ANILAM

# Wizard Digital Readouts Operating Manual

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# "WIZARD OPERATIONS MANUAL"

**IMPORTANT: IF YOU ARE OPERATING A WIZARD-LATHE SERIES, CONSULT PAGES 17-19 FIRST. IF YOU ARE OPERATING A TWINCOUNT, CONSULT PAGE 22 FIRST.**

**CONTENTS:**

**CONTENTS** (cont'd)

## I. OPERATIONS MANUAL INTRODUCTION

Anilam Electronics Corporation manufactures products that have a reputation for quality, dependability and fine workmanship. The new line of Anilam readouts reflects each of those characteristics in the **Wizard,** the **Miniwizard,** and the **Microwizard.**

Each digital readout in the old **Wizard** line has been streamlined and redesigned for greater simplicity in operation. More options are available to further increase the productivity and savings of both time and money in your shop.

Read and familiarize yourself with all the instructions and procedures before attempting to operate your readout. Follow the instructions correctly and you should not experience any difficulty with the unit.

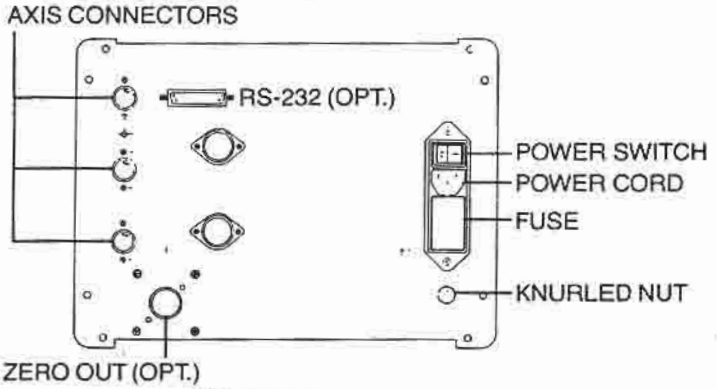
This operation manual has been designed to be as clear and easy to understand as possible. Each unit "down-the-line" has more features and functions than the unit before it. In other words, the **Miniwizard** has the same capabilities as the **Microwizard,** except the **Miniwizard** has a few additional features. This operation manual was designed to avoid repeating the same instructions unnecessarily. For this reason, if you own a **Wizard** you will have to read the sections on the **Micro** and **Miniwizard** to fully understand your unit.

## II. POWER SUPPLY AND PRECHECK

### A. **Supplying Power to Your Readout:**

All the readouts in the **Wizard-**line are powered by AC electrical current. It is best to supply power to your readout through one circuit. If electrical power from one AC outlet is shared with other machines in the shop, improper readings could result.

It is important for your unit to be grounded properly. Use the multi-strand wire supplied with your unit for grounding. Connect one end to the knurled nut (see illustration II A) on the back of the unit. Attach the other end to a nearby solidearth ground such as a cold waterpipe or an electrical conduit leading into a wall.




**IIA. UNIT BACK PANEL**

### B. **Prechecking the Unit:**

Precheck your readout at the start of each working day. Some problems with the unit could be detected at that time (if not avoided completely.)

First, see if your unit is secure on its mounting brackets. Then check your grounding cable. Is the unit grounded properly?

Insure that your transducer cables are hooked up correctly on the back of the unit (see illustration II A). Keep all cables off the floor to avoid damage from being run over or accidentally cut.

### C. **Turning the Unit On:**

After precheck is complete, locate the power switch on the back of the unit. Turn the unit on. Backward "C's" will flash in the axis displays on the front. The flashing backward "C's" is the power interrupt indicator which will occur when there is a disruption of power to the unit. Press SET and the flashing will stop and all zeros will show.

Press the IN/MM switch and the decimal point will move back and forth. (The advantages and functions of this switch will be fully explained in Chapter III.) Leave the readout in the INCH mode while using this manual.

## III. MICROWIZARD

### A. Basic Function:

The main purpose of the **Microwizard** is to give an accurate, precise, visual reading of the distance moved between two points on an axis. For clarity, illustration (III A) shows a dimensioned workpiece in which three holes are to be drilled in a flat, steel bar. Position your machine to the zero reference point.

The zero reference point is obviously at the bottom left corner. After you have centered your tool over the zero point it will be necessary to clear the display. To do this, push the axis keys (X, Y or Z) and then push SET. When the axis key is pressed, the leftmost digit of that axis will flash. This indicates the axis is waiting for instructions. The SET key will cancel this function. You have cleared the display.

**NOTE**

An axis key must first be selected before the readout will respond. If any number keys are pressed before selecting an axis, nothing will appear or change on the readout. Your unit will not accept a key strike that is out of sequence.

Once you have reached the zero reference point and cleared the readout you will be ready to begin:

(1) Move the table until the Y-axis display reads 1.0000.

(2) Move on the X-axis until the display reaches 2.0000. Drill.

(3) Continue moving your table until the X-axis reads 4.0000. Drill.

(4) Again move your table until the X-axis reads 8.0000.

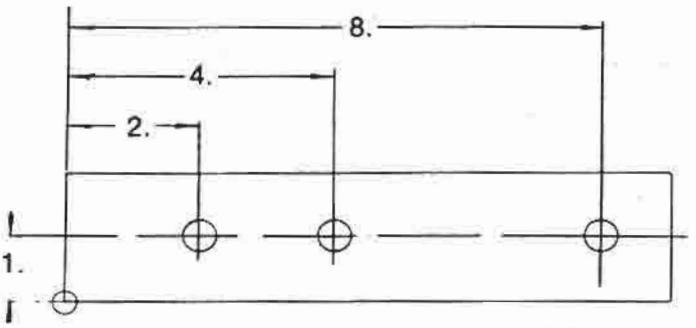
(5) Drill your third hole. The part is now complete and accurate.

All you have done is cleared the readout and then read the measurements as you moved to the various positions to drill. This is an example of using the digital readout in its simplest form.

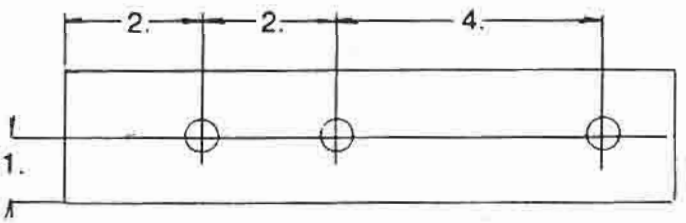
B. **The SET key:**
Both the **Micro** and **Miniwizard** readouts are provided with one level of memory. Basically the SET key will let you: (1) reset to zero, (2) enter a number into the memory, (3) recall a dimension from memory, and (4) clear the memory entirely.
See the following sections:

C. **Resetting to Zero:** AXIS, SET
In order to reset the readout to zero, press the axis key then SET. Resetting will not erase the memory but will clear the display.

If the workpiece is dimensioned incrementally, the reset function becomes useful. See the example. Get to the starting point on the X-axis and clear the readout. Now, move to 2.0000, drill and reset to zero. Again move to 2.0000, drill and reset to zero. Finally, move to 4.0000 and drill. The value in resetting to zero after each move is that it helps you avoid making any calculations.




**III A. WORKPIECE EXAMPLE (ABSOLUTE)**




**III B. WORKPIECE EXAMPLE (INCREMENTAL)**

D. **Entering a Dimension (or Presetting):** AXIS, DIMENSION, SET
To enter or preset a dimension into the memory, press the axis key, the proper number keys (including the +/− switch if necessary) then the SET key. The dimension is now preset into the memory.

E. **Recalling an Entered Dimension:** AXIS, AXIS
If you have cleared the display, you can recall the stored information by pressing the desired axis key twice.

For example, Preset and Recall can be used on the workpiece already shown in illustration (IIIB). After getting to your X-axis starting point, preset −2.0000 into your X-axis display (X − 2.SET). Move your table until the readout displays all zeros. Drill. Press "X" twice to recall your preset number (−2.0000). Move your table again to zero. Drill. Now, without recalling your number, simply move the table until the readout reaches 4.0000.

On workpieces that require the same incremental moves over and over again, this function is extremely useful.

A prime advantage of Preset is that you can use any location or known position on your work piece as a starting point. This is helpful when your workpiece is larger than your table. For example, say you have gone as far as you can reach and the last position was (X) 20.0000 and (Y) 8.0000. With preset, you can reposition your workpiece down the table, center your machine over your last hole, preset X, 20.0000 and Y, 8.0000 and continue to finish the part.

F. **To Clear an Entered Dimension:** AXIS, "O", SET
To clear a preset or entered dimension, simply press the correct axis (X, Y, or Z), press "O", then SET.

G. **Operator Error Safeguard:**
After selecting an axis, the SET switch must be pressed before moving the table if you wish to see the distance-moved displayed visually in the readout. However, the readout will still be storing the information internally. This is a safeguard to prevent time lost due to an operator's error.

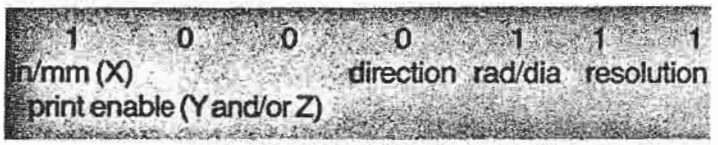
To find the distance moved, simply press SET and the information will be displayed in the proper axis readout. For example, if you press "X" and then move the table on the X-axis, nothing will change on the display board. If you now press the SET switch, the display will show the location from the point entered in the X-axis. If you press the axis key **and enter a dimension** without pressing SET and then move the table; the number showing when you do press SET will be the distance moved **plus** your entered dimension. The read-out will not lose your position.

H. **Inch-Metric Switch:**
Each unit has an instant inch-metric capability. Any number displayed in the readout will be converted to its metric or inch equivalent by pressing the IN/MM switch.

I. **Resolution Setting, Radius/Diameter, Polarity Reversal, Axis Print Enable:** "8", ten times
Each digital readout (Micro, Mini, Wizard) can be set externally via the keyboard for the resolution desired,

radius/diameter, direction of count (polarity reversal), inch/millimeter boot-up (whether the console comes on in the inch mode or millimeter mode), and enabling an axis to be printed if a printer port is ordered with the unit.

To check or to set the console, press the number 8 key ten times. This will access the settings and display them on the X, Y and/or Z axis displays. Each axis has its own settings. When accessed, the display will show a series of ones and zeros in every axis you have available. This is shown in illustration IIIC.




**IIIC. SETTING DISPLAY**

The first digit on the right in the X-axis will be blinking when the console is put in this mode. To set a new number, press either the number 0 or number 1 keys. The unit will not accept any other numbers. If the number is correct, press the + − key to make the cursor move to the next number. Entering a 0 or 1 will also make the cursor move to the next location. If the settings are correct for an axis and you want to move to another axis, simply press the axis key you wish to move to.

The first two numbers are for resolution. The resolution settings are listed below:
The scale resolution must match the unit resolution to get accurate readings.

00 = 1 micron or .00005"/.001mm (B-1 or E-1 Scales)
01 = 2 micron or .0001"/.002mm (A-2 or F-2 Scales)
10 = 5 micron or .00025"/.005mm (B-5 or E-5 Scales)
11 = 10 micron or .0005"/.010mm (A-10 or D-10 Scales)

The third digit from the right is the radius/diameter setting. Radius reading or normal reading = 1, Diameter readings = 0. With the diameter function in operation, the display will give readings in "doubled" measurements. For example, a move of one inch will be shown as two inches, a direct diameter reading. This is used mainly for lathe applications and turning.

If your unit is not reading in the proper direction of count, it is possible to switch the polarity on the readout. In other words, if your unit reads a minus direction when your tool moves to the right, you can cause the display to read a plus. The fourth digit from the right on the corresponding axis needs to be changed from a 1 to a 0 or 0 to a 1. This will change the sign automatically.

The fifth digit is used to turn Approaching zero ON and OFF. To turn ON, enter a one (1) in this location. To turn OFF, enter a zero (0) in this location.

The sixth digit must remain set as it comes from the factory.

The last digit on the X-axis will determine if the unit comes on in the inch mode or millimeter mode when power is turned on. A one will mean that the unit will power up in the inch mode, and a zero will allow the unit to power up in the millimeter mode.

The last digit on the Y and Z axis will permit the console to print the information displayed in that axis if a printer port is purchased with the unit. A 1 must be entered in this location to allow the axis to print. If the unit does not have a printer option, the setting has no effect on the operation of the unit. The X-axis will always print regardless of the last digit setting if the option is available.

To exit this mode, press the SET key.

When the operator has set the console, these settings will be stored. If there is a power failure or if the unit is turned off, these settings will remain the same. They will not change until the operator enters a new setting.

J. **Zero Marker Pulse:** SET, "0" seven times
This feature, when utilized, causes the readout to reset itself to zero each time the transducer head reaches a certain point on its scale. These special scales are called Absolute Zero scales and are equipped with marks that when read by the transducer head, cause a pulse to go to the readout and resets the displays to zero. This function will work when the operator presses SET and then presses "0" seven times.

The leftmost digit of each axis will blink. When the table is moved and the signal is received from one of the scales, that axis will be reset to zero and the blinking will stop.

A prime advantage of this option is the ability to return to an exact point each time you want. For example, if you note down the distance from the scale zero pulse to the workpiece zero reference point, you cannot get lost. If the power were to fail and you were only halfway finished, you can still find the workpiece zero reference point when the power returns. Simply go to the scale zero pulse and then move the noted distance to the zero reference point for your workpiece.

To cancel the marker pulse before the machine resets itself, simply press SET.

K. **Variable Resolution:** AXIS, "0" seven times
With this option, the operator can change the resolution of a scale to a lesser accuracy when desired. On some workpieces a fine accuracy is not needed, so this option enables the operator to have readings of lesser resolution in order to speed production. This feature can be used with both .0001"/.002mm scales and .0002"/.005mm scales.

To change the resolution from .0001"/.002mm to .0005"/.01mm or .0002"/.005mm to .0005"/.01mm, select the axis key that is to be changed and press "0" seven times. This can be done for one axis at a time. When activated, the last digit will read a 5 or a 0 instead of the normal readings. In metric, the decimal point remains in the same position, but only the first two digits will count. Follow the same process to return the readout to its proper scale readings. NOTE: This information is lost when the power is turned off. It is not affected by Battery Safeguard feature.

**L. Radius/Diameter: "2", AXIS (Microwizard, Miniwizard, Wizard Only)**

Radius/Diameter may be set when entering resolution. To set diameter without entering the resolution setting mode, depress the number two and the axis desired. This will give two times the normal reading or diameter. To return to normal or radius readings, depress the number two key and the axis key.

**M. Centering Function: DECIMAL POINT, 5, AXIS**

An operator often is required to find the center of a part or location. The first edge must be found and the axis must be set to zero. This is done by depressing the axis key, zero and set. The machine is then moved to the next location or edge. The axis that was moved will now have a dimension displayed. When this is done, depress the decimal point key, the number five key and the axis key that you just moved. The display will now show one half of the distance traveled. Move the machine until the display reads zero and you will be at the center of the part. This may be done for all axes if required. For the Miniwizard and Wizard consoles, this function must be operated in the INCR mode.

NOTE: If a number is entered from the keyboard, this function will not work.

**N. Last Position Store: "5" ten times**

This function allows the position on the display to be held for recall at a later time. Power may be lost overnight after the operator leaves or during regular working hours. If this happens and the operator has depressed the 5 key ten times his position can be recalled the next morning when he returns or when power is resumed. If the position is successfully stored, all axes will begin to blink.

NOTE: If the machine is moved while power is off, the position that was stored wil not be correct.

**O. Last Position Recall: "6" ten times**

By depressing the 6 key ten times, the stored last position will automaticaly be displayed once power has been restored to the console.

**P. Options:**

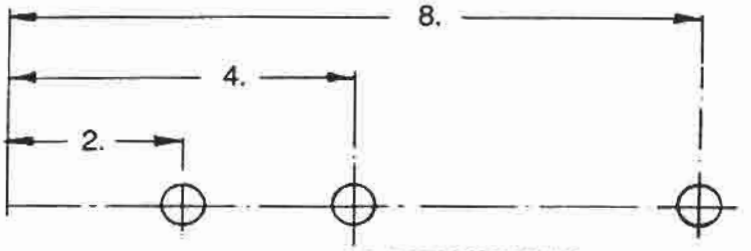
The Microwizard has two options available: Zero Output and Edge Sensor Probe. For a full explanation about the operations and uses of these functions, see Available Options, Chapter VII.

## IV. DIMENSIONING THEORY

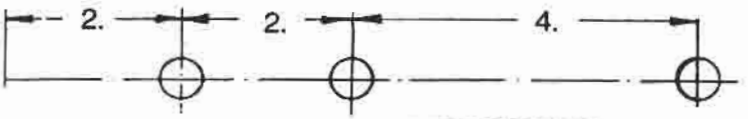
In order to fully appreciate the usefulness of the **Miniwizard** and **Wizard** it is necessary to understand the two types of dimensions most commonly used by draftsmen in blueprints. These dimensions are called "absolute" (ABS) and "incremental" (INC).

The term "absolute" applies when measurements are given from a common reference point (see illustration IVA). In the illustration, the common reference or "zero" reference point is located on the left-hand side of the workpiece. These absolute dimensions are frequently seen in many blueprints.

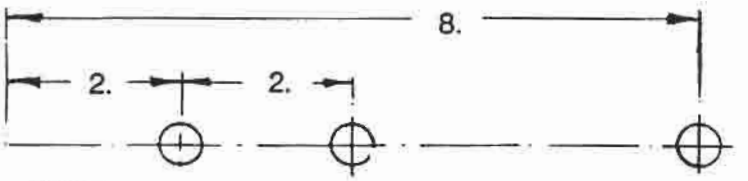
"Incremental" dimensioning occurs when the measurements on a workpiece have no **common** reference point. Rather, each location is the reference point to find the next location. Illustration (IVB) shows the same diagram dimensioned incrementally.




**IVA. ABSOLUTE DIMENSIONING**




**IVB. INCREMENTAL DIMENSIONING**




**IVC. COMBINATION INC-ABS DIMENSIONING**

Each location is dimensioned in steps, or increments.

Sometimes, both incremental **and** absolute measurements are used on a single blueprint. In the next illustration, the first two holes are dimensioned incrementally and the third hole is dimensioned from the absolute zero point or dimensioned absolutely.


## V. MINIWIZARD DIGITAL READOUT

The **Miniwizard** operates with the same functions as the **Microwizard.** It is necessary to read the previous chapters to understand the basic operating methods of all the **Wizard**-line readouts. In the same fashion, the information in this section will apply to the **Wizard,** but not to the **MicroWizard.**

A. **INC/ABS Switch:**

The prime advantage of the **Miniwizard** is derived when a part print has a combination of INC and ABS dimensions. By switching from incremental and absolute, you may position the part **just as the print reads,** without any math calculations.

The INC/ABS switch, in a sense, converts the **Miniwizard** (and the **Wizard)** into two digital readouts in one. When the INC switch is on, the readout measures in increments, but at the same time it is counting the total distance being moved on any axis. Flip the switch to ABS, and the absolute dimension from your starting point is revealed on the displays. For example, you have just made a series of six 2-inch incremental moves, and you want to know how far you have gone from your starting point. Change the switch to ABS, and the correct distance will appear, or 12.0000.

To clear the readout and establish a new absolute zero; press INC, all AXIS buttons, SET, ABS, all AXIS again, SET.

B. **"Diagnostics" or Self-Test Feature:**

In the event a problem should occur with the **Miniwizard** or **Wizard** digital readouts, both units come equipped with a self-test or "diagnostics" feature. This is an internal checking system designed to locate the source of the problem quickly.

**NOTE**

**Diagnostics is a separate subroutine and once started will erase all the data in the readout. Every single function is being tested during diagnostics to insure it is working properly.**

To put the readout in this diagnostic check, first remove the transducer cables from the back of the unit. Also remove the zero output connector cable if that option is on your unit. Then press the decimal point switch (5) times. Five presses on the decimal point key are required so that an operator cannot accidentally put the system into diagnostics and immediately wipe out the memory.

If done properly, all "eights" should appear in each axis display, indicating the start of the diagnostics routine. The routine will then go through various phases of self-check and will end in about 20-30 seconds with a combination of "ones" and "zeros" displayed in each axis.

At this point, pushing any key (besides the decimal point key), will reveal that key matrix code–these code numbers should match with the chart illustrated to insure that the key is working properly. If a different number code shows up or nothing at all displays, then the front panel may have to be replaced (see Troubleshooting–Chapter VIII).

To return the unit back to normal operation, press the decimal point key and then the SET key. Reconnect the transducer cables.

If the readout begins flashing all ones, twos, threes,

fours, fives, sixes or sevens across the board, that will indicate a problem with the readout itself. Repair of the unit will probably require changing the printed circuit (PC) board inside. See Troubleshooting, Chapter VIII. If the transducer or zero output connector cables are still connected during diagnostics, then all fives, sixes, or sevens may flash in the display. Press the decimal point key and the readout will continue in its diagnostic routine.

| KEY | MATRIX CODE | KEY | MATRIX CODE |
|---|---|---|---|
| 0 | 52 | X | 10 |
| 1 | 41 | Y | 20 |
| 2 | 42 | Z | 30 |
| 3 | 43 | (+-) | 11 |
| 4 | 31 | SET | 51 |
| 5 | 32 | IN/MM | 13 |
| 6 | 33 | ABS/INC | 12 |
| 7 | 21 | RECALL | 50 (Wizard Only) |
| 8 | 22 | STORE | 40 (Wizard Only) |
| 9 | 23 | | |

Matrix Code Chart

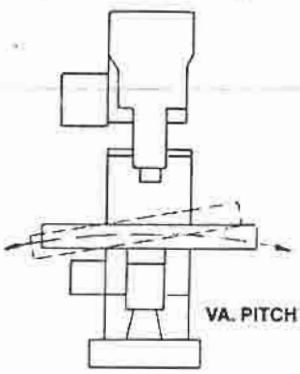
C. **Correction Factor:**

Many machines have geometric errors that result from age, wear or construction. There are two common errors: leadscrew and pitch. Any conventional readout is independent of the leadscrew and automatically compensates for this problem (i.e. backlash; the scales read table movement, not leadscrew movement). However, pitch error has been ignored in most readouts–with the exception of the **Miniwizard** and **Wizard.**

Pitch error can occur as a result of a number of factors: age, wear or construction of the machine, or size and weight of the workpiece.

Pitch error can be shown in the exaggerated illustration (V A). As the machine table moves to the left, it tends to tilt to the left. The same applies when moved to the right. The result is a pitch having a theoretical center point below the machine. The pitch error is increased as larger and heavier parts are placed on the machine.

Machine pitch errors can cause slightly inaccurate readings on a readout even though the readout and scale are accurate and working properly. The **Miniwizard** can compensate for pitch error through use of the correction factor (CF). After entering the dimensions, the readout can correct up to + −50% of any measurement.



VA. PITCH ERROR

To enter correction factor, first select the axis. Then enter the measured value (value shown on the display). Press the axis key again, then enter the indicated value (value you want the display to read). Press the CF button. The decimal point on the axis that has had correction factor entered will begin to blink at this point, indicating correction factor is on. If another correction factor is entered for another axis, both axis demical points will blink, indicating CF on both axis. The axis or axes that have CF active will have a blinking decimal point. To turn correction factor off when you no longer need it, press the On/Off button. The blinking decimal point will stop blinking. To turn the same correction factor back on, press the On/Off button again. The correction factor you have entered, will remain in the unit until the axis is set to a new correction factor.

If the blinking decimal point is bothersome, the light can be turned off without turning the correction factor off. Press the CF button. This stops the decimal point from blinking but leaves the correction factor on. To ensure that correction factor is still on, the CF button can be pressed again to turn the blinking decimal point back on.

To clear a correction factor from an axis, select the axis, enter any number. Press the axis again, and enter the same number. Press the CF key. The axis addressed will now have no CF or blinking decimal point, and the remaining axes will remain unchanged.

D. **Approaching Zero Indicator**

Approaching zero indicator will begin to blink all significant digits in the axis that has been activated when the axis reaches .5000". This is a preset dimension in the console and cannot be changed when activated. When the display reaches .0000, the blinking will stop, indicating zero has been reached. If the operator passes zero, the axis will begin to blink again.

To activate approaching zero, access the parameter page by pressing the 8 key ten times. When this has been done, a series of 1's and 0's will appear. Use the +/– key to move to the fifth digit on the axis you wish to have activated. Make the digit a 1 to activate this feature. This must be done for each axis the approaching zero is to be activated.

When the operator wants to deactivate approaching zero, follow the same procedure as above but make the fifth digit a 0.

E. **Options:**

**The Miniwizard** has 4 options available: Zero Output, Printer Option, Edge Sensor Probe and Full System Battery Back-up. For a full explanation about the operation and uses of each of these functions, see Available Options, Chapter VII.

## VI. WIZARD DIGITAL READOUT

To fully understand the capabilities of the **Wizard** digital readout, it is necessary to read each of the previous chapters. These chapters explain the basic functions and features of all the **Wizard**-line units. This chapter explains the features of the **Wizard** that the **Mini** and **Microwizard** do **not** include.

A. **250-Block Memory:**
Both the **Micro** and **Miniwizard** have one level of memory that can store a dimension and recall it when needed. The **Wizard** has the ability to store 250 levels, or blocks in its memory.

1. **To Store a Block in Memory:** INC/ABS, AXIS, DIMENSION, STORE, BLOCK NUMBER. To store a memory block, first select absolute mode, then select the axis you need and enter the dimension. Push the STORE key and enter the block number as three digits (EX: 001, 002, 003, etc.) To store a dimension in the **next consecutive block,** push STORE twice. It is not necessary to enter the next block number in this case. Note: Your first memory block must be entered in the ABS Mode.

2. **To Recall a Memory Block:**
RECALL, BLOCK NUMBER.
To recall a stored memory block, push RECALL, then press the three digits of the block you wish to recall. For example, RECALL 001 will give you the first dimensions you entered into the memory. To recall the next consecutive block, simply push RECALL twice.

When you recall a memory block the unit will switch to incremental mode automatically and will display the incremental difference between your present position and the memory block dimension you have just recalled. Move until display reads all zeros.

For example, if you have stored the following dimensions: X, 1.000 ABS.X, .500 INC. and X, .550 INC. in that order and recalled memory block 001, the display would read (X) 1.000. If you then recalled memory

block **003**, the display would give the distance from your current position to the third position (2.0500). The display would not read .550.

3. **To Clear the Memory Blocks:** SET (10 times).
To Clear the memory blocks, press the SET key ten (10) times. The memory digit will rapidly run from 001 through 125 (or 250 if that option is installed). At the end of this run, the memory blocks will be completely erased.

B. **Addition Feature:** AXIS, 1st NUMBER, AXIS, 2nd NUMBER, STORE, + −

It is possible to use the **Wizard** readout to add dimensions together. To add two numbers, select the appropriate axis key then enter your first number. (Do not press SET!) Push the same axis key again and then enter your second number.

Push STORE and then the ( + − ) key and your sum total will appear in the selected axis display.

C. **Subtraction Feature:** AXIS, 1st NUMBER, AXIS 2nd NUMBER RECALL, + −

The **Wizard** readout can also be used to accomplish quick subtraction problems. Follow the same steps outlined in section "B" for addition, except push the RECALL key instead of the STORE key. Then press the ( + − ) key.

D. **Radius-Diameter Compensation:** (WIZARD ONLY)
You may compensate for radius-diameter by entering the compensation value into a dimension already programmed in a memory block. For example: If X-axis has 1.000" programmed into block #004 and you wish to subtract the cutter radius of .125, simply enter X, -.125 into block #004. When you recall 004, the X-axis will display the compensated value of .875. You must be in the INC mode when using tool compensation in this fashion.

E. **Multiple Absolute Zero:** (Wizard Only)
Anilam has added another feature to the capabilities of the Wizard digital readout. This feature, called **Multiple Absolute Zero,** enables the operator to establish up to ten different absolute zero locations for the same workpiece or on several workpieces on the table.

Study the section on page 8 called **250 Block Memory.** It is necessary to know how to enter information into a memory block in order to use the multiple absolute zero feature.

As stated previously, there are ten absolute zero memory blocks. These are 800-809.

To illustrate the use of the feature, we will use the simple drawing shown in illustration (VIA). Notice the pattern repeats itself 2 times on this workpiece. Using the bottom left corner as our absolute zero point, program the first 2 hole locations.

At this point, it is easy to see that if you could re-establish your absolute zero at the location marked **x**, then it would no longer be necessary to program the locations of the final 2 holes. Using simple mathematics, figure the dimensions from the **x** position (new absolute zero) to the present absolute zero point, (Y.O;X,-2.000). Enter your original absolute zero with display reading all zeros in memory block 800. Now, with your tool still at the original absolute zero point, program the **x** position into memory block **801**. Note: You must be in the ABS mode when entering ABS zeros.

Now recall block **800.** When 800 is recalled, -0- will be displayed in the memory block location in the lower left hand corner indicating that absolute zero had been recalled. Press the recall key twice, and the last memory location that was used will return to the display. The first two holes can now be drilled, recalling each position from memory.

It is easy to understand how this feature is useful when doing a job with several workpieces on the table. The need to reprogram dimensions over and over again for each workpiece is eliminated. An alternate way of finding the new absolute zero dimensions when using multiple workpieces is through the following method:

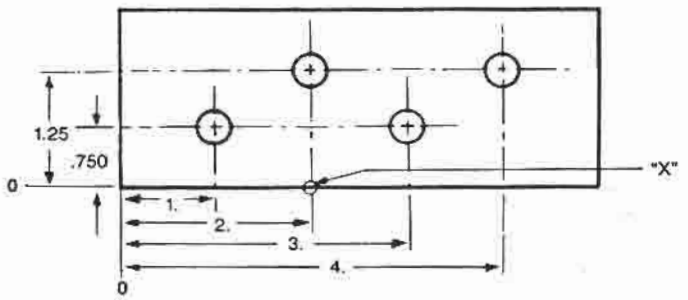
Put the tool at the absolute zero point on any one of the workpieces. Enter this point as X, **O** and Y, **O** into memory block 800. Then move the tool to the absolute zero point for each workpiece on the table. Clear the display (press all axis keys then set) and enter an ABS zero point for each workpiece into memory blocks 801-809 as needed. Recall **800** and return to the original zero reference point on the first workpiece. You now begin machining the parts.

If you have established a correction factor prior to setting the additional absolute zero locations, the readout will still compensate for pitch error accurately along the worktable.

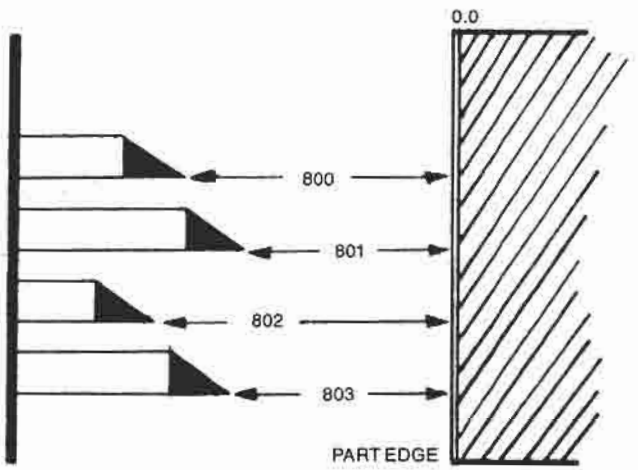
1. **Absolute Zero Indicator: Recall, "810"**
The operator may find out what Multiple Absolute Zero location is active. To find out, simply depress the recall key and 8, 1, and 0 keys. This will indicate the absolute zero in use in the memory location by a single digit with a – on either side. This can be done without effecting the program or the absolute zero that is active. To return to the program where you left off, press recall and 810 again. If you wish to go to the next block of information, press recall twice.

**NOTE:**
If power is turned off to the Wizard readout, memory locations 800-807 are stored.

F. **Tool Length Compensation**
The multiple absolute zero feature is also useful on lathes and other machines to compensate for various tool lengths when using Wizard memory. Move each tool to ABS. zero on the part, zero display, and assign the various tools a number from 800-809. Allow each tool to have its own absolute zero at the part's edge. By recalling the appropriate tool number after changing tools, the compensated dimensions will be displayed.




**VIA. MULTIPLE ABSOLUTE ZERO**




**VIB. TOOL LENGTH COMPENSATION**

G. **Insert/Delete Editing Feature:** (WIZARD ONLY)
The ability to edit by inserting or deleting blocks from the memory is now a standard feature of the **WIZARD** digital readout. The editing feature is activated through the use of a **400 memory code.**

1. **To insert a memory block:** Decide which two blocks you want to insert a new block between. Add the digit 400 to the higher block number. Enter the necessary dimensions into the chosen block by pressing 400 + BLOCK NUMBER. For example, to insert a block between blocks 011 and 012, add 400 + 012 (=412). Then press STORE, 412. Or, to insert a block between 116 and 117, add 400 + 117 (=517). Press STORE, 517. The dimensions previously stored in that memory block would now be shifted up to the next consecutive block and so on. **IMPORTANT:** The inserted block must be in absolute dimensions.

2. **To delete a block from memory:** After determining which block you are going to delete, again add that number to the digit 400. Press RECALL, 400 + BLOCK NUMBER. For example, to delete block 012, you would press RECALL, 412 (400 + 012). All the dimensions in the memory blocks above 012 (013, 014, etc) will now shift down one block.

H. **Correction Factor:**
To enter a correction factor, first select an axis. Then enter the measured value (value shown on the display). Press the axis key again then enter the indicated value (value you want the display to read). Push STORE followed by three presses of the number "9" key. The unit will now correct in proportionate ratios along that selected axis.

**NOTE**
Once the correction factor has been inserted into the unit it can be turned on and off by pressing RECALL 9 9 9. Entering a new correction factor will erase the old one. The Lathe Series and Twin Count are entered the same as the Wizard but are indicated as a Miniwizard.

As a practical example, suppose we have a .0005" system and we find through checking that our parts are out of tolerance by .002" in 10" of travel. When the readout measures 10.0000, the part indicates 9.9980. To eliminate the problem, enter X, 10.0000, X, 9.9980, STORE, 9 9 9. The unit will correct along this axis each time it moves; even in smaller dimensions (i.e. at 5.000", it will correct .001, etc.).

When the correction factor is utilized, a blinking decimal point will indicate CF as does the Miniwizard.

Obviously, this feature can be utilized to compensate for shrinkage factor when making a part. The procedure is simple. Suppose you manually move the machine 10.050 inches as shown on the display but, due to shrinkage, you wish the display to read 10.000 (ie. you wish to enter .050 correction). Enter the axis, 10.050, same axis, 10.000, STORE 9 9 9. The CF light will appear and when machining your part, the shrinkage factor will be automatically compensated for on all dimensions by the readout.

I. **Clear Counter/Axis:** AXES, STORE 000

This provides the capability for the operator to clear both the Absolute and Incremental display at the same time when setting up a workpiece. Both need to be set to zero once a job is ready to run, so that the numbers displayed are actual dimensions corresponding to the print.

To clear both the Absolute and Incremental counters for any or all axes, press the axis to be cleared. If more than one axis is to be cleared, press each axis, then press STORE 000. This will automatically set the display to zero, and also zero the counter that is not displayed. For the Wizard Lathe Series, follow the same procedure but press STORE 00.

J. **Mirror-Image Feature:** AXIS, (+ −) five times

At times a machine operator will be handed two blueprints of the same drawing, except one will have positive dimensions and the other will have opposite, or negative, dimensions. For example, these blueprints will sometimes illustrate the two halves of one mold, each with opposite dimensions of the other.

If the parts are the same (with the exception of positive versus negative dimensions) then the Mirror-Image feature is useful.

Basically, mirror-image will reverse the sign of the dimensions entered in the memory. All positive numbers will become negatives and vice versa on any selected axis or axis combinations.

To use mirror-image, push the desired axis key, then press (+ −) five times. When a block is recalled from memory, that axis will be on the opposite side of the number scale. (See example XC, Page 15)

K. **Battery Safeguard Feature** (Memory Protect):

The **Wizard** is equipped with a small rechargeable NICAD battery as a safeguard. This battery will hold the memory stored up to 20 days if all power is shut down to the readout system. The battery will automatically recharge itself when the power is returned. NOTE: Correction Factor will remain on as well.

L. **Multiple Absolute Zero Clear:** STORE 815

When program memory is cleared, the multiple absolute zero memory is not. To clear the absolute zero memory, press STORE and 815. This will not clear the program memory.

M. **Bolt Hole Circle**

A standard feature of the **Wizard** console is Bolt Hole Circle. The console has the ability to plot X and Y coordinates of hole centers around a given pitch circle diameter and automatically store those coordinates into memory locations.

The bolt hole calculation is available on 2 and 3 axis counters only. All programming is done on the X and Y axes. All information is entered in the X axis with the exception of operation 994, which utilizes X and Y.

1. The bolt hole circle may be either:
   a) A complete bolt hole circle.
   b) Part of a bolt hole circle which is defined by both a start angle and a finish angle.
2. The number of holes selectable are 3 to 99 in increments of 1.
3. Bolt holes can only be computed with equally spaced holes.
4. The maximum diameter of bolt hole circles is limited to the capacity on the shortest scale movement in either X or Y axis for complete bolt hole circles.
5. For partial bolt hole circles the bolt hole circle diameter of 2540 mm or 100″ provided the part bolt hole circle falls within the capacity of the X and Y axis.

**PROGRAMMING A BOLT HOLE PATTERN**

First, store information up to the point you require the bolt hole pattern. Bolt hole patterns will not interfere with normal programs. Once you have stored your last block of information prior to the bolt hole pattern, follow the procedure below to calculate your pattern.

NOTE: It is important that you are at the last block of memory stored. The **Wizard** will store the bolt hole information starting from the last block shown in the memory window. If the operator has gone to a previous block of information and then enters bolt hole, the **Wizard** will write over the information already stored.

**All patterns must be done in a counterclockwise direction regardless of requirement.**

STORE 990: Clears display

Press Store 990. This clears the display and also clears the RAM memory that holds bolt pattern calculation information. It does not clear the previous bolt hole circle, if any. This also sets the console to the absolute mode in which all bolt hole pattern information must be entered.

STORE 991 (DIAMETER): X, DIAMETER OF BOLT CIRCLE, STORE 991

Press X and enter the diameter of the bolt hole pattern. Then press STORE 991.

Example: The bolt hole diameter is 400mm. Press X, 400. STORE 991.

STORE 992 (STARTING ANGLE): X, ANGLE, STORE 992

The start angle must be entered as a whole number which is entered as a positive value. All bolt hole patterns reference the 3 o'clock position on an X, Y coordinate as the reference 0 position. See EXAMPLE VIC. If the start

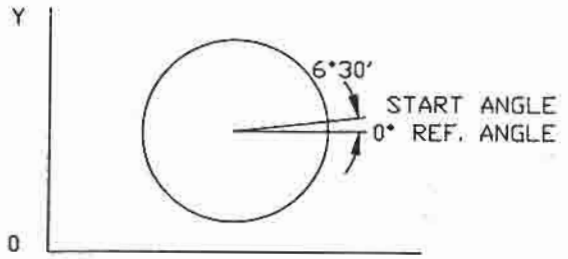
angle is zero, or starts at the three o'clock position, it must be entered as zero. Fractions of degrees can be entered also by entering the decimal equivalent of the angle. To enter the start angle in the inch mode, the operator presses X, enters the angle and STORE 992.

Example: Start angle +6½ degrees. Press X, 6.5, STORE 992.

For the start angle in Metric, the whole number must be followed by four digits. If you consider fractions of a degree, you may insert these after the whole number.

Example: Start angle + 12¼ degrees. Press X, 1225.00, STORE 992.
Start angle + 137 degrees. Press X, 13700.00, STORE 992.

Maximum start angle is 359 degrees.




**EXAMPLE VIC**

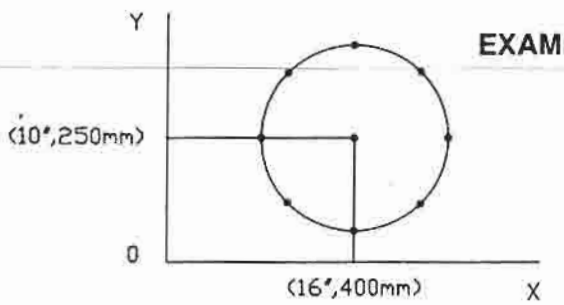
STORE 993 (NUMBER OF HOLES): X, NUMBER, STORE 993

Press X and the number of holes required in the pattern. This number is not entered as a whole number. The decimal point is ignored in both inch and metric. For instance a 24 hole pattern should look like the following examples.

EXAMPLE: INCH: X .0024. Then enter STORE 993.
METRIC: X 0.24. Then enter STORE 993.

STORE 994 (CENTER COORDINATES): X, NUMBER, STORE 994

The center coordinates of the bolt hole pattern are entered at this point. The coordinates are entered as shown in EXAMPLE VID.



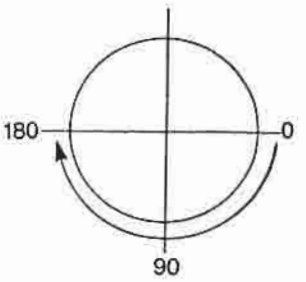

**EXAMPLE VID**

Examples: Inch–If the X value equals 16" and the Y value equals 10", press X, 16., Y, 10., STORE 994.
Metric–If the X value equals 400mm and the Y value equals 250mm, press X, 400., Y, 250., STORE 994.

STORE 995 (END ANGLE): X, NUMBER, STORE 995

The end angle applies to partial bolt hole patterns which have holes equally spaced in less than a full 360 degree circle. The end angle is also needed for whole patterns.

**All end angles must be entered as negative numbers.** All angles must be entered as whole numbers as previously shown for start angles. If the angle falls on the 0 degree reference line, the end angle must be entered as -360.0000. If you are doing a full bolt hole pattern, regardless of the end angle, a -360.0000 should be entered.




**EXAMPLE VIE**

To enter an angle, press X, enter end angle, STORE 995.

Example: Inch–To enter an end angle of 45 degrees press X, –45.0000, STORE 995.
Metric–To enter an end angle of 45 degrees press X, –4500.00, STORE 995.

STORE 996 (Compute):

This operation instructs the counter to compute all the previous information entered and load the X,Y coordinates to memory.

To compute, press STORE 996.

When this sequence is complete, the memory window in the lower left hand corner will begin to count up. If the memory display was at 000 and a 6 hole pattern was entered, the display would show 001, 002, 003, 004, 005, 006 and would stop at 006. The console would then be ready to accept more information or compute another bolt hole pattern.

To recall information, refer to section VIA RANDOM ACCESS MEMORY (STORE, RECALL, AND CLEAR) on page 8.

STORE COMMANDS
STORE 990–CLEARS DISPLAY

STORE 991–BOLT HOLE DIAMETER
STORE 992–START ANGLE–DEGREES AND FRACTION OF DEGREE
STORE 993–NUMBER OF HOLES IN PATTERN
STORE 994–BOLT HOLE CENTER
(X and Y coordinates)
STORE 995–END ANGLE FOR PARTIAL BOLT PATTERN
STORE 996–COMPUTE

N. **Approaching Zero Indicator:**
Approaching zero indicator will begin to blink all significant digits in the axis that has been activated when the axis reaches the distance the operator has preset. When the display reaches .0000, the blinking will stop, indicating zero has been reached. If the operator passes zero, the axis will begin to blink again.

To activate approaching zero, access the parameter page by pressing the 8 key ten times. When this has been done, a series of 1's and 0's will appear. Use the +/– key to move to the fifth digit on the axis you wish to have activated. Make the digit a 1 to activate this feature. This must be done for each axis the approaching zero is to be activated.

When the operator wants to deactivate approaching zero, follow the same procedure as above but make the fifth digit a 0.

To set the approaching zero dimension, press the axis to be set, enter the dimension and press the STORE key and 998. When this has been done, make sure that the axis approaching zero has been activated in the parameter page. To change the distance, follow the same procedure. The new number will be entered in place of the old one.

O. **Options:**
There are several options for the **Wizard** that will improve its usefulness in your shop. These options are Zero Output, Memory Recorder, Off-line Programming, Printer Option, Full System Battery Backup, RS-232 and Edge Sensor Probe. These features are thoroughly explained in Available Options, Chapter VII.

## VII. AVAILABLE OPTIONS

The options listed in this chapter are available from your sales representative. He can provide further information about these options and their applications. At the beginning of each section is a list of the units for which each option is available. Not all the options are available on each unit.

A. **Zero Output:** (MICROWIZARD, MINIWIZARD, WIZARD).

This feature, available on all the units, is designed to enable the readout to activate a relay switch each time the display reaches or passes zero. The relay will activate whatever the customer wishes, whether it is to turn off the rapid power feed on a machine table or to turn on a light.

Once installed, zero output will activate the relay every time the readout reaches zero. A connector is attached to the readout on the back panel. The zero crossing output for any axis will be active for 100 milliseconds with optically isolated, open collector transistor. See illustration on Page 12 for schematics.

These outputs are intended to drive small "ice-cube" style relays. This is the only option available on the **Microwizard.**

B. **Memory Recorder:** (WIZARD only)
With the recorder, it is possible to store information on cassettes. Once the dimensions of a workpiece are entered into the WIZARD memory, storing the information on a cassette would insure it would never be lost.

If a job returns, the dimensions would not have to be entered manually again into the readout. Simply playing the cassette into the memory blocks would enable the machine operator to begin on the workpiece within minutes.

To use the recorder, insert the interconnect cable properly into the back of the **Wizard** unit. Place a cassette into the tape holder and press the RECORD button. The cassette will begin recording the information stored in the memory blocks. While recording, the RECORD key will be lit. The light will go out briefly when the recording is completed, and then come on again as the cassette automatically rewinds. Now the cassette may be removed and stored for later use.

**NOTE**
Only one program may be recorded on each side of the cassette. Only **Anilam** cassettes may be used as they are computer graded for information protection.

When you need to use an existing cassette program, simply load the cassette into the recorder, shut the tape door and press the PLAY key. The key will light and when the program has been transferred to the **Wizard** memory, the light will go out.

C. **Off-Line Programming:** (WIZARD only)
When using the memory recorder, another feature becomes available to the customer–Off-line programming. To program away from the machine, all that is needed is another **Wizard** console with the recorder option.

The program is entered into the memory and transferred to the cassette tape. Now, when the machine tool is ready to run the program, the cassette tape is delivered to the machine and its program is transferred to the memory of the **Wizard** at the machine. Operator involvement is eliminated.

D. **Printer Option:** (MINIWIZARD and WIZARD)
This option enables the machine operator to keep an accurate record of his movements on a workpiece. After each movement on the workpiece, the printer will record the axis displays on paper with push of a button. With this ability, the operator maintains a constant log of movements, so he is never lost.

Some customers prefer a log of precise hole locations for quality control reasons. A printer would help eliminate the need to transfer large, finished workpieces to a QC station.

Insert the interconnect cable to the back panel of the **Miniwizard or Wizard.** Connect the power supply. To record a position, simply push the (+ −) key after a movement. Do not push an axis key first.

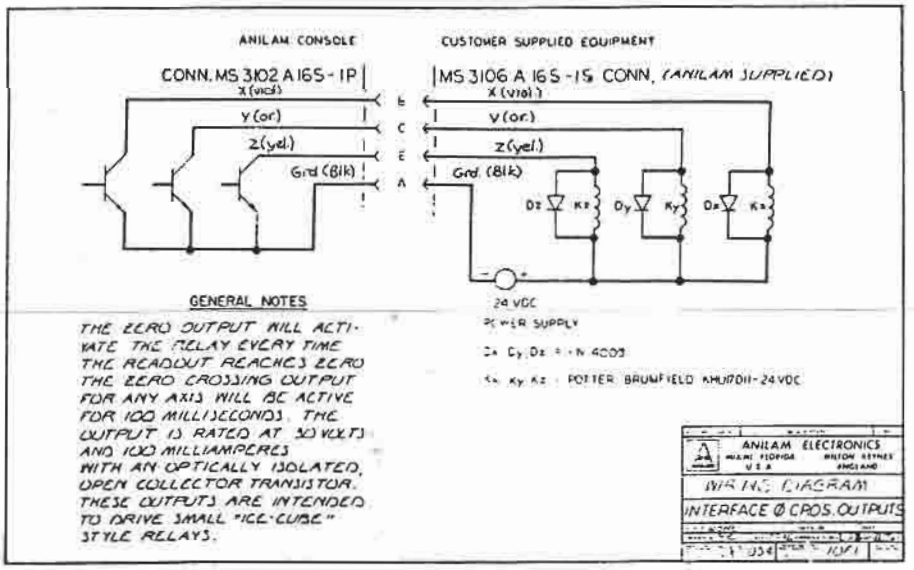
E. **Full System Power Backup:** (WIZARD only)
This new option allows the console to maintain display and scale operation even if the unit loses power. The display will be functional and the scales may be moved to location with the display showing the move.

To activate the power backup, turn the secondary power switch that is located on the back of the console on. This will maintain full power to the system for 15 minutes, if the main power is lost from the system.

F. **RS-232:** (WIZARD only)
Complete input and output from the Wizard keyboard. This option allows the operator to transmit information from the Wizard console to almost any peripheral device.

Insert the RS-232 cable to the back panel of the Wizard. Connect the device you want to use, then follow the instructions in the RS-232 manual for the Wizard.

G. **Edge Sensor Probe:**
(MICROWIZARD, MINIWIZARD, WIZARD)
The Edge Sensor will find the edge of a part and automatically zero the console in the axis that has been addressed. To address an axis, press the "0" key seven times, then the axis desired. When the seven zero's have been pressed, the left zero's for each axis will begin blinking. When the axis key is pressed, the last digit to the right on the axis that was pressed will begin to blink also. Move the probe to the material until the LED inside the probe lights or until the blinking digits stop. This will indicate that the probe has touched the materials and zeroed the console. At this point, the operator must move half the diameter of the probe ball end to center the spindle over the edge of the part. If the mode was entered in error and you wish to return to normal operation, press the SET key.



## VIII. TROUBLESHOOTING

This section should help you locate the source of a problem quickly and will give the procedures necessary to repair the problems.

In order to obtain replacement parts or to verify a problem, call your local Anilam distributor or sales office. **It is important to have your unit serial number available prior to calling any of the service lines.**

### A. Isolating a problem:

With the DRO system problems will result from either the console or transducer malfunctions. It is necessary to isolate where the actual problem exists. For example, if any one axis is miscounting, switch the axis connectors on the back of the unit. If the miscounts persist on the same axis, then the problem lies within the console. If the miscounting switches to a new axis then the problem lies with transducer, not the console.

Once you are sure where a problem exists, call the local Anilam distributor or sales office. Do not attempt any repairs prior to making the call.

### B. Problems and Answers

Below is a list of problem symptoms that may occur with the **Micro, Mini,** or **Wizard** digital readouts:

| SYMPTOMS | CAUSE/REPAIR PROCEDURE |
|---|---|
| 1. Miscounts: | A. Swap cables to encoders at rear of console as explained in Section "A". Problem should transfer if encoders are faulty.<br>B. If your unit is equipped, run the diagnostics check (Chap. V), if numbers flash, then problem exists on PC board and it has to be replaced. |
| 2. Unit displays incorrect distance, but will return to zero | A. Resolution set wrong (see Section I in chapter III for proper settings.)<br>B. Inherent machine inaccuracy; such as pitch error (See Chapter VI, Section "D"<br>C. Incorrect installation of transducer. |
| 3. Unit displays are out, with the except of the INC/ABS and IN/MM lights: | A. Turn the power off and wait 5 seconds before turning back on. If problem persists, replace the PC board. |
| 4. Front panel keys inoperative: | A. Replace front panel keyboard. |
| 5. Axis will not count; unit passes diagnostics: | A. Wire from rear panel to the PC board not installed properly.<br>B. Unit not grounded correctly (See Chapter III; Section "A".)<br>C. If your unit is equipped with Zero Output, check the schematic sketch in Chapter VII, Section A, to insure that all pin connections are properly made. |

### C. Encoder Connectors:

These connectors are the plugs on the wires that run from the back panel of the unit to the PC board. The connectors are black, multi-pronged plugs located at the top of the PC board. (See illustration at end of the Chapter for proper locations).

There is one plug for each axis and they are labelled on the PC board accordingly (X, Y, Z). If these plugs are not inserted into the board properly, the axis that plug controls may not count correctly or at all.

To change polarity of an axis (See Chapter III, Section J), pull the selected plug, or plugs, out and invert it end for end. Reinsert it correctly and the polarity for that axis will be changed.

### D. Illustrations:

Most problems with the readout can be corrected by simply replacing the PC board or (in some cases) the front panel keyboard. On the following page is an exploded view of a readout. Follow the diagrams for dismantling to gain access to the PC board and keyboard. All three models have similar procedures for dismantling and reassembling of the chassis section. The most significant differences are on the PC board inside the WIZARD unit.

**Removing the PC Board**

1. Remove 4⅜" Phillips Pan Head Screws. (3C or 5C)
2. Slide unit forward and lay on front bezel.
3. Remove 4 (2A)¼" Phillips Pan Head screws. (2 or 2A)

4. Remove connectors to X, Y, and Z axis. These are located near the top of the PC board.
5. Remove the 4 spacers (stanchion bars) and washers.
6. Remove the center brace nut located on the PC board. (See diagram).
7. Remove the PC board by lifting upwards and install new replacement board.
8. To reassemble unit–replace parts in reverse order starting with step 6.

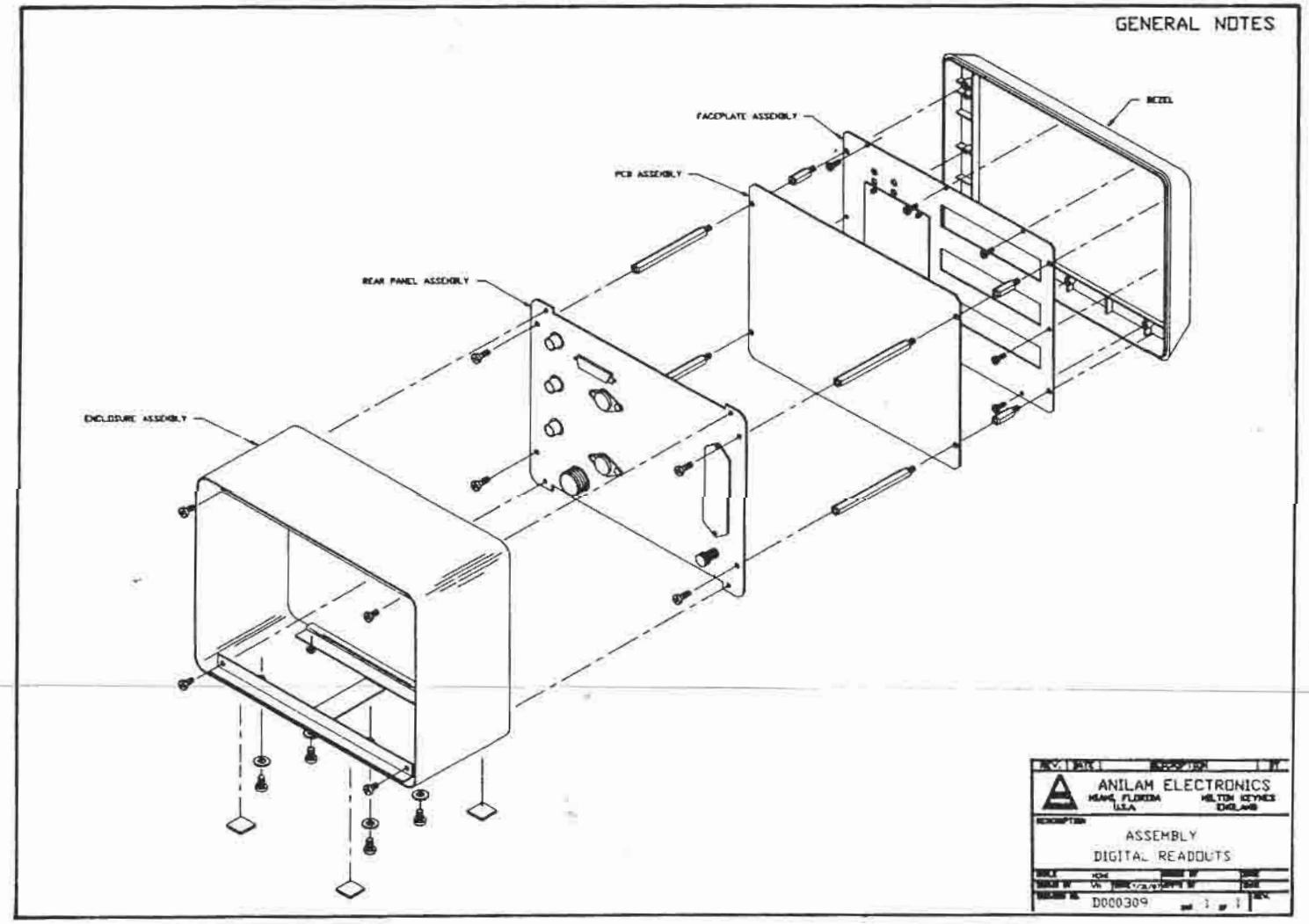
**To Remove Keyboard Front Panel:**

1. After step 7 above, remove the 4 spacers (#10 5/8").
2. Remove the Front Panel and install replacement.
3. Replace hardware (4 spacers), then reassemble unit in reverse order starting with step 6 for PC board reassembly.

## IX. DIMENSIONS AND SPECIFICATIONS

A. **All Wizard line units:**
   1. Dimensions: 8¾" × 11¾"W × 5¾"D (with bezel)
   2. Power Specifications:
   **Micro** and **Mini**: 115/230 volts AC; 25 watts; 110V-130V tolerance
   3. Approx. Weight: 7 pounds

B. **Cassette Recorder:**
   1. Dimensions: 4½"H × 9½" W × 7¾"D
   2. Weight: 3 pounds
   3. Specifications: 5 volts at .5 amps
   Serial transfer: 2400 baud



## X. OPERATING EXAMPLES

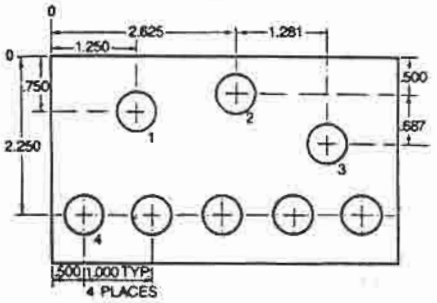



**FIGURE XA**

A. **Application Example:** "Incremental and Absolute Dimensioning"

The incremental/absolute feature (Miniwizard and Wizard) allows machining of parts like these just as the print reads. No mathematics or extra steps are required of the operator.

In the above example, positioning to hole locations #1, #2 and #3 is done easily with any DRO. You would move to the dimensions indicated on the print for #1 and #2, zero reset and move to #3, an incremental move. The problem lies in positioning to hole #4, an absolute dimension, since resetting the DRO loses your position from absolute zero. The incremental/absolute feature on MiniWizard and Wizard eliminates this problem. By switching back to absolute mode, you would simply work to the print dimensions to move to hole #4.

The need for additional mathematics, extra positioning steps, or rewriting prints is eliminated.

B. **Wizard Program Example:**
Procedure to program hole locations #1 through #6 (opposite page).

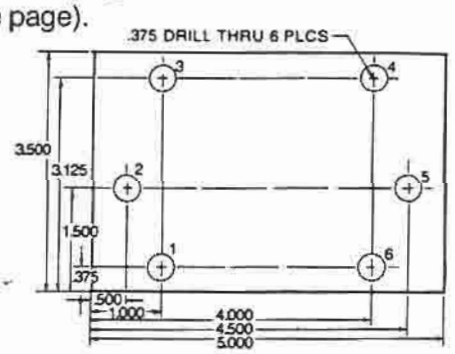



**FIGURE XB**

1. Locate tool at absolute zero (lower left hand corner of part).
2. Set absolute zero in Wizard:
X, Y, SET (INCREMENTAL)
X, Y, SET (ABSOLUTE)
3. In absolute mode, program first hole:
ABS. X, 1.000, Y, .375, STORE 001.

(Since all hole locations are referenced from absolute zero, remain in absolute mode. If incremental dimensions were given, simply switch to incremental mode and use the same method to program.)
4. Program holes #2 through #6:
X .500, Y, 1.500, STORE, STORE
X 1.000, Y 3.125, STORE, STORE
X 4.000, Y 3.125, STORE, STORE
X 4.500, Y 1.500, STORE, STORE
X 4.000, Y .375, STORE, STORE
By hitting recall and any memory block programmed, (001 through 006) the Wizard will display the incremental distance to move to get to that location.
(Example: If tool is at hole #1, to get to hole #5, hit RECALL, 005. the incremental distance to get to hole #5 – X 3.5000, Y 1.125, will be displayed).

C. **Wizard Program Example:** (Alternate Method) utilizing multiple absolute zero and mirror image features.
In the preceding program example, you can see that if we could establish a **second** absolute zero at the lower **right** hand corner of the part and change the direction or "mirror" the X-axis dimensions, we could use memory blocks #1 through #3 to machine holes #4 through #6. This can be done utilizing **multiple absolute zero** and **mirror image.**

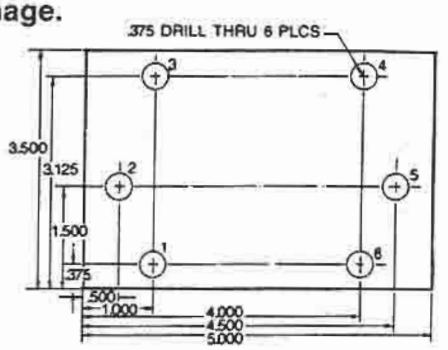



**FIGURE XC**

**Procedure**
1. Establish first absolute zero at lower left corner. X, Y, SET, INC, X, Y, SET, ABS, STORE #800.
2. Establish second absolute zero. First absolute zero is 5.000 from second ABS ZERO so:
X – 5.000, Y 0.000, STORE #801
3. Recall first absolute zero (RECALL, 800) and program holes #1 through #3:
X 1.000, Y .375 STORE 001
X .500, Y 1.500 STORE, STORE
X 1.000, Y 3.125 STORE, STORE
4. After recalling and machining holes #1 through #3, recall and move to second absolute zero.
RECALL #801.

5. Now mirror image the X-axis dimensions to reverse the direction (X-axis dimensions will show up as minus) X, +/−5 times.
6. Recall memory blocks #1 through #3 to machine holes #4 through#6.

NOTE: This is an over simplified example, but it should be evident how useful multiple absolute zero and mirror image can be on parts like multiple mold cavities, progression dies, etc.)

D. **Mini-Wizard Turning Example:**
1. Take skin cut, measure diameter, then preset diameter in absolute mode.
2. Switch to incremental (display reads all zero's) work to desired depth. Reset and repeat as often as needed.
3. Switch to absolute for actual diameter machined.

NOTE: SAME METHOD MAY BE USED ON LONGITUDINAL AXIS FOR MULTI-DIAMETER AND MULTI-GROOVING WORK.

E. **Wizard Turning Example:**

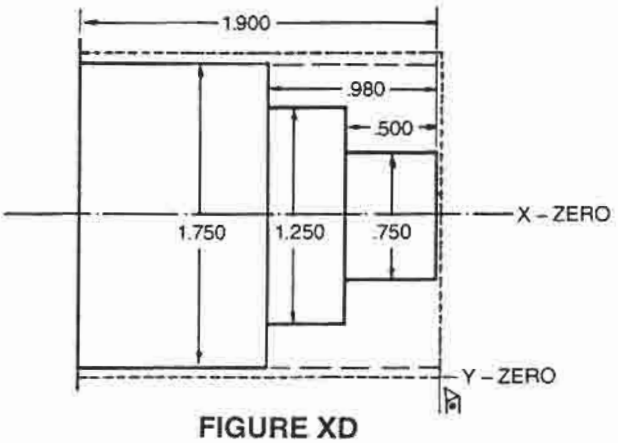



**FIGURE XD**

(With Crosslide Axis in Direct Diameter Mode:)

1. Face off part; set Y zero.
2. Take skin cut and measure diameter; leave tool at Y-zero (see illustration).
3. Enter finished dimensions into memory in absolute mode:
a. X 1.750 Y−1.900 STORE 001
b. X 1.250 Y− .980 STORE STORE
c. X .750 Y− .500 STORE STORE
4. Zero readout (INC X Y SET ABS X Y SET) and enter in diameter from 2 in absolute mode. (Ex: X 1.800 SET)
5. Recall 001. What will be displayed is the **incremental** distance to move to finished dimension (X−.050 Y 1.900). Anytime you wish to display actual part dimension, switch to absolute mode. The part diameter and tool position on length will be displayed.
6. Recall 002 and 003 and repeat procedure.

F. **Wizard–Lathe Program Example:** Tool Length Compensation

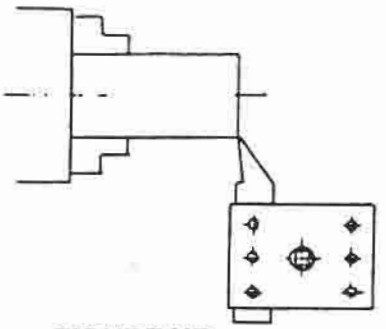


**FIGURE XE**

The 800 series zero offset facility really comes into its own when applied to lathes. The following is an example of how it might be used.

Set Tool No. 1 in lathe tool post and either by using the first component or a piece of scrap metal in the lathe chuck, determine the first tool offset.

**Method:**
1. Face across end of component and enter Y set into Wizard display. This datums the longitudinal axis at zero.
2. Take a test cut along the diameter and conventionally measure the diameter which has been produced.
3. Move lathe saddle back along the slide until Y-axis reads zero. This will now leave the tool tip in the position illustrated in the above diagram 1.
4. At this point the Wizard should be datumed (INC X, Y SET, ABS X, Y SET.)
**Now** Enter the diameter which has been measured into the X-axis (ABS X, 1.634 SET) followed by abs Y set.
5. Store 8).
You have now entered the position of tool No. 1 into the offset memory store and until the tool is physically removed from its holder (as in the case of preset tools) or removed from the lathe tool post this offset will remain valid.

Remove Tool No. 1 from the tool post (preset tooling) or index the tool post to the next tool and repeat the procedure.

By placing any one of these tools in the lathe tool post and selecting the appropriate offset (RECALL 801), it is now possible to nominate any diameter and produce it by selecting ABSOLUTE on the Wizard console and winding the lathe cross slide until the diameter required to be cut is displayed on the appropriate axis of the console (X-axis).

For batchwork however, the dimensions of the component should be programmed directly into the Wizard and stored.

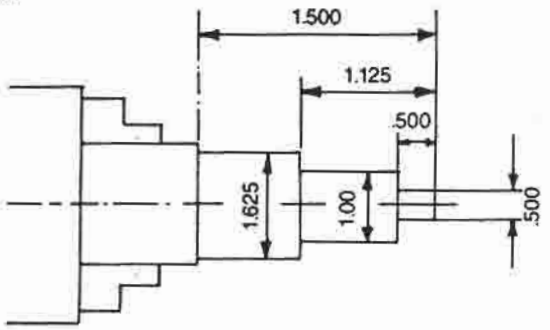



**FIGURE XF**

ABS X 1.625 Y – 1.500 STORE 001
ABS X 1.000 Y – 1.125 STORE STORE (stores 002)
ABS X .500 Y – .500STORE STORE (stores 003)

We will assume that offset tool 1 has been stored in 800.

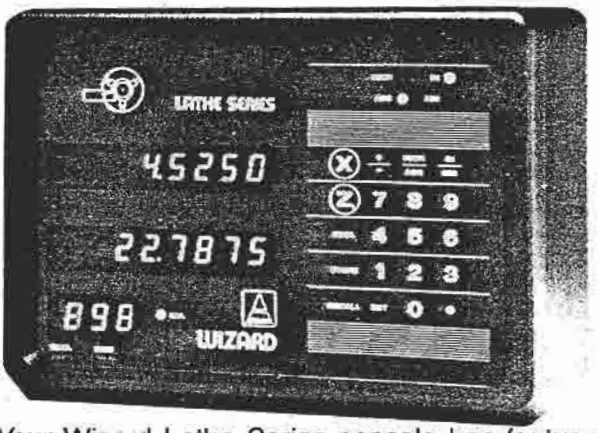
Therefore we proceed thus: RECALL 800, RECALL 801.
1. Set X-axis to zero by winding lathe cross-slide until display reads zero. (If a finishing cut is required, leave display at around .005" plus).
2. Feed longitudinal axis until display reads zero. (If this is a roughing cut, repeat the above but with X-axis now at zero).
3. This will have produced the first diameter (1.625 × 1.500 long).
4. RECALL 002 and repeat the procedure.
5. RECALL 003 and repeat the procedure.

If other tools are required to be used, recall the appropriate offset and recall the appropriate memory position and complete the operations.

If the completed component were part of a batch, then after the first component had been parted off and before the bar was drawn through the chuck again for the second component–it is recommended that tool No. 1 be put into the tool post and the appropriate offset recalled (RECALL 800).

This section is a supplement to the Standard Wizard Digital Readouts Operating Manual. To understand the full capabilities of your Wizard Digital Readout, it is necessary to read the Operator's manual completely. Bear in mind the changes to the text that are listed within this supplement.

## XI. SUPPLEMENT: WIZARD LATHE SERIES




Your Wizard Lathe Series console has features which differ from the standard Wizard console. They are:

- 97 Standard Memory Blocks (RAM)
- Tool number indicator for tool offset feature — accommodates up to nine tools (1-9) and tool reference position (0).
- Switchable Radius/Diameter Mode–Keyboard Access
- Diameter Mode Indicator

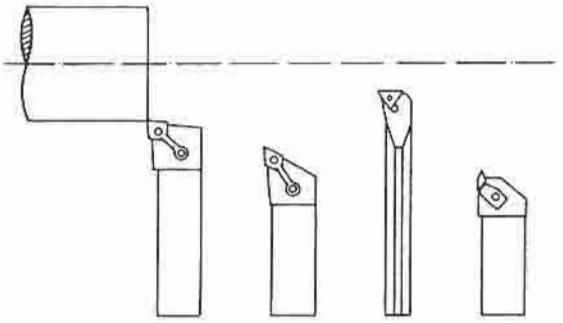
Please note the following changes to the Wizard Operator's Manual for the Wizard-Lathe Series that are listed below. **All other features in the standard manual remain the same.**

**Page 4** **(I) Radius/Diameter:**
It is possible to switch from radius to direct diameter reading (X-axis only) via the keyboard on the Wizard L.S. Pressing the **tool key (5 times)** switches radius/diameter reading. The diameter mode is indicated by the lamp marked *DIA* being illuminated.

**Page 8** **(A) Memory:**
The Wizard-L.S., has a standard 97 block memory. It is a two-digit entry and recall as opposed to the three-digit entry/recall explained in the manual. Example–to store a dimension in Memory Block #1–**Store 0 1.** To recall dimensions in block #1–**Recall 0 1.**

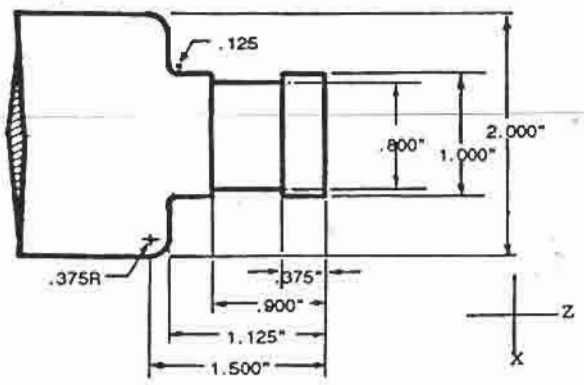
**Page 10** **(F) Tool Length Compensation:**
This feature is replaced by the Wizard-L.S., Tool Offset feature. It does not require the use of 800# memory blocks and can accommodate up to ten tools (0-9.) (See example on next page for procedure.)

**Page 10** **(H) Correction Factor:**
The entry of dimensions for correction factor are the same for the Lathe Series as the Miniwizard and Wizard. To store the correction factor and to activate it, press STORE and "9" twice. When this has been done, the axis that has had correction factor entered will have a blinking decimal point the same as the other consoles. To turn correction factor off, press RECALL and "9" twice. If STORE and "9" two times is pressed once correction factor has been entered, the blinking decimal point will stop, but correction factor will remain active. To insure correction factor is still active, press STORE and "9" twice, and the decimal points will begin to blink.



**THE WIZARD LATHE SERIES OFFERS UP TO 9 TOOLS OFFSETS**

The procedure for using the Wizard-Lathe Series Random Access Memory and Tool Offset features are illustrated in the below example in which three tools are used: A turn/face tool, a form tool and a grooving tool.




**Step 1** **Enter Print Dimensions into Memory.**

(1) Clear INCR. and ABS. counters and select Absolute Mode (all print dimensions entered **in Absolute):**

INCR X Z ABS X Z SET

This establishes the origin or datum point by clearing the incremental and absolute counters.

(2) X 1 Z − 1 . 1 25 STORE 0 1

This enters print dimensions into memory for the first move.

(3) X 1 . 625 Z − 1 . 5 STORE 0 12

This enters the second move, subtracting the radius of Tool 2 from the Z dimension and adding the radius to Z dimension.

(4) X . 8 Z − . 375 STORE 0 3

This enters print dimensions into memory for the third move.

**Step 2** **Setting your Tools** (Note: Always set tools in **absolute** mode)

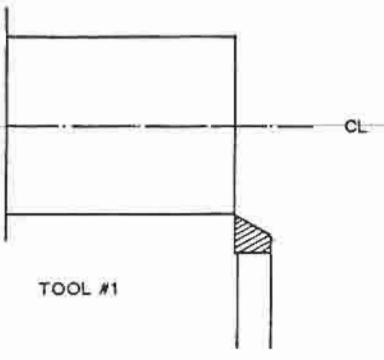
(1) Move the axes to a convenient position, clear of the workpiece for tool change position. Press X, Z STORE 00. Press TOOL 0 STORE. This will establish a home zero position that all dimensions will be referenced from.

(2) Chuck part and measure reference diameter (we will used a *miked* diameter of 2.000" for this example.) A skim cut should be used on the face of the part and on the diameter for the best results when doing an actual setup.

(3) Set first tool at corner of part, preset reference diameter in X-axis (dia. mode) and clear Z-axis.

X 2 . Z TOOL 1 STORE

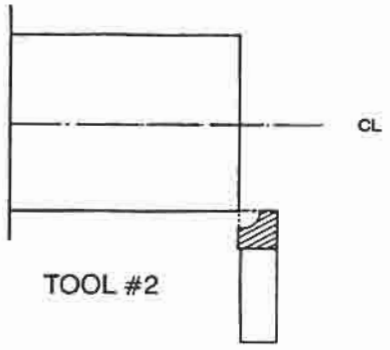
The first tool is now set.



(4) Set second tool at corner of part, preset reference diameter in X-axis (dia. mode) and clear Z-axis.

**X Z TOOL 2 STORE**

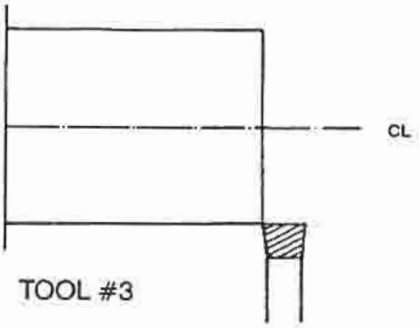
The second tool is now set.




(5) Repeat procedure for third tool:

**X Z TOOL 3 STORE**

Tool offsets and zero reference for all three tools have now been set.

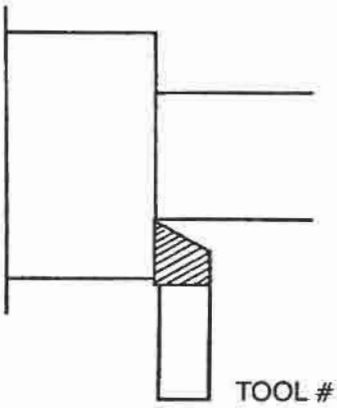



**Step 3** **Recall appropriate tool # and memory block # and position tool until X and Z displays read all zeros**

(1) **TOOL 1 RECALL**

(Readout will display incremental distance from present position to X0Y0.)

Move the machine until the displays on the console read zero. You will be at the correct dimension when this is done. The operator will be able to verify his position by pressing the ABS key. The dimensions he entered should be displayed at this time.



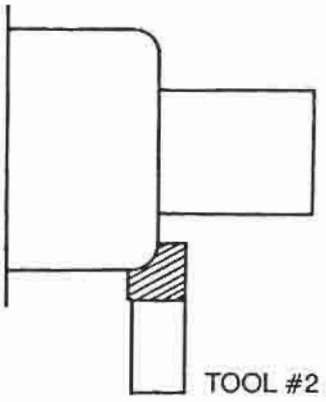

(2) **RECALL 0 1**

(Readout will display incremental distance from present position to first dimension stored in memory)

(3) Position tool until X and Z axis displays read all zero's

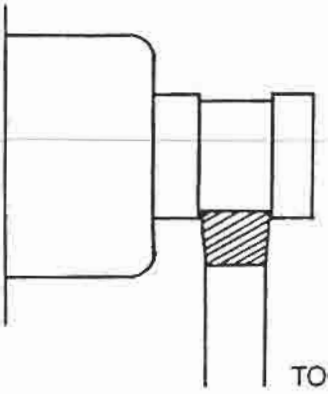
(4) TOOL 2 RECALL, RECALL 0 2

Position tool until X and Z-axis displays read all zero's




(5) **TOOL 3 RECALL, RECALL 0 3**

Position tool until X and Z-axis displays read all zero's.

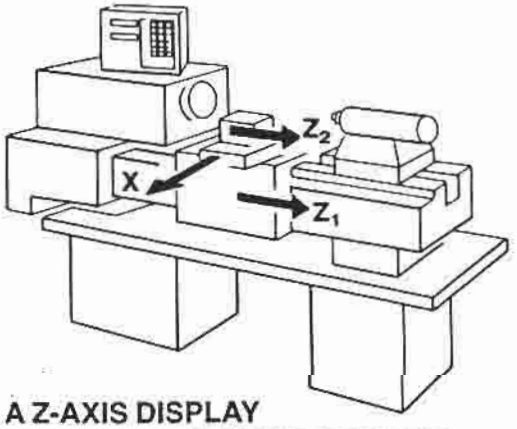


## XII. SUPPLEMENT: WIZARD TWINCOUNT

To understand the full capabilities of your Wizard Twin Count readout, please refer to the Standard Wizard Operator's Manual. The manual will provide a full description of the Memory and Tool Length Offset features.

The Twin Count's features are all simple-to-use and easy to understand. The chart below will explain each keyboard function and will describe the results of each operation.

| EXAMPLE: | PRESS KEYS: | RESULTS: |
|---|---|---|
| Select Z sum mode | Zs | Zs Mode Lamp Illuminated. Compound and saddle position appears in "Z" axis display |
| To clear (zero) Z1 and Z2 | Z Zs Set (Zs lamp must first be illuminated.) | All zeros in Z-axis display |
| To clear Z2 scale (compound slide.) | Z Set (Zs lamp must first be illuminated.) | Saddle position **only** is displayed in Z axis |
| To clear Z1 scale (saddle.) | Z Set (Zs Lamp must first be **off**) | All zeroes in Z-axis display (saddle position cleared) |
| Select Diameter Mode reading for X (crosslide) axis | Store 6 0 0 | "d" appears in Diameter Mode indicator. |
| Switch to radius mode reading for X (crosslide) axis | Store 6 0 0 | Diameter Mode indicator blank |




**A Z-AXIS DISPLAY USING 3 MEASURING DEVICES.**

## XIII. SUPPLEMENT: WIZARD EDM DRO

To fully understand all the capabilities of the EDM Digital readout, it is necessary to read each of the chapters in the Operating Manual on **Microwizard, Miniwizard** and **Wizard.** These chapters explain the basic functions of all the Wizard-line units. This supplement explains the features of the EDM that the Micro, Mini and Wizard do not include.

### SET-UP OF PARAMETERS: 8 KEY TEN TIMES

To access the parameter page, press the 8 key ten times as described in Section I on page 3. The resolution setting, radius/diameter and polarity reversal are set the same as all of the standard consoles.

The EDM differs on the Z axis only for set-up. Once the X and Y axis have been set, press the Z axis key. Set the axis for the proper resolution, radius/diameter and polarity.

The fifth digit from the right sets the console for EDM or for Zero Out. (See Example XIIIA below.) A O in the display will permit the console to work in the EDM mode. In this mode the console will load the dimension recalled from a memory location, and will output a signal when the target dimension has been reached. To activate Zero Out, a 1 should be entered as the fifth digit. This will allow the operator to enter a dimension in Z axis, move to zero and output a signal when zero has been reached.

The sixth digit sets the automatic/manual First Spark. For Automatic First Spark, this digit should be a 0. For manual First Spark, or First Spark simulation, a 1 should be set. If a 0 has been entered, the memory block location will indicate an F in the last digit, indicating automatic first spark.

The last digit is used for Reload or Manual operation of the memory. A O should be set if the operator wants to recall the block of information manually. A 1 should be entered if repetitive work is being done and the operator wants to recall the same information for production runs once the memory block has been recalled the first time.

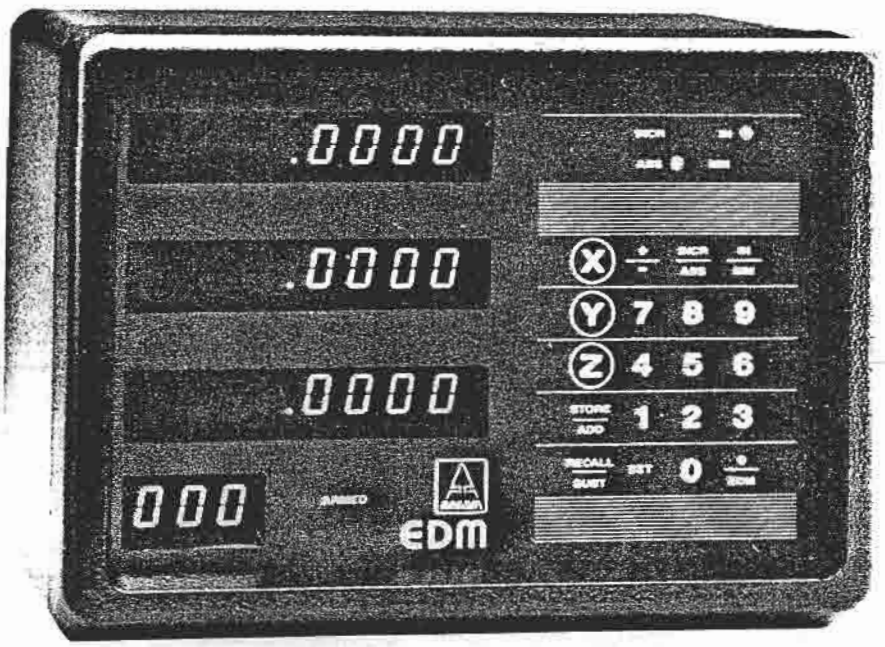
Once these parameters have been set, the operator can leave the parameter page by pressing the SET key or he can go to the second parameter page. If the SET key is pressed, the console will save the parameters and return to normal operation.

| 1 | 0 | 0 | 0 | 0 | 1 | 1 |
|---|---|---|---|---|---|---|
| Auto reload/ Manual recall | First Spark Auto/ First Spark Manual | EDM/ Zero Out | Direction | Radius/ Diameter | | Resolution |

EXAMPLE XIIIA

### ZERO OUTPUT PULSE SETTING:

It is possible to set the time of the output pulse. The standard output time to the machine is 100 milliseconds. This time will work on most machines. If a longer time is required, enter the first parameter page by pressing the 8 key ten times. Press the IN/MM key. This will bring up the second parameter page. Press the Z



axis key and enter the first three digits that correspond to the time that is required from the table below. When the time has been set, press the SET key. This will return you to the first parameter page. Press the SET key again to return to normal operation. The second page of parameters is saved the same as the first page, even if the console is turned off.

000 = 100 MILLISECONDS
001 = 150 MILLISECONDS
010 = 200 MILLISECONDS
011 = 250 MILLISECONDS
100 = 300 MILLISECONDS
101 = 350 MILLISECONDS
110 = 400 MILLISECONDS
111 = 500 MILLISECONDS (.5 SEC)

**FIRST SPARK: Z AXIS TWO (2) TIMES:**

First spark allows the operator to activate the console so that it looks for the electrode touching the workpiece. Once the console senses the electrode touching the workpiece, it automatically resets to zero and enters the depth that the electrode is to burn to. When the electrode reaches the depth specified, another signal is sent from the console to the EDM machine, retracting the ram to its up position.

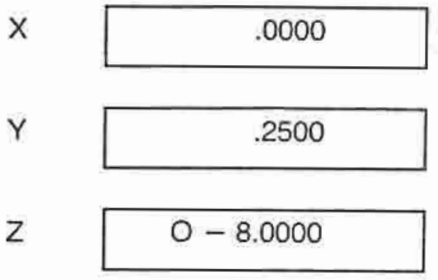
The burn depth must first be stored in memory. If X, Y and Z dimensions are to be stored in a memory block, press X, enter the dimension, press Y, enter the dimension, press Z, enter the dimension and press the STORE key. Press the 0 key and then the 1 key to enter the dimensions. This will store X, Y and Z dimensions to memory block 01. Z axis may be stored without X and Y. The procedure is the same as above, but only with Z axis and X, Y displays reading .0000. This will insure that no dimensions are displayed in X and Y when the Z axis is recalled. To store each consecutive memory location after block one, simply press the axis, enter the dimension as above and press the STORE key two times.

Example: The burn depth for your cut is .2500 deep. Press Z. The axis indicator will begin to flash in the Z axis. Press the decimal point key, the 2 and 5 key. press STORE 01. The flashing zero in the Z axis has stopped and 01 is displayed in the memory block window in the lower left hand corner of the console. The burn depth is now stored. For more detailed information on storing memory, refer to Section VI. A., on page 8.

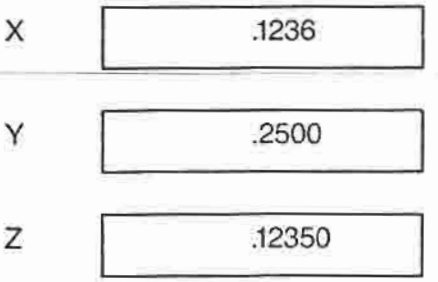
To prepare for the first cut, find the reference 0 point on the part and move the table so the electrode is in the correct position over your reference zero. Press X, Y, Z, STORE 00. This will clear your display and zero the console automatically in both Absolute and Incremental mode. You are now ready to move to your first location. Press RECALL 01. If X and Y have been stored in memory along with Z, move the table until the X and Y displays read zero. If X and Y have not been stored, move the table so the displays show the correct print dimentions.

The table is now in the correct location for the first burn. To arm the console for first spark, press the Z axis key two (2) times. If the console is in automatic first spark, this is done before the quill is started toward the part. If the console is set for manual operation, this is done when the electrode first sparks with the workpiece. The Armed LED will light when this is done.

If the console is set for automatic, .2500 will be displayed in the Y axis. 8.000 will show in the Z axis as well as a flashing zero to the left of the display. (See example below.) Manual operation is discussed in first spark simulation.




Begin to move the electrode to the workpiece. When the electrode touches the workpiece, or first sparks, the flashing zero in the Z axis display will stop flashing. The Z axis display will automatically set to zero. From this point, the console will begin to count toward the target dimension set in the Y axis. The X axis will show the deepest penetration of the electrode without oscillation, while the Z axis will bounce. (See example below.)



When the Z axis reaches the burn depth displayed in the Y axis, the console will send a signal to the machine to retract the ram. When this occurs, the X axis will maintain the last depth reached by the electrode. This number will verify that the burn depth was achieved even if the operator is not at the machine when the cut is complete. The Y axis will also keep the burn depth displayed until the console is disarmed. The Z axis will show the distance from the top of the part to the up position of the ram. (See example below.) The armed LED will begin to flash once this cycle has been completed. To return to normal operation of the console or to prepare for the next first spark, press the SET key.

| | |
|---|---|
| X | − .2500 |
| Y | − .2500 |
| Z | 6.4375 |

To disarm the first spark operation, press the SET key. This may be done at any time. While the electrode is burning, you may verify your position of the X and Y axis without disarming the console. This may be done by pressing the EDM/. key. To go back to the first spark display, press the EDM/. key again.

TO STORE A BLOCK IN MEMORY:
Your first memory block must be entered in the ABS mode. Any blocks entered after may be in either ABS or INCR. The Z axis dimension will always be entered as ABS regardless of what mode the other two are entered in.

RECALLING A MEMORY BLOCK:
When a memory block is recalled, the console will switch to INCR mode automatically. The displays will show the incremental distance between your present position and the position you have just recalled. Move until the display reads all zeros to reach position. This is not the case for the Z axis. The Z axis will display the dimension that was entered. This is done to allow first spark to operate properly.

FIRST SPARK SIMULATION:
First spark simulation allows the operator to activate first spark manually.

To allow first spark simulation, the operator must enter the resolution, direction, radius/diameter setting page by pressing the "8" key ten times. Next, press the "Z" axis key. At this point, the last zero to the right of the Z axis display will be flashing. Press the +/− key five times. The second digit from the left will be flashing when this has been done.

Press the "1" key to activate first spark simulation. To return to the normal operation of the console, press the SET key.

If the operator would like to disable this feature, he would follow the same procedure as above, but enter a "0" instead of a "1".

When first spark simulation is required, the operator must first press the Z axis key two times. This activates FIRST SPARK. The electrode is started toward the workpiece. When the operator wants to simulate the electrode touching the workpiece, he presses the "0" key and the console will complete its normal EDM cycle.

AUTO MEMORY RELOAD:
Auto memory reload must first be set on the parameter page to have it operate. The setting is described on page 23. When this has been done, call the block of information that is needed for the operation. Activate First Spark and run through the complete cycle of the burn. When the burn is done the operator can run the same block for another burn. This is done by pressing the decimal/EDM key one time. The dimension will load to the Y axis, the ARMED light will illuminate and the console will be ready to look for the first spark. To deactivate the operation, the SET key is pressed. To recall another block of memory, the recall key twice will call the next consecutive block or any other block can be called by pressing recall and the two digit block number.

## WARRANTY STATEMENT

ANILAM Inc. warrants its products to be free from defects in material and workmanship for one (1) year from date of shipment. At our option, we will repair or replace any defective product upon return, prepaid, to our factory in Miramar, FL.

This warranty applies to all products when used in a normal industrial environment. Any unauthorized tampering, misuse or neglect will make this warranty null and void.

Under no circumstances will ANILAM Inc. or any affiliate of ours have any liabilities for loss of use or for any indirect or consequential damages.

The foregoing warranties are in lieu of all other warranties expressed or implied, including, but not limited to, the implied warranties of merchantibility and fitness for a particular purpose.