# GROUP 3 TORQUE CONVERTER

## 1. FEATURES AND USE

Hydraulic torque converter is a single stage, single phase radial turbine hydraulic converter. In addition to the structural features of general hydraulic torque converter, this product features three output shafts and thus it can drive three different models of hydraulic pump or other components to meet the requirements of engine.

## 2. WORKING

The pump pulley connects to engine flywheel by a connection wheel and flexible steel board. Driven by mechanical energy from engine, the unit transforms the energy into hydraulic power, which drives the turbine to be transformed into mechanical energy and outputted by power output members. Guide pulley has functions to change direction of operating flow and give a counter torque to the flow to change torque and speed.

The oil inlet valve consists of main pressure valve and an overflow valve. Function of the main pressure valve is to ensure sufficient oil supply to torque converter and that oil pressure range in speed change oil circuit of engine is within 1.30 ~ 1.50 MPa. The function of overflow valve is to build up a compensatory pressure to the system and, by different loading of torque converter and variation of internal pressure of hydraulic oil, automatically control the flow passing through the torque converter to control the heat dissipating capacity of torque converter and provide overpressure protection when the outlet port of torque converter is clogged.

## 3. TECHNICAL DATA

| | |
|---|---|
| Limit input torque | 69.3 kgf · m (502 lbf · t) |
| Nominal torque at zero-speed loading | 5.8 kgf · m (42.2 lbf · t) |
| Nominal torque at high efficiency loading | 6.1 kgf · m (44.1 lbf · t) |
| Torque ration at zero-speed loading | 3.24 |
| Max. efficiency | 0.836 |
| Width of high efficiency region | 2.032 |
| Net weight | 159kg |
| Dimensions | 470 × 530 × 530 mm |

## 4. MOUNTING AND USAGE

### 1) MOUNTING

When mounting, ensure that centerline of rotation of torque converter coincide with that of crankshaft of engine (see page 2-39).

### 2) USAGE

(1) Hydraulic torque converter uses AFT (DEXRON Ⅲ). Oil temperature should be within 85~100˚C, and not exceed 110˚C normally.

(2) Before staring hydraulic torque converter, check each rotating part for smooth rotation and that if there is seizure and collision. Mount the hydraulic torque converter on the vehicle and add a suitable amount of hydraulic oil to the tank.

(3) Start the engine and make the hydraulic torque converter to run for 1~2 minutes at low speed. Add oil to the tank again. Oil level should reach indicator line in running of hydraulic torque converter. Keep in mind to bleed air for the oil supply system when adding oil.

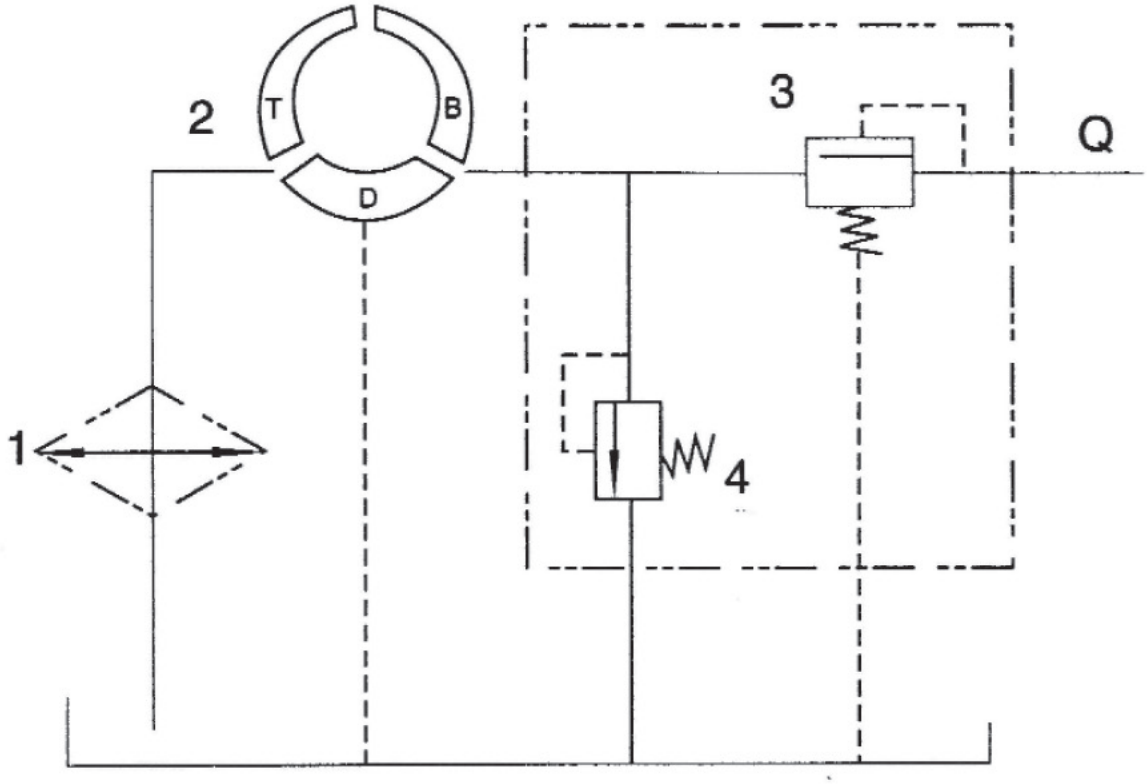
(4) After starting hydraulic torque converter, run it in low speed and moderate speed in sequence, then under load. Frequently watch its running and check if there is abnormal noise. Immediately stop and check if abnormal. During operation, frequently check for variation of oil pressure and temperature and ensure that are within normal range. When the hydraulic torque converter is in use, be sure to check it at least once a week and, if oil level is below the line, add adequate amount of oil promptly.

(5) It's required to renew oil for hydraulic torque converter after 30~50 hours of operation and then renew for second time after 500 hours of operation. After that, renew oil in the same time interval.

(6) For mechanic transmission, the driver should make timely gear shift to prevent the engine from dying by sound heard during operation. No engine dying will occur if transmission of hydraulic torque converter is matched rationally. However, the driver still needs to change gear timely by oil temperature readings to prevent from overheated oil in low efficiency region of torque converter that may cause damage to sealing pack.

## 5. OIL SUPPLY SYSTEM

Working principle of oil supply system of hydraulic torque converter.




| | | |
|---|---|---|
| 1 | Cooler | |
| 2 | Hydraulic torque converter | |
| 3 | Main pressure valve | Opening pressure 1.3 ~ 1.5 MPa |
| 4 | Overflow valve | Opening pressure 1.3 ~ 1.5 MPa |
| 5 | Flow | Q ≥ 50 ℓ/min |

## 6. TROUBLESHOOTING

| Problem | Cause | Increase engine rpm |
|---|---|---|
| Insufficient power output | Engine rpm drops. | Increase engine rpm. |
| | Gas exists in hydraulic oil. | Check transmission oil level.<br>Check for tightness of tubing system.<br>Check for deteriorated hydraulic oil. |
| | Too high hydraulic oil temperature. | Lower oil temperature. |
| | Too low pressure of overflow valve of hydraulic torque converter. | Check for sensitivity of motion of overflow valve and hydraulic oil leaks. |
| Too high oil temperature | Too long time of operation in low efficiency region. | Decrease external load or increase engine rpm. |
| | Too low oil level in oil tank or gas exists in hydraulic oil. | Add hydraulic oil, check for tightness of the connections of piping, and check for deteriorated oil. |
| | Oil does not meet requirements. | Use oil as recommended in operator's manual. |
| | Too low oil pressure in oil supply system. | Repair hydraulic valve, increase oil pressure. |
| | Low water level in cooling system. | Repair water tank. |
| | Insufficient oil supply. | Check oil supply system. |
| Too low oil pressure in oil supply system | Back pressure valve failure. | Replace back pressure valve. |
| | Clogged oil feed tube. | Check oil tubing. |
| | Insufficient oil supply of transmission oil pump. | Check and repair oil pump, or replace. |
| | Damaged or severely worn oil seal inside hydraulic torque converter. | Replace oil seal. |
| | Too low oil level in oil tank. | Add hydraulic oil. |
| | Clogged suction filter. | Clean or replace the filter. |
| | Failed pressure gauge. | Replace the pressure gauge. |
| Oil leakage | Damaged reinforced oil seal.<br>Damaged O-ring. | Replace the oil seal.<br>Replace the O-ring. |

## 7. OUTSIDE VIEW