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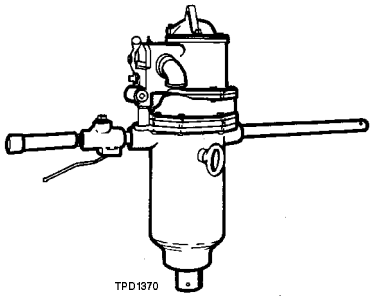
OPERATION AND MAINTENANCE MANUAL
for
MODEL 588A1 IMPACTOOL



⚠ WARNING

IMPORTANT SAFETY INFORMATION ENCLOSED.
READ THIS MANUAL BEFORE OPERATING TOOL.

FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

- Always operate, inspect and maintain this tool in accordance with American National Standards Institute Safety Code for Portable Air Tools (ANSI B186.1).
- For safety, top performance, and maximum durability of parts, operate this tool at 90 psig (6.2 bar/620 kPa) maximum air pressure at the inlet with 1" (25 mm) inside diameter air supply hose.
- Air powered tools can vibrate in use. Vibration, repetitive motions or uncomfortable positions may be harmful to your hands and arms. Stop using any tool if discomfort, tingling feeling or pain occurs. Seek medical advice before resuming use.
- Always turn off the air supply and disconnect the air supply hose before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool.
- Keep hands, loose clothing and long hair away from rotating end of tool.
- Anticipate and be alert for sudden changes in motion during start up and operation of any power tool.
- Tool shaft may continue to rotate briefly after throttle is released.
- Do not lubricate tools with flammable or volatile liquids such as kerosene, diesel or jet fuel.
- Do not remove any labels. Replace any damaged label.
- Use accessories recommended by Ingersoll-Rand.
- This tool can exert strong forces on the operator. Use proper support to control these forces.
- This tool is designed to be operated by two persons.
- This tool is not designed for working in explosive atmospheres.
- This tool is not insulated against electric shock.

NOTICE

The use of other than genuine Ingersoll-Rand replacement parts may result in safety hazards, decreased tool performance and increased maintenance, and may invalidate all warranties.

Ingersoll-Rand is not responsible for customer modification of tools for applications on which Ingersoll-Rand was not consulted.

Repairs should be made only by authorized, trained personnel. Consult your nearest Ingersoll-Rand Authorized Servicenter.

It is the responsibility of the employer to place the information in this manual into the hands of the operator.

Refer All Communications to the Nearest Ingersoll-Rand Office or Distributor.

Printed in U.S.A.

INGERSOLL-RAND®
PROFESSIONAL TOOLS

WARNING LABEL IDENTIFICATION

⚠ WARNING

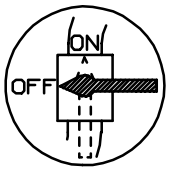
FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

⚠ WARNING

Always wear eye protection when operating or performing maintenance on this tool.

⚠ WARNING

Always wear hearing protection when operating this tool.



⚠ WARNING

Always turn off the air supply and disconnect the air supply hose before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool.

⚠ WARNING

Air powered tools can vibrate in use. Vibration, repetitive motions or uncomfortable positions may be harmful to your hands and arms. Stop using any tool if discomfort, tingling feeling or pain occurs. Seek medical advice before resuming use.

⚠ WARNING

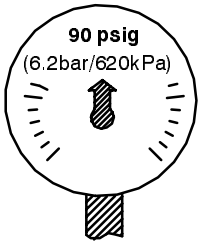
Do not carry the tool by the hose.

⚠ WARNING

Do not use damaged, frayed or deteriorated air hoses and fittings.

⚠ WARNING

Keep body stance balanced and firm. Do not overreach when operating this tool.



⚠ WARNING

Operate at 90 psig (6.2 bar/620 kPa) Maximum air pressure.

PLACING TOOL IN SERVICE

LUBRICATION

Ingersoll-Rand No. 50 **Ingersoll-Rand No. 28**
Ingersoll-Rand No. 100

Always use an air line lubricator with these tools.
We recommend the following Filter–Lubricator–Regulator Unit:

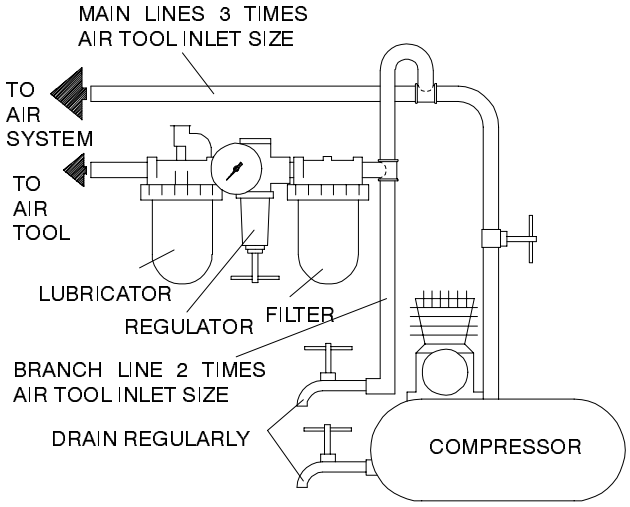
For USA - No. C31-06-G00
For International - No. FRL30-C6-A29

After each eight hours of operation, remove the Oil Chamber Plug (5) and fill the oil chamber with Ingersoll–Rand No. 50 Oil.
After each eight hours of operation, inject about one ounce (30 cc) of Ingersoll–Rand No. 100 Grease into the Grease Fitting (85) located near the front of the Hammer Case (82).
After each eight hours of operation, inject about one ounce (30 cc) of Ingersoll–Rand No. 100 Grease into the Grease Fitting located in the Backhead (22).
After each forty-eight hours of operation, inject about one ounce (30 cc) of Ingersoll–Rand No. 28 Grease into the Grease Fitting located in the Gear Case (50) and about two strokes from the P25–228 Grease Gun into the Grease Fitting located near the reverse Lever (42).
After each forty-eight hours of operation, remove the Hammer Case (82) and check the grease content. If the parts (especially the jaws of both the Hammer and Anvil) are not well coated with Ingersoll–Rand No. 100 Grease, shorten the interval between each greasing. If the Hammer Case is grease loaded, lengthen the interval. Before replacing the Hammer Case, be sure that the jaws on the Hammer and Anvil and all bearing surfaces are coated with grease. Also, insert one teaspoonful (3 cc) of grease into each hole in the side of the Hammer to lubricate the Cam Balls (74). Do not grease the cylindrical surface of the Hammer; this is not a bearing surface. Remove any excess grease, especially any that may have accumulated on the hammer case wall.
When not in use, the tool should be positioned with the front end down so that the grease within the Hammer Case will flow to the front end.

INSTALLATION

Air Supply and Connections

Always use clean dry air at 90 psig maximum air pressure. Dust, corrosive fumes and/or excessive moisture can ruin the motor of an air tool. An air line filter can greatly increase the life of an air tool. The filter removes dust and moisture. Be sure all hoses and fittings are the correct size and are tightly secured. See Dwg. TPD905–1 for a typical piping arrangement.



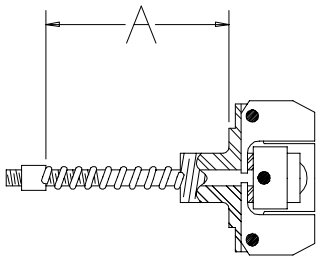
(Dwg. TPD905–1)

OILER ADJUSTMENT

Adjustment is made at the factory and should not be changed unless lubricating difficulties are experienced. If adjustment becomes necessary, remove the Hammer Case Bolts and Backhead Cap Screws holding the Motor Housing onto the Gear Case and remove the Housing. A small Adjusting Hole Plug is located in the Housing's front face. Remove this Plug, as well as a similar Plug on the side of the Housing. The Adjusting Screws are located beneath the Plugs. Turn the oiler Adjusting Screws with a small screwdriver. **Turning the Screws in reduces the oil flow; backing the Screws out increases the oil flow.**
Two Oiler Felts are located under each Screw. After long usage, these Felts may become clogged, preventing the passage of oil. If this happens, remove the Plugs and Screws and replace the Felts.

PLACING TOOL IN SERVICE

GOVERNOR ADJUSTMENT



(Dwg. TPD497)

The drawing illustrates the sensitive weight–type Governor which controls the speed of the Multi–Vane motor. It is adjusted at the factory to produce a socket speed of approximately 355 rpm. It is seldom necessary to change this adjustment. However, if the free speed of the square driver is checked with a tachometer and is not within 5 rpm of the recommended speed of 355 rpm, steps should he taken to correct it. Screwing the adjusting nut farther onto the governor stem increases the speed; backing the nut off decreases the speed. One–half turn of the nut will vary the socket speed about 5 rpm.

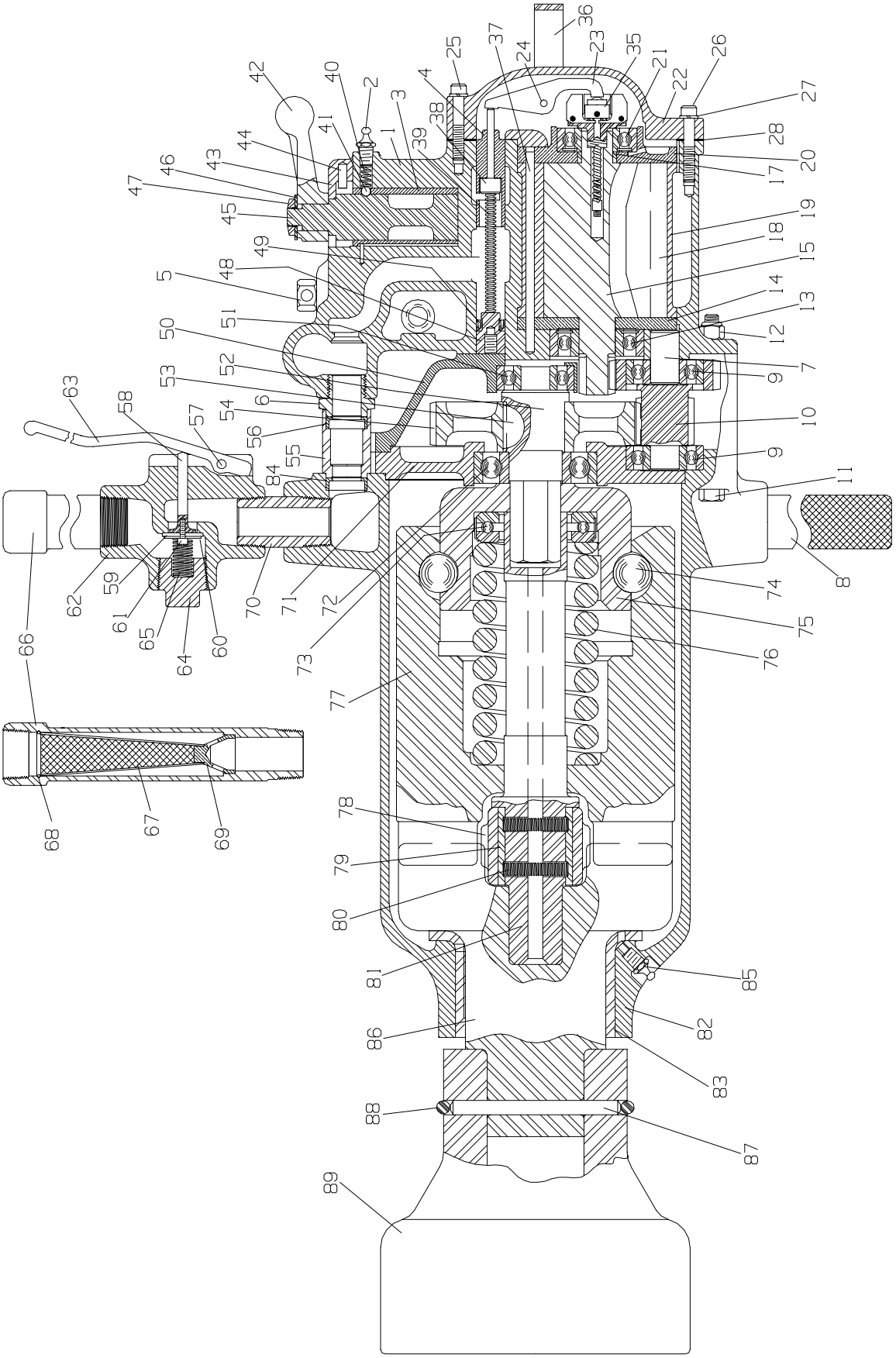
When installing a new Governor, set the Nut so that dimension "A" is 1–3/4" (44 mm). This usually produces an allowable speed.

The Model 588A1 Impactool is designed for large machinery repair, railroad right of way and engine maintenance, power plant maintenance, machinery mounting, pipe line and oil platform maintenance and other fastener applications requiring high torque.

HOW TO ORDER AN IMPACTOOL

LEVER HANDLE with 2-1/2" SQUARE DRIVE

Model	Impacts/min.	Recommended Torque Range ft–lb	Nm
588A1	550	12 000 – 25 000	16 270 – 33 900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(Dwg. TPA297–2)

		PART NUMBER FOR ORDERING
1	Motor Housing	
	for model 588A1-EU	588-EU-40
	for model 588A1	588-40
2	Grease Fitting	23-188
3	Reverse Valve Bushing	JC55-330
4	Governor Valve Bushing	R5H-429
5	Oil Chamber Plug	P25-227
6	Air Pipe Nipple	588-200
7	Intermediate Gear Bearing Stud	R5H-502
*	Oiler Adjusting Screw (2)	JA4-71
*	Adjusting Hole Plug (2)	R2-227
*	Oiler Felt (4)	JA4-75
*	Air Port Gasket (2)	R44H-210A
*	Exhaust Ell	KX-587
8	Dead Handle	588-48
9	Intermediate Gear Bearing	D04-366
10	Intermediate Gear	R5J-82
11	Hammer Case Long Bolt (2) (4-1/2" long)	588-636
12	Elastic Stop Nut (3/8"-24 Thread) (2)	FM-639
*	Hammer Case Short Bolt (6) (2" long)	588-638
*	Elastic Stop Nut (3/8"-24 Thread) (6)	FM-639
*	Housing Bolt (2) (1-3/8" long)	241-82
*	Elastic Stop Nut (3/8"-24 Thread) (2)	FM-639
*	Housing Cap Screw (2) (1" long)	D02-354
*	Housing Cap Screw Lock Washer (2)	D02-321
• 13	Front Rotor Bearing	R5H-24
• 14	Front End Plate	R55H-11
15	Rotor	9BM-K53

		PART NUMBER FOR ORDERING
17	Rotor Bearing Spacer	R5H-65
• 18	Vane Packet (set of 5 Vanes)	R5H-42-5
19	Cylinder	588-3
• 20	Rear End Plate	R55H-12
• 21	Rear Rotor Bearing	R5H-22
22	Backhead	JC55-102
23	Governor Lever	R5H-436
24	Governor Lever Pin	N00-15
*	Grease Fitting	23-188
25	Backhead Long Cap Screw	R4H-104
26	Backhead Short Cap Screw (5)	B8-240
27	Backhead Cap Screw Lock Washer (6)	T11-58
28	Backhead Gasket	JC55-283
35	Governor Assembly	R5H-A424B
36	Vertical Hanger	588-365A
*	Vertical Hanger Spacer (4)	588-140
37	Cylinder Dowel	R5H-98
38	Governor Valve	R5H-425
39	Governor Valve Spring	R4H-431
40	Reverse Valve Stop Ball Spring	503-607
41	Reverse Valve Stop Ball (5/16" diameter steel ball)	G601-65
42	Reverse Lever	JC55-163
43	Reverse Valve Cover	588-489
44	Reverse Valve Stop Pin	JC55-505
*	Reverse Valve Cover Cap Screw (2)	107-117

* Not illustrated.

• To keep downtime to a minimum, it is desirable to have on hand certain repair parts. We recommend that you stock one (pair or set) of each part indicated by a bullet (•) for every four tools in service.

		PART NUMBER FOR ORDERING	
	45	Reverse Valve	JC55–329
	46	Reverse Valve Washer	23–725
	47	Reverse Valve Nut	D02–418A
	48	Governor Valve Stop	JC55–434
	49	Governor Valve Stop Gasket	R2J–210
	50	Gear Case	588–37
	*	Grease Fitting	23–188
•	51	Spindle Rear Bearing	D04–366
	52	Spindle	588–8
	53	Spindle Gear Key	588–410
	54	Spindle Gear	588–9
	55	Air Pipe	588–199
	56	Air Port Gasket	R44H–210A
		Lever Throttle Assembly	588–A160
	57	Throttle Lever Pin	534–434
	58	Throttle Valve	588–161A
	59	Throttle Valve Face	588–159A
	60	Valve Face Cap	588–157
	61	Valve Face Retaining Screw	4U–359
	62	Throttle Body	588–160
	63	Throttle Lever	588–273
	64	Throttle Valve Cap	TA–464
	65	Throttle Valve Spring	22SR–262
	66	Throttle Handle	588–301
	67	Air Strainer Screen	588–61
	68	Air Strainer Screen Retainer	205–506
	69	Air Strainer Support	588–567
	70	Throttle Connector	588–333
	71	Gear Case Cover	588–720
•	72	Spindle Front Gearing	23–405
•	73	Hammer Spring Thrust Bearing	588–695

		PART NUMBER FOR ORDERING	
	74	Cam Ball (2) (1" diameter steel ball)	588–722
	75	Ball Cam	588–721
	76	Hammer Spring	588–728
	77	Hammer	588–724
	78	Anvil Driver	588–730
	79	Anvil Driver Shoe (2)	588–729
	80	Shoe Spring (2)	588–731
	81	Arbor	588–725
	82	Hammer Case Assembly	
		for model 588A1–EU	588–EU–A727
		for model 588A1	588–A727
	83	Hammer Case Bushing	588–641
	84	Air Port Gasket	R44H–210A
	85	Grease Fitting	23–188
	*	Eyebolt	215–4
	*	Eyebolt Hole Plug	EU–788
	*	Hammer Case Label	
		for model 588A1–EU	EU–99
		for model 588A1	WARNING–2–99
	*	Oversize Hammer Case Bushing	
+	*	.005" oversize	588–641–5
+	*	.010" oversize	588–641–10
+	*	.015" oversize	588–641–15
+	*	.031" oversize	588–641–31
	86	Anvil	
		Standard	588–726
		24" Extended	588–314–24
	87	Socket Pin	588–215
	88	Socket Pin Retainer	588–216
	89	Socket	#
	*	Grease Gun	P25–228

* Not illustrated.

• To keep downtime to a minimum, it is desirable to have on hand certain repair parts. We recommend that you stock one (pair or set) of each part indicated by a bullet (•) for every four tools in service.

\# Inquire at the nearest Ingersoll–Rand Branch Office or authorized distributor for sizes and prices of available Sockets.

\+ Refer to Oversize Hammer Case Bushings on page 9.

MAINTENANCE SECTION

⚠ WARNING

Always wear eye protection when operating or performing maintenance on this tool.
Always turn off the air supply and disconnect the air supply hose before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool.

DISASSEMBLY

General Instructions

1. Do not disassemble the tool any further than necessary to replace or repair damaged parts.
2. Whenever grasping a tool or part in a vise, always use leather–covered or copper–covered vise jaws to protect the surface of the part and help prevent distortion. This is particularly true of threaded members and housings.
3. Do not remove any part which is a press fit in or on a subassembly unless the removal of that part is necessary for repairs or replacement.
4. Do not disassemble the tool unless you have a complete set of new gaskets and O–rings for replacement.

Disassembly of the Impactool

⚠ WARNING

Never attempt to disassemble a Model 588A1 or 588A1–EU Impactool without a hoist, block and tackle, or other lifting device. The complete Impactool and its major assemblies are too heavy to be manually handled. Follow the recommended procedure for disassembly below.

1. Suspend the Impactool by the Vertical Hanger (36) in the Back Head (22) and place a large socket on solid, level footing beneath it.
2. Lower the tool, engaging the square driver in the socket drive hole. As a safety measure, leave the hoist hook attached to the Eyebolt so that the Tool cannot tip over.
3. Remove the Hammer Case Long Bolts (11) and Hammer Case Short Bolts.
4. Slowly lift the Motor Housing (1) with assembled parts from the Gear Case (50). If the Motor Housing and Gear Case fail to separate after raising the Motor Housing about 1/2" (12 mm), lightly strike the Gear Case with a soft hammer to jar it loose.
5. Attach the hoist sling to the planet gear frame assembly and lift the Gear Case with assembled parts from the Hammer Case (82). If the Gear Case and Hammer Case fail to separate after raising the Gear Case about 1/2" (12 mm), lightly strike the hammer case bosses a few downward blows with a soft hammer.
6. Remove the Backhead Long Cap Screws (25), Backhead Short Cap Screws (26) and Backhead (22). This will give access to the motor.

Disassembly of the Impact Mechanism

1. Before removing the Ball Cam (75) from the Hammer (77), clean the grease from the Hammer, Cam Balls (74) and Ball Cam.
2. Stand the Hammer, jaw end down, on an arbor press table and press on the face of the Ball Cam, telescoping it into the hammer bore against the compression of the Hammer Spring (76) until a Cam Ball drops from each of the two holes in the hammer wall.
3. Slowly ease the pressure on the Ball Cam and withdraw the Ball Cam from the Hammer.

Disassembly of the Motor

1. Grasp the splined rotor hub in copper–covered vise jaws and unscrew the Governor Assembly from the Rotor (15).

NOTICE

This is left–hand thread; turn clockwise to remove.

2. Grasp the Cylinder (19) in one hand; never clamp it in a vise. Insert a 5/16" (7 mm) diameter rod about 6" (150 mm) long into the rotor bore and drive on the rod until the rear rotor hub is driven out of the Rear Rotor Bearing (21), freeing the Rear End Plate (20), Cylinder and Vanes (18).
3. Support the Front End Plate (14) as close to the Rotor as possible and press on the pinion face to remove the Front Rotor Bearing (13) from the rotor hub.

ASSEMBLY

General Instructions

1. Always press on the **inne**r ring of a ball–type bearing when installing the bearing on a shaft.
2. Always press on the **outer** ring of a ball–type bearing when pressing the bearing into a bearing recess.
3. Whenever grasping a tool or part in a vise, always use leather–covered or copper–covered vise jaws. Take extra care with threaded parts and housings.
4. Always clean every part and wipe every part with a thin film of oil before installation.
5. Apply a film of o–ring lubricant to all O–rings before final assembly.

Assembly of the Motor

1. Slip the Front End Plate (14), crescent grooved side first, onto the rotor front hub.
2. Place the Front Rotor Bearing (13), shielded side first, over the hub.
3. Slide a sleeve that will contact only the bearing **inner ring** over the hub and press the Bearing onto the rotor hub until only running clearance remains between the faces of the End Plate and Rotor (15).

4. Grasp the splined hub in copper-covered vise jaws, positioning the Rotor upright. Place a Vane (18) in each vane slot in the Rotor; then place the Cylinder (19) over the Rotor and onto the End Plate.

NOTICE

Before proceeding, make sure the Cylinder is properly installed.
Check Cylinder installation as follows:
Note that there are two 3/4" (19 mm) holes, one in each of the two flats running lengthwise on the Cylinder. One of the holes is located about midway between the cylinder ends, while the other is located relatively close to one end. The hole nearer the end must be at the top or farthest from the splined rotor hub.

5. With the Cylinder properly installed, continue the assembly by sliding the Rotor Bearing Spacer (17), **internally-chamfered end first,** onto the rear rotor hub. Press the Rear Rotor Bearing (21), **shielded side first,** into the recess in the Rear End Plate (20) with an arbor that will contact only the bearing outer ring.
6. Press the End Plate and Bearing assembly onto the rotor hub with an arbor that will contact only the bearing inner ring. See **Governor Adjustment.** Then thread the Governor Assembly tightly into the Rotor.
7. Be sure both Air Port Gaskets are in good condition and are installed, large open end first, in the two air ports in the large bore in the Motor Housing (1) before installing the motor in the Motor Housing.
8. Align the dowel hole in each End Plate (14) and (20) with the dowel hole in the Cylinder (19) and insert a 1/4" (6 mm) diameter rod about 12" (305 mm) long, allowing it to protrude about 6" (150 mm) from the Front End Plate.
9. Enter the protruding end of the rod into the dowel hole at the bottom of the motor housing bore and slide the motor into the Motor Housing.
10. Run the Backhead Cap Screws (25) and (26) finger-tight. Then turn each a little at a time until all are tight.

Assembly of the Impact Mechanism

1. When assembling the Ball Cam (75) in the Hammer (77), stand the Hammer, jaw end down, on the table of an arbor press and enter the Hammer Spring (76) into the hammer bore. Note that one ring of the Hammer Spring Thrust Bearing (73) is held firmly in the shell, while the other is free to rotate.
2. Place the Bearing on the Spring so that the free ring rests on the end of the Spring.
3. Align the points of the cam grooves in the Ball Cam with the holes in the hammer wall and slide the Ball Cam over the Bearing and Spring.
4. Press on the cam rear face, telescoping the Ball Cam into the Hammer against the compression of the Spring, until a Cam Ball (74) can be entered into each cam groove through the holes in opposite sides of the Hammer.
5. Use a Reverse Valve Bushing Reamer to size a new Reverse Valve Bushing (3) after pressing it into the Motor Housing.
6. Use a Govenor Valve Bushing Reamer to size a new Governor Valve Bushing (4) after pressing it into the Motor Housing.
7. Periodically, examine the Hammer Case Bushing (83). Install a new Bushing if the present one is worn to the extent that the shank on the Anvil (86) is a loose fit in the bushing bore.

Assembly of the Impactool

⚠ WARNING

Never attempt to assemble a Model 588A1 or 588A1-EU Impactool without a hoist, block and tackle or other lifting device. The complete Impactool and its major assemblies are too heavy to be manually handled. Follow the recommended procedure for assembly below.

1. Make sure that the square driver is engaged in a large Socket (89) and that the Socket is resting on level footing so that the Hammer Case containing the assembled impact mechanism components are standing upright to prevent the tool from tipping over during assembly.
2. Attach the hoist sling to the planet gear frame assembly and lower the Gear Case (49) with assembled parts onto the Hammer Case (82).
3. Attach the hoist sling to the Motor Housing (1) and lower the Motor Housing with assembled parts onto the the Gear Case (50).
4. Install the Hammer Case Long Bolts (11) and Hammer Case Short Bolts to secure the Gear Case and Motor Housing in position.

Oversize Hammer Case Bushings

The continued use of a worn Hammer Case Bushing may permit the Bushing to deform or enlarge the hole in the front of the Hammer Case so that the Case no longer retains the Bushing properly. Should the Bushing become loose in the Case, an oversize Bushing should be installed. Bushings .005". .010", .015" and .031" are available. The amount of oversize is etched on the oversize Bushing; the standard size Bushing is unmarked.
After removing a loose Bushing, examine it for oversize etching. If unmarked, replace it with a .005" oversize Bushing; if it is marked, replace it with the next larger oversize Bushing. When pressed in, the oversize Bushing will automatically true up the deformed opening in the Hammer Case.

TROUBLESHOOTING GUIDE

Trouble	Probable Cause	Solution
Low power	Worn or broken Vanes	Replace the **complete** set of Vanes.
	Worn or broken Cylinder and/or scored End Plates	Examine the Cylinder and replace it if it is worn or broken or if bore is scored or wavy. Replace End Plates if they are scored.
	Dirty motor parts	Disassemble the tool and clean all parts with a clean, suitable, cleaning solution in a well ventilated area. Assemble the tool and inject 3 cc of recommended oil into Inlet and run tool to lubricate internal parts.
	Improper positioning of the Reverse Valve	Make certain that the Reverse Valve is **fully** engaged.
Motor will not run	Incorrect assembly of motor	Disassemble motor, replace worn or broken parts and reassemble as instructed.
	Insufficient lubricant in impact mechanism	Remove the Hammer Case Assembly and lubricate the impact mechanism.
Tool will not impact	Broken or worn impact mechanism parts	Remove the Hammer Case Assembly and examine impact mechanism parts. Replace any worn or broken parts.
	Impact mechanism not assembled correctly	Refer to **Assembly of Impact Mechanism.**

NOTICE

SAVE THESE INSTRUCTIONS. DO NOT DESTROY.

NOTES