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## ADMIRALTY FLEET ORDER

**RESPONSIBILITY FOR TESTING COMPASS CORRECTOR  
COILS IN H.M. SHIPS AND PROCEDURE FOR CARRYING  
OUT THE TESTS.**

ADMIRALTY, S.W.1,  
17th June, 1943.

The following Order having been approved by My Lords Commissioners of the Admiralty is hereby promulgated for information and guidance and necessary action.

By Command of their Lordships,

*H. V. Markham*

*To all Commanders-in-Chief, Flag Officers, Senior Naval Officers, Captains and Commanding Officers of H.M. Ships and Vessels, Superintendents or Officers in Charge of H.M. Naval Establishments, and Admiralty Overseers concerned.*

NOTE:—The scale of distribution is approximately half that shown in the Admiralty Fleet Order Volume, 1941, Instructions, paragraph 10.

Head of "P" Branch

### 2701.—Responsibility for Testing Compass Corrector Coils in H.M. Ships and Procedure for Carrying out the Tests

(C.D. 766/42.—17.6.1943.)

For H.M. Ships the responsibility for making final adjustments to compass corrector coils lies with the officer adjusting the compasses.

2. During the inspection of D.G. equipment, before H.M. ships are swung for adjustment of compasses, the representative of S.D.G. attending the inspection is to see that all compass corrector coils are tested. He is responsible that:—

- (i) They are electrically efficient.
- (ii) They are correctly connected.
- (iii) The correction provided by them is adequate in amount.

3. Should any of the above points require attention the D.G. Officer is to acquaint the local Officer responsible for overseeing the fitting of the D.G. equipment, who is to arrange for the rendering of any assistance necessary for the satisfactory completion of the installation.

4. In the case of certain Royal Dockyards where the service of a D.G. Officer may not be available, this responsibility is to rest with the E.E.M. or S.E.E. as the case may be.

5. Before making this test, see that all links are out.

- (i) Test for insulation.
- (ii) Test for continuity.
- (iii) See that compass corrector coil cases are efficiently earthed.

*Note.*—It is not permissible to earth the cases on the lead sheathing of the cables.

(iv) See that resistance box or potentiometer connections are satisfactory.

#### Tables of Resistance Values of Compass Corrector Coil Windings

B coil Pattern	Winding	
	X ohms	Y ohms
928	153	43
929	4.2	2
934	513	189
935	102	48
961	100	80
964	46.5	YI = 85 YP = 90
889 (2 coil)*	25 each coil, i.e. 50 ohms per pair in series.	
C coil Pattern	Winding ohms	
937	46.7	
951	21.8	
978 (3 coil)	10 (each coil)	
889 (2 coil)*	25 (each coil)	
H.E. coil Pattern	Winding ohms	
925D (or 925)	20	
925D3 (3 coil)	20 (each coil)	
933	43	
962	365	
962D2 (2 coil)	30 (each coil)	

\**Note.*—Pattern 889 will normally be used as "B" coil, but may occasionally be fitted as a "C" coil.

6. Now that multiwinding heeling error and other corrector coils are being used in increasing numbers, the following system of connections will be standardised for new items of equipment.

- Connect FI (QI) D.G. coils to lowest numbered pair of terminals.  
 Connect MF (MQ) D.G. coils (or FP, QP, if 3-part M is not fitted) to next highest pair of terminals.  
 Connect MM (M) D.G. coil to highest numbered pair of terminals.

E.g. H.E. coil, Pattern 925D3—FI QI to terminals	1 and 2	} In terminal box Pattern 864.
MF to terminals	3 and 4	
MM to terminals	5 and 6	
B coils, Pattern 889	M to terminals	} In terminal box Pattern 890.
H.E. coil, Pattern 962D2	M to terminals	

This does not apply to existing types of B coil which have windings marked "X", "Y", "YI", "YP", etc., e.g. Patterns 929, 964. The standard method of connecting Patterns 929, 934 is well known and is given in note at end of paragraph 12 below.

7. The routine procedure for adjusting compass corrector coils is given below.

It should be noted—

- (i) That all heeling error coils should be completed before adjusting "B" or "C" corrector coils;
- (ii) only one D.G. coil should be switched on at a time.

#### 8. Heeling Error Coils.

- (i) Heeling error coils may have one, two or three windings which are to be connected to the "M" D.G. coil and such other D.G. coils as indicated on the relevant wiring diagrams for various classes of ship.
- (ii) As the effect on the vertical field at the compass position from each of the several D.G. coils cannot be forecast, it will be necessary to ascertain that the heeling error coil winding in each case is so connected as to oppose the effect of the D.G. coil to which it is connected. For this purpose a Pattern 5 heeling error instrument should be used.

(iii) Procedure for Test.

- (a) Withdraw fuses from corrector coil circuits or break corrector coil circuits by removing the necessary links from the resistance box.
- (b) Remove the compass from the binnacle and place heeling error instrument in its stead. This should be so adjusted that the dipping needle occupies the position normally taken by the compass needle (this may be obtained either by inserting wood chocks under the instrument or by suitably suspending it from its chain). The dipping needle should lie approximately in the magnetic meridian with the magnetically red end towards the North. This end may be recognised by an engraved ring round it.
- (c) Adjust the small sliding weight or weights on the needle until this latter is horizontal as shown by the level on the base and marking on the front glass.
- (d) Switch on the D.G. coil being tested and note whether the North end rises or dips.
- (e) Set the adjustable resistance to the heeling error coil winding connected to the D.G. coil under test in the middle of its travel. Replace fuses or links for this particular winding. Note that the dipping needle moves in the opposite direction to that observed in (d) above. If it does not do so the connections to this particular heeling error winding should be reversed.
- (f) By adjusting the resistance slider ascertain that sufficient correction is available to return the dipping needle to the horizontal.
- (g) Switch off D.G. coil.

(iv) The test outlined in (iii) should be carried out with each heeling error winding in use.

*Note.*—When using a Pattern 5 heeling error instrument, care should be taken to raise the dip needle by means of its lifting plates, which are operated by the knob on the back of the case, except when actually observing readings. This saves wear on the knife edge supports and agate plates.

9. "M" D.G. Coil—Fore and Aft Correction by "X" Windings of "B" Corrector Coils.

- (i) Replace compass bowl.  
Compass card to be on East West heading, i.e. needles athwartships, using deflector if necessary.
- (ii) Switch on "M" D.G. coil, forward current and maximum ampere turns. Note deviation.
- (iii) Insert fuses or links for the "X" windings.  
With the slider of the potentiometer in the midway position, see that both "B" coils are the same polarity, and whether deviation has increased or decreased.  
If the deviation has increased, reverse the polarity of both "X" windings.
- (iv) Adjust slider of potentiometer until compass card is again on East West heading.  
Switch off "M" coil.

10. Athwartship Correction of "M" D.G. Coil by "C" Corrector Coils.

In ships with compasses located to one side of the centre line or where unsymmetrical magnetic material is located to one side of a centre line compass (e.g. bullet proof shelter) it is necessary to provide "C" corrector coils for athwartship compensation. To adjust these "C" coils proceed as follows:—

- (i) See "M" coil is switched off.
- (ii) Deflect compass to N-S heading, i.e. needles fore and aft.
- (iii) Switch on "M" coil. Note deviation.
- (iv) Insert fuses or links in "C" coil resistance box, and with potentiometer in mid position see that both "C" coils are of the same polarity.  
If the deviation has decreased the "C" coils are of the correct polarity.  
If increased the polarity of both "C" coils should be reversed. Adjust "C" coil potentiometer to annul all deviation.
- (v) Switch off "M" coil.

11. In ships fitted with 3 part M coil, i.e. MF, MM and MQ coils, similar tests as indicated in paragraphs 8, 9 and 10 must be made for MM and MF coils if the binnacle is Forward and for the MM and MQ coils if the binnacle is Aft. In such cases the "X" windings of the "B" correctors are used for the MM coil and the "Y" winding of the port "B" corrector is used for the MF coil or MQ coil as the case may be. When FI and QI coils are not fitted the "Y" windings of both port and starboard "B" correctors should be connected to the MF or MQ coil.

12. "F" D.G. Coil—Fore and Aft Correction by "B" Corrector Coils "Y" Windings.

- (i) With "F" coil off deflect compass to East West heading, i.e. needles athwartships.
- (ii) Switch on "F" coil, forward current and maximum ampere turns. Note deviation.
- (iii) Insert fuses or links for the "Y" windings and with the slider in the midway position, see that both "B" coils are the same polarity and note whether deviation has increased or decreased. If increased, reverse the polarity of both "Y" windings.
- (iv) Adjust slider potentiometer so that the compass is again on East West heading.
- (v) Switch off "F" coil.

*Note.*—In vessels fitted with the "split system" the port "Y" winding is connected to the "FP" coil. The starboard "Y" winding is connected to the "FI" coil. Compass correction is carried out in exactly the same manner as for the "F" coil, the coil under test being the only D.G. coil switched on.

13. "A" D.G. Coil—Athwartship Correction by "C" Corrector Coils.

- (i) With "A" coil off, deflect compass to North South heading, i.e. needles Fore and Aft.
- (ii) Switch on "A" coil, forward current and maximum ampere turns. Note deviation.

- (iii) Insert fuses or links, and with slider of potentiometer in the midway position, see that both "C" coils are the same polarity and note whether deviation has increased or decreased. If increased, reverse the polarity of both "C" coils.

- (iv) Adjust slider of potentiometer until the compass card is again on North South heading.

- (v) Switch off "A" coil.

Compass Correction in Aircraft Carriers with Island Bridges.

14. Vertical Correction by Heeling Error Coils.

In aircraft carriers, heeling error may be produced not only by the "M" D.G. coil, but also by the "A" and "F" D.G. coils.

A heeling error coil will be connected to each D.G. coil likely to produce heeling error.

It is necessary to use the heeling error instrument to obtain correct polarity and adjustment for each heeling error coil fitted.

Each D.G. coil is to be tested separately for heeling error as described above for vertical correction.

15. Fore and Aft Correction by "B" Coils in Aircraft Carriers.

Deviation may be produced by the fore and aft effect of "M", "F" and "A" D.G. coils.

This is corrected in the following manner:—

"M" coil is compensated by both X windings.

"F" coil is compensated by port Y windings.

"A" coil is compensated by starboard Y windings.

Compass correction is to be carried out on each coil separately as described above for fore and aft correction.

16. Athwartship Correction by "C" Coils in Aircraft Carriers.

Deviation may be produced not only by the "A" D.G. coil, but also by the "M" and "F" D.G. coils.

"C" corrector coils will be connected to each of these coils.

Compass correction is to be carried out on each D.G. coil separately as described above for athwartship correction.

17. Stores.

The following stores can be obtained from—

N.S.O.,

Admiralty Compass Observatory,

Ditton Park,

Slough, Bucks.

Pattern No. 918	...	Pocket compass.
Pattern No. 66	...	Deflector magnets, 4 in. × 1½ in., cased.
N.P.	...	...
...	...	...
Pattern No. 5	...	Heeling error instruments.

All compass corrector coils and resistance boxes.

(iii) When the error is not a simple error of position, but a simple error of position, see that both "C" cells are the same polarity and not  
 (iv) Adjust either of the cells with the same polarity as the other  
 (v) Adjust the "A" cell

In order to be able to check the error with the same polarity as the other cells, the error must be produced out step by step, M, D.O.  
 In order to be able to check the error with the same polarity as the other cells, the error must be produced out step by step, M, D.O.  
 A reading error will be produced for each D.O. cell likely to produce a reading error.  
 It is necessary to use the reading error instrument to obtain correct polarity and adjustment for each reading error cell.  
 The error is to be checked separately for each error as described above for each error.  
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This is covered in the following manner:  
 "M" cell is compensated by both X and Y windings.  
 "Y" cell is compensated by X and Y windings.  
 "X" cell is compensated by X and Y windings.  
 Compensation is to be checked out on each cell separately as described above for each error.

10. The error is to be checked out on each cell separately as described above for each error.  
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