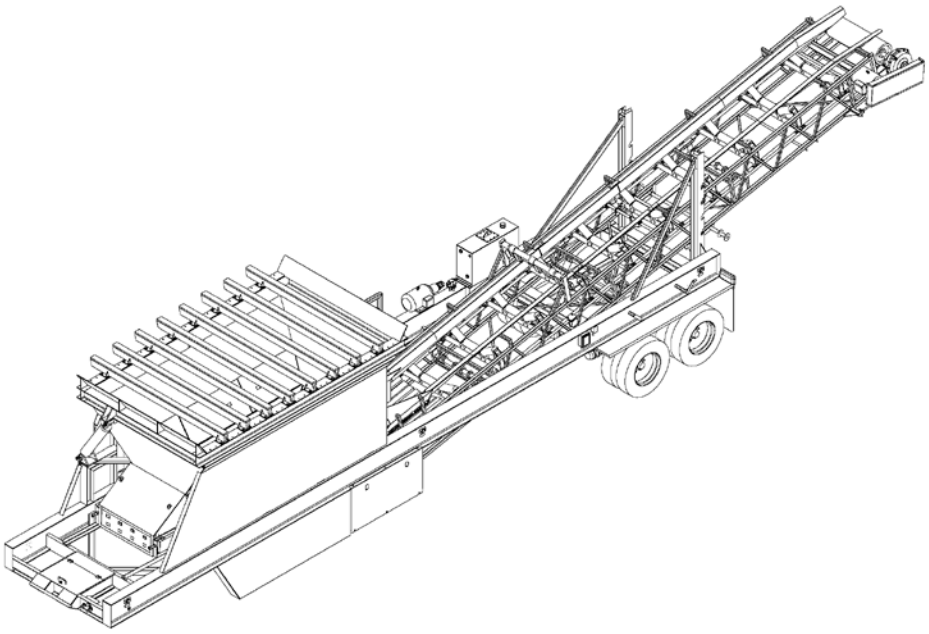
HIKON

INDUSTRIES LTD.

# Owner's Manual

## "Operation, Maintenance & Parts"



**Portable Feeder**

| | |
|---|---|
| Model #: | 4240-16 |
| Unit Serial #: | 194240429 |
| Hikon W/O: | 3285 |

Shipping Address – Hikon Industries Ltd., Lot One – Yellowhead Industrial Park, Saskatoon Sask.
Mailing Address – Hikon Industries Ltd., Site 412 – Box 279 R.R. 4, Saskatoon, Sask. S7K 3J7
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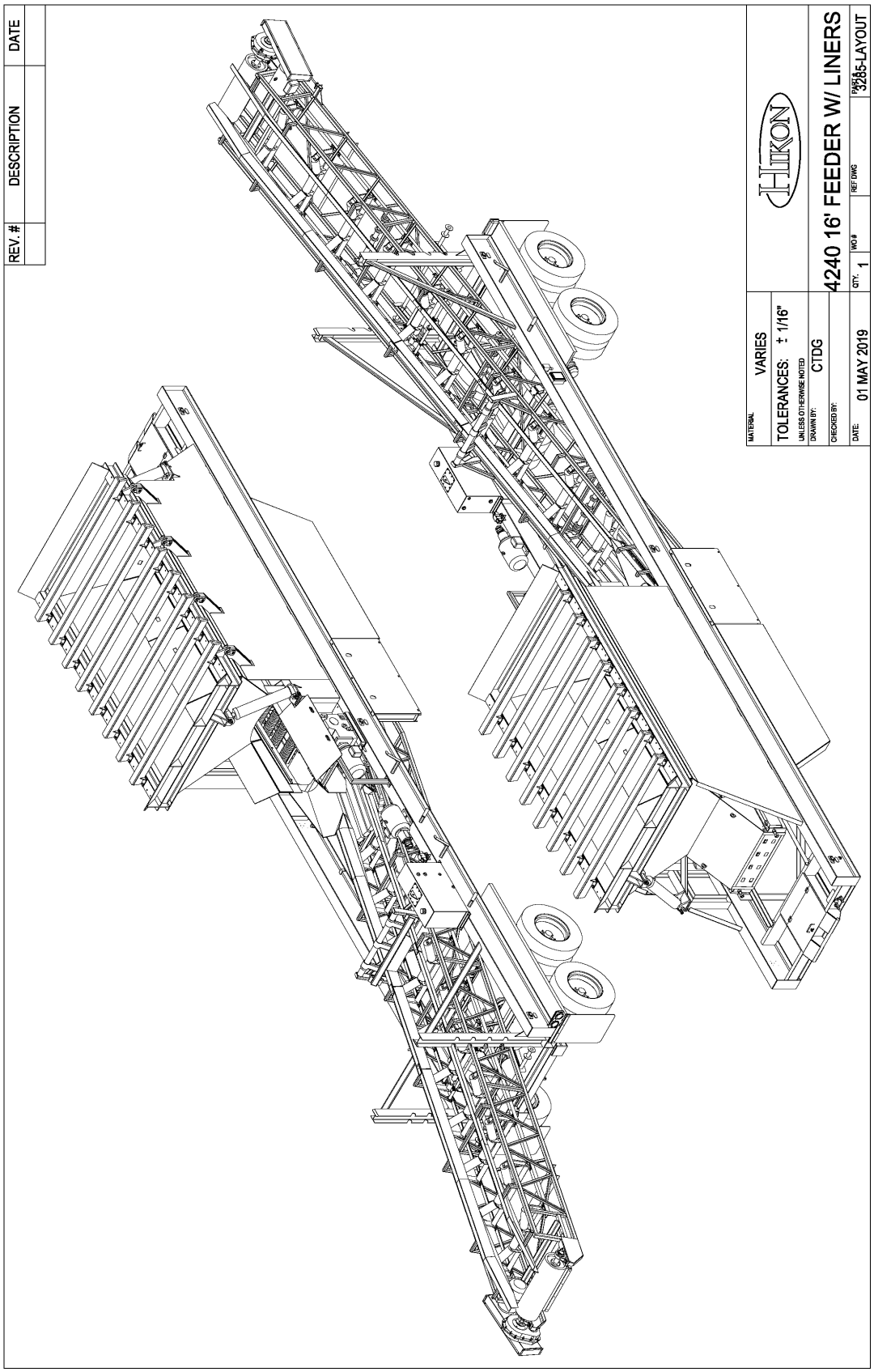
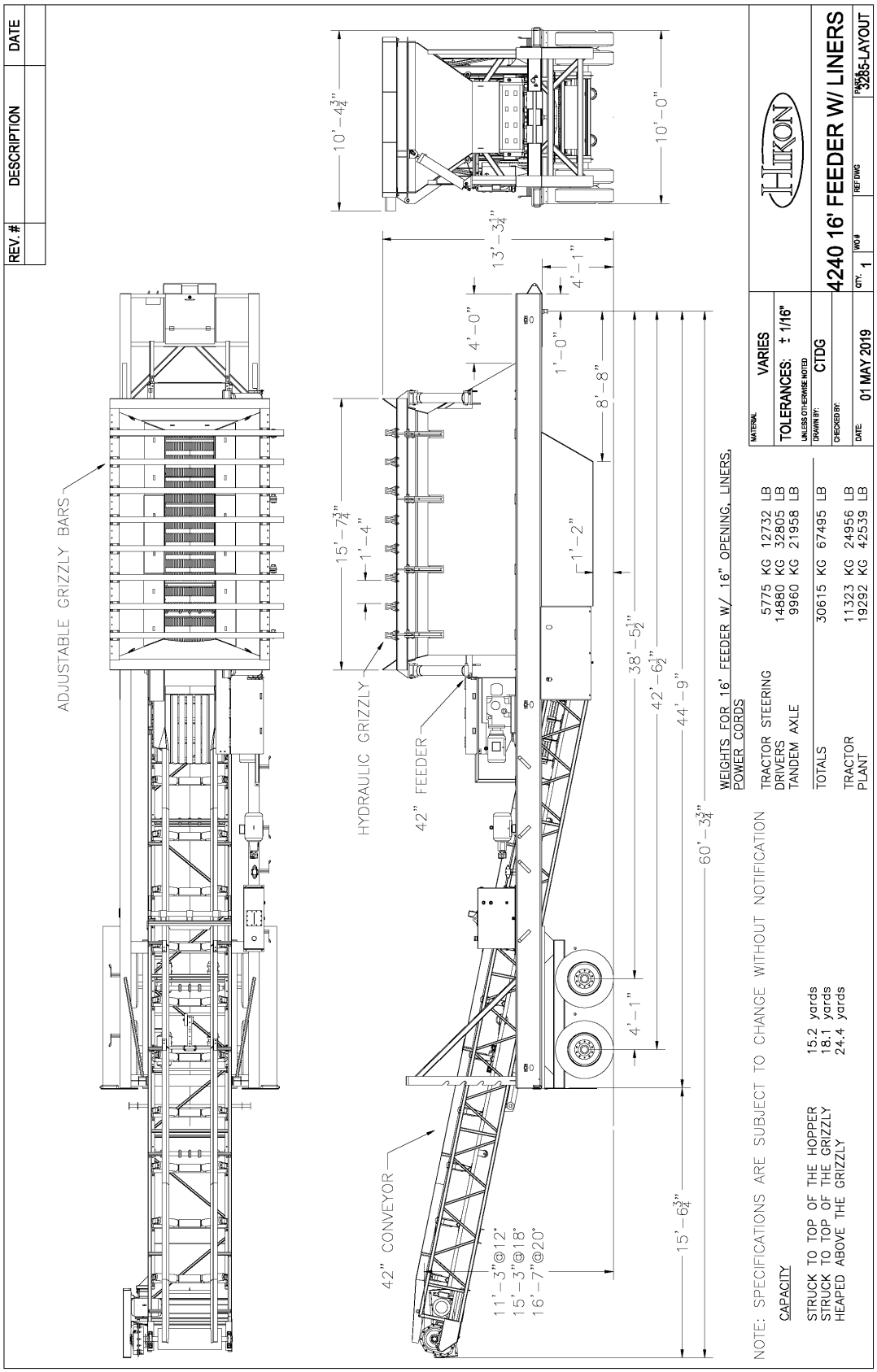



**EQUIPMENT PICTURE (AUTOCAD)**




**G.A. DRAWING TRANSPORT**

# OPERATION & MAINTENANCE

**It is important that the "Owners, Operators, and Anyone" working with this equipment read and understand this manual.**

This manual provides operation, lubrication and maintenance information.

As Hikon Industries Ltd. progresses, improvements to our products may cause changes to your equipment, which may not be reflected in this publication. We reserve the right to make changes and improvements to our products at any time, without incurring any obligation to make changes to previously manufactured equipment.

Hikon Industries Ltd. does not assume any liability for errors or omissions in this publication.

Failure to read and understand this manual may cause serious injury or equipment malfunction.

Hikon Industries Ltd. does not assume any liability for any injury, death, damage or cost caused by any act or omission on the part of the Owner, Operator or other personnel, agent, contractors, venders and others.



## PARTS, SALES & SERVICE

| | |
|---|---|
| **BUSINESS HOURS:** | **7:00am – 4:30pm** |
| **MONDAY – FRIDAY** | **CLOSED ON STAT HOLIDAYS** |
| **BUSINESS:** | **(306) 244 – 4533** |
| **AFTER HOURS:** | **(306) 244 – 4533** |
| **FAX:** | **(306) 244 – 5223** |

# PRE-INSPECTION

# IMPORTANT!

## MUST READ BEFORE OPERATION

New equipment must receive a pre-operation inspection and adjustment.

*INITIAL DELIVERY CAN LOOSEN HARDWARE AND CONNECTIONS*

Areas directly affected by highway travel & initial start-up: trough sets, sheaves, sprockets and pulleys mounted to shafts with removable bushing-type hubs. Components are mounted securely at the factory but will go through a seating process during the primary startup.

Electric motor drive direction must be checked prior to installing drive belts.

For the first month of operation; all bushings and cap screws should be checked once a week, then during regular shutdowns. This is important to prevent miss-alignment and equipment failure.

Gear Reducers maybe shipped **WITHOUT** lubrication. Refer to the manufacturer's brochure for recommended lubrication. Failure to do so will void manufacturer's warranty.

***IT IS ESSENTIAL TO READ AND UNDERSTAND THE "INITIAL SETUP SECTION" PRIOR TO STARTUP.***

# EQUIPMENT SPECIFICATIONS

## HIKON PORTABLE 4240-16' FEEDER C/W THE FOLLOWING SPECIFICATIONS

**- Basic chassis c/w**
- 49" tandem axle spring style suspension
- 11.00 x 22.5 radial tires
- Budd style wheels
- Air brakes
- Travel lights
- Mud flaps
- 18" main rails
- Blocking points under hopper
- Extended length on king pin end of chassis
- 15 feet discharge conveyor overhang

**- Discharge conveyor c/w**
- 42" wide belt
- Four foot impact bed under receiving hopper
- Luff trough sets spaced at a maximum of 42"
- Rubber disced return rolls spaced at 10' maximum
- Full length skirting
- 14" lagged head pulley c/w 2-15/16" shaft
- 12" crown faced winged tail pulley c/w 2-7/16 shaft
- Dodge TA #5 shaft mounted reducer c/w backstop
- Belt drive c/w guard
- 15 HP TEFC drive motor
- ¼ x 1/16 – 3 ply Conti Stacker Grade 375 PIW belting
- Vulcanized belt splice
- Manual adjustable discharge height
- Rock roll back swing gate
- Receiving hopper
- Belt scraper on head pulley

**- Belt Feeder c/w**
- 42" wide belt
- 6" rubber impact rolls c/w 1-15/16" bearings spaced at 9" centers
- Rubber disced return rolls spaced at 10' maximum
- 16" lagged head pulley c/w 3-7/16" shaft
- 12" crown faced winged tail pulley c/w 2-15/16 shaft
- Dodge right angle Quantis gear reducer
- 15 HP TEFC drive motor
- Chain drive between head pulley and gear reducer
- ¼ x 1/16 – 3 ply Conti Stacker Grade 600 PIW belting
- Vulcanized belt splice

**- Belt Feeder continued**

- Belt scraper on head pulley
- Removable cartridge style design
- Non reversing feeder
- Tail pulley cover plate and guarding

**- Hopper c/w**

- 8' x 15' top opening
- Hydraulic grizzly with adjustable 16" openings
- Standard Hikon grizzly bars
- Electric over hydraulic control valve
- 3/8" plate construction
- Bottom 2 feet lined with QT400 – 1/4" plate
- Sides of hopper are skirted with 3/16" ramp up plate
- Less hinged door at tail end of feeder
- Adjustable 1/2" x 6" QT400 steel flashing on inside of hopper

**- General**

- All conveyor rolls are 5" diameter Luff brand
- All bearings Dodge
- Mount for Vibco Model 2P-1700 on one side of the hopper
- Complete chassis blasted and painted with Hikon grey Durathane paint

**- Power cord package c/w**

- 100' long cords for all motors
- 30 Amp male cord ends
- Cord hangers

# DELIVERY INSPECTION

## PACKING SLIPS

These are provided to ensure a complete delivery. Items should be checked off as received.

## MISSING ITEMS

If any items are missing after a thorough inspection, Hikon Industries Ltd. must be notified immediately.

## DAMAGED ITEMS

Make note, on the freight bill, of any items damaged while in transit. Present the claim to the proper freight official and notify Hikon Industries Ltd.

# LIMITED WARRANTY

All equipment manufactured by Hikon Industries Ltd. is warranted to free of defects and workmanship when used under normal and proper use for a period of 12 months or 2000 hours of operation, whichever comes first, from delivery date.

Components manufactured by other venders including electric motors, bearings, reducers, belts, pumps, etc. are subject to warranty coverage as covered by the individual suppliers.

Normal wear and tear is not covered by this warranty.

Warranty is in effect to the original owner only and is not transferable.

All requests for warranty shall be made in writing to the Factory before the claim can be approved.

HIKON INDUSTRIES
PHONE: (306) 244-4533
FAX: (306) 244-5223

# SAFETY

## GENERAL PRECAUTIONS & WARNINGS

A copy of this manual must be kept in the general vicinity of the equipment. **It is important that "Owners, Operators, and Anyone" working with this equipment read and understand this manual.** To ensure a safe workplace, all employees must be aware of and follow all local safety regulations and procedures. All employees must be aware of operation instructions, maintenance, service, troubleshooting, safety features and any automated functions. Common sense along with proper safety procedures will lead to a safe workplace. Safety is the responsibility of everyone and must be enforced by the owners and operators of the equipment.

Always follow warning signs and lockout procedures. Be aware of your surrounding environment and those around you. Never remove safety features from equipment. Additional safety equipment may be required to meet local safety codes. **The customer is responsible to review and determine if additional guarding is required.** Anytime one is unsure about safety, consult the operation manual or a supervisor. Time is never a reason to compromise safety.

If a manual is lost or there are questions regarding the manual contact HIKON INDUSTRIES Ltd.

## LOCKOUT

Prior to any inspections, maintenance or service, equipment must be locked out. This means that every individual working on the equipment must have their own lockout tag. Lockout tags are to be provided by the employer. It is essential to prevent premature startup. The tags must identify the type of work being done and by who it is being done by. When the work is done, the individual must remove their own tag.

## DECALS

Decals are used to inform and warn. Prior to equipment operation, all personnel must read SAFETY DECALS. Decals must always be visible. At no time, may a decal be covered up or removed. If a decal becomes damaged or illegible it must be replaced. Contact Hikon Industries Ltd. for a replacement. Part numbers are located in the bottom right hand corner.

## DO'S & DON'TS

-Always follow instructions and procedures

-Never assume anything

-Always keep a clean work environment

-Never operate or work on equipment without reading the manual

-Do not modify this manual

-Do not stand or climb on areas which aren't designed for that

-Never operate equipment while intoxicated

-Always where protective clothing: ear plugs, hard hat, eye protection, gloves, work boots, dust protective devices and no loose clothing

-Always wear the proper harnesses when working in elevated areas

-Never bypass safety devices

-Never operate equipment without guarding in-place

-Never reach around guarding

-Only start equipment when it's clear of personnel

-Never leave equipment operating while unattended

-Never overload equipment

-Do not operate equipment if safety devices are malfunctioning

-Only use OEM parts on equipment

-Never perform maintenance while equipment is operating

-Equipment must be locked out before servicing

-Make sure equipment is properly grounded

-Always watch for falling or ejected debris

# MAINTENANCE

## GENERAL

Maintenance can only be performed when equipment is LOCKED OUT. Since the equipment usually has a large inertia force they do not stop abruptly. It is important to make sure all components are at a state of ZERO ENERGY. Any components that may move during the servicing must be blocked or restrained. Maintenance should only be performed by those who are trained to do so safely. A supervisor must know the whereabouts of all the maintenance personnel at all times.

Preventive Maintenance is an important part of productive equipment. Replacing worn-out parts during scheduled shutdowns is much more beneficial than replacing broken parts during a production cycle. Some general rules to follow:

1) Check oil levels regularly
2) Lubricate components regularly (not while operating)
3) Monitor the motors power consumption
4) Keep machine and its components clean
5) Repair leaks quickly to prevent further damage
6) Monitor all vibrations
7) Replace broken or cracked components
8) Always consult the manufacturer prior to welding
9) Tighten all loose fittings and components
10) Regularly test safety equipment and shutoffs
11) Maintain proper belt tensions (both drives & conveyors)
12) Keep conveyor belts properly trained

If and when welding or cutting is required, the manufacturer must be consulted. Materials used on equipment are not all the same, so welding or cutting may be difficult/detrimental if the material properties are not known. Always protect hoses, belting, and any flammable materials when performing maintenance to prevent a fire or damage. A trained person with fire extinguishing equipment must be present when welding or cutting.

## LUBRICATION

It is important to lubricate components and maintain proper oil levels. Refer to the manufacture's brochures for lubrication and oil recommendations for bearings, reducers, motors, motorized head pulleys, crushers, screener, etc. Always check that the component is not permanently sealed before attempting to lubricate. Any adjusting bolts, pivot points, slides, etc. should be lubricated with standard oil with detergent.

## PULLEY MAINTENANCE

All pulleys should be checked for shaft tightness. It is important to inspect bushings for proper seating and cap screws for proper torque. This should be done at least once a week for the first month of operation, then during shutdowns thereafter. Pulley lagging must be checked for wear, cracks and bond. Faults in anyone of these will result in belt slippage. Inspect the ends of the pulleys for cracks or fatigue. If there is any sign of either, the pulley must be taken out of operation or fixed.
Take-up pulleys and belt tension devices must be inspected. Excessive belt tension will cause premature failure of pulleys, bearings and shafts. Pulley alignment is critical. Misalignment can result in improper belt tracking which will cause premature pulley and idler wear. Pulleys must be kept clean and free of built up material. Only clean and service pulleys when equipment is not in operation and locked out.

Bearings should be visually checked for excessive shaft movement and vibration during operation. Then check bearings for alignment, lubrication and tightness while equipment is locked out. Never operate the equipment without guarding in place.

## BUSHING INSTALLATION & MAINTENANCE

### BUSHING INSTALLATION

Remove all paint, oil, grease and anti-rust inhibitors from the mating tapered surface of the bushing(s) and hub(s). Make sure that the shaft, bushing(s) and hub(s) are otherwise clean and free of burrs. Do not lubricate the bushing taper, the capscrews, or the product tapered bore and threaded holes. Lubricating these parts or surfaces could lead to breakage of the product. If the pulley is to be keyed to the shaft, make sure both shaft and bushing keyway(s) are clean, smooth and free of burrs. Check the key size with both shaft and bushing keyway(s). Key(s) should be placed into the shaft keyway(s) at this time. For conveyor pulleys requiring 2 bushings, shaft

keyways must be in line with each other for proper bushing installation. To assure the proper transmission of torque, all bushings used in drive pulleys must be keyed to the shaft. Place the shaft into pulley, being careful not to damage the bore of the hubs. Then slip the bushings onto the shaft and into the hubs. Line up the drilled holes of the bushings with the threaded holes of the hubs. Place and hand tighten the capscrews into the threaded holes of the hubs. When satisfied with the position of the shaft, slightly tighten the capscrews so the bushings are snug in the hubs. With a torque wrench, **alternately and evenly in one bushing only**, tighten the capscrews to the recommended torque values. **Do Not Tighten More Then Recommended Values**. Make sure that the bushing flange face surfaces on both sides of the split are even.

BUSHING CAPSCREW RECOMMENDED TORQUE VALUES

| QD Size | Torque (ft-lb) | XT Size | Torque (ft-lb) | OTHERS | Torque (ft-lb) |
|---|---|---|---|---|---|
| H | 7.5 | 15 | 8 | Q1 | 29 |
| JA | 5 | 20 | 16 | R1 | 29 |
| SDS | 9 | 25 | 29 | S1 | 70 |
| SK | 15 | 30 | 46 | UO | 140 |
| SF | 30 | 35 | 70 | 25-- | 36 |
| E | 60 | 40 | 100 | 30-- | 67 |
| F | 75 | 45 | 140 | 35-- | 83 |
| J | 135 | 50 | 250 | 40-- | 142 |
| M | 225 | 60 | 400 | 45-- | 204 |
| N | 300 | 70 | 600 | 50-- | 258 |
| P | 450 | 80 | 750 | 60-- | 652 |
| W | 600 | 100 | 750 | 70-- | 652 |
| S | 750 | 120 | 750 | 80-- | 652 |
| | | 140 | 750 | | |

Never exceed recommended torque in attempt to pull bushing flange flush with hub face. When tightened there should be clearance. If bushing flange is pulled flush with hub face while tightening capscrews, check for undersized shaft. If the problem persists, call the manufacturer. Once satisfied, tighten the next bushing.

## BUSHING MAINTENANCE

For the first month of operation inspect bushings, capscrews and check capscrew torque at least once a week and thereafter during periodic shutdowns. To remove the bushings all capscrews must be removed. Then insert the capscrews into the threaded holes of the bushing. Gradually tighten the capscrews alternately and evenly in one bushing only, until the bushing becomes loose. If the bushing doesn't become loose immediately, tap on the hub with a hammer. Once satisfied, loosen the next bushing.

## HYDRAULIC MAINTENANCE

All hydraulic components must be brought to a zero energy state prior to any repairs or maintenance. It is important to visually inspect hoses for wear, cracking and leakage on a regular basis. If hoses show any signs of damage, they must be replaced. For wear problems, it is best to locate the source and fix the problem to prevent continuous damage. Hose clamps must be kept tight. When repairing any hydraulic problem, it is very important to keep all components clean and free of contamination. After maintenance is completed, the hydraulic system must be checked leaks. Never repair any leaks while the system is pressurized. Always keep a safe distance away from any moving components and repair areas when initially pressurizing the hydraulic system.

Hydraulic oil should be checked once a day. It is important that all cylinders must be retracted before checking oil. The oil temperatures and pressures should be monitored during normal operation periods. Breather caps and filters must be kept clean and in proper working condition.

## TAKE-UPS

Inspect take-up rod threads prior to adjusting to avoid non-repairable damage. Adjust take-ups on a regular basis to maintain proper belt tension and tracking. Lubrication of the take-ups is entirely up to the operator based on the surrounding working environment. Moisture, dust and corrosive materials all affect the take-ups differently. The take-ups are shipped dry from factory but supplied with grease fittings.

## BELT TENSION & REPAIR

Conveyor belts must be adjusted regularly. For new belting it is important to adjust tension in small increments as the belting stretches. Over tightening a new belt will permanently stretch it. Belting should be visual inspected on a regular basis. If the belting is damage it must be repaired or replaced. It is important to keep the belt trained. This helps to avoid damage and leakage.

# CONVEYOR BELT TROUBLE-SHOOTING

| GOODYEAR CONVEYOR BELT TROUBLE-SHOOTING | | | | | | |
|---|---|---|---|---|---|---|
| **A.** Conveyor runs to one side at given point on structure | 5 | 4 | 1 | 2 | 3 | 44 |
| **B.** Particular section of belt runs to one side at all points on conveyor | 6 | 7 | - | - | - | - |
| **C.** Belt runs to one side for long distance or entire length of conveyor | 39 | 8 | 5 | 1 | 2 | 3 |
| **D.** Belt runs off at tail pulley | 39 | 10 | 1 | - | - | - |
| **E.** Belt runs off at head pulley | 33 | 10 | 1 | 3 | - | - |
| **F.** Belt slip | 34 | 33 | 31 | 10 | 4 | - |
| **G.** Belt slip on starting | 34 | 31 | 33 | - | - | - |
| **H.** Excessive belt stretch | 41 | 42 | 43 | 12 | 32 | 35 |
| **I.** Grooving, gouging or stripping of top cover | 13 | 14 | 15 | 16 | - | - |
| **J.** Excessive top cover wear, uniformly around belt | 19 | 20 | 10 | 8 | 36 | - |
| **K.** Severe pulley cover wear | 4 | 9 | 10 | 17 | 11 | 27 |
| **L.** Longitudinal grooving or cracking of bottom cover | 4 | 10 | 9 | 33 | - | - |
| **M.** Covers harden or crack | 23 | 37 | - | - | - | - |
| **N.** Cover swells in spots or streaks | 21 | - | - | - | - | - |
| **O.** Belt breaks at or behind fasteners; fasteners pull out | 24 | 22 | 12 | 23 | - | - |
| **P.** Vulcanized splice separation | 38 | 30 | 12 | 17 | 25 | - |
| **Q.** Excessive edge wear, broken edges | 8 | 10 | 40 | 7 | - | - |
| **R.** Transverse breaks at belt edge | 18 | 25 | 26 | - | - | - |
| **S.** Short breaks in carcass parallel to belt edge, star breaks in carcass | 16 | 17 | - | - | - | - |
| **T.** Ply separation | 29 | 30 | 23 | - | - | - |
| **U.** Carcass fatigue at idler junction | 25 | 26 | 27 | 28 | 29 | 36 |
| **V.** Cover blisters or sand blisters | 45 | 21 | - | - | - | - |
| **W.** Belt cupping - New belt | 46 | - | - | - | - | - |
| **X.** Belt cupping - Old belt (was OK when new) | 21 | 23 | - | - | - | - |

1. Idlers or pulleys out-of-square with center line of belt re-adjust idlers in affected area.
2. Conveyor frame or structure crooked: straighten in affected area.
3. Idler stands not centered on belt re-adjust idlers in affected area.
4. Sticking idlers: free idlers and improve maintenance and lubrication.
5. Buildup of material on idlers: remove accumulation; improve maintenance, install scrapers or other cleaning devices.
6. Belt not joined squarely: remove affected splice and resplice.
7. Bowed belt for new belt this condition should disappear during break-in; in rare instances belt must be straightened or replaced; check storage and handling of belt rolls.
8. 0ff-centre loading or poor loading: adjust chute to place load on center of belt; discharge material in direction of belt travel at or near belt speed.
9. Slippage on drive pulley: increase tension through screw take-up or add counterweight; lag drive pulley; increase arc of contact.
10. Material spillage and buildup: improve loading and transfer conditions; install cleaning devices; improve maintenance.
11. Bolt heads protruding above lagging: tighten bolts; replace lagging; use vulcanized-on lagging.
12. Tension too high: increase speed, same tonnage; reduce tonnage, same speed; reduce friction with better maintenance and replacement of damaged idlers; decrease tension by increasing arc of contact or go to lagged pulley; reduce CWT to minimum amount.
13. Skirt boards improperly adjusted or of wrong material: adjust skirt board supports to minimum 1" between metal and belt with gap increasing in direction of belt travel; use skirt board rubber (not old belt).
14. Belt spanking down under load impact install cushion idlers.
15. Material hanging up in or under chute: improve loading to reduce spillage; install baffles; widen chute.
16. Impact of material a belt: reduce impact by improving chute design; install impact idlers.

17. Material trapped between belt and pulley: install plows or scrapers on return run ahead of tail pulley.
18. Belt edges folding upon structure: same corrections as for 1, 2, 3; install limit switches; provide more clearance.
19. Dirty, stuck, or misaligned return rolls: remove accumulations; install cleaning devices; use self-cleaning return rolls; improve maintenance and lubrication.
20. Cover quality too low; replace with belt of heavier cover gauge or higher quality rubber.
21. Spilled oil or grease, aver-lubrication of idlers: improve housekeeping; reduce quantity of grease used; check grease seals.
22. Wrong type of fastener, fasteners too tight or too loose: use proper fasteners and splice technique; set up schedule for regular fastener inspection.
23. Heat or chemical damage: use belt designed for specific condition.
24. Fastener plates too long for pulley size: replace with smaller fasteners; increase pulley size.
25. Imp roper transition between troughed belt and terminal pulleys: adjust transition in accordance with Goodyear Handbook of belting.
26. Severe convex (hump) vertical curve: decrease idler spacing in curve; increase curve radius; consult Goodyear Handbook of Belting for assistance.
27. Excessive forward tilt of trough rolls: reduce forward tilt of idlers to no more than 2 from vertical.
28. Excess gap between idler rolls: replace idlers; replace with heavier belt.
29. Insufficient transverse stiffness: replace with the proper belt.
30. Pulleys too small: use larger diameter pulleys.
31. Increase screw take-up tension to value determined from calculations.
32. Counterweight too heavy: lighten counterweight to value required by calculations.
33. Pulley lagging worn: replace pulley lagging.
34. Insufficient traction between belt and pulley: lag drive pulley; increase belt wrap; install belt cleaning devices.
35. System underbelted: recalculate belt tensions and select proper belt.
36. Excessive sag between idlers causing load to work and shuffle on belt as it passes over idlers: increase tension if unnecessarily low; reduce idler spacing.
37. Improper storage or handling: refer to Goodyear for proper storage and handling instructions.
38. Belt improperly spliced: resplice using proper method as recommended by Goodyear.
39. Belt running off-centre around the tail pulley and through the loading area: install training idlers on the return run prior to tail pulley.
40. Belt hitting structure: install training idlers on carrying and return run.
41. Improper belt installation causing apparent excessive belt stretch: pull belt through counterweight with a tension equal to at least empty running tension; run belt in with mechanical fasteners.
42. Improper initial positioning of counterweight in its carriage causing apparent excessive belt stretch: check Goodyear Handbook of Belting for recommended initial position.
43. Insufficient counterweight travel: consult Goodyear Conveyor and Elevator Belt Selection Manual for recommended minimum distances.
44. Structure not level: level structure in affected area.
45. Cover cuts or very small cover punctures allow fines to work under cover and cut cover away from carcass; make spot repair with vulcanizer or self-curling repair material.
46. Excessive cover gauge ratio: use a belt with a lower gauge ratio and/or a thicker carcass.

# OPERATION INSTRUCTIONS

## PRE-OPERATION CHECKLIST

1) Read through the owner's manual.
2) Check all greaseable components to make sure their greased.
3) Make sure reducers are filled to the proper oil level.
4) Check all other fluid levels.
5) Check for properly adjusted skirt board rubber.
6) Verify that all wiring is done and done by a qualified electrician.
7) Check the drive direction prior to installing drive belts. Backstops in reducer will be damaged if drive direction is wrong. Have motors rewired by an electrician if drive direction is wrong.
8) Check that all drives are adjusted.
9) Check for any loose or missing hardware.
10) Confirm that belt scrapers are properly installed and adjusted.
11) Adjust conveyor belts to the proper tension.
12) All guarding and safety devices must be in place and in working order.
13) Inspect all hoses and hose clamps.
14) Always make sure equipment is clear of all personnel prior to start up.
15) Make sure equipment is not locked out before operating.
16) Once operating equipment make sure gauges, indicators and controls are working.
17) Double check safety shutoffs.

## EQUIPMENT SETUP FROM TRANSPORT

Before setting up equipment an adequate area must be selected. It is important to consider overhead and underground cables, maneuverability and functionality.

All equipment must be cribbed or blocked. It is very important to have a level and solid footing. Equipment cannot become unstable while operating. It must be level and regularly checked. Once equipment is in position and blocked, any access ladders, etc. can be put into place. All adjustable components need to be locked into their working position. (Refer to Plant Specific Operating Instructions). While lifting components into position, always use the proper techniques. Everyone must be in clear view of the operator and in a safe zone. Electrical cables must be located away from traffic areas. Cables cannot become damaged; they must be repaired or replaced by a qualified electrician.

Before startup one must go through the "Pre-Operation Checklist". During operation it is important to pay attention to the equipment and surrounding environment. Always acknowledge unauthorized people approaching the equipment. Take note of the noise, vibrations, smells and output of equipment. If there are any changes in these, equipment should be observed closely to prevent further damage.

## EQUIPMENT SETUP TO TRANSPORT

As operations reach completion and equipment is being shut down for transport, several steps need to be taken. Prior to anything, equipment must be shut down and at a zero-energy state. The power cords must be disconnected and wrapped up. All components must be shifted and locked in their transport position. (Refer to Plant Specific Operating Instructions). Equipment should be cleaned off and the general area should be cleaned up. Tire pressure and wheel lug nut torque should be checked. A brake and light inspection must take place when a tractor is hooked on to any equipment. Warning signs and flags must be attached to equipment. Know and follow weight and dimensional restrictions. It is important to follow the recommended limits on towing speed.

# PLANT SPECIFIC OPERATING INSTRUCTIONS

## TRANSPORT TO OPERATING POSITION

### Discharge Conveyor

1) Loosen and remove the ratchet strap from discharge conveyor.
2) Unwrap and connect power cord to the power van.
3) Support the discharge conveyor under the lifting channel.
4) Lift the conveyor.
5) Adjust height of conveyor and place the support bar in the nearest notch.
6) Lower the conveyor onto the bar.
7) Loosen the scraper rubber bolts under the feeder head pulley.
8) Adjust the rubber so it is tight to the feeder belt.
9) Tighten the scraper bolts.
10) Confirm drive direction prior to installing the drive belts to avoid damage to the backstop in the reducer.
11) When drive direction is correct install the drive belts and guard.
12) Train and track the belt. (Refer to "Belt Tension & Repair")
13) The conveyor is ready to use.

### Belt Feeder

1) Check and adjust the steel skirting in the hopper to avoid leakage. Make sure there is slight clearance (approx. 1/8") to the belt to avoid cutting the belt.
2) Unwrap and connect power cord to the power van.
3) Train and track the belt. (Refer to "Belt Tension & Repair")

### General

1) Level and block the chassis.
2) Unwrap and connect the hydraulic power cord and control cord to the power van.
3) Cycle the grizzly up and down to confirm proper function.

**IMPORTANT!** INSPECT AND SERVICE PLANT FOR LOOSE OR MALFUNCTIONING HARDWARE PRIOR TO START-UP.

## OPERATING TO TRANSPORT POSITION

### General

1) Make sure the grizzly is down.
2) The hopper must be empty.
3) Disconnect and wrap up all cords.
4) Remove built up and oversized material from around the plant.
5) Clean off any loose debris.

### Discharge Conveyor

1) Support the discharge conveyor under the lifting channel.
2) Raise the conveyor just enough to remove the support bar.
3) Place the support bar in the notch.
4) Lower the conveyor onto the transport stops.
5) Attach the ratchet strap to hold down the conveyor.

## OPERATION AND ADJUSTMENT

### Belt Feeder operation

1) The plant must be shut down and locked out prior to any work.
2) Maintain proper belt tension and track belt regularly.
3) Feeder belt speed must not be faster then the discharge conveyor belt speed.

4) Removing the belt feeder:
   a) Shift the feeder drive all the way towards the hopper.
   b) Remove the feeder drive chain and the large sprocket.
   c) Remove the tail guarding.
   d) Remove all 4 conveyor mounting bolts and spacers.
   e) Raise the steel skirting to avoid cutting the belt.
   f) Sling the tail shaft of the belt feeder.
   g) Remove the conveyor. It is important to support the conveyor as it is being removed to avoid damage to the equipment.

5) Installing the belt feeder:
   a) Sling the belt feeder.
   b) Raise the conveyor with the proper equipment.
   c) Place the head end of the belt feeder on the support angles.
   d) Remove the head end support slings.
   e) With the belt feeder at the same angle as the support angles slide it into position.
   f) Install the 4 spacers and mounting bolts.
   g) Install the tail guarding.
   h) Install the large sprocket and drive chain.
   i) Shift the reducer away from the hopper until proper chain tension is achieved.
   j) Check and adjust the steel skirting.
   k) Replace any guarding that was removed.

**Grizzly operation and adjustment**

- The feeder is supplied with an electrical control valve (110V).
- The customer supplies the switch to control the valve.
- It is important to keep the grizzly clean and free flowing; a buildup of material reduces capacity.
- Do not close the grizzly when material is heaped in the hopper.

1) Adjusting grizzly bar spacing requires all the proper safety equipment and harnesses.

2) Remove the hardware from all the bars that need to be adjusted.

3) Shift, add or remove the bars.

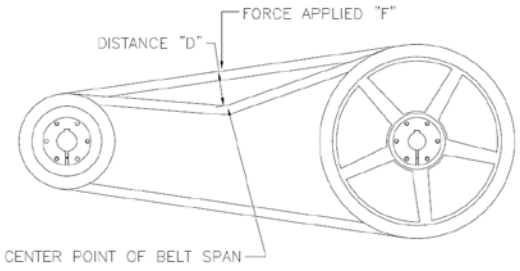
4) Install all the hardware.

## General operation and adjustment

1) Regularly adjust skirt rubber to prevent leakage.
2) Train and adjust the conveyor belt(s) regularly.
3) Refer to manufacturer's brochures and manuals for specific component maintenance.
4) Hang some weight from the head pulley scraper to maintain scraping pressure.
5) Replace the scraper rubber once it has worn within 1/8" of the scraper housing.

## Belt drive adjustment

**Important!** – The plant must be locked out when checking and adjusting the drive.




| | "D" | "F" |
|---|---|---|
| Discharge Conveyor | 0.4" | 6.4-6.7 lbs |

FIGURE 1

## Discharge conveyor belt drive

1) Remove the front drive guard panel.
2) Check belt tension.
3) To adjust belt tension, loosen torque arm jam nuts.
4) Adjust the turn buckle until proper belt tension is achieved.
5) Tighten the torque arm jam nuts.
6) Recheck the belt tension.
7) Install the front drive guard panel.

# PARTS

## PARTS LISTING

| QTY | PART NUMBER | DESCRIPTION |
|---|---|---|
| 83'-11" | 42" 1/4" x 1/16"-375-3ply Conti Stacker (89' including vulcanized splice allowance) | Discharge conveyor belt endless length |
| 34'-2" | 42" 1/4" x 1/16"-600-3ply Conti Stacker Grade (39' including vulcanized splice allowance) | Belt feeder endless length |
| 2 | Vulcanized | Belt splices |
| 2 | BX75 | Discharge drive belts |
| 10' | 140 | Feeder drive chain |
| 1 | H9700-49" Tandem | Suspension |
| 2 | D2216761616H94A (94" axles) | Axles |
| 4 | CS-TRA2727 | Springs Hutch 3 Leaf 3" |
| 4 | A2-3030GSB | 30/30 Spring brake less clevis |
| 4 | BA-12-40202 | 1/2" Clevis |
| 8 | 28408NE | Wheels |
| 8 | 11R22.5 | Tires |
| 8 | 573 | Valve stems |
| 1 | KN28600 | Regulator valve |
| 2 | 241-B | Drain cock |
| 4 | 1201-03-02 | Grizzly hinge bushings |
| 9 | BA-142-257-301 | Impact bars |
| 230L | AW32 | Hydraulic oil |
| 3.75L | Synduro SHB 220 Synthetic Multifunctional Lubricant | TXT5 Reducer oil |
| 8.3L | Mobilgear 600 XP 220 mineral oil | Quantis RHB reducer |

**Feeder Conveyor Cord**

| | | |
|---|---|---|
| 1 | ACP3034BC | Male cord end |
| 100' | 10/4 SOOW | Power cord |
| 1 | 2545 | Strain relief |
| 1 | 1" x 1.5" | Reducer bushing |

**Discharge Conveyor Cord**

| | | |
|---|---|---|
| 1 | ACP3034BC | Male cord end |
| 100' | 10/4 SOOW | Power cord |
| 1 | 2545 | Strain relief |
| 1 | 1" x 1.5" | Reducer bushing |

**Hydraulic Pump Cord**

| | | |
|---|---|---|
| 1 | ACP3034BC | Male cord end |
| 100' | 10/4 SOOW | Power cord |
| 1 | 2545 | Strain relief |
| 1 | 1" x 1.5" | Reducer bushing |

**Control Valve Cord**

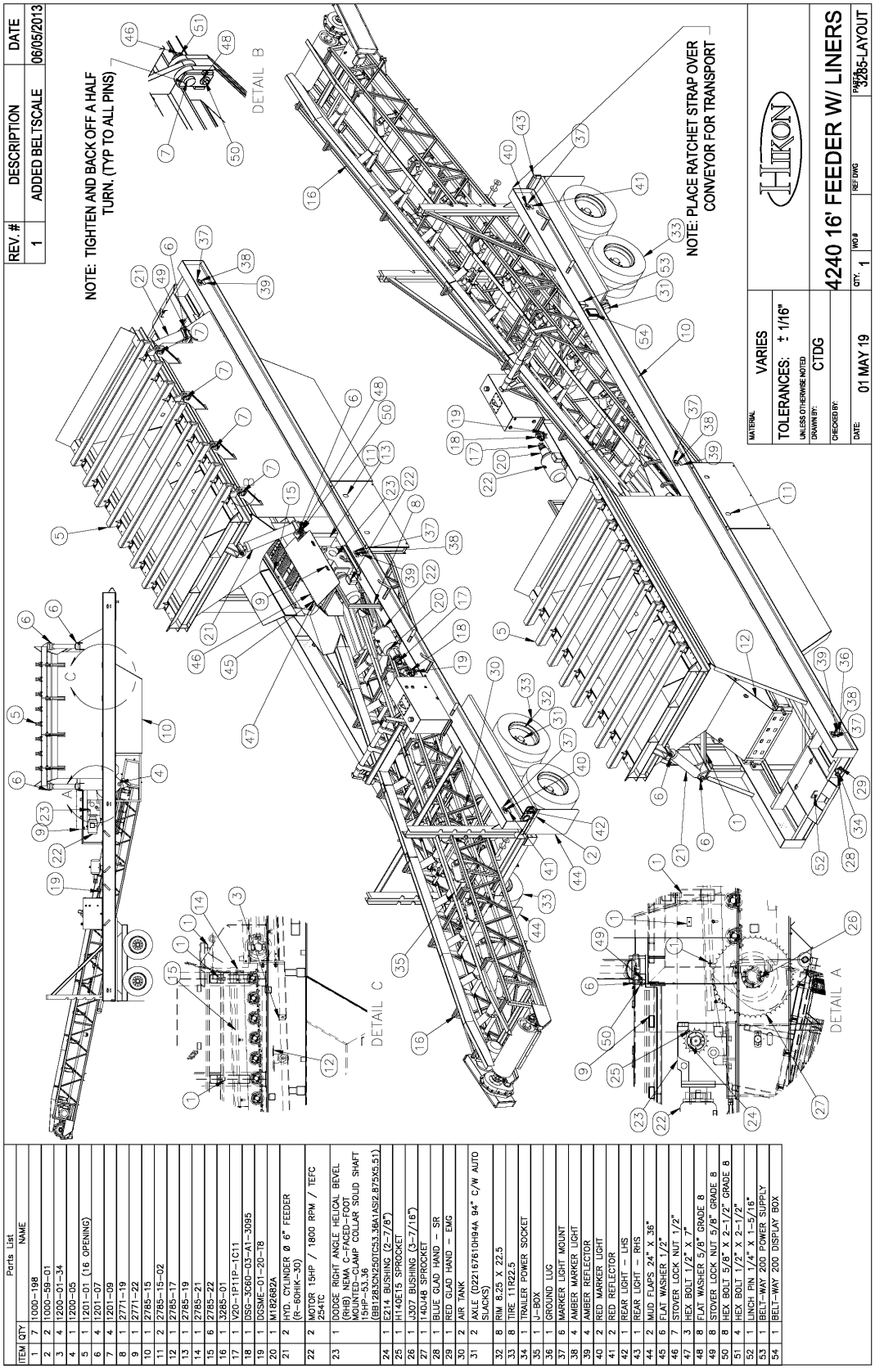
| | | |
|---|---|---|
| 100' | 16/4 SOOW | Power cord |
| 1 | 2522 | Strain relief |

# REPLACEMENT ROLLS

| **STEEL ROLL 5" - EQUAL ROLL** - 20° AND 35° **LUFF** TROUGHSET REPLACEMENT CHART | | | | | | |
|---|---|---|---|---|---|---|
| Troughset Part # | Roll Part # | Roll Quantity | Roll Length | Shaft Length | CEMA Code | Shaft Diameter |
| **42" Belt** | | | | | | |
| 42-253-HSE | 5CS15 | 2 | 14.75" | 16.125" | C | 25mm |
| 42-353-HSE | 5CS15 | 8 | 14.75" | 16.125" | C | 25mm |

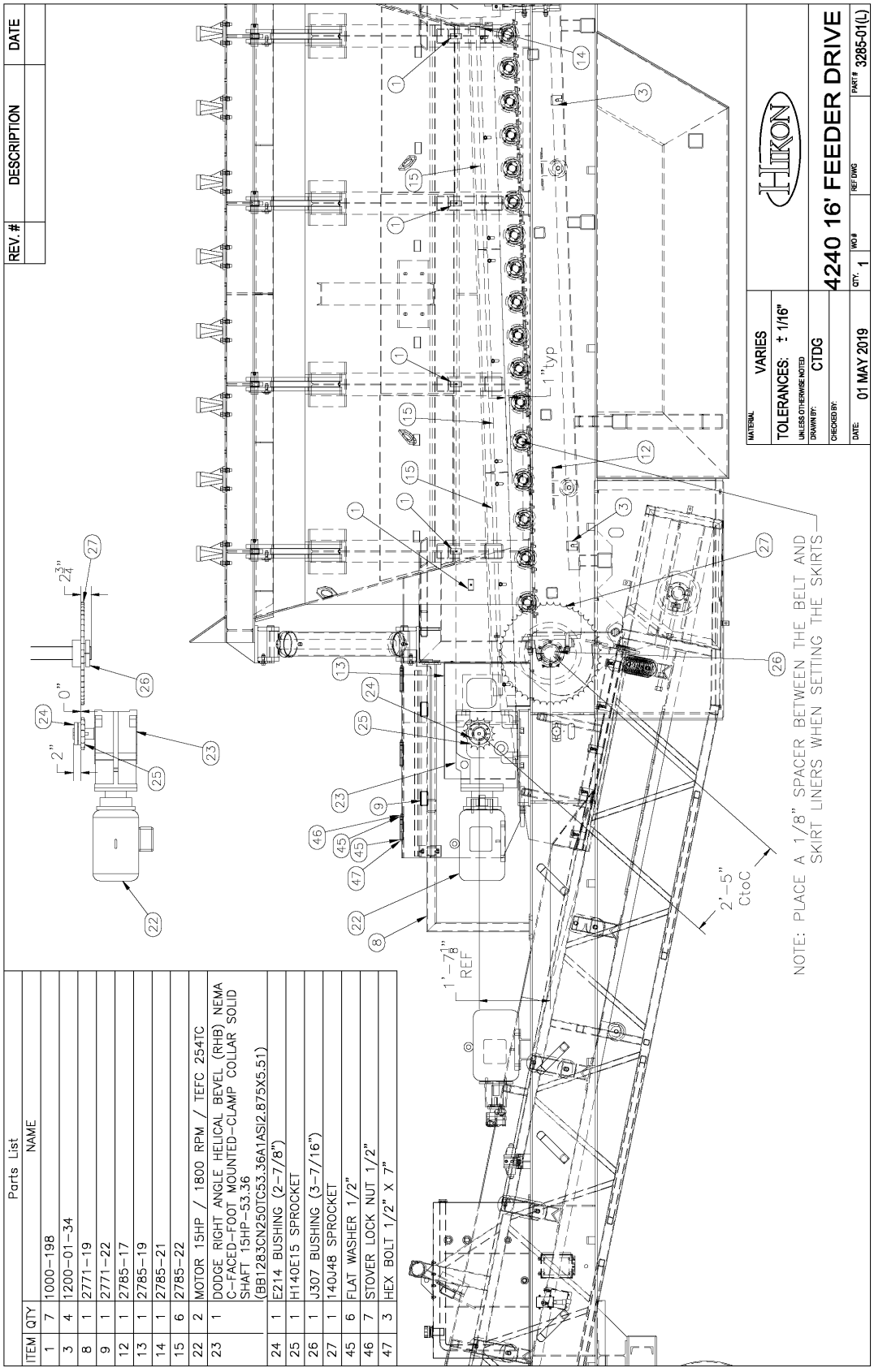
| **IMPACT ROLL 5" - EQUAL ROLL** - 20° AND 35° **LUFF** TROUGHSET REPLACEMENT CHART | | | | | | |
|---|---|---|---|---|---|---|
| Troughset Part # | Roll Part # | Roll Quantity | Roll Length | Shaft Length | CEMA Code | Shaft Diameter |
| **42" Belt** | | | | | | |
| 42-254-HDE | 5DD15 | 3 | 14.5" | 16.125" | C | 25mm |
| **RUBBER DISC RETURN ROLL 5" - LUFF** TROUGHSET REPLACEMENT CHART | | | | | | |
| Troughset Part # | Roll Part # | Roll Quantity | Roll Length | Shaft Length | CEMA Code | Shaft Diameter |
| 3400 4-1/2" Brackets | 945BPSR | 3 | Straight drop bracket 7-1/2" hole center | | | |
| | | | | Shaft length is belt width plus 6.5" | | |
| **42" Belt** | | | | | | |
| 42-053-HDR | 42-053-HDRC | 3 | 45.25" | 48.5" | C | 25mm |

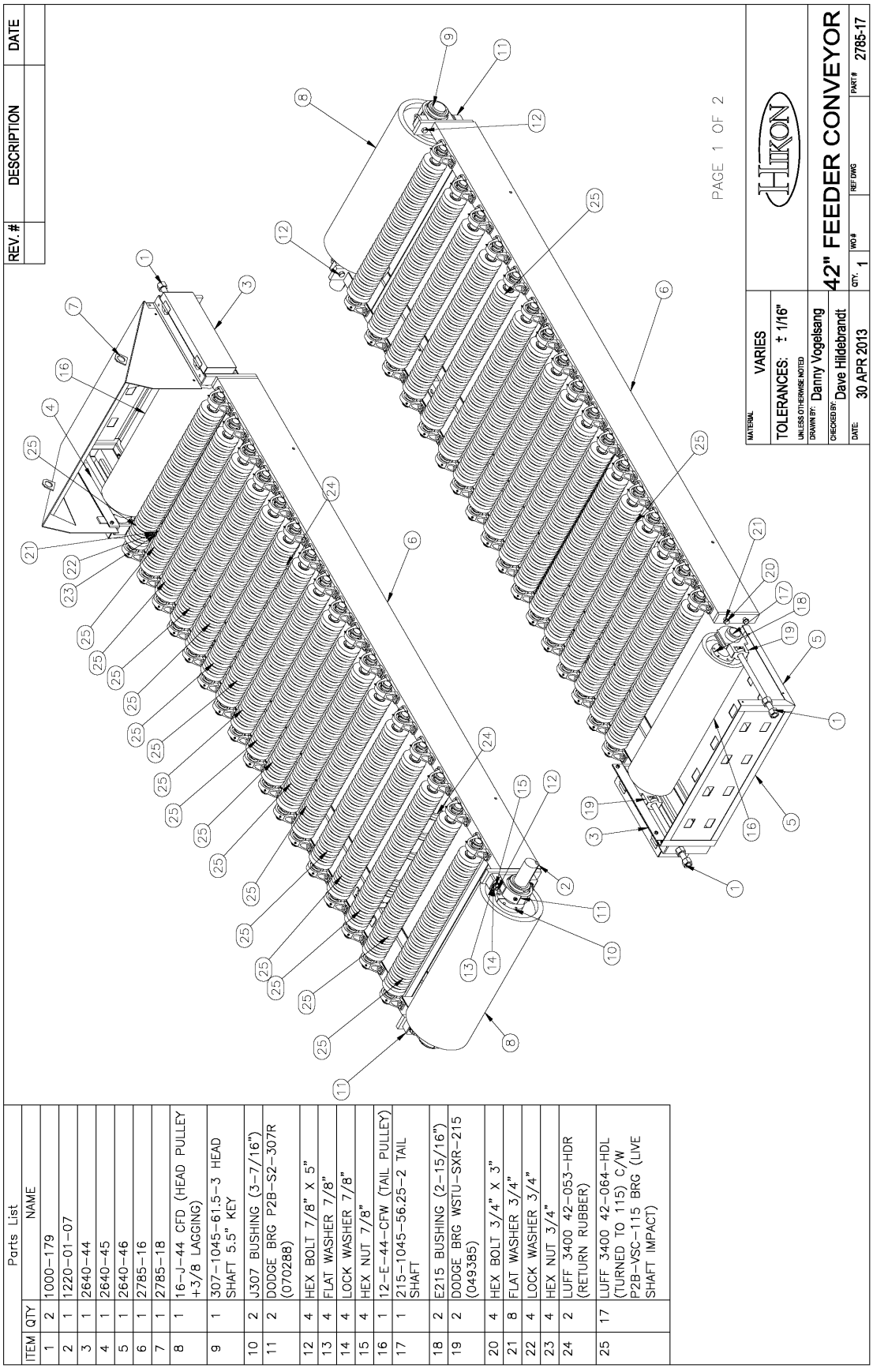
# PARTS DRAWINGS




Parts List

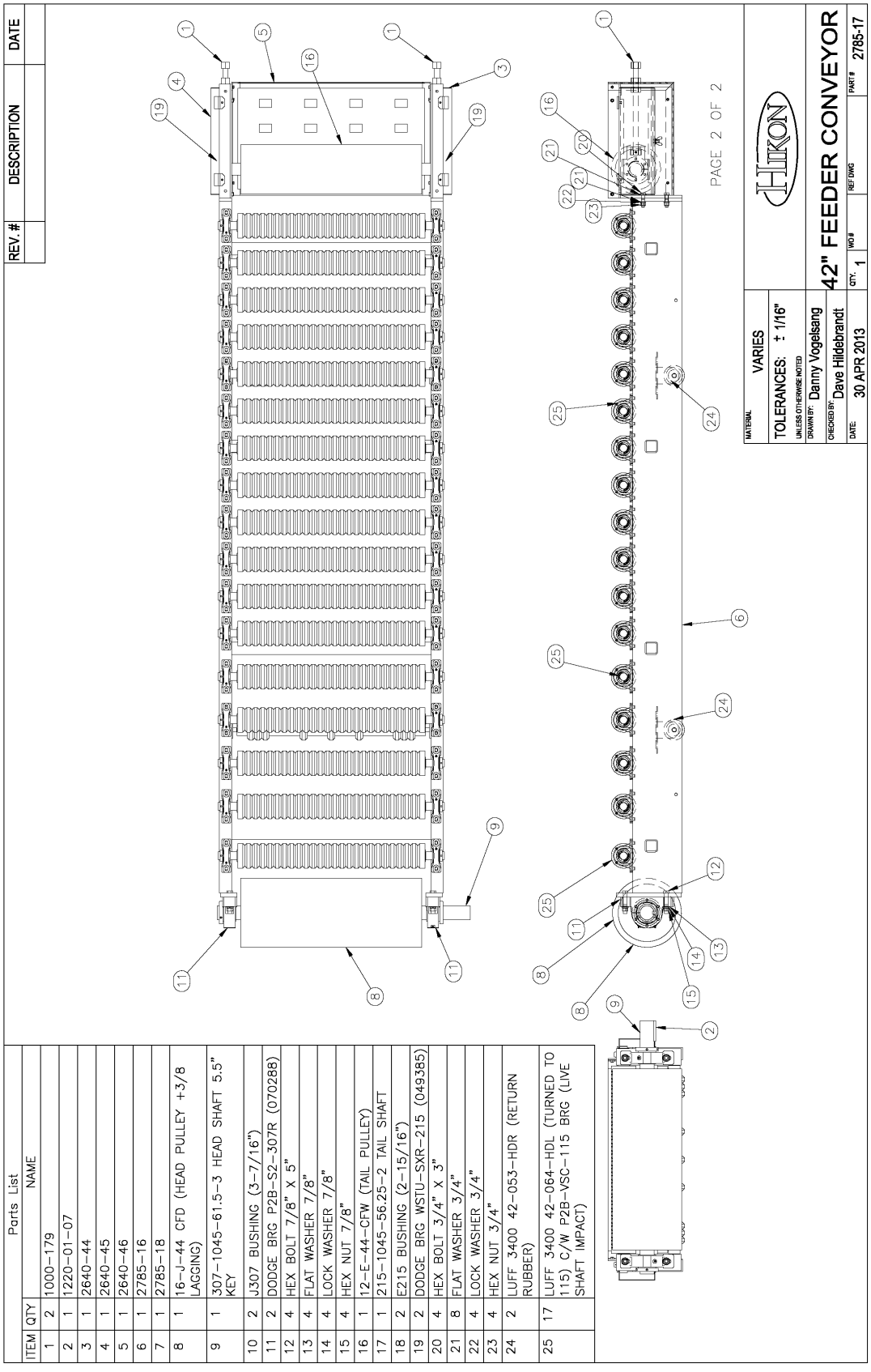
| ITEM | QTY | NAME |
|---|---|---|
| 1 | 7 | 1000-198 |
| 2 | 2 | 1000-59-01 |
| 3 | 4 | 1200-01-34 |
| 4 | 1 | 1200-05 |
| 5 | 1 | 1201-01 (16 OPENING) |
| 6 | 4 | 1201-07 |
| 7 | 4 | 1201-09 |
| 8 | 1 | 2771-19 |
| 9 | 1 | 2771-22 |
| 10 | 1 | 2785-15 |
| 11 | 2 | 2785-15-02 |
| 12 | 1 | 2785-17 |
| 13 | 1 | 2785-19 |
| 14 | 1 | 2785-21 |
| 15 | 6 | 2785-22 |
| 16 | 1 | 3285-01 |
| 17 | 1 | V20-1P11P-1C11 |
| 18 | 1 | DSG-3060-03-A1-3095 |
| 19 | 1 | DGSME-01-20-T8 |
| 20 | 1 | M182682A |
| 21 | 2 | HYD. CYLINDER Ø 6" FEEDER (6-60MK-30) |
| 22 | 2 | MOTOR 15HP / 1800 RPM / TEFC 254TC |
| 23 | 1 | DODGE RIGHT ANGLE HELICAL BEVEL (RHB) NEMA C-FACED-FOOT MOUNTED CLAMP COLLAR SOLID SHAFT 15HP-153.36 (EB12B3CN250TC53.36A1AS/2.875X5.51) |
| 24 | 1 | E214 BUSHING (2-7/8") |
| 25 | 1 | H140E15 SPROCKET |
| 26 | 1 | J307 BUSHING (3-7/16") |
| 27 | 1 | 140J48 SPROCKET |
| 28 | 1 | BLUE GLAD HAND - SR |
| 29 | 1 | RED GLAD HAND - EMG |
| 30 | 2 | AIR TANK |
| 31 | 2 | AXLE (D2216761H94A 94" C/W AUTO SLACKS) |
| 32 | 8 | RIM 8.25 X 22.5 |
| 33 | 8 | TIRE 11R22.5 |
| 34 | 1 | TRAILER POWER SOCKET |
| 35 | 1 | J-BOX |
| 36 | 1 | GROUND LUG |
| 37 | 6 | MARKER LIGHT MOUNT |
| 38 | 4 | AMBER MARKER LIGHT |
| 39 | 4 | AMBER REFLECTOR |
| 40 | 2 | RED MARKER LIGHT |
| 41 | 2 | RED REFLECTOR |
| 42 | 1 | REAR LIGHT - LHS |
| 43 | 1 | REAR LIGHT - RHS |
| 44 | 2 | MUD FLAPS 24" X 36" |
| 45 | 6 | FLAT WASHER 1/2" |
| 46 | 7 | STOVER LOCK NUT 1/2" |
| 47 | 3 | HEX BOLT 1/2" X 1" |
| 48 | 8 | FLAT WASHER 5/8" GRADE 8 |
| 49 | 8 | STOVER LOCK NUT 5/8" GRADE 8 |
| 50 | 8 | HEX BOLT 5/8" X 2-1/2" GRADE 8 |
| 51 | 4 | HEX BOLT 1/2" X 2-1/2" |
| 52 | 1 | LINCH PIN 1/4" X 1-5/16" |
| 53 | 1 | BELT-WAY 200 POWER SUPPLY |
| 54 | 1 | BELT-WAY 200 DISPLAY BOX |


REV. #
DESCRIPTION
DATE
Parts List
ITEM QTY NAME
1 7 1000-198
3 4 1200-01-34
8 1 2771-19
9 1 2771-22
12 1 2785-17
13 1 2785-19
14 1 2785-21
15 6 2785-22
22 2 MOTOR 15HP / 1800 RPM / TEFC 254TC
23 1 DODGE RIGHT ANGLE HELICAL BEVEL (RHB) NEMA C-FACED-FOOT MOUNTED-CLAMP COLLAR SOLID SHAFT 15HP-53.36 (BB1283CN250TC53.36A1ASI2.875X5.51)
24 1 E214 BUSHING (2-7/8")
25 1 H140E15 SPROCKET
26 1 J307 BUSHING (3-7/16")
27 1 140J48 SPROCKET
45 6 FLAT WASHER 1/2"
46 7 STOVER LOCK NUT 1/2"
47 3 HEX BOLT 1/2" X 7"
MATERIAL VARIES
TOLERANCES: ± 1/16"
UNLESS OTHERWISE NOTED
DRAWN BY: CTDG
CHECKED BY:
DATE: 01 MAY 2019
4240 16' FEEDER DRIVE
QTY: 1
WO#
REF DWG
PART# 3285-01(L)
NOTE: PLACE A 1/8" SPACER BETWEEN THE BELT AND SKIRT LINERS WHEN SETTING THE SKIRTS
1"typ
2'-5" CtoC
1'-7 7/8" REF
2 3/4"
2"
0"



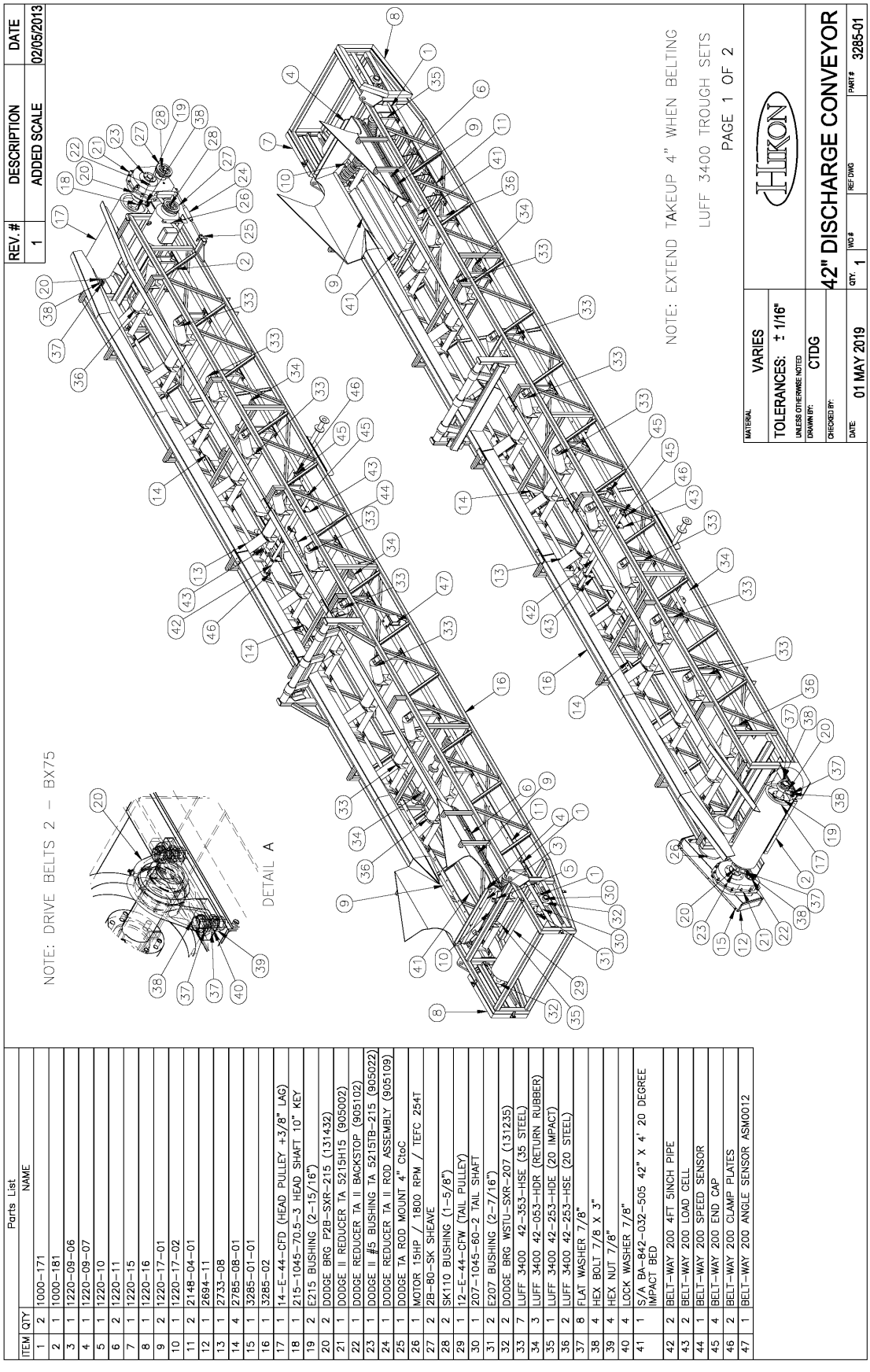

Parts List

| ITEM | QTY | NAME |
|---|---|---|
| 1 | 2 | 1000-179 |
| 2 | 1 | 1220-01-07 |
| 3 | 1 | 2640-44 |
| 4 | 1 | 2640-45 |
| 5 | 1 | 2640-46 |
| 6 | 1 | 2785-16 |
| 7 | 1 | 2785-18 |
| 8 | 1 | 16-J-44 CFD (HEAD PULLEY +3/8 LAGGING) |
| 9 | 1 | 307-1045-61.5-3 HEAD SHAFT 5.5" KEY |
| 10 | 2 | J307 BUSHING (3-7/16") |
| 11 | 2 | DODGE BRG P2B-S2-307R (070288) |
| 12 | 4 | HEX BOLT 7/8" X 5" |
| 13 | 4 | FLAT WASHER 7/8" |
| 14 | 4 | LOCK WASHER 7/8" |
| 15 | 4 | HEX NUT 7/8" |
| 16 | 1 | 12-E-44-CFW (TAIL PULLEY) |
| 17 | 1 | 215-1045-56.25-2 TAIL SHAFT |
| 18 | 2 | E215 BUSHING (2-15/16") |
| 19 | 2 | DODGE BRG WSTU-SXR-215 (049385) |
| 20 | 4 | HEX BOLT 3/4" X 3" |
| 21 | 8 | FLAT WASHER 3/4" |
| 22 | 4 | LOCK WASHER 3/4" |
| 23 | 4 | HEX NUT 3/4" |
| 24 | 2 | LUFF 3400 42-053-HDR (RETURN RUBBER) |
| 25 | 17 | LUFF 3400 42-064-HDL (TURNED TO 115) C/W P2B-VSC-115 BRG (LIVE SHAFT IMPACT) |



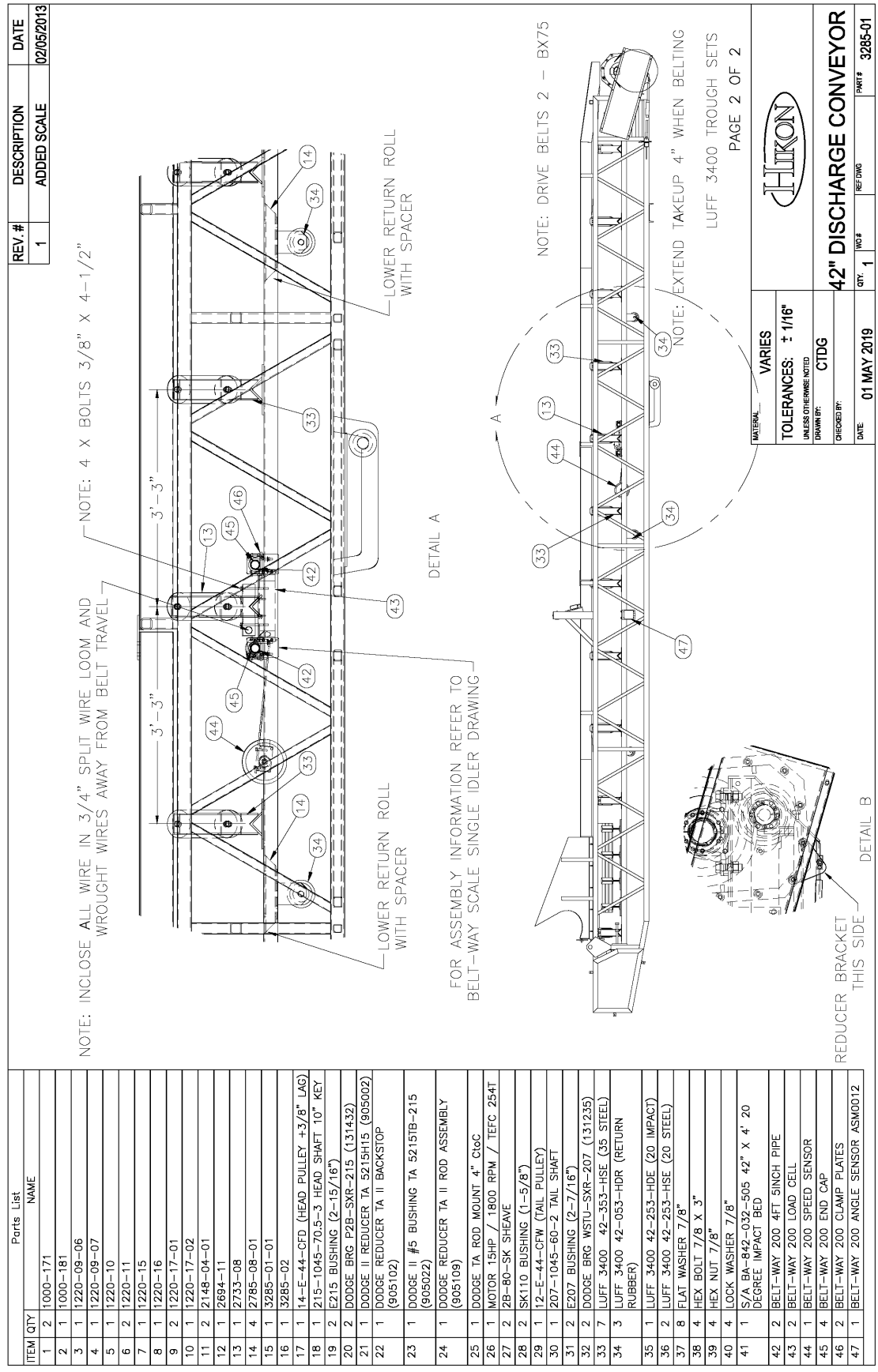

Parts List

| ITEM | QTY | NAME |
|---|---|---|
| 1 | 2 | 1000-179 |
| 2 | 1 | 1220-01-07 |
| 3 | 1 | 2640-44 |
| 4 | 1 | 2640-45 |
| 5 | 1 | 2640-46 |
| 6 | 1 | 2785-16 |
| 7 | 1 | 2785-18 |
| 8 | 1 | 16-J-44 CFD (HEAD PULLEY +3/8 LAGGING) |
| 9 | 1 | 307-1045-61.5-3 HEAD SHAFT 5.5" KEY |
| 10 | 2 | J307 BUSHING (3-7/16") |
| 11 | 2 | DODGE BRG P2B-S2-307R (070288) |
| 12 | 4 | HEX BOLT 7/8" X 5" |
| 13 | 4 | FLAT WASHER 7/8" |
| 14 | 4 | LOCK WASHER 7/8" |
| 15 | 4 | HEX NUT 7/8" |
| 16 | 1 | 12-E-44-CFW (TAIL PULLEY) |
| 17 | 1 | 215-1045-56.25-2 TAIL SHAFT |
| 18 | 2 | E215 BUSHING (2-15/16") |
| 19 | 2 | DODGE BRG WSTU-SXR-215 (049385) |
| 20 | 4 | HEX BOLT 3/4" X 3" |
| 21 | 8 | FLAT WASHER 3/4" |
| 22 | 4 | LOCK WASHER 3/4" |
| 23 | 4 | HEX NUT 3/4" |
| 24 | 2 | LUFF 3400 42-053-HDR (RETURN RUBBER) |
| 25 | 17 | LUFF 3400 42-064-HDL (TURNED TO 115) C/W P2B-VSC-115 BRG (LIVE SHAFT IMPACT) |

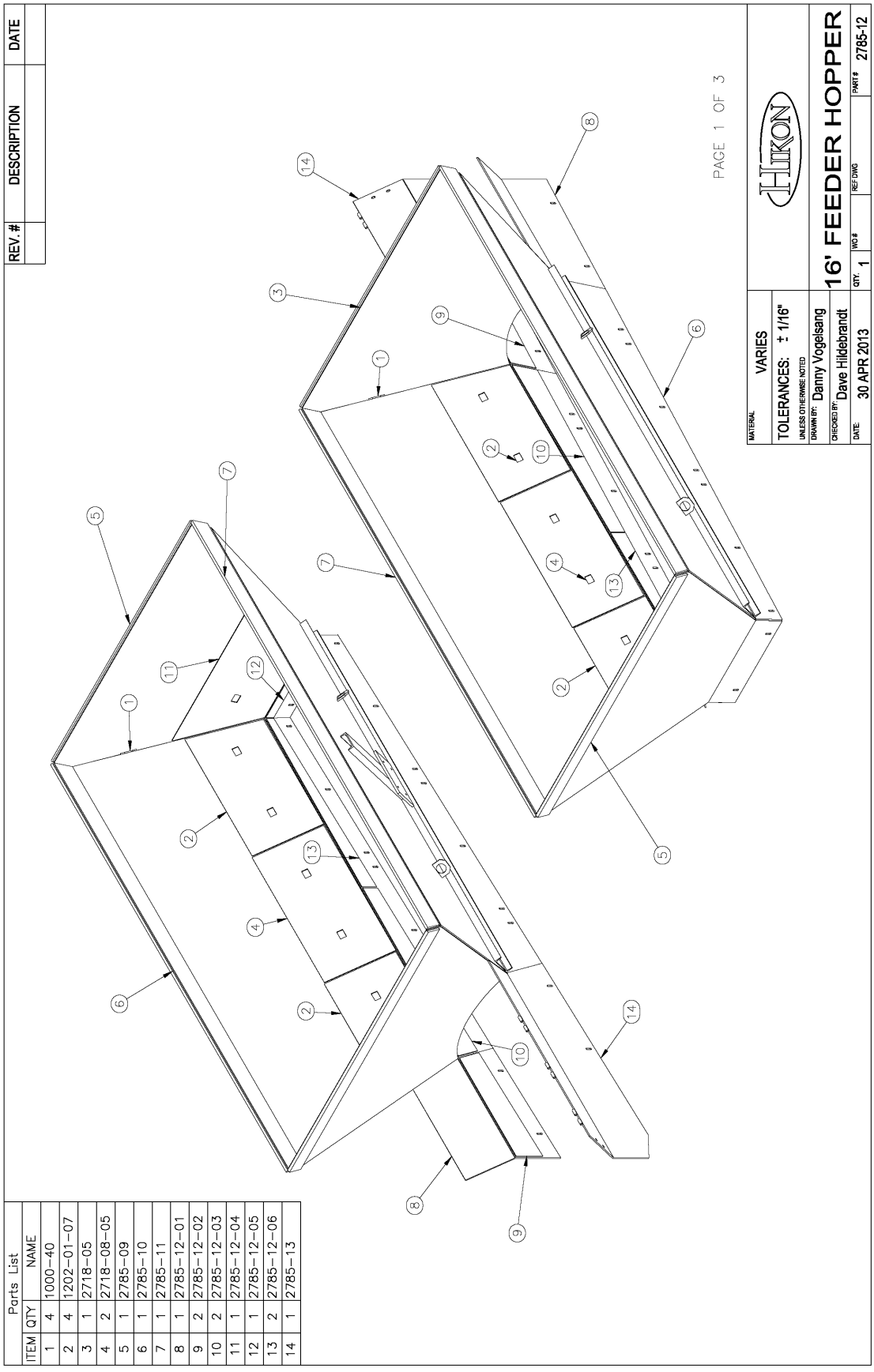



Parts List

| ITEM | QTY | NAME |
|---|---|---|
| 1 | 2 | 1000-171 |
| 2 | 1 | 1000-181 |
| 3 | 1 | 1220-09-06 |
| 4 | 1 | 1220-09-07 |
| 5 | 1 | 1220-10 |
| 6 | 2 | 1220-11 |
| 7 | 1 | 1220-15 |
| 8 | 1 | 1220-16 |
| 9 | 2 | 1220-17-01 |
| 10 | 1 | 1220-17-02 |
| 11 | 2 | 2148-04-01 |
| 12 | 1 | 2694-11 |
| 13 | 1 | 2733-08 |
| 14 | 4 | 2785-08-01 |
| 15 | 1 | 3285-01-01 |
| 16 | 1 | 3285-02 |
| 17 | 1 | 14-E-44-CFD (HEAD PULLEY +3/8" LAG) |
| 18 | 1 | 215-1045-70.5-3 HEAD SHAFT 10" KEY |
| 19 | 2 | E215 BUSHING (2-15/16") |
| 20 | 2 | DODGE BRG P2B-SXR-215 (131432) |
| 21 | 1 | DODGE II REDUCER TA 5215H15 (905002) |
| 22 | 1 | DODGE REDUCER TA II BACKSTOP (905102) |
| 23 | 1 | DODGE II #5 BUSHING TA 5215TB-215 (905022) |
| 24 | 1 | DODGE REDUCER TA II ROD ASSEMBLY (905109) |
| 25 | 1 | DODGE TA ROD MOUNT 4" CtoC |
| 26 | 1 | MOTOR 15HP / 1800 RPM / TEFC 254T |
| 27 | 2 | 2B-80-SK SHEAVE |
| 28 | 2 | SK110 BUSHING (1-5/8") |
| 29 | 1 | 12-E-44-CFW (TAIL PULLEY) |
| 30 | 1 | 207-1045-60-2 TAIL SHAFT |
| 31 | 2 | E207 BUSHING (2-7/16") |
| 32 | 2 | DODGE BRG WSTU-SXR-207 (131235) |
| 33 | 7 | LUFF 3400 42-353-HSE (35 STEEL) |
| 34 | 3 | LUFF 3400 42-053-HDR (RETURN RUBBER) |
| 35 | 1 | LUFF 3400 42-253-HDE (20 IMPACT) |
| 36 | 2 | LUFF 3400 42-253-HSE (20 STEEL) |
| 37 | 8 | FLAT WASHER 7/8" |
| 38 | 4 | HEX BOLT 7/8 X 3" |
| 39 | 4 | HEX NUT 7/8" |
| 40 | 4 | LOCK WASHER 7/8" |
| 41 | 1 | S/A BA-842-032-505 42" X 4' 20 DEGREE IMPACT BED |
| 42 | 2 | BELT-WAY 200 4FT SINCH PIPE |
| 43 | 2 | BELT-WAY 200 LOAD CELL |
| 44 | 1 | BELT-WAY 200 SPEED SENSOR |
| 45 | 4 | BELT-WAY 200 END CAP |
| 46 | 2 | BELT-WAY 200 CLAMP PLATES |
| 47 | 1 | BELT-WAY 200 ANGLE SENSOR ASM0012 |




| ITEM | QTY | NAME |
|---|---|---|
| 1 | 2 | 1000-171 |
| 2 | 1 | 1000-181 |
| 3 | 1 | 1220-09-06 |
| 4 | 1 | 1220-09-07 |
| 5 | 1 | 1220-10 |
| 6 | 2 | 1220-11 |
| 7 | 1 | 1220-15 |
| 8 | 1 | 1220-16 |
| 9 | 2 | 1220-17-01 |
| 10 | 1 | 1220-17-02 |
| 11 | 2 | 2148-04-01 |
| 12 | 1 | 2694-11 |
| 13 | 1 | 2733-08 |
| 14 | 4 | 2785-08-01 |
| 15 | 1 | 3285-01-01 |
| 16 | 1 | 3285-02 |
| 17 | 1 | 14-E-44-CFD (HEAD PULLEY +3/8" LAG) |
| 18 | 1 | 215-1045-70.5-3 HEAD SHAFT 10" KEY |
| 19 | 2 | E215 BUSHING (2-15/16") |
| 20 | 2 | DODGE BRG P2B-SXR-215 (131432) |
| 21 | 1 | DODGE II REDUCER TA 5215H15 (905002) |
| 22 | 1 | DODGE REDUCER TA II BACKSTOP (905102) |
| 23 | 1 | DODGE II #5 BUSHING TA 5215TB-215 (905022) |
| 24 | 1 | DODGE REDUCER TA II ROD ASSEMBLY (905109) |
| 25 | 1 | DODGE TA ROD MOUNT 4" CtoC |
| 26 | 1 | MOTOR 15HP / 1800 RPM / TEFC 254T |
| 27 | 2 | 2B-80-SK SHEAVE |
| 28 | 2 | SK110 BUSHING (1-5/8") |
| 29 | 1 | 12-E-44-CFW (TAIL PULLEY) |
| 30 | 1 | 207-1045-60-2 TAIL SHAFT |
| 31 | 2 | E207 BUSHING (2-7/16") |
| 32 | 2 | DODGE BRG WSTU-SXR-207 (131235) |
| 33 | 7 | LUFF 3400 42-353-HSE (35 STEEL) |
| 34 | 3 | LUFF 3400 42-053-HDR (RETURN RUBBER) |
| 35 | 1 | LUFF 3400 42-253-HDE (20 IMPACT) |
| 36 | 2 | LUFF 3400 42-253-HSE (20 STEEL) |
| 37 | 8 | FLAT WASHER 7/8" |
| 38 | 4 | HEX BOLT 7/8 X 3" |
| 39 | 4 | HEX NUT 7/8" |
| 40 | 4 | LOCK WASHER 7/8" |
| 41 | 1 | S/A BA-842-032-505 42" X 4' 20 DEGREE IMPACT BED |
| 42 | 2 | BELT-WAY 200 4FT 5INCH PIPE |
| 43 | 2 | BELT-WAY 200 LOAD CELL |
| 44 | 1 | BELT-WAY 200 SPEED SENSOR |
| 45 | 4 | BELT-WAY 200 END CAP |
| 46 | 2 | BELT-WAY 200 CLAMP PLATES |
| 47 | 1 | BELT-WAY 200 ANGLE SENSOR ASM0012 |


REV. #
DESCRIPTION
DATE
PAGE 1 OF 3
MATERIAL: VARIES
TOLERANCES: ± 1/16"
UNLESS OTHERWISE NOTED
DRAWN BY: Danny Vogelsang
CHECKED BY: Dave Hildebrandt
DATE: 30 APR 2013
16' FEEDER HOPPER
QTY: 1
WO #
REF DWG
PART # 2785-12
Parts List
ITEM QTY NAME
1 4 1000-40
2 4 1202-01-07
3 1 2718-05
4 2 2718-08-05
5 1 2785-09
6 1 2785-10
7 1 2785-11
8 1 2785-12-01
9 2 2785-12-02
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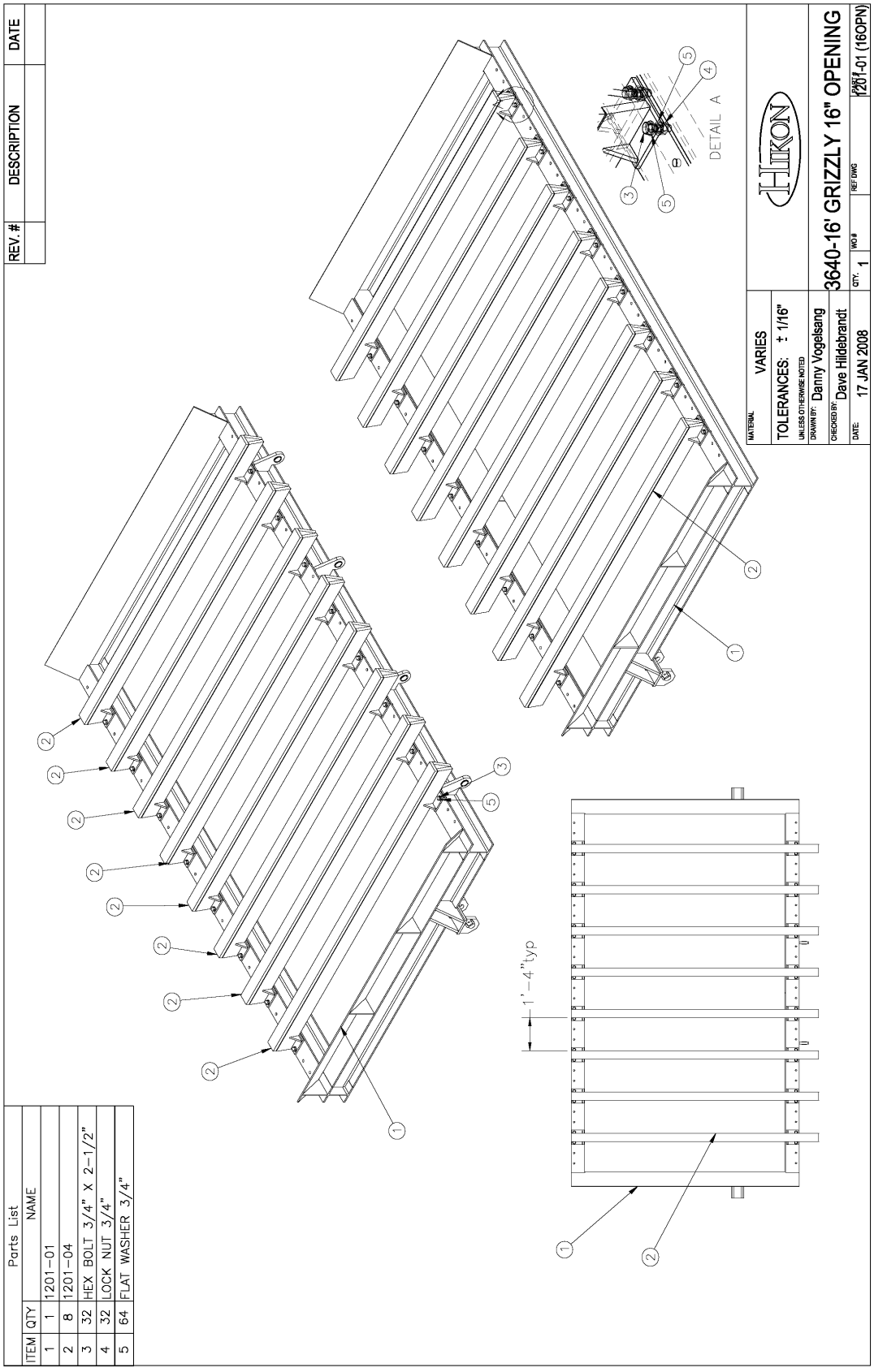
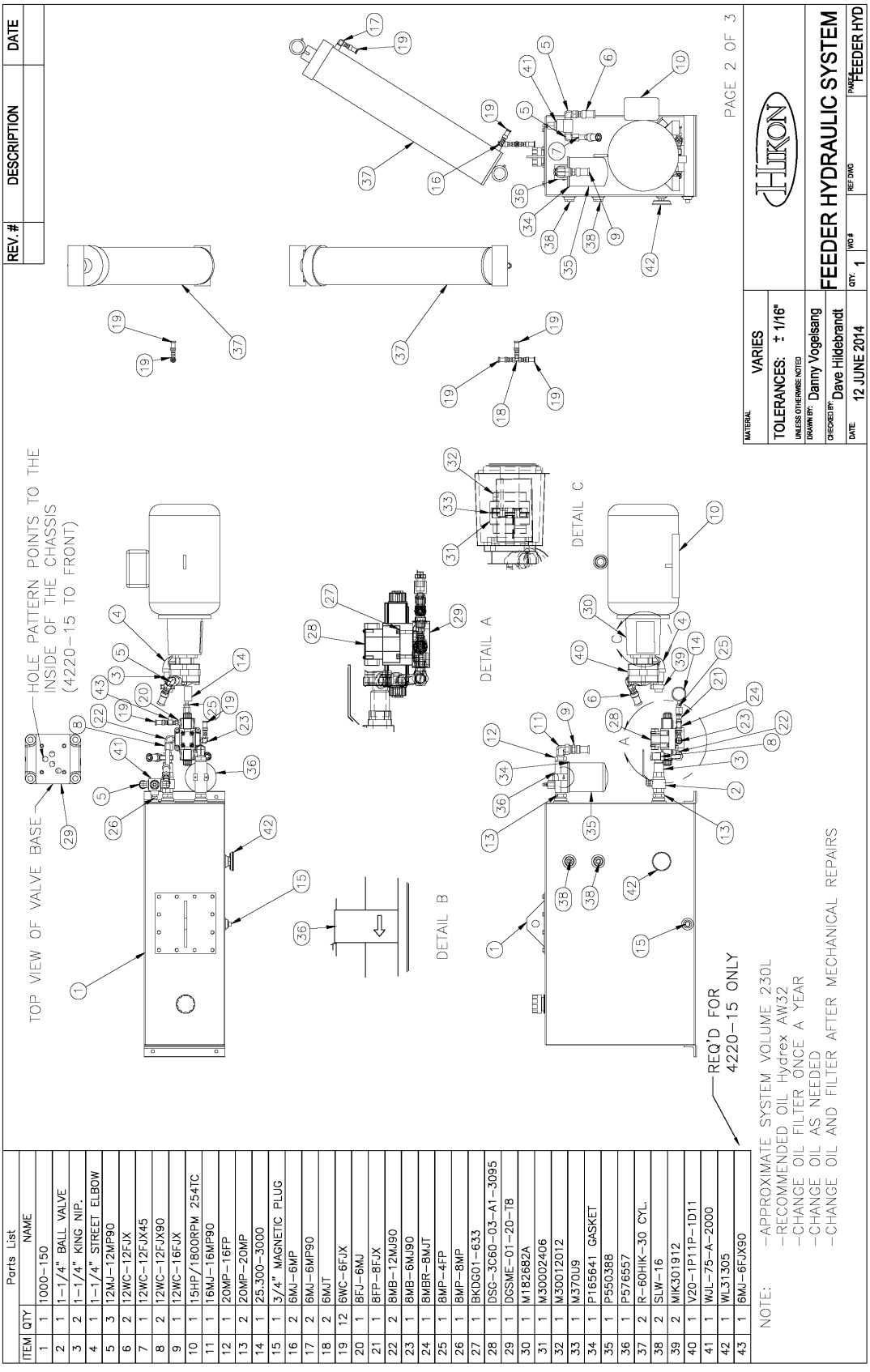
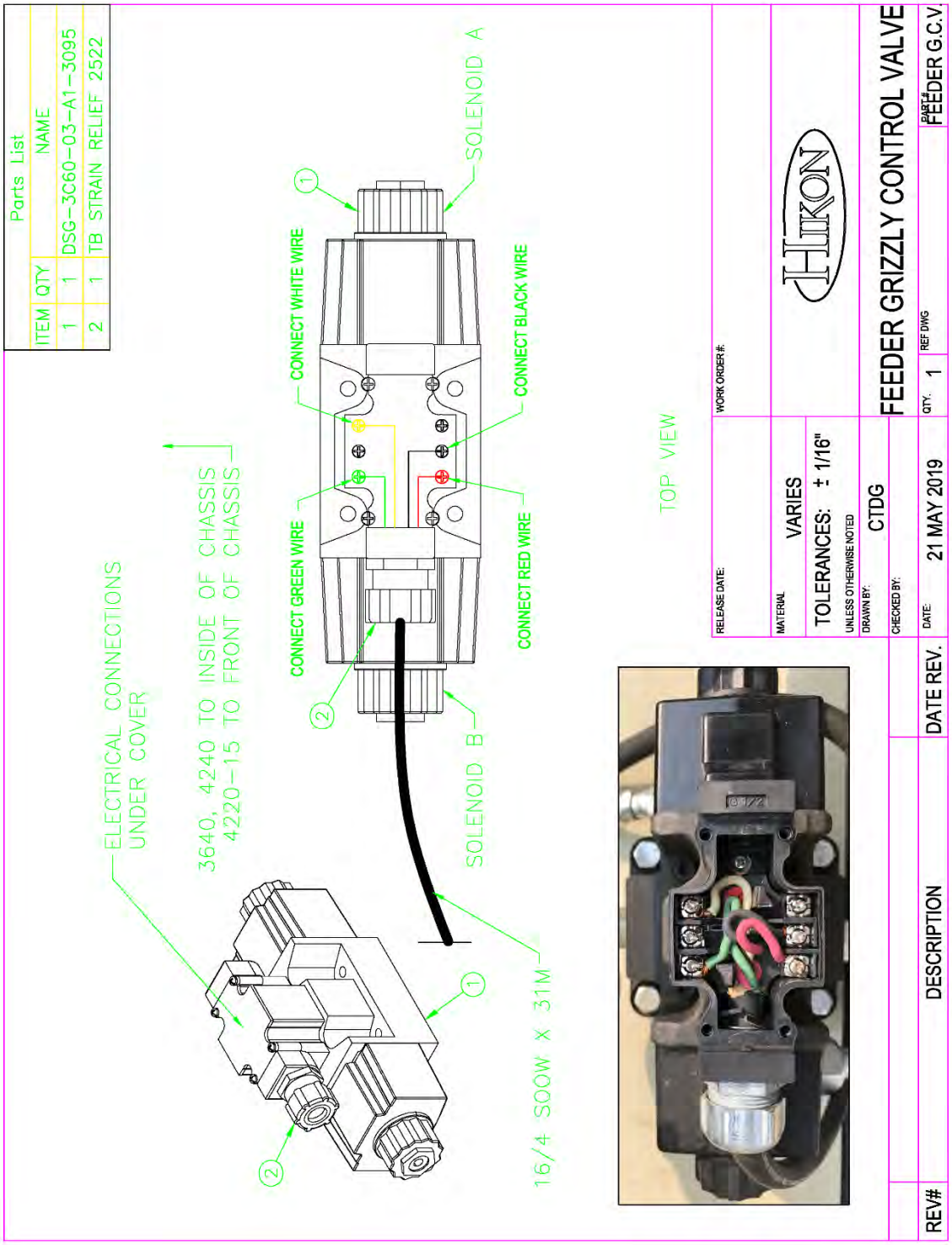
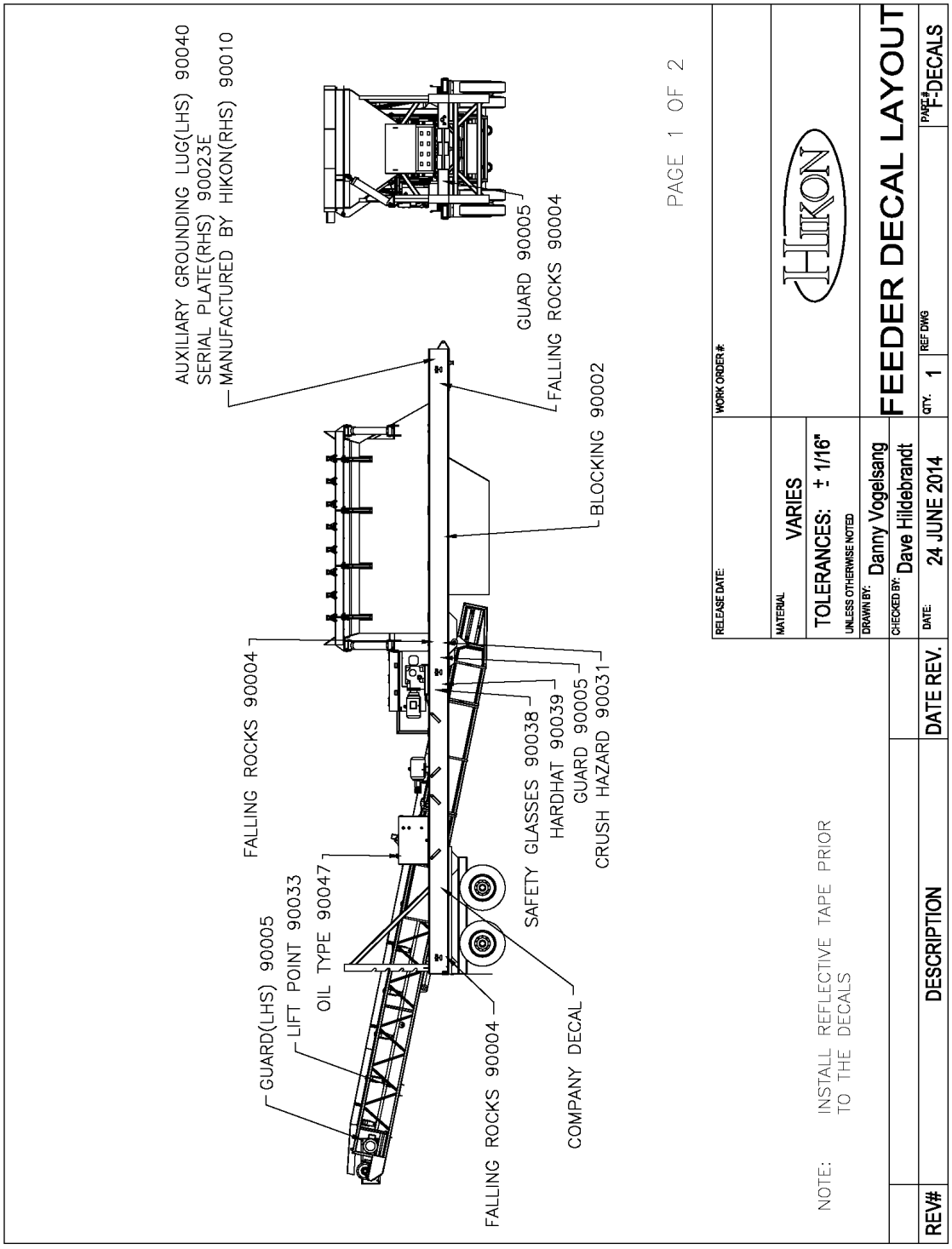
13 2 2785-12-06
14 1 2785-13

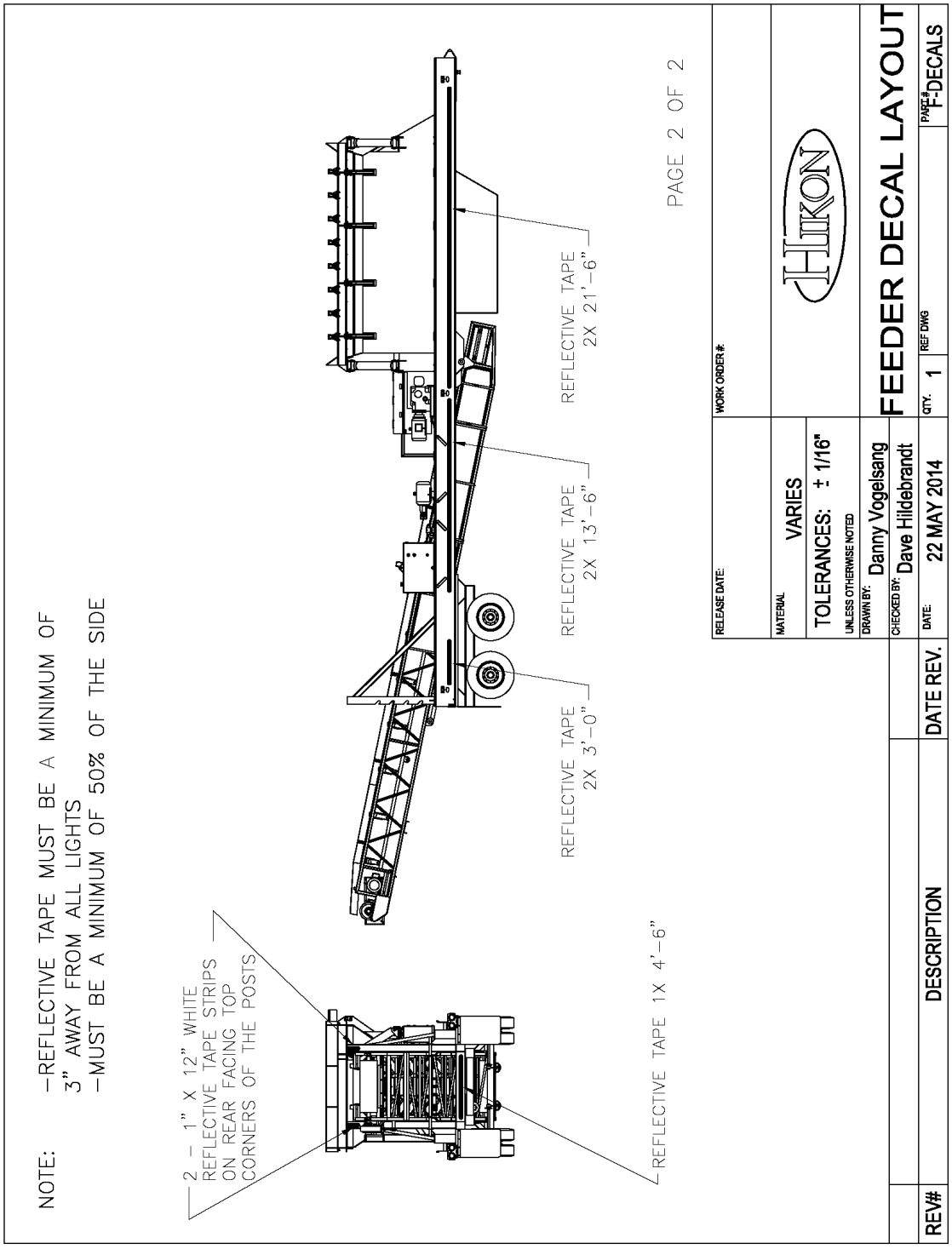

REV. #
DESCRIPTION
DATE
DETAIL A
1'-4" typ
MATERIAL
VARIES
TOLERANCES: ± 1/16"
UNLESS OTHERWISE NOTED
DRAWN BY: Danny Vogelsang
CHECKED BY: Dave Hildebrandt
DATE: 17 JAN 2008
3640-16' GRIZZLY 16" OPENING
QTY: 1
WO #
REF DWG
PART # 1201-01 (16OPN)
Parts List
ITEM QTY NAME
1 1 1201-01
2 8 1201-04
3 32 HEX BOLT 3/4" X 2-1/2"
4 32 LOCK NUT 3/4"
5 64 FLAT WASHER 3/4"



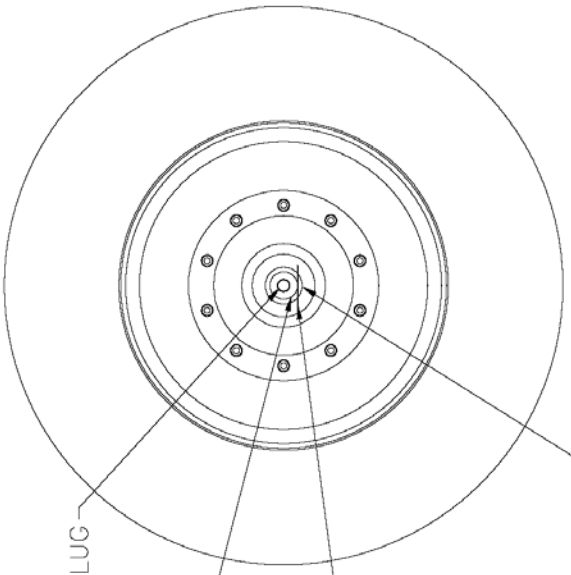

| ITEM | QTY | NAME |
|---|---|---|
| 1 | 1 | 1000-150 |
| 2 | 1 | 1-1/4" BALL VALVE |
| 3 | 2 | 1-1/4" KING NIP. |
| 4 | 1 | 1-1/4" STREET ELBOW |
| 5 | 3 | 12MJ-12MP90 |
| 6 | 2 | 12WC-12FJX |
| 7 | 1 | 12WC-12FJX45 |
| 8 | 2 | 12WC-12FJX90 |
| 9 | 1 | 12WC-16FJX |
| 10 | 1 | 15HP/1800RPM 254TC |
| 11 | 1 | 16MJ-16MP90 |
| 12 | 1 | 20MP-16FP |
| 13 | 2 | 20MP-20MP |
| 14 | 1 | 25.300-3000 |
| 15 | 1 | 3/4" MAGNETIC PLUG |
| 16 | 2 | 6MJ-6MP |
| 17 | 2 | 6MJ-6MP90 |
| 18 | 2 | 6MJT |
| 19 | 12 | 6WC-6FJX |
| 20 | 1 | 8FJ-6MJ |
| 21 | 1 | 8FP-8FJX |
| 22 | 2 | 8MB-12MJ90 |
| 23 | 1 | 8MB-6MJ90 |
| 24 | 1 | 8MBR-8MJT |
| 25 | 1 | 8MP-4FP |
| 26 | 1 | 8MP-8MP |
| 27 | 1 | BKDG01-633 |
| 28 | 1 | DSG-3C60-03-A1-3095 |
| 29 | 1 | DGSME-01-20-TB |
| 30 | 1 | M182682A |
| 31 | 1 | M30002406 |
| 32 | 1 | M30012012 |
| 33 | 1 | M370U9 |
| 34 | 1 | P165641 GASKET |
| 35 | 1 | P550388 |
| 36 | 1 | P576557 |
| 37 | 2 | R-60HIK-30 CYL. |
| 38 | 2 | SLW-16 |
| 39 | 2 | MIK301912 |
| 40 | 1 | V20-1P11P-1D11 |
| 41 | 1 | WJL-75-A-2000 |
| 42 | 1 | WL31305 |
| 43 | 1 | 6MJ-6FJX90 |


Parts List
ITEM QTY NAME
1 1 DSG-3C60-03-A1-3095
2 1 TB STRAIN RELIEF 2522
ELECTRICAL CONNECTIONS UNDER COVER
3640, 4240 TO INSIDE OF CHASSIS
4220-15 TO FRONT OF CHASSIS
CONNECT WHITE WIRE
CONNECT GREEN WIRE
CONNECT BLACK WIRE
CONNECT RED WIRE
SOLENOID A
SOLENOID B
16/4 SOOW X 31M
TOP VIEW
RELEASE DATE:
WORK ORDER #:
MATERIAL VARIES
TOLERANCES: ± 1/16"
UNLESS OTHERWISE NOTED
DRAWN BY: CTDG
CHECKED BY:
DATE: 21 MAY 2019
QTY. 1
REF DWG
FEEDER GRIZZLY CONTROL VALVE
PART# FEEDER G.C.V
REV# DESCRIPTION DATE REV.


AUXILIARY GROUNDING LUG(LHS) 90040
SERIAL PLATE(RHS) 90023E
MANUFACTURED BY HIKON(RHS) 90010
GUARD 90005
FALLING ROCKS 90004
BLOCKING 90002
FALLING ROCKS 90004
GUARD(LHS) 90005
LIFT POINT 90033
OIL TYPE 90047
SAFETY GLASSES 90038
HARDHAT 90039
GUARD 90005
CRUSH HAZARD 90031
FALLING ROCKS 90004
COMPANY DECAL
NOTE: INSTALL REFLECTIVE TAPE PRIOR TO THE DECALS
PAGE 1 OF 2
RELEASE DATE:
WORK ORDER #:
MATERIAL VARIES
TOLERANCES: ± 1/16"
UNLESS OTHERWISE NOTED
DRAWN BY: Danny Vogelsang
CHECKED BY: Dave Hildebrandt
DATE: 24 JUNE 2014
QTY: 1
REF DWG
PART# F-DECALS
FEEDER DECAL LAYOUT
REV# DESCRIPTION DATE REV.


NOTE:
-REFLECTIVE TAPE MUST BE A MINIMUM OF 3" AWAY FROM ALL LIGHTS
-MUST BE A MINIMUM OF 50% OF THE SIDE
2 - 1" X 12" WHITE REFLECTIVE TAPE STRIPS ON REAR FACING TOP CORNERS OF THE POSTS
REFLECTIVE TAPE 2X 3'-0"
REFLECTIVE TAPE 2X 13'-6"
REFLECTIVE TAPE 2X 21'-6"
REFLECTIVE TAPE 1X 4'-6"
PAGE 2 OF 2
RELEASE DATE:
WORK ORDER #:
MATERIAL: VARIES
TOLERANCES: ± 1/16"
UNLESS OTHERWISE NOTED
DRAWN BY: Danny Vogelsang
CHECKED BY: Dave Hildebrandt
DATE: 22 MAY 2014
QTY: 1
REF DWG
PART# F-DECALS
FEEDER DECAL LAYOUT
REV#
DESCRIPTION
DATE REV.

# OIL LEVEL IN AXLES




**RECOMMENDED OIL**
TRAXON 80/90 OIL

1. REMOVE RUBBER PLUG ON THE END OF THE HUB
2. WITH A FUNNEL, ADD OIL UNTIL LEVEL IS BETWEEN THE RINGS IN THE SIGHT GLASS (REFER TO DIAGRAM)
3. REPLACE PLUG AND CHECK OIL LEVEL AGAIN IN APPROX. 1 HOUR (REPEAT STEPS IN OIL IS BELOW THE OUTER RING)

*REPEAT THIS PROCESS FOR EACH HUB*

RELEASE DATE:
WORK ORDER #:
MATERIAL: VARIES
TOLERANCES: ± 1/16"
UNLESS OTHERWISE NOTED
DRAWN BY: Danny Vogelsang
CHECKED BY: Dave Hildebrandt
DATE: 30 JAN 2007
QTY:
REF DWG
PART # AXLE OIL

HIKON

AXLE OIL REQ'M

| REV# | DESCRIPTION | DATE REV. |
|---|---|---|
| | | |

# HUB PILOTED WHEELS




NOTE: VALVE STEMS NEED TO BE LOCATED 180° APART

**RECOMMENDED TORQUE-OILED**

M22 X 1.5 THREAD: 450-500FT.LBS.(33mm or 1 $\frac{1}{2}$" HEX)
-THREADS ARE RIGHT HAND METRIC

TWO PIECE FLANGE NUTS- TIGHTEN TO 50FT.LB USING THE SEQUENCE SHOWN.
(APPLY 2 DROPS OF OIL A POINT BETWEEN THE NUTS AND FLANGES)
(APPLY 2 DROPS OF OIL TO THE LAST 2 OR 3 THREADS AT THE END OF EACH STUD.)

CHECK DISC WHEELS FOR PROPER POSITIONING ON PILOTS AND PROPER SEATING AGAINST DRUM BACK.

THEN TIGHTEN TO RECOMMENDED TORQUE USING THE SEQUENCE SHOWN.

| RELEASE DATE: | WORK ORDER #: | | |
|---|---|---|---|
| MATERIAL: VARIES | HIKON | | |
| TOLERANCES: ± 1/16" UNLESS OTHERWISE NOTED | | | |
| DRAWN BY: Danny Vogelsang | WHEEL MOUNT REQ'M | | |
| CHECKED BY: Dave Hildebrandt | QTY: | REF DWG | PART# WHEEL MNT |
| DATE: 04 APR 2008 | | | |

| REV# | DESCRIPTION | DATE REV. |
|---|---|---|
| | | |

# MANUFACTURERS BROCHURES

## DODGE QUANTIS REDUCER

### DODGE® QUANTIS® RHB REDUCER

**Gearmotors**
**C-Face Reducers**
**Separates**

**Sizes 38 thru 168**

These instructions should be read thoroughly before installation or operation.

**DANGER: High voltage and rotating parts can cause serious or fatal injury and property damage. The use of electrical machinery, like all other utilization of concentrated power and rotating equipment, can be hazardous. Installation, operation and maintenance should be performed only by qualified electrical and mechanical maintenance personnel familiar with NEMA safety standards, the National Electrical Code and sound local practices. The manual is to be studied thoroughly by personnel responsible for the installation and maintenance of this equipment before installation is begun. Personnel must be familiar with the potential hazards involved. If this warning is not observed, personal injury and/or property damage may result. Keep this document for future reference.**

### GENERAL:

Please read these instructions carefully. They contain vital information on proper installation, operation, maintenance and service for the DODGE QUANTIS RHB gear reducer.

Each DODGE gear reducer is thoroughly inspected and tested at the factory prior to shipment. Care is taken in packing of each gear reducer. However, each gear reducer should be thoroughly inspected before it is accepted from the transportation company. If any of the goods called for in the bill of lading are damaged or missing, do not accept the shipment until the freight agent makes appropriate notation on your freight bill. If any loss or damage is discovered later, notify the agent at once and request an inspection. Though DODGE will be happy to assist you with claims for loss or damage in shipment, the transportation company is responsible for reimbursing you for such claims. Claims for loss or damage in shipment must not be deducted from the DODGE invoice, nor should payment of the DODGE invoice be withheld awaiting claims adjustment. The carrier, not DODGE, guarantees safe delivery. If considerable damage or shortage has occurred and the situation is urgent, contact the nearest BALDOR-DODGE Sales Office.

### WARRANTY:

**NOTE: SERVICE AND REPAIR UNDER WARRANTY SHOULD BE PERFORMED ONLY BY A DODGE AUTHORIZED SERVICE SHOP. CALL CUSTOMER SOLUTIONS CENTER AT 864-284-5777 FOR ASSISTANCE.**

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

The DODGE QUANTIS RHB is warranted under the DODGE "Standard Terms and Conditions of Sale". Warranty claims must be submitted to DODGE within one year from the date of installation or within three years from the date of manufacture, whichever comes first. The warranty does not extend to failures induced by misuse, improper storage or handling, abuse, or misapplication.

### LUBRICATION:

The DODGE QUANTIS RHB Gear Reducer is factory filled with ISO 220 EP type mineral oil to the correct oil level for the specified mounting position. **Changes in the mounting position will require relocation of the oil level and vent plugs.** Oil may have to be added or drained to get to the correct oil level in the new mounting position. See the Mounting Position Diagrams on Page 2 for the correct plug locations for various mounting positions of the QUANTIS RHB unit. The oil level should be checked before startup and frequently thereafter, preferably with the unit at operating temperature.

The DODGE QUANTIS RHB gearbox is factory filled with lubricant. The factory fill lubricant is suitable for use at all output speeds and in ambient temperatures from +10°F to +105°F (-12°C to +41°C). No initial oil change after break in is needed. The initial factory oil fill is good for up to 10000 hours or 3 years of service, whichever comes first, in normal industrial environments.

Normal operating conditions are defined as steady loads not exceeding normal ratings and running conditions as defined in the DODGE QUANTIS RHB catalog. Oil quantity and levels should be checked at frequent intervals, depending on usage. Oil changes are required after 10000 operating hours, or three years whichever comes first. The period can be extended to 20000 operating hours, or six years, if a synthetic lubricant is used. The lubricant should be changed more frequently if the unit is operating in a hostile environment. For extremely hot, wet, or dirty conditions consult Application Engineering at 864-284-5700. In those mountings that require grease lubrication for specific bearings, relubricate the affected bearings every year, or every 2000 operating hours whichever comes first. Use a grease with a lithium complex thickener and ISO 220 viscosity mineral oil base lubricant. Use 15 pumps of grease for the first re-greasing and 5 pumps of grease for subsequent re-greasing.

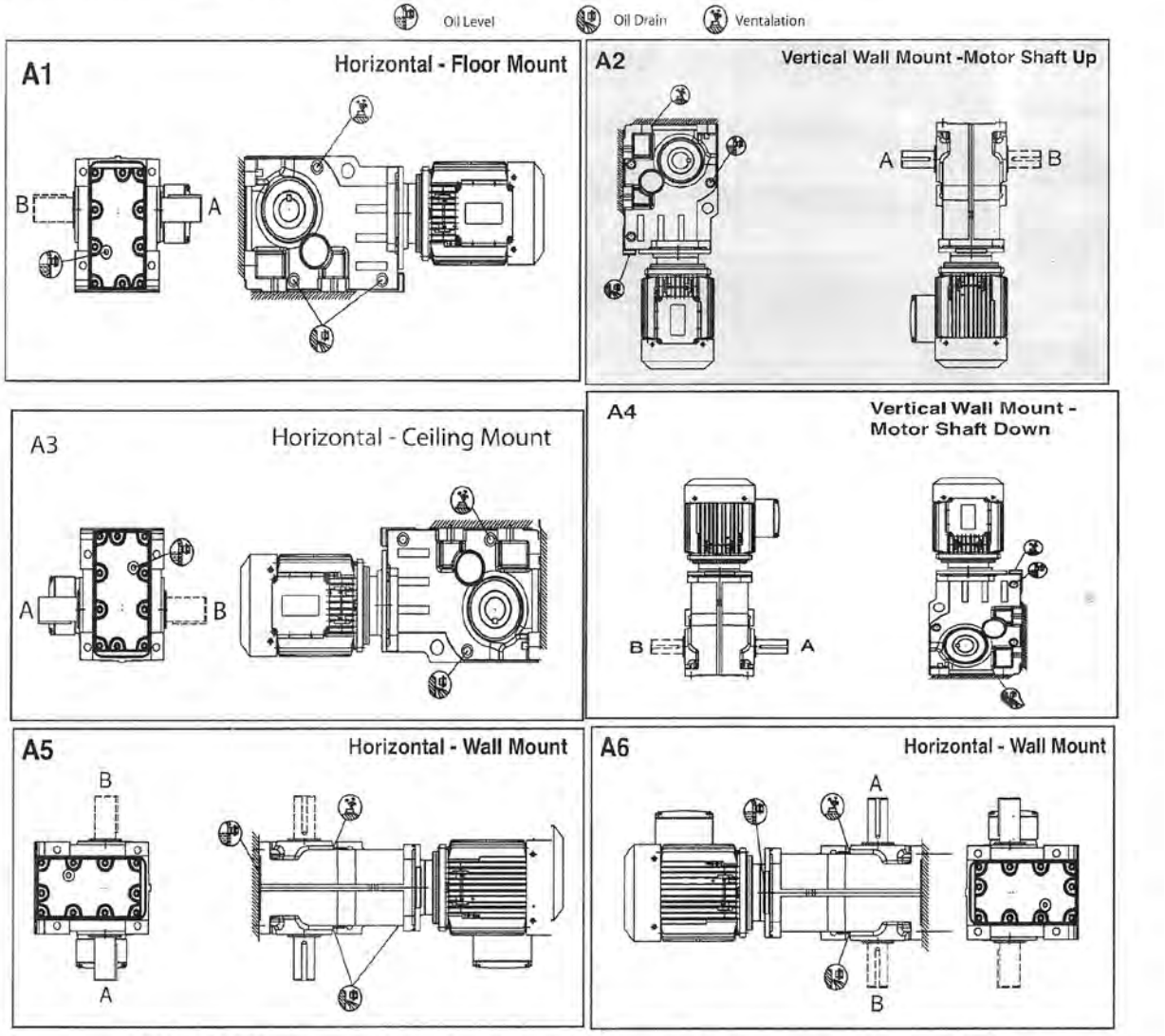
DODGE QUANTIS RHB Reducers are shipped with filling, oil level and drain plugs in place. A separate breather is included with the unit. Before putting the unit into service the filling plug must be replaced with the breather. BB38 and BF38 units have one oil plug, ventilation is not necessary.

Approximate oil volumes for each QUANTIS RHB unit are listed in the following tables in pints and liters. The oil volumes are approximate and should not be used to determine correct oil level. The correct oil level is defined as the bottom of the appropriate oil level hole.

DODGE®

1

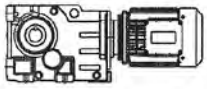
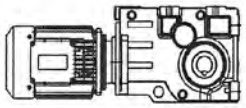
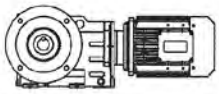
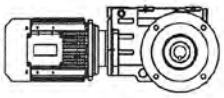
These mounting arrangements are for all output configurations and output shaft types. When ordering, please specify mounting position for correct oil quantity. In cases of mounting position other than shown here with regard to the oil quantity, please reference the Incline Mounting page in the QUANTIS catalog and contact Application Engineering.

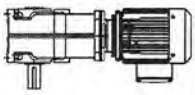
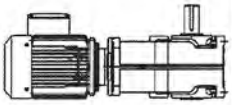
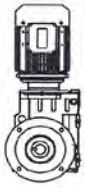
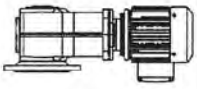
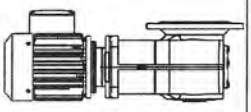



BB38 and BF38 units are sealed an furnished with only one plug for the purpose of filling and draining.
Shaded mounting position not recommended. Use of product in positions not recommended negates the time-in-use warranty.

**Figure 1 - Mounting Positions**

## OLD VS. NEW MOUNTING POSITIONS

| | A1 | A2 | A3 |
|---|---|---|---|
| **RHB (BB)** | B3<br>B6-01  | B6<br>B8-01  | B8  |
| **RHB (BF)** | B5-01<br>H-01  | B5<br>H-04  | B5-03<br>H-02  |

| | A4 | A5 | A6 |
|---|---|---|---|
| **RHB (BB)** | B3-01<br>B6-02  | V5<br>V5-01  | V6<br>V6-01  |
| **RHB (BF)** | B5-02<br>H-03  | V1<br>H-05  | V1-01<br>H-06  |

Shaded A2 mounting is not a recommended mounting position due to the weight of oil on the high speed input seal.

**Figure 2 - Old vs. New Mounting Position Nomenclature**

**Table 1 - Approximate Lubricant Amount**

| Type | Red. Stage | Mounting Position | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A1 | | A2 | | A3 | | A4 | | A5 | | A6 | |
| | | Pints | Liters | Pints | Liters | Pints | Liters | Pints | Liters | Pints | Liters | Pints | Liters |
| B_38 | 3 | 1.0 | 0.5 | 1.8 | 0.8 | 2.3 | 1.1 | 3.1 | 1.5 | 2.1 | 1.0 | 1.9 | 0.9 |
| B_48 | 3 | 1.5 | 0.7 | 2.5 | 1.2 | 3.6 | 1.7 | 4.9 | 2.3 | 3.3 | 1.6 | 3.8 | 1.8 |
| B_68 | 3 | 2.7 | 1.3 | 5.1 | 2.4 | 6.2 | 2.9 | 8.2 | 3.9 | 5.9 | 2.8 | 5.7 | 2.7 |
| B_88 | 3 | 4.7 | 2.2 | 9.7 | 4.6 | 12.8 | 6.1 | 16.3 | 7.7 | 10.7 | 5.1 | 9.8 | 4.6 |
| B_108 | 3 | 11.7 | 5.5 | 17.6 | 8.3 | 20.9 | 9.9 | 29.3 | 13.9 | 19.7 | 9.3 | 18.9 | 8.9 |
| B_128 | 3 | 17.5 | 8.3 | 31.2 | 14.8 | 41.4 | 19.6 | 53.7 | 25.4 | 36.9 | 17.6 | 35.1 | 16.6 |
| B_148 | 3 | 31.2 | 14.8 | 47.3 | 22.4 | 63.7 | 30.2 | 86.7 | 41.0 | 54.9 | 26.0 | 59.4 | 28.1 |
| B_168 | 3 | 45.8 | 21.7 | 73.6 | 34.8 | 97.8 | 46.3 | 132.3 | 62.6 | 86.9 | 41.1 | 83.4 | 39.4 |

**NOTE:** Do not mix oils from different manufacturers. If a change to another type or brand of oil is made, the existing lubricant should be drained and the gearcase flushed with a small quantity of the new lubricant before refilling with the new lubricant. This is necessary to avoid possible incompatibility problems between the two lubricants. The list below gives approved alternative lubricants. This is not an exclusive list. Equivalent lubricants from other manufacturers may be used.

All reducers are factory filled according to the mounting position indicated on the order. If the mounting position is changed from the ordered mounting position, the oil level must be changed. The oil volumes shown in the mounting position charts are approximate. The correct oil level is determined by the oil level hole in the housing except for size 38 reducers. If the reducer is ordered with the standard mineral oil and the oil is later changed to synthetic oil, it is recommended the shaft seals be changed to Viton (FKM) material.

RHB is furnished with oil level, drain, and fill plugs except for the size 38, which only has a fill plug. Before starting operation, the breather must be located in the correct location.

Continued operation in cold ambient conditions requires special modifications. Contact DODGE Gearing Application Engineering, Greenville, SC for application assistance (864-284-5700).

The density of the standard factory fill oil is 0.93 lbs/pint (1.98 lbs/liter).

The list below shows lubricants that are available as factory fill in QUANTIS reducers. The standard factory fill lubricant is Mobilgear 600 XP 220, which is a high performance mineral oil lubricant with special additives for use in industrial gear products.

**Table 2 - Lubricant Selection Table**

| Ambient Temperature* | Oil Type | ISO Viscosity Grade | Available Oils | Available Food Grade Oils (NSF H1) |
|---|---|---|---|---|
| 10°F to 105°F (-12°C to 41°C) | Mineral Oil | 220 | Mobilgear 600 XP 220 (standard factory fill **) | - |
| -20°F to 50°F (-29°C to 13°C) | Synthetic Oil | 68 | Mobil SHC 626 | - |
| -10°F to 115°F (-23°C to 46°C) | Synthetic Oil | 220 | Mobil SHC 630 | - |
| 30°F to 140°F (-0° C to 60° C) | Synthetic Oil | 460 | Mobil SHC 634 | - |
| | | | | |
| 25°F to 75°F (-4°C to 29°C) | Mineral Oil | 220 | - | Chevron FM 220 |
| 45°F to 105°F (7°C to 41°C) | Mineral Oil | 460 | - | Chevron FM 460 |

* Ambient temperatures listed are for lubricant only and do not indicate a particular gear unit's suitability to run in that ambient.
** Previous factory fill oil was Mobilgear 630 - Mobilgear 600 XP 220 and Mobilgear 630 are compatible with each other and do not require a flush.
Recommendations will be made based on specific application details.

## LONG TERM STORAGE:

**NOTE:** Unless an extended warranty has been negotiated prior to sale, time in storage is considered time in service for warranty purposes.

If the drive is not installed immediately, it should be stored in a clean, dry, protected area. During periods of long term storage (six months or longer) special procedures must be followed. The unit should be filled to the highest oil level hole with an approved lubricant blended with 2%, by volume, of "Daubert Chemical Co. Nox-Rust VCI-105" oil. Apply a thick coating of rust preventative on all unpainted surfaces including threads, bores, keyways, and shafts. Apply a thick coating of chassis-type grease to all exposed shaft seals. If the unit is to be stored outdoors or in a damp, unheated area indoors, cover the entire exterior with a rust preventative. Seal the unit in a moisture proof container or wrapping with a desiccant inside. Shade the enclosure from direct sunlight. Rotate the input shaft at least 60 revolutions once a month to redistribute the lubricant and prevent brinnelling of bearings and drying of seals.

Upon removal from storage, remove all protective coatings applied for protection during storage. Check all hardware for proper tightness. Drain and refill the gear reducer with a recommended lubricant. If the gear reducer has been stored for more than three years or in an area with high ambient temperatures, replace the oil seals.

## INSTALLATION AND OPERATION:

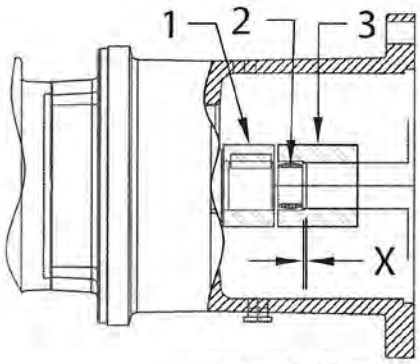
DODGE QUANTIS RHB Reducers are shipped with filling, oil level and drain plugs in place. A separate breather is included with the unit. Before putting the unit into service the filling plug must be replaced with the breather. Install the oil level plug and breather plug in the correct location for the appropriate mounting position using the mounting position diagrams shown on pages 2 and 3. Add or drain oil to get to the correct oil level for the mounting position used.

Review the dataplates on the reducer and drive motor to verify that the drive is correct for the intended loads, speeds and power supply. The gear reducer should be installed in a location that meets the following requirements:

- Ambient temperatures below 105°F (41°C).
- Free flow of air around the motor.
- Good access to gear reducer and motor for maintenance.
- A flat, level, rigid steel mounting surface.
- All four feet of the foot-mounted unit must be evenly supported.
- The flange mounted unit must have even support at the flange face.
- Units supported by both flange and feet must be shimmed to avoid housing stress.
- Good alignment to both input and output devices.

## INSTALLATION OF COMPONENTS ON GEAR REDUCER SHAFTS:

Use care when installing couplings, sprockets and sheaves (pulleys) on the DODGE QUANTIS RHB input and output shafts. Such components should not be hammered into place. Damage to shafts and bearings may result. If parts do not slip into place easily, check for dirt or burrs that may be binding the assembly. Very tightly fitted parts may need to be heated to get them onto the shafts. Keys should be located for maximum engagement between the shaft and the associated part. Sprockets and sheaves should be mounted as close to the gearcase as possible to minimize overhung loads. Retaining hardware (setscrews, etc.) for couplings, sprockets and sheaves should be tightened as recommended by the component manufacturer. Chain and belt drives must be aligned to run true. Tighten chains and belts according to the chain or belt manufacturer's instructions. Excessive tension results in rapid chain and belt wear and reduces the bearing life of the DODGE QUANTIS RHB unit.




1 Reducer Coupling Hub
2 Coupling Element
3 Motor Coupling Hub
X = Distance from motor shaft end to end face of coupling half (the length of the coupling jaws is not included in dimension X).

**Figure 3 - Three-Piece Coupling Assembly**

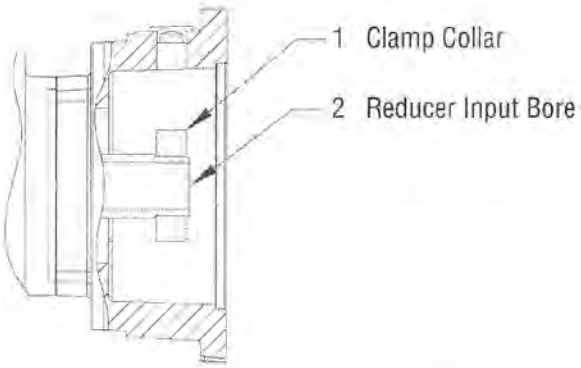



**Figure 4 - Clamp Collar Assembly**


**Figure 5 - Clamp Collar Motor Key Fit**

## Table 3 - MOUNTING MOTORS TO C-FACE REDUCERS

| FOR 3-PIECE COUPLED INPUT REDUCERS (Reference Figure 3) | FOR CLAMP COLLAR INPUT REDUCERS (Reference Figure 4) |
|---|---|
| Prepare the motor by checking the motor shaft extension for dirt or damage. Remove any anti-rust coating that may be on the shaft. Apply a thin even coating of anti-seize compound to the entire motor shaft. | Prepare the motor by checking the motor shaft extension for dirt or damage. Use solvent to remove all traces of anti-rust coating that may be on the shaft. |
| Insert the coupling key into the motor shaft keyway. Slip the motor coupling half onto the motor shaft and locate it a distance " x" from the motor shaft end. Refer to Figure 3 for definition of distance " x" . Refer to the table on page 8 for values of " X" for each motor. | Check the input bore for dirt or damage. Clean the bore with solvent to remove all traces of oil or anti-rust coating. |
| Tighten the motor coupling half setscrew to the correct torque value listed below. | **For NEMA motors ONLY:** A special long, tall motor key is provided with the QUANTIS unit.<br>1. Discard the motor key and replace it with the special key provided. **DO NOT USE THE MOTOR KEY.**<br>2. If the special key does not fit snugly in the motor shaft keyway, prepare the key for assembly by nicking its bottom in a couple of spots. A chisel may be used to accomplish this. This must be done on a work surface away from the QUANTIS unit and the motor. This nicking should widen the key bottom and cause it to fit snugly in the motor keyway. Refer to Figure 5 for definition of key bottom.<br>3. Install the key in the motor shaft keyway by lightly tapping it in place with a rubber mallet.<br>4. Locate the key so that it sits flat in the motor shaft keyway. The key will probably extend beyond the end of the motor shaft. This is OK. The key MUST NOT sit tilted in the keyway. A tilted key can occur when a motor shaft has a sled runner keyway. Refer to Figure 5.<br>5. Mark the clamp collar with a fine tipped marker on both sides of the setscrew to indicate where the center of the set screw is located. Run a line down both sides of the clamp collar that line up with the line previously created.<br>6. Remove the socket head screw and set screw from the clamp collar and apply Loctite 243 thread locker. Reinstall the screws into the clamp collar. Install the clamp collar onto the reducer input shaft and line up the mark previously made on the clamp collar with the center of the keyway in the shaft. If the clamp collar rotates freely, tighten the clamping screw slightly to keep it from rotating during assembly. Make sure the marked line is pointing to the center of the keyway. |
| Check that the reducer coupling half, with its key in place, is mounted on the reducer input shaft inside the C-face adapter. Make sure this coupling half is mounted on the reducer shaft such that the shaft extends the complete length of the coupling bore. Insert the coupling spider properly into the coupling jaws. | |
| The DODGE QUANTIS RHB C-Face reducer should be firmly anchored to prevent sliding as the motor is mounted. The motor should be rotated on its axis so the motor flange holes line up with the C-Face adapter holes. Check to be sure the motor conduit box, grease fittings and condensations drains (where fitted) will be oriented as needed by the reducer mounting position. | The DODGE QUANTIS RHB C-Face reducer should be firmly anchored to prevent sliding as the motor is mounted. The motor should be rotated on its axis so the motor flange holes line up with the C-Face adapter holes. Check to be sure the motor conduit box, grease fittings and condensate drains (where fitted) will be oriented as needed by the reducer mounting position. |
| Hoist motor level and in line with reducer input shaft. | Hoist motor level and in line with reducer input shaft. |
| Align the motor coupling half such that its jaws are aligned with the gaps between the spider and the reducer coupling half jaws. Push the motor into place. Motor flange to C-face adapter clearances are tight and good alignment is essential. | Align the motor shaft with the gear reducer input bore making sure that the motor shaft keyway is in line with the input bore key. Push the motor into place. Motor shaft to input bore clearances are tight and good alignment is essential. |
| Insert and tighten the motor retaining bolts Tighten to the correct torque value listed below. | Insert and tighten the motor retaining bolts. Tighten to the correct torque value listed below. |

| FOR 3-PIECE COUPLED INPUT REDUCERS (Reference Figure 3) | | | FOR CLAMP COLLAR INPUT REDUCERS (Reference Figure 4) | | |
|---|---|---|---|---|---|
| **NEMA Motor Frame** | **Motor Bolt** | **Bolt Tightening Torque** | **NEMA Motor Frame** | **Motor Bolt** | **Bolt Tightening Torque** |
| 56-140 | 3/8—16 | 276 lb-in (31 Nm) | 56-140 | 3/8—16 | 276 lb-in (31 Nm) |
| 180 | 1/2—13 | 660 lb-in (75 Nm) | 180 | 1/2—13 | 660 lb-in (75 Nm) |
| 210 | 1/2—13 | 660 lb-in (75 Nm) | 210 | 1/2—13 | 660 lb-in (75 Nm) |
| 250 | 1/2—13 | 660 lb-in (75 Nm) | 250 | 1/2—13 | 660 lb-in (75 Nm) |
| 280 | 1/2—13 | 660 lb-in (75 Nm) | 280 | 1/2—13 | 660 lb-in (75 Nm) |
| 320 | 5/8—11 | 1320 lb-in (150 Nm) | 320 | 5/8—11 | 1320 lb-in (150 Nm) |
| 360 | 5/8—11 | 1320 lb-in (150 Nm) | 360 | 5/8—11 | 1320 lb-in (150 Nm) |
| | | | | | |
| **IEC Motor Frame** | **Motor Bolt** | **Bolt Tightening Torque** | **IEC Motor Frame** | **Motor Bolt** | **Bolt Tightening Torque** |
| 71 | M8 | 220 lb-in (25 Nm) | 71 | M8 | 220 lb-in (25 Nm) |
| 80 | M10 | 440 lb-in (50 Nm) | 80 | M10 | 440 lb-in (50 Nm) |
| 90 | M10 | 440 lb-in (50 Nm) | 90 | M10 | 440 lb-in (50 Nm) |
| 100 | M12 | 800 lb-in (90 Nm) | 100 | M12 | 800 lb-in (90 Nm) |
| 112 | M12 | 800 lb-in (90 Nm) | 112 | M12 | 800 lb-in (90 Nm) |
| 132 | M12 | 800 lb-in (90 Nm) | 132 | M12 | 800 lb-in (90 Nm) |
| 160 | M16 | 1860 lb-in (210 Nm) | 160 | M16 | 1860 lb-in (210 Nm) |
| 180 | M16 | 1860 lb-in (210 Nm) | 180 | M16 | 1860 lb-in (210 Nm) |
| 200 | M16 | 1860 lb-in (210 Nm) | 200 | M16 | 1860 lb-in (210 Nm) |
| 225 | M16 | 1860 lb-in (210 Nm) | | | |
| 250 | M16 | 1860 lb-in (210 Nm) | | | |

**Table 3 - MOUNTING MOTORS TO C-FACE REDUCERS Cont.**

| FOR 3-PIECE COUPLED INPUT REDUCERS (Reference Figure 3) | FOR CLAMP COLLAR INPUT REDUCERS (Reference Figure 4) |
|---|---|
| View the coupling assembly through the access hole in the C-face adapter.<br>1. Make sure the couplings jaws fully engage the spider. If they do not, loosen the setscrew in the reducer coupling half and slide it forward until full jaw engagement is achieved. However, make sure the jaws on one coupling half do not contact the hub of the other coupling half.<br>2. Reaching through the access hole in the C-face adapter with a hex key, tighten the coupling setscrew on the reducer coupling half to the recommended torque given below. | View the clamp collar through the access holes in the C-face adapter.<br>1. Rotate the clamp collar to locate the setscrew over the key, if necessary.<br>2. Tighten the setscrew to the torque referenced below.<br>3. Reach through the access hole in the C-face adapter with a hex socket and tighten the clamp collar clamping bolt to the torque value given below. |
| Replace the access hole plugs in the C-face adapter. | Replace the access hole plugs in the C-face adapter. |
| **NOTE: A TEE handle hex key wrench is not stiff enough to properly tighten the coupling setscrews. A large diameter socket wrench extension with a short hex key insert must be used in conjunction with a torque wrench. Failure to tighten the setcrews to the proper torque may result in movement between shafts and coupling components and cause premature wear on the shafts, coupling and keys.** | **NOTE: A TEE handle hex key wrench is not stiff enough to properly tighten the clamp collar bolt. A socket wrench extension with a hex insert must be used in conjunction with a torque wrench. Failure to tighten the clamp collar to the proper torque may result in movement between motor and reducer shafts and cause premature wear on the shafts and keys.** |

| FOR 3-PIECE COUPLED INPUT REDUCERS Reference Figure 3 | | | | | FOR CLAMP COLLAR INPUT REDUCERS Reference Figure 4 | | | | |
|---|---|---|---|---|---|---|---|---|---|
| NEMA Motor Frame | Coupling Size | Setscrew Size | Setscrew Tightening Torque | Motor Coupling Half Position Dimension "X" | NEMA Motor Frame | Clamp Bolt | Clamp Bolt Tightening Torque | Setscrew Size | Set Screw Tightening Torque |
| 56 | 19 | M5 | 18 lb-in (2 Nm) | 0 | 56 | M6 | 132 lb-in (15 Nm) | M4 | 27 lb-in (3 Nm) |
| 140 | 19/24 | M5 | 18 lb-in (2 Nm) | 0 | 140 | M6 | 132 lb-in (15 Nm) | M4 | 27 lb-in (3 Nm) |
| 180 | 24/28 | M5 | 18 lb-in (2 Nm) | 0 | 180 | M8 | 312 lb-in (35 Nm) | M6 | 90 lb-in (10 Nm) |
| 210 | 28/38 | M6 | 42 lb-in (4.8 Nm) | 0 | 210 | M10 | 600 lb-in (68 Nm) | M8 | 220 lb-in (10 Nm) |
| 250 | 38/45 | M8 | 90 lb-in (10 Nm) | 0 | 250 | M8 | 312 lb-in (35 Nm) | M6 | 90 lb-in (10 Nm) |
| 280 | 42/55 | M8 | 90 lb-in (10 Nm) | 0 | 280 | M8 | 312 lb-in (35 Nm) | M6 | 90 lb-in (10 Nm) |
| 320 | 48/60 | M8 | 90 lb-in (10 Nm) | 0 | 320 | M10 | 600 lb-in (68 Nm) | M8 | 220 lb-in (25 Nm) |
| 360 | 55/70 | M10 | 150 lb-in (17 Nm) | 0 | 360 | M10 | 600 lb-in (68 Nm) | M8 | 220 lb-in (25 Nm) |
| IEC Motor Frame | Coupling Size | Setscrew Size | Setscrew Tightening Torque | Motor Coupling Half Position Dimension "X" | IEC Motor Frame | Clamp Bolt | Clamp Bolt Tightening Torque | Setscrew Size | Set Screw Tightening Torque |
| 71 | 19 | M5 | 18 lb-in (2 Nm) | 0 | 71 | M6 | 132 lb-in (15 Nm) | M4 | 27 lb-in (3 Nm) |
| 80 | 19/24 | M5 | 18 lb-in (2 Nm) | 0 | 80 | M6 | 132 lb-in (15 Nm) | M4 | 27 lb-in (3 Nm) |
| 90 | 19/24 | M5 | 18 lb-in (2 Nm) | 0 | 90 | M8 | 312 lb-in (35 Nm) | M6 | 90 lb-in (10 Nm) |
| 100 | 24/28 | M5 | 18 lb-in (2 Nm) | 0 | 100 | M8 | 312 lb-in (35 Nm) | M6 | 90 lb-in (10 Nm) |
| 112 | 24/28 | M5 | 18 lb-in (2 Nm) | 0 | 112 | M8 | 312 lb-in (35 Nm) | M6 | 90 lb-in (10 Nm) |
| 132 | 28/38 | M6 | 42 lb-in (4.8 Nm) | 0 | 132 | M8 | 312 lb-in (35 Nm) | M6 | 90 lb-in (10 Nm) |
| 160 | 38/45 | M8 | 90 lb-in (10 Nm) | 0 | 160 | M8 | 312 lb-in (35 Nm) | M6 | 90 lb-in (10 Nm) |
| 180 | 42/55 | M8 | 90 lb-in (10 Nm) | 0 | 180 | M8 | 312 lb-in (35 Nm) | M6 | 90 lb-in (10 Nm) |
| 200 | 42/55 | M8 | 90 lb-in (10 Nm) | 0 | 200 | M10 | 600 lb-in (68 Nm) | M8 | 220 lb-in (25 Nm) |
| 225 | 48/60 | M8 | 90 lb-in (10 Nm) | 0.040 in (6.0 mm) | | | | | |
| 250 | 55/70 | M10 | 150 lb-in (17 Nm) | 0 | | | | | |

**WARNING: The DODGE QUANTIS RHB and its connected equipment and accessories must be guarded. Rotating parts such as couplings, pulleys, fans and unused shaft extensions must be permanently guarded by the user against accidental contact with personnel and their clothing. The surface temperature of the DODGE QUANTIS RHB enclosure may reach temperatures which can cause discomfort or injury to personnel accidentally coming into contact with hot surfaces. The user should provide guards to prevent accidental contact with hot surfaces. Guards must be sufficiently rigid to maintain adequate guarding in normal service.**

**WARNING: Threaded hardware used to mount the DODGE QUANTIS RHB Unit must be SAE Grade 5 or Metric Class 8.8 or better. DO NOT USE HARDWARE OF A LOWER GRADE.**

## MAINTENANCE

Check oil levels and oil quality regularly. Change oil at the intervals specified in the Lubricants section of this document. Check alignments of drive components regularly. Check chain and belt tensions and hardware tightness periodically too.

## ASSEMBLY / DISASSEMBLY HELICAL BEVEL REDUCER (RHB)

Please follow the instructions outlined below when assembling and disassembling this unit. Failure to follow the instructions as outlined may result in damage to the gear unit or to the machine's drive shaft. For ease of assembly, it is recommended that the machine's drive shaft be chamfered. DO NOT HAMMER THE GEARBOX SHAFT ONTO THE MACHINE'S DRIVE SHAFT.
The machine's drive shaft should be produced in accordance with the dimensions shown on the accompanying tables 5 or 6.

**ASSEMBLY:**
All shaft mounted gearboxes are furnished with A) Retaining Ring B) Keeper plate C) Retaining Bolt D) Spring Washer and E) Dust Cap, as shown in the finished assembly, Figure 7. The gearbox is pulled onto the shaft by means of a threaded rod and nut assembly as shown in Figure 6 below. The threaded rod and spacer are not supplied. The threaded rod (M) is specified in Table 5 or 6. After the gearbox has been pulled completely onto the machine shaft firmly against the machine shaft's backing shoulder, it must be locked in place with the retaining bolt tightened to the tightening torque shown in Table 4.

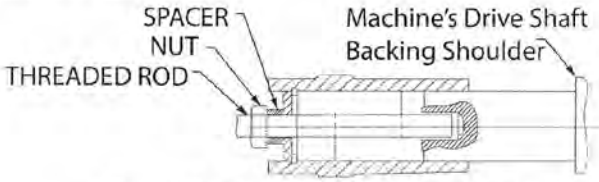



**Figure 6 - Threaded Rod and Nut Assembly**

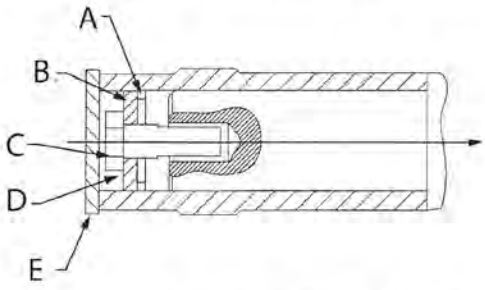



**Figure 7 - Finished Assembly**

**DISASSEMBLY:**
Prior to disassembly, the dust cap, retaining bolt, spring washer, keeper plate and retaining ring must be removed. For ease of disassembly, it is recommended that the following tools be made and used as described: The round keyed nut (A) is inserted into the free space between the retaining ring in the gear unit's hollow shaft and the end of the machine's drive shaft. The removal bolt (B) is screwed into the nut (A) which presses a disk (C) against the machine's drive shaft. The resulting force pushes the gearbox off of the machine's drive shaft. Reference Figure 8 for the disassembly arrangement.

**Please note: The retaining bolt supplied with the gear unit cannot be used for this purpose and must be replaced with the bolt specified in Table 5 or 6. The round keyed nut and disk should be made from 1045 steel and removal bolt should be a minimum of SAE Grade 5.**

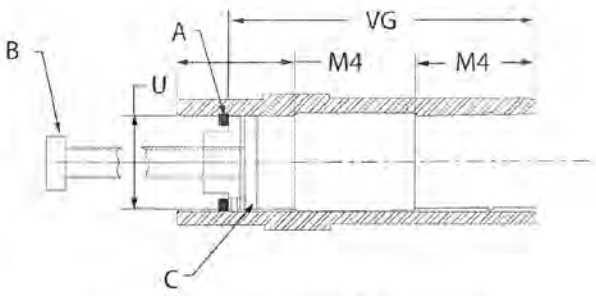
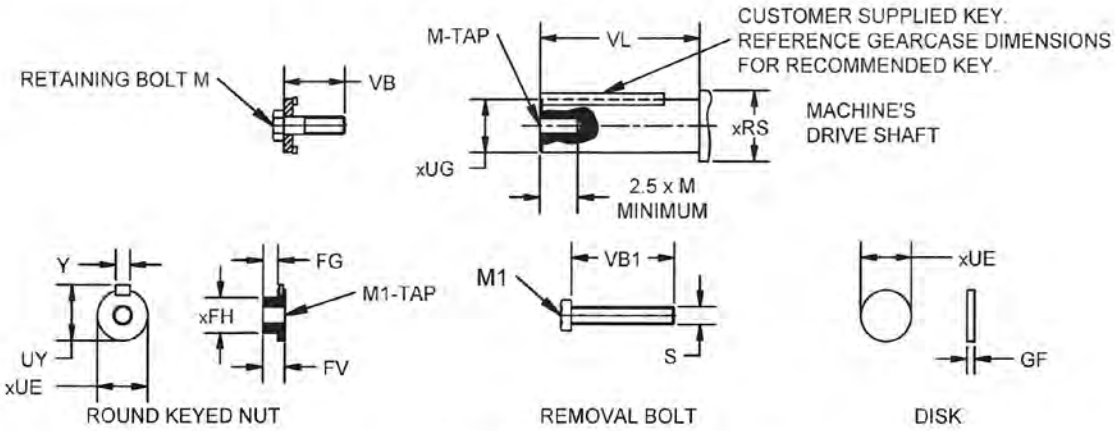



**Figure 8 - Disassembly Arrangement**

**Table 4 - Tightening Torques for Retaining Bolt**

| Recommended Tightening Torque for Retaining Bolt | | |
|---|---|---|
| **Unit Size** | **Bolt Thread Size (M)** | **Torque** |
| B38 | 3/8-16 | 248 in-lb |
| | M10 | 16 N-m |
| B48 | 3/8-16 | 248 in-lb |
| | M12 | 28 N-m |
| B68 | 5/8-11 | 611 in-lb |
| | M16 | 69 N-m |
| B88 | ¾-10 | 1221 in-lb |
| | M16 | 69 N-m |
| B108 | ¾-10 | 1221 in-lb |
| | M20 | 138 N-m |
| B128 | ¾-10 | 1221 in-lb |
| | M20 | 138 N-m |
| B148 | ¾-10 | 1221 in-lb |
| | M20 | 138 N-m |
| B168 | 1-8 | 2098 in-lb |
| | M24 | 237 N-m |




**Straight Hollow Bore Assembly / Disassembly**

**TABLE 5 - INCH SHAFTS for Straight Hollow Bore Installation**
Dimensions - Inch

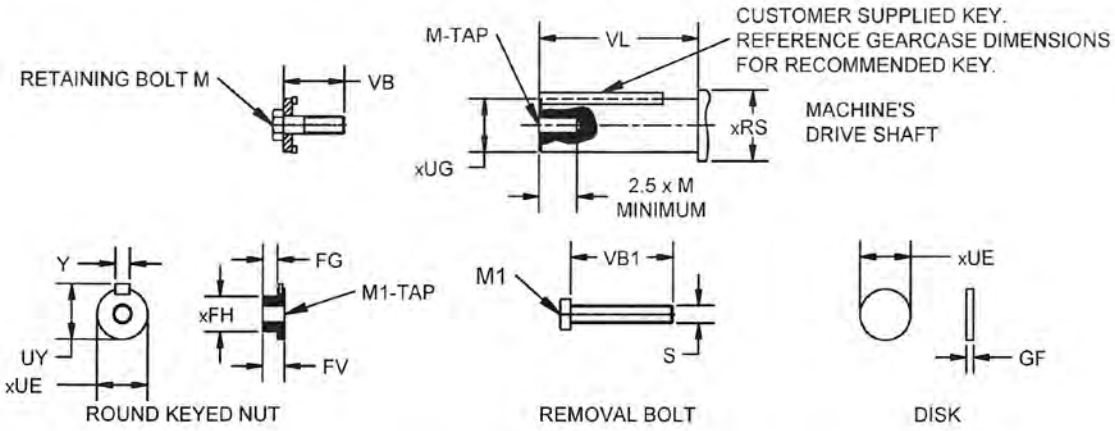
| Unit Size | FG | Ø FH | FV | GF | M | M1 | M4 | S | Ø U ① | Y Max. | Ø UE | Ø UG | tol. | UY Max | VL | VB | VB1 | VG | Ø RS ② |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B_38 | 0.38 | 0.75 | 0.625 | 0.12 | 3/8-16 | 3/8-16 | 1.73 | 0.31 | **1.250** | 0.250 | 1.245 | 1.250 | +0.000 -0.0006 | 1.367 | 3.50 | 1.75 | 6.00 | 4.02 | 1.75 |
| B_48 | 0.38 | 0.93 | 0.625 | 0.12 | 3/8-16 | 5/8-18 | 2.28 | 0.50 | **1.375** | 0.312 | 1.370 | 1.375 | +0.000 -0.0006 | 1.52 | 4.50 | 1.75 | 7.00 | 5.04 | 1.875 |
| B_68 | 0.50 | 1.06 | 0.875 | 0.25 | 5/8-11 | 3/4-10 | 2.72 | 0.63 | **1.500** | 0.375 | 1.495 | 1.5 | +0.000 -0.0006 | 1.669 | 5.25 | 2.25 | 8.00 | 5.91 | 2.00 |
| | | | | | 3/8-16 | | | | **1.4375** | | 1.433 | 1.4375 | +0.000 -0.0006 | 1.605 | | | | | 1.9375 |
| B_88 | 0.50 | 1.37 | 0.813 | 0.25 | 3/4-10 | 7/8-14 | 3.07 | 0.81 | **2.000** | 0.5 | 1.995 | 2.000 | +0.000 -0.0007 | 2.22 | 6.5 | 2.25 | 9.50 | 7.09 | 2.50 |
| | | | | | 5/8-11 | | | | **1.9375** | | 1.933 | 1.938 | +0.000 -0.0006 | 2.16 | | | | | 2.4375 |
| B_108 | 0.50 | 1.75 | 1.00 | 0.31 | 3/4-10 | 7/8-14 | 3.66 | 0.81 | **2.375** | 0.625 | 2.370 | 2.375 | +0.000 -0.0007 | 2.65 | 7.25 | 3.00 | 12.50 | 8.19 | 2.875 |
| | | | | | | | | | **2.4375** | | 2.433 | 2.438 | +0.000 -0.0007 | 2.714 | | | | | 2.9375 |
| B_128 | 0.50 | 2.00 | 1.00 | 0.31 | 3/4-10 | 7/8-14 | 4.84 | 0.81 | **2.750** | 0.625 | 2.745 | 2.750 | +0.000 -0.0007 | 3.03 | 9.5 | 3.00 | 14.00 | 10.35 | 3.25 |
| | | | | | | | | | **2.9375** | 0.750 | 2.933 | 2.938 | +0.000 -0.0007 | 3.269 | | | | | 3.4375 |
| B_148 | 0.50 | 2.62 | 1.00 | 0.31 | 1-8 | 1-1/4-12 | 5.83 | 1.00 | **3.625** | 0.875 | 3.620 | 3.625 | +0.000 -0.0009 | 4.01 | 11.00 | 3.00 | 16.00 | 12.20 | 4.125 |
| | | | | | | | | | **3.4375** | | 3.433 | 3.438 | +0.000 -0.0009 | 3.82 | | | | | 3.9375 |
| B_168 | 0.50 | 3.00 | 1.25 | 0.31 | 1-8 | 1-1/4-12 | 6.89 | 1.00 | **4.000** | 1.000 | 3.995 | 4.000 | +0.000 -0.0009 | 4.44 | 13.25 | 3.00 | 18.50 | 14.41 | 4.50 |
| | | | | | | | | | **3.9375** | | 3.933 | 3.938 | +0.000 -0.0009 | 4.378 | | | | | 4.4375 |

① Hollow shaft tolerances (For dimension U) are shown in the gearbox dimension pages.

Tolerance for dimension UE should be -0.01 in for inch bore shafts

Bold shaft diameters indicate standard shaft

② RS Dimension is the minimum recommended shaft shoulder diameter




**Straight Hollow Bore Assembly / Disassembly**

**TABLE 6 - METRIC SHAFTS for Straight Hollow Bore Installation**
Dimensions - mm

| Unit Size | FG | Ø FH | FV | GF | M | M1 | M4 | S | Ø U ① | Y Max. | Ø UE | Ø UG | tol. | UY Max | VL | VB | VB1 | VG | Ø RS ② |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B_38 | 10 | 9 | 15 | 6 | M10 | M10 x 1.5 | 44 | 8 | **30** | 8 | 29.9 | 30 | +0.000 -0.013 | 33 | 90 | 40 | 150 | 102 | 42 |
| B_48 | 9 | 22 | 15 | 6 | M12 | M12 x 1.5 | 58 | 10 | **35** | 10 | 34.9 | 35 | +0.0000 -0.0016 | 38 | 115 | 60 | 180 | 128 | 47 |
| | | | | | M16 | | | | **40** | 12 | 39.9 | 40 | +0.0000 -0.0016 | 43 | | | | | 52 |
| B_68 | 13 | 26 | 20 | 7 | M16 | M16 x 1.5 | 69 | 13 | **40** | 12 | 39.9 | 40 | +0.0000 -0.0016 | 43 | 135 | 60 | 210 | 150 | 52 |
| | | | | | | | | | **45** | 14 | 44.9 | 45 | +0.0000 -0.0016 | 49 | | | | | 57 |
| B_88 | 13 | 35 | 20 | 7 | M16 | M16 x 1.5 | 78 | 13 | **50** | 14 | 49.9 | 50 | +0.0000 -0.0016 | 53 | 165 | 60 | 250 | 180 | 62 |
| | | | | | M20 | | | | **60** | 18 | 59.9 | 60 | +0.0000 -0.0019 | 64 | | 70 | | | 72 |
| B_108 | 12 | 45 | 24 | 10 | M20 | M20 x 1.5 | 93 | 16 | **60** | 18 | 59.9 | 60 | +0.0000 -0.0019 | 64 | 185 | 80 | 320 | 208 | 72 |
| | | | | | | | | | **70** | 20 | 69.9 | 70 | +0.0000 -0.0019 | 74 | | | | | 82 |
| B_128 | 12 | 52 | 24 | 10 | M20 | M20 x 1.5 | 123 | 16 | **70** | 20 | 69.9 | 70 | +0.0000 -0.0019 | 74 | 240 | 80 | 360 | 263 | 82 |
| | | | | | | | | | **80** | 22 | 79.9 | 80 | +0.000 -0.019 | 85 | | 85 | | | 92 |
| B_148 | 7 | 61 | 24 | 10 | M20 | M20 x 1.5 | 148 | 16 | **80** | 22 | 79.9 | 80 | +0.0000 -0.0019 | 85 | 280 | 85 | 410 | 310 | 102 |
| | | | | | M24 | | | | **90** | 25 | 89.9 | 90 | +0.000 -0.022 | 95 | | 95 | | | |
| B_168 | 8 | 79 | 30 | 10 | M24 | M24 x 1.5 | 175 | 20 | **100** | 28 | 99.9 | 100 | +0.0000 -0.0022 | 106 | 330 | 95 | 470 | 366 | 112 |
| | | | | | | | | | **110** | | 109.9 | 110 | +0.000 -0.022 | 116 | | 100 | | | 122 |

①Hollow shaft tolerances (For dimension U) are shown in the gearbox dimension pages.

Tolerance for dimension UE should be -0.02 mm for metric bore shafts.

Bold shaft diameters indicate standard shaft

② RS Dimension is the minimum recommended shaft shoulder diameter

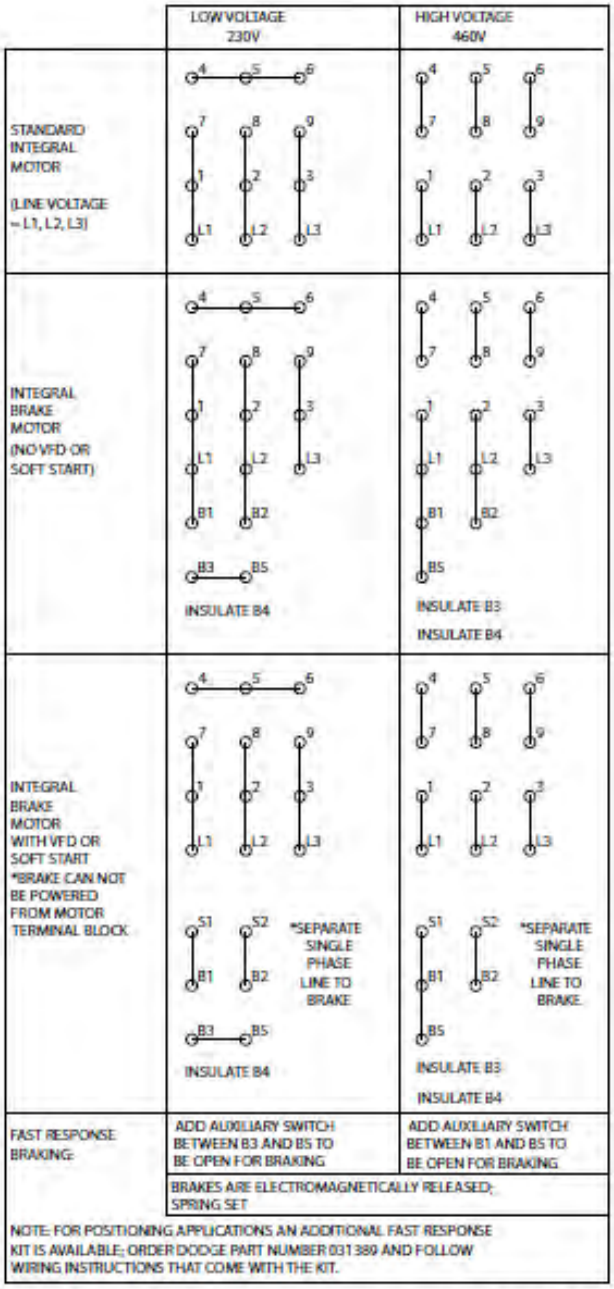



**Figure 11 - Wiring Diagram for Dual Voltage/Single Speed Integral Motor**

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*1618-0511*

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

| | |
|---|---|
| TA0107L | TA6307H |
| TA1107H | TA7315H |
| TA2115H | TA8407H |
| TA3203H | TA9415H |
| TA4207H | TA10507H |
| TA5215H | TA12608H |

These instructions must be read thoroughly before installation or operation.

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

## INSTALLATION

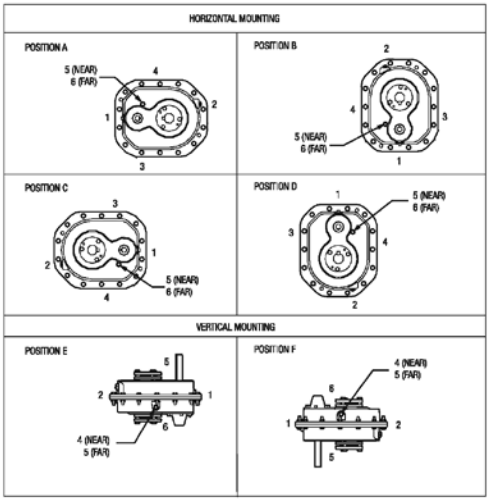
1. Use lifting bracket to lift reducer.

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

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

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

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




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

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

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

Figure 1 - Mounting Positions

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

If mounting the Torque-Arm II reducer on an inclined angle, consult Dodge for proper oil level.

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

4. Install sheave on input shaft as close to reducer as practical (Figure 2).

5. If not using a Dodge Torque-Arm II motor mount, install motor and V-belt drive so belt will approximately be at right angles to the centerline between driven and input shaft (Figure 3). This will permit tightening the V-belt with the torque arm.

6. Install torque arm and adapter plates reusing the reducer bolts. The adapter plates will fit in any position around the input end reducer.

7. Install torque arm fulcrum on a flat and rigid support so that the torque arm will be approximately at right angles to the centerline through the driven shaft and the torque arm anchor screw (Figure 4). Make sure that there is sufficient take-up in the turnbuckle for belt tension adjustment when using V-belt drive.

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

8. Fill gear reducer with recommended lubricant (Table 2).

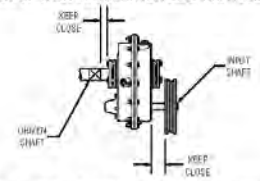



**Figure 2 - Reducer and Sheave Installation**

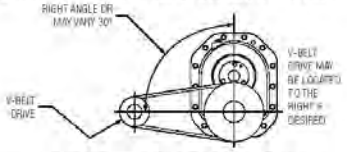



**Figure 3 - Angle of V-Drive**

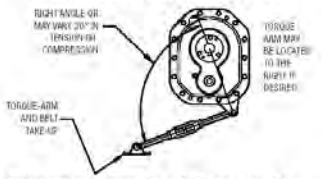



**Figure 4 - Angle of Torque-Arm**

## TORQUE-ARM II BUSHING INSTALLATION

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

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

**Standard Taper Bushings:**

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

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

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

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

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

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

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

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

**Short Shaft Bushings:**

1. One bushing assembly is required to mount the reducer on the driven shaft. An assembly consists of one long tapered bushing, one short tapered bushing, one tapered bushing wedge, bushing screws and washers, two bushing backup plates and retaining rings, and necessary shaft key or keys. The driven shaft does not need to extend through the reducer for the short shaft bushing to operate properly. The minimum shaft length, as measured from the end of the shaft to the outer edge of the bushing flange (Figure 5), is given in Table 1.

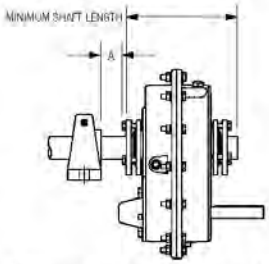



**Figure 5 – Minimum Recommended Dimensions**

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

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

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

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

3. Install the tapered bushing wedge into the hollow bore of the reducer from the same side as the long bushing will be installed. When installing the tapered bushing wedge into the reducer hub, install the flange end first so that the thin taper is pointing outwards towards the long bushing as shown in Figure 6. The wedge is properly installed when it snaps into place in the reducer hub.

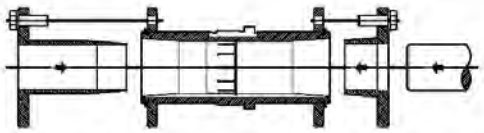


**Figure 6 – Short Shaft Bushing and Output Hub Assembly**

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

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

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

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

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

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

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

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

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

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

## LUBRICATION

**IMPORTANT: Because reducer is shipped without oil, it is necessary to add the proper amount of oil before operating reducer. Use a high-grade petroleum base rust and oxidation inhibited (R&O) gear oil (Tables 2 and 3). Follow instructions on reducer warning tags, and in the installation manual.**

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

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

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

**Table 2–Oil Volumes**

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

❶ Oil quantity is approximate. Service with lubricant until oil runs out of oil level hole.
❷ Refer to Figure 1 for mounting positions.
❸ US measure: 1 quart = 32 fluid ounces = .94646 liters.
❹ Below 15 RPM output speed, oil level must be adjusted to reach the highest oil level plug. If reducer position is to vary from those shown in Figure 1, either more or less oil may be required. Consult Baldor Electric Company, Dodge Engineering, Greenville, SC.

**Table 3 – Oil Recommendations**

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

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

**NOTES:**

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

## GUIDELINES FOR TORQUE-ARM II REDUCER LONG-TERM STORAGE

During periods of long storage, or when waiting for delivery or installation of other equipment, special care should be taken to protect a gear reducer to have it ready to be in the best condition when placed into service.

By taking special precautions, problems such as seal leakage and reducer failure due to lack of lubrication, improper lubrication quantity, or contamination can be avoided. The following precautions will protect gear reducers during periods of extended storage:

**Preparation:**

1. Drain oil from the unit. Add a vapor phase corrosion inhibiting oil (VCI-105 oil by Daubert Chemical Co.) in accordance with Table 4.
2. Seal the unit airtight. Replace the vent plug with a standard pipe plug and wire the vent to the unit.
3. Cover all unpainted exterior parts with a waxy rust preventative compound that will keep oxygen away from the bare metal. (Non-Rust X-110 by Daubert Chemical Co. or equivalent).
4. The instruction manuals and lubrication tags are paper and must be kept dry. Either remove these documents and store them inside, or cover the unit with a durable waterproof cover which can keep moisture away.
5. Protect reducer from dust, moisture, and other contaminants by storing the unit in a dry area.
6. In damp environments, the reducer should be packed inside a moisture-proof container or an envelope of polyethylene containing a desiccant material. If the reducer is to be stored outdoors, cover the entire exterior with a rust preventative.

**When placing the reducer into service:**

1. Fill the unit to the proper oil level using a recommended lubricant. The VCI oil will not affect the new lubricant.
2. Clean the shaft extensions with petroleum solvents.
3. Assemble the vent plug into the proper hole.

Follow the installation instructions provided in this manual.

**Table 4 – Quantities of VCI #105 Oil**

| Reducer Size | Quantity (Ounces / Milliliter) |
|---|---|
| TA0107L | 1 / 30 |
| TA1107H | 1 / 30 |
| TA2115H | 1 / 30 |
| TA3203H | 1 / 30 |
| TA4207H | 1 / 30 |
| TA5215H | 2 / 59 |
| TA6307H | 2 / 59 |
| TA7315H | 3 / 89 |
| TA8407H | 3 / 89 |
| TA9415H | 4 / 118 |
| TA10507H | 6 / 177 |
| TA12608H | 8 / 237 |

VCI #105 and #10 are interchangeable. VCI #105 is more readily available.

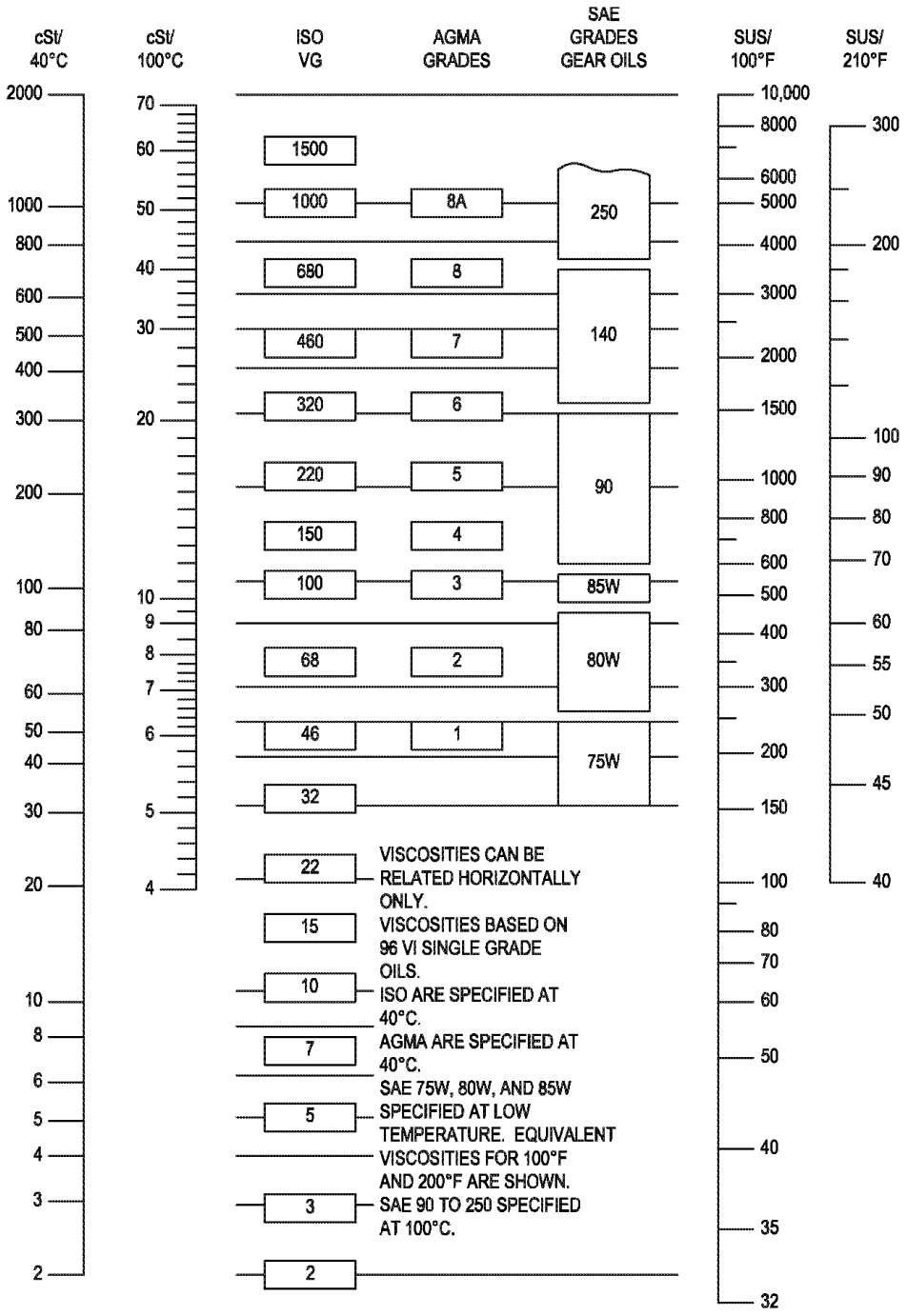



Figure 7 - OIL VISCOSITY EQUIVALENCY CHART

## COOLING FAN INSTALLATION

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

Unpack all components and inspect for shipping damage. Do not use any component that has been damaged or modified. Make sure all components are clean and free of any foreign material prior to assembly. Cooling fan assembly is designed to fit onto the input shaft before placement of sheaves or belt guard assembly.

### Installation for TA4207CF and TA5215CF:

1. Referring to Figure 9, install tapered bushing (9) into bore of fan blade assembly (2) and loosely install the three set screws provided with fan. Snug set screws but do not tighten at this time.
2. Slide fan assembly onto input shaft and install input shaft key. Note: Key is supplied with the TAII reducer. Locate fan blade edge distance "A" (Figure 8) from end of shaft per Table 5. Make sure fan assembly rotates without interference when input shaft is rotated.
3. Alternately tighten the set screws until fan assembly is securely installed on the input shaft.
4. Recheck fan assembly for proper location and clearance. Loosen set screws and repeat steps 2 and 3 above if not properly located.

### Installation for TA6307CF through TA12608CF:

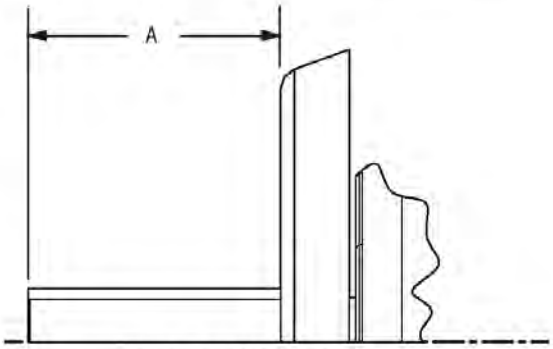
1. Referring to Figure 9, install fan guard back plate assembly (1) using the four bolts (4) provided. Note that the screen is mounted towards the reducer. Tighten to recommended torque in Table 5.

**CAUTION: Fan guard screen has sharp edges. Use caution when installing to avoid lacerations.**

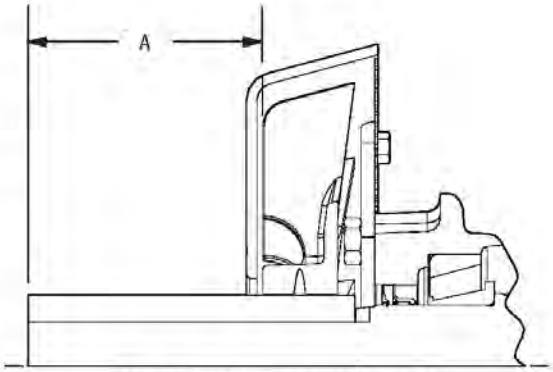
2. Slide fan blade assembly (2) onto input shaft and install key and set screws (5). Note: Key is supplied with the TAII reducer. Position fan blade edge distance "A" (Figure 8) from end of shaft per Table 5. Make sure fan assembly rotates without interference when input shaft is rotated. Tighten the two fan blade set screws (5) securely.
3. Install fan guard cover (3) with four bolts (6), lockwashers (7), and hex nuts (8). Tighten securely.
4. Verify fan blade rotates freely and does not interfere with fan guard back plate (1) or fan guard cover (3). Adjust fan blade if necessary.

**Table 5 - Dimensions and Bolt Torque**

| Reducer Size | Dim."A" mm | Torque (Ft.-Lbs.) |
|---|---|---|
| TA4207H | 3-3/4 | |
| TA5215H | 4-5/8 | |
| TA6307H | 4-1/4 | 33 - 30 |
| TA7315H | 4-3/8 | 33 - 30 |
| TA8407H | 5-1/16 | 33 - 30 |
| TA9415H | 6-1/4 | 33 - 30 |
| TA10507H | 6-7/16 | 33 - 30 |
| TA12608H | 6-7/16 | 33 - 30 |



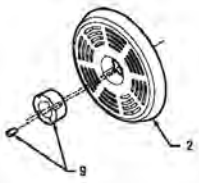

TYPICAL FOR REDUCER SIZES 4 AND 5



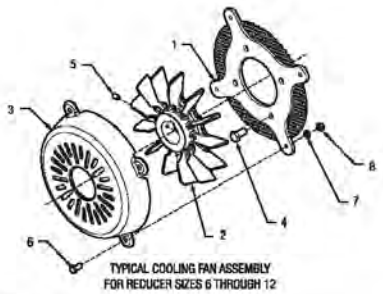

TYPICAL FOR REDUCER SIZES 6 AND 12

**Figure 8 - Fan Blade Placement**

Figure 9 - Parts Identification




TYPICAL COOLING FAN ASSEMBLY
FOR REDUCER SIZES 4 AND 5




TYPICAL COOLING FAN ASSEMBLY
FOR REDUCER SIZES 6 THROUGH 12

**Table 6 – Cooling Fan Part Numbers**

| Description | Ref. Number | Quantity | TA4207 | TA5215 | TA6307 | TA7315 | TA8407 | TA9415 | TA10507 | TA12608 |
|---|---|---|---|---|---|---|---|---|---|---|
| Cooling Fan Assembly ❶ | ------ | 1 | 904106 | 905106 | 906106 | 907106 | 907106 | 909106 | 910106 | 912106 |
| Fan Guard Plate Assy. ❷ | 1 | 1 | ------ | ------ | 906519 | 906519 | 906519 | 909519 | 909519 | 912519 |
| Fan Blade ❷ | 2 | 1 | 904517 | 905517 | 906517 | 907517 | 907517 | 909517 | 910517 | 910517 |
| Fan Guard Cover ❷ | 3 | 1 | ------ | ------ | 906521 | 906521 | 906521 | 909521 | 909521 | 909521 |
| Mounting Bolt ❷ | 4 | 4 | ------ | ------ | 411294 | 411294 | 411294 | 411294 | 411294 | 411394 |
| Fan Set Screw ❷ | 5 | 2 | ------ | ------ | 400086 | 400086 | 400086 | 400086 | 400086 | 400086 |
| Cover Bolt ❷ | 6 | 4 | ------ | ------ | 411390 | 411390 | 411390 | 411390 | 411390 | 411390 |
| Lockwasher ❷ | 7 | 4 | ------ | ------ | 419010 | 419010 | 419010 | 419010 | 419010 | 419010 |
| Hex Nut ❷ | 8 | 4 | ------ | ------ | 407085 | 407085 | 407085 | 407085 | 407085 | 407085 |
| Taper Bushing Assy. ❷ ❸ | 9 | 1 | 117162 | 117092 | ------ | ------ | ------ | ------ | ------ | ------ |

❶ Assembly includes parts listed below marked ❷
❸ Set screws are included with taper bushing assembly.

## BACKSTOPS

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

1. Remove backstop shaft cover and gasket, shown in Figure 10. These parts will not be reused. This cover is directly opposite the extended end of the input shaft.
2. Clean the face of the gearbox to remove any gasket material or contamination from the cover mounting surface. It is important that contamination not get into the gearbox or the backstop during the backstop installation/servicing process.
3. Face reducer looking at the side from which the cover was removed. Determine carefully the desired direction of free rotation. It is important that the direction be correctly determined because to reverse the direction after the backstop is installed, it is necessary to remove the backstop, turn it end-for-end and then reinstall it.
4. Match the arrow on the backstop inner race to the direction of free rotation for the desired shaft. Note that reversing the backstop end-for end changes the direction of the arrow. The shaft will rotate in the same direction as the arrow on the backstop.
5. If the backstop kit has a spacer ring included, install it onto the shaft first, adjacent to the bearing inner ring.
6. Install the backstop inner race and sprag cage assembly onto the shaft. DO NOT remove the cage from the inner race or the shipping strap from the sprag set at this time. Insert the key into the inner race and mating shaft keyway. These parts should slip onto the shaft easily, a light coating of oil may assist in assembly. Do not use a hammer to force the installation, damage can occur to the shaft and/or the backstop. Slide the race against the spacer or the shaft shoulder and install the retaining ring into the groove in the shaft. Only use the supplied key, as it is specifically designed for each backstop.
7. Apply a thin coating of RTV silicone onto the gearbox mating surface for the outer race (same as the cover area). It is important to apply the sealant around the fastener holes to prevent leakage. Do not allow excessive amounts of silicone to enter the gearbox or to be applied to other parts.
8. Install the outer race by gently rotating it opposite the shaft rotation while pressing lightly inwards. Do not force the outer race into position as backstop damage may occur. Once the outer race is well piloted onto the sprag set, remove the shipping strap from the sprag set by cutting it, being careful not to let the outer race back off the sprags. The outer race should slide easily into position with a slight turning motion. A light coating of oil on the race inner diameter may ease installation.
9. Align the fastener holes in the outer race with the mating holes in the gearbox. Use the supplied grade 5 fasteners and lock washers only. Torque the fasteners in an alternating pattern per Table 5.

**Table 5 – Backstop Fastener Torque Values**

| Reducer Size | Fastener Size | Torque in Ft.-Lbs. |
|---|---|---|
| TA0107L | 1/4-20 | 8 – 7 |
| TA1107H | 1/4-20 | 8 – 7 |
| TA2115H | 1/4-20 | 8 – 7 |
| TA3203H | 1/4-20 | 8 – 7 |
| TA4207H | 1/4-20 | 8 – 7 |
| TA5215H | 5/16-18 | 17 – 15 |
| TA6307H | 5/16-18 | 17 – 15 |
| TA7315H | 3/8-16 | 30 – 27 |
| TA8407H | 5/16-18 | 17 – 15 |
| TA9415H | 3/8-16 | 30 – 27 |
| TA10507H | 3/8-16 | 30 – 27 |
| TA12608H | 3/8-16 | 30 – 27 |

6

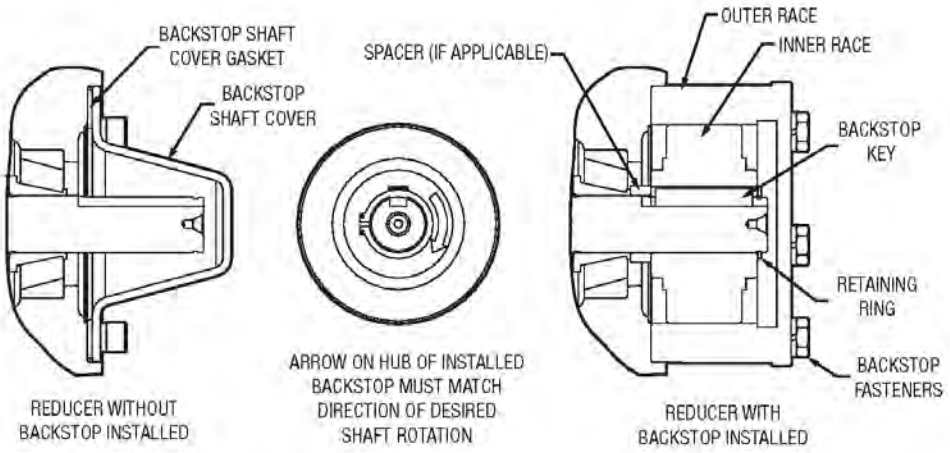



**Figure 10 - Backstop Assembly**

## MOTOR MOUNTS

**Motor Mount Assembly:**

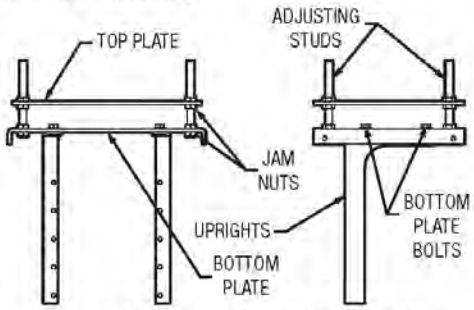



**Figure 11 – Motor Mount Components**

Refer to Figure 11 for descriptions of component parts. Using the hardware provided, assemble uprights (the angled parts to which the reducer is fastened) to the u-shaped, rectangular bottom plate. Notice that there are eight slots cut into the plate. If the reducer is to be mounted in Positions A or C, as illustrated in Figure 8, assemble the uprights in the outermost slots. If the reducer is to be mounted in Positions B or D, assemble the uprights in the innermost slots. The bottom plate may be mounted with the vertical flanges up or down (as shown in Figure 11). Snug bolts only, do not torque bolts at this time.

Fasten long threaded studs to the four corners of bottom plate using jam nuts, one on each side of the plate. Securely tighten these nuts, as they will not require any further adjustment. Add ne additional jam nut to each stud and thread approximately to the middle of the stud. Assemble top motor plate (the flat rectangular plate with many holes) on top of the jam nuts. Assemble the remaining jam nuts on studs to secure top motor plate. Do not fully tighten these nuts yet.

The motor mount may be installed in any of the four positions (A, B, C or D) and in any of the mounting levels (M1, M2, M3 or M4) shown in Figure 12. Note that the motor mount uprights attach to the input side of the reducer when mounted in either the "B" or "D" positions.

**Motor Mount Installation:**

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

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

Mount the motor onto the top plate and bolt securely. Install the motor sheave and reducer sheave as close to the motor and reducer housings as practical. Loosen the bottom plate bolts and slide the motor and mounting plate to accurately align the motor and reducer sheave. Securely tighten the bottom plate bolts. Install the required number of V-belts and tension belts by alternately adjusting the jam nuts on the four adjusting studs provided on the motor mount. Check all bolts to see that they are securely tightened. Verify that the V-belt drive is properly aligned before operating the reducer.

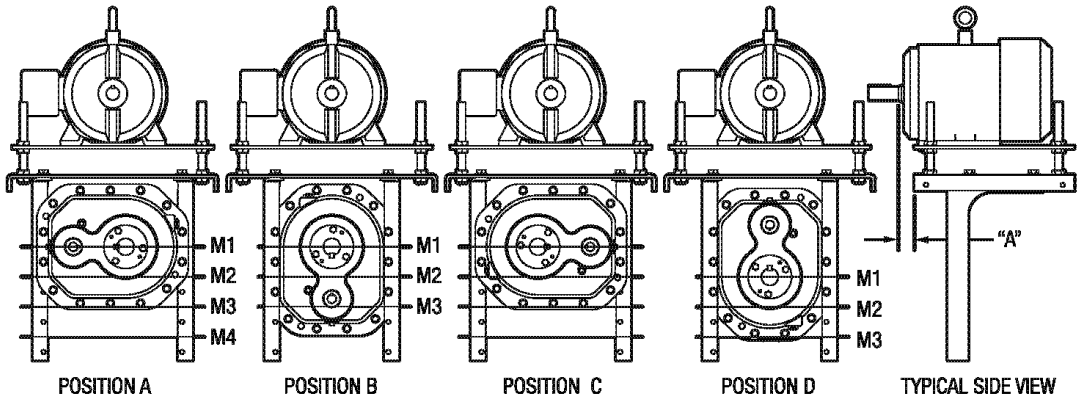



Figure 12 - Motor Mount Positions

Table 6 - V-Drive Center Distances

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

| | Position | Mtg. | Motor Frame / Motor Shaft Offset Dimensions "A" | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 56T / A=.78 | 140T / A=1.22 | 180T / A=1.37 | 210T / A=1.55 | 250T / =1.56 | 280T | 320T |
| TA1107L Reducer | A | M1 | 13.8 – 17.9 | 13.8 – 17.9 | 14.7 – 18.9 | 15.4 – 19.6 | 16.4-20.6 | ---- | ---- |
| | | M2 | 16.2 – 20.5 | 16.2 – 20.5 | 17.2 – 21.4 | 17.9 – 22.2 | 18.9-23.2 | ---- | ---- |
| | | M3 | 18.8 – 23.0 | 18.8 – 23.0 | 19.7 – 24.0 | 20.5 – 24.7 | 21.5-25.7 | ---- | ---- |
| | | M4 | 21.3 – 25.6 | 21.3 – 25.6 | 22.3 – 26.6 | 23.0 – 27.3 | 24.0-28.3 | ---- | ---- |
| | B | M1 | 17.7 – 22.0 | 17.7 – 22.0 | 18.7 – 23.0 | 19.5 – 23.8 | 20.5-24.7 | ---- | |
| | | M2 | 20.3 – 24.6 | 20.3 – 24.6 | 21.3 – 25.6 | 22.1 – 26.4 | 23.1-27.4 | ---- | ---- |
| | | M3 | 22.9 – 27.2 | 22.9 – 27.2 | 23.9 – 28.2 | 24.6 – 29.0 | 25.6-30.0 | ---- | ---- |
| | C | M1 | 13.8 – 17.9 | 13.8 – 17.9 | 14.7 – 18.9 | 15.4 – 19.6 | 16.4-20.6 | ---- | |
| | | M2 | 16.2 – 20.5 | 16.2 – 20.5 | 17.2 – 21.4 | 17.9 – 22.2 | 18.9-23.2 | ---- | ---- |
| | | M3 | 18.8 – 23.0 | 18.8 – 23.0 | 19.7 – 24.0 | 20.5 – 24.7 | 21.5-25.7 | ---- | ---- |
| | | M4 | 21.3 – 25.6 | 21.3 – 25.6 | 22.3 – 26.6 | 23.0 – 27.3 | 24.0-28.3 | ---- | ---- |
| | D | M1 | 11.3 – 15.7 | 11.3 – 15.7 | 12.3 – 16.7 | 13.1 – 17.4 | 14.1-18.4 | ---- | |
| | | M2 | 13.9 – 18.2 | 13.9 – 18.2 | 14.9 – 19.2 | 15.7 – 20.0 | 16.7-21.0 | ---- | ---- |
| | | M3 | 16.5 – 20.8 | 16.5 – 20.8 | 17.5 – 21.8 | 18.3 – 22.6 | 19.3-23. | ---- | ---- |

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

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

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

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

| | Position | Mtg. | Motor Frame / Motor Shaft Offset Dimension "A" | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 180T / A=1.37 | 210T / A=1.55 | 250T / A=1.56 | 280T / A=1.16 | 320T / A=.38 | 360T / A=1.01 | 400T / A=.75 |
| TA6307H Reducer | A | M1 | 21.2 – 25.0 | 21.9 – 25.8 | 22.9 – 26.7 | 23.6 – 27.4 | 24.5 – 28.4 | 25.5 – 29.4 | 26.5 – 30.4 |
| | | M2 | 26.2 – 30.1 | 26.9 – 30.8 | 27.9 – 31.8 | 28.6 – 32.5 | 29.6 – 33.5 | 30.5 – 34.5 | 31.5 – 35.4 |
| | | M3 | 31.2 – 35.1 | 32.0 – 35.9 | 32.9 – 36.9 | 33.7 – 37.6 | 34.6 – 38.6 | 35.6 – 39.6 | 36.6 – 40.6 |
| | | M4 | 36.3 – 40.3 | 37.0 – 41.0 | 38.0 – 42.0 | 38.8 – 42.7 | 39.7 – 43.7 | 40.7 – 44.7 | 41.7 – 45.7 |
| | B | M1 | 27.5 – 31.5 | 28.2 – 32.3 | 29.2 – 33.3 | 30.0 – 34.0 | 31.0 – 35.0 | 32.0 – 36.0 | 33.0 – 37.0 |
| | | M2 | 32.7 – 36.7 | 33.4 – 37.5 | 34.4 – 38.5 | 35.2 – 39.2 | 36.2 – 40.2 | 37.2 – 41.2 | 38.2 – 42.2 |
| | | M3 | 37.9 – 41.9 | 38.6 – 42.7 | 39.6 – 43.7 | 40.4 – 44.4 | 41.4 – 45.4 | 42.4 – 46.4 | 43.4 – 47.4 |
| | C | M1 | 17.9 – 21.6 | 18.6 – 22.3 | 19.5 – 23.3 | 20.2 – 24.0 | 21.1 – 25.0 | 22.1 – 25.9 | 23.0 – 26.9 |
| | | M2 | 22.8 – 26.6 | 23.5 – 27.3 | 24.4 – 28.3 | 25.2 – 29.0 | 26.1 – 30.0 | 27.1 – 31.0 | 28.0 – 32.0 |
| | | M3 | 27.8 – 31.7 | 28.5 – 32.4 | 29.5 – 33.4 | 30.2 – 34.1 | 31.2 – 35.1 | 32.1 – 36.1 | 33.1 – 37.1 |
| | | M4 | 32.8 – 36.8 | 33.5 – 37.5 | 34.5 – 38.5 | 35.3 – 39.2 | 36.2 – 40.2 | 37.2 – 41.2 | 38.2 – 42.2 |
| | D | M1 | 14.4 – 18.4 | 15.2 – 19.2 | 16.1 – 20.2 | 16.9 – 20.9 | 17.9 – 21.9 | 18.9 – 22.9 | 19.9 – 23.9 |
| | | M2 | 19.6 – 23.6 | 20.3 – 24.3 | 21.3 – 25.3 | 22.1 – 26.1 | 23.1 – 27.1 | 24.1 – 28.1 | 25.1 – 29.1 |
| | | M3 | 24.8 – 28.8 | 25.5 – 29.5 | 26.5 – 30.5 | 27.3 – 31.3 | 28.3 – 32.3 | 29.3 – 33.3 | 30.2 – 34.3 |

| | Position | Mtg. | Motor Frame / Motor Shaft Offset Dimension "A" | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 210T / A=1.55 | 250T / A=1.56 | 280T / A=1.16 | 320T / A=.38 | 360T / A=1.01 | 400T / A=.75 | 440T |
| TA7315H Reducer | A | M1 | 27.4 – 31.4 | 28.4 – 32.4 | 29.1 – 33.1 | 30.1 – 34.1 | 31.1 – 35.1 | 32.1 – 36.1 | ---- |
| | | M2 | 33.3 – 37.3 | 34.3 – 38.3 | 35.0 – 39.0 | 36.0 – 40.0 | 37.0 – 41.0 | 38.0 – 42.0 | ---- |
| | | M3 | 39.2 – 43.2 | 40.2 – 44.2 | 41.0 – 45.0 | 42.0 – 46.0 | 43.0 – 47.0 | 44.0 – 48.0 | ---- |
| | | M4 | 45.2 – 49.2 | 46.2 – 50.2 | 46.9 – 50.9 | 47.9 – 51.9 | 48.9 – 52.9 | 49.9 – 53.9 | ---- |
| | B | M1 | 30.0 – 34.0 | 31.0 – 35.0 | 31.8 – 35.7 | 32.8 – 36.7 | 33.7 – 37.7 | 34.7 – 38.7 | ---- |
| | | M2 | 36.0 – 40.0 | 37.0 – 40.9 | 37.7 – 41.7 | 38.7 – 42.7 | 39.7 – 43.7 | 40.7 – 44.7 | ---- |
| | | M3 | 41.9 – 45.9 | 42.9 – 46.9 | 43.6 – 47.6 | 44.6 – 48.6 | 45.6 – 49.6 | 46.6 – 50.6 | ---- |
| | C | M1 | 17.4 – 21.3 | 18.4 – 22.4 | 19.1 – 23.0 | 20.0 – 23.9 | 21.0 – 24.9 | 22.0 – 25.9 | ---- |
| | | M2 | 23.2 – 27.1 | 24.2 – 28.1 | 24.9 – 28.8 | 25.9 – 29.8 | 26.9 – 30.8 | 27.8 – 31.8 | ---- |
| | | M3 | 29.1 – 33.0 | 30.0 – 34.0 | 30.8 – 34.7 | 31.8 – 35.7 | 32.8 – 36.7 | 33.7 – 37.7 | ---- |
| | | M4 | 35.0 – 39.0 | 36.0 – 39.9 | 36.7 – 40.7 | 37.7 – 41.7 | 38.7 – 42.7 | 39.7 – 43.7 | ---- |
| | D | M1 | 20.5 – 24.4 | 21.5 – 25.4 | 22.2 – 26.1 | 23.2 – 27.1 | 24.2 – 28.1 | 25.1 – 29.1 | ---- |
| | | M2 | 26.4 – 30.3 | 27.4 – 31.3 | 28.1 – 32.0 | 29.1 – 33.0 | 30.1 – 34.0 | 31.0 – 35.0 | ---- |
| | | M3 | 32.3 – 36.3 | 33.3 – 37.2 | 34.0 – 38.0 | 35.0 – 39.0 | 36.0 – 40.0 | 37.0 – 41.0 | ---- |

| | Position | Mtg. | Motor Frame / Motor Shaft Offset Dimension "A" | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 210T / A=1.55 | 250T / A=1.56 | 280T / A=1.16 | 320T / A=.38 | 360T / A=1.01 | 400T / A=.75 | 440T |
| TA8407H Reducer | A | M1 | 27.4 – 31.3 | 28.3 – 32.3 | 29.1 – 33.0 | 30.1 – 34.0 | 31.0 – 35.0 | 32.0 – 36.0 | ---- |
| | | M2 | 33.2 – 37.2 | 34.2 – 38.2 | 35.0 – 39.0 | 36.0 – 39.9 | 37.0 – 40.9 | 37.9 – 41.9 | ---- |
| | | M3 | 39.2 – 43.2 | 40.2 – 44.2 | 40.9 – 44.9 | 41.9 – 45.9 | 42.9 – 46.9 | 43.9 – 47.9 | ---- |
| | | M4 | 45.1 – 49.1 | 46.1 – 50.1 | 46.9 – 50.9 | 47.9 – 51.9 | 48.8 – 52.8 | 49.8 – 53.8 | ---- |
| | B | M1 | 30.2 – 34.2 | 31.2 – 35.2 | 32.0 – 35.9 | 32.9 – 36.9 | 33.9 – 37.9 | 34.9 – 38.9 | |
| | | M2 | 36.2 – 40.1 | 37.1 – 41.1 | 37.9 – 41.9 | 38.9 – 42.9 | 39.9 – 43.9 | 40.9 – 44.9 | ---- |
| | | M3 | 42.1 – 46.1 | 43.1 – 47.1 | 43.8 – 47.8 | 44.8 – 48.8 | 45.8 – 49.8 | 46.8 – 50.8 | ---- |
| | C | M1 | 17.6 – 21.4 | 18.5 – 22.4 | 19.2 – 23.1 | 20.2 – 24.1 | 21.2 – 25.1 | 22.1 – 26.0 | ---- |
| | | M2 | 23.3 – 27.3 | 24.3 – 28.2 | 25.0 – 29.0 | 26.0 – 30.0 | 27.0 – 30.9 | 28.0 – 31.9 | ---- |
| | | M3 | 29.2 – 33.2 | 30.2 – 34.1 | 30.9 – 34.9 | 31.9 – 35.9 | 32.9 – 36.9 | 33.9 – 37.8 | ---- |
| | | M4 | 35.1 – 39.1 | 36.1 – 40.1 | 36.8 – 40.8 | 37.8 – 41.8 | 38.8 – 42.8 | 39.8 – 43.8 | ---- |
| | D | M1 | 20.3 – 24.2 | 21.3 – 25.2 | 22.0 – 25.9 | 23.0 – 26.9 | 23.9 – 27.9 | 24.9 – 28.9 | ---- |
| | | M2 | 26.1 – 30.1 | 27.1 – 31.1 | 27.9 – 31.8 | 28.8 – 32.8 | 29.8 – 33.8 | 30.8 – 34.8 | ---- |
| | | M3 | 32.1 – 36.0 | 33.0 – 37.0 | 33.8 – 37.8 | 34.8 – 38.8 | 35.8 – 39.7 | 36.7 – 40.7 | ---- |

| | Position | Mtg. | Motor Frame / Motor Shaft Offset Dimension "A" | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 250T / A=1.56 | 280T / A=1.16 | 320T / A=.38 | 360T / A=1.01 | 400T / A=.75 | 440T / A=1.62 |
| TA10507H Reducer | A | M1 | N/A | N/A | N/A | N/A | N/A | N/A |
| | | M2 | N/A | N/A | N/A | N/A | N/A | N/A |
| | | M3 | N/A | N/A | N/A | N/A | N/A | N/A |
| | | M4 | N/A | N/A | N/A | N/A | N/A | N/A |
| | B | M1 | 46.7 – 50.5 | 47.5 – 51.2 | 48.5 – 52.2 | 49.5 – 53.2 | 50.5 – 54.2 | 51.5 – 55.2 |
| | | M2 | 52.1 – 55.9 | 52.8 – 56.6 | 53.8 – 57.6 | 54.8 – 58.6 | 55.8 – 59.6 | 56.8 – 60.6 |
| | | M3 | N/A | N/A | N/A | N/A | N/A | N/A |
| | C | M1 | N/A | N/A | N/A | N/A | N/A | N/A |
| | | M2 | N/A | N/A | N/A | N/A | N/A | N/A |
| | | M3 | N/A | N/A | N/A | N/A | N/A | N/A |
| | | M4 | N/A | N/A | N/A | N/A | N/A | N/A |
| | D | M1 | 17.7 – 21.4 | 18.4 – 22.2 | 19.4 – 23.2 | 20.4 – 24.2 | 21.4 – 25.2 | 22.4 – 26.2 |
| | | M2 | 23.0 – 26.8 | 23.8 – 27.5 | 24.8 – 28.5 | 25.8 –29.5 | 26.8 – 30.5 | 27.8 – 31.5 |
| | | M3 | N/A | N/A | N/A | N/A | N/A | N/A |

| | Position | Mtg. | Motor Frame / Motor Shaft Offset Dimension "A" | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 250T / A=1.56 | 280T / A=1.16 | 320T / A=.38 | 360T / A=1.01 | 400T / A=.75 | 440T / A=1.62 |
| TA12608H Reducer | A | M1 | N/A | N/A | N/A | N/A | N/A | N/A |
| | | M2 | N/A | N/A | N/A | N/A | N/A | N/A |
| | | M3 | N/A | N/A | N/A | N/A | N/A | N/A |
| | | M4 | N/A | N/A | N/A | N/A | N/A | N/A |
| | B | M1 | 48.9 – 52.7 | 49.7 – 53.5 | 50.7 – 54.5 | 51.7 – 55.5 | 52.7 – 56.5 | 53.7 – 57.5 |
| | | M2 | 54.5 – 58.3 | 55.3 – 59.1 | 56.3 – 60.1 | 57.3 – 61.1 | 58.3 – 62.1 | 59.3 – 63.1 |
| | | M3 | N/A | N/A | N/A | N/A | N/A | N/A |
| | C | M1 | N/A | N/A | N/A | N/A | N/A | N/A |
| | | M2 | N/A | N/A | N/A | N/A | N/A | N/A |
| | | M3 | N/A | N/A | N/A | N/A | N/A | N/A |
| | | M4 | N/A | N/A | N/A | N/A | N/A | N/A |
| | D | M1 | 22.0 – 25.8 | 22.8 – 26.6 | 23.8 – 27.6 | 24.8 – 28.6 | 25.8 – 29.6 | 26.8 – 30.6 |
| | | M2 | N/A | N/A | N/A | N/A | N/A | N/A |
| | | M3 | N/A | N/A | N/A | N/A | N/A | N/A |

## TORQUE-ARM II BELT GUARD INSTALLATION

Two different belt guards are available for the Torque-Arm II speed reducer. One belt guard assembly is designed for mounting in position "B" and the other belt guard assembly is designed for mounting in position "C" as shown in Figure 13. It is important that the mounting position of the Torque-Arm II motor mount be determined prior to purchase of the belt guard as these two guards do not interchange and will be attached to the motor mount uprights.

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

**WARNING: Ensure that all guards are properly installed before proceeding. Exercise extreme care to avoid contacting rotating parts. Failure to observe these precautions could result in bodily injury.**

### Vertical Installation (Position B):

1. Move belt guard and hardware from box and verify all parts are available. The belt guard assembly consists of one back cover, one front cover, two brackets, and necessary hardware.
2. Using the hardware provided, assemble the two brackets to the back cover as shown in Figure 14. Note that the brackets are mounted so that the angles of the brackets are mounted to the inside. Do not fully tighten these bolts.
3. Position back cover over the motor shaft and reducer input shaft. The long slot in the back cover fits over the motor shaft.
4. Align the back cover assembly to the Torque-Arm II motor mount and attach using four cap screws, washers, and nuts. Securely tighten the brackets to the motor mount and back cover.
5. Install motor and reducer sheaves. Install belts and adjust accordingly.
6. Align hinges on front cover to pins on back cover and assemble.
7. Close cover and secure with two cap screws and washers.
8. Check machine for proper operation.

### Horizontal Installation (Position C):

1. Remove belt guard and hardware from box and verify all parts are available. The belt guard assembly consists of one back cover, one front cover, two brackets, and necessary hardware.
2. Using the hardware provided, assemble the two brackets to the back cover as shown in Figure 15. Note that the brackets are mounted so that the angles of the brackets are mounted in the same direction. Do not fully tighten these bolts.
3. Position back cover over the motor shaft and reducer input shaft. The long slot in the back cover fits over the motor shaft.
4. Align the back cover assembly to the Torque-Arm II motor mount and attach using four cap screws, washers, and nuts. Securely tighten the brackets to the motor mount and back cover.
5. Install motor and reducer sheaves. Install belts and adjust accordingly.
6. Align hinges on front cover to pins on back cover and assemble.
7. Close cover and secure with two cap screws and washers.
8. Check machine for proper operation.

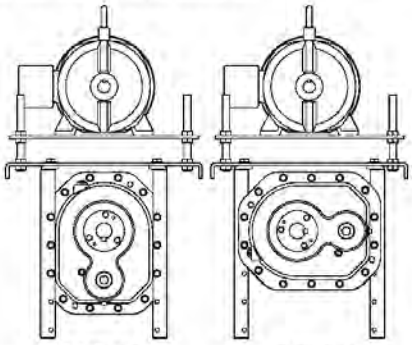



**Figure 13 – Belt Guard Mounting Positions**

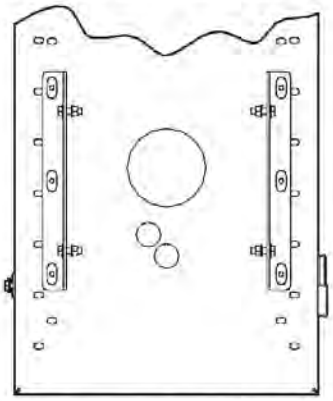


**Figure 14 – Mounting Brackets in Position B**

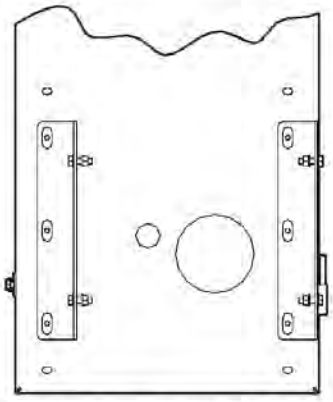


**Figure 15 – Mounting Brackets in Position C**

## SCREW CONVEYOR ADAPTER ASSEMBLY

1. Install seals (408) into adapter housing as shown in Figure 16. If the optional packing adapter is to be used, install only one seal in the small end of the adapter. Use extreme care when installing seals to avoid damage to the seals. Press or tap seals into place by applying pressure only on the outer edge of the seal. Make sure seals are install evenly and are not tilted.
2. If using the optional packing adapter, install the two studs (413), retaining ring (412), and two nuts (414). Thread the nuts onto the studs about 4-5 threads. Install the three braided type seals (415) in a circular direction into the adapter cavity. Shoulder the braided seals against the adjustable retaining ring (412). To aid in installation of the driveshaft in step 7, the braided seals can be flattened out slightly with a soft hammer prior to installation. When installing the braided seals offset the joints from each other.
3. Lightly tap the large washer (407) into the counterbore on the large end of the adapter to seal the braided material installed in step 2 or the seal installed in step 1.
4. Place reducer on blocks so that it lays flat with the input shaft down.
5. Position screw conveyor adapter (400) on the reducer output hub so that the small end (end with four drilled holes) rests on reducer. The approximate 1/8" piloting projection should locate in the output seal bore next to the auxiliary seal. Adapter projection should not touch the face of the gear case casting.
6. Place four adapter screws (409) and lock washers (410) through the adapter and thread into the reducer. Tighten the four cap screws (409) to the torque specified in Table 9.
7. Turn reducer onto its side. Use caution not to damage either type seals and install driveshaft through the adapter housing into the reducer. Line up the keyway in the driveshaft with the keyway in the reducer hub bore. Slide or gently tap key into reducer through the input shaft side of the output hub.
8. Install the retaining ring (411) into the screw conveyor wedge (402). Making sure the driveshaft is fully seated into the reducer, slide the wedge onto driveshaft.
9. Install keeper plate (401), driveshaft cap screw (404), and lockwasher (405). Torque to specifications in Table 9.

## DRIVESHAFT REMOVAL

To remove the driveshaft from the reducer the following steps are required.

1. Remove the driveshaft retaining bolt (404) and lock washer (405), the keeper plate (401), and the retaining ring (411).
2. Referring to Table 7, install the correct size hex head set screw into the end of the driveshaft until flush. Note TA6307H and TA7315H does not require a set screw.
3. Position the keeper plate (401) flush against the end of the driveshaft and with the small end facing out. Next install the retaining ring (411). When properly installed, the retaining ring holds the keeper plate (401) in place.
4. Screw removal bolt(s) into the keeper plate (401) and tighten until the driveshaft wedge (402) is dislodged. Once the driveshaft wedge (402) is dislodged, pull the assembly free from the reducer. If installed, remove the hex head set screw from the end of the driveshaft. The driveshaft can now be easily removed from the reducer by pulling the driveshaft straight out of the reducer.

**Note:** The removal bolt is not the same bolt as the retaining bolt. Refer to Table 7 for the correct bolt to be used for removal.

**Table 7 – Removal Hardware**

| Reducer Size | Removal Bolt | Hex Head Set Screw |
|---|---|---|
| TA0107L | 3/4-10 x 2 | 5/8-11 x 3/4 |
| TA1107H | 3/4-10 x 2 | 5/8-11 x 3/4 |
| TA2115H | 3/4-10 x 2 | 5/8-11 x 3/4 |
| TA3203H | 7/8-9 x 2 | 3/4-10 x 3/4 |
| TA4207H | 7/8-9 x 2 | 3/4-10 x 3/4 |
| TA5215H | 7/8-9 x 2 | 3/4-10 x 3/4 |
| TA6307H | 3/8-16 x 2 (4 required) | N/A |
| TA7315H | ½-13 x 2 (4 required) | N/A |

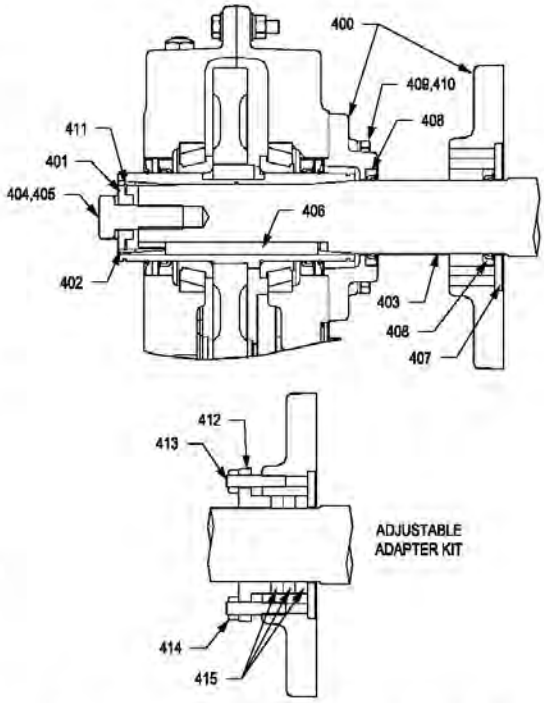



**Figure 16 – Screw Conveyor Adapter Assembly**

## REPLACEMENT OF PARTS

**IMPORTANT:** Using tools normally found in a maintenance department, a Dodge Torque-Arm II speed reducer can be disassembled and reassembled by careful attention to the instructions following.

Cleanliness is very important to prevent the introduction of dirt into the bearings and other parts of the reducer. A tank of clean solvent, an arbor press, and equipment for heating bearings and gears (for shrinking these parts on shafts) should be available. Our factory is prepared to repair reducers for customers who do not have proper facilities or who, for any reason, desire factory service.

The oil seals are contact lip seals. Considerable care should be used during disassembly and reassembly to avoid damage to the surface on which the seals rub.

The keyseat in the input shaft, as well as any sharp edges on the output hub should be covered with tape or paper before disassembly or reassembly. Also, be careful to remove any burrs or nicks on surfaces of the input shaft or output hub before disassembly or reassembly.

**Ordering Parts**: When ordering parts for reducer, specify reducer size number, reducer model number, part name, part number, and quantity.

It is strongly recommended that, when a pinion or gear is replaced, the mating pinion or gear is replaced also. If the large gear on the output hub must be replaced, it is recommended that an output hub assembly consisting of a gear assembled on a hub be ordered to ensure undamaged surfaces on the output hub where the output seals rub. However, if it is desired to use the old output hub, press the gear and bearing off and examine the rubbing surface under the oil seal carefully for possible scratching or other damage resulting from the pressing operation. To prevent oil leakage at the shaft oil seals, the smooth surface of the output hub must not be damaged.

If any parts must be pressed from a shaft or from the output hub, this should be done before ordering parts to make sure that none of the bearings or other parts are damaged in removal. Do not press against rollers or cage of any bearing.

Because old shaft oil seals may be damaged in disassembly, it is advisable to order replacements for these parts.

### Removing Reducer from Shaft:

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

**Taper Bushed**:

1. Disconnect and remove belt guard, v-drive, and motor mount as required. Disconnect torque arm rod from reducer adapter.
2. Remove bushing screws.
3. Place the screws in the threaded holes provided in the bushing flanges. Tighten the screws alternately and evenly until the bushings are free on the shaft. For ease of tightening screws, make sure screw threads and threaded holes in bushing flanges are clean. A tap can be used to clean out the threads. Use caution to use the proper size tap to prevent damage to the threads.
4. Remove the outside bushing, the reducer, and then the inboard bushing.

**Disassembly**:

1. Drain all oil from the reducer.
2. Position the reducer on its side and remove all housing bolts. Drive dowel pins from housing. Using the three pry slots around the periphery of the flange, gently separate the housing halves. Open housing evenly to prevent damage to the parts inside.
3. Lift input shaft, all gear assemblies, and bearing assemblies from housing.
4. Remove seals from housing.
5. Remove bearings from shafts and hubs. Be careful not to scratch or damage any assembly or seal area during bearing removal. The hub assembly can be disassembled for gear replacement but if scratching or grooving occurs on the hub, seal leakage will occur and the hub will need to be replaced.

**Reassembly**:

1. **Output Hub Assembly:** Heat gear to 325°F to 350°F to shrink onto hub. Heat bearings to 270°F to 290°F to shrink onto hub. Any injury to the hub surfaces where the oil seals rub will cause leakage, making it necessary to use a new hub.
2. **Countershaft Assembly:** Shaft and pinion are integral. Press gear and bearings on shaft. Press against inner race (not cage or rollers) of bearings.
3. **Input Shaft Assembly:** Shaft and pinion are integral. Press bearings on shaft. Press against inner race (not cage or rollers) of bearings.
4. Drive the two dowel pins into place in the right-hand housing half.
5. Place R.H. housing half on blocks to allow for protruding end of output hub.
6. Install bearing cups in right-hand housing half, making sure they are properly seated. The output hub assembly has one bearing pressed against the gear and the other bearing pressed against a shoulder on the hub. For double reduction reducers, install the output hub assembly so that the end where the bearing is pressed against the gear is up. For single reduction reducers, install the output hub assembly so that the end where the bearing is pressed against the gear is down.
7. Mesh output hub gear and small countershaft gear together and set in place in housing. Set input shaft assembly in place in the housing. Make sure bearing rollers (cones) are properly seated in their cups. Set bearing cups for left-hand housing half in place on their rollers.
8. Making sure both housing halves are clean, set left-hand housing half into position and tap with a soft hammer (rawhide, not lead hammer) until housing bolts can be used to draw housing halves together. Make sure reducer shafts do not bind while tightening housing bolts.
9. Rotate the input shaft and seat all bearings with a soft hammer. Using a magnetic base and indicator, measure and record the end play of the input shaft, countershaft, and output hub. Remove left housing half and shim behind the bearing cup as required to achieve the correct bearing end play or preload per Table 8. Repeat this process and check end play until proper end play is obtained. Note that the output shaft is preloaded. After end play is determined, add the correct shim thickness to the end play reading to obtain the correct preload.

**10.** Remove left housing half and clean housing flange surfaces on both halves, making sure not to nick or scratch flange face. Place a 1/8" bead of Dow RTV732 sealant or equivalent on flange face (make sure RTV is placed around bolt holes and inside of flange face). Place left housing half into position and tap with a soft hammer (rawhide, not lead hammer) until housing bolts can be used to draw housing halves together. Torque housing bolts per torque values listed in Table 9.

**11.** Install input seal, output seals, and auxiliary seals. Extreme care should be used when installing seals to avoid damage due to contact with sharp edges on the input shaft or output hub. The possibility of damage and consequent oil leakage can be decreased by covering all sharp edges with tape prior to seal installation. Lightly coat the seal lips with Mobilith AW2 All-Purpose grease or equivalent. Seals should be pressed or tapped with a soft hammer evenly into place in the reducer housing, applying pressure only on the outer edge of the seals. A slight oil leakage at the seals may be evident during initial running, but should disappear unless seals have been damaged.

**12.** Install bushing backup plates and snap rings on Taper Bushed reducers or hub collars on straight bore reducers.

**Table 8 - Bearing Adjustment Tolerances**

| Reducer Size | Bearing Endplay Values | | |
|---|---|---|---|
| | Input | Countershaft | Output |
| TA0107L | .002-.004 Loose | .0005-.003 Loose | .002-.004 Preload |
| TA1107H | .002-.004 Loose | .0005-.003 Loose | .002-.004 Preload |
| TA2115H | .002-.004 Loose | .0005-.003 Loose | .002-.004 Preload |
| TA3203H | .002-.004 Loose | .0005-.003 Loose | .002-.004 Preload |
| TA4207H | .002-.004 Loose | .0005-.003 Loose | .002-.004 Preload |
| TA5215H | .002-.004 Loose | .0005-.003 Loose | .003-.005 Preload |
| TA6307H | .002-.004 Loose | .0005-.003 Loose | .006-.008 Preload |
| TA7315H | .002-.004 Loose | .0005-.003 Loose | .006-.008 Preload |
| TA8407H | .002-.004 Loose | .0005-.003 Loose | .004-.006 Preload |
| TA9415H | .002-.004 Loose | .0005-.003 Loose | .004-.006 Preload |
| TA10507H | .002-.004 Loose | .0005-.003 Loose | .006-.008 Preload |
| TA12608H | .002-.004 Loose | .0005-.003 Loose | .006-.008 Preload |

**Table 9 - Recommended Bolt Torque Values**

| Housing Bolt Recommended Torque Values | | |
|---|---|---|
| Reducer Size | Fastener Size | Torque in Ft.-Lbs. |
| TA0107L | 5/16-18 | 17 – 15 |
| TA1107H | 5/16-18 | 17 – 15 |
| TA2115H | 3/8-16 | 30 – 27 |
| TA3203H | 3/8-16 | 30 – 27 |
| TA4207H | 1/2-13 | 75 – 70 |
| TA5215H | 1/2-13 | 75 – 70 |
| TA6307H | 1/2-13 | 75 – 70 |
| TA7315H | 5/8-11 | 90 – 82 |
| TA8407H | 5/8-11 | 90 – 82 |
| TA9415H | 5/8-11 | 90 – 82 |
| TA10507H | ¾-10 | 148 – 138 |
| TA12608H | ¾-10 | 148 – 138 |

| Backstop Cover Bolt Recommended Torque Values | | |
|---|---|---|
| Reducer Size | Fastener Size | Torque in Ft.-Lbs. |
| TA0107L | 1/4-20 | 8 – 7 |
| TA1107H | 1/4-20 | 8 – 7 |
| TA2115H | 1/4-20 | 8 – 7 |
| TA3203H | 1/4-20 | 8 – 7 |
| TA4207H | 1/4-20 | 8 – 7 |
| TA5215H | 5/16-18 | 17 – 15 |
| TA6307H | 5/16-18 | 17 – 15 |
| TA7315H | 3/8-16 | 30 – 27 |
| TA8407H | 5/16-18 | 17 – 15 |
| TA9415H | 3/8-16 | 30 – 27 |
| TA10507H | 3/8-16 | 30 – 27 |
| TA12608H | 3/8-16 | 30 – 27 |

| Screw Conveyor Adapter Bolt Recommended Torque Values | | |
|---|---|---|
| Reducer Size | Fastener Size | Torque in Ft.-Lbs. |
| TA0107L | 3/8-16 | 30 – 27 |
| TA1107H | 3/8-16 | 30 – 27 |
| TA2115H | 7/16-14 | 50 – 45 |
| TA3203H | 1/2-13 | 75 – 70 |
| TA4207H | 1/2-13 | 75 – 70 |
| TA5215H | 5/8-11 | 90 – 82 |
| TA6307H | ¾-10 | 148 – 138 |
| TA7315H | ¾-10 | 148 – 138 |

| Screw Conveyor Drive Shaft Retainer Bolt Recommended Torque Values | | |
|---|---|---|
| Reducer Size | Fastener Size | Torque in Ft.-Lbs. |
| TA0107L | 5/8-11 | 90 – 82 |
| TA1107H | 5/8-11 | 90 – 82 |
| TA2115H | 5/8-11 | 90 – 82 |
| TA3203H | 3/4-10 | 148 – 138 |
| TA4207H | 3/4-10 | 148 – 138 |
| TA5215H | 3/4-10 | 148 – 138 |
| TA6307H | 1-8 | 210 –190 |
| TA7315H | 1-8 | 210 – 190 |

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## REPLACEMENT PART AND KIT NUMBERS

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

| Reducer Size | Output Hub Bearing – LH and RH Sides Part Number |
|---|---|
| TA0107L | 900250/900251 |
| TA1107H | 901250/901251 |
| TA2115H | 403003/402003 |
| TA3203H | 903252/402268 |
| TA4207H | 403016/402193 |
| TA5215H | 403140/402050 |
| TA6307H | 906250/906251 |
| TA7315H | 403105/402147 |
| TA8407H | 403105/402147 |
| TA9415H | 403110/402160 |
| TA10507H | 910250/910251 |
| TA12608H | 912250/912251 |

| Reducer Size | Countershaft Bearing – LH Side Part Number |
|---|---|
| TA0107L | 304833/304740 |
| TA1107H | 403165/402265 |
| TA2115H | 304836/411626-05-B |
| TA3203H | 403101/402271 |
| TA4207H | 304809/304710 |
| TA5215H | 403005/402001 |
| TA6307H | 403026/906257 |
| TA7315H | 403159/907260 |
| TA8407H | 411626-06-BE/411626-05BM |
| TA9415H | 403036/304701 |
| TA10507H | 403087/402023 |
| TA12608H | 402233/912253 |

| Reducer Size | Countershaft Bearing – Backstop (RH) Side Part Number |
|---|---|
| TA0107L | 304833/304740 |
| TA1107H | 403165/402265 |
| TA2115H | 304836/411626-05-B |
| TA3203H | 403101/402271 |
| TA4207H | 304809/304710 |
| TA5215H | 403005/402001 |
| TA6307H | 403026/906257 |
| TA7315H | 403159/907260 |
| TA8407H | 411626-06-BE/908253 |
| TA9415H | 403036/304701 |
| TA10507H | 403087/402023 |
| TA12608H | 402233/912253 |

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

**Table 10 – Part Numbers for Replacement Bearings, Single and Double Reduction Reducers (Cont.)**

| Reducer Size | | Input Shaft Bearing – LH Side Part Number |
|---|---|---|
| TA0107L | 5:1 | 403166/402284 |
| | 9:1 | |
| | 15:1 | |
| | 25:1 | |
| | 40:1 | |
| TA1107H | 5:1 | 402169/402294 |
| | 9:1 | |
| | 15:1 | |
| | 25:1 | |
| | 40:1 | |
| TA2115H | 5:1 | 403094/304753 |
| | 9:1 | |
| | 15:1 | |
| | 25:1 | |
| | 40:1 | 403094/304707 |
| TA3203H | 5:1 | 304809/411626-05-K |
| | 9:1 | |
| | 15:1 | |
| | 25:1 | |
| | 40:1 | 403101/402271 |
| TA4207H | 5:1 | 304809/411626-05-K |
| | 9:1 | |
| | 15:1 | |
| | 25:1 | |
| | 40:1 | |
| TA5215H | 5:1 | 403005/402001 |
| | 9:1 | |
| | 15:1 | |
| | 25:1 | |
| | 40:1 | 403005/304717 |
| TA6307H | 5:1 | 403026/906260 |
| | 9:1 | |
| | 15:1 | |
| | 25:1 | |
| | 40:1 | |
| TA7315H | 5:1 | 304802/402041 |
| | 9:1 | |
| | 15:1 | |
| | 25:1 | |
| | 40:1 | |
| TA8407H | 15:1 | 908259/908260 |
| | 25:1 | |
| | 40:1 | |
| TA9415H | 15:1 | 403036/304701 |
| | 25:1 | |
| | 40:1 | |
| TA10507H | 15:1 | 402231/402232 |
| | 25:1 | |
| | 40:1 | |
| TA12608H | 15:1 | 402231/402232 |
| | 25:1 | |
| | 40:1 | |

**Table 10 – Part Numbers for Replacement Bearings, Single and Double Reduction Reducers (Cont.)**

| Reducer Size | | Input Shaft Bearing – RH Side Part Number |
|---|---|---|
| TA0107L | 5:1 | 403165/402265 |
| | 9:1 | |
| | 15:1 | |
| | 25:1 | |
| | 40:1 | 402169/402294 |
| TA1107H | 5:1 | 403063/402108 |
| | 9:1 | |
| | 15:1 | |
| | 25:1 | |
| | 40:1 | 403094/304753 |
| TA2115H | 5:1 | 403094/304707 |
| | 9:1 | |
| | 15:1 | |
| | 25:1 | 403094/304707 |
| | 40:1 | 304809/411626-05-K |
| TA3203H | 5:1 | 403101/402271 |
| | 9:1 | |
| | 15:1 | |
| | 25:1 | 403101/402271 |
| | 40:1 | 304809/411626-05-K |
| TA4207H | 5:1 | 904256/904257 |
| | 9:1 | |
| | 15:1 | |
| | 25:1 | |
| | 40:1 | 904256/904258 |
| TA5215H | 5:1 | 403005/402001 |
| | 9:1 | |
| | 15:1 | |
| | 25:1 | 403005/304717 |
| | 40:1 | 403005/411626-05-V |
| TA6307H | 5:1 | 403026/906260 |
| | 9:1 | |
| | 15:1 | |
| | 25:1 | |
| | 40:1 | 403026/906257 |
| TA7315H | 5:1 | 403159/907260 |
| | 9:1 | |
| | 15:1 | |
| | 25:1 | |
| | 40:1 | 403159/402054 |
| TA8407H | 15:1 | 9082569/908257 |
| | 25:1 | |
| | 40:1 | 304804/908258 |
| TA9415H | 15:1 | 411626-06-BE/411626-05-BM |
| | 25:1 | |
| | 40:1 | 304804/908258 |
| TA10507H | 15:1 | 411626-06-BE/411626-05-BM |
| | 25:1 | |
| | 40:1 | 304804/908258 |
| TA12608H | 15:1 | 403036/304701 |
| | 25:1 | |
| | 40:1 | 403036/912258 |

**Table 11 – Replacement Parts Kit Numbers**

| Reducer Size | Ratio | Seal Kit * | Output Hub Assembly ** | Countershaft Assembly *** | Bearing Kit **** | Shim Kit |
|---|---|---|---|---|---|---|
| TA0107L | 5:1 | 900126 | 900120 | --- | 900128 | 900180 |
| | 9:1 | | | 900122 | 900129 | |
| | 15:1 | | | 900123 | | |
| | 25:1 | | | 900124 | | |
| | 40:1 | | | 900125 | | |
| TA1107H | 5:1 | 901126 | 901120 | --- | 901128 | 901180 |
| | 9:1 | | | 901122 | 901129 | |
| | 15:1 | | | 901123 | | |
| | 25:1 | | | 901124 | | |
| | 40:1 | | | 901125 | | |
| TA2115H | 5:1 | 902126 | 902120 | --- | 902128 | 902180 |
| | 9:1 | | | 902122 | 902129 | |
| | 15:1 | | | 902123 | | |
| | 25:1 | | | 902124 | | |
| | 40:1 | 902127 | | 901125 | 902130 | |
| TA3203H | 5:1 | 903126 | 903120 | --- | 903128 | 903180 |
| | 9:1 | | | 903122 | 903129 | |
| | 15:1 | | | 903123 | | |
| | 25:1 | | | 903124 | | |
| | 40:1 | 903127 | | 903125 | 903130 | |
| TA4207H | 5:1 | 904126 | 904120 | --- | 904128 | 904180 |
| | 9:1 | | | 904122 | 904129 | |
| | 15:1 | | | 904123 | | |
| | 25:1 | | | 904124 | | |
| | 40:1 | | | 904125 | 904130 | |
| TA5215H | 5:1 | 905126 | 905120 | --- | 905128 | 905180 |
| | 9:1 | | | 905122 | 905129 | |
| | 15:1 | | | 905123 | | |
| | 25:1 | | | 905124 | 905130 | |
| | 40:1 | | | 905125 | 905131 | |
| TA6307H | 5:1 | 906126 | 906120 | --- | 906128 | 906180 |
| | 9:1 | | | 906122 | 906129 | |
| | 15:1 | | | 906123 | | |
| | 25:1 | | | 906124 | 906130 | |
| | 40:1 | | | 906125 | | |
| TA7315H | 5:1 | 907126 | 907120 | --- | 907128 | 907180 |
| | 9:1 | | | 907122 | 907129 | |
| | 15:1 | | | 907123 | | |
| | 25:1 | | | 907124 | | |
| | 40:1 | | | 907125 | 907130 | |
| TA8407H | 15:1 | 908126 | 908120 | 908123 | 908129 | 908180 |
| | 25:1 | | | 908124 | | |
| | 40:1 | | | 908125 | 908130 | |
| TA9415H | 15:1 | 909126 | 909120 | 909123 | 909129 | 909180 |
| | 25:1 | | | 909124 | | |
| | 40:1 | | | 909125 | 909130 | |
| TA10507H | 15:1 | 910126 | 910120 | 910123 | 910129 | 910180 |
| | 25:1 | | | 910124 | | |
| | 40:1 | | | 910125 | 910130 | |
| TA12608H | 15:1 | 912126 | 912120 | 912123 | 912129 | 912180 |
| | 25:1 | | | 912124 | | |
| | 40:1 | | | 919125 | 912130 | |

*Seal Kit consists of Input Seal, Output Seals, Backstop Cover Gasket and RTV Sealant.
**Output Hub Assembly consists of Output Hub, Output Gear and Gear Key.
***Countershaft Assembly consists of Countershaft Pinion, Countershaft Gear and Gear Key.
****Bearing Kit consists of LH and RH Output Bearing Cup/Cone, LH and RH Countershaft Bearing Cup/Cone (double reduction only) and LH and RH Input Bearing Cup/Cone.

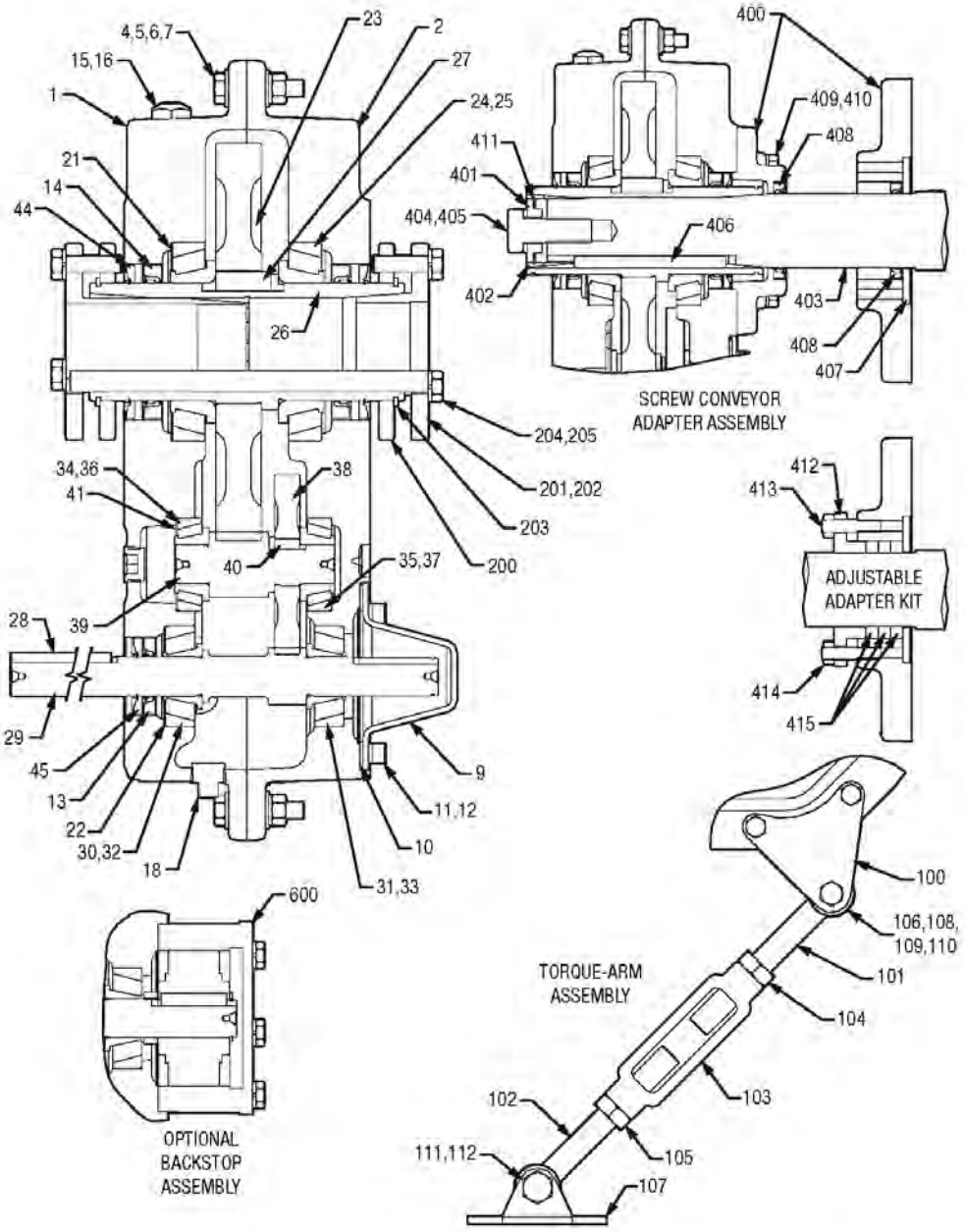


**Figure 17 - Parts for TA0107L thru TA12608H Taper Bushed Double Reduction Reducers**

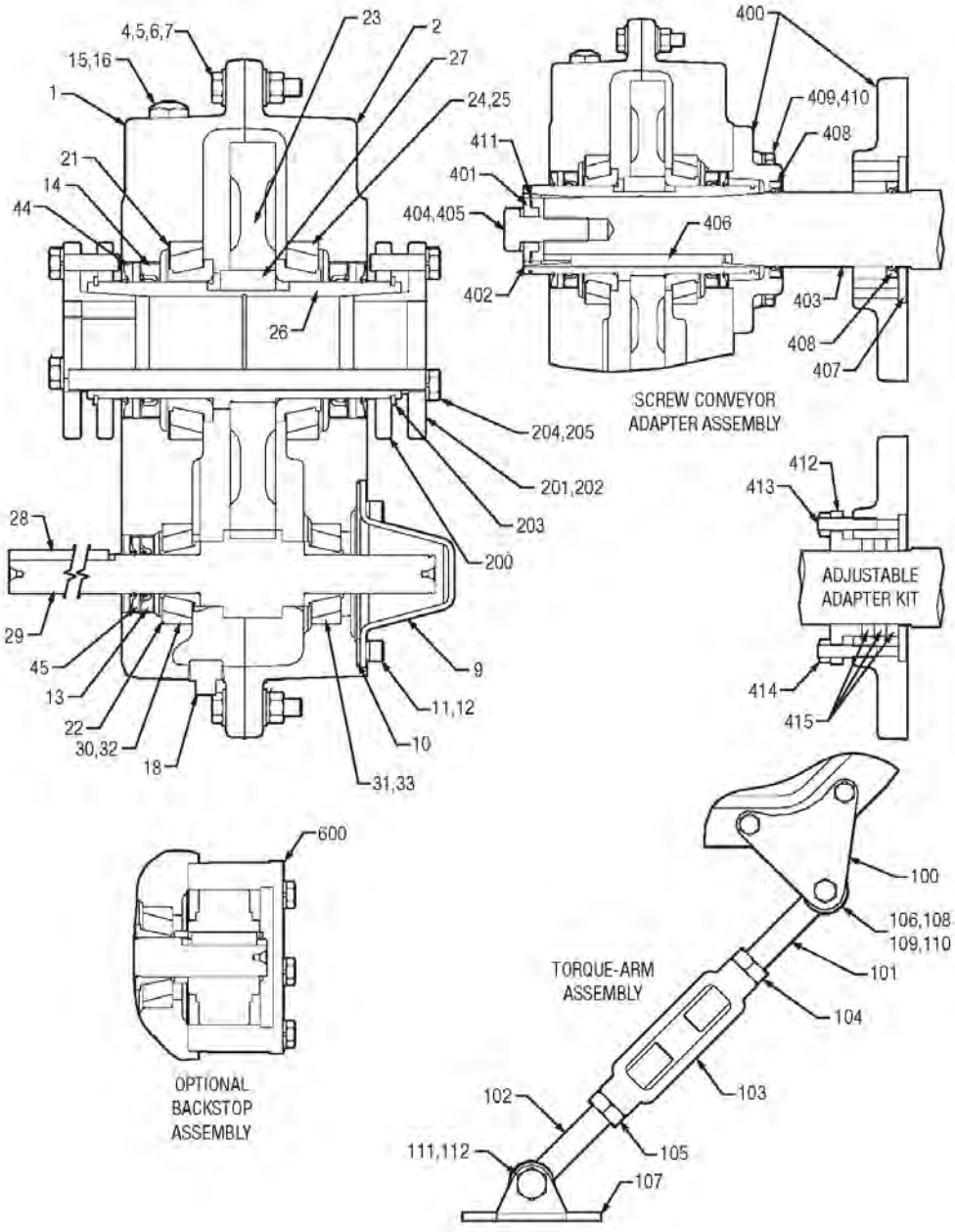


**Figure 18 - Parts for TA0107L thru TA7315H Taper Bushed Single Reduction Reducers**

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Table 12 - Parts for TA0107L through TA5215H Taper Bushed and Single Reduction Reducers

| Ref. | Description | | Qty. | TA0107L | TA1107H | TA2115H | TA3203H | TA4207H | TA5215H |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Housing-LH | | 1 | 900202 | 901202 | 902202 | 903202 | 904202 | 905202 |
| 2 | Housing-RH | | 1 | 900203 | 901203 | 902203 | 903203 | 904203 | 905203 |
| § | RTV Sealant, Tube | | 1 | 465044 | 465044 | 465044 | 465044 | 465044 | 465044 |
| 4 | Housing Bolt | | 14 | 411253 | 411253 | 411412 | 411412 | 411460 | 411460 |
| 5 | Flat Washer | | 28 | 900241 | 900241 | 902241 | 902241 | 904241 | 904241 |
| 6 | Nut | | 14 | 407085 | 407085 | 407087 | 407087 | 407091 | 407091 |
| 7 | Lockwasher | | 14 | 419010 | 419010 | 419011 | 419011 | 419013 | 419013 |
| 8 § | Dowel Pin | | 2 | 901248 | 901248 | 304624 | 901248 | 304624 | 304624 |
| 9 | Backstop Shaft Cover | | 1 | 901279 | 901279 | 901279 | 903279 | 904279 | 905279 |
| 10 | Backstop Cover Gasket | | 1 | 901280 | 901280 | 901280 | 903280 | 904280 | 905280 |
| 11 | Backstop Cover Screw | | 6 ■ | 417038 | 417038 | 417038 | 417038 | 417038 | 417074 |
| 12 | Lockwasher | | 6 ■ | 419045 | 419045 | 419045 | 419045 | 419045 | 419046 |
| 13 | Input Oil Seal | 5:1, 9:1, 15:1 ♦ | 1 | 276173 | 276173 | 276285 | 276280 | A73108 | 905266 |
| | | 25:1 Ratio ♦ | 1 | 276173 | 276173 | 276285 | 276280 | A73108 | 905266 |
| | | 40:1 Ratio ♦ | 1 | 276173 | 276173 | 276173 | 242281 | A73108 | 905266 |
| 14 | Output Oil Seal | | 2 | 900286 | 901286 | 902286 | A73109 | 904286 | 905286 |
| 15 | Air Vent | | 1 | 241237 | 241237 | 241237 | 241237 | 245237 | 245237 |
| 16 | Bushing | | 1 | N/A | N/A | N/A | N/A | 430079 | 430079 |
| 17 § | Oil Plug | | 4 | 430031 | 430031 | 430031 | 430031 | 430035 | 430035 |
| 18 | Magnetic Oil Plug | | 1 | 430060 | 430060 | 430060 | 430060 | 430064 | 430064 |
| 21 | Output Bearing Shim-As Req'd | .015" Shim | | 900263 | 901263 | 902263 | 903263 | 904263 | 905263 |
| | | .007" Shim | | 900265 | 901265 | 902265 | 903265 | 904265 | 905265 |
| | | .005" Shim | | 900264 | 901264 | 902264 | 903264 | 904264 | 905264 |
| 22 | Input Bearing Shim-As Req'd | .015" Shim | | 900271 | 901271 | 902271 | 903267 | 903267 | 905271 |
| | | .007" Shim | | 900273 | 901273 | 902273 | 903269 | 903269 | 905273 |
| | | .005" Shim | | 900272 | 901272 | 902272 | 903268 | 903268 | 905272 |
| 23 | Output Gear | | 1 | 900208 | 901208 | 902208 | 903208 | 904208 | 905208 |
| 24 | Output Bearing Cup | | 2 | 900250 | 901250 | 403003 | 903252 | 403016 | 403140 |
| 25 | Output Bearing Cone | | 2 | 900251 | 901251 | 402003 | 402268 | 402193 | 402050 |
| 26 | Output Hub | | 1 | 900230 | 901230 | 902230 | 903230 | 904230 | 905230 |
| 27 | Output Gear Key | | 1 | 900275 | 901275 | 901275 | 903275 | 904275 | 905275 |
| 28 | Input Pinion Key | 5:1, 9:1, 15:1, 25:1 Ratio ♦ | 1 | 443634 | 443634 | 902277 | 903277 | 904277 | 905277 |
| | | 40:1 Ratio ♦ | 1 | 443634 | 443634 | 902277 | 903298 | 904277 | 905277 |
| 29 | Input Pinion | 5:1 Ratio ♦ | 1 | 900222A | 901222A | 902222 | 903222 | 904222 | 905222 |
| | | 9:1 Ratio ♦ | 1 | 900221A | 901221A | 902221 | 903221 | 904221 | 905221 |
| | | 15:1 Ratio ♦ | 1 | 900220A | 901220A | 902220 | 903220 | 904220 | 905220 |
| | | 25:1 Ratio ♦ | 1 | 900219A | 901219A | 902219 | 903219 | 904219 | 905219 |
| | | 40:1 Ratio ♦ | 1 | 900218A | 901218A | 902218 | 903218 | 904218 | 905218 |
| 30 | Input Bearing Cup-LH | 5:1 Ratio ♦ | 1 | 403166 | 402169 | 403094 | 304809 | 304809 | 403005 |
| | | 9:1 Ratio ♦ | 1 | 403166 | 402169 | 403094 | 304809 | 304809 | 403005 |
| | | 15:1 Ratio ♦ | 1 | 403166 | 402169 | 403094 | 304809 | 304809 | 403005 |
| | | 25:1 Ratio ♦ | 1 | 403166 | 402169 | 403094 | 304809 | 304809 | 403005 |
| | | 40:1 Ratio ♦ | 1 | 403166 | 402169 | 403094 | 403101 | 304809 | 403005 |
| 31 | Input Bearing Cup-RH | 5:1 Ratio ♦ | 1 | 403165 | 403063 | 403094 | 403101 | 904256 | 403005 |
| | | 9:1 Ratio ♦ | 1 | 403165 | 403063 | 403094 | 403101 | 904256 | 403005 |
| | | 15:1 Ratio ♦ | 1 | 403165 | 403063 | 403094 | 403101 | 904256 | 403005 |
| | | 25:1 Ratio ♦ | 1 | 403165 | 403063 | 403094 | 403101 | 904256 | 403005 |
| | | 40:1 Ratio ♦ | 1 | 403165 | 403063 | 403094 | 403101 | 904256 | 403005 |
| 32 | Input Bearing Cone-LH | 5:1 Ratio ♦ | 1 | 402284 | 402294 | 304753 | 411626-05-K | 411626-05-K | 402001 |
| | | 9:1 Ratio ♦ | 1 | 402284 | 402294 | 304753 | 411626-05-K | 411626-05-K | 402001 |
| | | 15:1 Ratio ♦ | 1 | 402284 | 402294 | 304753 | 411626-05-K | 411626-05-K | 402001 |
| | | 25:1 Ratio ♦ | 1 | 402284 | 402294 | 304753 | 411626-05-K | 411626-05-K | 304717 |
| | | 40:1 Ratio ♦ | 1 | 402284 | 402294 | 304707 | 402271 | 411626-05-K | 304717 |
| 33 | Input Bearing Cone-RH | 5:1 Ratio ♦ | 1 | 402265 | 402108 | 304707 | 402271 | 904257 | 402001 |
| | | 9:1 Ratio ♦ | 1 | 402265 | 402108 | 304707 | 402271 | 904257 | 402001 |
| | | 15:1 Ratio ♦ | 1 | 402265 | 402108 | 304707 | 402271 | 904257 | 402001 |
| | | 25:1 Ratio ♦ | 1 | 402265 | 402108 | 304707 | 402271 | 904257 | 402001 |
| | | 40:1 Ratio ♦ | 1 | 402265 | 402108 | 304707 | 402271 | 904258 | 411626-05-V |
| 34 | Countershaft Bearing Cup-LH | | 1 | 304833 | 403165 | 304836 | 403101 | 304809 | 403005 |
| 35 | Countershaft Bearing Cup-RH | | 1 | 304833 | 403165 | 304836 | 403101 | 304809 | 403005 |

**NOTES:**
§ Not shown on drawing.
■ 8 required on TA5215H.
♦ See Table 14 for actual ratio.

Table 12 - Parts for TA0107L through TA5215H Taper Bushed and Single Reduction Reducers (Continued)

| Ref. | Description | | Qty. | TA0107L | TA1107H | TA2115H | TA3203H | TA4207H | TA5215H |
|---|---|---|---|---|---|---|---|---|---|
| 36 | Countershaft Bearing Cone-LH | | 1 | 304740 | 402265 | 411626-05-B | 402271 | 304710 | 402001 |
| 37 | Countershaft Bearing Cone-RH | | 1 | 304740 | 402265 | 411626-05-B | 402271 | 304710 | 402001 |
| 38 | First Stage Gear | 9:1 Ratio ♦ | 1 | 900217 | 901217 | 902217 | 903217 | 904217 | 905217 |
| | | 15:1 Ratio ♦ | 1 | 900215 | 901215 | 902215 | 903215 | 904215 | 905215 |
| | | 25:1 Ratio ♦ | 1 | 900213 | 901213 | 902213 | 903213 | 904213 | 905213 |
| | | 40:1 Ratio ♦ | 1 | 900211 | 901211 | 902211 | 903211 | 904211 | 905211 |
| 39 | Countershaft Pinion | | 1 | 900209 | 901209 | 902209 | 903209 | 904209 | 905209 |
| 40 | First Stage Gear Key | | 1 | 900276 | 901276 | 902276 | 903276 | 904276 | 905276 |
| 41 | Countershaft Bearing Shim-As Req'd | .015" Shim | | 900271 | 901271A | 901271 | 903267 | 903267 | 905271 |
| | | .007" Shim | | 900272 | 901273A | 901273 | 903269 | 903269 | 905273 |
| | | .005" Shim | | 900273 | 901272A | 901272 | 903268 | 903268 | 905272 |
| 44 | Auxiliary Output Seal | | 2 | 900236 | 901236 | 902236 | 903236 | 904236 | 905236 |
| 45 | Auxiliary Input Seal | 5:1, 9:1, 15:1, 25:1 Ratio ♦ | 1 | 442023 | 442023 | 902238 | 903238 | 904238 | 905238 |
| | | 40:1 Ratio ♦ | 1 | 442023 | 442023 | 442023 | N/A | 904238 | 905238 |
| 100 | Torque-Arm Adapter Bracket | | 2 | 900500 | 901500 | 902500 | 903500 | 904500 | 905500 |
| | **Torque-Arm Rod Kit ★** | | 1 | 241244 | 241244 | 242244 | 242244 | 244245 | 244245 |
| 101 | ▲ Torque-Arm Rod End | | 1 | 241245 | 241245 | 243245 | 243245 | 245245 | 245245 |
| 102 | ▲ Torque-Arm Extension | | 1 | 241247 | 241247 | 243247 | 243247 | 245247 | 245247 |
| 103 | ▲ Torque-Arm Turnbuckle | | 1 | 241246 | 241246 | 243246 | 243246 | 245246 | 245246 |
| 104 | ▲ RH Nut | | 1 | 407093 | 407093 | 407095 | 407095 | 407097 | 407097 |
| 105 | ▲ LH Nut | | 1 | 407242 | 407242 | 407244 | 407244 | 407246 | 407246 |
| 106 | Torque-Arm Bushing | | 1 | 242243 | 242243 | 243243 | 243243 | 245243 | 245243 |
| 107 | Torque-Arm Fulcrum | | 1 | 241249 | 241249 | 243249 | 243249 | 246249 | 246249 |
| 108 | Torque-Arm Bolt | | 1 | 411412 | 411412 | 411437 | 411437 | 411460 | 411460 |
| 109 | Torque-Arm Lockwasher | | 1 | 419011 | 419011 | 419012 | 419012 | 419013 | 419013 |
| 110 | Torque-Arm Nut | | 1 | 407087 | 407087 | 407089 | 407089 | 407091 | 407091 |
| 111 | Torque-Arm Bolt | | 1 | 411456 | 411456 | 411484 | 411484 | 411484 | 411484 |
| 112 | Torque-Arm Nut | | 1 | 407091 | 407091 | 407093 | 407093 | 407093 | 407093 |
| 113 | Lockwasher | | 1 | N/A | N/A | N/A | N/A | N/A | N/A |
| 200 | Bushing Back-Up Plate | | 2 | 241266 | 901301 | 243308 | 903301 | 904301 | 905301 |
| 203 | Retaining Ring | | 2 | 421111 | 901304 | 421109 | 903304 | 421107 | 421055 |
| 204 | Bushing Cap Screw | | 6 | 411405 | 411390 | 902306 | 411408 | 411408 | 411456 |
| 205 | Bushing Lockwasher | | 6 | 419010 | 419010 | 419011 | 419011 | 419011 | 419013 |
| 400 | Screw Conveyor Adapter | | 1 | 900401 | 901401 | 902401 | 903401 | 904401 | 905401 |
| 401 | Screw Conveyor Keeper Plate | | 1 | 900402 | 901402 | 902402 | 903402 | 904402 | 905402 |
| 402 | Screw Conveyor Wedge | | 1 | 900403 | 901403 | 902403 | 903403 | 904403 | 905403 |
| 403 | Screw Conveyor Drive Shaft | 1-1/2" Shaft | 1 | 900421 | 901421 | 902421 | 903421 | N/A | N/A |
| | | 1-1/2" Shaft, Stainless Steel | 1 | 900429 | 901429 | 902429 | 903429 | N/A | N/A |
| | | 2" Shaft | 1 | 900422 | 901422 | 902422 | 903422 | 904422 | 905422 |
| | | 2" Shaft, Stainless Steel | 1 | 900430 | 901430 | 902430 | 903430 | 904430 | 905430 |
| | | 2-7/16" Shaft | 1 | 900423 | 901423 | 902423 | 903423 | 904423 | 905423 |
| | | 2-7/16" Shaft, Stainless Steel | 1 | 900431 | 901431 | 902431 | 903431 | 904431 | 905431 |
| | | 3" Shaft | 1 | 900424 | 901424 | 902424 | 903424 | 904424 | 905424 |
| | | 3" Shaft, Stainless Steel | 1 | 900432 | 901432 | 902432 | 903432 | 904432 | 905432 |
| | | 3-7/16" Shaft | 1 | N/A | N/A | N/A | N/A | 904425 | 905425 |
| | | 3-7/16" Shaft, Stainless Steel | 1 | N/A | N/A | N/A | N/A | 904433 | 905433 |
| 404 | Retaining Bolt | | 1 | 411549 | 411549 | 411549 | 411551 | 411551 | 411551 |
| 405 | Lockwasher | | 1 | 419014 | 419014 | 419014 | 419016 | 419016 | 419016 |
| 406 | Drive Shaft Key | | 1 | 900405 | 901405 | 902405 | 903405 | 904405 | 905405 |
| 407 | Drive Shaft Washer | | 1 | 900404 | 901404 | 902404 | 903404 | 904404 | 905404 |
| 408 | Seal | | 2 | 900411 | 901411 | 902411 | 353085 | 904411 | 905411 |
| 409 | Bolt | | 4 | 411410 | 411410 | 411435 | 411456 | 411456 | 411483 |
| 410 | Lockwasher | | 4 | 419011 | 419011 | 419012 | 419013 | 419013 | 419014 |
| 411 | Retaining Ring | | 1 | 900406 | 901406 | 902406 | 903406 | 904406 | 905406 |
| 412 | Adjustable Packing Retainer | | 1 | 900413 | 901413 | 902413 | 903413 | 904413 | 905413 |
| 413 | Adjustable Packing Gland Stud | | 2 | 400404 | 400404 | 400404 | 400404 | 400404 | 400404 |
| 414 | Adjustable Packing Gland Nut | | 2 | 407202 | 407202 | 407202 | 407202 | 407202 | 407202 |
| 415 | Sealing Rings | | 3 | 900416 | 901416 | 902416 | 903416 | 904416 | 905416 |
| 600 | Backstop Assembly | 5:1, 9:1, 15:1, 25:1 Ratio ♦ | 1 | 901102 | 901102 | 902102 | 903102 | 904102 | 905102 |
| | | 40:1 Ratio ♦ | 1 | 901102 | 901102 | 902102 | 903102 | 904103 | 905103 |

**NOTES:**
★ Includes parts listed immediately below marked "▲".
▲ Makes up assembly under which it is listed marked "★"
♦ See Table 14 for actual ratio.

Table 13 - Parts for TA6307H through TA12608H Taper Bushed and Single Reduction Reducers

| Ref. | Description | | Qty. | TA6307H | TA7315H | TA8407H | TA9415H | TA10507 | TA12608 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Housing-LH | | 1 | 906202 | 907202 | 908202 | 909202 | 910202 | 912202 |
| 2 | Housing-RH | | 1 | 906203 | 907203 | 908203 | 909203 | 910203 | 912203 |
| § | RTV Sealant, Tube | | 1 | 465044 | 465044 | 465044 | 465044 | 465044 | 465044 |
| 4 | Housing Bolt | | 14 ✣ | 411460 | 411488 | 411488 | 411488 | 411496 | 411496 |
| 5 | Flat Washer | | 28 † | 904241 | 907241 | 907241 | 907241 | 910241 | 910241 |
| 6 | Nut | | 14 ✣ | 407091 | 407093 | 407093 | 407093 | 407095 | 407095 |
| 7 | Lockwasher | | 14 ✣ | 419013 | 419014 | 419014 | 419014 | 419016 | 419016 |
| 8 § | Dowel Pin | | 2 | 304624 | 304624 | 304624 | 304624 | 304624 | 304624 |
| 9 | Backstop Shaft Cover | | 1 | 906279 | 907279 | 908279 | 907279 | 910279 | 912279 |
| 10 | Backstop Cover Gasket | | 1 | 906280 | 907280 | 908280 | 907280 | 910280 | 912280 |
| 11 | Backstop Cover Screw | | 6 ■ | 417074 | 907281 | 417074 | 907281 | 907281 | 907281 |
| 12 | Lockwasher | | 6 ■ | 419046 | 419047 | 419046 | 419047 | 419047 | 419047 |
| 13 | Input Oil Seal | 5:1, 9:1 ♦ | 1 | 901286 | 907266 | N/A | N/A | N/A | N/A |
| | | 15:1 ♦ | 1 | 901286 | 907266 | 907266 | 907266 | 902286 | 902286 |
| | | 25:1 Ratio ♦ | 1 | 901286 | 907266 | 907266 | 907266 | 902286 | 902286 |
| | | 40:1 Ratio ♦ | 1 | 901286 | 907266 | 907266 | 907266 | 902286 | 902286 |
| 14 | Output Oil Seal | | 2 | 906286 | 907286 | 907286 | 909286 | 910286 | 912286 |
| 15 | Air Vent | | 1 | 245237 | 245237 | 245237 | 245237 | 245237 | 245237 |
| 16 | Bushing | | 1 | 430079 | 430079 | 430079 | 430079 | 430079 | 430079 |
| 17 § | Oil Plug | | 4 | 430035 | 430035 | 430035 | 430035 | 430035 | 430035 |
| 18 | Magnetic Oil Plug | | 1 | 430064 | 430064 | 430064 | 430064 | 430064 | 430064 |
| 21 | Output Bearing Shim-As Req'd | .015" Shim | | 906263 | 907263 | 907263 | 909263 | 910263 | 912263 |
| | | .007" Shim | | 906265 | 907265 | 907265 | 909265 | 910265 | 912265 |
| | | .005" Shim | | 906264 | 907264 | 907264 | 909264 | 910264 | 912264 |
| 22 | Input Bearing Shim-As Req'd | .015" Shim | | 906271 | 907271 | 903263 | 909267 | 910267 | 910267 |
| | | .007" Shim | | 906273 | 907273 | 903265 | 909269 | 910269 | 910269 |
| | | .005" Shim | | 906272 | 907272 | 903264 | 909268 | 910268 | 910268 |
| 23 | Output Gear | | 1 | 906208 | 907208 | 908208 | 909208 | 910208 | 912208 |
| 24 | Output Bearing Cup | | 2 | 906250 | 403105 | 403105 | 403110 | 910250 | 912250 |
| 25 | Output Bearing Cone | | 2 | 906251 | 402147 | 402147 | 402160 | 910251 | 912251 |
| 26 | Output Hub | | 1 | 906230 | 907230 | 908230 | 909230 | 910230 | 912230 |
| 27 | Output Gear Key | | 1 • | 906275 | 907275 | 908275 | 909275 | 910275 | 912275 |
| 28 | Input Pinion Key | 5:1, 9:1 ♦ | 1 | 906277 | 907277 | N/A | N/A | N/A | N/A |
| | | 15:1, 25:1 Ratio ♦ | 1 | 906277 | 907277 | 908277 | 909277 | 909277 | 909277 |
| | | 40:1 Ratio ♦ | 1 | 906277 | 907277 | 908277 | 909277 | 909277 | 909277 |
| 29 | Input Pinion | 5:1 Ratio ♦ | 1 | 906222 | 907222 | N/A | N/A | N/A | N/A |
| | | 9:1 Ratio ♦ | 1 | 906221 | 907221 | N/A | N/A | N/A | N/A |
| | | 15:1 Ratio ♦ | 1 | 906220 | 907220 | 908220 | 909220 | 910220 | 912220 |
| | | 25:1 Ratio ♦ | 1 | 906219 | 907219 | 908219 | 909219 | 910219 | 912219 |
| | | 40:1 Ratio ♦ | 1 | 906218 | 907218 | 908218 | 909218 | 910218 | 912218 |
| 30 | Input Bearing Cup-LH | 5:1 Ratio ♦ | 1 | 403026 | 304802 | N/A | N/A | N/A | N/A |
| | | 9:1 Ratio ♦ | 1 | 403026 | 304802 | N/A | N/A | N/A | N/A |
| | | 15:1 Ratio ♦ | 1 | 403026 | 304802 | 908259 | 403036 | 402231 | 402231 |
| | | 25:1 Ratio ♦ | 1 | 403026 | 304802 | 908259 | 403036 | 402231 | 402231 |
| | | 40:1 Ratio ♦ | 1 | 403026 | 304802 | 908259 | 403036 | 402231 | 402231 |
| 31 | Input Bearing Cup-RH | 5:1 Ratio ♦ | 1 | 403026 | 403159 | N/A | N/A | N/A | N/A |
| | | 9:1 Ratio ♦ | 1 | 403026 | 403159 | N/A | N/A | N/A | N/A |
| | | 15:1 Ratio ♦ | 1 | 403026 | 403159 | 908256 | 411626-06-BE | 411626-06-BE | 403036 |
| | | 25:1 Ratio ♦ | 1 | 403026 | 403159 | 908256 | 411626-06-BE | 411626-06-BE | 403036 |
| | | 40:1 Ratio ♦ | 1 | 403026 | 403159 | 304804 | 304804 | 304804 | 403036 |
| 32 | Input Bearing Cone-LH | 5:1 Ratio ♦ | 1 | 906260 | 402041 | N/A | N/A | N/A | N/A |
| | | 9:1 Ratio ♦ | 1 | 906260 | 402041 | N/A | N/A | N/A | N/A |
| | | 15:1 Ratio ♦ | 1 | 906260 | 402041 | 908260 | 304701 | 402232 | 402232 |
| | | 25:1 Ratio ♦ | 1 | 906260 | 402041 | 908260 | 304701 | 402232 | 402232 |
| | | 40:1 Ratio ♦ | 1 | 906260 | 402041 | 908260 | 304701 | 402232 | 402232 |
| 33 | Input Bearing Cone-RH | 5:1 Ratio ♦ | 1 | 906260 | 907260 | N/A | N/A | N/A | N/A |
| | | 9:1 Ratio ♦ | 1 | 906260 | 907260 | N/A | N/A | N/A | N/A |
| | | 15:1 Ratio ♦ | 1 | 906260 | 907260 | 908257 | 411626-05-BM | 411626-05-BM | 304701 |
| | | 25:1 Ratio ♦ | 1 | 906257 | 907260 | 908257 | 411626-05-BM | 411626-05-BM | 304701 |
| | | 40:1 Ratio ♦ | 1 | 906257 | 402054 | 908258 | 908258 | 908258 | 912258 |

**NOTES:**
§ Not shown on drawing.
■ 8 required on TA6307H, TA7315H, TA8407H and TA9415H; 12 required on TA10507H and TA12608H.
✣ 18 required on TA9415H; 20 required on T10507H; 22 required on TA12608H
† 36 required on TA9415H; 40 required on TA10507H; 44 required on TA12608H
• 2 required on TA7315H, TA8407H, TA9415H, and TA10507H
♦ See Table 14 for actual ratio.

Table 13 - Parts for TA6307H through TA12608H Taper Bushed and Single Reduction Reducers (Continued)

| Ref. | Description | | Qty. | TA6307H | TA7315H | TA8407H | TA9415H | TA10507H | TA12608H |
|---|---|---|---|---|---|---|---|---|---|
| 34 | Counter-Shaft Bearing Cup-LH | | 1 | 403026 | 403159 | 411626-06-BE | 403036 | 403087 | 402233 |
| 35 | Counter-Shaft Bearing Cup-RH | | 1 | 403026 | 403159 | 411626-06-BE | 403036 | 403087 | 402233 |
| 36 | Counter-Shaft Bearing Cone-LH | | 1 | 906257 | 907260 | 411626-05-BM | 304701 | 402023 | 912253 |
| 37 | Counter-Shaft Bearing Cone-RH | | 1 | 906257 | 907260 | 908253 | 304701 | 402023 | 912253 |
| 38 | First Stage Gear | 9:1 Ratio ♦ | 1 | 906217 | 907217 | N/A | N/A | N/A | N/A |
| | | 15:1 Ratio ♦ | 1 | 906215 | 907215 | 908215 | 909215 | 910215 | 912215 |
| | | 25:1 Ratio ♦ | 1 | 906213 | 907213 | 908213 | 909213 | 910213 | 912213 |
| | | 40:1 Ratio ♦ | 1 | 906211 | 907211 | 908211 | 909211 | 910211 | 912211 |
| 39 | Counter-Shaft Pinion | | 1 | 906209 | 907209 | 908209 | 909209 | 910209 | 912209 |
| 40 | First Stage Gear Key | | 1 | 906276 | 907276 | 908276 | 909276 | 910276 | 912276 |
| 41 | Countershaft Bearing Shim-As Req'd | .015" Shim | | 906271 | 906271 | 908267 | 909267 | 904263 | 912267 |
| | | .007" Shim | | 906273 | 906273 | 908269 | 909269 | 909265 | 912269 |
| | | .005" Shim | | 906272 | 906272 | 908268 | 909268 | 904264 | 912268 |
| 44 | Auxiliary Output Seal | | 2 | 906236 | 907236 | 907236 | 909236 | 910236 | 912236 |
| 45 | Auxiliary Input Seal | 5:1, 9:1 Ratio ♦ | 1 | 901236 | 907238 | N/A | N/A | N/A | N/A |
| | | 15:1, 25:1 Ratio ♦ | 1 | 901236 | 907238 | 907238 | 907238 | 902236 | 902236 |
| | | 40:1 Ratio ♦ | 1 | 901236 | 907238 | 907238 | 907238 | 902236 | 902236 |
| 100 | Torque-Arm Adapter Bracket | | 2 | 906500 | 907500 | 907500 | 909500 | 910500 | 912500 |
| | **Torque-Arm Rod Kit ★** | | 1 | 247238 | 248240 | 248240 | 272416 | 272416 | |
| 101 | ▲ Torque-Arm Rod End | | 1 | 247239 | 271050 | 271050 | 272050 | 272050 | 272151 |
| 102 | ▲ Torque-Arm Extension | | 1 | 247240 | 271052 | 271052 | 272052 | 272052 | 272153 |
| 103 | ▲ Torque-Arm Turnbuckle | | 1 | 247246 | 271051 | 271051 | 272051 | 272051 | 272152 |
| 104 | ▲ RH Nut | | 1 | 407099 | 407104 | 407104 | 407108 | 407108 | 407110 |
| 105 | ▲ LH Nut | | 1 | 407248 | 407250 | 407250 | 407251 | 407251 | 407111 |
| 106 | Torque-Arm Bushing | | 1 | 247244 | 271046 | 271046 | 272046 | 272046 | 272187 |
| 107 | Torque-Arm Fulcrum | | 1 | 247248 | 271054 | 271054 | 272054 | 272054 | 272154 |
| 108 | Torque-Arm Bolt | | 1 | 411489 | 411510 | 411510 | 411520 | 411520 | 411527 |
| 109 | Torque-Arm Lockwasher | | 1 | 419014 | 419020 | 419020 | 419024 | 419024 | 419025 |
| 110 | Torque-Arm Nut | | 1 | 407093 | 407099 | 407099 | 407104 | 407104 | 407108 |
| 111 | Torque-Arm Bolt | | 1 | 411489 | 411516 | 411516 | 419524 | 411524 | 411528 |
| 112 | Torque-Arm Nut | | 1 | 407093 | 407099 | 407099 | 407104 | 407104 | 407108 |
| 113 | Lockwasher | | 1 | 419014 | 419020 | 419020 | 419024 | 419024 | 419025 |
| 200 | Bushing Back-Up Plate | | 2 | 906301 | 272037 | 908301 | 909301 | 910301 | 912301 |
| 203 | Retaining Ring | | 2 | 906304 | 421098 | 908304 | 909304 | 910304 | 912304 |
| 204 | Bushing Cap Screw | | 6 ※ | 411456 | 411457 | 411457 | 411484 | 411484 | 411484 |
| 205 | Bushing Lockwasher | | 6 ※ | 419013 | 419013 | 419013 | 419014 | 419014 | 419014 |
| 400 | Screw Conveyor Adapter | | 1 | 906401 | 907401 | N/A | N/A | N/A | N/A |
| 401 | Screw Conveyor Keeper Plate | | 1 | 906402 | 907402 | N/A | N/A | N/A | N/A |
| 402 | Screw Conveyor Wedge | | 1 | 906403 | 907403 | N/A | N/A | N/A | N/A |
| 403 | Screw Conveyor Drive Shaft | 2-7/16" Shaft | 1 | 906423 | 907423 | N/A | N/A | N/A | N/A |
| | | 2-7/16" Shaft, Stainless Steel | 1 | 906431 | 907431 | N/A | N/A | N/A | N/A |
| | | 3" Shaft | 1 | 906424 | 907424 | N/A | N/A | N/A | N/A |
| | | 3" Shaft, Stainless Steel | 1 | 906432 | 907432 | N/A | N/A | N/A | N/A |
| | | 3-7/16" Shaft | 1 | 906425 | 907425 | N/A | N/A | N/A | N/A |
| | | 3-7/16" Shaft, Stainless Steel | 1 | 906433 | 907433 | N/A | N/A | N/A | N/A |
| 404 | Retaining Bolt | | 1 | 411552 | 411552 | N/A | N/A | N/A | N/A |
| 405 | Lockwasher | | 1 | 419020 | 419020 | N/A | N/A | N/A | N/A |
| 406 | Drive Shaft Key | | 1 | 906405 | 907405 | N/A | N/A | N/A | N/A |
| 407 | Drive Shaft Washer | | 1 | 906404 | 907404 | N/A | N/A | N/A | N/A |
| 408 | Seal | | 2 | 906411 | 907411 | N/A | N/A | N/A | N/A |
| 409 | Bolt | | 4 | 411983 | 411493 | N/A | N/A | N/A | N/A |
| 410 | Lockwasher | | 4 | 419016 | 419016 | N/A | N/A | N/A | N/A |
| 411 | Retaining Ring | | 1 | 906406 | 907406 | N/A | N/A | N/A | N/A |
| 412 | Adjustable Packing Retainer | | 1 | 906413 | 907413 | N/A | N/A | N/A | N/A |
| 413 | Adjustable Packing Gland Stud | | 2 | 400404 | 400404 | N/A | N/A | N/A | N/A |
| 414 | Adjustable Packing Gland Nut | | 2 | 407202 | 407202 | N/A | N/A | N/A | N/A |
| 415 | Sealing Rings | | 3 | 906416 | 907416 | N/A | N/A | N/A | N/A |
| 600 | Backstop Assembly | 5:1, 9:1 ♦ | 1 | 906102 | 907102 | N/A | N/A | N/A | N/A |
| | | 15:1 Ratio ♦ | 1 | 906102 | 907102 | 908102 | 909102 | 910102 | 912102 |
| | | 25:1 Ratio ♦ | 1 | 906103 | 907102 | 908102 | 909102 | 910102 | 912102 |
| | | 40:1 Ratio ♦ | 1 | 906103 | 907103 | 908103 | 907103 | 910103 | 912103 |

**NOTES:**
★ Includes parts listed immediately below marked "▲".
▲ Makes up assembly under which it is listed marked "★"
※ 8 required on TA12608H
♦ See Table 14 for actual ratio.

**Table 14 - Actual Ratios**

| Reducer Size | Nominal Ratios | | | | |
|---|---|---|---|---|---|
| | 5:1 | 9:1 | 15:1 | 25:1 | 40:1 |
| TA0107L | 5.200 | 9.000 | 14.928 | 25.091 | 30.942 |
| TA1107H | 5.000 | 8.990 | 14.912 | 25.064 | 30.909 |
| TA2115H | 5.200 | 9.103 | 15.619 | 25.067 | 33.333 |
| TA3203H | 4.913 | 9.234 | 15.067 | 24.954 | 32.451 |
| TA4207H | 5.000 | 9.231 | 15.000 | 25.125 | 39.107 |
| TA5215H | 5.105 | 9.183 | 14.923 | 24.996 | 38.907 |
| TA6307H | 4.944 | 9.215 | 15.451 | 24.868 | 38.319 |
| TA7315H | 5.188 | 9.716 | 14.914 | 24.837 | 39.656 |
| TA8407H | N/A | N/A | 15.120 | 24.965 | 39.667 |
| TA9415H | N/A | N/A | 15.103 | 25.435 | 39.406 |
| TA10507H | N/A | N/A | 15.092 | 25.184 | 39.676 |
| TA12608H | N/A | N/A | 14.788 | 25.025 | 38.188 |

## Supplemental Instructions For the Installation, Operation and Maintenance of ATEX Approved Torque-Arm II Shaft Mount Reducers (Zone 1) Sizes TA0107 – TA12608

### PREFACE

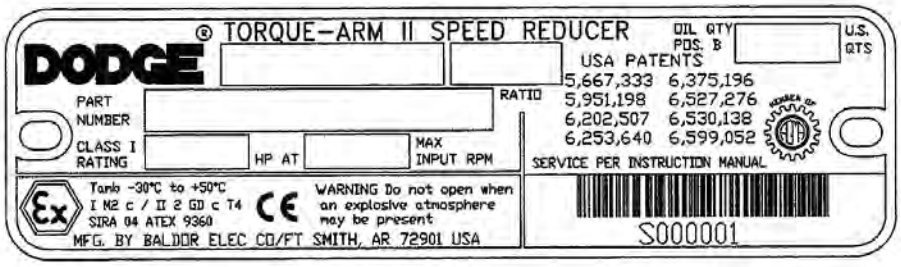
The products described in this manual are manufactured by Baldor Electric Company, Fort Smith, AR USA.

This manual is intended to provide basic information on the safe operation and maintenance of ATEX approved Torque-Arm II shaft mount reducers. These instructions do not cover all details or variations in equipment nor provide every possible contigency or hazard to be met in connection with installation, operation, and maintenance. Should further information be desired or should particular problems arise which are not covered in the manual, the matter should be referred to your local Baldor Electric Company representative.

The reducer was manufactured under the guidelines of the ATEX directive 94/9/EC.

Torque-Arm II reducers are suitable for ATEX Category 2 and M2, Group II and I, for gas and dust environments and are also suitable for ATEX Category 3 for all gas or dust environments with ignition temperatures higher than T4 - 135°C.

Typical reducer marking is contained on a certificaton plate similar to the following:




### ATTENTION

The reducer is designed to operate with a surface temperature at or below 200°F. Failure to operate the reducer properly can cause this maximum surface temperature to be exceeded. If applied in a Division 1 or Zone 1 environment this excessive temperature may cause ignition of hazardous materials.

The use of supplemental cooling devices such as a shaft-mounted cooling fan or heat exchanger may be required to ensure operating temperature below 200°F if indicated by catalog selection tables or if the reducer is operated at ambient temperatures above 80°F. Proper use of supplemental cooling, if provided, and avoidance of undesirable operating conditions is required.

### ABNORMAL CONDITIONS

Operating the reducer under any of the following conditions can cause higher than normal operating temperatures:

1. reducer load exceeding nameplate ratings
2. ambient temperatures above nameplate rating
3. inadequate cooling
4. operation above maximum nameplate speed
5. insufficient amount or improper type of lubricant

### ADDITIONAL INSTRUCTIONS FOR SAFE INSTALLATION AND USE

- Do not open reducer when an explosive atmosphere may be present.
- All rotating parts should be guarded to prevent contact with foreign objects which could result in sparks and ignition.
- The reducer should be periodically inspected for proper oil level, signs of oil leakage, and dust or dirt buildup that would impede heat dissipation.
- Follow lubrication instructions and service schedule in this manual. Use gear lubricant with flash point temperature 300°F or higher.
- Increasing levels of vibration and noise could indicate the need for repair or replacement of the reducer, including replacement of bearings.
- Electrical sparks are a source of ignition. To reduce this risk, proper electrical bonding and grounding are recommended. Under standard operating conditions, the reducer is electrically bonded to the driven equipment through the output shaft connection.

BALDOR

## *EC Declaration of Conformity*

*The undersigned, representing the following supplier and the authorised representative established within the Community*

**Baldor Electric Company**
**5711 R. S. Boreham, Jr. Street**
**Fort Smith, Arkansas 72901**
*USA*

*Baldor Electric Germany GmbH*
*Dieselstrasse 22a*
*85551 Kirchheim*
*Germany*

*herewith declare that the Products*

*Product identification (brand and catalogue number/part number):*

***Gear Reducers*** (Ex)
***Dodge Torque Arm II, Sizes TA0107 through TA12608, Equipment Group I, Category M2 c/Equipment Group II Category 2 GD c T4 TAMB - 30°C to +50°C***

*are in conformity with the provisions of the following EC Directive(s) when installed in accordance with the installation instructions contained in the product documentation:*

| | |
|---|---|
| *94/9/EC* | *ATEX* |

*and that the standards and/or technical specifications referenced below have been applied:*

| | |
|---|---|
| *EN 1127-1: 1998* | *Explosive Atmospheres - Explosion Prevention And Protection – Part 1: Basic Concepts And Methodology* |
| *EN 13463-1: 2001* | *Non - Electrical Equipment For Potentially Explosive Atmospheres -Method And Requirements* |
| *EN13463-5: 2003* | *Non-Electrical Equipment Intended For Use In Potentially Explosive Atmospheres - Part 5: Protection By Constructional Safety "C"* |

| *Supplier:* | | *Authorised Representative in the Community:* | |
|---|---|---|---|
| *Signature* | | *Signature* | |
| *Name:* | L. Evans Massey | *Name:* | Michael Klein |
| *Position:* | Manager Standards and Certification | *Position:* | Product Group Director Europe |
| *Date:* | **20-July-09** | *Date:* | **20-July-09** |

Document Control Number: DOC-BEZ-DG-M11-A-EN DOC 1 / 1

BALDOR

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www.baldor.com


MN1501 (Replaces 49931A)

3/10 FARR 25,000

# ROLLER BEARINGS

## INSTRUCTION MANUAL FOR DODGE® S-2000 SPHERICAL ROLLER BEARINGS

These instructions must be read thoroughly before installing or operating this product.

**WARNING: To ensure that drive is not unexpectedly started, turn off and lock out or tag power source before proceeding. Failure to observe these precautions may result in bodily injury.**

## INSTALLATION

### GENERAL INFORMATION

DODGE S-2000 Spherical Roller Bearing mounted units incorporate a unique way of sealing the internal components of the bearing while still allowing a full + or - 1 degree of misalignment. The patented sealing system (Pat. #5,908,249) has proven effective, due to its constant contact pressure, in protecting the internal bearing components under maximum allowable misaligned conditions.

### NON-EXPANSION BEARING

1. Clean shaft and bore of bearing. The shaft should be straight, free of burrs and nicks, and correct size (see shaft tolerance table). If used shafting is utilized, then the bearing should be mounted on unworn section of shafting.
2. Lubricate shaft and bearing bore with grease or oil to facilitate assembly. Slip bearing into position. When light press fit is required, press against the end of the inner ring of bearing. Do not strike or exert pressure on the housing or seals.
3. Bolt bearing to support, using shims where necessary to align bearing so inner ring does not rub on seal carrier. Use full shims which extend across the entire housing base.
4. Determine final shaft position and tighten setscrews in the locking collar(s) of non-expansion bearing to recommended torque while the other bearings remain free. Rotate the shaft slowly under load, if possible, to properly center the rolling elements with respect to the raceways. Then tighten setscrews into the locking collar of the remaining bearings to the recommended torque.
5. Check rotation. If there is any strain, irregular rotational torque or vibration, it could be due to incorrect alignment, bent shaft or bent supports. Installation should be rechecked and correction made where necessary.

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

### EXPANSION BEARING

1. Clean shaft and bore of bearing. The shaft should be straight, free of burrs and nicks, and correct size (see shaft tolerance table). If used shafting is utilized, then the bearing should be mounted on unworn section of shafting.
2. Lubricate shaft and bearing bore with grease or oil to facilitate assembly. Slip bearing into position. When light press fit is required, press against the end of the inner ring of bearing. Do not strike or exert pressure on the housing or seals.
3. Bolt bearing to support, using shims where necessary to align bearing so inner ring does not rub on seal carrier. Use full shims which extend across the entire housing base.
4. Position expansion bearing in the housing. For normal expansion conditions, the bearing insert should be positioned in the center of the housing. To center bearing insert in housing, move bearing insert to extreme position and mark shaft. Then using bearing maximum total expansion table, move bearing insert in opposite direction one-half the total expansion to center bearing in the housing. If maximum expansion is required, move bearing insert to the extreme position in the housing to permit full movement in direction of expansion. After expansion bearing has been positioned in the housing, tighten the setscrews in the locking collar to the recommended torque.
5. Check rotation. If there is any strain, irregular rotational torque or vibration, it could be due to incorrect alignment, bent shaft or bent supports. Installation should be rechecked and correction made where necessary.

### FIELD CONVERSION (RE-OP) OF A NON-EXPANSION BEARING INTO AN EXPANSION BEARING

All non-expansion bearing sizes can be re-oped to become expansion bearings. To re-op a non-expansion to an expansion bearing follow these steps:

1. Move the snap ring, opposite from the collar side of bearing, to the outermost snap ring groove.
2. Install bearing per Expansion Bearing instructions listed above.

**NOTE: Bearing nameplate has a non-expansion Part Number. When bearing is re-oped the bearing should be marked as expansion for future reference.**

**Table 1 - BEARING MAXIMUM TOTAL EXPANSION**

| Shaft Size (In.) | Total Expansion (In.) |
|---|---|
| 1-3/8 – 1 1/2 | 3/16 |
| 1-11/16 – 3 7/16 | 1/14 |
| 3-15/16 | 5/16 |
| 4-7/16 – 4 15/16 | 3/8 |

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# LUBRICATION INSTRUCTIONS

## OPERATION IN PRESENCE OF DUST, WATER OR CORROSION VAPORS

This bearing is factory lubricated with No. 2 consistency lithium complex base grease which is suitable for most applications. However, extra protection is necessary if bearing is subjected to excessive moisture, dust, or corrosive vapor. In these cases, bearing should contain as much grease as speed will permit (a full bearing with consequent slight leakage through the seal is the best protection against contaminant entry).

In extremely dirty environments, the bearing should be purged daily to flush out contaminants. For added protection, it is advisable to shroud the bearing from falling material.

## HIGH SPEED OPERATION

At higher operation speeds, too much grease may cause overheating. In these cases, the amount of lubrication can only be determined by experience. If excess grease causes overheating, remove grease fittings and run for ten minutes. This will allow excess grease to escape. Then wipe off excess grease and replace grease fittings.

In higher speed applications, a small amount of grease at frequent intervals is preferable to a large amount at infrequent intervals. However, the proper volume and interval of lubrication can best be determined by experience.

## AVERAGE OPERATIONS

The following table is a general guide for normal operating conditions. However, some situations may require a change in lubricating periods as dictated by experience. If the bearing is exposed to unusual operating conditions, consult a reputable grease manufacturer.

## Lubrication Guide

Read Preceding Paragraphs Before Establishing Lubrication Schedule

**Table 2 - Suggested Lubrication Period In Weeks**

| Hours run per day | 1 to 250 rpm | 251 to 500 rpm | 501 to 750 rpm | 751 to 1500 rpm | 1001 to 2000 rpm | 1501 to 2000 rpm | 2001 to 2500 rpm | 2501 to 3000 rpm |
|---|---|---|---|---|---|---|---|---|
| 8 | 12 | 12 | 10 | 7 | 5 | 4 | 3 | 2 |
| 16 | 12 | 7 | 5 | 4 | 2 | 2 | 2 | 1 |
| 24 | 10 | 5 | 3 | 2 | 1 | 1 | 1 | 1 |

## OPERATING TEMPERATURE

Abnormal bearing temperatures may indicate insufficient lubrication. If the housing is too hot to touch for more than a few seconds, check the temperature by applying a thermometer at the top of the pillow block with the thermometer tip surrounded by putty.

Because the thermometer reading will be approximately 10°F lower than the actual bearing temperature, add ten degrees to the reading and compare to the temperature rating of your grease. If the bearing temperature reading is consistent and operating within the recommended limits of your grease, the bearing is operating satisfactorily. The recommended maximum operating temperature for S-2000 Spherical Roller Bearings is 200 °F.

## STORAGE OR SPECIAL SHUT DOWN

If equipment will be idle for some time, before shutting down, add grease to the bearing until grease purges from the seals. This will ensure protection of the bearing, particularly when exposed to severe environmental conditions. After storage or idle period, add fresh grease to the bearing before starting.

**Table 3 - Set Screw Torque Table**

| Shaft Size | Socket Set Screw Size | Tightening Torque |
|---|---|---|
| 1-3/8 – 1-3/4 In. | 5/16 In. | 165 Inch Pounds |
| 1-15/16 – 2-7/16 In. | 3/8 In. | 290 Inch Pounds |
| 2-11/16 – 3-7/16 In. | 1/2 In. | 620 Inch Pounds |
| 3-15/16 – 4-15/16 In. | 5/8 In. | 1325 Inch Pounds |

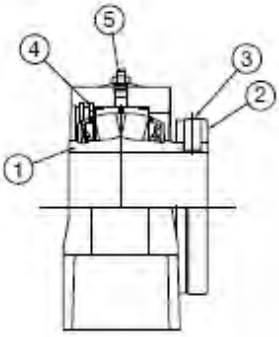
**Table 4 - Recommended Shaft Tolerance Table**

| Normal Shaft Size | Low to Normal Equivalent Load and Catalog Speed* | |
|---|---|---|
| Up to 1-1/2 In. | +.000 In. | –.0005 In. |
| Over 1-1/2 to 2-1/2 In. | +.000 In. | –.001 In. |
| Over 2-1/2 to 4 In. | +.000 In. | –.001 In. |
| Over 4 to 5 In. | +.000 In | –.0015 In. |

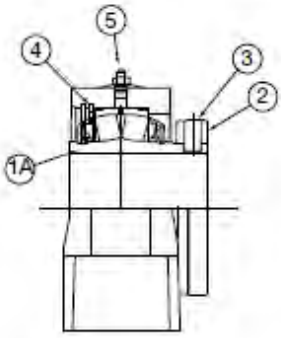
*Normal equivalent load .08C to .18C.

On severe applications and where dynamic balance and minimum runout are important, a snug to light press fit may be required to obtain optimum bearing performance. Consult Dodge Product Support.

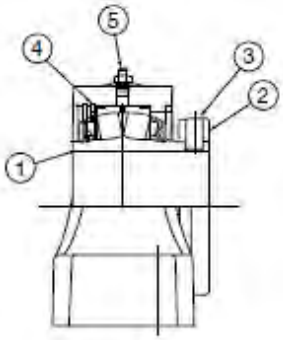
## S-2000 Parts Components



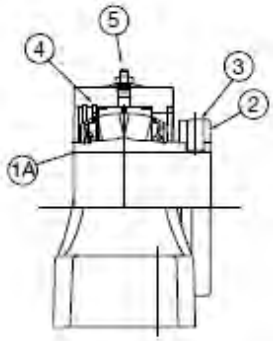

2 BOLT PILLOW BLOCK S2000-R



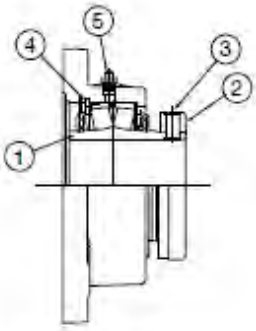

2 BOLT PILLOW BLOCK S2000-L



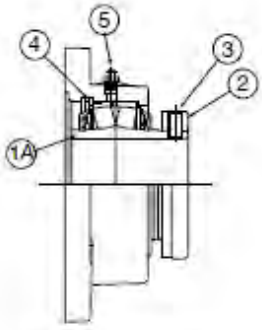

4 BOLT PILLOW BLOCK S2000-R



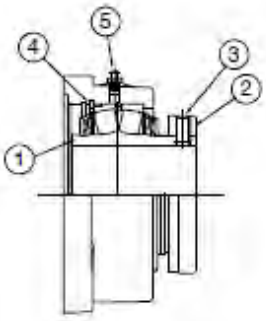

4 BOLT PILLOW BLOCK S2000-L



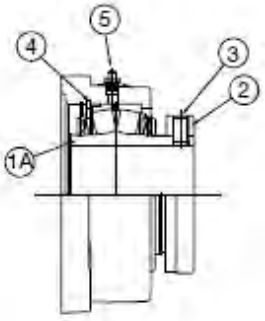

3 & 4 BOLT ROUND FLANGE S2000-R



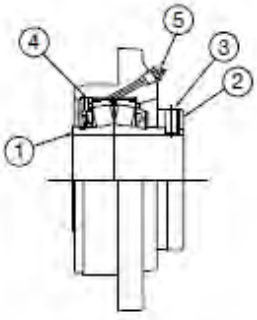

3 & 4 BOLT ROUND FLANGE S2000-L



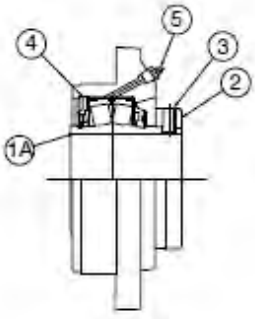

4 BOLT SQUARE FLANGE S2000-R



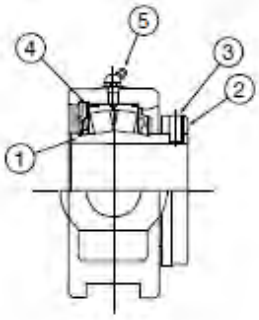

4 BOLT SQUARE FLANGE S2000-L



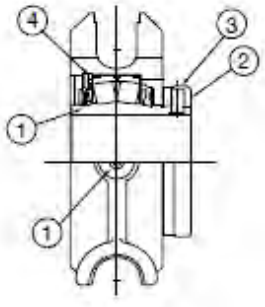

PILOTED FLANGE S2000-R




PILOTED FLANGE S2000-L




WIDE SLOT TAKE-UP S2000-R




TPHU TAKE-UP S2000-R

| COMPONENT PART NUMBERS (1 3/8" - 4 15/16") | | | | | | |
|---|---|---|---|---|---|---|
| ITEM | 1 | 1A | 2 | 3 | 4 | 5 |
| Shaft Size | Bearing Insert Assembly (R) Seal | Bearing Inert Assembly (L) Seal | *Collar | *Set Screw | Snap Ring | **Grease Fitting |
| 1 3/8 | 070000 | 070016 | 040050 | 400058 | 069276 | 405015 |
| 1 7/16 | 070001 | 070017 | 040050 | 400058 | 069276 | 405015 |
| 1 1/2 | 070002 | 070018 | 040050 | 400058 | 069276 | 405015 |
| 1 11/16 | 070003 | 070019 | 040051 | 400058 | 069277 | 405015 |
| 1 3/4 | 070004 | 070020 | 040051 | 400058 | 069277 | 405015 |
| 1 15/16 | 070005 | 070021 | 070587 | 400094 | 069278 | 405015 |
| 2 | 070006 | 070022 | 070587 | 400094 | 069278 | 405015 |
| 2 3/16 | 070007 | 070023 | 070588 | 400094 | 069279 | 405015 |
| 2 7/16 | 070008 | 070024 | 040054 | 400094 | 069280 | 405015 |
| 2 11/16 | 070009 | 070025 | 070589 | 400150 | 069281 | 405015 |
| 2 15/16 | 070010 | 070026 | 070589 | 400150 | 069281 | 405015 |
| 3 | 070011 | 070027 | 070589 | 400150 | 069281 | 405015 |
| 3 7/16 | 070012 | 070028 | 040056 | 400154 | 069282 | 405015 |
| 3 15/16 | 070013 | 070029 | 060946 | 400186 | 069283 | 405015 |
| 4 7/16 | 070014 | 070030 | " 060947 | " 400186 | 069284 | 405015 |
| 4 15/16 | 070015 | 070031 | " 040059 | " 400190 | 069285 | 405015 |
| QTY/PER | 1 | 1 | 1 | 2 | 1 | 1 |

*Shaft sizes 4 7/16" - 4 15/16" have two collars a
** WSTU and TPHU TU take a 405016 grease fitting.

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**www.baldor.com**


MN3033 (Replaces 499330)

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3/12 Printshop 200

# Instruction Manual for DODGE®
# Setscrew, Eccentric Collar, D-Lok, H-E Series & EZ-Kleen Mounted Ball Bearings

These instructions must be read thoroughly before installation or operation.

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

**CAUTION: Under certain operating conditions. It is possible for static electric charge to build up on EZ-KLEEN Polymer Housings. Do not operate these bearings in an environment where a sudden static discharge may cause either an operating hazard or personnel discomfort.**

## INSTALLATION:

1. Clean shaft and bearing bore thoroughly. Measure and confirm shaft size and tolerance. File flats on shaft at setscrew locations to permit easy removal of bearing.
2. Slip bearing into position. Be sure that bearing is not on a worn section of the shaft. For tighter fits, tap inner ring face only with soft driver. DO NOT HAMMER ON HOUSING.
3. The bearing outer ring OD is spherical and swivels in the housing to accommodate misalignment. Snug holddown bolts and use shaft to swivel each bearing until its final position is in the center of free movement top to bottom as well as side to side. Pass shaft through both bearings without forcing. This will prevent preloading of the bearings. Housing slippage depends on the mounting hold-down bolt tightening torque, number of bolts and friction characteristics between mounting surfaces. Auxiliary load carrying devices such as shear bars are advisable for side or end loading of pillow blocks and radial loads for flange units where normal to heavy loading or shock loading is encountered.

**NOTE: On coated and non-metallic housings, hold-down bolts should be tightened carefully with flat washers to prevent damage to the coating. Coated housings have reduced friction characteristics, so auxiliary load carrying devices are even more important in those applications.**

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

4. Tighten hold-down bolts to proper torque (Table 1). Turn shaft by hand. Resistance to turning should be the same as before full tightening of hold-down bolts.
5. For setscrew mounted bearings: **After final alignment of the shaft, tighten both setscrews hand tight**, then the setscrews should be tightened alternately and in small increments to the torque specified in Table 1. After 24 hours operation, the setscrews should be retightened to the torque in Table 1 to assure full locking of the inner race to the shaft. Care should be taken that the socket key or driver is in good condition with no rounded corners and the key is fully engaged in the setscrew and held square with the setscrew to prevent rounding out of the setscrew socket when applying maximum torque. Do not drill through the setscrew holes for spot drilling of the shaft. (Some inner rings have tempered setscrew threads and can be damaged by a drill.) If spot drilling is required, locate bearings on the shaft and center punch through the setscrew hole. Remove bearing and spot drill the shaft, then reassemble over the spot drilled position and assemble as above. Milled or filed flats are preferable to spot drilling.

**NOTE: On all Setscrew Product the setscrews can be re-torqued many times without damage to the bearing system. To achieve maximum shaft holding power it is highly recommended that setscrews be replaced with new hardware after any disassembly operation.**

6. For eccentric collar mounted bearings, slide collar against cam end of inner race. Use a punch in the hole provided in the collar, tap collar smartly in the direction of shaft rotation. Tighten setscrews to proper torque (Table 1). To remove bearings, loosen setscrew and tap collar in the direction opposite of shaft rotation.
7. For D-LOK mounted bearings, be sure collar is square and tight against shoulder on inner ring. Tighten cap screw to recommended torque shown in Table 1.
8. For expansion bearings (H-E Series), locate inner unit in housing to allow expansion in the desired direction before locking to the shaft.

DODGE®

1

Table 1 - Recommended Torque

| Setscrews | | | | | D-LOK | | | Mounting Bolts | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Recommended Torque | | | | | | Metal Housings | | EZ-KLEEN Housed Bearings | | | |
| Set-screw Size | Key Hex Across Flats | Standard Ball Bearing Insert | | Corrosion Resistant Stainless Steel | Cap Screw Size | Recom. Torque | EZ-Kleen Recom. Torque | Bolt Size | Recom. Dry Torque (Grade 2) | 2-Bolt PB, 2 & 4 Bolt Flg. and Flg. Brackets | | Tapped-Base PB | |
| | | Min | Max | | | | | | | Bolt Size | Torque ① | Bolt Size | Torque ② |
| (in.) | (in.) | (in-lbs.) | (in-lbs.) | (in-lbs.) | (in.) | (in-lbs.) | (in-lbs.) | (in.) | (in-lbs.) | (in.) | (in-lbs.) | (in.) | (in-lbs.) |
| #10 | 3/32 | 28 | 33 | 25 | #8-32 | 58 | 46 | 3/8-16 | 240 | 3/8-16 | 225 | 3/8-16 | 175 |
| 1/4 | 1/8 | 66 | 80 | 60 | #10-32 | 90 | 72 | 7/16-14 | 384 | 7/16-14 | 350 | 7/16-14 | 350 |
| 5/16 | 5/32 | 126 | 156 | 117 | 1/4-28 | 180 | 144 | 1/2-13 | 600 | 1/2-13 | 500 | 1/2-13 | 400 |
| 3/8 | 3/16 | 228 | 275 | 206 | 5/16-24 | 400 | 320 | 5/8-11 | 1200 | 9/16-12 | 650 | | |
| 7/16 | 7/32 | 342 | 428 | 321 | 3/8-24 | 750 | 600 | 3/4–10 | 1950 | 5/8-11 | 1000 | | |
| | | | | | | | | 7/8–9 | 2890 | | | | |
| (mm) | (mm) | (N-m) | (N-m) | (N-m) | (mm) | (N-m) | (N-m) | (mm) | (N-m) | (mm) | (N-m) | ①Torque for Austenitic (18-8) Stainless<br>②Max. torque values published. Do not exceed. | |
| M5 | 2.5 | 3.2 | 3.7 | 2.8 | M4 | 5.85 | 4.68 | M10 | 29 | M8 | 15 | | |
| M6 | 3 | 6.2 | 7.7 | 5.8 | M5 | 10.75 | 8.6 | M12 | 50 | M10 | 25 | | |
| M8 | 4 | 14.2 | 17.8 | 13.4 | M6 | 20.5 | 16.4 | M16 | 124 | M12 | 50 | | |
| M10 | 5 | 26 | 31 | 23 | M8 | 45 | 36 | M20 | 238 | M14 | 75 | | |
| M12 | 6 | 46 | 57 | 43 | | | | M22 | 322 | M18 | 125 | | |

## Lubrication

High Speed Operation - In the higher speed ranges, too much grease will cause over-heating. The amount of grease that the bearing will take for a particular high speed application can only be determined by experience. If excess grease in the bearing causes overheating, it will be necessary to remove grease fitting to permit excess grease to escape. The bearing has been greased at the factory and is ready to run. When establishing a relubrication schedule, note that a small amount of grease at frequent intervals is preferable to a large amount at infrequent intervals.

**Lubrication Guide**

**Use a No. 2 Lithium complex base grease or equivalent***

| Hours Run per Day | Suggested Lubrication Period in Weeks | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 to 250 RPM | 251 to 500 RPM | 501 to 750 RPM | 751 to 1000 RPM | 1001 to 1500 RPM | 1501 to 2000 RPM | 2001 to 2500 RPM | 2501 to 3000 RPM |
| 8 | 12 | 12 | 10 | 7 | 5 | 4 | 3 | 2 |
| 16 | 12 | 7 | 5 | 4 | 2 | 2 | 1 | 1 |
| 24 | 10 | 5 | 3 | 2 | 1 | 1 | 1 | 1 |

*For EZ-Kleen series bearings, use an aluminum complex base grease.

Lubrication recommendations are intended for standard products applied in general operating conditions. For modified products, high temperature applications, and other anomalous applications contact product engineering at 864-284-5700.

*30167111*

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MN3016 (Replaces 499498)
07/11 PRINTSHOP 200

# Impact Bed

## SIDE FOLD DOWN STYLE (SFD)

INSTALLATION AND SERVICE INSTRUCTIONS

SAFETY

# Important Safety Instructions

*This symbol indicates important safety statements throughout this manual.*
***READ THESE STATEMENTS CAREFULLY!***

## Danger

*For the purpose of this manual and product labels, DANGER indicates death, severe personal injury or substantial property damage will result if proper precautions are not taken.*

## Warning

*For the purpose of this manual and product labels, WARNING indicates death, severe personal injury or substantial property damage can result if proper precautions are not taken.*

## Caution

*For the purpose of this manual and product labels, CAUTION indicates minor personal injury or property damage can result if proper precautions are not taken.*

## Qualified Person

*For the purpose of this manual and product labels, a qualified person is one who is familiar with the installation, construction and operation of the equipment and the hazards involved.*

## SAFETY

### SAFETY FIRST

**Warning**

*Death, severe personal injury or substantial property damage can result if proper precautions are not taken when installing, operating, or maintaining this equipment. Due diligence must be practiced. Fully complying with all OH&S, owner, industry, provincial, and federal regulations during installation, operation and maintenance ot this equipment.*

**Warning**

*Before installing, operating, inspecting, adjusting, replacing or servicing any part ot this equipment, the conveyor must be shut down and locked out using industry acceptable Lock Out procedures. Acceptable Lock Out procedures are defined by OH&S, owner, industry, provincial, and federal regulations.*

**Warning**

*Proper personal safety equipment and clothing must be worn and only persons completely familiar with belt conveyor safety standards and the contents of this manual should be allowed to install, operate or maintain this equipment. It is very important that proper installation and mounting specifications are followed. Incorrect installation, operation or maintenance may result in belt wear, belt damage or personal injury. Read and fully understand the entire manual before installing, operating or maintaining this equipment. Do not exceed design loads or service conditions or modify this equipment in any way. Do not use this equipment in applications for which it was not intended. Make certain any guards removed for installation or servicing are promptly and properly replaced after completion of the work.*

**Important**

*If you have any questions or do not understand the instructions contained in this manual, contact your local distributor.*

# SAFETY

## TYPICAL MINIMAL LOCKOUT PROCEDURE

## DEFINITIONS

**Affected Employee**

An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

**Authorized Employee**

A person who locks or implements a tagout system procedure on machines or equipment to perform the servicing or maintenance on that machine or equipment. An authorized employee and an affected employee may be the same person when the affected employee's duties also include performing maintenance or service on a machine or equipment, which must be locked, or a tagout system implemented.

**Capable of Being Locked Out**

An energy isolating device will be considered to be capable of being locked out either if it is designed with a hasp or other attachment or integral part to which, or through which, a lock can be affixed, or if it has a locking mechanism built into it. Other energy isolating devices will also be considered to be capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy-isolating device or permanently alter its energy capability.

**Energized**

Connected to an energy source or containing residual or stored energy.

**Energy Isolating Device**

A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated electrical circuit breaker, a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, no pole can be operated independently; a slide plate; a slip blind; a lime valve; a block; and any similar device used to block or isolate energy. The term does not include a push button, selector switch, and other control circuit type devices.

**Energy Source**

Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

## SAFETY

**Lockout**

The placement of a lockout device on an energy-isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

**Lockout Device**

A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment.

**Normal Production Operations**

The utilization of a machine or equipment to perform its intended production function.

**Servicing and/or Maintenance**

Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the unexpected energization or startup of the equipment or release of hazardous energy.

**Setting Up**

Any work performed to prepare a machine or equipment to perform its normal production operation.

**Tagout**

The placement of a tagout device on an energy-isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

**Tagout Device**

A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and equipment being controlled may not be operated until the tagout device is removed.

### PROCEDURE

**Sequence of Lockout**

1. Notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance.
2. The authorized employee shall refer to the company procedure to identify the type and magnitude of the energy that the machine or equipment utilizes, shall understand the hazards of the energy, and shall know the methods to control the energy.
3. If the machine or equipment is operating, shut it down by the normal stopping procedure (depress stop button, open switch, close valve, etc.).
4. De-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s).

SAFETY

5. Lock out the energy isolating device(s) with assigned individual lock(s).
6. Stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.
7. Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the push button or other normal operating control(s) or by testing to make certain the equipment will not operate.

   ⚠ **Caution** *Return operating control(s) to "neutral" or "off" position after verifying the isolation of the equipment.*

8. The machine or equipment is now locked out.

**Restoring Equipment to Service**

When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps shall be taken:

1. Check the machine or equipment and the immediate area around the machine or equipment to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact.
2. Check the work area to ensure that all employees have been safely positioned or removed from the area.
3. Verify that the controls are in neutral.
4. Remove the lockout devices and reenergize the machine or equipment.

   **Note:** *The removal of some forms of blocking may require re-energization of the machine before safe removal.*

5. Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.

**Group Lockout or Tagout**

When servicing and/or maintenance is performed by a group they shall utilize a procedure which affords the employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device. Specific procedures shall be utilized during shift or personnel changes to ensure the continuity of lockout or tagout protection, including provision for the orderly transfer of lockout or tagout device protection between offgoing and oncoming employees, to minimize exposure to hazards from the unexpected energization or start-up of the machine or equipment, or the release of stored energy.

# SAFETY

**Important**

A good safety program makes provisions for hazard identification, open lines of communications, allocation of responsibilities, record keeping, training and, regular inspection and program audits both internal and externally conducted.

Communication is the key to improving the effectiveness of safety programs. Post all regulations, safety reminders, results of safety audits, newly found hazards, etc. All personnel should be encouraged to ask questions and to bring safety related matters to the attention of everyone.

All personnel need to be "**Proactive**" not "**Reactive**" when it comes to safety. Anticipate possible accidents and continually review the workplace for possible hazards.

All employees have accountability to themselves and their colleagues to achieve safety excellence. Safety needs to be an integral part of every employee's job and a working climate needs to be developed where safety is highly valued by each and every employee.

Educating and training employees is mandatory to achieve safety excellence. In addition to the applicable company, industry, provincial and federal regulations, the latest edition of the following codes and standards are recommended for your safety training programs and information/reference manuals:

1. ANSI/ASME B20.1
   Safety Standards for Conveyors and Related Equipment
   American National Standards Institute / The American Society of Mechanical Engineers
2. ANSI/ASME B15.1
   Safety Standard for Mechanical Power Transmission Apparatus
3. ANSI Z244.1
   Personnel Protection - Lockout/Tagout of Energy Sources - Minimum Safety Requirements
4. MSHA
   Guide to Equipment Guarding at Metal and Non-metal Mines
   U.S. Department of Labour, Mine and Health Administration
5. CEMA Publication No. 201
   Safety Label Brochure
   Conveyor Equipment Manufacturers Association
6. CSA Z432
   Safeguarding of Machinery
   Canadian Standards Association
7. ISO 1819
   Continuous mechanical Handling Equipment - Safety Code - General Rules
   International Standards Organization
8. ISO 5045
   Continuous Mechanical Handling Equipment - Safety Code for Belt Conveyors - Examples for Guarding of the Nip Points
9. ISO 7149
   Continuous Handling Equipment - Safety Code - Special Rules

## INSTALLATION AND SERVICE INSTRUCTIONS

Our Impact System is a proven, reliable system for handling severe impact loads experienced at the loading point of bulk material handling belt conveyors.

The system consists of four-foot long impact bars with four impact frames and five-foot long impact bars with five impact frames. Heavy-duty applications may require additional frames. Special lengths can be made by placing additional bars and frames in-line with each other. Bars may also be saw-cut to special lengths. Standard systems are available for 20 $^{O}$ and 35 $^{O}$ troughing angles.

Whatever the length and troughing angle ordered, these parts are shipped unassembled: impact stands, impact bars, and fasteners.

Complete assembly, as shown on the drawing is accomplished at the installation site.

Reliable operation and long service life depend on the care taken during installation.

The maximum operating temperature for the Impact System is 185 $^{O}$ F (85$^{O}$ C).

**⚠ Caution** *Safe practices for operating belt conveyors are given in American National Standards publication, "Safety Standards for Conveyors and Related Equipment" ANSI B20.1, Section 5 and 6.01.*

*Proper personal safety equipment and clothing must be worn and only persons completely familiar with these standards should be allowed to operate or maintain this equipment. Failure to observe these safety precautions and other specific procedures emphasized throughout these instructions may result in personal injury or damage to equipment.*

## IMPACT SYSTEM INSTALLATION

**Warning** *Before installing the system on an existing belt conveyor, be certain the conveyor is stopped and locked out to avoid injury and property damage.*

1. Prepare conveyor stringers for installation of the base frame assemblies. Refer to the drawings for spacing of frames. Note the difference for four and five foot standards. We recommend a steel roll troughing idler 3" - 12" from each end of the impact bars making sure they are outside any impact area.

2. If a standard four or five foot system is going to be extended in length, the last frame must be shifted by three inches to enable the ends of both adjoining bars to rest on the same support frame. The base frame and the impact bar supports have holes on both flanges to accept impact bar fasteners from both adjoining bars.

3. Prepare customer supplied shims for installation between conveyor stringers and base frames. Shim thickness must be calculated to provide the specified clearance between conveyor belt and top of impact bars. (Shimming of idler frames may be necessary to achieve recommended clearance.)

   **Note:** *The recommended clearance varies with the length of the impact bed system. The longer the length, the greater the clearance.*

**Recommended Clearance**

| IMPACT BED LENGTH | CLEARANCE |
|---|---|
| 4 ft. | 3/4" |
| 5 ft. | 3/4" |
| 8 ft. | 1-1/4" |
| 10 ft. | 1-1/2" |
| Specials (over 10 ft.) | Normally 1 percent of Idler Spacing |

4. Remove mud, stones or any other debris from conveyor stringers and deck plate. Remove all burrs, dents and bumps caused by excessive weld splatter so that the impact system frames can be securely positioned level with the plane of the conveyor and perpendicular to the line of conveyor belt travel.

5. The Impact System may be completely assembled and placed on the stringers as a unit, if space permits (See Illustration 1). If not, proceed to assemble as follows.

## IMPACT SYSTEM INSTALLATION

6. Place shims and frames on the conveyor stringers as shown in Illustration 2.

**ILLUSTRATION 1**

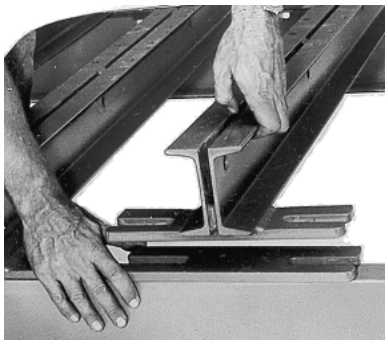


**ILLUSTRATION 2**

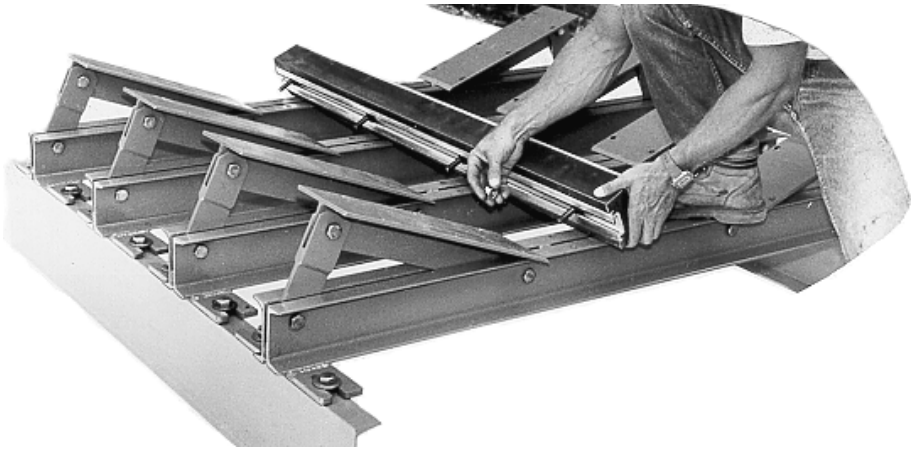
7. Bolt-base frame securely to the stringers using customer supplied bolts.

8. Assemble center impact bars to the base frame channels. Use **ONLY** one T-threaded bolt for each base frame, i.e.; four bolts per impact bar for four foot length; five bolts per impact for a five foot length. Also be sure to use the bevel washers provided.

**Note:** *Slide T-headed bolt into impact bars, as shown on Illustration 3 and bolt to base as shown on Illustration 4.*

**ILLUSTRATION 3**

**ILLUSTRATION 4**



## IMPACT SYSTEM INSTALLATION

A complete fastener assembly consists of T-bolt, flat washer or bevel washer and lock nut. See Illustration 5a and 5b. Use the flat washer when connecting the bars to the side supports. Use the bevel washer when fastening the bars directly to the channel base frame.

Tighten T-bolt nuts to 35-40 lb.-ft. All other fasteners to be tightened to 45-50 lb.-ft.

9. Assemble impact bar supports (t-bars) to the base frame, using fasteners provided.

**Note:** *The lower end of each t-bar has two holes. For 35° troughing, use the hole nearest the end. For 20° troughing, use other hole. See Illustration 6.*

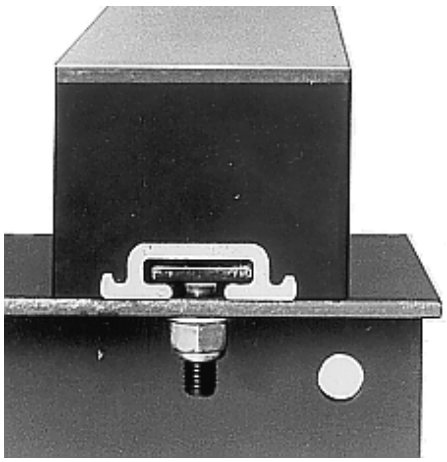


**ILLUSTRATION 5a**

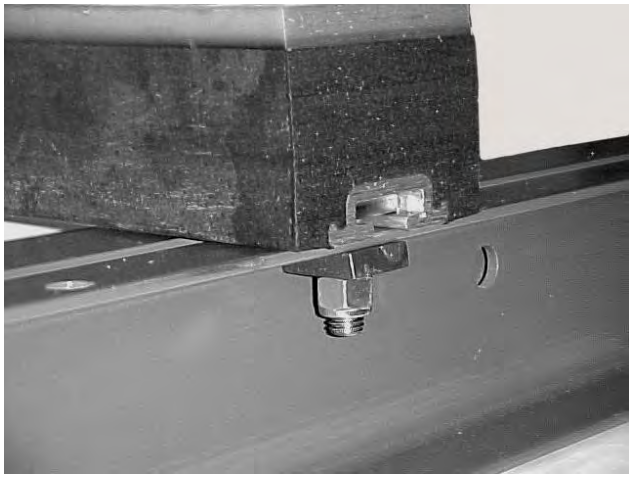
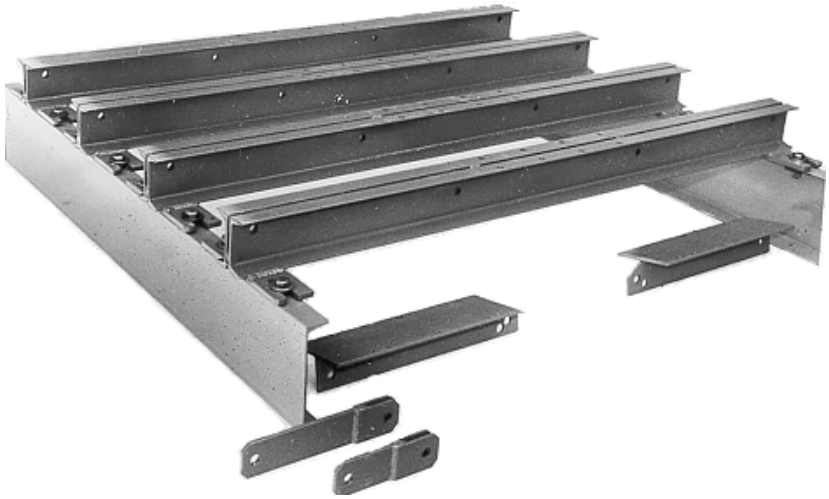


**ILLUSTRATION 5b**

**ILLUSTRATION 6**



## IMPACT SYSTEM INSTALLATION

10. Install the impact bars to the T-bars. Tighten the fasteners.

11. Raise the troughing sections and install the support arms with fasteners provided (See Illustration 7), to make a complete assembly (See illustration 8).

**ILLUSTRATION 7**

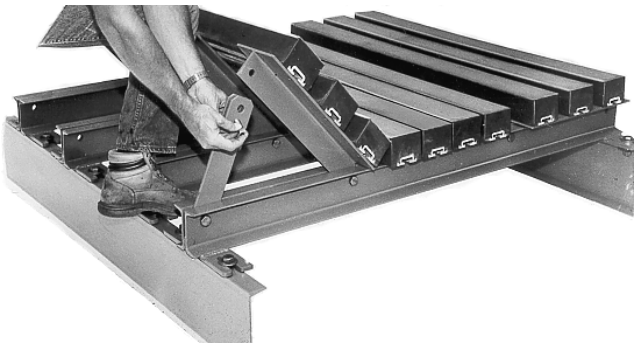


**ILLUSTRATION 8**

12. Tighten all frame fasteners so that the steel members at each bolt are pulled together tightly to make a ridged assembly.

## MAINTENANCE

**⚠ Warning** *Before maintenance is performed on the system be certain the conveyor is stopped and locked out to avoid injury and property damage.*

This impact system is self-contained and basically maintenance free.

By removing the support arm, the troughing sections can be lowered for easy inspection and replacement of bars. Impact bars need to be replaced when the top UHMW polyethylene is worn through.

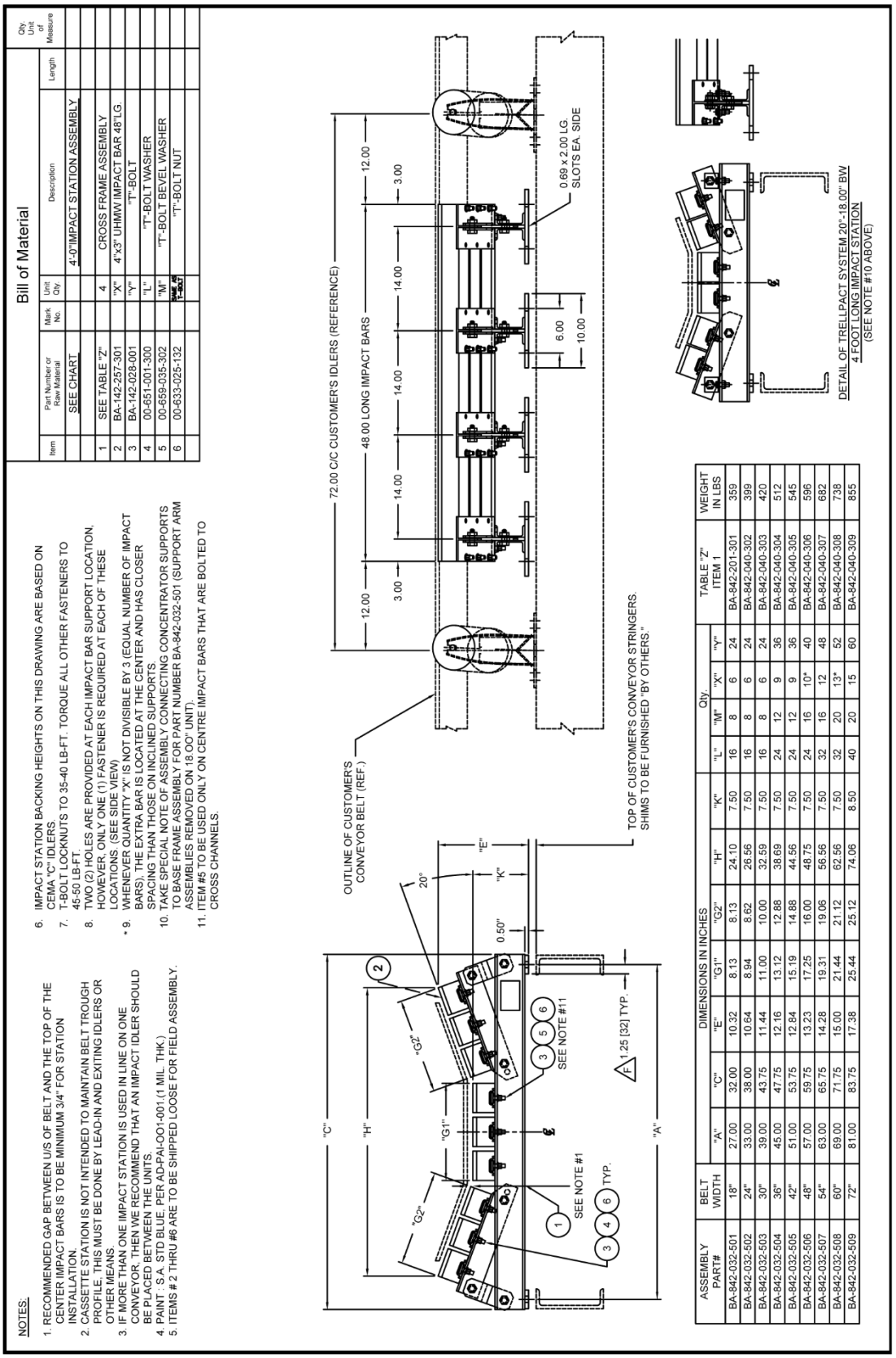
One size impact bar fits all frames at all loading points, unless special lengths are involved.

The impact bars and fastener assemblies are the only components that need to be inventoried. See drawings for number of bars required per belt width.

Do not allow constant contact between belt and horizontal impact bars: see page 11 for proper clearance. The belt edges will contact the impact bars, preventing spillage.

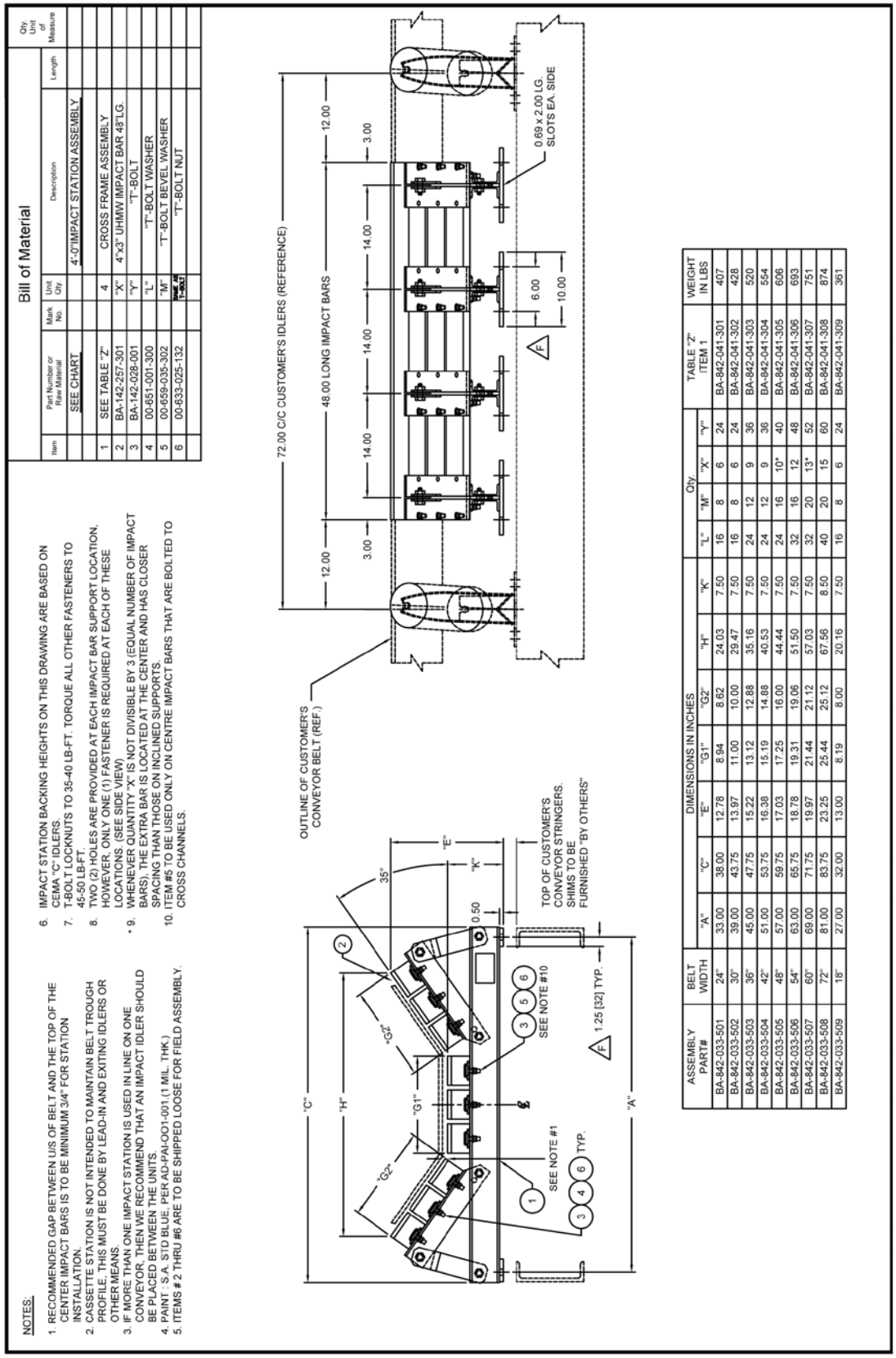
Periodically check to see that all fasteners are tight.

# GENERAL ARRANGEMENT DRAWINGS



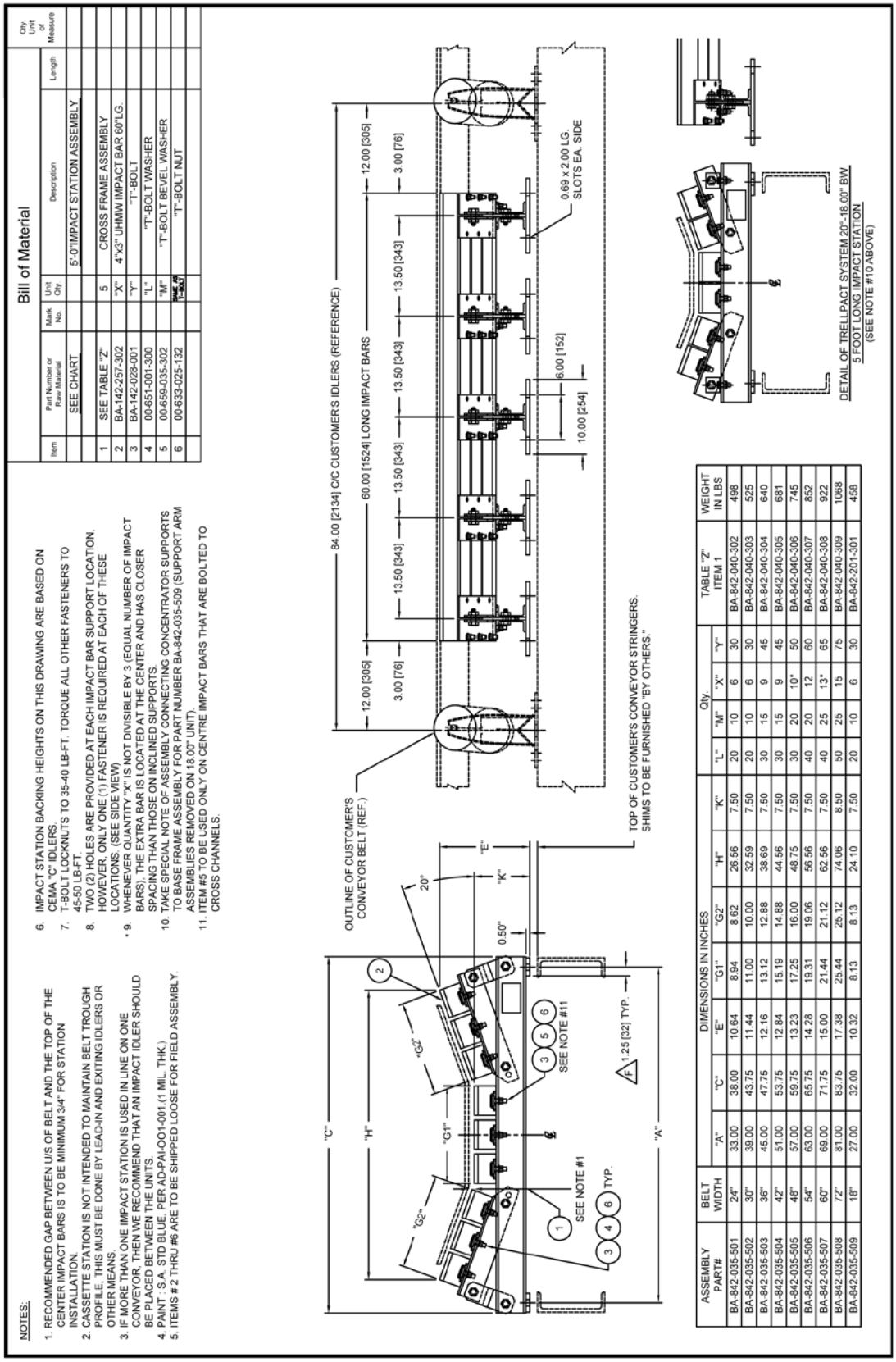

| ASSEMBLY PART# | BELT WIDTH | DIMENSIONS IN INCHES "A" | "C" | "E" | "G1" | "G2" | "H" | "K" | Qty "L" | "M" | "X" | "Y" | TABLE "Z" ITEM 1 | WEIGHT IN LBS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BA-842-032-501 | 18" | 27.00 | 32.00 | 10.32 | 8.13 | 8.13 | 24.10 | 7.50 | 16 | 8 | 6 | 24 | BA-842-201-301 | 359 |
| BA-842-032-502 | 24" | 33.00 | 38.00 | 10.64 | 8.94 | 8.62 | 26.56 | 7.50 | 16 | 8 | 6 | 24 | BA-842-040-302 | 399 |
| BA-842-032-503 | 30" | 39.00 | 43.75 | 11.44 | 11.00 | 10.00 | 32.59 | 7.50 | 16 | 8 | 6 | 24 | BA-842-040-303 | 420 |
| BA-842-032-504 | 36" | 45.00 | 47.75 | 12.16 | 13.12 | 12.88 | 38.69 | 7.50 | 24 | 12 | 9 | 36 | BA-842-040-304 | 512 |
| BA-842-032-505 | 42" | 51.00 | 53.75 | 12.84 | 15.19 | 14.88 | 44.56 | 7.50 | 24 | 12 | 9 | 36 | BA-842-040-305 | 545 |
| BA-842-032-506 | 48" | 57.00 | 59.75 | 13.23 | 17.25 | 16.00 | 48.75 | 7.50 | 24 | 16 | 10* | 40 | BA-842-040-306 | 596 |
| BA-842-032-507 | 54" | 63.00 | 65.75 | 14.28 | 19.31 | 19.06 | 56.56 | 7.50 | 32 | 16 | 12 | 48 | BA-842-040-307 | 682 |
| BA-842-032-508 | 60" | 69.00 | 71.75 | 15.00 | 21.44 | 21.12 | 62.56 | 7.50 | 32 | 20 | 13* | 52 | BA-842-040-308 | 738 |
| BA-842-032-509 | 72" | 81.00 | 83.75 | 17.38 | 25.44 | 25.12 | 74.06 | 8.50 | 40 | 20 | 15 | 60 | BA-842-040-309 | 855 |

# GENERAL ARRANGEMENT DRAWINGS



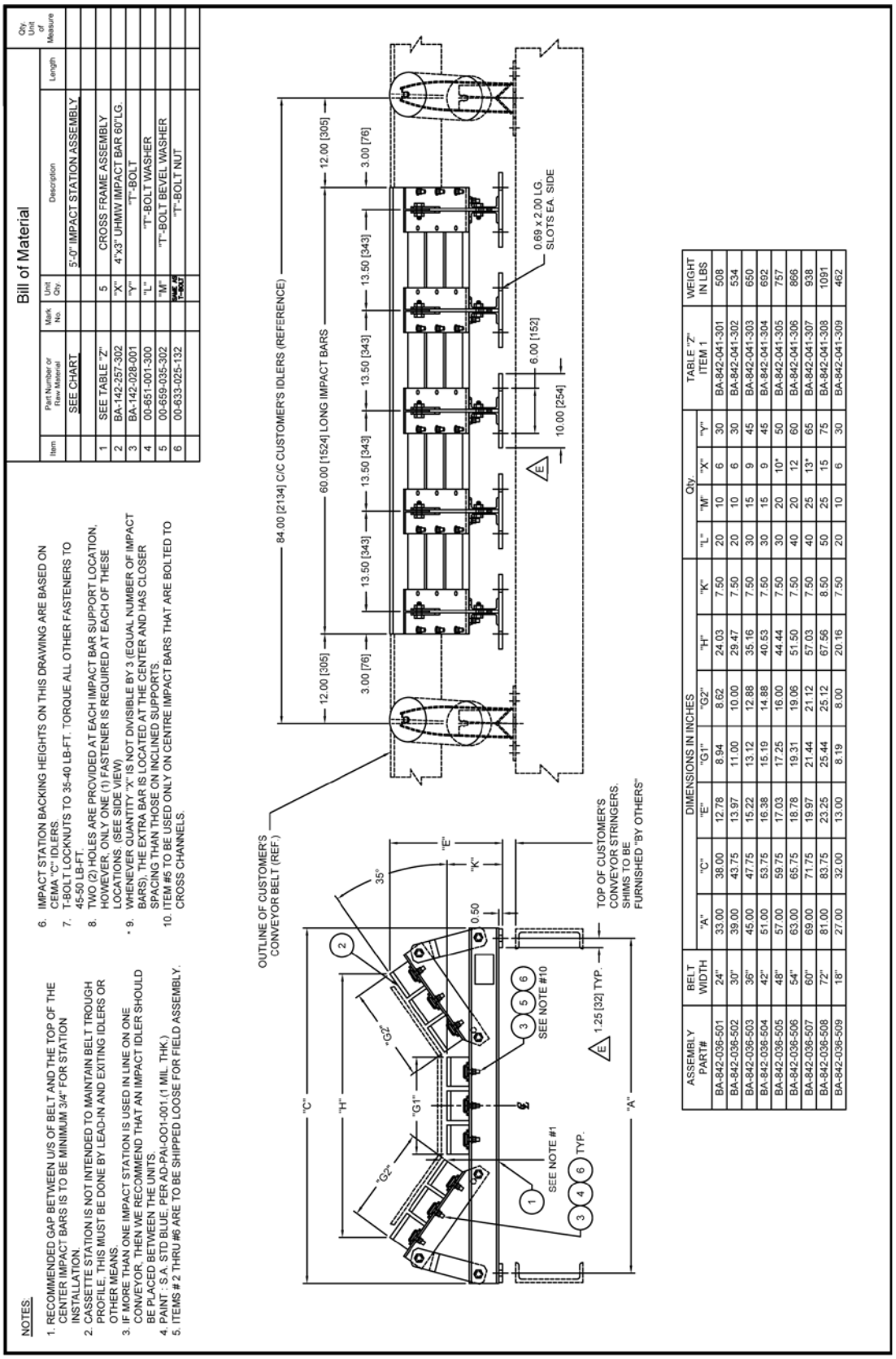

| ASSEMBLY PART# | BELT WIDTH | DIMENSIONS IN INCHES | | | | | | Qty. | | | | | TABLE "Z" ITEM 1 | WEIGHT IN LBS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | "A" | "C" | "E" | "G1" | "G2" | "H" | "K" | "L" | "M" | "X" | "Y" | | |
| BA-842-033-501 | 24" | 33.00 | 38.00 | 12.78 | 8.94 | 8.62 | 24.03 | 7.50 | 16 | 8 | 6 | 24 | BA-842-041-301 | 407 |
| BA-842-033-502 | 30" | 39.00 | 43.75 | 13.97 | 11.00 | 10.00 | 29.47 | 7.50 | 16 | 8 | 6 | 24 | BA-842-041-302 | 428 |
| BA-842-033-503 | 36" | 45.00 | 47.75 | 15.22 | 13.12 | 12.88 | 35.16 | 7.50 | 24 | 12 | 9 | 36 | BA-842-041-303 | 520 |
| BA-842-033-504 | 42" | 51.00 | 53.75 | 16.38 | 15.19 | 14.88 | 40.53 | 7.50 | 24 | 12 | 9 | 36 | BA-842-041-304 | 554 |
| BA-842-033-505 | 48" | 57.00 | 59.75 | 17.03 | 17.25 | 16.00 | 44.44 | 7.50 | 24 | 16 | 10* | 40 | BA-842-041-305 | 606 |
| BA-842-033-506 | 54" | 63.00 | 65.75 | 18.78 | 19.31 | 19.06 | 51.50 | 7.50 | 32 | 16 | 12 | 48 | BA-842-041-306 | 693 |
| BA-842-033-507 | 60" | 69.00 | 71.75 | 19.97 | 21.44 | 21.12 | 57.03 | 7.50 | 32 | 20 | 13* | 52 | BA-842-041-307 | 751 |
| BA-842-033-508 | 72" | 81.00 | 83.75 | 23.25 | 25.44 | 25.12 | 67.56 | 8.50 | 40 | 20 | 15 | 60 | BA-842-041-308 | 874 |
| BA-842-033-509 | 18" | 27.00 | 32.00 | 13.00 | 8.19 | 8.00 | 20.16 | 7.50 | 16 | 8 | 6 | 24 | BA-842-041-309 | 361 |

# GENERAL ARRANGEMENT DRAWINGS




| ASSEMBLY PART# | BELT WIDTH | DIMENSIONS IN INCHES "A" | "C" | "E" | "G1" | "G2" | "H" | "K" | Qty. "L" | "M" | "X" | "Y" | TABLE "Z" ITEM 1 | WEIGHT IN LBS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BA-842-035-501 | 24" | 33.00 | 38.00 | 10.64 | 8.94 | 8.62 | 26.56 | 7.50 | 20 | 10 | 6 | 30 | BA-842-040-302 | 498 |
| BA-842-035-502 | 30" | 39.00 | 43.75 | 11.44 | 11.00 | 10.00 | 32.59 | 7.50 | 20 | 10 | 6 | 30 | BA-842-040-303 | 525 |
| BA-842-035-503 | 36" | 45.00 | 47.75 | 12.16 | 13.12 | 12.88 | 38.69 | 7.50 | 30 | 15 | 9 | 45 | BA-842-040-304 | 640 |
| BA-842-035-504 | 42" | 51.00 | 53.75 | 12.84 | 15.19 | 14.88 | 44.56 | 7.50 | 30 | 15 | 9 | 45 | BA-842-040-305 | 681 |
| BA-842-035-505 | 48" | 57.00 | 59.75 | 13.23 | 17.25 | 16.00 | 48.75 | 7.50 | 30 | 20 | 10" | 50 | BA-842-040-306 | 745 |
| BA-842-035-506 | 54" | 63.00 | 65.75 | 14.28 | 19.31 | 19.06 | 56.56 | 7.50 | 40 | 20 | 12 | 60 | BA-842-040-307 | 852 |
| BA-842-035-507 | 60" | 69.00 | 71.75 | 15.00 | 21.44 | 21.12 | 62.56 | 7.50 | 40 | 25 | 13" | 65 | BA-842-040-308 | 922 |
| BA-842-035-508 | 72" | 81.00 | 83.75 | 17.38 | 25.44 | 25.12 | 74.06 | 8.50 | 50 | 25 | 15 | 75 | BA-842-040-309 | 1068 |
| BA-842-035-509 | 18" | 27.00 | 32.00 | 10.32 | 8.13 | 8.13 | 24.10 | 7.50 | 20 | 10 | 6 | 30 | BA-842-201-301 | 458 |

# GENERAL ARRANGEMENT DRAWINGS




| ASSEMBLY PART# | BELT WIDTH | DIMENSIONS IN INCHES | | | | | | | Qty | | | | TABLE "Z" ITEM 1 | WEIGHT IN LBS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | "A" | "C" | "E" | "G1" | "G2" | "H" | "K" | "L" | "M" | "X" | "Y" | | |
| BA-842-036-501 | 24" | 33.00 | 38.00 | 12.78 | 8.94 | 8.62 | 24.03 | 7.50 | 20 | 10 | 6 | 30 | BA-842-041-301 | 508 |
| BA-842-036-502 | 30" | 39.00 | 43.75 | 13.97 | 11.00 | 10.00 | 29.47 | 7.50 | 20 | 10 | 6 | 30 | BA-842-041-302 | 534 |
| BA-842-036-503 | 36" | 45.00 | 47.75 | 15.22 | 13.12 | 12.88 | 35.16 | 7.50 | 30 | 15 | 9 | 45 | BA-842-041-303 | 650 |
| BA-842-036-504 | 42" | 51.00 | 53.75 | 16.38 | 15.19 | 14.88 | 40.53 | 7.50 | 30 | 15 | 9 | 45 | BA-842-041-304 | 692 |
| BA-842-036-505 | 48" | 57.00 | 59.75 | 17.03 | 17.25 | 16.00 | 44.44 | 7.50 | 30 | 20 | 10* | 50 | BA-842-041-305 | 757 |
| BA-842-036-506 | 54" | 63.00 | 65.75 | 18.78 | 19.31 | 19.06 | 51.50 | 7.50 | 40 | 20 | 12 | 60 | BA-842-041-306 | 866 |
| BA-842-036-507 | 60" | 69.00 | 71.75 | 19.97 | 21.44 | 21.12 | 57.03 | 7.50 | 40 | 25 | 13* | 65 | BA-842-041-307 | 938 |
| BA-842-036-508 | 72" | 81.00 | 83.75 | 23.25 | 25.44 | 25.12 | 67.56 | 8.50 | 50 | 25 | 15 | 75 | BA-842-041-308 | 1091 |
| BA-842-036-509 | 18" | 27.00 | 32.00 | 13.00 | 8.19 | 8.00 | 20.16 | 7.50 | 20 | 10 | 6 | 30 | BA-842-041-309 | 462 |

## Important Notice

Only one (1) T-Bolt is required per Impact Bar per Frame.

The Frames are manufactured with one (1) extra hole per Frame to simplify installation by avoiding the need for Right and Left hand assemblies.

Only four (4) T-Bolts are required to fasten a 48" bar to the Frames and five (5) for the 60" Bar.

Use ½" standard bevel washers [16-2/3% slope, ≅9.5°] when bolting directly to channel flanges. Torque lock nuts for T-bolts to 35-40 lb-ft.

For further instructions and safety precautions please refer to the "Installation Manual" prior to installation.

## TB WOODS BELT DRIVE TENSION

# General Engineering Information

**BEV**

- **Tensioning Drives**
- **Idler Usage**
- **V-Flat Drive Design**
- **Quarter Turn Drive Design**
- **Belt Pull & Bearing Loads**

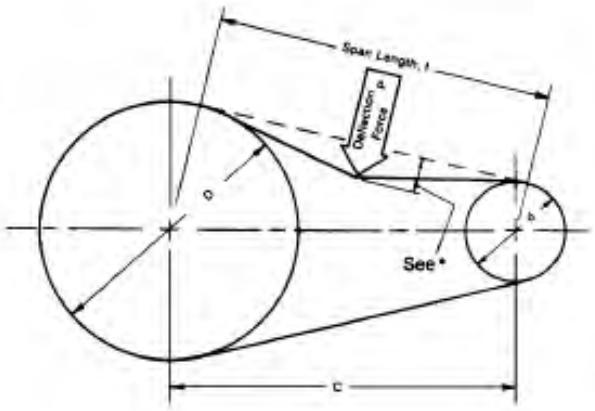
Below are some terms and abbreviations used on the following pages.

| | | | | | |
|---|---|---|---|---|---|
| **HP** | = | Horsepower | **Ac** | = | Arc Correction Factor |
| **DHP** | = | Design Horsepower | **Lc** | = | Length Correction Factor |
| **RPM** | = | Revolutions Per Minute | **C** | = | Center Distance |
| **D** | = | Large Diameter Wheel | **d** | = | Small Diameter Wheel |

# Tensioning V-Belt Drives

## Force Deflection Method

This method of tensioning should be used only for drives on which the grade of belt, rated belt capacity, service factor, design horsepower, etc. are known. If the drive has been designed in accordance with this catalog, or others with current horsepower ratings, the method outlined here is valid. When replacing belts on an older design, it would be recommended to review the capacity of the drive per current belt ratings. Due to the progressive development of belt horsepower ratings over time, older drives which were designed properly when new may now be drastically overdesigned. This could lead to excessive bearing load or excessive shaft deflection.




$$t = \sqrt{C^2 - \left(\frac{D-d}{2}\right)^2}$$

$$h = \frac{t}{64}$$

where t = Span length, inches
C = Center distance, inches
D = Larger sheave diameter, inches
d = Smaller sheave diameter, inches

* Deflection height h = 1/64 per inch of span

**Figure 2**

Step 1: Install belts per Step 1 of General Method above. Measure span length (t) in inches as shown in figure 2, or calculate using formula.

Step 2: From figure 2 the deflection height (h) is always 1/64" per inch of span length (t). For example, a 32" span length would require a deflection of 32/64" or 1/2".

Step 3: Determine the minimum, maximum, and initial recommended pounds force using table 1 or calculate based on the required Static Strand Tension ($T_S$). Note: The initial recommended force is used only for installing new belts which have not seated themselves into the sheave grooves and where initial belt stretch has not taken place.

Step 4: Using a spring scale, apply a perpendicular force to any ONE of the belts at the mid point of the span as shown in figure 2. Compare this deflection force with the values found in Step 3.

a. If the deflection force is below the minimum, the belts are too loose and the tension should be increased by increasing the center distance.

b. If the deflection force is higher than the maximum, the belts are too tight and the tension should be decreased.

When new V-belts are installed on a drive the INITIAL tension will drop rapidly during the first few hours. Check tension during the first 24 hours of operation. Subsequent retensioning should fall between the minimum and maximum force.

To determine the deflection distance from normal position, use a straightedge or stretch a cord from sheave to sheave to use as a reference line. On multiple-belt drives an adjacent undeflected belt can be used as a reference.

# Tensioning V-Belt Drives

Minimum deflection force values shown in table 1 are based on assumed average static tensions for drives having multiple belts or more than one V-band, thus eliminating calculations. (For drives using only one belt or one V-band, deflection force must be determined by use of engineering formulas.)

Find the minimum recommended deflection force for the belt section and type based upon the small sheave diameter, speed and drive ratio. For intermediate sheave diameters and/or drive ratio combinations, the minimum deflection force may be interpolated.

MAXIMUM Deflection Force = Minimum times 1.5

INITIAL Deflection Force = Minimum times 2.0

For Narrow Banded, Classical Banded, and Classical Cog Banded belts, multiply the minimum deflection force from table 1 by the number of belts in the band. Where larger values make use of the Force Deflection Method impractical, use the Elongation Method to tension V-bands.

**Table 2. K FACTORS AND ARC OF CONTACT**

| D-d / C | Arc Contact Degree | Factor Ac | Factor K | D-d / C | Arc Contact Degree | Factor Ac | Factor K |
|---|---|---|---|---|---|---|---|
| 0.000 | 180 | 1.000 | 24.750 | 0.750 | 136 | 0.879 | 30.411 |
| 0.025 | 179 | 0.997 | 24.883 | 0.775 | 134 | 0.874 | 30.688 |
| 0.050 | 177 | 0.994 | 25.019 | 0.800 | 133 | 0.869 | 30.975 |
| 0.075 | 176 | 0.990 | 25.158 | 0.825 | 131 | 0.864 | 31.270 |
| 0.100 | 174 | 0.987 | 25.300 | 0.850 | 130 | 0.858 | 31.576 |
| 0.125 | 173 | 0.983 | 25.444 | 0.875 | 128 | 0.852 | 31.892 |
| 0.150 | 171 | 0.980 | 25.591 | 0.900 | 127 | 0.847 | 32.219 |
| 0.175 | 170 | 0.977 | 25.742 | 0.925 | 125 | 0.841 | 32.558 |
| 0.200 | 169 | 0.973 | 25.896 | 0.950 | 123 | 0.835 | 32.909 |
| 0.225 | 167 | 0.969 | 26.053 | 0.975 | 122 | 0.829 | 33.273 |
| 0.250 | 166 | 0.966 | 26.213 | 1.000 | 120 | 0.823 | 33.652 |
| 0.275 | 164 | 0.962 | 26.377 | 1.025 | 118 | 0.816 | 34.045 |
| 0.300 | 163 | 0.958 | 26.545 | 1.050 | 117 | 0.810 | 34.454 |
| 0.325 | 161 | 0.954 | 26.717 | 1.075 | 115 | 0.803 | 34.879 |
| 0.350 | 160 | 0.951 | 26.892 | 1.100 | 113 | 0.796 | 35.323 |
| 0.375 | 158 | 0.947 | 27.072 | 1.125 | 112 | 0.789 | 35.786 |
| 0.400 | 157 | 0.943 | 27.257 | 1.150 | 110 | 0.782 | 36.270 |
| 0.425 | 155 | 0.939 | 27.445 | 1.175 | 108 | 0.774 | 36.777 |
| 0.450 | 154 | 0.935 | 27.639 | 1.200 | 106 | 0.767 | 37.307 |
| 0.475 | 153 | 0.930 | 27.837 | 1.225 | 104 | 0.759 | 37.864 |
| 0.500 | 151 | 0.926 | 28.040 | 1.250 | 103 | 0.751 | 38.448 |
| 0.525 | 150 | 0.922 | 28.249 | 1.275 | 101 | 0.742 | 39.064 |
| 0.550 | 148 | 0.917 | 28.463 | 1.300 | 99 | 0.734 | 39.713 |
| 0.575 | 147 | 0.913 | 28.684 | 1.325 | 97 | 0.725 | 40.398 |
| 0.600 | 145 | 0.908 | 28.910 | 1.350 | 95 | 0.716 | 41.123 |
| 0.625 | 144 | 0.904 | 29.142 | 1.375 | 93 | 0.706 | 41.892 |
| 0.650 | 142 | 0.899 | 29.381 | 1.400 | 91 | 0.697 | 42.709 |
| 0.675 | 141 | 0.894 | 29.627 | 1.425 | 89 | 0.687 | 43.580 |
| 0.700 | 139 | 0.889 | 29.881 | | | | |
| 0.725 | 137 | 0.884 | 30.142 | | | | |

**Table 1. RECOMMENDED MINIMUM FORCE PER BELT**

| Belt Section | | Small Sheave Speed Range | Small Sheave Dia. | Drive Ratio 1.0 | 1.5 | 2.0 | 4.0 & over |
|---|---|---|---|---|---|---|---|
| Narrow | 3V | 1200-3600 | 2.65 | 2.0 | 2.4 | 2.6 | 3.0 |
| | | 1200-3600 | 3.65 | 2.8 | 3.6 | 3.8 | 4.2 |
| | | 1200-3600 | 4.75 | 3.8 | 4.2 | 4.4 | 4.8 |
| | | 1200-3600 | 5.60 | 4.2 | 4.6 | 4.8 | 5.4 |
| | | 1200-3600 | 6.90 | 4.6 | 5.0 | 5.2 | 5.6 |
| | 5V | 900-1800 | 7.1 | 8.5 | 9.5 | 10 | 11 |
| | | 900-1800 | 9.0 | 10 | 11 | 12 | 13 |
| | | 900-1800 | 14.0 | 12 | 13 | 14 | 15 |
| | | 700-1200 | 21.2 | 14 | 15 | 16 | 17 |
| | 8V | 900-1800 | 12.5 | 18 | 21 | 23 | 25 |
| | | 900-1800 | 14.0 | 21 | 23 | 24 | 28 |
| | | 700-1500 | 17.0 | 24 | 26 | 28 | 30 |
| | | 700-1200 | 21.2 | 28 | 30 | 32 | 34 |
| | | 400-1000 | 24.8 | 31 | 32 | 34 | 36 |
| Narrow Cog | 3VX | 1200-3600 | 2.20 | 2.2 | 2.5 | 2.7 | 3.0 |
| | | 1200-3600 | 2.50 | 2.6 | 2.9 | 3.1 | 3.6 |
| | | 1200-3600 | 3.00 | 3.1 | 3.5 | 3.7 | 4.2 |
| | | 1200-3600 | 4.12 | 3.9 | 4.3 | 4.5 | 5.1 |
| | | 1200-3600 | 5.30 | 4.6 | 4.9 | 5.1 | 5.7 |
| | | 1200-3600 | 6.9 | 5.0 | 5.4 | 5.6 | 6.2 |
| | 5VX | 1200-3600 | 4.4 | 6.5 | 7.5 | 8.0 | 9.0 |
| | | 1200-3600 | 5.2 | 8.0 | 9.0 | 9.5 | 10 |
| | | 1200-3600 | 6.3 | 9.5 | 10 | 11 | 12 |
| | | 1200-3600 | 7.1 | 10 | 11 | 12 | 13 |
| | | 900-1800 | 9.0 | 12 | 13 | 14 | 15 |
| | | 900-1800 | 14.0 | 14 | 15 | 16 | 17 |
| Classical | AP | 1800-3600 | 3.0 | 2.0 | 2.3 | 2.4 | 2.6 |
| | | 1800-3600 | 4.0 | 2.6 | 2.8 | 3.0 | 3.3 |
| | | 1800-3600 | 5.0 | 3.0 | 3.3 | 3.4 | 3.7 |
| | | 1800-3600 | 7.0 | 3.5 | 3.7 | 3.8 | 4.3 |
| | BP | 1200-1800 | 4.6 | 3.7 | 4.3 | 4.5 | 5.0 |
| | | 1200-1800 | 5.0 | 4.1 | 4.6 | 4.8 | 5.6 |
| | | 1200-1800 | 6.0 | 4.8 | 5.3 | 5.5 | 6.3 |
| | | 1200-1800 | 8.0 | 5.7 | 6.2 | 6.4 | 7.2 |
| | CP | 900-1800 | 7.0 | 6.5 | 7.0 | 8.0 | 9.0 |
| | | 900-1800 | 9.0 | 8.0 | 9.0 | 10 | 11 |
| | | 900-1800 | 12.0 | 10 | 11 | 12 | 13 |
| | | 700-1500 | 16.0 | 12 | 13 | 13 | 14 |
| | DP | 900-1500 | 12.0 | 13 | 15 | 16 | 17 |
| | | 900-1500 | 15.0 | 16 | 18 | 19 | 21 |
| | | 700-1200 | 18.0 | 19 | 21 | 22 | 24 |
| | | 700-1200 | 22.0 | 22 | 23 | 24 | 26 |
| Classical Cog | AX | 1800-3600 | 3.0 | 2.5 | 2.8 | 3.0 | 3.3 |
| | | 1800-3600 | 4.0 | 3.3 | 3.6 | 3.8 | 4.2 |
| | | 1800-3600 | 5.0 | 3.7 | 4.1 | 4.3 | 4.6 |
| | | 1800-3600 | 7.0 | 4.3 | 4.6 | 4.8 | 5.3 |
| | BX | 1200-1800 | 4.6 | 5.2 | 5.8 | 6.0 | 6.9 |
| | | 1200-1800 | 5.0 | 5.4 | 6.0 | 6.3 | 7.1 |
| | | 1200-1800 | 6.0 | 6.0 | 6.4 | 6.7 | 7.7 |
| | | 1200-1800 | 8.0 | 6.6 | 7.1 | 7.5 | 8.2 |
| | CX | 900-1800 | 7.0 | 10 | 11 | 12 | 13 |
| | | 900-1800 | 9.0 | 11 | 12 | 13 | 14 |
| | | 900-1800 | 12.0 | 12 | 13 | 13 | 14 |
| | | 700-1500 | 16.0 | 13 | 14 | 14 | 15 |
| | DX | 900-1500 | 12.0 | 16 | 18 | 19 | 20 |
| | | 900-1500 | 15.0 | 19 | 21 | 22 | 24 |
| | | 700-1200 | 18.0 | 22 | 24 | 25 | 27 |
| | | 700-1200 | 22.0 | 25 | 27 | 28 | 30 |

# Tensioning V-Belt Drives

## Force Deflection Engineering Formulas

For a more precise method, or where a V-drive combination is not within specified limits, table 1, use the following engineering formulas to determine force deflection values.

Step 1: Determine Span Length (t) and Deflection Height (h). Reference figure 2.

Step 2: Calculate the Static Strand Tension (Ts).

$$Ts = \frac{K \times DHP}{N \times S} + \frac{MS^2}{2}$$

Step 3: Calculate the recommended Deflection Forces (P) for drives using multiple belts or more than one V-band.

$$P_{Minimum} = \frac{Ts + Y}{16}$$

$$P_{Maximum} = \frac{1.5\,(Ts) + Y}{16}$$

$P_{Initial}$ = 1.33 times $P_{Maximum}$

### Explanation of Symbols

$A_c$ = Arc of contact – smaller sheave, degrees
C = Center distance, inches
D = Larger sheave pitch diameter, inches
d = Smaller sheave pitch diameter, inches
DHP = Design horsepower based upon the recommended application service factor
h = Deflection height, inches (Refer. figure 2)
K = Value from table 2 depending on $\frac{D-d}{C}$ or $K = 16.5\left(\frac{2.5-A_c}{A_c}\right)$
L = Belt length, inches
M = Centrifugal constant table 3
N = Number of belts or V-band ribs
P = Deflection force, pounds
S = Belt speed, FPM/1000
t = Span length, inches (Refer. figure 2)
Y = Belt constant table 3

Note: For drives using only one belt or one V-band, and at least one shaft free to rotate use the following to determine the recommended Deflection Forces (P).

$$P_{Minimum} = \frac{Ts + Y}{16}\left(\frac{t}{L}\right) \qquad P_{Maximum} = \frac{1.5\,(Ts) + Y}{16}\left(\frac{t}{L}\right) \qquad P_{Initial} = 1.33 \text{ times } P_{Maximum}$$

**Table 3. BELT CONSTANTS M AND Y**

| Factors | Narrow | | | Narrow Cog | | Classical | | | | | Classical COG | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 3V | 5V | 8V | 3VX | 5VX | AP | BP | CP | DP | EP | AX | BX | CX | DX |
| M Single Belts | .46 | 1.23 | 3.28 | .39 | 1.08 | .66 | 1.08 | 1.96 | 3.74 | 5.85 | .61 | 1.00 | 1.78 | 3.97 |
| M V-Band | .51 | 1.32 | 3.60 | .43 | 1.17 | — | 1.40 | 2.33 | 4.29 | 6.26 | — | 1.28 | 2.10 | 4.56 |
| Y | 4.0 | 12.00 | 22.00 | 7.0 | 20.0 | 6.0 | 9.0 | 16.0 | 30.00 | 45.00 | 7.0 | 10.00 | 28.00 | 82.00 |

# Tensioning V-Belt Drives

## Belt Elongation Method

This method is recommended for V-band drives where larger deflecting forces make the use of previously described methods impractical.

Elongation is related to the tension causing it; thus, tape measured V-band lengths, both slack and tight, can be used to obtain proper V-band tension.

Step 1: Decrease the center distance until the V-band(s) can be easily slipped into the sheave grooves. Forcing the belts on can damage the load-carrying cords and cause premature belt failure.

Step 2: With the V-band(s) still on the drive at NO tension, measure the outside circumference (slack O.C.) of the bands. Note: If retensioning a used drive, decrease the center distance until there is no tension on the band(s), then measure the outside circumference (slack O.C.) of the band(s).

Step 3: Determine the required Static Tension (Ts) per individual rib strand using the following formula.

$$Ts = \frac{K \times DHP}{N \times S} + \frac{MS^2}{2}$$

Step 4: Find a range of recommended tensions.

Lower Tension = Ts
Upper Tension = 1.5 times Ts

Step 5: Calculate minimum and maximum elongated band lengths for use in tensioning the drive.

a. From table 4, find length multipliers corresponding to the lower and upper Ts values in Step 4 above.

b. Multiply the slack O.C. found in Step 2 by the length multipliers to find the minimum and maximum elongated band lengths.

Step 6: Increase the drive center distance until a tape measurement of the band(s) O.C. is between the two values calculated for elongated band length Step 5b.

Step 7: Retension as required. New V-bands may lose tension rapidly during the run-in period and will probably require retensioning. V-bands that have been on a drive for some time may also require retensioning due to tension decay from normal use and wear.

# Tensioning V-Belt Drives

**Table 4. BELT LENGTH MULTIPLIERS FOR TENSIONING BANDED BELTS**

| Ts Per Strand (lbs.) | NARROW BANDED | | | | | CLASSICAL BANDED | | | | | CLASSICAL COG BANDED | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CROSS SECTION | | | | | | | | | | | | |
| | 3V | 5V | | 8V | | BP | | CP | | DP | BX All Sizes | CX All Sizes | DX All Sizes |
| | | 5V1700 & under | 5V1800 & over | 8V1700 & under | 8V1800 & over | BP144 & under | Over BP144 | CP144 & under | Over CP144 | | | | |
| 10 | 1.00186 | 1.00056 | 1.00001 | 1.00013 | 1.00010 | 1.00113 | 1.00141 | 1.00029 | 1.00052 | 1.00013 | 1.00082 | 1.00027 | 1.00013 |
| 12 | 1.00220 | 1.00068 | 1.00097 | 1.00016 | 1.00012 | 1.00135 | 1.00168 | 1.00035 | 1.00062 | 1.00016 | 1.00098 | 1.00032 | 1.00016 |
| 14 | 1.00254 | 1.00079 | 1.00113 | 1.00019 | 1.00014 | 1.00157 | 1.00194 | 1.00041 | 1.00072 | 1.00019 | 1.00114 | 1.00038 | 1.00019 |
| 16 | 1.00288 | 1.00090 | 1.00129 | 1.00021 | 1.00016 | 1.00178 | 1.00220 | 1.00046 | 1.00082 | 1.00021 | 1.00129 | 1.00043 | 1.00021 |
| 18 | 1.00320 | 1.00101 | 1.00144 | 1.00024 | 1.00018 | 1.00199 | 1.00246 | 1.00052 | 1.00092 | 1.00024 | 1.00145 | 1.00048 | 1.00024 |
| 20 | 1.00352 | 1.00112 | 1.00159 | 1.00027 | 1.00020 | 1.00220 | 1.00271 | 1.00058 | 1.00102 | 1.00027 | 1.00160 | 1.00054 | 1.00027 |
| 24 | 1.00414 | 1.00133 | 1.00190 | 1.00032 | 1.00024 | 1.00261 | 1.00320 | 1.00069 | 1.00122 | 1.00033 | 1.00191 | 1.00065 | 1.00032 |
| 28 | 1.00472 | 1.00155 | 1.00219 | 1.00037 | 1.00029 | 1.00301 | 1.00368 | 1.00081 | 1.00141 | 1.00038 | 1.00220 | 1.00075 | 1.00038 |
| 32 | 1.00520 | 1.00176 | 1.00249 | 1.00043 | 1.00033 | 1.00339 | 1.00414 | 1.00092 | 1.00161 | 1.00044 | 1.00250 | 1.00086 | 1.00043 |
| 36 | 1.00556 | 1.00197 | 1.00277 | 1.00048 | 1.00037 | 1.00377 | 1.00458 | 1.00104 | 1.00180 | 1.00050 | 1.00278 | 1.00097 | 1.00049 |
| 40 | 1.00588 | 1.00217 | 1.00305 | 1.00054 | 1.00042 | 1.00413 | 1.00500 | 1.00115 | 1.00199 | 1.00056 | 1.00306 | 1.00107 | 1.00054 |
| 45 | 1.00625 | 1.00243 | 1.00340 | 1.00060 | 1.00047 | 1.00458 | 1.00529 | 1.00129 | 1.00222 | 1.00063 | 1.00341 | 1.00121 | 1.00061 |
| 50 | 1.00659 | 1.00268 | 1.00374 | 1.00067 | 1.00053 | 1.00500 | 1.00553 | 1.00144 | 1.00246 | 1.00071 | 1.00374 | 1.00134 | 1.00068 |
| 55 | 1.00691 | 1.00293 | 1.00406 | 1.00074 | 1.00058 | 1.00528 | 1.00574 | 1.00158 | 1.00268 | 1.00078 | 1.00407 | 1.00147 | 1.00075 |
| 60 | 1.00722 | 1.00317 | 1.00438 | 1.00081 | 1.00064 | 1.00553 | 1.00591 | 1.00172 | 1.00291 | 1.00086 | 1.00439 | 1.00161 | 1.00081 |
| 65 | 1.00754 | 1.00341 | 1.00470 | 1.00088 | 1.00070 | 1.00576 | 1.00606 | 1.00186 | 1.00313 | 1.00094 | 1.00470 | 1.00174 | 1.00088 |
| 70 | 1.00787 | 1.00365 | 1.00500 | 1.00095 | 1.00076 | 1.00596 | 1.00620 | 1.00200 | 1.00335 | 1.00102 | 1.00500 | 1.00187 | 1.00095 |
| 75 | 1.00822 | 1.00389 | 1.00523 | 1.00101 | 1.00082 | 1.00614 | 1.00632 | 1.00214 | 1.00357 | 1.00110 | 1.00522 | 1.00200 | 1.00102 |
| 80 | 1.00861 | 1.00412 | 1.00545 | 1.00108 | 1.00088 | 1.00631 | 1.00644 | 1.00228 | 1.00378 | 1.00118 | 1.00543 | 1.00213 | 1.00109 |
| 85 | 1.00903 | 1.00434 | 1.00566 | 1.00115 | 1.00094 | 1.00646 | 1.00656 | 1.00242 | 1.00399 | 1.00127 | 1.00563 | 1.00227 | 1.00116 |
| 90 | 1.00949 | 1.00456 | 1.00586 | 1.00122 | 1.00100 | 1.00659 | 1.00668 | 1.00256 | 1.00420 | 1.00135 | 1.00581 | 1.00240 | 1.00123 |
| 95 | 1.01000 | 1.00478 | 1.00606 | 1.00129 | 1.00106 | 1.00672 | 1.00682 | 1.00270 | 1.00441 | 1.00144 | 1.00599 | 1.00253 | 1.00130 |
| 100 | 1.01056 | 1.00500 | 1.00625 | 1.00136 | 1.00113 | 1.00684 | 1.00697 | 1.00284 | 1.00461 | 1.00152 | 1.00616 | 1.00266 | 1.00137 |
| 120 | 1.01333 | 1.00561 | 1.00696 | 1.00164 | 1.00139 | 1.00727 | 1.00780 | 1.00339 | 1.00528 | 1.00188 | 1.00679 | 1.00319 | 1.00166 |
| 140 | 1.01692 | 1.00617 | 1.00765 | 1.00192 | 1.00166 | 1.00771 | 1.00912 | 1.00393 | 1.00579 | 1.00226 | 1.00736 | 1.00371 | 1.00195 |
| 160 | 1.02081 | 1.00672 | 1.00836 | 1.00220 | 1.00194 | 1.00827 | 1.01104 | 1.00447 | 1.00627 | 1.00265 | 1.00793 | 1.00423 | 1.00224 |
| 180 | 1.02385 | 1.00728 | 1.00913 | 1.00249 | 1.00223 | 1.00902 | 1.01357 | 1.00500 | 1.00675 | 1.00306 | 1.00854 | 1.00474 | 1.00253 |
| 200 | 1.02655 | 1.00787 | 1.01000 | 1.00277 | 1.00254 | 1.01000 | 1.01718 | 1.00534 | 1.00724 | 1.00349 | 1.00922 | 1.00525 | 1.00283 |
| 240 | 1.03118 | 1.00921 | 1.01213 | 1.00335 | 1.00319 | 1.01279 | 1.02268 | 1.00607 | 1.00832 | 1.00440 | 1.01090 | 1.00625 | 1.00343 |
| 280 | 1.03579 | 1.01088 | 1.01524 | 1.00395 | 1.00389 | 1.01663 | 1.02737 | 1.00692 | 1.00963 | 1.00542 | 1.01313 | 1.00724 | 1.00405 |
| 320 | 1.04070 | 1.01292 | 1.01834 | 1.00454 | 1.00461 | 1.02088 | 1.03275 | 1.00797 | 1.01124 | 1.00656 | 1.01590 | 1.00824 | 1.00468 |
| 360 | 1.04671 | 1.01562 | 1.02162 | 1.00515 | 1.00543 | 1.02423 | 1.03853 | 1.00926 | 1.01317 | 1.00771 | 1.01925 | 1.00924 | 1.00532 |
| 400 | 1.05308 | 1.01826 | 1.02526 | 1.00575 | 1.00631 | 1.02708 | 1.04393 | 1.01081 | 1.01580 | 1.00886 | 1.02229 | 1.01026 | 1.00596 |
| 450 | | 1.02179 | 1.03056 | 1.00652 | 1.00744 | 1.03072 | 1.05000 | 1.01311 | 1.01877 | 1.01028 | 1.02625 | 1.01156 | 1.00663 |
| 500 | | 1.02558 | 1.03643 | 1.00732 | 1.00859 | 1.03425 | | 1.01610 | 1.02186 | 1.01164 | 1.03000 | 1.01292 | 1.00768 |
| 550 | | 1.02927 | 1.04200 | 1.00813 | 1.00976 | 1.03781 | | 1.01888 | 1.02500 | 1.01293 | 1.03354 | 1.01435 | 1.00856 |
| 600 | | 1.03286 | 1.04642 | 1.00896 | 1.01094 | 1.04158 | | 1.02169 | 1.02813 | 1.01413 | 1.03685 | 1.01557 | 1.00946 |
| 650 | | 1.03632 | 1.05000 | 1.00982 | 1.01213 | 1.04567 | | 1.02449 | 1.03123 | 1.01524 | 1.04000 | 1.01729 | 1.01037 |
| 700 | | 1.03967 | | 1.01071 | 1.01331 | 1.05000 | | 1.02718 | 1.03426 | 1.01625 | 1.04333 | 1.01919 | 1.01130 |
| 750 | | 1.04310 | | 1.01163 | 1.01449 | | | 1.03000 | 1.03719 | 1.01718 | 1.04667 | 1.02126 | 1.01224 |
| 800 | | 1.04655 | | 1.01257 | 1.01571 | | | 1.03282 | 1.04000 | 1.01802 | 1.05000 | 1.02372 | 1.01320 |
| 850 | | 1.05000 | | 1.01354 | 1.01689 | | | 1.03563 | 1.04268 | 1.01833 | | 1.02607 | 1.01418 |
| 900 | | | | 1.01454 | 1.01887 | | | 1.03838 | 1.04524 | 1.01936 | | 1.02840 | 1.01518 |
| 950 | | | | 1.01561 | 1.01927 | | | 1.04101 | 1.04768 | 1.02044 | | 1.03068 | 1.01619 |
| 1000 | | | | 1.01667 | 1.02049 | | | 1.04345 | 1.05000 | 1.02156 | | 1.03209 | 1.01717 |

## TB WOODS BUSHING

# SAE Sure-Grip® Bushings

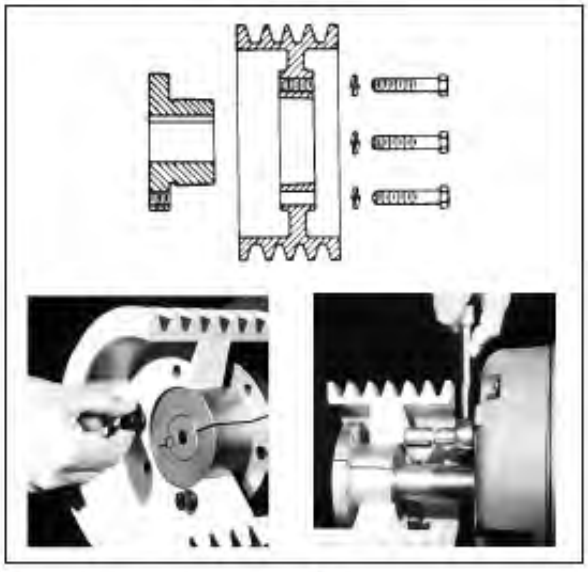
## Features

Sure-Grip® "Quick Detachable" bushings are easy to install and remove. They are split through flange and taper to provide a true clamp on the shaft that is the equivalent of a shrink fit. All sizes except JA and QT have a setscrew over the key to help maintain the bushing's position on the shaft until the cap screws are securely tightened. Sure-Grip bushings have a very gradual taper (3/4-inch taper per ft. on the diameter) which is about half the inclined angle of many other bushings. The result is the Sure-Grip securely clamps the shaft, with twice the force of those competitive bushings, to provide extreme holding power.


Versatile Sure-Grip bushings permit the mounting of the same mating part on shafts of different diameters, and the mounting of different sheaves on the same shaft using the same bushing. Their interchangeability extends through sheaves, pulleys, timing pulleys, sprockets, flexible and rigid couplings, made-to-order items by Wood's, and to product lines of several other mechanical power transmission manufacturers.

Sure-Grip bushings are manufactured with the drilled and tapped holes located at a precise distance from the keyseat; thus, a wide mating part having a bushing in each end can be mounted on a common shaft with the two keyways in line. This feature not only facilitates installation but also permits both bushings to carry an equal share of the load.

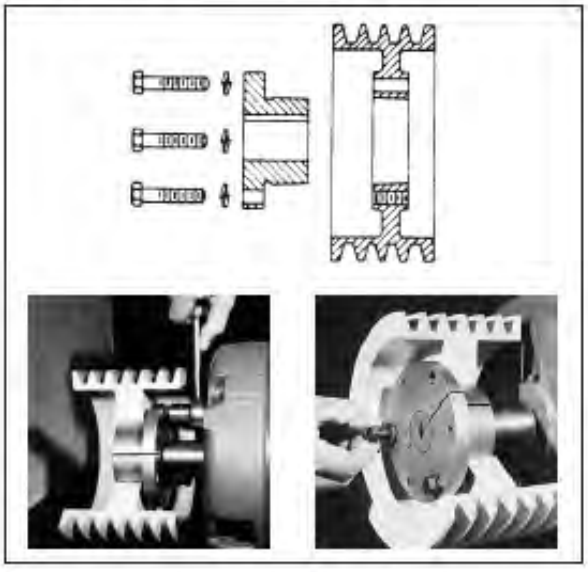
## STANDARD MOUNTING



**1.** Cap screws from outside through drilled holes in the mating part and into threaded holes in the bushing flange located on the inside of the assembly. Or the complete assembly reversed on the shaft and;

**2.** Cap screws from inside through drilled holes in the mating part and into threaded holes in the bushing flange located on the outside of the assembly.

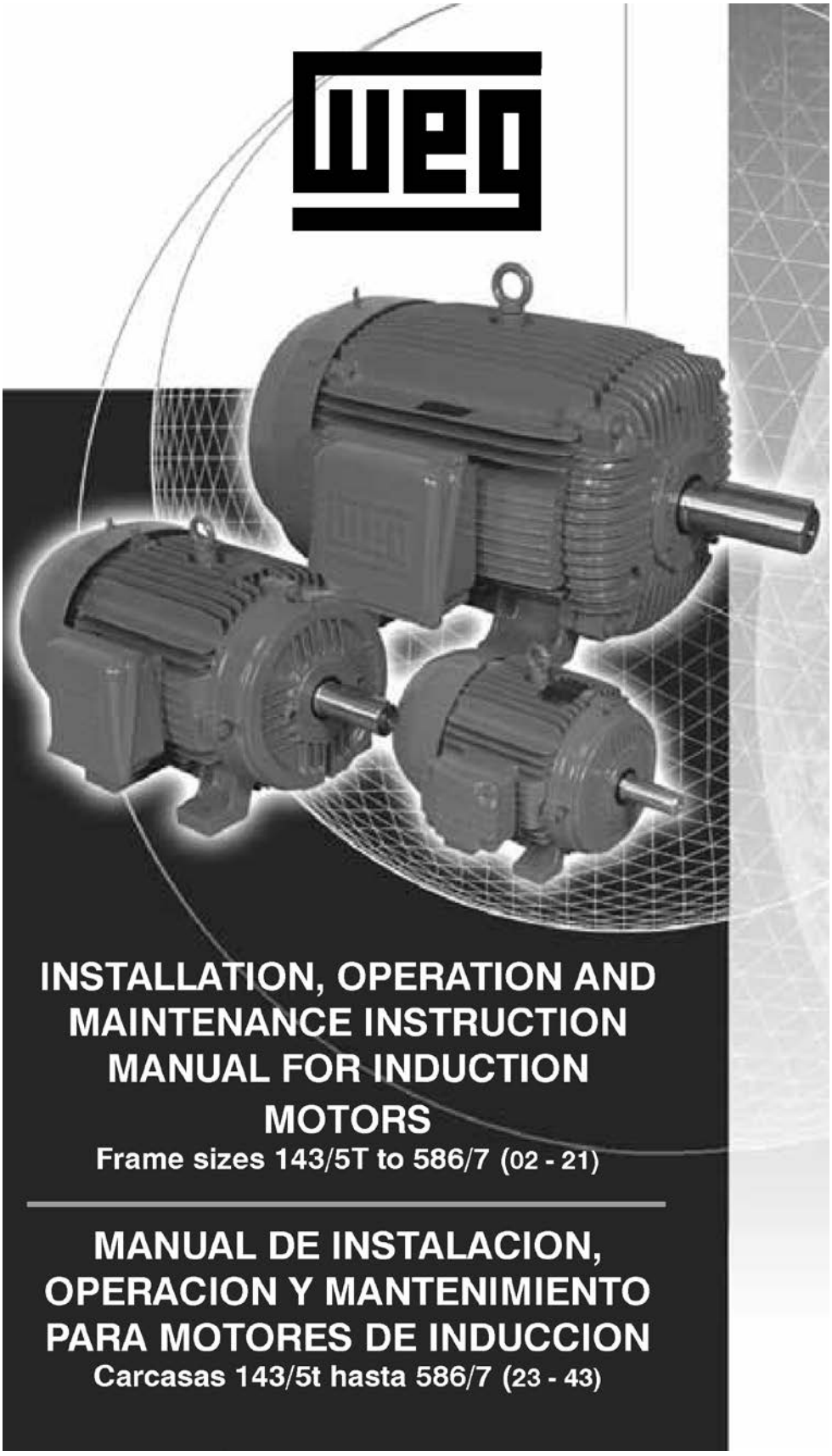
## REVERSE MOUNTING



**3.** Cap screws from inside through drilled holes in the bushing flange located on the inside of the assembly and into threaded holes in the mating part.

**4.** Cap screws from outside through drilled holes in the bushing flange located on the outside of the assembly and into threaded holes in the mating part.

## WEG MOTOR


INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTION MANUAL FOR INDUCTION MOTORS
Frame sizes 143/5T to 586/7 (02 - 21)
MANUAL DE INSTALACION, OPERACION Y MANTENIMIENTO PARA MOTORES DE INDUCCION
Carcasas 143/5t hasta 586/7 (23 - 43)

*THIS MANUAL IS INTENDED TO SUPPLY IMPORTANT TOPICS THAT MUST BE FOLLOWED DURING TRANSPORTATION, INSTALLATION, OPERATION AND MAINTENANCE OF WEG MOTORS. THEREFORE, WE RECOMMEND READING CAREFULLY THIS MANUAL BEFORE INSTALLING AND OPERATING THE MOTOR. TO ENSURE PHYSICAL INTEGRITY TO THE OPERATION AND MATERIAL PROTECTION, ALL INFORMATION INCLUDED IN THIS MANUAL MUST BE STRICTLY FOLLOWED.*

## INDEX

## 1 - HANDLING AND TRANSPORTATION

***MOTORS MUST NOT BE LIFTED BY THE SHAFT, BUT BY THE EYEBOLTS SPECIFIC FOR SUCH PURPOSE***

Lifting devices, when supplied, are designed only to support the motor. If the motor has two lifting devices then a double chain must be used to lift it.
Lifting and lowering must be done gently without any shocks, to avoid bearing damaged.

*DURING TRANSPORTATION, MOTORS FITTED WITH ROLLER OR ANGULAR CONTACT BEARINGS ARE PROTECTED AGAINST BEARING DAMAGES WITH A SHAFT LOCKING DEVICE*

*THIS LOCKING DEVICE MUST BE USED ON ANY FURTHER MOTOR TRANSPORTATION, EVEN WHEN THIS MEANS TO UNCOUPLE THE MOTOR FROM THE DRIVEN MACHINE*

## 2. RECEIVING INSPECTION

When receiving the motor, check if any damage has occurred during transportation.

If anything has been noticed, notify immediately the carrier, the insurance company and WEG.
Failure in giving notice to the carrier, to the insurance company and to WEG may result in loosing product warranty.

Do not remove the existing protecting grease from the shaft end, nor the stoppers or plugs that close the terminal box holes, if any. These protection items must be kept in place until the final installation has been concluded.
After being removed from the package, a complete visual inspection on the motor should be made:

✓ Check if any damage has occurred during transportation.
✓ Check nameplate data.
✓ Rotate shaft with the hand to make sure it is turning freely.
✓ Make sure the motor was not exposed to excessive dirt and moisture during transportation and storage.

## 3 - STORAGE

If motors are not immediately installed, they must be stored in dry areas, free of dust, vibrations, gases, corrosive smokes, under constant temperature and in normal position free from other materials.

Motor storage temperature must remain between 41°F (5°C) to 140°F (60°C), with relative humidity not exceeding 50%.

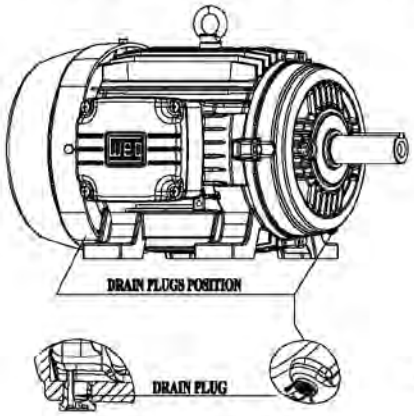
If motors are stored for more than two years, bearings must be replaced or the lubrication grease must be totally removed after cleaning.

Single-phase motors when kept in stock for 2 years or more must have their capacitors replaced (if any).

WEG recommends to rotate the shaft (by hands) at least once a month, and to measure the insulation resistance before installing it, if motors are stored for more than 6 months or when subject to high humidity areas.

If motor is fitted with space heaters, it is recommended to switch them on during storage period if the relative humidity exceeds 50%.
If motor remains in stock for a long period without having the space heaters switched-on or when installed but not in operation, moisture/water inside the motor may condense. On these cases, water must be drained by removing the drain plugs. When drainage is done, switch-on the space heaters and make sure the motor is completely dry, then reinstall the drain plugs to ensure proper Degree of Protection (see figure 1).

The space heaters should NEVER be energized while motor is running.




*Picture 1*

4

## Insulation Resistance Checking

Disconnect motor from power supply before making any insulation resistance measurement.
To avoid electric discharge risks, discharge the terminals right after performing the measurement.

Measure the insulation resistance before operating the motor and/or when there is any sign of moisture in the winding.

The resistance measured at 77°F (25°C) must be:

$Ri \geq (20 \times U) / (1000 + 2P)$ [MΩ]
(measured with a MEGGER at 500 V d.c.)
where U = voltage (V); P = power (kW).

If the insulation resistance detected is less than 5 mega ohms, the winding must be dried according to the following procedure: Warm it up in an oven at a minimum temperature of 176°F (80°C) increasing 41°F (5°C) every hour until reaching 105°C (221°F), remaining under this temperature for at least one hour.

Check if the stator insulation resistance remains constant within accepted values. If not, stator must be reimpregnated. If necessary, replace bearings and seals.

**Note:**
1) All drains (if any) must be removed while drying.
2 - Measured the insulation resistance in ambient temperature. If different than 25°C it should be corrected using the following formula:

$$R_{(25°C)} = [( K+25 ) / ( K + T_a )] . R_{(Ta)}$$

Where:
$R_{(25°C)}$ insulation resistance related to 25°C ambient temperature
K constant value 234.5 for copper
$T_a$ ambient temperature where the resistance was measured
$R_{(Ta)}$ resistance value measured in ambient temperature $T_a$

# 4. INSTALLATION

## 4.1 - Safety

All personnel involved with electrical installations, either handling, lifting, operation, start up, maintenance or repair must be well informed and updated concerning safety standards and principles that govern the work and carefully follow them.

For practical reasons, it is not possible to include in this Manual detailed information that covers all constructive variables, nor covering all possible assembly, operation or maintenance alternatives.
For this reason, the present Manual only includes required information that allows qualified and trained personnel to carry out the work.

If you still have further doubts about this, specially in reference to specific product information, WEG is willing to provide such information via its network of authorized service agents and/or distributors.
In order to allow WEG to provide prompt service, within technical standards, the motor serial number that is available on the identification nameplate should be supplied.

Use always appropriate tools for installation and removal.

*MAKE SURE THAT ELECTRIC MOTORS ARE SWITCHED OFF BEFORE STARTING ANY MAINTENANCE SERVICE*

All rotating parts such as pulleys, couplings, outside fans, shaft, etc. must be protected against accidental contact.
Motors must be protected against unexpected starts.
When performing any maintenance service, disconnect the motor from the power supply. Make sure all accessories have been switched off and disconnected.
In order to prevent from penetrating dust and/or water into the terminal box, cable glands or threaded pipe in the lead holes passage must be installed. They must be of equal or higher IP rating than the motor.

*LEAD CONNECTION INSULATION INSIDE THE TERMINAL BOX MUST BE DONE WITH AN INSULATING MATERIAL COMPATIBLE WITH MOTOR THERMAL CLASS WHICH IS SHOWN ON THE MOTOR NAMEPLATE*

If installation and safety instructions are not followed accordingly, warranty may be void.

## 4.2 - Operating Conditions

In general electric motors are designed for operation up to an altitude of 1000m above sea level for an ambient temperature ranging from -4°F (-20°C) to 104°F (40°C). Any variation is stated on the nameplate.
The recommended installation distance between air inlet from the motor and the wall should be at least ¼ of the air inlet diameter. A person should have enough room to carry out cleaning services.
Machines that are cooled with ambient air, air inlet screens must be cleaned at regular intervals so as to ensure free air circulation.
Warm air can not return to the motor.
✓ For vertically mounted motors with air inlet on top, the air opening must be protected by a proper cover so as to avoid dropping of foreign materials on the motors.
✓ Considering that direct sun heat causes increase in temperature, externally installed motors should be always protected against weathering.

*COMPARE THE CURRENT, VOLTAGE, FREQUENCY, SPEED, OUTPUT AND OTHER VALUES REQUIRED BY THE APPLICATION WITH MOTOR NAMEPLATE INFORMATION*

ODP MOTORS – Open motors (IP21, IP23) are machines designed for operation in clean, dry areas, with enough air circulation for proper cooling. These motors should never be used in areas with flammable materials. Open motors may cause sparks and release cast particles under any eventual insulation failure (short-circuit).
TEFC MOTORS – Totally enclosed motors are machines suitable to operate in areas with moisture, dirt and/or corrosive materials either in enclosed or open environments.

## 4.3 - Foundation

Motors provided with feet must be installed on solid foundations to avoid excessive vibrations.
All motors must be fully fixed and aligned.
The purchaser is fully responsible for the foundation.
Metal parts must be painted to avoid corrosion.

The foundation must be uniform and sufficiently strong to support any shock. It must be designed in such a way to stop any vibration originated from resonance.

Note: Considering that rotation direction is important for correct operation, then check it carefully before connecting motor to the load.

## 4.4 - Drain Holes

Make sure drains are placed at the lower motor position when the mounting configuration differs from that specified on the motor purchase order.

## 4.5 – Balance

*WHEN SPECIAL BALANCE IS REQUIRED, CONTACT THE FACTORY*

All motors are dynamically balanced at the factory with half key.

Transmission elements such as pulleys, couplings etc must be dynamically balanced with half key before installation.

Always use appropriate tools for installation and removal.

## 4.6 – Alignment

*ALIGN THE SHAFT ENDS AND USE FLEXIBLE COUPLING, WHENEVER POSSIBLE*

Make sure that the motor mounting devices do not allow modifications on the alignment and further damages to the bearings.
When assembling a half-coupling, make sure to use suitable equipment and tools to protect the bearings.
Suitable assembly of half-coupling:
Specially in cases of direct couplings, motor shaft must be aligned axially and radially with the driven machine shaft.

Incorrect alignment can lead to bearing damage, vibrations or even cause shaft rupture.
Correct alignment can be ensured with the use of dial gauges, as shown in figures 4.6.1, 4.6.2 and 4.6.3.

If considering a complete shaft turn, misalignment should not exceed 0.05 mm.

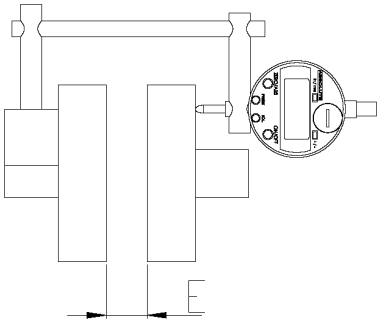



*Fig. 4.6.1 - Axial reading (parallelism)*

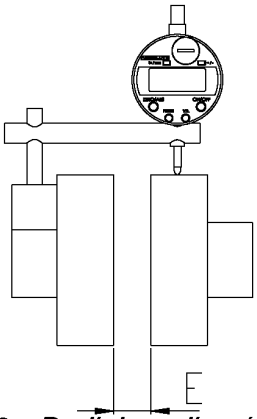



*Fig. 4.6.2 – Radial reading (concentricity)*

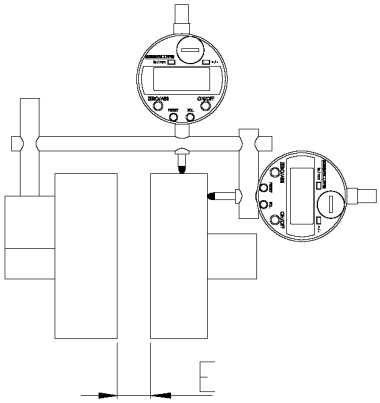



*Fig. 4.6.3 – Axial and radial reading combined*

**The axial alignment ("E" dimension) between half couplings should be performed in accordance with manufacturer's recommendations.**

**If required, WEG can offer its personnel duly trained as well as a laser equipment to make motor and driven machine alignment/leveling.**

**Expansion effect of the components may change the alignment/ leveling conditions during performance.**

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## 4.7 – Couplings

When using pulley or belt drive (coupling), follow the instruction given below:

Remove shaft-locking device (if any) before installing the motor.

Belts must be tighten just enough to avoid slippage when running, according to the specifications stated on the belt supplier recommendation.

To make the installation of the pulley on the shaft easier, it is recommended to heat up the pulley at 176°F (80°C) and have it mounted at hot, using suitable tools.

To avoid bearing and shaft end damage, mounting and dismounting of pulleys must be made with suitable tools.

While mounting and dismounting a pulley, never make pressure or knocks on the bearings.

Always use flexible couplings; rigid couplings require special bearing arrangement as well as axial and radial alignment of the shafts.

***WARNING:***
***EXCESSIVE BELT/CHAIN TENSION WILL DAMAGE THE BEARINGS AND LEAD TO A PROBABLE SHAFT RUPTURE***

The couplings used must be suitable to withstand radial and axial vibrations during operation. Special care must be taken to avoid that the allowable load and speed limits given in the catalog are not exceeded.

## 4.8 – Electrical Connection

Make sure the motor is connected to the correct power supply.
The cable gauges and the protection devices must be designed based on motor rated current.


*Voltage may be connected at motor standstill inside the terminal box for heating elements or direct winding heating*


*The capacitor on single-phase motors can retain a charge which appears across the motor terminals, even when the motor has reached standstill condition. So, avoid touching them at such condition*

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*A WRONG CONNECTION CAN BURN OUT THE MOTOR.*

Voltage and connection are indicated on the motor nameplate.
The acceptable voltage variation is ±10%;
the acceptable frequency variation is ±5% and the total acceptable variation for voltage and frequency is ± 10%.
Note: For rated voltage range (Tru Metric Line), the acceptable variation is ± 5% according to IEC 60034-1.

## 4.9 - Starting Methods

The motor is rather started through direct starting. In case this is not possible, use compatible start methods to the motor load and voltage.
When applying reduced voltage-starting method, remember that the starting torque will also reduce.

✓ 3 leads single voltage and 9 leads dual voltage motors can be started as follows:
- Full Voltage Direct online
- Auto-Transformer starting
- Electronic Soft-Starting
- VFD Starting – subject to verification and application analisys.
- Series - Parallel starting (only for 9 leads)

✓ 6 leads single and dual voltage motors and 12 leads dual voltage motors can be connected as follows:
- Full Voltage Direct online
- WYE/DELTA starting
- Auto-Transformer starting
- Electronic Soft-Starting
- VFD Starting – subject to verification and application analisys.
- Series - Parallel starting (only for 12 leads)

Rotation direction is clockwise when motor is viewed from Drive Endshields side and if the phases are connected according to sequence L1, L2, L3. This sequence and power system must be positive.

To change the rotation direction, reverse two of the connecting leads.
Note: For single-phase motors connections, please check the motor nameplate.

*THE CONNECTION TO THE POWER SUPPLY MUST BE DONE BY QUALIFIED PERSONNEL AND WITH FULL ATTENTION TO ASSURE SAFE AND PERMANENT CONNECTION. AFTER CONNECTING THE MOTOR, CHECK FOR ANY STRANGE BODY INSIDE THE TERMINAL BOX. THE CABLE INLETS NOT IN USE MUST BE CLOSED.*

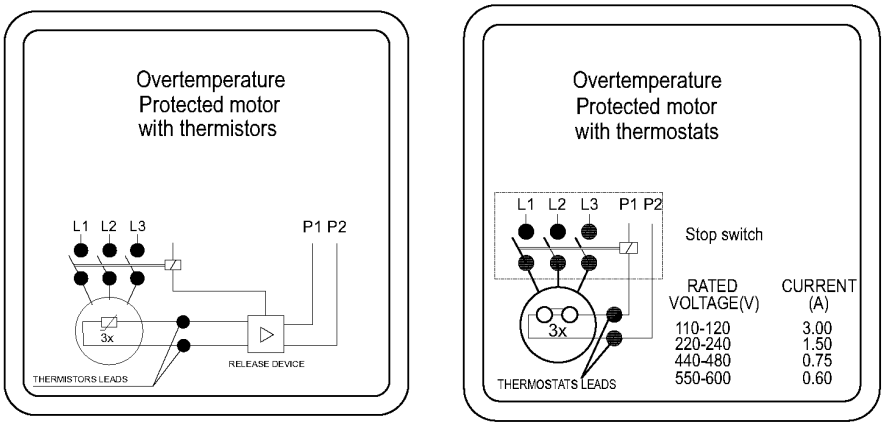
Make sure to use correct cable gauge, based on the rated current stamped on the motor nameplate.

*BEFORE ENERGIZING THE TERMINALS, CHECK IF THE GROUNDING IS MADE ACCORDING TO THE APPLICABLE STANDARDS. THIS IS ESSENTIAL TO AVOID ACCIDENTS.*

## 4.10 – Protection Device

When the motor is supplied with protective or monitor temperature device such as thermostats, thermistors, thermal protector etc, connect their terminals to the corresponding devices on the control panel. If this procedure is not followed accordingly, warranty will be void.
Do not change protection devices settings as they may not operate.

Protection Device Diagram




## 4.11 - Start-Up

*IF THE MOTOR IS RUN BARE SHAFT, THE KEY MUST BE FASTENED OR REMOVED BEFORE STARTING.*

a) The motor must start and operate smoothly. In case this does not occur, turn it off and check all connections and the mounting before starting it again.

b) In case there is excessive vibration, check if the fixing screws are correctly fastened.
Check also if the vibration comes from a neighbor machine.
Periodical vibration check must be done.

c) Run the motor under rated load for a short period of time and compare if the running current is in accordance to the nameplate current.

## 5 . MAINTENANCE

Any service on electric machines should only be carried out when it is completely stopped and all phases disconnected from the power supply.

*WARNING:*
*SAFETY CHECK LIST*

General Inspection
✓ Check motor periodically.
✓ Keep motor clean and ensure free air flow.
✓ Check seals and replace them, if required.
✓ Check connections as well as supporting screws.
✓ Check bearing condition and pay attention to: Any excessive noise, vibration, bearing temperature and grease condition.
✓ When a change, under normal conditions is detected, check the motor and replace required parts.

*DO NOT REUSE DAMAGED OR WORN PARTS. REPLACE THEM BY NEW ONES SUPPLIED BY THE FACTORY*

Periodical inspection depends on motor type and on application conditions.

### 5.1 – Lubrication

*FOLLOW REGREASING INTERVALS. THIS IS FUNDAMENTAL FOR PROPER MOTOR OPERATION*

### 5.1.1 - Machines without Grease Nipples

Motors up to frame size 215T are normally fitted without grease fittings. In these cases the regreasing shall be done during preventive maintenance service paying attention to the following aspects:

✓ Take motor apart carefully.
✓ Take all the grease out.
✓ Wash the bearing with kerosene or diesel.
✓ Dry the bearings
✓ Regrease the bearing immediately.

### 5.1.2 - Motors Fitted with Grease Fitting

It is strongly recommended to grease the machine while running. This allows the grease renewal in the bearing housing. When this is not possible due to rotating parts by the grease device (pulleys, bushing, etc) that offer some risk to physical integrity of the operator, proceed as follows:

✓ Clean the area near the grease nipple.
✓ Put approximately half of the total grease and run the motor for 1 minute at full speed.
Then turn off the motor and pump in the rest of the grease.
✓ The injection of all the grease with the motor in standstill can make the grease penetrate into the motor, through the bearing housing inner seal.
Inspections intervals depend on motor type and on application conditions.

*USE ONLY MANUAL GREASE GUN FOR LUBRICATION*

## RECOMMENDED RELUBRICATION INTERVALS – POLYREX EM GREASE (MOBIL)

| Frame size | Amount of grease (g) | 3600 rpm | 3000 rpm | 1800 rpm | 1500 rpm | 1200 rpm | 1000 rpm | 900 rpm | 750 rpm | 720 rpm | 600 rpm | 500 rpm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Relubrication intervals in hours - ball bearings | | | | | | | | | | | | |
| 254/6T | 13 | 15700 | 18100 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
| 284/6T | 18 | 11500 | 13700 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
| 324/6T | 21 | 9800 | 11900 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
| 364/5T | 27 | 3600 | 4500 | 9700 | 11600 | 14200 | 17300 | 19700 | 19700 | 20000 | 20000 | 20000 |
| 404/5TS | 27 | 3600 | 4500 | 9700 | 11600 | 14200 | 17300 | 19700 | 19700 | 20000 | 20000 | 20000 |
| 444/5TS | 27 | 3600 | 4500 | 9700 | 11600 | 14200 | 17300 | 19700 | 19700 | 20000 | 20000 | 20000 |
| 504/5TS | 27 | 3600 | 4500 | 9700 | 11600 | 14200 | 17300 | 19700 | 19700 | 20000 | 20000 | 20000 |
| 586/7TS | 27 | 3600 | 4500 | 9700 | 11600 | 14200 | 17300 | 19700 | 19700 | 20000 | 20000 | 20000 |
| Relubrication intervals in hours – cylindrical roller bearings | | | | | | | | | | | | |
| 324/5T | 21 | 9800 | 11900 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
| 364/5T | 27 | | | 9700 | 11600 | 14200 | 17300 | 19700 | 19700 | 20000 | 20000 | 20000 |
| 404/5T | 34 | | | 6000 | 7600 | 9500 | 13800 | 15500 | 15500 | 15500 | 17800 | 20000 |
| 444/5T | 45 | | | 4700 | 6000 | 7600 | 12200 | 13700 | 13700 | 13700 | 15700 | 20000 |
| 447/5T | 45 | | | 4700 | 6000 | 7600 | 12200 | 13700 | 13700 | 13700 | 15700 | 20000 |
| 504/5T | 45 | | | 4700 | 6000 | 7600 | 12200 | 13700 | 13700 | 13700 | 15700 | 20000 |
| 586/7T | 60 | | | 3300 | 4400 | 5900 | 10700 | 11500 | 11500 | 11500 | 13400 | 17300 |

Note:

The table above is specifically intended for relubrification with MOBIL Polyrex EM grease and bearing absolute operating temperature of:

✓ 70°C (158°F) for 254/6T to 324/6T frame size motors

✓ 85°C (185°F) for 364/5T to 586/7T frame size motors

For every 15°C (59°F) above these limits, relubrification intervals must be reduced by half. Shielded bearing (ZZ) are lubricated for bearing life as long are they operate under conditions and temperature of 70°C (158°F).

✓ Relubrication periods given above are for those cases applying MOBIL Polyrex® EM grease.

✓ When motors are used on the vertical position, their relubrication interval is reduced by half if compared to horizontal position motors.

✓ On applications with high or low temperatures, speed variation etc., the type of grease and relubrication intervals is given on an additional nameplate attached to the motor.

*WE RECOMMENDED TO USE BALL BEARINGS FOR MOTORS DIRECTLY COUPLED TO THE LOAD*

*WARNING:*
*EXCESS OF GREASE CAN CAUSE BEARING OVERHEATING RESULTING IN COMPLETE DAMAGE.*

### 5.1.3 - Compatibility of MOBIL Polirex EM grease with other types of grease

Containing polyurea thickener and mineral oil, the MOBIL Polyrex EM grease is compatible with other types of grease that contain:

✓ Lithium base or complex of lithium or polyurea and highly refined mineral oil.
✓ Inhibitor additive against corrosion, rust and anti-oxidant additive.

Note:
✓ Although MOBIL Polyrex EM is compatible with the types of grease given above, we do not recommend mixing it with any other types of grease.
✓ If you intend to use a type of grease different than those recommended above, first contact WEG.

*BEFORE USING STANDARD MOTORS IN SPECIFIC AREAS OR ON SPECIAL APPLICATIONS, FIRST CONTACT THE GREASE MANUFACTURER OR WEG*

### 5.2 - Assembly and Disassembly

Disassembly and assembly must be done by qualified personnel using only suitable tools and appropriate methods.

The bearing extractor grips must be applied over the side face of the inner ring to be disassembled or over an adjacent part.

It is essential to assemble bearings under clean conditions to ensure good operation and to avoid damages. New bearings shall only be taken out from their packages when assembling them.

Before installing a new bearing it is required to check the shaft fitting for any sharp edge or strike signals.

For bearing assembly warm their inner parts with suitable equipment – inductive process – or use suitable tools.

## 6. SPARE PARTS

When ordering spare parts, please specify the full type designation and product code as stated on the motor nameplate. Please also inform the motor serial number stated on the nameplate.

## 7 - VARIABLE FREQUENCY DRIVE MOTORS

### 7.1 - Standard Motors Line

Motors with voltages up to 575V do not require filters if follow the criteria bellow:

| TECHNICAL CRITERIA FOR VFD APPLICATION | | | | | |
|---|---|---|---|---|---|
| Rated Voltage | Insulation System | Voltage Spikes motor terminals (maximum) | dV/dt Inverter terminals (maximum) | Rise Time(*) Inverter terminals (minimum) | MTBP(*) Minimum Time Between Pulse |
| $V_{rated} \leq 460V$ | Standard Insulation | ≤ 1430V | ≤ 5200 V/µs | ≥ 0,1 µs | ≥ 6 µs |
| $460V < V_{rated} \leq 575V$ | Reinforced Insulation | ≤ 1780V | ≤ 6500 V/µs | | |

(*) Informed by the drive manufacturer.

Note:
1) Motors with nameplate showing voltage 380-415V / 660-690V - 50Hz and 440-480V - 60Hz, and fed by VFD on voltage 660-690V - 50Hz or 480V - 60Hz require filters.
2) Motors in frame sizes 504/5T and 586/7T* when uded with VFD's, require insulated bearings.

* Other frame sizes, under request.

***IF SUCH RECOMMENDATIONS AND CRITERIA ARE NOT FOLLOWED ACCORDINGLY, MOTOR WARRANTY WILL BE VOID***

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## 7.2 - Inverter Duty Motors Line

Motors with voltages above 575V and equal or below 690V and fed by VFD do not require filters when following the criteria below:

| Rated Voltage | Insulation System | TECHNICAL CRITERIA FOR VFD APPLICATION | | | |
|---|---|---|---|---|---|
| | | Voltage Spikes **motor terminals (maximum)** | dV/dt **inverter terminals (maximum)** | Rise Time(*) **inverter terminals (minimum)** | MTBP(*) **Minimum Time Between Pulse** |
| 575V < $V_{rated}$ ≤ 690V | **Reinforced Insulation** | **≤ 2140V** | **≤ 7800 V/µs** | **≥ 0,1 µs** | **≥ 6 µs** |

(*) informed by the drive manufacturer.

✓ Check power supply voltage of the forced cooling set.

> ***IF SUCH RECOMMENDATIONS AND CRITERIA ARE NOT FOLLOWED ACCORDINGLY, MOTOR WARRANTY WILL BE VOID***

## 7.3– Bearing insulation

Inverter Duty Motors line in frame sizes 504/5T and 586/7T* are supplied with ground system between the shaft and frame on Drive Endshield. Also, on request can be supplied with insulated bearings.

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For other lines, in frame sizes 504/5T and 586/7T* when used with VFD's it is required ground system between the shaft and frame or insulated bearings.
(*) Other frame sizes, under request.

## 8 - ADDITIONAL INSTRUCTIONS

### 8.1 - Hazardous Area Motors

#### 8.1.1 General

Besides the recommendations given above, these recommendations must be also followed.
Motors for hazardous area are manufactured according to specific Standards for such environments.
Motors supplied for hazardous area (classified areas) must be installed in areas that comply with those specified on the motor nameplate.

Notes:
- Motors of Division I are also suitable for Division 2.
- Motors of a given class of temperature are suitable also for combustible environments of a greater class of temperature (example, T4 motors are suitable for environments of class T3, T2, T1).

#### 8.1.2 Installation

A complete installation must follow procedures given by local legislation in effect.

*THE INSTALLATION OF HAZARDOUS AREA MOTORS MUST BE CARRIED OUT BY SKILLED PEOPLE*

*THE SPECIFICATION OF THE MOTOR INSTALLATION SITE IS FOR CUSTOMER'S RESPONSIBILITY, WHO WILL ALSO DETERMINE THE ENVIRONMENT CHARACTERISTICS*

When cable entrance is made by a cable gland, this must be suitable to the unit and to the type of cable; the cable gland has to be assembled, completely screwed in order to get the necessary pressure on the sealing rings, so as to:
- Avoid transmission of mechanical vibrations to the motor terminals.
- Guarantee mechanical protection "IP" to the terminal box.

### 8.1.3 Checking and Maintenance

Maintenance must be carried out by repair shops authorized and accredited by WEG.

Repair shops and people without WEG's authorization who will perform any service on hazardous area motors will be fully responsible for such service as well as for any consequential damage.
When performing maintenance, installation or relubrication, follow these instructions:

✓ Electric connections must be correctly locked to avoid resistance-increases, with consequent contact overheating.
✓ Insulation air-distance and surface-distance between conductors, required by the Standards, must be respected.
✓ All screws, used to assemble parts motor and terminal box, must be completely screwed.
✓ Seals and components replacement for cable entrance would be made using spare parts, supplied from the manufacturer, in order to guarantee the original type of protection.
✓ Explosion Proof motors joint surfaces have not to be machined and it is not allowed to insert, between them, any kind of seals, not foreseen or supplied by the manufacturer. Joint surfaces have just to be cleaned and, in order to avoid corrosion or water penetration; they can be oiled by means of a thin coat of silicon grease.
✓ Check if all components are free of edges, knocks or dirt.
✓ Make sure all parts are in perfect conditions.
✓ Lubricate the surfaces of the endshield fittings with protective oil to make the assembly easier.
✓ Use only rubber hammer to fit the parts.
✓ Check the correct bolts fastening.
✓ Use clearance calibrator for correct connection terminal box fitting (less than 0.05mm).

### 8.1.4 Explosion Proof Motor Repairs

Repairing of Explosion Proof motors can only be performed by authorized companies. Please get in contact with nearest WEG office/distributor.

## 9. WARRANTY TERMS

*WEG warrants its products against defects in workmanship and materials for eighteen (18) months from the invoice date issued by the factory, authorized distributor or agent limited to twenty four (24) months from manufacturing date independent of installation date as long as the following items are fulfilled accordingly:*
*- Proper transportation, handling and storage;*
*- Correct installation based on the specified ambient environmental conditions;*
*- Operation under motor capacity limits;*
*- Observation of the periodical maintenance services;*
*- Repair and/or replacement effected only by personnel duly authorized in writing by WEG;*
*- The failed product be available to the supplier and/or repair shop for a required period to detect the cause of the failure and corresponding repair;*
*- Immediate notice by the purchaser about failures occurred and that these are accepted by WEG as manufacturing defects.*
*This warranty does not include disassembly services at the purchaser facilities, transportation costs with product, tickets, accommodation and meals for technical personnel when requested by the customer.*
*The warranty service will be only carried out at WEG Authorized Repair Shops or at WEG's facilities.*
*Components whose useful life, under normal use, is shorter than the warranty period are not covered by these warranty terms.*
*The repair and/or replacement of parts or components, when affected by WEG and/or any WEG Authorized Repair Shop, will not give warranty extension.*
*This constitutes WEG's only warranty in connection with this sale and the company will have no obligation or liability whatsoever to people, third parties, other equipment or installations, including without limitation, any claims for consequential damages or labor costs.*

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