



Hydraulic Coupling unit For double acting elements

Part no 4500137 :



Description :

Hydraulic coupling units are used whenever the fixture is separated from the pressure generator, e.g. in flexible manufacturing systems. This fully equipped coupling unit has been developed for manual coupling and uncoupling for the purpose of clamping and unclamping. This unit includes two quick disconnect coupling (QDC) to connect / disconnect 'Hydraulic Power Unit', Pilot operated check valve to hold pressure in clamping line, Accumulator to compensate leakage (if any) in clamp line, Glycerin filled pressure gauge, Built in single acting cylinder takes care of across piston leakage and avoid building pressure in return line.

Versions :

- For double acting elements - Part no 4500137
- For single acting elements - Part no -----

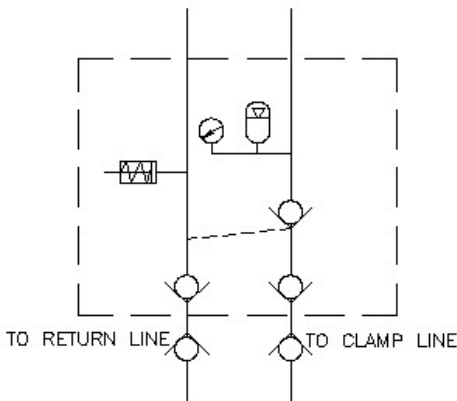
Installation :

This unit is mounted on pallet which is moving and live hydraulics is not continuously available

Specifications of coupling unit:

- Minimum operating Pressure: 50 bar
- Maximum operating Pressure: 250 bar
- Accumulator charging Pressure: 80 %of Operating pressure
- Accumulator Volume: 75 cc
- Total volume of the cylinder: 500 cc

Hydraulic Circuit Coupling Unit :



Specifications of power unit:

- Hydraulic power unit with control panel - 4500051
- Pump output: 1.8 LPM.
- Motor: 3 phase, 1hp.
- Tank Capacity: 30 liters approximately.
- Useful oil volume - 25 liters approximately.

Power Unit Hydraulic Circuit

This unit should have direction control valve, which is double solenoid, spring centered, and center open. At center position pressure line is connected to tank line and motor is unloaded. Due to this one can connect / disconnect quick disconnect coupling at center position. Push buttons are provided on pendant for ease of operation.

Sequence of operation

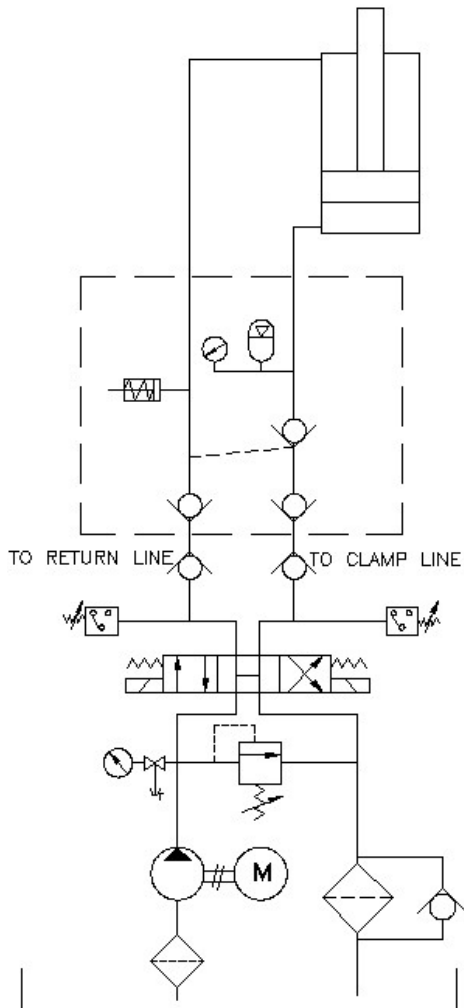
A) Clamping

1. QDC is connected if it is not in coupled position.
2. Push the clamp button, pressure will build and Ready for Disconnection lamp (green) will glow.
3. Disconnect QDC and put dust caps.
4. Now job is in clamped condition and pallet is ready to move.

B) Unclamping

1. Remove dust cap and clean quick disconnect coupling.
2. In un-pressurized mode connect QDC. (Ready for Connection / Disconnection lamp is on)
3. Push unclamp button, all elements will retract and gauge show zero pressure. And ready for Disconnection lamp will glow.
4. Now job can be removed and new job can be placed.

Hydraulic Circuit Power Unit :



Notes :

1. Clamping and unclamping time is more because every time accumulator is charged and discharged.
2. Accumulator is to support small leakages. Accumulator charging pressure should be approximately 80% of operating pressure. If operating pressure is reduced below Accumulator charging pressure, then there will not be any oil output for leakage compensation. This is unsafe situation. If cylinder oil volume is more than 500 cc, then one must use bigger accumulator.
3. In conventional clamping, live hydraulic line is always connected. Pump output can make-up leakages and Pressure switch can give signal for low or no pressure and machine can be stopped. Both options are not possible for moving pallet, hence one should critically check that leakage is nil or negligible.
4. Single Acting Cylinder. - This for absorbing across piston leakage in decoupled condition. Due to check valves in QDC unclamp line is in trapped condition. Due to this cylinder oil pressure does not rise in return/ unclamp side of cylinder. (In normal on line clamping unclamp line is always connected to tank line. To have clamping force first condition is to have clamping pressure in clamp line and secondly there should not be any pressure in unclamp line.) Here accumulator take care of maintaining pressure in clamp line and small single acting cylinder take care of keeping unclamp line in unpressurised mode in decoupled condition. When cylinders are new and do not have any leakage, this cylinder does not have any function. After some months there may be small across piston leakage, it will be supported by accumulator, and this leaked oil to other side will get absorbed by this cylinder. In the absence of this cylinder following are two conditions.
 - o If you are using push action to clamp the job, due to across piston leakage will get trapped in unclamp side due to check valve in QDC. pressure will rise there. Instead of job oil will get clamped, and job can move due to cutting forces.
 - o If you are using pull direction to clamp the job, due to across piston leakage and check valve in QDC, piston will start moving up to unclamp the job. You will get full pressure on gauge due to accumulator support, but job will be in unclamped condition. This is very hazardous condition for machine and operator as we do not have any feed back of unclamped job.

Preventive checking procedure:

1. Clamp the job as per defined procedure and disconnect QDC.
2. After 8-24 hours check following points.
 - o Pressure drop is not more than 20 bar.
 - o Built in cylinder piston should not come out by more than 8mm.

Dimensional details :

