

a vault of solutions



**FNCT : Nozzle type
coupling**

FNCT FLUID COUPLINGS

FNCT Fluid Couplings working on principle of Hydro Dynamic power transmission with fill control are ideal as a startup and acceleration control fluid coupling for large drive motors. They can also be used for speed variation in centrifugal fan and pump application. They can provide creep speed operation in conveyor drive.

CONSTRUCTION:

The Impeller (Pump) and Rotor (Turbine) enclosed in a primary casing have another casing (secondary). A fixed position Scoop Tube is provided to continuously collect the oil released by leak off nozzle from working circuit. The Impeller and Rotor are connected by shafts for onwards connection to motor and driven machine shaft through suitable flexible couplings. The shafts rest on ball and roller bearings on suitable bearing housings.

The whole rotating assembly is housed in a robustly built stationary self supported housing of welded construction.

A motor driven oil pump is provided to circulate working oil through the oil circuit of FNCT Coupling.

Two Nos. solenoid valves and Two Nos non return valves are provided which control oil level into the FNCT working circuit. A lube line branching out from pump outlet continuously feeds oil to bearings irrespective of oil level in working circuit.

OPERATION:

The circulating oil pumped by motor driven oil pump flows into the working circuit of fluid coupling through an oil collection ring and then into the working circuit. The leak off nozzle continuously drains oil from working circuit into the secondary casing from where it is collected by the fixed position scoop tube. This oil passes through an oil cooler and gets re-circulated into the working circuit of fluid coupling (achieved by solenoid valve operation) without flowing back into oil tank or flows back into oil tank for declutching or acceleration control. Any desired oil level between complete empty 0% to complete full 100% of working circuit can be achieved by adding or removing oil from working circuit by operation of solenoid valve.

The torque transmitted by the coupling depends on oil level in the working circuit and thus the torque transmission during starting or running can be controlled resulting into several advantages including speed variation. For declutching of coupling at any time during operation the complete circuit can be emptied by operation of solenoid valves. Creep speed operation in conveyor drives can also be achieved.

ADVANTAGES:

- No load start up of drive motor thus faster decay of starting current and improved and reliable motor protection.
- Wear free power transmission by virtue of circulation of oil.
- Smooth and controlled startup and acceleration control of driven machine.
- Gradual and shock free buildup of breakaway torque.
- Clutching and declutching of driven machine with motor running.
- Speed variation in centrifugal load application.
- Dampening of shock loads and torsional vibrations/oscillation.
- Suitable for multi drives in conveyor with load sharing and sequential startup.
- The empty belt can be moved at creep speeds for inspection and adjustment.
- Cooling of oil in coupling achievable when coupling in standstill condition.
- Suitable for adaptation of various types of flexible couplings.
- Robust design and construction with trouble free operation in dusty, hot and humid ambient conditions.
- Simple design, easy to operate and low maintenance.

Applications: The FNCT couplings can be used in variety of applications as a startup duty and controlled and smooth acceleration of heavy masses and inertia. Ideally suited for Belt and Pipe Conveyor application.

Typical applications include: • Belt conveyors on underground mines or on surface installations
• Pipe conveyors • Crushers • Ball and Rod Mills
• Shredders • Armored Face Conveyors (AFC)
• Mixers • Beaters • Other typical applications.

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THE OIL CIRCUIT & OPERATING CONDITIONS.

The oil circuit of fluid coupling is shown in **Figure 1**.

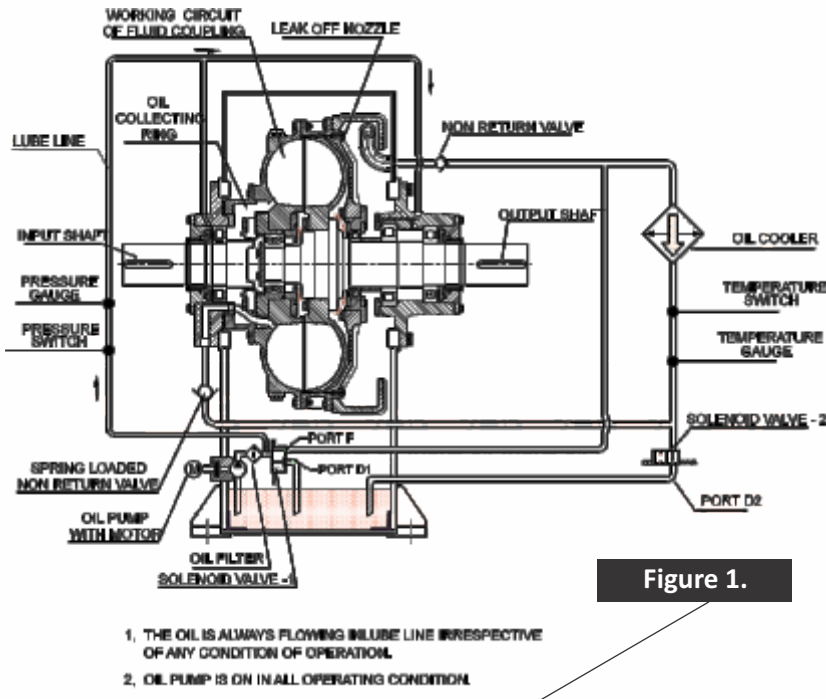


Figure 1.

The operation of the two solenoid valves achieves the complete operation control including parameters of coupling torque transmission during:

1. Motor startup.
2. Machine Acceleration.
3. Machine continuous running.
4. Declutching.
5. Cooling of coupling oil during standstill

Solenoid Valve 1: is a 3 Port – 2 way valve. The "fill" port (F) flows oil in coupling working circuit. The drain port (D1) bypasses oil flowing out from oil pump back to oil sump. Either port F is open and Port D1 is closed or Port D1 is open and Port F is closed.

Solenoid Valve 2: is a two port – 1 way valve. The drain port D2 is either closed or open. During declutching this port D2 is open.

1. During Motor start up: Oil should not flow in working circuit so that there is no power

transmission and motor starts on No Load and accelerates to full speed quickly.

Valve 1: Port F closed Port D1 – open.

2. During Acceleration Control: the solenoid valve 1 Port F and Port D1 and of solenoid valve 2 Port D2 continuously operate to fill or empty the working circuit of fluid coupling to continuously adjust the oil filling in the coupling and thus control torque transmission.

3. During Running: The oil level in coupling working is suitably adjusted for speed control or working circuit is full for full speed operation. Once the desired oil level is achieved then Port D2 is closed and Port D1 is open.

Oil in working circuit flows in a closed circuit through oil cooler.

4. During Declutching: Oil is to be drained from working circuit and new oil is not to be filled in working circuit.

Valve 1 – Port F closed and Port D1 open.

Valve 2 – Port D2 open.

5. Cooling oil during standstill: Drive motor of coupling is OFF. Only the oil required to circulate through oil cooler –

Valve 1 – Port F open and Port D1 closed.

Valve 2 – Port D2 open.

	VALVE 1		VALVE 2
Operation	Port F	Port D1	Port D2
Drive motor starting	Closed	Open	Open
Machine Acceleration # Close/open	Open/close	Close/open	
Steady state running of machine	Close	Open	Close
Declutching of machine	Close	Open	Open
Standstill cooling of oil	Open	Close	Open

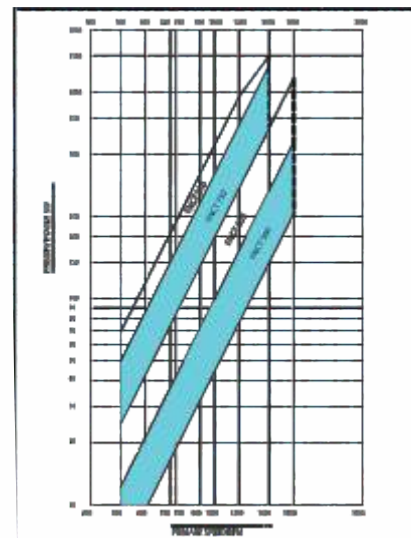
#Valve V1 and V2 will operate frequently and thus their ports will open to adjust oil level in working circuit and thus controlling the acceleration torque applied to driven machine.

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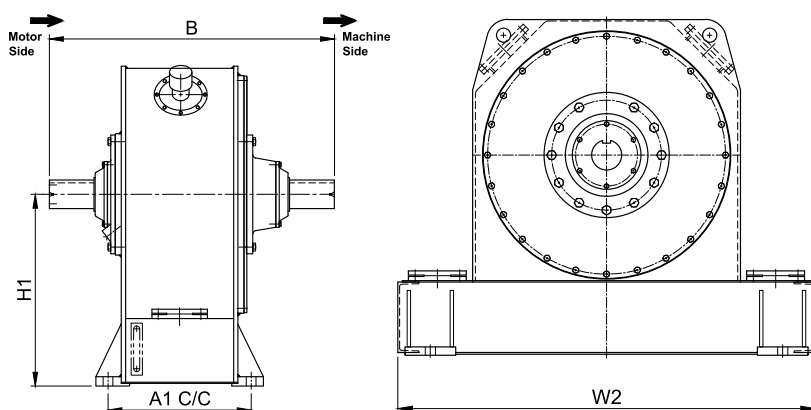
Fluidomat FNCT is offered in four standard sizes as per following KW rating.

Maximum rating KW at different input speeds – RPM

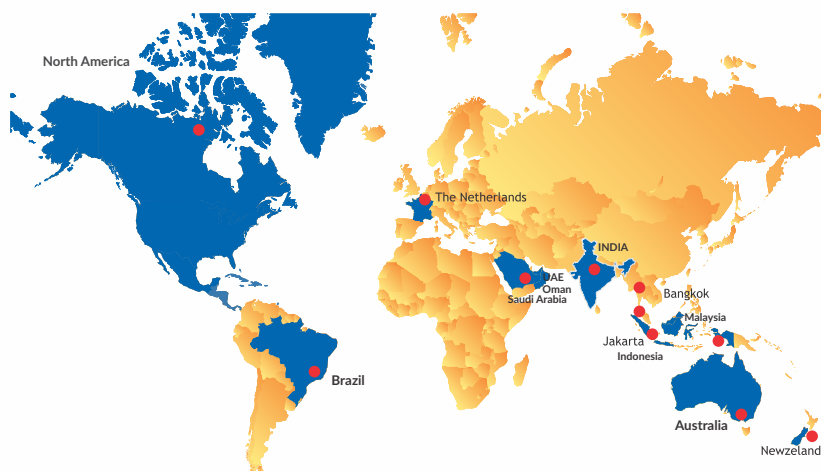
FNCT	500	600	720	750	900	1000	1200	1500	1800
566	12.2	21.1	36.5	41.2	71.3	97.8	168.9	330	570.2
655	24.8	42.9	74.1	83.7	144.7	198.5	343	670	1157.2
750	43	74	127	144	258	347	589	1150	-
810	69	119	205	232	400	550	950	1500	-



KW Vs Speed (RPM), Rating Graph
Model: FNCT-566 to FNCT - 810



Model FNCT	B	H1	A1	W2
566	849	615	310	1140
655	1055	710	530	1480
750	1200	710	675	1480
810	1575	900	883	2200



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