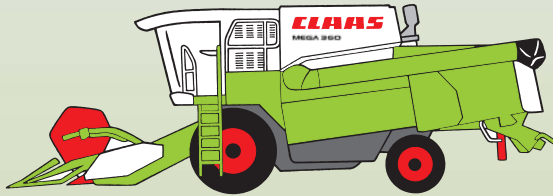


CLAAS



MEGA 370 – 350

From serial number:

845 00387

835 00361

Technical Systems

Hydraulic System

SERVICE & PARTS

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Description of function:

Steering

In the neutral steering position, oil flows freely through the steering control unit = Orbitrol (609).

Turning the steering wheel to one direction causes the discs to rotate relative to each other. At 1.5°, opening the channels towards the chambers starts. At 4°, the neutral position channels are fully closed. At 6°, the channels to the chambers are fully open. The rotation of the discs relative to each other is limited to ± 8°.

A feed of pressurized oil to the rotor set has the following effects:

- Rotation of rotor
- Feed of an oil quantity which is proportional to the rotation into the steering cylinder, the rear wheels being influenced.
- An internal mechanical return from the rotor to the outside disc so that the channels in the valve are closed when the rotor rotates to the same angle as the steering wheel.

Description of function:

Steering actuation

When actuating the steering to one or another direction, the Orbitrol rotary disc (609) is rotated by up to 8° relative to the outside disc. During this process, the return line from the steering hydraulics pump (218) to the tank is closed and the connection to the steering hydraulics proportioning pump (229) is released.

Via the steering hydraulics proportioning pump (229) and the Orbitrol rotary disc (609), the volume flow is released as a function of the sense of rotation, path and speed to the piston surface or the piston ring surface of the steering hydraulic cylinder (323). Here, the displacing surface of the steering hydraulic cylinder (323) is connected with the return line to the tank via the Orbitrol rotary disc (609).

As soon as there is no more steering motion, leaf springs bring the inner and the Orbitrol rotary discs (609) back to neutral position. Now both sides of the steering cylinder are shut off again and the connection from the steering hydraulics pump (218) to the tank is re-established.

Emergency steering

When the steering system is not supplied any more externally by steering hydraulics pump (218), the steering safety valve (742) closes and thus ensures that no oil will escape from the steering system.

When the steering is actuated, the inner and outer disc of the Orbitrol rotary disc (609) are rotated relative to each other. Now the oil can be conveyed from one side of the steering hydraulic cylinder (323) via the anti-cavitation valve (non-return valve) (728) to the other side through human power by the drive of the steering hydraulics proportioning pump (229).

On machines with one steering hydraulic cylinder (323), a reservoir in the return line to the tank compensates the volumetric difference between the piston surface and piston ring surface.

Description of function:

The working hydraulics of the MEGA series is an open hydraulic system.

The hydraulic functions of the working hydraulics are realised by two valve blocks (I+II) which may vary, depending on the equipment fitted to the machine.

The maximum system pressure is limited to 175⁺¹⁵ bar by means of pressure relief valve 703.

Key to diagram:

311	Threshing drum variable-speed drive hydraulic cylinder
441	Rotary coupling
734	Non-return valve (Lock-up valve unit)
759	One-way restrictor valve, two-sided
Y19	Threshing drum variable-speed drive slow solenoid valve
Y20	Threshing drum variable-speed drive fast solenoid valve
Y33	Grain tank unloading tube swing out solenoid valve
Y34	Grain tank unloading tube swing in solenoid valve
A	Consumer port
P	Working hydraulics pump port
P1	Parallel port for working hydraulics of other directional control valves
T	Tank port
Ilb	Working hydraulics valve block

Description of function:

Neutral function

The threshing drum variable-speed drive hydraulic cylinder (311) is tightly closed by the ball seat in the valve insert of the threshing drum slow solenoid valve (Y19).

Increase speed function

The threshing drum fast solenoid valve (Y20) and the master valve are actuated at the same time. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The pressure thus rising opens the ball in the valve insert of the unactuated threshing drum slow solenoid valve (Y19). The oil flows to consumer port A2 via the notch (a) in the one-way restrictor valve (759).

Reduce speed function

Solenoid valve (Y19) is actuated without the master valve. The pilot spool in question opens the ball in the valve insert and thus relieves the oil pressure via notches (b) of the one-way restrictor valve (597) and the valve insert of the unactuated threshing drum fast solenoid valve (Y20) to the tank.

Note: To ensure even control function in both directions, volume flow flows via notches (b) in the one-way restrictor valve (759) when adjusting the variator.

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Key to diagram:

226	Front attachment reverser drive motor
314	Reel raise/lower slave cylinder
315	Reel raise/lower master cylinder
353	Reverse front attachment
406	Orifice plate Ø 0.8 mm
731	Return line valve (non-return valve)
732	Non-return valve
734	Lock-up valve unit (non-return valve)
740	AUTOCONTOUR cross levelling flow control valve
776	Reversing connecting valve
801	Quick release coupling
Y24	Reel forward solenoid valve
Y25	Reel reverse solenoid valve
Y86	Reverse front attachment solenoid valve
Y67	AUTOCONTOUR cross levelling left solenoid valve
Y68	AUTOCONTOUR cross levelling right solenoid valve
A	Consumer port
B	Consumer port
P	Working hydraulics pump port
P1	Parallel port for working hydraulics of other directional control valves
T	Tank port

Description of function:**Reversing**

When the solenoid valve (Y86) is actuated, the reversing cylinder (353) extends and swings the hydraulic motor (226) to the drive gearwheel. Just before reaching its end position, the oil flow from the reversing cylinder (353) to the hydraulic motor (226) is released, ensuring reliable gearwheel engaging.

The non-return valve (732) keeps the hydraulic motor (226) from starting when pressure peaks occur in the return line.

Adjustment

The reverser support is aligned towards the feed rake conveyor drive shaft by adjusting an eccentric bushing on the reverser cylinder (353). The piston stroke is adjusted using the set screw (E). With the reverser swung in, the set screw (E) must have a play of **0.5 mm** from the end stop, then jam the set screw (E).

Key to diagram:

305	AUTOCONTOUR cross levelling right hydraulic cylinder
306	AUTOCONTOUR cross levelling left hydraulic cylinder
406	Orifice plate Ø 0.8 mm
408	Orifice plate Ø 1.2 mm
731	Return line valve (non-return valve)
732	Non-return valve
734	Lock-up valve unit (non-return valve)
740	AUTOCONTOUR cross levelling flow control valve 1.3 l/min
776	Reversing connecting valve
Y24	Reel forward solenoid valve
Y25	Reel reverse solenoid valve
Y67	AUTOCONTOUR cross levelling left solenoid valve
Y68	AUTOCONTOUR cross levelling right solenoid valve
Y86	Reverse front attachment solenoid valve
A	Consumer port
B	Consumer port
P	Working hydraulics pump port
P1	Parallel port for working hydraulics of other directional control valves
T	Tank port

Description of function:

Both sides of the hydraulic cylinder are tightly closed by the non-return valves (734) in the consumer ports A and B.

Cross levelling

Depending on the necessary direction of movement, one of the solenoid valves (Y19/Y20) and, at the same time, the master valve (Y77) is actuated. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The pressure which consequently rises builds up against piston (K) and opens the non-return valve (734) in port A or B.

The return line of the hydraulic cylinder is thus released to the tank via the valve insert of the unactuated solenoid valve (Y24/Y25). The pressure rising further now opens the non-return valve (734) at the opposite port and the respective hydraulic cylinders are retracted or extended.

Flow control valve 740

Flow control valves ensure constant volume flow to the consumers even when the load pressure changes. This function is achieved by the fact that the ram pressure ahead of the restrictor inside the control spool moves the control spool against the spring. During this process, the control edge is closed more or less, proportional to the pressure. Thus, at a high ram pressure ahead of the control spool, more oil does flow through the restrictor, but correspondingly less flows past the control edge. At a lower pressure, this ratio is reversed.

Key to diagram:

729	Low-pressure hydraulic circuit pressure relief valve 19 ⁺⁴ bar
A8	Port, volume flow input from ground drive feed pump (209)
P4	Port, volume flow input from ground drive feed pump (209)
T	Tank port
f	Compressed spring
k	Piston
s	Setscrew

Description of function:

The compressed spring (f) pushes the piston (k) on the seat until the pressure (P4) overcomes the spring force. The piston (k) now opens the connection to the tank (T). This occurs at a pressure of 19 bar.

The setscrew (s) adjusts the spring force and consequently the opening pressure.

5.1

Cutterbar fold circuit diagram

Key to diagram:

343	Cutterbar fold hydraulic cylinder
406	Orifice plate
426	Restrictor
K	Piston rod
R	Non-return valve

Description of function:

With the piston rod retracted, the non-return valve (R) is mechanically open by the piston rod (K). The flow from (s3) to (s2) is free. The orifice plates and/or restrictors cause the piston rod to extend or retract slowly.

Notes:

Key to diagram:	4	Accumulator(0.5 litres)
	5	Flow control valve
	6	Activation spool (4/2-way valve)
	7	Non-return valve(0.2 bar)
	8 (Y1)	4-Trac solenoid valve
	9	Flow divider
	10	Non-return valve
	12	Short-circuit valve (5/2-way valve)

Description of function:

4-Trac shut off

The 4/2-way valve (6) blocks the high-pressure lines from the variable displacement pump (P1, P2). The short-circuit valve (12) is open. The short-circuit valve (12) opens the circuits from the rear axle motors (11) (connections M1, M2, M3, M4). Leakage oil from the motors flows to the variable displacement pump (1) housing. Missing oil is fed into the circuits by the feed pump (port F) via non-return valve (7) and the bottom flow divider (9). The accumulator (4) is pre-stressed with feed pressure. When the machine is towed (no feed pressure), the hydraulic motors are protected against overspeed by the declutching device. In this process, the mounting bolts are screwed into the threaded bores which are offset by 90° until the shut-down bushing hits its stop. Tightening torque of bolts = 25 Nm.

Engaging 4-Trac

The solenoid valve (8) is activated by electro-magnetic means. The feed pressure switches over the 4/2-way valve (6) and the short-circuit valve (12). The accumulator (4) ensures reliable and rapid switching-over of both valves. The open circuits of the rear axle motors (11) are closed by the activated short-circuit valve (12). The connection between the high-pressure lines and the rear axle motors are opened by the 4/2-way valve (6). The oil pumped by the variable displacement pump (1) flows to the fixed displacement motor (3) and to the hydraulic motors (11). The oil quantity to the hydraulic motors (11) is limited to 110 l/min. by the respective flow control valve (5). This ensures that the fixed displacement motor (3) is supplied with oil in critical conditions. The respective flow divider (9) divides and/or controls the oil flow to the hydraulic motors (11), depending on the load on the individual motor. The oil returning from the motors flows to the pump via the non-return valves (10) of the other flow divider.

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