

APPENDIX No. 1

(Revised August, 1940)

CLASSIFICATION OF DIRECTOR INSTRUMENTS

ITEM.	WHERE FITTED.	CLASSIFICATION.	REMARKS.
Gyro Director Sights.	Fitted in "Nelson" (16-in. armoured hood and 6-in. D.C.T.s).	Type "G," Mark I.	Tilt corrector is incorporated in the gyro sight. Not fitted with backlaying gear. Elevation: 16-in., 40°; 6-in., 60°. Depression, 20°.
	"Nelson" (aloft and aft), "Kent" and "London" classes.	Type "G," Mark I*.	As above, but fitted with backlaying gear. Elevation: 16-in., 40°; 8-in., 70°. Depression, 20°.
	"London"	Type "GM," Mark I*.	As "G," Mark I*, but fitted with E.M. control of gyro and 2-speed elevating gear (values 20' and 1½°) for use in H.A. fire (augmenting scheme).
	"Dorsetshire" and "York" classes. Director towers.	Type "G," Mark II.	Tilt corrector incorporated in R.E. and D. unit. Fitted with 2-speed elevating handwheel. Not fitted with backlaying gear. Elevation, 60°. Depression, 10°.
	"Dorsetshire" and "York" classes D.C.T.s. Destroyer type (Vickers). Fitted to "C" and "D" class destroyers.	Type "G," Mark II*. Type "H," Mark I.	As above, but fitted with backlaying gear. 30° elevation, 20° depression. No backlaying gear. Binocular vision for unstabilised telescopes. Tilt corrector in sight. Director setting transmitted to F.C. clock electrically. Elliott gyro, Type "H.I."
	Destroyer type (Vickers). Fitted in "E" class destroyers.	Type "H," Mark II.	40° elevation, 20° depression. No backlaying gear. H.A. gear to be fitted.
	Fitted to "F," "G," "H" and "I" classes destroyers and "Tribal" classes.	Type "H," Mark II*.	Similar to "H," Mark II, but fitted with Vickers gyro, Mark I ("F" and "G") and Mark II ("H" and later), and re-designed sensitive system. H.A. gear to be fitted ("F"-"I" only).
	"J" class destroyers (except "Jervis").	Type "H," Mark II**.	Similar to "H," Mark II*, except for 2-speed elevating gear of 15' and 2° handwheel values and additional D.S. transmitter for H.A. control.
	"Enchantress" and 3 Gunnery Schools. Also "Tyne" and "Hecla" (pedestals only).	Type "H," Mark III.	Type "H," Mark II*, mounted on a training pedestal with electrical transmission of L.O.S. Vickers gyro, Mark I, in "Enchantress," remainder Mark II.
	"Warspite"	Type "H," Mark IV.	Similar to Type "H," Mark II* 45° elevation and 20° depression. Step value 1' director setting. Backlaying gear fitted. Vickers gyro, Mark II.
	"Jervis," "K," and "N" class destroyers.	Type "HM," Mark II**.	As "H," Mark II**, but with electro-magnetic control of gyro.
	"Renown," "Valiant," and "Queen Elizabeth."	Type "HM," Mark IV.	As Type "H," Mark IV, but with electro-magnetic control of gyro.

ITEM.	WHERE FITTED.	CLASSIFICATION.	REMARKS.
Gyro Director Sights—contd.	<p>“Leander,” “Neptune,” “Orion,” “Achilles,” “Ajax,” “Perth,” “Arethusa” and “Galatea.”</p> <p>Fitted in “Hobart,” “Sydney,” “Newcastle” and “Penelope.”</p> <p>“Birmingham,” “Glasgow,” “Sheffield,” “Aurora,” “Liverpool,” “Manchester,” “Gloucester,” “Belfast” and “Edinburgh.”</p>	<p>Type “J,” Mark I.</p> <p>Type “J,” Mark I*.</p> <p>Type “J,” Mark II.</p>	<p>60° elevation, 20° depression. Transmits D.S. to R.E. and D. unit mechanically from side of sight. Fitted with backlaying gear and 2-speed elevating gear, giving ratios of 15' and 60'. Elliott gyro, Type “H.I.”</p> <p>45° elevation, 30° depression. Fitted with backlaying gear. Vickers gyro, Mark I, in “Hobart” and “Sydney”; Mark II in “Newcastle” and “Penelope.” Redesigned sensitive system.</p> <p>60° elevation, 30° depression. Similar to Type “J,” Mark I*, except that special drive is provided to D.S. unit from rear of sight. Original side drive of Mark I sights retained and blanked off.</p>
Type “P” Sights.	<p>“Southampton”</p> <p>“Dido” and “Fiji” class cruisers and “King George V” class.</p> <p>“L” and “M” class destroyers</p>	<p>Type “P,” Mark I.</p> <p>Type “P,” Mark II.</p> <p>Type “P,” Mark III.</p>	<p>Power stabilised sight. 65° elevation, 20° depression. Experimental A.R.L. instrument. Outgoing transmissions to R. to E. unit. Stabilisation from Mark I oil unit.</p> <p>Similar to “P,” Mark I, but with drive to D.S. unit. Magslip transmission to R/F stabilising unit. Direct firing switch. Magslip transmission (6' only) to augmenting table. Mark II* gyro oil unit. D.S. stops act at 65° elevation and 20° depression. Roll correction drive cuts out at 20° depression and 65° elevation.</p> <p>Generally similar to Mark II, but with angle of sight transmitters for use in H.A. fire (12' steps). Mechanical transmission to R/F stabilising unit. Backlaying gear not fitted.</p>
Local Director Sights (L.D.S.).	<p>Fitted in “Nelson” and “Rodney.”</p> <p>Fitted in “Kent” class ..</p> <p>Fitted in “London” class ..</p> <p>Fitted in “Nelson” and “Rodney.”</p> <p>Fitted in “York,” “Dorset- shire,” “Norfolk” and “Exeter.”</p> <p>Fitted in “Leander,” “Nep- tune,” “Orion,” “Achilles,” “Ajax,” “Perth” and “Arethusa.”</p>	<p>Mark I (16-in.).</p> <p>Mark I (8-in.).</p> <p>Mark I* (8-in.).</p> <p>Mark II (6-in.).</p> <p>Mark II* (8-in.).</p> <p>Mark III (6-in.).</p>	<p>Periscopic sight. Transmits director setting to separate R.E. and D. unit mechanically. Separate tilt corrector.</p> <p>Periscopic sight. Transmits director setting to separate R.E. and D. unit mechanically. Separate tilt corrector.</p> <p>Similar to above, but D.S. hand-wheel has been speeded up.</p> <p>Telescopic sight. R. and E. gear and tilt corrector incorporated.</p> <p>Telescopic sight. R. and E. gear and tilt corrector incorporated. Special cams incorporating dip correction supplied for “Y” turret of “York” and “Exeter.”</p> <p>Elevation 60°, depression 10°. Telescopic sight. R. and E. gear and tilt corrector incorporated. Similar to Mark II, except for minor improvements. Special cams incorporating dip correction supplied for “Y” turret of ships mounting three turrets.</p>

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Local Director Sights (L.D.S.)— <i>contd.</i>	Fitted in "Hobart," "Sydney," "Galatea" and "Penelope."	Mark IV (6-in.).	Telescopic sight, fitted with improved design of monocular prismatic telescopes. Similar in principle to Mark III, except that the mechanism is contained in a fixed casing and the telescopes only are disturbed for deflection only. Special cams, incorporating dip correction, are supplied for "Y" turret sights.
	Fitted in "Newcastle" and "Southampton."	Mark IV* (6-in.).	Generally similar to Mark IV except that D.S. handwheel stops operate at 45° elevation and 10° depression.
	Fitted in "Sheffield," "Glasgow," "Birmingham" and "Aurora."	Mark V (6-in.).	Similar to Mark IV*, except that gun elevation is transmitted by magflip and additional "M" type range transmitter, 25-yard steps, fitted for relaying range for M.V. and dip in turret elevation receivers. In "Aurora" the D.S. stops operate at 60° and -10°.
	Fitted in "Liverpool," "Manchester," "Gloucester," "Belfast" and "Edinburgh."	Mark V* (6-in.).	Similar to Mark V, but D.S. handwheel stops operate at 20° elevation and 20° depression, and trainer's telescope can be freed in elevation.
	"Fiji" class cruisers	Mark VI	Similar to Mark V*, except that provision is made for director setting and L.S.T. drives into the pedestal and that range step value is in 50-yard steps. Pedestal in "X" turret contains transmitters for D.S. ± tilt and L.S.T. Change wheels carried for 25-yard step value in spare units (loose).
Range Elevation and Deflection Units (R.E. and D. Units).	Fitted in "Nelson" and "Rodney."	Mark I (16-in.).	Not fitted with tilt corrector. Fitted in forward towers.
	Do. do.	Mark I* (16-in.).	Incorporates convergence mechanism: fitted in after tower.
	Do. do.	Mark I (6-in.).	Fitted in forward towers. Not fitted with tilt corrector. H.A. transmitters will be fitted later.
	Do. do.	Mark I* (6-in.).	Fitted in after towers. Incorporates convergence mechanism.
	Fitted in "Kent" and "London" classes.	Mark I (8-in.).	Not fitted with tilt corrector. Fitted in forward towers. H.A. transmission to be fitted.
	Do. do.	Mark I* (8-in.).	Incorporates convergence mechanism. Fitted in after towers.
	Fitted in 8-in. and 16-in. turrets	Turret type (16-in. or 8-in.).	Similar to 16-in., Mark I, and 8-in., Mark I, except no L.S.T. or G.T. repeat receivers fitted.
	Fitted in "Dorsetshire," "Norfolk," "York" and "Exeter."	Mark II (8-in.).	Tilt corrector is incorporated. Fitted in forward towers. H.A. transmission allowed for.
	Do. do.	Mark II* (8-in.).	Incorporates convergence. Fitted in after towers.
	Fitted in "Leander," "Neptune," "Orion," and "Achilles."	Mark II (6-in.).	Similar to Mark II (8-in.) except for ballistics. H.A. transmission allowed for.

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Range to Elevation Units (R. to E. Units).	Fitted in "Perth," "Arethusa," "Ajax," "Hobart," "Sydney," "Galatea," "Southampton," "Newcastle" and "Penelope."	Mark III (6-in.).	Similar to R.E. and D. unit, Mark II (6-in.), except that deflection corrections are not applied and the appropriate parts of the mechanism are therefore omitted. A.B.C. transmission for line of sight training. H.A. transmission allowed for.
Line of Sight Training Units (L.S.T. Units).	<p>Fitted in forward 6-in. D.C.T.s of "Birmingham," "Sheffield," "Glasgow," "Aurora," "Liverpool," "Manchester," "Gloucester," "Belfast" and "Edinburgh."</p> <p>Fitted in after 6-in. director control towers of "Liverpool," "Manchester," "Gloucester," "Belfast" and "Edinburgh."</p> <p>Fitted in forward 15-in. D.C.T. and 15-in. armoured director towers of "Warspite," "Renown," "Queen Elizabeth" and "Valiant."</p> <p>Fitted in "King George V" (aft tower).</p> <p>Fitted in "King George V" (forward tower).</p> <p>"Fiji" and "Dido" class cruisers.</p> <p>"C" to "K" class and "Tribal" destroyers, "N" class destroyers.</p> <p>"L" and "M" class destroyers</p>	<p>Mark I (6-in.).</p> <p>Mark I* (6-in.).</p> <p>Mark II</p> <p>Mark III</p> <p>Mark III*</p> <p>Mark IV</p> <p>2-speed</p> <p>3-speed</p> <p>Mark I</p> <p>Mark II</p> <p>Mark III</p> <p>Mark IV</p>	<p>Convergence gear fitted. Magslip transmission. "M" type f.t.p. receiver of range for convergence in unit. 25-yard step value.</p> <p>Similar to and interchangeable with Mark I (6-in.), but convergence gear not fitted. Bearing transmission to plotting office provided. "M" type (20' steps).</p> <p>A.B.C. system of transmission. (Convergence unit is separate.)</p> <p>With convergence, magslip with sector control. "M" type motor for range reception. "M" type transmission to plotting office (20' steps).</p> <p>As Mark III, but without convergence.</p> <p>As Mark I, but with range for convergence, in 50-yard steps.</p> <p>In D.C.T.s contact hunter transmission.</p> <p>In D.C.T.s arranged for power training if necessary. Contact hunter transmission.</p> <p>Magslip transmission. Tilt incorporated.</p> <p>Similar to Mark I, but with sector control transmission.</p> <p>No tilt correction. "M" type transmission.</p> <p>"M" type transmission, receives director setting and sight elevation mechanically from Type "P," Mark III sight. Transmits D.S. in 3' steps and sight elevation (for H.A.) in 6' steps. Tilt incorporated in both transmissions.</p>
Director Setting Units (D.S. Units).	<p>Fitted in D.C.T.s of "Birmingham," "Sheffield," "Glasgow," "Aurora," "Liverpool," "Manchester," "Gloucester," "Belfast," and "Edinburgh"; and in "Fiji" and "Dido" class cruisers.</p> <p>Fitted in "King George V" class.</p> <p>15-in. armoured director towers of "Valiant," "Renown," "Warspite" and "Queen beth."</p> <p>"L" and "M" class destroyers.</p>	<p>Mark I</p> <p>Mark II</p> <p>Mark III</p> <p>Mark IV</p>	<p>Magslip transmission. Tilt incorporated.</p> <p>Similar to Mark I, but with sector control transmission.</p> <p>No tilt correction. "M" type transmission.</p> <p>"M" type transmission, receives director setting and sight elevation mechanically from Type "P," Mark III sight. Transmits D.S. in 3' steps and sight elevation (for H.A.) in 6' steps. Tilt incorporated in both transmissions.</p>
Pom-pom Directors for 2-pdr., Mark "M" Pom-pom Mountings.	Nos. 1 to 6 "Rodney" (1), "Hood" (1), "Nelson" (1), Devonport G.S. (1), Fort Cumberland (1), Vickers-Armstrongs, Crayford, on loan (1).	Mark I*	

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Pom-pom Directors for 2-pdr., Mark "M" Pom-pom Mountings <i>—contd.</i>	Nos. 7, 9 to 12, "Furious" (2), "Royal Sovereign" (2), "Barham" (1). Portsmouth (1), "Barham" (1), "Ramillies" (2), "Hood" (1), "Repulse" (2), "Nelson" (1), and Vickers-Armstrongs, Crayford (1), Chatham (1). "Coventry" (1), "Warspite" (4), "Furious" (1), "Malaya" (2), "Dorsetshire" (2), "Norfolk" (2), "Berwick" (2), "Hood" (1), "Ark Royal" and Devonport Gunnery School (1), "Excellent" (2), Vickers-Armstrongs, Ltd., Crayford (3). "Ark Royal" (4), "Edinburgh" (2). "Resolution" (2), "Royal Sovereign" (2), "Revenge" (2), "Australia" (2), "Ramillies" (2), "Malaya" (2), "Hermes" (2). "London" (2), "Adventure" (1), "Nelson" (5), "Newcastle" (2), "Southampton" (2), "Abdiel" (1), "Latona" (1), "Manxman" (1), "Welshman" (1). "Renown" (3), "Valiant" (4), "Illustrious" (6), "Victorious" (6), "Naiad" (2), "Phoebe" (2), "Kenya" (2), "Formidable" (6). To be fitted in future "King George V" (4), "Curacoa" (1), "Excellent" (1).	Mark I* Mark I** Mark II Mark II* Mark IIA Mark III Mark III* Mark IV Mark IV*	Fitted with C.O.F.A.S., "M" type transmission. As Mark II, but with magslip transmission. As Mark II, but fitted with improved C.O.F.A.S. As Mark II, but with improved ballistics (suitable for high M.V. shell). As Mark III, but with magslip transmission. Magslip transmission fitted with gyro rate unit and carrying additional rate follower. As Mark IV. Converted from Marks II, II*, IIA, III or III*.
H.A.C.S. I Director.	H.A. armament of various ships	H.A.C.S., Mark I.	"M" type transmission.
H.A.C.S. IC Director.	"Resource"	H.A.C.S., Mark IC.	As Mark I. Incorporating convergence unit for L.A. fire.
H.A.C.S. II Director.	"Leander" and "Neptune" class, "Repulse" (1).	H.A.C.S., Mark II.	As Mark I, fitted with A.V. cradle for 12-ft. H/F.
H.A.C.S. III Director.	"Ajax," "Perth," "Arethusa," "Coventry," "Hobart," "Sydney" and "Galatea."	H.A.C.S., Mark III.	A.B.C. transmission. Fitted with A.V. cradle for 15-ft. H/F.
H.A.C.S. III C Director.	"Woolwich"	H.A.C.S., Mark III C.	As Mark III. Incorporating convergence for L.A. fire.
H.A.C.S. III* Director.	"Penelope," "Southampton," "Newcastle," "Malaya," "Hood,"* "Australia,"* "Nelson,"* "Royal Sovereign,"* "Barham,"* "Resolution,"* "Cairo,"* "Excellent,"* "Revenge,"* "Calcutta,"* "Carlisle,"* "Curacoa"* and "C" class cruisers on rearmament, "Exeter,"* A.A. Escort Vessels,* "Adventure"* and Australian C.S.	H.A.C.S., Mark III*.	Similar to Mark III, but with larger windscreen and space for Rate Officer, if required. * Fitted with roll stabilisation for layer.
H.A.C.S. III** Director.	"Warspite"	H.A.C.S., Mark III**.	As Mark III*, but with specially stiffened windscreen.
H.A.C.S. III*G Director.		H.A.C.S., Mark III*G.	As Mark III*, but fitted with gyro rate unit and roll stabilisation for layer.

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H.A.C.S. IV Director.	" Birmingham," " Sheffield," " Glasgow," " Aurora," " Liverpool," " Manchester," " Gloucester," " Dido " and " Fiji " classes, " Forth," " Maidstone," " Renown," " Valiant," " Illustrious," " Formidable," " Victorious " and " Ark Royal."	H.A.C.S., Mark IV.	Similar to Mark III*, but with mag slip transmission. Circular screen and roll stabilisation for layer.
H.A.C.S. IV G Director.	" Dido " and " Fiji " classes	H.A.C.S., Mark IV G.	As Mark IV, but with gyro rate unit.
H.A.C.S. IV G.B. Director.	" King George V," " Prince of Wales," " Dido " and " Fiji " classes.	H.A.C.S., Mark IV G.B.	As Mark IV, but fitted with gyro rate unit and complete stabili- sation in laying and training. Keelavite system of power training.
H.A.C.S. V Director.	" Duke of York," " Anson " and " Howe."	H.A.C.S., Mark V.	Improved design, partially en- closed, complete stabilisation for elevation and training. Fitted with Keelavite system of power training and gyro rate unit. Duplex H/F.
H.A.C.S. V* Director.	" Indomitable "	H.A.C.S., Mark V*.	As Mark V, but with single H/F and heightfinder raised.
H.A.C.S. V* Director.	" Indomitable "	H.A.C.S., Mark V*.	As Mark V, but with single H/F and heightfinder raised.
H.A.C.S. V** Director.	" Implacable " and " Inde- fatigable."	H.A.C.S., Mark V**.	As Mark V, but with H/F raised.
H.A./L.A. III Director.	" Penelope "	H.A./L.A., Mark III.	Similar to Mark III, but with special combined H.A./L.A. training unit and change-over switch and additional instru- ments for duplex control.
H.A./L.A. IV Director.	Aft towers of " Birmingham," " Sheffield," " Glasgow," " Aurora," " Liverpool," " Manchester," " Gloucester," " Illustrious," " Ark Royal," " Maidstone," " Forth," aft towers of " Fiji " and " Dido " classes.	H.A./L.A., Mark IV.	Similar to H.A.C.S., Mark IV, but wired suitably for control of L.A. armament.
Bombardment Levels.	Watts type. Fitted at director sights of various ships.	Mark I	
	A.R.L. experimental design ..	Mark II	Not actually supplied to the Fleet.
	A.R.L. design. With standard adaptor for fixing to sights. Fitted to " G," " H," and " J " gyro sights and certain H.A.C.S. directors, Marks I-IV.	Mark III	Fitted with compensated bubble tube and internal illumination. Mandrel provided with viewing mirror when fitted in " G " sights and H.A. directors.
	R/F directors, Marks III, IV, V, H.A.C.S. IV, V, V* and V**.	Mark IV	Similar to Mark III, but smaller. Handed (right and left).
	Rangefinder directors, Marks IV* and V*.	Mark IV*	Similar to Mark IV, but with longer pins for securing to director.
Combined R/F Directors.	" Fleetwood "	Mark I	Designed for working in associa- tion with fuse-keeping clock system and/or F.C. box.
	" Tribal " and repeat " Tribal " class destroyers.	Mark II	With electrical transmission and A.V. mounting for R/F.
	" Egret," " Auckland," " Peli- can," " Stork," " Flamingo," " Black Swan," " Enchant- ress," " Erne," " Ibis."	Mark II W	As Mark II, but with revolving windscreen attached to director.
		Mark III	As Mark II, with accommodation for Rate Officer.

ITEM.	WHERE FITTED.	CLASSIFICATION.	REMARKS.
Telescopes— contd. Monocular	L.D.S., "Belfast" and "Edinburgh."	G.354	As G.353, but manufactured by Messrs. Ottway.
Monocular Prismatic.	8-in. cruisers, armoured and secondary armament director sights of 15-in. capital ships. "A" and "B" class destroyers. Monitors. Main armament directors of 15-in. capital ships. Also armoured directors of "Barham" and "Malaya."	G.355	Trainer's.
Binoculars	Rangefinder director, Mark I, "Fleetwood."	G.355*	Layer's (as G.355, but with forecasting graticules).
Monocular	Pom-pom directors, Marks II, II*, IIA, III, III* and IV*.	G.355*P	Do., but 6° super-elevation prisms fitted.
Monocular Prismatic.	Pom-pom directors, Marks II, II*, IIA, III and III*.	G.356	Similar to G.352, but with addition of dense neutral screen.
Monocular	Pom-pom directors, Marks II, II*, IIA, III and III*.	G.357	Layer's and trainer's.
Monocular	Pom-pom directors, Marks IV and IV*.	G.358	C.O.F.A.S. Manufactured by Messrs. Ottway.
Monocular	R/F directors, Marks II and III	G.359	C.O.F.A.S. Manufactured by Messrs. Ross.
Binocular	Type "P," Mark II, sights fitted to "Fiji" and "Dido" class cruisers and "King George V" class.	—	Fire distribution number.
Binocular	Type "P," Mark III, sights fitted to "L" and "M" classes destroyers.	G.360	Unit magnification telescope, with F.A.S. graticule.
Binoculars	H.A.C.S. V, V* and V**	G.363	Layer's telescope, fitted with searchlight deflecting prism of 10' value and incorporating forecasting graticules and barrage sight.
Monocular	R/F directors, Marks II and III, IIW, IIIW, IV and IV*, V and V*.	G.364	Do., for trainer. No forecasting graticule. Not interchangeable with G.363.
Monocular	Do. do.	G.365	Layer's, fitted with searchlight deflecting prisms of 5' value and incorporating forecasting graticules and barrage sight.
Monocular	T.S.I.	G.366	Do., for trainer's, but no forecasting graticule fitted. Not interchangeable with layer's.
Monocular Prismatic.	T.S.I. layer and trainer . .	G.367	Similar to G.352* P, but power increased to x 10.
Binocular	Pom-pom, Mark IV	G.368	Layer's } Similar to G.360, but Trainer's } with modified F.A.S. graticules.
Binocular	T.S.I.	G.369	Layer's and trainer's similar to G.360, G.368 and G.369, with modified F.A.S. graticules.
Binocular	T.S.I. layer and trainer . .	G.368*	H.A.D.F.A.S.
Binocular	Pom-pom, Mark IV	G.370	Axis telescope.
Binocular	Pom-pom, Mark IV	G.371	Similar to G.359. For layer and trainer.
Datum Angle Units.	"A" and "B" classes destroyers, "Assiniboine" and "Codrington."	Unit for modified "W" type director.	Datum angle unit combined with sighting mechanism with wipe-out drive from tower training gear. One set port and star-board.
Datum Angle Units.	"Queen Elizabeth," "Renown," "Valiant," "Warspite," "Leander" type cruisers, "Liverpool," "Manchester," "Gloucester," "Belfast," "Edinburgh," "Kent," "Cornwall," "Australia" and "Canberra."	Mark I	Single type with vertical drive from P.I.L. Later types fitted with silica-gel air dryers.
Datum Angle Units.	"London" class (re-armed) . .	Mark I*	Similar to Mark I, but with bevel input drive to suit position of unit in tower. Larger type of silica-gel air dryer.

ITEM.	WHERE FITTED.	CLASSIFICATION.	REMARKS.
Datum Angle Units—contd.	"Glasgow," "Birmingham," "Sheffield," "Aurora."	Mark II	Similar to Mark I, but provision is made for bolting relative bearing indicator on the bottom of the unit, and with an external mechanical shaft carrying datum angle transmission to the relative bearing indicator. Air dryer carried in R.B.I. Vertical drive from P.I.L. rack.
	"Dido" class	Mark II*	As Mark II, but with bevel drive from P.I.L. rack.
	"Fiji" class	Mark III	Special type receiving datum angle from "X" turret for transmission to T.S. bevel drive at top.
	"King George V" class battle-ships.	Mark IV	New design of unit to suit mag-slip transmission. With sector control transmission. With bevel drive from P.I.L. rack.
	All destroyers from "C" class onwards.	Mark V	As Mark I, except that direction of rotation of drive is to opposite hand, and is therefore not interchangeable.
Cross Levelling Gear.	"King George V" class ..	"BM," Mark I.	For 14-in. ballistics. Mag-slip transmission, with sector control.
	"Lion" and "Temeraire" ..	"BM," Mark II.	As above, but for 16-in. ballistics. Mag-slip transmission, with sector control.
	"Perth"	"C," Mark I	Vertical periscope for 6-in. ballistics, with A.B.C. system of transmission. Range in 25-yard steps.
	"Arethusa," "Newcastle," "Southampton" and "Penelope."	"C," Mark II	Improved Mark I. Horizontal periscope on left-hand side.
	"Birmingham," "Sheffield," "Glasgow," "Aurora," "Liverpool," "Manchester," "Gloucester," "Belfast," "Edinburgh."	"CM," Mark I	Similar to "C," Mark II, but mag-slip transmission. Range in 25-yard steps and periscope on right-hand side.
	"Fiji" class cruisers	"CM," Mark II.	Similar to "CM," Mark I, but range in 50-yard steps.
	"Dido" class cruisers	"CM," Mark III.	Similar to "CM," Mark II, but for 5·25-in. ballistics.
	"E" - "K" classes destroyers, including "Tribals."	"D," Mark II.	Improved "D," Mark I.
	"L" class destroyers and "M"	"D," Mark III.	To suit 4·7-in., Mark XI gun (62-lb. shell) ballistics. "M" type hunter transmission. Range in 50-yard steps. Horizontal periscope.
Time Interval Compensation Gear (T.I.C.).	"Nelson" (2), "Rodney" (1), "York" (1), "Southampton," "Duncan."	—	Early experimental type. Transmitting rate of roll only.
	5·25-in., 6-in., and 8-in., D.C.T.s "Tribal" and later destroyers.	Mark I	New design incorporates time interval setting gear. Fitted with 220-volt chaser motor. Maximum time interval setting, ·12 sec.
	"C" - "I" class destroyers inclusive.	Mark I*	As Mark I, but with 110-volt chaser motor. Maximum time interval setting, ·12 sec.
	"Nelson" and "Rodney" (16-in.), "Renown," "Warspite," "Valiant," "Queen Elizabeth," and "King George V" and later classes of capital ships.	Mark I**	Similar to Mark I, but with maximum time interval setting, ·24 sec. Fitted with 220-volt chaser motor.

ITEM.	WHERE FITTED.	CLASSIFI- CATION.	VALUE OF OUTPUT SHAFT.	REMARKS.
Gyro Oil Units	"Southampton," Type "P" sight, Mark I.	Mark I	4°	Driven by A.C. motor. Embodies advancer piston for lag compensa- tion.
	Not at present fitted	Mark II	4°	Similar to Mark I, but with D.C. motor fitted. Is 4-in. longer than Mark I.
	In conjunction with Type "P" sights, Marks II and III.	Mark II*	4°	Embodies "creeping relay" lag com- pensation. Otherwise as Mark II.
Oil Units ..	Not fitted	"B," Mark I	4°	—
	H.A.C.S., Mark III* directors.	"B," Mark II	4°	For stabilisation A.B.C. transmission.
	H.A.C.S., Mark IV directors.	"B," Mark III	4°	For stabilisation, 30° value. Magslip transmission. "Creeping relay" fitted.
	"L" and "M" class D.C.T.s.	"B," Mark X	4°	For stabilisation of C.O.'s glasses and R/F, valve operated mechanically from "P" sight. Not fitted with "creeping relay."
	"Fiji," "Dido" and 14-in. D.C.T.s.	"B," Mark XI	4°	As Mark III, but with magslip sector value of 20°. For R/F stabilisation. Fitted with "creeping relay."

ITEM.	WHERE FITTED.	CLASSIFICATION.	REMARKS.
Dial Sights.	— Destroyer D.C.T.s, H.A.C.S. and R/F directors. 6-in. secondary armament directors.	No. 7, Mark I No. 7, Mark II	— Single power eyepiece.
	Destroyer D.C.T.s, H.A.C.S. and R/F directors. 6-in. secondary armament directors.	No. 7, Mark II*	Double power eyepiece.
	15-in. directors.	G.B., Mark I	Periscopic sight—Barr & Stroud manufacture.
	Modern D.C.T.s.	G.B., Mark II	Periscopic sight (Barr & Stroud). Improved and of increased length.
Angle of Presentation Units.	"D" class destroyers and R/F directors, Marks I, II, III, IV, V, VA.	Barr & Stroud type.	Single transmitters.
	"K" and later class destroyers and "E" to "I" classes when fitted for H.A. control.	Destroyer type	Double transmitter type (with spotting knob).
	R/F directors, Marks IIW, IIIW, IV* and V*.	R/F director type.	Similar to destroyer type, but with "L" shaped casing.
Gyros.	Type "G" sights.	Elliott main armament.	Elliott flexible spindle, fitted with integral inner trunnions. Same diameter, but not interchangeable with Henderson gyros. Air blast control of "A" adjustment.
	Vickers "H," Marks I-II, and "J," Mark I, gyro sights.	Elliott H.I.	New design of larger diameter. Flexible spindle type, with improved bearings, 20-minute period. Sighting hoops fitted on gyro casing.
	"H," Mark II*, and "J," Mark I*, and later sights up to but excluding "H" class destroyers and "City" class cruisers.	Vickers, Mark I.	Interchangeable as a whole with Elliott H.I. gyros, but with 15-minute period and heavier pendulum weight. Sighting hoop fitted on gimbal ring. Not interchangeable with Vickers, Mark II, gyros.
	Vickers "H" and "J" sights in "H" and later destroyers and "City" class cruisers.	Vickers, Mark II.	Similar to Mark I, but redesigned for direct switching. Steel gimbal ring and steel casing. A Mark II gyro may be fitted in earlier sights, but the Mark I gyro must not be fitted in these sights.
	Gyro oil units of Type "P" sights. T.I.C. gear, Marks I, I* and I**	Gyro oil unit gyros. Vickers, Mark IV.	Elliott flexible spindle gyros. Air blast control about both axes with twin pendulous bails.

ELEVATION RECEIVERS

Classification.	Mountings and Ships Fitted.	Step Value.		Dial Value. Degrees per rev. of minute pointer.	Degrees of Elev. per rev. of incoming drive.	Remarks.
		Range yds.	Elev. mins.			
Type "A," Mark I.	4.7-in. H.A.XII "Adventure," 4.7-in.C.P. VI** "Amazon" and "Ambuscade."	Set by hand.	3	10°	30°	Fitted with corrector boxes.
Type "A," Mark I*.	4-in. H.A.IV "Resource."	"	3	10°	30°	As above, but arranged for 4-in. guns.
Type "A," Mark I**.	4-in.H.A.III "Hermes," 4-in. H.A.IV "Medway."	"	3	10°	30°	Not fitted with corrector boxes.
Type "B," Mark I.	16-in. turrets, "Nelson" and "Rodney."	25	$\frac{3}{4}$	5°	10°	These have now been fitted with corrector mechanisms similar to "D" type.
Type "B," Mark I*.	6-in. turrets, "Nelson" and "Rodney."	25	$\frac{3}{4}$	5°	2°·5	As above, but arranged 6-in. guns.
Type "B," Mark II.	8-in. turrets, "Kent" and "London" classes.	25	$\frac{3}{4}$	5°	10°	Similar in principle to the original design of Mark I, but with different linkage between range cam roller and M.V. cam (<i>see</i> C.B. 1925 (6)).
Type "B," Mark III.	8-in. turrets, "Dorsetshire," "Norfolk," and "York."	25	1	5°	10°	Similar to Mark II except for elevation step value. Dip is incorporated in "Y" turret of "York."
Type "C," Mark I.	Fitted to high angle mountings in ships with single or sided H.A.C.S.	Not so fitted.	3	10°	30°	Type "C" receivers are simple instruments, incorporating black and red degree and minute pointers. No correction is fitted.
Type "C," Mark I*.	4-in. H.A.B.D. twin mounting in "Resolution."	"	3	10°	30°	As Mark I, except that base is vertical instead of horizontal, necessitating special lubricating arrangements.
Type "C," Mark I**.	Earlier 2-pdr., Mark "M," pom-pom mountings.	"	6	10°	30°	As Mark I, except for step value.
Type "C," Mark II.	Fitted to high angle guns in certain ships fitted with H.A.C.S.	"	3	10°	30°	As Mark I, except that a circuit (red or blue) indicator lamp is incorporated.
Type "C," Mark II*.	2-pdr. pom-pom mountings up to and including Mark VI, Regd. No. 24, and Mark VII, Regd. No. 9, and 4-in., H.A. III and IV mountings in minesweepers, etc., on rearming with F.K.C. system of control. 3-man rangefinders of "E"-"I," "J" and later destroyers.	"	6	10°	30°	Similar to "C," Mark I, with 6' step value.
Type "C," Mark III.	High angle twin mountings in "Repulse."	"	3	10°	30°	Duplex receiver, incorporating two Mark II, receivers in one casing. Mechanical drive enters at top.

ELEVATION RECEIVERS—*contd.*

Classification.	Mountings and Ships Fitted.	Step Value.		Dial Value. Degrees per rev. of minute pointer.	Degrees of Elev. per rev. of incoming drive.	Remarks.
		Range yds.	Elev. mins.			
Type "C," Mark III*.	4-in., H.A. mountings. Capital ships and cruisers on re-armament with Duplex control.	Not so fitted.	3	10°	30°	As Mark III, except that mechanical pointer drive comes in at base of receiver.
Type "C," Mark IV.	4-in., H.A. mountings. Capital ships and cruisers on re-armament with single control.	"	3	10°	30°	As Mark III*, but with lower set of gearing omitted and dial blanked. In effect a single Mark II receiver in a duplex casing.
Type "C," Mark IV*.	To be fitted in 6-in. and 8-in. turrets when ships are fitted with augmenting tables, 4-in. mountings of "J," "K," "N," "Q," "Tribal" destroyers, capital ships and cruisers on re-armament with single control.	"	3	10°	30°	As Mark IV, but with redesigned casing having one dial only.
Type "C," Mark IV**.	4.5-in. mountings in "Scylla" and "Charybdis."	"	3	10°	30°	As Mark IV*, except that a circuit (red or blue) indicator is incorporated.
Type "C," Mark V.	2-pdr. pom-pom mountings, Mark VI, Regd. No. 25 and onwards. 2-pdr. pom-pom mountings, Mark VII, Regd. No. 10, and onwards, and 4-in. twin mountings in escort vessels on re-armament.	"	6	10°	30°	Similar to Mark IV, with 6' step value and upper dial blanked.
Type "C," Mark V*.	4-in. twin mountings in escort vessels (on re-armament) "Hunt" class destroyers.	"	6	10°	30°	As Mark V, but with redesigned casing having one dial only.
Type "C," Mark V**.	4.5-in., H.A./L.A. mountings. "Tyne," "Adamant" and "Hecla."	"	6	10°	30°	As Mark V*, except that a circuit (red or blue) indicator is incorporated.
Type "C," Mark VI.	Ships fitted with R/F directors and duplicate control.	"	6	10°	30°	As Mark III*, but with 6' step value.
Type "C," Mark VII.	4.5-in. mountings in "Scylla" and "Charybdis."	50	3	10°	30°	Double dial M.V. and temperature corrections for full and reduced charges. Suits ballistics of 4.5-in. gun. "M" type transmission. No dip or tilt corrections.
Type "C," Mark VIII.	4.5-in. H.A./L.A. mountings, "Tyne," "Adamant" and "Hecla."	50	6	10°	30°	Similar to "C," Mark VII, with 6' step value.
Type "C," Mark IX.	4-in., Mark XIX, twin mountings in "L" class destroyers, "Legion," "Lance," "Lively."	50	6	10°	30°	Similar to "C," Mark VIII, suits 4-in. ballistics.

ELEVATION RECEIVERS—*contd.*

Classification.	Mountings and Ships Fitted.	Step Value.		Dial Value. Degrees per rev. of minute pointer.	Degrees of Elev. per rev. of incoming drive.	Remarks.
		Range yds.	Elev. mins.			
Type "CM," Mark I.	2-pdr. pom-pom and 4-in., H.A. mountings. Ships using magslip system of transmission.	Not so fitted.	—	10°	30°	Simple receiver with base drive.
Type "CM," Mark I*.	2-pdr. pom-pom and 4-in., H.A. mountings. Ships using magslip system of transmission.	„	—	10°	30°	Similar to "CM," Mark I, with improved pointer visibility.
Type "CM," Mark II.	4·5-in., H.A./L.A. mountings. "Renown," "Forth," "Valiant," "Queen Elizabeth," "Maidstone," "Illustrious," "Victorious," "Formidable," "Indomitable," "Implacable," "Indefatigable" and "Ark Royal."	50	—	10°	30°	Double dial magslip receiver. Corrections for dip, tilt, M.V. and temperature. To suit ballistics of 4·5-in. gun. Full and reduced charges only. Provision for cancelling the effect of dip when in H.A. control
Type "CM," Mark III.	5·25-in., H.A./L.A. mountings. "Dido" class cruisers and capital ships of 1936 and 1937 programmes.	50	—	10°	30°	Similar to "CM," Mark II, except that range cam, etc., are designed to suit the ballistics of the 5·25-in. gun.
Type "D," Mark I.	4·7-in., C.P. XIV, "Acasta" and "Beagle" classes. "Codrington."	25	6	20°	30°	New design mechanism. Single dial. Single electric pointers. Dip corrector capable of correction only at guns below standard level.
Type "D," Mark II.	8-in., Mark II*, "Exeter."	25	1	5°	30°	Single dial. Duplicate electrical pointers. Dip correctors as in Mark I, 8-in. ballistics.
Type "D," Mark III.	4·7-in., C.P. XIV, "Crusader" class, "Assiniboine" (Canadian destroyers).	50	3	20°	30°	Single dial. Single electrical pointers. Dip correctors capable of correction at guns both above and below standard level. Fitted with coincident pointers. Improved Mark I.
Type "D," Mark III*.	4·7-in., C.P. XIV, "Defender" class, "Duncan."	50	3	10°	30°	Identical with Mark III, except that pointers fitted are the opposed type.
Type "D," Mark IV.	6-in., Mark XXI, "Leander."	25	1	5°	30°	Single dial. Single electrical pointers. Dip correctors as Mark III.
Type "D," Mark V.	6-in., Mark XXI, "Neptune," "Orion," "Achilles," "Ajax," "Perth," "Arethusa," "Hobart," "Sydney" and "Galatea."	25	1	5°	30°	Identical with Mark IV, except that range cams, M.V. cams, etc., are based on different ballistic data. Mark V are therefore, not interchangeable with Mark IV.

ELEVATION RECEIVERS—*contd.*

Classification.	Mountings and Ships Fitted.	Step Value.		Dial Value. Degrees per rev. of minute pointer.	Degrees of Elev. per rev. of incoming drive.	Remarks.
		Range yds.	Elev. mins.			
Type "E," Mark I.	4·7-in., C.P. XVII, "Eclipse" class, "Faulknor" and "Fearless" class, "G" class.	50	3	10°	15°	New design incorporating a modified Type "B," Mark II mechanism.
Type "E," Mark I*.	4·7-in., Mark XIX mountings. "H" to "K" and "Tribal" classes destroyers.	50	3	10°	15°	Similar to "E," Mark I, but M.V. scales not engraved for sub-calibre. Dip quadrant in later receivers engraved in feet instead of gun positions.
Type "E," Mark I**.	4·7-in., twin, Mark XIX mountings. "N" class and R.A.N. "Tribal" class destroyers.	50	3	10°	15°	Similar to the "E," Mark I*, except that the dip cam is arranged to cancel dip when in H.A. control.
Type "E," Mark II.	6-in., Mark XXI, and 6-in., triple, Mark I. "Newcastle," "Southampton," "Penelope."	25	1	5°	15°	Similar to Type "E," Mark I, but arranged to suit the ballistics of 6-in. guns.
Type "E," Mark III.	4·7-in., Mark XX mountings. "L" and "M" classes.	50	3	10°	15°	Similar to "E," Mark I*, except that range cam, etc., based on ballistics to suit the 4·7-in., Mark XI gun. Provision for cancelling the effect of dip when in H.A. control. Reduced charge introduced.
Type "E," Mark IV.	4·7-in., C.P. XVIII mountings. "O" and "P" class destroyers.	50	6	10°	15°	As "E," Mark I**, except for step value.
Type "EM," Mark I.	6-in., twin, XXI, and triple, Mark XXII mountings. "Sheffield," "Glasgow," "Birmingham" and "Aurora," "Belfast" and "Edinburgh." "Liverpool" "Manchester," "Gloucester."	25	—	5°	15°	Similar to "E," Mark II, but arranged for mag-slip transmission.
Type "EM," Mark II.	6-in., triple, Mark XXIII, "Fiji" class cruisers.	50	—	5°	15°	Similar to "EM," Mark I, with 50-yard range step value. Provision for cancelling effect of dip when in H.A. control. Spare change wheels for 25-yard step value carried.
Type "EM," Mark III.	14-in., Marks I and II mountings. "King George V" class capital ships.	50	—	5°	15°	Similar to "EM," Mark II, except that range cam, etc., suits 14-in. gun. No sub-calibre or provision for cancelling effect of dip. Mechanical pointers can be handed to suit right- or left-hand gear. No tilt correction.

ELEVATION RECEIVERS—*contd.*

Classification.	Mountings and Ships Fitted.	Step Value.		Dial Value. Degrees per rev. of minute pointer.	Degrees of Elev. per rev. of incoming drive.	Remarks.
		Range yds.	Elev. mins.			
Type "F," Mark I.	4-in. H.A./L.A. mountings in association with R/F director, Mark I, and F.K.C. system. "Fleetwood" only.	50 (counter-drum)	6	10°	30°	Single dial with slow and fast concentric pointers. "M" type transmission. No dip or tilt correction. M.V. correction applied differentially by hand. Range set on drum. Graduated for various M.V.s.
Type "F," Mark II.	R/F directors, Mark III, 4-in. H.A./L.A. mountings. 1938 and 1939 fast minelayers. H.M.S. "Unicorn," "Egret," "Auckland," "Pelican," "Flamingo," "Black Swan," "Erne," "Ibis" and later vessels of this type. Also "Stork" and "Enchantress" on re-armament. "Marshal Soutl."	50 (counter-drum)	6	10°	30°	Similar to "F," Mark I, but with dip correction in M.V. corrector.
Type "F," Mark III.	"C" class cruisers on re-armament, with single control.	50 (counter-drum)	3	10°	30°	Similar to "F," Mark I, but with 3' step value.

TRAINING RECEIVERS

Classification.	Mountings and Ships Fitted.	Step Value.		Dial Value. Degrees per rev. of minute pointer.	Degrees of training per rev. of incoming drive.	Remarks.
		Range yds.	Training mins.			
Type "A," Mark I.	4·7-in. H.A. XII, "Adventure." 4·7-in. C.P.VI**, "Amazon" and "Ambuscade."	Set by hand.	3	10°	51°·4285	Fitted with corrector boxes.
Type "A," Mark I*.	4-in. H.A. IV, "Resource."	"	3	10°	51°·4285	As above, but arranged for 4-in. guns.
Type "A," Mark I**.	4-in. H.A. III, "Hermes." 4-in. H.A. IV, "Medway."	"	3	10°	51°·4285	Not fitted with corrector boxes.
Type "B," Mark I.	16-in. turrets, "Nelson" and "Rodney."	Set by hand.	1½	5°	17°·7272	—
Type "B," Mark I*.	6-in. turrets, "Nelson" and "Rodney."	"	1½	5°	17°·7272	Similar to Mark I, except arranged for 6-in. guns.
Type "B," Mark II.	8-in. turrets, "Kent" and "London" classes.	See re-marks. 25	1½	5°	18°	Similar to Mark I, but range is applied by an external power relay which operates gearing fitted in the original range motor chamber.
Type "B," Mark III.	8-in. turrets, "Dorsetshire," "Norfolk," and "York."	"	2	5°	17°·7272	Similar to Mark II, except for step value.
Type "C," Mark I.	Fitted to H.A. mountings in ships with single or sided H.A.C.S.	Not so fitted.	3	10°	30°	The Type "C" receivers are simple instruments, incorporating black and red degree and minute pointers. No correction is fitted.
Type "C," Mark I*.	4-in. H.A.B.D. twin mounting in "Resolution."	"	3	10°	30°	As Mark I, except that the base is vertical instead of horizontal, necessitating special lubrication arrangements.
Type "C," Mark I**.	Earlier 2-pdr., Mark "M," pom-pom mounting.	"	6	10°	30°	As Mark I, except for step value.
Type "C," Mark II.	Fitted to H.A. guns in certain ships fitted with H.A.C.S.	"	3	10°	30°	As Mark I, except that a circuit (red or blue) indicator lamp is incorporated.
Type "C," Mark II*.	Earlier 2-pdr. pom-pom mountings and 4-in., H.A. III and IV mountings when F.K.C. system is fitted, and 3-man R/F mountings of "E" and later class destroyers.	"	6	10°	30°	As Mark I, except for step value.
Type "C," Mark III.	4-in. H.A. mountings. Capital ships and cruisers on re-armament with duplex control. "Scylla" and "Charybdis."	—	3	10°	30°	Duplex receiver, incorporating two Mark II receivers in one casing. Mechanical drive enters at base.
Type "C," Mark IV.	4-in. H.A. mountings. Capital ships and cruisers on re-armament with single control.	—	3	10°	30°	As Mark III, but with lower instrument omitted and dial blanked.