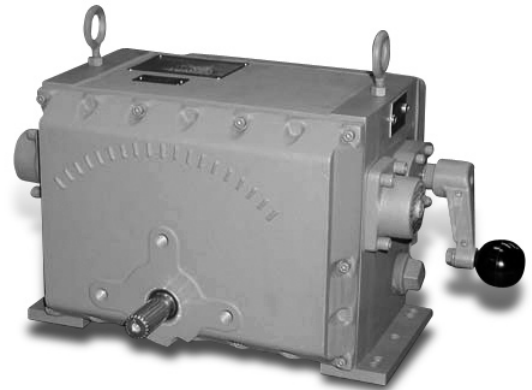


Electric Actuators and Control Systems

# rotork<sup>®</sup> Process Controls

Established Leaders in Valve Actuation

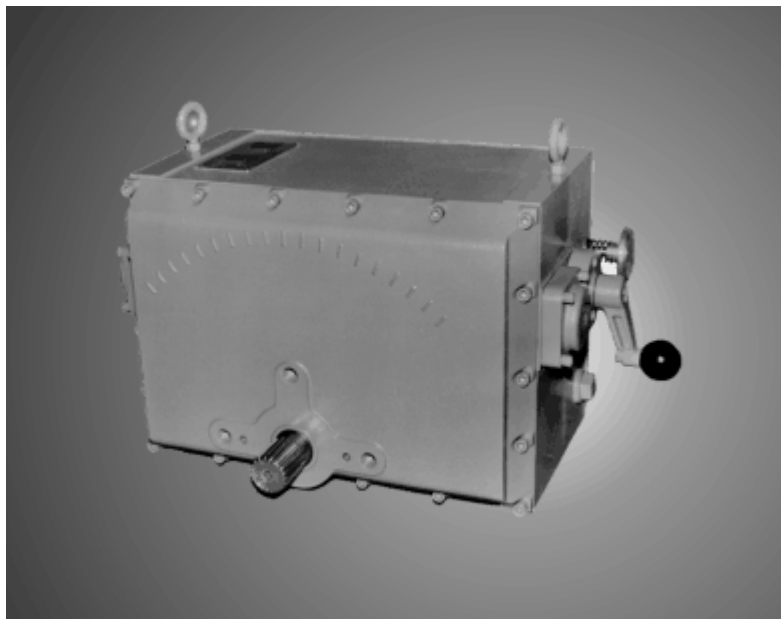


## SM-5200 Series

Instruction Manual

Publication P572E Issue 08/09

***SM-5200 Series***  
***Electric 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.*

# GENERAL INFORMATION

## TABLE OF CONTENTS

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10	.....Installation
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## IDENTIFICATION LABEL

An identification label is attached to each actuator cover. The serial number is also stamped on the aluminum housing, directly above the conduit entry. When ordering parts, requesting information, or service assistance, please provide all of the label information.

### EXAMPLE:

MODEL NUMBER SM 52 10

CODE: SM5210

SERIAL: 1627C92-23456-1

PH/HZ/V/A: 1/60/120/1

MODEL NUMBER: SM52 10

Actuator Series | Motor Type

CODE: SM5210

Model Series

SERIAL NUMBER: 1627 C 92 - 23456-1

Sequential Number | Job Reference No.  
Month built | Year built

PH/HZ/V/A: 1/60/120/1

PH=Phase

HZ=Hertz

V=Voltage

A=Amp

## RECEIVING

Once you have received the actuator(s), carefully inspect for shipping damage. Damage to the shipping carton is usually a good indication that it has received rough handling.

All damage should be immediately reported to the freight carrier and Jordan Controls, Inc.

## INSPECTION

Carefully unpack the actuator(s)— taking care to save the shipping carton and any packing material should return be necessary. Verify that the items on the packing list or bill of lading agree with your own.

## STORAGE

If the actuator(s) will not be installed immediately, they should be stored in a clean, dry area where the ambient temperature is not less than -20° F. The actuator(s) should not be stored in a corrosive environment.

## EQUIPMENT RETURN

For your convenience Jordan Controls, Inc. will provide an efficient method of returning equipment for repair.

### Returned Goods Authorization

A returned goods authorization (RGA) number is required to return any equipment for repair. This must be obtained from the Jordan Controls Service Department. The equipment must be sent to the following address after the RGA number is issued:

Jordan Controls, Inc.  
5607 West Douglas Avenue  
Milwaukee, Wisconsin 53218  
Attn: Service Department

To facilitate quick return and handling of your equipment include:

RGA Number  
Your Company Name  
Address  
Repair Purchase Order Number  
Brief description of the problem

# INTRODUCTION AND GENERAL DESCRIPTION

## INTRODUCTION

Jordan Controls, Inc., designs, manufactures and tests its products to meet many national and international standards. However, for these products to operate within their normal specifications, you must properly install, use and maintain these products. The following instructions must be adhered to and integrated with your safety program when installing, using and maintaining Jordan Controls products:

- Read and save all instructions prior to installing, operating and servicing this product.
- If you do not understand any of the instructions, contact your Jordan Controls representative for clarification.
- Follow all warnings, cautions and instructions marked on and supplied with the product.
- Inform and educate your personnel in the proper installation, operation and maintenance of the product.
- Install your equipment as specified on Jordan Controls installation instructions and per applicable local and national codes. Connect all products to the proper electrical sources.
- Handle, move and install each product using the appropriate number of personnel and moving devices/equipment (dolly, forklift, crane, etc.). Failure to do so could cause serious personal injury.
- To ensure proper performance, use qualified personnel to install, operate, update, tune and maintain the product.
- When replacement parts are required, ensure that the qualified service technician uses replacement parts specified by Jordan Controls. Unauthorized substitutions may result in fire, electrical shock, other hazards, or improper equipment operation.
- Keep all actuator protective covers in place, (except when maintenance is being performed by qualified personnel), to prevent electrical shock, personal injury, or damage to the actuator.

## CAUTION

Before installing the actuator, make sure the actuator supplied is suitable for the intended application with respect to environmental conditions and the voltage/frequency of available line power. If you are unsure of the suitability of this equipment for your installation, consult Jordan Controls prior to proceeding.

## WARNING— SHOCK HAZARD

Installation and servicing must be performed only by qualified personnel. De-energize all sources of power BEFORE removing the actuator cover. KEEP COVER TIGHT WHEN CIRCUITS ARE ALIVE. Failure to follow these precautions may result in serious injury.

## GENERAL DESCRIPTION

The SM-5200 series is a line of heavy duty, electrically operated rotary actuators. Available with output torque ratings of up to 1000 foot-pounds (1356 NM) and with or without a built-in servo amplifier, they provide a complete range of positioning control for both indoor and outdoor installations.

These rugged actuators were designed to provide years of maintenance-free operation, modulating the control element in process industries.

## BASIC MODELS

### SM-5210

240/480 Vac, 3 phase, 50/60 Hz, running current 1.8/9A, stall current 10.3/5.2A.

#### Duty cycle

600 ft-lbs output: modulating

1000 ft-lbs output: 20%, maximum 5 minute on-time

**Control Compatibility:** Three phase bi-directional motor contactor or controller.

### SM-5220

120/240 Vac, 1 phase, 50/60 Hz, running current 7.0/3.5A, stall current 13.2/6.6A.

#### Duty cycle

600 ft-lbs output: modulating

1000 ft-lbs output: 20%, maximum 5 minute on-time

**Control Compatibility:** Jordan Controls model MT-6220 meter with remote control, model CS-7200 control station, models AD-8823 or AD-8843 servo amplifiers.

### SM-5220/AD-8823

120 Vac, 1 phase, 50/60 Hz, running current 7.0A, stall current 13.2A.

#### Duty cycle

600 ft-lbs output: modulating

1000 ft-lbs output: 20%, maximum 5 minute on-time

**Control Compatibility:** 4 to 20 mA dc command signal capable of driving a 470 ohm load. Other command signal ranges are available - please consult the factory.

### SM-5220/AD-8843

240 Vac, 1 phase, 50/60 Hz, running current 3.5A, stall current 6.6A.

#### Duty cycle

600 ft-lbs output: modulating

1000 ft-lbs output: 20%, maximum 5 minute on-time

**Control Compatibility:** 4 to 20 mA dc command signal capable of driving a 470 ohm load. Other command signal ranges are available - please consult the factory.

### SM-5260

90 Vdc, (permanent magnet field), 4.7A.

#### Duty cycle

600 ft-lbs output: modulating

1000 ft-lbs output: 20%, maximum 5 minute on-time

**Control Compatibility:** Jordan Controls model AD-7300-A (90 Vdc output), servo amplifier.

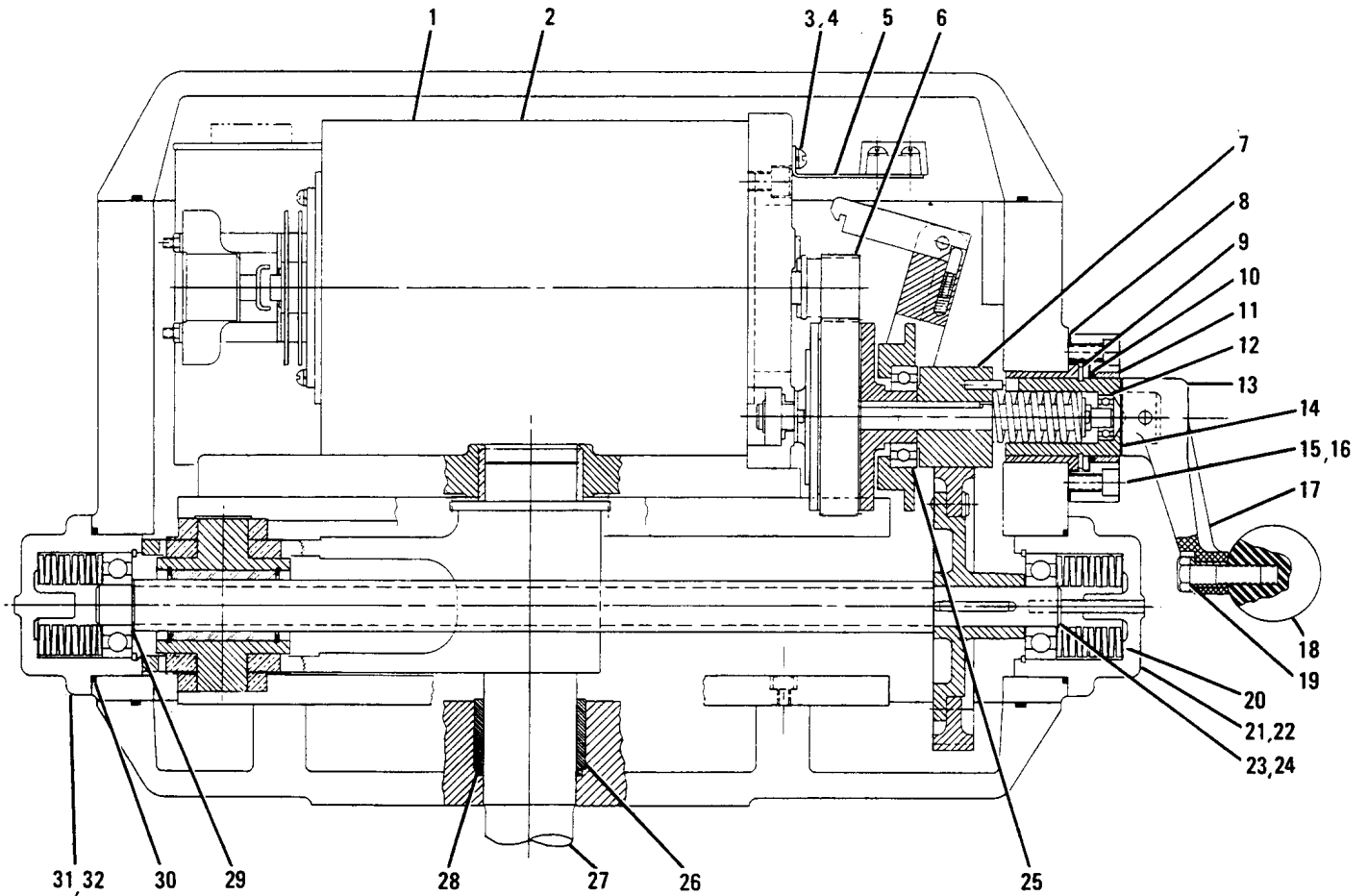


Figure 1

Item	Description	Stock No.	Qty.
1-	SM-5201 Main Assy. . . . .	70E-014137	
-1	Motor Bracket Assy, . . . . . (SM-5210)	68C-014120-001	1
	Motor Bracket Assy, . . . . . (SM-5220)	68C-014120-002	1
	Motor Bracket Assy, . . . . . (SM-5260)	68C-014120-003	1
-2	Motor, AC, SM-5210 . . . . .	23D-014664-002	1
	Motor, AC, SM-5220 . . . . .	23D-014664-001	1
	Motor, DC, SM-5260 . . . . .	23D-012363-001	1
-3	Screw, Rd Hd, . . . . . 10-24 x 0.50"	54A-015043-050	2
-4	Washer, Lock . . . . .	56A-015201-001	2
-5	Bracket, Terminal . . . . .	13B-015804-001	1
-6	Pinion Assy . . . . .	68A-011657-002	1
-7	Clutch Assy, . . . . . 20 sec./30 sec.	68B-015831-001	1
	Clutch Assy, 50 sec. . . . .	68B-018567-001	1
-8	Gasket . . . . .	74A-011648-001	1
-9	Ring, Retaining . . . . . (Truarc 5160-98)	58B-014186-150	1
-10	O-Ring . . . . .	74B-012708-222	1
-11	Bushing . . . . .	18B-003814-038	1
-12	Bearing . . . . .	17B-003813-007	1
-13	Handcrank Assy . . . . .	68B-015434-001	1
-14	Shaft, Override, Manual . . . . .	61A-010931-001	1
-15	Screw, Cap, Soc Hd. . . . . 5/16-18 x 1-1/4"	54A-015070-125	12

Item	Description	Stock No.	Qty.
-16	Washer, Lock, 5/16 . . . . .	56A-015221-001	12
-17	Handcrank . . . . .	60B-010978-002	1
-18	Knob . . . . .	47A-007639-001	1
-19	Bushing . . . . .	18B-SP1988-065	1
-20	Washer, Belleville . . . . .	56B-010462-004	20
-21	Overload Cap Assy . . . . .	68B-014671-001	1
-22	Cap, Overload . . . . .	60B-014670-002	1
-23	Drive Screw Assy, 20 sec. . . . .	68B-018576-001	1
	Drive Screw Assy, 30 sec. . . . .	68B-018576-002	1
	Drive Screw Assy, 50 sec. . . . .	68B-018576-003	1
-24	Screw Drive Sub-Assy, . . . . . 20 sec.	68B-018561-001	1
	Screw Drive Sub-Assy, . . . . . 30 sec.	68B-018561-002	1
	Screw Drive Sub-Assy, . . . . . 50 sec.	68B-018561-003	1
-25	Bearing, Ball . . . . .	17B-003813-031	1
-26	Bearing, Sleeve, . . . . . 1-3/4 x 2-1/8 x 1-1/2	68D-014059-001	1
-27	Output Shaft Assy . . . . .	68D-014059-001	1
-28	O-Ring . . . . .	74B-012708-224	1
-29	Ring, Retaining . . . . . (Truarc 5160-59)	58B-014183-078	1
-30	O-Ring . . . . .	74B-010953-232	2
-31	Overload Cap Assy . . . . .	68B-014671-003	1
-32	Cap, Overload . . . . .	60B-014670-001	1

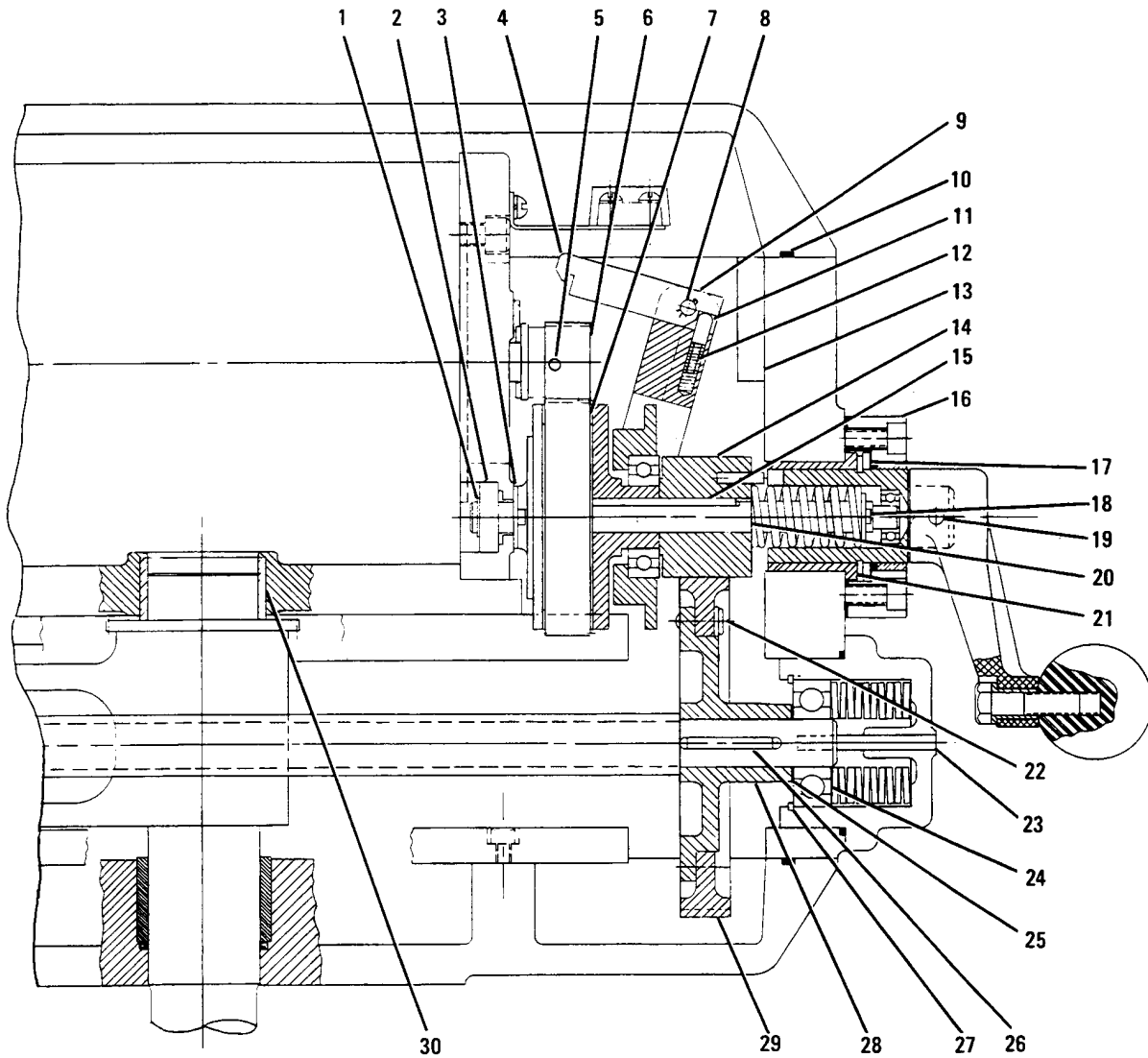


Figure 2

Item	Description	Stock No.	Qty.
2-1	Ring, Retaining . . . . .	58B-014183-050	1
-2	Bearing . . . . .	17B-003813-004	1
-3	Washer, Thrust . . . . .	56B-004107-011	1
-4	Latch, Crank, Manual. . . . .	61A-015503-001	1
-5	Pin, Roll, . . . . . 0.125 Dia. x 1.25"	57A-015185-125	1
-6	Key, 3/16 Sq. x 1" . . . . .	61B-010954-332	1
-7	Gear, Fiber . . . . .	16B-003806-019	1
-8	Pin, Clevis . . . . .	74A-016258-001	1
-9	Pin, Cotter, . . . . . 3/32 Dia. x 1/2"	COML	1
-10	String, O-Ring, 112.5" . . . . .	74B-010957-995	1
-11	Pin, Latch . . . . .	61A-011664-001	1
-12	Spring . . . . .	20A-012337-001	1
-13	Damper, Yoke . . . . .	61A-012091-001	1
-14	Gear, Slide, . . . . . 20 sec./30 sec.	68A-016468-001	1
	Gear, Slide, 50 sec. . . . .	68A-018566-001	1
-15	Key, 1/8 Sq. x 2.75" . . . . . 20 sec./30 sec.	61B-010954-288	1
	Key, 1/8 Sq. x 2.8" . . . . . 50 sec.	61B-010954-292	1

Item	Description	Stock No.	Qty.
-16	Cap . . . . .	60B-010926-001	1
-17	Washer . . . . .	61A-013829-001	1
-18	Pin, Cotter, . . . . . 0.130 Dia. x 3/4"	COML	1
-19	Pin, Roll, . . . . . 0.25 Dia. x 1.5"	57A-015215-150	1
-20	Shaft, Clutch . . . . .	62A-015825-001	1
-21	Bearing, Flanged . . . . .	18B-SP1988-056	1
-22	Rivet, Pop . . . . .	USM-A-610-50	6
-23	Bushing . . . . .	18B-003814-016	1
-24	Bearing . . . . .	17B-003813-003	2
-25	Spacer . . . . .	13A-014549-003	1
-26	Key, 3/16 Sq. x 1-3/16" . . . . .	61B-010954-338	1
-27	Ring, Retaining . . . . .	58B-014184-206	2
-28	Hub, Gear . . . . .	60B-018548-001	1
-29	Gear, 88T, 16P, 20°PA, . . . . . 20 sec./30 sec.	16A-013290-001	1
	Gear, 97T, 16P, 20°PA, . . . . . 50 sec.	16A-017308-001	1
-30	Bearing, Sleeve . . . . .	18B-003814-048	1

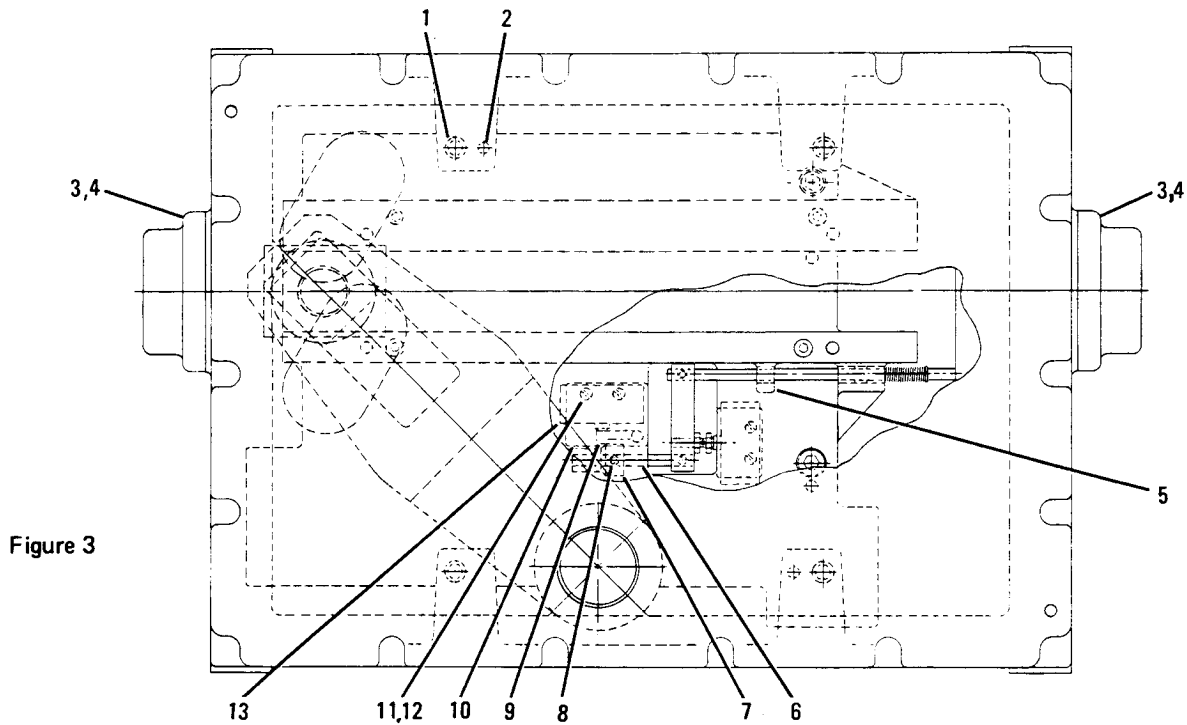


Figure 3

Item	Description	Stock No.	Qty.	Item	Description	Stock No.	Qty.
3-1	Screw, Cap, Soc Hd, . . . . . 5/16-18 x 1"	54A-015070-100	4	-8	Setscrew, Soc Hd, . . . . . 10-24 x 0.19"	54A-015047-019	4
-2	Pin, Dowel, . . . . . 0.25 Dia. x 1"	57A-015226-100	6	-9	Switch, Actuator . . . . .	14A-009192-001	1
-3	Screw, Cap, Soc Hd, . . . . . 5/16-18 x 1-1/4"	54A-015070-125	8	-10	Insulator, Switch . . . . .	61A-014784-001	2
-4	Washer, Lock, 5/16 . . . . .	56A-015221-001	8	-11	Screw, Rd Hd, . . . . . 6-32 x 1-1/4"	54A-015023-125	4
-5	Bushing . . . . .	18B-003814-003	1	-12	Washer, Lock . . . . .	56A-015180-001	4
-6	Shaft, Switch Acutating . . . . .	62A-014783-001	1	-13	Switch, Limit . . . . . (SM-5210, SM-5220)	46A-010016-001	2
-7	Collar, Switch Actuating . . . . .	61A-018266-011	1		Switch, Limit . . . . . (SM-5260)	46A-010016-003	2

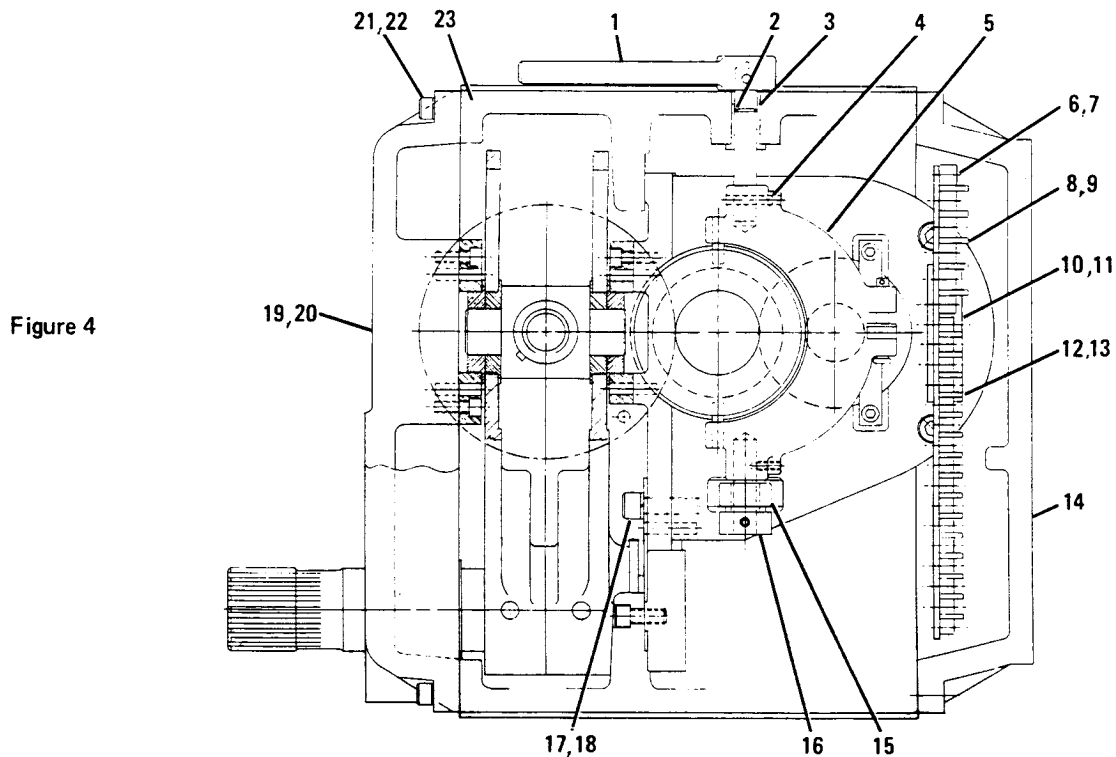
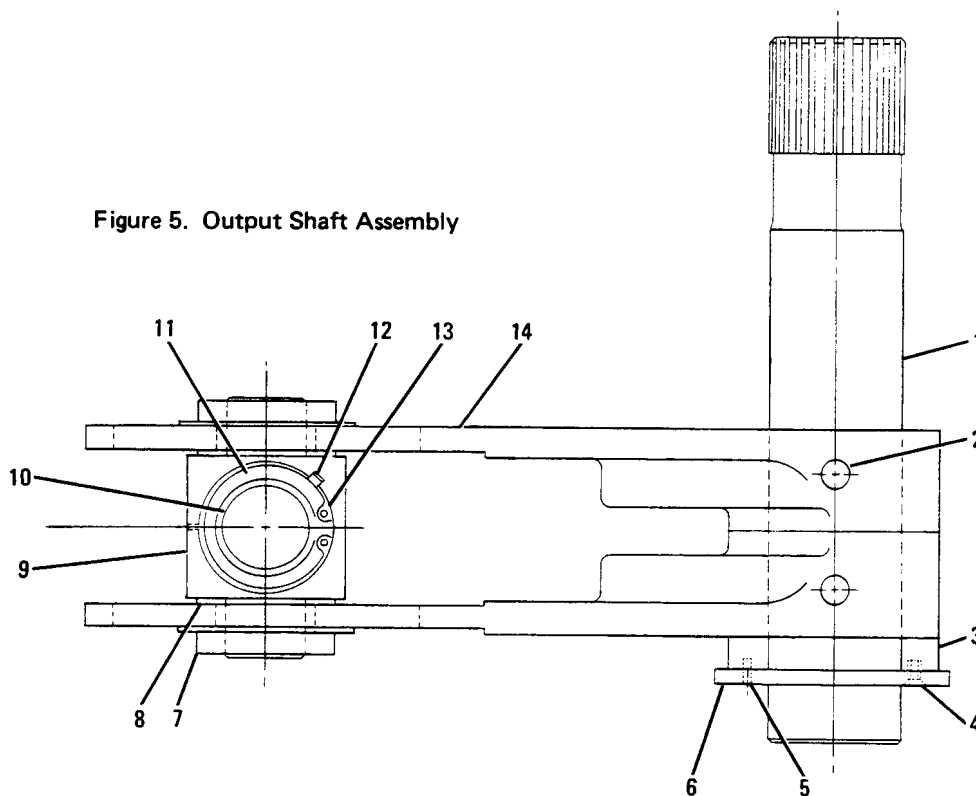


Figure 4

Item	Description	Stock No.	Qty.
4-1	Lockout Handle Assy. . . . .	68A-015493-001	1
-2	O-Ring . . . . .	74B-010957-012	1
-3	Bearing . . . . .	18B-SP1988-042	1
-4	Pin, Roll, . . . . .	57A-015205-100	1
	3/16 Dia. x 1"		
-5	Yoke Assy . . . . .	68C-015502-001	1
-6	Screw, Rd Hd, . . . . .	54A-015043-062	4
	10-24 x 5/8"		
-7	Washer, Lock . . . . .	56A-015201-001	4
-8	Strip, Terminal, 4 Pin. . . . .	43B-003888-504	1
-9	Insulator . . . . .	32A-014123-004	1
-10	Screw, Rd Hd, . . . . .	54A-015033-050	4
	8-32 x 1/2"		
-11	Washer, Lock . . . . .	56A-015191-001	4
-12	Strip, Terminal, 14 Pin. . . . .	43B-003888-314	1
-13	Insulator . . . . .	32A-014123-003	1
-14	Cover, Back, . . . . .	60D-010906-001	1
	Weathertight		
	Cover, Back, . . . . .	60D-010906-003	1
	Explosion-proof		

Item	Description	Stock No.	Qty.
-15	Bearing . . . . .	18B-SP1988-037	1
-16	Collar . . . . .	74A-012377-002	1
-17	Screw, Soc Hd, . . . . .	54A-015080-125	2
	3/8-16 x 1-1/4"		
-18	Washer, Lock . . . . .	56A-015281-001	2
-19	Front Cover Assy, . . . . .	68B-014130-001	1
	Weathertight		
	Front Cover Assy, . . . . .	68B-014130-003	1
	Explosion-proof		
-20	Cover, Front. . . . .	60D-014061-001	1
-21	Screw, Cap, Soc Hd, . . . . .	54A-015080-125	36
	3/8-16 x 1-1/4"		
-22	Washer, Lock . . . . .	56A-015231-001	36
-23	Housing, Main, . . . . .	60D-012276-001	1
	Weathertight		
	Housing, Main, . . . . .	60D-012276-004	1
	Explosion-proof		

Figure 5. Output Shaft Assembly



Item	Description	Stock No.	Qty.
5-	Output Shaft Assy . . . . .	68D-014059-001	1
	(See Fig. 1-27)		
-1	Shaft, Output, Splined . . . . .	62B-014055-001	1
	(SM-5210)		
	Shaft, Output, Keyway. . . . .	62B-014056-001	1
	(SM-5220, SM-5260)		
-2	Pin, Roll, . . . . .	57A-015235-250	2
	3/8 Dia. x 2.05"		
-3	Spacer, Gear . . . . .	61A-017199-001	1
-4	Screw, Flat Hd . . . . .	54A-015024-050	3
	6-32 x 0.5"		
-5	Pin, Roll, . . . . .	57A-015185-075	2
	1/8 Dia. x 0.75"		

Item	Description	Stock No.	Qty.
-6	Gear, 144T, 48P . . . . .	16B-003804-109	1
-7	Bearing . . . . .	17A-016100-001	2
-8	Bearing . . . . .	18A-010919-001	2
-9	Carrier, Nut . . . . .	60C-014384-001	1
-10	Nut, Drive, 1-5 . . . . .	14A-010955-002	1
	(SM-5210, SM-5220)		
	Nut, Drive, 1-8 . . . . .	61A-012784-002	1
	(SM-5260)		
-11	Spacer, Drive Nut . . . . .	74A-014777-001	2
-12	Key, 0.187 Sq. x 2" . . . . .	61B-010954-364	1
-13	Ring, Retaining . . . . .	58B-014184-138	2
	(Truarc N5000-138)		
-14	Arm, Pivot . . . . .	60C-014780-001	2



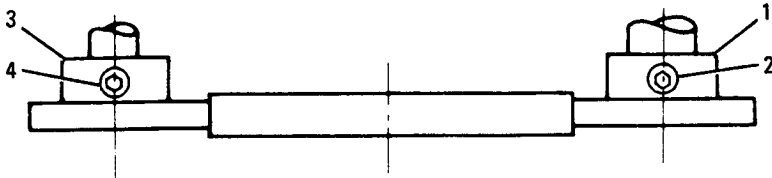


Figure 6. Feedback Gearing

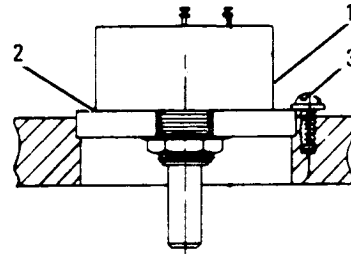


Figure 7. Standard Feedback – Potentiometers

Item	Description	Stock No.	Qty.
6-1	Gear	16A-014020-001	1
-2	Setscrew, 10-24 x 3/16"	54A-015047-019	1
-3	Gear	16B-003803-022	1
-4	Setscrew, 8-32 x 3/16"	54A-015047-019	1

Item	Description	Stock No.	Qty.
7-1	Potentiometer, Precision, One-Turn, 1K	34A-015848-001	1
-2	Disk, Adapter	61A-SM3304-003	1
-3	Screw, Truss Hd, 8-32 x 0.25"	54A-015032-025	2

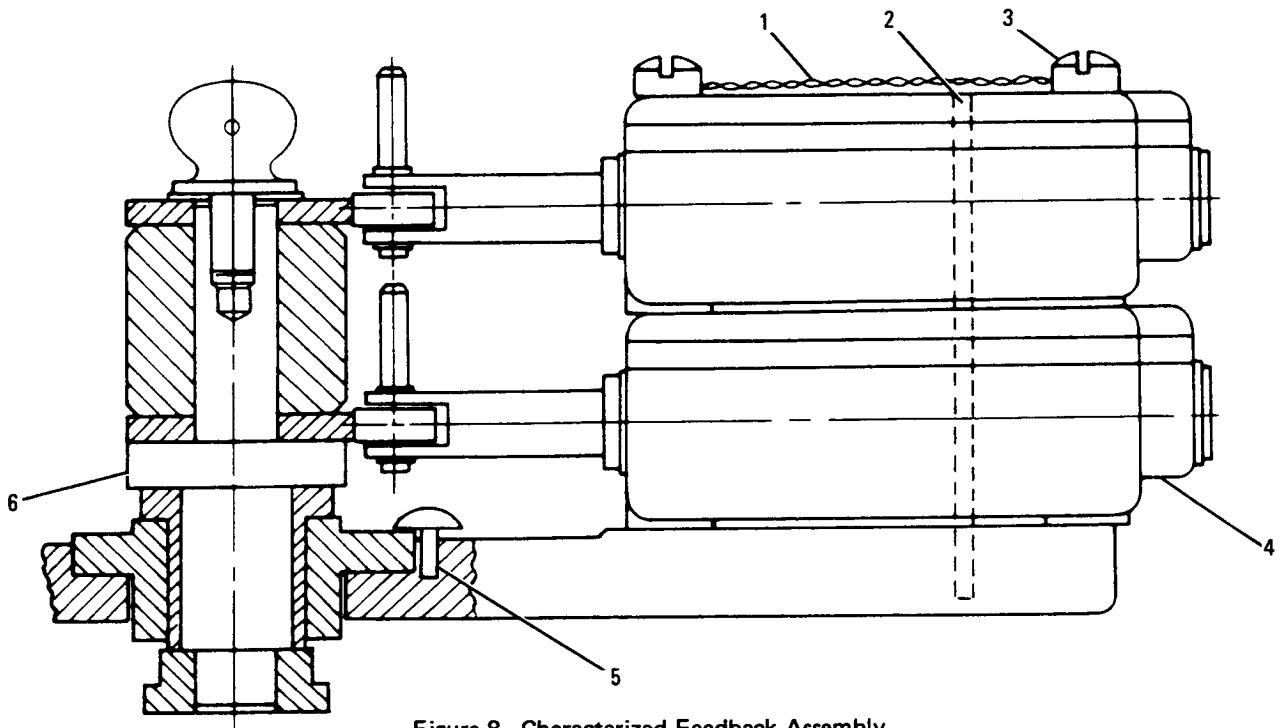
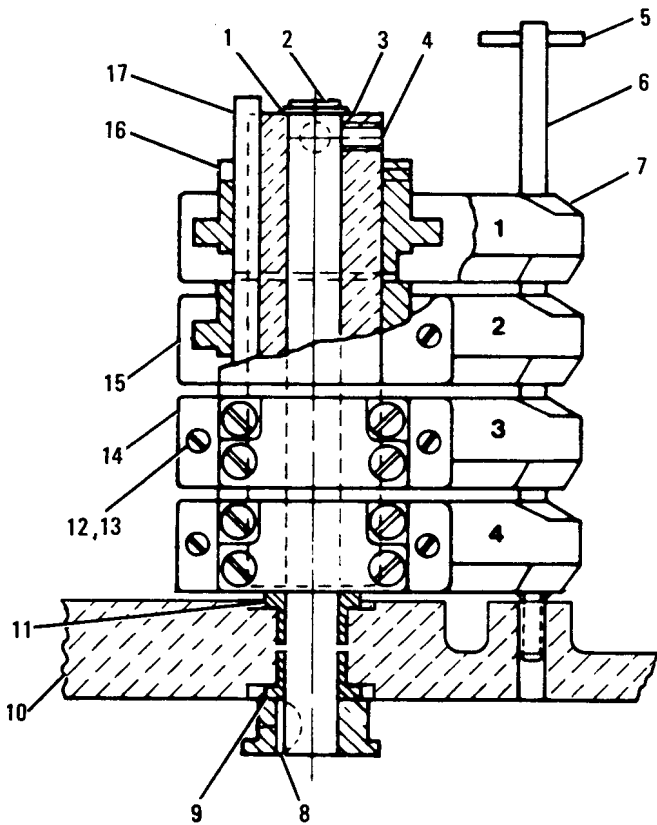


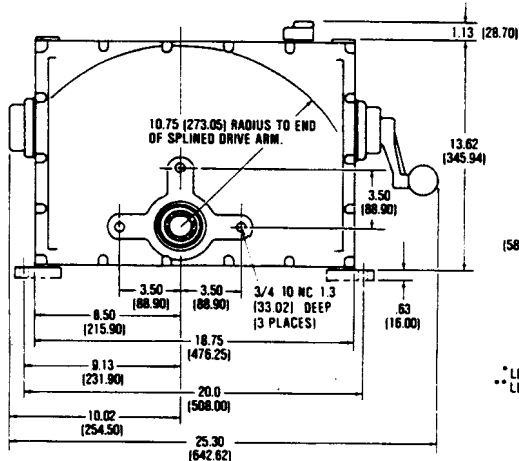
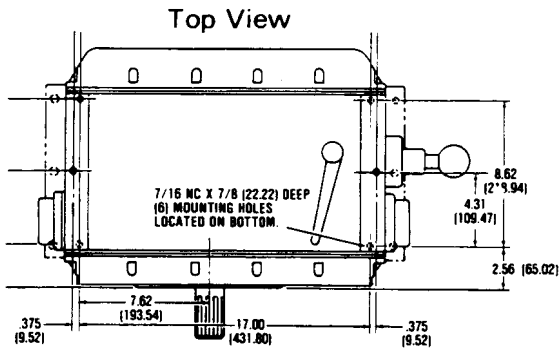
Figure 8. Characterized Feedback Assembly

Item	Description	Stock No.	Qty.
8-	Characterized Feedback Assy	68D-015436	1
-1	Wire, Tie	COML	AR
-2	Pin, Dowel, 0.093 Dia. x 0.31" (single)	57A-015176-031	1
	Pin, Dowel, 0.093 Dia. x 1.38" (tandem)	61A-015525-001	1
-3	Screw, Fil Hd, 10-32 x 1-3/8" (single)	COML	2
	Screw, Fil Hd, 10-32 x 2-3/8" (tandem)	COML	2
-4	Linear Pot Assy (single)	68C-015435-001	1
	Linear Pot Assy (tandem)	68C-015435-002	1
-5	Screw, Truss Hd, 8-32 x 0.25"	54A-015032-025	2
-6	Cam Shaft Assy (single)	68B-015488-001	1
	Cam Shaft Assy (tandem)	68B-015488-002	1

Figure 9. Heavy Duty Feedback Switch Assembly

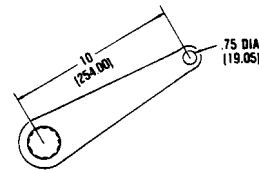


Item	Description	Stock No.	Qty.
9-	Heavy Duty Feedback Switch Assy	68C-014213-1	1
-1	Ring, Retaining. (Truarc 5100-50)	58B-014183-050	1
-2	Shaft, Inner	62A-014212-001	1
-3	Shaft, Feedback	62A-014211-001	1
-4	Setscrew, Soc Hd, 1/4-20 x 0.38"	54A-015067-038	1
-5	Pin, Roll, 1/8 Dia. x 1"	57A-015185-100	1
-6	Key, Feedback, Round	61A-014789-001	1
-7	Molding, Feedback Plate	61B-014592-001	4
-8	Key, Woodruff (404)	COML	1
-9	Bushing	18B-SP1988-038	1
-10	Support, Center	60D-014064-001	1
-11	Bushing	18B-SP1988-076	1
-12	Screw, Rd Hd, 6-32 x 0.50"	54A-015023-050	8
-13	Washer, Lock	56A-015180-002	8
-14	Switch, Limit, AC, (Standard)	46A-010017-001	4
	Switch, Limit, DC, (Used with Amp)	46A-010017-003	4
-15	Molding, Cam	14B-012775-001	4
-16	Ring, Retaining. (Truarc 5103-125)	58B-017287-125	1
-17	Key, Machining. Feedback	61A-013519-003	1

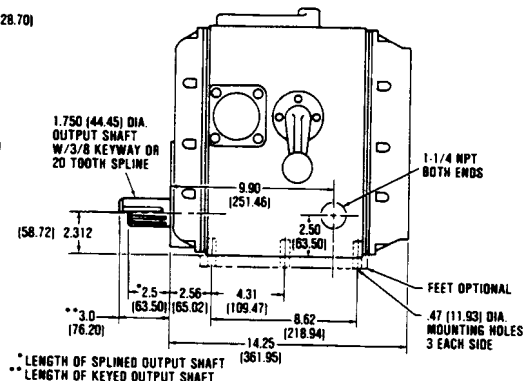


Side View

**DIMENSIONS**



Drive Arm



End View

Dimensions in parenthesis, ( ) are metric.

## INSTALLATION

### MOUNTING

The outline and mounting dimensions for a standard unit are shown on page 9 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, deenergize 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 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 cannot 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. Refer to page 11 for limit switch adjustment.

### 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 3/8 x 3/8 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° 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 12 show the interconnect wiring connections for typical three phase control, one 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 1-1/4 inch N.P.T.

**CAUTION:** Three phase or 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 9 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 an 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-# ¼-20 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.

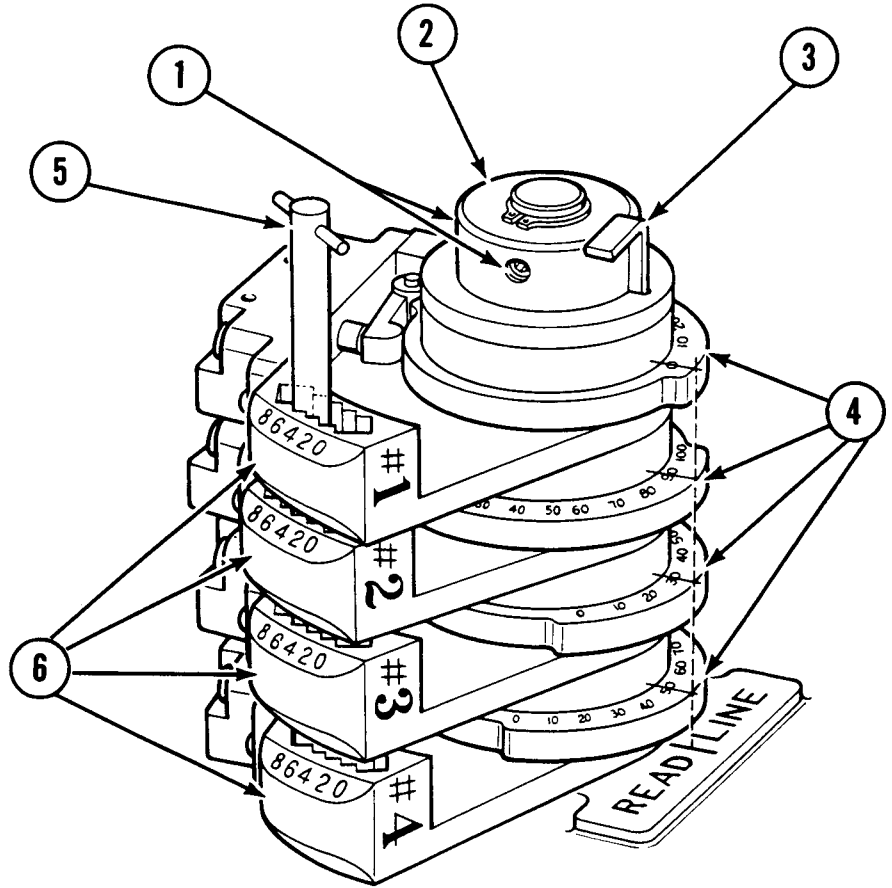
5. Insert Key ③ to lock cams in place after settings are made. Cams might have to be moved a small amount to line up key with keyway.

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.

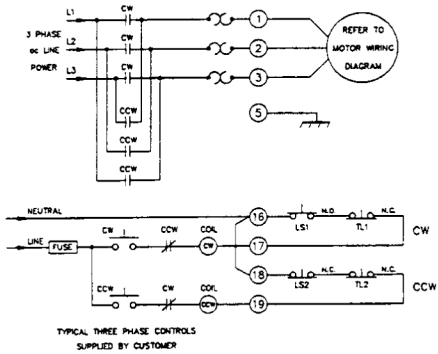
8. As the pin ⑤ is inserted in the last block, the complete group of blocks should be positioned so that pin ⑤ may be screwed back in the tapped hole.

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.

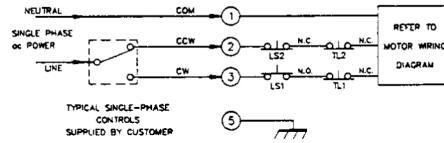


# TYPICAL WIRING DIAGRAMS

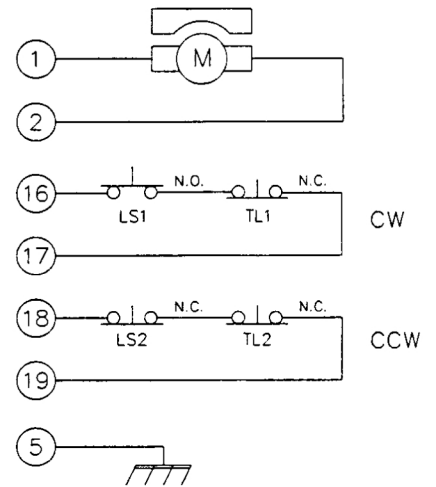
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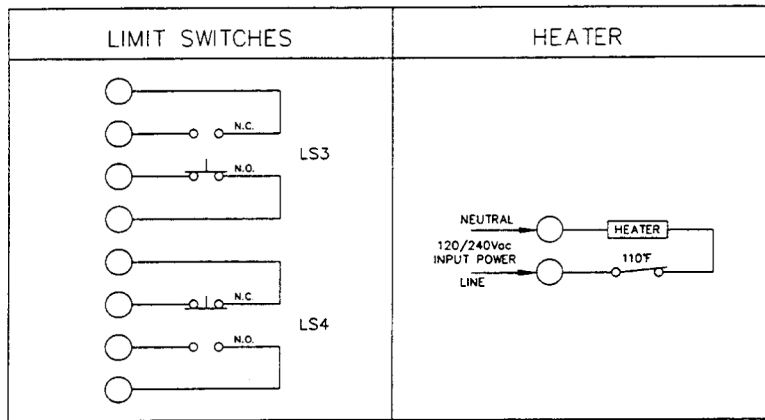
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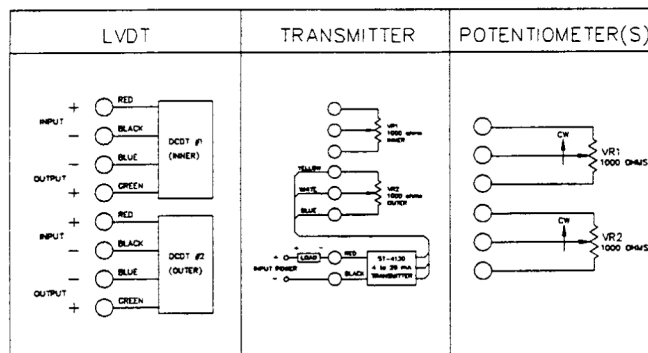
SM-5260



## OPTIONS



## FEEDBACK DEVICES



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