



ATTENTION:

VERY IMPORTANT

Before unloading and unpacking the stretchwrapper read carefully section 5 of this manual for unloading and unpacking instructions.

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

ORION PACKAGING INC.

NOTICE

In order to acquire more information about custom make features of the machine; and to provide quicker service, the following information is required when making an inquiry for a machine:

- 1) Serial Number
- 2) Model Number
- 3) Subassembly-Part Location

TABLE OF CONTENTS

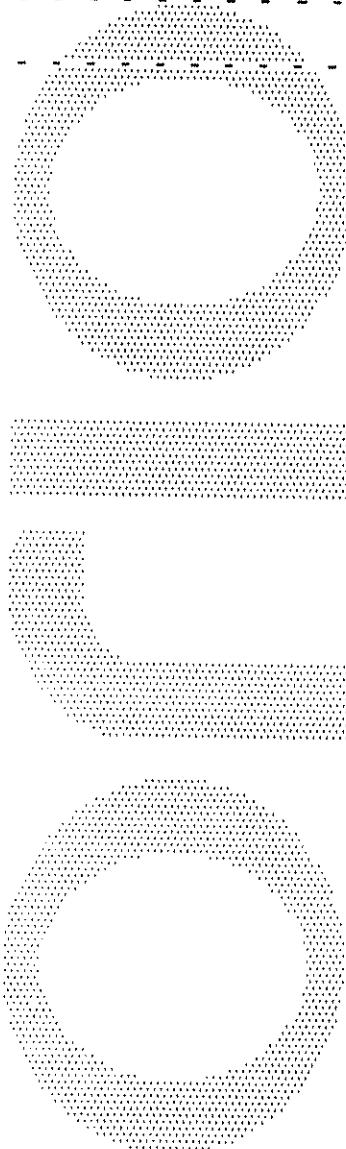
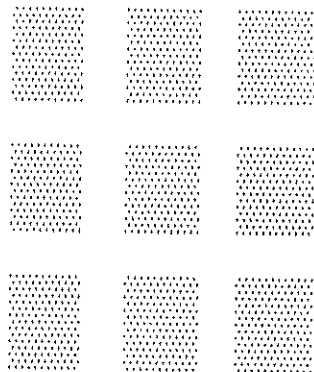
1. H44 SPECIFICATIONS	1
2. STANDARD FEATURES	2
3. OPTIONS	3
4. PARTS LISTS	
4.1 Tower Parts List	4
4.2 Carriage Parts List	6
4.3 Base And Turntable Parts List	9
4.4 Electrical Boards	11
5. MACHINE INSPECTION AND INSTALLATION	
5.1 Inspection Upon arrival	12
5.2 Installation	12
6. MACHINE CONTROLS	13
6.1 Power Switch	14
6.2 Start And Stop Switches	14
6.3 Top Cover Switch	14
6.4 Spiral Wrap Switch	15
6.5 Reinforce Wrap/Table Jog Switch	15
6.6 Carriage control switch	15
6.7 Table Speed Control Switch	16
6.8 Photocell Switch	16
7. CYCLE CONTROL SWITCHES	
7.1 Film Tension	17
7.2 Top And Bottom Wraps	17
7.3 Carriage Speed	18

h44

OWNER'S MANUAL

Orion Packaging Inc.
4263 Richelieu
Montreal H4C 1A1
Tel.: 514-937-6642

7.4 Turntable Speed Control	18
8. MACHINE MAINTENANCE	
8.1 Speed Reducer Maintenance	20
8.2 Motor Maintenance	20
8.3 Chain Maintenance	21
8.4 Cam Follower Maintenance	21
8.5 Caster Maintenance	21
8.6 Ring Gear Maintenance	22
APPENDIX	23



ORION PACKAGING SYSTEMS, INC.
DISTRIBUTOR PRICE LIST - EFFECTIVE MAY 1, 1989

ORION MODEL H-44XR S/N 9101115

Deluxe Spiral Semi-Automatic High Profile w/Ring Gear & PLC

Maximum Load Size	55"W x 55"L x 87"H
Weight Capacity	6,000 lbs. dynamic, 20,000 lbs. static
Utilities	115/1/60 20 Amp Electrical Service
Turntable	72"dia x 1/2" thk plate w/gravity conveyor 33" Dia. Ring Gear Turntable Support 13-1/2" Height to Top of Turntable
Turntable Drive	0-16 RPM Variable Turntable Speed 3/4 HP DC Drive Motor Pinion Gear Turntable Drive Electronic Soft Start Positive Alignment Feature
Control Features	OMRON C-40 PLC Electronic Film Force Control Separate Top and Bottom Wrap Selectors Separate Up/Down Carriage Speeds Auto-Height Photocell w/On/Off Switch Film Carriage Raise/Lower Switch Turntable Jog/Reinforce Wrap Selector Spiral Up or Up/Down Cycles Circuit Breaker Electrical Protection NEMA 12 Electrical Enclosure High/Low Turntable Speed Selection
Film Delivery	20" Orion MultiStretch Power Prestretch Electronic Film Tension Control End of Cycle Film Force Release Full Authority Film Dancer Bar Timing Gear/Belt Stretch Ratio Control 1/2 HP DC/SCR Film Drive
Film Carriage Drive	#50 Roller Chain Carriage Lift 1/2 HP Elevator Drive Motor Variable Speed SCR Control Structural "H" Channel Guidance Precision Cam Follower Tracking
Structural Features	Heavy Structural Steel Tubing Design Forklift Portable Base Design Film Roping Bar 8" x 31 lb./ft. "H" Channel Mast
Additional Features	Pneumatic Top Platen (48" stroke) range: 39" to 87"
Est. Shipping Weight	2,000 lbs.

ORION PACKAGING SYSTEMS, INC.
DISTRIBUTOR PRICE LIST - EFFECTIVE MAY 1, 1989

SEMI-AUTOMATIC MACHINE OPTIONS

Auto-Height Photocell for 77 Series

Loading Ramps for Low Profiles

L77/66/55/44
L55S/44S

Machine Base Extensions (Max. 3 ft.)

H77/66	(per foot)
L77/66	(per foot)
H55/44	(per foot)
L55/44	(per foot)

Machine Mast Extensions (Max. 3 ft.)

All Series (Except "M") (first foot)
All Series (Except "M") (each add'l foot)

Hinged Tower (For transport in low trucks)

All Series (Except "M")

Top Stabilizing Platens

77/66 Series - 24" Pneumatic stroke
55/44 Series - 36" Pneumatic stroke

Note: All platens are 48" x 48" unless otherwise specified, with foam cushion.

Dual Turntable Option

L66
H66
L55/44
H55/44
L55S/44S

Note: Dual turntable options includes second turntable with all drive components & controls, second auto-height photocell, and table selector switch.

Ring Gear/Pinion Gear Turntable Drive

H66	(20" Dia.)
H55	(25" Dia.)
H44	(33" Dia.)

Programmable Logic Controller Options

66/55 Series - Cutler Hammer PLC
44 Series - Cutler Hammer PLC
44 Series - Allen Bradley SLC-150
EPROM ordered with machine
EPROM ordered later

SEMI-AUTOMATIC MACHINE OPTIONS (CONT'D)

Turntable Options

- 0-12 RPM Variable Speed Turntable
Drive for L/H 77 Models
- 0-12 RPM Variable Speed Turntable
Drive with Positive Alignment Feature
for L/H 77 Models
- 72" Dia. round w/4" skirt (H55/44)
- 10,000 lb. Capacity (H55/44)
- 8,000 lb. Capacity (L55/44)
- 10,000 lb. Capacity (L55/44)
- Anti-skid surface

Cold Temperature Options (-20 F)

- Heated control enclosure, teflon wiring
and special lubricant in reducers

Conveyor Options

Idler Roller (Non-Driven)

- 72" Dia. idler roller turntable for
H55/44/66. (On H-66, requires ring gear
option and max. wt. 2,500 lbs)
Rollers are 3.5" Dia. on 4.5" centers,
with manual brake.
- 72" Dia. idler roller turntable for
L55S/44S. Rollers are 3.5" Dia. on 4.5"
centers, with manual brake
- Pneumatic roller brake for L series
- Pneumatic roller brake for H series
- 5' Length contoured idler roller
conveyor, 3.5" Dia. rollers on 4.5"
centers, 50" wide roller face
- 5' Length straight idler roller
conveyor, 3.5" Dia. rollers on
4.5" centers, 50" wide roller face

Powered Roller

- 76" Dia. powered roller turntable,
rollers 3.5" Dia. on 4.5" centers,
all full length driven. Includes DC drive,
adjustable speed (H55/44 only)
(Requires ring gear option)

ORION PACKAGING SYSTEMS, INC.
DISTRIBUTOR PRICE LIST - EFFECTIVE MAY 1, 1989

SEMI-AUTOMATIC MACHINE OPTIONS (CONT'D)

- 5' Length contoured powered roller conveyor, 3.5" Dia. rollers on 4.5" centers, 50" effective width, all full length rollers driven.
1/2 HP AC drive, non-reversing
(For use with 55 series machines)
- 5' Length contoured powered roller conveyor, 3.5" Dia. rollers on 4.5" centers, 52" effective width, all full length rollers driven.
1/2 HP DC drive, variable speed, with soft start
(For use with 44 series machines)
- Automatic sequencing, logic, and photocell for powered conveyor (per section)
- Turntable mechanical home position lock
(Pneumatic, positive lock)

Film Carriage Options

- Double #60 chain carriage lift
- 30" MultiStretch Carriage Upgrade from 20" on 66/55/44
- 20" MultiStretch Retrofit Carriage (for installation on existing machines)
- 30" MultiStretch Retrofit Carriage
- 30" EconoStretch Carriage Upgrade on 77 Series from 20"

Electronic Scale Package Option

- Includes heavy duty load cells incorporated into the machine or conveyor frame, protected from lateral shock, and a digital display of load weight, with RS-232C port, gross, net, tare, zero.

Note: On L-77 and L-66 models, scale option reduces machine capacity to 2,500 lbs., unless base reinforcement option is ordered

- Base reinforcement on L-77 or L-66 models, when 4,00 lb. capacity is desired with scale package

ORION PACKAGING INC.

H44/5XR With Top Platen and Air Brake Parts List

Model: H44/5XRT
Job No.: #1115
Dwg No.: #230-062C

<u>Item</u>	<u>Description</u>	<u>Qty</u>
1	Tower base plate #230-065B	1
2	Base #220-802C	1
3	Top Platen air cylinder (bore=3", stroke=48")	1
4	Clevis C-4 for top platen air cylinder	1
5	Tower #230-063C	1
6	Prestretch 20"	1
7	Top platen left beam holder #200-782B	1
8	Top platen right beam holder #200-783B	1
9	Chain #60 for top platen	
10	Sprocket for #60 chain, 16 teeth for top platen	2
11	Top platen support #220-267B	2
12	Top platen arm #230-064C	1
13	Top platen assy #210-047B	1
14	Plywood 3/4"thk for top platen	1
15	Foam 4" thk for top platen	1
16	Turntable #210-539D	1
17	Ring gear (138 teeth, 33" dia.)	1

4. PARTS LISTS

4.1 Tower Parts List

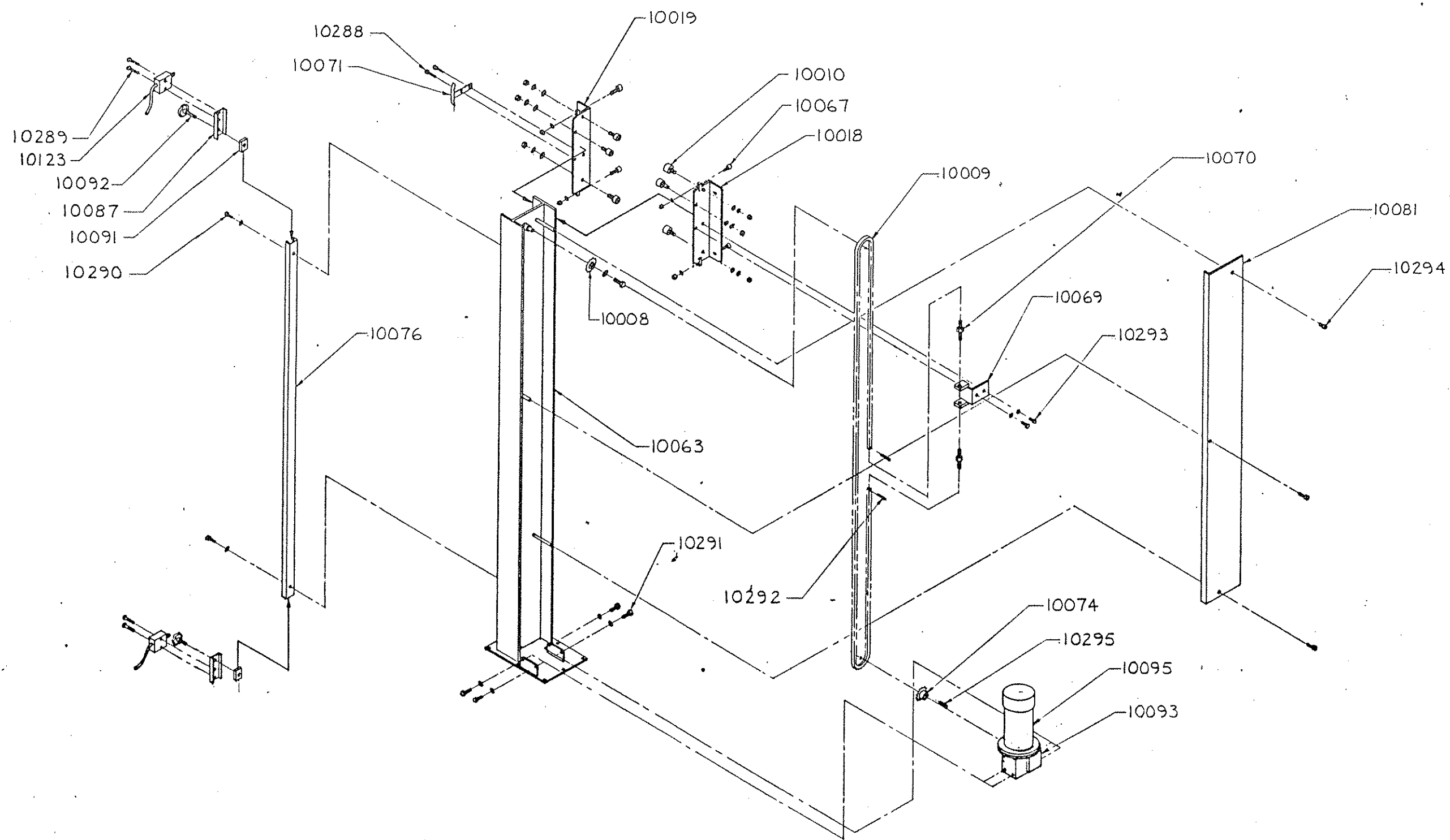
The exploded assembly drawing of the Standard Tower is shown on drawing number 200 99. Table 1 has the parts listed in order of part number. Note: the names given to the parts are generic.

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 3/4 Hex bolt	2
10294	Cover screw (1/4-20 UNC x 1/2 SHCS)	3
10295	3/16 inch square key	1



ORION PACKAGING MONTREAL			
SCALE: N.T.S.		APPROVED BY:	
DATE: 27-6-86		DRAWN BY: VAL/13/11/11	
		REVISED:	
STD. TOWER ASSY.			
L44		H44 L55 H55 PA33	
		DRAWING NUMBER 200-59	

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.

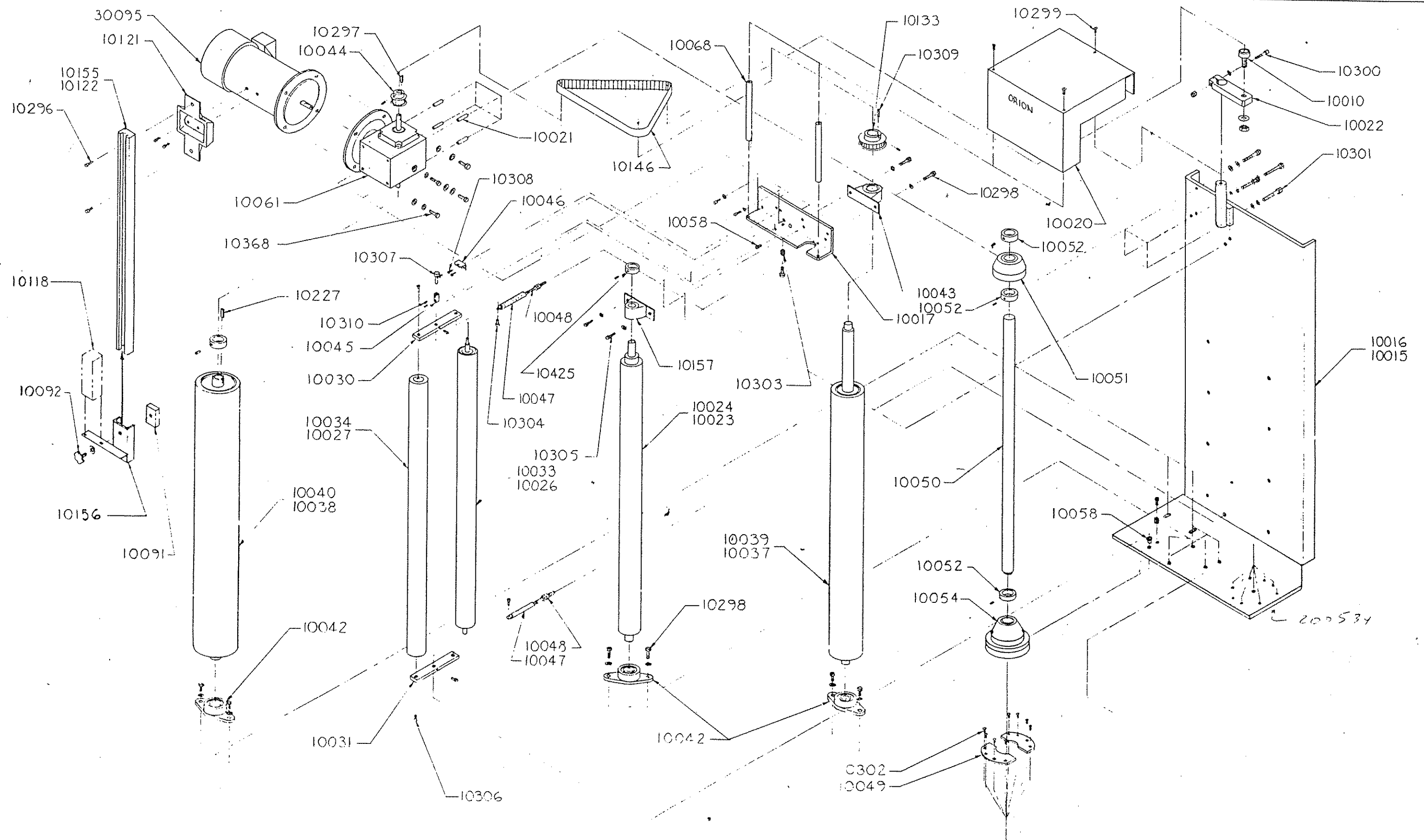
TABLE 2

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" Fallow 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	2
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: 1-7-66	APPROVED BY:	DRAWN BY:
STD. CARRIAGE ASS'Y		
44 55 66 PA33 PA33	DRAWING NUMBER	

ORION PACKAGING INC.
BASE AND TURNTABLE SUBASSEMBLY PARTS LIST

MODEL H44R

ORION P/N	DESCRIPTION	QTY
10032	Motor (3/4 hp, 90vdc, 1750 rpm)	1
10035	Reducer (BQ175, 15:1, assy 2)	1
10091	Channel Guide	1
10092	Knob	1
10201	Proximity Switch Stand	1
10202	Proximity Switch Channel	1
10203	Proximity Switch Holder	1
10739	Proximity Switch	1
10799	Base	1
10800	External Ring Gear (33" dia., 138 teeth)	1
10803	Pinion Gear (19 teeth, module 6)	1

ORION PACKAGING INC.

Gravity Conveyor Turntable - 72" dia. Parts List

Model: H44/5XRT
Job no.: #1115
Dwg No.: #210-539D

<u>Item</u>	<u>Description</u>	<u>Qty</u>
10	Roller #210-317A (roller tube length=16 1/4")	2
11	Roller #210-316A (roller tube length=34 1/4")	2
12	Roller #210-315A (roller tube length=45")	2
13	Roller #210-537A (roller tube length=53")	10
15	Bearing 3/4" dia.	12
16	Pillow block 1" dia.	20
	Air brake #220-915B	1

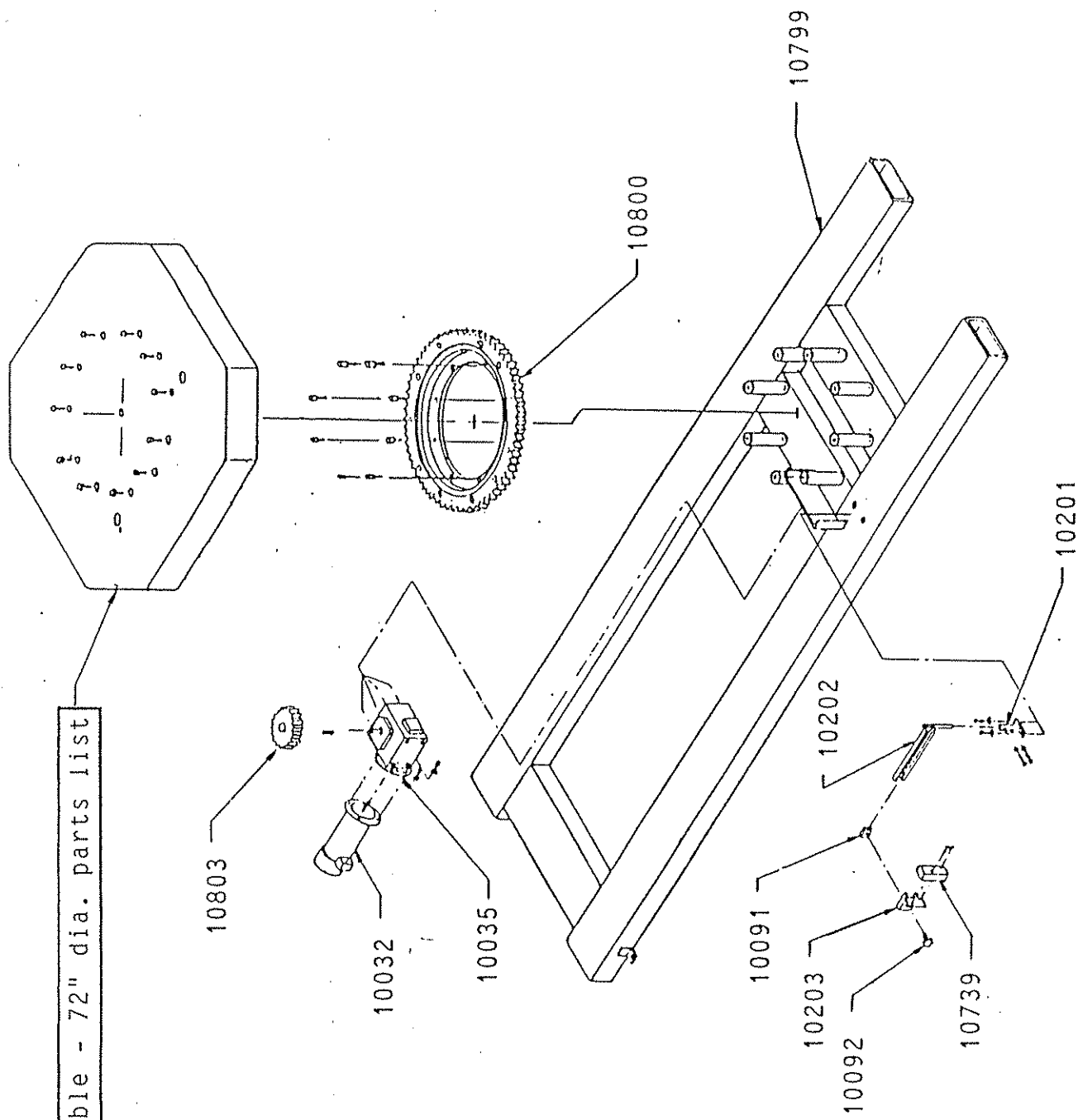
NOTE: turntable dia.= 72"

turntable thickness=1/2"

gravity rollers are 3 1/2" dia. on 4 1/2" centers

between frame dimension=53" / pass height=21 1/2"

See Gravity Conveyor Turntable - 72" dia. parts list



BASE AND TURNABLE SUBASSEMBLY - H44R

ORION PACKAGING INC.

Air Brake Parts List

Model: H44/5XRT
Job No.: #1115
Dwg No.: #220-915B

<u>Item</u>	<u>Description</u>	<u>Qty</u>
1	Guide #210-541A	1
2	Screw 3/8-16UNC	2
3	Turntable #210-539D	1
4	Brake lever #210-542B	1
5	Air spring plate 3/8" x 4" x 8" #210-540A	1
6	Flat head screw 3/8-16UNC	2
7	Screw 3/8-16UNC	2
8	Air spring	1
9	Screw 3/8-16UNC	2
	Pin 3/4" dia. L=6 11/16" #210-543A	2
	Pin 3/4" dia. L=7 3/16" #210-543A	1

5. MACHINE INSPECTION AND INSTALLATION

5.1 Inspection Upon Arrival

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 may include the blocks under the carriage and the restraining bar over the table.

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

A visual inspection of all the electrical 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 the motor and transmission housings and connections under the turntable, at the base of the tower, and on the carriage.

5.2 Machine Installation

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

An electrical diagram is provided in the panel box. Only a qualified electrical technician or an Orion representative should effect any repairs on the machines.

4.4 Electrical Boards

The standard H44 stretchwrapper panel box contains the following electrical control boards:

750+233
236
155-3A
168-4 (168-3)

The drawings of the face of these boards with the relevant output and input terminals and adjustment potentiometer locations are shown in the appendix.

A more detailed account of the adjustments possible on the 750+233 board is given in section 7.4 of this manual.

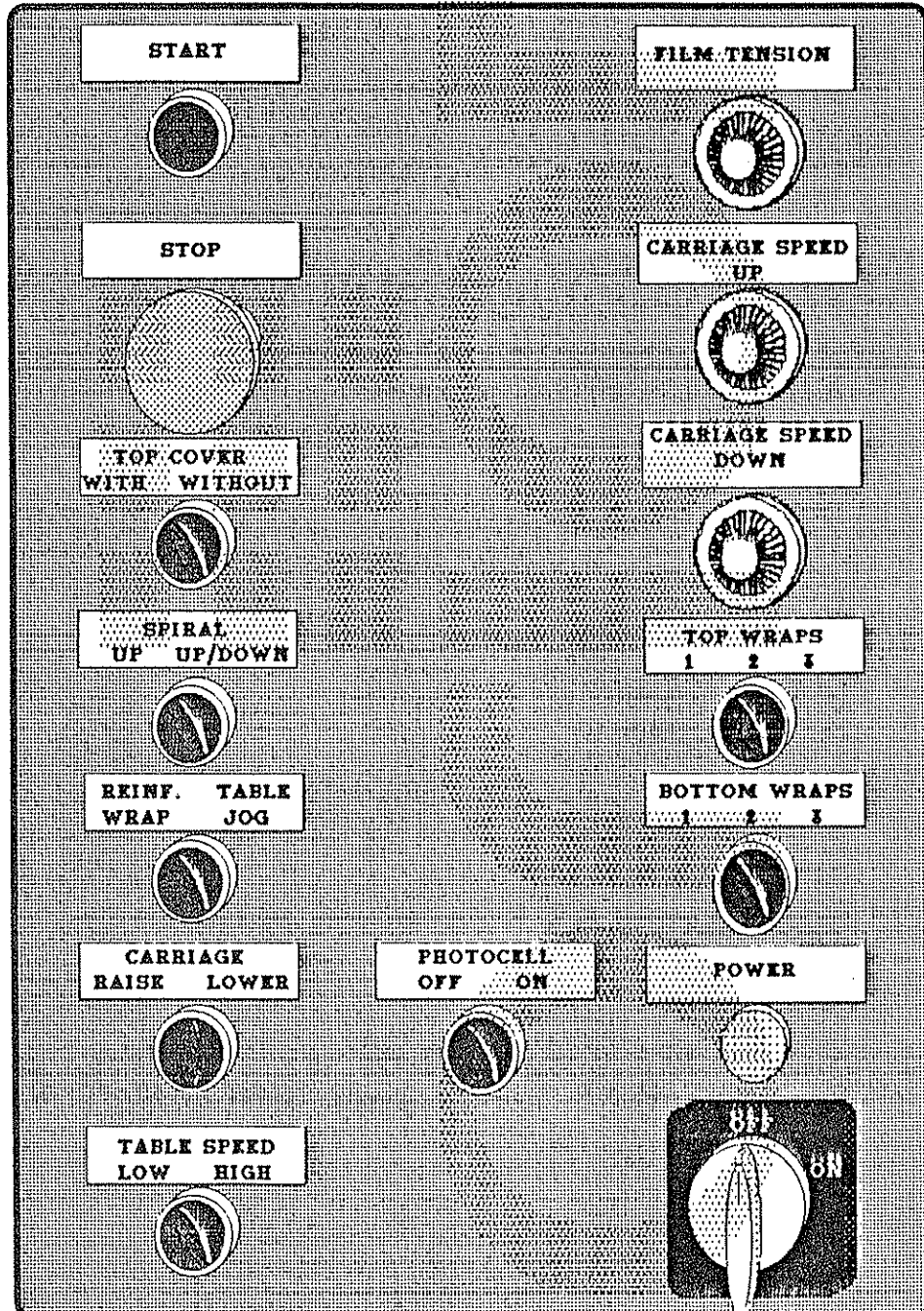
If the stretchwrapper is controlled with a PLC (Programmable Logic Controller) the boards used are:

750+233
236
168-4

The drawings of the faces of these boards will be placed in the appendix for a PLC controlled stretchwrapper.

6.

MACHINE CONTROLS



6.1 Power Switch

The Power Switch has two settings,

ON - Connects a 110 VAC power source to the machine,

OFF - Disconnects the power source.

Turning the power switch ON causes the POWER light to turn on.

6.2 Start And Stop Switches

The Start switch is used to start the cycle once the load is on the turntable. At this point the cycle may be stopped at any time by pressing the Stop button.

NOTE: if the Stop button is pressed in the middle of the cycle, the carriage and turntable must be returned back to their home positions before restarting the cycle.

6.3 Top Cover Switch

The Top Cover switch has two positions,

WITH - In the WITH position the cycle will stop after one top wrap is completed, allowing the placement of a top sheet on the load, after which the start button may be pressed to resume wrapping.

WITHOUT - In the WITHOUT position the cycle will not pause for the placement of a top cover.

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.

6.7 Table Speed Control Switch

The Table Speed Control switch has two settings,

LOW - The LOW setting may be used for wrapping unstable or very heavy loads that tend to fall apart when wrapped at higher speeds.

HIGH - The HIGH setting may be used for wrapping more stable loads. Once the up wrap has been wrapped on the low speed setting, unstable loads may also be wrapped on the high speed setting by switching from LOW to HIGH after the top wraps are done.

6.8 Photocell Switch

The Photocell switch has two settings,

ON - When turned ON, the photocell senses whether or not the carriage has reached the top of the load. The carriage will stop and begin the top wraps sequence once the top of the load is reached. The carriage will always stop at the top of the load regardless of its height. The photocell's position on the track can be adjusted in order to make the carriage pass the top of the load and overlap the top.

OFF - When turned OFF, the photocell is inoperative and the carriage will stop only once the top limit switch has been activated.

6.4 Spiral Wrap Switch

The Spiral Wrap switch has two positions,

UP - In the UP position the cycle will end after completing the specified number of top wraps, therefore, the machine will only wrap the load once, going up.

UP/DOWN - In the UP/DOWN position the cycle is complete after the load is wrapped in both the up and down directions.

6.5 Reinf. Wrap/Table Jog Switch

This switch has three positions,

middle position - in this position the switch is inactive and the machine will operate normally.

Reinf. Wrap - when the switch is held in this position during operation the carriage will stop rising or descending in order to increase the number of wraps around the chosen section.

Table Jog - when the switch is held in this position the turntable will turn in a clockwise direction as viewed from the top. The table jog is inoperative during the wrap cycle.

6.6 Carriage Control Switch

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

RAISE - Raises the carriage until the top limit switch on the tower is activated or until the photoswitch senses that the carriage has reached the top of the load.

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

7.

CYCLE 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 cycle.

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 multi-position switches which control the number of wraps that may be put at the top and bottom of the load. Each switch has positions going from 1 to 10 corresponding to the number of wraps which may be applied at the top or bottom of the load.

These switches may be set before the cycle begins.

7.4 Turntable Speed Adjustments

The turntable speed may be changed by adjusting the controls on the 750+233 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 HIGH speed of the turntable.

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

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

8.

MACHINE MAINTENANCE

8.1 Speed Reducer Maintenance

On the reducing transmission, 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
Mobile 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 J82
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.

8.2 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

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 HIGH 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 LOW 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.

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.

8.3 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. A loose turntable drive chain should be tightened at the drive console as shown on drawing number 200 97.

8.4 Cam Follower Maintenance

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

The portion of the tower on which the cam followers roll must be cleaned and regreased every 300 hours of operation. If the machine operates in a dusty or corrosive environment, the tower should be cleaned and relubricated more often.

8.5 Caster Maintenance

The casters underneath the carriage must be relubricated every 200 hours of operation by injecting

grease in the nipples and regreasing the surfaces of the casters. If the machine operates in a dusty or corrosive environment, the casters should be relubricated more often.

8.6 Ring Gear Maintenance

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

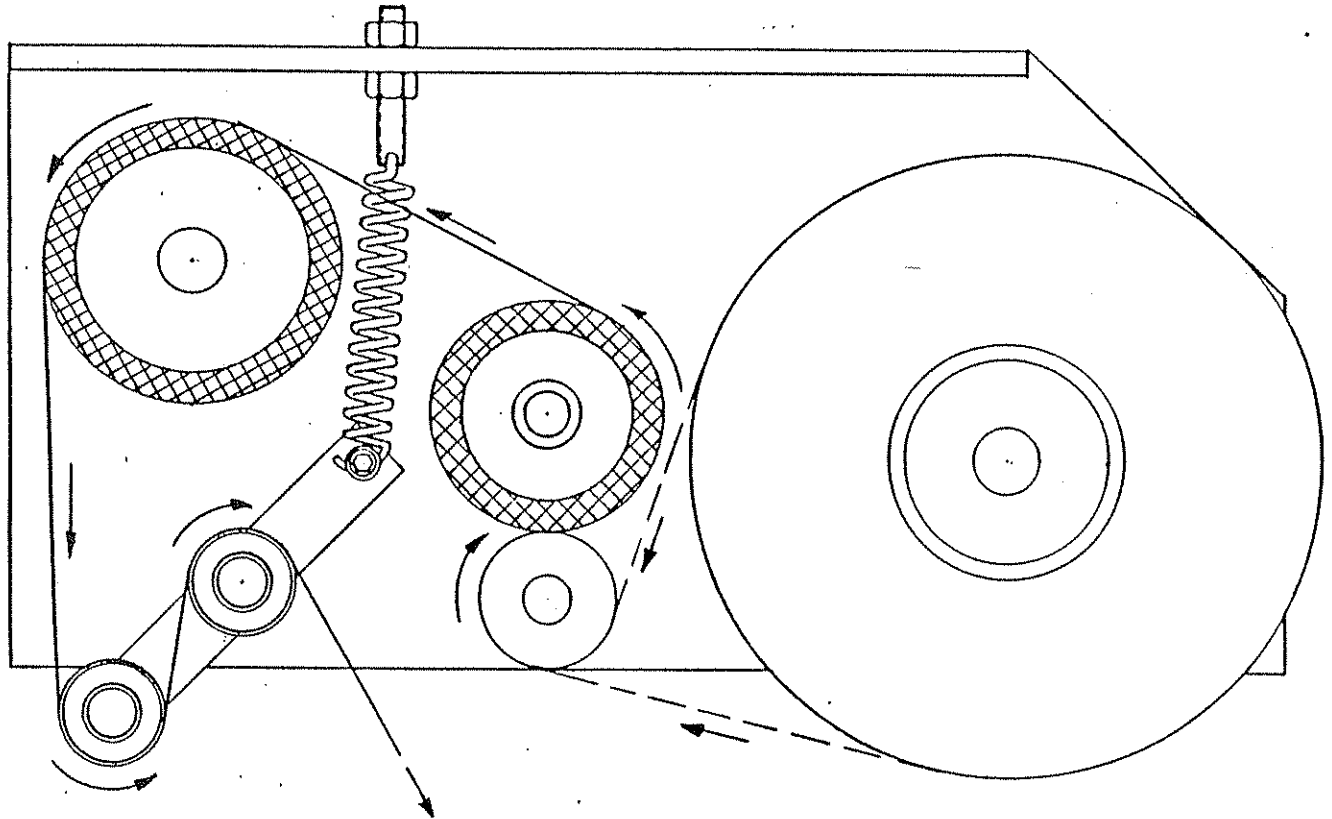
The ring gear is located under the turntable and should be lubricated at fixed intervals. This should be carried out by injecting grease into all the lubrication nipples in succession until a collar of fresh grease appears around the perimeter of both sealing rings. The bearing should be rotated slowly 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	Gear Teeth Oil
BP	Energrease LS 2	Energol WRL
Castrol	Spheerol AP 2	Grippa 33 S
ESSO	Beacon 2	Surret Fluid 30
Gulf	Crown Grease No.2	Lubcote No.2
Mobil	Mobilux 2	Mobiltac E
SHELL	Alvania Grease R 2	Cardium Compound C/Fluid C
Texaco	Glissando FT 2	Crater 2 X Fluid
Valvoline	LE-2	FGC



ORION MULTISTRETCH



DISCONNECT POWER BEFORE FEEDING

This diagram shows the pattern the film must take around the rollers for the proper operation of the stretchwrapper.

WARNING: The machine must be disconnected from the power source before the film is fed through the rollers. Failure to do this may result in serious injury to the operator and damage to the machine.

ORION PACKAGING INC.

NOTICE

The manual covers standard features of the machine. Certain machine options may not be covered fully by this manual due to their unique application.

Electrical Boards' Chart for ORION Stretchwrappers

	168-4	168-A	236	336	750+	750M-240V	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	

1-68-4

1

$$\begin{array}{c} \text{I} \\ + \\ \text{C} \end{array}$$

AC2

ACI-

1

ORION PACKAGING INC.

ECHELLE:
SCALE:

SCHEDEL

APPROVE PAR:
APPROVED BY:

APPROVED PA
APPROVED BY

DESSINE PAR: VALENTINI
DRAWN BY:

DESSINE PA
DRAWN BY:

REVISE PAR:
REVISED BY:

REVISÉ PAR
REVISÉ BY

DATE: 16-9-87

४।००७

NUMERO DE DESSIN
DRAWING NUMBER

NUMERO DE DESSIN
DRAWING NUMBER

2032

OPERATING INSTRUCTIONS FOR TYPE 236 TENSION CONTROL

INTRODUCTION

The 236 control is a solid state DC motor control specially designed for use in Constant Tension Mode, on stretch-wrap packaging machines. The unit functions as a pay-off drive, unwinding the pre-stretched film as the table and pallet rotate, and continuously regulating tension as the diameter of the wrapped item changes. Since the typical pallet load is of square cross section, the effective diameter changes abruptly with rotation; the film tension is monitored by a tension-arm, held in place by spring pressure. As the tension changes, the arm moves, and its position is sensed by a potentiometer. The potentiometer controls motor torque, increasing or decreasing it so as to restore the tension-arm to its previous position, and to restore tension to its preset level. The system response is tailored so that these small corrections are smooth, continuous and largely imperceptible.

INSTALLATION

The unit is equipped with an aluminum chassis, which serves as a heatsink. It may be mounted in any orientation. Extremes of heat and vibration are of course to be avoided. Connections are to terminal strips; A 5-Way strip at one end of the circuit board incorporates motor and line terminals. A 4-Way strip at the opposite end is for potentiometer connections. Standard

units require 120 VAC; 240V units are available on special order. AC line attaches to terminals AC1, AC2. Motor Armature attaches to terminals A1 (+), A2 (-). The standard unit is suitable for permanent magnet shunt style DC motors with 90 V armature rating, and up to 3/4 HP. The 4-Way strip has 15 VDC on terminal 1, 5 VDC on terminal 2, input on 3, common on 4. The control (Tension) potentiometer (typically 2.5 K ohms) is normally attached between 15V dc and common, with the wiper to terminal 3. The input sensitivity is usually controlled externally by means of a 10 K potentiometer installed between the wiper of the tension pot. and the control input terminal 3 of the PCB. In this case, the potentiometer RV1 on the PCB (Range) is deleted and replaced by a jumper.

ADJUSTMENTS

In addition to the above-mentioned Range pot., there is provision for 3 other trimmers, on the PCB:

1. GAIN (RV2)

This controls the system loop gain, and may be adjusted if the dancer is found to be unstable. This will not normally be found necessary, and the potentiometer is usually set to the full clockwise position.

2. COMPENSATION (RV3)

This control is replaced by a jumper on current production units. Its function is to .pa inject a stabilising current

signal into the armature voltage control loop. When jumpered, the effect is the same as that of setting the trimmer to maximum.

3. CURRENT LIMIT

To protect the unit against damage, should the motor stall, jam, or current demands exceed its rating, a current limiting circuit is included which limits motor current to a safe level regardless of motor load, or input from the Tension arm. This potentiometer is set at the factory to suit 1/2 HP motors. Should changes be required in the field, proceed as follows. Monitor the motor current. Turn the Current Limit (RV4) to minimum (CCW). Stall the motor. Advance the potentiometer slowly until the desired current is reached. This should not exceed 125% of the nameplate rating. Do not stall the motor for more than a few seconds, or damage may occur. When the unit is in Current Limit, an LED on the PCB is Lit.

age regulator U1 and capacitor C2. Replacing the obviously damaged items frequently restores operation. Faults which cause repeated fuse blowing are usually traceable to a defective power module (Item bolted to chassis). The item can be disconnected, checked for shorts and replaced as required.

If the Tension potentiometer has been replaced, improper operation often results from mis-connection of the leads. A check should be made to verify presence of + 15 VDC. at terminals 1 - 4. If absent, the regulator or transformer may be defective, or there may be a defective IC on the board. To eliminate the latter possibility, carefully remove ICs one at a time, checking the 15V supply after each removal. If at any stage voltage is restored, the last IC removed may be defective. This is easily verified by replacement with a new device. If the supply is still absent, try replacing the regulator U1, and finally the transformer.

TROUBLE SHOOTING & REPAIR

In most cases repair will require parts replacement. If user intends to, and is equipped to perform routine repairs, it is suggested that spare parts listed under RECOMMENDED SPARES are available before commencing.

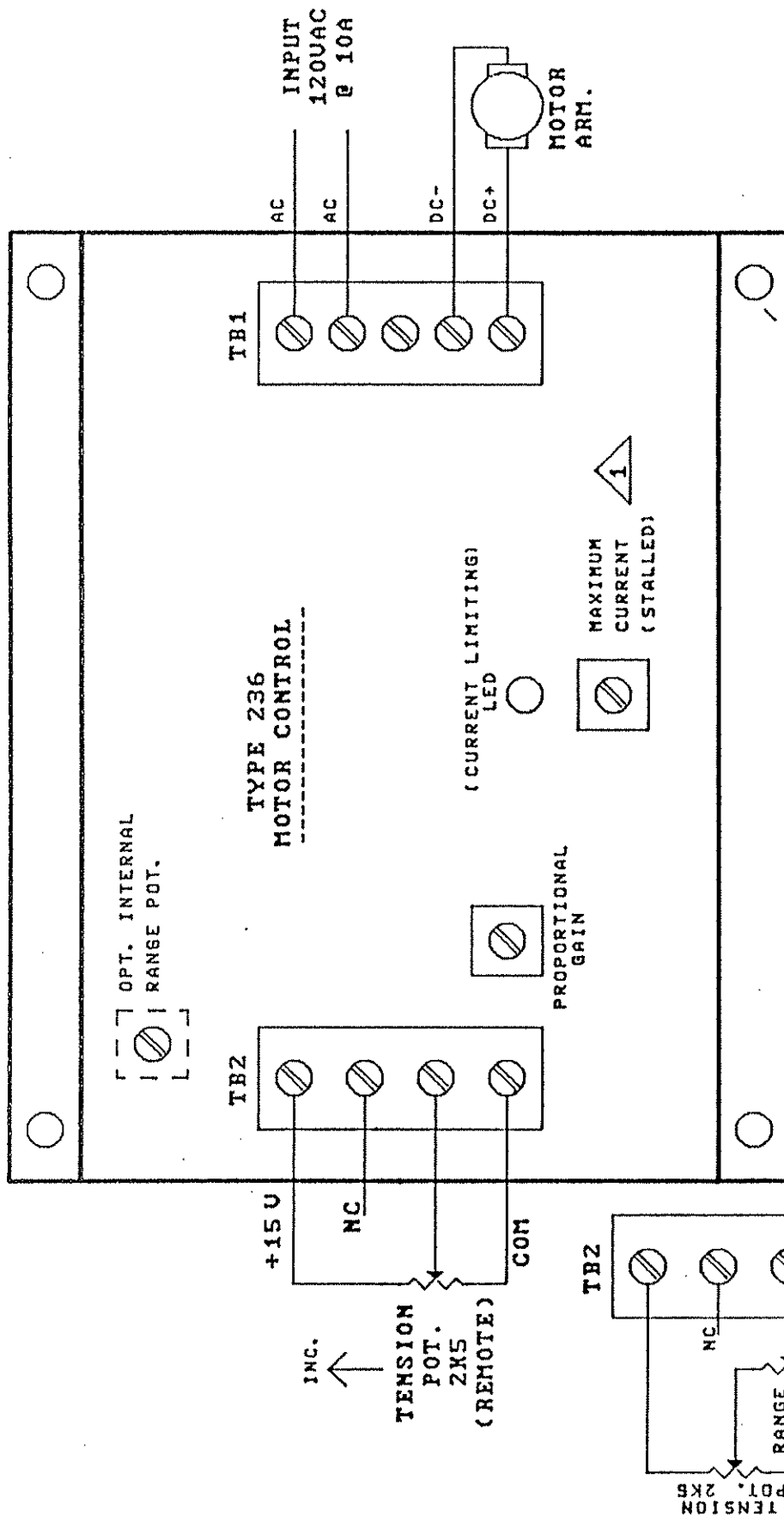
Since the control circuitry is live, grounding any of the Tension potentiometer leads will cause damage to the PCB. This has been found the most common cause of failure. Damage is usually evident visually in the area of volt-

RECOMMENDED SPARES

DESCRIPTION	REF.	MFR.	TYPE #	QTY.
POWER MODULE		I.R.	P102W	1
SUPPRESSOR	SS	I.R.	Z130LA2	2
DIODE, 1 AMP	VARIOUS	MOT.	1N4005	6
QUAD. OPAMP	A1	MOT.	MC3403	2
VOLT. REG. 15V	U1	MOT.	MC7815	2
VOLT. REG. 5V	U2	MOT.	MC78L05	2
OPT. COUPLER	O/C	MOT.	MOC3021	2
L.E.D	LED	T.I.	TIL220	2
TRANSISTOR, NPN	Q1	MOT.	2N2222	2
BUFFER, DUAL	U3	RCA.	CD40107BE	2
TRIMMER, 5K	RV4	BOURNS	3386F1-502	2
TRIMMER, 50K	RV2	BOURNS	3386F1-502	2
RESISTOR .01/5W	R5	RCL	LD-0HM	1
TRANSFORMER	TR	HAMMOND	161EA16	1

OTHER PARTS NOT LISTED SHOULD BE READILY AVAILABLE
LOCALLY.

SIZE OVERALL 7 3/4 x 7 1/4 x 2 1/2 H.



Title		FILM TENSION CONTROL OUTLINE & INSTALLATION	
Size	Number	Revision	
A	236-02A	6	
Date:	S-SEP 1989	Sheet	2 of 2
File:	236/1	Drawn By:	S.M.

REV 1 AUG 69
OPERATING INSTRUCTIONS FOR 750MX SPEED CONTROL

INTRODUCTION

THE 750MX CONTROL IS A DC MOTOR CONTROL DESIGNED FOR USE ON STRETCH-WRAP PALLET WRAPPING MACHINES AS A TURN-TABLE DRIVE. THIS UNIT IS INTENDED TO SERVE AS A UNIVERSAL REPLACEMENT FOR EARLIER DESIGNS, 750M-1, 750M1 + 223, 750M-2, 750M-2 + 223. THE BOARD WILL OPERATE ON 230VAC WITH MOTORS UP TO 2 HP, 180 V ARMATURE, OR ON 120VAC WITH MOTORS UP TO 1 HP, 90 V ARMATURE. AS STANDARD, THE BOARD ACCOMMODATES ONLY PERMANENT MAGNET FIELD MOTORS. THERE IS PROVISION FOR INSTALLATION OF FIELD DIODES SHOULD THEY BE REQUIRED.

THE BOARD HAS MULTIPLE-TURN POTENTIOMETERS FOR THE FOLLOWING DISCRETIONARY ADJUSTMENTS: THREE PRESET SPEEDS, AND TWO PRESET LINEAR DECELERATION RATES. A SINGLE TURN POTENTIOMETER IS FURNISHED FOR ADJUSTMENT OF LINEAR ACCELERATION RATE. THE CARD ALSO HAS ADJUSTMENTS FOR PRE-CONDITIONING (ZERO), CURRENT LIMIT, AND IR COMPENSATION. THE LAST THREE CONTROLS WILL NOT NORMALLY REQUIRE FIELD ADJUSTMENT.

INSTALLATION

THE UNIT SHOULD BE INSTALLED WHERE IT DOES NOT EXPERIENCE EXTREMES OF TEMPERATURE OR VIBRATION. IT MAY BE ORIENTED EITHER VERTICALLY OR HORIZONTALLY. AC LINE IS CONNECTED TO AC1, AC2. THE MOTOR ARMATURE IS CONNECTED TO A1, A2. IF A FIELD IS REQUIRED AND THE CARD IS FURNISHED WITH FIELD DIODES, THE MOTOR FIELD CONNECTS TO F1, F2. REFER TO OUTLINE AND INSTALLATION DRG. 750MX-05A.

THE SPEED SELECTION TERMINALS ARE LOCATED AT THE OPPOSITE END OF THE BOARD FROM THE POWER TERMINALS. THERE ARE 3 PRESET WRAPPING SPEEDS (PSET1, PSET2, PSET3). THESE CORRESPOND TO RV1, RV2, AND RV3 ON THE RAYTRON 750MX-11B SCHEMATIC. THE SPEEDS ARE SELECTED BY MEANS OF SOLID-STATE SWITCHING CIRCUITS ON THE CARD IN RESPONSE TO AC INPUT SIGNALS. THESE INPUTS ARE ISOLATED FROM THE POWER SECTION, AND ALWAYS REQUIRE 120 VAC REGARDLESS OF THE SUPPLY VOLTAGE TO THE POWER SECTION.

THE ACTUAL SPEED SELECTION PROTOCOL IS AS FOLLOWS:

PSET1 "LO"	SELECTED BY A SIGNAL APPLIED FROM TERMINAL (30) TO (N)
PSET3 "HI"	" " " " " " (30) & (62) TO (N)
PSET2 "JOG"	" " " " " " (35) TO (N)
	OR (35) & (62) TO (N)

THE NAMES "HI", "LO" "JOG" IMPLY DESCENDING SPEED MAGNITUDE, AS MAY BE THE CASE IN TYPICAL APPLICATIONS; HOWEVER, IF THE APPLICATION DEMANDS, EACH SPEED MAY BE INDEPENDENTLY SET ANYWHERE FROM 0 TO 100%. NOTE THAT THERE ARE TWO WAYS OF SELECTING PSET2. THESE DIFFER IN THAT WHEN TERMINAL 62 IS ENERGISED AS WELL AS 35, DECELERATION IS CONTROLLED BY DEC3; WHEN ONLY 35 IS ENERGISED, DECELERATION IS CONTROLLED BY DEC1,2.

BEFORE APPLYING POWER TO THE UNIT IT IS ESSENTIAL TO CONFIGURE IT CORRECTLY FOR THE PREVAILING LINE VOLTAGE, ELSE DAMAGE MAY OCCUR. THE TRANSFORMER PRIMARY CONNECTIONS ARE CONFIGURED BY MOVING THE TWO JUMPERS ADJACENT TO THE TRANSFORMER, TO THE 120 OR 240 V POSITIONS MARKED ON THE BOARD, AS APPROPRIATE. THE ARMATURE VOLTAGE FEEDBACK JUMPER NEAR THE CENTRE OF THE BOARD SHOULD BE SET TO THE 90 V POSITION FOR 120VAC INPUT, AND TO THE 180 V POSITION, FOR 230VAC INPUT.

ADJUSTMENTS

ACCELERATION AND CURRENT LIMIT

FOR ANY POSITIVE SPEED TRANSITION, THE INCREASE WILL TAKE PLACE IN A LINEAR FASHION, AT A RATE SET BY THE "ACC" POTENTIOMETER. A RANGE OF 0 - 20 SECONDS FROM 0 TO FULL SPEED IS AVAILABLE. CLOCKWISE ROTATION WILL INCREASE ACCELERATION TIME. THE TIME WILL USUALLY BE SET TO THE MINIMUM THAT CAN BE TOLERATED WITHOUT STRESSING THE MACHINERY, OR CAUSING MATERIAL TO BE JERKED FROM THE TABLE. IF TOO FAST A RATE IS SELECTED, THE CURRENT DEMANDS MAY EXCEED THE MOTOR RATING. THE CONTROL HAS AN ADJUSTABLE CURRENT LIMIT, WHICH LIMITS THE MOTOR CURRENT TO SAFE LEVELS DURING ANY CIRCUMSTANCES (ACCELERATION OR MECHANICAL OBSTRUCTION) WHICH DEMAND HIGHER TORQUE THAN MOTOR RATING. IN THESE CIRCUMSTANCES, PRESET SPEEDS OR ACCELERATION RATES WILL NOT, OF COURSE, BE MAINTAINED. THE CURRENT LIMIT CONTROL IS FACTORY-SET TO LEVELS SUITABLE FOR 1 HP, 90 V MOTORS, OR 2 HP 180 V MOTORS. IF LOWER HORSEPOWER IS REQUIRED, THE CURRENT LIMIT LEVEL CAN BE REDUCED BY CCW ROTATION. ON NO ACCOUNT SHOULD THE LEVEL BE INCREASED FROM THE FACTORY SETTING.

DECELERATION

TWO PRESET DECELERATION RATES ARE PROVIDED. THAT LABELED DEC 1,2 AFFECTS ONLY TRANSITIONS BETWEEN SPEEDS 1 AND 2, AND IN PARTICULAR, TRANSITIONS BETWEEN THE HIGHER AND THE LOWER OF SPEEDS 1 AND 2. THE DECELERATE RATE DEC 3 IS EFFECTIVE ON TRANSITIONS FROM A HIGHER SPEED (WHERE PSET1 AND/OR PSET2 ARE SO SET), TO SPEED 3.

ADJUSTMENT RANGE IS 0 TO 45 SECONDS FOR BOTH PRESETS, FROM FULL TO NEAR ZERO SPEED. CLOCKWISE ROTATION INCREASES DECELERATION TIME IN THE EVENT THAT TOO SHORT A TIME BE SELECTED, THE INERTIA OF THE TABLE WILL DETERMINE THE STOPPING TIME, SINCE THE MOTOR CONTROL CANNOT PROVIDE BRAKING TORQUE.

IR COMPENSATION

THIS FEATURE BOOSTS THE ARMATURE VOLTAGE AS LOAD CURRENT INCREASES, IMPROVING SPEED REGULATION UNDER LOAD. CLOCKWISE ROTATION INCREASES THE AMOUNT OF COMPENSATION. FIELD ADJUSTMENT WILL NOT NORMALLY BE REQUIRED. BE WARNED THAT EXCESSIVE COMPENSATION MAY MAKE THE MOTOR UNSTABLE.

POWER UP/DOWN CHARACTERISTICS.

THE PROPER STARTING/STOPPING CHARACTERISTICS ARE OBTAINED BY SWITCHING THE CONTROL INPUTS WHILE THE LINE POWER IS CONTINUOUSLY PRESENT. THE SYSTEM SHOULD BE CONFIGURED SO AS TO ENSURE THAT THE CONTROL IS ALWAYS ENERGISED A FEW SECONDS BEFORE IT IS PUT IN MOTION. AS PREVIOUSLY DESCRIBED, TRANSITIONS BETWEEN SPEEDS TAKE PLACE AT CONTROLLED RATES. THE "STOP" CONDITION IE: WHEN ALL CONTROL SIGNALS ARE REMOVED RESULTS IN AN IMMEDIATE COAST TO REST. THIS OCCURS ALMOST INSTANTLY AT LOW SPEEDS.

ACCELERATIONS FROM REST TAKE PLACE AT THE PRESET ACCELERATION RATE. IF THIS IS SET TO A SIGNIFICANT VALUE, SOME START-UP DELAY MAY BE NOTICEABLE. TO AVOID THIS, THE ZERO CONTROL MAY BE ADVANCED CLOCKWISE TO OBTAIN THE DELAY BY PRECONDITIONING THE TIMED ACCELERATION CIRCUIT.

APPENDIX

THE 750MX DESIGN INCORPORATES A SPECIAL FEATURE REGARDING THE SELECTION OF THE 2 DECELERATION POTENTIOMETERS (DEC1,2 AND DEC3) PERMITTING MORE FLEXIBILITY IN SWITCHING BETWEEN TABLE SPEEDS.

THIS FEATURE ALLOWS PERMANENT PRESETTING OF 2 DIFFERENT DECELERATION RATES FROM 2 GIVEN HI SPEEDS TO THE JOG SPEED. AS AN ILLUSTRATION, TWO POSSIBLE REQUIREMENTS ARE DISCUSSED. OTHER COMBINATIONS ARE, OF COURSE, POSSIBLE AND THE FOLLOWING SHOULD PROVIDE THE NECESSARY SET-UP INFORMATION. (REFER TO DIAGRAM C) NUMBERS.

ASE 1: (SEE FIG.A)

1. THE TABLE INITIALLY RUNNING AT HI SPEED (PSET3) WITH 120V SIGNAL ENABLED AT TERMINALS 30 & 62 TO N.
2. SWITCH TO "LO" SPEED (SPEED1) BY DE-ENERGISING TERMINAL 62. 120V SIGNAL NOW PRESENT AT 30 TO N ONLY.
3. UNIT DECELERATES TO PSET1 AT RATE DETERMINED BY DEC 1,2 POT.
4. SWITCH TO "JOG" SPEED BY DE-ENERGISING TERMINAL 30, AND ENABLING 35 & 62 TO N.
5. TABLE DECELERATES TO A SPEED DETERMINED BY PSET2, AT A RATE DETERMINED BY DEC3 POT.

CASE 2: (SEE FIG.B)

IN THIS EXAMPLE TABLE DECELERATES TO JOG SPEED FROM EITHER OF TWO HIGHER PRESET SPEEDS, BUT AT DIFFERENT RATES:-

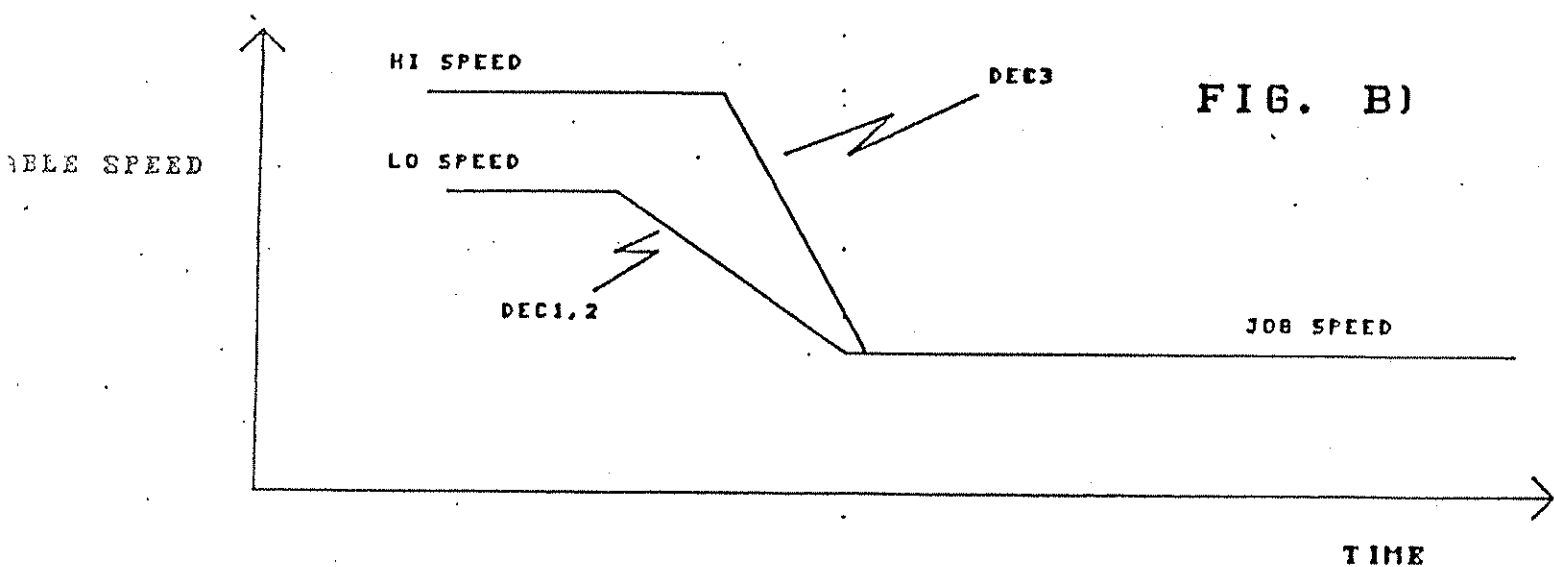
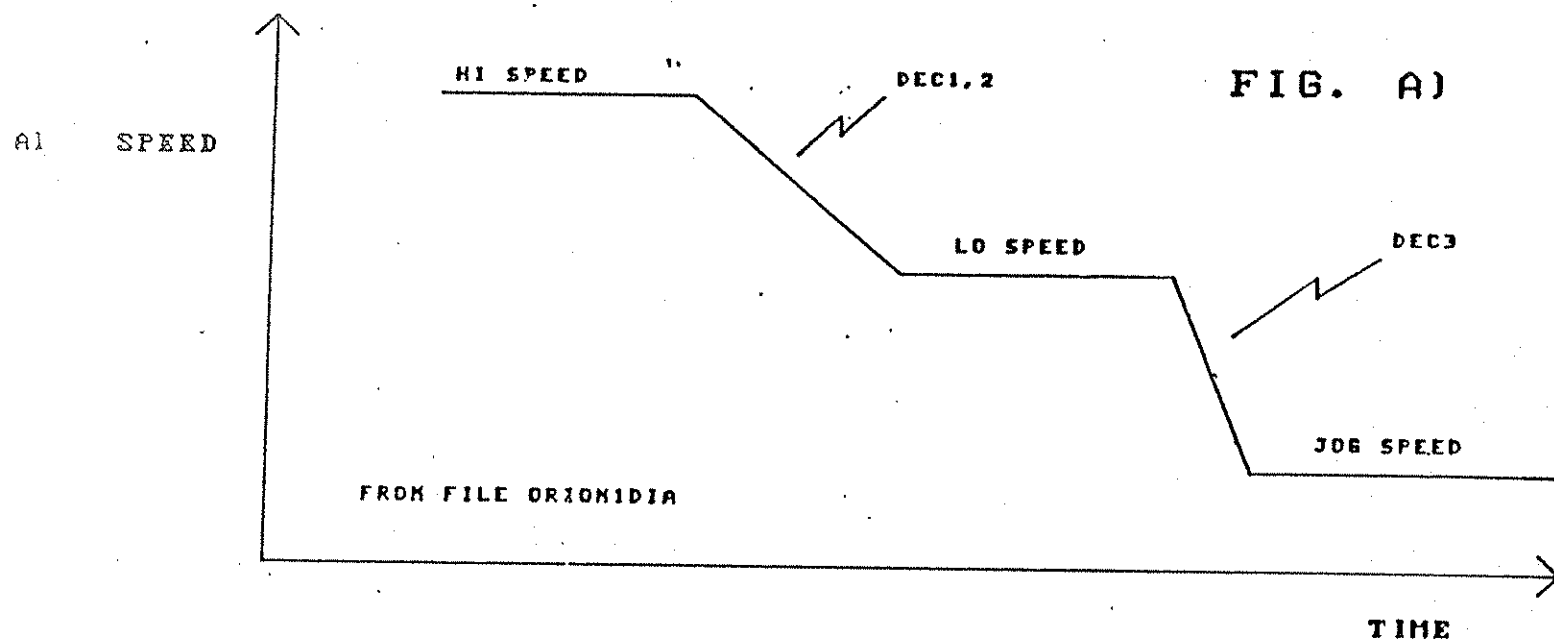
1. TABLE INITIALLY RUNNING AT "HI" SPEED (POT PSET3) WITH 120V SIGNAL PRESENT AT TERMINALS 62 & 30 TO N.
2. SWITCH TO "JOG" (PSET2) FROM "HI" SPEED (PSET3) BY DE-ENERGISING TERMINAL 30 AND ENERGISING 35.
3. DECELERATION CONTROLLED BY DEC3 POT. TERMINAL SPEED PSET2

OR

1. TABLE INITIALLY RUNNING AT "LO" SPEED (POT PSET1) WITH 120V SIGNAL PRESENT AT TERMINALS 30 TO N.
2. SWITCH TO "JOG" (PSET2) FROM "LO" SPEED (PSET1) BY DE-ENERGISING TERMINAL 30 AND ENERGISING 35 TO N.
3. DECELERATION CONTROLLED BY DEC1,2 POT.

HEREUNDER IS A SUMMARY OF THE CORRESPONDENCE BETWEEN DOWNWARD TRANSITIONS TO ALL PRESET SPEEDS AND THEIR RESPECTIVE DECEL. RATE CONTROL POT. IN ALL CASES 120 VAC NEUTRAL CONNECTS TO N, 120 VAC LINE TO THE OTHER CITED TERMINAL(S).

TRANSITION TO PSET1	DEC1,2	DECEL. CONTROL	=====>	30-N
TRANSITION TO PSET2	DEC1,2	" "	=====>	35-N
TRANSITION TO PSET2	DEC3	" "	=====>	35;62-N
TRANSITION TO PSET3	DEC3	" "	=====>	30;62-N



EX: CONNECTION OF
35:62-M

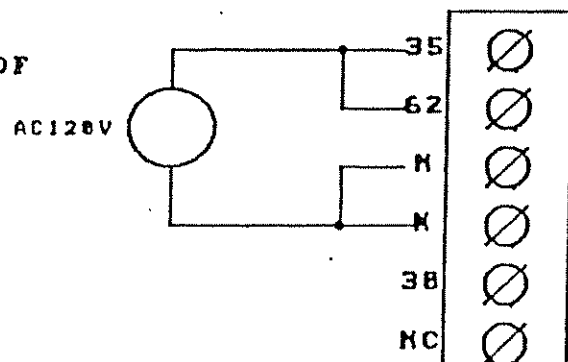
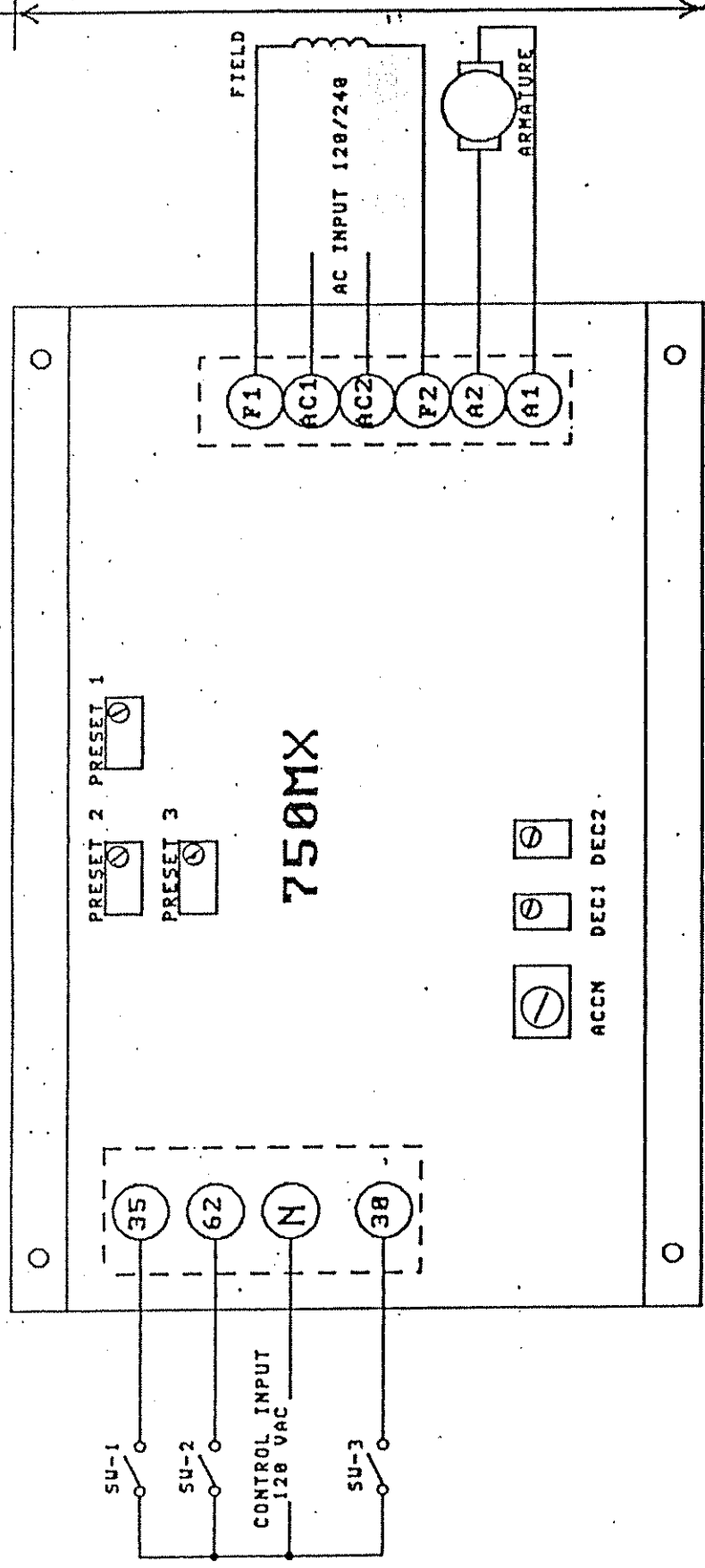


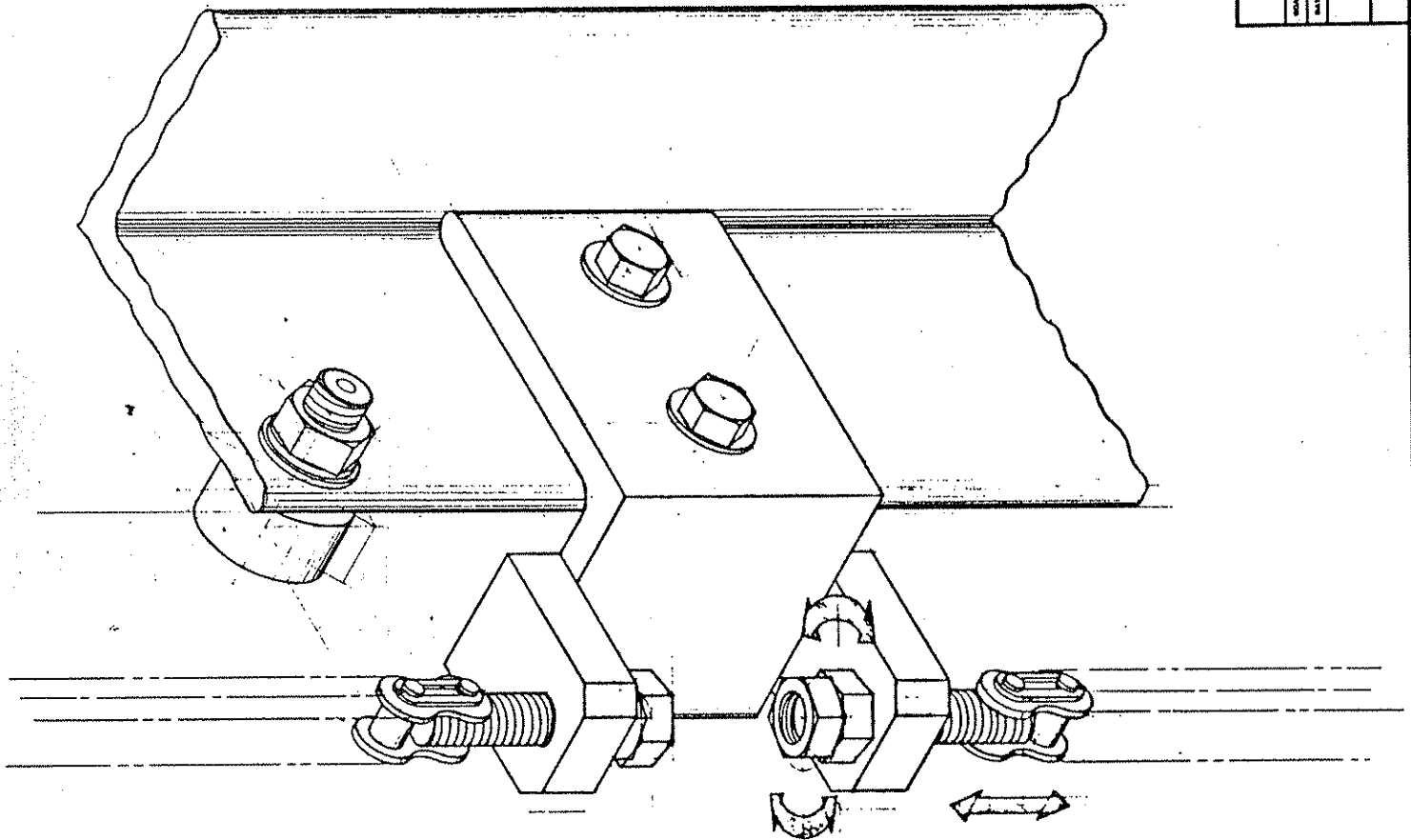
FIG. C)

OUTLINE AND INSTALLATION ON DRAWING

8.00" 7.25"



RAYTRON LTD. MONTREAL	
Title	
1 - 2 HP DC MOTOR SPEED CONTROL	
Size	Number
A	750MX-05A
Revision	
1	
Date:	31-MAR-1989
File:	2: 750MX-05A
Drawn By: RAY	

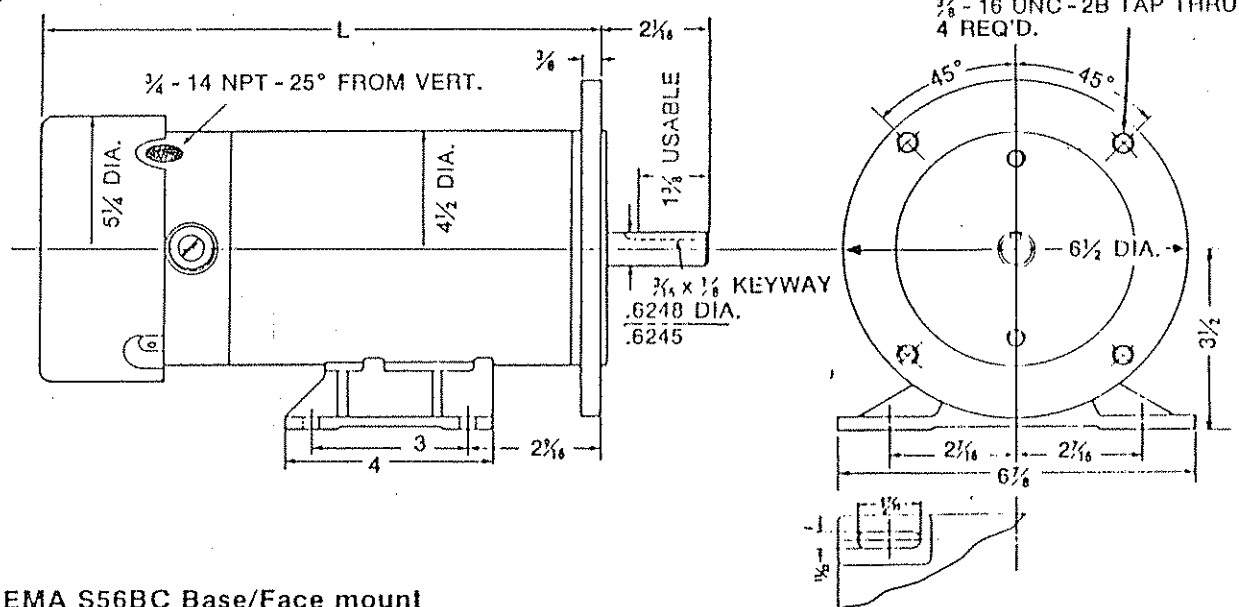
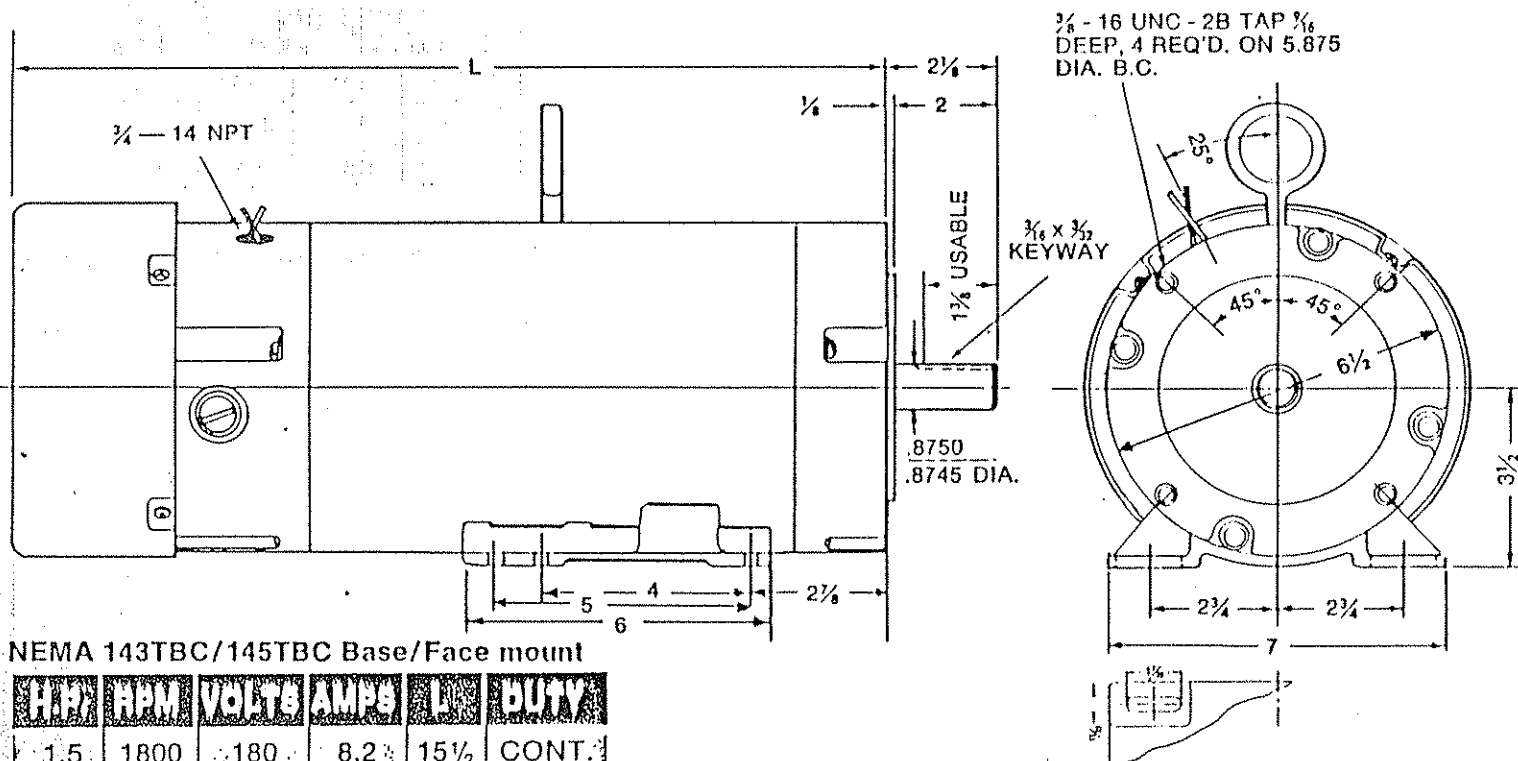


CHAIN TENSION
ADJUSTMENT

ORION PACKAGING		DESIGNED BY VALENTINI
DESIGNED BY N.T.S.	APPROVED BY	DATE
DATE 10-7-86		
CHAIN TENSIONER ASS'Y		QUANTITY ORDERED
		200-192

Motor dimensions

TEFC P/M motor



180 V.

H.P.	RPM	VOLTS	AMPS	L	DUTY
$\frac{1}{2}$	1725	180	2.8	$10\frac{3}{4}$	CONT.
$\frac{3}{4}$	1725	180	3.5	$12\frac{3}{4}$	CONT.
1	1725	180	5.35	$14\frac{3}{4}$	CONT.

90 V.

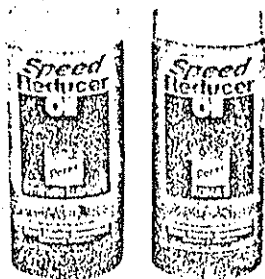
H.P.	RPM	VOLTS	AMPS	L	DUTY
$\frac{1}{2}$	1725	90	5.35	$10\frac{3}{4}$	CONT.
$\frac{3}{4}$	1725	90	8.1	$12\frac{3}{4}$	CONT.
1	1725	90	10.6	$14\frac{3}{4}$	CONT.

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.

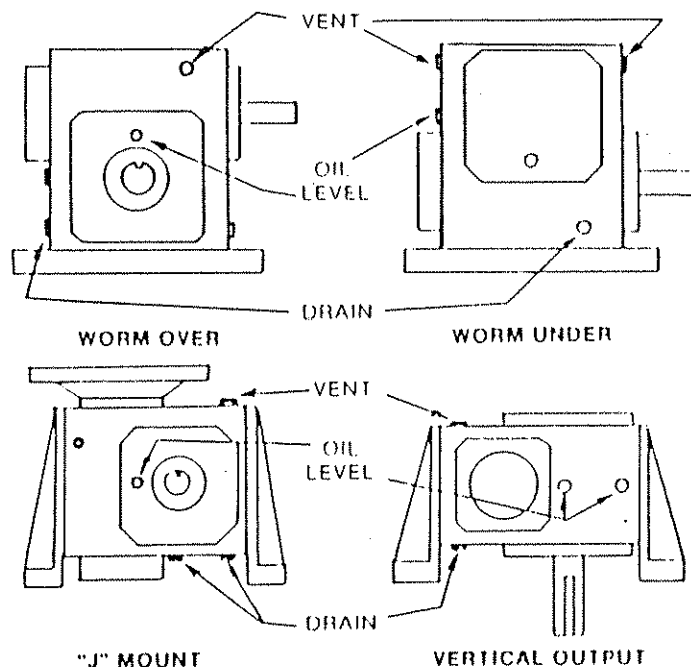
Contact DEC Service Dept. for order information.

OIL CAPACITIES*

UNIT TYPE	UNIT SERIES				
	100	150	200	300	500
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.

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:

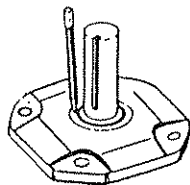


Figure 1

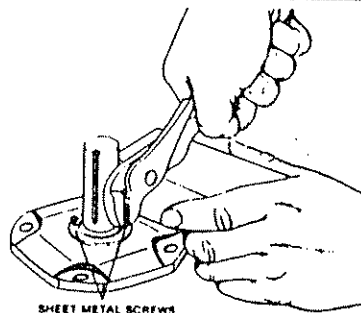


Figure 2

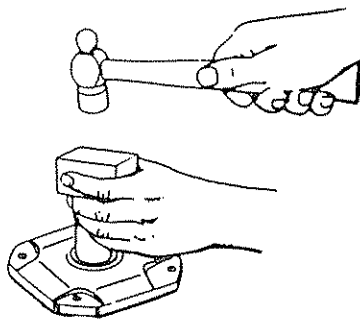


Figure 3

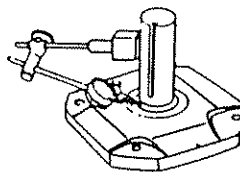


Figure 4

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 seat 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.

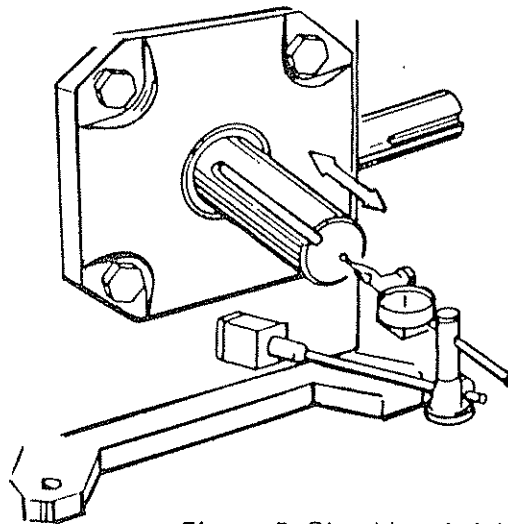
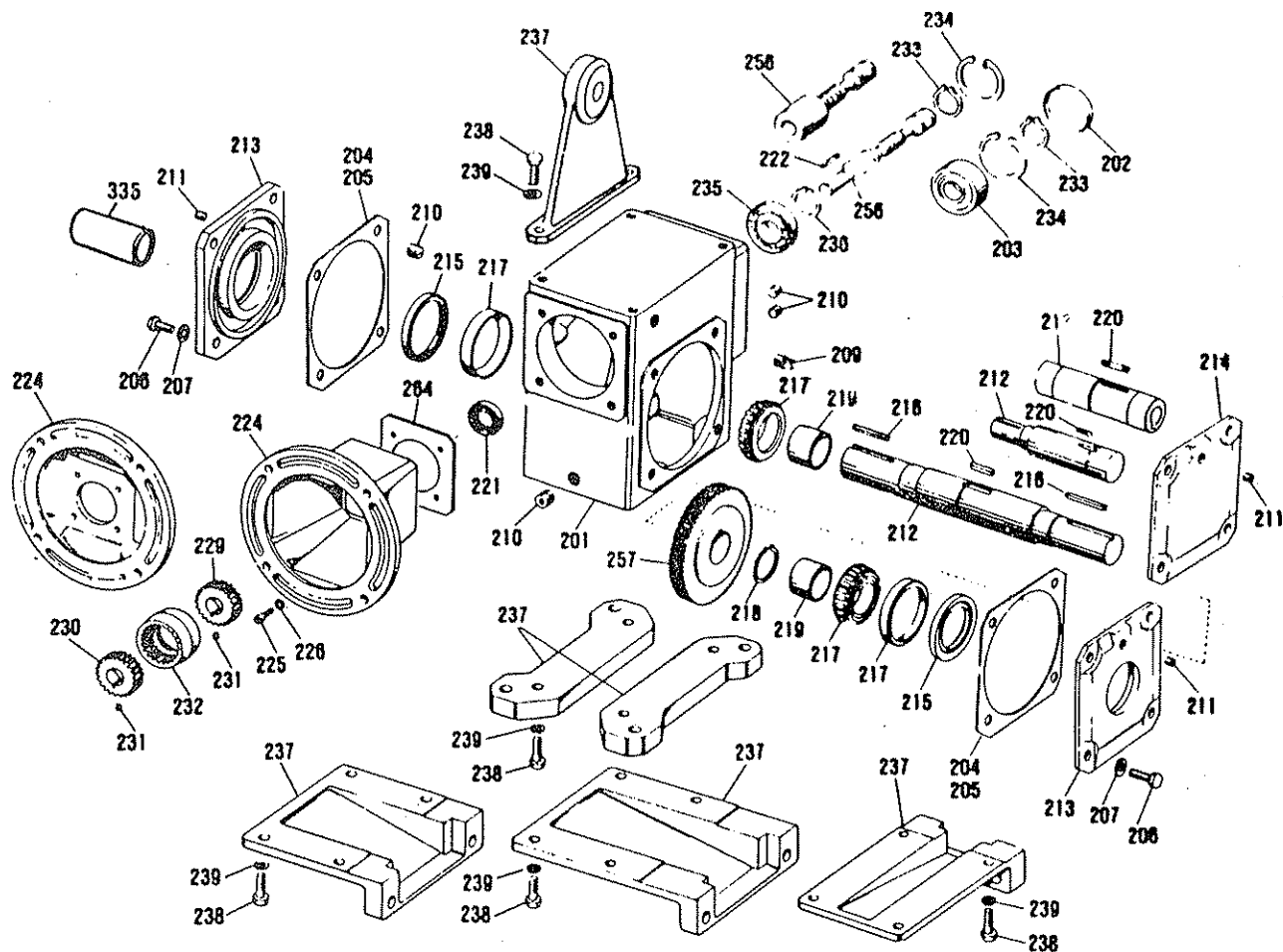
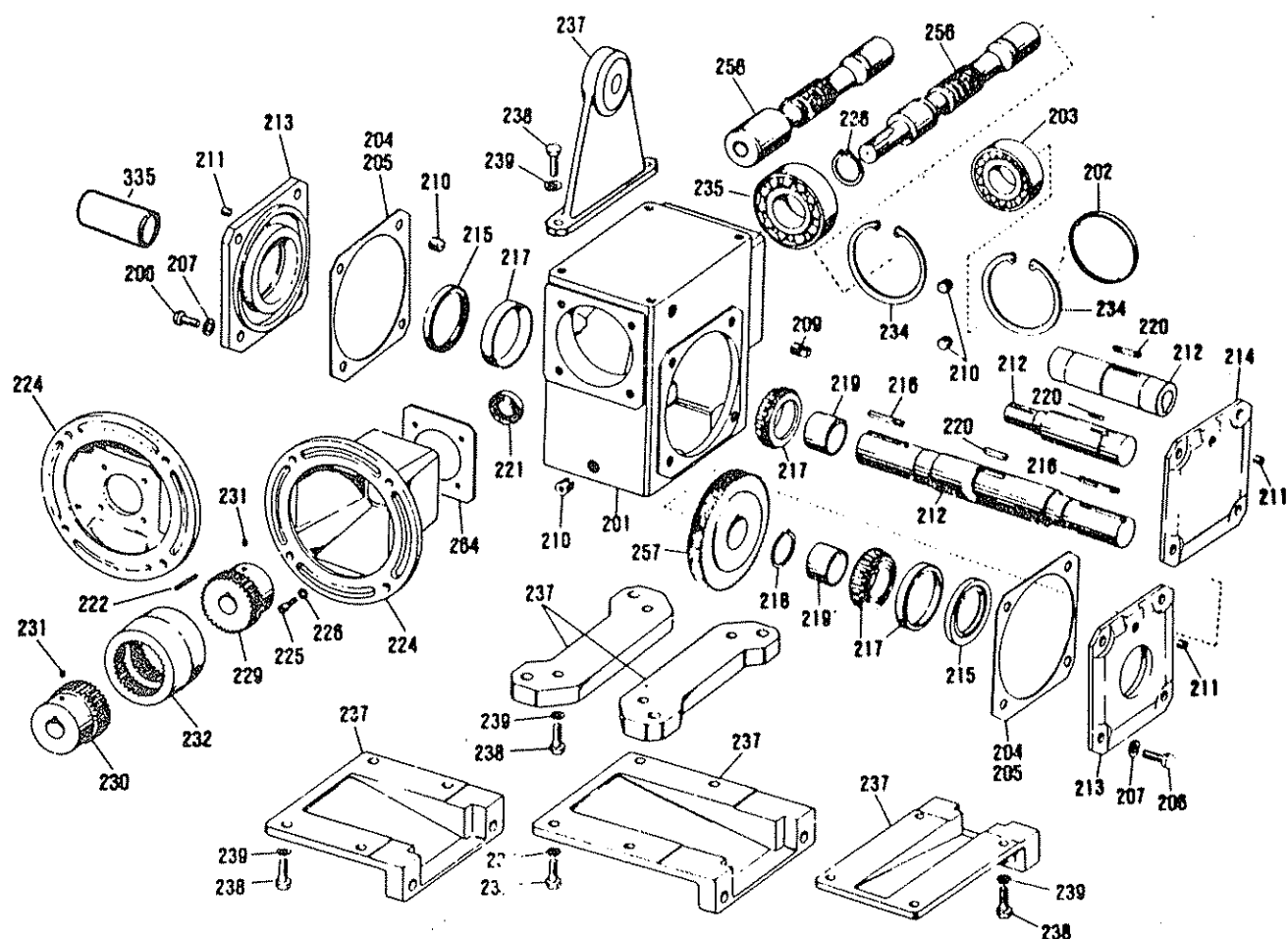


Figure 5 Checking Axial Float

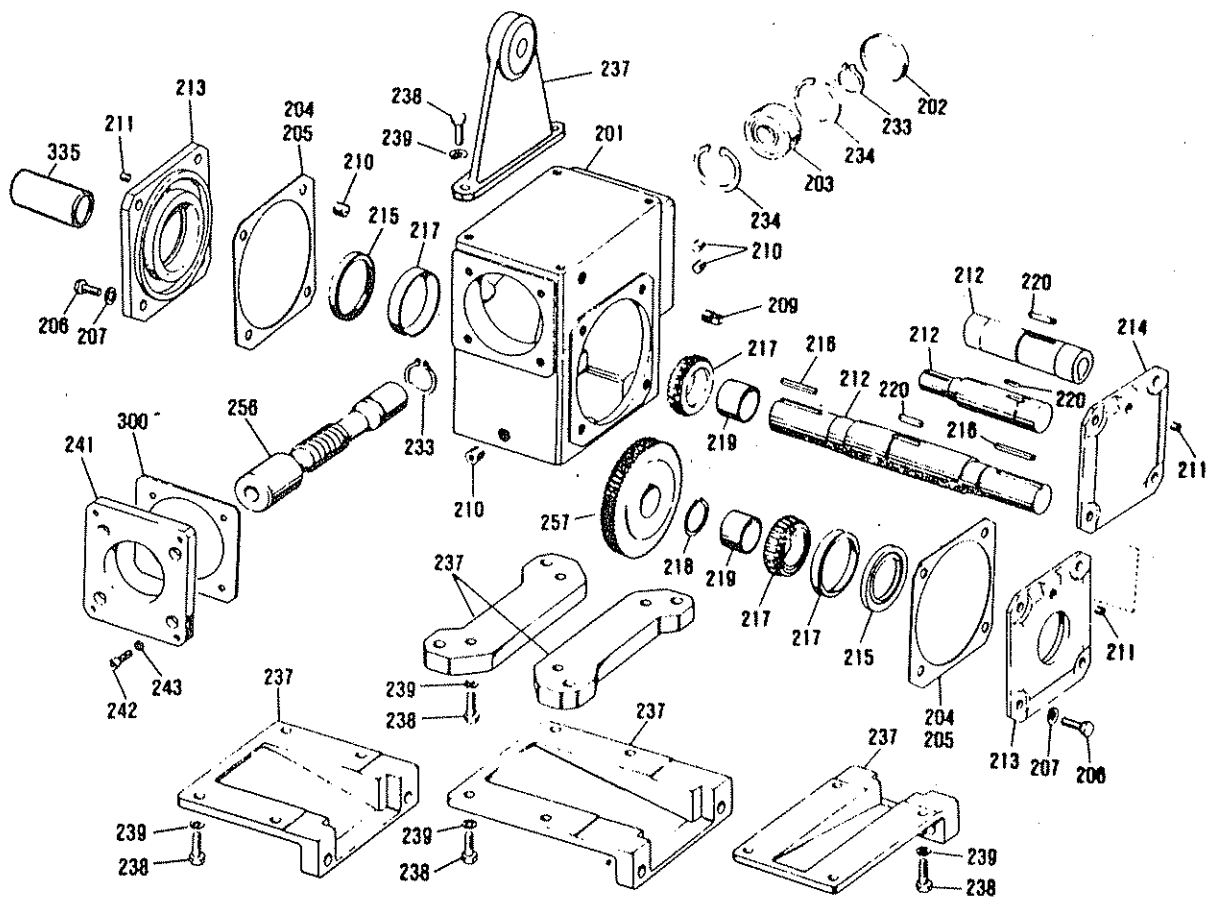
- D. Remove output shaft with seal cage and apply bluing to entire worm thread. Worm thread must be clean of oil. Reassemble output shaft and seal cage with output key facing up.
- E. Use a rag to apply hand pressure to the output shaft and rotate the high speed shaft until output key is down. Return 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.



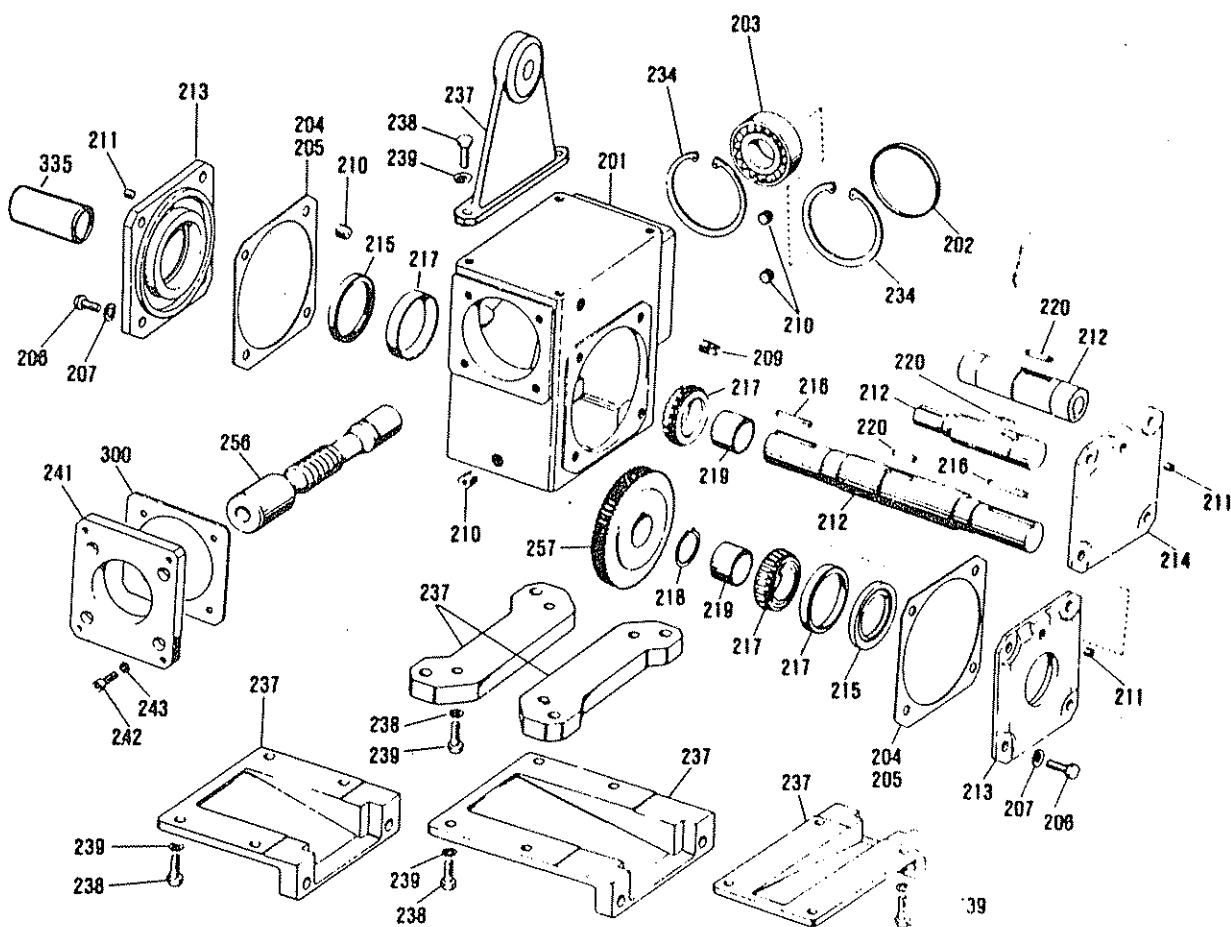
Single Reduction Unit 133, 175, 206 Series



Single Reduction Unit 262, 325 Series



Double Reduction Secondary Unit 133, 175, 206 Series



Double Reduction Secondary Unit 262, 325 Series

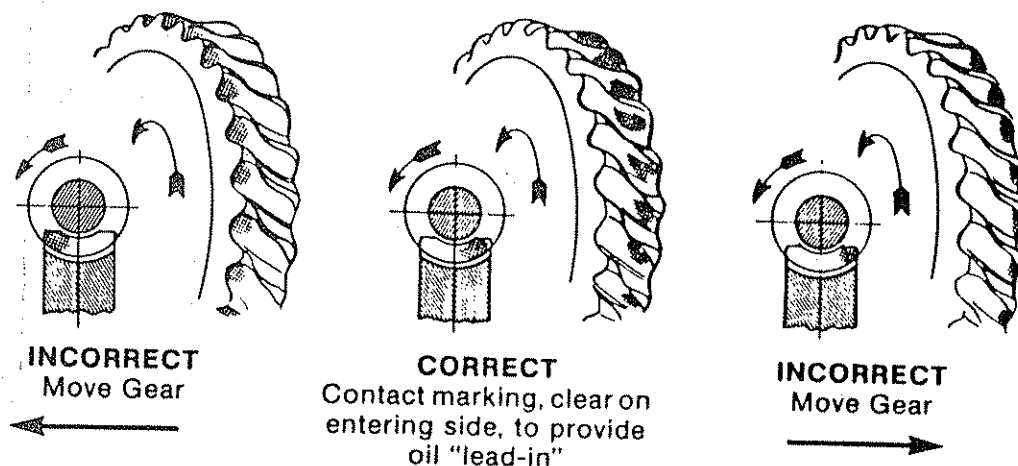


Figure 6 Gear Contact Pattern

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.

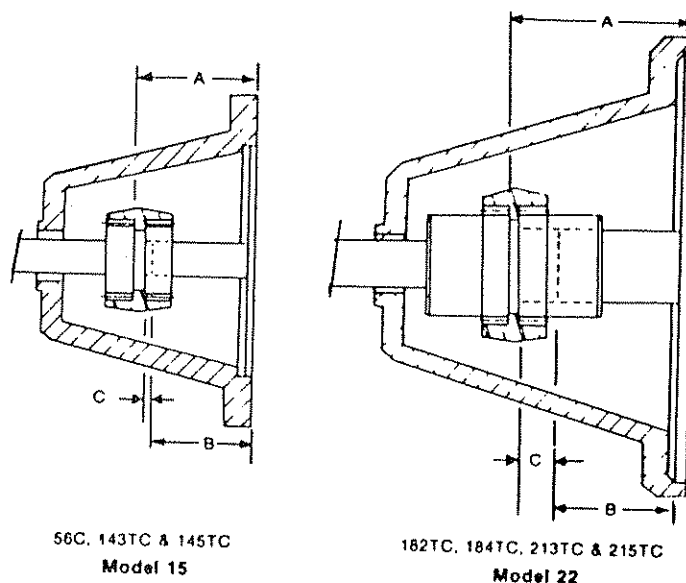


Figure 7 Motorized Coupling Adaptor

TABLE 2. COUPLING ADAPTOR DATA

"C" COUPLING MOUNTING DATA

N.E.M.A. Frame No.	Mounting Dimensions		
	Reducer A $\pm \frac{1}{64}$	Motor B $\pm \frac{1}{64}$	C
56C	$2\frac{5}{16}$	$2\frac{1}{16}$	$\frac{1}{16}$
143TC	$2\frac{5}{16}$	$2\frac{1}{8}$	—
145TC	$2\frac{5}{16}$	$2\frac{1}{8}$	—
182TC	$3\frac{5}{16}$	$2\frac{5}{8}$	$\frac{1}{2}$
184TC	$3\frac{5}{16}$	$2\frac{5}{8}$	$\frac{1}{2}$
213TC	$3\frac{5}{16}$	$3\frac{1}{8}$	—
215TC	$3\frac{5}{16}$	$3\frac{1}{8}$	—

BORE SIZES AVAILABLE

MODEL 15		MODEL 22	
Bore	Kwy.	Bore	Kwy.
.500	None	—	—
.500	$\frac{1}{8} \times \frac{1}{16}$	—	—
.625	$\frac{3}{16} \times \frac{3}{32}$.625	$\frac{3}{16} \times \frac{3}{32}$
.750	$\frac{3}{16} \times \frac{3}{32}$.750	$\frac{3}{16} \times \frac{3}{32}$
.875	$\frac{3}{16} \times \frac{3}{32}$.875	$\frac{3}{16} \times \frac{3}{32}$
—	—	1.125	$\frac{1}{4} \times \frac{1}{8}$
—	—	1.375	$\frac{5}{16} \times \frac{5}{32}$

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.

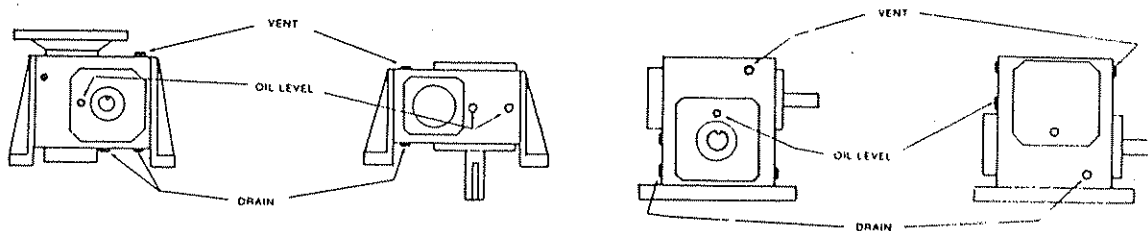


Figure 8 Standard Oil Levels

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.

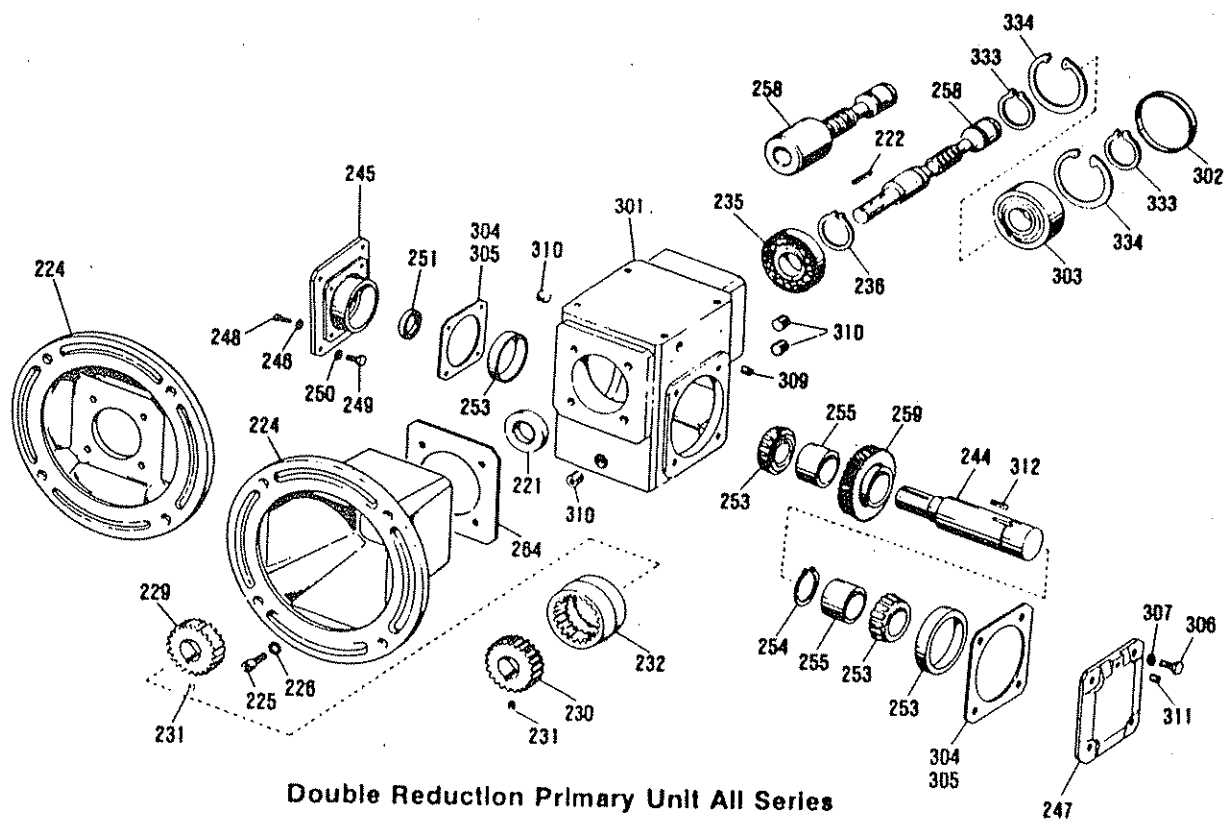
PARTS ORDERING INSTRUCTIONS

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.



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	Set screw	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.

