

IMPORTANT

Read carefully the instructions
included in this manual in order
to ensure a safe and continuous
operation to the equipment

weg
MOTORS AND DRIVES

TACHOGENERATORS

1R_
2R_
TCW



Installation and Maintenance Manual



This manual provides basic procedures that apply to **WEG Tachogenerators**. The machines referred in this manual are subject to constant improvements. For this reason, the information and instructions herewith contained may change without prior notice. For more information, contact the manufacturer.



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1. DESCRIPTION

1.1. APPLICATIONS

The WEG tachogenerators have been designed for applications on servocontrol operating machines, driving of textile machines, accelerators, braking of elevators, control and regulation of fine adjustments which depend on speed variation and other applications that require continuous and closely controlled speed.

The tachogenerator gives a continuous voltage sign corresponding to the speed actual value of the electric machine to which it is coupled.

1.2. CONSTRUCTION

The Tachogenerator is fitted with permanent magnets in the stator with the function of creating a magnetic field. An amplitude continuous voltage proportional to the speed, which depends on the rotation direction, is generated in the wound rotor.

a) Tachogenerator Type 1R (C) 2RC (P)

This tachogenerator is fitted with flange and shaft with key, where the coupling arrangement is made through a flexible coupling. The types 1RC/2RC (P) are built with terminal box. The "C" and "P" indicate that the tachogenerators are built with feet or T-box.

IMPORTANT:

Due to the characteristics of the permanent magnets used, this tachogenerator should not be disassembled. When the rotor is removed from the stator, the magnets become partially demagnetized and then the tachogenerator will not supply the voltage rated value.

b) Tachogenerator Type TCW

This tachogenerator is built with hollow shaft where the rotor is installed over a conic extension of the machine's shaft to which is coupled. The magnetic material of the magnets is a stabilized AlNiCo, which does not become demagnetized when tachogenerator is dismantled/mounted.

2. ASSEMBLING

2.1. TRANSPORTATION, RECEIVING, STORAGE

The WEG tachogenerators are packed in isopor boxes for safe transportation .If the tachogenerator is not put into operation immediately, it must be kept in the shipping box, in a dry ambient free of dust and under uniform temperature. I case of any abnormal situation, contact the transportation company and WEG Máquinas immediately.

2.2. ALIGNMENT (1R)/2RC(P)

The shafts of the tachogenerator and the machine to which it is coupled must form a perfect parallelism and concentricity to avoid vibrations.

2.3. COUPLING '

The WEG DC motors up to frame 132 (inclusive) are built with the shaft prepared to couple either the tachogenerator 1R(C)/2RC(P) or the TCW. For WEG DC motors in frames 160 and up, a shaft extension is required.

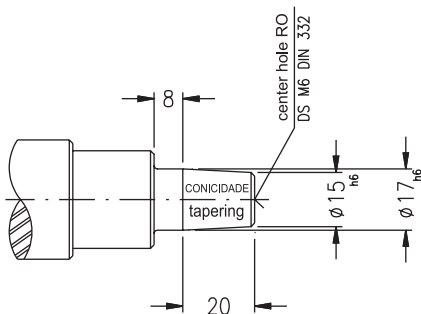


Figure 1 - Tapered shaft for DC motor up to frame 132.

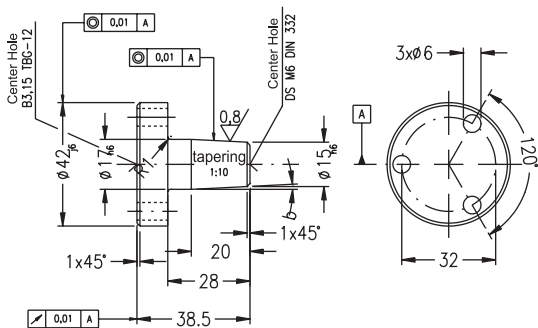


Figure 2 - Shaft extension for DC motors in frame 160 and up.

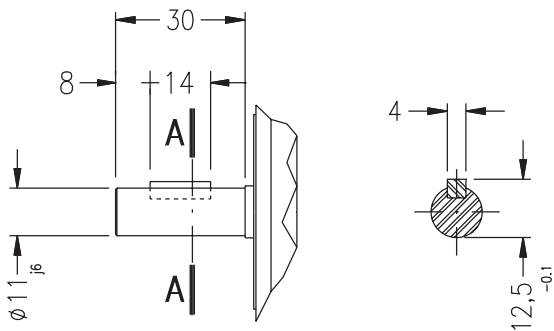


Figure 3 - Shaft end 1R(C)/2RC(P)

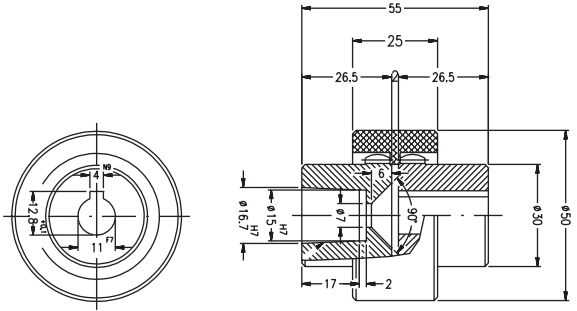


Figure 4 - Flexible coupling

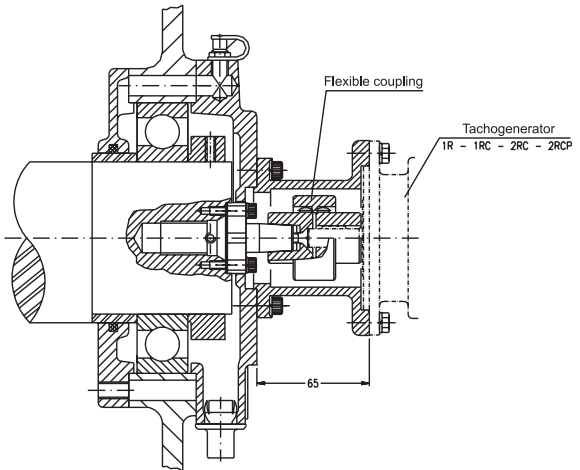


Figure 5 - Coupling Arrangement

a) Tachogenerator 1R(C)/2RC(P)

Tachogenerator 1R (P) 2RC(P) requires a suitable flexible coupling to compensate vibrations and small mounting inaccuracies (supplied optionally).

- The tachogenerator 1R (P) and 2RC(P) are supplied with feet and flange.
- Contact the manufacture for belt driving.

b) Tachogenerator TCW

The TCW tachogenerator is fitted with tapered shaft and it must be fixed on the machine shaft extension to which it is coupled.

The fixation of the rotor on the machine shaft is made by using an MC x 20 bolt and a pressure washer (supplied with the tachogenerator).

The TCW frame is fixed on the motor endshield.

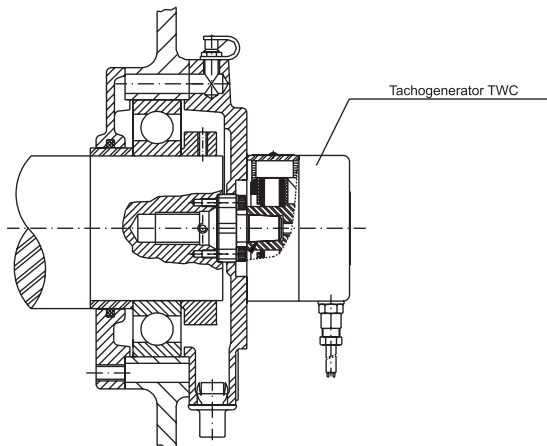


Figure 6 - TCW Tachogenerator coupling arrangement

3. OPERATION

Before the assembly, turn shaft manually and make sure it is free of any thrust as this could cause problem to good rotor operation. Before starting, make sure that outlet lead bolts and washers are securely tightened.

Check that the brushes can freely move in the brush holder and that they have perfect contact with the commutation, remove all foreign bodies and dust from the brushes.

4. MAINTENANCE

4.1. CLEANLINESS AND GENERAL CARE

Particular care should be taken when maintaining and installing the tachogenerator as it is a measuring device, which is subject to shocks and excessive vibrations. Inspections at regular intervals depend on the best way to prevent the tachogenerator from anti-economical breakdowns and long-time repairs. The tachogenerator must be kept free of dust coming from brushes and eventual penetration of any foreign body. After 2500 hours of continuous operation, a complete check-up of brushes and terminals is recommended for removal of possible carbon dust originated from the brushes.

On the tachogenerators type 1R (C) 2RC (P), the ND endshield must be mounted in such way that the connection lead goes out through the bottom side to prevent entering of any liquid. From time to time, brushes and brush holders must be removed and cleaned to ensure they move freely.

4.2. ROTOR DISASSEMBLY

a) Tachogenerator TCW

In order to remove the rotor from the shaft extension, remove the M6 fixing bolt and, tightening the M8 bolt on the shaft end, slide the tachogenerator rotor outward.

b) Tachogenerator 1R(C)/2RC(P)

Never remove the tachogenerator rotor from the frame as this will cause demagnetization as well as drop of generated voltage. Therefore, servicing can only be done at the factory or by authorized Repair Shops specialized for tachogenerators.

4.3.TACHOGENERATOR BEARINGS 1R(C)/2RC(P)

Tachogenerators are fitted with permanently lubricated bearings not requiring any type of maintenance. In case of wear or breakdown, bearings must be replaced. Under normal operation (approx. 8 hours per day) the lubrication grease lasts for several years. Then bearings must be replaced.

Type of bearings used:

- Drive end: 6201 2RS
- Non-drive end: 608 ZZ
- For 2RC(P): Non-drive end: 6001-2RS

DISASSEMBLY

a) D.E. Bearing

In order to replace the D.E. bearing, the rotor must be removed from the frame. As this process causes demagnetization, the bearing must be replaced at the factory.

b) N.D.E. Bearing

- 1.Remove the N.D.E. protection cover.
- 2.Remove the brushes.
- 3.Remove the brush holder's cover using an extractor.
- 4.Extractor is also to be used to remove the bearing. During this operation, care must be taken for not damaging the shaft end center hole.

NOTE:The rotor must not be moved from its original position so that demagnetization is avoided.

4.4. COMMUTATOR

Periodical checks on the commutator are fundamental for the good performance of the tachogenerator. Hence, the commutator must be kept free from dust, oil and dirt.

The slots between each commutator profile must be kept cleaned.

A dark brown or a slightly black coloring indicates good operation of the commutator. However, if the surface is rough and shining, it is possible that there are problems in the tachogenerator. In this case, contact the manufacturer.

If the surface is covered by a black dense patina, this must be removed using sandpaper nº 220 or artificial pumice-stone.

4.5. BRUSHES

a) Tachogenerator 1R(C)/2RC(P)

This tachogenerator is fitted with 4 electrographite brushes measuring 3 x 4 x 12.5mm. The types accepted by WEG are:

- GHS 431 (Carbano Lorena)
- RE 54 (Seecil-Ringsdorff)
- EG 0 (Carbano Lorena)

Special tachogenerators for high outlet voltage linearity are fitted with silver-graphite brushes.

- RS 35 (Seecil-Ringsdorff)
- CA 35 (Carbano Lorena)
- MH 37 (Carbano Lorena)

IMPORTANT:

In the same tachogenerator, different quality brushes can not be installed. When 2/3 of their length has been worn, brushes must be replaced. Before setting them in the brush holder, they should be ground with sandpaper to ensure that they have full and even surface contact with the commutator. Set into the brush holder, the brushes are pressed through a helicoidal spring for permanent adjustment. In the outer part, brushes are provided with a protecting cover.

b) Tachogenerator TCW

This tachogenerator is fitted with 4 silver-graphite brushes measuring 6.3 x 4 x 12.5mm. The types accepted by WEG are:

- RS 35 (Seecil-Ringsdorff)
- CA 35 (Carbano Lorena)
- MH 37 (Carbano Lorena)

The brushes should be seen at the brush holder inspection opening, that is, when only the spring can be seen.

4.6. TEMPERATURE COMPENSATING CIRCUIT FOR TACHOGENERATOR 1R(C)/2RC(P)

a) Operating

Composed by an electronic device, it operates as a resistant circuit. As the resistance varies linearly with the temperature, this circuit keeps the out going voltage constant even under fluctuation of ambient temperature.

b) Installation

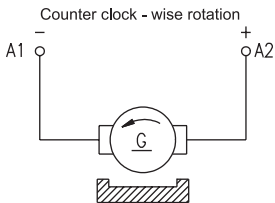
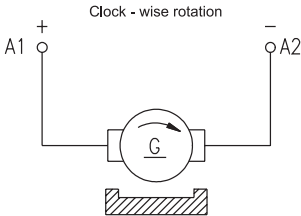
It is installed on the brush holder terminals where it receives and compensates the voltage signal coming from the commutator.

c) Failures

In case of failure or burn out of components, the complete circuit must be replaced maintaining the original design characteristics.

Note: In case the circuit is shipped to the factory for replacement, inform the type of machine it will be applied to.

5. CONNECTION DIAGRAM



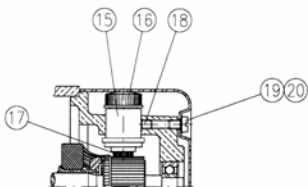
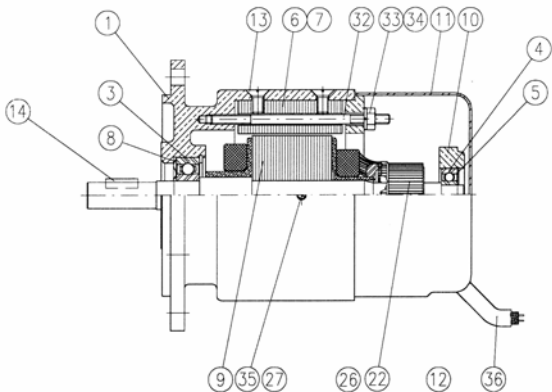
6. SPARE PARTS - 1R(C)

When ordering spare parts, always indicate the sequential number shown on the component list.

7.CROSS - SECTIONAL DRAWING POSITION OF COMPONENTS - 1R(C)

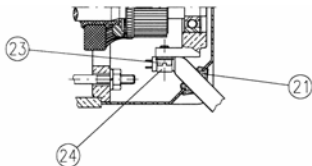
LIST OF COMPONENTS - Tachogenerator (1R - 1RC)

1. Frame - 1R
2. Frame - 1RC
3. Ball bearings - Drive end (A.S)
4. Ball bearings - Non drive end (N.S)
5. Retaining ring
6. Pole core
7. Permanent magnet
8. Spring washer
9. Wound rotor
10. Commutator protecting cover
11. Protecting cover- 1R
12. Protecting cover - 1RC
13. Festening ring for pole core
14. Key
15. Brush holder
16. Insulated brush cover
17. Brushes
18. Fastening bolt for brush holder
19. Fastening bolt for protection cover
20. Flat washer
21. Rubber ring for lead passage
22. Commutator
23. Fastening bolt for connection lead
24. Bracket
25. Rubber ring
26. Terminal box cover - 1RC
27. Fastening bolt for terminal box
28. Terminal block
29. Rubber gasket
30. Cable gland Pg. 9
31. Fastening bolt for terminal block
32. Through bolt
33. Hexagonal nut
34. Flat washer
35. Fastening bolt for magnet
36. Connection lead
37. Plastic cover

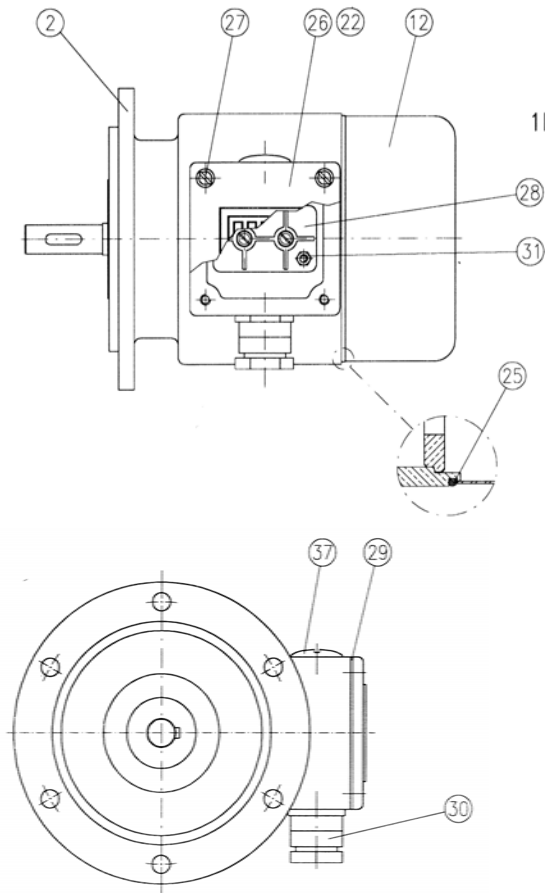


Detail of brush holder

Detail of connection outlet lead



1RC



8. PLANO DE MANUTENÇÃO

Weekly

Components	Inspection or maintenance services
Brushes and brush holders (1R(C)/2RC(P)/ TCW)	<ul style="list-style-type: none"> - Check wear mobility of brushes; - Control the brush holder condition.
Commutator (1R(C)/2RC(P)/ TCW)	<ul style="list-style-type: none"> - Check wears and condition of the commutator.

Monthly

Bearings(1R(C)/2RC(P))	<ul style="list-style-type: none"> - Check all bearings for possible noise.
Brushes and brush holders (1R(C)/2RC(P))	<ul style="list-style-type: none"> - Check length of brushes. - Replace brushes when wear has reached 2/3 of their size. - Use same or equivalent makes of brush for replacement. - Check wear and mobility of brushes as well as lead contact and possible breaking. - Remove some brushes and check the contacts on the commutator surface. Dark coloring on the commutator means commutation problems. - Clean the brushes and brush holders to remove the dust coming from the brushes by using a jet of dry compressed air.
Commutators (1R(C)/2RC(P)/ TCW)	<ul style="list-style-type: none"> - Check the roughness of the Commutator. - Loose brushes cause overheating an excessive wears to the commutator. - Check the rings on the commutator surface. If smooth and with no grooves - OK.

Commutators (1R(C)/2RC(P)/ TCW)	<ul style="list-style-type: none"> - In case the grooves keep increasing, contact WEG. - Check the commutator wear, grooves, copper friction and deformation of the copper plates. - The un round shape of the commutator can not exceed 0.05mm and the height difference of a copper plate with its adjacent can not be higher than 0.005mm. If this occurs, the commutator must be machined.
Bolts (1R(C)/ 2RC(P)/ TCW)	<ul style="list-style-type: none"> - Check for loose bolts, parts or electric connections.
Noise and Vibrations (1R(C)/ 2RC(P)/TCW)	<ul style="list-style-type: none"> - Strange noise or vibrations must be carefully checked.

Every 3 Months

Brushes (1R(C)/ 2RC(P)/TCW)	<ul style="list-style-type: none"> - Check terminals and the pressure on the brushes.
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Every 6 Months

Bearings (1R(C)/ 2RC(P))	<ul style="list-style-type: none"> - Check all bearings for possible noise.
Commutator (1R(C)/2RC(P)/ TCW)	<ul style="list-style-type: none"> - Check if cracks have occurred. If so, check also shaft end (cracks are a result of vibration and torsion in the operating system).
Bolts (1R(C)/ 2RC(P)/TCW)	<ul style="list-style-type: none"> - Check the electric connections. - Check if there are bad contacts.

Shaft (1R(C)/2RC(P))	<ul style="list-style-type: none"> - Check if there are cracks on the exposed parts of the shaft end and keys due to high vibration or torsion.
Vibration (1R(C)/ 2RC(P)/ TCW)	<ul style="list-style-type: none"> - Check balancing and alignment of the tachogenerator in relation to the motor to detect possible vibrations. - If vibration can not be noticed during operation, check the signs, which could cause the vibration such as loose parts, dust etc.

Yearly

Bearings(1R(C)/ 2RC(P))	<ul style="list-style-type: none"> - Perform careful control of bearings. - Replace bearings, if required.
Cleanliness(1R(C)/ 2RC(P)/ TCW)	<ul style="list-style-type: none"> - Clean all the accessible parts of the tachogenerator.

9. TROUBLESHOOTING

Failure	Probable Cause	Corrective Measures
Overheating under operation (1R(C)/2RC(P)/TCW)	- Short in the armature winding.	- Ship the tachogenerator to the factory.
Overheating of bearings (1R(C)/2RC(P)/TCW)	- Bearings in bad operation condition.	- Replace bearings (NDE) - Send the tacho to the factory (DE)
Sparking on the brushes (1R(C)/2RC(P)/TCW)	- Bad contact. Particles of impurities get-off from the brushes or copper plates and start sparking.	- Set the brushes correctly. - Clean the commutator and all brush devices. - If required, use a different type of brush after getting authorization from WEG.
Copper plates turned black (1R(C)/2RC(P)/TCW)		- In this case contact the factory.
Demagnetization (1R(C)/2RC(P)/TCW)	- Short in the armature winding. - Rotor was removed from the frame. - Rupture of windings, armature or commutator places.	- Send the tachogenerator to the factory for repair and magnetization.
Fluctuation of outgoing voltage (1R(C)/2RC(P)/TCW)	- Bad contact of brushes. - Tachogenerator without temperature compensating circuit.	- Set the brushes correctly. - Keep the ambient temperature at 40°C and

Failure	Probable Cause	Corrective Measures
	<ul style="list-style-type: none"> - Tachogenerator with temperature compensating circuit 	<ul style="list-style-type: none"> 1000masl or install temperature compensating circuit. - Replace the temperature compensating circuit.

WARRANTY TERMS FOR ENGINEERING PRODUCTS

These products, when operated under the conditions stipulated by WEG in the operating manual for such product, are warranted against defects in workmanship and materials for twelve (12) months from start-up date or eighteen (18) months from manufacturer shipment date, whichever occurs first.

However, this warranty does not apply to any product which has been subject to misuse, misapplication, neglect (including without limitation, inadequate maintenance, accident, improper installation, modification, adjustment, repair or any other cases originated from inadequate applications).

The company will neither be responsible for any expenses incurred in installation, removal from service, consequential expenses such as financial losses nor transportation costs as well as tickets and accommodation expenses of a technician when this is requested by the customer.

The repair and/or replacement of parts or components, when effected by WEG within the Warranty period do not give Warranty extension, unless otherwise expressed in writing by Weg.

This constitutes WEG's only warranty in connection with this sale and is in lieu of all other warranties, expressed or implied, written or oral.

There are no implied warranties of merchantability or fitness for a particular purpose that apply to this sale.

No employee, agent, dealer, repair shop or other person is authorized to give any warranties on behalf of WEG nor to assume for WEG any other liability in connection with any of its products.

In case this happens without WEG's authorization, Warranty is automatically cancelled.

LIABILITY

Except as specified in the foregoing paragraph entitled "Warranty Terms for Engineering Products", the company shall have no obligation or liability whatsoever to the purchaser, including, without limitation, any claims for consequential damages or labor costs, by reason of any breach of the express warranty described therein.

The purchaser further hereby agrees to indemnify and hold the company harmless from any causes of action (other than cost of replacing or repairing the defective product as specified in the foregoing paragraph entitled "Warranty Terms for Engineering Products", arising directly or indirectly from the acts, omissions or negligence of the purchaser in connection with or arising out of the testing, use, operation, replacement or repair of any product described in this quotation and sold or furnished by the company to the purchaser.



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