

# **Quantum Scale**

## **Installation Manual**



**ANILAM ELECTRONICS CORPORATION**

"America's largest manufacturer of Digital Readouts and CNC Controls"  
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ANILAM ELECTRONIC CORPORATION

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## I. INTRODUCTION

Anilam Electronics Corporation is a manufacturer of electronic measuring devices and controls for the machine tool industry. Our products have a reputation for quality, dependability and fine workmanship. With its patented design, our new **Quantum** scale more than meets the demands of that reputation.

This manual contains instructions for step-by-step installation of the Quantum scale. The scale is normally used with Anilam readout and control systems.

Familiarize yourself with all procedures before actually mounting the scales. Bear in mind that the Quantum scale is a precision electronic device and care should be taken to ensure that it is handled accordingly. Warranty is void if instructions are not followed. Contact your local Anilam representative if you have any questions regarding these procedures.

## II. IDENTIFICATION

Each Quantum scale and head resolution is identified through a labeling system of serial numbers. These serial numbers appear on both the head and scale and are prefixed by a code which identifies the level of modification:

CODE		RESOLUTIONS
SCALES:	<b>A</b>	.0005" (.01mm) and .0001" (.002mm)
	<b>B</b>	.002" (.005mm) and .00005" (.001mm)
	<b>C</b>	.0005" (.01mm) and .0001" (.002mm)
	<b>D</b>	.0005" (.01mm)
	<b>E</b>	.0001" (.002mm) and .00005" (.001mm)
	<b>F</b>	.002" (.005mm)
HEADS:	<b>A10</b>	.0005" (.01mm)
	<b>A2</b>	.0001" (.002mm) (used w/X-box)
	<b>B5</b>	.0002" (.005mm)
	<b>B1</b>	.00005" (.001mm) (used w/X-box)
	<b>C10</b>	.0005" (.01mm)
	<b>D10</b>	.0005" (.01mm)
	<b>E5</b>	.00025" (.005mm)
	<b>E1</b>	.00005" (.001mm) (used w/X-box)
	<b>F2</b>	.0001" (.002mm) (No X-box used)

### III. PREPARATION

The Quantum scale comes preassembled, ready to be mounted on your machine or fixture, though custom mounting brackets may have to be fabricated to attach the assembly to your particular machine. Anilam has optional brackets available for many machines. Prior to installation, ensure that scale is correct length and no damage has occurred during shipping. See figure 1 for dimensions.

During the installation of your scale, bear in mind the following points:

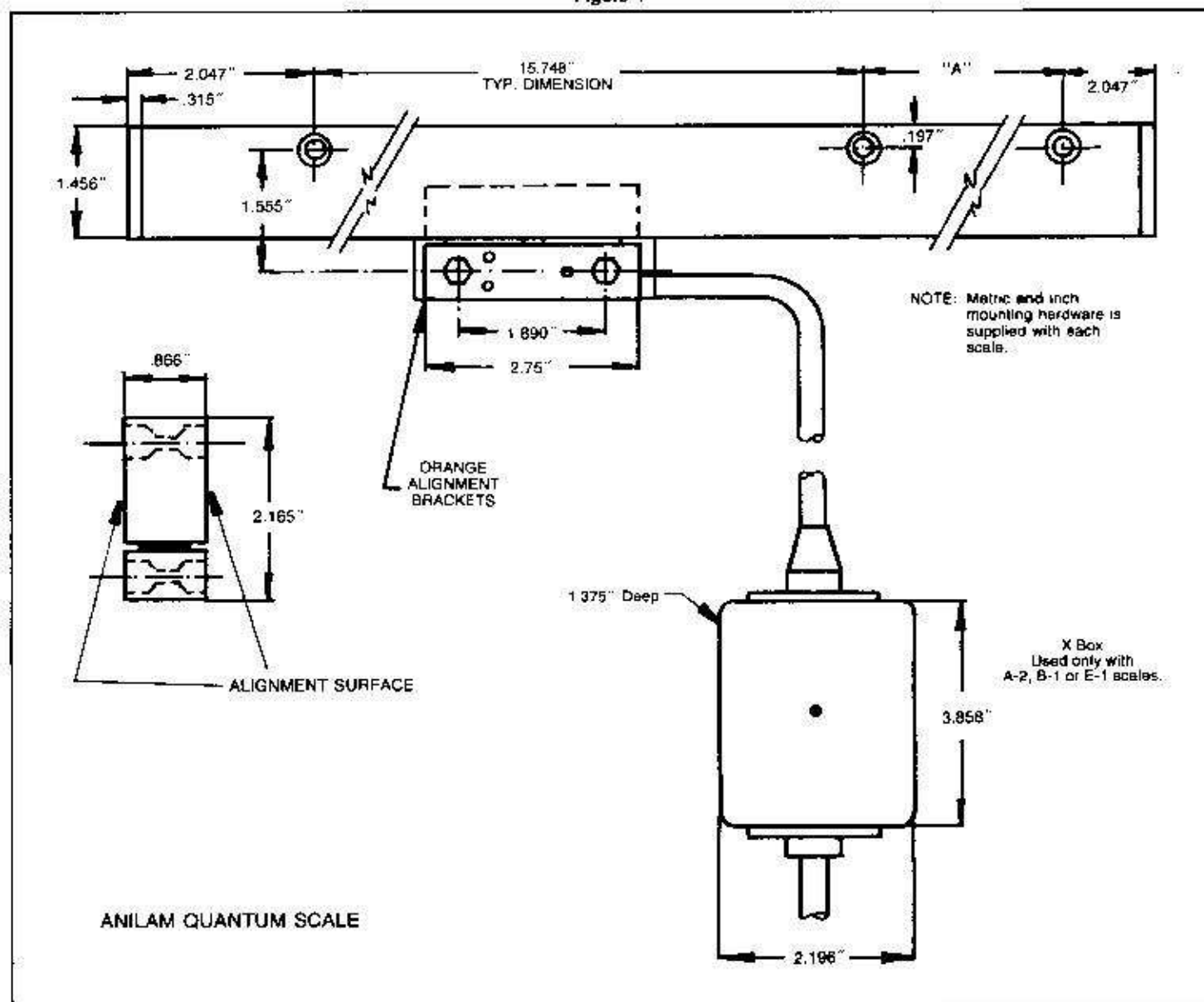
First, the Quantum scale is a precision measuring instrument which has been carefully calibrated. Failure to follow mounting instructions or keep within specified tolerances will result in poor accuracy and repeatability. Scale wear and reader head damage are also possible if the stated conditions are not met.

Second, the top and front surfaces of the scale case must be true to the machine table (and/or spindle travel) within .004" (.1mm) T.I.R. over the full length of the scale case.

Third, provide maximum protection against contamination by mounting the scale case with the rubber seals **facing down or away from cutters and coolant spray**. If the scale must be mounted with the seals facing the cutters and sprays, then fabricate a sheet metal or Neoprene guard to protect the scales.

Fourth, bear in mind which direction you plan to route the cable from the reader head to the readout. Determine this **prior** to installation, so that the cable does not have to fold back on itself or be in danger of getting pinched during table movements, etc.

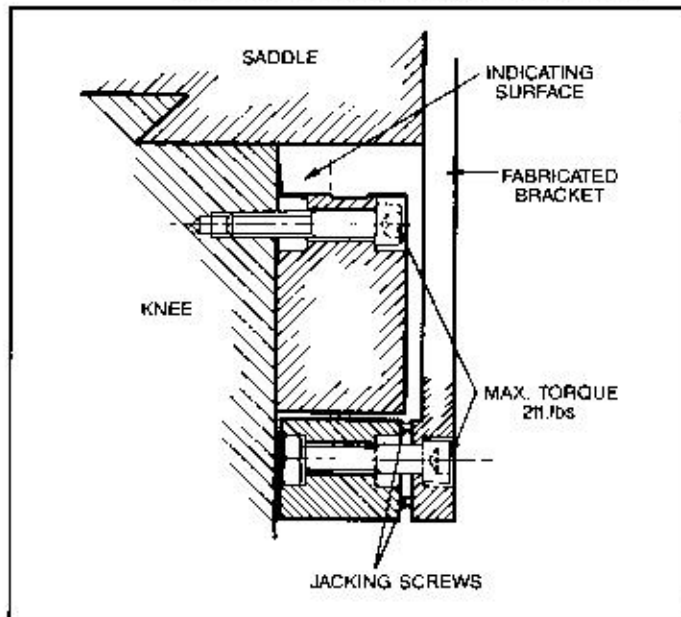
Figure 1



#### IV. MOUNTING QUANTUM SCALE ON FRONT OF TABLE (X AXIS)

The scale case and reader head are to be mounted against a **machined side surface** of the table or slide. If this cannot be done, then provide or fabricate spacer blocks, a backerbar or standoffs. It is necessary to provide rigid support and proper contact with a machined surface; therefore the mounting surfaces fabricated by the customer must be milled square and parallel. Mounting surfaces have to be flat and parallel to machine travels within 0.004" (0.1mm) T.I.R. (See Figure 2).

**Figure 2.** Typical Scale Mounting with Minimum Clearance Behind Reader Head



Note that excessively long or weak brackets will cause the readout display to flutter when the machine vibrates during cutting.

#### NOTE

All tapped holes into the machined surface must be 90 degrees straight and square from the scale case when mounted. If this is not done, inaccurate readings could result.

Make certain that a space of .03" (.8mm) to .10" (2.5mm) will remain between the reader head casting and its mounting surface. This spacing will be required later for proper adjustment of the reader head jack-screws.

- 1) Remove all dogs and stops. Save the two 3/8" cap screws for later use. See photo A.

PHOTO A



Before installation begins, be certain to add the two (2) provided hex head nuts to the reader head. See photo B.

PHOTO B



- 2) Temporarily attach the Quantum Scale to the table through the use of two C-Clamps so that when secured and table is moved, the reader head will not hit the end caps. After positioning, transfer punch the first hole. See photo C.

PHOTO C



- 3) Place scale in a safe position and drill and tap for a  $\frac{8}{32}$  cap screw approximately  $\frac{5}{8}$ " deep. When finished place scale up to the table and put the  $\frac{8}{32}$  cap screw through the scale into the tapped hole. Torque should be no more than 2ft.lbs. It is recommended that a torque screwdriver be used. See photo D.

PHOTO D



- 4) Set up a magnetic base indicator on the ways with the stylus on top of the scale and at a position just above the cap screw. Move the table and stop at the next hole location. With your indicator reading "0" transfer punch the location. Do the same for all remaining hole locations. Remove scale and repeat step 3. See photo E.

PHOTO E



- 5) After tapping all holes replace scale. Make certain that the two hex head nuts are in the head (Photo A). Tighten, using a torque screwdriver, the first cap screw to 2ft.lbs. and reset your indicator to zero. Move the table to your next location and again tighten the screw to 2ft.lbs. with the indicator still at zero. Do the same for all remaining locations. See photos F and G.

PHOTO F

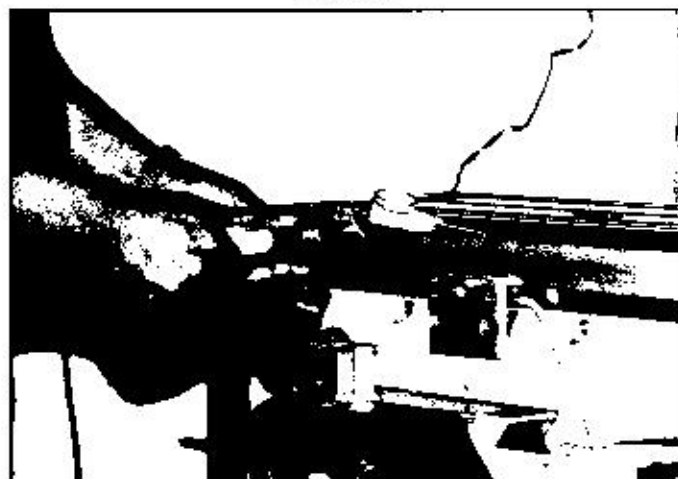
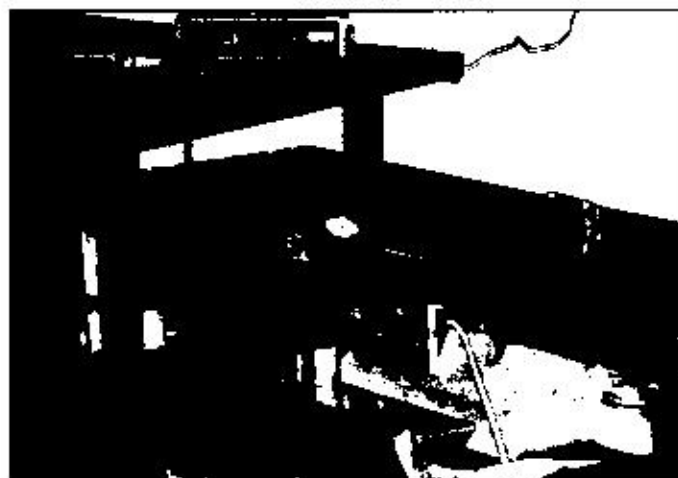


PHOTO G



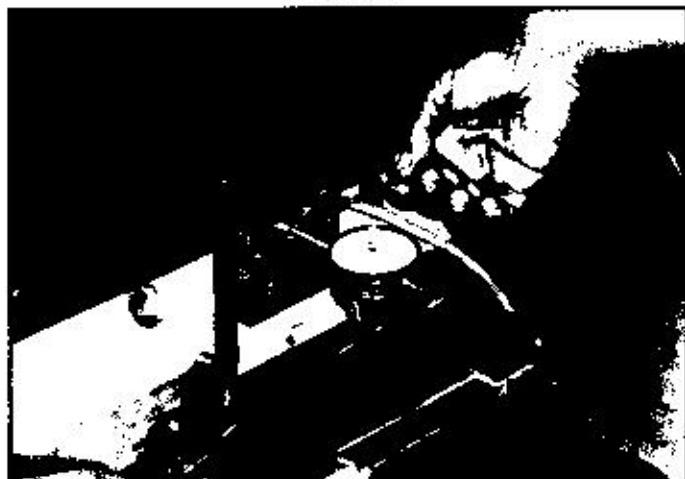
- 6) Set up the front mount bracket using the two  $\frac{3}{8}$ " cap screws that came off the front stop. Move the table so that the holes in the reader head line up with the bracket holes. See photo H.

PHOTO H



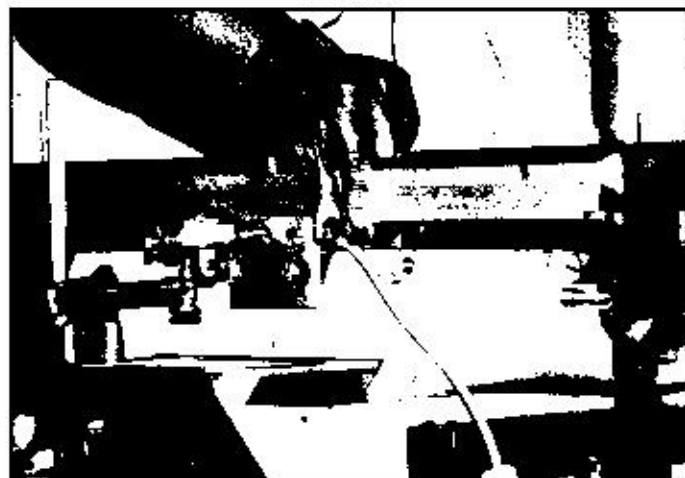
- 7) Place the four set screws into the front bracket and onto the reader head. Turn set screw until you read .001". Do the same for the remaining three set screws until you are reading .004. Place the 8/32 cap screws into place and tighten to 2ft.lbs. Indicator should read "0". If not, you may have to loosen the 8/32's and repeat the set screw instructions. When done do *not* move the table. See Photo I.

PHOTO I



- 8) When head is secure **you must remove the orange alignment brackets** from the sides of the reader head. Unscrew and give them a 90° twist so that they pop right out from the scale extrusion. See Photo J. The finished mounting is shown in photo K.

PHOTO J



### Cable Routing From Reader Head to Console

Route the cable to the rear of the console. Ensure that slack loops are sufficient to allow movement of the reader head, table and saddle to full extent of travel in all directions.

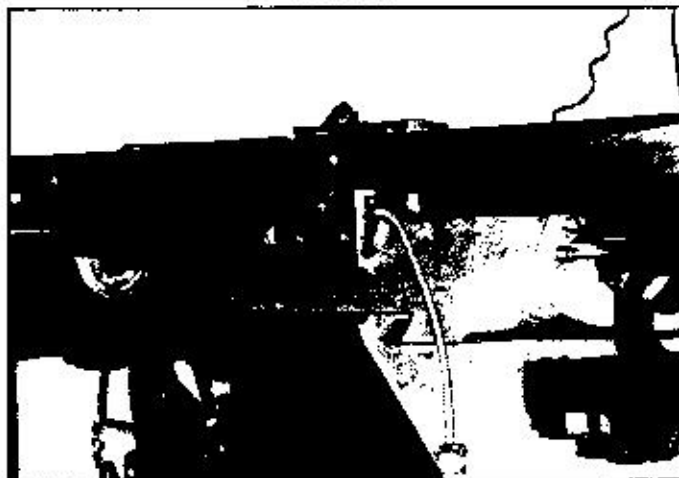
#### NOTE

If cable has to be led off in an upward direction from the reader head, a loop must be provided in the cable to facilitate coolant escape.

Plug the male connector (large spine up) of cable into the mating female connector at rear of console. Give the outer ring a ¼ clockwise turn to lock it into place.

Neatly tie the cable to the machine base to prevent excess slack from lying on the shop floor where it may become damaged. **Do not** allow the cable to lie on the ways or leadscrews where it is in danger of being pinched or cut. Damaged cable **cannot** be repaired and must be replaced complete with a reader head.

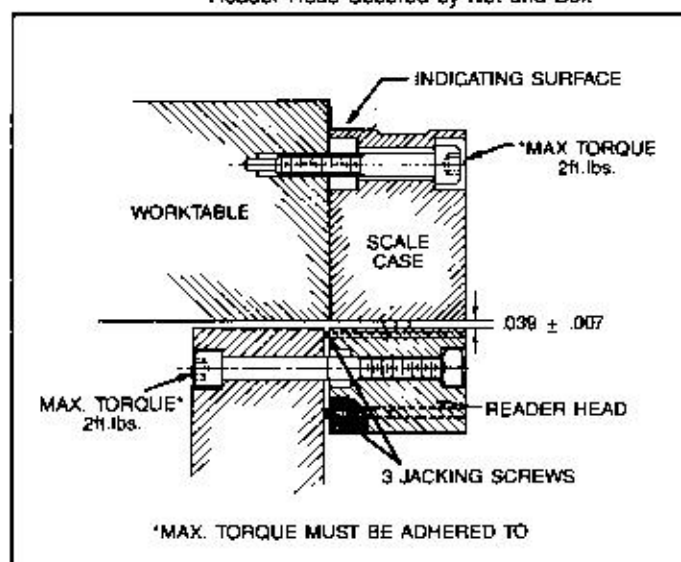
PHOTO K



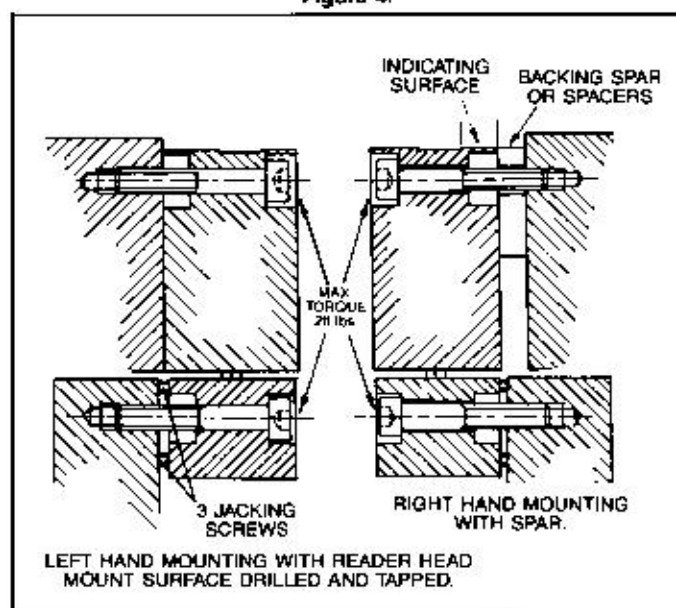
## V. MOUNTING QUANTUM SCALE ON THE BACK OF THE TABLE

- 1) Follow steps 2 through 5 in Section IV.
- 2) Position reader head so that when table is moved it will not hit the end caps. Transfer punch two holes through the reader head and onto the mounting surface. Move table and drill and tap for 8/32 cap screws. 3) After drilling and tapping, move the table so that the holes in the reader head are aligned with the tapped holes. Place set screws into the reader head and also set up an indicator so that the stylus is in the middle of the reader head. Turn one set screw in until you read .001" on the indicator. Do the same for the remaining set screws. When indicator reads .003" you can place the 8/32 cap screws into the tapped holes and tighten to 2ft.lbs. You should read "0" on the indicator once the 8/32's are tight. If not, loosen and reset the set screws to .002" a piece. After you tighten the 8/32 cap screws, do not move the table.
- 4) Follow step 8 in section IV.

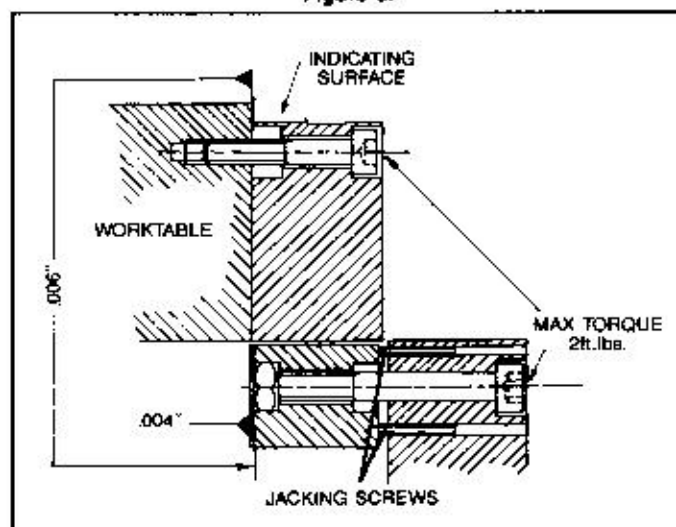
**Figure 3.** Typical Quantum Scale Mounting.  
Reader Head Secured by Nut and Bolt



**Figure 4.**



**Figure 5.**





## VI. SIDE MOUNTING OF THE QUANTUM SCALE (Y AXIS)

- 1) Place side mount backer bar with spacers and 3/8" cap screws onto the side of the machine. Notice three holes that are drilled, tapped, and counter-bored. Clean the area around the tapped hole so that the spacer for the backer bar sits properly into the area. You may have to run a tap into the holes to clean.
- 2) Set up your indicator and place the stylus on the front of the backer bar. Move the saddle and read the indicator. If you are getting a deflection of more than  $\pm .002"$ , use the shims provided and place them between the spacer and the backer bar. Try to get the indicator to read "0" if possible.

PHOTO L



- 3) Place the stylus of the indicator on the top of the backer bar and move the saddle. This should also be as close to "0" as possible. Adjust accordingly.

PHOTO M



- 4) You will notice a hole in the backer bar that is already drilled and tapped for a 8/32 cap screw. Place the scale on the bar and tighten the cap screw to 2ft.lbs. Place a depth micrometer from backer bar to scale. When

depth is determined, place micrometer at the next hole location. Take scale down and drill and tap for 8/32 cap screw.

PHOTO N

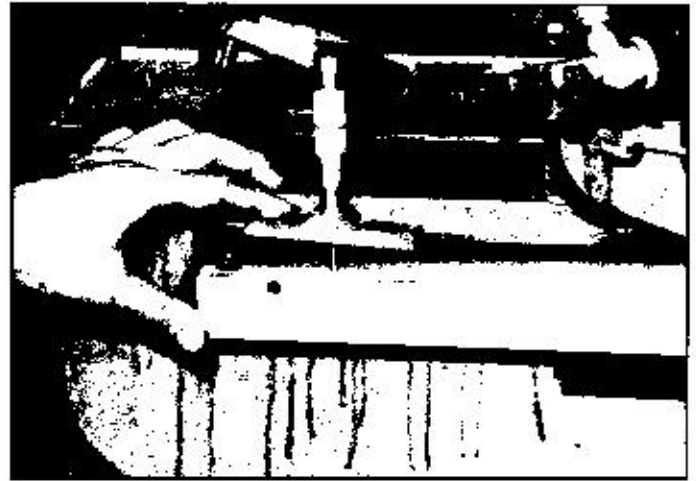
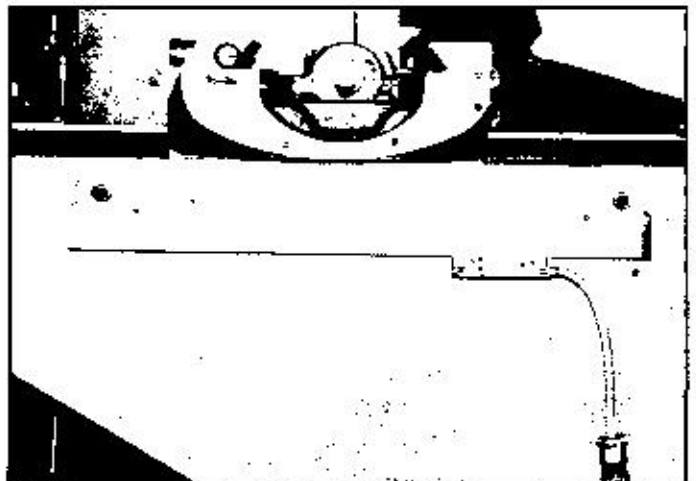


PHOTO O



- 5) After drilling, place scale up to the bar and screw the 8/32 cap screws into place using your depth micrometer as a guide. Tighten screws to 2ft.lbs.

PHOTO P



- 6) On the side of the saddle you will notice some tapped holes. By looking at the slingshot type bracket you can tell where it goes. Place bracket up to saddle and screw in 1/4-20 cap screws with washers that are provided. Move the saddle so that the holes in the bracket are aligned with the holes in the reader head. Make sure that you have placed the two hex head nuts into the back of the reader head casting.
- 7) Place set screws into the tapped holes in the bracket. Set up your indicator and place the stylus in the middle of the reader head. You can do this because of the cut-out in the middle of the bracket. Turn in the first set screw until you read .001" on the indicator. Repeat process with the other three set screws until you read .004". Place the 8/32 cap screws into place and tighten to 2ft.lbs. The indicator should read "0". If not, loosen and re-set the set screws at .002" each and tighten 8/32 to "0".
- 8) Follow step 10 in Section IV. Refer to figures 2 through 5 in Section V if necessary.

## VII. MINI-QUANTUM SCALE INSTALLATION (Lathes, EDM machines, Optical Comparators)

The Anilam Mini-Quantum scale was designed for use specifically on lathes, EDM machines and optical comparators. Review chapters 1-3 for a better understanding of the Quantum scale. Since scale installations techniques differ only slightly on various machines, you may find a review of the photos in the previous chapters to be helpful. Also, the general assembly drawing in this section will assist you during the scale installation.

Ensure that you have all the following materials on hand:

- a) Mini-Quantum Scale with cover kit.
- b) Scale mounting kit: Includes backer bar, cover, 4 x 4 aluminum block and hardware. Backer bar is 20.25". If Mini-Quantum scale is shorter than bar, cut bar to fit scale. 4 x 4 aluminum block is to be machined so that the reader head of the scale can be mounted to it.
- c) Allen wrenches.
- d) 1 thousandth indicator with magnetic base.
- e) Transfer punch (3/16").
- f) Ballpeen hammer.
- g) Screw driver.
- h) 8/32 tap and number 21 drill.
- i) Drill motor.
- j) 2 foot-pound torque driver (if available).

### LATHE

#### Mounting the Backer Bar:

Locate the backer bar in reference to crossslide travel. When the scale is mounted to the backer bar, the reader head must be located in the center of the travels. If the reader head is not centered, it may run into the end caps of the scale, causing damage to the head and/or glass in the scale housing. Also, ensure the backer bar is on the side of the crossslide farthest away from the chuck of the lathe.

Using your transfer punch and ballpeen hammer, mark the first backer bar screw location on your crossslide. When done, remove backer bar. Now, drill and tap that hole location for a 8/32 cap screw.

Mount backer bar with cap screw.

Set up a magnetic base with indicator and set the stylus on top of the backer bar. Set the indicator at zero (0) and move the crossslide until the stylus of the indicator is directly above the cap screw mounting hole.

If indicator has moved above or below the zero (0) on the indicator, adjust the backer bar until the indicator reads zero or  $\pm .002"$  tolerance. Transfer punch the hole and repeat the above process until all mounting hole locations are transfer punched. Remove cap screw and backer bar and drill and tap all hole locations in the crossslide.

Mount the backer bar. All inserted cap screws should be loose except for the first one. Set the indicator up as before and set it at zero (0). Move the crossslide and adjust backer bar for the indicator to read zero (0) at the next cap screw location. Tighten the cap screw and repeat the process for the remaining cap screws.

The backer bar is now ready to accept the Quantum Mini-Scale.

### Mounting the Scale:

Set scale up to backer bar and transfer punch the first hole location.

Remove scale and drill and tap into the backer bar for 8/32 cap screw. Place scale up to backer bar and mount the cap screw through the scale and into the tapped hole.

Set up the magnetic base and indicator. Place stylus directly above the first hole location and set the indicator to zero (0). Move crossslide to the next hole location and adjust the scale so the indicator reads  $\pm .002$ " or zero. Transfer punch that location. Repeat the process for the remaining holes. Remove the scale when done.

Drill and tap all locations for the 8/32 cap screws. Remount the scale and tighten the first cap screw using 2 foot-pounds of pressure.

Set up the magnetic base and indicator as before. Move the crossslide to the next cap screw location and adjust the indicator to read zero (0). Tighten cap screw using 2 foot-pounds of pressure. Repeat the process until all cap screws are tightened.

The scale is now installed.

### Mounting the Reader Head:

There are two ways to mount the reader head when using the 4 x 4 aluminum block. You can machine a part of the block so that the reader head is in front of the block or behind it. You must also put mounting holes in the block in order to mount to the saddle. Once this is done, the reader head may be installed.

If head is at front of mounting block:

- 1) Place your 8/32 cap screws into the tapped holes of the aluminum block but DO NOT TIGHTEN!
- 2) Set up the magnetic base indicator and place the stylus on the bottom middle portion of the reader head. Set indicator at zero (0).
- 3) Turn the first set screw until you read .001" on the indicator.
- 4) Repeat the process for the remaining set screws until indicator reads .004."

5) Tighten the 8/32 screws at 2 foot-pounds. Once these are tightened you should be reading zero on your indicator.

6) Remove the indicator.

7) Remove the orange transport brackets.

8) Just as a precautionary check, take the end caps of the scale off and look down through the scale. You should be able to see light all around the outside of the interior parts of the reader head. If you do not see light, adjust the set screws until light is seen.

9) Replace the end caps and plug the connector of the reader head cable into the digital readout.

10) Run a repeatability and accuracy check using an indicator and standard. If all checks are fine, then disconnect the cable from the digital readout and route the cable so that nothing will interfere with it.

11) Place the cover over the scale.

12) Make parts!

If head is mounted behind the mounting block:

- 1) Place nuts provided into casting behind reader head.
- 2) Put the 8/32 screws into nuts but DO NOT TIGHTEN!
- 3) Set up the magnetic base indicator with the stylus touching the reader head. Set indicator to zero (0).
- 4) Turn the first set screw until .001 is read on indicator.
- 5) Repeat process for the rest of the set screws. When complete, the indicator should read .004."
- 6) Tighten 8/32 screws to 2 foot-pounds.
- 7) Remove indicator and orange transport brackets.
- 8) Repeat steps 9 through 12 above.

## EDM MACHINES

EDM Machines generally have an X and Y movement. These axes are usually easy to install because the scales can be mounted right to the machine's surface. Therefore, in some cases, the backer bars may not be necessary to use.

### Mounting the Scales:

Center the scale so that once installed the reader head will not hit the very ends of the scale. This could cause damage to the scale and/or reader head. Once centered, transfer punch the first hole location to the machined surface. Now, set the scale down and drill and tap the first hole location for a 8/32 cap screw.

Place the scale up to the surface and tighten the screw (using 2 foot-pounds) through the scale. Set up the magnetic base indicator and place the stylus on top of the scale at the first hole location. Set indicator to zero (0).

Move the axis until your stylus is above the next hole location. Now, adjust the scale up or down so that the indicator is at  $\pm .002$ " or zero.

Transfer punch the hole location and repeat the process for existing holes. Once complete, remove the scale and drill and tap all locations for 8/32 cap screws. When done tapping, place the scale onto the surface and tighten the first 8/32 cap screw (2ft. lb.). Put the other screws into location but do not tighten.

Set up the magnetic base as before. Move the axis until the indicator is above the next hole location. Tighten cap screw using 2 foot-pounds of pressure and ensure the indicator is reading zero or  $\pm .002$ .

Repeat this process until all cap screws are tight and remove indicator.

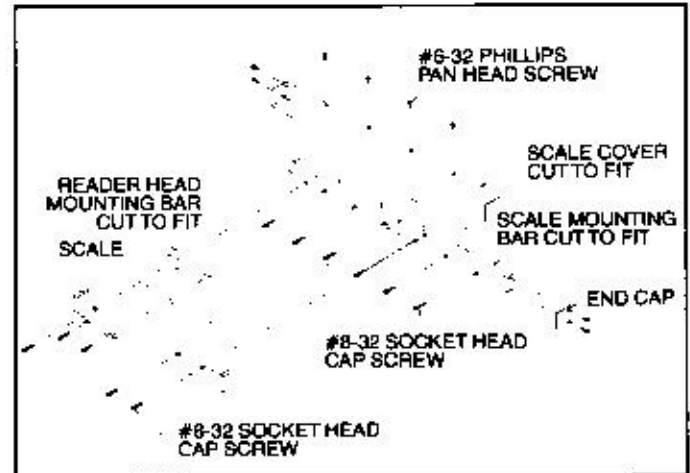
#### Mounting the Reader Head:

Follow the same steps outlined in the Lathe mounting instructions.

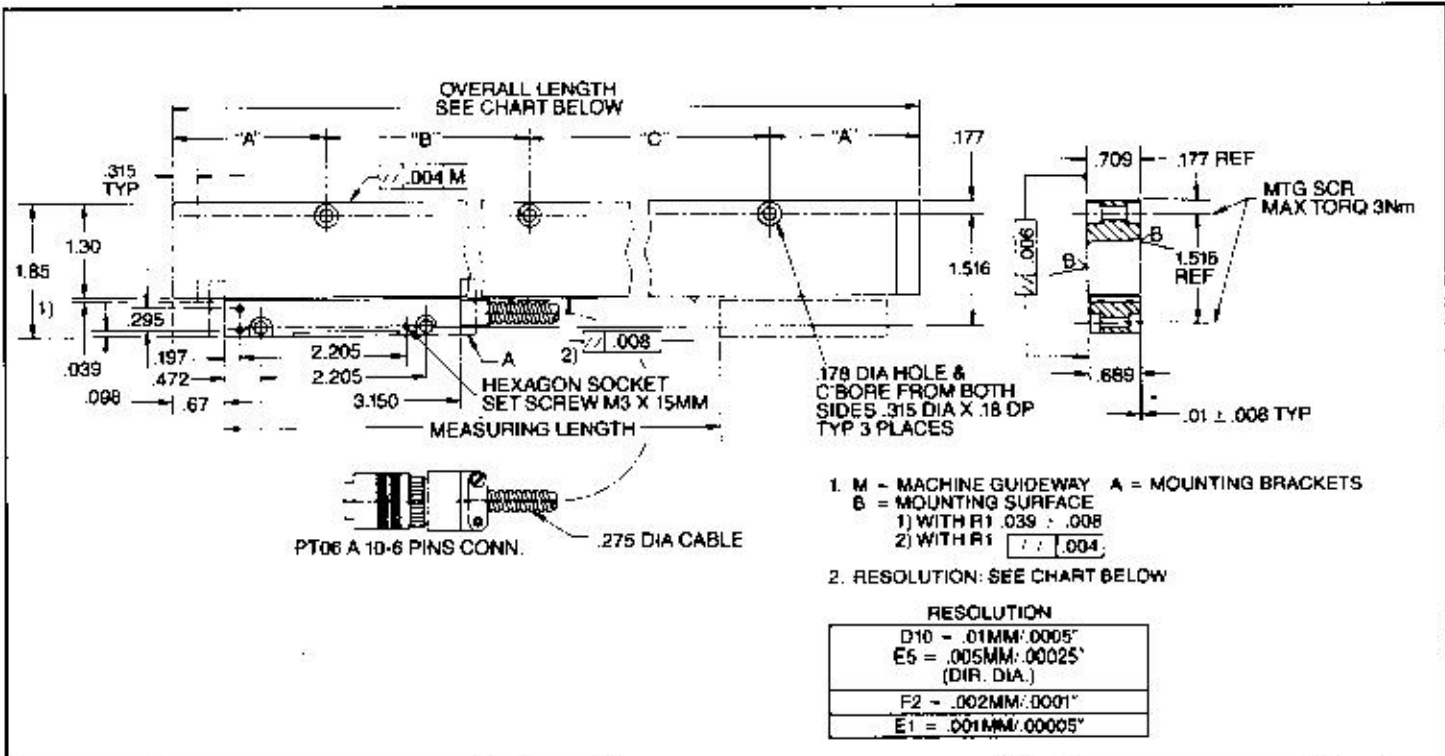
### OPTICAL COMPARATORS

The Optical Comparator has two axes, X and Y. The X Axis scale can be mounted directly to the table of the comparator. Y Axis will utilize the backer bar provided and you may need stand-off blocks for the bar in some cases. To mount the scale to the machine surface on the X-axis, follow the instructions given in the EDM instructions. Follow the instructions given in the Lathe section for mounting the scale along the Y-axis.

When mounting the reader heads, again follow the directions given in the Lathe section.



MEASURING LENGTH	OVERALL LENGTH	NO. MTG HOLES	"A"	"B"	"C"
50MM 1"	106MM 4.15"	2	2 X 2.048(52MM)		
100MM 2"	214MM 8.43"	2	2 X 2.048(52MM)		
150MM 4"	324MM 12.75"	2	2 X 2.048(52MM)		
200MM 6"	434MM 17.09"	2	2 X 2.048(52MM)		
250MM 8"	544MM 21.42"	3	2 X 2.048(52MM)	1 X 7.87(200MM)	2.93(75MM)
300MM 12"	654MM 25.75"	3	2 X 2.048(52MM)	1 X 7.87(200MM)	4.33(110MM)
350MM 14"	764MM 30.08"	3	2 X 2.048(52MM)	1 X 7.87(200MM)	5.37(137MM)
400MM 16"	874MM 34.41"	3	2 X 2.048(52MM)	1 X 7.87(200MM)	6.37(163MM)
450MM 18"	984MM 38.75"	3	2 X 2.048(52MM)	1 X 7.87(200MM)	7.37(188MM)
500MM 20"	1094MM 43.08"	3	2 X 2.048(52MM)	1 X 7.87(200MM)	8.37(213MM)
550MM 22"	1204MM 47.41"	3	2 X 2.048(52MM)	1 X 7.87(200MM)	9.37(239MM)
600MM 24"	1314MM 51.75"	3	2 X 2.048(52MM)	1 X 7.87(200MM)	10.37(265MM)
650MM 26"	1424MM 56.08"	3	2 X 2.048(52MM)	1 X 7.87(200MM)	11.37(291MM)
700MM 28"	1534MM 60.41"	3	2 X 2.048(52MM)	1 X 7.87(200MM)	12.37(317MM)
750MM 30"	1644MM 64.75"	3	2 X 2.048(52MM)	1 X 7.87(200MM)	13.37(343MM)
800MM 32"	1754MM 69.08"	3	2 X 2.048(52MM)	1 X 7.87(200MM)	14.37(369MM)
850MM 34"	1864MM 73.41"	3	2 X 2.048(52MM)	1 X 7.87(200MM)	15.37(395MM)
900MM 36"	1974MM 77.75"	3	2 X 2.048(52MM)	1 X 7.87(200MM)	16.37(421MM)
950MM 38"	2084MM 82.08"	3	2 X 2.048(52MM)	1 X 7.87(200MM)	17.37(447MM)
1000MM 40"	2194MM 86.41"	3	2 X 2.048(52MM)	1 X 7.87(200MM)	18.37(473MM)



## VIII. QUANTUM SCALE TESTING

Anilam recommends that this test be run periodically to ensure performance. This is good preventive maintenance.

- 1) Move the table to one extreme end of travel.
- 2) Mount a dial indicator onto a stationary machine part with the tip contacting the table.
- 3) Set dial indicators and digital display console at zero.
- 4) Move the table all the way to the other extreme. Come back again until the dial indicator reads zero. Digital display console should also be back to zero.

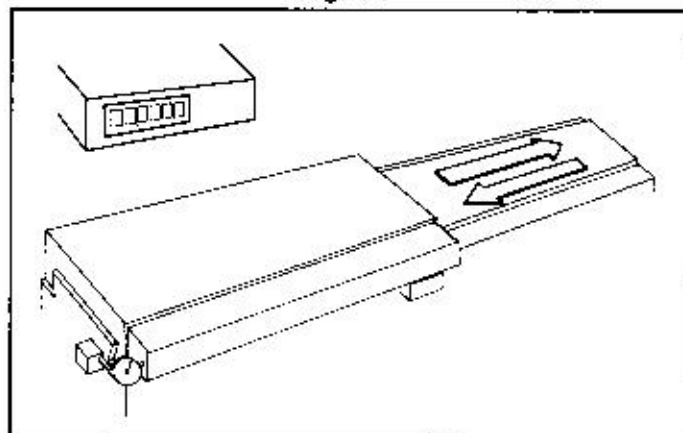
### NOTE

Table must always move in the same direction for zeroing out. Move table slightly beyond zero on dial indicator and then come back to zero mark each time. Also indicator point should be as close as possible to scale case, preferably contacting the center of the end cap.

### Accuracy Test

- 1) Set an indicator in the quill and place a 12" standard on the table. The edge of the standard should be touching the stylus of the indicator.
- 2) Set your indicator at zero and reset the readout to zero.
- 3) Traverse the table (X Axis) until you reach the end of the standard. Touch the end with your indicator until you read zero. Your readout will also read 12"  $\pm .0005$ .
- 4) Return to your original position.
- 5) Do the same as above when checking the saddle (Y Axis). You may have to use a shorter standard.

Figure 8





## IX. CABLE & READER HEAD REPLACEMENT

If the digital readout should stop reading properly or begins miscounting, it will be necessary for the operator to isolate the problem to either the readout or the scale assembly. Refer to the console operator's manual for procedures.

The readout operator's manual details several troubleshooting methods for the console. However, once a problem has been isolated to the scale transducer, it may be necessary to replace the reader head and cable.

### NOTE

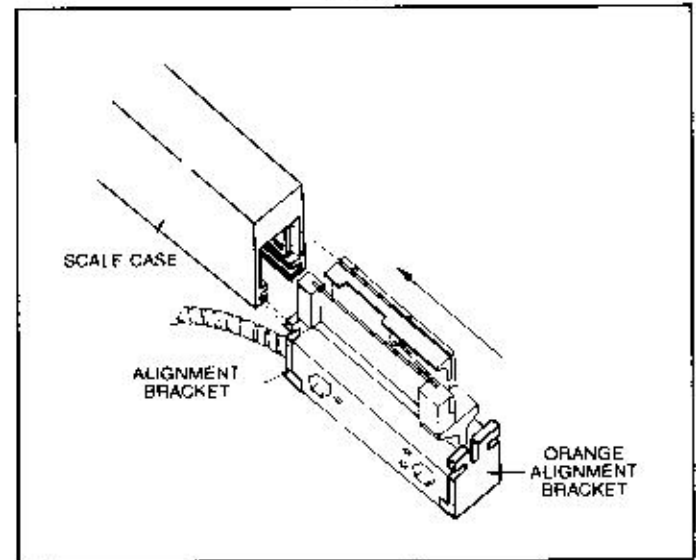
The cable cannot be separated from the reader head. **Always** consult with an Anilam Service Technician prior to attempting to repair the scale yourself. **Always** specify cable lengths and scale resolution when ordering head replacements from the factory.

Scales under 42 inches are supplied with 12 feet of cable. Scales over 42 inches are supplied with 18 feet of cable, unless otherwise specified.

To replace the Quantum scale reader head, follow the steps below:

- 1) Turn console power off.
- 2) Reattach the two alignment brackets with the screw provided.
- 3) Remove the reader head mounting bolts (head should slide freely along the scale).
- 4) Remove one end cap.
- 5) Slide head out (with alignment brackets attached).
- 6) Install new reader head (with alignment brackets attached) as shown in the illustration below.
- 7) Slide new reader head over the mounting holes on the mounting bracket or machined surface.
- 8) Place indicator on head and adjust jackscrews **in the order shown** in the illustration.
- 9) Install mounting bolts while being careful to allow **no** deflection on indicator.
- 10) Remove orange alignment brackets.
- 11) Replace end cap.
- 12) Place reader head in a package that provides adequate protection and stability during shipping. Failure to do so may cause extensive damage to the reader head and may result in a warranty cancellation.

Figure 7



## X. QUANTUM SCALE CARE

The Anilam Quantum Scale is a precision instrument that contains the latest electronic technology. With proper care and treatment, the Quantum scale should provide you with years of trouble-free operation and service.

Years of research and field testing are involved in the design of both the reader head and the scale case. The glass scale is protected from shop contaminant by a seal of durable "Buna-N" rubber stripping. This seal is permanently mounted into the scale case. Do not attempt to remove it.

These seals will keep contaminants from the interior of the scale case if these simple guidelines are followed:

- 1) Mount the scale case with the seals facing away from coolant spray and flying chips. If it must be mounted near these elements, fabricate a protective shield of sheet metal or Neoprene over the scale.
- 2) Do **not** use air blasts near the seals.
- 3) Avoid excessive vibration or unnecessary shock to the scale.
- 4) Do not put extra weight on the scales. **Always** consult with an Anilam technician before attempting to clean or repair the scales.

## XI. TROUBLESHOOTING

All Anilam Quantum Scales are laser checked for accuracy and repeatability prior to shipment. To achieve maximum accuracy from the Quantum Scale, certain conditions must exist during the installation. Listed below are common symptoms which occur when one or more problems exist between your machine and our scales.

### SYMPTOM / POSSIBLE CAUSE

#### 1) Distance measured by scale is not accurate will repeat to zero.

- A) Excessive torque on mounting bolts (2ft.lbs.)
- B) Excessive weight on table causing yaw or pitch.
- C) Resolutions .002mm should have temp controlled environment.
- D) Lead screw worn.
- E) Are alignments brackets from reading head removed?

#### 2) Distance measured by scale will not repeat to zero.

- A) All of the above in symptom 1 should be checked.
- B) Gibs too loose.
- C) Mounting block and/or reader head loose.
- D) Reader head malfunctioning - replace with proper type.

#### 3) Console has no movement or 0, 5 is displayed in last digit.

- A) Check head for proper torque and alignment.
- B) Alignment brackets removed.
- C) Inspect cable for damage.
- D) Switch X, Y inputs to console to determine whether console or reader head is at fault.

#### 4) Head will not indicate movement in a specific area of the glass scale.

- A) Items under symptom 2 should be performed.
- B) Mounting area to machine has lost rigidity. Use backing bar to correct situation.
- C) Replace reading head - if problem persists consult factory.

**QUANTUM SCALE**

	A-10	B-5 (Direct Dia.)	A-2	B-1	C-10
Resolution	.0005 in. .01mm	.0005 in. dia. .01mm dia.	.0001 in. .002mm	.00005 in. .001mm	.0005 in. .01mm
Accuracy	$\pm .0005/40"$ $\pm .01\text{mm/m}$	$\pm .0002/40"$ $\pm .005\text{mm/m}$	$\pm .0002/40"$ $\pm .005\text{mm/m}$	$\pm .0002/40"$ $\pm .005\text{mm/m}$ or $\pm .003/.5\text{m}$	$\pm .0005/40"$ $\pm .01\text{mm/m}$
Repeatability	.0005 .01mm	.0005 .01mm	.0001 .005mm	.00005 .001mm	.0005 .01mm
Maximum Permissible Speed (feed rate)	24"/sec.	12"/sec.	12"/sec.	8"/sec.	24"/sec
Travels	4" to 90"	4" to 54"	4" to 90"	4" to 42"	90" to 120"

Output Signals — TTL Compatible Quadrature Square Waves.

Reading Principle — Photo Electric

Light Source — Long Life Infra Red Diode

Sensors — Photo Transistors

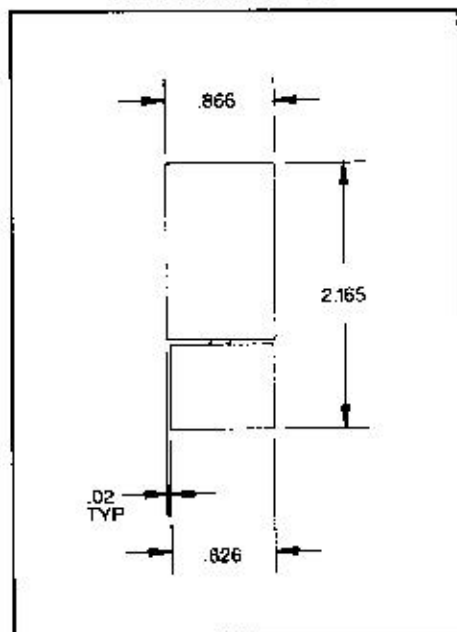
Zero Marker Pulse — Standard on All Scales

Power Requirement — 5 Volts - 200 Milliamperes

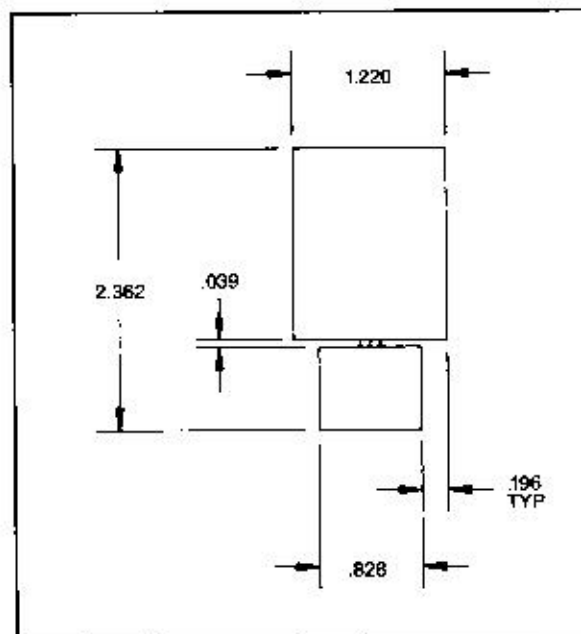
Cable — Armored Stand. 13' length to 42" travel, 19' length to 120" travel

Working Temp. — 32°F to +122°F Storage Temp. — -22°F to +158°F

**A & B Scale Dimensions**



**C Scale Dimensions**





### **WARRANTY STATEMENT**

Anilam 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 Miami.

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 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 merchantability and fitness for a particular purpose.

### **For service call:**

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South Carolina: (803) 732-1209

Illinois: (312) 359-2707

New York: (914) 946-2444

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