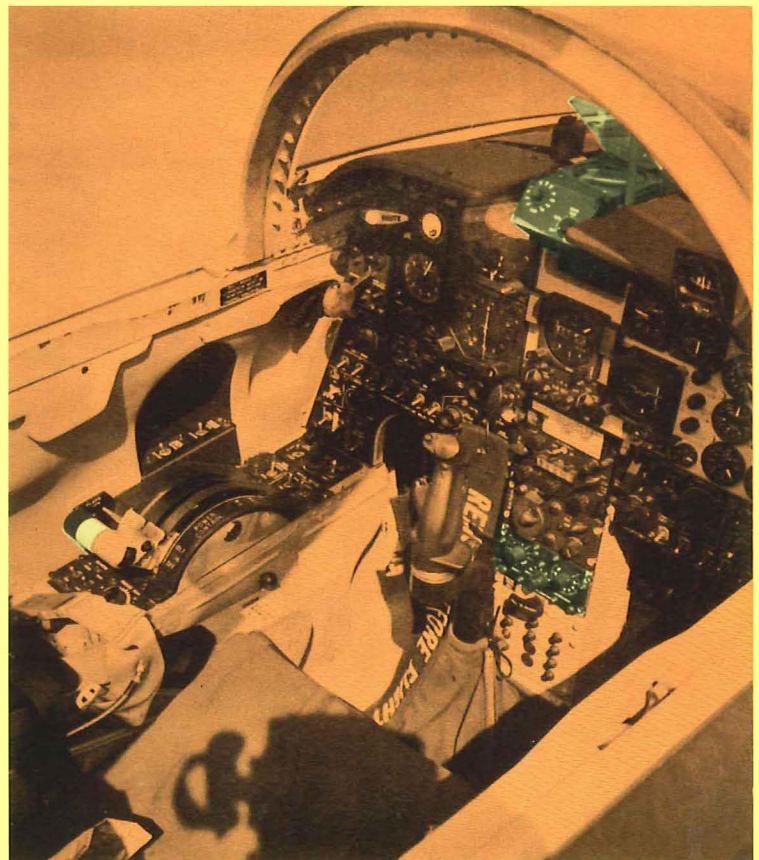
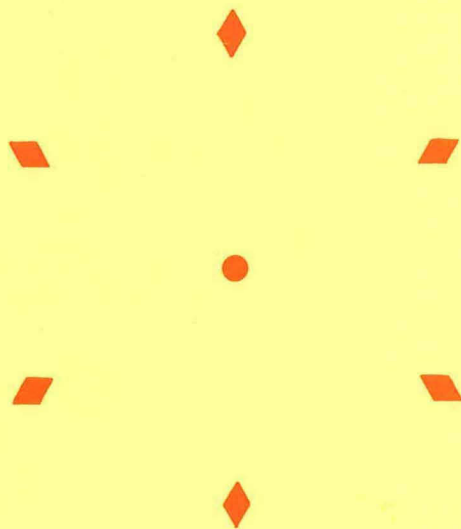


FERRANTI

CENTURY
SERIES

1515

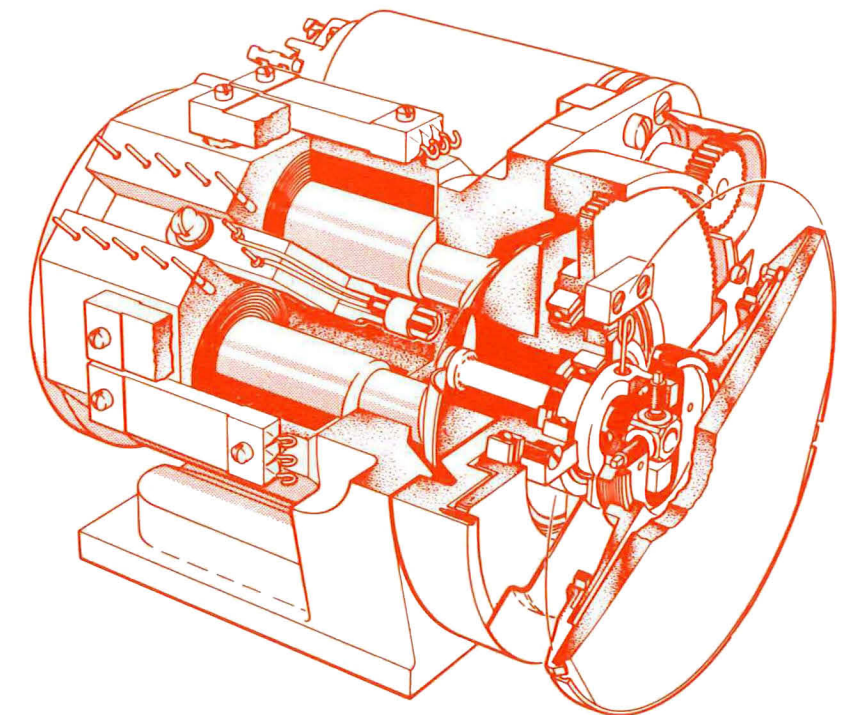
WEAPON AIMING *for* Tactical Aircraft



INTRODUCTION

The lead computing Gyroscopic Gunsight was invented more than 30 years ago to meet the requirements of air-to-air combat. Ferranti Limited, manufacturers of the Gyroscopic Gunsight since 1942 have continually developed this design, embodying the experience of over 30 Air Forces. The latest design, known as the ISIS series of Weapon Aiming Systems, utilise such sensors as roll, pitch, altitude, air speed, radar and laser range signals, which are now available in most modern tactical strike aircraft. The ISIS series is not only highly efficient for air-to-air combat but is also designed to resolve the Weapon Aiming problem of guns, rockets and bombs in the air-to-ground role.

The system incorporates a two-axis, eddy-current controlled gyro in the sight head. This gyro measures the aircraft rate of turn and deflects the sight line simultaneously.



"THE HEART OF ISIS"

CENTURY SERIES

Not all users require the same degree of complexity in their Weapon Aiming system, either because of the tactical requirement of the aircraft or because of the limited range of aircraft sensors. To meet such a wide range of requirements, Ferranti have developed the "Century Series" of ISIS.

The Century Series comprises three groups, identified by the type of reticle pattern displayed to the pilot.

The ISIS F-100 group of systems utilises a reticle, whose angular dimension is fixed but gyro controlled.

The ISIS D-100 group has two reticles, one of fixed angular dimension and manually depressable, the other of fixed dimension but gyro controlled.

The ISIS S-100 group utilises a reticle, which is adjustable, in that the pilot sets-in the target wing span and through a range servo mechanism changes the angular dimension of the reticle pattern to encircle the target, thus determining the target range. This is known as stadiametric ranging.

ISIS 'F'-100 SERIES

ISIS 'F'-126 SYSTEM

This is a single-unit weapon aiming system, wherein all controls and computations are included in the sight head.

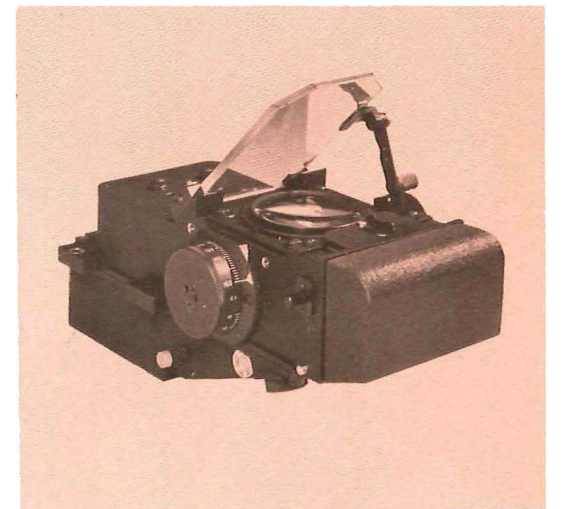
The system is designed such that all changes in computation to meet tactical requirements are carried out in the aircraft using a standard multimeter and the ISIS Angle Measuring Telescope.

Two modes of operation are available—Guns and Bombs.

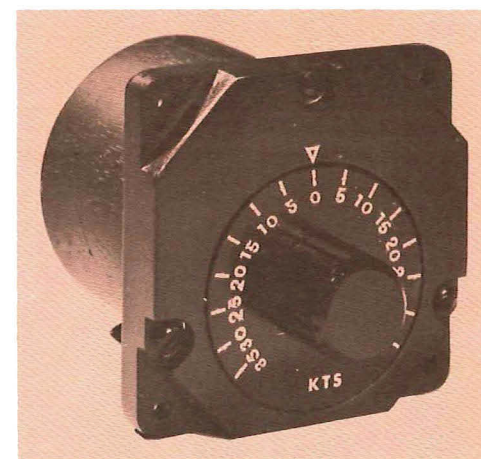
In the GUNS mode, the pilot may select one of two air-to-air firing ranges, between 600 and 3000 feet; by means of a switch in the sight head.

In the BOMBS mode, the system sensitivity, that is, gyro response to aircraft rate of turn, may be varied from 0.2 to 1.5 seconds sensitivity. This, of course, is ground pre-set.

The pilot manually sets-in the required sight-line depression to meet the tactical requirements of speed, dive angle and release range. The depression control provides a sight line depression from 0 to 200 milliradians. This mode may, of course, be used for other air-to-ground weapons, as required. The sight head incorporates a folding combining glass and a pilot selectable standby lamp filament, in case the primary quartz-iodine lamp fails in flight.



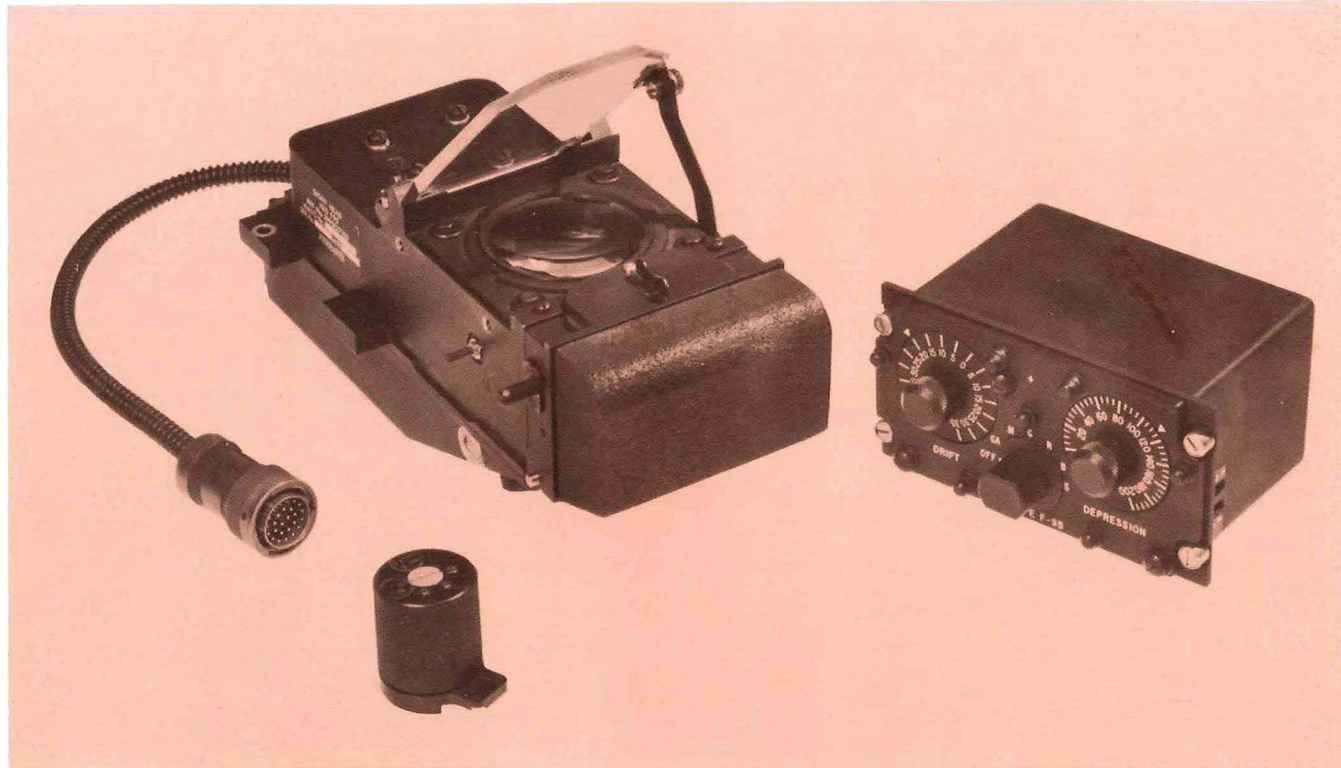
ISIS 'F'-126D SYSTEM



This system is a basic ISIS F-126 system, to which is added the facility to offset the aiming mark for crosswind allowance in air-to-ground operation. The Control Unit Type F-26D is added to the F-26 sight head to perform this function.

This facility does not require any additional aircraft supplies.

This is a three-unit system comprising the Sight Head Type F-95, Control Unit Type F-95 and the Throttle Unit Type 15, wherein the facilities of the ISIS F-126 system have been expanded to provide a greater flexibility of operation :



AIR-TO-AIR

● GUNS

The system includes a three-position switch, the Throttle Unit Type 15, which is designed to mount on the aircraft throttle control so that the pilot may select any one of three firing ranges just prior to the attack. Each firing range computation is capable of being ground re-set to meet changing tactical requirements. The pilot estimates the firing range by comparison of target size to sight reticle size. A "guns override" facility is incorporated whereby the pilot may select guns air-to-air, irrespective of the mode selected on the C.U. Type F-95.

● MISSILES

The system provides a zero sight line for the aiming of guided missiles air-to-air.

AIR-TO-GROUND

The system, through operation of the C.U. Type F-95 mode selector switch, offers the following facilities:

● GUNS

A ground pre-set computation for the sight-line depression determined by the tactical requirements of speed, dive angle and firing range. In addition, the aiming mark may be manually offset by the pilot.

● ROCKETS

Ground pre-set sight-line depression and manually adjustable crosswind allowance.

● BOMBS

Ground pre-set sight-line depression and manually adjustable crosswind allowance.

● DEPRESSED SIGHT LINE

An additional mode, whereby the pilot may set-in a sight-line depression between 0 and 200 milliradians and may offset the aiming mark for crosswind. This facility permits two types of the same weapon to be carried, the depressions for one ground pre-set, the other set-in by the pilot.

ISIS 'F'-195 R

This is a basic ISIS F-195 system, to which is added the function of a roll-stabilised aiming mark in all modes of operation. This introduces the Reference Gyro Interface Unit RGI Type F-5, which modifies the output of roll signals from the aircraft vertical reference gyro. All other facilities are identical to the ISIS F-195.

ISIS 'D'-100 SERIES

The ISIS "D" 100 series incorporates a sight head having two reticles. One reticle is controlled by the lead computing gyro as in the case of the F-100 series. The other reticle is manually depressible and is harmonised to the aircraft vertical axis.

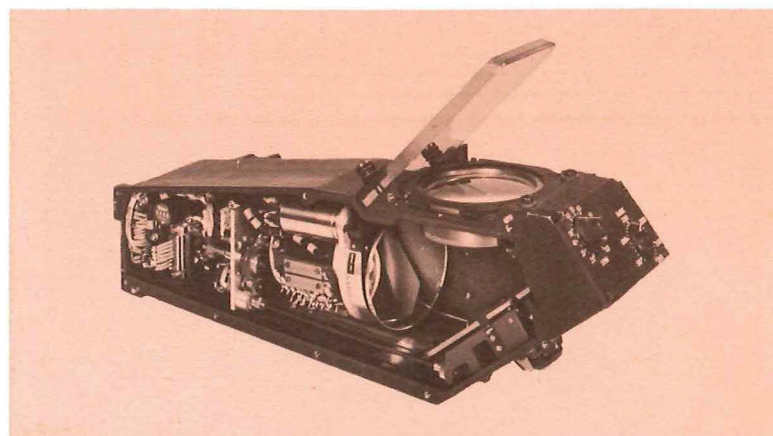
An example of this type of sight head is the ISIS D-01.

The Control Unit Type 17, in addition to the controls of the C.U. Type F-95, embodies the two dimmer units and reticle lamp changeover switches.



ISIS 'S'-100 SERIES

This system, in the air-to-ground modes, functions in identical fashion to the ISIS F-195 series. In the air-to-air mode the Sight Head Type S-02 incorporates a target wing-span scale and a range indicator dial. The reticle pattern subtended angle is varied by operation of a special Throttle Unit Type 18 mounted on the aircraft throttle arm. This facility, known as stadiametric ranging, improves the accuracy of the air-to-air guns mode.



INTERFACE UNITS

● REFERENCE GYRO INTERFACE UNIT

This item utilises an aircraft roll sensor which will enable the aiming mark to be roll stabilised in all modes. An example of this type of interface unit, the RGI Type F-5, is incorporated in the ISIS F-195R system.

● RADAR RANGING INTERFACE UNIT

This unit utilises the radar range sensors in an aircraft to update the computation of the ISIS system.

● LASER RANGE INTERFACE UNIT

If a Laser Rangefinder is fitted to the aircraft it may be utilised to improve the air-to-surface performance of the ISIS.

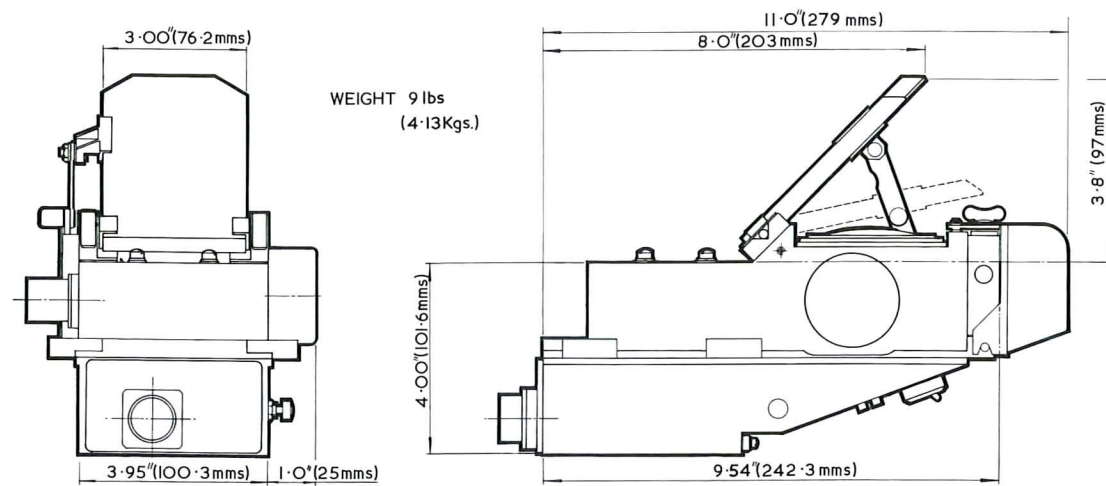
● ALTITUDE AND AIRSPEED UNIT

If required, this unit may be added to the ISIS 100 series to improve the accuracy of altitude computation in the guns, air-to-air mode of operation and to permit a variation in airspeed during the dive in the air-to-surface modes of operation.

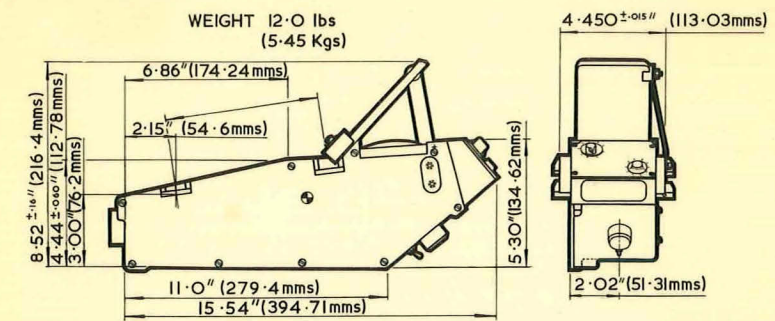
● AIRCRAFT SUPPLIES

- 28V dc 3 amps
- 200V ac 3 phase 400Hz. 30VA per phase.

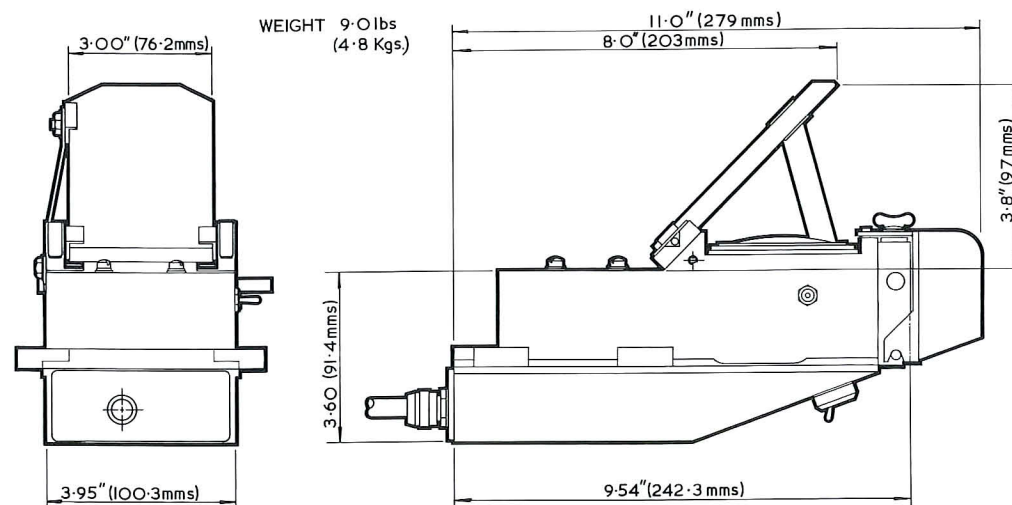
SIGHT HEAD - TYPE 'F'·26



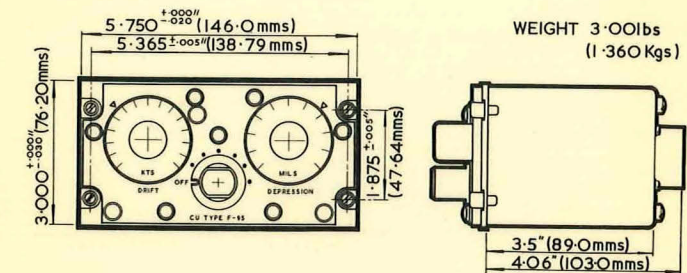
SIGHT HEAD - TYPE 'S'·02



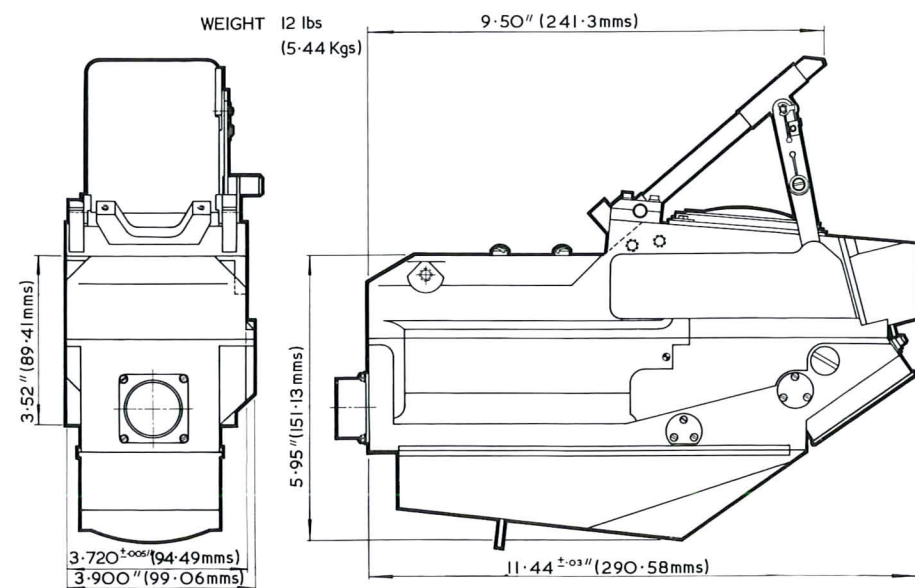
SIGHT HEAD - TYPE 'F'·95



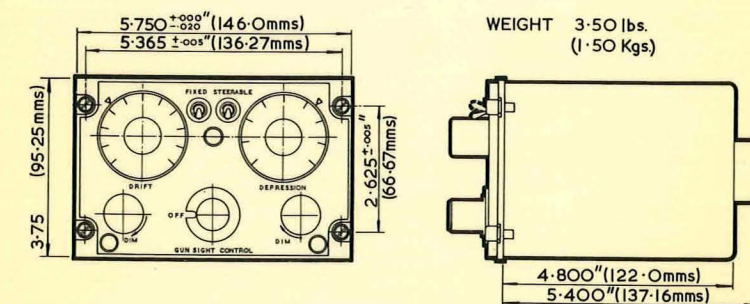
CONTROL UNIT - TYPE 'F'·95



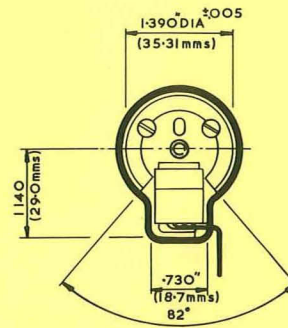
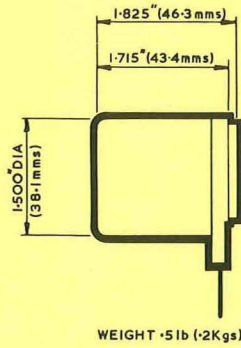
SIGHT HEAD - TYPE 'D'·01



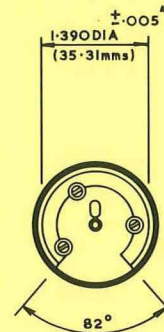
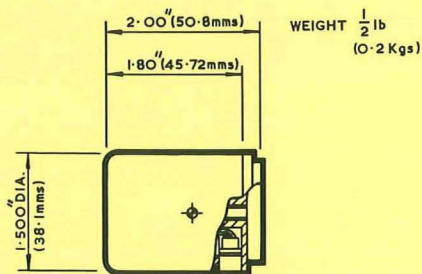
CONTROL UNIT - TYPE 17



THROTTLE UNIT - TYPE 15

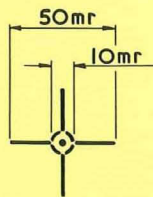


THROTTLE UNIT - TYPE 18

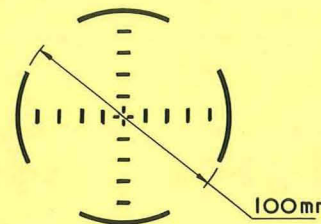


SIGHT AIMING MARKS

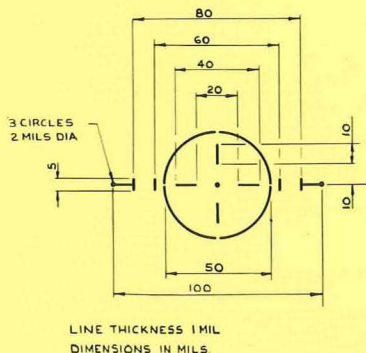
'F'-26
'F'-95



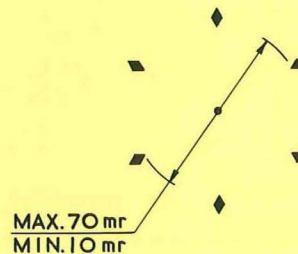
'D'-01 only



'F'-26
'F'-95



'S'-02 only



FERRANTI

LIST No. ES-ESD-ISIS-CEN2

Electronic Systems Department (Sales),
Ferranti Ltd., Ferry Road, Edinburgh, EH5 2XS, Scotland.
Tel: 031-332 2411 Telex: 72141

London Office:
Ferranti Ltd., Millbank Tower, Millbank, London, S.W.1.
Tel: 01-834 6611 Telex: 264055