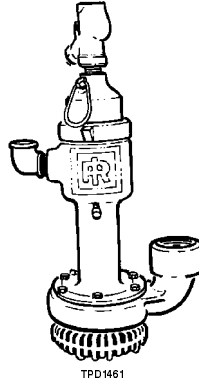


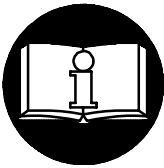
OPERATION AND MAINTENANCE MANUAL

for

MODEL 35 SUMP PUMP



⚠ 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 pump 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 pump at 90 psig (6.2 bar/620 kPa) maximum air pressure with 1" (25 mm) inside diameter air supply hose.
- Always turn off the air supply and disconnect the air supply hose before installing, removing or adjusting any accessory on this pump, or before performing any maintenance on this pump.
- Do not lubricate pumps with flammable or volatile liquids such as kerosene, diesel or jet fuel.
- Do not remove any labels. Replace any damaged label.
- Do not start or operate this pump unless it is submerged.
- This pump is not designed for working in explosive atmospheres.
- This pump is not insulated against electric shock.

NOTICE

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

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

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

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.

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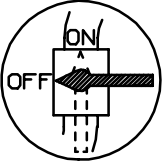
WARNING LABEL IDENTIFICATION

⚠ WARNING


FAILURE TO OBSERVE THE FOLLOWING WARNINGS COULD RESULT IN INJURY.

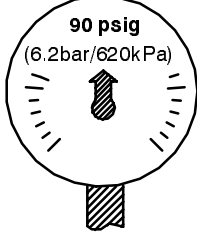
	⚠ WARNING
	Always wear hearing protection when operating this pump.

	⚠ WARNING
	Always wear eye protection when operating or performing maintenance on this pump.

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

	⚠ 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 pump.

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

PLACING PUMP IN SERVICE

LUBRICATION



Ingersoll-Rand No. 50 Ingersoll-Rand No. 80

Always use an air line lubricator with this pump. We recommend the following Filter-Lubricator-Regulator Unit:

For USA - No. 16LUB16

For International - No. 16LUB16

Before starting the pump, place 15 - 20 drops of Ingersoll-Rand No. 50 Oil into the air inlet before attaching the air hose. Unscrew the

MAINTENANCE SECTION
Oil Chamber Plug (41) and fill the oil chamber. Unscrew the caps from the Grease Fittings (3 and 40) and inject 1 - 2 cc of Ingersoll-Rand No. 80 Grease. Be certain to replace the caps after greasing the pump.

After each eight hours of operation, unless the air line lubricator is used, detach the air hose and fill the oil chamber with Ingersoll-Rand No. 50 Oil.

After each forty-eight hours of operation, or as experience indicates, inject 1 - 2 cc of the Ingersoll-Rand No. 80 Grease into the Grease Fittings (3 and 40).

Never use ordinary cup grease as it emulsifies with water and will not lubricate in this condition. Automotive water pump grease is not satisfactory as it is made for use with hot water.

AIR STRAINER

Periodically, clean the Air Strainer Screen (52) as follows:

1. Shut off the air supply to the pump.
2. Unscrew the Air Strainer Cap (50) and remove the Air Strainer Screen.
3. Clean the Screen in a suitable cleaning solution.

IMPELLER ADJUSTMENT

For the most efficient operation of the pump, particularly against high heads, it is necessary that proper Impeller clearance be maintained.

1. Pumps are assembled at the factory with a sufficient quantity of Suction Seal Shims (65) to provide 0.010" clearance between the faces of the Impeller (15) and the Suction Seal (68). When, due to wear, this clearance has increased to 0.032" (1/32"), remove enough Shims to obtain the original 0.010" clearance.
2. If decreased efficiency is noted, remove the Impeller and slip some of the Impeller Shims (16) from the

Arbor (18). Replace the Impeller and tighten the Arbor Nut (14). Rotate the Impeller. Repeat this procedure until enough Impeller Shims have been removed to cause a slight drag, then add one 0.010" Shim. Adjust the clearance between the Impeller and the Suction Seal (as explained in the preceding paragraph) whenever Impeller Shims have been removed.

OILER ADJUSTMENT

The Pump should use about 3 fluid ounces (90 mL) of oil during each four hours of operation. The Oiler is adjusted at the factory, but since flow rate varies somewhat with temperature, readjustment may be necessary. The rate of flow is regulated by an Oiler Adjusting Screw (44), located in the inner face of the Backhead (39).

To regulate the Oiler:

Remove the Backhead and turn the Oiler Adjusting Screw. Turning the Screw clockwise **decreases** the flow; turning the Screw counterclockwise **increases** the flow. Under no circumstance should the Screw be backed out beyond the face of the Backhead.

OPERATION

Always use an Exhaust Hose and be certain the free end of the Hose is kept well above the surface of the liquid.

Do not allow the pump to operate at free speed (not submerged) for long periods of time. The frictional heat generated will damage the composition sealing members. Prevent dirt from entering the pump. When pumping from a ditch or natural sump, set the pump on a board or flat stone or suspend it a few inches from the bottom of the sump. Arranging a wire screen around the inlet or setting the pump in a wire basket is also recommended.

If the inlet becomes clogged, stop the motor and lift the pump from the liquid. Liquid flowing through the discharge line will usually flush the obstruction from the inlet.

If the pump is stopped while pumping dirty liquids, gravel washed back through the pump by the liquid in the discharge line may sprag the impeller and prevent the motor from starting when the air is turned on. If the gravel cannot be dislodged by jarring or striking the pump with a wooden block; make sure that the air is turned off, remove the air line from the pump, remove the Inlet and rotate the Impeller by hand.

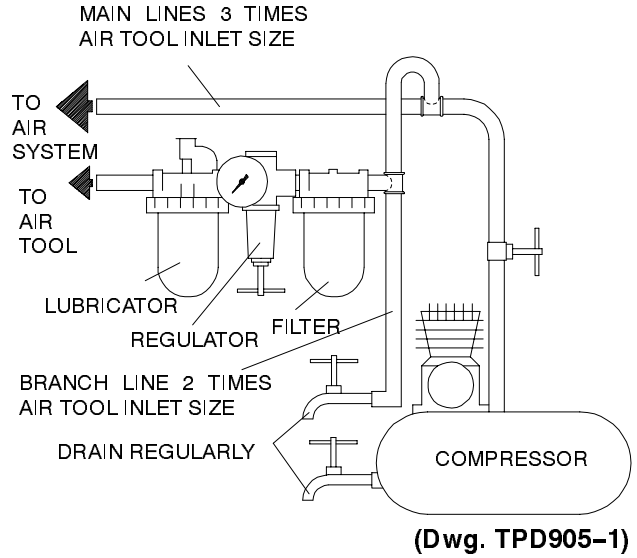
Be certain the Governor Valve slides freely in the Governor Valve Bushing. A sticking Governor Valve is the most common cause of erratic motor speed. A loose, sloppy fit resulting from a badly worn Valve or Bushing produces the same effect.

PLACING TOOL IN SERVICE

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.



Model 35 Sump Pump is a “High Head” pump that is very popular in mining applications.

HOW TO ORDER A SUMP PUMP

Model	Size of Opening Pump will Pass Through		Pump Housing Material
	in.	mm	
35A1	9-1/2 x 11-1/2	241 x 292	Iron
35A3	9-1/2 x 11-1/2	241 x 292	Iron

PART NUMBER FOR ORDERING

PART NUMBER FOR ORDERING

1	Motor Housing	P35-40	• 28	Cylinder	R5H-3
• 2	Water Seal (2)	P35-153	• 31	Housing Gasket	P35-43
3	Grease Fitting (2)	P25-188	• 32	Rear End Plate	P35-12
4	Impeller Hub Bushing	P35-41	33	Rotor Packing	P35-35
5	Rotor Spring	22SR-262	34	Rotor Packing Retainer	P35-36
7	Impeller Key	P35-150	35	Rotor Packing Washer	P35-34
8	Arbor Nut Washer	P35-157	37	Governor Valve	P35-425
10	Inlet	P25-148B	38	Governor Valve Spring	P35-431
11	3/8" Lock Washer (10)	D02-321	39	Backhead	P35-102
12	Suction Seal Cap Screw (4) (1/4"-20 x 3/4" long brass fillister head)	P35-146	40	Grease Fitting	P25-188
14	Arbor Nut	PS251-142	41	Oil Chamber Plug	P25-227
• 15	Impeller	P35-143	42	Governor Valve Bushing	P35-429
• 16	Impeller Shim (as required)		43	Oiler Felt	JA4-75
	0.005" thick	P35-151-5	44	Oiler Adjusting Screw	JA4-71
	0.010" thick	P35-151-10	• 45	Vane Packet (set of 4 Vanes)	R5H-42-4
	0.025" thick	P35-151-25	46	Housing Nut	P35-282
17	Impeller Spacer	P35-152	47	Seat Retaining Spring	H80-81B
18	Arbor	P35-4	48	Governor Valve Spring Seat	P25-418
19	Rotor Key	P35-70	49	Air Strainer Assembly	P250-A267
• 21	Front End Plate	P35-11	50	Air Strainer Cap	P25-268
22	Rotor Packing	P35-35	+ 51	Air Strainer Plug	P25-536
23	Rotor Packing Retainer	P35-36	• + 52	Air Strainer Screen	205-1061
24	Rotor Packing Washer	P35-34			
25	Rotor	P35-53			
26	Rotor Bearing Spacer (2)	P35-65			
27	Rotor Key Screw	JA4-129			

MAINTENANCE SECTION

- 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.
- + The listed parts are for the up-to-date Air Strainer that is 4-1/2" long. Previously, a Strainer 5-1/2" long was used. Only the Screen and Plug remain available for the longer Strainer. If required, order No. HU-61 Air Strainer Screen and No. 22SR-165 Air Strainer Plug.

PART NUMBER FOR ORDERING

PART NUMBER FOR ORDERING

53	Air Strainer Nipple	P35-286	*	Discharge Hose	
• 54	Rotor Bearing (2)	R5H-22		50 ft of 2-1/2" Hose, Female Coupling on one end to fit 3-1/16" O.D.	
57	Exhaust Elbow	P35-587		7-1/2 thread of No. P25-183	
• 58	Arbor Bearing Spring	T01-35		Fire Hose Adapter	P25-181-50
• 59	Rear Arbor Bearing	TA-22A		50 ft of 2-1/2" Hose, Female Coupling on one end to fit 3-1/16" O.D.	
60	Arbor Bearing Spacer	P35-277		7-1/2 thread of No. P25-183	
• 61	Front Arbor Bearing	P35-33		Fire Hose Adapter and Male Coupling on the other end 3-1/16" O.D.	
62	Arbor Bearing Seat	P35-115		7-1/2 thread to fit 2-1/2" National Standard Fire Hose Coupling	P25-182-50
63	Impeller Case Cap Screw (6)	D02-354		1" Pipe Line Valve	RC5-160
64	Impeller Case Gasket	P35-113		* Pipe Line Valve Connector	R44-115
• 65	Suction Seal Shim (as required)			* Muffler	P251-674
	0.003" thick	P35-145-3		* Hose Nipple (1" Hose to 1" Pipe)	P35-46
	0.005" thick	P35-145-5		* Discharge Nipple	P25-135
	0.015" thick	P35-145-15		* Fire Hose Adapter	P25-183
	0.031" thick	P35-145-31		* Expanding Coupling	P25-190
66	Inlet Cap Screw (4) (3/8"-16 x 2-3/4" long brass hex head)	P35-117		* Fire Hose Adapter	P25-192
67	1/4" Lock Washer (4)	L01-67		* Rotor Packing Retaining Pliers	P35-24
68	Suction Seal	P35-144		* Grease Gun	P25-228
69	Impeller Case				
	for models with standard tapped discharge ending in -EU	P35-EU-112			
	for all other models with standard tapped discharge	P35-112			
	for models with british pipe tapped discharge ending in -EU	P35-EU-212			
	for all other models with british pipe tapped discharge	P35-212			
70	Governor Assembly	R4V6-A424B			
78	Cylinder Dowel	R5H-98			

MAINTENANCE SECTION

- * 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.

MAINTENANCE SECTION

WARNING

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

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

LUBRICATION

Each time the Model 35 Sump Pump is disassembled for maintenance, repair or replacement of parts, lubricate the pump as follows:

1. Inject 1 – 2 cc of Ingersoll-Rand No. 80 Grease through the Grease Fittings (3 and 40).
2. Fill the oil chamber with Ingersoll-Rand No. 50 Oil. Place 15 – 20 drops of oil into the air inlet before attaching the air hose.

DISASSEMBLY

General Instructions

1. Do not disassemble the pump 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 pump unless you have a complete set of new gaskets and O-rings for replacement.

Disassembly of the Sump Pump

1. If the Air Strainer Screen (52) is to be cleaned or replaced, unscrew the Air Strainer Cap (50) and withdrawn the Screen.
2. With the Motor Housing (1) clamped in leather-covered or copper-covered vise jaws horizontally, remove the six Impeller Case Cap Screws (63).
3. Remove the Arbor Nut (14) and the Impeller (15).
4. Reposition the Motor Housing in the vise vertically. Unscrew the Housing Nut (46) and carefully remove the Backhead (39).
5. While grasping the Governor Assembly (70) in one hand, gently tap on the impeller end of the Arbor (18) with a plastic hammer and withdraw the assembled motor and Arbor.

6. Remove the Arbor from the Rotor (25). If required, unscrew the Rotor Key Screw (27) and remove the Rotor Key (19).
7. Carefully remove the Impeller Shim (16), the Water Seals (2), and the Impeller Spacer (17) from the Arbor.
8. Remove the Arbor Bearing Seat (62), the Front Arbor Bearing (61), the Arbor Bearing Spacer (60), the Rear Arbor Bearing (59) and the Arbor Bearing Spring (58).

Disassembly of the Motor

1. Carefully unscrew the Governor Assembly (70).
2. Remove the Rear End Plate (32).
3. Remove the four Vanes (45) then the Cylinder (28).
4. Remove the Front End Plate (21).
5. If required, remove the Rotor Bearings (54), Rotor Packing Retainers (23 and 34), Rotor Packings (22 and 33), and the Rotor Packing Washers (24 and 35) from both End Plates.

ASSEMBLY

General Instructions

1. Always press on the **inner** 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. Except for bearings, always clean every part and wipe every part with a thin film of oil before installation.
5. Check every bearing for roughness. If an open bearing must be cleaned, wash it thoroughly in a suitable cleaning solution and dry with a clean cloth. **Sealed or shielded bearing should never be cleaned.** Work grease thoroughly into every open bearing before installation.
6. Apply a film of O-ring lubricant to all O-rings before final assembly.

Assembly of the Motor

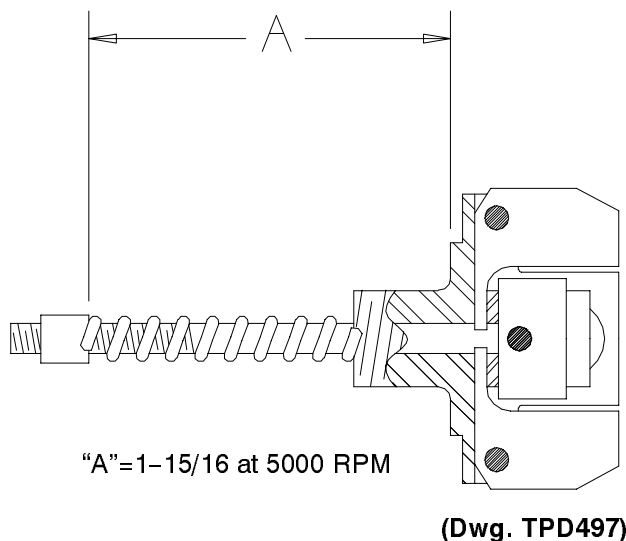
1. If required, reinstall the Rotor Packing Washers (35 and 24), the Rotor Packings (22 and 33), the Rotor Packing Retainers (23 and 34), and the Rotor Bearings (54) in the Front and Rear End Plates (21 and 32).
2. Place the Front End Plate on the slotted end of the Rotor (25).
3. Slide the Cylinder (28) over the Rotor.
4. Apply a thin coat of recommended oil to the Vanes (45) and install them in the slots in the Rotor.
5. Place the Cylinder Dowel (78) in the hole in the Cylinder.

MAINTENANCE SECTION

6. Place the Rear End Plate (32) on the Rotor.
7. Carefully reinstall the Governor Assembly (70) into the Rotor.
8. Place the Rotor Key (19) in the keyway in the Rotor and secure it with the Rotor Key Screw (27).

GOVERNOR ADJUSTMENT

When installing a new Governor Assembly, screw the Adjusting Nut onto the governor stem until dimension "A" equals 1-15/16" at 5000 RPM. This will usually result in the proper governed free speed. However, **this is only an approximate setting** and further adjustment may be necessary. Screw the nut farther onto the stem to **increase** the speed; back it off to **decrease** the speed. See Dwg. TPD497.



Assembly of the Sump Pump

1. Place the Front Arbor Bearing (61) on the Arbor (18).
2. Install the Arbor Bearing Seat (62) against the Front Bearing.

3. Place the Impeller Spacer (17) on the Arbor.
4. Start one Seal, lip side last, into the bore of the Motor Housing and press in the Impeller Hub Bushing. The Bushing will force the Seal into the Housing to the proper depth.
5. Slip the other Seal, lip side last, onto a round smooth rod, the same (or slightly larger) diameter as the shank on the Impeller Spacer. Grease the spacer shank. Place the end of the rod against the spacer face, and slide the Seal from the rod onto the Spacer.
6. Carefully place the two Water Seals (2) on the Impeller Spacer with their lips opposing each other.
7. Reinstall the Arbor Bearing Spacer (60) from the Rotor end of the Arbor.
8. Reinstall the Rear Arbor Bearing (59).
9. In required, replace the Impeller Hub Bushing (4).
10. Clamp the Motor Housing (1) in leather-covered or copper-covered vise jaws, Impeller end down.
11. With the Rotor Spring (5) in the Arbor, carefully guide the assembled Arbor into the Motor Housing.
12. Making sure that the keyway in the Arbor and the Rotor Key (19) in the Rotor (25) will mesh, install the motor in the Housing.
13. Place the Backhead (39) onto the Motor Housing, making sure that the Cylinder Dowel (78) seats in the dowel hole.
14. Secure the Backhead with the Housing Nut (46).
15. Rotate the Motor Housing in the vise.
16. Reinstall the Impeller Shim (16).
17. With the Impeller Key (7) in the Arbor, reinstall the Impeller (15) on the Arbor and secure it with the Arbor Nut (14).
18. Reinstall the Impeller Case (69) and secure it with the six Impeller Case Cap Screws (63).

MAINTENANCE SECTION

TROUBLESHOOTING GUIDE

Trouble	Probable Cause	Solution
Low power or low free speed	Dirty Air Strainer Screen and/or Muffler	Using a clean, suitable, cleaning solution in a well-ventilated area, clean the Air Strainer Screen and/or Muffler. Allow to air dry.
	Worn or broken Vanes	Replace complete set of Vanes.
	Worn or broken Cylinder	Examine Cylinder and replace it if it is worn or broken or if bore is scored or wavy.
	Improper lubrication or dirt build-up in the motor	Lubricate the pump as instructed in LUBRICATION . If lubrication does not result in satisfactory operation, disassemble the pump, inspect and clean all parts.
Erratic speed	Sticking Governor Valve	Replace Governor Valve and/or Governor Valve Bushing.
Rough operation	Worn or broken Rear Rotor Bearing, Front Rotor Bearing or Arbor Bearing	Examine each Bearing. Replace if worn or damaged.
	Worn Rotor Key	Replace the Key. Check the Rotor Shaft and Rotor for keyslot wear and replace if necessary.
Scoring of End Plates and Cylinder	Improper assembly	Make certain that all motor parts are properly aligned prior to clamping the motor assembly.
	Worn Rotor Packing	Replace the Rotor Packing.

NOTICE

SAVE THESE INSTRUCTIONS. DO NOT DESTROY.

NOTES