

Turbocharger Model S3A

SERVICE INSTRUCTIONS

This data sheet covers the recommended procedures for overhauling Model S3A Schwitzer Turbochargers, with single piece bearing housing.

These instructions should be used in conjunction with the latest issue of the 'S Series Turbocharger Service Limits and Torque Values' Data Sheet.

System troubleshooting and failure analysis are not covered but detailed service procedure is given which is to be followed should the turbocharger need repair. The text is written with the assumption that a Schwitzer Overhaul Kit will be used to rebuild the turbocharger.

Unauthorised field disassembly may nullify factory warranty. Ensure that the turbocharger is no longer under warranty before dismantling.

We urge you to contact your nearest Schwitzer location with regard to any warranty or turbo rebuilding questions.

Service Instructions

The shop requirements for servicing the Model S3A turbochargers are minimal. The few standard tools commonly needed are listed below. Also recommended is a securely mounted vice, a source of clean compressed air, a plastic scraper, a stiff natural or wire brush, a nonflammable safety solvent such as trichlorethylene, a "squirt can" of clean engine oil, a CLEAN work area, and the appropriate Schwitzer Service Parts.

- 1) Circlip Pliers
- 2) 12 point sockets $\frac{9}{16}$ $\frac{11}{16}$ inch A/F
- 4) Open ended spanners $\frac{7}{16}$ inch A/F
- 5) Torque wrench 0-20 lb. ft. (2.1 Kg. M)

Dismantling Procedure

- 1) Mark the relative position of the compressor cover and the turbine housing to the bearing housing.
- 2) Fix the turbine housing in the vice using soft jaws with the turbocharger shaft vertical.
- 3) Release the compressor vee clamp.
- 4) Lift off the compressor cover and vee clamp.
- 5) Release the turbine end vee clamp.
- 6) Lift the core assembly out of the turbine housing.
- 7) Clamp the $\frac{11}{16}$ inch A/F 12 point socket wrench in the vice with

the socket axis vertical.

- 8) Place the 12 point hub of the turbine wheel into the socket. Hold the core assembly in one hand and release the compressor wheel locknut using the $\frac{9}{16}$ inch A/F spanner. **Note** later models use left hand thread.
- 9) Remove the compressor nut and slide the compressor wheel from the turbine shaft.
- 10) Gently remove the turbine shaft and wheel by tapping with a small soft faced mallet on the compressor end of the shaft. Be careful not to bend or damage the shaft.
- 11) Sit the bearing housing on the turbine backplate on the bench and remove the insert retaining snap ring.
- 12) Lever out the insert assembly from the bearing housing by prying evenly with two screwdrivers under the lip.
- 13) Dismantle the insert assembly by pushing the flinger sleeve out of the insert.
- 14) Lift out the thrust washers and thrust bearing from the bearing housing.
- 15) Carefully open the bearing restraining clip with a pair of long thin circlip pliers and lift the journal bearing out of the bearing housing.

Cleaning of Parts

- 1) **Aluminium Parts**
Soak in commercially available non-caustic solvent until deposits have been softened. Clean surfaces with bristle brush and

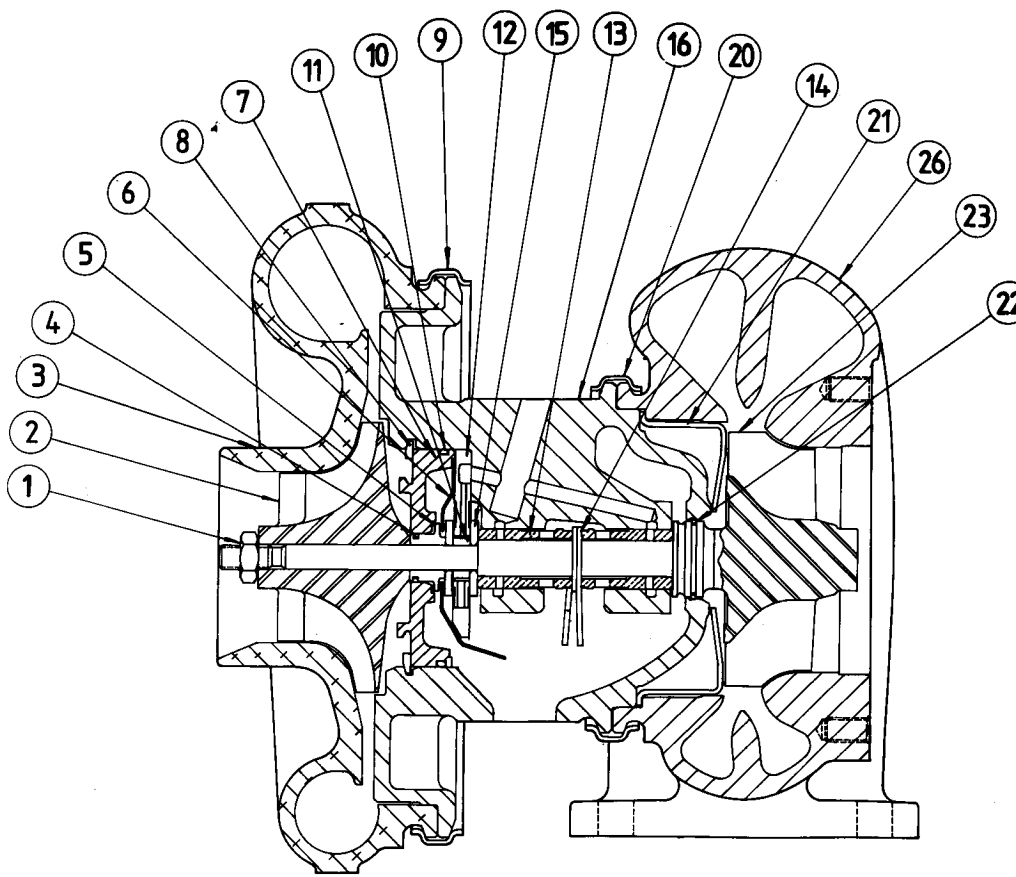
soft scraper. Vapour blast may be used providing bearing surfaces are protected.

- 2) **Cast Iron Parts**
Soak in commercially available non-caustic solvent.
Alternatively bead blast, taking care with internal profile surfaces.
- 3) **Shaft and Wheel Assembly**
Soak in commercially available solvent to remove oily residue. Mask entire shaft section and vapour blast wheel and hub to total cleanliness. Avoid concentrating on piston ring seal groove.

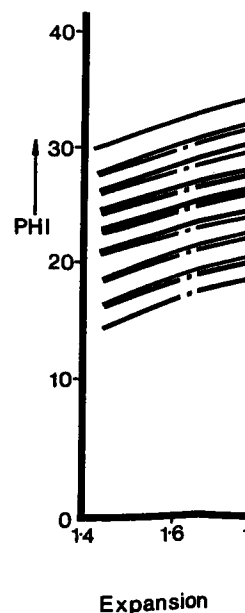
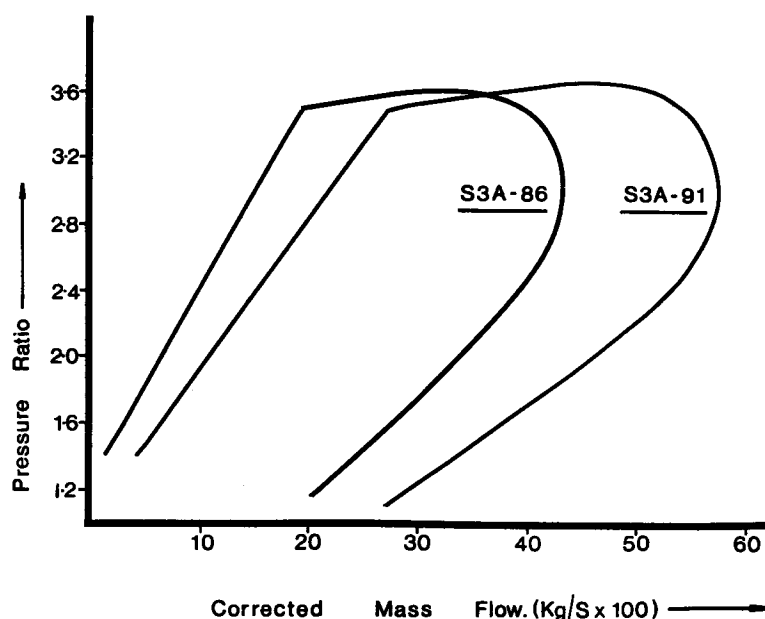
Inspection of Parts for Re-Use

Critical dimensions mentioned below are given in the latest issue of the 'S Range Service Limits and Torque Values' Data Sheet.

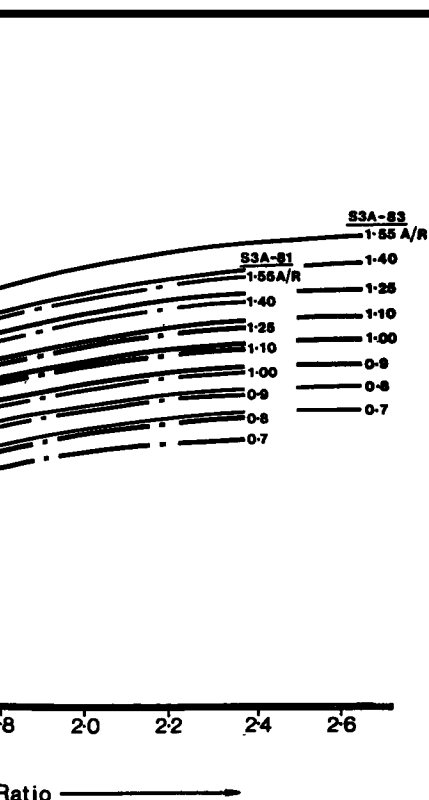
- 1) **Bearing Housing Assembly**
 - a) Inspect the bearing bore visually for sign of damage or wear.
 - b) Check the turbine end seal bore for damage.
- 2) **Compressor Wheel**
Inspect visually for evidence of bent, burred, nicked or eroded blades and for evidence of scuffing on the back face. Very minor damage is acceptable. Reject and replace if damage appears sufficient to affect wheel balance. Do not attempt to straighten any bent blades.
- 3) **Shaft and Wheel Assembly**
 - a) Check journal diameter for wear.
 - b) Check seal groove width.
 - c) Measure eccentricity between large and small shaft diameter.
 - d) Check balance in both planes. Replace if outside limits.
- 4) **Compressor Cover**
Visually inspect for evidence of contour damage. Replace if damage is excessive.
- 5) **Turbine Housing**
Inspect visually for evidence of contour damage and evidence of overtemperature damage such as cracking, pitting, warping, erosion. Reject and replace if damage is excessive.



Compressor and turbine performance



Item No.	Description	Qty.	O/H Kit Item
1	Locknut	1	*
2	Compressor Wheel	1	
3	Compressor Cover	1	
4	Piston Ring	1	*
5	Flinger Sleeve	1	
6	Oil Deflector	1	
7	Insert	1	
8	Snap Ring	1	
9	Vee Clamp	1	
10	O Ring	1	*
11	Spacer Sleeve	1	
12	Thrust Bearing	1	*
13	Bearing	1	*
14	Spring Clip	1	*
15	Thrust Ring	2	
16	Bearing Housing Assembly	1	
20	Vee Clamp	1	
21	Backplate	1	
22	Piston Ring	1	*
23	Shaft & Wheel Assembly	1	
26	Turbine Housing	1	
—	Locknut (Vee Clamp)	2	



- 6) **Turbine Backplate**
Replace if cracked or warped.
- 7) **Flinger Sleeve**
Check piston ring groove width and for signs of taper or damage to groove. Reject if worn.
- 8) **Thrust Rings**
Replace if thrust surfaces are worn. In most cases these may be re-used by reversing the position so that the non worn side is in contact with the thrust bearing.
- 9) **Spacer Sleeve**
This part should show no sign of surface disturbance.

Assembly Instructions

- 1) Use only the parts complying with the dimensions outlined in the inspection instructions above plus an 'Overhaul Kit'.
- 2) All parts must be washed in clean solvent and dried with compressed air.
- 3) Fit the journal bearing into the bearing housing carefully positioning the restraining clip. Take care not to strain the clip. When fitted it should stop the bearing turning under a modest torque.
- 4) Fit a new piston ring seal to the groove in the shaft and wheel assembly.
- 5) Fit the turbine backplate over the shaft section and rest it on the back of the turbine wheel.
- 6) Fit the shaft and wheel etc. into the bearing housing assembly after lubricating both shaft and piston ring. Take care not to damage the piston ring when entering the sealing bore.
- 7) Place this assembly into the turbine housing with the shaft vertical.
- 8) Fit the thrust ring and spacer onto the shaft.
- 9) Fit the thrust bearing into the bearing housing locating carefully on the dowel and lubricate the bearing surfaces.
- 10) Fit the second thrust washer and oil deflector.
- 11) Fit a new 'O' ring to the groove in

the insert.

- 12) Fit a new piston ring onto the flinger sleeve.
- 13) Assemble the flinger sleeve assembly into the insert taking care not to damage the piston ring.
- 14) Lubricate the 'O' ring and assemble the insert assembly into the bearing housing and shaft assembly and retain with the snap ring, taking care to ensure the bevelled edge is uppermost.
- 15) Fit the compressor wheel and lock nut.
- 16) Clamp the $\frac{11}{16}$ inch A/F 12 point socket wrench in the vice with the socket axis vertical.
- 17) Place the 12 point hub of the turbine wheel into the socket.
- 18) Tighten the compressor locknut with a Tee handle wrench in accordance with 'S Range Service Limits and Torque Values' Data Sheet. Apply 2 drops of loctite 290 to the threads.
- 19) Fit the core assembly into the compressor cover, orientate to the marks, fit the vee clamp and tighten the nut to 8lb. ft. (1.1 KgM).
- 20) Fit the core assembly into the turbine housing, orientate to the marks, fit the vee clamp and tighten the nut.

Reinstallation Checklist

- A. Inspect the intake and exhaust systems leading to and from the turbocharger to ensure absence of foreign material including burrs and loose lining fragments. Be thorough - even small particles entering the turbocharger during operation can cause severe rotor damage.
- B. Use new, approved gaskets at the various air, oil and exhaust connections to the turbocharger. Do not use sealing or jointing compounds at flanged connections.
- C. Use a high temperature antiseize compound (such as Fel-Pro C5A) on all threaded fasteners connected to the turbocharger.

- D. Limit drain port tilt to 20 degrees from bottom centre in either direction. Tilting in excess of this amount can create a low-idle leakage tendency at both the turbine and compressor seals.
- E. Fill the oil inlet port to overflowing with clean engine oil before connecting the oil feed hose to the turbocharger. Avoid using any thread sealer on oil inlet - it can contaminate the oil system.
- F. Before connecting the oil drain hose, crank the engine without firing until a steady stream of oil flows from the drain port.
- G. Upon first start-up of engine, stand clear of vehicle and observe that turbo operates smoothly after installation. Run the engine at low idle for at least three minutes. This will prevent oil starvation damage to the bearing system, and will tend to purge residual

contaminants from the bearing housing prior to unit acceleration.

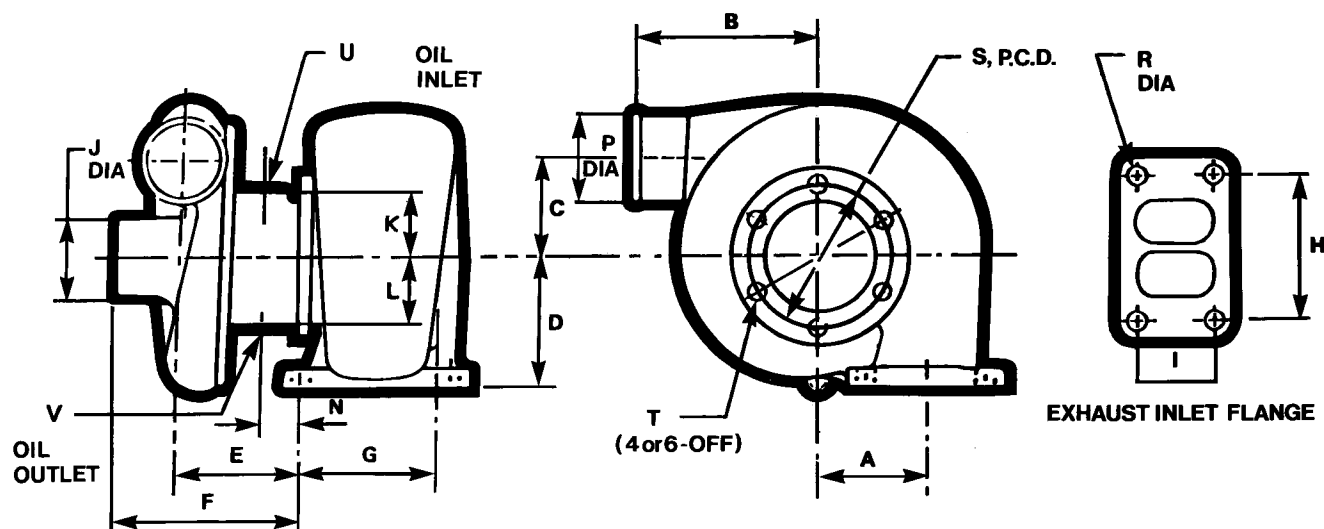
Important Safeguards

WARNING: Misuse or modification of the turbocharger can result in serious injury and property damage. Basic safety precautions including the following should always be practiced.

- A. Read and comply with all instructions.
- B. Install turbocharger only on an engine which has been approved for such application (check Schwitzer catalogue). The turbocharger is a precision built product which has been matched and tested for use on specific engines only.
- C. Do not modify or substitute any parts of the turbocharger. Do not

remove metal from any part of the turbocharger.

- D. Service should be done only in accordance with the appropriate Schwitzer Service Instructions for the specific turbocharger model.
- E. Do not modify or substitute any parts of engine except in accordance with engine owner's manual. Do not modify engine fuel control system, restrict exhaust system or air inlet.
- F. Do not operate at excessive altitudes.
- G. Be sure that oil supply and drain lines are adequate.
- H. Always warm up the engine for 2-5 minutes to allow oil to reach the turbocharger before operating under load.
- I. Perform all maintenance specified by the engine manufacturer at the recommended intervals.



Dimensions given below are for information only. Refer to Schwitzer for exact details.

A	B	C	D	E	F	G	H	I	J	K	L	N	P	R	S	T	U	V
63.5	128	70	89	73	124	83.2	89	70	75	47.5	47.5	26.6	65	11	108	M8	M8	M8
92.2	140	78.5	108	114	193	84.4	113	70	89	47.5	47.5	31.4	76.2	11	121	M10	M8	M8

Dimensions are in mm

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