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ENCO MANUFACTURING, INC

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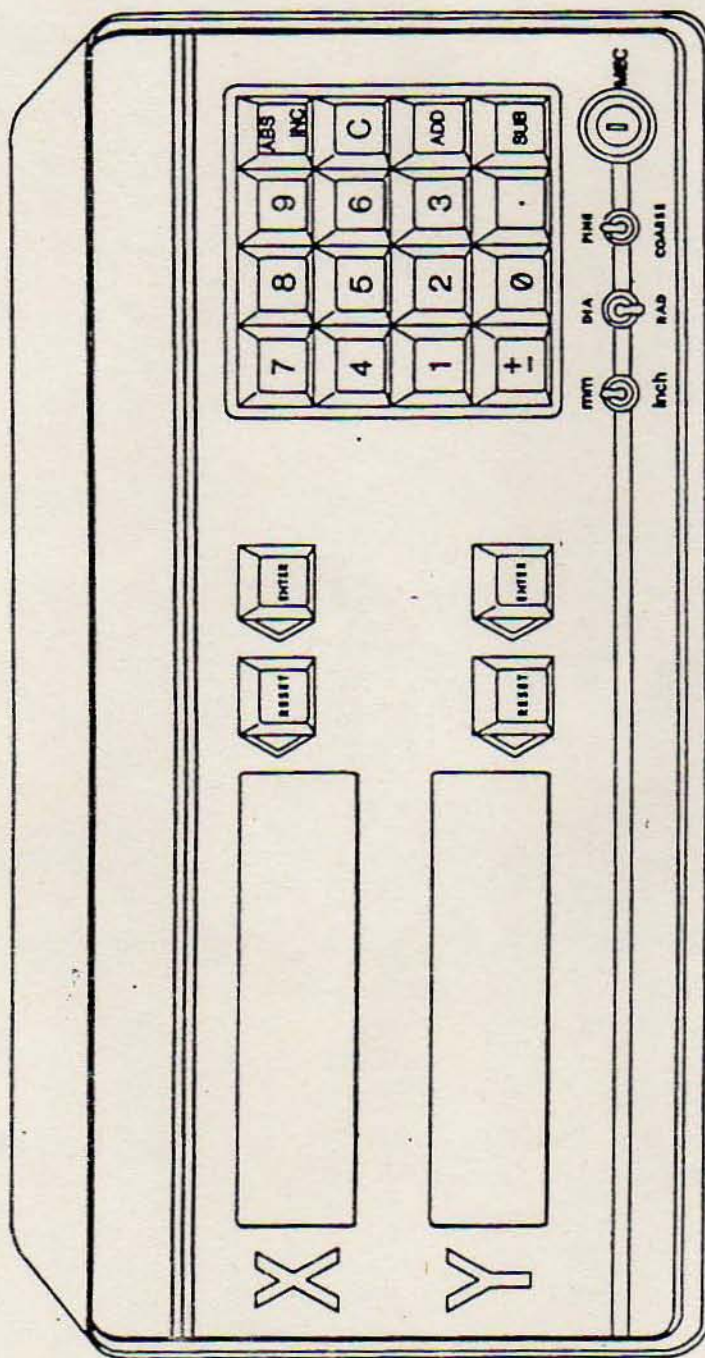
PELIMINARY OPERATIONAL/INSTALLATION INSTRUCTIONS

FOR

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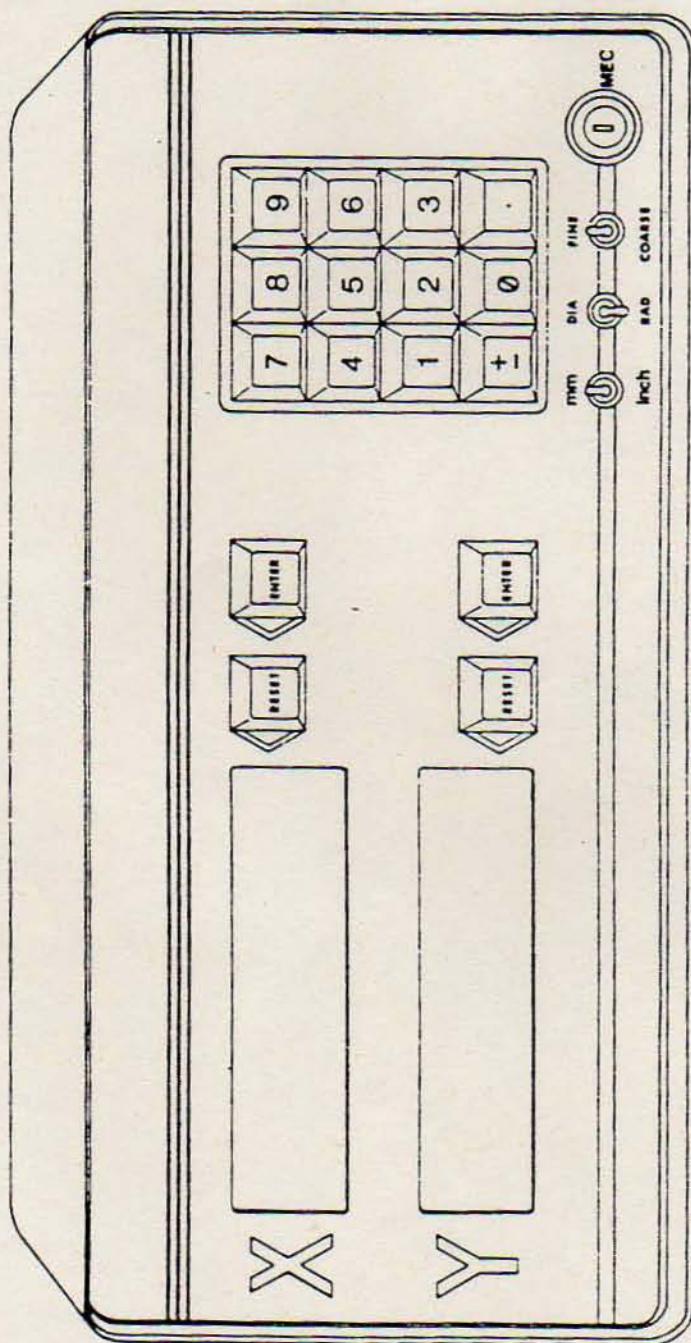
SUPER PLATINUM EDGE D.R.O. DISPLAYS

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## 1. 700 SERIES GENERAL OPERATING INSTRUCTIONS

### A. GENERAL;

The following general operational instructions are common to models 711A, 712A, 713A, 721A, 722A, and 723A Digital Readout Displays. Section II provides the required instructions to operate the additional features found in Models 721A, 722A, and 723A displays.

All 700 Series displays incorporate a unique "nonvolatile" memory feature that replaces the old "battery backup technology still used by other D.R.O. manufacturers. This feature represents the latest in solid-state and integrated circuit technology. The power supply has a special AC power monitoring detector. This detector commands the microcomputer to store its data in a special memory integrated circuit called a Shadow RAM and "dumps" its stored information back into the microcomputer.

The nonvolatile memory is featured when the operator initially turns the display's AC power switch to "ON". The display digits will flash a series of horizontal dashes informing the operator that the AC power is on, and normal. Normal is defined as  $\pm 20\%$  of its assigned value. During normal operation the sudden presentation of flashing horizontal dashes would alert the operator of a momentary power dropout (failure).

**WARNING:** WHEN AC LINE VOLTAGE DROPS BELOW A PREPROGRAMMED LEVEL THE MEASUREMENT SYSTEM ACCURACY MAY HAVE BEEN JEOPARDIZED.

### B. FRONT PANEL CONTROLS:

The description of the 700 Series counter display common controls are as follows:

1. RESET: The RESET control zeros the counter relevant axis



display to an incremental "floating zero".

2. ENTER: The ENTER control is used to execute TWO functions; the first, or primary function, is to select the axis to be programmed. The second function is to enter data such as preset, and machine error compensation.

3. INCH/MM SWITCH: The display's microcomputer converts inch or millimeter dimensional values to millimeter or inch values by activating the inch/mm switch to INCH or MM.

4. RADIUS/DIAMETER SWITCH: This switch programs the display's "Y" axis microcomputer to convert radius/diameter measurements to diameter/radius dimensions. When the switch is activated from radius to diameter, the display reading will double the measured value. Example: If there is a 2 micron scale mounted on a lathe cross slide, and it is reading a radius dimensional value of 0.111mm, when the operator switches the radius/diameter switch to diameter, the displayed value will immediately change from 0.111mm to 0.222mm

5. FINE/COARSE SWITCH: The Fine/Coarse switch is a unique feature that enhances production, reduces scrap, and operator fatigue. With this control the operator selects the optimum scale resolution for the job. EXAMPLE: The example machine tool has 0.0005" (0.01mm) resolution scale, therefore the display's (0.01mm) resolution scale, therefore the display's "FINE" mode will resolve measurements in 0.0005" (0.01mm) incremental steps, and its COARSE mode will resolve 0.001" (0.02mm) incremental steps.

6. MACHINE ERROR COMPENSATION (M.E.C.) The M.E.C. keylock switch with nonvolatile memory is an EXCLUSIVE feature that facilitates secured machine error compensation in a matter of seconds.

Examples of linear machine errors that can be compensated for, are errors realized by geometric distortion such as ways, gibs, and table distortions. These errors can be automatically compensated for by measuring the error of dimension and programming the compensation factor into the relevant axis microcomputer.

7. +/--KEY: This key allows the operator to program (preset) positive or negative dimensions.

8. .KEY: This key positions the decimal point in it's required location during presetting and/or "M.E.C." programming.

9. 0 THROUGH 9 NUMBER KEYS: The numerical keys are



used to program presetting dimensions and/or M.E.C. factors.

10. ON/OFF SWITCH: The ON/OFF switch is located on the display's rear panel. A.C. power is activated to the display's electronics when the switch is in the "ON" position. A.C. power is removed from the display's electronics when the power switch is in the "OFF" position.

#### C. OPERATIONAL PROCEDURES:

For first time operation it is recommended to position the toggle switches in the following modes:

1. INCH/MM switch to millimeter (metric)
2. DIAMETER/RADIUS switch to "Radius"
3. FINE/COARSE switch to "Fine"
4. POWER ON/OFF switch to "On"

1. DIAGNOSTIC: The 700 Series computers have "built in" diagnostics "self test" that test the computer's operation and tells the operator if everything is functional, or faulty. The operation is as follows:

STEP 1. Turn Power "On" by activating the power ON/OFF switch to ON position

ACTION The 7 digit L.E.D.'s will momentarily depict "-8.8.8.8.8.8.8."

STEP 2. View the display for approximately 1 to 2 seconds.

ACTION The 7 Digit Display L.E.D.'s will come up "-8.8.8.8.8.8.8." and begin flashing. This action states that Diagnostic tests are functional and computer is ready for operation.

NOTE When the display shows random numbers and/or the digit bars do not "flash" the computer has a fault. Turn the display off and then back on and try again. If the display still shows a fault contact your local service center or the factory.

STEP 3. Press each axis "ENTER" key.

ACTION THE DISPLAY IS READY FOR OPERATION

(2) AXIS SELECT: Follow the below steps to program a selected axis dimension (preset), machine error compen



sation (M.E.C.) factor, or other function into the relevant display axis.

Step 1. Select the axis that requires programming and press its "ENTER" key.

ACTION The selected axis display's least significant digit (L.S.D.) decimal point is flashing.

NOTE 1 The L.S.D. decimal point flashed when an axis select command has been given to the axis computer. The flashing indicates that the axis computer is ready for programming.

NOTE 2 If a program has not been entered within approximately 30 seconds from initial pressing of the "ENTER" key the display will depict the last entry.

### (3) ONE TO ONE MACHINE ERROR COMPENSATION. (M.E.C.)

The 700 Series displays are programmed for a one to one error compensation factor at the factory. To enter a one to one compensation factor in the field switch the INCH/MM switch to mm position and complete the below steps:

STEP 1. Clear the relevant axis by pressing the PRE-SET key.

ACTION The relevant axis is displaying a quantity of zero.

STEP 2. Press the axis ENTER key.

ACTION The L.S.D. decimal is flashing on and off.

STEP 3. Turn the M.E.C. key clockwise to unlock, then return counter clockwise to vertical position.

ACTION The axis display will demonstrate zeros.

### (4) MACHINE ERROR COMPENSATION:

For the best accuracy, machine error compensation should be done in the unit of measurement that is going to be predominantly used for a particular job. If the job is in metric then calibrate the system in metric. If the job is in Imperial measurement then calibrate in inch.

STEP 1. Measure the machine tool table travel error in the classical manner, using the DRO, standard unit of



length such as a certified gage block and dial indicator. It is recommended to compensate for the error the machine tool table working area such as the vice of job location.

**ACTION** The display will demonstrate the actual travel, including the error.

Step 2. Select and press the relevant axis "ENTER" key.

**ACTION** The relevant display is blanked and the L.S.D. digit's decimal point is flashing on and off.

Step 3. Using the numerical keys, enter the correct travel dimension as stated on the gage block.

**ACTION** The correct dimension or gage block value is displayed.

Step 4. Unlock the M.E.C. key switch by turning key lock clockwise, then turn key counter clockwise to the vertical position back to lock.

**ACTION** The compensated axis is displaying the gage block value.

**NOTE:** If the display depicts zero the programmed calibration factor was not accepted. Repeat the One-to-One Machine Error Compensation procedure.

(5) **PRESET A POSITIVE OR NEGATIVE DIMENSION:**  
To preset a typical positive or negative dimension follow the steps below:

STEP 1 Press the relevant "ENTER" key.

**ACTION** The display digits are blanked. The L.E.D. decimal point is flashing on and off.

Step 2. Program the preset dimension by pressing the relevant polarity numerical and/or decimal key. Press the required "ENTER" key again.

**ACTION** The display is depicting the programmed quantity.

(6) **PRESET RECALL:**

STEP 1. Press "ENTER" on the relevant axis.



ACTION The relevant axis display will now have all of its digits blanked. The decimal point will be flashing on the least significant digit.

STEP 2. Press the axis "ENTER" again.

ACTION The last preset dimension is displayed.

(7) CLEARING A PRESET DIMENSION:

The following steps are required to clear a preset dimension from memory.

STEP 1. Press the relevant axis "ENTER" key

ACTION The relevant axis display will now have all of its digits blanked. The decimal point will be flashing on the least significant digit.

STEP 2. Preset the quantity zero and press ENTER.

ACTION The xis is displaying zero and the previous dimension has been cleared.

II. 720 SERIES GENERAL OPERATING INSTRUCTIONS

A. GENERAL:

The 721A, 722A and 723A Displays are similar to the 711A, 712A, 713A. The difference between the two families is the absolute/Incremental ABS/INC and Additonal/Subtraction ADD/SUB features incorporated in the 720 Series.

B. ADDITION AND SUBTRACTION:

Addition and subtraction features are sometimes called "Tool Compensation" or "Calculator" features. Any of the above names are correct. The operator can use the ADD and SUB to add or subtract various coordinate quantities or to compensate for cutting tool diameter.

(1) SUBTRACTION:

STEP 1. Press the relevant axis select "ENTER" key.

ACTION The relevant axis display will now have all of its digits blanked. The decimal point will be flashing on the least significant digit.

STEP 2. Program in the SUBTRAHEND quantity and the



polarity to be subtracted by pressing the +/- key and/or relevant numerical keys.

ACTION The display will depict the quantity and polarity to be subtracted.

STEP 3. Press the SUB key.

ACTION The display will now depict the answer.

## (2) ADDITION

STEP 1. Press the relevant axis "ENTER" key.

ACTION The relevant axis display will now have all of its digits blanked. The decimal point will be flashing on the least significant digit.

STEP 2. Program in the quantity and its polarity to be added by pressing the +/- key and/or relevant numerical keys.

ACTION The display will depict the quantity and its polarity to be added.

STEP 3. Press the ADD key.

ACTION The display will now depict the sum.

NOTE Confusion may be realized when programming quantities that have different signs. Remember when adding or subtracting positive quantities to negative quantities the algebraic process is always addition.

## C ABSOLUTE/INCREMENTAL: ABS/INC.

Each axis of the 720 Series DRO counts movement simultaneously in absolute and incremental modes of operation. To view the ABS dimension press ABS/INC key and the L.E.D. located directly above the ABS/INC key will illuminate. Pressing the ABS/INC key again will view the incremental operation as depicted by the illuminated L.E.D. located just right of the ABS/INC key.

### (1) ABSOLUTE CLEAR:

To clear the relevant absolute counter's dimension follow the below steps:

STEP 1. Select the axis that requires its absolute



counter to be cleared and press its ENTER key.

ACTION The display digits are blanked. The L.E.D. decimal point is flashing on and off.

STEP 2. Press the CLEAR key.

ACTION The axis display will illuminate zeros. The display's axis is now ready to count a new absolute dimension.

(2) ABS PRESET:

Program the relevant counter axis to an ABS mode and PRESET as above part I, C, 5.

(3) RECALL ABSOLUTE PRESET DIMENSION.

STEP 1. Select the axis that requires its absolute to be recalled and press its ENTER key.

ACTION The display digits are blanked. The L.E.D. decimal point is flashing on and off.

STEP 2. Press the RESET key.

ACTION The axis display will illuminate the preset dimension.