

## MODEL 3BMGA20RH-34F STARTER

### WARNING

The Model 3BMGA20RH-34F Starter is designed for gas operation. It is not totally sealed in dynamic operation since the exhaust must be vented or piped away and there is a possibility of leakage around the output shaft when rotating.

Caution should be taken when operating this Starter on gas because of the danger of fire, explosion, or inhalation.

After reassembling the 3BMGA20RH-34F Starter, always test it in accordance with the procedures outlined in this manual. Never install a reassembled Starter that has not been tested in accordance with the procedures outlined in this manual.

If the Starter is gas operated, the exhaust must be piped away to a location where it will not be ignited or inhaled. The Starter should be installed with the exhaust down.

### LUBRICATION

For temperatures above 32° F (0° C), use a good quality SAE 20 nondetergent motor oil.

For temperatures below 32° F (0°), use diesel fuel.

### OPERATING INSTRUCTIONS

Do not operate the Model 3BMGA20RH-34F Starter on air or gas pressures greater than 150 psig (10.2 bar/1034 kPa). Use 3/4" (19 mm) hose, or larger, for maximum efficiency.

Model 3BMGA20RH-34F Starters and replacement Drives are shipped from the factory with the drive pinion in the retracted position. However, should the pinion become extended and appear to be locked, the situation can be overcome by installing the Starter on the engine and initiating a normal start. As the engine starts and overspeeds the drive, the pinion will return to its normal retracted position for the next start. **WARNING:** Do not remove the springs and pins in the Drive in an attempt to unlock the pinion.

**Caution:** Do not engage Starter while engine is running.

### MAINTENANCE INSTRUCTIONS

Remove and install the Starter as a unit. Never immerse the Starter Drive (16) in solvent. Doing so will remove or dilute the factory-applied lubricant within the drive.

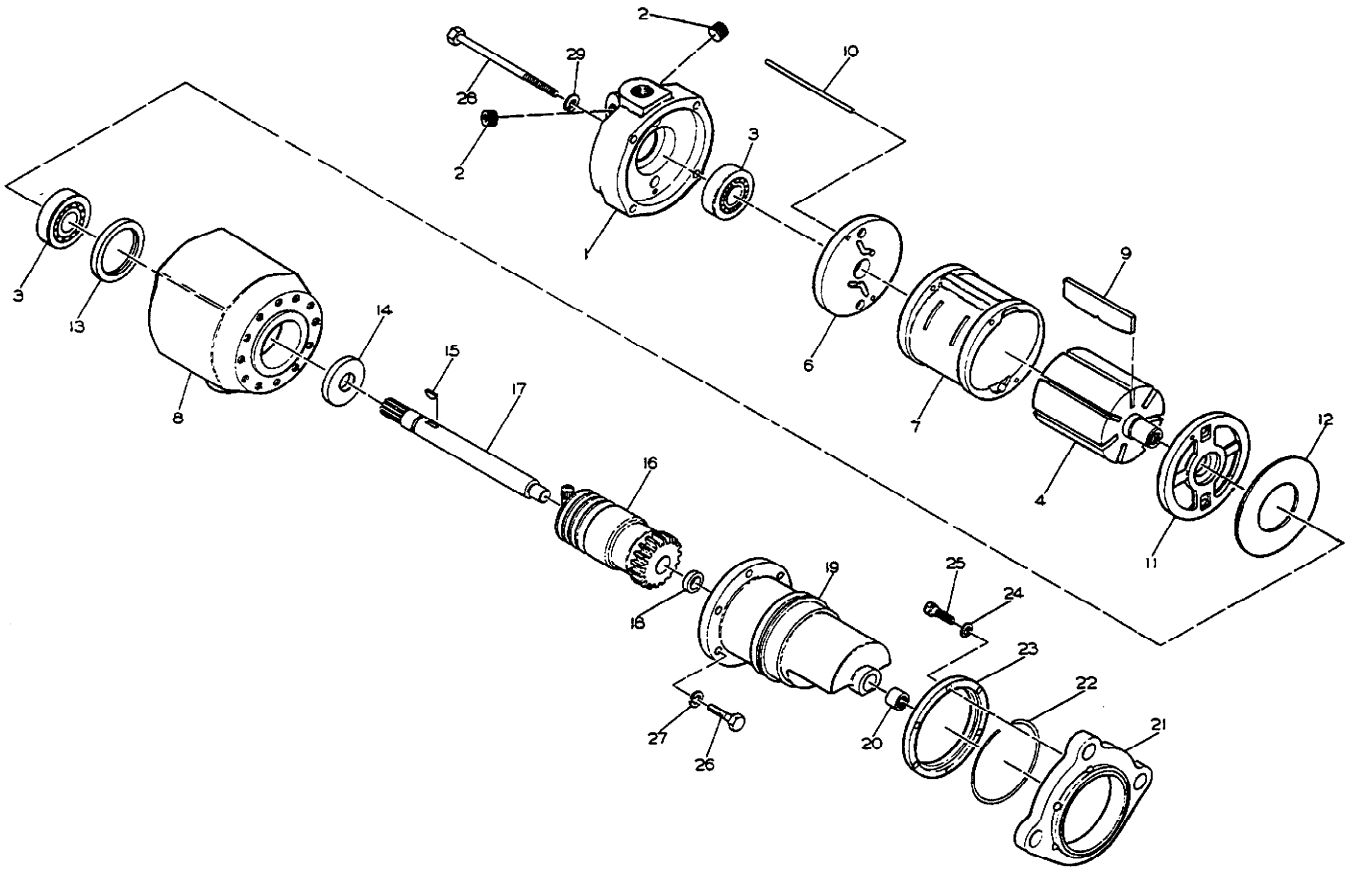
**Notice:** The use of other than genuine Ingersoll-Rand replacement parts may result in decreased Starter performance and increased maintenance, and may invalidate all warranties.

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

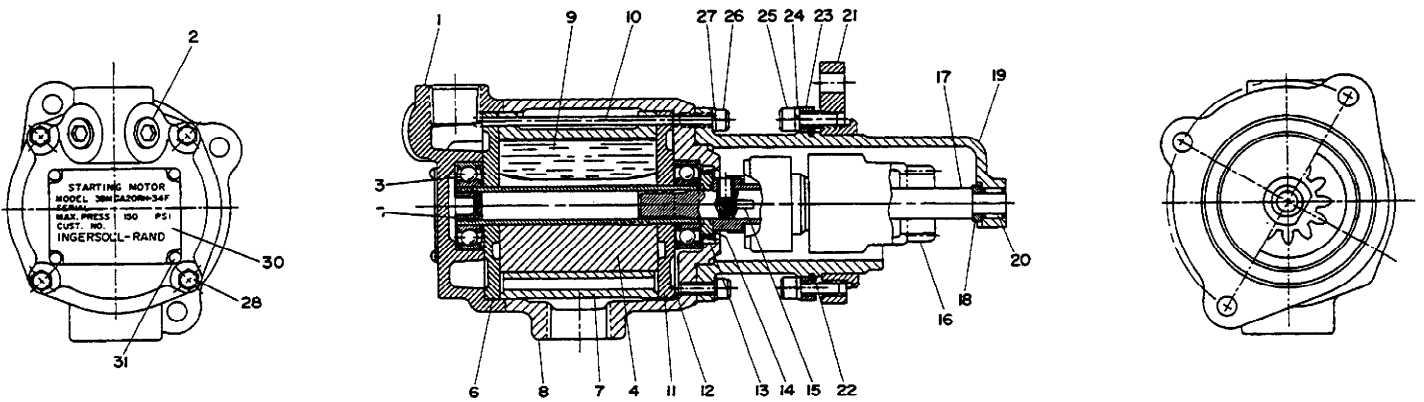
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**INGERSOLL-RAND®**  
**ENGINE STARTING SYSTEMS**



(Dwg. TPA1186)



(Dwg. TPA1187)

**PART NUMBER FOR ORDERING** 

1	Motor Housing Cover . . . . .	3BM-102B
2	Plug (2). . . . .	HSPPS-3
3	Rotor Bearing (2) (special; purchase from Ingersoll-Rand) . . . . .	3BMG-24
4	Rotor . . . . .	3BM-53
5	Rotor Plug (for gas sealing) . . . . .	3BMG-531
6	Rear End Plate . . . . .	3BM-12A
7	Cylinder. . . . .	3BM-3
8	Motor Housing . . . . .	3BM-4020
9	Vane Packet (set of 7 Vanes) . . . . .	3BM-42-7
10	Cylinder Dowel. . . . .	3BM-98
11	Front End Plate . . . . .	3BM-11A
12	Front Motor Gasket . . . . .	3BM-284
13	Seal . . . . .	91RM 271
14	Drive Shaft Collar . . . . .	3BM-30
15	Drive Shaft Key . . . . .	TC-18
16	Starter Drive . . . . .	3BM-299-1
17	Drive Shaft . . . . .	3BM-8-1
18	Drive Housing Thrust Washer. . . . .	3BM-180
19	Drive Housing. . . . .	3BM-300-1
20	Drive Housing Bearing . . . . .	3BM-363-7
21	Mounting Flange . . . . .	3BM-301-1
22	Mounting Flange Snap Ring. . . . .	3BM-303
23	Mounting Flange Clamp Ring. . . . .	3BM-302-1
24	Mounting Flange Cap Screw Lock Washer (1 for each Cap Screw) . . . . .	34U-58
25	Mounting Flange Cap Screw (3) . . . . .	R44H-490A
26	Drive Housing Cap Screw (6) . . . . .	ROH-354
27	Housing Cap Screw Lock Washer (6). . . . .	L01-67
28	Motor Housing Cover Cap Screw (4). . . . .	R3H-57
29	Cover Cap Screw Washer (4) . . . . .	DLC-504B
30	Nameplate. . . . .	SS800-301
31	Nameplate Screw (4). . . . .	R4K-302
*	Mounting Adapter	
	5/8" thick (for some Buda Engines) . . . . .	9BM-B212-5/8
	3/4" thick (for some Perkins Engines) . . . . .	3BM-212-3/4
	13/16" thick (for some Waukesha Engines) . . . . .	3BM-212-13/16
	1" thick (for some Waukesha Engines) . . . . .	3BM-212-1
	1" thick (for some Buda Engines). . . . .	9BM-B212-1
	1-1/8" thick (for some Hercules Engines) . . . . .	3BM-212-1 1/8
	1-5/16" thick (for some Waukesha Engines). . . . .	3BM-313-1 5/16
	1-5/8" thick (for some Wisconsin Engines) . . . . .	3BM-212-1 5/8
	1-23/32" thick (for some Wisconsin Engines) . . . . .	3BM-212-1 23/32

\* Not illustrated.

## GAS-OPERATED STARTERS

**Warning:** When repairing or converting Air Starters for gas operation, it is imperative that the motors be properly sealed. In the procedure below, "Sealant" is Ingersoll-Rand No. SMB-431 Gasket Eliminator or General Electric No. RTV 102.

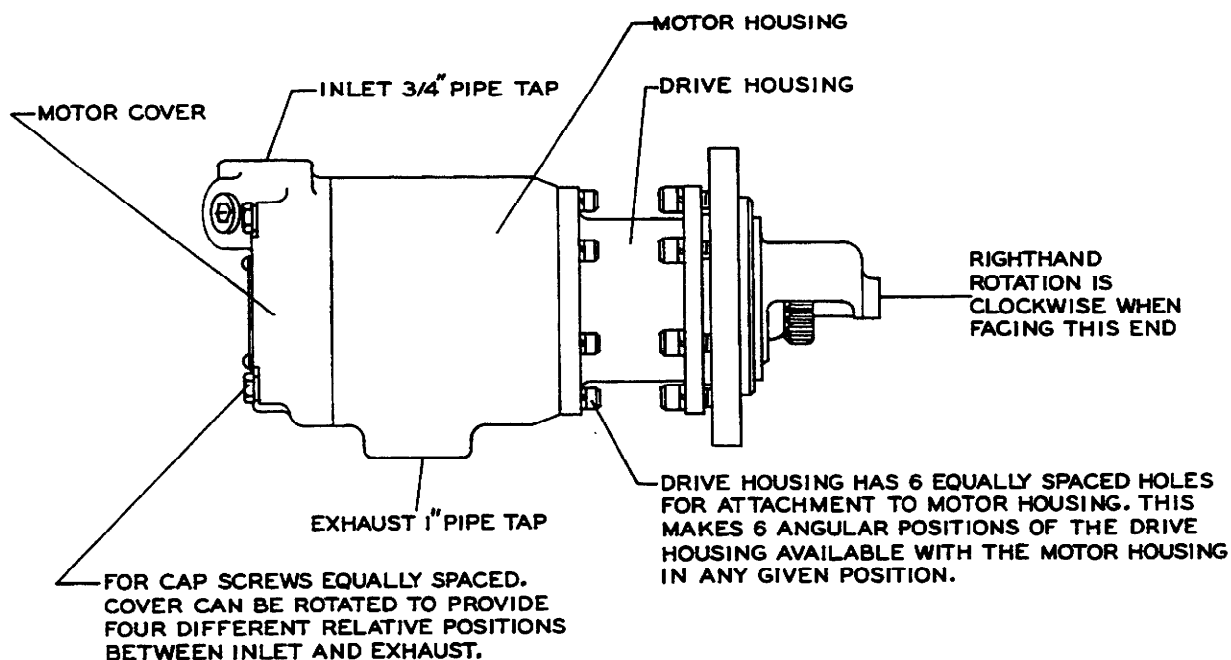
1. Inspect the Rotor (4). If it does not have a plastic plug, order and press in a No. 3BMG-531 Rotor Plug (5) for gas sealing.
2. If the shaft seal is being replaced, it must be installed with sealant between the seal outside diameter and housing bore. The lip of the seal must be inward toward the ball bearing.
3. Apply a thin film of sealant between the Motor Housing Cover (1) and the Motor Housing (8). Apply the Cover to the Housing.
4. Apply sealant to both sides of the copper sealing washers and under the head of the Motor Cover Cap Screws (28). Assemble, install and tighten to 100 in-lb (11.3 N m) torque.
5. Plugs for the lubricator connection (2) will normally be supplied with sealant previously applied. When substitute plugs are used, sealant must be applied to the threads.
6. Apply sealant to the nameplate screw holes; install the Nameplate (30) and Nameplate Screws (31).
7. Assemble the Drive Shaft (17), Starter Drive (16), Drive Shaft Key (15) and Drive Shaft Collar (14). Loctite the Drive Shaft Collar to the Drive Shaft after installing the Starter Drive.
8. Finish assembling using sealant on the threads of the Drive Housing Cap Screws (26) and on both sides of the Housing Cap Screw Lock Washers (27).
9. Allow four hours drying time.
10. Plug the exhaust, apply 40 psig (2.8 bar/280 kPa) air to the inlet. Immerse the unit for 30 seconds in a nonflammable solvent. If the unit is properly sealed, no bubbles will appear.

## STARTER REORIENTATION

Starters can be assembled in various angular positions to provide a selection of locations for the inlet, exhaust, pinion opening and mounting flange holes. Reorientation should not be done unless necessary to mount the Starter to the engine or connect air lines to the Starter.

### WARNING

If a reoriented Starter is to be used for gas operation, it is imperative that it be properly sealed. See **GAS-OPERATED STARTERS** above.

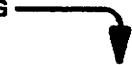


(Dwg. TPD898)

REORIENTATION OF SIZE 3BMG STARTERS

# ACCESSORIES

PART NUMBER FOR ORDERING



Starter Control Valve .....	SMB-618
Lubricator .....	HDL1
Lubricator Mounting Bracket .....	HDL1-A40
Lubricator Filter .....	HDL1-47
Sealant for Pipe Threads .....	SMB-441
12-Volt Solenoid Valve .....	150BMP-1050C
24-Volt Solenoid Valve .....	150BMP-2450
Combination Pressure Relief/Check Valve .....	150BMP-1054
Check Valve .....	150BMP-1056
Pressure Gauge .....	150BMP-1064
3/4" Air Strainer .....	EU-A267
Relay Valve .....	SRV100

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