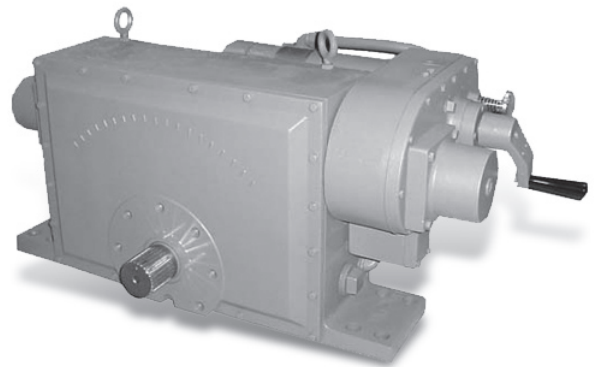


Electric Actuators and Control Systems

rotork[®] Process Controls

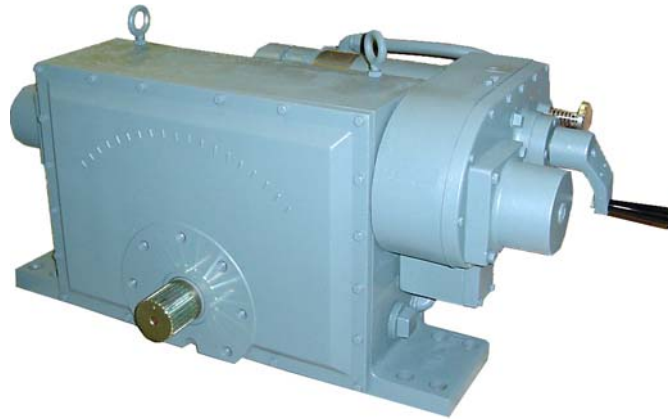
Established Leaders in Valve Actuation



SM-5400 Series

Instruction Manual

SM-5400 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

2Identification Label
2Receiving/Inspection/Storage
2Equipment Return/Return Goods Authorization
2Basic Models
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IDENTIFICATION LABEL

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

EXAMPLES:

MODEL NUMBER: SM 5430

SM 54	Actuator Series
30	Motor Type

CODE:

SM-5430	Model Series
---------	---------------------

SERIAL NUMBER: 1627C92 - 23456-1

1627	Sequential number
C	Month built
92	Year built
- 23456-1	Reference no.

PH/HZ/V/A: 3/60/240/4.2

PH=Phase
HZ=Hertz
V=Voltage
A=Amp

RECEIVING

Carefully inspect for shipping damage. Damage to the shipping carton is usually a good indication that it has received rough handling. Report all damage immediately to the freight carrier and Jordan Controls, Inc.

INSPECTION

Carefully unpack the actuator and information packet—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 will not be installed immediately, it should be stored in a clean, dry area where the ambient temperature is not less than -20° F. The actuator should not be stored in a corrosive environment.

EQUIPMENT RETURN

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

Return Goods Authorization

A Returned Goods authorization (RG) number is required to return any equipment for repair. This must be obtained from the Jordan Controls Service Department. The equipment must be shipped, freight prepaid, to the following address after the RG 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:
RG Number on outside of box
Your Company Name, Contact Person, Phone/Fax number
Address
Repair Purchase Order Number
Brief description of the problem

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, they must be properly installed and maintained. 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.

PRODUCT SPECIFICATIONS

MODEL	LINE VOLTAGE	DUTY	CURRENT		FREQUENCY
			RUN	STALL	
SM-5430	3 phase / 240 Vac	Modulating	4.2	32.0	50/60 Hz
SM-5430	3 phase / 480 Vac	Modulating	2.1	16.0	50/60 Hz
SM-5480	180 Vdc	Modulating	9.2	N/A	N/A

OPTIONS:

- 1) 1000 ohm potentiometer and/or 4 to 20 mA (ST-4130) position feedback signals, or linear variable displacement transducer (LVDT).
- 2) Heater for outdoor locations or where actuator is subject to wide ambient temperature variations.
- 3) Customer use position limit switches.
- 4) Splined Drive Arm
- 5) Driven Arm
- 6) Adaptor Clevis Kit

MECHANICAL

MODEL	ACTUATOR SHIFT TIME (sec.) / TORQUE (ft./lbs.)		
	SM-5430	42/5000, 42/7500	56/10,000
SM-5480	40/5000, 40/7500	54/10,000	70/7500, 70/12,500

MASS: Approximately 525 lbs. (238 kg)

CONDUIT ENTRY: Two, 2 inch NPT

ENVIRONMENTAL:

Temperature Limits: -40° F to +150°F (-40° C to +65° C)

Enclosure: Watertight, NEMA Type 4 (IP65)

GENERAL DESCRIPTION

The SM-5400 series are electro-mechanical, 90 degree rotary actuators. They may be three phase ac or dc powered. These rugged actuators are designed to meet the requirements of a closed-loop servo control system and are equally suited for on/off applications. They are easily interfaced with Jordan Controls integral or remote servo amplifiers and customer supplied remote controllers for a complete positioning system. The SM-5400 series can provide up to 12,500 foot-pounds (16,948 NM) of output torque with rotation from 30 to 90 degrees at shift times of 40 to 73 seconds for 90 degrees of travel. The actuator is protected from torque overload by integral torque overload switches that will trip when excessive loads are placed on the actuator output shaft. A manual handcrank allows the unit to be positioned without electrical power. The enclosure is suitable for watertight, NEMA Type 4 (IP65) locations.

The SM-5400 series actuators utilize three phase (240/480 Vac), or direct current (180 Vdc) reversible motors to produce torque at the motor pinion gear. The motor torque is increased (with a corresponding decrease in speed) through three stages of bearing supported spur gearing. The final spur gear is mounted on a bearing supported shaft with an acme thread profile on one end. Rotation of this screw shaft causes a mating nut to be pulled or pushed axially. This axial nut movement is transmitted through the scotch yoke mechanism which transforms linear movement into rotary output shaft movement providing the final output torque. A fine pitch spur gear on the output shaft assembly allows the degrees of movement of the output shaft to be sensed by a single turn potentiometer (or other device) and position limit switches that will trip at the ends of travel. Possible damage to the actuator from running into an obstruction or exceeding the rated torque capability (-0% to +20%) is avoided by the torque overload protection mechanism. The screw shaft incorporates a spring pack and a torque limit switch assembly. If the actuator encounters an overload, the spring pack deflects, absorbing the overload, and causing a torque limit switch to trip. A manual handcrank is provided to allow the actuator to be manually positioned during installation, alignment or power outage. (Operation of the manual handcrank is described in the Set Up section of this instruction manual.)

NOTE: For CW rotation of the output shaft viewed facing shaft end, turn handcrank CCW.

BASIC MODELS

SM-5430

230/460 Vac, 3 phase, 50/60 Hz, running current 4.2/2.1A, stall current 32.0/16.0A, modulating duty.

Control Compatibility: Any 3 phase motor contactor.

SM-5480

180 Vdc, permanent magnet field, modulating duty, capable of plug reversing and speed control with proper input. Running current 9.2A.

Control Compatibility: Jordan Controls model AD-7300 (remote) or AD-9120 (integral or remote) servo amplifiers.

INSTALLATION

Mounting

The outline and mounting dimensions for a standard unit are shown on page 12 of this manual. The rear cover opposite the output shaft must have clearance so that it may be removed 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 face 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 depressing the manual clutch plunger. Facing the crank end of the actuator, with the output shaft to the left, depress the plunger until latching occurs. If latching does not occur, turn the crank handle slowly while continuing to depress the plunger. Latching will then occur. Release the plunger. 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 is 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 tell-tale-indicator shaft, located in the center of the thrust housing assembly nearest the handcrank, indicates over-torquing. The tell-tale-indicator shaft will either protrude or recede depending on the direction of over-torquing. Discontinue cranking in that direction on over-torque warning.

The motor, 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 afterwards.

The limit switch and feedback area of the actuator depends on 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 the switches and feedback might be required. However, no internal damage will have occurred.

CAUTION: Torque overload protection is provided by the mechanism described on page 3 and is factory set at the specific torque level ordered. This setting is not field adjustable.

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 standard 1" square 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 ensure that the limited range of the actuator matches the limited range of the driven load.

Electrical Interconnect

The typical wiring diagrams on page 9 & 10 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 as optional may not be supplied. In all instances the wiring diagram appropriate to the equipment will be supplied with the equipment and should be used for actual installation purposes.

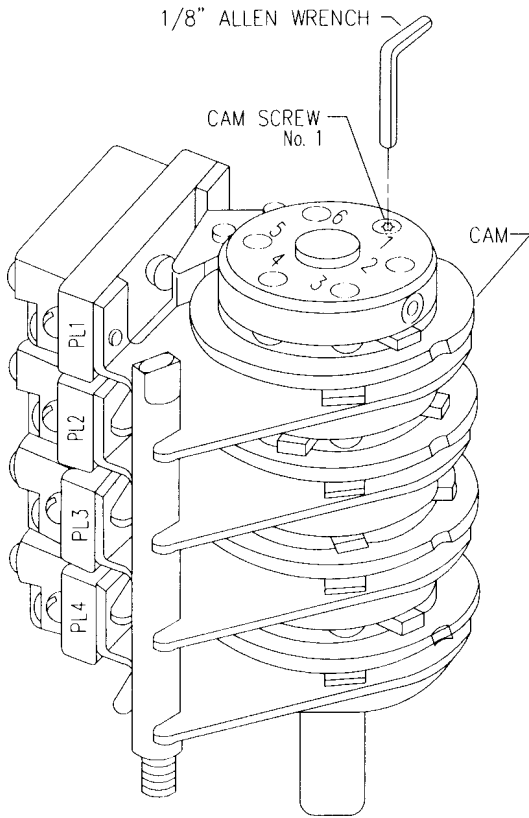
A terminal strip is located inside the rear cover opposite the output shaft. One conduit entry is located at each end of the unit to accommodate standard 2" NPT fittings.

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

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 and Andok B or equal grease. Care should be taken to ensure that no foreign material is allowed to become entrained with the grease in the gear train, which will cause premature failure.

INSTALLATION



METAL LIMIT SWITCH ASSEMBLY

Limit Verification

Ensure that all power is off when adjusting switches. To set up the CW limit switch setting, handcrank the actuator in the CW direction until mechanical resistance of the actuator is felt. Back off from this position approximately 10 turns. Adjust PL-1 to trip. Handcrank the actuator CCW until PL-1 resets, and then handcrank CW until PL-1 trips again. Check that the unit is approximately 10 handcrank turns from the mechanical end of travel of the actuator. Repeat this procedure as needed. Now connect a degree indicator to the main housing with the zero position on the left-hand side or connect a pointer to the output shaft to point at zero.

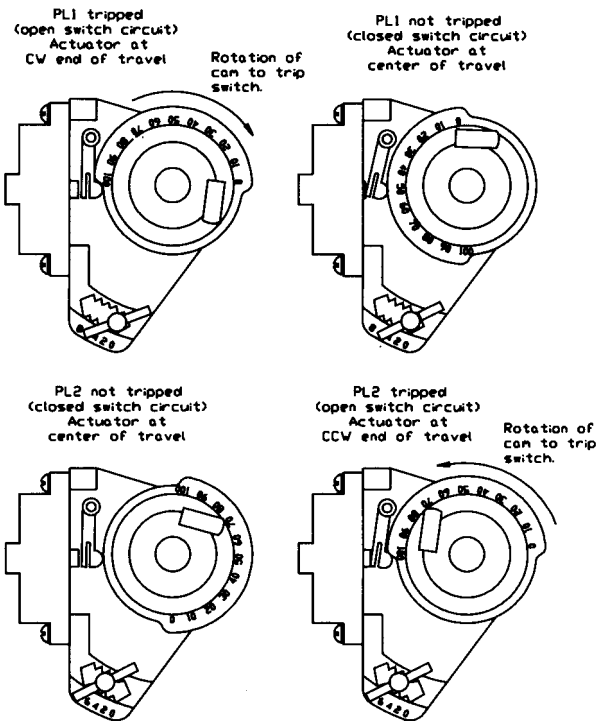
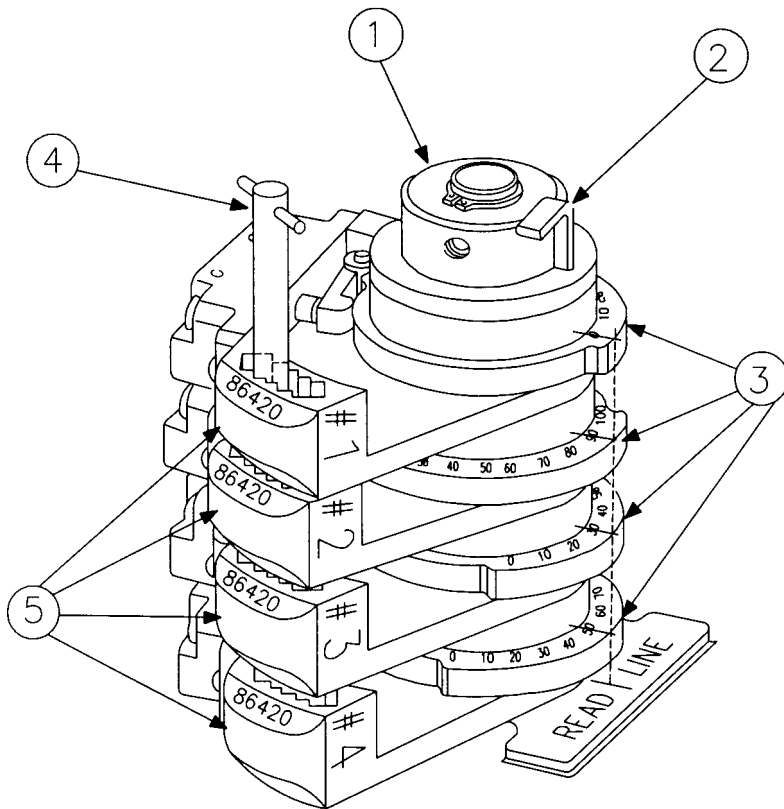
To set up the CCW limit switch setting, handcrank the actuator CCW 90 degrees. Now confirm that the PL-2 trip point is at least 10 turns from the CCW mechanical end of travel of the actuator.

Adjustment

To adjust the position limit switch manually, handcrank the actuator to the full CW position limit approximately 10 turns from the mechanical stop. Using a 1/8 inch, long shaft Allen wrench, loosen cam screw 1 about a quarter turn. Rotate cam 1 CCW to allow the actuator to run further in the CW direction or rotate the cam CW to turn the actuator off sooner. (Cam 1 will turn off the motor for CW output shaft rotation when the switch roller lever moves to the high side of the cam with the cam rotating CW.) Position the cam as desired and while holding in place, tighten screw 1 with moderate force to adequately clamp the cam in place. **DO NOT OVER TIGHTEN.**

Now handcrank the actuator to the full CCW position limit approximately 10 turns from the mechanical stop. Using a 1/8 inch, long shaft Allen wrench, loosen cam screw 2 about a quarter turn. Rotate cam 2 CW to increase the actuator's travel range or CCW to decrease the travel range. While holding the cam in place, tighten screw 2. Switches 3 through 6 (optional) are adjusted by loosening their respective cam screws and rotating the cam. They may be set anywhere within the range of PL-1 and PL-2.

INSTALLATION



NON-METALLIC LIMIT SWITCH ASSEMBLY

Limit Verification

Ensure that all power is off when adjusting switches. To set up the CW limit switch setting, handcrank the actuator in the CW direction until mechanical resistance of the actuator is felt. Back off from this position approximately 10 turns. Adjust PL-1 to trip. Handcrank the actuator CCW until PL-1 resets. Handcrank CW until PL-1 trips again. Check that the unit is approximately 10 handcrank turns from the mechanical end of travel of the actuator. Repeat this procedure as needed. Now connect a degree indicator to the main housing with the zero position on the left-hand side or connect a pointer to the output shaft to point at zero.

To set up the CCW limit switch setting, handcrank the actuator CCW 90 degrees. This should be the point at which PL-2 trips. (Adjustment of the limit switch holder may be necessary to achieve this.) Now confirm that the PL-2 trip point is at least 10 turns from the CCW mechanical end of travel of the actuator.

Adjustment

To adjust the position limit switch manually, handcrank the actuator to the full CW output shaft position. Pull key (2) which will release the cams (3). Cam 1 and 3 trip their respective switches when rotated in the CW direction. The scale on the cam represents degrees of travel in 10 degree increments with 0 degrees being the CW end of travel. Rotate cam 1 and 3 to the nearest increment below the desired CW travel limit. For instance, if 4 degrees is required, set cam 1 and 3 at 0 degrees. Cam 2 and 4 trip their respective switches when rotated in the CCW direction. The maximum setting for either cam is 90 degrees. Rotate the cams to the nearest 10 degree increment below the desired CCW travel limit. For 90 degree rotation, set cam 2 and 4 at 90 degrees.

Next insert key (2) to lock cams in place after the settings are made. The cams might have to be moved a small amount to line the key up with the keyway. Unscrew key (4) until it becomes loose, and pull it completely out of the switch holders (5). The switch holders have five positions that key (4) may be placed in. Each position represents a 2 degree increment within 10 degree increment range on the cam. If 0 degrees is desired at the CW end of travel, insert key (4) into the square hole 0 on switch holder 1. If 90 degrees is desired at the CCW end of travel, insert key (5) into square hole 2 or 4 on switch holder 2. Insert the key into switch holders 3 and 4 at the desired settings within the range of 1 and 2. As the key is inserted into the last switch holder, position all of the holders so the key may be screwed back in the tapped hole on the center support plate.

Observe the position at which the actuator stops. If it is incorrect, note the amount and adjust the switches controlling that position. Remember, if the shaft required correction in the CW direction, move the switch to a lower degree of travel. If CCW, move the switch to a higher setting.

NOTE: For 90 degree output shaft rotation, set cam 1 at 0 degrees and cam 2 at 90 degrees with key (2). Set holder 1 at 0 degrees. Set holder 2 at either 2 degrees or 4 degrees with key (4). Switches 3 and 4 may be set anywhere within the range of switches 1 and 2.

TROUBLESHOOTING

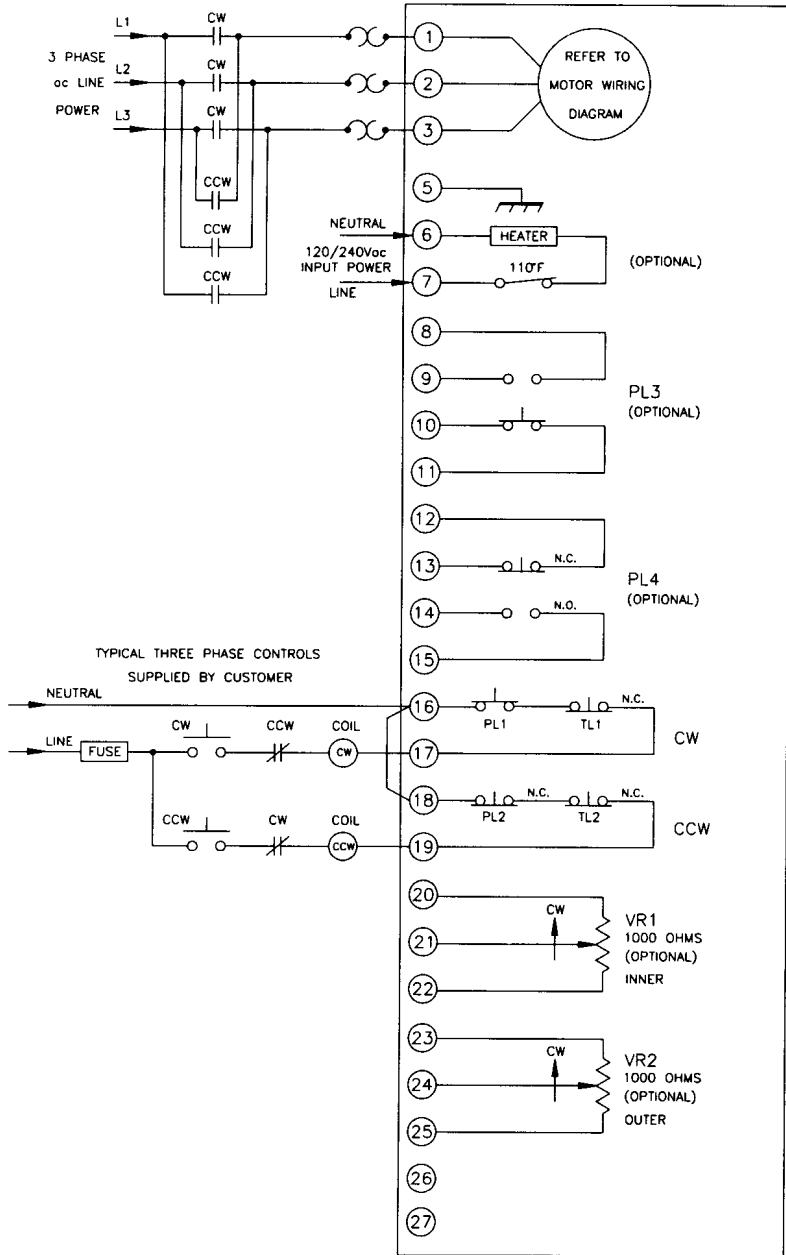
TROUBLE	POSSIBLE CAUSES	REMEDY
1. The motor will not run in either direction.	<ul style="list-style-type: none"> a. No power to the actuator. b. Motor burned out. c. Motor is wired incorrectly. d. Both limit switch circuits are open. e. Defective reversing starter or starter overloads open. (Three phase ac units only.) f. Defective servo amplifier. (DC units only.) g. Defective interconnect wiring between servo amplifier and actuator. 	<ul style="list-style-type: none"> a. Restore power. b. Replace motor. c. Correct wiring per wiring diagram. d. Align limit switches. Check for torque overload problems. e. Replace starter. Allow overloads to reset. f. Replace amplifier. g. Check interconnect wiring.
2. Motor runs in one direction only.	<ul style="list-style-type: none"> a. Open limit switch circuit. b. Actuator is torque overloaded c. Motor and feedback potentiometers are out of phase. 	<ul style="list-style-type: none"> a. Check position limit switch. Check for torque overload condition. b. Determine obstruction and remove it. c. Reverse potentiometer end leads or reverse motor direction leads. (Refer to wiring print for proper wiring).
3. Actuator runs full CW or CCW but position limit switches do not trip.	<ul style="list-style-type: none"> a. Switches not properly set for actuator travel range. b. Bad switch cam, or switch holder lever arm is worn. c. Cam shaft not rotating. d. Wiring. 	<ul style="list-style-type: none"> a. Adjust switches to output range. b. Replace defective parts. c. Tighten set screws in top of cam shaft. Check drive gear on cam shaft. d. Check wiring print.
4. Motor runs but output shaft does not rotate.	<ul style="list-style-type: none"> a. Actuator latched in manual and will not release. b. Clutch slipping. c. Drive nut stripped or pulled out of nut carrier, or drive arm pins are broken. d. Motor pinion is broken. 	<ul style="list-style-type: none"> a. Check clutch release weight assembly. b. Replace/repair clutch. c. Replace drive nut if stripped. Replace complete output shaft assembly if nut pulled out of carrier. Replace drive arm pins if broken. d. Replace motor pinion.
5. Actuator operates electrically, but output shaft does not move when handcranking.	<ul style="list-style-type: none"> a. Not latched in handcrank mode. b. Will not stay latched when plunger is released. c. Will not stay latched when handcranking. d. Handcrank shear pin is sheared. 	<ul style="list-style-type: none"> a. Press plunger to latch. b. Replace latch lever. c. Motor power is being applied from control amplifier. Turn off power. OR clutch gears are stuck to hub. Repair clutch. d. Replace shear pin. Use correct pin only. DO NOT SUBSTITUTE.
6. Poor response to command signal changes.	<ul style="list-style-type: none"> a. Amplifier deadband is too wide. b. Amplifier is defective. c. Bad command signal (noise). 	<ul style="list-style-type: none"> a. Reduce deadband setting. b. Replace amplifier. c. Shield command line to command source common only.
7. Oscillates at setpoint.	<ul style="list-style-type: none"> a. Amplifier deadband is too narrow. b. Noise on command input signal. c. Amplifier is defective. 	<ul style="list-style-type: none"> a. Increase deadband setting. b. Shield command line to command source common only. c. Replace amplifier.

SPARE PARTS LIST

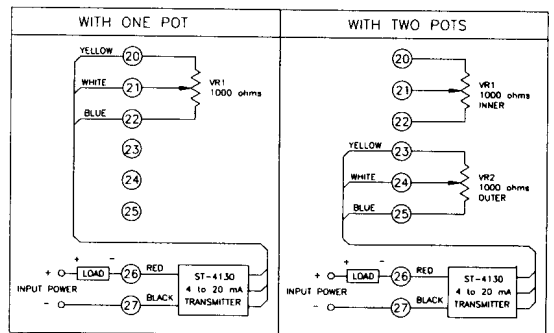
QTY.	DESCRIPTION	PART NUMBER
1	Motor & Pinon Ass'y - SM-5430, 42 seconds	68B-019325-003
1	Motor & Pinon Ass'y - SM-5430, 56 seconds	68B-019325-004
1	Motor & Pinon Ass'y - SM-5430, 73 seconds	68B-019325-005
1	Motor & Pinion Ass'y - SM-5480, 40 seconds	68B-019322-003
1	Motor & Pinion Ass'y - SM-5480, 54 seconds	68B-019322-004
1	Motor & Pinion Ass'y - SM-5480, 70 seconds	68B-019322-005
1	Clutch, 54 or 55 seconds	68C-017755-001
1	Clutch, 70 or 73 seconds	68C-017755-002
1	Clutch, 40 or 42 seconds	68C-017755-003
1	Drive Nut	61A-014077-001
1	Drag Brake	68B-017723-001
1	Electrical Cover Gasket	13C-014426-001
1	Output Shaft Bearing (units built after 3/1/94)	18A-033861-001
1	Output Shaft Bearing & Spacer (units built after 3/1/94)	68A-033862-001
5	Handcrank Shear Pin, 10,000 & 12,000 foot-pounds	61A-014719-001
5	Handcrank Shear Pin, 5,000 & 7,500 foot-pounds	61A-014719-002
2	Position Limit Switch Assembly, ac units	68B-021608-001
2	Position Limit Switch Assembly, dc units	68B-021608-002
2	Position Limit Switch Assembly, DPDT	68B-021608-003
2	Torque Limit Switch, ac units	46A-010016-001
2	Torque Limit Switch, dc units	46A-010016-003
1	1K Potentiometer	34B-033104-001
1	1K Characterized Potentiometer	68C-015435-001
1	1K/1K Potentiometer	34B-003956-160
1	LVDT	68C-019632-001
1	ST-4130, 4 to 20 mA Transmitter	70A-019948-001
1	Screw Shaft Grease	73A-032878-001

TYPICAL WIRING DIAGRAMS

SM-5430



TRANSMITTER OPTIONS:



NOTES:

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

A. 230/460 Vac, 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 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, and 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, and 3.

2. Torque and position limit switches, terminals 16, 17, 18, and 19 must be wired as shown. Terminals 16 and 17 must open the contactor (coil) when energized in the CW direction.

B. The arrow indicates the direction of the pot wiper arm rotation for CW rotation of the actuator shaft (as viewed from the end).

C. All switches are shown at mid position of actuator travel.

D. PL1 and PL2 are set for 90° travel. PL1 trips at the CW limit of actuator shaft rotation. PL2 trips at the CCW limit.

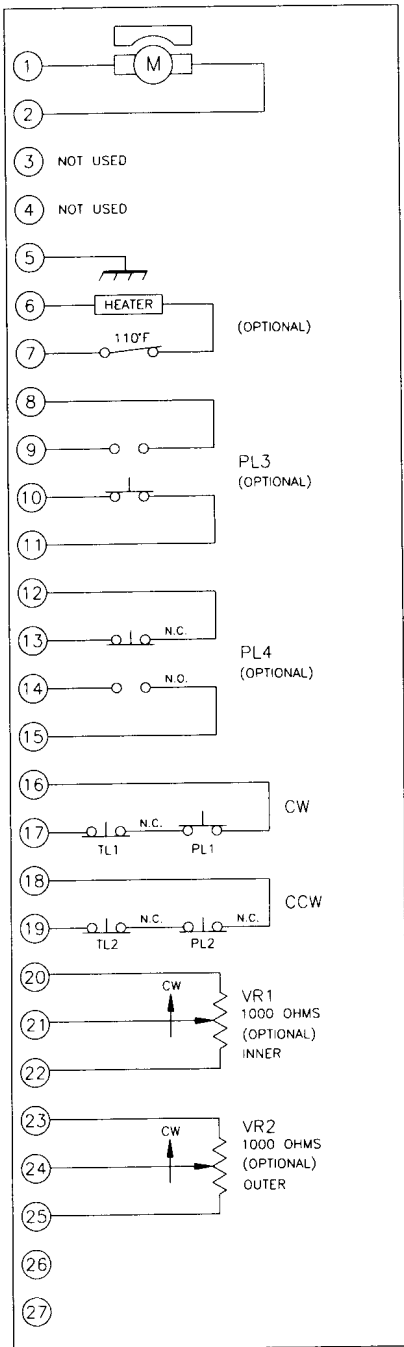
E. TL indicates thrust limit switch. TL1 activates when the actuator shaft is loaded in the CW direction. TL2 activates when the actuator shaft is loaded in the CCW direction.

F. Limit switch ratings are: current-10A, voltage-600Vac (non-inductive load).

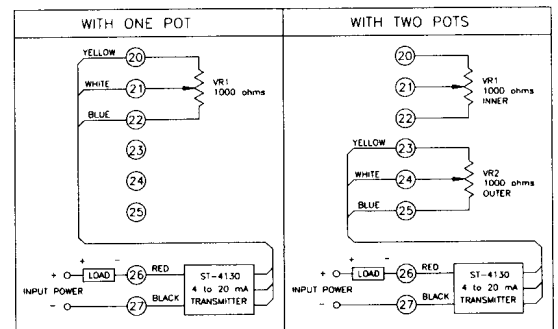
TYPICAL WIRING DIAGRAMS

(Not for use with integral servo-amplifiers)

5M-5480



TRANSMITTER OPTIONS:



NOTES:

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

A. 180 Vdc operation:

1. The motors used are 2 wire permanent magnet type.
2. When the polarities of the terminals are 1 plus and 2 minus the actuator shaft will rotate clockwise (CW).

B. The arrow indicates the direction of the pot wiper arm rotation for CW rotation of the actuator shaft (as viewed from the end).

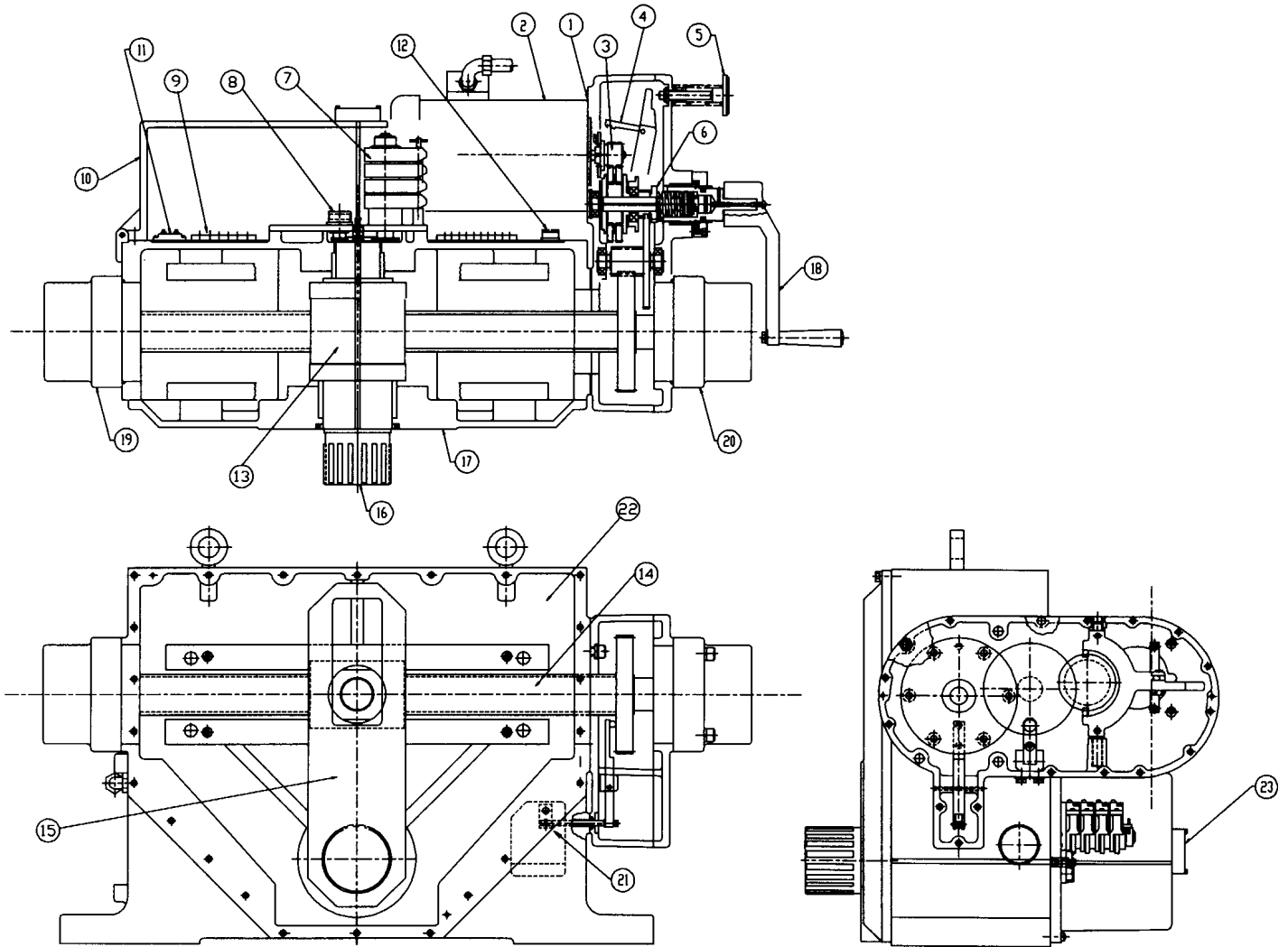
C. All switches are shown at mid position of actuator travel.

D. PL1 and PL2 are set for 90° travel. LS1 trips at the CW limit of actuator shaft rotation. PL2 trips at the CCW limit.

E. 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.

F. Limit switch ratings are: current-10A, voltage-600Vac (non-inductive load).

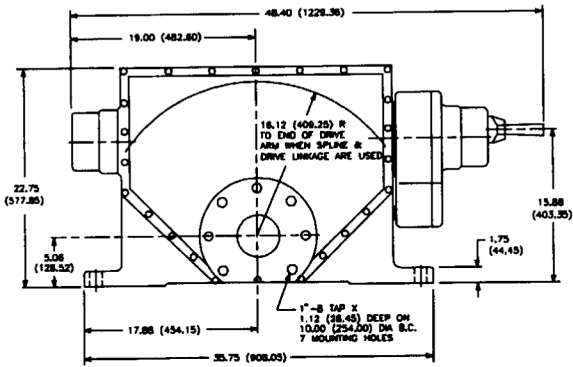
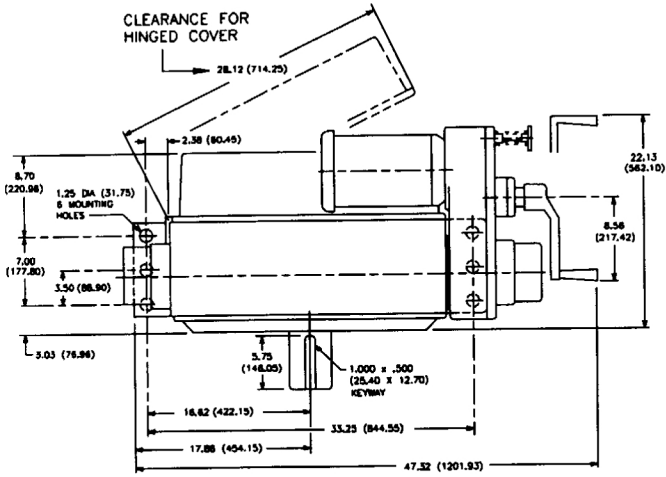
PARTS IDENTIFICATION



1	Motor Gasket	9	Terminal Strip	17	Output Shaft Cover
2	Motor	10	Electrical Cover	18	Handcrank
3	Motor Pinion	11	Terminal Strip	19	Spring Pack
4	Clutch Latch	12	Thermostat	20	Spring Pack (Torque Indicator)
5	Clutch Latching Assembly	13	Drive Nut Assembly	21	Torque Limit Assembly
6	Clutch Assembly	14	Drive Screw Shaft	22	Main Housing
7	Position Limit Switches	15	Slotted Drive Arm	23	Position Indicator
8	Potentiometer Feedback	16	Output Shaft		

INSTALLATION DIMENSIONS

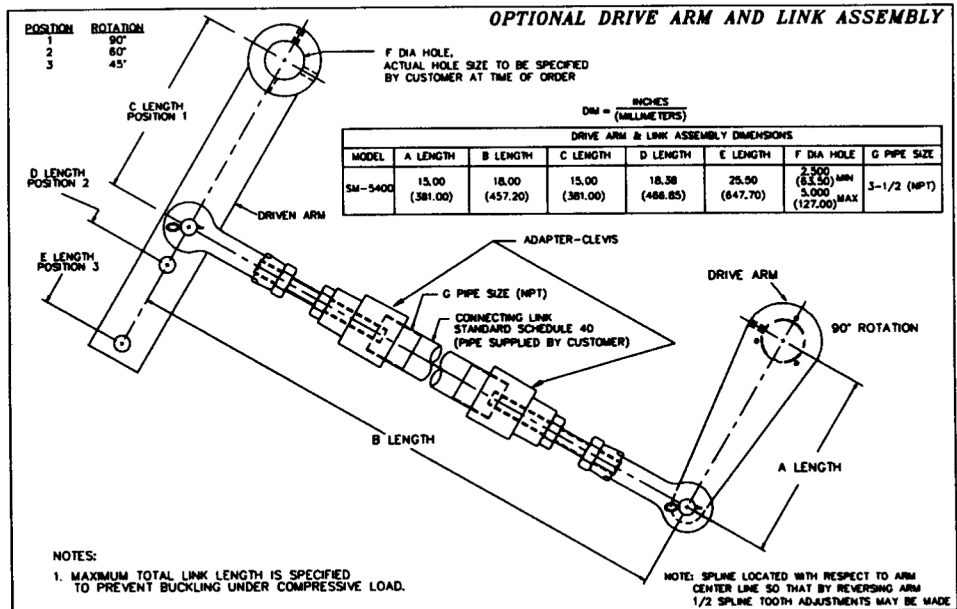
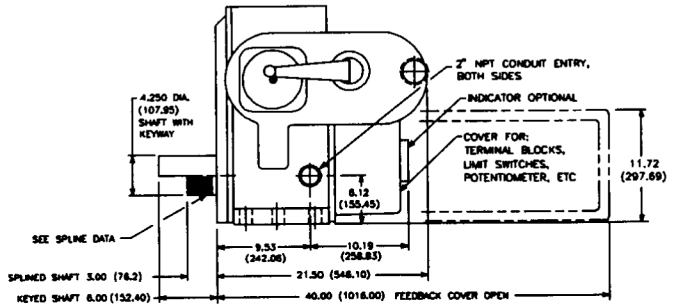
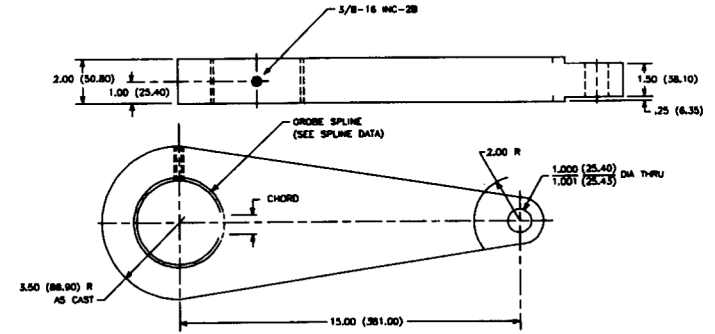
NOTE: DIMENSIONS IN () ARE IN MILLIMETERS



SPLINE DATA:

SPLINE NO.	CHORD	OUTSIDE DIA.	ROOT DIA.	NO. OF TEETH	WEIGHT
4000-40-4	1.084-1.086 (27.53-27.58)	4.115-4.120 (104.52-104.64)	3.875-3.880 (98.43-98.55)	40	525

WEIGHT ON SKID: 565lbs
WEIGHT ON CRATE: 610lbs



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IM-0470 11/95
Supersedes IM-0470 9/81

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