

INTER-AMERICAN OIL WORKS, LTD.

OWI

TORQUE CONVERTER

MODEL C-300-OWI

SERVICE MANUAL

Inter-American Oil Works, Ltd.

P.O. Box 69170

Odessa, TX 79769

(432) 381-5265

oilworksinc@oilworksinc.com



WITH NATIONAL-OILWELL*

*NOT AFFILIATED

FOREWARD

This service manual has been prepared to include information on installation, operation, and maintenance. Proper use of this manual will assist the operator in obtaining good torque converter operation and trouble-free service.

The operator is warned that before performing any internal maintenance work on the torque converter, it is necessary to shut down the converter and allow it to cool. This precaution must always be observed because immediately after shutdown the oil temperature is sufficiently high enough to cause burns.

THE RIGHT AND LEFT SIDES OF THE TORQUE CONVERTER ARE DETERMINED BY VIEWING THE TORQUE CONVERTER FROM THE OUTPUT SHAFT, LOOKING TOWARD THE ENGINE.

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INSTALLATION

PREPARATION OF ENGINE

Use a jack or lever and lift the engine flywheel to the limit allowed by the rear main bearing. Measure the amount of this movement by using an indicator. Jack or bump the engine crankshaft to its limiting front and rear positions and measure the amount of this movement by using an indicator. If either of these indicator readings exceeds the engine manufacturer's specifications, consult an engine representative.

MOUNTING TORQUE CONVERTER TO ENGINE

1. All surfaces which have been coated with a preservative must be thoroughly cleaned with a suitable solvent. (ANY PAINT ON THE FLYWHEEL OR INSIDE THE FLYWHEEL HOUSING MUST BE REMOVED.)
2. Apply sealant to both torque converter and engine housing. Install mounting gasket.
3. Make up torque converter drive ring to engine flywheel and torque converter housing to engine flywheel housing.
4. Use feeler gauge to determine gap under torque converter supports, insert shims plus an additional .005" to relieve stress from flywheel housing.
5. Install an oil drain line from the bottom of the engine flywheel housing to the ½" N.P.T. hole provided in the torque converter sump.

MOUNTING AND ALIGNMENT OF ENGINE AND TORQUE CONVERTER PACKAGE TO DRIVEN COMPONENT USING AIR CLUTCH

1. Install clutch drum hub and clutch drum on output shaft of torque converter.
2. Position engine and torque converter assembly so clutch drum is fully inserted into clutch element.



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MOUNTING AND ALIGNMENT CONT'D.

3. Secure bolts in engine and torque converter skid to master skid.
4. Parallel (O.D.) Misalignment, also referred to as offset or run out, occurs when the axes of rotation are parallel to each other. It is measured by attaching a dial indicator to one shaft; rotating the shaft with the indicator about the outside diameter of the other shaft and noting indicator readings.
5. Angular (Face) misalignment, also referred to as gap, occurs when the axes of rotation intersect each other. Either a micrometer or dial indicator can be used to take gap measurements.
6. Parallel and angular measurements are then used to determine the necessary adjustments. Tolerances within .010" for parallel and angular measurements are acceptable.
7. Make certain to maintain the additional .005" lift on rear mounting feet of torque converter to compensate for sag between engine flywheel housing and end clutch drum.

OPERATION

START UP

The following initial start up procedure should be followed at all times when the fluid elements and cooler have been drained.

1. Fill the sump with a recommended oil. (APPROXIMATELY 37 U.S. GALLONS)
Use premium grade oil possessing excellent oxidation resistance, corrosion resistance, and containing anti-foam inhibitors.

Viscosity - SSU of 150 to 200 at 100° F
Viscosity Index in Excess of 100

First Choice: Premium Grade Turbine Oils
Second Choice: Torque Fluid Type C₁ or C₂



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START UP CONT'D.

2. Start the engine and run at idle speed with the compound clutch disengaged for a period of five minutes. Check the oil level and add oil as required through the breather-filter port.
3. Gradually increase engine speed until operating speed is reached. If the pressure remains steady and in the operating range, the torque converter is ready for load.

THE OIL SHOULD BE CHECKED FREQUENTLY IN THE FIRST TWO HOUR PERIOD AS ANY AIR TRAPPED IN THE CIRCUIT IS GRADUALLY ELIMINATED.

LUBRICATION

All internal bearings are automatically pressure lubricated with the working fluid. The throw-out bearings on units equipped with a throw-out clutch between the torque converter and the engine require daily greasing.

OIL CHANGE

The oil should be changed and the circulating pump chain tightened (See Page 4) after the first 200 hours of operation of a new torque converter or one that has been overhauled.

The oil filter, breather filter, strainer, and orifice assembly should be cleaned each time the oil is changed.

Under normal conditions the oil should be changed every 3000 hours or every three months if the torque converter is operated 24 hours per day. The elements and cooler should be drained and the sump thoroughly cleaned at this time. The elements are drained by removing the two plugs in the drive bell. The cooler is drained by removing the plug on the bottom of the unit.



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OIL FILTER

THE TORQUE CONVERTER MUST BE SHUT DOWN, PRESSURE AT 0 PSI, AND FILTER DRAIN COCK OPENED BEFORE REMOVING THE FILTER CAN.

The oil filter is located on the outside of the torque converter housing (left side) on the bottom of the pressure control valve block. The filter may be removed by removing the hex head bolt from the center of the cover. Be careful not to damage the O'ring seal. The cartridge can now be removed for inspection and cleaning. (Replace can and O'ring.)

SPIN-ON FILTER

Carefully remove filter cartridge. Fill new filter with oil and install on adapter hand tight. To replace O'rings and gasket under the spin-on adapter, remove pipe nipple and allen screw inside adapter. Remove adapter, replace O'rings and gasket, and reinstall adapter.

BREATHER FILTER

The breather filter is located on the left side of the torque converter and covers the oil fill port. Periodic cleaning and inspection of the breather filter element should be made to prevent the accumulation of hazardous oil vapors and air pressure within the torque converter housing. Operation in dusty areas will require more frequent cleaning and inspection.

The filter element may be cleaned with any suitable cleaning solvent.

STRAINER AND ORIFICE ASSEMBLY

The strainer and orifice assembly is located on the end cap of the pressure control valve.

This should be cleaned when the oil filter is cleaned to avoid clogging. If the strainer or orifice is plugged, the pressure control valve will not operated properly, resulting in sluggish pressure response to loading and unloading of the torque converter. The torque converter will tend to overheat and/or dump oil from the circuit.



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SUCTION STRAINER

There is a suction strainer located in the bottom of the sump. This strainer is a safety device to prevent large objects from being drawn into the oil pump and should not ordinarily require attention. It should, however, be checked in case of low oil pressure.

CHAIN ADJUSTMENT

An idler sprocket is used to adjust the chain driving the circulating pump. Two cap screws, one inside and one outside the converter housing, hold the idler sprocket in position. Adjustment is made by loosening the cap screws and rotating the idler sprocket arm.

GAUGES

The temperature and pressure gauges give the first indication of trouble and it is important that these gauges be kept operative at all times. If at any time there is reason to suspect the accuracy of a gauge it should be replaced immediately. **THE TORQUE CONVERTER SHOULD NEVER BE OPERATED WHEN THE GAUGES ARE IN THE RED SECTION DURING NORMAL OPERATION.** The pressure gauge may operate in the red section at low engine speeds (under 500 rpm) without danger.

TEMPERATURE

The normal operating range for this torque converter is in the vicinity of 200° F and will vary with ambient temperature and the type of operation. It should never exceed 240° F but can be safely operated up to this point

OIL PRESSURE

The oil pressure will vary with load. At no load, it may run as high as 50 psi and will hold between 15 and 20 psi in the working range. The oil pressure should never go under 10 psi. If this occurs see "Low Pressure" section on page 6 for trouble shooting procedures.

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EXTENDED SHUTDOWN

If the torque converter is to be shut down for a long period of time, it should be drained and thoroughly flushed. The filters should be cleaned and the sump filled with a rust-inhibiting oil. A running-in period will thoroughly mix and circulate the rust-inhibitor to provide a protective coating to the internal working parts. Drain the torque converter and seal off all openings to prevent the entrance of dust or any foreign material.

OVERHEATING OF TORQUE CONVERTER

The torque converter cooling package is designed to furnish sufficient cooling down to 35% speed ratio. If the output shaft of the torque converter is turning at less than one-third (1/3) of engine speed, overheating will occur and a more efficient drive ratio should be selected. Overheating may also occur if the output shaft of the torque converter is turning at more than 80% of the engine speed.

Any oil leak in either the piping or the torque converter internal turbine assembly should be repaired immediately. If the sump oil level is allowed to drop below the oil pump suction, the torque converter will lose power and overheat. Bearings and seals may be severely damaged before the power loss is noted.

LOW PRESSURE

Check gauge readings with a second gauge. The gauge may be installed by removing the one-fourth-inch (1/4") pipe plug in the end of the control block (aluminum cap). The torque converter must be shut down before removing any pipe plugs.

The oil flow may be checked with a pressure gauge. There are two one-fourth-inch (1/4") pipe plugs on the face of the pressure control valve. Remove the plug on the left and connect the pressure gauge. With the engine at full throttle, the converter hot (above 125° F), and no load on the output shaft, if the pressure is 10 psi or over, the flow is sufficient and the trouble is in the control valve. Check the strainer and orifice for clogging and the spool for sticking.



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LOW PRESSURE CONT'D.

If the pressure at the left tap of the pressure control valve is low (5 psi or under) and the torque converter pressure is low, the trouble is in the circulating pump. First, add extra oil (2" above the fill mark with converter running). With low oil pressure, it is possible to have air in the circuit and get a false reading on the dipstick. Excessive oil can also cause low pressure due to excessive agitation and foaming from the chain.

An excessive leak inside the torque converter can cause sufficient foaming in the sump from the spray to keep the pump air locked. This can be checked by removing the cover plate with the engine at idle speed. **THIS SHOULD BE DONE WITH CAUTION.**



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RECOMMENDED RUNNING & OVERHAUL SPARE PARTS
FOR C-300-OWI TORQUE CONVERTER

<u>ITEM</u>	<u>NATIONAL PART NO.</u>	<u>OWI PART NO.</u>	<u>DESCRIPTION</u>	<u>RUNNING</u>	<u>O/H</u>
BASIC CONVERTER					
	7618018	1NA1919	Washer, 1/2"	4	4
	2230064	1NA3064	Gasket, Control Vlv	1	1
	2410022-224	1NA3924	O'Ring	1	1
	2230029	1NA3029	Gasket, Cover	1	1
	7618024	1NA3920	Washer, 3/4"	8	12
	2410031-210	1NA3923	Packing	8	8
	2410022-454	1NA3926	O'Ring	1	1
	2232072	1NA1072	Valve, Safety	1	1
	2230055	1NA3055	Idler, Assy	1	1
	5700022-144	1NA3922	Chain	1	1
	5802221		Link	1	1
	2410022-267	1NA3925	O'Ring	1	1
	2230036	1NA3036	Gasket, Pump	1	1
SHAFT ASSEMBLY					
	YS-4513	1NA3912	Seal	1	1
	2230009	1NA3009	Shim .005	-	3
	2232010	1NA3010	Shim .007	-	2
	2232011	1NA3011	Shim .020	-	2
	ZT-5009	1NA3905	Bearing	-	2
	2230008	1NA3008	Carrier	-	1
	2232047	1NA1047	Ring, 5 3/4" Seal	-	1
	2210032	1NA3812	Carrier	-	1
	2210020	1NA3901	Ring, 8" Seal	-	1
	ZR-6690	1NA3906	Bearing	-	1
	1277810	1NA3962	Ring, Retaining	-	1
	ZT-4370	1NA3907	Bearing	-	1
	7300110	1NA3947	Shim, .005	-	3
	7300131	1NA3948	Shim, .007	-	3



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	730012	1NA3949	Shim, .020	-	2
GAUGE ASSEMBLY					
	2230050	1NA3050	Gauge, Temperature	1	1
	2230068	1NA3060	Gauge, Pressure	1	1
CIRCULATING PUMP					
	2230083	1N3083	Sprocket	1	1
	YS-1127	1N3911	Seal, Oil	2	2
	ZT-1123	1N3909	Bearing	2	2
	2400042	1NA3805	Key	1	1
	2230025	1NA3025	Impeller	1	1
	2230024	1NA3024	Shaft	1	1
	2404057	1NA3910	Key	2	2
PRESSURE CONTROL VALVE					
	2230043	1NA3043	Spring, Valve	1	1
	2410022-234	1NA3927	O'Ring	3	1
		1NA3957	Gasket, Valve	1	1
		1NA3807	Adapter, Spin On	1	1
		1NA3808	Nipple, Spin On Adapter	1	1
		1NA3928	Filter, Spin On	1	1
	2230045	1NA3045	Gasket, Valve	1	1
	2230046	1NA3046	Ring, Piston	1	1
	2230042	1NA3042	Spool, Valve	1	1