

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

DIRECT SUPPORT, GENERAL SUPPORT,
AND DEPOT MAINTENANCE MANUAL
INCLUDING REPAIR PARTS AND
SPECIAL TOOLS LIST
FOR
TELESCOPE, STRAIGHT: M120
(1240-930-4259)

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**DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT
MAINTENANCE MANUAL
TELESCOPE, STRAIGHT: M120
(1240-930-4259)
AND
TELESCOPE, STRAIGHT: XM134
(1240-179-1155)**

This manual is current as of 30 June 1971

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CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This publication contains instructions for the repair and overhaul of telescope, straight, M120, 1240-930-4259 and telescope, straight XM134, 1240-179-1155, and support equipment by direct support (DS), general support (GS), and depot maintenance shops.

b. These instructions are used in conjunction with and are supplementary to those in the operator's and organizational maintenance manual for the armored command and reconnaissance carrier M114A1E1 using the 20 mm Rapid Fire Weapons System for telescope, straight M120, and Gun AAA, SP 20 mm XM163 and Gun AAA, Towed 20 mm XM167 for telescope, straight XM134. Instructions for operation, lubrication, operator's and organizational maintenance (including installation and removal procedures, as well as tests and adjustments after installation) are contained in TM 9-2320-224-10 for telescope, straight M120 and TM 9-2350-300-10 and TM 9-1005-286-10 for telescope, straight XM134. It may be necessary to refer to these manuals for complete procedures.

Note: In this manual, "the telescope" will refer to both telescopes unless otherwise noted.

1-2. Comments

DA Form 2028 (Recommended Changes to DA Publications) will be used for reporting discrepancies and recommendations for improving this equipment manual. The form will be completed by the individual using this publication and forwarded directly to Commanding Officer, Frankford Arsenal, ATTN: AMSWE-MAF-W3100, Philadelphia, Pa., 19137.

1-3. Maintenance Allocation and Parts

The maintenance allocation chart (MAC) in TM 9-2320-224-20 (telescope M120) and TM 9-2350-300-20 and TM 9-1005-286-20 (telescope XM134) and repair parts and support equipment listed in appendix B allocate maintenance responsibilities

1-4. Forms, Records, and Reports

a. *Authorized Forms.* The forms are listed in DA Pamphlet 310-2 and TM 38-750.

b. *Report of Accidents.* The necessary reports are prescribed in AR 385-40.

c. *Equipment Improvement Recommendations (EIR).* Use the equipment Improvement Recommendation section of DA Form 2407.

Section II. DESCRIPTION AND DATA

1-5. Description

a. Straight tube telescope M120 (fig. 1-1) is used on the armored command and reconnaissance carrier M114A1E1 with 20 mm automatic gun M139. Straight tube telescope XM134 (fig. 1-1) is used with both the gun, AAA, SP, 20 mm XM163 and gun, AAA, towed 20 mm XM167. The telescopes are the direct fire control instruments used for positioning the weapon in deflection and elevation on targets visible from the weapon. Telescope M120 is mounted by means of a dovetail to a bracket and secured with a locking device located on mount, telescope M148. Telescope XM134 is secured by the same method on mount, telescope XM164.

b. The external parts of the telescopes are the same. They are located and identified in figure 1-1 as follows: A cap assembly (1) consisting of an optical glass window in a flexible rubber cap, fits over the front end of the telescope to protect the objective lens. A rubber eyeshield (2) fits over the rear end of the telescope to protect the eye of the observer. A light well (for instrument light) (3) contains a threaded stainless steel insert to accept the threads on the brass metal shield containing the lamp socket of the instrument light. A cap (4), used to cover the light well and prevent the entry of dirt, moisture, etc., when the instrument light is not in place, is fastened to the housing by a bead chain, secured by one of the screws holding the identification plate. The dovetail mounting plate (5) is located directly under the identification plate, secured by two socket head screws and two steel pins to the telescope housing. Two screws (6), one located in front, and the other located in back of the mounting plate, are used to close purging ports in the housing. After the assembled telescope has been purged and charged with dry nitrogen gas, these ports are sealed to eliminate moisture which may damage internal optics and metal parts.

c. The optical system (fig. 1-2) for both telescopes consists of the objective system, the reticle lens, the erector system, a diaphragm, eyepiece assembly, and illumination window. All the light transmitting surfaces of the optical components, with the exception of the reticle, are fluoride coated to increase light transmission through

the instrument and to reduce internal reflections. A description of each optic in the system is as follows:

(1) *Objective assembly.* The objective lens assembly (1 through 3, fig. 1-2) is a three element air spaced triplet consisting of a double convex lens and an air spaced doublet. A negative field lens (4) mounted in front of the reticle is also part of the objective system. Light passing through the objective forms an inverted image of the distant object (target) at the reticle focal plane.

(2) *Reticle.* The reticle lens (5) serves as a collective member to direct the field rays to the center of the erector system, thus keeping the diameter of the erector lens to a minimum size. The reticle is a ballistic-type with etching on the plane surface of a plano-convex lens and is part of the erector system.

(3) *Erector assembly.* The erector assembly (6 through 9) consists of a double convex lens, two cemented doublets, and a second double convex lens. These lenses invert and revert the image (target) and project the erected image to the focal plane of the eyepiece assembly.

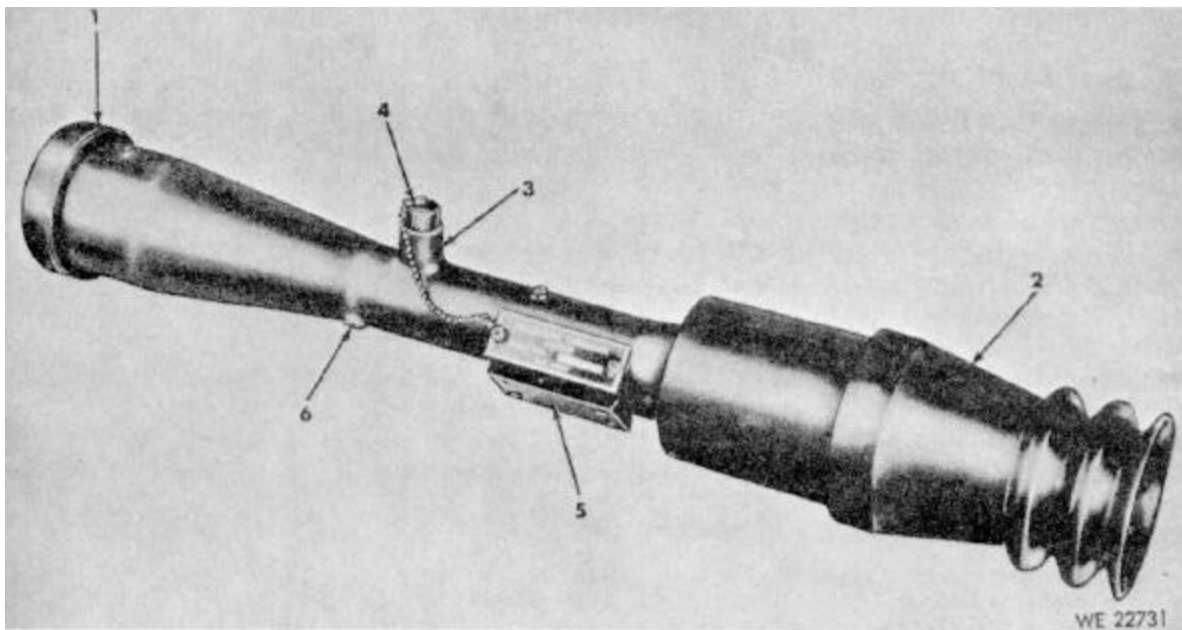
(4) *Diaphragm.* The diaphragm (13) acts as a field stop by blocking light rays that are not essential to the field-of-view.

(5) *Eyepiece assembly.* The eyepiece assembly (10 and 11) consists of a cemented doublet and a single element double convex eye lens. The eyepiece serves to magnify the image (target) and reticle pattern.

(6) *Illumination window.* The window (12) allows light from the instrument light M52E1 to illuminate the etching of the reticle.

d. Support equipment necessary for storage and operation of the telescope are as follows:

(1) A carrying case (fig. 10, located in appendix B) of molded, laminated, sheet plastic



- | | | |
|----------------|--------------|------------------|
| 1 Cap assembly | 3 Light well | 5 Dovetail |
| 2 Eyeshield | 4 Cap | 6 Purging screws |

Figure 1-1. Telescope, straight M120 and telescope, straight XM134.

with polyurethane foam padding on the inside, is provided to transport and store the telescope when not in use.

(2) An instrument light M52E1 used on telescope M120 only (fig. 11, located in appendix B) is used to provide illumination of the reticle in the telescope.

1-6. Data

a. Telescope.

(1) Physical characteristics.

Length (w/cap and eyeshield)	19 in
Width	2-3/4 in.
Height	2-3/4 in.
Weight	3 lb, 4 oz approx

(2) Optical system.

Magnification	6 power
Field-of-view	5 deg 12 min.
Effective focal length (EFL objective)	6.375 in.

Effective focal length (EFL eyepiece)	2.250 in.
Eye relief	3.50 in.
Diameter of exit pupil	.275 in.
Dioptral range (fixed)	-3/4 to -1.0 diopter

b. Carrying case.

Length	21 in.
Width	6 in.
Height	4-1/2 in.
Weight	6 lb approx

c. Instrument Light M52 E1

Length (excluding lead)	7-1/4 in.
Diameter	1-7/8 in.
Diameter at rheostat	2-5/8 in.
Weight (without batteries)	3/4 lb approx
(one battery weight)	2-1/2 oz approx

d. Temperature Range.

Operable	-65°F to 160°F.
Storage	-80°F to 160°F.