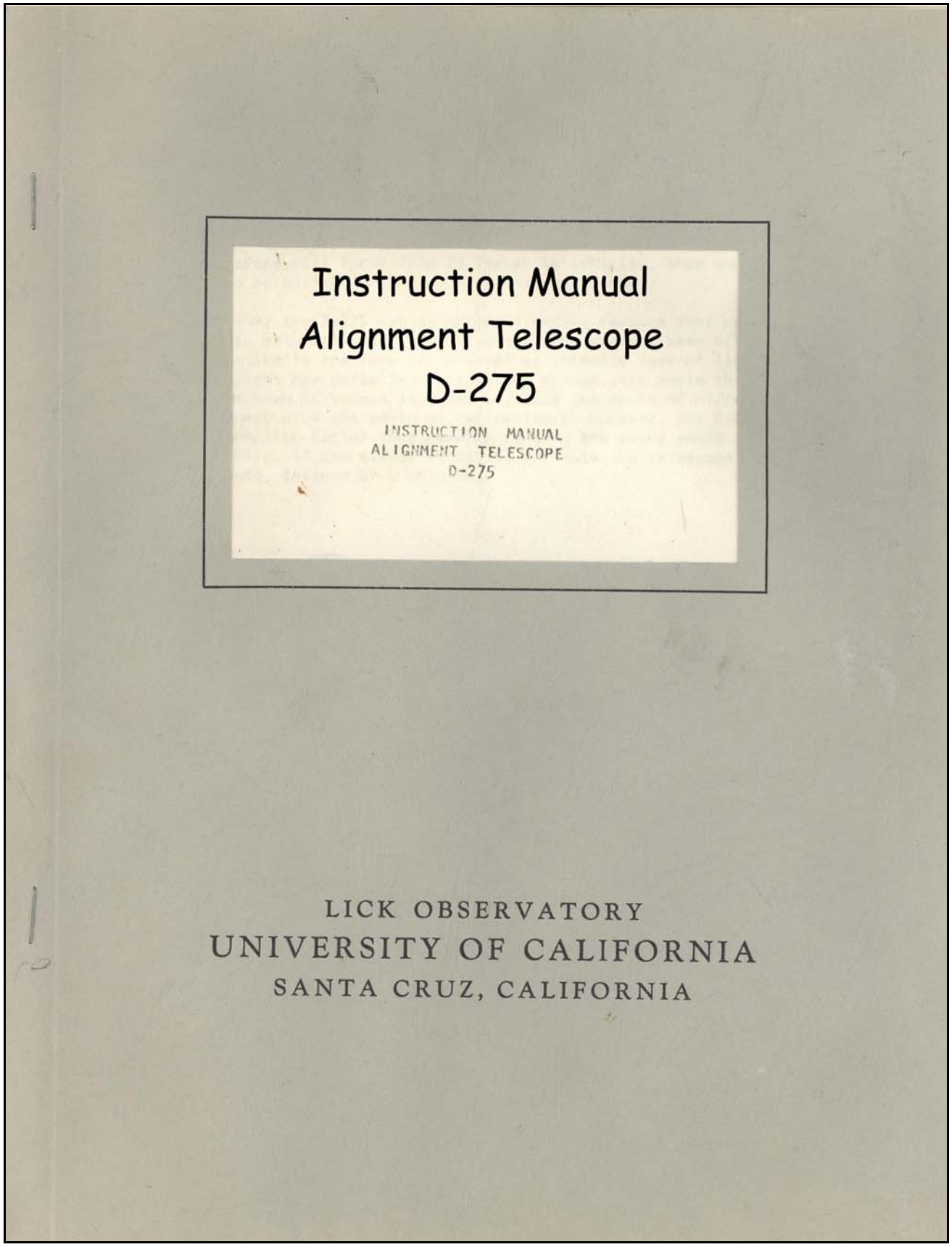
D-275 Alignment Telescope
Instruction Manual



D-275 Alignment Telescope Instruction Manual

INTRODUCTION

The D-275 (Figure 1) is primarily an alignment telescope which means that the optical line of sight of the telescope, at any distance, is an accurate extension of the axis of the outside cylindrical barrel or tube of the telescope. The telescope will focus from 18 inches to infinity, thus enabling a group of points to be optically aligned in a straight line.

In addition, the D-275 has an autocollimating feature that permits it to be used as an autocollimator. The light source sends a beam of light out of the objective in the form of parallel or infinite rays of light. When these rays of light are deflected by a tilted mirror, the angle through which the reflected beam is turned is equal to twice the angle of mirror tilt. (Angle of incidence plus the angle of reflection.) However, the D-275 has a built-in compensating factor that permits reading the exact angle of mirror tilt. Specifically, if the mirror is tilted 1 minute the telescope reading will be 1 minute, instead of 2 minutes.

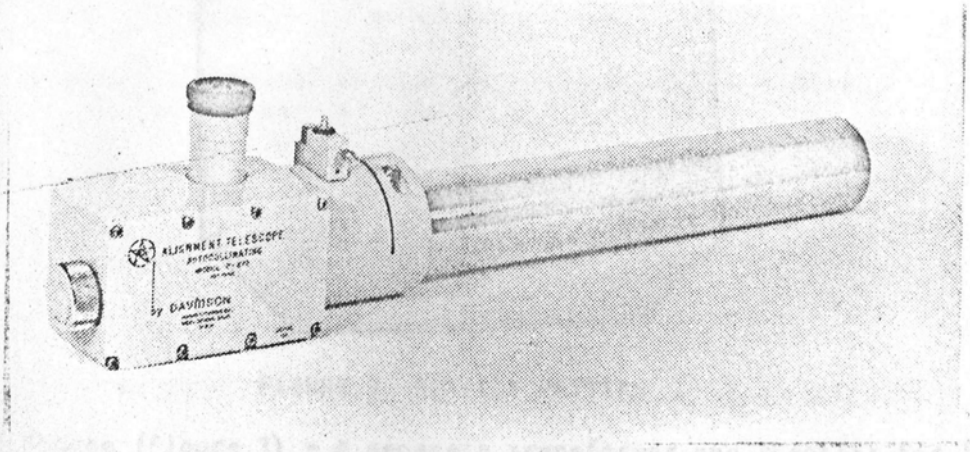


FIGURE 1 ALIGNMENT TELESCOPE, D-275

GENERAL DESCRIPTION

Telescope Tube - The telescope tube is made of hardened, stabilized and polished gauge block steel and fits the standard NAS-900 spherical mount. The diameter of the tube is concentric to the optical axis to within .0002 of an inch. Over the full length of the tube, the outer surface of the tube is parallel to the optical axis within 1 second of arc.

Eyepiece - The eyepiece has a 40X magnification with full diopter adjustment. It permits .010 inch devisions of scale to be read at 140 feet. Other corresponding divisions are readable at other distances.

Focusing Knob - The telescope contains a focusing knob which is used to focus from 16 inches to infinity. Turning the knob moves the secondary objective, thereby adjusting the focal length of the lens system.

Reticle Pattern (Figure 2) - The functional field of the telescope is devoid of complex super imposed images, thus simplifying the process of achieving alignment. The autocollimating reticle, as seen through the eyepiece, consists of 15 concentric illuminated rings numbered in increments of 5 minutes. Any slight movement of the telescope or external mirror will cause the autocollimating reticle to move in the field. The alignment reticle is a fixed black cross, the intersection of which represents the optic axis of the telescope. The field is dark to give contrast to the two reticles as well as to lessen eye fatigue when the telescope is used over a long period of time.

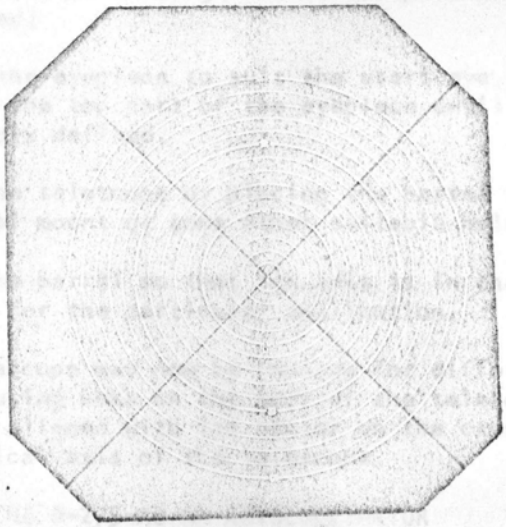


FIGURE 2 RETICLE PATTERN

Light Source (Figure 3) - A separate transformer and rheostat for 115 volt operation of the light source is provided to control light intensity. The light source may also be illuminated by battery pack if desired.

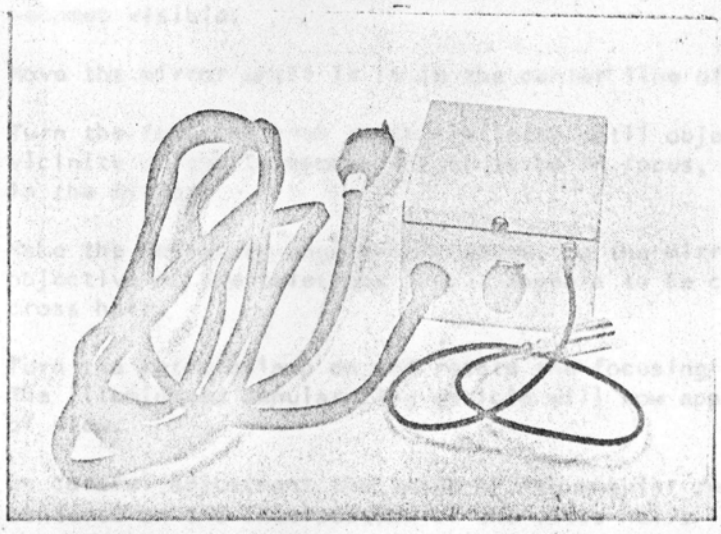


FIGURE 3 LIGHT SOURCE

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OBTAINING A READING

The light source projects an image of the illuminated reticle through the objective lens to the external mirror. If the surface of the mirror is square or normal to the optic axis of the autocollimator, the fixed reticle will bisect the center of the illuminated reticle. When the mirror is tilted within 15 minutes of alignment, the amount of tilt can be read at the point where the intersection of the fixed reticle bisects the illuminated reticle.

PROCEDURES FOR USING THE D-275 AS AN ALIGNMENT TELESCOPE

When using the D-275 as an alignment telescope the following procedures should be followed:

1. Adjust the eyepiece to suit the users eye. This is done by turning the top part of the eyepiece until the black cross hair is sharply defined.

2. Mount the telescope by placing the barrel in either a standard AN spherical mount or some other suitable holder.

3. Align the barrel so that its axis is in the line of sight which is desired for the particular application.

4. The telescope may now be focused for different distances by turning the focusing knob on the rear of the telescope case. Any target that is aligned with its center on the cross hair will then be on the optical axis of the telescope.

PROCEDURES FOR USING THE D-275 AS AN AUTOCOLLIMATOR

When using the D-275 as an autocollimator the following procedures should be followed:

1. Place the mirror to be aligned in the approximate spot desired.

2. Look into the eyepiece and turn the focusing knob until the mirror becomes visible.

3. Move the mirror until it is in the center line of sight.

4. Turn the focusing knob toward infinity until objects in the vicinity of the telescope appear to be in focus, as reflected in the mirror.

5. Make the necessary angular adjustment to the mirror until the objective of the telescope itself appears to be centered in the cross hair.

6. Turn the reticle lamp on and rotate the focusing knob to infinity. The illuminated annular ring reticle will now appear in the field of view.

7. By careful adjustment the image of the annular reticle can be centered on the intersection of the cross hair. The mirror is now normal to the line of sight.

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DETAILED SPECIFICATIONS
ALIGNMENT TELESCOPE D-275

MAGNIFICATION	40X
FOCUSING RANGE	18 inches to infinity
FIELD	20 inches at 100 feet
RESOLUTION	5 seconds
WEIGHT	13 pounds
LENGTH	20½" overall
OPTICS	Fully coated
RETICLES	Autocollimating Reticle consists of 15-1 minute rings--Total field 30 min. Alignment reticle is a cross line pattern. Width of line reticle .00025". Simple and easy to understand without confusion of many super imposed images.
SEALING	Dust and moisture protected
MOUNTING SURFACE	Outside of telescope tube fits the standard NAS-900 spherical mount. Diameter is 2.2493 to 2.2498 and is concentric to the center line of sight within .0002 inches.
CONSTRUCTION	Telescope tube is hardened, stabilized and polished gauge block steel. (Rockwell C63-64) e.g. high carbon--high chrome--. Each instrument is manufactured and tested to the highest instrument quality as measured by A.N. requirements.
CARRYING CASE	Fitted hardwood with carrying handle.

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