Gear Pump Division

Dry Valve and Pump

ENGINEERING YOUR SUCCESS.
What is a Dry Valve?

A Dry Valve is a two position valve which is mounted directly to the inlet of the pump. In the first position, the dry valve shuts off the inlet flow to the pump while it is running except for about a ½ gpm that moves through the pump to lubricate it and carry away heat. In this position the hydraulic system is said to be in the “dry mode”. In the second position, the valve allows full flow to the pump inlet with out any restriction. In this position the hydraulic system is in the “wet mode” or active.
Why use a Dry Valve?

1) Cost Savings - A dry valve eliminates the need to use a clutch assembly or PTO (Power Take Off) to disengage the pump from the prime mover.
2) Horse Power Savings - A pump with a dry valve uses a very small amount of horse power in the dry mode compared with a direct drive pump sending flow through an inactive open center system.
What happens at the inlet of the pump when the system is in the “dry mode”?

In the “dry mode” the inlet of the pump is subjected to a very high vacuum, as much as 28 in. Hg has been recorded.
Pressures on Both Sides of Dry Valve In the Dry and Wet Modes
Dry Valve and Pump Schematic
In Dry Mode

- Vent to Atmosphere
- Air Pressure Supply Pump
- Air Control Valve
- Loop line
- Dry Valve
- Tank
- Pump
- To Control Valve

Legend:
- Tank Pressure
- System Pressure
- Air Pressure
- Vented to Atmosphere
- ½ gpm Flow in Dry Mode
Dry Valve and Pump Schematic
In Wet Mode

- Vent to Atmosphere
- Air Pressure Supply Pump
- Air Control Valve
- Loop line
- Dry Valve
- Tank
- Loop line

Key:
- Tank Pressure
- System Pressure
- Air Pressure
- Vented to Atmosphere
- ½ gpm Flow in Dry Mode

To Control Valve
Dry Valve and Pump Schematic In Wet Mode

Vent to Atmosphere
Air Pressure Supply Pump
Air Control Valve
Loop line
Dry Valve
Tank
Loop line
Pump
To Control Valve

Legend:
- Tank Pressure
- System Pressure
- Air Pressure
- Vented to Atmosphere
- ½ gpm Flow in Dry Mode
Dry Valve and Pump Porting

- 3/8” ODT Air Control Port
- 3/8” ODT Loop Line Port
- 3/8” ODT Loop Line Port (Hidden)
- 3/4” ODT Excess Flow Port
- Bleed Drain
- Bleed Drain (Hidden)
- 2” Split Flange from Tank
- 3/8” ODT Air Control Port
- 2” Split Flange Pump Inlet
- 1 1/4” Split Flange Pump Outlet
Dry Mode

- Tank Pressure
- System Pressure
- Air Pressure
- Vented to Atmosphere
- ½ gpm Flow in Dry Mode

½ gpm Dry Mode Flow Line

From Tank
To Tank
To Control Valve

Air Pressure

Parker
Wet Mode

- Tank Pressure
- System Pressure
- Air Pressure
- Vented to Atmosphere
- ½ gpm Flow in Dry Mode
- ½ gpm Dry Mode Flow Line
- From Tank
- To Tank
- Vented to Atmosphere
- To Control Valve
Dry Valve and Pump Schematic with Flow Control Valve

- Vent to Atmosphere
- Air Pressure Supply Pump
- Air Control Valve
- Tank
- Dry Valve
- Pump
- Flow Control Valve
- To Control Valve
Dry Mode

Air Pressure

½ gpm Flow in Dry Mode

½ gpm Dry Mode Flow Line

Excess Flow

From Tank

To Tank

Flow Control Valve

To Control Valve

Air Pressure

Tank Pressure

System Pressure

Air Pressure

Vented to Atmosphere

½ gpm Flow in Dry Mode
Will a standard roller bearing pump work with a dry valve?

NO - Changes must be made in three areas to get the longest life possible from a pump used in the dry valve system.

1) Low friction, fixed clearance ring seals should be installed
2) Special “dry valve” thrust plates must be used
3) Special lip seal arrangement must be used
Special Dry Valve Pump
Thrust Plates & Ring Seal Parts

P50/51™
- Thrust Plate - 391 2185 062
- Thrust Plate Seals - standard pocket seals (6 per thrust plate)
- Ring Seals - 391 2585 022

P75/76™
- Thrust Plate - 391 2185 072
- Thrust Plate Seals - 391 2885 040 Teflon ring (2 per thrust plate)
- Ring Seals - 391 2585 023
Will a standard bushing pump work with a dry valve?

**NO -** The same special lip seal arrangement that is used in the roller bearing pumps must be used in the P300™ series bushing pumps.
P50/51™ and P350™ Dry Valve Pump integral shaft lip seal setup

Retainer - 391 2584 050
Motor Seal - 391 2883 115
Install with lip facing out

Integral Gear Shaft

Pump Seal - 391 2883 103
Installed in the shaft end cover in the normal manner

O Ring - 391 2881 141
P75/76™ and P365™
Dry Valve Pump
integral shaft lip seal setup

Retainer - 391 2584 051
Motor Seal - 391 2883 094
Install with lip facing out

Integral Gear Shaft

Pump Seal - 391 2883 052

O Rings - 391 2881 457
P75/76™
Dry Valve Pump
“continental” shaft, lip seal setup

Out Board Bearing - 391 0381 078
Motor Seal - 391 2883 094
1) Install with lip facing out.
2) Press to bottom of bore.

Retaining Ring - 391 2685 029
Retainer - 391 2584 052
Pump Seal - 391 2883 094

Continental Shaft
Spacer - 391 3381 039
O Ring - 391 2881 457
Parker Gear Pump Division has brought you this training program on the Dry Valve and Pump. If you have any further questions on this or any of our other hydraulic products, please contact your Parker Sales Representative or your nearest Authorized Distributor.