TM-8 & TM-10 HIGH MAGNIFICATION TOOLMAKERS AND METALLURGICAL MICROSCOPE

The TM-8 and TM-10 Measuring Microscopes were designed to bridge the gap between th TM-II (Zoom Objective 30X-160X Magnification) Toolmakers Microscope and the Modular Toolscope Single Objective Measuring and Alignment Microscopes.

The TM-8 and TM-10 have designed into their system all the features necessary for high magnifications. They have the special advantage of a Co-Axial Illuminator with a condenser and filter plus substage illuminator. An extra micro-screw ultra-fine depth focusing knob, in addition to the standard Rack & Pinion focusing, three objective lenses revolving nosepiece with a positive stop, depth measuring attachment with a zeroing screw and many other advantageous features.

The TM-8 and TM-10 Measuring Microscopes as purchased come with the following magnifications: 50X, 100X and 200X, with a 10X Eyepiece and 5X, 10X and 20X Objectives. A separate 20X Eyepiece can be purchased which will double all the above magnifications to 400X. The advantage of this is that you keep a long working distance. We then have available as optional extras separate objective lenses to the simplest of 1X and the highest of 40X. At 800X which can be obtained with the 40X Objective and 20X Eyepiece the measuring capabilities of the Eyepiece Reticle is greatly enhanced. It should be quite easy to measure in the X-Y axis to .00005" and the same depth measurements.

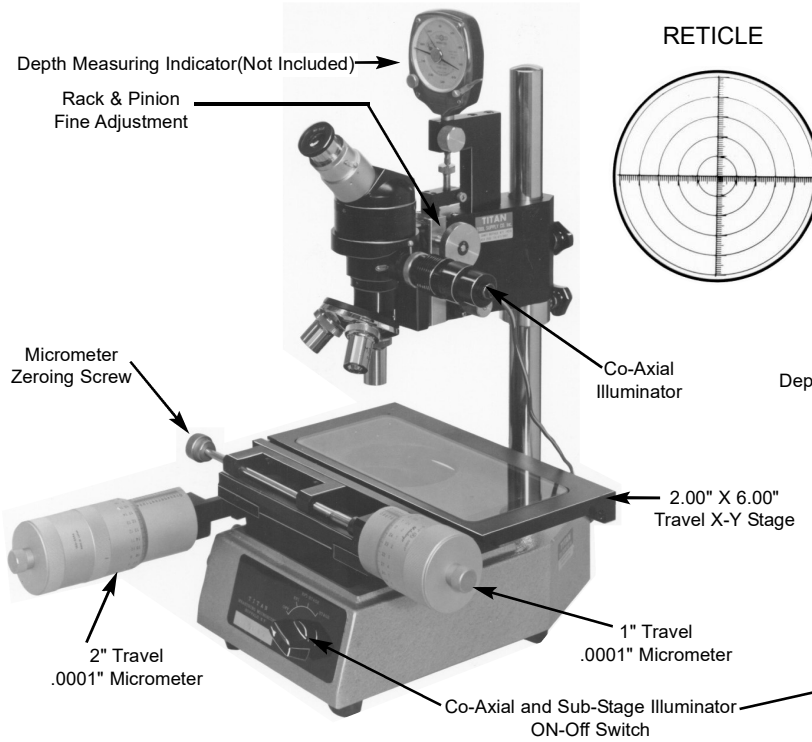
The only difference between the TM-8 and the TM-10 is the stages and their micrometers. The TM-8 has 2" travel stage in both the X & Y axis. The size of the stage is 6.00" X 6.00". The micrometers are 2" diameter with 1" travel with .0001" divisions. The extra travel is obtained through the use of gage blocks. TheTM-10 has a 2" travel in the Y Axis and 6" travel in the X Axis. The X & Y Axis have zeroing screws so that the micrometer can always be set at an even number or zero as you start measuring. The range of the Y Axis micrometer is 2", the range of the X Axis is 1". Both have .0001" divisions. The size of the TM-10 stage is 5.375" X 9.00".

Depth Measurement is obtained through a .0001" Division Mechanical or Electronic Indicator. Any standard indicator with a .375" stem will work. This indicator is *not* furnished with the unit. The principal of in and out focus is used. Focus on the workpiece area to be measured, zero the indicator, raise or lower the vertical coarse and fine adjustment to the new height or depth in focus and read the indicator for the difference. Optional protractor eyepiece AME-5M with accuracy of 5' of a degree is available as an optional extra.

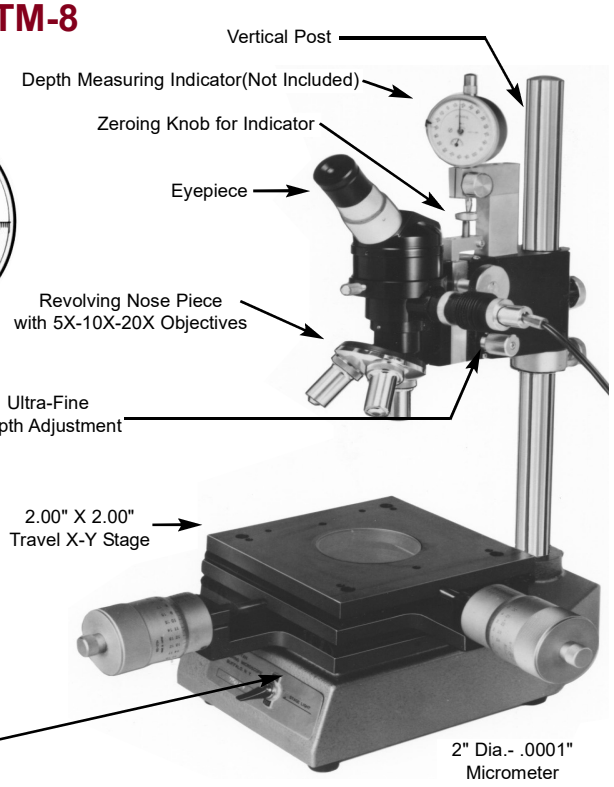
If it is desirable to supplement the Co-Axial illuminator with additional lighting, it is possible to purchase a separate Ring Illuminator for Objective Lenses 1X to 5X. Any higher magnification objectives, the working distance is too short for this illuminator.

The capabilities of the TM-8 and TM-10 are enhanced over the TM-II and TM-IV because of its ultra fine focus adjustment for Z AXIS MEASUREMENTS. This Allows repetitive Z Axis Measurements to accuracies of .0002" or better, especially if further enhanced by VIDEO ADAPTATION. This is ideally suited in the ELECTRONICS INDUSTRY for SEMICONDUCTOR MEASUREMENTS of strain in lead frames, measurement of the height of bonded portion of lead wires, measurements of the height of solder on printed circuit boards, measurements of water bump height, for ELECTRONIC COMPONENTS, measurement of projection of head on the VTR drum measurement of steps on hybrid IC, measurement of height of steps on Multi Layer P.C. Boards. It also lends itself to measurements of the depth of scoring on metal beer and beverage cans, depth of engraving on plastic molds and stamped electrical strips and wherever Z Axis Measurements of greater accuracies are necessary. An extra 40X OBJECTIVE LENS AND 20X EYEPIECE can be purchased as OPTIONAL EXTRAS to further enhance the Z Axis or Depth Measurements. If X and Y Axis Measurements are combined with Z Axis, the application for the TM-8 and TM-10 become limitless.

TM-10



TM-8



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SPECIFICATIONS:

Eyepieces: Coated 10x Standard - 20X Optional
Objectives: 5X, 10X and 20X Standard, 1X, 2X, 3X, 4X and 40X Optional
Working Distance: See Table of Magnifications Included
Reticle: Same for 10X and 20X Eyepieces, 90° Cross Hairs and 4 Concentric Circles with 10 line divisions between circles. The 10X is standard with unit.
Image: Optically Correct

TABLE OF MAGNIFICATION VALUES FOR EXTRA OBJECTIVES FOR THE TM-8 AND TM-10 MEASURING MICROSCOPES

WITH 10X EYEPIECE							WITH OPTIONAL 20X EYEPIECE						
Mag.	Field of View Inches	Working Distance Inches	Value Each Division in Thousands of Inch	Value of Radi	Res.*	Depth of Field	Mag.	Field of View Inches	Working Distance Inches	Value Each Division in Thousands of Inch	Value of Radi	Res.*	Depth of Field
10X	.760"	6.496"	.005"	.100" & .200" & etc.	40.3	.600"	20X	.508"	6.496"	.005"	.100" & .200" & etc.	57	.300"
20X	.340"	2.874"	.0025"	.050" & .100" & etc.	90.5	.150"	40X	.240"	2.874"	.0025"	.050" & .100" & etc.	144	.120"
30X	.230"	1.300"	.0016"	.032" & .064" & etc.	114	.100"	60X	.160"	1.300"	.0016"	.032" & .064" & etc.	161	.060"
40X	.1606"	.600"	.0011"	.011" & .022" & etc.	161	.050"	80X	.116"	.600"	.0011"	.011" & .022" & etc.	350	.020"
50X	.150"	.518"	.001"	.020" & .040" & etc.	203	.040"	100X	.100"	.518"	.001"	.020" & .040" & etc.	400	.010"
100X	.0705"	.255"	.0005"	.010" & .020" & etc.	400 +	.010"	200X	.045"	.255"	.0005"	.010" & .020" & etc.	500	.0025"
200X	.036"	.060"	.00025"	.005" & .010" & etc.	500 +	.0022"	400X	.024"	.060"	.00025"	.005" & .010" & etc.	600	.0013"
400X	.018"	.030"	.000125"	.0025" & .005" & etc.	600 +	.0014"	800X	.012"	.030"	.000125"	.0025" & .005" & etc.	700	.00085"

*Resolution line pairs per millimeter

TITAN 10X ANGLE MEASURING EYEPIECE MODEL AME-5M

1 DIV = 5'

The Titan Protractor Eyepiece measures over 360° to an accuracy of 5' (minutes) by the use of a Rotary Vernier and a simple cross hair eyepiece. The white scale on a black background is easy to read and enlarged by a 10X Magnifier. It easily fits in the eyetube of Models TM-8 and TM-10.

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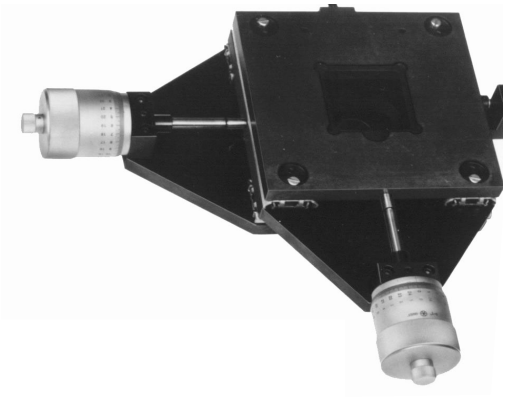
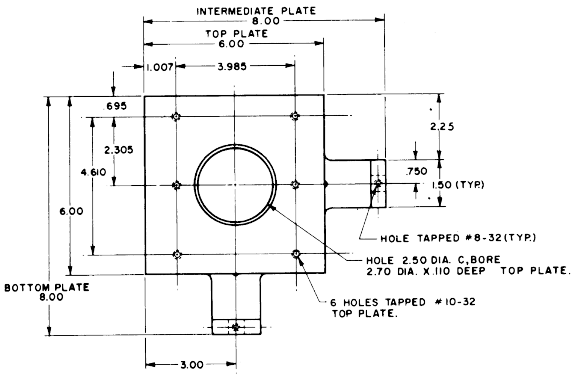
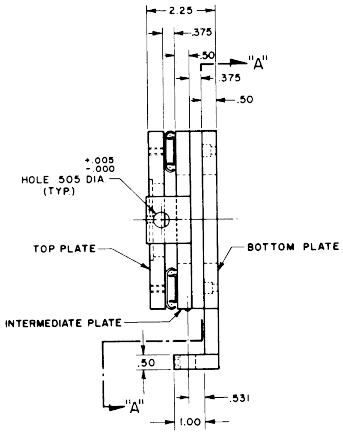
X-Y Coordinate Measuring and Micro Movement Stage (With Micrometers)

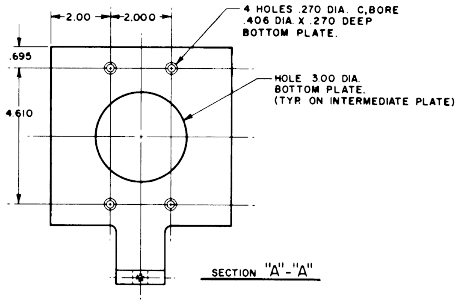
MODEL TRW-2 (Without Micrometers)

Model TRW-2M is a simple X-Y Movement Stage with a 2" travel in each axis. It can be fastened to the TM-8 Base with 4 simple 1/4-20 screws. It has a 2 1/2" center cut-out glass plate for light to shine through from the substage illuminator built into the stand. It also has 6 tapped holes with a 10-32 thread for fastening special fixtures onto the stage. You have the additional option of using any micrometer movement you desire for this stage. You can purchase your own digital Micrometers, we furnish 2 pieces, 2" diameter 1" movement Micrometers reading in .0001" divisions. Size of Stage 6.00" X 6.00". Digital Micrometers available.





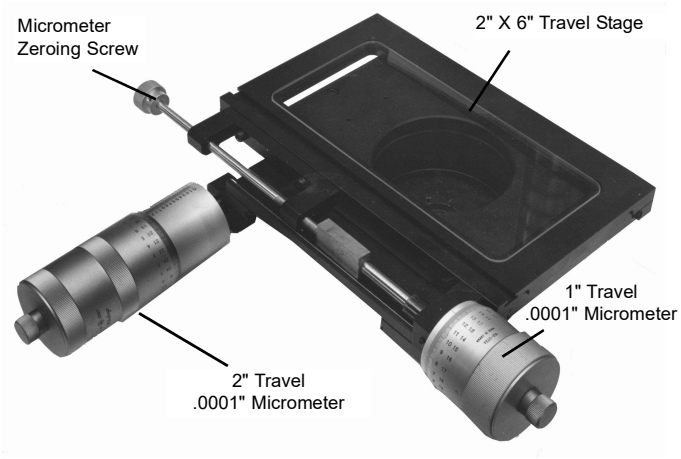




X-Y COORDINATE MEASURING AND MICRO MOVEMENT STAGE

MODEL TM-4ST-2 (Without Micrometers)

The TM-4ST-2M is a ruggedly constructed 2" X 6" movement stage with micro-adjusting screws that allow for self-zeroing of the X & Y movement micrometers at any point. The Y axis travel micrometer is fastened underneath the stage so that it cannot be supplemented with gage blocks, this necessitates a 2" travel micrometer in this axis. The X axis travel is above the stage and can be supplemented with rods or gage blocks. The physical size of the stage is 5.375" X 9.00".



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THE VIDEO TOOLMAKERS-MEASURING MICROSCOPE WITH PURCHASE OF THE TSTVA-12 VIDEO ADAPTER

TSTVA-12 VIDEO ADAPTER (For Models TM-8 and TM-10)
It is a simple procedure to turn the TITAN MEASURING MICROSCOPES into VIDEO SCOPES at a relative , minor expense. Model TM-8, TM-10, are easily converted by substituting the normal eyepiece for the TSTVA-12 VIDEO ADAPTER WITH RETICLE.

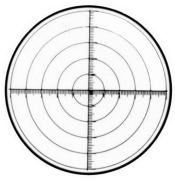
THE ADVANTAGES OF VIEWING BY VIDEO ARE:

1) It alleviates eye strain for lengthy or continuous usage.
2) Multiple viewing. More than one person can view the problem at the same time.
3) Higher magnifications are possible. You can reach magnifications as high as 1300X with a 21" monitor and a 40X objective.
4) The image can now be FROZEN, DIGITIZED or COMPUTERIZED.
5) The image, when viewed on the VIDEO SCREEN, leads to better accuracies as the video camera is not as accommodating as the human eye. This eliminates parallax problems in the X-Y Measuring Axis and better accuracies in Z Axis Depth Measuring.

The TM-8 and TM-10 can be converted by substituting the normal eyepiece for the Video Adapter, which has a C Mount thread to fit directly to the camera.

TSTVA-12
Video Adapter

RETICLE



DI-IQ3600 Digital Depth Indicator
15mm (0.600”) Measuring Range

Ordering Information

Model Number
TM-8 (Complete with Venier Mic Heads)
TM-10 (Complete with Venier Mic Heads)

Optional Extras
RI-17 Fibre Optic Ring Illuminator
FOI-150 Fibre Optic Light Source
AME-5M Angle Measuring Eyepiece
TSTVA-12 Video Adapter
2XL Adapter 2X Remagnifier
1X-4X Objectives
5X-40X Objectives
DI-IQ3600 Digital Depth Indicator

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