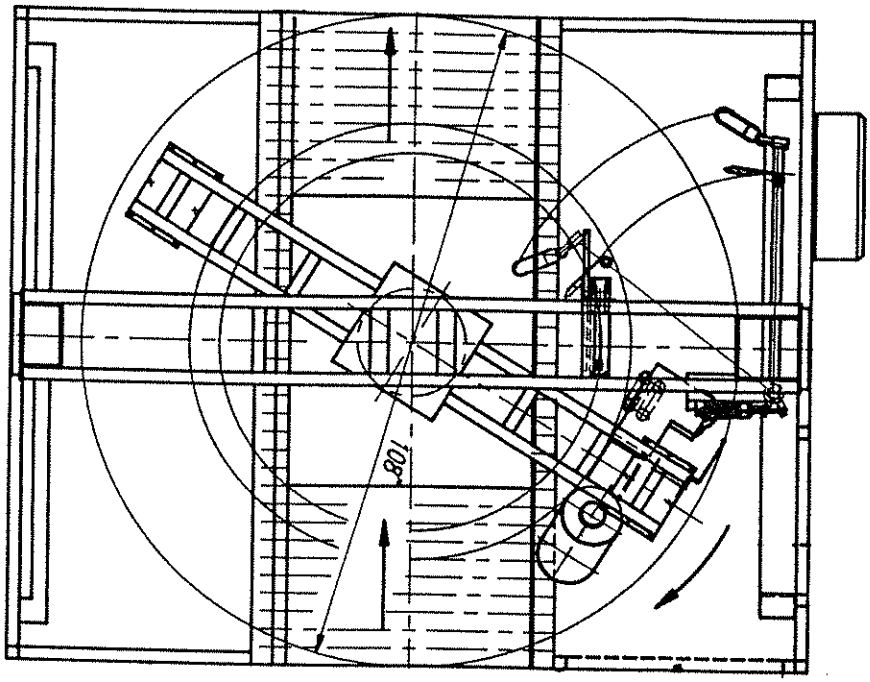
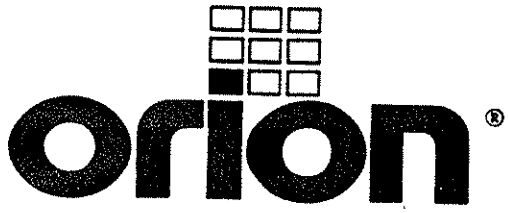
orion®



STRETCHWRAPPERS

2270 Industriel, Montreal (Laval) Canada H7S 1P9 / Tél.: (514) 667-9769 Fax: (514) 667-6320



INSTRUCTION MANUAL

2270 Industriel, Montreal (Laval) Canada H7S 1P9 / Tél.: (514) 667-9769 Fax: (514) 667-6320

Thank you for choosing ORION stretch-wrapping equipment. It is a wise choice which will benefit your company now and in the future.

ORION uses a unique combination of functional, rugged steel structure and sophisticated control systems to offer equipment high in durability and low in maintenance requirements. Our advanced control systems mean that ORION equipment can be operated safely and efficiently without the need for special operator expertise.

Please read this manual carefully and keep it handy. Following these simple operating instructions will insure the safe and efficient performance of this machine while simple maintenance procedures will guarantee a long and productive life of the equipment.

NOTICE:

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

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

1) **MODEL**
2) **SERIAL NUMBER** 083754
3) **SUBASSEMBLY (see PART LIST)**

SAFETY:

ORION'S stretch wrappers should be operated with caution and common sense as any other industrial equipment. To prevent injury and / or electrical shock, careful operation of the machine and awareness of its many automatic functions is required.

Note: All electrical power and compressed air must be disconnected prior to performing any inspection, maintenance or repair work.

ORION PACKAGING INC.

ORION MODEL L-77

083754

Spiral Semi-Automatic Medium Duty Low Profile

Maximum Load Size	55"W x 55"L x 84"H (Recommended) 63"W x 63"L x 87"H (Theoretical)*
Weight Capacity	3,000 lbs. Dynamic, 15,000 lbs. Static
Utilities	115/1/60 15 Amp Service
Turntable	59" Diameter 3/8" Steel Plate Steel Cam Follower Support System Self Lubricating System with Reservoirs 3" Height Floor to Top of Turntable
Turntable Drive	0-10 RPM Variable Turntable Speed 1/3 HP DC Drive Motor #50 Roller Chain Drive with Tensioner Electronic Soft Start
Control Features	Electronic Film Force Control Separate Top and Bottom Wrap Selectors Variable Speed Film Carriage Control Auto-Height Photocell Film Carriage Raise/Lower Switch Turntable Jog Pushbutton Power On/Off Switch Current Overload Protection NEMA 1 Electrical Enclosure
Film Delivery	20" Orion Omni-Stretch Film Carriage Electronic Film Tension Control End of Cycle Film Force Release Limited Authority Film Dancer Bar #40 Chain/Sprocket Ratio Control 1/3 HP DC/SCR Film Drive 150% Fixed Pre-Stretch Ratio
Film Carriage Drive	#50 Roller Chain Carriage Lift 1/4 HP Elevator Drive Motor Variable Speed SCR Control Structural "H" Channel Guidance UHMW Carriage Guidance System
Structural Features	Forklift Portable Base Design Cam Follower Turntable Support All Structural Steel Construction Film Roping Bar 6" x 12 lb./ft. "H" Beam
Estimated Shipping Weight	1,500 lbs.

*Theoretical is based upon removal of the roping bar, and reflects maximum film web height attainable.

MACHINE UNLOADING
INSPECTION
& INSTALLATION

UNLOADING

Machine can be easily unloaded and transported by a forklift with a minimum capacity of 2500 lbs.

1. Carefully insert the forks into the lifting tubes to the maximum possible depth. Depending on the model, a forklift access may be either at the turntable end of the machine frame, the tower end or both. In case of the mongoose machine or the conveyor, enter the forks under the frame.

2. Lift the machine (or other part of system) only to the necessary height to move it with no bouncing or friction on the floor.
2a. On the mongoose machines use the brackets welded on the top part of the machine.

3. Sit the machine down assuring uniform contact with the floor which is necessary to ensure correct and smooth operation.
3a. Mongoose type machines (M66, M67) have to be attached on the bracket or on the stand (collapsible or anchored to the floor). The M55 has it's own supporting frame which allows the machine to stand independently.

INSPECTION

1. Remove all packing and supporting additions - these may include the blocks under the carriage and the restraining bar over the table.

NOTE: when removing the stretchwrap film covering the machine, care must be taken not to cut <u>any of the electrical wires and rubber covering on the multistretch rollers.</u>

2. Perform a visual inspection of the electrical and mechanical parts for loosened joints and / 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 as follows:
- motors and transmissions
- junction boxes
- electrical conduits
- proximity and limit switches
- photocells

3. Check under the turntable (H - series models only) to ensure that there is no crippling of the movable parts i.e. casters, center axle or drive assembly.

4. Verify the following:

- turntable or rotary arm drive system to confirm that the reducer to drive the chain is snug and properly aligned

- verify the wires tight conduits for crushed sections or loose fittings

- verify the carriage to be sure that it is correctly aligned with the tower and verify the tension on the lift chain

- verify all the dials and knobs on the control panel for smooth action.

MACHINE INSTALLATION

After the visual inspection has been completed the electrical power and the compressed air may be connected as specified on the diagrams supplied with the machine.
An electrical diagram is provided with each machine in the envelope attached to the panel box.

ASSEMBLY PROCEDURE

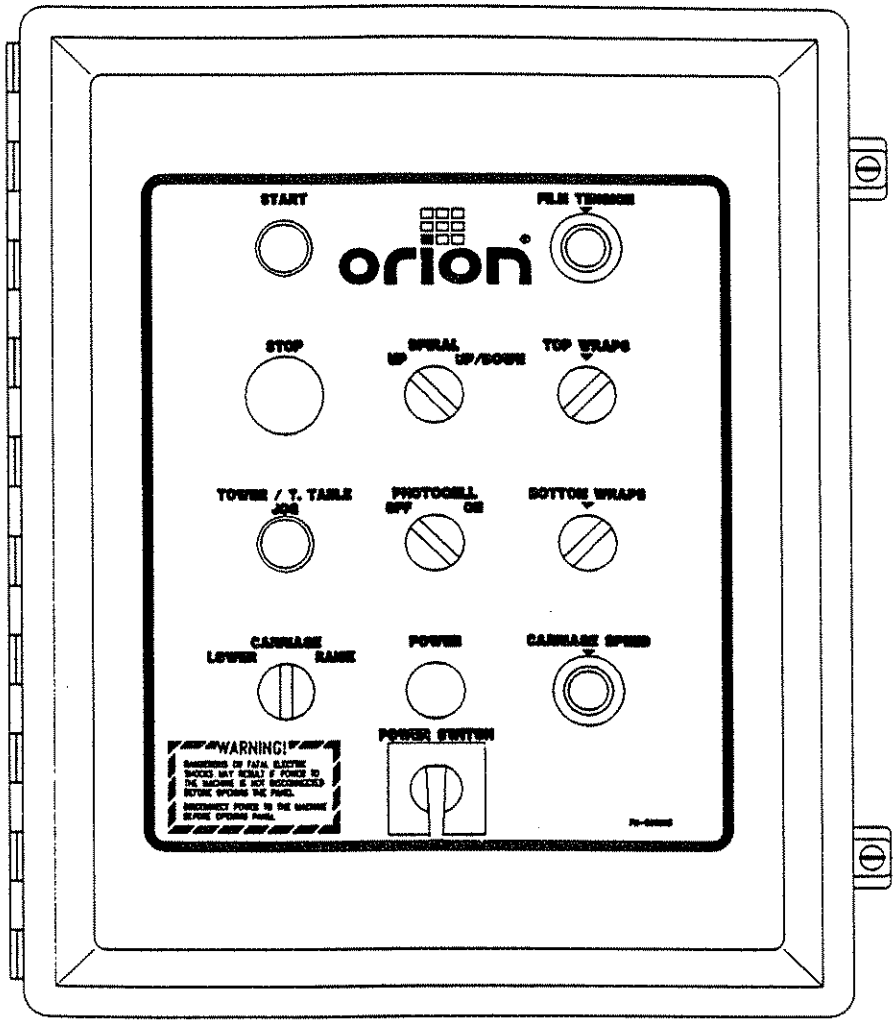
The structural frames of the machine have to be installed on a levelled floor. Locate the main wrapper section into its final position, keeping the tower assembly* away from any traffic.
The wrapper mainframe section must be bolted to the floor by the 1/2" concrete floor anchors (leg & shield or expandable type).

Conveyor sections (where applicable) have to be positioned, levelled** and bolted to the floor. Any wiring which has been disconnected to facilitate transport is marked with a number located on the junction box to which the wiring must be reconnected. It allows identification of the proper position of the infeed and outfeed conveyor sections. Any wire run that appears too short or long may indicate that the position of the mechanical components is incorrect. Verify the status of all assemblies before proceeding.

CAUTION: improper placement and alignment of the conveyor section(s) and/or electric photocells may lead to equipment malfunction and damage.

* The tower deviation from vertical must not exceed 1/4" on the distance of 10 feet (angle: 0 degrees 6').

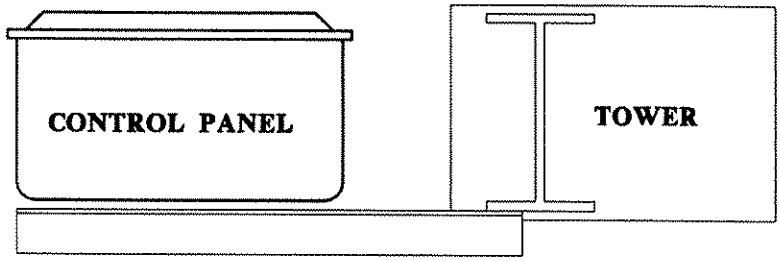
** In the case of the conveyors, the roller deviation from the horizontal must not exceed 1/16 "on the distance 52" (angle: 0 degrees 4').



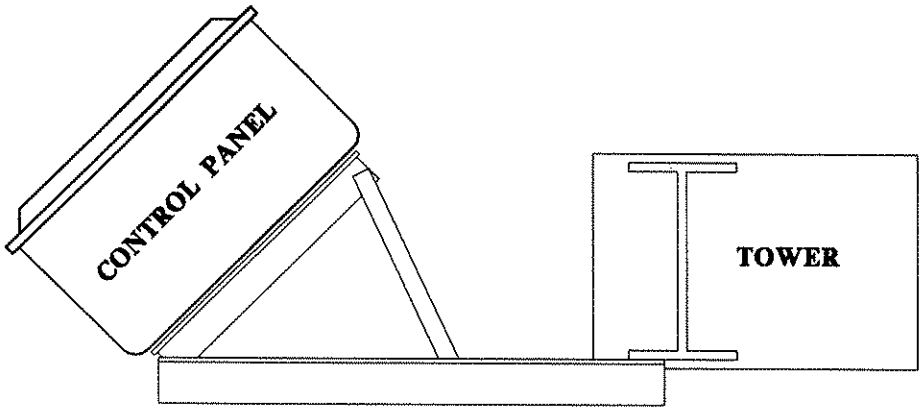
CONTROL PANEL

In case of the free standing panel (console) place it adjacent to the system and anchor firmly to the floor.Connect the liquid tide (rigid conduit) to the main junction box located on the wrapper main frame next to the tower (or tower home position in case of mongoose).The wires have to be matched properly on both sides.

In order to faciliate access and manipulation, the control panel can be mounted in two positions:



1. On the angle brackets aligned to the tower.



2. With the position bar (installed between upper angles), control panel can be rotated forward/to the side. (additional screw is attached to the tower's foot)

CONTROL PANEL MOUNT TWO POSITIONS

CYCLE CONTROLS

The control panel layout is custom designed for each particular installation, however, common standard controls have been employed.

CAUTION: before proceeding be familiar with the EMERGENCY button and all functions, switches and pushbuttons.

POWER SWITCH

The Power Switch has two settings:

ON - connects a power source to the machine (voltage depends on the machine type - see electrical diagram provided with the machine).

OFF - disconnects the power source.

START AND STOP SWITCHES (EMERGENCY STOP)

The START switch is used to start the cycle once the load is on the turntable (or under the rotary arm). The cycle may be stopped at anytime by pressing the STOP button.
NOTICE: In case of emergency, use the STOP button which interrupts all the machine electrical circuits (except multistretch drive). If the STOP pushbutton is pressed in the middle of the cycle, the carriage and turntable may be returned to their home position by using the jog buttons before restarting the cycle.

SPIRAL WRAP SWITCH

The SPIRAL WRAP switch has two positions:

UP - in this 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 this position the cycle will be completed after the load is wrapped in both the up and down directions.
NOTE: TOP WRAP FIRST (OPTIONAL)
The carriage raises faster at the beginning of the cycle to wrap the top of the load (see electrical diagram provided with the machine).

CARRIAGE CONTROL SWITCH

The CARRIAGE CONTROL switch is a three position switch with the following settings:

RAISE - raises the carriage until the top limit switch on the tower is activated.

LOWER - lowers the carriage until the bottom limit switch on the tower is attained.

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

TURNTABLE (ROTARY TOWER) JOG

The turntable (rotary tower) jog switch is a pushbutton which will rotate the turntable (rotary arm) in a clockwise direction (as viewed from the top) when the switch is held depressed. When the switch is released the turntable (rotary tower) will stop. The switch is inoperative during the wrap cycle.

PHOTOCELL SWITCH

The photocell switch has two settings:
ON - when turned ON, the photocell instructs the carriage to 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 photoswitch 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 when the top limit switch has been activated.

FILM TENSION

Film tension may be adjusted using the film tension control knob. It has a range of tension from 0 to 10 (0 to 4 the low range, 4 to 8 the most usefull range for most of the films used by our customers, 8 to 10 as a very high range which may break some films).

NOTE: Lighter loads may require lower tension settings then heavier loads.

Film tension is controlled through the dancer bar system. Occasionally the feed back proximity sensor may need some adjustment. Adjustment of feed back is shown on drawing # 001

Adjustment instructions:
- remove the carriage cover
- unbolt the two nuts holding the proximity switch -item # 1
- turn the proximity switch - item # 2 until the moment when the motor starts to turn (or hums)
- tighten on the nuts securing the proximity switch.

NOTE: The condition in which the motor hums but does not turn must be maintained even after all elements are tightened. If not, the adjustment procedure must be repeated.

TO LOAD THE FILM....

The film roll can be loaded on the mandrel of the carriage from either end of the roll. When using tacky film, please verify that the inward tacky surface of the film is inward on the load.

1. Disconnect power (turn off power switch).

2. Put the roll of film on the mandrel and press down to insure penetration of spikes into the card board center of the film roll.

3. In the case of automatic machines, install the film cap on top of the roll to prevent upward movement.

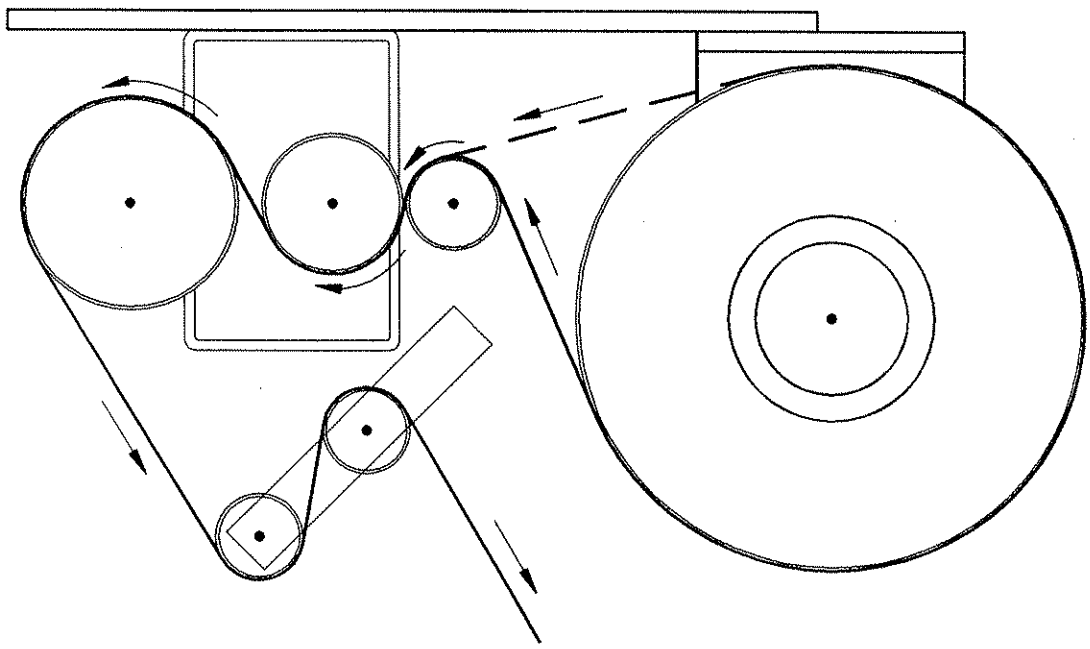
4. Introduce the roping end of the film between the shafts of all rollers (as shown on the dwg.) and pull to pass it around all three rollers (pressure roller and both rubber rollers).

5. Pass the film between the two dancer (aluminium) rollers (in certain applications the film has to be passed around one or two additional position aluminium rollers).

6. When the film feeding is completed - turn the power switch ON

7. Peel off the first few winds of the film (multistretch will run due to displacement of the dancer roller) and fix the film end onto the load or into the clamp mechanism (if machine is fully automatic).

The system is now ready to begin the first wrapping cycle.
Proceed to page titled SYSTEM START UP.



WARNING:

DISCONNECT POWER BEFORE FEEDING FILM

FILM FEEDING PATTERN FOR STANDARD CARRIAGE

SYSTEM START-UP

Notice: It is advisable to test-run the equipment with several pallet loads before make the attempt to wrap with film. Please position a worker at the EMERGENCY STOP push button.

Start up of the machine (system) may determine the need for the adjustment of:

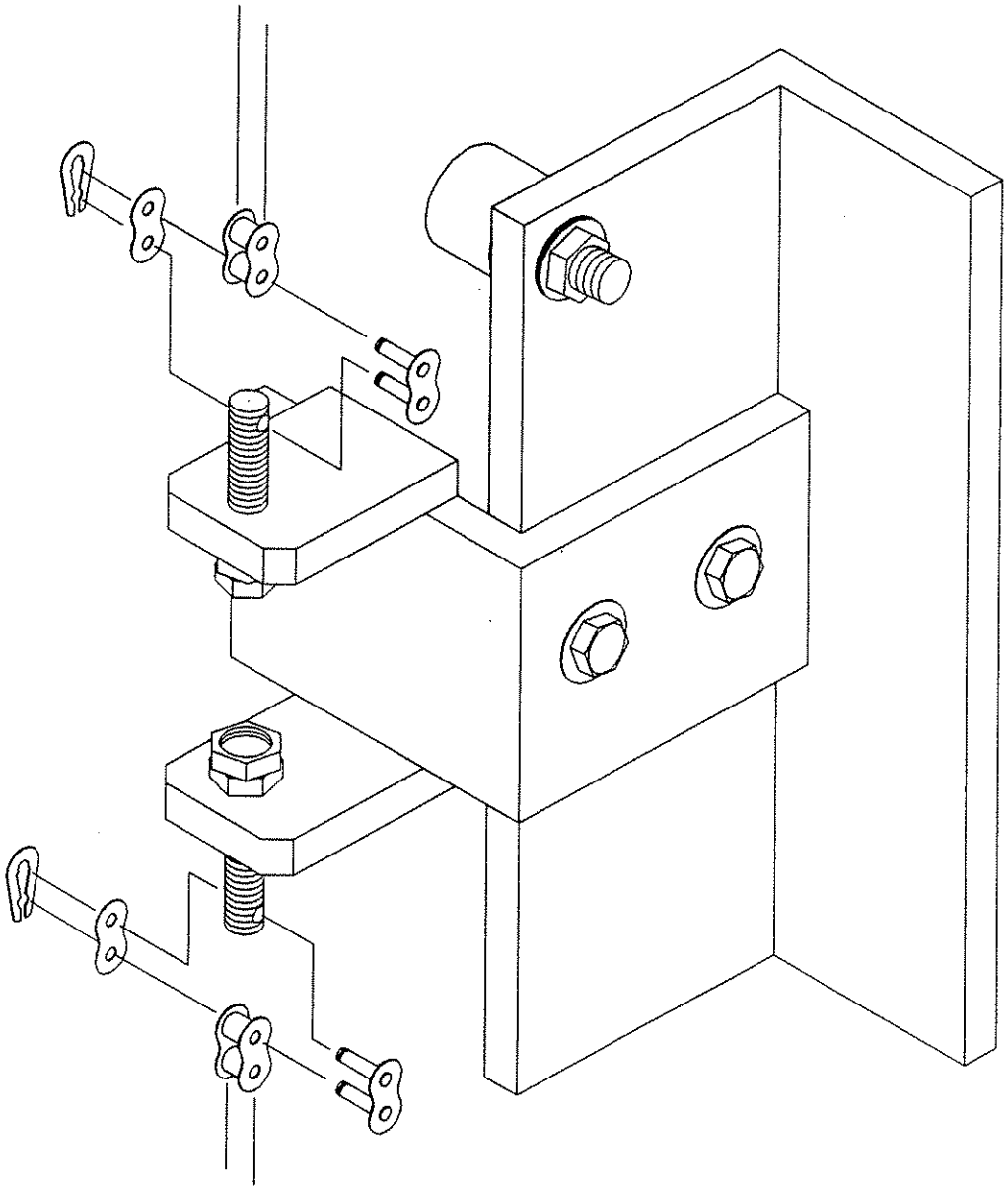
- pallet sensor eyes (automatic systems only)
- load height stop photoswitch (on the carriage)
- conveyor acceleration/deceleration
- turntable speed & jog speed
- turntable speed acceleration/deceleration
- turntable home position (rotary tower home position)
- film tail treatment devices (automatic systems).

MACHINE WRAPPING TEST

Before the test procedure adjust the wrapping cycle parameters i.e. top wraps, bottom wraps, height photocell on/off, film tension, carriage speed (those two parameters may be adjusted during the wrapping cycle).
When there is no photocell, verify the top limit switch position.

ATTENTION:

WHEN MOUNTING THE CARRIAGE LIFT CHAIN, PLEASE ENSURE, THAT THE CONNECTING LINK'S PIN IS INSERTED FROM THE TOWER SIDE



CHAIN TENSIONER ASSEMBLY

MACHINE MAINTENANCE

REDUCER OIL CHANGE

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 25000 hours of operation, which ever 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 100-5
Gulf Oil Corp.	Gulf Senate 155
Mobil Oil Corp.	Mobil 600 W Suerr Cyl.Oil
Philips 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

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 shape, 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.

CHAIN MAINTENANCE

To clean the chain, wipe it with an oily cloth every month. If the environment is very dusty or damp, it may be necessary to clean it more often.
With time the chain will tend to stretch. A loose elevator and turntable (rotary arm) chain should be tightened at the chain tensioner, or by moving the reducer on the mounting plate.

CAM FOLLOWER MAINTENANCE

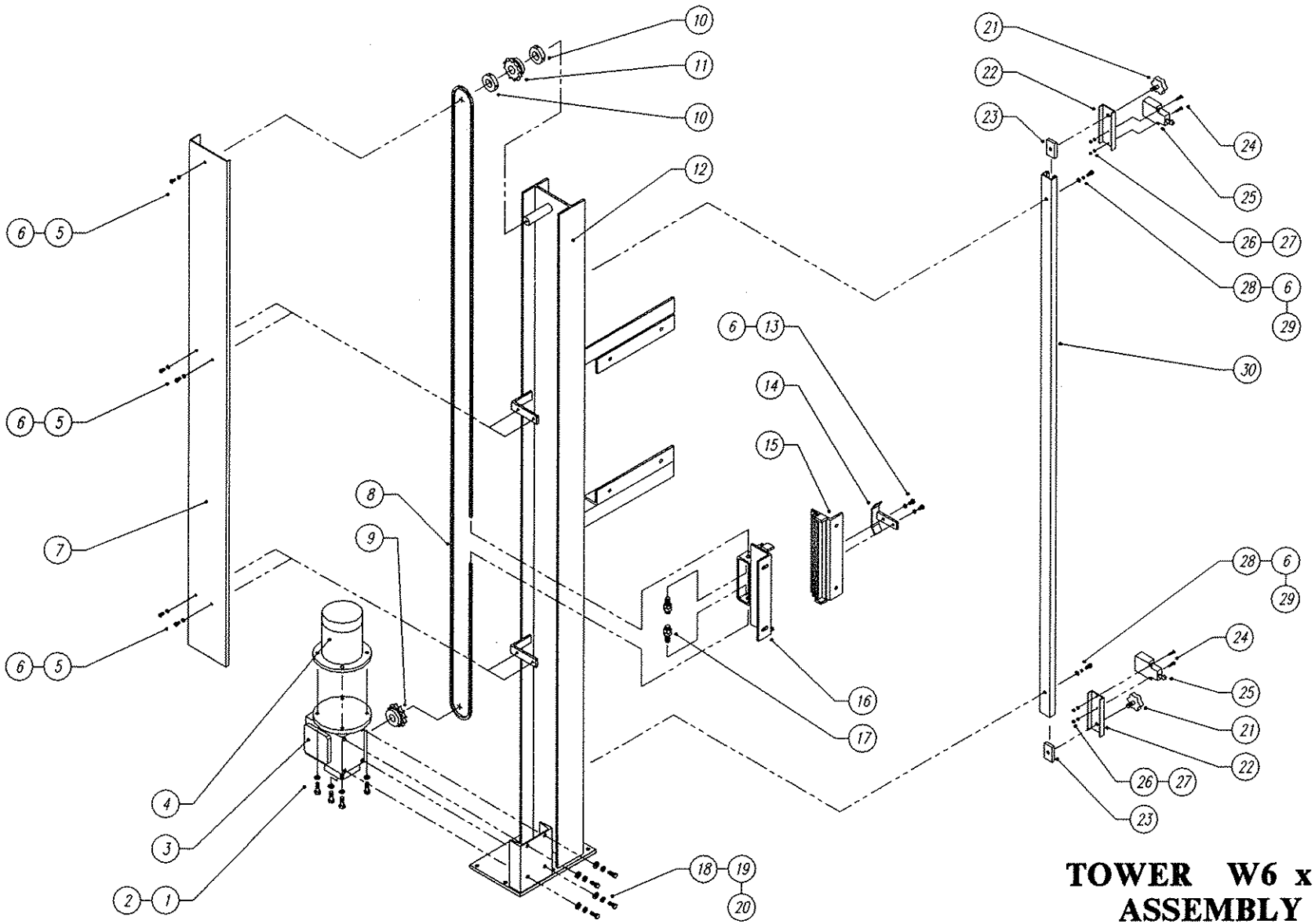
The cam followers behind the carriage have deep grease pockets and do not need frequent relubrication. The portion of the tower on which the cam followers run, should be cleaned and regreased every 300 hours of operation. If the machine operates in a dusty or corrosive environment the tower should be relubricated more often.

SEMI-AUTOMATIC
STANDARD ASSEMBLY
PART LIST

Note :

*** Quantity listed in order of part number**

**** The names given to the parts are generic**



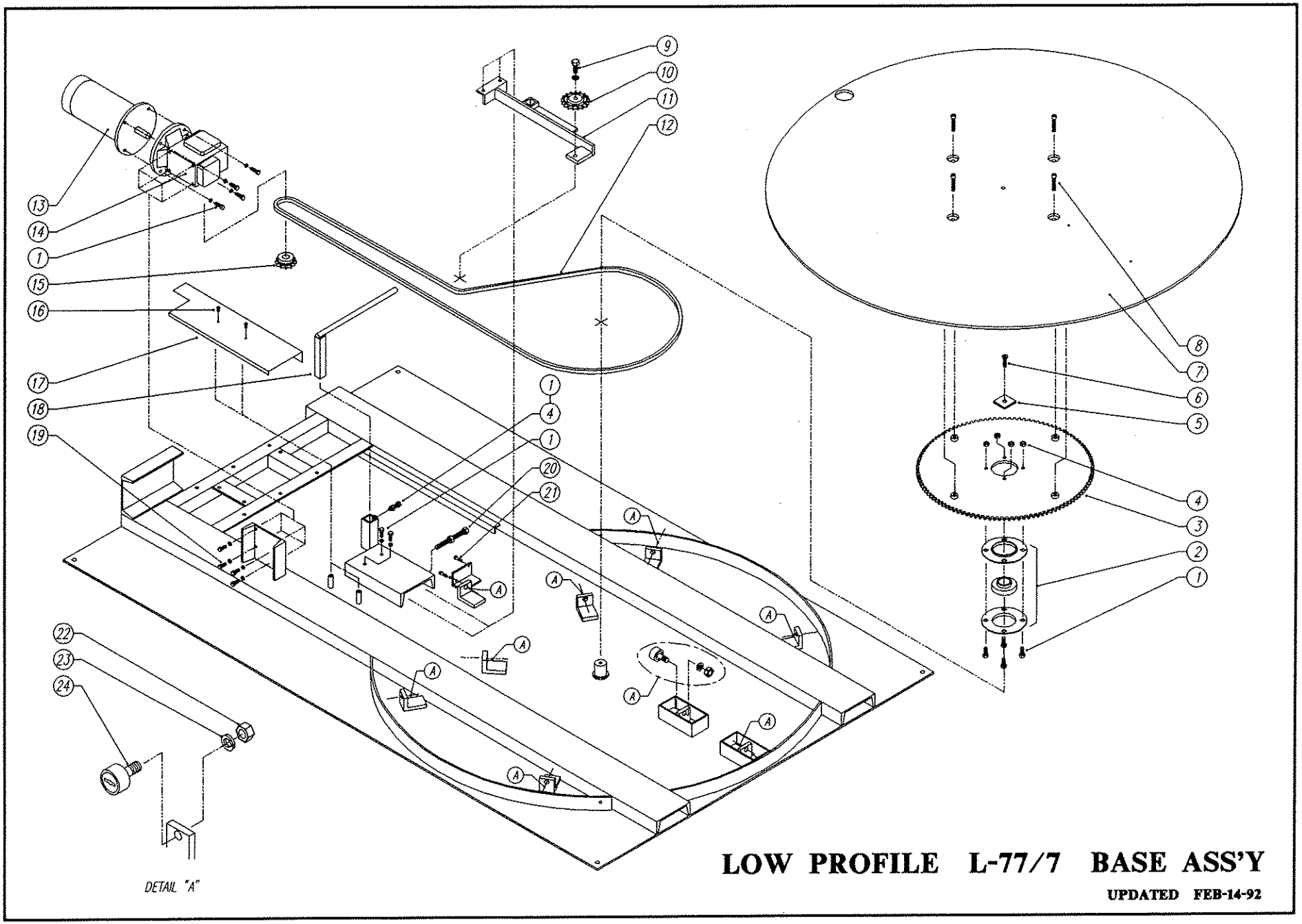
TOWER W6 x 12 ASSEMBLY

UPDATED APR-08-92

TOWER W6 x 12 ASS'Y - PART LIST

updated April-07-92

NO.	ORION PART NO.	DESCRIPTION	Q-TY
1.	010293	HEX HEAD SCREW	4
2.	011390	SPRING WASHER	4
3.	010986	REDUCER	1
4.	010545	ELECTR. MOTOR	1
5.	012049	PAN PHILL	3
6.	011393	SPRING WASHER	7
7.	012735	TOWER CHAIN COVER	1
8.	010009	CHAIN	1
9.	010094	SPROCKET	1
10.	010052	COLLAR	2
11.	010999	SPROCKET	1
12.	012737	TOWER	1
13.	012722	HEX HEAD SCREW	2
14.	012740	LIMIT SWITCH ACTUATOR	1
15.	012742	RIGHT CARRIAGE HOLDER	1
16.	012741	LEFT CARRIAGE HOLDER	1
17.	010387	CHAIN TENSION SCREW	2
18.	012723	HEX HEAD SCREW	4
19.	012724	SPRING WASHER	4
20.	012725	FLAT WASHER	4
21.	010092	KNOB	2
22.	010087	LIMIT SWITCH HOLDER	2
23.	011153	CHANNEL GUIDE	2
24.	012690	PAN PHILL	4
25.	010123	LIMIT SWITCH	2
26.	012726	HEX NUT	2
27.	012743	SPRING WASHER	4
28.	010257	SOCKET HEAD CAP SCREW	4
29.	012221	FLAT WASHER	2
30.	010335	LIMIT SWITCH CHANNEL	1



LOW PROFILE L-77/7 BASE ASS'Y

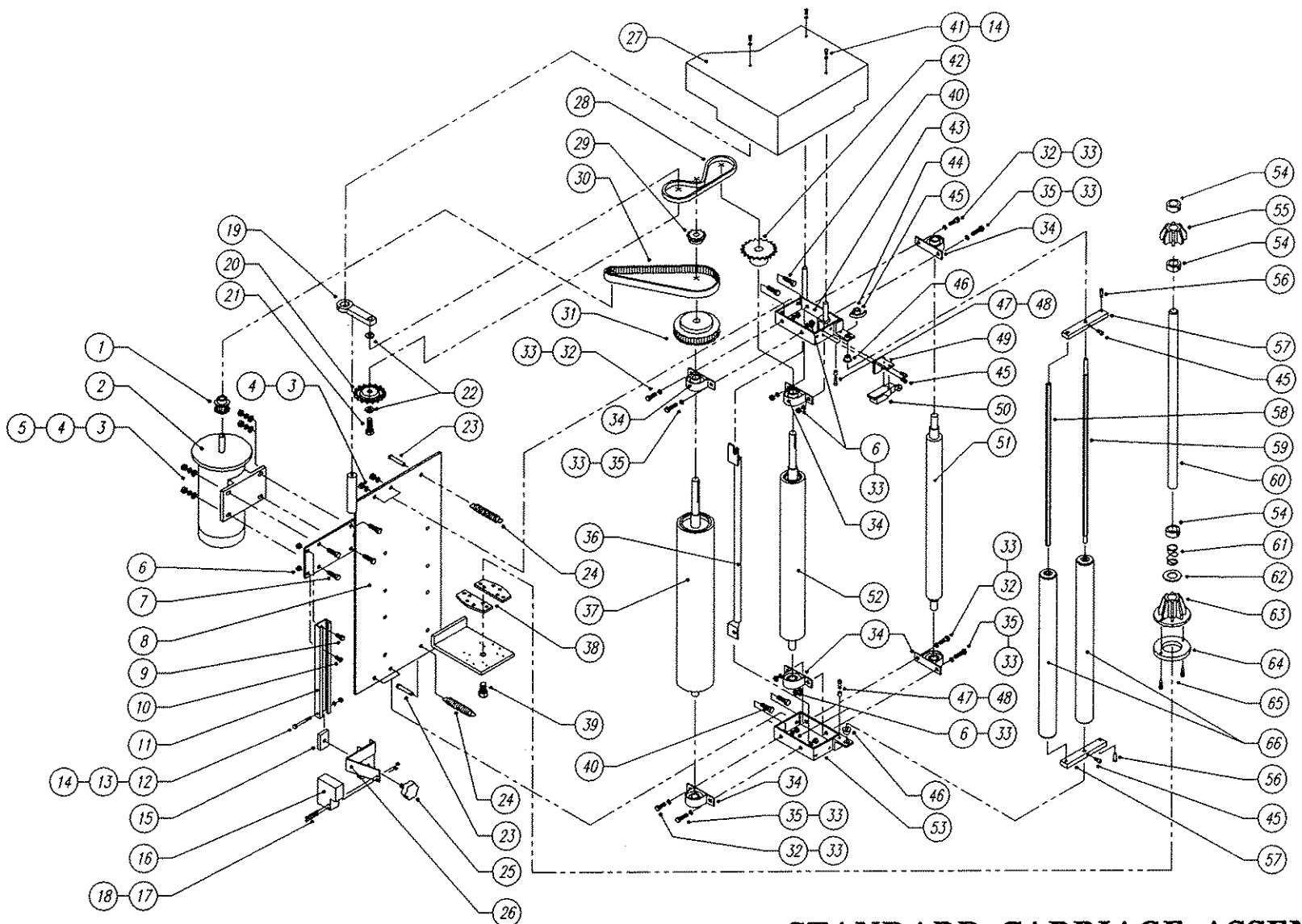
UPDATED FEB-14-92

LOW PROFILE L-77/7 BASE ASS'Y

PART LIST

updated Feb-14-92

NO.	ORION PART NO.	DESCRIPTION	Q-TY
1.	010293	HEX HEAD SCREW	11
2.	010007	CENTRAL BEARING UNIT	1
3.	010006	TURNTABLE SPROCKET	1
4.	012477	HEX NUT	5
5.	010898	PLATE	1
6.	012591	FLAT SOCKET CAP SCREW	1
7.	012596	TURNTABLE DISK	1
8.	010319	SOCKET HEAD CAP SCREW	4
9.	010329	HEX HEAD SCREW	1
10.	010008	IDLER SPROCKET	1
11.	012667	CHAIN TENSIONER	1
12.	010009	CHAIN	1
13.	010059	ELECTR. MOTOR	1
14.	010093	REDUCER	1
15.	~~010074~~	SPROCKET 010435	1
16.	012049	PAN PHILL	2
17.	012599	CHAIN GUARD	1
18.	012594	ROPING BAR	1
19.	010382	HEX HEAD SCREW	4
20.	010233	CHAIN TENSION SCREW	1
21.	012647	PAN PHILL	2
22.	011322	HEX NUT	9
23.	012601	LOCK WASHER	9
24.	012598	CAM FOLLOWER	9



STANDARD CARRIAGE ASSEMBLY

FOR H-77/7 & L-77/7

UPDATED AUG-07-92

STANDARD CARRIAGE ASS'Y

FOR H-77/7 & L-77/7 - PART LIST

updated Aug-07-92

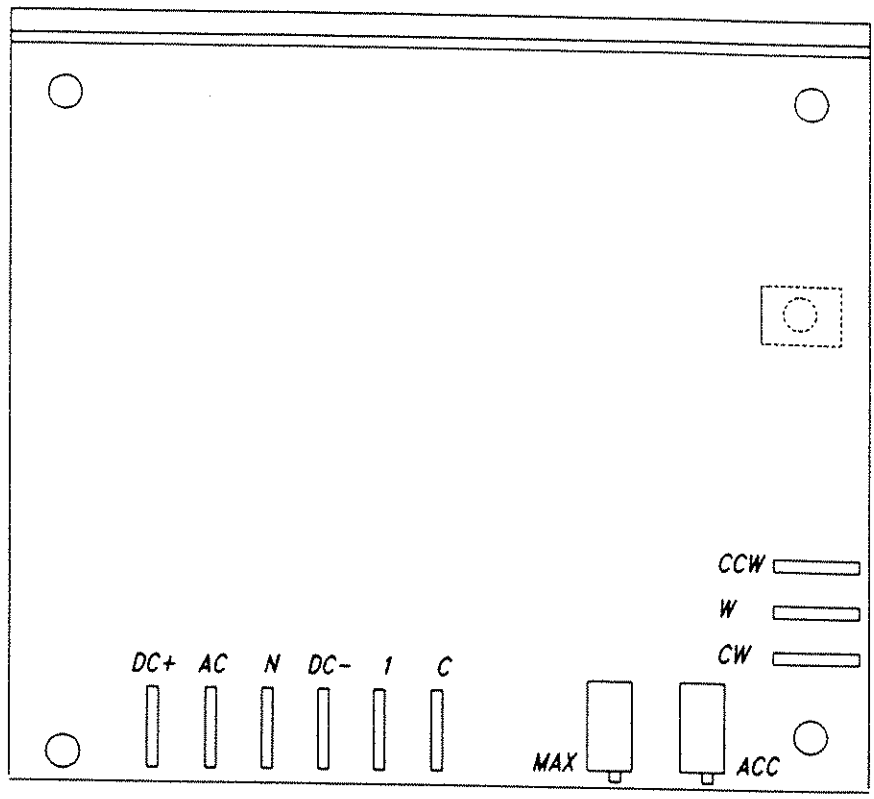
NO.	ORION PART NO.	DESCRIPTION	Q-TY
1.	011283	TIMING BELT PULLEY	1
2.	010059	ELECTR. MOTOR	1
3.	011128	HEX NUT	8
4.	011390	SPRING WASHER	8
5.	010948	FLAT WASHER	4
6.	012751	HEX NUT	10
7.	012752	HEX HEAD SCREW	4
8.	260382	BACK PLATE F/20" FILM	1
9.	010382	HEX HEAD SCREW	1
10.	012693	FLAT SOCKET CAP SCREW	1
11.	011152	PHOTOCELL CHANNEL F/20" FILM	1
12.	012753	HEX HEAD SHOULDER SCREW	1
13.	012689	HEX NUT	1
14.	011393	SPRING WASHER	4
15.	011153	CHANNEL GUIDE	1
16.	011495	PHOTOCELL	1
17.	012754	PAN PHILL SCREW	2
18.	012726	HEX NUT	2
19.	011142	CHAIN TENSIONER	1
20.	011297	IDLER SPROCKET	1
21.	012482	HEX HEAD SCREW	1
22.	012584	FLAT WASHER	2
23.	012755	CLEVIS PIN	2
24.	010047	TENSION SPRING	2
25.	010092	KNOB	1
26.	012090	PHOTOCELL BRACKET	1
	012091	PHOTOCELL BRACKET F/R.H. ASS'Y	1
27.	260383	CARRIAGE COVER	1
28.	010583	CHAIN	1
29.	010975	DRIVE SPROCKET	1
30.	012701	TIMING BELT	1
31.	011003	PULLEY	1
32.	012723	HEX HEAD SCREW	4
33.	012725	FLAT WASHER	16
34.	010157	PILLOW BLOCK BEARING	6
35.	012757	HEX HEAD SCREW	4
36.	011412	SAFETY BAR F/20" FILM	1
37.	012763	RUBBER ROLLER 4" DIA. F/20" FILM	1
38.	010049	BRAKE PADS	2
39.	012758	HEX HEAD SCREW	1
40.	010293	HEX HEAD SCREW	4
41.	012049	PAN PHILL SCREW	3
42.	011452	DRIVE SPROCKET	1

NO.	ORION PART NO.	DESCRIPTION	Q-TY
43.	011369	TOP BRACKET	1
44.	260633	MINI LIMIT SWITCH ACTUATOR	1
45.	010257	SOCKET HEAD CAP SCREW	5
46.	010058	BRONZE BUSHING	2
47.	010286	SOCKET HEAD SHOULDER CAP SCREW	2
48.	010946	PLASTIC HOSE	2
49.	260842	MINI LIMIT SWITCH BRACKET	1
50.	012006	MINI LIMIT SWITCH	1
51.	011410	PRESSURE ROLLER F/20" FILM	1
52.	012764	RUBBER ROLLER 2.66"DIA. F/20"FILM	1
53.	011416	BOTTOM BRACKET	1
54.	010052	COLLAR	3
55.	010051	TOP SPOOL	1
56.	012756	CLEVIS PIN	2
57.	011370	LEVER	2
58.	011419	SHORT SHAFT F/20" FILM	1
59.	011421	LONG SHAFT F/20" FILM	1
60.	010050	MANDREL SHAFT F/20" FILM	1
61.	010891	COMPRESSION SPRING	1
62.	010199	FLAT WASHER	1
63.	010838	BOTTOM SPOOL	1
64.	010887	MANDREL BRAKE DISK	1
65.	010886	SPIKE	2
66.	011371	DANCER ROLLER F/20" FILM	2

ELECTRICAL BOARDS' CHART
FOR ORION STRETCHWRAPPERS

	168-4	168-A	336-6	750 MX	850 M	850 C	155-3	850 D
L-77, H-77		X					X	X
M-77		X				X	X	X
M-67		X	X			X	X	
M-67 PA		X	X		X		X	
M-67 DEMO		X	X		X		X	
M-66, L-66, H-66		X	X		X		X	X
M-57		X	X			X	X	
M-55, L-55, H-55		X	X		X		X	
M-44, L-44, H-44	X	X	X	X			X	
*M-44,*L-44,*H-44	X	X	X	X				

* - PROCESSOR
PA - POSITIVE ALIGNMENT
DEMO - DEMO PACKAGE
336-6 - REPLACES 336-4

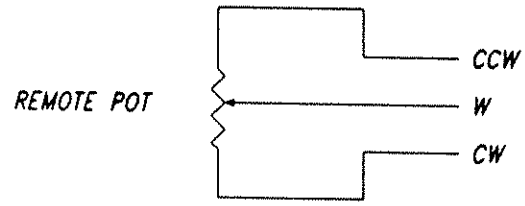


DC+: ARMATURE CONTROL.
AC: AC INPUT - LINE.
N: AC INPUT - NEUTRAL.
DC-: ARMATURE CONTROL.
1: CONTROL - LINE.
C: CONTROL - COMMON.

POTIENTIOMETERS:

MAX: MOTOR SPEED ADJUSTMENT.
ACC: ACCELERATION ADJUSTMENT.

NOTE: INPUTS W & CW ARE SHORTED IN CONVEYOR MOTOR CONTROL



850D SINGLE SPEED DC MOTOR CONTROL BOARD

TURNTABLE 850D MOTOR CONTROL (for H&L77)

Acceleration: (ACC Pot) The ACC pot controls the soft start feature of the 850D Board.

For an initial setting, turn the ACC pot fully counter clock wise (untill a clicking sound is heard), and then approximately 11 turns or revolutions clock wise. For a smoother start of the turntable, turn the ACC pot further CW. For a quicker start, turn the ACC pot CCW.

Speed Control: (MAX Pot) The MAX pot controls the turntable running speed during the wrap cycles. This speed is set at 10 r.p.m.

For an initial setting, the remote pot located on the front panel should be set to maximum, (i.e. fully CW). Using the pot on the board marked MAX set the turntable speed to achieve 10 r.p.m. A CW turn will increase the speed, CCW will decrease the speed.

In order to compensate for unstable and various load sizes, the 850D board features a remote Turntable Speed adjustment which is located on the front panel. This pot is provided to reduce the wrapping speed during a wrap ~~function~~ cycle.

Since the 850D is a single speed board, the jog function will jog the turntable at 10 r.p.m.

NOTE: It is recommended that Turtable Speed be reduced when jogging unstable loads.

MULTISTRETCH 850D MOTOR CONTROL (for H&L77)

Acceleration: (ACC Pot) The ACC pot controls the soft start feature of the 850D Board.

For an initial setting, turn the ACC pot fully counter clock wise (untill a clicking sound is heard), and then approximately 8 turns or revolutions clock wise. For a softer start on the Multistretch motor, turn the ACC pot further CW. For a sharper response, turn the ACC pot CCW.

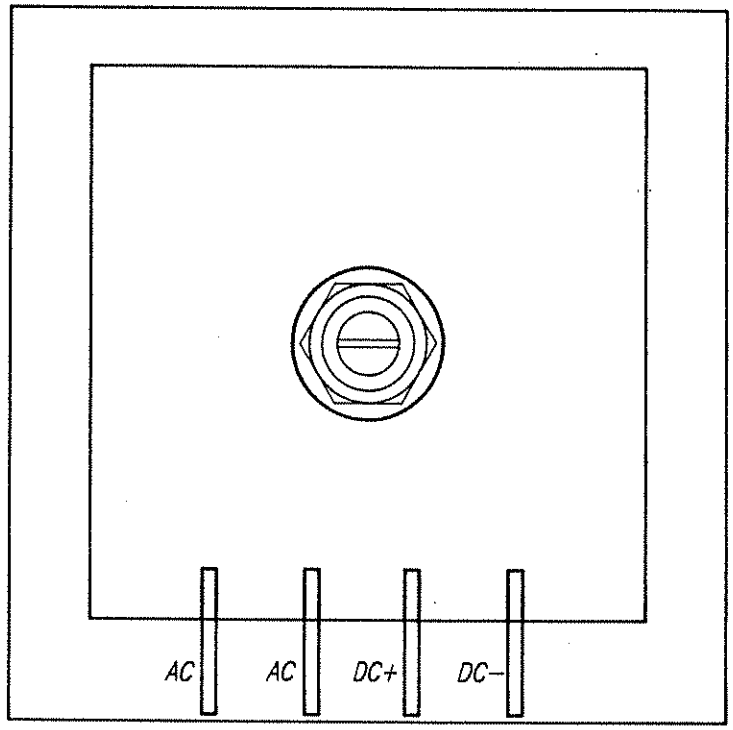
Note: If acceleration time is too low, an excessive amount of film will be ejected prior to the turntable achieving maximum speed.

Speed Control: (MAX Pot) The MAX pot controls the running speed of the Multistretch motor during the wrap cycles or any time dancer bars are deliberately moved.

For an initial setting, (w/turntable not running) the Film Tension remote pot located on the front panel should be set to minimum (i.e. fully CCW). Using the pot on the board marked MAX, set the Multistretch speed to achieve stable condition, (i.e. a smooth continious release of film). A CW turn will increase the speed, CCW will decrease the speed.

This board also features a Film Tension adjustment which is located on the front panel.

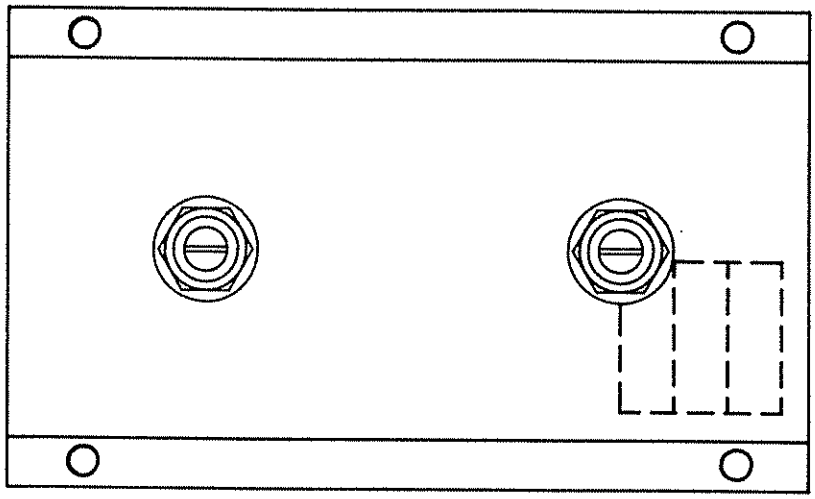
Note: If speed is too high dancer bars will jolt back and forth which in turn will switch the motor off and on. This will cause the film to be released unevenly.

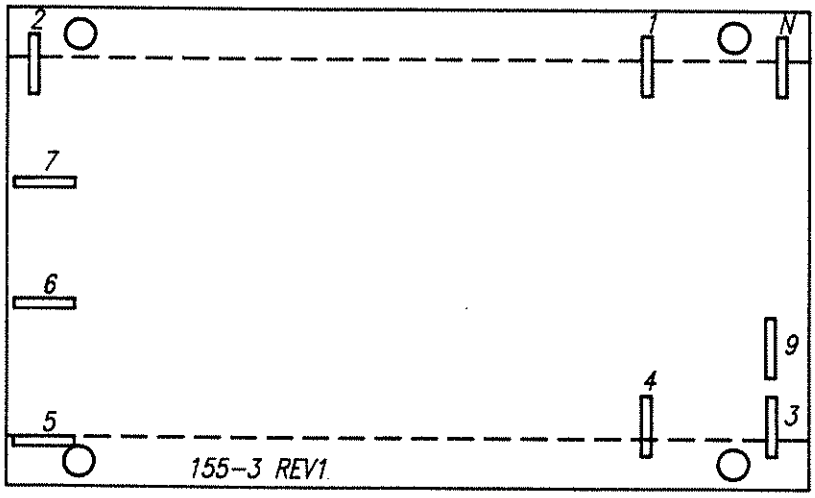


AC: AC INPUT
AC: AC INPUT
DC+: ARMATURE CONTROL
DC–: ARMATURE CONTROL

168–A

CARRIAGE SINGLE SPEED BOARD





1: AC INPUT
2: AC INPUT
3: COUNT
4: RESET
5: OUTPUT
6: OUTPUT T/W
7: OUTPUT B/W
8: N/A
9: COMMON
N: NEUTRAL

155-3
COUNTER BOARD

NEUTRAL

LINE

DS

58

A

APH

70

17

RL3

RL1

2

RL3

RL7

10

1

PRS

PB1

PB1

14

SW1

APH

JUMPER

28

RL6

24

LS2
TOP

RL4

RL2

16

RL4

12

RL2

RL4

RL5

18

C2

18

7

RL2

RL5

22

LS1
BOTTOM

RL6

23

RL1

21

RL5

20

RL3

6

RL6

RL7

27

RL3

26

RL6

C1

25

RL2

25

RL4

PB3

35

RL1

34

RL6

30

RL1

AC1
COM
DC-
SCR-1
TYPE 850M
(OR 850-DM)
1
2
DC+
AC2

31

M-1

32

TURNTABLE
MOTOR-1/3HP,90VDC

CARRIAGE
MOTOR-1/4HP,90VDC

AC2
DC+
SCR-2
TYPE-168-A
DC-
AC1

43

C2

C2

45

M-2

46

C2

C2

44

38

C1

39

36

FU-2
MDL-8A

58

FU-3
MDL-6A

58

PB2
PUSH-
PULL

70

FU-1
MDL-8A

58

1

LS3

8

AC1
CONTR.
(1)
DC+
SCR-3
TYPE-850D
CCW
W
CW
DC-
N

47

M-3

48

52

53

54

FIM TENSION
ADJ. POT.
P1-10k

MULTISTRETCH
MOTOR-1/3HP,90VDC

1 7 1 6

9

RL3

C1

3

4

(2) (7) (1) (6) (5)
COM
(9)
CNT
(3)
RESET
(4)
WRAPS
COUNTER
TYPE - 155
(N)

NEUTRAL NEUTRAL NEUTRAL

REQUIREMENTS:

- 120V
- 60HZ
- 1PH
- 15A

LEGEND

DS - MAIN POWER OFF/ON
SW1 - CARRIAGE UP/DOWN JOG

LS1 - CARRIAGE BOTTOM LIMIT SWITCH
LS2 - CARRIAGE TOP LIMIT SWITCH
LS3 - MOTOR ENABLE/DISABLE LIMIT SWITCH

PB1 - START PB
PB2 - EMERGENCY STOP PB
PB3 - TURNTABLE JOG PB

PRS - TURNTABLE ALIGNMENT PROXIMITY SWITCH

APH - CARRIAGE AUTOHEIGHT PH. (OPTIONAL)

C1 - CARRIAGE DRIVER POWER CONTACTOR
C2 - CARRIAGE REVERSE CONTACTOR

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QUEBEC, CANADA, H7S 1P9
TEL.:(450) 667-9769

ORION PACKAGING INC.

2270 INDUSTRIEL BLVD LAVAL, QUE., CANADA H7S 1P9
TEL: (450) 667-9769 FAX: (450) 667-6320

APPR. BY: J.B.S. DRAWN BY: J.B.S.

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DATE: OCT-08-1993 SHEET: 1 OF 1

FILENAME:: HL77-8.DWG BASE:

APPENDIX

DOERR ELECTRIC

MAINTENANCE INSTRUCTIONS

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

INDEX

AUTIONS (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, contamining 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 tempera ture 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**
—	—	13121-1	1000
15050 to 16051	165	—	—
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 17801	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

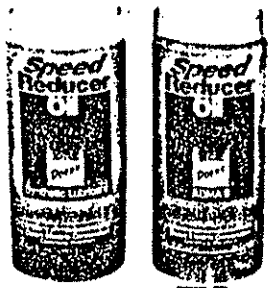
1.10 S 100M 11/86 Printed in U.S.A.

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)

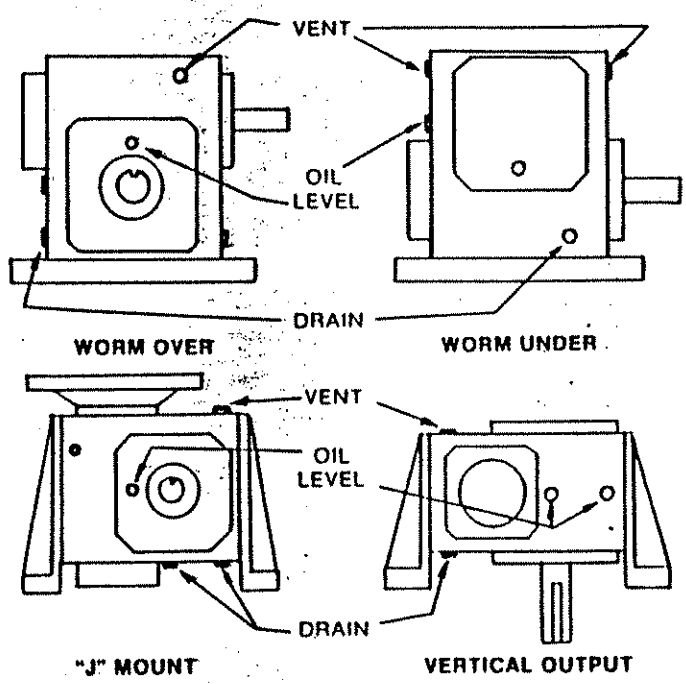
Oil is packed 12 one quart bottles per carton, minimum ship one carton.
Contact DEC Service Dept. for order information.

OIL CAPACITIES*

UNIT TYPE	UNIT SERIES 133	175	208	262	325
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.**

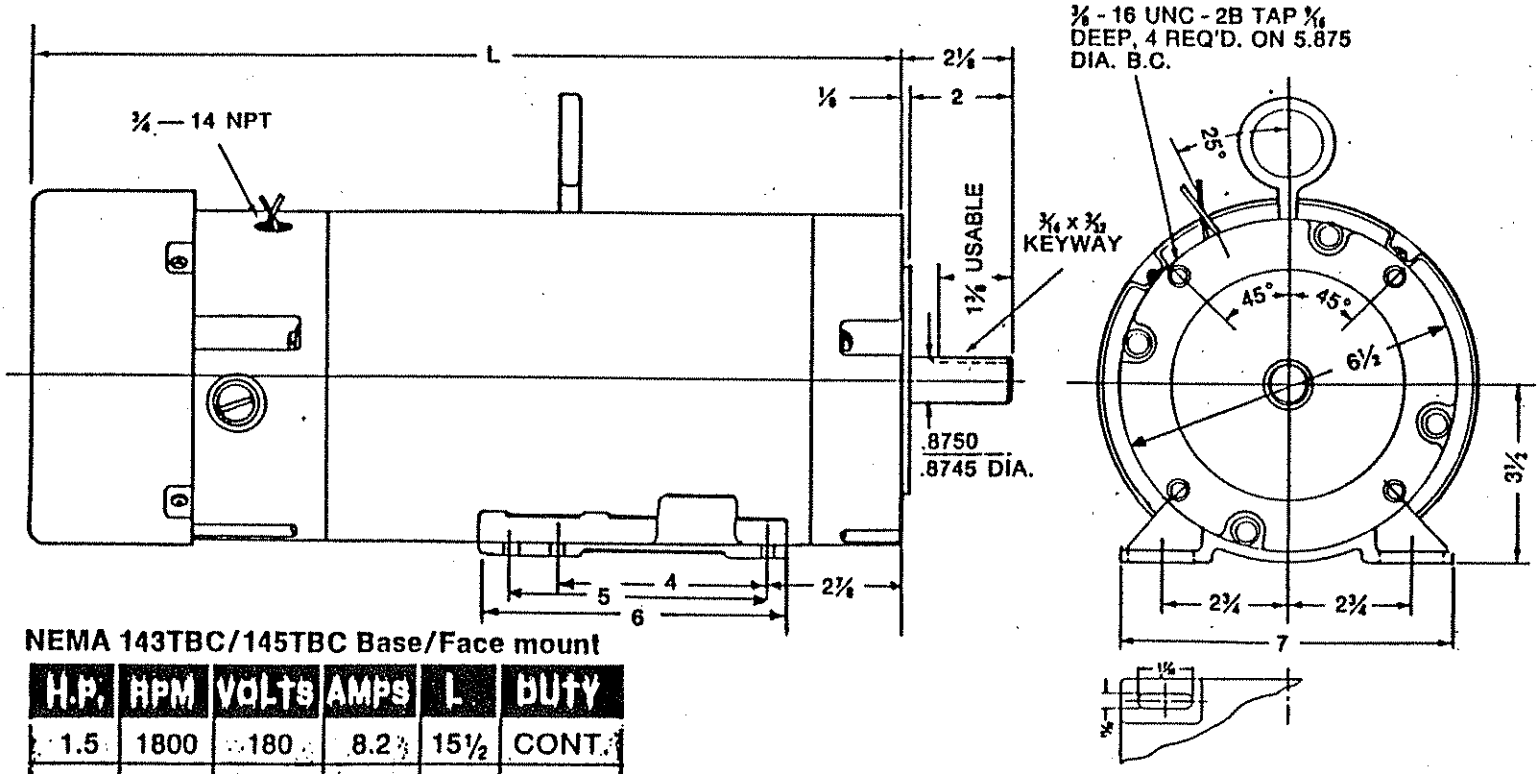
OIL LEVELS*



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

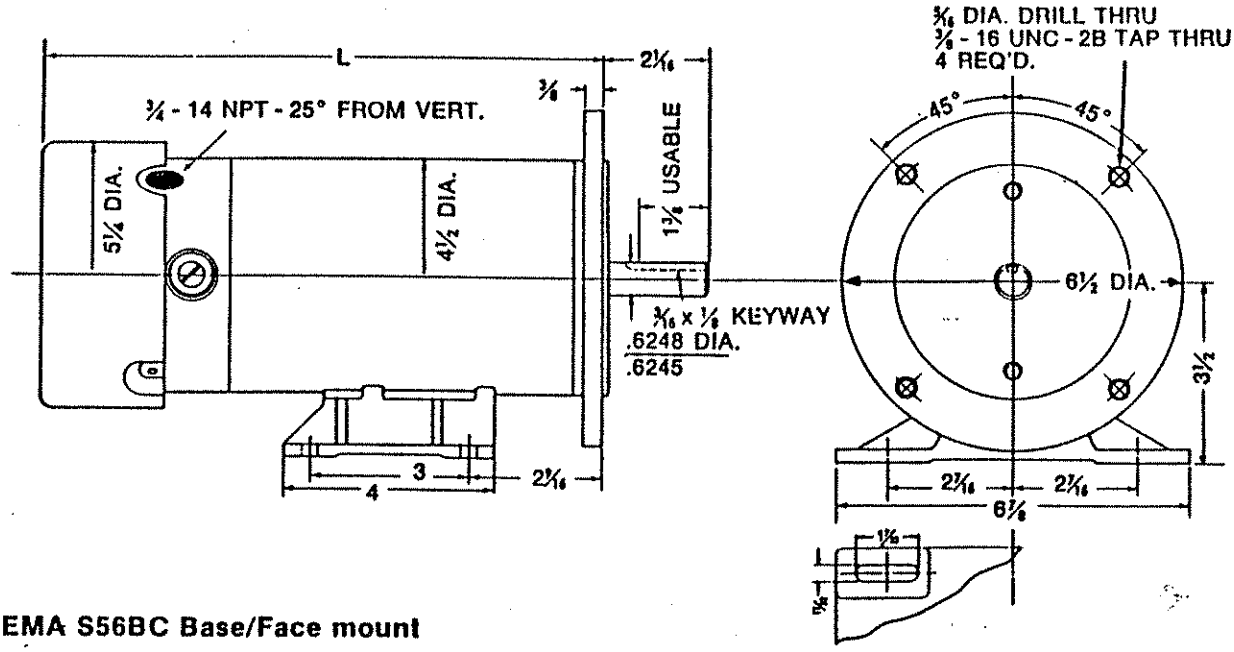
Motor dimensions

TEFC P/M motor



NEMA 143TBC/145TBC Base/Face mount

H.P.	RPM	VOLTS	AMPS	L	DUTY
1.5	1800	180	8.2	15½	CONT.
2	1800	180	11.6	16½	CONT.



NEMA S56BC Base/Face mount

180 V.

H.P.	RPM	VOLTS	AMPS	L	DUTY
½	1725	180	2.8	10¾	CONT.
¾	1725	180	3.5	12¾	CONT.
1	1725	180	5.35	14¾	CONT.

90 V.

H.P.	RPM	VOLTS	AMPS	L	DUTY
½	1725	90	5.35	10¾	CONT.
¾	1725	90	8.1	12¾	CONT.
1	1725	90	10.6	14¾	CONT.

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.

arts 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:

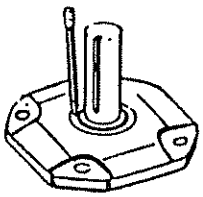


Figure 1

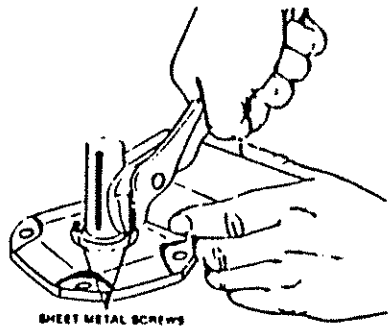


Figure 2

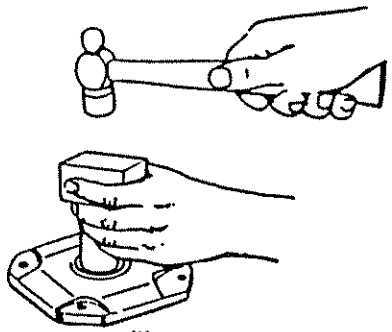


Figure 3

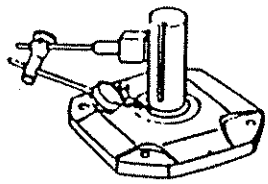


Figure 4

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 wrappng 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.

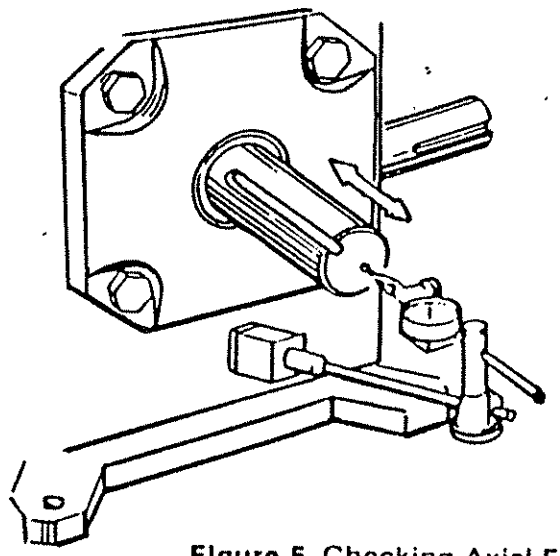


Figure 5 Checking Axial Float

   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.

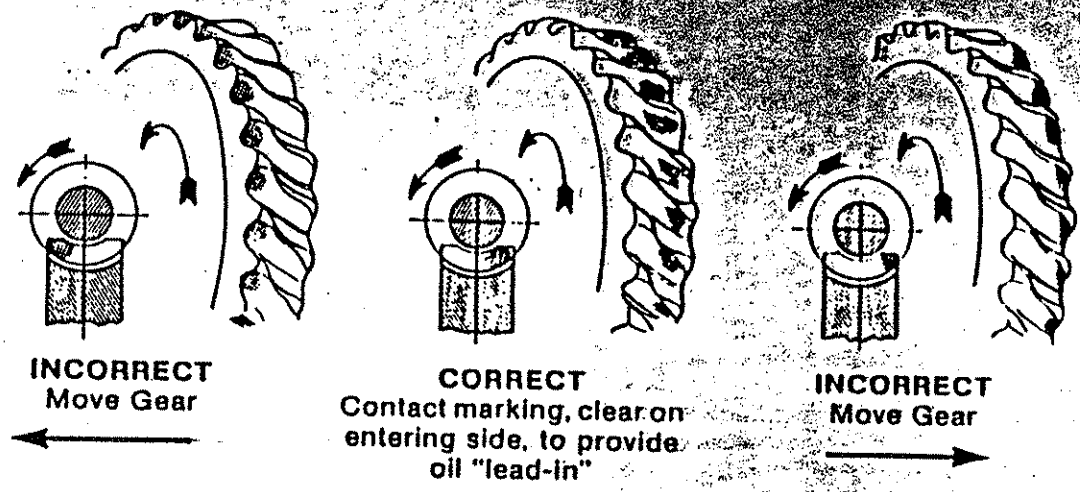


Figure 6 Gear Contact Pattern

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.

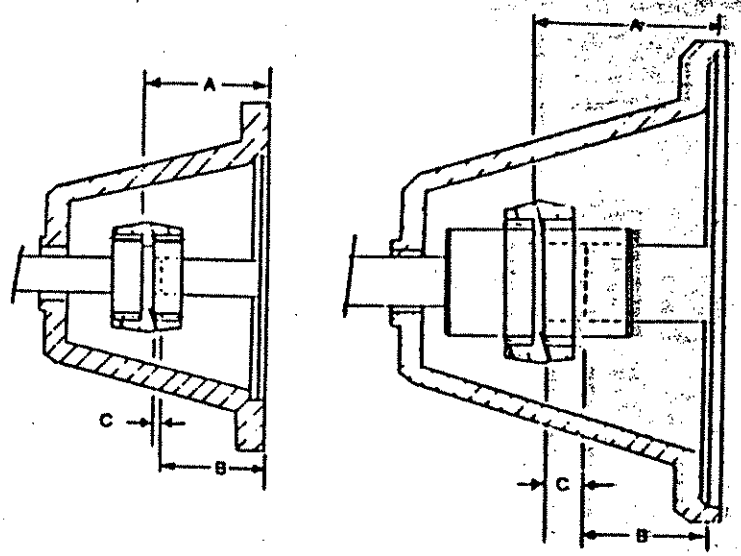


Figure 7 Motorized Coupling Adaptor

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 5/16	2 1/16	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 x 1/16	—	—
.625	3/16 x 3/32	.625	3/16 x 3/32
.750	3/16 x 3/32	.750	3/16 x 3/32
.875	3/16 x 3/32	.875	3/16 x 3/32
—	—	1.125	1/4 x 1/8
—	—	1.375	5/16 x 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.

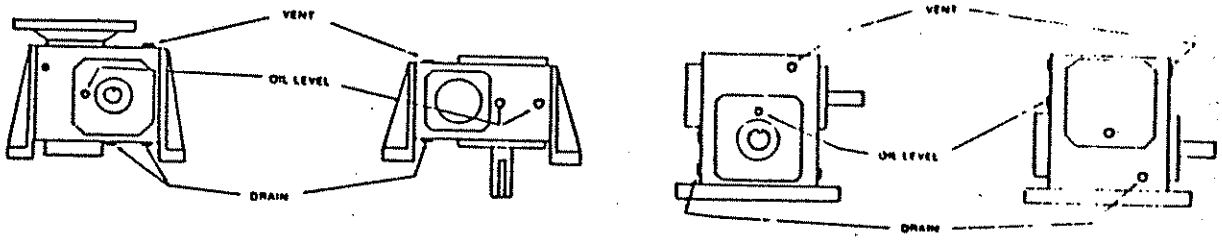


Figure 8 Standard Oil Levels

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.

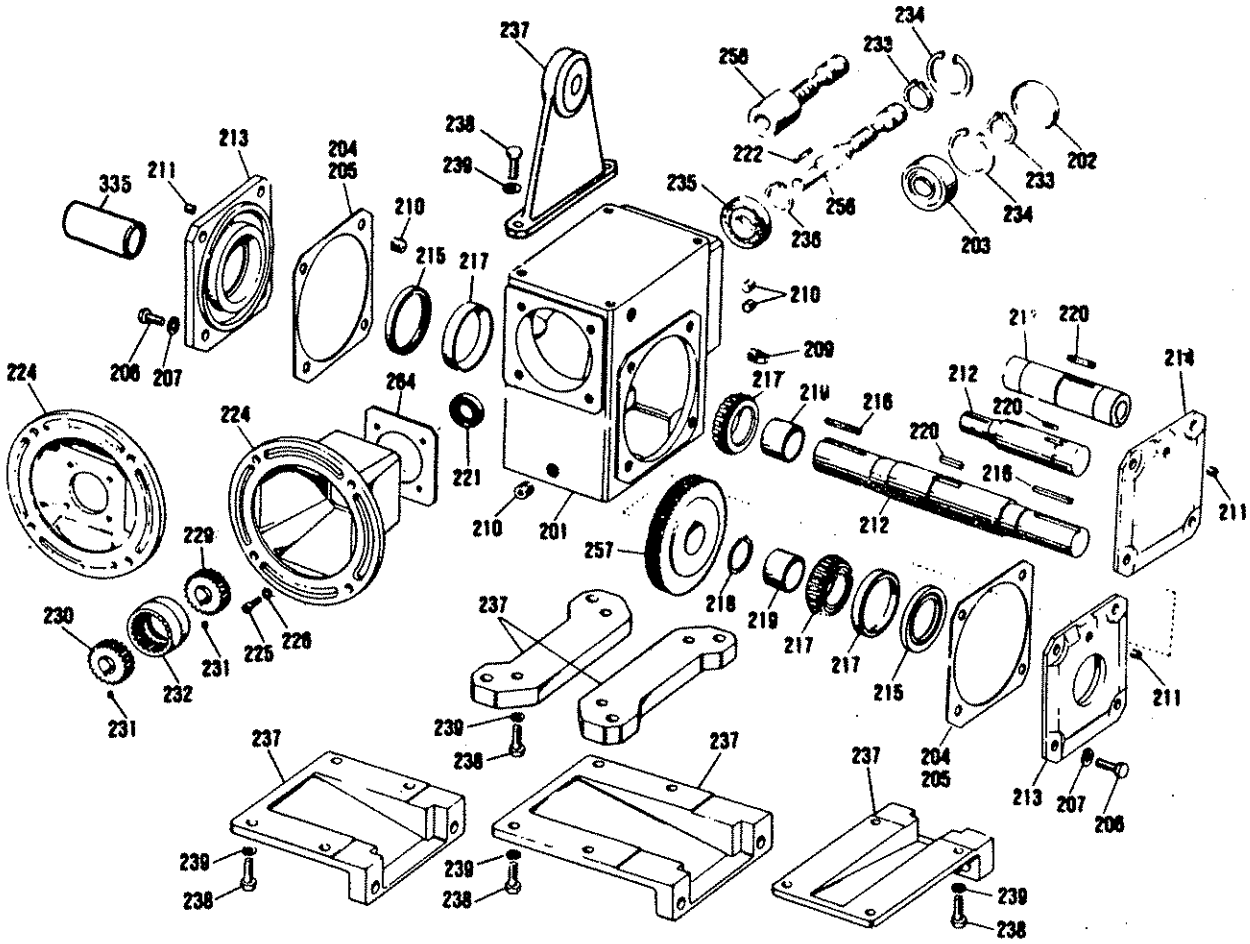
PARTS ORDERING INSTRUCTIONS

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:

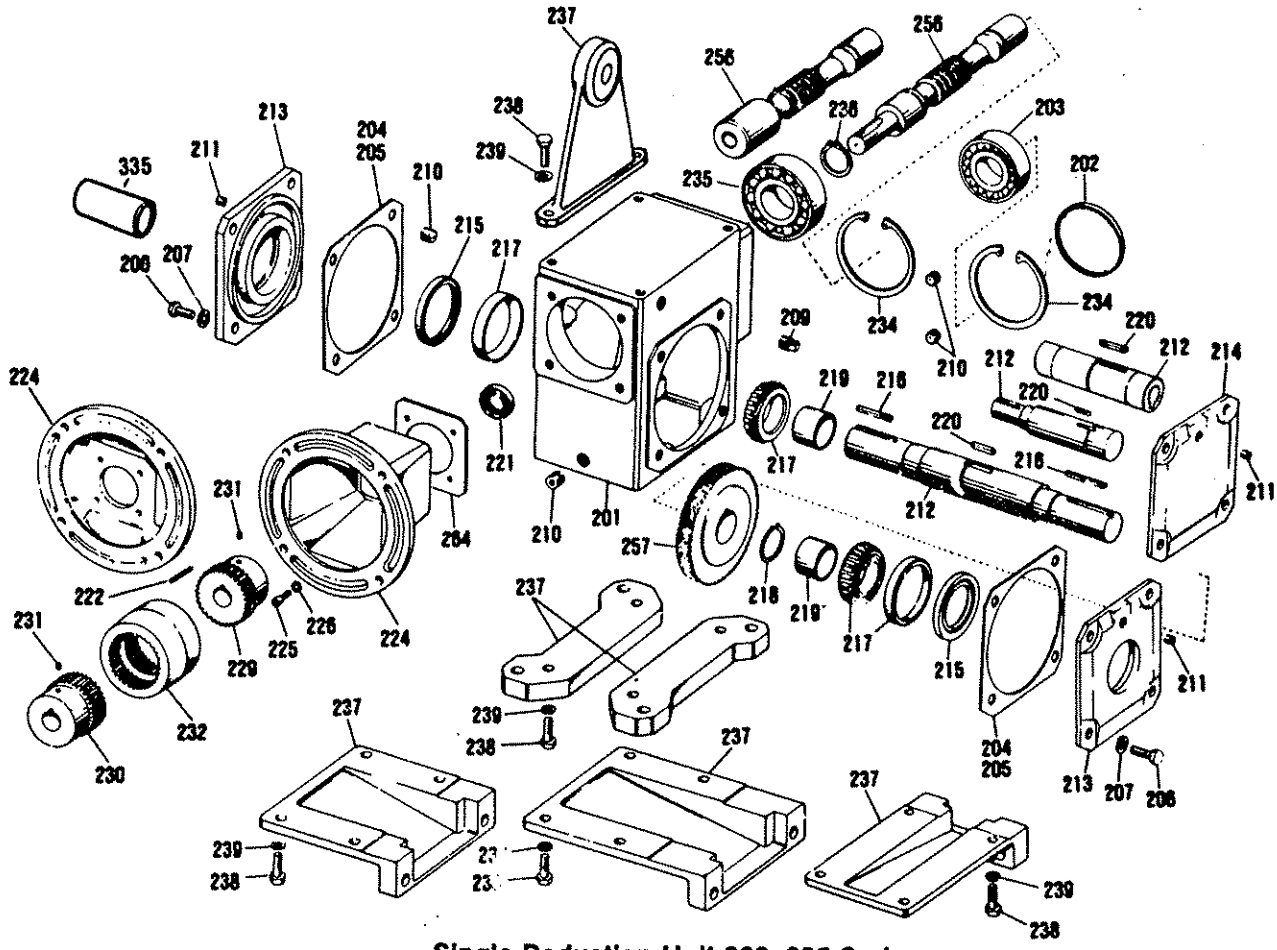
1. Complete Model Number (Nameplate)
2. Item Number (Exploded view and parts list)
3. Part Description (Parts list)

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

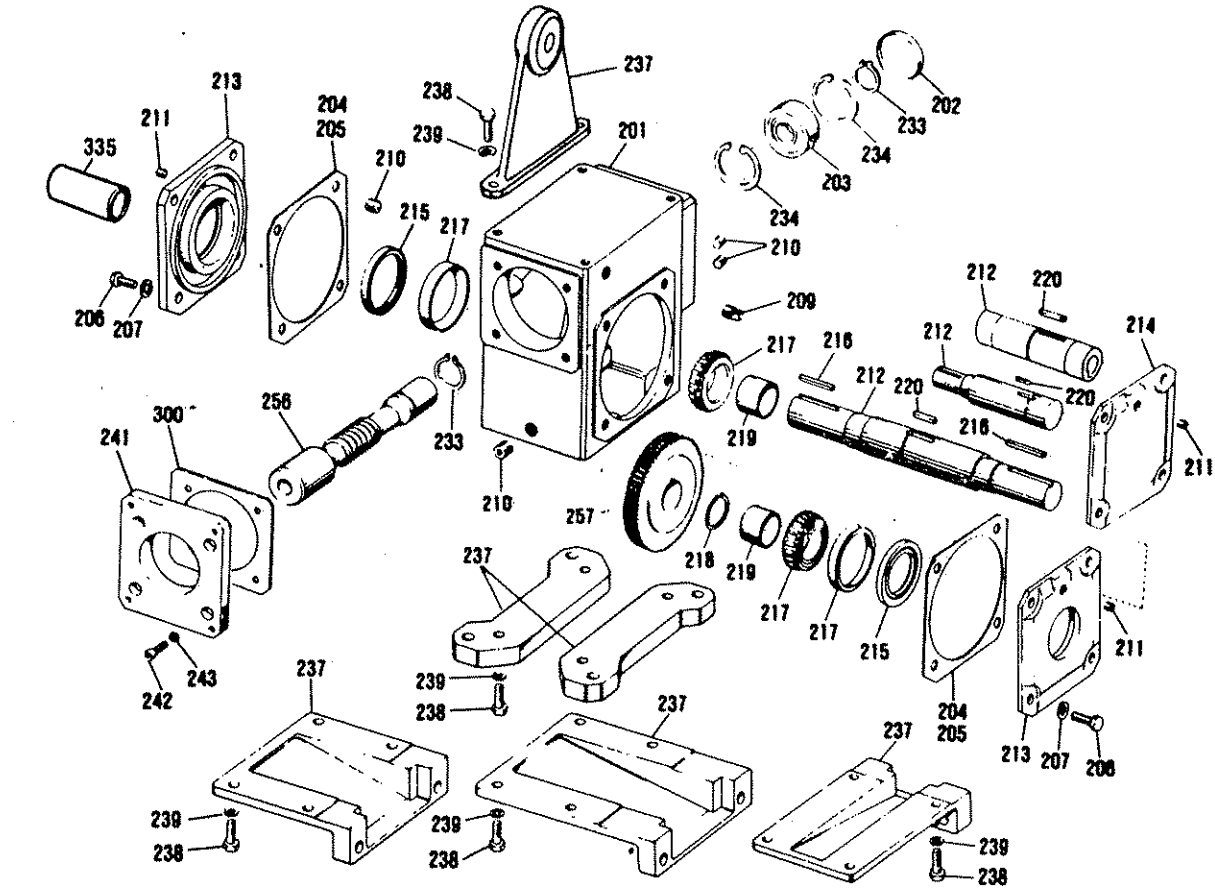
Failure to provide this information will only slow or prevent the processing of your order.



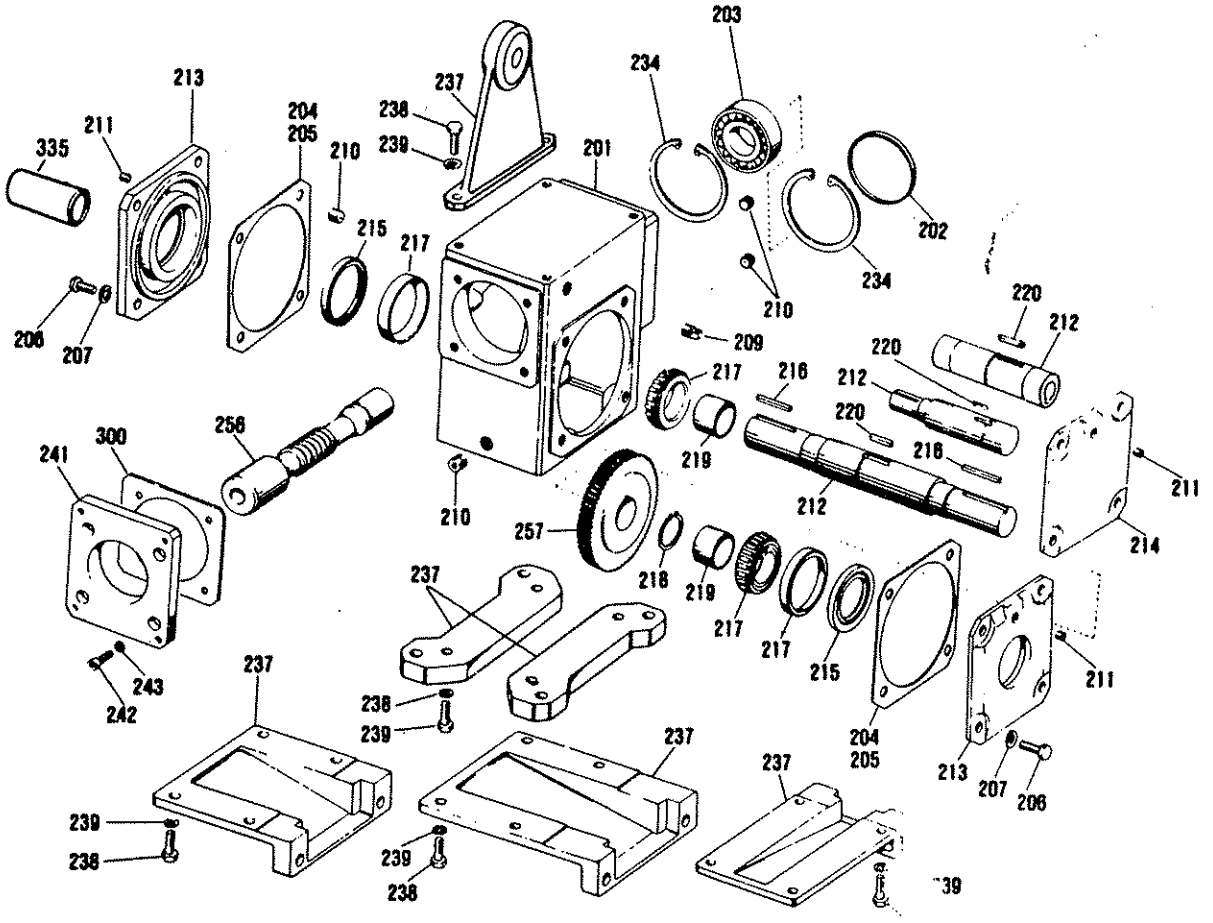
Single Reduction Unit 133, 175, 206 Series



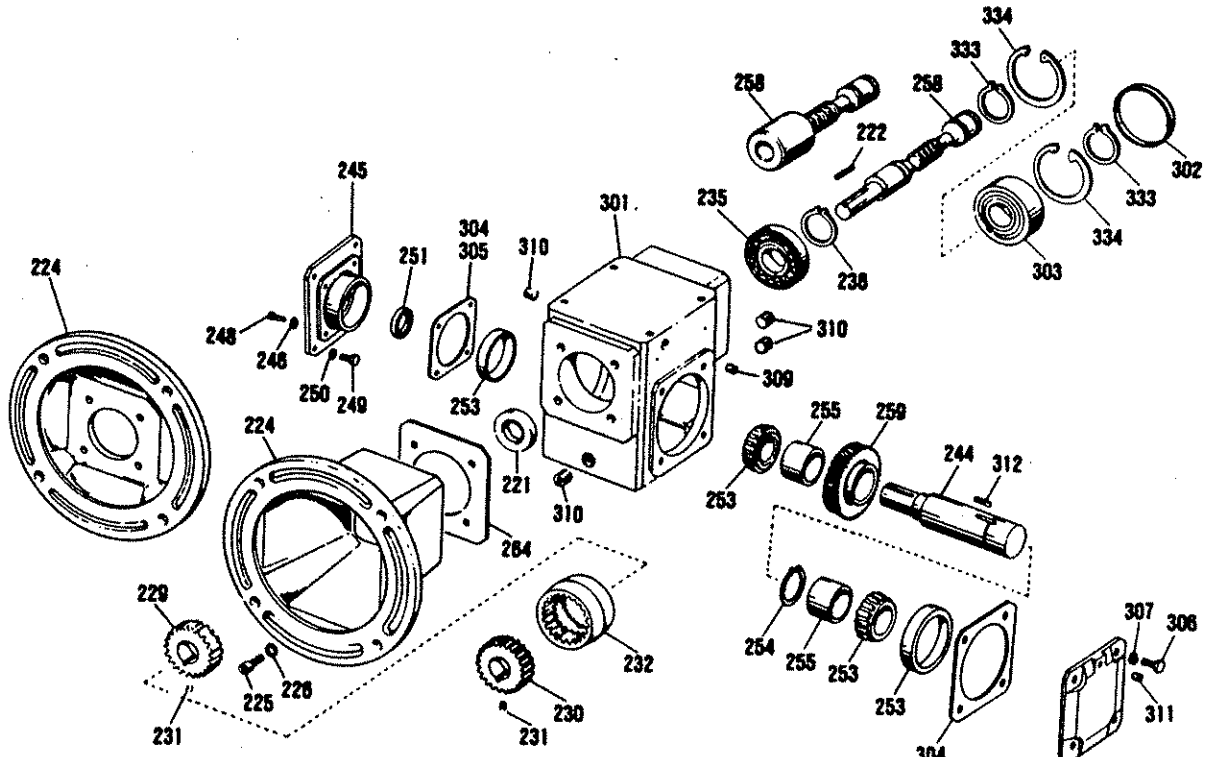
Single Reduction Unit 262, 325 Series



Double Reduction Secondary Unit 133, 175, 206 Series



Double Reduction Secondary 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.