

# **dynatek/manierre**

200 N. Harrison Street  
North Prairie WI 53153  
[www.dynatekmanierre.com](http://www.dynatekmanierre.com)

Safety, Installation Operation & Lubrication	<b>1</b>
Drawings— Components—Parts—Install—Inlet Info Drawings	<b>2</b>
LaLeonessa Bearings	<b>3</b>
Sumitomo Reducer Dodge Reducer	<b>4</b>
Intersystems Conveyor Manual	<b>5</b>
Electric Motors	<b>6</b>
Auto Grease System	<b>7</b>



## **SAFETY**

1. Multi-arm loaders can be dangerous. Disconnect all power before doing any maintenance.
2. Disconnect all power before working on the control panel.
3. Be aware of where you are when operating this loader. Stay clear of possible pinch points.
4. Be aware of the portable control cable location. Do not leave cable lying around when not in use-hang cable in designated area
5. Be aware of the cable location at the pivot point. **Do Not** over rotate the loader. The cable may break.
6. Do not work on the loader if the power has not been disconnected.
7. Do not ride or hang on to the end of this loader.
8. **ALWAYS.....**
  - a. Check clearances
  - b. Do not tamper with hydraulic unit
  - c. Check Position of control cable
  - d. Be aware of your location during operation
  - e. Avoid pinch points
  - f. Automatically or manually move loader with care
  - g. "Power off" during repairs or maintenance
  - h. Be aware of other people in your work area
  - i. Keep hands away from all moving parts

## **INSTALLATION**

**SAFETY** – Always take required precautions when working around heavy equipment. Make sure that all equipment used for this installation is in proper working condition before putting it into service.

### 1.) Equipment required for installation.

- a.) Forklift
- b.) Small crane with lifting straps
- c.) Mechanics tool box
- d.) Torque wrench

### 2.) Post Installation. If Required.

- a.) Secure post with the crane using the straps.
- b.) Install leveling nuts on bolt circle before lifting Post on to pad or mounting platform.
- c.) Set post into place and level
- d.) Install fastener nuts and torque to recommended tightness
- e.) Locate the large sprocket, place on top of the post. Note any match markings. Align holes in sprocket with holes on top of the post.

### 3.) Loader installation – First Arm.

- a.) Secure the first conveyor section using the forklift or crane.
- b.) Locate any match markings on the bearing ring located at the rear of the conveyor.
- c.) Install 7/8"-9 grade 8 bolts in main conveyor slew bearing.
- d.) Lift the conveyor section to the top of the post.
- e.) Locate match markings. Turn by hand the bearing ring until marks on the bearing ring match the pedestal.
- f.) Align conveyor bolts with pedestal top plate.
- g.) Using the crane, reposition the conveyor frame to align all bolt holes. Lower main conveyor arm and install the 7/8-9 nuts. Do not tighten nuts until all nuts been installed.
- h.) Tighten nuts & bolts and torque to recommended tightness.

### 4.) Loader Installation – Second Arm

- a.) Secure the 2<sup>nd</sup> conveyor section using the forklift or crane.
- b.) Observe any match markings located on the sprocket assembly or 2<sup>nd</sup> conveyor section.
- c.) Have grade 8 bolts ready (provided) 1/2-13.



- d.) Observe any match markings on first arm conveyor section bearing ring located at end of conveyor section.
- e.) Lift the conveyor section to the bearing ring on the first conveyor. Spin by hand the bearing ring until the markings line up.
- f.) Install a bolt (loosely) finger tight. Jog the conveyor until the rest of the bolt holes align. Install all bolts (finger tight) and torque to the recommended tightness.

5.) Power Chains (IF APPLICABLE)

- a.) Reinstall power chains and adjust till tight.

6.) Electrical

- a.) Reinstall electrical. NOTE – There will be a large loop at the transition.
- b.) Control lines are to be run through the center of the post. Locate the hole on the first conveyor center line on post. Drop the power and control wires through this hole.
- c.) When control panel is put in its final position, cut a small Access hole through the post (small hole), pull the wires through and install in control panel.

7.) Dust Spout Installation (IF APPLICABLE)

- a.) Dust Spout should bolt up into position (bolts provided)
- b.) Dust Spout will have it's own manual and electrical drawings.

8.) Air and Air Recovery Lines (IF APPLICABLE)

- a.) Install 1" high-pressure air hose. There will be a large loop.
- b.) Install 3" pressure hose. (clamps provided) There will be a large loop.
- c.) Install air recovery hose, 4" hose, dust spout to recovery pipe. 6" Hose, 6" recovery pipe to 8" recovery pipe – cut hose to correct length.

## OPERATION

The Dynatek 2-arm Loader has been designed for loading bulk products into rail hopper cars or hopper trucks. The operator drives the loader to the hopper inlet and activates the loader and feed conveyors. To accomplish this, the operator must do the following:

NOTE: This loader operates using 480-volt service. Take care when operating this loader. Make sure that electric cables are not pinched or tangled in any machinery.

- 1.) Turn on the power at the main control panel. (Note Pilot Light)
- 2.) Control Switches on Main Panel
  - a.) 2<sup>nd</sup> Conveyor arm----Up/Down
  - b.) First Arm---Left/Right
  - c.) 2<sup>nd</sup> Arm---Left/Right
  - d.) Hydraulic pump---On
  - e.) Conveyors---ON/OFF
- 3.) By activating the 1<sup>st</sup> or 2<sup>nd</sup> arm switches, either left or right, the Operator moves the loader arm into position. Then lowers the 2<sup>nd</sup> arm into position and loads material.

## SUMMARY

### Sequence of Operation

- 1.) Turn on power
- 2.) Position loader over hopper inlet, and lower 2<sup>nd</sup> arm.
- 3.) Start loader conveyors.
- 4.) Start infeed conveyors.
- 5.) Load product into hopper inlet.
- 6.) Turn off infeed conveyor when proper amount of product has been loaded.
- 7.) Reposition conveyor over another hopper inlet.
- 8.) Turn on infeed conveyor.
- 9.) Repeat sequence until rail car or truck is loaded.
- 10.) When finished, place loader in its resting position
- 11.) Turn off power.

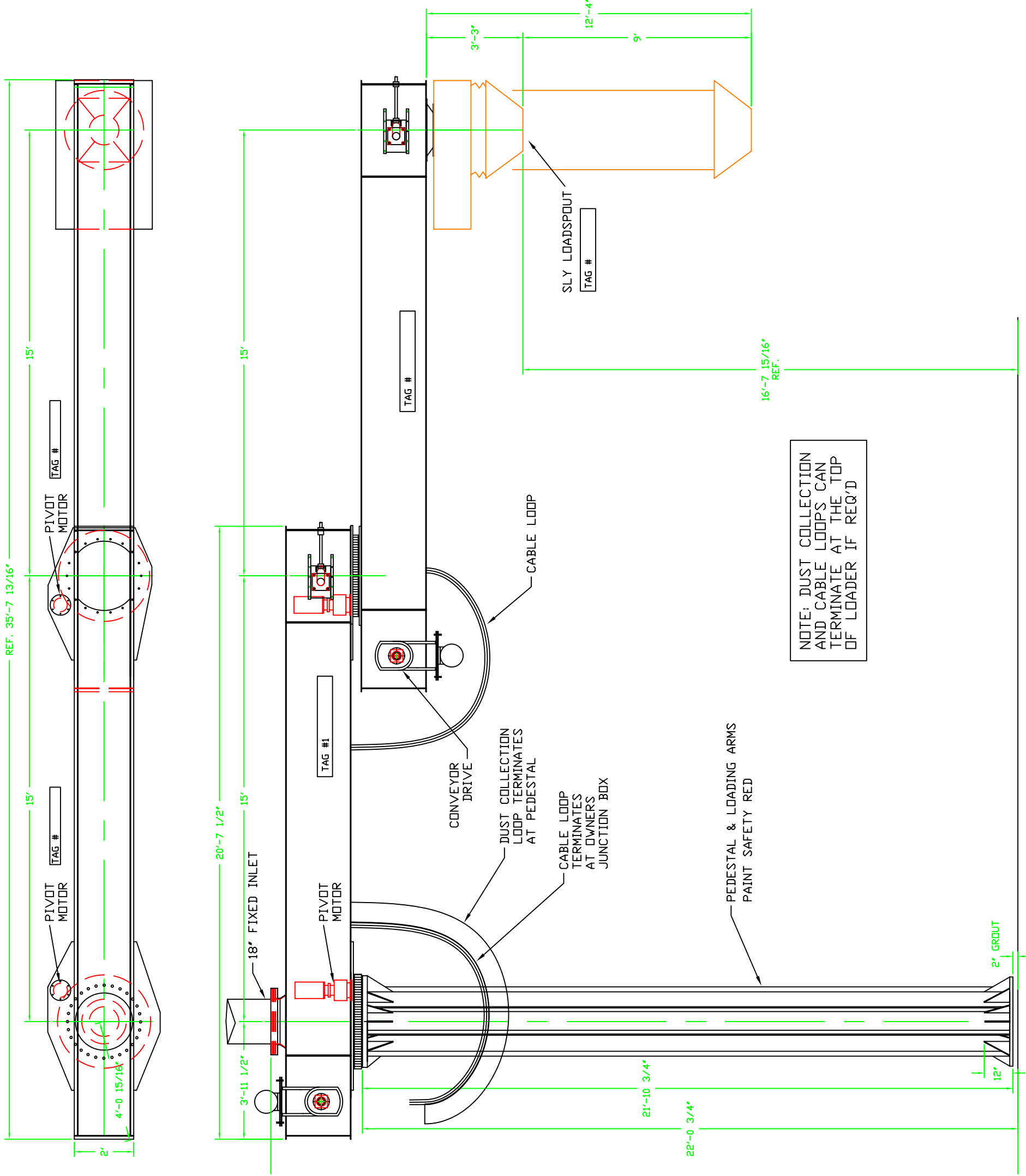
## **LUBRICATING INSTRUCTIONS**

- 1.) The loader has 2 slew bearings each bearing needs to be greased. There is a grease system connection fitting located on the flat plate above each slew bearing. A battery operated automatic grease system has been provided along with 1 refill of grease. You must adjust the grease system timer to start the system and then refill the system when it has timed out. we recommend setting the grease system for 3 to 6 months before refilling. See manual for specific information on this grease system.
- 2.) Lubricate pillow block bearing every 100 hours of operation.
- 3.) Lubricate electric motor bearing every six months.
- 4.) Use proper gear oil in all gearboxes located on conveyor drives and Pivots. There are 2 Dodge gearboxes in total. Replace every 2500 hours.

The Sumitomo Pivot gear boxes are filled with grease (Shell Alvania #2) at the factory. The gear boxes are maintenance free for the next 20,000 hours of operating and not scheduled for maintenance for 4 to 5 years. Each month visually check the pinion drive gear for wear. Also check the flange mounting bolts and make sure they are tight.

- 5.) Use proper lubricants recommended by the manufacturer.





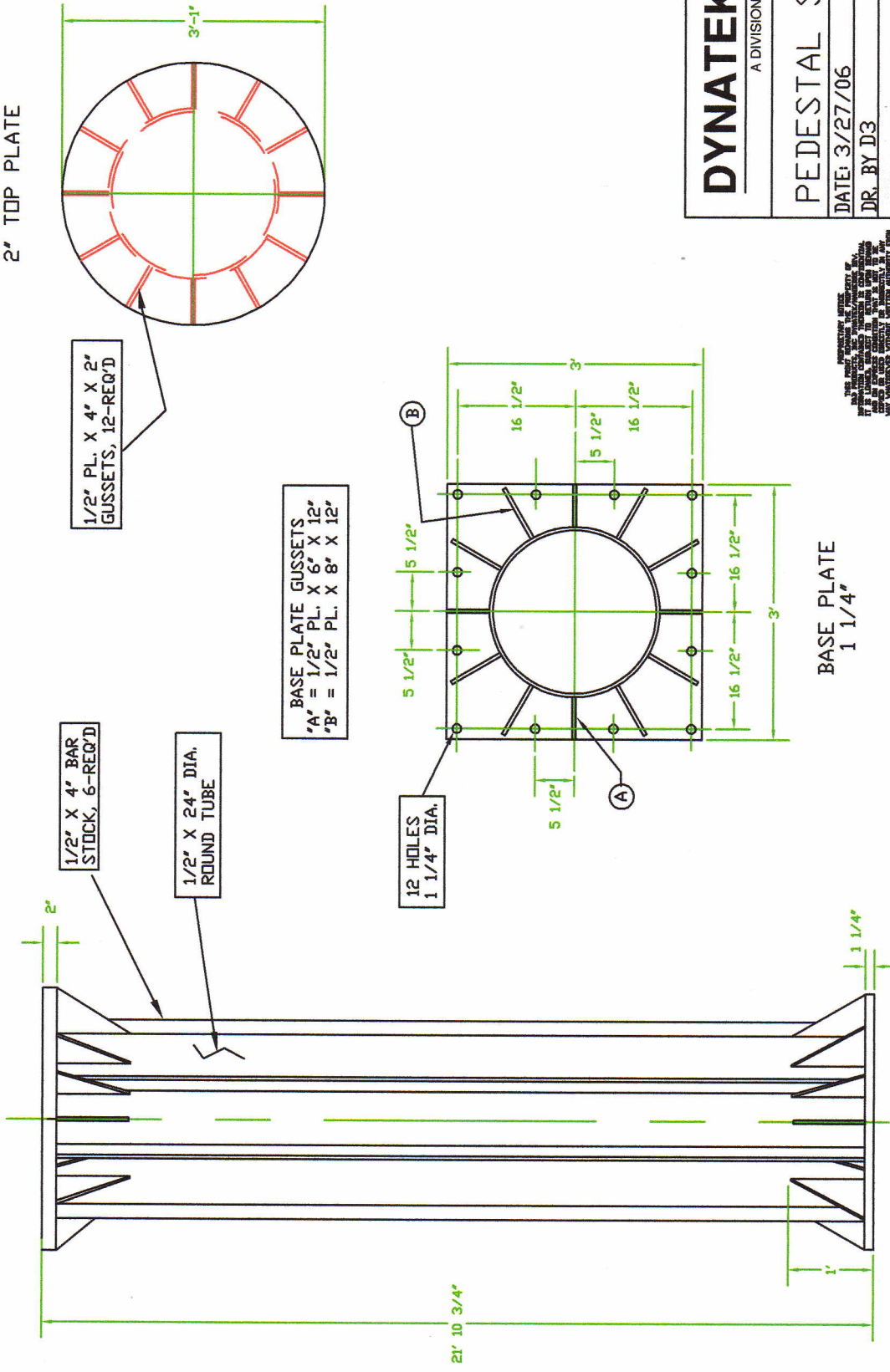
NOTE: DUST COLLECTION AND CABLE LOOPS CAN TERMINATE AT THE TOP OF LOADER IF REQ'D

PAINT ALL CONVEYORS AND PEDESTAL. SAFETY RED

<b>DYNATEK/MANIERRE</b>				
A DIVISION OF D&D PRODUCTS				
SCALE	DATE	NAME	CHKD BY	SIZE
NTS	3/27/06	3D		C
TITLE: 30' DRAG CONVEYOR BULK LOADER				
FOR:				
PART NO: 15000-A3				REV
				3

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PAINTED  
SAFETY RED



1/2" PL. X 4" X 2"  
GUSSETS, 12-REQ'D

1/2" X 4" BAR  
STOCK, 6-REQ'D

1/2" X 24" DIA.  
ROUND TUBE

BASE PLATE GUSSETS  
"A" = 1/2" PL. X 6" X 12"  
"B" = 1/2" PL. X 8" X 12"

12 HOLES  
1 1/4" DIA.

BASE PLATE  
1 1/4"

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PEDESTAL SUPPORT POST

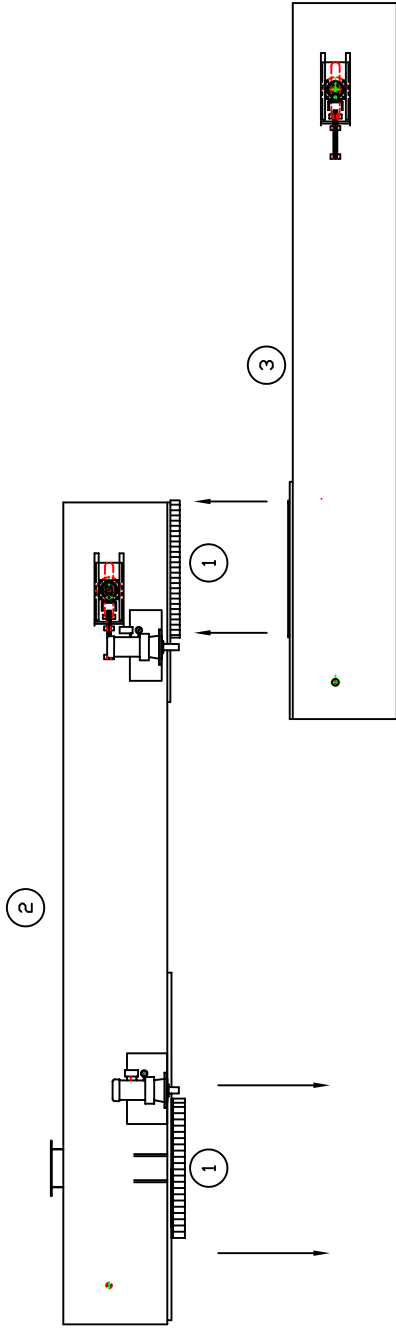
DATE: 3/27/06

DRAW#

DR. BY D3

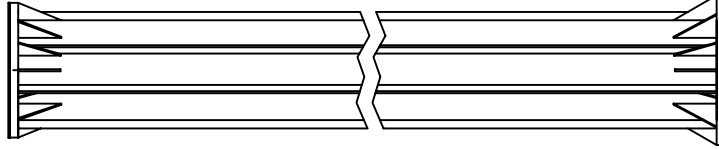
**B** 15000-P3

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AFTER PEDESTAL IS INSTALLED

- 1 LOCATE SLEW BEARING BOLTS AND INSTALL IN MAIN SLEW AND 2ND SLEW BEARINGS. 7/8-9 BOLTS & NUTS AND 1/2-13 BOLTS
- 2 LIFT MAIN ARM TO TOP OF PEDESTAL, ALIGN BOLTS WITH HOLES, LOWER ARM AND INSTALL NUTS ON BOLTS. IF YOU HAVE THE TOOLS TORQUE BOLTS TO 460 FT LBS (LUBRICATED) OR TIGHTEN AND TORQUE LATER
- 3 LIFT 2ND ARM TO 2ND SLEW BEARING, 2 PEOPLE REQUIRED AND IF POSSIBLE 2 MANLIFTS. ONE MAN ON EACH SIDE OF BULK LOADER. ALIGN THE 2ND ARM SLEW BEARING BOLTS WITH THE HOLES IN THE 2ND ARM CONVEYOR. \*NOTE\* YOU MUST SCREW EACH BOLT IN AT THE SAME RATE, THIS WILL TAKE A FEW MINUTES TO DO. IT WILL BE A TIGHT FIT SO USE FLAT 3/4 WRENCHES, TURN EACH BOLT 2 OR 3 TURNS AND MOVE TO THE NEXT BOLT. WHEN ALL BOLTS ARE THGHT, TORQUE THE BOLTS TO 80 FT LBS (LUBRICATED) OR 110 FT LBS (DRY).



TOP OF TRACK OR ROAD SURFACE

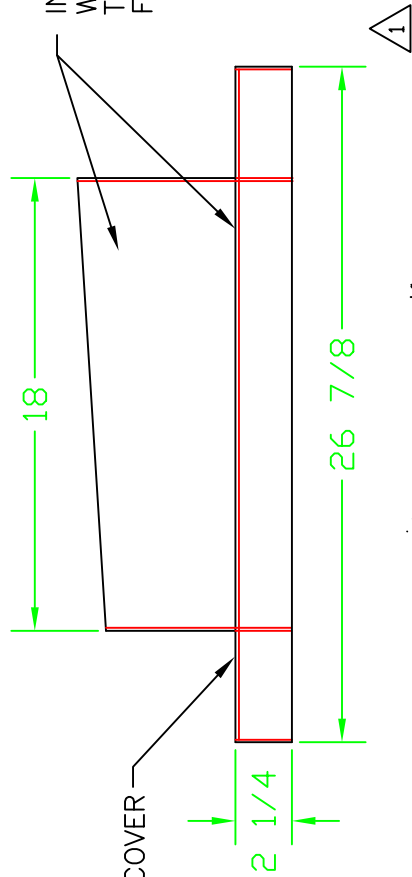
<b>DYNATEK/MANIERRE</b>			
A DIVISION OF D&D PRODUCTS			
SCALE	DATE	NAME	CHKD BY
3/8=12"	3/27/06	3/D	
TITLE: BULK LOADER INSTALLATION			SIZE
FOR:			B
PART NO. 15000-INSTALL			REV
			1

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FEED CONVEYOR  
 OR SAMPLER

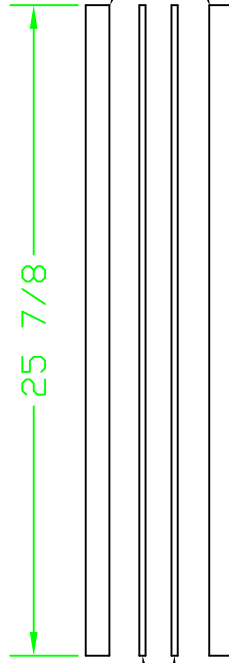
INFEED CHUTE CAN BE BOLTED OR  
 WELDED TO THE INFEED CHUTE COVER.  
 THIS ASSEMBLY REMAINS STATIONARY.  
 FITTED IN THE FIELD BY OTHERS.



INFEED CHUTE COVER

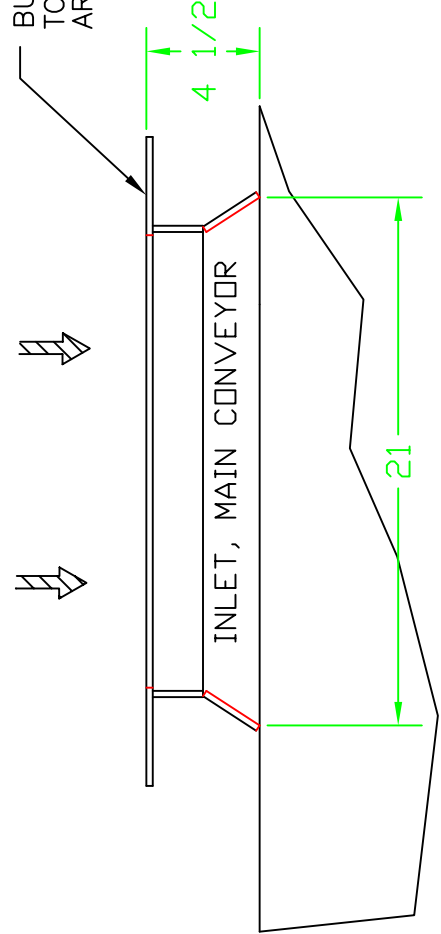
NOTE: THE INLET SUPPLIED BY DYNATEK  
 WILL MATCH THE OWNERS SUPPLY CHUTE.  
 DIMENSIONS GIVEN ARE FOR REFERENCE  
 ONLY. IF THE OWNERS CHUTE IS 8" DIA  
 DYNATEK WILL SUPPLY AN 8" INLET ASSEMBLY

STATIONARY DISKS  
 NEOPRENE RUBBER  
 1/2" THICK



SLIP DISKS  
 UHMW  
 1/4" THICK

BULK LOADER INLET CHUTE IS WELDED  
 TO THE MAIN FRAME OF CONVEYING  
 ARM, THIS ASSEMBLY ROTATES.



INLET, MAIN CONVEYOR

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SCALE	DATE	NAME	CHKD. BY	SIZE
3/4 = 12	3/27/06	3/D		A

TITLE: DRAG LOADER INLET ASSEMBLY  
 FDR:

PART NO. 15000-INLET  
 REV 2



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ADDITIONAL INFORMATION

ITEMS SUPPLIED

1-30' LONG BULK LOADING SYSTEM

FEATURES

- 1ST ARM CONVEYOR 20' 7-1/2" LONG
- 26"H X 21"W DRAG CONVEYOR BOX FRAME
- DRAG CONVEYOR CHAIN INSTALLED INSIDE
- ACCESS PORTS
- 5 HP 3/60/230/460 VAC, EXP. MOTOR
- 3/8" AR BOTTOM & 1/4" AR SIDES
- PLUG DETECTION AND
- CHAIN DETECTION SWITCH
- TAPED TAIL SHAFT FOR SPEED SWITCH
- TAPED TO 1/2" X 1" LONG UNC

2ND ARM CONVEYOR 20' 7-1/2" LONG

- 26"H X 21"W DRAG CONVEYOR BOX FRAME
- DRAG CONVEYOR CHAIN INSTALLED INSIDE
- ACCESS PORTS
- 5 HP 3/60/230/460 VAC MOTOR
- 3/16" AR BOTTOM & 3/16" AR SIDES
- PLUG DETECTION AND
- CHAIN DETECTION SWITCH
- TAPED TAIL SHAFT FOR SPEED SWITCH
- TAPED TO 1/2" X 1" LONG UNC

STRUCTURAL SUPPORT MEMBERS WILL  
 BE CARBON STEEL.

CAPACITY  
 15,000 BU/HR OF DRIED DISTILLERS GRAIN  
 (DDG) @34-37 LBS/CUFT

SLEW BEARINGS

- MAIN BEARING MOMENT LOAD  
 443,200 FT LBS
- 2ND PIVOT BEARING MOMENT LOAD  
 90,000 FT LBS

SUMITOMO PINION GEAR DRIVES.

PEDESTAL PIVOT MOTOR AND DRIVE

1/3 HP, 3/60/230/460 VAC MOTOR

473:1 RATIO GEAR BOX

TURNING A 17 TOOTH PINION GEAR

LOADING ARM ROTATES AT 1/2 OF 1 RPM.

2ND PIVOT MOTOR AND DRIVE

1/3 HP, 3/60/230/460 VAC, MOTOR

473:1 RATIO GEAR BOX

TURNING A 17 TOOTH PINION GEAR

LOADING ARM ROTATES AT 1/2 OF 1 RPM.

LUBRICATION

-ALL GEAR BOXES WILL BE SHIPPED FULL  
 LUBRICANTS FOR OPERATING AT EXTREME  
 COLD TEMPERATURES, DOWN TO -25 F.

CONVEYOR & PEDESTAL DESIGNED TO  
 START & STOP UNDER FULL LOAD

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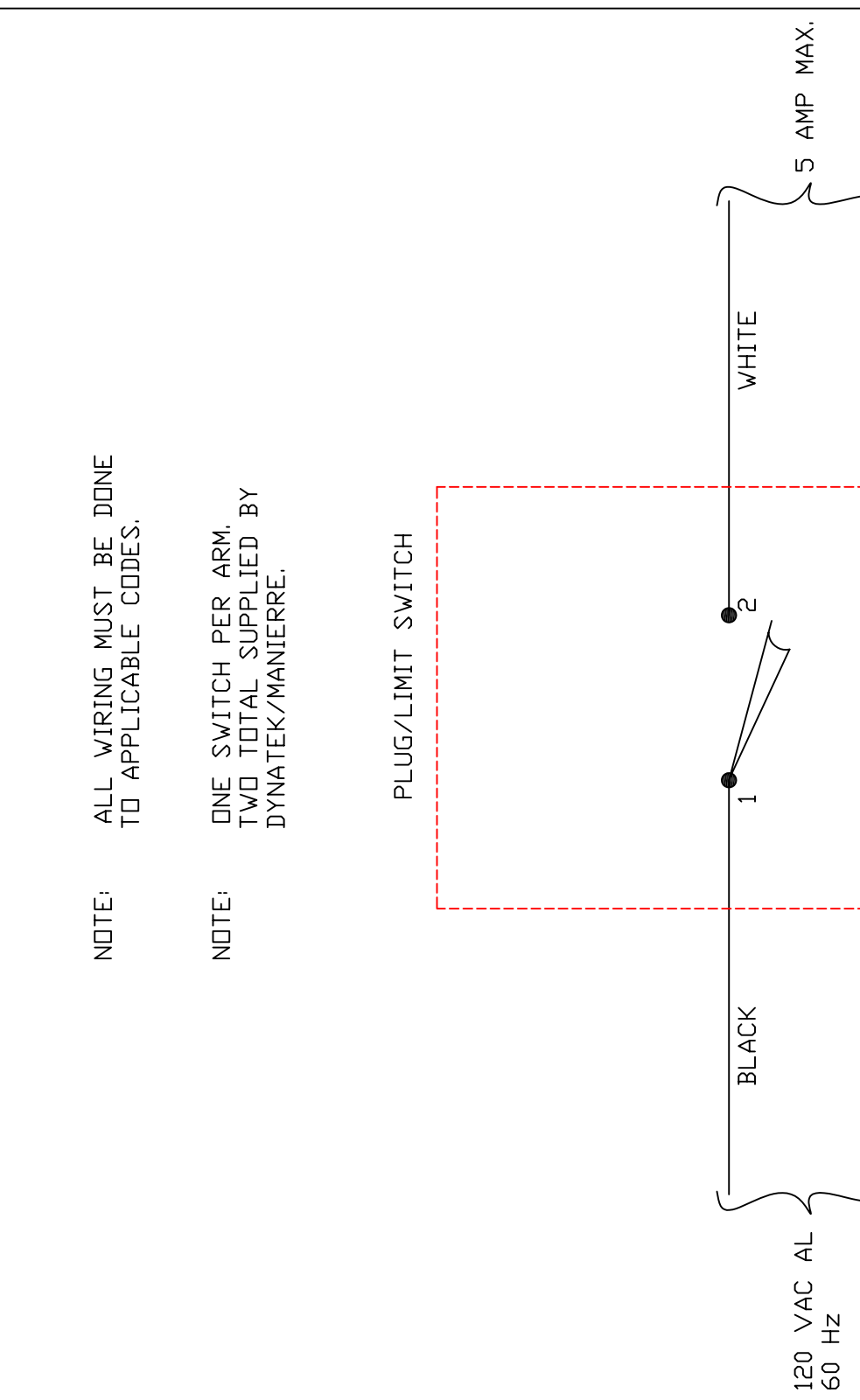
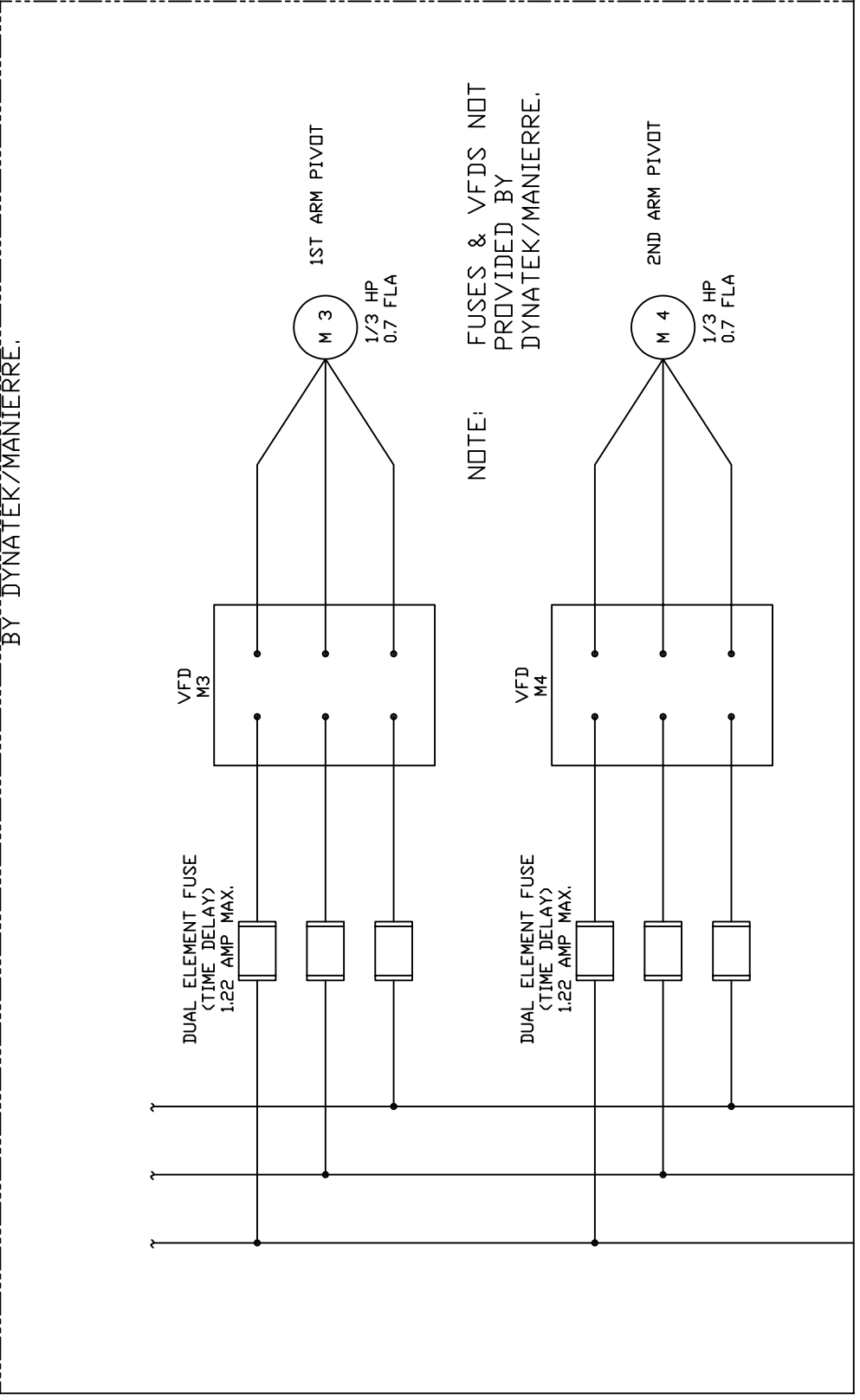
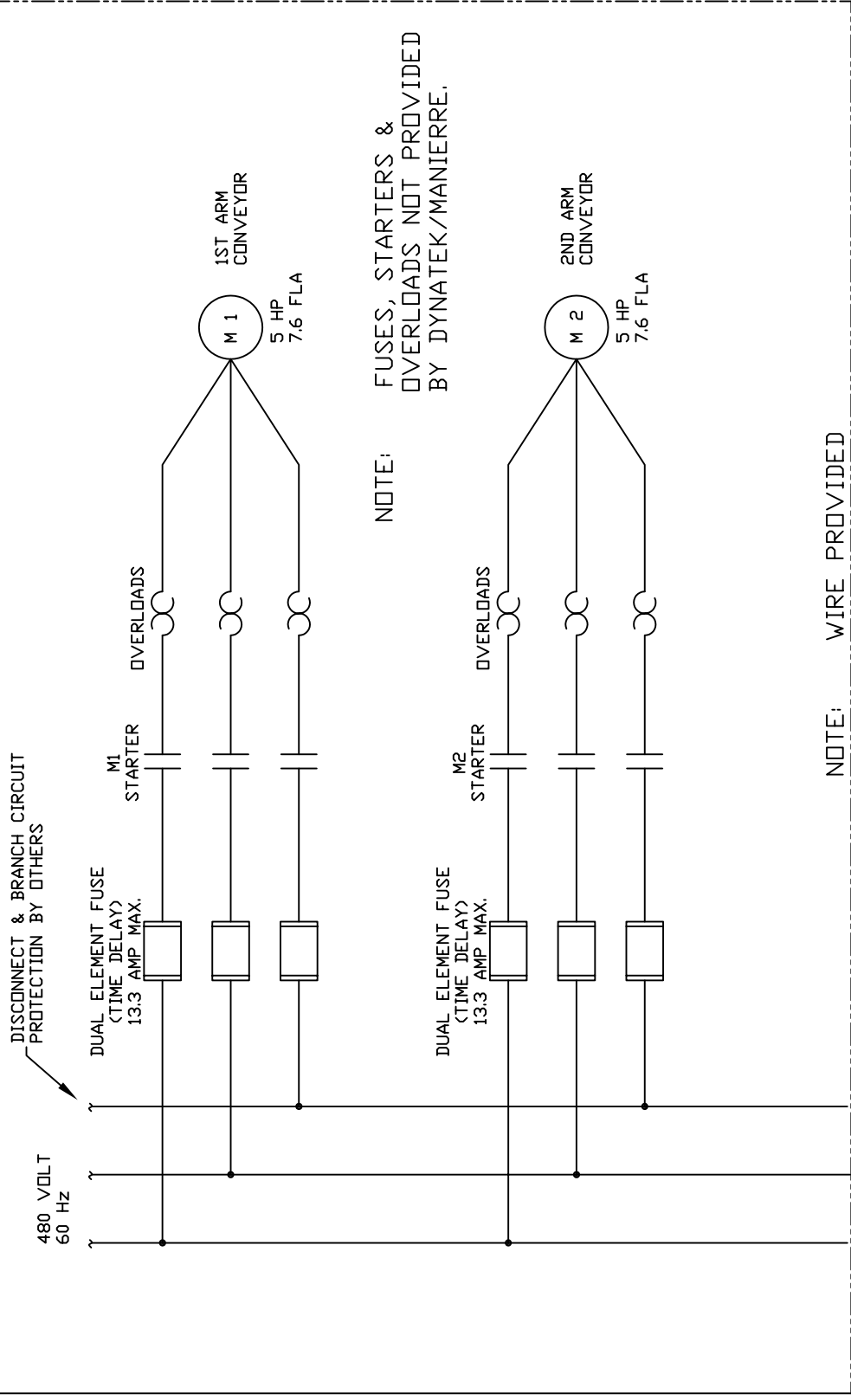
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NONE	3/27/06	3/D		A

TITLE: ADDITIONAL INFORMATION

FDR:

PART NO. 15000-INF0

REV  
 2



15000 BTU DRAG LOADER

# DYNATEK/MANIERRE

A DIVISION OF D&D PRODUCTS

SCALE	DATE	NAME	CHKD BY	SIZE
3/8=12"	12/28/06	EJH		B

TITLE: WIRING SCHEMATIC

FOR: DRAG LOADER

PART NO. 15000-E1

REV 0

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15000 BTU DRAG LOADER

# DYNATEK/MANIERRE

A DIVISION OF D&D PRODUCTS

SCALE	DATE	NAME	CHKD BY	SIZE
3/8=12"	12/28/06	EJH		B

TITLE: WIRING SCHEMATIC

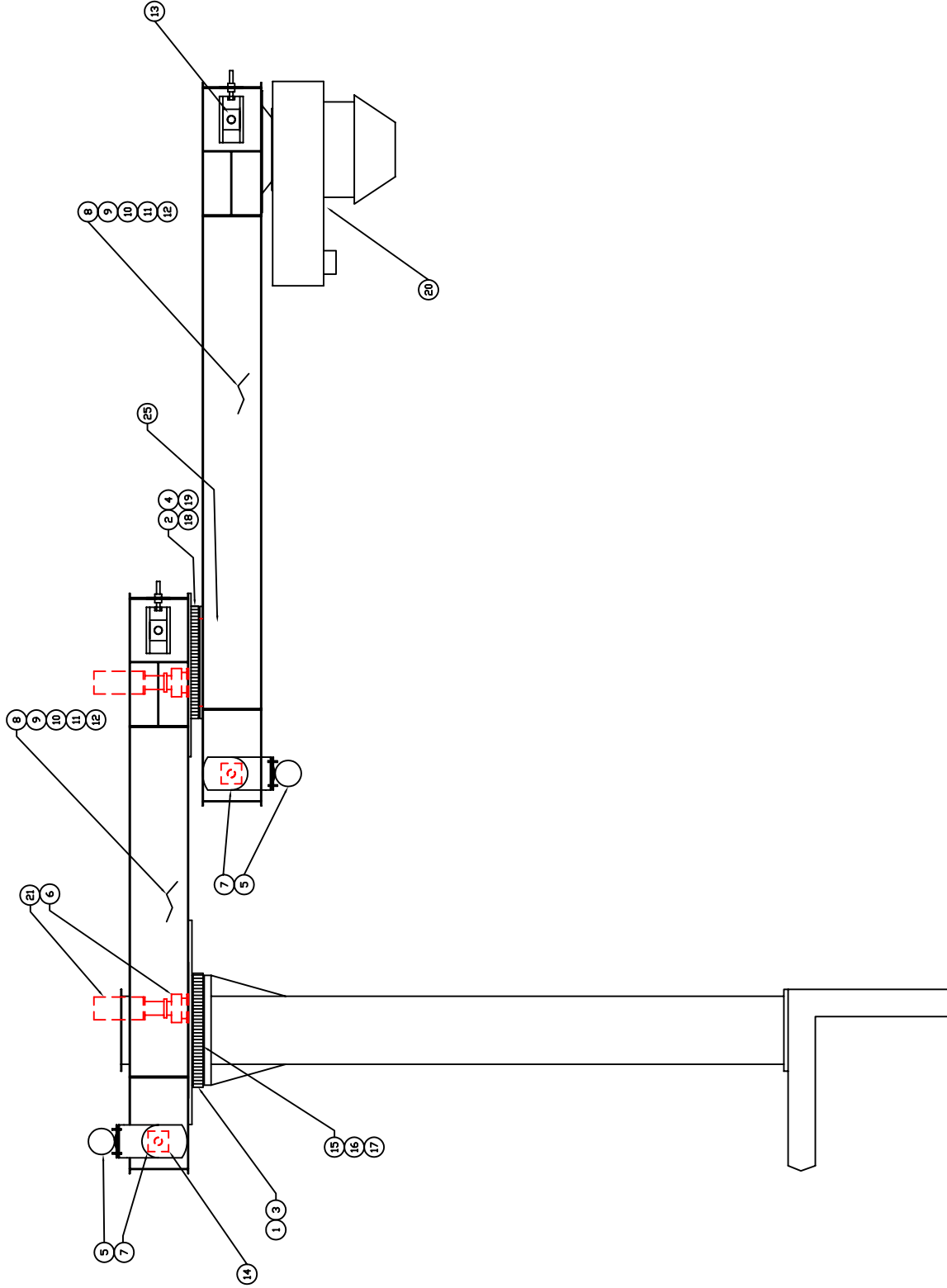
FOR: DRAG LOADER

PART NO. 15000-E1

REV 0

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NOTE: CONTROLS AND MOTOR STARTERS BY OTHERS.



NOTE: SEE PARTS LIST IN MANUAL FOR INFORMATION AND VENDORS

ITEM	REQ	DESCRIPTION
21	2	PIVOT MOTOR VM7002A BALDOR
20	1	INCL LOADOUT SPOUT
19	18	END PVT SLV BLTS 1/2-13 x 2-3/4 GR8
18	18	END PVT SLV BLTS 5/8-11 x 1-1/4 GR8
17	28	MAIN PIVOT SLEW BOLTS 7/8-9 x 4 GR8
16	24	PEDEATAL SLEW NUTS 7/8-9 GR8
15	24	PEDESTAL SLEW BOLTS 7/8-9 x 7' GR8
14	1	FLANGELOCK BRG #UCF212-47 (2-15/16)
13	2	FLANGELOCK BRG #UCF212-39 (2-7/16)
12	2	DRAG CHAIN SPKT #SPI189 2-15/16' (UST)
11	2	DRAG CHAIN SPKT #SPI194 2-7/16' (UST)
10	1	POLY RETURN ROLLER #S10953
9	1	DRAG CHAIN POLY FLIGHT #S26392
8	1	DRAG CONV. CHAIN-10' LGTHS #S26396
7	2	CONVEYOR REDUCER #T44207H25
6	2	PIVOT REDUCER #CNV4612SDBY437156
5	2	CONV. MOTOR SHP #PI8G4826A RELIANCE
4	1	END SLEW PINION GEAR #3920004
3	1	MAIN PINION GEAR #3920004
2	1	END SLEW BRG #E002 094520
1	1	MAIN SLEW BRG #E002 097030
ITEM	REQ	DESCRIPTION

<b>DYNATEK/MANIERRE</b>			
A DIVISION OF DTD PRODUCTS			
SCALE	DATE	NAME	CHKD BY
1/8"	10/2/83	JD	JD
TITLE: DRAG CONVEYOR LOADER PARTS			
PART NO. PARTS			
REV			0



## PARTS LIST PRICING EFFECTIVE 9/27/06

### SLEW BEARINGS AND PINIONS DRIVE GEARS

1.	Main Slew Bearing	#E002 097030	LaLeonessa	\$4,800.00
2.	2 <sup>nd</sup> Slew Bearing	#E002 094520	LaLeonessa	\$3,759.00
3.	Main Slew Pinion Gear 1.5 Dia	#39200004	Kaydon	\$ 540.00
4.	2 <sup>nd</sup> Slew Pinion Gear 1.5 Dia	#39200004	Kaydon	\$ 540.00

### EXPLOSION PROOF MOTORS

5.	Conv. Mtrs 5HP XPFC	#P18G4826	RELIANCE	\$ 623.00
6.	Pivot Mtrs 1/3 HP EXPF	#VM7002A	Baldor	\$ 456.00

### REDUCERS

8.	Pivot Reducers	#CNVX6125DBY437	Sumitomo	\$3,455.00
9.	Conveyor Reducers	#TA4207H25	Dodge	\$1,744.00

### DRAG CONVEYOR PARTS

10.	Drag Chain-10' lengths	#526396	Intersystems	\$ 479.00
11.	Drag Chain Poly Flight	#526392	Intersystems	\$ 5.95
12.	Ploy Return Roller	#510953	Intersystems	\$ 49.00
13.	Drag Chain Sprockets	#SP1189 2-15/16" dia.	Intersystems	\$ 994.00
14.	Drag Chain Sprockets	#SP1194 2-7/16" dia.	Intersystems	\$ 798.00
15.	Flange Bearings	#UCF212-39 2-7/16 dia.	AMI	\$ 377.00
16.	Flange Bearings	#UCF212-47 2-15/16 dia.	AMI	\$ 168.00

### REPLACE BOLTS AND NUTS WITH GRADE 8 STYLE ONLY

20.	Pedestal Slew Bolts	7/8-9 x 7" Bolts	(24 Req'd)
21.	Pedestal Slew Nuts	7/8-9 Nuts	(24 Req'd)
22.	Main Pivot Slew Bolts	7/8-9 x 4" Bolts	(28 Req'd)
23.	2 <sup>nd</sup> Pivot Inside Slew Bolts	5/8-11 x 1-1/4" Bolts	(18 Req'd)
24.	2 <sup>ND</sup> Pivot Outside slew Bolts	1/2-13 x 2-3/4" Bolts	(18 Req'd)

### ALMITE EASYT LUBE BATTERY

25.	#339603 Lithium 6V replacement battery (available at camera stores)
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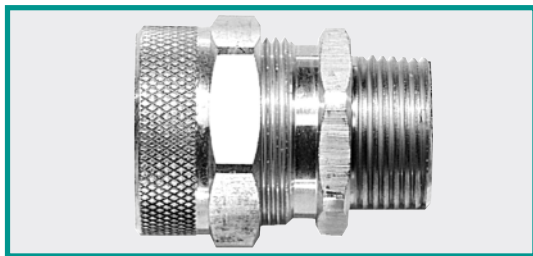


## RSR Series Straight Body Aluminum Cord Grips

Tuff-Seal™ RSR Series Aluminum Cord Grips with external threads are UL Listed and CSA Certified for use in both indoor and outdoor applications to prevent cable pullout, control arc of bend, and to provide a tight seal against environmental elements such as dirt, moisture and coolants.

Tuff-Seal fittings are offered in machined aluminum, steel, stainless steel and nylon with either NPT, PG/metric, or ISO “M” threads. These grips accommodate conduit sizes from 1/4” to 3”, can be ordered with or without wire mesh attachments, and feature an anti-friction washer that fits between the nut and bushing for easier compression.

These Tuff-Seal grips are used in conduit hubs or knock-outs at the point where the electrical cable is to be terminated, and they protect cable from damage and pull-out.



### Certification and Compliances:

UL Standard: 514  
File #E53599

CSA Standard C22.2 #18  
File #28985

National Electrical Code  
Articles 400-10 and 400-14

NEMA Standards FBI-1983

#### Hazardous Locations:

NEC Sec. 501-4(b)  
502-4(a)(2), and 503-3(a).  
For Class I, Div.2; Class II, Div. 1 and 2; and Class III, Div. 1 and 2.

Complete Assembly Catalog Numbers				
Conduit Size	Cable Range	Cord Grip Only	Cord Grip With Mesh	
1" 4	.125- .188	RSR-0003	—	
	.188- .250	RSR-0004	RSR-0004-E	
	.250- .312	RSR-0005	RSR-0005-E	
	.312- .375	RSR-0006	RSR-0006-E	
	.375- .438	RSR-0007*	RSR-0007-E	
3" 8	.125- .188	RSR-003	—	
	.188- .250	RSR-004	RSR-004-E	
	.250- .312	RSR-005	RSR-005-E	
	.312- .375	RSR-006	RSR-006-E	
	.375- .438	RSR-007*	RSR-007-E	
1" 2	.125- .188	RSR-1003	—	
	.188- .250	RSR-1004	RSR-1004-E	
	.250- .312	RSR-1005	RSR-1005-E	
	.312- .375	RSR-1006	RSR-1006-E	
	.375- .438	RSR-1007	RSR-1007-E	
1" 2	.125- .188	RSR-103	—	
	.188- .250	RSR-104	RSR-104-E	
	.250- .312	RSR-105	RSR-105-E	
	.312- .375	RSR-106	RSR-106-E	
	.375- .438	RSR-107	RSR-107-E	
	.438- .500	RSR-108	RSR-108-E	
	.500- .562	RSR-109	RSR-109-E	
	.562- .625	RSR-110	RSR-110-E	
	.438- .500	RSR-1208	RSR-1208-E	
	.438- .562	RSR-1209	RSR-1209-E	
.500- .625	RSR-1210	RSR-1210-E		
.562- .688	RSR-1211*	RSR-1211-E		
.625- .750	RSR-1212*	RSR-1212-E		
.688- .812	RSR-1213*	RSR-1213-E		
3" 4	.125- .188	RSR-2103	—	
	.188- .250	RSR-2104	RSR-2104-E	
	.250- .312	RSR-2105	RSR-2105-E	
	.312- .375	RSR-2106	RSR-2106-E	
	.375- .438	RSR-2107	RSR-2107-E	
	.438- .500	RSR-2108	RSR-2108-E	
	.500- .562	RSR-2109	RSR-2109-E	
	.562- .625	RSR-2110	RSR-2110-E	
	.438- .500	RSR-208	RSR-208-E	
	.438- .562	RSR-209	RSR-209-E	
.500- .625	RSR-210	RSR-210-E		
.562- .688	RSR-211	RSR-211-E		
.625- .750	RSR-212	RSR-212-E		
.688- .812	RSR-213	RSR-213-E		
3" 4	.438- .562	RSR-2309	RSR-2309-E	
	.500- .625	RSR-2310	RSR-2310-E	
	.562- .688	RSR-2311	RSR-2311-E	
	.625- .750	RSR-2312	RSR-2312-E	
	.688- .812	RSR-2313	RSR-2313-E	
	.750- .875	RSR-2314*	RSR-2314-E	
	.812- .938	RSR-2315*	RSR-2315-E	
	.875- 1.000	RSR-2316*	RSR-2316-E	

See page 8 for dimension information.

### RSR Straight Cord Grips Dimension Table

Catalog Number*	Conduit Size	A Body Bore	B	C	D	E Body Hex	F Nut Dia.	Form Size
RSR-0000-W	1/4"	.34	.44	.59	1.50	.88	.96	1
RSR-000-W	3/8"	.46	.44	.59	1.50	.88	.96	1
RSR-1000-W	1/2"	.46	.44	.59	1.50	.88	.96	1
RSR-100-W	1/2"	.62	.56	.72	1.81	1.00	1.26	2
RSR-1200-W	1/2"	.62	.54	.86	2.06	1.37	1.55	3
RSR-2100-W	3/4"	.62	.56	.72	1.81	1.12	1.26	2
RSR-200-W	3/4"	.81	.57	.86	2.06	1.25	1.55	3
RSR-2300-W	3/4"	.81	.57	.97	2.31	1.37	1.74	4
RSR-300-W	1	1.00	.62	.97	2.31	1.44	1.74	4
RSR-3500-W	1	1.10	.70	1.25	2.78	2.00	2.47	5
RSR-400-W	1 1/4"	1.30	.70	1.25	2.78	2.00	2.47	5
RSR-500-W	1 1/2"	1.43	.70	1.25	2.78	2.47	2.47	5
RSR-5600-W	1 1/2"	1.50	1.00	1.72	3.88	2.90	2.97	6
RSR-600-W	2"	2.00	.81	1.72	3.75	2.83	2.97	6
RSR-6700-W	2"	1.90	1.31	3.50	4.81	4.00	4.30	7
RSR-700-W	2 1/2"	2.36	1.31	3.50	4.81	4.00	4.30	7
RSR-8700-W	3"	2.36	1.31	3.50	4.81	4.00	4.30	7

Catalog number of Body-Nut-Washer sub-assemblies are shown above.

Each of these can be used with a series of bushings to determine the dimensions of any straight bodied Cord Grip, complete with the Bushing listed, match the Conduit Size and Form No. with that shown above.

Example: RSR-007 Cord Grip is Conduit Size 3/8", Form No. 1. So is RSR-000-W. Both would have the dimensions shown above. So would RSR-003, RSR-004, RSR-005, and RSR-006. Note: if the last two digits of the complete Cord Grip catalog number are replaced with "00" and "-W" is added, the above number results.

Dimension A is the minimum Body Bore. Other dimensions are nominal.

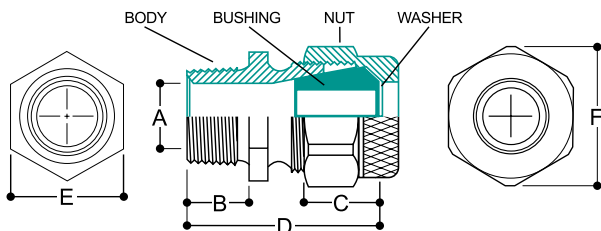
Dimension D is with the Nut snug but Bushing uncompressed.

Dimension E is across the Body hex. flats. Forms 6 & 7 are octagonal.

Dimension F is the outside diameter of the Nut except at the wrench lugs.

Bushing temperature operating range: -40° F (-40°C) min. to 250° F (121° C) max.

Dimensions are approximate.



		Complete Assembly Catalog Numbers	
Conduit Size	Cable Range	Cord Grip Only	Cord Grip With Mesh
1"	.438- .562	RSR-309	RSR-309-E
	.500- .625	RSR-310	RSR-310-E
	.562- .688	RSR-311	RSR-311-E
	.625- .750	RSR-312	RSR-312-E
	.688- .812	RSR-313	RSR-313-E
	.750- .875	RSR-314	RSR-314-E
	.812- .938	RSR-315	RSR-315-E
.875- 1.000	RSR-316	RSR-316-E	
1"	.875- 1.000	RSR-3516	RSR-3516-E
	1.000- 1.125	RSR-3518	RSR-3518-E
	1.125- 1.250	RSR-3520*	RSR-3520-E
	1.250- 1.375	RSR-3522*	RSR-3522-E
1 1/4"	.562- .688	RSR-411	—
	.688- .812	RSR-413	—
	.750- .875	RSR-414	—
	.875- 1.000	RSR-416	RSR-416-E
	1.000- 1.125	RSR-418	RSR-418-E
	1.125- 1.250	RSR-420*	RSR-420-E
1.250- 1.375	RSR-422*	RSR-422-E	
1 1/2"	.562- .688	RSR-511	—
	.688- .812	RSR-513	—
	.750- .875	RSR-514	—
	.875- 1.000	RSR-516	RSR-516-E
	1.000- 1.125	RSR-518	RSR-518-E
	1.125- 1.250	RSR-520	RSR-520-E
1.250- 1.375	RSR-522	RSR-522-E	
1 1/2"	1.250- 1.375	RSR-5622	RSR-5622-E
	1.438- 1.562	RSR-5625	RSR-5625-E
	1.562- 1.688	RSR-5627*	RSR-5627-E
	1.688- 1.812	RSR-5629*	RSR-5629-E
2"	1.250- 1.375	RSR-622	RSR-622-E
	1.438- 1.562	RSR-625	RSR-625-E
	1.562- 1.688	RSR-627	RSR-627-E
	1.688- 1.812	RSR-629	RSR-629-E
2"	1.688- 1.812	RSR-6729	RSR-6729-E
	1.812- 1.938	RSR-6731	RSR-6731-E
	1.938- 2.062	RSR-6733*	RSR-6733-E
	2.062- 2.188	RSR-6735*	RSR-6735-E
	2.188- 2.312	RSR-6737*	RSR-6737-E
	2.312- 2.438	RSR-6739*	RSR-6739-E
2 1/2"	1.688- 1.812	RSR-729	RSR-729-E
	1.812- 1.938	RSR-731	RSR-731-E
	1.938- 2.062	RSR-733	RSR-733-E
	2.062- 2.188	RSR-735	RSR-735-E
	2.188- 2.312	RSR-737	RSR-737-E
	2.312- 2.438	RSR-739*	RSR-739-E
3"	1.688- 1.812	RSR-8729	RSR-8729-E
	1.812- 1.938	RSR-8731	RSR-8731-E
	1.938- 2.062	RSR-8733	RSR-8733-E
	2.062- 2.188	RSR-8735	RSR-8735-E
	2.188- 2.312	RSR-8737	RSR-8737-E
	2.312- 2.438	RSR-8739*	RSR-8739-E





Catalogo Catalogue 1998

**Cuscinetti di base**

**Slewing rings**

**LA LEONESSA**



## 1 - Transport, packaging and preparation

The LaLeonessa bearing must be transported and handled in its horizontal position, avoiding impacts or damage especially in its radial direction.

Since it is a machined component, bearings of any size must be handled carefully.

The bearing is packaged on a Europallet, fastened down and protected by an anti-

corrosive oil film. This film protects the surfaces perfectly for about 6 months but only if the bearing is stored in a closed place protecting it from the atmosphere.

When the bearing is being unpacked, take care not to damage the seals. The bearing must be degreased using commercial solvents, taking care that

these do not attack the seals or enter the roller tracks.

We advise not to use solvents containing chlorides as these would damage the surfaces.

## 3 - Connection structures

For long life and satisfactory service the bearing requires a suitably efficient connection structure.

The connection structures must guarantee:

- Sufficient flexible strength
- Sufficient torsional stress resistance
- Compatibility with the fastening screws

Deformed structures as shown in these figures are not permitted:



## 2 - Bearing indetify

Every LaLeonessa bearing is identified by stamped lettering close to the aperture cover for introducing the rolling parts.

The printing states:

- ◆ The type of bearing
- ◆ The year and month of construction
- ◆ The progressive serial number

### Example

**CB-I-1345-99061654**

CB = bearing

I = internal gear teeth

1345 = external diameter in mm

99 = year of construction

6 = month of construction

1654 = internal progressive number

Surfaces for attachment must be machine finished, not exceeding the flatness errors, including the inclination, shown in the table below.

### Flatness errors

Flatness errors, including inclination, in mm

Rolling diameter in mm	Ball bearings with 4 contact points	Ball bearings with 8 contact points	Cross roller bearings
up to 1000	0,15	0,20	0,10
up to 1500	0,20	0,25	0,15
up to 2000	0,25	0,30	0,20



## 4 - Positioning the bearing

Always observe the marks made on LaLeonesa bearings to make sure that they are positioned properly and to guarantee them a long and efficient life.

▲ **Hardening start and finish union**  
This is shown by the letter "T" imprinted on the face of the geared ring.

On the smooth ring, it can be found close to

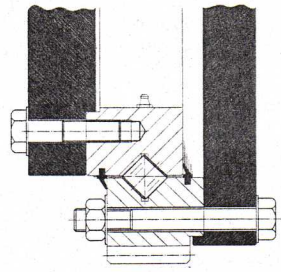
the plug for introducing the rolling parts. During assembly always make sure that the hardening points of union are outside the maximum load area.

● **Gear teeth eccentricity**  
This is detected by means of three red-painted teeth and during assembly it is necessary to ensure that

in these positions the clearance between the sides of the tooth and that of the pinion is at least 0.05 mm per tooth module.

▲ **Grease nipples**  
LaLeonesa bearings are provided with an adequate number of grease nipples

These nipples must be in easily accessible positions.



## Tightening torque

The bolts must be tightened using dynamic wrenches or hydraulic systems.

Below we give the table showing the tightening torques for bolts in the 8.8 and 10.9 quality classes:

Class or resistance according to DIN/ISO 898

8.8 10.9

Ultimate yield point  $R_{p0.2}$  in N/mm<sup>2</sup>

640 for < M16 940

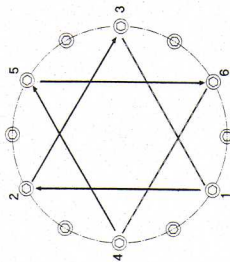
660 for > M16

## 5 - Fastening bolts

Before connecting together the LaLeonesa bearing and the support, always make sure that the fastening bolts are of the required type (8.8-10.9-12.9).

The bolts must be lightly oiled ( $\mu = 0.14$ ). Hardened and tempe-

red flat washers can be used, especially for normalised steel bearings, whilst it is strictly forbidden to use any kind of flexible washers which would void any warranty.



1 Mount all the bolts on the first ring and tighten slightly

	Tensile stress N	Tightening torque and assembly Nm	Tensile stress N	Tightening torque and assembly Nm
M12	38500	78	56000	117
M14	53000	126	77000	184
M16	72000	193	106000	279
M18	91000	270	129000	387
M20	117000	387	166000	558
M22	146000	522	208000	747
M24	168000	666	239000	954
M27	221000	990	315000	1395
M30	270000	1350	385000	1890



## **9 - Maintenance**

Periodical checks must be made on lubrication, the tightness of the bolts, the state of the seals and machine clearance.

### **LUBRICATION**

The rolling tracks must be lubricated at intervals depending on operating conditions. We recommend greasing the rolling tracks after 50 hours of use, then every 100 hours. Before and after a long period of idleness the bearing must be greased again.

The grease is pumped while the bearing is turning and is considered complete when the grease overflows from the seal forming a light film which also serves as a seal. If this visual check cannot be made, our Technical Office will tell you how much grease to use. The grease should be brushed or sprayed on the gear teeth and must cover the sides of the teeth completely. When it is not possible to visually check the presence of grease, we recommend greasing every three or six months according to the use of the machine.

The table on page 9 shows the types of grease to use. For special applications requiring low temperature greases, please contact our Technical Office.

### **BOLTS**

After the first 100 hours of operations, the tightness of the bolts must be checked according to the values indicated in the table on page 7. Afterwards, we recommend yearly inspections.

Checks should be made more frequently when special working conditions require it. If loose or worn bolts are found during inspections, they must be replaced.

### **SEALS**

The seals mounted on LaLeonessa bearings are manufactured in a basic nitrile rubber elastomer which resists well to temperatures and atmospheric agents. During the bearing's life, we recommend regular visual checks on the state of the seals and if these have deteriorated or become fragile, they should be replaced without delay.

### **MACHINE CLEARANCE**

As described on page 9, the first measurement made serves as a reference for future measurements which represents the wear on the bearing's tracks. It should be measured once a year.

## **Maintenance of slewing rings**

Controls on lubrication, bolt tightening, the state of the seals and machine backlash es must be carried out periodically.

### **LUBRICATION**

Lubrication of the raceways is carried out at intervals depending on the conditions of use of the machine. We recommend that the raceway be greased after the first 50 hours of use, and then after every 100 hours of use. Before and after long periods of disuse of the machine, a new bearing lubrication should be carried out. The operation of pumping the grease should be carried out while the bearing is rotating and should be considered complete when the grease leaks from the seal and forms a light film, which also creates a seal. In the event that this visual inspection should prove impossible, our Technical Department can communicate the amount of grease to be used. The grease should be spread on the gears by using a brush or by spraying, and must completely cover the sides of the teeth. Where it is impossible to carry out a visual check for the presence of grease, we recommend that you carry out greasing every three or six months, according to the use of the machine. The table shown in the section on Assembly/Lubrication provides information on the greases to be used. For special applications that require grease at low temperatures, we invite you to contact our Technical Department.

### **BOLTS**

After the first 100 working hours an inspection must be carried out of the tightening force of the bolts, according to the values indicated in the following table. After which we recommend that an inspection be carried out once a year. The frequency of the inspection can be reduced in the event of particular conditions of use. If, during the inspection, loose or worn bolts are found, they should be replaced.

### **SEALS**

The seals mounted on the La Leonessa slewing rings are made with a basic elastomer in nitrile rubber, which has good characteristics of resistance to temperatures and to weather conditions.

During the lifetime of the slewing ring we recommend that you carry out visual inspections on the state of the seals, and do not hesitate to replace them if they appear to have deteriorated or become fragile.

### **MACHINE BACKLASH**

As described previously in the section on Assembly/Assessment of machine backlash, the first measurement recorded is the reference for further measurements that will be carried out and that represent the wear of the slewing ring raceways.

It is good practice to carry out measurement once a year. The maximum acceptable increase, before having to replace the slewing ring, depends on the diameter of the ring, on the type and size of the rolling elements (balls or rollers), on the type of application for which higher limits of wear can be accepted if this does not compromise the functioning. When backlash increases by four times the initial backlash, do not hesitate to contact our Technical Service for the evaluation of the state of wear on the slewing ring.

## **Assembly and Maintenance of the Bearings**



# Assembly and Maintenance of the Bearings



Thank you for choosing LaLeonessa Bearings. We are certain that you will be satisfied with our product if it is installed according to the instruction given in this handbook.



This installation and maintenance handbook has been created to offer customers, old and new, a tool for obtaining the best working conditions and a long life for the product.

Please pass on this information to the final users.

April 2000  
Year 1, Number 1

### SUMMARY:

Transport packaging and preparation	1
Bearing identify	2
Connection structures	3
Positioning the bearing	4
Fastening the bolts	5
Installing the pinion	6
Lubrication	7
Estimating machine clearance	8
Maintenance	9
Warranty	10



## 1 - Transport, packaging and preparation

---

The LaLeonessa bearing must be transported and handled in its horizontal position, avoiding impacts or damage especially in its radial direction.

Since it is a machined component, bearings of any size must be handled carefully.

The bearing is packaged on a Europallet, fastened down and protected by an anti-

corrosive oil film. This film protects the surfaces perfectly for about 6 months but only if the bearing is stored in a closed place protecting it from the atmosphere.

When the bearing is being unpacked, take care not to damage the seals. The bearing must be degreased using commercial solvents, taking care that

these do not attack the seals or enter the roller tracks.

We advise not to use solvents containing chlorides as these would damage the surfaces.

## 2 - Bearing identify

---

Every LaLeonessa bearing is identified by stamped lettering close to the aperture cover for introducing the rolling parts.

The printing states:

- ◆ The type of bearing
- ◆ The year and month of construction
- ◆ The progressive serial number

### Example

**CB-I-1345-99061654**

CB = bearing

I = internal gear teeth

1345 = external diameter in mm

99 = year of construction

6 = month of construction

1654 = internal progressive number

We advise noting the serial number on the machine or system log book. This will be useful in tracing the product once the part is installed as paint or guards may prevent it being able to be seen.

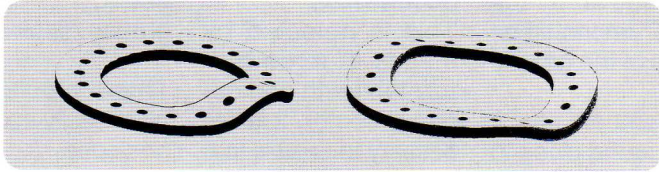
### 3 - Connection structures

For long life and satisfactory service the bearing requires a suitably efficient connection structure.

The connection structures must guarantee:

- Sufficient flexible strength
- Sufficient torsional stress resistance
- Compatibility with the fastening screws

Deformed structures as shown in these figures are not permitted.



Surfaces for attachment must be machine finished, not exceeding the flatness errors, including the inclination, shown in the table below.

#### Flatness errors

Flatness errors, including inclination, in mm

Rolling diameter in mm	Ball bearings with 4 contact points	Ball bearings with 8 contact points	Cross roller bearings
up to 1000	0,15	0,20	0,10
up to 1500	0,20	0,25	0,15
up to 2000	0,25	0,30	0,20



## 4 - Positioning the bearing

Always observe the marks made on LaLeonessa bearings to make sure that they are positioned properly and to guarantee them a long and efficient life.

### ▶◀ Hardening start and finish union

This is shown by the letter "T" imprinted on the face of the geared ring.

On the smooth ring, it can be found close to

the plug for introducing the rolling parts. During assembly always make sure that the hardening points of union are outside the maximum load area.



### ● Gear teeth eccentricity

This is detected by means of three red-painted teeth and during assembly it is necessary to ensure that

in these positions the clearance between the sides of the tothing on the wheel and that of the pinion is at least 0.05 mm per tooth module.

### ▶ Grease nipples

LaLeonessa bearings are provided with an adequate number of grease nipples

These nipples must be in easily accessible positions.

## 5 - Fastening bolts

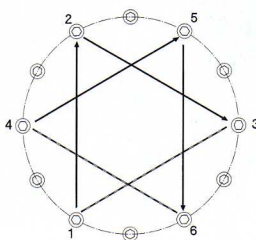
Before connecting together the LaLeonessa bearing and the support, always make sure that the fastening bolts are of the required type (8.8-10.9-12.9).

The bolts must be lightly oiled ( $\mu = 0.14$ ). Hardened and tempe-

red flat washers can be used, especially for normalised steel bearings, whilst it is strictly forbidden to use any kind of flexible washers which would void any warranty.

1 Mount all the bolts on the first ring and tighten slightly

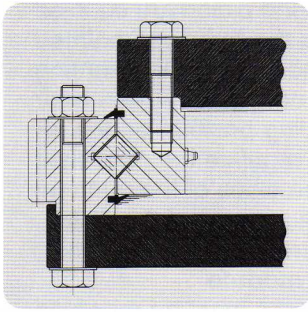
2 Continue to tighten according to the order shown in the figure below.



# Tightening torque

The bolts must be tightened using dynamometric wrenches or hydraulic systems.

Below we give the table showing the tightening torques for bolts in the 8.8 and 10.9 quality classes:



## Class or resistance according to DIN/ISO 898

8.8

10.9

Ultimate yield point  $R_{p0.2}$  in N/mm<sup>2</sup>

640 for < M16

940

660 for > M16

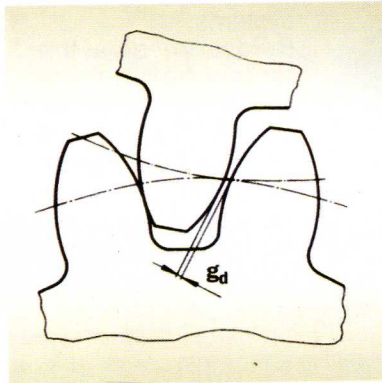
	Tensile stress N	Tightening torque and assembly Nm	Tensile stress N	Tightening torque and assembly Nm
M12	38500	78	56000	117
M14	53000	126	77000	184
M16	72000	193	106000	279
M18	91000	270	129000	387
M20	117000	387	166000	558
M22	146000	522	208000	747
M24	168000	666	239000	954
M27	221000	990	315000	1395
M30	270000	1350	385000	1890

## 6 - Installing the pinion

The wheel and pinion are coupled by bringing the three red painted teeth on the wheel (representing maximum eccentricity) into their corresponding position on the pinion. Then regulate the clearance between the sides of the teeth on the wheel and those of the pinion, making sure that it is at least: **gd = 0.05\* module**

This procedure must be repeated when there is more than one pinion. During installation, always check the vertical alignment between the teeth of the wheel and pinion. We recommend recording all data in the machine/system log book.

When installation is completed, we recommend turning the system a few times before lubrication to make sure that the coupling is correct.



## 7 - Lubrication

Before starting the system, the gear teeth should be greased so that the sides of the teeth are covered completely.

The LaLeonessa be-

aring is supplied with ready-greased roller tracks so these need to be lubricated after the first 100 hours of operations (see *Maintenance* paragraph).

Standard grease is used according to ISO L-X-BCHB-2 and DIN 51825 KP2K 20 classifications.

The lubricants mentioned in the table are suitable for use at temperatures between -20°C and +120°C. Special greases are required when operating at lower temperatures. Below we give some typical values for greases used in the rolling system.

- NLGI consistency = 2
- ASTM °C drip point = 190
- Manipulated penetration dmm = 280
- Basic oil viscosity at 40°C mm<sup>2</sup>/s = 103



Grease type	Rolling system	Gear teeth
AGIP	GRMU EP2	SAGUS 60
BP	LS-EP2	Energol WRL
ESSO	Beacon EP2	Surret Fluid NX
SHELL	Calithia EP2	Malleus Fluid C
MOBIL	Mobilux EP2	Mobiltac 81

## 8 - Estimating machine clearance

After mounting the bearing, machine clearance must be checked.

The distance detected will serve as a reference for future measurements during opera-

tions and show the bearing's state of wear.

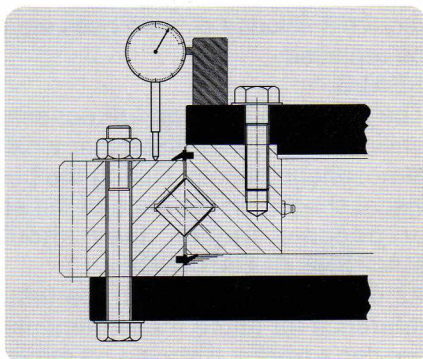
The distance must be measured between the upper and lower structure, as close as possible to the bearing

rolling track to diminish the influence of the elastic deformation of the connecting structure.

### Operations

1. Use a 0.01 mm precision comparator, positioned as shown below and reset to zero.
2. Bring the machine to its maximum load capacity
3. Check the variation on the instrument
4. Repeat the check at various angles

The maximum value recorded represents the initial clearance of the machine itself.



## **9 - Maintenance**

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Periodical checks must be made on lubrication, the tightness of the bolts, the state of the seals and machine clearance.

### **LUBRICATION**

The rolling tracks must be lubricated at intervals depending on operating conditions. We recommend greasing the rolling tracks after 50 hours of use, then every 100 hours. Before and after a long period of idleness the bearing must be greased again.

The grease is pumped while the bearing is turning and is considered complete when the grease overflows from the seal forming a light film which also serves as a seal. If this visual check cannot be made, our Technical Office will tell you how much grease to use. The grease should be brushed or sprayed on the gear teeth and must cover the sides of the teeth completely. When it is not possible to visually check the presence of grease, we recommend greasing every three or six months according to the use of the machine.

The table on page 9 shows the types of grease to use. For special applications requiring low temperature greases, please contact our Technical Office.

### **BOLTS**

After the first 100 hours of operations, the tightness of the bolts must be checked according to the values indicated in the table on page 7. Afterwards, we recommend yearly inspections.

Checks should be made more frequently when special working conditions require it. If loose or worn bolts are found during inspections, they must be replaced.

### **SEALS**

The seals mounted on LaLeonessa bearings are manufactured in a basic nitrile rubber elastomer which resists well to temperatures and atmospheric agents. During the bearing's life, we recommend regular visual checks on the state of the seals and if these have deteriorated or become fragile, they should be replaced without delay.

### **MACHINE CLEARANCE**

As described on page 9, the first measurement made serves as a reference for future measurements which represents the wear on the bearing's tracks. It should be measured once a year.

Before changing the bearing, the maximum admissible increase is in proportion to the diameter of the bearing, the type and dimensions of the rolling parts (ball bearings or rollers), and the type of application for which greater limits of wear can be accepted whilst operations are not compromised. When the clearance reaches four times the initial value, please contact our Technical Service without delay to assess the bearing's state of wear.

## 10 - Warranty

The bearing must never be submitted to a load exceeding its capacity as defined in the technical documents.

The bearing is an essential part of the machine and should be handled with special care and attention during all phases of assembly and maintenance. This LaLeonessa product will last longer and function better if all the instructions in this handbook are followed accurately. We recommend entrusting assembly and maintenance work only to trained staff.

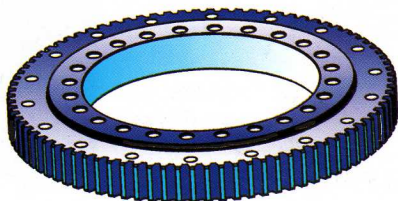
We decline all responsibility in the case of non-observance of the instructions given in this handbook, improper use of the product, incorrect use or tampering such as:

- Modifications to the product such as drillings, machining or welding.
- Use of flexible washers for fastening the bolts or washers that are not flat.
- Use of bolts that are not suitable for the fastening holes on the bearing.

- Disassembly of the cover and the rolling parts
- Damage caused by neglect or accidents.

Any parts rejected because they are considered faulty must be returned at your own expense. Should a manufacturing fault be found during the inspection, LaLeonessa will provide for the repair or replacement of the product without any refund for damages or direct or indirect costs of any nature or for any reason.

LaLeonessa reserves the right, without prior notice and at any time, to make any technical changes to its products deriving from future development.



**LA LEONESSA**



Visit us on Internet:  
**[www.laleonessa.it](http://www.laleonessa.it)**  
**[e-mail: sales@laleonessa.it](mailto:sales@laleonessa.it)**

*Design and  
production  
of ball and roller  
bearings*



25013 CARPENEDOLO (BS) - Viale S. Maria, 90  
Tel. 030/9965435 - Fax 030/9965629

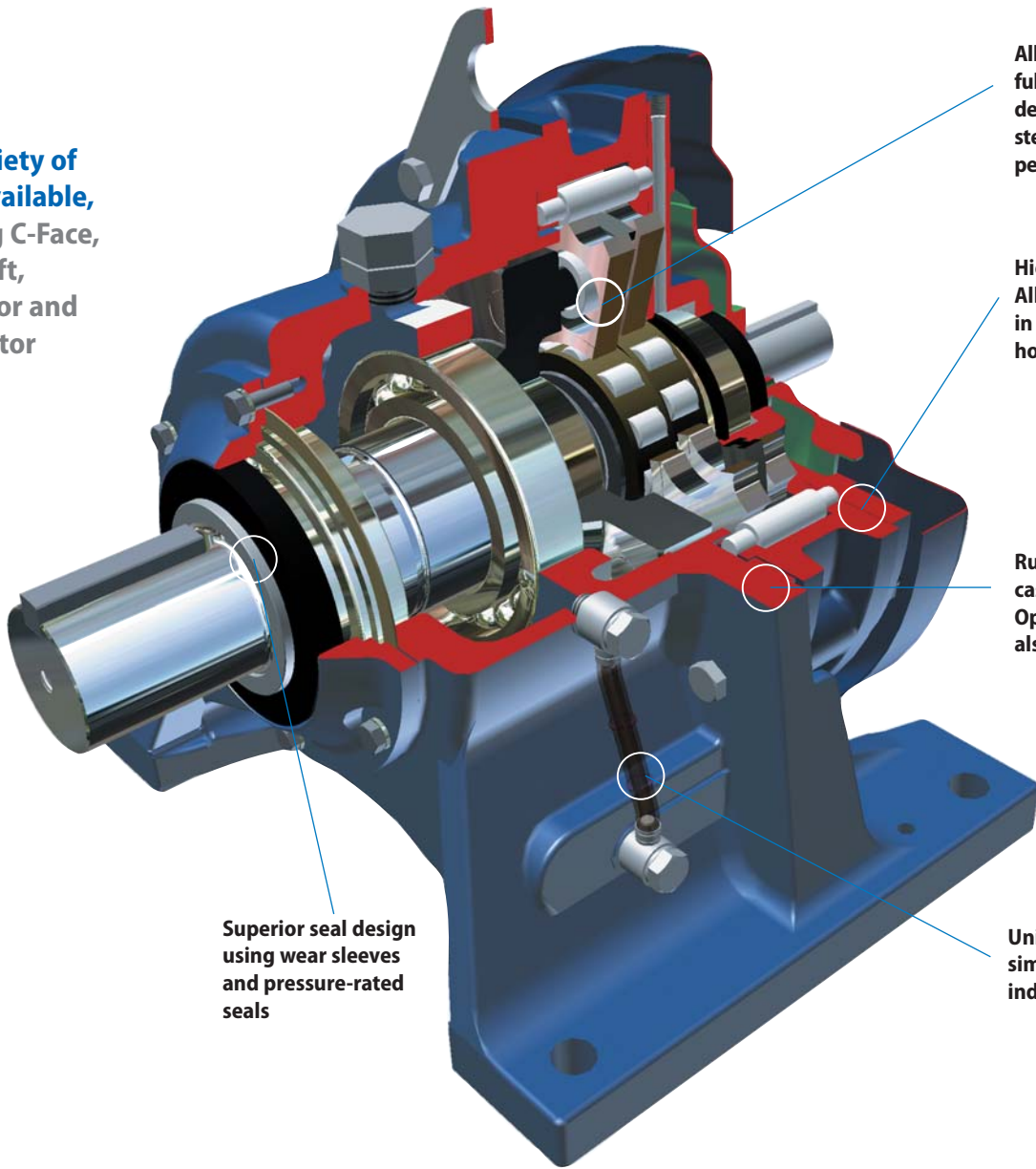
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# Cyclo® 6000

- ▶ **Wide variety of inputs available, including C-Face, Free-Shaft, Gearmotor and Brakemotor**



All rotating components are fully hardened, vacuum degassed bearing grade steel, for consistent, reliable performance

High power density. All reduction contained in compact ring gear housing

Rugged, shock-resistant cast iron housing. Optional ductile iron also available

Superior seal design using wear sleeves and pressure-rated seals

Unique oil sight gauge for simple, visible lubrication indication



## Unmatched Reliability, Exceptional Performance

- ▶ Cyclo® speed reducers and gearmotors are designed to withstand shock loads exceeding 500% of their ratings



## Product Description

Sumitomo Cyclo® speed reducers and gearmotors are the **premier in-line drives**. The revolutionary Cyclo® design provides **quiet, efficient and reliable performance** exceeding that of involute tooth gear designs. The key to Cyclo®'s matchless performance and reliability is that 67% of the reduction components are in contact at all times, compared to geared designs that use only limited tooth contact. Unlike geared designs, the Cyclo®'s reduction components operate in compression rather than shear, which results in **exceptionally rugged and shock resistant performance**. The Cyclo® technology coupled with innovative product options and accessories offer the most extensive range of application solutions available.

## Features & Benefits

- **Cycloidal speed reduction technology**
  - ~ Quiet, efficient and reliable operation with high torque density and compact size
- **Modular design**
  - ~ Interchangeable cast iron housings in foot, flanged or face mount configurations
- **Universal mounting arrangements**
  - ~ Available free-shaft, quill hollow shaft, C-face, shovel base, and top-mount inputs
- **Internal components manufactured from hardened, vacuum-degassed, bearing grade steel**
  - ~ Minimal vibration, low noise, low backlash and extended operational life
- **The best product warranty**
  - ~ The 24 month warranty backs up the superb Cyclo® product reputation

## Specifications

<b>Sizes:</b>	23 sizes (5lbs to 5000lbs)
<b>Torque Rating:</b>	55 to 603,000 lb in
<b>HP Rating:</b>	.10 to 235 HP
<b>Ratio Range:</b>	3:1 to 119:1 (single) 121:1 to 7569:1 (double) 8041:1 to 658,503:1 (triple)
<b>Mounting:</b>	Foot, Flange, Face Mount
<b>Motor Standards:</b>	NEMA, IEC, JIS, UL, CSA, CE

- ▶ **Sumitomo's Cyclo® 6000 is a highly reliable, torque dense cycloidal speed reducer and gearmotor**



- **Simple, Compact Design**
- **Rugged Forged Output Shaft**
- **Universal Mounting**
- **C-Face, Shovel Base & Top Mount Options**



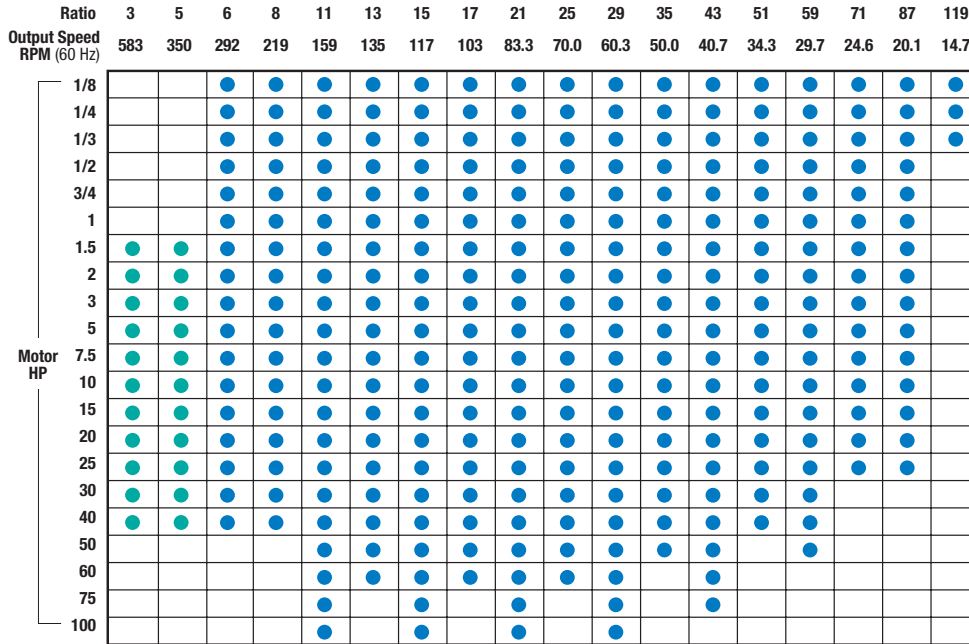
## ▶ Applications

- Conveyors
- Food Machinery
- Mixers
- Automotive Plants
- Recycling Machines
- Poultry Plants
- Sawmills and Wood Mills
- Wastewater Treatment
- Steel Mills
- Construction Equipment
- Paper Mills
- Processing Plants

# Product Range (Standard Motor and Reducer Combinations)

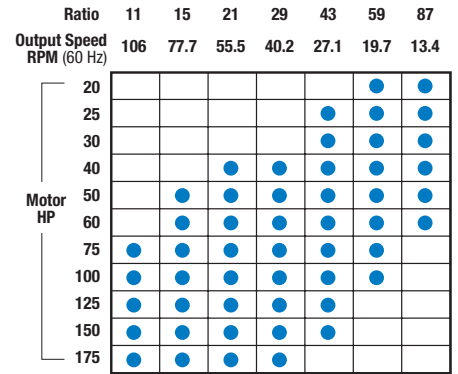
## Single Reduction Ratios 3 – 119

Combinations with 1750 RPM input speed



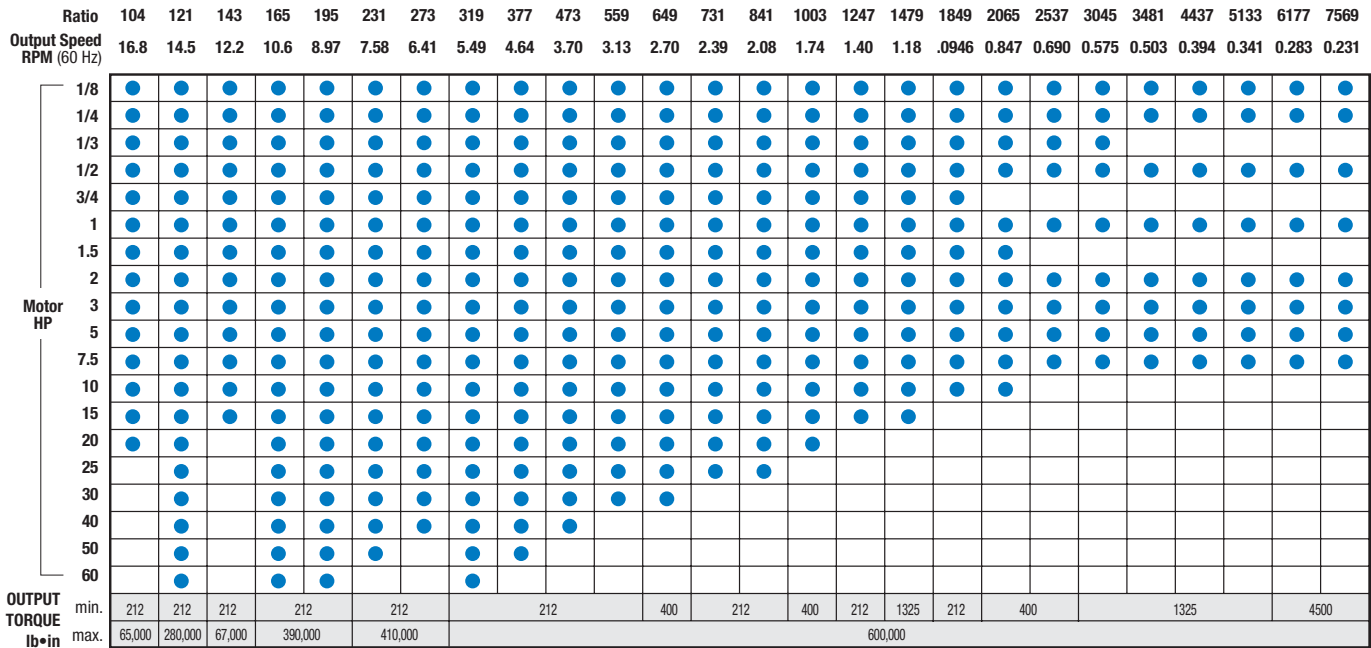
## Ratios 11 – 87

Combinations with 1165 RPM input speed



## Double Reduction Ratios 104 – 7569

Combinations with 1750 RPM input speed



**How do I select a Cyclo® speed reducer or gearmotor?**

Selection is based on the actual horsepower and/or torque requirements at the output shaft. The Cyclo® speed reducer has particularly high efficiencies over a wide range of reduction ratios, which frequently permits the use of reduced input power requirements (smaller HP motor) without sacrificing output shaft torque. The selection procedures in this catalog will guide you in choosing the most efficient reducer for your application.

**What information do I need to get started in the selection process?**

To select the proper reducer for your application, you will need to know:

- Application: type of driven machine
- Hours of operation per day
- Motor horsepower (HP) and speed (RPM)
- Mounting position

If there are any special environmental factors or operation requirements, they must also be noted. This information will be important in determining the Service Factor of your application.

**What are Service Factors and how are they used?**

In general, reducers and gearmotors are rated for the specific conditions and operating requirements of the application by the use of AGMA-defined Service Factors. There are three AGMA load classifications for reducers: uniform (U), moderate shock (M) and heavy shock (H) (page 2.3) The Service Factors are used in the product selection process to adjust for the specific conditions and operating requirements of your application.

**What do I do if my application has particularly severe operating conditions?**

The standard ratings for Cyclo® are based on 10-hour daily service under conditions of uniform loads (equivalent to AGMA service factor 1.0). By following the product selection process, you will determine and apply the Service Factors to compensate for the severe operating conditions.

**How can I be sure that the reducer can withstand periodic excessive overloads?**

Cyclo® Speed Reducers provide 500% momentary intermittent shock load capacity. For applications with shock loads greater than 500%, consult an SMA Application Engineer.

**What are the standard input speeds?**

In general terms, the speeds are 1750 and 1165 RPM. The selection tables in this catalog are based on 1750, 1165, 870, 580, and 50 RPM. When non-standard input speeds are used, the horsepower and torque ratings also vary.

**What thermal capacity limitations does the Cyclo® have?**

The Cyclo® speed reducer, by virtue of its smooth, almost frictionless operation (unlike traditional helical gears), has a thermal rating that far exceeds its mechanical capacity and all but eliminates the conventional limitations due to heat.

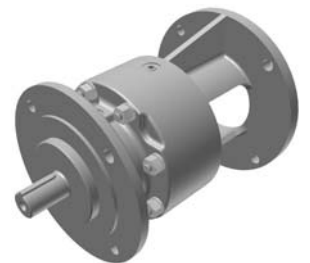
## Common Configurations



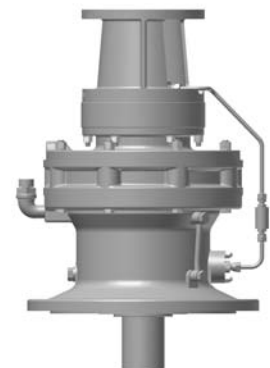
Single Reduction,  
Horizontal Flange Mount  
with Hollow Shaft Input



Single Reduction, Flange  
Mount with C-Face Adapter



Single Reduction, V-Flange Mount  
with C-Face Adapter



Double Reduction with  
C-Face Adapter

# Standard Specifications

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<b>Reducer</b>	<b>Reduction:</b>	Internal planetary gear mechanism with trochoidal curved tooth profile.
	<b>Lubrication:</b>	Grease or oil lubricated models available.
	<b>Seals:</b>	Nitrile material, dual lipped, double output seals available.
	<b>Material:</b>	Rugged cast iron or ductile housings.
	<b>Paint Color:</b>	Blue, Muenters color number 6.5PB 3.6/8.2

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<b>Ambient Conditions</b>	<b>Installation Location:</b>	Indoors (Minimal dust and humidity)
	<b>Ambient Temperature:</b>	14°~104° F (-10° ~ 40° C)
	<b>Ambient Humidity:</b>	Under 85%
	<b>Elevation:</b>	Under 3,281 ft. (1000 meters)
	<b>Atmosphere:</b>	Well ventilated location, free of corrosive gases, explosive gases, vapors and dust.

## Shaft Rotation

On single reduction Cyclo® speed reducers, ratios 3 through 119, the slow speed shaft rotates in a reverse direction to that of the high speed shaft.

On double reduction units, ratios 104 through 7569, both the high speed and the slow speed shaft rotate in the same direction.

## Input Speeds

In general terms, the standard input speeds of single reduction units are 1750, 1165, 875, 580, and 50 RPM. When non-standard input speeds are used, the horsepower and torque ratings will also vary.

## Thermal Capacity

The Cyclo® speed reducer's smooth, almost frictionless operation all but eliminates the conventional limitations due to heat. In all sizes, Cyclo® speed reducers have thermal ratings that exceed their mechanical capacity.



# How to Select a Speed Reducer

## Step 1: Collect data about your application

Before starting you need to know the:

- **Application (e.g. Conveyor, Mixer, etc.)**
- **Hours of Operation per day**
- **Motor Horsepower (HP) and Input Speed (RPM)**
- **Desired Output Speed**
- **Mounting Position and Style**
- **Overhung or Thrust Loads**

## Step 2: Select a Frame Size

**2A:** Find the **Load Classification** of your application in the *AGMA Load Classification Table* on page 2.4.

**2B:** Find the recommended **Service Factor** using the *Recommended Reducer Service Factor Table* on the right.

**2C:** Determine the **Selection Horsepower** by multiplying the Motor Horsepower by the Service Factor.

**2D:** Select a **Frame Size** from the Reducer Selection Tables on pages 3.1–3.31 by matching both the Selection Horsepower and Desired Output Speed (RPMs) to a Frame Size model number.

## Step 3: Select a Housing Style and Mounting Position

Select a Housing Style from chart on page 2.5.

## Step 4: Verify Dimensions

Use the Dimensions information on pages 4.1–4.79 to verify that the selected Frame Size is appropriate.

## Step 5: Choose Options

The following options may apply:

- **C-Face Adapter**
- **Hollow Quill Adapter**
- **Top Motor Mount**
- **Shovel Base**

*Please see the Cyclo® price list, or visit our website at [www.sumitomodrive.com](http://www.sumitomodrive.com) for other available modifications.*

## Step 6: Configure a Model Number

Go to page 2.6 to configure a model number.

**Note:** You will use the information you gather from the procedure on this page to Configure a Model Number.

The Service Factor table below presents both AGMA standard service factors and Cyclo® service factors. Cyclo® service factors are smaller than AGMA, based on the Cyclo® strength and performance experience.

If your application requires AGMA specified service factors, then the AGMA value should be used. Otherwise, the Cyclo® service factor should be used.

Service Factors		Load Classifications					
		Uniform		Moderate Shock		Heavy Shock	
Prime Mover	Service Duration	AGMA	Cyclo®	AGMA	Cyclo®	AGMA	Cyclo®
Electric Motor	1/2 hr. per day (Occasional)	0.50	<b>0.50</b>	0.80	<b>0.80</b>	1.25	<b>1.20</b>
	3 hrs. per day (Intermittent)	0.80	<b>0.80</b>	1.00	<b>1.00</b>	1.50	<b>1.35</b>
	Up to 10 hrs. per day	1.00	<b>1.00</b>	1.25	<b>1.20</b>	1.75	<b>1.50</b>
	24 hrs. per day	1.25	<b>1.20</b>	1.50	<b>1.35</b>	2.00	<b>1.60</b>
Multi Cylinder Internal Combustion Engine	1/2 hr. per day (Occasional)	0.80	<b>0.80</b>	1.00	<b>1.00</b>	1.50	<b>1.35</b>
	3 hrs. per day (Intermittent)	1.00	<b>1.00</b>	1.25	<b>1.20</b>	1.75	<b>1.50</b>
	Up to 10 hrs. per day	1.25	<b>1.20</b>	1.50	<b>1.35</b>	2.00	<b>1.60</b>
	24 hrs. per day	1.50	<b>1.35</b>	1.75	<b>1.50</b>	2.25	<b>1.70</b>
Single Cylinder Internal Combustion Engine	1/2 hr. per day (Occasional)	1.00	<b>1.00</b>	1.25	<b>1.20</b>	1.75	<b>1.50</b>
	3 hrs. per day (Intermittent)	1.25	<b>1.20</b>	1.50	<b>1.35</b>	2.00	<b>1.60</b>
	Up to 10 hrs. per day	1.50	<b>1.35</b>	1.75	<b>1.50</b>	2.25	<b>1.70</b>
	24 hrs. per day	1.75	<b>1.50</b>	2.00	<b>1.60</b>	2.50	<b>1.80</b>

How to Select

**Determine Selection Horsepower (HP)**

$$\text{Motor HP} \times \text{Service Factor} = \text{Selection HP}$$

Example: 10 Motor HP X 1.25 Service Factor = 12.5 Selection HP

**Select a Frame Size**


**1 Match your OUTPUT RPM (or RATIO)...**

Output RPM Ratio	583 3	350 5	292 6	219 8	199 11	135 13	117 15	103 17	83.3 21	FRAME SIZE
Input HP	20.2	20.2	20.3	20.3	20.3	20.3	16.1	14.8		614S
Output Torque in•lbs	2081	3469	5560	7650	9030	10300	9370	10500		614H
Overhung Load (lbs)	1554	1843	2170	2430	2470	2580	2710	2890		
Input HP	27.2	27.2	26.4	26.4	26.4	25.1	17.6	17.3		616S
Output Torque in•lbs	2798	4654	7230	9900	11800	12900	10200	12400		616H
Overhung Load (lbs)	1702	2019	2450	2890	2890	2890	2450	3350		
Input HP	32.3	32.3	37.0	37.0	37.0	32.3	21.6	21.6		616S
Output Torque in•lbs	3322	5530	8000	8000	8000	6000	4000	4000		616H
Overhung Load (lbs)	1686	1998	2400	2400	2400	1800	1800	1800		
Input HP	37.0	37.0	40.4	40.4	40.4	32.3	26.2	26.2		617S
Output Torque in•lbs	3796	6335	8200	8200	8200	6000	4000	4000		617H
Overhung Load (lbs)	1906	2261	2400	2400	2400	1800	1800	23200		
Input HP	40.4	40.4	40.4	40.4	40.4	47.2	47.2	43.5	41.1	40.3
Output Torque in•lbs	-	-	-	-	-	17800	21000	22300	23800	28900
Overhung Load (lbs)	-	-	-	-	-	4030	4210	4430	4670	5030
Input HP	-	-	-	-	-	52.3	52.3	52.3	52.3	52.3
Output Torque in•lbs	-	-	-	-	-	19600	23300	26800	30500	37600

**2 ...to your SELECTION HP..**

**3 ...to find your FRAME SIZE**

If Overhung or Axial Load are present, any Overhung or Axial Load must be checked against the capacity of the selection.



For special circumstances in selecting a Frame Size such as:

- Overhung Load
- Axial Loads
- Shock Loading

Consult Technical Information, pages 5.6–5.13.

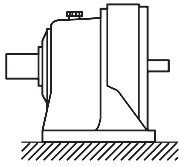
# AGMA Load Classifications

TYPE OF APPLICATION	TYPE OF LOAD	TYPE OF APPLICATION	TYPE OF LOAD	TYPE OF APPLICATION	TYPE OF LOAD
Agitators		Large (industrial)	M	Paper Mills	
Pure liquids	U	Light (small diameter)	U	Agitators (mixers)	M
Liquids and solids	M	Feeders		Barker, hydraulic	M
Variable-density liquids	M	Apron	M	Barker, mechanical	M
Blowers		Belt	M	Barking drum	H
Centrifugal	U	Disc	U	Beater and pulper	M
Lobe	M	Reciprocating	H	Bleacher	U
Vane	U	Screw	M	Calenders	M
Brewing and Distilling		Food Industry		Calenders, super	H
Bottling machinery	U	Beet slicer	M	Converting machine (except cutters, platers)	M
Brew kettles, cont. duty	U	Cereal cooker	U	Conveyors	U
Cookers, cont. duty	U	Dough mixer	M	Couch	M
Mash tubs, cont. duty	U	Meat grinders	M	Cutters, platers	H
Scale hopper, frequent starts	M	Generators (Not Welding)	U	Cylinders	M
Can Filling Machines	U	Hammer Mills	H	Dryers	M
Cane Knives	M	Hoists		Felt stretcher	M
Car Dumpers	H	Heavy duty	H	Felt whipper	H
Car Pullers	M	Medium duty	M	Jordans	H
Clarifiers	U	Skip	M	Log haul	H
Classifiers	M	Laundry Washers — Reversing	M	Presses	U
Clay Working Machinery		Laundry Tumblers — Reversing	M	Pulp machine reel	M
Brick press	H	Line Shaft		Stock chest	M
Briquette machine	H	Drive processing equipment	M	Suction roll	U
Clay working machinery	M	Light	U	Washers and thickeners	M
Pug mill	M	Other line shafts	U	Winders	U
Compressors		Lumber Industry		Printing Presses	S
Centrifugal	U	Barkers — hydraulic and mechanical	S	Pullers, Barge Haul	H
Lobe	M	Burner conveyor	M	Pumps	
Reciprocating, multi-cylinder	M	Chain Saw and Drag Saw		Centrifugal	U
Reciprocating, single-cylinder	H	Chain transfer	H	Proportioning	M
Conveyors — Uniformly Loaded or Fed		Craneway transfer	H	Reciprocating	
Apron	U	De-barking drum	H	Single acting, 3 or more cylinders	M
Assembly	U	Edger feed	M	Double acting, 2 or more cylinders	M
Belt	U	Gang feed	H	Rotary-gear type	U
Bucket	U	Geen chain	M	Rubber and Plastics Industries	
Chain	U	Live rolls	H	Crackers	H
Flight	U	Log haul-lockline	H	Laboratory equipment	M
Oven	U	Log turning device	H	Mixing mills	H
Screw	U	Main log conveyor	M	Refiners	M
Conveyors — Heavy Duty, Not Uniformly Fed		Off bearing rolls	M	Rubber calenders	M
Apron	M	Planer feed chains	M	Rubber mill (2 on line)	M
Assembly	M	Planer floor chains	M	Rubber mill (3 on line)	U
Belt	M	Planer tilting hoist	M	Sheeter	M
Bucket	M	Re-saw merry-go-round conveyor	M	Tire building machines	S
Chain	M	Roll cases	H	Tire and tube press openers	S
Flight	M	Slab conveyor	H	Tubers and strainers	M
Live roll oven	M	Small waste-conveyor-belt	U	Warming mills	M
Reciprocating	H	Small waste-conveyor-chain	M	Sand Muller	M
Screw	M	Sorting table	M	Screens	
Shaker	H	Tipple hoist conveyor	M	Air washing	U
Cranes (Except for Dry Dock Cranes)		Tipple hoist drive	M	Rotary, stone or gravel	M
Main hoists	U	Transfer conveyors	M	Traveling water intake	U
Bridge travel	S	Transfer rolls	M	Sewage Disposal Equipment	
Trolley travel	S	Tray drive	M	Bar screens	U
Crusher		Trimmer feed	M	Chemical fenders	U
Ore	H	Waste conveyor	M	Collectors, circuline or straightline	U
Stone	H	Machine Tools		Dewatering screens	M
Sugar	M	Bending roll	M	Grit collectors	U
Dredges		Notching press, belt driven	S	Scum breakers	M
Cable reels	M	Plate planer	H	Slow or rapid mixers	M
Conveyors	M	Punch press, gear driven	H	Sludge collectors	U
Cutter head drives	H	Tapping machine	H	Thickeners	M
Jig drives	H	Other machine tools		Vacuum filters	M
Maneuvering winches	M	Main drives	M	Slab Pushers	M
Pumps	M	Auxiliary drives	U	Steering Gear	S
Screen drive	H	Metal Mills		Stokers	
Stackers	M	Draw bench carriage and main drive	M	U	
Utility winches	M	Forming machines	H	Sugar Industry	
Dry Dock Cranes	S	Pinch, dryer and scrubber rolls, reversing	S	Cane knives	M
Elevators		Slitters	M	Crushers	M
Bucket, uniform load	U	Table conveyors, nonreversing		Mills	H
Bucket, heavy load	M	Group drives	M	Textile Industry	
Bucket, cont.	U	Individual drives	H	Batchers	M
Centrifugal discharge	U	Table conveyors, reversing	S	Calenders	M
Escalators	U	Wire drawing and flattening machine	M	Cards	M
Freight	M	Wire winding machine	M	Dry cans	M
Gravity discharge	U	Mills, Rotary Type		Dryers	M
Man lifts	S	Ball	M	Dyeing machinery	M
Passenger	S	Cement kilns	M	Knitting machines	S
Extruders (Plastics)		Dryers and coolers	M	Looms	M
Blow molders	M	Kilns	M	Mangles	M
Coating	U	Pebble	M	Nappers	M
Film	U	Rod, plain and wedge bar	M	Pads	M
Pipe	U	Tumbling barrels	H	Range drives	S
Pre-plasticizers	M	Mixers		Slashers	M
Rods	U	Concrete mixers, cont.	M	Soapers	M
Sheet	U	Concrete mixers, intermittent	M	Spinners	M
Tubing	U	Constant density	U	Tenter frames	M
Fans		Variable density	M	Washers	M
Centrifugal	U	Oil Industry		Winders	M
Cooling towers	S	Chillers	M	Windlass	S
Forced draft	S	Oil well pumps	S		
Induced draft	M	Paraffin filter press	M		
Large (mine, etc.)	M	Rotary kilns	M		

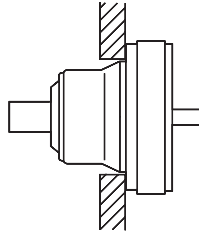
U = Uniform Load      H = Heavy Shock  
M = Moderate Shock    S = Contact Sumitomo

# Housing Styles & Mounting Positions

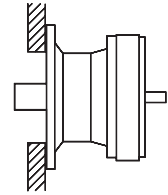
**CHH  
(CNH)**



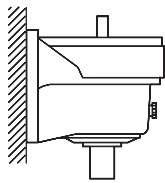
**CHF  
(CNF)**



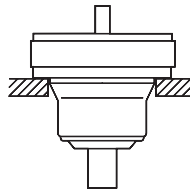
**CHV  
(CNV)**



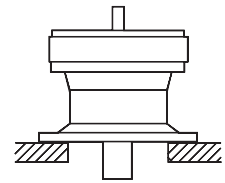
**CVH  
(CNH)**



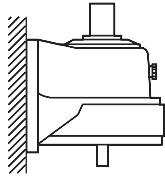
**CVF  
(CNF)**



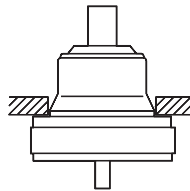
**CVV  
(CNV)**



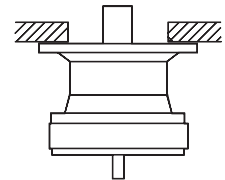
**CWH  
(CNH)**



**CWF  
(CNF)**

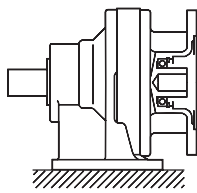


**CWV  
(CNV)**

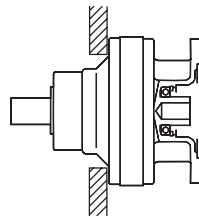


**Input Side Hollow Shaft**

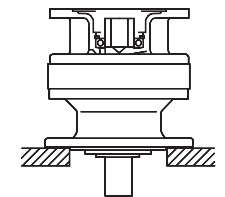
**CHHX  
(CNHX)**



**CHFX  
(CNFX)**

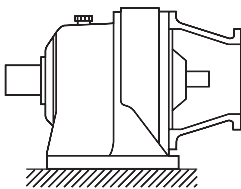


**CVVX  
(CNVX)**

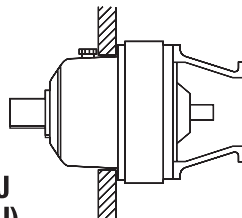


**With Adaptor**

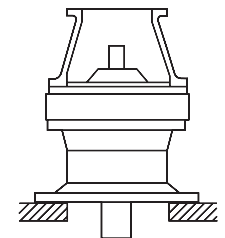
**CHHJ  
(CNHJ)**



**CHFJ  
(CNFJ)**



**CVVJ  
(CNVJ)**



Mounting  
Positions

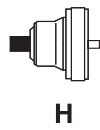


# Configure a Model Number

Nomenclature

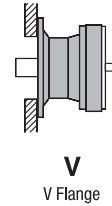
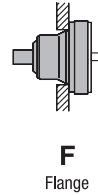
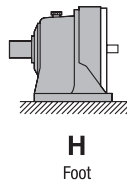
### Output Shaft Orientation

Type	Prefix
Horizontal	H
Vertical	V
Vertical Up (Solid Shaft)	W
Universal Direction	N



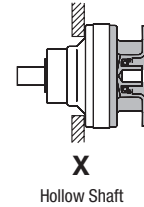
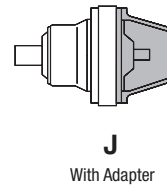
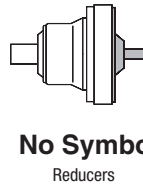
### Housing Style

Type	Prefix
Foot	H
Flange	F
V-Flange	V



### Input Connection

Input Connection	Prefix
None	-
C-Face Adaptor	J
Hollow Input Shaft	X



### Modification (Special)

	Prefix
Special	S
Standard	-

### Frame Size (from Selection Tables)

### Shaft Specifications

Input Shaft	Suffix
Inch	Y
DIN	G
Metric DIN	-

**C H H - 6 1 6 5 Y - SB - 29**

Frame size

Modification (Special feature)

Input connection

Mounting style

Output shaft orientation

**C = Ratios 6:1 and greater** (Cyclo® Speed Reducer product code)

**P = Ratios 3:1 and 5:1** (Cyclo® 6000 planetary product code)

# Nomenclature

## Example

### CHH – 6165Y – 29

**C** – Cyclo® 6000                      **6165** – Frame Size  
**H** – Horizontal O/P                    **Y** – Inch Shaft  
**H** – Foot Mount                         **29** – Ratio

Nomenclature

**Reducer Specification**

Type		Suffix
Torque Limiter		<b>TL</b>
High Capacity Bearing		<b>R1</b>
High Capacity Bearing Ductile Casing		<b>R2</b>
Baseplate		<b>BP</b>
Shovel Base		<b>SB</b>
Top Mount	Center	-
	Right	<b>PR</b>
	Left	<b>PL</b>
HH Type	Ceiling	<b>H1</b>
	Left Wall	<b>H2</b>
	Right Wall	<b>H3</b>
Low Backlash		<b>LB</b>

**Nominal Total Ratio**

**Ratio**

Ratio is found here in Selection Tables

Output RPM	563	350	292	219	159	135	117	103	83.3	
Ratio	3	5	6	8	11	13	15	17	21	FRAME SIZE
<b>Input HP</b>	20.2	20.2	20.3	20.3	20.3	20.3	20.3	16.1	14.6	<b>6145</b>
Output Torque in•lbs	2081	3469	4170	5560	7650	9030	10300	9370	10500	<b>614H</b>
Overhung Load (lbs)	1554	1843	1960	2170	2430	2470	2580	2710	2890	
<b>Input HP</b>	27.2	27.2	27.2	26.4	26.4	26.4	25.1	17.6	17.3	<b>6160</b>
Output Torque in•lbs	2798	4654	5580	7230	9900	11800	12900	10200	12400	
Overhung Load (lbs)	1702	2019	2150	2400	2690	2800	3000	3150	3350	
<b>Input HP</b>	32.3	32.3	32.3	32.3	32.3	30.3	30.3	25.2	21.6	<b>6165</b>
Output Torque in•lbs	3322	5530	6610	8850	12200	13500	15500	14700	15500	<b>616H</b>
Overhung Load (lbs)	1686	1998	2130	2360	2670	2780	2950	3060	3310	
<b>Input HP</b>	37.0	37.0	37.0	37.0	37.0	36.6	34.2	26.4	26.2	<b>6170</b>
Output Torque in•lbs	3796	6335	7600	10100	13900	16300	17500	15300	16700	
Overhung Load (lbs)	1906	2261	2400	2650	3040	3150	3260	3460	3750	
<b>Input HP</b>	40.4	40.4	40.4	40.4	40.4	40.4	40.4	32.3	32.3	<b>6175</b>
Output Torque in•lbs	4141	6914	8290	11000	15200	18000	20700	18700	23200	
Overhung Load (lbs)	1906	2261	2400	2620	3020	3130	3240	3440	3680	
<b>Input HP</b>	-	-	-	-	47.2	47.2	43.5	41.1	40.3	<b>6180</b>
Output Torque in•lbs	-	-	-	-	17800	21000	22300	23800	28900	
Overhung Load (lbs)	-	-	-	-	4030	4210	4430	4670	5030	
<b>Input HP</b>	-	-	-	-	52.3	52.3	52.3	52.3	52.3	<b>6185</b>
Output Torque in•lbs	-	-	-	-	19600	23300	26800	30500	37600	

# Reduction Ratios

## Standard Reduction Ratios

Single Reduction								
3*	5*	6	8	11	13	15	17	21
25	29	35	43	51	59	71	87	119
Double Reduction								
104 (13x8)	121 (11x11)	143 (13x11)	165 (15x11)	195 (15x13)	231 (21x11)	273 (21x13)	319 (29x11)	377 (29x13)
473 (43x11)	559 (43x13)	649 (59x11)	731 (43x17)	841 (29x29)	1003 (59x17)	1247 (43x29)	1479 (87x17)	1849 (43x43)
2065 (59x35)	2537 (59x43)	3045 (87x35)	3481 (59x59)	4437 (87x51)	5133 (87x59)	6177 (87x71)	7569 (87x87)	

\* Note: Ratios 3 and 5 are planetary.

## Optional Reduction Ratios

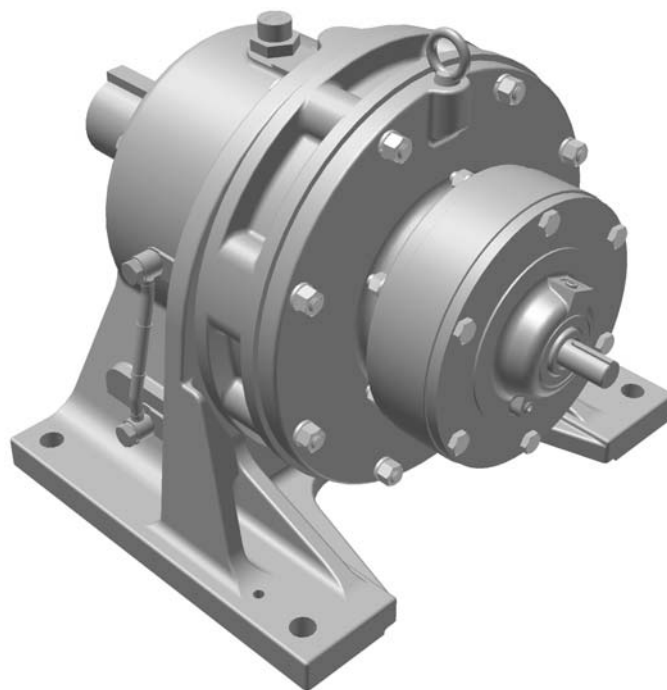
The following reduction ratios may also be available for certain specifications; please consult factory. The output shaft RPM listed in the table below represents coupling the reducer with a four-pole motor, 60 Hz, input speed 1750 RPM.

<b>Reduction Ratio</b>	<b>88</b> (11x8)	<b>90</b> (15x6)	<b>102</b> (17x6)	<b>120</b> (15x8)	<b>126</b> (21x6)	<b>136</b> (17x8)	<b>150</b> (25x6)	<b>168</b> (21x8)	<b>169</b> (13x13)	<b>174</b> (29x6)	<b>187</b> (17x11)	<b>200</b> (25x8)	<b>210</b> (35x6)	<b>221</b> (17x13)	<b>225</b> (15x15)
<b>Output Speed RPM</b>	19.9	19.4	17.2	14.6	13.9	13.9	11.7	10.4	10.4	10.1	9.36	8.75	8.33	7.92	7.78
<b>Reduction Ratio</b>	<b>232</b> (29x8)	<b>255</b> (17x15)	<b>258</b> (43x6)	<b>275</b> (25x11)	<b>280</b> (35x8)	<b>289</b> (17x17)	<b>306</b> (51x6)	<b>315</b> (21x15)	<b>325</b> (25x13)	<b>344</b> (43x8)	<b>354</b> (59x6)	<b>357</b> (21x17)	<b>375</b> (25x15)	<b>385</b> (35x11)	<b>408</b> (51x8)
<b>Output Speed RPM</b>	7.54	6.86	6.87	6.36	6.25	6.06	5.72	5.56	5.38	5.09	4.94	4.90	4.67	4.55	4.29
<b>Reduction Ratio</b>	<b>425</b> (25x17)	<b>426</b> (71x6)	<b>435</b> (29x15)	<b>441</b> (21x21)	<b>455</b> (35x13)	<b>472</b> (59x8)	<b>493</b> (29x17)	<b>522</b> (87x6)	<b>525</b> (35x15)	<b>561</b> (51x11)	<b>568</b> (71x8)	<b>595</b> (35x17)	<b>609</b> (29x21)	<b>625</b> (25x25)	<b>645</b> (43x15)
<b>Output Speed RPM</b>	4.12	4.11	4.02	3.97	3.85	3.71	3.55	3.35	3.33	3.12	3.08	2.94	2.87	2.80	2.71
<b>Reduction Ratio</b>	<b>663</b> (51x13)	<b>696</b> (87x8)	<b>725</b> (29x25)	<b>735</b> (35x21)	<b>765</b> (51x15)	<b>767</b> (59x13)	<b>781</b> (71x11)	<b>867</b> (51x17)	<b>875</b> (35x25)	<b>885</b> (59x15)	<b>903</b> (43x21)	<b>923</b> (71x13)	<b>957</b> (87x11)	<b>1015</b> (35x29)	<b>1065</b> (71x15)
<b>Output Speed RPM</b>	2.64	2.51	2.41	2.38	2.29	2.28	2.24	2.02	2.00	1.98	1.94	1.90	1.83	1.72	1.64
<b>Reduction Ratio</b>	<b>1071</b> (51x21)	<b>1075</b> (43x25)	<b>1131</b> (87x13)	<b>1207</b> (71x17)	<b>1225</b> (35x35)	<b>1239</b> (59x21)	<b>1275</b> (51x25)	<b>1305</b> (87x15)	<b>1475</b> (59x25)	<b>1491</b> (71x21)	<b>1505</b> (43x35)	<b>1711</b> (59x29)	<b>1775</b> (71x25)	<b>1785</b> (51x35)	<b>1827</b> (87x21)
<b>Output Speed RPM</b>	1.63	1.63	1.55	1.45	1.43	1.41	1.37	1.34	1.19	1.17	1.16	1.02	0.99	0.98	0.96
<b>Reduction Ratio</b>	<b>2059</b> (71x29)	<b>2175</b> (87x25)	<b>2193</b> (51x43)	<b>2485</b> (71x35)	<b>2523</b> (87x29)	<b>2601</b> (51x51)	<b>3009</b> (59x51)	<b>3053</b> (71x43)	<b>3621</b> (71x51)	<b>3741</b> (87x43)	<b>4189</b> (71x59)	<b>5041</b> (71x71)			
<b>Output Speed RPM</b>	0.85	0.80	0.80	0.70	0.69	0.67	0.58	0.57	0.48	0.47	0.42	0.35			

# Selection Tables

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## Double Reduction



Speed  
Reducers

Selection  
Tables

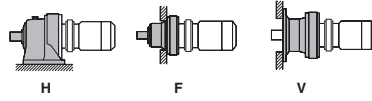
**Single Reduction** see page **3.2**



**NOTE:** Motor HP in **GRAY** is to overcome breakaway torque requirements in cold temperatures or high inertia applications. A torque limiting device is recommended to protect the unit or driven machine.

# Frame Size Selection Tables 1750 RPM

## Double Reduction, Ratios 104-731 H, F, V Housing Styles



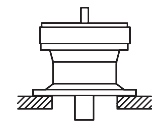
Dimensions:	Pages
Foot Mount (H)	4.21-4.33
F-Flange (F)	4.43-4.51
V-Flange (V)	4.69-4.83

Output RPM Ratio	16.8	14.5	12.2	10.6	8.97	7.58	6.41	5.49	4.64	3.70	3.13	2.70	2.39	FRAME SIZE
	104	121	143	165	195	231	273	319	377	473	559	649	731	
<b>Input HP</b>	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	-	0.13	<b>6060DA</b>
Output Torque (in•lbs)	213	213	213	213	213	213	213	213	213	213	213	-	213	
Overhung Load (lbs)	265	265	265	265	265	265	265	265	265	265	265	-	265	
<b>Input HP</b>	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	-	0.13	<b>6065DA</b>
Output Torque (in•lbs)	266	266	266	266	266	266	266	266	266	266	266	-	266	
Overhung Load (lbs)	265	256	265	265	265	265	265	265	265	265	265	-	265	
<b>Input HP</b>	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	<b>6070DA</b>
Output Torque (in•lbs)	398	398	398	398	398	398	398	398	398	398	398	398	398	
Overhung Load (lbs)	397	397	397	397	397	397	397	397	397	397	397	397	397	
<b>Input HP</b>	0.16	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	<b>6075DA</b>
Output Torque (in•lbs)	531	450	531	531	531	531	531	531	531	531	531	508	531	
Overhung Load (lbs)	397	397	397	397	397	397	397	397	397	373	373	355	373	
<b>Input HP</b>	0.40	0.34	0.29	0.25	0.21	0.18	0.15	0.13	0.13	0.13	0.13	0.13	0.13	<b>6090DA</b>
Output Torque (in•lbs)	1330	1330	1330	1330	1330	1330	1330	1330	1330	1330	1330	1290	1330	
Overhung Load (lbs)	750	750	750	750	750	750	750	741	741	745	745	741	745	
<b>Input HP</b>	0.48	0.36	0.35	0.33	0.28	0.24	0.20	0.17	0.15	0.13	0.13	-	0.13	<b>6095DA</b>
Output Torque (in•lbs)	1600	1420	1620	1770	1770	1770	1770	1770	1770	1770	1770	-	1770	
Overhung Load (lbs)	750	750	750	750	750	750	750	719	719	723	723	-	723	
<b>Input HP</b>	0.58	0.57	0.48	0.41	0.35	0.30	0.25	0.22	0.18	0.15	0.13	0.13	0.13	<b>6100DA</b>
Output Torque (in•lbs)	1940	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	
Overhung Load (lbs)	1210	1210	1210	1210	1210	1210	1210	1210	1210	1210	1210	1210	1210	
<b>Input HP</b>	0.58	0.58	0.57	0.50	0.42	0.35	0.30	0.26	0.22	0.17	0.15	0.13	0.13	<b>6105DA</b>
Output Torque (in•lbs)	1940	2260	2660	2660	2660	2660	2660	2660	2660	2660	2660	2620	2660	
Overhung Load (lbs)	1210	1210	1210	1210	1210	1210	1210	1210	1210	1210	1210	1140	1210	
<b>Input HP</b>	1.38	1.19	1.00	0.87	0.74	0.62	0.52	0.45	0.38	0.30	0.26	0.22	0.20	<b>6120DB</b>
Output Torque (in•lbs)	4640	4640	4640	4640	4640	4620	4620	4600	4600	4640	4640	4640	4640	
Overhung Load (lbs)	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	
<b>Input HP</b>	1.65	1.41	1.20	1.04	0.88	0.75	0.63	0.54	0.456	0.364	0.307	0.266	0.235	<b>6125DB</b>
Output Torque (in•lbs)	5570	5500	5570	5570	5570	5570	5570	5570	5570	5570	5570	5570	5570	
Overhung Load (lbs)	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	
<b>Input HP</b>	2.05	1.76	1.49	1.29	1.09	0.92	0.78	0.67	0.57	0.45	0.38	0.38	0.29	<b>6130DC</b>
Output Torque (in•lbs)	6900	6900	6900	6900	6900	6900	6900	6900	6900	6900	6900	8070	6900	
Overhung Load (lbs)	3310	3310	3310	3310	3310	3310	3310	3310	3310	3310	3310	3310	3310	
<b>Input HP</b>	2.47	2.12	1.80	1.56	1.32	1.11	0.94	0.81	0.68	0.54	0.46	0.44	0.35	<b>6135DC</b>
Output Torque (in•lbs)	8320	8320	8320	8320	8320	8320	8320	8320	8320	8320	8320	9290	8320	
Overhung Load (lbs)	3310	3310	3310	3310	3310	3310	3310	3310	3310	3310	3310	3310	3310	
<b>Input HP</b>	2.04	2.04	2.04	2.03	1.72	1.45	1.23	1.05	0.89	0.71	0.60	0.52	0.46	<b>6140DB</b>
Output Torque (in•lbs)	6880	7980	9480	10900	10900	10900	10900	10900	10900	10900	10900	10900	10900	
Overhung Load (lbs)	3590	3590	3590	3590	3590	3590	3590	3590	3590	3590	3590	3590	3590	
<b>Input HP</b>	2.04	2.04	2.04	2.15	1.91	1.58	1.34	1.17	0.99	0.79	0.67	0.58	0.51	<b>6145DB</b>
Output Torque (in•lbs)	6880	7980	9480	11500	12000	11800	11800	12200	12200	12200	12200	12200	12200	
Overhung Load (lbs)	3570	3590	3590	3590	3590	3590	3590	3550	3550	3530	3530	3590	3530	
<b>Input HP</b>	4.62	3.96	3.36	2.91	2.46	2.08	1.76	1.50	1.27	1.00	0.85	0.74	0.65	<b>6160DC</b>
Output Torque (in•lbs)	15500	15500	15500	15500	15500	15500	15500	15500	15500	15400	15400	15500	15400	
Overhung Load (lbs)	4960	4960	4960	4960	4960	4960	4960	4960	4960	4960	4960	4960	4960	
<b>Input HP</b>	5.52	4.74	4.01	3.48	2.94	2.48	2.11	1.80	1.52	1.21	1.03	0.88	0.79	<b>6165DC</b>
Output Torque (in•lbs)	18600	18600	18600	18600	18600	18600	18600	18600	18600	18600	18600	18600	18600	
Overhung Load (lbs)	4960	4960	4960	4960	4960	4960	4960	4960	4960	4960	4960	4960	4960	
<b>Input HP</b>	6.64	5.72	4.83	4.19	3.54	2.99	2.54	2.16	1.84	1.46	1.24	1.07	0.95	<b>6170DC</b>
Output Torque (in•lbs)	22400	22400	22400	22400	22400	22400	22400	22400	22400	22400	22400	22400	22400	
Overhung Load (lbs)	6440	6640	6640	6640	6640	6640	6640	6640	6640	6640	6640	6640	6640	
<b>Input HP</b>	8.28	7.11	6.03	5.22	4.42	3.73	3.15	2.70	2.28	1.83	1.54	1.33	1.18	<b>6175DC</b>
Output Torque (in•lbs)	27900	27900	27900	27900	27900	27900	27900	27900	27900	27900	27900	27900	27900	
Overhung Load (lbs)	6350	6640	6640	6640	6640	6640	6640	6640	6640	6640	6640	6640	6640	

Speed Reducers Selection Tables



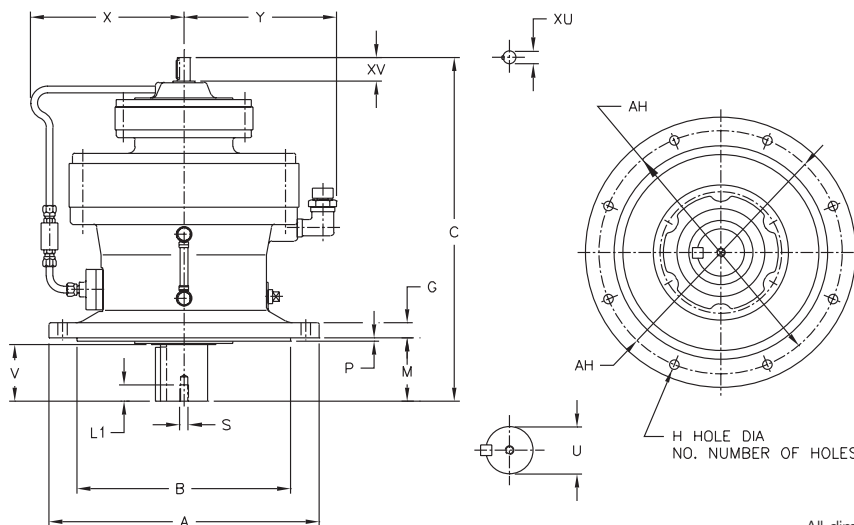




# Dimensions Vertical V-Flange Mount

## Double Reduction

### CVV-6130/5DCY ▶ 6275DAY



**\*Shaft Tolerances**

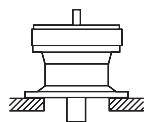
Shaft Nominal Diameter (inches)	Tolerances (inches)
0.500 (1/2) through 0.625 (5/8)	+0.0000/-0.0004
0.750 (3/4) through 1.125 (1 1/8)	+0.0000/-0.0005
1.250 (1 1/4) through 1.875 (1 7/8)	+0.0000/-0.0006
2.000 (2) through 3.125 (3 1/8)	+0.0000/-0.0007
3.250 (3 1/4) through 4.625 (4 5/8)	+0.0000/-0.0009
4.750 (4 3/4) through 7.000 (7)	+0.0000/-0.0010

All dimensions are in inches

Model CVV	A	B	C	G	H	NO.	M	P	AH	X	Y
6130/5DCY	10.24	7.8720 7.8692	14.53	0.59	0.43	6	2.99	0.16	9.06	-	-
6140/5DBY	10.24	7.8720 7.8692	15.08	0.59	0.43	6	3.78	0.16	9.06	-	-
6160/5DCY	13.39	10.6277 10.6245	18.19	0.79	0.43	6	3.50	0.16	12.20	7.72	7.87
6170/5DCY	15.75	12.4385 12.4350	20.04	0.87	0.55	8	3.70	0.20	14.17	8.58	8.86
6180/5DBY	16.93	13.5802 13.5767	22.72	0.87	0.71	8	4.33	0.20	15.35	9.17	9.45
6190/5DAY	19.29	15.7456 15.7421	24.76	1.18	0.71	12	5.71	0.24	17.72	10.04	10.63
6190/5DBY	19.29	15.7456 15.7421	25.71	1.18	0.71	12	5.71	0.24	17.72	10.04	10.63
6205DAY	17.91	13.9739 13.9704	26.38	1.18	0.87	8	8.03	0.20	15.94	13.43	11.30
6205DBY	17.91	13.9739 13.9704	27.76	1.18	0.87	8	8.03	0.20	15.94	13.43	11.30
6215DAY	19.29	15.3519 15.3484	28.78	1.38	0.94	8	7.99	0.28	17.32	13.70	12.05
6215DBY	19.29	15.3519 15.3484	30.71	1.38	0.94	8	7.99	0.28	17.32	13.70	12.05
6225DAY	21.06	16.3359 16.3321	30.43	1.38	1.06	8	8.27	0.39	18.70	13.86	12.83
6225DBY	21.06	16.3359 16.3321	33.86	1.38	1.06	8	8.27	0.39	18.70	13.86	12.83
6235DAY	22.44	17.7139 17.7100	34.76	1.57	1.06	8	9.84	0.39	20.08	14.13	13.54
6235DBY	22.44	17.7139 17.7100	36.93	1.57	1.06	8	9.84	0.39	20.08	14.13	13.54
6245DAY	25.00	19.0918 19.0880	36.26	1.57	1.30	8	9.84	0.39	22.05	14.57	14.61
6245DBY	25.00	19.0918 19.0880	38.39	1.57	1.30	8	9.84	0.39	22.05	14.57	14.61
6255DAY	26.97	21.0600 21.0557	42.56	1.77	1.30	8	11.61	0.39	24.02	15.55	15.71
6255DBY	26.97	21.0600 21.0557	44.61	1.77	1.30	8	11.61	0.39	24.02	15.55	15.71
6265DAY	29.53	22.4380 22.4336	48.94	1.97	1.54	8	14.17	0.39	25.98	16.81	16.97
6275DAY	45.67	35.4297 35.4242	59.21	2.36	1.54	8	13.98	0.39	40.16	24.02	24.13

Speed Reducers

Dimensions



# Dimensions Vertical V-Flange Mount

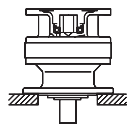
## Double Reduction CVV-6130/5DCY ▶ 6275DAY (cont.)

All dimensions are in inches

Model CVV	Low Speed Shaft					High Speed Shaft			Approx. Wt. (lb.)
	U*	V	S	L1	Key	XU*	XV	Key	
6130/5DCY	1.875	2.40	3/8-16UNC	0.71	1/2 X 1/2 X 2.16	0.625	0.98	3/16 X 3/16 X 0.75	97
6140/5DBY	1.875	3.19	3/8-16UNC	0.71	1/2 X 1/2 X 2.95	0.625	0.98	3/16 X 3/16 X 0.75	95
6160/5DCY	2.250	3.15	3/8-16UNC	0.71	1/2 X 1/2 X 2.95	0.750	1.38	3/16 X 3/16 X 1.02	198
6170/5DCY	2.750	3.31	1/2-13UNC	0.94	5/8 X 5/8 X 3.15	0.750	1.38	3/16 X 3/16 X 1.02	276
6180/5DBY	3.125	3.94	1/2-13UNC	0.94	3/4 X 3/4 X 3.74	0.875	1.57	3/16 X 3/16 X 1.38	377
6190/5DAY	3.625	4.92	3/4-10UNC	1.34	7/8 X 7/8 X 4.92	0.750	1.38	3/16 X 3/16 X 1.02	505
6190/5DBY	3.625	4.92	3/4-10UNC	1.34	7/8 X 7/8 X 4.92	0.875	1.57	3/16 X 3/16 X 1.38	529
6205DAY	3.875	6.50	3/4-10UNC	1.34	1 X 1 X 6.50	0.750	1.38	3/16 X 3/16 X 1.02	542
6205DBY	3.875	6.50	3/4-10UNC	1.34	1 X 1 X 6.50	0.875	1.57	3/16 X 3/16 X 1.38	569
6215DAY	4.250	6.50	3/4-10UNC	1.34	1 X 1 X 6.50	0.875	1.57	3/16 X 3/16 X 1.38	734
6215DBY	4.250	6.50	3/4-10UNC	1.34	1 X 1 X 6.50	1.125	1.77	1/4 X 1/4 X 1.77	783
6225DAY	4.625	6.50	3/4-10UNC	1.34	1-1/4 X 7/8 X 6.5	0.875	1.57	3/16 X 3/16 X 1.38	900
6225DBY	4.625	6.50	3/4-10UNC	1.34	1-1/4 X 7/8 X 6.5	1.375	2.17	5/16 X 5/16 X 2.16	1003
6235DAY	5.000	7.87	1-8UNC	1.61	1-1/4 X 7/8 X 7.87	1.125	1.77	1/4 X 1/4 X 1.77	1125
6235DBY	5.000	7.87	1-8UNC	1.61	1-1/4 X 7/8 X 7.87	1.500	2.56	3/8 X 3/8 X 2.56	1200
6245DAY	5.500	7.87	1-8UNC	1.61	1-1/4 X 7/8 X 7.87	1.125	1.77	1/4 X 1/4 X 1.77	1332
6245DBY	5.500	7.87	1-8UNC	1.61	1-1/4 X 7/8 X 7.87	1.500	2.56	3/8 X 3/8 X 2.56	1396
6255DAY	6.250	9.45	1-1/4-7UNC	1.93	1-1/2 X 1 X 9.45	1.375	2.17	5/16 X 5/16 X 2.16	2040
6255DBY	6.250	9.45	1-1/4-7UNC	1.93	1-1/2 X 1 X 9.45	1.750	2.76	3/8 X 3/8 X 2.76	2190
6265DAY	6.625	11.81	1-1/4-7UNC	1.93	1-3/4 X 1-1/4 X 11.8	1.750	2.76	3/8 X 3/8 X 2.76	2789
6275DAY	7.000	12.60	1-1/4-7UNC	2.05	1-3/4 X 1-1/4 X 13	1.750	2.76	3/8 X 3/8 X 2.76	5865

Speed  
Reducers

Dimensions



# Dimensions Universal and Vertical V-Flange Mount, Hollow Input

## Double Reduction CNVX-6065DAY ▶ 6125DBY, CVVX-6135DCY ▶ 6145DBY (cont.)

All dimensions are in inches

Model CNVX, CVVX <sup>[1]</sup>	Motor Frame	AJ	AK	BD	BB	BF	R	CE	CL	C	Z	XU	High Speed Shaft		Approx Wt. (lb)
													XV	Keyway	
<b>6065DAY</b>	56C	5.88	4.50	6.69	0.20	0.43	4	7.91	2.99	7.28	0.47	0.625 +0.0007 -0.00000	1.10	3/16 x 3/32	15
<b>6075DAY</b>	56C	5.88	4.50	6.69	0.20	0.43	4	8.15	2.99	7.13	0.47	0.625 +0.0007 -0.00000	1.10	3/16 x 3/32	19
<b>6095DAY</b>	56C	5.88	4.50	6.69	0.20	0.43	4	10.47	2.99	9.45	0.47	0.625 +0.0007 -0.00000	1.10	3/16 x 3/32	27
<b>6105DAY</b>	56C	5.88	4.50	6.69	0.20	0.43	4	11.02	2.99	10.00	0.47	0.625 +0.0007 -0.00000	1.10	3/16 x 3/32	33
<b>6125DBY</b>	56C	5.88	4.50	6.69	0.20	0.43	4	13.27	3.35	12.24	0.47	0.625 +0.0007 -0.00000	1.18	3/16 x 3/32	68
	143TC-145TC	5.88	4.50	6.69	0.20	0.43	4	13.27	3.35	12.64	0.47	0.875 +0.0008 -0.00000	1.57	3/16 x 3/32	68
<b>6135DCY</b>	56C	5.88	4.50	6.69	0.20	0.43	4	15.63	3.15	14.57	0.47	0.625 +0.0007 -0.00000	1.18	3/16 x 3/32	101
	143TC-145TC	5.88	4.50	6.69	0.20	0.43	4	15.63	3.15	15.04	0.47	0.875 +0.0008 -0.00000	1.65	3/16 x 3/32	101
<b>6145DBY</b>	56C	5.88	4.50	6.69	0.20	0.43	4	16.06	3.35	15.04	0.47	0.625 +0.0007 -0.00000	1.18	3/16 x 3/32	99
	143TC-145TC	5.88	4.50	6.69	0.20	0.43	4	16.06	3.35	15.43	0.47	0.875 +0.0008 -0.00000	1.57	3/16 x 3/32	99

Note: [1] Models 6065DA ~ 6215DB are type CNVX; models 6135DC ~ 6145DB are type CVVX.

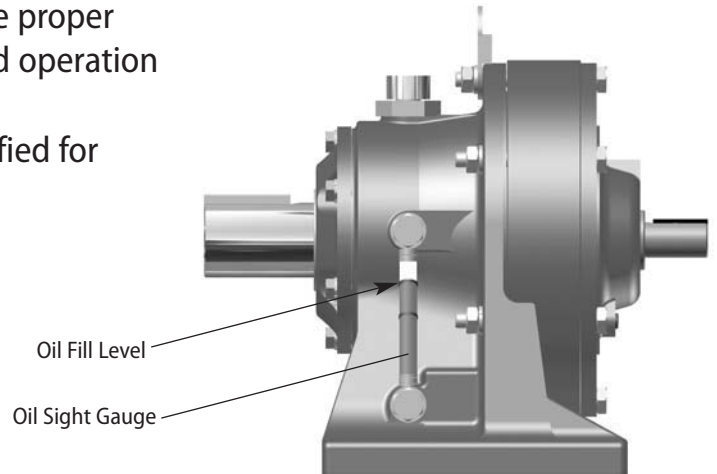
Speed  
Reducers

Dimensions

# Lubrication

Cyclo® Reducers are either Grease lubricated or Oil lubricated. Refer to pages 5.3 and 5.4 to determine the unit lubrication type.

- **Grease lubricated** reducers are filled with grease prior to shipment and are ready for installation and operation
- **Oil lubricated** reducers must be filled with the proper amount of approved oil before installation and operation
- **Lubrication methods** (grease or oil) are specified for Cyclo® driven at standard input speed.



## Approved Greases

Grease lubricated reducers are filled with grease prior to shipment and are ready for installation and operation. This information is provided for maintenance purposes.

Ambient Temperature		Cyclo	Planetary
°F	°C	ExxonMobil	Shell Oil
14 to 122	-10 to 50	Exxon Unirex N2 Grease (NLGI Grade #2)	Shell Alvania® EP (NLGI Grade #0)



When the Cyclo® reducer will be used under widely fluctuating temperatures or ambient temperatures (other than those listed here) or any other special conditions, consult the factory.

## Approved Oils

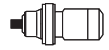
Oil lubricated reducers must be filled with oil prior to operation. Fill the reducer to the correct level with the recommended oil.

Ambient Temperature		Gulf Oil	Exxon Oil	Mobil Oil	Shell Oil	BP Oil
°F	°C					
14 to 41	-10 to 5	EP Lubricant HD 68	Spartan® EP 68	Mobilgear® 626 (ISO VG 68)	Omala® Oil 68	Energol® GR-XP 68
32 to 95	0 to 35	EP Lubricant HD 100 HD 150	Spartan® EP 100 EP 150	Mobilgear® 627, 629 (ISO) VG 100, 150	Omala® Oil 100, 150	Energol® GR-XP 100 GR-XP 150
86 to 122	30 to 50	EP Lubricant HD 220 HD 320 HD 460	Spartan® EP 220 EP 320 EP 460	Mobilgear® 630, 632 633, 634 (ISO) VG 220-460	Omala® Oil 220 320 460	Energol® GR-XP 220 GR-XP 320 GR-XP 460

For use in winter or relatively low ambient temperatures, use the lower viscosity oil specified for each ambient temperature range.

For consistent use in ambient temperatures outside of the range 32°F to 104°F (0°C to 40°C), consult factory.





**HORIZONTAL Mounted Reducer • SINGLE Reduction • Frame Sizes 6060 to 6275**

Frame Size	Reduction Ratio																	
	3	5	6	8	11	13	15	17	21	25	29	35	43	51	59	71	87	119
6060, 6065 6070, 6075 6080, 6085 6090, 6095 6100, 6105, 610H 6110, 6115 6120, 6125, 612H	Grease		Maintenance Free Grease															
6130, 6135 6140, 6145, 614H 6160, 6165, 616H 6170, 6175 6180, 6185 6190, 6195 6205 6215 6225 6235 6245 6255 6265 6275	Oil																	

**HORIZONTAL Mounted Reducer • DOUBLE Reduction • Frame Sizes 6060DA to 6275DA**



Frame Size	Reduction Ratio																									
	104	121	143	165	195	231	273	319	377	473	559	649	731	841	1003	1015	1247	1479	1849	2065	2537	3045	3481	4437	5133	6177
6060DA, 6065DA 6070DA, 6075DA 6090DA, 6095DA 6100DA, 6105DA 6120DA, 6120DB 6125DA, 6125DB	Maintenance Free Grease																									
6130DA, 6135DA 6130DB, 6135DB 6130DC, 6135DC 6140DA, 6140DB, 6140DC 6145DA, 6145DB, 6145DC 6160DA, 6165DA 6160DB, 6165DB 6170DA, 6175DA 6170DB, 6175DB 6180DA, 6185DA	Grease																									
6160DC, 6165DC 6170DC, 6175DC 6180DB, 6185DB 6190DA, 6195DA 6190DB, 6195DB 6205DA, 6205DB 6215DA, 6215DB 6225DA, 6225DB 6235DA, 6235DB 6245DA, 6245DB 6255DA, 6255DB 6265DA 6275DA	Oil																									

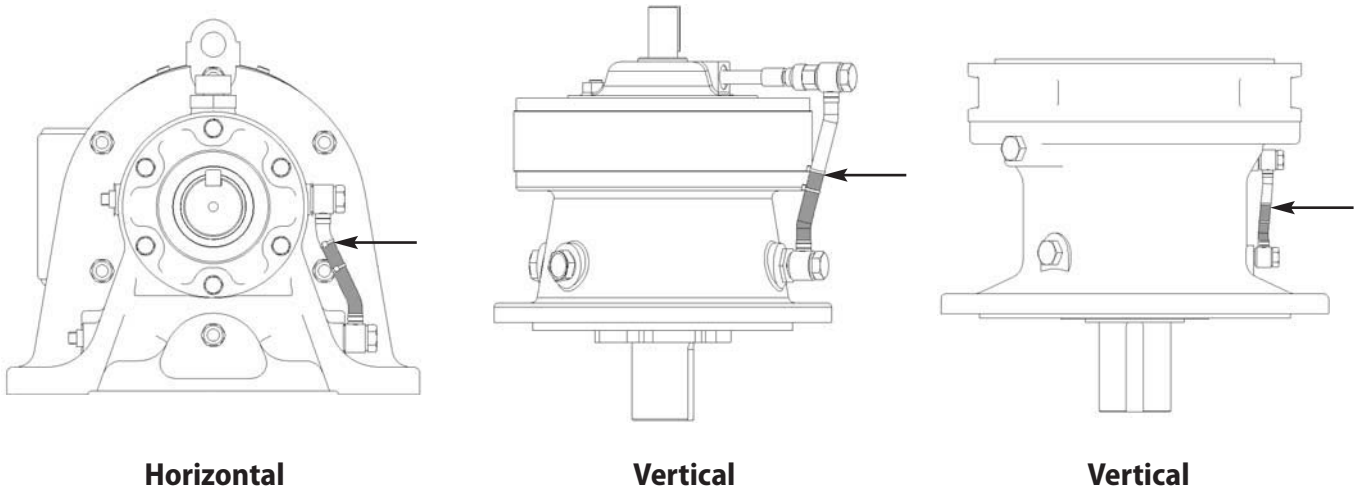
Lubrication

### Oil Fill Quantities

Single Reduction					Double Reduction				
Frame Size	Mounting Configuration				Frame Size	Mounting Configuration			
	Horizontal <sup>[1]</sup>		Vertical <sup>[1]</sup>			Horizontal <sup>[1]</sup>		Vertical <sup>[1]</sup>	
	U.S. gal.	litre	U.S. gal.	litre		U.S. gal.	litre	U.S. gal.	litre
6130, 6135	0.18	0.7	0.29	1.1	6160DC, 6165DC	0.40	1.5	0.26	1.0
6140, 6145, 614H	0.18	0.7	0.29	1.1	6170DC, 6175DC	0.63	2.4	0.50	1.9
6160, 6165, 616H	0.37	1.4	0.26	1.0	6180DB, 6185DB	0.92	3.5	0.53	2.0
6170, 6175	0.50	1.9	0.50	1.9	6190DA, 6195DA	1.5	5.8	0.71	2.7
6180, 6185	0.66	2.5	0.53	2.0	6190DB, 6195DB	1.6	6.0	0.71	2.7
6190, 6195	1.1	4.0	0.71	2.7	6205DA, 6205DB	1.6	6.0	2.9	11
6205	1.5	5.5	1.5	5.7	6215DA, 6215DB	2.6	10	3.7	14
6215	2.2	8.5	2.0	7.5	6225DA, 6225DB	2.9	11	4.8	18
6225	2.6	10	2.6	10	6235DA, 6235DB	4.5	17	6.1	23
6235	4.0	15	3.2	12	6245DA, 6245DB	4.8	18	7.7	29
6245	4.2	16	4.0	15	6255DA, 6255DB	6.1	23	11.1	42
6255	5.5	21	11.1	42	6265DA	8.5	32	13.5	51
6265	7.7	29	13.5	51	6275DA	15.9	60	15.9 <sup>[2]</sup>	60 <sup>[2]</sup>
6275	14.8	56	15.9 <sup>[2]</sup>	60 <sup>[2]</sup>					

[1] Please consult factory for oil quantities when the reducer is mounted in any other position or angle  
 [2] With trochoid pump

### Oil Fill Level



Sizes 6130/5 and 6140/5 only

Lubrication

# Installation and Parts Replacement Manual For

## Dodge® TORQUE-ARM II™ Speed Reducers Ratios 5, 9, 15, 25, and 40:1

TA0107L  
TA1107H  
TA2115H  
TA3203H  
TA4207H  
TA5215H

TA6307H  
TA7315H  
TA8407H  
TA9415H  
TA10507H  
TA12608H

**WARNING:** Because of the possible danger to person(s) or property from accidents which may result from the improper use of products, it is important that correct procedures be followed. Products must be used in accordance with the engineering information specified in the catalog. Proper installation, maintenance and operation procedures must be observed. The instructions in the instruction manuals must be followed. Inspections should be made as necessary to assure safe operation under prevailing conditions. Proper guards and other suitable safety devices or procedures, as may be desirable, or as may be specified in safety codes should be provided, and are neither provided by Rockwell Automation, nor are the responsibility of Rockwell Automation. This unit and its associated equipment must be installed, adjusted and maintained by qualified personnel who are familiar with the construction and operation of all equipment in the system and the potential hazards involved. When risks to persons or property may be involved, a holding device must be an integral part of the driven equipment beyond the speed reducer output shaft.

[www.rockwellautomation.com](http://www.rockwellautomation.com)   [www.ptplace.com](http://www.ptplace.com)   [www.dodge-pt.com](http://www.dodge-pt.com)   [www.reliance.com](http://www.reliance.com)   [www.ptplace.ca](http://www.ptplace.ca)

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Asia Pacific: Rockwell Automation, 27/F Citicorp Centre, 18 Whitfield Road, Causeway Bay, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846



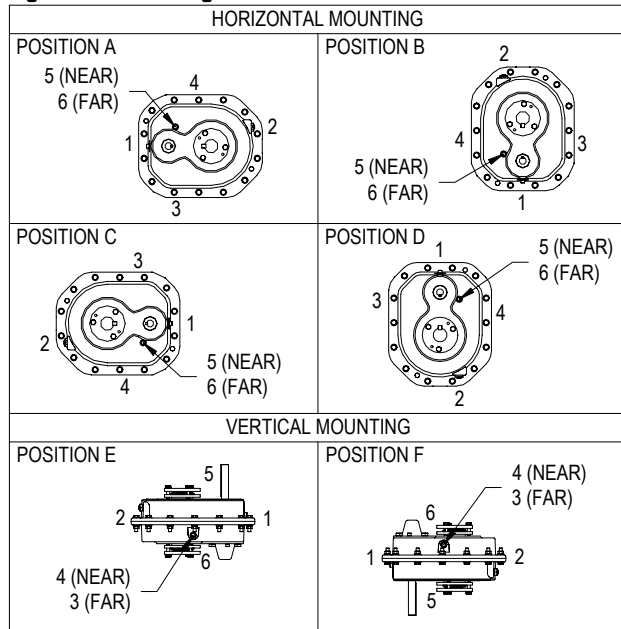
# INSTALLATION

1. Use lifting bracket to lift reducer.
2. Determine the running positions of the reducer. (See Fig. 1) Note that the reducer is supplied with 6 plugs; 4 around the sides for horizontal installations and 1 on each face for vertical installations. These plugs must be arranged relative to the running positions as follows:

**Horizontal Installations** - Install the magnetic drain plug in the hole closest to the bottom of the reducer. Throw away the tape that covers the filter/ventilation plug in shipment and install plug in topmost hole. Of the 2 remaining plugs on the sides of the reducer, the lowest one is the minimum oil level plug.

**Vertical Installations** - Install the filter/ventilation plug in the hole provided in the upper face of the reducer housing as installed. If space is restricted on the upper face, install the vent in the highest hole on the side of the reducer per Figure 1. Install a plug in the hole in the bottom face of the reducer. Do not use this hole for the magnetic drain plug. Of the remaining holes on the sides of the reducer, use the plug in the upper housing half for the minimum oil level plug.

**Figure 1 – Mounting Positions**



Output Speeds Above 15 RPM						
Mounting Position	Vent and Plug Locations					
	1	2	3	4	5	6
Position A	Level	Plug	Drain	Vent	Plug	Plug
Position B	Drain	Vent	Level	Plug	Plug	Plug
Position C	Plug	Level	Vent	Drain	Plug	Plug
Position D	Vent	Drain	Level	Plug	Plug	Plug
Position E	Level	Plug	Plug	Drain	Vent	Plug
Position F	Plug	Drain	Level	Plug	Plug	Vent

Output Speeds 15 RPM and Below ●						
Mounting Position	Vent and Plug Locations					
	1	2	3	4	5	6
Position A	Plug	Level	Drain	Vent	Plug	Plug
Position B	Drain	Vent	Plug	Level	Plug	Plug
Position C	Level	Plug	Vent	Drain	Plug	Plug
Position D	Vent	Drain	Level	Plug	Plug	Plug
Position E	Level	Plug	Plug	Drain	Vent	Plug
Position F	Plug	Drain	Level	Plug	Plug	Vent

● Below 15 RPM output speed, oil level must be adjusted to reach the highest oil level plug. If reducer position is to vary from those shown in Figure 1, either more or less oil may be required. Consult Dodge.

The running position of the reducer in a horizontal application is not limited to the four positions shown in Fig. 1. However, if running position is over 20° in position "B" & "D" or 5° in position "A" & "C", either way from sketches, the oil level plug cannot be used safely to check the oil level, unless during the checking, the torque arm is disconnected and the reducer is swung to within 20° for position "A" & "C" or 5° for position "B" & "D" of the positions shown in Fig. 1. Because of the many possible positions of the reducer, it may be necessary or desirable to make special adaptations using the lubrication filling holes furnished along with other standard pipe fittings, stand pipes and oil level gauges as required.

3. Mount reducer on driven shaft as follows:

**WARNING:** To ensure that drive is not unexpectedly started, turn off and lock out or tag power source before proceeding. Remove all external loads from drive before removing or servicing drive or accessories. Failure to observe these precautions could result in bodily injury.

**For Taper Bushed Reducer:** Mount reducer on driven shaft per instruction in Torque-Arm II Bushing Installation section of this manual.

4. Install sheave on input shaft as close to reducer as practical. (See Fig. 2)
5. If not using a Dodge Torque-Arm II motor mount, install motor and V-belt drive so belt will approximately be at right angles to the centerline between driven and input shaft. (See Fig. 3) This will permit tightening the V-belt with the torque arm.
6. Install torque arm and adapter plates reusing the reducer bolts. The adapter plates will fit in any position around the input end reducer.
7. Install torque arm fulcrum on a flat and rigid support so that the torque arm will be approximately at right angles to the centerline through the driven shaft and the torque arm anchor screw. (See Fig. 4) Make sure that there is sufficient take-up in the turnbuckle for belt tension adjustment when using V-belt drive.

**CAUTION:** Unit is shipped without oil. Add proper amount of recommended lubricant before operating. Failure to observe this precaution could result in damage to or destruction of the equipment

8. Fill gear reducer with recommended lubricant. See Table 2.

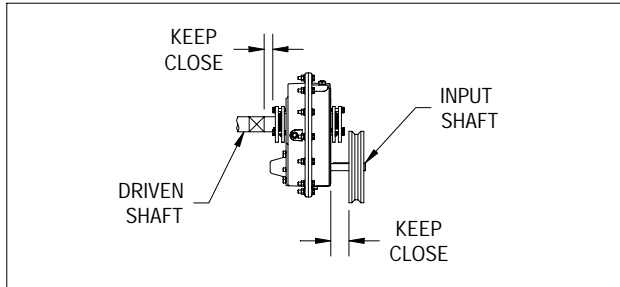


Figure 2 – Reducer and Sheave Installation

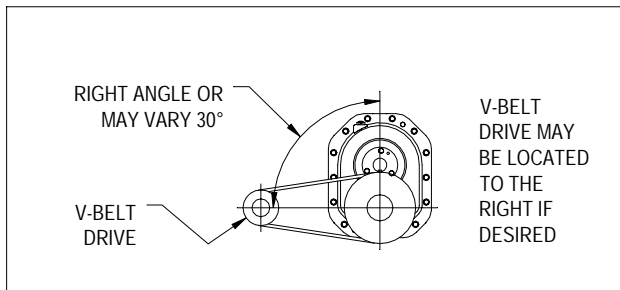


Figure 3 – Angle of V-Drive

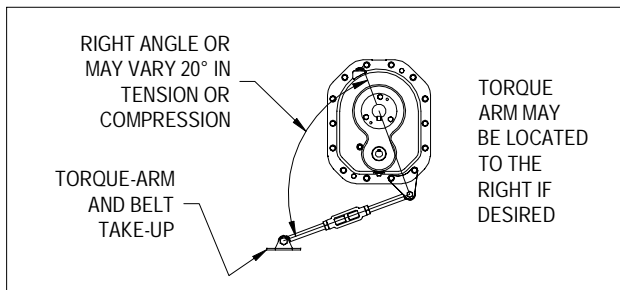


Figure 4 – Angle of Torque-Arm

## TORQUE-ARM II BUSHING INSTALLATION

**WARNING:** To ensure that drive is not unexpectedly started, turn off and lock out or tag power source before proceeding. Remove all external loads from drive before removing or servicing drive or accessories. Failure to observe these precautions could result in bodily injury.

The Dodge Torque-Arm II reducer is designed to fit both standard and short length driven shafts. The Standard Taper Bushings series is designed where shaft length is not a concern. The Short Shaft Bushing series is to be used where the driven shaft does not extend through the reducer.

### Standard Taper Bushings:

1. One bushing assembly is required to mount the reducer on the driven shaft. An assembly consists of two tapered bushings, bushing screws and washers, two bushing backup plates and retaining rings, and necessary shaft key or keys. The driven shaft must extend through the full length of the reducer. If the driven shaft does not extend through the reducer do not use the standard tapered bushings; instead use the short shaft bushings as described in the Short Shaft Bushings section that follows. The minimum shaft length, as measured from the end of the shaft to the outer edge of the bushing flange (see Figure 5), is given in Table 1.

2. Install one bushing backup plate on the end of the hub and secure with the supplied retaining ring. Repeat procedure for other side.

3. Place one bushing, flange end first, onto the driven shaft and position per dimension "A", as shown in Table 1. This will allow the bolts to be threaded into the bushing for future bushing and reducer removal.

4. Insert the output key in the shaft and bushing. For easy of installation, rotate the driven shaft so that the shaft keyseat is at the top position.

5. Mount the reducer on the driven shaft and align the shaft key with the reducer hub keyway. Maintain the recommended minimum distance "A" from the shaft bearing.

6. Insert the screws, with washers installed, in the unthreaded holes in the bushing flange and align with the threaded holes in the bushing backup plate. If necessary, rotate the bushing backup plate to align with the bushing screws. Tighten the screws lightly. If the reducer must be positioned closer than dimension "A", place the screws with washers installed, in the unthreaded holes in the bushing before positioning reducer making sure to maintain at least 1/8" between the screw heads and the bearing.

7. Place the second tapered bushing in position on the shaft and align the bushing keyway with the shaft key. Align the unthreaded holes in the bushing with the threaded holes in the bushing backup plate. If necessary, rotate the bushing backup plate to align with the bushing holes. Insert bushing screws, with washers installed in the unthreaded holes in the bushing. Tighten screws lightly.

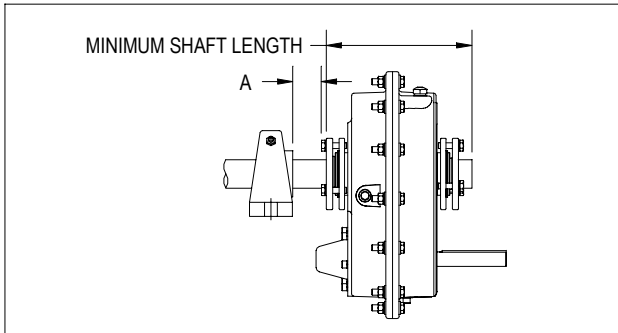
8. Alternately and evenly tighten the screws in the bushing nearest the equipment to the recommended torque given in Table 1. Repeat procedure on outer bushing.

### Short Shaft Bushings:

1. One bushing assembly is required to mount the reducer on the driven shaft. An assembly consists of one long tapered bushing, one short tapered bushing, one tapered bushing wedge, bushing screws and washers, two bushing backup



plates and retaining rings, and necessary shaft key or keys. The driven shaft does not need to extend through the reducer for the short shaft bushing to operate properly. The minimum shaft length, as measured from the end of the shaft to the outer edge of the bushing flange (see Figure 5), is given in Table 1.



**Figure 5 – Minimum Recommended Dimensions**

**Table 1 – Minimum Mounting Dimensions and Bolt Torques**

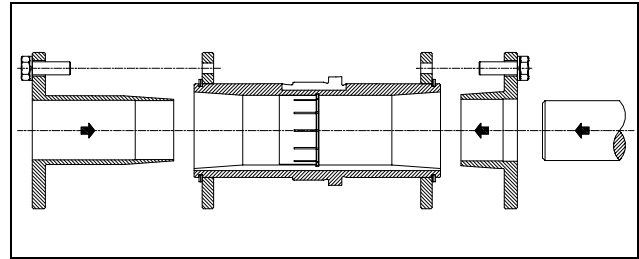
Reducer Size	Minimum Required Shaft Length	
	Standard Taper Bushing	Short Shaft Bushing
TA0107L	6.83	4.32
TA1107H	6.95	4.43
TA2115H	7.80	4.80
TA3203H	8.55	5.46
TA4207H	8.94	5.66
TA5215H	10.33	6.35
TA6307H	10.82	6.72
TA7315H	11.87	7.62
TA8407H	12.82	8.10
TA9415H	13.74	8.56
TA10507H	15.46	9.67
TA12608H	18.32	11.60

Bushing Screw Information and Minimum Clearance for Removal			
Reducer Size	Fastener Size	Torque in Ft.-Lbs.	A
TA0107L	5/16-18	20 – 17	1.08
TA1107H	5/16-18	20 – 17	1.20
TA2115H	3/8-16	20 – 17	1.20
TA3203H	3/8-16	20 – 17	1.20
TA4207H	3/8-16	26 – 23	1.48
TA5215H	1/2-13	77 – 67	1.81
TA6307H	1/2-13	77 – 67	1.81
TA7315H	1/2-13	77 – 67	2.06
TA8407H	1/2-13	77 – 67	2.06
TA9415H	5/8-11	86 – 75	2.39
TA10507H	5/8-11	86 – 75	2.39
TA12608H	5/8-11	86 – 75	2.39

2. The long bushing is designed to be installed from the side of the reducer opposite the driven equipment as shown in Figure 6. The long bushing when properly installed is designed to capture the end of the customer shaft that does not extend through the reducer. Normally the reducer would be mounted such that the input shaft extends from the side of the reducer opposite the driven equipment however the reducer design allows installation of the reducer to be mounted in the opposite direction.

3. Install the tapered bushing wedge into the hollow bore of the reducer from the same side as the long bushing will be installed. When installing the tapered bushing wedge into the reducer

hub, install the flange end first so that the thin taper is pointing outwards towards the long bushing as shown in Figure 6. The wedge is properly installed when it snaps into place in the reducer hub.



**Figure 6 – Short Shaft Bushing and Output Hub Assembly**

4. Align the tapered bushing wedge keyway with the reducer hub keyway. The keyway in the wedge is slightly wider than the keyway in the reducer hub allowing for easier installation.

5. Install one bushing backup plate on the end of the hub and secure with the supplied retaining ring. Repeat procedure for other side.

6. Install the short bushing; flange first, on the driven shaft and position per dimension “A”, as shown in Table 1. This will allow the bolts to be threaded into the bushing for future bushing and reducer removal.

7. Insert the output key in the shaft and bushing. For easy of installation, rotate the driven shaft so that the shaft keyseat is at the top position.

8. Mount the reducer on the driven shaft and align the shaft key with the reducer hub keyway. Maintain the recommended minimum distance “A” from the shaft bearing.

9. Insert the screws, with washers installed, in the unthreaded holes in the bushing flange and align with the threaded holes in the bushing backup plate. If necessary, rotate the bushing backup plate to align with the bushing screws. Tighten the screws lightly. If the reducer must be positioned closer than dimension “A”, place the screws with washers installed, in the unthreaded holes in the bushing before positioning reducer making sure to maintain at least 1/8” between the screw heads and the bearing.

10. Place the long bushing in position on the shaft and align the bushing keyway with the shaft key. Use care to locate the long bushing with the tapered bushing wedge installed earlier. Align the unthreaded holes in the bushing with the threaded holes in the bushing backup plate. If necessary, rotate the bushing backup plate to align with the bushing holes. Insert bushing screws, with washers installed in the unthreaded holes in the bushing. Tighten screws lightly.

11. Alternately and evenly tighten the screws in the bushing nearest the equipment to the recommended torque given in Table 1. Repeat procedure on outer bushing.

## LUBRICATION

### Bushing Removal for Standard Taper or Short Shaft Bushings:

1. Remove bushing screws.
2. Place the screws in the threaded holes provided in the bushing flanges. Tighten the screws alternately and evenly until the bushings are free on the shaft. For ease of tightening screws make sure screw threads and threaded holes in the bushing flanges are clean. If the reducer was positioned closer than the recommended minimum distance "A" as shown in Table 1, loosen the inboard bushing screws until they are clear of the bushing flange by 1/8". Locate two (2) wedges at 180 degrees between the bushing flange and the bushing backup plate. Drive the wedges alternately and evenly until the bushing is free on the shaft.
3. Remove the outside bushing, the reducer, and then the inboard bushing.

**IMPORTANT:** Because reducer is shipped without oil, it is necessary to add the proper amount of oil before operating reducer. Use a high-grade petroleum base rust and oxidation inhibited (R&O) gear oil - see tables. Follow instructions on reducer warning tags, and in the installation manual.

Under average industrial operating conditions, the lubricant should be changed every 2500 hours of operation or every 6 months, whichever occurs first. Drain reducer and flush with kerosene, clean magnetic drain plug and refill to proper level with new lubricant.

**CAUTION:** Too much oil will cause overheating and too little will result in gear failure. Check oil level regularly. Failure to observe this precaution could result in bodily injury.

Under extreme operating conditions, such as rapid rise and fall of temperature, dust, dirt, chemical particles, chemical fumes, or oil sump temperatures above 200°F, the oil should be changed every 1 to 3 months, depending on severity of conditions.

**Table 2 – Oil Volumes**

Reducer Size		Approximate Volume of Oil to Fill Reducer to Oil Level Plug ■ ●											
		† Position A		† Position B		† Position C		† Position D		† Position E		† Position F	
		▲ Qt	L	▲ Qt	L	▲ Qt	L	▲ Qt	L	▲ Qt	L	▲ Qt	L
TA0107L	Single	0.7	0.6	0.5	0.5	0.7	0.6	1.4	1.3	1.3	1.2	1.5	1.4
	Double	0.7	0.6	0.5	0.5	0.6	0.6	1.3	1.3	1.2	1.2	1.4	1.3
TA1107H	Single	1.3	1.3	0.7	0.7	0.7	0.6	1.7	1.6	1.5	1.4	1.9	1.8
	Double	1.3	1.3	0.7	0.7	0.6	0.6	1.7	1.6	1.5	1.4	1.9	1.8
TA2115H	Single	2.1	2.0	1.2	1.2	1.1	1.0	2.7	2.5	2.3	2.2	3.1	2.8
	Double	2.1	2.0	1.1	1.1	1.0	1.0	2.6	2.5	2.4	2.3	3.0	2.9
TA3203H	Single	2.8	2.7	1.6	1.6	1.8	1.7	4.1	3.9	3.3	3.1	4.4	4.2
	Double	2.8	2.7	1.5	1.4	1.7	1.6	4.0	3.8	3.4	3.3	4.2	4.0
TA4207H	Single	4.4	4.2	2.6	2.5	2.9	2.8	7.4	7.0	6.3	6.0	7.8	7.3
	Double	4.4	4.2	2.5	2.4	2.8	2.6	7.3	6.9	6.4	6.0	7.5	7.1
TA5215H	Single	7.4	7.0	4.9	4.7	5.8	5.5	13.2	12.5	11.6	11.0	13.1	12.4
	Double	7.4	7.0	4.7	4.4	5.5	5.2	12.9	12.2	11.4	10.8	12.6	11.9
TA6307H	Single	8.8	8.4	5.8	5.5	6.6	6.2	16.1	15.3	13.2	12.5	16.1	15.3
	Double	8.8	8.4	5.5	5.2	6.2	5.9	15.8	15.0	13.9	13.1	15.3	14.5
TA7315H	Single	8.4	8.0	11.8	11.1	13.9	13.2	22.5	21.3	22.1	20.9	25.1	23.7
	Double	8.4	8.0	10.8	10.3	13.2	12.5	22.0	20.9	22.4	21.2	23.1	21.8
TA8407H	Single	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Double	7.7	7.3	11.7	11.1	13.7	12.9	25.1	23.8	24.0	22.7	25.8	24.4
TA9415H	Single	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Double	17.0	16.1	16.8	15.9	18.1	17.1	33.2	31.4	33.2	31.4	38.6	36.5
TA10507H	Single	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Double	38.0	36.0	27.6	26.1	25.8	24.4	53.5	50.6	53.8	50.9	56.1	53.0
TA12608H	Single	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Double	53.0	50.2	41.5	39.3	37.1	35.1	70.7	66.9	72.2	68.3	80.4	76.1

■ Oil quantity is approximate. Service with lubricant until oil runs out of oil level hole.

† Refer to Figure 1 for mounting positions.

▲ US measure: 1 quart = 32 fluid ounces = .94646 liters.

● Below 15 RPM output speed, oil level must be adjusted to reach the highest oil level plug. If reducer position is to vary from those shown in Figure 1, either more or less oil may be required. Consult Dodge.

**Table 3 – Oil Recommendations**

ISO Grades For Ambient Temperatures of 50°F to 125°F ※												
Output RPM	Torque-Arm II Reducer Size											
	TA0107L	TA1107H	TA2115H	TA3203H	TA4207H	TA5215H	TA6307H	TA7315H	TA8407H	TA9415H	TA10507H	TA12608H
301 – 400	320	320	320	220	220	220	220	220	220	220	220	220
201 – 300	320	320	320	220	220	220	220	220	220	220	220	220
151 – 200	320	320	320	220	220	220	220	220	220	220	220	220
126 – 150	320	320	320	220	220	220	220	220	220	220	220	220
101 – 125	320	320	320	320	220	220	220	220	220	220	220	220
81 – 100	320	320	320	320	320	220	220	220	220	220	220	220
41 – 80	320	320	320	320	320	220	220	220	220	220	220	220
11 – 40	320	320	320	320	320	320	320	320	320	320	220	220
1 – 10	320	320	320	320	320	320	320	320	320	320	320	320

ISO Grades For Ambient Temperatures of 15°F to 60°F ※												
Output RPM	Torque-Arm II Reducer Size											
	TA0107L	TA1107H	TA2115H	TA3203H	TA4207H	TA5215H	TA6307H	TA7315H	TA8407H	TA9415H	TA10507H	TA12608H
301 – 400	220	220	220	150	150	150	150	150	150	150	150	150
201 – 300	220	220	220	150	150	150	150	150	150	150	150	150
151 – 200	220	220	220	150	150	150	150	150	150	150	150	150
126 – 150	220	220	220	150	150	150	150	150	150	150	150	150
101 – 125	220	220	220	220	150	150	150	150	150	150	150	150
81 – 100	220	220	220	220	220	150	150	150	150	150	150	150
41 – 80	220	220	220	220	220	150	150	150	150	150	150	150
11 – 40	220	220	220	220	220	220	220	220	220	220	150	150
1 – 10	220	220	220	220	220	220	220	220	220	220	220	220

※ **Notes:**

1. Assumes auxiliary cooling where recommended in the catalog.
2. Pour point of lubricant selected should be at least 10°F lower than expected minimum ambient starting temperature.
3. Extreme pressure (EP) lubricants are not necessary for average operating conditions. When properly selected for specific applications, TORQUE-ARM II backstops are suitable for use with EP lubricants.
4. Special lubricants may be required for food and drug industry applications where contact with the product being manufactured may occur. Consult a lubrication manufacturer's representative for his recommendations.
5. For reducers operating in ambient temperatures between -22°F (-30°C) and 20°F (-6.6°C) use a synthetic hydrocarbon lubricant, 100 ISO grade or AGMA 3 grade (for example, Mobil SHC627). Above 125°F (51°C), consult DODGE Gear Application Engineering (864) 288-9050 for lubrication recommendation.
6. Mobil SHC630 Series oil is recommended for high ambient temperatures.

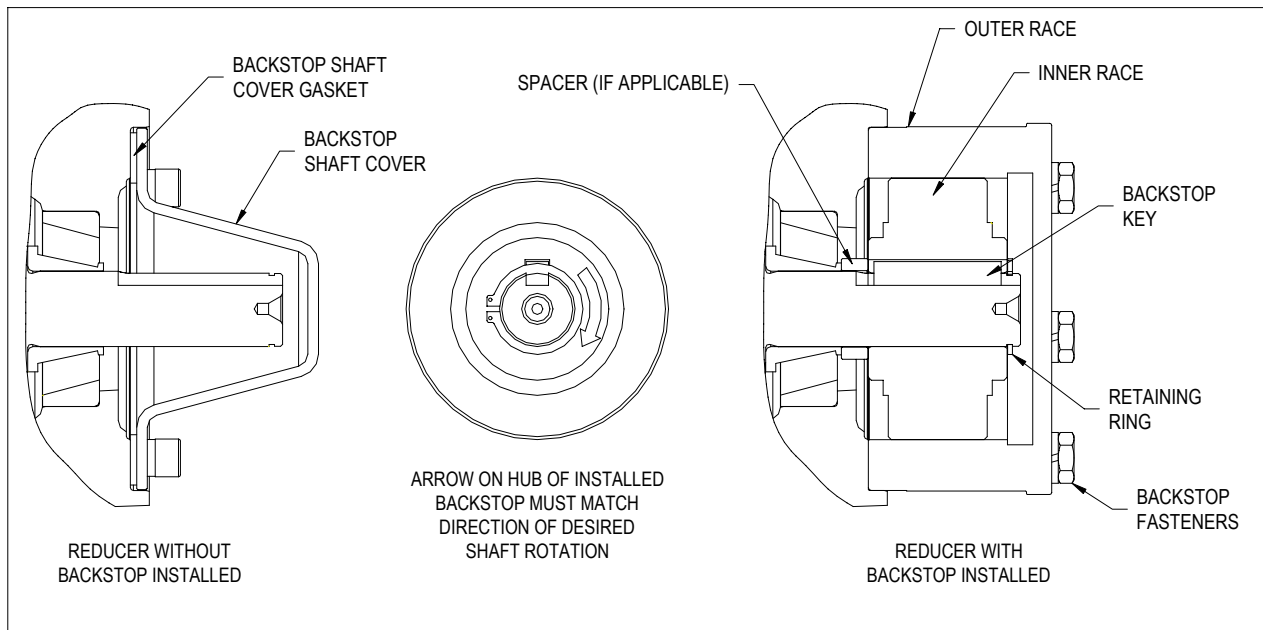


Figure 7 – Backstop Assembly

## MOTOR MOUNTS

### Motor Mount Assembly:

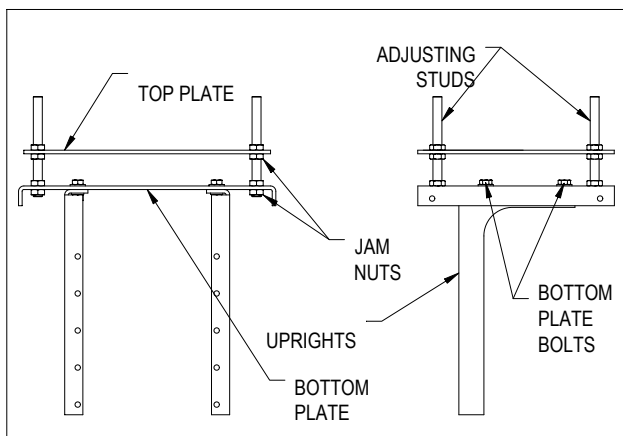


Figure 8 – Motor Mount Components

Refer to Figure 8 for descriptions of component parts. Using the hardware provided, assemble uprights (the angled parts to which the reducer is fastened) to the u-shaped, rectangular bottom plate. Notice that there are eight slots cut into the plate. If the reducer is to be mounted in Positions A or C, as illustrated in Figure 8, assemble the uprights in the outermost slots. If the reducer is to be mounted in Positions B or D, assemble the uprights in the innermost slots. The bottom plate may be mounted with the vertical flanges up or down (as shown in Figure 8). Snug bolts only, do not torque bolts at this time.

Fasten long threaded studs to the four corners of bottom plate using jam nuts, one on each side of the plate. Securely tighten these nuts, as they will not require any further adjustment. Add

one additional jam nut to each stud and thread approximately to the middle of the stud. Assemble top motor plate (the flat rectangular plate with many holes) on top of the jam nuts. Assemble the remaining jam nuts on studs to secure top motor plate. Do not fully tighten these nuts yet.

The motor mount may be installed in any of the four positions (A, B, C or D) and in any of the mounting levels (M1, M2, M3 or M4) shown in Figure 9. Note that the motor mount uprights attach to the input side of the reducer when mounted in either the “B” or “D” positions.

### Motor Mount Installation:

**WARNING:** To ensure that drive is not unexpectedly started, turn off and lock out or tag power source before proceeding. Remove all external loads from drive before removing or servicing drive or accessories. Failure to observe these precautions could result in bodily injury.

Remove four or six (as required) housing bolts from the reducer. Place the motor mount in position and reinstall the bolts through the motor mount uprights and reducer housing. Where reducer is shaft mounted in positions A or C, the torque-arm adapter plate must be mounted between the reducer housing and the motor mount upright. Tighten bolts to the torque specified in Table 9.

Mount the motor onto the top plate and bolt securely. Install the motor sheave and reducer sheave as close to the motor and reducer housings as practical. Loosen the bottom plate bolts and slide the motor and mounting plate to accurately align the motor and reducer sheave. Securely tighten the bottom plate bolts. Install the required number of V-belts and tension belts by alternately adjusting the jam nuts on the four adjusting studs

provided on the motor mount. Check all bolts to see that they are securely tightened. Verify that the V-belt drive is properly

aligned before operating the reducer.

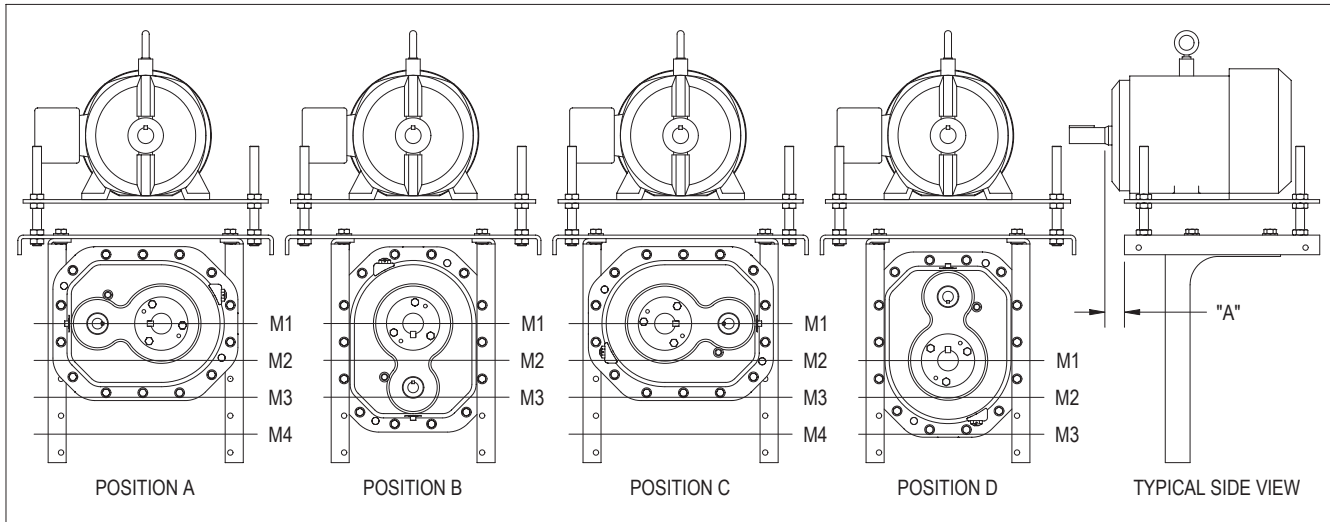


Figure 9 – Motor Mount Positions

Table 6 – V-Drive Center Distances

	Position	Mtg.	Motor Frame / Motor Shaft Offset Dimension "A"						
			56T / A=.78	140T / A=1.22	180T / A=1.37	210T / A=1.55	250T	280T	320T
TA0107L Reducer	A	M1	14.4 – 18.2	14.4 – 18.2	15.4 – 19.2	16.2 – 19.9	----	----	----
		M2	16.8 – 20.5	16.8 – 20.5	17.8 – 21.5	18.5 – 22.3	----	----	----
		M3	19.1 – 22.9	19.1 – 22.9	20.1 – 23.9	20.8 – 24.6	----	----	----
		M4	21.5 – 25.2	21.5 – 25.2	22.5 – 26.2	23.2 – 27.0	----	----	----
	B	M1	17.2 – 21.0	17.2 – 21.0	18.2 – 22.0	19.0 – 22.8	----	----	----
		M2	19.6 – 23.4	19.6 – 23.4	20.6 – 24.4	21.3 – 25.1	----	----	----
		M3	22.0 – 25.8	22.0 – 25.8	23.0 – 26.8	23.7 – 27.5	----	----	----
	C	M1	12.6 – 16.4	12.6 – 16.4	13.6 – 17.4	14.3 – 18.1	----	----	----
		M2	14.9 – 18.7	14.9 – 18.7	15.9 – 19.7	16.7 – 20.4	----	----	----
		M3	17.3 – 21.1	17.3 – 21.1	18.3 – 22.1	19.0 – 22.8	----	----	----
		M4	19.6 – 23.4	19.6 – 23.4	20.6 – 24.4	21.4 – 25.2	----	----	----
	D	M1	11.8 – 15.6	11.8 – 15.6	12.8 – 16.6	13.5 – 17.3	----	----	----
M2		14.1 – 17.9	14.1 – 17.9	15.1 – 18.9	15.9 – 19.7	----	----	----	
M3		16.5 – 20.3	16.5 – 20.3	17.5 – 21.3	18.3 – 22.1	----	----	----	

	Position	Mtg.	Motor Frame / Motor Shaft Offset Dimension "A"						
			56T / A=.78	140T / A=1.22	180T / A=1.37	210T / A=1.55	250T / A=1.56	280T	320T
TA1107H Reducer	A	M1	13.8 – 17.9	13.8 – 17.9	14.7 – 18.9	15.4 – 19.6	16.4 – 20.6	----	----
		M2	16.2 – 20.5	16.2 – 20.5	17.2 – 21.4	17.9 – 22.2	18.9 – 23.2	----	----
		M3	18.8 – 23.0	18.8 – 23.0	19.7 – 24.0	20.5 – 24.7	21.5 – 25.7	----	----
		M4	21.3 – 25.6	21.3 – 25.6	22.3 – 26.6	23.0 – 27.3	24.0 – 28.3	----	----
	B	M1	17.7 – 22.0	17.7 – 22.0	18.7 – 23.0	19.5 – 23.8	20.5 – 24.8	----	----
		M2	20.3 – 24.6	20.3 – 24.6	21.3 – 25.6	22.1 – 26.4	23.1 – 27.4	----	----
		M3	22.9 – 27.2	22.9 – 27.2	23.9 – 28.2	24.6 – 29.0	25.6 – 30.0	----	----
	C	M1	13.8 – 17.9	13.8 – 17.9	14.7 – 18.9	15.4 – 19.6	16.4 – 20.6	----	----
		M2	16.2 – 20.5	16.2 – 20.5	17.2 – 21.4	17.9 – 22.2	18.9 – 23.2	----	----
		M3	18.8 – 23.0	18.8 – 23.0	19.7 – 24.0	20.5 – 24.7	21.5 – 25.7	----	----
		M4	21.3 – 25.6	21.3 – 25.6	22.3 – 26.6	23.0 – 27.3	24.0 – 28.3	----	----
	D	M1	11.3 – 15.7	11.3 – 15.7	12.3 – 16.7	13.1 – 17.4	14.1 – 18.4	----	----
M2		13.9 – 18.2	13.9 – 18.2	14.9 – 19.2	15.7 – 20.0	16.7 – 21.0	----	----	
M3		16.5 – 20.8	16.5 – 20.8	17.5 – 21.8	18.3 – 22.6	19.3 – 23.6	----	----	



	Position	Mtg.	Motor Frame / Motor Shaft Offset Dimension "A"						
			56T / A=.78	140T / A=1.22	180T / A=1.37	210T / A=1.55	250T / A=1.56	280T	320T
TA2115H Reducer	A	M1	13.6 – 17.2	13.6 – 17.2	14.6 – 18.1	15.3 – 18.9	16.3 – 19.8	----	----
		M2	16.6 – 20.1	16.6 – 20.1	17.5 – 21.1	18.3 – 21.9	19.2 – 22.8	----	----
		M3	19.5 – 23.1	19.5 – 23.1	20.5 – 24.1	21.2 – 24.9	22.2 – 25.9	----	----
		M4	22.5 – 26.2	22.5 – 26.2	23.5 – 27.1	24.2 – 27.9	25.2 – 28.9	----	----
	B	M1	18.5 – 22.2	18.5 – 22.2	19.5 – 23.2	20.3 – 24.0	21.3 – 25.0	----	----
		M2	21.6 – 25.3	21.6 – 25.3	22.6 – 26.3	23.3 – 27.0	24.3 – 28.0	----	----
		M3	24.6 – 28.3	24.6 – 28.3	25.6 – 29.3	26.4 – 30.1	27.4 – 31.1	----	----
	C	M1	13.6 – 17.2	13.6 – 17.2	14.6 – 18.1	15.3 – 18.9	16.3 – 19.8	----	----
		M2	16.6 – 20.1	16.6 – 20.1	17.5 – 21.1	18.3 – 21.9	19.2 – 22.8	----	----
		M3	19.5 – 23.1	19.5 – 23.1	20.5 – 24.1	21.2 – 24.9	22.2 – 25.9	----	----
		M4	22.5 – 26.2	22.5 – 26.2	23.5 – 27.1	24.2 – 27.9	25.2 – 28.9	----	----
	D	M1	10.4 – 14.1	10.4 – 14.1	11.4 – 15.1	12.2 – 15.9	13.2 – 16.9	----	----
M2		13.5 – 17.2	13.5 – 17.2	14.5 – 18.2	15.3 – 19.0	16.3 – 20.0	----	----	
M3		16.6 – 20.3	16.6 – 20.3	17.6 – 21.3	18.3 – 22.0	22.0 – 23.0	----	----	

	Position	Mtg.	Motor Frame / Motor Shaft Offset Dimension "A"						
			140T / A=1.22	180T / A=1.37	210T / A=1.55	250T / A=1.56	280T / A=1.16	320T	360T
TA3203H Reducer	A	M1	14.6 – 18.4	15.5 – 19.4	16.2 – 20.1	17.2 – 21.1	17.9 – 21.8	----	----
		M2	17.9 – 21.8	18.9 – 22.8	19.6 – 23.5	20.5 – 24.5	21.3 – 25.2	----	----
		M3	21.2 – 25.2	22.2 – 26.2	22.9 – 26.9	23.9 – 27.9	24.7 – 28.6	----	----
		M4	24.6 – 28.6	25.6 – 29.6	26.3 – 30.3	27.3 – 31.3	28.1 – 32.1	----	----
	B	M1	19.8 – 23.9	20.8 – 24.9	21.6 – 25.6	22.6 – 26.6	23.3 – 27.4	----	----
		M2	23.3 – 27.3	24.3 – 28.3	25.0 – 29.1	26.0 – 30.1	26.8 – 30.8	----	----
		M3	26.7 – 30.8	27.7 – 31.8	28.5 – 32.5	29.5 – 33.5	30.2 – 34.3	----	----
	C	M1	13.6 – 17.4	14.5 – 18.4	15.2 – 19.1	16.2 – 20.1	16.9 – 20.8	----	----
		M2	16.9 – 20.8	17.8 – 21.7	18.6 – 22.5	19.5 – 23.5	20.2 – 24.2	----	----
		M3	20.2 – 24.2	21.2 – 25.1	21.9 – 25.9	22.9 – 26.9	23.6 – 27.6	----	----
		M4	23.6 – 27.6	24.6 – 28.5	25.3 – 29.3	26.3 – 30.3	27.0 – 31.0	----	----
	D	M1	10.2 – 14.2	11.2 – 15.2	11.9 – 16.0	12.9 – 17.0	13.7 – 17.7	----	----
M2		13.6 – 17.7	14.6 – 18.7	15.4 – 19.4	16.4 – 20.4	17.1 – 21.2	----	----	
M3		17.1 – 21.1	18.1 – 22.1	18.8 – 22.9	19.8 – 23.9	20.6 – 24.6	----	----	

	Position	Mtg.	Motor Frame / Motor Shaft Offset Dimension "A"						
			140T / A=1.22	180T / A=1.37	210T / A=1.55	250T / A=1.56	280T / A=1.16	320T / A=.38	360T
TA4207H Reducer	A	M1	17.3 – 21.1	18.3 – 22.1	19.0 – 22.8	19.9 – 23.8	20.6 – 24.5	21.6 – 25.5	----
		M2	21.2 – 25.1	22.2 – 26.1	22.9 – 26.8	23.9 – 27.8	24.6 – 28.6	25.6 – 29.5	----
		M3	25.2 – 29.2	26.2 – 30.2	26.9 – 30.9	27.9 – 31.9	28.7 – 32.6	29.6 – 33.6	----
		M4	29.3 – 33.2	30.2 – 34.2	31.0 – 34.9	32.0 – 35.9	32.7 – 36.7	33.7 – 37.7	----
	B	M1	22.6 – 26.7	23.6 – 27.7	24.4 – 28.4	25.4 – 29.4	26.1 – 30.2	27.1 – 31.2	----
		M2	26.8 – 30.8	27.8 – 31.8	28.5 – 32.5	29.5 – 33.5	30.3 – 34.3	31.3 – 35.3	----
		M3	30.9 – 34.9	31.9 – 35.9	32.6 – 36.7	33.6 – 37.7	34.4 – 38.4	35.4 – 39.4	----
	C	M1	15.4 – 19.2	16.3 – 20.1	17.0 – 20.8	18.0 – 21.8	18.7 – 22.5	19.6 – 23.5	----
		M2	19.3 – 23.1	20.2 – 24.1	20.9 – 24.8	21.9 – 25.8	22.6 – 26.5	23.6 – 27.5	----
		M3	23.2 – 27.2	24.2 – 28.1	24.9 – 28.9	25.9 – 29.9	26.6 – 30.6	27.6 – 31.6	----
		M4	27.3 – 31.2	28.2 – 32.2	29.0 – 32.9	29.9 – 33.9	30.7 – 34.6	31.7 – 35.6	----
	D	M1	12.2 – 16.2	13.2 – 17.2	14.0 – 18.0	15.0 – 19.0	15.7 – 19.7	16.7 – 20.7	----
M2		16.3 – 20.4	17.3 – 21.4	18.1 – 22.1	19.1 – 23.1	19.8 – 23.9	20.8 – 24.9	----	
M3		20.4 – 24.5	21.4 – 25.5	22.2 – 26.2	23.2 – 27.2	23.9 – 28.0	24.9 – 29.0	----	

	Position	Mtg.	Motor Frame / Motor Shaft Offset Dimension "A"						
			180T / A=1.37	210T / A=1.55	250T / A=1.56	280T / A=1.16	320T / A=.38	360T / A=1.01	400T
TA5215H Reducer	A	M1	19.5 – 23.4	20.2 – 24.1	21.1 – 25.1	21.8 – 25.8	22.8 – 26.8	23.8 – 27.8	----
		M2	24.2 – 28.3	25.0 – 29.0	25.9 – 30.0	26.7 – 30.7	27.6 – 31.7	28.6 – 32.7	----
		M3	29.1 – 33.2	29.8 – 33.9	30.8 – 34.9	31.5 – 35.6	32.5 – 36.6	33.5 – 37.6	----
		M4	34.0 – 38.1	34.7 – 38.8	35.7 – 39.8	36.5 – 40.6	37.4 – 41.5	38.4 – 42.5	----
	B	M1	26.2 – 30.3	26.9 – 31.1	27.9 – 32.1	28.7 – 32.8	29.7 – 33.8	30.7 – 34.8	----
		M2	31.2 – 35.3	31.9 – 36.1	32.9 – 37.1	33.7 – 37.8	34.7 – 38.8	35.7 – 39.8	----
		M3	36.2 – 40.3	36.9 – 41.1	37.9 – 42.1	38.7 – 42.8	39.7 – 43.8	40.7 – 44.8	----
	C	M1	16.4 – 20.3	17.1 – 21.0	18.0 – 21.9	18.7 – 22.6	19.7 – 23.6	20.6 – 24.6	----
		M2	21.1 – 25.1	21.8 – 25.8	22.8 – 26.8	23.5 – 27.5	24.4 – 28.5	25.4 – 29.4	----
		M3	25.9 – 29.9	26.6 – 30.7	27.6 – 31.6	28.3 – 32.4	29.3 – 33.4	30.3 – 34.3	----
		M4	30.8 – 34.8	31.5 – 35.6	32.5 – 36.6	32.2 – 37.3	34.2 – 38.3	35.2 – 39.3	----
	D	M1	17.7 – 21.8	18.4 – 22.6	19.4 – 23.6	20.2 – 24.3	21.2 – 25.3	22.2 – 26.3	----
M2		22.7 – 26.8	23.4 – 27.6	24.4 – 28.6	25.2 – 29.3	26.2 – 30.3	27.2 – 31.3	----	
M3		N/A	N/A	N/A	N/A	N/A	N/A	----	

### Horizontal Installation (Position C):

1. Remove belt guard and hardware from box and verify all parts are available. The belt guard assembly consists of one back cover, one front cover, two brackets, and necessary hardware.
2. Using the hardware provided, assemble the two brackets to the back cover as shown in Figure 12. Note that the brackets are mounted so that the angles of the brackets are mounted in the same direction. Do not fully tighten these bolts.
3. Position back cover over the motor shaft and reducer input shaft. The long slot in the back cover fits over the motor shaft.
4. Align the back cover assembly to the Torque-Arm II motor mount and attach using four cap screws, washers, and nuts. Securely tighten the brackets to the motor mount and back cover.
5. Install motor and reducer sheaves. Install belts and adjust accordingly.
6. Align hinges on front cover to pins on back cover and assemble.
7. Close cover and secure with two cap screws and washers.
8. Check machine for proper operation.

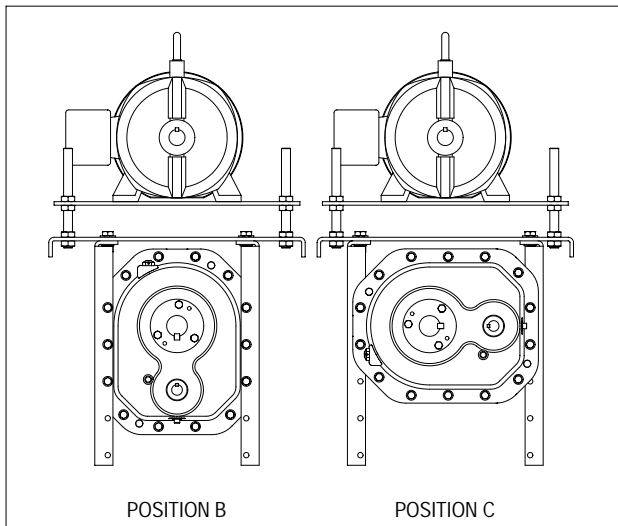


Figure 10 – Belt Guard Mounting Positions

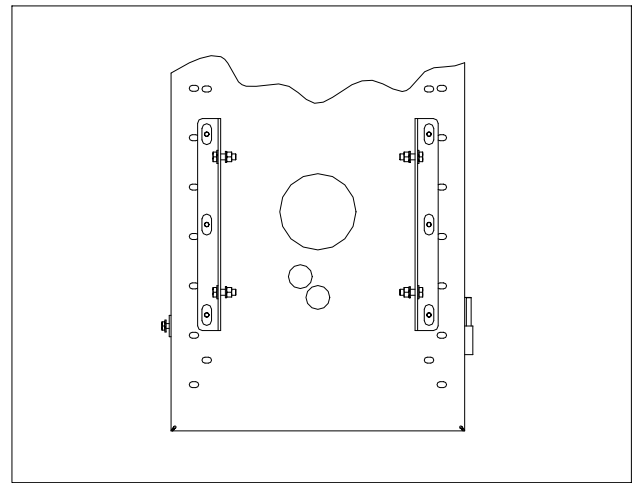


Figure 11 – Mounting Brackets in Position B

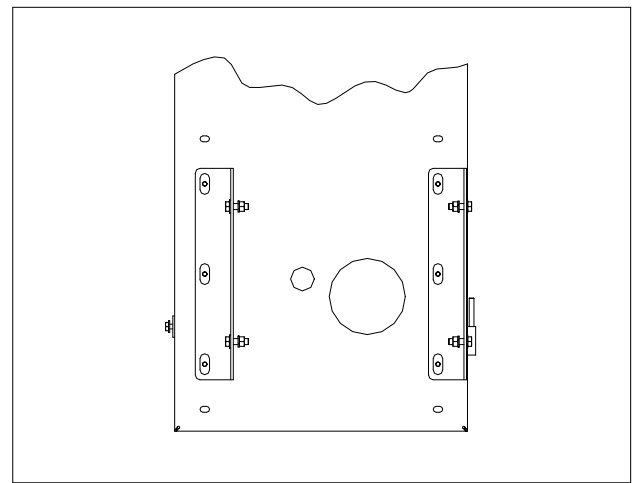


Figure 12 – Mounting Brackets in Position C

# REPLACEMENT PART AND KIT NUMBERS

**Table 10–Dodge and Timken Part Numbers for Replacement Bearings, Single and Double Reduction Reducers**

Reducer Size	Output Hub Bearing – LH and RH Sides	
	Dodge Part Number	Timken Part Number
TA0107L	900250/900251	LM104911/LM104949
TA1107H	901250/901251	382A/387A
TA2115H	403003/402003	JLM714110/JLM714149
TA3203H	903252/402268	493/498
TA4207H	403016/402193	42584/42381
TA5215H	403140/402050	JM822010/JM822049
TA6307H	906250/906251	68712/68462
TA7315H	403105/402147	36620/36690
TA8407H	403105/402147	36620/36690
TA9415H	403110/402160	46720/46790
TA10507H	910250/910251	JM738210/JM38249
TA12608H	912250/912251	LM742710/LM742749

Reducer Size	Countershaft Bearing – LH Side	
	Dodge Part Number	Timken Part Number
TA0107L	304833/304740	LM11710/LM11749
TA1107H	403165/402265	LM11910/LM11949
TA2115H	304836/411626-05-B	M12610/M12649
TA3203H	403101/402271	02820/02872
TA4207H	304809/304710	25821/25877
TA5215H	403005/402001	3820/3877
TA6307H	403026/906257	45220/45280
TA7315H	403159/907260	HM807010/HM807046
TA8407H	411626-06-BE/411626-05-BM	65500/65237
TA9415H	403036/304701	6320/6379
TA10507H	403087/402023	6420/6461
TA12608H	402233/912253	HH221410/HH221434

Reducer Size	Countershaft Bearing – Backstop (RH) Side	
	Dodge Part Number	Timken Part Number
TA0107L	304833/304740	LM11710/LM11749
TA1107H	403165/402265	LM11910/LM11949
TA2115H	304836/411626-05-B	M12610/M12649
TA3203H	403101/402271	02820/02872
TA4207H	304809/304710	25821/25877
TA5215H	403005/402001	3820/3877
TA6307H	403026/906257	45220/45280
TA7315H	403159/907260	HM807010/HM807046
TA8407H	411626-06-BE/908253	65500/65200
TA9415H	403036/304701	6320/6379
TA10507H	403087/402023	6420/6461
TA12608H	402233/912253	HH221410/HH221434

Reducer Size	Input Shaft Bearing – LH Side		
	Dodge Part Number	Timken Part Number	
TA0107L	5:1	403165/402265	LM11910/LM11949
	9:1		
	15:1		
	25:1		
	40:1		
TA1107H	5:1	403063/411626-05-AY	09195/09081
	9:1		
	15:1		
	40:1		
TA2115H	5:1	403094/304753	15245/15113
	9:1		
	15:1		
	40:1		
TA3203H	5:1	304809/411626-05-K	25821/25880
	9:1		
	15:1		
	25:1		
	40:1		
TA4207H	5:1	304809/411626-05-K	25821/25880
	9:1		
	15:1		
	40:1		
TA5215H	5:1	403005/402001	3820/3877
	9:1		
	15:1		
	40:1		
TA6307H	5:1	403026/906260	45220/45290
	9:1		
	15:1		
	40:1		
TA7315H	5:1	304802/402041	HM212011/HM212049
	9:1		
	15:1		
	40:1		
TA8407H	15:1	908259/908260	H414210/H414242
	25:1		
	40:1		
TA9415H	15:1	403036/304701	6320/6379
	40:1		
TA10507H	15:1	402231/402232	JH415610/JH415647
	25:1		
	40:1		
TA12608H	15:1	402231/402232	JH415610/JH415647
	25:1		
	40:1		

Reducer Size	Input Shaft Bearing – RH Side		
	Dodge Part Number	Timken Part Number	
TA0107L	5:1	403165/402265	LM11910/LM11949
	9:1		
	15:1		
	25:1		
	40:1		
TA1107H	5:1	403063/402108	09195/09067
	9:1		
	15:1		
	25:1		
	40:1		
TA2115H	5:1	403094/304707	15245/15101
	9:1		
	15:1		
	25:1		
	40:1		
TA3203H	5:1	403101/402271	02820/02872
	9:1		
	15:1		
	25:1		
	40:1		
TA4207H	5:1	904256/904257	2523/2585
	9:1		
	15:1	904256/904258	2523/2578
	25:1		
	40:1		
TA5215H	5:1	403005/402001	3820/3877
	9:1		
	15:1		
	25:1		
	40:1	403005/411626-05-V	3820/3875
TA6307H	5:1	403026/906260	45220/45290
	9:1		
	15:1	403026/906257	45220/45280
	25:1		
	40:1		
TA7315H	5:1	403159/907260	HM807010/HM807046
	9:1		
	15:1		
	25:1		
	40:1	403159/402054	HM807010/HM807040
TA8407H	15:1	908256/908257	HM813810/HM813844
	25:1	304804/908258	6220/6277
	40:1		
TA9415H	15:1	411626-06-BE/411626-05-BM	65500/65237
	25:1	304804/908258	6220/6277
	40:1		
TA10507H	15:1	411626-06-BE/411626-05-BM	65500/65237
	25:1	304804/908258	6220/6277
	40:1		
TA12608H	15:1	403036/304701	6320/6379
	25:1	403036/912258	6320/6381
	40:1		

Note: LH is input side of reducer, and RH is backstop or output side of reducer. Bearing part numbers refer to Timken Roller Bearing Cup/Cone combinations, respectively, and apply to all ratios unless otherwise specified. For actual reducer ratios, refer to Table 12.

**Table 11 – Replacement Parts Kit Numbers**

Reducer Size	Ratio	Seal Kit	Output Hub Assembly	Countershaft Assembly	Bearing Kit	
TA0107L	5:1	900126	900120	---	900128	
	9:1			900122	900129	
	15:1			900123		
	25:1			900124		
	40:1			900125		
TA1107H	5:1	901126	901120	---	901128	
	9:1			901122	901129	
	15:1			901123	901130	
	25:1			901124		
	40:1			901125		
TA2115H	5:1	902126	902120	---	902128	
	9:1			902122	902129	
	15:1			902123		
	25:1			902124		
	40:1			902125		902130
TA3203H	5:1	903126	903120	---	903128	
	9:1			903122	903129	
	15:1			903123		
	25:1			903124		
	40:1			903125		903130
TA4207H	5:1	904126	904120	---	904128	
	9:1			904122	904129	
	15:1			904123		
	25:1			904124		
	40:1			904125		904130
TA5215H	5:1	905126	905120	---	905128	
	9:1			905122	905129	
	15:1			905123		
	25:1			905124		905130
	40:1			905125		905131
TA6307H	5:1	906126	906120	---	906128	
	9:1			906122	906129	
	15:1			906123		
	25:1			906124		906130
	40:1			906125		
TA7315H	5:1	907126	907120	---	907128	
	9:1			907122	907129	
	15:1			907123		
	25:1			907124		
	40:1			907125		907130
TA8407H	15:1	908126	908120	908123	908129	
	25:1			908124	908130	
	40:1			908125		
				909123	909129	
TA9415H	25:1	909126	909120	909124	909130	
	40:1			909125		
				15:1		910123
TA10507H	25:1	910126	910120	910124	910130	
	40:1			910125		
				15:1		912123
TA12608H	25:1	912126	912120	912124	912130	
	40:1			912125		
				15:1		

Seal Kit consists of Input Seal, Output Seals, Backstop Cover Gasket and RTV Sealant.

Output Hub Assembly consists of Output Hub, Output Gear and Gear Key.

Countershaft Assembly consists of Countershaft Pinion, Countershaft Gear and Gear Key.

Bearing Kit consists of LH and RH Output Bearing Cup/Cone, LH and RH Countershaft Bearing Cup/Cone (double reduction only) and LH and RH Input Bearing Cup/Cone.





**InterSystems, Inc.**

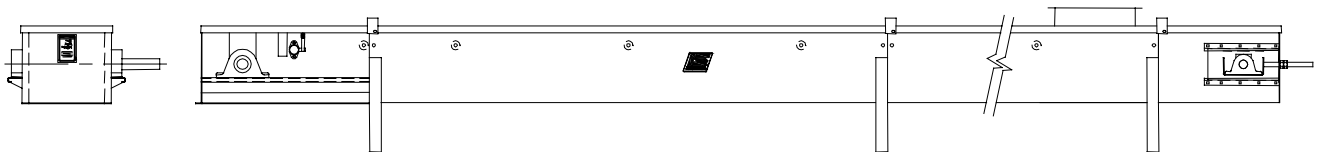
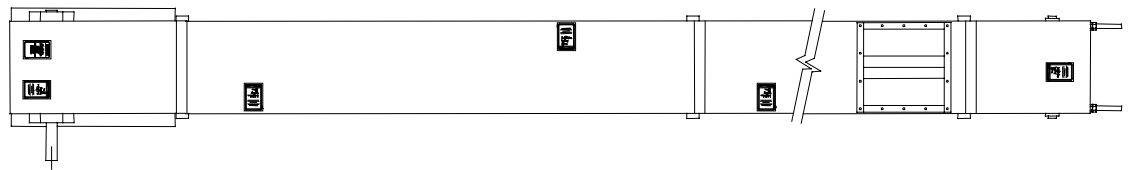
# **En Masse Conveyor Manual**

**Safety**

**Installation**

**Operation**

**Maintenance**

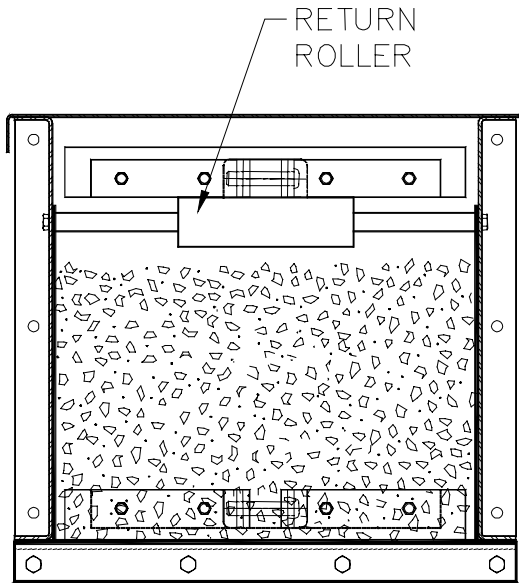


## II. INSTALLATION & STARTUP

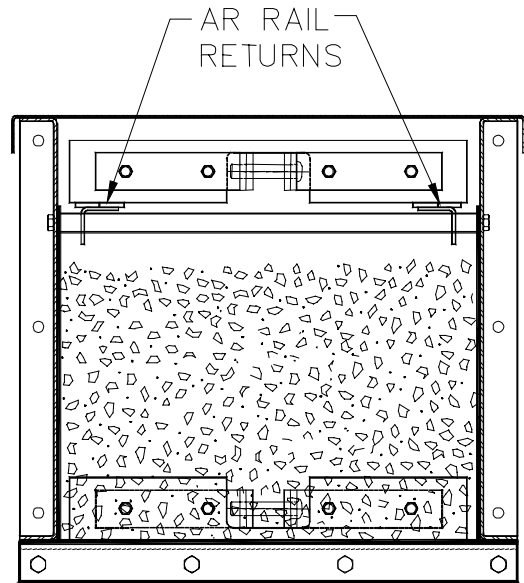
### 2.1 Receiving Inspection

Carefully inspect the shipment for damage upon arrival. Verify that the quantity of parts actually received corresponds to the quantity shown on the packing slip. One or more cartons containing the fasteners required for assembly are included with the shipment.

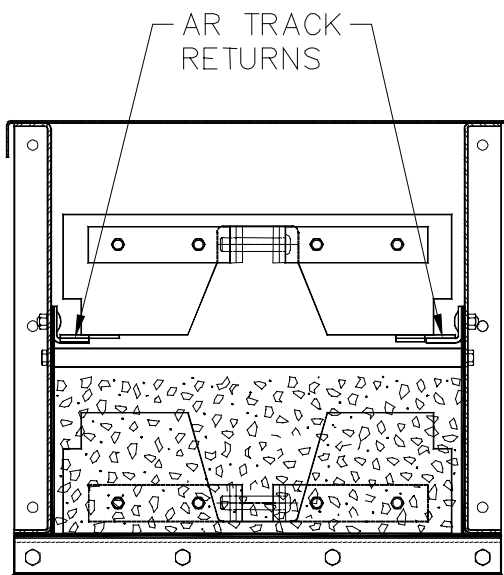
The four types of conveyors built by InterSystems are illustrated below. (Figure 1-1, 1-2, 1-3, and 1-4) Refer to the certified drawing that came with your equipment to verify your conveyor type.



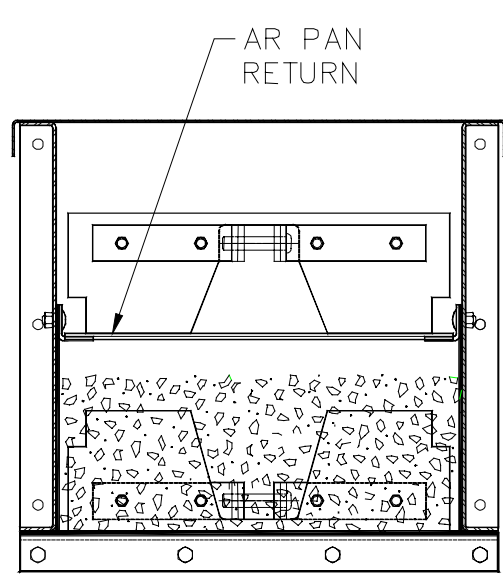
**Figure 1-1 Roller Return Conveyor**



**Figure 1-2 Rail Return Conveyor**



**Figure 1-3 Tall Flight Track Return Conveyor**





**Figure 1-4 Tall Flight Divider Pan Return Conveyor**

### 2.3 Placing Conveyor Sections on the Supporting Structure

The supporting structure should be in place and completely assembled before hoisting conveyor sections in place for assembly.

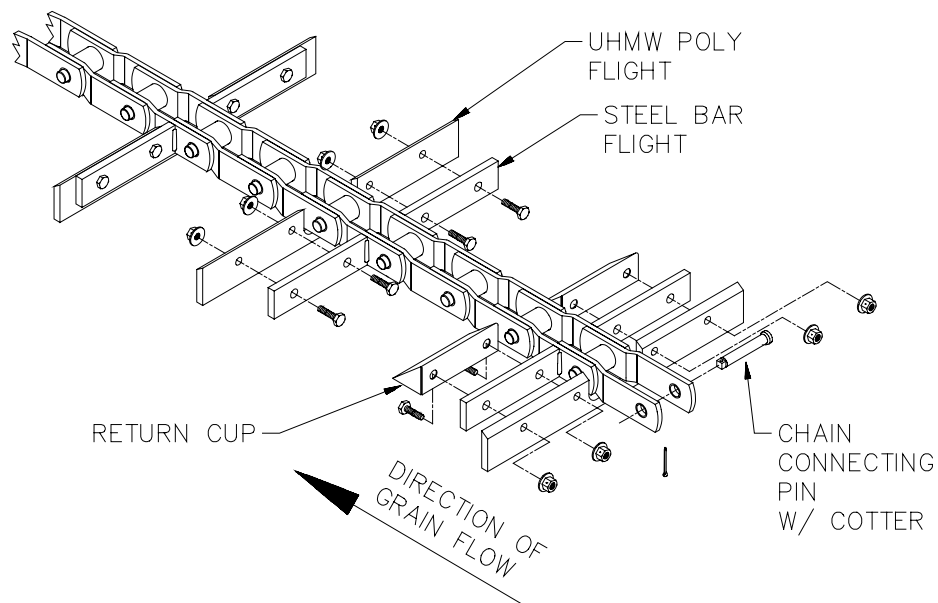
### 2.4 Conveyor Assembly

Conveyor installation usually begins by positioning the Head section over the discharge chute. Make certain there is sufficient room to allow the drive to be assembled on the head shaft before the entire conveyor is assembled. From that point, assembly works backwards through the intermediate sections, ending with the placement of the tail section. This is the generally accepted practice of conveyor installation. Your situation may dictate that assembly be done in some other order.

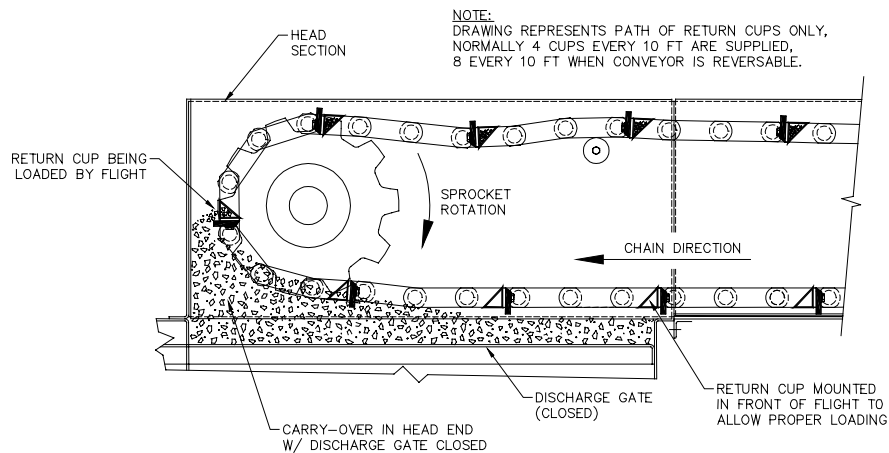
**DANGER**

**DO NOT ATTEMPT TO HOIST A COMPLETELY ASSEMBLED CONVEYOR INTO POSITION ONTO ITS SUPPORTING STRUCTURE. DEATH OR SERIOUS INJURY COULD RESULT TO ANYONE IN THE WORK AREA. BEFORE LIFTING ANY OF THE CONVEYOR SECTIONS, MAKE SURE HOISTING MACHINERY CAPACITY EXCEEDS THE WEIGHT OF THE HEAVIEST SECTION. ALSO MAKE CERTAIN THAT THE CHAINS, CABLES, OR SLINGS USED ARE RATED FOR OVERHEAD HOISTING DUTY AND OF SUFFICIENT LIFTING CAPACITY FOR THE HEAVIEST CONVEYOR SECTION TO BE LIFTED.**

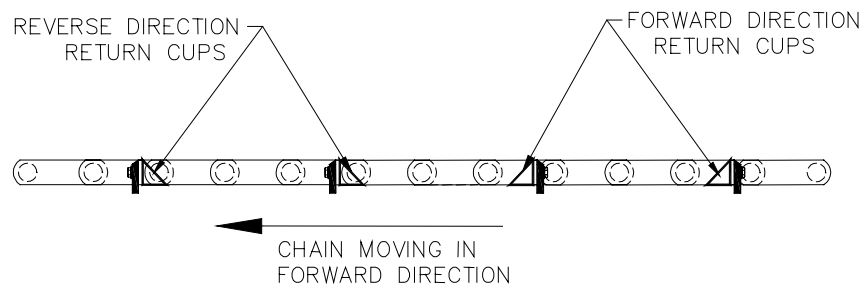
Study the drawing of the chain and flight details, **Figure 2-2**. As each conveyor section is set in place, verify that the chain flights are positioned as shown with respect to the direction of movement. It will be much easier to correct improperly assembled or positioned chain now than after conveyor assembly is complete. Also note the location of the return cups (if conveyor is equipped with intermediate discharge gates) See **Figure 2-2A**. The cups must be in front of the flight in order to fill properly. In the case of a reversing conveyor, the cups should alternate front and back. See **Figure 2-2B**.



**Figure 2-2, Conveyor Chain and Flight Details**



**Figure 2-2A, Return Cup Orientation for Standard Conveyors**



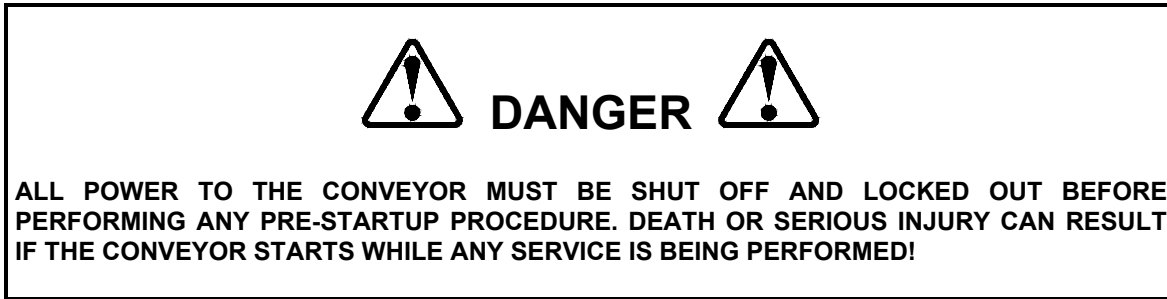
**Figure 2-2B, Return Cup Orientation for Reversing Conveyors**

- A. Position the head section over the discharge chute. Refer to **Figure 2-3A**. Note that head is not self supporting and must be attached to a transition or flange to operate properly. The transition must have a vertical flange on the intermediate section side.
- B. There will be one or more intermediate sections in a complete En Masse conveyor. Mate the first intermediate section with the head section. Loosely fasten sections together with 3/8" diameter hex head capscrews and nuts. Sections may be assembled in any order unless otherwise specified on the certified drawing.
- C. Attach a pair of optional support legs and complete fastening the two conveyor sections together as shown in **Figure 2-3B**. DO NOT TIGHTEN FASTENERS AT THIS TIME. Support legs are optionally furnished in right-hand/left-hand sets. One set is required at each conveyor section joint to insure proper alignment and support.



- D. Referring to **Figure 2-3B**, notice also that the bottom flanges of each conveyor section have several 3/8" diameter holes. As each conveyor section is assembled to the preceding section, drive bull-nose alignment pins through the matching pairs of the smaller 3/8" diameter holes. This arrangement insures that liners of adjoining conveyor sections form a smooth, even surface with no lip or ledge in which conveyed materials or flights might otherwise catch. Use a straightedge to verify that the liner surfaces of adjoining conveyor sections are even. If they are not, find and correct the problem.
- E. As each conveyor section is mated with the preceding section, remove the lids and connect the sections of chain. The connecting pins and cotterpins were inserted in one of the end links at the factory.
- F. FOR PARTIALLY INCLINED CONVEYORS ONLY! A Knee Section Assembly must be assembled to the conveyor at the point of transition between the horizontal and the inclined portions of the conveyor. Refer To **Figure 2-4**. First temporarily remove the carriage bolts which fasten the liners to the conveyor sides at the junction where the Knee Section is to be installed. Next loosely bolt the side and bottom flanges of the Knee Section to the flanges of the other conveyor sections. Next, reinsert the carriage bolts through the holes in the shoe weldment tabs, through the liners, and the trough sides.
- G. CONVEYORS WITH DIVIDED FLOW INLETS ONLY! If the conveyor includes a Divided Flow Inlet Assembly, it is usually assembled to the conveyor immediately preceding the tail section. See **Figure 2-7B**.
- H. Continue to assemble conveyor sections as explained in Steps B through E until all conveyor sections are assembled.
- I. Install tail section as shown in **Figure 2-3C**. Make certain at this time that the take-up is in the full forward position to allow easy connection of chain.
- J. Tighten all the fasteners.
- K. Drive out the alignment pins. Replace them with 3/8" diameter hex head capscrews and nuts which have been furnished with the conveyor. This is done to prevent pins from vibrating out and potentially causing injury to persons or property below the conveyor.
- L. Connect chain sections by pressing in the provided connecting pins. Make certain all flights and return cups are facing the correct direction. (See **Figure 2-2, 2-2A & 2-2B**).
- M. This completes the assembly of the basic conveyor.

## 2.5 Pre-Startup Procedure



### 2.5.1 Initial Lubrication

#### 2.5.1.1 Filling The Reducer With Lubricant

The conveyor's drive reducer is shipped without lubricant (dry). Referring to the documentation furnished with the optional reducer, fill the reducer gearcase with the recommended lubricant to the specified level. All lubricants to be supplied by others.

#### 2.5.1.2 Mounted Bearings

The mounted bearings in the head and tail sections were filled with lubricant from the manufacturer and do not require relubrication at this time.

#### 2.5.1.3 Conveyor Chain

DO NOT lubricate the conveyor chain. It is designed to run dry. Any lubricant will cause dirt and residue from the conveyed material to accumulate on the chain, causing rapid, premature wear.

### 2.5.2 Head Shaft Alignment

Verify that the head shaft is truly perpendicular to the conveyor axis and that the sprocket is centered on the shaft. A misaligned shaft or incorrectly positioned sprocket will cause rapid chain, sprocket, and flight wear.

### 2.5.3 Initial Tail Section (Takeup) Adjustment

- A. Remove the first unobstructed cover from the intermediate section nearest the tail section.
- B. Turn the inner nuts to apply tension evenly to both takeup screws. The chain is properly tensioned when there is 1/4" to 1/2" sag between return rollers in a standard length intermediate section. NOTE: If conveyor is equipped with rail return, check the chain as it comes off of the head sprocket, as this is where ALL the slack will accumulate.

**NOTE: TOO MUCH CHAIN TENSION IMPOSES EXCESSIVE LOAD ON BEARINGS, SHAFTS, AND CHAIN, RESULTING IN INCREASED WEAR.**

- C. Verify that the tail shaft is truly perpendicular to the conveyor axis and that the sprocket is centered on the shaft. A misaligned shaft or incorrectly positioned sprocket will cause rapid chain, sprocket, and flight wear.
- D. If the conveyor has a knee section, the chain must be sufficiently slack so that the upper or return strand of chain does not rub against the cover of the knee section.
- E. Retighten the takeup screw locking nuts. Replace any trough covers removed.
- F. After the conveyor has operated for approximately 100 hours, the chain may "stretch" or (wear), taking an initial set and requiring readjustment.

### **2.5.4 General Safety & Housekeeping**

DO THIS BEFORE POWER IS APPLIED TO THE CONVEYOR.

- A. Make sure all guards are in place and all warning labels are in place and legible. Section I, GENERAL SAFETY INFORMATION, explains the purpose and intended location of the warning signs. Section I also lists the part numbers of the signs. Warning signs are an important part of any safety program; replace any missing signs IMMEDIATELY!
- B. Make certain all electrical connection box covers are in place and securely fastened. Check for exposed wiring and damaged conduit
- C. Inspect the inside of the conveyor for tools, or anything else that could cause damage on startup.
- D. Verify that all trough covers are in place and firmly held in place by the appropriate extension spring clip assemblies and snap lid clips.

### **2.6 Startup**

- A. For the initial startup, the conveyor should be empty.
- B. Depending on the conveyor length and configuration, station one or more persons to listen and watch for potentially dangerous or damaging conditions.
- C. Turn the conveyor ON. If there is provision for JOGGING the conveyor, do so rather than operate it continually. Verify correct direction of motor rotation. Reverse conveyor operation may damage chain and flights. unless the conveyor was designed and furnished for reversible operation. If necessary, rearrange motor wiring for correct direction of motor rotation.
- D. Regardless of the mode of operation, listen for any unusual sound indicating that foreign material was left in the conveyor and is dragging, scraping, or jamming the equipment. Listen carefully at each conveyor joint to make sure the flights are not catching or snagging any of the liner seams. If the conveyor has any discharge gates, listen carefully to make sure the flights are not snagging any of the cutout areas. If the conveyor includes a knee section, listen to make sure the chain moves through without jerking or contacting the cover.
- E. Shutdown the conveyor. Lock out all power.

- F. Remove the cover from an intermediate section. Inspect the flights for any grooves which would indicate a burr or sharp edge somewhere in the conveyor. If a problem is discovered, find the cause and correct it immediately. Slight, even discoloration of the contact surfaces of flights and liner is normal. In fact, the mutual polishing action reduces friction.
- G. Recheck chain tension as detailed in Paragraph 2.5.3, Initial Tail Section (Takeup) Adjustment. Apply a protective coating to the takeup screw threads to prevent rust and corrosion. Future takeup adjustments will be much easier if this is done.
- H. After correcting any problems detected during initial conveyor operation, replacing any guards or covers removed, and observing all safety precaution, proceed to test the conveyor with the product or material to be conveyed in normal operation. Since InterSystems, Inc. is not responsible for system integration or controls, a system test procedure is beyond the scope of this manual.

## 2.7 Conveyor Dry Run Time

### **DO NOT RUN THE CONVEYOR EMPTY FOR EXTENDED PERIODS OF TIME !**

*IT IS IMPORTANT THAT CONVEYOR DRY RUN TIME WITH NO MATERIAL BEING CONVEYED*

*KEPT TO A MINIMUM* . Dry running in excess of 5 minutes will cause acoustic vibration of the bar flights and can lead to metal fatigue. This may result in bar flights becoming detached from chain, causing damage to the conveyor and any other equipment down stream. Conveyor should be electrically interlocked for proper operation sequences and shut down, and/or operating personnel given adequate training procedures.

### III. MAINTENANCE AND REPAIR

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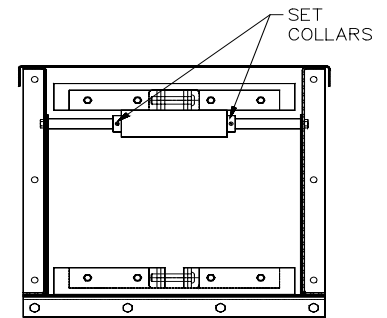
#### 3.1 General Maintenance

A good maintenance program involves thorough general housekeeping, adequate periodic relubrication, and timely adjustment of takeups to maintain proper chain tension.

#### 3.2 Periodic Inspection

At regularly scheduled intervals, while observing all safety precautions, observe the conveyor as it operates. Inspect for:

- A. Loose or missing hardware, in particular:
  - 1. Flight mounting fasteners
  - 2. Return roller mounting screws and set collars.
  - 3. Setscrews that lock return roller locating setcollars to the roller shafts. If the rollers slip sideways on their shafts, the chain will bear directly on the shafts instead of the rollers. Rapid wear and extensive damage will occur very rapidly.
  - 4. Check and tighten all sprocket set screws.
- B. Noisy bearings, motor, or reducer
- C. Overheated bearings, motor, or reducer
- D. Structural damage
- E. Rust or corrosion
- F. Damaged wiring, including exposed conductors and connections
- G. Periodically shut off and lockout all power to the conveyor. Check the CHOKE/CHAIN BREAK switch to see that it actuates and restores smoothly.



**Figure 3-1, Typical Return Roller Cross Section**



- H. Check chain and flights for damage due to foreign object caught in conveyor. Replace damaged poly-flights with new. Straighten bar flights which have been bent. If bars have been bent more than two times, the chain section should be replaced. **DO NOT ATTEMPT TO REWELD BARS ONTO THE CHAIN!** Special preheating procedures must be followed or the heat treated chain side bars can become brittle and cause chain failure. Consult InterSystems on this procedure.
- I. Make sure that all guards are in place and that all warning labels are in place and legible. Section I, GENERAL SAFETY INFORMATION, explains the purpose and intended location of the warning signs. Section I also lists the part numbers of the signs. Warning signs are an important part of any safety program; replace any missing signs IMMEDIATELY!

### **3.3 Lubrication Information**

#### **3.3.1 Reducer**

Refer to the documentation furnished with the reducer. The user must interpret the data therein in light of the severity of duty in each application. If there is any doubt, contact the manufacturer or a local supplier of the reducer for specific recommendations.

#### **3.3.2 Motor**

Many motors have sealed and permanently lubricated bearings; with these, no relubrication is possible or desirable. If bearings of this type becomes noisy or overheat, they must be replaced.

Motors having bearings which can be re-lubricated are usually larger integral horsepower sizes. Special pressure lubricating equipment may be required. Refer to the documentation furnished with the motor.

#### **3.3.3 Mounted Bearings**

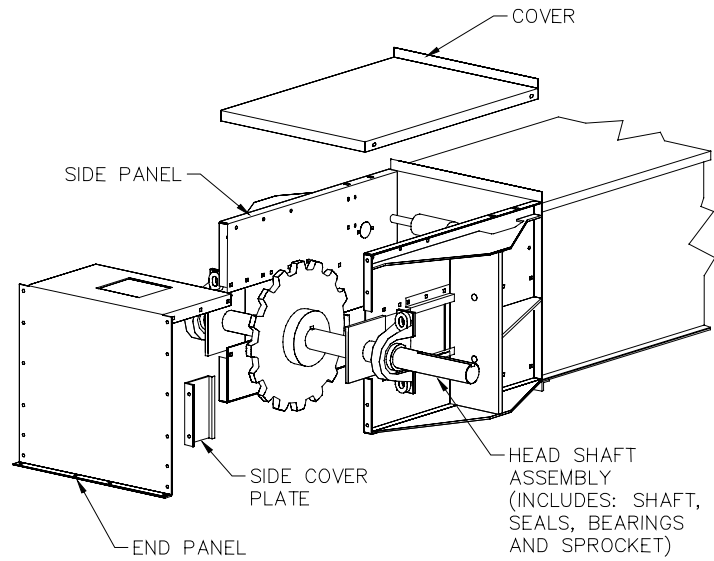
Mounted bearings require periodic relubrication at appropriate intervals. The amount and frequency depends in large extent upon the severity of the operating environment and the duty cycle.

Inject each mounted bearing with an NLGI #2 grease, Lubri-Plate "Multi-Lube A " for example. Inject only enough lubricant so that a slight bead can be seen to form around the seal. The appearance of the bead indicates that the bearing has been filled adequately and helps purge and exclude contaminants from the bearing cavity.

#### **3.3.4 Roller Chain Drive**

For conveyors which include InterSystems, Inc. supplied chain drives, the lubricant level in the chain case/cover should be maintained at a high enough level to immerse the lower sprocket teeth and roller chain. It obviously must not be so high as to leak from the joints in the chain case. **Figure 2-8B** shows a typical chain drive.

Chain lubricant should be examined at appropriate intervals and changed whenever it is dirty or yearly, whichever occurs first. Use heavyweight 140 Wt. gearlube.



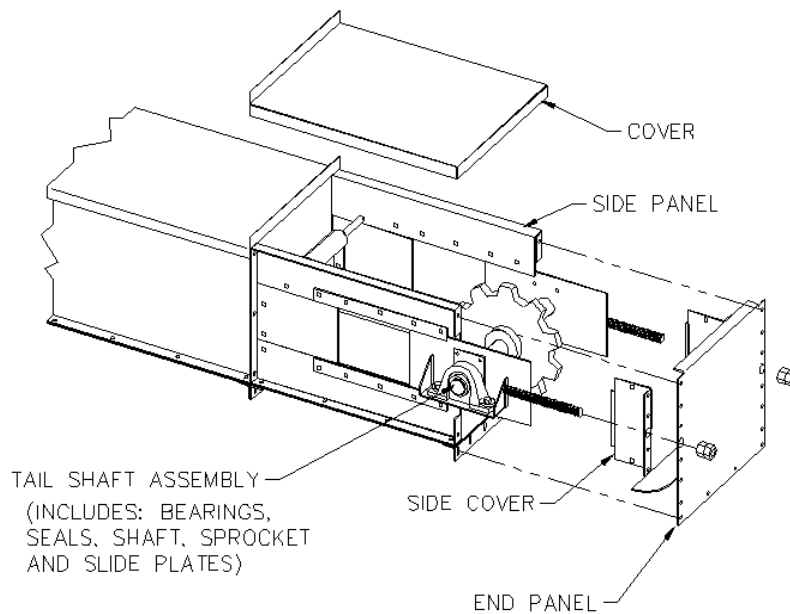
**Figure 3-1B, 26" Head Shaft Removal and Reinstallation**

### 3.5.2 Tail Shaft Assembly Removal

Refer to **Figure 3-1B**.

Remove the tail shaft ONLY AFTER the chain has been separated at the tail sprocket per Subsection 3.5.

- A. Remove the fasteners attaching the tail section end panel to the side and bottom panel. Save the fasteners.
- B. Separate the chain from the sprocket.
- C. Pull the shaft assembly from the tail section.



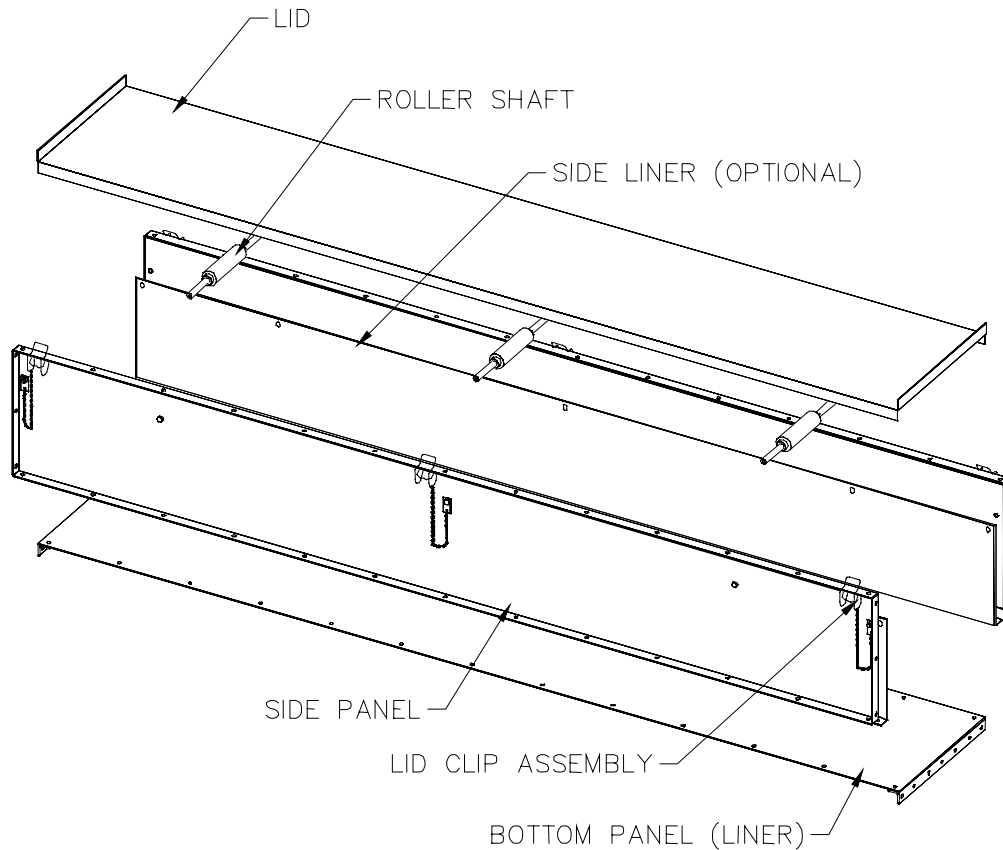
**Figure 3-1C, Tail Shaft Removal and Reinstallation**

### 3.5.3 Head And Tail Shaft Reinstallation

Reinstallation of either the head or the tail shaft is essentially the reverse of the removal process. Then re-splice the chain. A comealong may be required to stretch the chain to allow it to be re-spliced after the shaft assembly is reinstalled.

### 3.6 Conveyor Trough Panel and Liner Replacement

Trough panels and liners can be replaced without disconnecting the chain and flights. The following procedures reference side panel liner replacement. Follow the same procedures for side or bottom panel replacement. Refer to **Figure 3-2**



**Figure 3-2, Trough Liner and Panel Replacement**



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## General Info

-  [Selection](#)
-  [Nameplate](#)
-  [Major Motor Types](#)
  -  [AC Motors](#)
  -  [DC Motors](#)

 [Mechanical](#)

 [Electrical](#)

 [Metric IEC](#)

 [Maintenance](#)

 [Reference](#)

 [Conversions/Formulas](#)

 [Glossary](#)

## General Information

### Introduction

Electric motors are the workhorse of the industry. Many applications exist where more than one motor can be used or the exact replacement is not available. LEESON makes every effort to maximize interchangeability, mechanically and electrically, where compromise does not interfere with reliability and safety standards. If you are not certain of a replacement condition, contact any LEESON [Sales Office](#) or LEESON Authorized Distributor.

### Selection

Identifying a motor for replacement purposes or specifying a motor for new applications can be done easily if the following information is known :

- Nameplate Data
- Motor Type
- Mechanical Construction
- Electrical and Performance Characteristics

Much of this information consists of standards defined by the National Electrical Manufacturers Association (NEMA). These standards are widely used throughout North America. In other parts of the world, the standards of the International Electrotechnical Commission (IEC) are most often used.

[back](#)

## Nameplate Data

### Description

Nameplate data is the most important first step in determining motor replacement. Much of the information needed can be generally obtained from the nameplate of the motor to be replaced. Take time to record nameplate information because it can save time, avoid confusion and misapplication.

### Important Nameplate Data

#### Catalog Number

#### Motor Model Number

#### Frame

#### Type

(classification varies from manufacturer to manufacturer.)

#### Phase

single, three or direct current.

#### HP

horsepower rated at full load speed.

#### HZ

frequency in cycles per second. Usually 60hz in USA, 50hz overseas.

#### RPM

revolutions per minute of the shaft at full load.

#### Voltage



<b>Amperage (F.L.A)</b>	full load motor current.
<b>Maximum ambient temperature in centigrade</b>	usually +40° C (104° F).
<b>Duty</b>	most motors are rated continuous. Some applications, however may use motors designed for intermittent, special, 15, 30 or 60 minute duty.
<b>NEMA electrical design</b>	B, C and D are most common. Design letter represents the torque characteristics of the motor.
<b>Insulation class</b>	standard insulation classes are B, F and H. NEMA has established safe maximum operating temperatures for motors. This maximum temperature is the sum of the maximum ambient and maximum rise at ambient temperature.
<b>Code</b>	indicated locked rotor kVA per horsepower.
<b>Service factor</b>	a measure of continuous overload capacity.

[back](#)

## Major Motor Types

### Alternating Current (AC) Motors

Alternating current (AC) motors are divided into two electrical categories based on their power source.

#### 1. Single Phase Motors

- [Capacitor Start / Induction Run](#)
- [Capacitor Split Capacitor Run](#)
- [Permanent Split Capacitor \(PSC\)](#)

#### 2. Polyphase (three phase)

##### Capacitor Start/Induction Run

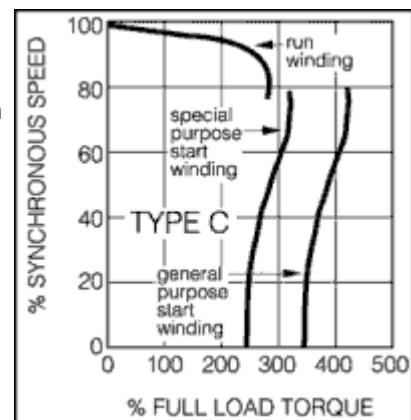
A single phase general purpose design, with an electrolytic capacitor in series with the start winding, offering maximum starting torque per ampere.

A centrifugal switch removes the auxiliary winding and capacitor when the motor approaches full load speed. The design is a heavy duty unit which has approximately 300% (of full load) starting torque. Common applications include compressors, pumps conveyors and other "hard-to-start" applications.

##### Capacitor Start/Capacitor Run

A single phase general purpose design, with an electrolytic capacitor in series with the start winding, offering maximum starting torque per ampere.

A second run capacitor remains in series with the auxiliary winding during full load operation. This type of design has lower full-load amps as a result of the run capacitor and is consequently used on most higher horsepower single phase motors.



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**Maintenance**

**Introduction**

1. Motors, properly selected and installed, are capable of operating for many years with a reasonably small amount of maintenance.
2. Before servicing a motor and motor-operated equipment, disconnect the power supply from motors and accessories. Use safe working practices during servicing of the equipment.
3. Clean motor surfaces and ventilation openings periodically, preferably with a vacuum cleaner. Heavy accumulations of dust and lint will result in overheating and premature motor failure.

**Lubrication Procedure**

Motors 10 HP and smaller are usually lubricated at the factory to operate for long periods under normal service conditions without re-lubrication. Excessive or too frequent lubrication may actually damage the motor. Follow instructions furnished with the motor, usually on the nameplate or terminal box cover or on a separate instruction. If instructions are not available, re-lubricate according to the following chart. Use high quality ball bearing grease. Grease consistency should be suitable for the motor's insulation class. For Class B, F or H use a medium consistency polyurea grease such as Shell Dolium R.

If the motor is equipped with lubrication fitting, clean the fitting tip and apply grease gun. Use 1 to 2 full strokes on NEMA 215 frame and smaller motors. Use 2 to 3 strokes on NEMA 254 through NEMA 365 frame. Use 3 to 4 strokes on NEMA 404 frames and larger. For motors that have grease drain plugs, remove the plugs and operate the motor for 20 minutes before replacing the plugs.

For motors equipped with slotted head grease screws, remove the screw and insert a two to three-inch long grease string into each hole on motors in NEMA 215 frame and smaller.

Insert a three to five-inch length on larger motors. For motors having grease drain plugs, remove the plug and operate the motor for 20 minutes before replacing the plugs.

**Relubrication Intervals Chart For Motors Having Grease Fittings**

Hours of Service Per Year	HP Range	Hours of Relube Value
5000	1/18 to 7 1/2	5 years
	10 to 40	3 years
	50 to 100	1 years
	to 7 1/2	2 years
	10 to 40	1 years
Continuous Normal Applications	50 to 100	9 months
	ALL	1 year (beginning of season)
Seasonal Service - Motor is idle for 6 months or more		

**Continuous high ambient,  
high vibration or where  
shaft end is hot**

**1/8 to 40  
50 to 150**

**6 months  
3 months**

**Caution:** Keep grease clean. Lubricate motors at a standstill. Do not mix petroleum grease and silicone grease in motor bearings.

[back](#)

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Also see our [Technical Reference Guide](#) and the [Installation & Operation Manuals](#) in [Literature](#).

## WARRANTIES AND LIMITATIONS OF LIABILITY

LEESON Electric warrants to the Buyer that its motors, gearmotors, DC controllers, and AC drives are free from defects in workmanship and materials when operated under normal conditions and in accordance with nameplate characteristic limits. This warranty shall be in effect for a period of 12 months from date of installation, but in no event be in effect for more than 24 months from date of manufacture, with the following exceptions: 1) EPACT motors ("G" prefix), which are warranted for a period of 24 months from date of installation but for not more than 30 months from date of manufacture, 2) Wattsaver<sup>®</sup> Premium Efficiency three phase motors and Speedmaster Inverter-Duty motors are warranted for a period of 36 months from the date of installation but for not more than 42 months from the date of manufacture, & 3) Motor brakes provided as coupler brakes, brake kits, or as part of brakemotors are covered by the manufacturers (Stearns or Dings) warranties.

LEESON Electric's sole obligation under the foregoing warranties is limited to either, at LEESON Electric's option, replacing or repairing defective goods (or defective parts thereof) within the warranty period. LEESON Electric shall not be liable under any circumstances, for consequential or incidental damages, including, but not limited to personal injury or labor costs. This warranty does not cover the cost of removal, installation, or re-testing of the new or repaired goods or parts, or any other direct or incidental expenses incurred in shipping the product to or from LEESON Electric. Replacement goods or parts are warranted for the remainder of the warranty period applicable to the goods originally supplied by LEESON Electric. All claims for allegedly defective goods must be made within 10 days after Buyer learns of such alleged defects. All claims not made in writing and received by LEESON Electric within such 10 day period shall be deemed waived. With prior approval from LEESON Electric, Buyer shall return a sample of the alleged defective part, freight prepaid, for LEESON Electric's inspection, and no other goods shall be returned to LEESON Electric's District Office/Warehouse, nearest factory, or Authorized Service Center without LEESON Electric's written consent. This warranty shall not extend to goods subjected to misuse, abuse, neglect, accident or improper installation or maintenance, incorrect lubrication, incorrect electrical connection, improper power supply, or goods which have been altered or repaired by anyone other than LEESON Electric or its authorized representative.

Under no circumstances will LEESON Electric be responsible for any expense in connection with any repairs made by anyone other than the factory or an Authorized Service Center, unless such repairs have been specifically authorized in writing.

In the case of motors, drives, gears and reducers manufactured or marketed by LEESON Electric, LEESON Electric warrants only that such products, when shipped, shall be capable of delivering the service rating as indicated in LEESON Electric's written documents, including quotations and catalogs or as noted on such products, providing such equipment is properly installed, connected, and maintained, correctly lubricated, operating under normal conditions with competent supervision, and within the load limits and voltage range for which it was sold, and provided further that the equipment is free from critical speed, torsional or other type vibration, no matter how induced.

If any prototype or sample was provided to the Buyer, it was used merely to illustrate the general type and quality of goods and not to warrant that goods shipped would be of that type or quality.

UNLESS AUTHORIZED IN WRITING BY A CORPORATE OFFICER OR VICE PRESIDENT, NO AGENT, EMPLOYEE OR REPRESENTATIVE OF LEESON ELECTRIC HAS ANY AUTHORITY TO BIND LEESON ELECTRIC TO ANY AFFIRMATION, REPRESENTATION OR WARRANTY CONCERNING THE GOODS SOLD UNDER THE SALES CONTRACT AND ANY SUCH AFFIRMATION, REPRESENTATION OR

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Products manufactured and work not performed by LEESON Electric are warranted only to the extent and in the manner that the same are warranted to LEESON Electric by LEESON Electric's vendors, and then only to the extent that LEESON Electric is reasonably able to enforce such warranty. In enforcing such warranty, it is understood LEESON Electric shall have no obligation to initiate litigation unless Buyer undertakes to pay all costs and expenses therefor, including but not limited to Attorney's fees, and indemnifies LEESON Electric against any liability to LEESON Electric's vendors arising out of such litigation.

THE FOREGOING IS LEESON ELECTRIC'S ONLY OBLIGATION AND BUYER'S EXCLUSIVE REMEDY FOR BREACH OF WARRANTY. BUYER'S FAILURE TO SUBMIT A CLAIM AS PROVIDED ABOVE SHALL SPECIFICALLY WAIVE ALL CLAIMS FOR DAMAGES OR OTHER RELIEF INCLUDING BUT NOT LIMITED TO CLAIMS BASED ON LATENT DEFECTS. IN NO EVENT SHALL BUYER BE ENTITLED TO INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES, NOR SHALL LEESON ELECTRIC'S LIABILITY EXCEED THE PURCHASE PRICE OF THE GOODS. ANY ACTION ARISING HEREUNDER OR RELATED HERETO MUST BE COMMENCED WITHIN ONE (1) YEAR AFTER THE CAUSE OF ACTION OCCURS OR IT SHALL BE BARRED, NOTWITHSTANDING ANY STATUTORY PERIOD OF LIMITATIONS TO THE CONTRARY.

In the event of the resale of any of the goods, in whatever form, Buyer will include the following language in a conspicuous place and in a conspicuous manner in a written agreement covering such resale: "THE MANUFACTURER MAKES NO WARRANTIES OR REPRESENTATIONS, EXPRESS OR IMPLIED, BY OPERATION OF LAW OR OTHERWISE, AS TO THE MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE GOODS SOLD HEREUNDER. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE GOODS PURCHASED HEREUNDER WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. IN NO EVENT WILL MANUFACTURER BE LIABLE FOR CONSEQUENTIAL, INCIDENTAL OR OTHER DAMAGES."

frequency	11%	Decrease 5%	no change	Decrease 5%	Decrease	Decrease	Decrease	Decrease	Decrease	Decrease
1% Unbalance	Slight Decrease	Slight Decrease		Slight Decrease	2% Decrease			5-6% Decrease		
2% Unbalance	Slight Decrease	Slight Decrease		Slight Decrease	8% Decrease			7% Decrease		

**NOTE:** *This table shows general effects, which will vary somewhat for specific ratings.*

## LOCATION

This motor is suitable for Class 1, Group D, Class 11, Group F & G, Division 2 application. See the National Electric Code (NEC) for classification definition. In addition the motor should be installed in a location compatible with the motor enclosure and ambient.

**WARNING:** *THIS MOTOR IS NOT SUITABLE FOR DIVISION I APPLICATION.*

## LIFTING MEANS

**WARNING:** *WHEN A LIFTING MEANS IS PROVIDED FOR HANDLING THE MOTOR OR GENERATOR, IT SHOULD NOT BE USED TO LIFT THE MOTOR OR GENERATOR PLUS ADDITIONAL EQUIPMENT SUCH AS GEARS, PUMPS, COMPRESSORS, OR OTHER DRIVEN EQUIPMENT.*

In the case of assemblies on a common base, any lifting means provided on the motor or generator should not be used to lift the assembly and base but, rather, the assembly should be lifted by a sling around the base or by other lifting means provided on the base. In all cases, care should be taken to assure lifting in the direction intended in the design of the lifting means. Likewise, precautions should be taken to prevent hazardous overloads due to deceleration, acceleration or shock forces.

## DRIVE

The pulley, sprocket, or gear used in the drive should be located on the shaft as close to the shaft shoulder as possible. Heat to install. Driving a unit on the shaft will damage the bearings.

Belt Drive: Align the pulleys so that the belt will run true; tighten the belt just enough to prevent slippage, any tighter will cause premature bearing failure. If possible, the lower side of the belt should be the driving side.

Chain Drive: Mount the sprocket on the shaft as close to the bracket as possible. Align the sprockets so that the chain will run true. Avoid excessive chain tension.

Gear Drive and Direct Connection: Accurate alignment is very essential. Secure the motor and driven unit rigidly to the base.

## ROTATING PARTS

**WARNING:** *ROTATING PARTS, SUCH AS COUPLINGS, PULLEYS, EXTERNAL FANS, AND UNUSED SHAFT EXTENSIONS, SHOULD BE PERMANENTLY GUARDED AGAINST ACCIDENTAL CONTACT WITH HANDS OR CLOTHING. THIS IS PARTICULARLY IMPORTANT WHERE THE PARTS HAVE SURFACE IRREGULARITIES SUCH AS KEYS, KEYWAYS OR SET SCREWS. SOME SATISFACTORY METHODS OF GUARDING ARE:*

1. Covering the machine and associated rotating parts with structural or decorative parts of the driven or driving equipment.



2. Providing covers for the rotating parts. The openings in or at the edges of such covers should not be over 1/2 inch wide (3/4 inch if the rotating parts are more than 4 inches from the opening) in the direction, usually above and to the side, from which contact is to be expected. In other directions where other stationary parts, such as a sub-base provide partial guarding, somewhat wider openings may be used. Covers should be sufficiently rigid to maintain adequate guarding in normal service.

## WIRING

Connect the motor to the power supply according to the diagram on the motor nameplate. For most 230 and 460 volt motors, nine leads are brought out from the stator windings so that the motor may be connected for either 230 or 460 volts.

## GROUNDING

**WARNING:** *THE FRAMES AND OTHER METAL EXTERIORS OF MOTORS AND GENERATORS (EXCEPT FOR INSULATED PEDESTAL BEARINGS) USUALLY SHOULD BE GROUNDED TO LIMIT THEIR POTENTIAL TO GROUND IN THE EVENT OF ACCIDENTAL CONNECTION OR CONTACT BETWEEN LIVE ELECTRICAL PARTS AND THE METAL EXTERIORS.*

See the National Electrical Code, Article 430 for information ,on grounding of motors, Article 445 for grounding of generators, and Article 250 for general information on grounding. In making the ground connection, the installer should make certain that there is a solid and permanent metallic connection between the ground point, the motor or generator terminal housing, and the motor or generator frame. A common method of providing a ground is through a grounded metallic conduit system.

Motors with resilient cushion rings are usually supplied with a bonding conductor across the resilient member. Some motors are supplied with the bonding conductor on the concealed side of the cushion ring to protect the bond from damage. Motors with bonded cushion rings should usually be grounded at the time of installation in accordance with the above recommendations for making ground connections. When motors with bonded cushion rings are used in multimotor installations employing group fusing or group protection, the bonding of the cushion rind should be checked to determine that it is adequate for the rating of the branch circuit over-current protective device being used.

There are applications where grounding the exterior parts of a motor or generator may result in greater hazard by increasing the possibility of a person in the area simultaneously contacting ground and some other nearby live electrical part of other ungrounded electrical equipment. In portable equipment it is difficult to be sure that a positive ground connection is maintained as the equipment is moved, and providing a grounding conductor may lead to a false sense of security.

**WARNING:** *WHEN CAREFUL CONSIDERATION OF THE HAZARDS INVOLVED IN A PARTICULAR APPLICATION INDICATE THE MACHINE FRAMES SHOULD NOT BE GROUNDED OR WHEN UNUSUAL OPERATING CONDITIONS DICTATE THAT A GROUNDED FRAME CANNOT BE USED, THE INSTALLER SHOULD MAKE SURE THE MACHINE IS PERMANENTLY AND EFFECTIVELY INSULATED FROM THE GROUND. IN THOSE INSTALLATIONS WHERE THE MACHINE FRAME IS INSULATED FROM GROUND, IT IS RECOMMENDED THAT APPROPRIATE WARNING LABELS OR SIGNS BE PLACED ON OR IN THE AREA OF THE EQUIPMENT BY THE INSTALLER.*

## STARTING

**CAUTION:** *Check direction of motor rotation before coupling motor to load.*

**WARNING:** *BEFORE STARTING MOTOR, REMOVE ALL UNUSED SHAFT KEYS AND LOOSE ROTATING PARTS TO PREVENT THEM FROM FLYING OFF.*

1. The rotor should turn freely when disconnected from the load.
2. Driven machine should be unloaded when first starting the motor.

The motor should run smoothly with little noise. If the motor should fail to start and produces a decided hum, it may be that the load is too great for the motor or that it has been connected improperly. Shut down immediately and investigate for trouble.

## THERMOSTAT

The motor is provided with thermostats to prevent the surface temperature of the motor from exceeding 165 degrees C. Failure to connect the thermostat leads (normally identified as P, and P2) will violate the motor warranty.

## DRAIN PLUGS

The motor is provided with automatic condensate drains. They are located in the lower portion of the end shield(s).

## ROTATION

To reverse the direction of rotation, disconnect from power source and interchange any two of the three line leads for three phase motors.

## TEST FOR GENERAL CONDITION

If the motor has been in storage for an extensive period or has been subjected to adverse moisture conditions, it is best to check the insulation resistance of the stator winding with a megohmmeter.

**WARNING:** SURFACE TEMPERATURE OF MOTOR ENCLOSURE MAY REACH TEMPERATURES WHICH CAN CAUSE DISCOMFORT OR INJURY TO PERSONNEL ACCIDENTALLY COMING INTO CONTACT WITH HOT SURFACES. (WHEN INSTALLING, PROTECTION SHOULD BE PROVIDED BY USER TO PROTECT AGAINST ACCIDENTAL CONTACT WITH HOT SURFACE.

If the resistance is lower than one megohm the windings should be dried in one of the two following ways:

1. Bake in oven at temperatures not exceeding 90 degrees C. until insulation resistance becomes constant.
2. With rotor locked, apply low voltage and gradually increase current through windings until temperature measured with thermometer reaches 194 degrees F. Do not exceed this temperature.

## INITIAL LUBRICATION

"Reliance Electric motors are shipped from the factory with the bearings properly packed with grease and ready to operate. Where the unit has been subjected to extended storage (6 months or more) the bearings should be relubricated prior to starting."

## MOUNTING

Mount the motor on a foundation sufficiently rigid to prevent excessive vibration. Roller bearing and ball bearing motors may be mounted with the shaft horizontal, with the feet at any angle. Roller bearing motors are not suitable for coupled duty applications. After carefully aligning the motor with the driven unit, bolt securely in place.

When motors, which are normally mounted with the shaft in a horizontal position, are mounted vertically, it may be necessary to provide additional guards to prevent foreign objects from falling into the motor openings and striking rotating parts. Such guards may be obtained at the time of purchase or from a local service repair center.

[\[Previous\]](#) [\[Table of Contents\]](#) [\[Next\]](#)

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## Instruction Manual B-3651

### LUBRICATION OF ANTI-FRICTION BEARINGS

This motor has been properly lubricated at the time of manufacture and it is not necessary to lubricate at time of installation. When the motor has been in storage for a period . of six months or more, lubricate before starting.

Lubrication of anti-friction bearings should be done as a part of a planned maintenance schedule. The Recommended Lubrication Interval should be used as a guide to establish this schedule.

Cleanliness is important in lubrication. Any grease used to lubricate anti-friction bearings should be fresh and free from contamination. Similarly, care should be taken to properly clean the grease inlet area of the motor to prevent grease contamination.

### RECOMMENDED LUBRICANT

For motors operating in ambient temperatures shown below, use the following lubricant or its equal:

OPERATING TEMP. - 25 degrees C (-15 degrees F) to 50 degrees C (120 degrees F)

- CHEVRON OIL SRI NO. 2
- SHELL OIL CO. DOLIUM R
- TEXACO INC. PREMIUM RB

MINIMUM STARTING TEMPERATURE-75°C (-100°F)

- SHELL OIL CO. AEROSHELL #7

### LUBRICATION PROCEDURE

Reliance anti-friction bearings may be lubricated with the motor running or stationary. Stationary with the motor warm is preferred.

1. Locate the grease inlet, clean the area and replace the pipe plug with a grease fitting, if the motor is not equipped with grease fittings.
2. Add the Recommended Volume of the Recommended Lubricant using a hand operated grease gun.
3. Run the motor for two hours.
4. Replace the pipe plug in grease inlet.

### LUBRICATION INSTRUCTIONS

1. Select Service Condition from Table 1.
2. Select Lubrication Frequency from Table 2.
3. Select Lubrication Volume from Table 3.
4. Lubricate the motor at the required frequency with the required lubricant volume in accordance with LUBRICATION PROCEDURE.

Table 1	
Standard Conditions:	Eight hours per day, normal or light loading, clean, @ 40 degrees C (100 degrees F) maximum ambient.
Severe Conditions:	Twenty-four hour per day operation or shock loading, vibration, or in dirt or dust @ 40-50 degrees C (100-120 degrees F) ambient.
Extreme Conditions:	Heavy shock or vibration, or dust.

## LUBRICATION FREQUENCY

Table 2				
Ball Bearings				
Speed	Frame	Standard Conditions	Severe Conditions	Extreme Conditions
1800 RPM And Slower	182 thru 215	3 Years	1 Year	6 Months
	243 thru 365	2 Years	6 to 12 Months	3 Months
	404 thru 449 and 5000	1 Year	6 Months	1 to 3 Months
3600 RPM	ALL	6 Months	3 Months	1 Month
ROLLER BEARINGS				
For Roller Bearings divide the time periods above by 2.				

## LUBRICATION VOLUME

Table 3		
FRAME SIZE	VOLUME IN CUBIC INCHES	
	1800 RPM And Slower	3600 RPM
182 Thru 215	0.5	0.5
254 Thru 286	1.0	1.0
324 Thru 365	1.5	1.5
404 Thru 449	2.5	1.0

**IMPORTANT NOTE:** *Mixing lubricants is not recommended due to possible incomparability. If it is desired to change lubricant, follow instructions for lubrication and repeat lubrication a second time after 100 hours of service. Care must be taken to look for signs of lubricant incomparability, such as extreme soupiness visible from the grease relief area.*

[\[Previous\]](#) [\[Table of Contents\]](#) [\[Next\]](#)

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Automation**

# Instruction Manual B-3651

## MAINTENANCE

The fundamental principle of electrical maintenance is KEEP THE APPARATUS CLEAN AND DRY. This requires periodic inspection of the motor, the frequency depending upon the type of motor and the service.

The following should be checked at regular intervals:

1. Windings should be dry and free of dust, grease, oil, and dirt. Windings may be cleaned by suction cleaners or by wiping. Nozzles on suction type cleaners should be non-metallic. Gummy deposits of dirt and grease may be removed by using a commercially available low volatile solvent.

**WARNING:** DO NOT USE GASOLINE OR OTHER INFLAMMABLE SOLVENTS.

2. Terminal connections, assembly screws, bolts and nuts should be tight. They may loosen if motor is not securely bolted and tends to vibrate.
3. Insulation resistance of motors in service should be checked periodically at approximately the same temperature and humidity conditions to determine possible deterioration of the insulation. When such measurements at regular intervals indicate a wide variation, the cause should be determined. Motor should be reconditioned if the motor has been subjected to excessive moisture, or by re-winding or re-insulating if necessary. Enclosed motors require very little attention. Be sure that external air chamber of fan-cooled motors does not become clogged with foreign material which will restrict passage of air.

## DISASSEMBLY

If it becomes necessary to disassemble the motor, care should be taken not to damage the stator windings as the insulation may be injured by improper or rough handling. Precautions to keep bearings clean should be exercised.

Before removing either end shield:

1. Disconnect motor from power source. Tag the leads to insure proper reconnection.
2. Remove motor from mounting base.
3. Mark end brackets relative to position on frame so they can be easily replaced.

## REMOVING BRACKETS AND ROTOR

4. Remove bearing cartridge nuts or screws. (if used)
5. Remove front end bracket bolts.
6. Pull bracket.
7. Remove back end bracket in same manner.
8. Remove rotor.

## REMOVING AND REPLACING BALL BEARINGS

BEARINGS SHOULD NOT BE REMOVED UNLESS THEY ARE TO BE REPLACED. WHEN



REMOVAL IS NECESSARY, USE A BEARING PULLER. A BEARING PULLER MAY BE RIGGED BY USING A METAL PLATE WITH HOLES DRILLED TO MATCH THE TAPPED HOLES IN THE INNER CAP. USE CARE TO KEEP THE PRESSURE EQUAL TO PREVENT BREAKING THE CAP.

TO INSTALL A BEARING, HEAT THE BEARING IN AN OVEN AT 250°F. THIS WILL EXPAND THE INNER RACE, ALLOWING IT TO SLIP OVER THE BEARING SEAT. ALL BEARINGS MUST BE REPLACED WITH THE IDENTICAL PART USED BY RELIANCE. IN MANY CASES SPECIAL BEARINGS ARE USED WHICH CANNOT BE IDENTIFIED BY MARKINGS ON BEARING. IN ALL CASES, WHEN REPLACING BEARINGS, USE MARKINGS ON BEARINGS AND MOTOR IDENTIFICATION NUMBER TO OBTAIN CORRECT REPLACEMENT BEARING.

THE MAJORITY OF BEARINGS USED NOW HAVE A C3 INTERNAL LOOSENESS.

## REASSEMBLY

Following reverse procedure as outlined for Disassembly. Having marked the brackets in the original position, replace as marked.

[\[Previous\]](#) [\[Table of Contents\]](#) [\[Next\]](#)

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## Easylube Automatic Lubricator

### Description

**IMPORTANT:** Refer to the **Troubleshooting Chart** for installation hints.

Automatic lubricator model 1746-151 automatically supplies a single lubrication point with oil or grease (up to grade 2) electromechanically. This model lubricator:

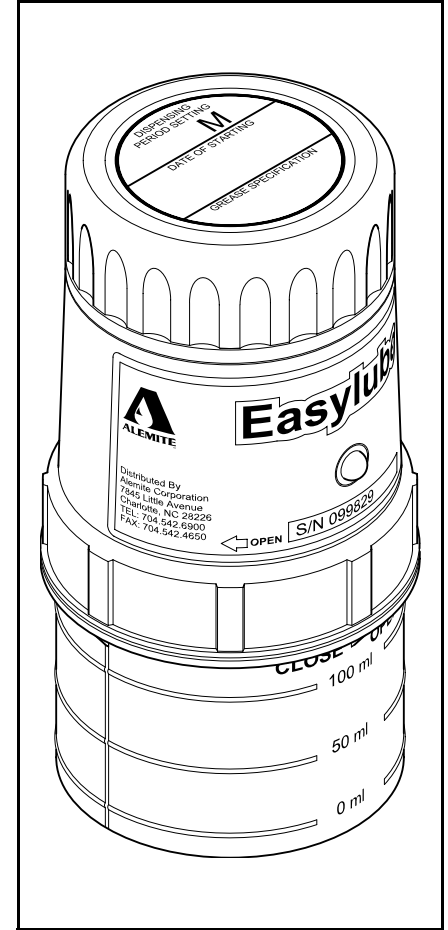
- contains a cup that is designed to be refilled with the use of accessories.
- is powered and activated with the installation of its battery pack.

#### Dispense Period and Lubrication Amount

The lubricator can be set to any of 12 (represents months) dispensing periods. It is empty at the end of the chosen setting. Each monthly setting dispenses the same amount of lubricant per cycle, but at a different frequency. See **Table 1**.

Dispense Period	Time Span Between Cycles	Amount/Cycle		Amount/Day		Amount/Week		Amount/Month	
		Oz	ml	Oz	ml	Oz	ml	Oz	ml
Month	Hrs								
1	2	0.014	0.417	0.17	5	1.18	35	5.1	150
2	4			0.08	2.5	0.59	17.5	2.54	75
3	6			0.06	1.67	0.39	11.67	1.7	50
4	8			0.04	1.25	0.30	8.75	1.27	37.5
5	10			0.033	1.00	0.24	7.00	1.01	30
6	12			0.028	0.83	0.20	5.83	0.84	25
7	14			0.024	0.71	0.17	5.00	0.72	21.43
8	16			0.021	0.63	0.15	4.38	0.63	18.75
9	18			0.019	0.56	0.13	3.89	0.56	16.67
10	20			0.017	0.50	0.12	3.50	0.51	15
11	22			0.015	0.45	0.11	3.18	0.46	13.64
12	24			0.014	0.42	0.10	2.92	0.42	12.5

**Table 1** Lubricator Dispense Period Compared with Frequency



**Figure 1** Easylube Lubricator Model 1746-151

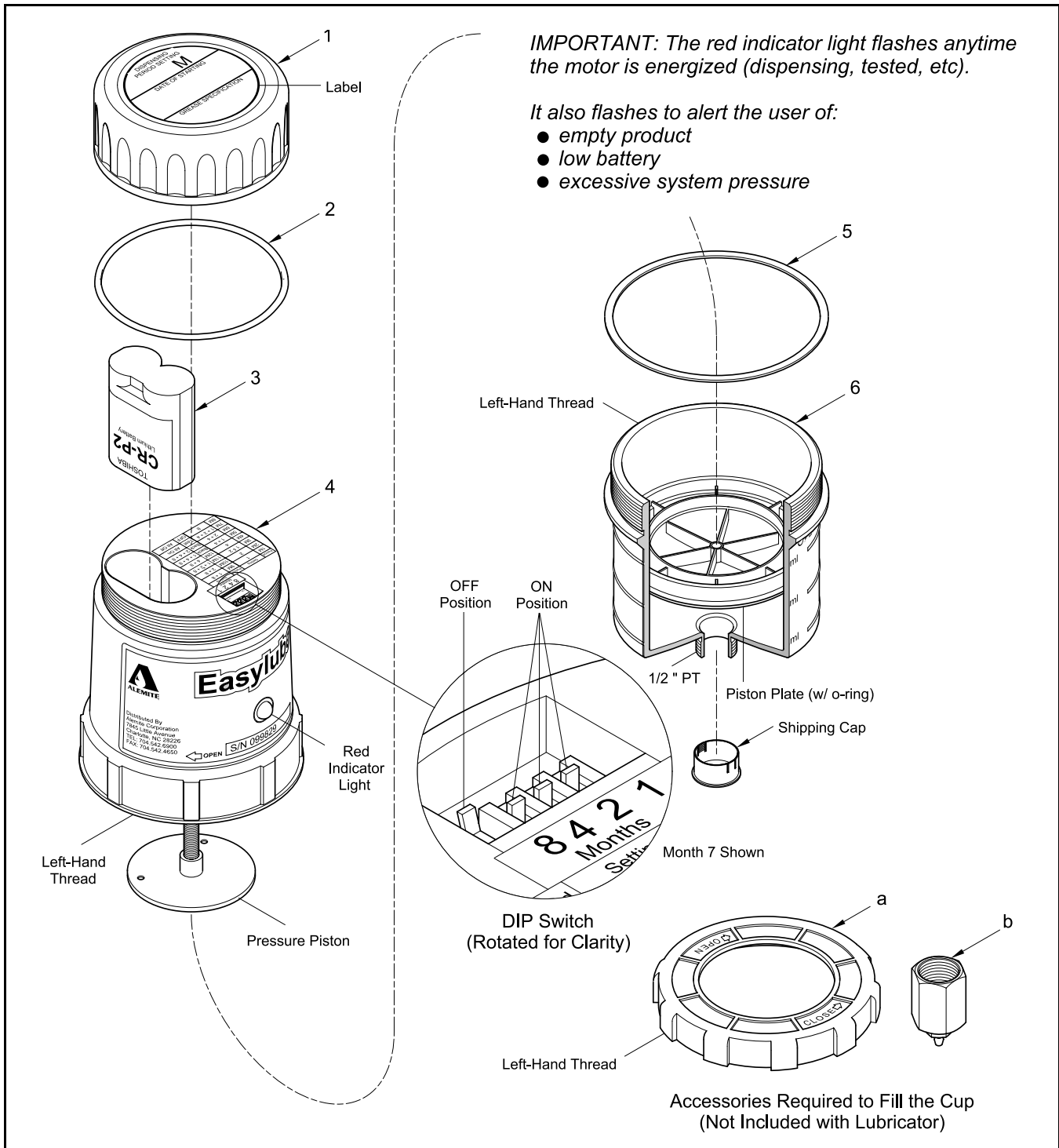
UL Approved	Material Outlet	Capacity		Pressure Range		Operating Temperature Range		Dimensions (Length x Diameter)		Lithium Battery
		Ounces	ml (cm <sup>3</sup> )	psi	bar	° F	° C	Inches	Cm	
Class I Division 2 Group B, C, D Class II Division 2 Group F, G	1/2 " PT (m)	5.1	150	75 - 150	5 - 10	-4 to 140	-20 to 60	6 x 3.3	15.2 x 8.4	6 Volt

**Table 2** Easylube Lubricator Model 1746-151 Specifications

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Item No.	Part No.	Description	Qty	Item No.	Part No.	Description	Qty
1		Cover (w/ Label)	1	5		Gasket	1
2		O-Ring	1	6	339588	Cup, (includes Piston Plate)	1
3	339603	Battery, Lithium (6 Volt)	1	a	339589	Cover, Refill Positioning	1
4		Body Assembly	1	b	339590	Nipple, Refill, 1/2" PT (f)	1

**Legend:**  
Part numbers left blank are not available separately

**Figure 2** EasyLube Lubricator Model 1746-151 - Exploded View

## Preparation / Maintenance

**NOTE:** Refer to **Figure 2** for component identification on all procedures.


### Fill the Cup

1. Remove the lubricator from its system connection or remove the Shipping Plug from Cup (6).
2. Screw Nipple (b) onto the outlet of the Cup.
3. Unscrew the Cup from Body Assembly (4).

*IMPORTANT: Do not attempt to fill the Cup manually. Air can become trapped within the grease.*

4. Screw Positioning Cover (a) onto the Cup.

---



**WARNING**

**Do not exceed the maximum pressure rating of the lubricator [75 psi (5.2 bar)]. Personal injury can occur.**

---

With the use of a control valve or gun:

5. Fill the Cup with lubricant until the Piston Plate contacts the Positioning Cover.
6. Unscrew the Positioning Cover from the Cup.

### Position the Pressure Plate

7. Facing the bottom of the Body Assembly, turn the Pressure Piston clockwise until it seats.
8. Next, rotate the Pressure Piston counterclockwise with a 3/4 turn.
9. Screw the Cup into the Body Assembly securely.

Dispense Period in Months	DIP Switch Levers On	Battery Life in Days *	Dispense Period in Months	DIP Switch Levers On	Battery Life in Days *	Dispense Period in Months	DIP Switch Levers On	Battery Life in Days *
1	1	87	5	1 and 4	194	9	1 and 8	300
2	2	114	6	2 and 4	221	10	2 and 8	328
3	1 and 2	140	7	1 and 2 and 4	245	11	1 and 2 and 8	351
4	4	168	8	8	277	12	4 and 8	382
Back **	1 + 4 + 8 and 2 + 4 + 8		Test ***	All On		OFF	All Off	

**NOTE:** Refer to **Figure 2** for location of DIP switch levers.

\* The number of days is approximate and is based on a system pressure of 45 psi (3 bar).

\*\* **Back** causes the red indicator light to flash and enables the motor to operate the Pressure Piston counterclockwise (away from Pressure Plate).

\*\*\* **Test** causes the red indicator light to flash and enables the motor to operate the Pressure Piston clockwise (toward Pressure Plate).

## Install / Replace Battery Pack


Replace the Battery Pack:

- at the end of each dispensing period
- once the red indicator light begins to flash
- anytime the Battery Pack's voltage is below 6V

*IMPORTANT: The lubricator maintains memory and can remain installed during this procedure.*

10. Unscrew Cover (1) from Body Assembly (4).

---



**WARNING**

**Always recycle or dispose of the Battery Pack properly.**

**Do not burn or puncture the batteries. Toxic materials may be emitted which can cause personal injury.**

---

11. Remove Battery Pack (3) from the Body as required.
  - Discard the Battery Pack.

The removal of the Battery Pack turns off the lubricator.

### Set / Change the Dispense Period

12. Make sure the Battery Pack is removed from the Body.
13. Locate the DIP (Dual Inline Package) Switch in the Body Assembly.
14. Set the levers on the switch to correspond to the time period required. See **Table 3**.
  - Use a ball point pen or similar tool (small screwdriver).

**Table 3** Lubricator Dispense Period Compared with DIP Switch Lever Positions and Battery Life

Start the Lubricator

**CAUTION**

**Avoid touching the contact surfaces of the new batteries. Skin oils can cause deterioration. Clean any suspect battery with alcohol prior to installation.**

15. Install the Battery Pack into the Body slowly.

The red indicator light on the Body illuminates for 5 seconds and then goes out. This indicates the lubricator has been started correctly.

16. Screw the Cover onto the Body securely.

Identification

17. On the Cover's label record the:

- dispensing period setting
- type of lubricant
- date of installation

Installation

Whenever possible, install oil-filled lubricators at a level below the lubrication point.

If this installation is not viable, then the use of an oil throttle, or check valve, within the system is required to prevent drainage. See the bolded items in **Table 5**.

Direct Mount

*IMPORTANT: Make sure the existing lubricant in the bearing is compatible with the lubricant in the Cup.*

1. Remove Nipple (b) from Cup (6).
2. Screw the lubricator (in any position) into the bearing.
  - Do not overtighten.

Use a reducer or adapter as required.

Remote Mount

*IMPORTANT: Do not install the lubricator further than 15 feet (4.6 m) from the lubrication point. Keep the number of bends and the length of line to a minimum.*

If a direct connection is not feasible, tubing, hose, or pipe can be used [with an optional mounting bracket (see **Table 5**)]. The size of the line is dictated by its type. See **Table 4**.

The pressure rating on any system component must be a minimum of 150 psi (10.3 bar).

*IMPORTANT: Should system pressure be greater than 75 psi (5.2 bar) the lubricator's:*

- motor is enabled to operate the Pressure Piston counterclockwise (relieve pressure from the Pressure Plate)
- red indicator light begins to flash

Should this occur, the system may require cleaning and/or the dispensing period may be too frequent.

Tubing	Hose	Pipe
5/16 " OD	3/8 " ID	1/4 "

**Table 4** Tubing, Hose, and Pipe Size

Accessories

Part No.	Description	Part No.	Description
339592	Adapter, Straight, 1/2 " (f) x 1/8 " (m)	339591	Adapter, 45°, 1/2 " (f) x 1/8 " (m)
339594	Adapter, Straight, 1/2 " (f) x 1/4 " (m)	339593	Adapter, 45°, 1/2 " (f) x 1/4 " (m)
339596	Adapter, Straight, 1/2 " (f) x 3/8 " (m)	339595	Adapter, 45°, 1/2 " (f) x 3/8 " (m)
339600	Adapter, Straight, 1/2 " (f) x 8 mm (m)	339599	Adapter, 45°, 1/2 " (f) x 8 mm (m)
339602	Adapter, Straight, 1/2 " (f) x 10 mm (m)	339601	Adapter, 45°, 1/2 " (f) x 10 mm (m)
339597	Bracket, Mounting [w/ 1/2 " PT (f) connector for plastic tube]	339598	Bracket, Mounting [w/ 1/2 " PT (f) connector for copper tube] *
<b>387390</b>	<b>Check Valve, 1/4 " (f) x 1/4 " (m)</b>	<b>387391</b>	<b>Oil Throttle, 1/8 " (f) x 1/8 " (m)</b>

Either of the items listed in **bold** (with Adapter) are required for an oil-filled lubricator when its lubrication point is above the lubricator

\* Use when the ambient temperature within the environment of the bearing exceeds 122 ° F (50 ° C)

**Table 5** Easylube Lubricator Accessories

## Troubleshooting Chart

Indications	Possible Problems	Solution
Grease separates.	Lubricator lines not completely flushed.	Flush the bearing and all lines completely with the same grease as the lubricator.
Lubricator does not dispense.	<ol style="list-style-type: none"> <li>1. Weak battery. Warning light can consume battery.</li> <li>2. Pressure Plate is not in contact with the follower.</li> <li>3. Ambient temperature too low for the viscosity of the grease.</li> </ol>	<ol style="list-style-type: none"> <li>1. Verify the output voltage of battery exceeds 6.0 V. Always start the lubricator with a new battery. Operate the lubricator in test mode for 1 minute to ensure proper operation prior to installation.</li> <li>2. Check the position of the pressure plate to ensure it is in contact with the follower.</li> <li>3. Change to a lower viscosity grease. For example, change from NLGI #2 to NLGI #1 or #0.</li> </ol>
Unable to set DIP switch levers.	Incorrect tool being used.	Move the levers with a ball point pen or a small screwdriver.
Lubricator's red indicator light begins to flash.	<ol style="list-style-type: none"> <li>1. Battery Low.</li> <li>2. Lubricator empty.</li> <li>3. Back pressure exceeds 75 psi (5.2 bar).</li> </ol>	<ol style="list-style-type: none"> <li>1. Test battery voltage with volt meter.</li> <li>2. Fill the cup.</li> <li>3. Use test apparatus to measure back pressure.</li> </ol>

**Changes Since Last Printing**

Deleted Model 1746-151



# **IMPORTANT!**

To make sure your new Easylube operates properly in your application, please read the following before installation.

- Although the Easylube can generate up to 75 psi, applications with high backpressure will require frequent battery replacement. The pressure generated decreases with battery voltage. When generated pressure falls below the system backpressure, the red indicator light flashes and no lubricant will be dispensed. If backpressure is unknown, test the application before installing the Easylube.
- Is the grease viscosity suitable for the lowest ambient temperature where the Easylube is mounted? NLGI #1 or #0 may be required on an outdoor application. The Easylube can be mounted up to 15 feet away from the application, but only if grease viscosity and temperature permit.
- When changing the dispense period, first remove the battery. After setting the DIP switches, reinstall the battery. If the battery is not removed, the unit will continue to dispense at the original setting.
- When setting the DIP switches, ensure that they are seated. If the switches are not set firmly, the unit will not dispense properly.
- The Easylube can be tested by setting all four DIP switches to the ON position. In this “TEST” mode, the Easylube will cycle every two seconds.
- When filling the lubricant cup, the blue positioning cover must be used. This will position the red piston plate in the lubricant cup to the correct starting position. If the piston plate is out of position, the Easylube will not operate. If done properly, a small amount of lubricant discharges when the lubricant cup is screwed into the body assembly.
- When filling the lubricant cup, stop filling as soon as the piston plate reaches the blue positioning cover. Pressurizing the lubricant cup may cause damage.
- When a low battery causes the indicator light to flash, it will flash for only approximately one week. Check regularly to avoid missing a fault.

