

MC2 Compass Calibration Record

MOD Form 712D
(Revised Mar 24)

Aircraft Type: _____ Aircraft No: _____ Compass System: _____ Sheet No: ____/1
 Ship/Station/Unit: _____ Work Order SNOW/Date: _____ Tradesperson: _____

<p>Switch Positions Note: Original switch and control settings given in Section A remain as set until new setting is specified.</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center;">Flux Valve:</th> </tr> <tr> <td style="width: 50%;">Part No:</td> <td style="width: 50%;">Serial No:</td> </tr> </table>	Flux Valve:		Part No:	Serial No:	<p style="text-align: center;">Remarks</p>																																																							
Flux Valve:																																																													
Part No:	Serial No:																																																												
<p>FV Select to 2 Headout Select to F.V. Heading Selector to 0 MISAL to 0 Mode Selector to Mon Δ 180 to 0 Δ 270 to 0 E1-E2 Check to Off E1 Norm Rev to Off E2 Norm Rev to Off Power Off-On to On Volts Adjust for 23.5 Area Comp to position specified in 6A</p>	<p style="text-align: center;">Section A. Check the Magnetic Bearing at Monitor Location</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: center;">Table A</th> <th colspan="2" style="text-align: left;">Compass Swing Target Bearing (Line 9C, Area Survey Sheet)</th> </tr> <tr> <th rowspan="2" style="text-align: center;">Monitor Heading</th> <th colspan="2" style="text-align: center;">Error Readout</th> <th colspan="2" style="text-align: left;">Monitor Index Error = $\frac{\text{Algebraic Error Sum}}{4}$ _____ 1A</th> </tr> <tr> <th style="text-align: center;">A</th> <th style="text-align: center;">A'</th> <th colspan="2"></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td></td> <td></td> <td colspan="2" style="text-align: left;">Flux Valve Location Correction (Line 11E, Area Survey Sheet) _____ 2A' _____ 2A</td> </tr> <tr> <td style="text-align: center;">90</td> <td></td> <td></td> <td colspan="2" style="text-align: left;">Corrected Monitor Index (2A + 3A) _____ 3A</td> </tr> <tr> <td style="text-align: center;">180</td> <td></td> <td></td> <td colspan="2" style="text-align: left;">Monitor Zero Error _____ 4A' _____ 4A</td> </tr> <tr> <td style="text-align: center;">270</td> <td></td> <td></td> <td colspan="2" style="text-align: left;">Area Comp Setting (Line 11C, Area Survey Sheet) _____ 5A' _____ 5A</td> </tr> <tr> <td style="text-align: center;">Algebraic Sum</td> <td></td> <td></td> <td colspan="2" style="text-align: left;">_____ 6A</td> </tr> <tr> <td colspan="3" style="background-color: #cccccc;"></td> <td colspan="2" style="padding: 5px;"> <p>Note: Use "A" column if flux valve calibrated same day as compass swing, "A'" column for compass swing if flux valve not calibrated on same day as compass swing.</p> </td> </tr> </tbody> </table>		Table A			Compass Swing Target Bearing (Line 9C, Area Survey Sheet)		Monitor Heading	Error Readout		Monitor Index Error = $\frac{\text{Algebraic Error Sum}}{4}$ _____ 1A		A	A'			0			Flux Valve Location Correction (Line 11E, Area Survey Sheet) _____ 2A' _____ 2A		90			Corrected Monitor Index (2A + 3A) _____ 3A		180			Monitor Zero Error _____ 4A' _____ 4A		270			Area Comp Setting (Line 11C, Area Survey Sheet) _____ 5A' _____ 5A		Algebraic Sum			_____ 6A					<p>Note: Use "A" column if flux valve calibrated same day as compass swing, "A'" column for compass swing if flux valve not calibrated on same day as compass swing.</p>																
Table A			Compass Swing Target Bearing (Line 9C, Area Survey Sheet)																																																										
Monitor Heading	Error Readout		Monitor Index Error = $\frac{\text{Algebraic Error Sum}}{4}$ _____ 1A																																																										
	A	A'																																																											
0			Flux Valve Location Correction (Line 11E, Area Survey Sheet) _____ 2A' _____ 2A																																																										
90			Corrected Monitor Index (2A + 3A) _____ 3A																																																										
180			Monitor Zero Error _____ 4A' _____ 4A																																																										
270			Area Comp Setting (Line 11C, Area Survey Sheet) _____ 5A' _____ 5A																																																										
Algebraic Sum			_____ 6A																																																										
			<p>Note: Use "A" column if flux valve calibrated same day as compass swing, "A'" column for compass swing if flux valve not calibrated on same day as compass swing.</p>																																																										
<p>Mode Selector to Cal</p>	<p style="text-align: center;">Section B. Align the Flux Valve to Magnetic North</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="7" style="text-align: center;">Table B</th> <th colspan="2" style="text-align: left;">Flux Valve</th> </tr> <tr> <th rowspan="2" style="text-align: center;">Turntable Heading</th> <th colspan="5" style="text-align: center;">Readout Errors</th> <th rowspan="2" style="text-align: center;">Corrected Manual (Avg 1B)</th> <th colspan="2" style="text-align: left;">Index Error = $\frac{\text{Algebraic Sum}}{4}$ _____ 1B</th> </tr> <tr> <th style="text-align: center;">Initial</th> <th style="text-align: center;">1</th> <th style="text-align: center;">2</th> <th style="text-align: center;">3</th> <th style="text-align: center;">Average</th> <th colspan="2"></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td colspan="2" rowspan="5" style="vertical-align: top;"> <p>Note: Correct index until error is within ±15 minutes.</p> </td> </tr> <tr> <td style="text-align: center;">90</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">180</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">270</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">Algebraic Sum</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Table B							Flux Valve		Turntable Heading	Readout Errors					Corrected Manual (Avg 1B)	Index Error = $\frac{\text{Algebraic Sum}}{4}$ _____ 1B		Initial	1	2	3	Average			0							<p>Note: Correct index until error is within ±15 minutes.</p>		90						180						270						Algebraic Sum						
Table B							Flux Valve																																																						
Turntable Heading	Readout Errors					Corrected Manual (Avg 1B)	Index Error = $\frac{\text{Algebraic Sum}}{4}$ _____ 1B																																																						
	Initial	1	2	3	Average																																																								
0							<p>Note: Correct index until error is within ±15 minutes.</p>																																																						
90																																																													
180																																																													
270																																																													
Algebraic Sum																																																													
<p>Mode Selector to Mon</p>	<p>Monitor Zero Error _____ 2B</p>																																																												

Switch Positions							Remarks	
Mode Selector to Cal E1 and E2 Volts to position specified in Tables C1 and C2. Heading Selector to 90 Readout Select to position specified in Tables C1 and C2. Note: Coarse voltage for E2 (Table C1) is to be same for all 6 readings. Coarse voltage for E1 (Table C2) is to be same for all readings.	Section C. Determine Flux Valve E1 and E2 Voltages							
	Table C1	E2		Table C2	E1			E2 Average = E2 Vernier Sum _____ 1C <div style="text-align: center;">6</div>
	E1 and Off E2 to Norm Readout to 0 Turntable to 270 heading			E1 and Rev E2 to Off Readout to 90 Turntable to 180 heading				
	E2 and Rev Readout to 0 Turntable to 90 heading	↓		E1 and Norm Readout to 90 Turntable to 0 heading	↓			E1 Average = E1 Vernier Sum _____ 2C <div style="text-align: center;">6</div>
Vernier Sum			Vernier Sum					
Mode Selector to Mon E1-E2 to Norm E1 Volts to 2C E2 Volts to 1C E1-E2 Check as required Readout Select to 90	E1 Check Control Setting. (E1-E2 Check switch to E1 Check , and adjust E1 Check vernier to null Null Indicator) _____ 3C							
	E2 Check Control Setting. (E1-E2 Check switch to E2 Check , and adjust E2 Check vernier to null Null Indicator) _____ 4C							

E1-E2 Check to Off Readout Select to F.V.	Section D. Determine the Δ180 and Δ270 Values						
	Monitor Zero Error _____ 1D						
	MISAL Control Setting = 1B + (1D - 2B) _____ 2D						

Mode Selector to Cal E1 Volts to 2C E2 Volts to 1C MISAL to 2D Heading Selector - as indicated E1-E2 to Norm (Turntable to 0 heading) E1 Norm-E1 Rev to Off E2 Norm-E2 Rev to Off Power On-Off to Off at completion of Section D	Table D								
	Heading Selector	Readout Error				Corrected Manual Swing Valve (From Table B)	(Σ _E - Σ _M) Electrical Error Minus Manual Error		Corrected Electrical Swing
		1	2	3	Average				
	0								
	90								
	180								
270									
	$\Delta 180 = (\Sigma_E - \Sigma_M)_{180}$ _____ 3D								
	$\Delta 270 = (\Sigma_E - \Sigma_M)_{90} + (\Sigma_E - \Sigma_M)_{270}$ _____ 4D								
	$(\Sigma_E - \Sigma_M)_{90}$ is to equal $(\Sigma_E - \Sigma_M)_{270} \pm 9$ minutes; if not, repeat Sections B and C.								

Switch Positions		Remarks
Section E. Determine Aircraft Misalignment		
	<p>Plumb Bob Separation along Aircraft _____ 1E</p> <p>Displacement of Nose Plumb Bob from N-S Line _____ 2E</p> <p>Displacement of Tail Plumb Bob from N-S Line _____ 3E</p> <p>Plumb Bob Total Displacement = 2E - 3E _____ 4E</p> <p>Aircraft Alignment with N-S Line from Nomograph _____ 5E</p> <p>Optical Alignment Correction = 5E + 4A - 1B + (2B - 5A) + (Toe-in) _____ 6E (Not Used for indexed Flux Valve)</p>	

	Section F. Electrical Compass Swing		
	Data		
<p>E1-E2 to Norm E1-E2 Check to Off Mode Selector to Mon Heading Selector to 0 Readout Select to F.V. E1 Check to 3C E2 Check to 4C Power On-Off to On (voltage = 23.5v) Area Comp to 6A</p>	<p>Monitor Zero Error _____ 1F</p> <p>MISAL Control Setting = $5E + 4A' + (1F - 5A)' + (Toe-in)$ *Use 4A and 5A if A' Table not used. _____ 2F</p> <p>Δ180 Correction Value (from 3D) _____ 3F</p>	<p>Δ270 Correction Value (from 4D) _____ 4F</p> <p>E1 Check Control Setting (from 3C) _____ 5F</p> <p>E2 Check Control Setting (from 4C) _____ 6F</p>	
<p>Readout Select to 90 E1, E2 Volts to null Null Indicator</p>	<p>E1 Recorded with</p> <p>E1-E2 Check in E1 Check _____ 7F</p>	<p>E2 Recorded with</p> <p>E1-E2 Check in E2 Check _____ 8F</p>	

Switch Positions	Section F. Continued										Remarks
E1-E2 Check to Off MISAL to 2F Mode Selector - as required Readout Selector - as required Power On-Off to Off at completion of Section F	Index and One-Cycle Error Compensation										
	Table F1					$\text{Index} = \frac{\sum_0 + \sum_{90} + \sum_{180} + \sum_{270}}{4} \quad \text{-----} \quad 9F$ $\text{North-South Error} = \frac{\sum_0 - \sum_{180}}{2} \quad \text{-----} \quad 10F$ $\text{East-West Error} = \frac{\sum_{90} - \sum_{270}}{2} \quad \text{-----} \quad 11F$					
	Heading Selector	System Readout Error									
		1	2	3	4						
	0										
	90										
	180										
	270										
	System Error Compensation										
	Table F2										
	Heading Selector	System Readout Error				Heading Selector	System Readout Error				
		1	2	3			1	2	3		
	0					180					
	15					195					
	30					210					
45				225							
60				240							
75				255							
90				270							
105				285							
120				300							
135				315							
150				330							
165				345							
Transmission Error											
$D = 1/4 (\sum_{45} - \sum_{135} + \sum_{225} - \sum_{315})$					$\text{Magnitude} = \sqrt{D^2 + E^2}$		$\text{Direction} = 1/2 \arctan D/E$				
$E = 1/4 (\sum_0 - \sum_{90} + \sum_{180} - \sum_{270})$											