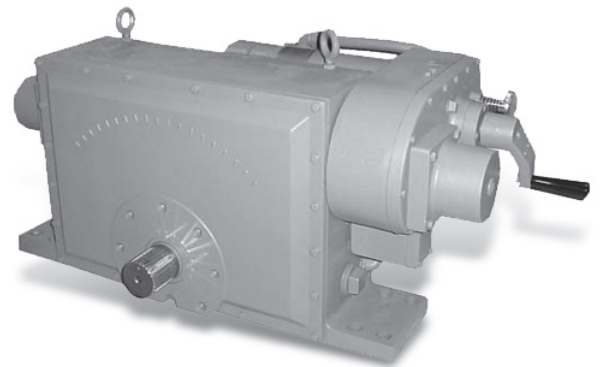


Electric Actuators and Control Systems

rotork[®] Process Controls

Established Leaders in Valve Actuation

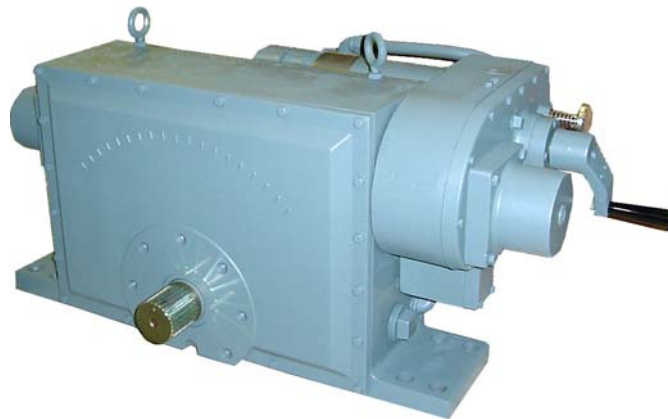


SM-5300 Series

Instruction Manual

SM-5300 Series

90 ° Rotary Actuator



Failure to properly wire torque/thrust switches will result in actuator damage.
Refer to the specific wiring diagram supplied with your actuator for correct wiring.

Due to wide variations in the terminal numbering of actuator products, actual wiring of this device should follow the print supplied with the unit.

SM-5300 ROTARY ACTUATOR

DESCRIPTION

These rugged Jordan electric motor-driven actuators are built for heavy duty 90° applications. Available in torque ratings from 1600 to 3200 ft. lbs. they provide a complete range of positioning control. Performance under continuous modulation for extended periods of time was the main consideration in designing this line. The SM 5300 series actuators are built to operate even under the adverse environmental conditions and still perform with maximum precision, Jordan actuators have all the features necessary for such demanding duty.

FEATURES

Standard

Variable position limit switches.
Torque limit cutoff.
Long term power train lubrication.
Foot or flange mount installation.
Ratings 1600 to 3200 ft. lbs.
AC or DC motor drives.
NEMA 4, NEMA 7 or NEMA 9 housing.
Modulating or on-off control.

Optional

Potentiometer for remote control
Characterized cam position feedback.
Manual override.

APPLICATION

The Jordan SM 5300 Series Rotary Actuators are specifically designed to provide rugged power and dependable operation as positioners for dampers, diverters, valves and similar applications requiring 90 degree actuation. Torque ranges up to 3200 ft. lbs. ensure positive positioning even under adverse conditions encountered in extended service.

BASIC MODELS

Note: The last digit of nameplate model numbers may be other than a zero (0). This is not of significance to customers, in the application of this manual.

SM-5310

MOTOR - 230/460 Vac, 50/60 Hz, 3 PH.,
modulating duty.

CONTROL COMPATIBILITY - Jordan AD-8900 pulse type 3-phase solid state servo amplifier or any conventional 3-phase motor contactor.

SM-5360

MOTOR - 90V, DC, permanent magnet, modulating duty, capable of plug reversing and speed control with proper input.

CONTROL COMPATIBILITY - Jordan AD-7310 or any 90V, DC servo amplifier compatible with permanent magnet motors.

HOW TO USE THE FOLLOWING SELECTION CHART

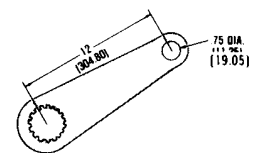
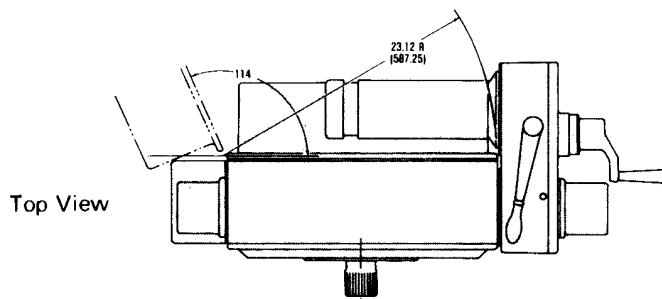
1. The basic motor characteristics must be determined from the descriptions of the various models at the top of each specification page. The selection of AC or DC continuous or intermittent duty and the type of control.
2. Next, these questions must be answered about your application and the driven load:
 - a. How much torque to move the load?
 - b. Time in seconds to cover the full 90° travel (shift time).
3. Now proceed through the 12 selections in the selection chart. All sections must be filled in before we can proceed with manufacturing. The following are aids in your selection.
 - a. The spline is a special and if it is to be used with a drive arm, the drive arm should be ordered with the actuator.
 - b. The heavy duty limit switches supplied with this unit are the Jordan key lock adjustments that require no special tool. Guaranteed positive cam locations.
 - c. All Jordan amplifiers require a 1K OHM feedback potentiometer when actuator position is the feedback. Your selection in this case is between a potentiometer that gives a linear relationship with output shaft or our characterized cam driven potentiometer where feedback may be matched to the non-linearity of the driven load. A linear, square, square root and max. cam are supplied. These are hard aluminium cams with printed scales on each side and may be hand contoured in the field.
 - d. The motor matches the basic actuator selection and should be transferred into the selection column.
 - e. A brake may be supplied on AC units where the normal coast of an on-off AC unit would be excessive. If there is a question concerning your application, please contact the factory.
 - f. A manual override may be supplied offering complete isolation of the motor. This allows manual driving of the output shaft for emergency or set up positioning.
 - g. A heater is required whenever the ambient operating temperature of the actuator would go below freezing.

SM-5300 SERIES SELECTION CHART

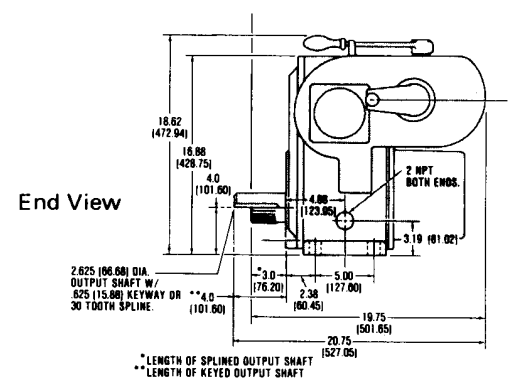
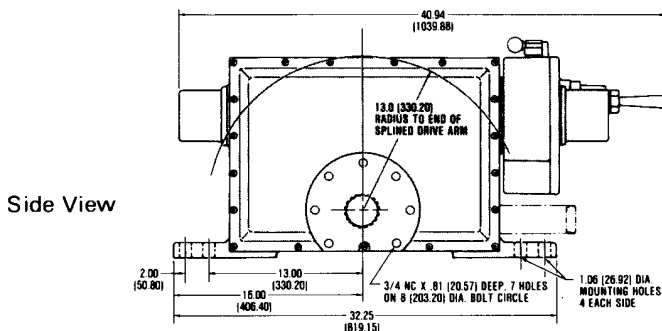
1,600 to 3,200 ft. lbs.

SM-5300 SELECTION CHART — Description (TO ORDER ENTER ONE BOLD FACE CHARACTER FROM EACH SECTION)					WRITE SELECTION HERE
BASIC UNIT	SM-5310		SM-5360	1	
ENCLOSURE	E — NEMA TYPE 4 Water-tight X — NEMA TYPE 7 and 9 Explosion Proof			2	
POWER OUTPUT Time sec./Ft. lbs. All times for 90°	18.5 sec. 1600 ft. lbs. 37 sec. 3200 ft. lbs.	18 sec. 1600 ft. lbs. 36 sec. 3200 ft. lbs.		3	
OUTPUT SHAFT	S — 30 tooth splined shaft - drive arm required K — Square keyway Z — Special (specify requirements)			4	
MOUNTING	S — Standard includes foot and face mount			5	S
OUTPUT SHAFT REVOLUTIONS	90° — 90° rotation standard			6	90°
LIMIT SWITCHES	0 — None required 2 — 2 Heavy duty 20 amp rated 4 — 4 Heavy duty 20 amp rated Z — Special (specify requirements)			7	
FEEDBACK	0 — None required 1P — 1K ohm precision 1CC — 1K ohm characterized cam Z — Special (specify requirements)			8	
MOTOR	3AC3	9DC2		9	
BRAKE	0 — None required B — Consult factory for brake requirements			10	
MANUAL OVERRIDE	0 — None required M — Auto preference manual override			11	
HEATER	0 — None required H — Heater required on all outside installations in freezing areas			12	

NOTE: The SM5300 is designed for full modulating duty with the 3200 ft. lb. torque rating.



Drive Arm

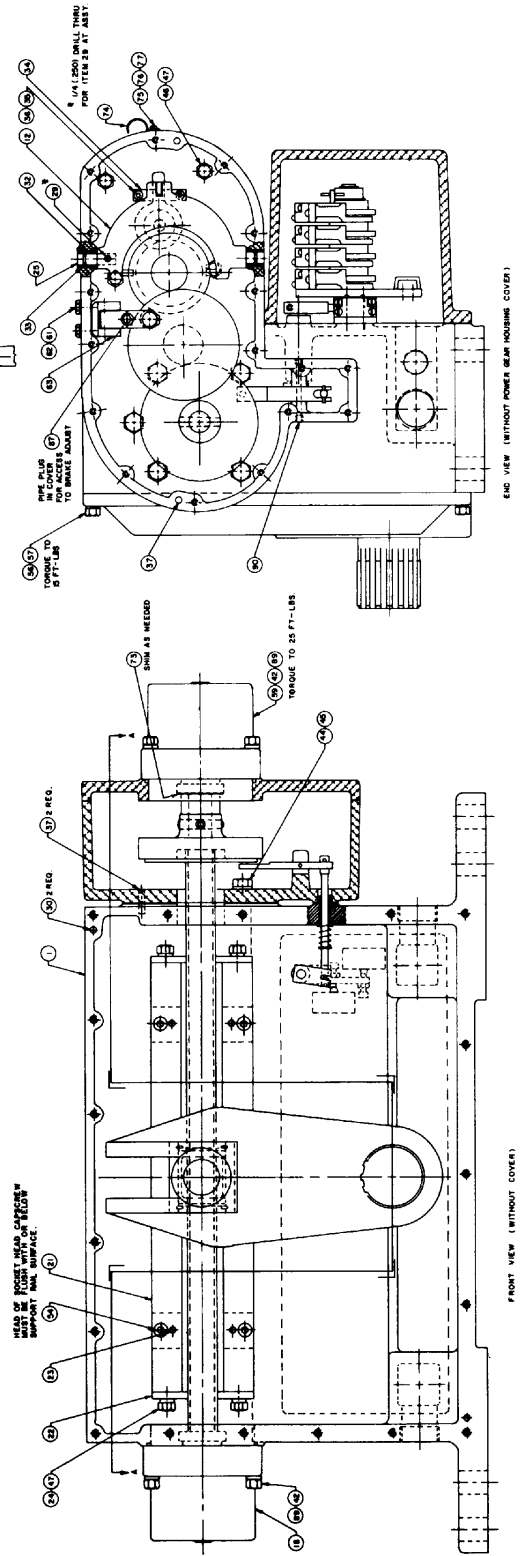
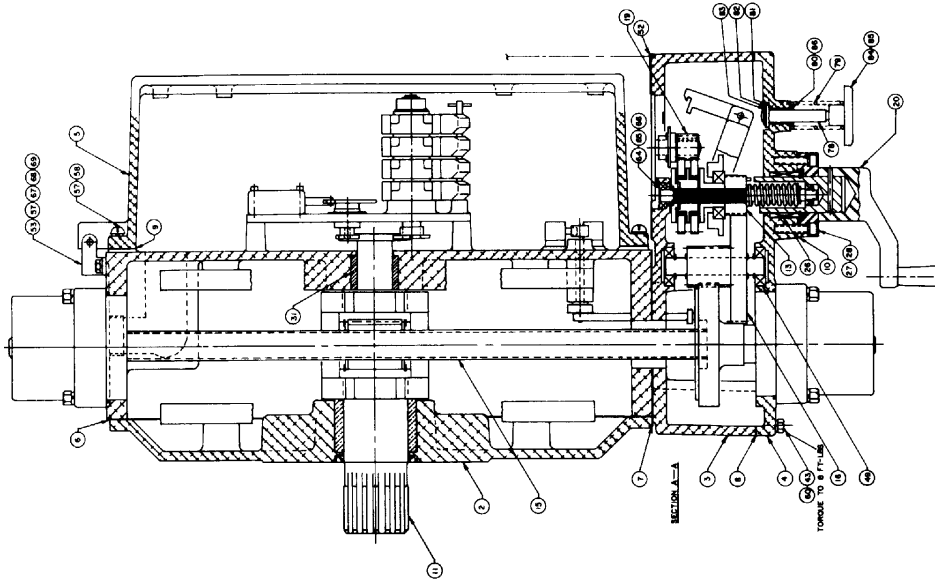
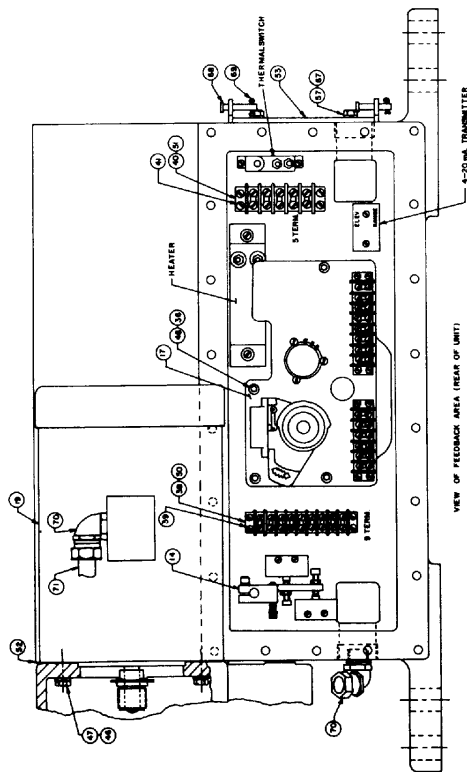


Dimensions in parenthesis, () are metric.

PARTS ORDERING PROCEDURE

ALL PARTS SHOWN ARE NOT IMPACTS WITH ALL UNITS, OR MAY IMPACT SLIGHTLY TO ORDER. FURNISH THE FOLLOWING INFORMATION:

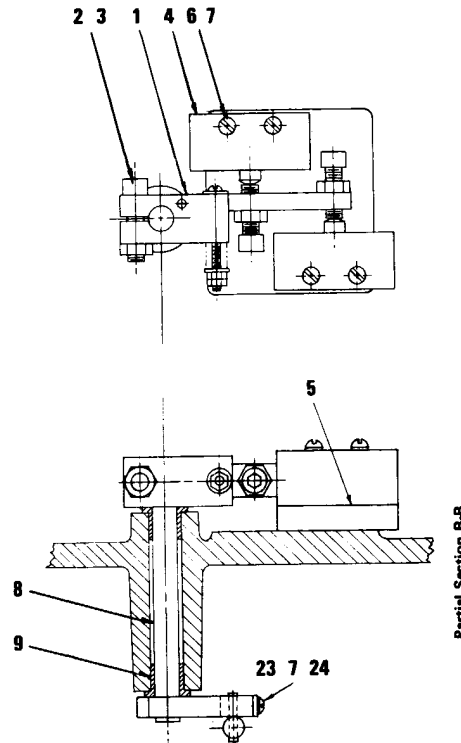
1. Complete model and code information.
2. Assembly manual number.
3. Part number, quantity and description.



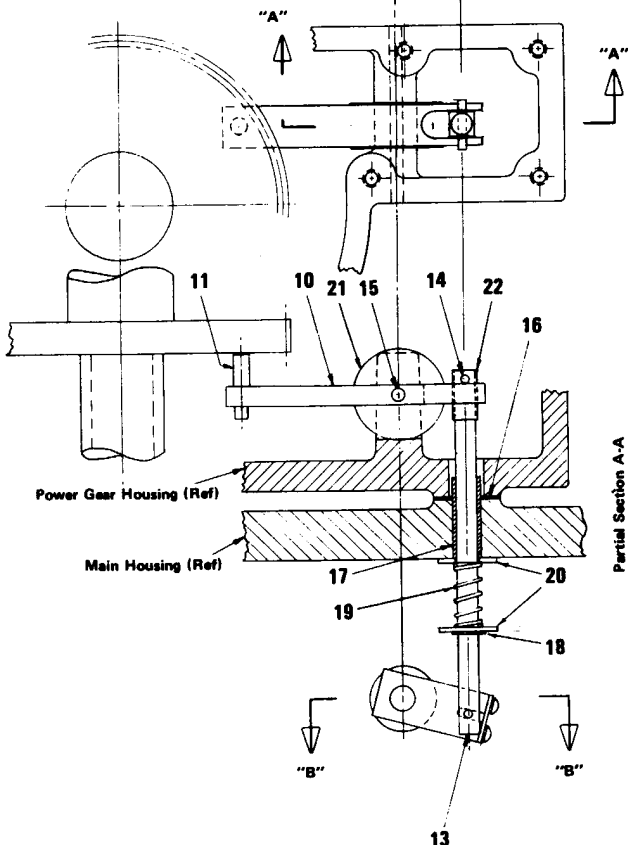
END VIEW (WITHOUT POWER REAR HOUSING COVER)

Item	Description	Part No.	Qty	Item	Description	Part No.	Qty
1	Main Housing	60E-013921-001	1	47	Lockwasher, 3/8 Std.....	56A-015230-002	8
2	Front Cover Assy.....	68C-022776-001	1	48	Soc. Hd. Screw, 1/4-20 x .75 Lg.....	54A-015060-075	4
3	Power Gear Housing.....	60E-022774-001	1	49	Ball Bearing.....	17B-003813-012	2
4	Power Gear Housing Cover.....	60E-022805-001	1	50	Term Block Insulator.....	32A-014121-001	1
5	Feedback Cover.....	60D-013534-001	1	51	Term Block Insulator.....	32A-014122-001	1
6	Gasket, Front Cover.....	13C-013366-001	1	52	Gasket, Motor to Power Gear Hsg.....	13B-013890-001	1
7	Gasket, Main Hsg to Power Gear Hsg.....	13C-013925-001	1	53	Hinge Bracket.....	61B-024765-001	1
8	Gasket, Power Gear Hsg. Cover.....	13C-013924-001	1	54	Soc. Hd. Screw, 3/8-16 x .88 Lg.....	54A-015080-088	4
9	Gasket, Feedback Cover.....	13C-013927-001	1	55			
10	Gasket, Hand Crank Cap.....	13A-014001-001	1	56	Hex. Hd. Screw, 5/16-18 x 1.25 Lg.....	54A-015071-125	15
11	Drive Shaft Assy.....	68C-021085-xxx	1	57	Lockwasher, 5/16 Std.....	56A-015220-002	43
12	Clutch Yoke Assy.....	68C-013959-001	1	58	Rd. Hd. Screw, 5/16-18 x 1.0 Lg.....	54A-015073-100	22
13	Clutch Assy.....	68C-022794-xxx	1	59	Screw Thrust Hsg. Assy.....	68C-014509-xxx	1
14	Torque Limit Switch Assy.....	68D-019379-001	1	60	Lockwasher, 1/4 Std.....	56A-015210-002	17
15	Screw Shaft Assy.....	68B-019356-001	1	61	Stat-O-Seal Washer.....	56A-022752-007	2
16	Intermediate Gear Assy.....	68B-019352-001	1	62	Hex. Hd. Screw, 5/16-18 x 1.0 Lg.....	54A-015871-100	2
17	Feedback Plate Assy.....	Consult Factory	1	63	Drag Brake Assy.....	68B-017723-002	1
18	Screw Thrust Hsg. Assy.....	68C-014509-xxx	1	64	Thrustwasher.....	56B-004107-011	1
19	Motor, Pinion & Release Assy.....	68B-019315-xxx	1	65	Bearing.....	17B-003813-011	1
20	Handcrank Assy.....	68C-015452-001	1	66	Retaining Ring, 5000-112.....	58B-014184-112	1
21	Support Rail.....	61B-011794-001	2	67	Hex. Hd. Screw, 5/16-18 x .75 Lg.....	54A-015071-075	2
22	End Block.....	61A-011796-001	2	68	Clevis Pin.....	74A-017486-005	2
23	Dowel Pin, .250 Dia. x 1.0 Lg.....	57A-015226-100	4	69	Cotter Pin, 3/32 Dia. x .75 Lg.....	58B-024244-067	2
24	Hex. Hd. Screw, 3/8-16 x 1.0 Lg.....	54A-015081-100	4	70	1/2" x 90° Elbow, Appleton #S19050.....	58B-024244-082	2
25	Yoke Shaft.....	62A-022566-001	1	71	Liquatite Tubing 1/2" x 18" Lg.....	58B-024244-113	1
26	Needle Bearing.....	17A-013947-001	1	72	Pipe Plug, Steel 2" (not Shown, Conduit)	52A-024353-003	2
27	Soc. Hd. Screw, 5/16-18 x 1.0 Lg.....	54A-015070-100	4	73	Shim Washer.....	13A-014549-001	A/R
28	Lockwasher, Hi Collar 5/16.....	56A-015221-001	4	74	Thinwall Clamp, Gardner 3/4".....		1
29	Rollpin, .250 Dia. x 1.0 Lg.....	57A-015215-100	1	75	Rd. Hd. Screw, 10-24 x .50 Lg.....	54A-015043-050	1
30	Dowel Pin, .250 Dia. x .50 Lg.....	57A-015226-050	2	76	Lockwasher #10 Std.....	56A-015200-002	1
31	Bearing (Main Hsg.).....	18B-003814-066	1	77	Flatwasher #10.....	56A-015202-001	1
32	Bearing (Yoke Shaft).....	18B-SP1988-012	2	78	Clutch Latching Shaft.....	62A-022400-001	1
33	"0" Ring, .38 ID x .500 OD.....	74B-010957-012	1	79	Spring.....	20A-017916-001	1
34	Latch Plate.....	61A-014003-001	1	80	Seal Adaptor Bushing.....	61A-019023-001	1
35	Soc. Hd. Screw, 1/4-20 x .50 Lg.....	54A-015060-050	2	81	Rubber Washer.....	07A-016974-001	1
36	Lockwasher, Hi Collar 1/4".....	56A-015211-001	6	82	Washer.....	74A-017915-001	1
37	Dowel Pin, .250 Dia. x .75 Lg.....	57A-015226-075	4	83	Retaining Ring 5100-50.....	58B-014183-050	1
38	Terminal Block 9 Pin.....	43B-003888-309	1	84	Knob.....	61A-017764-001	1
39	Rd. Hd. Screw, 8-32 x .63 Lg.....	54A-015033-063	4	85	Set Screw, 10-24 x .19 Lg.....	54A-019695-019	1
40	Terminal Block, 5 Pin.....	43B-003888-505	1	86	Seal.....	19B-003815-017	1
41	Rd. Hd. Screw, 10-24 x .63 Lg.....	54A-015043-063	4	87	Pipe Plug, 3/4-14 NPT.....	52A-024353-006	1
42	Hex. Hd. Screw, 3/8-16 x 2.25 Lg.....	54A-015081-225	8	88	Zerust Vapor Capsule (not shown).....	74A-023169-001	1
43	Hex. Hd. Screw, 1/4-20 x 1.5 Lg.....	54A-015061-150	17	89	Stat-O-Seal.....	56A-022752-008	8
44	Hex. Hd. Screw, 1/2-13 x 1.38 Lg.....	54A-015101-138	5	90	Pipe Plug, 1/16 Hex. Soc.....	58B-024244-176	2
45	Lockwasher, 1/2" Std.....	56A-015250-002	5				
46	Hex. Hd. Screw, 3/8-16 x 1.25 Lg.....	54A-015081-125	8				

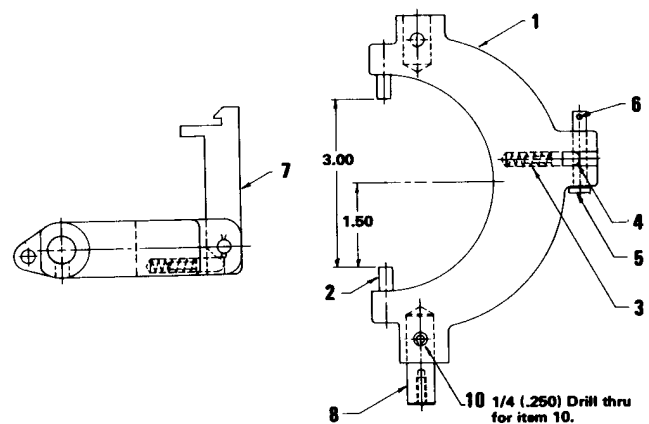
TORQUE LIMIT SWITCH ASSEMBLY



Item	Description	Stock No.
1	Switch Actuating Arm Assy.	68-B-013573-001
2	1/4-20 x 1" Lg. Soc Hd Cap Scr.	54-A-015060-100
3	1/4-20 Jam Nut.	55-A-015069-001
* 4	Limit Switch.	46-A-010016-001
4	Limit Switch (Hi Pressure).	46-A-010016-003
5	Spacer Block.	61-A-014626-001
6	#6-32 x 1.38 Lg. Rd Hd Screw.	54-A-015023-138
7	#6 Lockwasher.	56-A-015180-002
8	Arm & Shaft Assy.	68-A-014015-001
9	Bushing.	18-B-SP1988-015
10	Lever.	61-A-014007-001
11	Button.	61-A-014552-001
13	Sliding Shaft Assy.	68-A-014554-001
14	.125 Dia x .75 Lg Roll Pin.	57-A-015185-075
15	.188 Dia x 1-1/4" Lg Dowel Pin.	57-A-015206-125
16	Gasket.	13-A-013928-001
17	Sleeve Bearing.	18-B-003814-030
18	Ret. Ring-Truarc 5100-31.	58-B-014183-031
19	Spring.	20-A-013616-001
20	Plain Washer, 5/16".	56-A-015222-001
21	Insulator.	75-A-003958-001
22	Anti-Rotation Block.	61-A-015655-001
23	Retainer.	61-A-017082-001
24	Screw, Rd Hd, #6-32 x .38 Lg.	54-A-015023-038

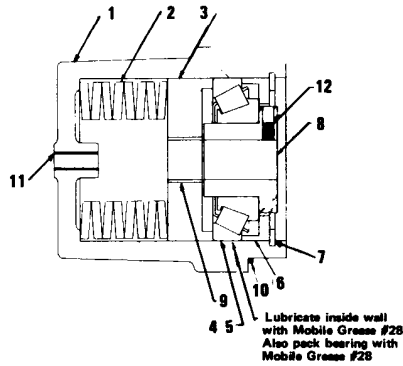


CLUTCH YOKE ASSEMBLY



Item	Description	Stock No.
1	Clutch Yoke.	60-C-013958-001
2	Dowel Pin, .250 Dia. x 1.00 Lg.	57-A-015226-100
3	Spring.	20-A-012337-001
4	Latch Pin.	61-A-011664-001
5	Clevis Pin.	74-A-014771-001
6	Cotter Pin, 3/32 Dia. x 1/2 Lg.	61-A-013960-001
7	Manual Crank Latch.	62-A-013961-001
8	Yoke Shaft.	57-A-015215-100
10	Roll Pin 1/4 Dia x 1" Lg.	

SCREW THRUST HOUSING ASSEMBLY

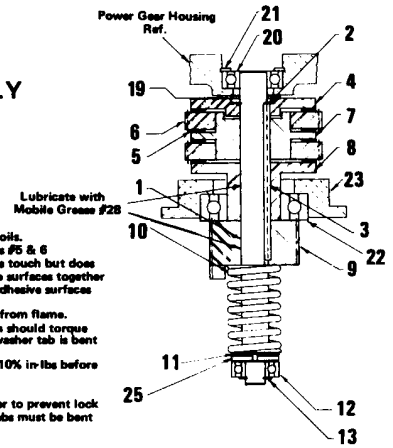


Item	Description	Stock No.
1	Screw Thrust Housing	60-C-014508-001
	Screw Thrust Housing W/Hole	60-C-014508-002
2	Bellville Washer	56-B-010462-006
	Bellville Washer	56-B-010462-005
3	Spacer	61-A-011778-001
3	Spacer	61-A-011778-002
3	Spacer	61-A-011778-003
3	Spacer	61-A-011778-004
* 4	Roller Bearing Cone (Steep Angle)	17-B-014239-001
* 5	Roller Bearing Cup (Steep Angle)	17-B-014239-002
6	Spacer	61-A-012516-001
7	Ret. Ring Truarc #N5000-362	58-B-014184-362
8	Thrust Sleeve	61-A-011799-001
9	Bushing, .878 I.D. x 1.003 O.D. x .750 Lg	18-B-003814-019
10	"O" Rings 4-3/8 I.D. x 4-5/8 O.D.	74-B-010957-245
3	Spacer	61-A-011778-007
3	Spacer	61-A-011778-009
11	Bushing	18-B-003814-016
12	5/16-18 Setscrew x 3/8 Lg	54-A-016077-038
3	Spacer	61-A-011778-008
8	Thrust Sleeve	61-A-011799-002
9	Bushing	61-A-016668-001

CLUTCH ASSEMBLY

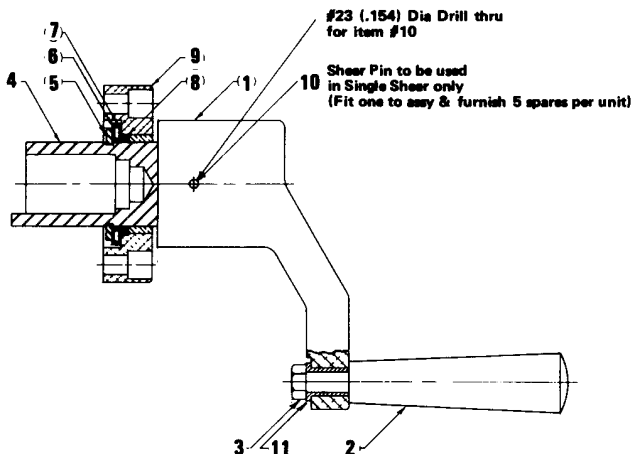
NOTE:

1. Use Royal Adhesive M6130 or equiv.
2. All surfaces should be free of dust and oils.
3. Brush one coat on each surface of items #5 & 6 when the adhesive becomes tacky to the touch but does not transfer to the finger, bond the two surfaces together using enough pressure to contact the adhesive surfaces as completely as possible.
4. This product is flammable. Keep away from flame.
5. After clutch has been assembled, clutch should torque tested for 150±10% in-lbs before lockwasher tab is bent over -.001 only.
6. After lockwasher tab has been bent over to prevent lock nut from backing off then remaining tabs must be bent to conform to lock nut.



Item	Description	Stock No.
1	Clutch Shaft	62-A-013940-001
2	Ret. Ring 5100-50	58-B-014183-050
3	Key, .125 Sq. x 2.87 Lg S.S. #303	61-A-014885-001
4	Clutch Disc	61-A-013941-001
5	Friction Disc (See Note)	61-A-013942-001
* 6	Clutch Gear, 62T-20P-20° P.A. (36 Sec)	16-A-013943-001
6	Clutch Gear, 49T-20P-20° P.A. (18 Sec)	16-A-013943-002
7	Gear Idler Drum	61-A-013944-001
8	Clutch Drum	61-A-013945-001
* 9	Clutch Pinion	16-A-013946-001
10	1" x 2" MD Spring	20-A-012340-001
11	Lockwasher	74-A-014545-002
12	Bearing	17-B-003813-025
13	Ret. Ring 5100-37	58-B-014183-037
19	Thrust Washer	56-B-004107-011
20	Bearing (Ref.)	17-B-003813-011
21	Ret. Ring (Ref.) 5000-112	58-B-014184-112
22	Ball Bearing	17-B-003813-031
23	Throwout Slider	61-A-010932-001
25	Locknut	74-A-014545-001

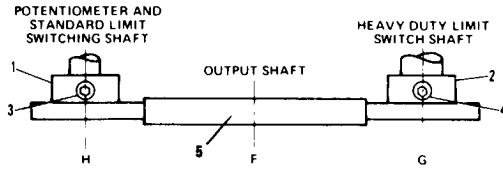
HANDCRANK ASSEMBLY



Item	Description	Stock No.
1	Handcrank	60-B-014514-001
1	Handcrank (Painted)	60-B-014514-002
2	Handle	74-A-014614-001
3	Screw, Hex. Hd, 3/8-16 x 1.50 Lg	54-A-015081-150
4	Manual Override Shaft	61-A-013950-001
5	Ret. Ring - #5160-150	58-B-014186-150
6	Thrust Race	17-A-013949-001
7	Needle Thrust Bearing	17-A-013948-001
8	"O" Ring, 1.50 I.D. x 1.75 O.D.	74-B-010957-222
9	Cap Assy	68-A-015364-001
9	Cap Assy (Painted)	68-A-015364-002
* 10	Shear Pin (Single Shear)	61-A-014553-001
11	Bushing	18-B-SP1988-065

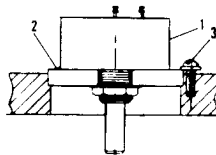
*NOTE: Recommended spare parts for an order of one.

FEEDBACK GEARING



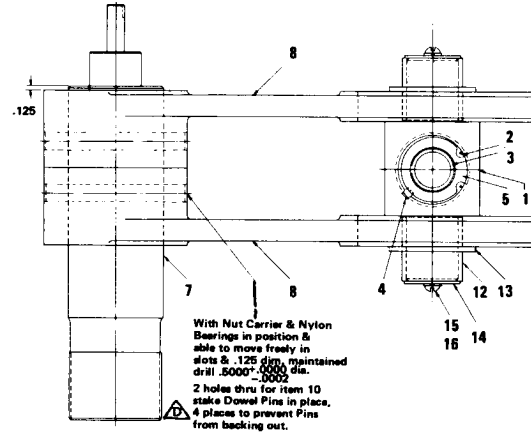
Item	Description	Stock No.
* 1	Gear	16-B-003803-022
* 2	Gear	16-A-014020-001
3	Setscrew, 6-32 x 3/16	54-A-015027-019
4	Setscrew, 8-32 x 3/16	54-A-015037-019
* 5	Gear	16-A-014019-001

STANDARD FEEDBACK – POTENTIOMETERS



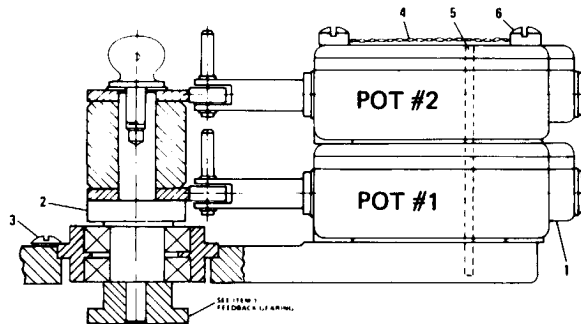
Item	Description	Stock No.
* 1	Precision One Turn, 1K	34-B-003956-043
2	Disc, Adapter (Precision)	61-A-SM3304-003
3	Screw, Truss Hd, 8-32 x 0.25 Lg	54-A-015032-025

DRIVE SHAFT ASSEMBLY



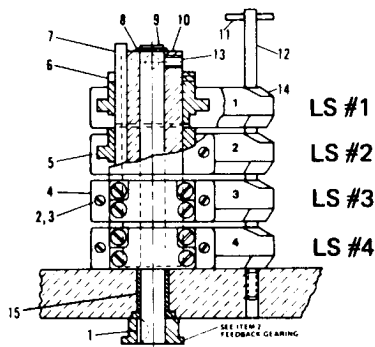
Item	Description	Stock No.
1	Nut Carrier	60-B-013985-001
2	Ret. Ring 5000-237	58-B-04184-237
* 3	Drive Nut	61-A-014432-001
4	Key, .250 Sq. x 3.00 Lg.	61-B-010954-496
5	Nut Spacer	61-A-013986-001
7	Output Shaft (Position Transmitter) Splined	62-A-016731-001
7	Output Shaft-Splined	62-B-013983-001
7	Output Shaft-Key	62-B-013984-001
8	Pivot Arm	60-B-014446-001
10	Dowel Pin, .500 Dia. x 2.00 Lg.	57-A-015266-200
12	Bearing	61-A-014540-001
13	Spacer	13-A-014541-001
14	Bearing Retainer	61-A-014542-001
15	1/4-20 x 1/2 Lg Rd Hd Screw	54-A-015063-050
16	1/4 Lockwasher	56-A-015210-002

CHARACTERIZED FEEDBACK ASSEMBLY



Item	Description	Stock No.
* 1	Linear Pot Assy (Single)	68-C-015435-001
	Linear Pot Assy (Tandem)	68-C-015435-002
2	Cam Shaft Assy (Single)	68-B-017793-003
	Cam Shaft Assy (Tandem)	68-B-017793-004
3	Screw, Truss Hd, 8-32 x 0.25 Lg	54-A-015032-025
4	Wire, Tie	
5	Pin, Dowel, 0.093 Dia. x 0.31 Lg (Single)	57-A-015176-031
	Pin, Locating, 0.093 Dia. x 1.38 Lg (Tandem)	61-A-015525-001
6	Screw, Fil Hd, "Drilled" 10-32 x 1-3/8 (Single)	
	Screw, Fil Hd, "Drilled" 10-32 x 2-3/8 (Tandem)	

HEAVY DUTY FEEDBACK SWITCH ASSEMBLY



Item	Description	Stock No.
1	Key, Woodruff	404
2	Screw, Rd Hd, 6-32 x 0.50 Lg	54-A-015023-050
3	Lockwasher, No. 6 Standard	56-A-015180-002
(4) *	Switch, Limit (Standard) AC	46-A-010017-001
	Switch, Limit (Used with amp) DC	46-A-010017-003
5	Molding, Cam	14-B-012775-001
6	Ring, Retaining, Truarc 5103-125	58-B-017287-125
7	Key, Machining Feedback	61-A-013519-003
8	Ring, Retaining, Truarc 5100-50	58-B-014183-050
9	Shaft, Inner	62-A-014212-001
10	Shaft, Feedback	62-A-014211-001
11	Pin, Roll, 1/8" Dia. x 1" Lg	57-A-015185-100
12	Key, Feedback (Round)	61-A-014789-001
13	Setscrew, Soc Hd, 1/4-20 x 0.38 Cup Pt	54-A-015067-038
14	Molding, Feedback Plate	61-B-014592-001
15	Bushing	18-SP1988-057
16	Switch, Actuator (Not Shown)	14-A-009192-001

*NOTE: Recommended spare parts for an order of one (1)

INSTALLATION

MOUNTING

The outline and mounting dimensions for a standard unit are shown on page 3 of this brochure. The rear cover opposite the output shaft must have clearance so that it may swing open for adjustments and interconnect wiring. When the actuator is directly coupled to a drive shaft, it is recommended that a flexible no backlash type coupling be used. The output shaft is also available with a splined output for standard lever arms and linkage drive to the driven load. The unit may be mounted on the standard foot mount, or a flange mount. Mounting may be in any position convenient to the driven load. When mounting the unit, be sure that no excessive axial or side loading is applied to the output shaft. The limit switches and position feedback are connected through gearing to the output shaft of the actuator which should be positively secured to the driven load shaft so that no slippage can occur which would cause misalignment or damage.

When manual override is required, as in the event of a power failure, or to initially align and connect linkages, de-energize the motor before starting the manual cranking procedure. The crank is engaged by operating the auto-manual selector lever at the top of the actuator. Facing the selector lever at the top of the actuator. Facing the crank end of the actuator with the output shaft to the left, pull the lever toward you until latching occurs. If latching does not occur, turn the crank handle slowly while continuing to operate the lever. Latching will then occur. Release the lever. It will return to the normal position. Normally crank handle rotation of less than 180° will enable engagement.

Hand cranking will now rotate the actuator output shaft to the desired position. CW rotation of the crank will result in CW rotation of the shaft when viewing the shaft-end side of the actuator. If during manual cranking, electric power were to be applied to the actuator, the handcrank will be instantly disengaged and the actuator will respond to the power command. The manual crank can not be power driven, thereby protecting the operator.

Care should be taken when manually driving a load, to recognize that excessive output torque can be developed through the handcrank. A mechanical telltale-indicator shaft, located in the center of the thrust housing assembly nearest the handcrank, indicates the over-torquing. The telltale shaft will either protrude or recede depending on the direction of over-torquing. Discontinue cranking in that direction on over-torque warning.

The limit switch and feedback area of the actuator depends upon the cover to maintain the NEMA 4 rating. This cover should be removed only when actual work is being done in that area and reinstalled immediately thereafter.

This actuator contains no internal mechanical stops. If it is allowed to run outside of the initial factory alignment of the limit switches, a realignment of switches and feedback might be required. However, no internal damage will have occurred.

Several gear reductions are available to provide a choice of speed torque ranges. Maximum torque rated at 3200 ft. lbs. for the SM 5300.

MECHANICAL

Mount the actuator per the provisions shown in the installation drawing.

When coupling to a keyway shaft, attach a load coupling device to the shaft using a 5/8 x 5/8 standard key. When a keyed shaft is specified, care should be taken to orient the coupling that will connect the actuator to the driven load. The output shaft of the actuator rotates only 90° and the keyway when in the straight up position with respect to level orientation, represents the 45 degree position. If the driven load is a butterfly valve or damper, caution should be taken to insure that the limited range of the actuator matches the limited range of the driven load.

ELECTRICAL INTERCONNECT

The wiring diagrams on page 11 show the interconnect wiring connections for typical three phase control, and the standard DC motor. These drawings show an arrangement with torque switches, limit switches, feedback potentiometer and a heater. To meet special requirements certain items shown may not be supplied and in that case the terminals will be blank. In all instances the wiring diagram appropriate to the equipment will be supplied with the equipment.

A barrier type terminal strip is located under the rear cover opposite the output shaft. One conduit entry is located at each end of the unit to accommodate standard 2 inch N.P.T.

CAUTION: Three phase of DC units must have their limit switches and torque switches wired into their controlling device so as to cause end of travel or torque shut down. Care must be taken in wiring these to the controlling device so that the appropriate direction of drive is turned off when that direction's protective switches are actuated. If care is not taken in properly phasing the equipment, damage may occur to the actuator or the driven load.

Refer to page 11 for additional electrical information and date.

MAINTENANCE

Under normal service conditions the motor, gearing, bearings and parts are all pre-lubricated and should not require periodic maintenance. If for any reason the unit is disassembled in the field, all oillite bushings should be resaturated with a S.A.E. 30 oil and all gearing heavily coated with an Andok B or equal grease. Care should be taken to insure that no foreign material is allowed to become entrained with the grease in the gear train, which will cause premature failure.

KEY LOCK SWITCH ADJUSTMENT

The key lock limit switch assembly is a method of switch adjustment that after alignment may be adjusted without special tools. Following Steps 1 and 2 are normally factory adjustments. Steps 3 through 9 describe how coarse 10% adjustments are made with cams (4) and fine 2% adjustments are made with adjusting blocks (6).

1. Manually turn the actuator to the full clockwise position, viewing the output shaft.
2. Loosen 2-# 1/4-20 set screws (1) in outer shaft (2). Rotate (2) until key (3) lines up with "Read Line". Lock both set screws (1). This is a one time alignment, and the screws must be tight.

3. Pull Key (3) which will release the cams (4). The outer most cam #1 and cam #3 are the clockwise cams. The scale on the cams represent % of travel in increments of 10% with 0 at the clockwise end. Rotate cams 1 and 3 to the nearest 10% increment below the desired CW travel limit. That is if 4% is required, set cam (4) at 0 on the read line.

4. Cam 2 and 4 are the counter clockwise cams. 100% will be at the counter clockwise end. Rotate cams 2 and 4 to the nearest 10% increment below the desired CCW travel limit. That is if 96% is required, set cams at at 90% on the read line.

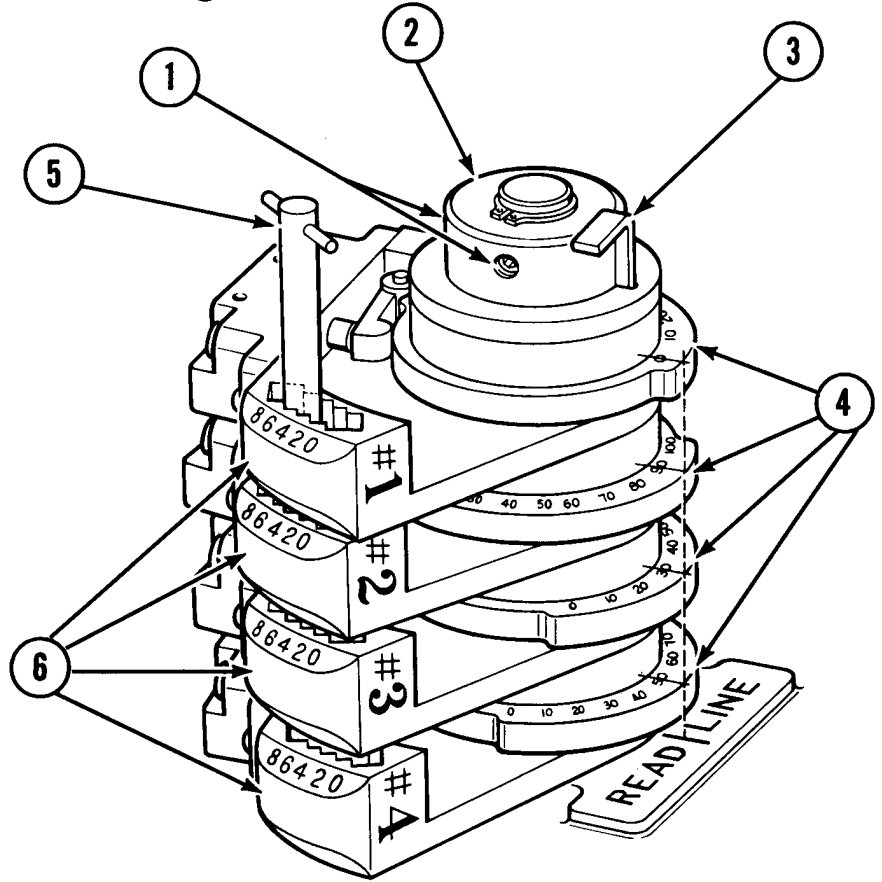
5. Insert Key (3) to lock cams in place after settings are made. Cams might have to be moved a small amount to line up key with keyway.

6. Unscrew pin (5) until loose and pull completely out of fine adjusting blocks (6).

7. The fine adjusting blocks have 5 positions that pin (5) may be placed in. Each position represents a 2% increment within the 10% range on the cam. If 4% is desired at the clockwise end of travel, insert pin (5) in the square hole opposite 4 on the adjusting block (6) on switch 1. Insert pin (5) through the remaining blocks adjusting the desired percentage on each one.

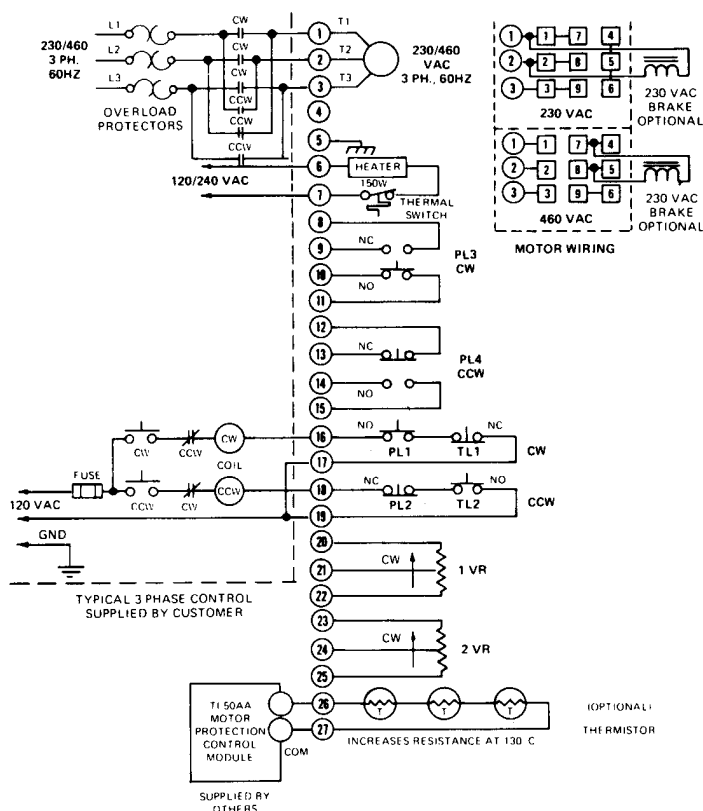
8. As the pin (5) is inserted in the last block, the complete group of blocks should be positioned so that pin (5) may be screwed back in the tapped hole.

9. Observe the position that the actuator stops at, and if incorrect, note the amount that it is off so that the switches controlling that position may be adjusted that amount. Remember if the shaft requires correction CW move switches to a lower percent of travel. If CCW move switches to a higher setting.



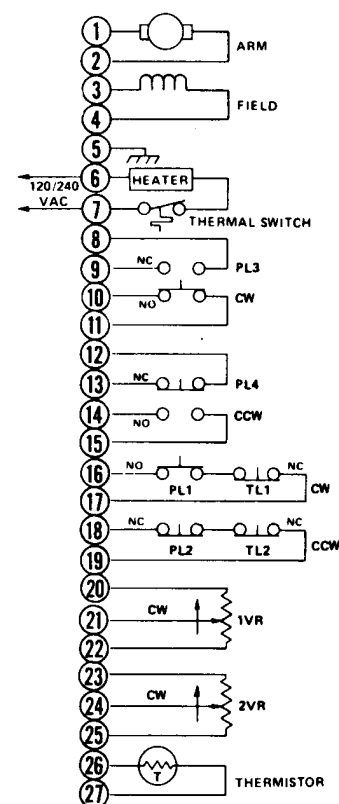
SM-5300 SERIES WIRING DIAGRAMS AND INSTRUCTIONS

SM-5310



SM-5360

90 VDC ARM
100 VDC FIELD



WIRING NOTES:

Warning: To avoid damage to the actuator, the torque limit switches must be wired so that power is removed from the motor when an over-torque condition is reached. Torque limit switches are TL1 and TL2.

A. 230/460, 3 phase, 60 HZ Operation:

Warning: Connection of the 3 phases to terminals 1, 2 and 3 must be checked for proper actuator shaft rotation. When wired correctly (50-50 chance) the torque limit switches (TL1, TL2) and the position limit switches (PL1, PL2) will de-energize the correct relay coil to protect the unit. If not phased correctly, damage could occur. Crank to midposition for checking.

1. Phasing of the motor, terminals 1, 2, 3 is correct if the actuator shaft rotates clockwise (CW) as viewed from the end of the shaft, when the CW button is pushed. If a contactor is used the phase should be (A, B, C, or 1, 2, 3) for terminals 1, 2, 3.
2. Torque and position limit switches, terminals 16, 17, 18, 19 must be wired as shown. Terminals 16 and 17 must open the contactor (coil) when energized in the CW direction.

B. 180 VDC Operation:

1. If the motor field is not supplied, terminals 3 and 4 will be vacant.

2. When the polarities of the terminals are: 1 plus (+), 2 minus (-), 3 plus (+), 4 minus (-); the actuator shaft will rotate clockwise (CW).

C. Notes Common To All Forms of Operation

1. The arrow indicates the direction of the pot. wiper arm rotation for CW rotation of the actuator shaft (as viewed from shaft end).
2. All switches are shown at mid position of actuator travel.
3. LS1 and LS2 are set for 90° travel. LS1 trips at the CW limit of actuator shaft rotation. LS2 trips at the CCW limit.
4. TL indicates thrust limit switch. TL1 activates when the actuator shaft is loaded in the CW direction. TL2 activates when the actuator shaft is loaded in the CCW direction.
5. Limit switch ratings are: Current 10 Amps.; Voltage 600V (non-inductive load).
6. Potentiometer Data: Resistance 1000 ohms 5%; maximum voltage, Rotary - 40V, Characterized 20V.
7. Thermistor Data: Resistance at 25°C is 500 to 2500 ohms. Resistance increases to greater than 500,000 ohms between 125° and 135°C.

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