

TRANSMITTAL OF SUBMITTAL

DATE: 8/14/23

TO: Scott Miller

CMG - City of Atlanta
2528 Chattahoochee Circle
Atlanta, GA 30318

New X-Submittal Resubmittal

Project: East Area Water Quality Control Facility
Improvements

Specification Section No. : 14620

Supplier/Vendor/Subcontractor: Principle
Environmental

FROM: LAKESHORE ENGINEERING

_____ 1259 Ellsworth Drive
_____ Atlanta, GA 30318


Manufacturer: Serpintex

The following items are hereby submitted:

Number of Copies	Description of Item Submitted (Type, Size, Model Number, Etc.)	Submittal number	Submittal Type	Contains Variation to Contract	
				No	Yes
Email	Belt press - O&M Manual	14620 65.01	O&M Manual	X	

Comments/Variation:

CONTRACTOR hereby certifies that (i) CONTRACTOR has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

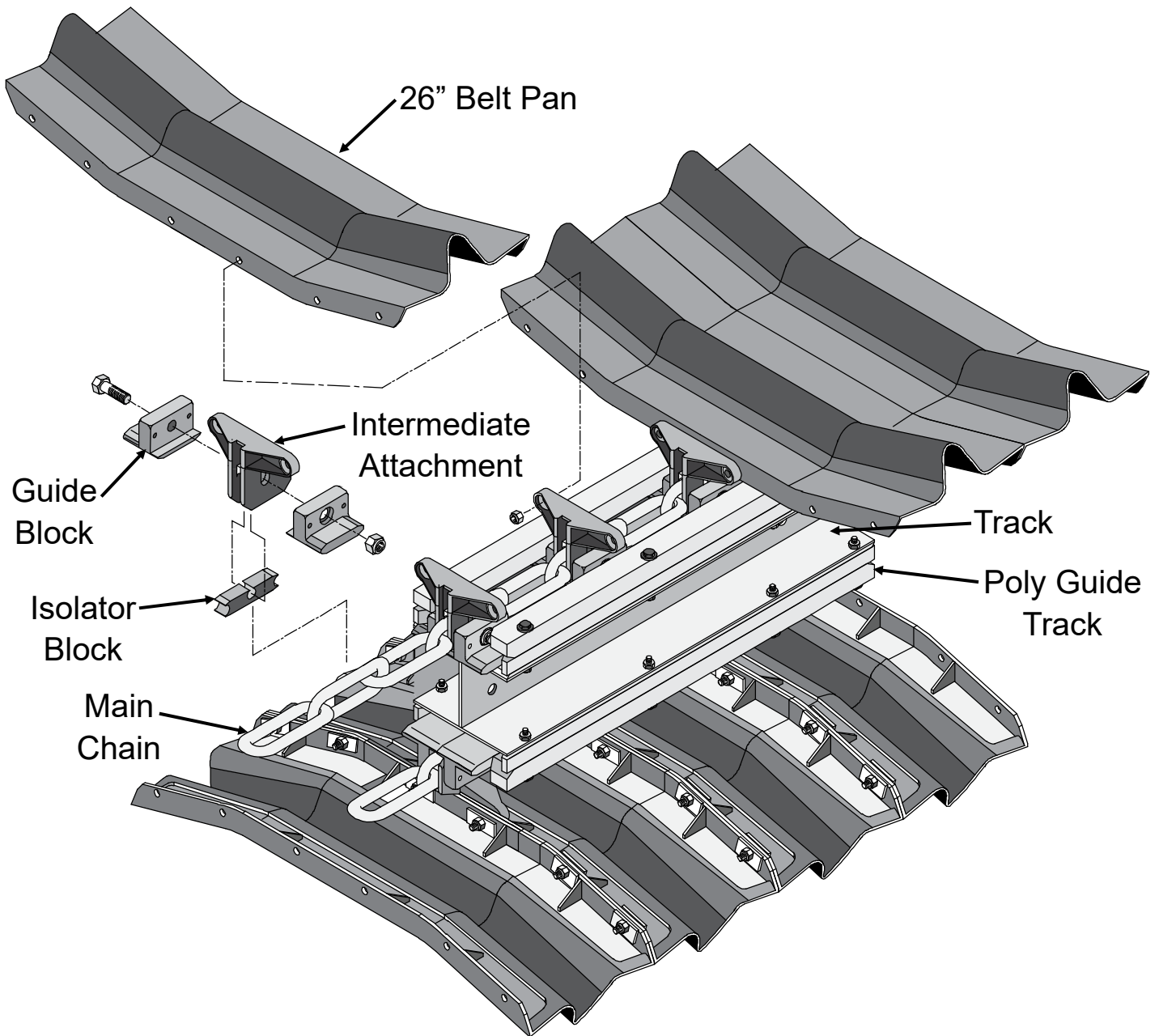
By:  _____
Brandon Dow



Operation & Maintenance Manual

Atlanta (East Area), GA

Job # P2-22-1258



PATHWINDER CONVEYOR

3-17-2023



TABLE OF CONTENTS

PREFIX - GENERAL INFORMATION

1	Cover Page
2	Table of Contents
3	Table of Contents
4	Table of Contents
5	Table of Contents
6	Conveyor Warranty & Safety Regulation Disclaimer
7	Project Contact Addresses & OEM Equipment List
8	Maintenance Summary
9	Recommended Preventative Maintenance
9	Recommended Lubrication
10	Recommended Spare Parts/Price
11	Belt Speed Configuration
12	Drive Quality Control Test Report
13	Drive Quality Control Test Report
14	Tension Quality Control Test Report

DIVIDER NO. 1

SECTION A - INSTALLATION

15	Introduction
16	Inventory
17	Delivery, Storage, Tools & Safety
18	Theory of Operation / Side Designation
19	Track Installation
20	Track Installation Continued...
21	Installation of Chain & Guide Blocks
22	Installation of Chain & Guide Blocks Continued...
23	Standard Chain Strand Assembly
24	Belt Pan Installation
25	Belt Pan Protection / Disassembly
26	Tension Station Pre-Assembly Instructions
27	Applying Chain Tension
28	Chain Tensioning Observation
29	Oiler Installation
30	Oiler Adjustment



TABLE OF CONTENTS

DIVIDER NO. 1

SECTION A - INSTALLATION

31	Drip Pan & Skirtboard Installation
32	Standard Drip Pan Assembly
33	Standard Skirtboard Exploded View
34	Standard Skirtboard Adjustment
35	Cover Installation
36	Safety (Emergency) Single Stop Switch
37	Safety (Emergency) Stop Switch Installation
38	Tension Station Exploded View & Bill of Material
39	Tension Station Exploded View & Bill of Material
40	Zero Speed Switch Bill of Material
41	Zero Speed Switch Adjustment
42	Zero Speed Switch Flex Cable
43	Zero Speed Switch Electrical
44	Zero Speed Switch Testing
45	Drive Station Assembly / Bill of Material
46	Drive Station Assembly / Bill of Material Continued...
47	Drive Station Assembly / Bill of Material Continued...
48	Standard Scraper Mechanism BOM
49	Drive Station Scraper Installation BOM
50	Drive Station Scraper Mounting
51	Scraper Tensioning
52	-

DIVIDER NO. 2

SECTION B - MAINTENANCE

53	Standard Spare Parts
54	Operating Procedures
55	Conveyor Observation when Running
56	Preventative Inspection of Conveyor Components
57	Preventative Inspection of Conveyor Components
58	Preventative Inspection of Conveyor Components



TABLE OF CONTENTS

DIVIDER NO. 2

SECTION B - MAINTENANCE

59	Main Drag Chain Wear & Length Observation
60	Main Drag Chain Shortening Procedure
61	Main Drag Chain Shortening Procedure Continued...
62	Chain Troubleshooting
63	General Troubleshooting
64	General Troubleshooting Continued...
65	Adjusting Roller Chain Tension
66	Adjusting Roller Chain Tension
67	Adjusting V-Belt Tension
68	Aunspach S180 Clutch Operation
69	Aunspach S180 Torque Safety Clutch
70	Aunspach S180 Torque Safety Clutch
71	Lubrication
72	Abbreviated Maintenance Schedule
73	Maintenance Log
74	Conveyor Failure
75	Name Plate Data
76	-

DIVIDER NO. 3

SECTION C - SAFETY INSTRUCTIONS

77	CEMA Safety Illustrations
78	Safety Sticker Location Diagram—Tension Station
79	Safety Sticker Location Diagram—Drive Station
80	Safety Sticker Location Diagram—Drive Station
81	Safety Instructions for Equipment Operation
82	Safety Instructions for Maintenance Work

DIVIDER NO. 4

SECTION D - SERPENTIX BILL OF MATERIALS

83	Parts List
84	Parts List Continued...
85	Parts List Continued...
86	Parts List Continued...
87	Parts List Continued...
88	Spare Parts List



TABLE OF CONTENTS

DIVIDER NO. 5

BALDOR ELECTRIC MOTOR

OEM Literature
OEM Instruction Manual
Baldor ECP3587T - Motor
Baldor MOD Express M21A - Space Heater
Baldor MOD Express M23A - Thermostats

DIVIDER NO. 6

REXNORD-FALK GEAR BOX

Rexnord - Falk 5203 Gear Box
OEM Service Instruction Manual

DIVIDER NO. 7

MATERIAL CONTROL E-STOP SWITCHES

Material Control - Conveyor Safety PC-Stop Switch
OEM Literature

DIVIDER NO. 8

ELECTRO SENSORS ZERO SPEED SWITCH

Electro Sensors - Zero Motion Speed Switch
OEM Literature
OEM Instruction Manual

DIVIDER NO. 9

AUNSPACH TORQUE LIMITING SHEAVE

OEM Literature

DIVIDER NO. 10

SERPENTIX DRAWINGS 11x17

Drawing No. P2-22-1258 Sht. 1-2	General Arrangement Drawing
Drawing No. HTA-SER-092222-000-01	General Arrangement Drawing



CONVEYOR WARRANTY & SAFETY REGULATION DISCLAIMER

The World Leader in Continuous Path Conveying

Conveyor Warranty

Seller warrants that the products manufactured by seller conform to applicable drawings and specifications accepted in writing by Seller, will be free from defects in material and workmanship, will be merchantable and will perform in accordance with the detailed specifications and design/operating requirement established by the customer and accepted in writing by Seller. These warranties extend from a period of:

One (1x) year limited warranty that covers against defects in materials and workmanship (aside from abuse negligence, improper operation or lack of regular & preventative maintenance as outlined in the O&M Manual) from the start date when the equipment is certified (equipment start-up), put into service, provides beneficial use, upon owner acceptance, or upon substantial project completion, **whichever occurs first**. Parts only supplied by manufacturer if warranty claim is validated - labor of removal and installation is the responsibility of the Owner.

Buyers exclusive remedy and Sellers sole duty under these warranties is to repair or replace the product. Normal wear and tear on Seller's product shall not constitute a warranty defect. **There are no other warranties, express or implied, which extend beyond those set forth above. The warranty of merchantability is limited to the time period above.** These warranties are contingent upon the product being stored, installed, maintained and operated in accordance with the detailed specifications, good engineering practices and the instructions contained in the Operating and Maintenance Manual supplied by Seller. These warranties shall apply to the original customer/owner only.

Cautionary Note: Use of other than Serpentix-supplied replacement parts may void all warranties, and guarantees as well as product liability responsibilities applicable to Serpentix's equipment and parts.

Safety Regulation Disclaimer

This conveyor as shipped meets the specifications prescribed in the sales contract and terms and conditions covering this specific piece of equipment.

Any additions to this conveyor or installation requirements mandated by a regulation authority controlling various environments in which conveyors may be installed and operated are the responsibility of the owner, or contractor performing the installation, and have not been supplied by Serpentix Conveyor Corporation. It is the owner's responsibility to arrange for or supply and install all equipment required to install and operate this conveyor in its location per any applicable regulations.



PROJECT CONTACT ADDRESSES

<p><u>Manufacturer:</u> Serpentix Conveyor Corporation 11821 Huron Street Westminster, CO 80234 Telephone: 303-430-8427 Email: sales@serpentix.com</p>	<p><u>Plant Address:</u> Intrenchment Creek WPCP 1510 Key Road Atlanta, GA 30318 Attn: Wayne Owenby Telephone: 678-524-4220</p>
<p><u>Manufacturers Representative:</u> Principle Environmental 1770 The Exchange SE # 210 Atlanta, GA 30339 Telephone: 404-285-1481 (Mobile) 770-952-9444 (Office)</p>	<p><u>Engineer</u> LAKESHORE ENGINEERING, LLC 1259 Ellsworth Drive Atlanta, GA 30318 Telephone: 404-355-3976</p>

OEM EQUIPMENT LIST

<p><u>Motor:</u> Baldor Electric Company 5711 R.S Boreham, Jr. Street P.O. Box 2400 Fort Smith, AR 72901 Telephone: 479-646-4711 Fax: 479-648-5792</p>	<p><u>Falk Gearbox:</u> Rexnord Corporation, LLC 3001 West Canal Street Milwaukee, WI 53208 Telephone: 414-342-3131 Fax: 414-937-4259</p>
<p><u>Bearings:</u> Dodge 6040 Ponders Court Greenville, SC 29602-0499 Telephone: 864-297-4800 Fax: 864-284-5020</p>	<p><u>Emergency Stop-Switch:</u> Material Control 338 East Sullivan Road Aurora, IL 60504 Telephone: 1-800-926-0376 Fax: 630-892-4931</p>
	<p><u>Zero Speed Switch:</u> Electro Sensors 6111 Blue Circle Drive Minnetonka, MN 55343 Telephone: 952-930-0100 Fax: 952-930-0130</p>



MAINTENANCE SUMMARY FORM

- **PROJECT:** Atlanta (East Area), GA
- **SPECIFICATION SECTION:** 41 12 13 Serpentine Belt Conveyor System
- **EQUIPMENT ITEM:** SCREENINGS CONVEYOR
- **MANUFACTURE:** SERPENTIX CONVEYOR CORP.
- **EQUIPMENT/TAG/JOB NUMBER:** P2-22-1262
- **NAMEPLATE DATA MOTOR:** MODEL NO. 0034SDSR41A-P, 3HP,1760RPM,3PH,60Hz,182T Frame, TEFC, F1

RECOMMENDED PREVENTATIVE MAINTENANCE CONVEYOR MODEL-P2		Initial Completion Following Start-Up							
		D	W	M	Q	S	A	HRS	Lubricant
1	Entire Conveyor = observe, look for tracking problems / damaged components	X							
2	Main Drag Chain = check tension (built-in hand ratchet); increase tension as needed		X						
3	Scraper Blade: check for wear / replace rubber blade if torn or worn			X					
4	Oilier Bottle = check to ensure oil flow smoothly (2 drops per minute); fill with 10wt. or Hydraulic oil as necessary			X					X
5	UHMWPE Guide Channel = clean channel; use high pressure washer to remove material				X				
6	Roller Chain = lubricate with adhesive chain spray lubricant				X				X
7	Roller Chain & Sprocket = check tension, wear (stretch)/noise and alignment adjust if necessary; replace if worn				X				
8	Wash down conveyor (water 60psi or less). Avoid electrical components.				X				
9	Bearings = check rotation, wear/noise and alignment; lubricate with #2 Lithium Based Grease (Drive & Tension Stations)					X		900	X
10	Electrical Component = test safety stop-switches (pull cables) to confirm they are in working order; replace if faulty					X			
11	Electrical Component = test the zero-speed switch to confirm it is in working order; replace if faulty					X			
		D=Daily	W-Weekly	M=Monthly	Q=Quarterly	S=Semi-Annually	A=Annually		



RECOMMENDED PREVENTATIVE MAINTENANCE CONVEYOR MODEL-P2		Initial Completion Following Start-Up							
		D	W	M	Q	S	A	HRS	Lubricant
12	Electrical Component = test each panel emergency stop buttons (if applicable) to confirm they are in working order; replace if faulty					X			
13	Motor Bearing = lubricate with #2 Lithium Based Grease (if applicable)					X			X
14	V-Belts = check, wear (fraying)/noise and alignment					X			
15	Guide Blocks = check for wear; replace if worn or damaged					X			
16	Main Drag Chain = check wear pockets in chain at tension station sprocket, shorten chain (removing/cut out 2 links) if needed					X			
17	Track Wear = check for wear; schedule replacement if worn						X		
18	Drive & Tension Station Sprockets = check for wear; replace if teeth are worn or damaged						X		
19	Drive Station Gearbox = check oil level; change 85/90wt. oil with 3.5 Quarts (3.3 Liters) (Note: if synthetic oil is used the hours would extend to 8000)						X	2500	X

D=Daily W=Weekly M=Monthly Q=Quarterly S=Semi-Annually A=Annually

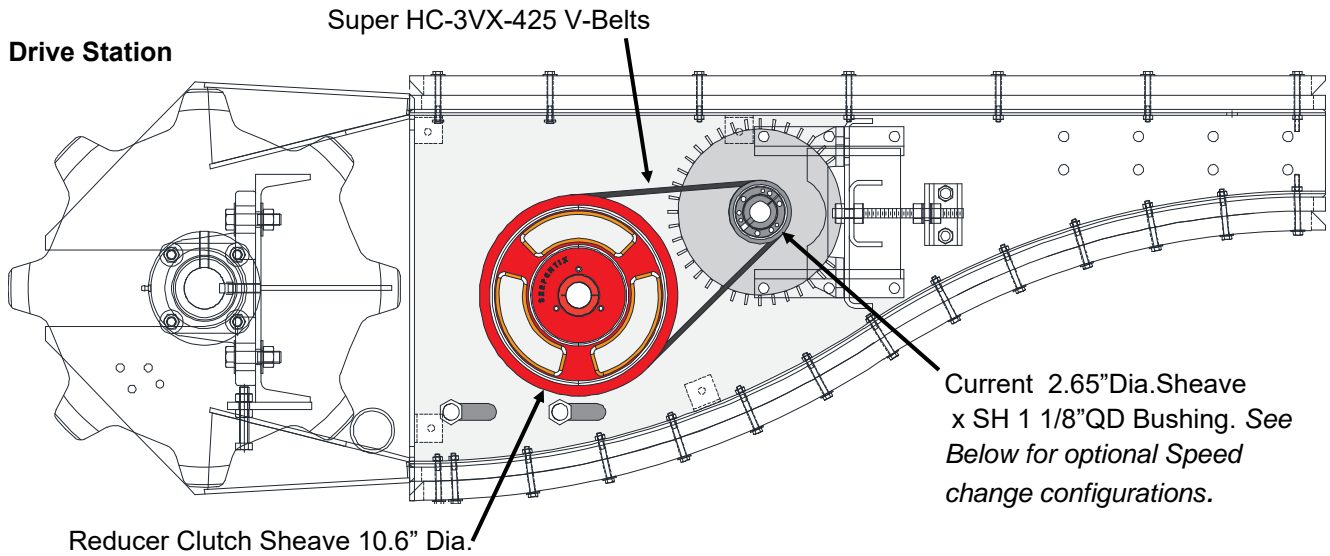
RECOMMENDED LUBRICATION MAINTENANCE CONVEYOR MODEL-P2			
Item No.	Lubricated Device	Lubrication Substance	Comments
4	Main Chain Oiler at Tension Station	1 Qt. Straight 10wt. or Hydraulic oil	The oiler is of a Gravity feed design (light wt. Oil best because of needle flow control size). In the event that a different viscosity oil is used, a readjustment of the flow control will be required to meet the 2 drops per minute.
6	#60 Roller Chain at Drive Station	Adhesive Chain Spray Lubricant	Foaming Penetrating Lubricants for Chain (Dirt Bike or CRC). The chain Guard itself is oil tight and 30 wt. oil (1.5 Quarts) can be used.
9	Drive & Take Up Station Bearings	#2 Lithium Based Grease	Due to the low speed and the presence of dust, water or corrosive vapors the bearings should contain as much grease as speed will permit, since a full bearing with consequent slight leakage is the best protection against entrance of foreign material.
13	Motor Bearing at Drive Station	#2 Lithium Based Grease	The presence of a male Zerk on the motor frame indicates it does not have sealed bearings and must be lubricated.
19	Reducer Gear Box at Drive Station	3.5 Qt. 85/90wt. (220) Transmission Fluid	The breather/fill plug is located on the top side of the gear box. There is a forward side plug (Allen Hd.) to be removed when refilling the oil to prevent a vacuum. (Note: if synthetic oil is used the hours would extend to 8000)



RECOMMENDED SPARE PARTS

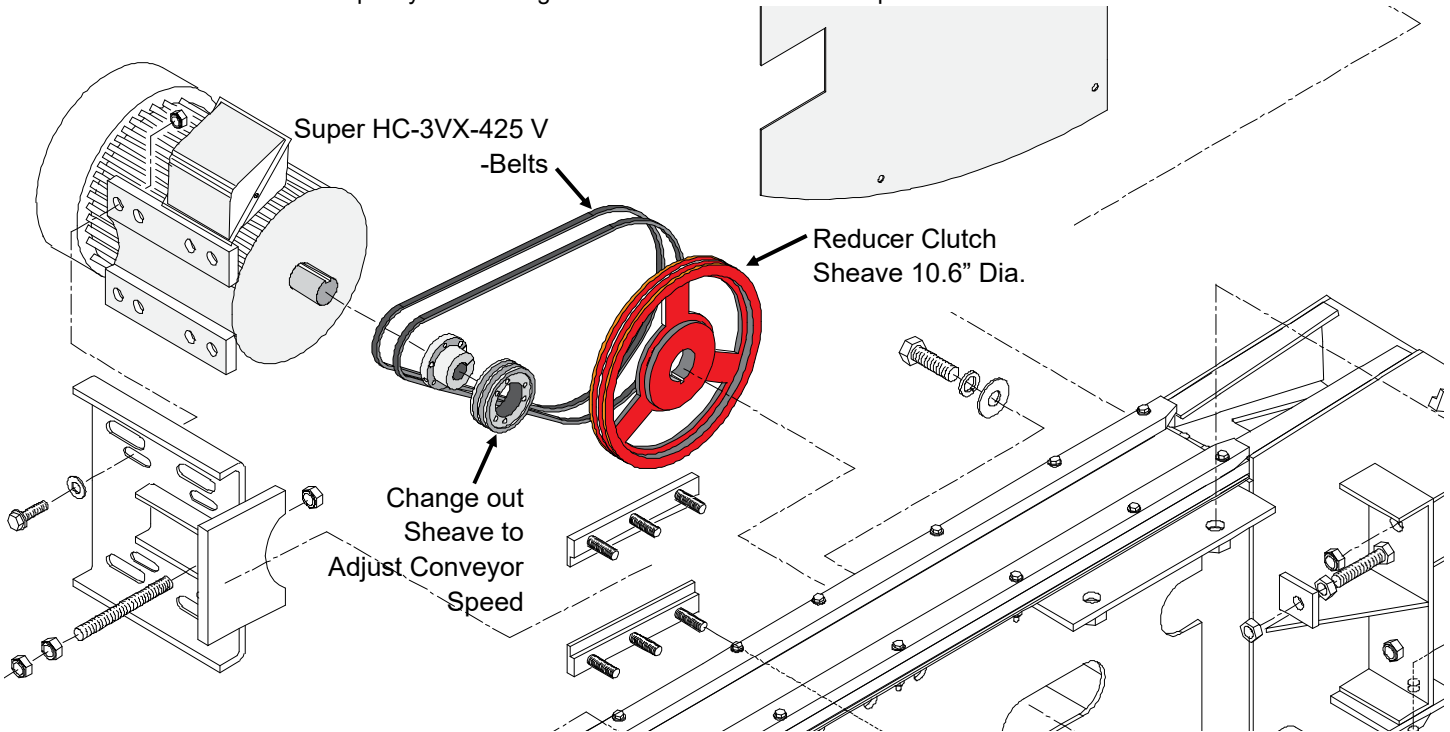
RECOMMENDED SPARE PARTS				
CONVEYOR MODEL-P2 (SUPPLIED WITH INITIAL INSTALL) Prices 2/06/2023				
Part No.	Description	Material	Qty.	Unit Cost
PW-0104-0007-A Rev.D	Guide Block—Grey (Wide)	Urethane Injected	10	\$12.50
H-0104-0010-A Rev.H	Intermediate Chain Attachment	Nylon	5	\$22.15
H-0101-0122-D	26" Wide Belt Pan	MPR	5	\$79.85
PW-0137-0095-A	26" Scraper 1/4" Blade	Neoprene	2	\$48.90

2HP/BELT SPEED CONFIGURATION



Belt Speed Ft/Min	QD Sheave Size	QD Bushing Size	Super HC 3VX V-Belts	Capacity @ 2 TPH
22	2.65"	JA- 1 1/8"	3VX-425	54 Cu./inch/Belt Pan
30	3.35"	SH- 1 1/8"	3VX-425	39 Cu./inch/Belt Pan
35	4.12"	SH- 1 1/8"	3VX-425	34 Cu./inch/Belt Pan
40	4.75"	SH- 1 1/8"	3VX-425	30 Cu./inch/Belt Pan
45	5.30"	SH- 1 1/8"	3VX-450	26 Cu./inch/Belt Pan
50	6.00"	SH- 1 1/8"	3VX-450	24 Cu./inch/Belt Pan

Max. Capacity at a 45 Degree Incline for 26" Belt Pans Equates to 203 Cu/inch/Belt Pan





DRIVE QUALITY CONTROL TEST CERTIFICATION

JOB Name	Atlanta (East Area), GA
JOB No.	P2-22-1258
Conveyor No.	CNV-83CON3730

Drive Stations with Falk Reducer Design	Drive Structure Size	5'-0"Lg.	X	3'-6" Curve		7'-6"Lg.	
	Drive Station Mat'l.	Black Steel		Galvanized		304SS	X
	Drive Orientation	Piggy-Back		Opposite Mount	X		
	Reducer Mounted	Right Side	X	Left Side			
	DRIVE SPROCKET TOOTH WIDTH (Designed: 0.625")						

Description	YES	NO
UHMWPE DRIVE SPROCKET CENTERED		
HUB OFFSET OPPOSITE OF SHAFT OVERHANGE		
HUB MOUNTING BOLTS x 4 TIGHT		
SPROCKET HUB SET SCREWS x 2 TIGHT		
BEARING SET SCREWS x4 TIGHT		
BEARING BOLTS x 4 TIGHT		
BEARINGS x 2 GREASED		
TAPER LOCK BUSHING MOUNTED SECURELY		
TAPER LOCK BUSHING SET TO 108 FT/LBS TORQUE		
REDUCER BOLTS x 3 TIGHT		
REDUCER BRKT. BOLTS x 4 TIGH		
MARK TOP REDUCER BRACKET: DATE, TYPE OF OIL & QUANTITY		

Description	YES	NO
15 & 60 TOOTH SPROCETS ARE IN ALIGNMENT		
15 TOOTH SPROCKET SET SCREW TIGHT		
60 TOOTH SPROCKET SET SCREW TIGHT		
#60 ROLLER CHAIN TESION ADEQUATE		
#60 ROLLER CHAIN SPLICE MOUNDED SECURELY		
MOTOR SHEAVE IN ALIGNMENT WITH 10.6" SHEAVE		
MOTOR SHEAVE SET SCREW TIGHT		
V-BELT TENSION ADEQUATE		
MOTOR MOUNT ALL-THREAD ADJUST-ED & TIGHTENED PROPERLY		
MOTOR BOLTS TIGHT		

BELT SPED (FEET/MINUTE)	22
MOTOR SHEAVE SIZE (INCHES)	2.65"
MOTOR SHEAVE BUSHING SIZE	JA-1 1/8"
V-BELT SIZE (2 GROOVE) (3VX)	425

MOTOR SHEAVE	BELT FPM @ 1750 RPM	ZSS RPM	BELT FPM @ 1800 RPM	ZSS RPM
2.65	22.48	5.8	23.12	6.0
3.35	28.42	7.4	29.23	7.6
4.12	34.95	9.1	35.94	9.3
4.75	40.29	10.5	41.44	10.8
5.30	44.96	11.7	46.24	12.0
6.00	50.89	13.3	52.35	13.6



DRIVE QUALITY CONTROL TEST CERTIFICATION

JOB Name	Atlanta (East Area), GA
JOB No.	P2-22-1258
Conveyor No.	CNV-83CON3730

MOTOR MODEL #:					MOTOR SERIAL #:					
HP	RPM	PHASE	FREQUENCY	SERVICE FACTOR	FRAME	VOLTAGE	INSULATION CLASS	DESIGN	ENCLOSURE	MOUNTING

Description	YES	NO
MECHANICAL CLUTCH BOLT TIGHT TO 10.6" SHEAVE		
MECHANICAL CLUTCH MOUNTING BOLTS TIGHT		
MECHANICAL CLUTCH OPERATIONAL & TESTED (FACTORY)		
MECHANICAL CLUTCH PRE-SET LOAD 15 FT/#		
CHAIN GUARD MOUNTED		
V-BELT GUARD MOUNTED		
NAME PLATE MOUNTED		
SAFETY STICKERS APPLIED		

Description	YES	NO
TEFLON TAPE APPLIED TO REDUCER PLUGS/PIPES/DRAIN PLUG		
REDUCER FILLED WITH GEAR OIL		
REDUCER VENT INSTALLED		
REDUCER LUBRICATIO LEAKAGE		
OPERATING NOISE CONDITIONS OPTIMAL		
CHECK POLY TRACK CLEARANCE TO GUIDE BLOCK SAMPLE CHAIN		
PICTURES		

REDUCER LUBRICATION	
BRAND	CHERON
OIL WEIGHT	80/90 WT.
CAPACITY	3.5 QTS.

MOTOR TESTING	
RUN TIME (HRS)	
AMP. DRAW	

ADDITIONAL COMMENTS:

ASSEMBLED BY: _____

DATE: _____

CHECKED BY: _____



TENSION QUALITY CONTROL TEST CERTIFICATION

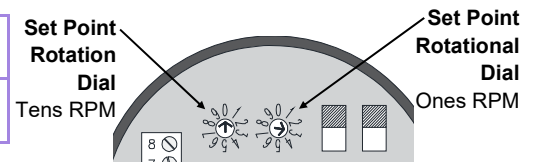
JOB Name	Atlanta (East Area), GA
JOB No.	P2-22-1258
Conveyor No.	CNV-83CON3730

TENSION STATION	Tension Structure Size	3'-8"Lg.		6'-8" Curve	X	
	Tension Station Mat'l.	Black Steel		Galvanized		304SS X
	Ratchet Mounted	Right Side	X	Left Side		
	TENSION SPROCKET TOOTH WIDTH (Designed: 0.625")					

Description	YES	NO
UHMWPE TENSION SPROCKET CENTERED		
HUB OFFSET OPPOSITE OF SHAFT OVERHANGE		
HUB MOUNTING BOLTS x 4 TIGHT		
SPROCKET HUB SET SCREWS x 2 TIGHT		
BEARING SET SCREWS x4 TIGHT		
BEARINGS x 2 GREASED		
SPRING HOUSING TUBES CONNECTED PROPERLY TO BEARINGS		
SPRINGS INSTALLED		
SPRING HOUSING CONNECTING PLATE INSTALLED UPRIGHT		
CONNECTING PLATE BOLTS INSTALLED DOWNWARD		
CONNECTING PLATE BOLTS x 4 TIGHT		
304SS ACME THREAD & PUSH BAR OPERATE FREELY		

Description	YES	NO
ACME THREAD MOUNTING PLATE INSTALLED LEVEL & NUTS ARE TIGHT		
PUSH BAR ADJUSTING FLUSH W/ OUTSIDE OF SPRING HOUSING		
RATCHET MOUNTING BOLT TIGHT		
BEARING TRAVEL STOP BOLTS INSTALLED & TIGHT		
SHIPPING BOLTS INSTALLED & TIGHT		
NAME PLATE INSTALLED		
SAFETY STICKERS APPLIED		
OILER BRUSH CENTERED W/ HEIGHT 1/16" PROTRUDING POLY BASE		
ZERO SPEED SWITCH RPM CALCULATED FROM THE FPM BELT SPEED		
ZSS-MAGNETIC SENSOR CLEARANCE 1/16" TO 1/8"		
CHECK POLY TRACK CLEARANCE TO GUIDE BLOCK SAMPLE CHAIN		
PICTURES		

ZERO SPEED SWITCH	RH	LH	SET POINT ONES RPM	5
MOUNTING BRACKET		X	SET POINT TENS RPM	0



ADDITIONAL COMMENTS:

ASSEMBLED BY: _____

DATE: _____

CHECKED BY: _____



INTRODUCTION

Introduction

The Serpentix P2 Pathwinder conveyor is the equipment of choice for many extreme conveying applications. The P2 can turn in any vertical, horizontal or helical direction, and can be scraped of sticky material. The modular belt pan sections are easily replaceable if one becomes damaged, and Serpentix conveyors can climb at angles up to 45°. These combined features are not available on any other bulk conveying systems, so the installation and assembly instructions for this conveyor will differ from other conventional conveyors.

The instructions in this manual do not attempt to cover every step in the assembly process. By this Serpentix means that specific, component-by-component instructions are not provided. Serpentix does provide detailed, generic assembly information for each major step of the general assembly process such as the conveyor track, supports, accessories and belting. Competent contractors or assemblers will have their own assembly methods.

It is highly recommend that the owner / purchaser / installer spend 1-2 hours reading this manual thoroughly to acquaint with the design, operation and terminology related to the conveyor components. In the back of this manual are the Bill of Material (BOM) and the general arrangement (GA) drawings. These drawings have been prepared specifically for each job, and contain Bill of Material (BOM) and balloon icons to allow identification of all the associated parts. While studying these drawings, note that the conveyor track splice points are identified by a number inside a hexagon, while the conveyor support points are identified by a number inside a diamond. These symbols are also used in the match marking of the individual track sections to help assemble them correctly. If you would like to discuss with us any questions you may have, please feel free to call us at:

1.800.466.7979 or 303.430.8427

Office hours: 7:00am to 5:00pm MST - Monday through Friday

24-Hour Email: conveyors@serpentix.com

Please reference the job name and job number on the cover of this manual, or the drawing number on one of the general arrangement drawings when you call Serpentix.

Priority of Instructions

The General Arrangement drawings, prepared specifically for your job, have the highest priority when assembling, installing, and maintaining your conveyor. The written text in this manual is prepared for general use, and does not attempt to show all the detail for your job. Should there be an instance of conflict between the two, the General Assembly drawings shall govern.



INVENTORY

Inventory

The first step is to inventory your shipment. This conveyor equipment has been shipped in knocked-down form. This means that the major components such as the track, chain drive and tension stations have been assembled for you. This is common for conveyors because they typically cannot be shipped as a complete unit, and must be assembled on-site. These components are to be assembled in the field, one piece at a time, working from one end to the other.

The largest components are typically the drive and tension stations. These components are shipped fully assembled. Depending upon the size of these components, they may be shipped together on a shipping stand, or the tension station may be in one of the large boxes with some other components.

The straight track sections are typically shipped in individual boxes, but shorter sections may be packed in some of the larger boxes with other components. The belt pans, chain, and other items are shipped in boxes.

The shorter supports will be boxed, and the larger supports are shipped loose and will be listed on the Bill of Lading.

When the conveyor was packed for shipment, we carefully checked the quantities as they were placed into their shipping box. On each packing slip, we have indicated in which box you will find each component. Check each packing list against the contents to make sure everything was shipped correctly.

All nuts and bolts assembly hardware is shipped in a box containing only hardware. Check the quantities against the bill of material listed on the general arrangement drawings found in the back of this manual. In most cases, we allowed for a small amount of hardware loss at the job site, so the actual quantities shipped may be somewhat larger than the amount called out on the BOM.

Important:

The packing lists that came with your shipment are your **only** proof of what was shipped to you. **SAVE THESE PACKING LISTS!** In case of shortages or discrepancies, please notify us with in thirty (30) days after receiving, so that we can help you to have all the needed parts when you are assembling.



DELIVERY, STORAGE, TOOLS & SAFETY

Delivery, Storage, and Handling Requirements

The drive station, tension station, and anything that is shipped in boxes should be protected from weather elements such as rain and snow. Galvanized supports can be stored outside in a dry location.

Tools Required

Special tools are not required to assemble this equipment. Commonly used power tools, hand tools, wrenches, ratchets, large c-clamps, ropes and come-alongs, etc. are generally all that will be required. Pneumatic tools will speed the assembly and installation of the belt pans. A forklift or similar type equipment will be needed to lift and place the heavier components such as the drive and tension stations and some of the support structures.

Some field welding is required. Those components that require field welding will be identified in this manual. If the shop coating is hot-dipped galvanized, the welds must be repaired in the field by a coating or system approved by the design engineer or project owner.

NOTE: Some conveyors do not require field welding. Check the general arrangement drawings in the back of this manual for additional welding information.

Safety

Since Serpentix conveyors are very useful in carrying loads up inclines, there are usually considerable elevation changes involved in the field assembly. Appropriate safety ladders and/or scaffolding should be used where applicable. Note that the general arrangement drawings give the assembled conveyor floor loads for each support point or support leg. Studying these floor loads will help provide a safe estimate of the individual piece weights for planning your lifting arrangements. See our Safety Regulation Disclaimer listed below the conveyor warranty, refer to the table of contents.



THEORY OF OPERATION

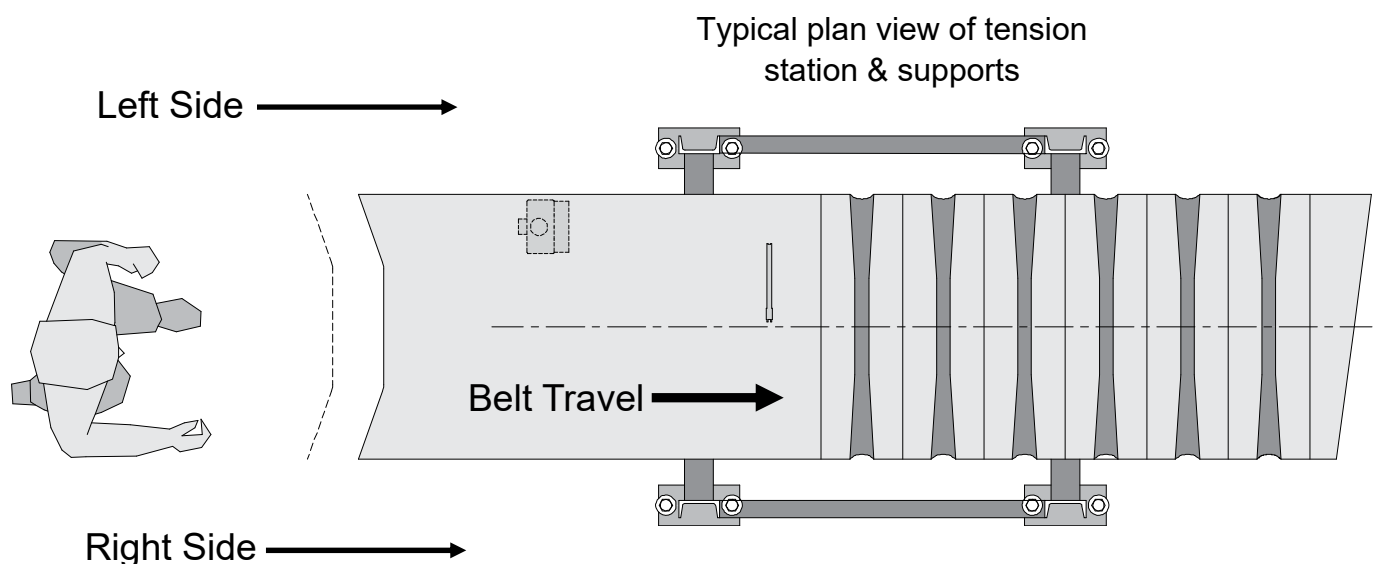
The Serpentix P2 Pathwinder conveyor is a slide or drag-type conveyor system. This conveyor design differs from a conventional flat belt in several ways. The P2 belting is bolted to a drag chain, and the drag chain is pulled through a ultra high molecular weight polyethylene (UHMWPE) guide channel.

The belting on all Serpentix conveyors consists of individual belt pans 8" long, and either 20, 26 or 32" wide. Each belt pan has a convolution approximately 1½" high molded into the belt material. This convolution hold material on the belt on the inclined sections of the conveyor.

The belt pans are bolted to the drag chain with a nylon chain attachment. There are 2 guide blocks bolted to the chain and chain attachment every 8". This guide block-chain-chain attachment-belt pan assembly is pulled through the UHMWPE channel by a sprocket in the drive station.

Idlers are not used in any Serpentix continuous path conveyor system. In this P2 design, the UHMWPE channel insures alignment and continuous tracking. Since the chain and belt assembly is contained, it cannot get out of alignment.

Serpentix designates side orientation when standing directly behind the tension station and facing the belting; see image below.





TRACK INSTALLATION

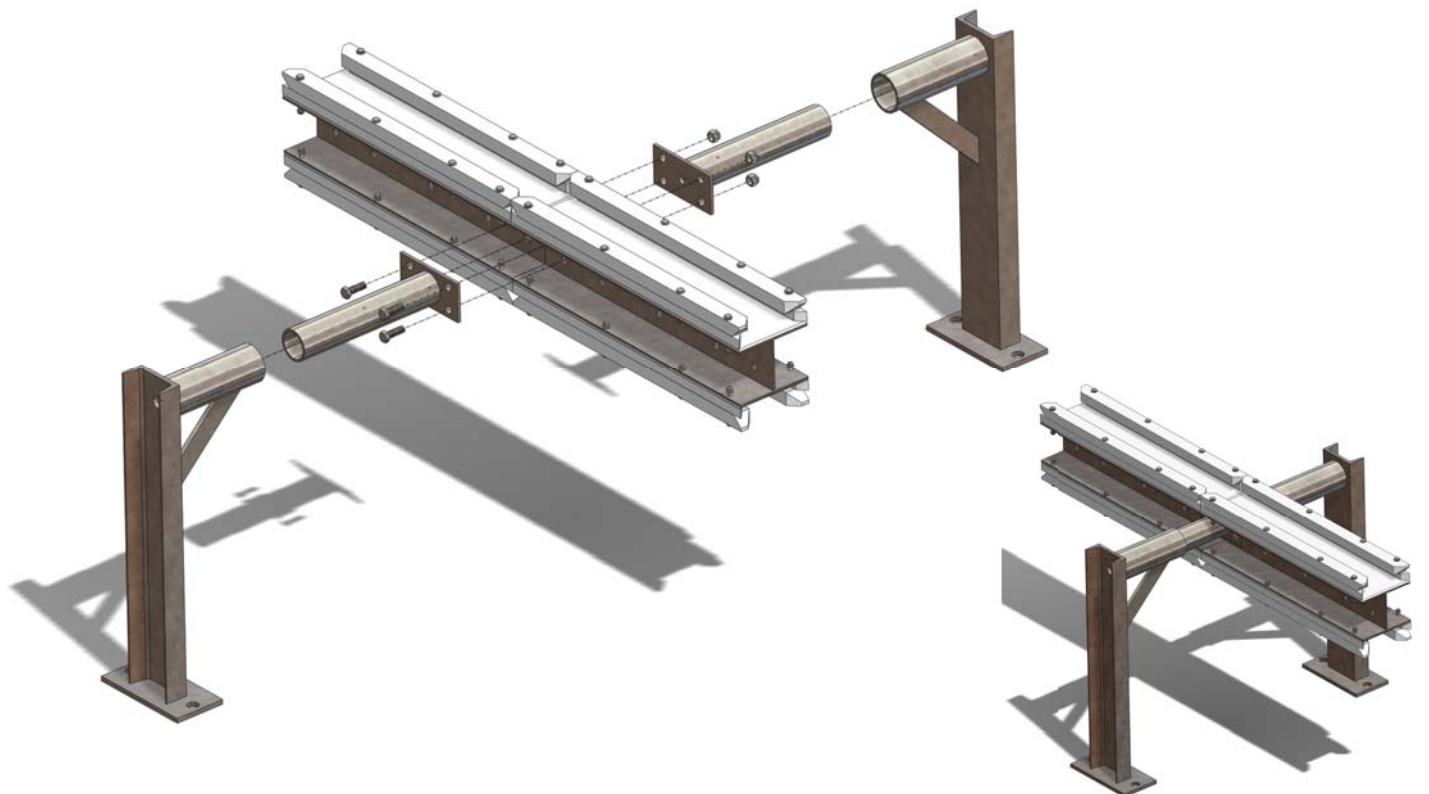
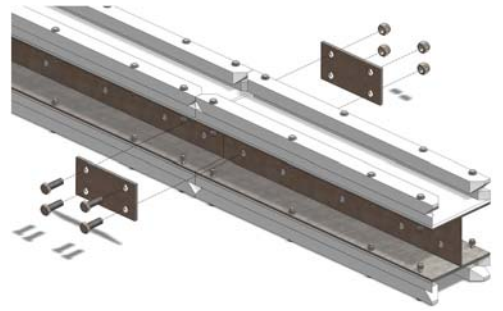
Track Installation

Track must be installed from one end toward the other. Choose a starting point, based upon your assessment of which will be better for you, considering whether one end must be more precisely located than the other.

Please note that Serpentix typically denotes a datum reference or point of origin of where installation is typically easier to begin with. Be advised that references where the conveyor passes through a building wall are critical and should be taken as primary starting locations for assembly.

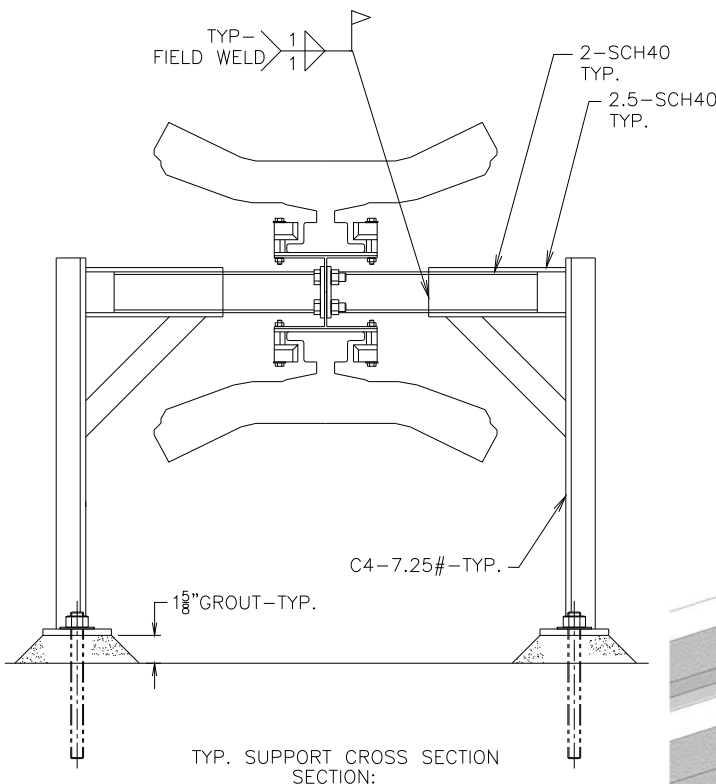
Each track splice joint requires (4) 1/2" x 1-1/2" bolts and (4) 1/2" nuts. Work through the track layout, bolting together at the joints. Support legs mounted at other than splice points fasten to the conveyor track where appropriate mounting plates and bolt holes are provided.

The standard design support legs consist of 2" pipe lengths, fastened to the sides of the conveyor, which slip into 2 1/2" pipe lengths welded to the legs. This design assures freedom of movement to allow for local variations and tolerances. Support legs are most often located at splice points and therefore the pipe length is welded to splice plate which spans the joint.

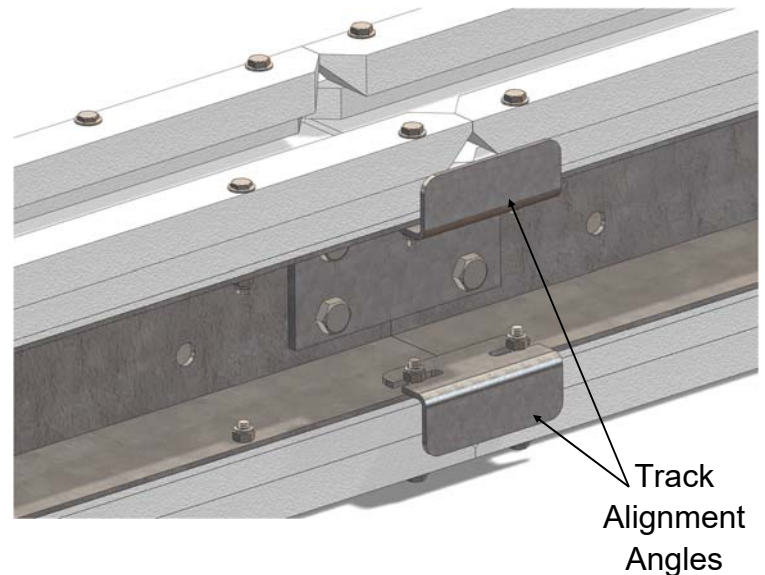


TRACK INSTALLATION CONTINUED...

When the complete track arrangement and support legs have been bolted in place, check the layout against the drawings. Field adjustments may be made at this time to bring the conveyor into specific locations. Each splice joint should be aligned to allow the guide blocks in the track to make a smooth transition thru the splice joint. When the track is assembled to the desired location, field welding of the support pipes is required. Place a one (1) inch bead 180° apart from each other.



Placing anchor bolts into the floor and grouting under support legs should be performed as the next step. Finally, dress the welds and prime paint the welded areas along with any areas where the factory galvanized finish has been damaged.



Track and Flange Alignment

It is essential that the flange on each track section line up with each other, thus allowing the chain guide blocks to be pulled smoothly throughout the conveyor track. Angles have been supplied to help align the track flanges. Installation is simple, loosen or remove the existing 1/4" bolts from the end of each track section and position the

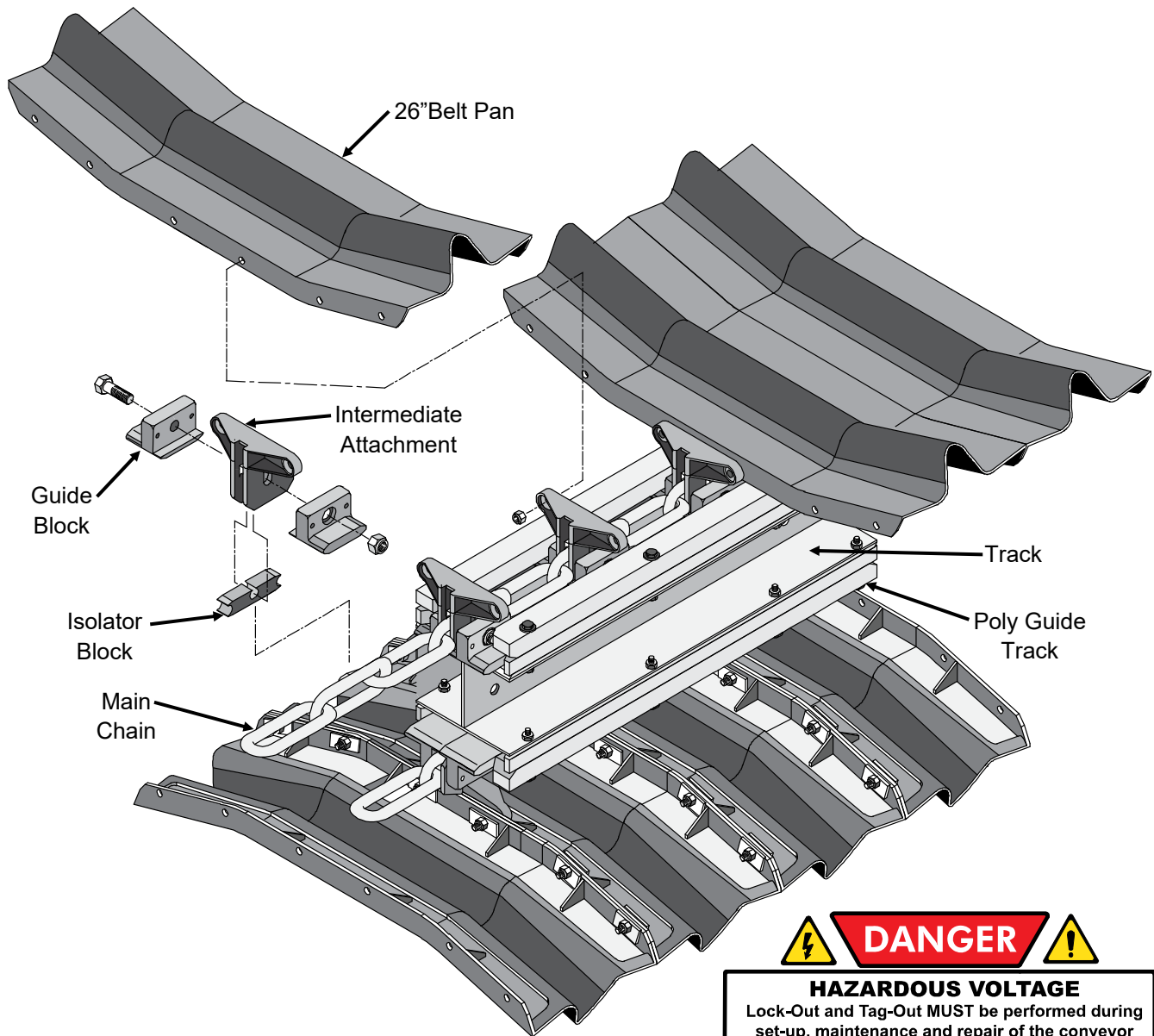


INSTALLATION OF CHAIN & GUIDE BLOCKS

Installation of Chain and Guide Blocks

Prepare for the installation of the conveyor chain by disconnecting electrical power so that the drive station pulley can be rotated by hand. **NOTE:** Once track has been assembled, *clean out the guide channel* removing any dirt, construction debris, and extra hardware; guide channel can be washed out with water. Check track splices for lodged trash and remains.

Place a shipping container of chain at the tension station so that the chain can be pulled out of the container while feeding the assembly into the track. At this time everyone associated with handling the chain must be instructed to use care that the chain is not to be dropped or hit with hard objects, or upon hard surfaces. This caution is necessary because the chain is case hardened and any such blows can create a stress rise point that will weaken the chain.





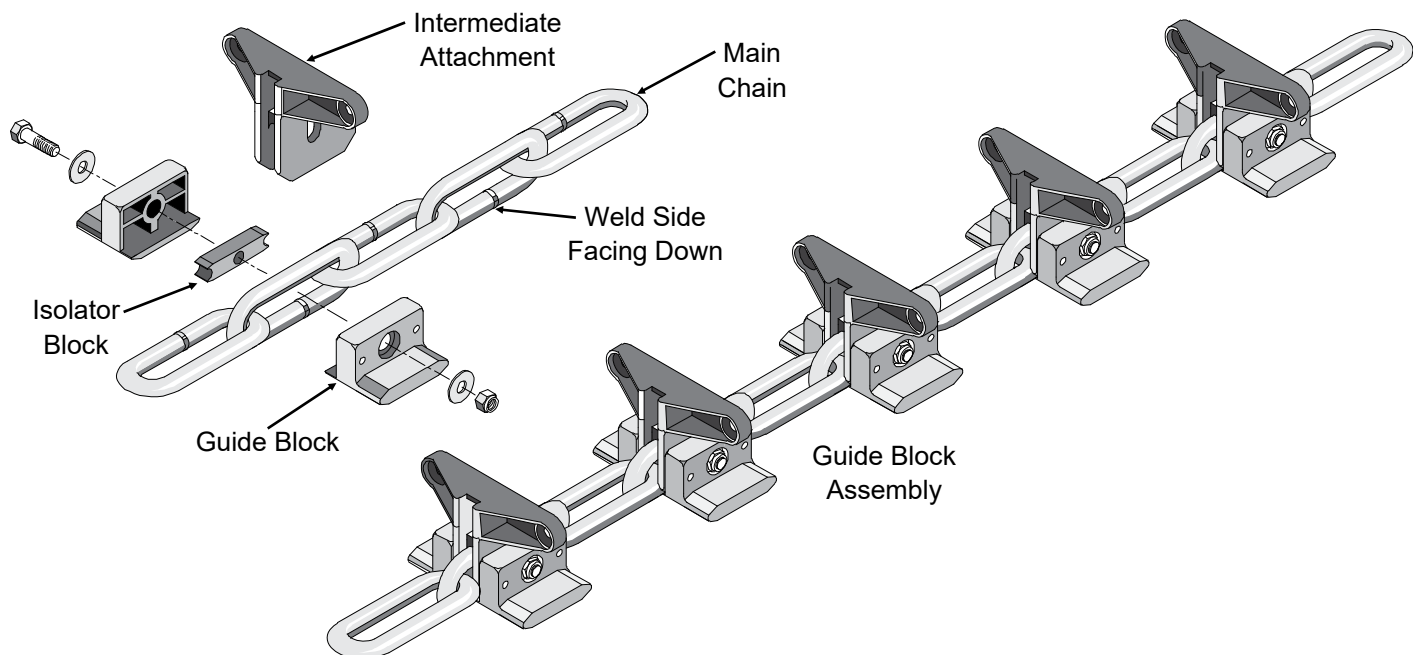
INSTALLATION OF CHAIN & GUIDE BLOCKS CONTINUED...

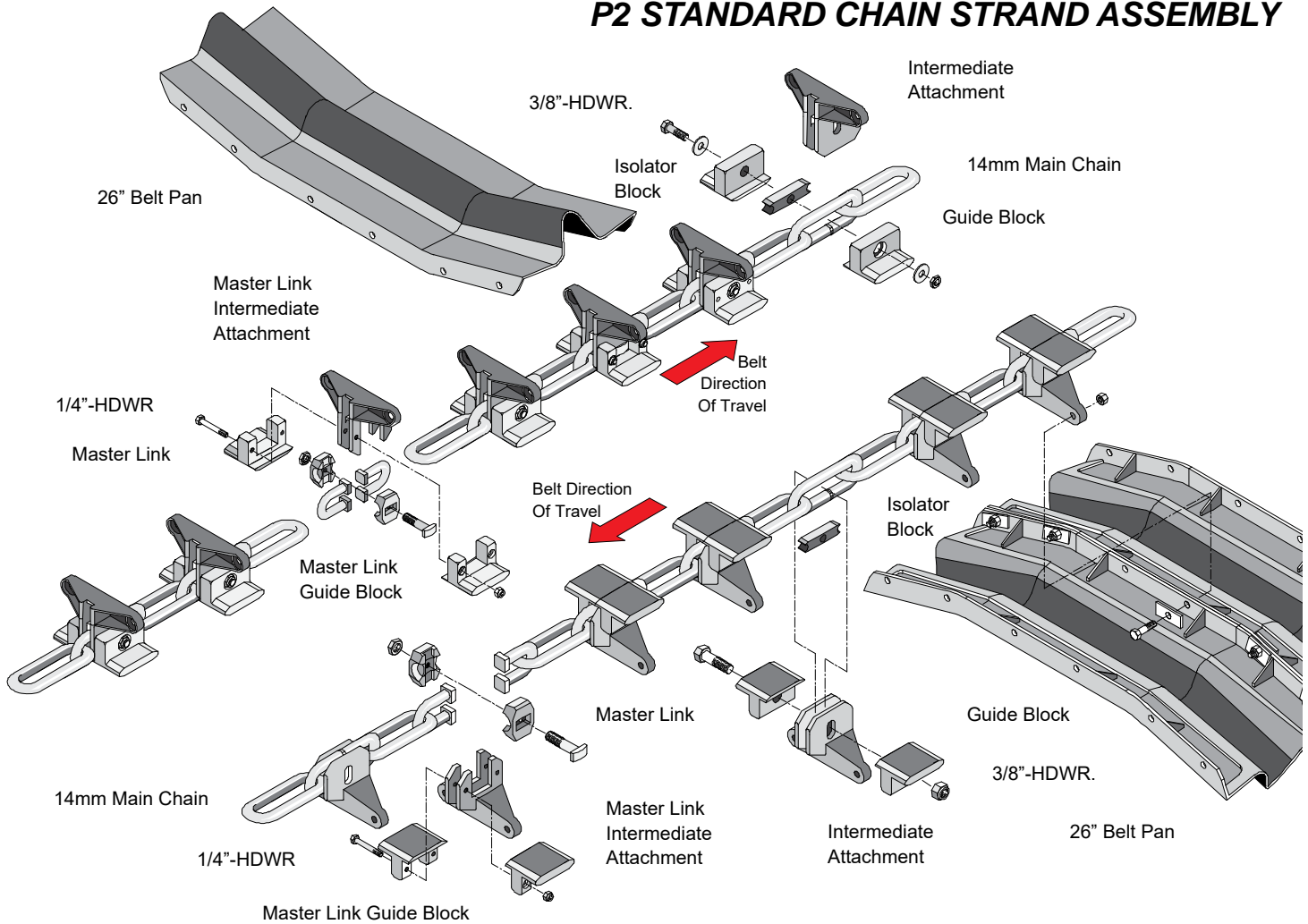
As shown in the below illustration, note the “Belt Pan Attachment” positioning in relationship to the “Chain Travel” direction. This relationship must be correct when feeding the chain, or undue wear with other associated parts can occur. The belt pan attachments should be pushing the belting, not pulling it. Pull the first chain section into the guide channel, leaving enough chain outside of the channel to install the “Master Link Assembly” and connect the next section of chain. Continue adding and splicing lengths of chain, while pulling the assembly through the track, over the drive sprocket, and back through the return guide channel.

When feeding new chain into the track, once the chain reaches the drive station sprocket the chain can be feed around the sprocket two different ways:

- remove the belt guard and rotate the large sheave which rotates the drive sprocket through the gear box; can use a high-speed drill with a fabricated attachment to spin
- remove the #60 roller chain so the drive sprocket is free spinning

When the first link is back to the tension sprocket, the last length of chain can be wrapped back over the sprocket and a determination made whether links will need to be removed. If the chain as shipped from the factory is too long so the tension station push bar will not take up the slack, chain links will need to be removed in 2 link sections (8”) to arrive at a proper length. Make sure the chain is lying flat throughout the guide channels and is properly seated in the sprockets before determining the amount of chain links to be removed.



P2 STANDARD CHAIN STRAND ASSEMBLY


ITEM NO.	PART NO.	DESCRIPTION	MATERIAL
1	H-0105-0004-A RevD	Chain Strand @ 99 Links (32'-5 3/4" LG.)	Case Hardened
2	H-0105-0004-A RevD	Chain Strand @ xx Links (see GA for specific length per application)	Case Hardened
3	PW-0104-0010-A RevB	Isolator Block	60 Duro. Rubber
4	H-0104-0010-A RevH	Intermediate Attachment	Nylon
5	PW-0104-0007-A RevD	Guide Block - Gray (Wide) Injected	Urethane Injected
6	-	3/8"-16NC x 2"LG. HX. HD. Bolt	304SS Hdwr.
7	-	3/8"-16NC HX. ESNA Nut	304SS Hdwr.
8	-	3/8"-Flat Washer	304SS Hdwr.
9	PW-0106-0004-A	Chain Master Link	Case Hardened
10	PW-0104-0005-A	Splice Intermediate Attachment	Nylon
11	PW-0104-0008-A RevB	Splice Guide Block - Gray (Wide) Injected	Urethane Injected
12	-	1/4"-20NC x 2 1/2"LG. HX.HD.Bolt	304SS Hdwr.
13	-	1/4"-20NC HX. Tri-Lock Jam Nut	304SS Hdwr.

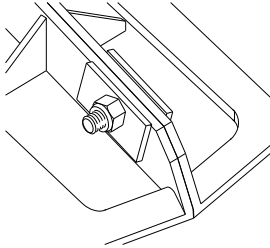


BELT PAN INSTALLATION

Belt Pan Installation

For this operation it is more efficient for two people to work as a team, one on each side of the conveyor. If power is available, the chain may be jogged to progressively bring the empty chain to the assemblers. The belt pans are bolted to each other and to the belt pan attachments. Install the belt pans so the attachment "PUSHES" the belt pans in the direction of the drive station.

CORRECT WAY



Installation Recommendations

- 1/2" wrench and socket (3/8 or 1/4 ratchet drive).

NOTE: The use of pneumatic or electric tools will significantly reduce belt pan instal-



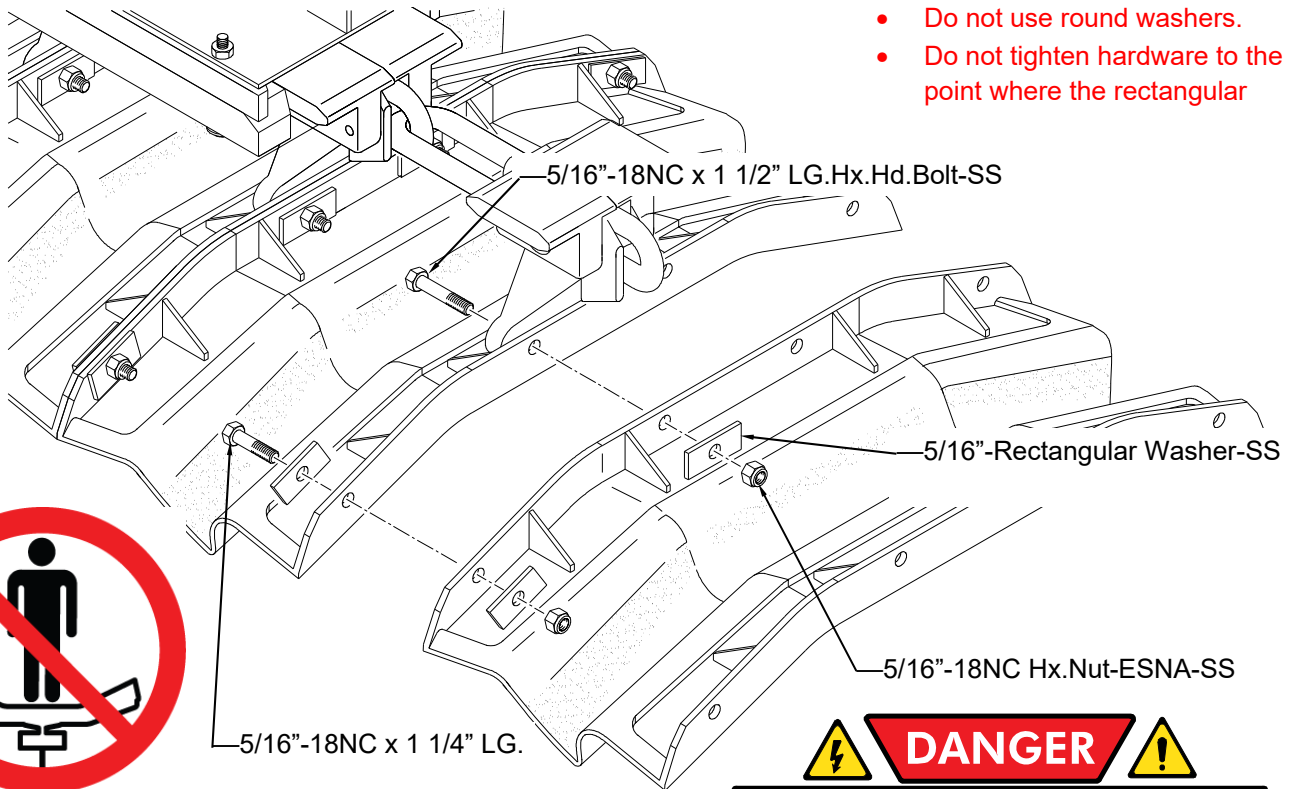
INCORRECT WAY



Bent washer (over tightened) will cause the plastic belt pan stiffener

- Use only Serpentix supplied hardware.
- Always use Anti-seize when hardware is stainless steel.
- Tighten hardware enough to provide a

- Do not use round washers.
- Do not tighten hardware to the point where the rectangular



DO NOT STAND OR WALK ON THE CONVEYOR BELT



HAZARDOUS VOLTAGE
Lock-Out and Tag-Out **MUST** be performed during set-up, maintenance and repair of the conveyor



BELT PAN PROTECTION / DISASSEMBLY

Belt Pan Protection During Installation Period

New conveyors are often installed during building construction and then left idle as other equipment is installed and started up. All loose, extra hardware should be cleared away and the conveyor protected for dirt and debris as other work is done. If construction or masonry remnants fall into the guide channel of the track, blow out with air or complete a heavy wash down to remove the clumps of material that form together. The guide channel must be clean and free of debris before equipment start-up can occur.

If the Serpentix is not to be operated over one week, the stretched belt pans at each terminal end of the conveyor should be relieved of stretch by jogging the conveyor a distance of three (3) to four (4) feet weekly.

If it will not be practical to jog the conveyor on a weekly basis, disconnect the belt pans at the terminals and fold them back over the adjacent straight section. Put signs at the conveyor start switch or switches to reconnect the belt pans before running the conveyor.

Disassembly

Disassembly of the conveyor, if required, will be to follow the assembly instructions in reverse order. Welded joints around the support pipes will have to be removed.

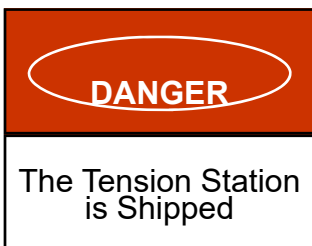
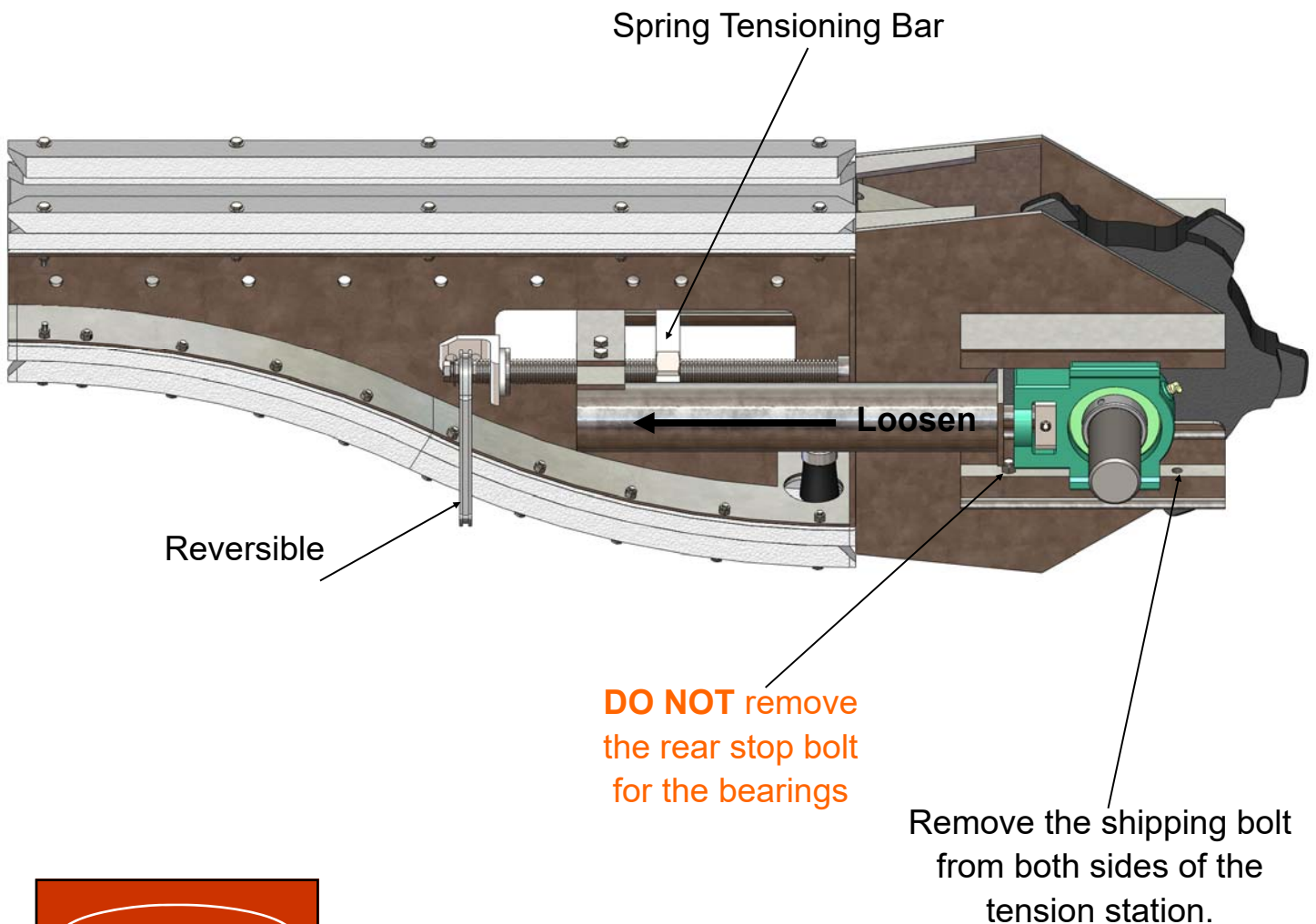


TENSION STATION PRE-ASSEMBLY INSTRUCTIONS

Tension Station Retention Bolts

The tension station is shipped under pressure. Before tension can be applied directly to the chain, remove all of the tension from the springs in the tensioner assembly by turning the ratchet so that the spring tensioning bar is removed from the tubes. This will allow the bearing to be moved forward allowing the shipping bolts to be removed.

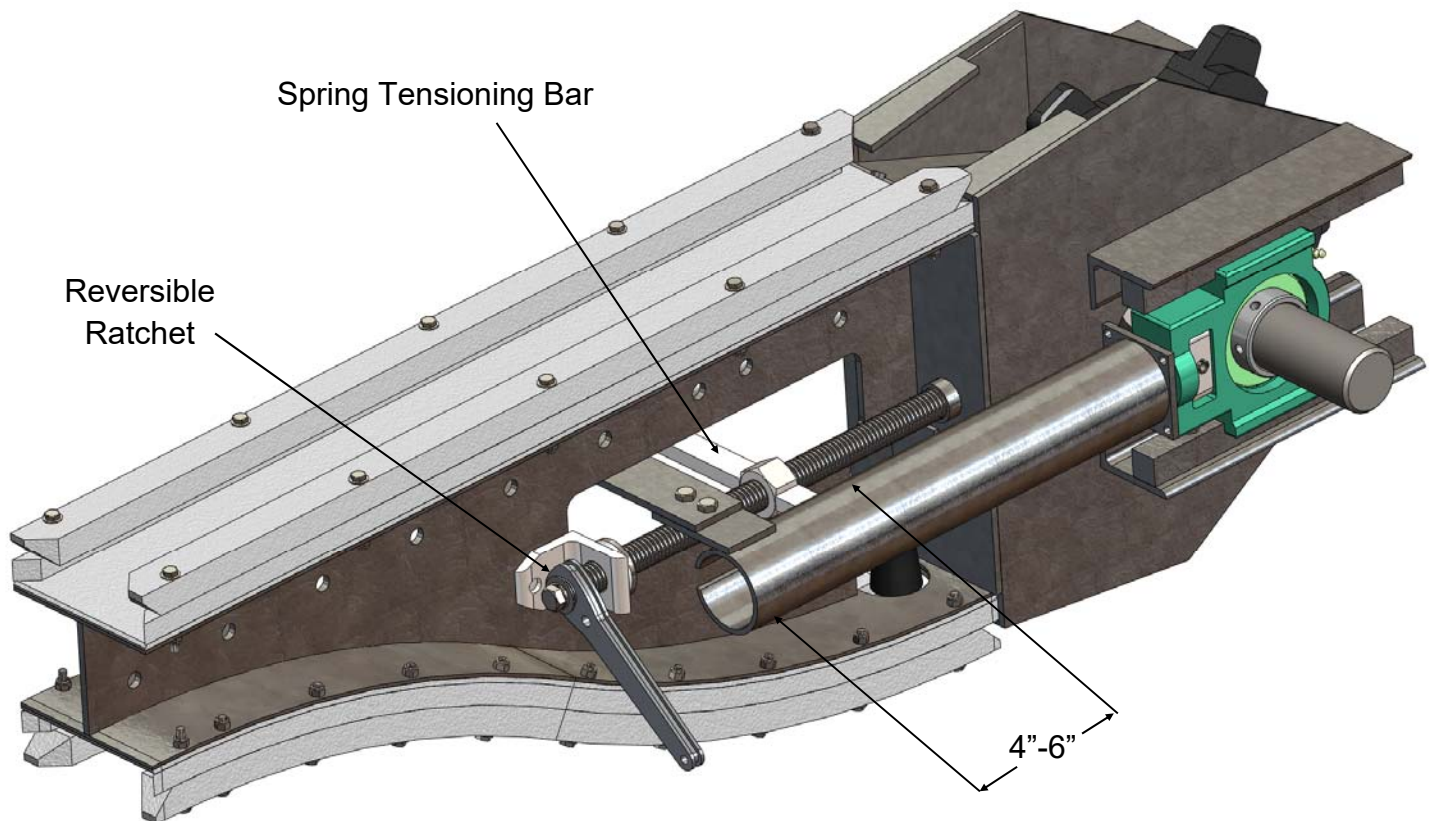
These shipping bolts must be removed to apply proper tension to the main drag chain.





APPLYING CHAIN TENSION

Serpentix conveyors are provided with a spring loaded chain tensioner located at the tail sprocket of the conveyor system. The tensioner keeps constant force on the sliding sprocket unit, forcing the centerline to centerline distance of the conveyor to be at



The tensioner is properly adjusted by the following procedure: A single ratchet system is provided on the easy access side of the conveyor. Turn the ratchet in the direction that the tensioning bar will compress the springs inside the tubes, thus causing force against the sliding sprocket unit. The movable spring tensioning bar shows the amount of equal compression on the springs. The spring tensioning bar is normally at a starting position of 4"-6" from the open end of the spring tube.

Once the tensioner forces the bearing units to the end of the guide system, the main chain must be shortened by removing two (2x) chain links, at a splice location, and one (1x) belt pan. Reconnect the chain and readjust the tensioner as stated above. The main conveyor chain gains length over time only by wear on the inner, facing surfaces.

DANGER
The Tension Station is Shipped



CHAIN TENSIONING OBSERVATION

Procedure No. 1

Physical observation of the belt pans stretched around the sprocket at the drive and tension stations is required. The conveyor must be STOPPED. Shake the belt pans side to side and feel the tension. If the belt pans spring back moderately and the chain rattles a little, you have completed part of the tensioning procedure. A loosely tensioned chain will exhibit a lot of chain rattle and very floppy belt pans. A tightly tensioned chain will exhibit no chain rattle and the belt pans will still be flexible but feel stiff in movement.

Procedure No. 2

For physical observation of the top side of a vertical curve, the conveyor must be STOPPED. Press down on the belt pans on the top side of the track with medium force so as to allow the chain to touch the base of the track. Note: If this cannot be accomplished, the chain is too tight. If the chain is resting on the track base, then the chain is too loose.

Procedure No. 3

At the drive station as the chain re-enters the track on the bottom side, it should be a smooth transition. A loosely tensioned chain will fall from the sprocket and start clipping against the re-entry ramp. If not corrected, the chain could get caught on the ramp and cause a derailment, unzipping the chain from the track. A tightly tensioned chain will exhibit a binding sound and cause excessive wear on all parts of the conveyor. At the tension station a loose chain will fall more pronouncedly as it exits the bottom track. A tight chain will exhibit a binding sound.

Procedure No. 4

Visually observe the bottom side movement of chain and belt pans while running. On the bottom side a pulling action should occur towards the tension station. Note: a loose chain will exhibit, on the bottom side of the track, a pushing action or pulsating effect. This effect generally becomes more apparent as the chain approaches the take-up station. The conveyor chain assembly will eventually derail if allowed to go uncorrected.

Procedure No. 5

When the conveyor is running, visually observe the tension bearings. When adequate tension is set, the bearings will oscillate 1/16" - 1/8" back-and-forth. That oscillation is caused by the tension sprocket hill-and-valley design which allows to remove excess chain slack. If the bearings are not oscillating, more tension on the main chain is required.

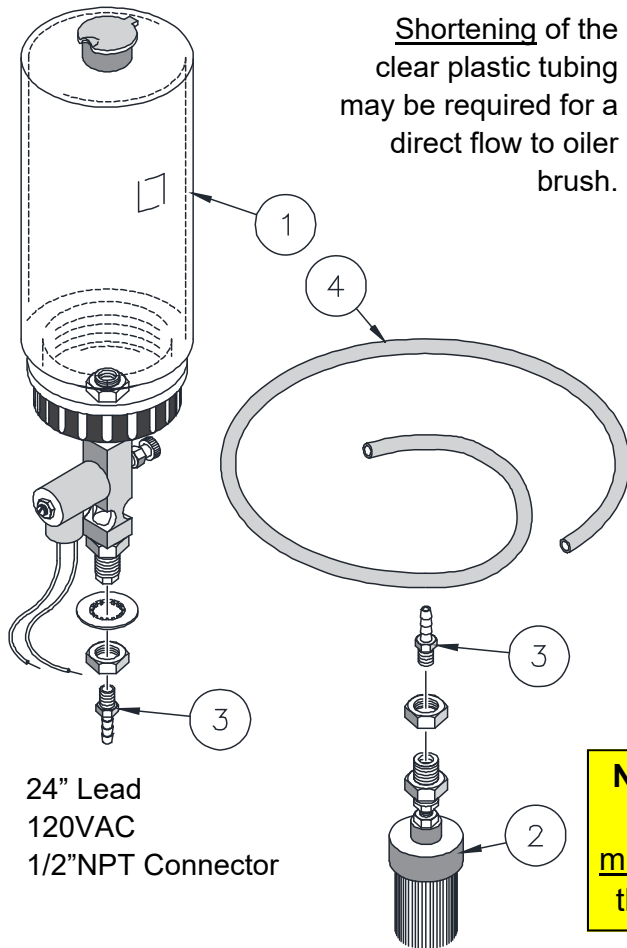
SOLENOID OILER INSTALLATION PW-0147-0005



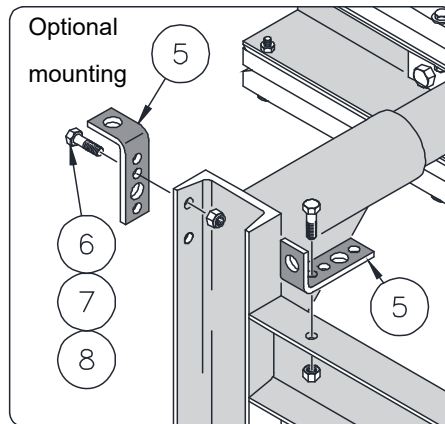
HAZARDOUS VOLTAGE

Lock-Out and Tag-Out **MUST** be performed during set-up, maintenance and repair of the conveyor

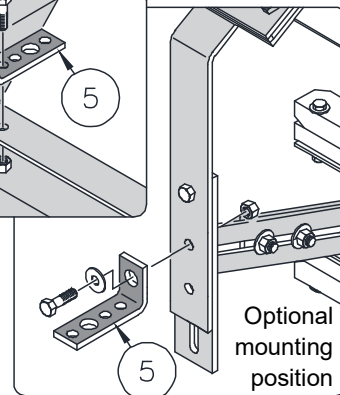
Shortening of the clear plastic tubing may be required for a direct flow to oiler brush.



24" Lead
 120VAC
 1/2" NPT Connector

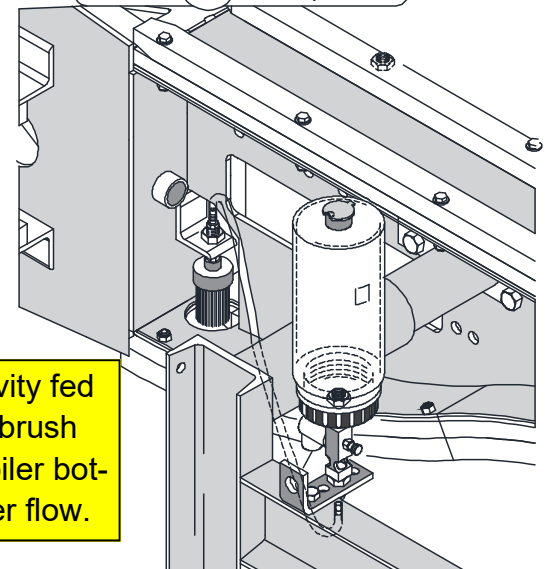


Note: 7/16" holes may be needed to be field drilled in the support



Tensioning assembly not shown for clarity.

Note: This is a gravity fed oiler system. The brush must be below the oiler bottle to provide proper flow.



ITEM NO.	PART NO.	DESCRIPTION	MATERIAL	NO. REQ'D
1	B1764-6X00	SOLENOID 120VAC OILER BOTTLE—1 QUART (OIL-RITE)	ACRYLIC	1
2	A-2256-4X01	OILER BRUSH (OIL-RITE)	NYLON	1
3		1/8" BARBED x 1/8"-27NPT MALE PIPE ADAPTER	BRASS	2
4		FLEX TUBING 3/16" x 1/4" O.D. x 3'-0" LG.	PLASTIC	2
5	P-116-032-A	OILER MOUNTING BRKT. REV. B	304SS	1
6		3/8"-16NC x 2" LG. HX. HD. BOLT	304SS	2
7		3/8"-16NC HX. TRI-LOCK NUT	304SS	2
8		3/8"-FLAT WASHER	304SS	1



SOLENOID OILER ADJUSTMENT PW-0147-0005

Oil Type:

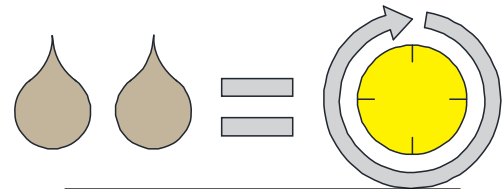
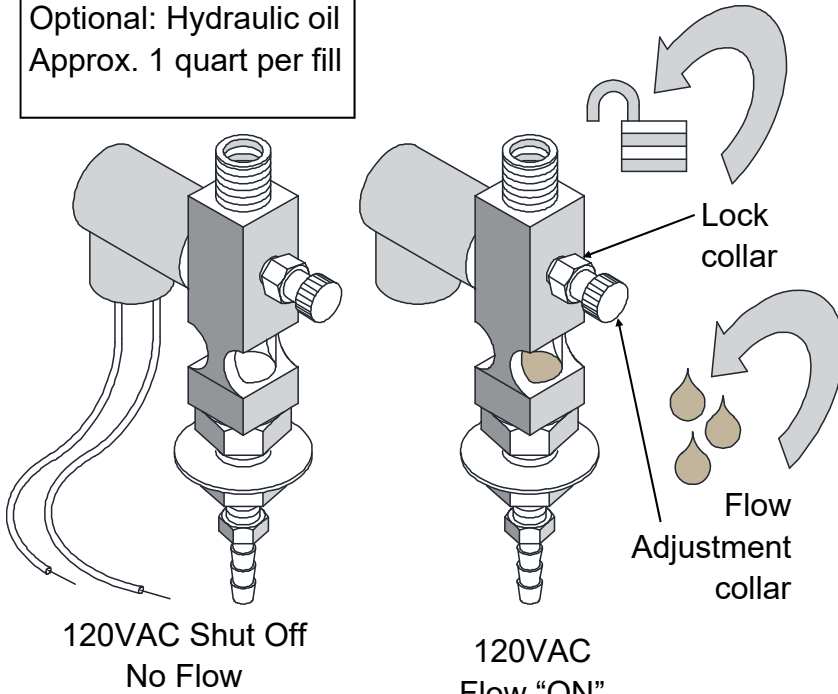
No. 10 SAE

Optional: Hydraulic oil

Approx. 1 quart per fill

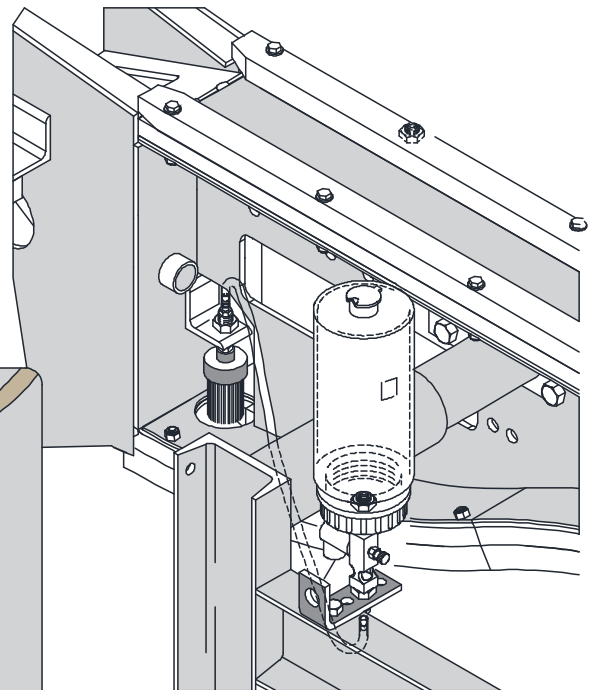
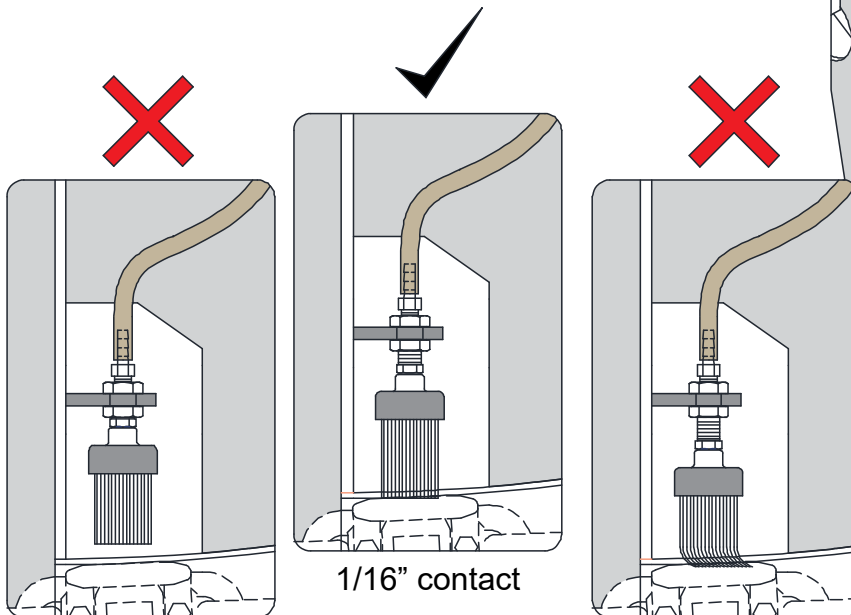
Operating Instructions:

1. The 120VAC connection is applied when the conveyor is running and disconnected when the conveyor is turned off.
2. To increase oil flow loosen lock collar and turn adjusting collar counterclockwise. Turn clockwise to decrease oil flow. Re-tighten lock collar.
3. Adjust flow rate to 2 drops per minute.



2 Drops = 60 Seconds

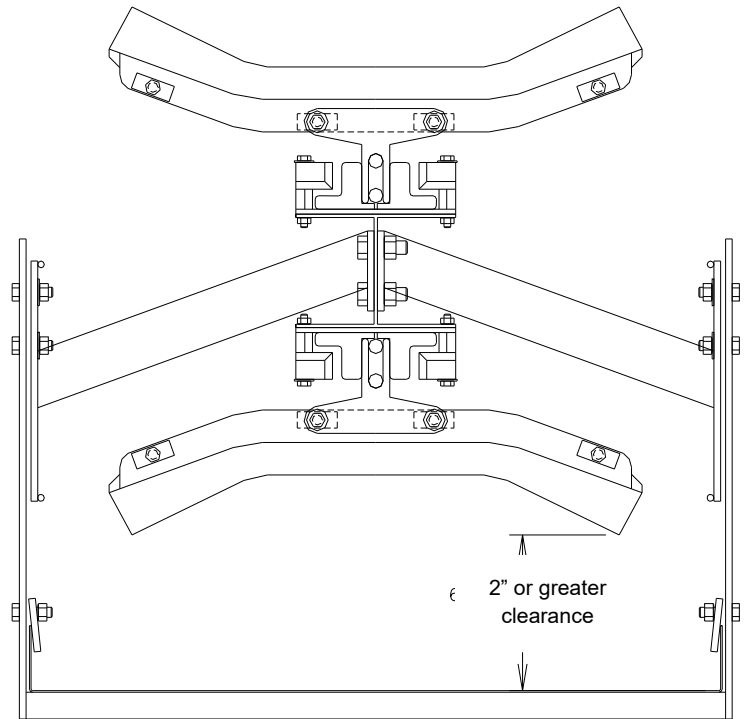
Brush Positioning Instruction



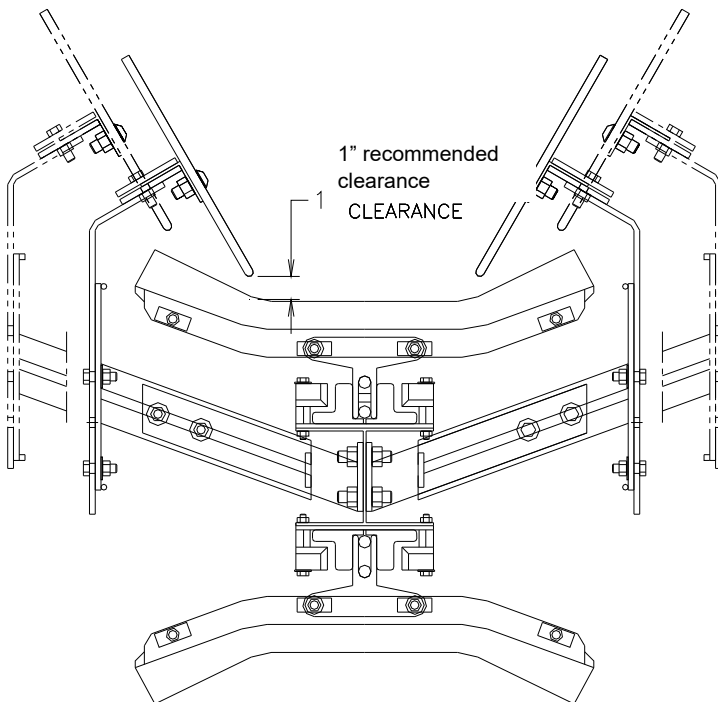
DRIP PAN & SKIRTBOARD INSTALLATION

Drip Pan Installation

If drip pans are provided, it is important to note that one end of each pan is slightly wider to allow for positioning similar to those of roof shingles. We supply either T-shaped slotted brackets or slotted clamp brackets bolted around pipe supports. The bolt holes are large to allow adjustment so you must use the fender washers provided at each bolt point. When the drip pans are installed with proper slope, caulk the inside seams to prevent leakage. Adjust the slope to provide drainage to the proper drain points.



TYP. DRIP PAN CROSS SECTION SECTION:



TYP. SKIRTING CROSS SECTION SECTION:

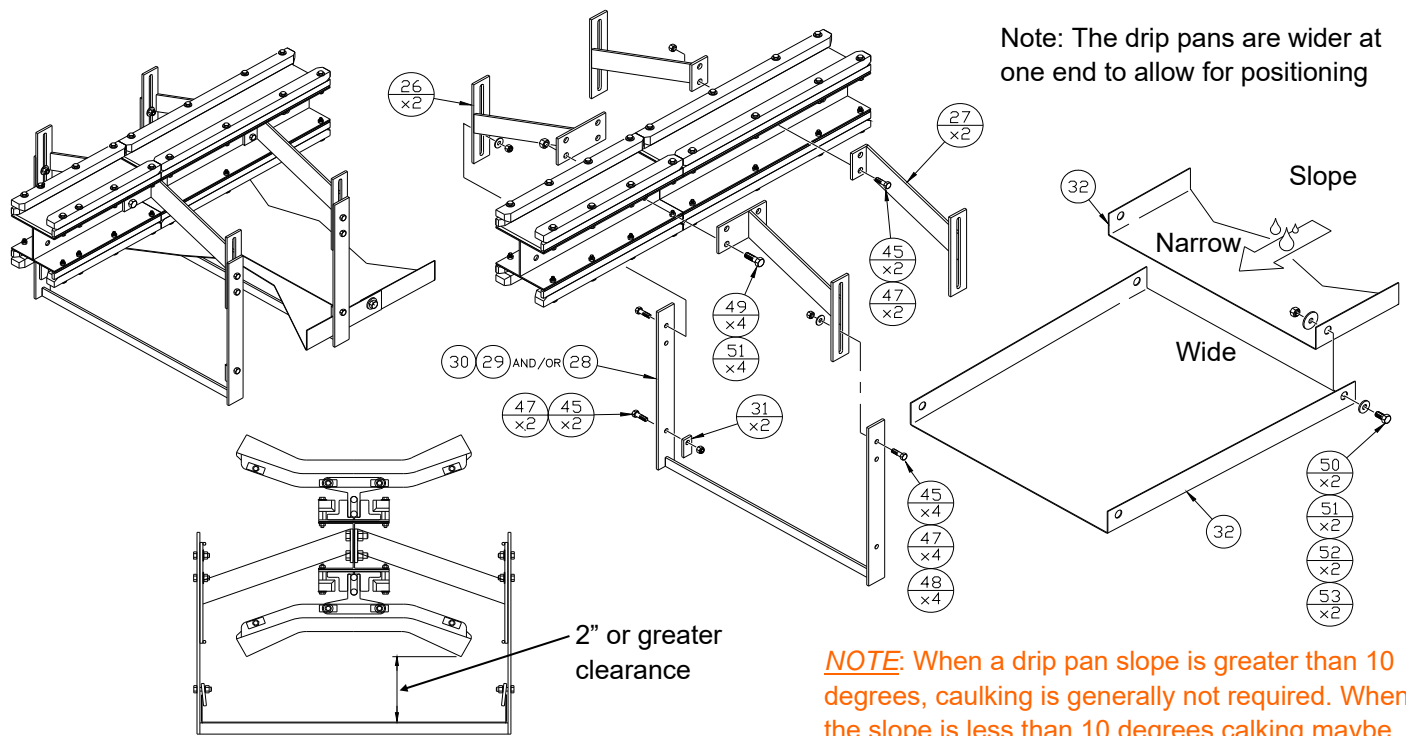
Skirt Board Installation

Any skirt boards provided will again mount with the same T-shaped slotted bracket or alternate system as the drip pans. Adjust the skirt boards so that there is a minimum of 1" clearance over the top of the belt pan convolution. If the skirt boards are allowed to touch the belting surface, premature wear on the belt pans will occur.



STANDARD DRIP PAN ASSEMBLY

Note: The drip pans are wider at one end to allow for positioning



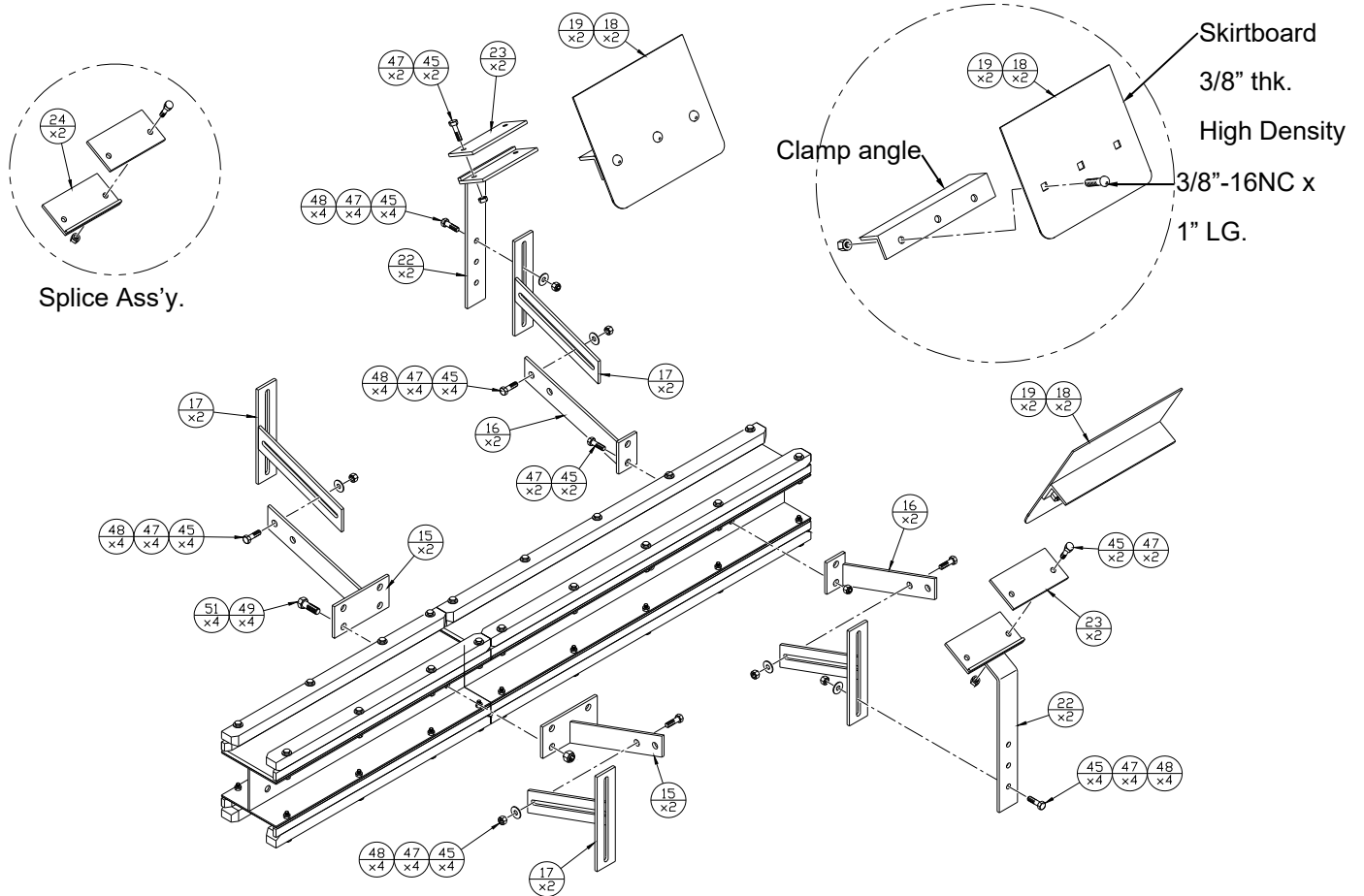
NOTE: When a drip pan slope is greater than 10 degrees, caulking is generally not required. When the slope is less than 10 degrees caulking maybe

ITEM NO.	PART NO.	DESCRIPTION	MATERIAL
26	See GA.	Drip pan splice support	See GA.
27	See GA.	Drip pan intermediate support	See GA.
28	See GA.	Drip pan hanger x 12" LG.	See GA.
29	See GA.	Drip pan hanger x 18" LG.	See GA.
30	See GA.	Drip pan hanger x 24" LG.	See GA.
31	See GA.	Drip pan clamp plate	See GA.
32	See GA.	Drip pan x 4'-0" LG.	See GA.
45		3/8"-16NC x 1 1/4" LG. Hx. Hd. Bolt	See GA.
47		3/8"-16NC Hx. Hd. Nut—ESNA	See GA.
48		3/8"-Flat Washer	See GA.
49		1/2"-13NC x 1 1/2" LG. Hx. Hd. Bolt	See GA.
50		1/2"-13NC x 1 "LG. Hx. Hd. Bolt	See GA.
51		1/2"-13NC Hx. Hd. Nut—ESNA	See GA.
52		1/2"- Flat Washer	See GA.
53		1/2"- Fender Washer	See GA.

Please refer to the general arrangement drawings for specific items provided.



STANDARD SKIRTBOARD EXPLODED VIEW

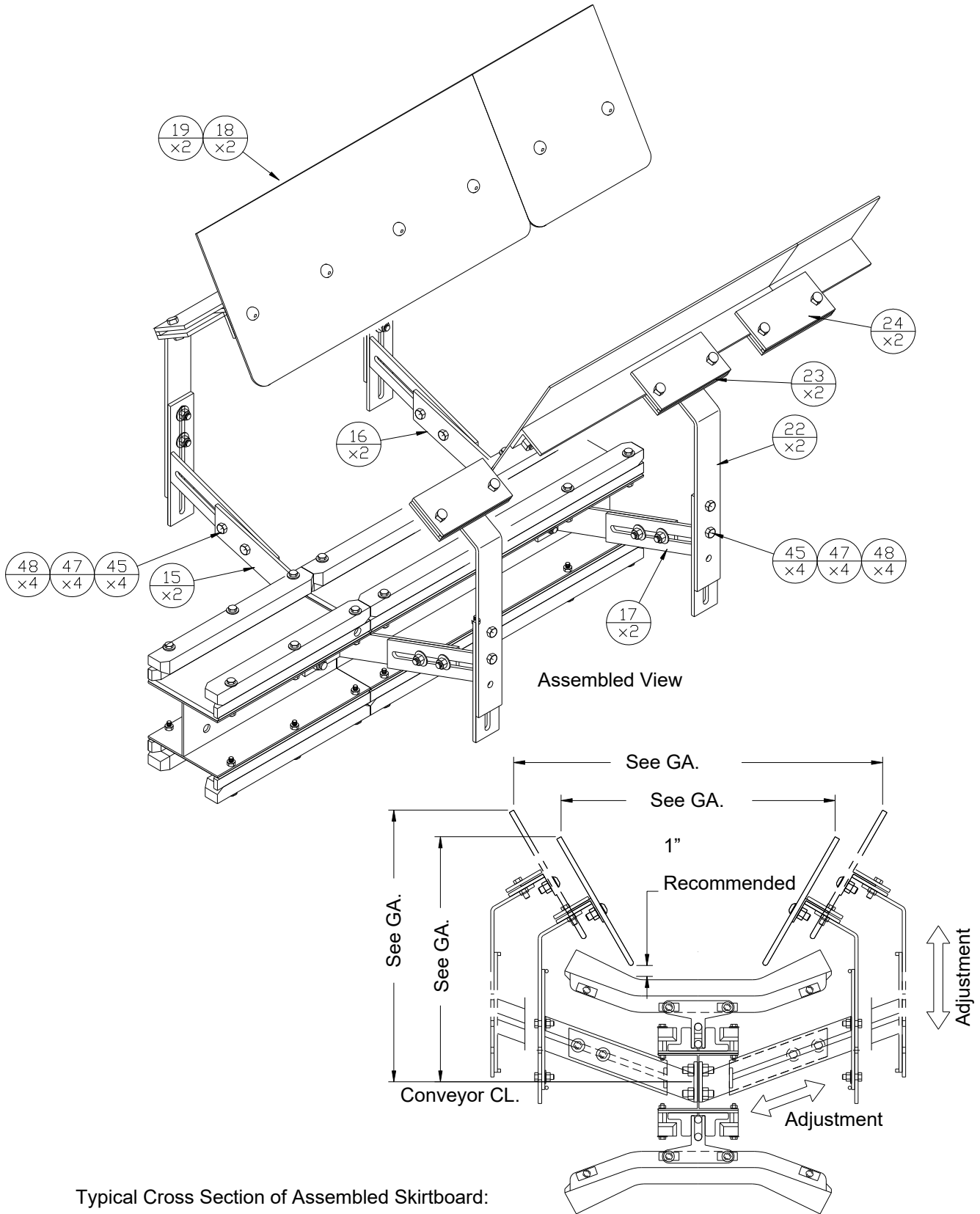


ITEM NO.	PART NO.	DESCRIPTION	MATERIAL
15	See GA.	Skirtboard splice support	See GA.
16	See GA.	Skirtboard intermediate support	See GA.
17	See GA.	Skirtboard T-bracket	See GA.
18	See GA.	Skirtboard x 10' - 0" LG.	See GA.
19	See GA.	Skirtboard x xx' - xx" LG. (see GA. for other lengths)	See GA.
22	See GA.	Skirtboard support bracket	See GA.
23	See GA.	Skirtboard clamp bar	See GA.
24	See GA.	Skirtboard splice assembly	See GA.
45		3/8"-16NC x 1 1/4" LG. Hx. Hd. Bolt	See GA.
47		3/8"-16NC Hx. Hd. Nut—ESNA	See GA.
48		3/8"-Flat washer	See GA.
49		1/2"-13NC x 1 1/2" LG. Hx. Hd. Bolt	See GA.
51		1/2"-13NC Hx. Hd. Nut—ESNA	See GA.

Please refer to the general arrangement drawings for specific items provided.



STANDARD SKIRTBOARD ADJUSTMENT



Typical Cross Section of Assembled Skirtboard:

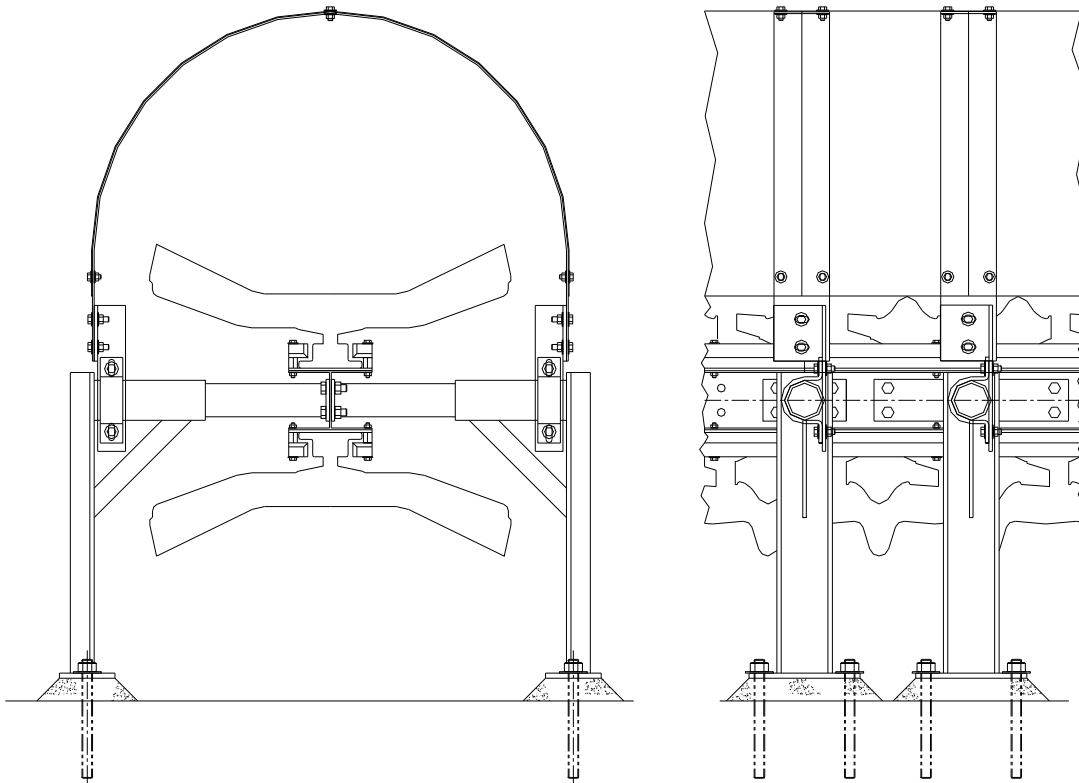
Belt width may differ from illustration.



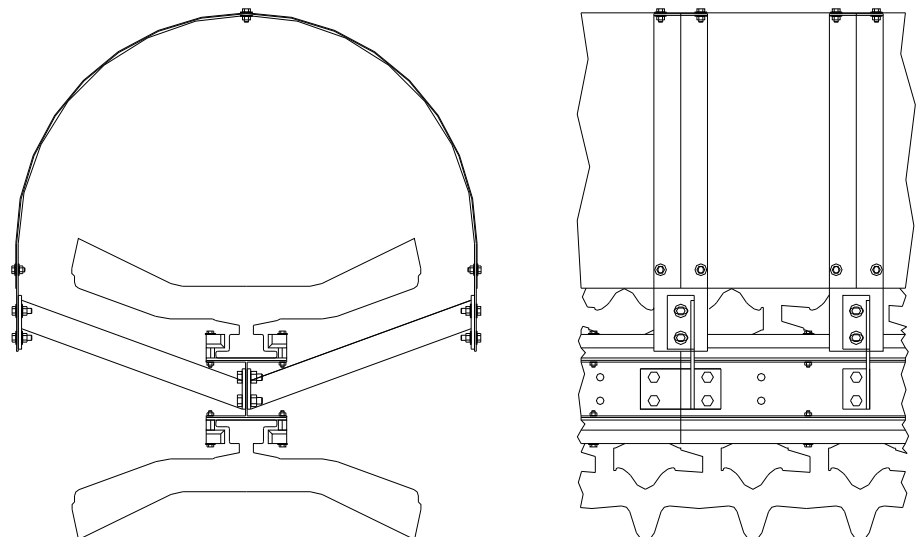
COVER INSTALLATION

Cover Installation

If covers are provided, install the bands at the designated points given. It is important to make sure that the cover bands are placed in proper position to accommodate each specific cover length. The covers are shipped flat and must be bowed into position. The covers then bolt to the bands.



TYP. COVER/SUPPORT CROSS SECTION SECTION:



TYP. COVER CROSS SECTION SECTION:

STOP SWITCH SINGLE FLAG 120VAC



HAZARDOUS VOLTAGE
 Lock-Out and Tag-Out MUST be performed during set-up, maintenance and repair of the conveyor

INSTALLATION:

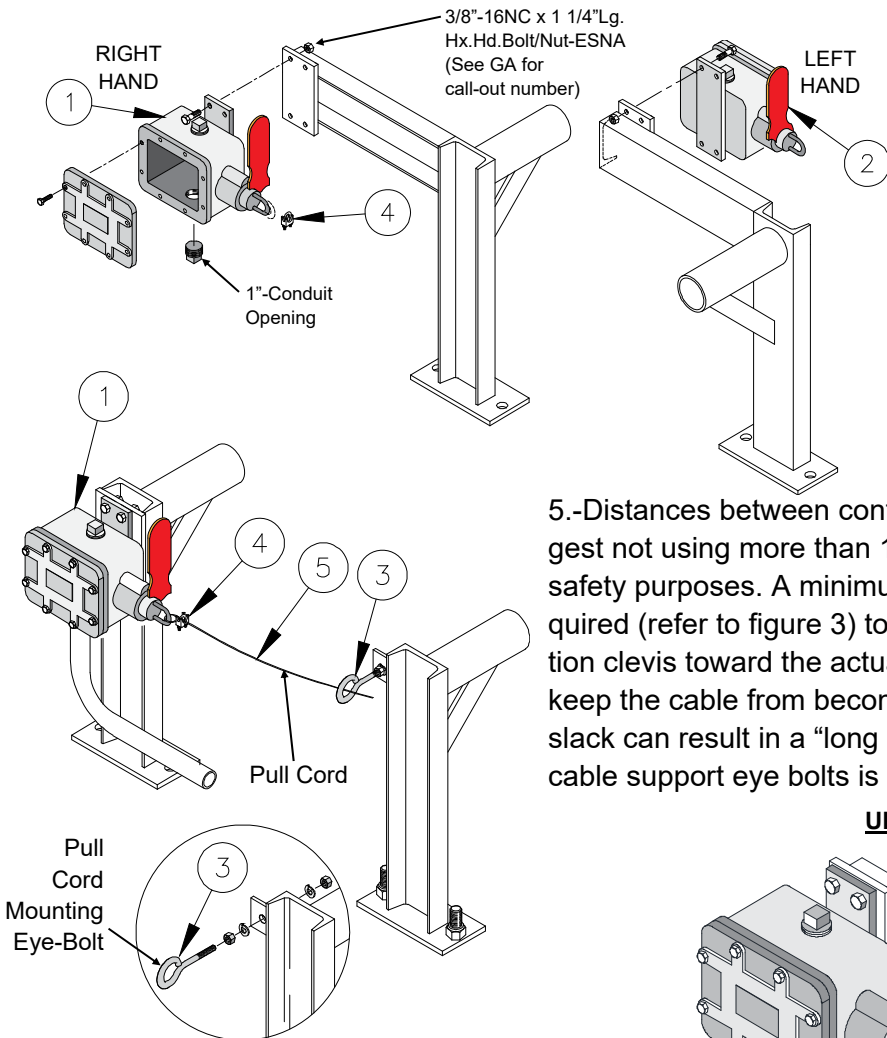
1.-DO NOT remove hubs from explosion proof units at any time. Modifications to the units or hub assemblies may affect functionality and reliability, and will void the warranty. Hub and housing modifications of all models must be done at the factory only.

2.-Notice: cover screws must be tightened at 12ft-lbs each, and conduit entries must be sealed to meet enclosure types.

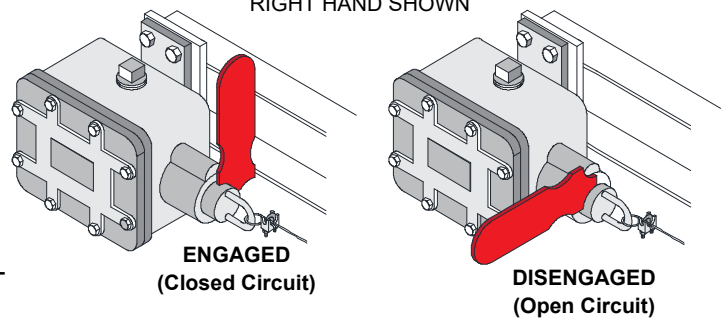
3.-BEFORE you begin, lock out all power to the conveyor system to prevent accidental start-up.

4.-Control should be mounted on a flat surface by using 3/8" diameter bolts (see GA) in the four 13/32" diameter mounting holes provided.

5.-Distances between controls should not exceed 200 feet. We suggest not using more than 100 ft. of cable at each control end for safety purposes. A minimum of 2" of slack for 100 ft. of cable is required (refer to figure 3) to avoid pulling out the cable end connection clevis toward the actuated position. Care should be taken to keep the cable from becoming too slack as too much cable and slack can result in a "long pull" situation. Recommended spacing of cable support eye bolts is 10 ft.



UPRIGHT MOUNTING POSITION
 RIGHT HAND SHOWN



Note: Refer to the General Arrangement Drawings for mounting location and part call out numbers.

ITEM NO.	PARTS NO.	DESCRIPTION	MATERIAL	NO. REQ'D.
1	PCR-2SX	Stop Switch (Explosion Proof) By Material Control	319 Cast Aluminum	See GA
2	PCL-2SX	Stop Switch (Explosion Proof) By Material Control	319 Cast Aluminum	See GA
3		3/8"-16NC x 6"Lg. Eye-Bolt w/Hdwr.	304SS	See GA
4	31985T72	3/32-7X7 Cable End Fitting (McMaster-Carr)	304SS	See GA
5		3/16"O.D. Orange Cable x (see GA) Lg.	Vinyl Coated	See GA



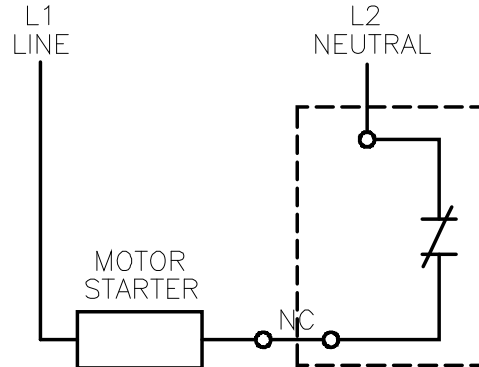
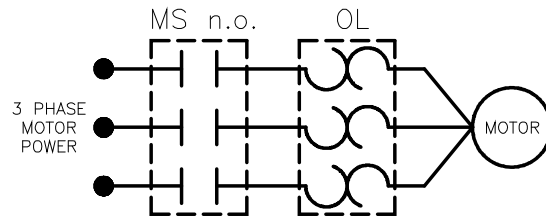
DANGER



HAZARDOUS VOLTAGE

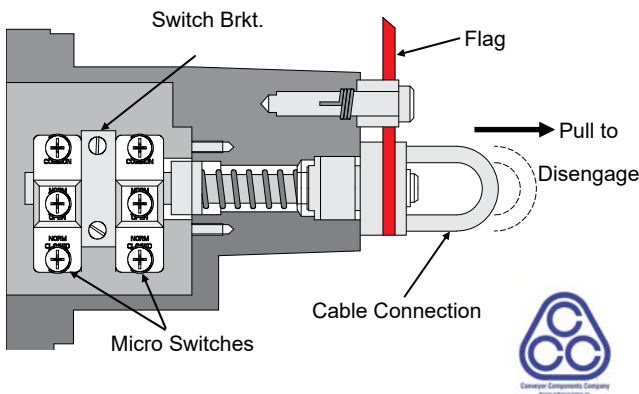
Lock-Out and Tag-Out **MUST** be performed during set-up, maintenance and repair of the conveyor

SAFETY STOP CONTROL INSTRUCTIONS



6.-Connect one end of the activation cable to a fixed point, and the other end to the cable connection clevis on the control hub. Leave 2" of slack in the cable.

7.-Test the micro-switch(es) before wiring. Remove the cover, and follow step 6 or 7, depending on which micro-switch is supplied with the PC control.



8.-To test switch-hub assembly, connect a continuity tester to the common screw and each of the N.O. and N.C. screws in turn. When testing, be sure to test each of the two combinations of common and N.O. and N.C. terminals. Slowly apply a pulling force to the hubs cable connection clevis away from the assembly. The switch shall activate before the flag moves. The continuity tester should indicate the correct change in electrical continuity from Common to N.C. and Common to N.O. If it does not, please contact Conveyor Components Co. for assistance.

9.-Once testing is complete, then check the supply / control wiring with a voltmeter to insure there is no electrical power present. Then wire the control. Note: wiring should only be through the motor control circuit. Replace the cover and cover hardware.

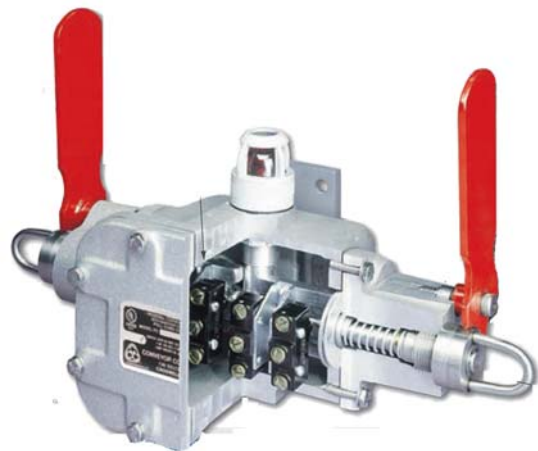
10.-Power-up the PC control and the conveyor system. Test the control operation by pulling the actuation cable. This will insure that there is not too much slack in the cable and that there are no obstructions to the cable or flag arm. The conveyor should stop, and the flag arm should rotate, locking the cable clevis assembly in the out position.

ENCLOSURE RATINGS:

Standard General Purpose Models: UL Types 3, 4, 4X; CSA Types 3, 3S, 4
Standard Hazardous Location Models: UL / CSA for Class I, Groups C & D; Class II, Groups E, F & G Hazardous Locations
Add "X" to meet Explosion Proof NEMA 7 class I, Groups C and D as well as NEMA 9 class II, Groups E,F and G.

OPERATION:

A cable is connected from a fixed point to the cable end connection clevis. A pull on the cable with a movement of approximately 1/2" will actuate the control and trip the flag arm, and lock the control / flag arm in the actuated position. The unit is reset by rotating the flag arm to the normal position. The standard control is supplied with an actuation (pull) force of 16 lbs. Units with a factory set pull of 24 lbs. are available.

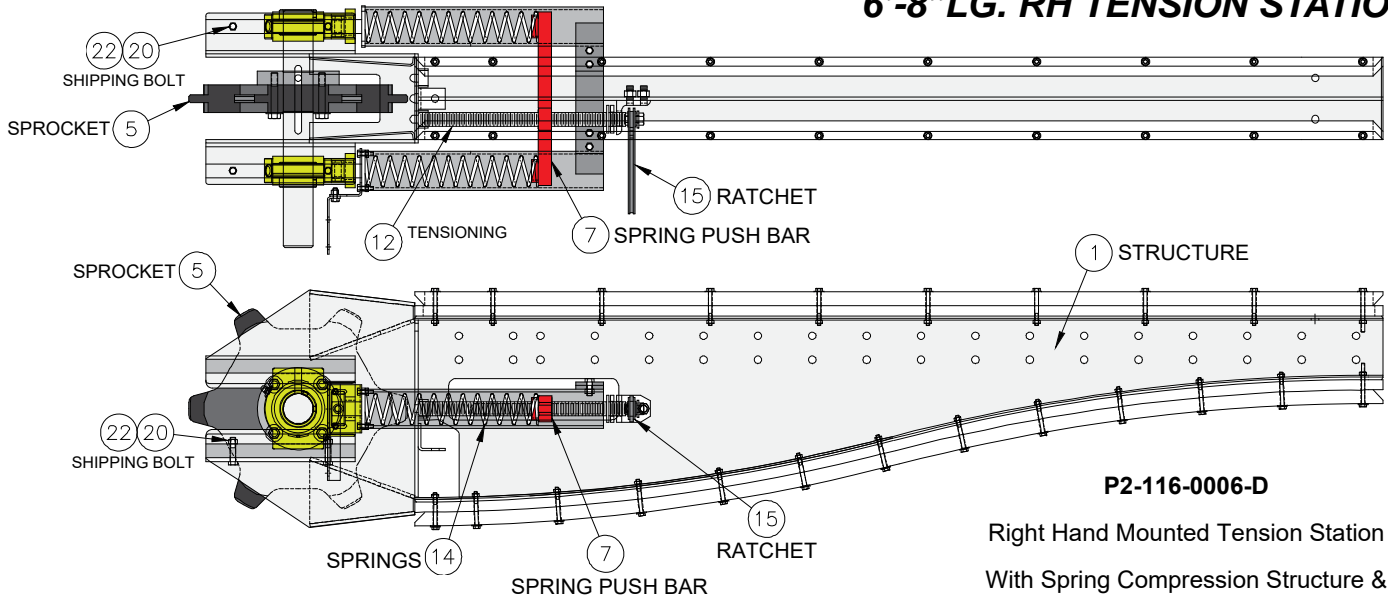


MAINTENANCE:

Be sure to test each PC control every **3 months** by pulling the actuation cable and observing its operation. Again, the conveyor should stop, and the flag arm should rotate, locking the cable clevis in the out position. If the control fails to operate, lock out the system, and carefully inspect the installation.



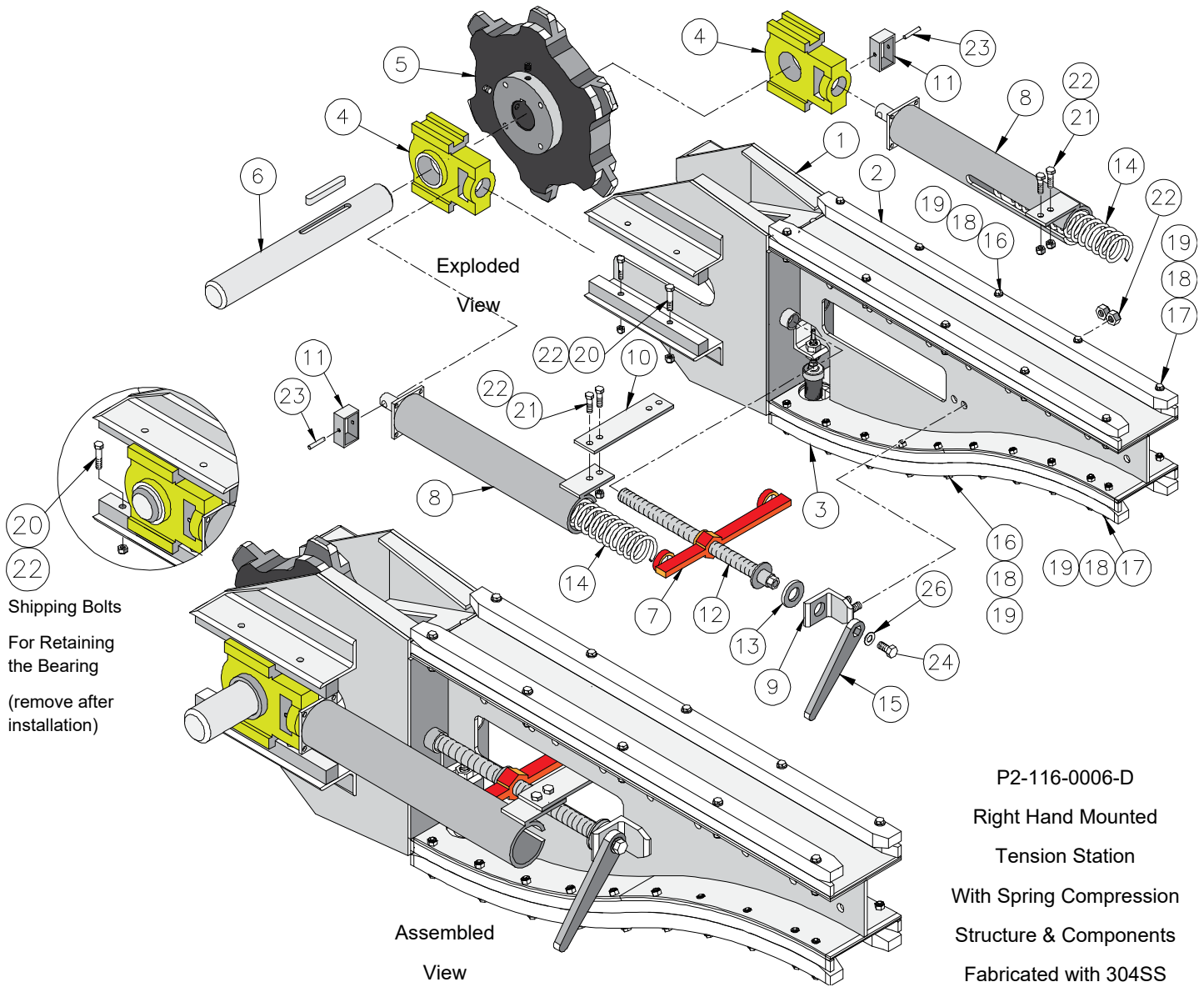
Section-A Installation 6'-8" LG. RH TENSION STATION



ITEM NO.	PARTS NO.	TENSTION STATION DESCRIPTION	MATERIAL	NO. REQ'D.
1	P2-116-0004-D,Rev.B	6'-8"LG. Tension Structure	304SS	1
2	P2-109-0020-D	Upper Guide Channel Assembly	UHMWPE	1
3	P2-109-0024-D	Lower Guide Channel Assembly	UHMWPE	1
4	#WSTUSC203	Tension Wide Slot Bearing 2 3/16" Bore- Dodge	OEM Cast	2
5	PW-107-0003-D	6-Tooth Sprocket w/Hub Assembly	UHMWPE	1
6	PW-108-0004-A,Rev.D	Sprocket Shaft 2 3/16"OD. w/1/2"SQ.x 3 3/4"lg. Key	416SS	1
7	PW-116-0020-A,Rev.K	Tension Spring Push Bar	304SS	1
8	PW-116-0022-A,Rev.C	Tension Spring Housing Cylinder	304SS	1PR.
9	PW-116-0023-A,Rev.B	Tension Adjusting Screw Mounting Bracket	304SS	1
10	PW-116-0033-A	Spring Housing Cylinder Stiffener Bar	304SS	1
11	I-116-0088-A	Bearing Adjusting Rod Container	304SS	2
12	PW-116-0031-A,Rev.C	Tension Adjusting Acme Screw 1"-6 TPI x 1'-3 1/4"	304SS	1
13	I-116-0149-A	Tension Screw Washer Bushing	UHMWPE	1
14	I-144-0001-A	Compression Spring – 57 #/inch Spring Rate	Spring 5150	2
15	101-3/4"Hex.	Reversing Ratchet-Lowell	Nickel Plated	1
16		1/4"-20NC x 2 1/2"LG. Hx. Hd. Bolt	<u>316SS</u>	22
17		1/4"-20NC x 3"LG. Hx. Hd. Bolt	<u>316SS</u>	4
18		1/4"-Flat Washer	<u>316SS</u>	26
19		1/4"-20NC Hx. Hd. Nut-ESNA	<u>316SS</u>	26



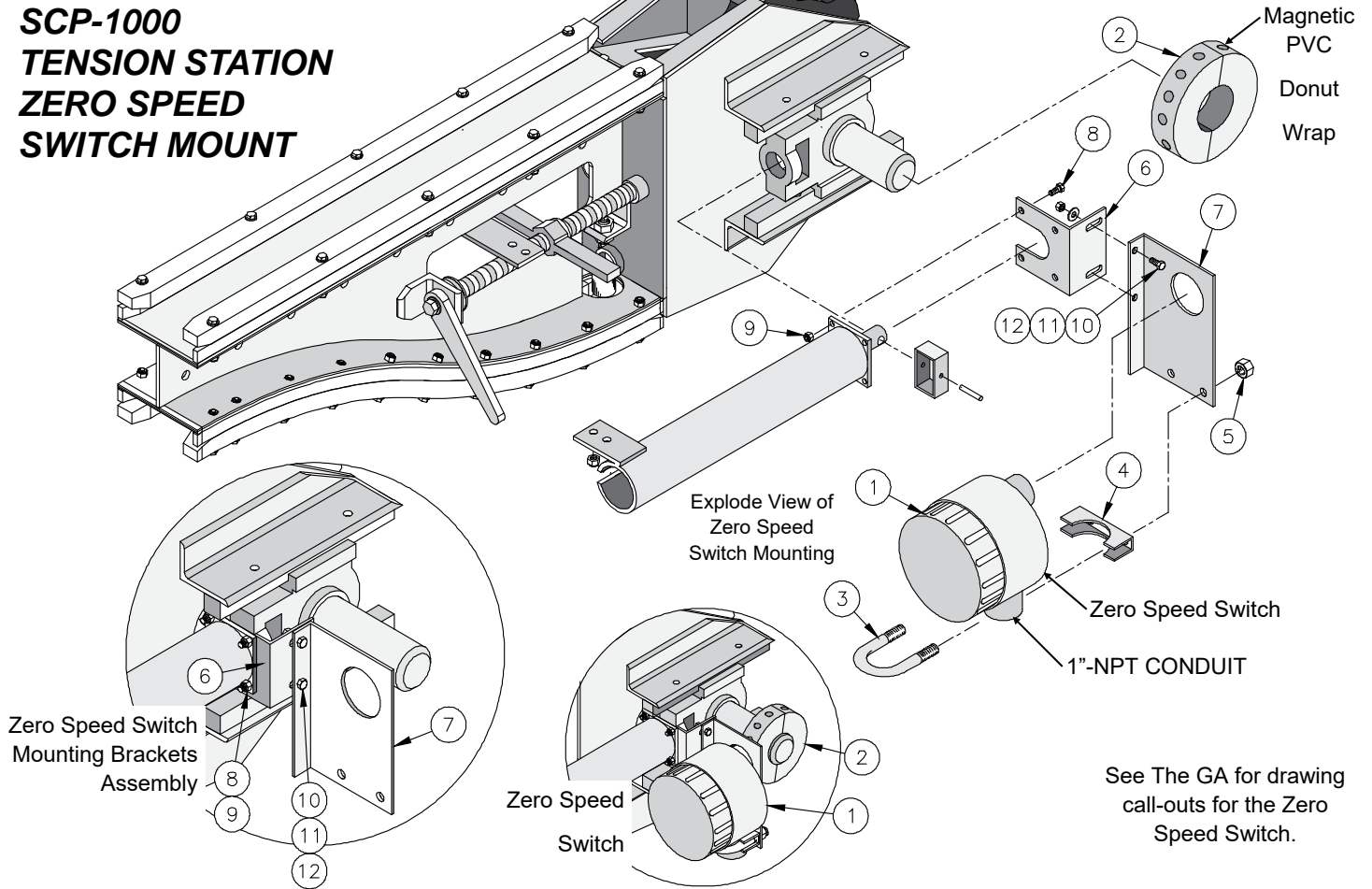
Section-A Installation 6'-8"LG. RH TENSION STATION



ITEM NO.	PARTS NO.	OILER DESCRIPTION	Mat'l.	NO. REQ'D.
20		3/8"-16NC x 1 3/4"LG. Hx. Hd. Bolt	316SS	5
21		3/8"-16NC x 1"LG. Hx. Hd. Bolt	316SS	4
22		3/8"-16NC Hx. Hd. Nut-ESNA	316SS	9
23		7/16" Dia. Spring Pin x 1 3/4"LG.	CRS 1070	2
24		1/2"-13NC x 3/4"LG. Hx. Hd. Bolt	316SS	1
25		1/2"-13NC Hx. Hd. Nut-ESNA	316SS	2
26		1/2"-Flat Washer	316SS	1



SCP-1000 TENSION STATION ZERO SPEED SWITCH MOUNT

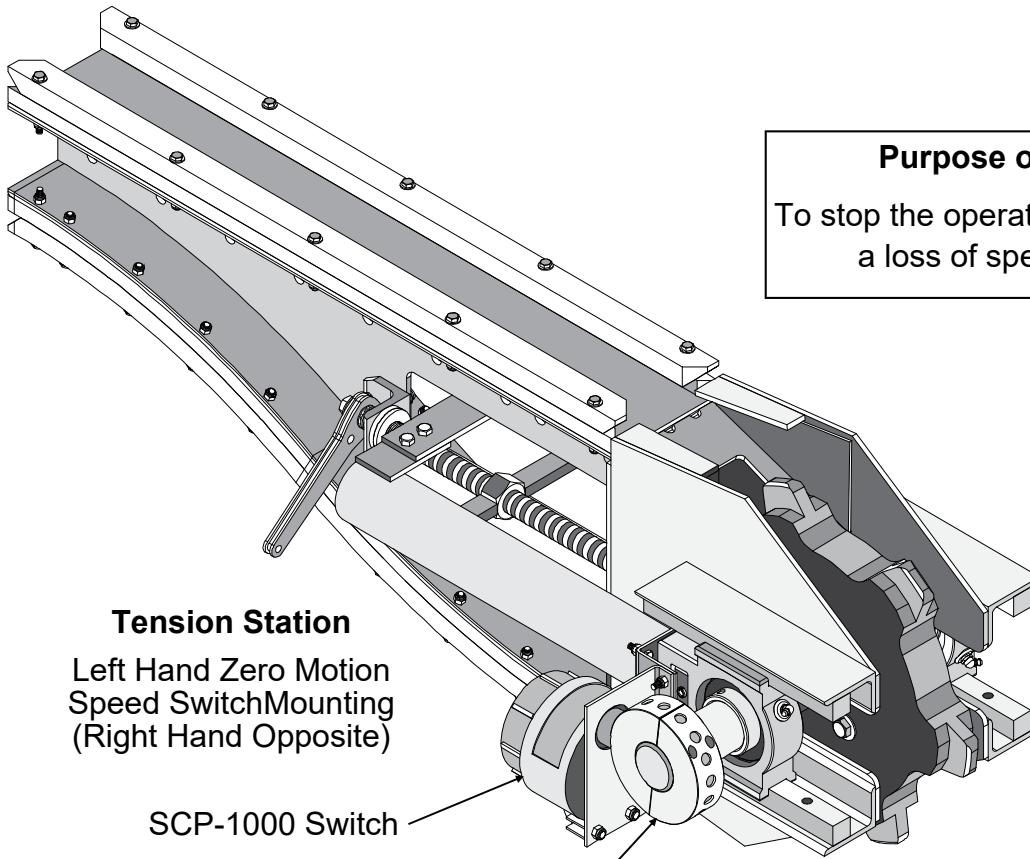


See The GA for drawing call-outs for the Zero Speed Switch.

ITEM NO.	PART NO.	DESCRIPTION	MAT'L	QTY.
1	SCP-1000	Electro-Sensor Zero Motion Speed Switch (Pre-settable)	Cast Alum.	1
2		Split Collar Pulser Wrap	PVC, Magnets	1
3		1/4\"-20NC x U- Bolt	ZINC	1
4		1/4\" Switch Clamp Bracket	ZINC	1
5		1/4\"-20NC Hx. Hd. Nut	ZINC	2
6	PW-116-0056-A,Rev.D	LH- Zero Speed Switch Sliding Bracket- Electro Sensor	304SS	1
7	PW-116-0056-A,Rev.D	LH- Zero Speed Switch Housing Bracket- Electro Sensor	304SS	1
8		1/4\"-20NC x 1\"LG. Hx. Hd. Bolt	<u>316SS</u>	4
9		1/4\"-20NC Hx. Hd. Nut-ESNA	<u>316SS</u>	2
10		5/16\"-18NC x 3/4\"LG. Hx. Hd. Tap Bolt	<u>316SS</u>	2
11		5/16\"-18NC Hx. Hd. Nut-ESNA	<u>316SS</u>	2
12		5/16\"-Flat Washer	<u>316SS</u>	2



SCP-1000 TENSION STATION ZERO SPEED SWITCH MOUNT



Purpose of the Device:
To stop the operation of the conveyor if a loss of speed is detected.

Tension Station

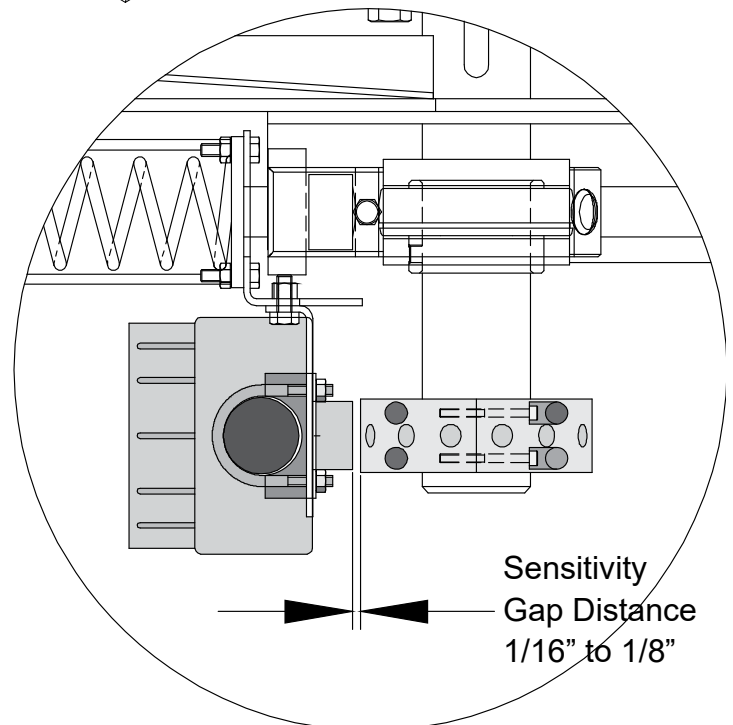
Left Hand Zero Motion Speed Switch Mounting (Right Hand Opposite)

SCP-1000 Switch

Magnetic Split Collar Pulsar Wrap

Principle of Operation:

The SCP-1000 has an internal hall-effect sensor and is supplied with a split collar pulser wrap, which generates an alternating magnetic field that is picked up by the SCP-1000 sensing head. The SCP-1000 decodes the frequency signal to determine shaft speed, and compares it to the pre-adjusted set points. The relay output(s) can then shut-down and/or provide an alarm in the event of an error. The Electro-Sensor switch provides safe protection against malfunctions during operation.

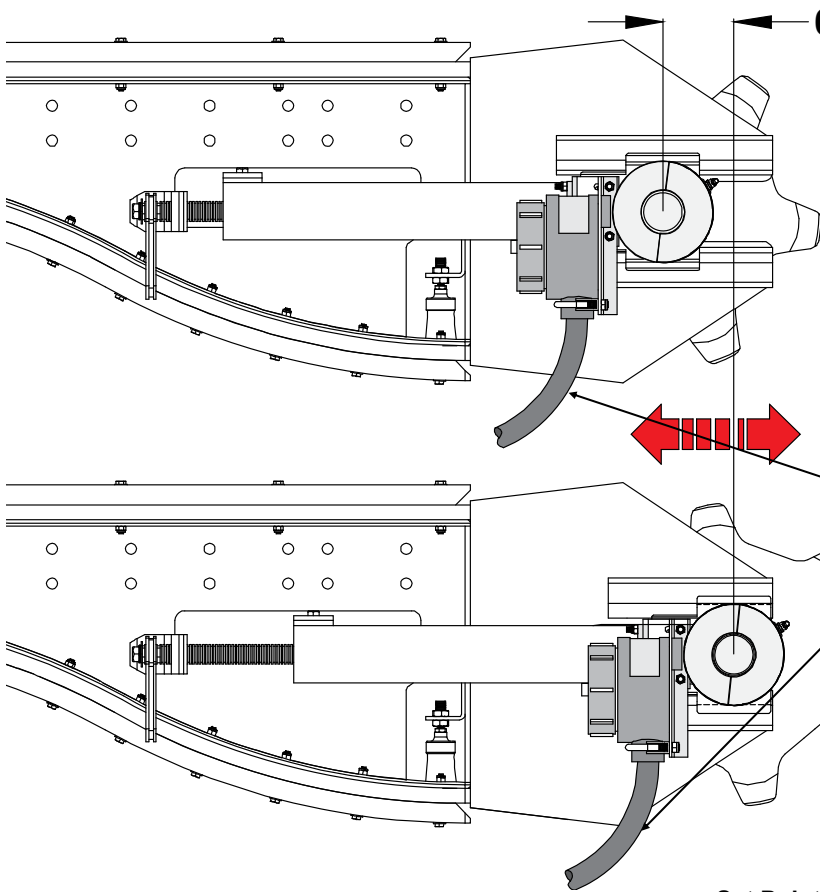


Sensing Head and Wrap Distance

Sensitivity
Gap Distance
1/16" to 1/8"



SCP-1000 TENSION STATION ZERO SPEED SWITCH MOUNT



Why Flexible Conduit is Required

The sprocket moves back and forth due to spring tensioning. As the main chain wears, the chain length will increase, and will eventually need to be shortened.

Flexible Conduit Requirements

18" of movement in the conduit is required for the Zero Speed Switch because of Sprocket movement.

**Set Point
Rotation Dial**
Tens RPM

**Set Point
Rotational Dial**
Ones RPM

Mode Switch
On = Under Speed
Off = Over Speed

TB1

- 8-Relay N.O.
- 7-Relay Com.
- 6-Relay N.C.
- 5-Relay N.O.
- 4-Relay Com.
- 3-Relay N.C.
- 2-115 V Neut.
- 1-115 V Hot



Set Point Range Switch

On = 1 thru 100 RPM
Off = 10 thru 1000 RPM

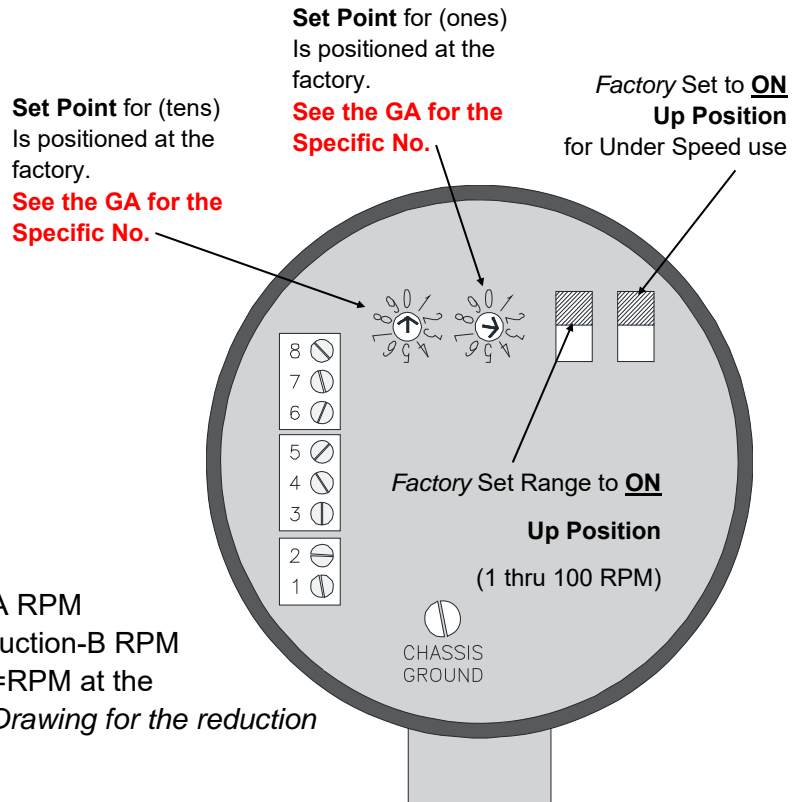
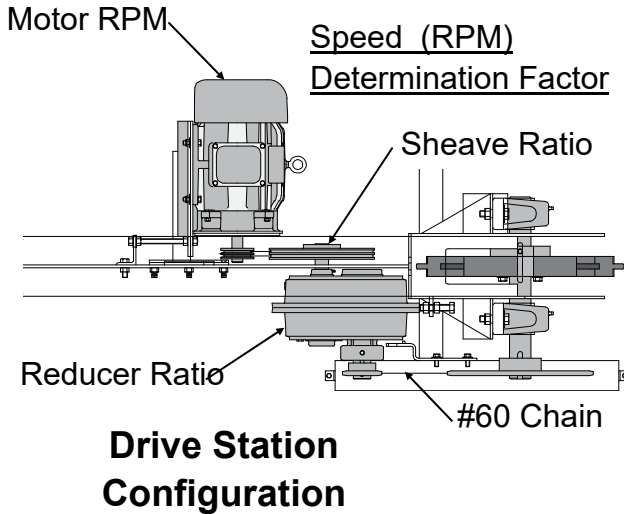
CHASSIS
GROUND

1"NPT Female Connection



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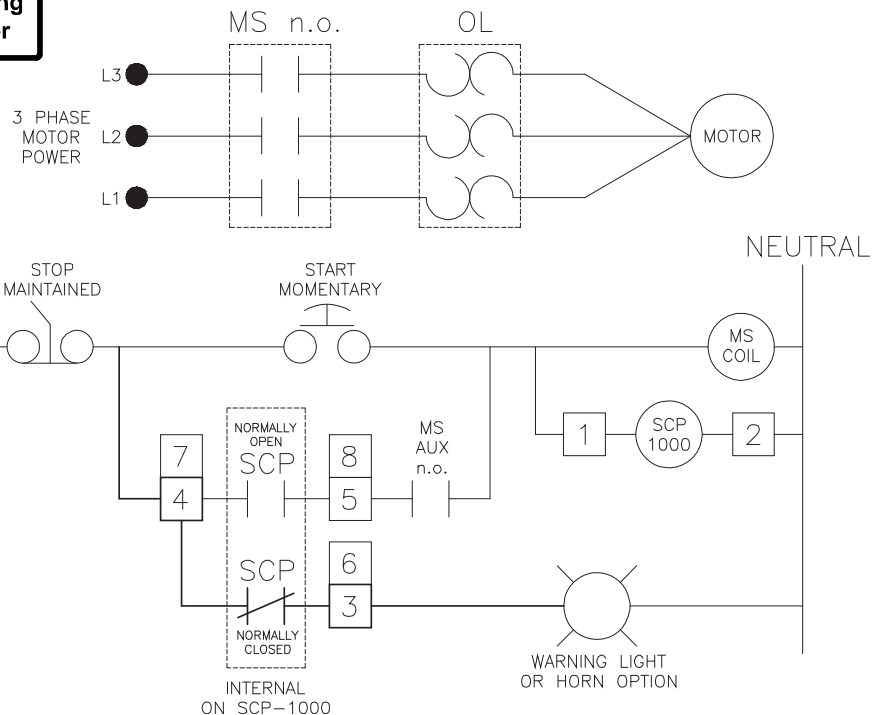
SCP-1000 TENSION STATION ZERO SPEED SWITCH MOUNT



RPM (Revolution Per Minute) Calculation:
 Motor RPM/Sheave Reduction Ratio=Reduction-A RPM
 Reduction-A RPM/Reducer Reduction Ratio=Reduction-B RPM
 Reduction-B RPM/#60 Sprocket Reduction Ratio=RPM at the Shaft (Set Point Number). (See the Drive Station Drawing for the reduction components for the calculation)



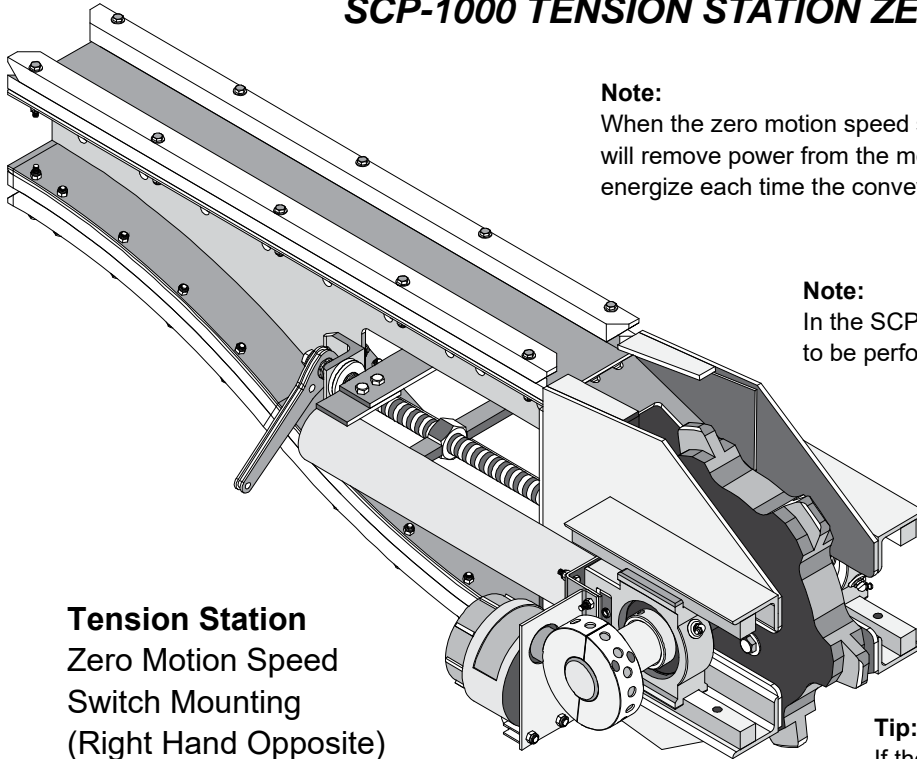
HAZARDOUS VOLTAGE
 Lock-Out and Tag-Out MUST be performed during set-up, maintenance and repair of the conveyor



Wiring Diagram Key:
 MS- Motor Starter (not Supplied)
 OL- Overload Contact
 n.o.- Normally Open (relay is in a de-energized state)
 TDR- Time Delay "OFF" Relay (not supplied). If the shaft being monitored comes up to speed slowly, a TDR can be used so the operator will not have to hold the START button in.



SCP-1000 TENSION STATION ZERO SPEED SWITCH MOUNT



**Tension Station
Zero Motion Speed
Switch Mounting
(Right Hand Opposite)**

Note:

When the zero motion speed switch is wired correctly the under speed action will remove power from the motor as well as the SCP-1000. It needs to re-energize each time the conveyor starts.

Note:

In the SCP-1000 the calibration of the set points has to be performed with the power shut off.

Note:

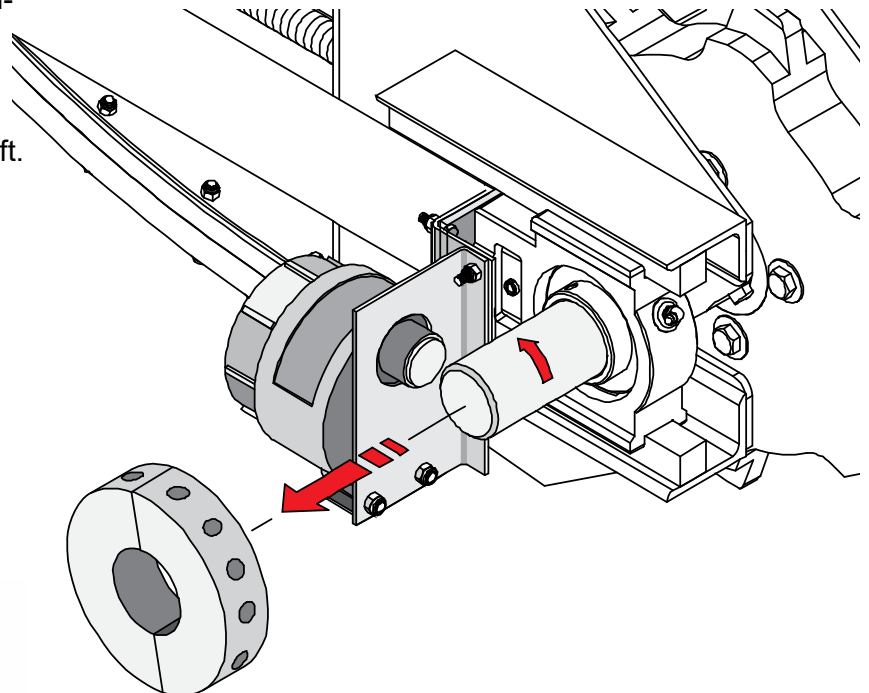
The start delay is 10 seconds (fixed) for the SCP-1000.

Tip:

If the set point number (RPM) is set *lower* than the designed RPM for the conveyor, the SCP-1000 will still work. If the set point is set *higher*, the system will never fully energize and will stop the conveyor after the start delay.

Wiring/Operation Test:

- Shut down and lock-out power to the conveyor.
- With a 3/16" Allen wrench, loosen the 4 screws in the collar wrap so it rotates freely and can be removed from the shaft.
- Start the conveyor and wait 30 seconds. Next slide the wrap off the shaft. If the calibration is correct the conveyor will shut down with in 30 seconds, because the Zero Motion Speed Switch (SCP-1000) has detected a loss of speed situation.
- Re-install/align & tighten the collar wrap.



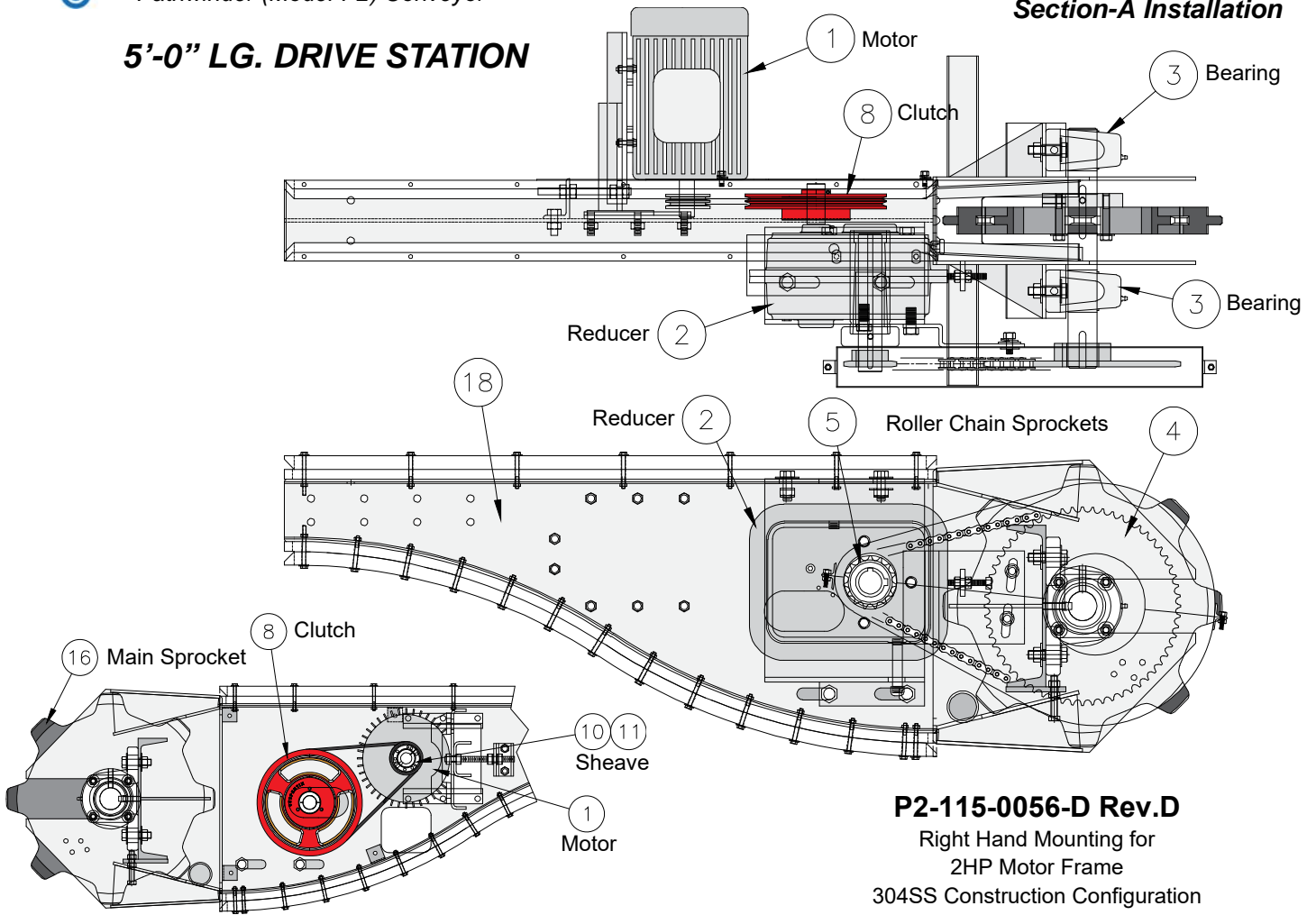
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Pathwinder (Model-P2) Conveyor

5'-0" LG. DRIVE STATION

Section-A Installation



P2-115-0056-D Rev.D

Right Hand Mounting for
2HP Motor Frame
304SS Construction Configuration

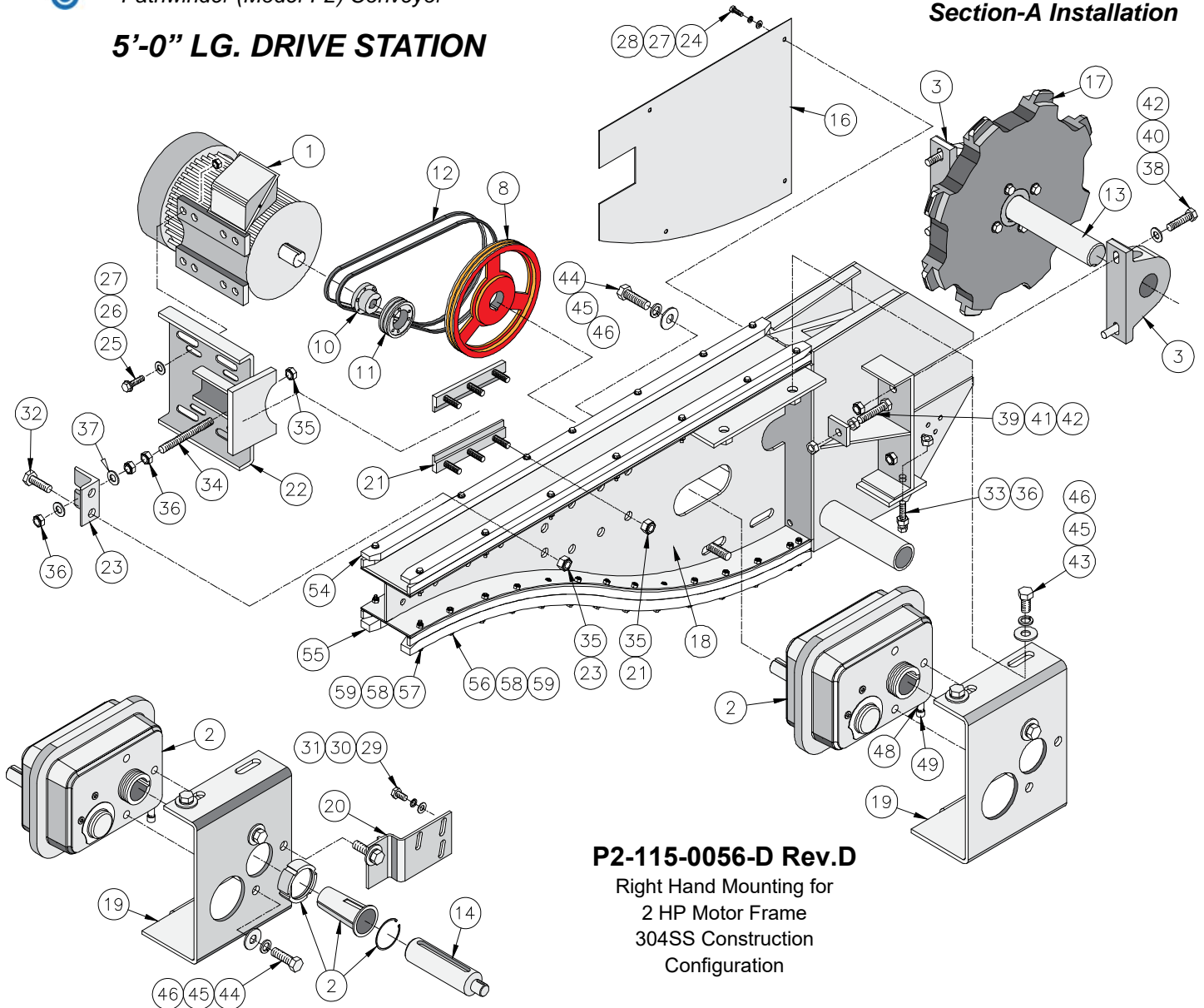
ITEM NO.	PART NO.	DESCRIPTION	MAT'L	QTY.
1	Baldor ECP3587T	2-HP, 1755 RPM, TEFC, 3-Phase, 60 Hz, 230/460 VAC, Frame-Cast Iron 182T, Service Factor-1.15, Insulation-F, Ambient Temp. -40 Degrees C, Mounting - RH, Motor Special- M21A Space Heater, M23A Thermostats	Cast	1
2	5203J25C	Helical Speed Reducer - Falk w/ Bushing #BU5203J-1.750	Cast	1
3	MP-35-3-23	2 3/16" Pillow Block Bearing	Steel	2
4		Sprocket, No 60 BS 60, 2 3/16" Bore	Steel	1
5		Sprocket, No. 60 FB 15, 1 3/4" Bore	Steel	1
6		Single Strand Roller Chain-ANSI #60- 83 Pitch x 62.5"Lg.	Steel	1
7		Single Strand Roller Chain Connector Link-ANSI #60	Steel	1
8	S180	Aunsbach Torque Limiting Sheave x 10.6"Dia. x Red	Cast	1
9		-BLANK-		
10		QD Bushing JA-7/8"Dia. x 2 Groove	Steel	
11		QD Sheave, 3V- Ø2.65 - 2 Groove (22 FPM)	Cast	1
12		V-Belt, Super HC, No. 3VX-425	Belt	2
13	PW-0108-0001-A Rev.C	Ø2 3/16" Drive Shaft with Keys	416SS	1
14	PW-0108-0009-A Rev.A	Ø1 3/4" Reducer Shaft with Key	MS-1045	1
15	PW-0141-0042-D Rev.C	Chain Guard Assy.	304SS	1



Pathwinder (Model-P2) Conveyor

5'-0" LG. DRIVE STATION

Section-A Installation



P2-115-0056-D Rev.D

Right Hand Mounting for
2 HP Motor Frame
304SS Construction
Configuration

ITEM	PART NO.	DESCRIPTION (2HP RH Configuration)	MAT'L	QTY.
16	P2-0141-0001-D Rev.C	Belt Guard	304SS	1
17	PW-0107-0004-D Rev.B	Drive Sprocket- 8 Tooth w/Hub	UHMWPE	1
18	P2-0115-0009-D Rev.B	Right-Hand Drive Structure x 5'-0" lg.	304SS	1
19	PW-0115-0079-D Rev.H	Reducer Bracket-RH-Welded	304SS	1
20	PW-0115-0067-D Rev.H	Chain Guard Bracket	304SS	1
21	PW-0115-0021-A	Motor Mount Slide/Clamp Bracket	304SS	2
22	P2-0115-0008-D Rev.F	Motor Mount Plate	304SS	1
23	PW-0115-0023-A	Motor All-Thread Bracket	304SS	1
24		5/16"-18NC x 1" Lg. Hx. Hd. Bolt	316SS	6
25		5/16"-18NC x 1 1/4" Lg. Hx. Hd. Bolt	316SS	4
26		5/16"-18NC Hx. Nut - ESNA	316SS	6
27		5/16" Flat Washer	316SS	8
28		5/16" Lock Washer	316SS	4
29		3/8"-16NC x 1" Lg. Hx. Hd. Bolt	316SS	7
30		3/8" Flat Washer	316SS	11
31		3/8" Lock Washer	316SS	11
32		1/2"-13NC x 1 1/2" Lg. Hx. Hd. Bolt	316SS	2
33		1/2"-13NC x 2 1/2" Lg. Hx. Hd. Bolt	316SS	2



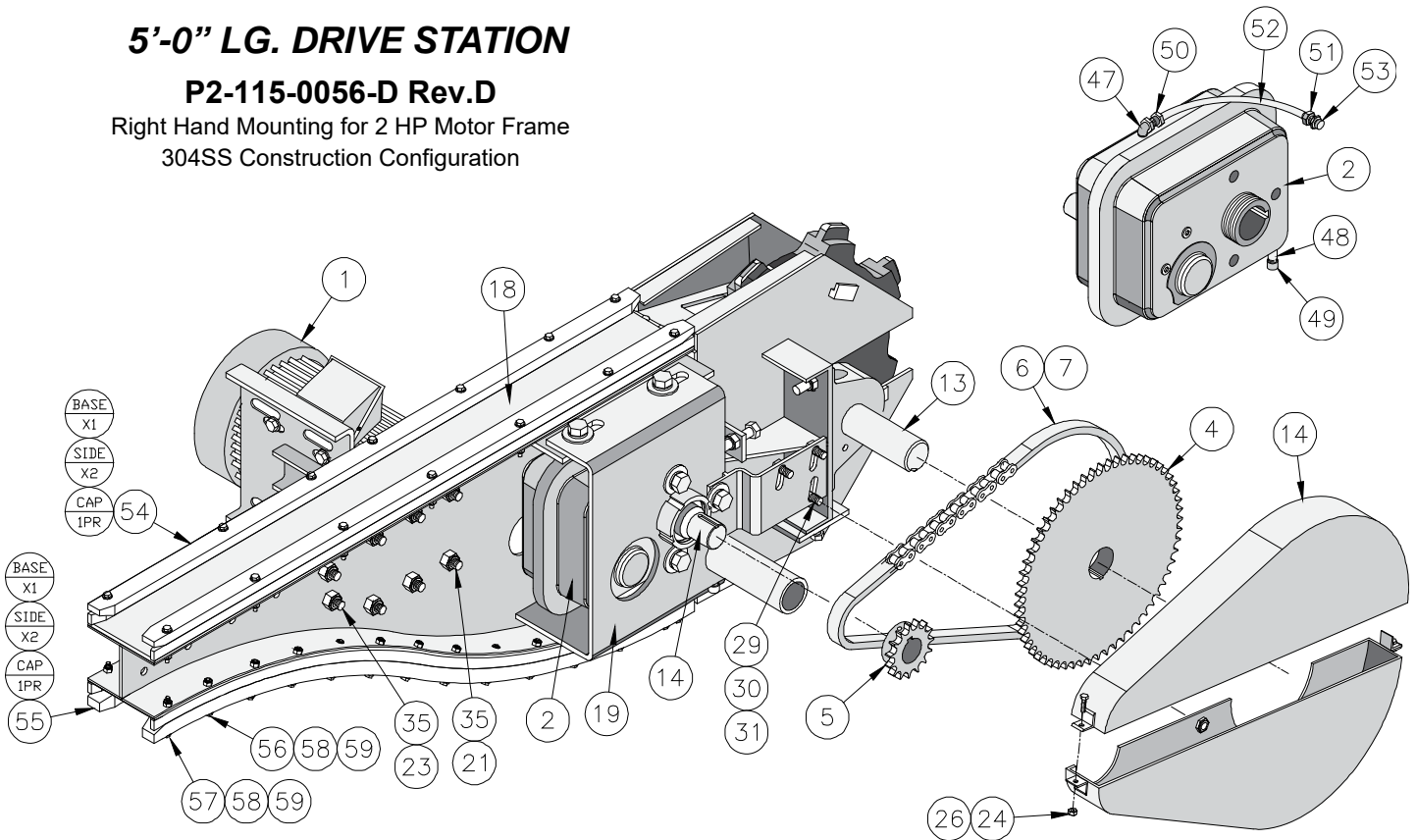
Pathwinder (Model-P2) Conveyor

Section-A Installation

5'-0" LG. DRIVE STATION

P2-115-0056-D Rev.D

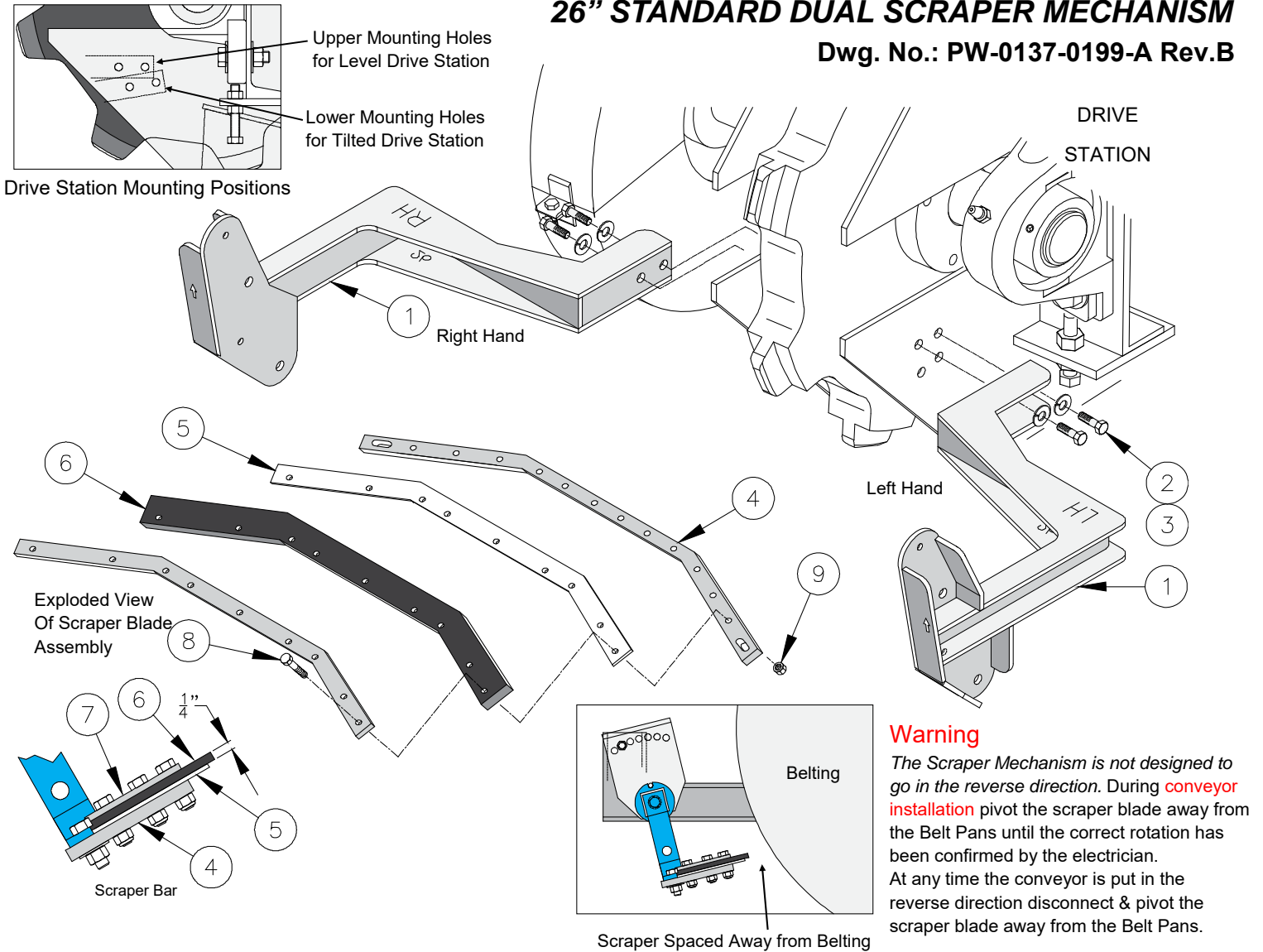
Right Hand Mounting for 2 HP Motor Frame
304SS Construction Configuration



ITEM NO.	PART NO.	DESCRIPTION (2HP RH Configuration)	MAT'L	QTY.
34		1/2"-13NC x 7" Lg. All-Thread	316SS	1
35		1/2"-13NC Hx. Nut - ESNA	316SS	8
36		1/2"-13NC Hx. Nut	316SS	8
37		1/2" Flat Washer	316SS	2
38		5/8"-11NC x 2 1/2" Lg. Hx. Hd. Bolt	316SS	4
39		5/8"-11NC x 3 1/2" Lg. Hx. Hd. Bolt (All-Thread)	316SS	1
40		5/8"-11NC Hx. Nut - ESNA	316SS	4
41		5/8"-11NC Hx. Nut	316SS	2
42		5/8" Flat Washer	316SS	4
43		3/4"-10NC x 1 1/2" Lg. Hx. Hd. Bolt	316SS	2
44		3/4"-10NC x 2" Lg. Hx. Hd. Bolt	316SS	5
45		3/4" Lock Washer	316SS	7
46		3/4" Flat Washer	316SS	7
47		3/8"NPT Pipe Street Elbow 90 Degrees —McMaster-Carr #4464K37	304SS	1
48		3/8"NPT Pipe Nipple x 4"Lg.—McMaster-Carr # 4830K156	304SS	1
49		3/8"NPT Pipe Cap—McMaster-Carr #4464K86	304SS	1
50		3/8"NPT Barbed Male Pipe Connector—McMaster-Carr #5670K83	304SS	1
51		3/8"NPT Barbed Female Pipe Connector - McMaster-Carr #91465K961	Brass	1
52		3/8" Blue Push-On Hose x 2'-0"Lg.—McMaster-Carr #5288K12	Buna-N	1
53		3/8"NPT Breather Cap (Supplied w/Reducer)	Galv.	1
54	P2-0109-0036-D	Upper Poly Guide Channel Assembly	UHMWPE	1
55	P2-0109-0040-D	Lower Poly Guide Channel Assembly	UHMWPE	1
56		1/4"-20NC x 2 1/2" Lg. Hx. Hd. Bolt	316SS	38
57		1/4"-20NC x 3" Lg. Hx. Hd. Bolt	316SS	4
58		1/4"-20NC Hx. Nut - ESNA	316SS	42
59		1/4" Flat Washer	316SS	42

26" STANDARD DUAL SCRAPER MECHANISM

Dwg. No.: PW-0137-0199-A Rev.B



Warning

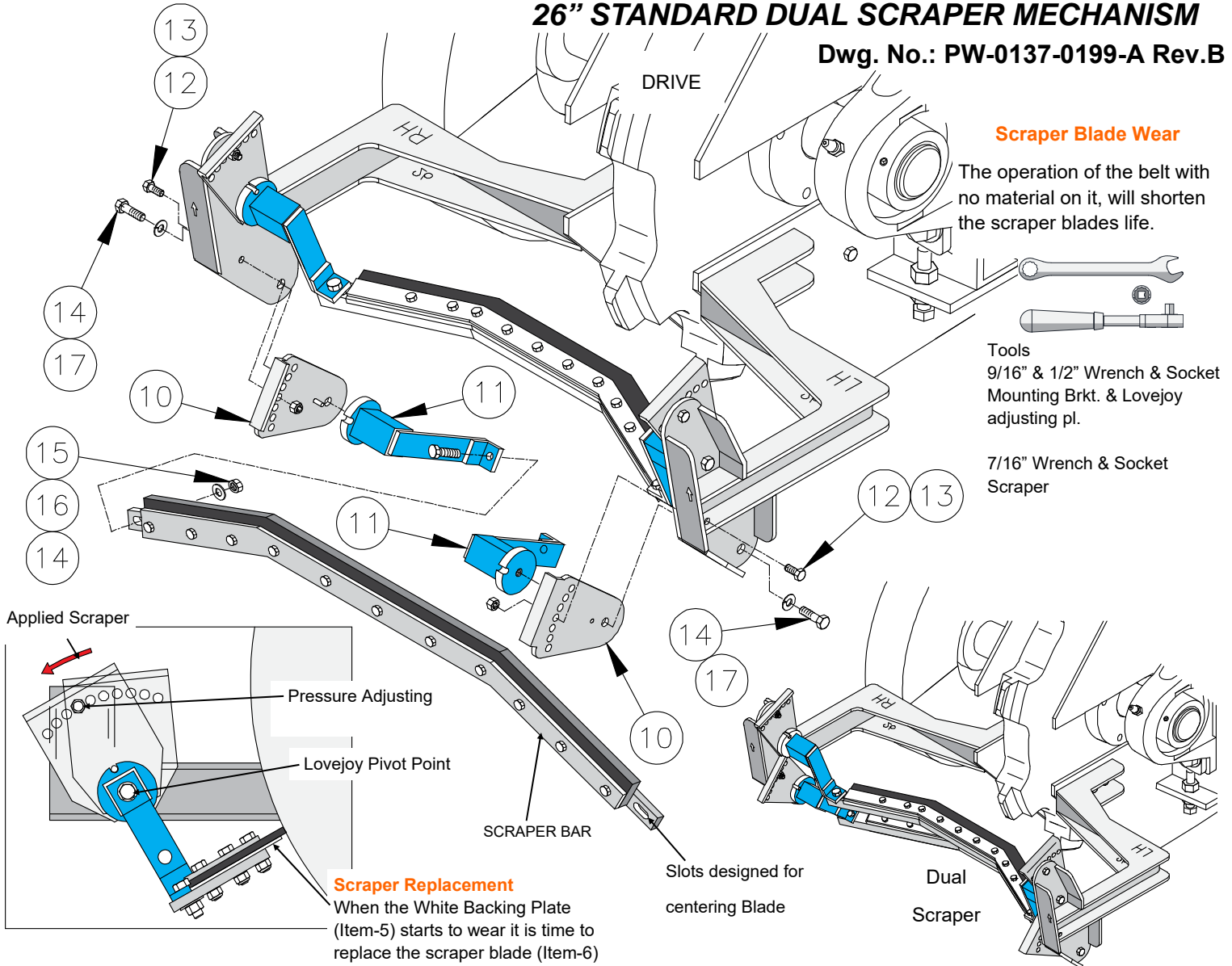
The Scraper Mechanism is not designed to go in the reverse direction. During conveyor installation pivot the scraper blade away from the Belt Pans until the correct rotation has been confirmed by the electrician. At any time the conveyor is put in the reverse direction disconnect & pivot the scraper blade away from the Belt Pans.

ITEM NO.	PARTS NO.	DESCRIPTION	MATERIAL	NO. REQ'D.
1	PW-137-0314-rC	26" Dual Scraper Mounting Bracket	304SS	1 PR
2		3/8"-16NC x 1 1/4"LG.HX.HD.Bolt	304SS	4
3		3/8"-Lock Washer	304SS	4
4	P2-0137-0510-A	Scraper Mount Bar (Was PW-0137-0023-A RevA)	304SS	2
5	PW-137-0103-rA	Backing Plate (1/8" Thick)	HDPE	2
6	PW-137-0095-rA	Blade (1/4" Thick)	Neoprene	2
7	PW-137-0023-rA	Clamp Plate	304SS	2
8		1/4"-20NC x 1 1/4"LG.HX.HD.Bolt	316SS	24
9		1/4"-20NC HX. Nut-ESNA	316SS	24



26" STANDARD DUAL SCRAPER MECHANISM

Dwg. No.: PW-0137-0199-A Rev.B



ITEM NO.	PARTS NO.	DESCRIPTION	MATERIAL	NO. REQ'D.
10	PW-137-0031-rA	20"/26"/32" Lovejoy Adjusting Plate (Rev.A)	304SS	4
11	PW-137-0032-rA	20"/26"/32" Lovejoy Elastometric Tensioner	Manuf. Prime/Paint	4
12		5/16"-18NC x 1"LG.HX.HD.Bolt	316SS	4
13		5/16"-18NC HX. Nut-ESNA	316SS	4
14		3/8"-16NC x 1 1/2"LG.HX.HD.Bolt	316SS	8
15		3/8"-16NC HX. Nut-ESNA	316SS	8
16		3/8"-Flat Washer	316SS	4
17		3/8"-Lock Washer	316SS	4

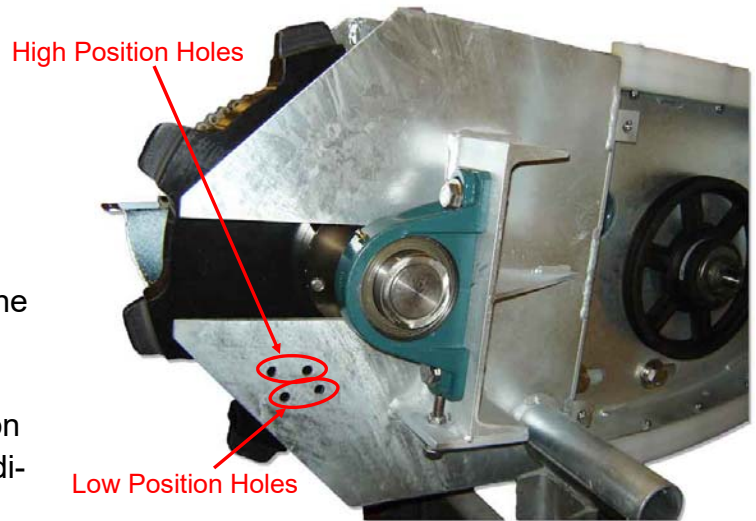


DRIVE STATION SCRAPER INSTALLATION

Tools Required:

- 1/2" socket
- 9/16" socket
- 1/2" open-end wrench
- 9/16" open-end wrench
- Appropriate ratchets for sockets

The scraper mounting bracket is installed on the discharge end of the drive station. There are two (2) sets of holes to position the bracket based on job application; shown on the right is the drive station and arrows indicating those holes.



Shown on the right, the top, or "high" position holes are the most common position. This set of holes is used when the drive station has a discharge angle between 0° - 15° degrees.

Note: The mounting brackets for the scraper should be installed on the same hole position on both sides of the drive station

The lower positioned holes, shown on the right, are when the drive station discharge angle greater than 15° degrees; see the general arrangement drawings for discharge angle measurement.



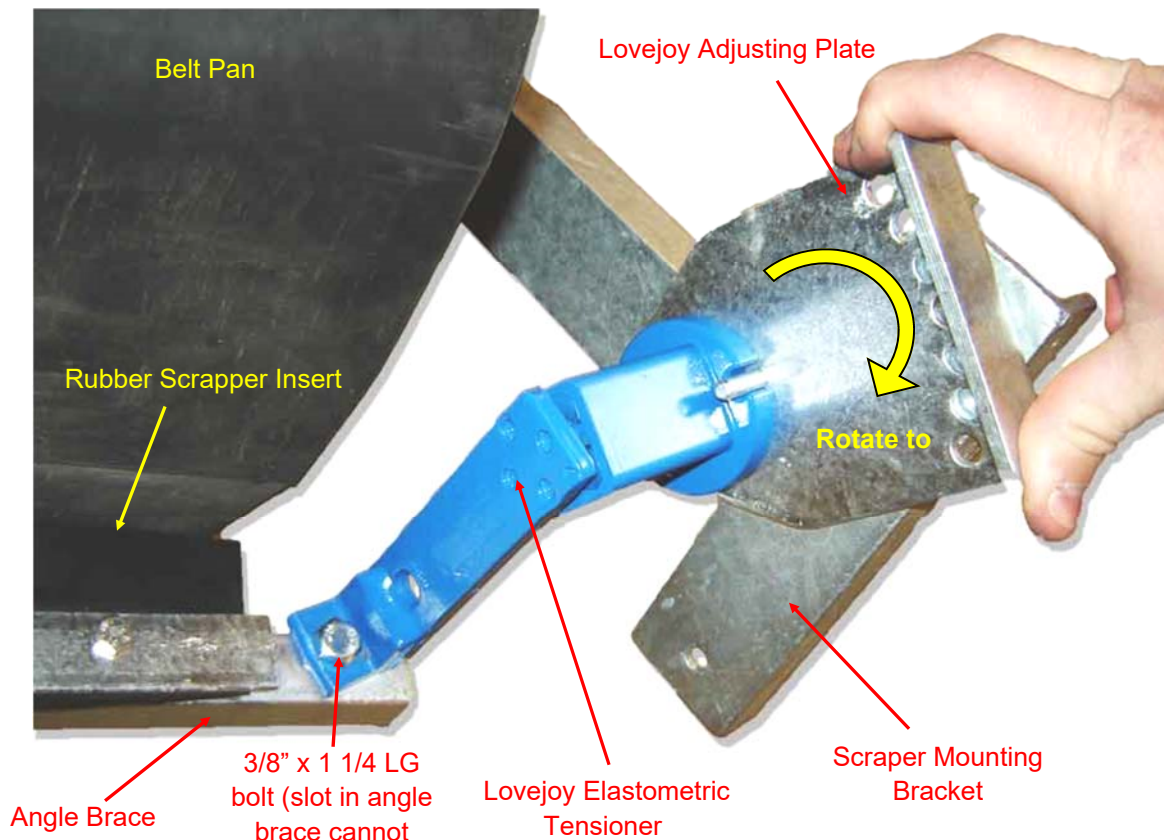
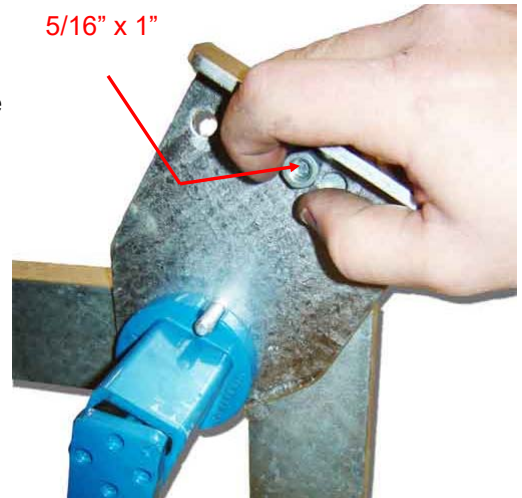
DO NOT mix and combine the two sets of mounting holes for the scraper mounting bracket. The scraper blade will not make contact with the belting. The incorrect installation of the mounting bracket is shown to the left.



SCRAPER TENSIONING

After installation of the scraper assembly, centering of the blade and applying tension must be performed.

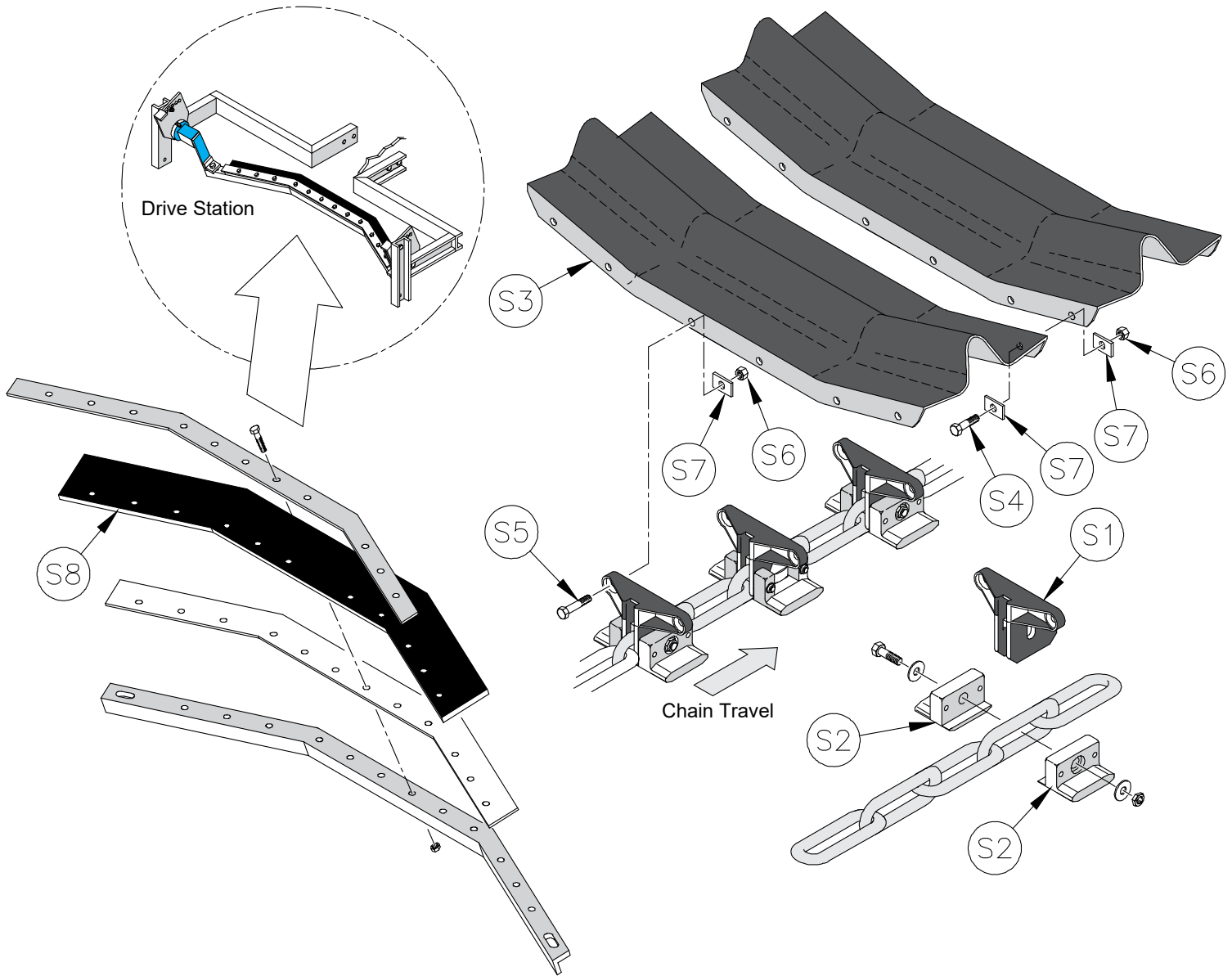
- 1.) Remove, as shown on right, the 5/16" x 1" LG bolts and nuts in the Lovejoy adjusting plates on both sides of the scraper assembly; blade should freely swing.
- 2.) Adjust the rubber blade to center on the belting; loosen the 3/8" x 1 1/4" LG bolts, as shown below, to move the angle brace appropriately; retighten bolts after blade and angle brace are centered.
- 3.) To apply tension on the blade, rotate the Lovejoy adjusting plate away from the conveyor as shown below. When blade touches belt, note the adjustment hole; the blade pressure to the belting is 0lbs; each subsequent hole on the adjustment plate adds 10lbs of additional force to scraper blade.
- 4.) Insert and retighten 5/16" x 1" LG bolts when desired scraper tension is met.







26" STANDARD SPARE PARTS



ITEM NO.	PARTS NO.	DESCRIPTION (Packed Separately)	MATERIAL	NO. REQ'D.
S1	H-0104-0010-A RevH	Intermediate Chain/Belt Pan Attachment	Nylon	5
S2	PW-0104-0007-A RevD	Guide Block– Grey Injected (Wide)	Urethane	10
S3	H-0101-0122-D	Belt Pans 26"	MPR	5
S4		5/16"-18NC x 1 1/4"LG. HX.HD.Bolt	316SS	20
S5		5/16"-18NC x 1 1/2"LG. HX.HD.Bolt	316SS	10
S6		5/16"-18NC HX. Nut-ESNA	316SS	30
S7	H-0101-0156-A RevA	5/16"- Rectangle Washer	316SS	50
S8	PW-0137-0095-A	Scraper Blade 26" (1/4" Thk. 65 Duro)	Neoprene	2



OPERATING PROCEDURES

This conveyor is powered by an electric motor, located in the drive station assembly. The operational instructions for this equipment are very simple.

START-UP / SHUT-DOWN PROCEDURES

Serpentix did not provide Start / Stop controls with the conveyor equipment. A start-up / Shut-down sequence, if required, is to be provided by others.

General Start-up / Operation Procedure:

- Make sure there are no objects leaning against the conveyor.
- Make sure personnel are not working on the conveyor.
- Start the conveyor.

General Shut-down Procedure:

- Be sure that the product being conveyed has been completely transferred. Do not stop the conveyor with product still on the belt.
- Shut off power to the conveyor. (Stop the conveyor)

Emergency Stop Procedure:

- In the event of an operational emergency, either: shut-off power to the conveyor at the control panel, or pull the emergency stop switch cable.

Resetting Conveyor from E-Stop:

- If the emergency pull-stop cables are triggered, reset the flag on the switch and then go return the control panel to press the reset button.
- If the zero speed switch is triggered, inspect the conveyor on why an under speed condition occurred. Look for jamming of the conveyor, thermal circuit protection of the drive station motor, or excess slack in the main chain. Once the problem has been corrected, return to the control panel to press the reset button.



CONVEYOR OBSERVATION WHEN RUNNING

This equipment has been designed for low maintenance. This does not imply that this is a maintenance free conveyor system. Section B of the manual describes the routine maintenance procedures required to keep the conveyor operational and trouble free.

General Observation

When starting the conveyor watch the belt make one complete revolution. During this time, look for damaged belt pans, broken chain attachments, or missing / loose belt pan hardware, or anything that is abnormal with the operation of the conveyor. Schedule time for the replacement of any damaged components immediately.

Observe for anything that is obviously wrong, such as:

- [Is the conveyor making any noise?](#)
Some chain noise, as small “cracks” or “pops” is normal, but are there other sounds that may indicate an obstruction in the channel, or something rubbing against the belt pan? The conveyor is normally rather quiet, and noise often means that something is wrong with the conveyor.
- [Are any of the belt pans damaged?](#)
Schedule a time to replace them immediately, otherwise material will enter the UHMWPE channel causing accelerated wear, component damage or even conveyor derailment.
- [Is there anything leaning against or rubbing against the conveyor belt?](#)
Starting the conveyor with objects leaning against or rubbing on top of the belt will damage the belt pans and decrease their service life. Check all associated conveyor accessories including skirtboards (minimum 1” clearance), drip pans, hanger brackets; interference with those items will wear and destroy the belt pans. The conveyor may also jam due to interference’s with the chain and belt pans causing extensive damage to the conveyor.
- [Is there a lot of material in the drip pans?](#)
Schedule time to clean out the drip pans if there is an accumulation of material in the drip pans.



PREVENTATIVE INSPECTION OF CONVEYOR COMPONENTS

For preventative maintenance measures, several components are inspected at various intervals as noted below for the P2 Pathwinder Conveyor:

ITEMS TO BE CHECKED DAILY:

Belt Pan Damage - Observe the belt for one (1) complete revolution, looking for tears, cracks, abrasions. Belt pan failure may be caused by one or more of the following: overloading, impact loading, maladjustment of tension station, skirt boards rubbing, foreign objects rubbing or jammed into belt, belt scraper making heavy contact with belt, belt scraper “digging in” on reversal of belt travel, aging, overstressing at drive and/or tension station. Prompt replacement of torn belt pans in turn prevents further failure caused by material falling into the chain mechanism.

Unusual Noise or Action - Check that the track splices are aligned properly; material or objects on track, cracks or major scrapes in track deflecting the guide blocks; broken or cracked guide blocks or intermediate attachments.

ITEMS TO BE CHECKED WEEKLY:

Chain Tension - Observe the tension bearings at the tension station while the conveyor is running. It should move back and forth approximately 1/16” to 1/8” inch for the chain to have proper tension. Also check the placement of the tension bearings; if the bearing overhangs the slide bar of the tension station, the chain is too long and must be shortened by removing two (2) links. The **CHAIN TENSION MUST BE MAINTAINED AT ALL TIMES** or the conveyor could be seriously damaged!

ITEMS TO BE CHECKED MONTHLY:

Scraper Blade - Check the scraper blade for wear. If the blade is worn out the belt will rub against the metal mounting bar of the scraper causing rips or tears. Replace with new rubber insert accordingly.

Oiler Bottle - Fill oiler bottle when level is low; check for proper flow out of needle valve. Clean oiler brush if full of gunk and debris.



PREVENTATIVE INSPECTION OF CONVEYOR COMPONENTS

ITEMS TO BE CHECKED EVERY SIX (6) MONTHS:

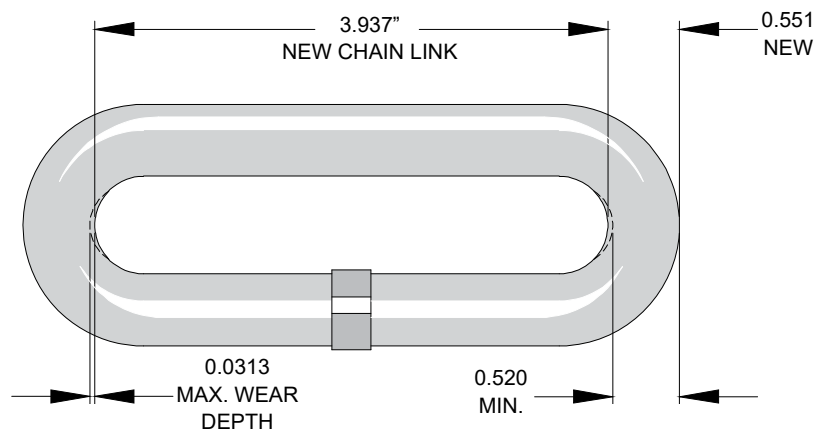
Bearings at Drive and Tension Station shaft - every six (6) months or 350 operating hours the bearing should be checked and greased; refer to lubrication chart.

Roller Chain Tension - The initial tension should be set at start-up. The sag should be checked after eight (8) hours, forty-eight (48) hours and one (1) week; thereafter, every month as shown in this illustration below. For tensioning procedure, refer to the drive station assembly drawing in the O&M manual.

Roller Chain Alignment - Alignment of the roller chain and sprockets should be checked along with tightness of the tapered bushings. Misalignment will cause wear on the sides of the teeth and chain links, refer to O&M manual for alignment and assembly. During inspection, also check the oil level in the chain guard.

Check tightness of **nuts / bolts on guide blocks**, and **mounting hardware for intermediate attachments** - Refer to installation instructions for torque values to apply to bolts.

Main Drag Chain Links - Every six (6) months or 2,500 operating hours or every time the main chain is shortened due to wear; visually inspect all links for signs of wear. This wear will show up as indented pockets on the inside radius of the link ends as shown here. Reference dimensions are given for new chain and for chain that has worn through the case hardening.



CAUTION: The **case hardening depth** of the chain link is **1/32"** thick. Once this is worn through, the wear will be very rapid and the tensile strength of the chain will diminish. Serpentix advises that chain with the case hardening worn through should not be used.

Guide Blocks - Inspect the guide blocks and check for wear on the sides and wings. Replace with new units if blocks are damaged, broken or excessively worn; worn and damaged blocks can cause the conveyor to derail or jam.



PREVENTATIVE INSPECTION OF CONVEYOR COMPONENTS

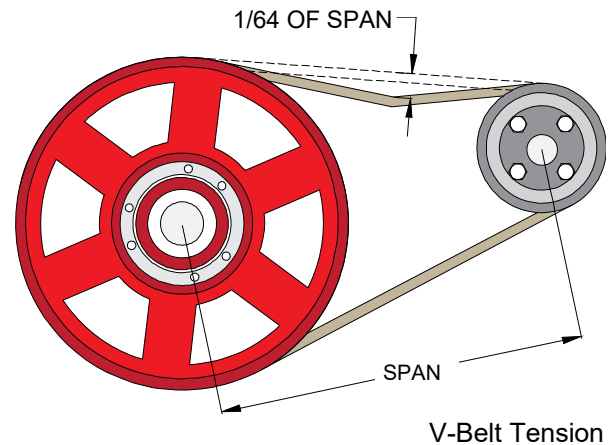
ITEMS TO BE CHECKED EVERY SIX (6) MONTHS:

Oil In Speed Reducer At Drive Station – Drain and fill oil every 6 months or every 2,500 operating hours.

V-Belt Tension At Drive Station - The method of checking V-belt tension is show at right.

DEFLECTION EXAMPLE

- Span = 16 inches; $16 \times 1/64 = .25$ inches; Belt should deflect 1/4"



ITEMS TO BE CHECKED EVERY TWELVE (12) MONTHS:

Check Wear on Track over entire length of conveyor.

Sprocket Alignment and Wear At Drive and Tension Stations - Look for signs of abnormal wear on the sprocket. Misalignment to the right will show scraping wear marks on the right side of the sprocket teeth. Misalignment to the left will show scraping wear marks on the left side of the sprocket teeth/ To realign the sprocket, loosen all the set screws on the sprocket hub and shift wedge the sprocket to the proper location on the shaft.

HOSE WASH DOWN INSTRUCTIONS:

- Do not use water pressure over 60psi, normal tap water supply is adequate.
- Wash load carrying surface when it is on the top run of the conveyor or at either terminal.
- Wash opposite side of belt, and chain on the bottom run of the conveyor.
- If a detergent is used for washing, rinse with plain water afterwards.
- Conveyor may be washed while running. Run conveyor for a minimum of fifteen (15) minutes immediately after finishing the wash down to allow trapped pockets of water to drain.
- Avoid directing hose stream into drive and tensioning mechanisms.

WARNING: Do not allow water to enter electrical control boxes either by direct hose stream or by draining from the conveyor.

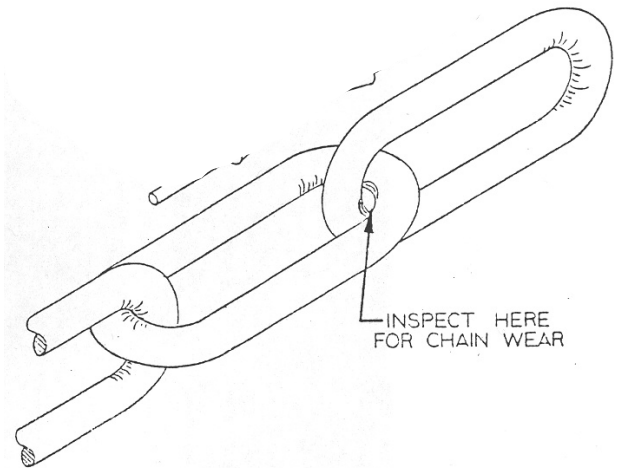
IMPORTANT NOTE: Wash down is recommended before accumulation of foreign matter on conveyor surfaces interferes with proper conveyor operation.



MAIN DRAG CHAIN WEAR & LENGTH OBSERVATION

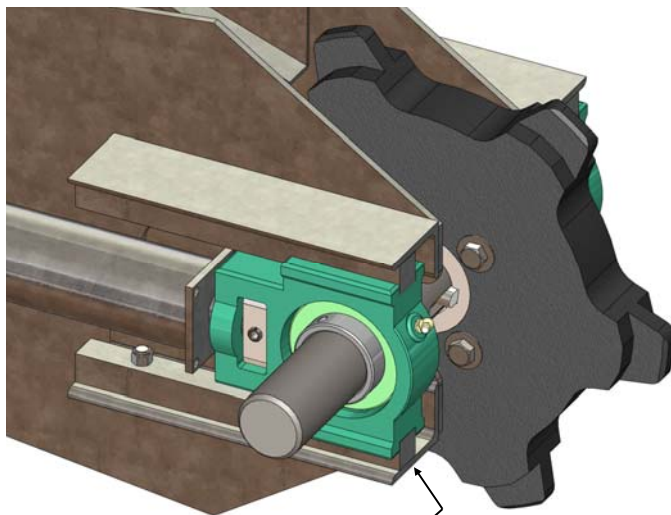
Chain Wear

Chain wear should be checked at least once a year. Wear is minimal due to limited movement between links. Wear can be significantly reduced if the chain tension is properly maintained. The point of maximum wear will be in-between the links where they join each other. The variation in rate of wear is primarily a function of the number of times the chain cycles in the conveyor.



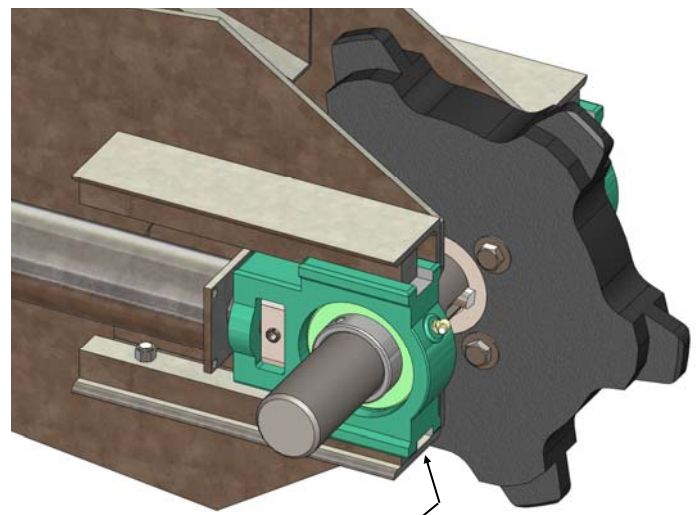
Length Observation

With this wear, the chain length increase causing the tension bearings to shift farther on the bearing running blocks on the tension station. When the bearings reach the end of the running blocks, it is required to shorten the chain. If the bearings are overhanging the running blocks, the main chain is too long and the compression springs cannot place enough tension on the bearings; neglecting to shorten the chain can cause derailment issues and damage to the conveyor.



When bearings reach the end of the running block, a chain shortening procedure is required to remove excess length in the chain.

Chain shortening should be scheduled and completed soon.



If bearings overhang the running block, the compression springs cannot apply correct tension on the main chain, creating chain slack, and possible derailment and damage to the conveyor. **Chain shortening is immediately required!**

MAIN DRAG CHAIN SHORTENING PROCEDURE

Tools Required:

- Wrenches & Sockets
- Grinder, Cutting Torch, Portable Band Saw, or other cutting tool.

1.) Locate a master link on the drag chain. Master links are located every 33'. The master links are different than the rest of the chain; they are a bolted steel



Master Link Assembly

2.) Rotate the master link so it is at the 3 or 9 O'clock position on the tension station sprocket (depending upon which side of the conveyor you are on).

3.) Lock-out and Tag-out power to the conveyor.



Push bar (As shown the tension is released)

5.) Release all chain tension at the tension station with the ratchet, pulling the push bar out of the spring tubes and push the tension sprocket forward.

6.) Before cutting the chain be sure



MAIN DRAG CHAIN SHORTENING PROCEDURE CONTINUED...

7.) Remove the master link, and cut 2 links from one of the ends of chain. The chain case hardened; about R_c60 which is as hard as tool steel. You can use a grinder wheel, or torch to cut the chain.

8.) Using the same master link, splice the two ends of the chain back together.

9.) Once you have spliced the chain,



10.) Reconnect belt pans to chain.

11.) Since you have removed a total of 8" of chain, you can eliminate one of the belt pans and use it as a spare.

12.) Apply power to conveyor, and jog the chain and belt around the length of the conveyor.

If there any questions or concerns during the chain shortening procedure, please call us toll-free at:

1.800.466.7979 or 303.430.8427





CHAIN TROUBLESHOOTING

NOTE: Refer to other pages in this maintenance schedule which will help you to prevent any of the above malfunctions. Chain derailment or failure will severely damage the conveyor; it is important to carefully inspect chain annually.

Causes of Chain Failure or Derailment

- Insufficient chain tension
- Deformed or worn chain links
- Sprocket (s) misaligned
- Chain link not properly in line with all other links
- Build-up of material on sprocket (s) or chain
- Foreign objects on sprocket (s) or chain
- Misaligned track joints and/or improper joint welds
- Damaged track
- Build-up of material or foreign objects in guide channel
- New sprocket with worn chain
- New chain with worn sprocket
- Impact loading (large amounts of material dropping on belt rather than even flow)
- Spillage of material on return belt at loading point(s)
- Cracked belt pans allowing material to contact moving parts

In the event a chain does fail, the following should be performed:

- Check the adjoining chain for other damaged links.
- Splice the chain with a master link assembly, **DO NOT WELD BROKEN LINK.**
- Check for broken belt pans.



GENERAL TROUBLESHOOTING

SYMPTOMS	POSSIBLE CAUSE(S)	REQUIRED ACTION
<i>Belt pans are ripped / torn</i>	Skirtboards making contact with belting Belting is dragging through material that has accumulated in drip pans Weather seal making contact with belting Other equipment, tools, or objects making contact with belting	Raise and adjust skirtboards to ensure clearance from belting Clean out material from drip pans Adjust or trim weather seal for proper clearance Remove other items that touch the belt
<i>Material sticks to belting</i>	Scraper blade tension is inadequate Scraper blade worn	Increase tension on scraper Replace and adjust rubber insert blade to fit belting profile
<i>Conveyor main drag chain derails at drive station</i>	Inadequate tension for main drag chain Drive station sprocket not Centered Guide blocks on main drag chain damaged, worn or missing One or more belt pans are torn or damaged	Increase tension on main drive chain through the adjusting ratchet; refer to main chain tensioning and shortening procedures supplied in O&M manual Check and adjust positioning of drive sprocket Replace worn / damaged guide blocks Replace worn / damaged belt pans
<i>Conveyor drive motor runs, but belting does not move</i>	V-belts loose / worn / broken on the drive station Roller chain loose / worn / broken on the drive station Drive sprocket teeth are worn causing the chain to skip a tooth	Check and adjust v-belt tension Check and adjust roller chain tension Replace drive sprocket

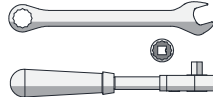


GENERAL TROUBLESHOOTING CONTINUED...

SYMPTOMS	POSSIBLE CAUSE(S)	REQUIRED ACTION
<i>Conveyor drive motor does not run</i>	Emergency pull-stop switch Activated Zero speed switch for under-speed conditions activated	Check to ensure why e-stop cable was pulled; reset switch by lifting up the trigger flag Check to see if conveyor is binding / jamming; reset switch and inspect belt speed
<i>Conveyor drive station makes loud audible noise; belt-ing does not move</i>	Mechanical clutch is engaged	Conveyor is binding or jammed; power down and fully inspect entire conveyor to locate jamming location

Tools Required:

- 1/2" socket
- 9/16" socket
- 1 1/8" socket
- 15/16" open-end wrench
- Appropriate ratchets for sockets



ADJUSTING ROLLER CHAIN TENSION



HAZARDOUS VOLTAGE
 Lock-Out and Tag-Out **MUST** be performed during set-up, maintenance and repair of the conveyor

PREVENTATIVE MAINTENANCE: The following instructions are for checking / adjusting the roller chain every six (6) months of conveyor operation.

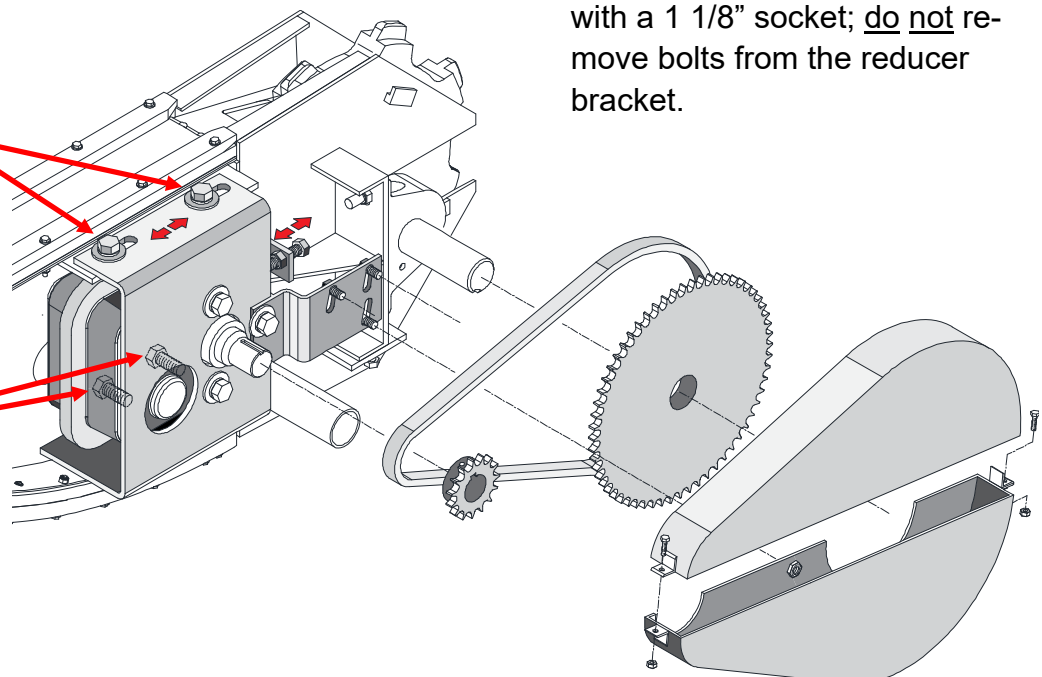
Procedure:

1.) Remove the upper half of the chain guard assembly by unscrewing the two (2x) 5/16" bolts on either end of the guard, and the two (2x) 3/8" bolts on the backside of the guard using the 1/2" and 9/16" sockets; set aside guard and hardware. Check tension on roller chain; if deflection is greater than 1/8", adjustment is required.



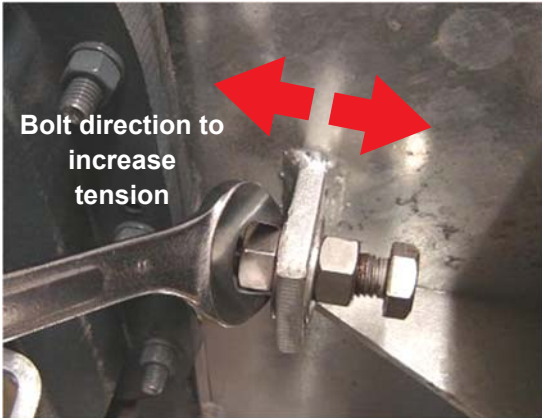
2.) Locate the belt guard on the left side of the drive station and remove the four (4x) 5/16" bolts with 1/2" socket; set aside.

3.) Loosen the four (4x) 3/4" bolts on the reducer bracket, two on the top and two on the bottom with a 1 1/8" socket; do not remove bolts from the reducer bracket.

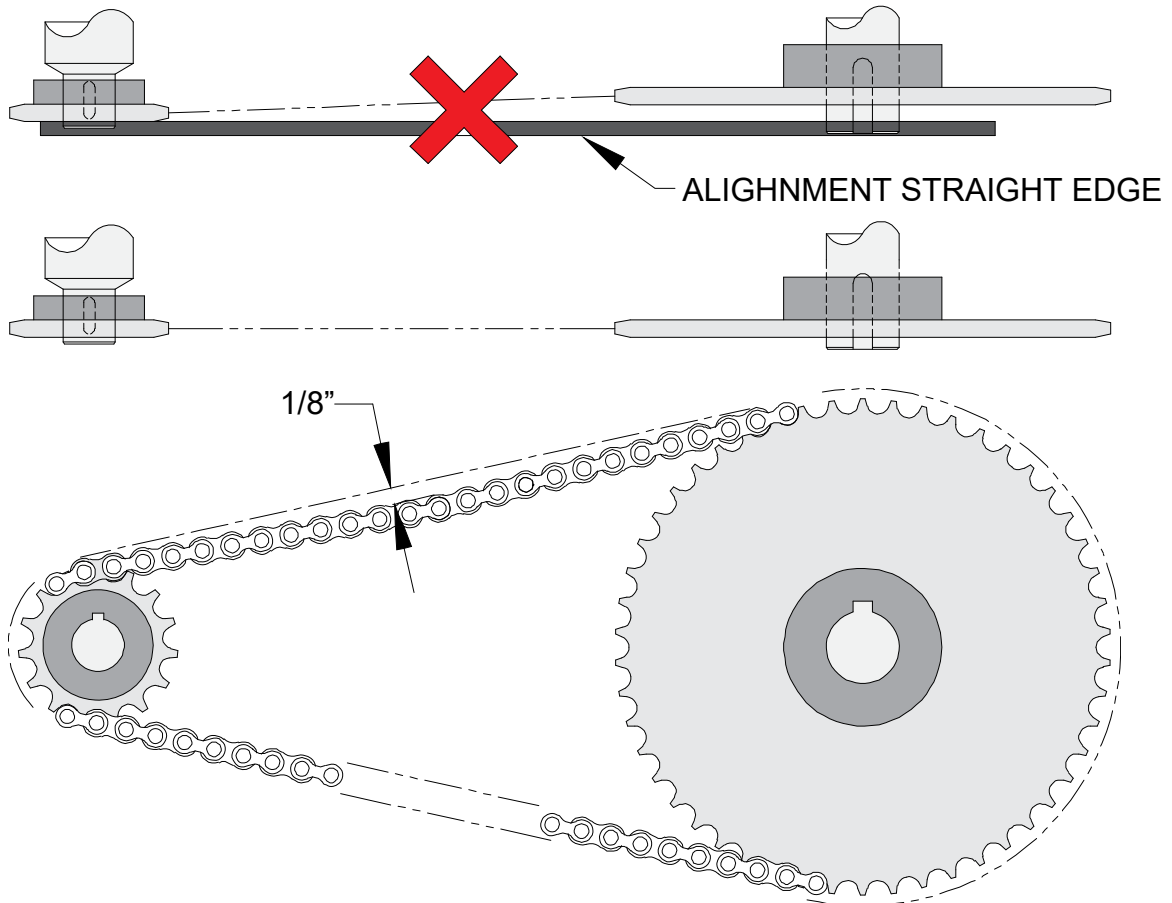




ADJUSTING ROLLER CHAIN TENSION



- 4.) Adjust the 5/8" gear box set-bolt with a 15/16" wrench; increase tension on the chain until there is less than 1/8" deflection. **NOTE:** lubricate the roller chain with a spray lube.



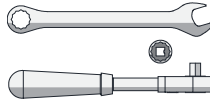
- 5.) When adjustment of the roller chain is corrected, reducer bracket bolts can be tighten down and the chain guard can be reinstalled. However v-belt tension adjustment will be required; see following page for the v-belt tensioning procedure.



ADJUSTING V-BELT TENSION

Tools Required:

- 1/2" socket
- 3/4" socket
- 3/4" open-end wrench
- Appropriate ratchets for sockets



HAZARDOUS VOLTAGE
Lock-Out and Tag-Out **MUST** be performed during set-up, maintenance and repair of the conveyor

PREVENTATIVE MAINTENANCE:

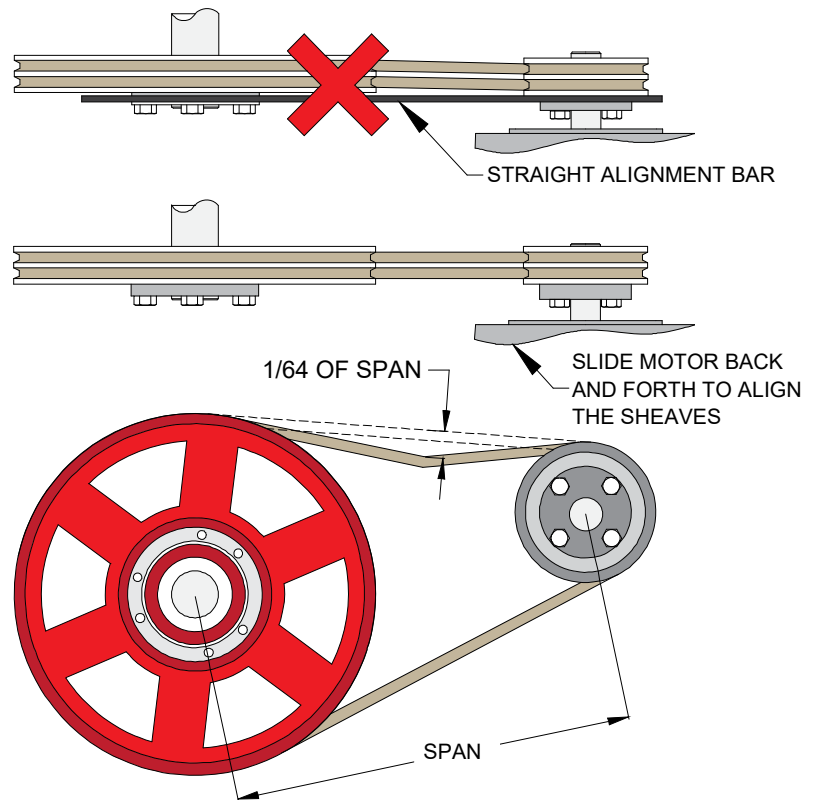
The following instructions are for checking / adjusting the v-belt tension every six (6) months of conveyor operation or when the roller chain is adjusted.

Procedure:

- 1.) Remove the belt guard, if not already completed, by unbolting the four (4x) 5/16" bolts with 1/2" socket; set aside.
- 2.) Gently loosen the motor mount clamp bar 1/2" nuts on the right side of the drive station with 3/4" socket. **WARNING: DO NOT** loosen the nuts too far or remove them since the motor mount assembly will fall out from the clamp bars.
- 3.) Adjust the v-belt tension by first loosening the inner 1/2" retaining nut with a 3/4" open-end wrench, and then tightening the 1/2" outer nut, which pulls the motor closer to the all-thread bracket. The belts should be tighten till there is 5/32" or less of deflection. **NOTE: Be careful not to over tighten the belts since it increases wear.**
- 4.) Once correct v-belt tension has been achieved, tighten down the 1/2" nuts on the motor mount clamp bar. Also retighten the 1/2" retaining nuts on the all-thread.
- 5.) Reinstall belt guard; check to make sure clutch / sheave assembly and the motor sheave do not interfere with the guard.

DEFLECTION EXAMPLE

- Span = 16 inches;
- $16 \times 1/64 = .25$ inches;
- Belt should deflect 1/4"



Replace v-belts when the contact surface is severely cracked or the belt slip due to glazing. Correct sizing is specified on the back-side of the belt or referring to the drive station BOM in Section A - Installation of this manual.



AUNSPACH S180 CLUTCH OPERATION

Serpentix has fitted the drive station with a over-torque clutch system on the input shaft of the gearbox. Its purpose is a safety device to reduce possible damage to the conveyor if a chain problem occurs.

The clutch is a ratcheting ball-bearing unit. In the event of the conveyor binding or jamming, the clutch will disengage allowing a mechanical disconnect from the motor to the gearbox. If disengagement occurs there will be a loud audible metal clacking noise from the clutch; ***IMMEDIATELY*** shut down the conveyor and inspect where the jamming is present. Once the jam has been cleared and corrections have been made, restart the conveyor; there is no required reset of the clutch. The internal springs recess the ball-bearings and engagement returns.

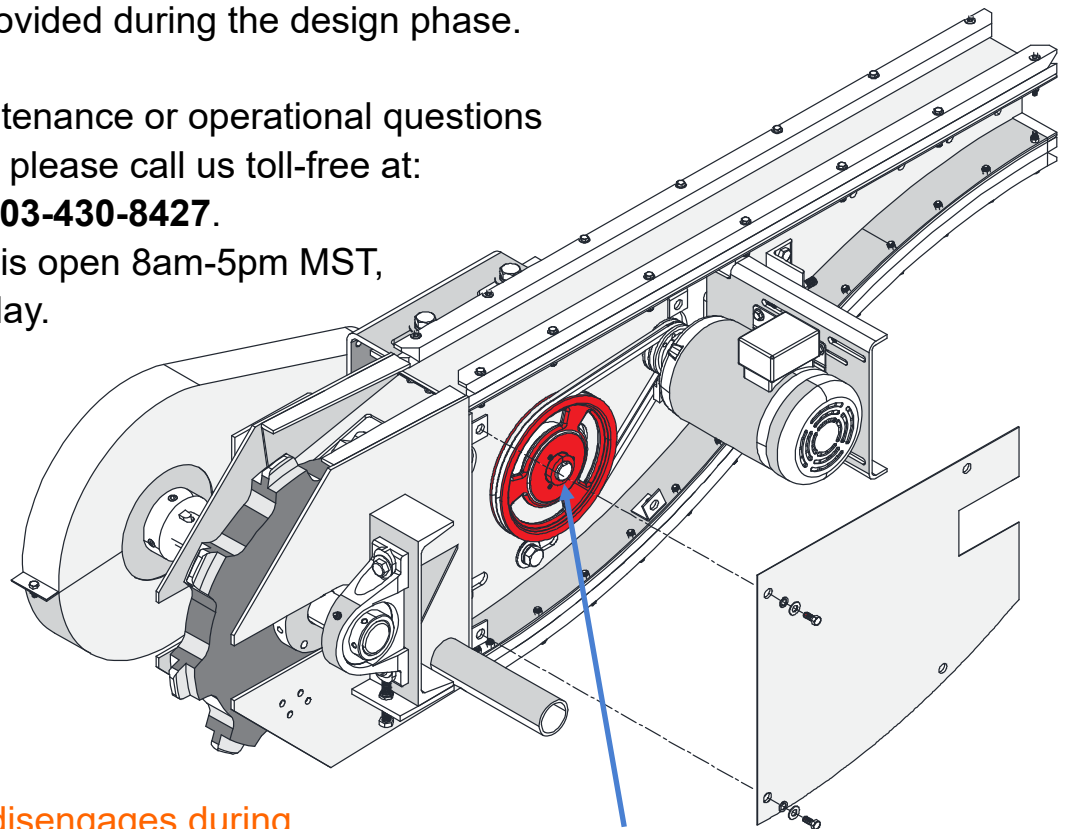
Torque Limit Disengagement

The torque limit to when clutch disengagement happens is PRE-SET from Serpentix based on the design requirements of the system, capacity and load provided during the design phase.

If there are any maintenance or operational questions of the clutch system, please call us toll-free at:

1-800-466-7979 or **303-430-8427**.

The Serpentix office is open 8am-5pm MST, Monday through Friday.

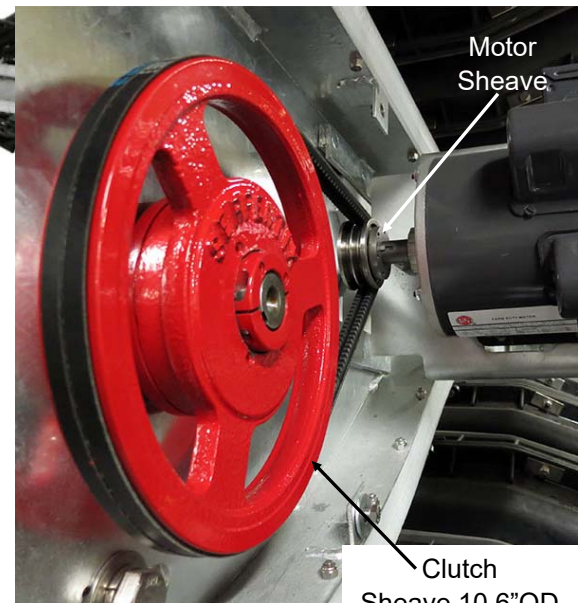
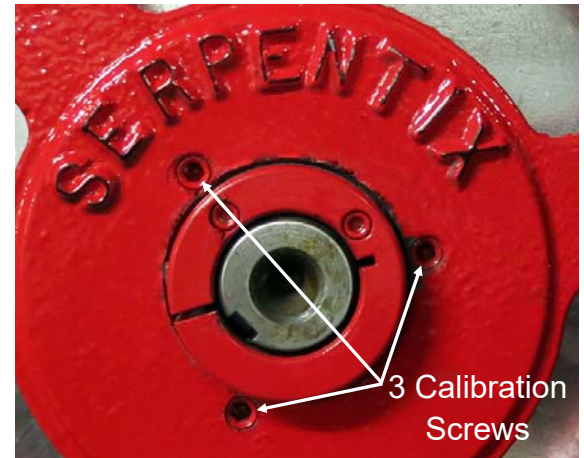


The S180 clutch is mounted to the input shaft of the gearbox

NOTE: If the clutch disengages during normal operating loads and procedures, **contact Serpentix first** before attempting to adjust torque levels on the clutch.

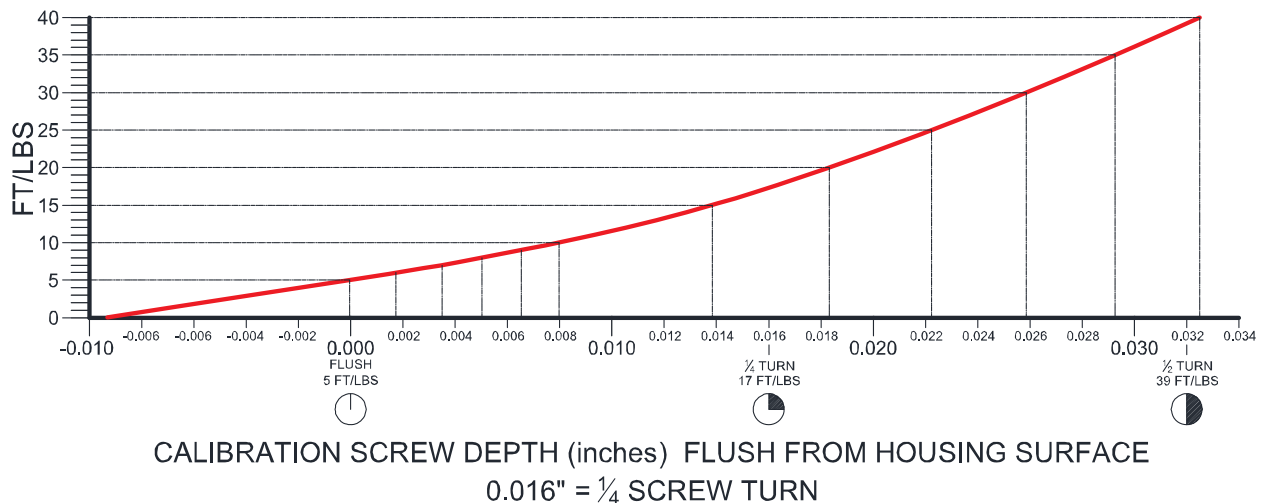
S-180 Conveyor Torque Safety Clutch

Serpentix provides a mechanical safety device (torque safety clutch) to protect the conveyor. This drive station component will help limit track and moving parts damage if the conveyor system ever derails.



Features

- Zero Maintenance
- One-Piece Integral Sheave Construction
- Automatic reset
- Easy Access Calibration (Factory set per Installation)
- Fusion Bonded Epoxy for Corrosion Protection
- Weighs only 15 lbs.

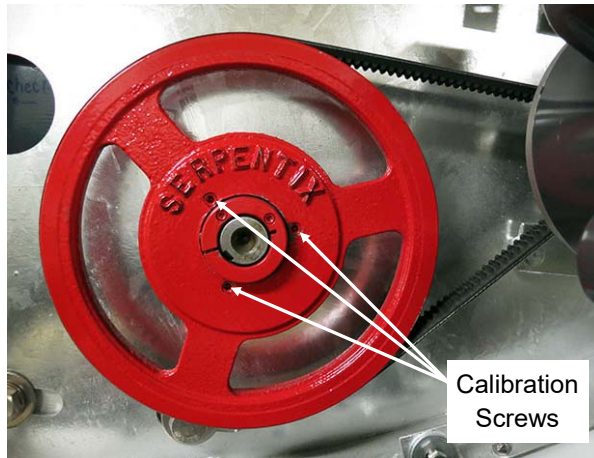
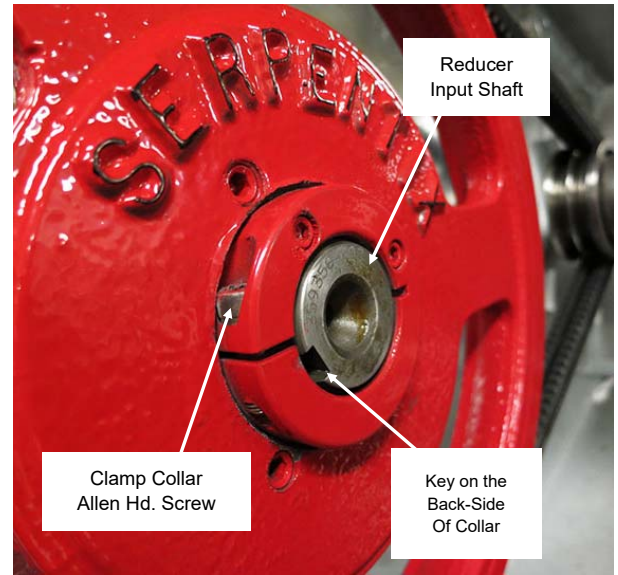




S-180 Conveyor Torque Safety Clutch

MOUNTING

1. With the clamp-collar mounting screws loose and facing towards you, slide the S-180 and finished key onto the
2. 1 3/8" Dia. reducer input shaft. (Note: a flat head screw drive maybe required to increase the spread on the clamp collar split.)
3. Tighten clamp collar allen-head screw.



CALIBRATION

1. Determine motor sheave size and motor HP rating and RPM from the motor name plate. Calculate the required torque (refer to the line chart on the previous page).
2. Adjust each of the three calibration screws evenly in 1/8 turn increments to the prescribed torque.
3. Apply a drop of **Loctite 290** to each calibration screw after the torque adjustment has been completed.

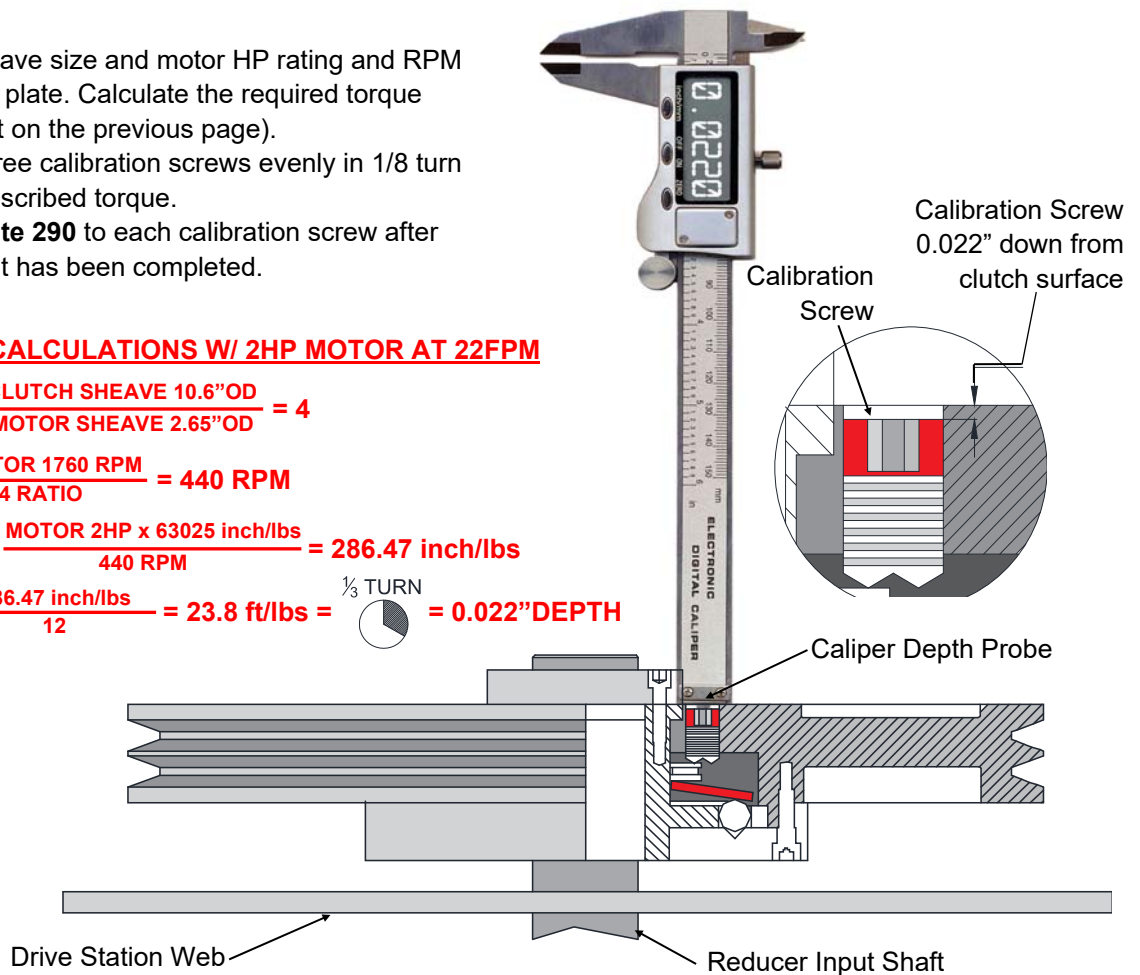
FT/LBS EXAMPLE CALCULATIONS W/ 2HP MOTOR AT 22FPM

$$\text{SHEAVE RATIO} = \frac{\text{CLUTCH SHEAVE 10.6"OD}}{\text{MOTOR SHEAVE 2.65"OD}} = 4$$

$$\text{CLUTCH RPM} = \frac{\text{MOTOR 1760 RPM}}{4 \text{ RATIO}} = 440 \text{ RPM}$$

$$\text{TORQUE inch/lbs} = \frac{\text{MOTOR 2HP} \times 63025 \text{ inch/lbs}}{440 \text{ RPM}} = 286.47 \text{ inch/lbs}$$

$$\text{TORQUE ft/lbs} = \frac{286.47 \text{ inch/lbs}}{12} = 23.8 \text{ ft/lbs} = \frac{1}{3} \text{ TURN} = 0.022" \text{ DEPTH}$$





LUBRICATION

Reducer (Gear-box) Lubrication

Please Note: Check the reducer oil level because the reducer may be shipped without oil.

If required, fill the reducer with oil with 3.5 quarts of approved fluid.

(See recommended lubricant selection chart in the Falk O&M literature, please refer to the table of contents.)

- Drain and replace oil after 350 hours of operating time
- Drain and replace oil every 2,500 hours thereafter.
- Check oil level quarterly or every 600 hours.
- Check that oil selected will meet recommended operating temperature SAE number.

Lubrication for Bearings at Drive and Tension Station

- Lubricate every six (6) months or 350 hours.

Lubrication for the #60 Roller Chain

- Use a spray chain lube on the roller chain every six months.

Please Note: The main drag chain (14mm conveyor chain) is case hardened and lubrication is not necessary.

SERPENTIX CONVEYOR LUBRICATION SCHEDULE

COMPONENT	FREQUENCY	LUBRICANT
Gear Reducer	Drain & Refill after the initial 350 hours of operation. After that, drain and refill after 2,500 hours of operation.	#2 or #4 AGMA (85-90W) Gear Oil
	Lubricate shaft bearings every 6 months.	#2 Lithium based grease
Drive & Tension Station Bearings	Lubricate every 6 months or 350 hours of operation	#2 Lithium based grease
Motor Bearings	Lubricate every 6 months (if applicable).	#2 Lithium based grease
Oilier Bottle	Monthly. Adjust flow rate to 3-5 drops/minute.	SAE 10W Oil
#60 Roller Chain	Every 6 months.	Chain Spray Lube

**ABBREVIATED MAINTENANCE SCHEDULE**

COMPONENT	REQUIRED SERVICE	FREQUENCY
Entire Conveyor	Observation only. Look for tracking problems/damaged components.	Daily
Main Drag Chain	Check tension. Increase tension if necessary	Weekly
Scraper	Check for wear. Replace rubber scraper blade if worn.	Monthly
Oiler bottle	Check to insure oil flows smoothly. Fill with oil as necessary.	Monthly
Bearings	Check wear. Lubricate.	Semi-Annually
Roller Chain & Sprockets	Check tension and wear. Adjust if necessary. Replace if worn. Lubricate.	Semi-Annually
Assembly Hardware	Check for loose hardware on chain and belting; tighten accordingly	Semi-Annually
Main Drag Chain	Check wear pockets on inside of links. Shorten chain if necessary.	Semi-annually
Guide Blocks	Check for wear. Replace if worn or damaged.	Semi-annually
Drive Gearbox	Drain and fill gear oil every 6 months or every 2500 operating hours.	Semi-Annually
V-belts & Sheaves	Check tension. Adjust if necessary. Replace if worn.	Semi-Annually
Track Wear	Check for wear. Schedule replacement if necessary.	Annually
Drive & Tension Station Sprockets	Check for wear. Replace if teeth are worn.	Annually



MAINTENANCE LOG

DATE	WORK PERFORMED
	EQUIPMENT START-UP: SERPENTIX REPRESENTATIVE TO APPROVE FULL-TIME USE OF CONVEYOR SYSTEM



CONVEYOR FAILURE

The conveyor will fail to operate under several circumstances, some of which are:

- **Main Drag Chain Breakage**

Check where the failure in the main drag chain occurred; see detailed pages on chain wear and inspection.

- **Main Drag Chain Derailment**

Check both the drive and tension sprockets for worn teeth; check for build up of foreign material on the sprockets and the chain - washdown chain and sprockets as needed; verify chain tension is properly set.

- **V-Belt Breakage**

If the v-belts fail, check for sheave alignment and proper tension on belts. Replace with direct size replacement.

- **Roller Chain Breakage**

Check for tension on the gear reducer gear sprocket and drive shaft sprocket; check for wear on sprockets and misalignment; adjust alignment and tension; Roller chain can fail if clutch does not disengage when conveyor jam occurs; verify that main drag chain does not have any binding or slack. Verify clutch unit has not seized together not allowing disengagement in over-torque situations.

- **Electrical Motor Seize / Failure**

Remove motor from system and bench test for proper operation; if motor has failed, replace with exact unit. O&M manual has contact information for supplied OE components.

- **Gearbox Reducer Failure**

Gearbox failure can be due to maintenance neglect; lack of oil inside reduce will cause excessive heat and wear causing the gearbox to lose mechanical efficiency; if failure occurs, remove gearbox from conveyor, and follow disassembly of gearbox outline in the manufacturer's OEM owners manual to locate damaged components.

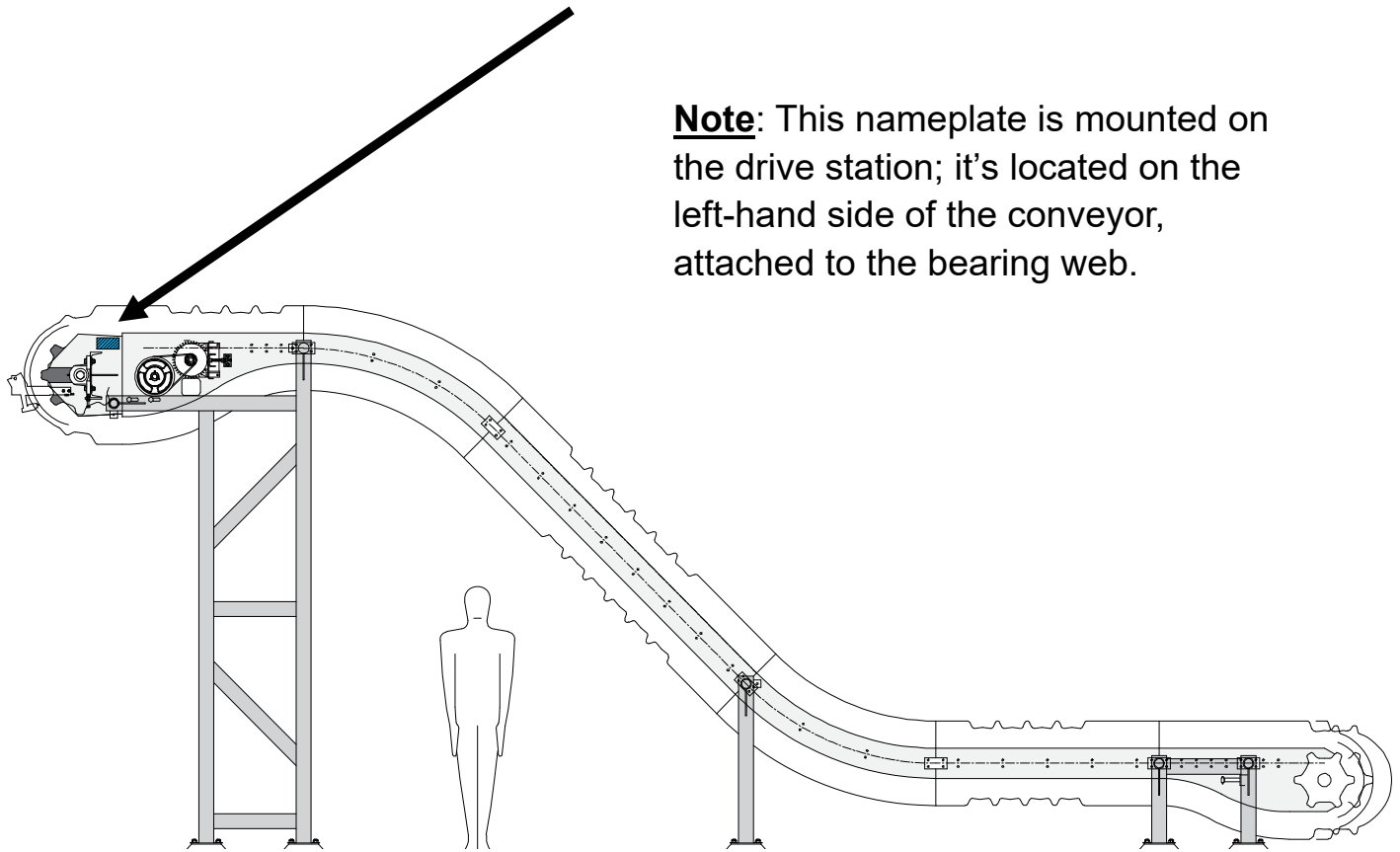
NOTE: For other failures that may happen, or if additional assistance is required please call us toll-free at: **1.800.466.7979** or **303.430.8427**. The Serpentix office is open 7am-5pm MST, Monday through Friday.



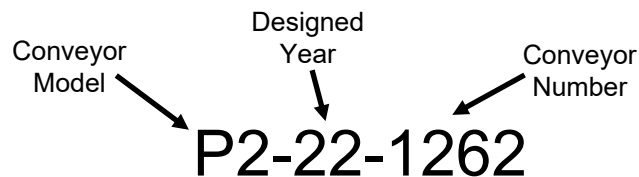
NAME PLATE DATA



Note: This nameplate is mounted on the drive station; it's located on the left-hand side of the conveyor, attached to the bearing web.



SERPENTIX EQUIPMENT/TAG/JOB NUMBER







CEMA SAFETY ILLUSTRATIONS



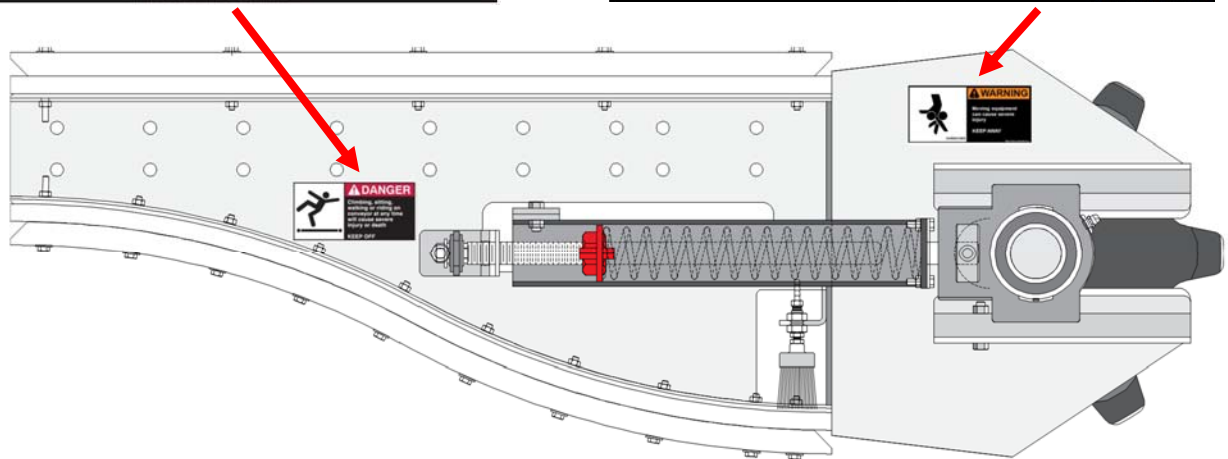
Bulk Handling Conveyors



 <p>Do Not Climb, Sit, Stand, Walk, Ride, or Touch the Conveyor at Any Time</p>	 <p>Do Not Perform Maintenance on Conveyor Until Electrical, Air, Hydraulic and Gravity Energy Sources Have Been Locked Out and Blocked</p>	 <p>Operate Equipment Only With All Approved Covers and Guards in Place</p>
 <p>Lock Out All Power and Block Gravity Loads Before Servicing</p>	 <p>Ensure That All Personnel Are Clear of Equipment Before Starting</p>	 <p>Allow Only Authorized Personnel and Trained Personnel To Operate or Maintain Conveyors and Accessories</p>
 <p>Keep Clothing, Body Parts, and Hair Away from Conveyors</p>	 <p>Clean Up Spillage Around Tail Pulleys, Idlers, and Load Points Only When the Power is Locked Out and Guards are In Place</p>	 <p>Do Not Modify or Misuse Conveyor Controls</p>
 <p>Ensure That ALL Controls and Pull Cords are Visible and Accessible</p>	 <p>Do Not Modify or Remove Controls, Guards, Interlocks, Warnings or other Safety Items without Manufacturer's Approval</p>	 <p>Report All Unsafe Conditions</p>



SAFETY STICKER LOCATION DIAGRAM—TENSION STATION



GENERAL SAFETY INSTRUCTIONS

It is the responsibility of the contractor, the installer, and the owner to maintain and operate the equipment supplied by Serpentix in such a manner as to comply with the laws concerning occupational safety and health, as well as with all national, state, and local laws and ordinances. Consult the local safety standard authorities or plant supervisors for a complete listing of these regulations.

Safety must be considered a primary factor in all aspects of equipment installation, operation, and maintenance. Safety training and equipment maintenance will be covered by authorized Serpentix personnel during equipment start-up and O&M training. All operating personnel will be advised of the location and operation of all emergency control devices.

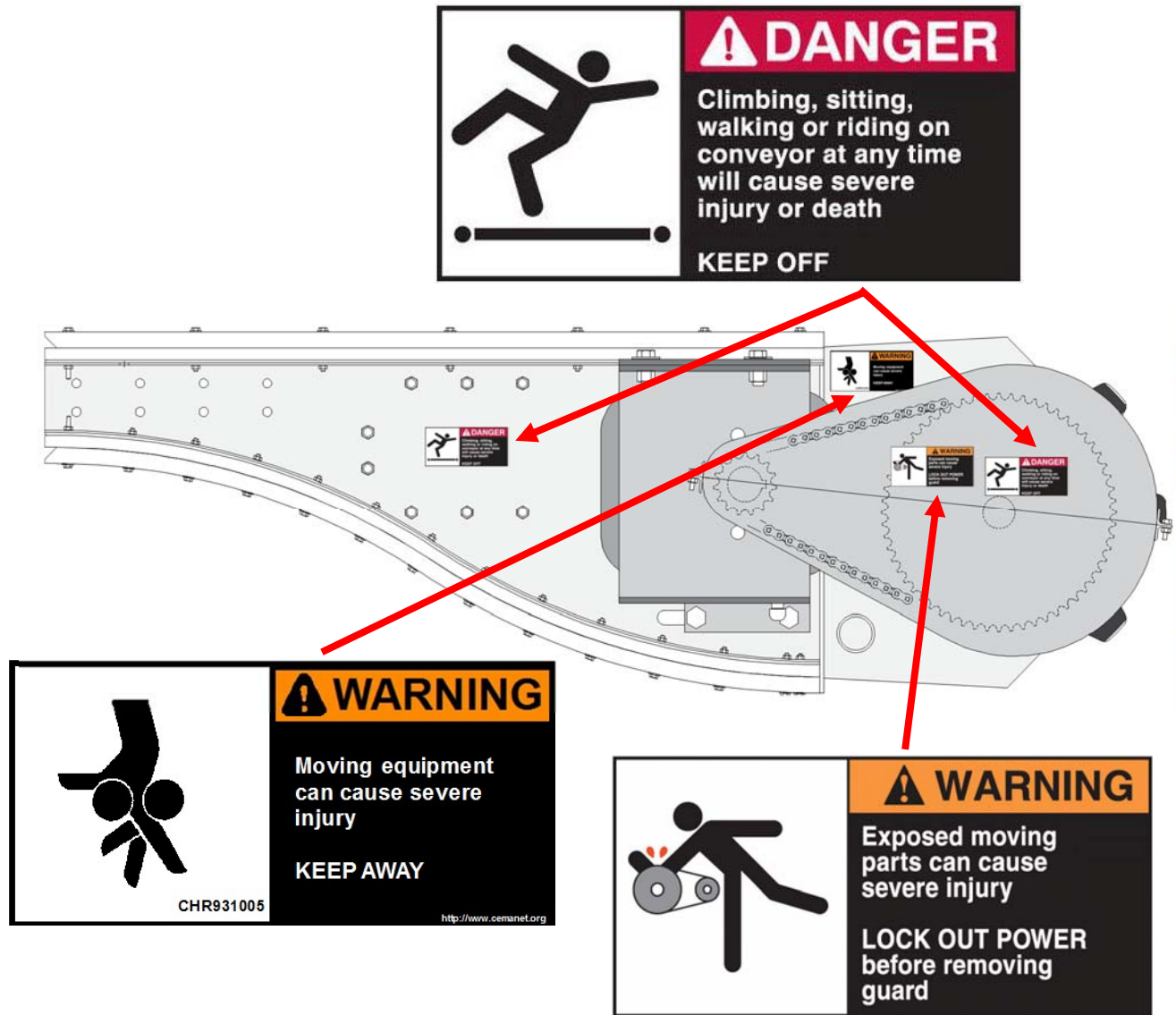
The following safety instructions are basic guidelines, and should be considered minimum provisions:

- High-voltage and rotating electrical machinery can cause serious or fatal injury. Installation, operation, and maintenance of rotating electrical machinery should be performed by qualified personnel.



SAFETY STICKER LOCATION DIAGRAM—DRIVE STATION

Note: diagram shows the typical placement of safety stickers on a drive station.



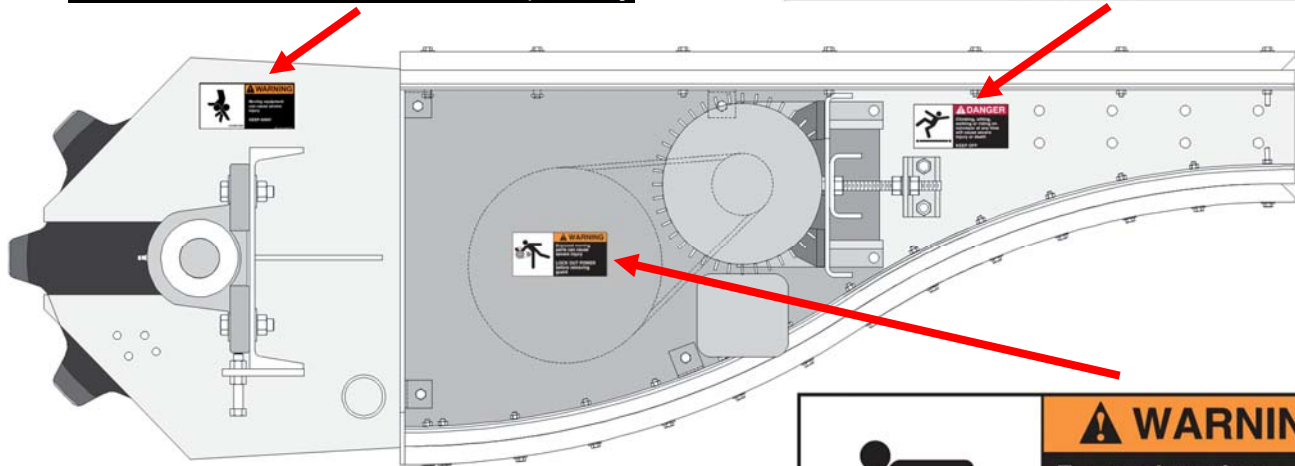
GENERAL SAFETY INSTRUCTIONS Con't.

- Unobstructed access to controls and emergency stop devices should be maintained at all times.
- Good housekeeping practices to be maintained around the equipment at all times.
- If the conveyor is stopped for inspection, maintenance, or servicing, the main power should be **locked-out, tagged out, and secured against being turned on accidentally**. Operation should not resume until all covers and safety guards are in place.



SAFETY STICKER LOCATION DIAGRAM—DRIVE STATION

Note: diagram shows the typical placement of safety stickers on a drive station.



SAFETY INSTRUCTIONS FOR EQUIPMENT OPERATION

Caution should be exercised in all aspects of conveyor operation. Safeguards against potentially hazardous situations have been provided by Serpentix, but common sense is the operator's best protection.

The following is a list of the most noteworthy safety instructions regarding the operation of the *P2 Pathwinder Conveyor*:

- Do not stand or walk on the conveyor belting.
- Confirm that all safety guards are securely fastened before operating the equipment.
- The conveyor should not be operated with torn or ripped belt pans.

SAFETY INSTRUCTIONS FOR EQUIPMENT OPERATION Con't.

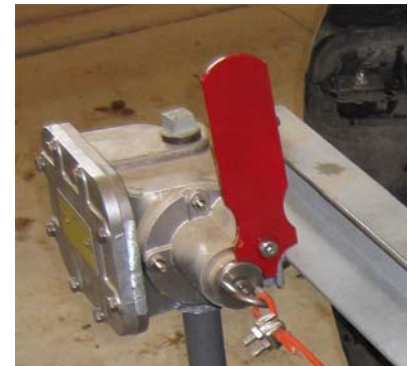
- During operation of the equipment, manual intervention on the conveyor is strictly prohibited.
- Such interventions, such as adjusting the tension on the belt scraper should be adjusted when the conveyor is not in operation, **locked-out, tagged out, and secured against being turned on accidentally.**

If it is necessary to clean the equipment during operation or no-load operation, this should only be done using a hose and water pressure at a safe distance from rotating and pull-in areas of the equipment.



HAZARDOUS VOLTAGE
 Lock-Out and Tag-Out **MUST** be performed during set-up, maintenance and repair of the conveyor

- Hands and feet should be kept clear of the conveyor during operation. Loose-fitting clothing, along with loose hair, present a safety hazard and should not be worn around an operating piece of machinery.
- Emergency stop switches should be periodically tested for proper operation. When the orange safety cable is pulled, the flag on the Material Control emergency stop switch should drop down and immediately shut off the conveyor. When the flag is reset the conveyor should not start back into operation without going through the control panel first.
- The conveyor should not be started and stopped with the belting loaded with material to be conveyed. The conveyor should be allowed to run a sufficient period of time to discharge and remove all material on the belting prior to shutting down the conveyor.
- Routinely test emergency stop buttons and zero motion speed switches to ensure they are in good working order. The zero motion speed switch can be tested by removing the magnets from the shaft on the tension station. Replace all damaged guards—Serpentix will supply them at its cost to promote their continued use.
- Any modification to the conveyor system or any parts, sub-assemblies and / or components, not approved in writing by Serpentix Conveyor will void any and all warranty coverage.





SAFETY INSTRUCTIONS FOR MAINTENANCE WORK

For safety reasons, as well as for operating efficiency, personnel responsible for maintenance of the P2 Pathwinder Conveyor must be thoroughly familiar with the procedures outlined in this manual. Failure to follow recommended guidelines could result in personal injury or damage to the equipment.

The following is a list of safety considerations while performing maintenance tasks:

- Do not attempt to service any part of the conveyor system while it is in operation.
- Before starting any maintenance work, power should be **locked out & tagged out or secured against being switched-on inadvertently by unauthorized persons**. Electric current should be locked out before removing safety guards.



HAZARDOUS VOLTAGE

Lock-Out and Tag-Out **MUST** be performed during set-up, maintenance and repair of the conveyor

- When maintenance work calls for cleaning of the conveyor system with water, **do not** allow water to enter electrical control boxes, motors, or other electrical components either by direct stream or by draining from the conveyor.
- The tension should be released from the main drag chain before attempting to split the chain at the master link to avoid the release of stored energy.
- Do not operate the conveyor with the safety guards removed.
- Warning signs should not be removed. If warning signs become dirty or damaged, they should be cleaned or replaced immediately.





PARTS LIST

SERPENTIX JOB NUMBER: P2-22-1258

SERPENTIX JOB NAME: Atlanta (East Area), GA

<u>MATERIAL:</u>	<u>ITEM NO.</u>	<u>QTY.</u>	<u>ITEM DESCRIPTION:</u>	<u>PART NO.</u>
Case Hardened	1	1	Chain Strand Ass'y. @ 291Links (95'-11 1/2"Lg.)	H-0105-0004-A RevD
	2	-		
60 Duro. Rubber	3	146	Isolator Block	PW-0104-0010-A RevB
Nylon	4	146	Intermediate Attachment	H-0104-0010-A RevH
Urethane Injected	5	292	Guide Block Grey (Wide)	PW-0104-0007-A RevD
304SS Hdwr.	6	146	3/8"- 16NC x 2 "Lg. Hx. Hd. Bolt	
304SS Hdwr.	7	146	3/8" - 16NC Hx. Nut-ESNA	
304SS Hdwr.	8	292	3/8"- Flat Washer	
Case Hardened	9	1	Chain Master Link Ass'y.	PW-0106-0004-A
Nylon	10	1	Splice Intermediate Attachment	PW-0104-0005-A
Urethane Injected	11	2	Splice Guide Block-Grey (Wide)	PW-0104-0008-A RevB
304SS Hdwr.	12	2	1/4" - 20NC x 2 1/2" Lg. Hx. Hd. Bolt	
304SS Hdwr.	13	4	1/4"- Flat Washer	
304SS Hdwr.	14	2	1/4" - 20NC Hx. Nut-ESNA	
MPR	15	147	26" Wide Belt Pan	H-0101-0122-D
304SS Hdwr.	16	588	5/16"- 18NC x 1 1/4" Lg. Hx. Hd. Bolt	
304SS Hdwr.	17	294	5/16" - 18NC x 1 1/2" Lg. Hx. Hd. Bolt	
304SS Hdwr.	18	882	5/16" - 18NC Hx. Nut-ESNA	
304SS Hdwr.	19	1470	5/16" Rectangular Washer x 1 3/4" Lg.	H-0101-0156-A RevA
<u>316SS</u>	20	2	4-Hole Splice Plate	PW-0135-0001-A

Please Note: The bill of materials were taken directly off of the general arrangement



PARTS LIST

SERPENTIX JOB NUMBER: P2-22-1258

SERPENTIX JOB NAME: Atlanta (East Area), GA

<u>MATERIAL:</u>	<u>ITEM NO.</u>	<u>QTY.</u>	<u>ITEM DESCRIPTION:</u>	<u>PART NO.</u>
	21			
<u>316SS</u>	22	12	Splice Support Pl. (12.5"Pipe Lg.)	PW-0135-0004-A Rev.A
	23			
	24			
<u>316SS</u>	25	2	8-Hole Splice Plate w/ Eyebolt Attachment	PW-0135-0818-A
	26			
<u>316SS</u>	27	6	Skirtboard Intermediate Support (14 3/4"Bar Lg.)	PW-0135-0744-A Rev.B
<u>316SS</u>	28	6	Skirtboard T-Bracket w/Holes	PW-0135-0733-A Rev.C
3/8" HDPE	29	2	Skirtboard x 11 7/8"x 8'-0"Lg. (<u>316SS</u> Hdwr.)	P2-0139-0291-A Rev.C
	30			
	31			
	32			
<u>316SS</u>	33	6	Skirtboard Support Brkt.	PW-0135-0017-A Rev.C
<u>316SS</u>	34	6	Skirtboard Clamp Pl.	PW-0135-0015-A
	35			
	36			
<u>316SS</u>	37	18	Drip Pan Intermediate Support (20"Bar)	PW-0135-0745-A RevB
<u>316SS</u>	39	7	Drip Pan Hanger x 12"LG. (31 1/4" Wide Bar)	PW-0135-0013-A Re- vA
<u>316SS</u>	39	2	Drip Pan Hanger x 18"LG. (31 1/4" Wide Bar)	PW-0135-0013-A Re- vA
	40			

Please Note: The bill of materials were taken directly off of the general arrangement drawings



PARTS LIST

SERPENTIX JOB NUMBER: P2-22-1258

SERPENTIX JOB NAME: Atlanta (East Area), GA

<u>MATERIAL:</u>	<u>ITEM NO.</u>	<u>QTY.</u>	<u>ITEM DESCRIPTION:</u>	<u>PART NO.</u>
<u>316SS</u>	41	18	Drip Pan Clamp Pl.	PW-0135-0014-A RevB
16GA <u>316SS</u>	42	8	Drip Pan x 3'-11 1/2"Lg.	H-0140-0242-A RevC
	43			
	44			
	45			
	46			
	47			
	48			
10GA 304SS	49	24	Track Alignment Angle	PW-0135-0728-A RevF
OEM Mat'l.	50	1	Oiler Ass'y.-1 QT. (Soledoid Operated)	PW-0147-0005-A
	51			
	52			
	53			
	54			
<u>316SS</u> Hdwr.	55	98	3/8"-16NC x 1 1/4" LG. HX. HD. Bolt	
	56			
<u>316SS</u> Hdwr.	57	98	3/8"-16NC HX. Nut - ESNA	
<u>316SS</u> Hdwr.	58	36	3/8" Flat Washer	
<u>316SS</u> Hdwr.	59	124	1/2"-13NC x 1 1/2" LG. HX. HD. Bolt	
<u>316SS</u> Hdwr.	60	16	1/2"-13NC x 1" LG. HX. HD. Bolt	

Please Note: The bill of materials were taken directly off of the general arrangement drawings which are located in the back of the O&M manual.



PARTS LIST

SERPENTIX JOB NUMBER: P2-22-1258

SERPENTIX JOB NAME: Atlanta (East Area), GA

<u>MATERIAL:</u>	<u>ITEM NO.</u>	<u>QTY.</u>	<u>ITEM DESCRIPTION:</u>	<u>PART NO.</u>
<u>316SS</u> Hdwr.	61	140	1/2"-13NC HX. Nut - ESNA	
<u>316SS</u> Hdwr.	62	16	1/2" Flat Washer	
<u>316SS</u> Hdwr.	63	16	1/2" Fender Washer	
304SS Struc.	66	1	<u>RH</u> Tension Station x 6'-8 3/8" LG	P2-0116-0006-D
304SS Struc.	67	1	Vert. Curve x R6' x 30deg w/ 1'-6" ext.	P2-0127-0398-B
304SS Struc.	68	1	Straight Track x 5'-6" LG.	P2-0125-0004-D
304SS Struc.	69	2	Straight Track x 10'-0" LG.	P2-0125-0004-D
304SS Struc.	70	1	Vert. Curve x R6' x 30deg	P2-0127-0399-B
304SS Struc.	71	1	Drive Station x 5'-0"	P2-0115-0056-D
304SS Struc.	72	1	26" <u>Dual</u> Scraper Assembly x 1/4" thick Blade	PW-0137-0199-A RevE
Galv. Struc.	73	1PR	Tension Support x 3'-0 3/4"LG. C4 x 7.25#	P2-0135-0945-D
Galv. Struc.	74	1PR	Support L-Leg x 2'-1 7/16"LG. C4 x 7.25#	P2-0135-0945-D
Galv. Struc.	75	2	Support Leg x 4'-10 7/16"LG. C4 x 7.25#	P2-0135-0945-D
Galv. Struc.	76	2	Support Leg x 9'-10 7/16"LG. C4 x 7.25#	P2-0135-0945-D
Galv. Struc.	77	1PR	Suspended Drive Support x 5'-2 1/4" LG. C4 x 7.25#	P2-0135-0945-D
Galv. Struc.	78	9	Channel Brace x 2'-9 1/2" LG. C4 x 7.25#	P2-0135-0945-D
Galv. Struc.	79	4	Cross Angle Brace x 3'-1 5/16"LG. Angle 1/4" x 2" x 2"	P2-0135-0945-D
Galv. Struc.	80	2	Cross Angle Brace Plate x 30deg Bolt-Up	P2-0135-0945-D

Please Note: The bill of materials were taken directly off of the general arrangement drawings which are located in the back of the O&M manual.

**PARTS LIST****SERPENTIX JOB NUMBER: P2-22-1258****SERPENTIX JOB NAME: Atlanta (East Area), GA**

<u>MATERIAL:</u>	<u>ITEM NO.</u>	<u>QTY.</u>	<u>ITEM DESCRIPTION:</u>	<u>PART NO.</u>
Aluminum	81	1	Stop Switch—PCL2SX	
Aluminum	82	1	Stop Switch—PCR2SX	
304SS Hdwr.	83	4	3/16" Wire Rope Clamp	McMaster #31985T72
304SS Hdwr.	84	14	3/8"-16NC x 6"LG. Eye Bolt w/ Hdwr.	
Vinyl Coated	85	2	3/16" O.D. Orange Cable x 36'-0"LG.	
OEM Cast	86	1	Zero Speed Switch (Right-Hand Mount) - Electro-Senser	SCP-1000
14GA 304SS	100	1	Weather Seal Assembly w/ Vinyl Finger Ext.	P2-0138-0678-A
<u>316SS</u> Hdwr.	101	16	3/4"-10NC x 8 1/2" LG. All-Thread Anchor (5" Min. Embed.)	
<u>316SS</u> Hdwr.	102	8	3/4"-10NC x 12" LG. All-Thread Anchor (8" Min. Embed.)	
<u>316SS</u> Hdwr.	103	72	3/4"-10NC Hx. Nut	
<u>316SS</u> Hdwr.	104	72	3/4" Flat Washer	
Adhes. Epoxy	105	1	Hilty HDM 500 Red Manual Dispenser	
Adhes. Epoxy	106	4	Hilti Hit-Re 500 V3 Injectable Epoxy Mortar (11.16oz)	
Adhes. Epoxy	107	8	Hilty Hy/Re Mixing Nozzle	
Galv. Struc.	108	1PR	Chute Support Side Arms C4 x 7.25#	P2-0140-0298-D
Galv. Struc.	109	1	Chute Support Rear Brace C4 x 7.25#	P2-0140-0298-D
14GA <u>316SS</u>	110	1	Detachable Chute Assembly w/ Vinyl Ext.	P2-0140-0298-D
16GA <u>316SS</u>	111	1	Drip Pan x 4'-0"LG. x 31" Wide w/ 35deg Cutback	P2-0140-0295-A
NEMA 4X	112	1	Control Panel (316SS)	HTA-SER-092222-000-00 RevA

Please Note: The bill of materials were taken directly off of the general arrangement drawings which are located in the back of the O&M manual.



PARTS LIST

SERPENTIX JOB NUMBER: P2-22-1258

SERPENTIX JOB NAME: Atlanta (East Area), GA

<u>MATERIAL:</u>	<u>ITEM NO.</u>	<u>QTY.</u>	<u>SPARE PARTS DESCRIPTION</u>	<u>PART NO.</u>
Nylon	S1	5	Intermediate Attachment	H-0104-0010-A RevH
Urethane Injected	S2	10	Guide Block—Grey / Blue (Wide)	PW-0104-0007-A RevD
	S2			
	S3			
	S4			
	S5			
	S6			
	S7			
	S8			
	S9			
	S10			
	S11			
MPR	S12	5	26" Wide Belt Pan	H-0101-0122-D
304SS Hdwr.	S13	20	5/16" - 18NC x 1 1/4" Lg. Hx. Hd. Bolt	
304SS Hdwr.	S14	10	5/16" - 18NC x 1 1/2" Lg. Hx. Hd. Bolt	
304SS Hdwr.	S15	30	5/16" - 18NC Hx. Nut—ESNA	
304SS Hdwr.	S16	50	5/16" Rectangular Washer x 1 3/4" Lg.	H-0101-0156-A RevA
Neoprene	S17	2	26" Scraper Blade x 1/4" Thick	PW-0137-0095-A

Please Note: The bill of materials were taken directly off of the general arrangement drawings which are located in the back of the O&M manual.

BALDOR • RELIANCE

**Integral Horsepower
AC Induction Motors
ODP, WPI, WPII Enclosure
TEFC Enclosure
Explosion Proof**

Installation & Operating Manual

Table of Contents

Section 1	
General Information	1-1
Overview	1-1
Limited Warranty	1-1
Safety Notice	1-2
Receiving	1-4
Storage	1-4
Unpacking	1-4
Handling	1-4
Section 2	
Installation & Operation	2-1
Overview	2-1
Location	2-1
Mounting	2-1
Alignment	2-1
Doweling & Bolting	2-2
Power Connection	2-2
Conduit Box	2-2
AC Power	2-2
First Time Start Up	2-4
Coupled Start Up	2-4
Jogging and Repeated Starts	2-4
Section 3	
Maintenance & Troubleshooting	3-1
General Inspection	3-1
Lubrication & Bearings	3-1
Type of Grease	3-1
Relubrication Intervals	3-1
Relubrication Procedure	3-3
Accessories	3-4
Troubleshooting Chart	3-5

Section 1

General Information

Overview This manual contains general procedures that apply to Baldor Motor products. Be sure to read and understand the Safety Notice statements in this manual. For your protection, do not install, operate or attempt to perform maintenance procedures until you understand the Warning and Caution statements. A Warning statement indicates a possible unsafe condition that can cause harm to personnel. A Caution statement indicates a condition that can cause damage to equipment.

Important: **This instruction manual is not intended to include a comprehensive listing of all details for all procedures required for installation, operation and maintenance. This manual describes general guidelines that apply to most of the motor products shipped by Baldor. If you have a question about a procedure or are uncertain about any detail, Do Not Proceed. Please contact your Baldor distributor for more information or clarification.**

Before you install, operate or perform maintenance, become familiar with the following:

- NEMA Publication MG-2, Safety Standard for Construction and guide for Selection, Installation and Use of Electric Motors and Generators.
- The National Electrical Code
- Local codes and Practices

Limited Warranty

1. Most Baldor products are warranted for 18 months from the date of shipment to Baldor's customer from Baldor's district warehouse or, if applicable, from Baldor's factory. Baldor Standard-E® standard efficient motors are warranted for 24 months. Standard-E is limited to three phase, general purpose, 1-200 HP ratings that fall under the Energy Policy Act (EPA). Baldor Super-E® premium efficient motors are warranted for 36 months. Baldor IEEEE841 motors are warranted for 60 months. All warranty claims must be submitted to a Baldor Service Center prior to the expiration of the warranty period.
2. Baldor will, at its option repair or replace a motor which fails due to defects in material or workmanship during the warranty period if:
 - a. the purchaser presents the defective motor at or ships it prepaid to, the Baldor plant in Fort Smith, Arkansas or one of the Baldor Authorized Service Centers and
 - b. the purchaser gives written notification concerning the motor and the claimed defect including the date purchased, the task performed by the Baldor motor and the problem encountered.
3. Baldor will not pay the cost of removal of any electric motor from any equipment, the cost of delivery to Fort Smith, Arkansas or a Baldor Authorized Service Center, or the cost of any incidental or consequential damages resulting from the claimed defects. (Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you.) Any implied warranty given by laws shall be limited to the duration of the warranty period hereunder. (Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.)
4. Baldor Authorized Service Centers, when convinced to their satisfaction that a Baldor motor developed defects in material or workmanship within the warranty period, are authorized to proceed with the required repairs to fulfill Baldor's warranty when the cost of such repairs to be paid by Baldor does not exceed Baldor's warranty repair allowance. Baldor will not pay overtime premium repair charges without prior written authorization.
5. The cost of warranty repairs made by centers other than Baldor Authorized Service Centers **WILL NOT** be paid unless first authorized in writing by Baldor.
6. Claims by a purchaser that a motor is defective even when a failure results within one hour after being placed into service are not always justified. Therefore, Baldor Authorized Service Centers must determine from the condition of the motor as delivered to the center whether or not the motor is defective. If in the opinion of a Baldor Authorized Service Center, a motor did not fail as a result of defects in material or workmanship, the center is to proceed with repairs only if the purchaser agrees to pay for such repairs. If the decision is in dispute, the purchaser should still pay for the repairs and submit the paid invoice and the Authorized Service Center's signed service report to Baldor for further consideration.
7. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Safety Notice:

This equipment contains high voltage! Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt installation, operation and maintenance of electrical equipment.

Be sure that you are completely familiar with NEMA publication MG-2, safety standards for construction and guide for selection, installation and use of electric motors and generators, the National Electrical Code and local codes and practices. Unsafe installation or use can cause conditions that lead to serious or fatal injury. Only qualified personnel should attempt the installation, operation and maintenance of this equipment.

- WARNING:** Do not touch electrical connections before you first ensure that power has been disconnected. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the installation, operation and maintenance of this equipment.
- WARNING:** Be sure the system is properly grounded before applying power. Do not apply AC power before you ensure that all grounding instructions have been followed. Electrical shock can cause serious or fatal injury. National Electrical Code and Local codes must be carefully followed.
- WARNING:** Avoid extended exposure to machinery with high noise levels. Be sure to wear ear protective devices to reduce harmful effects to your hearing.
- WARNING:** This equipment may be connected to other machinery that has rotating parts or parts that are driven by this equipment. Improper use can cause serious or fatal injury. Only qualified personnel should attempt to install operate or maintain this equipment.
- WARNING:** Do not by-pass or disable protective devices or safety guards. Safety features are designed to prevent damage to personnel or equipment. These devices can only provide protection if they remain operative.
- WARNING:** Avoid the use of automatic reset devices if the automatic restarting of equipment can be hazardous to personnel or equipment.
- WARNING:** Be sure the load is properly coupled to the motor shaft before applying power. The shaft key must be fully captive by the load device. Improper coupling can cause harm to personnel or equipment if the load decouples from the shaft during operation.
- WARNING:** Use proper care and procedures that are safe during handling, lifting, installing, operating and maintaining operations. Improper methods may cause muscle strain or other harm.
- WARNING:** Before performing any motor maintenance procedure, be sure that the equipment connected to the motor shaft cannot cause shaft rotation. If the load can cause shaft rotation, disconnect the load from the motor shaft before maintenance is performed. Unexpected mechanical rotation of the motor parts can cause injury or motor damage.
- WARNING:** Disconnect all electrical power from the motor windings and accessory devices before disassembly of the motor. Electrical shock can cause serious or fatal injury.
- WARNING:** Do not use non UL/CSA listed explosion proof motors in the presence of flammable or combustible vapors or dust. These motors are not designed for atmospheric conditions that require explosion proof operation.

Safety Notice Continued

WARNING: Motors that are to be used in flammable and/or explosive atmospheres must display the UL label on the nameplate along with CSA listed logo.

Specific service conditions for these motors are defined in NFPA 70 (NEC) Article 500.

WARNING: UL Listed motors must only be serviced by UL Approved Authorized Baldor Service Centers if these motors are to be returned to a hazardous and/or explosive atmosphere.

Caution: To prevent premature equipment failure or damage, only qualified maintenance personnel should perform maintenance.

Caution: Do not over-lubricate motor as this may cause premature bearing failure.

Caution: Do not lift the motor and its driven load by the motor lifting hardware. The motor lifting hardware is adequate for lifting only the motor. Disconnect the load from the motor shaft before moving the motor.

Caution: If eye bolts are used for lifting a motor, be sure they are securely tightened. The lifting direction should not exceed a 20° angle from the shank of the eye bolt or lifting lug. Excessive lifting angles can cause damage.

Caution: To prevent equipment damage, be sure that the electrical service is not capable of delivering more than the maximum motor rated amps listed on the rating plate.

Caution: If a HI POT test (High Potential Insulation test) must be performed, follow the precautions and procedure in NEMA MG1 and MG2 standards to avoid equipment damage.

If you have any questions or are uncertain about any statement or procedure, or if you require additional information please contact your Baldor distributor or an Authorized Baldor Service Center.

Receiving

Each Baldor Electric Motor is thoroughly tested at the factory and carefully packaged for shipment. When you receive your motor, there are several things you should do immediately.

1. Observe the condition of the shipping container and report any damage immediately to the commercial carrier that delivered your motor.
2. Verify that the part number of the motor you received is the same as the part number listed on your purchase order.

Storage

If the motor is not put into service immediately, the motor must be stored in a clean, dry and warm location. Several precautionary steps must be performed to avoid motor damage during storage.

1. Use a "Megger" periodically to ensure that the integrity of the winding insulation has been maintained. Record the Megger readings. Immediately investigate any significant drop in insulation resistance.
2. Do not lubricate bearings during storage. Motor bearings are packed with grease at the factory. Excessive grease can damage insulation quality.
3. Rotate motor shaft at least 10 turns every two months during storage (more frequently if possible). This will prevent bearing damage due to storage.
4. If the storage location is damp or humid, the motor windings must be protected from moisture. This can be done by applying power to the motors' space heater (if available) while the motor is in storage.

Unpacking

Each Baldor motor is packaged for ease of handling and to prevent entry of contaminants.

1. To avoid condensation inside the motor, do not unpack until the motor has reached room temperature. (Room temperature is the temperature of the room in which it will be installed). The packing provides insulation from temperature changes during transportation.
2. When the motor has reached room temperature, remove all protective wrapping material from the motor.

Handling

The motor should be lifted using the lifting lugs or eye bolts provided.

1. Use the lugs or eye bolts provided to lift the motor. Never attempt to lift the motor and additional equipment connected to the motor by this method. The lugs or eye bolts provided are designed to lift only the motor. Never lift the motor by the motor shaft or the hood of a WP11 motor.
2. When lifting a WP11 (Weather Proof Type 2) motor, do not lift the motor by inserting lifting lugs into holes on top of the cooling hood. These lugs are to be used for hood removal only. A spreader bar should be used to lift the motor by the cast lifting lugs located on the motor frame.
3. If the motor must be mounted to a plate with the driven equipment such as pump, compressor etc., it may not be possible to lift the motor alone. For this case, the assembly should be lifted by a sling around the mounting base. The entire assembly can be lifted as an assembly for installation. Do not lift using the motor lugs or eye bolts provided.

If the load is unbalanced (as with couplings or additional attachments) additional slings or other means must be used to prevent tipping. In any event, the load must be secure before lifting.

Section 2 Installation & Operation

Overview

Installation should conform to the National Electrical Code as well as local codes and practices. When other devices are coupled to the motor shaft, be sure to install protective devices to prevent future accidents. Some protective devices include, coupling, belt guard, chain guard, shaft covers etc. These protect against accidental contact with moving parts. Machinery that is accessible to personnel should provide further protection in the form of guard rails, screening, warning signs etc.

Location

It is important that motors be installed in locations that are compatible with motor enclosure and ambient conditions. Improper selection of the motor enclosure and ambient conditions can lead to reduced operating life of the motor.

Proper ventilation for the motor must be provided. Obstructed airflow can lead to reduction of motor life.

1. **Open Drip-Proof/WPI** motors are intended for use indoors where atmosphere is relatively clean, dry, well ventilated and non-corrosive.
2. **Totally Enclosed and WPII** motors may be installed where dirt, moisture or dust are present and in outdoor locations.

Severe Duty, IEEE 841 and Washdown Duty enclosed motors are designed for installations with high corrosion or excessive moisture conditions. These motors should not be placed into an environment where there is the presence of flammable or combustible vapors, dust or any combustible material, unless specifically designed for this type of service.

Mounting

The motor must be securely installed to a rigid foundation or mounting surface to minimize vibration and maintain alignment between the motor and shaft load. Failure to provide a proper mounting surface may cause vibration, misalignment and bearing damage.

Foundation caps and sole plates are designed to act as spacers for the equipment they support. If these devices are used, be sure that they are evenly supported by the foundation or mounting surface.

After installation is complete and accurate alignment of the motor and load is accomplished, the base should be grouted to the foundation to maintain this alignment.

The standard motor base is designed for horizontal or vertical mounting. Adjustable or sliding rails are designed for horizontal mounting only. Consult your Baldor distributor or authorized Baldor Service Center for further information.

Alignment

Accurate alignment of the motor with the driven equipment is extremely important.

1. **Direct Coupling**

For direct drive, use flexible couplings if possible. Consult the drive or equipment manufacturer for more information. Mechanical vibration and roughness during operation may indicate poor alignment. Use dial indicators to check alignment. The space between coupling hubs should be maintained as recommended by the coupling manufacturer.

2. **End-Play Adjustment**

The axial position of the motor frame with respect to its load is also extremely important. The motor bearings are not designed for excessive external axial thrust loads. Improper adjustment will cause failure.

3. **Pulley Ratio**

The pulley ratio should not exceed 8:1.

4. **Belt Drive**

Align sheaves carefully to minimize belt wear and axial bearing loads (see End-Play Adjustment). Belt tension should be sufficient to prevent belt slippage at rated speed and load. However, belt slippage may occur during starting.

Caution: Do not over tension belts.

5. Sleeve bearing motors are only suitable for coupled loads.

Doweling & Bolting

After proper alignment is verified, dowel pins should be inserted through the motor feet into the foundation. This will maintain the correct motor position should motor removal be required. (Baldor motors are designed for doweling.)

1. Drill dowel holes in diagonally opposite motor feet in the locations provided.
2. Drill corresponding holes in the foundation.
3. Ream all holes.
4. Install proper fitting dowels.
5. Mounting bolts must be carefully tightened to prevent changes in alignment. Use a flat washer and lock washer under each nut or bolt head to hold the motor feet secure. Flanged nuts or bolts may be used as an alternative to washers.

Power Connection

Conduit Box

Motor and control wiring, overload protection, disconnects, accessories and grounding should conform to the National Electrical Code and local codes and practices.

For ease of making connections, an oversize conduit box is provided. The box can be rotated 360° in 90° increments. Auxiliary conduit boxes are provided on some motors for accessories such as space heaters, RTD's etc.

AC Power

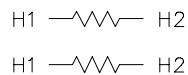
Connect the motor leads as shown on the connection diagram located on the name plate or inside the cover on the conduit box. Be sure the following guidelines are met:

1. AC power is within $\pm 10\%$ of rated voltage with rated frequency. (See motor name plate for ratings).
OR
2. AC power is within $\pm 5\%$ of rated frequency with rated voltage.
OR
3. A combined variation in voltage and frequency of $\pm 10\%$ (sum of absolute values) of rated values, provided the frequency variation does not exceed $\pm 5\%$ of rated frequency.

Performance within these voltage and frequency variations are shown in Figure 2-2.

Figure 2-1 Accessory Connections

HEATERS



One heater is installed in each end of motor.
Leads for each heater are labeled H1 & H2.
(Like numbers should be tied together).

THERMISTERS



Three thermistors are installed in windings and tied in series.
Leads are labeled T1 & T2.

WINDING RTDS



Winding RTDs are installed in windings (2) per phase.
Each set of leads is labeled W1, W2, W3, W4, W5, & W6.

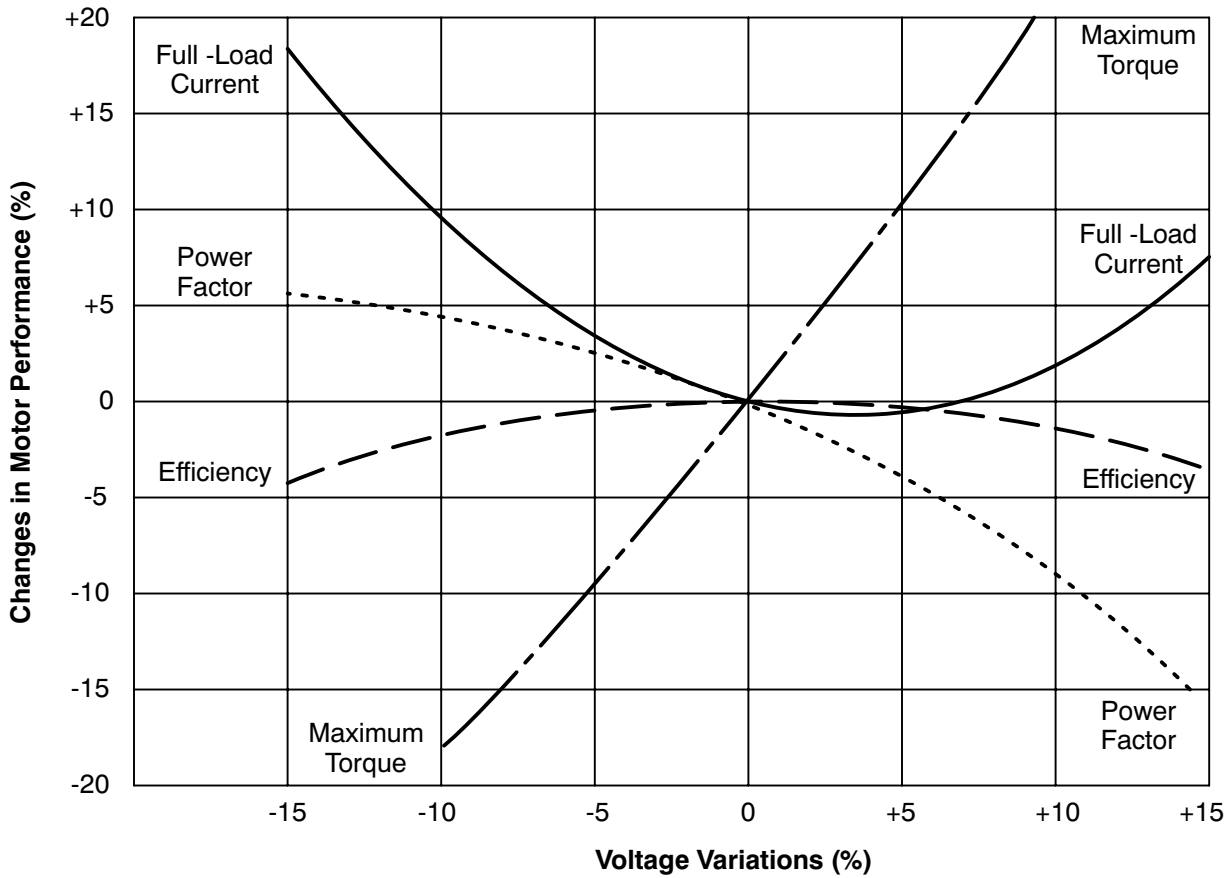
BEARING RTD



- * One bearing RTD is installed in Drive endplate (PUEP), leads are labeled RTDDE.
- * One bearing RTD is installed in Opposite Drive endplate (FREP), leads are labeled RTDODE.

* Note RTD may have 2-Red/1-White leads; or 2-White/1-Red Lead.

Figure 2-2 Typical Motor Performance VS Voltage Variations



First Time Start Up

Be sure that all power to motor and accessories is off. Be sure the motor shaft is disconnected from the load and will not cause mechanical rotation of the motor shaft.

1. Make sure that the mechanical installation is secure. All bolts and nuts are tightened etc.
2. If motor has been in storage or idle for some time, check winding insulation integrity with a Megger.
3. Inspect all electrical connections for proper termination, clearance, mechanical strength and electrical continuity.
4. Be sure all shipping materials and braces (if used) are removed from motor shaft.
5. Manually rotate the motor shaft to ensure that it rotates freely.
6. Replace all panels and covers that were removed during installation.
7. Momentarily apply power and check the direction of rotation of the motor shaft.
8. If motor rotation is wrong, be sure power is off and change the motor lead connections. Verify rotation direction before you continue.
9. Start the motor and ensure operation is smooth without excessive vibration or noise. If so, run the motor for 1 hour with no load connected.
10. After 1 hour of operation, disconnect power and connect the load to the motor shaft. Verify all coupling guards and protective devices are installed. Ensure motor is properly ventilated.

Coupled Start Up

This procedure assumes a coupled start up. Also, that the first time start up procedure was successful.

1. Check the coupling and ensure that all guards and protective devices are installed.
2. Check that the coupling is properly aligned and not binding.
3. The first coupled start up should be with no load. Apply power and verify that the load is not transmitting excessive vibration back to the motor through the coupling or the foundation. Vibration should be at an acceptable level.
4. Run for approximately 1 hour with the driven equipment in an unloaded condition.

The equipment can now be loaded and operated within specified limits. Do not exceed the name plate ratings for amperes for steady continuous loads.

Jogging and Repeated Starts Repeated starts and/or jogs of induction motors generally reduce the life of the motor winding insulation. A much greater amount of heat is produced by each acceleration or jog than by the same motor under full load. If it is necessary to repeatedly start or jog the motor, it is advisable to check the application with your local Baldor distributor or Baldor Service Center.

Heating - Duty rating and maximum ambient temperature are stated on the motor name plate. Do not exceed these values. If there is any question regarding safe operation, contact your local Baldor distributor or Baldor Service Center.

Section 3 Maintenance & Troubleshooting

WARNING: UL Listed motors must only be serviced by UL Approved Authorized Baldor Service Centers if these motors are to be returned to a hazardous and/or explosive atmosphere.

General Inspection

Inspect the motor at regular intervals, approximately every 500 hours of operation or every 3 months, whichever occurs first. Keep the motor clean and the ventilation openings clear. The following steps should be performed at each inspection:

WARNING: Do not touch electrical connections before you first ensure that power has been disconnected. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the installation, operation and maintenance of this equipment.

1. Check that the motor is clean. Check that the interior and exterior of the motor is free of dirt, oil, grease, water, etc. Oily vapor, paper pulp, textile lint, etc. can accumulate and block motor ventilation. If the motor is not properly ventilated, overheating can occur and cause early motor failure.
2. Use a "Megger" periodically to ensure that the integrity of the winding insulation has been maintained. Record the Megger readings. Immediately investigate any significant drop in insulation resistance.
3. Check all electrical connectors to be sure that they are tight.

Relubrication & Bearings

Bearing grease will lose its lubricating ability over time, not suddenly. The lubricating ability of a grease (over time) depends primarily on the type of grease, the size of the bearing, the speed at which the bearing operates and the severity of the operating conditions. Good results can be obtained if the following recommendations are used in your maintenance program.

Type of Grease

A high grade ball or roller bearing grease should be used. Recommended grease for standard service conditions is Polyrex EM (Exxon Mobil).

Equivalent and compatible greases include:

Texaco Polystar, Rykon Premium #2, Pennzoil Pen 2 Lube and Chevron SRI.

Relubrication Intervals

Recommended relubrication intervals are shown in Table 3-1. It is important to realize that the recommended intervals of Table 3-1 are based on average use.

Refer to additional information contained in Tables 3-2, 3-3 and 3-4.

Table 3-1 Relubrication Intervals *

NEMA / (IEC) Frame Size	Rated Speed - RPM					
	10000	6000	3600	1800	1200	900
Up to 210 incl. (132)	**	2700 Hrs.	5500 Hrs.	12000 Hrs.	18000 Hrs.	22000 Hrs.
Over 210 to 280 incl. (180)		**	3600 Hrs.	9500 Hrs.	15000 Hrs.	18000 Hrs.
Over 280 to 360 incl. (225)		**	* 2200 Hrs.	7400 Hrs.	12000 Hrs.	15000 Hrs.
Over 360 to 5800 incl. (300)		**	*2200 Hrs.	3500 Hrs.	7400 Hrs.	10500 Hrs.

* Relubrication intervals are for ball bearings.

For vertically mounted motors and roller bearings, divide the relubrication interval by 2.

** For motors operating at speeds greater than 3600 RPM, contact Baldor for relubrication recommendations.

Table 3-2 Service Conditions

Severity of Service	Hours per day of Operation	Ambient Temperature Maximum	Atmospheric Contamination
Standard	8	40° C	Clean, Little Corrosion
Severe	16 Plus	50° C	Moderate dirt, Corrosion
Extreme	16 Plus	>50° C* or Class H Insulation	Severe dirt, Abrasive dust, Corrosion, Heavy Shock or Vibration
Low Temperature		<-29° C **	

* Special high temperature grease is recommended (Dow Corning DC44). Note that Dow Corning DC44 grease does not mix with other grease types. Thoroughly clean bearing & cavity before adding grease.

** Special low temperature grease is recommended (Aeroshell 7).

Table 3-3 Relubrication Interval Multiplier

Severity of Service	Multiplier
Standard	1.0
Severe	0.5
Extreme	0.1
Low Temperature	1.0

Some motor designs use different bearings on each motor end. This is normally indicated on the motor nameplate. In this case, the larger bearing is installed on the motor Drive endplate. For best relubrication results, only use the appropriate amount of grease for each bearing size (not the same for both).

Table 3-4 Bearings Sizes and Types

Frame Size NEMA (IEC)	Bearing Description (These are the "Large" bearings (Shaft End) in each frame size)			
	Bearing	Weight of Grease to add * oz (Grams)	Volume of grease to be added	
			in ³	teaspoon
56 to 140 (90)	6203	0.08 (2.4)	0.15	0.5
140 (90)	6205	0.15 (3.9)	0.2	0.8
180 (100-112)	6206	0.19 (5.0)	0.3	1.0
210 (132)	6307	0.30 (8.4)	0.6	2.0
250 (160)	6309	0.47 (12.5)	0.7	2.5
280 (180)	6311	0.61 (17)	1.2	3.9
320 (200)	6312	0.76 (20.1)	1.2	4.0
360 (225)	6313	0.81 (23)	1.5	5.2
400 (250)	6316	1.25 (33)	2.0	6.6
440 (280)	6319	2.12 (60)	4.1	13.4
5000 to 5800 (315-450)	6328	4.70 (130)	9.2	30.0
5000 to 5800 (315-450)	NU328	4.70 (130)	9.2	30.0
360 to 449 (225-280)	NU319	2.12 (60)	4.1	13.4
AC Induction Servo				
76 Frame 180 (112)	6207	0.22 (6.1)	0.44	1.4
77 Frame 210 (132)	6210	0.32 (9.0)	0.64	2.1
80 Frame 250(160)	6213	0.49 (14.0)	0.99	3.3

* Weight in grams = .005 DB of grease to be added

Note: Not all bearing sizes are listed. For intermediate bearing sizes, use the grease volume for the next larger size bearing.

Caution: To avoid damage to motor bearings, grease must be kept free of dirt. For an extremely dirty environment, contact your Baldor distributor or an authorized Baldor Service Center for additional information.

Relubrication Procedure Be sure that the grease you are adding to the motor is compatible with the grease already in the motor. Consult your Baldor distributor or an authorized service center if a grease other than the recommended type is to be used.

Caution: Do not over-lubricate motor as this may cause premature bearing failure.

With Grease Outlet Plug

1. With the motor stopped, clean all grease fittings with a clean cloth.
2. Remove grease outlet plug.

Caution: Over-lubricating can cause excessive bearing temperatures, premature lubrication breakdown and bearing failure.

3. Add the recommended amount of grease.
4. Operate the motor for 15 minutes with grease plug removed. This allows excess grease to purge.
5. Re-install grease outlet plug.

Without Grease Provisions

Note: Only a Baldor authorized and UL or CSA certified service center can disassemble a UL/CSA listed explosion proof motor to maintain it's UL/CSA listing.

1. Disassemble the motor.
2. Add recommended amount of grease to bearing and bearing cavity. (Bearing should be about 1/3 full of grease and outboard bearing cavity should be about 1/2 full of grease.)
3. Assemble the motor.

Sample Relubrication Determination

Assume - NEMA 286T (IEC 180), 1750 RPM motor driving an exhaust fan in an ambient temperature of 43° C and the atmosphere is moderately corrosive.

1. Table 3-1 list 9500 hours for standard conditions.
2. Table 3-2 classifies severity of service as "Severe".
3. Table 3-4 shows that 1.2 in³ or 3.9 teaspoon of grease is to be added.

Note: Smaller bearings in size category may require reduced amounts of grease.

Table 3-5 Troubleshooting Chart

Symptom	Possible Causes	Possible Solutions
Motor will not start	Usually caused by line trouble, such as, single phasing at the starter.	Check source of power. Check overloads, fuses, controls, etc.
Excessive humming	High Voltage.	Check input line connections.
	Eccentric air gap.	Have motor serviced at local Baldor service center.
Motor Over Heating	Overload. Compare actual amps (measured) with nameplate rating.	Locate and remove source of excessive friction in motor or load. Reduce load or replace with motor of greater capacity.
	Single Phasing.	Check current at all phases (should be approximately equal) to isolate and correct the problem.
	Improper ventilation.	Check external cooling fan to be sure air is moving properly across cooling fins. Excessive dirt build-up on motor. Clean motor.
	Unbalanced voltage.	Check voltage at all phases (should be approximately equal) to isolate and correct the problem.
	Rotor rubbing on stator.	Check air gap clearance and bearings.
		Tighten "Thru Bolts".
	Over voltage or under voltage.	Check input voltage at each phase to motor.
	Open stator winding.	Check stator resistance at all three phases for balance.
	Grounded winding.	Perform dielectric test and repair as required.
	Improper connections.	Inspect all electrical connections for proper termination, clearance, mechanical strength and electrical continuity. Refer to motor lead connection diagram.
Bearing Over Heating	Misalignment.	Check and align motor and driven equipment.
	Excessive belt tension.	Reduce belt tension to proper point for load.
	Excessive end thrust.	Reduce the end thrust from driven machine.
	Excessive grease in bearing.	Remove grease until cavity is approximately $\frac{3}{4}$ filled.
	Insufficient grease in bearing.	Add grease until cavity is approximately $\frac{3}{4}$ filled.
	Dirt in bearing.	Clean bearing cavity and bearing. Repack with correct grease until cavity is approximately $\frac{3}{4}$ filled.
Vibration	Misalignment.	Check and align motor and driven equipment.
	Rubbing between rotating parts and stationary parts.	Isolate and eliminate cause of rubbing.
	Rotor out of balance.	Have rotor balance checked and repaired at your Baldor Service Center.
	Resonance.	Tune system or contact your Baldor Service Center for assistance.
Noise	Foreign material in air gap or ventilation openings.	Remove rotor and foreign material. Reinstall rotor. Check insulation integrity. Clean ventilation openings.
Growling or whining	Bad bearing.	Replace bearing. Clean all grease from cavity and new bearing. Repack with correct grease until cavity is approximately $\frac{3}{4}$ filled.

Suggested bearing and winding RTD setting guidelines

Most large frame AC Baldor motors with a 1.15 service factor are designed to operate below a Class B (80°C) temperature rise at rated load and are built with a Class H winding insulation system. Based on this low temperature rise, RTD (Resistance Temperature Detectors) settings for Class B rise should be used as a starting point. Some motors with 1.0 service factor have Class F temperature rise.

The following tables show the suggested alarm and trip settings for RTDs. Proper bearing and winding RTD alarm and trip settings should be selected based on these tables unless otherwise specified for specific applications.

If the driven load is found to operate well below the initial temperature settings under normal conditions, the alarm and trip settings may be reduced so that an abnormal machine load will be identified.

The temperature limits are based on the installation of the winding RTDs imbedded in the winding as specified by NEMA. Bearing RTDs should be installed so they are in contact with the outer race on ball or roller bearings or in direct contact with the sleeve bearing shell.

Winding RTDs - Temperature Limit In °C (40°C Maximum Ambient)

Motor Load	Class B Temp Rise ≤ 80°C (Typical Design)		Class F Temp Rise ≤ 105°C		Class H Temp Rise ≤ 125°C	
	Alarm	Trip	Alarm	Trip	Alarm	Trip
≤ Rated Load	130	140	155	165	175	185
Rated Load to 1.15 S.F.	140	150	160	165	180	185

- Note:
- Winding RTDs are factory production installed, not from Mod-Express.
 - When Class H temperatures are used, consider bearing temperatures and relubrication requirements.

Bearing RTDs - Temperature Limit In °C (40°C Maximum Ambient)

Bearing Type Oil or Grease	Anti-Friction		Sleeve	
	Alarm	Trip	Alarm	Trip
Standard*	95	100	85	95
High Temperature**	110	115	105	110

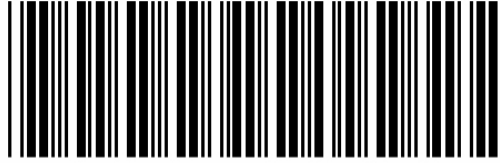
- Note:
- * Bearing temperature limits are for standard design motors operating at Class B temperature rise.
 - ** High temperature lubricants include some special synthetic oils and greases.

Greases that may be substituted that are compatible with Polyrex EM (but considered as "standard" lubricants) include the following:

- Texaco Polystar
- Mobilith SHC-100
- Darmex 707
- Rykon Premium #2
- Pennzoil Pennzlube EM-2
- Darmex 711
- Chevron SRI #2
- Chevron Black Pearl
- Petro-Canada Peerless LLG

See the motor nameplate for replacement grease or oil recommendation.

Contact Baldor application engineering for special lubricants or further clarifications.



* 4 0 0 - 0 2 0 7 *



BALDOR ELECTRIC COMPANY
World Headquarters
P.O. Box 2400 Fort Smith, AR 72901-2400
(479) 646-4711 Fax (479) 648-5792
www.baldor.com

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Product Information Packet

ECP3587T

2HP,1755RPM,3PH,60HZ,145T,0535M,TEFC,F1

General Information

- Overview
- Specifications
- Performance Data
- Parts List
- Drawings

More Information

- Where To Buy
- Baldor Sales Offices

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[AC Motors](#) | [Severe Duty](#) |

Product Overview: ECP3587T



* Click for Larger Image

Catalog Number: ECP3587T
Description: 2HP,1755RPM,3PH,60HZ,145T,0535M,TEFC,F1
Ship Weight: 64 lbs.
List Price:
Multiplier Symbol: SD

[View Specifications](#) | [View Operation Manual](#)

FEATURES

- 1.15 Service Factor
- Corrosion resistant epoxy finish
- Regreasable ball bearings
- Oversized rotatable cast iron conduit box
- Forsheda® shaft seal
- Moisture resistant copper windings
- Class F insulation
- Stainless steel nameplate and corrosion resistant hardware
- Tropicalized

APPLICATIONS

Typical applications include petro-chemical plants, mines, foundries, pulp and paper plants, waste management facilities, chemical plants, tropical climates and other processing industry applications requiring protection against corrosion caused by severe environmental operating conditions.

* The image shown is representative only. Actual product may differ in appearance from image shown.

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Part Detail							
Revision:	J	Status:	PRD/A	Change #:		Proprietary:	No
Type:	AC	Prod. Type:	0535M	Elec. Spec:	05WGX009	CD Diagram:	
Enclosure:	TEFC	Mfg Plant:		Mech. Spec:	05F008	Layout:	
Frame:	145T	Mounting:	F1	Poles:	04	Created Date:	12-29-2008
Base:	RG	Rotation:	R	Insulation:	F	Eff. Date:	07-24-2013
Leads:	9#18	Literature:		Elec. Diagram:		Replaced By:	

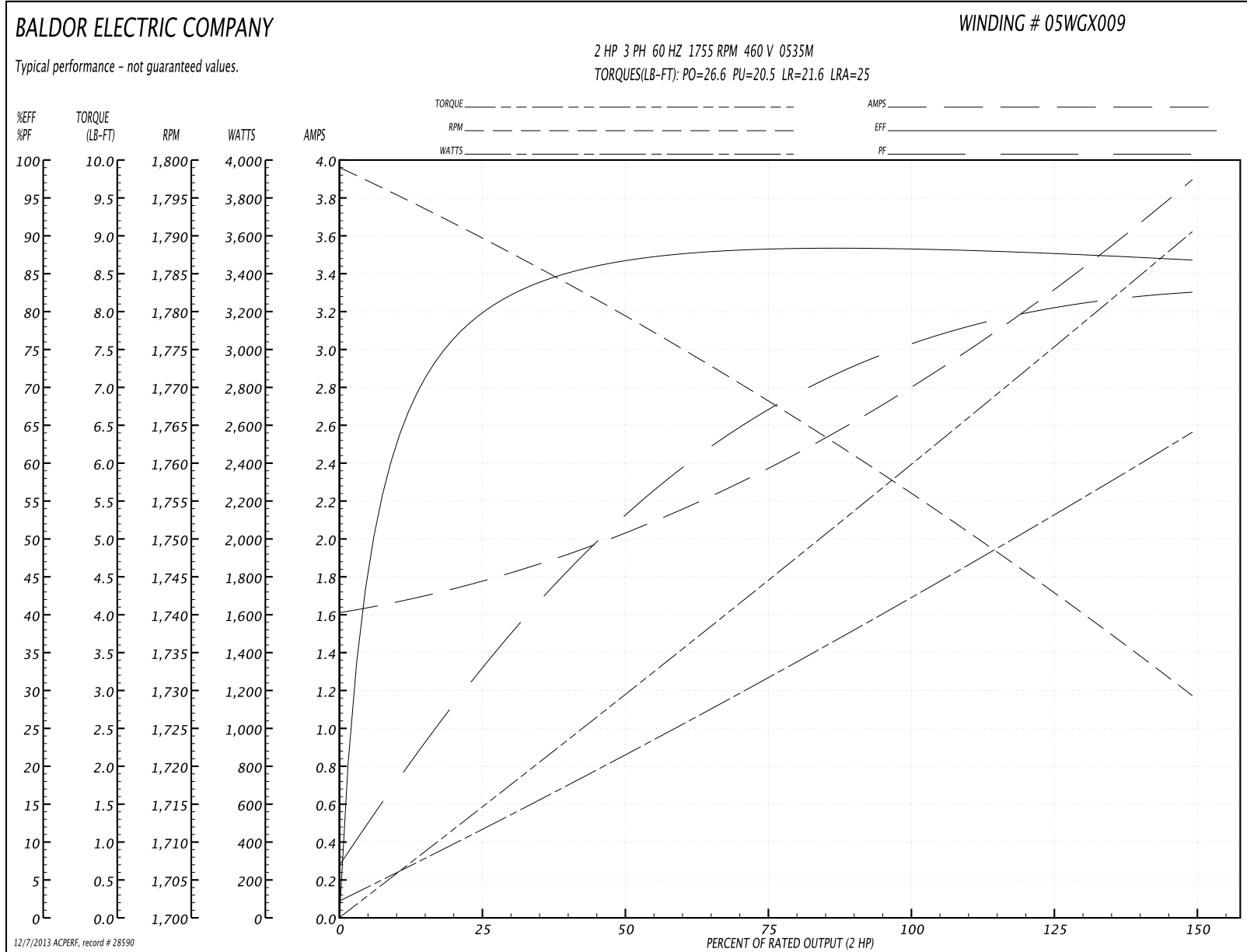
Nameplate NP2069E

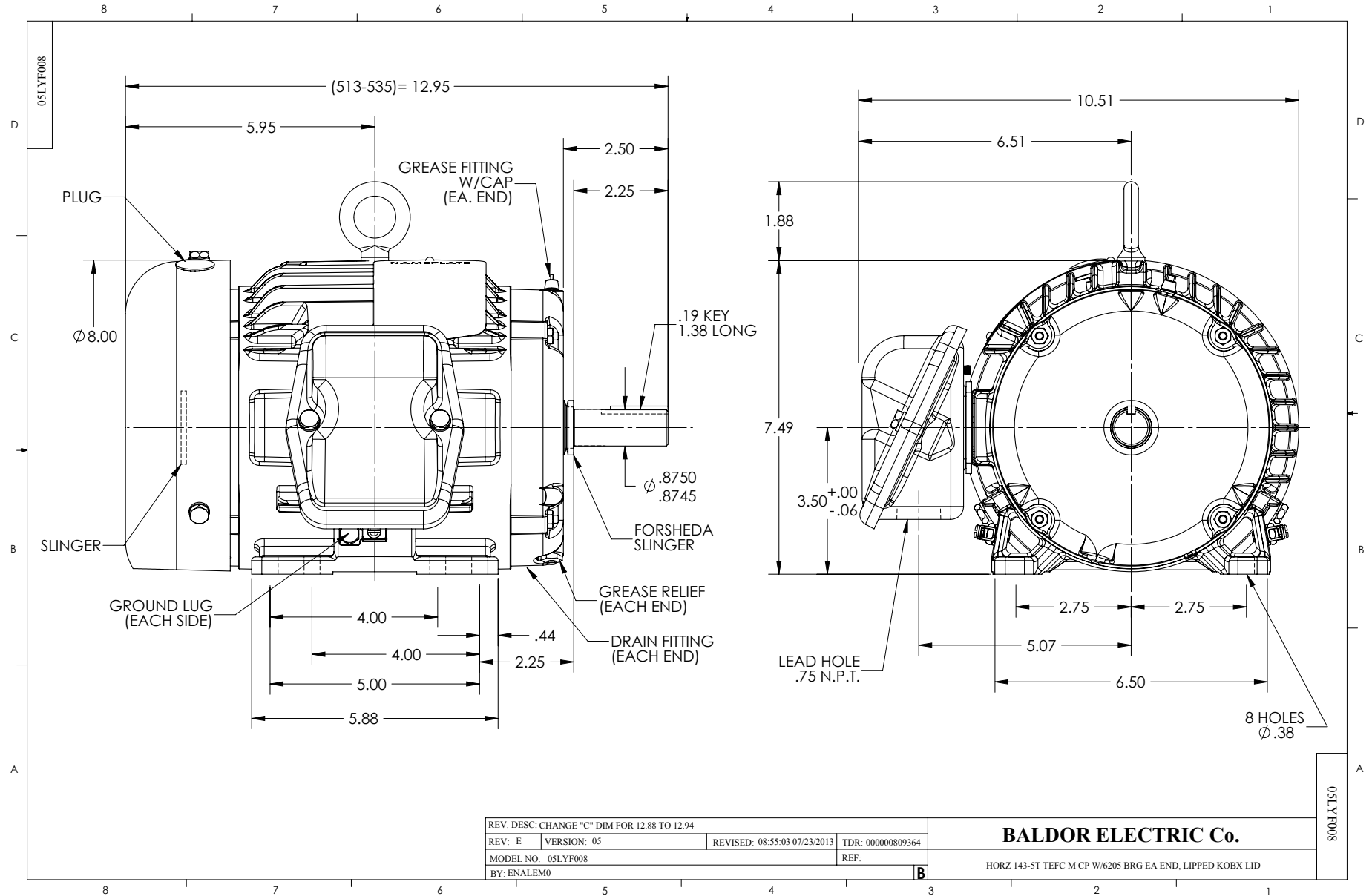
CAT.NO.	ECP3587T						
SPEC.	05F008X009G1						
HP	2						
VOLTS	208-230/460						
AMP	6.1-5.6/2.8						
RPM	1755						
FRAME	145T	HZ	60	PH	3		
SER.F.	1.15	CODE	L	DES	B	CL	F
NEMA-NOM-EFF	88.5	PF	75				
RATING	40C AMB-CONT						
CC	010A	USABLE AT 208V					
DE	6205	ODE	6205				
ENCL	TEFC	SN					

Performance Data at 460V, 60Hz, 2.0HP (Typical performance - Not guaranteed values)

General Characteristics							
Full Load Torque:	6.01 LB-FT			Start Configuration:	DOL		
No-Load Current:	1.64 Amps			Break-Down Torque:	26.6 LB-FT		
Line-line Res. @ 25°C.:	6.46 Ohms A Ph / 0.0 Ohms B Ph			Pull-Up Torque:	20.5 LB-FT		
Temp. Rise @ Rated Load:	38 C			Locked-Rotor Torque:	21.6 LB-FT		
Temp. Rise @ S.F. Load:	47 C			Starting Current:	25.0 Amps		
Load Characteristics							
% of Rated Load	25	50	75	100	125	150	S.F.
Power Factor:	34.0	54.0	67.0	75.0	80.0	83.0	78.0
Efficiency:	80.0	86.9	88.5	88.6	87.9	86.8	88.2
Speed:	1790.0	1779.0	1768.0	1756.0	1743.0	1729.0	1748.0
Line Amperes:	1.74	2.01	2.39	2.83	3.34	3.88	3.14

Performance Graph at 460V, 60Hz, 2.0HP Typical performance - Not guaranteed values





CD0005

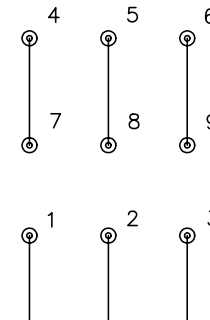


LOW VOLTAGE
(2Y)



LINE

HIGH VOLTAGE
(1Y)



LINE

NOTES:

1. INTERCHANGE ANY TWO LINE LEADS TO REVERSE ROTATION.
2. OPTIONAL THERMOSTATS ARE PROVIDED WHEN SPECIFIED.
3. ACTUAL NUMBER OF INTERNAL PARALLEL CIRCUITS MAY BE A MULTIPLE OF THOSE SHOWN ABOVE.
4. LEAD COLORS ARE OPTIONAL. LEADS MUST ALWAYS BE NUMBERED AS SHOWN.

REV. DESC: REVISE TO SHOW OPTIONAL COLORS			
REV. LTR: E	BY: JLP	REVISED: 01/19/99 10:15	TDR: 0171435
90000		FILE: AAA00005140	MDL: -
		MTL: -	

BALDOR ELECTRIC Co.

3PH, DV, 9 LEADS

CD0005

Modification Number	Motor Mod Express® Description and List Price	Working Days Required
---------------------	--	-----------------------

Space Heaters

M21A **Add Space Heaters to TEFC or Open Motors** TWO DAYS
 Standard space heater voltage is 110VAC. Heaters for 230 or 460 volts are available. Specify circuit voltage.

NEMA Frame	List Price Per Motor
145T and Smaller	319
182 - 215T	402
254 - 365T	598
404 - 449T	680

NOTE: Strip type space heaters are standard. 5000 frame performed at plant of manufacturing. Contact Baldor for time.
Does Not Apply to Explosion-Proof Motors

M21B **Add Conduit Box for Accessory Leads**
 See M4E
Not for explosion proof motors.

Textile Service

M22A **Lint Proof Fan Cover for Textile Applications** TWO DAYS
 Remove standard fan cover and replace with textile fan shroud and cover.

NEMA Frame	List Price Per Motor
48 - 145T	292
182 - 184T	380
213 - 215T	429
254 - 256T	613
284 - 286T	719
324 - 326T	795
364 - 365T	944
404 - 405T	1026
444 - 449T	1108

Motor Accessories

PT Components

Grinders

Baldor Mod Express

ABB Mod Express

ABB ATEX Mod Express

Product Index

**Modification
Number****Motor Mod Express®
Description and List Price****Working Days
Required****Thermal Protectors****M23A****Thermostats****One or More Thermostats Laced to Winding**

For over temperature protection. These are pilot circuit devices only with leads into conduit box tagged "JJ". Specify normally open or closed contacts. All ECP motors require hermetically sealed thermostats to maintain Division 2 marking.

TWO
DAYS

NEMA Frame	Number of Devices	Standard List Price Per Motor	Hermetically Sealed for Division 2
Single Phase	1	185	N/A
Three Phase 42 - 215T	3 (3)	209	304
Three Phase 254 - 449T	3 (3)	557	653
Direct Current 48 - 215T	1	209	N/A

NOTE: (3) In Series with two leads into conduit box. Normally open are in parallel.

Does Not Apply to Explosion-Proof Motors

M23B**Exchange Thermal Overload**

Exchange from manual thermal overload to automatic thermal overload or exchange from automatic thermal overload to manual thermal overload.

TWO
DAYS

NEMA Frame	List Price Per Motor
	M.T.O to A.T.O. OR A.T.O. to M.T.O.
48 and 56	230
143 and 145T	235
182 - 184T	270
213 - 215T	372

Does Not Apply to Explosion-Proof Motors

M23C**Install Resistance Temperature Detectors**

Install on low voltage winding endturns (Six 100 OHM RTD's).

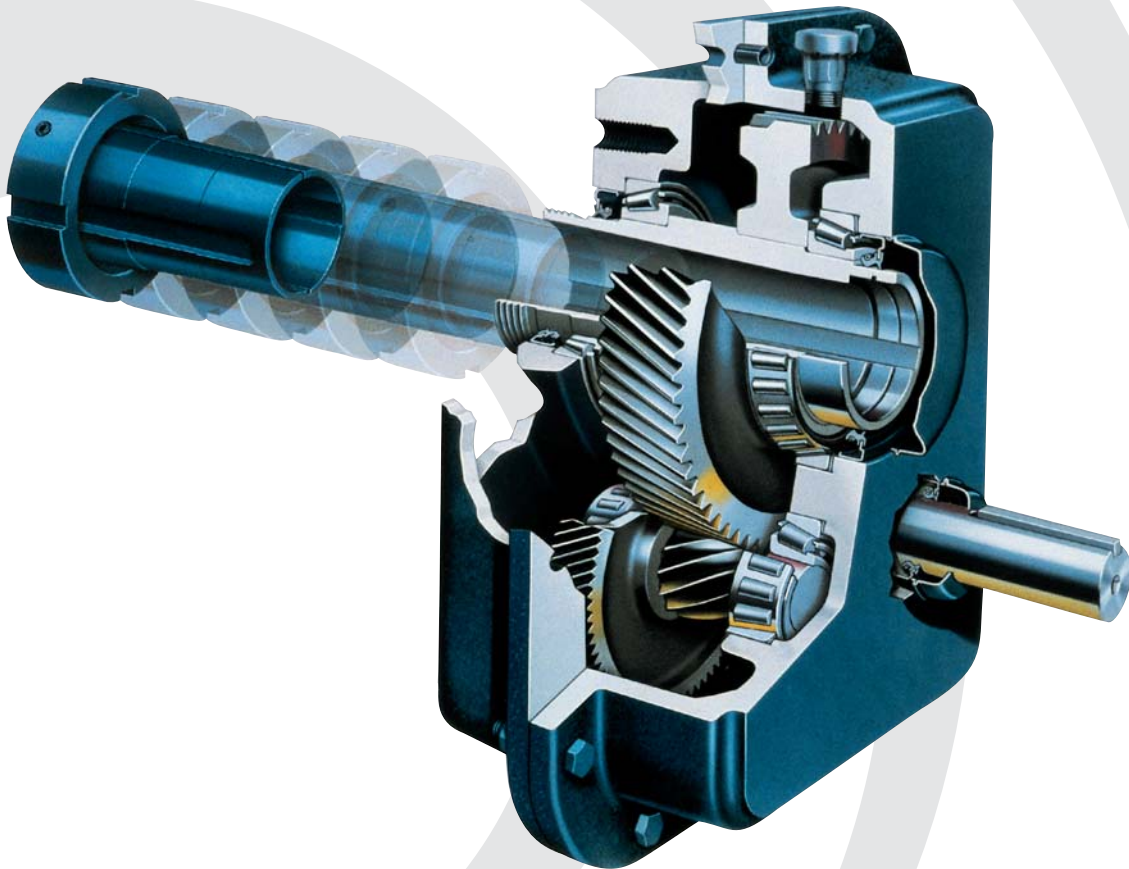
CONTACT
YOUR
BALDOR
DISTRICT
OFFICE

NEMA Frame	List Price Per Motor
449T	4096

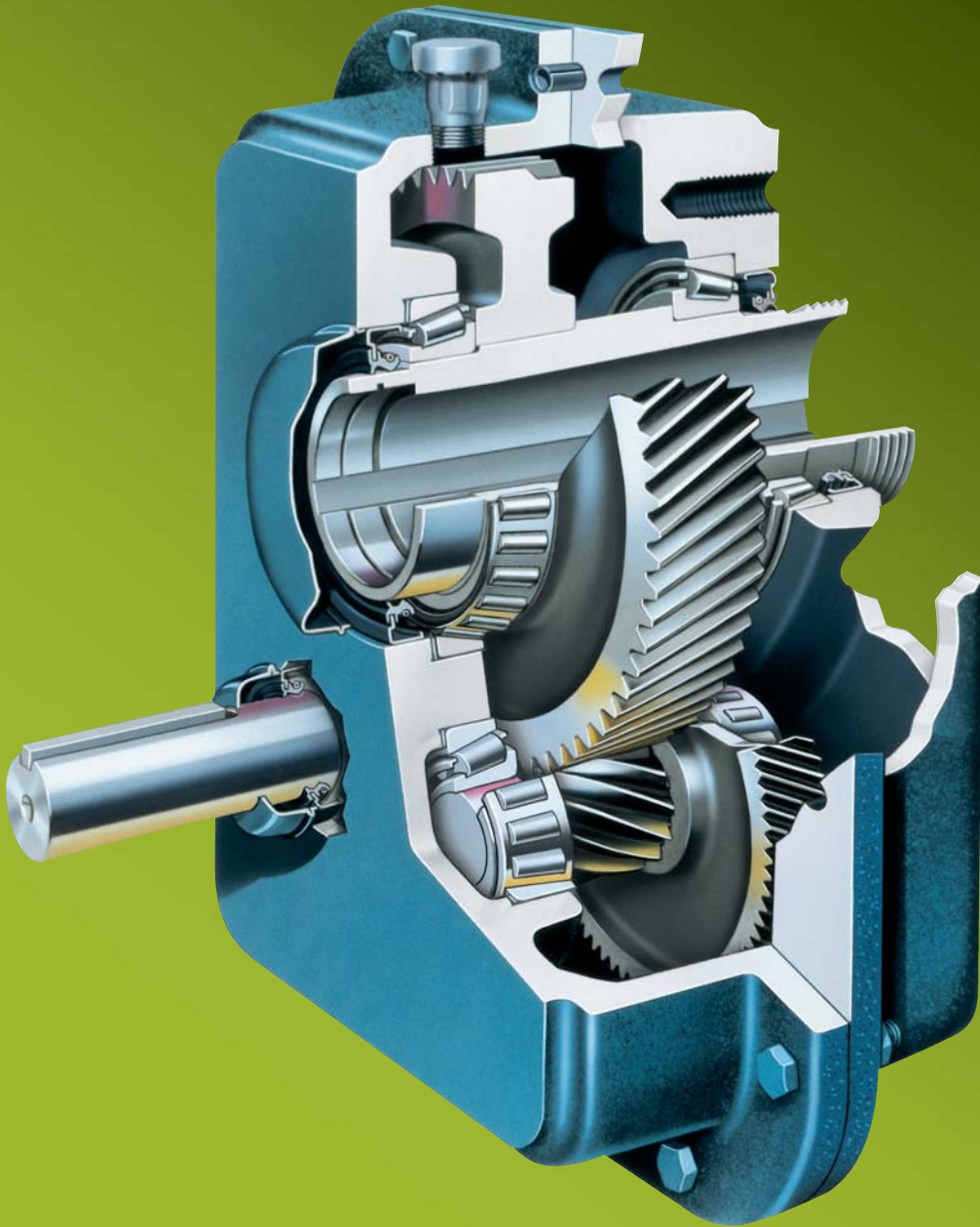
NOTE: Installing RTD on winding endturns are not as effective as embedded RTD in winding. For embedded RTD, build as custom motor.

Does Not Apply to Explosion-Proof Motors

Falk™ Quadrive® Shaft Mounted Drive | **Easiest Off, Easiest On, Guaranteed**
(Imperial-Inch)



QUADRIVE Shaft-Mounted Drives Selection Guide



Load Classifications * . . . Electric Motor Driven Applications

Recommendations are minimum and normal conditions are assumed.

TABLE 1

APPLICATION	Service		APPLICATION	Service		APPLICATION	Service		APPLICATION	Service	
	3 to 10 Hour	Over 10 Hour		3 to 10 Hour	Over 10 Hour		3 to 10 Hour	Over 10 Hour		3 to 10 Hour	Over 10 Hour
AGITATORS			Belt . . . . .	||	||	LINE SHAFTS			PUMPS		
Paper Mill (Mixers) . . . . .	||	||	Flight . . . . .	||	||	Uniform Load	I	||	Proportioning	Refer to Factory	
Pure Liquids	I	||	Oven	I	||	Heavy Load . . . . .	||	||	Reciprocating, open		
Semi-Liquids, Variable			Live Roll (Package)	I	||				Discharge	I	||
Density . . . . .	||	||	Screw	I	||	LIVE ROLL CONVEYORS			Double Acting		
			Table—See Metal Mills . . . . .	...	...	Uniformly Loaded, Package	I	||	Multi-Cylinder . . . . .	||	||
APRON CONVEYORS			CONVEYORS—HEAVY DUTY			Heavy Duty	Refer to Factory		Single Cylinder	Refer to Factory	||
Uniformly Loaded	I	||	—NOT UNIFORMLY FED †						Rotary (Gear Type)		
Heavy Duty . . . . .	||	||	Apron . . . . .	||	||	MACHINE TOOLS			Constant Density	I	||
ASSEMBLY CONVEYORS			Assembly . . . . .	||	||	Auxiliary Drives	I	||	Variable Density . . . . .	||	||
Uniformly Loaded	I	||	Belt . . . . .	||	||	Main Drives Uniform Load . . . . .	||	||	RECIPROCATING		
Heavy Duty . . . . .	||	||	Bucket or Pan . . . . .	||	||	Main Drives Heavy Load . . . . .	||	||	Conveyors . . . . .	||	||
BELT CONVEYORS			Flight . . . . .	||	||				RUBBER INDUSTRY		
Uniformly Loaded	I	||	Live Roll	Refer to Factory		METAL MILLS			Tire Building Machines . . . . .	||	||
Heavy Duty . . . . .	||	||	Oven . . . . .	||	||	Table Conveyors,			Tire & Tube Press Openers	I	I
BREWING & DISTILLING			Reciprocating . . . . .	||	||	Non Reversing . . . . .	||	||	SCREENS		
Bottling Machinery	I	||	Table—See Metal Mills . . . . .	...	...	Reversing	Refer to Factory		Air Washing	I	||
Brew Kettles, Continuous . . . . .	||	||	CRANES & HOISTS †			Wire Drawing & Flattening			Rotary, Stone or Gravel . . . . .	||	||
Can Filling Machines	I	||	Bridge and Trolley Drive . . . . .	||	||	Machines . . . . .	||	||	Traveling Water Intake	I	||
Cookers, Continuous . . . . .	||	||	CUTTER HEAD DRIVES	Refer to Factory		MILLS			Shaker . . . . .	||	||
Mash Tubs, Continuous . . . . .	...	||	DRYERS & COOLERS,			(See Metal Mills)			SCREW CONVEYORS		
Scale Hoppers, Frequent			ROTARY			Pebble . . . . .	||	||	Uniformly Loaded	I	||
Starts . . . . .	||	||	ELEVATORS						Heavy Duty . . . . .	||	||
BUCKET			Bucket—Uniform Load	I	||	MIXERS (See Agitators)			Constant Density	I	||
Conveyors Heavy Duty . . . . .	||	||	Bucket—Heavy Load . . . . .	||	||	Concrete, Continuous . . . . .	||	||	Variable Density . . . . .	||	||
Elevators, Uniform Load	I	||	Escalators†	Not Approved	||	Concrete, Intermittent . . . . .	||	...	Liquid . . . . .	||	||
Elevators, Heavy Duty . . . . .	||	||	Freight†	Not Approved	||	Variable Density . . . . .	||	||	Paper Mill (Agitators)	||	||
CAN FILLING MACHINES			Man lifts, Passenger†	Not Approved	||				Semi-Liquid . . . . .	||	||
CAR			FLIGHT CONVEYORS			OVEN CONVEYORS			SKI TOWS & LIFTS †	Not Approved	
Dumpers . . . . .	||	...	Uniformly Loaded . . . . .	||	||	Uniformly Loaded	I	||	SKIP HOISTS † . . . . .	||	...
Pullers	Refer to Factory		Heavy Duty . . . . .	||	||	Heavy Duty . . . . .	||	||	STOKERS . . . . .	...	||
CLARIFIERS			FOOD INDUSTRY			PAN CONVEYORS			TEXTILE INDUSTRY		
CLASSIFIERS			Beet Slicers . . . . .	||	||	Heavy Duty . . . . .	||	||	Batchers . . . . .	||	||
CLAY WORKING			Can Filling Machines	I	||	PAPER MILLS			Calenders . . . . .	||	||
MACHINERY			Cereal Cookers	I	||	Agitators (Mixers) . . . . .	||	||	Card Machines . . . . .	||	||
Brick Presses . . . . .	||	||	Dough Mixers . . . . .	||	||	Bleachers	I	||	Dry Cans . . . . .	||	||
Briquette Machines . . . . .	||	||	Meat Grinders . . . . .	||	||	Calenders . . . . .	...	||	Dyeing Machinery . . . . .	||	||
Extruders & Mixers . . . . .	||	||	LAUNDRY			Cylinders . . . . .	||	||	Looms	Refer to Factory	||
CONVEYORS—UNIFORMLY			Washers, reversing	Refer to Factory		Felt Stretchers . . . . .	...	||	Mangles, Nappers & Soapers . . . . .	||	||
LOADED OR FED †			Tumblers . . . . .	||	||	Winders . . . . .	||	||	Spinners . . . . .	||	||
Apron and Assembly	I	||				PEBBLE MILLS . . . . .	||	||	Tenter Frames . . . . .	||	||

* **LOAD CLASSIFICATIONS FOR ENGINE-DRIVEN APPLICATIONS — Multi-Cylinder Engines:** Use the next higher Service Class than the one given in Table 1 for the same application when motor driven. (Example: A motor-driven uniformly loaded belt conveyor for 10 hour service is Class I; the same conveyor driven by a multi-cylinder engine would be Class II). For applications which require Class III when motor driven, Refer to Factory for recommendations on engine drives. **Single Cylinder Engines:** Refer to Factory.

† Selection of Falk products for applications whose primary purpose is the transportation of people is not approved. This includes such applications as freight or passenger elevators, escalators, man lifts, fork lift platforms and ski tows and ski lifts. If the primary purpose of the application is material conveyance and occasionally people are transported, the Falk warranty may remain in effect provided the design load conditions are not exceeded and certification to the appropriate safety codes and load conditions has been obtained by the system designer or end user from the appropriate enforcement authorities.

Class II

Selections for ★ Shaft (JR) and Flange (JF) Mounted Drives — Sizes 5107 thru 5608
Screw Conveyor (JSC) Drives — Sizes 5107 thru 5407

TABLE 3

HP	Output rpm	Drive Size	Min H.S.S. Sheave Pitch Dia †	HP	Output rpm	Drive Size	Min H.S.S. Sheave Pitch Dia †	HP	Output rpm	Drive Size	Min H.S.S. Sheave Pitch Dia †	HP	Output rpm	Drive Size	Min H.S.S. Sheave Pitch Dia †							
1/4	350-191	5107J_05	1.7	7-1/2 Cont	70-44	5302J_25	4.0	30	350-301	5207J_05	6.7	100	350-296	5315J_05‡	9.6							
	190-126	5107J_09	1.7		43-28	5207J_25	5.0		300-260	5207J_05	11.9		295-251	5315J_05	10.6							
	125-71	5107J_14	1.7		27-17	5215J_25	6.0		259-191	5215J_05	6.0		250-221	5315J_05	14.5							
	70-5	5107J_25	1.7		16-11	5307J_25	7.0		190-150	5207J_09	9.2		220-166	5315J_09*	11.3							
1/3	350-191	5107J_05	1.7	10	10-8	5315J_25	7.0		40	149-126	5215J_09		6.0	125	165-141	5315J_09*	16.5					
	190-126	5107J_09	1.7		7-6	5407J_25	7.0			125-71	5215J_14		6.0		220-126	5407J_05	9.4					
	125-71	5107J_14	1.7		5	5415J_25	8.0			70-66	5215J_25		6.0		125-117	5315J_14*	13.9					
	70-6	5107J_25	1.9		350-297	5107J_05	3.2			65-41	5307J_25		7.0		116-77	5407J_14*	7.0					
1/2	350-191	5107J_05	1.7		15	296-191	5115J_05			3.5	50		40-32		5315J_25	7.0	150	76-71	5415J_14	9.5		
	190-126	5107J_09	1.7			176-126	5115J_09			2.0			31-22		5407J_25	7.0		70-55	5415J_25*	8.0		
	125-71	5107J_14	1.7			125-95	5115J_14			2.0			21-17		5415J_25	8.0		54-35	5507J_25‡	8.0		
	70-9	5107J_25	1.9			94-71	5203J_14			4.0			16-11		5507J_25	8.0		34-24	5608J_25	9.5		
3/4	350-191	5107J_05	1.7			20	70-63	5203J_25		4.0		60	10-7		5608J_25	9.5		200	350-311	5407J_05‡	7.4	
	190-126	5107J_09	1.7				62-37	5207J_25		5.0			350-225		5215J_05	7.0			310-181	5407J_05‡	12.7	
	125-71	5107J_14	1.7				36-22	5215J_25		6.0			224-191		5307J_05	7.0			180-156	5407J_05	10.9	
	70-13	5107J_25	2.0				21-14	5307J_25		7.0			270-191		5307J_05	7.0			155-136	5407J_05	13.6	
1	350-191	5107J_05	1.7	25			13-11	5315J_25	7.0	75			190-126	5215J_09	6.0	250			135-126	5407J_05	15.7	
	190-126	5107J_09	1.7				10-8	5407J_25	7.0				125-88	5215J_14‡	7.7				125-96	5407J_14*	7.0	
	125-71	5107J_14	1.7				7-6	5415J_25	8.0				87-71	5307J_14	7.0				95-71	5415J_14*	8.0	
	70-9	5107J_25	1.9				350-301	5115J_05	4.1				70-54	5307J_25	7.0				70-67	5415J_25*	8.0	
1 1/2	350-191	5107J_05	1.7		30		209-191	5207J_05	5.0		80		53-43	5315J_25	7.0		300		66-44	5507J_25‡	8.0	
	190-126	5107J_09	1.7				70-55	5207J_25	5.0				42-29	5407J_25	7.0				43-30	5608J_25‡	9.9	
	125-71	5107J_14	1.7				54-33	5215J_25	6.0				28-22	5415J_25	8.0				350-301	5407J_05‡	9.2	
	70-17	5107J_25	2.1				32-21	5307J_25	7.0				21-14	5507J_25	8.0				300-221	5407J_05‡	12.5	
2	350-191	5107J_05	1.7			40	209-191	5207J_05	5.0			100	13-10	5608J_25	9.5			150	220-176	5407J_05‡	17.4	
	190-126	5107J_09	1.7				152-126	5203J_09	5.1				350-300	5215J_05	8.0				175-156	5415J_05‡	17.4	
	125-71	5107J_14	1.7				125-90	5203J_14	4.5				300-191	5307J_05	7.0				155-146	5415J_05‡	18.6	
	70-26	5107J_25	2.0				89-71	5207J_14	5.0				190-126	5215J_09‡	8.7				145-136	5415J_05‡	20.0	
3	350-191	5107J_05	1.7	50			70-26	5107J_25	2.0	150			125-110	5215J_14‡	9.6	200			135-126	5415J_05‡	21.6	
	190-126	5107J_09	1.7				15-11	5407J_25	7.0				109-88	5307J_14‡	9.7				125-84	5415J_14*	8.0	
	125-71	5107J_14	1.7				10-9	5415J_25	8.0				87-71	5307J_14	7.0				83-71	5507J_14*	8.0	
	70-26	5107J_25	2.0				8-6	5507J_25	8.0				70-68	5307J_25‡	7.0				70-53	5507J_25*	8.0	
5	350-191	5107J_05	1.7		60		10-9	5407J_25	8.0		200		67-54	5315J_25‡	7.0		250		52-36	5608J_25*	9.9	
	190-126	5107J_09	1.7				8-6	5608J_25	9.5				53-36	5407J_25‡	7.0				350-271	5407J_05*	13.2	
	125-71	5107J_14	1.7				350-301	5115J_05	4.1				35-28	5415J_25	8.0				270-231	5407J_05*	17.8	
	70-26	5107J_25	2.0				299-259	5203J_05	12.1				27-18	5507J_25	8.0				230-176	5415J_05‡	20.7	
7 1/2	350-191	5107J_05	1.7			75	258-191	5207J_05	5.0			150	17-12	5608J_25	9.5			200	175-166	5415J_05‡	23.2	
	190-126	5107J_09	1.7				145-126	5203J_09	11.2				350-301	5307J_05	7.0				165-156	5415J_05*	21.8	
	125-71	5107J_14	1.7				125-74	5207J_14	6.5				300-191	5307J_05	10.6				155-71	5507J_14*	8.1	
	70-34	5107J_25	2.0				73-71	5215J_14	6.0				190-126	5315J_09‡	7.0				70-48	5608J_25*	9.5	
10	350-191	5107J_05	1.7	80			70-34	5107J_25	2.0	200			175-155	5307J_09‡	10.1	250			70-48	5608J_25*	9.5	
	190-126	5107J_09	1.7				18-12	5203J_25	4.0				155-126	5307J_09‡	15.7							
	125-71	5107J_14	1.7				11-8	5207J_25	5.0				125-81	5307J_14‡	8.6							
	70-34	5107J_25	2.0				7-5	5215J_25	6.0				80-71	5315J_14‡	10.0							

★ Horizontal Drives – Selections shown in **bold** type require cooling as indicated by footnotes † and * below. Refer to Engineering 377-114 for maximum output speeds.
Vertical Drives – Make selection from Table 2, 3, or 4 and then refer to Engineering 377-114 to determine drive speed limits with and without cooling.

† Values are for V-Belt drives and load applied one shaft diameter from seal cage or fan if so equipped. For minimum sheave diameters for other axial locations, refer to load location factor table on Page 15. Multiply values by 0.66 when using timing belt or chain drives.

‡ Shaft driven fan required.

• Electric fan required.

Table of Contents

Introduction 2
 Drive Identification 3

SECTION I — DRIVE INSTALLATION

Outfitting 4
 Installation 7
 Lubrication 9
 Startup 9

SECTION II — DRIVE SERVICE & REPAIR

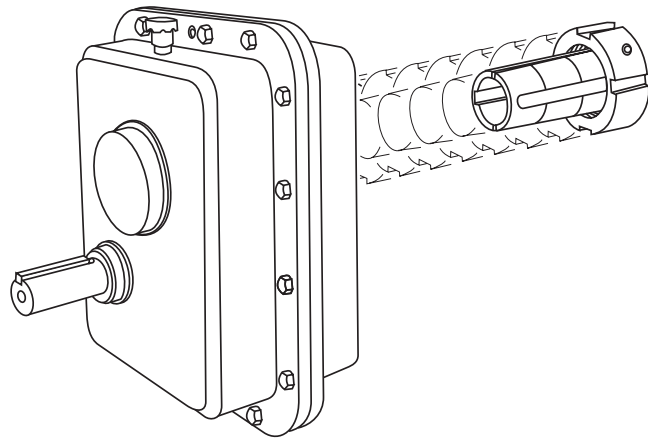
Preventive Maintenance 10
 Oil Changes 10
 Stored & Inactive Drives 10
 Removal of Drive 10
 Drive Disassembly 12
 Identifying & Ordering Parts 14
 Recommended Spare Parts 14
 Parts List of Falk Part Numbers 16
 Bearing Cross Reference Numbers 17
 Seal Cross Reference Numbers 17

SECTION III — DRIVE REASSEMBLY

Drive Reassembly 18

APPENDICES

Appendix A: Lubrication Recommendations 23
 Appendix B: Backstop Installation 27
 Appendix C: TA Removal Tool 29
 Appendix D: Motor Mount Installation 31
 Appendix E: Vertical Standpipe Installation 33
 Appendix F: Modifications for Non-Standard
 Mounting Positions 34
 Appendix G: Retaining Rings for Bushing Nuts and Thrust
 Plates, Tooth Combinations for Vibration Analysis
 & JSC Lip Seal Accessory 36
 Appendix H: Drive Shaft Recommendations for Tapered
 Drive Shafts 37
 Appendix J: Drive Shaft Recommendations Using
 TA Taper Bushing 38
 Appendix K: Drive Shaft Recommendations Using (TCB) Kit 40
 Appendix L: V-Belt Guard Installation 42
 Appendix M: Electric Fan Installation 44



Serpentix uses
Model No. 5203



Introduction

WARRANTY — Rexnord Industries (the “Company”) warrants that, for a period of one year from the date of shipment, the product described herein will deliver successfully its rated output as indicated on the nameplate, provided, it is properly installed and maintained, correctly lubricated, and operated in the environment and within the limits of speed, torque or other load conditions for which it was sold. Such product is expressly not warranted against failure or unsatisfactory operation resulting from dynamic vibrations imposed upon it by the drive system in which it is installed unless the nature of such vibrations has been fully defined and expressly accepted in writing by the Company as a condition of operation.

WARNING: Consult applicable local and national safety codes for proper guarding of rotating members.
Lock out power source and remove all external loads from drive before servicing drive or accessories.

CAUTION: Do not weld the drive housing or accessories without prior approval from Rexnord Geared Products. Welding on the drive may cause distortion of the housing or damage to the bearings and gear teeth. Welding without prior approval will void the warranty.

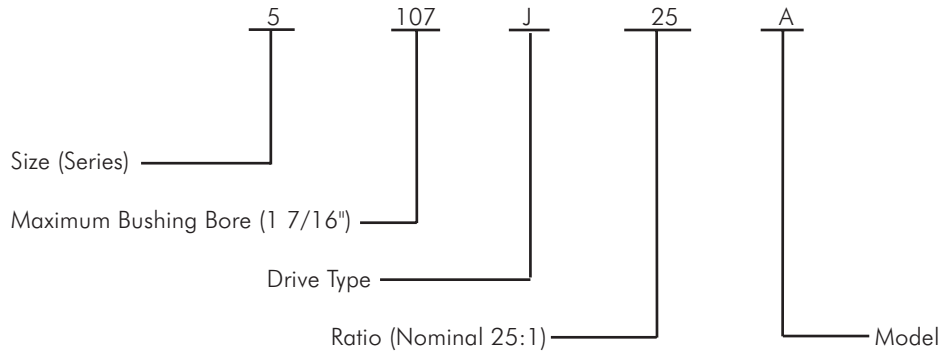
DRIVE RATING — Operate the drive only within the horsepower and output speed for which it was selected and specified in Selection Guide 371-110 for the application. Refer to the nameplate for drive size, ratio, and data.

FACTORY REPAIR AND REBUILD — Falk/Renew wants to continue to be your primary supplier, and extend our service to you if your equipment is in need of repair or replacement.

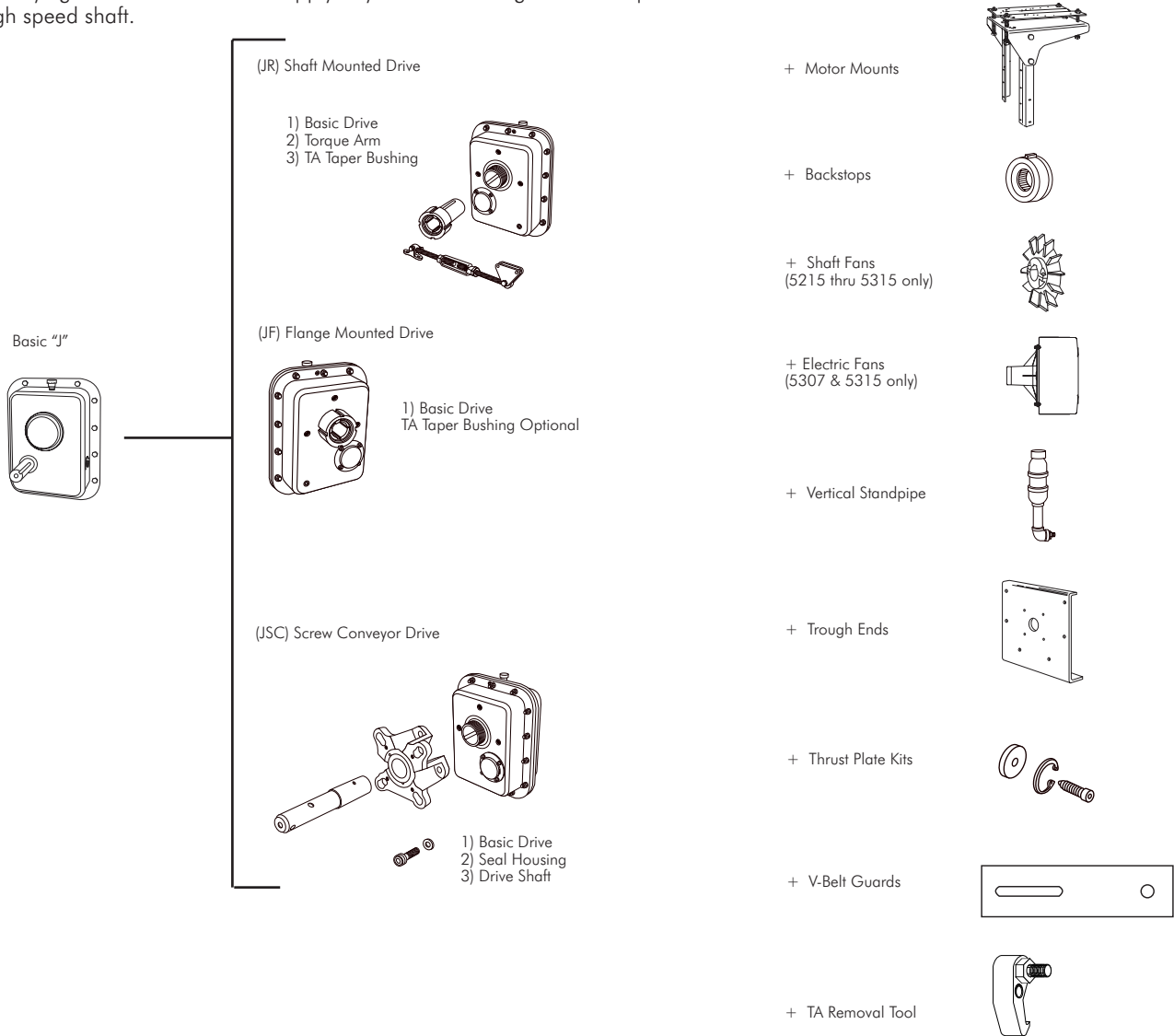
We are able to furnish a fast turn-around on both the quotation and rebuild. Nobody can do the job better than Falk. If you need repair on Falk products . . . just ask.

Contact your local Rexnord account executive or Rexnord-Falk Distributor for more information.

Drive Identification



J is the basic drive identification. It can be outfitted for use as a shaft mounted drive JR; a flange mounted drive JF; or a screw conveyor drive JSC, as illustrated below. These unique identifiers, JR, JF & JSC, are used throughout this manual to assist you in identifying the instructions which apply to your drive arrangement. The prefix "M" identifies a drive that features a nominal metric high speed shaft.



NOTE: Use a TA-Taper bushing when mounting these drives on a straight driven shaft. (Hollow shaft is taper bored.)

Section I Drive Installation

Outfitting

1. **JR, JF & JSC** — Find the desired mounting position in Figure 1 and install air vent and magnetic drain plug (packaged separately with basic drive). Also note and/or mark the oil level plug location OR in the case of a vertical mounting, refer to Appendix E, for installation of vertical stand pipe. If the mounting angle exceeds the limitations shown in Figure 1, refer to Appendix F, to determine modifications necessary within the limits illustrated therein. **DO NOT** fill drive with lubricant at this time. Oil plugs are located on input housing half.

2. **JR** — Remove anchor brackets, housing flange fasteners and rod end fasteners from tie rod kit and assemble to drive as illustrated in Figure 2. Refer to Table 1 for tightening torque. (Original fasteners may be discarded).

Figure 1

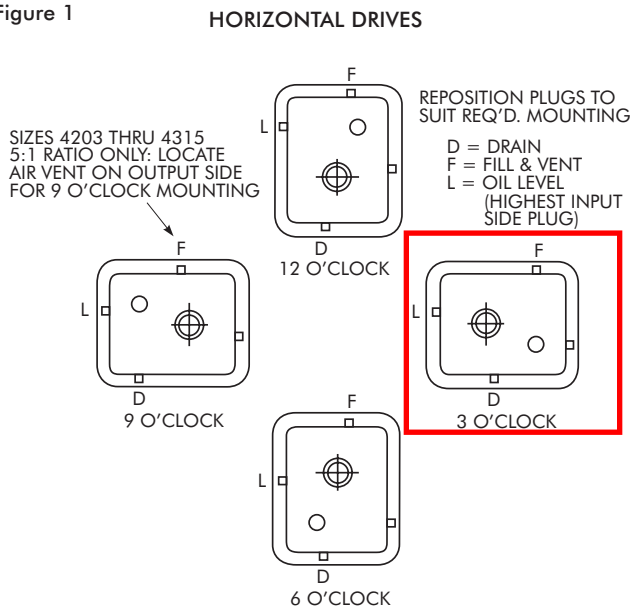


Figure 2

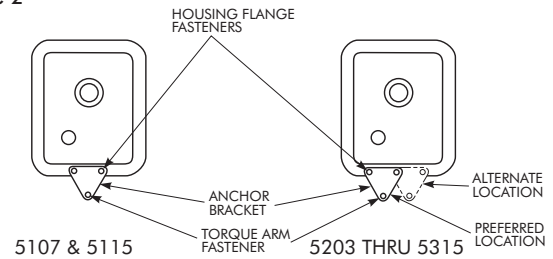
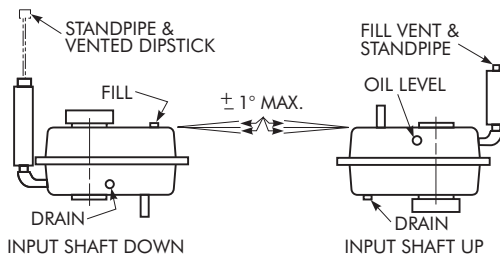


TABLE 1 — Housing Flange Fastener Size and Tightening Torque (Non-Lubricated Fasteners)

DRIVE SIZE	Fastener Size	Tightening Torque lb-ft(Nm)
5107	.312-18	19 (26)
5115	.312-18	19 (26)
5203	.375-16	28 (37)
5207	.500-13	69 (94)
5215	.500-13	69 (94)
5307	.500-13	69 (94)
5315	.500-13	69 (94)

3. **JR** — The tapered bore hollow shaft is designed for use with a TA Taper bushing for mounting on a driven shaft with a straight outside diameter. Shaft tolerances for the driven shaft are given in Table 1A. The minimum and maximum driven shaft engagements, dimension “N” in Figure 3, are shown in Table 2. The minimum engagement is necessary for full bushing engagement; the maximum engagement is only required if a thrust plate will be employed to remove the drive from the driven shaft (See Appendix C for preferred removal method).

VERTICAL DRIVES



ANGULAR LIMITS FOR HORIZONTAL MOUNTING (ALL CLOCK POSITIONS)

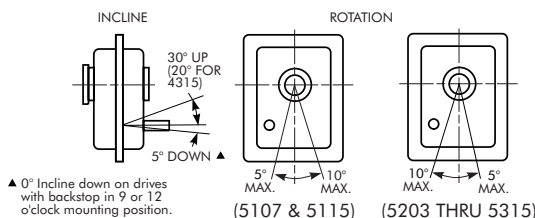


TABLE 1A — Driven Shaft Tolerances ★

Shaft Diameter - Inches	Maximum Undersize - Inches
Up to 1.500	.004
1.500 - 2.500 incl.	.005
2.500 - 4.000 incl.	.006

★ Millimeters = h10 tolerance.

Figure 3

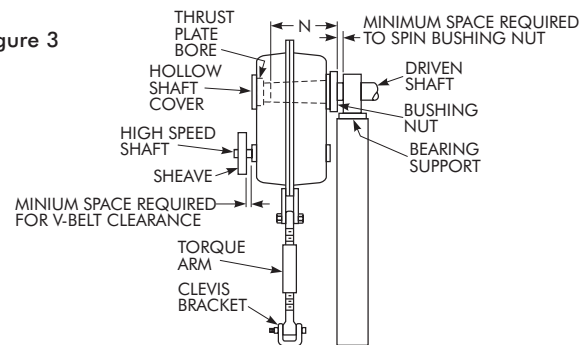


TABLE 2 — N Dimension Inches (mm) ★

DRIVE SIZE	Minimum	Maximum
5107	5.00 (127)	7.19 (183)
5115	5.55 (141)	8.05 (204)
5203	5.53 (140)	7.78 (198)
5207	6.11 (155)	8.72 (221)
5215	7.08 (180)	10.15 (258)
5307	7.39 (188)	10.69 (272)
5315	7.92 (201)	10.74 (273)

★ The minimum engagement is necessary for full bushing engagement; the maximum engagement is only required if a thrust plate will be employed to remove the drive from the driven shaft.

★ The minimum engagement is necessary for full bushing engagement; the maximum engagement is only required if a thrust plate will be employed to remove the drive from the driven shaft.

- a. **THIN WALL BUSHING** (with keyway slot through the bushing wall) — With the driven shaft keyway at the 12 o'clock position, slide bushing assembly onto the driven shaft, nut end first, and position the keyway slot over the shaft keyway (the bushing may have to be pried open slightly). Insert the drive, key furnished with the bushing, into the shaft keyway. Proceed to Step 7.

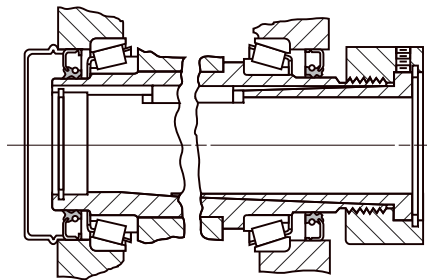


Figure 4

4. **JSC — NOTE:** See Appendix K for non-tapered drive shafts. Remove the hollow shaft cover from the input side of the hollow shaft bore and save. Separate contents from the drive shaft kit. Install thrust plate and retaining ring in the hollow shaft, Figure 5. When the drive is a Size 5107 and will employ a 2.437" (61,9 mm) or 3.000" (76,2 mm) diameter drive shaft, place the (2) gaskets and trough end spacer, packaged separately, over the trough end surface of the seal housing, Figure 6. Continue outfitting based on the type of trough end seal to be installed: (a) Waste Packing Seal; (b) Lip Seal or; (c) Packing Gland Seal.

Figure 5

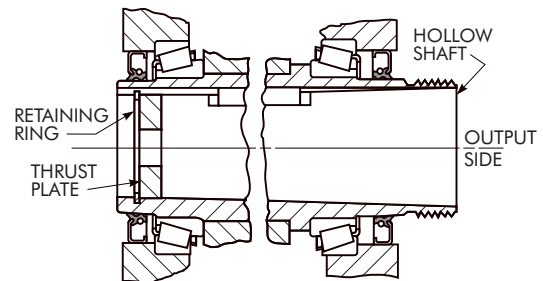
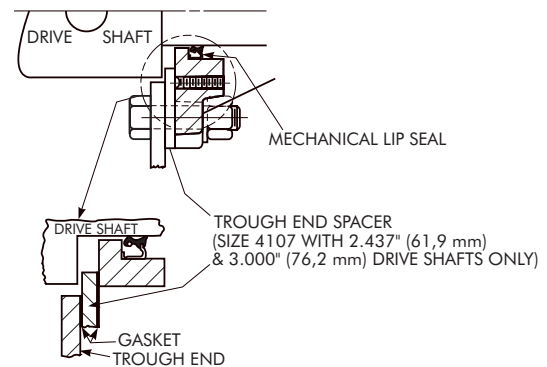


Figure 6



- a. **WASTE PACKING SEAL** (Figure 7) — Slide drive shaft thru seal housing. Insert key into drive shaft and slide drive shaft into hollow shaft. The seal housing registers into the basic drive seal bore. Install the drive shaft thrust plate fastener thru thrust plate and torque to the value specified in Table 3. Use the seal housing fasteners to secure the seal housing to the basic drive housing. Refer to Table 4 for proper torque value. Reinstall hollow shaft cover. Pack seal housing with waste packing and proceed to Step 5.

TABLE 3 — JF & JSC Thrust Plate Fastener Data (Non-Lubricated Fasteners)

DRIVE SIZE	Fastener Size & Grade †	Torque lb-ft (Nm)	Min. Thread Depth Inches (mm)
5107	.500-13UNC x 3.25, GR. 8	92 (125)	2.00 (50,8)
5115	.500-13UNC x 3.25, GR. 8	92 (125)	2.00 (50,8)
5203	.625-11UNC x 3.50, GR. 8	183 (248)	2.00 (50,8)
5207	.625-11UNC x 3.50, GR. 8	183 (248)	2.00 (50,8)
5215	.875-9UNC x 3.50, GR. 8	533 (723)	2.50 (63,5)
5307	1.00-8UNC x 4.00, GR. 5 ‡	567 (769)	2.75 (69,8)
5315	1.00-8UNC x 4.00, GR. 8	792 (1074)	2.75 (69,8)

† Fastener lengths given are for applications using tapered drive shafts. Other lengths may be needed for applications using tapered bushings.

‡ 1.00-8UNC x 3.50, GR. 5 for 5307 JF.



Figure 7

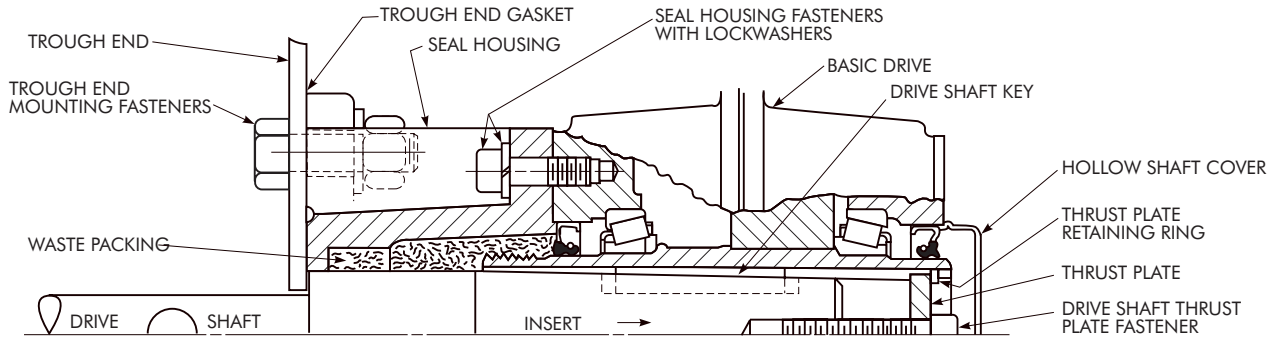


TABLE 4 — Seal Housing & Trough End Fastener Size – UNC & Tightening Torque – (Non-Lubricated Fasteners)

Fastener Location	DRIVE SIZE						
	5107	5115	5203	5207	5215	5307	5315
Seal Housing Fasteners lb-ft (Nm)	.500-13 69 (94)	.625-11 137 (186)	.750-10 245 (332)	.875-9 380 (515)	1.000-8 567 (769)	1.000-8 792 (1074)	1.000-8 792 (1074)
Trough End Fasteners lb-ft (Nm)	1.500" Diameter Drive Shaft .500-13 Fasteners 69 (94)						
	2.000" & 2.437" Diameter Drive Shafts .625-11 Fasteners with Nuts — 137 (186)						
	3.000" & 3.437" Diameter Drive Shafts .750-10 Fasteners with Nuts — 245 (332)						

b. **LIP SEAL** (Figure 8) — Coat outside diameter of seal with Permatex #3 or equivalent. Drive seal into seal housing with the spring loaded seal lip away from the driver. Wrap the keyway on tapered shank of drive shaft with masking tape or light weight Kraft paper to protect against damaging the seal lips. Coat the seal lips and straight portion of the drive shaft with bearing grease. Line up the keyway in the drive shaft with the hollow shaft keyway and insert the drive shaft into the seal housing. Remove the protective wrap and install the drive shaft key. Insert the drive shaft into the hollow shaft. The seal housing registers into the basic drive seal bore. Use the thrust plate fastener Figure 7, to secure the drive shaft. Refer to Table 3 for proper torque value. Install the seal housing fasteners to secure the seal housing to the basic drive. Refer to Table 4 for proper torque value. Reinstall hollow shaft cover and proceed to Step 5.

Figure 8

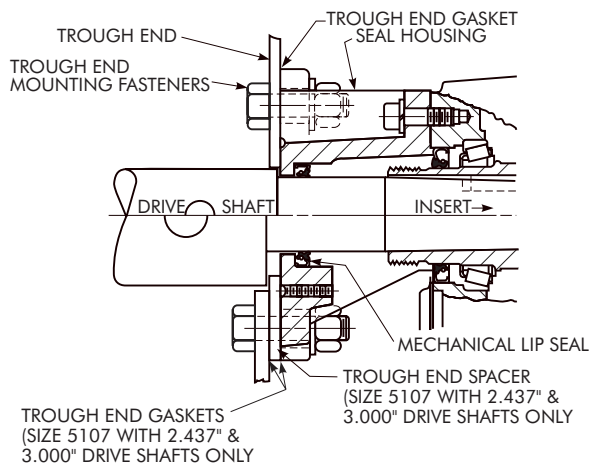


Figure 9

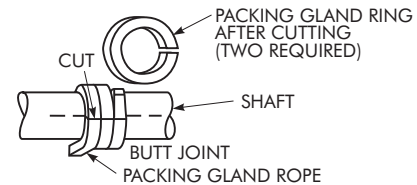
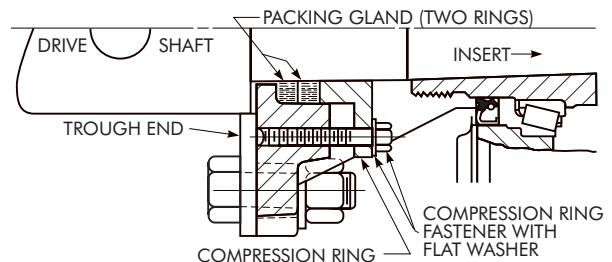


Figure 10



c. **PACKING GLAND SEAL** (Figure 10) — First, wrap the packing around the drive shaft adjacent to the tapered portion of the drive shaft as shown in Figure 9. Cut the packing to produce two complete split seal rings. **CAUTION:** Do not mar the shaft's seal surface.

Remove packing rings from the drive shaft and slide the drive shaft through the seal housing. Install seal rings into the seal housing. Stagger the seal joints approximately 90° apart. Slip the compression ring into place. Use fasteners with flat washers to hold the ring but **DO NOT** tighten at this time. Install key in the drive shaft keyway and then install the drive shaft into the hollow shaft. Use the thrust plate fastener, Figure 7, to secure the drive shaft. Refer to Table 3 for torque value. Use the seal housing fasteners to secure the seal housing to the basic drive. Refer to Table 4 for the torque value. Reinstall the hollow shaft cover. To adjust packing seal, rotate input shaft to test the resistance. Tighten the compression ring fasteners evenly until an additional resistance can be detected when the high speed shaft is rotated. **DO NOT OVERTIGHTEN** - this can cause premature seal wear and possible overheating. Proceed to Step 5.

5. **JSC** — Fasten the trough end to the seal housing using the hex head cap screws included in the drive shaft kit. Refer to Table 4 for torque value. Proceed to Step 7.
6. **JF** — Install backstops prior to installation of the drive (Refer to Appendix B). If an adapter flange is provided, assemble it to the drive using fasteners provided with the flange. Refer to Table 5 for fastener selection and torque value. Remove the input side hollow shaft cover. The standard method for connecting a flange mounted drive to the driven shaft is to prepare the driven shaft per Appendix H and mount the drive to the tapered shaft using a thrust plate kit with fastener as shown in Table 3. An optional method of connection should be used when replacing existing drives with special shafts or when producing tapered shafts is impractical. This optional method uses a TA tapered bushing as outlined in Appendix J.

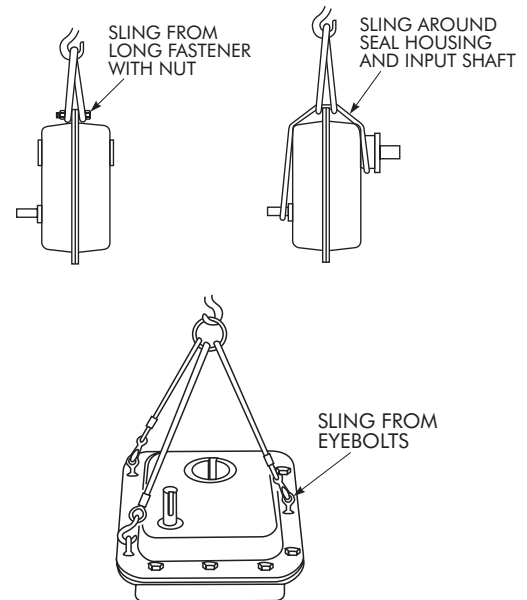
TABLE 5 — Flange Mounted Drive – Foundation Fastener Size & Tightening Torque (Non-Lubricated Fasteners)

DRIVE SIZE	Fastener Size and Grade	Torque lb-ft (Nm)	Min Fastener Engagement Into Drive Housing Inches (mm)
5107	.500-13UNC, GR.5	69 (94)	.76 (19,3)
5115	.625-11UNC, GR.5	137 (186)	.94 (23,9)
5203	.750-10UNC, GR.5	245 (332)	.76 (19,3)
5207	.875-9UNC, GR.5	380 (515)	.88 (22,4)
5215	1.000-8UNC, GR.5	567 (769)	1.00 (25,4)
5307	1.000-8UNC, GR.8	792 (1074)	1.24 (31,5)
5315	1.000-8UNC, GR.8	792 (1074)	1.24 (31,5)

Installation

7. **JR, JF & JSC** — Refer to Figure 11 for recommended lifting method. In order to sling JR & JF as illustrated, remove a housing flange fastener and install a long fastener with nut. For vertical installation, use (3) eye bolts as illustrated. Eyebolt sizes are 5/16" for 5107 and 5115, 3/8" for 5203 and 1/2" for 5207 thru 5315. **DO NOT** remove sling until drive is secured to shaft. Before lifting the drive into position, rotate the high speed shaft until the hollow shaft keyway will be in position to line-up with the driven shaft key. JF proceed to Step 12; JSC to

Figure 11



Step 13.

8. **JR** — If the drive was received with a backstop installed, the backstop must be temporarily removed to facilitate mounting.
Refer to Section II, Figure 19 and remove cover Ref. #16 and backstop Ref. #5A1.
9. **JR** — Lift the drive into position and slide onto the drive shaft taking care that the driven shaft key seats into the hollow shaft keyway. **DO NOT** hammer or use excessive force. Refer to Figure 12 for installation of the torque arm. The exact position of the tie rod may vary within the range shown. For torque arm mountings other than shown, refer to Falk. If it is necessary to shorten the torque arm, cut the excess from either threaded end.

The support to which the clevis bracket is to be fastened must sustain the torque reaction shown in Table 8. The maximum load reaction through the torque arm occurs when the torque arm is located in the extreme (30°) off angle position. Use Grade 5 fasteners to anchor the clevis bracket; see Table 7 for the fastener diameter and tightening torque.

Bolt the tie rod to both the clevis bracket and the drive anchor bracket and tighten the bolts until seated against the brackets. **DO NOT** bend the bracket as clearance between the clevis brackets and tie rod is necessary.

Figure 12

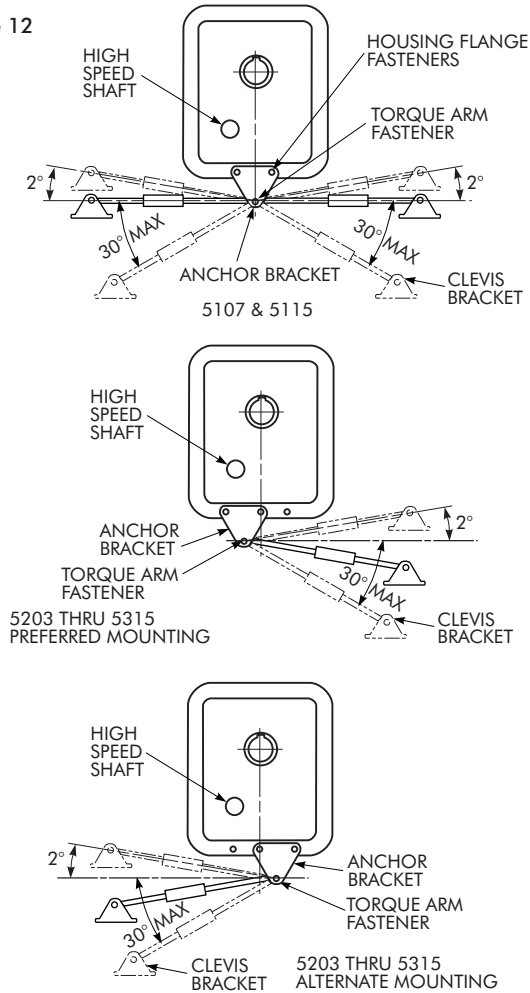


TABLE 8 — Load Reaction Through Torque Arm

DRIVE SIZE	5107	5115	5203	5207	5215	5307	5315
Load lb (N) †	2440 (10850)	3810 (16940)	4680 (20810)	6250 (27790)	9160 (40720)	12963 (57660)	15890 (70700)

† Load includes moment due to motor and motor mount with torque arm at maximum angle.

10. **JR** — Thread the bushing nut onto the hollow shaft one to two turns. NOTE: The bushing nut threads have been coated with an anti-seize compound at the Factory. This compound should not be removed. Before re-installing a previously used nut, recoat the nut threads only with an anti-seize compound. KEEP THE TAPERED SURFACE OF THE BUSHING AND HOLLOW SHAFT BORE FREE FROM ALL ANTI-SEIZE OR LUBRICATING COMPOUNDS.

WARNING: Overtightening can fail the internal retaining ring. (See Appendix G, for listing of retaining rings).

- PREFERRED METHOD** — Use a spanner (Table 6), chain or pipe wrench to tighten the bushing nut to the torque value indicated in Table 6. NOTE: For applications where external vibratory or transient loads may act on drive and cause the setscrew to become loose, apply Loctite 243 or equivalent to threads of setscrew. Tighten the setscrew on the bushing nut.
- ALTERNATE METHOD** — (To be used when torque cannot be measured.) Use a spanner (Table 6), chain or pipe wrench to tighten the bushing nut just until the drive can no longer be moved by hand axially on the driven shaft. Loosen nut ONLY until it can be turned by hand but do not unseat the taper. Retighten the nut hand tight. Now mark a spot on the top of the driven shaft. Next mark a spot on the bushing nut 180° from the driven shaft mark (90°CCW for Sizes 5107 & 5115). Use the spanner wrench to tighten the nut CW one half turn until the two marks are aligned (one quarter turn for Sizes 5107 & 5115). NOTE: For applications where external vibratory or transient loads may act on drive and cause the setscrew to become loose, apply Loctite 243 or equivalent to threads of setscrew. Tighten the setscrew on the bushing nut.

TABLE 6 — Spanner Wrench Type & Spanner Nut Tightening Torque

DRIVE SIZE	Adjustable Hook Spanner Wrench		Spanner Nut Tightening Torque lb-ft (Nm)
	Armstrong Tools	Williams	
5107	34-307 (2"-4 3/4")	474	83 (113)
5115	34-307 (2"-4 3/4")	474	83 (113)
5203	34-307 (2"-4 3/4")	474	167 (226)
5207	34-310 (4 1/2"-6 1/4")	474A	167 (226)
5215	34-310 (4 1/2"-6 1/4")	474A	250 (339)
5307	34-310 (4 1/2"-6 1/4")	474A	250 (339)
5315	34-313 (6 1/8"-8 3/4")	474B	250 (339)

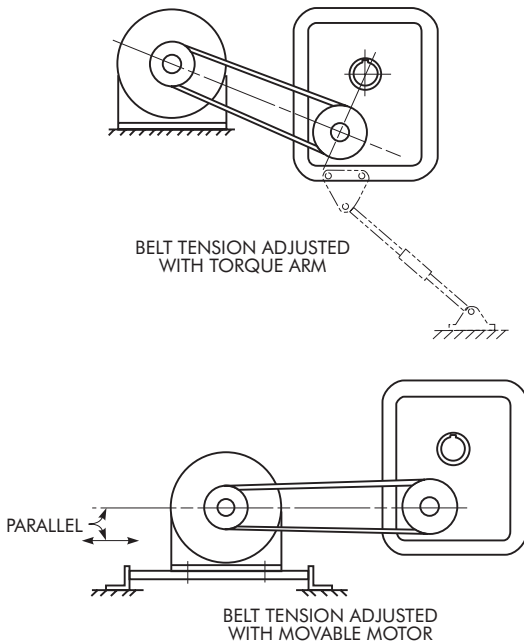
TABLE 7 — Torque Arm Clevis Bracket Fastener Tightening Torque

DRIVE SIZE	Fastener ★ Size	Tightening Torque — lb-ft (Nm)	
		Steel Foundation	Concrete Foundation
5107	.375-16UNC	28 (38)	21 (28)
5115	.375-16UNC	28 (38)	21 (28)
5203	.500-13UNC	69 (94)	53 (72)
5207	.500-13UNC	69 (94)	53 (72)
5215	.625-11UNC	137 (186)	107 (145)
5307	.750-10UNC	245 (332)	191 (259)
5315	1.000-8UNC	567 (769)	467 (633)

★ Grade 5 fasteners required.

- JR** — Install backstop, motor mount, motor, sheaves (mount sheaves as close to the drive and motor housing as possible), belts and guard. Refer to Appendix D for motor mount installation instructions. Proceed to Step 14.
- JF (USING TAPERED DRIVE SHAFT)** — Put key into the driven shaft. Lift drive into position and slide onto the driven shaft taking care that the driven shaft key seats into the hollow shaft keyway. DO NOT hammer or use excessive force. Secure the drive to the shaft with the thrust plate fastener. Refer to Table 3 for torque value. Reinstall the hollow shaft cover. Install motor mount, motor, sheaves, belts and guard. Refer to Appendix D for motor mount installation instructions. Proceed to Step 15.
- JSC** — Assemble drive to trough and install drive shaft coupling bolts per screw conveyor manufacturer's instructions. Install motor mount, motor, sheaves, belts and guard. Refer to Appendix D for motor mount installation instructions. Proceed to Step 15.

14. **JR** — When the torque arm turnbuckle is used for belt tension adjustment, position the motor so that the belt pull will be about 90° to a line through the drive high speed shaft and hollow shaft as shown in Figure 13. For drives where the motor is moved to adjust belt tension, mount the motor slide base so that the belt tension adjustment is approximately parallel to the belt centers. Refer to Appendix D, for instructions relative to alignment of sheaves and belts.

Figure 13


Lubrication

CAUTION: *Drives shipped without oil.*

15. **JR, JF & JSC** — Refer to Appendix A for selection of lubricant. Refer to Table 9 at right for approximate oil capacity of drives.

16. **JR, JF & JSC** — HORIZONTAL MOUNTING

Remove air vent and oil level plug (Refer to Step 1). Fill the drive until oil shows in the oil level hole. Coat the air vent and plug threads with #3 Permatex or equivalent thread sealant before replacing.

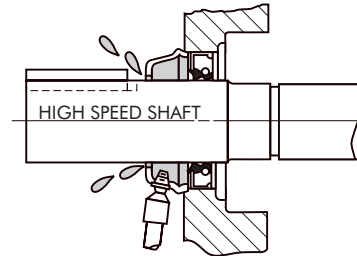
JRV, JFV & JSCV — (VERTICAL MOUNTING) - Refer to Figure 1, Step 1.

Input Shaft DOWN — Remove the fill plug and fill with oil to level marked on the dipstick.

Input Shaft UP — Remove the oil level and fill plugs and fill until oil shows in the oil level hole.

Coat the plug threads with #3 Permatex or equivalent thread sealant before replacing.

17. **JR, JF & JSC** — Where applicable, pump grease into the high speed shaft seal cover **WITH A HAND GREASE GUN**, Figure 14, until fresh grease flows out along the shaft. Wipe off excess grease from the shaft. **DO NOT** use grease where it could contaminate the product e.g. foods, drugs, etc.

Figure 14


Start Up

18. **JR, JF & JSC** — Before operating the drive, check any fasteners, pipe plugs, air vent, etc. which may have been loosened in the course of Outfitting, Installing and Lubricating the drive, to be sure that they have been properly retightened. If a long fastener was used to lift the drive into place, reinstall the housing flange fastener and torque to the value shown in Table 1. After one week of operation repeat check of all external fasteners and pipe plugs.

19. **AFTER ONE MONTH OF OPERATION:**

a. Operate the drive until the sump oil reaches normal operating temperature. Shut the drive down and drain immediately.

b. Immediately flush the drive with an oil of the same type and viscosity grade as the original charge (warmed to approximately 100°F[38°C] in cold weather). Rapidly pour or pump a charge equal to 25-100% of the initial fill thru the drive, or until clean oil flows thru the drain.

c. Close the drain and refill the drive to the correct level with new or reclaimed oil of the correct type and viscosity. If determined to be in good condition by the supplier, drain oil may be reused if it is filtered thru a 100 micron or finer filter.

TABLE 9 — Approximate Oil Capacity — Quarts (Liters) ★

DRIVE SIZE	JR, JF & JSC	JRV & JFV
5107	2 (1,9)	3 (2,8)
5115	3 (2,8)	4.5 (4,3)
5203	3.5 (3,3)	5 (4,7)
5207	5.5 (5,2)	7.5 (7,1)
5215	9 (8,5)	13 (12,3)
5307	13 (12,3)	18 (17)
5315	15 (14,2)	21 (19,9)

★ Quantities are approximate. Always fill drive to specified level.



Section II

Drive Service & Repair

Preventive Maintenance

PERIODICALLY — Carefully check the oil level of the drive when it is stopped and at ambient temperature, add oil if needed. If the oil level is above the specified level, have the oil analyzed for water content. Moisture in the oil may indicate seal leakage or condensation. If so, correct the defect immediately and change the oil. **DO NOT** overfill or oil leakage may result. If a drive is equipped with a fan, periodically clean accumulated foreign matter from the fan and fan guard to allow adequate air flow.

GREASE PURGED SEALS — Periodically (at least every six months), depending upon the frequency and degree of contamination, purge contaminated grease from seal by slowly pumping fresh bearing grease through the seal cage, **WITH A HAND GREASE GUN**, until fresh grease flows out along the shaft. Wipe off the purged grease. Refer to Appendix A.

PACKING GLAND SEAL — Section I, Step 4(C)

Oil Changes

PETROLEUM LUBRICANTS — For normal operating conditions, change gear oil every six months or 2500 operating hours, whichever occurs first. If the drive is operated in an area where temperatures vary with the seasons, change the oil viscosity grade to suit the temperature. Where applicable, grease seals when changing oil. Refer to Appendix A.

SYNTHETIC LUBRICANTS — Synthetic lube change intervals can be extended to 8000-10,000 hours depending on operating temperatures and lubricant contamination. Laboratory analysis is recommended for optimum lubricant life and drive performance. Change lube with changes in ambient temperature, if required. Refer to Appendix A.

Stored & Inactive Drives

NEW DRIVES WHICH HAVE NOT BEEN OPERATED — Each drive is spin tested with a rust preventive oil that will protect internal parts against rust for a period of 4 months in an outdoor shelter or 12 months in a dry building after shipment from the Factory.

If a drive is to be stored or inactive beyond the above periods, spray all internal parts with a rust preventive oil that is soluble in lubricating oil or add 1 ounce (23,35 grams) of "Motorstor ★" vapor phase rust inhibitor oil. Seal air vent immediately with pressure sensitive tape.

Before operating drives which have been stored or inactive, remove tape and fill to the proper level with oil meeting specifications given in the Lubrication Recommendation found in Appendix A.

★ Product of the Daubert Chemical Company, Chicago, Illinois. (Formerly known as "Nucl Oil.")

SHUTDOWN OF NEW OR EXISTING DRIVES WHICH HAVE BEEN OPERATED — If a drive is to be stored or inactive for more than 2 months after a period of operation, add 1 ounce (23,35 grams) of "Motorstor" to the oil sump and immediately seal the air vent with pressure sensitive tape. It is not necessary to drain the oil prior to storage if oil is still serviceable and not contaminated.

Before operating drive, remove tape and check oil level.

PERIODICALLY INSPECT STORED OR INACTIVE DRIVES AND SPRAY OR ADD RUST INHIBITOR EVERY SIX MONTHS, OR MORE OFTEN IF NECESSARY. INDOOR DRY STORAGE IS RECOMMENDED.

Drives Ordered for Extended Storage can be treated at the Factory with a special preservative and sealed to rust-proof parts for periods longer than those stated above, if specified on the order.

Repair & Replacement

WARNING: Consult applicable local and national safety codes for proper guarding of rotating members. Lock out power source and remove all external loads from drive before servicing drive or accessories.

NOTE: Only the seals on the input side of the drive can be replaced without removing the drive from the driven equipment. All other repairs require removal of the drive from the driven equipment. Proceed to Step 1 for drive removal. Proceed to Step 5 for replacement of seals.

Removal (See above note for seal replacement only)

1. **JR, JF & JSC** — Drain the lubricant at this time. Remove safety guards and belts (motor and motor mount, optional). Remove backstop (if so equipped). Refer to Section II, Step 10, for backstop removal instructions.

WARNING: Drive must be supported during removal process. Use a sling around the motor mount or as recommended in Section I, Step 7. Take up the slack in the sling before proceeding.

2. **JR** — Refer to Appendix C for instructions on using the TA Torque Assist Removal Tool.

ALTERNATE METHOD — Loosen the setscrew on the bushing nut which is located at the output end of the hollow shaft. Use a spanner, pipe or chain wrench to loosen the bushing nut (Section I, Table 6). Initially, the nut will freely rotate counter clockwise approximately 180° as the nut moves from the locked position to the removal position. At this point anticipate resistance which indicates unseating of the bushing. Continue to turn the nut until it is free from the hollow shaft. Prepare drive for lifting by disconnecting the torque arm at the drive end. Slide the drive from the bushing. The bushing can be left in place or removed, as required. If bushing will not slide off of the shaft, insert a small pry bar into the split of the bushing and pry the split open slightly to loosen the bushing and remove from the shaft. Proceed to Step 5 for replacement of seals or Step 9 for drive disassembly procedure.

3. **JF & JSC** — Remove the cover from the input end of the hollow shaft.

JF — Remove the bolts which fasten the drive to the driven equipment.

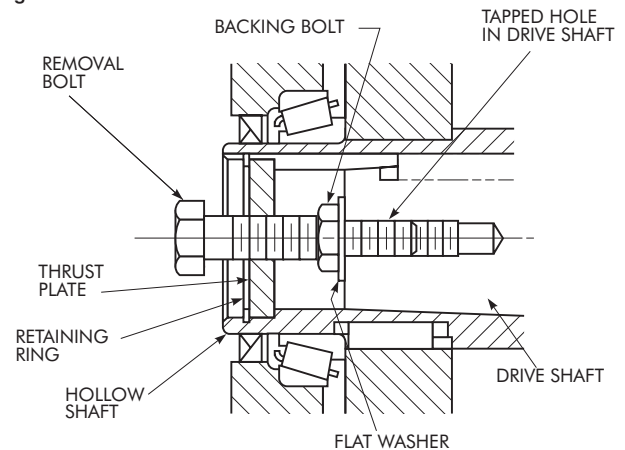
JSC — (a) If the drive is to be removed from the drive shaft, remove the seal housing fasteners (Figure 7, Section I), or (b) if the drive is to be removed with the drive shaft attached, remove the trough end mounting fasteners and drive shaft coupling bolts. Remove the assembly from the trough.

JF & JSC — Remove the thrust plate, fastener and retaining ring from the hollow shaft. Refer to Table 10 and select a backing bolt and flat washer and install them into the drive shaft as illustrated in Figure 15. The head of the backing bolt provides a working surface for the removal bolt. Reinsert the thrust plate and retaining ring into the hollow shaft and select a removal bolt from Table 10. Thread the removal bolt into the thrust plate until it contacts the backing bolt head. Torque the removal bolt to the value shown in Table 10. (If the thrust plate rotates in the shaft, align the slot in the plate with the hollow shaft keyway and insert a screwdriver or piece of key stock to prevent rotation of the plate). After torquing the bolt, as instructed, strike the bolt, sharply with a hammer and retorque the bolt if separation of the drive from the shaft did not occur. Repeat this procedure, retorquing the bolt after each blow, until separation occurs.

**TABLE 10 —
Removal & Backing Bolt Size & Length**

DRIVE SIZE	Removal Bolt Size & Minimum Length - Inches	Maximum Tightening Torque lb-ft (Nm)	Backing Bolt Size & Maximum Length - Inches
5107	0.625-11UNC x 1.75	133 (180)	0.500-13UNC x 1.25
5115	0.625-11UNC x 1.75	133 (180)	0.500-13UNC x 1.25
5203	0.750-10UNC x 2.00	242 (328)	0.625-11UNC x 1.75
5207	0.750-10UNC x 2.00	242 (328)	0.625-11UNC x 1.75
5215	1.000-8UNC x 2.50	567 (769)	0.875-9UNC x 2.25
5307	1.125-7UNC x 3.00	742 (1006)	1.000-8UNC x 2.50
5315	1.125-7UNC x 3.00	742 (1006)	1.000-8UNC x 2.50

Figure 15



CAUTION: Failure to follow this procedure may result in the destruction of the threads in the thrust plate. (If the retaining ring becomes damaged, refer to Appendix G, for replacement information).

Proceed as follows:

JF to Step 5 for replacement of Quadrive seals only OR Step 9 for drive disassembly procedure.

4. **JSC** — If the drive was removed with the seal housing and the drive shaft attached, remove the seal housing fasteners to separate the seal housing and drive shaft from the drive. After separation of the drive and shaft has been achieved, determine the type of seal equipped in the seal housing. If it is a waste packing seal (Figure 7, Section I), a packing gland seal (Figure 10, Section I) or a lip seal (Figure 8, Section I), proceed as follows for removal of the drive shaft from the seal housing:
- PACKING GLAND SEAL** — Remove the key from the drive shaft keyway. Loosen the compression ring fasteners. Remove the seal housing toward the tapered end of the drive shaft.
 - LIP SEAL** — Remove the key from the drive shaft keyway. Remove any burrs from the tapered end of the shaft and wrap the entire length with masking tape or a light weight Kraft paper to protect the seal lips during removal. Carefully remove the seal housing toward the tapered end of the drive shaft. For replacement of Quadrive seals only proceed to Step 5, otherwise to Step 9.
 - WASTE PACKING SEAL** — Remove the key from the drive shaft keyway. Remove the waste packing material and remove the seal housing toward the tapered end of the drive shaft.

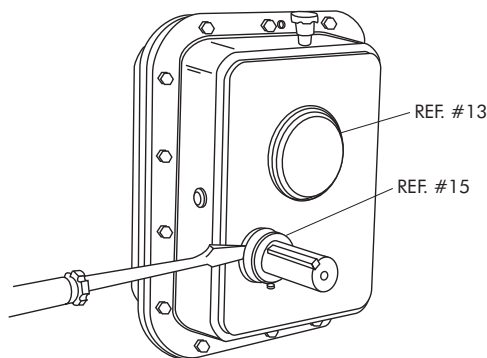
Drive Disassembly — (Refer To Parts Drawing Figure 19)

Prior to initiating any disassembly or repair, clean accumulated dirt and grime from the surface of the drive housing. Clean the exposed portion of the input and output shafts with a solvent and a non-abrasive cloth. If only the seals are being replaced, proceed to Step 5. If the drive will be disassembled for inspection or repair, remove input side seal covers, Ref. #13 & 15, as illustrated in Figure 16, then skip to Step 9.

CAUTION: Do not damage shaft. New seals will leak if seal contacting surface is marred. Do not use abrasive material on shaft seal contacting surface.

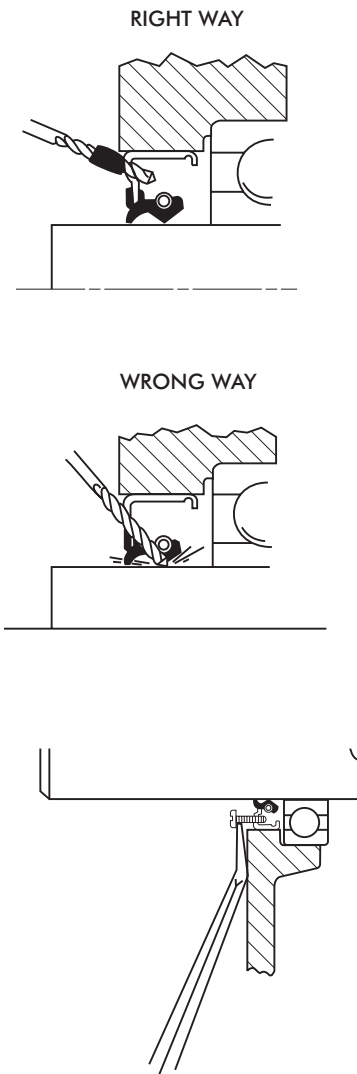
5. **SEAL REMOVAL** — The input side low speed and high speed shaft seals, Ref. #19 & 20, respectively, can be replaced without removing drive from the driven shaft. Remove input side seal covers, Ref. #13 & 15, as illustrated in Figure 16.

Figure 16



- a. Remove all sharp edges from shaft extension. Use a sharp center punch to lightly punch the seal case as a guide for drill bit. NOTE: Seals are not axially restrained. DO NOT drive seal into bore too deep, or disassembly of drive may be required to extract seal.
- b. Wrap several turns of tape around the drill bit approximately .250" (6 mm) from the drill point to prevent the drill bit from entering too deeply into the housing and damaging the bearing. Grease or magnetize the drill bit to help retain the chips. Drill two .125" (3 mm) diameter holes in the seal case 180° apart. Control the angle of the drill as illustrated in Figure 17 to prevent damage to the shaft.
- c. Insert two #10-.750" (M5 x 20) sheet metal screws into the seal case leaving .5" (13 mm) of the screw protruding above the seal face. DO NOT drive the screw more than .25" (6 mm) beyond seal face or bearing damage may occur. Use a claw type pry bar under the screw head as shown in Figure 17 to lift seal out. Remove all metal chips. Use a magnet to remove the metal chips that fall into the bore. Flush the drive to remove chips from the bearing. Remove Permatex from the housing bore.

Figure 17



6. **SEAL SURFACE CONDITION** — Carefully inspect polished surface of shaft where the seal makes contact. If the seal surface shows any sign of a nick, scratch, spiral swirl or groove, the shaft should be replaced or refurbished to prevent leakage of the lubricant. (In many instances the seal surface can be restored by use of a thin wall wear sleeve. Check with your local seal supplier and follow the manufacturer's instructions for installing the wear sleeve).

7. SEAL INSTALLATION

CAUTION: Protect seal lips from sharp edges of the keyway by wrapping thin strong paper around the shaft and coating the paper and seal lips with grease before sliding the seal on or off the shaft. Do not expand the seal lips more than .030" (0,75 mm) diameter.

- a. Coat O.D. of seal with #3 Permatex or equivalent sealant. Position seal squarely in seal bore with the garter spring toward bearing. Place a square ended cylindrical tool against seal and press or lightly tap tool (not seal) until seal outer wall is seated .14" (3,5 mm) inside the seal bore outer wall.

CAUTION: A shaft shoulder is NOT provided for stopping seal. DO NOT seat seal against bearing.


- b. Measure seal axial runout with a dial indicator mounted on the shaft. If the seal axial runout is more than .010" (0,25 mm), tap high side of seal with installation tool until seal axial runout is .010" (0,25 mm) or less.
 - c. Remove shaft wrapping and reinstall the input side seal covers, Ref. #13 and 15.
8. **DRIVE REPAIR IS COMPLETE** — Review instructions in Section I for reassembly of drive onto driven shaft.
 9. When seals, Ref. #19 & #20, are to be reused (replacement is recommended), wrap the input shaft keyway and output shaft threads with masking tape or light weight Kraft paper to protect seal lips during disassembly. Cover wrapping with a light coat of grease.
 10. If drive is equipped with a backstop, remove output side end cover Ref. #16, gasket Ref. #23, backstop Ref. #5A1, and key Ref. #5A4 from output housing Ref. #11. (Note the direction of rotation of the input shaft for proper reassembly).
 11. Lay drive on bench with input shaft down. Remove housing flange fasteners, Ref. #25. Tap out dowel pins.

SIZE 5115J05 — Remove fasteners from retaining plate, Ref. #3A6.

SIZES 5203 THRU 5315 — Use one of the housing flange fasteners as a jackbolt to separate input and output housing halves using the tapped hole on input housing flange provided for this purpose. Carefully lift off output housing, Ref. #11.

12. Remove the shaft assemblies (J05 - 3A & 4A; J09, J14 or J25 -1A, 2A, & 4A) from input housing, Ref. #10.
13. Drive seals out from input and output housing bores if replacement is indicated. Remove gasket material, seal compound and any accumulated foreign matter from seal joints, bores and adjacent sealing surfaces. Use a solvent to clean housing and shaft assemblies.

CAUTION: On Sizes 5203 thru 5315 tapered roller bearing cups are assembled in input housing with a slight clearance fit. In addition, metal shims for adjusting bearing preload and axial float are installed behind bearing cups in housing. When handling input housing be careful that bearing cups and shims do not fall out of input housing.

14. If drive is equipped with a backstop, check the shaft surface and backstop sprags (inside diameter) for signs of wear. If either component shows evidence of wear, both should be replaced (Ref. #1A and 5A or Ref. #3A and 5A assemblies). Also refer to Step 6 for inspection of seal surfaces.
15. Inspect gear teeth for wear or indications of fatigue e.g. hairline cracks at root of tooth. If one element has undergone severe wear or broken teeth, replace the mating element also.
16. Clean and inspect bearings for wear. Lubricate with light oil before spinning to avoid scoring of working surfaces. Remove any worn bearings with a wheel puller. When replacing tapered roller bearings, replace both cups and cones. DO NOT use new cone assemblies with worn (old) cups.
17. Use a wheel puller or press to remove gears Ref. #1A4 or 4A4 from the shaft. Exercise caution to avoid scoring shaft seal diameter with the keyway of gear.
18. Inspect all fasteners for damage or wear and replace with fasteners of equal grade. Grade 5 fasteners have three (3) radial lines on the head.  Fasteners are available in kit form, Ref. #80.
19. If the shaft assemblies can be reused intact (no new parts required), refer to Section III, Steps 6 thru 9, for reassembly procedure. Replace all shim-gaskets with new parts, Kit Ref. #100. On Sizes 5107 and 5115, use the same thicknesses as removed during disassembly.

Identifying & Ordering Parts

1. Refer to the drive component diagram, Figure 18 and exploded parts diagram, Figure 19, and make a list of the parts required by part reference number. For example, Ref. #15, 20 100, 1A, 2A1, and 2A2. When a gasketed joint is separated, always replace with new shim-gaskets. Order Ref. #100 shim-gasket kit.
2. Now refer to the parts list, Table 11, and determine the part description and Falk part number using the part reference number (Step 1) and the drive identification (e.g. 5107J25) in the column headers of the parts list.
3. Use the part description and Falk part number to order the required parts. In the examples in steps 1 and 2, Ref. #15, 20, 100, 1A, 2A1 and 2A2 for a 5107J25 would be ordered as follows:

Seal cover	4723094
Seal	2921419
Shim-gasket kit	0754740
Shaft assembly with gear	4729003
Bearing	2926357
Bearing	2926358
4. Table 12 and 13 convert Falk part numbers to bearing and seal manufacturer's part numbers. Tooth combinations are listed in Appendix G.
5. Place your order with your local Rexnord-Falk Distributor. If you need to locate a distributor, phone (414)342-3131 in the United States or Canada.

Recommended Spare Parts

1. For non-critical drive applications a complete set of bearings, seals and shim-gaskets is recommended. If stored in their original packaging in a dry, cool location, these parts have a minimum shelf life of 5 years.
2. For critical drive applications (where an outage would create a major production loss), a complete drive is recommended.

Figure 18

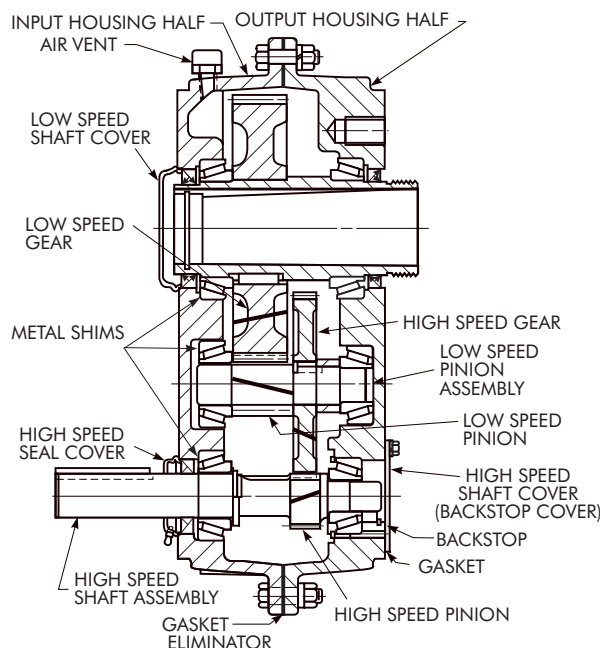


Figure 19

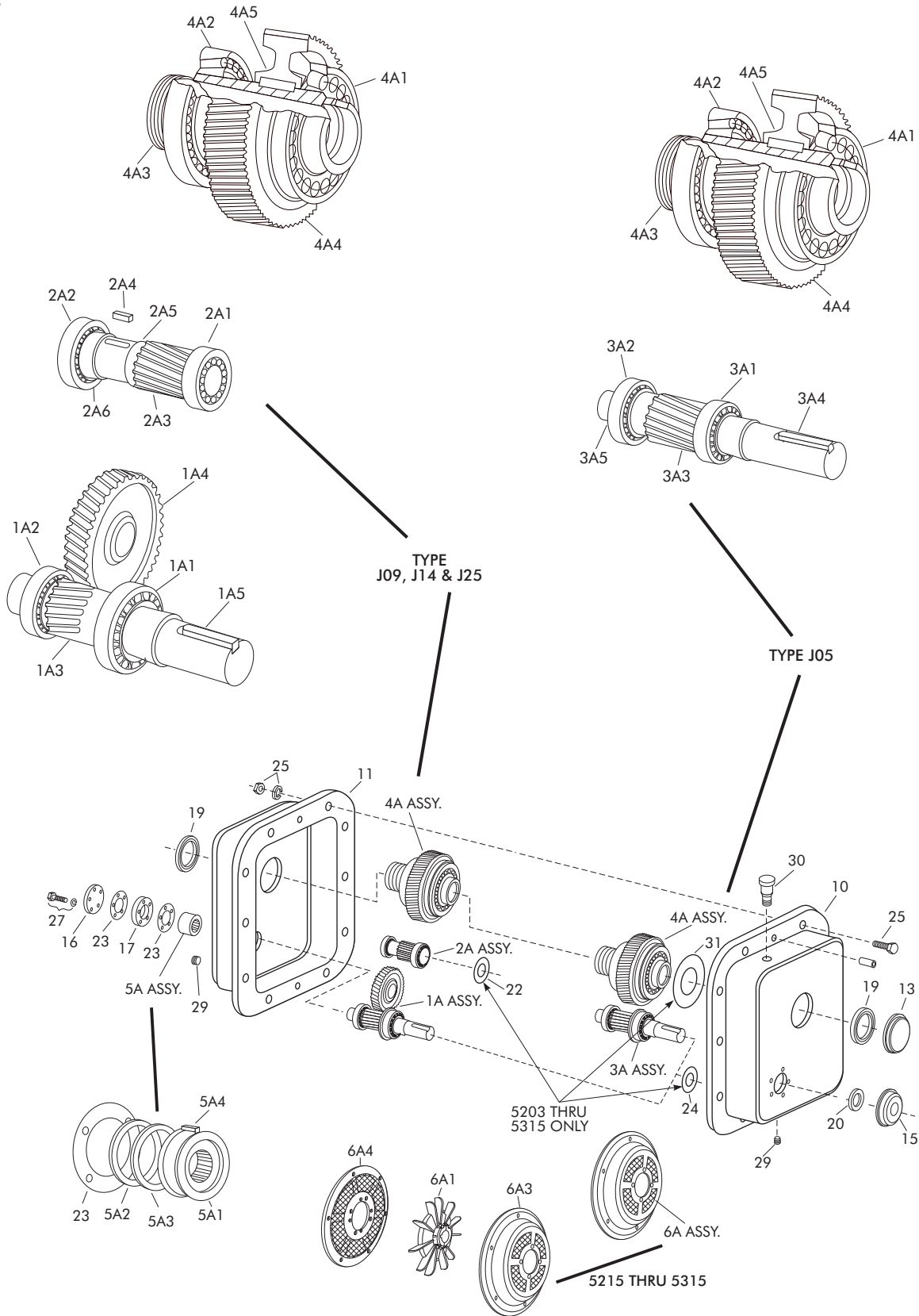




TABLE 11 — Parts List of Falk Part Numbers

Ref. No.	Part Description	DRIVE SIZE						
		5107	5115	5203	5207	5215	5307	5315
Housing Components — J05, J09, J14 & J25								
13	Shaft Cover	2109906	4723091	4723092	2110134	4723093	2110504	2110779
15	Seal Cover	4723094	4723095	4723096	4723097	4723098	4723099	4723109
16	Shaft Cover	1161865	1161866	1238030	2119130	1161870	1161870	1161870
16	Shaft Cover With Backstop	...	...	1238019	...	1219342	1237944	1219342
17	Cover Spacer-Backstop	...	...	...	2119132	...	...	...
19	Seal	2902218	2921425	2921422	2921421	2904606	2921423	2922295
20	Seal	2921419	2921416	2902929	2921417	2921420	2916797	2920669
30	Air Vent	0914088	0914088	0914088	0914088	0914088	0914088	0914088
80	Fastener Kit - Incl. Ref. #25, 27 & 29	4829000	4729017	4729032	4729049	4729079	4729082	4729117
100	Shim-Gasket Kit - Incl. Ref. #21, 22, 23, 24 & 31	0754740	0754741	0786836	0786837	0786838	0786839	0786840
Rotating Elements — J05								
3A	Shaft Assembly - Incl. Ref. #3A1 - 3A6	4729012	4729029	4729045	4729061	4729076	4729094	4729112
3A1	Bearing	2926357	2926361	2919339	2918700	2919359	0921354	2919215
3A2	Bearing	2926357	2919340	2919340	0921521	2919360	2916263	0921853
3A3	Pinion & Shaft - Incl. Ref. # 3A4 & 3A5	4729013	4729031	4729046	4729062	4729077	4729095	4729113
4A	Shaft Assembly - Ref. #4A1 - 4A5	4729015	4729033	4729047	4729063	4729078	4729096	4729114
4A1	Bearing	4729014	4720891	2911822	2905191	0921778	0921727	0921366
4A2	Bearing	4729014	4720891	2911822	2905191	0921778	0921727	0921366
4A3	Hollow Shaft - Incl. Ref. #4A5	4729016	4723015	4723028	4723039	4723050	4723061	4723073
4A4	Gear	1238091	1238105	1238018	1237897	1238053	1237941	1237763
5A	Backstop Assy. - Incl. Ref. #5A1 - 5A4 & 23	0738495	0738484	0785596	0783905	0785610	...	...
6A	Fan Assembly - Incl. Ref. #6A1 - 6A4	...	...	...	...	0785911	0785530	0785432
6A1	Fan	...	...	...	...	4729079	4729097	4729116
6A3	Guard	...	...	...	...	4729080	4729098	4729117
6A4	Backplate	...	...	...	...	4729081	4729099	4729118
Rotating Elements — J09								
1A	Shaft Assembly Without 1A4 Gear	4729004	4729021	4729037	4729053	4729068	4729086	4729104
1A	Shaft Assembly With 1A4 Gear	4729001	4729018	4729034	4729050	4729065	4729083	4729101
1A1	Bearing	2926357	2926361	2919339	2918700	2919359	0921354	2919215
1A2	Bearing	2926357	2919340	2919340	0921521	2919360	2916263	0921851
1A3	Pinion & Shaft - Incl. Ref. #1A5	4729007	4729024	4729041	4729056	4729071	4729089	4729107
1A4	Gear	1238087	1238108	1238015	1237895	1238055	1237967	1237889
5A	Backstop	0738495	0738484	0785596	0783905	0785610	0785529	0757183
Rotating Elements — J14								
1A	Shaft Assembly Without 1A4 Gear	4729005	4729022	4729038	4729054	4729069	4729087	4729105
1A	Shaft Assembly With 1A4 Gear	4729002	4729019	4729035	4729051	4729066	4729084	4729102
1A1	Bearing	2926357	2926361	2919339	2918700	2919359	0921354	2919215
1A2	Bearing	2926357	2919340	2919340	0921521	2919360	2916263	0921851
1A3	Pinion & Shaft - Incl. Ref. #1A5	4729008	4729025	4729042	4729057	4729072	4729090	4729108
1A4	Gear	1238088	1238107	1238016	1237896	1238057	1237942	1237856
5A	Backstop	0738495	0738484	0785596	0783905	0785610	0785529	0757183
Rotating Elements — J25								
1A	Shaft Assembly Without 1A4 Gear	4729006	4729023	4729039	4729055	4729070	4729088	4729106
1A	Shaft Assembly With 1A4 Gear	4729003	4729020	4729036	4729052	4729067	4729085	4729103
1A1	Bearing	2926357	2926361	2919339	2918700	2919359	0921354	2919215
1A2	Bearing	2926357	2919340	2919340	0921521	2919360	2916263	0921853
1A3	Pinion & Shaft - Incl. Ref. #1A5 & 1A6	4729009	4729026	4729043	4729058	4729073	4729091	4729109
1A4	Gear	1238089	1238106	1238017	1237223	1238059	1237943	1237764
5A	Backstop	0738496	0738506	0785596	0783905	0785610	0738529	0757183
6A	Shaft Fan Assembly - Incl. Ref. #6A1 - 6A4	...	...	...	...	0785611	0785530	0785432
6A1	Fan	...	...	...	...	4729079	4729097	4729116
6A3	Guard	...	...	...	...	4729080	4729098	4729117
6A4	Backplate	...	...	...	...	4729081	4729099	4729118

TABLE 11 — Parts List of Falk Part Numbers (Continued)

Ref No.	Part Description	DRIVE SIZE						
		5107	5115	<u>5203</u>	5207	5215	5307	5315
Rotating Elements — J09, J14 & J25								
2A	Shaft Assembly - Incl. Ref. #2A1 - 2A6	4729010	4729027	4729040	4729059	4729074	4729092	4729110
2A1	Bearing	2926359	2926360	2919338	2918700	0921350	0921793	0921850
2A2	Bearing	2926359	2926360	2919338	2918701	2916288	0921793	0921850
2A3	Pinion & Shaft - Incl. Ref. #2A4	4729011	4729028	4729044	4729060	4729075	4729093	4729111
2A5	Spacer	1179876	1179877	...	...	...	...	...
2A6	Spacer	1161925	1163034	1161889	1163762	2120246	...	...
4A	Shaft Assembly - Incl. Ref. #4A1 - 4A5	4729015	4729033	4729047	4729063	4729078	4729096	4729114
4A1	Bearing	4729014	4720891	2911822	2905191	0921778	0921727	0921366
4A2	Bearing	4729014	4720891	2911822	2905191	0921778	0921727	0921366
4A3	Hollow Shaft - Incl. Ref. #4A5	4729016	4723015	4723028	4723039	4723050	4723061	4729115
4A4	Gear	1238091	1238105	1238018	1237897	1238053	1237941	1237763
6A	Fan Assembly - Incl. Ref. #6A1 - 6A4	...	...	...	...	0785611	0785530	0785432
6A1	Fan	...	...	...	...	4729079	4729097	4729116

TABLE 12 — Bearing Cross Reference Numbers

Falk Part Number	Manufacturers Number
Tapered Roller Bearings †	
0921350	HM804843/HM804810
0921354	475/472
0921366	48393/48320
0921521	19138/19283-B
0921727	68462/68712
0921778	IM822049/IM822010
0921793	HM803149/HM803110
0921850	JHM807045/HM807010
0921851	46176/46368
0921853	46162/46368
2905191	497/492A
2911822	34478/34300
2916263	418/414
2916288	3879/3820
2918700	350A/352
2918701	339/332
2919215	HM813841A/HM813810
2919338	26112/26283-S
2919339	LM48548A/LM48510
2919340	17098/17244-B
2919359	386A/382A
2919360	3379/3320-B
2926357	30205M
2926358	30303M
2926359	30304M
2926360	30305M
2926361	30206M
4720891	29675/29620
4729014	JLM506810/JLM506849

* Other Falk suppliers of bearings that are considered equal to those listed are: TRW, Fafnir, FAG and BCA.

† Falk suppliers of Tapered Roller Bearings are: Timken, Bower and Tyson.

TABLE 13 — Viton Seal Cross Reference Numbers

Falk Part Number	Manufacturers Number ‡	
	Chicago Rawhide	National
2902929	13661	...
2904606	42433	...
2916797	21091	...
2920669	23843	...
2921416	11207	470712V
2921417	15138	...
2921419	8704	481570V
2921420	18582	...
2921421	33699	...
2921422	29912	415995V
2921423	46155	...
2921425	27324	455315V
2922295	52498	...

‡ Subject to substitution of equivalent seals without notice.



Section III Drive Reassembly

Refer to Parts Drawing Figure 19.

1. GENERAL

a. Clean all parts to be reassembled and coat all tapered roller bearing cups and pinion teeth with an SAE 20 (or heavier) oil. DO NOT lubricate gear teeth prior to assembly on shaft.

b. Heat all ball bearings and tapered roller bearing cones in an oven to 275°F(135°C).

CAUTION: Do not apply flame directly to bearings or rest bearings directly on a heated surface.

c. Slide or press all ball bearings and bearing cones tight against the shoulder.

CAUTION: Do not apply force to the bearing outer race. Apply force against the inner race only.

2. ASSEMBLY OF TAPERED ROLLER BEARING CUPS

a. **SIZE 5107 THRU 5315** — Drive high speed bearing cup, Ref. #1A2 or 3A2, squarely into high speed shaft bearing bore of output housing, Ref. #11, with a press or steel bar as shown in Figure 20.

On drives with an intermediate shaft assembly, Ref. #2A, install bearing cup, Ref. #2A2, into intermediate shaft bearing bore of output housing, Ref. #11.

NOTE: With the exception of Sizes 5207 and 5215, there is a small clearance fit between the intermediate shaft bearing cup and bearing bore of output housing. In an effort to inhibit tendency of bearing cup to fall out when housing is subsequently turned over for final assembly to input housing, coat output housing bearing bore with a NLGI #2 bearing grease prior to installing bearing cup. On Sizes 5207 and 5215 there is an interference fit between the intermediate shaft bearing cup and bearing bore of output housing. For these drives, assemble bearing cup into bearing bore of output housing with a press or steel bar as shown in Figure 20.

Similarly, coat low speed shaft bearing bore of output housing, Ref. #11, with a NLGI #2 bearing grease. Install low speed shaft bearing cup, Ref. #4A2, into low speed shaft bearing bore of output housing.

3. HIGH SPEED SHAFT ASSEMBLY — Ref. #1A or 3A Assembly.

Figure 20

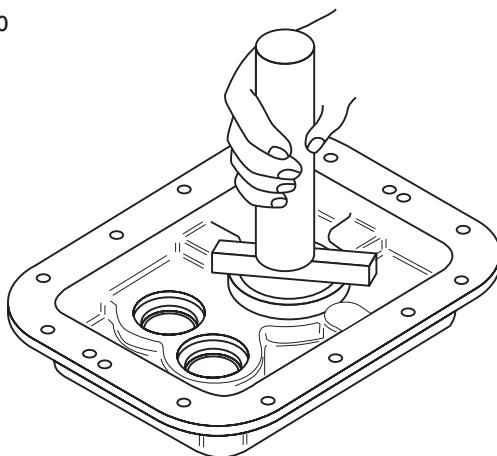
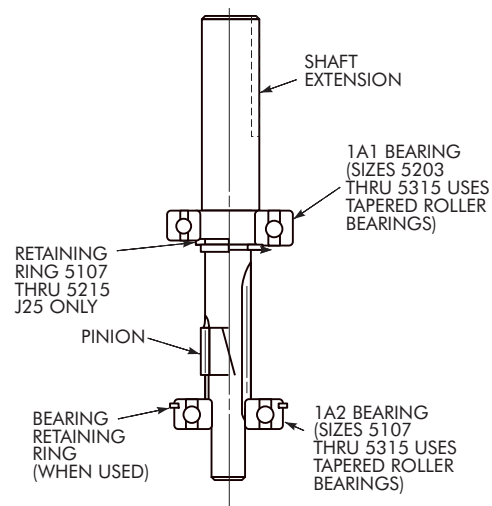


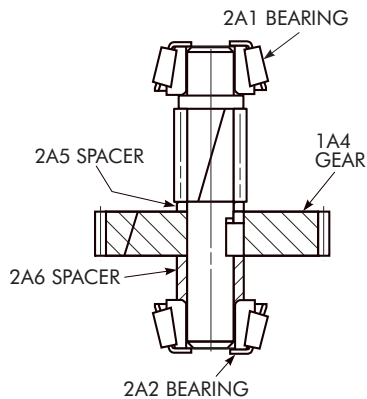
Figure 21



Seat heated bearings or cones, Ref. #1A1, 1A2 or 3A1 & 3A2, firmly against shaft shoulder or retaining ring.

CAUTION: Allow bearings to cool. Apply a coat of oil to the cooled bearings to lubricate and avoid scoring of working surfaces.

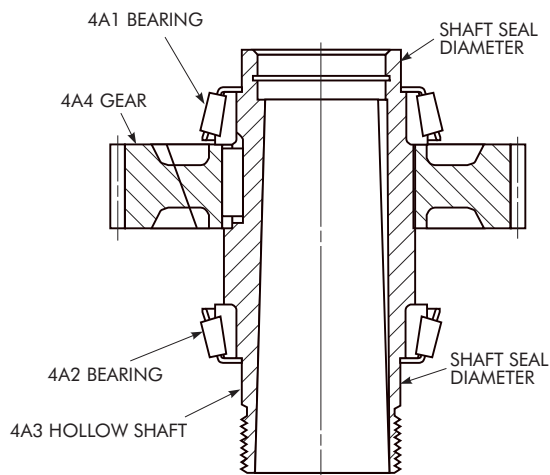
4. **INTERMEDIATE SHAFT ASSEMBLY** — Ref. #2A Assembly - Type J09, J14 and J25 - Figure 22. Prepare bearings per Steps 1b and c on Page 18.

Figure 22


- a. **ALL SIZES** — Heat gear Ref. #1A4 to 325° (163°C) in an oven. Insert key, Ref. #2A4, in shaft keyway. Assemble gear onto shaft, with the chamfer toward pinion, using a press to ensure a tight fit. Allow gear to cool before proceeding.
- b. Assemble spacer, Ref. #2A6, onto intermediate shaft (except Sizes 5307 and 5315). Seat bearings or cones, Ref. #2A1 & 2A2, on shaft. Seat all components firmly so spacers do not rotate on shaft.

CAUTION: Allow assembly to cool. Apply a coat of oil to the cooled bearings to lubricate and avoid scoring of the working surfaces.

5. **LOW SPEED SHAFT ASSEMBLY** — Ref. #4A Assembly - ALL TYPES - Figure 23. Prepare bearing cones per Steps 1b and c.

Figure 23


- a. Heat gear, Ref. #4A4, to 325°F (163°C) in an oven. Insert gear key, Ref. #4A5, into hollow shaft keyway. Assemble the gear with the chamfer toward the shoulder

on the shaft using a press to ensure a tight fit.

WARNING: Exercise care so that the gear keyway does not contact the shaft seal diameter(s) as scoring could occur.

- b. Seat bearing cones, Ref. #4A1 & 4A2, firmly against gear and shoulder.

CAUTION: Allow assembly to cool before proceeding. Apply oil to the cooled bearing rollers and gear teeth to lubricate and avoid scoring of the working surfaces.

6. BEARING ADJUSTMENT

- a. **SIZES 5107 THRU 5315** — Bearing adjustment is made by adjusting thickness of metal shims, Ref. #24, behind bearing cups in input housing, Ref. #10.

NOTE: The thickest shim should be located adjacent to the bearing cup. The thinnest shims should be located in the center of the shim pack.

- (1) Support input housing, such that when high speed shaft assembly, Ref. #1A or 3A, is lowered into place there is clearance for shaft extension end. Install bearing cups in input housing without any metal shims. Tap dowel pins into input housing with solid pin nearest high speed shaft bore.
- (2) Lower low speed shaft assembly, Ref. #4A, into input housing, Ref. #10, with threaded end facing up. (DO NOT install Ref. #1A [or 3A] or 2A shaft assemblies at this time.)
- (3) Assemble output housing, Ref. #11, to input housing. Install housing flange fasteners, Ref. #25, with heads of cap screws against input housing. Cross tighten fasteners to torque specified in Table 14.

TABLE 14 — Housing Flange Fastener Size & Tightening Torque ±5% (Non-Lubricated Fasteners)

DRIVE SIZE	Fastener Size	Tightening Torque
		lb-ft (Nm)
5107	.312-18	19 (26)
5115	.312-18	19 (26)
5203	.375-16	27 (37)
5207	.500-13	67 (91)
5215	.500-13	67 (91)
5307	.500-13	67 (91)
5315	.500-13	67 (91)

- (4) Measure low speed shaft axial float with a dial indicator, in accordance with method described on the following page..

- (5) Low Speed Shaft Axial Float Measurement — Ref. #4A Assembly – For drives equipped with TA Taper bushing, carefully thread bushing nut onto hollow low speed shaft threads. Rotate shaft to seat cone assemblies in bearing cups. Set up a dial indicator on output housing as illustrated in Figure 24. Indicator tip must rest on low speed shaft and not on nut surface. Rotate and oscillate shaft with axial force applied in both directions to obtain axial float measurement.

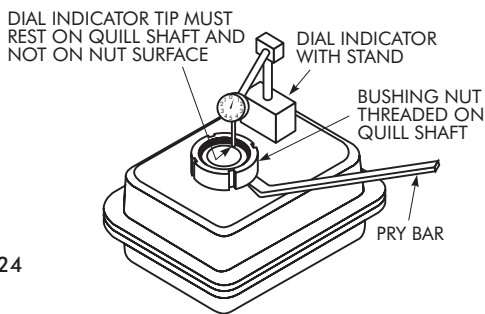


Figure 24

For drives without the TA Taper bushing, insert hollow shaft thrust plate and secure with retaining ring as illustrated in Section I, Figure 5. Thread a bolt into the thrust plate. Set up a dial indicator on output housing, as illustrated in Figure 24, with the indicator tip on end of hollow shaft. Rotate and oscillate shaft with axial force applied in both directions to obtain axial float measurement. (Upward force can be applied by applying upward force on head of thrust plate bolt.)

Refer to Table 15 and note the preload specified for bearings 4A1 and 4A2. Add to upper and lower limits shown, the axial float measured. This will indicate thickness of metal shim(s), Ref. #31, to be added behind input housing bearing cup to obtain the specified preload. Table 16 provides shim thickness for each shim pack to assist in obtaining the desired results.

TABLE 15 — Preload & Axial Float Settings

DRIVE SIZE	Ref. #4A1 & 4A2 Bearing Preload Inches (mm)	Ref. #2A3 Assembly Intermediate Shaft Axial Float Inches (mm)	Ref. #1A3 or 3A3 Assembly High Speed Shaft Axial Float Inches (mm)
5107	0.001-0.004 (0,00-0,10)	.001-.003 (0,03-0,08)	.001-.003 (0,03-0,08)
5115	0.111-0.004 (0,00-0,10)	.001-.003 (0,03-0,08)	.001-.003 (0,03-0,08)
5203	0.001-0.004 (0,00-0,10)	.001-.003 (0,03-0,08)	.001-.003 (0,03-0,08)
5207	0.001-0.004 (0,00-0,10)	.001-.003 (0,03-0,08)	.001-.003 (0,03-0,08)
5215	0.001-0.004 (0,00-0,10)	.001-.003 (0,03-0,08)	.001-.003 (0,03-0,08)
5307	0.001-0.004 (0,00-0,10)	.001-.003 (0,03-0,08)	.001-.003 (0,03-0,08)
5315	.001-0.004 (0,00-0,10)	.001-.003 (0,03-0,08)	.001-.003 (0,03-0,08)

For example, from Table 15 the desired bearing preload for the Size 5203 low speed shaft bearings, Ref. #4A1 & 4A2, is .002" to .004" (0,05 mm to 0,10 mm) tight. If the measured axial float is .039" (0,99mm) then addition of metal shims with a total thickness between .041" to .043" (1,04 mm to 1,09 mm) behind the low speed input housing bearing cup will produce the desired preload.

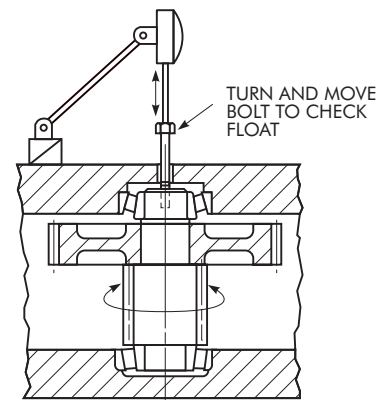
- (6) With drive resting on input housing cover, Ref. #10, tap the dowel pins out of the housing, remove flange fasteners and set output housing aside. Remove low speed shaft assembly and bearing cups. Install metal shim(s), as determined in Step 6b5, behind bearing cup in input housing.

Reinstall dowels, shims and output housing cover & torque housing flange fasteners, Ref. #25, to value in Table 14. Proceed to Step 7.

- (7) Lower low speed, Ref. #4A, high speed, Ref. #1A (or 3A), and intermediate, Ref. #2A shaft assemblies into input housing. Reinstall dowels and output housing and torque flange fasteners to value listed in Table 14. Recheck low speed shaft with dial indicator to ensure that no float is present. Measure intermediate and high speed shaft float with a dial indicator in accordance with methods described below.

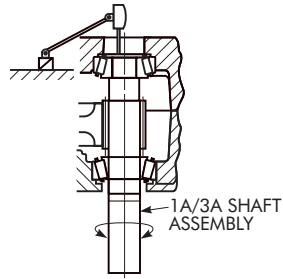
- (8) **INTERMEDIATE SHAFT AXIAL FLOAT MEASUREMENT** — Ref. #2A Assembly — Figure 25. Remove pipe plug from output housing cover. Install a .375-16 x 2" size bolt through hole in housing and turn by hand until snug. Set up a dial indicator on output housing with the indicator tip on bolt head as illustrated in Figure 26. While turning bolt in a clockwise direction, lift upward to measure axial float. Subtract from this reading the axial float for the Ref. #2A shaft assembly shown in Table 15. This indicates the thickness of metal shim(s), Ref. #22 to be added behind the input housing bearing cup to obtain the specified axial float.

Figure 25



For example, from Table 15 the desired axial float for the Size 5307 intermediate shaft assembly, Ref. #2A, is .001" to .003" (0,03 mm to 0,08 mm). If the measured axial float is .039" (0,99 mm) then addition of metal shims with a total thickness between .036" to .038" (0,91 mm to 0,96 mm) behind the intermediate speed input housing bearing cup will produce the desired axial float.

Figure 26

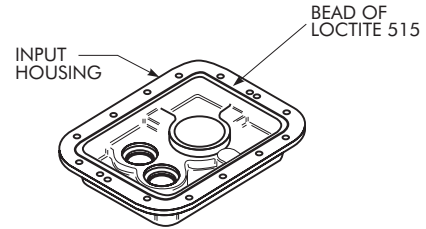


- (9) **High Speed Shaft Axial Float Measurement** — Ref. #1A or 3A Assembly – Figure 26. Set up a dial indicator as illustrated in Figure 26 to measure axial float of output end of shaft. Push upward on shaft extension end with a twisting motion to obtain reading. Subtract from this reading the axial float for the Ref. #1A (or 3A) shaft assembly shown in Table 15. This indicates the thickness of metal shim(s), Ref. #24, to be added behind the input housing bearing cup to obtain the specified axial float.

WARNING: Cover shaft extension end keyway with tape to avoid lacerations to the hand.

- (10) Disassemble drive once more to add metal shim(s) behind input intermediate and high speed housing bearing cups to obtain the specified axial float shown in Table 15.
- (11) Apply a bead of Loctite 515 to input housing flange as shown in Figure 27. Assemble output housing to input housing and install dowels. Install and cross tighten flange fasteners to torque specified in Table 14.

Figure 27



- (12) Check intermediate and high speed shaft axial floats with dial indicator to ensure they are within specified limits. If necessary, disassemble drive. Clean Loctite 515 from housing flanges. Readjust metal shims behind input housing bearing cups, reapply Loctite 515, and reassemble. Repeat until specified float is achieved.

7. BACKSTOP INSTALLATION

If drive will be installed on the driven equipment using a TA tapered bushing, do not install backstop at this time. If not, refer to Appendix B, for installation instructions.

8. SHAFT COVER INSTALLATION

Assemble output side high speed shaft cover, Ref. #16, and gasket, Ref. #23 (Table 16). Cross tighten fasteners to 3.5 lb-ft (4,7 Nm) torque.

9. SEAL INSTALLATION

Refer to Section II, Step 7. Position input end low speed and high speed shaft covers, Ref. #13 & 15, respectively, over housing bore and tap lightly until cover is fully seated into bore.

DRIVE IS READY TO INSTALL — Refer To Section I.

TABLE 16 — Individual Shim-Gasket Part Numbers

Ref. No.	Shim Thickness Inch (mm)	DRIVE SIZE						
		5107	5115	5203	5207	5215	5307	5315
100	...	?	?	0786836	0786837	0786838	0786839	0786840
22	.002 (0,05)	793762	793770	0787097	0781116	0787109	0787080	0785034
	.005 (0,13)	793763	793771	0787098	0781117	0787110	0787081	0785035
	.010 (0,25)	1242592	1242594	1238022	1237213	1238062	1237946	1237766
	.030 (0,76)	793764	793772	0787099	0781118	0787111	0787082	0785036
23 (w/o backstop) 23 (with backstop)	.031 (0,79)	1161871	1161872	2120198	2119131	1161876	1161876	1161876
	.031 (0,79)	1161871	1161872	1238020	2119131	1189882	2120077	1189882
24	.002 (0,05)	793762	793770	0787100	0781116	0787106	0787083	0785037
	.005 (0,13)	793763	793771	0787101	0781117	0787107	0787084	0785038
	.010 (0,25)	124592	1242594	1238023	1237213	1238061	1237947	1237767
	.030 (0,76)	793764	793772	0787102	0781118	0787108	0787085	0785039
31	.002 (0,05)	793758	793766	0787094	0781113	0787112	0787077	0785031
	.005 (0,13)	793759	793767	0787095	0781114	0787113	0787078	0785032
	.010 (0,25)	1242591	1242593	1238021	1237212	1238063	1237945	1237765
	.030 (0,76)	793760	793768	0787096	0781115	0787114	0787079	0785033

Falk Shim-Gasket Compressibility — Inches (mm)

Thickness	New	.002 (0,05)	.005 (0,13)	.007 (0,18)	.009 (0,23)	.010 (0,25)	.015 (0,38)	.030 (0,76)	.031 (0,79)
	Compressed		.002 (0,05)	.005 (0,13)	.006 (0,15)	.008 (0,20)	.010 (0,25)	.013 (0,33)	.030 (0,76)	.028 (0,71)



Table of Contents

Appendix A: Lubrication Recommendations 23
Appendix B: Backstop Installation 27
Appendix C: TA Removal Tool 29
Appendix D: Motor Mount Installation 31
Appendix E: Vertical Standpipe Installation 33
Appendix F: Modifications for Non-Standard Mounting Positions. 34
Appendix G: Retaining Rings for Bushing Nuts and Thrust Plates, Tooth Combinations
for Vibration Analysis & JSC Lip Seal Accessory 36
Appendix H: Drive Shaft Recommendations for Tapered Drive Shafts 37
Appendix J: Drive Shaft Recommendations Using TA Taper Bushing. 38
Appendix K: Drive Shaft Recommendations Using (TCB) Kit. 40
Appendix L: V-Belt Guard Installation 42
Appendix M: Electric Fan Installation 44

Lubrication

Introduction

Lubricants listed in this manual are typical products **ONLY** and should not be construed as exclusive recommendations. Industrial type petroleum based rust and oxidation inhibited (R & O) gear lubricants or industrial type sulfur-phosphorus extreme pressure (EP) gear lubricants are the recommended lubricants for ambient temperatures of 30°F to 125°F (-1°C to 52°C).

For drives operating outside the above temperature range, refer to the "Synthetic Lubricants" paragraph. Synthetic lubricants can also be used in normal climates.

Carefully follow instructions on the drive nameplate, warning tags and installation manuals furnished with the drive.

Viscosity (Important)

The proper viscosity grade for R & O and EP lubricants is found in Table 3. For synthetic lubricant viscosity grades, refer to Table 4 and the "Synthetic Lubricants" paragraphs. Petroleum based lubricant selections must have a pour point at least 10°F (5.5°C) below the expected minimum ambient starting temperature.

Petroleum Based Lubricants

R & O GEAR LUBRICANTS (TABLE 3) — Industrial type petroleum based rust and oxidation inhibited (R & O) gear lubricants are the most common and readily available general purpose gear lubricants.

EXTREME PRESSURE (EP) LUBRICANTS (TABLE 3) — For highly loaded drives or for drives loaded in excess of original estimates, industrial-type petroleum extreme pressure lubricants are preferred. The EP lubricants currently recommended are of the sulfur-phosphorus type.

CAUTION: PETROLEUM BASED LUBRICANTS & INTERNAL BACKSTOPS — Do not use EP lubricants or lubricants with anti-wear additives or lubricant formulations including sulfur, phosphorus, chlorine, lead derivatives, graphite or molybdenum disulfides in drives equipped with internal cartridge type backstops. Some lubricants in Table 3 may contain anti-wear additives. EP lubricants in Table 3 do contain several of these additives.

WARNING: EP LUBRICANTS IN FOOD PROCESSING INDUSTRY — EP lubricants may contain toxic substances and should not be used in the food processing industry without the lubricant manufacturer's approval. Lubricants which meet USDA "H1" classification are suitable for food processing applications.

Synthetic Lubricants

Synthetic lubricants of the polyalphaolefin type are recommended for cold climate operation, high temperature applications, extended temperature range (all season) operation and/or extended lubricant change intervals. The proper viscosity grade of synthetic lubricant is given in Table 4. Usable temperature ranges can sometimes be widened if specific application conditions are known.



NOTE: SYNTHETIC LUBRICANTS & INTERNAL BACKSTOPS – Synthetic lubricants of the polyalphaolefin type may be used in drives with internal backstops. Select proper lubricant grade from Table 4.

NORMAL CLIMATE CONDITIONS — For temperatures of 30°F (–1°C) and above, use viscosity grades as recommended in Table 3 for petroleum based lubricants, or see Table 4 for synthetic lubricants.

WARNING: SYNTHETIC LUBRICANTS IN FOOD PROCESSING INDUSTRY – Synthetic lubricants may contain toxic substances such as sulfur, phosphorus, chlorine, lead derivatives, graphite or molybdenum disulfides and should not be used in the food processing industry without the lubricant manufacturer’s approval. Lubricants which meet USDA “H1” classification are suitable for food processing applications.

Lubricant Changes

OIL ANALYSIS REPORT — Checking oil condition at regular intervals is recommended. In the absence of more specific limits, the guidelines listed below may be used to indicate when to change oil:

1. Water content is greater than 0.05% (500 ppm).
2. Iron content exceeds 150 ppm.
3. Silicon (dust/dirt) exceeds 25 ppm.
4. Calcium content 50 ppm above normal lubricant amount.
5. Viscosity changes more than 15%.

PETROLEUM LUBRICANTS — For normal operating conditions, change gear oils every six months or 2500 operating hours, whichever occurs first. If the drive is operated in an area where temperatures vary with the seasons, change the oil viscosity grade to suit the temperature, refer to Table 3. Lubricant suppliers can test oil from the drive periodically and recommend economical change schedules.

SYNTHETIC LUBRICANTS — Synthetic lube change intervals can be extended to 8000 hours depending upon operating temperatures and lubricant contamination. Laboratory analysis is recommended for optimum lubricant life and drive performance. Change lube with change in ambient temperature, if required. Refer to Table 4.

TABLE 1 — Approximate Oil Capacity – Quarts (Liters) ★

DRIVE SIZE	JR, JF & JSC	JRV & JFV
5107	2 (1,9)	3 (2,8)
5115	3 (2,8)	4.5 (4,3)
5203	3.5 (3,3)	5 (4,7)
5207	5.5 (5,2)	7.5 (7,1)
5215	9 (8,5)	13 (12,3)
5307	13 (12,3)	18 (17)
5315	15 (14,2)	21 (19,9)

★ Quantities are approximate. Always fill drive to specified level.

Grease Lubricated Seals

All drives are furnished with grease purged seals which minimize the entry of contaminants and abrasive dusts into the drive. Drives are shipped with NLGI #2 grease in the seal housing cavities unless otherwise specified.

Whenever changing oil in the drive, purge the seals with one of the NLGI #2 greases listed in Table 2.

TABLE 2 — Greases for Grease Purged Seals
[0°F to 200°F (-18°C to 93°C)]

Manufacturer	Lubricant
Amoco Oil Co. BP Oil Co. Chevron U.S.A., Inc. Citgo Petroleum Corp.	Amolith Grease No. 2 Energrease LS-EP2 Industrial Grease Medium Premium Lithium Grease No. 2
Conoco Inc. Exxon Company, U.S.A. Houghton Int., Inc. Imperial Oil Ltd.	EP Conolith Grease No. 2 Unirex N2 Cosmolube 2 Unirex N2L
Kendall Refining Co. Keystone Lubricants Lyondell Petrochemical (ARCO) Mobil Oil Corp.	Multi-Purpose Lithium Grease L421 Zeniplex 2 Litholine H EP 2 Grease Mobilith 22
Mobil Oil Corp. Petro-Canada Products Phillips 66 CO Shell Oil Co.	Mobilith SHC 460 † Multipurpose EP2 Philube Blue EP Alvania Grease 2
Shell Canada Limited Sun Oil Co. Texaco Lubricants	Alvania Grease 2 Ultra Prestige EP2 Premium RB Grease
Unocal 76 (East & West) Valvoline Oil Co.	Unoba EP2 Multilube Lithium EP Grease

† High performance synthetic alternate.

Some of these greases are of the EP type and may contain toxic substances not allowed in the food processing industry. If grease could contaminate the product, as in the food and drug industries, the grease should be removed. A grease that meets the USDA “H1” classification is suitable for food processing applications.

Periodically (at least every six months) depending upon the frequency and degree of contamination, purge contaminated grease from seals by slowly pumping fresh bearing grease through the seal, **WITH HAND GREASE GUN**, until fresh grease flows out along the shaft. Wipe off purged grease.

Table 3 — Petroleum Based Gear Lubricants ★

Ambient Temperature Range		+30 to +90°F	+70 to +125°F
		-01 to +32°C	+21 to +52C
AGMA Viscosity Grade		5	6
ISO Viscosity Grade		220	320
Viscosity	cSt @ 40°C	198 - 242	288-352
	SSU @ 100°F	918 - 1122	1335-1632
Manufacturer		Lubricant	
Amoco Oil Co.		Amer. Ind. Oil 220 Permogear/Amogear EP 220 •	Amer. Ind. Oil 320 Permogear/Amogear EP 320 •
BP Oil Co.		Energol HLP-HD 220 Energear EP 220 •	Energear EP 320
Chevron U.S.A., Inc.		Machine Oil AW 220 Gear Compounds EP 220 •	Machine Oil AW 320 Gear Compounds EP 320 •
Citgo Petroleum Corp.		Citgo Pacemaker 220 Citgo EP Compound 220 •	Citgo Pacemaker 320 Citgo EP Compound 320 •
Conoco Inc.		Dectol R&O Oil 220 Gear Oil 220 •	Dectol R&O Oil 320 Gear Oil 320 •
Exxon Company, U.S.A.		Teresstic 220 Spartan EP 220 •	Teresstic 320 Spartan EP 320 •
Houghton International, Inc.		Hydro - Drive HP 1000 MP Gear Oil 220 •	MP Gear Oil 320 •
Imperial Oil Ltd.		Teresso 220 Spartan EP 220 •	Teresso 320 Spartan EP 320 •
Keystone Lubricants		KLC-50 Keygear 220 •	Keygear 320 •
Lyondell Petrochemical (ARCO)		Duro 220 Pennant NL 220 •	Duro 320 Pennant NL 320 •
Mobil Oil Corp.		DTE Oil BB Mobilgear 220 •	DTE Oil AA Mobilgear 320 •
Petro-Canada Products		Harmony 220 Ultima EP 220 •	Harmony 320 Ultima EP 320 •
Phillips 66 Co.		Magnus Oil 220 Philgear 220 •	Magnus Oil 320 Philgear 320 •
Shell Oil Co.		Morlina 220 Omala Oil 220 •	Morlina 320 Omala Oil 320 •
Shell Canada Limited		Tellus 220 Omala Oil 220 •	Tellus 320 Omala Oil 320 •
Texaco Lubricants		Regal Oil R&O 220 Meropa 220 •	Regal Oil R&O 320 Meropa 320 •
Unocal 76 (East)		Unax RX 220 Extra Duty NG Gear Lube 220 •	Unax AW 320 Extra Duty NG Gear Lube 320 •
Unocal 76 (West)		Turbine Oil 220 Extra Duty NG Gear Lube 220 •	Turbine Oil 320 Extra Duty NG Gear Lube 320 •
Valvoline Oil Co.		Valvoline AW ISO 220 AGMA EP 220 •	Valvoline AW ISO 320 AGMA EP 320 •

- ★ Minimum viscosity index of 90. Maximum operating temperature of lubricants is 200°F (93°C)
 ● Extreme Pressure Lubricant (contains sulfur-phosphorus). **DO NOT** use in drives equipped with internal backstop.



TABLE 4 — Synthetic Lubricants – Polyalphaolefin Type ‡

Ambient Temp. Range	-30 to +10°F (-34 to -12°C)	-15 to +50°F (-26 to +10°C)	0 to +80°F (-18 to +27°C)	+10 to +125°F (-12 to +52°C) ★	+20 to +125°F (-7 to +52°C)
AGMA Viscosity Grade	05	25	45	55	65
ISO Viscosity Grade	32	68	150	220	320
Viscosity cSt @ 40°C	28.8-35.2	61.2-74.8	135-165	198-242	288-352
Viscosity SSU @ 100°F	134-164	284-347	626-765	918-1122	1335-1632
Manufacturer	Lubricant				
Chevron U.S.A., Inc.	...	...	...	Clarity Synthetic PM Oil 220 Syn. Gear Lube Tegra 220 ■	...
Conoco Inc.	Syncon R & O 32	Syncon R & O 68 Syncon EP 68 ■	Syncon EP 150 ●■	Syncon R & O 220 ● Syncon EP 220 ●■	Syncon EP 320 ●■
Dryden Oil Co.	Dryden SHL Lubricant 32	Dryden SHL Lubricant 68	Dryden SHL Lubricant 150	Dryden SHL Lubricant 220	Dryden SHL Lubricant 320
Exxon Company, U.S.A.	Teresstic SHP 32	Teresstic SHP 68	Teresstic SHP 150 Spartan Synthetic EP 150 ■	Teresstic SHP 220 Spartan Synthetic EP 220 ■	Teresstic SHP 320 Spartan Synthetic EP 320 ■
Mobil Oil Corp.	SHC 624	SHC 626	SHC 629 Mobilgear SHC 150 ■	SHC 630 Mobilgear SHC 220 ■	SHC 632 Mobilgear SHC 320 ■
Pennzoil Products Co.	Pennzgear SHD 32	Pennzgear SHD 68 Super Maxal "S" 68 ■	Pennzgear SHD 150 Super Maxal "S" 150 ■	Pennzgear SHD 220 Super Maxal "S" 220 ■	Pennzgear SHD 320 Super Maxal "S" 320 ■
Petro-Canada Products	...	...	Super Gear Fluid 150EP ■	Super Gear Fluid 220EP ■	Super Gear Fluid 320EP ■
Shell Oil Co.	...	...	...	Hyperia 220 Hyperia S 220 ■	Hyperia 320 Hyperia S 320 ■
Sun Co.	...	...	...	Sunoco Challenge 220 Sunoco challenge eP 220 ■	Sunoco Challenge 320 Sunoco Challenge EP 320 ■
Texaco Lubricants Co.	Pinnacle 32	Pinnacle 68	Pinnacle 150 Pinnacle EP 150 ■	Pinnacle 220 Pinnacle EP 220 ■	Pinnacle 320
Whitmore Manufacturing Co.	...	...	Decathlon 4EP ■	Decathlon 5EP ■	Decathlon 6EP ■

‡ Minimum viscosity index of 130. Consult lubricant supplier/manufacturer for maximum operating temperature.

● Minimum viscosity index of 120.

■ Extreme pressure EP lubricant (contains sulphur-phosphorus). **DO NOT** use in drive equipped with internal backstop.

★ Drives **NOT** equipped with internal backstop may widen the ambient temperature range to -25 to +125°F (-32 to 52°C).

Backstop Installation

Introduction

The following instructions apply to INSTALLATION ONLY of internal backstops in horizontal drives, Sizes 5107 thru 5215 single and double reduction and Size 5307 & 5315 double reduction.

CAUTION: If backstop is to be replaced, the high speed shaft must also be replaced. Refer to instructions regarding high speed shaft replacement, Section III.

Remove all external loads from system before servicing drive or accessories, and lock out starting switch of prime mover.

Lubricant

PETROLEUM BASED LUBRICANTS — Use R & O type lubricants which do not contain anti-wear(AW) additives if the drive is equipped with an internal backstop.

CAUTION: Do not use EP lubricants, lubricants with anti-wear additives or lubricant formulations including sulfur, phosphorus, chlorine, lead derivatives, graphite or molybdenum disulfides in drives equipped with internal backstops. Refer to Appendix A for proper selection of petroleum based lubricants. Use of an improper lubricant will contribute to premature wear or malfunction of the backstop.

SYNTHETIC LUBRICANTS — Synthetic lubricants of the polyalphaolefin type may be used in drives with internal backstops.

Before installing backstop, check direction of free rotation (overrunning) indicated by the arrow etched on each side of the backstop.

Backstop Application

Backstops are designed to prevent reverse rotation or backrun without backlash in applications such as conveyors, bucket elevators, fans, rotary pumps and kilns. Backstops are not approved for use on systems that are designed for handling of people such as elevators, manlifts, ski tows and ski lifts. DO NOT use a backstop as a substitute for a brake.

Indexing

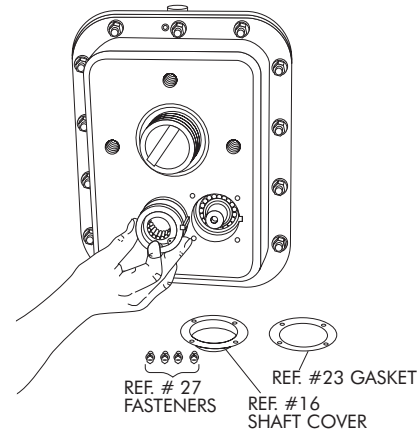
DO NOT use the backstop for indexing applications. The backstop is designed to prevent reverse rotation five times or less in eight hours, with one minute or more in overrunning direction between backstopping load applications. If backstopping operations are more frequent, or the time between operations is less than one minute, the backstop is classified as an indexing device and must be referred to the Factory.

Installation

1. Drain oil from drive.

If a backstop is being added to an existing drive, remove fasteners Ref. #27, gasket Ref. #23 and end cover Ref. #16, Figure 1.

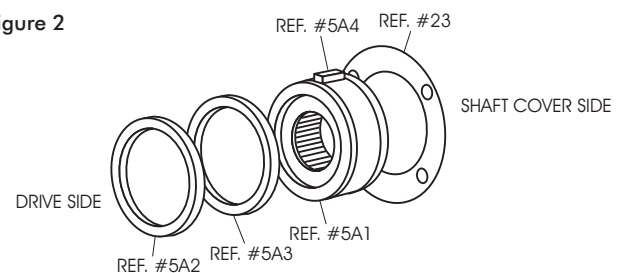
Figure 1



If a backstop is being replaced, for Sizes 5107 and 5115, remove fasteners Ref. #27, end cover Ref. #16, gasket Ref. #23, backstop Ref. #5A1 and spacer Ref. #5A3 (where necessary). For Sizes 5203 thru 5315, remove fasteners Ref. #27, end cover Ref. #16, gasket(s) Ref. #23, backstop Ref. #5A1, spacer Ref. #35A3 (all sizes) and cover spacer Ref. #17 (Size 5207 only). See Section II for complete parts list.

2. Remove backstop Ref. #5A1 from the kit and wipe off any excess lubricant.
3. **SIZE 5107** — Assemble retaining ring 5A2 into one of the grooves on the backstop O.D., Figure 2.

Figure 2



4. **SIZE 5115J25** — Assemble retaining ring 5A2 into one of the grooves on the backstop O.D. and slide spacer Ref. #5A3 into position as illustrated in Figure 2.
5. **SIZES 5203 THRU 5315** — Insert spacer Ref. #5A3 into exposed housing bore. This spacer will fit between bearing cup and backstop. (Retaining ring supplied with backstop kit is used as spacer for Size 5207.)

Backstop Installation

6. **ALL SIZES** — Apply oil to the O.D. of the high speed shaft backstop journal and the sprags inside of the backstop. Insert key Ref. #5A4 into backstop keyway Figure 2. Align the key with the keyway in the exposed housing bore and carefully slide the backstop into the bore while slowly rotating the high speed shaft. The shaft will only rotate in one direction. **DO NOT FORCE OR HAMMER**; this may damage the shaft or misalign the sprags.

Check operation of backstop by turning high speed shaft in required direction of rotation by hand. If the shaft does not rotate in the required direction, remove backstop, reverse it, reposition the retaining ring and spacer (where required) and reinsert it into the bore as instructed above.

Rotate high speed shaft in the required direction of rotation and then reverse the rotation to lock up the backstop. Observe the position of the sprags. All sprags must be engaged and lay in the same relative position around the shaft. If the sprags are not uniformly positioned, lightly tap the backstop cage to centralize all the sprags around the shaft and cage. If sprags cannot be uniformly positioned in this manner, remove the backstop and run a finger around the sprags in the overrunning direction. Reinstall backstop as instructed in preceding steps.

Check the position of the sprags several times by overrunning and locking the sprags. If all sprags move uniformly, hold the backstop in the locked position and proceed to the next assembly step.

7. **SIZES 5203 & 5215 THRU 5315** — If the backstop is being added to an existing drive, discard the original end cover Ref. #16 and fasteners Ref. #27 and replace with the end cover, fasteners and gasket included with the backstop kit. When a backstop is being replaced, use a new gasket Ref. #23 from the shim-gasket kit Ref. #100.

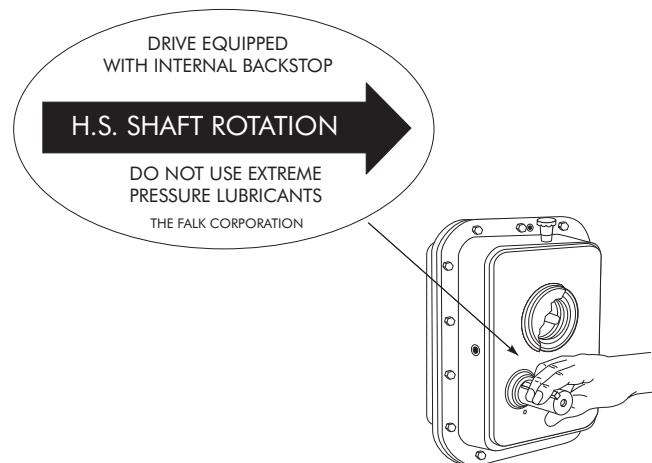
NOTE: Position gasket and spacer so that the drain back hole is open. Blocking the drainback hole will not allow oil to lubricate backstop sufficiently and could lead to premature wear, resulting in backstop or drive failure. Cross tighten the fasteners to 8 lb-ft (11 Nm) torque.

8. **SIZE 5207** — If the backstop is being added to an existing drive, install spacer Ref. #17 (spacer with drain back hole) between housing and original end cover Ref. #16, using gaskets Ref. #23 supplied with backstop kit. A gasket must be installed on both sides of spacer. When a backstop is being replaced, use two new gaskets, Ref. #23 from the shim-gasket kit Ref. #100.

NOTE: Position gasket and spacer so that the drain back hole is open. Blocking the drainback hole will not allow oil to lubricate backstop sufficiently and could lead to premature wear, resulting in backstop or drive failure. Cross tighten the fasteners to 8 lb-ft (11 Nm) torque.

9. Clean housing surface for rotation and WARNING labels. Affix the rotation indicator next to high speed shaft extension to indicate the free direction of rotation (Figure 3). Fill to oil level specified in Section I with oil specified in Appendix A. Check motor for correct rotation before completing connection to drive.

Figure 3



TA Removal Tool

Introduction

The patented TA removal tool offers a positive method for removing a TA Taper equipped Quadrive from the driven shaft. This method uses the torque multiplying characteristic of the drive to separate the drive from the bushing and driven shaft.

The removal tool is available in kit form suitable for use with Sizes 5107 thru 5315. The kit can be ordered from your Rexnord-Falk Distributor by specifying "TA Removal Kit - Part 0769406". NOTE: Use of this tool requires a minimum axial clearance "M" shown in Figure 1 and Table 1.

CAUTION: DO NOT modify the tool in any way OR use it in another manner except to loosen the bushing nut as instructed herein.

Figure 1

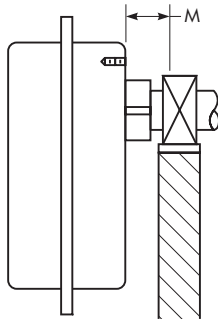


TABLE 1 — Minimum Tool Clearance – Inches (mm)

DRIVE SIZE	M Dimension
5107	2.62 (67)
5115	2.62 (67)
5203	2.62 (67)
5207	2.62 (67)
5215	3.18 (81)
5307	3.18 (81)
5315	3.18 (81)

Preparation For Removal

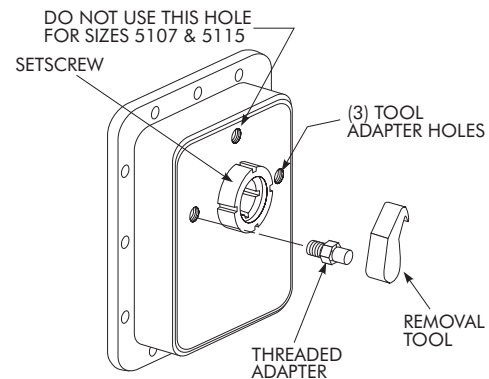
WARNING: Always "lock out" prime mover before working on the Quadrive.

1. Quadrive shafts, input and output, must be free to rotate.
 - a) Remove any external load on the driven shaft.
 - b) Remove belts from input shaft sheave.
 - c) Remove the backstop (if so equipped). Refer to Section II — Step 10, for backstop removal instructions.

CAUTION: DO NOT disconnect the drive from its torque arm until the removal process is completed. In addition, the drive must be supported during removal process. Use a sling around the motor mount or as recommended in SECTION I, Step 7. Be sure to take up the slack in the sling before proceeding.

2. Loosen the setscrew on the O.D. of the bushing nut and select the most convenient of the tapped holes in the housing face for the threaded adapter. Figure 2.
3. Select the proper adapter from the tool kit. (Adapters are marked with the Quadrive Size and part number.) Make sure the tapped hole in the housing face is clean before inserting the adapter. Apply tightening torque from Table 2.

Figure 2



4. Mount the removal tool as illustrated in Figure 3 or 4. It is generally preferable to install the tool in a position where its weight will tend to keep it engaged into the nut. Then rotate the input shaft until the tool hook engages one of the slots in the nut.

TABLE 2 — Adapter Tightening Torque

DRIVE SIZE	Adapter Part Number	Torque lb-ft (Nm)
5107	2111955	35 (47)
5115	2111956	70 (95)
5203	9111957	108 (146)
5207	2111958	120 (163)
5215	2111959	180 (244)
5307	2111959	180 (244)
5315	2111959	180 (244)



TA Removal Tool

Figure 3

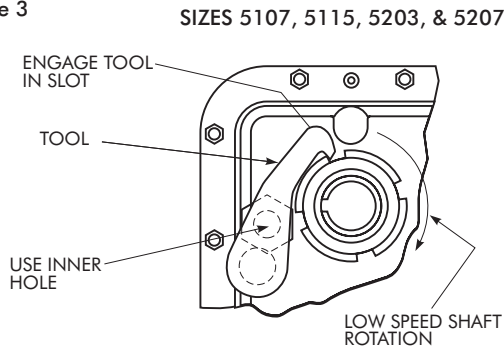
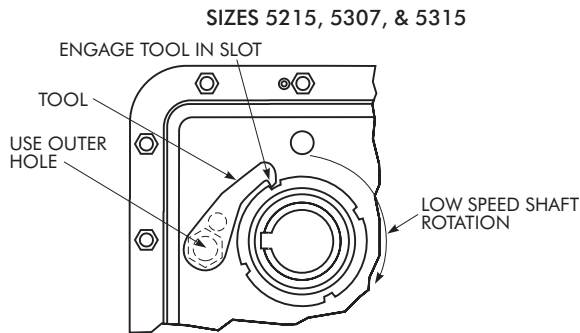


Figure 4



Removal of Quadrive

5. Use a spanner wrench to apply torque through the input shaft keyway (Type J05 clockwise; Types J09, J14 or J25 counter-clockwise) to loosen the bushing nut.

CAUTION: Never use the prime mover to produce the torque needed. This could result in severe personal injury or damage to the equipment.

To avoid damage to the drive or the removal tool, DO NOT exceed the H.S. shaft torque values listed in Table 3. NOTE: The nut will rotate freely for approximately 180° as it moves from the locked to the removal position. Resistance will indicate that unseating is occurring. Turn until the nut and bushing are completely free. Now, prepare the drive for lifting by disconnecting the torque arm at the drive end.

6. **ALTERNATE METHOD** — Torque may be applied to the sheave or sprocket mounted on the input shaft.

**TABLE 3 — Maximum Torque – H.S. Shaft
lb-ft (Nm)**

DRIVE SIZE	Drive Reduction			
	J05	J09	J14	J25
5107	164 (223)	88 (120)	58 (78)	33 (44)
5115	248 (336)	133 (181)	90 (121)	50 (68)
5203	406 (550)	224 (304)	143 (193)	79 (107)
5207	493 (668)	263 (357)	173 (234)	100 (136)
5215	677 (917)	371 (503)	245 (332)	133 (181)
5307	762 (1033)	405 (549)	278 (377)	150 (203)
5315	813 (1102)	432 (585)	283 (384)	160 (217)

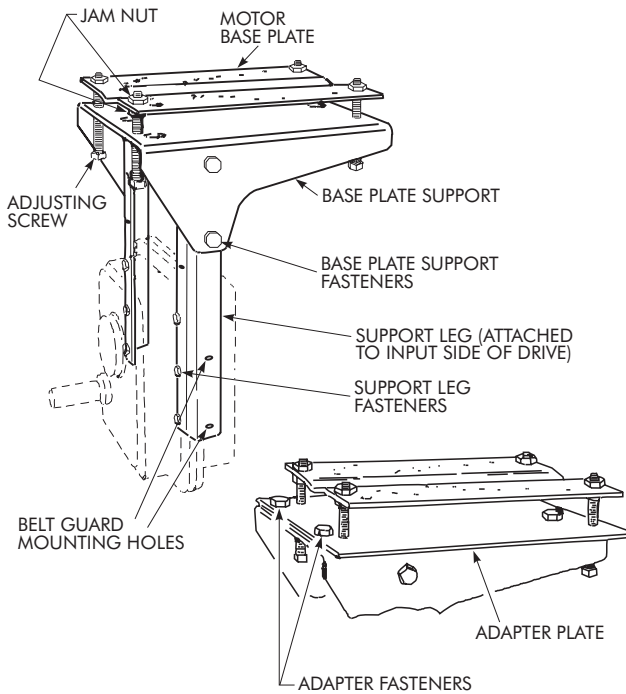
Motor Mount Installation

Introduction

The Falk Equi-Poised motor mount is an all steel weldment that bolts directly to the drive housing of Falk Shaft Mounted (Type JR), Flange Mounted (Type JF) and Screw Conveyor (Type JSC) Drives, as shown in Figure 1.

This modern design provides a simple means of tensioning V-belts or chains with adjusting screws. Motor baseplates are available from Factory predrilled for NEMA and IEC standard foot-mounted motors within the rated capacity of the drive.

Figure 1

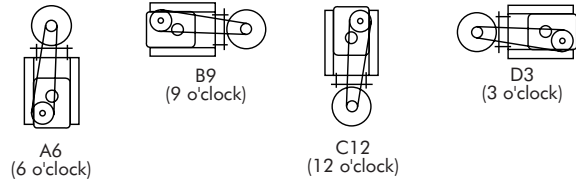


Assembly Instructions

From Figure 2, determine which assembly is required. For minimum bearing loads on driven machine, minimum shaft deflection and the most economical belt selections, use the 6 o'clock mounting position, high speed shaft relative to the low speed shaft, illustrated in Figure 1. The motor/drive assembly can also be mounted in positions shown in Figure 2. Always locate air vent at the top of horizontal drives.

STANDARD ASSEMBLIES

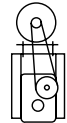
Figure 2



Letter = Motor Mount Position
Clock = Drive High Speed Shaft Position

OPTIONAL ASSEMBLY

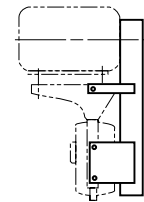
The motor mount may be mounted on the high speed shaft end of FLANGE MOUNTED DRIVES – JF (also SCREW CONVEYOR DRIVES – JSC) if clearance over the trough end permits) when increased motor mount clearance is required at the driven machine. Consult Factory for SHAFT MOUNTED DRIVES – JR.



Guards

CAUTION: Consult applicable local and national safety codes for proper guarding of rotating members.

Mounting holes located on the motor mount supports are provided for installing a belt guard. Refer to Appendix L for installation of Falk V-Belt guards.



OSHA type guard when specified. Dimensions to suit components.

WARNING: Remove all external loads from system before servicing drive or accessories.

1. **ASSEMBLE MOTOR MOUNT** — Loosely assemble support legs to the base plate support as shown in Figure 1.

NOTE: Nuts on inside for Sizes 5107 thru 5115.
Nuts on outside for Sizes 5203 thru 5315.

For NEMA motor frames 254 and larger or IEC motor frames 160 & larger, fasten adapter plate to base plate support and tighten adapter fasteners to the torque specified in Table 1. Assemble adjusting screws to base plate support (or adapter plate when used). Assemble motor base plate to adjusting screws with a jam nut above and below the motor base plate.

TABLE 1 — Motor Mount Fasteners & Torques ★ lb-ft (Nm)

DRIVE SIZE	Support Leg to Baseplate Support		Support Leg to Housing		Adapter Plate to Baseplate Support		Adjusting Screws (W/O Adapter)		Adjusting Screws (With Adapter)	
	Fastener Size	Tightening Torque	Fastener Size	Tightening Torque	Fastener Size	Tightening Torque	Fastener Size	Tightening Torque	Fastener Size	Tightening Torque
5107	.375-16UNC x 1.00	28 (38)	.312-18UNC x 1.50	20 (26)	...	...	.625-11UNC x 5.00	60 (81)	...	...
5115	.375-16UNC x 1.00	28 (38)	.312-18UNC x 1.50	20 (26)	.625-11UNC x 1.00	60 (81)	.625-11UNC x 5.00	60 (81)	.750-10UNC x 6.00	108 (146)
5203	.500-13UNC x 1.25	69 (94)	.375-16UNC x 2.00	28 (38)	.625-11UNC x 1.00	60 (81)	.625-11UNC x 5.00	60 (81)	1.000-8UNC x 6.00	180 (244)
5207	.500-13UNC x 1.25	69 (94)	.500-13UNC x 2.25	69 (94)	.625-11UNC x 1.00	60 (81)	.625-11UNC x 5.00	60 (81)	1.250-7UNC x 7.00	362 (491)
5215	.625-11UNC x 1.50	137 (186)	.500-13UNC x 2.25	69 (94)	.625-11UNC x 1.00	60 (81)	.625-11UNC x 5.00	60 (81)	1.250-7UNC x 7.00	362 (491)
5307	.750-10UNC x 1.75	245 (332)	.500-13UNC x 2.50	69 (94)	.625-11UNC x 1.00	60 (81)	.625-11UNC x 5.00	60 (81)	1.250-7UNC x 7.00	362 (491)
5315	.750-10UNC x 1.75	245 (332)	.500-13UNC x 2.50	69 (94)	.625-11UNC x 1.00	60 (81)	.625-11UNC x 5.00	60 (81)	1.250-7UNC x 7.00	362 (491)

★ All fasteners are Grade 5.



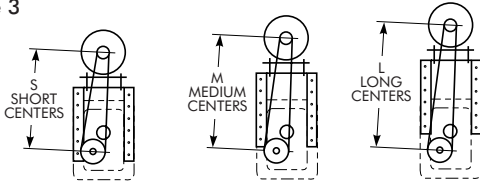
Motor Mount Installation

2. **ATTACH MOTOR MOUNT TO DRIVE** — To determine the number of housing flange fasteners to be removed for a given shaft center and drive size, refer to Table 2. Remove and discard appropriate number of housing flange fasteners, and replace them with the longer support leg fasteners provided. Attach support legs to the input side of drive with the hex nuts on output side of drive. Tighten support leg and base plate support fasteners to torque values specified in Table 1.

Adjustment of the belt or chain is accomplished by turning adjusting screws evenly. **DO NOT** over tighten belts or chains. Over tightening belts or chains reduces belt/chain and bearing life. When the required tension is reached, tighten adjusting screw jam nuts to torques listed in Table 1. Adjust chain tension to manufacturer's specifications. Adjust belts as follows:

SHAFT CENTERS FOR HORIZONTAL & VERTICAL DRIVES

Figure 3



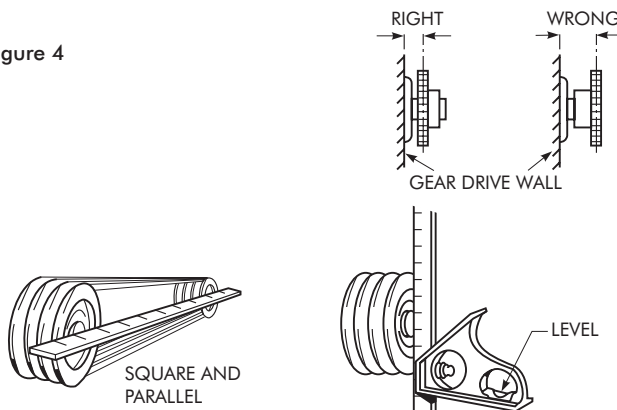
The ideal belt tension is the lowest tension at which the belt will not slip under peak load conditions. Check belt tension frequently during the first 24 to 48 hours of run-in operation. Keep belts free from foreign material which may cause slippage. Inspect the V-belt drive periodically; re-tighten belts if they are slipping.

TABLE 2 — Support Leg Fastener Quantity (Each Side)

Shaft Centers	DRIVE SIZE					
	5107	5115	5203	5207	5215	5307 5315
Short	NA	NA	4	4	4	6
Medium	3	3	3	3	3	5
Long	2	2	2	2	2	4

3. **MOUNT MOTOR** — Position motor on motor base plate so that all mounting holes are in alignment. Install and tighten motor fasteners.
4. **SPROCKET, PULLEY OR SHEAVE CONNECTION** — Mount power take-offs as close to drive and motor housing as possible to avoid undue bearing load and shaft deflection. Align the high speed shaft of drive square and parallel with motor shaft by placing a straightedge across the face of the sprockets or sheaves as illustrated in Figure 4. Check horizontal shaft alignment by placing one leg of a square against the face of the sheave or sprocket with the spirit level on the horizontal leg of the square.

Figure 4



Vertical Standpipe Installation

Introduction

The following instructions apply to the installation of standpipe kits to standard drives mounted for vertical operation (high speed shaft up or down). Drawings are representative of this series of drives and may not agree in exact detail with all drive sizes.

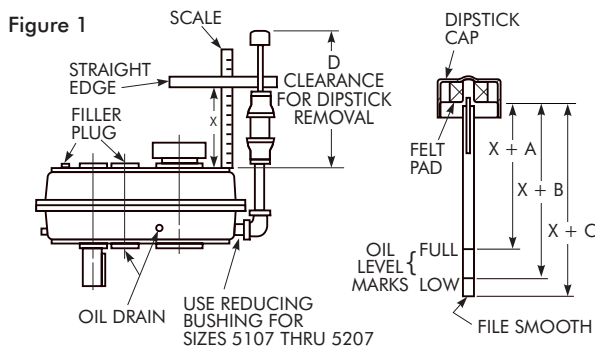
High Speed Shaft Down — Figure 1.

- After installing the drive per the Owners Manual installation instructions, determine which of the lower side plug locations on the drive will provide the best location for the standpipe, observing clearance required to remove dipstick (Dimension D, Table 1). Discard the air vent. When the air vent location is not used for the standpipe, relocate the pipe plug from the selected standpipe location to the air vent location. Recoat pipe plug threads with Permatex #3 or equivalent sealant before reinstalling.

TABLE 1 — Dimensions - Inches (mm)

DRIVE SIZE	A	B	C	D
5107	0.90 (23)	1.10 (28)	1.60 (41)	19.2 (488)
5115	0.90 (23)	1.10 (28)	1.60 (41)	18.3 (465)
5203	1.08 (27)	1.28 (33)	1.78 (45)	18.2 (462)
5207	1.14 (29)	1.34 (34)	1.84 (47)	20.4 (518)
5215	1.54 (39)	1.74 (44)	2.24 (57)	22.1 (561)
5307	1.54 (39)	1.84 (47)	2.34 (59)	23.7 (602)
5315	1.70 (43)	2.20 (56)	2.70 (69)	23.1 (587)

- Coat all pipe threads of kitted parts with Permatex #3 or equivalent sealant.
- Assemble kitted parts to the drive as illustrated in Figure 1 and then secure the standpipe with an external support to maintain its vertical position.



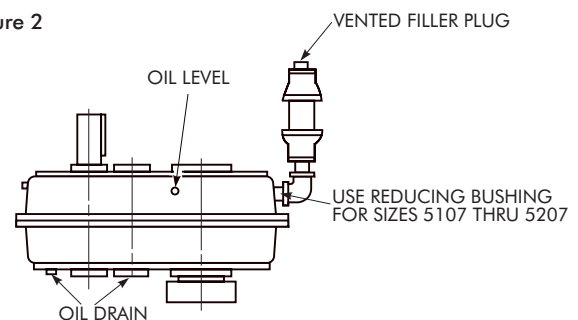
- Carefully measure Dimension "X" as illustrated in Figure 1.
- From Table 1:
 - X + A equals oil level "Full" mark.
 - X + B equals oil level "Low" mark.
 - X + C equals dipstick length.

- Scribe Dimensions X + A and X + B on the dipstick as illustrated in Figure 1. Make measurements from the felt pad in the dipstick cap.
- Lightly chisel permanent oil level marks on the scribed lines and cut the dipstick to the length marked. File end of dipstick smooth.
- Install magnetic drain plug furnished in oil drain location.
- Remove the oil filler plug. Add oil until the oil level reaches the "Full" mark on the dipstick. Coat the filler plug (not vented) with Permatex #3 or equivalent sealant and replace it.
- Filler plug must always be removed to relieve entrapped air before checking oil level.

High Speed Shaft Up — Figure 2.

- After installing the drive per the Owners Manual installation instructions, determine which of the upper four side plug locations on the drive will provide the best location for the standpipe, observing clearance required to remove dipstick (Dimension D, Table 1). Discard the air vent. When the air vent location is not used for the standpipe, relocate the pipe plug from the selected standpipe location to the air vent location. Recoat pipe plug threads with Permatex #3 or equivalent sealant before reinstalling.

Figure 2



- Coat all pipe threads of kitted parts with Permatex #3 or equivalent sealant.
- Assemble kitted parts to drive as illustrated in Figure 2 and then secure the standpipe with an external support to maintain its vertical position.
- See Figure 1 and follow steps 4 thru 7 at left.
- Install magnetic drain plug furnished in oil drain location.
- Remove one of the three oil level plugs. Add oil through the standpipe until the oil level reaches the plug hole. Coat the plug with Permatex #3 or equivalent sealant and replace it. Be sure to use only the vented filler plug in the standpipe.



Modifications for Non-Standard Mounting Positions

Instructions

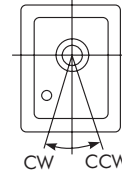
For non-standard mountings, modify drives as illustrated below and on Page 35 to assure satisfactory lubrication. For applications that exceed the limits shown, drives that are both rotated AND tilted and drives with backstops, consult Falk.

CAUTION: Inadequate lubrication will cause damage.

When replacing a pipe plug (P) with a street elbow (E), insert the plug in the elbow (E/P). When replacing a pipe plug (P) with a street elbow (E), pipe nipple (N) and a pipe cap (C), discard the pipe plug. Kits consist of parts for an oil expansion chamber. Pipe fittings and kits tabulated on Page 38 are available from Falk. Pipe fittings may also be purchased locally. Use galvanized pipe fittings.

Remove all pipe plugs and coat them and the added parts, with Permatex #3 or equivalent to prevent leakage. Install parts as illustrated to suit the mounting position. The air vent must be in the top of the drive or in the kit standpipe. Fill drives with oil to the level indicated by the letter "L" in the following drawings.

Standard Drive Mounting Limits



The standard drive rotation limits from the basic 3, 6, 9 & 12 o'clock mounting positions are given in Section I, Page 4. For higher limits, follow the instructions at the left and the drawings below. (6 o'clock illustrated)

CODE

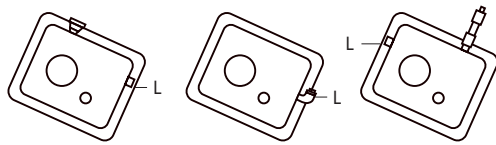
B — Bushing N — Nipple
 C — Cap P — Pipe Plug
 E — Street Elbow STD — No Modifications
 L — Oil Level

Horizontal Drive Modifications 20° Max. Drive Rotation

5 to 20° CW Rotation – Sizes 5107 & 5115

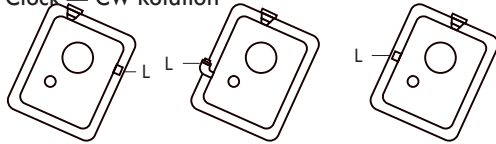
10 to 20° CW Rotation – Sizes 5203 thru 5315

3 O'Clock — CW Rotation



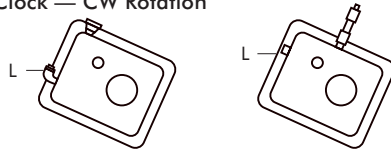
5107 = STD 5115 = .375 E/P 5203 & 5207 = KIT 0786775
 5215 thru 5315 = KIT 0786776

6 O'Clock — CW Rotation



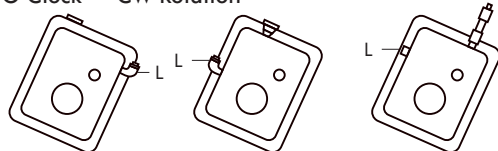
5107 = STD 5115 = .375 E/P 5203 thru 5315 = STD

9 O'Clock — CW Rotation



5107 = 5-12° STD 5203 & 5207 = KIT 0786775
 5107 = 13-20° .375 E/P 5215 thru 5315 = KIT 0786776
 5115 = .375 E/P

12 O'Clock — CW Rotation

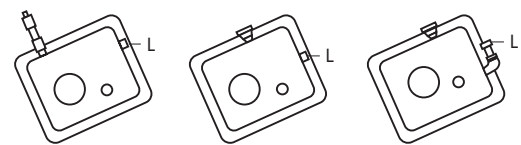


5107 = .375 E/P 5115 = .375 E/P 5203 & 5207 = KIT 0786775
 5215 thru 5315 = KIT 0786776

5 to 20° CCW Rotation – Sizes 5203 thru 5315

10 to 20° CCW Rotation – Sizes 5107 & 5115

3 O'Clock — CCW Rotation



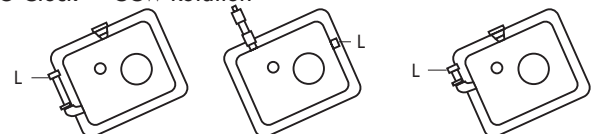
5107 = KIT 0738540 5115 = STD 5203 = .375 E/C & .375 X 1.00N
 5207 = .375 E/C & .375 X 2.00N
 5215 = .500 E/C & .500 X 2.00N
 5307 = .500 E/C & .500 X 2.50N
 5315 = .500 E/C & .500 X 2.50N

6 O'Clock — CCW Rotation



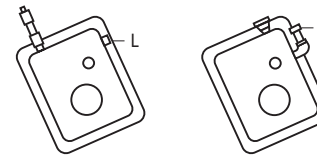
5107 & 5115 = STD 5203 = .375 E/C & .375 X 1.00N
 5207 = .375 E/C & .375 X 1.50N
 5215 = .500 E/C & .500 X 1.12N
 5307 & 5315 = .500 E/C & .500 X

9 O'Clock — CCW Rotation



5107 = .375 E/C & .375 X 3.00N 5115 = KIT 0786775 5203 = .375 E/C & .375 X 1.00N 1.50N
 5207 = .375 E/C & .375 X 1.00N 1.50N
 5215 = .500 E/C & .500 X 1.12N 1.50N
 5307 = .500 E/C & .500 X 1.50N 2.00N
 5315 = .500 E/C & .500 X 1.50N 2.00N

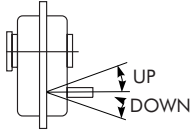
12 O'Clock — CCW Rotation



5107 & 5115 = KIT 0738540 5203 = .375 E/C & .375 X 1.50N
 5207 = .375 E/C & .375 X 2.00N
 5215 = .500 E/C & .500 X 2.00N
 5307 = .500 E/C & .500 X 2.50N
 5315 = .500 E/C & .500 X 2.50N

Modifications for Non-Standard Mounting Positions

Standard Drive Mounting Limits



The standard drive incline limits from the basic 3, 6, 9 & 12 o'clock mounting positions are given in Section I, Page 4. For higher limits, follow the instructions on Page 37 and the drawings below. (6 o'clock illustrated)

CODE

C — Cap N — Nipple
 E — Street Elbow P — Pipe Plug
 L — Oil Level STD — No Modifications

Standard Pipe Fittings ★ — Inches

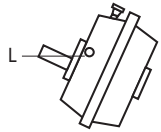
.375-18 NPT	Falk No.	.500-14 NPT	Falk No.
.375 Street Elbow	0915252	.500 Street Elbow	0915251
.375 Cap	0914802	.500 Cap	0914803
.375 x 1 Nipple	0915724	.500 x 1.12 Nipple	0915734
.375 x 1.5 Nipple	0915725	.500 x 1.5 Nipple	0915735
.375 x 2 Nipple	0915722	.500 x 2 Nipple	0915736
.375 x 3 Nipple	0915727	.500 x 2.5 Nipple	0915723
		.500 x 3 Nipple	0915737
		.500 x 4 Nipple	0915739

★ Kits: Falk Nos. 0786775 & 0786776 . . . Oil expansion chamber parts. All pipe fittings are galvanized.

Horizontal Drive Modifications for Inclined H.S. Shaft

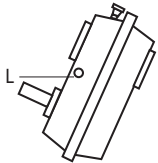
H.S. Shaft Inclined 20 to 30° Up

3 O'Clock H.S.S. Up



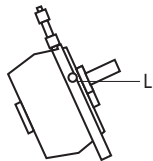
5107 THRU 5315 = STD

6 O'Clock H.S.S. Up



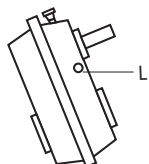
5107 THRU 5315 = STD

9 O'Clock H.S.S. Up



5107 THRU 5307 = STD
 5315 = KIT 0786776

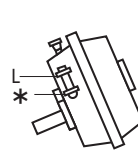
12 O'Clock H.S.S. Up



5107 THRU 5315 = STD

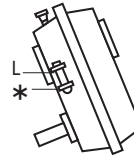
H.S. Shaft Inclined 5 to 30° Down

3 O'Clock H.S.S. Down



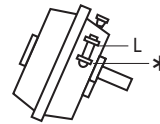
5107 = 5-25° .375 E/P
 5107 = 26-30° .375 E/C, .375 X 1.00N & KIT 0786775
 5115 = 5-20° .375 E/C & .375 X 1.00N
 5115 = 21-30° .375 E/C, .375 X 2.00N & KIT 0786775
 5203 = 5-30° .375 E/C & .375 X 1.50N
 5207 = 5-15° .375 E/P
 5207 = 16-30° .375 E/C & .375 X 2.00N
 5215 = 5-30° .500 E/C & .500 X 2.50N
 5307 = 5-30° .500 E/C & .500 X 2.50N
 5315 = 5-30° .500 E/C & .500 X 2.50N

6 O'Clock H.S.S. Down



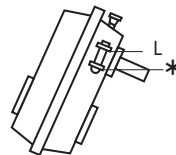
5107 = .375 E/P
 5115 = .375 E/C & .375 X 2.00N
 5203 = .375 E/C & .375 X 1.50N
 5207 = .375 E/C & .375 X 2.00N
 5215 = .500 E/C & .500 X 2.50N
 5307 = .500 E/C & .500 X 2.50N
 5315 = .500 E/C & .500 X 2.50N

9 O'Clock H.S.S. Down



5107 = 5-15° STD
 5107 = 16-30° .375 E/P & KIT 0786775
 5115 = 5-15° .375 E/P
 5115 = 16-30° .375 E/C, .375 X 2.00N & KIT 0786775
 5203 = 5-20° .375 E/P
 5203 = 21-30° .375 E/C, .375 X 1.50N & KIT 0786775
 5207 = 5-20° .375 E/C
 5207 = 21-30° .375 E/C, .375 X 2.00N & KIT 0786775
 5215 = 5-15° .500 E/P
 5215 = 16-30° .500 E/C, .500 X 2.00N & KIT 0786776
 5307 = 5-20° .500 E/P
 5307 = 21-30° .500 E/C, .500 X 2.00N & KIT 0738471
 5315 = 5-30° .500 E/C, .500 X 4.00N & KIT 0738471

12 O'Clock H.S.S. Down



5107 = 5-15° .375 E/P
 5107 = 16-30° .375 E/C, .375 X 1.00N & KIT 0786775
 5115 = 5-15° .375 E/P
 5115 = 16-30° .375 E/C, .375 X 2.00N & KIT 0786775
 5203 = 5-30° .375 E/C & .375 X 1.50N
 5207 = 5-30° .375 E/C & .375 X 2.00N
 5215 = 5-30° .500 E/C & .500 X 2.50N
 5307 & 5315 = 5-30° .500 E/C & .500 X 2.50N

* This oil level applies when only a street elbow with a pipe plug is used.

L — Always locate at high side plug.
 KIT — Install at standard air vent location.



Retaining Rings for Bushing Nuts & Thrust Plates

JR — Retaining Rings for Bushing Nuts

DRIVE SIZE	Manufacturer Part Number
5107	Truarc N5000-237
5115	Truarc N5000-312
5203	Truarc N5000-334
5207	Eaton IN375
5215	Truarc N5000-462
5307	Eaton IN500
5315	Truarc N5000-575

JF & JSC — Retaining Rings for Thrust Plate Kits

DRIVE SIZE	Manufacturer Part Number
5107	Truarc N5000-165
5115	Eaton IN225
5203	Eaton IN244
5207	Eaton IN281
5215	Eaton IN334
5307	Eaton IN375
5315	Eaton IN433

Tooth Combinations for Vibration Analysis

Type J05 — Tooth Combinations

DRIVE SIZE	Exact Ratio	Pinion Ref. #3A3	Gear Ref. #4A4
5107	5.077	13	66
5115	5.053	19	96
5203	5.071	14	71
5207	5.077	13	66
5215	4.923	13	64
5307	4.857	14	68
5315	4.857	14	68

Type J09 — Tooth Combinations

DRIVE SIZE	Exact Ratio	Input		Output	
		Pinion Ref. #1A3	Gear Ref. #1A4	Pinion Ref. #2A3	Gear Ref. #4A4
5107	9.462	22	41	13	66
5115	9.357	27	50	19	96
5203	9.179	21	38	14	71
5207	9.492	23	43	13	66
5215	8.997	29	53	13	64
5307	9.131	25	47	14	68
5315	9.131	25	47	14	68

Type J14 — Tooth Combinations

DRIVE SIZE	Exact Ratio	Input		Output	
		Pinion Ref. #1A3	Gear Ref. #1A4	Pinion Ref. #2A3	Gear Ref. #4A4
5107	14.43	19	54	13	66
5115	13.95	21	58	19	96
5203	14.45	20	57	14	71
5207	14.47	20	57	13	66
5215	13.60	21	58	13	64
5307	14.03	18	52	14	68
5315	13.91	22	63	14	68

Type J25 — Tooth Combinations

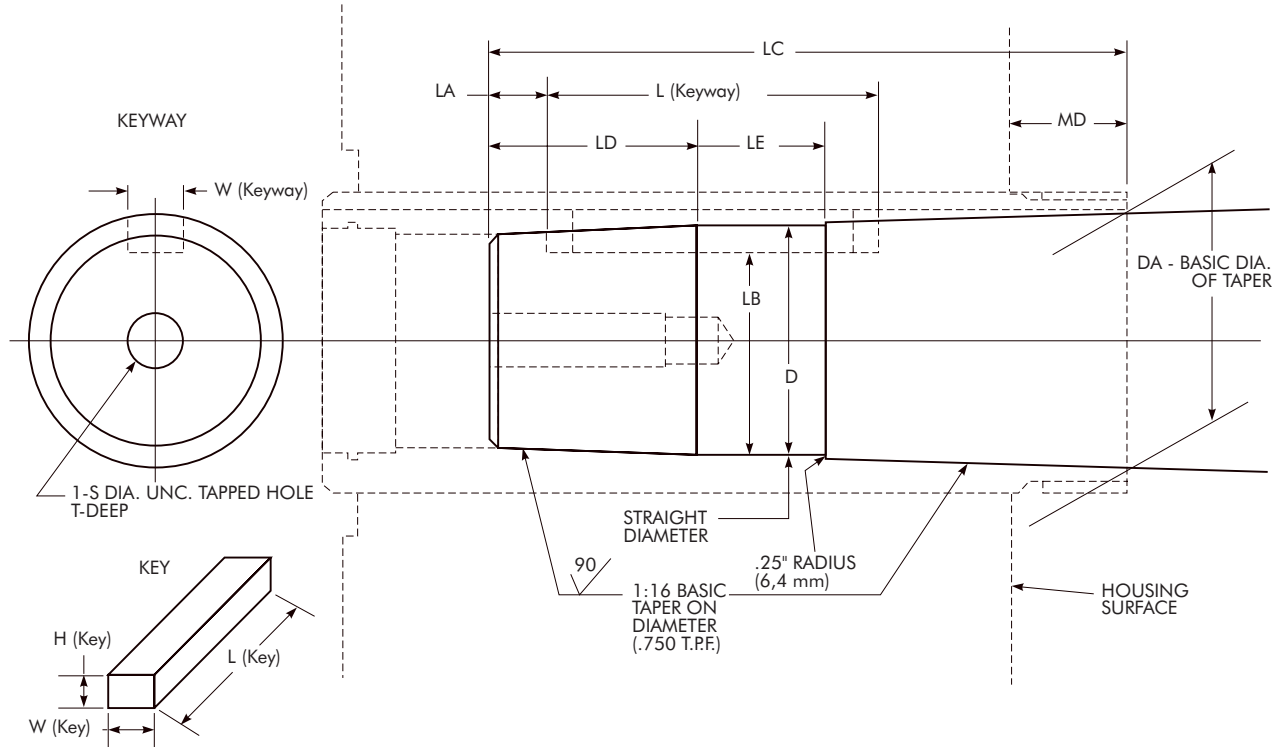
DRIVE SIZE	Exact Ratio	Input		Output	
		Pinion Ref. #1A3	Gear Ref. #1A4	Pinion Ref. #2A3	Gear Ref. #4A4
5107	25.81	12	61	13	66
5115	24.87	13	64	19	96
5203	26.94	16	85	14	71
5207	24.99	13	64	13	66
5215	24.94	15	76	13	64
5307	25.26	15	78	14	68
5315	25.26	15	78	14	68

Seal Housing Lip Seals for Type JSC

Type JSC — Seal Housing Lip Seals Accessory

DRIVE SIZE	Falk Part No.	Manufacturer's Part No.
5107	2905318	Chicago Rawhide 17271
5115	0912859	National 470565
5203	2911847	Chicago Rawhide 26153
5207	0912835	Chicago Rawhide 29865
5215	2911957	Chicago Rawhide 34861
5307	0912741	Chicago Rawhide 34886
5315	0912741	Chicago Rawhide 34886

Drive Shaft Recommendations for Tapered Drive Shafts



Dimensions – Inches (mm) ★

DRIVE SIZE	Keyway		D • +.000, -.005 (+0,00, - 0,13)	DA	LA ±.030 (±0,76)	LB +.000, -.010 (+0,00, - 0,25)	LC +.040, -.000 (+1,02, - 0,00)	LD	LE	MD ■	S	T Min.	Key		
	W ‡	L ±.010 (±0,25)											W	H	L
5107	.375 (9,53)	2.875 (73,02)	1.614 (40,996)	1.825 (46,36)	.437 (11,10)	1.329 (33,76)	5.140 (130,56)	1.80 (45,7)	1.75 (44,5)	1.02 (25,9)	.500-13	2.00 (50,8)	.375	.375	2.50
5115	.500 (12,70)	3.250 (82,55)	2.173 (55,194)	2.357 (59,87)	.500 (12,70)	1.902 (48,31)	5.920 (150,37)	2.98 (57,7)	1.50 (38,1)	1.11 (28,2)	.500-13	2.00 (50,8)	.500	.375	2.75
5203	.500 (12,70)	3.750 (95,25)	2.425 (61,595)	2.620 (66,55)	.500 (12,70)	2.153 (54,69)	5.550 (140,97)	2.39 (60,7)	1.50 (38,1)	1.10 (27,9)	.625-11	2.00 (50,8)	.500	.375	3.25
5207	.625 (15,88)	4.875 (123,82)	2.725 (69,215)	2.920 (74,17)	.625 (15,88)	2.416 (61,37)	6.490 (164,85)	3.37 (85,6)	2.00 (50,8)	1.11 (28,2)	.625-11	2.00 (50,8)	.625	.438	4.25
5215	.750 (19,05)	4.250 (107,95)	3.258 (82,753)	3.500 (88,90)	.750 (19,05)	2.923 (74,24)	7.795 (197,99)	3.93 (99,8)	2.00 (50,8)	1.19 (30,2)	.875-9	2.50 (63,5)	.750	.500	3.50
5307	.875 (22,23)	5.875 (149,22)	3.878 (98,501)	4.100 (104,14)	.875 (22,22)	3.413 (86,69)	8.320 (211,33)	4.77 (121,2)	2.04 (51,8)	1.27 (32,2)	1.000-8	2.75 (69,8)	.875	.625	5.00
5315	1.000 (25,40)	6.000 (152,40)	4.433 (112,598)	4.664 (118,47)	1.000 (25,40)	3.871 (98,32)	8.710 (221,23)	5.06 (128,5)	2.00 (50,8)	1.27 (32,2)	1.000-8	2.75 (69,8)	1.000	.750	5.00

★ Dimensions are for reference only and are subject to change without notice unless certified.

‡ Inch keyway width tolerances are as follows: over .312" (7,92) to & including .500" (12,70) = +.0025" (+0,064), -.0000" (-0,000), over .500" (12,70) to & including 1.000" (25,40) = +.0030" (+0,076), -.0000" (-0,000). Keyway depth tolerance is +.010" (+0,25), -.000" (-0,00).

● Straight diameter is used to aid in measurement and manufacture of the keyway.

■ Dimension "MD" will vary slightly depending on degree of axial compression during installation and manufacturing tolerances.



Drive Shaft Recommendations Using TA Taper Bushing

INTRODUCTION — These instructions are for use when a flange mounted 5107-5315JF drive is to be used and the manufacture of a tapered drive shaft is not feasible. For JF tapered drive shaft recommendations, see Appendix H. Use this appendix to retrofit existing applications or for outfitting new installations. Parts required are the Basic drive, TA Taper bushing and a thrust plate kit.

This appendix will allow the use of a straight drive shaft with the tapered bushing (without spanner nut) on flange mounted applications. Provided are dimensions (Table 4) for shaft recommendations and instructions for the installation and removal of the assembly. All bushing bore sizes, which are available in the standard Quadrive, are possible with this setup.

Drives are provided with tapped holes in the output face of the housing along with a female register to allow mounting to the driven equipment. JF drives are mounted to the equipment without the use of an adapter flange. Optional adapter flanges are available, consult the Factory.

FIGURE 2 — The hollow shaft of the drive has a tapered bore which accepts the tapered bushing. When the bushing is drawn into the taper a clamping force is applied to the drive shaft. The drive shaft is drawn into the hollow shaft via a fastener in the thrust plate. The bushing seats against a shoulder on the driven shaft and is drawn into the drive with the shaft. Removal is accomplished by using a jackscrew in the thrust plate and forcing the drive shaft out of the drive. The retaining ring in the drive shaft assures that the bushing will be removed along with the shaft.

DRIVE SHAFT RECOMMENDATIONS — The recommendations for the drive shaft consist of two major features. The first is the shoulder which must be provided in the location shown in Figure 2. This shoulder provides the backing necessary to draw the bushing into the taper. A permanently fixed shoulder must be provided in order for this design to be effective. SET COLLARS ARE NOT ACCEPTABLE. A retaining ring may be used, in the driven shaft, to provide the shoulder, but stress concentrations occur at the groove and therefore shaft stresses must be checked. The second major feature on the shaft is the retaining ring groove in the shaft end. This feature is recommended to ensure positive removal of the bushing when the drive shaft is removed from the drive. The threaded hole in the end of the drive shaft accepts the thrust plate fastener.

WARNING: Lock out power source and remove all external loads from system before servicing drive or accessories.

INSTALLATION PROCEDURE — With the drive shaft manufactured per the recommendations shown, and the bushing selected for the proper shaft diameter, remove and discard the retaining ring and spanner nut from the bushing assembly.

Slide the bushing (flange end first) onto the drive shaft until it contacts the shoulder on the shaft. Insert the key through the bushing and into the drive shaft keyway. Install the retaining ring into the groove in the drive shaft. Bring the drive into position, line up the hollow shaft keyway with the key and slide the bushing and drive shaft into the hollow shaft bore.

Attach the drive to the mounting surface with fasteners (not provided). Refer to Table 1 for fastener size and tightening torque. Assemble the thrust plate and retaining ring into the counterbore in the hollow shaft. Insert the thrust plate fastener through the thrust plate and thread into the drive shaft end. Tighten to the torque given in Table 2. Install all covers and guards.

REMOVAL PROCEDURE — Remove low speed shaft input end cover. Remove the thrust plate fastener, retaining ring and thrust plate from the hollow shaft. Refer to Table 3 and select a backing bolt and flat washer and install them into the drive shaft as illustrated in Figure 1. The head of the backing bolt provides a working surface for the removal bolt. Reinsert the thrust plate and retaining ring into the hollow shaft and select a removal bolt from Table 3. Thread the removal bolt into the thrust plate until it contacts the backing bolt head. Tighten the removal bolt to the torque indicated in Table 3. (If the thrust plate rotates in the shaft, align the slot in the plate with the hollow shaft keyway and insert a screw driver or piece of key stock to prevent rotation of the plate.) After torquing the bolt, as instructed, strike the bolt sharply with a hammer and retorquing the bolt if separation of the drive from the shaft did not occur. Repeat this procedure, retorquing the bolt after each blow, until separation occurs.

Figure 1

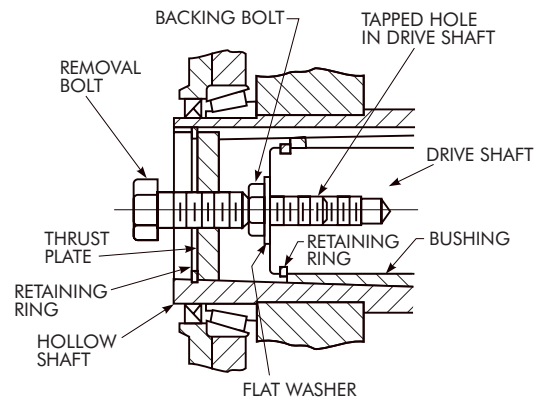
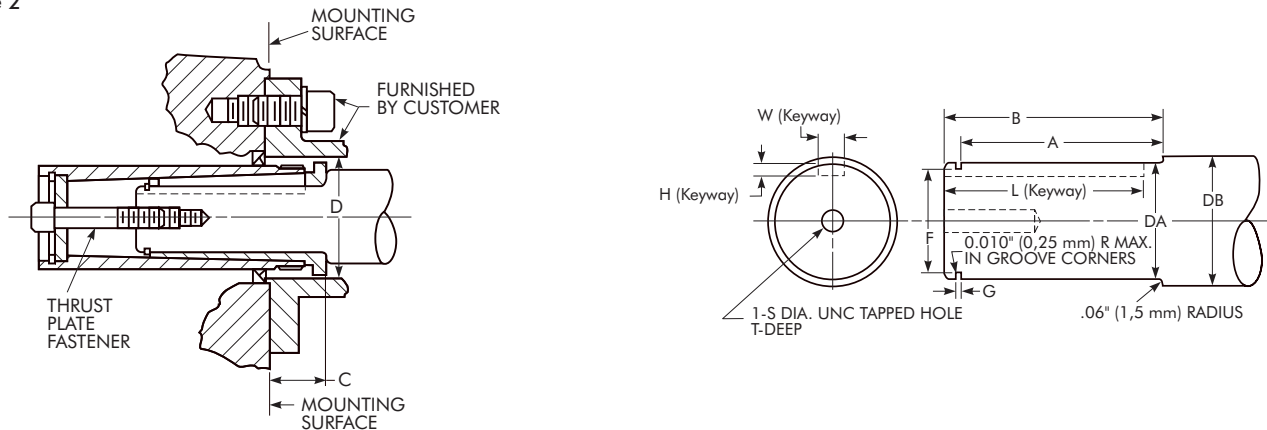


TABLE 1 — JF Drive – Foundation Fastener & Tightening Torque (Non-Lubricated Fasteners)

DRIVE SIZE	Fastener Size & Grade	Max. Tightening Torque lb-ft (Nm)	Min. Fastener Engagement Into Drive Housing Inch (mm)
5107	.500-13UNC, GR. 5	69 (94)	.76 (19,3)
5115	.625-11UNC, GR. 5	137 (186)	.94 (23,9)
5203	.750-10UNC, GR. 5	245 (332)	.76 (19,3)
5207	.875- 9UNC, GR. 5	380 (515)	.88 (22,4)
5215	1.000- 8UNC, GR. 5	567 (769)	1.00 (25,4)
5307	1.000- 8UNC, GR. 8	792 (1074)	1.24 (31,5)
5315	1.000- 8UNC, GR. 8	792 (1074)	1.24 (31,5)

Drive Shaft Recommendations Using TA Taper Bushing

Figure 2



**TABLE 2 — Thrust Plate Fastener Data ▲
(Non-Lubricated Fasteners)**

DRIVE SIZE	Fastener Size & Grade	Max. Tightening Torque lb-ft (Nm)	Min Thread Depth Inches (mm)
5107	.500-13UNC x 3.50, GR.8	92 (125)	2.00 (50,8)
5115	.500-13UNC x 4.00, GR.8	92 (125)	2.00 (50,8)
5203	.625-11UNC x 3.50, GR.8	183 (248)	2.00 (50,8)
5207	.625-11UNC x 3.50, GR.8	183 (248)	2.00 (50,8)
5215	.875- 9UNC x 5.00, GR.8	533 (723)	2.50 (63,5)
5307	1.000- 8UNC x 5.00, GR.5	567 (769)	2.50 (63,5)
5315	1.000- 8UNC x 5.00, GR.8	792 (1074)	2.50 (63,5)

▲ Fasteners may be hex socket head or hex head except for Size 5307, which must be a hex head to clear input end cover.

TABLE 3 — Removal & Backing Bolt Size and Tightening Torque

DRIVE SIZE	Removal Bolt Size & Min Length – Inches	Max Tightening Torque lb-ft (Nm)	Backing Bolt Size & Max Length – Inches
5107	.625-11UNC x 1.75	133 (180)	.500-13UNC x 1.25
5115	.625-11UNC x 1.75	133 (180)	.500-13UNC x 1.25
5203	.750-10UNC x 2.00	242 (328)	.625-11UNC x 1.75
5207	.750-10UNC x 2.00	242 (328)	.625-11UNC x 1.75
5215	1.000- 8UNC x 2.50	567 (769)	.875- 9UNC x 2.25
5307	1.125- 7UNC x 3.00	742 (1006)	1.000- 8UNC x 2.50
5315	1.125- 7UNC x 3.00	742 (1006)	1.000- 8UNC x 2.50

TABLE 4 — Dimensions For Largest Bore Bushing – Inches (mm) *

DRIVE SIZE	Thrust Plate Kit †	Thrust Plate Part No.	A ± 0.010 (± 0.250)	B ± 0.030 (± 0.75)	C ‡	D •	DA ■	DB Min	Retaining Ring ♦				Keyway *			S	T Min
									Groove		Spir O Lox		W	H	L Min		
									F	G	Mfg. No.	Max O.D.					
5107	TP5107JF	0778773	4.780 (121,41)	5.000 (127,00)	-1.356 (-34,4) -1.606 (-40,8)	2.500 (63,50)	1.4375	1.750 (44,45)	1.295 1.287	0.056 0.060	RSN-137	1.500	0.375	0.1875	3.563 (90,50)	0.500-13	2.00 (50,8)
5115	TP5115JF	0778774	5.330 (135,38)	5.500 (139,70)	-1.528 (-38,8) -1.794 (-45,6)	3.250 (82,55)	1.9375	2.250 (57,15)	1.735 1.725	0.068 0.072	RST-181	2.000	0.500	0.2500	4.000 (101,60)	0.500-13	2.00 (50,8)
5203	TP5203JF	0778775	5.310 (134,87)	5.625 (142,88)	-1.634 (-41,5) -1.921 (-48,8)	3.500 (88,90)	2.1875	2.500 (63,50)	1.952 1.940	0.086 0.091	RSN-206	2.250	0.500	0.2500	4.625 (117,48)	0.625-11	2.00 (50,8)
5207	TP5207JF	0778776	5.890 (149,61)	6.250 (158,75)	-1.557 (-39,6) -1.885 (-47,9)	4.000 (101,60)	2.4375	2.750 (69,85)	2.290 2.278	0.056 0.060	RS-236	2.500	0.625	0.3125	5.625 (142,88)	0.625-11	2.00 (50,8)
5215	TP5215JF	0778777	6.860 (174,24)	7.125 (180,98)	-1.755 (-44,6) -2.082 (-52,9)	4.750 (120,65)	2.9375	3.250 (82,55)	2.728 2.716	0.056 0.060	RS-281	3.062	0.750	0.3750	5.875 (149,22)	0.875-9	2.50 (63,5)
5307	TP5307JF	0778778	7.170 (182,12)	7.500 (190,50)	-1.843 (-46,8) -2.175 (-55,2)	5.125 (130,18)	3.4375	3.750 (95,25)	3.172 3.160	0.103 0.108	RSN-334	3.625	0.875	0.4375	6.750 (171,45)	1.000-8	2.50 (63,5)
5315	TP5315JF	0778779	7.700 (195,58)	8.000 (203,20)	-1.840 (-46,7) -2.175 (-55,2)	6.000 (152,40)	3.9375	4.250 (107,95)	3.701 3.690	0.120 0.125	RST-387	4.125	1.000	0.5000	7.062 (179,37)	1.000-8	2.50 (63,5)

* For metric drive shafts or bushing bores smaller than the maximum, provide the retaining ring groove per manufacturers' recommendations, keyway appropriate for the shaft diameter, and DB minimum of 0.300" (7.62 mm) larger than the bushing bore to provide adequate backing.

† Kit consists of: thrust plate, thrust plate fastener, hollow shaft retaining ring and drive shaft retaining ring.

‡ The range for C dimensions is the variation which may occur due to axial compression and manufacturing tolerances. Negative C dimensions indicate that the bushing protrudes beyond the mounting surface.

• The D dimension is the recommended minimum bore which clears the TA Taper bushing flange.

■ Shaft diameter tolerances are per AGMA as follows: to 1.50" = +.000", -.004"; over 1.50" to & including 2.50" = +.000", -.005"; over 2.50" to & including 4.00" = +.000", -.006". Metric drive shafts are to be based on h10 tolerances.

♦ Smalley retaining rings may be used instead of Spir O Lox by substituting WS for RS, WST for RST or WSM for RSN.

* Inch keyway widths tolerances are as follows: over .312" to & including .500" = +.0025", -.0000"; over .500" to & including 1.000" = +.0030", -.0000". Metric keyway widths are based on class N9 tolerances. Inch keyway depth tolerance is +.010", -.0000". Refer to ISO 773 or DIN 6885 sheet 1 for metric keyway depth tolerances.



Drive Shaft Recommendations Using (TCB) Kit

INTRODUCTION — These instructions are for use when a screw conveyor 5107 - 5315JSC drive is to be used and the following conditions exist: Falk standard or 316 stainless steel JSC tapered drive shafts can not be used due to special extension dimensions or materials; or manufacturing a special tapered drive shaft is not feasible. Use this appendix to retrofit existing applications or for outfitting new installations where the above conditions warrant. For tapered shaft recommendations, see Appendix H.

This appendix will allow the use of a straight (non tapered) drive shaft with a special bushing conversion kit on screw conveyor applications. This kit provides one bushing bore per drive size as shown in Table 4. Provided in this appendix are dimensions for drive shaft recommendations and instructions for the installation and removal of the assembly.

FIGURE 2 — The hollow shaft of the drive has a tapered bore which accepts the tapered bushing. When the bushing is drawn into the taper a clamping force is applied to the drive shaft. The drive shaft is drawn into the hollow shaft via a fastener in the thrust plate. The bushing seats against a shoulder on the drive shaft and is drawn into the drive with the shaft. Removal is accomplished by using a jackscrew in the thrust plate and forcing the drive shaft out of the drive. The retaining ring in the drive shaft assures that the bushing will be removed along with the shaft.

The packing gland sealing option (Sizes 5107-5315) is usable with the bushing kit, but the clamp ring must be assembled from the extension end of the drive shaft on Sizes 5307 and 5315.

DRIVE SHAFT RECOMMENDATIONS — The recommendations for the drive shaft consist of two major features. The first is the shoulder which must be provided in the location shown in Figure 2. This shoulder provides the backing necessary to draw the bushing into the taper. A permanently fixed shoulder must be provided in order for this design to be effective. The shoulder may be a welded collar or an integral step. SET COLLARS ARE NOT ACCEPTABLE. A retaining ring may be used in the drive shaft, to provide the shoulder, but stress concentrations can occur at the groove and therefore shaft stresses must be checked. The second major feature on the shaft is the retaining ring groove in the shaft end. This feature is recommended to ensure positive removal of the bushing when the drive shaft is removed from the drive. The threaded hole in the end of the drive shaft accepts the thrust plate fastener.

WARNING: Lock out power source and remove all external loads from system before servicing drive or accessories.

INSTALLATION PROCEDURE — With the shaft manufactured per the recommendations shown, proceed as follows:

5107-5215JSC — The seal housing may be assembled to the drive before or after the drive shaft is installed into the drive, depending on the shaft extension diameter.

5307-5315JSC — The seal housing must be assembled over the drive shaft from the extension end of the shaft, or the shaft shoulder must be fixed in position after the seal housing is assembled over the drive shaft (see Figure 2).

ALL JSC DRIVES — Slide the bushing (large end first) onto the drive shaft until it contacts the shoulder on the shaft. Insert the key through the bushing and into the drive shaft keyway. Install the retaining ring into the groove in the drive shaft. Line up the keyway in the drive hollow shaft with the key in the drive shaft and slide shaft/bushing assembly into the hollow shaft. Attach

the seal housing to the drive with the fasteners provided. Tighten fasteners to torque given in Table 1. Assemble the thrust plate and retaining ring into the counterbore in the hollow shaft. Insert the thrust plate fastener through the thrust plate and thread into the drive shaft end. Tighten to the torque given in Table 2. Install all covers and guards.

REMOVAL PROCEDURE — Remove low speed shaft input end cover. Remove the thrust plate fastener, retaining ring and thrust plate from the hollow shaft. Refer to Table 3 and select a backing bolt and flat washer and install them into the drive shaft as illustrated in Figure 1. The head of the backing bolt provides a working surface for the removal bolt. Reinsert the thrust plate and retaining ring into the hollow shaft and select a removal bolt from Table 3. Thread the removal bolt into the thrust plate until it contacts the backing bolt head. Tighten the removal bolt to the torque indicated in Table 3. (If the thrust plate rotates in the shaft, align the slot in the plate with the hollow shaft keyway and insert a screwdriver or piece of key stock to prevent rotation of the plate.) After torquing the bolt, as instructed, strike the bolt sharply with a hammer and retorquing the bolt if separation of the drive from the shaft did not occur. Repeat this procedure, retorquing the bolt after each blow, until separation occurs.

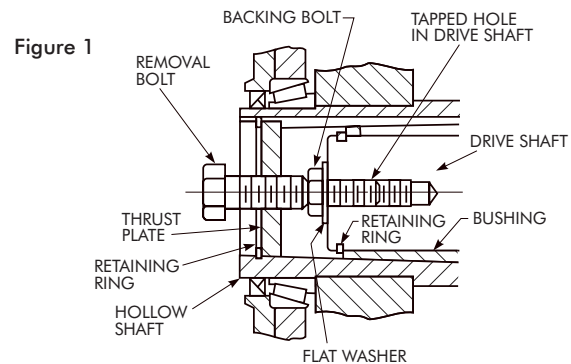


TABLE 1 — Seal Housing Fastener Tightening Torque (Non-Lubricated Fasteners)

DRIVE SIZE	Fastener Size	Max Tightening Torque lb-ft (Nm)
5107	.500-13UNC	69 (94)
5115	.625-11UNC	137 (186)
5203	.750-10UNC	245 (332)
5207	.875- 9UNC	380 (515)
5215	1.000- 8UNC	567 (769)
5307	1.000- 8UNC	792 (1074)
5315	1.000- 8UNC	792 (1074)

TABLE 2 — Thrust Plate Fastener Data ▲ (Non-Lubricated Fasteners)

DRIVE SIZE	Fastener Size & Grade	Max. Tightening Torque lb-ft (Nm)	Min Thread Depth Inches (mm)
5107	.500-13UNC x 3.50, GR.8	92 (125)	2.00 (50,8)
5115	.500-13UNC x 4.00, GR.8	92 (125)	2.00 (50,8)
5203	.625-11UNC x 3.50, GR.8	183 (248)	2.00 (50,8)
5207	.625-11UNC x 3.50, GR.8	183 (248)	2.00 (50,8)
5215	.875- 9UNC x 5.00, GR.8	533 (723)	2.50 (63,5)
5307	1.000- 8UNC x 5.00, GR.5	567 (769)	2.50 (63,5)
5315	1.000- 8UNC x 5.00, GR.8	792 (1074)	2.50 (63,5)

▲ Fasteners may be hex socket head or hex head except for Size 5307, which must be a hex head to clear input end cover.

Drive Shaft Recommendations Using (TCB) Kit

Figure 2

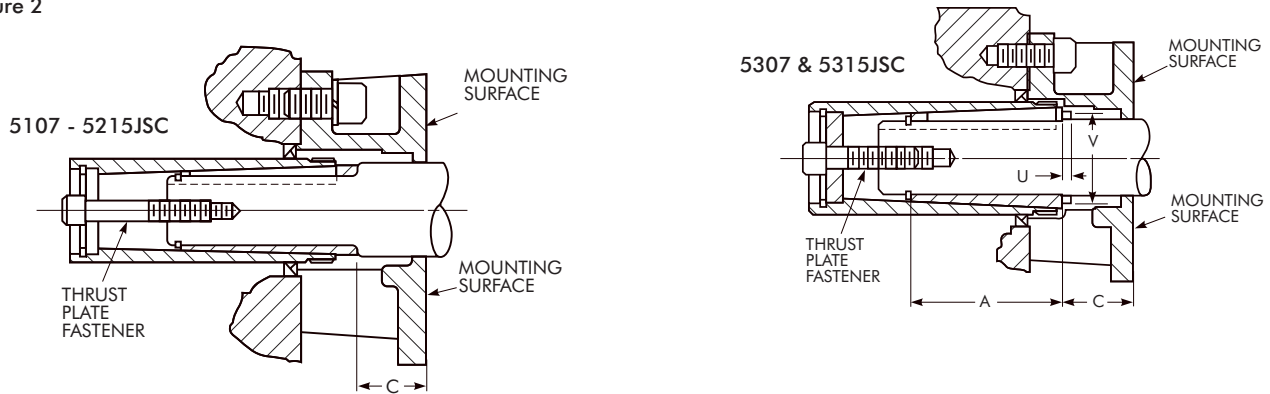


TABLE 3 — Removal & Backing Bolt Size and Tightening Torque

DRIVE SIZE	Removal Bolt Size & Min Length – Inches	Max Tightening Torque lb-ft (Nm)	Backing Bolt Size & Max Length – Inches
5107	.625-11UNC x 1.75	133 (180)	.500-13UNC x 1.25
5115	.625-11UNC x 1.75	133 (180)	.500-13UNC x 1.25
5203	.750-10UNC x 2.00	242 (328)	.625-11UNC x 1.75
5207	.750-10UNC x 2.00	242 (328)	.625-11UNC x 1.75
5215	1.000- 8UNC x 2.50	567 (769)	.875- 9UNC x 2.25
5307	1.125- 7UNC x 3.00	742 (1006)	1.000- 8UNC x 2.50
5315	1.125- 7UNC x 3.00	742 (1006)	1.000- 8UNC x 2.50

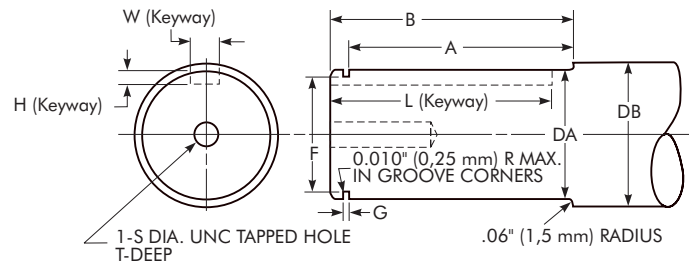


TABLE 4 — Dimensions – Inches (mm)

Taper Conversion Bushing Kit †	(TCB) Kit Part No.	A ± 0.010 (± 0.25)	B ± 0.030 (± 0.75)	C ‡	DA •	DB ■ +0.000, -0.003 (+0.00, -0.08)	Retaining Ring ♦			Keyway *			S	T Min	Weld/Integral Flange		
							Groove		Mfg. No.	Max O.D.	W	H			L Min	U	V
							F	G									
TCB5107J-1.438	0766041	4.780 (121,41)	5.000 (127,00)	2.625 (66,68) 2.414 (61,32)	1.4375	1.750 (44,45)	1.295 1.287	0.056 0.060	Spir O Lox RSN-137	1.500	0.375	0.1875	3.563 (90,50)	0.500-13	2.00 (50,8)	...	...
TCB5115J-1.938	0766042	5.330 (135,38)	5.500 (139,70)	2.452 (62,28) 2.226 (56,54)	1.9375	2.375 (60,33)	1.735 1.725	0.068 0.072	Spir O Lox RST-181	2.000	0.500	0.2500	4.000 (101,60)	0.500-13	2.00 (50,8)	...	...
TCB5203J-2.188	0766043	5.310 (134,87)	5.625 (142,88)	2.346 (59,59) 2.099 (53,31)	2.1875	2.625 (66,68)	1.952 1.940	0.086 0.091	Spir O Lox RSN-206	2.250	0.500	0.2500	4.625 (117,48)	0.625-11	2.00 (50,8)	...	...
TCB5207J-2.438	0766044	5.890 (149,61)	6.250 (158,75)	2.548 (64,72) 2.260 (57,40)	2.4375	3.000 (76,20)	2.290 2.278	0.056 0.060	Spir O Lox RS-236	2.500	0.625	0.3125	5.625 (142,88)	0.625-11	2.00 (50,8)	...	...
TCB5215J-2.938	0766045	6.860 (174,24)	7.125 (180,98)	2.475 (62,87) 2.188 (55,58)	2.9375	3.500 (88,90)	2.728 2.716	0.056 0.060	Spir O Lox RS-281	3.062	0.750	0.3750	5.875 (149,22)	0.875-9	2.50 (63,5)	...	...
TCB5307J-3.438	0766046	6.530 (165,86)	6.860 (174,24)	3.527 (89,59) 3.235 (82,17)	3.4375	3.500 (88,90)	3.172 3.160	0.103 0.108	Spir O Lox RSN-334	3.625	0.875	0.4375	6.750 (171,45)	1.000-8	2.50 (63,5)	0.375 ▲ (9,52)	4.250 (107,95)
TCB5315J-3.438	0785785	7.030 (178,56)	8.500 (215,90)	3.560 (90,42) 3.266 (82,96)	3.4375	3.500 (88,90)	3.263 3.251	0.103 0.108	Spir O Lox RSN-343	...	0.875	0.4375	8.250 (209,55)	1.000-8	2.50 (63,5)	0.375 ▲ (9,52)	4.250 (107,95)

† Kit consists of: Bushing, thrust plate, fastener, key, retaining ring, and hardware.

‡ The range of C dimension is the variation which may occur due to axial compression and manufacturing tolerances.

• Shaft diameter tolerances are per AGMA as follows: to 1.50" = +.000", -.004"; over 1.50" to & including 2.50" = +.000", -.005"; over 2.50" to & including 4.00" = +.000", -.006".

■ If a lip type seal is used, a 32rms finish is recommended.

♦ Smalley retaining rings may be used instead of Spir O Lox by substituting WS for RS, WST for RST or WSM for RSN.

* Inch keyway width tolerances are as follows: over .312" to & including .500" = +.0025", -.0000"; over .500" to & including 1.000" = +.0030", -.0000"; 1.000" Inch keyway depth tolerance is +.010", -.000".

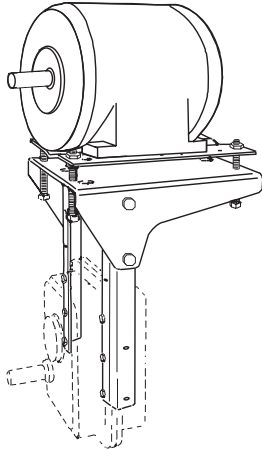
▲ Maximum for use with packing gland seal.

OSHA V-Belt Guard Installation for Drives without Shaft Fan

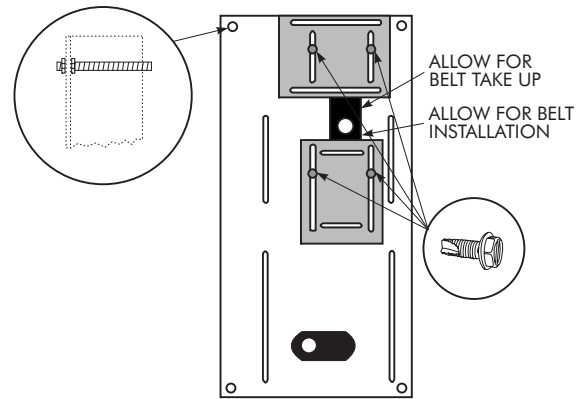
WARNING: Consult applicable local and national safety codes for proper guarding of rotating members.

WARNING: Lock out power source and remove all external loads from drive before servicing drive or accessories.

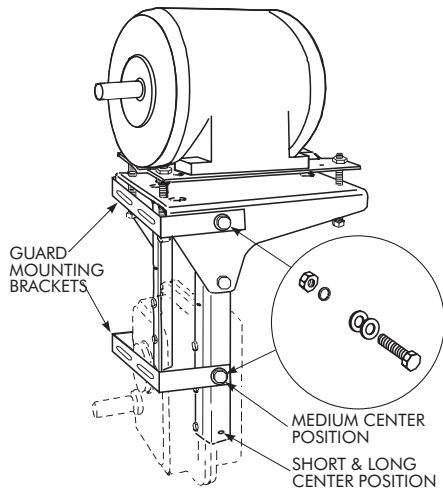
1. ASSEMBLE MOTOR MOUNT AND MOTOR TO DRIVE AS INSTRUCTED IN APPENDIX D



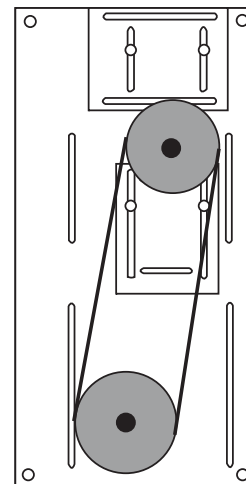
4. ASSEMBLE THREADED RODS TO BACKPLATE & MOUNT SLOT COVER(S) AS REQUIRED



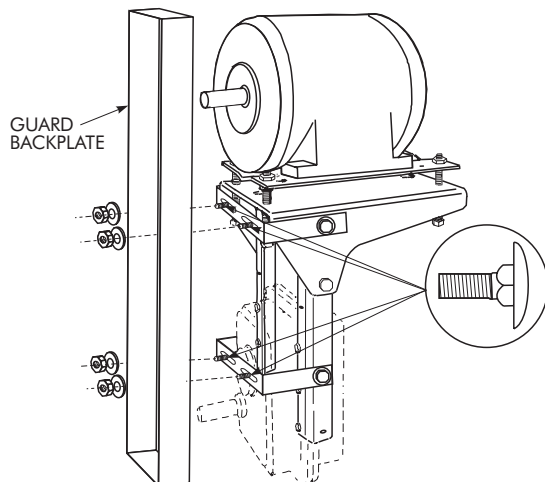
2. ASSEMBLE BELT GUARD BRACKETS TO MOTOR MOUNT



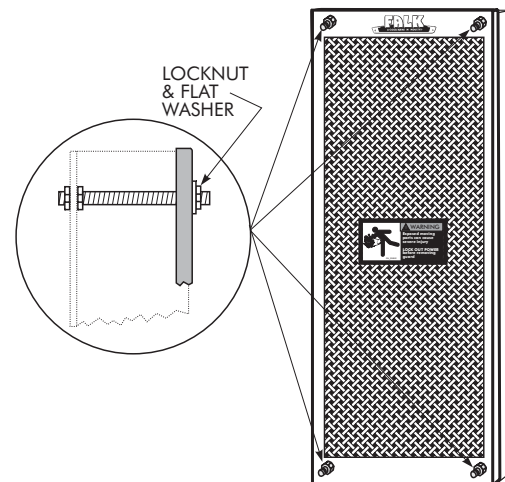
5. MOUNT BELT DRIVE AS INSTRUCTED IN APPENDIX D



3. ASSEMBLE BACKPLATE TO BRACKETS



6. MOUNT COVER AND APPLY WARNING LABEL

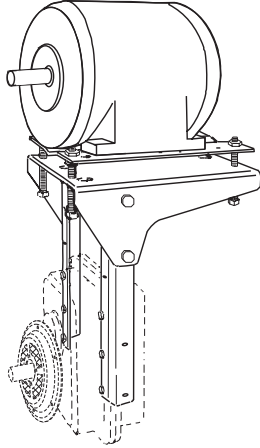


OSHA V-Belt Guard Installation for Drives with Shaft Fan

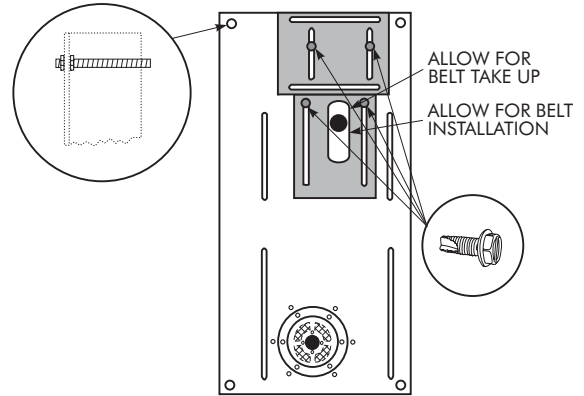
WARNING: Consult applicable local and national safety codes for proper guarding of rotating members.

WARNING: Lock out power source and remove all external loads from drive before servicing drive or accessories.

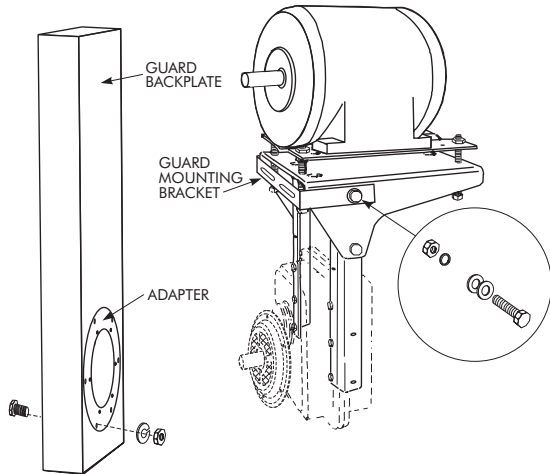
1. ASSEMBLE MOTOR MOUNT AND MOTOR TO DRIVE AS INSTRUCTED IN APPENDIX D



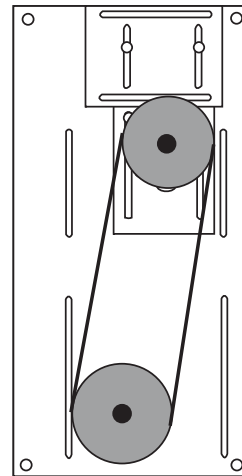
4. ASSEMBLE THREADED RODS TO BACKPLATE & MOUNT SLOT COVER(S) AS REQUIRED



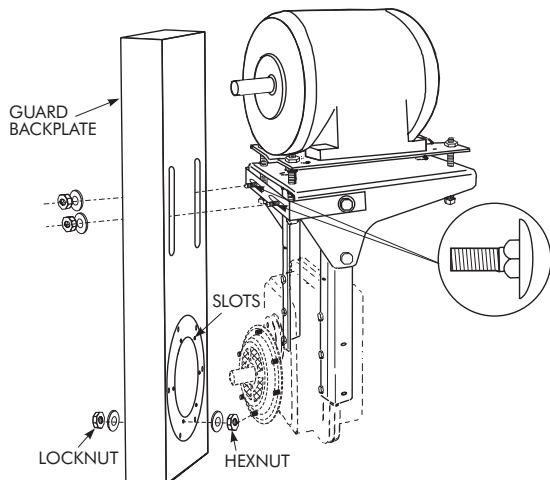
2. ASSEMBLE GUARD MOUNTING BRACKET & ADAPTER



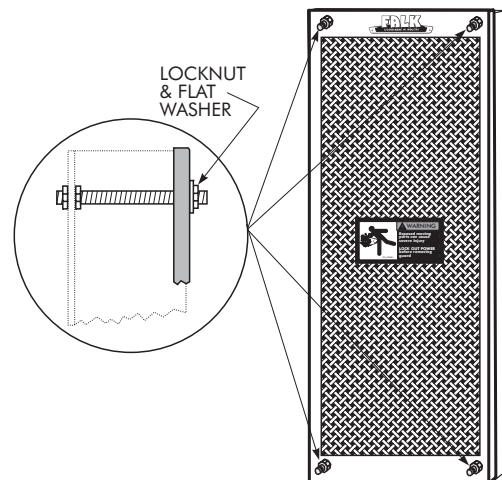
5. MOUNT BELT DRIVE AS INSTRUCTED IN APPENDIX D



3. ASSEMBLE BACKPLATE TO BRACKET & FAN



6. MOUNT COVER AND APPLY WARNING LABEL

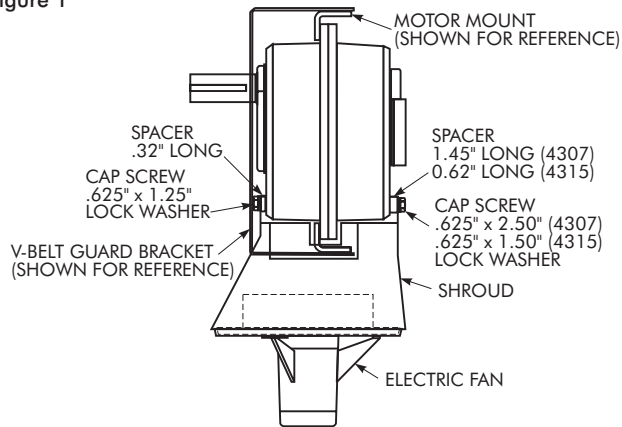


Electric Fan Installation

Introduction

The following instructions apply to the installation of electric fans. Refer to Figure 1 for fan mounting location.

Figure 1

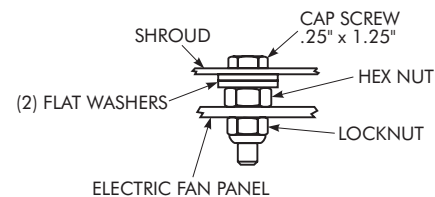


Assembly Instructions

WARNING: Consult applicable local and national safety codes for proper guarding of rotating members. Lock out power source and remove all external loads from drive before servicing drive or accessories.

1. Remove V-belt guard assembly.
2. Insert four 1.25" (32 mm) long cap screws through fan mounting holes in shroud with threaded portion of cap screw away from drive. Secure cap screws to shroud with flat washers and hex nut, see Figure 2.
3. Mount shroud to drive using spacers and hardware, see Figure 1.

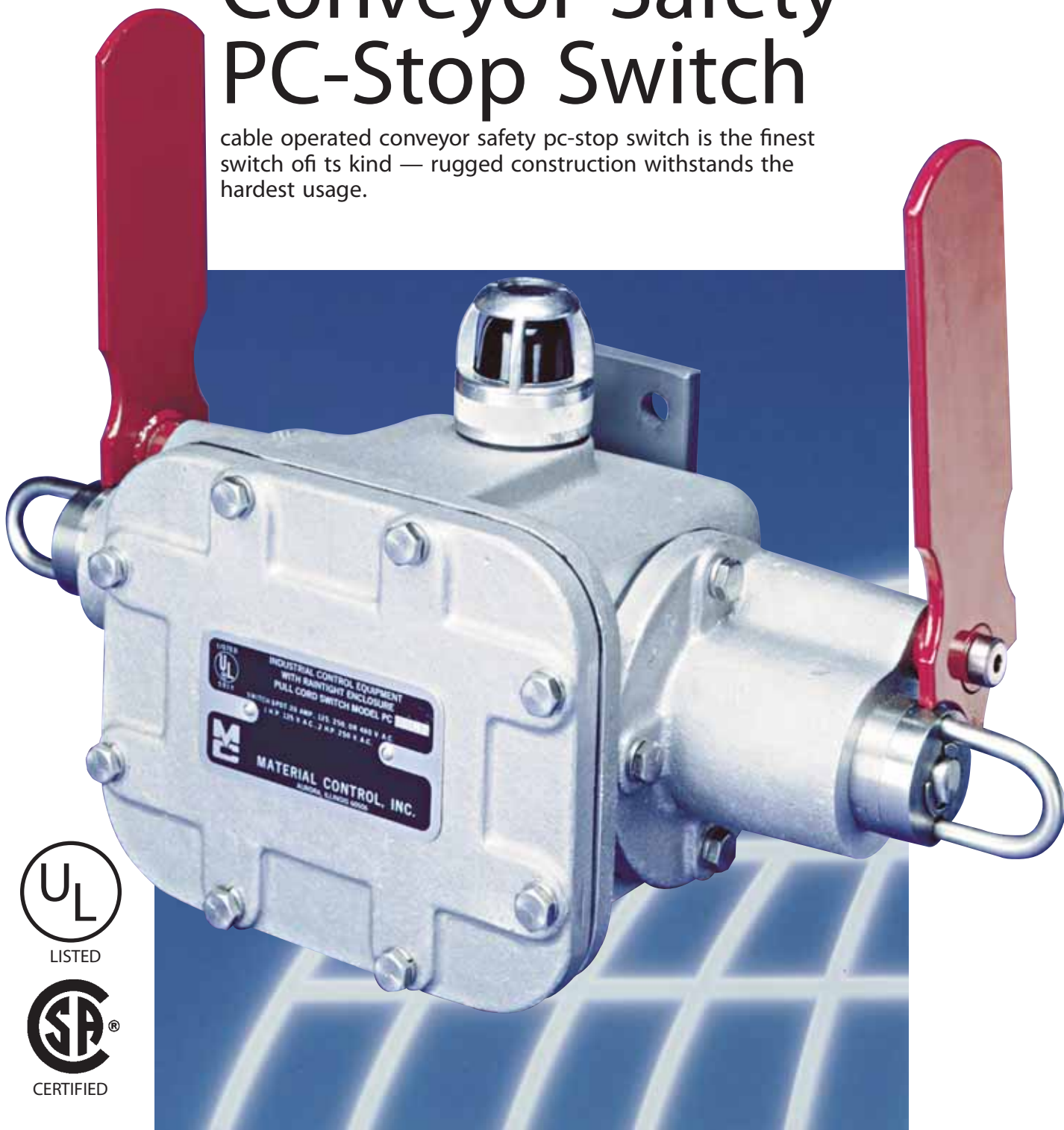
Figure 2



4. Assemble V-belt guard bracket.
5. Position the electric fan panel on the remaining threaded portion of the cap screws and secure it to the shroud with four locknuts, see Figure 2.
6. Remove the condensation plug from bottom of the fan.
7. Finish installing V-belt guard assembly per installation instruction in Appendix L.
8. Connect electric fan to power source per local and national electrical codes.

Conveyor Safety PC-Stop Switch

cable operated conveyor safety pc-stop switch is the finest switch of its kind — rugged construction withstands the hardest usage.



LISTED



CERTIFIED



MATERIAL CONTROL, INC.

197 POPLAR PL. • UNIT 3

P.O. BOX 308

NORTH AURORA, IL 60542-0308

800-926-0376 • 630-892-4274 • FAX 630-892-4931

WWW.MATERIALCONTROLINC.COM • EMAIL: SALES@MATERIALCONTROLINC.COM

OPERATION INFORMATION:

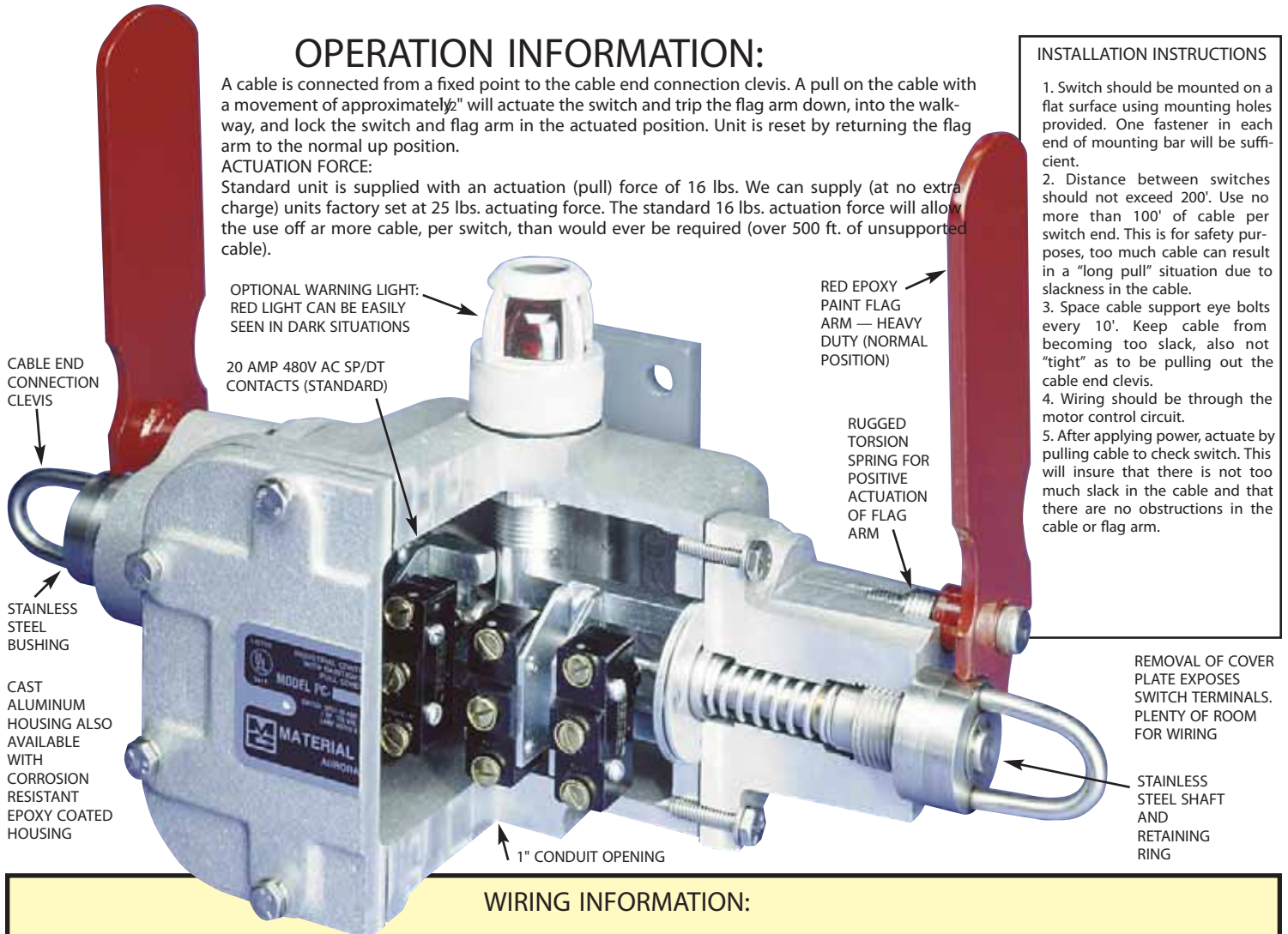
A cable is connected from a fixed point to the cable end connection clevis. A pull on the cable with a movement of approximately 1/2" will actuate the switch and trip the flag arm down, into the walkway, and lock the switch and flag arm in the actuated position. Unit is reset by returning the flag arm to the normal up position.

ACTUATION FORCE:

Standard unit is supplied with an actuation (pull) force of 16 lbs. We can supply (at no extra charge) units factory set at 25 lbs. actuating force. The standard 16 lbs. actuation force will allow the use of as much cable, per switch, as would ever be required (over 500 ft. of unsupported cable).

INSTALLATION INSTRUCTIONS

1. Switch should be mounted on a flat surface using mounting holes provided. One fastener in each end of mounting bar will be sufficient.
2. Distance between switches should not exceed 200'. Use no more than 100' of cable per switch end. This is for safety purposes, too much cable can result in a "long pull" situation due to slackness in the cable.
3. Space cable support eye bolts every 10'. Keep cable from becoming too slack, also not "tight" as to be pulling out the cable end clevis.
4. Wiring should be through the motor control circuit.
5. After applying power, actuate by pulling cable to check switch. This will insure that there is not too much slack in the cable and that there are no obstructions in the cable or flag arm.



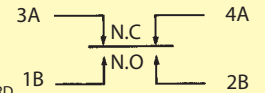
WIRING INFORMATION:

STANDARD SWITCH — One SP/DT switch per end (extra switch per end avail.)
 • 20 AMPS, 125, 250 or 480 VAC • 10 AMPS, 125 VAC "L" (tungsten lamp load)
 • 1 HP, 125 VAC • 2 HP, 250 VAC • 1/2 AMP, 125 VDC • 1/4 amp, 250 VDC

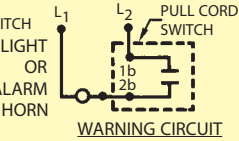
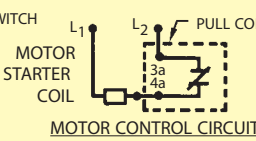
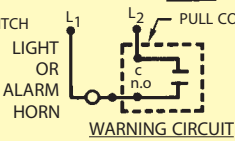
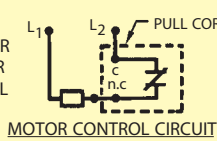
OPTIONAL SWITCH — One two circuit double break switch per end (extra switch per end available.) • 15 AMPS, 120, 240, 480 or 600 VAC 1/2 HP, 120 VAC
 • 1 HP, 240 VAC • 0.8 AMPS, 115 VDC • 0.4 AMP, 230 VDC

SINGLE POLE, DOUBLE THROW CIRCUIT

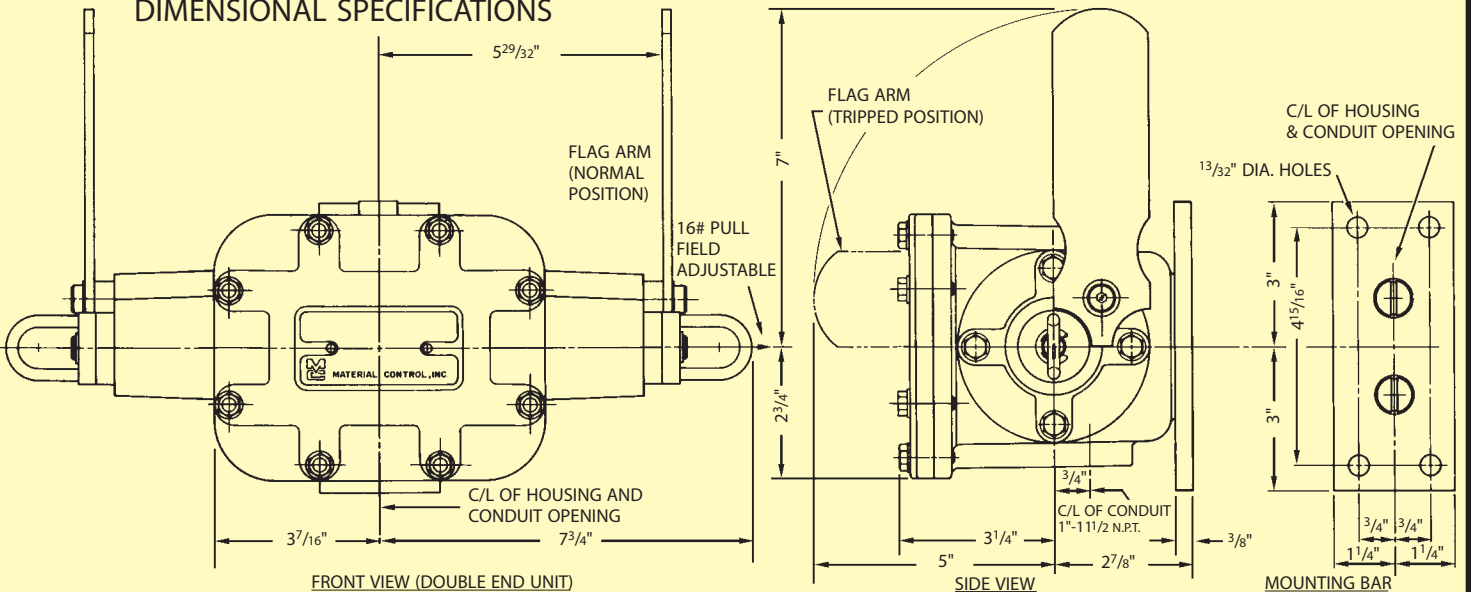
TWO CIRCUIT, DOUBLE BREAK CIRCUIT

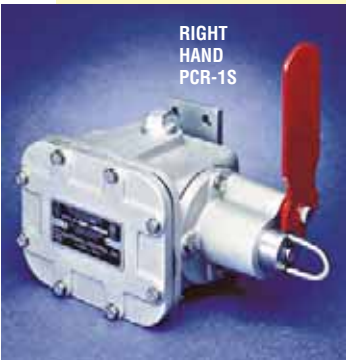


NOTE: Two circuit double break switches must be wired to equal voltage sources and the same polarity. Loads should be on the same side of the lines. 1B has the same polarity as 3A.



DIMENSIONAL SPECIFICATIONS

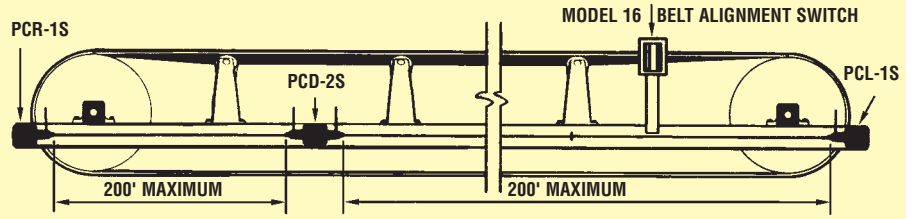




RIGHT HAND
PCR-1S



LEFT HAND
PCL-1S



TECHNICAL INFORMATION:
 Enclosure sealed for outside applications • Standard unit meets NEMA 1,3,4,4X and 12 requirements • Housing: cast aluminum
 • Flag arm: steel with red epoxy paint coating.

SELECTION AND MODEL INFORMATION

1-SINGLE POLE:
 double throw micro switch
PCL-1S LEFT HAND
PCR-1S RIGHT HAND
TYPICAL USE:
 Emergency shutdown of conveyors or other machinery.
AVAILABLE OPTIONS:

- Hazardous locations
- Corrosive locations

1-TWO CIRCUIT:
 double throw micro switch for D.C circuits
PCL-1T LEFT HAND
PCR-1T RIGHT HAND
TYPICAL USE:
 Emergency shutdown of conveyors and other machinery.
AVAILABLE OPTIONS:

- Hazardous locations
- Corrosive locations

1-SINGLE POLE:
 double throw micro switch at each end
PCD-2S DOUBLE ENDED
TYPICAL USE:
 Emergency shutdown of conveyors and other machinery.
AVAILABLE OPTIONS:

- Hazardous locations
- Corrosive locations
- Remote or dark locations

1-TWO CIRCUIT:
 double throw micro switch at each end for D.C circuits
PCD-2T DOUBLE ENDED
TYPICAL USE:
 Emergency shutdown of conveyors or other machinery.
AVAILABLE OPTIONS:

- Hazardous locations
- Corrosive locations
- Remote or dark locations
- Pennsylvania B.O.T.E. approved

2-SINGLE POLE:
 Double throw micro switch
PCL-2S LEFT HAND
PCR-2S RIGHT HAND
TYPICAL USE:
 Emergency shutdown of conveyors or other machinery — with alarm or computer interface capability.
AVAILABLE OPTIONS:

- Hazardous locations
- Corrosive locations
- Remote or dark locations

2-TWO CIRCUIT:
 Double throw micro switch for D.C circuits
PCL-2T LEFT HAND
PCR-2T RIGHT HAND
TYPICAL USE:
 Emergency shutdown of conveyors or other machinery — with alarm or computer interface cap.
AVAILABLE OPTIONS:

- Hazardous locations
- Corrosive locations
- Remote or dark locations

2-SINGLE POLE:
 Double throw micro switches at each end
PCD-4S DOUBLE ENDED
TYPICAL USE:
 Emergency shutdown of conveyors or other machinery — with alarm or computer interface capability.
AVAILABLE OPTIONS:

- Hazardous locations
- Corrosive locations
- Remote or dark locations

2-TWO CIRCUIT:
 Double throw micro switches at each end for D.C circuits
PCD-4T DOUBLE ENDED
TYPICAL USE:
 Emergency shutdown of conveyors or other machinery — with alarm or computer interface capability
AVAILABLE OPTIONS:

- Hazardous locations
- Corrosive locations
- Remote or dark locations

MODELS	
→	PCL-1S
→	PCR-1S
→	PCL-2S X
→	PCR-2S X

MODELS	
	PCL-1T
	PCR-1T
	PCL-2T
	PCR-2T

MODELS	
	PCD-2S
	PCD-4S

MODELS	
	PCD-2T
	PCD-4T

SPECIAL APPLICATION OPTIONS:

HAZARDOUS LOCATIONS:
 Explosion proof units meet NEMA 7 — class 1, Groups C and D
 • NEMA 9 — class II, Groups E, F and G for hazardous locations. Add "X" to model number, **NO ADDITIONAL CHARGE.**

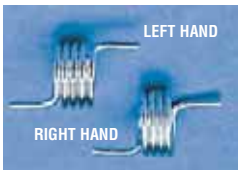
REMOTE OR DARK LOCATIONS:
 Use or red warning light in dark and remote areas (requires two micro switches per end of housing). 125V AC.
NOTE: Available in rain tight, dust tight and explosion proof. Add prefix "L" to model number.

CORROSIVE LOCATIONS:
 Epoxy coated switches with standard flag arms and plated torsion springs. Please add "EPOXY" to model number.

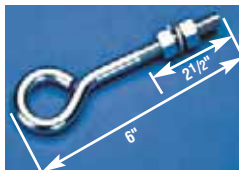
PENNSYLVANIA B.O.T.E. APPROVED:
PCD-27-B.O.T.E.

SEE PRICE SHEET FOR PRICES

ACCESSORIES:



TORSION SPRINGS
 Right or left hand replacement torsion springs for all PC switches. **PC-31 RH or LH**



CABLE SUPPORT EYE BOLTS
 Plated 1/2" N.C. thread - two nuts and one lock-washer included. **PC-27**



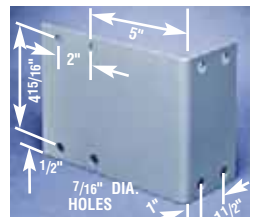
CABLE END FITTINGS
 Forged steel saddle and steel U-bolt. Cadmium plated bolts and nuts. **PC-28**



CABLE WITH ORANGE PROTECTIVE COATING
 3/32 7x7 preformed galvanized aircraft cable 3/16" O.D. Vinyl coated. **PC-25**
 Nylon coated. **PC-26**



CONDUIT PLUG
 1" metal conduit plug. **PC-29**



PC MOUNTING BRACKET. PC-30



SCP 1000 Presettable Speed Switch

- Single or double relay set point protection.
- 1-100 and 10-1000 RPM set point ranges (others available).
- Built-in start delay and signal loss protection.
- ETL® approved to applicable UL and CSA standards.
- Explosionproof housing is dirt, dust, grease and waterproof.
- Switch selectable overspeed or underspeed sensing.
- Dial in set point adjustment with digital accuracy.

Product Information

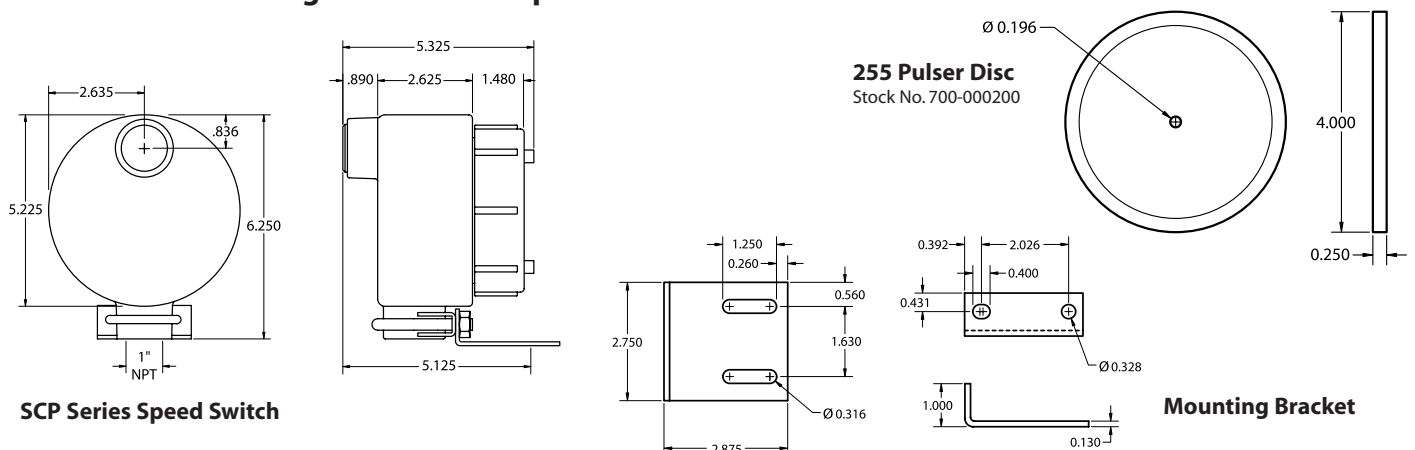
Description

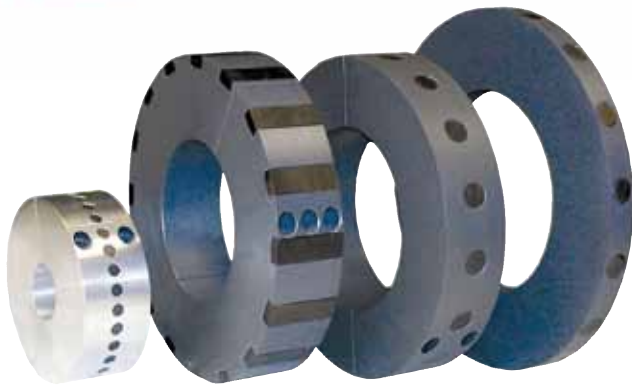
SCP series presettable speed switches are self-contained shaft rotation monitoring systems providing one or two individually adjustable relay set points. They are ideal for use in hazardous and wet locations where speed indication for alarm or machinery shutdown is critical for safe operation. SCP series switches are an excellent choice for overspeed and/or underspeed protection of bucket elevators, fans/blowers, screw conveyors, rotary airlocks or virtually any rotating shaft. SCP series switches are offered as standard in two configurations: a single relay output (SCP-1000). While many applications require only one set point (SCP-1000). If the shaft continues to slow down and reaches the second set point, the primary process can be wired for shutdown, maintaining the efficiency and safety of operations by preventing machine damage, product waste and costly downtime. SCP series switches feature visual set point adjustment via rotary dials for ease and accuracy, and all calibration can be done with the machinery at rest.

Principle of Operation

SCP series switches have an internal Hall-Effect sensor and are supplied with a shaft-end mounted Pulser Disc (or optional split collar or Pulser Wrap), which generates an alternating magnetic field picked up by the SCP's large-gap, non-contact sensor. The SCP decodes this frequency signal to determine shaft speed, and compares it to the pre-adjusted set point(s). The relay output(s) can then be used for equipment shutdown or to provide an alarm, assuring machine protection and process integrity. SCP series speed switches are fail-safe; any malfunction during operation will de-energize the control circuit.

Dimensional Drawings • SCP Series Speed Switches





Split Collar Pulser Wraps

Custom made for your application, built to your specifications

- No machinery tear-down required for mounting
- Five types of wraps fit most applications
- Custom number of pulses per revolution
- PVC, aluminum, or stainless steel
- High temperature wraps available

Product Information

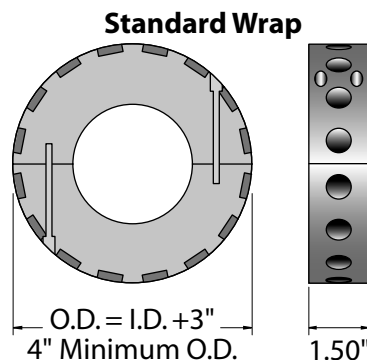
Description

Pulser Wraps are PVC, aluminum, or stainless steel split collars with magnets mounted on the outside circumference. The magnets serve as targets for Hall-Effect and Magneto-resistive sensors that switch when exposed to magnetic fields. All wraps are custom machined to the diameter of the monitored shaft and are split into halves. This splitting process allows the wrap to clamp tightly onto the shaft without tearing down any equipment to install them. The halves are secured around the shaft with recessed Allen-head socket screws supplied. Pulser Wraps provide magnetic targets that are strong enough to allow large gap distances (up to 1/2 -inch) between the wrap and the sensor. The wrap and sensor system forgives slight misalignment of the sensor, machinery vibration, dirty, wet, or greasy environments, and shaft end-play.

Special Wraps

Wraps purchased for use with standard Electro-Sensors systems are typically provided with 16 magnets of alternating polarity. Using a standard Hall-Effect sensing system, this provides 8 pulses per revolution from the sensor. Special wraps can be provided to suit particular application requirements. This often includes adding magnets to the wraps to increase the number of pulses per revolution generated by the sensing system. Adding magnets will usually require an increase in the outside diameter of the wrap. Standard and miniature wraps are typically selected when more magnets are required because the magnets may be added without large increases in the outside diameter, particularly if the 1/4" diameter magnets are used. Wraps can be manufactured from PVC, aluminum, or stainless steel, and have the option of a keyway where required. **Steel inserts can be substituted for magnets when using proximity or mag sensors.** An Electro-Sensors Application Specialist can assist in the design of wraps to meet specific or special needs.

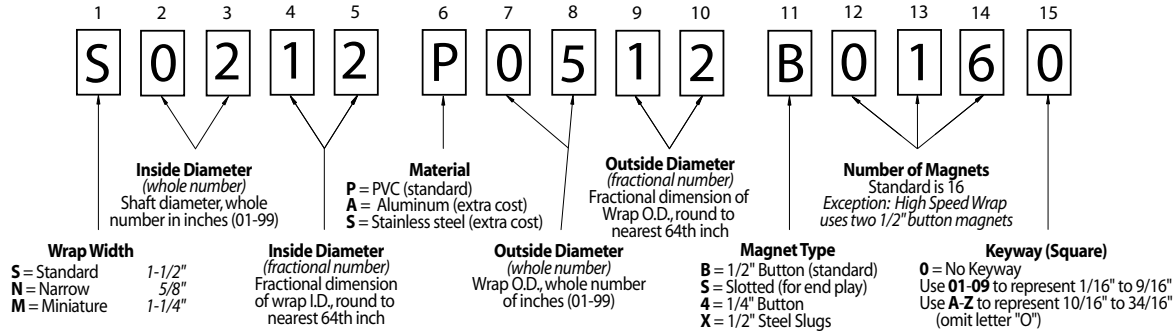
Dimensional Drawing



Installation

Pulser Wraps are custom manufactured to fit the shaft they will be mounted on. When the wrap is shipped, four Allen-head cap screws hold the two halves of the wrap together. These screws must be removed so that the wrap is in two halves. Place the two halves around the shaft, reinsert the screws and torque them evenly to 5 foot pounds. After installation, a small gap between the two halves is normal.

**Use the following chart to create a part number for any wrap.
Please state the exact shaft diameter and maximum RPM when ordering.**



Examples

1. Standard PVC Wrap for 3-1/2" shaft, 1,750 RPM, with 16 magnets	Part No. S0332	P0632	B0160
2. Narrow Aluminum Wrap for 1-5/8" shaft, 1,200 RPM, 1/4" keyway, with 16 magnets	Part No. N0140	A0700	B0164
3. High Speed Aluminum Wrap for 6-1/4" shaft, 6,000 RPM, with 2 magnets	Part No. S0616	A0716	B0020
4. Miniature PVC Wrap for 1-1/8" shaft, 3,000 RPM, with max. no. of 1/4" magnets	Part No. M0108	P0400	40310

The formulas below show the maximum number of magnets that can be mounted on the Standard or Miniature Wraps with respect to magnet diameter and the outside diameter of the Wrap.

1/2" Magnets

$$\frac{(\text{Wrap Outside Diameter} - 1/2") \times 3.14}{0.65}$$

1/4" Magnets

$$\frac{(\text{Wrap Outside Diameter} - 1/2") \times 3.14}{0.35}$$

Specifications • Split Collar Pulser Wraps

All Wraps - Temperature Range

PVC Material	60°C max.
Aluminum Material	150°C max.
Stainless Steel	150°C max.

Consult factory for higher temperature ranges.

Wrap Types

Standard - Under 3,000 rpm

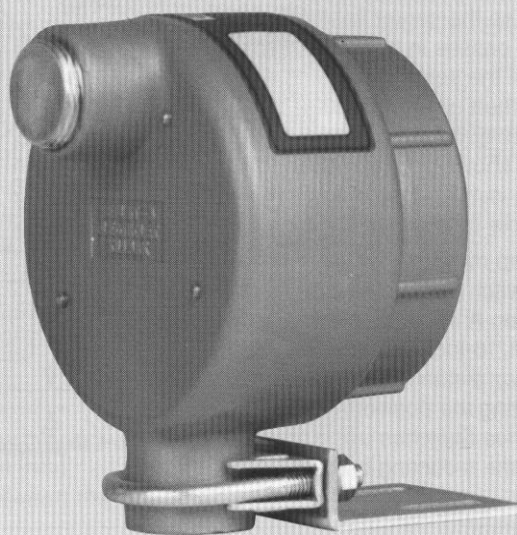
Width	1-1/2"
Inside diameter	Custom to shaft size
Outside diameter	I.D. + 3"
Min. outside diameter	4"
Material	PVC std., aluminum optional
Standard magnet size	1/2" diameter
Standard no. of magnets	16 (8 or 16 pulses/revolution)

Specifications subject to change without notice.

Presettable Speed Switch



SCP1000/2000 ©1998



Features:

- **Single or Double Relay Set Point Protection**
- **Positive Visual Set Point Adjustment w/Digital Accuracy**
- **Built-in Start Delay**
- **Switch Selectable Underspeed or Overspeed Sensing**
- **1-100 and 10-1000 rpm Set Point Ranges**
- **Dustproof, Dirtproof, Greaseproof and Waterproof**
- **ETL® Approved to UL® 508 Standard**
- **Explosion-proof Housing, UL, CSA Approved**

Description:

The SCP-Series Presettable Machine Switches are complete systems for providing one or two individually adjustable relay set points, while monitoring a single rotating shaft. The SCP-Series Switches are ideal for applications where speed indication for alarm and shutdown purposes is critical for safe and efficient operation of your equipment. The SCP-Series are the "Installers Choice" for protecting bucket elevators, fans, airlocks, mixers, or virtually any rotating shaft, including overspeed sensing requirements.

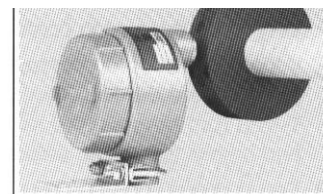
The SCP-Series Speed Switches are offered with a single relay output (Model SCP-1000).

Another control function, commonly used in the grain industry, employs both relays set in the Underspeed Mode. The first relay provides warning of a slowdown, and also permits interlock wiring to shut down auxiliary machinery. If the shaft continues to slow down and reaches the second set point speed, the primary process can be wired for shutdown to prevent equipment damage and product loss.

Both models feature visual set point adjustment for "dial in" ease and accuracy of set point settings. The SCP-Series Switches can be completely adjusted with the machinery at rest. There is no need to run the shaft. Precision digital circuitry provides high accuracy, repeatability, and reliability.

Shaft Monitoring:

The SCP-Series Switches have an internal Hall-Effect Sensor which is used to monitor a magnetic target, such as a Pulser Disc or the optional Pulser Wrap, mounted on the monitored shaft. As the Disc or Wrap rotates in front of the Hall-Effect Sensor, a digital signal proportional to the speed of the monitored shaft is produced. The signal is used by the unit's electronics to determine shaft speed and relay set point actuation.



SCP Switch and Optional Pulser wrap

Pulser Wrap

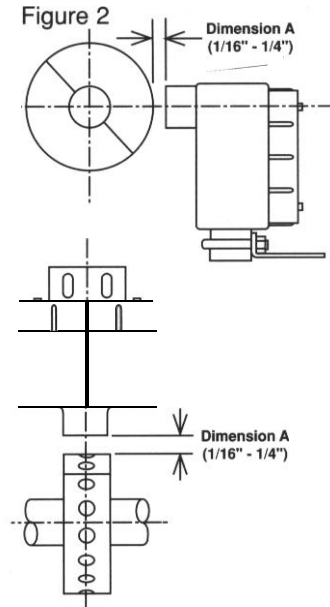
Pulser Wraps are custom manufactured to fit the shaft they will be mounted on. When the wrap is shipped, four head cap screws hold the two halves of the wrap together. These screws must be removed so that the wrap is in two halves. Place the halves around the shaft, reinsert the screws and torque them to 8 foot pounds.

SCP-Series Installation:

The SCP-Series Switches are supplied with a mounting bracket assembly. The speed switch must be installed so the center line of the magnets passes in front of the center portion of the sensing head as they rotate.

The gap distance between the speed switch and the wrap (dimension A in the diagrams) can be from 1/16-inch to 1/4-inch. The proper gap distance is achieved by adjusting the position of the SCP-Series Switches using the slots on the mounting bracket.

Sensing Head and Wrap:



SCP-Series Calibration:

See Figure 3 for Switch Locations

Four Steps to Calibrating the SCP-Series Switches:

1. Determine your monitoring requirement. The Model SCP-1000 provides a single relay set point, while the Model SCP-2000 has two independent relay set points Double Set Point Protection.
2. Determine whether the relay(s) should deenergize when the shaft speed drops below the set point speed (Underspeed Operation), or when the shaft speed goes above the set point speed (Over Speed Protection). Adjust the Under/Over Speed Selection switch(es) to set the SCP-Series Switch in the desired Mode. (See the diagram at right for the switch positions).
3. If the required relay trip point (set point speed) is below 100 rpm, set the Set Point Range Selection Switch to the 1-100 rpm range. If the relay trip set point is above 100 rpm and below 1000 rpm, select the 10-1000 rpm range.
4. Set the corresponding rotary Set Point switches to the desired set point RPM. The switches can be set to any number from 01-99. A setting of 00 will read as though it was entered as 01.

Calibration Example: If the Set Point Range Selection Switch was set in the 1-100 rpm range, and the desired set point speed is 50 rpm, the Set Point switches should be set to 50. In the 10-1000 rpm range, the set point is 10-times the switch setting (i.e. a switch setting of 60 results in a set point of 600 rpm).

Note: Calibration should be done with power to the SCP turned off. If a change is made to the calibration while power is on (not recommended), cycle power to the unit. This will store the new set point, and restart the 10-second start delay.

Set Point Range Selection Switch

Under/Over Speed Selection Switch

Switch Position	Set Point Range
ON	1 - 100 RPM
OFF	10 - 1000 RPM

Switch Position	Mode
ON	Under Speed
OFF	Over Speed

Set Point Switches
Selection Range from 01 to 99

Tens

Ones

Signal Loss Protection:

In Underspeed Mode, a loss of sensor signal will be detected immediately, and the relay(s) will deenergize. In Overspeed Mode, the loss of signal will be detected immediately, but the SCP-Series Switch will wait 30-seconds for the signal to resume. This prevents unwanted shutdown when monitoring very slow-moving shafts. After the 30-seconds have elapsed with no incoming signal, the relay(s) will deenergize.

Start Delay:

A 10-second start delay is built into the SCP-Series Switches. In Underspeed Mode, the start delay holds the relay(s) in an energized state for 10-seconds, allowing monitored shaft to reach a speed above the set point(s)

before monitoring begins. The start delay begins when power is applied to the SCP-Series Switch. If additional start delay time is required, an external time delay relay can be used, or consult the factory for more options.

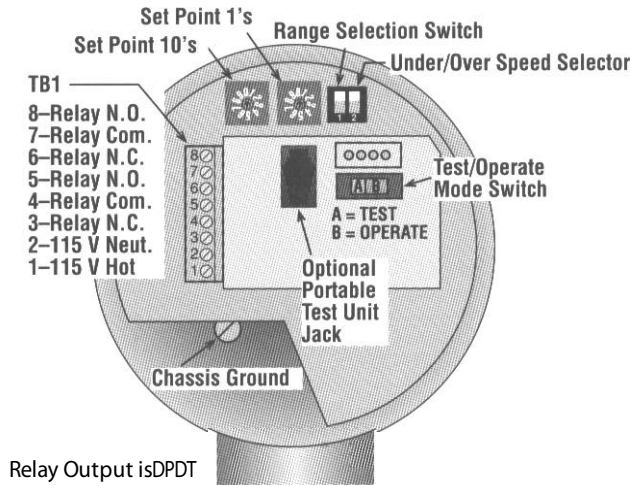
Special Options:

Special options are available from the factory to modify the standard functions of the SCP-Series Switches. Options include: Increased or Decreased Start Delay Interval, No Start Delay, Reduced or Enlarged Set Point Hysteresis, Set Point Over 1000 RPM, Calibration in Percent of Speed, and Signal Loss Protection Inactivation in Overspeed Mode.

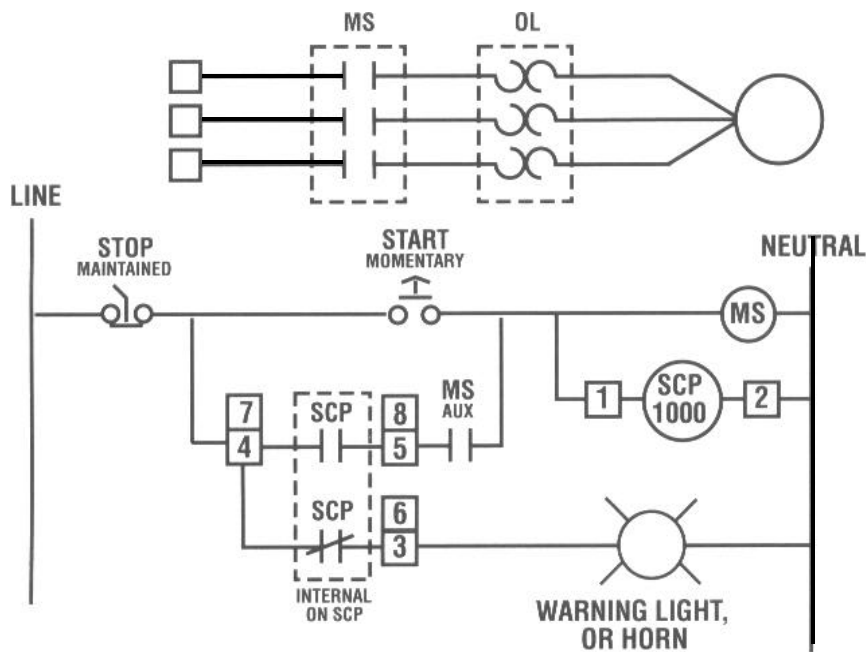
Wiring Connections:

Figure 3

SCP-1000



Motor Shutdown with Alarm



This Wiring Configuration Will Disable the Alarm on a Stop Command. To Maintain the Alarm, Replace the Maintained Stop Switch with a Momentary Normally Closed Switch.

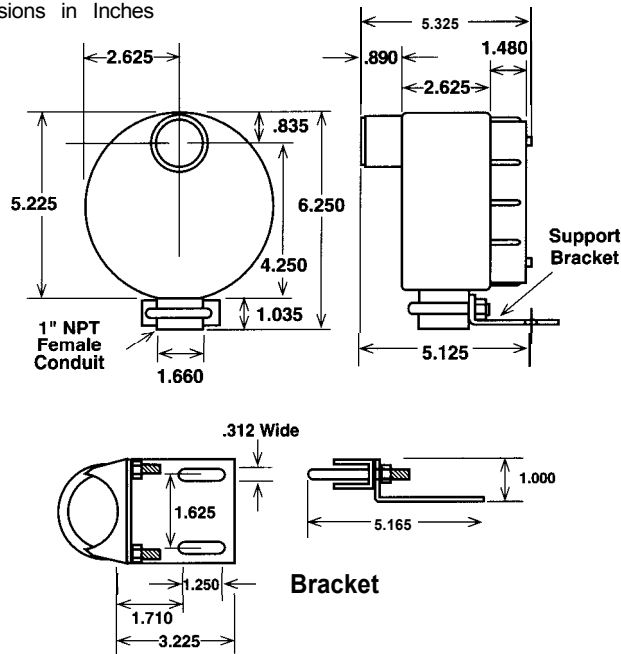
Wiring Diagram Key:

- MS Motor Starter (not supplied)
- OL Overload contacts
- n.o. Normally open (relay is in a deenergized state).
- TDR Time Delay "OFF" Relay (not supplied)
- If the shaft being monitored comes up to speed slowly, a TDF can be used so the operator will not have to hold the START button in.

WARNING

During a stopped condition, even a slight movement of the shaft or magnetic disc could energize the control relay and start the motor if the Motor Auxiliary Normally Open Contact (MS n.o.) is not wired in series as shown in these typical wiring diagrams. This situation could cause equipment damage or PERSONAL INJURY! To prevent starting the motor accidentally, ALWAYS USE PROPER LOCK-OUT-TAG-OUT PROCEDURES.

SCP-Series Dimensional Drawings:
Dimensions in Inches



SCP-Series Switch General Specifications:

Power:	
Voltage	115 + 10%, Standard, 230 Vac Optional
Frequency	50 - 60 Hz
Wattage	1.1 VA
Input Signal:	
Type	Open Collector/Logic
Amplitude	5V Pull-Up, 4.7 K Ohms
Impedance	2200 Ohms to 15V
Pulse Width	15 m/sec. Min.
Maximum Frequency	266.66 Hz
Minimum Pulse Width	One m/sec.
Set Point Data:	
Number Available	One or Two
Actuation State	Overspeed or Underspeed
Adjustments	Rotary Switches (Tens and Ones Digit)
Hysteresis	6%
Range	1-100rpm, 10-1000rpm
Mode	Selectable - Over or Under
Accuracy	0.005% at Bottom of Range 0.25% at Midrange 0.5% at Top of Range
Relay Contact Rating	SCP-1000/SCP-2000: Isolated, 5A 250 Vac, 30 Vdc Resistive
Contact Arrangement	SCP-1000: One Form C, D.P.D.T. SCP-2000: Two Form C, S.P.D.T.

Physical/Environmental:	
Housing and Cover.	Cast Aluminum, C.S.A. & FM Approved. Meets NEMA 1, 3, 12, 13 and NEMA 7, 9. Hazardous Location. U.L. Rated: Class I Group D; Class II Groups E, F, G. NEMA 4 8-Position Removable Terminal Block
Electrical Connections	Bracket, 1-inch NPT Conduit Opening
Mounting	Operating Temperature Maximum Speed Range. Shipping Weight (System)
	-40°C to 60°C* Consult Factory 4 lb.
Pulser Disc:	
Material	Nylon 12 (with Ferrite Material)
Dimensions	4-in. Dia. x 1/4-in. Thick
Operating Temperature	-40°C to 60°C*
Maximum speed Range.	Consult Factory
Pulser Wrap (optional):	
Material	PVC (Standard) Aluminum (Optional)
Operating Temperature.	-40°C to 60°C*
Maximum Speed	Consult Factory
Spare Parts List:	
	<u>Stock No.</u> <u>Part No.</u>
4-inch Dia. Pulser Disc (Nylon 12)	700-000200 255
4-inch Dia. Pulser Disc (Aluminum)	700-001500 255-A
SCP1000 internal Electronics	770-020100
Waterproofing Gasket	295-000200

**Higher Temperature Ranges Available. Consult Factory*

Specifications Subject to Change Without Notice.



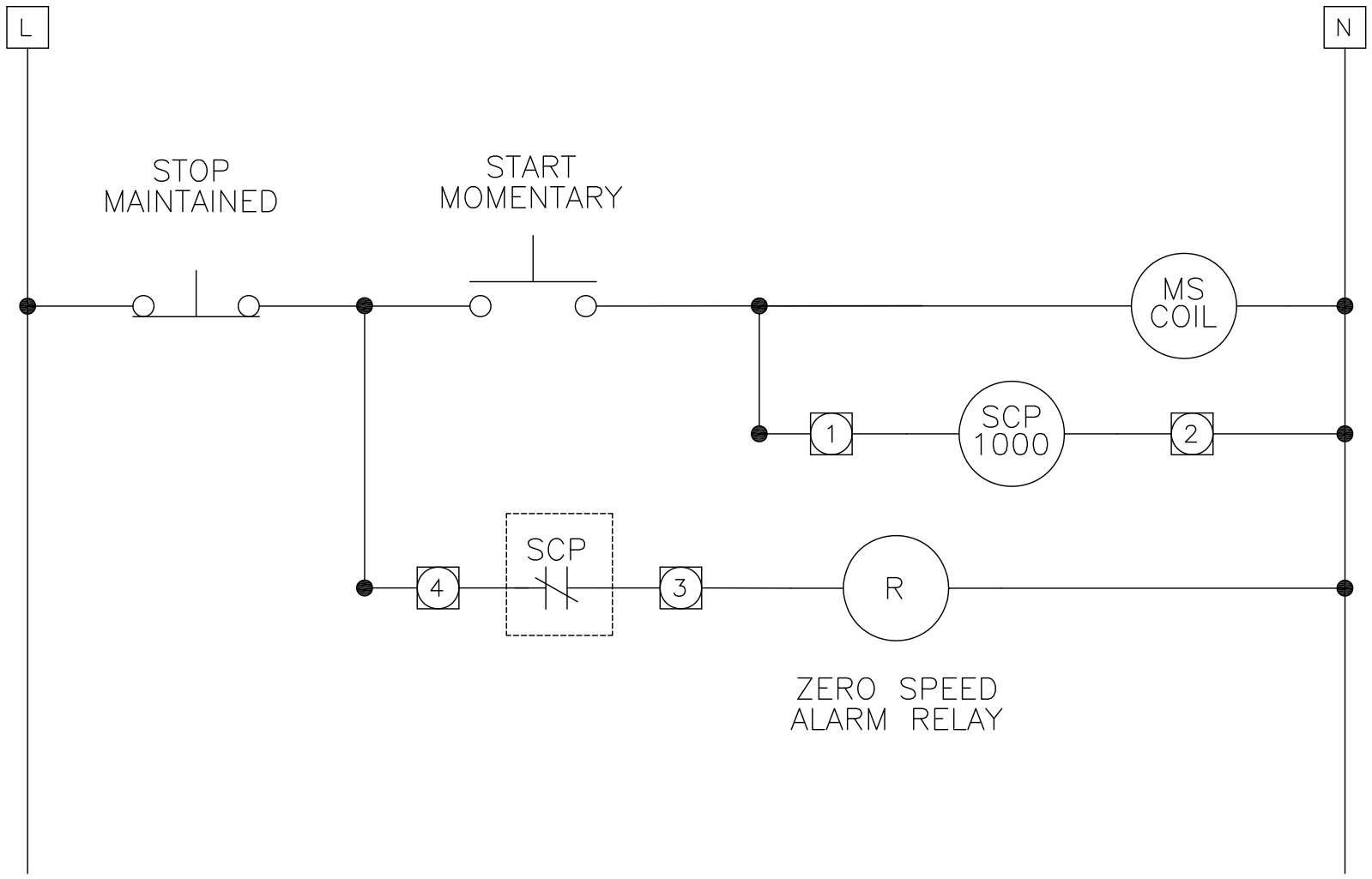
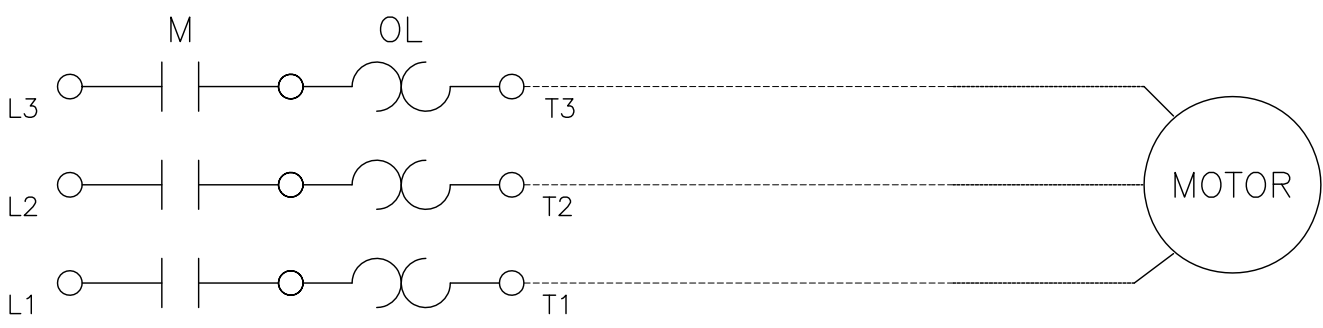
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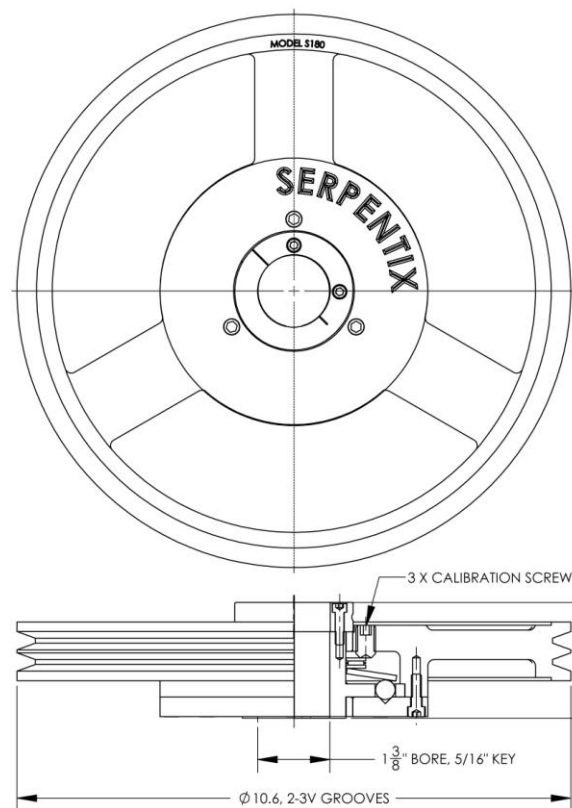


OPERATING MANUAL

MODEL S-180



Model S-180 Torque Limiting Sheave	
Trip-torque Range:	8 to 180 lbft
Sheave:	2-3V 10.6
Thickness:	2 ¼ in
Weight:	15 lb



FEATURES

- Thin profile body.
- Integral clamp collar for ease of mounting
- Permanently lubricated mechanism.
- ZERO maintenance
- Fully adjustable throughout full torque range without disassembly.
- Units can be shipped pre-calibrated and ready to mount.
- Increased versatility. Universal design accommodates multiple applications.
- One-piece integral-sheave construction. "Serpentix" name cast into sheave.
- Fusion-bonded epoxy corrosion protection.
- Easy access calibration. Factory or field adjustable.
- Easy mounting with simple hand tools.
- Optional **Calibration Stop** to prevent over-adjustment lockup.
- Dynamically balanced to standard sheave specs.



OPERATING MANUAL

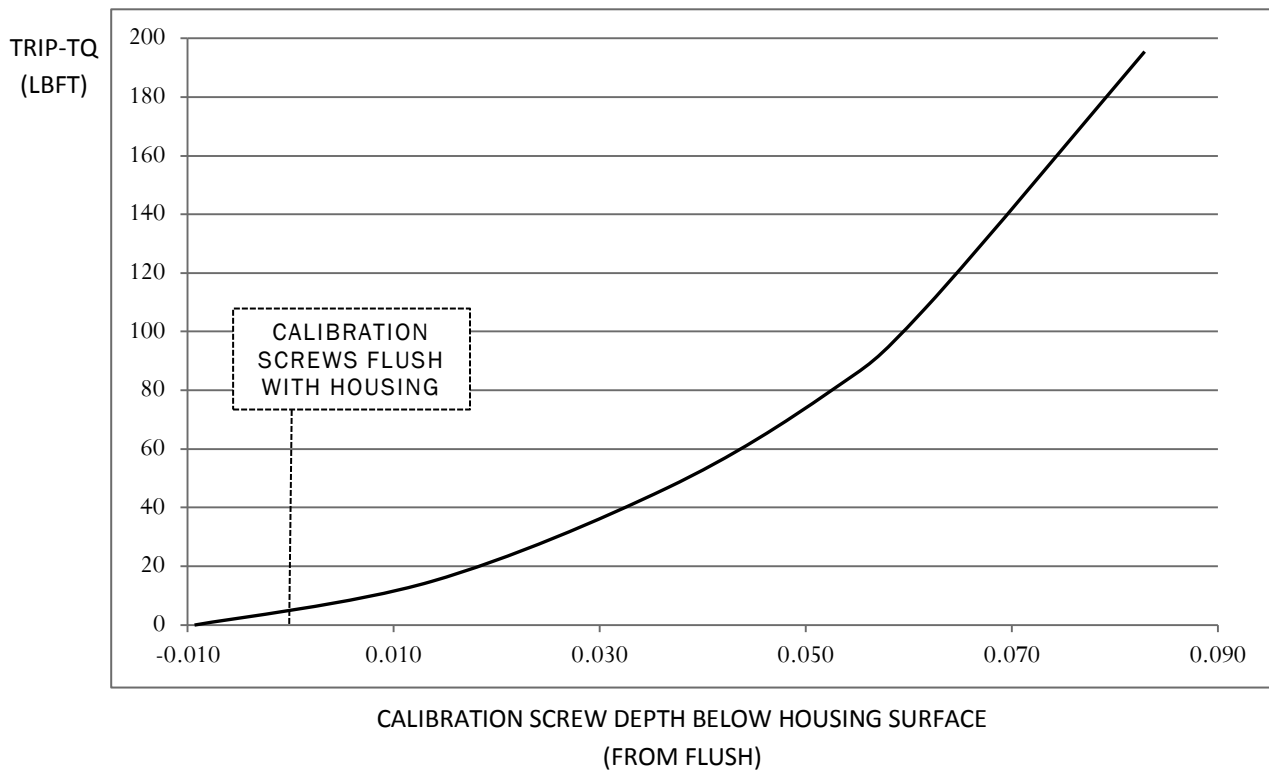
**MODEL
S-180**

MOUNTING

1. Remove existing sheave from 1-3/8" diameter motor drive shaft. If no sheave exists, move on to step 2.
2. With the clamp-collar's mounting screws loose and facing toward you, slide the Model S-180 and furnished key onto the 1-3/8" diameter motor drive shaft. If the S-180 will not go easily onto the motor's shaft, spread the clamp-collar at the split with a flat-head screw driver, and then proceed.
3. Tighten down the clamp-collar bolt to eliminate axial play.
4. Tighten clamp-collar's mounting bolts.
5. Test trip-torque setting.

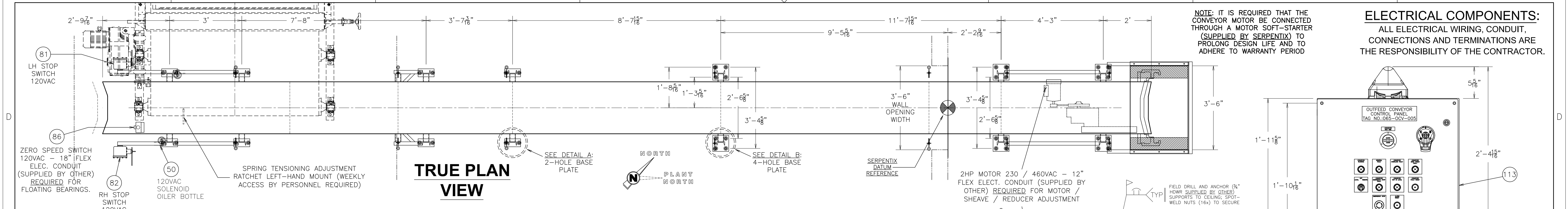
CALIBRATION

1. Adjust each of the three calibration screws evenly in 1/8 turn increments according to the table below, until required trip-torque is reached.
2. Apply a drop of *Loctite 290* to each calibration screw after calibration screw adjustment is complete.



0.016 IN = 1/4 SCREW TURN

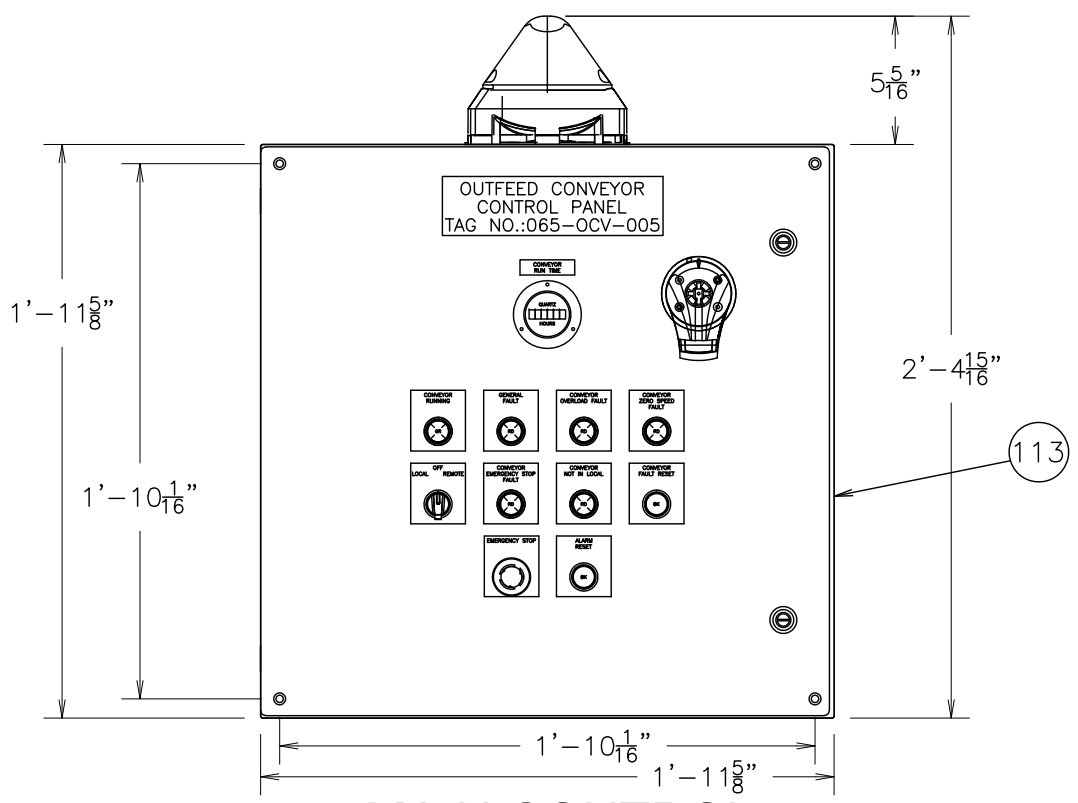




TRUE PLAN VIEW

NOTE: IT IS REQUIRED THAT THE CONVEYOR MOTOR BE CONNECTED THROUGH A MOTOR SOFT-STARTER (SUPPLIED BY SERPENTIX) TO PROLONG DESIGN LIFE AND TO ADHERE TO WARRANTY PERIOD

ELECTRICAL COMPONENTS:
ALL ELECTRICAL WIRING, CONDUIT, CONNECTIONS AND TERMINATIONS ARE THE RESPONSIBILITY OF THE CONTRACTOR.



MAIN CONTROL PANEL LAYOUT / SIZE
SCALE: 1.5" = 1'-0"

***NOTE: CONTROL PANEL(S) TO BE INSTALLED PER CONTRACT DRAWINGS - SERPENTIX DOES NOT DESIGNATE SPECIFIC LOCATION(S) OF PANEL(S)

VERIFY ALL DIMENSIONS:
CONTRACTOR IS RESPONSIBLE FOR ALL DIMENSIONAL VERIFICATIONS, COORDINATION OF DRAWINGS, DATA APPLICABLE TO THE CONVEYOR, AND PROPERLY INTERFACING OTHER EQUIPMENT, COMPONENTS AND SURROUNDINGS NOT SUPPLIED BY SERPENTIX CONVEYOR.

SUPPORT MATERIAL:
ALL SUPPORTS ARE FABRICATED FROM ASTM A572 GRADE-50 STRUCTURAL STEEL; HOT-DIPPED GALVANIZED TO ASTM 123-892 SPECIFICATION

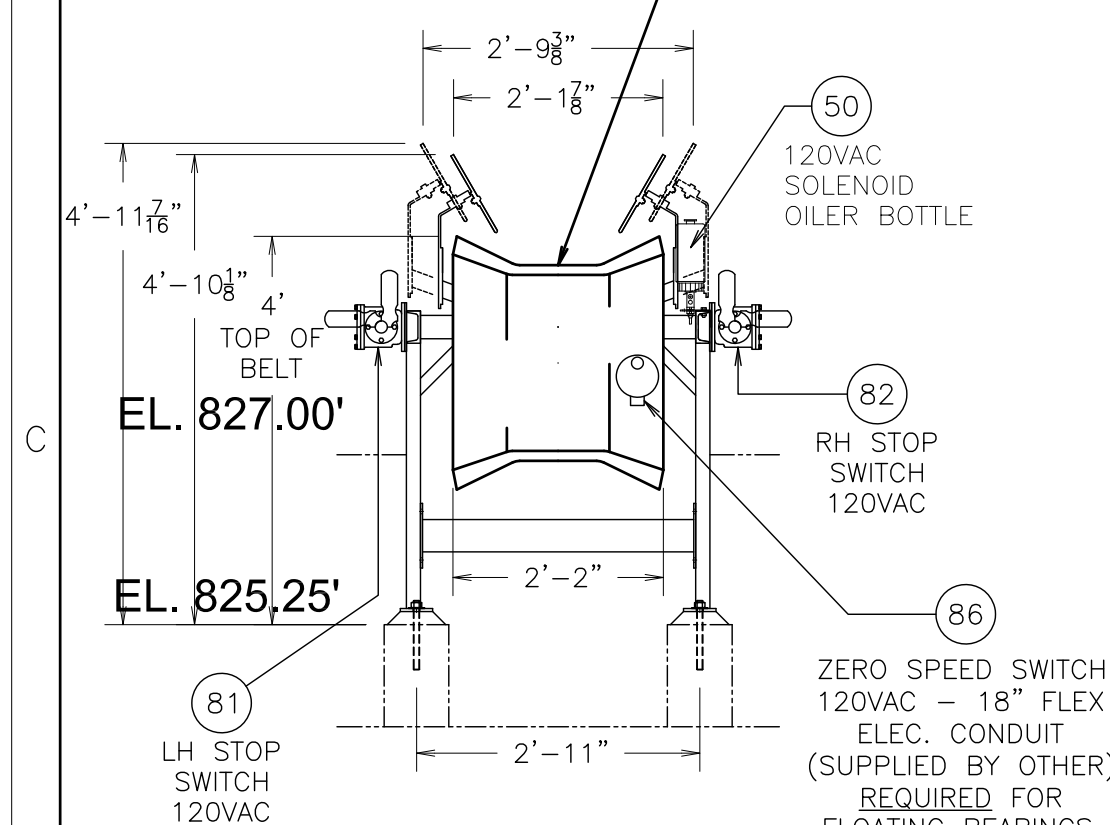
TRACK MATERIAL:
TRACK, DRIVE AND TENSION STRUCTURES ARE FABRICATED FROM 304 STAINLESS STEEL

ACCESSORIES MATERIAL:
ALL SKIRTBOARD BRACKETS, DRIP PANS HANGERS, AND DRIP PANS ARE FABRICATED FROM 316 STAINLESS STEEL

SUSPENDED SUPPORT CONNECTION:
ALL SUSPENDED SUPPORT CONNECTIONS TO THE BUILDING ARE THE RESPONSIBILITY OF OTHERS. SERPENTIX WAS GIVEN NO INFORMATION OR HAS NO KNOWLEDGE OF THE PROPOSED METHOD OF CONNECTION. SERPENTIX DOES RECOMMEND THE CONNECTION BE BOLTED AND WELDED TO THE BUILDING MEMBERS.

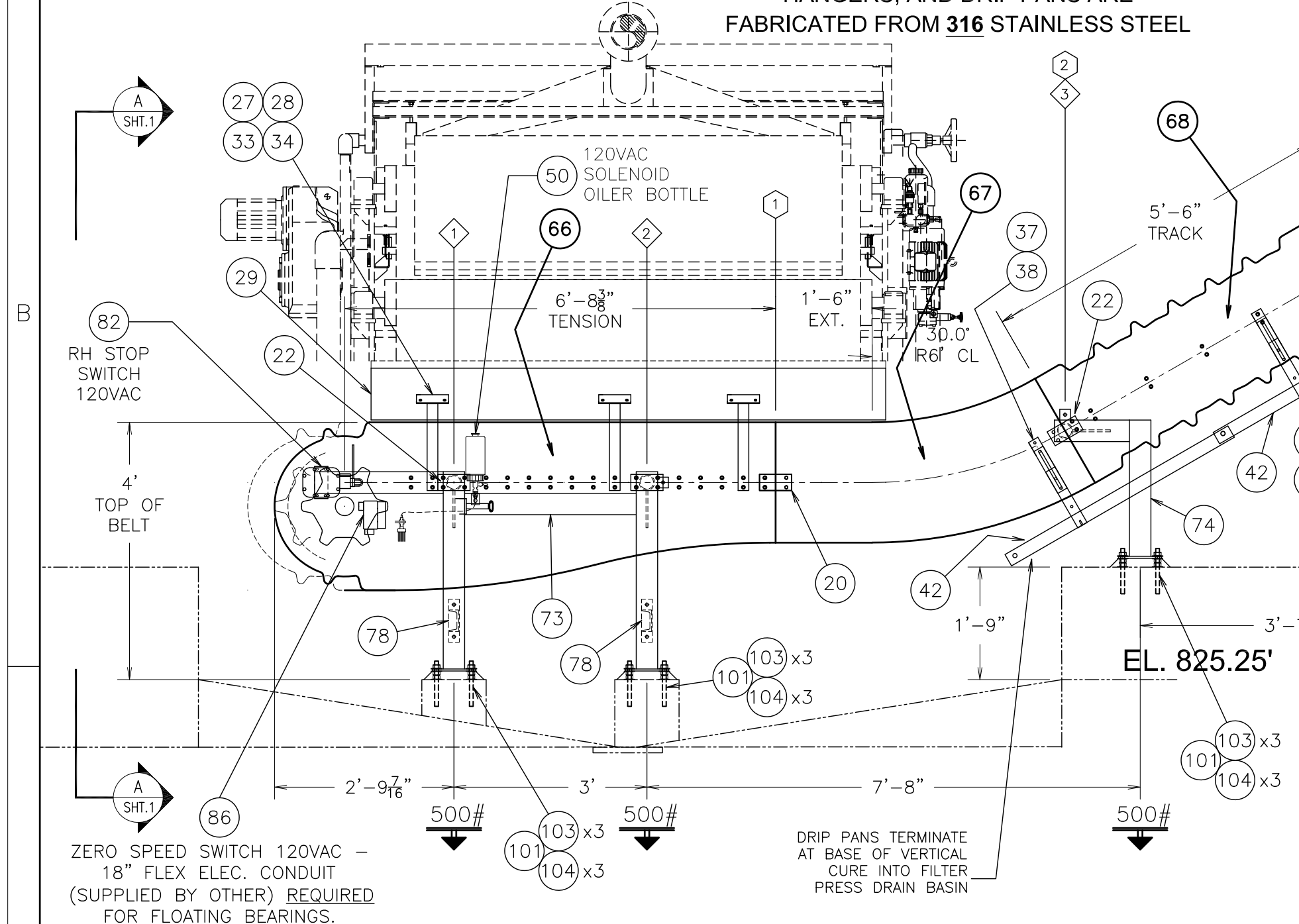
FLOOR ANCHORAGE HARDWARE:
ALL-THREAD & ASSOCIATED HARDWARE PROVIDED FOR ANCHORING THE CONVEYOR IS 316 STAINLESS STEEL.

NOTE: MATERIAL DISCHARGE MUST BE CENTERED ON BELTING - INSTALLER IS RESPONSIBLE FOR COORDINATING EQUIPMENT ACCORDINGLY



SECTION A-A: TENSION STATION END VIEW

WEATHER SEAL CROSS SECTION

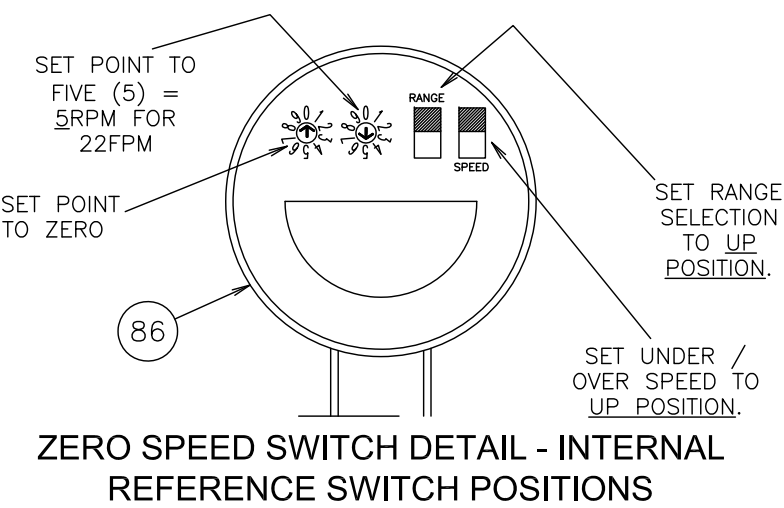


RIGHT-HAND ELEVATION VIEW

DETAIL A: 2-HOLE 4" x 8"
3/8" THICKNESS
SCALE: 2" = 1'-0"

DETAIL B: 4-HOLE 8" x 8"
3/8" THICKNESS
SCALE: 2" = 1'-0"

TYPICAL ANCHOR INSTALLATION
SCALE: 2" = 1'-0"



ZERO SPEED SWITCH DETAIL - INTERNAL REFERENCE SWITCH POSITIONS

DETERMINING TENSION SHAFT RPM
MOTOR = 1750 RPM
SHEAVE REDUCTION: 2.65" / 10.6"
SHEAVE RATIO: 4.00 = 437.50 RPM
REDUCER REDUCTION RATIO: 25 = 17.50 RPM
#60 CHAIN SPROCKET REDUCTION: 15 / 60
SPROCKET RATIO: 4.000 = 4.375 RPM AT DRIVE SHAFT

BELT SPEED = 2 x 3.1415 x RPM x SPROCKET RADIUS
BELT SPEED = 2 x 3.1415 x 4.375 x 9.5" = 261.145 IN/MIN = **21.76 FT/MIN**

TENSION RPM = (BELT SPEED x 12 IN/FT) / (2 x 3.1415 x SPROCKET RADIUS)
TENSION RPM = (21.76 x 12) / (2 x 3.1415 x 6.75") = **6.157 RPM**

PROPRIETARY STATEMENT
THE INFORMATION CONTAINED HEREIN IS PROPRIETARY, AND FURNISHED IN CONFIDENTIALITY AND NOT TO BE DISCLOSED, USED, OR DUPLICATED FOR ANY PURPOSE OTHER THAN INTENDED, WITHOUT THE PRIOR WRITTEN PERMISSION OF SERPENTIX CONVEYOR CORP. THIS LEGEND SHALL BE MARKED ON ANY REPRODUCTION HEREOF, IN WHOLE OR IN PART. RECEIPT OF THIS MATERIAL SHALL BE DEEMED TO BE AN ACCEPTANCE OF THE CONDITIONS SPECIFIED HEREIN.

ITEM NO.	QTY.	DESCRIPTION	MATERIAL	REMARKS
112	1	CONVEYOR CONTROL PANEL (316SS)	316SS	HEITZ AUTOMATION #18-529-09222-000-00 (Rev)
111	1	DRIP PAN x 3'-11 1/2" LG. x 31" WIDE w/ 35" CUTBACK	316SS	P2-0140-0295-A
110	1	CHUTE ASSEMBLY w/ 18oz VINYL COATED PVC CHUTE EXTENSION	316SS HDWR.	P2-0140-0298-D
109	1	C4x7.25# CHUTE SUPPORT REAR BRACE	316SS	P2-0140-0298-D
108	1PR	C4x7.25# CHUTE SUPPORT SIDE ARMS	316SS	P2-0140-0298-D
107	8	HILTI HY/RE MIXING NOZZLE	HILTI HY/RE	ANCHOR SYSTEM
106	4	HILTI HIT-RE 500 VS - INJECTABLE EPOXY MORTAR (11.16oz)	HILTI HIT-RE 500 VS	ANCHOR SYSTEM
105	1	HILTI HDM 500 RED MANUAL DISPENSER	HILTI HDM 500 RED	ANCHOR SYSTEM
104	72	3/4" FLAT WASHER	316SS	ANCHOR SYSTEM
103	72	3/4"-10NC HX. NUT	316SS	ANCHOR SYSTEM
102	8	3/4"-10NC x 12" LG. ALL-THREAD ANCHOR (8" MIN. EMBEDMENT)	316SS	ANCHOR SYSTEM
101	16	3/4"-10NC x 8 1/2" LG. ALL-THREAD ANCHOR (5" MIN. EMBEDMENT)	316SS	ANCHOR SYSTEM
100	1	WEATHER SEAL ASSEMBLY w/ VINYL FINGER EXT.	316SS HDWR.	P2-0138-0678-A
86	1	ZERO SPEED SWITCH (RIGHT-HAND MOUNT)	OEM CAST	SET POINT: 5 RPM = 22 FPM ELECTRO/SENSOR SCP1000
85	2	3/16" O.D. ORANGE CLAMP 47'-0" LG.	VINYL COATED	
84	14	3/8"-16NC x 6" LG. EYE-BOLT w/ HDWR.	304SS	
83	4	3/16" WIRE ROPE CLAMP	304SS	MCMASTER CARR# 3198572
82	1	STOP SWITCH - PCR2SX	ALUMINUM	FLAG MUST FALL DOWNWARD MATERIAL CONTROL EXPLOSION PROOF
81	1	STOP SWITCH - PCL2SX	ALUMINUM	FLAG MUST FALL DOWNWARD MATERIAL CONTROL EXPLOSION PROOF
80	2	ANGLE CROSS PLATE x 30" BOLT-UP	GALV. STRUC.	P2-0135-0945-D
79	4	ANGLE CROSS BRACE x 3'-1 5/16" LG.	GALV. STRUC.	P2-0135-0945-D
78	9	C4x7.25# CHANNEL BRACE x 2'-9 1/2" LG.	GALV. STRUC.	P2-0135-0945-D
77	1PR	C4x7.25# SUSPENDED DRIVE SUPPORT x 5'-2 1/4" LG.	GALV. STRUC.	P2-0135-0945-D
76	2	C4x7.25# SUPPORT LEG x 9'-10 7/16" LG.	GALV. STRUC.	P2-0135-0945-D
75	2	C4x7.25# SUPPORT LEG x 4'-10 7/16" LG.	GALV. STRUC.	P2-0135-0945-D
74	1PR	C4x7.25# SUPPORT L-LEG x 2'-1 7/16" LG.	GALV. STRUC.	P2-0135-0945-D
73	1PR	C4x7.25# TENSION SUPPORT x 3'-0 3/4" LG.	GALV. STRUC.	P2-0135-0945-D
72	1	26" DUAL SCRAPER ASSEMBLY (HIGH POSITION)	304SS	PW-0137-0199-A RevB 1/4" RUBBER
71	1	DRIVE STATION x 5'-0" LG.	304SS	P2-0115-0056-D BALDOR ECP3872 AINSPACH CLUTCH
70	1	VERTICAL CURVE x R6' x 30'	304SS	P2-0127-0399-B
69	2	STRAIGHT TRACK x 10'-0" LG.	304SS	P2-0125-0004-D
68	1	STRAIGHT TRACK x 5'-6" LG.	304SS	P2-0125-0004-D
67	1	VERTICAL CURVE x R6' x 30' w/ 1'-6" EXT.	304SS	P2-0127-0398-B
66	1	RH TENSION STATION x 6'-8 3/8" LG.	304SS	P2-0116-0006-D

STANDARD NOTES - UNLESS OTHERWISE SPECIFIED

1. O INDICATES SPLICE POINT
2. X INDICATES SUPPORT POINT
3. CONVEYOR SHIPPED UNASSEMBLED, CONTRACTOR TO ASSEMBLE ON SITE.
4. ALL ELECTRICAL COMPONENTS INCLUDING MOTOR STARTERS AND LOCAL CONTROLS TO BE SUPPLIED BY OTHER. (UNLESS CONTRACTUALLY OTHERWISE)
5. DESIGNATED SUPPORT LOAD WEIGHTS ARE PER PAIR OF LEGS.
6. ANCHOR BOLTS SUPPLIED BY OTHER. (UNLESS CONTRACTUALLY OTHERWISE)
7. IT IS CRITICAL THAT THE CONTRACTOR VERIFY ALL DIMENSIONS AND ELEVATIONS AND CROSS REFERENCE THESE WITH OTHER EQUIPMENT ASSOCIATED TO ENSURE PROPER CONVEYOR INSTALLATION AND ALLEVIATE POSSIBLE INTERFERENCES.

UNIT SPECIFIC NOTES

CONVEYOR UNIT - CNV-83CON3730
CONTRACTOR - LAKESHORE ENGINEERING
TRACK DESIGN - P2 BELT WIDTH - 26" (660 mm)
HP - 2 (60Hz - 1750 RPM)
BELT SPEED - 22 FT/MIN. (6.71M/MIN.)
CAPACITY - 2 TONS/HR
MATERIAL HANDLED - SLUDGE
DENSITY - 65 #/CU.FT. (1041 KGS/CU.M.)
BELT PAN VOL. - 53.7 CU.INCH/PAN (880 CU.CM./PAN)
CL. LENGTH OF CONVEYOR - 44'-11 3/4" (13710 mm)
TOTAL BELT LENGTH - 95'-11 1/2" (29248 mm)

ATLANTA (EAST AREA WQCF), GA
DEWATERED SLUDGE CONVEYOR

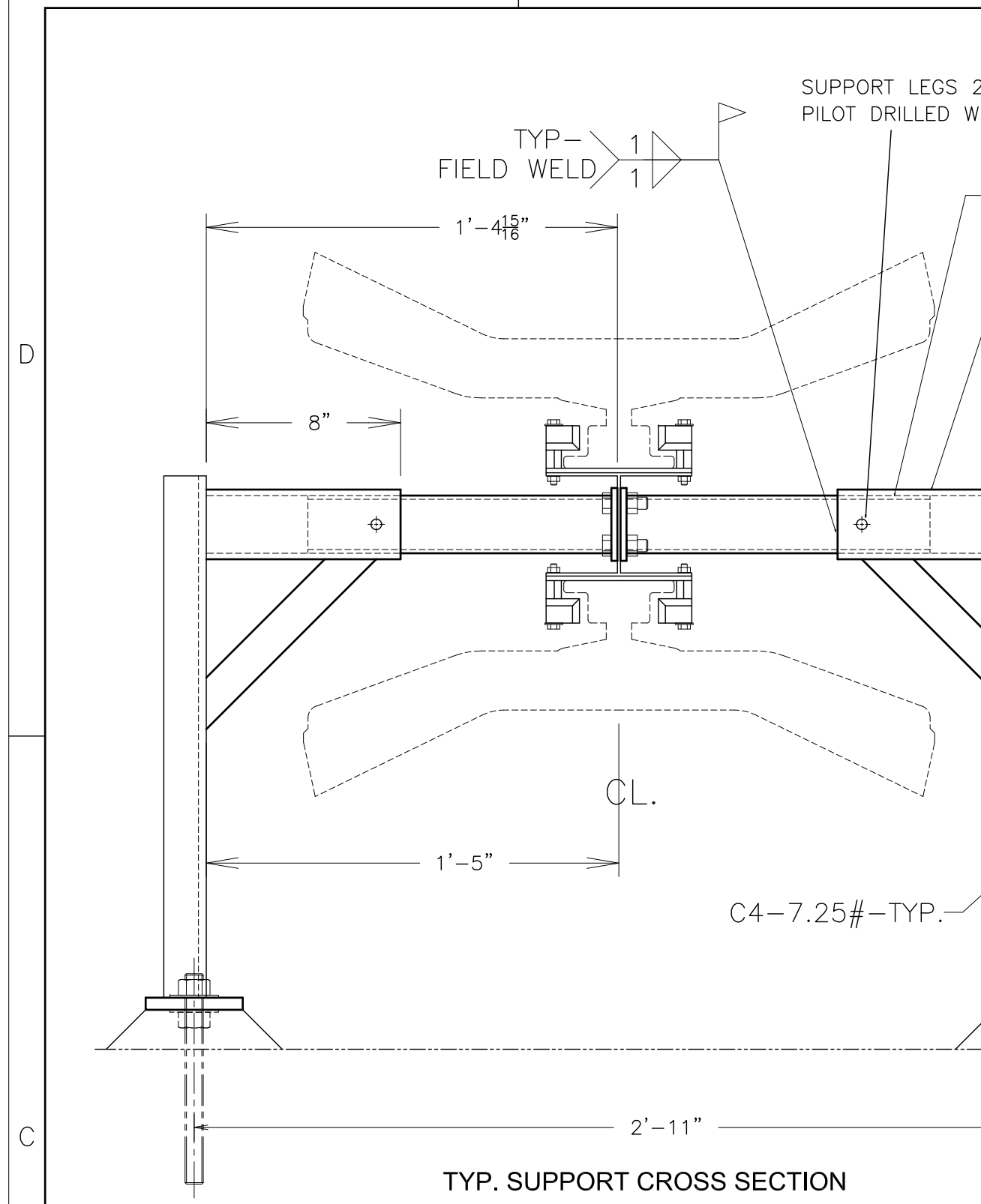
DRAWN BY: ERIK MELANDER
DRAWN DATE: 9/26/2022
CHECKED BY: AARON MOORE
CHECKED DATE: 9/29/2022

SCALE: 1/2" = 1'-0"

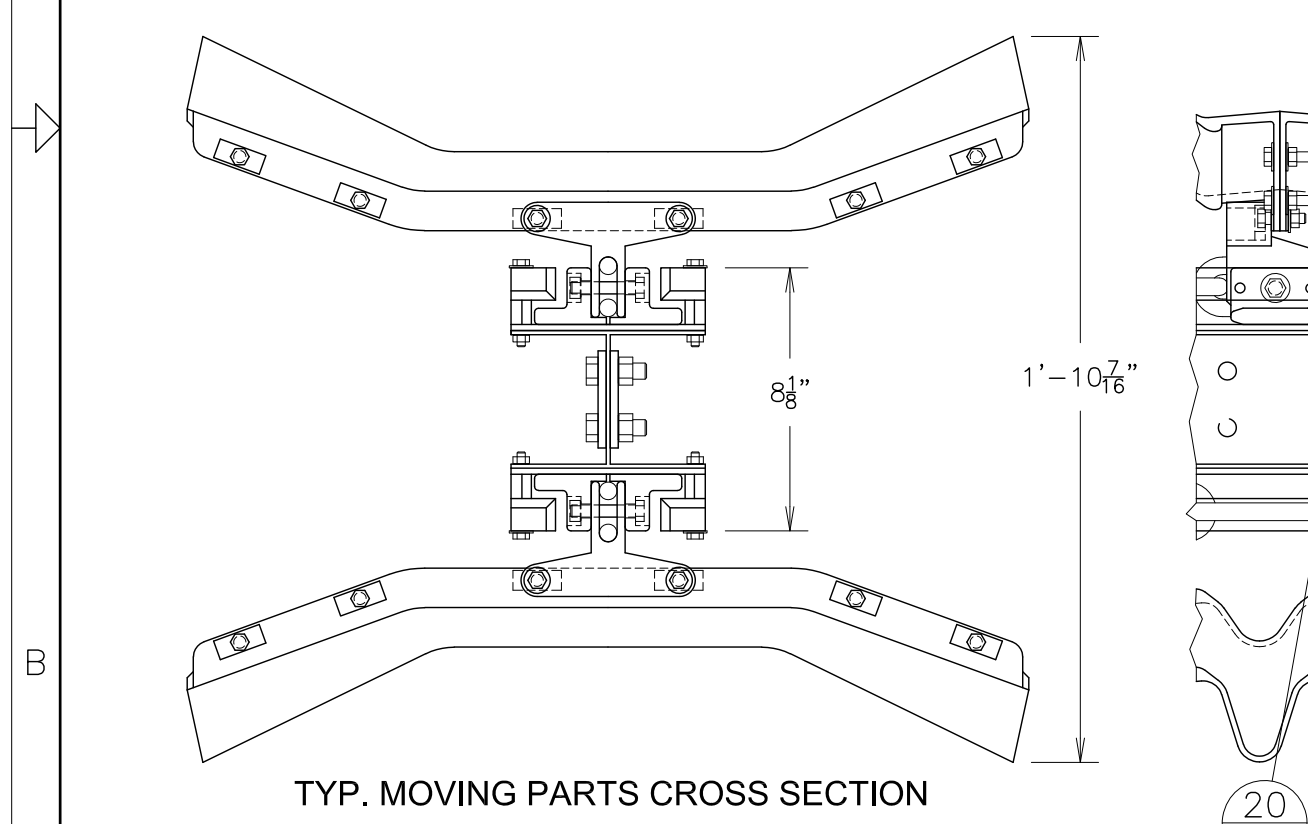
SHEET 1 of 2

FOR APPROVAL 9/30/2022
FOR RECORD 3/9/2023

BY	REV	DATE	DESCRIPTION
-	-	-	-



INSTALLER IS RESPONSIBLE FOR SECURING SPLICE SUPPORT PIPES TO SUPPORT LEGS BY EITHER:
 A.) FIELD WELDING (1" BEAD - 180° APART), OR
 B.) FIELD DRILLING THROUGH TELESCOPING 2" PIPE AND FASTENING WITH 3/8"-16NC x 3.5" LG. BOLT AND LOCKING NUT



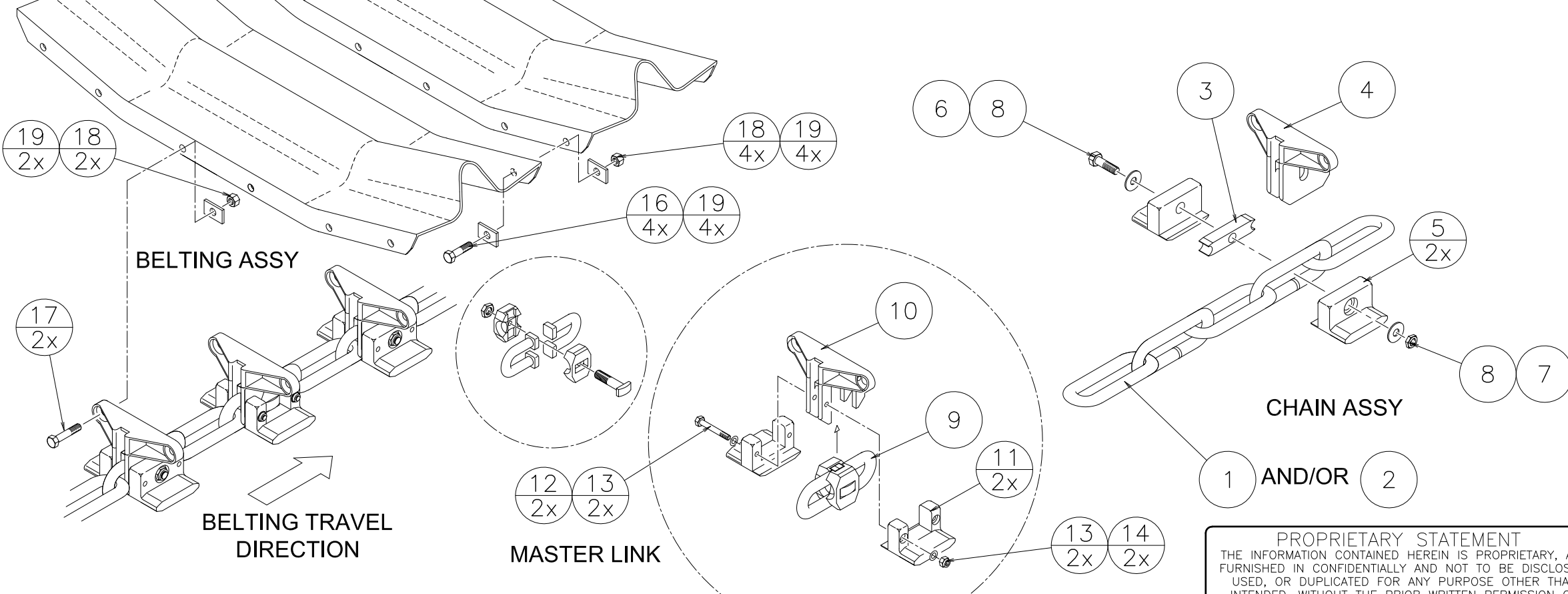
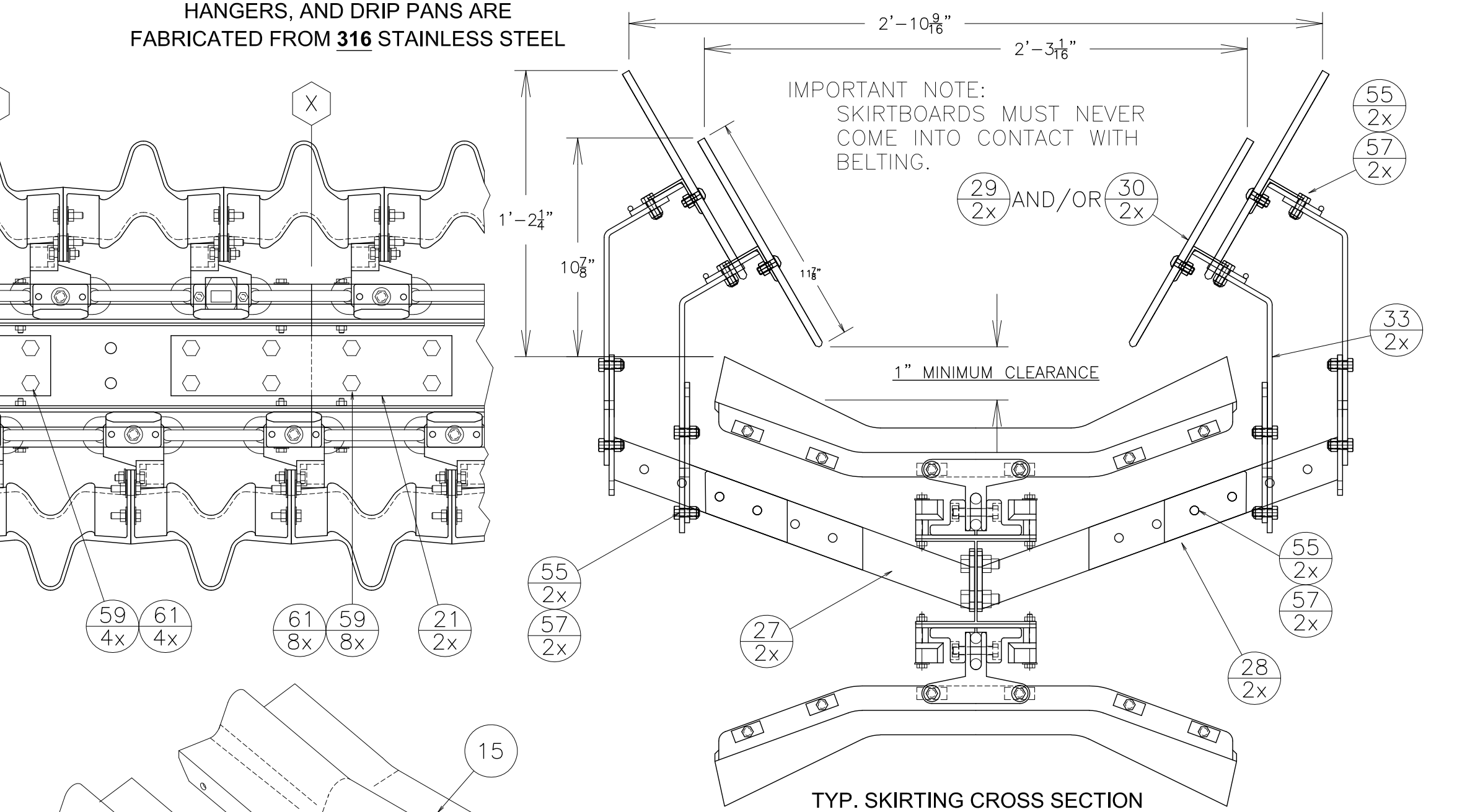
MAT'L	No.	QTY	DESCRIPTION	REV
NEO PRENE	S17	2	26" SCRAPER BLADE INSERT x 1/4" THICK	PW-0137-0095-A
316SS HDWR.	S16	50	5/16" RECTANGULAR WASHER x 1 3/4" LG. 14 GA LASERED	H-0101-0156-A RevB
316SS HDWR.	S15	30	5/16"-18NC HX. NUT - ESNA	
316SS HDWR.	S14	10	5/16"-18NC x 1 1/2" LG. HX. HD. BOLT	BELT TO INTER ATTACHMENT
316SS HDWR.	S13	20	5/16"-18NC x 1 1/4" LG. HX. HD. BOLT	BELT TO BELT CONNECTION
MPR	S12	5	26" BELT PAN	WIDTH 26" LG. H-0101-0122-D
	S11		- NOT USED ON SYSTEM -	
	S10		- NOT USED ON SYSTEM -	
	S9		- NOT USED ON SYSTEM -	
	S8		- NOT USED ON SYSTEM -	
	S7		- NOT USED ON SYSTEM -	
	S6		- NOT USED ON SYSTEM -	
	S5		- NOT USED ON SYSTEM -	
	S4		- NOT USED ON SYSTEM -	
	S3		- NOT USED ON SYSTEM -	
URETHANE INJECTED	S2	10	GUIDE BLOCK - GREY / BLUE (WIDE)	PW-0104-0007-A RevD
NYLON	S1	5	INTERMEDIATE ATTACHMENT	H-0104-0010-A RevH

SPARE PARTS DESCRIPTION
(PACKED SEPARATELY)

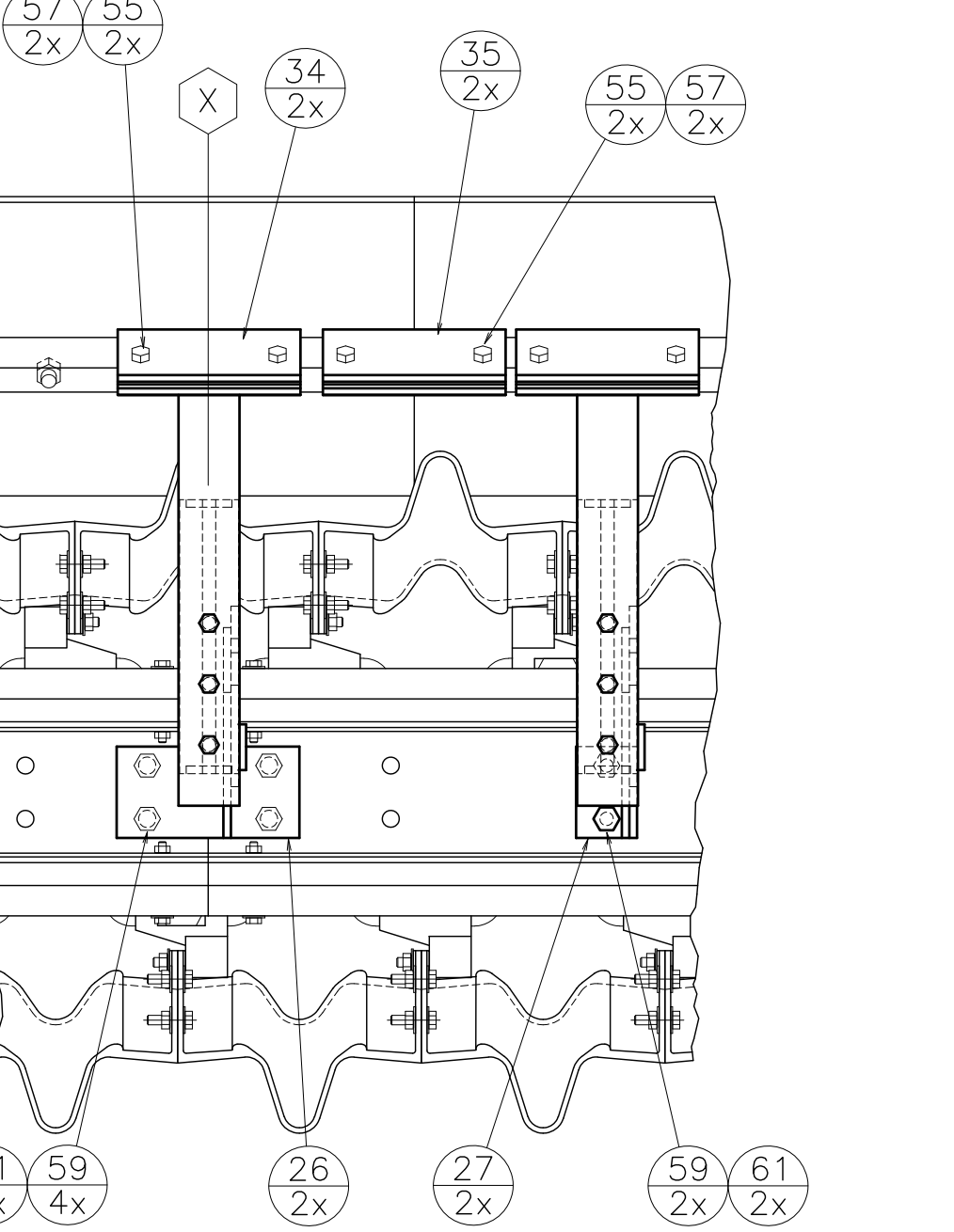
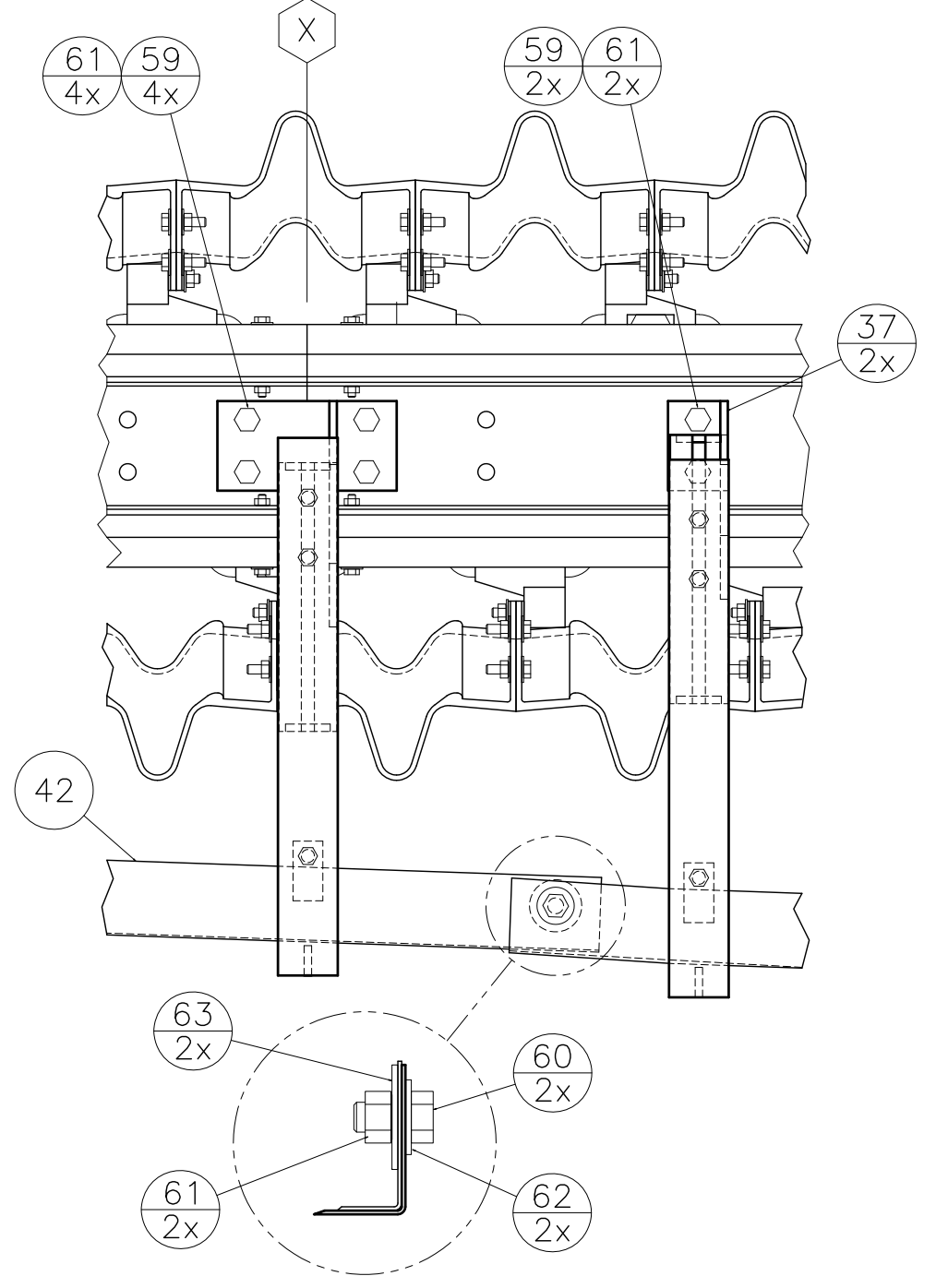
HARDWARE ANTI-SEIZE:
 ALL HARDWARE PROVIDED WITH THE CONVEYOR IS 316 STAINLESS STEEL. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ANTI-SEIZE FOR ALL HARDWARE USED IN THE INSTALLATION OF THE CONVEYOR.

SYSTEM HARDWARE	QTY	DESCRIPTION	REV
	65	- NOT USED ON SYSTEM -	
	64	- NOT USED ON SYSTEM -	
316SS HDWR.	63	1/2" FENDER WASHER	16x LOOSE SHIPPED
316SS HDWR.	62	1/2" FLAT WASHER	16x LOOSE SHIPPED
316SS HDWR.	61	1/2"-13NC HX. NUT - ESNA	24x PRE-ASSEMBLED / 116x LOOSE SHIPPED
316SS HDWR.	60	1/2"-13NC x 1" LG. HX. HD. BOLT	DRIP PAN TO DRIP PAN CONNECTION HARDWARE 16x LOOSE SHIPPED

ACCESSORIES MATERIAL:
 ALL SKIRTBOARD BRACKETS, DRIP PANS HANGERS, AND DRIP PANS ARE FABRICATED FROM 316 STAINLESS STEEL



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FOR APPROVAL 9/30/2022

FOR RECORD 3/9/2023

BY	REV	DATE	DESCRIPTION
-	-	-	-

MAT'L	No.	QTY.	DESCRIPTION	REV
316SS HDWR.	59	124	1/2"-13NC x 1 1/2" LG. HX. HD. BOLT	TRACK SPLICES, CHANNEL BRACE, ANGLE BRACE HARDWARE 24x PRE-ASSEMBLED / 100x LOOSE SHIPPED
316SS HDWR.	58	36	3/8" FLAT WASHER	DRIP PAN BRACKET HARDWARE 36x PRE-ASSEMBLED / 280x LOOSE SHIPPED
316SS HDWR.	57	98	3/8"-16NC HX. NUT - ESNA	90x PRE-ASSEMBLED / 8x LOOSE SHIPPED
	56		- NOT USED ON SYSTEM -	
316SS HDWR.	55	98	3/8"-16NC x 1 1/4" LG. HX. HD. BOLT	SKIRTBOARDS, DRIP PAN HANGER HARDWARE & STOP SWITCH 90x PRE-ASSEMBLED / 8x LOOSE SHIPPED
	54		- NOT USED ON SYSTEM -	
	53		- NOT USED ON SYSTEM -	
	52		- NOT USED ON SYSTEM -	
	51		- NOT USED ON SYSTEM -	
OEM MAT'L	50	1	OILER ASS'Y.-1 QT. (120VAC)	SOLENOID OPERATION PW-0147-0005-A
10 GA 304SS	49	24	TRACK ALIGNMENT ANGLE	PW-0135-0728-A RevF
	48		- NOT USED ON SYSTEM -	
	47		- NOT USED ON SYSTEM -	
	46		- NOT USED ON SYSTEM -	
	45		- NOT USED ON SYSTEM -	
	44		- NOT USED ON SYSTEM -	
	43		- NOT USED ON SYSTEM -	
16 GA 316SS	42	8	DRIP PAN x 3'-11 1/2" LG. x 31" WIDE	H-0140-0242-A RevC
10 GA 316SS	41	18	DRIP PAN CLAMP PLATE	PW-0135-0014-A RevB
	40		- NOT USED ON SYSTEM -	
1/4" 316SS	39	2	DRIP PAN HANGER x 18" LG. x 31 1/4" WIDE BAR	PW-0135-0013-A RevA
1/4" 316SS	38	7	DRIP PAN HANGER x 12" LG. x 31 1/4" WIDE BAR	PW-0135-0013-A RevA
1/4" 316SS	37	18	DRIP PAN INTERM. SUPPORT x BAR 16 5/8" LG.	PW-0135-0745-A RevB
	36		- NOT USED ON SYSTEM -	
	35		- NOT USED ON SYSTEM -	
10 GA 316SS	34	6	10GA. x SKIRTBOARD CLAMP BAR	PW-0135-0015-A RevC
1/4" 316SS	33	6	SKIRTBOARD SUPPORT BRKT.	PW-0135-0017-A RevG
	32		- NOT USED ON SYSTEM -	
	31		- NOT USED ON SYSTEM -	
	30		- NOT USED ON SYSTEM -	
3/8" THK HDPE	29	2	SKIRTBOARD x 11 7/8" x 8'-0" LG.	316SS HDWR. 304SS ANGLE P2-0139-0291-A
1/4" 316SS	28	6	SKIRTBOARD T-BRACKET w/ HOLES	PW-0135-0733-A RevC
1/4" 316SS	27	6	SKIRTBOARD INTERM. SUPPORT x BAR 14 3/4" LG.	PW-0135-0744-A RevB
	26		- NOT USED ON SYSTEM -	
1/4" 316SS	25	2	8-HOLE SPLICE PLATE w/ EYEBOLT ATTACH.	PW-0135-0818-A
	24		- NOT USED ON SYSTEM -	
	23		- NOT USED ON SYSTEM -	
1/4" 316SS	22	12	SPLICE SUPPORT PL. x 12.5" LG. PIPE	PIPE 12.5" LG. PW-0135-0004-A RevA
	21		- NOT USED ON SYSTEM -	
1/4" 316SS	20	2	SPLICE PLATE (4-HOLE)	PW-0135-0001-A
316SS HDWR.	19	1470	5/16" RECTANGULAR WASHER x 1 3/4" LG.	H-0105-0156-A RevA 376x PRE-ASSEMBLED / 494x LOOSE SHIPPED
316SS HDWR.	18	882	5/16"-18NC HX. NUT - ESNA	488x PRE-ASSEMBLED / 384x LOOSE SHIPPED
316SS HDWR.	17	294	5/16"-18NC x 1 1/2" LG. HX. HD. BOLT	BELT TO INTER ATTACHMENT 284x LOOSE SHIPPED
316SS HDWR.	16	588	5/16"-18NC x 1 1/4" LG. HX. HD. BOLT	BELT TO BELT CONNECTION 488x PRE-ASSEMBLED / 100x LOOSE SHIPPED
MPR	15	147	26" BELT PAN	H-0101-0122-D 24x SECTIONS @ 6-PAN 1x SECTION @ 3-PAN
316SS HDWR.	14	2	1/4"-20NC HX. NUT - ESNA	
316SS HDWR.	13	4	1/4"-FLAT WASHER	
316SS HDWR.	12	2	1/4"-20NC x 2 1/2" LG. HX. HD. BOLT	
NYLON	11	2	SPLICE GUIDE BLOCK - GREY (WIDE)	PW-0104-0008-A RevB
CASE, HDENED	9	1	CHAIN MASTER LINK ASSEMBLY	PW-0106-0004-A
316SS HDWR.	8	292	3/8"-FLAT WASHER	
316SS HDWR.	7	146	3/8"-16NC HX. NUT - ESNA	
316SS HDWR.	6	146	3/8"-16NC x 2" LG. HX. HD. BOLT	
URETHANE INJECTED	5	292	GUIDE BLOCK - GREY (WIDE)	PW-0104-0007-A RevD
NYLON	4	146	INTERMEDIATE ATTACHMENT	H-0104-0010-A RevH
60 DURO RUBBER	3	146	ISOLATOR BLOCK	PW-0104-0010-A RevB
	2		- NOT USED ON SYSTEM -	
CASE, HDENED	1	1	CHAIN STRAND ASS'Y. @ 293 LINKS	CL. OF CONV. 44'-11 3/4" H-0105-0004-A RevD

ATLANTA (EAST AREA WQCF), GA
 DEWATERED SLUDGE CONVEYOR

DRAWN BY: ERIK MELANDER
 DRAWN DATE: 9/26/2022
 CHECKED BY: AARON MOORE
 CHECKED DATE: 9/29/2022

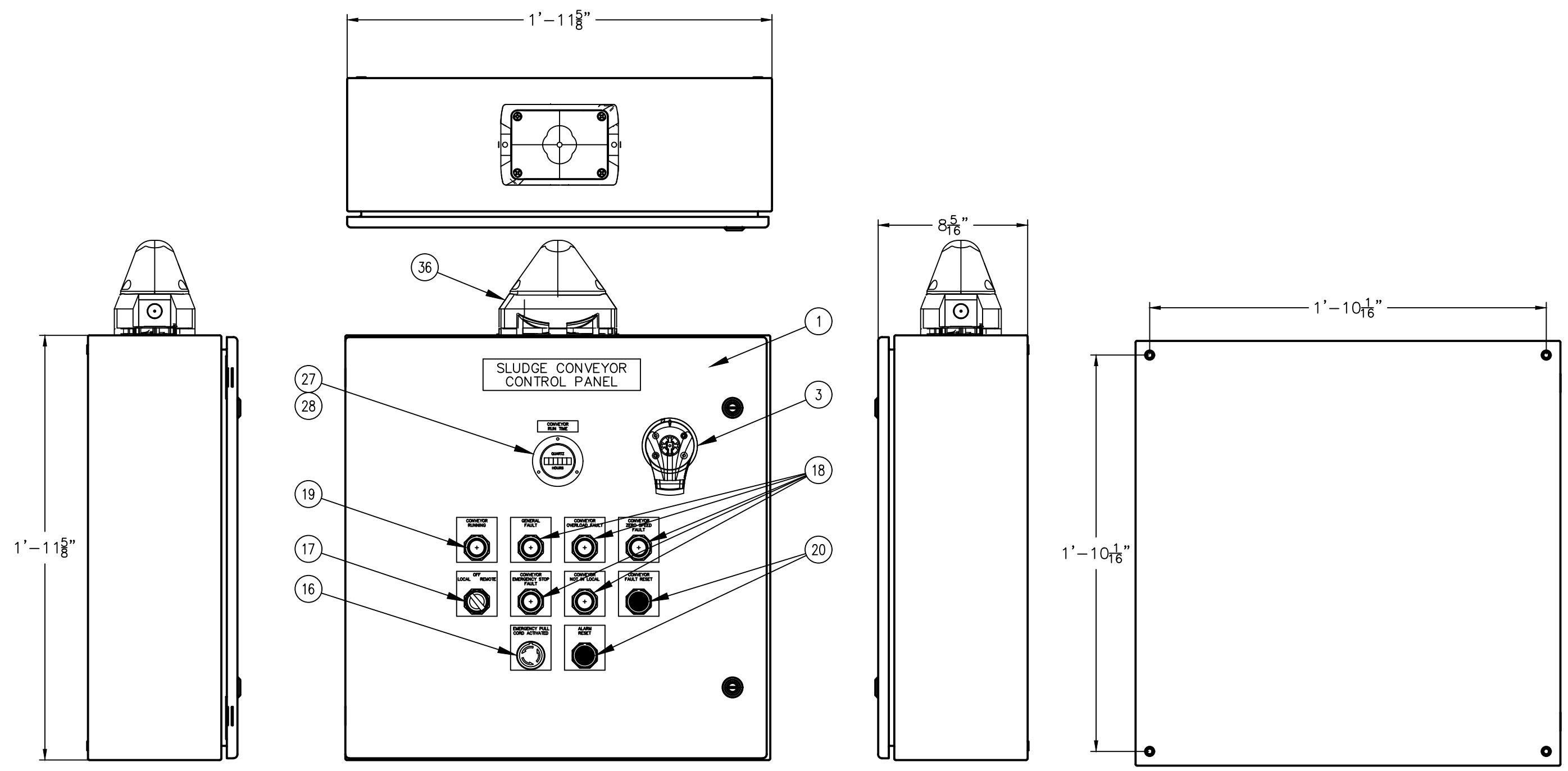
SCALE: 2" = 1'-0"

SHEET: 2 of 2

REV.:

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P2-22-1258



MOUNTING DIMENSIONS

GENERAL NOTES:

1. CONTROL PANEL ENCLOSURE RATING: TYPE 4X 316 S.S.
2. MINIMUM SCCR RATING: 25KAIC
3. PANEL SHALL BE UL 508A LISTED

BY	REV	DATE	DESCRIPTION
NAB	C	11/17/2022	REVISION PER CUSTOMER COMMENTS
NAB	B	10/24/2022	REVISION PER CUSTOMER COMMENTS
NAB	A	9/29/2022	INITIAL SUBMITAAL DRAWING

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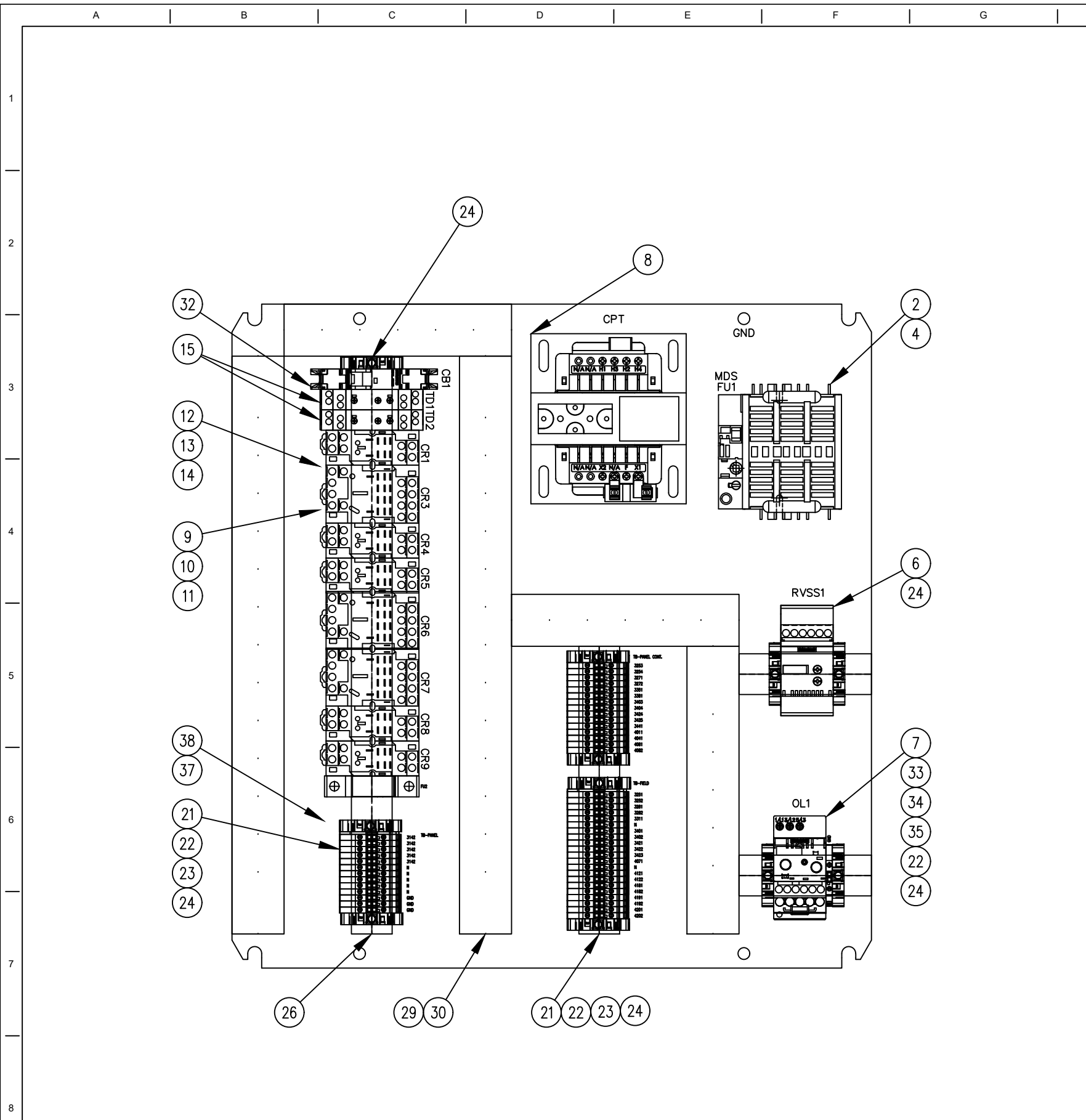
CONTROL PANEL LAYOUT OVERVIEW

CONVEYOR CONTROL PANEL
 ATLANTA EAST AREA, GA
 P2-21-1250

DRAWN BY	NAB	CHECKED BY	-
DRAWN DATE	09-26-2022	CHECKED DATE	-
SCALE	1:5	SHEET	1 OF 4

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DWG NO. HTA-SER-092222-000-01 REV. C



Item	Quantity	UOM	Manufacturer	Part Number	Description
1	1	EA	Rittal	WM242408N6	WM 24X24X08 316 S.S. BRUSHED
2	1	EA	Socomec	37103004	FUSE COMBINATION SWITCH, 30A, 3-pole, front or side operated, DIN rail or base mount, class J, clamp terminals
3	1	EA	Socomec	147E1111	NEMA 4, 4X, external operation S-type handle, ON(I)-OFF(0) front operation, black, padlockable, defeatable
4	1	EA	Socomec	14010520	SHAFT EXTENSION FOR EXTERNAL HANDLE, SHAFT TYPE S-5X5-200MM
5	1	EA	Socomec	14290000	ACCESSORY FOR SIRCO M RANGE, SHAFT GUIDE FOR S-TYPE EXTERNAL HANDLE
6	1	EA	Siemens	3RW30141BB14	SIRIUS soft starter S00 6.5 A, 3 kW/400 V, 40 °C 200-480 V AC, 110-230 V AC/DC Screw terminals
7	1	EA	Siemens	3RU21161E80	Overload relay 2.8...4.0 A Thermal For motor protection Size S00, Class 10 Contactor mounting Main circuit: Screw Auxiliary circuit: Screw Manual-Automatic-Reset
8	1	EA	Siemens	MT0500A	Control Power Transformer, 500va, PRI 240x480 230x460 220 440v, SEC 120/115/110v, Domestic
9	5	EA	Siemens	3TX71145LF13	Plug-in Relay, Premium LED, Mechanical Flag 8-pin Square Base DPDT, 15A, 120VAC
10	5	EA	Siemens	3TX71444E6	ACC_Relay -Socket for 3TX7
11	5	EA	Siemens	3TX71441L11	Metal clip for plug-in relay
12	3	EA	Siemens	3TX71175PF13	Plug-in Relay, Premium LED, Mechanical Flag 14-pin Square Base 4PDT, 15A, 120VAC
13	3	EA	Siemens	3TX71444E9	ACC_Relay -Socket for 3TX7
14	3	EA	Siemens	3TX71441L10	Metal clip for plug-in relay
15	2	EA	Weidmueller	2697250000	TFI-SERIES, Multifunction timing relay, with separate control input, Number of contacts: 1, CO contact, AgNi, Rated control voltage: 12...240 V UC -10 % / +10 %, Continuous current: 8 A
16	1	EA	Siemens	52BR8W2A	30mm BlackMax, 1.79" (45 mm) Plastic Cap, Red 2 Position Maintained, Twist-to-Release 1 N.O. - 1 N.C. UL Listed
17	1	EA	Siemens	52SX2CABA1	Selector switch, NEMA 4X Maintained Short lever, C Cam 1N0-1NC left, right 3 position
18	5	EA	Siemens	52BL4E2XB	30mm BlackMax, Illuminated Indicator Light Full Voltage type, 120V AC/DC LED Lens, Red UL Listed
19	2	EA	Siemens	52BL4E3XB	30mm BlackMax, Illuminated Indicator Light Full Voltage type, 120V AC/DC LED Lamp Lens, Green UL Listed
20	1	EA	Siemens	52BM8A1	30mm BlackMax, Round Pushbutton Non-Illuminated Flush Button, Black 2 Position Momentary UL Listed
21	48	EA	TE Connectivity	1SNK505010R0000	Z54 screw clamp terminal block Feed-through - 5.2 mm 0.205 in spacing
22	4	EA	TE Connectivity	1SNK505150R0000	Z54-PE screw clamp terminal block Feed-through - 5.2 mm 0.205 in spacing
23	3	EA	TE Connectivity	1SNK505910R0000	Z54 screw clamp terminal block end cover
24	10	EA	TE Connectivity	1SNK900001R0000	End stop
25	2	EA	TE Connectivity	1SNK905305R0000	5 position jumper bar
26	1	STK	TE Connectivity	1SNA173220R0500	Pre-punched 35mm din rail
27	1	EA	Trumeter	722-0004	Elapsed Time Meter 120VAC
28	1	EA	Trumeter	5003-011	ETM Gasket
29	12	FT	Panduit	F1.5X3LG6	Panduct Lead-Free PVC Narrow Slot Wiring Duct - 1.5in Gray
30	12	FT	Panduit	C1.5LG6	PVC Flush Wiring Duct Cover - 1.5in Gray
31	3	EA	Bussmann	LPJ-10SP	10A Indicator Class J fuse
32	1	EA	Siemens	5S41067HG42	Circuit breaker 10kA, 1-pole, C, 6A according to UL 489-277V
33	1	EA	Siemens	3RU19002AF71	Electronic remote reset 110...127 V AC/DC for 3RU Size S00...S3
34	1	EA	Siemens	3RU29163AA01	stand-alone assembly support for 3RU21/3RB30/3RB31/3RR2 Size S00 Stand-alone installation
35	1	EA	TE Connectivity	1SNA008521R2600	Terminal Block Connector, ENTRELEC, TS.45 Mounting Bracket, SNA Series
36	1	EA	Pfannenberg	21554155055	Flashing Light w/Alarm, 115VAC, Red, 5 Joules, 100dB, Gray Case, 190x120x140mm, 8 Tones
37	1	EA	Bussmann	FNM-2R	Midget Fuse 2A
38	1	EA	Socomec	57010011	1-pole, dead front fuse holder, front operated, 32A, LED fuse indicator

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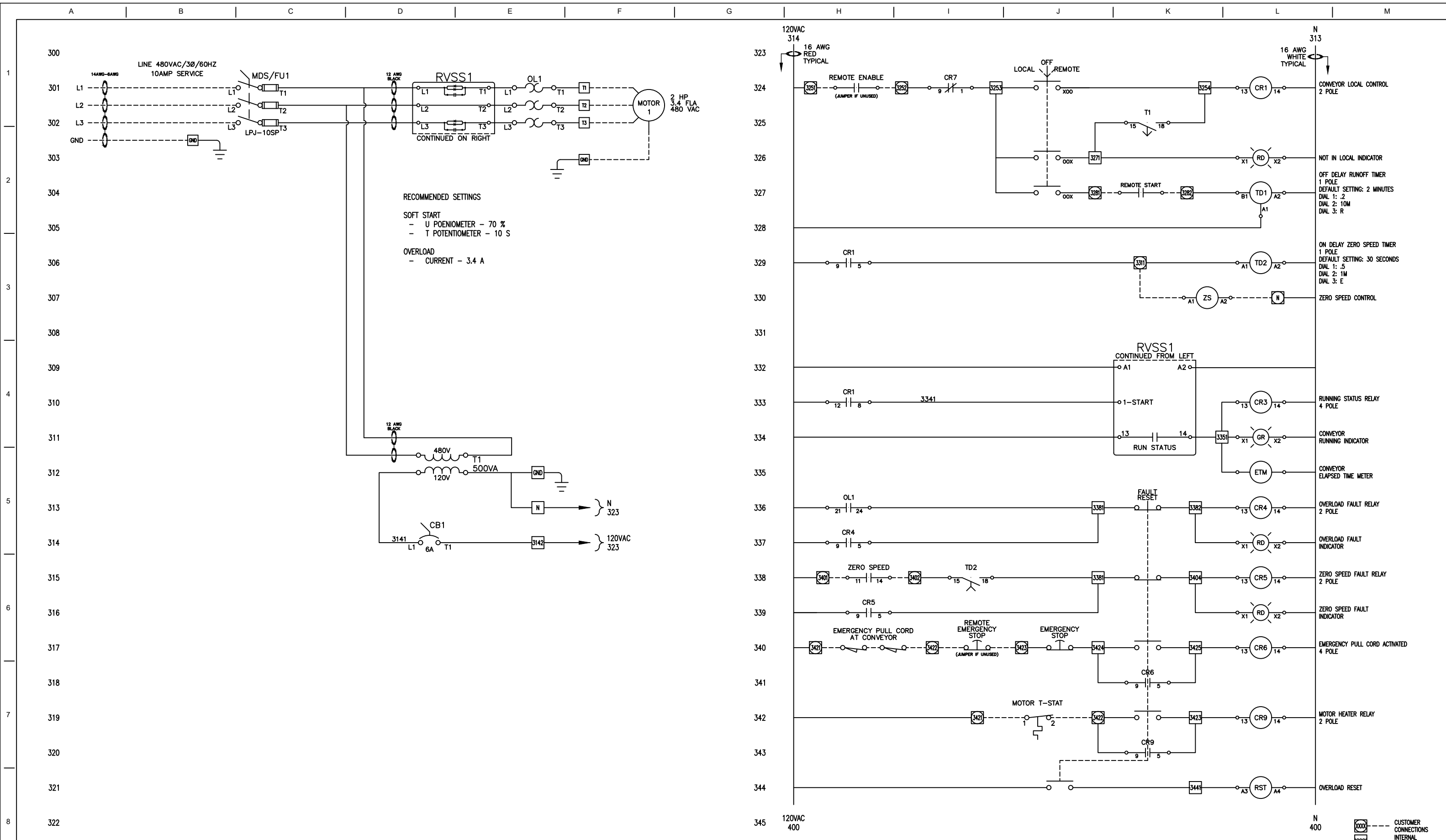
SUBPANEL AND
 BILL OF MATERIALS

CONVEYOR CONTROL PANEL
 ATLANTA EAST AREA, GA
 P2-21-1250

DRAWN BY	CHECKED BY
NAB	-
DRAWN DATE	CHECKED DATE
09-26-2022	-
SCALE	SHEET
NTS	3 OF 4

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DWG NO. HTA-SER-092222-000-01 REV. C



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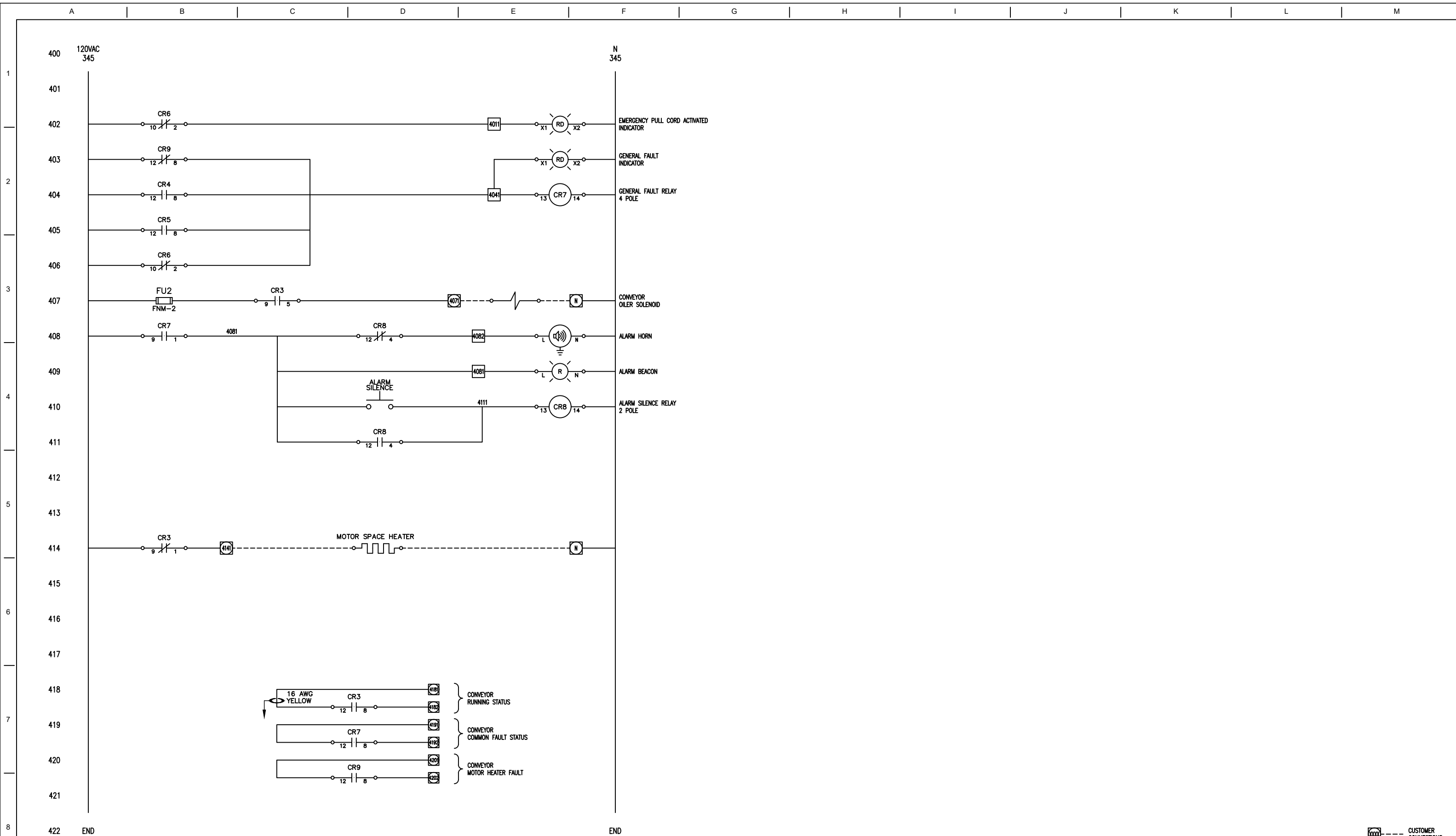
PLC CONTROL PANEL
 WIRING DIAGRAM

CONVEYOR CONTROL PANEL
 ATLANTA EAST AREA, GA
 P2-21-1250

DRAWN BY	NAB	CHECKED BY	-
DRAWN DATE	09-26-2022	CHECKED DATE	-
SCALE	NTS	SHEET	4 OF 4

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DWG NO. HTA-SER-092222-000-01 REV. C



--- CUSTOMER CONNECTIONS
 --- INTERNAL CONNECTIONS

BY	REV	DATE	DESCRIPTION
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PLC CONTROL PANEL
WIRING DIAGRAM

CONVEYOR CONTROL PANEL
ATLANTA EAST AREA, GA
P2-21-1250

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DRAWN DATE	09-26-2022	CHECKED DATE	-
SCALE	NTS	SHEET	5 OF 4

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