



**PRODUCT SERVICE MANUAL**  
**FOR**  
**AM322ICX-325AE, 350AN and 400A PUMPS**

<b>WARNING</b>
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<p><b>This Special Instruction Manual and General Instructions Manual, SRM00046, should be read thoroughly prior to pump installation, operation or maintenance.</b></p>
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<b>Manual No. SRM00108</b>
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<b>Rev. 01</b>
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## READ THIS ENTIRE PAGE BEFORE PROCEEDING

FOR SAFETY OF PERSONNEL AND TO PREVENT DAMAGE TO EQUIPMENT, THE FOLLOWING NOMENCLATURE HAS BEEN USED IN THIS MANUAL:

	<b>DANGER</b>	
Failure to observe precautions noted in this box can result in severe bodily injury or loss of life.		

	<b>WARNING</b>	
Failure to observe precautions noted in this box can cause injury to personnel by accidental contact with equipment or liquids. Protection should be provided by user to prevent accidental contact.		

<b>CAUTION</b>	<b>ATTENTION</b>	
Failure to observe precautions noted in this box can cause damage or failure of equipment.		

Non compliance of safety instructions identified by the following symbol could affect safety of persons:  <div style="text-align: center;"></div>	Safety instructions where electrical safety is involved are identified by:  <div style="text-align: center;"></div>	Safety instructions which shall be considered for reasons of safe operation of pump and/or protection of pump itself are marked by below sign:  <div style="text-align: center;"><b>ATTENTION</b></div>
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### CONTENTS

Safety and Table of Contents.....	1
General Instructions .....	2
Introduction and Description of Equipment .....	2
Pump Model Identification .....	3
Ordering instructions .....	3
Operation .....	3
Parts List .....	4
Pump Disassembly .....	5
Pump Assembly .....	7
Installation Alignment & Troubleshooting .....	9
Pump Assembly Drawing.....	10

<b>ATTENTION</b>
<b><i>If operation of pump is critical to your business, we strongly recommend you keep a spare pump or major repair kit in stock at all times. As a minimum, a minor repair kit (o-rings and bearings) should be kept in stock so pump refurbishment after internal inspection can be accomplished.</i></b>

## A. GENERAL INSTRUCTIONS

Instructions found herein cover disassembly, assembly and parts identification of AM322ICX pumps.

**NOTE:** Individual contracts may have specific provisions that vary from this manual. Should any questions arise which may not be answered by these instructions, refer to the General Instructions Manual, SRM00046, provided with your order. For further detailed information and technical assistance please refer to Imo Pump, Technical/Customer Service Department, at (704) 289-6511.

This manual cannot possibly cover every situation connected with installation, operation, inspection, and maintenance of equipment supplied. Every effort was made to prepare text of manual so engineering and design data is transformed into most easily understood wording. Imo Pump must assume personnel assigned to operate and maintain supplied equipment and apply this instruction manual have sufficient technical knowledge and are experienced to apply sound safety and operational practices which may not be otherwise covered by this manual.

In applications where equipment furnished by Imo Pump is to become part of processing machinery, these instructions should be thoroughly reviewed to ensure proper fit of said equipment into overall plant operational procedures.



### WARNING

If installation, operation and maintenance instructions are not correctly and strictly followed and observed, injury to personnel or serious damage to pump could result. Imo Pump cannot accept responsibility for unsatisfactory performance or damage resulting from failure to comply with instructions.

## B. INTRODUCTION

This instruction manual covers AM322ICX pumps. These pumps have been designed for use in turbine lubricating applications. The model, and design construction of each pump can be identified by the designator code on pump nameplate. Definitions of model designators are identified in Figure 1.

## C. DESCRIPTION OF EQUIPMENT

The AM322ICX pumps are positive displacement, rotary screw pumps consisting of a precision bored housing/case that encloses a driven screw (power rotor) and four intermeshing following screws (idler rotors). These screws when rotating form a succession of closures or cavities. As they rotate, fluid is moved axially from inlet port at center of pump to outlet port in a continuous, uniform flow with minimum fluid pulsation and pump noise. The /AM322ICX also has a lip seal that prevents pumped fluid from spilling out the front end.

## D. PUMP MODEL IDENTIFICATION

This instruction manual covers the Imo AM322ICX pumps. Model of each pump is identified on pump nameplate. Refer to Figure 1 for instructional keys when using this manual.

# Model Nomenclature

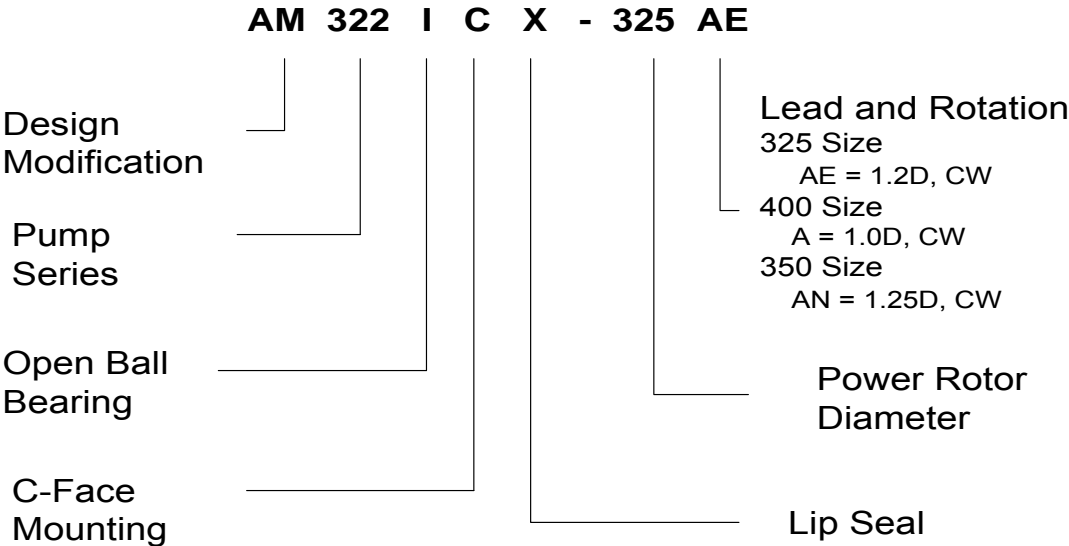


Figure 1

## E. ORDERING INSTRUCTIONS

When corresponding with Imo Pump regarding AM322ICX pumps, refer to pump nameplate, this instruction manual, and assembly drawing as instructed below:

1. From pump nameplate, record pump model number, serial number & manufactured date.
2. Record instruction manual number, revision and date.
3. From assembly drawing or parts list provide the IDP number(s) and names for replacement part(s).
4. Give above information to your Imo service representative.

Imo sales and service representatives are listed in General Instruction Manual, CA-1.

## F. OPERATION

### F.1 LIQUID LIMITATIONS

Never operate with thin liquids such as solvents or water. Pump is designed for liquids having general characteristics of oil.

## F.2 OPERATING LIMITS

CAUTION	ATTENTION
<p>Operating conditions, such as speed, fluid viscosity, temperature inlet pressure, discharge pressure, filtration, duty cycle, drive type, mounting, etc., are interrelated. Due to these variable conditions, specific application limits may be different from that of operational limitations. Equipment must not be operated without verifying system's operating requirements are within pump's capabilities.</p>	

**Under no circumstances are the following operating limits (specified in Table 1) to be exceeded without specific approval from Imo Pump.**

**Table 1 – Normal Pump Operating and Structural Limits**

MAXIMUM SPEED .....	3000 RPM
VISCOSITY .....	50 – 3000 SSU
MINIMUM – MAXIMUM LIQUID TEMPERATURE .....	0 to 250 F (-18 to 107°C)
MAXIMUM INLET PRESSURE .....	5 psig
MAXIMUM DISCHARGE PRESSURE .....	200 psig, Cont. Duty
FILTRATION .....	(See General Instruction Manual, SRM00046)
DRIVE .....	Direct only
MOUNTING .....	Mounted in any attitude

## G. PARTS LIST

**Table 2 – Pump Parts List**

IDP	QTY	DESCRIPTION	KIT	IDP	QTY	DESCRIPTION	KIT
1	1	Pump Case		19	1	Outboard Cover	
2	1	Inboard Cover		20	1	Thrust Plate	
3	12	Inboard Cover Capscrews		21	1	Name Plate	
4	2	O-Rings	X	22	1	Name Plate	
5	1	Balance Piston Bushing		23	1	Name Plate	
6	1	Ball Bearing	X	24	1	Name Plate	
7	2	Retaining Rings	X	25	8	Drive Screw	
8	1	Key		26	1	Shoulder Screw	
11	1	Bearing Retainer		27	2	Pipe Plugs	
12	12	Thrust and Brg Retainer Capscrews		28	1	Pin Spring	
13	2	Shoulder I-Bolts		29	1	Pipe Plug	
14	4	Hex Bolts		30	2	Lip Seal	X
15	12	Outboard Cover Hex bolts		31	1	Tubing / MNPT Fitting	
16	1	Power Rotor		32	1	Seal Cover O-ring	X
17	2	Inboard Idlers (Set in 350 Pump Size)		33	1	Tubing	
18	2	Outboard Idlers (325 and 400 Pump Size Only)					
X = Minor Repair Kit Items.							

## H. DISASSEMBLY AND ASSEMBLY INSTRUCTIONS



### WARNING

Failure to observe precautions while installing, inspecting and maintaining pump can cause injury to personnel from accidental handling of liquids that may harm skin or clothing, or fire hazard risks from flammable liquids, or injury from high pressure fluid jets.



### DANGER

**BEFORE** working on equipment, make sure all power to equipment is disconnected and locked-out.

### GENERAL COMMENTS

**NOTE:** Part number identifiers (IDPs) contained within parenthesis such as (10) refer to the circled numbers shown on the assembly drawing. See Assembly and Table 2.

### Tools Required

Procedures described in manual require common mechanics hand tools, a torque wrench, dial indicator and suitable lifting device (such as) slings. They also require fabrication of a strong-back as illustrated in figure 2 for bearing removal and a bearing installation tool as illustrated in figure 3.

### PUMP DISASSEMBLY



### DANGER

Fluid Leakage from disassembly of pump may make floor slippery and can cause personal injury.

**Note:** Series AM322IC pumps incorporate highly finished precision parts that must be handled carefully to avoid damage to critical machined surfaces.

If complete overhaul of pump is required, removal of pump from its mounting and locating pump in a suitable work area is recommended. It is also recommended that all O-rings and lip seals be replaced during overhaul, regardless of their condition.

1. Close suction and discharge piping to pump and disconnect piping. Remove drain plug (29), and drain unit. Remove pump from gear box or mounting bracket.
2. Remove tubing (33) and coupling half and key (8).
3. Remove hex head fasteners (15) and outboard cover (19) with o-ring (4) from case (1).
4. Remove Nylok fasteners (12) thrust plate (20) and o-ring (4) from cover (19).

5. Remove outboard idlers (17 or 18 on 325 and 400 sizes) by unscrewing them from their bores.

**CAUTION**

**ATTENTION**

**Do not permit idlers (17, 18) to drop as they emerge from housing (1). Be careful not to catch fingers between idler and power rotor threads.**

6. Support inboard cover (2) with a sling and overhead crane or hoist. Slowly remove inboard cover assembly from pump case (1) after removing capscrews (12). Inboard cover assembly includes inboard cover (2), power rotor (16), ball bearing (6), retaining rings (7), bushing (5), retainer (11), nylok fasteners (12), seals (30), shoulder screw (26) and inboard idlers (17).

**CAUTION**

**ATTENTION**

**Be sure to grasp idlers (17) as they emerge from pump case (1) to prevent them from falling. Be careful not to catch fingers between idler and power rotor threads.**

7. Remove o-ring (4) from inboard cover (2).
8. Remove Nylok shoulder bolt (26) and allow sleeve bushing (5) to slide out of its bore and rest against the power rotor inboard thread face.
9. Remove Nylok fasteners (3) and bearing retainer plate (11).
10. Remove outer Truarc ring (7).
11. Remove bearing (6) as follows: (See Figure 2 below for Strongback drawing)

## STRONGBACK FOR BEARING REMOVAL

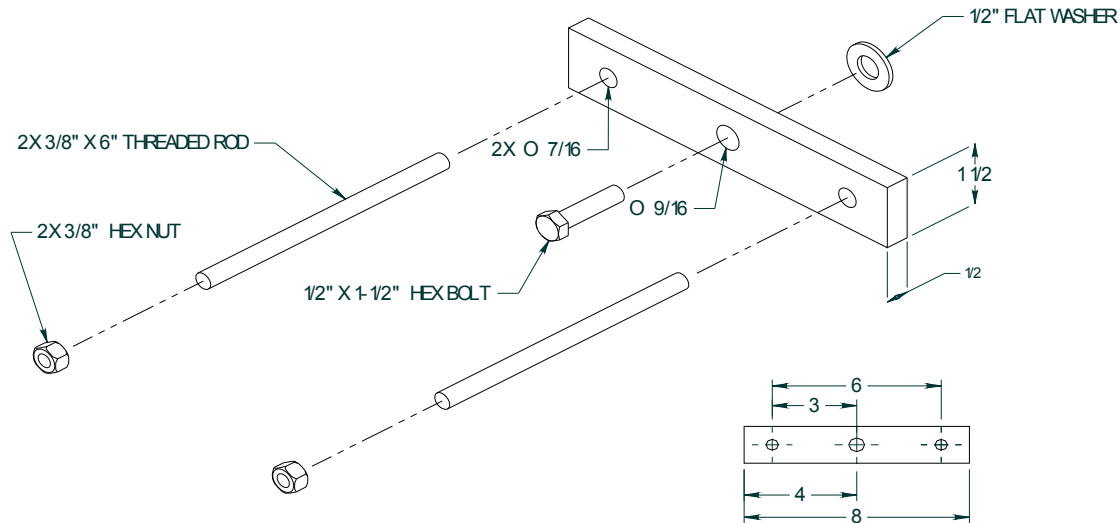


Figure 2

- Install threaded rods 180° apart in two bearing retainer (11) holes in inboard cover (2).
- Place ½" washer on end of power rotor (16) and then place strongback plate shown in figure 2 over threaded rods and against washer.
- Install a ½" bolt through strongback and tighten into threaded hole in end of power rotor (16).
- Install nuts on threaded rods and then thread nuts evenly to begin pressing power rotor (16) through ball bearing (6) until power rotor is completely off bearing (6).
- Once power rotor (16) is off bearing, remove 1/2" bolt and remove power rotor (16) from inboard cover (2).

<b>CAUTION</b>	<b>ATTENTION</b>
<b>Ensure the power rotor (16) does not fall to floor once it is off bearing (6).</b>	

- Remove inner Truarc ring from power rotor.
- Remove sleeve bushing (5) from power rotor shaft.
- Remove ball bearing (6) from inboard cover (2) bore.

### PUMP ASSEMBLY PROCEDURE NOTES

Note: Prior to assembly, all parts should be cleaned and inspected for burrs or nicks. Replace all worn or damaged parts. Imo Pump recommends automatic replacement of O-rings and ball bearing when parts have been removed from previously installed positions. Wipe all parts including threaded bolts with light lubricating oil prior to assembly.



## NYLOK FASTENER TORQUE PROCEDURE

Required torque stated on assembly drawing and supplemental torque table does not include additional torque required to install fasteners containing Nylok inserts (pellet, strip, patch, ring, and collar). Torque required for first application is much higher than it is for subsequent applications. To insure that required preload on a Nylok fastened joint is achieved for each application, following procedure is mandatory assembly practice.

1. Using a suitable torque wrench, install fastener in mating piece until Nylock insert is completely engaged. Note torque required.
2. Add torque measured in Step 1 to value called for on assembly drawing.
3. Complete by tightening fastener to torque value determined in 2 above.
4. This procedure must be repeated each time a Nylok fastener is reused.

### Pump Assembly:

1. Slide bushing (5) into bore of inboard cover (2) aligning slot in bushing with tapped hole in inboard cover. Install shoulder bolt (26) by tightening until shoulder is fully seated against the face of inboard cover (2). Check to assure that bushing (5) is not binding and is free to float.
2. Assemble ball bearing to shaft as below:

<b>CAUTION</b>	<b>ATTENTION</b>
<p>Ball bearing (6) may be assembled to power rotor shaft by one of two methods. When using either method, <b>DO NOT PRESS ON BALL BEARING OUTER RACE.</b> Pressing on outer race for installation could damage ball bearing.</p>	

Method 1: See Figure 3 for Ball Bearing Installation Sleeve Assembly.

- a. On a flat and level surface, stand power rotor on its outboard end face. Carefully lower bushing/cover assembly from step 1. onto shaft (16). Continue to lower cover until bushing face rests against power rotor inboard thread end face.
- b. Install inner Truarc ring (7) to groove in power rotor (16).
- c. Start ball bearing (6) onto power rotor (16) shaft.
- d. Install 1/2" threaded rod into tapped hole in power rotor coupling end face.
- e. Place sleeve on ball bearing inner race.
- f. Place plate on top of sleeve with threaded rod through center hole.
- g. Install flat washer and nut to threaded rod.
- h. Tighten nut and begin pressing ball bearing onto shaft.
- i. Install outer Truarc ring (7) once bearing is seated against inner Truarc ring (7)

## BEARING INSTALLATION SLEEVE

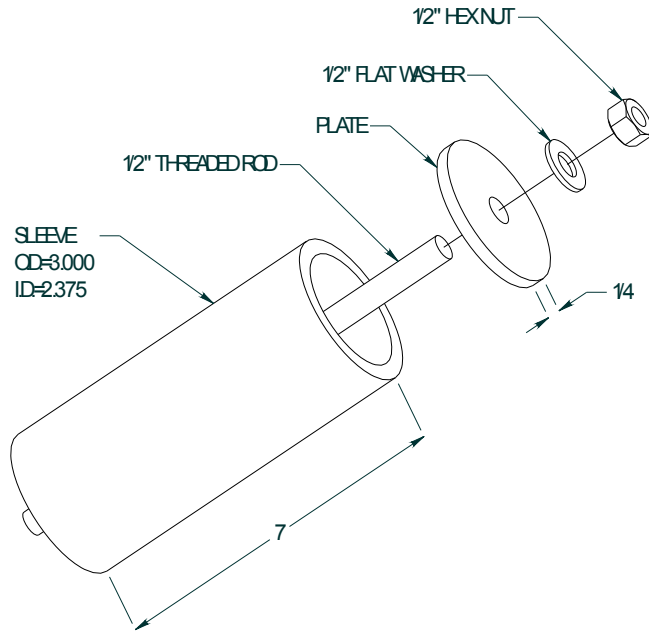


Figure 3

### CAUTION

### ATTENTION

Use caution not to over press ball bearing beyond its desired position. Ball bearing should just touch inner Truarc ring.

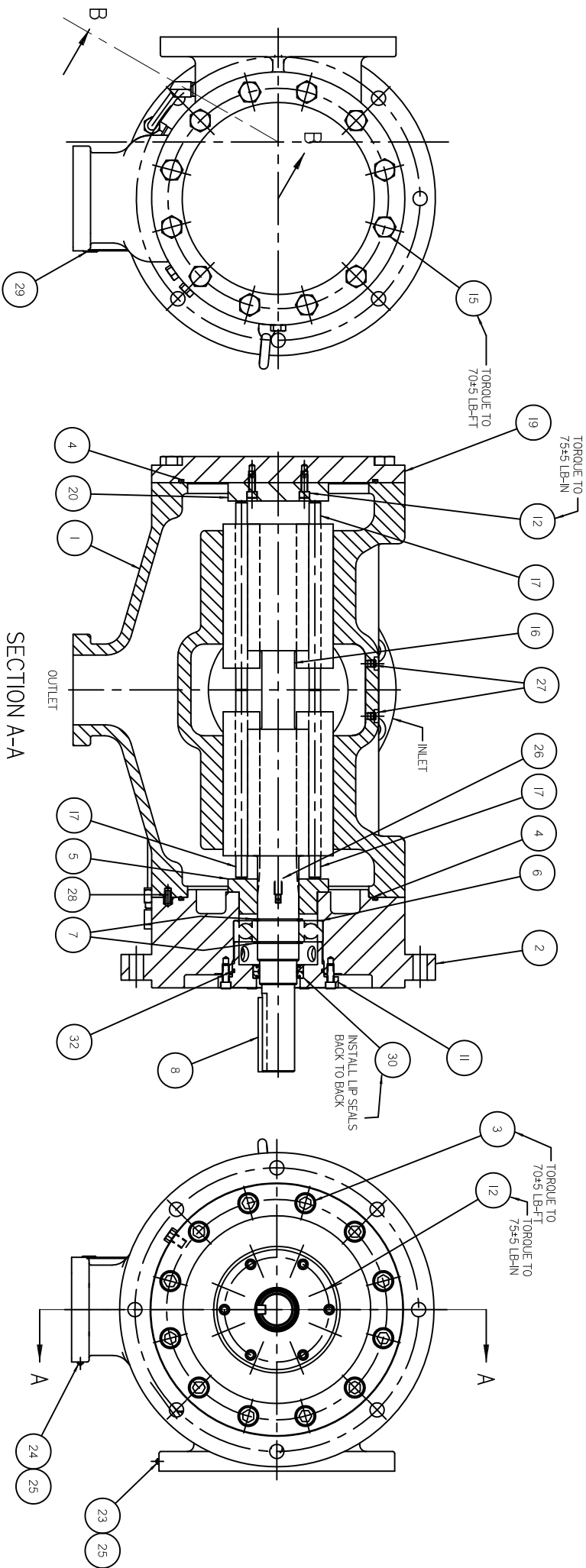
Method 2 – Oven required with temperature verification capability.

- Place ball bearing (6) in oven and set temperature to 200°F (93°C) **Maximum**. Heat ball bearing for 30 minutes.
  - On a flat and level surface, stand power rotor on its outboard end face. Carefully lower bushing/cover assembly from step above onto shaft (16). Continue to lower cover until bushing face rests against power rotor inboard thread end face
  - Install inner Truarc ring (7) to groove in power rotor (16).
  - Using protective gloves, remove ball bearing from oven and install onto power rotor bearing diameter. Ball bearing should easily slide on bearing diameter and position itself next to inner Truarc ring (7).
  - Allow ball bearing to cool, then install outer Truarc ring (7).
3. Install lip seals (30) into seal cover (11).

4. Raise cover assembly (2) off of power rotor end face and position ball bearing (6) into its bore. Install bearing retainer plate (11) with previously installed lip seals (30) using nylok fasteners (12). Torque nylok fasteners as described in nylok torque procedure. The basic torque is 75±5 lb-in.
5. Install O-ring (4) in groove in inboard cover (2).
6. Using sling and hoist, lift assembled power rotor and cover and slide into housing (1) power bore. Once the first threaded section (outboard end) of power rotor is well into bore, mesh inboard idlers (17) onto inboard end of power rotor threaded section. Continue to hold idlers in place until they are able to be supported by their bores.
7. Install inboard cover assembly to case (1) using Nylok fasteners (3). Torque Nylok fasteners (3) as described in the Nylok Fastener Torque procedure. Basic torque for Nylok fastener (3) is shown on assembly drawing.
8. Install outboard idlers (17 or 18 on 325 and 400 sizes) into bores on outboard end of case (1).
9. Install thrust plate (20) to outboard cover (19) using Nylok fasteners (12). Torque Nylok fasteners (12) as described in Nylok Fastener Torque procedure. Basic torque for Nylok fastener (3) is shown on assembly drawing.
10. Install O-ring (4) in groove of outboard end cover (19) and assemble outboard end cover (19) and o-ring (4) to case (1) using hex head fasteners (15). Torque hex head fasteners (15) to values shown on assembly drawing.
11. Install key (8) and coupling half to power rotor (16).

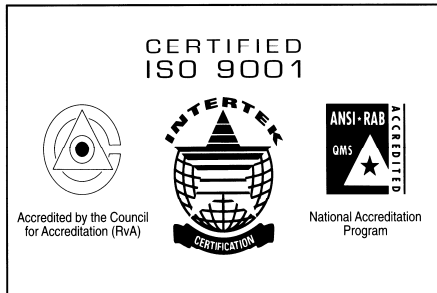
### **Installation, Alignment and Troubleshooting**

For instructions regarding Installation, Alignment and Troubleshooting, See General Instruction Manual, SRM00046.



# AM3221CX-350AN/042 ASSEMBLY

788 LBS [357kg]



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