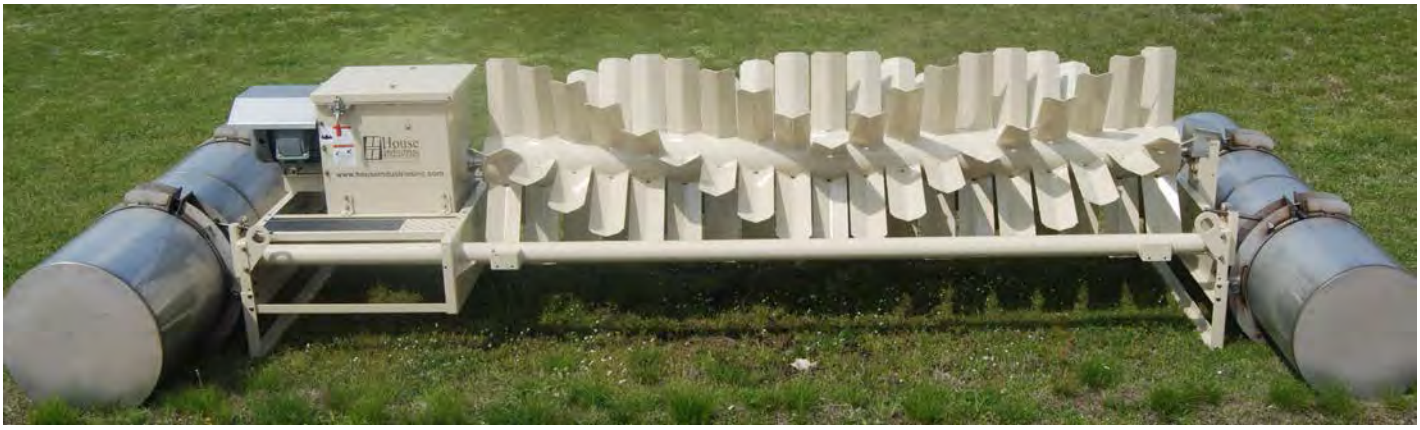
ECS House Industries, Inc.

3720 Highway 1 South, Cherry Valley, Arkansas 72324



Submittal Package

5HP Floating Brush Aerator

Queensland Urban Utilities

9/5/2012

AERATOR OPERATION & MAINTENANCE MANUAL

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ECS House Industries, Inc.

3720 Highway 1 South, Cherry Valley, Arkansas 72324

5hp Direct-Drive, ECS House #SDB059TA2
Floating Electric Brush Aerator Specifications

PART 1 GENERAL

1.1 Summary

A. The design, fabrication, supply, and installation of the aeration system shall be as specified herein.

B. Floating brush aerators are equipped with all necessary equipment and materials to meet the specified requirements in the proposed wastewater treatment process.

1.2 Qualifications

A. The aeration system supplier shall be experienced in wastewater treatment processes and shall be prepared to demonstrate the affect on the client's process of the aeration systems supplied through documented analysis relating to flow, hydraulic retention time, and biological contact.

B. The floating brush aeration system Design Engineer shall have documented water and wastewater treatment and design experience for a minimum of ten (10) years.

C. The manufacturers of the aeration system components shall provide a twelve (12) month warranty on all items from the date of start-up, not to exceed eighteen (18) months from the date of delivery.

1.3 Submittals

A. The Contractor shall submit to the ENGINEER for approval, submittals showing full details of all aeration equipment and appurtenances. The submittals shall be supported by such notes or written directions as may be necessary.

B. This submission shall be made as soon as feasible after Contract award. The Contractor shall furnish the ENGINEER with (5) five copies of the submission as approved. He shall also provide approved copies sufficient for the use of his own forces.

C. The information required on the submittals shall include, but not necessarily be limited to, the following:

1. Full and complete specifications covering the proposed equipment and appurtenances to be furnished, including certified aeration design provided by Floating Brush Aeration Design Engineer. The design shall show the mixing and oxygen capabilities of the ECS House Industries, Inc. Floating Brush Aerator System.
2. Detail drawings showing plan and elevation dimensions of the proposed equipment and appurtenances to be furnished.
3. Assembly, Installation, and adjustment instructions.
4. Nearest location of factory maintenance and service facilities that will be available to service the equipment offered.
5. Full and complete specifications for each motor or motor drive unit, or gear reducer proposed to be furnished as a component part of the equipment
6. Such weights of the equipment as necessary including the heaviest piece to be handled during construction.
7. Warranty as specified herein.
8. Troubleshooting guide.
9. Electrical requirements, including power and control wiring schematics.

Failure to submit the above data as set forth shall be cause for rejection of the submittal and equipment.

1.4 Operation and Maintenance Manuals

A. Upon the Engineer's approval of submittals the manufacture shall provide (5) five copies of the operation and maintenance manuals.

B. The O&M manuals shall include details of all components, installation instructions, start-up procedures, and operation and maintenance procedures. The O&M manuals shall include specific instructions for receiving and handling, assembly, mooring, wiring, installation, repair, service and storage.

PART 2 PRODUCTS

2.1 The Contractor shall furnish and install a total of four (4) 5hp floating electric brush aerators as part of this project. ECS House Industries, Inc., located in Cherry Valley, Arkansas, shall manufacture the floating electric brush aerators or Engineered Approved Equal.

2.2 Aeration units and appurtenances shall be adaptable to the layout shown on the drawings and shall be of new and current manufacture. Units shall operate without objectionable noise or abnormal vibration over the specified operating range. All rotating parts shall be balanced through precise CNC machining and precision rotor and shaft alignment. Units shall have a nameplate that will include the manufacturer's name, serial number, model number, size, gear reducer speed, and horsepower.

2.3 Horizontal - Rotor Assembly

A. The 5 hp floating electric brush aerator assembly shall include an 8" schedule 40 rotor pipe. The rotor shall be 059" long and no shorter. The rotor shall have 45 brushes that are 6" minimum width x 14" minimum length and have 133-degree V-shaped angle. The brushes shall be robotically welded, on both sides, in a spiral configuration to achieve superior balance and rotation. The rotor assembly shall be constructed of 304L Stainless Steel. Lifting eyes shall be welded onto the rotor pipe so compete unit can be removed and installed with balance.

The rotor shall have welded in CNC machined inner-plates that shall allow both the drive and non drive end shafts the ability to be bolted-into the rotor. The drive shaft and non drive shaft shall be fabricated from 316 stainless steel.

B. Welded-in or bolted "on" drive or non drive end shafts shall <u>not</u> be acceptable.

C. Lifting mechanisms shall be welded onto the rotor pipe so the complete unit can be removed and installed with balance.

2.4 Non Drive End Rotor Bearing

A. The non drive end bearing shall be a grease lubricated, stainless steel, eccentric collar 1-1/2" ball-bearing assembly. The bearing shall have a 304L stainless steel inspection cover and an auxiliary non-corrosive seal mounted in a power coated seal plate on the rotor side of the power coated bearing bracket. The collar shall have a stainless steel rear cover mounted above and around the upper half the collar and bolted to the bearing bracket sides. An external grease fitting shall be located on the side of the bearing bracket. The bearing shall have an L10 bearing life over 100,000 hours.

B. Any aerator that has to use a plastic drive-end bearing will not be acceptable.

2.5 Electric Motor

A. Each aerator shall use a premium efficiency severe-duty C-face motor with feet. The motors shall be 5hp, 3 phase, 50 Hertz, 415 volt, 1750 RPM with a 1.25 operating service factor when motor is operating at 90% of rated full load during normal operation.

B. Motor shall be totally enclosed, fan cooled (TEFC), rated for severe corrosive-duty, NEMA Class F insulation, cast iron construction with an epoxy coating, and stainless steel hardware and nameplate. (Premium efficiency; meets or exceeds the requirements of EPACT '92 and Canadian Federal Efficiency Levels defined in CSA C390-93. Full load efficiency of all ratings is certified under the EEV Program of the CSA.)

2.6 Electric Motor Certification

A. The aerator manufacturer shall provide certification that the nameplate data affixed to the aerator's electric motor is valid, specific data applicable to that particular motor.

2.7 Gear Reducer

A. Constant-duty AGMA Class III DODGE Model TA2, Gear Reducer shall be directly mounted on the rotor's drive shaft with tapered-bushings. The shaft mounted helical gear reducer shall have tapered roller bearings. Ball bearings in the gear reducer are not acceptable. The gear reducer shall be rated for a minimum of 12hp, providing a minimum 2.0 hp Service Factor.

B. The input shaft and output hub seals shall be non-corrosive, non-metallic, stainless steel spring loaded double lip, nitrile seals. The output hub shall have two seals on each side. The input shaft of the gear reducer shall be connected to the motor shaft with a Dodge PX40 coupler thus giving the assembly a “Dampened System” and creating the “Direct Drive” aerator. The coupler shall be high speed and the coupler element shall be constructed of high density reinforced rubber. The gear reducer shall produce a nominal rotor speed of 70 RPM. The gear reducer shall not be connected to the motor using any type of V-belt driven system or a “low speed coupled” direct driven system.

C. An input shaft mounted steel hub shall have a cooling fan bolted to the hub face to provide gear drive cooling.

2.8 Aerator Drive End Shaft & Triple Seal Protection System

The 1-15/16" diameter 316 SS drive shaft enters the gear drive enclosure through the "Triple Seal Protection System".

A. This consists of CNC machined, piloted, inner and outer seal plates which help prevent fluids from entering the gear housing. The inner and outer plate seals shall be non-corrosive, non-metallic type, stainless steel spring loaded, double-lip, nitrile seals. The outer seal is additionally protected with a v-ring shaft seal and protective stainless steel collar. The cavity between the inner and outer seal plates are grease filled through a port on the side of the outer seal plate. Internally, the drive shaft is supported by a 1-15/16" piloted flange bearing that is bolted internally to the drive case with a spacer ring that permits a close fit and aligns the shaft seals. The aerator gear drive enclosure shall be designed to keep fluids from entering the enclosure. The materials are 304L Stainless Steel, 7 gauge and 1/4" plate steel. The enclosures shall be ECS House Industries part numbers MFG005489.

   The gear reducer enclosures consists of a welded drive case, drive case cover with glued neoprene seal with hinge linkage, vented motor mounting bracket, motor height adjusting brackets with adjusting bolts, vent hole splash prevention angle, 16 gauge 304SS motor cover, stiffening angles bolted to the upper case sides and ends, and anti-rotation angles that lock the gear drive into position after motor and gear drive input shaft alignment. The rotor end stiffening angle shall provide an adjustable hinge point for compression of the cover seal around the rotor end top edge of the enclosure, sides and motor bracket.

   The vent holes on the motor bracket shall be protected with a 16 gauge 304 stainless steel splash angle to prevent fluids from entering the enclosure in case of wash down. The motor bracket bolts directly to the drive case to provide room for installation and removal of the shaft mounted gear drive assembly and shall be sealed with silicon. The motor bracket shall provide that the C-face motor shall be removed without repositioning the gear drive.

   The sealing drive case cover shall be held closed with two stainless steel clamp latches mounted on stainless steel blocks bolted to the drive case enclosure sides. The latching force shall be adjustable to maximize sealing of the cover. The stainless steel clamp catches shall be bolted to the drive case cover flange. When in the raised position for service and inspection, the cover shall be held open with manually inserted stainless steel pins with lanyard in the hinge linkage.

   The drive train enclosure shall be bolted to the framework in four places provided by four angle brackets bolted to the enclosure sides.

2.9 Floatation Assembly, Main Frame Construction, Floatation Attachment Bands, Anchoring System, and Powder Coating Specifications

A. Each 5 hp unit shall have (2) two-16 gauge, 304L stainless steel tanks. The drive-end tank shall be 8' long x 22" diameter, and the non-drive end tank shall be 8' long x 19" diameter.

B. All stainless steel floats shall be seam welded and pressure checked after fabrication. The stainless steel floats shall be foam filled with "closed celled" two part foamular foam.

C. The main frame of the aerator shall be fabricated from 304L Stainless Steel. The main frame shall be fabricated out of 3" schedule 40 pipe and 7 gauge steel. The frame shall be welded and bolted together with stainless steel hardware.

D. Each float shall be attached to the mainframe using 7 gauge, 304L Stainless Steel bands and connected to the frame with stainless steel pins and 304L stainless steel bolted brackets. The frame shall be connected to the anchoring system in such a manner that external forces, resulting from wave action and other external movement, are not transferred to the Floatation attachment.

E. Each unit shall have adjusting linkage attached to each corner of the main frame. Adjusting linkage shall be capable of changing the operating depth of the horizontal rotor blades; the horsepower requirement and amperage draw, and provide aerator leveling. Adjusting linkage shall be fabricated from 304L stainless steel rods with brass adjusting nuts. A djusting linkage shall not be connected directly to the anchoring system nor shall it mechanically depend upon the anchoring system for it to be effective.

F. Anchoring system shall hold the aerator firmly in position. The type of anchoring system to be used is determined by the placement of the aerator(s) as indicated on the ENGINEER'S Plans. Anchoring system shall be fabricated from 304L Stainless Steel. The anchoring system shall not restrict the unit's floatation and shall allow for continuous aerator operation with fluctuations in the water surface elevation up to (plus/minus) three feet (±3ft.). The anchoring system shall consist of two (2) parallel mooring arms, one (1) cross-brace assembly, and two (2) bank stake poles in order to anchor to the levee of the lagoon or cable anchoring can be provided.

PART 3 EXECUTION

3.1 The aerator shall be installed as shown on the drawings and in strict accordance with the manufacturer's instructions.

3.2 The aerator supplier, through their field service technician or representative, shall provide service to verify the proper installation and supervision of equipment start-up. Operation and maintenance instruction shall be given to the engineer/owner through the use of illustrated material within the manual.

3.3 Installation supervision and start-up services shall be provided only to the extent required to comply with the manufacturer's warranty conditions.

3.4 After completion of the equipment installation, testing of the rotor shall be done continuously for a period of 24 hours.

ECS HOUSE INDUSTRIES, INC. WARRANTY AGREEMENT

This Is A Legal Contract Between You And ECS House Industries, Inc.

1. ECS House Industries, Inc. ("ECS") warrants directly to you that the equipment identified below will be free from defects in materials and workmanship appearing under normal commercial use and service for a period of twelve (12) months following your first use of the equipment or eighteen (18) months from the date of first delivery of said equipment to you, whichever period expires first, subject to the restrictions and conditions contained herein. The warranty contained herein does not extend to any purchaser of the equipment other than the original purchaser.

List of Warrantied Equipment:

a.
b.
c.

2. The warranty contained herein does not apply to any part(s) or component(s) not manufactured by ECS which are included and/or contained within the equipment supplied to you by ECS. Any warranty, if any, covering parts or components purchased by ECS which are included and/or contained within the equipment purchased by you from ECS is provided to you by the respective manufacturer(s) of such part(s) and/or component(s). ECS is not obligated to bear the cost of labor, lodging, removal of equipment from water, meals or transportation regarding any part(s) or component(s) not manufactured by ECS. Notwithstanding the foregoing statements, with regard to any part(s) or component(s) not manufactured by ECS which are included and/or contained within the equipment supplied to you by ECS and which are found by ECS to be faulty or defective, ECS agrees to facilitate and pursue all warranty claim(s) on your behalf with the manufacturer(s) of the faulty or defective parts(s) and/or component(s) and to bear the cost of shipping any such faulty or defective part(s) or component(s) back to the manufacturer thereof for evaluation during the warranty period set forth by this Agreement.

3. **WARRANTY DISCLAIMER AND LIMITATIONS OF LIABILITY**:

Your sole and exclusive remedy against ECS arising from your purchase and use of the equipment manufactured by ECS is limited to the repair or replacement of defective materials or workmanship. Within the warranty period, ECS will replace or repair any parts built and manufactured by ECS that have failed under normal use subject to the restrictions and conditions listed herein. Unless otherwise stated specifically herein, ECS will not be responsible for shipping or handling on parts returned pursuant to this warranty. All parts returned for warranty replacement or repairs must be returned within thirty (30) days of failure, have the proper serial number and have a RMA number attached.

ECS is only obligated to perform repair(s) or replacement(s) of defective material and/or workmanship pursuant to this warranty at an ECS facility or another place designated by ECS. No warranty will be honored by ECS when, in the sole opinion of ECS, there is loss or damage resulting from any cause beyond the control of ECS, including, but not limited to, abuse, neglect, alterations or modifications, an accident, unauthorized repairs or attempted repairs, improper installation, use of the equipment in a sea water or salt water application, or damages resulting from acts of God or governments, floods or fires, or other parties, specifically including, but not limited, to purchaser. ECS will not be responsible for failures of any kind due to: (1) ph levels that vary outside normal limits or (2) abnormal water density in any application. All warranties as stated herein will be null and void upon failure of any kind that is determined by

ECS to have been caused by lack of routine maintenance and/or proper fluid changes as required by the operator's manual and the specifications of the original equipment manufacturer. All warranties stated herein will be null and void upon any failure due to or resulting from foreign objects coming in contact with any ECS equipment. All serial numbers shall remain intact and together as recorded and coordinated by ECS. All parts replaced during the warranty period shall be purchased from ECS and shall be the correct part for the correct model. ECS shall not be liable for any damage caused by corrosion, amoeba or bacteria to any material, part, or workmanship during the warranty period or any other time. This warranty is subject to any existing conditions of supply which may directly affect the ability of ECS to obtain materials or manufacture replacement parts. Any repair or replacement under this warranty shall not extend the original warranty expiration date.

EXCEPT FOR THE ABOVE WARRANTY, ECS MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, AND MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.

It is agreed that ECS shall not be liable for any incidental or consequential damages experienced or claimed by you, including, but not limited to: loss of profits; loss of income; damage to equipment; damage to facilities; loss of or damage to your product(s) or crop(s); damages resulting from lack of oxygenation; damages resulting from corrosion, amoeba or bacteria; attorney's fees; costs of litigation; or any liability that you may have with respect to any other person or entity.

4. **TIME LIMIT ON COMMENCING LEGAL ACTION:**

It is agreed that you have one (1) year from the accrual of the cause of action within which to commence any legal action arising from the purchase or use of the equipment, or be barred forever.

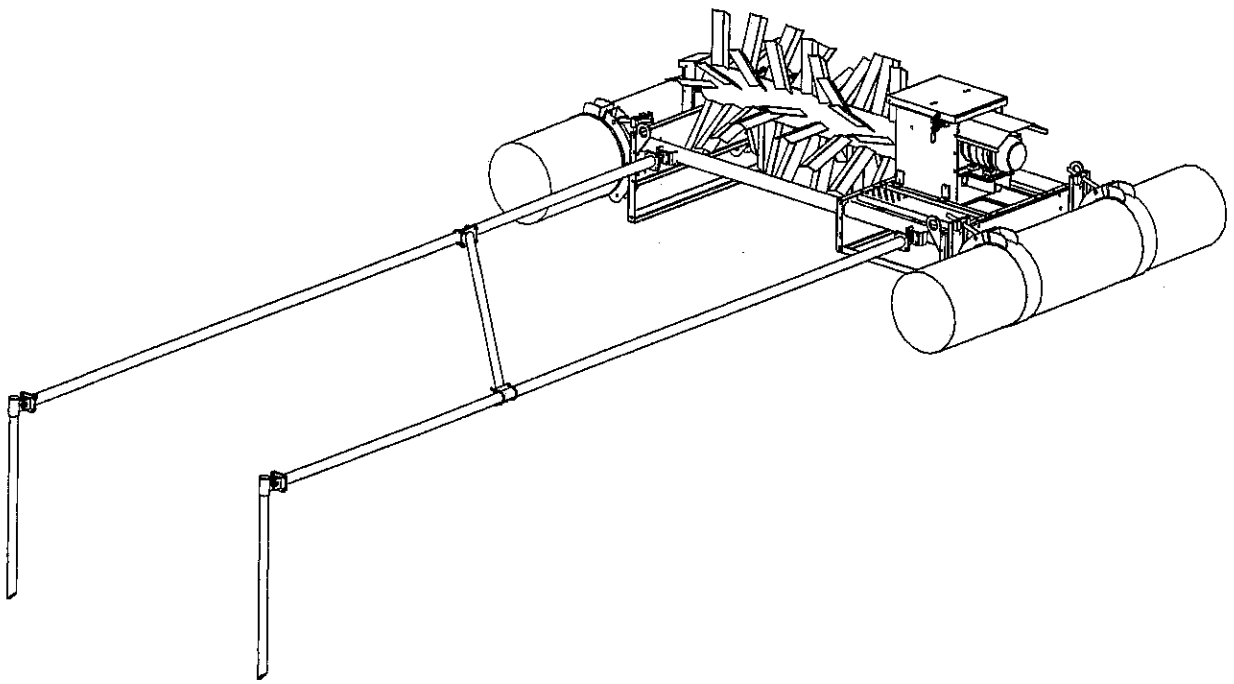
5. The parties hereby agree that the United Nations Convention on Contracts for the International Sale of Goods ("CISG") will not apply to this Agreement. Any dispute arising under or related to this Agreement shall be governed by and decided under the laws of the State of Arkansas, United States of America. Venue for any lawsuit and/or claim filed by any party to this Agreement in connection with or related to this Agreement shall lie solely with the courts of the State of Arkansas, United States of America.

6. To the extent that any provision of this warranty contravenes the law of any jurisdiction, such provision shall be inapplicable in such jurisdiction, and the remainder of the warranty shall not be affected thereby. This warranty shall become null and void upon the dissolution of ECS. This warranty supersedes and voids any and all previous warranty statements and guarantees issued by ECS.

ECS House Industries, Inc.	**I, the undersigned, have read the above-stated warranty agreement and understand and accept its terms and acknowledge receipt of a copy of the agreement.**
By: _____	**By:** _____
Date:_____	**Date:**_____

ECS
House
Industries

SDB059TA2253050
5 HP ELECTRIC BRUSH AERATOR
Parts List & Drawings
9/6/2012



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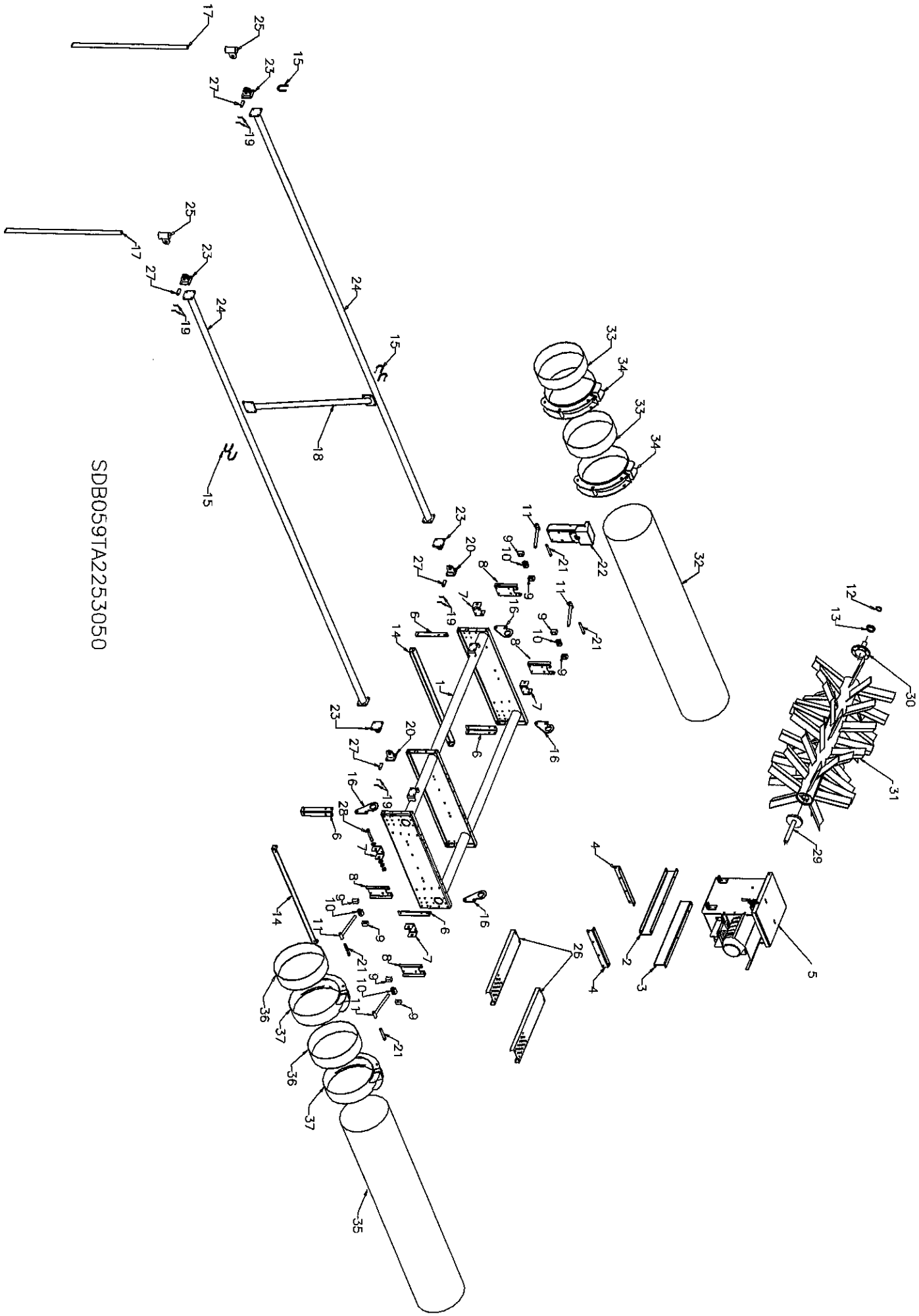
REF#	DESCRIPTION	QTY	PART #
1	Frame, Welded Assembly	1	MFG005514S1
2	Channel, Drive Case Base (L)	1	MFG005594LS1
3	Channel, Drive Case Base (R)	1	MFG005594RS1
4	Angle, Base Channel Support	2	MFG005593S1
5	Assy, Drive Case TA2	1	MFG005599S1
6	Ang, Corner Stand	4	MFG001344S1
7	Channel, Float Band Frame	4	MFG000929S1
8	Channel, Float Adjuster Trunion Block Mount	4	MFG000978S1
9	Block, Float Adjuster Trunion	8	MFG000881S2
10	Trunion, Float Adjuster	4	MFG000997S2
11	Rod, Float Adjuster	4	MFG000393S2
12	Seal, TE V Ring	1	5SLS400400
13	Collar, TE V Ring Shaft	1	MFG005578S2
14	Ang, Corner Stand Base	2	MFG001345S1
15	U-Bolt, 3/8"x 2-1/2"x 3/12"	4	5BLT38212312
16	Eye, Frame Corner Inside Lifting	4	MFG001727S1
17	Stake, Mooring Arm	2	MFG000326S1
18	Brace, Mooring Arm Cross	1	MFG001700S1
19	Pin, Cotter	8	5PINCOTR316134S
20	Assy, Single Clevis	2	MFG001768S1
21	Pin, 3/4" 304SS Mooring Arm/Float Attaching	4	MFG000330S1
22	Assembly, Greased Tail Bearing	1	MFG005918S1
23	Assy, Double Clevis 1"	4	MFG001769S1
24	Arm, Mooring	2	MFG001690S1
25	Bracket, 2" Shallow Lagoon Marm Stake Pivot	2	MFG001273S1
26	Channel, Upper Splash	2	MFG000854S1
27	Pin, Mooring Arm Attaching 1" 316SS	4	MFG001770S2
28	Bolt, 3/4 x 5-1/2 SS	4	5BLT34512NCHXS
29	Shaft, Drive	1	MFG005572S2
30	Shaft, Tail	1	MFG005512S2
31	Rotor	1	MFG000898S1
32	Float, 19" X 8'	1	MFG000371S1F
33	Insulator, Float Band 19"	2	MFG000560
34	Band, Float 19"	2	MFG000841S1
35	Float, 22" X 8'	1	MFG000372S1F
36	Insulator, Float Band 22"	2	MFG000561
37	Band, Float 22"	2	MFG000842S1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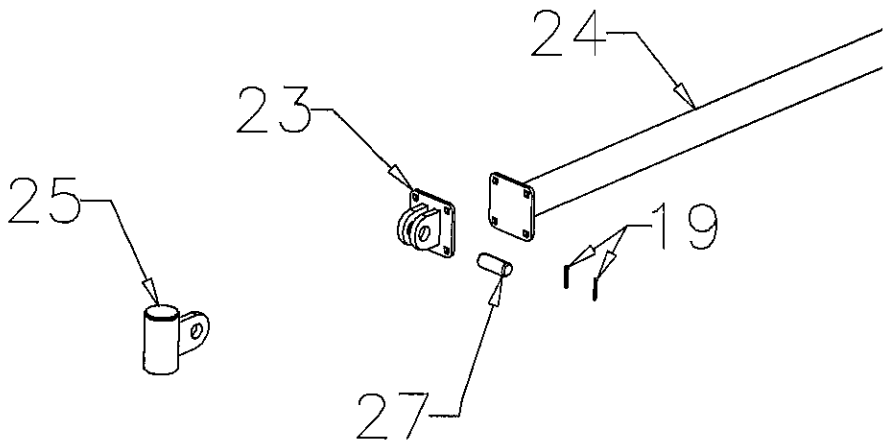
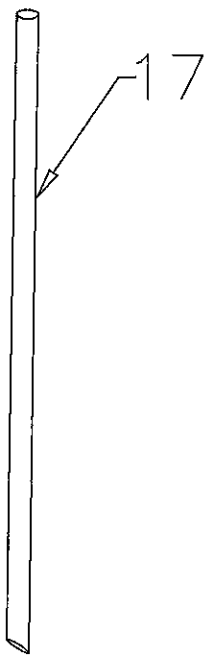
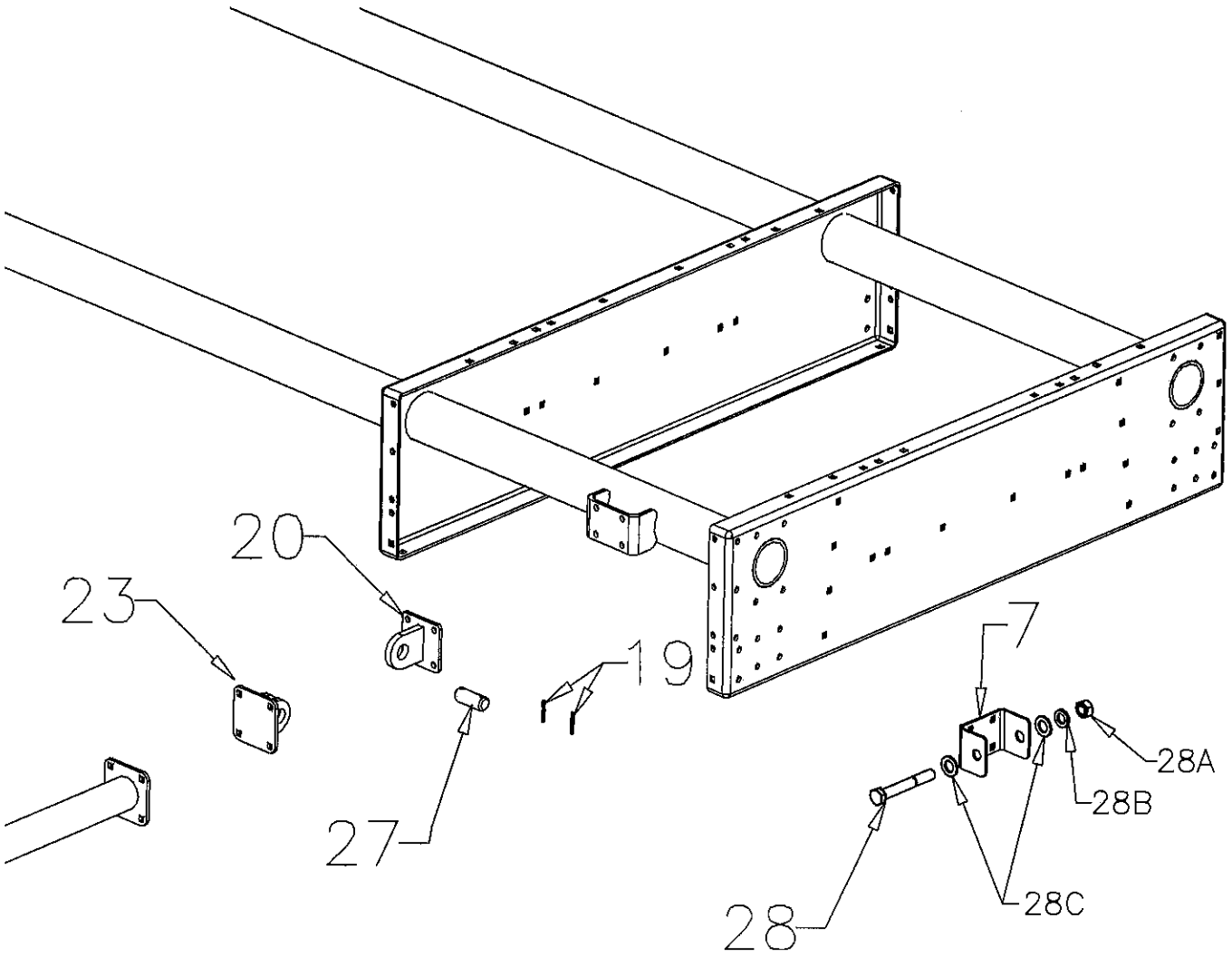
	MOORING ARM BRACKET ASSEMBLY	
REF#	DESCRIPTION	PART NUMBER
17	Mooring Arm Stake	MFG000326S1
19	Pin, Cotter	5PINCOTR316134S
23	Assy, Double Clevis 1"	MFG001769S1
25	Bracket, 2" Shallow Lagoon Marm Stake Pivot	MFG001273S1
27	Pin, Mooring Arm Attaching 1" 316SS	MFG001770S2





	FLOAT FRAME BRACKET ASSEMBLY	
REF#	DESCRIPTION	PART NUMBER
7	Channel, Float Band Frame	MFG000929S1
19	Pin, Cotter	5PINCOTR316134S
20	Assy, Single Clevis	MFG0017681S1
23	Assy, Double Clevis 1"	MFG001769S1
27	Pin, Mooring Arm Attaching 1" 316SS	MFG001770S2
28	Bolt, 3/4 x 5-1/2" SS	5BLT34512NCHXS
28A	Nut	5NUT34HXBRS
28B	Washer, Lock	5WSHLOCK34S
28C	Washer, Flat	5WSHFLT34S



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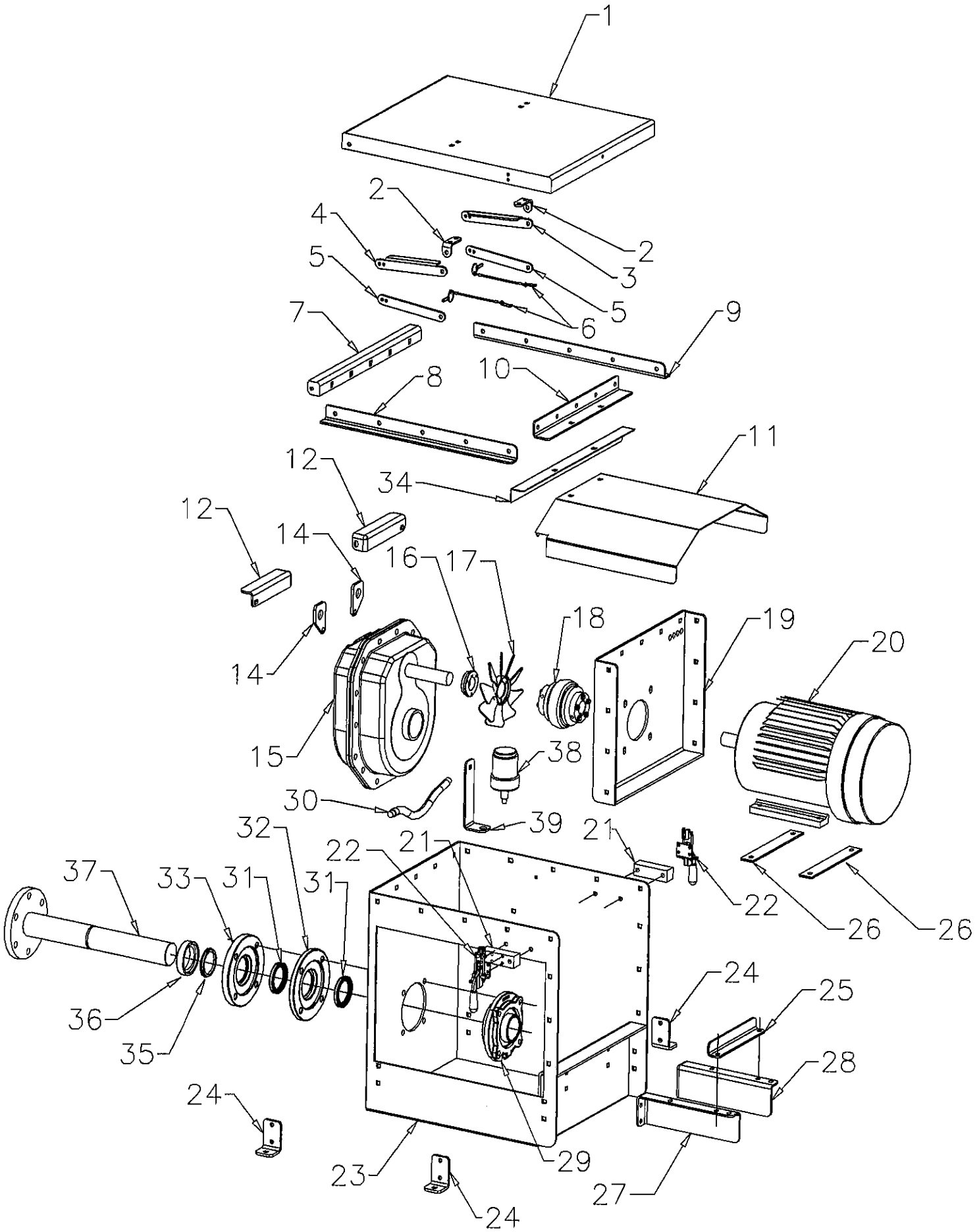
	MOTOR BOX ASSEMBLY	
Ref#	DESCRIPTION	PART#
1	Cover, Drive Case	MFG005589S1
2	Angle, Drive Case Cover Tilt	MFG00400651
3	Angle, Motor Shield Support RH	MFG005558RS1
4	Angle, Motor Shield Support LH	MFG005558LS1
5	Flat, Motor Shield Support	MFG005559S1
6	Pin, Quick Release w/ lanyard	5PINQUIC1412S
7	Angle, Drive Case Hinge	MFG005588S1
8	Angle, Drive Case Upper Left Side	MFG005587LS1
9	Angle, Drive Case Upper Right Side	MFG005587RS1
10	Angle, Motor Channel Upper	MFG005582S1
11	Shield, Motor	MFG005564S1
12	Angle, TA2 Anti Rotation RH	MFG005584RS1
13	Angle, TA2 Anti Rotation LH	MFG005584LS1
14	Eye, Drive Case Lifting	MFG000674S1
15	Reducer, TA2 Gear	MFG005604
16	Hub, TA2 Cooling Fan	MFG005581S1
17	Fan, TA2 Cooling	MFG005469
18	Assembly, Coupler	MFG000695
19	Assembly, Motor Channel	MFG005574S1
20	Motor, 5HP	5MTRTCOE0054
21	Block, Drive Case Cover Clamp	MFG004039S1
22	Clamp, Cover	5EAR514331SS
23	Assembly, Drive Case	MFG005586S1
24	Angle, Drive Case Mounting	MFG004001S1
25	Angle, Motor Adjusting Cross Brace	MFG005567S1
26	Spacer, Motor	MFG005565S1
27	Angle, Motor Adjusting LH	MFG005566LS1
28	Angle, Motor Adjusting RH	MFG005566RS1
29	Bearing, Rotor Flange	5BRG124229
30	Hose, Drain	MFG005596
31	Seal	5SLS0193-03556
32	Plate, Inner Seal	MFG000251S1
33	Plate, Outer Seal	MFG000246S1
34	Angle, Motor Channel Vent Hole Shield	MFG005563S1
35	Seal, DE V Ring	5SLS400400
36	Collar, DE V Ring Shaft	MFG005580S2
37	Shaft, Drive	MFG005572S2
38	Lube Site	5EAR560LUB
39	Angle, Lube Site	MFG005898S1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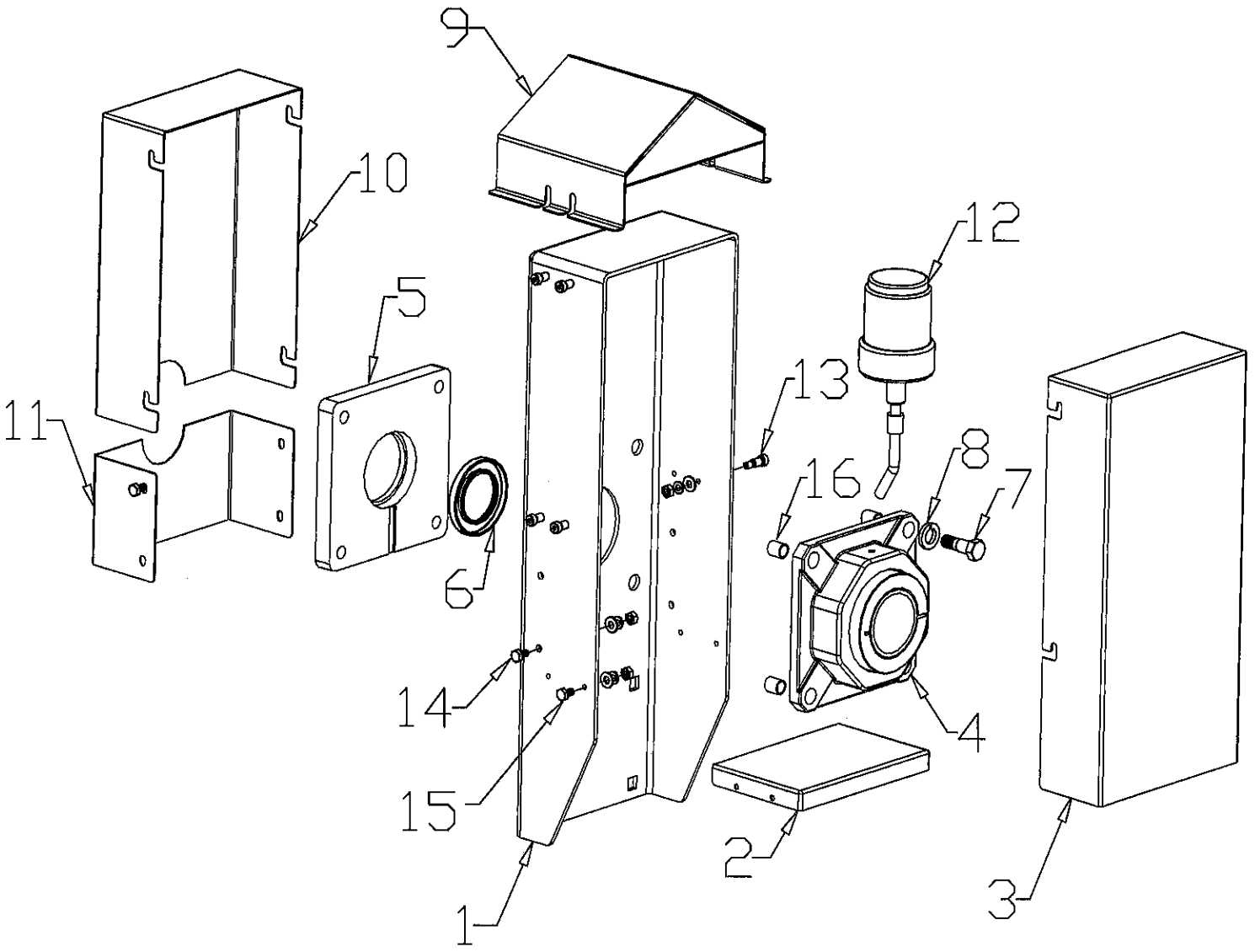
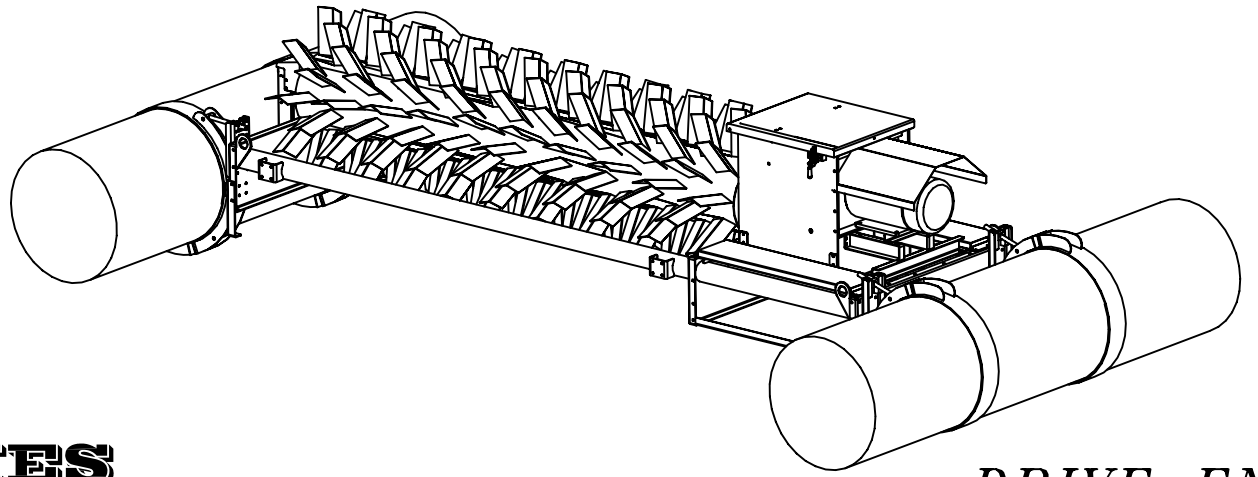
TAIL BEARING BRACKET ASSEMBLY
MFG005918S1

1. CHANNEL, TAIL BEARING BRACKET	MFG005917S1
2. PANEL, BRACKET LOWER SPLASH	MFG005916S1
3. COVER, BRACKET FRONT	MFG005913S1
4. BEARING, TAIL	MFG002291
5. PLATE, TAIL BEARING SEAL	MFG000273S2
6. SEAL, TAIL BEARING	5SLS0150-12184
7. BOLT 5/8 "x 1- ½", (4) TAIL BEARING HEX	5BLT58112HXBRS
8. LOCKWASHER, 5/8" SS	5WSHFLT58S
9. ASSEMBLY, BRACKET UPPER COVER	MFG005912S1
10. COVER, BRACKET UPPER REAR	MFG005914S1
11. COVER, BRACKET LOWER REAR	MFG005915S1
12. GREASE FEEDER	5EAR560LUB
13. BOLT, ¼" X ½" (8) SHOULDER	5BLT1412SHLDS
14. BOLT 1/4"x ½", (4) HEX	5BLT1412HXS
15. BOLT 3/16"x ½", (4) HEX	5BLT31612HXS
16. BUSHING, BEARING	MFG001392



AERATOR FLOAT ATTACHMENT AND ANCHORING INSTRUCTIONS

TAIL END

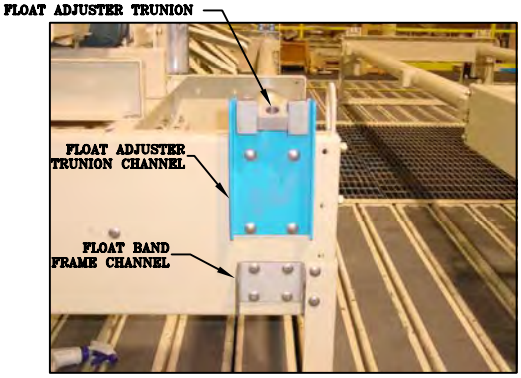


SDB SERIES

DRIVE END

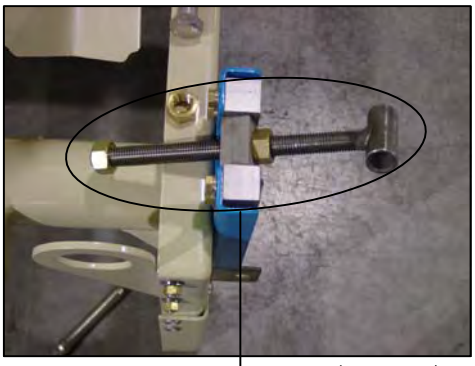
ECS House Industries
P.O. Box 67, Cherry Valley, AR 72324

FLOAT ASSEMBLY ATTACHMENT



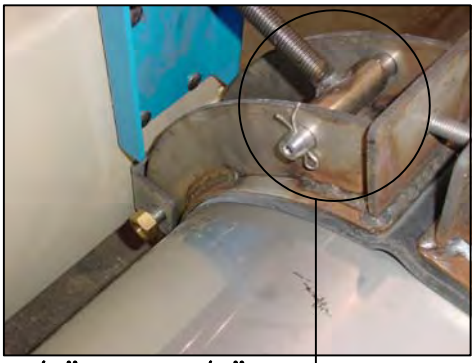
(FIGURE 8)

FLOAT ADJUSTER TRUNION CHANNEL AND FLOAT BAND FRAME CHANNEL (Fig.8) SHOULD COME PRE-ASSEMBLED FROM THE FACTORY.



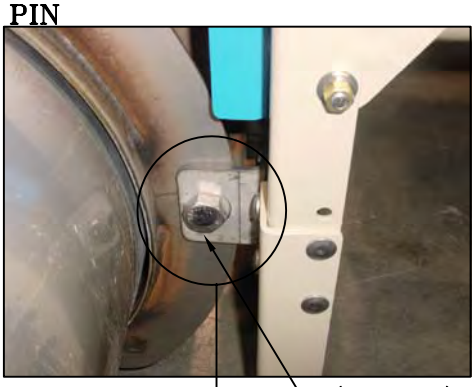
(FIGURE 9)

PRE-ASSEMBLE ALLTHREAD (Fig.9) WITH SUPPLIED BRASS NUTS. APPLY THE FIRST BRASS NUT HALF WAY DOWN THE ALLTHREAD TO SAVE ADJUSTING TIME. INSTALL THE ALLTHREAD THROUGH THE FLOAT ADJUSTER TRUNION. PLACE THE OTHER BRASS NUT ON END OF ALLTHREAD TO KEEP IN PLACE.



(FIGURE 10)

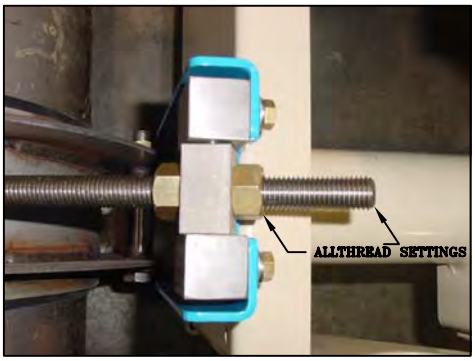
ALIGN LOWER FLOAT BAND HOLES WITH FLOAT BAND FRAME CHANNEL (Fig.11) HOLES. INSTALL SUPPLIED 3/4" X 5-1/2" STAINLESS STEEL CONNECTING BOLT WITH 3/4" FLAT WASHER, LOCK WASHER, AND BRASS NUT IN FLOAT BAND FRAME CHANNEL. INSTALL SUPPLIED 3/4" X 5-1/4" STAINLESS STEEL FLOAT ATTACHING PIN WITH COTTER PIN (Fig.10) IN UPPER FLOAT BAND HOLES AND TUBE END OF ALLTHREAD.



(FIGURE 11)

ONCE ASSEMBLED TIGHTEN STAINLESS STEEL CONNECTING BOLT. FLOAT ATTACHMENT COMPLETE WHEN BOLTS ARE TIGHT.

ALLTHREAD MEASUREMENT SETTINGS

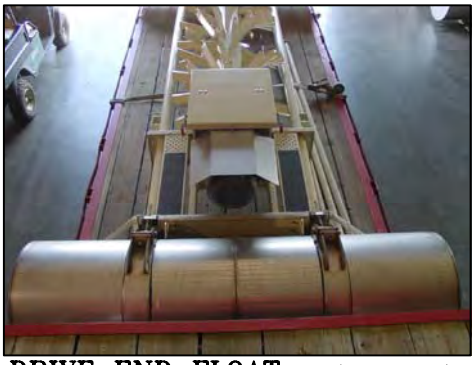


(FIGURE 12)

ALLTHREAD SETTINGS (Fig.12) ARE SET TO ADJUST THE BLADE AND DEPTH OF THE AERATOR. STARTING POINT FACTORY MEASURMENTS (BASED ON 480V 3 PHASE) ARE INDICATED FOR THE SPECIFIED AERATOR. ADJUST AND MEASURE THE ALLTHREAD SETTINGS. SETTINGS ARE MEASURED FROM THE BACK OF THE BRASS NUT TO THE END OF THE ALLTHREAD. AFTER ADJUSTING ALLTHREAD TO REQUIRED MEASURMENTS TIGHTEN THE BRASS NUTS. IF YOUR AERATOR IS A 2HP, USE A 3/4" OPEN END WRENCH. IF YOUR AERATOR IS A 3HP 5HP 7.5HP OR 10HP, USE A 1-1/8" OPEN END WRENCH TO TIGHTEN THE BRASS NUTS. IF YOUR AERATOR IS A 15HP 20HP OR 25HP USE A 1-5/16" OPEN END WRENCH.

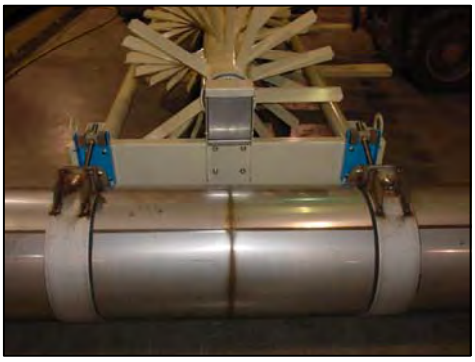
FLOAT ATTACHED

MAKE SURE TO CHECK FOR LOOSE BOLTS AND NUTS OR MISSING PINS AFTER ASSEMBLY.



DRIVE END FLOAT ASSEMBLY (FIGURE 13)

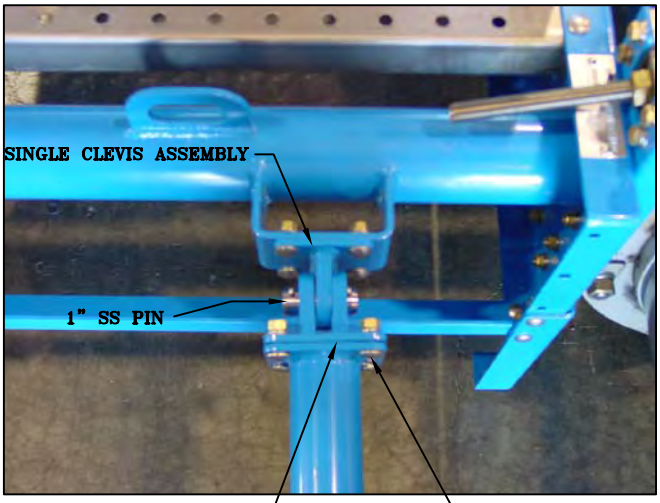
DRIVE END ASSEMBLED FLOAT SHOULD RESEMBLE FIGURE 13.



TAIL END FLOAT ASSEMBLY (FIGURE 14)

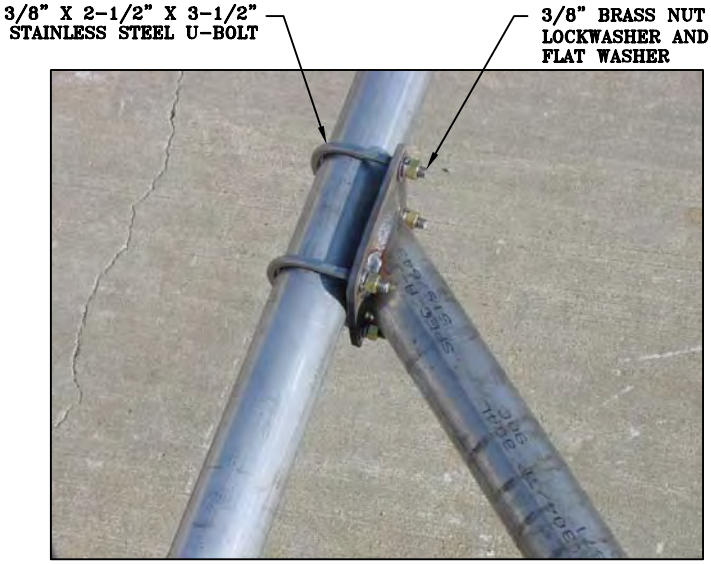
TAIL END ASSEMBLED FLOAT SHOULD RESEMBLE FIGURE 14.

MOORING ARM CLEVIS ASSEMBLY



MOORING ARM ATTACHMENT

MOORING ARM CLEVIS ASSEMBLY. REFER TO THE PARTS LIST FOR REFERENCE.

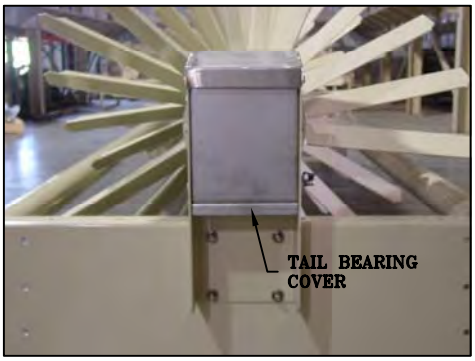


CROSS BRACE ATTACHMENT

MOORING ARM CROSS BRACE ASSEMBLY

ANCHORING THE AERATOR IS JOB SPECIFIC. PLEASE FOLLOW THE ANCHORING INSTRUCTIONS VIA YOUR O&M MANUAL, SECTION: PARTS LIST & DRAWING

GREASE LUBRICATED TAIL BEARING ASSEMBLY

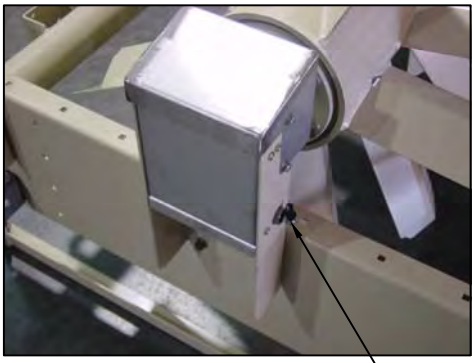


(FIGURE 15)

WHEN THE AERATOR IS OPERATING, STAINLESS STEEL COVER SHOULD BE CLOSED.

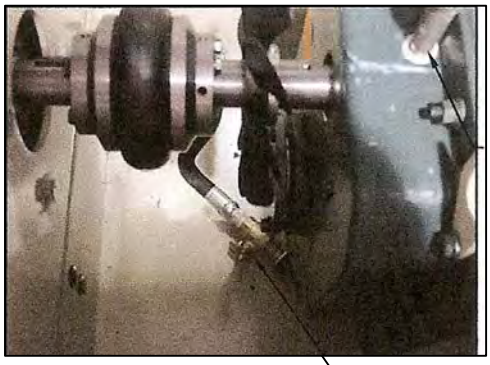
GREASE LUBRICATED
TAIL BEARING

OPEN THE COVER FOR ROUTINE INSPECTION AND MAINTENANCE. REMOVE CAP AND ANY DEBRIS FROM GREASE FITTING. SEE O&M MANUAL FOR LUBRICATION FREQUENCY, AMOUNT, AND SPECIFIED LUBRICANT. O&M SECTION: ENCLOSED, NON-DRIVE END BEARING.



AERATORS HAVE A GREASE FITTING ON THE OUTSIDE COVER FOR EASIER ACCESS WHILE LUBRICATING THE BEARING.

GEAR REDUCER OIL DRAIN VALVE



DRAIN VALVE

EXTERNAL DRAIN

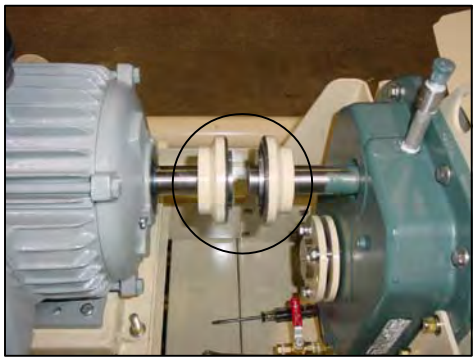
OIL DRAIN HOSE

REFER TO THE O&M MANUAL, SECTION: DODGE GEAR REDUCER.

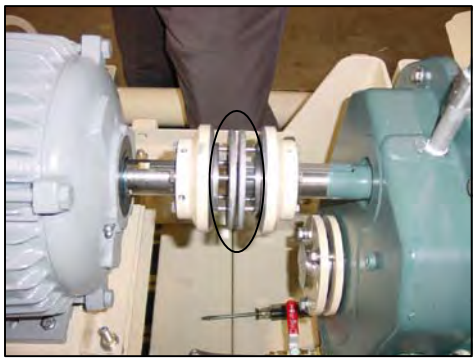
THE OIL IN THE GEAR REDUCER SHOULD BE CHANGED VIA THE OIL DRAIN VALVE BY PRESSURIZING THE CASE. REMOVE 1/2" PLUG FROM BOX SIDE AND INSTALL 1/2" HOSE AND FITTING TO DRAIN VALVE. REMOVE VENT PLUG ASSEMBLY AND INSTALL PRESSURIZING FITTING TO FORCE USED OIL OUT OF THE CASE BY A MAXIMUM PRESSURE OF 10LB FROM AN AIR SOURCE.

AFTER REMOVING USED OIL, FOLLOW DODGE GEAR REDUCER INSTRUCTIONS (SEE O&M MANUAL, SECTION: DODGE GEAR REDUCER OWNERS MANUAL) FOR FLUSHING THE GEAR REDUCER. NEXT, REFILL WITH NEW OIL AND RE-INSTALL VENT PLUG ASSEMBLY AND MAKE SURE DRAIN VALVE IS CLOSED.

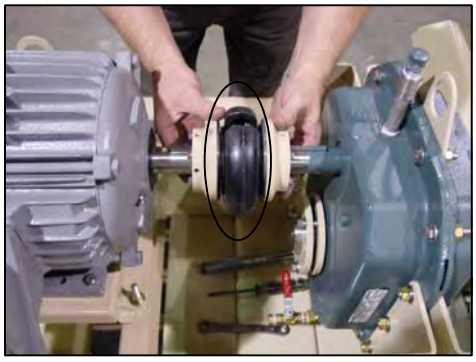
FLEXIBLE COUPLING



COUPLER FLANGE



INTERNAL CLAMP RING

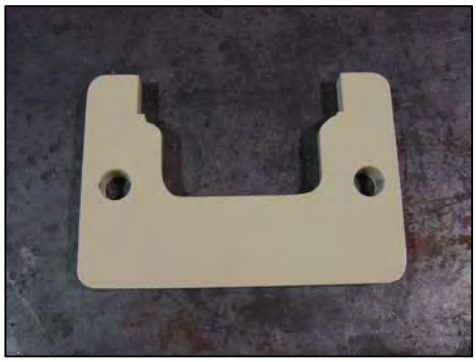


FLEXIBLE COUPLER ELEMENT

TORQUE WRENCH

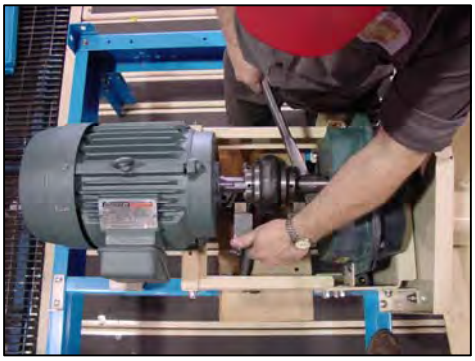
REFER TO THE O&M MANUAL, SECTION: DODGE GEAR REDUCER, TAPERED BUSHINGS, AND FLEXIBLE COUPLING OWNERS MANUAL, FOR FLEXIBLE COUPLING ASSEMBLY.

FLEXIBLE COUPLING



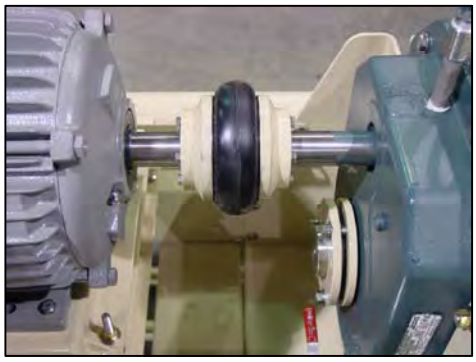
ALIGNMENT TOOL (FIGURE 6)

WHEN PURCHASING A SDB UNIT, YOUR PACKAGE SHOULD INCLUDE AN ALIGNMENT TOOL (FIGURE 6). THIS TOOL IS USED TO CORRECTLY SPACE THE COUPLING FLANGES WITH THE ELEMENT INSTALLED. THIS TOOL SHOULD BE USED DURING THE INSTALLATION OF A NEW MOTOR OR GEAR DRIVE. IT IS IMPORTANT THAT YOU FOLLOW THE INSTRUCTIONS THAT COME WITH THE COUPLING FOR IT TO PROPERLY FUNCTION.



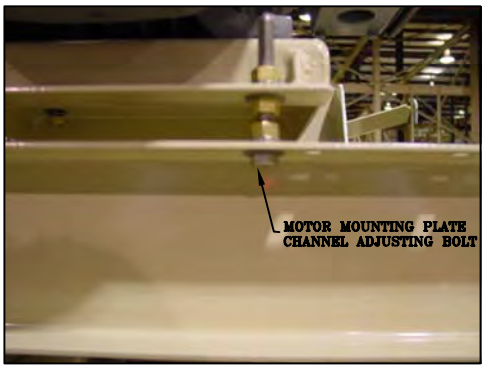
ALIGNMENT TOOL IN USE (FIGURE 7)

THE USE FOR THE ALIGNMENT TOOL IS SHOWN IN FIGURE 7. FOR EASIER INSTALLATION, FIRST TIGHTEN THE SET SCREWS IN THE COUPLING MOTOR SIDE. SQUEEZE THE ENDS OF THE COUPLING ELEMENT TO INSTALL. TIGHTEN THE SET SCREWS ON THE GEAR DRIVE SIDE AFTER SPACING THE FLANGES WITH THE ALIGNMENT TOOL. THEN SQUEEZE THE ELEMENT ENDS TOGETHER AND SNUG THE FLANGE BOLTS TO PREVENT THE ELEMENT FROM GAPPING OPEN. TIGHTEN THESE BOLTS TO THE PROPER TORQUE. IT WILL BE NECESSARY TO TIGHTEN EACH BOLT SEVERAL TIMES UNTIL THE PROPER TORQUE VALUES ARE ATTAINED.

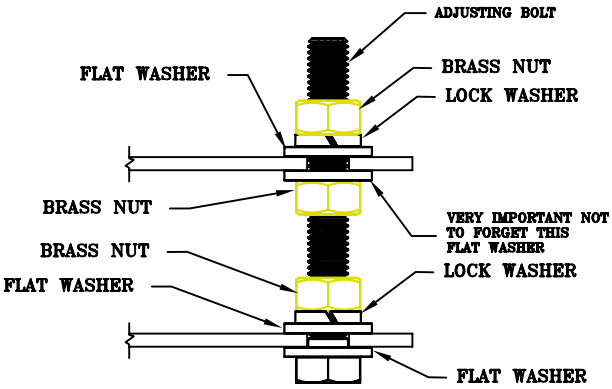


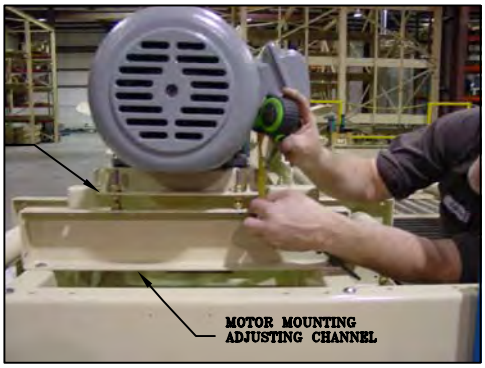
FLEXIBLE COUPLING ASSEMBLED

MOTOR MOUNT ADJUSTER CHANNEL SETUP



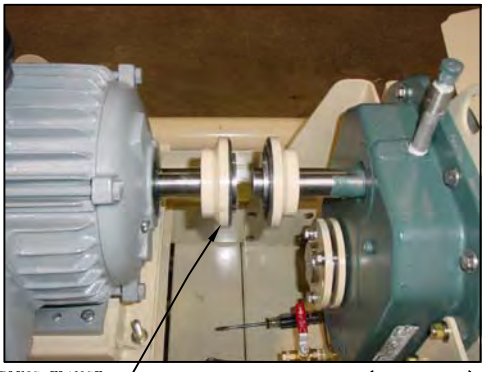
(FIGURE 1)





(FIGURE 2)

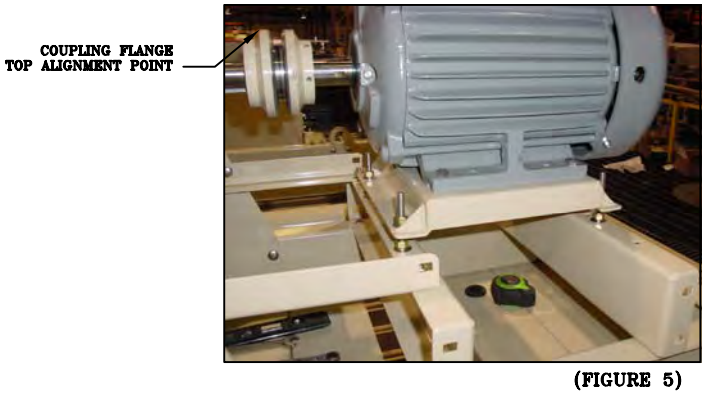
PRESET ALL FOUR (4) ADJUSTING BOLTS (Fig.1) OF THE MOTOR MOUNTING PLATE CHANNEL (Fig.2) FROM THE TOP OF THE MOTOR MOUNTING ADJUSTER CHANNELS (Fig.2) TO THE BOTTOM OF THE MOTOR MOUNTING PLATE CHANNEL. SET THE MOTOR ON THE MOTOR MOUNTING PLATE CHANNEL. SEE PARTS LIST & DRAWING FOR SPECIFIC NUT, WASHER, AND BOLT SIZE.



(FIGURE 3)

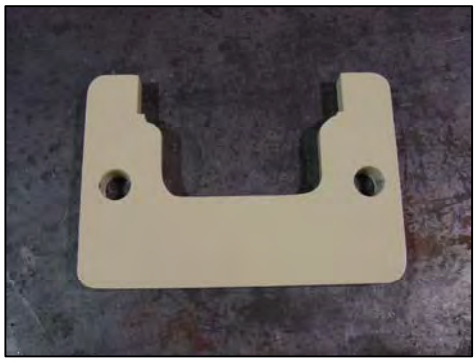
ALIGN THE SIDE OF THE COUPLING FLANGE (Fig.3) IN ORDER TO CENTER THE MOTOR. GENTLY TIGHTEN ALL THE MOTOR BOLTS (Fig.4) SO THE MOTOR WILL NOT MOVE ON THE MOUNTING PLATE CHANNEL. ALIGN THE TOP OF THE COUPLING FLANGE (Fig.5) BY ADJUSTING THE MOTOR MOUNTING PLATE CHANNEL BOLTS. TIGHTEN THE MOTOR MOUNTING PLATE CHANNEL BOLTS AND MAKE SURE THE COUPLING FLANGE IS ALIGNED. TIGHTEN THE MOTOR BOLTS. ASSEMBLE FLEXIBLE COUPLING ASSEMBLY. REFER TO THE O&M MANUAL, SECTION: DODGE GEAR REDUCER, TAPERED BUSHINGS, AND FLEXIBLE COUPLING OWNERS MANUAL, FOR FLEXIBLE COUPLING ASSEMBLY.

(FIGURE 4)



(FIGURE 5)

FLEXIBLE COUPLING ALIGNMENT TOOL



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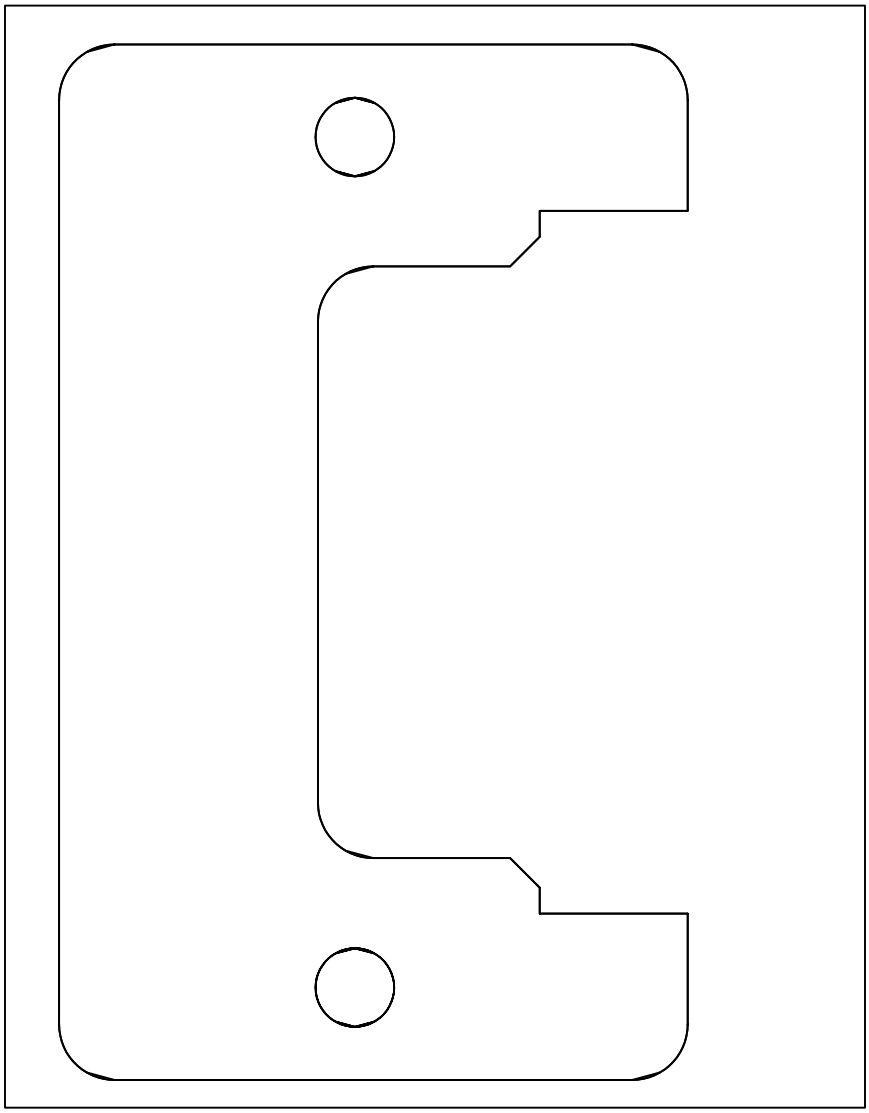


PX60 ALIGNMENT TOOL

ECS House Industries, Inc.

3720 Highway 1 South, Cherry Valley, Arkansas 72324

Aerator Set-up & Instruction

Step One: Attach Drive-End float (labeled DE) to the motor end of the aerator. Attach the float with the Stainless Steel pins and Stainless Steel bolt provided in your floatation kit. You will need a 1-1/8" wrench and socket for the 5hp aerator. Do not tighten the bolts too much. This will prevent the aerator from pivoting

Step Two: Repeat step one, only this time you will be attaching the Tail-End float (labeled TE) to the non-motor end of the aerator.

Step Three: Adjust the all thread settings (as described in Figure 1 on the next page) to 2 1/8" on the Drive-End all-threads, and 3 1/8" on the Tail-End all-threads for the 5 hp aerators.

Step Four: Attach mooring arms to the frame of the aerator with the Stainless Steel 1" pins provided in your floatation kit. You pins are secured with Stainless Steel Carter Keys.

Step Five: After the aerator is wired correctly and the aerator is positioned where you want it to face, take the mooring arms stakes and put them in the ground with a sledge hammer, back hoe bucket, etc.

*Make sure you check the amperage. The "pre-settings" we provide are based on 480 volt, 3 phase electricity.

After the aerator is initially installed, let the unit run continuously for approximately 24 hours before you turn it off.

ECS House Industries, Inc.

3720 Highway 1 South, Cherry Valley, Arkansas 72324

Thank you for choosing the ECS House Industries, Inc., floating brush aerator. In this manual, you will find the proper way to maintain your aerator so your aerator will operate at peak performance levels. Listed below, are the maintenance time and schedules for your brush aerators. Please add this to your normal preventative maintenance schedules.

If you give your aerator an ounce of maintenance, it will give you pounds of performance year after year!

5hp Floating Brush Aerator Maintenance

REQUIRED MAINTENANCE

Fafnir Stainless Steel, Enclosed Tail-Bearing- The Fafnir Stainless Steel, Enclosed Tail-Bearing should be greased once a month. We recommend the Schaeffers #221 Moly Ultra EP grease specified in this manual. You should pump 8 to 9 shots of grease into the alomite located on the outside cover of the enclosed Tail-Bearing. Visually inspect the bearing to insure the shaft is aligned in the center of the bearing. If the shaft is not aligned in the center of the bearing then the bearing will need to be replaced. Visually check for any debris around the seal once a week. Any buildup of solids around the seal could lead to a bearing failure.

> ***If using a Lubesite Mechanical Greaser, Fill the reservoir during the Gear Drive Oil Change below.***

Dodge Gear Reducer- The Dodge Gear Reducer should receive an oil change every 6 months or 2,500 hours, whichever comes first. We recommend the Schaeffer's 209A ISO 220 oil specified in this manual. You should put 5 pints of oil in the TA2 gear reducer model used on the 5hp aerators.

Drive End Bearing- The Dodge Piloted Flange Bearing should be greased during Gear Drive Oil change. *Slowly* pump grease until it starts coming out of the bearing. Visually inspect the bearing to insure the shaft is aligned in the center of the bearing. If the shaft is not aligned in the center of the bearing then the bearing will need to be replaced.

> ***If using a Lubesite Mechanical Greaser, Fill the reservoir during the Gear Drive Oil Change below.***

Drive Shaft Grease Seal Plates – Every 2,500 hours or 6 months whichever occurs first, slowly pump 2 3 shots of grease into the seal cavity. Visually check for any debris around the seals once a week. Any buildup of solids around the seal could lead to a bearing failure.

Paraflex Coupler- Visually inspects for any element misalignment or wear of the paraflex coupling element and replace if necessary.

Weg Electric Motor- Visually inspect for any debris build up on or around the electric motor weekly.

****Visually inspect floats, mooring arms, and remove any debris that may be wrapped around the drive and tail shaft****

If you have any questions, please call our office number, (870) 588-3773.

Once again, thanks for choosing ECS House Industries, Inc. for your aeration needs!

		No.:
		Date: 9/29/2010

Customer :

TECHNICAL PROPOSAL

Three-phase induction motor - Squirrel cage rotor

Product line : Three-Phase : W21 TEFC (IP55) - NEMA Premium Efficiency

Catalog Number : 00518ET3E184TC
List Price : $810

Notes:
Three-Phase : W21 TEFC (IP55) - NEMA Premium Efficiency

Performed by:	Checked:

		No.:
		Date: 9/29/2010

DATA SHEET
Three-phase induction motor - Squirrel cage rotor

Customer	:	
Product line	:	Three-Phase : W21 TEFC (IP55) - NEMA Premium Efficiency

Frame	:	184T
Output	:	5 HP
Frequency	:	60 Hz
Poles	:	4
Full load speed	:	1755
Slip	:	2.50 %
Voltage	:	208-230/460 V
Rated current	:	14.2-12.8/6.40 A
Locked rotor current	:	100/49.9 A
Locked rotor current (Il/In)	:	7.8
No-load current	:	6.12/3.06 A
Full load torque	:	14.8 lb.ft
Locked rotor torque	:	210 %
Breakdown torque	:	300 %
Design	:	B
Insulation class	:	F
Temperature rise	:	80 K
Locked rotor time	:	20 s (hot)
Service factor	:	1.25
Duty cycle	:	S1
Ambient temperature	:	-20°C - +40°C
Altitude	:	1000 m
Degree of Protection	:	IP55
Approximate weight	:	102 lb
Moment of inertia	:	0.44494 sq.ft.lb
Noise level	:	56 dB(A)

	D.E.	N.D.E.
Bearings	6307 ZZ	6206 ZZ
Regreasing interval	---	---
Grease amount	---	---

Load	Power factor	Efficiency (%)
100%	0.81	89.5
75%	0.75	90.2
50%	0.63	88.5

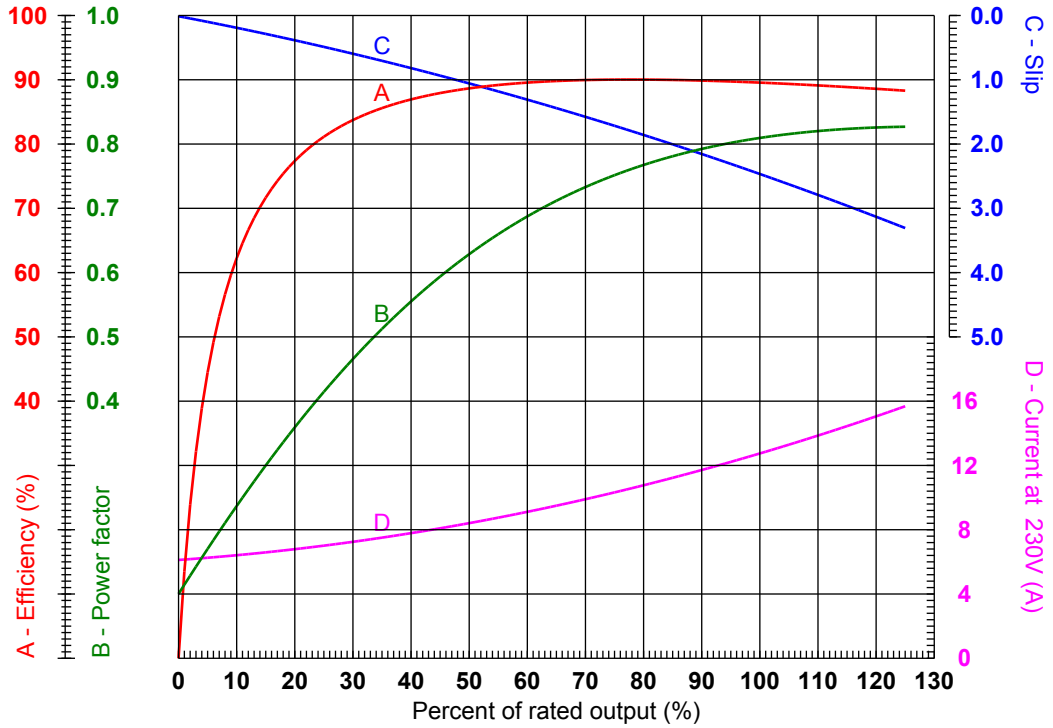
Notes:

Performed by:	Checked:

	No.:
	Date: 9/29/2010

PERFORMANCE CURVES RELATED TO RATED OUTPUT

Three-phase induction motor - Squirrel cage rotor



Customer	:
Product line	: Three-Phase : W21 TEFC (IP55) - NEMA Premium Efficiency

Output	: 5 HP	Locked rotor current (Il/In)	: 7.8
Frame	: 184T	Duty cycle	: S1
Full load speed	: 1755	Service factor	: 1.25
Frequency	: 60 Hz	Design	: B
Voltage	: 208-230/460 V	Locked rotor torque	: 210 %
Insulation class	: F	Breakdown torque	: 300 %
Rated current	: 14.2-12.8/6.40 A		

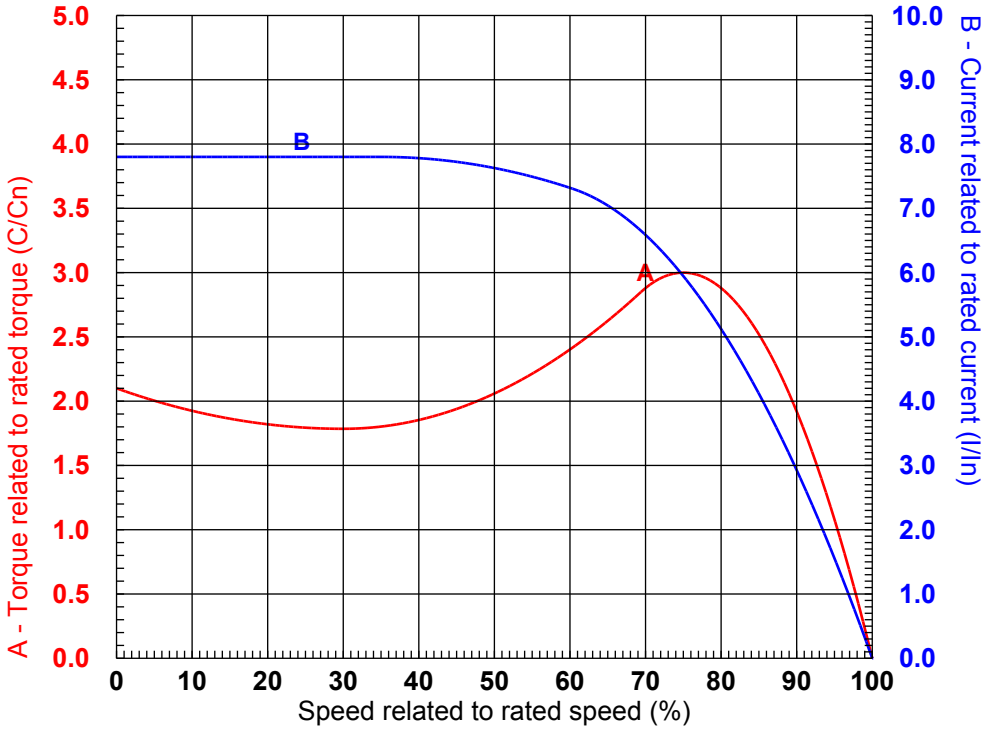
Notes:

Performed by:	Checked:

	No.:
	Date: 9/29/2010

CHARACTERISTIC CURVES RELATED TO SPEED

Three-phase induction motor - Squirrel cage rotor



Customer	:
Product line	: Three-Phase : W21 TEFC (IP55) - NEMA Premium Efficiency

Output	: 5 HP	Locked rotor current (Il/In)	: 7.8
Frame	: 184T	Duty cycle	: S1
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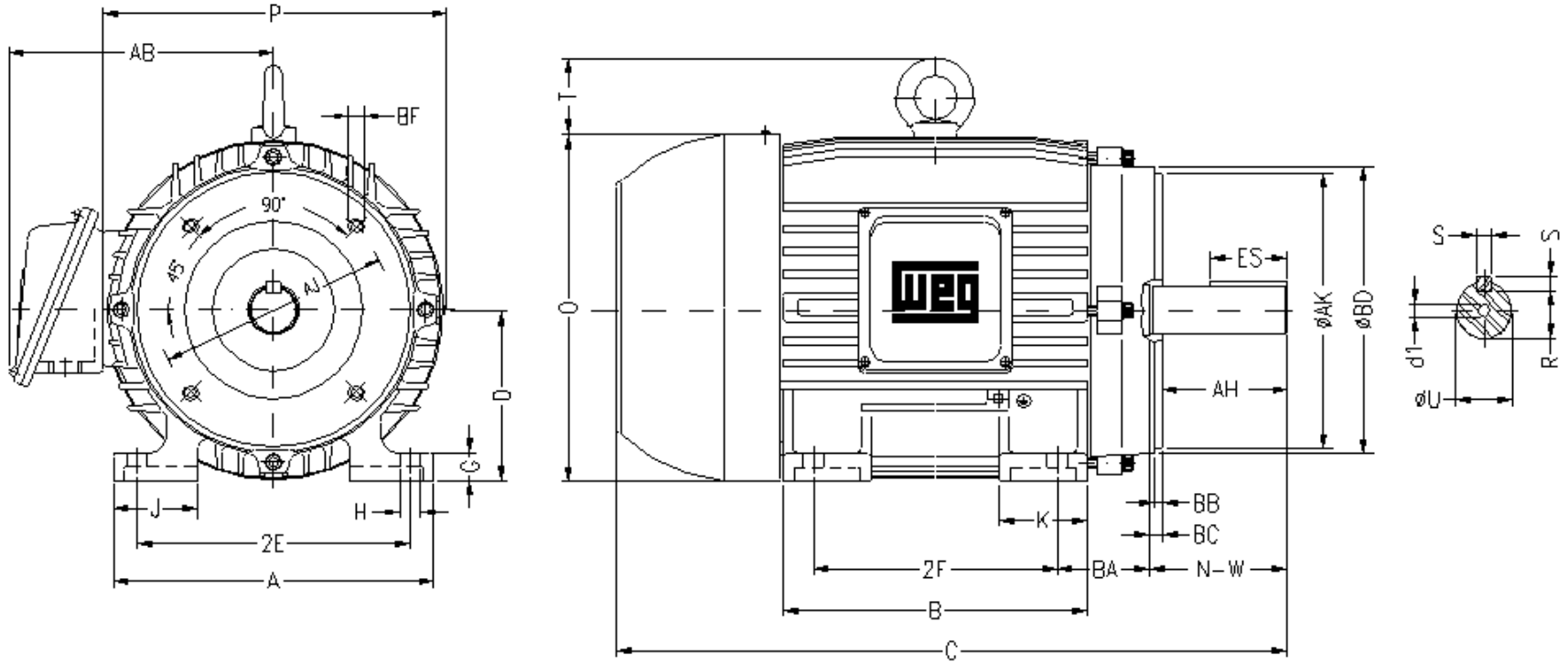
Insulation class	: F	Breakdown torque	: 300 %
Rated current	: 14.2-12.8/6.40 A		

Notes:

Performed by:	Checked:



2E 7.500	2F 5.500	H 0.406	BA 2.750	A 8.661
B 6.969	C 15.860	D 4.500	G 0.720	J 1.890
K 1.969	O 9.343	P 8.740	T 1.772	ES 1.969
S 0.250	N-W 2.750	U 1.125	R 0.984	AB 7.086
AA NPT 1	d1 A4	Flange FC-184	AJ 7.250	AK 8.500
BD 8.875	BF UNC 1/2"x13	BB 0.250	BC 0.125	AH

Notes:

Performed by:

Checked:

Customer:

Three-Phase : W21 TEFC (IP55) - NEMA Premium Efficiency

Three-phase induction motor
Frame 184T - IP55

9/29/2010

Couplings & Mechanical Soft Starts

DODGE®

BALDOR®


PARA-FLEX® PX

DODGE® Coupling Solution

The Dodge Coupling Family

Uniquely engineered to dampen torsional vibration, handle unavoidable misalignment, and resist catastrophic failure.

Continuing our long-standing tradition of developing products that improve the performance and total cost efficiency of our customers' operations, we are proud to offer a complete family of DODGE® couplings.

Exclusive to Baldor Electric Company and our DODGE brand, these couplings include product features and performance capabilities that increase bore size, improve torque capacity, speed installation, reduce maintenance, and lower the total cost of ownership.

No other manufacturer can offer you the variety of coupling designs, sizes, and options we can. Nor can any other supplier provide you with the knowledge and experience we have gained from 100-plus years of application expertise. We were the first to develop the industry's only elastomeric shear-type coupling—the original DODGE PARA-FLEX®—and we remain the only resource today who can offer you a five-year limited warranty on couplings in the elastomeric family.

With DODGE and Baldor Electric Company, you get elastomeric or metallic coupling solutions you can trust from a time-tested supplier. With their built-in ability to solve problems, DODGE couplings can withstand the toughest applications and processes, performing reliably and efficiently long after other couplings have failed.

DODGE STANDARD PARA-FLEX COUPLINGS

FINISHED BORE COUPLINGS

The finished bore flange design allows you to downsize your coupling selection for greater cost savings. Plus, with its built-in, factory assembled features, the FBX design ensures long service life, eliminates loose parts, and reduces maintenance requirements.

TAPER-LOCK COUPLINGS

The TAPER-LOCK flange design uses standard TAPER-LOCK bushings and accommodates a wide range of bore sizes. Quick, easy installation and removal with minimal shaft damage help reduce maintenance time and costs.

BORED-TO-SIZE (BBS) AND MILL MOTOR TAPER (TBS) COUPLINGS

These steel flange assemblies are designed to accommodate larger bore sizes than TAPER-LOCK style couplings, while still providing the industry-leading misalignment capabilities. The TBS style is designed to fit ANSI 600 or 800 Series mill motors. And both BBS and TBS model couplings are available in a piloted design for use in floating shaft applications.

HIGH SPEED PARA-FLEX AND FLYWHEEL PARA-FLEX COUPLINGS

These performance-proven couplings are designed for applications with speeds up to 6000 RPM. They work with almost any power source, including internal combustion engines, and can accommodate angular misalignment up to 1°, parallel misalignment up to 1/16", and end float of 3/32".

PRE-ASSEMBLED SPACER FLANGES

The coupling's factory-assembled spacer center drops in and drops out for easy installation and removal. The spacer design accommodates a wide range of between-shaft-end lengths for greater versatility.

DODGE PARA-FLEX Couplings will accommodate up to 11" bores and 453,000 in. lbs. of torque.

DODGE PARA-FLEX ELEMENTS

SUPERIOR DESIGN PROVIDES ADVANTAGES OVER OTHER RUBBER OR POLYURETHANE ELEMENTS

DODGE PARA-FLEX elements are manufactured with reinforced fabric tension cords throughout the center of the rubber, with uniform and centered beads at the edge of the rubber element. This helps to prevent tire pull-out from the flanges, provides increased reliability, limits untimely catastrophic failures and provides replacement warning signs. Additionally, DODGE PARA-FLEX elements are reinforced at the split to limit wear.

TORSIONALLY SOFT RUBBER PROTECTS CONNECTED EQUIPMENT

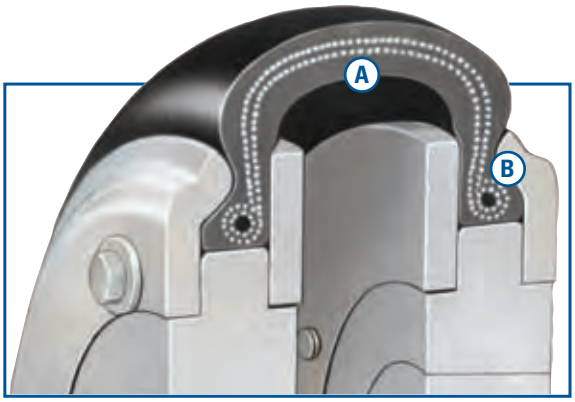
The flexible design of the DODGE PARA-FLEX element is crucial in preventing damage to connected equipment in harsh-running environments. The torsional softness is instrumental in dampening vibrations and absorbing shock loads to the system, and it also requires less service factor than stiffer elements.

INDUSTRY LEADING MISALIGNMENT CAPABILITIES

DODGE PARA-FLEX elements provide accommodation of shaft misalignment during installation, running-time, and replacement better than other elastomeric elements. With an industry-leading combined 4° angular, 1/8" parallel, and 5/16" end-float capability, you can be sure that PARA-FLEX couplings will perform in harsh environments, reducing valuable time needed for installation and maintenance.

LARGE INSTALLED BASE

With over 50 years of history and development, DODGE PARA-FLEX elements have the experience of providing reliable solutions in a wide range of industries and applications. DODGE PARA-FLEX Couplings carry an industry-leading 5-Year Limited Warranty.



(A) Fabric centered throughout rubber increases tire life.

(B) Uniformed and centered beads prevent tire from pulling out of flange.

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Installation Instructions Manual For DODGE® Para-Flex® Couplings

I) FLANGE INSTALLATION

Two-Piece Flange Styles

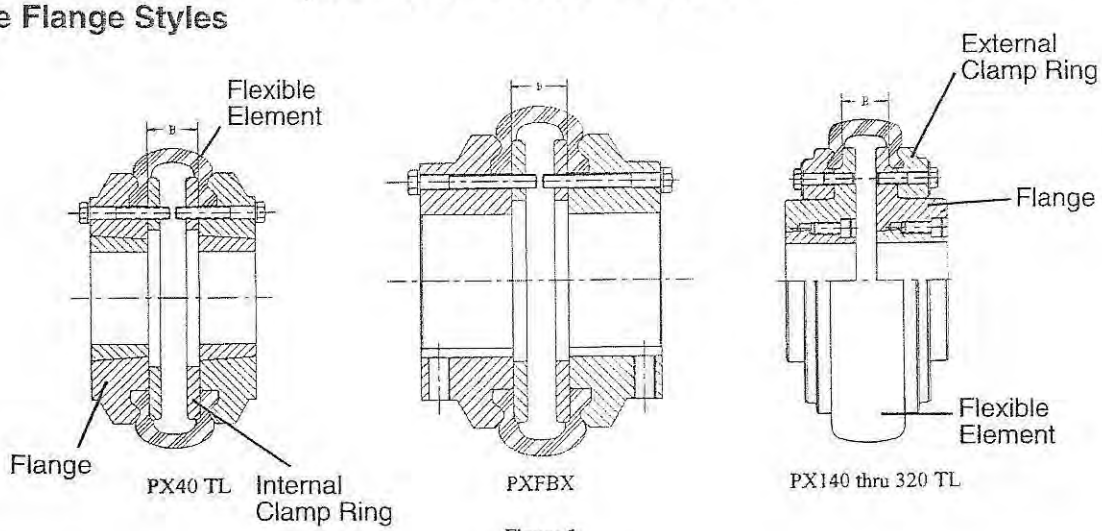


Figure 1

Install in the following sequence:

1. For the TAPER-LOCK® flange, install bushing in the flange per Steps 1 thru 3 in the instructions (No. 499737) packed with the bushing.

2. Check the axial float of the shafts. Position the shafts at the mid-point of the float. Where **Limited End Float** is required or **Sleeve Bearings** are used, consult DODGE for application assistance.

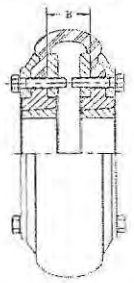
3. Referring to Figure 1 and Table 1, observe the "B" dimension for the coupling size being installed. Mount and position the flanges on the shafts so that dimension "B" is achieved when the shafts are in their final position. For the TAPER-LOCK flange, secure the flange assembly to the shaft per Steps 4 and 5 in the bushing instructions. For the clearance fit straight bore (FBX) flange, tighten the set screws to values listed in Table 2. Align flanges using precision equipment such as dial indicators or laser equipment. If precision equipment is not available, scales, straight edges, and calipers can be used as less accurate means of alignment. If using a scale or calipers, refer to Figure 3 and check the angular misalignment by measuring dimension "B" at four places 90° apart. Adjust the equipment until the four measurements do not vary more than value "C" in Table 1. If using a straight edge, check the parallel offset by laying the straight edge across the outside diameter of the flanges in four places 90° apart. The gap between the flange and straight edge should not exceed 1/32". To achieve maximum coupling performance, align the coupling as accurately as possible during initial installation.

4. Remove any anti-rust lubricants or oil from the grooved side of the clamp rings. Loosen but do not remove clamp ring screws until only one or two threads are engaged and proceed to Section II for element installation.

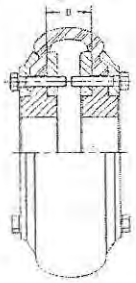
WARNING: Because of the possible danger to person(s) or property from accidents which may result from the improper use of products, it is important that correct procedures be followed. Products must be used in accordance with the engineering information specified in the catalog. Proper installation, 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.

I) FLANGE INSTALLATION

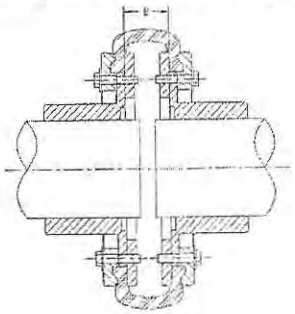
Three-Piece Flange Styles



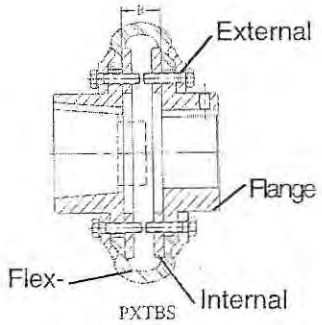
PX50-120 TL



PXFBS



PXBBS



PXTBS

Figure 2

Install in the following sequence:

1. Disassemble the clamp rings from the flanges. Place the external clamp rings on the shafts with the grooved side facing the shaft end.

2. For the TAPER-LOCK flange, install the bushing in the flange per Steps 1 thru 3 in the instructions (No. 499737) packed with the bushing.

3. Check the axial float of the shafts. Position the shafts at the mid-point of the float. Where **Limited End Float** is required or **Sleeve Bearings** are used, consult DODGE for application assistance.

4. Referring to Figure 2 and Table 1, observe the "B" dimension for the coupling size being installed. Mount and position the flanges on the shafts so that dimension "B" is achieved when the shafts are in their final position. For the TAPER-LOCK flange, secure the flange assembly to the shaft per Steps 4 and 5 in the bushing instructions. For the clearance fit straight bore (FBS and BS) flange, tighten the set screws to values listed in Table 2. For the interference fit straight bore (BS) flange, press or shrink flange to shaft. For the taper bore flange (TS), tighten shaft nut as required. Align flanges using precision equipment such as dial indicators or laser equipment. If precision equipment is not available, scales, straight edges, and calipers can be used as less accurate means of alignment. If using a scale or calipers, refer to Figure 3 and check the angular misalignment by measuring dimension "B" at four places 90° apart. Adjust the equipment until the four measurements do not vary more than value "C" in Table 1. If using a straight edge, check the parallel offset by laying the straight edge across the outside diameter of the flanges in four places 90° apart. The gap between the flange and straight edge should not exceed 1/32". To achieve maximum coupling performance, align the coupling as accurately as possible during initial installation.

5. Remove any anti-rust lubricants or oil from the element side of the clamp rings. Assemble clamp rings on the flanges engaging only one or two threads and proceed to Section II for element installation.

TABLE 1

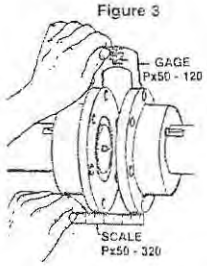
Coupling Size	Clamp Ring Screw Wrench Torque (lb*in) Flange Style Two-Piece	Clamp Ring Screw Wrench Torque (lb*in) Flange Style Three-Piece	Distance Between Flanges B (in)	Total Difference See Figure 8 (below) C (in)
PX40	130	130	49/64	1/64
PX50	130	130	31/32	1/64
PX60	290	290	1-9/32	1/64
PX70	290	290	1-1/2	1/64
PX80	290	290	1-1/2	1/64
PX90	480	480	1-17/32	1/32
PX100	480	480	1-23/32	1/32
PX110	480	480	1-9/16	1/32
PX120	1080	1080	1-3/4	1/32
PX140	1080	1080	2-1/16	1/32
PX160	2160	1150	2-11/16	1/16
PX200	2160	2400	3-5/16	1/16
PX240	3600	4020	3-29/32	1/16
PX280	4320	6600	4-7/32	1/16
PX320	4320	6600	4-1/2	1/16

TABLE 2

Set Screw Size	#0	#1	#2	#3	#4	#5	#6	#8	#10	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
Installation Torque (lb*in)	1.0	1.8	1.8	5	5	10	10	20	36	87	165	290	430	620	620	1325	2400	5200	7200

Note: Verify set screw size prior to tightening.

Figure 3



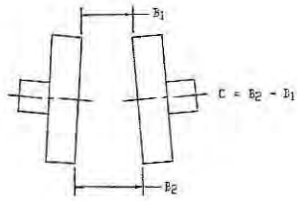


Figure 8

Note: Gages not supplied for PX40 and PX140 thru PX320. Gages should not be used for alignment purposes.

II) FLEXIBLE ELEMENT INSTALLATION

Install in the following sequence:

1. Clean flange mounting area as well as flexible element seats with a solvent, such as Xylene (Xylol), to remove grease, oil, wax, and dirt from surfaces. A diluted soapy water solution may be applied to aid with element installation.
2. Wrap flexible element around flanges as shown in Figure 4. Make sure beads of element are fully worked down upon the seats. To ensure proper seating, rap around the tire's outside diameter with a small mallet until split is closed. Make sure element is evenly centered on the flanges.
3. Hold split of flexible element closed as shown in Figure 5. Tighten (finger tight) one or two screws 180° from split. Using both hands, knead the tire pulling it toward the split. Hold split closed and tighten (finger tight) next two screws farthest from the split. Repeat the procedure on all remaining clamp ring screws. Use a torque wrench to tighten each clamp ring screw in succession to the torque specified in Table 1. Using a torque wrench, re-check all clamp ring screw torque values before coupling operation.
4. **Optional Procedure:** Hold split of flexible element closed as shown in Figure 5. Tighten (finger tight) one or two screws 180° from split. Using both hands, knead the tire pulling it toward the split. Hold split closed and tighten (finger tight) next two screws in a star or cross pattern as shown in Figure 6. Repeat the procedure on all remaining clamp ring screws. Use a torque wrench to tighten each screw to the torque specified in Table 1. Using a torque wrench, re-check all clamp ring screw torque values before coupling operation.

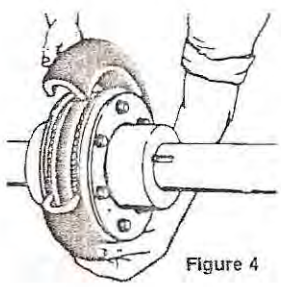


Figure 4

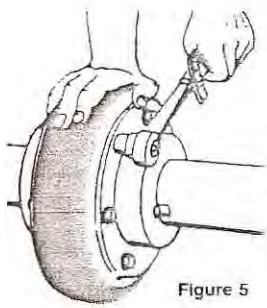


Figure 5

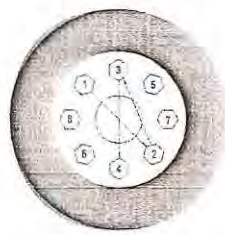


Figure 6

WARNING: The metal components of the coupling that clamp the flexible element will operate properly only if the screws are tightened properly. Tightening one screw to full torque before proceeding to the next screw may cause excessive clamp ring or flange deflection. To prevent clamp ring and flange deflection, the screws must be evenly and gradually tightened to full torque.

III) FLEXIBLE ELEMENT REPLACEMENT

Loosen all clamp ring screws. Grasp one end of flexible element at the split and peel off the flanges. Clean clamping parts with a solvent, such as Xylene (Xylol), to remove grease, oil, wax, and dirt from surfaces. Check to see that only one or two threads of each clamp ring screw are engaged. Re-align flanges and install new flexible element according to Section I & II. When replacing clamp ring screws and washers, use only SAE Grade 8 or ISO Class 10.9 screws and hardened washers.

IV) FLOATING SHAFT COUPLING INSTALLATION

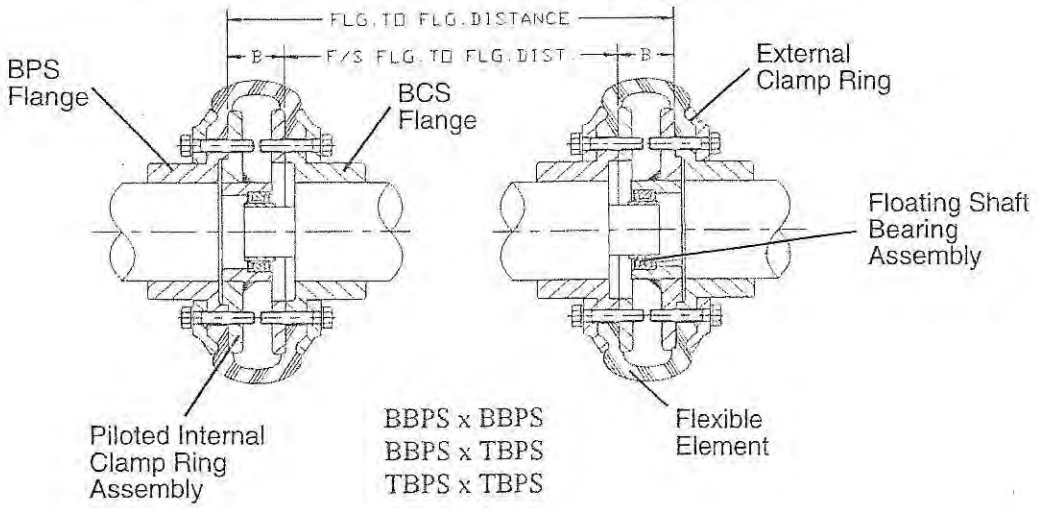


Figure 7

Install in the following sequence:

1. Disassemble the clamp rings from the flanges. Place the external clamp rings on the shafts with the grooved side facing the shaft end.
2. Check the axial float of the shafts. Position the shafts at the mid-point of the float. Where **Limited End Float** is required or **Sleeve Bearings** are used, consult DODGE for application assistance.
3. Referring to Figure 7 and Table 1, observe the "B" dimension for the coupling size being installed. Mount and position the flanges on the shafts so that dimension "B" is achieved when the shafts are in their final position. Where flanges contain set screws, tighten to values listed in Table 2.
4. Remove any anti-rust lubricants or oil from the grooved side of the clamp rings. Assemble internal and external clamp rings to floating shaft flanges and snug up clamp ring screws. Slip internal piloted clamp rings onto the turned down portion of floating shaft. Hub projection on clamp ring should be toward floating shaft as shown in Figure 7.
5. Position and support floating shaft assembly between driving and driven flanges. Make sure clamp ring pilot is seated in flange counterbore. Assemble external clamp rings to flange with screws. Tighten screws sufficiently to prevent movement between the parts.
6. Align flanges using precision equipment such as dial indicators or laser equipment. If precision equipment is not available, scales, straight edges, and calipers can be used as less accurate means of alignment. If using a scale or calipers, refer to Figure 3 and check the angular misalignment by measuring dimension "B" at four places 90° apart. Adjust the equipment until the four measurements do not vary more than value "C" in Table 1. Repeat the procedure at both ends of the coupling. To achieve maximum coupling performance, align the coupling as accurately as possible during initial installation.
7. Loosen clamp ring screws and proceed to Section II for element installation.

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3/05 30M-K

Installation and Parts Replacement Manual
For

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

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

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5/04-5M-K

IM499385

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INSTALLATION

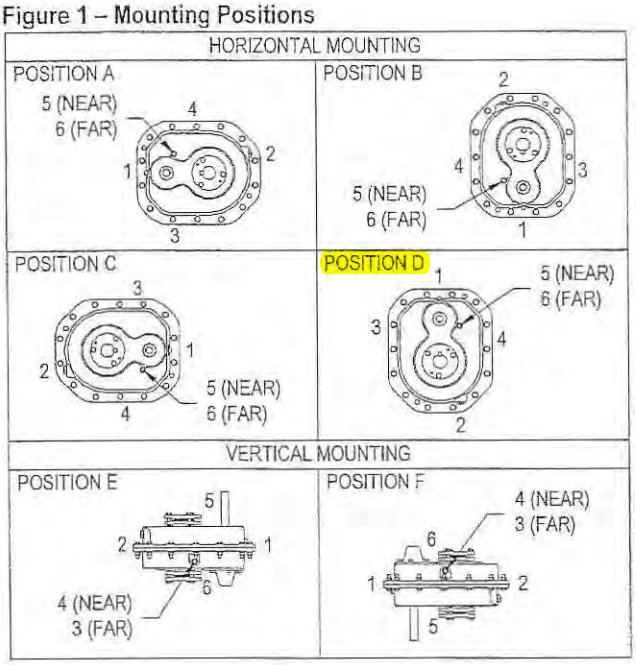
1. Use lifting bracket to lift reducer.

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

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

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

Figure 1 – Mounting Positions



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

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

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

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

3. Mount reducer on driven shaft as follows:

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

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

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

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

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

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

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

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

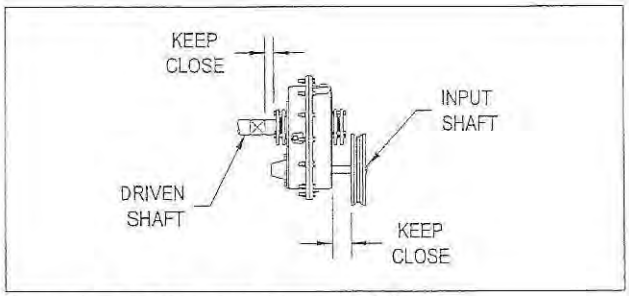


Figure 2 – Reducer and Sheave Installation

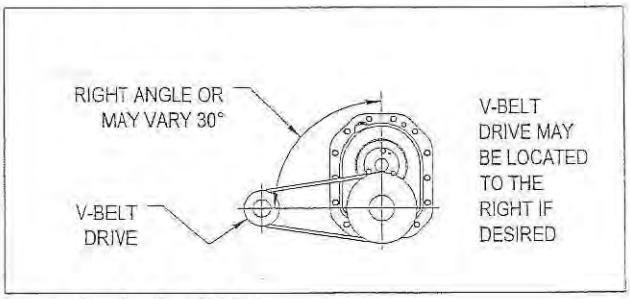


Figure 3 – Angle of V-Drive

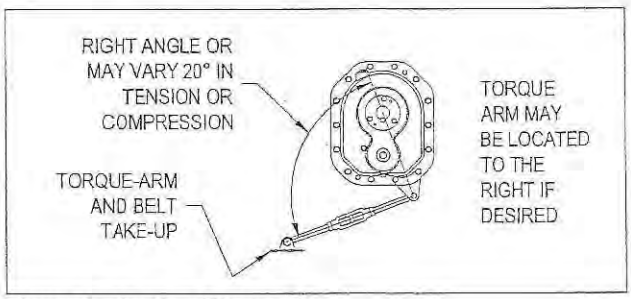


Figure 4 – Angle of Torque-Arm

TORQUE-ARM II BUSHING INSTALLATION

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

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

Standard Taper Bushings:

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

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

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

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

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

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

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

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

Short Shaft Bushings:

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

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

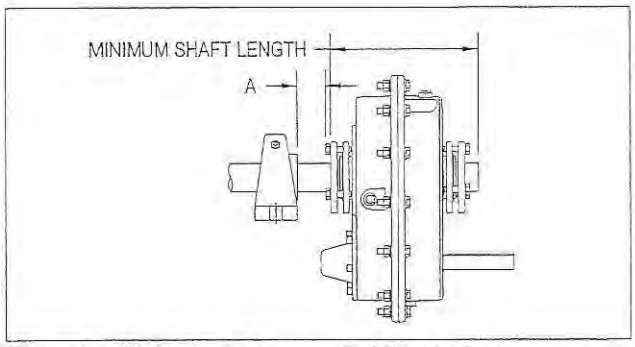


Figure 5 – Minimum Recommended Dimensions

Table 1 – Minimum Mounting Dimensions and Bolt Torques

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

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

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

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

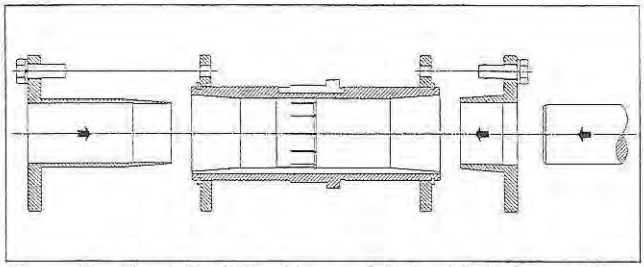


Figure 6 – Short Shaft Bushing and Output Hub Assembly

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

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

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

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

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

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

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

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

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 - see tables. Follow instructions on reducer warning tags, and in the installation manual.

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

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

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

Table 2 – Oil Volumes

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

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

Table 3 – Oil Recommendations

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

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

* Notes:

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

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.

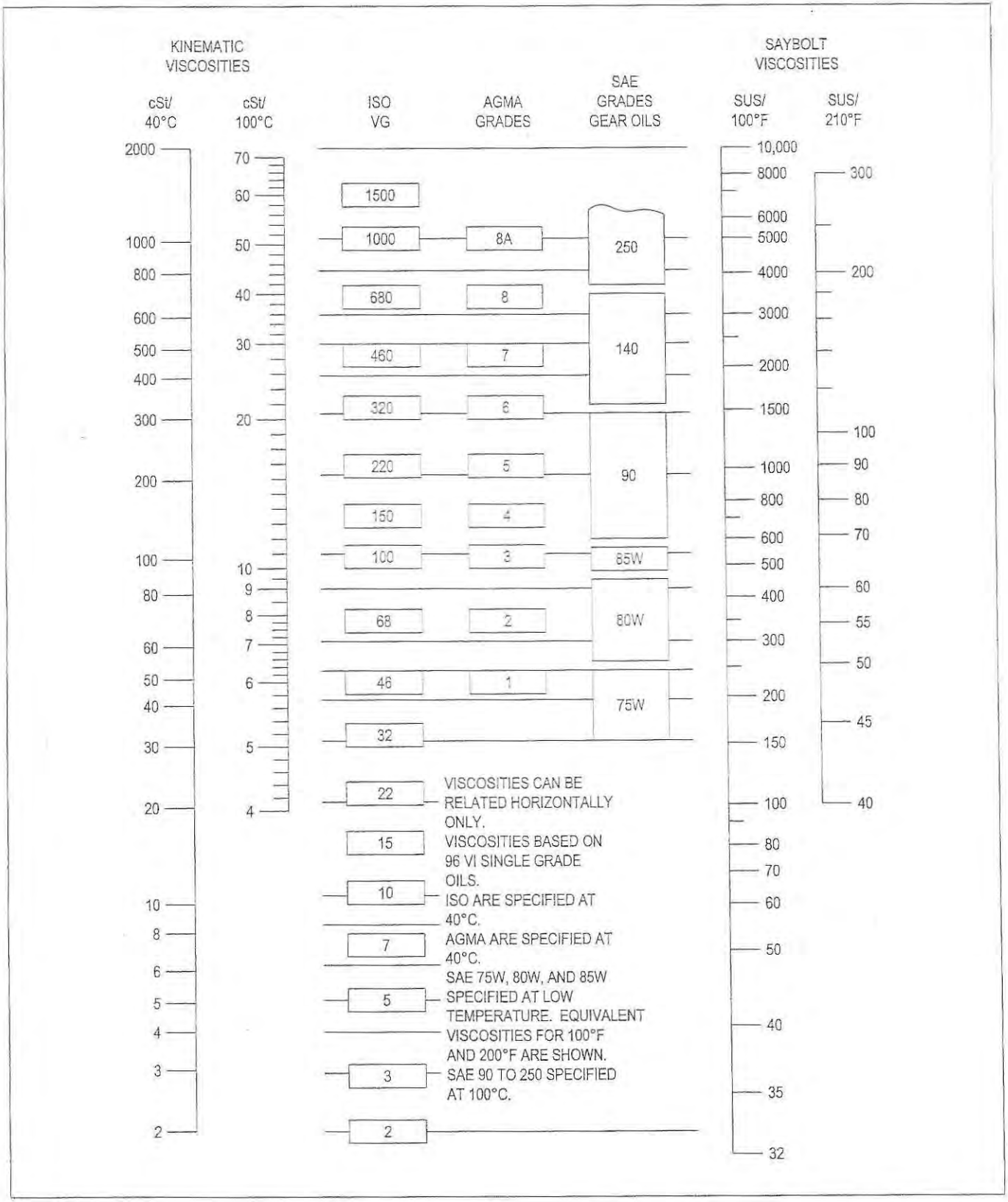
Follow the installation instructions provided in this manual.

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.

OIL VISCOSITY EQUIVALENCY CHART



SCREW CONVEYOR ADAPTER ASSEMBLY

1. Install seals (408) into adapter housing as shown in Figure 13. 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

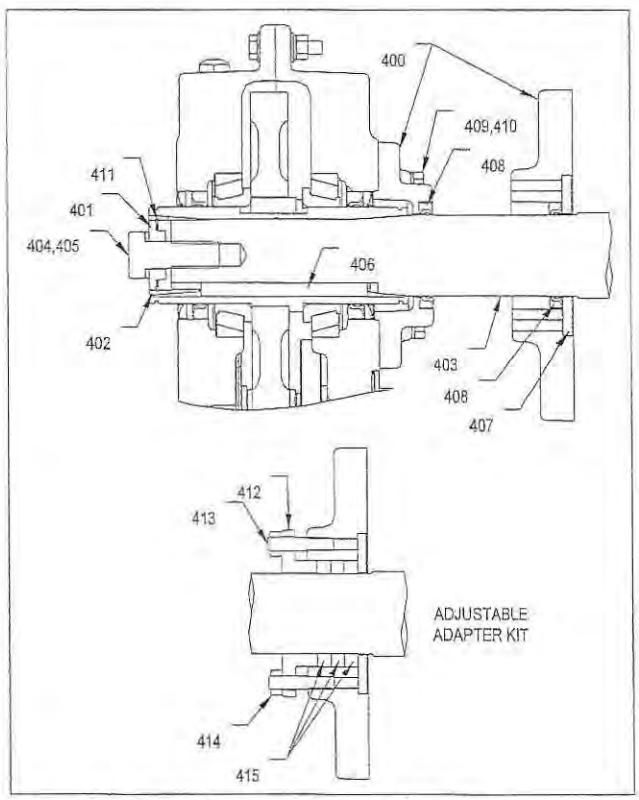


Figure 13 – Screw Conveyor Adapter Assembly

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 endplay 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 endplay until proper endplay is obtained. Note that the output shaft is preloaded. After endplay is determined, add the correct shim thickness to the endplay 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

REPLACEMENT PART AND KIT NUMBERS

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

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

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

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

Reducer Size		Input Shaft Bearing – LH Side	
		Dodge Part Number	Timken Part Number
TA0107L	5:1 9:1 15:1 25:1 40:1	403165/402265	LM11910/LM11949
TA1107H	5:1 9:1 15:1	403063/411626-05-AY	09195/09081
	25:1 40:1	403063/402108	09195/09067
TA2115H	5:1 9:1 15:1 25:1	403094/304753	15245/15113
	40:1	403094/304707	15245/15101
TA3203H	5:1 9:1 15:1 25:1	304809/411626-05-K	25821/25880
	40:1	403101/402271	02820/02872
TA4207H	5:1 9:1 15:1 25:1 40:1	304809/411626-05-K	25821/25880
TA5215H	5:1 9:1 15:1	403005/402001	3820/3877
	25:1 40:1	403005/304717	3820/3880
TA6307H	5:1 9:1 15:1 25:1 40:1	403026/906260	45220/45290
TA7315H	5:1 9:1 15:1 25:1 40:1	304802/402041	HM212011/HM212049
TA8407H	15:1 25:1 40:1	908259/908260	H414210/H414242
TA9415H	15:1 25:1 40:1	403036/304701	6320/6379
TA10507H	15:1 25:1 40:1	402231/402232	JH415610/JH415647
TA12608H	15:1 25:1 40:1	402231/402232	JH415610/JH415647

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

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

Table 11 – Replacement Parts Kit Numbers

Reducer Size	Ratio	Seal Kit	Output Hub Assembly	Countershaft Assembly	Bearing Kit
TA0107L	5:1	900126	900120	—	900128
	9:1			900122	900129
	15:1			900123	
	25:1			900124	
	40:1			900125	
TA1107H	5:1	901126	901120	—	901128
	9:1			901122	901129
	15:1			901123	
	25:1			901124	901130
	40:1			901125	
TA2115H	5:1	902126	902120	—	902128
	9:1			902122	902129
	15:1			902123	
	25:1			902124	
	40:1	902127		902125	902130
TA3203H	5:1	903126	903120	—	903128
	9:1			903122	903129
	15:1			903123	
	25:1			903124	
	40:1	903127		903125	903130
TA4207H	5:1	904126	904120	—	904128
	9:1			904122	904129
	15:1			904123	
	25:1			904124	
	40:1			904125	904130
TA5215H	5:1	905126	905120	—	905128
	9:1			905122	905129
	15:1			905123	
	25:1			905124	905130
	40:1			905125	905131
TA6307H	5:1	906126	906120	—	906128
	9:1			906122	906129
	15:1			906123	
	25:1			906124	906130
	40:1			906125	
TA7315H	5:1	907126	907120	—	907128
	9:1			907122	907129
	15:1			907123	
	25:1			907124	
	40:1			907125	907130
TA8407H	15:1	908126	908120	908123	908129
	25:1			908124	
	40:1			908125	908130
TA9415H	15:1	909126	909120	909123	909129
	25:1			909124	
	40:1			909125	909130
TA10507H	15:1	910126	910120	910123	910129
	25:1			910124	
	40:1			910125	910130
TA12608H	15:1	912126	912120	912123	912129
	25:1			912124	
	40:1			912125	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.

Parts for TA0107L thru TA5215H Taper Bushed Double 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	Lock-Washer	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	Lock-Washer	6 ♣	419045	419045	419045	419045	419045	419046
13	Input Oil Seal							
	5:1, 9:1, 15:1 ♠	1	901235	901235	902235	304924	244524	304932
	25:1 Ratio ♠	1	901235	901235	902235	304924	244524	304932
	40:1 Ratio ♠	1	901235	901235	902233	903235	244524	304932
14	Output Oil Seal	2	900234	352122	243578	244673	245545	246310
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		901267	901271	902271	903267	903267	905271
	.007" Shim		901269	901273	902273	903269	903269	905273
	.005" Shim		901268	901272	902272	903268	903268	905272
41	Counter-Shaft Bearing Shim-As Req'd							
	.015" Shim		900267	901267	901271	903267	903267	905271
	.007" Shim		900269	901269	901273	903269	903269	905273
	.005" Shim		900268	901268	901272	903268	903268	905272
23	Output Gear	1	900208	901208	902208	903208	904208	905208
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	901277	901277	902277	903277	904277	905277
	40:1 Ratio ♠	1	901277	901277	902277	903298	904277	905277
29	Input Pinion							
	5:1 Ratio ♠	1	900222	901222	902222	903222	904222	905222
	9:1 Ratio ♠	1	900221	901221	902221	903221	904221	905221
	15:1 Ratio ♠	1	900220	901220	902220	903220	904220	905220
	25:1 Ratio ♠	1	900219	901219	902219	903219	904219	905219
	40:1 Ratio ♠	1	900218	901218	902218	903218	904218	905218
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	Counter-Shaft Pinion	1	900209	901209	902209	903209	904209	905209
40	First Stage Gear Key	1	900276	901276	902276	903276	904276	905276
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
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 Lock-Washer	1	419011	419011	419012	419012	419013	419013

Parts for TA1107H thru TA5215H Taper Bushed Double and Single Reduction Reducers

Ref.	Description	Qty.	TA0107L	TA1107H	TA2115H	TA3203H	TA4207H	TA5215H
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	Lock-washer	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 Lock-Washer	6	419010	419010	419011	419011	419011	419013
24	Output Bearing Cup	2	900250	901250	403003	903252	403016	403140
25	Output Bearing Cone	2	900251	901251	402003	402268	402193	402050
30	Input Bearing Cup-LH							
	5:1 Ratio ♠	1	403165	403063	403094	304809	304809	403005
	9:1 Ratio ♠	1	403165	403063	403094	304809	304809	403005
	15:1 Ratio ♠	1	403165	403063	403094	304809	304809	403005
	25:1 Ratio ♠	1	403165	403063	403094	304809	304809	403005
	40:1 Ratio ♠	1	403165	403063	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	402265	411626-05-AY	304753	411626-05-K	411626-05-K	402001
	9:1 Ratio ♠	1	402265	411626-05-AY	304753	411626-05-K	411626-05-K	402001
	15:1 Ratio ♠	1	402265	411626-05-AY	304753	411626-05-K	411626-05-K	402001
	25:1 Ratio ♠	1	402265	402108	304753	411626-05-K	411626-05-K	304717
	40:1 Ratio ♠	1	402265	402108	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	Counter-Shaft Bearing Cup-LH	1	304833	403165	304836	403101	304809	403005
35	Counter-Shaft Bearing Cup-RH	1	304833	403165	304836	403101	304809	403005
36	Counter-Shaft Bearing Cone-LH	1	304740	402265	411626-05-B	402271	304710	402001
37	Counter-Shaft Bearing Cone-RH	1	304740	402265	411626-05-B	402271	304710	402001
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	901238	901238	902238	903238	904238	905238
	40:1 Ratio ♠	1	901238	901238	——	——	904238	905238
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	Lock-Washer	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	901411	901411	902411	353085	904411	905411
409	Bolt	4	411410	411410	411435	411456	411456	411483
410	Lock-Washer	4	419011	419011	419012	419013	419013	419014
411	Retaining Ring	1	900406	901406	902406	903406	904406	905406

Parts for TA0107L thru TA5215H Taper Bushed Double and Single Reduction Reducers

Ref.	Description	Qty.	TA0107L	TA1107H	TA2115H	TA3203H	TA4207H	TA5215H
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

Notes:
§ Not shown on drawing.
★ Includes parts listed immediately below marked "▲".
▲ Makes up assembly under which it is listed.
♣ 8 required on TA5215H.
♠ See Table 12 for actual ratio.

Parts for 6307H thru TA12608H Taper Bushed Double and Single Reduction Reducers

Ref.	Description	Qty.	TA6307H	TA7315H	TA8407H	TA9415H	TA10507H	TA12608H
409	Bolt	4	411983	411493	N/A	N/A	N/A	N/A
410	Lock-Washer	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

Notes:
§ Not shown on drawing.
★ Includes parts listed immediately below marked "▲".
▲ Makes up assembly under which it is listed.
♣ 8 required on TA5215H, TA6307H, TA7315H, TA8407H, and TA9415H, 12 required on TA10507 and TA12608H.
♠ See Table 12 for actual ratio.
♦ 18 required on TA9415H, 20 required on TA10507H, 22 required on TA12608H.
♥ 36 required on TA9415H, 40 required on TA10507H, 44 required on TA12608H.
• 2 required on TA7315H, TA8407H, TA9415H, and TA10507H
* 8 required on TA12608H.

ACTUAL RATIOS

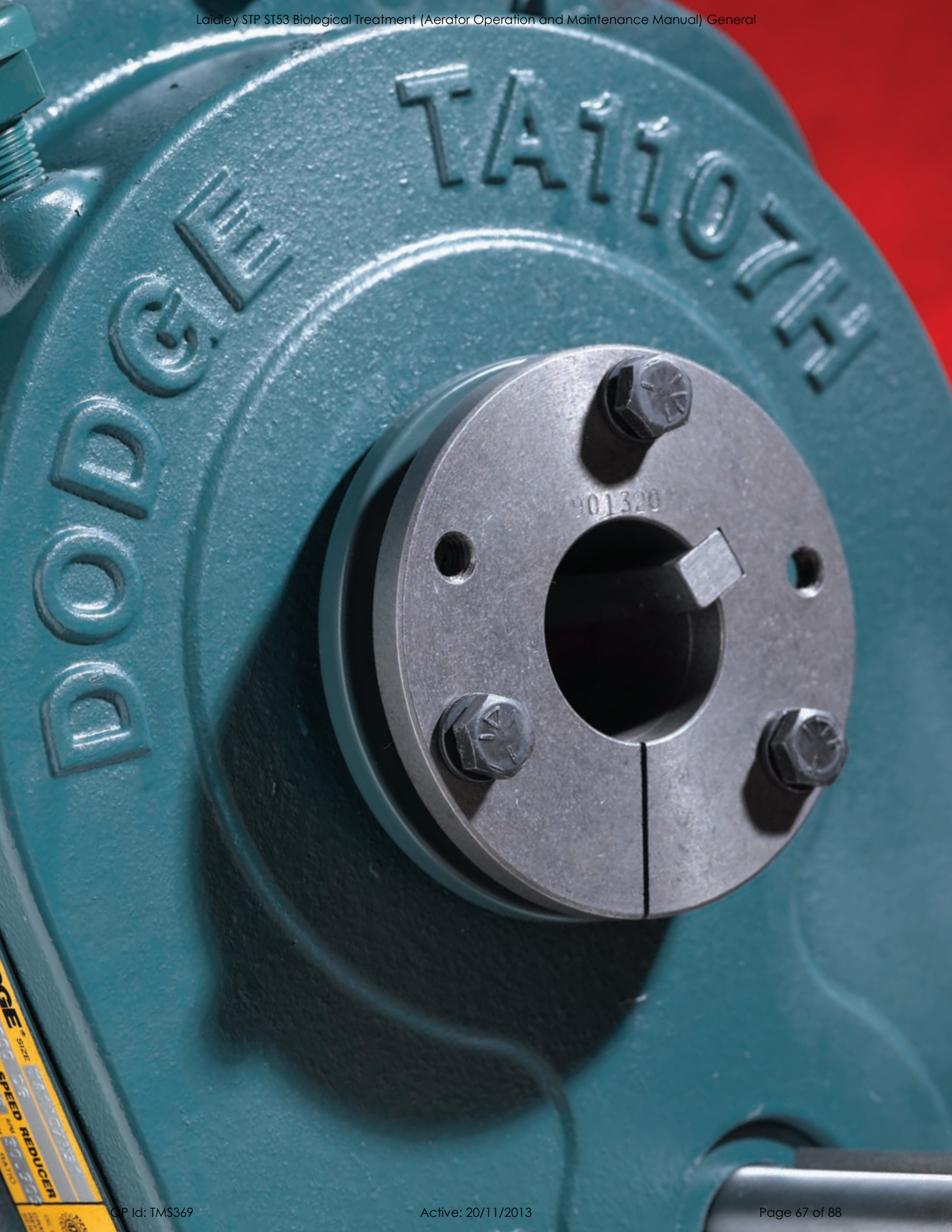
Table 12 – Actual Ratios

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

Torque-Arm II™

DODGE®

BALDOR®


DODGE TAPER-LOCK
901320
SPEED REDUCER

DODGE® TORQUE-ARM II™

THE LEGACY CONTINUES

The DODGE TORQUE-ARM II surpasses all other reducers on the market because of its industry proven design and patented features.

This powerful line of shaft mounted speed reducers –in 12 case sizes through 400 horsepower (HP)—offers unparalleled torque ratings and is quickly becoming the new industry standard. Improved features include: an all-new backstop concept, a patented sealing system, a steel motor mount system, a state-of-the-art, totally modular design with an expanded ratio range to 40:1 and a patented twin tapered bushing system.

The increased ratings on the TORQUE-ARM II line are comparable to the next larger sized TXT reducer and are the result of the extended gear centers, wider gear faces and optimized tooth geometry. The new backstop design features centrifugal lift-off sprags for extended life and can be used with lubricants containing EP additives.

In addition, the TORQUE-ARM II line has a patented, premium sealing system that uses an HNBR oil seal protected by a metal excluder seal with rubbing lip. This harsh duty sealing system makes this reducer series a perfect fit for today's harsh duty industries such as aggregates, mining, cement, asphault, mixing & milling and ethanol.

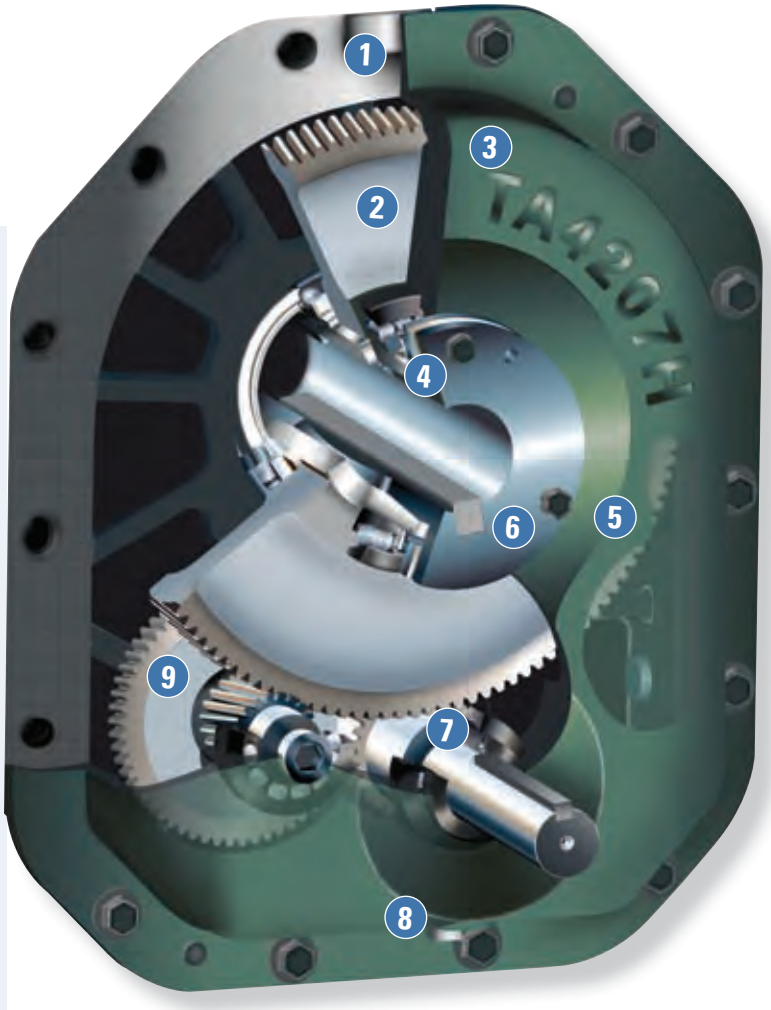
The new steel motor mount adjusts to multiple center distances and mounts in shaft mount and screw conveyor positions.Its patented twin tapered bushing system –in standard length, short shaft, and metric versions– offers all the features of our standard twin tapered TORQUE-ARM bushing design which are unique to DODGE. The patented insertable tapered wedge enables the optional extended tapered bushing kit to be applied for shorter shaft lengths; allowing the replacement of straight bore or single bushed reducers.

DODGE®

Dodge Torque-Arm II™, Gear-Reducers for

Product Capabilities

- Twelve reducer sizes with modular accessories
- All reducers can be shaft mounted, screw conveyor, vertical and flange mounted.
- HP through 400, and torque ratings through 500,000 lb in.
- Standard 5, 9, 15, 25 and up to 40: 1 gear ratios.
- Nearly 300: 1 speed reduction with V belt drives.
- Bushing bores 1 inch through 7 inch.
- All highly efficient helical gearing design.
- Meets or exceeds AGMA standards including 5,000 hour L-10 bearing life, 25,000 average life.
- Smooth, rugged class 30 cast iron housings with pry slots.
- 36 month - 18 month warranty protection.
- TA II products are in conformance with ATEX directive 94//9/EC guidelines
- New Premium HNBR oil sealing system and filter breather



Design/Construction Features and Benefits

1) Three large pry slots make rebuilding easy

2) Proven, AGMA-rated, case-carburized gear design ensures high efficiency. Has Class I starting load capability of 200%

3) Totally modular construction, one reducer for shaft mount, screw conveyor, vertical and flange mount applications

4) Premium HNBR oil seals are protected by a patented labyrinth metal shield and excluder lip auxiliary seal on all shafts.No lubrication required. Factory tested

5) 100% cast iron housing (Class 30) eliminates bearing cap leak paths and maximizes surface area for heat dissipation

6) Patented twin-tapered bushings are available in standard, short shaft, and metric versions

7) Heavy duty tapered roller bearings provide 25,000 hours average life and 5,000 L-10 minimum hours life—even in the heaviest load conditions

8) Magnetic drain plug and new filter breather are standard

9) Extended gear centers and increased gear tooth contact provide dramatically increased torque and horsepower ratings.

DODGE TORQUE-ARM II gear reducers are in conformance with the European ATEX Directive 94/9/EC (ATEX 100a) - Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres and are certified 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

All of Your Industry Needs

Testing and Development

It's what makes the TORQUE-ARM II different and even better than the original TORQUE-ARM and all competition.

Using QFD techniques, DODGE began product development by asking our customers to tell us what they liked and/or disliked about our original TORQUE-ARM and other speed reducers on the market. From these comments, our engineering team developed specifications, which became the blueprint for the TORQUE-ARM II reducer's state of the art design.

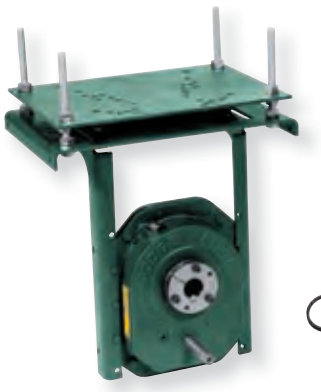
First and second generation prototypes were built in production quantities and tested in our own lab under full load conditions. All designs used for the prototypes were developed using our proprietary in-house development programs for gearing design, bearing selection, and shaft design. In addition, all reducers were modeled using Pro-ETM modeling software and analyzed using FEM techniques.

Each size and ratio for each generation prototype was subjected to rigorous mechanical, structural, and thermal testing, and all models were evaluated for design optimization, structural strength, and stress and deflection. The prototypes were also used to perform manufacturing capability studies to verify that the design tolerances could be maintained under manufacturing conditions.

It was the knowledge gained from these tests that influenced our final design specifications. To ensure optimum performance, each size and ratio of the final design was also put through the same thorough, stringent design analysis and testing as the prototypes.

TORQUE-ARM II™
The Legacy Continues . . .

Modular Concepts



Shaft mounted reducer with twin tapered bushing and motor mount

Screw conveyor drive with adapter, drive shaft and motor mount

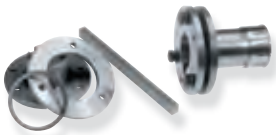
Motorized Torque-Arm II

- Heavy Duty AGMA rated design
- Tapered roller bearings on all helical shafts
- Premium HNBR oil seals
- Industry leading backstop design
- Standard Screw Conveyor Adapter and drive shaft
- Standard and short shaft twin-tapered bushings
- Standard stock torque arm rod kit
- EZ Class I & II selection tables
- Rugged, high efficiency, case carburized helical/bevel gearing
- Part numbered product concept
- Reduced assembly time
- Reduced gaurding costs
- Reduced maintenance requirements
- Optional metal end covers
- Reducer mounts in multiple positions
- Three piece coupled design utilizes standard Reliance Electric NEMA c-face motors in two motor speeds and multiple gear ratios to provide a wide spectrum of output speeds
- Space saving integral gearmotor design uses VFD to adjust output speeds for individual applications

Modular Accessories

- **Standard Twin-Tapered Bushing System:** an easy on, easy off, no-wobble bushing system featuring a fully split, ductile iron 8° taper and reliable twin support. Available in inch and metric bores. increased bore capability in many sizes.

- **Short-shaft twin tapered bushing kits:** (Patent numbers 5,667,333 and 5,951,198) eliminate the need for full-length shafts. Constructed with ductile iron, it has all the features of our standard bushing system. Available in both inch and metric bores.



- **Modular Motor Mount:** attached and supported by two angle iron brackets with equally spaced holes, which align with the spacing of the cast slots of the gear case. This way, the motor mount can be adjusted up or down depending on the customer's requirements. It can also be mounted on the side of the reducer for screw conveyor applications.

- **Backstop Option:** helps prevent reverse rotation in high stop-start loads, and results in less wear and longer life. Its centrifugal throw-out design eliminates sprag sliding and reduces wear. It operates with standard and EP lubricants and requires no external lubrication.

- **TA rod kit includes:** standard brackets functions as a belt-tensioning device, and offers universal mounting options.

- **CEMA bolt-on adapter:** features double-lip seals on both surfaces. the adapter center is open for contaminate drop out for optimized sealing.

- **Adjustable packaging adapter kit:** bolts to the standard adapter and provides a proven sealing option for hostile environments. Packing can be retightened.
- **Screw conveyor drive shafts:** made from high alloy steel and engineered to CEMA dimensions. They are three-bolt drilled and their tapered fit ensures simple installation. The rugged locking plate (patent pending) also provides a mechanical shaft removal feature.

- **Bolt-on belt guard package:** requires no drilling or straps. It allows multiple height adjustments, features a lift-off cover construction, and has an open metal inspection feature.

World Headquarters
P.O. Box 2400, Fort Smith, AR 72902-2400 U.S.A., Ph: (1) 479.646.4711, Fax (1) 479.648.5792, International Fax (1) 479.648.5895
Baldor - Dodge
6040 Ponders Court, Greenville, SC 29615-4617 U.S.A., Ph: (1) 864.297.4800, Fax: (1) 864.281.2433
www.baldor.com

BR1602
2/10 TCP 25,000

FEATURES/BENEFITS

Setscrew Ball Bearings - Inch

For over 70 years, DODGE has been talking to mounted bearing users and listening to their needs. This experience led to design of the optimum mounted ball bearing. A state-of-the-art facility was built in Rogersville, Tennessee, to manufacture the new DODGE design.

The result is the DODGE SC/SCM/VSC/SL line. It is the most current design setscrew mounted ball bearing on the market and provides the user unmatched quality and true total value.

- Light Duty Narrow Inner Ring (SL)
- Intermediate Duty Narrow Inner Ring (VSC)
- Normal Duty Wide Inner Ring (SC)
- Medium Duty Wide Inner Ring (SCM)
- Wide Variety of Housing Configurations
- Available in 1/2, to 3-1/2, Bore Sizes
- Seal options:
  - Flingers on SC/SCM (flingers are standard on E-Z KLEEN® nickel plated and Screw Conveyor Hanger Bearings)
  - Low friction labyrinth on SC/SCM
- Other options:
  - Corrosion resistant inserts for SC/SCM, E-Z KLEEN and nickel plate.
  - FDA/USDA lubricant and other special lubricants
  - High temperature SC/SCM designed for temperatures from 225°F to 400°F. Factory assembled to order.

For application assistance, contact DODGE Engineering.

Phone 864-297-4800
Fax 864-281-2317

Precision Hardened and Honed Inner and Outer Rings for wear resistance, quiet operation and long life.

Grade 10 Balls for quieter operation and less vibration.

Superior Locking Force

The DODGE SC/SCM/VSC/SL line uses 65° spacing for setscrews. The unique 65° design offers an optimum balance between locking force and inner ring stress.

FEATURES/BENEFITS

Setscrew Ball Bearings - Inch

The DODGE PROGUARD Seal

PROGUARD positive contact, low drag rubber seal

DODGE SC/SCM/VSC/SL mounted ball bearings use the field proven PROGUARD™ land-riding contact seal with steel shield protection. This highly effective positive seal design assures uniform lip contact with the inner ring to seal out contaminants and seal in lubricants.

On SC/SCM optional flingers can be added to form a tight labyrinth with the PROGUARD seal and provide additional seal protection against contaminants and trash.

Stronger, More Flexible Cage

Reinforced, stabilized nylon cage

The ball cage is made of heat stabilized nylon with 33% fill short fiberglass reinforcement for added strength. The nylon material provides a natural lubricity for longer life. Fiberglass reinforcement allows higher operating temperatures than plain nylon, yet is more resistant to fatigue than metallic cages. Short fiberglass allows greater flexibility than steel or nomal fiberglass, especially under misalignment. That means longer life in mounted bearings where some degree of misalignment is unavoidably encountered.

Anti-Rotation Pin (SC/SCM)

An anti-rotation pin prevents rotation of the outer race within the housing. Simple and effective, it makes system inserts easier to replace. There is no need to remove and replace grease fittings, location pins or other devices.

Simplified Anti-rotation device

DODGE E-Z KLEEN® Ball Bearings

Available with *Teflon*® or nylon coated and nickel/chrome plated housings (SC). These features make the SC ball bearing uniquely suited for the food, chemical and processing industries.

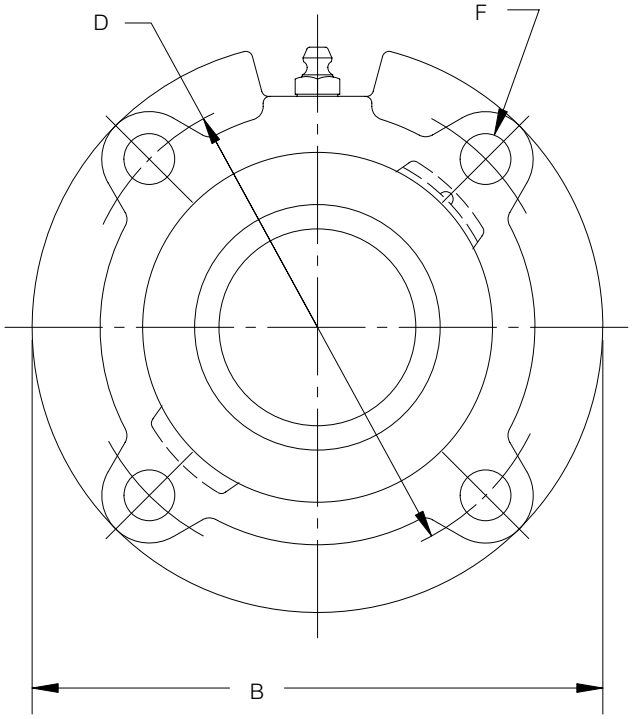
Teflon Coated Housing
U.S. Patents 4973172, 5028151, 5107589, 5074040

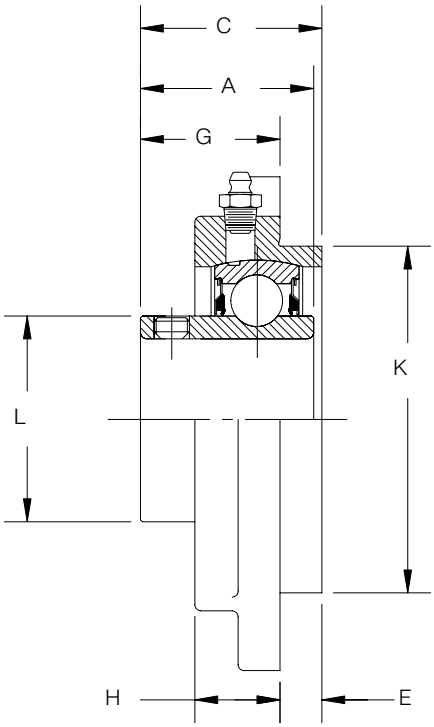
Teflon® is a registered trademark of DuPont Co.

SELECTION/DIMENSIONS

Setscrew Ball Bearings - Inch

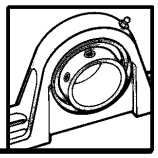
SCM Medium Duty Piloted Flange Bearings





FEATURE/BENEFITS SETSCREW BALL BEARINGS PAGE 2	HOW TO ORDER/ NOMENCLATURE PAGE 4	SELECTION PAGE 5	SCM METRIC PILOTED FLANGE BEARINGS PAGE 88

SELECTION/DIMENSIONS



Setscrew Ball Bearings - Inch

SCM Medium Duty Piloted Flange Bearings

Series	Shaft Size	Part Number	Description	Weight lbs.	A	B	C	D
206	1	**126167**	FC-SCM-100	3.3	1-25/64	4-3/8	1-1/2	3-5/8
207	1-3/16 1-1/4	**126168** **124224**	FC-SCM-103 FC-SC-104	4.2 3.9	1-17/32	5	1-49/64	4-1/8
208	1-7/16 1-1/2	**126170** **126171**	FC-SCM-107 FC-SCM-108	4.8 4.6	1-11/16	5-1/4	1-57/64	4-3/8
209	1-1/2	@	FC-SCM-108L	5.6	1-23/32	5-3/4	1-57/64	4-3/4
210	1-11/16 1-3/4	**126172** **126173**	FC-SCM-111 FC-SCM-112	6.4 6.3	1-3/4	6-1/8	1-61/64	5-1/8
211	1-15/16 2	**126174** **126175**	FC-SCM-115 FC-SCM-200	7.6 7.4	1-27/32	6-3/8	2-7/32	5-3/8
212	2-3/16 2-1/4	**126176** **126177**	FC-SCM-203 FC-SCM-204	9.5 9.3	1-63/64	7-1/8	2-29/64	6
214	2-7/16 2-1/2	**126178** **126179**	FC-SCM-207 FC-SCM-208	13.2 13.0	2-15/64	7-5/8	2-49/64	6-1/2
216	2-15/16 3	**126180** **126182**	FC-SCM-215 FC-SCM-300	18.8 18.6	2-11/32	8-3/4	3-1/32	7-1/2
218	3-7/16 3-1/2	**126183** **126184**	FC-SCM-307 FC-SCM-308	28.7 28.5	2-31/64	10-1/4	3-19/64	8-5/8

@ Assemble to order.

Series	Shaft SIze	E	F Bolt Dia.	G	H	K*	L
206	1	1/4	3/8	1-1/4	13/16	3	1-37/64
207	1-3116 1-1/4	3/8	3/8	1-29/64	57/64	3-3/8	1-27/32
208	1-7/16 1-1/2	7/16	7/16	1-29/64	57/64	3-5/8	2-3/64
209	1-1/2	7/16	1/2	1-29/64	29/32	4	2-7/32
210	1-11/16 1-3/4	15/32	1/2	1-31/64	59/64	4-1/4	2-7/16
211	1-15/16 2	5/8	1/2	1-19/32	1	4-1/2	2-23/32
212	2-3/16 2-1/4	7/8	1/2	1-37/64	1	5	2-31/32
214	2-7/16 2-1/2	1-1/8	1/2	1-41/64	1-1/16	5-1/2	3-5/16
216	2-15/16 3	1-1/4	5/8	1-25/32	1-3/16	6-3/8	3-53/64
218	3-7/16 3-1/2	1-3/8	3/4	2-11/64	1-5/8	7-3/8	4-23/64

* +.000-.002″

MODIFICATIONS PAGE 96 | RELATED PRODUCTS PAGE 97

TIMKEN

Where You Turn

Timken® Survivor® Series

Corrosion Resistant Housed Units

THE SUPERIOR SOLUTION FOR CORROSIVE APPLICATIONS

SURVIVOR UNIT SELECTION GUIDE FEATURING TIMKEN FAFNIR® BALL BEARINGS

Survivor Unit Nomenclature

Example: YCJT 1 3/16 PT

Y — ***Insert Type:***
- Y = setscrew lock
- R = self-locking collar
- K = light-duty, setscrew lock

1 3/16 — ***Shaft Size:***
- 1 3/16 = 1 3/16"
- 25 = 25mm

CJT — ***Housing Style:***
- AK = low base pillow block
- AS = high base pillow block
- CJ = four-bolt flange
- CJT = two-bolt flange
- TB = tapped base pillow block
- FB = flanged bracket
- TU = take-up unit

PT — ***Series Type:***
- PT = polymer housing, TDC coated insert
- NT = nickel-plated housing, TDC coated insert
- PS = polymer housing, stainless steel insert

	FREQUENT WASHDOWNS	LOW SPEED OR LIGHT LOADS	FULL RANGE SPEED/LOAD	SINGLE-DIRECTION ROTATION	REVERSING-DIRECTION ROTATION	LARGE SIZES AVAILABLE
Y-PT SURVIVOR PT with setscrew lock pages 4-6	●		●		●	
R-PT SURVIVOR PT with self-locking collar pages 4-5	●		●	●		
K-PS SURVIVOR PS with light-duty stainless steel, setscrew lock bearings page 10	●	●			●	
R-NT SURVIVOR NT with self-locking collar pages 7-9	●		●	●		●

COMMON APPLICATIONS FOR SURVIVOR BEARINGS

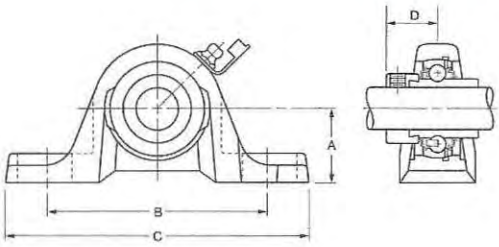
Food Applications

- Packaging and Processing
- Beverage Bottling
- Dairies
- Beef, Pork, Poultry and Fish Processing
- Fruit and Vegetable Processing
- Bakeries

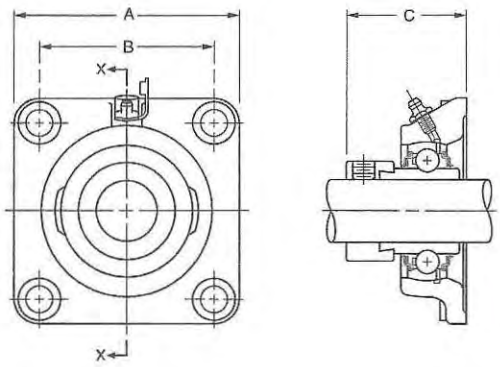
Other Applications

- Chemical & Rubber Processing
- Pharmaceutical Industries
- Paper Mills
- Car Washes
- Material Handling
- Maritime Applications
- Highway Salt & Sand Trucks
- Wastewater Treatment Facilities

TIMKEN SURVIVOR NT HOUSED UNITS



Timken Fafnir P/N		Insert Bearing P/N		RAK A	RAS A	B	C	D	LOAD RATINGS Static lbs.	LOAD RATINGS Dynamic lbs.	Limiting Speed (RPM)
RAK 1/2	NT	G1008KRRB	TDCF	1.06	1.19	3.62	4.87	0.92	1,060	2,400	13,800
RAK 5/8	NT	G1010KRRB	TDCF	1.06	1.19	3.62	4.87	0.92	1,060	2,400	11,000
RAK 3/4	NT	G1012KRRB	TDCF	1.25	1.31	3.78	5.00	1.05	1,460	3,250	9,200
RAK 1	NT	G1100KRRB	TDCF	1.31	1.44	4.12	5.50	1.06	1,730	3,550	6,900
RAK 1 3/16	NT	G1103KRRB	TDCF	1.56	1.69	4.62	6.19	1.18	2,500	4,900	5,800
RAK 1 1/4S	NT	G1103KRRB3	TDCF	1.56	1.69	4.62	6.19	1.18	2,500	4,900	5,500
RAK 1 1/4	NT	G1104KRRB	TDCF	1.81	1.87	5.12	6.56	1.28	3,400	6,400	5,500
RAK 1 7/16	NT	G1107KRRB	TDCF	1.81	1.87	5.12	6.56	1.28	3,400	6,400	4,800
RAK 1 1/2	NT	G1108KRRB	TDCF	1.94	1.94	5.37	7.06	1.37	4,400	8,150	4,600
RAK 1 11/16	NT	G1111KRRB	TDCF	2.06	2.12	5.87	7.53	1.37	4,500	8,150	4,100
RAK 1 3/4	NT	G1112KRRB	TDCF	2.06	2.12	5.87	7.53	1.37	4,500	8,150	3,900
RAK 1 15/16	NT	G1115KRRB	TDCF	2.19	2.25	6.22	7.87	1.50	5,100	8,800	3,600
RAK 2	NT	G1200KRRB	TDCF	2.44	2.50	6.94	8.75	1.72	6,400	10,800	3,400
RAK 2 3/16	NT	G1203KRRB	TDCF	2.44	2.50	6.94	8.75	1.72	6,400	10,800	3,100
RAK 2 7/16	NT	G1207KRRB	TDCF	2.69	—	7.41	9.44	1.84	8,000	13,200	2,800
RAK 2 11/16	NT	G1211KRRB	TDCF	3.00	—	8.00	10.50	1.78	9,650	15,600	2,600
RAK 2 15/16	NT	G1215KRRB	TDCF	3.31	—	9.50	12.00	2.16	9,800	15,600	2,300



Timken Fafnir P/N		A	B	C	LOAD RATINGS Static lbs.	LOAD RATINGS Dynamic lbs.	Limiting Speed (RPM)
RCJ 1/2	NT	3.00	2.12	1.58	1,060	2,400	13,800
RCJ 5/8	NT	3.00	2.12	1.58	1,060	2,400	11,000
RCJ 3/4	NT	3.37	2.50	1.80	1,460	3,250	9,200
RCJ 1	NT	3.75	2.76	1.81	1,730	3,550	6,900
RCJ 1 3/16	NT	4.25	3.25	1.97	2,500	4,900	5,800
RCJ 1 1/4S	NT	4.25	3.25	1.97	2,500	4,900	5,500
RCJ 1 1/4	NT	4.62	3.62	2.09	3,400	6,400	5,500
RCJ 1 7/16	NT	4.62	3.62	2.09	3,400	6,400	4,800
RCJ 1 1/2	NT	5.12	4.00	2.31	4,400	8,150	4,600
RCJ 1 11/16	NT	5.37	4.12	2.31	4,500	8,150	4,100
RCJ 1 3/4	NT	5.37	4.12	2.31	4,500	8,150	3,900
RCJ 1 15/16	NT	5.62	4.37	2.59	5,100	8,800	3,600
RCJ 2	NT	6.37	5.12	2.94	6,400	10,800	3,400
RCJ 2 3/16	NT	6.37	5.12	2.94	6,400	10,800	3,100
RCJ 2 7/16	NT	6.87	5.62	3.19	8,000	13,200	2,800
RCJ 2 11/16	NT	7.37	5.87	3.50	9,650	15,600	2,600
RCJ 2 15/16	NT	7.75	6.00	3.78	9,800	15,600	2,300

Note: All dimensions shown are in inches.

ECS House Tail-Bearing Life Calculations

	Insert	RPM	Load Rating (lbs)	Radial Load lbs	Life (hours)	TDC Factor	HP
RCJ NT 1 1/4	G1103KRRB3	84	4900	80	45,592,817	136,778,452	2hp
RCJ NT 1 1/2	G1108KRRB	80	8150	165	25,106,631	75,319,893	5hp
RCJ NT 1 15/16	G1115KRRB	78	8800	250	9,319,462	27,958,385	7.5hp
		78	8800	350	3,396,305	10,188,916	10hp
RCJ NT 2 7/16	G1207KRRB	79	13200	550	2,916,514	8,749,542	15hp
		79	13200	700	1,414,679	4,244,038	20hp
		79	13200	850	790,124	2,370,373	25hp

Survivor Series

Overview | Details | Related Products & Services | Where to Buy

Survivor Series housed units excel in highly corrosive environments.

Survivor PT Series

With a polymer housing that is more durable than nylon or coatings, the Survivor PT Series provides lasting protection with high-load capacity. Integral anti-corrosion properties cannot scrape or flake off during use. The polymer resists a broad range of acids and alkalis, as well as steam and continuous temperature up to 120 degrees Celsius (250 degrees Fahrenheit) (brief exposure up to 160 degrees Celsius (320 degrees Fahrenheit)).

Survivor NT Series

These units feature an electroless, nickel-plated housing and a corrosion-resistant bearing insert with a choice of locking systems.

PS Series

The PS Series offers polymer housing and a 300-series stainless-steel insert to provide the highest possible corrosion resistance.

Design Attributes

- Proprietary thin-dense chrome (TDC) coating is applied to all NT/PT bearing inserts for superior corrosion protection. Coating is designed not to crack or peel under known application conditions.
- All Survivor units are FDA/USDA-compliant for incidental contacts.
- Bearings are installed in housings that use engineered torque fits.
- Channels grease to flush through the bearing rather than between the bearing OD and housing.
- Stainless balls, set screws and collars are included (where applicable).

Applications

- Food and beverage
- Waste water
- Car washes
- Highway salt and sand
- Chemical and rubber
- Pharmaceutical
- Maritime
- Paper mills
- Material handling

back to top

Aerospace Bearings
Automotive Specialty Kits
Ball Bearings
Housed Units
Integrated Bearing Assemblies
Roller Bearings
Spherical Plain Bearings
High Performance Bearings
Precision Bearing Assemblies

Survivor Series

Housing types available: pillow blocks, flange units, take-up units

Centerline heights available: high base, low base, tapped base

Product variations:

Example: YCJT 1 3/16 PT

Y	**Insert Type:**	1 3/16	**Shaft Size:**
	Y = setscrew lock		1 3/16 = 1 3/16"
	R = self-locking collar		25 = 25mm
	K = light-duty, setscrew lock	PT	**Series Type:**
CJT	**Housing Style:**		PT = polymer housing, TDC coated insert
	AK = low base pillow block		NT = nickel-plated housing, TDC coated insert
	AS = high base pillow block		PS = polymer housing, stainless steel insert
	CJ = four-bolt flange		
	CJT = two-bolt flange		
	TB = tapped base		
	FB = flanged bracket		
	TU = take-up unit		

	FREQUENT WASHDOWNS	LOW SPEED OR LIGHT LOADS	FULL RANGE SPEED/LOAD
Y-PT SURVIVOR PT with setscrew lock	X		X
R-PT SURVIVOR PT with self-locking collar	X		X
K-PS SURVIVOR PS with light-duty stainless steel, setscrew lock bearings	X	X	
R-NT SURVIVOR NT with self-locking collar	X		X

	SINGLE-DIRECTION ROTATION	REVERSING-DIRECTION ROTATION	LARGE SIZES AVAILABLE
Y-PT SURVIVOR PT with setscrew lock		X	
R-PT SURVIVOR PT with self-locking collar	X		
K-PS SURVIVOR PS with light-duty stainless steel, setscrew lock bearings		X	
R-NT SURVIVOR NT with self-locking collar	X		X

HOUSING - ELECTROLESS NICKEL-PLATED

TDC INSERTS	2-bolt flange	4-bolt flange	High Base Pillow Block	Low Base Pillow Block
Eccentric Locking Collar	RCJT NT	RCJ NT	RAS NT	RAK NT
Setscrew	YCJT NT SGT	YCJT NT SGT	YAS NT SGT	YAS NT SGT
***STAINLESS INSERTS**	Not Applicable	Not Applicable	Not Applicable	Not Applicable

HOUSING - ENGINEERED POLYMER

TDC INSERTS	2-bolt flange	4-bolt flange	High Base Pillow Block	Low Base Pillow Block
Eccentric Locking Collar	RCJT PT	RCJ PT	RAS PT	RAK PT
Setscrew	YCJT PT SGT	YCJT PT SGT	YAS PT SGT	YAS PT SGT
***STAINLESS INSERTS**	KCJT PS	KCJ PS	KAS PS	KAK PS

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LubeSite® Lubricator

Facts you need to know about lubrication

Manual lubrication is subject to many variables. You must set up a fixed schedule and stick to that schedule. It is easy to forget about the schedule when you are busy. When you manually lubricate your equipment you run the additional risk of applying too much or not enough lubrication. Both cases are bad. Too much lubrication will cause over heating of the bearings. Too little lubrication and you will run the bearings dry.

With the high cost of lube oil and high costs of repairs and labour, analysis have shown that it is possible to reduce the overall cost of operating your equipment by using automatic lubricators.

A steady oil flow only when the bearing Drive is running avoids dry running and over lubricating.

LubeSite® automatic lubricator is characterised by:

- NO over- or under lubrication of the bearing resulting in longer bearing life
- Cost savings both in labour and materials through longer lubricating Intervals
- Possibility to refill again with all lube oils (consistency 0...4 NLGI)
- Easy to maintain and environmentally-friendly construction
- Extensive program for almost all applications

LubeSite® lubricators can be used for all units with antifriction- or floating bearings.

The consistent lubrication of the bearing can be achieved by the spring pressure and the bevelled lengthwise slotted plunger.

Decreasing of the spring pressure on the aperture results in an increase at the plunger.

Because of the low pressure under 0,7 bar, the lubricator only flows, when the bearing moves.

LubeSite® lubricators will help you lower your maintenance costs by replacing your manual lubrication by lubricators that can be refilled.

The refill interval depends on the application and bearing condition of each unit:

small (Type 202, 302, 502) 3:1;

medium (Type 205, 305, 505) 6:1;

large (Type 260, 360, 560) 12:1.

BEHAbelt
Made in Germany

LubeSite® automatic refill lubricators

Light construction

LubeSite®-series 200

LubeSite® **202**, **205** and **260** within the clear-sight cages are the standard lubricators for most bearing applications.

They only supply lube oil, when the bearing is moving and therefore protect the bearing from over and under lubrication.

Units are assembled with medium springs. Three additional light and heavy springs each are included in a box of ten. Model 260 is assembled within a single package with additional springs (light, heavy)

Area of operations...: -25...+120° C

Heavy construction

LubeSite®-series 300

LubeSite® **302**, **305** and **360** are designed for bearing housings which operate under static conditions, vibration and centrifugal forces. The strong metal castings compensate for the heavy loads.

The main application areas are eccentric presses, compactors, stone mills, construction machines, pumps, etc. Units are assembled with medium springs. Three additional light and heavy springs each are included in a box of ten.

Model 360 is assembled within a single package with additional springs (light, heavy)

Area of operations...: -25...+120° C

For chemically aggressive media

LubeSite®-series 500

LubeSite® **502**, **505** and **560** is resistant to aggressive chemical agents.

The light metal cases are special nickel-chrome double plated. The seals are plated with chemical resistant VITON.

The 500 series is a proven product for many years in the chemical, food and nuclear industry. Units are assembled with medium springs. Three additional light and heavy springs each are included in a box of ten.

Model 560 is assembled within a single package with additional springs (light, heavy)

Area of operations...: -25...+120° C

High temperature accomplishment

LubeSite® 704

LubeSite® **704** is the only automatic lubricator on the market, that can be used in ambient and high temperature applications.

The case is made of light metal, the body is made of borosilicate glass, the pressure spring is made of high quality steel and the sealing is made of temperature consistent VITON.

LubeSite® 704 is used with best results within roller mills, plants, dehumidfiers, etc.

Model 704 is assembled within a single package with one additional heavy spring.

Area of operations...: -25...**+230° C**

Order more information about LubeSite®!

Technical data LubeSite® springs




	low	medium	strong	extra strong
Type	**Spring resilience N tensioned/unstressed**			
202 205 206	26/13 N 30/15 N 84/42 N	40/20 N 44/22 N 130/65 N	54/27 N 72/36 N 140/70 N	98/49 N 90/45 N 156/78 N
302 305 360	26/13 N 30/15 N 84/42 N	40/20 N 44/22 N 130/65 N	54/27 N 72/36 N 140/70 N	98/49 N 90/45 N 156/78 N
302 305 360	26/13 N 30/15 N 84/42 N	40/20 N 44/22 N 130/65 N	54/27 N 72/36 N 140/70 N	98/49 N 90/45 N 156/78 N
704	–	80/40 N	158/79 N	–

mpa Engineering Pty Ltd
Specialists in Machine and Plant Automation
Queensland Electrical Contractor's Licence Number 10423

Unit 3, 22-24 Strathwyn Street
Brendale Qld 4500
Tel 07 3881 0722
Fax 07 3881 0723

3706

CERTIFICATE OF: (Mark relevant check-box)

☑ **TESTING AND COMPLIANCE** (Electrical Installations)
Issued in accordance with section 159 of the *Electrical Safety Regulation 2002*

☑ **TESTING AND SAFETY** (Electrical Equipment)
Issued in accordance with section 15 of the *Electrical Safety Regulation 2002*

Worked Performed for: Name Thomas & Coffey

Address East Rd Laidley

Details of work carried out:

Visual Inspection:

Cables		Switchboard		Electrical Equipment	
Current rating	☑	Location / Access	☑	Isolating / switching devices	☑
Installation	☑	Protective devices	☑	Connections	☑
Terminations	☑	Isolating devices	☑	Compliance with Codes	☑
Identification	☑	Labelling	☑	Interlocks / Guards	☑
Colours	☑	Connections	☑	Emergency Stop Check	☑

Earthing lead & electrode / Bonding conductors / MEN Connection / Identification ☑

Electrical Testing:

		Result
Main earthing conductor resistance	☑	0.15 (Max 0.5 ohm)
Equipotential bonding conductor resistance	☑	0.2 (Max 0.5 ohm)
Insulation resistance	☑	200MΩ (Min 1.0 megohm)
Verification of polarity	☑	
Circuit connections	☑	
Earth fault loop impedance	☑	
RCD's trip tested by test button	☑	

Comments: meets and exceeds requirements of AS/NZS 3000

For **electrical installations**, this certifies that the electrical installation, to the extent it is affected by the electrical work carried out, has been tested to ensure that it is electrically safe and is in accordance with the requirements of the wiring rules and any other standard applying under the *Electrical Safety Regulation 2002* to the electrical installation.

For **electrical equipment**, this certifies that the electrical equipment, to the extent it is affected by the electrical work carried out, is electrically safe.

Date of Test: 26/6/13 Tested by: Troy Conway

Licence No: 127 277 Signature:

MPA Job No. 2 0 1 4 2

Effective Date:15/10/10
Issue: 1

WORK INSTRUCTION
INSTALLATION TEST SHEET

QWI 07.31
Pages: 1

TEST	CIRCUIT		CIRCUIT		CIRCUIT		CIRCUIT	
	MF Building		Aerator 1		Aerator 2		[redacted] MF Building Lts	
	Value	Pass	Value	Pass	Value	Pass	Value	Pass
Circuit breaker	100 A	✓	20 A	✓	20 A	✓	20 A	✓
Protection Size								
1 Ø or 3 Ø	3Ø	✓	3Ø	✓	3Ø	✓	1Ø	✓
Visual Inspection complete		✓		✓		✓		✓
Main earth resistance < 0.5 Ohms	0.1	✓	0.2	✓	0.2	✓	0.23	✓
Bonding conductors < 0.5 ohms	0.15	✓	N/A	✓	N/A	✓	N/A	✓
Correct polarity and connections		✓		✓		✓		✓
Insulation Resistance Ø(L1) to Ø(L2 or N) >1mΩ	200mΩ	✓	200 mΩ	✓	200 mΩ	✓	200mΩ	✓
Insulation Resistance Ø(L2) to Ø(L3) >1mΩ	200 mΩ	✓	200 mΩ	✓	200 mΩ	✓		
Insulation Resistance Ø(L3) to Ø(L1) >1mΩ	200 mΩ	✓	200 mΩ	✓	200 mΩ	✓		
Insulation Resistance Ø(L1) to earth >1mΩ	200 mΩ	✓	200 mΩ	✓	200 mΩ	✓	200 mΩ	✓
Insulation Resistance Ø(L2) to earth >1mΩ	200 mΩ	✓	200 mΩ	✓	200 mΩ	✓		
Insulation Resistance Ø(L3) to earth >1mΩ	200 mΩ	✓	200 mΩ	✓	200 mΩ	✓		
Insulation Resistance neutral to earth >1mΩ	200 mΩ	✓	200 mΩ	✓	200 mΩ	✓	200 mΩ	✓
Fault loop impedance correct for circuit		✓		✓		✓		✓
Thermal overload set (motors)				✓		✓		
Motor runs in correct direction (motors)				✓		✓		
Operates correctly (motors)				✓		✓		
Connection (Y/Δ) – as per nameplate (motors)				✓		✓		

I certify that the electrical installation, to the extent that it is effected by the electrical work, has been tested to ensure it is electrically safe and is in accordance with the requirements of the wiring rules and any other standard applying to the electrical installation under state legislation.

Tested By	License No.	Signature	Date
T. Conway	127 277		26/6/13

Effective Date:15/10/10
Issue: 1

WORK INSTRUCTION
INSTALLATION TEST SHEET

QWI 07.31
Pages: 1

TEST	CIRCUIT		CIRCUIT		CIRCUIT		CIRCUIT	
	Existing DB							
	Value	Pass	Value	Pass	Value	Pass	Value	Pass
Circuit breaker	C	✓						
Protection Size	63A	✓						
1 Ø or 3 Ø	3Ø	✓						
Visual Inspection complete								
Main earth resistance < 0.5 Ohms	0.15	✓						
Bonding conductors < 0.5 ohms	0.15	✓						
Correct polarity and connections		✓						
Insulation Resistance Ø(L1) to Ø(L2 or N) >1mΩ	200MΩ	✓						
Insulation Resistance Ø(L2) to Ø(L3) >1mΩ	200MΩ	✓						
Insulation Resistance Ø(L3) to Ø(L1) >1mΩ	200MΩ	✓						
Insulation Resistance Ø(L1) to earth >1mΩ	200MΩ	✓						
Insulation Resistance Ø(L2) to earth >1mΩ	200MΩ	✓						
Insulation Resistance Ø(L3) to earth >1mΩ	200MΩ	✓						
Insulation Resistance neutral to earth >1mΩ	200MΩ	✓						
Fault loop impedance correct for circuit		✓						
Thermal overload set (motors)								
Motor runs in correct direction (motors)								
Operates correctly (motors)								
Connection (Y/Δ) – as per nameplate (motors)								

I certify that the electrical installation, to the extent that it is effected by the electrical work, has been tested to ensure it is electrically safe and is in accordance with the requirements of the wiring rules and any other standard applying to the electrical installation under state legislation.

Tested By	License No.	Signature	Date
T. Conway			26/6/13