Hydraulic Multidisc Clutch
H 110 VAR00

Service Manual

P-2066-WE
SM301gb - rev 02/09

Warner® Electric

An Altra Industrial Motion Company

*We, **WARNER ELECTRIC EUROPE,** 7, rue Champfleur, B.P. 20095, F-49182 St Barthélémy d'Anjou Cedex, declare that the clutches made in our factories from St Barthélémy d'Anjou,*

*and hereafter designated : **H110 VAR 00***

are designed to be incorporated into an installation or assembled with other equipment in order to form a machine that is covered by directive 98/37/EC.

St Barthélémy d'Anjou, July 2002
Eric Prat, General Managing Director

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1 Technical specifications

Size		**100**	**200**	**400**	**800**	**1600**
N max.	rpm	3600	2900	2700	2000	1800
P nominal	bar	10	8	8	10	10
P max.	bar	12	10	10	12	12
Weight	kg	5,3	8,5	11,5	22	35
Length "L±0,5"	mm	81	89	96	118	135

Size		**3200**	**6400**	**12800**	**25600**	**51200**	**102400**
N max.	tr/min	1500	1300	1200	1000	900	800
P nominal	bar	10	10	16	16	16	22
P max.	bar	12	12	18	18	18	24
Weight	kg	55	87	124	262	510	770
Length "L±0,5"	mm	155	170	190	235	290	330

NB : data for catalogue equipment **Table 1**


Symbol designating an action that might damage the brake


Symbol designating an action that might be dangerous to human safety


Symbol designating an electrical action that might be dangerous to human safety

2 Precautions and restrictions on use

2.1 Restrictions on use


These clutches are designed to run in oil. Dry running will cause premature wear in the disc set.


Exceeding the maximum rotation speed given in the catalogue invalidates the warranty.


These clutches are designed solely to run on a horizontal shaft.

2.2 Precautions in use and safety measures

During maintenance work, ensure that the mechanism to be driven by the clutch is at rest and that there is no risk of it being started accidentally. All intervention have to be made by qualified personnel, owning this manual.

Any modification made to the brake without the express authorisation of a representative of Warner Electric, in the same way than any use out of the contractual specifications accepted by “Warner Electric”, will result in the warranty being invalidated and Warner Electric will no longer be liable in any way with regard to conformity.

3 Installation

3.1 Transport / storage

These units are supplied as standard in packaging guaranteeing protection for a period of 6 months by land or air transport, or after transport by ship to neighbouring continents (without crossing the tropics).

3.2 Handling

The clutch is supplied assembled with the drive flange not fixed.

Avoid any impact on the units so as not to alter their performance.

3.3 Setting up

The hub (515) is normally supplied at tolerances H7 for the bore and P9 for the width of the keyway (In accordance with NF E 22-175/DIN 6885/BS 4235/ISO R773).

The drive flange (529) is generally supplied at a bore H7 but without fixing holes.
We recommend a tolerance h6 for the shaft and an adjustment H7/f7 for the flange.

In cases where two coaxial shafts are fitted, the maximum authorised set-over is 0,05 mm. The angular misalignment should not exceed 0,1 mm over a length of 100 mm.

If these values cannot be attained, we recommend that an elastic coupling is fitted between the drive and receiving parts.

- Put the drive flange (529) in place

After tightening to torque, do not forget to secure the bolts fixing the drive flange (529) with Loctite 243 or an equivalent type of product.

- Slide the hub (515) onto the shaft (after adjusting the keyways) by positioning the teeth of the outer discs (303) or (304) opposite the hollows in the drive flange (529)

Never directly strike the cylinder (401), closing flange (408), or hub (515), use a soft alloy block or drift between these parts and the fitting device provided.

It is essential to comply with the length dimension “L ± 0,5” (see table 1) in order to prevent any risk of contact between the drive flange (529) and the hub (515).

4 Maintenance

4.1 Maintenance

When operating conditions are complied with (running in oil, oil temperature, rotation speed, etc) the wear on the H110 disc set is found to be negligible, in addition, it is automatically compensated for, until all the wear adjustment available is used up, by movement of the piston. So this type of clutch needs little maintenance.

It is however necessary to:

- Change the oil after 40 h running from first use, then every year of normal running
- Regularly check the pressure chamber seal and in the event of leakage, or after 5 years use, change the seals (701, 702)
- Check the wear on the disc set by measuring the travel of the piston (402), using table 2, below

Size	100	200	400	800	1600
Initial travel nominal (mm)	3	2,5	2,5	3	3
Travel, clutch worn - max. (mm)	5,5	5	5	7	7,5

Size	3200	6400	12800	25600	51200	102400
Initial travel nominal (mm)	5	5	5	5	6	6
Travel, clutch worn - max. (mm)	10	11,5	12,5	14,5	17,5	17,5

4.2 Spare parts

All orders for spare parts must state the size of the unit with its code number, the reference number of the part (see appendice), and the quantity of each component wanted.

4.3 Dismantling / reassembling

During maintenance work, ensure that the mechanism to be driven by the clutch is at rest and that there is no risk of it being started accidentally. Also ensure that the hydraulic supply is shut off.

Dismantling:

- Remove the fixing screws from the cylinder (401) or closing flange (408)
- Remove the cylinder (401) or closing flange (408)
- Take out the piston (402)
- Remove the worn disc set
- Fit a new disc set

Start with an inner disc, then an outer disc, and then alternate, ending of necessity with an inner disc. For size 3200, after the last inner disc add the thrust disc (310).

- Change the seals (701, 702)
- Refit the piston (402)
- Refit the cylinder (401) or closing flange (408)

Take care not to damage the seals while reassembling

- Replace the cylinder (401) or closing flange (408) fixing screws, tighten them to the torque shown in table 3, below and secure them with Loctite 243 or an equivalent type of product

Size	100	200	400	800	1600	3200	6400	12800	25600	51200	102400
Screw	M4	M5	M6	M8	M10	M10	M14	M16	M20	M24	M24
Torque (Nm)	2,6	5,2	9,1	22	44	44	121	189	370	637	637

Table 3

5 Hydraulic connection

5.1 Important recommendations

Ensure that working pressures are complied with, to get the nominal performance from the equipment.

Do not exceed the maximum pressures (seetable 1).

We recommend control oil filtration of about 10 microns in order to guarantee trouble-free operation and full life for the hydraulic components.

The disc lubricating oil should not exceed a running temperature of 80°C.

5.2 Hydraulic oils

The types of oil to be used for lubricating the discs should meet the following criteria:
- Good rust resistance
- No friction modifying additive
- No additive that might corrode the bronze friction surfaces (1a or 1b NF M 07-015)
- Compatible with materials used for hydraulic seals
- High viscosity index (>80)

The oils listed below (see table 4) meet these characteristics. The list is not exhaustive and other lines may be added to it. The viscosity of the oil to be selected varies depending on the running temperature and speed (measured on the outer diameter of the piston).

Size	Mineraloil			ATF
Viscosity Running Speed	ISO VG 22 > 12 m/s	ISO VG 32 > 12 m/s	ISO VG 46 > 12 m/s	 > 12 m/s
BP ESSO MOBIL SHELL ELF	 Nuto H22 DTE 22 Tellus 22	Energol HLP-D32 Nuto h 32 DTE Oil Light Tellus 32 Polytelis 32	Energol HLP-D46 Nuto H 46 DTE Oil Medium Tellus 46 Polytelis 46	Autran MBX AT Dexron II ATF 220 Donax TM Elfmatic G2”

Table 4

5.3 Connection diagram

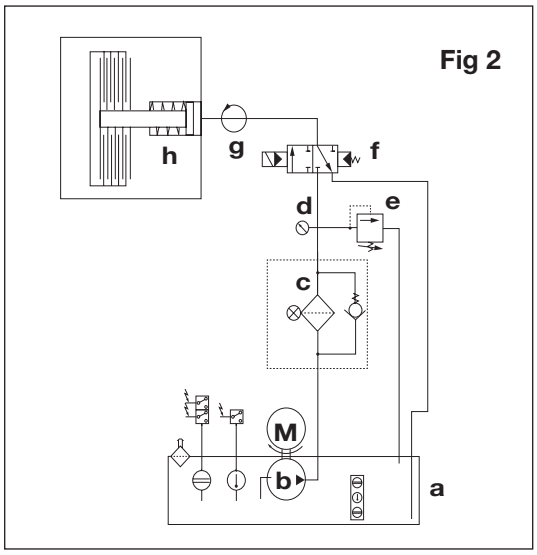


Figure 2 : Basic circuit

a: Tank
b: Pump
c: Filter
d: Pressure gauge
e: Pressure restrictor
f: Distributor
g: Revolving seal
h: Clutch

The clutch is lubricated by a drip-feed of oil that is not recycled.

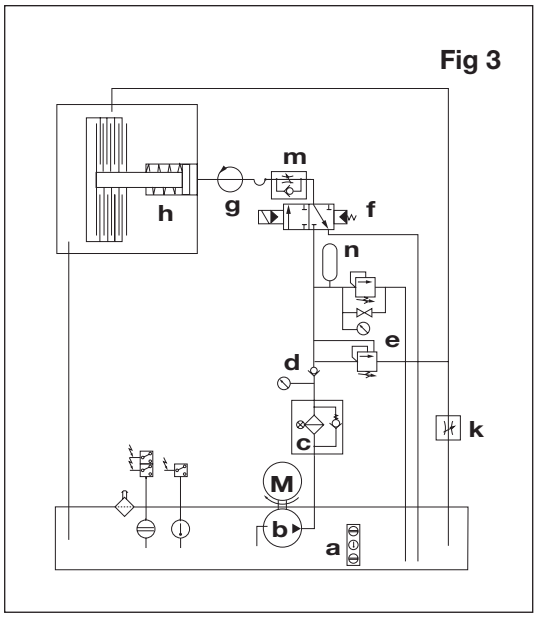


Figure 3 : Circuit with progressive* clutch and external lubrication of the disc set

a: Tank
b: Pump
c: Filter
d: Pressure gauge
e: Pressure restrictor
f: Distributor
g: Revolving seal
h: Clutch
k: Flow restrictor
m: Flow restrictor with non-return valve
n: accumulator with safety unit, clutch speed is adjusted by means of the restrictor **m** and the non-return valve enables quick de-clutching.

Once the clutch is engaged, it is retained by the accumulator **n**. Excess control oil is used to top up the clutch drip-feed.

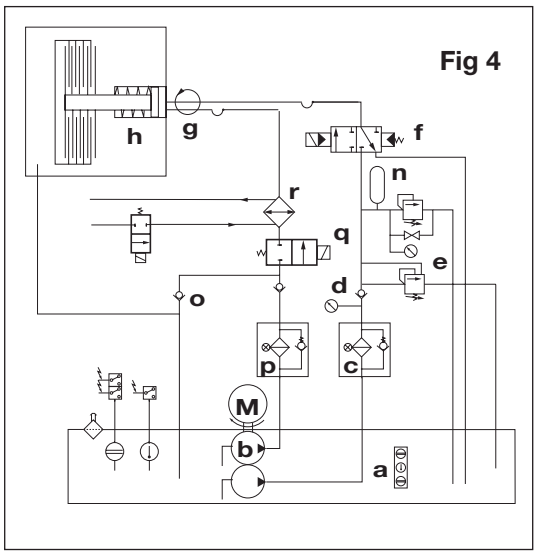


Figure 4 : Circuit with lubrication via the shaft

In the event of especially tough running conditions, equipment can be supplied for lubrication via the shaft.

This requires additional machining of the clutch and the use of a hydraulic circuit including a 2-way rotating seal (1 way pressure and 1 way sprinkling) and an air or water cooler.

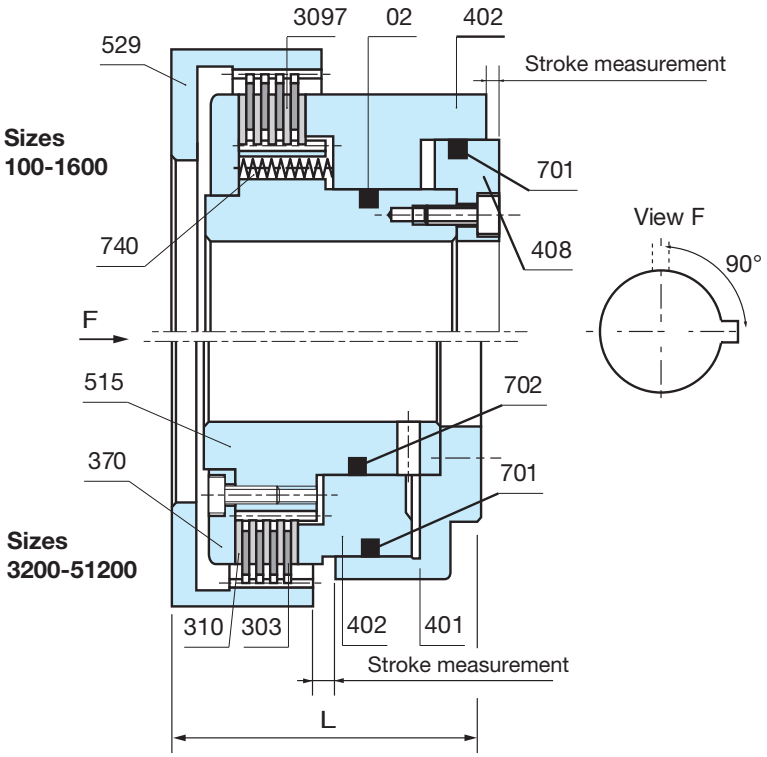
a: Tank
b: Two-stage pump
c: Filter
d: Pressure gauge
e: Pressure restrictor
f: Distributor
g: 2-way rotating seal
h: Clutch
n: Accumulator with safety unit
o: Calibrated non-return valve
p: Filter
q: Distributor
r: Cooler

* Ask our technical department for details of progressive clutch conditions depending on use.

6 Appendice

6.1 Diagram

Ref. Nr	Description
303	Steel outer disc
309	Steel inner disc
310	Thrust disc (SZ3200)
370	Pressure ring
401	Cylinder
402	Piston
408	Closing flange
515	Hub
529	Driving flange
701	Cylinder 'O' ring seal
702	Piston 'O' ring seal
703	Cylinder quad ring seal
704	Piston quad ring seal
740	Spring



7 Troubleshooting

Troubleshooting		
Problem	**Possible Reason**	**Action**
The Clutch Slips	• Hydraulic pressure too low • Fault in the hydraulic circuit • Faulty pressure chamber seals • Wrong lubricating oil • Discs worn or damaged	• Check that nominal pressure is complied with (see table 1) • Check it • Check the condition of the contact surface (scratches, foreign particles, etc.) clean, change the seals • Change the oil in accordance with the data given in table 4 • Change the discs - Check the condition of the receiving parts' teeth (hub, flange)
Oil temperature over 80ºC	• Running speed too high • Too little cooling oil	• Reduce the speed - Adopt oil circulation • Adopt oil circulation - Increase flow, where possible

Subject to alteration without prior notice

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Warner Electric LLC warrants that it will repair or replace (whichever it deems advisable) any product manufactured and sold by it which proves to be defective in material or workmanship within a period of one (1) year from the date of original purchase for consumer, commercial or industrial use.

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