

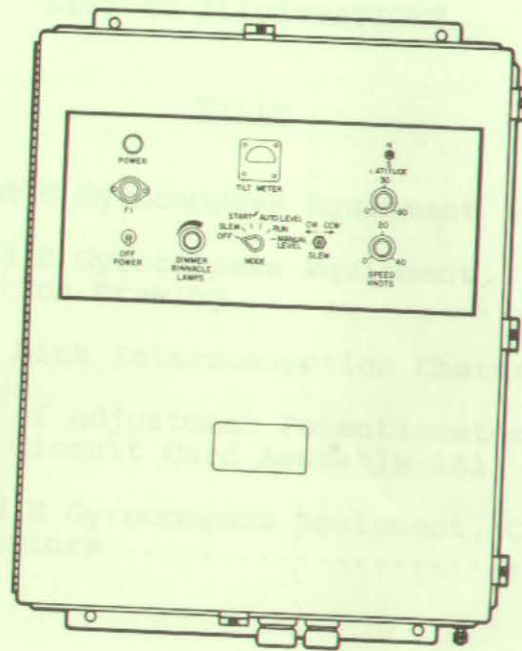
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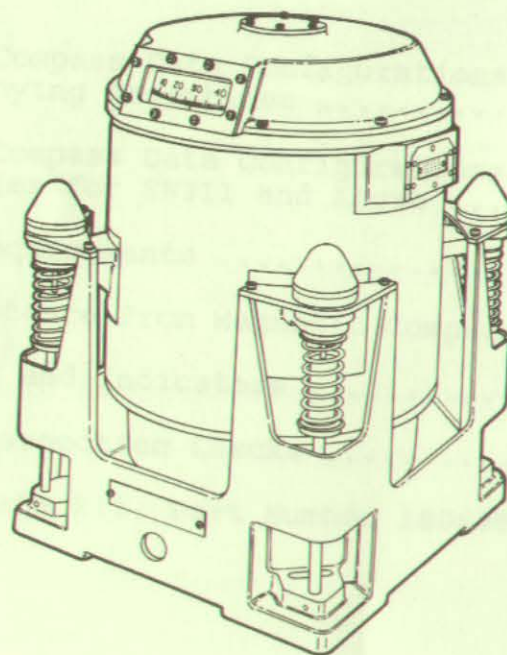
Sperry Marine Inc.

**MK-37 MOD E
GYROCOMPASS
EQUIPMENT
OPERATION MANUAL**

S.132



CONTROL AND TRANSMISSION UNIT
P/N 03956-1976054



MASTER COMPASS
P/N 03956-1891974-VAR

Figure 1-1. MK-37 Mod E Gyrocompass Equipment

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CHANGE 4

CHAPTER 1

GENERAL INFORMATION

1-1. INTRODUCTION. The MK-37 Mod E Gyrocompass equipment, shown in Figure 1-1, contains a controlled gyroscope which seeks and aligns itself with the meridian and points to true north. It uses the properties of the gyroscope in combination with the rotation of the earth and the effect of gravity. The MK-37 Mod E Gyrocompass equipment uses a three gimbal system.

The gyrosphere containing the gyroscope rotor is immersed in silicone fluid and is designed and adjusted to have neutral buoyancy. This feature is a distinct advantage in that:

- (a) The weight of the gyrosphere is removed from the sensitive axis bearings
- (b) The gyrosphere and bearings are protected from excessive shock loads
- (c) Sensitivity to shifts of the center of mass of the gyrosphere relative to the sensitive axis is eliminated, thereby providing improved accuracy
- (d) The effects of accelerations are minimized because the center of mass of the gyrosphere and the center of buoyancy are coincident

The effects of varying speed and latitude on the gyrocompass are compensated for by the use of manually operated controls. A servo followup system is provided in the azimuth axis to keep the phantom yoke aligned with the gyrosphere as the vessel turns. It also drives the Compass Dial and the data transmitters. The Compass Dial is viewed from the aft side but has the normal sense of rotation for direct steering purposes. No heaters are required because of the low viscosity of the suspension and ballistic fluids.

1-2. EQUIPMENT DESCRIPTION. The MK-37 Mod E Gyrocompass equipment consists of a MK-37 Mod E Control and Transmission Unit, a MK-37 Mod D Master Compass Unit, and an interconnecting cable assembly. These units are described in the following paragraphs.

1-3. MK-37 MOD E CONTROL AND TRANSMISSION UNIT. The Control and Transmission Unit is a drip-proof bulkhead-mounted enclosure which contains the power and control circuits needed to operate the Master Compass Unit. It also contains an amplification circuit which amplifies the signal from the step transmitter in the Master Compass to provide sufficient power to drive a repeater load of 200 watts. (This is normally equivalent to twelve repeaters, each having 160-ohm (35 volt) or 640-ohm (70 volt) coils. Terminals are provided for twelve step repeater outputs, each controlled by a toggle switch and protected by a fuse. Included are manual controls to compensate for

CHANGE 2

1-1

errors due to the effect of the vessel's course and speed at varying North or South latitudes. These speed and latitude compensator controls are designed so they can be externally mounted in a remote enclosure as an option in the event the Control and Transmission Unit is not readily accessible during normal operation.

This unit may be connected to any of several standard ship voltages. This unit may also be wired for 35-volt, 50-volt, or 70-volt dc step repeater systems at installation. Refer to Figure 2-2 for connection information. If purchased as an option, 1-speed or 36-speed, 60 or 400 hertz synchro outputs are also available.

1-4. MK-37 MOD D MASTER COMPASS UNIT. The MK-37 Mod D Master Compass Unit consists of a shock-mounted, fluid-filled Binnacle Assembly which houses the Compass Element Assembly. This unit is sealed and designed for deck mounting. The viewing window for the Compass Dial is on the aft end of the Master Compass. The Compass Dial is illuminated (red) and the brightness is adjustable at the Control and Transmission Unit.

1-5. CABLE ASSEMBLY. A cable assembly is furnished to connect the Master Compass Unit to the Control and Transmission Unit. This cable includes a prewired connector for the Master Compass connection and labeled wires for connection to the various terminal boards within the Control and Transmission Unit. The standard cable length is 10 feet (3 meters) but other lengths are available as options.

1-6. MASTER COMPASS TYPES. The type of Master Compass available for use in the MK-37 Mod E Gyrocompass equipment is variable depending upon the type of output data transmission required. The standard unit (1891974-1) provides a step transmitter as the reference from which remote step repeaters are controlled. The alternate types (1891974-2, -3, -4, -5, -6, and -8) provide the standard step transmitter in addition to either synchro or sin/cos data transmitters. Tables 1-1 and 1-1A list the part numbers of the major assemblies which accompany the Master Compass.

1-7. SYSTEM SPECIFICATIONS. Table 1-2 lists the power requirements of the MK-37 Mod E Gyrocompass equipment.

1-8. POWER TRANSFER UNIT (OPTIONAL). The optional Power Transfer Unit is a voltage sensing device which monitors the internal 24-volt d-c power supply in the Control and Transmission Unit and provides automatic power changeover when necessary to a 24-volt d-c standby supply obtained from an external battery source. The internal 24-volt d-c power supply is rectified from the ship's primary a-c supply. When a critical drop is detected, the automatic power transfer provides for continued operation of the Master Compass from the 24-volt d-c standby supply. When normal internal 24-volt d-c is again available, power is automatically switched back.

During the time that the compass is powered from the standby supply, no power is provided for d-c step transmission repeater loads. Therefore, upon return of normal power, step repeaters should be checked for correct orientation. The Power Transfer Unit has a set of relay contacts (1 N.O./1 N.C.) for remote alarm purposes.

Table 1-1. Master Compass Data Configurations and Accompanying Assemblies for SN 310 and Below

MASTER COMPASS	TYPE OF OUTPUT DATA	CABLE ASSEMBLY*	CONTROL AND TRANSMISSION UNIT
1891974-1	Step Data Only	T965860-0	1976054
1891974-2	Step Data and 1X-60 Hz Synchro (15TRX6) 115V	T965860-2	1976054
1891974-3	Step Data and 1X-400 Hz Synchro (15CX4), 115V	T965860-2	1976054
1891974-4	Step Data and 1X-400 Hz Synchro (11CX4), 26V	T965860-2	1976054
1891974-5	Step Data and Sin/Cos Potentiometer	T965860-7	1976054
1891974-6	Step Data and 1X and 36X-400 Hz Synchro (15CX4), 115V	T965860-6	1976054
1891974-8	Step Data and 1X and 36X-60 Hz Synchro (15TRX6), 115V	T965860-6	1976054

* The standard cable assemblies listed are 10 feet (3 meters) in length. Other dash numbered cable assemblies are as follows:

A. Same as T965860-0 except length: T965860-3 (17 feet or 5M), T965860-4 (25 feet or 8M), T960860-5 (31 feet or 10M), T965860-8 (45 feet or 13.7M), T965860-9 (40 feet or 12M)

B. Same as T965860-7 except length: T965860-10 (33 feet or 10M)

C. Same as T965860-2 except length: T695860-13 (18 feet or 5.5M)

Table 1-1A. Master Compass Data Configurations and Accompanying Assemblies for SN 311 and Above

MASTER COMPASS	TYPE OF OUTPUT DATA	CABLE ASSEMBLY*	CONTROL AND TRANSMISSION UNIT
1891974-2	Step Data and 1X-60 Hz Synchro (15TRX6) 115V	T965860-0	1976054
1891974-3	Step Data and 1X-400 Hz Synchro (15CX4), 115V	T965860-0	1976054
1891974-4	Step Data and 1X-400 Hz Synchro (11CX4), 26V	T965860-0	1976054
1891974-5	Step Data and Sin/Cos Potentiometer	T965860-0	1976054
1891974-6	Step Data and 1X and 36X-400 Hz Synchro (15CX4), 115V	T965860-0	1976054
1891974-8	Step Data and 1X and 36X-60 Hz Synchro (15TRX6), 115V	T965860-0	1976054

* The standard cable assemblies listed are 10 feet (3 meters) in length. All cable assemblies starting with system S/N 311 are manufactured with identical wire preparation on the control and transmission end. Therefore, the only difference in cable assemblies is in the following lengths:

- A. T965860-0 (10 feet or 3 meters) - Standard
- B. T965860-3 (17 feet or 5 meters) - Optional
- C. T965860-4 (25 feet or 8 meters) - Optional
- D. T965860-5 (32 feet or 10 meters) - Optional
- E. T965860-8 (45 feet or 14 meters) - Optional
- F. T965860-9 (40 feet or 12.5 meters) - Optional

The previous T965860-2, -6, and -7 cables were all 10 feet (3M) long and are now superceded by the dash 0 cable. The dash 10 cable was 33 feet (10M) long and is now superceded by the dash 5 cable. The dash 13 cable was 17 feet (5M) long and is now superceded by the dash 3 cable.

Table 1-2. Power Requirements

SHIP'S SUPPLY VOLTAGE	TOLERANCE (%)	FREQUENCY (HZ)	TOLERANCE (%)	MAX. CONTINUOUS CURRENT CONTROL & TRANSMISSION UNIT		
				START	RUN	12 REPEATER LOAD
24 vdc	22 to 28 vdc	-	-	4.5	2.5	-
110/115 vac	+10	50/60	+6	1.5	0.75	2.5
230 vac	+10	50/60	+6	0.75	0.38	1.2
380/460 vac	+10	50/60	+6	0.44	0.22	0.73

CHAPTER 2

INSTALLATION

2-1. INTRODUCTION. This chapter provides installation instructions for the MK-37 Mod E Gyrocompass equipment. The MK-37 Mod E Gyrocompass equipment consists of the Master Compass Unit and the Control and Transmission Unit.

2-2. INSTALLATION DRAWINGS. Figure 2-1 provides the physical size, mounting dimensions, and electrical information required to install the MK-37 Gyrocompass System.

2-3. INSTALLATION REQUIREMENTS. The Control and Transmission Unit requires 50 or 60 hertz, single-phase ship's supply voltage. The voltage may be 115, 230, 380, or 460 volts ac. The Control and Transmission Unit can be operated from 24 volts dc ship's supply if normal ac power fails to maintain the Master Compass Unit (but no output step data transmission will be supplied).

2-4. MASTER COMPASS UNIT INSTALLATION. The Master Compass can be installed for use either as a direct-reading compass or as a remotely located unit driving compass repeaters. When remotely located, it should be mounted as close to the ship's center of roll and pitch as possible. The Master Compass should be located within view of the Control and Transmission Unit because access to each unit is required during starting procedures. The Master Compass should be located no closer to a magnetic compass than the distance defined in Table 2-1. Install the Master Compass as follows:

- (1) Prepare a flat and level surface to mount the MK-37 Gyrocompass. Installation of the mounting bolts in relationship with the ship's centerline is shown in Figure 2-1.
- (2) Mount the gyrocompass on the prepared foundation so the fore and aft alignment marks on the base of the compass are aligned with the ship's fore and aft lines. A 1/32-inch misalignment between the fore and aft alignment marks equals a 1/6-degree compass error. Slots on the base of the compass permit a plus or minus 5-degree adjustment when making the alignment. If the mounting surface is not flat and level, shims should be used so the mounting base is not warped or strained.
- (3) Connect cable number 1 to gyrocompass connector J1 per Figure 2-1. Make certain that the cable is run so that it does not interfere with the movement of the binnacle in its shock mounts.
- (4) Connect the Master Compass to the ship's hull (ground) by using a bonding strap connected to the bonding screw terminal on the compass (see Figure 2-1).

2-5. CONTROL AND TRANSMISSION UNIT INSTALLATION. The Control and Transmission Unit can be mounted on any vertical surface providing that its front panel is accessible and the cabinet door can be opened to turn on and off the repeater switches. Four mounting holes are provided on the cabinet. Stuffing tubes and cable entrance plates are provided at the bottom of the enclosure for interconnecting cabling. The unit should be connected to the ship's hull (ground) by a bonding strap connected to the bonding screw terminal provided.

The Control and Transmission Unit is cooled by conduction and convection and must not be located adjacent to any large heat source. A well-ventilated area is preferred.

At installation, the connections at terminal board 1A1TB5 and the proper fuse 1F1 must be installed to correctly match the ship's voltage to the equipment. Various fuses are supplied in a separate package with the unit. The charts shown in Figure 2-2 (mounted inside the cabinet) show the correct arrangement for connecting the system voltage and the proper fuse to be used.

At installation, connections at terminal board 1A3TB1 must be made to obtain the required step transmission voltage (35, 50, or 70 volts dc). A cable entrance plate is provided on the bottom of the enclosure that must be drilled at installation to accommodate the output repeater load cables.

Cable number 1 from the Master Compass Unit has its own stuffing tube for connection to the Control and Transmission Unit. Individual wires for connection to their terminal boards within the unit are labeled. The Control and Transmission Unit should be located no closer to a magnetic compass than the distance defined in Table 2-1.

2-6. SPEED AND LATITUDE COMPENSATOR UNIT (OPTIONAL EXTERNAL MOUNTED) INSTALLATION. The Speed and Latitude Control Board may be removed from the Control and Transmission Unit and externally mounted in a remote enclosure, if desired. Refer to installation drawing, Figure 2-1, for the procedure and interconnection required.

2-7. POWER TRANSFER UNIT (OPTIONAL). The optional Power Transfer Unit is designed for mounting on any vertical surface. Refer to installation drawing, Figure 2-1, for the mounting dimensions and interconnections required.

Table 2-1. Safe Distance From Magnetic Compass

SAFE DISTANCE FROM:	MASTER COMPASS	CONTROL AND TRANSMISSION UNIT
STANDARD MAGNETIC COMPASS	0.9 meters	2.5 meters
STEERING MAGNETIC COMPASS	0.6 meters	1.5 meters

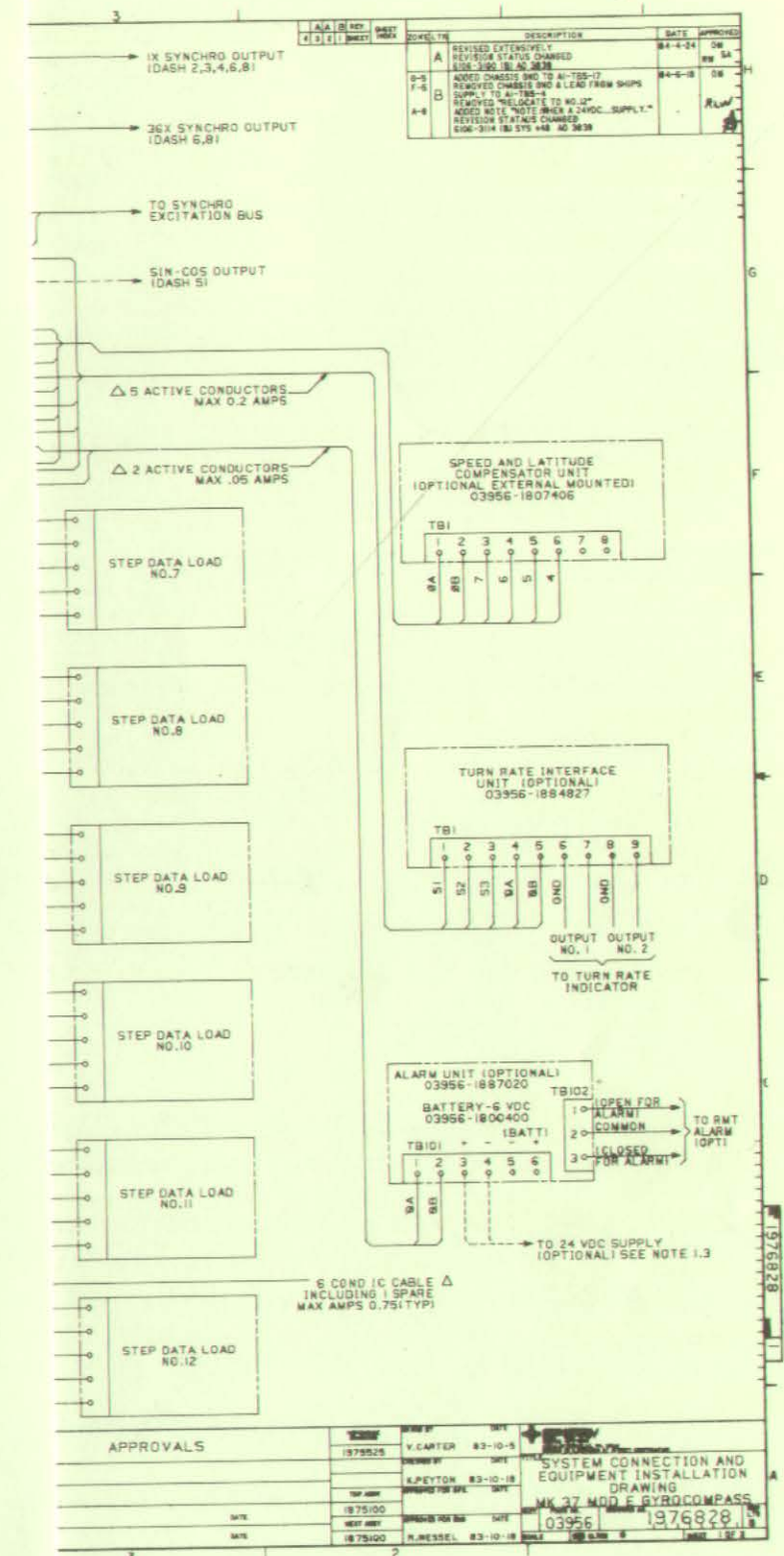


Figure 2-1. MK-37 Mod E Gyrocompass Equipment, Installation Drawing (Sheet 1 of 6)

2-8 INSTALLATION ADJUSTMENTS. When the MK-37 Mod E Gyrocompass equipment is installed, the balance potentiometer (1A1R59) and gain potentiometer (1A1R10) on circuit board 1A1 in the Control and Transmission Unit may require adjustment. If the potentiometers are not properly adjusted, the system will not properly slew or level during the starting procedure. Refer to Figure 2-3 and the following procedure to perform the adjustment.

- (1) Perform steps (1) through (5) of paragraph 3-3.
- (2) Position Control and Transmission Unit MODE switch to AUTO level.
 - (a) The compass should level within 15 to 30 seconds (TILT METER needle deflects from (+)10 to (-)10 with equal oscillations).
 - (b) If TILT METER needle swings more positive than negative, rotate potentiometer 1A1R59 counterclockwise.
 - (c) If TILT METER needle swings more negative than positive, rotate potentiometer 1A1R59 clockwise.
 - (d) If TILT METER does not begin to swing within 15 to 30 seconds, proceed as follows:
 1. Rotate potentiometer 1A1R10 fully counterclockwise.
 2. Rotate potentiometer 1A1R10 ten turns clockwise.
 3. Position MODE switch to SLEW.
 4. Operate SLEW switch until compass card starts to slew.
 5. Allow gyro wheel to regain speed when MODE switch is in START position.
 6. Position MODE switch to AUTO LEVEL. Compass shall level within 15 to 30 seconds. If not, rotate 1A1R10 clockwise. Repeat steps 1 through 5.

NOTE

Potentiometer 1A1R59 is the balance potentiometer (causes the TILT METER to swing with equal oscillations). Potentiometer 1A1R10 is the gain potentiometer - when rotated CCW, slows the AUTO leveling action; when rotated CW, speeds up the AUTO leveling action.

- (3) Position Control and Transmission Unit MODE switch to OFF.

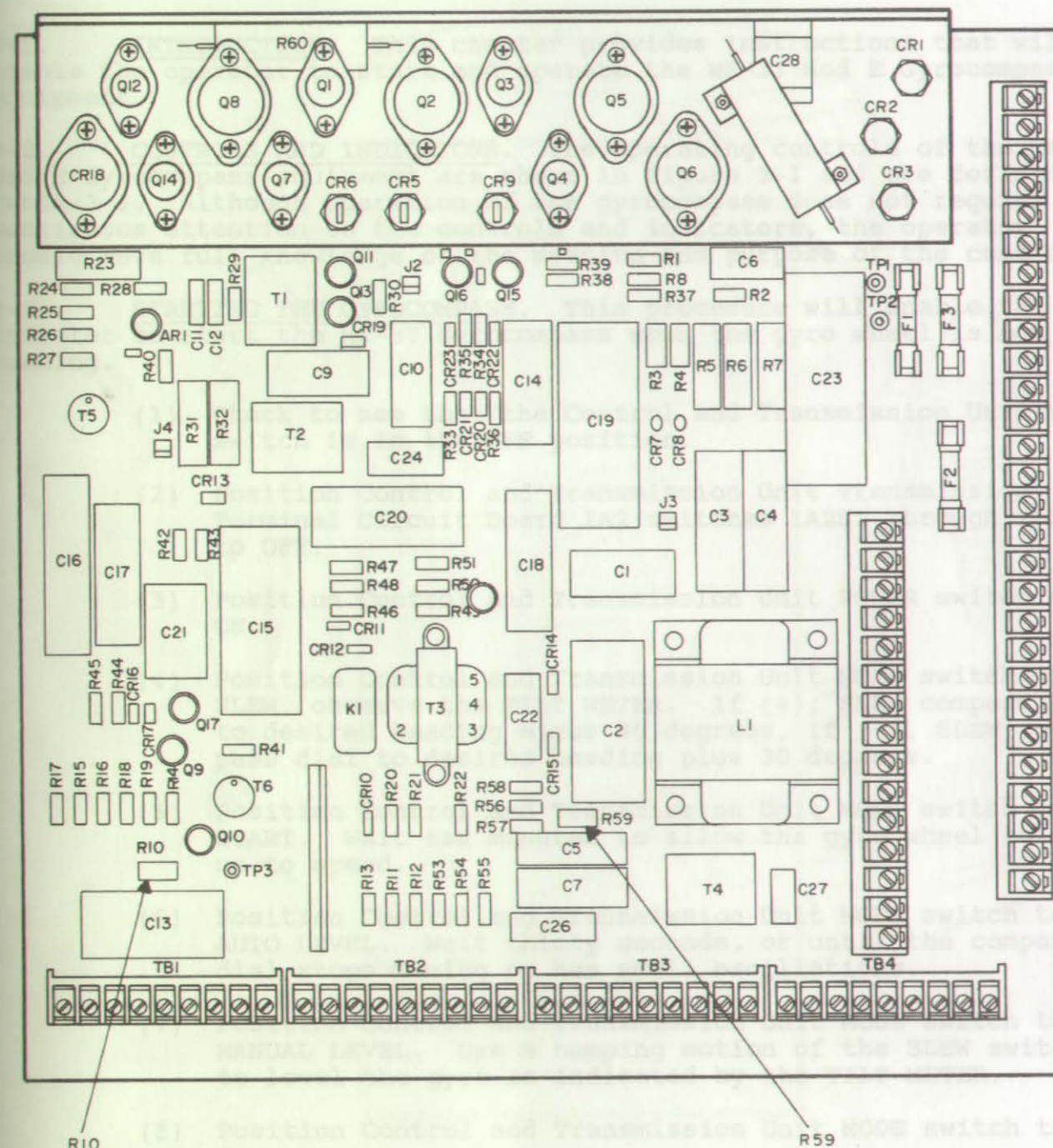
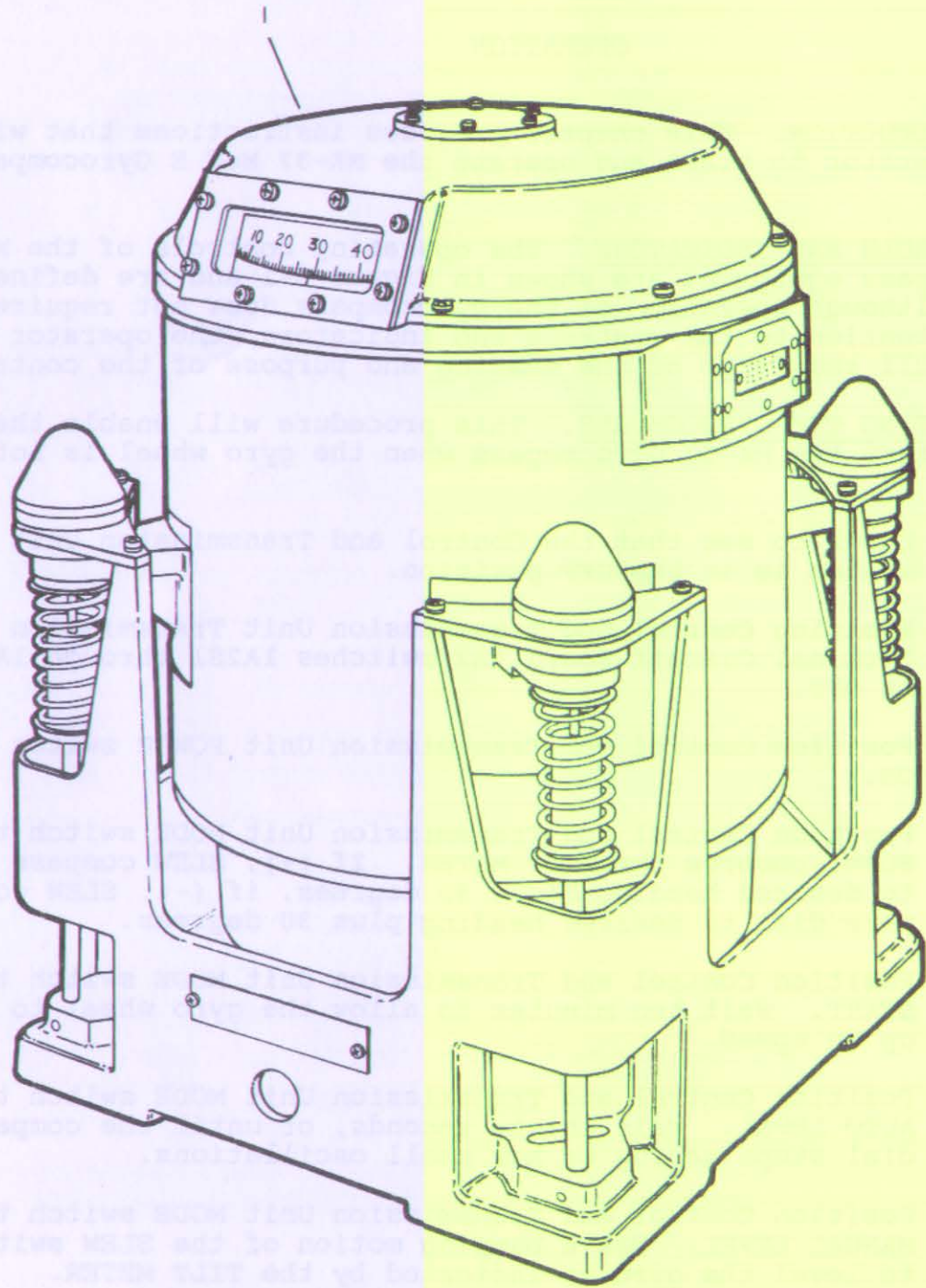
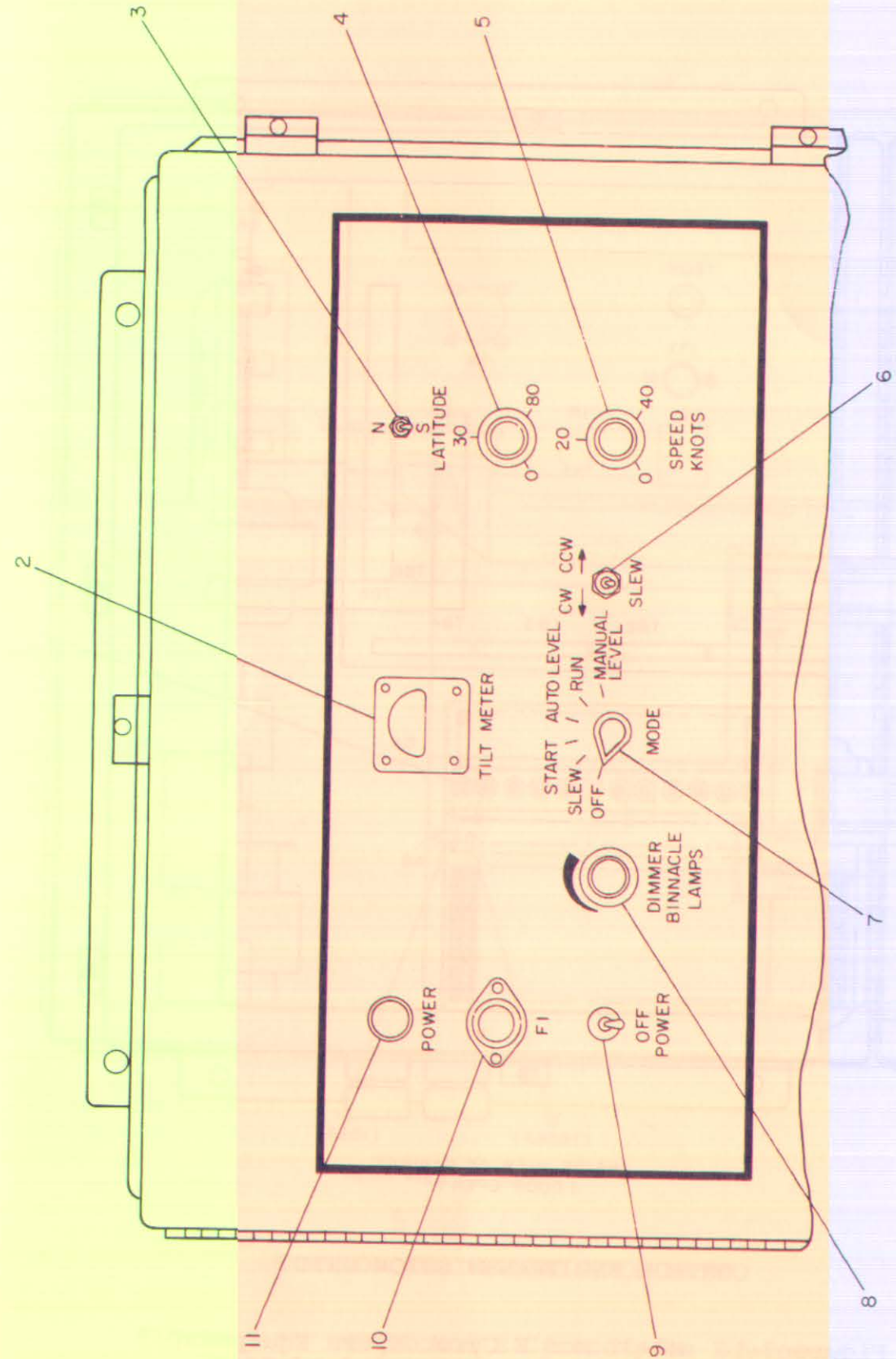


Figure 2-3. Location of Adjustment Potentiometers (Control Circuit Card Assembly 1A1)



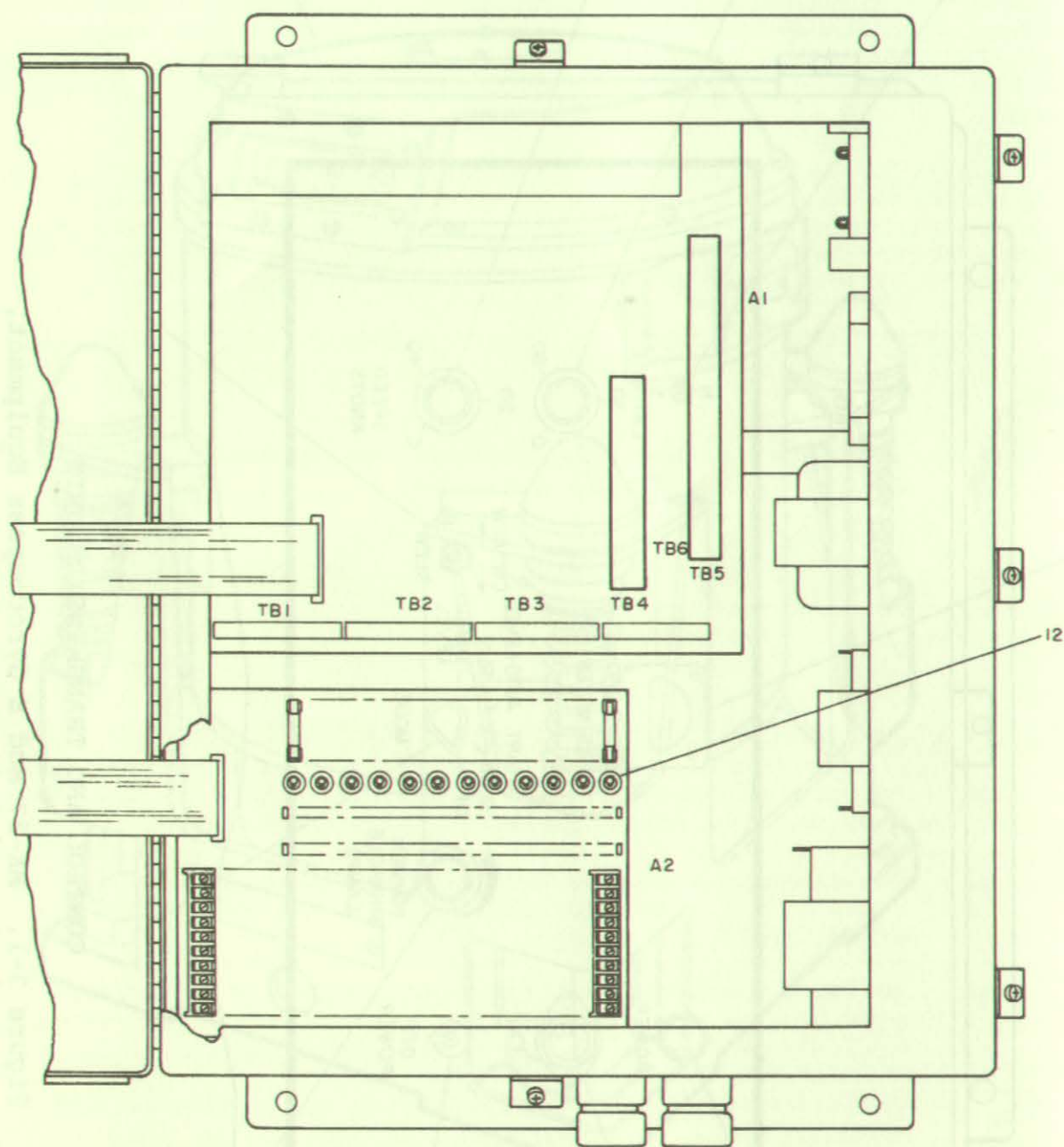
MASTER COMPASS

Figure 3-1. MK-37 Mod E Gyrocompass Equipment,
Controls and Indicators (Sheet 1 of 4)



CONTROL AND TRANSMISSION UNIT

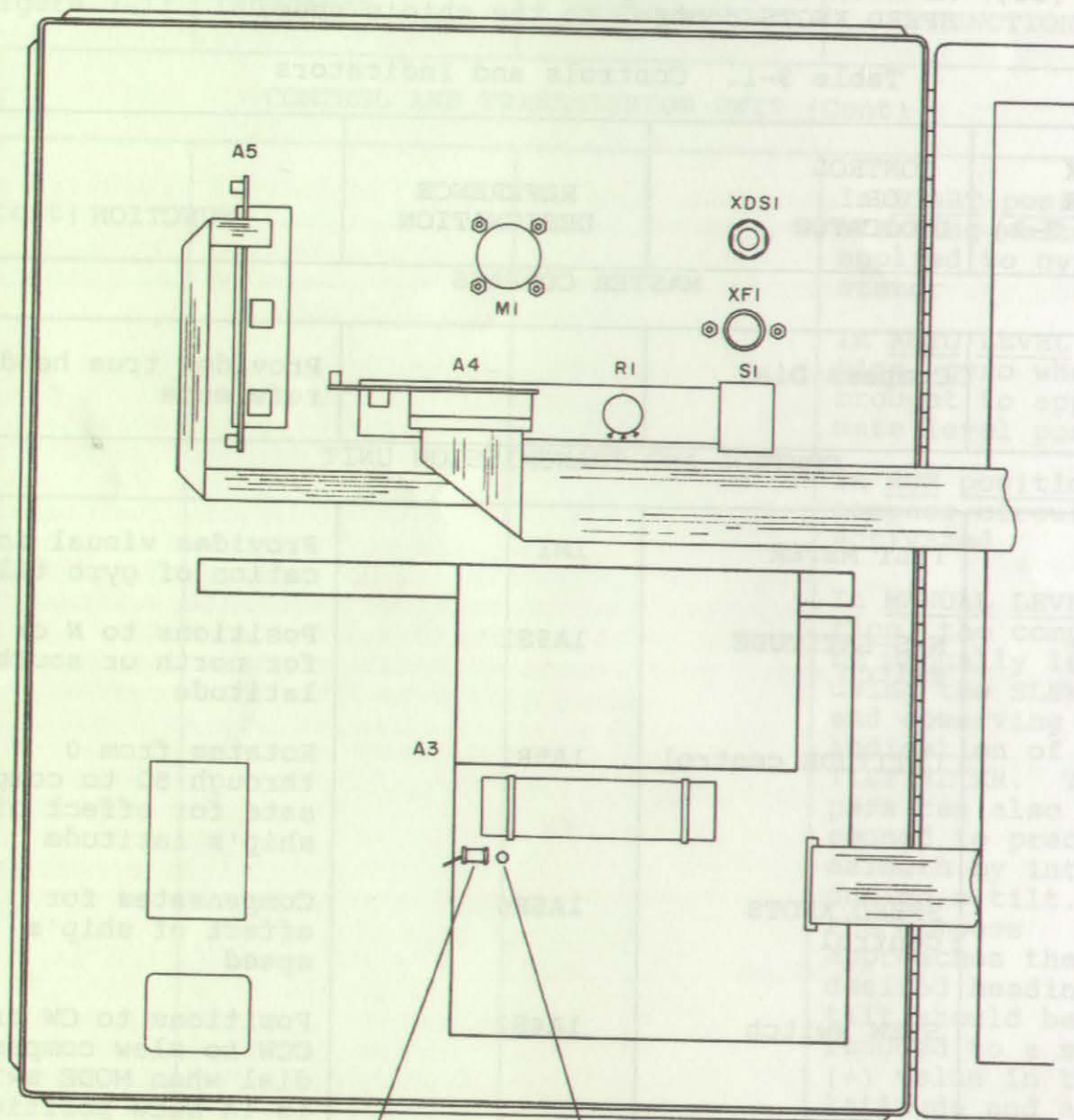
Figure 3-1. MK-37 Mod E Gyrocompass Equipment,
Controls and Indicators (Sheet 2 of 4)



INSIDE VIEW OF CABINET
(DOOR OPEN)

CONTROL AND TRANSMISSION UNIT

Figure 3-1. MK-37 Mod E Gyrocompass Equipment,
Controls and Indicators (Sheet of 3 of 4)



13 (A3SI)
14 (A3DSI)

REAR VIEW OF DOOR

CONTROL AND TRANSMISSION UNIT

Figure 3-1. MK-37 Mod E Gyrocompass Equipment,
Controls and Indicators (Sheet 4 of 4)

- (10) Position N-S LATITUDE switch to proper hemisphere and set the LATITUDE control to the ship's latitude.
- (11) As soon as the ship is underway, set and maintain the SPEED KNOTS control to the ship's speed.

Table 3-1. Controls and Indicators

INDEX NUMBER (Figure 3-1)	CONTROL OR INDICATOR	REFERENCE DESIGNATION	FUNCTION
MASTER COMPASS			
1	Compass Dial	-	Provides true heading reference
CONTROL AND TRANSMISSION UNIT			
2	TILT METER	1M1	Provides visual indication of gyro tilt
3	N-S LATITUDE switch	1A5S1	Positions to N or S for north or south latitude
4	LATITUDE control	1A5R1	Rotates from 0 through 80 to compensate for effect of ship's latitude
5	SPEED KNOTS control	1A5R6	Compensates for effect of ship's speed
6	SLEW switch	1A4S2	Positions to CW or CCW to slew compass dial when MODE switch is in SLEW position or to manually adjust the tilt of the gyrosphere when MODE switch is in MANUAL LEVEL position
7	MODE switch	1A4S1	In <u>SLEW position</u> , permits slewing of the compass dial with gyro wheel stopped

Table 3-1. Controls and Indicators-(Continued)

INDEX NUMBER (Figure 3-1)	CONTROL OR INDICATOR	REFERENCE DESIGNATION	FUNCTION
CONTROL AND TRANSMISSION UNIT (Cont)			
7 (cont)			<p>In <u>START position</u>, starting voltage is applied to gyro wheel stator</p> <p>In <u>AUTO LEVEL position</u>, gyro wheel is brought to approximate level position</p> <p>In <u>RUN position</u>, all compass circuits are activated</p> <p>In <u>MANUAL LEVEL position</u>, the compass can be manually leveled using the SLEW switch and observing the indication of the TILT METER. The compass can also be caused to precess in azimuth by introducing a tilt. As the compass approaches the desired heading, the tilt should be reduced to a small (+) value in the N latitude and a small (-) value in the S latitude</p> <p style="text-align: center;">CAUTION</p> <p>In <u>MANUAL LEVEL mode</u>, avoid introducing excessive tilt using the SLEW switch. Holding the SLEW switch in the direction of the TILT METER will result in upsetting the compass</p>

Table 3-1. Controls and Indicators-(Continued)

INDEX NUMBER (Figure 3-1)	CONTROL OR INDICATOR	REFERENCE DESIGNATION	FUNCTION
CONTROL AND TRANSMISSION UNIT (Cont)			
8	DIMMER BINNACLE LAMPS control	1R1	Rotated clockwise or counterclockwise to control the brightness of the Binnacle lamps
9	POWER switch	1S1	In <u>ON</u> position, applies ship's power to the Control and Transmission Unit
10	F1 power fuse	1F1	Protects the Control and Transmission Unit input circuit from excessive current
11	POWER lamp	1DS1	Lights to indicate compass power supply output is available
12	Repeater switches	1A2S1 through 1A2S12	In ON position, transmits amplified step transmitter signal to a remote repeater
13	Reset switch	1A3S1	Resets alarm lamp
14	Alarm lamp	1A3DS1	Lights when overload protection circuit of Repeater Circuit Card Assembly is triggered

3-4. STOPPING THE MASTER COMPASS. To stop the Master Compass, perform the following steps in sequence:

- (1) Position Control and Transmission Unit MODE switch to OFF.
- (2) Position Control and Transmission Unit Transmission Terminal Circuit Board 1A2 switches to OFF.
- (3) Position Control and Transmission Unit POWER switch to OFF.

3-5. ROUTINE OPERATION. Although the operation of the Master Compass is automatic, the following checks should be performed during each watch.

- (1) Check the Control and Transmission Unit LATITUDE control; reset control to proper latitude as required.
- (2) Check the Control and Transmission Unit N-S LATITUDE switch; reset switch to proper hemisphere.
- (3) Check Control and Transmission Unit SPEED KNOTS control; reset control to proper speed of ship as required.
- (4) Make periodic normal azimuth checks to verify the compass heading information.

3-6. FAST SETTLE PROCEDURE. The MK-37 Gyrocompass can be settled within one hour to within 0.5 degree secant latitude of actual heading by using the following procedure. This procedure will require some practice on the specific compass and requires some judgement skills on the part of the operator.

Each compass has its own characteristic tilt. Determine this characteristic tilt from the TILT METER on the Control and Transmission Unit under calm conditions with the compass fully settled. This tilt value should be taken at dockside or at calm anchorage and may be refined by observation over several independent operations. Record and save this number.

- (1) Position Control and Transmission Unit controls as follows:

Control	Position
Repeater switches (1A2S1 through 1A2S12)	OFF
POWER switch	ON
MODE switch	SLEW
SPEED KNOTS control	0
LATITUDE switch	Proper hemisphere
LATITUDE control	Local latitude

- (2) Observe Control and Transmission Unit TILT METER. Using the SLEW switch, slew the compass to the ship's heading minus 30 degrees if the TILT METER indicates plus. Slew the compass to the ship's heading plus 30 degrees if the TILT METER indicates minus.
- (3) Position the Control and Transmission Unit MODE switch to START. Wait ten minutes for the gyro wheel to come up to speed.

- (4) Position the Control and Transmission Unit MODE switch to AUTO LEVEL. Observe the TILT METER until it indicates a value less than ten in either direction.
- (5) Position the Control and Transmission Unit MODE switch to MANUAL LEVEL. The Compass Dial will now normally oscillate about the true heading with gradual damping of the oscillations. The object of this procedure is to manually enhance the damping process and settle the compass in less time.
 - (a) If the Compass Dial indication is higher than ship's heading, set the TILT METER TO -5 to -8 divisions by jogging the SLEW switch.
 - (b) If the Compass Dial indication is lower than ship's heading, set the TILT METER TO +5 to +8 divisions by jogging the SLEW switch.
 - (c) As the Compass Dial indication nears the ship's heading from either direction, jog the SLEW switch in the opposite direction to move the TILT METER to 5 to 8 divisions in the opposite direction. By alternating between the plus and minus TILT METER settings, overshoots can be controlled and the dial indication will quickly approach the ship's heading.
 - (d) When the Compass Dial indication is within one degree or less of the ship's heading, jog the SLEW switch to obtain the normal TILT METER indication for the compass recorded at the beginning of this procedure.
- (6) Position Control and Transmission Unit MODE switch to RUN.
- (7) When the vessel is underway, position the Control and Transmission Unit SPEED KNOTS control to the ship's speed.

3-7. REPEATER OVERLOAD PROTECTION CIRCUITS. If a short circuit occurs in one of the compass repeaters (causing an overload current), a thyristor is triggered on Repeater Circuit Card Assembly 1A3, and data transmission stops until the overload is removed. A lamp on the circuit card lights and stays on until the circuit is manually reset.

If the compass repeaters do not follow or agree with the Master Compass, the protection circuit may have been triggered. Open the front panel of the Control and Transmission Unit. If the lamp on the Repeater Circuit Card Assembly 1A3 is on, an overload has occurred. Check whether the overload still exists by pressing the toggle switch 1A3S1 (this switch turns the lamp off). If the lamp lights again after the Master Compass has changed its heading by one degree or more, the overload still exists. If not, synchronize the repeaters with the Master Compass and continue normal operation.

CHAPTER 4

MAINTENANCE

4-1. INTRODUCTION. This chapter provides information concerning maintenance inspections of the MK-37 Mod E Gyrocompass equipment to ensure that it is operating properly. This chapter also includes cleaning instructions for the gyrocompass equipment.

4-2. SCHEDULED MAINTENANCE INSPECTION. The maintenance inspections listed in Table 4-1 are to be performed within the frequency indicated to assure proper operation of the gyrocompass equipment.

Table 4-1. Visual Inspection Checks

INSPECT OR CHECK	FREQUENCY OF INSPECTION	INDICATION DESIRED	CORRECTIVE ACTION
MASTER COMPASS			
Compass Dial	When accurate heading checks can be made	Within 0.5 degree secant latitude of true heading when settled and properly compensated	If repeated checks show the Compass Dial is consistently off by the same amount from the true heading, up to five degrees may be corrected by shifting the Master Compass base in the mounting holes. Do not attempt to correct dial reading by moving the dial
Dial Window	Each week	Clean	Clean with a cloth dampened with a solution of mild detergent and water
Fluid level viewed in window	Each week	Fluid level higher than top of window; no bubbles are present	Compass may be operated even though fluid surface is partially visible, but a low level may cause somewhat larger errors in heavy seas; compass shall be filled when convenient

Table 4-1. Visual Inspection Checks--(Continued)

INSPECT OR CHECK	FREQUENCY OF INSPECTION	INDICATION DESIRED	CORRECTIVE ACTION
MASTER COMPASS (Cont)			
Shock Mounts	Each week	Binnacle free in its shock mounts	Check for dirt and obstructions; be sure that cable from Binnacle is free and flexible
Master Compass	Each week	No indication of oil seepage around any seam or seal	Tighten screws on Binnacle covers
CONTROL AND TRANSMISSION UNIT			
TILT METER	Each watch	Normal settled tilt indication	Record average reading of pointer oscillations when compass is settled; abnormal deviations in average values indicate malfunction
N-S LATITUDE switch	Each watch	Set for north (N) or south (S) hemisphere	Set to proper hemisphere location
LATITUDE control	Each watch	Local latitude setting	Reset to local latitude
SPEED KNOTS control	Each watch	Ship's speed	Reset to ship's speed

4-3. CLEANING INSTRUCTIONS. The Master Compass is completely sealed and, therefore, requires no cleaning internally. Each month, however, any accumulated dirt and oil on the exterior surface should be removed. This can be done using a lint-free cloth moistened with inhibited methyl chloroform to remove oil deposits. Use the solvent according to safety notices. Particular attention should be given to shock mounts to ensure that dirt has not accumulated in this area. The Control and Transmission Unit should be cleaned externally in the same manner as the Master Compass.

4-4. SPARE PARTS KIT. The MK-37 Mod E Gyrocompass equipment is supplied with an onboard spare parts kit which includes components normally replaceable by the ship's personnel. Table 4-2 is a list of parts supplied.

Table 4-2. Spare Parts Kit, Part Number 1806253

ITEM NUMBER	QTY	REFERENCE DESIGNATION	PART NUMBER	NOMENCLATURE
1	10	1A1F2, 1A2F1-F12	F03A250V1A	Fuse, 1 Amp
2	5	1A1F1, 1A3F1	F03A250V8A	Fuse, 8 Amp
3	2	1F1	F60C500V5A	Fuse, 5 Amp
4	2	1F1	F09A250V6A	Fuse, 6 Amp
5	2	1F1	F09A250V8A	Fuse, 8 Amp
6	2	1DS1	M15098/10-001	Lamp, Neon