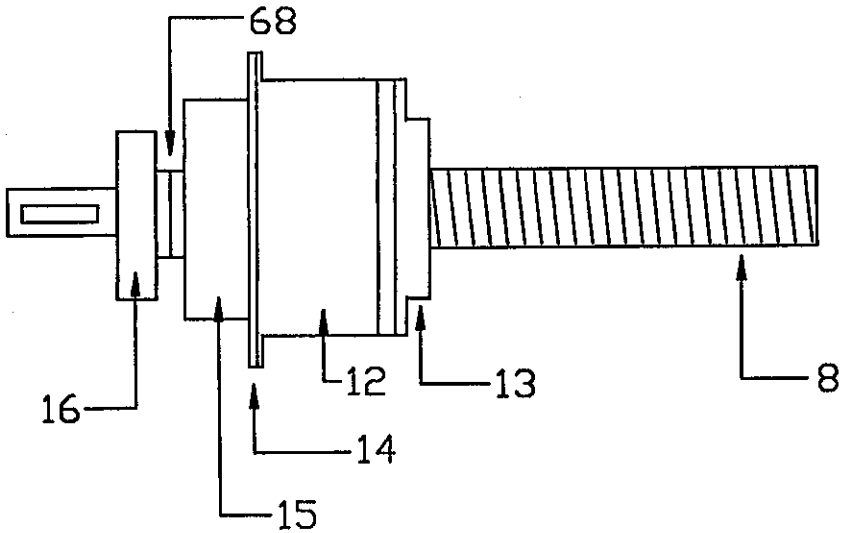


FIG. JJ

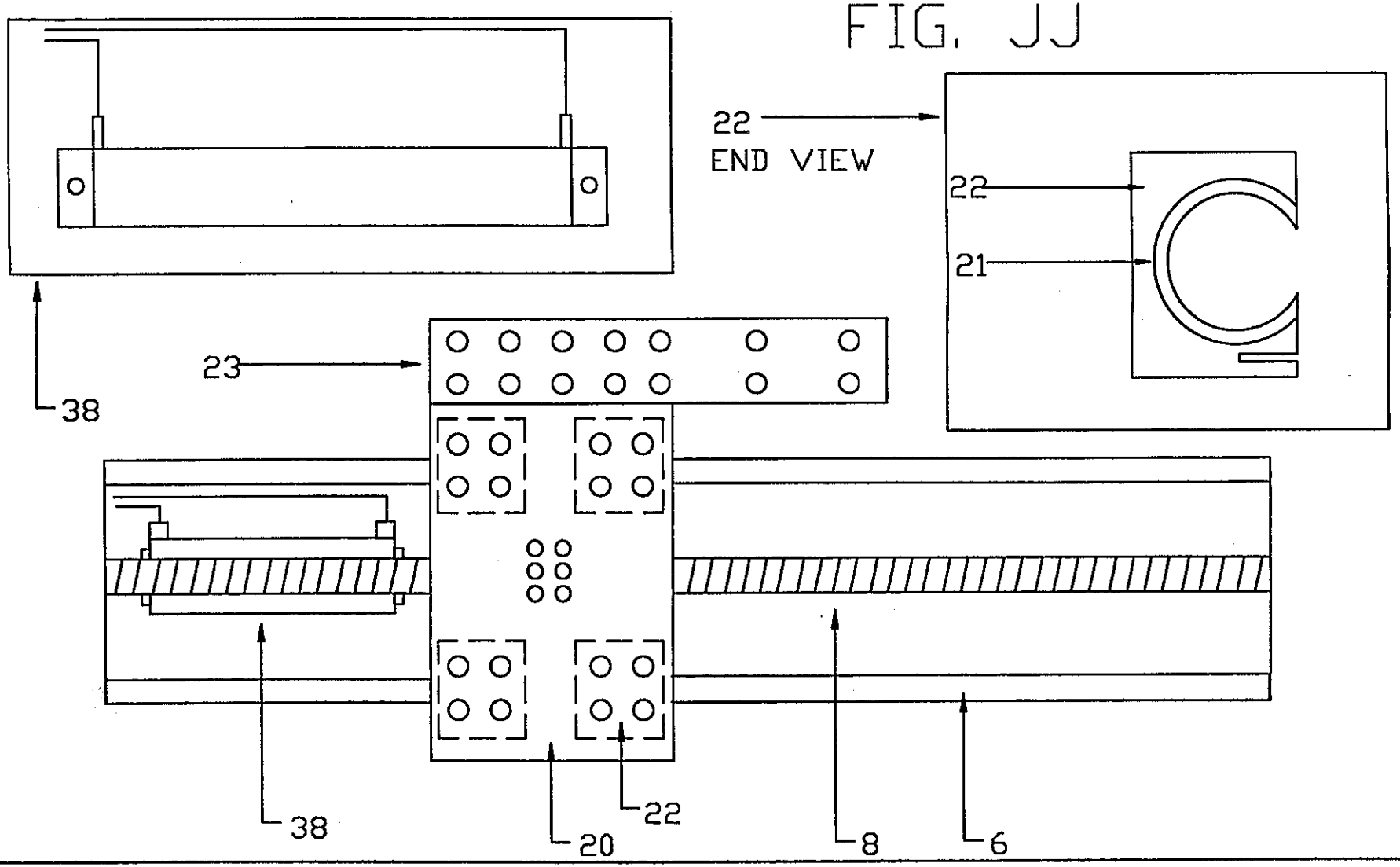
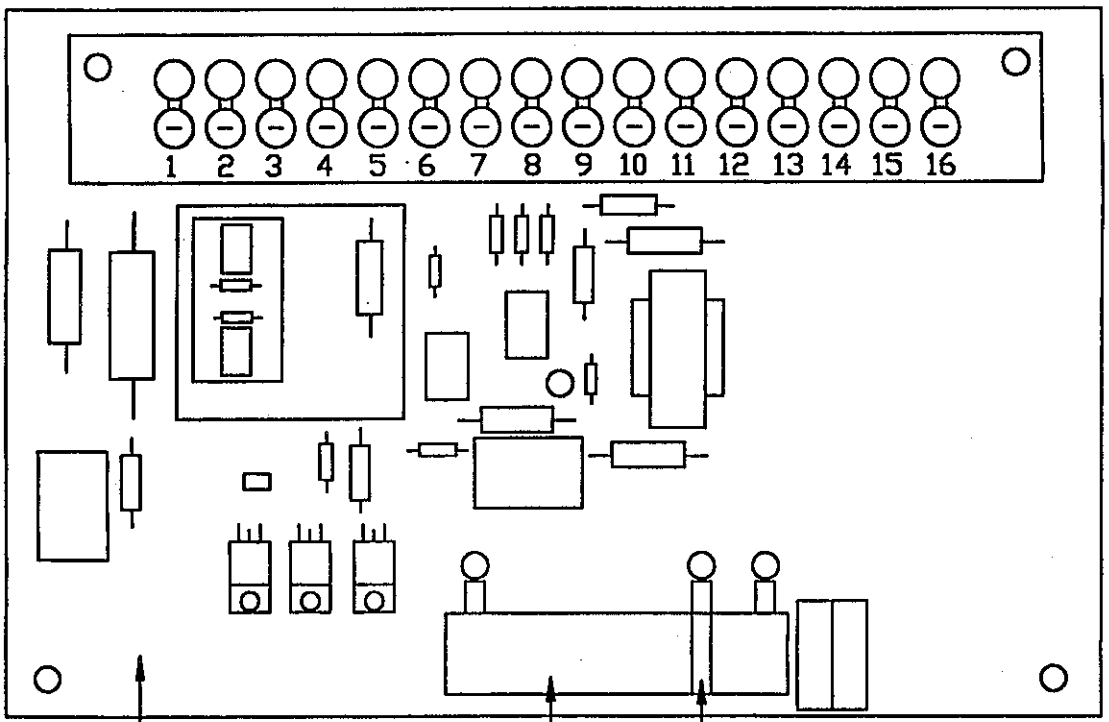


FIG. KK

G2404 MOTOR DRIVE BOARD




CIRCUIT BREAKER 112-205-101

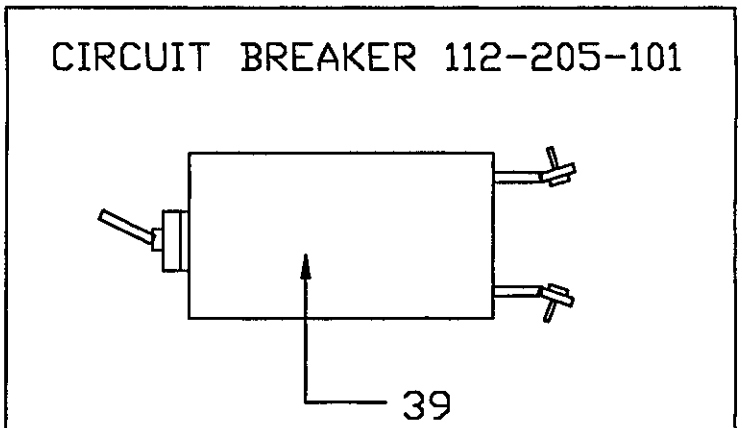
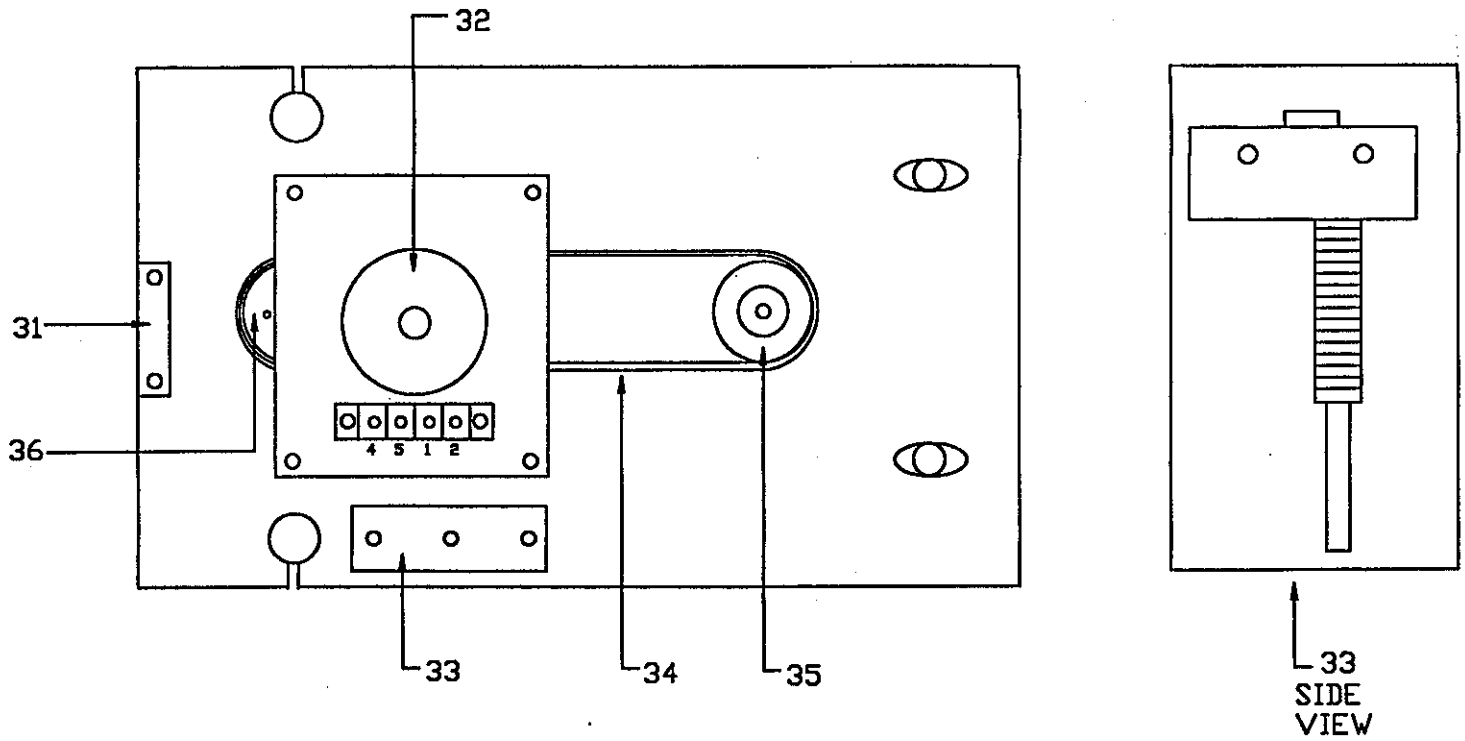
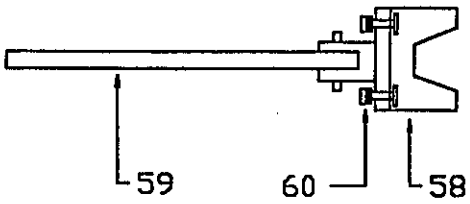


FIG. LL

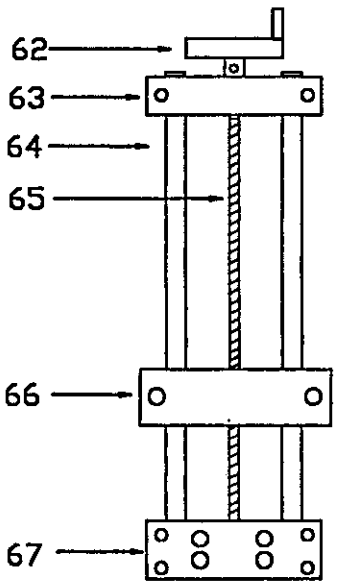


# FIG. MM

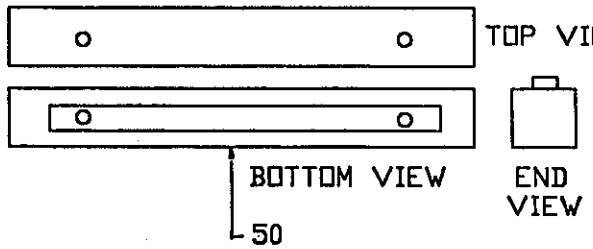
GAUGE BAR SUPPORT/SLIDER ROD



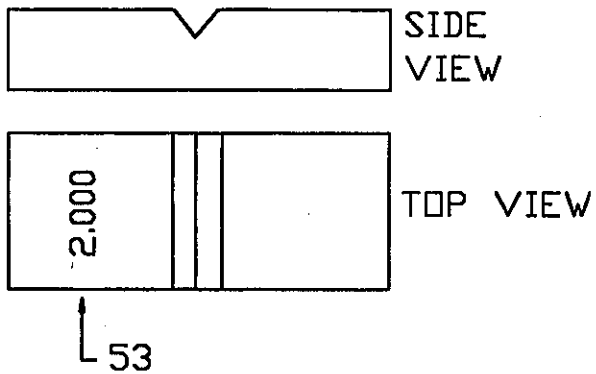

UPRIGHT ASSEMBLY



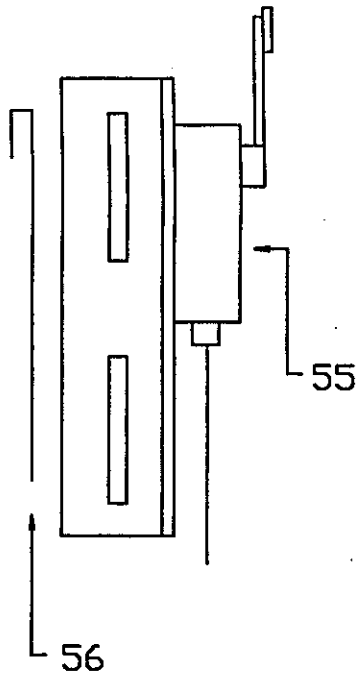

WORK BLOCK



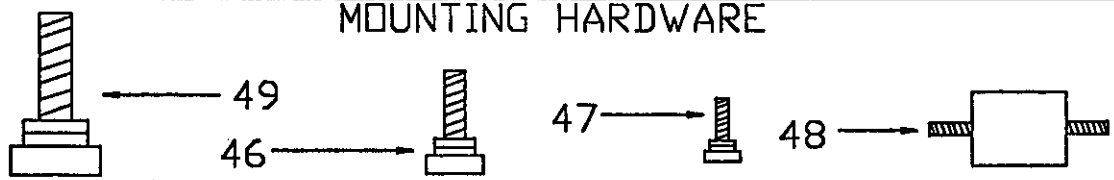

REFERENCE BLOCK




RAM SWITCH ASSY.

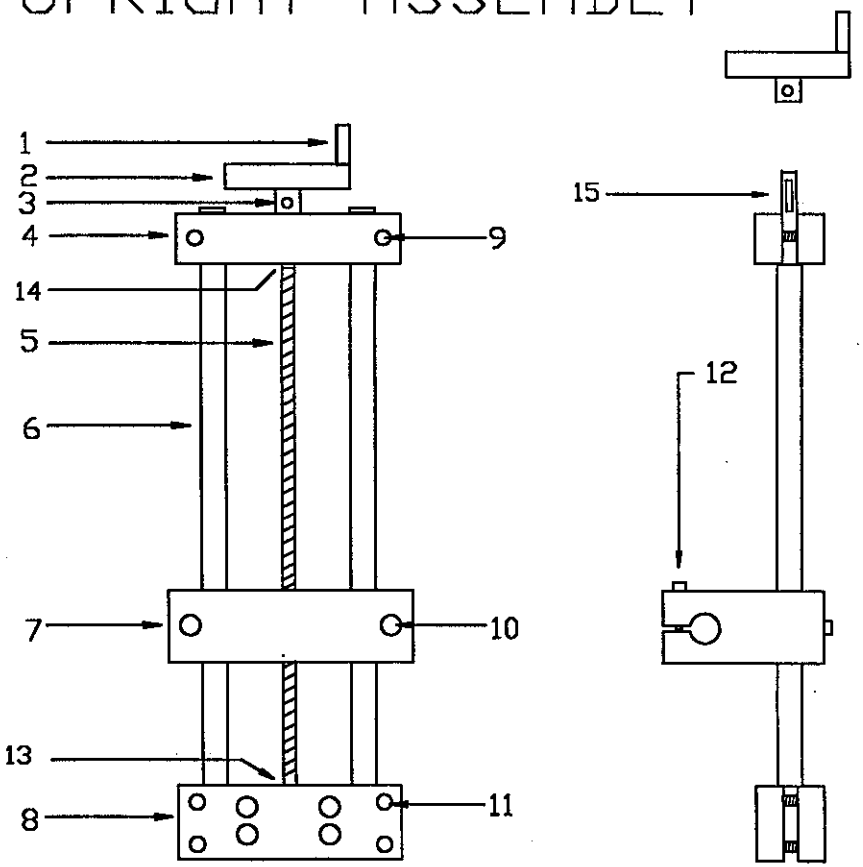



MOUNTING HARDWARE



# FIG. NN

## UPRIGHT ASSEMBLY




SIDE VIEW END VIEW

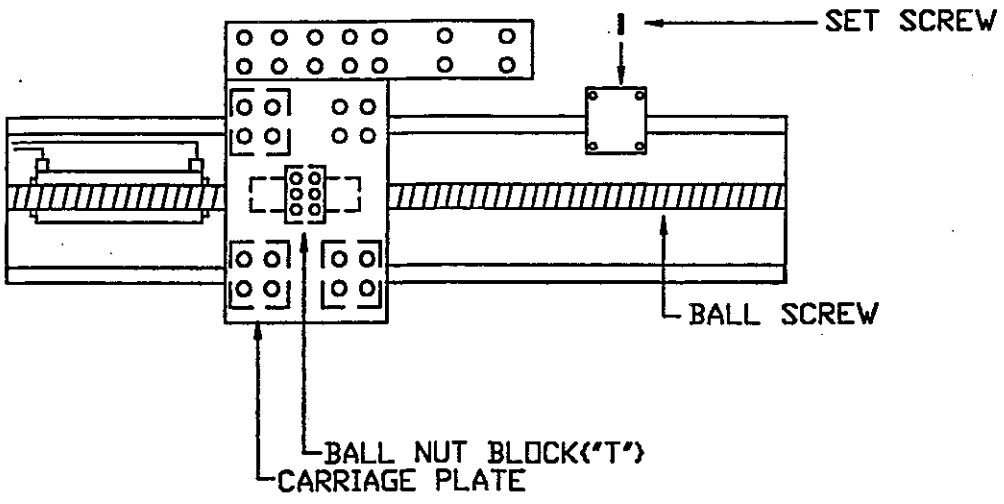
| ITEM # | PART # | DESCRIPTION |
|---|---|---|
| 1 | HS-19 | HAND |
| 2 | 11059/B | HANDWHEEL |
| 3 | 10-32x3/8 | SETSCREW |
| 4 | 47718 | TOP CLAMP |
| 5 | 11072/B | VERTICAL LD.SC. |
| 6 | 11071/B | VERTICAL SHAFT |
| 7 | 4772 0 | ELEVATION BLK. |
| 8 | 47719 | BOTTOM CLAMP |
| 9 | 1/4-20x1" | SOC CAP SCREW |
| 10 | 3/8-16x1 3/4 | SOC CAP SCREW |
| 11 | 1/4-20x1" | SOC CAP SCREW |
| 12 | 3/8-16x1 3/4 | SHCS |
| 13 | .156 | BALL |
| 14 | 3/8x1/2 | WASHER |
| 15 | # 211 | WOODRUFF KEY |

# BALL BUSHING ADJUSTMENT

The ball bushings are adjusted (tightened) by removing them individually from the carriage plate and turning the ¼-28 adjustment screw a very small amount clockwise.

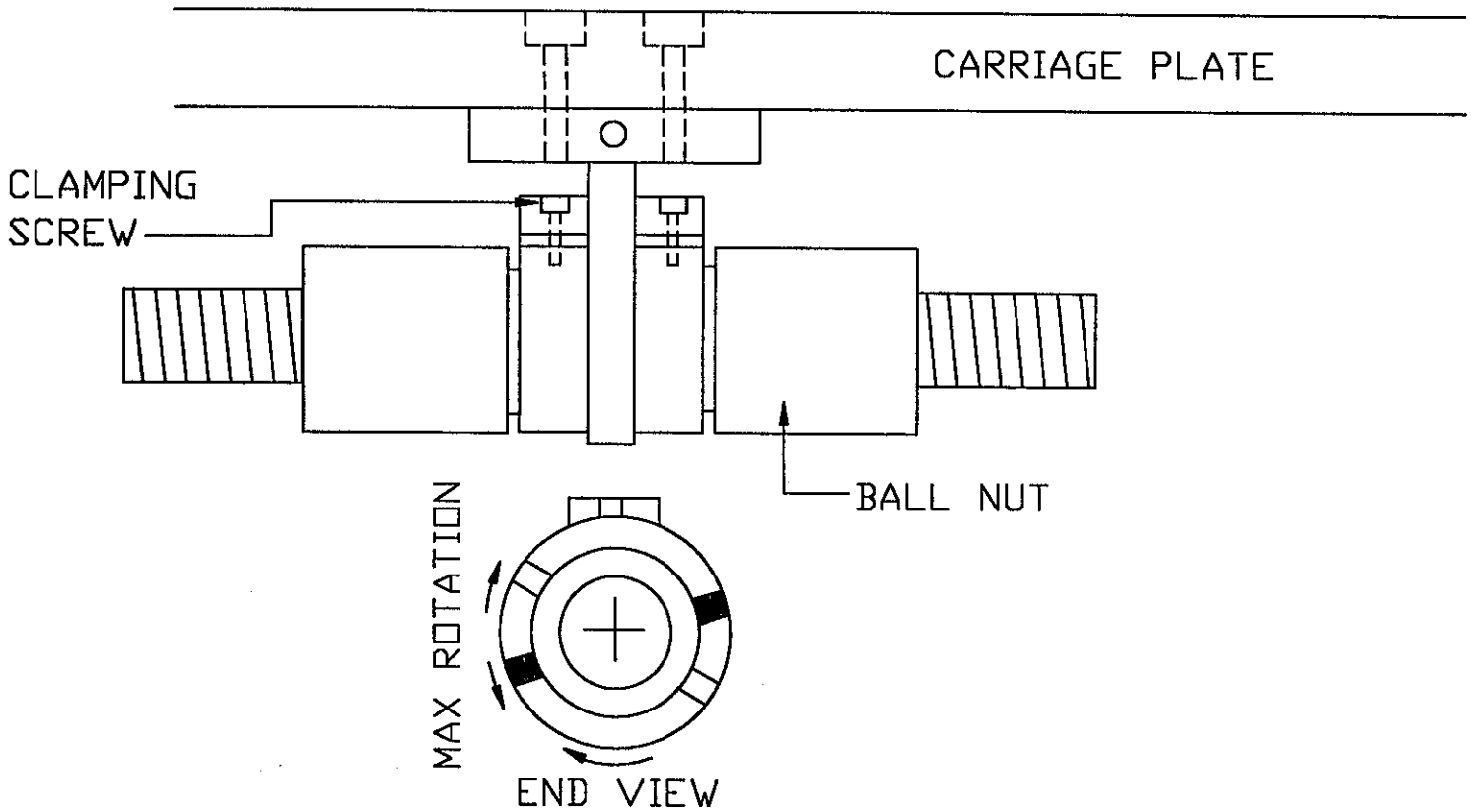
The bushing (when properly adjusted) should offer moderate resistance (about ½ ft. lb.) to a twisting force that is on a plane perpendicular to its line of travel as shown in **Fig. QQ.** Replace and repeat on remaining bushings. Each ball busing should have the same amount of "pre-load" as the next. This method will assure uniform loading and reduce the possibility of a failure. THIS PROCEDURE SHOULD PRECEDE THE BALL NUT ADJUSTMENT.

FIG. QQ



# FIG. W

# BALL NUT ASSEMBLY

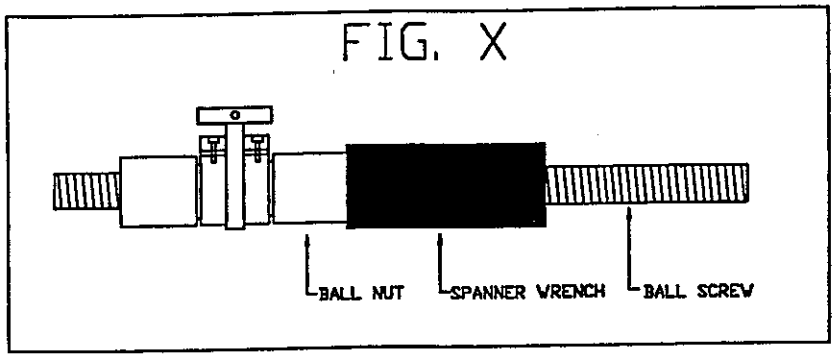


# BALL NUT ADJUSTMENT

The ball nuts are adjusted by turning either ball nut in either direction. Maximum play is achieved when one ball nut is turned to the approximate center of its possible rotation.

This will result in about .005" end play or less. To properly adjust the assembly, turn the ball nut a small amount at a time until the play is minimized or gone. This can be done by loosening the lock screw and using the ball nut spanner wrench (see **Fig. X**) or a suitable pair of adjustable joint pliers. The ball nuts are too tight if "catching" is evident when the ball screw is rotated. THIS PROCEDURE SHOULD FOLLOW THE BALL BUSHING ADJUSTMENT.

FIG. X



# BINDING

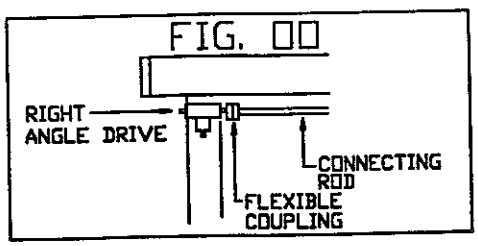
A simple test for binding:

1. Turn the toggle switch off at the rear of the mechanical assembly.

2. Hold the ball screw with thumb and forefinger and rotate at various spots along the screw.

3. If more pressure is required than can be applied in this manner, a bind exists.

To locate the source of binding, first remove the gauge bar and separate the flexible coupling (see **Fig. OO**) to determine which side the binding is in. A ball nut adjustment could alleviate the problem or simply loosening the 4 bolts that hold the ball nut assembly to the carriage plate will allow re-alignment to occur. If binding persists, further mechanical adjustments may be necessary. SEE HEIGHT ADJUSTMENT.



# HEIGHT ADJUSTMENT

1. Remove the (4) ¼-20 screws that hold the ball nut assembly to the carriage plate (see **Fig. PP**). Assembly should be close to the brake end or fixed end.

2. Remove excess play from by nut assembly by turning one of the ball nuts in a clockwise direction. SEE BALL NUT ADJUSTMENT.

3. Loosen the (3) 8-32 socket head screws that hold the ball nut assembly together. Loosen only enough to allow movement of center "T" piece (ball nut block #1).

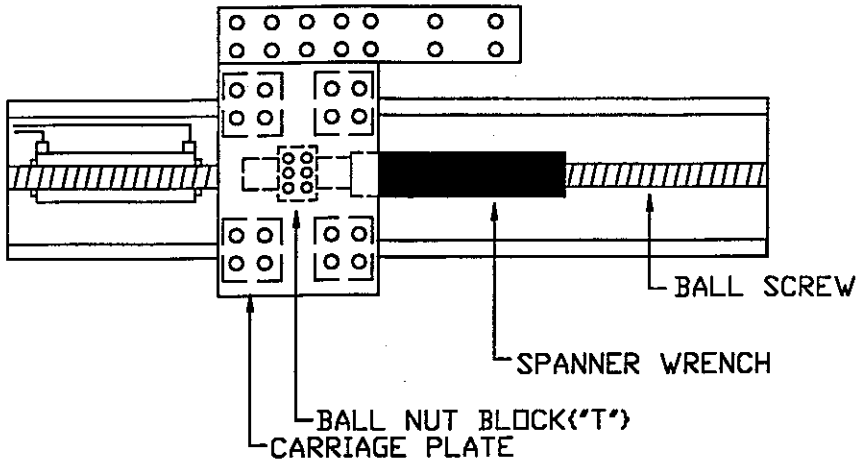
4. Gently raise or lower the position of this part by tapping it with a screwdriver or other appropriate tool. Make sure the ball nut block ("T") is not tilted. It should be flat against the bottom of the carriage plate (see **Fig. PP**) since the carriage plate will travel along a fixed plane, the "T" must be adjusted so that the carriage plate will not exert undue pressure on the ball nuts and screw when the assembly nears the fixed end of the screw. Therefore, this adjustment should be performed as close to the "fixed" or brake end as possible (as described in step #1).

5. When the "T" is properly located, tighten the 3 screws. **NOTE:** A "T" that is adjusted too high will move the carriage plate

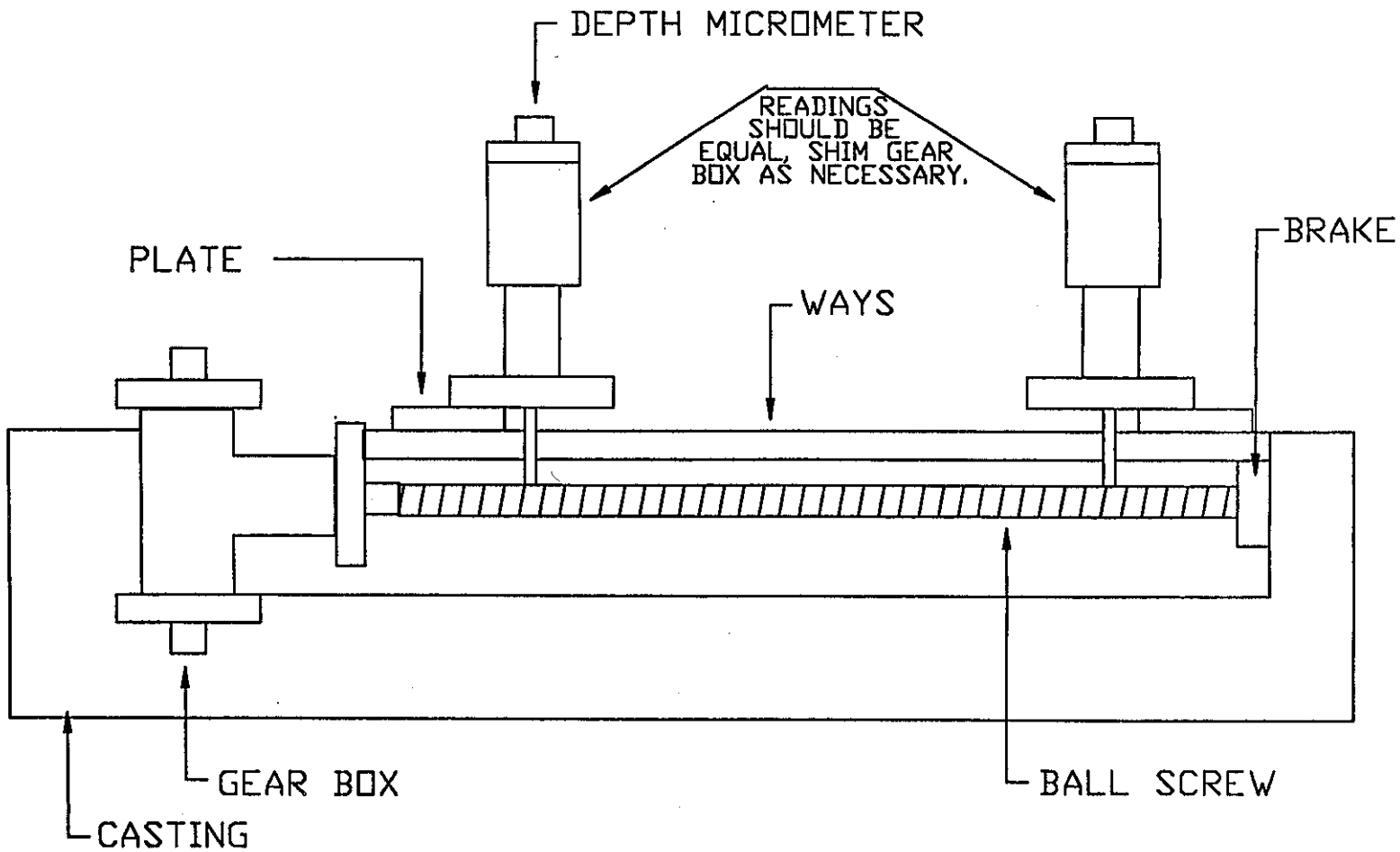
when the ball screw is rotated even though they are not bolted together yet. A "T" that is adjusted too low will never quite make contact with the bottom of the carriage plate.

6. Replace the (4) ¼-20's (tighten evenly so they do not pull the ball screw off center). Conditions should nearly be the same with the ball nut assembly and carriage plate close to the gear box end. If this is true, it proves the screw runs parallel with the ways and no further adjustment is needed. **Fig. TT** shows another way to check for this.

FIG. PP



# FIG. TT


DEPTH MICROMETER
READINGS SHOULD BE EQUAL, SHIM GEAR BOX AS NECESSARY.
PLATE
WAYS
BRAKE
GEAR BOX
CASTING
BALL SCREW

# QUICK HEIGHT ADJUSTMENT

**LEFT SIDE:**

Do not remove the ¼-20 screws as in step 1. Instead with the carriage plate back at 24.00" using a 9/64" Allen screw driver (ball end type) reach in and loosen the (3) 8-32 screws that hold the ball nut assembly together. The ball screw is being held off-center by the carriage plate, it will center itself when these screws are loosened. While rotating the screw slightly, slowly, and evenly tighten the 8-32 screws.

**RIGHT SIDE:**

Follow the same procedure but at 0.00". This is performed at 0.00" because the bolt heads cannot be reached while the unit is at 24.00". It is also assumed that the gear box is centered properly.

# MAINTENANCE

The only maintenance required on the Autogauge is regular oiling of the ball screw, hardened ways, upright shafting, gauge bar support rods, and connecting rod end couplings. This is mainly to prevent rust but is necessary on the ball screw and bushing ways for lubrication.

**DO NOT GET OIL ON THE BRAKE DISC OR EXTERNAL POWER RESISTOR.**

If the screws should become very dirty, they can be cleaned with a brush and mineral spirits, then re-oiled with a med. viscosity lubricating oil. A drop of oil or grease should be applied to the encoder gear to prevent wear.

It is also good practice to occasionally check the tightness of all hardware, especially coupling and sprocket set screws.

# *CNC 99* MOUNTING PROCEDURE

The standard *CNC 99* has 3 items which must be mounted:

1. Backgauge Assembly
2. Data Entry Panel (Display)
3. Auto Go Switch (Ram Switch)

Step 1 - **MOUNT THE BACKGAUGE**

Measure down 10" for B and HD models and 7" for A and BP models from the top of the lowest female die. This will be the gauge height mounting position. Next, center the backgauge between the housings of the pressbrake and mark mounting holes. Drill and tap 5/8-11 holes two inches deep. Mount the backgauge with hardware supplied. See drawings on following pages for correct mounting dimensions.

*** NOTE:** When mounting on up-acting brakes, the backgauge will bolt directly to the die holder or dovetail slot. A centering adapter plate is available for small Promecam brakes.

## BACKGAUGE MOUNTING

Backgauges should be centered between the pressbrake side frames at a height that allows for vertical adjustment of the gauge bar to accommodate various die heights. Before drilling, it is a good idea to loosely pre-assemble the total mechanical assembly, including gauge fingers, to check the gauge height in relation to your particular dies.

In the illustrations on the following page, **Fig. 29** would be the preferred mounting scheme. Increased rigidity in the uprights can be obtained in this manner. Care must be taken, however, not to mount the gauge too low, or the upright will not crank down low enough. Particularly if a shorter die is used; and/or the GF-3 maxi finger is used which sits 2½" higher than the work block; or GF-1 finger. As a general rule, the mounting holes are drilled 10" below the top of the lowest die. Of course, if a dovetail slot is present, it can almost always be used.

See the following pages for recommended mounting hole pattern for the following models: ***CNC 99/A***, ***CNC 99/BP***, ***CNC 99/B***, and ***CNC 99/HD***.

FIG. 29

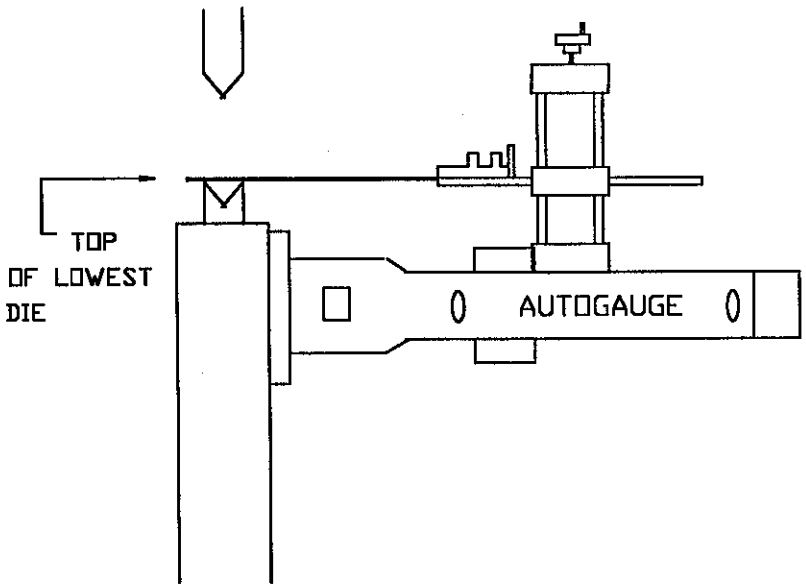
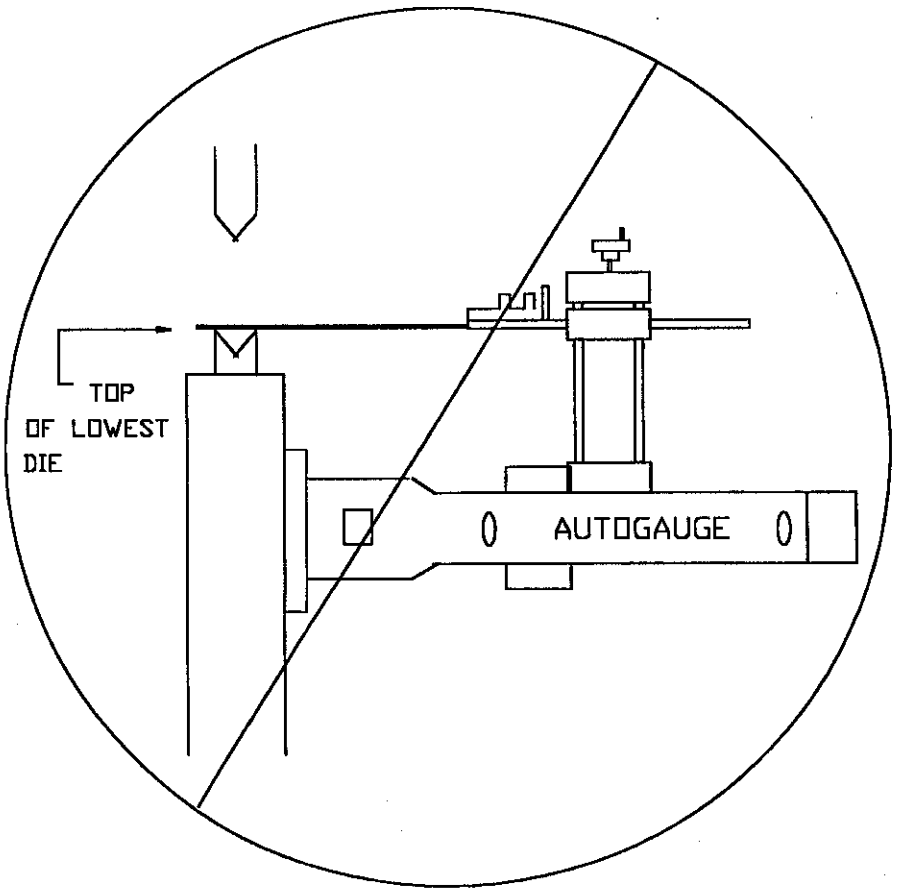



FIG. 30



Next, mount the uprights, horizontal shafts, gauge bar, and fingers (see photo in parts list section).

*** IMPORTANT NOTE:** Installation of Vertical Uprights

There are 3 mounting positions for the vertical uprights. The proper selection is dependent on the type of gauging finger being used and the distance from the die centerline to the backgauge mounting surface on the back of the pressbrake bed.

To select the proper position, program and send the backgauge to a 2.000" dimension. With the 2.000" calibration V-blocks clamped in the die, mount the gauging finger or workblocks to the gauge bar and slide that gauging surface forward to the V-blocks by loosening the horizontal shafts.

Try to minimize the extension of the horizontal shaft (**Fig. 45**) by bolting the uprights to the forward most position allowed while still allowing the 2.000" calibration.

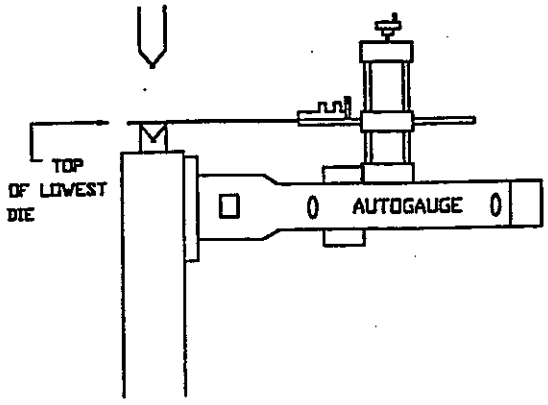



FIG. 45

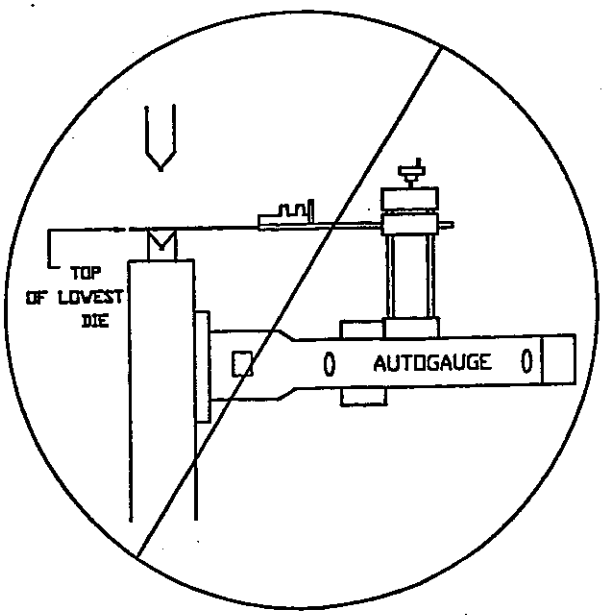



FIG. 46

RECOMMENDED MOUNTING HOLE PATTERN FOR A
TOP OF LOWEST DIE

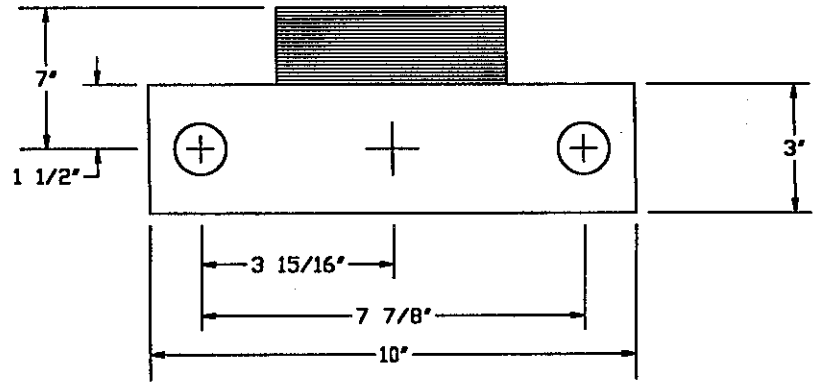



FIG. 47

RECOMMENDED MOUNTING HOLE PATTERN FOR BP
TOP OF LOWEST DIE

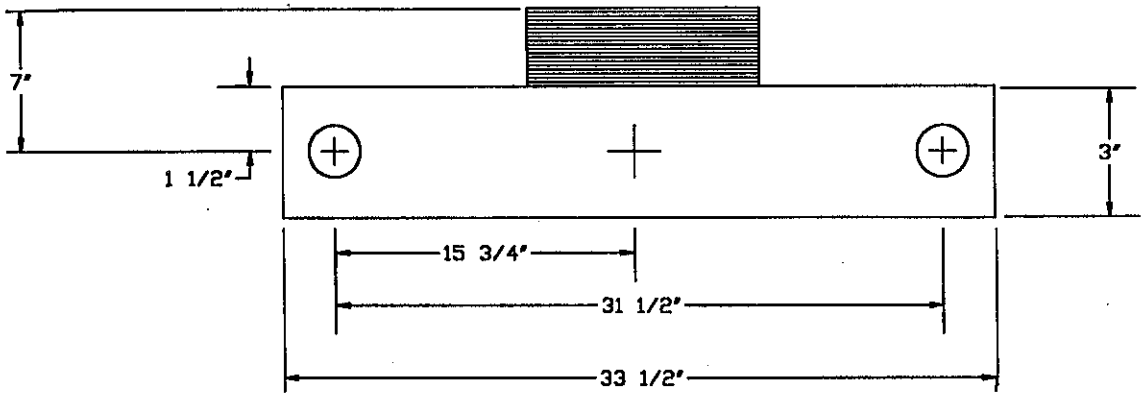



FIG. 48

RECOMMENDED MOUNTING HOLE PATTERN FOR B
TOP OF LOWEST DIE

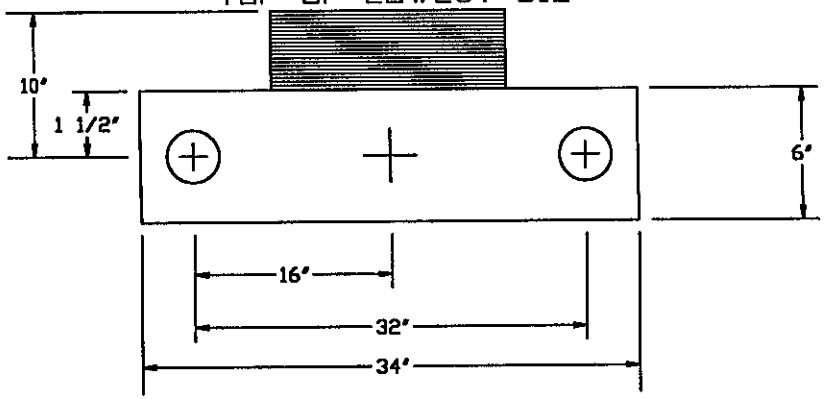



FIG. 49

RECOMMENDED MOUNTING HOLE PATTERN FOR HD
TOP OF LOWEST DIE

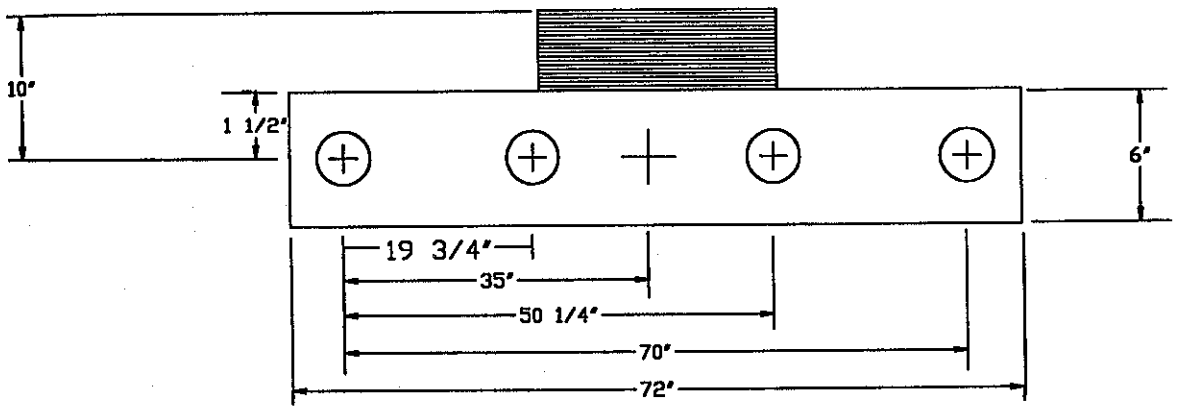



FIG. 50

Step 2 - **MOUNT THE DATA ENTRY PANEL**

Choose a spot (preferably on the ram) which will be easily accessible to the operator. Drill and tap two ¼-20 holes approximately 3/4" deep on 15 5/15" centers and bolt data entry panel in place. See drawing below for data entry panel dimension.

CNC 99 DISPLAY

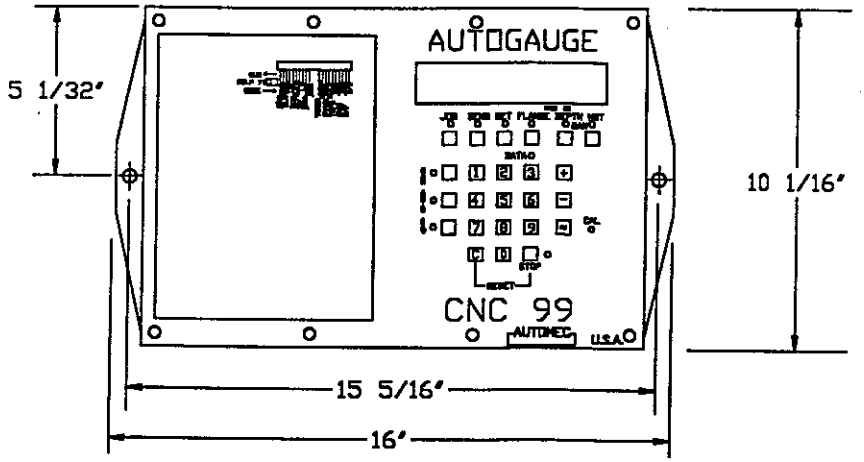



FIG. 51

* **IMPORTANT NOTE:** When mounting a pendant, the cables connecting into the rear of the display must be disconnected from the display, fed through the pendant and then reconnected to the rear of the display.

STEP 3 - **MOUNT AUTO RAM SWITCH**

1. Find recommended mounting hole pattern for auto switch. See **Fig. 25.**

2. Select a place on the pressbrake to mount the auto ram switch such that it will be moved to its neutral position as the ram descends and engages the metal being formed, and will be actuated on the upstroke once the workpiece is released. It is the action of being moved to neutral position and then being actuated that causes the backgauge to move to its next position. The cable from the auto switch must also reach the grey box. Many pressbrakes have a ram slow down switch which is actuated by an adjustable lever. In many cases a bracket can be made for the auto switch such that it can be mounted in the same location as the pressbrake ram slow down switch and be actuated by the slow down switch lever. The location chosen for mounting the auto switch should not be such that as the ram stroke length is varied, the auto switch is no longer activated.

3. Lay out hole pattern for auto switch or switch bracket.

4. Drill and tap (2) mounting holes ¼-20 x 3/4" deep for switch bracket.

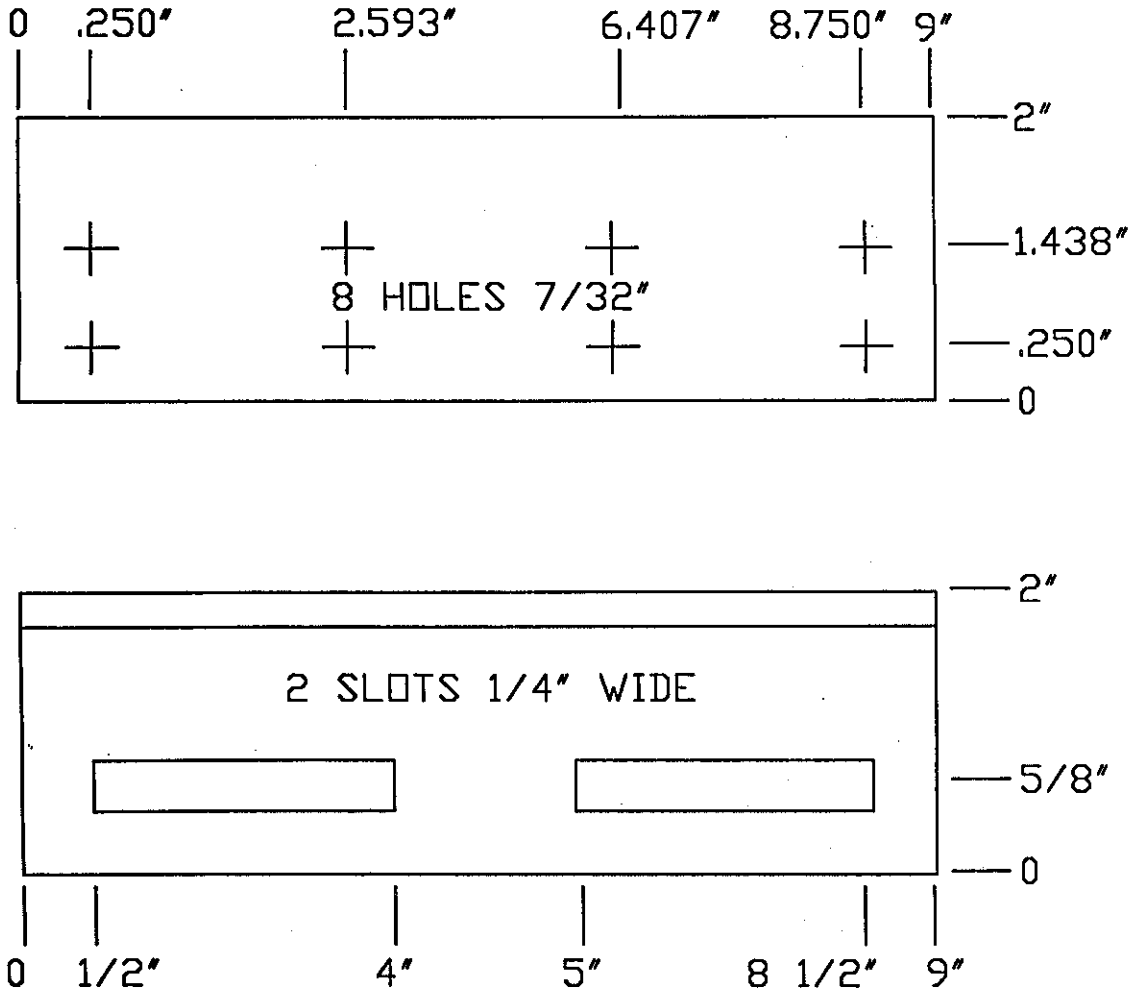



FIG. 25

AUTO SWITCH BRACKET

END VIEW

# SECOND AXIS MOUNTING - CAT 1
# LINEAR SCALE

REFER TO **FIGURES 32 AND 80.**

**IMPORTANT: MOUNT LINEAR SCALE AS CLOSE TO THE RAM AS POSSIBLE.**

1. Select an unobstructed location on the sidewall of the pressbrake where the linear scale may be mounted. This location may be on the right or left sidewall, inside or outside. However, the scale cable must reach grey box. Mount scale as close to pressbrake as possible. Make scale parallel to ram and place top of scale up. Dress scale cable so that it will not kink or bind as scale goes through its motion. Allow at least ½" of clearance between scale slider and top of scale when ram is at max top of stroke and also at least ½" of clearance between scale slider and bottom of scale when ram is at max bottom of stroke.

2. Lay out hole pattern on selected sidewall location being sure to observe minimum ½" clearances and keeping scale parallel to ram.

3. Drill and tap (2) mounting holes ¼-20 x 3/4" deep for scale.

4. Bolt scale to sidewall of pressbrake.

5. Dress cable so that it will not kink or impede scale slide motion and fix in place with cable ties and adhesive backed holders supplied, so that it will reach grey box which will be mounted on sidewall of pressbrake.

**MOUNT TO MAGNETIC HOLDER:**

1. Find recommended hole pattern for magnet holder. Note there are two ways to mount holder; either parallel to face the ram or perpendicular to ram of pressbrake.

2. Select a place on the ram of pressbrake where magnet holder may be mounted keeping in mind that the 3/4" rod and magnet must reach and should be parallel to magnet link. The magnet should be in contact with as much like surface area as possible. The magnet should also engage the bottom surface of the link so that it could break away from link in its downward motion. The 3/4" rod may be cut shorter to accommodate the closer mounting of linear scale. The magnet holder should be oriented so that the bolt that secures the 3/4" rod to the holder is accessible.

3. Lay out hole pattern on ram of pressbrake.

4. Drill and tap (2) mounting holes ¼"-20 x 3/4" deep for magnetic holder.

5. Bolt holder to ram of pressbrake.

6. Measure distance from holder to link on linear scale slide and cut 3/4" rod accordingly. Make sure bolt in magnet is tight in 3/4" rod so that magnet will not rotate in rod. Secure rod to magnet holder with magnet engaging link surface.

7. Loosen bolts that secure linear scale and position ram at top of travel. Hand tighten top of scale bolts, position ram at bottom of travel and hand tighten bottom of scale bolts. This should make scale reasonable parallel to ram. Run ram up and down to check clearances and parallelism and tighten scale bolts securely.

**MOUNT PRESSBRAKE CONTROL RELAYS:**

1. Observe relay bracket supplied and measure location of mounting holes.

2. Select location inside pressbrake control console where relay bracket will fit keeping in mind that wires from relays must reach pressbrake terminal strip and control cable from relay bracket must reach grey box.

3. Lay out hole pattern for relay bracket supplied in pressbrake control console.

4. Drill mounting holes and bolt relay bracket in place.

5. Use any knockout available on drill or punch hole in pressbrake control console for ½" strain relief supplied with relay bracket control cable.

6. Disconnect relay control cable from relay bracket, mount strain relief and dress relay control cable to reach grey box, fixing in place with cable ties and adhesive backed holders supplied. Feed cable through strain relief and tighten in place. Reconnect relay control cable to relay bracket according to numbers on wires.

7. Refer to pressbrake to relay control interconnection schematics supplied and connect wires from relay into proper pressbrake terminal locations per schematic.

# RECOMMENDED MOUNTING HOLE PATTERN FOR MAGNET HOLDER

Magnet holder should be mounted to ram of pressbrake such that magnet may be coupled to magnet link on Linear Scale and carry Linear Scale slide head over its travel range.

Holes should be drilled and tapped for 5/16"-18 x 3/4" deep.

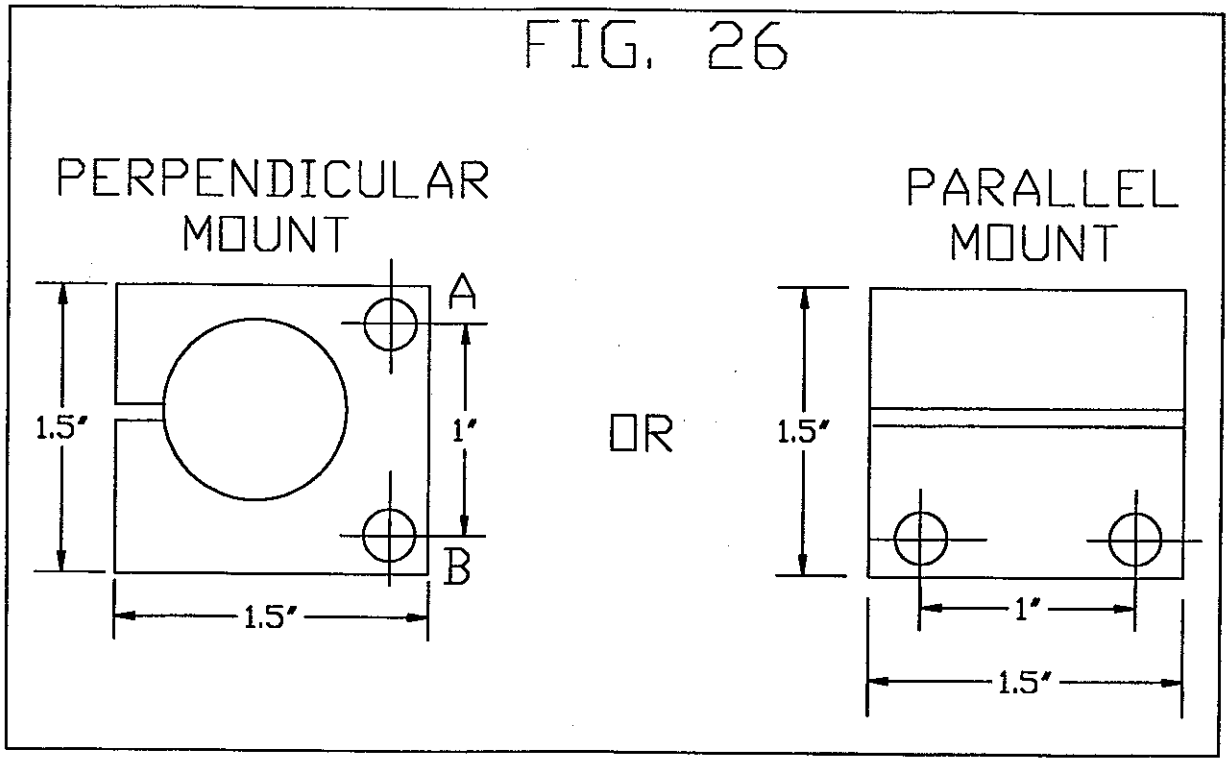
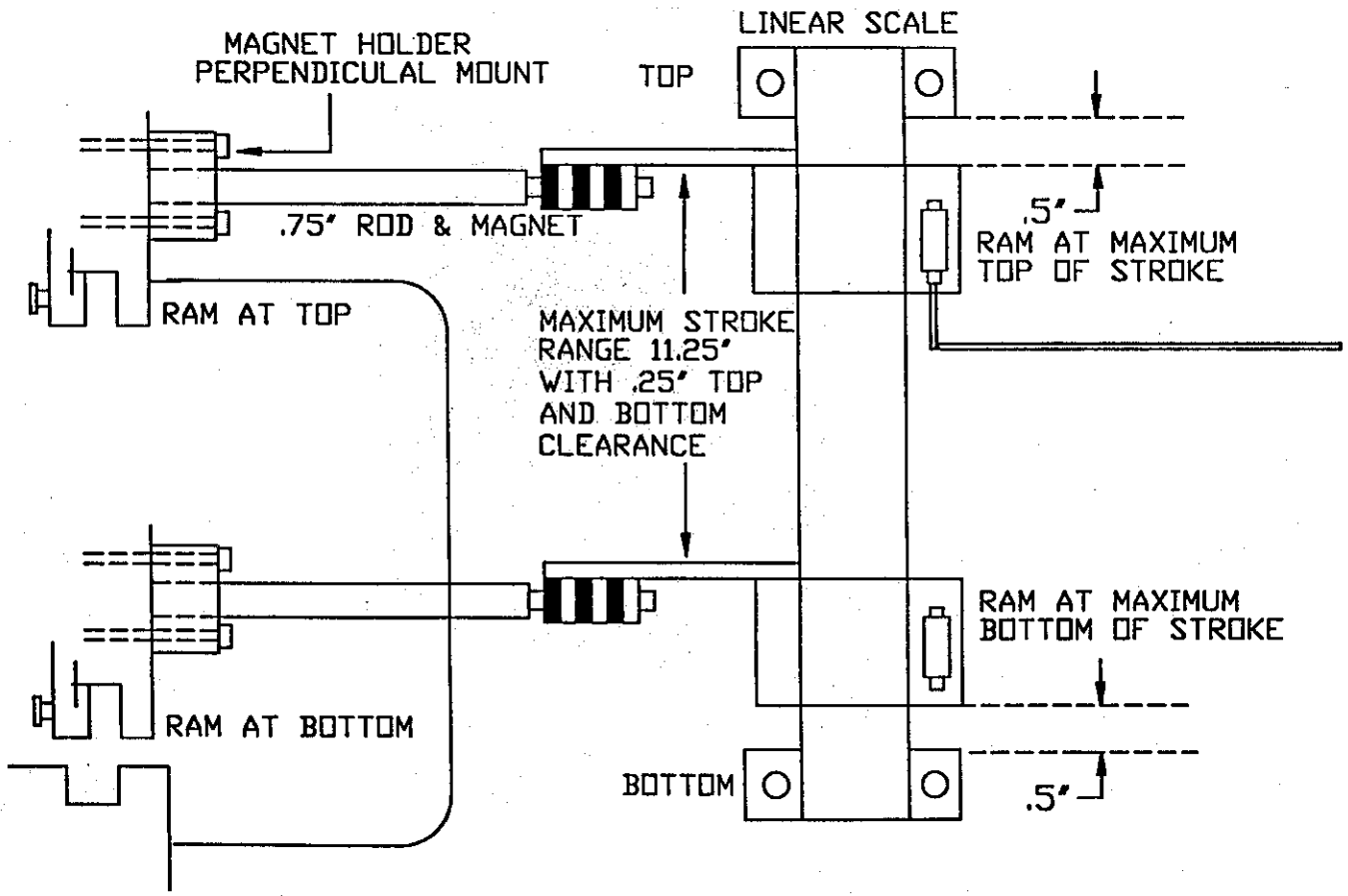
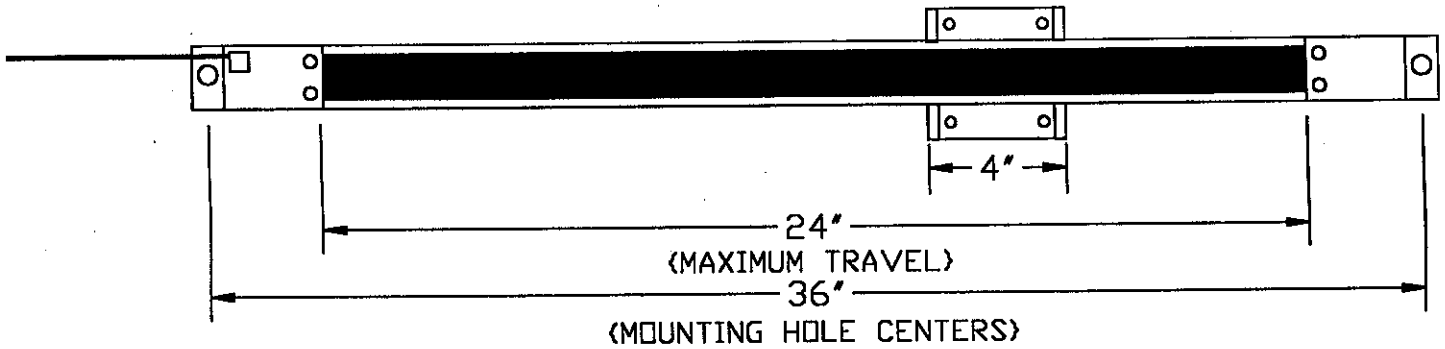


FIG. 32

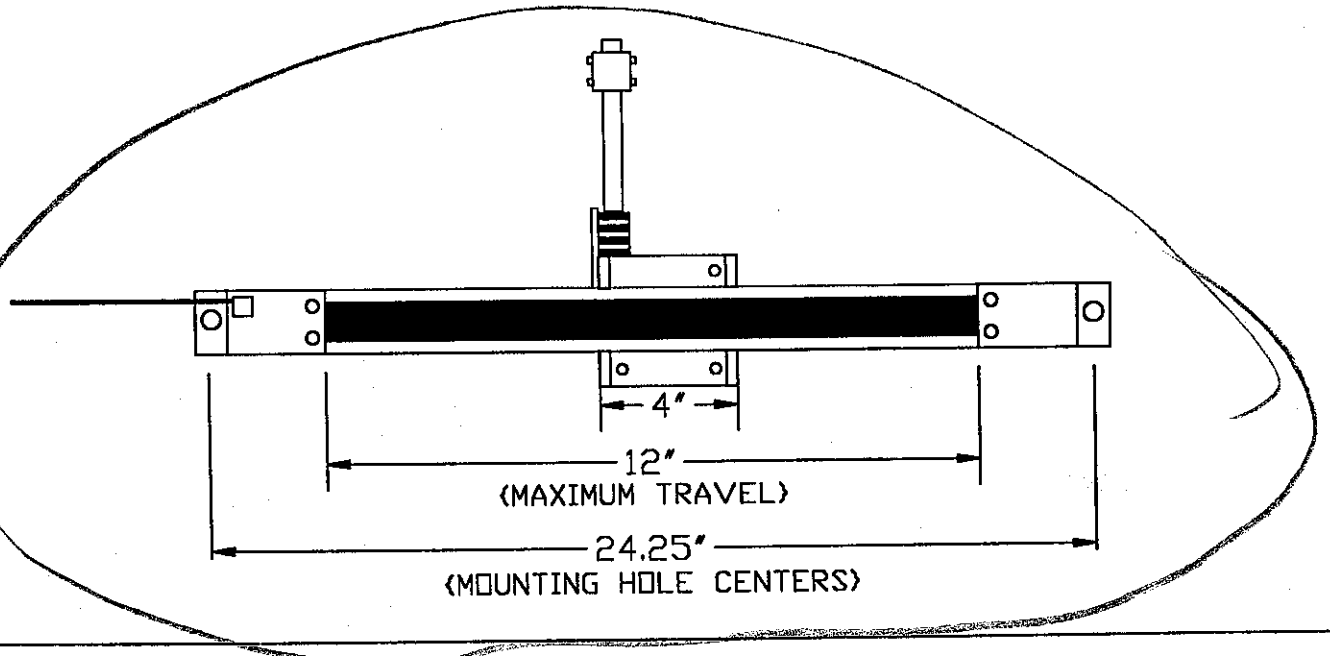

MAGNET HOLDER
PERPENDICULAL MOUNT
LINEAR SCALE
TOP
.75" ROD & MAGNET
.5"
RAM AT MAXIMUM
TOP OF STROKE
RAM AT TOP
MAXIMUM STROKE
RANGE 11.25"
WITH .25" TOP
AND BOTTOM
CLEARANCE
RAM AT MAXIMUM
BOTTOM OF STROKE
RAM AT BOTTOM
BOTTOM
.5"

# FIG. 80



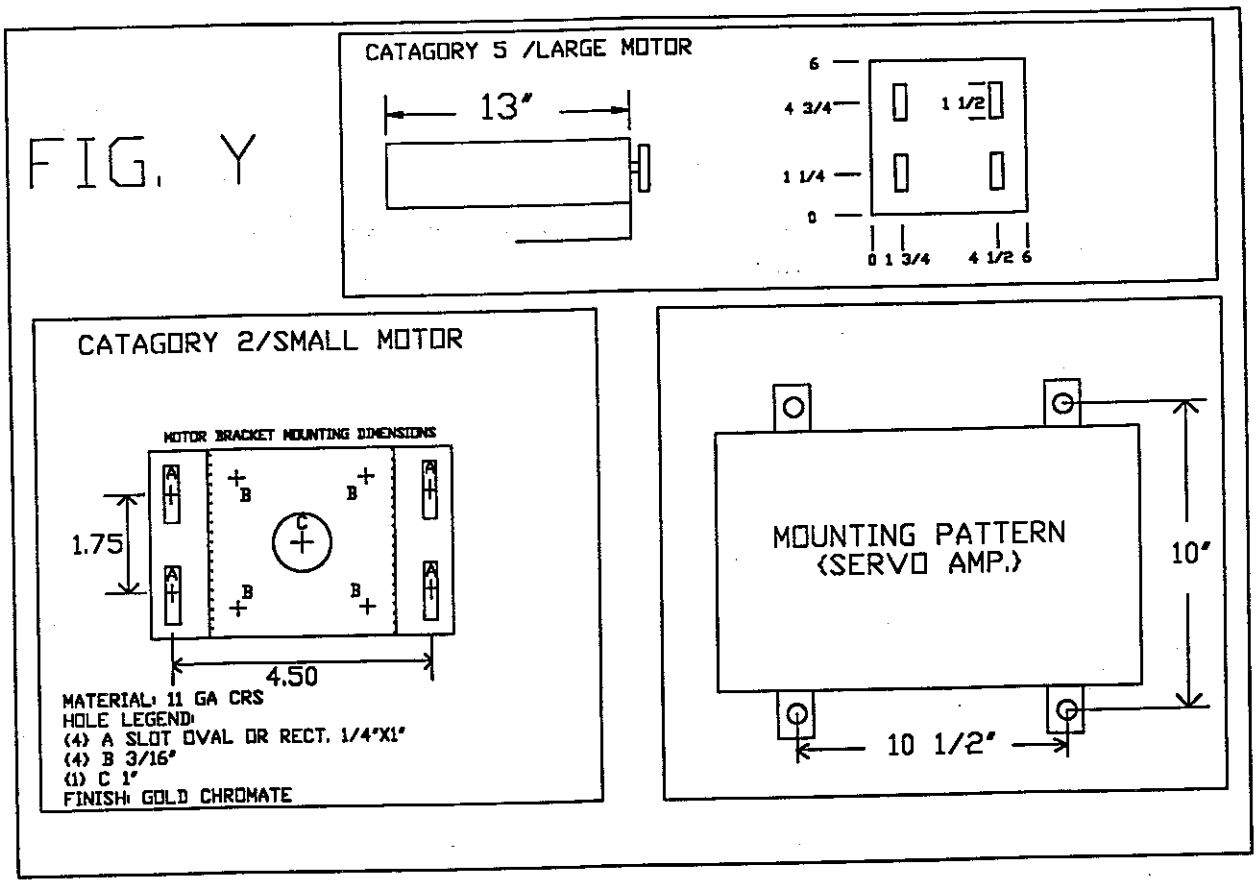

## LINEAR SCALE MOUNTING SPECIFICATIONS

FOR BEST RESULTS PILLOW BLOCK SHOULD BE AS CLOSE TO MAGNET AS POSSIBLE. MAGNET ROD SHOULD BE CUT DOWN AS MUCH AS POSSIBLE TO PREVENT VIBRATION AND IMPROVE ACCURACY. 1/4-20x1/2 INCH BOLTS ARE RECOMMENDED FOR MOUNTING LINEAR SCALE TO PRESS BRAKE.

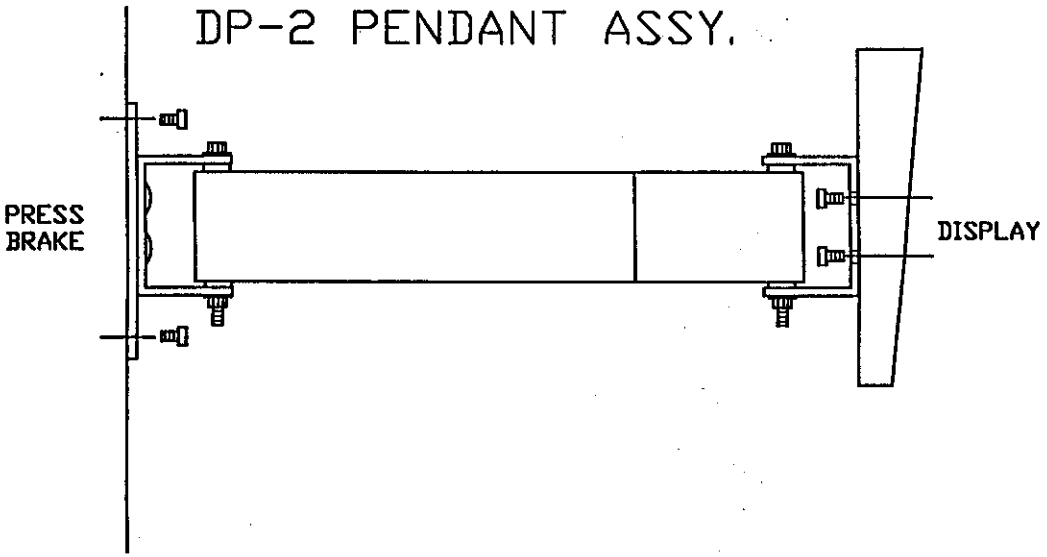


# SECOND AXIS MOUNTING - CATEGORY 2/5

1. Mount the servo motor with bracket.
2. Mount the amplifier in close proximity to the servo motor.
3. Remove handwheel and mount sprocket in its place.
4. Mount sprocket on servo motor.
5. Connect two sprockets together with chain or belt provided.
6. Connect interconnecting cables as necessary.

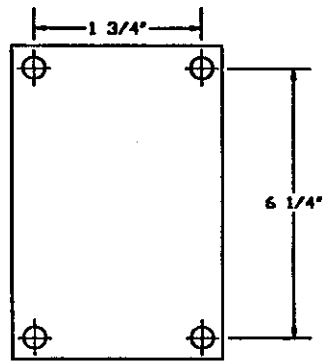


# DP-2 PENDANT ASSY.




| PARTS LIST | QUANTITY |
|---|---|
| 1. 1/2-13x4 1/2 HEX CAP SCREW | 2 |
| 2. 1/2-13 HEX NUT | 2 |
| 3. 1/2 FLAT WASHER. 120 THK | 8 |
| 4. 3/8-16x3/4 BUT. SOC. | 4 |
| 5. 1/4-20x5/8 SOC. CAP SCREW | 4 |

## PENDANT MOUNT HOLE PATTERN



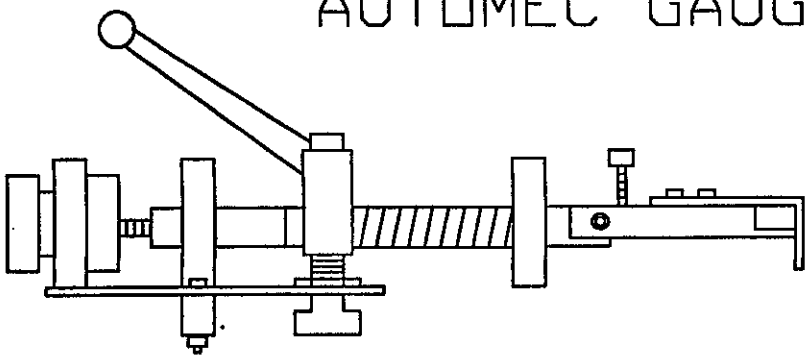

DRILL & TAP (4)1/4-20 BY 3/4" DEEP SPACED AS SHOWN.

THIS MOUNTING PATTERN IS APPLICABLE FOR THE DP-1 AND THE DP-2 PENDANT ASSY.

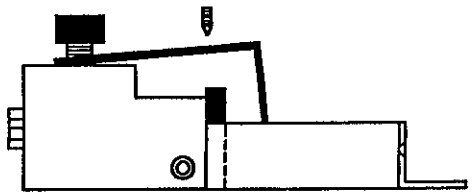
FIG. UU

# FIG. 2

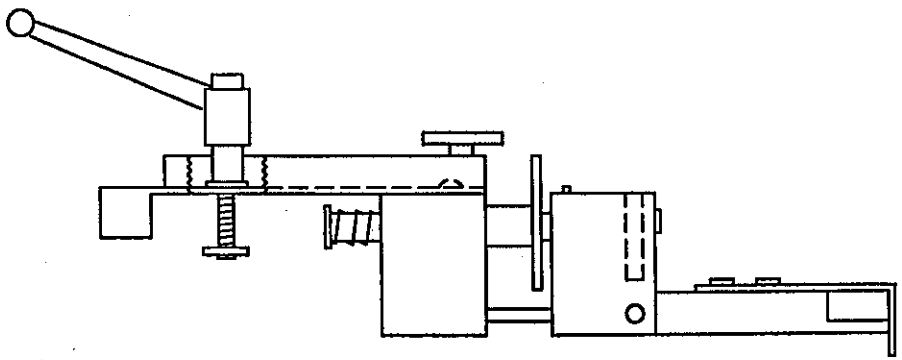
## AUTOMEC GAUGING FINGERS



GF-8 (SEE FIG. BB)



GF-1 (SEE FIG. RR)



GF-9 (SEE FIG. AA)

# APPENDIX

**DIAGNOSTIC KEYS:**

To run the diagnostics press and release the following keys at the same time.

For the LED segment test: Press both **8** and **2** .
For open key test: Press both **8** and **5** .

As each key is pushed if it closes it should display the same number as listed in the stuck key fail codes.

To clear the memory: Press **MAN**, **AUT**, and **ADV** .
For 30 second memory test: Press both **7** and **4** .

If the memory fails the program window will display "88". The rest of the display will be blank.

Jobs 00 to 99

| BEND | RET | FLANGE | DEPTH | HGT |
|---|---|---|---|---|
| Bend Positions | Retract | Flange | Ram Depth | Ram Height (not used for Servo) |
| 01 to 30 | 0 to 9 sec. | 0 to 24.000" | 0 to 4.000" | -0.1 to -19.9" 0=no height control |
| 00 | _____ | Flange Offset +/-0.999" | Ram Offset +/-0.099" | Ram slow Speed -0.1 to -1.9" Above Calibrate 0= slow speed disabled |
| -1 | | Calibrate @ 2.000" or 50.80mm (Push Flange Man & Adv) | Cal Ram @ Flat Metal (Depth Man & Adv) Svo. Jog.+-= | Set Bot Lim (Hgt, Man & Adv) |
| -2 | -------- | IN or MM (Use = to change) | OFF, POS, & LPA with L.S. only (Use = to change) | ---------- |

MACHINE CODE PROGRAMMING SET CODE/RUN SWITCH TO CODE

-9_____FLANGE BUTTON CODES_____

△ Scale Factor of Back Gauge +/-00 to +/-99 (#of .0001"/1")

GAUGE STOP BITS
0 = GAUGE OFF
1-9 = # OF STOP BITS

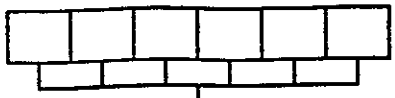
GAUGE ENCODER FACTOR
0 = 4000 SF (200 count encoder)
1 to 9 = 1000 SF (50 count encoder)

AUTO/RID MODE

| DIGIT CODE | AUTO | ADV | RID (Becomes Slow Speed relay when Linear Scale enabled) |
|---|---|---|---|
| 0 | EXT | O | DE-ENERGIZED WHEN GAUGE GETS TO POSITION. |
| 1 | EXT | C | DE-ENERGIZED WHEN GAUGE GETS TO POSITION. |
| 2 | INT | O | DE-ENERGIZED WHEN GAUGE GETS TO POSITION. |
| 3 | INT | C | DE-ENERGIZED WHEN GAUGE GETS TO POSITION. |
| 4 | EXT | O | ENERGIZED WHEN GAUGE GETS TO POSITION. |
| 5 | EXT | C | ENERGIZED WHEN GAUGE GETS TO POSITION. |
| 6 | INT | O | ENERGIZED WHEN GAUGE GETS TO POSITION. |
| 7 | INT | C | ENERGIZED WHEN GAUGE GETS TO POSITION. |
| 8 | EXT | O | DISABLED (SLOW SPEED ENABLED WITH LINEAR SCALE ENABLED) |
| 9 | EXT | C | DISABLED (SLOW SPEED ENABLED WITH LINEAR SCALE ENABLED) |

Fig. CC

-9 DEPTH BUTTON SCALE FACTOR



SCALE FACTOR FOR RAM LINEAR SCALE OR SERVO
000.800 TO 999.999 . IF BELOW .800 IT WILL DEFAULT 001.000

-9 RAM HGT BUTTON CODES (LINERS SCALE)

NO VALUE ASSIGNED

NO VALUE ASSIGNED

NO VALUE ASSIGNED

UP SLOW SPEED ENABLED BELOW RAM HEIGHT ENABLED (ACUPRESS)

SERVO CONTROL
0 = DISABLED 1-9 = ERROR

LINEAR SCALE/ANTI-WHIP
0 = LINEAR SCALE DISABLED
1 - 8 = THE # OF 0.100" ABOVE THE BOTTOM WHERE THE ANTI-WHIP RELAY WILL BE ENERGIZED
9 = L. S. ENABLED ANTI-WHIP OPTION DISABLED

-9 RAM HGT BUTTON CODES (SERVO SYSTEM)

Anti Back Lash
X .001" 00 to 99

SERVO RAMP
Starts at counts
$2^{(5n)}$ n = 0 - 9

TIMER BITS (SERVO)
0 = NO TIMER
1 - 9 = # OF 0.001" ENCODER MAY BE OUT OF POSITION BEFORE STARTING TIMER

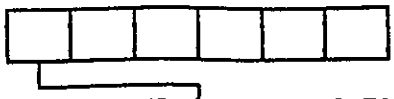
LINEAR SCALE/ANTI-WHIP
0 = LINEAR SCALE DISABLED
1-9 = ERROR

SERVO CONTROL
0,9 = SERVO DISABLED

| CODE | DIRECTION | TOP/BOT SW |
|---|---|---|
| 1 = | CW | NO |
| 2 = | CCW | NO |
| 3 = | CW | NC |
| 4 = | CCW | NC |
| 5 = | CW | NO |
| 6 = | CCW | NO |
| 7 = | CW | NC |
| 8 = | CCW | NC |

Fig. DD

## RET BUTTON NUMERICON OPTION



0 NUMERICON OPTION DISABLED (MUST BE 0 TO HAVE PINCH POINT)
1 NUMERICON OPTION ENABLED

NUMERICON OPTION ENABLED:
THE ANTI-WHIP RELAY WILL BE ENERGIZED IF A ONE IS PROGRAMMED IN RET. THE ANTI-WHIP RELAY WILL BE DE-ENERGIZED IF A ZERO IS PROGRAMMED IN RET. THE RELAY WILL ONLY ACTUATE WHEN IN THE AUTO OR MANUAL MODE AND THE ADV BUTTON PUSHED SELECTING THE GIVEN BEND. NUMBERS 2-9 HAVE NO EFFECT.

FOR THE RELAY ENERGIZED THE RET DISPLAY WILL READ:

| | | | | | |
|---|---|---|---|---|---|
| A | | | S | E | L |

FOR THE RELAY DE-ENERGIZED THE RET DISPLAY WILL READ:

| | | | | | |
|---|---|---|---|---|---|
| A | | | O | F | F |

NUMERICON OPTION DISABLED:
THE ANTI-WHIP RELAY FUNCTIONS AS THE ANTI-WHIP RELAY WHEN THE LINEAR SCALE IS ENABLED. THE RET FUNCTION WILL SELECT THE NUMBER OF SECONDS RETRACT FOR THE BACK-GAUGE WHEN PROGRAMMED

THE NUMERICON OPTION OVER-RIDES THE ANTI-WHIP RELAY FUNCTION IN ALL CASES WHEN THE OPTION IS ENABLED.

Fig. EE

## SERVO SECOND AXIS

The linear scale must be disabled before the servo system can be enabled. The servo second axis may be programmed on at bend -9 by pressing the ram height button to flash the right most digit an press "c" "0". Then press the ram height button to flash the second digit from the right and entering a digit 1 through 8. The digit in this window refers to the direction of the servo motor, the polarity of the Top and Bottom limit switches.

If no limit switches are installed or the limit switches are wired normally opened, use codes 1,2,5, or 6 .

The even numbered codes cause the motor to rotate counter clockwise for positive motion into the die.

The third digit from the right represents the number of 0.001" out of position the servo may be before the servo timer starts.

The third digit from the left represents the distance from the target point that the servo begins to ramp down in speed.

The left two digits represent the number of thousands the servo will overshoot the target dimension in going to a shallower dimension.

To jog the servo press [BEND],[0],[-],[DEPTH],[MAN].

Press [+] to rotate the motor 0.001" into the die. Press [-] to rotate the motor 0.001" out of the die. Hold down [+] to walk the motor slowly into the die. Hold down [-] to walk the motor slowly out of the die.

Press [+] and [=] at the same time to rapid jog the motor into the die, or [-] and [=] to rapid jog the motor out of the die.

Jogging of the motor is allowed before calibrating but the second axis must be calibrated at BEND -1 before the system will advance to the first bend as is true with the linear scale systems.

Once the system has been calibrated and advanced to the first bend, the system may be re-calibrated at the station as follows. While the motor is in position at a bend pressing [CLEAR] will free up the motor and the ADVANCE LED will flash indicating that there is no control over the servo motor.

The servo system and ram may now be readjusted to a new calibration point. Once a new calibration point has been established, press [=] to re-calibrate the servo.

Push advance to reposition at the bend.

While the servo is on its way to position or if the servo is running away, press [STOP] to stop the motor.

## LINEAR SCALE RAM AXIS SET UP

The Servo must be disabled before the linear scale system can be enabled. Press the ram height button to flash the second digit from the right and enter "c" "0" to disable the servo. Enable the linear scale by pressing the ram height button to flash the right most digit an press "c" then a digit 1 through 9. The digit in this window refers to the number of 100 thousandths above the bottom that the anti whip relay pulls in.

The third digit from the right represents the number of 100 thousandths below the top relay program point at which the slow relay will pull in. This is to slow the ram down so that it will stop at the program point and not over shoot.

Fig. FF

**TO PROGRAM THE LPA MODE:**

LPA Mode (Lowest Position Attained) (Peak Depth Mode)

The LPA mode can be used for trouble shooting or for diagnostic reading of the lowest position of the ram on a given bend. This mode will enable the operator to view the actual depth the ram has achieved by locking the display in the ram depth axis on the lowest dimension the ram has achieved. The ram axis can run in this LPA mode or the POS mode. Most of the time you will want to run in the POS mode.

1. Press **BEND** .
2. Press **0** .
3. Press **-** .
4. Press **-** .
5. Press **DEPTH** .
6. Press = until -2 _____ LPA appears in the display window. The LPA mode is now operational.

**TO PROGRAM OFF MODE:**

The OFF mode for the ram axis shuts off the ram axis. This may be used if the operator wants to use the manual depth stops of the pressbrake without using the Automec ram axis. The operator may also want to use this mode if the Automec ram axis fails and he still wants to run as a single axis rather than being completely down. For the most part, this mode is primarily used for diagnostic reasons.

1. Press **BEND** .
2. Press **0** .
3. Press **-** .
4. Press **-** .
5. Press **DEPTH** .
6. Press = until -2 _____ OFF appears in the display window. The depth mode is now turned off and you now have single axis operation only.

**PROCEDURE TO RETRIEVE RAM DEPTH AXIS:**

If system should lose ram axis due to memory loss or component failure, the following procedure will reactivate ram axis.

1. Move the indented switch under the magnetic card to the code position.
2. Press **HGT**, right hand digit should not be "0". If the right hand digit is "0", follow steps 3,4, & 5.
3. Continue to press **HGT** until right hand digit is flashing.
4. Press **C** .
5. Press **1** .

Ram axis should now be operational.

**ADDITIONAL INFORMATION:**

**TO CHANGE POLARITY OF RAM SWITCH** - Lift up magnetic instruction card and move indented switch to code position (right position). -9 should appear in the job window. Now press the **FLANGE** button until the 3rd window from the right, as shown in the diagram, is blinking. Push **C** . The letter C will appear in the window blinking. You may now enter either **0** or **1** . These are the two different ram switch polarities. Move indented switch back to run position and polarity change has been completed.

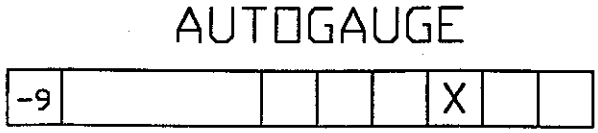



FIG. 41
RAM SWITCH

**TO ADJUST STOP BITS (For fine tuning of positioning)** - Lift magnetic card and move indented switch to code position (right position). Now press the **FLANGE** button until the last window on the right is blinking. Push **C** . The letter C will appear in the window blinking. Next, enter a number 1-9 in that window. Choose a number which allows the backgauge to position within tolerance (+/- .002"). Move indented switch back to run position and check out for accuracy.


FIG. 42
SCALE FACTOR

**TO PROGRAM SCALE FACTOR** - The scale factor is factory preset and should not have to be reprogrammed. If you should have to reset the scale factor, lift up the magnetic instruction card and move the indented switch to the code (right) position. The scale factor positions are the 4th, 5th, and 6th digits form the right (see diagram). Scale factor can be positive or negative. The positive side is understood unless the **(-)** button is depressed prior to entering scale factor. The scale factor number should be opposite the real number you want to compensate for. For instance, if your lead error is **-.003**, program **+.003** for your scale factor. Next, push the indented switch to the run position and you are ready to go.

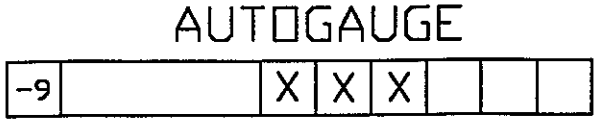



FIG. 43
STOP BITS