F147

GROUND RADAR

A.M.E.S. TYPES 13, 14 & 21

(BRITISH AIR MINISTRY PATTERN)

PROVISIONAL DESCRIPTION

REF.PD. 508/4.

Marconi

MARCONI'S WIRELESS TELEGRAPH COMPANY LIMITED

Head Office: Marconi House, Chelmsford · Telephone: Chelmsford 3221 · Telegraphic Address: Expanse, Chelmsford

GROUND RADAR UNITS
AMES TYPES 13, 14 & 21
(BRITISH AIR MINISTRY PATTERN)

This apparatus is of British Air Ministry pattern but incorporates certain improvements with the concurrence of that authority.

Provisional Description
PD.508/4.

This description is intended only as a general indication of the equipment and should not be taken as a rigid performance specification.

CONTENTS

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INTRODUCTION

AMES Types 13 and 14 Equipments provide, respectively, long-range height-reading and plan-position information of aircraft at distances up to 90 miles (145 km), while Type 21 is a combination of Types 13 and 14 together with an operations room containing display consoles. The latter provides an extremely flexible system for the control of simultaneous multi-channel fighter interception at ranges of up to 90 or 100 miles.

These equipments can either be supplied as completely mobile stations, or alternatively, in transportable form (without vehicle chassis) when they can be installed as fixed stations.

The contents of this booklet are condensed from the relevant official British Air Ministry handbooks which are supplied with the equipment, and the information is common to all three types of equipment, unless otherwise stated.

The maximum range is dependent on the size and aspect of a single target aircraft, and by the number of aircraft in a formation.

PERFORMANCE SUMMARY

AMES TYPE 13.

Function: Height-finding by direct measurements of range and angle of elevation up to ranges of 90 miles (145 km).

Display: Elevation trace, giving direct presentation of target height in thousands of feet.

Accuracy: ± 250 ft (75 m) from 0.5° to 21.5° of elevation.

Beam width: Vertical: less than 1°
Horizontal: " " 3°
(for 6 db attenuation on either side).

AMES TYPE 14.

Function: Determination of azimuthal position of aircraft and surface vessels by direct measurement of range and bearing.

Display: Plan-position indication (PPI) allowing direct reading of grid co-ordinates.

Range: Over 120 miles (192 km) depending upon target height and size.

Beam width: Horizontal: less than 1°
Vertical: " " 3°
(for 6 db attenuation on either side).

AMES TYPE 21.

Function: Location of target by direct measurement of range, bearing and angle of elevation.

AMES TYPE 21 (Cont'd).

Display: Direct presentation of target height in thousands of feet, together with PPI allowing direct reading of grid co-ordinates.

Range: Over 120 miles (192 km) depending upon target height and size.

Beam widths: Height Finder -

Vertical: less than 1^{o}
Horizontal: " " 3^{o}

Bearing Finder -

Horizontal: " " 1^{o}
Vertical: " " 3^{o}

AMES TYPE 14 with HIGH COVER AERIAL.

Function: Determination of azimuthal position of aircraft by direct measurement of range and bearing.

Display: Plan-position indication (PPI) allowing direct reading of grid co-ordinates.

Range: Over 65 miles (105 km) depending upon target height and size.

Beam width: Horizontal, less than 1^{o}

(all beam widths indicated for 6 db attenuation on either side).

DATA SUMMARY

Frequency:	3000 Mc/s
Pulse Length:	0.6 or 1.9 μs
Pulse Recurrence Frequency:	500 per second
Peak Power Output:	500 kW
Receiver Intermediate Frequency:	45 Mc/s
Aerial:	Type 13, Mk.V. Single parabolic reflector 20 ft (6.15 m) high and 5½ ft (1.7 m) wide, with focal line parallel to long dimension, thus giving a beam very narrow in the vertical plane. The aerial is controlled in azimuth by the operator but searches automatically in elevation ten times per minute between the limits of -1° and +20°.
	Type 14, Mk.VI. Single parabolic reflector 25 ft (7.7 m) long and 8 ft (2.46 m) high, permanently inclined at 1° to the vertical, with focal line parallel to the long dimension, thus giving a beam very narrow in the azimuthal plane. The aerial is automatically rotated at ½ to 15 rpm about a vertical axis, in either direction. Alternatively a selected arc of 20° to 100° in bearing may be covered by a reciprocating sweep at a speed equivalent to ⅓ to 2½ rpm.
Beam Width:	Type 13, Mk.V. Vertical beam width less than 1° for 6 db attenuation on either side; width in azimuth approximately 3°.
	Type 14, Mk.VI. Beam width in azimuth less than 1° for 6 db attenuation on either side; vertical width approximately 3°.

High Cover Aerial: Type 14 can also be supplied with a special reflector (cosecant-squared), providing cover for targets at high angles of elevation. It has its focal line parallel to the long dimension, which gives a beam width very narrow in the azimuthal plane - less than 1^{o}, for 6 db attenuation on either side.

Power Supply: The main input is 230 volts, 50 c/s, 3-phase delta connected. This may be obtained from a mobile or static diesel-electric generator, or from a main supply system. A motor-alternator with an output of 5 kVA at 180 volts 500 c/s fed from this 3-phase supply, is provided for the purpose of operating the radar unit. Accessory equipment and display consoles operate from one phase of the supply.

BRIEF GENERAL DESCRIPTION

Radar Unit.

The radar unit is the same for both Types 13 and 14 Equipments, except that for Type 13 the aerial is an oscillating vertical reflector, while for Type 14 it is a rotating horizontal reflector. For Type 21, two radar units are provided, one of each type.

The unit consists of a special box cabin fitted on a turntable and mounting frames. This is suitable for transportation, but is normally fitted on to a vehicle chassis to form a completely mobile unit.

The aerial is mounted upon the side of the cabin, which rotates with it. Inside the cabin are installed:-

Rectifier and modulator	Panel 3AT
Transmitter	Panel 9R
Output unit	Type S.E.2
Receiver	Type 177
Monitor	Type 53

Slip-ring, turning gear and control unit.
500 c/s motor-alternator and associated equipment.
Accessory equipment, including heating, lighting and ventilating apparatus.

The radar panels are basically British Admiralty pattern as used in Types 276, 277 and 293M, with certain modifications.

Radio-frequency feed to the aerial arrays is by means of a slotted linear waveguide system.

Space is provided in the cabin for the fitting of IFF equipment.

Operations Room.

Type 13 Equipment is normally provided with one Display Console Type 15 which gives height/range indication, the height being directly presented in thousands of feet.

A Display Console Type 16 can be supplied, if desired, in order to give plan-position indication from another equipment (which may be AMES Type 11, 14, or 15).

Type 14 Equipment is normally provided with two Display Consoles - one Type 15 for range measurement, and one Type 16 for plan-position indication. A second Type 16 Display Console, for plan-position indication, can also be supplied if desired.

Type 21 Equipment is a combination of Type 13 and Type 14 Equipments, together with the necessary Display Consoles for the indication of both types of radar signals, i.e., one Type 15 Display Console for height/range indication, and two Type 16 Display Consoles for plan-position indication. One of the Type 16 Display Consoles is used to direct the height/range equipment on to the target. All the above consoles are fitted with 12-inch (30.5 cm) cathode-ray tubes.

In the mobile equipment the appropriate display consoles are installed in a special operations room cabin mounted on a suitable vehicle chassis. The cabin, without the vehicle chassis, can be supplied for transportable use. A complete operations room would be equipped with telephone exchange, plotting tables, heating, lighting, ventilation and other accessories.

Power Generating Equipment.

Power supplies are usually obtained from the electricity supply mains, but in cases where this is not possible, supply may be obtained from 4-cylinder, 3-phase diesel-electric generating sets which can be supplied with all the necessary control equipment and voltage regulating devices.

For the mobile equipment, diesel-electric sets, mounted in suitable vehicles, are recommended.

BRIEF TECHNICAL DESCRIPTION

Rectifier & Modulator Unit.

This unit provides a high voltage (7 kV) pulse of short duration (0.6 or 1.9 μs), and causes the output valve (a magnetron) to oscillate. The method by which this pulse is produced is briefly as follows:-

A 500 c/s voltage of suitable phase and amplitude is applied to a circuit which produces from it a short-duration low-voltage pulse every cycle. This, in turn, is applied to the grid of a large thyratron (gas discharge triode) in the anode circuit of which is a "discharge line". This latter is an arrangement of distributed inductance and capacitance and is charged up to a very high voltage between the pulses. When the short-duration low-voltage pulse is applied to the thyratron, the latter conducts and discharges the line, its energy being transferred through a pulse transformer (step up 4:1) to the magnetron. The time which the line takes to discharge is dependent upon the value of the inductance and capacitance comprising it and is a definite fixed period (pulse length).

Transmitter & Output Unit.

The transmitter contains the pulse transformer, the magnetron, and their associated equipment. The high-voltage negative pulse (28 kV) from the secondary of the pulse transformer is applied to the cathode of the magnetron and causes it to oscillate for the duration of the pulse. The output of the magnetron is fed directly into the output unit, a special section of waveguide, attached to which is the "duplexer" or common-aerial switch. This device enables the same aerial system to be used for transmitting and receiving and consists of a special resonant chamber which is ionized during the transmitted pulse and prevents the latter from reaching the receiver. When, however, the chamber is not ionized, as during the receiving period, the total energy reflected back from an object (i.e. an echo) will pass straight through to the receiver, none being absorbed by the transmitter.

Receiver Type 177.

The unit consists of a mixer and three low-noise intermediate-frequency (IF) stages.

The first stage, the mixer, contains a crystal rectifier into which is injected the received signal and a local oscillator signal, to produce an intermediate frequency of 45 Mc/s.

The remaining portion of the receiver consists of the three low-noise IF stages and the output is fed through a cable to the main display console in the operations room and also to the IF amplifier of the Monitor Unit Type 53.

Monitor Type 53.

This unit consists of an IF amplifier, a local oscillator and an indicating unit.

The IF amplifier consists of three RF pentode valves, a diode rectifier and a second diode which acts as a limiter to the input of the video amplifier stages.

The local oscillator provides the voltage for mixing with the received signal in the mixer box and the receiver is tuned by varying its frequency.

The indicating unit provides a range display ("A" scan), and consists of a cathode-ray tube with associated high-voltage circuits, and a time-base circuit capable of generating three different sweep speeds for the three ranges:-

Short	34 miles (54.6 km)
Medium	68 miles (109.68 km)
Long	136 miles (219.36 km)

The sweeps are synchronized by a pulse produced by stepping down the magnetron current pulse by a special transformer. The repetition frequency of the sweeps is therefore the same as the main pulse repetition frequency of the set, namely, 500 per second. The output from the time base-circuits is applied to the horizontal pair of

deflector plates in the tube, and the video-signal output of the receiver to the vertical pair. During the period between successive sweeps the spot on the tube is blacked out. Thus, all that can be seen is the appropriate trace with receiver noise ("grass") and echoes. A transparent calibrated scale is fitted in front of the tube and the trace lengths are adjusted to coincide with its markings. Calibration markers appear on the trace during calibration and mark off 5 mile (8 km) intervals. If the lining-up has been done correctly, the distance along the printed scale at which the leading edge of the echo deflection appears will correspond to the range of the target.

Display Consoles Types 15 & 16.

As previously stated, the received signal is fed, at the intermediate frequency, from the output of Receiver Type 177 via a length of cable to the Display Consoles Types 15 and 16. Each of these consoles is fitted with IF amplifiers, demodulators, limiters, video amplifiers and display circuits. Power supplies, time-base circuits and all relevant controls are provided, and each console is capable of independent operation. Details of the display unit are given in the following sections.

Plan Position Indicator.

The plan position indicator, PPI (Indicator Unit Type 115) mounted in Console Type 16, is a form of display in which the objects detected by the radar appear as patches of light on the screen of a cathode-ray tube whose centre represents the position of the radar station. This is achieved by using a scan which is radial, and not diametric as in the "A" scan display, and by modulating the electron stream in the tube with the video signal from the receiver in order to produce a response on the screen. The radial sweep is produced by scanning coils which are energized from a time-base circuit having three sweep speeds corresponding to the three range scales:-

Short	40 to 60 miles	(64 to 96 km).
Medium	60 to 90 miles	(96 to 144 km).
Long	80 to 120 miles	(128 to 192 km).

These coils are mounted in an assembly which rotates round the neck of the tube and which is synchronized with the aerial rotation by means of an electro-mechanical transmission system.

The speed of the aerial rotation is such that there is an appreciable interval between the successive times an object is encountered by the aerial beam. To provide a continuous presentation of the images the cathode-ray tube screen has a special coating which continues to glow for some seconds after it has been activated, and with each successive revolution the electron beam brightens the image already present. During calibration, range markers appear on the PPI screen as bright rings corresponding to 5-mile (8 km) intervals.

In the case of the Type 21, one of the two PPI displays is fitted with an optical device which projects a radial line of light on to the face of the tube for the purpose of indicating the orientation of the Type 13 radar equipment. Facilities available on the control unit enable the operator, by setting the radial line to any particular target appearing on the PPI, to direct the Type 13 on to that target and thus enable a height reading to be taken.

Elevation Scan Display.

The elevation scan display, E/S (Indicator Unit Type 114), mounted in Console Type 15, gives a direct presentation of the range and height of the target.

As in the case of the normal "A" scan, a diametric trace gives range indication, but the target is indicated as a bright spot and not as a deflection. The trace is arranged to shift vertically in synchronism with the angular movement of the Type 13 aerial system. The target then appears as a small vertical patch of light, and its height can be read off directly from the constant-height curves marked on the face of the tube.

The vertical shift of the trace is produced by applying the amplified output voltage of a magslip to the "Y" plates of the cathode-ray tube. This magslip is associated with the aerial system of the Type 13 equipment, and its voltage output is proportional to the cosine of the angular displacement of the aerial in the vertical plane.

Aerial Turning Gear & Control Equipment.

The aerial turning gear and control equipment is the same in Types 13, 14, and 21 Equipments, and serves the purpose of rotating the aerial systems and radar cabins. The main feature of the turning gear is the central assembly known as the Pivot Mount. It consists of two widely-spaced bearings of the thrust and journal type on a vertical column. These bearings are made to precision limits and so mounted as to be capable of self-adjustment. They are continuously lubricated by flow from an oil pump situated at the base of the mount, and are loaded to no more than one twentieth of their full-rated capacity.

At the top of the mount is situated the slip-ring unit in a position free from obstruction and easily removeable. It is so designed that on the stationary centre column the slip-ring unit plugs into a 37-pin plug and socket connector, while on the rotating brush assembly, each group of leads from each particular circuit is led through to one of a group of multi-pin and socket connectors. Thus the whole unit can easily be removed without the necessity of disconnecting individual leads from terminals.

At the base of the mount is situated the main drive motor and gear box. The main drive motor of 5 h.p. is amply rated for its duty and will rotate the Equipment at any continuously variable speed up to 15 r.p.m. It is completely detachable from its coupling and thus easily removed for overhaul. The main gear box is also detachable from a similar type of coupling; and driven from it are the servo selsyn for control of the turning gear, the transmitter selsyn for control of the scan coil drive of the display consoles, and the Heading Line Switch which gives indication of the orientation of the aerial reflector. All are easily removeable both from their mechanical and electrical connections.

Thus it will be seen that the whole assembly of the Pivot Mount and its associated units have been specially designed to eliminate the previously widely-distributed and inaccessible parts.

The power amplification necessary to provide sufficient torque for starting, stopping and rotating the Equipment under even adverse weather conditions, is obtained by use of an amplidyne generator which has an output of approximately 6 h.p. It is driven by a squirrel-cage induction motor, and both are vertically mounted in the cabin so as to occupy the minimum of floor space. The associated amplifier and starter are specially designed for ease of access and serviceability.

The Control Unit itself is located in the operations room, together with the display consoles, and offers facilities for producing:-

(a) continuous rotation in either direction at speeds of 0.5 to 15 revolutions per minute.

(b) sweeping in a reciprocating cycle, over an arc of from 20^{o} to 100^{o} about any pre-selected mean bearing, at speeds equivalent to $\frac{1}{3}$ to $2\frac{1}{2}$ revolutions per minute.

(c) manual position-laying by means of coarse and fine controls at a speed of up to 10 revolutions per minute.

(d) "inching control", by means of which small changes of bearing may be made in either direction at a speed corresponding to $\frac{1}{3}$ revolutions per minute.

Here again, a feature of the design is the facility for swinging forward the control unit from its mounting frame so as to expose the back panel for easy servicing and maintenance.

The trace of the PPI displays are aligned with the bearing of the radar beam and rotated in synchronism with it by means of selsyn repeater motors.

The Mounting & Jacking Frame.

The mounting and jacking frame is of robust design and completely independent of the vehicle chassis. It allows complete withdrawal of the transporting vehicle when the jacks are extended, and thus affords an unobstructed view for the radar aerial. When the transporting vehicle has been removed, the radar cabin can then be lowered to the operational height desired by means of the four jacks which are hydraulically controlled. Each jack has a mechanical safety interlock device and can be independently operated.

Height-Finding Aerial Equipments.

Height-finding of selected targets is obtained by use of the Type 13 Equipment which has a vertical parabolic reflector of height 20 ft. (6.15 m) and horizontal aperture of 5'6" (1.7 m). It is constructed of aluminium alloy tubes mounted in a suitable frame of the same material. This has the advantage over the previous solid sheet metal reflector in that wind resistance and inertia are greatly reduced. The considerable saving in weight also means that erection into the operational position can be done by hand, and the old winch and pulley tackle dispensed with. The supporting frames are so designed that they fold back into their transit position, and dismantling is not required.

The mechanism for reciprocation of the aerial reflector has been completely re-designed. A hydraulic pump unit situated inside the radar cabin is connected by stout flexible hose to the reciprocator on the roof of the cabin. The close proximity of the reciprocator to the aerial reflector means that the connecting rod is very short, with obvious advantages. Facility is provided for adjustment of the length of this connecting rod in order to set the reflector to its zero position when calibrating. A feature of the design is the ease of dismantling - the connecting rod only need be disengaged when the reflector is stowed for transit. The pump unit is a motor-driven constant-volume machine fitted with a control valve for regulation of the feed to the reciprocator. This control valve is calibrated and affords variation of the rate of oscillation of the reflector of up to 10 cycles per minute.

The aerial is fed by means of a slotted waveguide system of approved design.

Range-Finding Aerial Equipment.

Range and bearing of all targets within the operational area are found by means of the Type 14 Equipment and are usually displayed on a plan position indicator (PPI).

The aerial consists of a horizontal parabolic reflector of length 25 ft. (7.7 m) and width 8 ft. (2.46 m), constructed of aluminium alloy tubes mounted in a suitable frame of the same material.

Again, this construction has the advantages previously described, of wind resistance, inertia, and weight reduction.

The aerial is fed by means of a slotted waveguide system of approved design.

VALVES

Type	Quantity		
	AMES Type 13 or Type 14	Display Console Type 15	Display Console Type 16
CV.5 (GU.20/21)	2	-	-
CV.12	1	-	-
CV.18 (DET.19)	1	-	-
CV.35	1	-	-
CV.54 (VU.133A)	1	2	-
CV.103 (Crystal)	1	-	-
CV.124 (807)	-	10	6
CV.193 (E.1481)	2	-	-
CV.575 (5U4G)	1	3	3
CV.988	4	-	-
CV.1054 (ARDD.5)	2	9	5
CV.1061	1	-	-
CV.1068	-	2	1
CV.1070 (7475)	1	-	-
CV.1071	-	1	1
CV.1091 (EF.50)	14	37	28
CV.1092 (EA.50)	3	5	3
CV.1103 (Y.63)	1	-	-
CV.1120 (VU.120)	-	2	1
CV.1122 (41.MXP)	1	-	-
CV.1144 (BT.19)	1	-	-
CV.1197 (NR.88)	1	-	-
CV.1290 (NU.33)	1	-	-
CV.1479 or) CV.1480 or) CV.1481 or) CV.1482)	1	-	-
CV.1572 (VT.60A)	1	-	-
CV.1863 (5Z4G)	1	1	1
CV.1097 (VCR.97)	1	-	-
CV.1588 (VCR.139A)	1	-	-
CV.1546 (VCR.140A)	-	-	1
CV.1528 (VCR.528)	-	1	-

DIMENSIONS

AMES Type 13

Height:

Overall height erected (top of aerial to base of mounting frame).	23ft 0in (7 m)
Overall height dismantled.	7ft 6in (2.3 m)
Height of cabin only.	5ft 6in (1.67 m)

Length:

Overall length dismantled (aerial mounted on side).	20ft 0in (6.1 m)
Overall length of cabin only.	13ft 3in (3.98 m)

Depth:

Overall depth (front of aerial in vertical position to back of cabin).	7ft 5in (2.26 m)
Overall depth dismantled.	7ft 5in (2.26 m)
Depth of cabin only.	4ft 10in (1.5 m)

Weight:

Total weight of cabin and all equipment, including aerial system and mounting frame but excluding vehicle chassis.	5½ tons (5600 kg)

AMES Type 14

Height:

Overall height erected (top of aerial to base of mounting frame).	10ft 6in (3.2 m)
Overall height dismantled.	10ft 6in (3.2 m)
Height of cabin only.	5ft 6in (1.67 m)

Length:

Overall length erected.	25ft 0in (7.5 m)
Overall length dismantled.	20ft 0in (6.1 m)
Overall length of cabin.	13ft 3in (3.98 m)

Depth:

Overall depth (front of aerial to back of cabin).	7ft 5in (2.26 m)
Depth of cabin.	4ft 10in (1.5 m)

Weight:

Total weight of cabin and all equipment, including aerial system and mounting frame but excluding vehicle chassis.	5½ tons (5600 kg)

Display Consoles

Height:	5ft 0in (1.52 m)
Width:	3ft 0in (0.92 m)
Overall Depth:	4ft 4in (1.3 m)
Weight:	6½ cwt (330 kg)

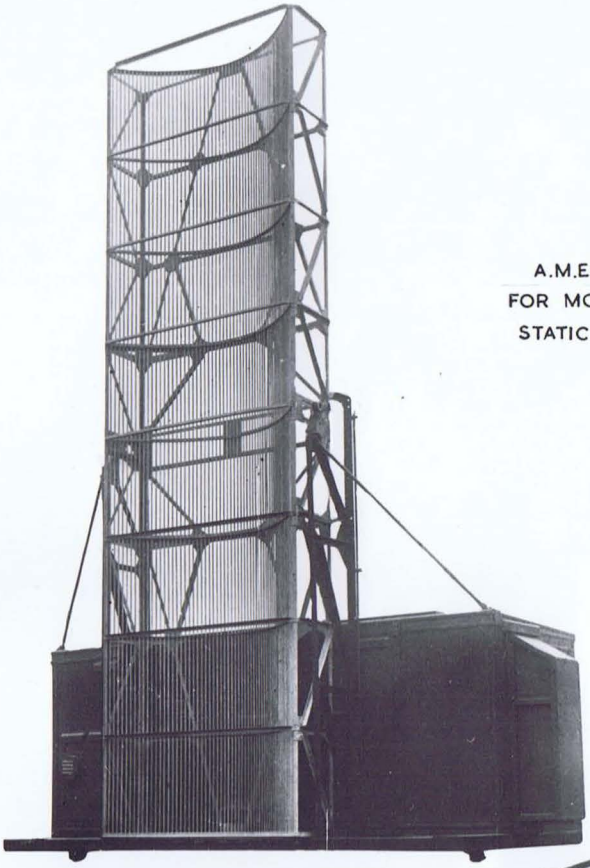
Control Unit

Height: 3ft $11\frac{7}{8}$ in.

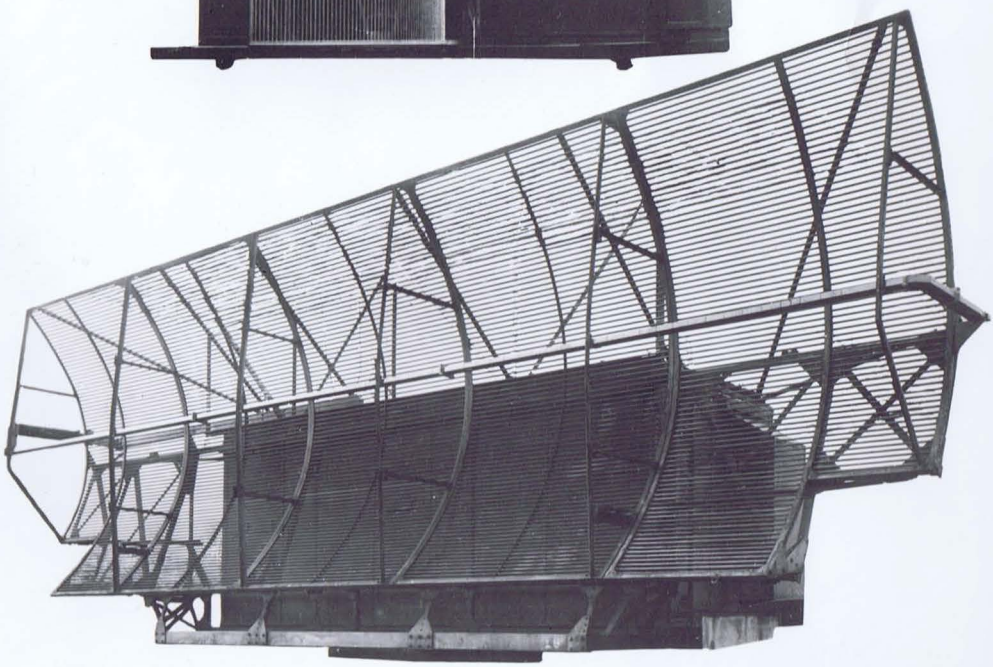
Width: $11\frac{7}{8}$ in.

Depth: 2ft $2\frac{7}{8}$ in.

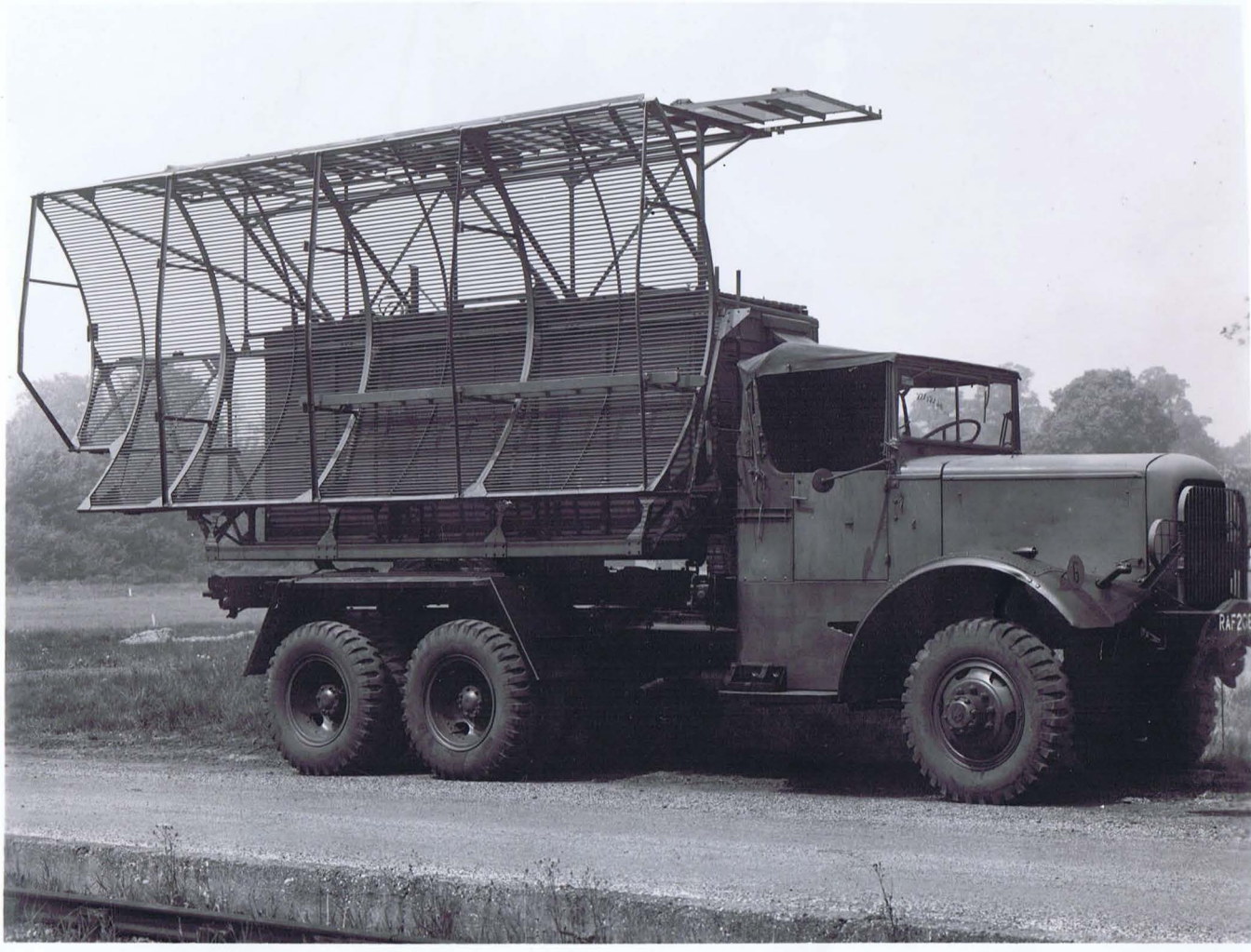
Note: All weights and dimensions given are approximate.



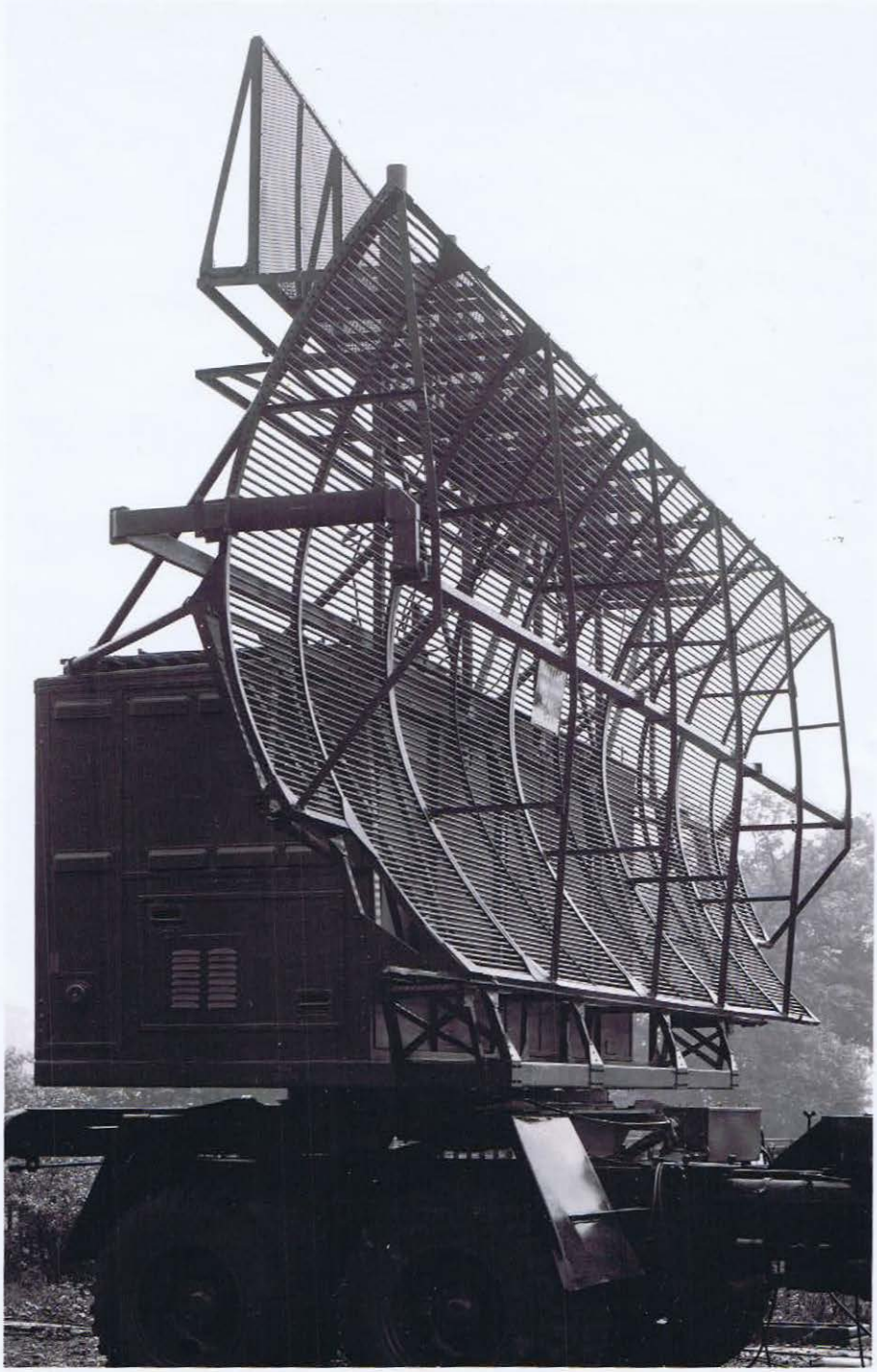
A.M.E.S TYPE 13.
FOR MOUNTING AS A
STATIC RADAR UNIT.



A.M.E.S. TYPE 14. FOR MOUNTING AS A STATIC RADAR UNIT.



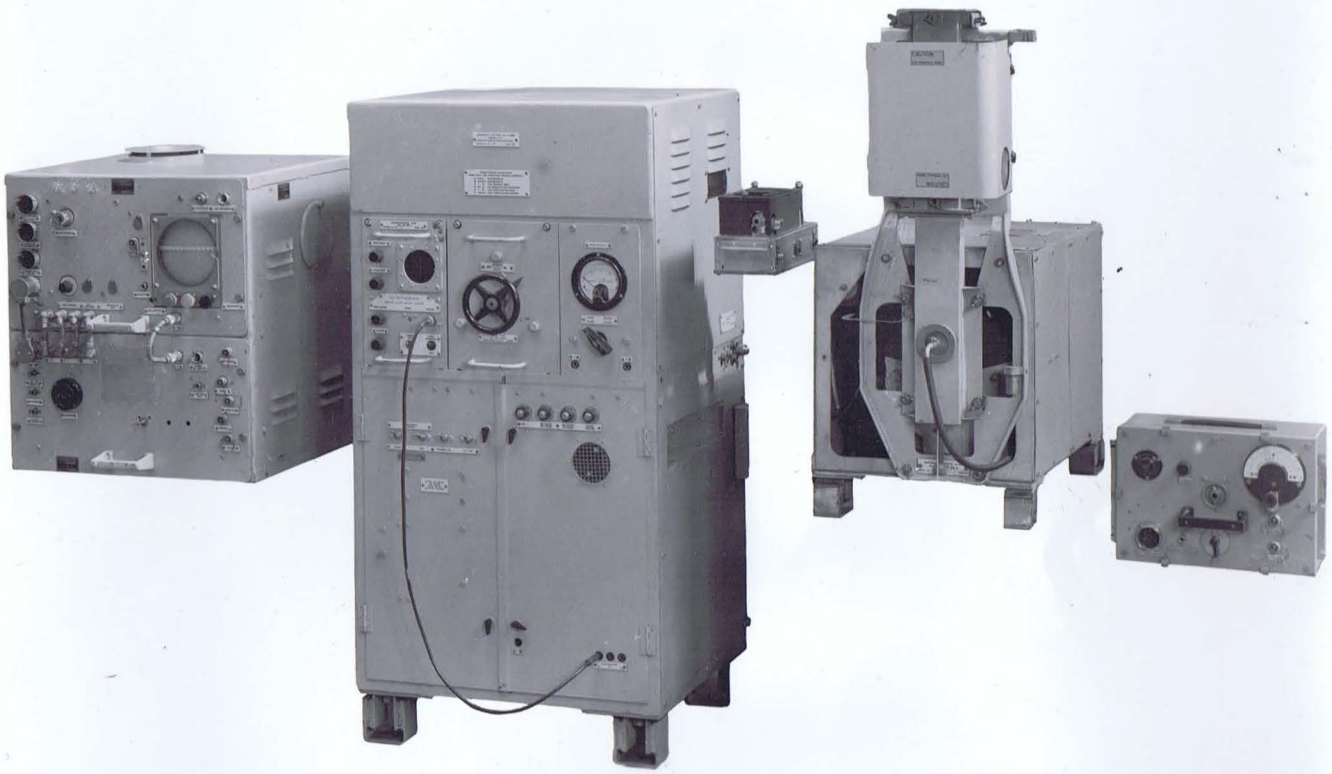
A.M.E.S. TYPE 14 MOBILE RADAR UNIT
(WITH I.F.F. AERIAL FRAME) IN TRANSIT CONDITION



A.M.E.S. TYPE 14 MOBILE RADAR UNIT (WITH I.F.F. AERIAL IF REQUIRED) IN OPERATIONAL CONDITION.

RECEIVER. TYPE 177.
HEAD AMPLIFIER

OUTPUT UNIT
TYPE SE2



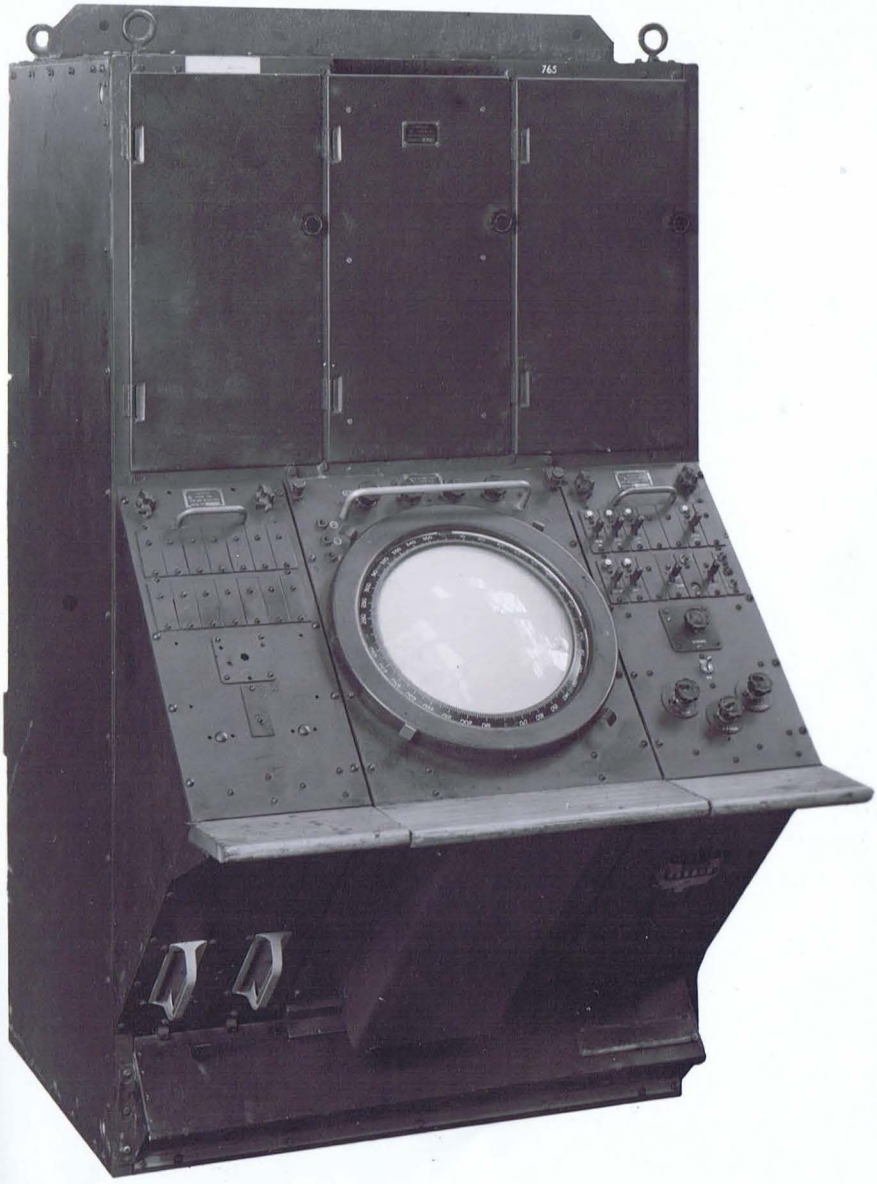
MONITOR
TYPE 53.

RECTIFIER-MODULATOR
PANEL TYPE 3AT.

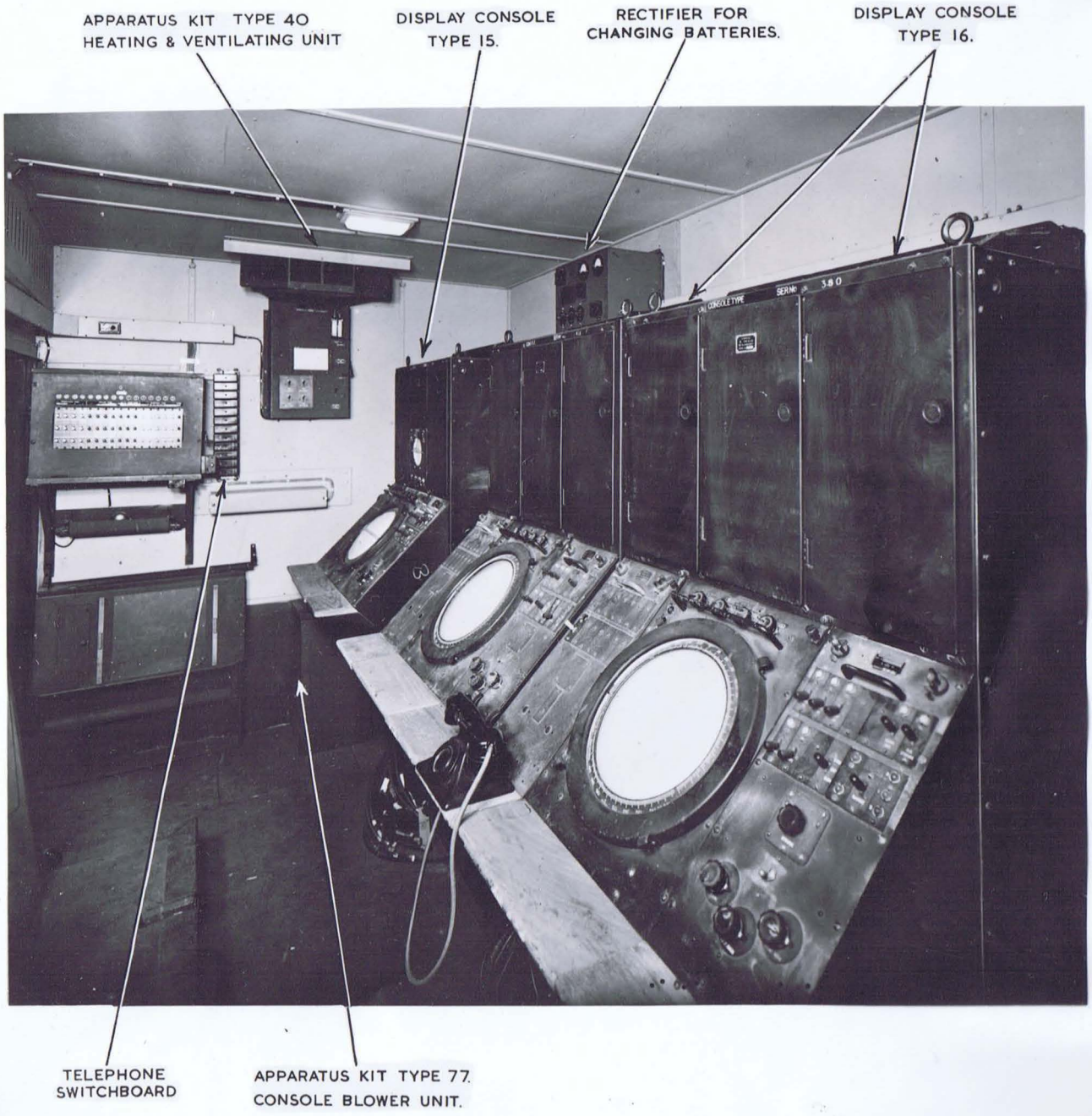
TRANSMITTER
TYPE T9R.

WAVEMETER-OSCILLATOR
TYPE G82A.

UNITS OF TRANSMITTER-RECEIVER TR 3561.
FOR A.M.E.S TYPES 13 14 & 21 EQUIPMENTS.



DISPLAY CONSOLE TYPE 16 WITH TURNING GEAR CONTROL UNIT.



A TYPICAL MOBILE OPERATIONS ROOM.

COVERAGE DIAGRAMS

A.M.E.S. TYPE 14 RADAR EQUIPMENT.

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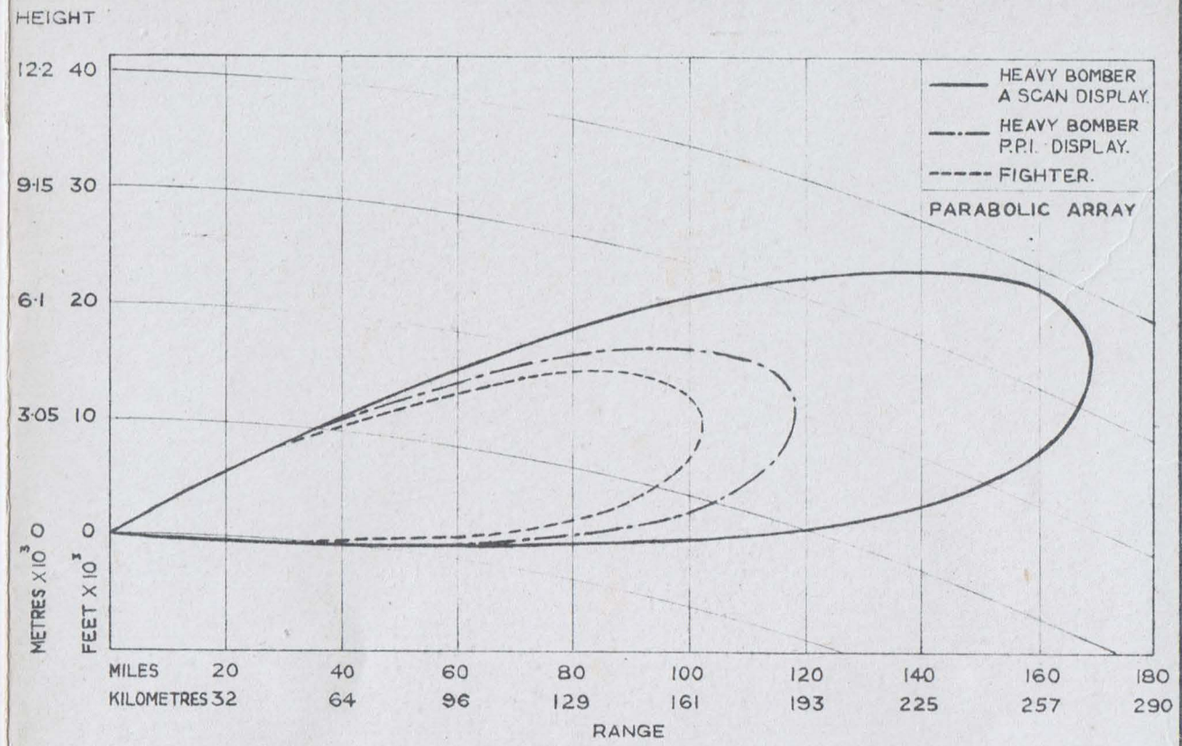
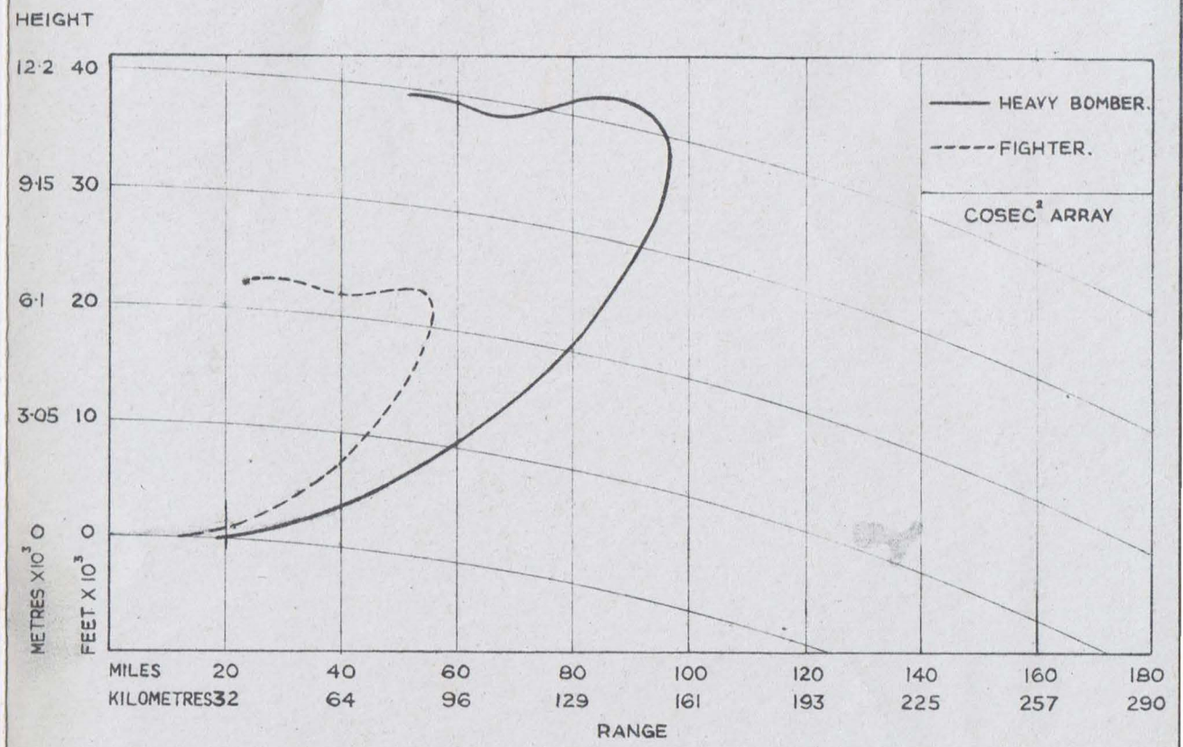
ISSUE Nº	1
SCALE ——	Nº OF SHEETS 1

DRAWN BY J.P.W. 6.5.49
FIRST ISSUED (1.)



A.M.E.S. TYPE 14
VERTICAL COVERAGE DIAGRAM.



A.M.E.S. TYPE 14
HIGH VERTICAL COVERAGE DIAGRAM.

SCHEMATIC DIAGRAM

RADAR UNITS AND DISPLAY CONSOLES

A.M.E.S. TYPES 13, 14 & 21 RADAR EQUIPMENTS

FIRST ISSUED	DRAWN BY	TI
(1.)	J.P.W. 10-5-49	

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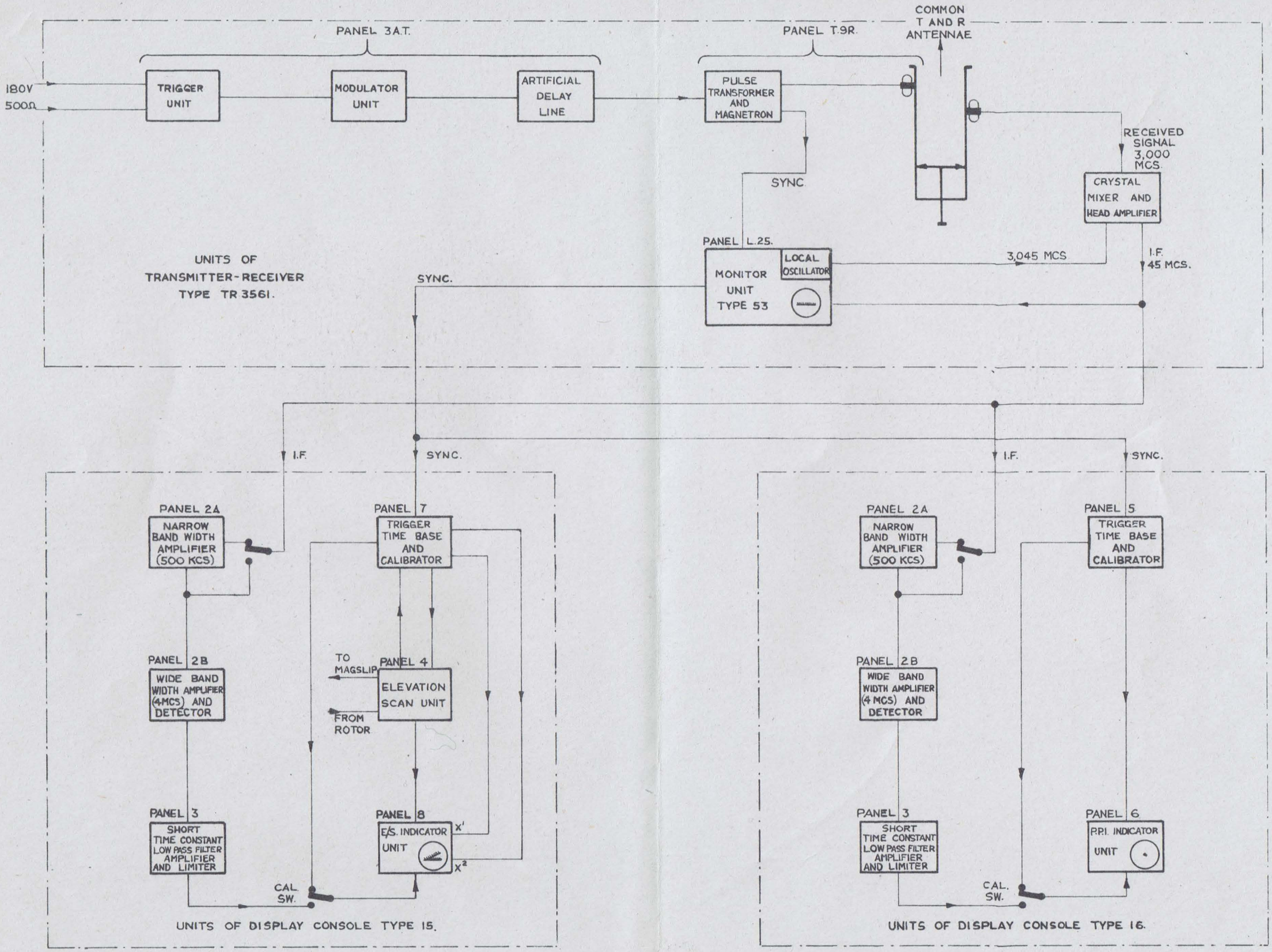
PANEL 3A.T.
PANEL T.9R.
COMMON T AND R ANTENNAE
180V
500Ω
TRIGGER UNIT
MODULATOR UNIT
ARTIFICIAL DELAY LINE
PULSE TRANSFORMER AND MAGNETRON
SYNC.
RECEIVED SIGNAL 3,000 MCS.
CRYSTAL MIXER AND HEAD AMPLIFIER
PANEL L.25.
LOCAL OSCILLATOR
MONITOR UNIT TYPE 53
3,045 MCS
I.F. 45 MCS.
UNITS OF TRANSMITTER-RECEIVER TYPE TR 3561.
SYNC.
I.F.
SYNC.
I.F.
SYNC.
PANEL 2A
NARROW BAND WIDTH AMPLIFIER (500 KCS)
PANEL 7
TRIGGER TIME BASE AND CALIBRATOR
PANEL 2B
WIDE BAND WIDTH AMPLIFIER (4 MCS) AND DETECTOR
TO MAGSLIP
FROM ROTOR
PANEL 4
ELEVATION SCAN UNIT
PANEL 3
SHORT TIME CONSTANT LOW PASS FILTER AMPLIFIER AND LIMITER
PANEL 8
E/S. INDICATOR UNIT
X'
X²
CAL. SW.
UNITS OF DISPLAY CONSOLE TYPE 15.
PANEL 2A
NARROW BAND WIDTH AMPLIFIER (500 KCS)
PANEL 5
TRIGGER TIME BASE AND CALIBRATOR
PANEL 2B
WIDE BAND WIDTH AMPLIFIER (4 MCS) AND DETECTOR
PANEL 3
SHORT TIME CONSTANT LOW PASS FILTER AMPLIFIER AND LIMITER
PANEL 6
P.R.I. INDICATOR UNIT
CAL. SW.
UNITS OF DISPLAY CONSOLE TYPE 16.

SCHEMATIC DIAGRAM

A.M.E.S. TYPE 21 RADAR EQUIPMENT.

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FIRST ISSUED 11.5.49 (1.)
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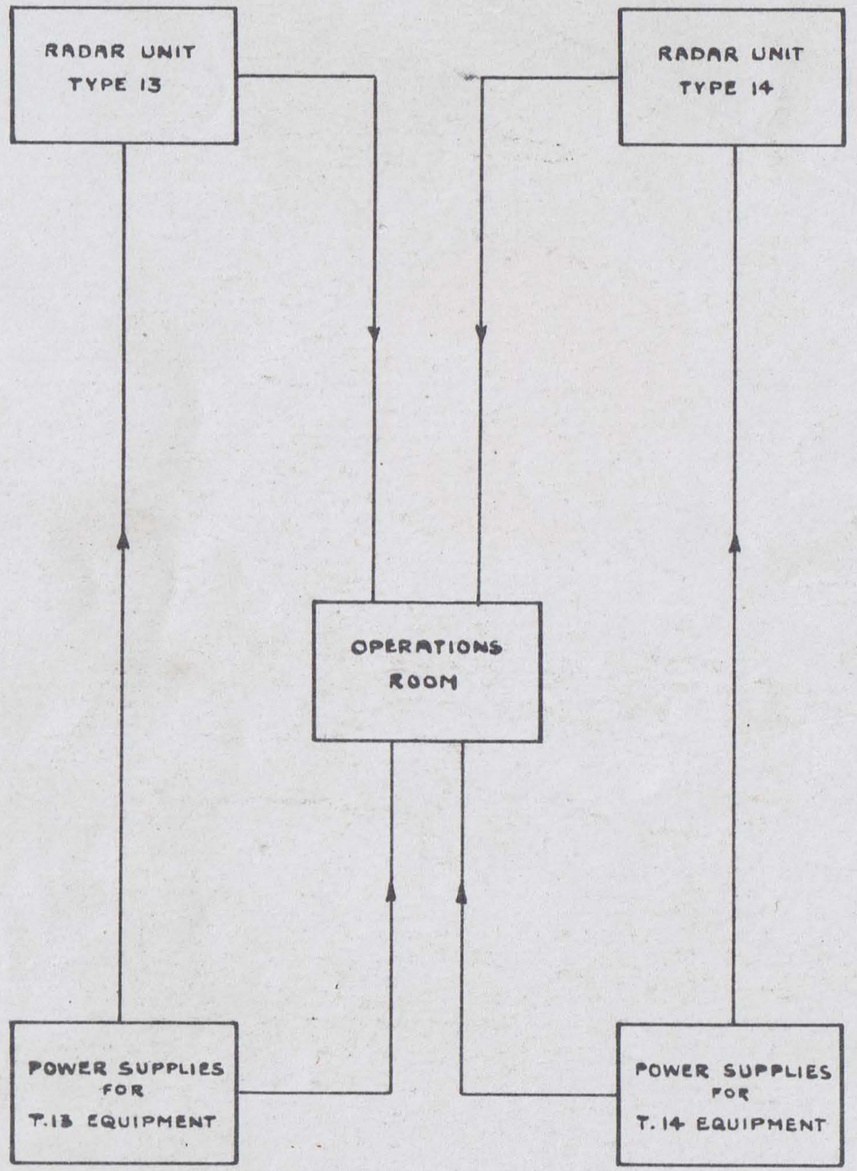


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