



# **FABRICATED ROTARY AIRLOCK**

## **INSTRUCTION, OPERATIONS & MAINTENANCE MANUAL**

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NOTE:

It is the owner's responsibility to maintain the safety features included with this equipment. The safety features may include, but not necessarily be limited to: guards, access doors and covers, warning decals, caution decals, and advisory decals. Replacement features are available from CAMCORP.

Do not attempt to operate this equipment until you have read and understand the contents of this manual. If you do not understand the contents of this manual bring it to the attention of your supervisor. This manual contains important safety instructions concerning the maintenance, use and operation of this product. Failure to follow these instructions may result in serious injury or death.

## **GENERAL COMMENTS:**

CAMCORP supplies rotary airlocks comprised of gear reducers and motors manufactured by various companies. A Service Manual for your specific gear reducer and motor is included as an inset in this manual. For specific maintenance and lubrication information please refer to this insert.

## **-READ & UNDERSTAND SAFETY DECALS-**

### **Installation and Operation Cautions:**

Be sure that the motor is wired for the correct rotation; rotation should be counter clock wise when standing in front of the chain guard. This airlock must be wired and grounded in accordance with all applicable codes.

Check lubrication level only when airlock is stopped.

Do not operate this equipment without guards, access doors and covers secured.

Keep chain properly tensioned and aligned.

Lock out power before servicing this equipment.

This equipment is automatically controlled and will start at any time without warning.

Finger guards should be installed on airlocks that discharge into drums or open containers. The inlet and outlet of the airlock must be inaccessible.

**Failure to follow these instructions may result in personal injury or property damage.**

## **PRINCIPLE OF OPERATION**

CAMCORP fabricated rotary airlocks are set up to provide metered dry granular, pelletized or powdered materials at a controlled rate from a bin, hopper, screw conveyor or dust collector to a downstream destination such as a tank, scale hopper, screener or drum. Along with metering the product, the airlock also provides a seal from pressurized air leaving or entering the equipment that is attached to the airlock. Fabricated rotary airlocks use a rubber wiper attached to the rotor vanes to provide this seal. Some air will be reintroduced into the attached equipment as empty rotor pockets return to the material inlet. Discharge rates can be increased or decreased by changing the rpm of the airlock rotor. This can be achieved by changing the sprocket ratio of the drive or by using a variable frequency drive. Caution should be taken to make sure that the motor supplied is inverter duty in the application of a variable frequency drive.

## **INSTALLATION**

A visual inspection of your rotary airlock should be performed before it is removed from the truck. Scratches, dents or other damage should be noted on the freight's bill of lading and reported to the carrier as well as Camcorp. Damage during transportation is the responsibility of the carrier.

The shipping cover should be removed from the inlet of the rotary airlock to check for any accessories that were placed inside the airlock for shipment.

The inlet and outlet of the airlock should be attached to other components using silicone sealant as a gasket along with the properly sized fasteners. Component flanges must be flat and square.

The rotary airlock can be rigidly mounted to other components, but must not be twisted or forced out of shape, which will affect the performance. The rotary airlock also is not designed to support the weight of other components connected to it.

The chain guard should be removed for an inspection of the sprockets and chain. Sprockets should be properly secured and aligned. The chain should be checked for proper tightness. Replace the chain guard after inspection and before start-up.

The gear reducer should be checked for lubrication. See the manufacturers manual, included in this manual, for proper lubrication type and quantity.

The rotary airlock has two flanged bearings that require greasing. Consult the attached manufacturers manual for the proper type of grease and lubrication schedules.

## **LOCKOUT / TAGOUT BEFORE PRE – STARTUP CHECK**

### **PRE – START-UP CHECK LIST:**

- A. Check alignment of the drive and tension of the chain.
- B. Make sure that the chain is properly lubricated.
- C. Check the oil level in the gear reducer.
- D. Check that the airlock feed and discharge devices are free of foreign material.
- E. Verify that the electrical connections have been properly attached/installed.
- F. Replace the chain guard and make sure that all other safety devices are in place.

### **START-UP**

- A. Bump the motor to check for:
  - Freedom of rotation
  - Proper rotor rotation
- B. Start unit and operate for fifteen minutes with no load, checking for hot spots, noise and other indications of interference. Allow gear reducer to cool to room temperature and recheck oil level. Add oil if necessary being careful not to overfill.
- C. Start unit and apply load, observe operation for the first hour.
- D. Check all connections for air leaks.
- E. Check current draw of the motor and verify that it does not exceed its full load rating. See motor nameplate.

## **MAINTENANCE**

- A. Check gear reducer oil level monthly.
- B. Refer to the general lubrication guidelines in the manufacturer's insert (manual) accompanying this manual for recommended frequency of oil change and type of oil for the gear reducer.
- C. Refer to the general lubrication guidelines in the manufacturer's insert (manual) accompanying this manual for recommended frequency of greasing and type of grease for the bearings
- D. Check the drive chain for tension and lubrication after the first 24 hours of operations and every 100 hours thereafter. Sprockets should be inspected every 200 hours.
- E. Check chain guard
- F. Inspect the rotor and rotor wiper monthly for wear.

## TROUBLESHOOTING FABRICATED ROTARY AIRLOCKS

<u>Symptom</u>	<u>Possible cause</u>	<u>Solution</u>
Rotor does not rotate	No power to motor	Check breaker Check motor heaters Check motor starter
	Rotor is jammed	Inspect rotor and remove object
	Chain is broken or has come off	Remove guard and inspect drive
	Faulty motor or gear reducer	Remove chain and run motor with no load
Excessive noise	Bearings need grease	Grease bearings, replace if necessary
	Rotor has shifted	Inspect rotor and realign
	Drive chain is rubbing on guard	Reposition chain guard or sprockets and chain
Excessive air leakage through airlock	Worn rotor wiper	Inspect and replace

# INSTRUCTION MANUAL

## DODGE® TIGEAR-2™ RIGHT ANGLE QUILL C-FACE, 3 PIECE COUPLED C-FACE, & SEPARATE SPEED REDUCERS

### Mounting, Operation and Maintenance Instructions

**SIZES: 13 – 47**

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

#### GENERAL INFORMATION

The Reliance Electric Company manufactures the products described in this manual.

#### APPLICATION INFORMATION

The Dodge Tigear-2 reducer is designed to operate within the following temperature limits:

Oil sump      0 to +200°F

The oil sump temperature can be approximated by taking measurements on the gear case upper or lower mounting pads on the end of the reducer opposite of the motor.

Where ambient temperatures exceed 100°F, care should be taken not to exceed 200°F sump temperature during unit operation. Contact Dodge Engineering for application assistance in extreme hot or cold ambient conditions.

The continuous rated input horsepower (mechanical) shown on the reducer nameplate is for service factor of 1.0 at an input speed of 1750 RPM. Before placing the reducer into service, check the nameplate to confirm that its horsepower rating is consistent with the motor horsepower and the desired service factor. Service factor information and reducer ratings for different speeds can be found in your DODGE Engineering catalogs.

#### INITIAL START-UP

##### WARNING

TO ENSURE THAT DRIVEN EQUIPMENT IS NOT UNEXPECTEDLY STARTED, TURN OFF AND LOCK OUT AND TAG POWER SOURCE BEFORE WORKING NEAR THE EQUIPMENT. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN BODILY INJURY OR PROPERTY DAMAGE.

The Dodge TIGEAR-2 reducer will require a break-in period before reaching maximum operating efficiency and may run hot for the first several hours after start-up. This is normal. It is also possible for a few drops of oil to be purged from the lip seals during the break-in period. The user can recognize this start-up seepage by its small volume and short duration. New reducers should be checked periodically during the first few days of use for any signs of severe overheating, continuous lubricant leakage or unusual noises.

## CHECKLIST

1. Visually inspect the contents of the shipping container for any damage that may have been caused during shipping. Check contents for missing hardware and accessories.
2. **Quill style** input reducers are shipped from the factory as follows:
  - a) Input key installed in the Quill bore
  - b) Quill bore is pre-lubricated with special anti-seize compound – (do not remove)
  - c) (4) motor mounting bolts with lock washers in a plastic bag
  - d) Output key is taped to the output (slow speed) shaft
  - e) With hollow output reducers, the output key is supplied along with (6) set screws that have been pre-installed in the output (slow speed) hub
  - f) Motor mounting flange gasket
3. **Separate style** input reducers (keyed input shaft) are shipped from the factory with:
  - a) Input key taped to input shaft
  - b) Output key taped to output (slow speed) shaft
  - c) With hollow output reducers, the output key is supplied along with (6) set screws that have been pre-installed in the output (slow speed) hub
4. **Motor Adapter Kits** (Three piece coupled)
  - a) Reducer coupling hub
  - b) Motor coupling hub
  - c) Elastomeric element
  - d) Motor adapter
  - e) Adapter mounting hardware
  - f) (4) motor mounting bolts with lock washers in a plastic bag
  - g) "O" ring for adapter to reducer
  - h) Gasket motor to adapter

## MAINTENANCE

Dodge **TIGEAR-2 reducers require no periodic maintenance.** However, an occasional visual inspection to check for hardware tightness, leakage and the general overall condition of the reducer is good practice. TIGEAR-2 reducers are designed to operate successfully without breather vents. Since the reducer is shipped with lubricant, and breather plugs are not required, the user is able to eliminate the lengthy preparation normally required to place a reducer into service.

## LUBRICATION – OIL FILL LEVELS

TIGEAR-2 reducers are filled at the factory with **Klüber Klübersynth UH1 6-460**, a synthesized lubricant that is formulated for long life and successful operation in a broad temperature range. **The quantity of oil shipped with every reducer is suitable for all approved mounting positions. Do not add or remove any oil during installation or after the break-in period.** Change the oil only when performing maintenance that requires gearbox disassembly. If lubricant must be replaced, **use only the lubricant supplied by Dodge.** The use of another lubricant will compromise the performance of the reducer and may void the warranty. Contact the TIGEAR-2 customer order engineering group at (864) 338-4000 for information on purchasing the proper amount of lubricant and to check fill levels.

## THE TIGEAR-2 SEALING SYSTEM

TIGEAR-2 reducers are kept completely sealed from the environment. **No breather vents are required for any approved mounting position.** The special design of the gear sets and the special synthetic lubricant enable the reducer to operate in a highly efficient manner. The internal temperature rise is minimized which, in turn, minimizes internal pressure build up. TIGEAR-2 oil seals employ special lip constructions and lip material and are designed to ensure long, leak-free operation when subjected to the small amounts of pressure that may develop within the speed reducer.

### WARNING

The gearcase may be under pressure when the oil sump temperature is higher than the ambient temperature. Allow the reducer to cool down to room temperature before removing seals or bearing covers. Slightly loosen oil fill plug on top of gear case to vent any internal pressure. Failure to observe this precaution could result in personal injury.

## MOUNTING POSITIONS

Because TIGEAR-2 reducers do not require the use of a breather, they are suitable for a wide variety of mounting positions without modification. However, Dodge does not recommend using mounting positions that place the high-speed (input) shaft below the level of the low-speed (output) shaft. These worm-under mounting positions should be avoided in order to maximize long term leak-free performance. Since the high-speed seal will experience more revolutions than the output, it will also experience more heat and more wear. When the reducer is mounted in a position where the high-speed seal is below the oil sump, and that seal has reached the end of its useful life, the constant head of oil on the high-speed seal will result in a leak. If the reducer is kept in a position where the input seal is above the oil sump it may not leak even after the high-speed seal reaches the end of its useful life. Because low-speed seals experience fewer revolutions, less heat and less wear, they will generally last longer than high-speed seals. Anytime the user notices a constant leak from a lip seal, plans should be made to either replace the seal or replace the speed reducer.

## MOTOR MOUNTING INSTRUCTIONS – QUILL INPUT STYLE REDUCER

### NEMA 56C and 140TC frame motors

1. Check the reducer C-Face, tenon and input bore for nicks, burrs and cleanliness.
2. Locate the 4 motor mounting bolts and lock washers shipped with the reducer.
3. Remove the plastic cap from the input bore taking care not to remove the anti-seize compound that has been pre-applied at the factory.
4. Check that the input key has been securely pre-installed in the input quill bore at the factory.
5. Check the motor shaft, motor shaft keyway and motor C-Face for nicks, burrs, cleanliness and proper size.
6. Be sure to install gasket between motor and motor adapter on reducer.
7. Align the input bore key with the motor shaft keyway and push motor into place, fully engaging the tenon. Rotate the motor to the desired conduit box position and install the motor mounting bolts and lock washers. Tighten the bolts according to the values shown in table 1. (See installation tip below) **BE SURE THAT THE MOTOR AND REDUCER TENONS ARE FULLY ENGAGED BEFORE TIGHTENING ANY BOLTS. FAILURE TO DO SO COULD RESULT IN MISALIGNMENT AND COULD CAUSE DAMAGE TO THE MOTOR OR REDUCER.**

### NEMA 180TC frame motors

1. Check the reducer C-Face, tenon and input bore for nicks, burrs and cleanliness.
2. Attach adapter plate to 180TC motor using the low head socket screws provided. Tighten the bolts according to the values shown in table 1.
3. Mount motor with adapter plate attached to the reducer using the same procedures for the 56C and 140TC frame motors.

Table 1

Size Bolt	Torque In-lb (non-lubricated)
3/8	250-300
1/2	650-700

### INSTALLATION TIP – (Optional)

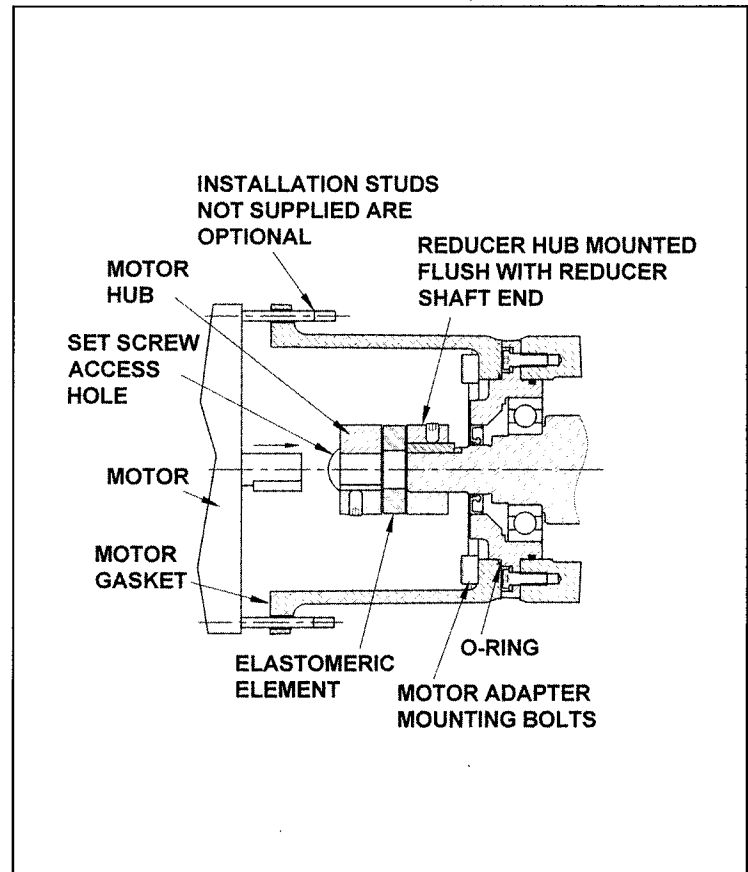
The use of two threaded studs during assembly will help locate, align and support the motor as it is being mounted onto the reducer. Thread the studs into any two tapped holes on the motor C-Face that are 180 degrees apart as shown in figure 2. Align the reducer key and the motor keyway as described above and align the threaded studs with the mounting holes in the reducer C-Face. When the tenons are fully engaged, install the motor mounting bolts and lock washers in the other two holes. Remove the studs and install the remaining motor mounting bolts and lock washers as described above.

## MOTOR MOUNTING INSTRUCTIONS – Separate Style Reducer with 3 Piece coupling Motor Adapter

This configuration of Tigear-2 uses a standard NEMA C-Face motor with a 3-piece flexible coupling.

## ASSEMBLING THE COUPLING

1. Install reducer half of the coupling with key so that it is flush with the end of the reducer input shaft and tighten the set-screw.
2. Install the supplied "O" ring between the reducer and the motor adapter.
3. Install Motor Adapter using the supplied hardware.
4. Install the elastomeric center element of the coupling.
5. Place the motor half of the coupling onto the elastomeric element mounted on the reducer shaft.
6. Install the key into the motor shaft.
7. Be sure to install the gasket between the motor and motor adapter flange as the motor is installed.
8. Align the coupling keyway and motor key then slide the motor shaft into the coupling assembly until the motor stops against the flange.
9. Tighten motor bolts.
10. Looking through the access hole verify that the coupling faces are in full contact with the coupling elastomeric element - without any preload.
11. There should be a 0 to .010 inch clearance between hub faces and the elastomeric element. Reposition hub if required.
12. Tighten the set-screw of the motor half coupling.



Contact the TIGEAR-2 customer order engineering group at (864) 338-4000 with any questions

## LIMITED WARRANTY

The Dodge TIGEAR-2 Reducer is warranted under the Dodge "Standard Terms and Conditions of Sale" against defects in material and workmanship. Warranty claims must be submitted to the company within one (1) year from the date of installation or three (3) years from the date of manufacture, whichever occurs first. The warranty is valid providing the product is properly applied, installed, operated and maintained in accordance with the instruction manual. This warranty covers product replacement or repair only and excludes labor, equipment and/or downtime for removal and installation. This warranty shall not apply where equipment is operated above rated load capacity or is subject to accident, alteration, misuse or abuse. This warranty described in the Dodge "Standard Terms and Conditions of Sale" is in lieu of and excludes all other expressed or implied warranties.

**NOTE:** Service and repair under warranty should be performed only by a Dodge authorized service shop. Contact Rockwell Automation Power Systems Warranty Administration at (864) 284-5777 for the nearest location and to register warranty claims.

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

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Installation and  
Operation Manual

**Fractional Horsepower  
Duty Master<sup>®</sup> A-C Motors**

- Type CS, Capacitor Start
- Type P, Polyphase
- 1/8 Thru 3 hp
- 48-56-140T

Reliance  
Electric

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**A-C MOTORS**

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Instruction Manual B-3622-13

June, 1988

# INSTALLATION AND OPERATION

## UNPACKING

Unpack motor carefully. Inspect for possible damage during shipment. Check packing materials. Save any instruction tags or wiring diagrams found in carton. Report any damages or shortages immediately to local transportation agent.

Before connecting motor to electrical supply, inspect for any damage resulting from shipment. Turn shaft by hand to insure free rotation. If the motor has been in storage or subjected to adverse moisture conditions, have it dried thoroughly before operating. After drying, run motor not connected to load for a short time for further drying and as a check on bearings.

### WARNING

**HIGH VOLTAGE AND ROTATING PARTS CAN CAUSE SERIOUS OR FATAL INJURY. THE USE OF ELECTRIC MACHINERY, LIKE ALL OTHER UTILIZATION OF CONCENTRATED POWER AND ROTATING EQUIPMENT, CAN BE HAZARDOUS. INSTALLATION, OPERATION, AND MAINTENANCE OF ELECTRIC MACHINERY SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. FAMILIARIZATION WITH NEMA SAFETY STANDARDS, NATIONAL ELECTRICAL CODE AND SOUND LOCAL PRACTICES IS RECOMMENDED.**

## MOUNTING

Mount the motor on a foundation sufficiently rigid to prevent vibration. After careful alignment, bolt motor securely in place.

## WIRING

Check nameplate data on motor before installing to insure correct rating and that the available power supply agrees with the motor power supply. If in doubt, check local power company. Fuses, wires, thermal cutouts and other protective devices should be the proper size and rating to safely carry the load and to interrupt the circuit on overloads. Built in thermals, when installed, are of proper size to provide the required protection.

### WARNING

**GROUND THE MACHINE PROPERLY TO AVOID SERIOUS INJURY TO PERSONNEL. GROUNDING SHOULD BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND CONSISTENT WITH SOUND LOCAL PRACTICES.**

All motors contain wiring instructions either as a label on the inside of the conduit box cover or by separate sheet or tag. All motors should be installed in accordance with the National Electric Code and local requirements. Check leads or terminals with connection diagrams or label so the proper connections to the incoming power leads are made.

## STARTING

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

The motor should start quickly and run smoothly. If the motor should fail to start it may be that the load is too great, the applied voltage low or the motor improperly connected. In any case, immediately shut motor off, disconnect from power supply, and investigate the cause.

## ROTATION

Refer to notation on wiring diagram for method of changing rotation.

## AMBIENT TEMPERATURE

Each motor nameplate carries a maximum ambient temperature rating. Motors should not be operated at ambients in excess of this rating.

# MAINTENANCE

### WARNING

**WARNING HIGH VOLTAGE. ELECTRIC SHOCK MAY CAUSE SERIOUS OR FATAL INJURY. DISCONNECT POWER BEFORE TOUCHING ANY INTERNAL PART.**

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

The following should be checked at regular intervals.

1. Windings should be dry and free of dust, grease, oil, and dirt. Windings may be cleaned by suction cleaners or by wiping. Nozzles on suction type cleaners should be non-metallic. Gummy deposits of dirt and grease may be removed by using a commercially available mineral solvent. Do not use gasoline or other inflammable solvents.
2. Terminal connections, assembly screws, bolts and nuts should be tight. They may loosen if motor is not securely bolted and tends to vibrate.
3. Insulation resistance of motors in service should be checked periodically at approximately the same temperature and humidity conditions to determine possible deterioration of the insulation. When such measurements at regular intervals indicate a wide variation, the cause should be determined. Motor should be reconditioned if the motor has been subjected to excessive moisture, or by re-winding or re-insulating if necessary. Enclosed motors

require very little attention. Be sure that external air chamber of fan cooled motors does not become clogged with foreign material which will restrict passage of air.

**WARNING**

**MINERAL SOLVENTS ARE FLAMMABLE AND MODERATELY TOXIC. THE USUAL PRECAUTIONS FOR HANDLING CHEMICALS OF THIS TYPE SHOULD BE OBSERVED. THESE INCLUDE:**

- 1. AVOID EXCESSIVE CONTACT WITH SKIN.**
- 2. USE IN WELL VENTILATED AREAS.**
- 3. TAKE NECESSARY PRECAUTIONS TO PREVENT FIRE OR EXPLOSION HAZARDS.**

## LUBRICATION

### BALL BEARINGS

The ball bearing has deep grooved, double shielded bearings with sufficient lubricant packed into the bearings by the manufacturer for "life Lubrication". The initial lubricant is supplemented by a supply packed into larger reservoirs in the end shield at time of assembly. No grease fittings are provided as the initial lubrication is adequate for up to 10 years of operation under normal conditions.

### SLEEVE BEARINGS

The bearing sleeve is steel on the outside for strength with a tin base babbit lining on the inside or low friction and long wear. A storage space around the bearing is filled with Permawick, a commercial composition of special cellulose fiber highly saturated with oil. The initial factory lubrication is normally adequate for approximately one year under normal operation. Thereafter, lubricate about every six (6) months. This requires about 3 to 4 squirts from a 4 in. oil can. Use only LIGHT grade mineral oil (similar to SAE 10W) having viscosity of 210 sec. at 100°F. If the motor has been subjected to storage prior to operation it is advisable to lubricate in accordance with the above.

## OVERLOAD PROTECTION

Motors supplied with thermal protectors are furnished with either a manual or automatic reset type to protect against destructive overheating. If the protector trips, proceed as follows:

### FOR MANUAL RESET TYPE

1. Wait two minutes.
2. Push in reset plunger until it catches.

### FOR AUTOMATIC RESET TYPE

This type will reset itself when the motor cools sufficiently.

If the thermal protector continues to trip, some abnormal condition exists. This condition must be corrected before motor will operate normally.

**WARNING**

**MOTORS WITH AUTOMATIC RESET THERMAL PROTECTORS SHOULD BE USED IN APPLICATIONS WHERE AN UNEXPECTED RESTART WOULD NOT BE HAZARDOUS.**

**IF A MOTOR USING AN AUTOMATIC RESET THERMAL PROTECTOR HAS TRIPPED "OFF" MAKE SURE TO DISCONNECT MOTOR FROM LINE BEFORE WORKING NEAR THE MOTOR OR ANY EQUIPMENT DRIVEN BY IT: SERIOUS INJURIES COULD OCCUR OTHERWISE DUE TO AN UNEXPECTED "RESET" AND MOTOR START UP.**

## TROUBLESHOOTING

If trouble develops in operation of motor, be sure that:

- (a) The bearings are in normal condition and have been properly lubricated with a high grade, ball bearing lubricant, free of dirt or grit. (If dirt enters bearing, flush and relubricate.)
- (b) There is no mechanical misadjustment to prevent free rotation of moving parts of motor and drive.
- (c) All bolts and nuts are properly tightened.
- (d) Motor instructions have been carefully carried out.
- (e) That rated voltage is available in all phases at the motor terminals.
- (f) That the line voltage, frequency and phase correspond to the values stamped on the nameplate.
- (g) That all connections and contacts are properly made in all circuits between motor and line, and between motor and control.

- (h) That overload and low voltage devices in control equipment, fuses or other protective devices are in proper working order.
- (i) That no excessive overload exists on the motor. Company line amperes at full load with nameplate stamping.

## WARRANTY

Reliance Electric Company warrants workmanship and materials on each Fractional Horsepower Duty Master A-C Motor for one year from date of shipment. This warranty does not extend to failures induced by misuse, abuse or misapplication. For warranty service, contact the nearest Reliance Electric distributor, service shop or sales office.

## REPAIR PROCEDURES

**NOTE:** *Reliance Electric Company cannot be held responsible for expense incurred in any repairs performed by other than the Company's Engineers or Authorized Service stations unless authorization has been granted by Reliance field Representatives or the factory at Cleveland, Ohio.*

**WARNING**

**INTERNAL PARTS OF THIS MOTOR MAY BE AT LINE VOLTAGE EVEN WHEN MOTOR IS NOT ROTATING. BEFORE CONTACTING ANY INTERNAL PART: DISCONNECT ALL A-C LINE CONNECTIONS.**

### DISASSEMBLY

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

Before removing either end shield;

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

### REMOVING END SHIELDS AND ROTOR

4. Remove any bearing cartridge nuts or screws.
5. Remove end shield through bolts.
6. Pull end shields by tapping lightly on screw driver in slot between end shield and frame with fiber mallet.
7. Remove rotor.

### REMOVING AND REPLACING BALL BEARINGS

Should it become necessary to replace bearings, the bearing bore and cavity should be thoroughly cleaned and repacked with approximately 1/2 teaspoonful of recommended grease. (Chevron SRI #2 or equivalent.)

Bearings should be removed with bearing pullers using a center insert in the end of the shaft to protect the shaft center. If a puller is not available, use a fiber hammer and transmit blows through a hard wood block.

To re-install ball bearings, either in a press or on the bench, pressure should be applied to the inner race by using a square faced sleeve or piece of pipe that will fit over the shaft, to avoid damaging the bearing. If a press is not available and a hammer is used, the blows should be transmitted against the sleeve by a block of wood or fiber.

### REASSEMBLY

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

**WARNING**

**THE USE OF ELECTRICAL EQUIPMENT IN HAZARDOUS LOCATIONS IS RESTRICTED BY THE NATIONAL ELECTRICAL CODE, ARTICLE 500. ORIGINAL EQUIPMENT MANUFACTURERS AND USER CUSTOMERS MUST READ, UNDERSTAND AND APPLY THESE RULES FOR INSTALLATION AND USE OF ALL EQUIPMENT IN SUCH LOCATIONS AND CONSULT LOCAL CODE INSPECTION AND ENFORCEMENT AGENCIES AS NECESSARY TO INSURE COMPLIANCE. MOTORS LISTED BY UNDER WRITERS LABORATORIES, INC., FOR USE IN SPECIFIC LOCATIONS HAVE BEEN DESIGNED, TESTED, AND APPROVED FOR USE IN SUCH LOCATIONS ONLY.**

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# INSTRUCTION MANUAL FOR DODGE® SETSCREW, ECCENTRIC COLLAR, D-LOK, H, H-E SERIES & EZ-KLEEN MOUNTED BALL BEARINGS

## INSTALLATION

### 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.

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

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 hold-down 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.

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 SC 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.

**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 Rockwell Automation nor are the responsibility of Rockwell Automation. This unit and its associated equipment must be installed, adjusted and maintained by qualified personnel who are familiar with the construction and operation of all equipment in the system and the potential hazards involved. When risk to persons or property may be involved, a holding device or shear bars must be an integral part of the driven equipment.

SETSCREWS					D-LOK			MOUNTING BOLTS					
Setscrew Size	Key Hex Across Flats	Recommended Torque		Corrosion Resistant-Stainless Steel	Cap Screw Size	Recommended Torque	E-Z Kleen Recommended Torque	Metal Housings		EZ-KLEEN Housed Bearings			
		Standard Ball Bearing Insert	Max					Bolt Size	Recommended Dry Torque	2-Bolt PB, 2 & 4-Bolt Fig. And Fig. Brackets		Tapped-Base PB	
		(in.)	(in.)	(in.-lbs.)	(in.-lbs.)	(in.-lbs.)	(in.)	(in.-lbs.)	(in.)	(in.-lbs.)	(in.)	Torque*	Bolt Size
#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)		
M5	2.5	3.2	3.7	2.8	M4	5.85	4.68	M10	29	M8	15		*Torque for Austenitic (18-8) Stainless
M6	3	6.2	7.7	5.8	M5	10.75	8.6	M12	50	M10	25		**Max. torque values published. Do not exceed.
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	M16	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 lubrication 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 H and H-E series bearings, use Exxon Unirex N3 or equivalent suitable to 300° F.

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

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