Honeywell

MAINTENANCE MANUAL

BENDIX/KING®

KS 270C

SERVO SYSTEM

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WARNING
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SECTION IV

THEORY OF OPERATION

4.1 GENERAL

The KS 270C pitch primary servo is used to provide AFCS control of the elevators. It contains a servo motor with amplifier and an engage clutch, as well as a torque sensor for trim command generation. The servo outputs a dual-channel trim sense signal with a scale factor of 100mV/in-lb (combining the channels), with a positive differential voltage representing CW torque. Maximum sensed torque is at least 20 in-lb in each direction Pitch servos also contain a tach feedback signal to provide servo motion sensing. The servo outputs a differential signal with a scale factor of approximately 5.3 V for full servo speed.

Each primary servo is installed with a KM 275 servo mount, which contains a slip clutch for pilot override. The servo recieves a differential command input and drives the servo motor with a speed proportional to the magnitude of the command. The command polarity will determine direction of the servo rotation. The command inputs have an impedance of at least 15 K ohms. The interface is designed such that an open command signal will not cause a servo drive of more than 25% of full-scale speed.

The pitch servo also contains a validity circuit which compares the motor voltage against the servo command. The servo actuator outputs a open/ground discrete signal, where ground represents a valid servo. If the comparison fails, the servo outputs an invalid (open) signal to the FCC.

NOTE

Removing power to the servo (e.g. by pressing the AP DISC switch) will also cause the servo to be sensed as invalid.

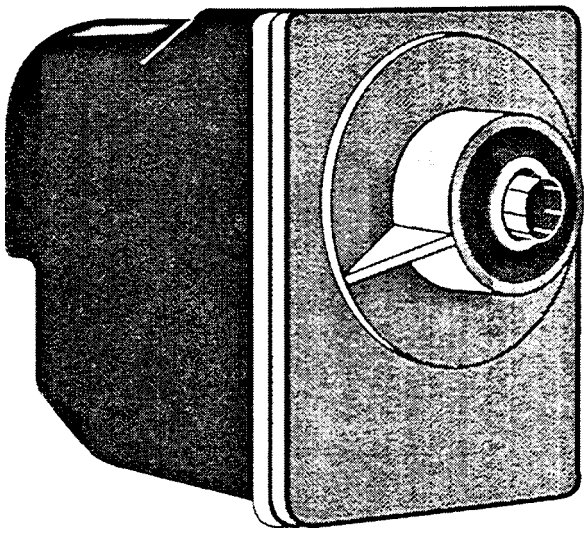


Figure 4-1 KS 270C Pitch Servo

4.2 UNIT INTERFACE DESCRIPTION

4.2.1 Pitch Servo Interface To The KC 225

PIN	DESCRIPTION
P2252-2	TRIM_SENSE_1
P2252-3	TRIM_SENSE_REF
P2252-8	PITCH_CLUTCH
P2252-9	PITCH_SERVO_VALID
P2252-10	PITCH_SERVO_CMD_+
P2252-11	PITCH_SERVO_CMD_REF
P2252-67	TRIM_SENSE_2

Table 4-1 Pitch Servo Interface

The KS 270C Pitch Servo uses the following signals: a clutch high-side and a clutch low-side input, a command high and a command low input, a trim sense + output, trim sense - output, trim sense reference output and a servo valid output.

The PITCH_CLUTCH signal from the FCC is wired to the low side of the servo engage clutch solenoid. The high side of the clutch is wired to the aircraft power through the AP DISC switch. When the clutch is disengaged by the FCC, there should be 28 V on the low side clutch (assuming AP DISC switch is not pressed). When the clutch is engaged, there should be >0.1 V and <2.5 V on the low side of the clutch. If AP DISC is pressed, 28 V is removed from the clutch solenoid and the clutch will disengage. When the low-side clutch engage transistor in the FCC is turned on, the current flowing in the solenoid (nominally 600mA @ 28 v or 1.2 A @ 14 V) is monitored to determine that the solenoid is working correctly during pre-flight test. These outputs begin to go into foldback current-limiting around 1.8 A. The FCC clutch output can be engaged or disengaged through the diagnostic pages. When the Pitch Clutch output is turned on (using the DISCRETE OUTPUTS page), the Pitch Clutch Engage discrete input (which can be viewed on the DISCRETE INPUT STATUS diagnostic page) should also be turned on. If the clutch engaged bit is not turned on when the clutch output is set, verify that power is supplied to the servo (e.g. AP DISC is not pressed) and the hardware monitors are not tripped. If a hardware monitor has failed, the clutch outputs associated with that monitor will not be able to be engaged. (The hardware monitor status can be viewed through the diagnostic pages.)

The PITCH_CMD outputs from the Flight Computer supply the servo command outputs to the KS 270C. The command high and low (REF) signals form a differential input that is used to drive the servomotor via the internal servo amplifier. The command high input is a + or - 10 V signal (through a 2Kohm series resistor) generated by the Flight Computer. The command low input is a reference back to the internal Flight Computer ground, isolated through a 2Kohm series resistor. The value of the output signal determines how fast the servo is driven. Anything greater than +/- 9 volts will command full speed servo movement. The servo can be commanded to drive in either direction through the ANALOG OUTPUTS diagnostic interface.

NOTE

To be able to move the controls, the servo clutch must be engaged.

The TRIM_SENSE servo outputs are generated by a strain gauge inside the KS 270C. The strain gauge produces a voltage based on the amount of torque measured on the pinion of the KS 270C. The voltage is amplified and buffered to provide a +/- 3 V signal that is proportional to the torque. If the trim sense+ (labeled TRIM_SENSE_1 on the FCC) output is +1.2 V, then the trim sense - (labeled TRIM_SENSE_2 on theFCC) output is -1.2 V.

These signals are then referenced to 3 V, (the reference voltage is provided to the TRIM_SENSE_REF input of the FCC) so the voltage measured at the servo, with respect to ground, would be +4.2 V and +1.8 V. The differential voltage measured from the trim sense+ to trim sense - has a scale factor of 100 mV per inch-pound of torque. This strain gauge output is used to determine when the trim needs to run in AP mode.(i.e. If the AP mode is engaged, the trim servo will start to run after a certain value is exceeded on the trim sense output.) The TRIM_SENSE_1, TRIM_SENSE_2, and TRIM_SENSE_REF inputs to the FCC are all being monitored by the Flight Computer to determine if a failure has occurred in the dual strain gauge circuitry in the pitch servo. If the monitor determines that a failure has occurred then the Flight Computer will not allow autotrim operation to occur.

The PITCH_SERVO_VALID signal from the KS 270C is used by the Flight Computer to determine if the pitch servo is working properly. If this output is at ground, the pitch servo is valid. If this output is open, the pitch servo is invalid. This output is routed to the Flight Computer 225 discrete input PITCH_SERVO_VALID. When it is invalid, the Flight Computer locks out operation of the pitch and roll axies.

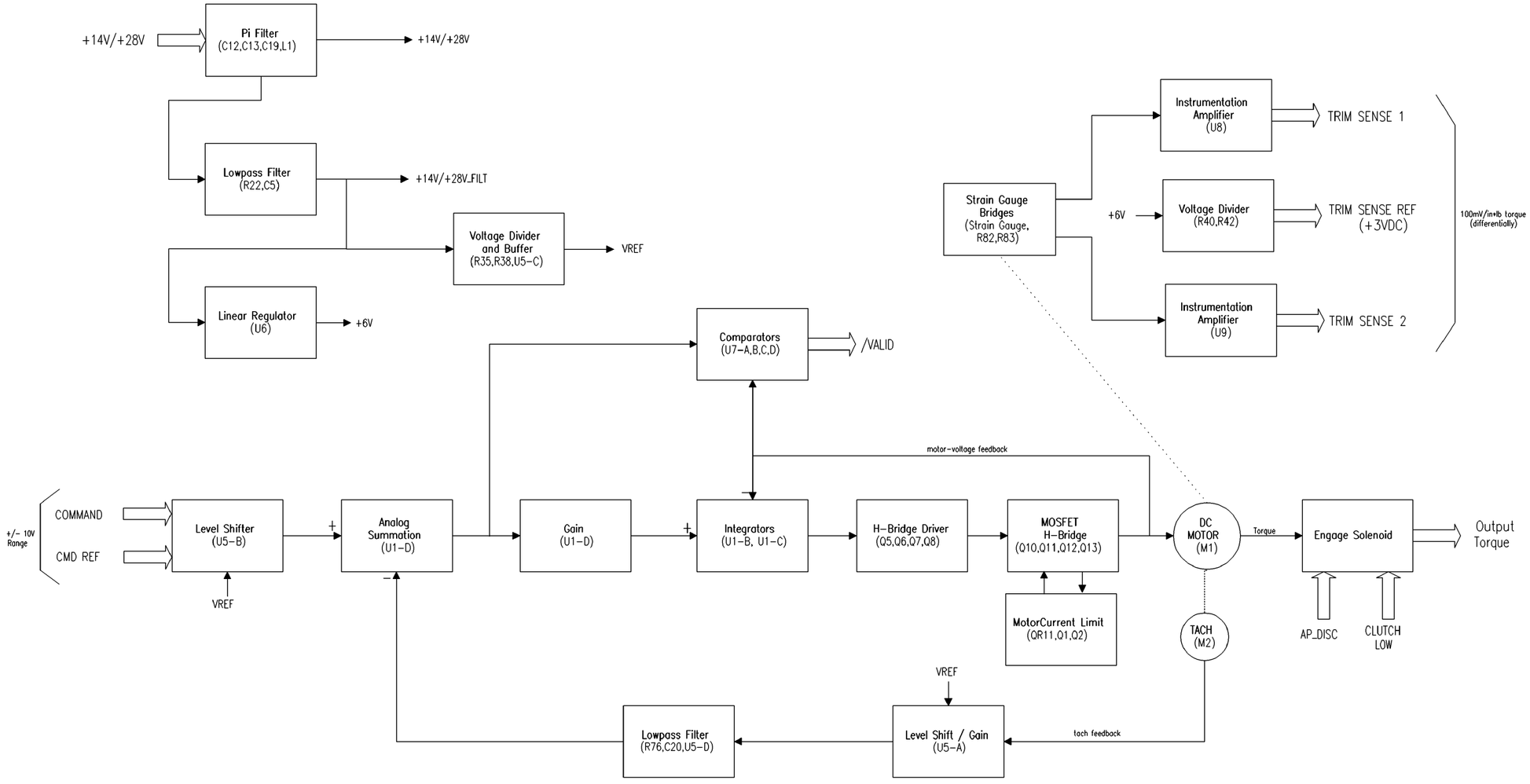
NOTE

If there is less than 0.1 V on the low side clutch, when it is engaged and AP DISC is not pressed, there is a possibility that the low side clutch has inadvertently been shorted to ground and the pre-flight test will fail, since the clutch current is monitored by the Flight Computer.

The TRIM_Sense input can be viewed on the ANALOG VOLTAGE INPUTS diagnostic page.

DIAGNOSTIC NAME	SCALE FACTOR
Trim Sense	100 mV/in-lb

Table 4-2 Trim Sense



Note: The KS-270C Pitch Servo currently operates only with +28VDC input power. The +14V/+28V labeling used in the KS-270C documentation is to facilitate future flavor releases that may operate from +14V.

Figure 4-2 KS 270C Block Diagram
Dwg. No. XXX-XXXXX-XXXX Rev -

SECTION V

MAINTENANCE

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SECTION V

MAINTENANCE

5.1 INTRODUCTION

The maintenance section contains test and alignment procedures for an operational KS 270C Pitch Servo Actuator P/N 065-00178-XX00. This section also contains trouble-shooting and assembly/disassembly Procedures. Before maintenance is attempted it is advisable to have a thorough understanding of the theory of operation of the unit.

5.2 TEST AND ALIGNMENT

5.2.1 Standard Test Conditions

Unless otherwise specified, all tests shall be made at an ambient room temperature of + 25° ± 5° C with a relative humidity not to exceed 80 %. No warm up is required. All tests shall be made with the cover on and the chassis at ground potential. Power input shall be at + 27.5 ± 0.5 VDC.

Null adjustments, gain adjustments and mechanical adjustments are to be calibrated as per 5.2.4 with the unit cover removed.

All testing throughout 5.2.5 is to be performed with the unit cover in place.

Unless otherwise stated, all voltages are referenced to the POWER GND pin P101-C.

All tests marked with an asterisk are to be performed on all units. Tests not marked with an asterisk may be performed at the discretion of Test Engineering.

5.2.2 Test Equipment Required

This section contains information on special tools, fixtures and test equipment used to test, troubleshoot and repair KS 270C Pitch Servo Actuator.

The following is a listing of the test equipment required to perform the testing and troubleshooting procedures described in this manual. Equipment other than that listed can be substituted if the characteristics fullfil those required.

Force Gauge	Dillon Type a or equivalent
KM 275 Servo Mount	KPN 065-00030-0000
Power Supply	28 VDC, 3 Amp.
Stop Watch	
Digital Multimeter	Fluke 8000A or equivalent
Storage Scope	Tektronic 350 or equivalent
22.5 in-lbs. Torque Screwdriver	

1.5 in-oz Torque Wrench

5.2.3 Test Equipment (Optional)

The following is a listing of optional equipment which enhance the testing and repair of the KS 270C Pitch Servo Actuator.

Test Stand	KPN 071-06028-0000
Servo Test Fixture	CA-310
Servo Test Cables	CA-310-1
Test Procedures	CA-8

5.2.4 Testing and Troubleshooting

This section of the manual contains instructions for functional testing, troubleshooting and aligning the KS 270C Pitch Servo Actuator. The functional test is a cover-on test performed to determine the operational status of the KS 270C. The alignment procedures are used after a misalignment has been isolated during troubleshooting or a module or component has been replaced that requires alignment.

CAUTION

THIS EQUIPMENT CONTAINS ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES. EQUIPMENT MODULES AND ESDS DEVICES MUST BE HANDLED IN ACCORDANCE WITH SPECIAL ESDS HANDLING PROCEDURES.

5.2.5 Pre-test Adjustments

The unit cover must be removed to complete the following adjustments:

A. Solenoid Adjustment *

With the KS 270C mounted to a KM 275, apply + 28 volts to pin E, Autopilot Clutch Engage, and ground to pin F of P101. The outer pinion gear should be able to rotate 1/4 of a degree. This can be measured by aligning an edge of a gear tooth on the large gear on the pinion gear shaft by line of sight and rotating the pinion gear back and forth. The large gear should rotate between 1/4 and 1 gear tooth width and show evidence that there is clearance between the intermediate clutch gear and the large gear on the pinion gear shaft to be acceptable. If the rotation is greater than this or if there is no backlash at all, the solenoid can be adjusted using the three screws which hold it in place. Inspect the alignment of the plunger going into the solenoid to insure that binding does not occur during engagement or disengagement of the clutch. Torque solenoid screws to 22.5 in-lbs $\pm$ 3 in-lbs. after alignment is complete.

B. Pitch Servo Null Adjust *

Engage the solenoid by applying + 28 volts to pin E, Autopilot Clutch Engage and ground to pin F of P101. ground the Command Input pin L, and pin d, and measure the voltage between TP3 and TP4. Adjust R78 for a voltage reading of 0 V ± 0.02 V. the servo motor should not rotate. Remove pin L from ground. Apply glyptal to R78.

C. Strain Gauge Adjust *

Position the KS 270C servo so the baseplate is on the **bottom** side and the unit is fixtured so that the pinion gear is free to turn.

Ensure motor is free to rotate and wiring is optimized so that no force is being exerted on the strain gage beam. Engage the solenoid by applying + 28 volts to pin E, Autopilot Clutch Engage, and ground to pin f of P101.

Apply a + 1.0 V ± .25 V signal to the Command Input pin L, and ground to pin D of P101. Ensure that the motor rotation is smooth and that there are no noticable jerks on the strain gage beam. Repeat with a - 1.0 V ± .25 V pin L and ground at pin D of P101.

With the servo still engaged (but with no load), ground the Command Input pin L.

D. Null Adjust

(For 0X00 versions)
Measure the voltage between pin R and pin C of P101. Verify that it is + 3 ± 0.10 v. This value should not change when a torque is applied to the motor.

Fixture the unit so that the pinion gear is free to turn and the baseplate is on the bottom. Verify that no force is being exerted on the strain gage beam.

Measure the voltage between pin J and pin R of P101 and adjust R45 for a reading of 0 V ± 0.01 V.

(For 2X00 versions)
Measure the voltage between pin M and pin C of P101. Verify that it is + 3.0 V ± 0.01 V. This value should not change when torque is applied to the motor.

Fixture the unit so that the pinion gear is free to turn and the baseplate is on the bottom. Verify that no force is being exerted on the strain gage beam.

Measure the voltage between pin J and pin M of P101, and adjust R90 for a reading of 0 V ± 0.01 V.

Measure the voltage between pin R and pin M of P101, and adjust R91 for a reading of 0 V ± 0.01 v.

E. Adjusting The Set-Screws *

(For 0X00 versions)
Measure the voltage between TP1 and TP2 and adjust the appropriate set-screw while torquing the motor to the set-screw until the voltage is + 2.3 v ± 0.1 V. Adjust the other set-screw while torquing the motor to the set-screw until the voltage is - 2.3 v ± 0.1 V. Apply Loctite to the set-screws.

(For 2X00 versions)
Measure the voltage between pin J and pin R and adjust the appropriate set-screw while torquing the motor to the set-screw until the voltage is + 2.3 v ± 0.1 V. Adjust the other set-screw while torquing the motor to the set-screw until the voltage is - 2.3 V ± 0.1 V. Apply Loctite to the set-screws.

F. Strain Gauge Zero Shift *

With the solenoid still engaged, torque the motor by hand for maximum Strain Gauge Beam deflection (to set-screw limit). Then remove torque so that the Strain Gauge Beam has no force being exerted on it. Record the null measurements (with no force on the Strain Gauge Beam) after every CW and CCW twist as shown in Table 5-1 below. Calculate Xbar (average of X1 - X4 voltages) and Range (highest voltage minus lowest voltage for X1 - X4) for both the between pin J and pin M and between pin R and pin M of P101.

Xbar = 0 ± 0.01 V
Range <0.06 V

Measurement	Direction	J-M (V)	R-M (V)
X1	CW		
X2	CCW		
X3	CW		
X4	CCW		
	Xbar (average)		
	Range (max - min)		

Table 5-1
Pretest Strain Gauge Measurements

(for 0X00 Versions)

Perform Zero Shift Test using the voltage between pin J and pin R only.

G. Stability Test *

With the cover on the unit (or an equivalent method to ensure that the unit's inner parts will not be touched) and with clutch engaged, but no load applied to the servo, measure the voltage between pin J and pin R of P101 in the orientations shown in Figure 5-1. Record the voltage in Table 5-2.

Calculate Xbar (average of X1 - X4 voltages) and Range (highest voltage minus lowest voltage for X1 - X4) for the voltage between pin J and pin R of P101.
Xbar = 0 ± 0.015 V
Range <0.05 V

Reading	Orientation	J-R (V)
X1	0°	
X2	90°	
X3	180°	
X4	270°	
	Xbar (average)	
	Range (max - min)	

Table 5-2
Pretest Stability measurements

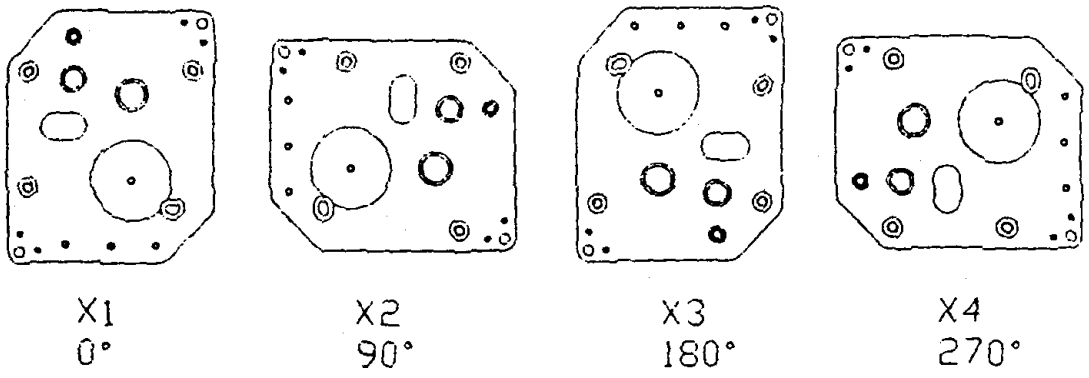

Figure 5-1
Pretest Stability Orientation

Remove cover (if needed) and apply glyptal to R90 and R91 (-2X00 versions) or to R45 (-0X00 versions).

H. Tach Time Constant *

(For 2X00 versions)
Apply a 10 v ± 0.2 v step command input to pin L with respect to pin D of P101. the tach time constant as measured at TP5 with respect to TP3 (with a digital storage scope) should be 520 msec ± 15%. A sample measurement is shown in Figure 5-1.

I. Pinion Gear Shaft Alignment *

Adjust the alignment between the servo subplate and the baseplate so that the output pinion gear spins freely. Torque up to 1.5 in-oz max is permissible.

5.2.6 Minimum Performance Tests

Or see 5.2.10 for Final Test Procedures using Test Fixture CA-310 or Test Procedures CA-8 may be used with Test Fixture CA-310.

The unit cover must be in place to complete the following tests:

A. Ohm Meter Measurements *

Measure the resistance between pin N of the KS 270C input connector and the servo actuator metal case. the resistance should be less than 2 ohms.

Mount the KS 270C on a KM 275 and connect the unit to the test set.

B. Solenoid Engage

1. External Strapping Test *

   Apply + 28 volts to pin E , Autopilot Clutch Engage, and ground pin F of P101. The solenoid should engage smoothly and without hesitation. Remove the voltage from pin E and the solenoid should disengage.

2. Solenoid Engage *

   With the solenoid disengaged, turn the unit so that the solenoid must pull against gravity. Engage the solenoid by applying no greater than + 20.6 V to pin E, Autopilot Clutch Engage, and ground to pin F of P101. The solenoid should engage smoothly and without hesitation. Remove the voltage and the solenoid shall disengage.

C. Motor Breakout and Direction *

Insure that the pinion gear spins freely. Torque up to 1.5 in-oz max is permissible.

Engage the solenoid by applying + 28 volts to pin E and ground to pin F of P101. The solenoid should engage without hesitation.

Apply a voltage no greater than + 20 V to the COMMAND input pin L and ground to pin D of P101.
The pinion gear visible on the front of the servo should slowly turn **counter-clockwise**. Insure that the pinion gear makes at least one full revolution. Return pin L to zero volts.

Apply a voltage no greater in magnitude than - 20 V to the COMMAND input pin L and ground to pin D of P101. The pinion gear visible on the front of the servo should slowly turn **clockwise**. Insure that the pinion gear makes at least one full revolution. Return pin L to zero volts.

D. Speed Characteristics and Phasing *

Mount the KS 270C to a KM 275 and engage the solenoid by applying + 28 V to pin E and ground to pin F of P101. The solenoid should engage without hesitation.

CAUTION

WHEN MOUNTING THE KS 270C AND KM 275 ON THE TEST STAND, TIGHTEN ALL MOUNTING BOLTS SECURELY. DO NOT LEAVE BOLTS LOOSE FOR IT WILL RESULT IN THE BREAKAGE OF THE GUIDE PIN ON THE KS 270C FRONT PLATE.

Apply + 8.0 V ± .25 V signal to the COMMAND input pin L and ground to pin D of P101. The capstan should rotate **clockwise**. Measure the time for the specific number of capstan revolutions in Table 5-3. The Tach Output as measured from pin A to pin P should be positive and should return to zero when the COMMAND input is reduced to zero volts.

Apply - 8.0 V ± .25 V signal to the COMMAND input pin L and ground to pin D of P101. The capstan should rotate **counterclockwise**. Measure the time for the specified number of capstan revolutions in Table 5-3. The Tach Output as measured from pin A to pin P should be negative, and should return to zero when the command input is reduced to zero volts.

Apply + 4.0 V ± .10 V signal to the COMMAND input pin L and ground to pin D of P101. The capstan should rotate **clockwise**. Measure the time for half the number of capstan revolutions specified in Table 5-3 and verify that it matches the time specified in Table 5-3.

Apply - 4.0 V ± .10 V signal to the COMMAND input pin L and ground to pin D of P101. The capstan should rotate **counterclockwise**. Measure the time for half the number of capstan revolutions specified in Table 5-3 and verify that it matches the time specified in Table 5-3.

NOTE

When testing at - 55° C, the motor must start rotating within 10 sec. After a 30 sec. warm up period, the capstan must obtain a speed that is specified in Table 5-3.

KS 270C Version	Number of Revolutions	Time (Secs.)
-0100, 2100	1	17.0 ± 2.5
-0200, 2200	1	25.0 ± 4.0
-0300, 2300	1	13.0 ± 2.0
-2400	1	51.0 ± 7.5
-2500	1	31.0 ± 4.5

Table 5-3
Speed Characteristics

E. Tach Scale Factor *

With the KS 270C mounted on a KM 275, engage the solenoid by applying + 28 V to pin E and ground to pin F of P101. The solenoid should engage without hesitatation.

Apply + 8.0 V ± .25 V signal to the COMMAND input pin L and ground to pin D of P101. The capstan should rotate **clockwise**. Measure the time for one revolution of the capstan. Apply this measured time (in seconds) to the appropriate formula in Table 5-4. The Tach Voltage as measured at pin A with respect to pin P should be positive and within 15% of the calculated value.

Repeat the test for the **counterclockwise** direction by applying - 8.0 V ± .25 V to pin L. The Tach Voltage as measured at pin A with respect to pin P should be negative and within 15 % of the calculated value.

Version	Formula	Nominal Tach Voltage
-0100, 2100	76.85 T(Sec)	± 4.52 V
-0200, 2200	114.39 T(Sec)	± 4.59 V
-0300, 2300	57.54 T(Sec)	± 4.53 V
-2400	226.93 T(Sec)	± 4.46 V
-2500	145.16 T(Sec)	± 4.68 V

Table 5-4
Tach Generator Scale Factor

NOTE

Nominal Tach Voltage is given as a guide to the correct value.

F. Tach Time Constant *

(For 0X00 Versions)
Apply a 10 V ± 0.2 V step command input to pin L with respect to pin D of P101. The Tach Time Constant as measured at pin A with respect to pin P (with a digital storage scope) should be 520 mseconds ± 15%. A sample measurement is shown in Figure 5-2.

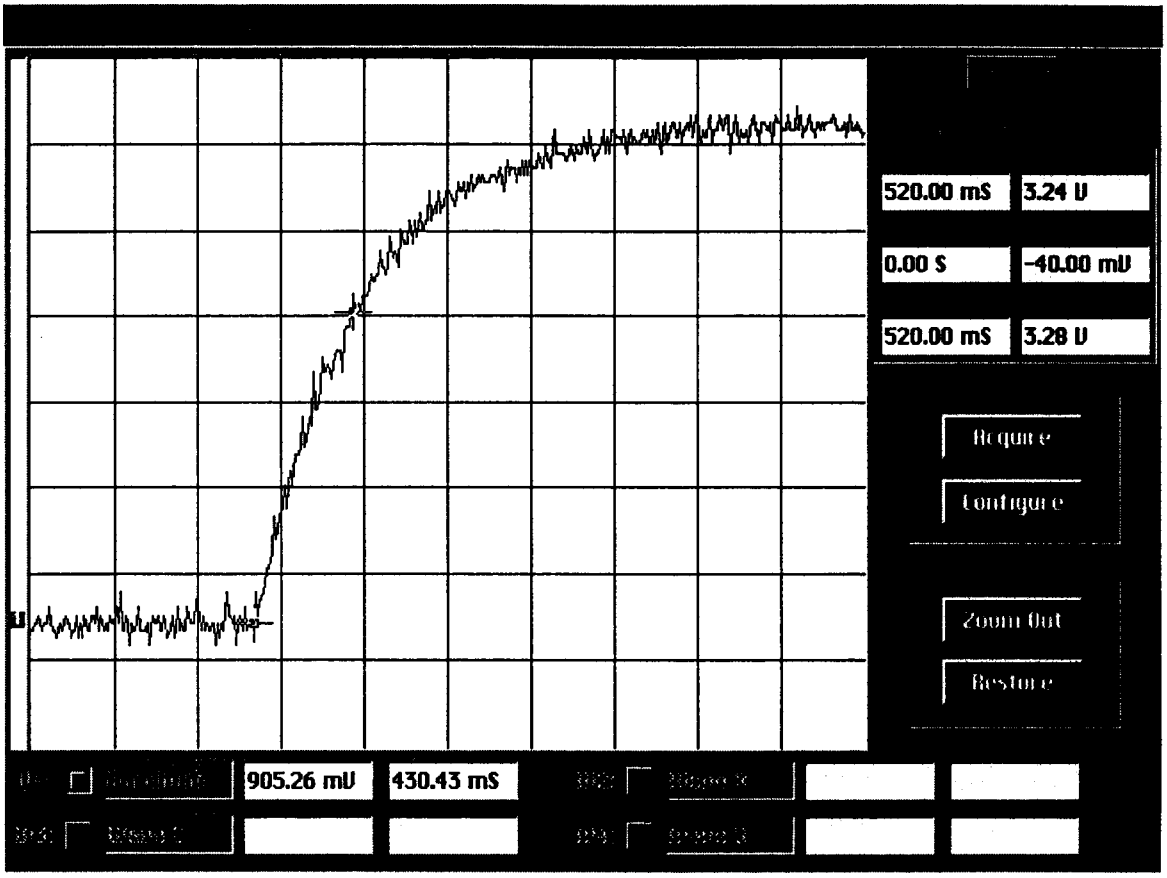

Figure 5-2 Tach Time Constant

G. Valid Output *

Apply - 3.5 V ± 0.1 V to the COMMAND input pin L and ground to pin D of P101. Connect the VALID TP switch to + 28 V; The VALID lamp should extinguish. Return the VALID TP switch to the OPEN position; The lamp should come ON.

Apply + 3.5 V ± 0.1 V to the COMMAND input pin L and ground to pin D of P101. Connect the VALID TP switch to ground; The VALID lamp should extinguish. Return the VALID TP switch to the OPEN position; The lamp should come ON.

H. Torque Characteristics *

Mount the KS 270C on a KM 275 and secure the two units in a test stand. Adjust the KM 275 clutch to slip at 80 lbs. nominal with the capstan cable connected to the force gauge load cell.

NOTE

80 lbs. on a KM 275 capstan is equivalent to 70.6 in-lbs torque.

CAUTION

DO NOT RUN THE SERVO IN A STALLED CONDITION. IF THE SERVO STOPS ROTATING, REMOVE POWER IMMEDIATELY.

Set the input voltage to + 28 V. engage the solenoid by applying + 28 V to pin E and ground to pin F of P101. The solenoid should engage smoothly.

Apply + 9.50 ± .3 V to pin L, the COMMAND input and ground to pin D of P101. The capstan should begin to turn and the force gauge should show an increasing load. When the Force Gauge reading reaches 80 ± 5 lbs., remove + 28 V form pin E, disengaging the solenoid. The servo clutch gear must disengage within 2 seconds.

Re-engage the solenoid and repeat the above test with - 9.50 V ± .3 V applied to pin L and ground to pin D of P101.

I. Strain Gauge Sensing *

With the KS 270 mounted on the KM 275, and the capstan axis horizontal, engage the solenoid by applying + 28 volts to pin E and ground to pin F of P101. The solenoid should engage without hesitation.

Adjust the clutch to slip at 10 in-lbs. nominal.

Apply + 8 V ± .25 v signal to the COMMAND input pin L and ground to pin D of P101. Measure the voltage at pin J with respect to pin R of P101. It shouild be 1.0 V ± 0.20 V with the clutch slipping at 10 in-lbs.

Apply - 8.0V ± .25 V signal to the COMMAND input pin L and ground to pin D of p101. Measure the voltage at pin J with respect to pin R of P101. It should be - 1.0 V ± 0.20 V with the clutch slipping at 10 in-lbs.

NOTE

If the voltage between pins J and R is less than 0.85 v and the servo uses the 200-09087-0000 PC Board, replace R30 with 139-02672 and repeat the test. If the voltage between pins J and R is higher than 1.15 V and the servo uses the 200-09087-0000 PC Board, then replace R30 with 139-03322-0000.

NOTE

If the voltage betwee pins J and R is less than 0.85 V and the servo uses the 200-09366-0000 or 300-09653-01 PC Board, replace R88 and R89 with 139-03010-0000 and repeat the test. If the voltage between pins J and R is higher than 1.15 V and the servo uses the 200-09366-0000 or 300-09653-01 PC Board, then replace R88 and R89 with 139-03650-0000 and repeat the test.

Remove the servo from the KM 275 and position the KS 270C servo so that the baseplate is on the bottom side and the unit fixture so that the pinion gear is free to turn. Engage the solenoid by applying + 28 volts to pin E and ground to pin F of P101. Verify that the gears are fully meshed.

The voltage between pin J and pin M should be 0 V ± 0.05 V. (-2X00 versions only)

The voltage between pin R and pin M should be 0 v ± 0.05 V. (-2X00 versions only)

The voltage between pin J and pin R should be 0 v ± 0.07 V.

J. Stability Test *

With the cover on the unit and with the solenoid engaged, but no load applied to the servo, measure the voltage between pin J and pin R of P101 in the orientations shown in Figure 5-3. Calculate Xbar (average of X1 - X2 voltages) and Range (highest voltage minus lowest voltage for X1 - X2) for the voltage between pin J and pin R. Record voltages in Table 5-5.

Individual X = 0 ± 0.07 V

Xbar = 0 ± 0.04 V Range < 0.06 V

Reading	Orientation	J-R (V)	Limits
X1	0°		-0.07 to +0.07 VDC
X2	90°		-0.07 to +0.07 VDC
	Xbar (average		-0.04 to +0.04
	Range (max - min)		-0.06 to +0.06

Table 5-5
Stability Test Measurement

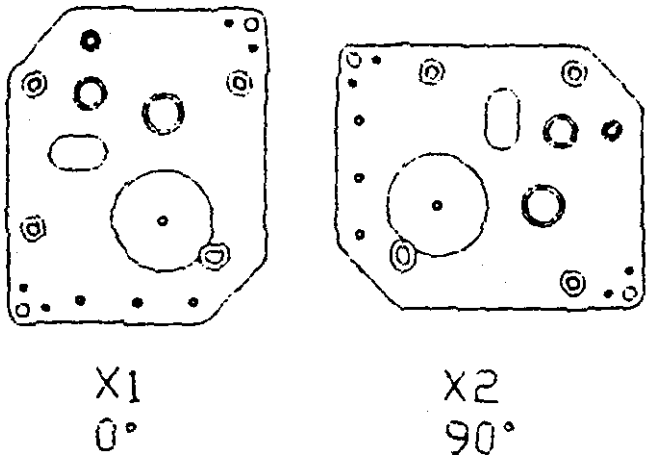

Figure 5-3
Stability Test Orientation

5.2.7 Test Under Environmental Conditions

The KS 270C Pitch Servo Actuator 065-00178-XX00 meets the DO-160C environmental categories identified in Environmental Qualifications Form 004-02038-4800.

A. High/Low Voltage Performance

The unit shall perform as described in 5.2.4 with variations in the DC power supplies from 20 V to 33V.

B. High/Low Temperature Performance

The unit shall perform as described in 5.2.4 under ambient temperature variations from - 55° to + 70° C, unless noted otherwise.

5.2.8 Functional Test Procedure

A. General

The purpose of the functional testing, a cover-on test, is to determine the operational status of the KS 270C Pitch Servo Actuator. functional test procedures are provided for return to service condition.

If an in-service unit tests within the acceptable limits given in this test procedure, no further testing is required and the unit should be considered suitable for installation in an aircraft. If the unit fails any portion of the functional test, proceed to paragraph 5.2.7 of this section for fault isolation. In general, after fault repair and/or alignment, the unit should be tested again to make sure it meets the performance criteria.

5.2.9 Troubleshooting Procedures

The troubleshooting procedures are for use as deemed necessary, whenever a unit fails to meet the minimum performance requirements of the test procedures in the testing paragraphs of this section. Alignment procedures are to be used after misalignment has been isolated and to adjust levels to customer specifications.

The correct troubleshooting procedure is determined by the type of failure in the functional test procedure. The technician should use traditional troubleshooting methods to isolate to the component level. Schematics and theory of operation are provided to assist troubleshooting to the component level.

After the faulty area is isolated by the troubleshooting procedure, and the repair is made, the unit should be retested using the functional testing procedure in this manual.

Table 5-6 describes how to troubleshoot a system with problems that do not generate an error code; these are primarily related to system performance.

Use of this information with the wiring harness diagrams and a multimeter should allow diagnosis of most system problems.

Symptom	Possible Causes	Checks to Perform
All pitch modes “porpoise” or have poor tracking behavior.	Pitch servo bridle cable below minimum allowed tension.	Check and adjust bridle cable tension to certified value
	Faulty pitch attitude output from vertical gyro	Replace vertical gyro
	Pitch Servo slip clutch set below minimum torque.	Check and adjust slip clutch torque to certified value.
Pinion Shaft will not spin CCW	Q13 shorted	Check or replace Q13.
Pinion Shaft will not spin CW	Q7 or CR4 shorted	Check or replace Q7 or CR4.
Motor Speed is incorrect	Incorrect value of CR5	Check selectable CR5 for proper value

Table 5-6 Troubleshooting

5.2.10 KS 270C Final Test Procedure
(Using Test Fixture CA-310)

A. Purpose

This document defines the procedures and checks that are necessary to insure that the KS 270C complies with the requirements of the minimum performance specification (MPS).

B. Reference Documents

KS 270C Minimum Performance Standards 004-02037-4000, Rev. AE

C. Required Test Equipment

28 VDC 3A Power Supply
CA-310 KS 270C/271C//272C Test FixtureCapital Avionics, Inc.
Tallahassee,FL
CA-310-1 Test Cable-KS 270C/KS 271CCapital Avionics, Inc.

	Tallahassee,FL
Test Stand HPN 071-06028-0000 with	Fabricated to hold KM 275 and
KM 27 Servo Mount	Load Cell (Dillon) or adapter (torque wrench)
KM 275	Special for speed tests
Torque Meter or Torque Wrench	Dillon 0-110 lbs. w/SGFC Load Cell Snap-on TE12A or equivalent
Capstan Adapter w/pin (for torque wrench) HPN 071-06021-003	
Oscilloscope	HP 54600A or equivalent
Digital Multimeter	Fluke 37 or equivalent
Stop Watch	Industry Standard
Base Plate Stand	Tool Number 6183
Test Clutches	11.5 lbs and 80 lbs

D. Equipment Connections

Connect the Test Cable Harness to the rear of the Test Panel. Connect the DC power source, set to +27.5 VDC, to rear input power jacks.

Connect Test Leads, Red to DMM (+) and Black to DMM (-). Connect the opposite end to the TEST SELECT jacks on the Test Panel or as required by individual tests.

F. Test Panel

PANEL POWER to the “ON” position.
UNIT POWER to the “OFF” position.
MANUAL TRIM SHORT A-C/OPEN TOGGLE to the “OPEN” position.
SERVO CLUTCH POWER ON/OFF TOGGLE to the “OFF” position.
CAPSTAN DRIVE ON/OFF TOGGLE to the “OFF” postion.
VLDTSTHI/NORM/VLDTSTLO TOGGLE to the “NORMAL” position.

G. Digital Multimeter

Power to ON.
Function to the K Ohm (Ω).
Range to the 200 Ohm or autorange.

H. Definitions

CW = Clockwise.
CCW = Counterclockwise.
DMM = Digital Multimeter.
NLT = Not Less Than.
NMT = Not More Than.
UUT = Unit Under Test.

J. Test Equipment Notes

When zeroing the Dillon Force Gauge, make sure that attached cable around the Clutch is very loose.
The Dillon Force Gauge should not require frequent re-zeroing (this usually indicates a problem with the Load Cell).
The UUT Dust Cover must be installed prior to performing this procedure.
Prior to performing the following tests, ensure that all of the test equipment has a current calibration sticker.
When torque is specified in the MPS and a force gauge is used in test, due to capstan size the conversion is Torque* 1.15 = Force.

K. Ohm Meter Measurement (MPS 4.1)

Connect the UUT to the Test Cable and connect a lead from the CHASSIS RESISTANCE Banana Jack on the Test Panel UUT Chassis.
Configure the DMM for measuring resistance. Ensure the TEST SELECT switch is set for measuring “CHASSIS RESISTANCE”.
The reading on the DMM must be NMT 2 Ohms. **IF OK, MARK SO ONTHE DATA SHEET.**
Remove ground lead from UUT Chassis.

L. External Strapping Test (MPS 4.2.1

Set the TEST SELECT switch to “UUT VOLTS”.
Turn Unit Power “ON”.
Set the SERVO CLUTCH PWR ON/OFF switch to “ON”.
Adjust the POWER SUPPLY VOLTAGE for +27.5 ± 0.5 VDC as read on the DMM.
Switch the SERVO CLUTCH PWR switch to “ON” and “OFF” several times ensuring the solenoid engages and disengages smoothly and without hesitation. **IF OK, MARK SO ON THE DATA SHEET.**

M. Solenoid Engage (MPS 4.2.2)

Set the SERVO CLUTCH PWR ON/OFF switch to the “ON” position.
Adjustthe POWER SUPPLY for no more than +20.6 VDC.
Turn the UUT oon it’s left side so that the solenoid is pulling against gravity.
NOTE: Gear and Pin are horizontal, facing forward, and above centerline.
Switch the SERVO CLUTCH PWR switch to “ON” and “OFF” several times ensuring the Solenoid engages and disengages smoothly and without hesitation. **IF OK, MARK SO ON THE DATA SHEET.**
Return the SERVO CLUTCH PWR ON/OFF switch to the “OFF” position.
Readjust the POWER SUPPLY for 27.5 ± 0.5 VDC.

N. Motor Breakout and Direction (MPS 4.3)

Ensure that the SERVO CLUTCH PWR ON/OFF switch is set to the “OFF” position.
Verify that the Pinion Gear rotates freely.
Set the SERVO CLUTCH PWR ON/OFF switch to the “ON” position.
Set the TEST SELECT switch to the “CAPSTAN DRIVE” position.
Turn the UNIT POWER switch to “ON” and adjust the CAPSTAN DRIVE COMMAND potentiometer for +0.20 VDC on the DMM.
Set the TEST SELECT switch to the “TACH A-P” position. Note voltage on the DMM.
Turn the CAPSTAN DRIVE ON/OFF switch to the “ON” position.
The TACH VOLTAGE shall increase positive within 10 seconds.
Verify a CCW rotation of the pinion gear for a minimum of one (1) full rotation. **IF OK, MARK SO ON THE DATA SHEET.**
Return the CAPSTAN DRIVE ON/OFF switch to the “OFF” position.
Set the TEST SELECT switch to the “CAPSTAN DRIVE” position, and adjust the CAPSTAN DRIVE COMMAND potentiometer for -0.20 VDC on the DMM.
Set the TEST SELECT switch to the “TACH A-P” position. Note the Voltage on the DMM.
Turn the CAPSTAN DRIVE switch to the “ON” position.
The TACH VOLTAGE shall increase negative within 10 seconds.
Verify a CW rotation of the Pinion Gear for minimum of one (1) full rotation. **IF OK, MARK SO ON THE DATA SHEET.**
Return the CAPSTAN DRIVE switch to the “OFF” position. Return the SERVO CLUTCH PWR switch to the “OFF” position.

O. Speed Charactaristics, Phasing and Tach Scale Factor (MPS 4.5/4.7)

Mount the KM 275 onto the UUT
Set the SERVO CLUTCH PWR switch to the “ON” position.
The solenoid should engage without hesitation.
Set the TEST SELECT switch to “CAPSTAN DRIVE”.
Adjust the CAPSTAN DRIVE COMMAND potentiometer for -8.0 ± 0.25 VDC on the DMM.
Set the TEST SELECT switch to “TACH A-P”.
Set the CAPSTAN DRIVE switch to the “ON” position.
Check for a CCW rotation of the CAPSTAN and a negative reading on the DMM. **IF OK, MARK SO ON DATA SHEET.**
Time the CAPSTAN for the number of revolutions as specified in Table 5-3. **IF OK, MARK SO ON THE DATA SHEET.**
See Table 5-8 for the absolute TACH output voltage requirement based on the time determined above. **IF OK, MARK SO ON THE DATA SHEET.**
Set the TEST SELECT switch to “CAPSTAN DRIVE”.
Adjust the CAPSTAN DRIVE COMMAND potentiometer for -4.0 ± 0.10 VDC on the DMM.
Set the TEST SELECT switch to “TACH A-P”.

Time the capstan for the number of revolutions as specified above. The time and tolerance for the specified number of revolutions shall double. **IF OK, MARK SO ON THE DATA SHEET.**

Set the CAPSTAN DRIVE ON/OFF switch to the “OFF” position.

The DMM reading shall return to 0.0 ± 0.1 VDC. **IF OK, MARK SO ON THE DATA SHEET.**

Set the TEST SELECT switch to “CAPSTAN DRIVE” position.

Adjust the CAPSTAN DRIVE COMMAND potentiometer for +8.0 ± 0.25 VDC on the DMM.

Set the TEST SELECT switch to “TACH A-P”.

Set the CAPSTAN DRIVE ON/OFF switch to the “ON” position.

Check for CW rotation of the CAPSTAN and a positive reading on the DMM. **IF OK, MARK SO ON THE DATA SHEET.**

Time the CAPSTAN for the number of revolutions specified in Table 5-3. **IF OK, MARK SO ON THE DATA SHEET.**

See Table 5-8 for the absolute TACH voltage requirement based on the time determined above. **IF OK, MARK SO ON THE DATA SHEET.**

Set the TEST SELECT switch to “CAPSTAN DRIVE” and adjust CAPSTAN DRIVE COMMAND potentiometer for +4.0 ± 0.10 VDC on the DMM.

Set the TEST SELECT switch to “TACH A-P”.

Time the CAPSTAN for the number of revolutions as specified in Table 5-3. The time and tolerance for the specified number of revolutions shall double. **IF OK, MARK SO ONTHE DATA SHEET.**

Set the CAPSTAN DRIVE ON/OFF switch to the “OFF” position.

Return the SERVO CLUTCH PWR switch to the “OFF” position.

P. Tach Time Constant (for -0X00 Versions Only) (MPS 4.8)

Set the TEST SELECT switch to “CAPSTAN DRIVE”.

Adjust the CAPSTAN DRIVE COMMAND potentiometer for +10.0 ± 0.2 VDC as read on the DMM.

Disconnect the DMM from the TEST SELECT jacks and connect the Digital Oscilloscope Channel 1 vertical input probe to the Red (+) TEST SELECT jack and the probe ground lead to the Black (-) TEST SELECT jack.

NOTE

The Oscilloscope must be isolated from ground for this test.

Set the Oscilloscope Channel 1 Vertical Amplitude for 1 Volt/Div. and the horizontal sweep for 200mS/div sweep time.

Set the Oscilloscope for Single Sweep. Set the TEST SELECT switch to “ TACH A-P”.

Simultaneously start the Oscilloscope Sweep and switch the CAPSTAN DRIVE ON/OFF switch to the “ON” position.
When the sweep is finished:
Switch the CAPSTAN DRIVE ON/OFF switch to “OFF”.
Set the Bottom Cursor “V1” at the Base of the waveform.
Set the Top Cursor “V2” at the Top of the waveform. NOTE: “Delta V” reading.
Calculate “Delta V” times 63% (0.63).
Adjust “V2” so that Delta V value matches the calculated value.
Set “T1” at the start of the waveform rise.
Set “T2” to intersect wave form at “V2”. NOTE: “Delta T” reading.
Verify that one time constant “Delta T” (zero to 63% of full amplitude) falls between 442 and 598mS. **IF OK, MARK SO ON THE DATA SHEET.**
Disconnect the Oscilloscope from the TEST SELECT jacks and reconnect the DMM.

Q. Valid Output (MPS 4.9)

Set the TEST SELECT switch to the “CAPSTAN DRIVE” position.
Adjust the CAPSTAN DRIVE COMMAND potentiometer for +3.5 ± 0.10 VDC on the DMM.
Set the COMMAND DRIVE ON/OFF switch to “ON”.
Verify that the “VALID LO” led is lit. **IF OK, MARK SO ON THE DATA SHEET.**
Set the VLDTST HI/NORM/VLDTST LO switch to the “VLDTST LO” position.
Verify that the “VALID LO” led is extinguished. **IF OK, MARK SO ON THE DATA SHEET.**
Turn the CAPSTAN DRIVE ON/OFF switch to “OFF”.
Set the VLDTST HI/ NORM/VLDTST LO switch back to the “NORM” position.
Adjust the CAPSTAN DRIVE COMMAND potentiometer for _3.5 ± 0.10 VDC on the DMM.

Set the CAPSTAN DRIVE ON/OFF switch to “ON”.
Verify that the “VALID LO” led is lit. **IF OK, MARK SO ON THE DATA SHEET.**
Set the VLDTST HI/NORM/VLDTST LO switch to the “VLDTST HI” position.
Verify that the “VALID LO” led is extinguished. **IF OK, MARK SO ON THE DATA SHEET.**
Turn the CAPSTAN DRIVE ON/OFF switch to “OFF”.
Set the VLDTST HI/NORM/VLDTST LO switch back to the “NORM” position.
Remove the KM 275.

R. Torque Characteristics (MPS 4.6)

NOTE

DO NOT STALL MOTOR! FAILURE TO FOLLOW PROCEDURE EXACTLY WILL CAUSE DAMAGE TO THE MOTOR.

Mount the UUT on the KM 275 Test Stand.
Install a Test Clutch set to slip at 80 lbs (Dillon) or 70 in-lbs (torque wrench) nominal.
Wrap the cable around the Clutch and secure it to the Load Cell (Dillon) or attach the torque meter.
The Clutch may be adjusted during test for nominal setting.
Set the TEST SELECT switch to the “CAPSTAN DRIVE” position.
Adjust the CAPSTAN DRIVE COMMAND potentiometer for +9.50 ± 0.3 VDC on the DMM.
Set the SERVO CLUTCH PWR switch to the “ON” position.
The solenoid should engage without hesitation.
Set the CAPSTAN DRIVE ON/OFF switch to “ON”.
The CAPSTAN should start to turn CW.
When the Dillon reaches 80 ± 5 lbs or the torque wrench reaches 70 ± 4 in-lbs, set the SEVO CLUTCH PWR switch to “OFF”.
The solenoid shall disengage within two (2) seconds. **IF OK, MARK SO ON THE DATA SHEET.**
Set the CAPSTAN DRIVE ON/OFF switch to “OFF”.
Set the SERVO CLUTCH PWR switch to the “ON” position.
The solenoid should engage without hesitation.
Adjust the CAPSTAN DRIVE COMMAND potentiometer for -9.50 ± 0.3 VDC on the DMM.
Set the CAPSTAN DRIVE ON/OFF switch to “ON”.
The CAPSTAN should start to turn CCW.
When the Dillon reaches 80 ± 5 lbs or the torque wrench reaches 70 ± 4 in-lbs, set the SERVO CLUTCH PWR switch to “OFF”.
The solenoid shall disengage. **IF OK, MARK SO ON THE DATA SHEET.**

NOTE

If the Clutch slips out of engagement during the CCW CAPSTAN direction, install a clutch set to slip at 75 -0/+5 lbs (Dillon) or 66 -0/+4 in-lbs (torque wrench) and retest in the CCW CAPSTAN direction for at least 10 seconds. The Clutch must not slip engagement and must disengage normally.

Set the SERVO CLUTCH PWR switch to the “OFF” position.
Set the CAPSTAN DRIVE ON/OFF switch to the “OFF” position.
Remove the cable or torque wrench from the CAPSTAN.

S. Strain Guage Sensing (MPS 4.4)

Install a test clutch set to slip at 11.5 lbs (Dillon) or 10 in-lbs (torque wrench) nominal.
Wrap the cable around the clutch and secure it to the Load Cell (Dillon) or attach the torque meter.
Set the TEST SELECT switch to “CAPSTAN DRIVE”.
Adjust the CAPSTAN DRIVE COMMAND potentiometer for +8.0 ± 0.25 VDC on the DMM.
Set the SERVO CLUTCH PWR switch to the “ON” position.
Set the CAPSTAN DRIVE ON/OFF switch to the”ON’ position.
Adjust the Clutch, if necessary, to slip at 11.5 ± 0.5 lbs (Dillon) or 10 ± 0.5 in-lbs (torque wrench).
Set the TEST SELECT switch to “J-R” position.
The reading on the DMM should be +1.0 ± 0.20 VDC. **IF OK, MARK SO ON THE DATA SHEET.**
Return the SERVO CLUTCH PWR switch to the “OFF position.
Return the CAPSTAN DRIVE ON/OFF switch to the “OFF” position.
Set the SERVO CLUTCH PWR ON/OFF switch to the “ON” position.
Set the TEST SELECT switch to “CAPSTAN DRIVE”.
Adjust CAPSTAN DRIVE COMMAND potentiometer for -8.0 ± 0.25 VDC on the DMM.
Set the CAPSTAN DRIVE ON/OFF switch to the “ON” position.
Set the TEST SELECT switch to the “J-R” position.
The reading on the DMM should be -1.0 ± 0.20 VDC. **IF OK, MARK SO ON THE DATA SHEET.**
Return the SERVO CLUTCH PWR switch to the “OFF” position.
Return the CAPSTAN DRIVE ON/OFF switch to the “OFF” position.
Position the SERVO so that the Base Plate is on the bottom side, with no force on the pinion gear, using a base plate stand.
For -0X00 versions set the TEST SELECT switch to the “J-R” position.
The measured voltage shall be 0 ± 0.070 VDC **IF OK, RECORD ON THE DATA SHEET.**

For -2X00 versions set the TEST SELECT switch to the “J-M’ position.
The measured voltage shall be 0 ± 0.050 VDC. **IF OK, RECORD ON THE DATA SHEET.**
For -2X00 versions set TEST SELECT switch to the “R-M” position.
The measured voltage shall be 0 ± 0.050 VDC. **IF OK, RECORD ON THE DATA SHEET.**

T. Strain Gauge Stability (MPS REF 4.4.1)

Switch the SERVO CLUTCH PWR switch to the “ON” position.
Turn the TEST SELECT switch to the “J-R” position.
Orient the unit as shown in Figure 5-4 for X1 reading.
Enter the measured value for “J-R” in Table 5-7 for X1 measurement.
Orient the unit as shown in Figure 5-4 for X2 reading.
Enter the measured value for “J-R” in Table 5-7 for X2 measurement.
Calculate the average of the readings and enter the calculated values in Table 5-7 for Xbar.The calculation for Xbar is (X1 + X2)/2.
Calculate the Range of the readings and enter the calculated values in Table 5-7 for Range. Calculation for Range is (Max X - Min. X).

Reading	Orientation	J-R (V)	Limits
X1	0°		-0.07 to +0.07 VDC
X2	90°		-0.07 to +0.07 VDC
	Xbar (average)		-0.04 to +0.04
	Range (Max-Min)		-0.06 to +0.06

Table 5-7
Final Test Strain Gauge Stability

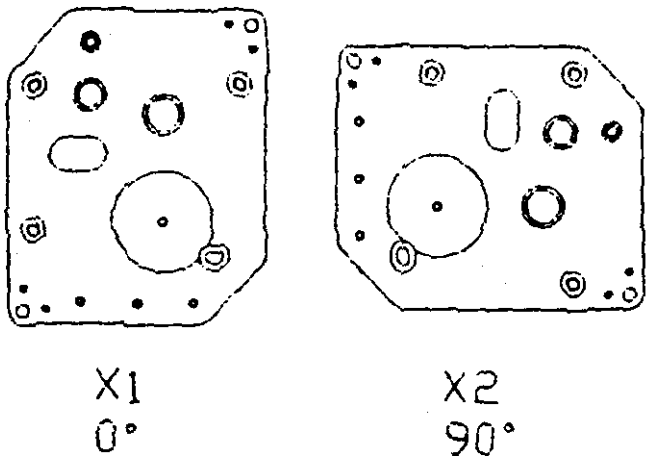

Figure 5-4
Final Test Strain Gauge Stability Orientation

U. Post Procedure

Turn Unit Pqwer “OFF”.
Turn Panel Power “OFF”.
Disconnect the test cable from the unit cable.
Date and Test Stamp the Process Sheet and Data Sheet.
Place Plug Cover (088-00578-0003) on Tail Connector Assembly.

VERSION -0100/-2100			VERSION -0200/-2200			VERSION -0300/-2300		
Sec for 1 Rev	Tach Voltage		Sec for 1 Rev	Tach Voltage		Sec for 1 Rev	Tach Voltage	
	NLT	NMT		NLT	NMT		NLT	NMT
14.5	4.51	6.10	21.0	4.63	6.26	11.0	4.45	6.02
15.0	4.35	5.89	21.5	4.52	6.12	11.5	4.25	5.75
15.5	4.21	5.70	22.0	4.42	5.98	12.0	4.08	6.02
16.0	4.08	5.52	22.5	4.32	5.85	12.5	3.91	5.29
16.5	3.96	5.34	23.0	4.23	5.72	13.0	3.76	5.06
17.0	3.84	5.20	23.5	4.14	5.60	14.0	3.49	4.73
18.0	3.63	4.91	24.0	4.05	5.48	14.5	3.37	4.56
18.5	3.53	4.78	24.5	3.97	5.37	15.0	3.26	4.41
19.0	3.44	4.65	25.0	3.89	5.26			
19.5	3.35	4.53	26.0	3.74	5.06			
			26.5	3.67	4.96			
			27.0	3.60	4.87			
			27.5	3.54	4.78			
			28.0	3.47	4.70			
			28.5	3.41	4.62			
			29.0	3.35	4.54			

Table 5-8
Tach Scale Factor Chart

Version -2400			Version -2500		
Sec for 1 Rev	Tach Voltage		Sec for 1 Rev	Tach Voltage	
	NLT	NMT		NLT	NMT
43.0	4.49	6.07	26.0	4.74	6.42
44.0	4.39	5.93	27.0	4.57	6.19
45.0	4.2	5.80	28.0	4.40	5.95
46.0	4.19	5.67	29.0	4.26	5.76
47.0	4.11	5.55	30.0	4.11	5.57
48.0	4.02	5.44	31.0	3.98	5.38
49.0	3.94	5.32	32.0	3.89	5.26
50.0	3.86	5.22	33.0	3.74	5.06
51.0	3.79	5.13	34.0	3.63	4.91
52.0	3.71	5.03	35.0	3.53	4.77
53.0	3.64	4.92	36.0	3.43	4.63
54.0	3.57	4.83			
55.0	3.51	4.75			
56.0	3.45	4.66			
57.0	3.39	4.58			
58.0	3.33	4.50			
59.0	3.27	4.43			

Table 5-8 (cont)
Tach Scale Factor Chart

KS 270C FINAL DATA SHEET
FOR -0100/2100 FLAVOR

SERIAL #_____

PROC STEP	MPS REF.	TEST DESCRIPTION	LIMITS	DATA
K	4.1	**Ohm Meter Measurement**	(NMT 2 ohms)	_____√OK
L	4.2.1	**External Strapping Test**		
		Input @ 27.5	(Solenoid engages & disengages)	_____√OK
M	4.2.2	**Solenoid Engage – Pulling against gravity**		
		Input NMT @ 20.6	(Solenoid engages & disengages)	_____√OK
N	4.3	**Motor Breakout and Direction**		
		CW Input = +0.20	(CCW Pinion Gear & Positive Tach Voltage)	_____√OK
		CCW Input = –0.20	(CW Pinion Gear & Negative Tach Voltage)	_____√OK
O	4.5/4.7	**Speed Characteristics, Phasing & Tach Scale Factor**		
		CCW Tach Output	(CCW Capstan & Negative Tach Voltage)	_____√OK
		CCW Speed (-8.0V)	(14.5 to 19.5 Seconds)	_____ Sec
		CCW Tach Output Voltage	(See Table 2)	_____ Vdc
		CCW Speed (-4.0V)	(29.0 to 39.0 Seconds)	_____ Sec
		CCW Tach Output Voltage (OFF)	(-0.1 to +0.1 Vdc)	_____√OK
		CW Tach Output	(CW Capstan & Positive Tach Voltage)	_____√OK
		CW Speed (+8.0V)	(14.5 to 19.5 Seconds)	_____ Sec
		CW Tach Output Voltage	(See Table 2)	_____ Vdc
		CW Speed (+4.0V)	(29.0 to 39.0 Seconds)	_____ Sec
		CW Tach Output Voltage (OFF)	(-0.0 + 0.1 Vdc)	_____√OK
P	4.8	**Tach Time Constant (-0X00 Flavors only)**		
		Time to 63% of Maximum Output	(442 to 598 mSec)	_____mSec
Q	4.9	**Valid Output**		
		VLDTST NRML	(Valid-L "ON")	_____√OK
		VLDTST LO	(Valid-L "OFF")	_____√OK
		VLDTST NRML	(Valid-L "ON")	_____√OK
		VLDTST HI	(Valid-L "OFF")	_____√OK
R	4.6	**Torque Characteristics**		
		CW	(Disengages)	_____√OK
		CCW	(Disengages)	_____√OK
S	4.4	**Strain Gauge Sensing**		
		CW TRIM Sense	(1.0 ±0.20 Vdc)	_____√OK
		CCW TRIM Sense	(-1.0 ±0.20 Vdc)	_____√OK
		Trim Sense (-0X00 Flavors)	(-0.07 to +0.07 Vdc)	_____√OK
		J-M (-2X00 Flavors)	(-0.05 to +0.05 Vdc)	_____√OK
		R-M (-2X00 Flavors)	(-0.05 to +0.05 Vdc)	_____√OK

TESTED BY: _____ DATE _____

KS 270C FINAL DATA SHEET
FOR -0200/2200 FLAVOR

SERIAL #_____

PROC STEP	MPS REF.	TEST DESCRIPTION	LIMITS	DATA
K	4.1	**Ohm Meter Measurement**	(NMT 2 ohms)	_____√OK
L	4.2.1	**External Strapping Test**		
		Input @ 27.5	(Solenoid engages & disengages)	_____√OK
M	4.2.2	**Solenoid Engage – Pulling against gravity**		
		Input NMT @ 20.6v	(Solenoid engages & disengages)	_____√OK
N	4.3	**Motor Breakout and Direction**		
		CW Input = +0.20	(CCW Pinion Gear & Positive Tach Voltage)	_____√OK
		CCW Input = –0.20	(CW Pinion Gear & Negative Tach Voltage)	_____√OK
O	4.5/4.7	**Speed Characteristics, Phasing & Tach Scale Factor**		
		CCW Tach Output	(CCW Capstan & Negative Tach Voltage)	_____√OK
		CCW Speed (-8.0V)	(21.0 to 29.0 Seconds)	_____ Sec
		CCW Tach Output Voltage	(See Table 2)	_____ Vdc
		CCW Speed (-4.0V)	(42.0 to 58.0 Seconds)	_____ Sec
		CCW Tach Output Voltage (OFF)	(-0.1 to +0.1 Vdc)	_____√OK
		CW Tach Output	(CW Capstan & Positive Tach Voltage)	_____√OK
		CW Speed (+8.0V)	(21.0 to 29.0 Seconds)	_____ Sec
		CW Tach Output Voltage	(See Table 2)	_____ Vdc
		CW Speed (+4.0V)	(42.0 to 58.0 Seconds)	_____ Sec
		CW Tach Output Voltage (OFF)	(-0.1 + 0.1 Vdc)	_____√OK
P	4.8	**Tach Time Constant (-0X00 Flavors only)**		
		Time to 63% of Maximum Output	(442 to 598 mSec)	_____mSec
Q	4.9	**Valid Output**		
		VLDTST NRML	(Valid-L "ON")	_____√OK
		VLDTST LO	(Valid-L "OFF")	_____√OK
		VLDTST NRML	(Valid-L "ON")	_____√OK
		VLDTST HI	(Valid-L "OFF")	_____√OK
R	4.6	**Torque Characteristics**		
		CW	(Disengages)	_____√OK
		CCW	(Disengages)	_____√OK
S	4.4	**Strain Gauge Sensing**		
		CW TRIM Sense	(1.0 ±0.20 Vdc)	_____√OK
		CCW TRIM Sense	(-1.0 ±0.20 Vdc)	_____√OK
		Trim Sense (-0X00 Flavors)	(-0.07 to +0.07 Vdc)	_____√OK
		J-M (-2X00 Flavors)	(-0.05 to +0.05 Vdc)	_____√OK
		R-M (-2X00 Flavors)	(-0.05 to +0.05 Vdc)	_____√OK

TESTED BY: _____ DATE _____

KS 270C FINAL DATA SHEET FOR –0300/2300 FLAVOR

SERIAL #_____

PROC STEP	MPS REF.	TEST DESCRIPTION	LIMITS	DATA
K	4.1	**Ohm Meter Measurement**	(NMT 2 ohms)	_____√OK
L	4.2.1	**External Strapping Test**		
		Input @ 27.5	(Solenoid engages & disengages)	_____√OK
M	4.2.2	**Solenoid Engage – Pulling against gravity**		
		Input NMT @ 20.6v	(Solenoid engages & disengages)	_____√OK
N	4.3	**Motor Breakout and Direction**		
		CW Input = +0.20	(CCW Pinion Gear & Positive Tach Voltage)	_____√OK
		CCW Input = –0.20	(CW Pinion Gear & Negative Tach Voltage)	_____√OK
O	4.5/4.7	**Speed Characteristics, Phasing & Tach Scale Factor**		
		CCW Tach Output	(CCW Capstan & Negative Tach Voltage)	_____√OK
		CCW Speed (-8.0V)	(11.0 to 15.0 Seconds)	_____ Sec
		CCW Tach Output Voltage	(See Table 2)	_____ Vdc
		CCW Speed (-4.0V)	(22.0 to 30.0 Seconds)	_____ Sec
		CCW Tach Output Voltage (OFF)	(0.1 to +0.1 Vdc)	_____√OK
		CW Tach Output	(CW Capstan & Positive Tach Voltage)	_____√OK
		CW Speed (+8.0V)	(11.0 to 15.0 Seconds)	_____ Sec
		CW Tach Output Voltage	(See Table 2)	_____ Vdc
		CW Speed (+4.0V)	(22.0 to 30.0 Seconds)	_____ Sec
		CW Tach Output Voltage (OFF)	(-0.1 + 0.1 Vdc)	_____√OK
P	4.8	**Tach Time Constant (-0X00 Flavors only)**		
		Time to 63% of Maximum Output	(442 to 598 mSec)	_____mSec
Q	4.9	**Valid Output**		
		VLDTST NRML	(Valid-L "ON")	_____√OK
		VLDTST LO	(Valid-L "OFF")	_____√OK
		VLDTST NRML	(Valid-L "ON")	_____√OK
		VLDTST HI	(Valid-L "OFF")	_____√OK
R	4.6	**Torque Characteristics**		
		CW	(Disengages)	_____√OK
		CCW	(Disengages)	_____√OK
S	4.4	**Strain Gauge Sensing**		
		CW TRIM Sense	(1.0 ±0.20 Vdc)	_____√OK
		CCW TRIM Sense	(-1.0 ±0.20 Vdc)	_____√OK
		Trim Sense (-0X00 Flavors)	(-0.07 to +0.07 Vdc)	_____√OK
		J-M (-2X00 Flavors)	(-0.05 to +0.05 Vdc)	_____√OK
		R-M (-2X00 Flavors)	(-0.05 to +0.05 Vdc)	_____√OK

TESTED BY _____ DATE _____

KS 270C FINAL DATA SHEET
FOR -2400 FLAVOR

SERIAL #_____

PROC STEP	MPS REF.	TEST DESCRIPTION	LIMITS	DATA
K	4.1	**Ohm Meter Measurement**	(NMT 2 ohms)	_____√OK
L	4.2.1	**External Strapping Test**		
		Input @ 27.5	(Solenoid engages & disengages)	_____√OK
M	4.2.2	**Solenoid Engage – Pulling against gravity**		
		Input NMT @ 20.6v	(Solenoid engages & disengages)	_____√OK
N	4.3	**Motor Breakout and Direction**		
		CW Input = +0.20	(CCW Pinion Gear & Positive Tach Voltage)	_____√OK
		CCW Input = –0.20	(CW Pinion Gear & Negative Tach Voltage)	_____√OK
O	4.5/4.7	**Speed Characteristics, Phasing & Tach Scale Factor**		
		CCW Tach Output	(CCW Capstan & Negative Tach Voltage)	_____√OK
		CCW Speed (-8.0V)	(43.5 to 58.5 Seconds)	_____ Sec
		CCW Tach Output Voltage	(See Table 2)	_____ Vdc
		CCW Tach Output Voltage (OFF)	(-0.1 to +0.1 Vdc)	_____√OK
		CCW Speed (-4.0V)	(1 min 27 Sec to 1min 56 Sec)	_____ Sec
		CW Tach Output	(CW Capstan & Positive Tach Voltage)	_____√OK
		CW Speed (+8.0V)	(43.5 to 58.5 Seconds)	_____ Sec
		CW Tach Output Voltage	(See Table 2)	_____ Vdc
		CW Speed (+4.0V)	(1min 27 sec to 1 min 56 sec)	_____ Sec
		CW Tach Output Voltage (OFF)	(-0.1 + 0.1 Vdc)	_____√OK
P	4.8	**NA**		
Q	4.9	**Valid Output**		
		VLDTST NRML	(Valid-L "ON")	_____√OK
		VLDTST LO	(Valid-L "OFF")	_____√OK
		VLDTST NRML	(Valid-L "ON")	_____√OK
		VLDTST HI	(Valid-L "OFF")	_____√OK
R	4.6	**Torque Characteristics**		
		CW	(Disengages)	_____√OK
		CCW	(Disengages)	_____√OK
S	4.4	**Strain Gauge Sensing**		
		CW TRIM Sense	(1.0 ±0.20 Vdc)	_____√OK
		CCW TRIM Sense	(-1.0 ±0.20 Vdc)	_____√OK
		J-M	(-0.05 to +0.05 Vdc)	_____√OK
		R-M	(-0.05 to +0.05 Vdc)	_____√OK

TESTED BY _____ DATE _____

KS 270C FINAL DATA SHEET
FOR -2500 FLAVOR

SERIAL #_____

PROC STEP	MPS REF.	TEST DESCRIPTION	LIMITS	DATA
K	4.1	**Ohm Meter Measurement**	(NMT 2 ohms)	_____√OK
L	4.2.1	**External Strapping Test**		
		Input @ 27.5	(Solenoid engages & disengages)	_____√OK
M	4.2.	**Solenoid Engage – Pulling against gravity**		
		Input NMT @ 20.6v	(Solenoid engages & disengages)	_____√OK
N	4.3	**Motor Breakout and Direction**		
		CW Input = +0.20	(CCW Pinion Gear & Positive Tach Voltage)	_____√OK
		CCW Input = –0.20	(CW Pinion Gear & Negative Tach Voltage)	_____√OK
O	4.5/4.7	**Speed Characteristics, Phasing & Tach Scale Factor**		
		CCW Tach Output	(CCW Capstan & Negative Tach Voltage)	_____√OK
		CCW Speed (-8.0V)	(26.5 to 45.5 Seconds)	_____ Sec
		CCW Tach Output Voltage	(See Table 2)	_____ Vdc
		CCW Speed (-4.0V)	(53.0 to 1 min 30 Sec)	_____ Sec
		CCW Tach Output Voltage (OFF)	(0.0 +0.1 Vdc)	_____√OK
		CW Tach Output	(CW Capstan & Positive Tach Voltage)	_____√OK
		CW Speed (+8.0V)	(26.5 to 45.5 Seconds)	_____ Sec
		CW Tach Output Voltage	(See Table 2)	_____ Vdc
		CW Speed (+4.0V)	(53 Sec to 1 min 30 Sec)	_____ Sec
		CW Tach Output Voltage (OFF)	(0.0 + 0.1 Vdc)	_____√OK
P	4.8	**NA**		
Q	4.9	**Valid Output**		
		VLDTST NRML	(Valid-L "ON")	_____√OK
		VLDTST LO	(Valid-L "OFF")	_____√OK
		VLDTST NRML	(Valid-L "ON")	_____√OK
		VLDTST HI	(Valid-L "OFF")	_____√OK
R	4.6	**Torque Characteristics**		
		CW	(Disengages)	_____√OK
		CCW	(Disengages)	_____√OK
S	4.4	**Strain Gauge Sensing**		
		CW TRIM Sense	(1.0 ±0.20 Vdc)	_____√OK
		CCW TRIM Sense	(-1.0 ±0.20 Vdc)	_____√OK
		J-M	(-0.05 to +0.05 Vdc)	_____√OK
		R-M	(-0.05 to +0.05 Vdc)	_____√OK

TESTED BY _____ DATE _____

5.3 OVERHAUL

5.3.1 Visual Inspection

This section contains instructions and information to assist in determining, by visual inspection,the condition of the KS 270C Pitch Servo's major and subassemblies.These inspection procedures will assist in finding defects resulting from wear, physical damage or other causes. To aid inspection, detailed procedures are arranged in alphabetical order.

A. Capacitors Fixed

Inspect capacitors for case damage, body damage and cracked, broken or charred insulation. Check for loose, broken or corroded terminal studs, lugs or leads. Inspect for loose, broken or improperly soldered connections. On chip caps be especially alert for hairline cracks in the body and broken terminals.

B. Capacitors, Variable

Inspect trimmers for chipped and cracked bodies, damaged dielectrics and damaged contacts.

C. Chassis

Inspect the chassis for loose or missing mounting hardware, deformation, dents, damaged fasteners or damaged connectors. In addition, check for corrosion or damage to the finish that should be repaired.

D. Circuit Boards

Inspect for loose, broken or corroded terminal connections; insufficient solder or proper bonding; fungus, mold or other deposits; and damage such as cracks, burns or charred track.

E. Connectors

Inspect the connector bodies for broken parts, check the insulation for cracks and check the contacts for damage , misalignment, corrosion or bad plating. Check for broken, loose or poorly soldered connections to the terminals of the connectors. Inspect connector hoods and cable clamps for crimped wires.

F. Covers and Shields

Inspect covers and shields for punctures, deep dents and badly worn surfaces. Also check for damaged fastener devices, corrosion and damage to the finish.

G. Flex Circuits

Inspect flex circuits for punctures and badly worn surfaces. Check for broken traces, especially near the solder contact points.

H. Plate

Check that name, serial and any other plates or stickers are secure and hardware is tight.

I. Insulators

Inspect insulators for evidence of damage, such as broken or chipped edges, burned areas and presence of foreign matter.

J. Jacks

Inspect all jacks for corrosion, rust, deformations, loose or broken parts, cracked insulation, bad contacts or other irregularities.

K. Potentiometers

Inspect all potentiometers for evidence of damage or loose terminals, cracked insulation or other irregularities.

L. Resistors, Fixed

Inspect the fixed resistors for cracked, broken, blistered or charred bodies and loose, broken or improperly soldered connections. On chip resistors be especially alert for hairline cracks in the body and broken terminations.

M. RF Coils

Inspect all RF coils for broken leads, loose mountings and loose, improperly soldered or broken terminal connections. Check for crushed, scratched, cut or charred windings. Inspect the windings, leads, terminals and connections for corrosion or physical damage. Check for physical damage to forms and tuning slug adjustment screws.

N. Terminal Connections; soldered

1. Inspect for cold soldered or resin joints. These joints present a porous or dull, rough appearance. Check for strength of bond using the points of a tool.

2. Examine the terminals for excess solder, protrusions from the joint, pieces adhering to adjacent insulation and particles lodged between joint, conductors or other components.

3. Inspect for insufficient solder and unsoldered strands of wire protruding from the conductor at the terminal. Check for insulation that is stripped back too far from the terminal.

4. Inspect for corrosion at the terminal.

O. Transformers

1. Inspect for signs of excessive heating, physical damage to the case, cracked or broken insulation and other abnormal conditions.

2. Inspect for corroded, poorly soldered or loose connecting leads or terminals.

P. Wiring/Coaxial Cable

Inspect the wiring in the chassis for breaks in the insulation, conductor breaks, cut or broken lacing and improper dress in relation to adjacent wiring or chassis.

5.3.2 Disassembly

A. General

This section contains information for disassembly of the KS 270C Pitch Servo. Disassembly procedures are to be accomplished only when repairs or modifications are required, and only to the extent that is required by the repair or as described in the modification service bulletin. This section contains the recommended procedures for the removal of all subassemblies. Refer to the Illustrated Parts List (IPL) for aid in disassembly. Part numbers are used in the IPL drawings to identify specific parts. Complete disassembly should never be undertaken. Provisions have been made in the design of the unit to make complete disassembly unnecessary except to replace a damaged mechanical part that cannot be reached otherwise.

WARNING

REMOVE ALL POWER FROM THE UNIT BEFORE DISASSEMBLY OF ANY MODULE. BESIDES BEING DANGEROUS TO LIFE, VOLTAGE TRANSIENTS CAN CAUSE CONSIDERABLE DAMAGE TO THE EQUIPMENT.

CAUTION

EXERCISE EXTREME CARE WHEN DISCONNECTING AND RECONNECTING THE MULTIPLE PIN CONNECTORS TO ENSURE THAT THE CONNECTORS ARE NOT DAMAGED BY MISALIGNMENT OF THE PINS.

B. Recommended Disassembly Procedures

NOTE

View unit from the Front Plate for determining the left and right sides. Tag, or by some other means, identify all disconnected wires.

1. Dust Cover Removal (See Figure 6-2)

   Remove the two 4-40 x 1/4 phillips screws (089-05903-0004), from the back of the unit.

   Carefully slide the cover off over the pigpail and connector.

2. Printed Circuit Board Assembly Removal (See Figure 6-4)

   Remove the two 4-40 x 1/4 flathead phillips screws (089-06008-0004), attaching the Printed Circuit Board Assembly to solenoid and Sub Plate Assemblies.

   Remove the three 4-40 x 3/16 phillips screws attaching the Printed Circuit Board assembly to the Front Plate Assembly.

   Separate the assemblies.

   Unplug P1 from the bottom of the Printed circuit board, noting the orientation of Pin 1, and remove the Printed Circuit Board Assembly from the unit.

3. Printed Circuit Board Removal (See Figure 6-4)

   The printed circuit board may be removed from the assembly by the following procedures:

   Remove the two 4-40 x 1/4 phillips screws (089-05903-0004), attaching Q4 (120-03555-0000) to the Printed Circuit Board Assembly.

   Remove the one 4-40 x 1/4 flathead phillips screw (089-06008-0004) from locknut 4-40 (089-02140-0000 and bushing (091-00156-0000) attaching U6 (120-03026-0002) to the Printed Circuit Board Assembly.

   Remove the four 4-40 x 1/4 phillips screws (089-05903-0004) attaching the Printed Circuit Board (200-09087-0000) to the Printed Circuit Board Assembly frame.

Separate Q4 and U6 from the assembly and remove the Printed Circuit Board.

CAUTION

OBSERVE ALL ESDS PROCEDURES WHEN HANDLING THE PRINTED CIRCUIT BOARD AND ASSEMBLY.

4. Front Plate Assembly Removal (See Figure 6-3)

   Remove the one 6-32 x 7/16 flat head phillips screw (089-06012-0007) on the front attaching the Front Plate Assembly (200-05631-0000) to the Sub Plate Assembly (200-05633-000X).

   Remove the one 8-32 x 1/4 phillips screw (089-05909-0004) on the front attaching the Front Plate Assembly to the Solenoid Assembly (023-00190-0000).

   Remove the one 8-32 x 5/8 phillips screw (089-05905-0010) attaching the Sub Plate Assembly, spacer (076-00301-0000) and Clutch Assembly Spring (078-02103-0002) to the Front Plate Assembly.

   Remove the retainer ring (090-00019-0010) which is behind the Sub Plate Assembly, from the Front Plate Pinion Shaft (076-02935-0001) .

   Remove the two 8-32 x 1/4 phillips screws attaching the Front Plate Assembly to the Subplate Assembly.

   Separate the Front Plate Assembly from the Sub Plate Assembly by pulling the assemblies apart.

5. Sub Plate Assembly Removal (See Figure 6-9)

   After the Front Plate Assembly is removed, remove the roll pin (090-00052-0026) from the Motor Pinion Gear (029-00777-0001) and remove the Motor Pinion Gear.

   Remove the two 4-40 x 1/4 flathead phillips screws attaching the Spur Motor (148-05188-00XX) to the Sub Plate Assembly.

   Remove the Spur Motor from the Sub Plate Assembly.

6. Clutch Assembly Removal (See Figure 6-10)

   After the Front Plate Assembly is removed, remove the two 8-32 x 1/4 phillips screws (089-05903-0004) attaching the solenoid Assembly (023-00190-0000) to the Sub Plate Assembly.

NOTE

When reassembling the solenoid to the Front Plate Assembly and the Sub Plate Assembly, torque the screws to 22.5 in/lbs. Torque driver Cal 3614 Roto Torq may be used. Apply locktite to the screws.

Pull the Solenoid Plunger from the coil. This will allow the Clutch Assembly (200-05634-0000) to separate from the Sub Plate Assembly.

5.3.3 Repair

A. General

This section contains information required to perform limited repairs on the KS 270C Pitch Servo unit. The repair or replacement of damaged parts in airborne electronic equipment usually involves standard service techniques. In most cases, examination of drawings and equipment reveal several approaches to perform a repair. However, certain repairs demand following an exact repair sequence to ensure proper operation of the equipment. After correcting a malfunction in any section of the unit, it is recommended that a repetition of the functional test of the unit be performed.

B. Repair Precautions

1. Refer to paragraph C, 3 for special ESDS and MOS handling precautions.

2. Perform repairs and replace components with power disconnected from the equipment.

3. Use a conductive table top for repairs and connect the table to ground conductors of 60Hz and 400Hz power lines.

4. Replace connectors, coaxial cables, shield conductors and twisted pairs ONLY with identical items.

5. Reference “Component Side” of a printed circuit board in this manual means the side on which components are located; “Solder Side” refers to the other side.

The standard references are as follows: nearside is the component side; farside is the solder side; On surface mount boards with components on both sides the nearside is the side that has the J#### and P#### connector numbers.

6. When repairing circuits, carefully observe lead dress and component orientation. Keep leads as short as possible and observe correct repair techniques.

7. There are certain soldering considerations with surface mount components. The soldering iron tip should not touch the ceramic component body. The iron should be applied only to the termination-solder filet.

8. Observe cable routing throughout instrument assembly, prior to disassembly, to enable a proper reinstallation of the cabling during reassembly procedures.

CAUTION

THE EQUIPMENT CONTAINS ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES. EQUIPMENT MODULES AND ESDS DEVICES MUST BE HANDLED IN ACCORDANCE WITH SPECIAL ESDS HANDLING PROCEDURES.

C. Electrostatic Sensitive Devices (ESDS) Protection

1. Always discharge static before handling devices by touching something that is grounded.

2. Use a wrist strap ground through a 1Meg Ohm resistor.

3. Do not slide anything on the bench. Pick it up and set it down instead.

4. Keep all parts in protective cartons until ready to insert them into the board.

5. Never touch the device leads or the circuit paths during assembly.

6. Use a grounded tip, low wattage soldering station.

7. Keep the humidity in the work environment as high as feasibly possible.

8. Use grounded mats on the work station unless the table tops are made of approved anti-static material.

9. Do not use synthetic carpet on the floor of the shop. If a shop is carpeted, ensure that a grounded mat is placed at each work station.

10. Keep common plastics out of the work area.

D. MOS Device Protection

MOS (Metal Oxide Semicunductor) devices may be used in this equipment. While the attributes of MOS type devices are many, characteristics make them susceptible to damage by electrostatic or high voltage charges. Therefore, special precautions must be taken during the repair procedures to prevent damaging the device. The following precautions are recommended for MOS circuits and are especially important in low humidity or dry conditions.

1. Store and transport all MOS devices in conductive material so that all exposed leads are shorted together. Do not insert MOS devices into conventional plastic “snow” or plastic trays used for storing and transporting standard semiconductor devices.

2. Ground working surfaces on the workbench to protect the MOS devices.

3. Wear cotton gloves or a conductive wrist strap in series with a 200 Kohm resistor connected to ground.

4. Do not wear nylon clothing while handling MOS devices.

5. Do not insert or remove MOS device with power applied. Check all power supplies to be used for testing MOS devices and be sure that there are no voltage transients present.

6. When straightening MOS leads, provide ground straps for the apparatus for the device.

7. Ground the soldering iron when soldering a device.

8. When possible, handle all MOS devices by package or case, not by the leads. Prior to touching the device, touch an electrical ground to displace the static charge that you may have accumulated.

   The package and substrate may be electrically common. If so, an electrical discharge to the case would cause the same damage as touching the leads.

‘ 9. Clamping or holding fixtures used during repair should be grounded, as should the circuit board during repair.

10. Devices should be inserted into the printed circuit boards such that leads on the back side do not contact any material other than the printed circuit board (in particular, do not use any plastic foam as a backing).

11. Devices should be soldered as soon as possible after assembly. All soldering irons must be grounded.

12. Boards should not be handled in the area around the devices, but rather by the board edges.

13. Assembled boards must not be placed in conventional home-type plastic bags. Paper bags or anti-static bags should be used.

14. Before removing devices from the conductive portion of the device carrier, make certain the conductive portion of the carrier is brought into contact with a well grounded table top.

E. PC Board, Two lead Component Removal (Resistors, Capacitors, Diodes, etc.)

1. Heat one lead from the component side of the board until the solder flows and lift one lead from the board; Repeat for the other lead and remove the component (note Orientation).

2. Melt solder into each hole and using a de-soldering tool to remove solder from each hole.

3. Dress and form leads of the replacement component; insert leads into correct holes.

4. Insert replacement component observing correct orientation.

F. PC Board, Multi-lead Component Removal (IC's etc.)

1. Remove the component by clipping each lead along both sides. Clip off leads as close to the component as possible. Discard the component.

2. Heat the hole from the solder side and remove clipped lead from each hole.

3. Melt solder in each hole and using a de-soldering suction tool remove solder from each hole.

4. Insert replacement component observing the correct orientation.

5. Solder the component in place from the farside of the board. Avoid solder runs. No solder is required on contacts where no tracks exist.

G. Replacement of Power Transistors

1. Unsolder leads and remove attaching hardware. Remove transistor and hard-coat insulator.

2. Apply Thermal Joint Compound type 120 (Wakefield Engineering, Inc.) to the mounting surface of the replacement transistor.

3. Reinstall the transistor insulator and the power transistor using the hardware removed in step 1.

4. After installing the replacement transistor, but before making any electrical connections, measure the resistance between the case of the transistor and the chassis to ensure that the insulation is effective. The resistance measured should be no less than 10 Megohms.

5. Reconnect the leads of the transistor and solder in place.

H. Replacement of Printed Circuit Board Protective Coating

WARNING

CONFORMAL COATING CONTAINS TOXIC VAPORS! USE ONLY WITH ADEQUATE VENTILATION!

1. Clean repaired area of the printed circuit board per the instructions in the Cleaning Section of this manual.

2. Apply Conformal Coating Humiseal #1B-31 HYSOL PC20-35M-01 (Humiseal Division, Columbia Chase Corp., 24-60 Brooklyn Queens Expressway West, Woodside, NY, 11377) P/N 016-01040-0000.

3. Shake container well before using.

4. Spray or brush surfaces with smooth, even strokes; If spraying, hold the nozzle 10-15 inches from the work surface.

5. Cure time is ten minutes at room temperature.

5.3.4 Replacement of Components

This section describes the procedure along with any special techniques for replacing damaged or defective components.

A. Connectors

When replacing a connector, refer to the appropriate PC board assembly drawing and follow the notes to insure correct mounting and mating of each connector.

B. Crystal

The use of any other than a Bendix/King crystal is considered an unauthorized modification.

C. Diodes

Diodes used are silicon and germanium. Use long nose pliers as a heat sink under normal soldering conditions. NOTE the diodes polarity before removal.

D. Integrated Circuits

Refer to Appendix A for removal and replacement instructions.

E. Wiring/Coaial Cable

When repairing a wire that has broken from it's terminal, remove all the old solder and pieces of wire from the terminal, restrip the wire to the necessary length and resolder the wire to the terminal. Replace a damaged wire or coax with one of the same type, size and length.

5.3.5 Cleaning

A. General

This section contains information to aid in the cleaning of the component parts and subassemblies of the KS 270C Pitch Servo Unit.

WARNING

GOGGLES ARE TO BE WORN WHEN USING PRESSURIZED AIR TO BLOW DUST AND DIRT FROM THE EQUIPMENT. ALL PERSONNEL SHOULD BE WARNED AWAY FROM THE IMMEDIATE AREA.

WARNING

OPERATIONS INVOLVING THE USE OF A CLEANING SOLVENT SHOULD BE PERFORMED UNDER A VENTILATED HOOD. AVOID BREATHING SOLVENT VAPOR AND FUMES; AVOID CONTINOUS CONTACT WITH THE SOLVENT.

B. Table 5-9 lists the recommended cleaning agents to be used during the overhaul of the KS 270C.

NOTE

Equivelent substitutes may be used for the listed cleaning agents.

TYPE	USED TO CLEAN
Denatured Alcohol	Exterior Surfaces
Isopropyl Alcohol	Interior Surfaces

Table 5-9 Recommended Cleaning Agents

C. Recommended Cleaning Procedures

1. Exterior

   Wipe dust cover with a lint-free cloth dampened with denatured alcohol.

   Use a clean camel-hair brush saturated with denatured alcohol to remove any foreign matter from the connector.

2. Interior

CAUTION

ALUMINUM ELECTROLYTIC CAPACITORS CAN BE DAMAGED BY HALOGENATED HYDROCARBON SOLVENTS. HONEYWELL RECOMMENDS “ISOPROPYL ALCOHOL” AS A SAFE CLEANING SOLVENT FOR PRINTED CIRCUIT BOARDS CONTAINING ALUMINUM ELECTROLYTIC CAPACITORS. OTHER SOLVENTS WHICH MAY BE USED ARE AS FOLLOWS:

SAFE SOLVENTS

XYLENE
ETHYL ALCOHOL
BUTYL ALCOHOL
MENTHYL ALCOHOL
PROPYL ALCOHOL
CALGONITE (DETERGENT)

PRINTED CIRCUIT BOARDS CONTAINING ALUMINUM ELECTROLYTIC CAPACITORS SHALL NOT BE CLEANED WITH THE FOLLOWING SOLVENTS:

FREON TF,IMC
CARBON TETRACHLORIDE
CHLOROFORM
TRICHLOROETHYLENE
TRICHLOROETHANE
ALL ™ (DETERGENT)
METHYLENE CHLORIDE

Remove each module subassembly. Then remove any foreign matter from the casting.

a. Casting covers and shields should be cleaned as follows:

   (1) Remove surface grease with a lint free cloth.

   (2) Blow dust from surfaces, holes and recesses using an air stream.

   (3) If necessary use a solvent. Scrub until clean, working over all surfaces and into all holes and recesses with a suitable non-metallic brush.

   (4) Position the part to dry so that the solvent is not trapped in holes or recesses. Use an air stream to blow out any trapped solvent.

   (5) When thoroughly clean, touch up any minor damage to the finish.

b. Assemblies containing resistors, capacitors, RF coils, inductors, transformers and other wired parts should be cleaned as follows:

CAUTION

AVOID AIR-BLASTING DELICATE PARTS

c. Remove dust and dirt from all surfaces, including all parts and wiring, using soft-bristled brushes in conjunction with air stream.

CAUTION

SOLVENT SHOULD NOT BE USED TO CLEAN COMPONENTS, COUPLERS, BUSHINGS OF NYLON OR RUBBER GROMMETS. CLEAN THESE ITEMS USING A WASHING BATH OF LIQUID DETERGENT AND WATER.

EXCESS CLEANING SOLVENT MUST NOT BE PERMITTED TO ACCUMULATE IN ANY OF THE ADJUSTMENT SCREW CREVICES AND THUS SOFTEN OR DISSOLVE THE ADJUSTMENT SCREW OR IT"S SEALANT.

d. Any dirt that cannot be removed in this way should be removed with a brush (not synthetic) saturated with an approved solvent such as mentioned above. Use of a clean, dry, compressed air stream (25 to 35 psi) is recommended to remove any excess solvent.

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SECTION VI

ILLUSTRATED PARTS LIST

LIST OF ILLUSTRATIONS

SECTION VI

ILLUSTRATED PARTS LIST

6.1 INTRODUCTION

The Illustrated Parts List (IPL) is a complete list of assemblies and parts required for the unit. The IPL also provides for the proper identification of replacement parts. Individual Bills of Materials (BOM) within this IPL are arranged in numerical sequence starting with the top assembly and continuing with the sub-assemblies. All mechanical parts will be separated from the electrical parts used on the sub-assembly.

Parts identified in this IPL by Honeywell Part Number meet the design specifications for this equipment and are the recommended replacement parts. Warrenty information concerning Honeywell replacement parts is contained in service memo #1 P/N 600-08001-00XX.

This Section describes the various items that appear on the Bills of Material. A sample BOM is included in this section as Figure 6-1.

A. BOM Number

The Bill of Material Number appears at the top of the BOM as a 9 or 12-digit number which is also the Honeywell Part Number for the assembly. The BOM Number is followed by the assembly description and the revision level of the BOM.

B. Symbol Column

This column contains the Reference Designators of the electrical components of the assembly. Mechanical parts are not assigned Reference Designators. The Reference Designator consists of a letter abbreviation which indicates the type of component followed by a number assigned to that part (C101, Q101, etc.). Common Reference Designator abbreviations are listed below.

B	Motor or Synchro	Q	Transistor
C	Capacitor	P	Plug
CJ	Circuit Jumper	R	Resistor
CR	Diode	RT	Thermistor
DS	Lamp	S	Switch
F	Fuse	T	Transformer
FL	Filter	TP	Test Point
I	Integrated Circuit	U	Resistor/Capacitor Network /Integrated Circuit
J	Jack	V	Photocell/Vacuum Tube
L	Inductor	WG	Waveguide
M	Meter	Y	Crystal

C. Part Number Column

This column contains the Honeywell Part Number for each part. Special Purpose 999-09999-00XX series part numbers may appear in the BOM and are described below.

1. CR401 999-09999-0096 RESERVED

   The Reference Designator CR401 has been reserved for future use; The assembly does not currently include a CR401.

2. CR401 999-09999-0097 SEE NEXT ASSEMBLY

   CR401 is a part of the electrical circuit but due to assembly or testing requirements is actually part of a different assembly.

3. CR401 999-09999-0098 NOT USED

   The Reference Designator CR401 is available for future assignment. The assembly does not currently include a CR401.

4. CR401 999-09999-0099 DO NOT USE

   The Reference Designator CR401 has been previously used for this assembly and later deleted. It may not be reassigned on this assembly.

5. I401 999-09999-0090 REF SFTWARE SET SEE APPENDIX S

   I401 is a programmed memory device. Refer to Section H, Software Documentation in this introduction for a description of the software documentation system being used at the time of publication of this manual.

D. Description Column

This column contains the description of each part in the assembly. Common abbreviations which may appear in this column are listed below.

AL	Aluminum	MY	Mylar
ASSY	Assembly	PC	Polycarbonate
BIFLR	Bifilar	PF	Precision Film
BOM	Bill of Material	PP	Paper
CAP	Capacitor	PS	Polystrene
CC	Carbon Composite	QW	Quarter Watt
CF	Carbon Film	RES	Resistor
CH	Choke	S	Silicon
CR	Ceramic	SCR	Screw
CRT	Cathode Ray Tube	SM	Silver Mica
DC	Disc Ceramic	STDF	Standoff
DIO	Diode	SW	Switch

EL	Electrolytic	TERM	Terminal
EW	Eighth Watt	TN	Tantalum
FC	Fixed Composition	TST PT	Test Point
FERR	Ferrite	TW	Tenth Watt
FLTR	Filter	U	Integrated Circuit
FT	Feedthru	VA	Variable
HV	High Voltage	WW	Wire Wound
HVXFMR	High Voltage XFMR	XFMR	Transformer
HW	Half Watt	XSTR	Transistor Ceramic
MC	Monolithic	XTAL	Crystal

E. Assembly (A) Column

An “A” in this column indicates that the part indicated is an assembly. If the P/N and description reads “200-0XXXX-0099 COMMON BOM”, the parts for that assembly are included in the same BOM. The parts breakdown for an assembly with any other P/N will be found in the BOM with the same number.

F. Unit of Measure (UM) Column

This column indicates the Unit of Measure for each part. Common abbreviations found in this column are listed below.

EA	Each	RF	For Reference Only
FT	Foot	IN	Inch
AR	As Required		

G. Quantity and Version Columns

Individual versions of an assembly are identified by the last four digits of the P/N. Part quantities for each version will be indicated under headings numbered 0000 through 9900 as required. The parts indicated in the 9900 Column are common to all other versions of the assembly and are considered the Common Bill of Material for the assembly.

H. Software Documentation

The documentation of software involves the use of several unique types of part numbers. The following subsections list these part numbers with their description. In some cases, some specific versions of hardware must be used with specific versions of software. Refer to Appendix S to determine the correct P/N for ordering the correct programmed device. You will need to know the part number of and the software revision level of the unit. Appendix S contains block diagrams for documented software/hardware configurations. The unit designator and part numbers are listed in the top box. One level down from that is a box for the 206-type system software BOM number and boxes for the BOM numbers for all other hardware assemblies that do not contain software. The next level are boxes containing 205-type BOMs for assemblies which use software under the system software box.

Below these top BOM boxes are two boxes. One box shows the hardware BOM number and the other contains a list of circuit designators and part numbers of individual integrated circuits use on the circuit board. The hardware/software configuration diagrams in Appendix S provide a method to coordinate hardware with software versions and revision levels.

The last two digits of all software related P/Ns, designated in the following text as -RN, indicate the revision number and level of the related software. This number is incremented with each revision of software. For example, -01 is revision 0, -02 is revision 1, and so on. When ordering specific integrated circuits or devices, the applicable 122-XXXXX-XXRN is used. Applicable assembly drawings and schematic diagrams will then follow in order.

1. General Information

   The part number of the unit, typically the 065-, 066- or 071- top assembly part number, contains a 206- item in its bill of materials. This 206- item is the configuration control mechanism for programmable electronic devices of the unit. Two different means exist to label the hardware/software configuration of the unit depending on the part number of the unit.

   a. When the part number of the unit is a 9-digit part as represented on the TSO label, the last two digits of the 206- item are the digits of the SOFTware IDentification tag that appears on the unit.

   b. When the part number of the unit is a 12-digit part as represented on the TSO label, the last four digits of the 206- item are the digits of the SOFTware MODification tag that appears on the unit. In the example shown on page 6-7, the 206- item is flagged with an “A” in the right hand margin.

2. Definition of a Hardware/Software System

   The 206- item represents the collection of all boards in the unit which contain electronic programmable devices (software). The hardware/software system (206-) bill of materials contains two categories of items:

   a. The part number of the unit label, i.e. The SOFT ID or SOFT MOD tag.

      (1) In the case of the 9-digit TSOed unit, the unit label part number 057-03284-00XX where XX is the last two digits of the 206- number.

(2) In the case of the 12-digit TSOed unit, the unit label part number is 057-05287-YYYY where YYYY is the last four digits of the 206- number. This number is also refered to as the software revision level of the unit. The software identification tag is illustrated below.

SW ID 01

b. The 205- hardware/software board assemblies which constitute all the hardware/software boards which this unit contains. In the example, the item marked “B” is the 205- hardware/software board used in the rest of the example.

3. Definition of a Hardware/Software Board

The hardware/software board (205-) bill of materials contains four categories of items:

a. The part numbers of the board label.

(1) For 12-digit 205-0XXXX-00YY board labels, the first 10 digits are contained on a label part number of 057-05252-XXXX and the last two digits are specified by 057-05335-00YY.

(2) For 9-digit 205-WWWWW-ZZ board labels the first 7 digits are contained on a label part number o 057-050WW-00WW and the last two digits are specified by 057-05252-00ZZ.

The 205-0XXXX-00YY and the 057-05252-00YY P/N is incremented whenever the revision number of any one or more of the 125-0XXXX-XXRN P/Ns are incremented. This means that the -RN part of the P/Ns for the 057-05252-XXRN and the 205-0XXXX-XXRN will be the same. A circuit board identification tag is illustrated below.

205-06616-	0000

b. The software programmable device set assemblies (125-). Each 125- programmable device set constitutes all the software for a unique microprocessor on the hardware board. The group of 125- programmable device sets constitutes all of the software for all of the microprocessors.

(1) 125-0XXXX-XXRN Honeywell Part Numbers

The 125-0XXXX-XXRN P/N is a BOM which lists all the 122-0XXXX-XXRN programmed devices in a software set for a given circuit board. There may be only one 122-0XXXX-XXRN P/N listed or there may be several. Whenever the revision number (RN) of any one or more of the 122-0XXXX-XXRN programmed devices is incremented in a new software release, the -XXRN part of the 122-0XXXX-XXRN P/N is also incremented. This 125-0XXXX-XXRN BOM also identifies the “U” or “I” circuit designators used to identify the programmed devices on assembly drawings and schematic diagrams.

(2) The 122-0XXXX-XXRN P/N is used to identify an individual integrated circuit or other device containing software.

c. The non-software programmable device set assemblies (126-) which fulfill software requirements

d. The specification of the hardware board (200-).

In the example, the items marked “C” in the right margin are all the programmable device assemblies which fulfill the software requirements.

4. Definition of a Hardware Board

The hardware board (200-) bill of materials contains two categories of items that relate to programmable devices:

a. The non-software programmable device sets (126s) that fulfill hardware requirements. (Items D1 thru D4 in the example).

b. The references to all of the programmable devices (122-) on the board. These references resolve device location on the board in that they use the SYMBOL field of the bill of materials to specify component location. These 122- numbers are of the form 122-3XXXX-9999 or 122-0YYYY-9999.

The 122- numbers of the form 122-3XXXX-9999 are used for non-software programmable devices (126-) that fulfill hardware requirements and therefore these programmable device sets appear on the hardware board (200-) bill of materials. (Items D5 thru D10 in the example).

The 122- numbers of the form 122-0YYYY-9999 are used for both software programmable devices (125-) (items D12 thru D15 in the example) and non-software programmable devices (126-) (item D11 in the example) that fulfill software requirements.

These programmable device sets appear on the hardware/software board (205-) bill of materials.

The exact programmable device (the resolution of the -9999 in the above items) is specified by the respective software programmabl device set (125-) or the non-software programmable device set (126-) bill of materials.

Using the SYMBOL field as specified above would discourage the use of the SYMBOL field for this purpose in the programmable device sets (125- and 126-) bill of materials. This would then permit the specification of the same programmable device sets in different boards, hence different component designators.

In the example, Figure 6-1:

- the items flagged D1 thru D4 in the right margin are non-software programmable device sets;

- the items flagged D5 thru D10 in the right margin are non-software programmable device designators that fulfill hardware requirements;

- the item flagged D11 in the right margin is a non-software programmable device designator that fulfills software requirements;

- the items flagged D12 thru D15 in the right margin are software programmable device designators that fulfill software requirements.

Figure 6-1, while closely related to a specific product, does not represent an exact configuration in use by that product. This example has been modified to clarify certain points.

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Assy: 066-04020-0203 SG464 HSI W/O WX

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm	
	016-01008-0004	3	GLYPTAL 7526 BL	AR	1.00		
	016-01131-0000	1	CNTCT CMT BND 1055	AR	1.00		
	047-02579-0002	2	HANDLE ASSEMBLY	EA	1.00		
	.						
	047-09392-0001	0	SPACER RT W/FIN	EA	1.00		
	057-02203-0002	3	FLAVOR STCKR	EA	1.00		
	057-02203-0003	3	FLAVOR STCKR	EA	1.00		
	057-05286-0000	0	SERIAL TAG SG 464	EA	1.00		
	075-05082-0002	0	GUIDE PLATE TOP	EA	1.00		
	.						
	090-00277-0000	1	HOLD DOWN BRACKET	EA	1.00		
	155-02536-0001	1	CABLE ASSY	EA	1.00		
	200-07703-0000	2	DPX CONN BD ASSY	EA	1.00		
	200-07704-0000	8	LV PS BD ASSY	EA	1.00		
	206-00118-0301	0	EFS40/50 HSI SET	EA	1.00		<--- A

Assy: 206-00118-0301 EFS40/50 HSI SET

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm	
	057-05287-0301	0	SW MOD TAG	EA	1.00		
	205-00564-0002	0	EFIS 40/50 I/O PBS	EA	1.00		
	205-00565-0004	0	E40/50 HSI P/D PBS	EA	1.00		<--- B

Assy: 205-00565-0004 E40/50 HSI P/D PBS

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm	
	057-02241-0016	1	IDENT LABEL	EA	1.00		
	057-05252-0565	1	IDT 205-00565-0000	EA	1.00		
	125-00602-0004	0	EFIS 40/50 NAV SDS	EA	1.00		<--- C1
	125-00603-0002	0	EFIS40/50 DSPL SDS	EA	1.00		<--- C2
	126-00019-0000	1	EFS40/50 CLIPPER	EA	1.00		<--- C3
	200-07706-0000	1	PRCSR/DSPL BD ASSY	EA	1.00		

Figure 6-1 Typical Bill of Materials
(Sheet 1of 4)

```
Assy: 200-07706-0000  PRCSR/DSPL BD ASSY

 Symbol  Part Number    Rev  Description         UM  Quantity BxItm

         009-07706-0000   0  PC BD PRCSR/DSPL    EA      1.00
                 .
                 .
                 .
         150-00004-0010   3  TUBING TFLN 22AWG   IN      2.00
         200-04969-0000   0  EXT BD PRCSR/ADI A  RF      0.00
         126-00005-0000   1  EFS40/50 INT LOGIC  EA      1.00     <--- D1
         126-00006-0000   1  EFS40/50 VIDEO MUX  EA      1.00     <--- D2
         126-00017-0000   1  EFS40/50 SM SET     EA      1.00     <--- D3
         126-00018-0000   1  EFS40/50 SINE SET   EA      1.00     <--- D4
C  5001  111-02104-0042  26  CAP MC100KPF50V20%  EA      1.00
                 .
                 .
                 .
I  5005  122-30001-9999   0  EFS40/50 VIDEO MUX  RF      0.00     <--- D5
I  5008  122-30002-9999   0  EFS40/50 INT LOGIC  RF      0.00     <--- D6
                 .
                 .
                 .
I  5036  122-30003-9999   0  EFS40/50 SM HIGH    RF      0.00     <--- D7
I  5037  122-30004-9999   0  EFS40/50 SM LOW     RF      0.00     <--- D8
I  5038  122-30005-9999   0  EFS40/50 SINE HIGH  RF      0.00     <--- D9
I  5039  122-30006-9999   0  EFS40/50 SINE LOW   RF      0.00     <--- D10
                 .
                 .
                 .
I  5075  122-00958-9999   0  EFS40/50 CLIPPER    RF      0.00     <--- D11
                 .
                 .
                 .
I  5138  122-00918-9999   0  EFS40/50 HSI NAV-E  RF      0.00     <--- D12
I  5139  122-00919-9999   0  EFS40/50 HSI NAV-O  RF      0.00     <--- D13
                 .
                 .
                 .
I  5158  122-00920-9999   0  EFS40/50 HSI DSP-E  RF      0.00     <--- D14
I  5159  122-00921-9999   0  EFS40/50 HSI DSP-0  RF      0.00     <--- D15
                 .
                 .
                 .
Assy: 126-00005-0000  EFS40/50 INT LOGIC

 Symbol  Part Number    Rev  Description         UM  Quantity BxItm

         122-30002-0000   0  EFS40/50 INT LOGIC  EA      1.00

Assy: 122-30002-0000  EFS40/50 INT LOGIC

 Symbol  Part Number    Rev  Description         UM  Quantity BxItm

         120-02376-0000   1  EPLD EP320 (OTP)    EA      1.00
```

Figure 6-1 Typical Bill of Material
(Sheet 2 of 4)

Assy: 125-00602-0004 EFIS 40/50 NAV SDS

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	122-00918-0004	0	EFS40/50 HSI NAV-E	EA	1.00	
	122-00919-0004	0	EFS40/50 HSI NAV-O	EA	1.00	

Assy: 125-00603-0002 EFIS40/50 DSPL SDS

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	122-00920-0002	0	EFS40/50 HSI DSP-E	EA	1.00	
	122-00921-0002	0	EFS40/50 HSI DSP-O	EA	1.00	

Figure 6-1 Typical Bill of Material
(Sheet 3 of 4)

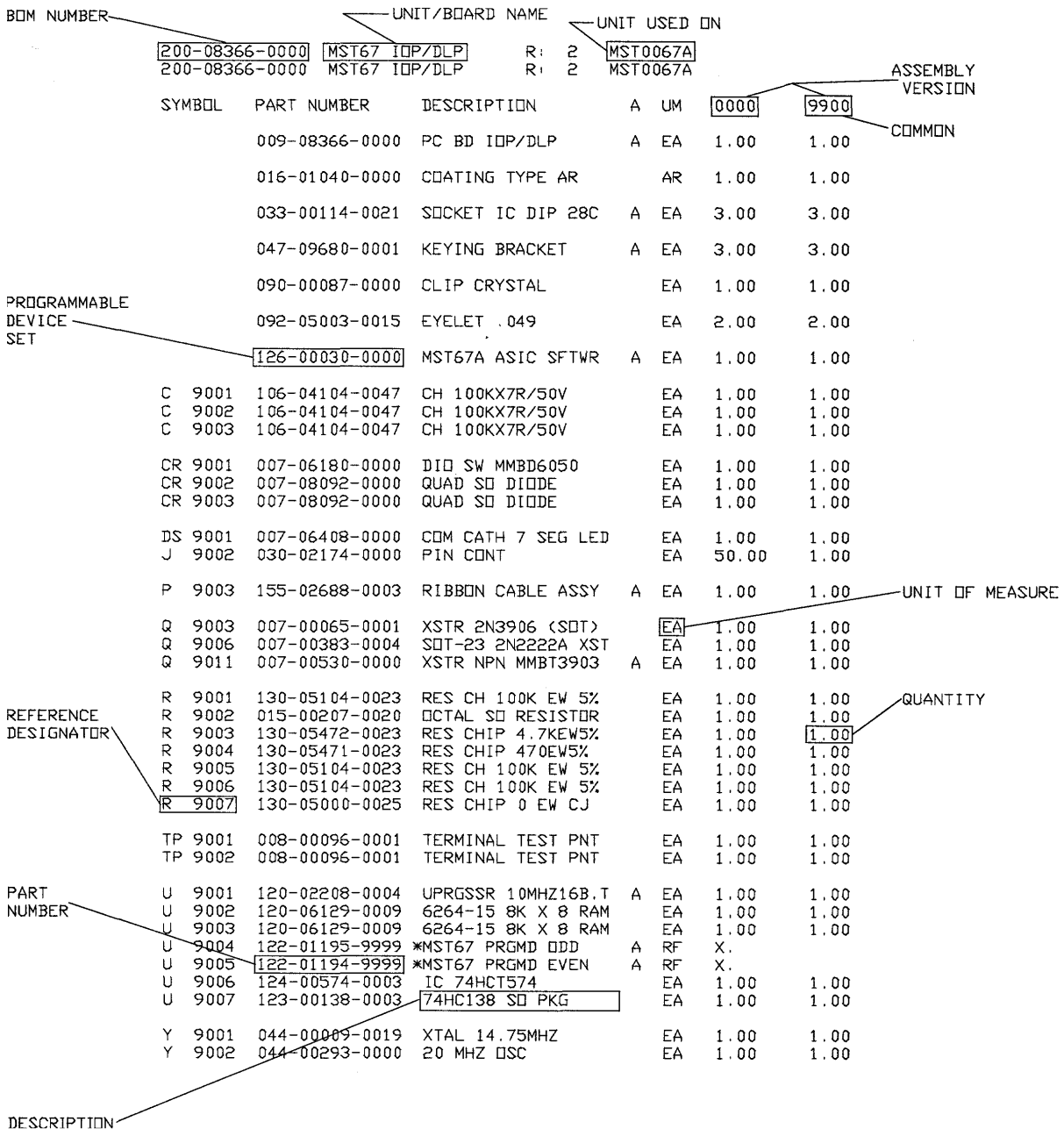

Figure 6-1 Typical Bill of Materials
(Sheet 4 of 4)

6.2 KS 270C FINAL ASSEMBLY

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065-00178-0100 Rev. AB
065-00178-0200 Rev. AB
065-00178-0300 Rev. AB

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0100	0200	0300	0099
ASY1	200-05631-0000		FRONT PLATE ASSY	EA	.	.	.	1.00
ASY2	200-05632-0004		CIRCUIT ASSY - KS270C	EA	1.00	1.00	1.00	.
ASY3	200-05633-0005		SUB PLATE ASSY	EA	.	.	1.00	.
ASY3	200-05633-0006		SUB PLATE ASSY	EA	.	1.00	.	.
ASY3	200-05633-0007		SUB PLATE ASSY	EA	1.00	.	.	.
ASY4	200-05634-0000		CLUTCH ASSY	EA	.	.	.	1.00
ITM1	023-00190-0000		SOLENOID 24 V	EA	.	.	.	1.00
ITM2	029-00779-0002		GEAR 53T64DP W/HUB	EA	.	.	.	1.00
ITM3	029-00780-0002		GEAR 66T64DP W/ HO	EA	.	.	.	1.00
ITM4	047-10987-0001		TACH BRKT	EA	.	.	.	1.00
ITM5	057-02203-0000		FLAVOR STCKR	EA	.	.	.	1.00
ITM6	057-02203-0001		FLAVOR STCKR	EA	1.00	.	.	.
ITM6	057-02203-0002		FLAVOR STCKR	EA	.	1.00	.	.
ITM6	057-02203-0003		FLAVOR STCKR	EA	.	.	1.00	.
ITM7	057-05811-0001		S/N TAG KS270C	EA	.	.	.	1.00
ITM8	076-00301-0000		SPACER .250	EA	.	.	.	1.00
ITM9	076-02938-0000		COUNTER WEIGHT	EA	.	.	.	1.00
ITM10	088-00537-0000		ENCLOSURE	EA	.	.	.	1.00
ITM11	089-05853-0004		SCR SET 2-56X1/8	EA	.	.	.	2.00
ITM12	089-05853-0006		SCR SET 2-56X3/16	EA	.	.	.	2.00
ITM13	089-05899-0004		SCR PHP 2-56X1/4	EA	.	.	.	2.00
ITM14	089-05899-0006		SCR PHP 2-56X3/8	EA	.	.	.	2.00
ITM15	089-05903-0003		SCR PHP 4-40X3/16	EA	.	.	.	3.00
ITM16	089-05909-0004		SCR PHP 8-32X1/4	EA	.	.	.	5.00
ITM17	089-05909-0010		SCR PHP 8-32X5/8	EA	.	.	.	1.00
ITM18	089-06008-0004		SCR FHP 4-40X1/4	EA	.	.	.	2.00

065-00178-0100 Rev. AB
065-00178-0200 Rev. AB
065-00178-0300 Rev. AB

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0100	0200	0300	0099
ITM19	089-06012-0007		SCR FHP 6-32X7/16	EA	.	.	.	1.00
ITM20	089-06642-0004		SCR FHS M1.6 X 4	EA	.	.	.	2.00
ITM21	090-00019-0002		RING RTNR .250	EA	.	.	.	1.00
ITM22	090-00019-0010		RING RTNR .312	EA	.	.	.	1.00
ITM23	090-00557-0024		HOSE CLAMP 1 1/4	EA	.	.	.	1.00
ITM24	137-00038-0000		STRAIN GAGE	EA	.	.	.	1.00
ITM25	148-05142-0000		DC MOTOR	EA	.	.	.	1.00
ITM26	155-02838-0003		CABLE ASSY, KS 272	EA	.	.	.	1.00
ITM27	150-00049-0010		TUBING SHRINK WHT	IN	.	.	.	.50
ITM28	030-02205-0001		TERM 28-32	EA	.	.	.	4.00
ITM29	030-02205-0005		TERM 22-26	EA	.	.	.	4.00
ITM30	088-00578-0003		CONN COVER 0.936	EA	.	.	.	1.00
ITM31	089-05903-0004		SCR PHP 4-40X1/4	EA	.	.	.	2.00
ITM32	025-00018-0066		WIRE 26 BLU	IN	.	.	.	4.25
ITM33	025-00018-0024		WIRE 26 RD/YL	IN	.	.	.	4.25
ITM34	057-03511-0001		DECAL, CAUTION	EA	.	.	.	1.00
ITM35	091-00109-0003		CABLE TIE	EA	.	.	.	1.00
ITM38	200-02598-0005		HARNESS ASSY -KS 2	EA	1.00	1.00	1.00	.
ITM39	091-00007-0002		BSHG STRN RELIEF	EA	.	.	.	1.00
ITM40	091-00109-0000		CABLE TIE	EA	.	.	.	2.00
ITM41	025-00029-0000		WIRE 24 BLK	IN	.	.	.	12.00
ITM42	025-00029-0002		WIRE 24 RED	IN	.	.	.	12.00
ITM43	016-01122-0000		EPOXY DEVCON 14250	AR	.	.	.	1.00
L1	013-00040-0000		TWO HOLE BALUN	EA	.	.	.	1.00
R46	139-03012-0000		RES CHIP 30.1KEW1%	EA	1.00	.	.	.
R46	139-03162-0000		RES CHIP 31.6KEW1%	EA	.	1.00	.	.
R46	139-04022-0000		RES CHIP 40.2KEW1%	EA	.	.	1.00	.
R47	139-03012-0000		RES CHIP 30.1KEW1%	EA	1.00	.	.	.
R47	139-03162-0000		RES CHIP 31.6KEW1%	EA	.	1.00	.	.

065-00178-0100 Rev. AB
065-00178-0200 Rev. AB
065-00178-0300 Rev. AB

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0100	0200	0300	0099
R47	139-04022-0000		RES CHIP 40.2KEW1%	EA	.	.	1.00	.
REF1	300-05631-0000		FRONT PLATE ASSY	RF	.	.	.	.00
REF1	300-05632-0000		PC BOARD ASSEMBLY	RF	.	.	.	.00
REF1	300-05634-0000		CLUTCH ASSY	RF	.	.	.	.00
REF1	300-05680-0000		FINAL ASSY PITCH S	RF	.	.	.	.00
REF100	000-00977-0000		PRODUCT STRUCTURE	RF	.	.	.	.00
REF4	004-02037-4000		KS 270C PITCH SERV	RF	.	.	.	.00
	065-00178-0099		COMMON BOM KS 270C	EA	1.00	1.00	1.00	.

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065-00178-2100 Rev. AB
065-00178-2200 Rev. AB

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	2100	2200	0099
ASY1	200-05631-0000		FRONT PLATE ASSY	EA	.	.	1.00
ASY2	200-05632-0007		CIRCUIT ASSY., KS270C	EA	1.00	1.00	.
ASY3	200-05633-0006		SUB PLATE ASSY	EA	.	1.00	.
ASY3	200-05633-0007		SUB PLATE ASSY	EA	1.00	.	.
ASY4	200-05634-0000		CLUTCH ASSY	EA	.	.	1.00
ITM1	023-00190-0000		SOLENOID 24 V	EA	.	.	1.00
ITM2	029-00779-0002		GEAR 53T64DP W/HUB	EA	.	.	1.00
ITM3	029-00780-0002		GEAR 66T64DP W/ HO	EA	.	.	1.00
ITM4	047-10987-0001		TACH BRKT	EA	.	.	1.00
ITM5	057-02203-0000		FLAVOR STCKR	EA	.	.	1.00
ITM6	057-02203-0021		FLAVOR STCKR	EA	1.00	.	.
ITM6	057-02203-0022		FLAVOR STCKR	EA	.	1.00	.
ITM7	057-05811-0001		S/N TAG KS270C	EA	.	.	1.00
ITM8	076-00301-0000		SPACER .250	EA	.	.	1.00
ITM9	076-02938-0000		COUNTER WEIGHT	EA	.	.	1.00
ITM10	088-00537-0000		ENCLOSURE	EA	.	.	1.00
ITM11	089-05853-0004		SCR SET 2-56X1/8	EA	.	.	2.00
ITM12	089-05853-0006		SCR SET 2-56X3/16	EA	.	.	2.00
ITM13	089-05899-0004		SCR PHP 2-56X1/4	EA	.	.	2.00
ITM14	089-05899-0006		SCR PHP 2-56X3/8	EA	.	.	2.00
ITM15	089-05903-0003		SCR PHP 4-40X3/16	EA	.	.	3.00
ITM16	089-05909-0004		SCR PHP 8-32X1/4	EA	.	.	5.00
ITM17	089-05909-0010		SCR PHP 8-32X5/8	EA	.	.	1.00
ITM18	089-06008-0004		SCR FHP 4-40X1/4	EA	.	.	2.00
ITM19	089-06012-0007		SCR FHP 6-32X7/16	EA	.	.	1.00
ITM20	089-06642-0004		SCR FHS M1.6 X 4	EA	.	.	2.00
ITM21	090-00019-0002		RING RTNR .250	EA	.	.	1.00
ITM22	090-00019-0010		RING RTNR .312	EA	.	.	1.00

065-00178-2100 Rev. AB
065-00178-2200 Rev. AB

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	2100	2200	0099
ITM23	090-00557-0024		HOSE CLAMP 1 1/4	EA	.	.	1.00
ITM24	137-00038-0000		STRAIN GAGE	EA	.	.	1.00
ITM25	148-05142-0000		DC MOTOR	EA	.	.	1.00
ITM26	155-02838-0003		CABLE ASSY, KS 272	EA	.	.	1.00
ITM27	150-00049-0010		TUBING SHRINK WHT	IN	.	.	.50
ITM28	030-02205-0001		TERM 28-32	EA	.	.	4.00
ITM29	030-02205-0005		TERM 22-26	EA	.	.	4.00
ITM30	088-00578-0003		CONN COVER 0.936	EA	.	.	1.00
ITM31	089-05903-0004		SCR PHP 4-40X1/4	EA	.	.	2.00
ITM32	025-00018-0066		WIRE 26 BLU	IN	.	.	4.25
ITM33	025-00018-0024		WIRE 26 RD/YL	IN	.	.	4.25
ITM34	057-03511-0001		DECAL, CAUTION	EA	.	.	1.00
ITM35	091-00109-0003		CABLE TIE	EA	.	.	1.00
ITM36	013-00096-0001		FERRITE BEAD	EA	4.00	4.00	.
ITM37	089-02140-0000		NUT LOCK 4-40	EA	1.00	1.00	.
ITM38	200-02598-0007		HARNESS ASSY KC 27	EA	1.00	1.00	.
ITM39	091-00007-0002		BSHG STRN RELIEF	EA	.	.	1.00
ITM40	091-00109-0000		CABLE TIE	EA	.	.	2.00
ITM41	025-00029-0000		WIRE 24 BLK	IN	.	.	12.00
ITM42	025-00029-0002		WIRE 24 RED	IN	.	.	12.00
ITM43	016-01122-0000		EPOXY DEVCON 14250	AR	.	.	1.00
L1	013-00040-0000		TWO HOLE BALUN	EA	.	.	1.00
R46	139-03012-0000		RES CHIP 30.1KEW1%	EA	1.00	.	.
R46	139-03162-0000		RES CHIP 31.6KEW1%	EA	.	1.00	.
R47	139-03012-0000		RES CHIP 30.1KEW1%	EA	1.00	.	.
R47	139-03162-0000		RES CHIP 31.6KEW1%	EA	.	1.00	.
REF1	300-05631-0000		FRONT PLATE ASSY	RF	.	.	.00
REF1	300-05632-0000		PC BOARD ASSEMBLY	RF	.	.	.00
REF1	300-05634-0000		CLUTCH ASSY	RF	.	.	.00

065-00178-2100 Rev. AB
065-00178-2200 Rev. AB

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	2100	2200	0099
REF1	300-05680-0000		FINAL ASSY PITCH S	RF	.	.	.00
REF4	004-02037-4000		KS 270C PITCH SERV	RF	.	.	.00
REF100	000-00977-0000		PRODUCT STRUCTURE	RF	.	.	.00
	065-00178-0099		COMMON BOM KS 270C	EA	1.00	1.00	.

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065-00178-2300 Rev. AC
065-00178-2400 Rev. B
065-00178-2500 Rev. -

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	2300	2400	2500	0099
ASY1	200-05631-0000		FRONT PLATE ASSY	EA	.	.	.	1.00
ASY2	200-05632-0007		CIRCUIT ASSY., KS270C	EA	1.00	1.00	1.00	.
ASY3	200-05633-0005		SUB PLATE ASSY	EA	1.00	.	.	.
ASY3	200-05633-0011		SUB PLATE ASSY	EA	.	1.00	.	.
ASY3	200-05633-0012		SUB PLATE ASSY	EA	.	.	1.00	.
ASY4	200-05634-0000		CLUTCH ASSY	EA	.	.	.	1.00
ITM1	023-00190-0000		SOLENOID 24 V	EA	.	.	.	1.00
ITM2	029-00779-0002		GEAR 53T64DP W/HUB	EA	.	.	.	1.00
ITM3	029-00780-0002		GEAR 66T64DP W/ HO	EA	.	.	.	1.00
ITM4	047-10987-0001		TACH BRKT	EA	.	.	.	1.00
ITM5	057-02203-0000		FLAVOR STCKR	EA	.	.	.	1.00
ITM6	057-02203-0023		FLAVOR STCKR	EA	1.00	.	.	.
ITM6	057-02203-0024		FLAVOR STCKR	EA	.	1.00	.	.
ITM6	057-02203-0025		FLAVOR STCKR	EA	.	.	1.00	.
ITM7	057-05811-0001		S/N TAG KS270C	EA	.	.	.	1.00
ITM8	076-00301-0000		SPACER .250	EA	.	.	.	1.00
ITM9	076-02938-0000		COUNTER WEIGHT	EA	.	.	.	1.00
ITM10	088-00537-0000		ENCLOSURE	EA	.	.	.	1.00
ITM11	089-05853-0004		SCR SET 2-56X1/8	EA	.	.	.	2.00
ITM12	089-05853-0006		SCR SET 2-56X3/16	EA	.	.	.	2.00
ITM13	089-05899-0004		SCR PHP 2-56X1/4	EA	.	.	.	2.00
ITM14	089-05899-0006		SCR PHP 2-56X3/8	EA	.	.	.	2.00
ITM15	089-05903-0003		SCR PHP 4-40X3/16	EA	.	.	.	3.00
ITM16	089-05909-0004		SCR PHP 8-32X1/4	EA	.	.	.	5.00
ITM17	089-05909-0010		SCR PHP 8-32X5/8	EA	.	.	.	1.00
ITM18	089-06008-0004		SCR FHP 4-40X1/4	EA	.	.	.	2.00
ITM19	089-06012-0007		SCR FHP 6-32X7/16	EA	.	.	.	1.00
ITM20	089-06642-0004		SCR FHS M1.6 X 4	EA	.	.	.	2.00

065-00178-2300 Rev. AC
065-00178-2400 Rev. B
065-00178-2500 Rev. -

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	2300	2400	2500	0099
ITM21	090-00019-0002		RING RTNR .250	EA	.	.	.	1.00
ITM22	090-00019-0010		RING RTNR .312	EA	.	.	.	1.00
ITM23	090-00557-0024		HOSE CLAMP 1 1/4	EA	.	.	.	1.00
ITM24	137-00038-0000		STRAIN GAGE	EA	.	.	.	1.00
ITM25	148-05142-0000		DC MOTOR	EA	.	.	.	1.00
ITM26	155-02838-0003		CABLE ASSY, KS 272	EA	.	.	.	1.00
ITM27	150-00049-0010		TUBING SHRINK WHT	IN	.	.	.	.50
ITM28	030-02205-0001		TERM 28-32	EA	.	.	.	4.00
ITM29	030-02205-0005		TERM 22-26	EA	.	.	.	4.00
ITM30	088-00578-0003		CONN COVER 0.936	EA	.	.	.	1.00
ITM31	089-05903-0004		SCR PHP 4-40X1/4	EA	.	.	.	2.00
ITM32	025-00018-0066		WIRE 26 BLU	IN	.	.	.	4.25
ITM33	025-00018-0024		WIRE 26 RD/YL	IN	.	.	.	4.25
ITM34	057-03511-0001		DECAL, CAUTION	EA	.	.	.	1.00
ITM35	091-00109-0003		CABLE TIE	EA	.	.	.	1.00
ITM36	013-00096-0001		FERRITE BEAD	EA	4.00	4.00	4.00	.
ITM37	089-02140-0000		NUT LOCK 4-40	EA	1.00	1.00	1.00	.
ITM38	200-02598-0007		HARNESS ASSY KC 27	EA	1.00	1.00	1.00	.
ITM39	091-00007-0002		BSHG STRN RELIEF	EA	.	.	.	1.00
ITM40	091-00109-0000		CABLE TIE	EA	.	.	.	2.00
ITM41	025-00029-0000		WIRE 24 BLK	IN	.	.	.	12.00
ITM42	025-00029-0002		WIRE 24 RED	IN	.	.	.	12.00
ITM43	016-01122-0000		EPOXY DEVCON 14250	AR	.	.	.	1.00
L1	013-00040-0000		TWO HOLE BALUN	EA	.	.	.	1.00
R46	139-02492-0000		RES CH 24.9K EW 1%	EA	.	.	1.00	.
R46	139-03162-0000		RES CHIP 31.6KEW1%	EA	.	1.00	.	.
R46	139-03922-0000		RES CH 39.2K EW 1%	EA	1.00	.	.	.
R47	139-02492-0000		RES CH 24.9K EW 1%	EA	.	.	1.00	.
R47	139-03162-0000		RES CHIP 31.6KEW1%	EA	.	1.00	.	.

065-00178-2300 Rev. AC
065-00178-2400 Rev. B
065-00178-2500 Rev. -

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	2300	2400	2500	0099
R47	139-03922-0000		RES CH 39.2K EW 1%	EA	1.00	.	.	.
REF1	300-05631-0000		FRONT PLATE ASSY	RF	.	.	.	.00
REF1	300-05632-0000		PC BOARD ASSEMBLY	RF	.	.	.	.00
REF1	300-05634-0000		CLUTCH ASSY	RF	.	.	.	.00
REF1	300-05680-0000		FINAL ASSY PITCH S	RF	.	.	.	.00
REF4	004-02037-4000		KS 270C PITCH SERV	RF	.	.	.	.00
REF100	000-00977-0000		PRODUCT STRUCTURE	RF	.	.	.	.00
	065-00178-0099		COMMON BOM KS 270C	EA	1.00	1.00	1.00	.

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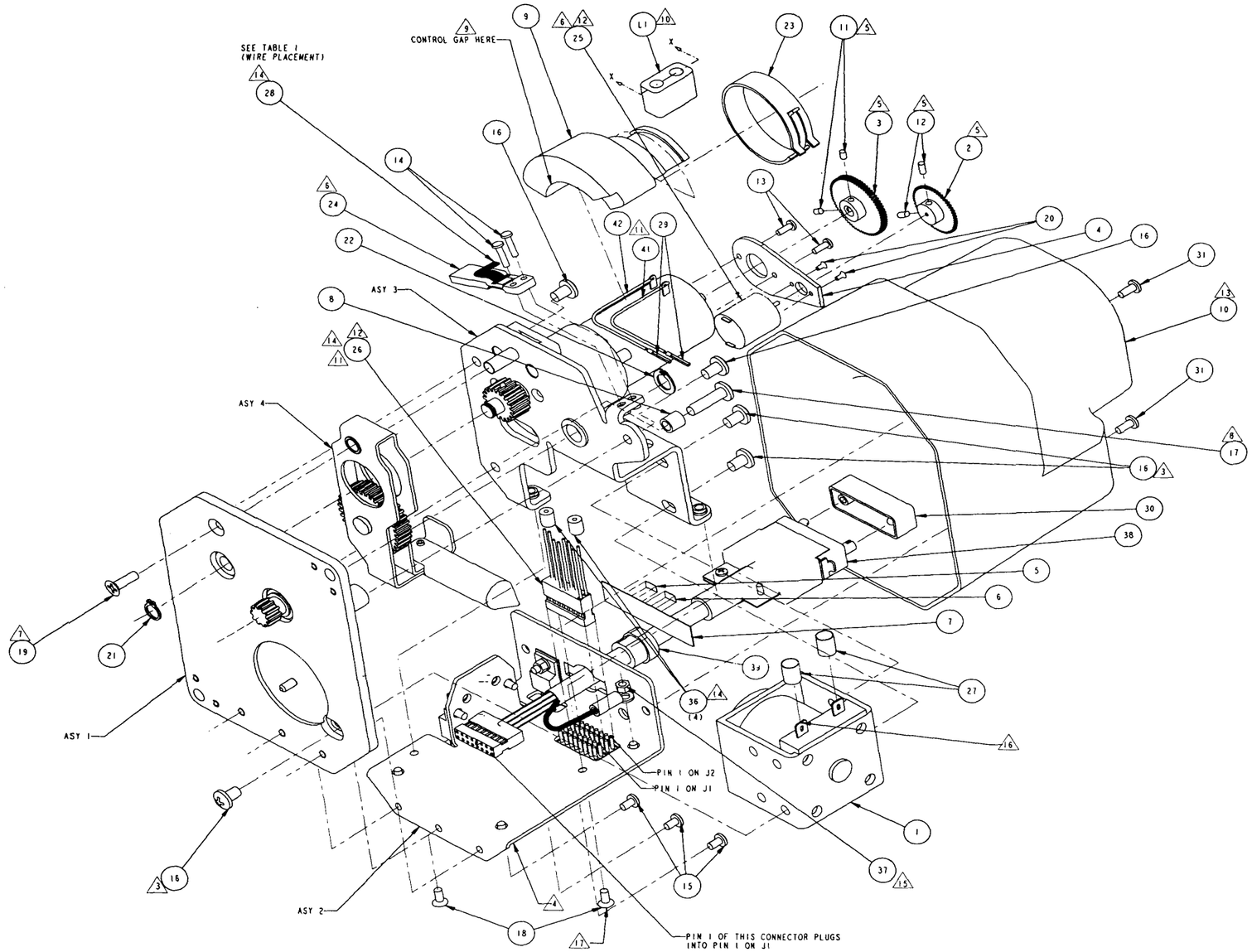


Figure 6-2 KS 270C Final Assembly
Dwg. No. 300-05680-0000 Rev AJ
(Sheet 1 of 2)

NOTES:

1. FOR COMPLETE ITEM DESCRIPTION SEE BOM 065-00178-XXXX.

2. SECURE ALL HARDWARE WITH LIQUID STAKING PER 001-01080-0000.

3. ADJUST SOLENOID FOR PROPER ENGAGEMENT BEFORE SECURING SCREWS, ITEM 16. (SEE MINIMUM PERFORMANCE SPECIFICATION 004-02037-4000 FOR SOLENOID ADJUSTMENT PROCEDURE)

4. FOR DETAILED VARIABLE RESISTOR LOCATIONS OF R46 AND R47 SEE 300-09087-0000.
FOR DETAILED VARIABLE RESISTOR LOCATIONS OF R46, R47, R40, AND R42 SEE 300-09366-0000
FOR DETAILED VARIABLE RESISTOR LOCATIONS OF R46 AND R47 SEE 300-09653-01

5. .015 INCH ±.005 CLEARANCE REQUIRED BETWEEN BACK SIDE OF HUB ON ITEM 3 AND MOTOR. INSURE SETSCREWS CAN BE FREELY THREADED THROUGH TO GEAR HUB ID BEFORE INSTALLING GEARS ONTO MOTOR SHAFT. VISUALLY CENTER THE GEAR TEETH OF ITEM 2 WITH THE GEAR TEETH OF ITEM 3. POST APPLY LIQUID STAKE (016-01412-0000) TO ITEMS 2 AND 3 AT THE INTERFACE BETWEEN THE GEAR HUB AND THE MOTOR SHAFT.

6. INSURE FREE ROTATION OF THE MOTOR WITH NO FORCE EXERTED ON THE STRAIN GAGE BEAM, ITEM 24, DUE TO PULL FROM THE MOTOR OR TACH MOTOR WIRES. IT IS PERMISIBLE TO GENTLY BEND WIRES AS NEEDED FROM MOTORS TO INSURE FORCES ON STRAIN GAGE BEAM ARE ELIMINATED. ALIGN STRAIN GAGE SETTING PER MINIMUM PERFORMANCE SPECIFICATION 0041-02037-4000.

7. MAKE SURE CLUTCH ASSEMBLY PIVOTS FREELY AFTER ITEM 19, SCREW, IS TIGHTENED.

8. WHEN TIGHTENING SCREW, ITEM 17, MAKE SURE SPRING BODY IS KEPT PERPENDICULAR TO CLUTCH BRACKET ASSEMBLY. DO NOT ALLOW SCREW HEAD TO TWIST SPRING. SPRING END FITS BETWEEN HEAD OF SCREW AND SPACER.

9. SEE DETAIL 'C' AND SHEET 1
- ORIENT ITEM 23, SPRING CLIP AS SHOWN.
- INSURE ITEM 9, COUNTERWEIGHT IS SEATED DOWN AGAINST MOTOR SHOULDER AND AGAINST MOTOR BODY BASE WITH GAP LESS THAN .010" WHERE SHOWN BEFORE APPLYING EPOXY.
- AFTER ALIGNMENT, APPLY APPROX 1/8" THICK BEAD OF 5 MINUTE EPOXY, ITEM 43, TO SURFACE BETWEEN COUNTERWEIGHT AND MOTOR WHERE SHOWN.

10. - BOTH MOTOR LEAD WIRES LOOP THROUGH BALUN, ITEM L1, 2.5 TIMES AND EXIT OPPOSITE HOLE. SEE SECTION VIEW X-X. AFTER WIRES HAVE BEEN ROUTED, SECURE BALUN TO HORIZONTAL CHASSIS, AS SHOWN IN DETAIL 'A' USING THE 1st CABLE TIE AND ROUTING THROUGH EXISTING HOLES IN CHASSIS.

- THE 2nd CABLE TIE IS USED TO SECURE THE WIRE BUNDLE, INCLUDING THE STRAIN GAGE WIRES, ABOVE ITEM 26, APPROXIMATELY 1". THE CABLE TIE MUST BE SNUG, BUT ABLE TO SLIDE ON WIRES. DO NOT USE TIE WRAP GUN. FERRITE BEADS, ITEM 36, SHALL BE BETWEEN CABLE TIE AND CONNECTOR, ITEM 26.

- THE 3rd CABLE TIE SECURES THE STRAIN GAGE WIRES TO THE SOLENOID WIRES AND KEEPS THEM FROM CONTACTING THE COUNTERWEIGHT (ITEM 9). INSURE THE WIRES ARE DRESSED SO THEY DO NOT CONTACT THE COUNTERWEIGHT, BUT NOT SO TIGHT THAT THEY EFFECT THE STRAIN GAGE OUTPUT (NOTE 6) OR PULL THE WIRES AWAY FROM THE STRAIN GAGE BEAM. THE CABLE TIE MUST BE SNUG, BUT ABLE TO SLIDE ON WIRES. DO NOT USE TIE WRAP GUN.

11. TRIM MOTOR LEADS, ITEMS 41 AND 42, TO LENGTH, AFTER WIRES HAVE BEEN ROUTED PER NOTE 10. SOLDER TO MOTOR LUGS WITH WIRES PARALLEL TO MOTOR SHAFT AND PER NOTE 2. CRIMP ON TERMINALS, ITEM 29, TO WIRES AND INSERT INTO CONNECTOR, ITEM 26, AS SHOWN IN TABLE 2. TERMINALS MAY BE CRIMPED ON BEFORE ROUTING WIRES THRU BALUN.

12. CRIMP ON TERMINALSS, ITEM 29, TO TACH WIRES, ITEMS 32 AND 33. CONNECT ASSEMBLED WIRES BETWEEN CONNECTOR, ITEM 26, AND TACH MOTOR, ITEM 25, AS SHOWN PER TABLE 2. SEE NOTE 6.

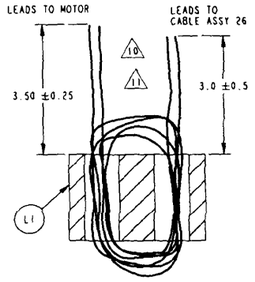
13. ATTACH ESD STICKER, ITEM 34, TO BACKSIDE OF COVER, ITEM 10, DIRECTLY ABOVE SERIAL TAG AND CENTERED.

14. SLIDE FERRITE BEAD, ITEM 36, ONTO WIRES BLACK, GREEN, RED, AND WHITE OF STRAIN GAGE ASSY, ITEM 24, AND ATTACH TERMINALS, ITEM 28 TO END OF STRAIN GAGE WIRES. INSERT TERMINALS INTO CONNECTOR, ITEM 26, AS SHOWN BY TABLE 1. SEE NOTE 10.

15. GROUND TERMINATED SHIELD LUG TO CHASSIS AS SHOWN, USING ITEM 37.

16. THIS TERMINAL CONNECTS TO PIN 4 (RED WIRE) OF CABLE ASSY 26.

17. ASSEMBLE PC~~B0~~ FROM ASY 2 AFTER SCREW IS INSTALLED.



SECTION X-X
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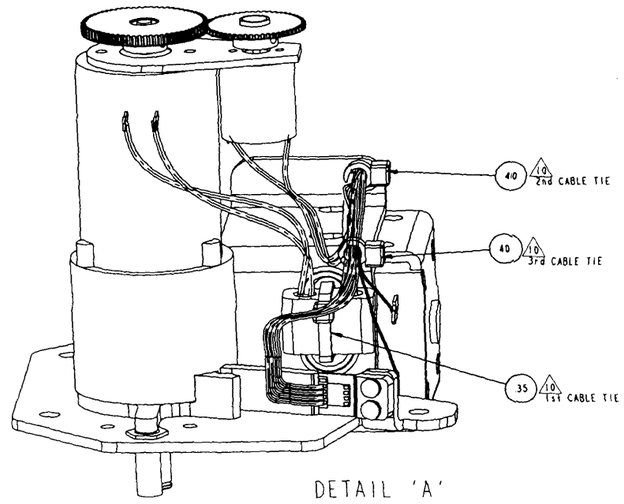
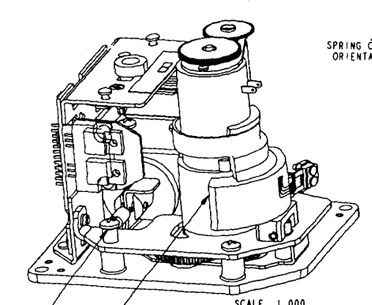


DETAIL 'A'
SCALE 2.000



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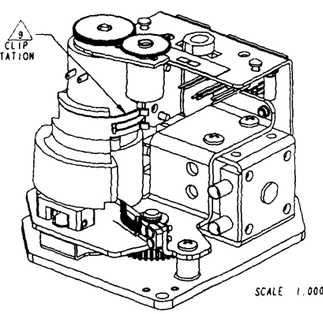

SCALE 1.000

DETAIL 'C'

Figure 6-2 KS 270C Final Assembly
Dwg. No. 300-05680-0000
(Sheet 2 of 2)

6.3 KS 270C FRONT PLATE ASSEMBLY

200-05631-0000 Rev. AD					
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0099
ITM1	029-00774-0001		GEAR: FINAL DRIVE	EA	1.00
ITM2	073-00988-0004		BASE PLATE W/ HARD	EA	1.00
ITM3	076-02935-0001		PINION SHAFT	EA	1.00
ITM4	090-00019-0010		RING RTNR .312	EA	1.00
ITM5	090-00096-0000		PIN DOW, .0938D X	EA	1.00
ITM6	147-05180-0000		BALL BEARING	EA	1.00
ITM7	147-05180-0001		BALL BEARING	EA	1.00
ITM8	016-01007-0013		LOCTITE 680	AR	1.00
ITM9	016-01160-0001		ADHESIVE PRIMER N	AR	1.00
REF1	300-05631-0000		FRONT PLATE ASSY	RF	.00

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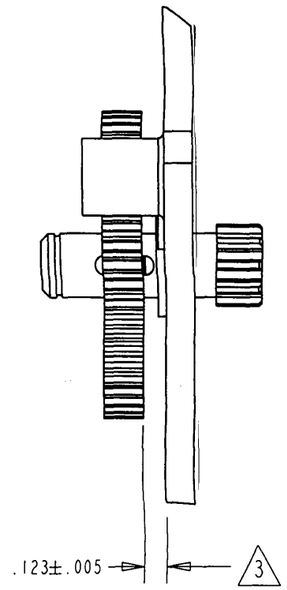
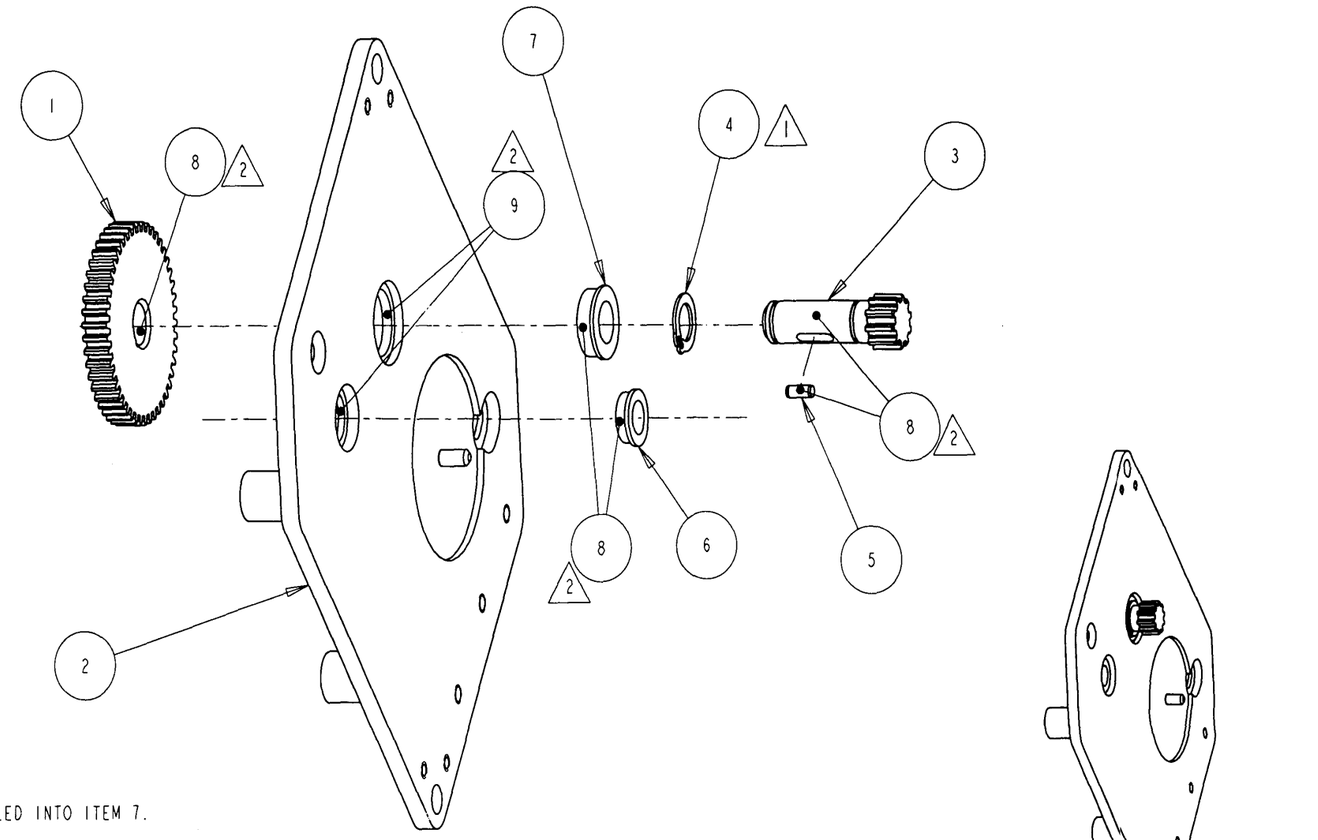


DETAIL A
SCALE 1.500



ASSEMBLED VIEW SCALE 0.600

THIS DRAWING IS NOT COMPLETE WITHOUT PARTS LIST 200-05631-0000.

NOTES:

1. ITEM 4 MUST BE INSTALLED BEFORE ITEM 3 IS ASSEMBLED INTO ITEM 7.
2. APPLY LOCTITE 7649 (PRIMER N), 016-01160-0001 (ITEM 9) WHERE INDICATED & ALLOW TO DRY. INSTALL LOCTITE 680 (016-01007-0013) (ITEM 8) TO EACH PART INDICATED BEFORE FINAL ASSEMBLY, MAKING SURE THAT LOCTITE DOESN'T CONTAMINATE BALLS INSIDE THE BEARINGS AND CAUSE BINDING. APPLY LOCTITE TO ITEMS 3 AND 5 AFTER INSERTING THROUGH ITEM 7.
3. THIS DIMENSION SHOULD BE OBTAINED WITH PINION SHAFT SNAP RING PRESSED FULLY AGAINST FRONT OF BALL BEARING SURFACE.

Figure 6-3 Front Plate Assembly
Dwg. No. 300-05631-0000 Rev AD

6.4 KS 270C PRINTED CIRCUIT BOARD ASSEMBLY

200-05632-0004 Rev AF					
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0004
ASY1	200-09087-0000		KFC 140 SERVO - PC	EA	1.00
ITM1	047-10988-0002		PCB BRACKET	EA	1.00
ITM2	089-02140-0000		NUT LOCK 4-40	EA	1.00
ITM3	089-05903-0004		SCR PHP 4-40X1/4	EA	4.00
ITM4	089-06008-0004		SCR FHP 4-40X1/4	EA	1.00
ITM6	091-00156-0000		BUSHING	EA	1.00
ITM11	089-05903-0004		SCR PHP 4-40X1/4	EA	2.00
Q4	120-03555-0000		MOS H-BRIDGE	EA	1.00
U6	120-03026-0002		IC MC7806CT	EA	1.00
REF1	300-05632-0000		PC BOARD ASSEMBLY	RF	.00

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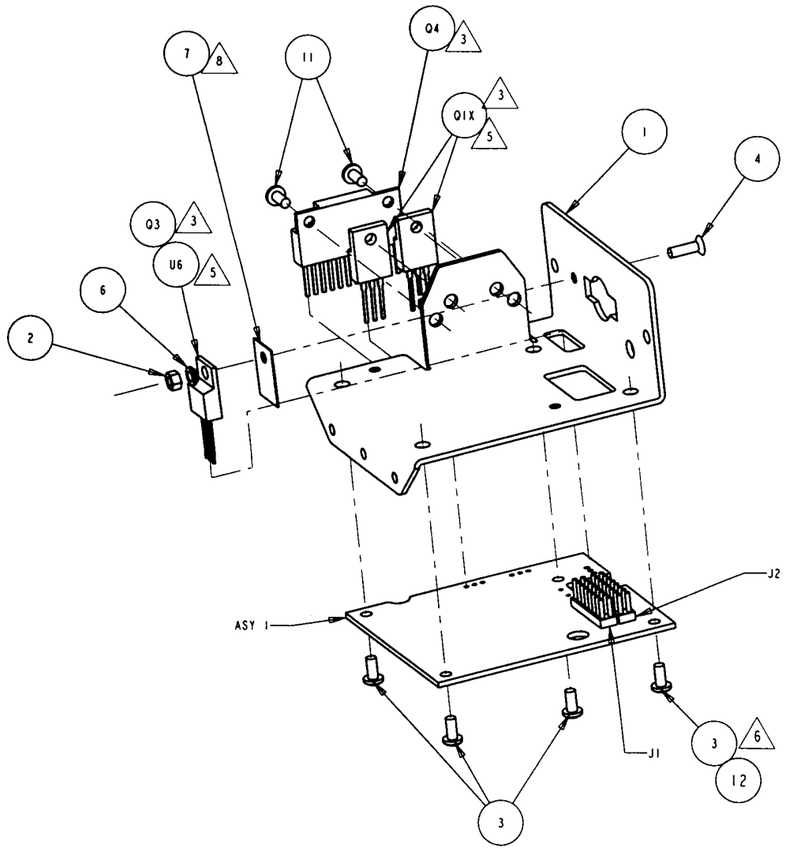
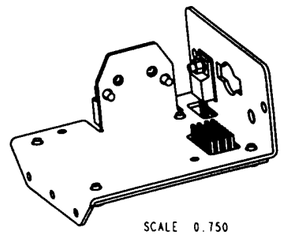




SCALE 0.750

ASSEMBLED VIEW

NOTES:

1. FOR COMPLETE ITEM DESCRIPTION SEE BOM 200-05632-0XXX.
2. SECURE ALL HARDWARE WITH LIQUID STAKING PER 001-01080-0000.
3. TRIM LEADS ON ITEMS Q3, Q4, Q1X, U6 AFTER SOLDERING TO PC BOARD.
5. SEE PARTS LIST FOR SPECIFIC REFERENCE DESIGNATOR CALLOUT.
6. ITEM 12 IS INSTALLED ON ASSEMBLY 200-05632-0007 ONLY. ALL OTHER ASSEMBLIES REQUIRE ITEM 3. SEE PARTS LIST.
7. SEE 300-09013-0000, 300-09014-0000, 300-09087-0000, 300-09089-0000, 300-09366-0X00, 300-09448-0X00, 300-09653-0X, 300-09656-0X, 300-09720-0X FOR DETAILED LOCATION OF Q3, Q4, Q1X, U6.
8. ITEM 7 NOT USED ON ALL FLAVORS, REFER TO SPECIFIC 200-05632-XXXX.

THIS DRAWING IS NOT COMPLETE WITHOUT PART LIST 200-05632-XXXX.

Figure 6-4 Printed Circuit Board Assembly
Dwg. No. 300-05632-0000 Rev AF

6.5 KS 270C PITCH SERVO BOARD

300-09653-0501 Rev 0					
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0501
C1	106-04182-0016		CAPCH1800PFNPO/50V	EA	1.00
C3	106-04182-0016		CAPCH1800PFNPO/50V	EA	1.00
C5	106-00129-0000		CAP CH 1UF X7R/50V	EA	1.00
C7	106-04104-0047		CH 100KX7R/50V	EA	1.00
C8	106-04104-0047		CH 100KX7R/50V	EA	1.00
C9	096-01186-0014		CAP 10.0UF 16V 10%	EA	1.00
C12	106-00134-0001		CAP CH CR .01 200	EA	1.00
C13	106-04103-0047		CH 10K X7R/50V	EA	1.00
C15	106-05392-0047		CAP CH3900PFX7R/50	EA	1.00
C16	106-05153-0047		CAP CH 15K X7R/50V	EA	1.00
C17	106-05153-0047		CAP CH 15K X7R/50V	EA	1.00
C18	106-04104-0047		CH 100KX7R/50V	EA	1.00
C19	097-00214-0017		CAP AL 82UF 50V	EA	1.00
C20	106-00129-0000		CAP CH 1UF X7R/50V	EA	1.00
C21	106-00129-0000		CAP CH 1UF X7R/50V	EA	1.00
C22	106-00129-0000		CAP CH 1UF X7R/50V	EA	1.00
C23	106-04562-0057		CAPCH5600PFX7R/100	EA	1.00
C24	106-04101-0026		CH 100PF NPO/100V	EA	1.00
C25	106-04101-0026		CH 100PF NPO/100V	EA	1.00
C26	106-04104-0047		CH 100KX7R/50V	EA	1.00
C27	106-04104-0047		CH 100KX7R/50V	EA	1.00
CR1	007-05245-0024		DIO Z 33V SMD	EA	1.00
CR2	007-05117-0015		DIO Z 13V SOT	EA	1.00
CR3	007-05117-0015		DIO Z 13V SOT	EA	1.00
CR4	007-05117-0015		DIO Z 13V SOT	EA	1.00
CR5	007-05117-0015		DIO Z 13V SOT	EA	1.00
CR6	007-05247-0001		TRANSIENT VOLTAGE	EA	1.00

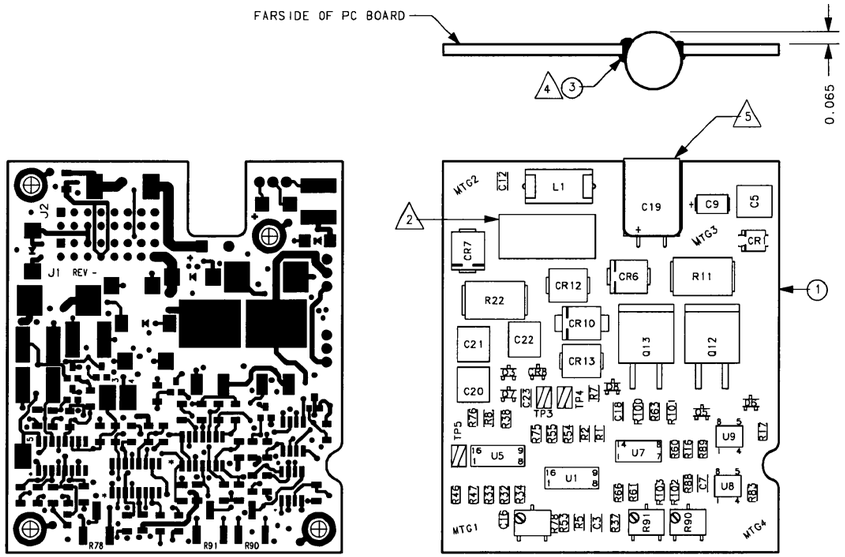
300-09653-0501 Rev 0					
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0501
CR7	007-06437-0007		DIO 3A 600V SMD	EA	1.00
CR8	007-06177-0000		SMD DIO SI MMBD914	EA	1.00
CR9	007-06177-0000		SMD DIO SI MMBD914	EA	1.00
CR10	007-05240-0000		36V TRANSORB SO	EA	1.00
CR12	007-05241-0203		TRNSRB 1500W 15V	EA	1.00
CR13	007-05241-0203		TRNSRB 1500W 15V	EA	1.00
ITM1	009-09653-0001		KS 270C SERVO BOAR	EA	1.00
ITM2	016-01040-0000		COATING TYPE AR	AR	1.00
ITM3	016-01082-0000		DC RTV 3145	AR	1.00
J1	030-02453-0008		CONNECTOR 16P	EA	1.00
J2	030-02453-0008		CONNECTOR 16P	EA	1.00
L1	019-02752-0100		IND SM 10UH 15%	EA	1.00
Q1	007-00383-0004		SOT-23 2N2222A XST	EA	1.00
Q2	007-00383-0004		SOT-23 2N2222A XST	EA	1.00
Q3	007-00383-0004		SOT-23 2N2222A XST	EA	1.00
Q5	007-00383-0004		SOT-23 2N2222A XST	EA	1.00
Q6	007-00383-0004		SOT-23 2N2222A XST	EA	1.00
Q7	007-00383-0004		SOT-23 2N2222A XST	EA	1.00
Q8	007-00383-0004		SOT-23 2N2222A XST	EA	1.00
Q9	007-00383-0004		SOT-23 2N2222A XST	EA	1.00
Q10	007-01074-0001		POWER MOSFET 100V	RF	.00
Q11	007-01074-0001		POWER MOSFET 100V	RF	.00
Q12	007-01072-0001		POWER MOSFET	EA	1.00
Q13	007-01072-0001		POWER MOSFET	EA	1.00
R1	139-03483-0000		RES CH 348K EW 1%	EA	1.00
R2	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R3	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R4	139-03483-0000		RES CH 348K EW 1%	EA	1.00
R5	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R6	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00

300-09653-0501 Rev 0					
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0501
R7	139-01212-0000		RES CHIP 12.1K1%EW	EA	1.00
R8	139-01212-0000		RES CHIP 12.1K1%EW	EA	1.00
R9	139-01003-0000		RES CHIP 100KEW1%	EA	1.00
R10	139-01003-0000		RES CHIP 100KEW1%	EA	1.00
R11	132-05145-0330		RES SM WW .33 5%	EA	1.00
R12	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00
R13	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00
R14	139-03573-0000		RES CHIP 357KEW1%	EA	1.00
R15	139-03573-0000		RES CHIP 357KEW1%	EA	1.00
R16	139-03831-0000		RES CHIP3.83KEW1%	EA	1.00
R17	139-03831-0000		RES CHIP3.83KEW1%	EA	1.00
R18	139-03831-0000		RES CHIP3.83KEW1%	EA	1.00
R19	139-03831-0000		RES CHIP3.83KEW1%	EA	1.00
R20	139-02802-0000		RES CH 28K EW 1%	EA	1.00
R21	139-02802-0000		RES CH 28K EW 1%	EA	1.00
R22	132-05145-0103		RES SM 100 2W 5%	EA	1.00
R23	139-00200-0000		RES CH 20.0 EW 1%	EA	1.00
R24	139-00200-0000		RES CH 20.0 EW 1%	EA	1.00
R25	139-01002-0000		RES CHIP 10K EW 1%	EA	1.00
R26	139-01002-0000		RES CHIP 10K EW 1%	EA	1.00
R27	139-02001-0000		RES CHIP 2K EW 1%	EA	1.00
R29	139-02053-0000		RES CH 205K EW 1%	EA	1.00
R31	139-01004-0003		RES CH 1M .1% EW	EA	1.00
R32	139-01004-0003		RES CH 1M .1% EW	EA	1.00
R33	139-01004-0003		RES CH 1M .1% EW	EA	1.00
R34	139-01004-0003		RES CH 1M .1% EW	EA	1.00
R35	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R36	139-02001-0000		RES CHIP 2K EW 1%	EA	1.00
R37	139-02001-0000		RES CHIP 2K EW 1%	EA	1.00
R38	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00

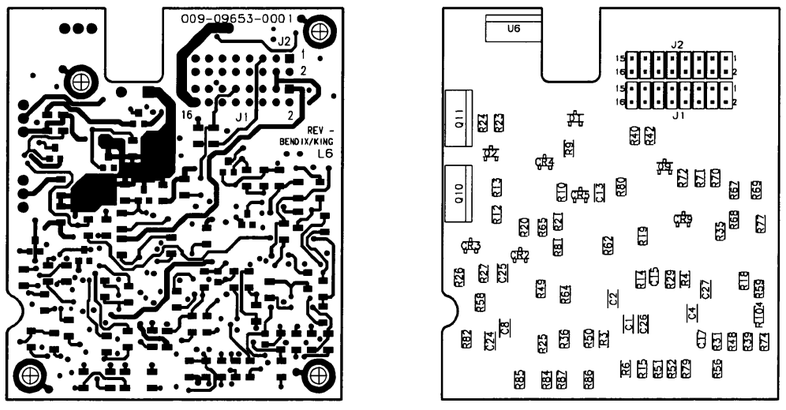
300-09653-0501 Rev 0					
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0501
R39	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00
R40	139-04021-0000		RES CH 4.02K EW 1%	EA	1.00
R42	139-04021-0000		RES CH 4.02K EW 1%	EA	1.00
R48	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00
R49	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R50	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R51	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00
R52	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00
R53	139-01002-0000		RES CHIP 10K EW 1%	EA	1.00
R54	139-01822-0000		RES CHIP 18.2KEW1%	EA	1.00
R55	139-04991-0000		RES CHIP 4.99KEW1%	EA	1.00
R56	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00
R58	139-02001-0000		RES CHIP 2K EW 1%	EA	1.00
R59	139-01182-0000		RES CH 11.8K EW1	EA	1.00
R60	139-07323-0000		RES CH 732K EW 1%	EA	1.00
R61	139-07323-0000		RES CH 732K EW 1%	EA	1.00
R62	139-01002-0000		RES CHIP 10K EW 1%	EA	1.00
R63	139-04221-0000		RES CH 4.22K EW 1%	EA	1.00
R64	139-01002-0000		RES CHIP 10K EW 1%	EA	1.00
R65	139-09091-0000		RES CH 9.09K EW 1%	EA	1.00
R66	139-09091-0000		RES CH 9.09K EW 1%	EA	1.00
R67	139-09091-0000		RES CH 9.09K EW 1%	EA	1.00
R68	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R69	139-01181-0000		RES CHIP 1.18KEW1%	EA	1.00
R70	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R71	139-01181-0000		RES CHIP 1.18KEW1%	EA	1.00
R72	139-20100-0000		RES CH 1 EW 1%	EA	1.00
R74	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R75	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R76	139-04993-0000		RES CHIP 499K EW1%	EA	1.00

300-09653-0501 Rev 0					
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0501
R77	139-02553-0000		RES CH 255K EW 1%	EA	1.00
R78	133-00562-3104		RES VAR 12/15T100K	EA	1.00
R79	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R80	139-00000-0004		RES CH 0 EW	EA	1.00
R81	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R82	139-01001-0003		RES CH 1K EW 1%	EA	1.00
R83	139-01001-0003		RES CH 1K EW 1%	EA	1.00
R84	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R85	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R86	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R87	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R88	139-03010-0000		RES CHIP 301 EW 1%	EA	.25
R88	139-03320-0000		RES CHIP 332 EW 1%	EA	.90
R88	139-03650-0000		RES CH 365 EW 1%	EA	.25
R89	139-03010-0000		RES CHIP 301 EW 1%	EA	.25
R89	139-03320-0000		RES CHIP 332 EW 1%	EA	.90
R89	139-03650-0000		RES CH 365 EW 1%	EA	.25
R90	133-00562-3102		RES VAR 12-15T 1K	EA	1.00
R91	133-00562-3102		RES VAR 12-15T 1K	EA	1.00
R100	139-04991-0000		RES CHIP 4.99KEW1%	EA	1.00
R101	139-04991-0000		RES CHIP 4.99KEW1%	EA	1.00
R102	139-04223-0000		RES CH 422K EW 1%	EA	1.00
R103	139-04223-0000		RES CH 422K EW 1%	EA	1.00
R104	139-04993-0000		RES CHIP 499K EW1%	EA	1.00
REF1	300-09653-01		PITCH SERVO BOARD	RF	.00
REF2	002-09653-01		PITCH SERVO	RF	.00
REF3	300-09653-0401		KS 270C SERVO BOAR	RF	.00
TP3	008-00309-0000		TEST POINT SURF MN	EA	1.00
TP4	008-00309-0000		TEST POINT SURF MN	EA	1.00
TP5	008-00309-0000		TEST POINT SURF MN	EA	1.00

300-09653-0501 Rev 0					
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0501
U1	120-03552-0000		QUAD OP AMP	EA	1.00
U5	120-03552-0000		QUAD OP AMP	EA	1.00
U6	120-03026-0002		IC MC7806CT	RF	.00
U7	120-03163-0001		LM2901 SO-14 COMP	EA	1.00
U8	120-03696-0001		AMP, INST, LOW PW	EA	1.00
U9	120-03696-0001		AMP, INST, LOW PW	EA	1.00



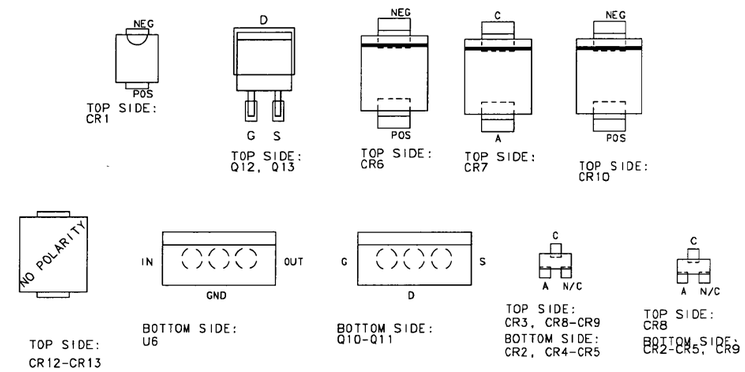
NEARSIDE VIEW OF PC BOARD



FARSIDE VIEW OF PC BOARD

Figure 6-5 KS 270C Pitch Servo Board
Dwg. No. 300-09653-01 Rev 0

NOTES:
1. PRIOR TO POST COATING BOTH SIDES OF P.C. BOARD WITH ITEM 2, MASK OFF ALL MOUNTING AREAS AND REFERENCE DESIGNATORS: J1-J2, MTG1-MTG4, TP3-TP5
2. PRINTED CIRCUIT ASSEMBLY IDENTIFICATION MUST BE IN ACCORDANCE WITH SPEC. 001-01101-0000.
3. WHERE APPLICABLE, LIQUID STAKE ALL FASTENERS PER SPEC. 001-01080-0000.
4. APPLY ITEM 3 AS SHOWN TO FILL GAP BETWEEN COMPONENT OUTER DIAMETER AND BOARD EDGE.
5. C19 TOP MUST BE FLUSH OR BELOW EDGE OF BOARD.



THIS DRAWING IS NOT COMPLETE WITHOUT PARTS LIST 300-09653-0501

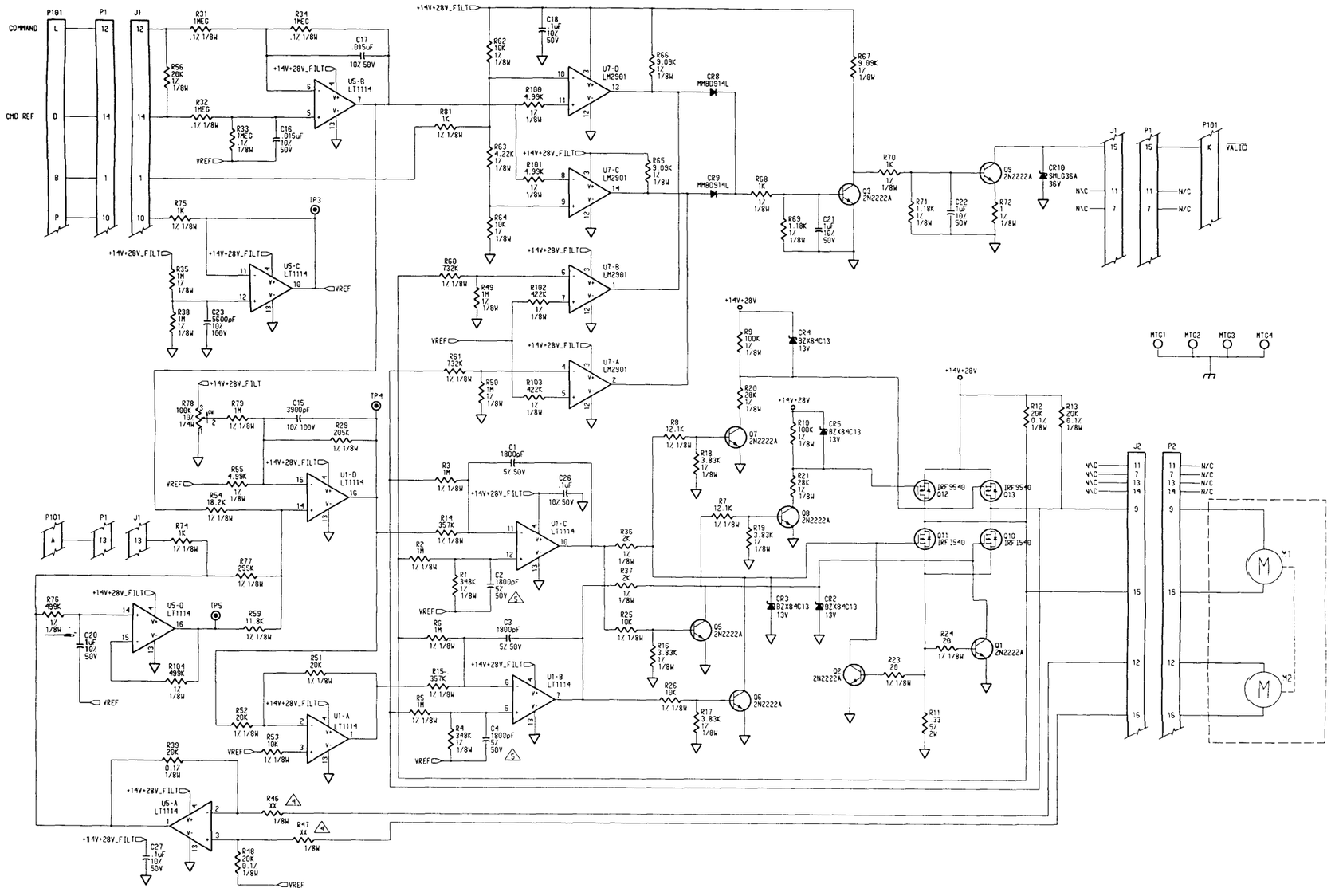
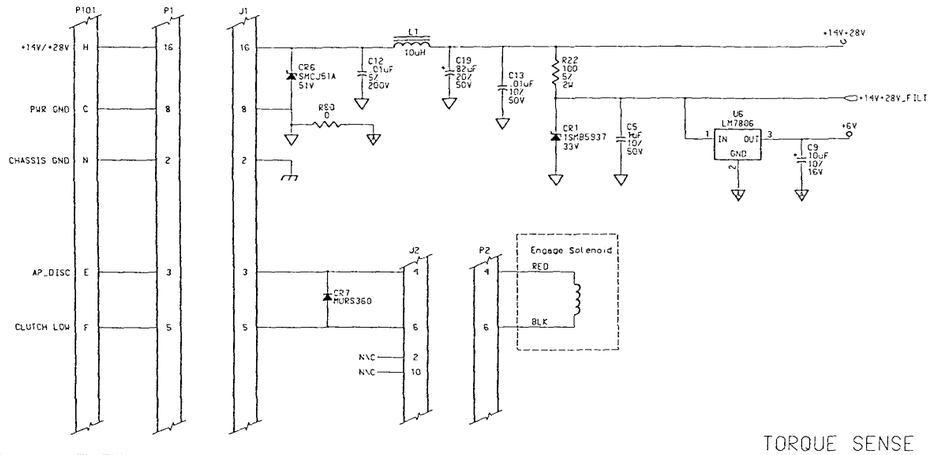


Figure 6-6 KS 270C Pitch Servo Schematic
Dwg. No. 002-09653-01 Rev A
(Sheet 1 of 2)



NOTES:

1. P101 is a harness connector external to the P.C. board.
2. Symbols located inside of dashed boxes denote components external to the P.C. board.
3. P1 and P2 mate to J1 and J2 respectively.
4. R45 and R47 are specified on 065-00178-XX00 BOM.
5. C2 and C4 not installed.
6. R88 AND R89 ARE TEST SELECTABLE (SEE 350-03653-0501 BOM FOR OPTIONS)

Figure 6-6 KS270C Pitch Servo Schematic
Dwg. No. 002-09653-01 Rev A
(Sheet 2 of 2)

6.6 KS 270C PITCH SERVO BOARD

200-09366-0000 Rev AG					
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
C1	106-04182-0016		CAPCH1800PFNPO/50V	EA	1.00
C3	106-04182-0016		CAPCH1800PFNPO/50V	EA	1.00
C5	106-00129-0000		CAP CH 1UF X7R/50V	EA	1.00
C7	106-04104-0047		CH 100KX7R/50V	EA	1.00
C8	106-04104-0047		CH 100KX7R/50V	EA	1.00
C9	096-01186-0014		CAP 10.0UF 16V 10%	EA	1.00
C12	106-00129-0000		CAP CH 1UF X7R/50V	EA	.
C13	106-04103-0047		CH 10K X7R/50V	EA	1.00
C15	106-05392-0047		CAP CH3900PFX7R/50	EA	1.00
C16	106-05150-0026		CAP CH15PFNPO/100V	EA	1.00
C17	106-05150-0026		CAP CH15PFNPO/100V	EA	1.00
C18	106-04104-0047		CH 100KX7R/50V	EA	1.00
C19	106-00129-0000		CAP CH 1UF X7R/50V	EA	.
C20	106-00129-0000		CAP CH 1UF X7R/50V	EA	1.00
C21	106-00129-0000		CAP CH 1UF X7R/50V	EA	1.00
C22	106-00129-0000		CAP CH 1UF X7R/50V	EA	1.00
C23	106-04562-0057		CAPCH5600PFX7R/100	EA	1.00
C24	111-00001-0008		CAP CR 100PF 200V	EA	1.00
C25	111-00001-0008		CAP CR 100PF 200V	EA	1.00
CR1	007-05245-0024		DIO Z 33V SMD	EA	1.00
CR2	007-05117-0015		DIO Z 13V SOT	EA	1.00
CR3	007-05117-0015		DIO Z 13V SOT	EA	1.00
CR4	007-05117-0015		DIO Z 13V SOT	EA	1.00
CR5	007-05117-0015		DIO Z 13V SOT	EA	1.00
CR6	007-05247-0001		TRANSIENT VOLTAGE	EA	1.00
CR7	007-06437-0007		DIO 3A 600V SMD	EA	1.00
CR8	007-06177-0000		SMD DIO SI MMBD914	EA	1.00
CR9	007-06177-0000		SMD DIO SI MMBD914	EA	1.00

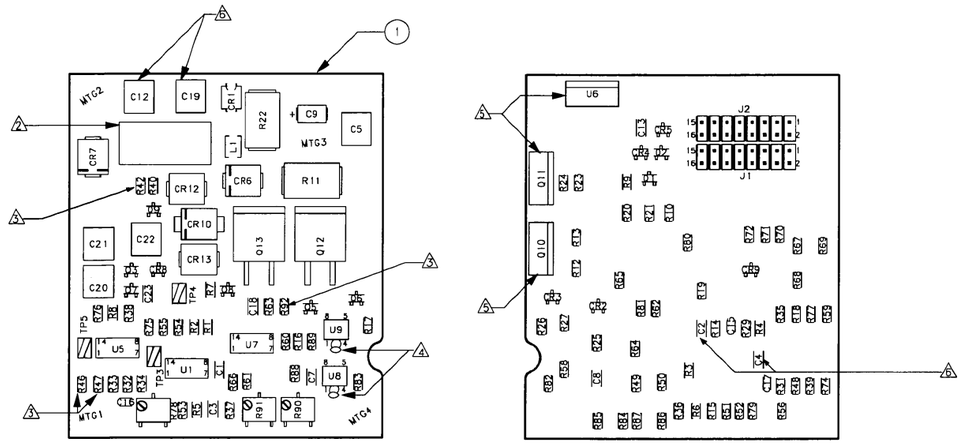
200-09366-0000 Rev AG					
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
CR10	007-05240-0000		36V TRANSORB SO	EA	1.00
CR12	007-05241-0203		TRNSRB 1500W 15V	EA	1.00
CR13	007-05241-0203		TRNSRB 1500W 15V	EA	1.00
CR14	007-06184-0000		DIO DUAL SWITCHING	EA	.
ITM1	009-09366-0000		RITCH/ROLL SERVO P	EA	1.00
ITM2	012-01005-0002		TAPE MYLAR .500 W	IN	.
J1	030-02453-0008		CONNECTOR 16P	EA	1.00
J2	030-02453-0008		CONNECTOR 16P	EA	1.00
L1	013-00172-0000		FERRITE BEAD, SURF	EA	1.00
Q1	007-00261-0003		XSTR 2N2907A (SOT)	EA	1.00
Q2	007-00261-0003		XSTR 2N2907A (SOT)	EA	1.00
Q3	007-00383-0004		SOT-23 2N2222A XST	EA	1.00
Q5	007-00383-0004		SOT-23 2N2222A XST	EA	1.00
Q6	007-00383-0004		SOT-23 2N2222A XST	EA	1.00
Q7	007-00383-0004		SOT-23 2N2222A XST	EA	1.00
Q8	007-00383-0004		SOT-23 2N2222A XST	EA	1.00
Q9	007-00383-0004		SOT-23 2N2222A XST	EA	1.00
Q10	007-01074-0001		POWER MOSFET 100V	RF	.00
Q11	007-01074-0001		POWER MOSFET 100V	RF	.00
Q12	007-01072-0001		POWER MOSFET	EA	1.00
Q13	007-01072-0001		POWER MOSFET	EA	1.00
R1	139-03483-0000		RES CH 348K EW 1%	EA	1.00
R2	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R3	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R4	139-03483-0000		RES CH 348K EW 1%	EA	1.00
R5	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R6	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R7	139-01212-0000		RES CHIP 12.1K1%EW	EA	1.00
R8	139-01212-0000		RES CHIP 12.1K1%EW	EA	1.00
R9	139-01003-0000		RES CHIP 100KEW1%	EA	1.00

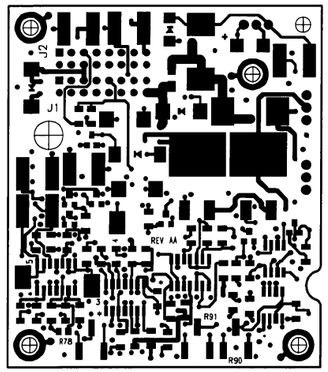
200-09366-0000 Rev AG					
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
R10	139-01003-0000		RES CHIP 100KEW1%	EA	1.00
R11	132-05145-0150		RES SM .15 2W 5%	EA	1.00
R12	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00
R12	139-02002-0003		RES CH 20.0K EW.1%	EA	.
R13	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00
R13	139-02002-0003		RES CH 20.0K EW.1%	EA	.
R14	139-03573-0000		RES CHIP 357KEW1%	EA	1.00
R15	139-03573-0000		RES CHIP 357KEW1%	EA	1.00
R16	139-03831-0000		RES CHIP3.83KEW1%	EA	1.00
R17	139-03831-0000		RES CHIP3.83KEW1%	EA	1.00
R18	139-03831-0000		RES CHIP3.83KEW1%	EA	1.00
R19	139-03831-0000		RES CHIP3.83KEW1%	EA	1.00
R20	139-02802-0000		RES CH 28K EW 1%	EA	1.00
R21	139-02802-0000		RES CH 28K EW 1%	EA	1.00
R22	132-05145-0103		RES SM 100 2W 5%	EA	1.00
R23	139-00200-0000		RES CH 20.0 EW 1%	EA	1.00
R24	139-00200-0000		RES CH 20.0 EW 1%	EA	1.00
R25	139-01002-0000		RES CHIP 10K EW 1%	EA	1.00
R26	139-01002-0000		RES CHIP 10K EW 1%	EA	1.00
R27	139-02001-0000		RES CHIP 2K EW 1%	EA	1.00
R29	139-02053-0000		RES CH 205K EW 1%	EA	1.00
R31	139-01004-0003		RES CH 1M .1% EW	EA	1.00
R32	139-01004-0003		RES CH 1M .1% EW	EA	1.00
R33	139-01004-0003		RES CH 1M .1% EW	EA	1.00
R34	139-01004-0003		RES CH 1M .1% EW	EA	1.00
R35	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R36	139-02001-0000		RES CHIP 2K EW 1%	EA	1.00
R37	139-02001-0000		RES CHIP 2K EW 1%	EA	1.00
R38	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R39	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00

200-09366-0000 Rev AG					
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
R39	139-02002-0003		RES CH 20.0K EW.1%	EA	.
R40	139-04021-0000		RES CH 4.02K EW 1%	EA	1.00
R42	139-04021-0000		RES CH 4.02K EW 1%	EA	1.00
R48	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00
R48	139-02002-0003		RES CH 20.0K EW.1%	EA	.
R49	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R50	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R51	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00
R52	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00
R53	139-01002-0000		RES CHIP 10K EW 1%	EA	1.00
R54	139-01822-0000		RES CHIP 18.2KEW1%	EA	1.00
R55	139-04991-0000		RES CHIP 4.99KEW1%	EA	1.00
R56	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00
R58	139-02001-0000		RES CHIP 2K EW 1%	EA	1.00
R59	139-01182-0000		RES CH 11.8K EW1	EA	1.00
R60	139-07323-0000		RES CH 732K EW 1%	EA	1.00
R61	139-07323-0000		RES CH 732K EW 1%	EA	1.00
R62	139-01002-0000		RES CHIP 10K EW 1%	EA	1.00
R63	139-04221-0000		RES CH 4.22K EW 1%	EA	1.00
R64	139-01002-0000		RES CHIP 10K EW 1%	EA	1.00
R65	139-09091-0000		RES CH 9.09K EW 1%	EA	1.00
R66	139-09091-0000		RES CH 9.09K EW 1%	EA	1.00
R67	139-09091-0000		RES CH 9.09K EW 1%	EA	1.00
R68	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R69	139-01181-0000		RES CHIP 1.18KEW1%	EA	1.00
R70	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R71	139-01181-0000		RES CHIP 1.18KEW1%	EA	1.00
R72	139-20100-0000		RES CH 1 EW 1%	EA	1.00
R74	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R75	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00

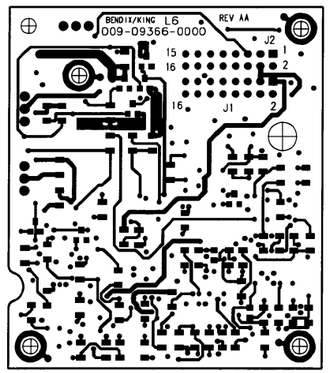
200-09366-0000 Rev AG					
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
R76	139-04993-0000		RES CHIP 499K EW1%	EA	1.00
R77	139-02553-0000		RES CH 255K EW 1%	EA	1.00
R78	133-00562-3104		RES VAR 12/15T100K	EA	1.00
R79	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R80	139-00000-0004		RES CH 0 EW	EA	1.00
R81	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R82	139-01001-0003		RES CH 1K EW 1%	EA	1.00
R83	139-01001-0003		RES CH 1K EW 1%	EA	1.00
R84	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R85	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R86	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R87	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R88	139-03010-0000		RES CHIP 301 EW 1%	EA	.25
R88	139-03320-0000		RES CHIP 332 EW 1%	EA	.90
R88	139-03650-0000		RES CH 365 EW 1%	EA	.25
R89	139-03010-0000		RES CHIP 301 EW 1%	EA	.25
R89	139-03320-0000		RES CHIP 332 EW 1%	EA	.90
R89	139-03650-0000		RES CH 365 EW 1%	EA	.25
R90	133-00562-3102		RES VAR 12-15T 1K	EA	1.00
R91	133-00562-3102		RES VAR 12-15T 1K	EA	1.00
R93	139-01002-0000		RES CHIP 10K EW 1%	EA	.
R94	139-08451-0000		RES CH 8.45K EW 1%	EA	.
REF1	300-09366-0000		PITCH/ROLL SERVO	RF	.00
REF1	300-09366-0100		PRIMARY SERVO	RF	.
REF2	002-09366-0000		PITCH/ROLL SERVO	RF	.00
REF3	192-09366-0000		KS 270C PITCH/ROLL	RF	.00
REF3	192-09366-0100		PRIMARY SERVO BOAR	RF	.
TP3	008-00309-0000		TEST POINT SURF MN	EA	1.00
TP4	008-00309-0000		TEST POINT SURF MN	EA	1.00
TP5	008-00309-0000		TEST POINT SURF MN	EA	1.00

200-09366-0000 Rev AG					
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
U1	120-03552-0000		QUAD OP AMP	EA	1.00
U5	120-03552-0000		QUAD OP AMP	EA	1.00
U6	120-03026-0002		IC MC7806CT	RF	.00
U7	120-03163-0001		LM2901 SO-14 COMP	EA	1.00
U8	120-03696-0001		AMP, INST, LOW PW	EA	1.00
U9	120-03696-0001		AMP, INST, LOW PW	EA	1.00

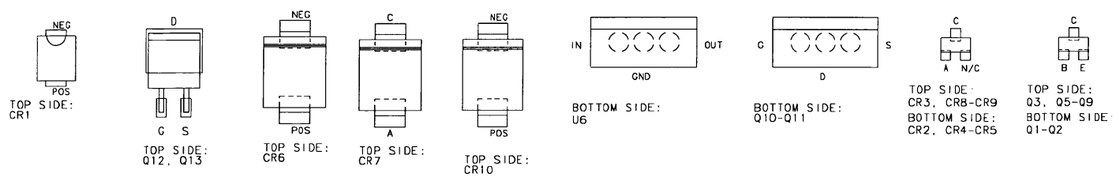




NEARSIDE VIEW OF PC BOARD



FARSIDE VIEW OF PC BOARD



NOTES:

1. PRIOR TO POST COATING BOTH SIDES OF P.C. BOARD WITH KPN 016-01040-0000, MASK OFF ALL MOUNTING AREAS AND REFERENCE DESIGNATORS: J1-J2, MTG1-MTG4, R78, R90-R91 TP3-TP5
2. PRINTED CIRCUIT ASSEMBLY IDENTIFICATION MUST BE IN ACCORDANCE WITH SPEC. 001-01101-0000.
3. R40, R42, R46, R47, AND R92, WILL BE INSTALLED (IF REQUIRED) AS PER FINAL ASSEMBLY BILL OF MATERIAL.
4. SOLDER CAPACITORS C24 (111-00001-0008) ACROSS PINS 2 AND 3 OF U8 AND C25 ACROSS PINS 2 AND 3 OF U9.
5. Q10, Q11 AND U6 WILL BE INSTALLED ON 200-05632-00XX.
6. C2,C4, C12 AND C19 ARE NOT INSTALLED.

THIS DRAWING IS NOT COMPLETE WITHOUT PARTS LIST 200-09366-0000

Figure 6-7 KS 270C Pitch Servo Board
Dwg. No. 300-09366-0000 Rev A

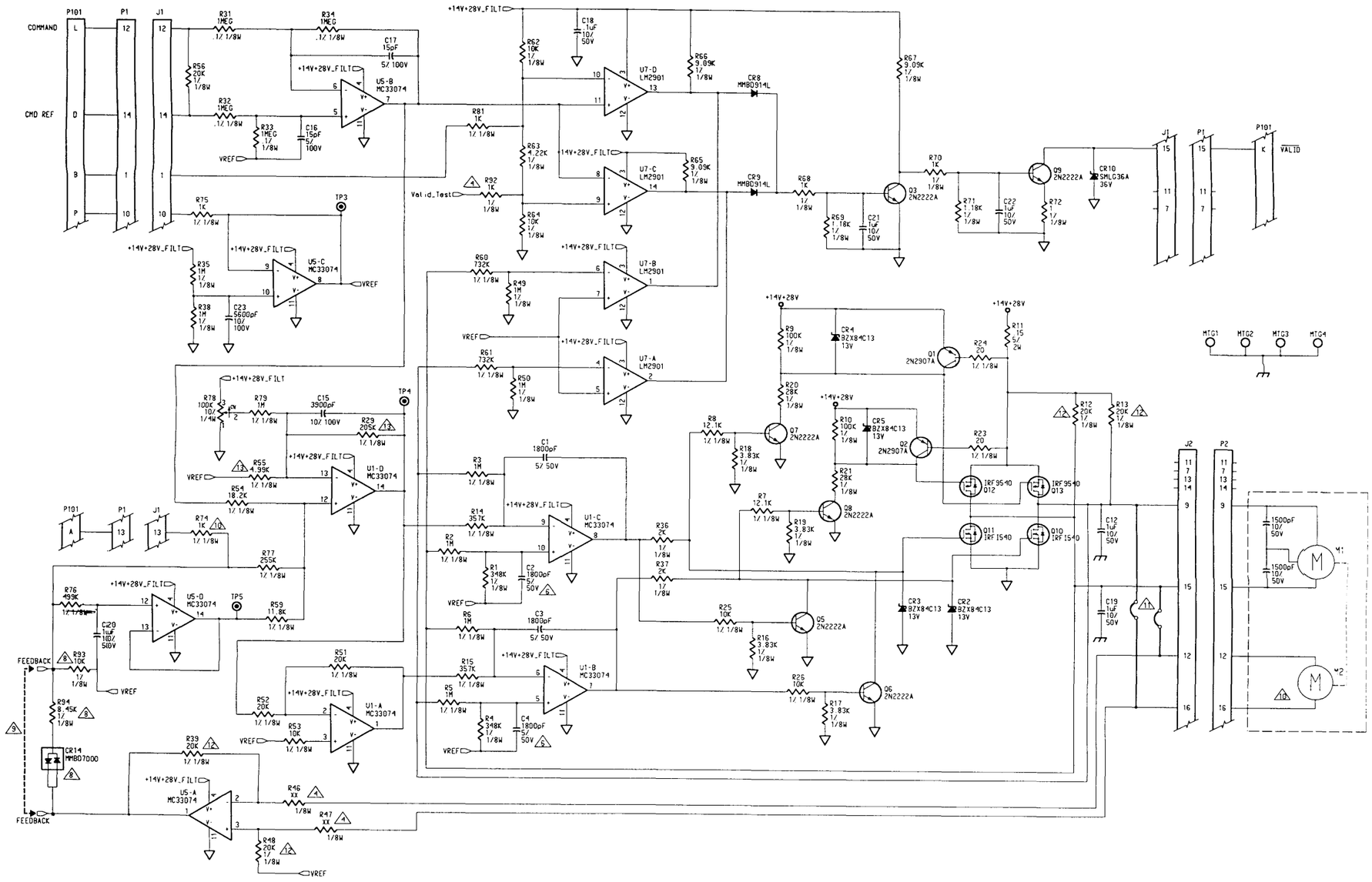
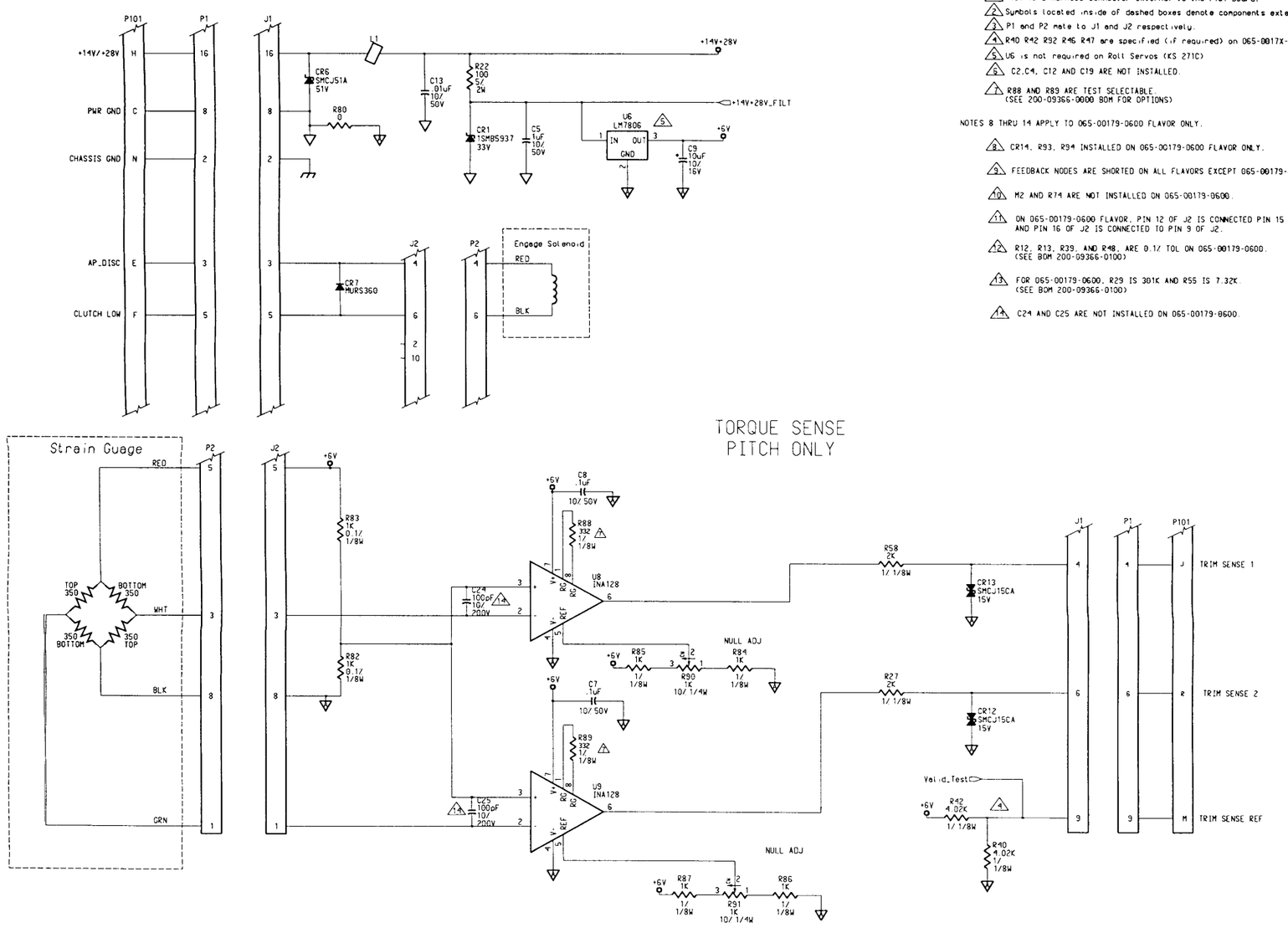


Figure 6-8 KS 270C Pitch Servo Schematic
Dwg. No. 002-09366-0000 Rev AF
(Sheet 1 of 2)



NOTES:

1. P101 is a harness connector external to the P.C. board.
2. Symbols located inside of dashed boxes denote components external to the P.C. board.
3. P1 and P2 mate to J1 and J2 respectively.
4. R40 R42 R92 R46 R47 are specified (if required) on 065-0017X-XX00 BOM.
5. U6 is not required on Roll Servos (KS 271C)
6. C2,C4, C12 AND C19 ARE NOT INSTALLED.
7. R88 AND R89 ARE TEST SELECTABLE. (SEE 200-09366-0000 BOM FOR OPTIONS)

NOTES 8 THRU 14 APPLY TO 065-00179-0600 FLAVOR ONLY.

8. CR14, R93, R94 INSTALLED ON 065-00179-0600 FLAVOR ONLY.
9. FEEDBACK NODES ARE SHORTED ON ALL FLAVORS EXCEPT 065-00179-0600.
10. M2 AND R74 ARE NOT INSTALLED ON 065-00179-0600.
11. ON 065-00179-0600 FLAVOR, PIN 12 OF J2 IS CONNECTED PIN 15 OF J2, AND PIN 16 OF J2 IS CONNECTED TO PIN 9 OF J2.
12. R12, R13, R39, AND R48, ARE 0.1% TOL ON 065-00179-0600. (SEE BOM 200-09366-0100)
13. FOR 065-00179-0600, R29 IS 301K AND R55 IS 7.32K. (SEE BOM 200-09366-0100)
14. C24 AND C25 ARE NOT INSTALLED ON 065-00179-0600.

Figure 6-8 KS 270C Pitch Servo Schematic
Dwg. No. 002-09366-0000 Rev AF
(Sheet 2 of 2)

6.7 KS 270C PITCH SERVO BOARD

200-09087-0000 Rev AA					
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
C1	106-04473-0057		CAP CH 47K X7R/100	EA	1.00
C2	106-04473-0057		CAP CH 47K X7R/100	EA	1.00
C3	106-04473-0057		CAP CH 47K X7R/100	EA	1.00
C4	106-04473-0057		CAP CH 47K X7R/100	EA	1.00
C5	106-04104-0047		CH 100KX7R/50V	EA	1.00
C6	106-04104-0047		CH 100KX7R/50V	EA	1.00
C7	106-04104-0047		CH 100KX7R/50V	EA	1.00
C8	106-04104-0047		CH 100KX7R/50V	EA	1.00
C9	096-01186-0014		CAP 10.0UF 16V 10%	EA	1.00
C10	106-00129-0001		CAP CH .68UF 50V	EA	1.00
C11	106-00129-0001		CAP CH .68UF 50V	EA	1.00
C12	106-00129-0000		CAP CH 1UF X7R/50V	EA	1.00
C13	106-04103-0047		CH 10K X7R/50V	EA	1.00
C15	106-05392-0047		CAP CH3900PFX7R/50	EA	1.00
C16	106-05150-0026		CAP CH15PFNPO/100V	EA	1.00
C17	106-05150-0026		CAP CH15PFNPO/100V	EA	1.00
C18	106-04104-0047		CH 100KX7R/50V	EA	1.00
C19	106-00129-0000		CAP CH 1UF X7R/50V	EA	1.00
C20	106-00129-0000		CAP CH 1UF X7R/50V	EA	1.00
C21	106-00129-0000		CAP CH 1UF X7R/50V	EA	1.00
C22	106-00129-0000		CAP CH 1UF X7R/50V	EA	1.00
C23	106-04562-0057		CAPCH5600PFX7R/100	EA	1.00
CR1	007-05245-0024		DIO Z 33V SMD	EA	1.00
CR2	007-05117-0015		DIO Z 13V SOT	EA	1.00
CR3	007-05117-0015		DIO Z 13V SOT	EA	1.00
CR4	007-05117-0015		DIO Z 13V SOT	EA	1.00
CR5	007-05117-0015		DIO Z 13V SOT	EA	1.00

200-09087-0000 Rev AA					
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
CR6	007-05247-0001		TRANSIENT VOLTAGE	EA	1.00
CR7	007-06437-0007		DIO 3A 600V SMD	EA	1.00
CR8	007-06177-0000		SMD DIO SI MMBD914	EA	1.00
CR9	007-06177-0000		SMD DIO SI MMBD914	EA	1.00
CR10	007-05240-0000		36V TRANSORB SO	EA	1.00
CR12	007-05241-0203		TRNSRB 1500W 15V	EA	1.00
ITM1	009-09087-0000		KFC 140 SERVO- PC	EA	1.00
J1	030-02453-0008		CONNECTOR 16P	EA	1.00
J2	030-02453-0008		CONNECTOR 16P	EA	1.00
L1	013-00172-0000		FERRITE BEAD, SURF	EA	1.00
Q1	007-00261-0003		XSTR 2N2907A (SOT)	EA	1.00
Q2	007-00261-0003		XSTR 2N2907A (SOT)	EA	1.00
Q3	007-00383-0004		SOT-23 2N2222A XST	EA	1.00
Q4	120-03555-0000		MOS H-BRIDGE	RF	.00
Q5	007-00383-0004		SOT-23 2N2222A XST	EA	1.00
Q6	007-00383-0004		SOT-23 2N2222A XST	EA	1.00
Q7	007-00383-0004		SOT-23 2N2222A XST	EA	1.00
Q8	007-00383-0004		SOT-23 2N2222A XST	EA	1.00
Q9	007-00383-0004		SOT-23 2N2222A XST	EA	1.00
R1	139-03483-0000		RES CH 348K EW 1%	EA	1.00
R2	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R3	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R4	139-03483-0000		RES CH 348K EW 1%	EA	1.00
R5	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R6	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R7	139-01212-0000		RES CHIP 12.1K1%EW	EA	1.00
R8	139-01212-0000		RES CHIP 12.1K1%EW	EA	1.00
R9	139-01003-0000		RES CHIP 100KEW1%	EA	1.00
R10	139-01003-0000		RES CHIP 100KEW1%	EA	1.00
R11	132-05145-0150		RES SM .15 2W 5%	EA	1.00

200-09087-0000 Rev AA					
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
R12	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00
R13	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00
R14	139-03573-0000		RES CHIP 357KEW1%	EA	1.00
R15	139-03573-0000		RES CHIP 357KEW1%	EA	1.00
R16	139-03831-0000		RES CHIP3.83KEW1%	EA	1.00
R17	139-03831-0000		RES CHIP3.83KEW1%	EA	1.00
R18	139-03831-0000		RES CHIP3.83KEW1%	EA	1.00
R19	139-03831-0000		RES CHIP3.83KEW1%	EA	1.00
R20	139-02802-0000		RES CH 28K EW 1%	EA	1.00
R21	139-02802-0000		RES CH 28K EW 1%	EA	1.00
R22	132-05145-0103		RES SM 100 2W 5%	EA	1.00
R23	139-00200-0000		RES CH 20.0 EW 1%	EA	1.00
R24	139-00200-0000		RES CH 20.0 EW 1%	EA	1.00
R25	139-01002-0000		RES CHIP 10K EW 1%	EA	1.00
R26	139-01002-0000		RES CHIP 10K EW 1%	EA	1.00
R27	139-07681-0000		RES CH 7.68K EW 1%	EA	1.00
R28	139-01002-0000		RES CHIP 10K EW 1%	EA	1.00
R29	139-02053-0000		RES CH 205K EW 1%	EA	1.00
R30	139-02672-0000		RES CHIP 26.7KEW1%	EA	1.00
R30	139-03012-0000		RES CHIP 30.1KEW1%	EA	1.00
R30	139-03322-0000		RES CH 33.2K EW 1%	EA	1.00
R31	139-01004-0003		RES CH 1M .1% EW	EA	1.00
R32	139-01004-0003		RES CH 1M .1% EW	EA	1.00
R33	139-01004-0003		RES CH 1M .1% EW	EA	1.00
R34	139-01004-0003		RES CH 1M .1% EW	EA	1.00
R35	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R36	139-02001-0020		RES CH 2000 QW 1%	EA	1.00
R37	139-02001-0020		RES CH 2000 QW 1%	EA	1.00
R38	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R39	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00

200-09087-0000 Rev AA					
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
R40	139-04021-0000		RES CH 4.02K EW 1%	EA	1.00
R41	139-03242-0000		RES CH 32.4K EW 1%	EA	1.00
R42	139-04021-0000		RES CH 4.02K EW 1%	EA	1.00
R43	139-04993-0000		RES CHIP 499K EW1%	EA	1.00
R44	139-04993-0000		RES CHIP 499K EW1%	EA	1.00
R45	133-00560-0012		RES VA SMD 100K QW	EA	1.00
R48	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00
R49	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R50	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R51	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00
R52	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00
R53	139-01002-0000		RES CHIP 10K EW 1%	EA	1.00
R54	139-01822-0000		RES CHIP 18.2KEW1%	EA	1.00
R55	139-04991-0000		RES CHIP 4.99KEW1%	EA	1.00
R56	139-02002-0000		RES CHIP 20.0KEW1%	EA	1.00
R58	139-02001-0000		RES CHIP 2K EW 1%	EA	1.00
R59	139-01182-0000		RES CH 11.8K EW1	EA	1.00
R60	139-07323-0000		RES CH 732K EW 1%	EA	1.00
R61	139-07323-0000		RES CH 732K EW 1%	EA	1.00
R62	139-01002-0000		RES CHIP 10K EW 1%	EA	1.00
R63	139-04221-0000		RES CH 4.22K EW 1%	EA	1.00
R64	139-01002-0000		RES CHIP 10K EW 1%	EA	1.00
R65	139-09091-0000		RES CH 9.09K EW 1%	EA	1.00
R66	139-09091-0000		RES CH 9.09K EW 1%	EA	1.00
R67	139-09091-0000		RES CH 9.09K EW 1%	EA	1.00
R68	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R69	139-01181-0000		RES CHIP 1.18KEW1%	EA	1.00
R70	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R71	139-01181-0000		RES CHIP 1.18KEW1%	EA	1.00
R72	139-20100-0000		RES CH 1 EW 1%	EA	1.00

200-09087-0000 Rev AA

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
R73	139-04022-0000		RES CHIP 40.2KEW1%	EA	1.00
R74	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R75	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R76	139-04993-0000		RES CHIP 499K EW1%	EA	1.00
R77	139-02553-0000		RES CH 255K EW 1%	EA	1.00
R78	133-00560-0012		RES VA SMD 100K QW	EA	1.00
R79	139-01004-0000		RES CHIP 1M EW 1%	EA	1.00
R80	139-00000-0004		RES CH 0 EW	EA	1.00
R81	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R82	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
REF	002-09087-0000		KFC 140 SERVO - PC	RF	.00
REF	300-09087-0000		KFC 140 SERVO - PC	RF	.00
TP1	008-00309-0000		TEST POINT SURF MN	EA	1.00
TP2	008-00309-0000		TEST POINT SURF MN	EA	1.00
TP3	008-00309-0000		TEST POINT SURF MN	EA	1.00
TP4	008-00309-0000		TEST POINT SURF MN	EA	1.00
U1	120-03552-0000		QUAD OP AMP	EA	1.00
U2	120-03504-0000		OP07 OP AMP SO PK	EA	1.00
U3	120-03504-0000		OP07 OP AMP SO PK	EA	1.00
U4	120-03504-0000		OP07 OP AMP SO PK	EA	1.00
U5	120-03552-0000		QUAD OP AMP	EA	1.00
U6	120-03026-0002		IC MC7806CT	RF	.00
U7	120-03163-0001		LM2901 SO-14 COMP	EA	1.00

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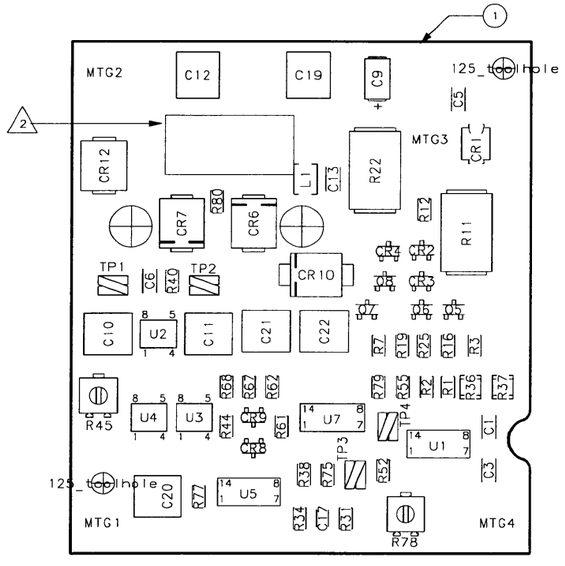
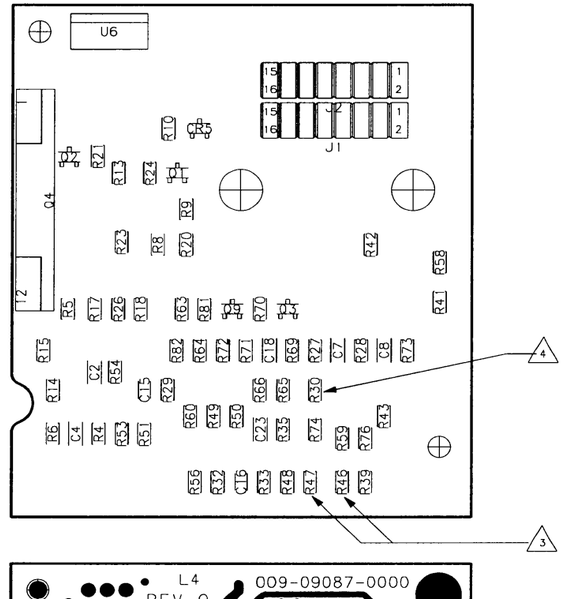


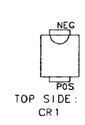


NOTES:
1. PRIOR TO POST COATING BOTH SIDES OF P.C. BOARD WITH KPN 016-01040-0000, MASK OFF ALL MOUNTING AREAS AND REFERENCE DESIGNATORS: R45, R78, TP1-TP4, J1, J2, R46, R47, Q4, U6.

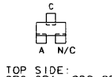
2. PRINTED CIRCUIT ASSEMBLY IDENTIFICATION MUST BE IN ACCORDANCE WITH SPEC. 001-01101-0000.

3. R46 AND R47 WILL BE INSTALLED ON FINAL ASSEMBLY.

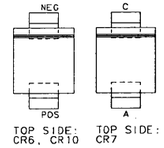
4. R30 IS TEST SELECTABLE. SEE 200-09087-0000 BOM FOR OPTIONS.



TOP SIDE:
CR1



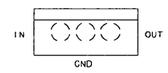
TOP SIDE:
CR2-CR4, CR8-CR9
BOTTOM SIDE:
CR5



TOP SIDE:
CR6, CR10

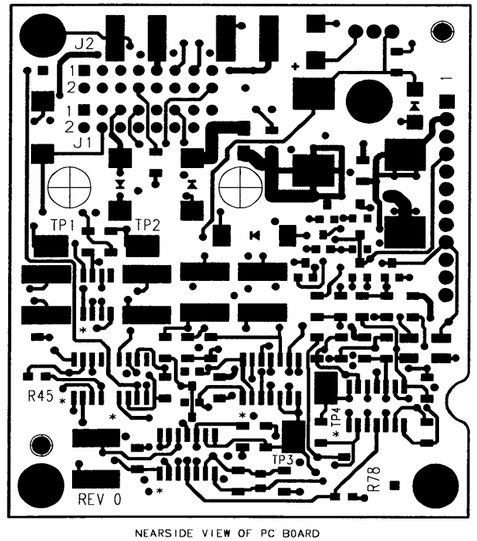
TOP SIDE:
CR7

TOP SIDE:
Q5-Q8
BOTTOM SIDE:
Q1-Q3, Q9

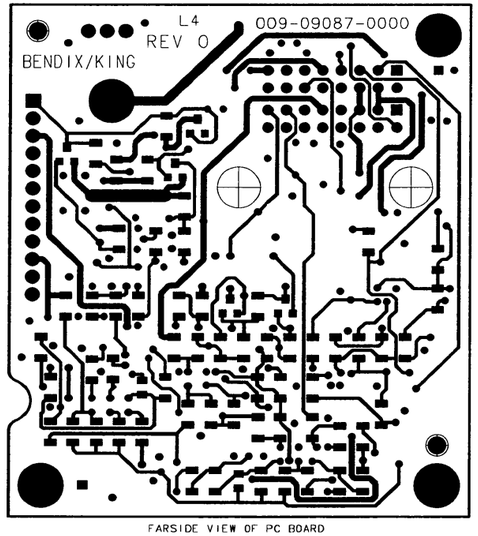


BOTTOM SIDE:
U6

THIS DRAWING IS NOT COMPLETE WITHOUT PARTS LIST 200-09087-0000



NEARSIDE VIEW OF PC BOARD



FARSIDE VIEW OF PC BOARD

Figure 6-9 KS 270C Pitch Servo Board
Dwg. No. 300-09087-0000 Rev AA

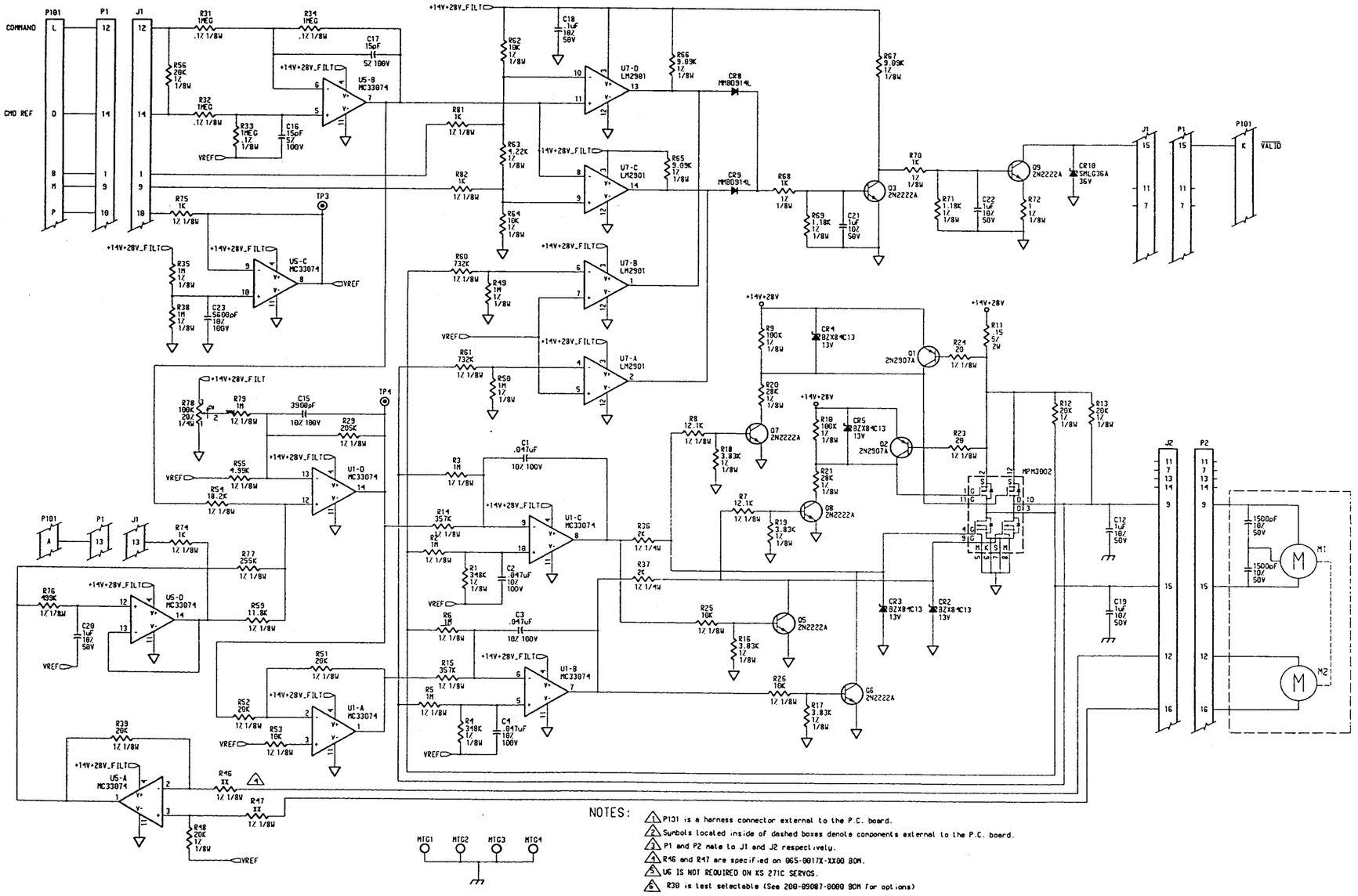


Figure 6-10 KS 270C Pitch Servo Schematic
Dwg. No. 002-09087-0000 Rev AA
(Sheet 1 of 2)

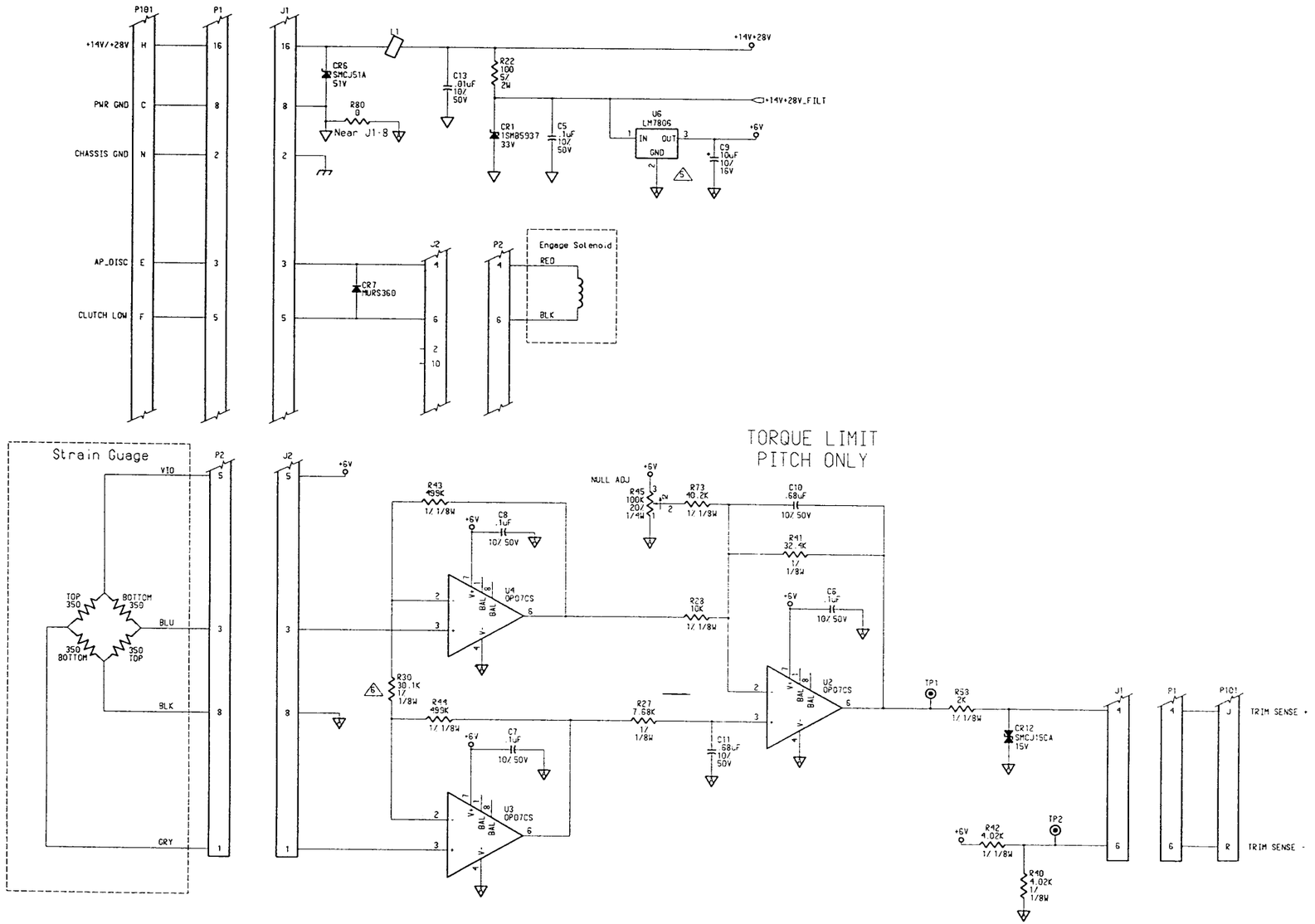
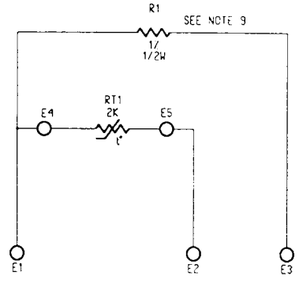


Figure 6-10 KS 270C Pitch Servo Schematic
Dwg. No. 002-09087-0000 Rev AA
(Sheet 2 of 2)



NOTES:

1. ALL RESISTANCE IN OHMS.
2. ALL RESISTORS 1/4W UNLESS OTHERWISE SPECIFIED.
3. ALL INDUCTANCE IN MICROHENRYS.
4. EXCEPT FOR PLUGS AND JACKS ADD NNNN TO ALL REFERENCE DESIGNATORS.
5. THIS SYMBOL ⊃ INDICATES AREA OF SUBASSEMBLY MOD CHANGE. NUMBER WITHIN SYMBOL INDICATES MOD LEVEL.
6. NEXT CIRCUIT SYMBOL NUMBER TO BE USED FOR COMPONENT ADDITIONS: R2, RT2
7. ACTIVE LOW SIGNALS ARE INDICATED BY AN ASTERISK (*).
8. CAUTION: THIS MODULE EITHER CONTAINS OR IS ASSOCIATED WITH ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES. HANDLE WITH CARE IN ACCORDANCE WITH THE PROCEDURES OUTLINED IN THE REPAIR SECTION OF THIS MANUAL. EACH ESDS DEVICE IS IDENTIFIED IN THE PARTS LIST.
9. 200-09643-0000 USE 51.1 OHMS.
   200-09643-0001 USE 150 OHMS.

Figure 6-11 KS 270C Heated RTD
Dwg. No. 002-09643-0000 Rev A

6.8 KS 270C PITCH SUB PLATE ASSEMBLY

200-05633-0005 Rev 1
200-05633-0006 Rev 1
200-05633-0007 Rev 1
200-05633-0011 Rev 1
200-05633-0012 Rev 1
200-05633-0099 Rev AC

SYMBOL	PART NUMBER	FN	DESCRIPTION	UM	0005	0006	0007	0011	0012	0099
ITM1	029-00777-0001		PINION MOTOR H.T.	EA	.	.	.	.	.	1.00
ITM2	047-10989-0002		SUB PLATE	EA	.	.	.	.	.	1.00
ITM3	047-10990-0001		MOTOR STOP BRKT	EA	.	.	.	.	.	1.00
ITM4	073-00989-0003		MOTOR STOP - W/FIN	EA	.	.	.	.	.	1.00
ITM5	089-05857-0010		SCR SET 4-40X5/16	EA	.	.	.	.	.	2.00
ITM6	089-06008-0004		SCR FHP 4-40X1/4	EA	.	.	.	.	.	5.00
ITM7	089-08070-0011		WSHR FLT STD .265	EA	.	.	.	.	.	2.00
ITM8	090-00052-0026		ROLL PIN .437LX .0	EA	.	.	.	.	.	1.00
ITM9	147-05180-0000		BALL BEARING	EA	.	.	.	.	.	1.00
ITM10	147-05180-0001		BALL BEARING	EA	.	.	.	.	.	1.00
ITM11	148-05188-0005		MOTOR SPUR	EA	1.00	.	.	.	.	.
ITM11	148-05188-0006		MOTOR SPUR	EA	.	1.00	.	.	.	.
ITM11	148-05188-0007		MOTOR SPUR	EA	.	.	1.00	.	.	.
ITM11	148-05188-0011		MOTOR SPUR	EA	.	.	.	1.00	.	.
ITM11	148-05188-0012		MOTOR SPUR	EA	.	.	.	.	1.00	.
ITM12	016-01007-0013		LOCTITE 680	AR	.	.	.	.	.	1.00
ITM13	016-01160-0001		ADHESIVE PRIMER N	AR	.	.	.	.	.	1.00
REF1	300-05633-0000		SUB PLT ASSY PITCH	RF	.	.	.	.	.	.00
	200-05633-0099		COMMON BOM	EA	1.00	1.00	1.00	1.00	1.00	.

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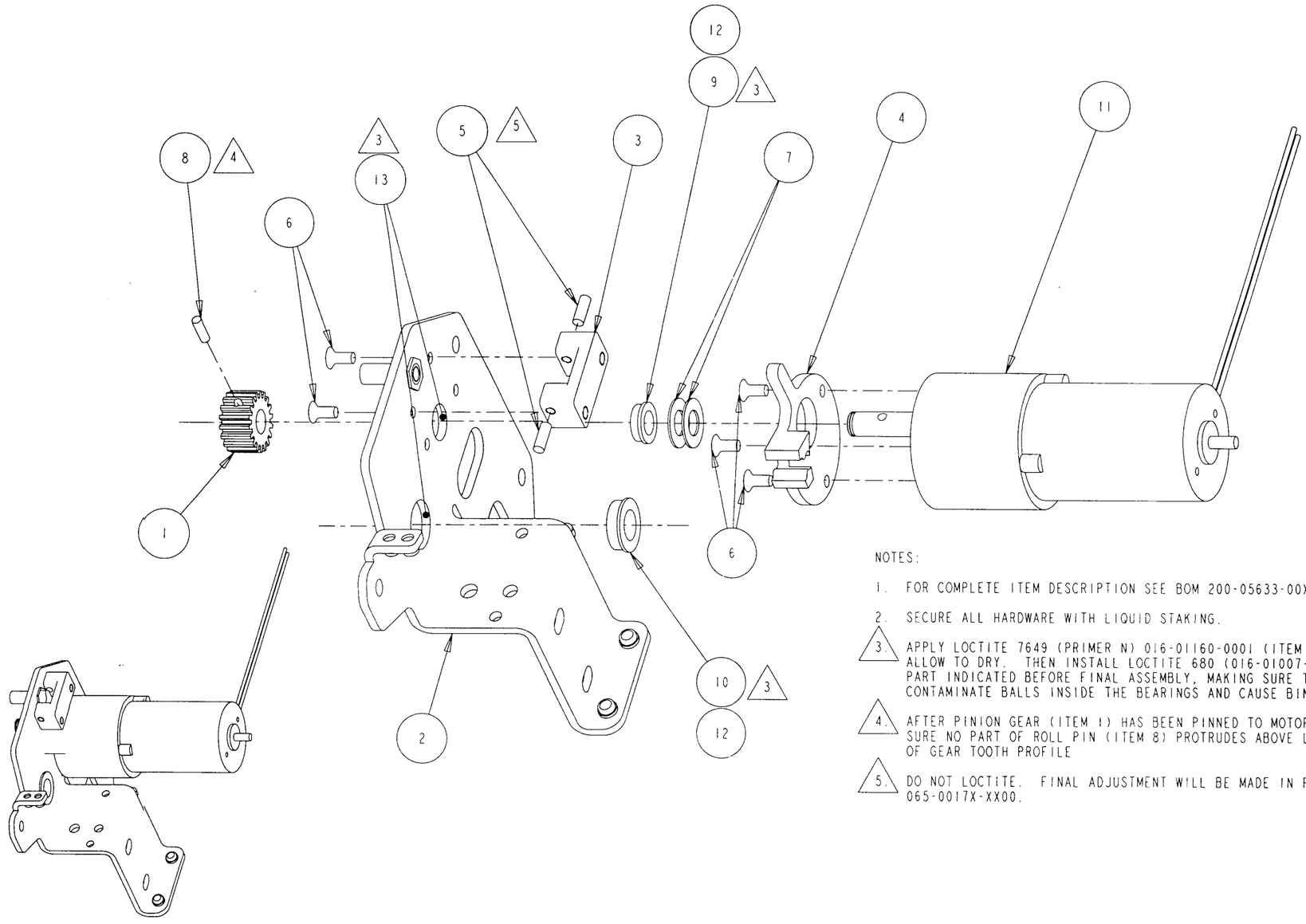

NOTES:

1. FOR COMPLETE ITEM DESCRIPTION SEE BOM 200-05633-00XX.
2. SECURE ALL HARDWARE WITH LIQUID STAKING.
3. APPLY LOCTITE 7649 (PRIMER N) 016-01160-0001 (ITEM 13) WHERE INDICATED AND ALLOW TO DRY. THEN INSTALL LOCTITE 680 (016-01007-0013) (ITEM 12) TO EACH PART INDICATED BEFORE FINAL ASSEMBLY, MAKING SURE THAT LOCTITE DOESN'T CONTAMINATE BALLS INSIDE THE BEARINGS AND CAUSE BINDING.
4. AFTER PINION GEAR (ITEM 1) HAS BEEN PINNED TO MOTOR SHAFT, MAKE SURE NO PART OF ROLL PIN (ITEM 8) PROTRUDES ABOVE LOWEST SURFACE OF GEAR TOOTH PROFILE
5. DO NOT LOCTITE. FINAL ADJUSTMENT WILL BE MADE IN FINAL ASSEMBLY 065-0017X-XX00.

Figure 6-12 KS 270C Sub Plate Assembly
Dwg No. 300-05633-0000 Rev AA

6.9 KS 270C CLUTCH ASSEMBLY

200-05634-0000 Rev AB					
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
ITM1	029-00778-0001		GEAR INTERMED T	EA	1.00
ITM2	047-10872-0002		CLUTCH BRACKET	EA	1.00
ITM3	076-03072-0001		CLUTCH SHAFT	EA	1.00
ITM4	078-02103-0002		SPRING, EXT- .625	EA	1.00
ITM6	090-00052-0003		PIN ROL .066X.500	EA	1.00
ITM7	147-05178-0001		BEARING - CLUTCH P	EA	1.00
ITM8	147-05179-0001		BEARING - CLUTCH G	EA	1.00
ITM10	016-01007-0013		LOCTITE 680	AR	1.00
REF1	300-05634-0000		CLUTCH ASSY	RF	.00

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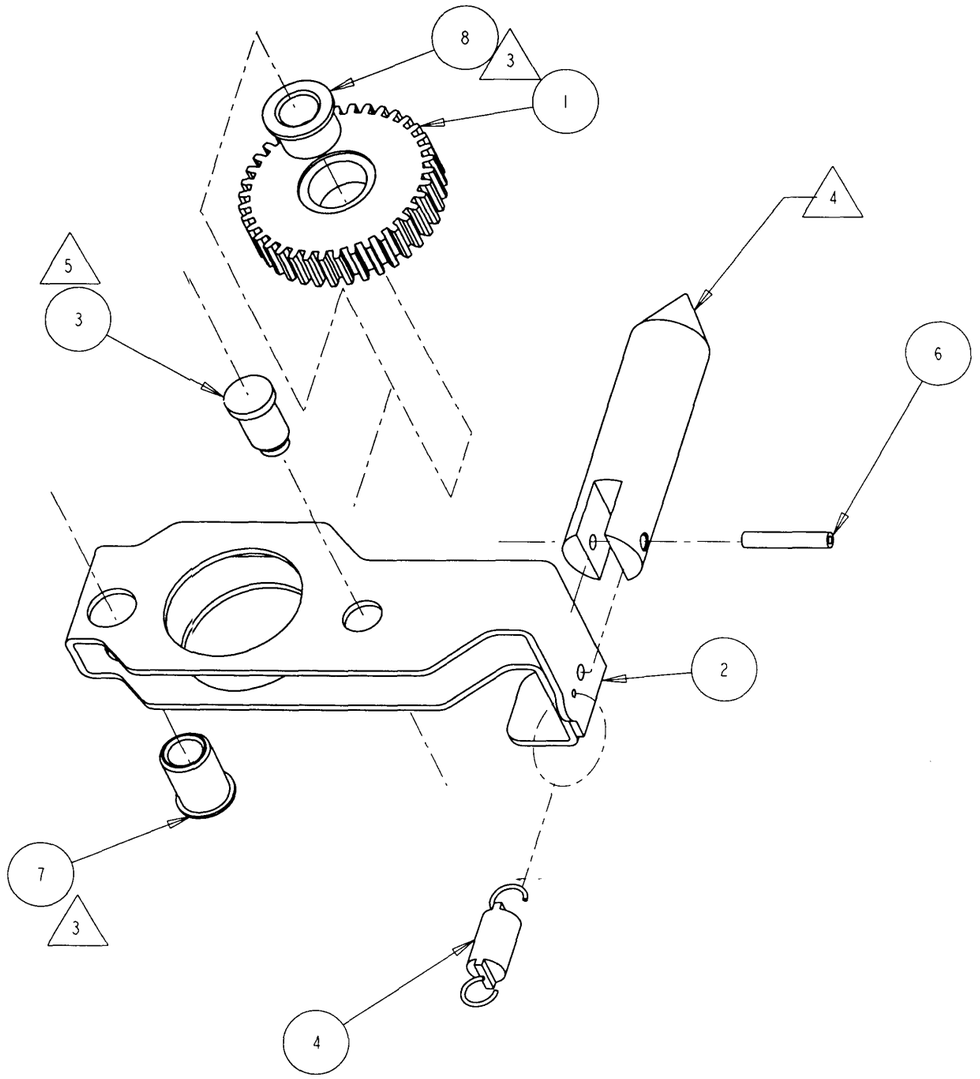

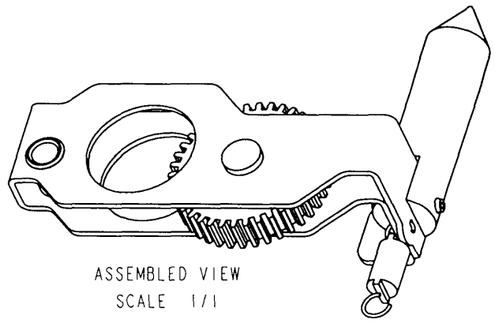

ASSEMBLED VIEW
SCALE 1/1

NOTES:

1. FOR COMPLETE ITEM DESCRIPTION SEE B/M 200-05634-0000.
2. SECURE ALL HARDWARE WITH LIQUID STAKING PER 001-01080-0000.
3. APPLY ITEM 10 (LOCTITE 680, 016-01007-0013) TO OUTSIDE BEARING SURFACE OF ITEMS 7 & 8, AND TO INNER SURFACE OF BEARING MOUNT HOLES IN ITEMS 1 & 2. INSURE LOCTITE IS DISTRIBUTED OVER MATING SURFACES BETWEEN BEARINGS AND GEAR OR BRACKET WHILE ASSEMBLING. MAKE SURE NO LOCTITE GETS ON INNER BEARING SURFACE WHICH COULD CAUSE BINDING.
4. SOLENOID PLUNGER IS PART OF SOLENOID ASSY 023-0019X-000X AND IS PURCHASED AS AN ASSEMBLY. FOR PN# CALL OUT SEE B/M 065-0017X-0099 AND 065-00180-0099.
5. INSERT AND ROLL OVER TUBULAR END OF ITEM 5 TO RETAIN IT IN ITEM 2. ITEM 5 MUST BE HELD TIGHTLY IN ITEM 2. GEAR AND BEARING ASSEMBLY (ITEM 1 AND 8) MUST SPIN FREELY AFTER ASSEMBLY.

THIS DRAWING IS NOT COMPLETE WITHOUT
PART LIST 200-05634-0000.

Figure 6-13 KS 270C Clutch Assembly
Dwg. No. 300-05634-0000 Rev AD