

Air Motors

99RM395/GVSM-31, 99RM396/GVSM-31 and 99RM396/GVSM-43

Installation and Maintenance Information







General Product Safety Information

- · Important Safety Information enclosed.
- Read and understand this manual before operating this tool.
- · It is your responsibility to make this safety information available to others that will operate this tool.

Safety Information - Explanation of Safety Signal

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage.

NOTICE

Indicates information or a company policy that relates directly or indirectly to the safety of personnel or protection of property.



Failure to observe the following warnings could result in injury.

- Operate this motor at 90 p.s.i.g. (6.2bar/620 KpA) maximum air pressure at the air inlet of the motor.
- Always install, operate, inspect and maintain this product in accordance with all applicable standards and regulations (local, state, country, federal, etc.).
- Keep hands, clothing and long hair away from rotating end of the motor.
- · Anticipate and be alert for sudden changes in motion during start up and operation of any power motor.
- Never exceed rated r.p.m. of motor.
- Wear suitable eye and hearing protection while operating motor.
- Motor shaft can continue to rotate briefly after throttle is released.
 Do not lubricate motor with flammable or volatile liquids such as kerosene, diesel or jet fuel.
- Turn off air supply and disconnect air supply hose before installing, removing or adjusting any accessory on this motor or before
 performing any maintenance on this motor.
- This product is not designed for working in explosive environments, including those caused by fumes & dust, or near flammable materials.
- · This product is not insulated against electric shock.
- This motor is not designed or sealed to be operated on compressed gas. Use compressed air only.
- Do not carry the motor by the Hose.
- Do not use damaged, frayed or deteriorated air hoses and fittings.
- Do not overreach when operating this tool. Keep body stance balanced and firm.
- · Do not remove any labels. Replace any damaged label.
- Use only proper cleaning solvents to clean parts. Use only cleaning solvents which meet current safety and health standards. Use cleaning solvents in a well ventillated area.
- Use only accessories recommended by Ingersoll-Rand.
- Repeated prolonged operator exposure to vibrations which may be generated in use of certain hand-held tools may produce Raynaud's
 phenomenon, commonly referred to as Whitefinger disease. The phenomenon produces numbness and burning sensations in the hand and
 may cause circulation and nerve damage as well as tissue necrosis. Repetitive users of hand held tools who experience vibrations should
 closely monitor duration of use and their physical condition.
- 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.

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.
- Tool maintenance and repair should be performed by authorized, trained, competent personnel. Consult your nearest Ingersoll-Rand authorized service center
- · It is the responsibility of the employer to place the information in this manual into the hands of the operator.

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Safety Symbol Identification



Wear Respiratory Protection



Wear Eye Protection



Wear Hearing Protection



Read Manuals Before Operating Product

(Dwg. MHP2598)

Lubrication



Ingersoll-Rand No.50 Or a good quality SAE 20 Motor Oil



Ingersoll-Rand Grease No. 10546836

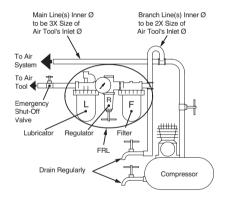


Do not Grease excessively; too much grease may cause the gearcase to overheat.

Installation and Maintenance

Always use an air line lubricator with these tools.

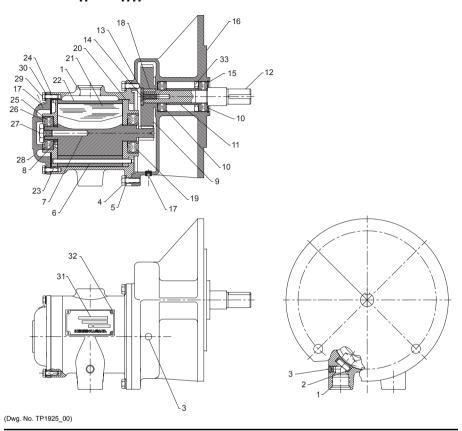
We recommend the following Filter-Regulator-Lubricator (FRL) Unit: ${\bf C31-08-G00}$.



(Dwg. TPD905-2)

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Air Motor 99M39 [] GVSM-[][] - Cross Section View



Air Motor 99M39 [] GVSM-[][] - Parts List

Item	Part Description	Part Number	Item	Part Description	Part Number
1	Motor Housing	VRSM-138	14	Drive Gear Retainer Screw	91RM-126
2	Air Port Gasket (2 Required)	R44H-210A	15	Bearing Retainer	FMC2-280
3	Pipe Plug (3 Required)	R2-227	16	Gear case	99RM70-37
4	Housing Cap Screw (8 Required)	FM-554	17	Pipe Plug (2 Required)	R2-227
5	Housing Cap Screw Lock Washer (8 Required)	T11-58	18	Drive Gear Key	9BM-610
6	Cylinder Dowel	205-1098	19	Front Rotor Bearing	10546844
7	Rotor	R55L-53	20	Front Endplate	9BM-11
	(Note: 2-Piece Rotor Replaced with 1-Piece Rotor [Year 1987])	GEA40-A2309	21	Vane (5 Required)	R5H-42
8	Rotor Bearing Spacer	R5H-65	22	Cylinder	577-3
9	Gear Drive	99RM70-756	23	Rear Endplate	9BM-12
10	Drive Shaft Bearing (2 Required)	JC33501-24	24	Housing Cover Gasket	9BM-283
11	Drive Shaft Bearing Spacer	99RM61-761	25	Rear Rotor Bearing	10546851
12	Drive Shaft		26	Rear Rotor Bearing Spring	9BM-278
	99RM395/GVSM-31	99RM91-8	27	Rear Rotor Bearing Lock Screw	9BM-119
	99RM396/GVSM-31	99RM92-8	28	Housing Cover	DP991SP-102
13	Drive Gear Retainer Washer	9BM-13	29	Housing Cover Cap Screw (6 Required)	R3-7

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Item	Part Description	Part Number	Item	Part Description	Part Number			
30	Housing Cover Cap Screw Lock Washer (6 Required)	L01-67	*	Grease (2 oz. Container)	10554939			
31	Nameplate (Specify Model Number & Serial Number when ordering this item)	9MJ-301	*	Joint Sealant	VSM-6225			
32	Nameplate Screw (4 Required)	20BM-302	*	Tune-up Kit	10546828			
33	Drive Shaft Seal	99RM91-271						
* Items not illustrated								

Disassembly



- Always use protective eyewear when performing maintenance on a motor or operating a motor.
- Always turn off the air supply and disconnect the air supply line, before installing, removing or adjusting any accessory on this motor or before performing any maintenance on this motor.
 Failure to do so could result in injury.

General Instructions

- Always use protective eyewear when performing maintenance on or operating a Motor.
- Do not disassemble the motor any further than necessary to replace or repair damaged parts.
- Do not disassemble the Motor unless you have a complete set of gaskets and O-rings for replacement.
- Do not remove any part which is a press fit in or on an assembly unless the removal of that part is necessary for repair or replacement.
- When grasping a motor in a vise, always use leather-covered or copper covered vise jaws to protect the surface of the part or motor and help prevent distortion. This is particularly true of threaded members and housings.
- 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.

Motor Disassembly

- Remove the eight Housing Cap Screws (4) along with Housing Cap Screw Lock washers (5). Pull the Motor Housing (1) from the Gear case (16).
- 2. Remove the two Pipe Plugs (3) from the Motor Housing (1) and drain any oil or grease from the Motor Housing.
- Remove Pipe Plug (17) from the Housing Cover (28) and drain any oil or grease from the rear of the Assembled Motor.
- 4. Before removing the Housing Cover (28), be sure to have a new Housing Cover Gasket (24) on hand. Remove the six Housing Cover Cap Screws (29) along with the Housing Cover Cap Screw Lock washers (30). Pull the Housing Cover and Housing Cover Gasket from the Motor Housing.
- Pull the Rear Rotor Bearing Spring (26) from the rear of the Assembled Motor.

- Slide the Assembled Motor from the rear of the Motor Housing (1). If necessary the Motor Housing may be need to be tapped with a plastic hammer to remove the Assembled Motor.
- Pull the two Air Port Gaskets (2) from the Motor Housing (1) only if necessary and if there are replacements available.
- Remove the Cylinder Dowel (6) from the Motor Assembly.
- Place the gear end of the Assembled Motor in vise jaws being careful
 not to damage the gear teeth of the Rotor (7). Place a wrench on the
 Rear Rotor Bearing Lock Screw (27) and turn Clockwise to remove it
 from the Rotor. Remove the Assembled Motor from the vise jaws.
- 10. Grasp the Cylinder (22) and Front Endplate (20) with the gear end of the Rotor (7) facing up. Holding the Motor Assembly over a work surface, tap the gear end of the Rotor with a plastic hammer until the rear of the Motor Assembly falls from the front of the Motor Assembly.
- 11. Slide the Front Rotor Bearing (19) from the Front Endplate (20).
- 12. Pull the five Vanes (21) from the Rotor (7).
- 13. Support the front face of the Rear Endplate (23) in an arbor press and using a pin large enough to cover the rear hub of the Rotor (7), taking care not to damage the internal threads of the Rotor, press the Rotor through the Rear Endplate.
- 14. Slide the Rotor Spacer (8) from the Rotor (7).
- 15. Slide the Rear Rotor Bearing (25) from the Rear Endplate (23).

Gearcase Disassembly

- Remove the two Pipe Plugs (3) and (17) from the Gear case (16) and drain any oil or grease from the Assembled Gear case.
- Remove the Drive Gear Retainer Screw (14) from the Drive Shaft (12) and pull the Drive Gear Retainer Washer (13) from the Drive Gear (9).
- 3. Using a pair of internal retaining ring pliers, remove the Bearing Retainer (15) from the Gear case (16).
- 4. Place the Assembled Gear case in an arbor press with the Drive Shaft (12) facing down supporting the outer race of the front Drive Shaft Bearing (10), taking care not to damage the threads in the Drive Shaft, press the Drive Shaft out until it is free of the Drive Gear (9). Pull the Drive Gear from the rear of the Gear case (16).
- Slide the Drive Shaft (12) along with the two Drive Shaft Bearings (10) and Drive Shaft Bearing Spacer (11) and Drive Shaft Seal (33) out the front of the Gear case (16).
- Remove the Drive Gear Key (18) from the Drive Shaft (12).
- Using a bearing puller, remove the rear Drive Shaft Bearing (10) from the Drive Shaft (12). Slide the Drive Shaft Bearing Spacer (11) and Drive Shaft Seal (33) off from the rear of the Drive Shaft and remove the front Drive Shaft Bearing from the Drive Shaft.

Assembly



- Always use protective eyewear when performing maintenance on a motor or operating a motor.
- Always turn off the air supply and disconnect the air supply line, before installing, removing or adjusting any accessory on this motor or before performing any maintenance on this motor.
 Failure to do so could result in injury.

General Instructions

- Always use protective eyewear when performing maintenance on or operating a Motor.
- Always press on the inner ring of a ball-type bearing when installing the bearing on a shaft.
- Always press on the outer ring of a ball-type bearing when installing the bearing in a recess.

- Check each bearing for roughness. If an open bearing must be cleaned, wash it thoroughly in clean solvent and dry with a clean cloth. Sealed bearings should never be cleaned. Work grease thoroughly into every open bearing before installing.
- Except for bearings, always clean every part and wipe every part with a thin film of oil before installation.
- When grasping a motor in a vise, always use leather covered or copper covered vise jaws to protect the surface of the part or motor and help prevent distortion. This is particularly true of threaded members and housings.
- Apply O-ring lubricant to each O-ring before assembly and use only new gaskets when reassembling the Motor.

Motor Assembly

 Support the gear end of the Rotor (7) in an arbor press and slide the Rotor Bearing Spacer (8) onto the hub of the Rotor. Slide the Rear Endplate (23) over the Rotor until it contacts the back face of the Rotor.

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- Start the Rear Rotor Bearing (25) onto the Rotor (7) hub with the
 writing facing up and using a sleeve that contacts only the inner ring
 of the Rear Rotor Bearing, press the Rear Rotor Bearing onto the
 Rotor hub until it contacts the Rotor Bearing Spacer (8).
 Place the gear end of the Assembled Rotor in vise is was being careful
- not to damage the gear teeth of the Rotor (7). Apply three drops of Loctite #271 onto the threads of the Rear Rotor Bearing Lock Screw (27) and thread counterclockwise into the Rotor. Place a wrench on the Rear Rotor Bearing Lock
- Screw and tighten to between 20-24 ft.- lbs. torque.

 4. Slide the Cylinder (22) over the Rotor (7) until it rests against the Rear Endplate (23) and align the Cylinder Dowel holes.
- Coat the five Vanes (21) with Ingersoll-Rand No. 50 Oil and slip them into the Rotor (7) slots.
- Support the Rear Rotor Bearing Lock Screw (27) in an arbor press and slide the Front Endplate (20) over the gear end of the Rotor (7) and align the Cylinder Dowel holes.
- 7. Start the Front Rotor Bearing (19) onto the Rotor (7) hub and using a sleeve that contacts only the inner ring of the Front Rotor Bearing, press the Front Rotor Bearing onto the Rotor hub until it stops. If the Assembled Motor is tight and does not turn smoothly, hold the Cylinder (22) and Front Endplate (23) with the gear end of the Rotor (7) facing up and lightly tap the Rotor with a plastic hammer until the Assembled Motor turns smoothly.
- Install the two Air Port Gaskets (2) into the Motor Housing (1) until they seat against the bottom of the bore.
- Place the Motor Housing (1) into a vise with the rear of the Motor Housing facing up.
- 10. Slide a ½" x 12.00" long pin into the Cylinder Dowel holes of the Assembled Motor through to the hole in the Motor Housing (1), slide the Assembled Motor into the Motor Housing (1) until the Front Endplate (20) stops against the Motor Housing. Remove the ½" x 12.00" pin from the Assembled Motor and insert the Cylinder Dowel (6) until it is flush to below the rear surface of the Rear Endplate (23).
- Set the Rear Rotor Bearing Spring (26) against the Rear Rotor Bearing (25) outer ring.
- Apply a light film of Ingersoll-Rand Joint Sealant (VSM- 6225) to the back face of the Motor Housing (1). Align and place the Housing Cover Gasket (24) onto the rear face of the Motor Housing.
- Apply a light film of Ingersoll-Rand Joint Sealant (VSM- 6225) to the front face of the Housing Cover (28) and place it onto the Housing Cover Gasket (24).
- Install the six Housing Cover Screw Lock washers (30) onto the Housing Cover Cap Screws (29) and thread into the Motor Housing (1). Tighten to between 20-24 ft.-lbs. torque.

- Install Pipe Plug (17) into the housing Cover (28) and tighten to between 5-10 ft.-lbs. torque.
- Install the two Pipe Plugs (3) into the Motor Housing (1) and tighten to between 5-10 ft.-lbs. torque.

Gearcase Assembly

- Support the front face of the Drive Shaft (12) in an arbor press and using a sleeve that contacts only the inner ring of the front Drive Shaft Bearing (10), press front Drive Shaft Bearing onto the Drive Shaft
- Slide the Drive Shaft Bearing Spacer (11) onto the Drive Shaft (12).
- Coat the outside diameter Drive Shaft Bearing Spacer (11) with a light film of Ingersoll-Rand Grease (10546836) and slip the Drive Shaft Seal (33) over the Drive Shaft Bearing Spacer until it contacts the front Drive Shaft Bearing (10).
- 4. With the Drive Shaft (12) still supported in the arbor press, using a sleeve that contacts only the inner ring of the rear Drive Shaft Bearing (10), press the rear Drive Shaft Bearing onto the Drive Shaft until it contacts the Drive Shaft Bearing Spacer (11).
- Insert the Drive Gear Key (18) into the Drive Shaft (12) with the rear face of the Drive Gear Key aligned with the rear face of the Drive Shaft
- 6. Insert the Drive Gear (9) into the rear of the Gear case (16) so the front of the Drive Gear contacts the rear shoulder face of the Gear case. Slide the assembled Drive Shaft (12) into the front of the Gear case. When the two pieces contact in the rear of the Gear case, align the Drive Gear Key (18) with the keyway in the Drive Gear. Position the Gear case in an arbor press supporting the rear face of the Drive Gear as close to the center of the part as possible and press the front of the Drive Shaft into the Drive Gear.
- Using a pair of internal retaining ring pliers, install the Bearing Retainer (15) into the front groove of the Gear case (16) to secure the Drive Shaft assembly in the Gear case assembly.
- Assemble the Drive Gear Retainer Washer (13) into the rear of the Drive Gear (9).
- Apply 3 drops of Loctite #271 onto the threads of the Drive Gear Retainer Screw (14) and thread into the Drive Shaft (12) and tighten to between 20-24 ft.-lbs. torque.
- 10. Position the assembled Gear case onto the assembled Motor Housing and align the two in the correct orientation. Assemble the eight Housing Cap Screw Lock washers (5) onto their respective Housing Cap Screws (4). Thread the eight Housing Cap Screws into the Gear case (16) and tighten to between 20-24 ft.-lbs. torque.
- Install Pipe Plugs (3) and (17) into the Gear case (16) and torque to 5-10 ft.-lbs.

NOTICE

SAVE THESE INSTRUCTIONS. DO NOT DESTROY

When the life of the tool has expired, it is recommended that the tool be disassembled, degreased and the parts be separated by material so that they can be recycled.

Product Parts Information.



CAUTION

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

Ingersoll-Rand is not responsible for customer modification of motors for applications on which Ingersoll-Rand was not consulted. Repairs should be made only by authorized trained personnel. Consult your nearest Ingersoll-Rand Authorized Service center.

Manuals can be downloaded from www.irtools.com

Refer all communications to the nearest Ingersoll-Rand Office or Distributor.

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Notes:

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