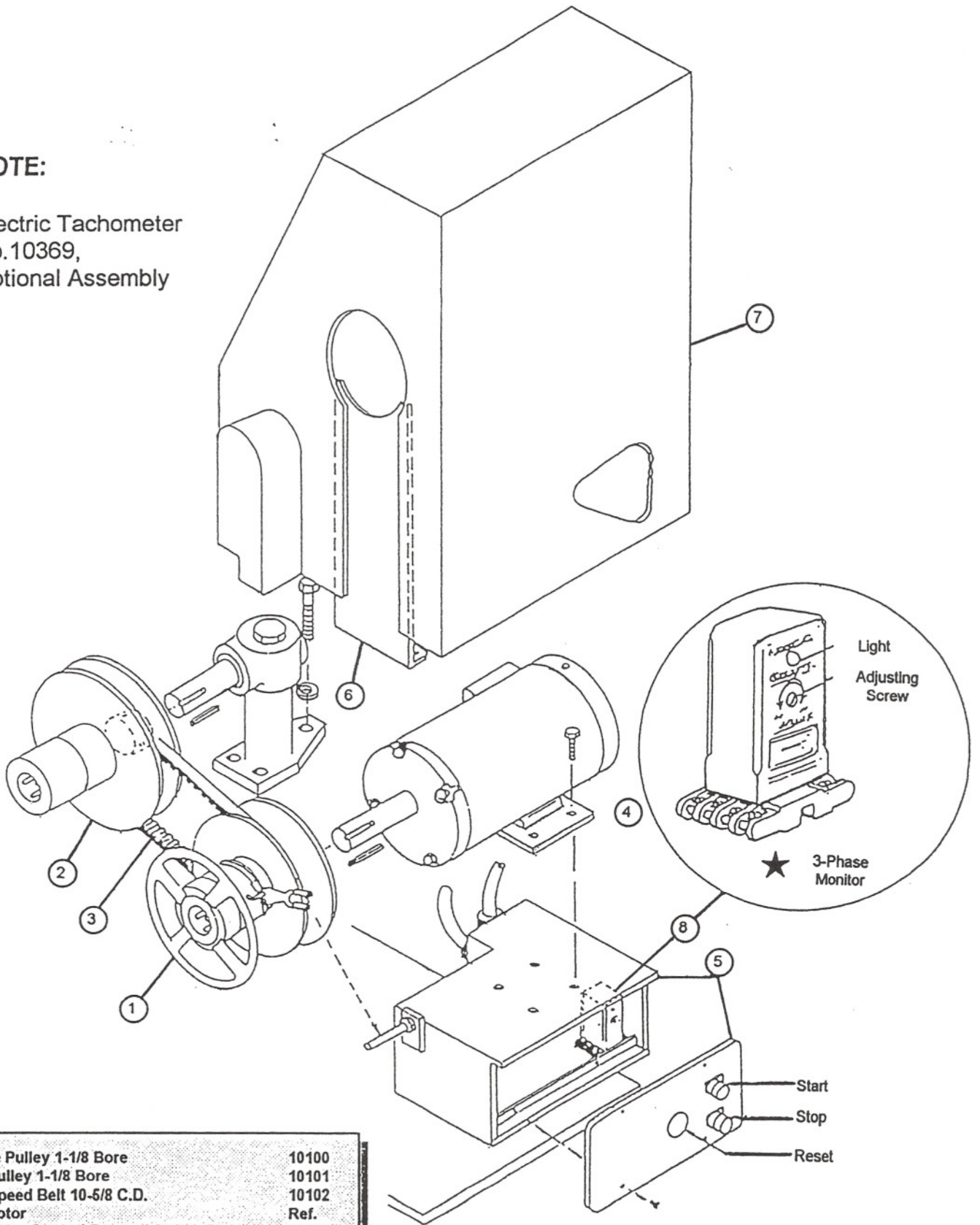


LOHE, ELECTRIC DRIVE ASSEMBLY

NOTE:

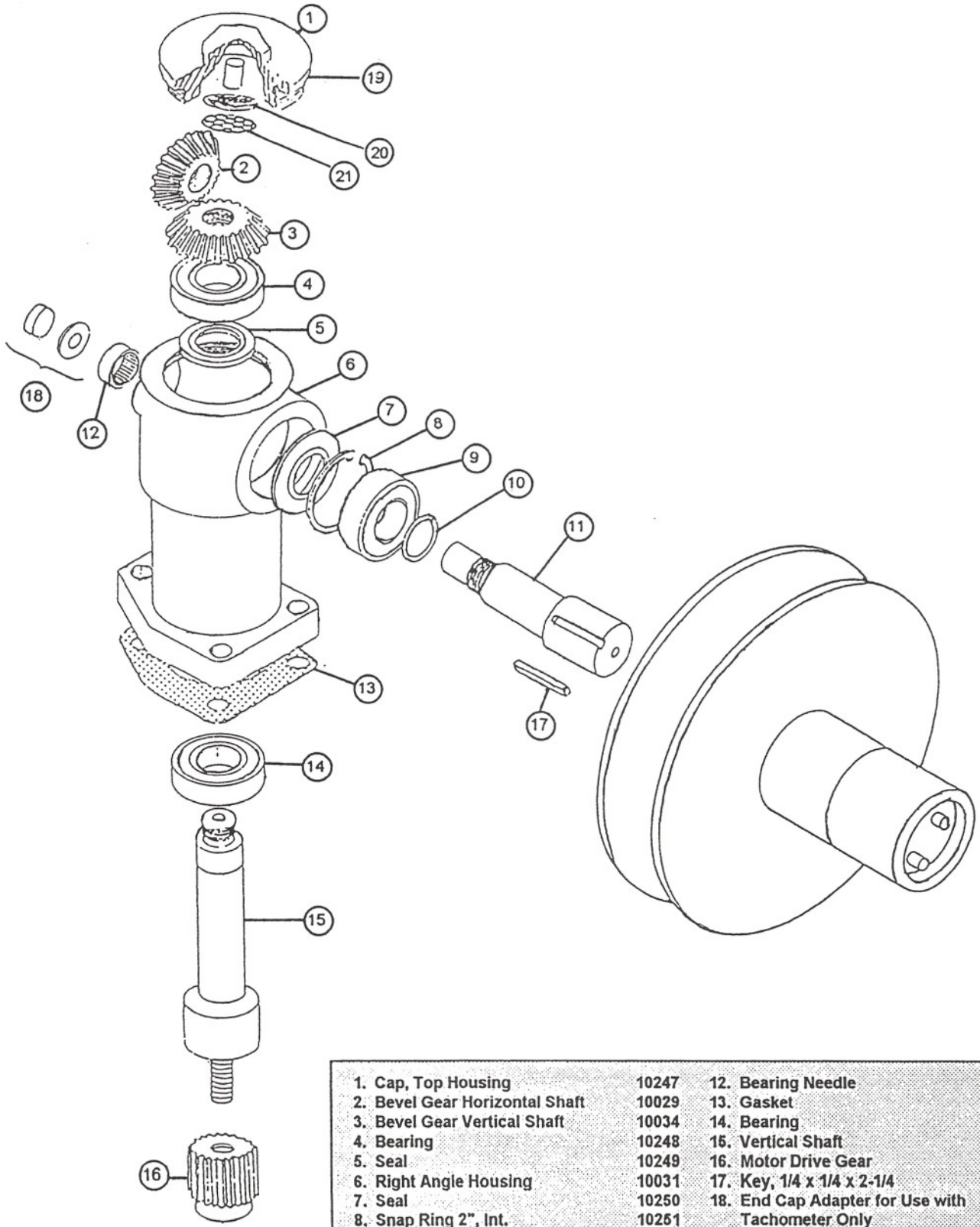
Electric Tachometer
No. 10369,
Optional Assembly



1. Adjustable Pulley 1-1/8 Bore	10100
2. Variable Pulley 1-1/8 Bore	10101
3. Variable Speed Belt 10-5/8 C.D.	10102
4. Electric Motor	Ref.
5. Electric Motor Control Box and Switch Plate	10166
6. Cover Adjustable Hand Wheel	10146
7. Electric Motor Cover	10148
8. 3-Phase Power Monitor	★

★ 10109 208-250 VOLTS
10110 440-480 VOLTS

LOHE (LARGE GUN, ELECTRIC DRIVE)
RIGHT ANGLE DRIVE ASSEMBLY NO.10026

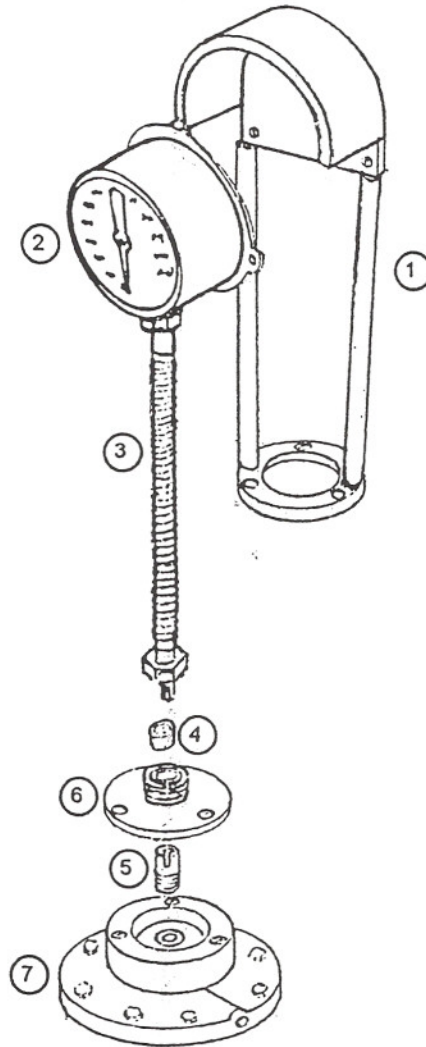


1. Cap, Top Housing	10247	12. Bearing Needle	10252
2. Bevel Gear Horizontal Shaft	10029	13. Gasket	10254
3. Bevel Gear Vertical Shaft	10034	14. Bearing	10248
4. Bearing	10248	15. Vertical Shaft	10032
5. Seal	10249	16. Motor Drive Gear	10063
6. Right Angle Housing	10031	17. Key, 1/4 x 1/4 x 2-1/4	10026
7. Seal	10250	18. End Cap Adapter for Use with Tachometer Only	Ref.Only
8. Snap Ring 2", Int.	10251	19. Felt Seal	10255
9. Bearing	10248	20. Wire Pad Oil Retainer	10024
10. Snap Ring 1", Ext.	10253	21. Wire Brade Seal Retainer	10023
11. Horizontal Shaft	10033		

COMPLETE TACHOMETER ASSEMBLY #10369

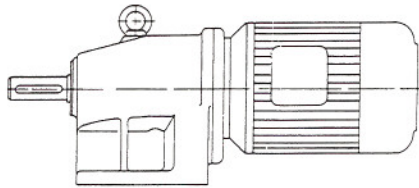
FOR LOVA 8-4 ONLY (OPTIONAL ASSEMBLY)

FOR ELECTRIC POWERED MACHINES
LOHE-4 No. 10369

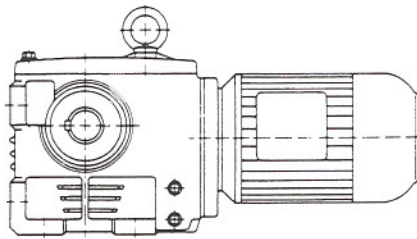


1. Tachometer Mounting Weldment		10377
2. Tachometer 75/1 Ratio		10012
3. Tachometer Flex Drive Shaft		10380
4. Tachometer Right Angle		10241
5. Air Motor End Shaft Adapter Drive	(8AM)	10242
	(16AM)	10243
6. Adapter Plate	(8AM)	10244
	(16AM)	10245
7. Air Motor Reference		

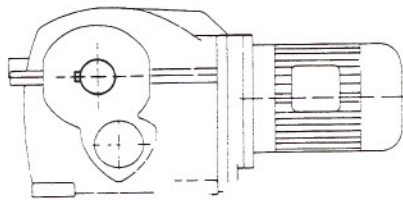
OPERATING & MAINTENANCE INSTRUCTIONS



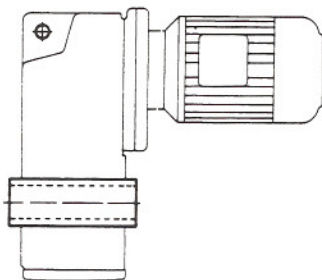
HELICAL



HELICAL-WORM



BEVEL-HELICAL



SHAFT MOUNT

Use high quality ball bearing grease. Use consistency of grease suitable for class of insulation stamped on nameplate as follows:

INSULATION CLASS	CONSISTENCY	TYPE	TYPICAL	FRAME TYPE
A & B	#2	Lithium Base	Shell Alvania Grease R 3	215 T & smaller
A & B	Medium	Polyurea	Shell Dolium Grease R	254T & larger
F & H	Medium	Polyurea	Shell Dolium Grease R	All

Procedure:

If motor is equipped with Alemite fitting, clean tip of fitting and apply grease gun. Use 1 to 2 full strokes on motors in NEMA 215 frame and smaller. Use 2 to 3 strokes on NEMA 254 through NEMA 365 frame. Use 3 to 4 strokes on NEMA 404 frames and larger. On motors having drain plugs, remove grease drain plug and operate motor for 20 minutes before replacing drain plug.

On motors equipped with slotted head grease screw, remove screw and apply grease tube to hole. Insert 3 to 3 inch length of grease string into each hole on motors in NEMA 215 frame and smaller. Insert 3 to 5 inch length on larger motors. Motors having grease drain plugs, remove plug and operate motor 20 minutes before replacing drain plug.

Caution: Keep grease clean. Lubricate motors at standstill. Remove and replace drain plugs at standstill. Do not mix petroleum grease and silicone grease in motor bearings.

B. GEARS

Gear units should have the oil changed every 10,000 hours or 2 years. If synthetic lubricant is used it should be changed every 20,000 hours or 4 years. For adverse operating conditions the interval should be shorter. DO NOT MIX SYNTHETIC & MINERAL BASE OILS. Units should be checked periodically for increased noise, surface temperature, vibration, shaft movement & amperage draw. Units with inspection covers should not be operated with the inspection cover removed.

The table below offers suggestions on the viscosity & manufacturers of recommended lubricants.

VISCOSITY RANGE FOR AGMA LUBRICANTS

RUST AND OXIDATION INHIBITED GEAR OILS	VISCOSITY RANGE ‡	EQUIVALENT ISO GRADE ◀	EXTREME PRESSURE GEAR LUBRICANTS ‡‡	VISCOSITIES OF FORMER AGMA SYSTEM ◀◀
AGMA Lubricant No.	mm ² /s (cSt) at 40 °C		AGMA Lubricant No.	SSU at 100 °F
1	41.4 to 50.6	46		193 to 235
2	61.2 to 74.8	68	2 EP	284 to 347
3	90 to 110	100	3 EP	417 to 510
4	135 to 165	150	4 EP	626 to 765
5	198 to 242	220	5 EP	918 to 1122
6	288 to 352	320	6 EP	1335 to 1632
7 Comp	414 to 506	460	7 EP	1919 to 2346
8 Comp	612 to 748	680	8 EP	2837 to 3467
8A Comp	900 to 1100	1000	8A EP	4171 to 5098

NOTE: Viscosity ranges for AGMA lubricant numbers will henceforth be identical to those of ASTM 2422.

‡ "Viscosity System for Industrial Fluid Lubricants", ASTM 2422. Also British Standards Institute, B.S. 4231.

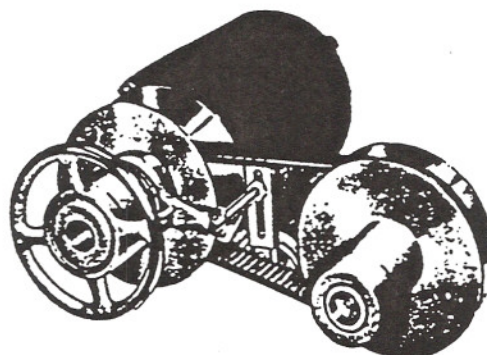
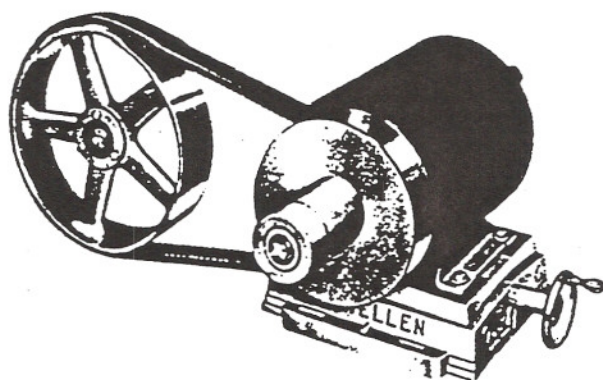
◀ "Industrial Liquid Lubricants—ISO Viscosity Classification." International Standard, ISO 3448.

‡‡ AGMA 250.03, May, 1972 and AGMA 251.02, November, 1974.

◀◀ Oils marked Comp are compounded with 3% to 10% fatty or synthetic fatty oils.

VARIABLE PULLEY COMBINATION PULLEYS

SERVICE MANUAL NO.20



LEWELLEN MANUFACTURING COMPANY - COLUMBUS, INDIANA

Installing Variable Pulley And Adjustable Base with Handwheel

Place your motor on slide of Lewellen Adjustable Base, fig.13, and center motor on slide.

Drill slide and bolt motor in place.

Read general instructions on page 7, then mount Variable Pulley on motor shaft.

To locate Adjustable Base, shift slide to its mid-position by turning handwheel.

Install Variable Belt around Variable Pulley and driven Pulley. Locate Variable Belt between Variable Pulley discs at mid-pitch diameter.

Align Adjustable Base so that motor and machine shafts are parallel, and Variable Belt will track in a straight line on pulleys. (See instructions on page 8). Bolt down Adjustable Base.

Lubricate guide rods, screw, screw bearing "A" and Variable Pulley.

To set speed limiting stops, start motor and shift slide away from handwheel until Variable Belt is flush with top of Variable Pulley.

Set stop by turning slotted stop screw "B" counterclockwise to limit slide travel at fastest speed position.

Shift slide to slowest speed position and set other stop by turning slotted stop screw "G" clockwise.

Installing Variable Pulley And Adjustable Base with Chain Shifter

Adjustable Base with chain shifter is installed in the same manner as Adjustable Base with handwheel.

If necessary, cut chain and recouple to required length.

The shifting bracket is adjustable for chain slack takeup.

Installing Variable Pulley And Adjustable Base with Countershaft

Adjustable Base with countershaft is installed in the same manner as Adjustable Base with handwheel.

The Base Guide Rod extensions position the countershaft pedestal. Loosen pedestal set screws to move countershaft.

The countershaft is mounted on ball bearings. These bearings must be lubricated periodically. Use only greases recommended on page 6.

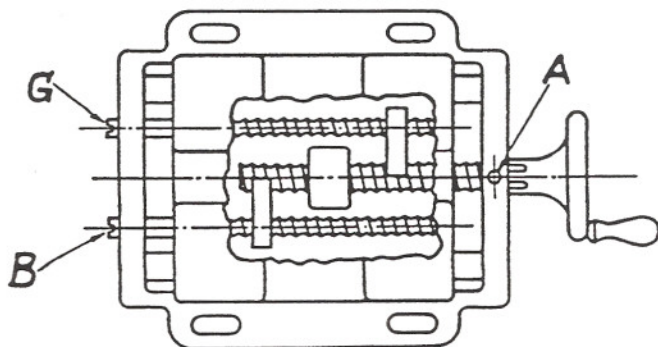


Fig. 13

Installing Variable Pulley and Adjustable Base with Remote Control

To mount motor and locate Adjustable Base, follow procedure under Adjustable Base with Handwheel. Check Pilot Motor gearhead oil level. Follow attached Motor Instruction Tag for operating and servicing. Follow attached Wiring Diagram for connecting pilot motor and push button station.

CAUTION - The power circuit connection must be made between driving motor and starter so that pilot motor is inoperative when drive is not running.

Set collars "E" and "F", fig. 14, for fastest and slowest speed positions of slide, following wiring diagram instructions.

CAUTION - Make certain that limit switches "D" and "C" function. The wiring diagram describes the re-connections to be made if limit switches are inoperative.

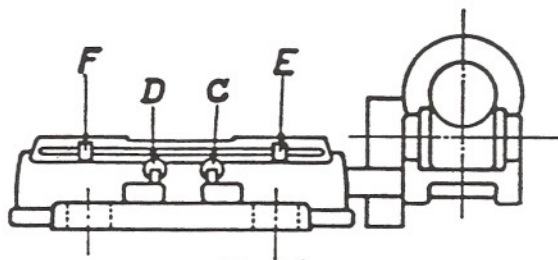


Fig. 14

Installing Combination Pulleys

See Fig. 15 and Fig. 25.

Adjust motor and machine shafts to correct centers and make certain shafts are parallel.

Place Adjustable Pulley on motor shaft as close to shaft bearing as possible. Lock Adjustable Pulley in place by tightening set screws.

While holding outer bearing housing arm of Adjustable Pulley turn handwheel and separate discs.

Place Variable Pulley on machine shaft.

Place Variable Belt at minimum pitch diameter of Adjustable Pulley.

Carefully separate discs of Variable Pulley and place Belt between discs. Take up slack by turning Adjustable Pulley Handwheel, making sure belt does not slip out of Variable Pulley discs.

Using parallel bar on back sides of discs, align Variable Pulley with Adjustable Pulley, so that Variable Belt will track in a straight line. Lock Variable Pulley in place by tightening set screws.

Locate guide bracket in most convenient position on motor side of Adjustable Pulley.

Assemble guide rod through fork of outer bearing housing arm. Make certain rod projects through fork far enough for complete travel of fork.

Outer bearing housing arm should slide freely on stop rod. Drill guide bracket mounting holes and bolt bracket in place.

Lubricate both pulleys.

Start motor. Turn Adjustable Pulley handwheel to desired slowest speed.

Adjust short stop in outer bearing housing arm so that lug from thread stop cover hits stop at this speed. Lock set screw on short stop.

Turn handwheel in opposite direction to desired fastest speed and adjust long stop so that lug from thread cover hits stop at this speed. Lock set screw on long stop.

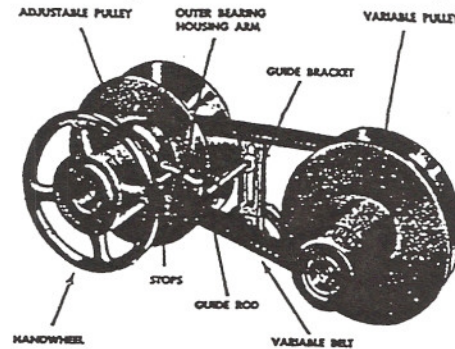


Fig. 15

Installing Combination Countershaft

Adjust countershaft motor rails to your motor mounting dimensions. Place motor on motor rails.

Adjust motor rails vertically to correct shaft centers. Make certain shafts are parallel. Align motor shaft bearing even with countershaft bearing. Bolt motor in place.

Using the same procedures outlined under Combination Pulleys: Install Adjustable Pulley, Variable Pulley and Variable Belt. Then assemble guide bracket.

Locate Combination Countershaft in relation to driven machine. Drill mounting holes and bolt Combination Countershaft in place.

Make certain countershaft is parallel with driven shaft.

Start motor and set stops as described under Combination Pulleys.

The Combination Countershaft is now ready to run and may be connected to the machine.

Include Combination Countershaft bearings in the routine lubrication of the Pulleys. Use greases listed below.

LUBRICATION

Both Variable and Adjustable Pulleys must be lubricated regularly.

Add fresh grease to both fittings at hub end of each pulley at the following intervals:

Intermittent Service - Every other week
24 Hour Service - Every week

All parts of both pulleys are lubricated through the grease fittings. Use generous amounts - forcing out old lubricant and filling internal grease channels with fresh lubricant. Grease channels are vented - pulleys cannot be over-lubricated.

IMPORTANT: after lubricating, shift drive through its entire speed range. This distributes lubricant and prevents sticking.

We recommend these greases: Gulfcrown E.P. No.2 made by Gulf Oil Corporation; or Mobilplex E.P. No.2 made by Mobil Oil Corporation.

LIMITED WARRANTY

Our products are warranted to be free from defects in material and workmanship. Our warranty is specifically limited to repair or replacement at our factory free of charge, within one year from date of delivery or our unit which has failed to perform properly, provided the unit is returned to our factory freight prepaid and has not been subject to improper handling, overloading, servicing, or faulty installations. Our responsibility shall be terminated whenever a unit is modified or repaired by any one other than seller. Under no circumstances shall we be responsible for consequential damages.

IMPORTANT

Lewellen Pulleys are precision built units, and when treated as such, they will give lasting satisfaction. **DO NOT DRIVE OR FORCE PULLEYS ON SHAFT.** They are bored accurately as specified. Be sure that motor and driven shafts are parallel. Align Pulleys per instructions on page 8. Optimum efficiency results when belt ambient temperature is less than 135°F. Higher temperatures shorten belt life.

Variable Pulley

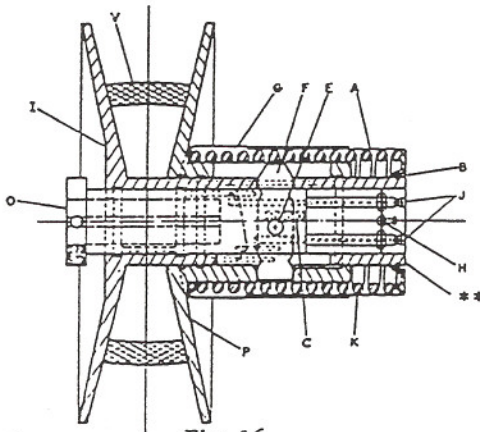


Fig. 16

- A—Inner Spring Cover
- B—Snap Wire
- E—Pivot Pin
- F—Shifting Link
- G—Outer Spring Cover
- H—Dust Seal
- I—Inner Disc
- J—Lubrication Fittings
- K—Spring
- O—Sleeve (Specify Bore)
- P—Outer Disc
- V—Variable Belt (Specify Length)

** Identifying size and 5 digit series number stamped here. Also on decals on O.D. of pulley hub.

Disassembly of Variable Pulley

Refer to fig.16 above and fig.23, page 8. Place pulley on table of arbor press or drill press as shown and described, fig. 23. Press inner spring cover "A", fig.16, down until snap wire "B" is exposed. Remove snap wire and unload spring slowly. **CAUTION:** The spring is compressed to one-third its free length. Unload spring carefully, holding it in line to prevent buckling and possible injury.

To remove discs, pull out dust seal "H", loosen set screw "C", and remove pivot pin "E". Then remove shifting link "F". Discs and sleeve now come apart. Re-assemble in reverse order.

Adjustable Pulley

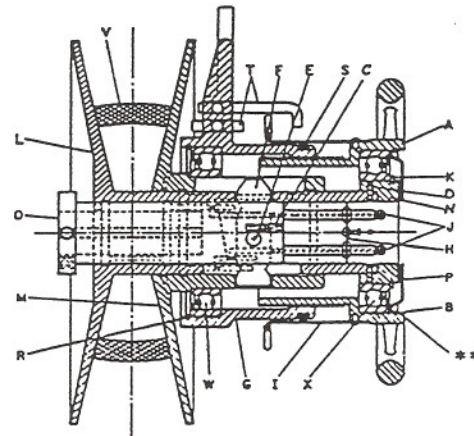


Fig. 18

- A—Inner Bearing Housing with Handwheel
- B—Inner Disc Bearing Wire
- E—Pivot Pin
- F—Shifting Link
- G—Outer Bearing Housing
- H—Dust Seal
- I—Thread Cover
- J—Lubrication Fittings
- K—Truarc Ring
- L—Inner Disc with Bearing Hub
- M—Outer Disc
- O—Sleeve (Specify Bore)
- P—Bearing Closure
- R—Outer Disc Bearing Wire
- S—O-Ring
- T—Adjustable Stops
- V—Variable Belt (Specify Length)
- X—Inner Disc Ball Bearing
- W—Outer Disc Ball Bearing

Disassembly of Adjustable Pulley

Refer to fig.18 above and fig.24, page 8. Adjust discs "L" and "M" to mid-position for all sizes except 412. 412 discs are adjusted together to closest position. Remove snap wire "B" and bearing closure "P", then remove truarc ring "K". Inner and outer bearing assemblies will then slide free from the discs.

To remove discs separately, first drive out roll pins "D" and remove bearing hub "N". Next, pull out dust seal "H", loosen set screw "C" and remove pivot pin "E". Then remove shifting link "F". Discs and sleeve now come apart. Re-assemble in reverse order.

To remove sleeve "O" without separating discs "L" and "M", it is not necessary to remove bearing hub "N".

ASSEMBLING THE VARIABLE BELT



Fig. 19

By backing off the stops (see page 5) and shifting the Base further, the Variable Pulley Belt assembles easily, fig.19.

The Belt enters or releases without prying the Pulley discs apart.

The Combination Pulleys Belt is quickly installed or removed for all catalog listed shaft centers.

To remove the Belt, stop the drive with the Belt in the position shown, fig.20.

Turn the Adjustable Pulley handwheel, opening the discs wide, fig.21.

Roll the Belt out of the Variable Pulley.

Roll the Belt out of the Adjustable Pulley, fig.22. Reverse the procedure to install the Belt.

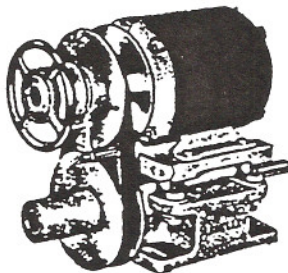


Fig. 20

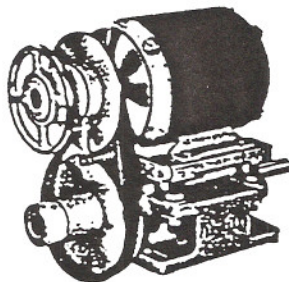


Fig. 21

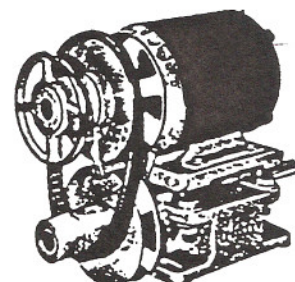


Fig. 22

ASSEMBLING THE PULLEYS

Fig.23 shows how to disassemble the Variable Pulley as described page 7. Note that the Pulley disc rests on the supporting bars.

Fig.24 shows the assembly of the Adjustable Pulley. Locate the discs in the fig.18 position, and remove the snap wire, closure and truarc ring. The thrust bearing housings may be re-

moved, assembled or separated, as shown.

This construction provides for installation with handwheel outside an enclosure.

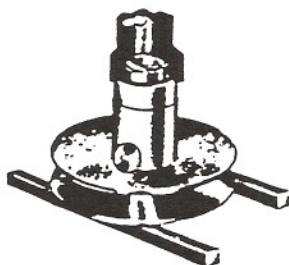


Fig. 23

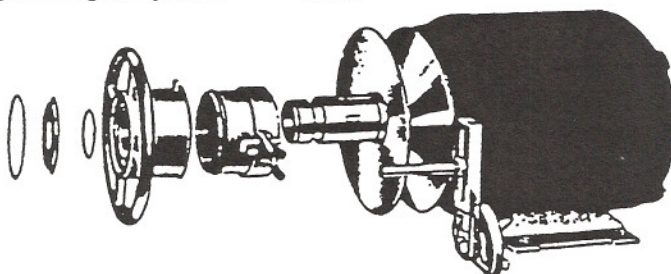


Fig. 24

ALIGNING THE COMBINATION PULLEYS

(ALSO APPLIES TO SINGLE PULLEY DRIVES)

The Combination Pulleys drive must be aligned on parallel shafts to give satisfactory service. The method described here will show both misalignment of the Pulleys and out-of-parallel shafts.

After mounting the Combination Pulleys and Belt, follow the method shown in fig.25 for an accurate check of alignment, using a straight edge and scale.

Dimensions A and C are measured at position 1 of the straight edge. E is measured at position 2, B at position 3.

Move or shim motor until dimensions A, C, E and B are all equal. The shafts are now parallel.

Next compare dimension E and D, holding the straight edge at positions 2 and 4.

Slip one of the Pulleys along shaft until dimension E and D are equal. The pulleys are now aligned.

Make sure that the center distance of the shafts is still correct.

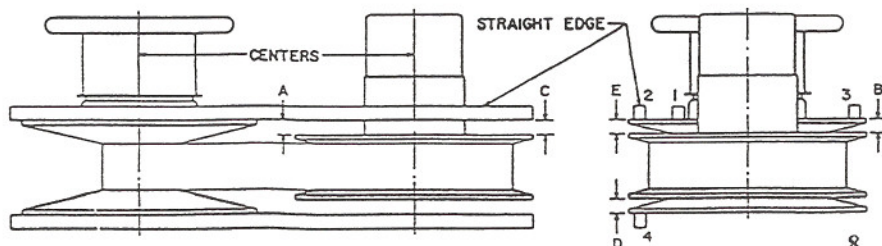


Fig. 25

OMRON MOTOR PROTECTIVE RELAY

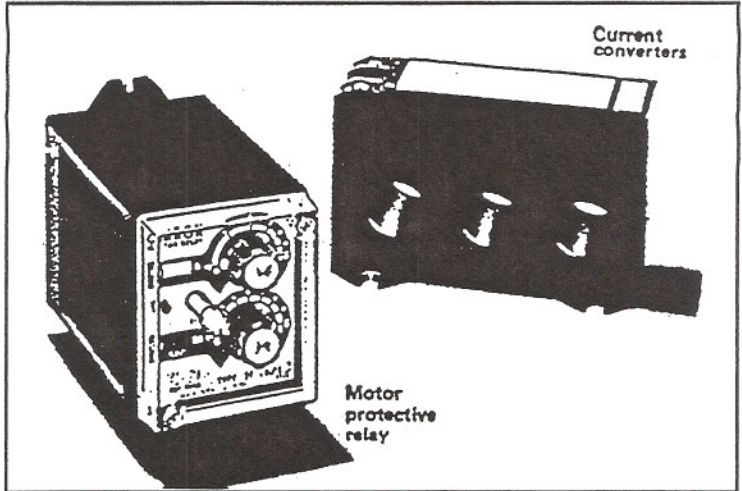
Cat. No. N31 -E3-1

Model SE

Solid-state, Plug-in Relay with Three Highly Reliable Functions (Overcurrent, Open-phase & Reverse-phase)

FEATURES

- Prevents burnouts in 3-phase induction motors
- Wide setting ranges - rated current (1 to 160A) and operating time (2 to 40 sec.)
- Protects delta-connected motors against open phase in the 3-phase circuit
- Prevents the motor from reversing without starting it
- Stable operation against noise, induction and current waveform distortion



AVAILABLE TYPES (When placing your order, refer to the "AVAILABILITY/PRICING LIST" of the Others).

MOTOR PROTECTIVE RELAYS

CURRENT CONVERTERS

Control voltage	Operating function Time specification	Overcurrent, open-phase & reverse-phase		Overcurrent, open-phase	
		Inverse type	Instantaneous type	Inverse type	Instantaneous type
110/120 VAC		SE-KP12	SE-KQP12	SE-AP12	SE-AQP12
220/240 VAC		SE-KP24	SE-KQP24	SE-AP24	SE-AQP24

Type	Applicable current range
SET-3A	1 to 80A
SET-3A	64 to 160A

SE-K4 380V to 440V
all rated voltages are -15% of lower V
and +10% of higher V

NOTE: Consult OMRON for additional rated voltages.

OMRON

SPECIFICATIONS

RATINGS

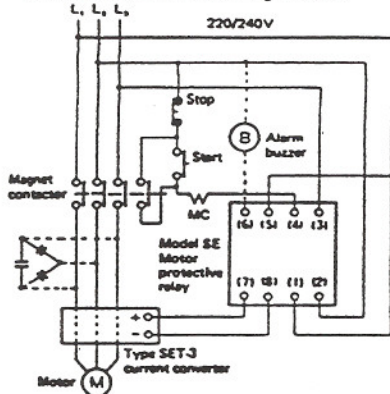
Rated voltage of motor circuit	220 or 240 VAC, 50/60Hz, 3-phase
Operating voltage	100/110, 110/120, 200/220 or 220/240 VAC
Operating voltage range	-15 to +10% of operating voltage (-50% for open-phase element)
Rated current and capacity	1 to 80A or 64 to 160A AC
Overcurrent function operating value	115% of the setting value
Current setting range	Refer to Table 1 - Current Setting Range
Overcurrent function operating time characteristics	Inverse type - Inverse time both at starting and during operation Instantaneous type - Fixed time at starting and instantaneous during operation (0.5 sec. max. at 140% overload)
Setting range of overcurrent operating time	2 to 40 sec. (value at 500% overload) 2 to 10 or 8 to 40 sec. variable by a changeover switch (with instantaneous type, denotes a lock time. The relay starts at 30% min. of the set current value)
Open-phase operating value	75% max. of overcurrent operating value (at open phase) Current unbalance factor 35± 10% (at overcurrent operating value)
Open-phase operating time	2 sec. max. of the overcurrent operating value (at open phase)
Reverse-phase operating value	80% max. of the rated voltage
Reverse-phase operating time	0.5 sec. max. at the rated voltage
Power consumption	5 VA max. (Approx. 70VA for several cycles upon operation)
Control output	SPDT: 7.5A 200 VAC, power factor -1 3A 200 VAC, power factor -0.4

CHARACTERISTICS

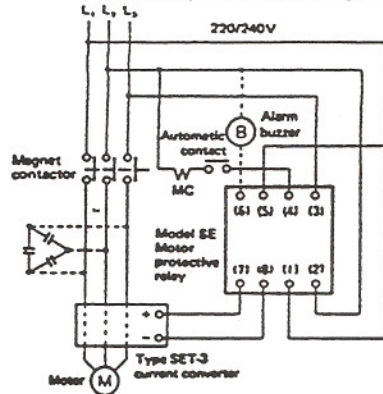
Insulation resistance	10MΩ min. between the entire electric circuitry and external case; 5MΩ min. between electric circuits (one contact terminal and other terminal) measured at 500 VDC with a megohmmeter
Dielectric strength	2,000 VAC, 50/60 Hz for 1 minute between the entire electric circuitry and external case 1,500 VAC, 50/60 Hz for 1 minute between electric circuits (one contact terminal and other terminal).
Permissible impulse voltage	1 x 40μsec, 4500V
Surge input	1 x 40μsec, 3000V
Overcurrent strength	No abnormality develops when 40 times the relay's rated current is applied to through-conductors of current transformer for 1 second
Vibration	Malfunction durability: 16.7 Hz, 1mm double amplitude (in X, Y, Z directions, respectively, for 10 minutes)
Shock	Mechanical durability: Approx. 300 m/s ² (approx. 30G's)
Setting accuracy	± 10% max. of overcurrent operating value
Variation due to temperature fluctuation	±5% max. of overcurrent operating value (at 20°C ± 20°)
Variation due to voltage fluctuation	±3% max. of overcurrent operating value (at -15 to +10% of rated voltage)
Variation due to frequency fluctuation	±3% max. of overcurrent operating value (at 45 to 65 Hz)
Ambient temperature	Operating: -10 to +60° C
Weight	Approx. 390 ~ 620g

EXTERNAL CONNECTIONS (TYPICAL WIRING DIAGRAM EXAMPLES)

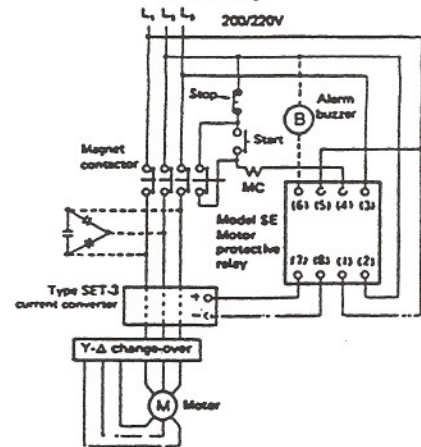
Manual operation low voltage circuit



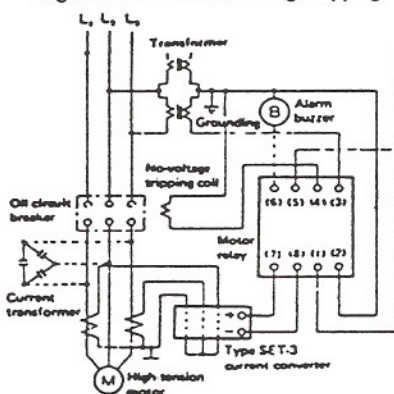
Automatic operation low voltage circuit



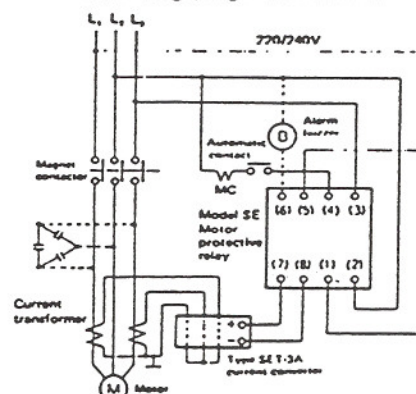
Y-Δ starting



High tension motor no-voltage tripping



Low voltage, large current circuit



HINTS ON CORRECT USE

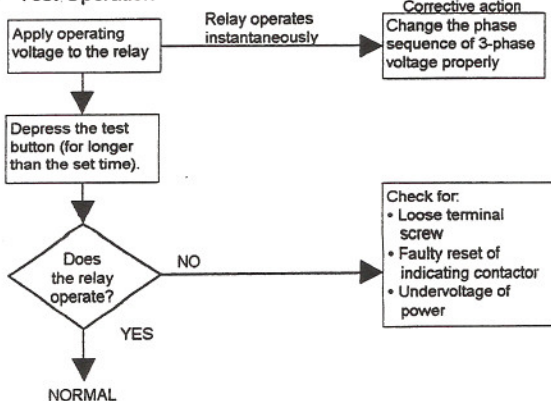
Check Items After Connection and Before Starting Motor

Check the current converter for the proper number of conductor runs through holes and the proper direction of insertion.

Check the current converter and major protecting relay for connection with proper polarity.

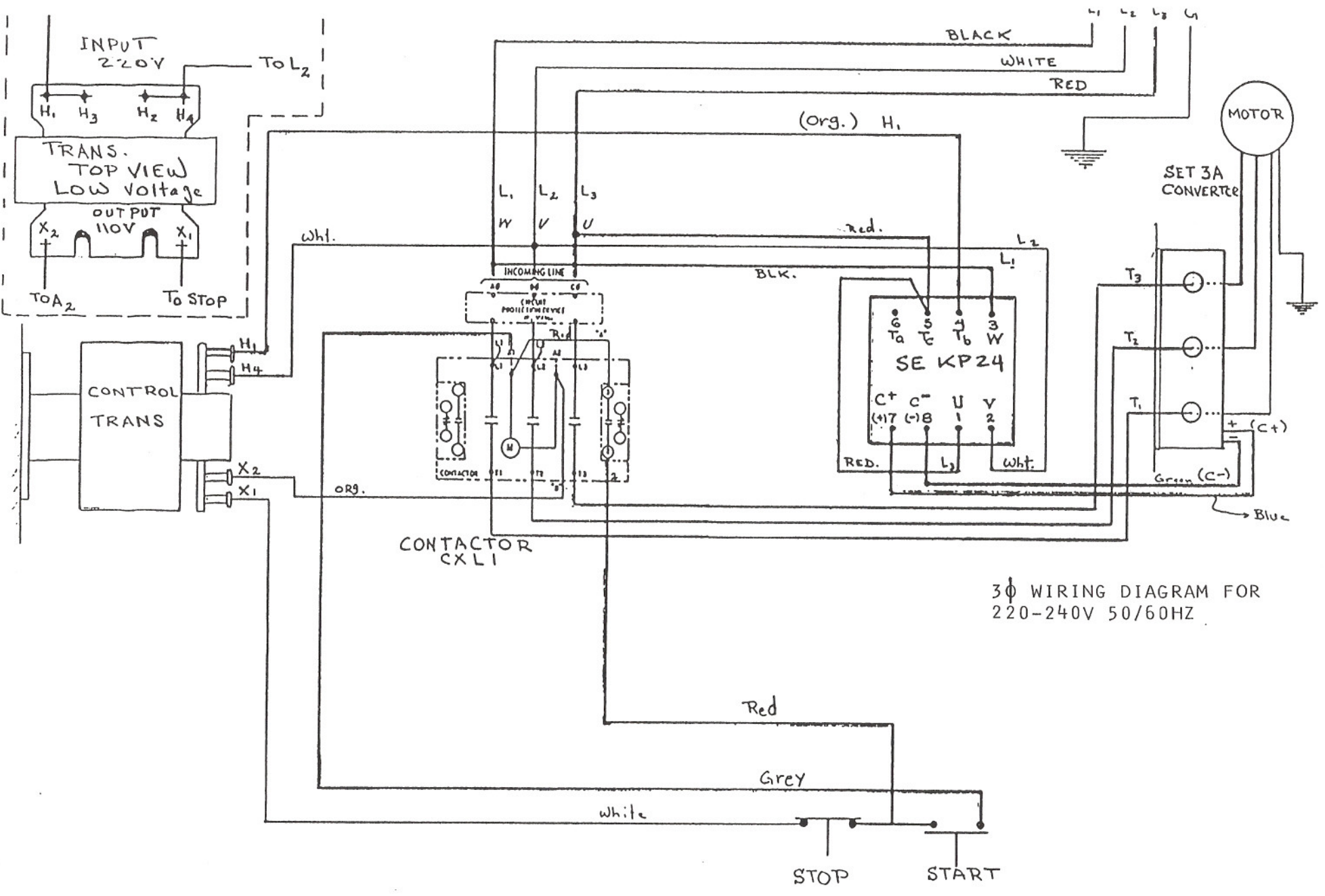
Check phase-sequence of 3-phase voltage (for 3E relay).

Test Operation

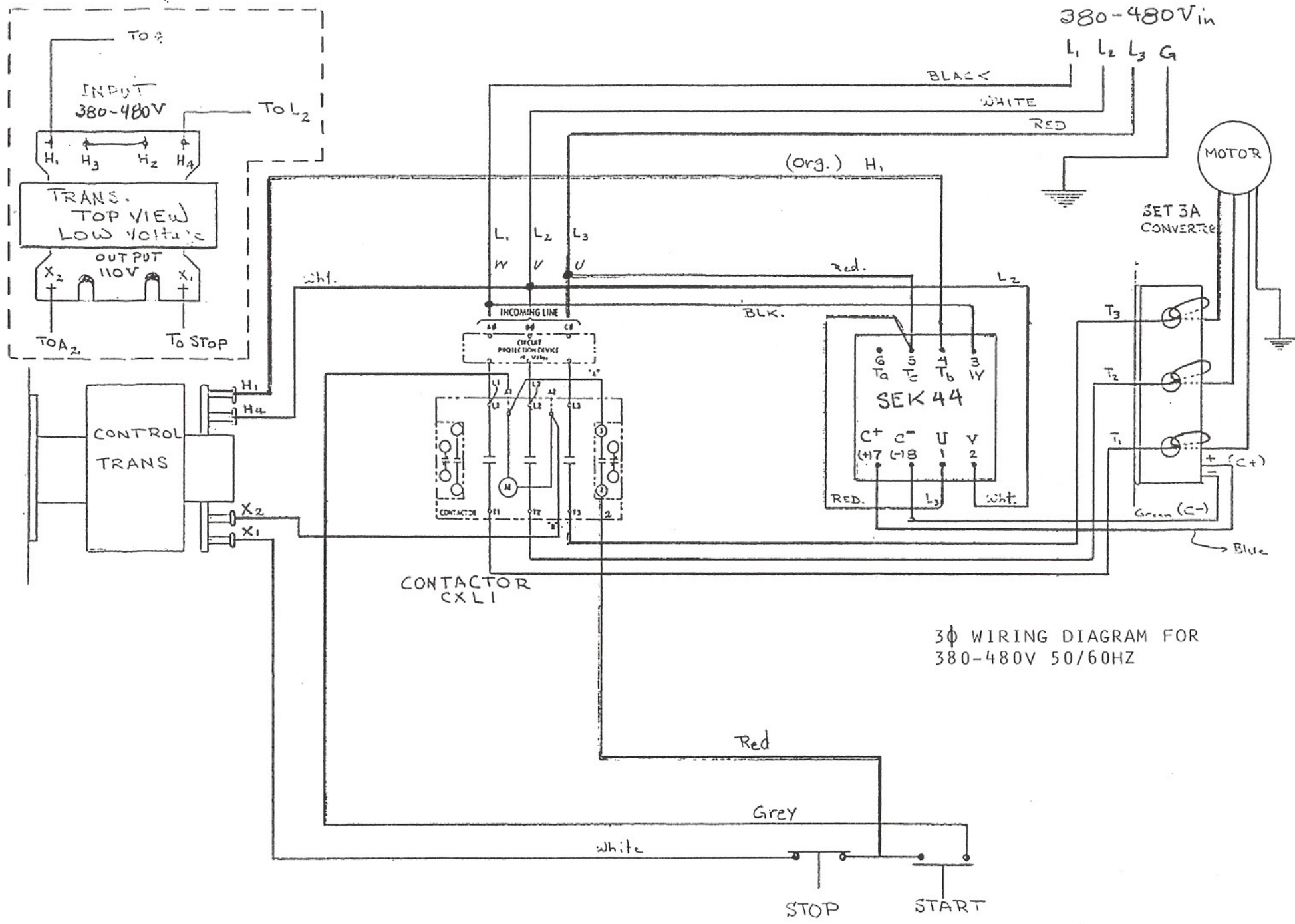


Maintenance and Inspection

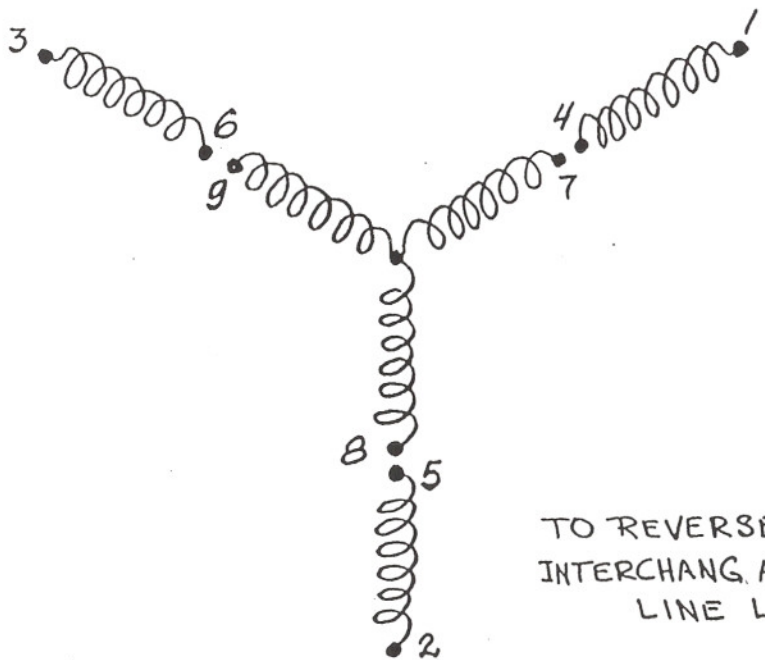
Trouble	Check Points
Relay operates before the motor starts.	<ul style="list-style-type: none"> Is there any open-phase trouble in the motor or its circuit (fuses, electromagnetic contactors, wiring, etc.)? Does the current converter have the correct number of conductor runs through holes? Is the inserting direction of each conductor proper? Is the supply voltage or motor current unbalanced (unbalance factor of more than 35%)?
Relay operates after the motor starting time has elapsed.	<ul style="list-style-type: none"> Does the set current match the motor current? Does the set operating time match the motor starting time? Does the current converter have the correct number of conductor runs through holes?
Motor circuit is not tripped when the relay operates following the depression of the test button.	<ul style="list-style-type: none"> Disconnect terminals 6, 4 and 5 and check the relay contacts for electrical continuity.



3 ϕ WIRING DIAGRAM FOR
220-240V 50/60HZ



3φ WIRING DIAGRAM FOR
380-480V 50/60HZ

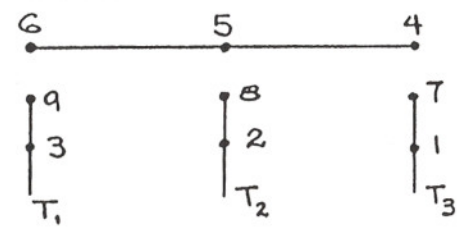


TO REVERSE ROTATION
INTERCHANG. ANY TWO
LINE LEAD

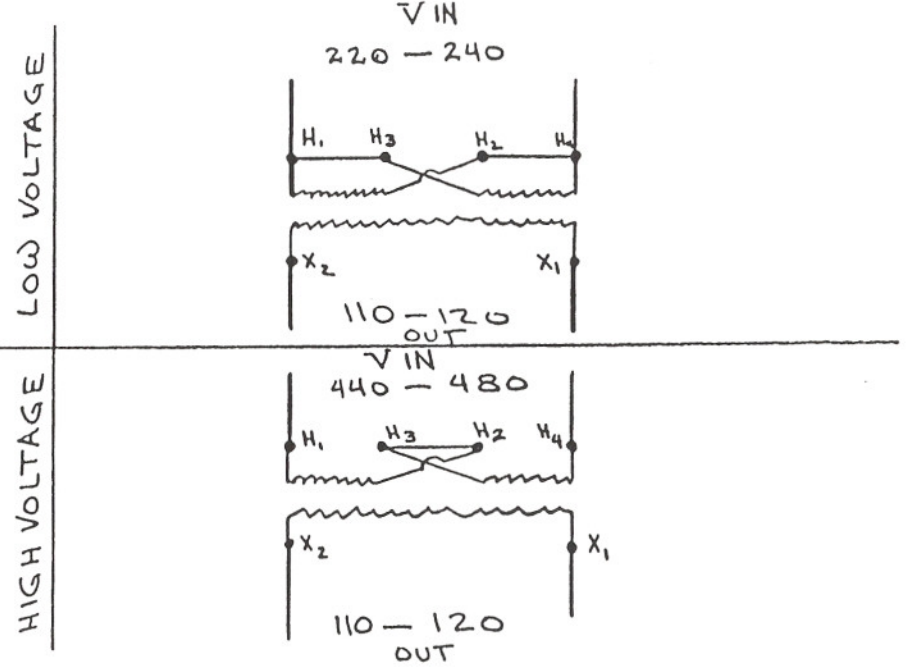
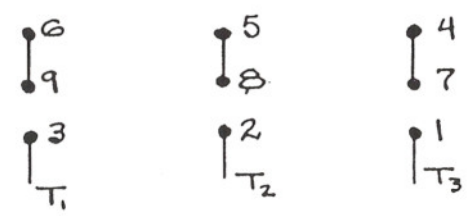
9 LEADS std. 60 CPS MOTOR

FOR	LINE			TIE LEADS	TIE LEADS	TIE LEADS
	T ₁ TO	T ₂ TO	T ₃ TO			
LOW VOLTAGE	3 & 9	2 & 8	1 & 7	6, 5, 4	—	—
HIGH VOLTAGE	3	2	1	6, 9	5, 8	4, 7

LOW VOLTAGE

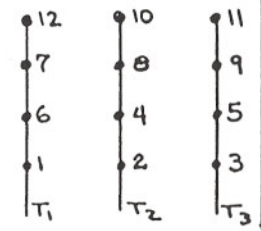


HIGH VOLTAGE

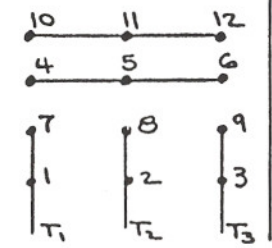


3 Φ MOTOR (1-575A) TRIPLE VOLTAGE
12 LEADS 50 CPS.

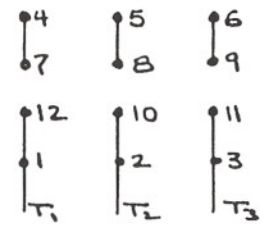
220 VOLT CONN.



380VOLT CONN.



440 VOLT CONN.



TO REVERSE ROTATION: INTERCHANGE ANY TWO LINE LEADS