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Electromagnetic Toothed Clutch E320

Service Manual

P-2035-WE
SM309-gb-11/04



Warner® Electric

An Altra Industrial Motion Company

*We: **WARNER ELECTRIC EUROPE,** 7, rue Champfleur, B.P. 20095, F-49182 St Barthélemy d'Anjou Cedex declare*

*that the clutches made in our factories from St Barthélemy d'Anjou, and hereafter designated : **E320***
are exclusively designed for incorporation into a machine and to be assembled with other equipments to create a machine. The operation of the product is submitted to the conformity of the complete equipment, following the provisions of the machinery directive 98/37/EC and if electric to the EMC directive 89/336 /EEC.

The conformity of the electric units to the Low Voltage directive 72/23 (modified) is supported by the full respect of the following standards : NFC 79300 and VDE 05808/8.65.

Drawn up in St Barthélemy d'Anjou, july 2002 E.

PRAT, General Managing Director

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1 Technical specifications

Size		20	50	100	200	400	800	1600
N max. VAR00	min^{-1}	5000	5000	4300	3600	3300	2700	2100
N max. VAR04/05	min^{-1}	-	3900	3500	2800	2600	2100	1500
Dimension J ±0.1	mm	0.3	0.4	0.5	0.5	0.5	0.6	0.7
Weight VAR04/10/14	kg	1	1.2	2	3	4	7	14
Coupling	-	-	28/38	38	42	48	55	75
Dimension E VAR05	mm	-	20+1.5/0	24+1.8/0	26+2/0	28+2.1/0	30+2.2/0	40+3/0
Weight VAR05	kg	-	2,5	4.5	6.8	8.3	15.5	31

Size		3200	6400	12800	25600
N max. VAR00	min^{-1}	1800	1500	1500	1200
N max. VAR04/05	min^{-1}	1400	1000	-	-
Dimension J ±0.1	mm	0.8	1	1	1
Weight VAR04/10/14	kg	29.5	82	145	254
Coupling	-	90	125	-	-
Dimension E VAR05	mm	45+3.4/0	60+4.6/0	-	-
Weight VAR05	kg	61	161	-	-

Table 1

NB: Data for catalogue equipment.

2 Precautions and restrictions on use


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

2.1 Restrictions on use


VAR00/10 units are designed for operation in oil (not sealed bearings).


VAR04/14 and VAR05 are designed for dry operation (sealed bearings).


Exceeding the maximum rotation speed listed in the catalogue will invalidate the guarantee.


The suitable ambient temperature for these units is max. 40°C (Insulation class of 155°C).


E320 clutches are designed for horizontal mounting. Consult our technical services if other mounting positions are required.

2.2 Precautions in use and safety measures

During maintenance, ensure that the machine's moving parts are stationary and that there is no risk of accidental start-up. 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

Our clutches and brakes are supplied in packaging guaranteeing a preservation period of 6 months with land or air transport, or after transport by ship to neighbouring continents (without crossing the tropics).

3.2 Handling

Avoid any impacts on the equipment so as not to alter their performance.

Never carry the equipment by the electrical supply cable.

3.3 Installing

E320 are delivered with bore / tolerance H7 and keyway/ tolerance P9 according to NFE22175 / DIN6885 / ISO R773 / BS 4235. The mobile plate assembly (353) is delivered with bore / tolerance H7. We recommand to use tolerance h6 for shaft and g6 for the mobile toothed ring assembly (352).

Important: It is important to prevent inductor (101) from rotating. It is the customers responsibility to supply means to prevent inductor rotating. i.e. retention pin in slot.Check gaps between the inductor and the retention pin (see Figure 1) : minimum 0,5 mm gap -1 mm gap at the slot bottom.

The pin should not generate any stress on the bearings. In case of vibrations, it is strongly recommended to insert a damping elastic slot between the anti-rotation device and the anti-rotation slot and to fix the coil's cable the nearest of it to avoid whipping.

In the case where two co-axial shafts are fitted, the recommended setover is 0,05 mm maximum.
The angular misalignment should not be greater than 0,1 mm over a length of 100 mm. If this is the case, use a VAR05 (flexible coupling).

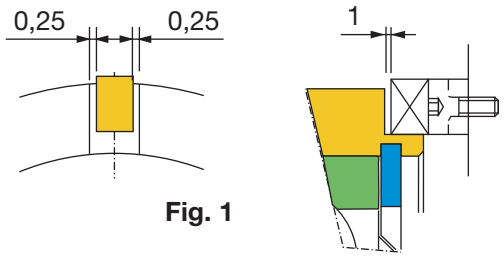


Fig. 1

3.3.1 Installing VAR00/VAR04/VAR10/VAR14

- Center the mobile toothed ring assembly (352) or the mobile plate (353) on the driven part, then fix it with screws and lock them
- After adjusting the driving key, mount inductor on the shaft and fix it axially onto the shaft

It is important to tighten the locking screws from mobile toothed assembly to the specified torque (see table 2) or to the mobile plate (353) and secure them with loctite 243 or an equivalent product.

While assembling the driving and driven parts, it is essential to note the value J (which is the distance between tooth heads), see Table 1.

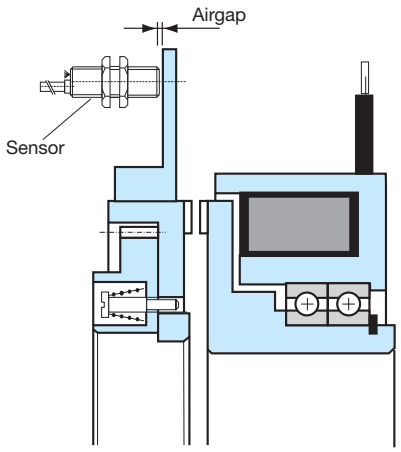
3.3.2 VAR504

Detection discs (aluminium or steel) compatible with inductive proximity sensor are provided with unit.

The position of the sensor should not obstruct the travel of the toothed flange (352) (353).

We suggest to use the inductive sensor (615) provided by our company, (see technical form).

MOUNTING EXAMPLE



3.3.3 Installing VAR05

• After adjusting the driving key, mount the inductor onto the shaft, then fit the adjusting spacer (526) and the bearing assembly and finally lock the whole axially on the shaft.

Sizes 3200 and 6400 : the coupling flange (528) is not mounted in our workshops. After mounting the u to thshaft, fit the flange with the screws provided to the specified torque (see Table 2) and secure them with Loctite 243 or equivalent.

Size	3200	6400
Screws	M12	M16
Tightening torque	76 ± 8 Nm	189 ± 18 Nm

Table 2

NB.: VAR05 is delivered with a pre-adjusted airgap. However check the value J between tooth heads after mounting. (see Table 1).

- Mount the coupling hub (507) onto the second shaft and lock it axially
- Put the spider (730) inside the coupling flange (528)
- Assemble the driving part with the driven part and insert the coupling hub with the spider (730)

While mounting the unit, it is essential that you note value E (elastic coupling mounting), see Table 1.

4 Maintenance

After continued operation it may become necessary to change bearings. The inductor bearings are mounted in a special way, and we recommend returning the unit back to the factory for replacement.

5 Electrical connection

E320 units must be supplied with direct current (D.C) and are equipped with a 500 mm length wire. Polarity does not affect the functioning.

5.1 Important recommendations

All works on the electrical connections have to be made with power off.

Ensure compliance with the nominal supply voltage (inadequate supply causes a reduction in the starting distance and transmissible torque).

The connecting wires should be of sufficient diameter to prevent voltage drops between the source and equipment supplied.

I (A) / L (m)	0 to 10 m	from 10 to 20 m
0 to 3 (A)	1,5 mm^2	1,5 mm^2
3 to 6 (A)	1,5 mm^2	2,5 mm^2

Tolerance in the supply voltage to the clutch terminals +5% / -10% (NF C 79-300).

5.2 Supply

For controlling these clutches, we advise the use of Warner Electric supply units

Sizes 20 to 3200:

CBC 400-24, CBC450-24
CBC 140-5

Sizes 6400 to 12800:

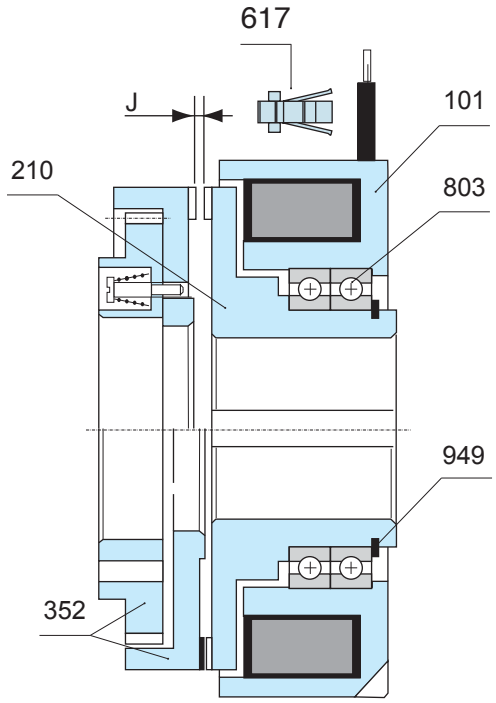
CBC 140-5

Warner Electric supply units provide protection for coils and circuits. Where a clutch is used without our supply units, with switching on the DC, it is essential for the coil to be protected against surges by a varistor fitted in parallel.

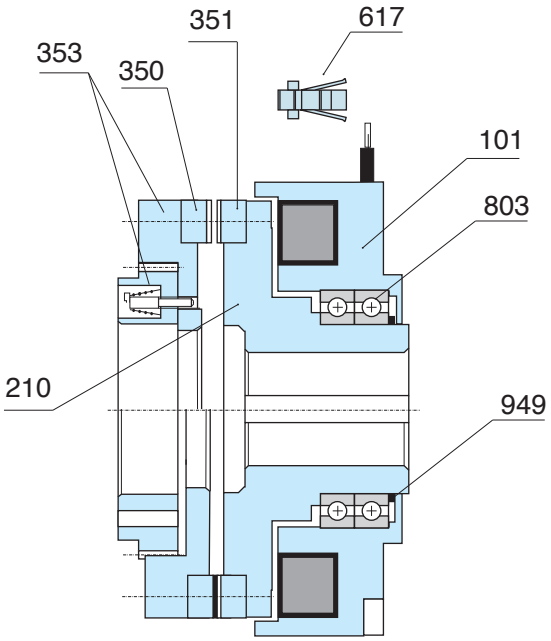
6 Appendix

6.1 Drawings / Part numbers

VAR00 / 04 / 10 / 14
Sizes 20 to 3200

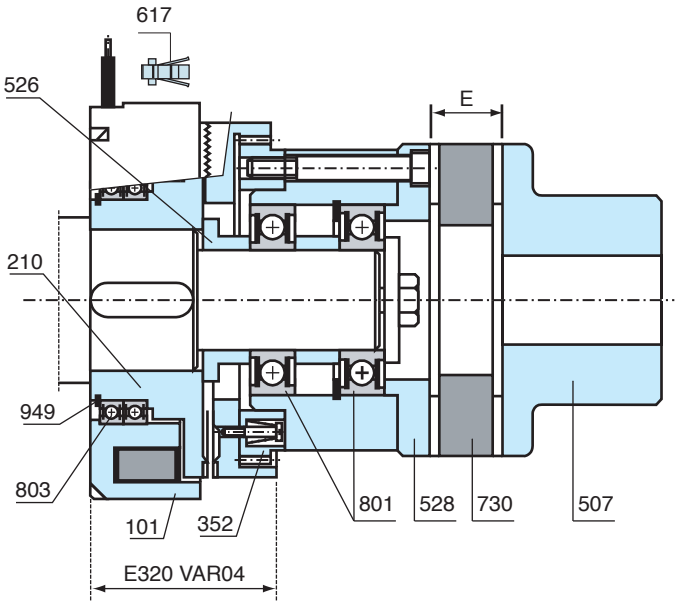


VAR00 / 04 / 10 / 14
Sizes 6400 to 25600



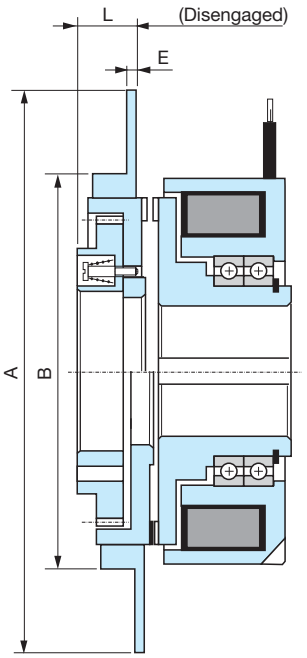
Nr	Description
101	Magnet
210	Driving hub
350	Bronze toothed rim
351	Steel toothed rim
352	Mobile toothed ring assembly
353	Mobile plate assembly
507	Coupling hub
526	Spacer adjustment
528	Coupling flange
730	Spider
801	Ball bearings
803	Centering ball bearing
949	Outside retainer
615	Inductive proximity sensor
617	Connector kit

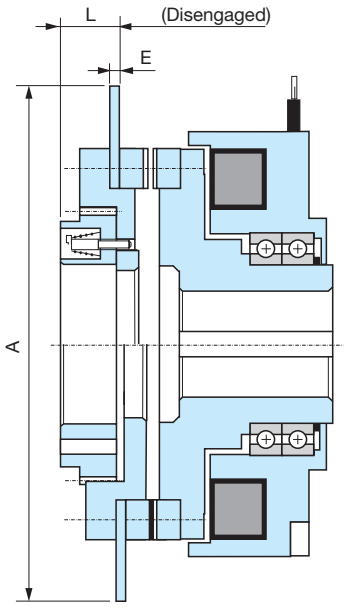
VAR05



6.1 Drawings VAR504

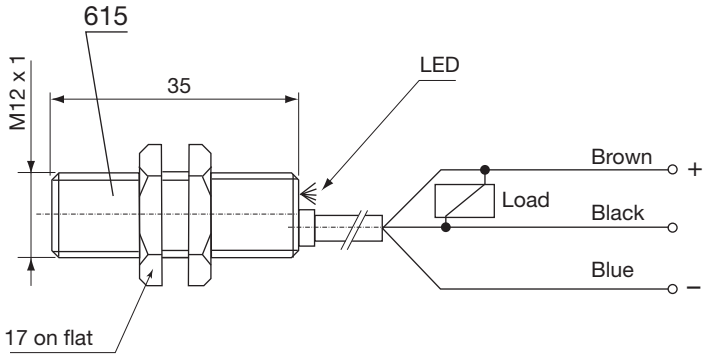
Size 20-3200





Size 6400-25600

INDUCTIVE PROXIMITY SENSOR



Sizes	50	100	200	400	800	1600	3200	6400	12800	25600
A	135	152	168	178	205	250	288	400	465	540
B	88	104	120	132	158	205	235	–	–	-
E	3	3	3	3	3	3	3	5	5	5
L	12	14	15,5	16	20,5	28	40	37,5	42	59,5

CHARACTERISTICS

Rate operating distance (steel target)	2 mm
Monting	shilded
Switching element function	Normally open
Cable	NPN, 3 x 0,34 mm², 2 m
Usable supply voltage	18 V... 30 VDC
Ripple voltage	≤ 10 %
No load supply voltage	≤ 10 mA
Rated operational current	120 mA
Voltage drop	≤ 1,5 V
Off-state current	≤ 10 µA
Short circuit protection	yes
Overload protection	yes
Reverse battery protection	yes
Wire break resistance	yes
EMC	Group A
Operating frequency	2000 Hz
Hysteresis	≤ 15 %
Temperature drift	≤ 10 %
Repeat accuracy	≤ 10 %
Housing	Nickel-plated brass
Front cap	PBTP
Degree of protection (EN 60529)	IP 67
Ambiant air temperature	–25°C... +70°C

Warranty

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.

This warranty extends only to the original purchaser and is not transferable or assignable without Warner Electric LLC's prior consent.

Warranty service can be obtained in the U.S.A. by returning any defective product, transportation charges prepaid, to the appropriate Warner Electric LLC factory. Additional warranty information may be obtained by writing the Customer Satisfaction Department, Warner Electric LLC, 449 Gardner Street, South Beloit, Illinois 61080, or by calling 815-389-3771.

A purchase receipt or other proof of original purchase will be required before warranty service is rendered. If found defective under the terms of this warranty, repair or replacement will be made, without charge, together with a refund for transportation costs. If found not to be defective, you will be notified and, with your consent, the item will be repaired or replaced and returned to you at your expense.

This warranty covers normal use and does not cover damage or defect which results from alteration, accident, neglect, or improper installation, operation, or maintenance.

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Warner® Electric

Warner Electric Europe
7 rue Champfleur, B.P. 20095, St Barthelemy d'Anjou - France
+33 (0)2 41 21 24 24 • Fax: +33 (0)2 41 21 24 70
www.warnerelectric.com

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