

Swift SM90, M28Z, M29TZ Series Stereo Microscope

Use and Care Manual

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SWIFT SM90 SERIES STEREO MICROSCOPE

The Swift SM90 Series stereo microscope is a full size, well-balanced, stereoscopic instrument producing an erect, three-dimensional image with a large, comfortable field of view. The SM90 Series features a modular design which allows the use of other Swift modular heads to provide maximum versatility of the instrument for classroom use. It is built to the highest, most rigid optical and mechanical standards.

SWIFT M28Z / M29TZ ZOOM STEREO MICROSCOPES

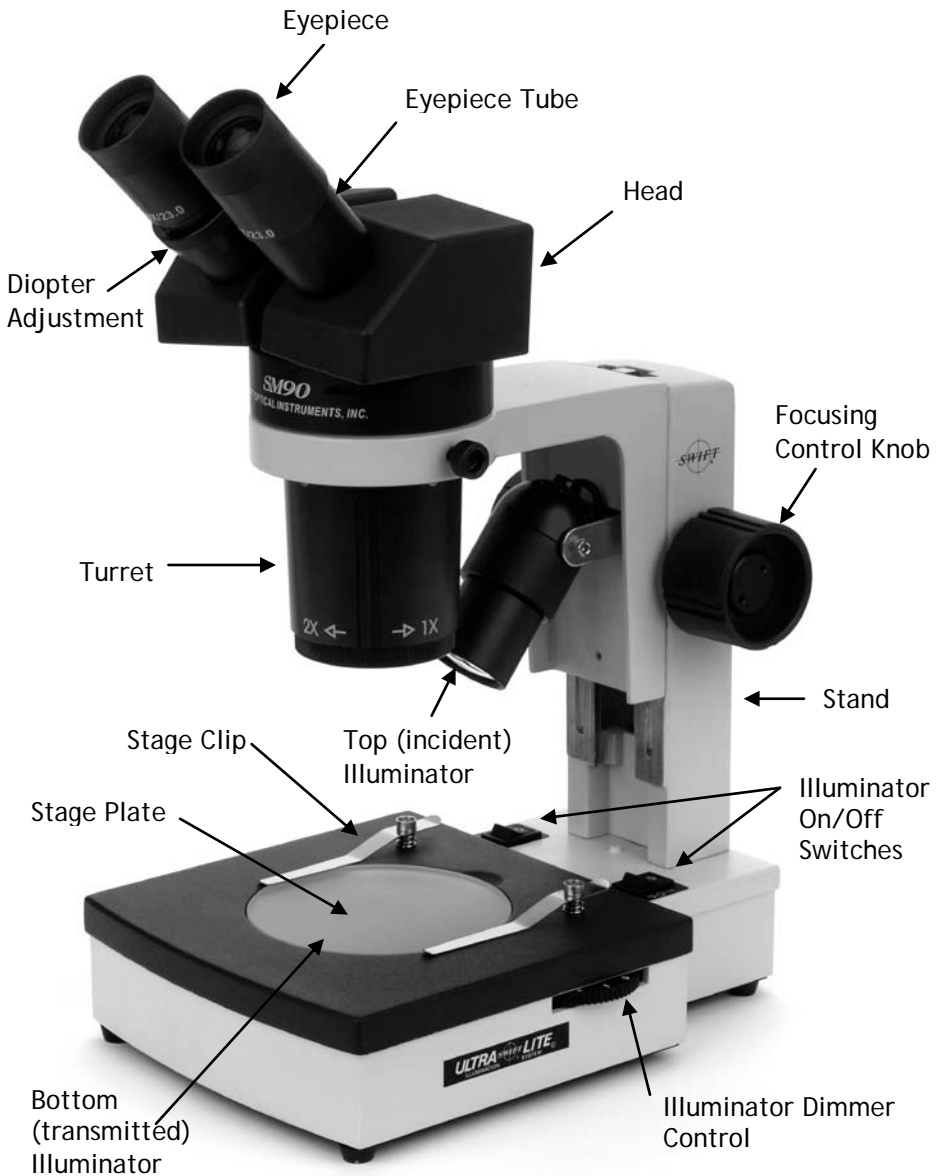
The Swift M28Z / M29TZ zoom stereo microscope is ideal for laboratory, industrial and educational use. The M28Z /M29TZ is designed to produce a crisp image (erect) with a generous field of view and an excellent depth of focus. It features zoom objectives with continuous magnification ranges from 10X to 40X which is not possible with a fixed power stereo microscope.

SM90 SERIES STEREO MICROSCOPE SPECIFICATIONS

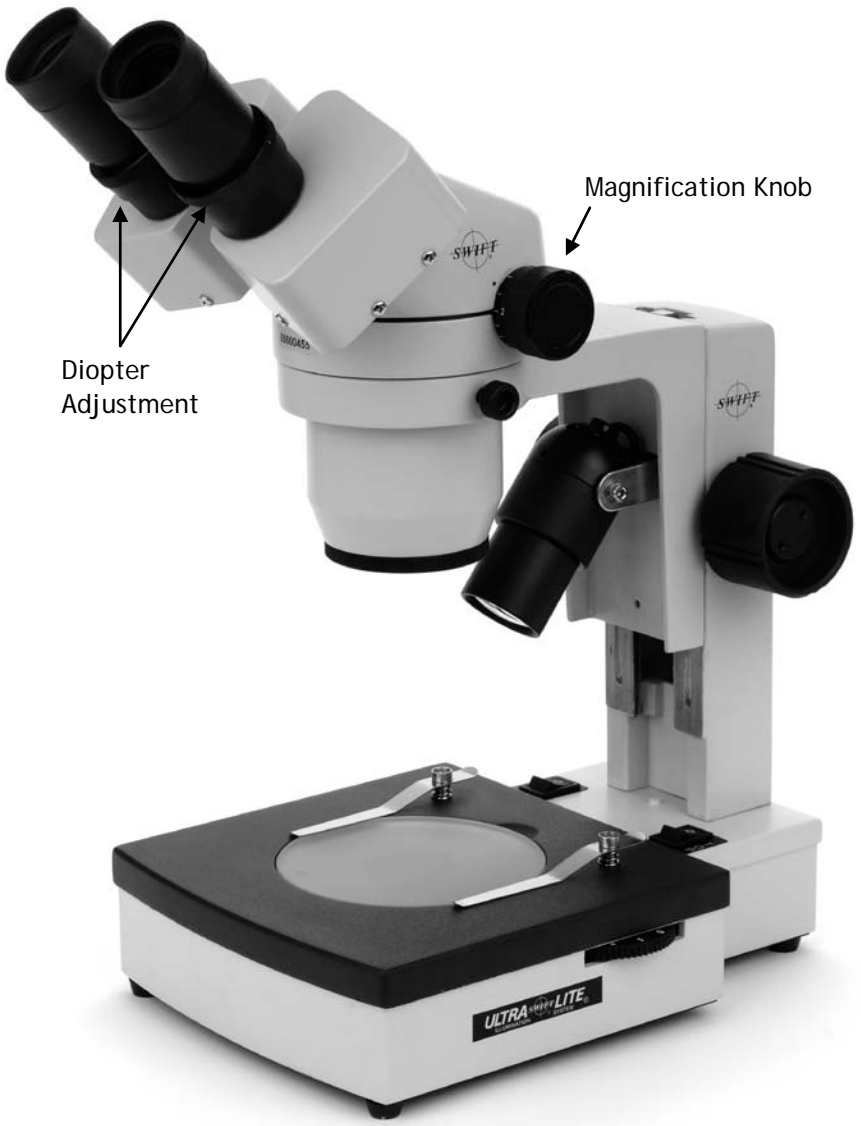
Model Number	SM91	SM95	SM98
Objectives	1X, 2X	1X, 3X	2X, 4X
Eyepieces	W10X, FN23	W10X, FN23	W10X, FN23
Total Magnification/ Field of View	10X / 23mm 20X / 11.5mm	10X / 23mm 30X / 7.67mm	20X / 11.5mm 40X / 5.75mm
Working Distance	80mm	80mm	80mm
Stand	SM90CL	SM90CL	SM90CL
SM90CL Illuminator (incident & transbase)	3W, 5500K LED	3W, 5500K LED	3W, 5500K LED

M28Z/M29TZ STEREO ZOOM MICROSCOPE SPECIFICATIONS

Model Number	M28Z	M29TZ
Objectives	1X - 4X	1X - 4X
Eyepieces	W10X, FN23	W10X, FN23
Total Magnification/ Field of View	10X - 40X / 23mm - 5.75mm	10X - 40X / 23mm - 5.75mm
Working Distance	80mm	80mm
Stand	SM90CL	SM90CL
SM90CL Illuminator (incident & transmitted)	3W, 5500K LED	3W, 5500K LED



(SM91-SM90CL Pictured)



(M28Z-SM90CL pictured)

COMPONENTS OF THE STEREO MICROSCOPE

BOTTOM ILLUMINATOR - The light source that is mounted in the base to provide trans-illumination.

DIOPTRER ADJUSTMENT - Located on the left eyepiece tube (SM90) or left and right eye tubes (M28Z/M29TZ). This adjustment is used to fine focus the optics to compensate for visual differences between the user's eyes.

EYEPIECE - The upper optical element that further magnifies the primary image of the specimen and brings the light rays in focus at the eyepoint.

EYEPIECE TUBE - The part of the head that holds the eyepieces in place. Set screws in the eyepiece tubes can be used to lock the eyepieces in place.

STAGE CLIP - Used to hold specimen in place.

FOCUSING CONTROL KNOB - The focusing control knobs located on either side of the stand are used to raise or lower the head to bring the specimen into focus. The control knobs incorporate a slip clutch system which prevents the head from traveling past both ends of the focusing range. When the focusing limit is reached, the clutch system begins to slip to prevent gear damage.

HEAD - The 360° rotatable component that contains all of the optical elements of the stereo microscope including the eyepieces, refracting prisms and objective lenses. The head of the SM90 series and M28Z / M29TZ is designed to allow users to adjust the interpupillary distance of the eyepieces for proper viewing.

ILLUMINATOR DIMMER CONTROL - The intensity of the top (incident light) LED or bottom (trans-illumination) LED can be adjusted to the preferred brightness (0 through 9) by using the dimmer control located on the side of the base.

ILLUMINATOR ON/OFF SWITCHES - A tri-illumination system is incorporated into the stand. The illumination system is controlled by top (incident light) and bottom (trans-illumination) on/off switches located at the base of the stand. The incident illuminator is used for opaque specimens, while the trans-illuminator effectively illuminates the internal structure of transparent specimens. Translucent specimens may be seen in greater detail if both illuminators are used simultaneously.

MAGNIFICATION KNOB - Used to change the M28Z and M29TZ magnification settings.

STAGE PLATE - Opaque and black and white stage plates are provided with the microscope stand. The opaque stage plate allows light from the bottom illuminator to pass through. The black and white stage plates can be used for additional contrast to the specimen that is being viewed.

STAND - Used to support the stereo microscope head. The height is adjustable which allows the head to change its focusing range. The stand also contains the top and bottom illuminators.

TOP ILLUMINATOR - The round-shaped housing which contains a light source that can be adjusted up or down to illuminate the desired spot on the stage plate.

TURRET - The round barrel that houses the objective lenses. The SM90 Series has two magnifications that can be changed by rotating the turret to a different set of objective lenses.

OPERATING YOUR SM90 SERIES STEREO MICROSCOPE

1. Place the specimen onto the stage plate and select the type of illumination. If the specimen is transparent, turn on the bottom illumination. If the specimen is opaque, turn on the top illuminator.
2. The SM90 is equipped with two built-in magnifications. To change magnifications, rotate the turret one direction or to the other as far as it will move. This will place one pair of objectives in alignment for viewing. The power that is in use is marked on the objective barrel.
3. Look through the eyepieces and rotate the focus control knob to focus the specimen in the field of view.
4. Grasp the eyepiece tubes and move them either closer together or farther apart, to see one clear image. Note, if two separate images are observed, the eyepiece tubes are too far apart and should be moved together. If two overlapping images are seen, the eyepiece tubes are too close together and should be moved apart.
5. Close your left eye and adjust the focus controls so the image is in sharp focus, while viewing with the right eye only.
6. Close your right eye and while viewing with the left eye

only, adjust the diopter ring on the left eyetube to bring the image of the specimen into sharp focus. The optical system is now adjusted to your particular vision.

7. Rotate the turret to switch to another magnification if necessary. Minor focusing using the focusing control knob may be required.

OPERATING YOUR M28Z / M29TZ SERIES STEREO ZOOM MICROSCOPE

1. Place the specimen onto the stage plate and select the type of illumination. If the specimen is transparent, turn on the bottom illumination. If the specimen is opaque, turn on the top illuminator.
2. Turn the diopter adjustments (on the eyepiece tubes) until the rotatable diopter tube touches the silver line on the eyepiece tubes.
3. Grasp the eyepiece tubes and move them either closer together or farther apart, to see one clear image. Note, if two separate images are observed, the eyepiece tubes are too far apart and should be moved together. If two overlapping images are seen, the eyepiece tubes are too close together and should be moved apart.
4. Rotate the magnification knob to 4.0X (zoom in). Now adjust the focus with the focusing control knob.
5. Rotate the magnification knob (zoom out) to 1.0X and focus each eye (one after the other) with only using the diopter adjustments. (This may be achieved by closing one eye while the other is being adjusted).
6. Repeat adjustments 4 and 5 if further focus is required.
7. Once the diopter adjustment has been made for each eye, the user can operate the focusing knobs on the microscope stand to get new specimens into focus.

SERVICE

Use and store your instrument in a dry environment. When not in use, microscopes should be stored with dust covers in place and illuminators turned off. Avoid direct sunlight, high temperatures, moisture, smoke, and fungus.

Your Swift stereo microscope is designed to function satisfactorily with only ordinary maintenance. The instrument should be periodically serviced by a qualified, authorized service technician, who will clean, re-lubricate and perform routine adjustments. Unauthorized personnel should never disassemble lens assemblies or other precision components. For information regarding service, contact your local authorized Swift dealer or Swift customer service at (877) 967-9458.

BULB REPLACEMENT

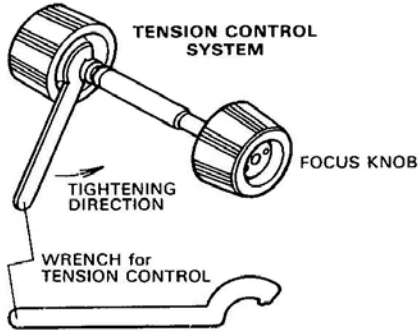
Unplug the stereo microscope from the electrical outlet and remove specimens from the stage before you attempt to replace a LED. To prolong the life of the LED, you should always turn off the unit when not in use.

The top illuminator bulb is Swift #MA14778, 3W, 5500K LED bulb. The top bulb may be replaced by carefully laying your microscope on its back so that the top light is facing up. Unscrew the top light cover to expose the LED bulb assembly. Carefully remove the LED condenser lens to gain access to the two Phillips screws holding LED bulb down, and remove them. Approximately 1" below the LED bulb assembly on the outside of the top light barrel are three 1.27mm hex head set screws. Loosen all three set screws and detach the LED wiring harness within the barrel. Remove the old LED bulb assembly, attach the new LED bulb assembly and assemble in the reverse.

The transmitted (bottom) illumination bulb is Swift #MA14778, 3W, 5500K LED bulb. The bottom bulb may be replaced by carefully laying your stereoscope on its side and using a Phillips screw driver remove the four screws securing the rubber feet and base plate to illuminator base. Remove three 3mm Phillips head screws securing lamp housing to lamp bracket; then remove lamp housing. Using a 5.5mm hex nut driver, remove two nuts securing the 3W LED lamp assembly. Carefully unplug LED lamp connector (attached to LED socket located on circuit board). Replace LED lamp assembly and then, reverse the above process.

TENSION CONTROL OF FOCUSING MOVEMENT

The focus tension is easily adjusted by using the Swift adjustment wrench. This wrench fits the tension collar found on the focusing controls, between the knob and upright support. A clockwise turn of this collar moves it toward the upright support and increases tension, while a counter clockwise turn moves the collar toward the knob and decreases tension (see illustration).



CLEANING

Eyepieces should be cleaned as often as necessary to allow unobstructed viewing. Clean the eyepieces by brushing away dust particles using a soft camel hair brush or with air pressure, then moistening the lens by breathing onto it. Wipe the lens carefully with quality lens tissue. If dirt or other foreign matter still remains, it may be necessary to use water or optical cleaner (eyeglass or camera lens). Note: the lens tissue should be moistened, not saturated, for cleaning, after which the lens should be dried using a quality lens tissue. Painted surfaces should be cleaned with soapy water or mild non-abrasive cleaners and a soft cloth. Do not use solvents on painted surfaces.

COMMON PROBLEMS IN MICROSCOPY

If you have a problem, you may be able to correct it yourself. Here are a few common problems and easy solutions you may want to try before calling for service.

CAUTION - Never disassemble mechanical or optical components. This servicing should only be done by an authorized Swift technician. The Limited Lifetime Warranty will be null and void if the mechanical or optical components are disassembled by a non-Swift dealer.

- A. PROBLEM** - The illuminator light does not come on
CORRECTION -
1. Make sure the microscope is plugged into a functional electrical socket.
 2. Make sure the bottom illuminator dimmer control is set above "0"
 3. The bulb may need to be replaced. See "Bulb replacement" on page 9.
- B. PROBLEM** - Unable to bring specimen into focus.
CORRECTION -
1. Eye lens of the eyepiece is partially unscrewed. Remove the eyepiece and screw the two sections together.
 2. The turret may need to be fully rotated to align the objective lenses into the correct position (SM90 Series).
 3. The specimen may not be centered properly on the stage and needs to be re-positioned to be in the optical path.
- C. PROBLEM** - Image of the specimen goes out of the focus all by itself.
CORRECTION - Use the tension control collar to tighten the focusing mechanism found on the focusing spindle.
- D. PROBLEM** - Focusing knobs turn with difficulty even with tension-collar loosened.
CORRECTION - Microscope should be disassembled, cleaned and re-lubricated by a qualified, authorized technician.

PARTS and ACCESSORIES

- MA10592 W10X Eyepieces (pair)
- MA19029 Rubber Eyeshields (pair)
- MA19060 Black / White Contrast Plate
- MA19061 Frosted Stage Plate
- MA19069 Stage Clips (pair)
- MA533 Dustcover
- MA14778 3W, 5500K LED Bulb (in-base illuminator)
- MA14779 Power supply converter (100-240v in, 12v out)

(Only M28Z/M29TZ)

- MA10598 0.5X Auxiliary Lens
- MA10599 1.5X Auxiliary Lens

(Only M29TZ)

- MA15600 C-Mount Adapter
- MA15601 SLR Photo Adapter

SWIFT OPTICAL INSTRUMENTS, INC. LIMITED LIFETIME WARRANTY

Please see our website, www.swiftoptical.com, for complete warranty details and exclusions.

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