

**MEIJI
TECHNO** **TM200** Series

TEACHING MICROSCOPE

INSTRUCTION MANUAL



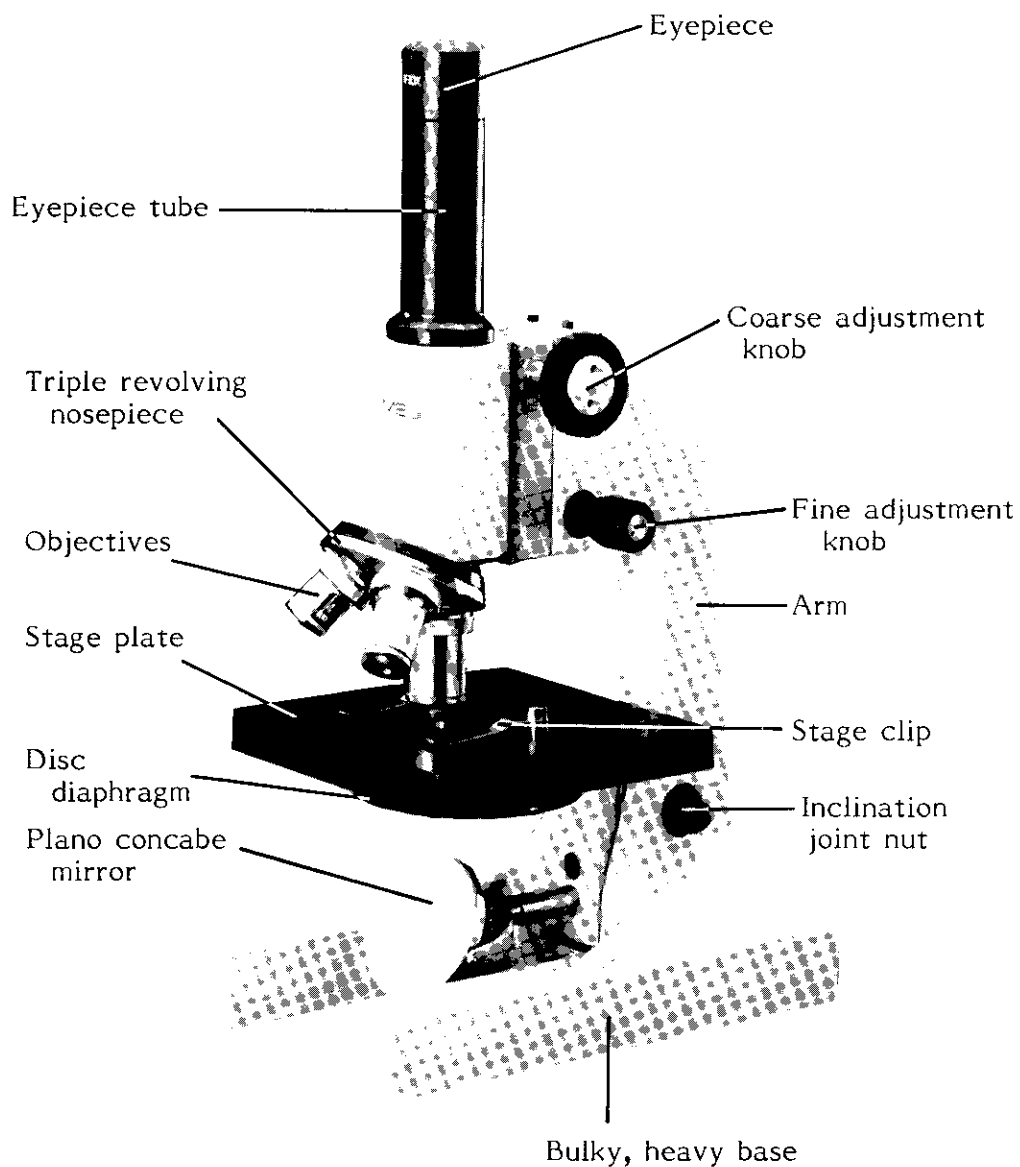
MEIJI TECHNO CO.,LTD.

JAPAN

C O N T E N T S

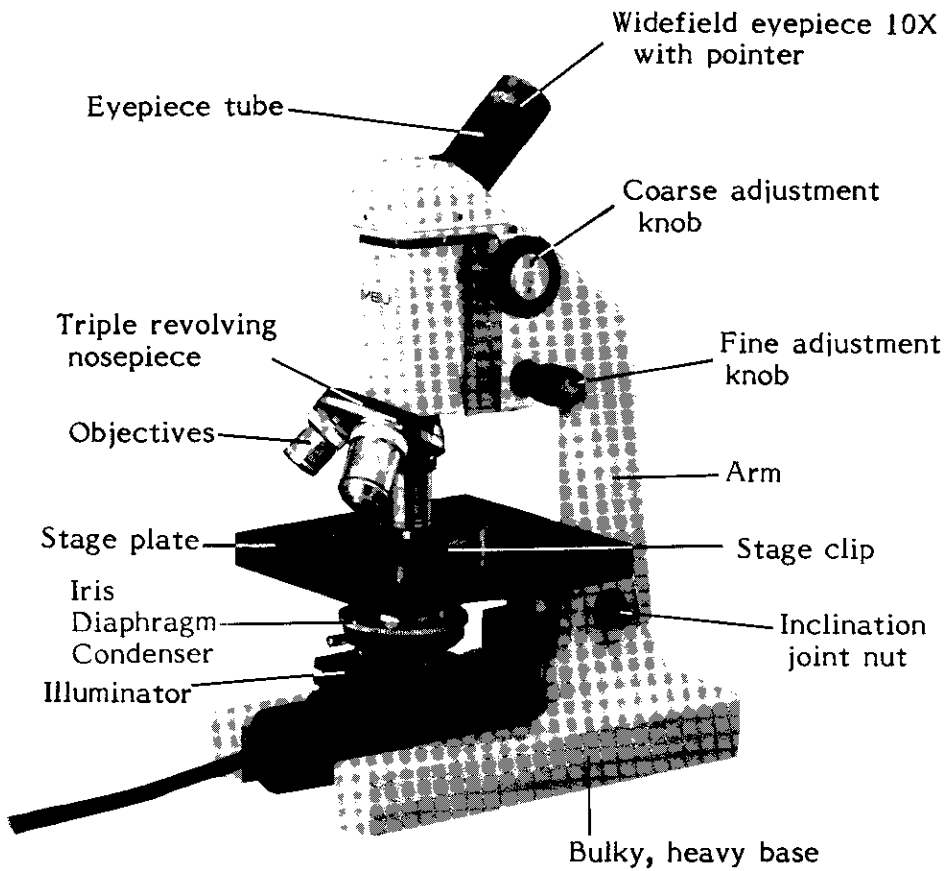
LAYOUT OF CONTROL	2
UNPACKING	4
USING	4
PREVENTIVE CARE & MAINTENANCE	9
EXPLODED VIEW OF TM200 SERIES MICROSCOPE AND PARTS LIST	10

"MEIJI" TM200 SERIES MICROSCOPE



TM-206

"MEIJI" TM200 SERIES MICROSCOPE



TM-214

THE USE AND CARE OF "MEIJI" TM200 SERIES MICROSCOPE

The TM200 Series Microscope is an instrument of precision, both optically and mechanically and will last a lifetime at a minimum of maintenance.

UNPACKING:

The TM200 Series Microscope is usually supplied in a styrofoam container. The objectives are housed in a plastic shipping capsules. The eyepiece is locked to the eyepiece tube of microscope.

Remove the microscope from its styrofoam container by grasping the arm of instrument and supporting the base with the other hand. In case the microscope is supplied in a wooden cabinet. Open the lid of the wooden cabinet with a key attached to the cabinet and remove the microscope from the cabinet by unscrewing the bolt which is fastening the microscope stand to the cabinet through the bottom of the wooden cabinet. A metal plate is attached to the cabinet to use for unscrewing the bolt.

Take out the objectives from the compartment located in the wooden cabinet and also eyepiece from the separate compartment located otherside of the objectives. Place the microscope on a firm table. Remove the objectives from plastic capsules. Install the objectives in a clockwise direction from the lowest to the highest power. Care should be taken not to drop them or allow your fingers to contact the lens.

USING:

1. Select a position to work where little light falls on the

instrument. The worst position is to face a large window, because light falling directly on the slide will affect contrast and resolution.

2. If your microscope is equipped with a mirror and fork, place your bench lamp 20–25cm from the microscope. If your microscope is equipped with a illuminator, make sure that the mains voltage shown on the plate stucked onto the microscope matches your mains supply.
3. If your microscope is equipped with a vertical body tube, incline the main body of the microscope by grasping the arm to adjust it to the most comfortable viewing position. If your microscope is equipped with a inclined body tube, you do not to incline the microscope body as it has the 45° inclined tube. (A special feature of the inclined body is the rotation of the head through 360° so that either the conventional position or with the stage nearest the observer can be utilized.)
4. Secure the microslide specimen to be observed to the stage under the spring stage clips. If using a mechanical stage, pull back the lever on the left side of the stage, insert the slide, then bring the crescent shaped holder into contact with slide. Be certain that the coverslip of the slide is facing toward the objective, otherwise you will not be able to focus your specimen at high magnification.
5. If your microscope is equipped with a disc diaphragm, turn the diaphragm so that the number 2 or 3 opening is aligned with the instage condenser, and then adjust the diaphragm

until proper specimen contrast is reached. If your microscope is equipped with a condenser iris diaphragm, open the diaphragm fully with the lever located immediately below the condenser. The correct setting of this control is described later, but initially it is useful to have as much light as possible.

6. Rotate the nosepiece to position the lowest power objective.
7. Focus the objective on your specimen by turning the large coarse adjustment knob until the image of your specimen is bright and clear.

Now bring the specimen into sharp focus by turning slightly smaller fine adjustment knobs.

With the specimen now in sharp focus, rotate the nosepiece to the other objectives and focus using the fine adjustment knob. Since the optics on TM200 microscope are both par-focal and par-centered, only a slight turn of the fine focus knob will be necessary.

(NOTE: It is important to note that because of our built-in stop, the 4X and 10X objectives can never come into contact with your microslides. The 40X(S) and 100X(S) objectives may occasionally touch the microslide but because these lenses are in retractable mounts your slide will not be damaged.)

8. The iris diaphragm is not intended to control the brightness of the illumination but induces contrast into the specimen by diffracting light rays.

Focusing of the specimen should be done with the iris diaphragm opened to its maximum aperture. If additional

contrast is required to permit accurate viewing of the specimen, the diaphragm should be slowly closed until the details of the specimen are sharply defined. Care should be taken not to use an aperture too small to gain high contrast, as then fine structure of the image will be destroyed.

Reducing the aperture does increase contrast and depth of focus, but it is also reduces resolution and introduces diffraction. The aperture must be selected for each objective; i.e. the aperture for the 10X (N.A. 0.25) objective will not be the same as for 40X (N.A. 0.65), since the angle of light required is determined by the numerical aperture of the objective. Proper adjustment aperture is easily determined after a little experience with the microscope. The numerical aperture of the condenser must be equal to or greater than the N.A. of the highest power objective. The iris diaphragm provides a continuously variable increase or reduction of the diameter of the cone of light from the mirror or illuminator. Correct focusing of the N.A. 1.25 Condenser is important and is accomplished in the following way:

- a) Raise the condenser to its upper limits and open iris diaphragm fully.
- b) Focus the specimen with 40X objective. (The diameter of the cone of light should fill the back lens of the objective. This utilized the full resolving power of the objective. However, most specimen react better to a cone of light approximately $\frac{3}{4}$ the diameter of the back lens of the objective.)
- c) Lower the condenser to achieve a cone of light approxi-

mately $\frac{3}{4}$ the diameter of the lens.

- d) If additional contrast is required to permit study of the specimen, the iris diaphragm may be closed slightly.
9. When you use the 100X objective, it is necessary to exclude air from the space between the cover glass over the specimen and front lens of the 100X objective. This is accomplished by placing a drop of immersion oil onto the cover glass. The controls are then manipulated to immerse the front lens of the objective into the oil. This forms an air tight connection through which the specimen may be viewed without interference from the atmosphere. Care must be taken not to come into direct contact between the lens of the objective and the cover glass since this may scratch or otherwise mar the viewing area of the lens itself. Oil immersion objectives should be cleaned immediately after each use since the oil will dry after a time and prevent satisfactory viewing thereafter.
10. You are now ready for microscope observation.

Preventive Care and Maintenance of Your MEIJI MICROSCOPE

The MEIJI Microscope is a precision instrument and requires only minimum maintenance. With ordinary care, the microscope will last a lifetime. Microscope like other precision instruments should be cleaned after each use, which prevents dust and other forms of contaminants from drying on exposed surfaces.

Eyepiece and objective lenses should never be wiped while dry. Particles of dust should be removed using a soft camels hair brush or air. Lens paper folded several times and moistened with an approved lens cleaner such as xylol or xylene should be used to clean glass surfaces. Lenses should never be disassembled except by qualified, authorized technicians.

The finish of the Microscope is hard epoxy and is acid resistant. It is extremely durable and stands up well under rough use. The finish should be wiped off periodically with a soft cotton cloth.

Periodic servicing is recommended. This should be done only by qualified technicians since general servicing includes disassembly, cleaning and relubrication. Also at this time all parts are tightened and inspected for wear. Period of maintenance will vary depends on the hours of use of the microscope each days. Some schools will find servicing every two years adequate, while others will require more frequent attention.

A Microscope has very little value when not in proper working condition. Inquiries regarding the MEIJI Microscopes should be directed to your authorized MEIJI dealer.

PARTS LIST FOR TM200 SERIES MICROSCOPE

<u>INDEX NO.</u>	<u>DESCRIPTION</u>	<u>INDEX NO.</u>	<u>DESCRIPTION</u>	<u>INDEX NO.</u>	<u>DESCRIPTION</u>
1	Screw for fine focusing knob	37	Stopper for focus adjustment		Inclined head
2	Fine Focusing knob	38	Rack	80	Eye tube
3	Spindle case	39	Rack guide	81	Set screw
4	Fine focusing spindle	40	Set screw for rack	82	Coupling
5	Stopper screw	41	Main tube	83	Prism case
6	Arm	42	Flange	84	Set screw
7	Arm cover	43	Straight eyepiece tube	85	Prism
8	Set screw for arm cover	44	Set screw for eyepiece	86	Shim
9	Spindle case cover	45	Revolving nosepiece	87	Prism seat
10	Fine focusing knob	46	Base	88	Set screw
11	Screw for fine focusing knob	47	Nut for joint pin	89	Ring
12	Stopper screw	48	Washer	90	Retaining ring
13	Spacer for lever	49	Spring washer		Substage condenser
14	Fine focusing lever	50	Joint pin	91	Condenser sleeve
15	Spring case with pin	51	Spring washer	92	Set screw
16	Set screw for spring case	52	Washer	93	Set screw
17	Coil spring	53	Nut for joint pin	94	Top lens mount
18	Set screw	54	Set screw	95	Top lens
19	Spacer	55	Rubber foot	96	Retaining ring
20	Spring for fine adjustment	56	Stage support	97	Field lens
21	Dovetail slide	57	Set screw	98	Retaining ring
22	Set screw for dovetail slide	58	Set screw	99	Sleeve
23	Knock pin	59	Spring washer	100	Set screw
24	Set screw for dovetail slide	60	Mirror fork bush	101	Set screw
25	Slide block	61	Screw	102	Iris diaphragm
26	Set screw for pinion metal	62	Mirror fork metal		Substage illuminator, MA261/35
27	Coarse adjustment handle nut	63	Mirror fork	103	Set screw
28	Coarse adjustment handle	64	Set screw	104	Bracket
29	Plastic washer	65	Nut for mirror fork	105	Set screw
30	Pinion metal	66	Mirror	106	Retaining ring
31	Tension control ring	67	Stage plate	107	Condensing lens
32	Set screw for tension control ring	68	Screw for stage clip	108	Blue filter
33	Pinion	69	spacer for stage clip	109	Lamp house
34	Plastic washer	70	Stage clip blade	110	Bulb, MA261/SL10 or SL20
35	Coarse adjustment handle	71	Spacer	111	Socket
36	Coarse adjustment handle nut	72	Condenser mount	112	Socket house
		73	N.A. 0.65 condenser lens	113	Set screw
		74	Retaining ring	114	Cord clamp
		75	disc diaphragm	115	Set screw
		76	Set screw for disc diaphragm	116	Cord clamp
		77	Metall ring	117	Coupling
		78	Click stopper	118	Cap
		79	Set screw	119	Set screw