Model 11 Transmission

The Model 11 Transmission is designed primarily for applications with engines rated at 7.5-15 Kw [10-20 hp] at maximum speed of 3600 RPM or electric motors up to 7.5 Kw [10 hp] at 3600 RPM.

Operation
For optimum control and power, the transmission should be operated at constant input speeds. When operating the unit under varying load conditions, there will be noticeable changes in the output speed. If the output speed decreases due to increased load, the shift lever should be directed toward neutral position to increase the output torque. This produces the same result as shifting down to a lower gear with a typical mechanical transmission.

Drive
The input drive for the Model 11 should be in line with the engine or motor and coupled with either universal joints or elastomeric couplings capable of correcting for any slight misalignments. Special model 11 transmissions can be belt driven.

Cooling
Proper cooling is essential to both performance and life of the transmission. The recommended maximum oil operating temperature is 82° C[180° F]. An 200 mm [8 in.] diameter fan, customer supplied, must be attached to the coupling at the input shaft to blow air across the finned cover.

Fluid
See Bulletin 3-401 for Recommended fluids. The preferred fluid viscosity is the same as that specified by SAE 20 W20.
Light Duty Hydrostatic

Internal Features
Model 11
Transmission

Performance Data

Displacement (Theoretical)
- Pump (Variable) .............. 0 - 18.9 cm³/r [0 - 1.15 in³/r]
- Motor (Fixed) ................. 34.3 cm³/r [2.09 in³/r]

Speed
- Input (Maximum) ..................... 3600 RPM
- Output ...................................... 0 - 1950 RPM

Kw/Horsepower, Input (Max.)
- @3600 RPM ............................. 15 Kw [20 HP]

Torque, Output
- Continuous ......................... 31 Nm [360 lb-in]
- Intermittent .......................... 61 Nm [540 lb-in]
- Peak ................................. 81 Nm [720 lb-in]

Operating Temperature (Max. Cont.) ........ 82° C [180° F]
Model 11 Transmission

System
The flow diagrams show the flow of oil through the unit. Speed control is achieved by changing the amount of oil delivered by the variable displacement pump by rotating the control shaft. Check valves on the inlet side of the pump enable the pump to receive charge pump flow as needed to make up for internal leakage.

Charge Pump
The charge pump performs five functions:
1. Maintains pressure 2-3 bar [30-50 PSI] on the low pressure side of the circuit to supercharge the variable displacement pump.
2. Supplies oil lost due to internal leakage to the circuit.
3. Provides a means of moving the hydraulic fluid through a filter and cooler when needed to maintain fluid cleanliness and temperature.
4. Provides a source of auxiliary hydraulic power for secondary operations such as a hydraulic cylinder used to power attachments on vehicles. (If a cylinder is used, be sure it is a double acting type.)
5. A charge pump option is available with a ball bearing input which is recommended for overhung loads such as pulleys, sprockets, etc.

Filter
An external filter, customer supplied, is also required and should be the last component in the charge pump discharge line before the pump. It should have a rating of 10 microns or less and be capable of filtering up to 17 L/min [4.5 GPM]. The filtered fluid then flows into the pump, past one of the check valves and into the low pressure circuit. Excess oil not needed for the system make-up is relieved into the pump case past the low pressure relief valve.

Dimensions Model 11 Transmission

Charge Pump Return Port
Straight Thread –6 Port O-ring Boss (for 3/8 inch nominal tubing OD) per SAE J514 spec.

Charge Pump Intake Port
Straight Thread –10 Port O-ring Boss (for 5/8 inch nominal tubing OD) per SAE J514 Spec.

Charge Pump Discharge Port
103.1 [4.06]
14.2 [0.56]
101.6 [4.00]
10.4 [0.41] Dia.
Thru for 3/8 in. Dia.
Bolts (4) Torque to 40 Nm [31 lb-ft]

Case Drain Port
Straight Thread
–10 Port O-ring Boss
(for 5/8 inch nominal tubing OD)
per SAE J514 Spec.

Control Shaft
Max. recommended control angle 14° for CW output rotation with CW input rotation (stops must be provided by customer, on linkage).

Max. recommended control angle 14° for CW output rotation with CW input rotation (stops must be provided by customer, on linkage).

Auxiliary Circuit
If an auxiliary circuit is used, the fluid flows from the charge pump to a valve in the auxiliary circuit. This valve should be an open center type and have an internal pressure relief valve set at no more than 35 bar [500 PSI] (55 bar [800 PSI] optional). At this pressure, the flow will be approximately 5.7 L/min [1.5 GPM] with an input speed of 3600 RPM and an oil viscosity of 10 cSt [60 SUS].

Acceleration Valves
Acceleration valves are available on models for applications where gradual acceleration from neutral is desirable. The valves are open in neutral position. The valve in the side of the circuit being used closes gradually as the pressure increases, cushioning load acceleration. On deceleration when pressure is decreased below a certain point the valve opens, bypassing the pump flow.

Options
- Wide Band Neutral
- Neutral Detent
- Heavy Duty Package
- Internal Charge Inlet
- Dump Valve
- Internal Charge Inlet

See Page 13 for Allowable Side Load
See Page 15 for Shaft Detail
See Page 15 for Shaft Detail
Sump cooled gear box, axle housing, etc. (shown with optional acceleration valves) uses flow thru output bearing with no shaft seal.

If the sump oil level can fall below the output shaft center line, then the optional motor body with case drain hole and sealed output shaft should be chosen.

Reservoir cooled models (shown with optional acceleration valves) uses sealed output bearing and shaft seal.

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Model 11 Pump

The Eaton Model 11 radial ball piston pump uses the same pumping element used in the Eaton Model 11 hydrostatic transmission. Over a quarter million of these transmissions have been produced and shipped to the field over the years, earning the Model 11 a reputation for the highest quality and reliability. And like all of our Hydraulics Division products, the Model 11 Pump is covered by Eaton's three year warranty.

The Model 11 pump is the ideal choice for applications requiring variable flow, in both directions, up to 66.2 L/min [17.5 GPM]. With an input speed capability of 3600 RPM and the integrity to handle 15 Kw [20 HP], the Model 11 pump, in combination with Eaton’s Char-Lynn motors, is the perfect match for many different types of mobile equipment as well as a wide array of industrial applications.
Model 11 Pump Performance and Specifications

Unit Ratings

Maximum Input Speed
Not to exceed 3600 RPM

Maximum Input Power
@ 3600 RPM 15 kw [20 HP]

Displacement (Theoretical)
Variable 0 - 18.9 cm³/r [0 - 1.15 in³/r]

Maximum Operating Pressure
155.2 bar [2250 PSI] Peak
120.7 bar [1750 PSI] Intermittent
86.2 Bar [1250 PSI] Continuous

Normal Charge Pump Flow and Pressure
15 L/min [4.0 GPM] at 7.6 bar [110 PSI] and 3600 RPM.

Charge Pump Flow and Pressure Available to Auxiliary Circuit
5.7 l/min [1.5 GPM] 34 bar [500 PSI] (55 bar [800 PSI] optional)

Unit Dry Weight
9.5 kg [21 lb.]

Operating Conditions

Filtration
A 10 micron (nominal) rated filter is required for filtration of fluid supplied to the return fitting. Filter cartridge must be capable of withstanding 10.3 bar [150 PSI] internal pressure.

Case Pressure
Case Pressure Should Not Exceed:
0.8 bar [12 PSI] Intermittent.
0.5 bar [7 PSI] Continuous.

Fluids
See Bulletin 3-401 for recommended fluids and cleanliness. The preferred fluid viscosity is the same as that specified by SAE 20W-20.

Maximum Oil Temp of 82° C [180° F]
Oil viscosity range of 10 cSt [60 SUS] minimum to 22000 cSt [100,000 SUS] maximum (cold start only).

Options
• Acceleration Valves
• Neutral Detent
• Wide Band Neutral
• High Rate Charge Relief
• Dump Valve
• Heavy Duty Package

For any deviation from these specifications, consult your Eaton Hydraulics Division representative.
Dimensions
Model 11 Pump

Charge Pump Intake Port
Straight Thread –10 Port O-ring Boss (for 5/8 inch nominal tubing OD) per SAE J514 Spec.

Max. recommended control angle 14° for flow from port A for CW input rotation (stops must be provided by customer, on linkage).

Charge Pump Discharge Port
Straight Thread –6 Port O-ring Boss (for 3/8 inch nominal tubing OD) per SAE J514 Spec.

Max. recommended control angle 14° for flow from port B for CW input rotation (stops must be provided by customer, on linkage).

Case Drain Port
Straight Thread –10 Port O-ring Boss (for 5/8 inch nominal tubing OD) per SAE J514 Spec.

Port A
Straight Thread –10 Port O-ring Boss (for 5/8 inch nominal tubing OD) per SAE J514 Spec.

Charge Return Port
Straight Thread –6 Port O-ring Boss (for 3/8 inch nominal tubing OD) per SAE J514 Spec.

Control Shaft (for CW Input Rotation)

Direction of Rotation Optional

100.8 [3.97]
76.2 [3.00]
57.2 [2.25]
106.7 [4.20]
14.2 [.56]

10,4 [.41] Dia. Thru for 3/8 inch Dia. Bolts (4) Torque to 40 Nm [31 lb-ft]

18,8/17.3 [.74/.68]
1/8 x 5/8 Woodruff Key (#5) Provided by Customer

26.9 [1.06]

22.4/19.8 [.88/.78]
17,2/1.34 [.68/.053]

128,75/124,58 Taper Per Meter [1.545/1.495]
Taper Per Foot

1/2-13 UNC 2A Thread
12.7 [.50] Min. Full Thread Max. Hold Down Torque of 32.6 Nm [24 lb-ft]

152,4 [6.00]

87.4 [3.44]

51.8 [2.04]

153,26 [6.034] 2 Ropes

207.8 [8.18] Charge Pump with Ball Bearing

188,0 [7.40] Charge Pump with Bushing

41,02 [1.615]

21.6 [.85] Dia. Thru for 3/8 inch Dia. Bolts (4) Torque to 40 Nm [31 lb-ft]

19,063/19,037 [.7505/.7495] Dia.
Dimensions — Input Shafts
Model 11 Transmission
Model 11 Pump

Dimensions — Output Shafts
Model 11 Transmission