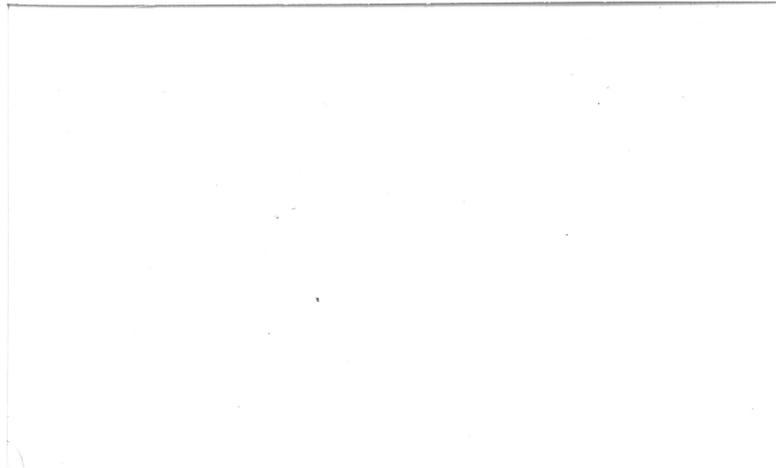# EQUIPMENT MANUAL

MPC-2100

Gage Control

Manual Form C-36-A

CLEARING NIAGARA

ATENCIÓN: Lean y comprendan las instrucciones en este manual antes de instalar, operar o mantener máquinas, o fundar matrices. Si Usted no comprende este manual pidale a su supervisor que se lo explique o que lo interprete.

CLEARING NIAGARA

EQUIPMENT MANUAL

MPC-2100

Gage Control

Manual Form C-36-A

T A B L E   O F   C O N T E N T S

MPC-2100 KEYPAD CONTROLS

Display Readout

24000

MPC 2100 N

R U N

Enter Key
Manual Move, In

* Menu Selection
Manual Move, Out

Minus Key

Decimal Point

Clear Key

10 Number Keys

Job Number Key

Manual Move, Jog / Increment

* Menu Selections:
1. Taper
2. Offset
3. Edit
4. Program/Step
5. Cuts Display

3

I   SYSTEM DESCRIPTION

The Stepper Motor Gage controller consists of two Stepper motors, two Stepper motor drives and a microprocessor controller with continuous memory.

Microprocessor Controller

It will store permanently, in continuous memory, the gage maximum limit and the positions of the two calibration limit switches, all program information, system parameters, as well as offsets and taper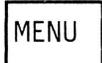s. The controller is capable of storing 62 jobs with 16 steps each. The maximum number of cuts per step is 9999. The display shows the current gage position to the nearest .001". It can also display operator input, or offsets and tapers to the nearest .001".

In addition to the numbers 0-9, the keyboard (see Fig. 1) has a DECIMAL POINT key, a MINUS key (for entering negative offsets, tapers and program delete), 2 manual position keys (WIDE ☐△ and NARROW ☐▽), which are used in conjunction with the JOG/INC key for manual gage positioning, an ENTER key and a CLEAR key. The keyboard also has a MENU key to access taper, offset and edit modes.

II   SYSTEM OPERATION

Power Control

The power to the gage is controlled by the gage stop and the gage reset buttons on the shear front panel. The gage stop button turns off all power to the gage system. When the power is turned off, none of the program, offset or taper information entered previously is lost. The power is turned on by the gage reset button.

Calibration

When the system is powered up, the gage display reads "CAL" and is in the calibration mode ready for calibration. To calibrate the system the operator enters the width of a cut via the numeric keypad and then presses the ENTER key. The display will read "AUTO CAL". The gage will then move until it hits the calibration switches. If the gage is not "square", the gage may repeat this calibration procedure several times. Once the gage is calibrated, it will move to the gage position previously entered by the operator.

Numeric Keypad

The 0 through 9 and . keys are used to enter cut widths, tapers and offsets. The - key is used to enter negative offsets, negative tapers, and in the

Numeric Keypad (continued)

"Edit" mode, will <u>delete</u> programs. It is ignored if used to enter a width. Cut widths and offsets are entered in decimal inches to the nearest .001". Leading zeroes are not displayed if entered and trailing zeroes are not necessary.
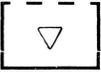
ENTER
    Enters gage data such as width of cut, offset or taper. As an example, if a 12 and 5/8's inch cut is desired, the operator would type the key sequence "12.625, ENTER". Providing the gage was previously calibrated, the gage would then move to 12.625 inches. If gage <u>was</u> <u>not</u> previously calibrated, "AUTO CAL" would display during the calibration procedure. After calibration the gage moves to the entered dimension and displays this value, less offsets and tapers. If the operator tries to enter a width larger than the programmed limit, the error message -E01- will be displayed. If the operator has previously entered an offset or taper and then tries to enter a width larger than the programmed limit, the offset or the programmed limit, 1.5 x the taper, the error message -E01- will be displayed. If the operator tries to enter a width less than the offset or less than 1.5 x the taper, error message -E01- will be displayed. If this occurs, the operator may immediately enter a new width. If the ENTER key is pressed without first entering a width, the current gage position is displayed. This key is also used to enter program information when in edit mode.

CLEAR
   Nulls the display in case the operator makes an error entering a width, taper or offset. After it is pressed, only the display is zeroed and ready for a new entry.

Manual Operations
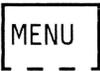
JOG
INC
    The manual gage position keys allow the operator to manually move the gage. One such function key is <u>JOG</u>. To enter the JOG mode press JOG/INC key to show a "J" on the left side of the display. Pressing △ key will cause

Manual Operations (continued)

the gage to move out at normal jog speed. Pressing $\boxed{\triangledown}$ key will cause

the gage to move in at normal jog speed. The gage will move as long as the

key is held, and the display will show actual position.

Another manual function is <u>Incremental</u>. To enter this mode, press $\boxed{\text{JOG/INC}}$

key again. Now an "i" will be displayed on the left side. Pressing
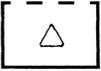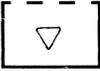
$\boxed{\triangle}$ or $\boxed{\triangledown}$ keys will cause the gage to move .001 inches per key

actuation in the direction initiated. Outgoing moves only, will contain a

backlash programmed parameter move also.

$\boxed{\text{TAPER}}$ Used when the operator desires to move the gage out of square with the

blade. Press $\boxed{\text{MENU}}$ key once to display "TPR". Tapers are entered by

typing the desired taper (min. .001" to max. of 5.999 measured at the gage

drivescrew) and then pressing the $\boxed{\text{ENTER}}$ key. To taper the gage in the

outgoing direction the operator enters the taper as a negative value. Posi-

tive or normal tapers will cause an ingoing move towards the blades. To

display the current taper the operator presses the $\boxed{\text{MENU}}$ key. To remove

a taper the operator presses $\boxed{\text{CLEAR}}$ then $\boxed{\text{ENTER}}$. If the operator tries

to enter a taper whose magnitude is greater than 5.999 inches, the error

message -E02- will be displayed. The operator may immediately reenter a

lesser value or press $\boxed{\text{MENU}}$ key to call a different entry.

The operator is urged to check this entry upon running a new program or

after initial power-up and calibration, as previous entries may not suit

his particular need. This entry is retained when power is turned off and

the new piece part may not require this taper dimension, due to material

and offcut differences.

NOTE: For shears cutting right to left, (i.e. right side low rake end) a negative
taper causes the left side of the gage (as viewed from the front of the
shear) to move back away from the blade. A positive taper causes the left

side of the gage to move forward, toward the blade. Shears with left to right cutting action will have the opposite taper side (or right side) moving.

OFFSET

To display and enter offsets for adjusting the gage position, press MENU key twice to display "OFT". Offsets are entered by typing the desired offset and then pressing the ENTER key. A negative offset will give a larger cut; a positive offset will give a smaller cut. A negative offset is entered by pressing the - key before typing in the width. For example, to enter an offset which would give a cut 1/8" larger than displayed, the operator would type -.125 ENTER . The display will blank while gage is moving, then show the original dimension. The offset adjustment is now made and gage position is .125" smaller than the original dimension. If the operator tries to enter an offset whose magnitude is greater than ± 1.999 inches, error message -E02- will be displayed. If this occurs, the operator may immediately enter a lesser offset, or press MENU key for other entry. To display the current offset, the operator presses the MENU key twice to display "OFT". To remove an offset, the operator presses CLEAR then ENTER keys. A new offset may then be entered.
As with taper function above, the operator is urged to check this entry between new programs and on power-up. Previous offsets may not prove accurate for a new program or dimension, due to material differences and/or offcut dimensions.

EDIT

Used to enter and alter job data. The gage controller must first be in edit mode to change or enter any program values. The controller must be out of edit mode to move the gage in either programmed or manual modes. To enter the edit mode the operator presses MENU key three times to display "EDIT". To exit the edit mode the operator again presses MENU and gage dimension will be displayed.

Display "E" - Codes

E01   - Invalid dimension entry, beyond parameter limit

E02   - Taper or offset beyond parameter limit

E03   - Invalid entry prior to calibration

E04   - Invalid entry procedure

"Null" - Job number not existing

Programming a New Job

To create a new job, press $\boxed{\text{MENU}}$ key three times to display "EDIT". It is good practice to first <u>delete</u> the job number to be used. This will insure that any previous data will be erased from this particular job number. Delete is accomplished in Edit mode, by first pressing the minus ($\boxed{\text{-}}$) key. The display should now show "del". Enter the job <u>number</u> to be deleted, in this case the <u>new</u> job number. Press $\boxed{\text{ENTER}}$. The display should now show "del. done". Press $\boxed{\text{MENU}}$ to return to Edit mode.

Type in new job number again (1 to 62), press decimal point key (.), then type in step number zero-one. Display should now show the job number, point, zero-one. (Example: for job number one, step number one display reads .... 1.01) Press $\boxed{\text{ENTER}}$ key. Display reads "01" for step one. Next type in the cut width dimension for step one. (Trailing zeros do not need to be used.) Press $\boxed{\text{ENTER}}$ key. Display reads "01 ct.", ready for operator entry of number of cuts to be made in step one <u>at</u> previously entered cut dimension. (1 to 9999) Press the number of cuts required and press $\boxed{\text{ENTER}}$. Display will now show "02", requiring step two cut dimension to be typed in. After pressing $\boxed{\text{ENTER}}$ key, "02 ct." displays. As with step one above, type in the number of cuts to be made in step two and press $\boxed{\text{ENTER}}$. Repeat this process of cut dimension, enter, number of cuts, enter, etc. for all concurring steps to complete this new job (maximum of 16 steps). Pressing $\boxed{\triangle}$ key reverses the entered program (step by step) to check previously entered program data. Press $\boxed{\text{JOG/INC}}$ key, then $\boxed{\text{CLEAR}}$ to exit edit mode to manual mode. New job may now be ran. (See "Running a Job")

Programming a New Job (continued)

Example:

Function Keys   Programmer Displays

Press MENU key three times   "Edit" mode

Type in 1.01   "1.01"

Press ENTER   "01" on left

Type in cut dimension, step one   "01   XX.XXX"

Press ENTER   "01 ct." on left

Type in number of cuts   "01 ct.   XX"

Press ENTER   "02" on left

Type in cut dimension, step two   "02   XX.XXX"

Press ENTER   "02 ct." on left

Type in number of cuts   "02 ct.   XX"

Press ENTER   "03" on left

(Type in step three data as above)

Continue with entry procedure. Maximum of 16 steps allowed.

Pressing △ key will reverse program to view contents. Likewise, pressing

▽ key will advance program to view its contents.

Press JOG/INC key, then CLEAR to exit edit mode.

Editing a Job

Any step in any job may be changed while in edit mode. To change a step the gage
controller must be in edit mode. To enter edit mode, press ENTER key three times
to show "Edit" on the display. Type in job number to be edited, press decimal point
key, type in step number to edit or numbers zero-one to start at the beginning with
step one. Press ENTER key. Display will show cut dimension on right and step num-
ber on left of display for previously chosen step entry.

Editing a Job (continued)

To change program displayed data, press CLEAR key to zero data, then reenter new data.

Pressing △ key will backstep program and display previous step data.

Pressing ▽ key will advance program and display next step data.

Press JOG/INC key, then CLEAR key to exit "Edit" mode.

Running a Job

To call a job from memory and to run this job, the operator must first press the JOB # key. At this point the display will read "Job.0". Type in the job number to run (1 to 62) and press ENTER key. If the gage was previously calibrated and if the job number entered exists in memory, the gage will move to the dimension in step one. The display will show the dimension of the current step as the program is automatically advanced during machine operation.

Upon entering a job number, if "NULL" is displayed, the indication is the entered job number is not contained in memory. The operator must then either recheck the number entered or call up the job in "Edit" mode to program it.

If the gage was not previously calibrated when calling up a job to run, the gage will perform an "AUTO. CAL." procedure prior to the gage moving to the program dimension.

Once the job is called and displayed, the operator may select various hidden displays and features through pressing the MENU key. When pressing this key, the display will change as follows:

"tPR." - This allows the gage to be "tapered" or skewed to adjust for offcut shearing inaccuracies. (Refer to "taper" section of Manual Operations.)

"oFt" - This allows the gage to be "offset" or to move the same distance on both sides to adjust for offcut shearing inaccuracies. (Refer to "offset" section of Manual Operations.)

Running a Job (continued)

"Job" - When in this mode, current job and step numbers will be displayed and updated.

"ct" - Displays number of cuts to be performed in this step. Number indicates one less than actual value to be made. (For example: display of 99 equals 100 cuts to be made.)

Deleting a Job

To delete or clear a job from memory, the operator must first call up "Edit" mode via MENU key. Pressing the minus key (-) will cause the display to show "del.". Type in the job number to delete and press ENTER key. Display will now show "del.done". Exit edit mode by pressing JOG/INC key then CLEAR key. The gage system is now in manual mode of operation.

III SYSTEM SETUP

There are four basic steps to <u>initial</u> setup of the MPC-2100 Gage System. The steps are:

    1. Dip Switch Settings
    2. System Parameter Entry
   3A. Calibration Switch Determination
    B. System Checkout and Adjustment

<u>Existing</u> gage systems, requiring possible service and/or alignment, may need some combination of these steps. All above steps were factory performed at time of gage installation.

```
┌─────────────────────────────────────────────────────────────┐
│  CHECKS AND ADJUSTMENTS MUST BE PERFORMED BY QUALIFIED       │
│      PERSONS OF ELECTRICAL AND MACHINE EXPERIENCE.           │
└─────────────────────────────────────────────────────────────┘
```

Step 1. Dip Switch Settings

Drawing #1, Gage Keypad-Controller, shows rear view with location of plug-in connectors and internal view showing dip switches with settings.

Only upon <u>initial</u> controller setup will the dip switches need to be checked for proper setting. All SW1 switches must be <u>on</u> and all SW2 switches <u>off</u>. SW3 setting should be 1, 2, 3 and 6 <u>on</u>. These dip configurations <u>must</u> be done prior to system power up and energizing.

NOTE: This configuration reflects our <u>standard stepping motor gage</u>. Refer to Niagara electricals for other gage positioning techniques and dip settings.

Step 2. System Parameter Entry

The MPC-2100 Keypad-Controller requires a number of system parameters to be entered during <u>initial</u> system setup and later for calibration adjustment. To be allowed entry into this sensitive area of memory a programming switch must be energized and a code entry performed. With power off, turn on programming switch located within electrical cabinet. This enables the keypad-controller to enter a parameter change mode. Power gage system on. "CAL" is now displayed. Press $\boxed{\text{ENTER}}$ key. "Code" shows on display. Entry of valid code number will only be accepted. Pressing $\boxed{\triangledown}$ key will advance system parameter page <u>after</u> keyed in code number. Pressing $\boxed{\triangle}$ key reverses parameter page sequencing at this time also.

Step 2. System Parameter Entry (continued)

To change a parameter, advance or reverse parameter page to display the parameter to be altered. Press CLEAR key to zero preset data. Key in new data and press ENTER key. Page advances to next parameter. Pressing [⌐ ⌐] key reverses page to show previous entry.

When completed with parameter changes, power gage system off, turn off programming switch, power system on and check for proper operation of gage.

Repeat above procedure as needed to make further parameter changes.

The following is a list of system parameters:

```
PER.P.  - Percent Positioning Speed
PER.H.  - Home Limit Search Speed
PER.L.  - Home Final Approach and Anti-Backlash
PER.J.  - Jog Speed
Per.i.  - Incremental Speed
ACCE.   - Acceleration and Deceleration Time
1.C.    - Number of Steps per Unit of Measurement (INCH)
2.C.    - Number of Steps per Unit of Measurement (METRIC)
in.     - Amount of Movement Upon Increment Command
1.d.    - Display Calibrator (1/C.C. x Resolution of Display) (INCH)
1.dp.   - Decimal Places to Display (INCH)
2.d     - Display Cal. (METRIC)
2.dp    - Decimal Places (METRIC)
*H.o.   - Home Offset. Limit Switch Distance of Pivot Axis
*H.t.   - Home Taper. Limit Switch Distance of Moving Taper Axis
            minus Home Offset Distance
o.t.    - Maximum Travel. Overtravel Limit.
b.l.    - Backlash Move
Baud    - Used for off-line programming only.
Id.No.  - Used for off-line programming only.
```

While most of the preceding parameters are consistent between machine models, consult "MPC-2100 Parameter/Calibration Data" sign located in the electrical enclosure for machine data and limits.

*Limit switch calibration settings (H.o. and H.t.) are machine specific entries.

NOTE: Refer to "Obtaining H.o. and H.t. Position" section for explanation.

Step 3. Calibration Switch Determination

Calibration switch parameters (H.o. and H.t.) are factory preset. However, there may be times to obtain a new calibration switch position. For new, first time gage system startups, a make-break point of switch closure must be determined. This is basically a one-time factory procedure performed during gage assembly and inspection. However, if calibration switch replacement or major mechanical service is performed, this first procedure will need to be repeated. (Refer Procedure "A" below.)

Another reason to determine a calibration switch parameter would be when a fine tuning adjustment is needed. This second procedure involves actual material cutting, precise piece measurement and adjustment of the previous switch parameter. (Refer Procedure "B" below.)

Step 3. Calibration Switch Determination (continued)

Procedure A:

Perform this procedure to determine a new make-break point of the calibration switches. This is an electrical position to achieve a "ball park" parameter. Procedure "B" is needed to tighten parameter accuracy. Refer to this procedure ("B") for minor corrections to existing "H.o." and "H.t." parameters.

With power off, manually position the gage against shear knife. This establishes a mechanical zero point. With system power off, insert one end of 3 jumper test wires, approximately two feet in length, to terminals *TB2-6, TB2-9 and TB3-8. (Refer to system schematics on Niagara electrical prints for wire numbers.)

* NOTE: Jumper wire TB2-6 may not be used on some model machines. Check schematics and parameter sign for no connection to this point and no "H.t." value and proceed with test. Be sure not to allow other ends of these wires to touch surrounding, potentially dangerous areas.

Connect jumper TB2-9 to TB3-8. This is "calibration (H.o.) switch" and "display hold" inputs. Power gage on. Press ⌈JOG/INC⌋ key to prompt a "J" on the display. Press ⌈△⌋ key to move gage out past the make-break point of right calibration switch (generally 3 to 4 inches). Now press ⌈▽⌋ key to move gage towards knives until display stops counting and holds a dimension. This dimension is preliminary "H.o." parameter. Press ⌈△⌋ and ⌈△⌋ keys to check displayed dimension holds to the same dimension just indicated.

Disconnect TB2-9 and TB3-8 jumpers. Connect *TB2-6 to TB3-8 and repeat above moves to cause display to "freeze" again. This second value will be used to derive the other calibration switch dimension known as H.t. As above *"NOTE" indicated, this second calibration switch is not used on some models of machines. Primarily this is only used on the dual step motor style gage systems. Refer to specific electrical prints to determine this.

If gage system only requires "H.o." calibration parameter, enter this number into system parameter page. (Refer to Step 2 "System Parameter Entry" above.)

Systems requiring both "H.o." and "H.t." parameters (right and left calibration switches) are now able to derive the "H.t." parameter with the now known calibration switch values. To determine "H.t." subtract the switch value "H.o." from the second switch value found above. This preliminary "Home Taper" ("H.t.") value and known "Home Offset" ("H.o.") value can now be entered into the system parameter page as described in Step 2. (See *Note below.)

As previously stated, these are preliminary parameters that establish an electronic "ball park" dimension. Perform Procedure B to "fine tune" these values and derive accurate working parameters.

* NOTE: If "H.t." becomes a negative number through the subtraction process, be sure to enter minus sign too.

Step 3. Calibration Switch Determination (continued)

Procedure B:

Knowing "H.o." and "H.t." and having entered these into parameter memory will allow actual shearing of material to be performed with marginal tolerances. Choose a full bed length of material that most closely represents normal shearing applications. Enter a dimension into manual mode of controller (1 or 2 inches). After calibration routine is accomplished and gage runs to inputted dimension, shear material chosen and precisely measure this offcut piece. Make adjustments to "H.o." and "H.t." as follows and enter these new parameters into system memory (refer Step 2.).

Fine Tuning Calibrate Switch Settings

Adjustment Relationship of Calibration Parameters:

Pivot Side of Gage: (H.o.)

- Adding a value to "H.o." will cause this side of the gage to move in this value.
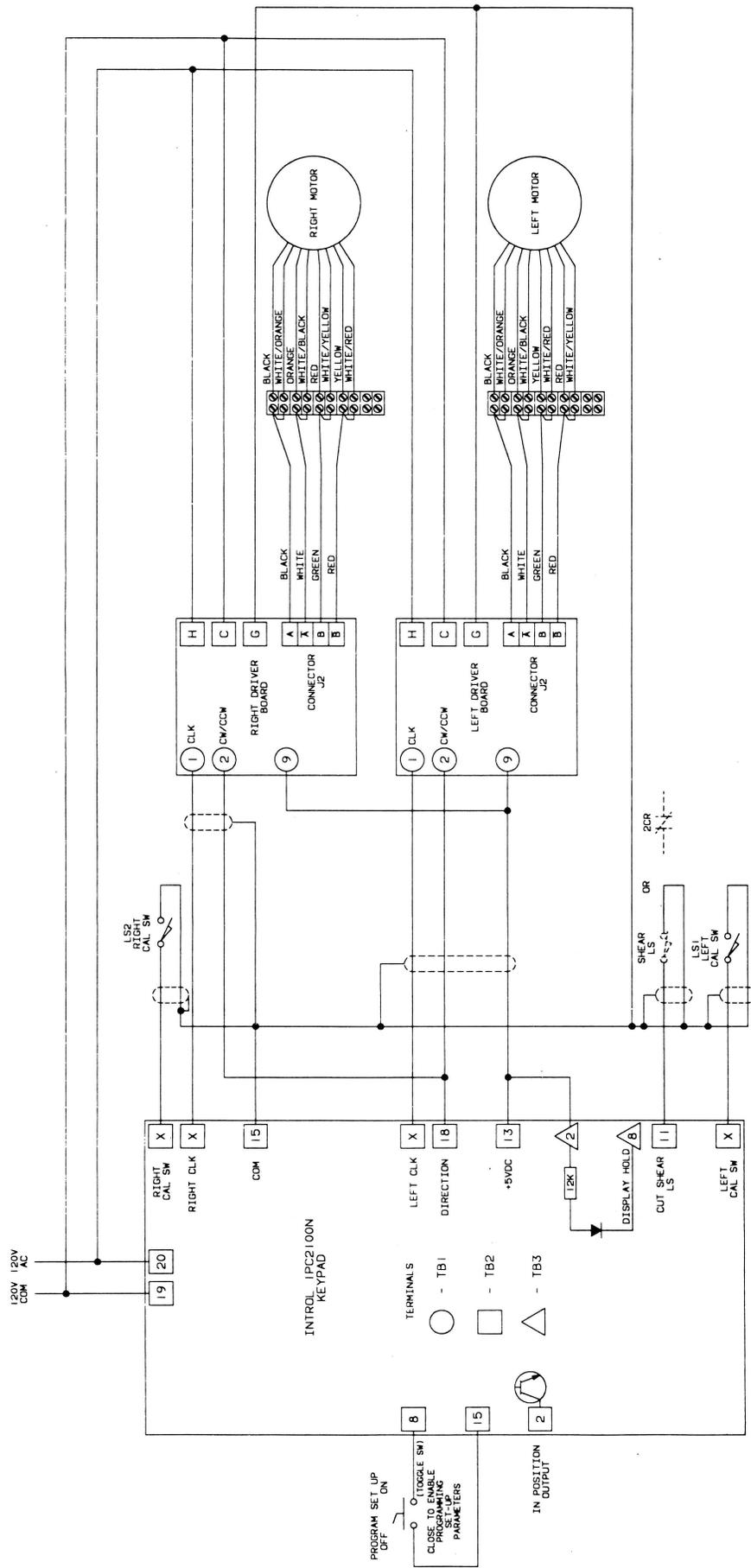- Subtracting from "H.o." will cause this side of the gage to move out this value.

Remember: The taper side (H.t.) is derived from this pivot (H.o.) side, so a change in H.o. will effect H.t.

Taper or Moving Side of Gage: (H.t.)

Since it is possible for "H.t." to become a negative value, adjustment will be in terms of sign. Therefore, the more negative (or less positive) "H.t." becomes, the larger (moving out) the gage will become. Likewise, the less negative "H.t." is adjusted (or more positive), the smaller (moving inward) the gage will be adjusted.

After the adjustments to "H.o." and "H.t." have been made and entered to memory, power gage system off and back on again. Enter the "test" dimension again and make a cut of the material to check that previous parameter adjustments were correct and measured piece accurately.

* NOTE: Gage repeatability will adhere to consistency. Variances in material will be the greatest factor to offcut accuracy. To accommodate the variances due to grain, internal stresses, offcut size and so on, the gage system employs an "offset" and a "taper" feature. Refer to these sections in the operation portion of this manual to adjust the gage to compensate for these "real world" variables.

RIGHT MOTOR

LEFT MOTOR

BLACK
WHITE/ORANGE
ORANGE
WHITE/BLACK
RED
WHITE/YELLOW
YELLOW
WHITE/RED

BLACK
WHITE/ORANGE
ORANGE
WHITE/BLACK
YELLOW
WHITE/RED
RED
WHITE/YELLOW

BLACK
WHITE
GREEN
RED

BLACK
WHITE
GREEN
RED

H C G A A̅ B B̅

RIGHT DRIVER BOARD

CONNECTOR J2

LEFT DRIVER BOARD

CONNECTOR J2

1 CLK
2 CW/CCW
9

1 CLK
2 CW/CCW
9

LS2 RIGHT CAL. SW

SHEAR LS

LS1 LEFT CAL. SW

2CR

RIGHT CAL SW — X
RIGHT CLK — X
COM — 15

LEFT CLK — X
DIRECTION — 18

+5VDC — 13

2 — 12K

DISPLAY HOLD — 8
CUT SHEAR LS — 11
LEFT CAL SW — X

120V 120V AC — 20
120V COM — 19

INTROL IPC2100N KEYPAD

TERMINALS   ◯ – TB1
            ▢ – TB2
            △ – TB3

PROGRAM SET UP
ON
OFF
(TOGGLE SW)
CLOSE TO ENABLE PROGRAMMING SET-UP PARAMETERS

IN POSITION OUTPUT

8
15
2

X – TERMINAL NO'S DEPENDANT ON SHEAR TYPE

16

REAR VIEW KEYPAD–CONTROLLER

```
                              ⊘
MODEL 2100 N                            TB 1   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

TB 3
      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |


TB 2
      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
```
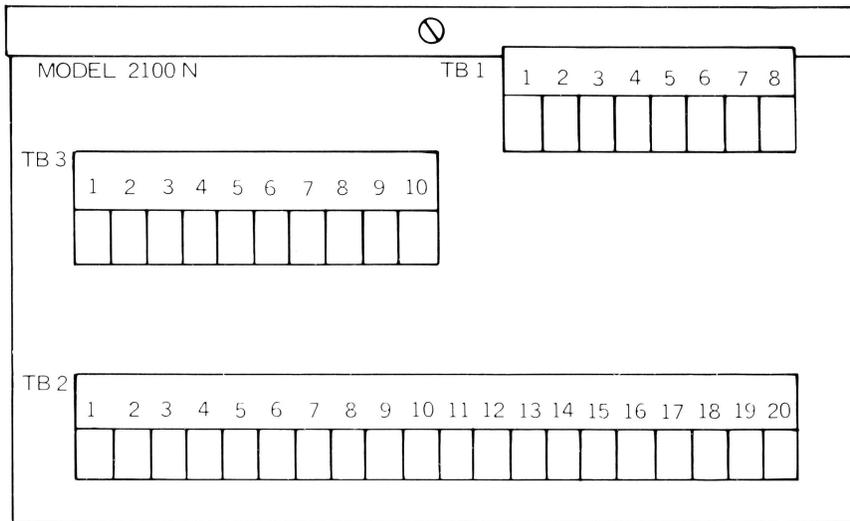
INTERNAL–TOP VIEW KEYPAD CONTROLLER (INSIDE COVER)

```
              SW1                    SW2                      SW3
TB2    ↑    |1|2|3|4|5|6|7|8|    |1|2|3|4|5|6|7|8|   OFF  |1|2|3|4|5|6|7|8|9|10|11|12|
       ON                                            ↓
          (ALL ON)              (ALL OFF)              (1,2,3&6 ON)

TB1
```

NOTE:

SW3 SETTING MAY VARY THRU
MACHINE GAGE MODELS. THIS
SETTING REFLECTS DUAL STEP
MOTOR GAGE OPERATING IN
FULL STEP MODE. PLACE 2+4
"ON" FOR 1/5 STEP OPERATION.
SEE IPC 2100 NCA OPERATION
MANUAL FOR "SINGLE" MOTOR
TYPE BACKGAGE.
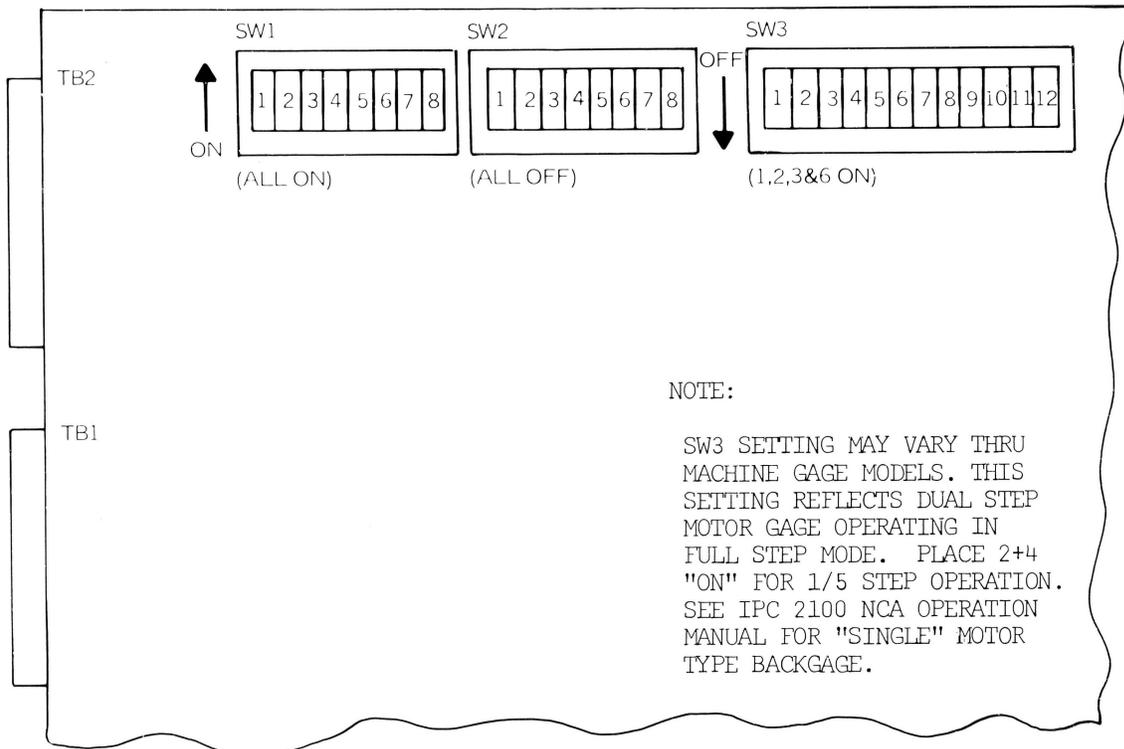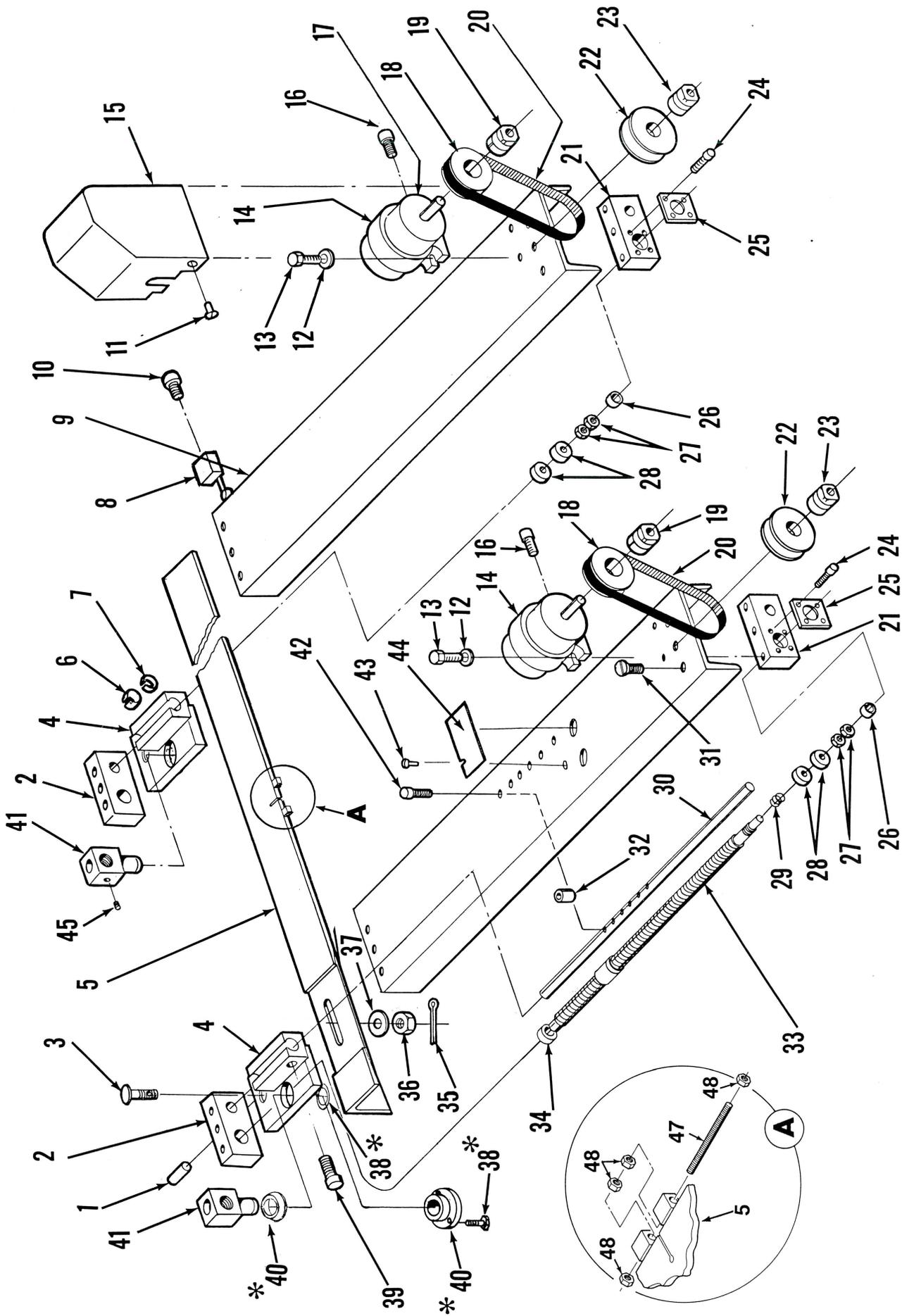
MPC-2100 PROGRAMMABLE SHEAR BACKGAGE

PARTS LIST

1. Set Screw
2. Bearing Block
3. Stud
4. Slide
5. Back Gage
6. Oil Wick
7. Seal
8. Limit Switch
9. Bracket
10. Socket Head Capscrew
11. Hex Head Bolt
12. Washer
13. Hex Head Bolt
14. Motor Bracket
15. Motor Cover
16. Socket Head Capscrew
17. Motor
18. Pulley
19. Coupling
20. Belt
21. Bearing Block
22. Pulley
23. Coupling
24. Hex Head Bolt
25. Bearing Keeper
26. Bearing Spacer (48" model only)
27. Lock Nuts
28. Bearing (single on 36" model)
29. Disc Spring
30. Support Shaft
31. Flat Head Screw
32. Shaft Spacer
33. Ball Screw
34. Bearing
35. Cotter Pin
36. Hex Nut
37. Washer
*38. Retaining Ring or Block Mounting Screw
39. Socket Head Capscrew
*40. Bearing (Solid or Ball)
41. Trunnion
42. Socket Head Capscrew
43. Button Head Socket Screw
44. Cover
45. Set Screw
47. Stud
48. Hex Nut

WARNING

TO PREVENT SERIOUS BODILY INJURY

NEVER PLACE ANY PART OF YOUR BODY NEAR MOVING PARTS OF THIS SHEAR INCLUDING MATERIAL BEING SHEARED AND ALL AUXILIARY EQUIPMENT.

IT IS THE EMPLOYER'S RESPONSIBILITY TO IMPLEMENT THE ABOVE BY PROVIDING PROPER DEVICES OR MEANS THAT MAY BE NECESSARY OR REQUIRED FOR THE PARTICULAR OPERATION BEING PERFORMED.

TURN OFF MAIN DRIVE AND LOCK-OUT THE OPERATOR CONTROLS BEFORE ENTERING REAR AREA OF SHEAR.

DO NOT ALLOW ANY PART OF BODY TO BE STRUCK BY MOVING BACK GAGE.

DO NOT GET ANY PART OF BODY BETWEEN STACKED MATERIAL AND BACK GAGE.

• DO NOT REMOVE THIS SIGN FROM THIS SHEAR   P-99319 •