



ATTENTION:

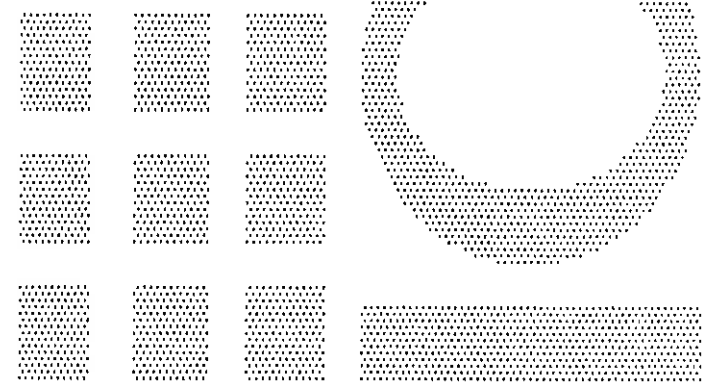
VERY IMPORTANT

Before unloading and unpacking the machine, read section 5 of this manual for unloading and unpacking instructions.

Failure to do so may result in the forfeiture of the warranty.

# pa33

LOWNER'S  
MANUAL



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# PA 33 SPECIFICATIONS

Power requirements: 115 VAC, 60 Hz, 30 A, 1 phase

Air pressure requirements: 1 cfm at 80 psi min.

Machine floor space requirements: 64" x 120"

Distance from floor to top of table: 14 inches

Turntable dimensions: 52" x 52"

Turntable drive motor: 3/4 hp, 1750 rpm, DC

Elevator motor: 1/2 hp, 1750 rpm, 90 VDC, TEFC

Elevator speed control: 25 fpm max.

Multistretch motor: 1/2 hp, 1750 rpm, 90 VDC, TEFC

Maximum static load: 20 000 lbs.

Maximum dynamic load: 8 000 lbs.

Minimum load: 350 lbs.

Turntable brake system: dynamic brake.

Maximum pallet load dimensions: 52" x 52" x 80" height

Minimum pallet load dimensions: 30" width x 30" length x (30" or 20") height

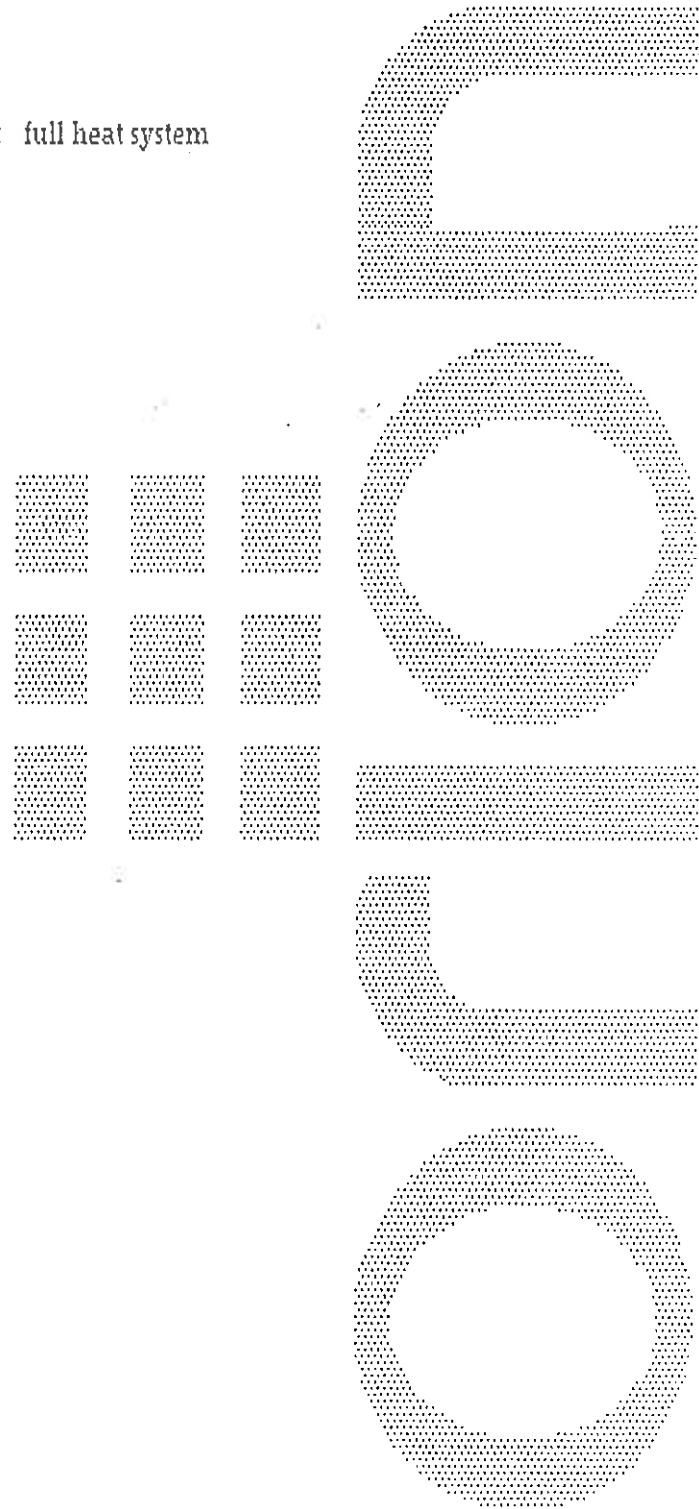
Load output: 60 loads per hour (based upon desired wrap pattern)

Film roll: 20" to 30" wide

Film delivery: Multistretch I prestretch system with a dancer bar that controls the "force to load" compensation.

Film cutoff and seal: full heat system

Dust tight controls.



## 2. STANDARD FEATURES

The standard, Portable automatic stretchwrapper comes with,

- Automatic, programmed spiral wrapping,
- Heavy duty structural steel chassis,
- Multistretch I prestretch system,

The carriage height is controlled by a variable speed, SCR controlled DC motor, with an automatic load height sensor.

The film feed system uses a dancer bar and roller system that regulates the feed speed in order to keep a constant film tension when wrapping around corners.

The Multistretch I prestretch system has the capability of varying its prestretch through the use of change timing belt pulleys which are available through your Orion representative.

The variable speed turntable is directly driven by a right-angle, worm and gear speed reducer, coupled with a chain and sprocket arrangement. The use of this system will allow the turntable to have a variable speed of up to a maximum of 16 RPM with an automatic, dynamic braking system.

# 3. OPTIONS

Power requirements:

- 575 VAC, 60 Hz, 3 phase, 30 Amps
- or 440 VAC, 60 Hz, 3 phase, 25 Amps
- or 240 VAC, 60 Hz, 3 phase, 20 Amps

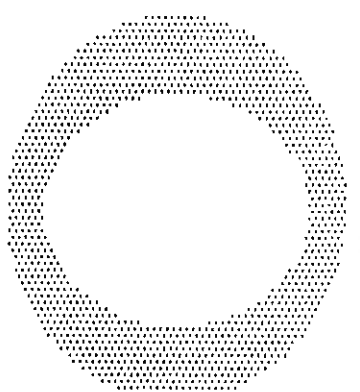
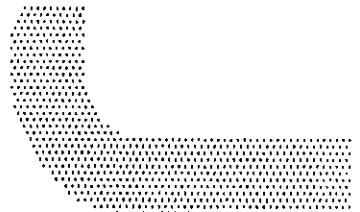
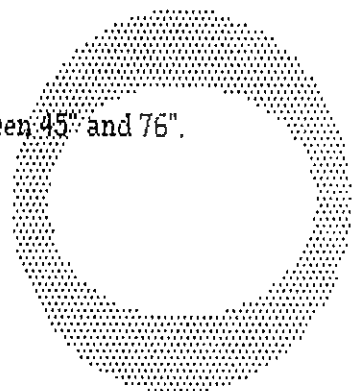
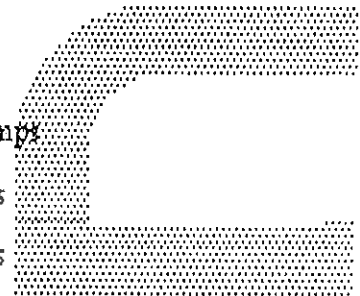
Turntable system: any diameter turntable between 45" and 76".

Carriage for 20" film.

Carriage for 30" film.

Extended tower.

Ring gear drive and support system.





PARTS LISTS

4.1 TOWER PARTS LIST

The exploded assembly drawing of the Fully Automatic Tower is shown on drawing number 200 99.

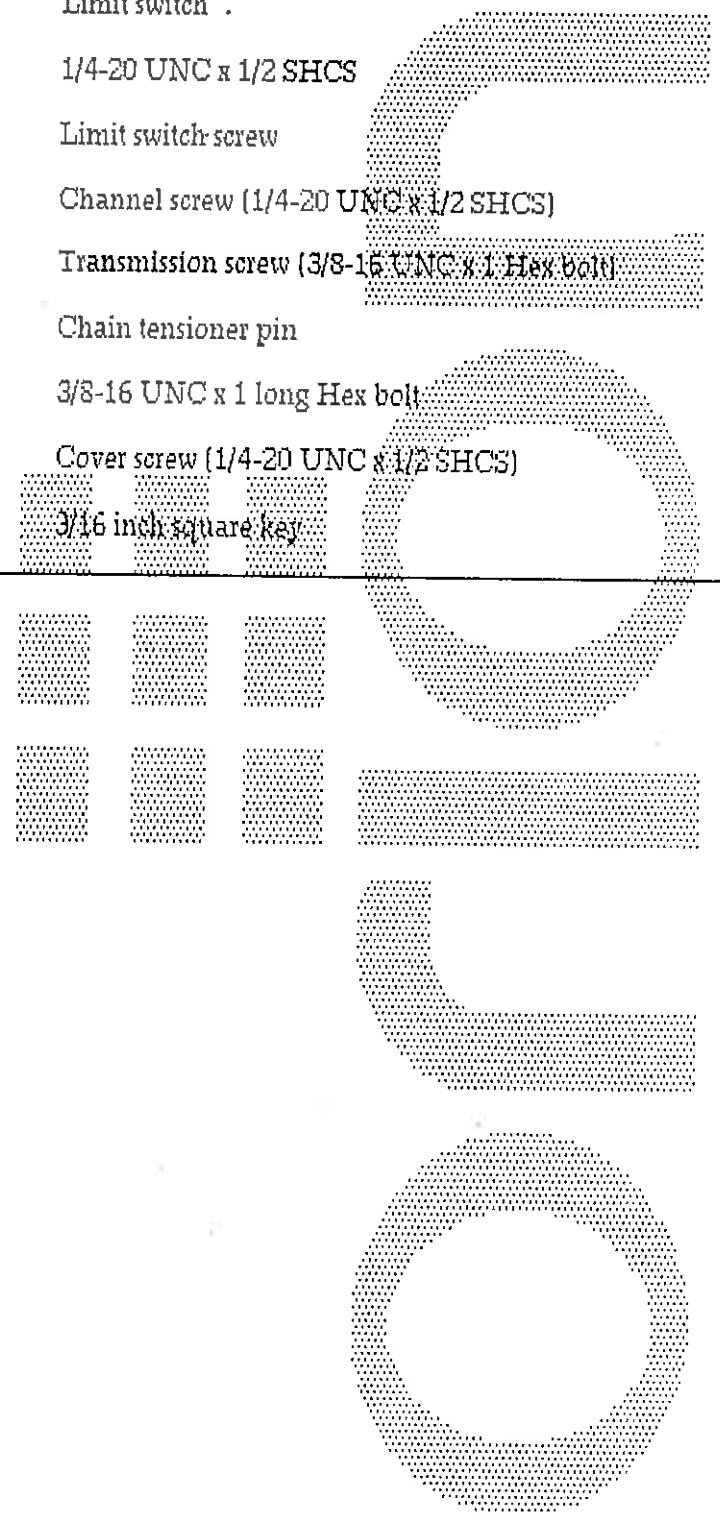
Table 1 has the parts listed in order of part number. Note: the names given to the parts are generic.

TABLE 1

Tower Parts List

Part Number	Description	Quantity
10008	Idler sprocket	1
10009	#50 chain	1
10010	Cam follower (1 3/8 inch O.D.)	6
10018	Left carriage holder	1
10019	Right carriage holder	1
10063	Tower	1
10067	Cam follower (1/2 inch O.D.)	4
10069	Chain tensioner	1
10070	Chain tensioning screw	2
10071	Limit switch actuator	1
10074	Drive sprocket	1
10076	Limit switch channel	1
10081	Chain cover	1
10087	Limit switch bracket	3
10091	Channel guide	3
10092	Knob	3

10093	Reducer	1
10095	Elevator motor (1/2 hp, 1750 rpm)	1
10123	Limit switch .	3
10288	1/4-20 UNC x 1/2 SHCS	2
10289	Limit switch screw	6
10290	Channel screw (1/4-20 UNC x 1/2 SHCS)	2
10291	Transmission screw (3/8-16 UNC x 1 Hex bolt)	4
10292	Chain tensioner pin	2
10293	3/8-16 UNC x 1 long Hex bolt	2
10294	Cover screw (1/4-20 UNC x 1/2 SHCS)	3
10295	3/16 inch square key	1



## 4.2 CARRIAGE PARTS LIST

The exploded assembly drawing of the Standard carriage is shown on drawing number 200 100.

Table 2 has the parts listed in order of part number. Note: the names given to the parts are generic.

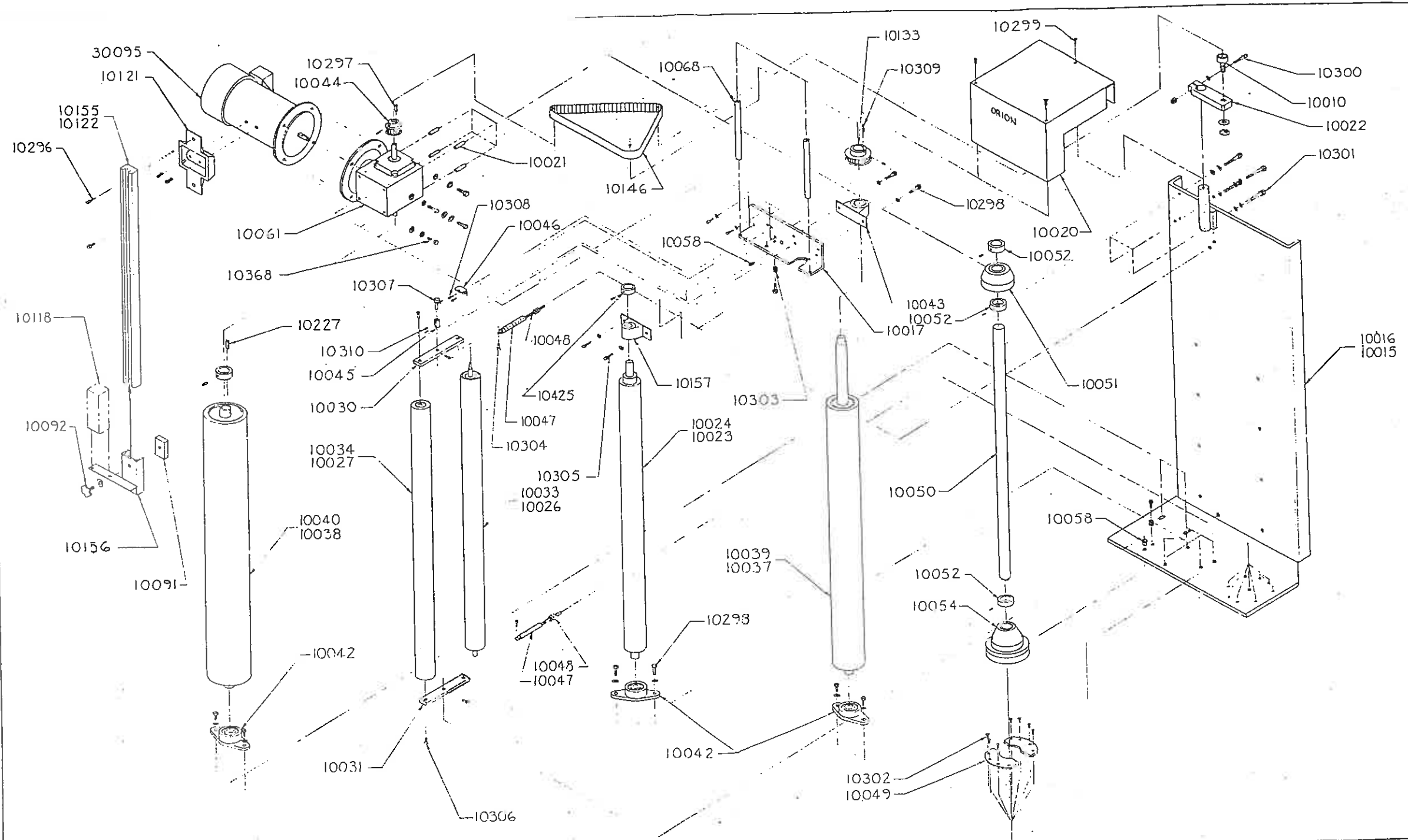
TABLE 2

Carriage Parts List

Part Number	Description	Quantity
10010	Cam follower (1 3/8 inch O.D.)	1
10015	20" Carriage frame	1
10016	30" Carriage frame	1
10017	Roller bracket	1
10020	Multistretch mechanism cover	1
10021	Spacer	1
10022	Belt tensioner	1
10023	30" Pressure roller	1
10024	20" Pressure roller	1
10026	30" Center dancer roller	1
10027	30" roller	1
10030	Top dancer lever	1
10031	Bottom dancer lever	1
10033	20" Center dancer roller	1
10034	20" Roller	1
10037	30" x 3" dia. rubber roller	1
10038	30" x 4" dia. rubber roller	1
10039	20" x 3" dia. rubber roller	1

10040	20" x 4" dia. rubber roller	1
10042	3/4" flanged bearing unit	2
10043	1" Pillow block	1
10044	Prestretch driver pulley	1
10045	Potentiometer coupling	1
10046	Potentiometer bracket	1
10047	Film tension spring	2
10048	Spring adjustment screw	2
10049	Brake pad	2
10050	Film spool mandrel	1
10051	Top mandrel	1
10052	1" Collar	6
10054	Bottom mandrel	1
10058	Bronze bushing	2
10061	Prestretch transmission (5:1 worm & gear)	1
10068	Cover bracket	2
10091	Channel guide	1
10092	Knob	1
10118	Photoswitch	1
10121	Channel bracket	1
10122	30" Channel	1
10133	Prestretch driven pulley	1
10146	Timing belt	1
10155	20" Channel	1
10156	Photoswitch bracket	1
10157	3/4 inch pillow block	1
10227	3/16 inch square key	1

10296	Channel screw	2
10297	3/16 inch square key	1
10298	3/8-16 UNC x 1 long hex bolt	6
10299	Multistretch cover screw	3
10300	3/8-16 UNC x 2 long SHCS	1
10301	5/16-18 UNC x 2 1/2 long Hex bolt	4
10302	8-32 UNC x 1/2 long BHCS	8
10303	Bumper	2
10304	10-24 UNC x 3/4 long SHCS	2
10305	5/16-18 UNC x 3/4 long SHCS	2
10306	1/4-20 UNC x 3/4 long CHCS	2
10307	Feedback potentiometer	1
10308	10-24 UNC x 1/2 long SHCS	2
10309	1/4" square key	1
10310	10-24 UNC x 1 long SHCS	2
10368	3/8-16 UNC x 1 long hex bolt	4
10425	3/4" collar	1
30095	Prestretch motor (1/2 hp, 1750 rpm)	1



ORION PACKAGING MONTREAL		
DATE: 11-1-66	APPROVED BY:	DESIGNED BY: E. CHAPLAIN
STD. CARRIAGE ASSY		
44 55 66 PA33 PA33		206 1005

### 4.3 Sealing Mechanism Parts List

The exploded assembly drawing of the Sealing Mechanism is shown on drawing number 200 406.

Table 3 has the parts listed in order of part number. Note: the names given to the parts are generic.

TABLE 3  
Sealing Parts List

Part Number	Description	Quantity
10027	30" Roller	1
10034	20" Roller	1
10158	Washer	1
10159	Cylinder tower plate	1
10160	Spacer	1
10161	Roller yoke	1
10162	Roller yoke	1
10163	Roller yoke	1
10164	20" Roper arm	1
10165	30" Roper arm	1
10166	20" Hot plate	1
10167	30" Hot plate	1
10168	20" Heater (two req'd in knife, one in hot plate)	3
10169	30" Heater (two req'd in knife, one in hot plate)	3
10170	20" Knife	1
10171	30" Knife	1
10172	20" Teflon film	1
10173	30" Teflon film	1

10174	20" Teflon film block	2
10175	30" Teflon film block	2
10176	Roper arm yoke	1
10177	1 1/2" Bore pneumatic cylinder	2
10178	7/16" Tie rod end	4
10179	Cylinder tower	1
10180	Roller yoke	1
10181	Knife thermostat	1
10182	Knife arm	1
10183	Knife arm yoke	1
10184	Knife bracket	1
10185	Hot plate arm	1
10186	2" Bore pneumatic cylinder	1
10187	9/16" Tie rod end	1
10188	Hot plate arm yoke	1
10189	9/16 UNF SHCS	1
10190	9/16 UNF hex nut	1
10191	7/16 UNF SHCS	4
10192	Hot plate holder	1
10193	Arm washer	4
10194	1 1/4" I.D. Erenze bushing	3
10255	5/16-18 UNC x 1 1/2 long SHCS	2
10256	Knife cover screw (#10 UNC)	6
10257	1/4-20 UNC x 1/2 long SHCS	8
10258	20" Teflon film plate	2
10259	10-24 UNC x 3/4 long SHCS	2
10260	1/4-20 UNC x 3/4 long CHCS	1



10261	10-24 UNC x 1/2 long CHCS	4
10262	7/16 UNF Hex nut	4
10263	Hot plate bracket	1
10264	1/2" Cylinder pin	1
10265	1/2" Retaining ring	1
10266	3/8" Retaining ring	2
10267	3/8-16 UNC x 3 long SHCS	6
10268	3/8" Cylinder pin	2
10269	7/16 UNC Hex nut	2
10270	7/16 UNF x 1 long SHCS	2
10271	Thermocouple screw	1
10272	Thermocouple	1
10273	7/16 UNC hex nut	2
10274	5/16-18 UNC x 1 1/2 long SHCS	2
10275	Hot plate bracket	1
10276	Teflon film spring	2
10277	1/4-20 UNC x 1 long SHCS	2
10278	3/8-16 UNC x 1 long CHCS	2
10279	10-24 UNC x 1/2 long Button head cap screw	6
10280	Spring bracket	2
10281	10-24 UNC x 3/4 long SHCS	4
10282	Teflon film bracket	4
10283	10-24 UNC x 3/4 long SHCS	8
10284	5/16-18 UNC x 1 1/2 long SHCS	2
10285	5/16-18 UNC x 1 1/2 long SHCS	4
10286	1/4-20 UNC x 3/4 long SHCS	4
10287	1/2-13 UNC x 1 1/2 long Hex bolt	1

10390

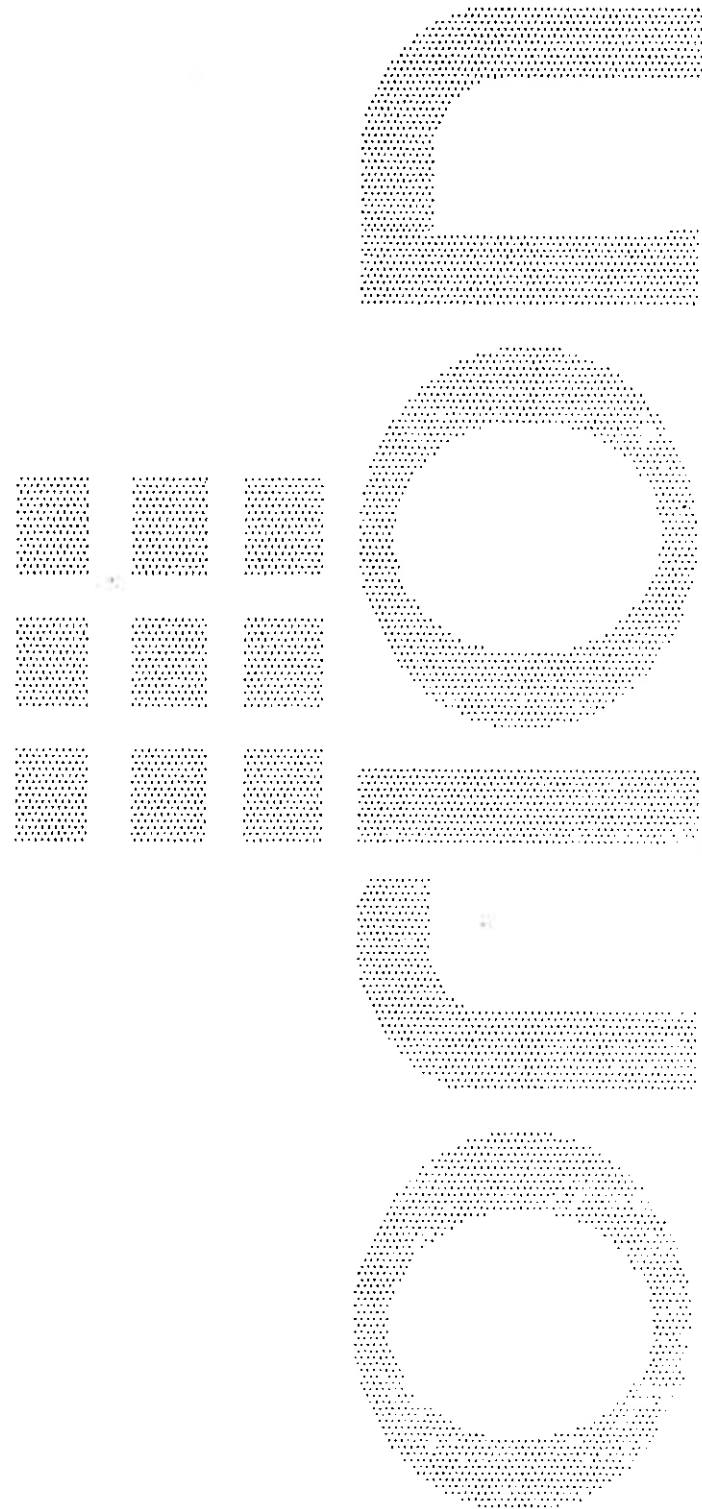
10-24 UNC x 1/2 long BHCS

10

10457

30" Teflon film plate

2



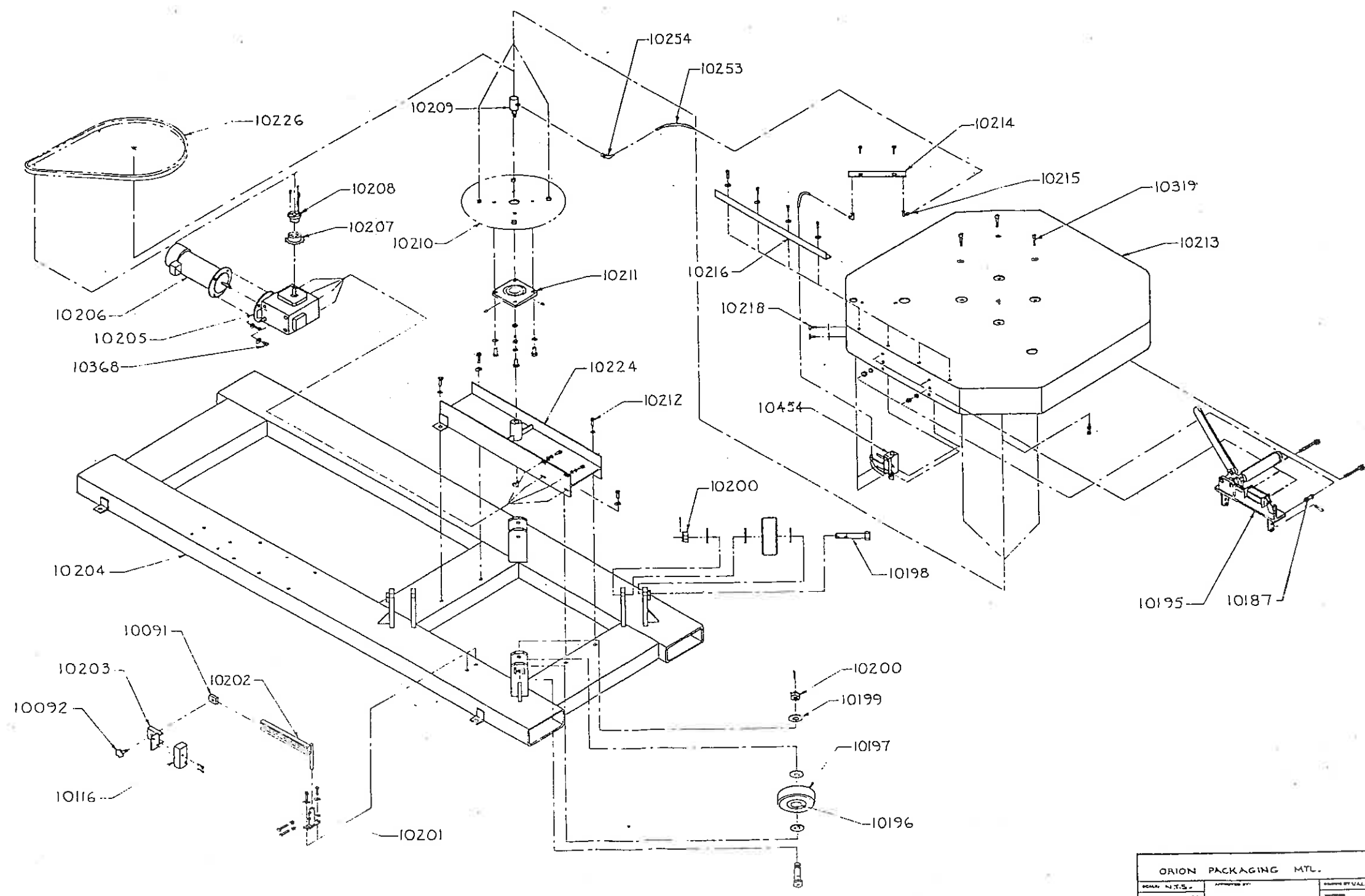
#### 4.4 Base And Turntable Parts List

The exploded assembly drawing of the Portable Automatic base and turntable is shown on drawing number 200 196. Table 4 has the parts listed in order of part number. Note: the names given to the parts are generic.

TABLE 4  
Base And Turntable Parts List

Part Number	Description	Quantity
10091	Channel guide	1
10092	Knob	1
10116	Proximity switch	1
10187	9/16" dia. tie rod end	2
10195	Clamp assembly	1
10196	Tapered roller bearings	8
10197	Caster	4
10198	Caster shaft	4
10199	Caster washer	12
10200	Caster shaft nut	4
10201	Channel stand	1
10202	Proximity switch channel	1
10203	Proximity switch bracket	1
10204	Base frame (caster system)	1
10205	Turntable speed reducer	1
10206	Turntable drive motor	1
10207	Turntable drive sprocket	1

10208	Drive sprocket taper bushing	1
10209	Pneumatic rotary joint	1
10210	Turntable sprocket	1
10211	Center bearing	1
10212	1/2-13 UNC x 1 long hex bolt	4
10213	Turntable	1
10214	Air bridge	1
10215	Air bridge elbow connector	2
10216	Clamp protector	1
10218	Four-way valve screw	2
10224	Drive console	1
10226	Drive chain	1
10253	Hose	1
10254	Rotary joint elbow connector	1
10319	3/8-16 UNC x 1 1/2 long SHCS	4
10368	3/8-16 UNC x 1 long hex bolt	4
10454	Four-way valve	1



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DATE 27-10-67		
PORTABLE AUTOMATIC BASE ASSEMBLY		
PA 33		200 196

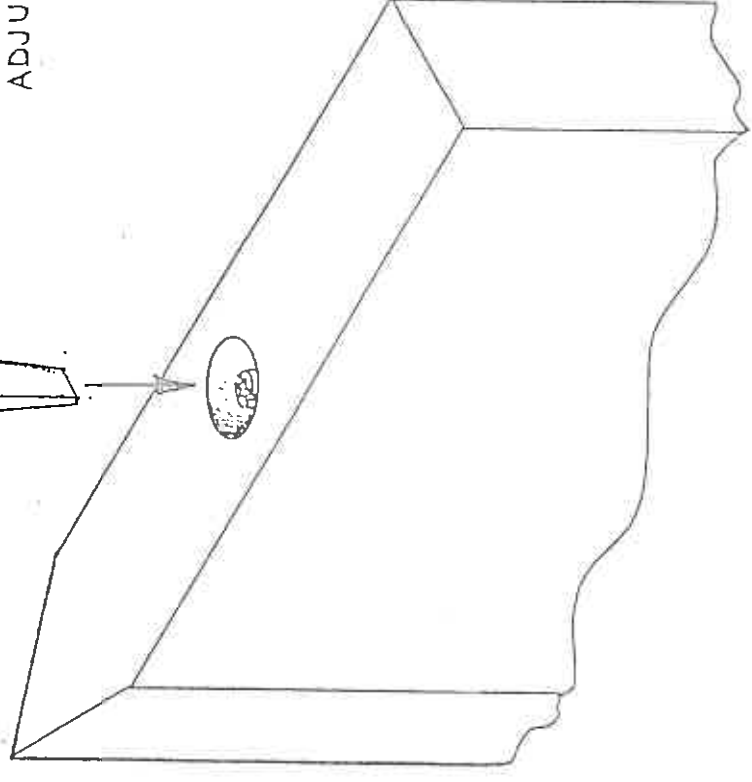
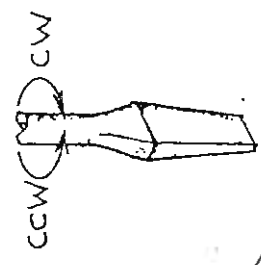
10416	Commutator and roto-seal assembly	200 769
10454	Clamp 4-way valve	200 769
10457	Hot plate assembly	200 406
10458	Knife assembly	200 406
10459	Lock assembly	200 769
10463	Reducer (EQ175, 40:1)	200 770

ELECTRICAL BOARDS: 336 (236)

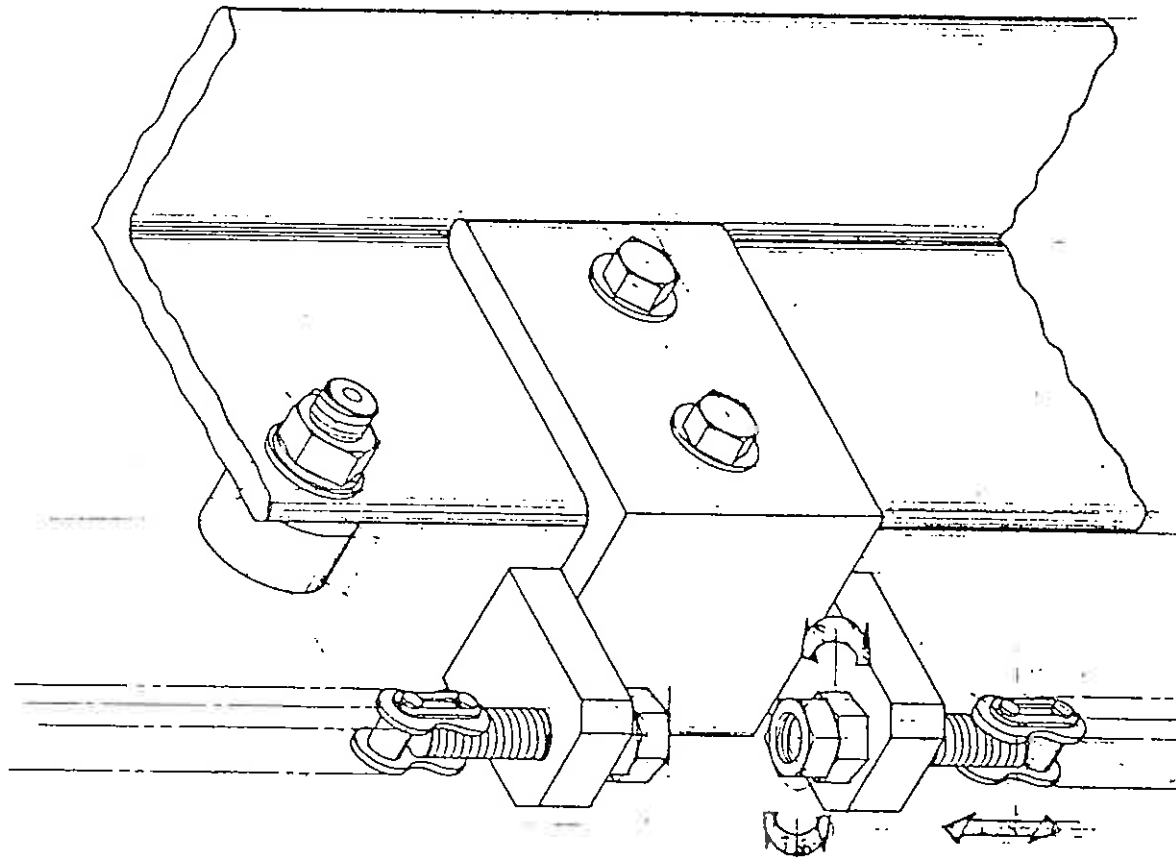
- 16S-4 (16S-3)
- 750M-240v
- 850C

Note: This spare parts list is for the stretchwrapper with a carriage for the 20" wide film.

FOR A HIGHER TEMPERATURE  
ADJUSTMENT .TURN CCW .  
FOR A LOWER TEMPERATURE  
ADJUSTMENT .TURN CW .



ORION PACKAGING			
SCALE: N.T.S	APPROVED BY:		DRAWN BY VALENTINI
DATE: 17-6-86			REVISED
THERMOSTAT ADJUSTMENT			
PA		DRAWING NUMBER	
		200 159	

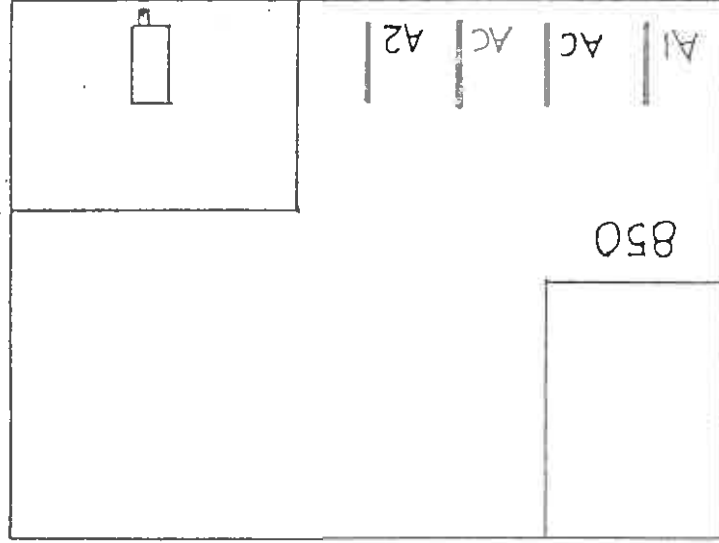


CHAIN TENSION  
ADJUSTMENT

ORION PACKAGING	
Material: H.T.S.	Approved by: M.A.C./J.L.A.
Part No: 10 - 7 - 86	Quantity:
CHAIN TENSIONER ASS'Y	
Drawing No: 200 - 1'	



CONVEYOR SPEED



850

A2

AC

AC

A1

ORION PACKAGING INC.

ECHELLE: N.T.S. APPROUVE PAR: JALENTIN

SCALE:

APPROVED BY:

DATE: 24-12-87

CESSINE PAR: JALENTIN

DRAWN BY: JALENTIN

REVISE PAR:

REVISED BY:

850 C

FA 33 MA 33 MA 44 MA 55

NUMERO CE CESSIN  
DRAWING NUMBER  
210 142 A

## 5 MACHINE INSPECTION AND INSTALLATION

**CAUTION:** When unloading the stretchwrapper, care must be taken not to lift it by the turntable. The forks of the forklift should be inserted in the 10 x 4 structural tube steel members in the base to lift the machine.

Before inspection, all packing and restraining blocks must be removed; these include the blocks under the carriage and between the heat seal arms.

**CAUTION:** When cutting the stretchwrap material covering the machine, care must be taken not to cut any electrical or pneumatic lines.

A visual inspection of all the electrical and pneumatic connections should be performed after unpacking the machine to check for loosened joints or broken connections. Any suspected shipping damage must be reported immediately to the freight carrier.

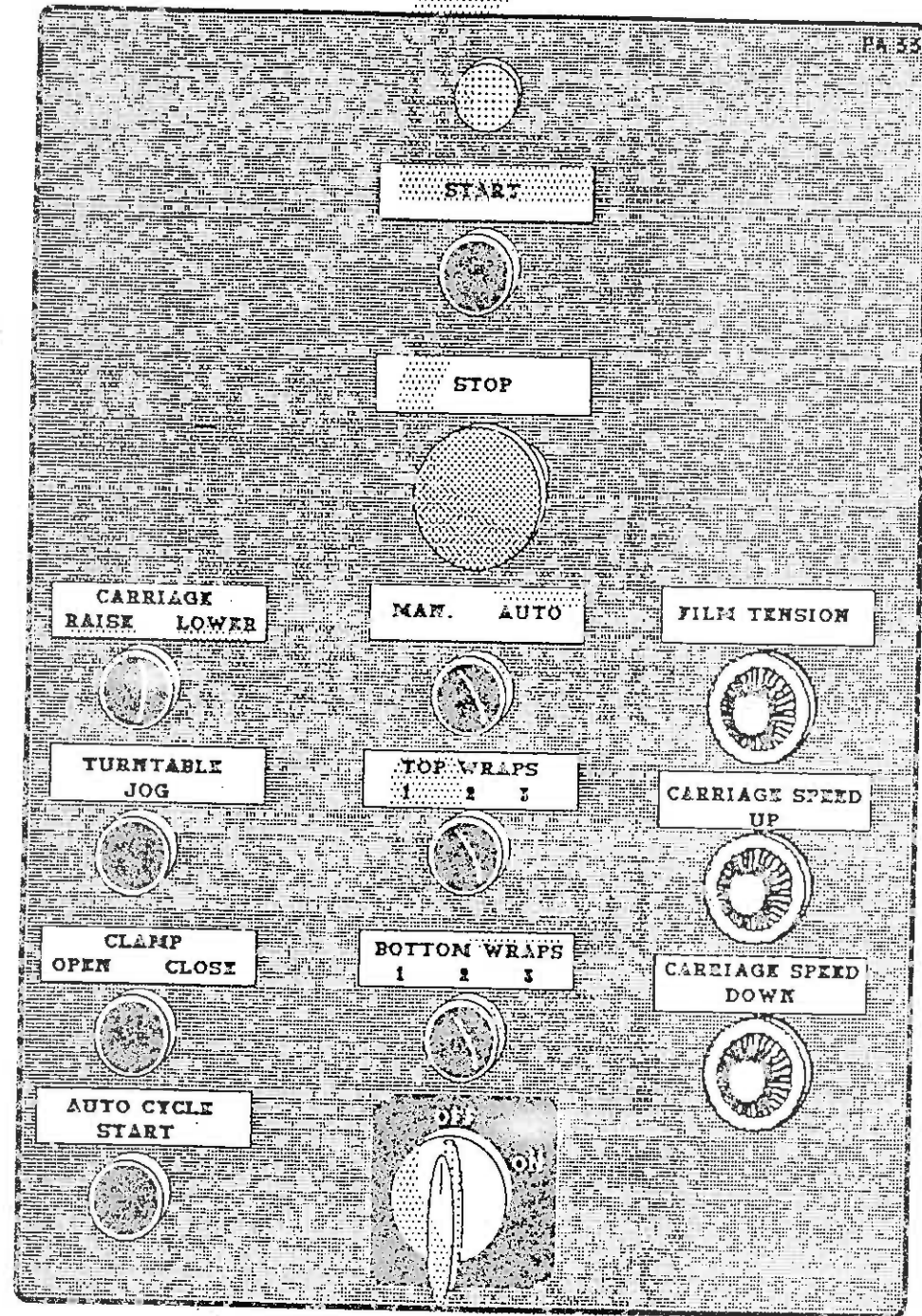
Items that are vulnerable to damage and must be inspected are,

- motor and transmission housings and connections under the turntable, at the base of the tower, and on the carriage.
- the pneumatic valves and the filter-regulator-lubricator on the stretchwrapper base, next to the sealing mechanism.
- the pneumatic cylinders of the sealing mechanism and their hose connections.
- the pneumatic components and connections leading to the film clamp on the turntable.

After the visual inspection has been performed, the customer is required to provide the electrical and pneumatic power requirements as outlined in the specifications (sections 1, 2, and 3 of this manual).

An electrical drawing of the panel is provided in the panel box and in the appendix at the end of this manual. Also, a copy of the FLC's instruction booklet is included in the appendix. Only a qualified electrical technician or an Orion representative should effect any repairs on the machine.

3. MANUAL CONTROLS AND START-UP



## 6.1 Power Switches

Main disconnect switch:

ON - connects a 240 VAC power source to the transformer.

OFF - disconnects the power source.

When the main disconnect switch is in the ON position, the master contactor energizes and power is supplied to the control panel (all controls required for day to day operation are located on the control panel).

## 6.2 Operation Mode Selector Switch

The two settings on the operation mode selector switch are,

MANUAL - Manual operation: for use in machine testing, operation set-up, or troubleshooting.

AUTO - Automatic operation: for use when using the programmed commands of the automatic cycle.

When the switch is set to MANUAL, the manual control switches are enabled. In order to begin machine testing or operational set-up, the operation mode selector must be set to MANUAL. This will permit the operator to use the manual control switches described in this section.

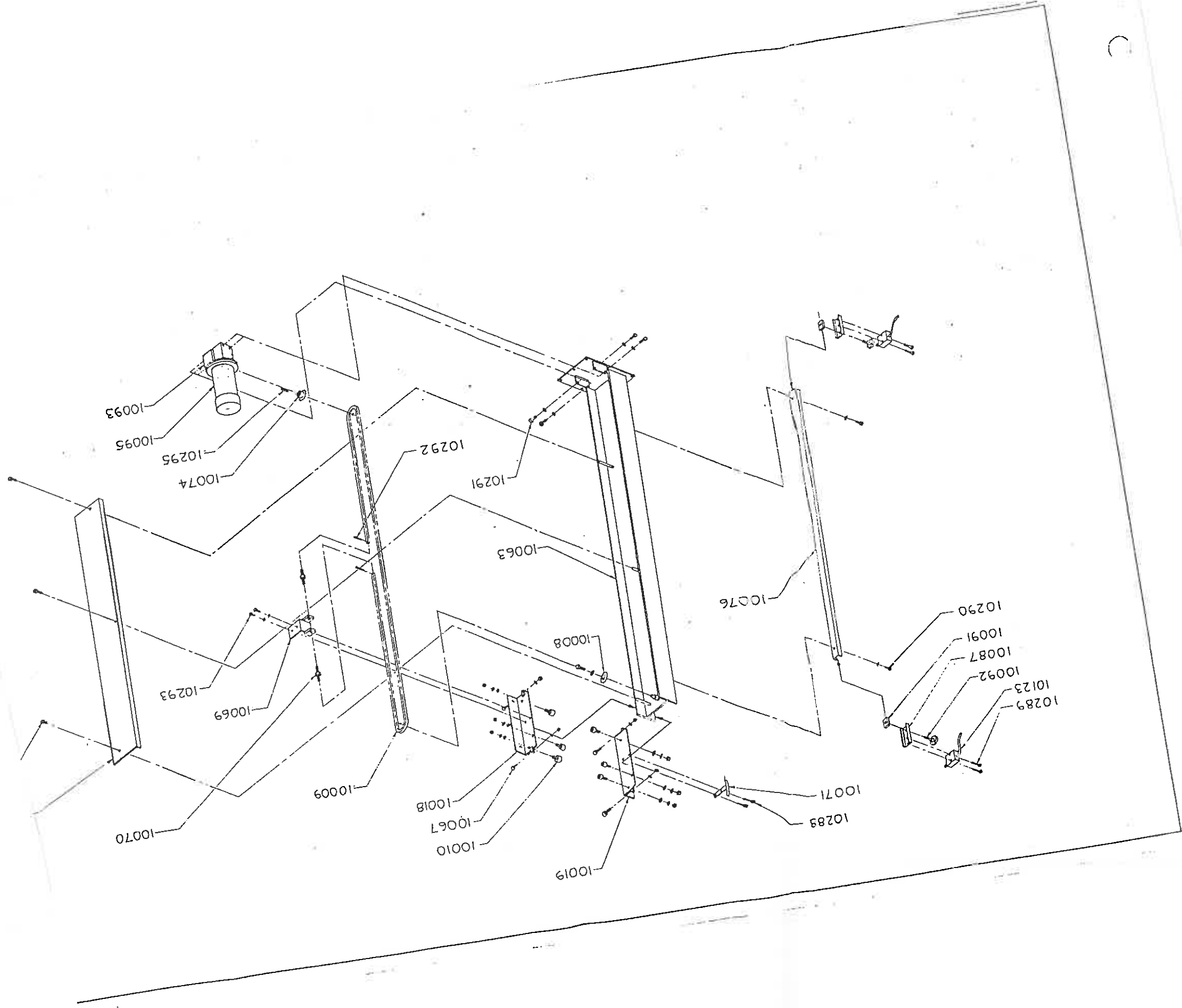
When the mode selector switch is set to AUTO, the programmed commands stored in the PLC are operative. The switch may be turned from AUTO to MANUAL during the cycle to switch to manual control.

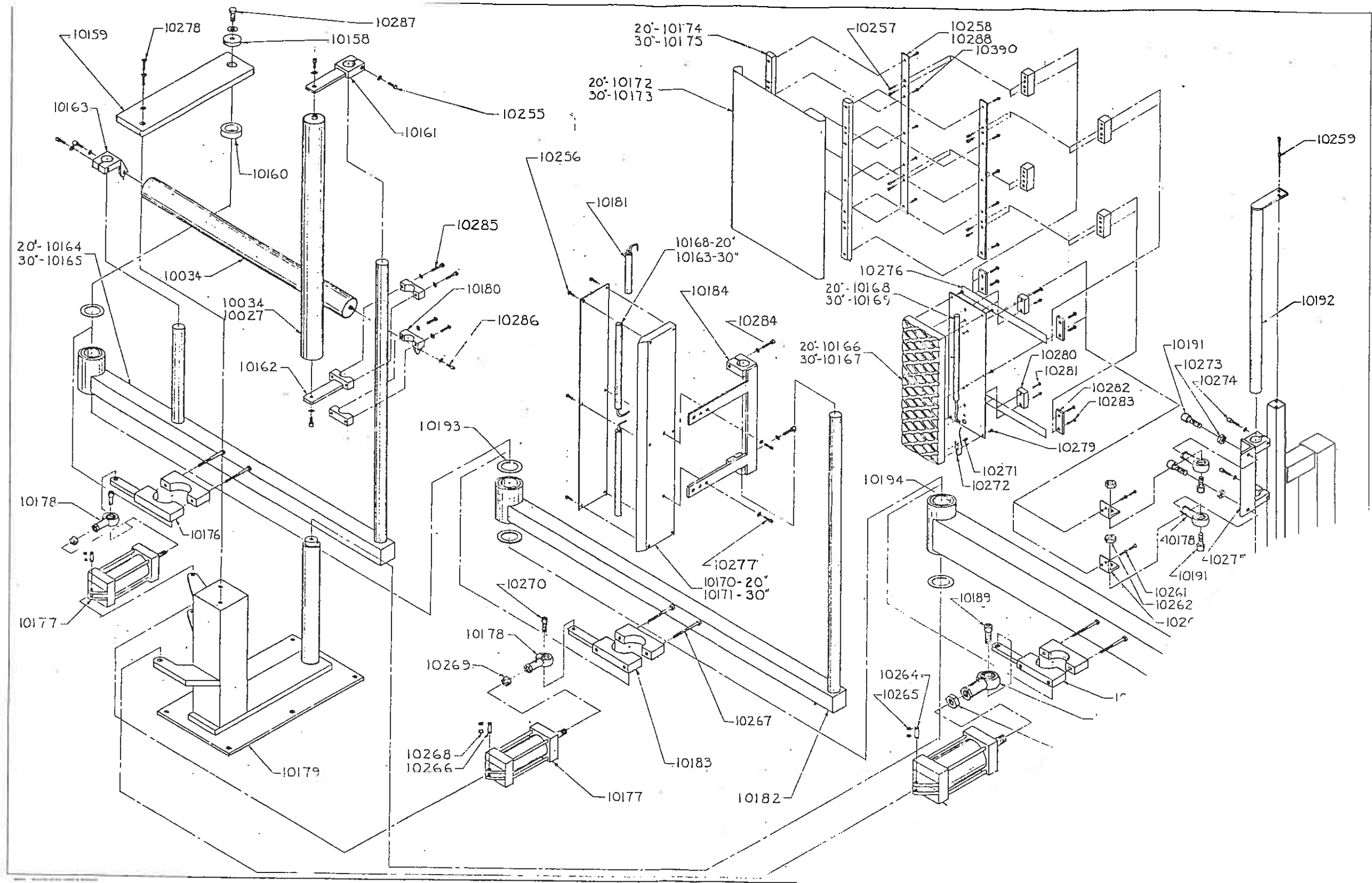
## 6.3 Carriage Control Switch

The Carriage Control switch is a monostable three position switch with the following settings,

RAISE - Raises the carriage until the photoswitch senses that the carriage is at the same level as the top

ORION PACK  
M.T.S.  
27-C-84  
STD. TOWER





of the load.

LOWER - Lowers the carriage until the bottom limit switch on the tower is activated.

The switch is normally in the middle position where the carriage remains stationary. Turning the switch to the RAISE or LOWER position will activate the carriage to move in its respective direction.

The carriage control switch will only work when the Operation Selector switch is set to MANUAL.

#### 6.4 Turntable Jog Switch

The Turntable Jog switch is a push-button switch that causes the turntable to turn in the clockwise direction (as viewed from the top) when the button is held depressed. The turntable jog will only work when the Operation Selector switch is set to MANUAL.

#### 6.5 Clamp Jog

The Clamp Jog is a bistable push-button switch that opens the clamp when pressed once and closes the clamp when pressed again. The monostable action is achieved through the use of a four-way pneumatic valve mounted on the turntable next to the clamp itself. The clamp jog will only work when the Operation Selector switch is set to MANUAL.

#### 6.6 Start Cycle And Stop Switches

With the Power switch ON, the START button may be pressed to enable the outputs of the machine.

If the start button is not pressed the automatic cycle can be traced internally at the PLC. With the Start button pressed the machine may be set up and loaded.

When the machine is ready to wrap, the START AUTOCYCLE button may be pressed and the machine will go through the automatic cycle.

The STOP switch may be used to stop the cycle at any time during operation or to stop the broken film alarm. If the STOP button is pressed the machine can be restarted by pressing the Start button, setting up the machine, and pressing the START AUTOCYCLE button again.





## 7. CYCLE ADJUSTMENT CONTROLS

### 7.1 Film Tension

The film tension may be adjusted through the film tension control potentiometer. The pot has a range of tension from 0 to 10, 10 being the highest tension rating. This pot may be adjusted during the automatic cycle or when the Operation Selector switch is set to AUTO.

CAUTION: Lighter loads may require lower tension settings than heavier loads.

The film tension is controlled through the dancer bar system. Occasionally the feedback potentiometer may need some adjustment. The adjustment of the feedback potentiometer can be performed while there is no film on the carriage. The bottom screw on the potentiometer coupling must first be loosened. Once the screw is loosened the potentiometer shaft must be turned until the prestretch motor just begins to hum but does not rotate, at which point the screw can be tightened. NOTE: the condition in which the motor hums but doesn't turn must be maintained even after the screw is tightened, if not, the adjustment procedure must be repeated.

### 7.2 Carriage Speed

There are two carriage speed controls on the panel.

CARRIAGE SPEED UP,  
CARRIAGE SPEED DOWN.

The carriage speed controls can be used to control the amount of overlap the film will have on itself during a wrap. It is recommended to start with a RAPID upward wrap in order to stabilize the load early in

the cycle.

The control potentiometers have settings from 0 to 10, the higher settings being the fastest. High settings will mean less film overlap because of faster carriage speed, and low settings will mean more film overlap because of lower carriage speeds.

### 7.3 Top And Bottom Wraps

There are two bistable, three position, switches which control the number of wraps that may be put at the top and bottom of the load,

TOP WRAPS - 1, 2, 3

BOTTOM WRAPS - 1, 2, 3

These switches may be set before the automatic cycle begins, and in their different positions will wrap respectively 1, 2, or 3 turns of film on the top or bottom of the load.

### 7.4 Turntable Speed Adjustments

The turntable speed may be changed by adjusting the controls on the 750 or 850 board inside the panel. The controls on the board regulate the steady-state speed, the jog speed, and the acceleration and deceleration of the turntable. The controls are labeled on the board and listed below:

ZERO - The zero adjustment controls the deadband voltage for the turntable motor; it should be adjusted so that the motor just begins to hum but does not turn.

PRESET 1 - The preset 1 controls the FAST speed of the turntable.

PRESET 2 - The preset 2 controls the jog speed of the turntable.

PRESET 3 - The preset 3 controls the slow speed of the turntable.

DN 1 - The DN 1 adjustment regulates the rate of deceleration of the turntable for when it reaches the end of the cycle at the fast speed.

DN 3 - The DN 3 adjustment regulates the rate of deceleration of the turntable for when it reaches the end of the cycle at the slow speed.

UP - The UP adjustment regulates the rate of acceleration of the turntable for the beginning of the cycle.

IRC - The IRC needs only adjustment if there is a very large range of load weight; for most applications it will not need to be adjusted but if adjustment is necessary, contact your Orion representative.

CL - The CL is factory set and needs no further adjustment.

## MACHINE MONITORING SWITCHES

### 8.1 Photoswitches

Photoswitches are placed on the machine to check whether there is a load on the turntable, and for safety reasons, to make sure that the area around the machine is clear.

There is one photoswitch located on the standard P.A. 33. The photoswitch is located on the carriage and stops the carriage from moving higher than five inches of the highest point on the load. The photoswitch's position on the track can be adjusted in order to make the carriage pass the top of the load and overlap the top.

### 8.2 Limit Switches

There are three limit switches located on the tower. The topmost and bottom-most switches limit the motion of the carriage to that determined by the location of the elevator's drive and idler sprockets. The middle limit switch's purpose is to cause the clamp to open once the carriage reaches its level and activates the limit switch.

CAUTION: These limit switches are factory adjusted and should not need any further adjustment unless they have been disturbed.

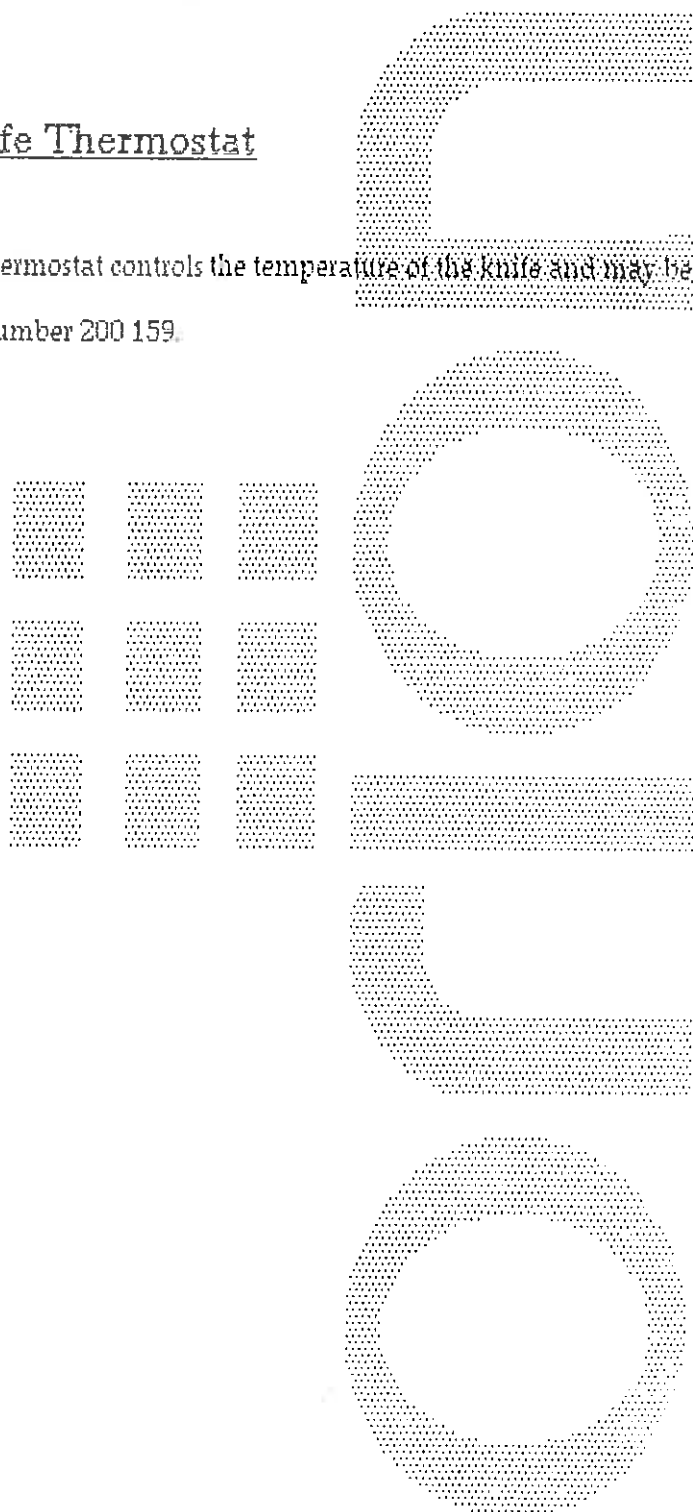
### 8.3 Proximity Switch

The only proximity switch is located under the turntable, next to the turntable lock. Its purpose is to monitor the turntable's position and the number of turntable rotations. The proximity switch's proper adjustment ensures that the turntable will stop in the correct position for the lock to be activated.

NOTICE: The proximity switch is factory adjusted and should not need any further adjustment unless it has been disturbed.

#### 8.4 Knife Thermostat

The knife thermostat controls the temperature of the knife and may be adjusted with a screw driver as shown in drawing number 200 159.



## MACHINE MAINTENANCE

### 9.1 Speed Reducer Maintenance

On the reducing transmissions, after the first week all external cap screws and plugs should be checked for tightness. It is recommended to change the oil every six months or every 2500 hours of operation, whichever comes first. When adding oil, the transmission should never be filled above the oil level mark indicated because leakage and overheating may occur. Below is a list of the type of lubricant that should be used.

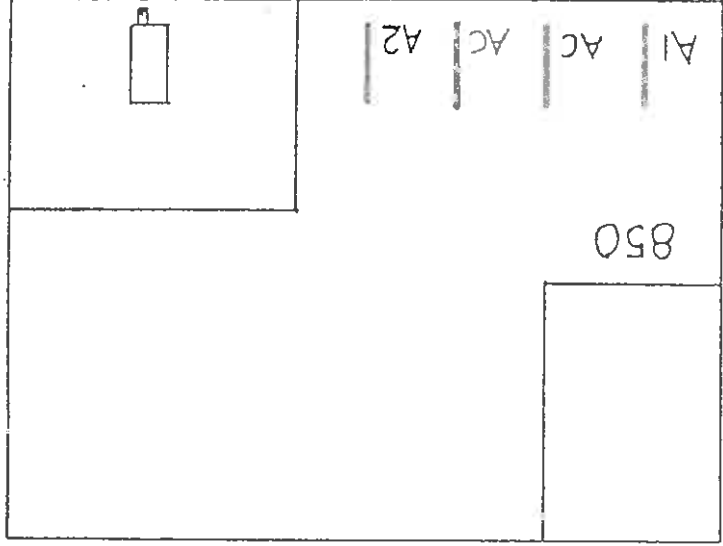
Manufacturer	Lubricant
American Oil Co.	American Cyl. Oil No. 196-L
Cities Service Oil Co.	Citgo Cyl. Oil 180-5
Gulf Oil Corp.	Gulf Senate 155
Mobil Oil Corp.	Mobil 600 W Super Cyl. Oil
Phillips Oil Co.	Andes S 180
Texaco Inc.	624-650T Cyl. Oil
Shell Oil Co.	Velvata Oil JS2
Union Oil Of Cal.	Red Line Worm Gear Lube 140

Reducing transmissions are found under the turntable, on the carriage, and at the base of the tower.

### 9.2 Caster Maintenance

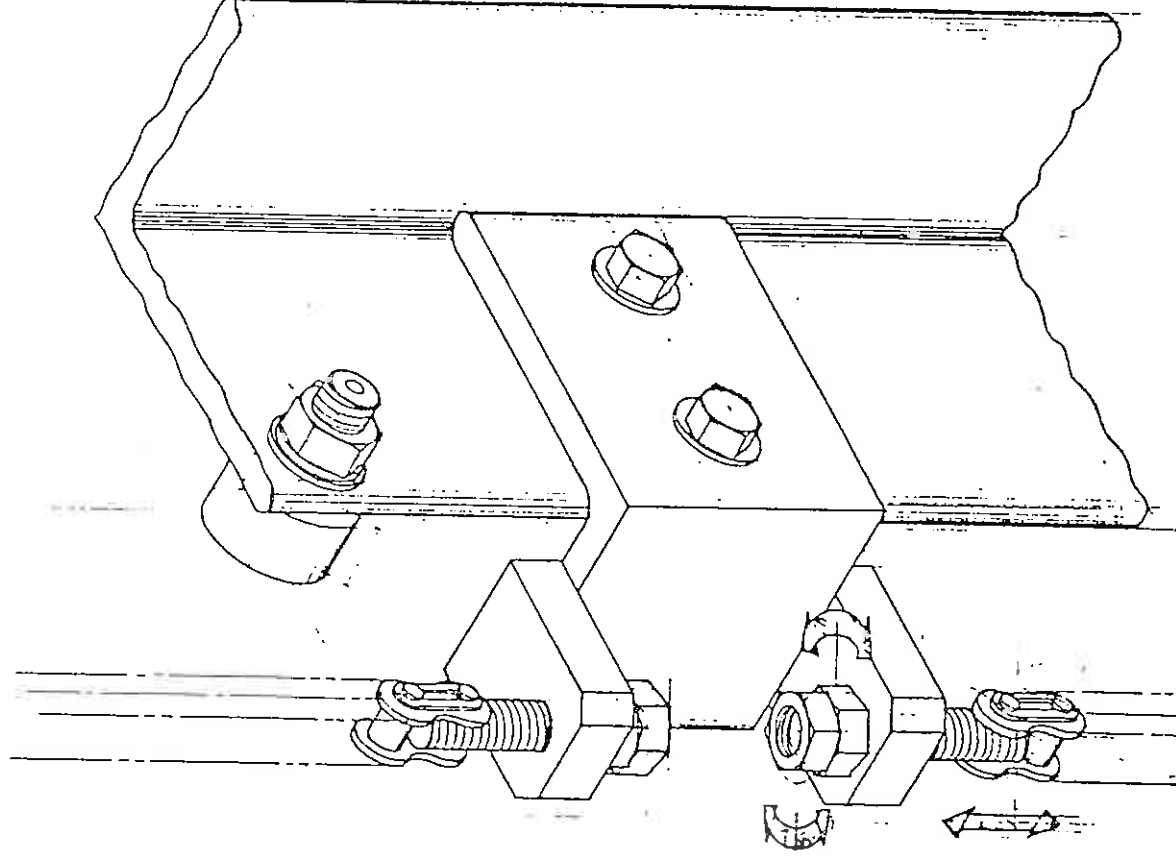
If the machine has a caster support system, the casters should be relubricated every 100 or 200 hours of operation with a good quality lithium based grease. The casters should be greased both at the grease nipples

CONVEYOR SPEED



ORIGN PACKAGING INC.

ECHELLE. SCALE.	N.T.S.	APPROUVE PAR: APPROVED BY:	CESSINE PAR: DRAWN BY: J.L. 11/1
DATE: 24-12-37	850 C		REVISE PAR: REVISED BY:
FA 33 MA33 MA44 MA55		NUMERO DE CESSIN DRAWING NUMBER	
		210 142 A	



CHAIN TENSION  
ADJUSTMENT

ORION PACKAGING

Part No. N.T.S.  
Quantity 10 - 7-8 1/2

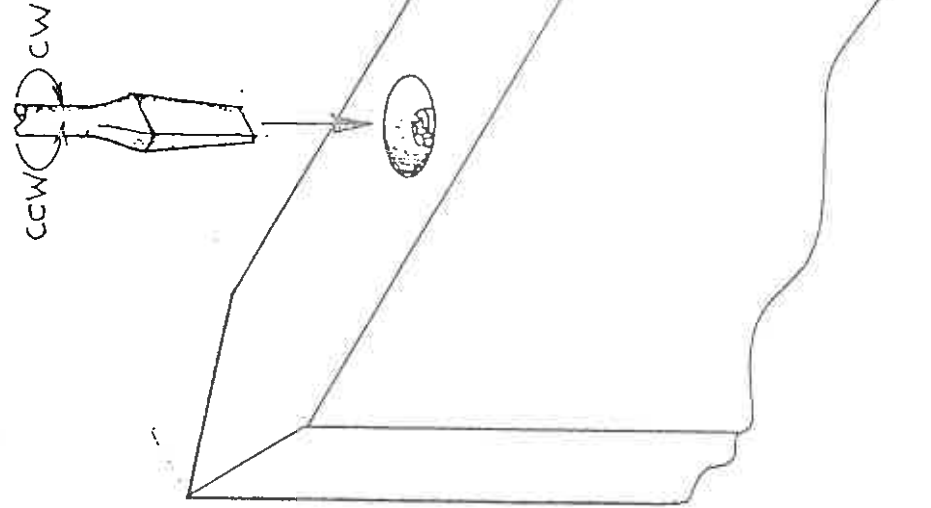
Manufactured by PALZCO (USA)  
Part No. 10-7-8 1/2

CHAIN TENSIONER ASS'Y

Manufactured by  
700 - 11



FOR A HIGHER TEMPERATURE  
ADJUSTMENT .TURN CCW .  
FOR A LOWER TEMPERATURE  
ADJUSTMENT .TURN CW .



ORION PACKAGING	
SCALE: N.T.S	APPROVED BY:
DATE: 17-6-86	DRAWN BY VALENTI/111
	REVISED
THERMOSTAT ADJUSTMENT	
PA	DRAWING NUMBER 200 159



10416	Commutator and roto-seal assembly	200 769
10454	Clamp 4-way valve	200 769
10457	Hot plate assembly	200 406
10458	Knife assembly	200 406
10459	Lock assembly	200 769
10463	Reducer (BQ175, 40:1)	200 770

---

ELECTRICAL BOARDS:	336 (236)
	168-4 (168-3)
	750M-240v
	850C

---

Note: This spare parts list is for the stretchwrapper with a carriage for the 20" wide film.

## RECOMMENDED SPARE PARTS LIST

Part Number	Description	Drawing Number
10008	Elevator idler sprocket	200 99
10010	Cam follower (1 3/8 inch diameter)	200 99, 100
10034	20" dancer roller	200 100, 406
10039	20" x 3" dia. rubber roller	200 100
10040	20" x 4" dia. rubber roller	200 100
10047	Film tension spring	200 100
10061	Reducer (5:1 EQ133)	200 100
10067	Cam follower (1/2 inch diameter)	200 99
10093	Reducer (50:1 EQ175)	200 99
10095	Motor (1 1/2 hp DC)	200 99
10123	Limit switch	200 99
10146	Timing belt	200 100
10168	20" heater	200 406
10177	1 1/2" bore pneumatic cylinder	200 406
10186	2" bore pneumatic cylinder	200 406
10195	Clamp assembly (PA)	200 196
10206	Motor (1 hp, 90 vdc, PA)	200 196
10307	Feedback potentiometer	200 100
10397	Motor (1 1/2 hp, DC)	200 769
10398	Reducer (20:1 EQ262)	200 769
10402	Clamp assembly	200 769
10411	Reducer (50:1 EQ175)	200 769

## 9.6 Pneumatic System Maintenance

The air supply system must be checked weekly and must be free from moisture. In humid environments it may be necessary to drain the air supply system daily. The air lubricator should be kept filled to approximately 3/4 of its full capacity, an SAE #10 oil should be used.

## 9.7 Ring Gear Maintenance

If the stretchwrapper has the optional ring gear turntable drive and support system, this maintenance routine must be performed.

The ring gear is located under the turntable and should be lubricated at fixed intervals. This should be carried out by injecting grease into all the lubrication nipples in succession until a collar of fresh grease appears around the perimeter of both sealing rings. The bearing should be rotated slowly during lubrication.

The relubrication interval depends on the operating conditions. For bearings exposed to an aggressive environment, relubrication should occur every 50 operating hours. Normally, relubrication should occur every 100 to 200 hours of operation. The gear teeth should also be relubricated. Lubricants of different manufacture recommended for the ring gear are shown below.

Manufacturer	Raceway Grease	Gearteeth Oil
BP	Energrease LS 2	Energol WRL
Castrol	Spherol AF 2	Grippa 33 S
ESSO	Beacon 2	Surret Fluid 30
Gulf	Crown Grease No. 2	Lubcote No. 2
Mobil	Mobilus 2	Mobiltac E
SHELL	Alvania Grease R 2	Cardium Compound C/Fluid C

and on their surfaces.

### 9.3 Motor Maintenance

An occasional inspection of the brushes should be made in order to establish a wear rate. Replacement brushes should be installed before old brushes wear to  $9/16$ " long, measured on the long side. After replacing brushes run the motor near rated speed for at least  $1/2$  hour with no load to seat the new brushes. Failure to properly seat the new brushes may cause commutator damage and rapid wear of the new brushes. If the commutator becomes rough, scored, or out of round, a competent motor shop should disassemble the motor and resurface the commutator. With every third brush change, have a competent motor shop resurface the commutator and blow the carbon dust out of the motor.

### 9.4 Chain Maintenance

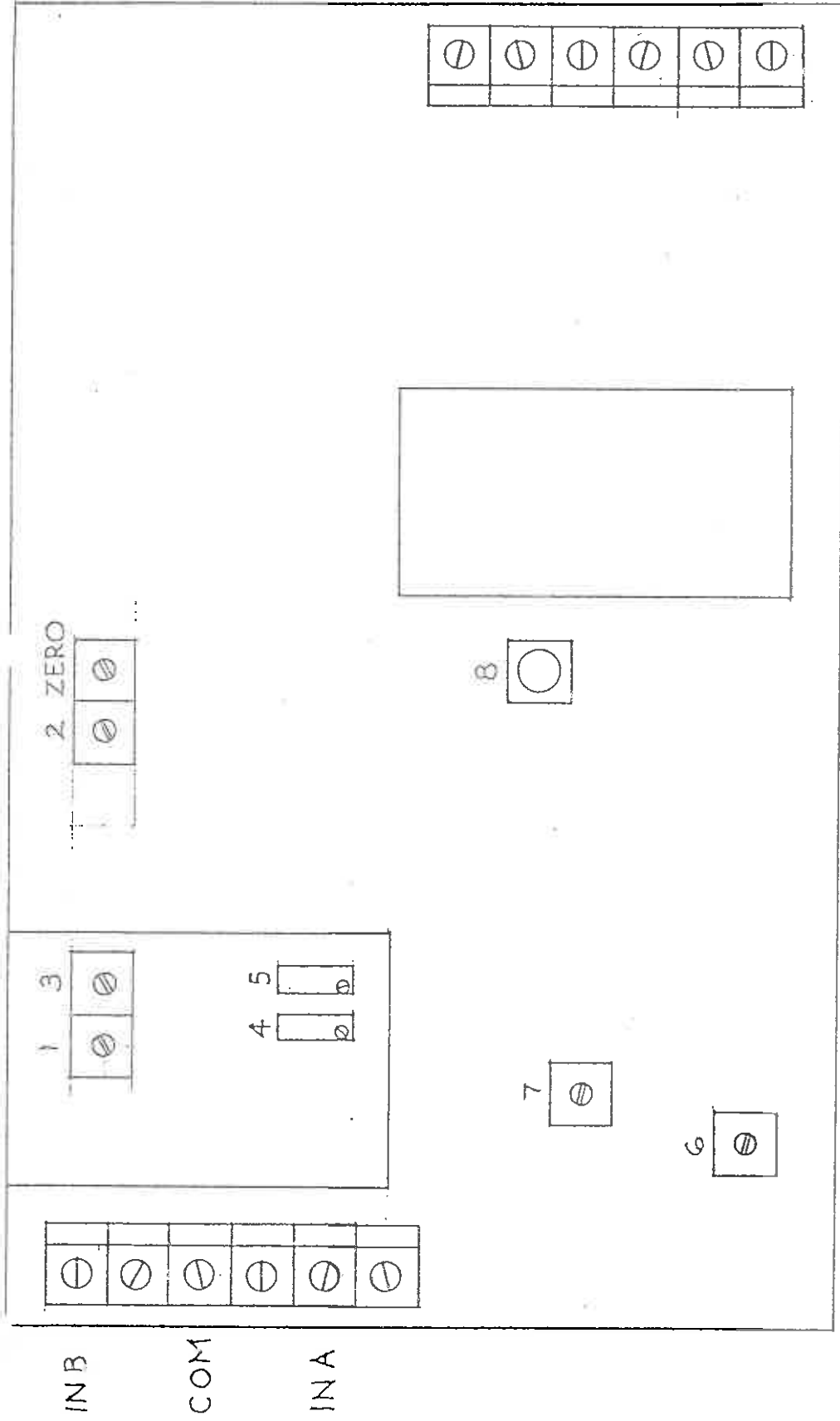
To clean and relubricate chains, wipe them with an oily cloth every month. If the environment is very dusty or damp, it may be necessary to clean and relubricate the chains more often.

With time, chain will tend to stretch. A loose elevator chain should be tightened at the chain tensioner as shown on drawing number 200 192. The drive chain of a caster support system may be tensioned as shown on drawing number 200 97.

### 9.5 Cam Follower Maintenance

The cam followers behind the carriage, on the tower, have deep grease pockets and do not need frequent relubrication.

APPENDIX



ZERO: TURNTABLE DEADBAND ADJ.

1: HIGH SPEED ADJ.

2: JOG SPEED ADJ.

3: LOW SPEED ADJ.

4: HIGH SPEED DECELERATION ADJ.

5: LOW SPEED DECELERATION ADJ.

6: ACCELERATION ADJ.

7: LOAD RANGE ADJ.

8: CURRENT LIMITER

ORION PACKAGING INC.

ÉCHELLE: N.T.S.

SCALE:

APPROUVE PAR:

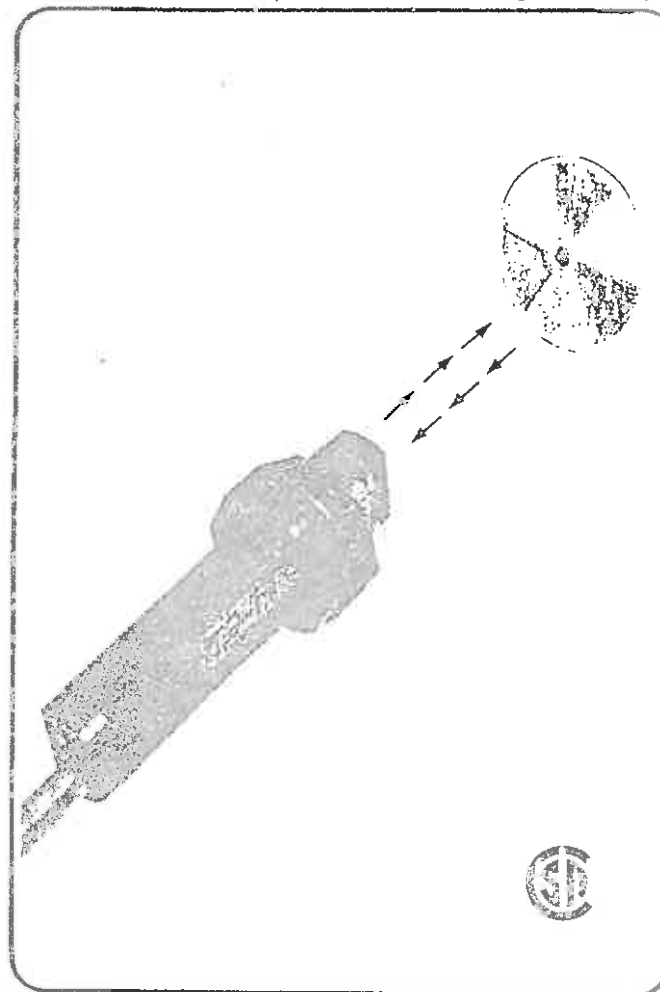
APPROVED BY:

DATE: 16-09-87

750M + 233

**Type 42SRU  
AC/DC  
Long Range  
Visible  
LED  
Beam  
Reflex Control  
Series 6000**

Mini-sized photoelectric sensors  
with adjustable sensitivity  
wide supply voltage range  
and  
power MOSFET output



Type 42SRU AC/DC Long Range Reflex Control

**FEATURES**

- Minimum size with maximum operating features  
—.5"W x 1"H x 3.6"D
- Four ways to mount the control
- Visible LED beam  
—simplifies alignment and inspection
- Rated operating distance to 20 feet (6.1 meters)  
—with adequate operating margins for normal  
Industrial environments
- Two 3-wire AC/DC models operate from  
—20 to 132 VAC or DC  
—20 to 264 VAC or DC
- Low power consumption - 1.2 VA
- Solid state power MOSFET AC/DC output  
—rated 300 mA for 120V models  
—rated 150 mA for 240V models
- LIGHT OPERATE and DARK OPERATE models
- Sensitivity adjustable over wide range
- Synchronous Detection to minimize ambient noise
- No False Turn-On Pulse
- Protected against line voltage transients
- Fast operating response
- Fully Encapsulated with Thick film Microcircuitry for  
Quality and Reliability
- Nema 3, 4, 12, and 13 Corrosion Resistant, High  
Impact Housing
- LED Alignment and Output Indicator
- Control Includes 10 feet (3 meters) of UL Recognized  
Type SJTO cable  
—Not required to be enclosed in conduit  
—Reduces installation cost
- Designed to meet UL requirements
- CSA Certified

**PHOTOSWITCH**



## GENERAL

Type 42SRU Series 6000 AC/DC Long Range Reflex mini-sized self-contained photoelectric controls literally provide new dimensions for the solution of productivity problems by application of photoelectric sensing. They combine PHOTOSWITCH ability, reliability and versatility into functional packages of reduced size, lower cost and increased operating features.

This control consists of a modulated visible LED source, high speed silicon photodetector and state-of-the-art thick film hybrid circuitry to operate a solid state power MOSFET output which can be used to interface with AC or DC power loads as well as with programmable controllers. The small size plus its functional flexibility makes the Series 6000 control ideally suited for space-limited applications on all types of machinery, robotics, conveyors, storage-retrieval systems and other automated assembly and material handling systems.

The Type 42SRU Series 6000 REFLEX control will operate reliably at distances up to 20 feet with a 3 inch retroreflective target and to proportionate distances with other types of retroreflective targets and tapes. See Typical Response Curve on page 2. The control is usable in high ambient light applications. Both LIGHT OPERATE and DARK OPERATE models are available.

Adjustable Sensitivity provides the ability to reduce sensitivity so the control can be used for applications requiring the detection of semi-transparent or translucent objects such as glass or plastic bottles, plate glass, plastic sheet and film when used with small diameter retro targets or retro tape. The externally adjustable sensitivity potentiometer is mounted above the cable entrance at the rear of the control. At the same location, a visible LED Alignment Indicator goes on, for LIGHT OPERATE models, to indicate that the control is on the retroreflective target. For DARK OPERATE models, the LED Alignment Indicator goes off when the control is on the retroreflective

target. In addition, all type 42SRU Reflex controls are factory calibrated to assure no white paper response.

The functional electronics include Synchronous Detection circuitry which tends to restrict the control to operate only with its own pulsed LED source and thereby minimize interference from ambient noise. Also included in the circuit design is the assurance that there will be no false signal when power to the control is first applied.

Type 42SRU Series 6000 AC/DC models are designed to operate from supply voltages spanning the range of 20-132 VAC or DC or 20-264 VAC or DC, depending on model selected. These Reflex controls are three-wire devices consisting of two power leads and one solid state output switch lead — the other output switch lead being common with one power lead. See page 3 for Wiring Diagrams

The solid state output switch is a power MOSFET with a current handling capacity of 300 mA AC or DC for the 20-132 V controls and 150 mA for the 20-264 V scanners. Leakage current, with the switch open, is less than 1 mA for 120 V control and 1.5 mA for 240 V control. However, as a precaution, please note that this device is not suitable to drive low level DC logic because there is a voltage drop of about 2 V across the switch regardless of the load.

Both the MOSFET output and the driving circuitry are protected against destructive line transients by heavy-duty transient suppressors. The MOSFET output will handle inrush currents up to 10 times the continuous current rating. Please note that the MOSFET is not protected against severe overloads and direct short-circuits. Proper fusing is the customer's responsibility.

The electronic circuitry is fully encapsulated and sealed in a corrosion-resistant, high impact NORYL housing and the optical system is fully gasketed to insure Nema 3, 4, 5, 12 and 13 ratings.

The Type 42SRU Series 6000 is designed to function in difficult industrial environments. Its unique dimensional cross-section, 1/2" x 1", offers the best in mounting flexibility. It is round and threaded on the top and bottom and flat on the sides.

The control can be mounted in a nominal 1" diameter hole secured by two knurled hex mounting nuts supplied with the control. Or it can be mounted to a flat surface to take advantage of its 1/2" width. A series of bracket assemblies is available for single-hole or flat-side mounting with angular tilt, horizontal and vertical adjustments to assure installation flexibility. See Page 4 for mounting details.

Type 42SRU Series 6000 AC/DC controls are supplied with a 10 foot long UL Recognized Type SJTO cable that does not require enclosure in conduit. This represents considerable savings in installation cost.

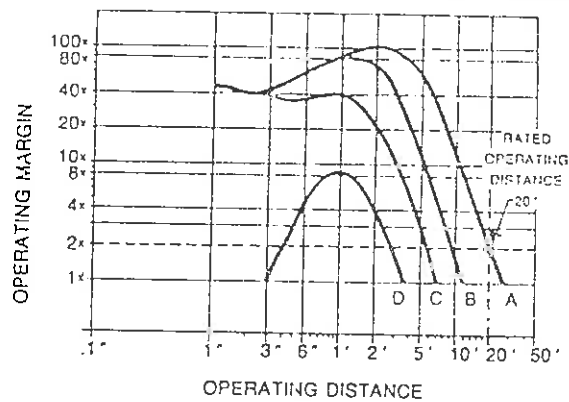
## OPERATING DISTANCE SELECTION

The Maximum operating Distance, shown in the specifications, is based on installing the control in a relatively clean environment. Experience tells us, however, that very few such ambient conditions exist in industry and the more normal industrial environment actually tends to cover the spectrum of classifications from moderately "dusty" to extremely "dirty".

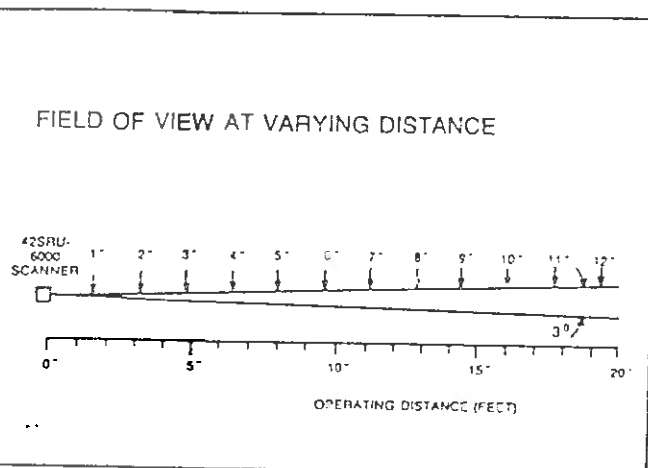
For reliable service in "dusty" and "dirty" environments, greater Operating Margin (Excess Gain) may be required, therefore limiting the reliable Operating Distance of the control. The chart, in the adjacent column, is a typical response curve showing typical operating margins at varying distances.

At the extremes of minimum and maximum rated Operating Distances, rotating the retroreflector might improve the Operating Margin.

TYPICAL RESPONSE — 42 SRU-6000



- A. 3" DIA. #92-39 RETROREFLECTOR
- B. 1.25" DIA. #92-43 RETROREFLECTOR
- C. 0.625" DIA. #92-47 RETROREFLECTOR
- D. 1" SQUARE 3M #7520 RETRO-TAPE



## GENERAL

Type 42SRU Series 6200 AC/DC Polarized Beam Reflex mini-sized self-contained photoelectric controls were designed to solve a major application problem — that of Reflex controls responding to reflective objects and materials other than retroreflective Targets. The Type 42SRU Polarized Beam Reflex control includes a unique optical filter system which will respond only to corner-cube type retroreflective targets. It will not respond to highly reflective surfaces such as stretch wrap, shrink wrap, mylar tape, metal straps, staples, retroreflective tape and even mirrors. This permits the use of easy to install, low cost Reflex controls instead of the more expensive Transmitted-Beam controls for applications where undesirable reflective surfaces are present.

This AC/DC Polarized Beam Reflex control consists of a modulated visible LED source, high speed silicon photodetector, filtered optics and state-of-the-art thick film hybrid circuitry to operate a solid state power MOSFET output which can be used to interface with power loads as well as with programmable controllers. The small size plus its functional flexibility makes the Series 6200 control ideally suited for space-limited applications on all types of machinery, robotics, conveyors, storage-retrieval systems and other automated assembly and material handling systems.

The Type 42SRU Series 6200 Polarized Beam Reflex control will operate reliably at distances up to 10 feet with a 3 inch corner-cube retroreflective target (#92-39) and to proportionate distances with other types of corner-cube retroreflective targets. See Typical Response Curve on Page 2. The control is usable in high ambient light applications. Both LIGHT OPERATE and DARK OPERATE models are available.

Adjustable Sensitivity provides the ability to reduce sensitivity so the control can be used for applications requiring the detection of transparent objects such as glass or plastic bottles, plate glass, plastic sheet and film. The externally adjustable sensitivity potentiometer is mounted above the cable entrance at the rear of the control. At the same location, a visible LED Alignment Indicator goes on, for LIGHT OPERATE models, to indicate that the control is on the retroreflective target. For DARK OPERATE models, the LED Alignment Indicator goes off when the control is on the retroreflective target. In addition, all models are factory calibrated to ensure neither white paper nor mirror response.

The functional electronics include Synchronous Detection circuitry which tends to restrict the control to operate only with its own pulsed LED source and thereby minimize interference from ambient noise. Also included in the circuit design is the assurance that there will be no false signal when power to the control is first applied.

Type 42SRU Series 6200 AC/DC models are designed to operate from supply voltages spanning the range of 20-132 VAC or DC or 20-264 VAC or DC, depending on the model selected. These Reflex controls are three-wire devices consisting of two power leads and one solid state output switch lead — the other output switch lead being common with one power lead. See Page 3 for Wiring Diagrams.

The solid state output switch is a power MOSFET with a current handling capacity of 300 mA AC or DC for the 20-132 V controls and 150 mA for the 20-264 V scanners. Leakage current with the switch open is less than 1 mA for 120 V control and 1.5 mA for 240 V control. However, as a precaution, please note that this device is not suitable to drive low level DC logic because there is a voltage drop of about 2 V across the switch regardless of the load.

Both the MOSFET output and the driving circuitry are protected against destructive line transients by heavy-duty transient suppressors. The MOSFET output will handle inrush currents up to 10 times the continuous current rating. Please note that the MOSFET is not protected against severe overloads and direct short-circuits. Proper fusing is the customer's responsibility.

The electronic circuitry is fully encapsulated and sealed in epoxy in a corrosion-resistant, high impact NORYL housing and the optical system is fully gasketed to insure Nema 3, 4, 5, 12 and 13 ratings.

The Type 42SRU Series 6200 is designed to function in difficult industrial environments. Its unique dimensional cross-section, 1/2" x 1" offers the best in mounting flexibility. It is round and threaded on the top and bottom and flat on the sides. The control can be mounted in a nominal 1" diameter hole secured by two knurled hex mounting nuts supplied with the control. Or, it can be mounted to a flat surface to take advantage of its 1/2" width. A series of bracket assemblies is available for single-hole or flat-side mounting with angular tilt, horizontal and vertical adjustment for installation flexibility. See page 4 for mounting details.

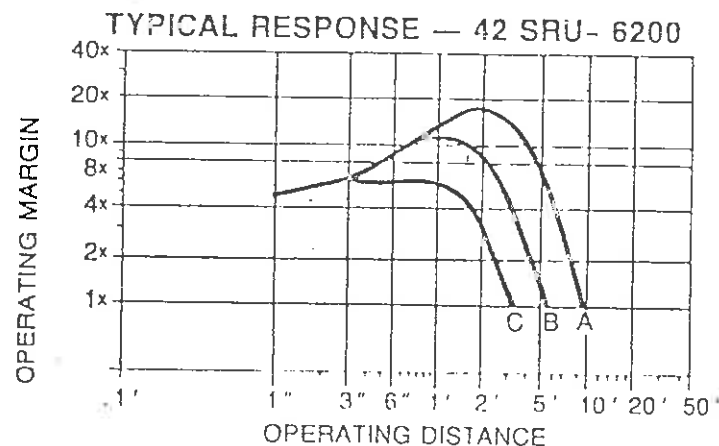
Type 42SRU Series 6200 AC/DC controls are supplied with a 10 foot long UL Recognized Type SJTO cable that does not require enclosure in conduit. This represents considerable savings in installation cost.

## OPERATING DISTANCE SELECTION

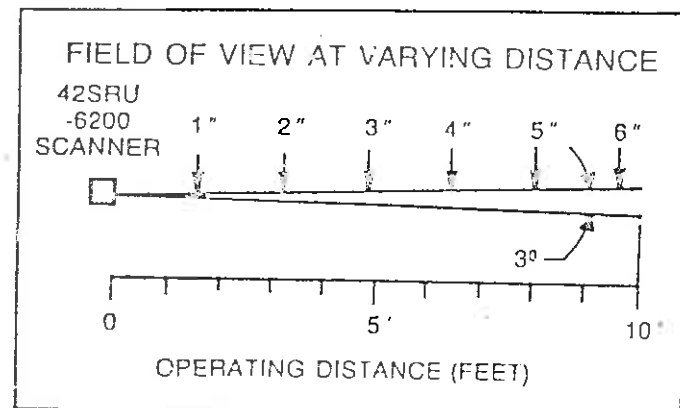
The Maximum operating Distance, shown in the specifications, is based on installing the control in a relatively clean environment. Experience tells us, however, that very few such ambient conditions exist in industry and the more normal industrial environment actually tends to cover the spectrum of classifications from moderately "dusty" to extremely "dirty".

For reliable service in "dusty" and "dirty" environments, greater Operating Margin (Excess Gain) may be required, therefore limiting the reliable Operating Distance of the control. The chart, in the adjacent column, is a typical response curve showing typical operating margins at varying distances.

At the extremes of minimum and maximum rated Operating Distances, rotating the retroreflector might improve the Operating Margin.



- A. 3" DIA., #92-33 RETROREFLECTOR
- B. 1.25" DIA., #92-46 RETROREFLECTOR
- C. 0.625" DIA., #92-47 RETROREFLECTOR





# SLC™ 150 Programmable Controller

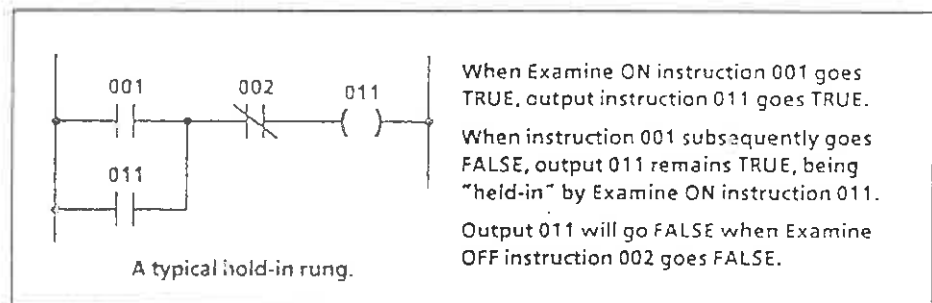
## Addendum to SLC 150 Processor Unit Product Data, Publication 1745-2.5

**Overview** This addendum covers the following subjects:

- Operating differences between Series A and Series B processor units with regard to "hold-in" rungs.
- Comparison of SLC 100 and SLC 150 units with regard to ZCL zone operation.
- Explanation of zero-cross fault correction for the ~~Zero-Cross~~ Turn-On instruction.

**IMPORTANT:** The examples and diagrams in this publication are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Allen-Bradley Company cannot assume responsibility or liability for actual use based on the examples and diagrams.

### Hold-In Rungs — Series A vs Series B



The figure above shows a typical hold-in rung, analagous to the familiar electromechanical start-stop hold-in circuit. Both Series A and Series B SLC 150 processor units will function as described in the figure. However, there are two conditions under which Series A and Series B operation is different. These are pointed out in the table below.

Event	Status of Non-Retentive Outputs in Hold-In Rungs	
	Series A SLC 150	Series B SLC 150 and Series A, B, C SLC 100
Power is cycled from Off to On.	Outputs return to their last state.	Outputs are Off.
Processor is switched from the Run mode to any other operating mode, then switched back to the Run mode.	Outputs return to their last state. However, if the Program mode was entered and a program change was made, outputs will be Off.	Outputs are Off.

### ZCL Zone Operation

The table below lists operational differences between SLC 100 and SLC 150 processor units. The table applies for either of the following conditions:

1. ZCL zone is FALSE. Non-retentive outputs inside ZCL zone are being held in last state.
2. ZCL zone is either TRUE or FALSE. Non-retentive output instruction inside ZCL zone is being held ON by hold-in rung (see Page 1 figure).

Event	Status of Outputs Within ZCL Zone	
	SLC 100 Series A, B, C and SLC 150 Series A	SLC 150 Series B
Power is cycled from Off to On.	Outputs return to their last state.	Outputs turned Off.
Processor is switched from the Run mode to any other operating mode, then switched back to the Run mode.	Outputs return to their last state. However, if the Program mode was entered and a program change was made, outputs will be Off.	Outputs turned Off.

### Triac Zero-Cross Turn-On Instruction - Address 866

This is an output energize instruction at address 866. It is used to synchronize triac outputs with the AC line to help minimize noise generated when switching loads. To achieve zero-cross turn-on, you must use a common power source for the processor unit power supply and the output circuits.

**Zero-Cross Fault:** The Processor measures the input power frequency each time you power-up. If the frequency falls outside the ranges of 57-63 Hz or 47-53 Hz, a processor fault may occur. The pocket programmer will display error 27. When this happens, press the cancel key; if the number 2 appears, the error is a zero-cross fault. (If you are using the SLC Personal Computer Software, a message indicating a Zero-Cross fault appears on the screen.)

Correct the fault as follows:

1. Remove input power to the processor.
2. Correct the input power problem so that the input frequency remains within a valid range.
3. Apply input power to the processor.

**Note:** When you perform the corrective action above, retentive outputs (timers, counters etc.) will remain in their last state when the Run mode is re-entered. If you want the retentive outputs to be reset to their Off states on power-up, you must clear the error message *before* performing the corrective steps above. Do this by pressing the cancel key until the message "Run 3" is displayed. (If you are using the SLC Personal Computer Software, press any key until the main menu is displayed.) Then correct the fault as indicated above.

# SPECIFICATIONS

- Voltage Supply:**  
 Model 6004 (Light Operate).....20 to 132 VAC or DC  
 Model 6005 (Dark Operate).....20 to 132 VAC or DC  
 Model 6006 (Light Operate).....20 to 264 VAC or DC  
 Model 6007 (Dark Operate).....20 to 264 VAC or DC
- Power Consumption**.....1.2 VA
- Rated Load Current**  
 Models 6004 and 6005 .....300 mA AC or DC  
 Models 6006 and 6007 .....150 mA AC or DC
- Inrush Current** .....10x Rated Load Current
- Leakage Current (Off-State)**.....1 mA max. at 120 V  
 .....1.5 mA max. at 240 V
- Response Time (Includes output switch)**  
 Models 6004 and 6005 .....12 milliseconds for AC  
 .....5 milliseconds for DC  
 Models 6006 and 6007 .....18 milliseconds for AC  
 .....10 milliseconds for DC
- Transmitter LED**.....Visible RED, 660 nanometers
- Turn-On Pulse Suppression** .....YES
- Sensitivity Adjustment**.....YES
- Field of View** .....3°
- Ambient Temperature Range**.....-40° F to +150° F  
 .....-40° C to + 65° C
- Relative Humidity** .....95%

**Operating Environment:**  
 Nema 3, 4, 5, 12 and 13 rated housing. Made of very high  
 act and chemically resistance NORYL.

**Operating Distances:**  
 Maximum Operating Distance - 20 feet (6.1m)  
 Minimum Operating Distance - 1 inch (2.54cm)  
 - 3 inches (7.6cm) with tape

With 2 to 1 Operating Margin:

Retroreflective Targets			1" Square Retroreflective Tape (3M)			
3" Diam #92-39	1.25 Diam #92-47	625 Diam #92-46	#3370	#7590	#7610	#7900
20 ft. (6.1m)	9 ft. (2.74m)	6 ft. (1.82m)	4.5 ft. (1.37m)	3 ft. (.91m)	5.5 ft. (1.68m)	3.5 ft. (1.07m)

Notes: See Typical Response Curve on Page 2  
 \*Consult Factory

**Cable:**  
 10 feet UL Recognized Type SJTO, 3 conductor  
 For extension beyond 10', order required footage of #59-296  
 cable.

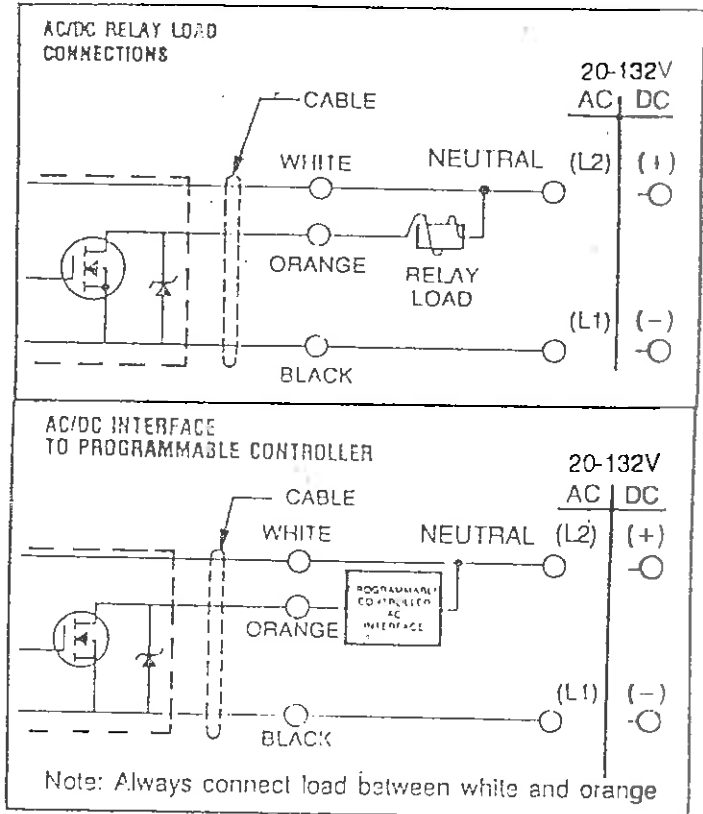
## ORDERING INSTRUCTIONS

1. Select Control

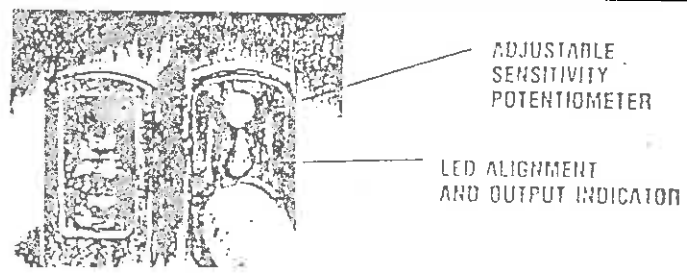
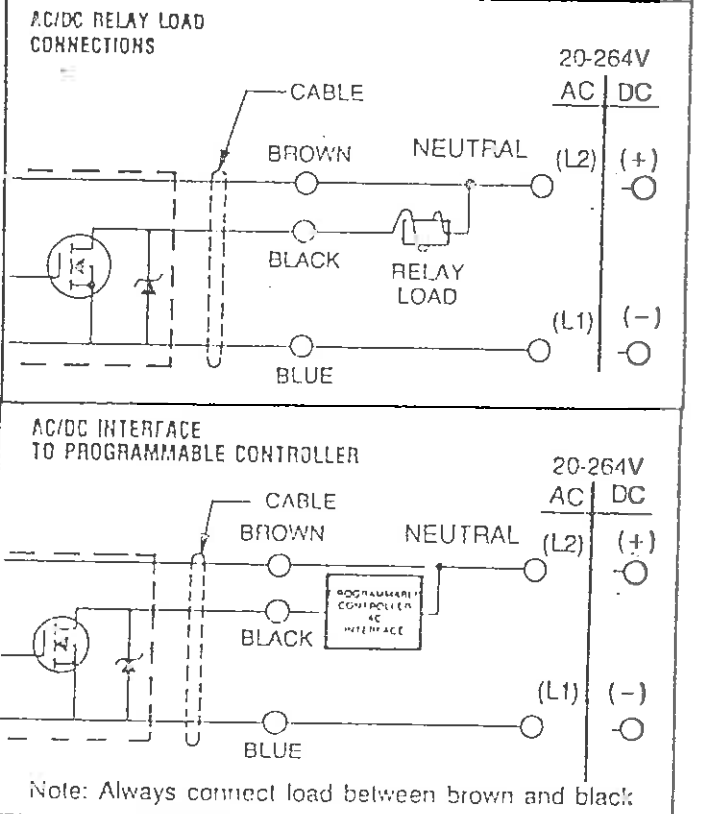
Voltage Supply	Light Operate	Dark Operate	Type and Model
20-132 V AC OR DC	X	X	42SRU-6004 42SRU-6005
20-264 V AC OR DC	X	X	42SRU-6006 42SRU-6007

2. Accessories (Optional):  
 #60-2006 Single Hole Mounting Assembly  
 #129-99 Hex Mounting Nuts (2) Package (included with control)  
 #60-2007 Tilt Mounting Assembly

## MODELS 6004 AND 6005



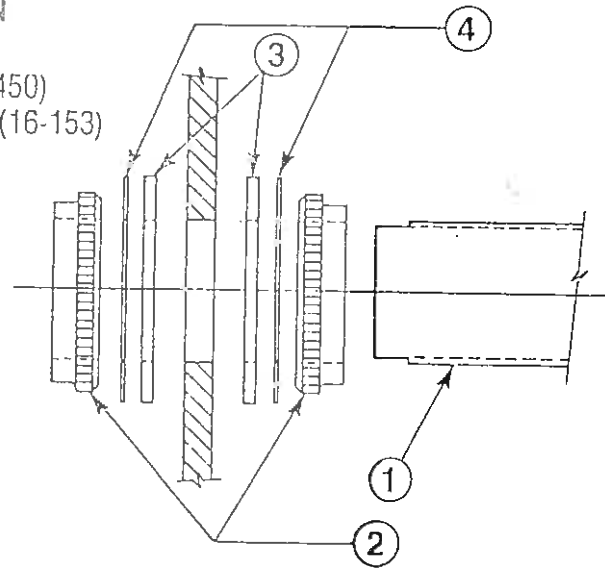
## MODELS 6006 AND 6007



## INSTALLATION INSTRUCTIONS FOR ANTI-VIBRATION MOUNTING

### PART IDENTIFICATION

- ① SERIES 6000 UNIT
- ② PLASTIC NUTS (33-450)
- ③ VIBRATION MOUNT (16-153)
- ④ SLIP PAD (89-51)



133-440

### 6000 SERIES CONTROLS FEATURE INTERFERENCE AVOIDANCE BY CHOICE OF FREQUENCIES

6000 Series Controls are supplied to operate at two different frequency ranges, permitting controls to be mounted close to each other without generating interfering signals.

Units in one frequency range are marked with a dot (\*) next to date code. Units in the other frequency range have no dot.

Accordingly, when two Series 6000 Controls are mounted close together and/or face each other, select controls so that one is marked with a dot (\*) and the other has no dot.

131 419

# INSTALLATION

The Type 42SRU Series 6000 control must be mounted on a firm, stable surface or support. A mounting, which is subject to excessive vibration or shifting may cause intermittent operation. For installation convenience, we offer four mounting methods.

1. **Single Hole Mounting Assembly #60-2006.** A mounting bracket, with a nominal 1" hole, in which the 42SRU control is inserted and secured with the mounting nuts supplied with the control.
2. **Tilt Mounting Assembly #60-2007.** Includes stainless steel bracket and hardware to provide angular tilt adjustments.
3. **Universal Mounting Assembly #60-2008.** Includes stainless steel bracket and hardware to provide horizontal and vertical adjustments.
4. **Combination Assembly consisting of Tilt #60-2007 and Universal #60-2008 Mounting Accessories** to provide horizontal, vertical and angular tilt adjustments.

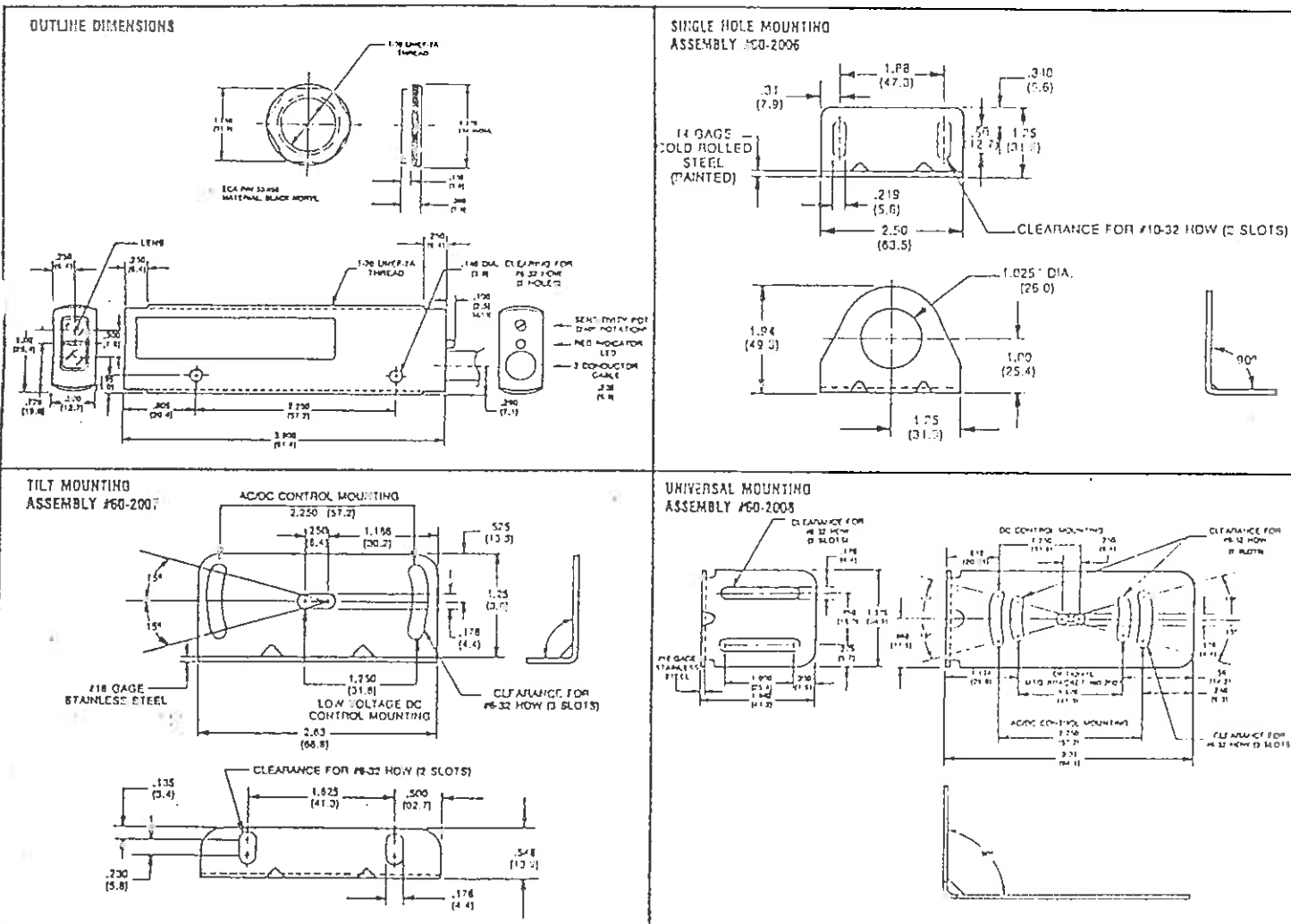
## Wiring:

All external wiring should conform to The National Electric Code and applicable local codes. See Wiring Diagrams on Page 3 for external connections.

## ALIGNMENT

Alignment of the Type 42SRU control, can be accomplished by visually sighting the control of the Retroreflector until the visible LED on the rear of the control glows (with LIGHT OPERATE model) or goes out (with DARK OPERATE model).

To be certain that the beam is centered on the retroreflector, it is required to sweep the LED beam across the reflector in the horizontal plane and determine at what position the Alignment Indicator goes on and then goes off, set the beam halfway between both positions. Do the same in the vertical plane.



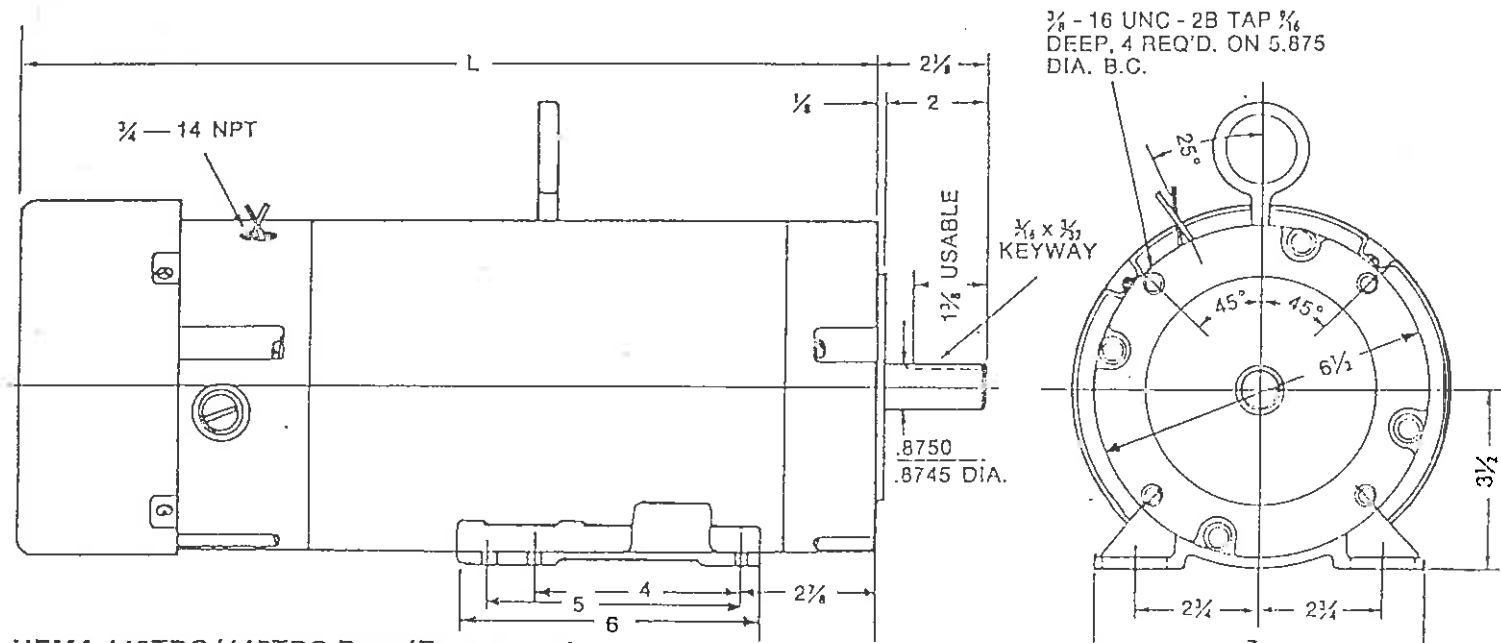
## ELECTRONICS CORPORATION OF AMERICA PHOTOSWITCH DIVISION

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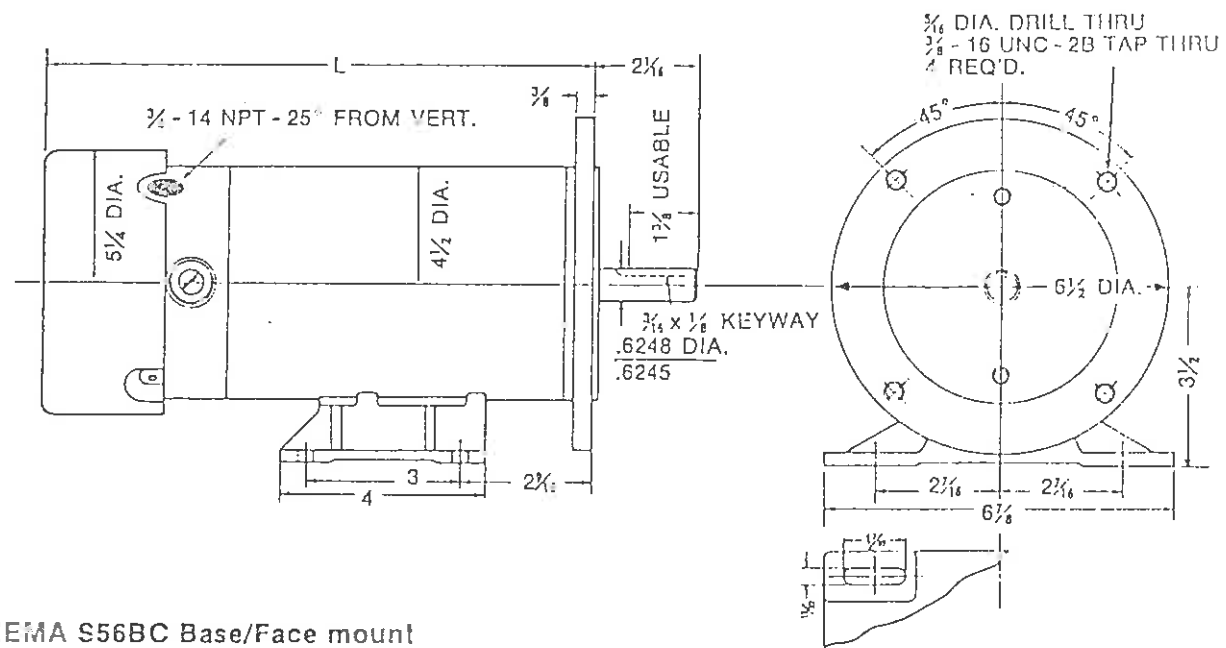
# Motor dimensions

## TEFC P/M motor



NEMA 143TBC/145TBC Base/Face mount

HP	RPM	VOLTS	AMPS	MTG. DIA.	MTG. DIA.
1.5	1800	180	8.2	15 1/2	CONT.
2	1800	180	11.6	16 1/2	CONT.



NEMA S56BC Base/Face mount

180 V.

HP	RPM	VOLTS	AMPS	MTG. DIA.	MTG. DIA.
1/2	1725	180	2.8	10 3/4	CONT.
3/4	1725	180	3.5	12 3/4	CONT.
1	1725	180	5.35	14 3/4	CONT.

90 V.

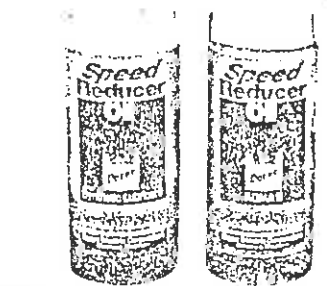
HP	RPM	VOLTS	AMPS	MTG. DIA.	MTG. DIA.
1/2	1725	90	5.35	10 3/4	CONT.
3/4	1725	90	8.1	12 3/4	CONT.
1	1725	90	10.6	14 3/4	CONT.



# Lubrication

REDUCERS MAY BE FILLED TO THE PROPER LEVEL AT THE FACTORY WITH AGMA No. 8 compounded oil. AFTER INSTALLATION OF THE BREATHER PLUG, UNIT IS READY FOR USE. Before installing breather plug, refer to instruction tag and determine proper position according to reducer mounting.

We recommend an initial oil change after 250 hours of operation, then every six months or every 2500 hours of service under Class I Service. If fluctuating temperatures, humid, dirty or corrosive environment, oil changes should be made more frequently. Frequency can be established by oil sample analysis.  
KEEP YOUR OIL CLEAN



## Doerr Electric Replacement Oil

To order oil, request:  
 Doerr part no. 00019001 — synthetic AGMA #7EP (-40°F to 150°F)  
 Doerr part no. 00019101 — AGMA #8 (50°F to 125°F)

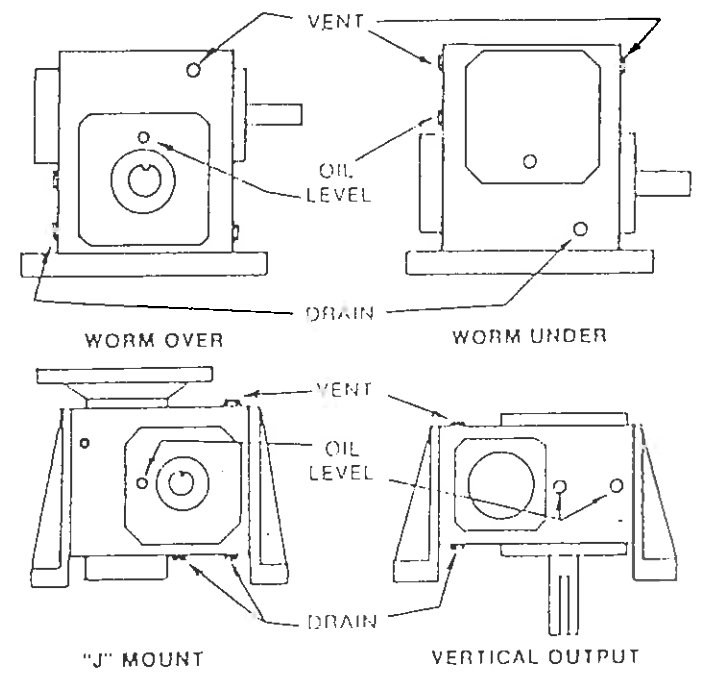
Oil is packed 12 one quart bottles per carton, minimum ship one carton.  
 Contact DEC Service Dept. for order information.

### OIL CAPACITIES\*

UNIT TYPE	UNIT SERIES				
	100	100	200	300	310
Worm Over	14	20	27	49	84
Worm Under	17	22	28	49	73
Vertical Output	10	15	20	37	63
"J" Mount	13	18	23	38	63

\*Capacities in approximate ounces. On double reduction units determine capacity of both primary and secondary reducers.

### OIL LEVELS\*



\*On double reduction units fill and vent each unit to levels shown.

## TEMPERATURE SETTING OF CAL-STAT

Unless otherwise specified the temperature setting of CAL-STAT should be made in the following manner.

1. The open on temp. rise (O.T.R.) CAL-STAT will be adjusted to open at the set point and the close on temp. rise (C.T.R.) CAL-STAT will be adjusted to close at the set point.
  2. Connect unit leads to heater with test light or other device suitable for determining contact position. (Contacts should be closed on O.T.R. units and open on C.T.R. units at this point).
  3. Procedure for setting CAL-STAT:
    - 3.1 Install CAL-STAT in media to be controlled.
    - 3.2 Allow temp. of media to increase to 10° to 20° above required temp. by turning the adjusting screw CCW (Adjusting rate: approx. 90°F/rev. for 5/8" CAL-STAT). Allow media to stabilize at this temp.
    - 3.3 Turn adjusting screw C.W. in small increments until desired control temp. is reached.
    - 3.4 CAL-STAT is now set.
- NOTE: If over adjustment is made during step 3.3, re-start at step 3.2.
4. If readjustment is required, return to step 3.2 and repeat the procedure. Remember that all readjustments must be made by turning the adjusting screw C.W. to reach the desired set point.
  5. Slow make-break CAL-STATS may be subject to a small amount of set point drift after the first few cycles under load. Due to relaxation of stresses and other factors, checking of set point and readjustment, if required, after approximately 100 cycles under load is recommended if very close control of set point is desired.

## VULCAN ELECTRIC COMPANY VULCAN CAL-STAT®

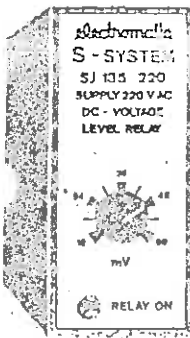
This unit is calibrated for.....°F. To increase setting turn screw CCW. Do not turn screw more than 7 revolutions in either direction from room temp. without checking set point. Disassembly of adjusting screw may render thermostat inoperative. Adjusting rate is approx. 90°F./revolution. Observe electric rating marked on unit.

In mounting, allow for expansion on both longitudinal and transverse axes. Our products are warranted to be free from defects in material and workmanship for a reasonable period of time, usually one year. Damage resulting from mishandling, improper application or injurious ambients cannot be covered by this warranty.

CONSULT FACTORY FOR SPECIAL  
APPLICATIONS

Electrical Boards' Chart  
for  
ORION Stretchwrappers

	168-4	168-A	236	336	750+	750M-240Y	850M	850C	155-3A
MLH 44 Processor	X		X		X				
MLH 44	X		X		X				X
MLH 55		X		X			X		X
MLH 66		X		X			X		X
MLH 77		X							X
PA 33	X			X	X				
FA 33	X			X		X		X	
MA 33	X			X		X		X	
MA 44	X			X	X			X	
MA 55	X			X			X	X	



SJ 135 =  
11-pin circular plug

# SJ 135



- \* DC voltage metering relay with absolute scale.
- \* Measuring range: 12 mV - 500 VDC, divided into 10 ranges.
- \* Knob-adjustable set point.
- \* Latching at set level possible.
- \* 10 A SPDT output relay.
- \* LED-indication: relay on.
- \* AC or DC power supply.

## SPECIFICATIONS

### The common technical data

#### Measuring ranges

Ranges	Internal resistance	Max. voltage	YYYYY
12 - 60 mV	100 Ω	1 V	60 mV
30 - 150 mV	150 Ω	2 V	150 mV
0.2 - 1 V	1 KΩ	10 V	1 V
1 - 5 V	3 KΩ	30 V	5 V
2 - 10 V	10 KΩ	50 V	10 V
4 - 20 V	20 KΩ	100 V	20 V
10 - 50 V	51 KΩ	150 V	50 V
30 - 150 V	150 KΩ	350 V	150 V
60 - 300 V	300 KΩ	500 V	300 V
100 - 500 V	510 KΩ	600 V	500 V

#### Hysteresis

Approx. 10%.

The hysteresis can be extended to approx. 75% by connecting a suitable resistor between pins 8 and 9.

Resistor limits are 470 KΩ/3 KΩ (0.25 W).

The hysteresis increases by decreasing resistance.

#### Latching

By interconnecting pins 8 and 9 the relay will latch at set level until either the power supply or the interconnection is interrupted.

#### Ordering key

11-pin circular plug.

SJ 135 XXXYYYYY = 10 A SPDT

XXX = power supply

024 = 20-28 VAC

115 = 95-135 VAC

230 = 155-265 VAC

724 = 20-28 VDC

YYYYY: See measuring ranges.

#### Accessories

Bases.

Hold down spring.

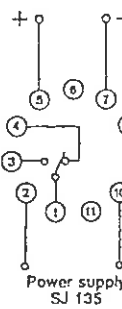
Mounting rack.

Base covers.

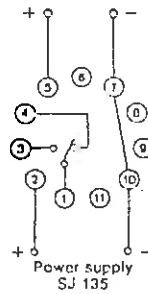
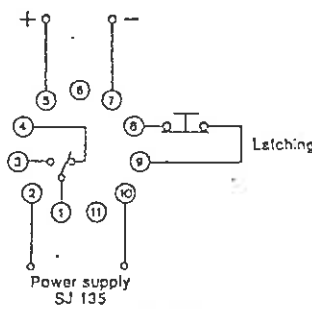
Front mounting bezel.

## WIRING DIAGRAMS

Example 1



Example 2



Note:  
Internal connection between pins 7 and 10 at DC power supply. No current is to pass through this internal connection.

## MODE OF OPERATION

### Example 1

DC voltage metering.  
(AC power supply).

The relay will operate when the actual voltage equals the set value.

The relay releases when the voltage drops min. 10% below the set value (see hysteresis) or when the power supply is interrupted.

### Example 2

DC voltage metering. Latching.  
(AC power supply).

The relay will operate and remain in operating position when the actual voltage equals the set value.

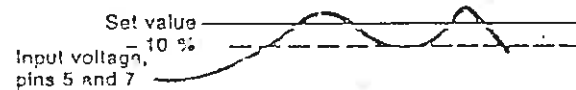
Provided that the voltage has dropped min. 10% below the set value (see hysteresis), the relay will release when the interconnection between pins 8 and 9 is interrupted.

The relay also releases when the power supply is interrupted.

## OPERATION DIAGRAM

Example 1

Power supply

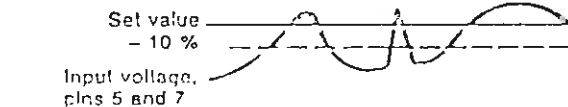


Relay on

Example 2

Power supply

Latching



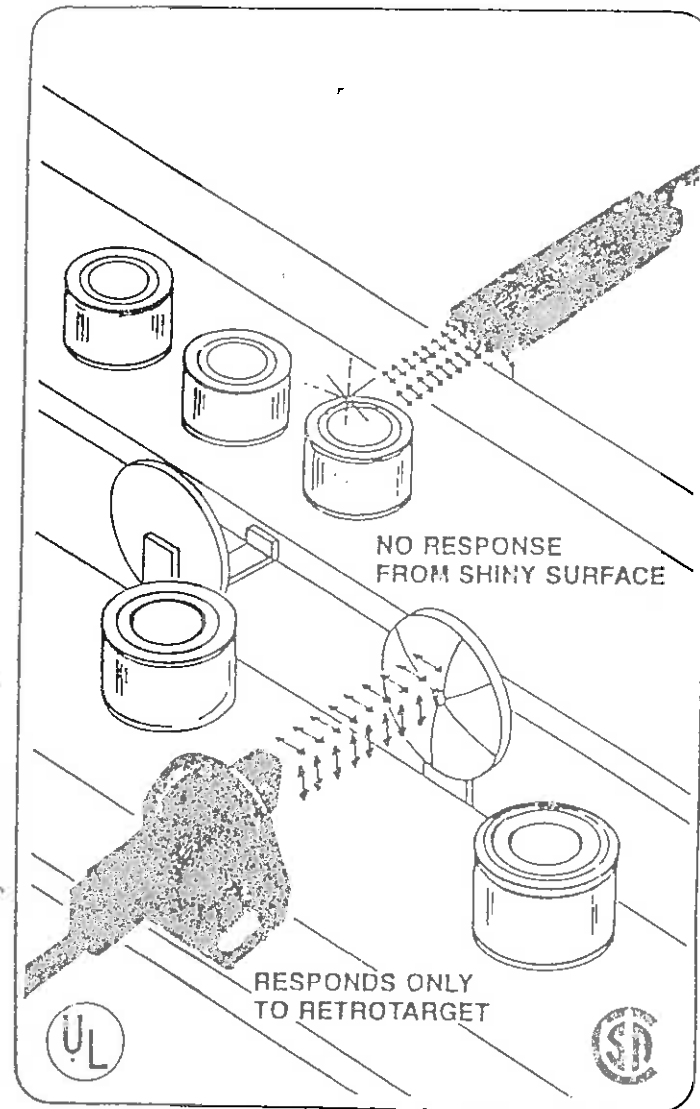
Relay on

**Type 42SRU  
AC/DC  
POLARIZED  
Visible  
LED  
Beam  
Reflex Control  
Series 6200**

Responds only to Retro Targets  
No false signals from  
other shiny surfaces

**FEATURES**

- Minimum size with maximum operating features  
—.5"W x 1"H x 3.6"D
- Four ways to mount the control
- Polarized Visible LED beam  
—simplifies alignment and inspection
- Maximum operating distance to 10 feet (3.05 meters)  
—8 feet (2.44 meters) with 2 to 1 operating margin
- Two 3-wire AC/DC models operate from  
—20 to 132 VAC or DC  
—20 to 264 VAC or DC
- Low Power Consumption - 1.2 VA
- Solid state power MOSFET AC/DC output  
—rated 300 mA for 120V models  
—rated 150 mA for 240V models
- LIGHT OPERATE and DARK OPERATE models



Type 42SRU AC/DC Polarized Reflex Control

- Sensitivity adjustable over wide range
- Synchronous Detection to minimize ambient noise
- No False Turn-On Pulse
- Protected against line voltage transients
- Fast operating response
- Fully Encapsulated with Thick Film Microcircuitry for Quality and Reliability
- Nema 3, 4, 12, and 13 Corrosion Resistant, High Impact Housing
- LED Alignment and Output Indicator
- Control Includes 10 feet (3 meters) of UL Recognized Type SJTO cable  
—Not required to be enclosed in conduit  
—Reduces installation cost
- UL Listed
- CSA Certified

**PHOTOSWITCH**


**MAINTENANCE INSTRUCTIONS**

STANDARD REDUCERS SERIES 133, 175, 206, 262, 325

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# MAINTENANCE INSTRUCTIONS FOR STANDARD REDUCERS

Series 133, 175, 206, 262 and 325

## INTRODUCTION

The following instructions apply to standard Worm Gear Reducers. When ordering parts or requesting information specify all information stamped on the reducer nameplate. The nameplate will also identify the type of lubricant to be used.

## EQUIPMENT REQUIRED

In addition to standard mechanic's tools, the following equipment is required: arbor press, wheel puller, torque wrench, dial indicator, seal driver, bluing, Permatex No. 2 and Permatex No. 3, snap ring pliers for internal and external rings.

## GENERAL INSTRUCTIONS

**Housings** — Clean external surfaces of reducer before removing seal cages and end covers to prevent dirt from falling into the unit. Record mounting dimensions of accessories for reference when reassembling. If it is necessary to remove the reducer from its operating area, disconnect all connected equipment and lift reducer from its foundation.

**Seals** — Replacement of all seals is recommended when a unit is disassembled. However, if seals are not to be replaced, protect seal life by wrapping shaft with thin, strong paper coated with oil or grease before removing or replacing seal case assembly. Clean the shaft but do not use any abrasive material on the shaft surface polished by the seal.

## CAUTION

If the reducer is painted, extreme care should be taken to mask the shaft extensions and rubber surface of the seals. Paint on the shaft adjacent to the seal or on the seal lip will cause oil leakage.

## TO CHANGE OUTPUT SHAFT DIRECTION

To change the hand of a unit from left hand to right hand, or vice versa, the following instructions apply:

1. Remove drain plug and drain oil from unit.
2. Remove end cover and seal cage cap screws; then while supporting output shaft remove end cover and shims from the unit.
3. Remove output shaft and seal cage together from extension side.

**NOTE:** Keep shims with their respective seal cage and end cover.

4. Insert seal cage, shims and sub-assembly into the housing from the side opposite from which they were removed. Insert seal cage cap screws and tighten with light pressure.
5. Assemble end cover and shims. Insert end cover cap screws and tighten with light pressure.
6. Turn high speed shaft in both directions to see that gear train is running freely.
7. Cross tighten seal cage and end cover cap screws to torques listed in Table 1.

TABLE 1. CAPSCREW TIGHTENING TORQUE

Capscrew Diameter	1/4 - 20 UNC	5/16 - 18 UNC	3/8 - 16 UNC
Torque (in. lbs.) Dry	96	204	360

## UNIT DISASSEMBLY, PARTS SERVICE, AND ASSEMBLY

### Disassembly:

1. Remove drain plug and drain oil from unit.
2. Low speed shaft (gear shaft) removal:
  - A. Remove end cover and seal cage cap screws.
  - B. With a firm hold on the output extension remove end cover and shims.
  - C. Carefully slide output shaft assembly and seal cage out extension side.
  - D. Slide seal cage off low speed shaft using caution to prevent damage to seal lips.
  - E. Wire or tie the shims to their mating end cover and seal cages. They will be available for reference when assembling the unit.
3. High speed shaft (worm shaft) removal:
  - A. Position unit with input shaft down. With a small chisel make a groove in the stamped steel cover opposite the shaft extension. Pry cover off.

- B. Remove internal snap ring from housing bore.
- C. Reposition the housing with the worm shaft horizontal. Using a plastic hammer gently tap on the end of the shaft extension to feed worm shaft assembly through housing and out.

**Parts Service:**

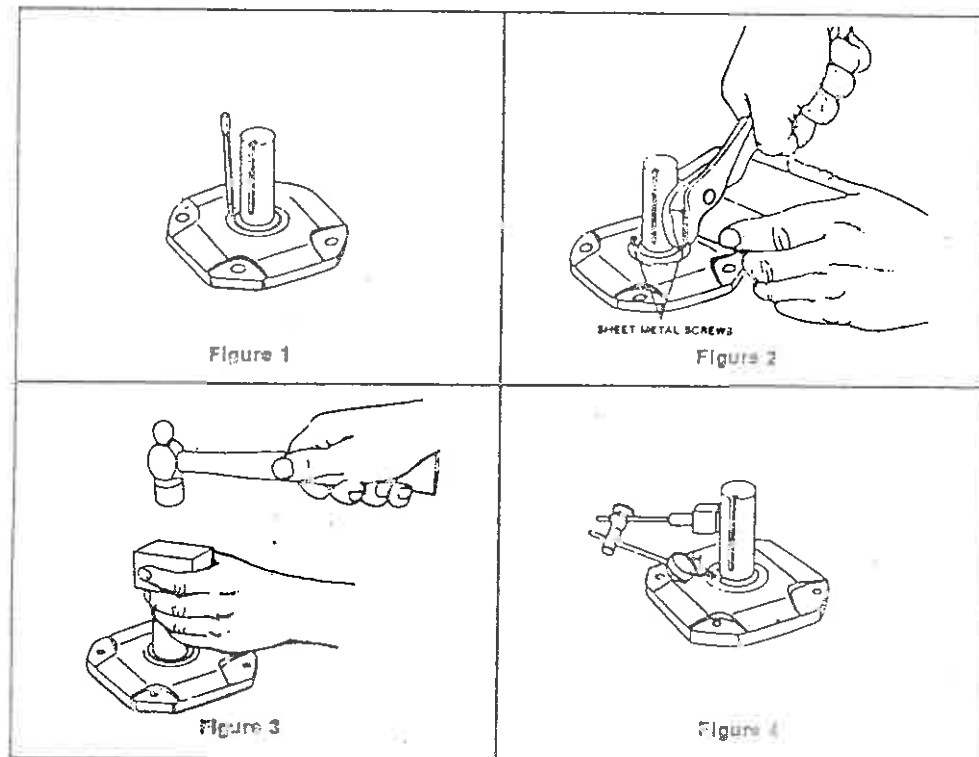
- 1. **Housing** — Clean inside of housing with kerosene or solvent and then dry.
- 2. **Seal cages and end cover** — Remove dirt from joint faces, wipe clean and dry.
- 3. **Air vent** — Wash in kerosene, blow clean and dry.
- 4. **Seals** — To replace seals without dismantling reducer refer to steps C through F below. To replace seals when the entire reducer is dismantled and coupling hubs, sprockets, pulleys, pinions, keys, etc. have been removed the following instructions apply:

**NOTE:** Replacement of all seals is recommended when a unit is disassembled.

**Caution**

New seals will leak if the seal lips or if seal's rubbing surface on the shaft has been altered. Protect seal lips at all times. Clean the shaft but do not use any abrasive material on the shaft surface polished by the seal.

- A. Block up seal cages and press or drive out seal.
- B. Remove old sealing compound from seal seat in cage if it is present. If a seal with rubber coating on the outside diameter is used, no Permatex is necessary. If no rubber coating is on seal outside diameter, coat seal cage bore with Permatex No. 3 or equivalent immediately before assembly. To prevent possible damage to seal lips, do not reassemble seals until high speed and low speed shafts have been reassembled to the housing. Then see steps E and F below.
- C. See Figures 1 through 4—To replace seals without dismantling reducer, proceed as follows:





**Caution**

Do not damage shaft; new seals will leak if seal contacting surface is marred. Use punch and place two or more holes in steel casing of seal, Figure 1. (The steel casing may be rubber coated) Insert sheet metal screws, leaving the heads sufficiently exposed so they can be pried up or grasped with pliers, Figure 2. Do not drill holes because chips may get into the unit.

- D. Work seal loose. Be careful to keep all metal or dirt particles from entering unit. Remove old sealing compound from seal if it is present. Also remove burrs and sharp edges from shaft. Clean with rag moistened with solvent. Do not use abrasive material on shaft seal contacting surface.

**Caution**

- E. Protect seal lips when handling; seal leakage will result if these are damaged. If a seal with rubber coating on the outside diameter (O.D.) is used, no Permatex is necessary. If no rubber coating is on seal O.D., coat seal cage bore with Permatex No. 3 or equivalent. Coat seal lips with oil and carefully work seal into position. Before sliding seal into position, protect seal lips from shaft keyway edges by wrapping shaft with thin, strong paper coated with oil. Position garter spring toward the inside of the unit. Place a square faced pipe or tube against the seal O.D. and drive or press seal until fully seated as shown in Figure 3. Do not strike seal directly.

- F. For best performance, seat the seal square with shaft within .005" at 180°. Check with dial indicator as shown in Figure 4, Page 2, or with a straight edge and feelers, or square and feelers. To straighten a cocked seal, place tubing over the seal and tap the tube lightly at a point diametrically opposite the low point on the seal. DO NOT strike seal directly.

**5. Bearings —**

- A. Wash all bearings in clean kerosene and then dry.  
B. Inspect bearings carefully and replace those that are worn or questionable.  
**NOTE:** Replacement of all bearings is recommended.  
C. Use a wheel puller or press to remove worm shaft bearings. Apply force to inner race only — not to cage or outer race.  
D. Use a wheel puller or press to remove output bearing inner races.  
E. New seal cages and end covers must be used when replacing output bearings. Output bearing outer races must be pressed in square and seated completely.  
F. To replace output bearing inner races and all input bearings, heat bearings in an oil bath or oven to maximum of 290 degrees F (143 degrees C). Slide high speed shaft bearings onto the oiled shaft until seated against the shoulder or snap ring of the shaft. Slide low speed shaft bearings onto the oiled shaft against the gear spacer.  
G. Thoroughly coat all bearings with lubricating oil.

**6. Worm, gear and shafts**

- A. Worm and high speed shaft—since all worms are integral with the high speed shaft, any wear or damage to the worm will necessitate replacing both.  
B. Press shaft out of bronze worm gear. To reassemble gear and low speed shaft, freeze shaft or heat gear. Do not exceed 200 degrees F (93 degrees C). Insert key into shaft keyway and press shaft into oiled gear bore. The short hub of the gear must be assembled toward snap ring on the shaft.  
**NOTE:** It is advisable to replace both the worm and worm gear should either of the assemblies require replacement.

Unit Reassembly:

1. Preliminary
  - A. Check to see that all worn parts have been replaced, gear and bearings coated with oil and all parts cleaned. Remove all foreign matter from unit feet. The feet must be flat and square with each other.
  - B. Before starting to reassemble reducer, add old shims or replace with new shims of equal thickness.
2. High Speed Shaft (Worm Shaft) Assembly
  - A. Lubricate bearing bores of housing and insert high speed shaft sub-assembly from opposite extension end into housing until seated against shoulder in bore. Tap the end of the shaft lightly with a plastic hammer to feed bearings through bores.
  - B. Lock high speed sub-assembly in housing bore with lock ring.
  - C. Coat outside diameter of stamped steel end cover with Permatex No. 2 and press into high speed bore opposite extension end until flush with housing. If steel endcover is rubber coated then no Permatex is necessary.
3. Low Speed Shaft (Gear Shaft) Assembly
  - A. Determine output shaft direction.
  - B. Assemble low speed shaft assembly, seal cage, and end cover with shims on both seal cage and end cover. Torque cap screws to torques listed in Table 1. Rotate the input shaft to seat output bearings.
  - C. Moving the shaft back and forth by hand, check axial float with dial indicator as shown in Figure 5. Axial float must be .0005-.003 with .0005 being the absolute minimum. Do not preload bearings. If the axial float is not as specified add or subtract required shims under end cover.

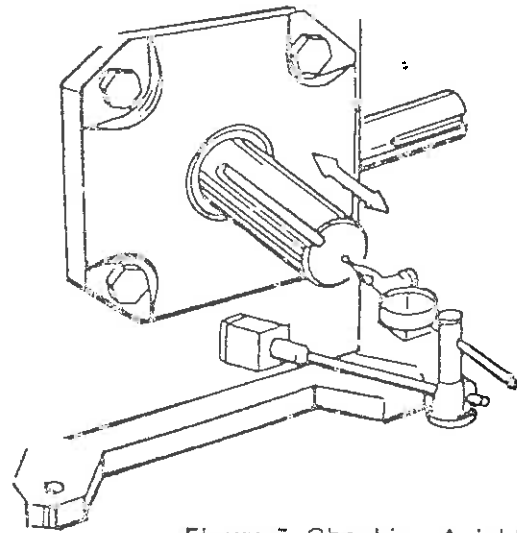


Figure 5 Checking Axial Float

- D. Remove output shaft with seal cage and apply bluing to entire worm thread. Worm thread must be clean of oil. Reassemble output shaft and seal cage with output key facing up.
- E. Use a rag to apply hand pressure to the output shaft and rotate the high speed shaft until output key is down. Return output shaft to original position by reversing rotation. Remove output shaft and seal cage to inspect contact. Compare with Figure 6. If contact is not correct move assembly in the direction shown in Figure 6 by adding shims to the side to which the arrow points after removing them from the opposite side. Repeat steps D and E until contact pattern is correct.
- F. Recheck axial float with dial indicator.
- G. When contact pattern is correct tighten seal cage and end cover cap screws to torques listed in Table 1 page 1.

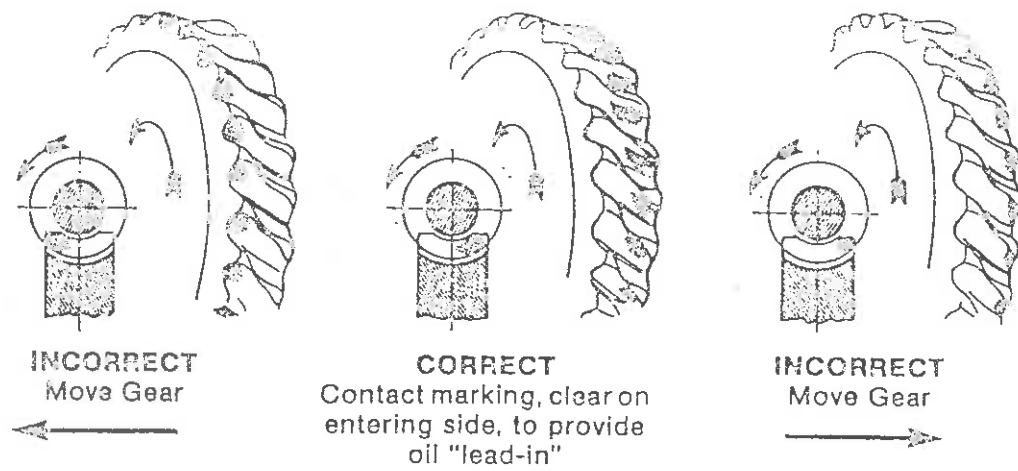


Figure 6 Gear Contact Pattern

4. **Seals** — To reassemble seals to unit, see Parts Service Steps 4E and 4F, page 3.
5. **Motorized Coupling Adapter**  
 Certain mounting dimensions should be adhered to when removing motor and coupling assembly for service. When ordering replacement coupling halves (metal gear), specify correct bore diameter. See Table 2 for mounting dimensions and available bore sizes.

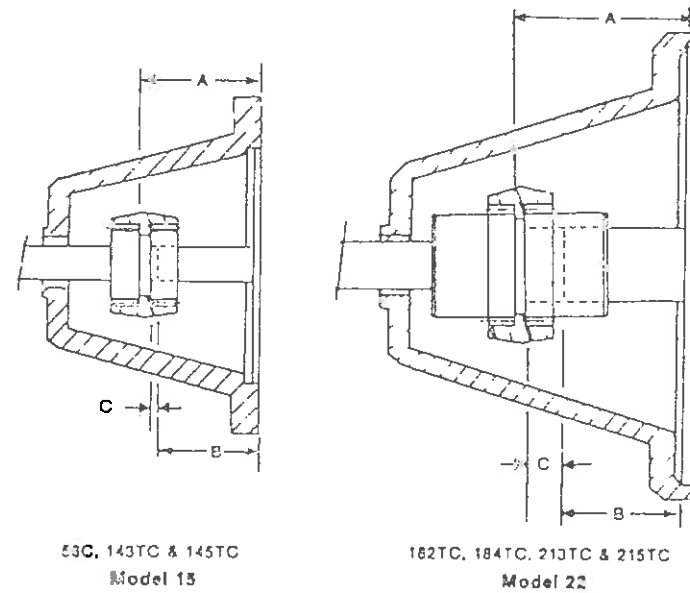


Figure 7 Motorized Coupling Adaptor

TABLE 2. COUPLING ADAPTOR DATA

"C" COUPLING MOUNTING DATA

N.E.M.A. Frame No.	Mounting Dimensions		
	Reducer A ± 1/64	Motor B ± 1/64	C
56C	2 7/16	2 1/8	1/16
143TC	2 5/16	2 1/8	—
145TC	2 5/16	2 1/8	—
182TC	3 5/16	2 5/8	1/2
184TC	3 5/16	2 5/8	1/2
213TC	3 5/16	3 1/8	—
215TC	3 5/16	3 1/8	—

BORE SIZES AVAILABLE

MODEL 15		MODEL 22	
Bore	Kwy.	Bore	Kwy.
.500	None	—	—
.500	1/8 × 1/16	—	—
.625	3/16 × 3/32	.625	3/16 × 3/32
.750	3/16 × 3/32	.750	3/16 × 3/32
.875	3/16 × 3/32	.875	3/16 × 3/32
—	—	1.125	1/4 × 1/8
—	—	1.375	3/16 × 3/32

6. Final Inspection
  - A. Turn gear train over by hand as a final check.
  - B. Re-install reducer and accessories.

**CAUTION:** Discard motor key. Use only special key provided with reducer. Failure to use special key will make assembly impossible.

- C. Fill reducer with the recommended oil to proper level. See Fig. 8 for standard oil levels. (Type of oil recommended — see nameplate).
- D. Spin test for three minutes and check for noise, leakage, and rapid temperature rise.

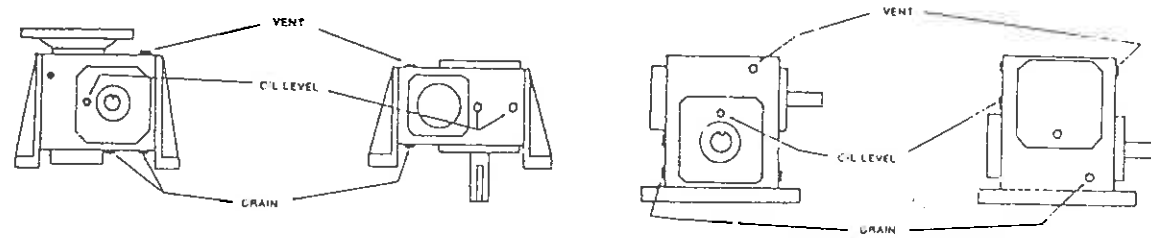


Figure 8 Standard Oil Levels

#### PREVENTATIVE MAINTENANCE

- A. After first week check all external cap screws and plugs for tightness.
- B. Periodically, check oil level when gears are at rest. Add oil if needed. Do not fill above mark indicated by level because leakage and overheating may occur.
- C. Oil changes — For normal operating conditions, change oil every six months or 2500 hours, whichever occurs first. Also if the unit is operated in an area where temperatures vary with the season, change the oil viscosity to suit the temperature. Most lubricant suppliers can test oil periodically and recommend economical oil change schedules.

#### CAUTION

See nameplate for type of lubricant to be used.

#### STORED AND INACTIVE UNITS

1. Each unit is shipped with oil that will protect parts against rust for a period of 4 months in an outdoor shelter or 12 months in a dry building after shipment from the factory. Indoor dry storage is recommended.
2. If a unit is to be stored or is to be inactive after installation beyond the above periods, fill the unit completely with oil.

#### CAUTION

Before starting a stored unit or re-starting an inactive unit, the oil level should be returned to the proper value as indicated by the oil level.

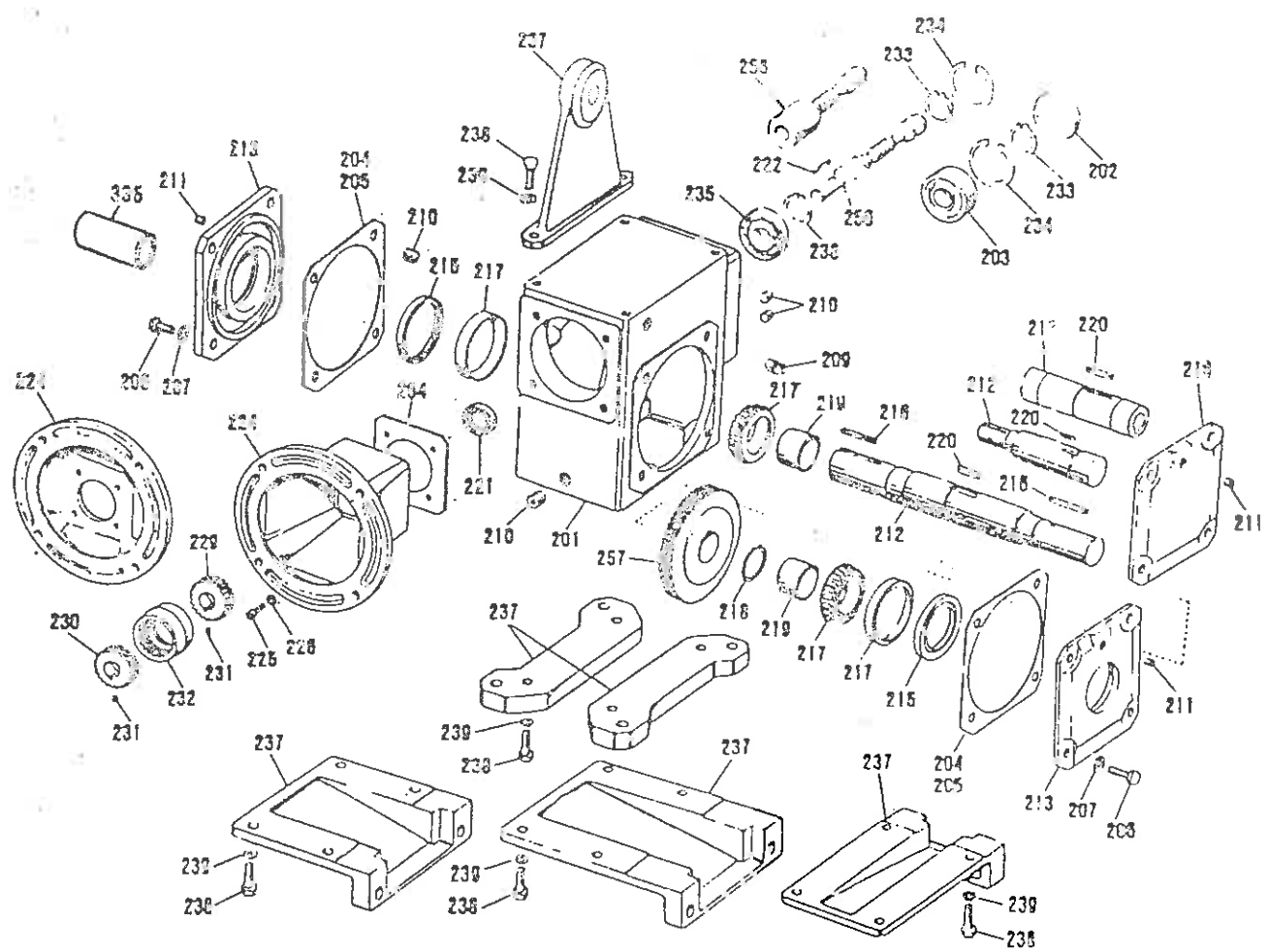
#### PARTS ORDERING INSTRUCTIONS

When ordering replacement parts first locate the exploded view that corresponds to your Doerr Electric gear reducer. Then determine which parts must be ordered. To order the parts, please provide the following:

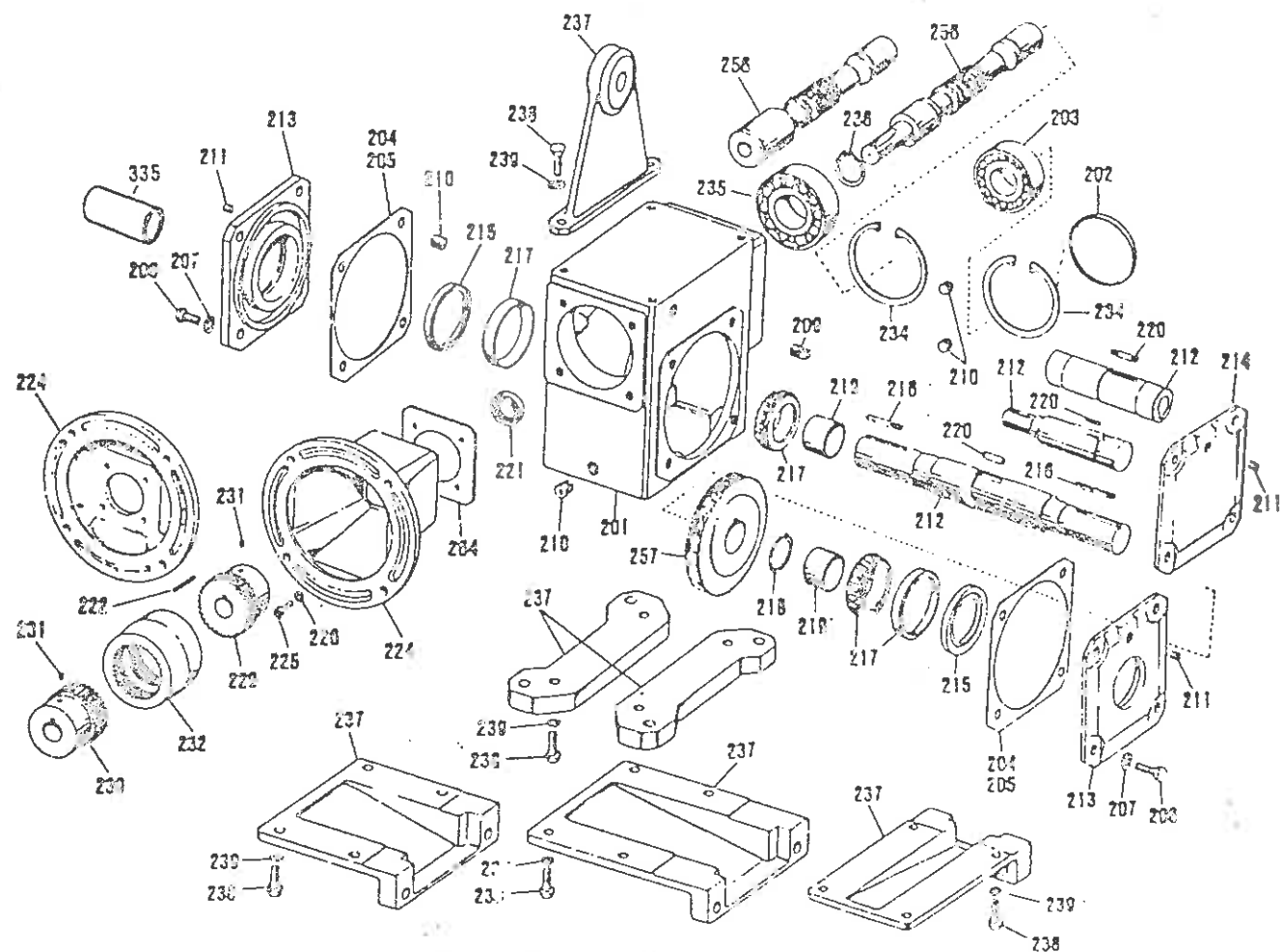
1. Complete Model Number (Nameplate)
2. Item Number (Exploded view and parts list)
3. Part Description (Parts list)

Note that one parts list covers all five exploded views. Although a single item number may refer to the same part on all five exploded views, it is incorrect to assume that these parts are interchangeable. They are not. Therefore, it is imperative that items 1 through 3 above be provided when ordering your parts.

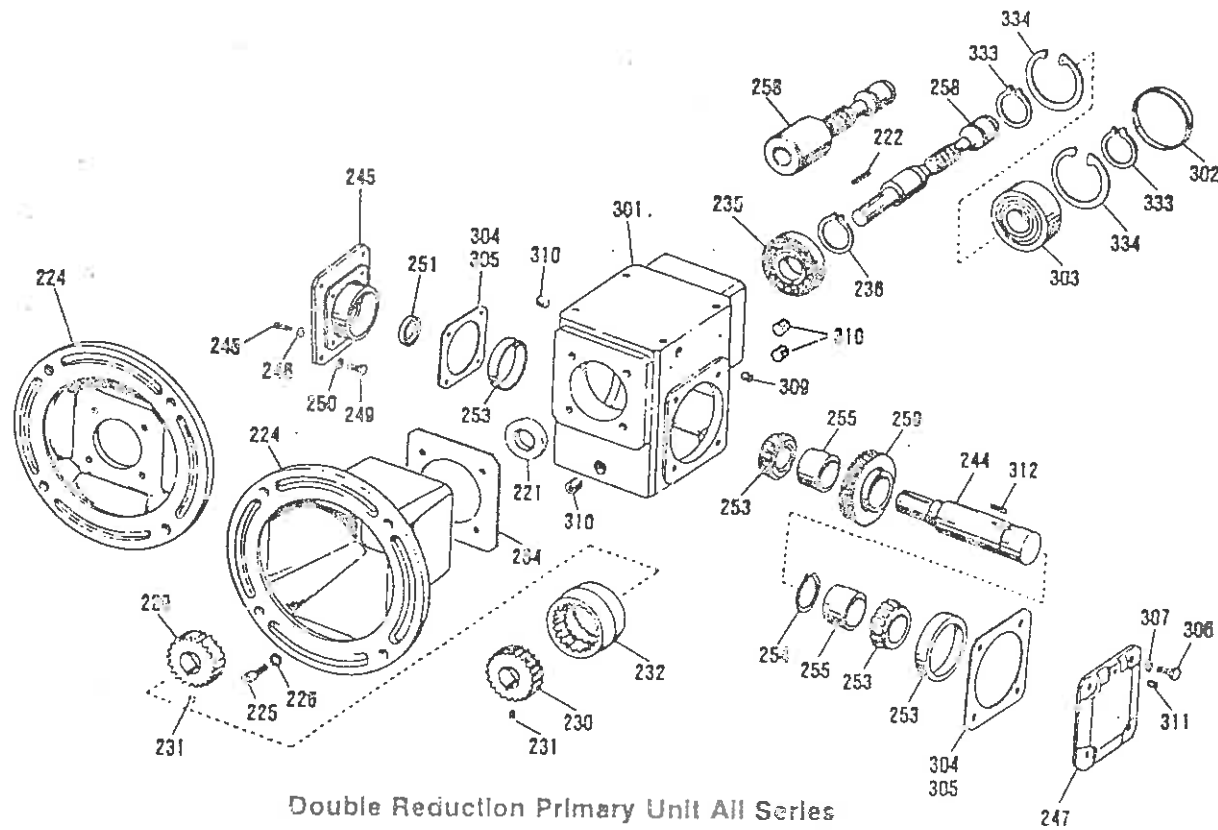
Failure to provide this information will only slow or prevent the processing of your order.



Single Reduction Unit 133, 175, 206 Series



Single Reduction Unit 262, 325 Series



Double Reduction Primary Unit All Series

**PARTS LIST**  
(Applies to all exploded views)

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
201	Housing	229	Coupling Hub (Unit)	255	Spacer
202	End Cover	230	Coupling Hub (Motor)	256	Worm
203	Bearing	231	Setscrew	257	Gear
204	Shim (.019 Thick)	232	Coupling Sleeve	258	Worm
205	Shim (.007 Thick)	233	Lock Ring	259	Gear
206	Capscrew	234	Lock Ring	260	Thrust Plate
207	Lock Washer	235	Bearing	261	Capscrew
209	Vent Plug	236	Lock Ring	264	Gasket
210	Pipe Plug	237	Base	300	Gasket
211	Pipe Plug	238	Capscrew	301	Housing
212	Output Shaft	239	Lock Washer	302	End Cover
213	Seal Cage	241	Secondary Adaptor	303	Bearing
214	End Cover	242	Capscrew	304	Shim (.019 Thick)
215	Oil Seal	243	Lock Washer	305	Shim (.007 Thick)
216	Key	244	Primary Output Shaft	306	Capscrew
217	Bearing	245	Primary Adaptor	307	Lock Washer
218	Lock Ring	246	Lock Washer	309	Vent Plug
219	Spacer	247	End Cover	310	Pipe Plug
220	Key	248	Capscrew	311	Pipe Plug
221	Oil Seal	249	Capscrew	312	Key
222	Key	250	Lock Washer	333	Lock Ring
224	Motor Flange	251	Oil Seal	334	Lock Ring
225	Capscrew	253	Bearing	335	Shaft Cover
226	Lock Washer	254	Lock Ring		

Note: When ordering replacement parts, specify model number, item number, and part description.

Electrical Boards' Chart  
for  
ORION Stretchwrappers

	168-4	168-A	236	336	750+	750M-240y	850M	850C	155-3A
MLH 44 Processor	X		X		X				
MLH 44	X		X		X				X
MLH 55		X		X			X		X
MLH 66		X		X			X		X
MLH 77		X							X
PA 33	X			X	X				
FA 33	X			X		X		X	
MA 33	X			X		X		X	
MA 44	X			X	X			X	
MA 55	X			X			X	X	

## THERMOSWITCH® Temperature Controllers INSTALLATION INSTRUCTIONS

**ATTENTION: TO ASSURE SAFE AND PROPER PERFORMANCE READ THESE INSTRUCTIONS.**

### GENERAL INFORMATION

The shell of each THERMOSWITCH unit contains the catalog number, the current rating, the temperature range and the contact arrangement.

The fifth digit of the catalog number describes whether contacts open or close on temperature rise. If contacts open on temperature rise (regular unit), the fifth digit of the catalog number is an even number such as 17000, 17002, etc. If contacts close on temperature rise (inverse unit), the fifth digit is an odd number such as 17021, 17023, etc.

UL Component recognized units will either have a "4" as the first digit (47002, etc.) or will bear the UL logo and utilize a 17000 series catalog number (17021, etc.).

If the fourth digit is other than "2" or "7" (such as 17021, 17071, etc.) it is compression operated. Inverse compression units are recommended if overshoots are to be encountered. Low temperature units can be overshoot to 500°F and high temperature units (-100 to 600°F) overshoot to 700°F for intervals not exceeding one hour.

### INSTALLATION

Fenwal THERMOSWITCH® units are supplied in five basic head configurations - Cartridge, Block Head, Hex Head, Coupling Head and Circular Flange.

To avoid restricting shell expansion when making installations in solid metal blocks, a 5/8" diameter reamed hole for 5/8" units or a 13/16" diameter reamed hole for 13/16" diameter heavy duty units, is recommended. See specific controller style listing for additional installation instructions.

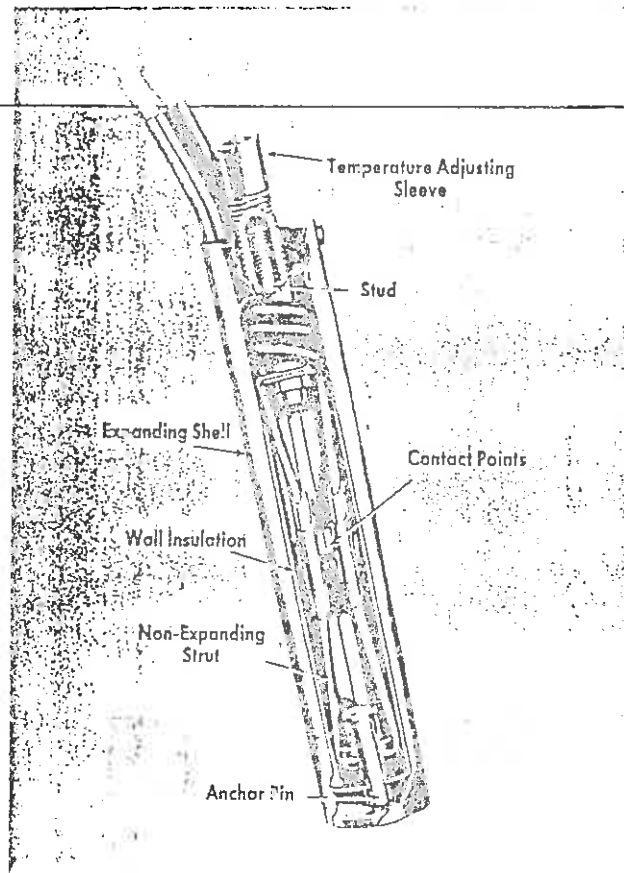
**Cartridge [Style 1]** (includes moisture resistant high and low temperature units, A and C.) Hole should have short spline to receive the 1/8" diameter locating pin. This prevents the unit from rotating when the adjusting sleeve is turned. It may also be used for surface control if inserted into a Fenwal surface mounting block (Cat. No. 11100-2).

**Block Head [Style 2]** - is mounted in a similar manner to the cartridge type. If the unit is to be inserted into a reamed hole, two short pins should be mounted on either side of the hole. The pins should rest against the sides of the block head to prevent rotation of the unit.

**Hex and Coupling Head [Styles 3 and 4]** - can be installed like any pipe fitting. See Table 1 for maximum torque value.

**Circular Flange [Style 5]** - Three holes in flange allow for easy mounting on any flat surface.

**NOTE:** If the threaded units are installed in a pipe tee, the tee should be large enough to allow adequate circulation of the fluid around the temperature sensitive section of the unit.



**NOTE:** Certain gases or liquids including water at elevated temperature could be corrosive and may also cause electrolytic action, which could severely shorten the life of the controller.

The rate of corrosion or electrolysis is influenced by a great many system parameters such as chemical makeup and temperature of the solution, stray electric currents, etc. Consult the supplier of your chemicals or the factory for suggestions.

TABLE 1 - Torque

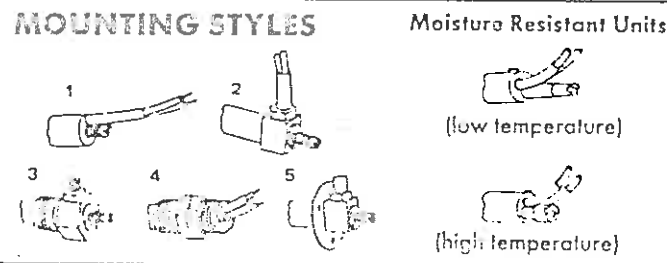
Max. Torque	THERMOSWITCH® Controller Types
35 ft. lbs.	5/8" Dia. Standard with N.P.T. *
70 ft. lbs.	13/16 Dia. Heavy Duty with N.P.T. **

* 4 ft. lbs.	When Teflon tape lubricant is used.
**8 ft. lbs.	

**WARNING:** Excessive torque may change temperature settings.

### CAUTIONS:

- DO connect THERMOSWITCH controller leads in series with the load and power supply.
- DO be certain that there is sufficient but not excessive room for the installed THERMOSWITCH unit to expand in diameter and length.
- DO use stainless steel heliarc welded thermowells, (Series 11100, 11200) or various platings which may increase controller life where corrosion or electrolysis is suspect.
- DO insulate head of the THERMOSWITCH unit where large external temperature variation may occur. This precaution is not necessary on the junction box type. (Series 17700, 17800).
- DO prevent internal damage by mechanically presetting regular tension units (those with catalog number containing fourth digit other than 2 or 7) to approximate required elevated temperature before inserting into process. Preset by turning adjusting sleeve counterclockwise following the adjustment rate information shown on Table II, Page 2.





## CAUTIONS (Continued)

- DON'T immerse your unit in liquids or vapors unless it was specified for that job.
- DON'T seal head with silicone materials.
- DON'T exceed the ratings indicated on THERMOSWITCH unit shell.
- DON'T thermally shield unit from medium being controlled.
- DON'T remove adjusting screw or turn adjusting screw in farther than necessary for desired operation. This action may permanently damage the unit and may void standard Fenwal warranty!
- DON'T oil your unit. Oil around adjusting screw will flow inside, contaminating contacts.
- DON'T allow moisture buildup in head cavity area of 37X0X0-000 Moisture Resistant Units. Where excessive moisture is a problem, specify Special Feature 01-982039-00X when ordering.
- DON'T try to repair unit yourself.
- DON'T handle unit with pliers or force it into position either by hand or tools, or apply excessive torque in tightening threaded units.
- DON'T subject shell of unit to deformation.
- DON'T over-torque threaded units.

## TESTING AND ADJUSTMENT



The arrow on the head of THERMOSWITCH unit indicates direction to turn adjusting screw to increase temperature setting. Torque in excess of 15 inch pounds on adjusting sleeve will deform slot.

Each full turn of adjusting sleeve will change temperature the approximate number of degrees as follows:

TABLE II - Adjustment Rates for Thermoswitch Units

TENSION OPERATED		COMPRESSION OPERATED	
Catalog Series Number	Approx. F° per full turn of adj. sleeve	Catalog Series Number	Approx. F° per full turn of adj. sleeve
15050 to 16051	165	13121-1	1000
17000 to 17503	90-115	17020 to 17523	90-100
17700 to 17701	145	17720 to 17721	85
17702 to 17703	180	17722 to 17723	100-150
17800 to 17601	125	17820 to 17821	75
17802 to 17803	160	17822 to 17823	115
18000 to 18003	80-100	18020 to 18023	70-135
01-37X0X0-000	90		

After the THERMOSWITCH unit has been installed, final adjustment can be made by allowing the unit to operate for several cycles to permit the controlled system to stabilize and then adjust to desired temperatures. The system should then be cooled to ambient temperature, reheated and stabilized to check the setting.

To adjust a high temperature moisture resistant THERMOSWITCH unit (Cat. No. 01-370020-000) it is necessary to remove the seal cap. A screwdriver adjustment is then made internally. Use caution when making adjustments at temperature extremes.

Where extremely accurate temperature control is desired several readjustments may be necessary to stabilize the THERMOSWITCH control after which the adjustment will be maintained.

## CONTACT PROTECTION

Capacitors are not required under average conditions. For smoother control at small loads, on D.C. applications or to prevent contact bounce due to vibration, the following table is recommended as a guide:

TABLE III - Contact Protection

VOLTAGE	SERVICE	CAPACITANCE MFD (non-polarized)
120VAC	Resistance	Non required
240VAC	Resistance	.1
120 or 240VAC or DC	Relays, Magnetic Contactors	.001 to .01
15-25VAC or DC	Relays	.02
120 or 240VAC	Motor	Use Relay

NOTE: Capacitors should be wired in parallel with thermostat lead connections. Capacitors should be rated for a minimum of 600VDC with 120VAC circuits and a minimum of 1000VDC for 240VAC circuits.

## TESTING TEMPERATURE SET POINT

The Set Point Temperature is the temperature at which the contacts on a THERMOSWITCH unit just "make" (close). All THERMOSWITCH units are set at room temperature (75°F ± 15°F) unless otherwise specified in which case they are factory preset at any specified temperature within listed temperature range and setting tolerance of THERMOSWITCH unit.

If customer requires testing of temperature set point, it is recommended that testing devices can be used similar to those at the factory. An ideal thermal installation may require that the THERMOSWITCH unit be located as near as possible to the heat source. Testing the temperature set point of a THERMOSWITCH unit in an application or under conditions where heat source is remotely located from THERMOSWITCH unit, or when ambient temperature conditions are far below or above 75°F, may give misleading results. In some cases, this has led to rejection of units which were actually within proper setting tolerance.

Therefore we recommend the use of a Fenwal Model 80001-0 Test Kit, for testing temperature set points on Fenwal THERMOSWITCH units.

For customers who wish to build their own test equipment we recommend that you contact your nearest Fenwal Representative. He is equipped to give you further guidance in setting up a good thermal test system.

## LIMITED WARRANTY STATEMENT

Fenwal Incorporated represents that this product is free from defects in material and workmanship, and it will repair or replace any product or part thereof which proves to be defective in workmanship or material for a period of twelve (12) months from the date of purchase but not to exceed eighteen (18) months after shipment by the seller. For a full description of Fenwal's LIMITED WARRANTY, which among other things, limits the duration of warranties of MERCHANTABILITY and FITNESS FOR A PARTICULAR PURPOSE and EXCLUDES liability for CONSEQUENTIAL DAMAGES, please read the entire LIMITED WARRANTY on the Fenwal Quotation, Acceptance of Order and/or Original Invoice which will become a part of your sales agreement. Defective units should be returned to the factory, Ashland, Massachusetts, shipment prepaid. Fenwal Incorporated will repair or replace and ship prepaid.

# FENWAL INCORPORATED

Division of Kidde, Inc.

## KIDDE

400 Main Street Ashland, Massachusetts 01720 (617) 881-2000

11105 100M 11/85 Printed in U.S.A.

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## 2. STANDARD FEATURES

The standard, Portable automatic stretchwrapper comes with:

- Automatic, programmed spiral wrapping,
- Heavy duty structural steel chassis
- Multistretch I prestretch system,

The carriage height is controlled by a variable speed, SCR controlled DC motor, with an automatic load height sensor.

The film feed system uses a dancer bar and roller system that regulates the feed speed in order to keep a constant film tension when wrapping around corners.

The Multistretch I prestretch system has the capability of varying its prestretch through the use of change timing belt pulleys which are available through your Orion representative.

The variable speed turntable is directly driven by a right-angle, worm and gear speed reducer, coupled with a chain and sprocket arrangement. The use of this system will allow the turntable to have a variable speed of up to a maximum of 16 RPM with an automatic, dynamic braking system.