

CMTD DC MOTOR SERIES

OPERATING AND MAINTENANCE INSTRUCTIONS MANUAL



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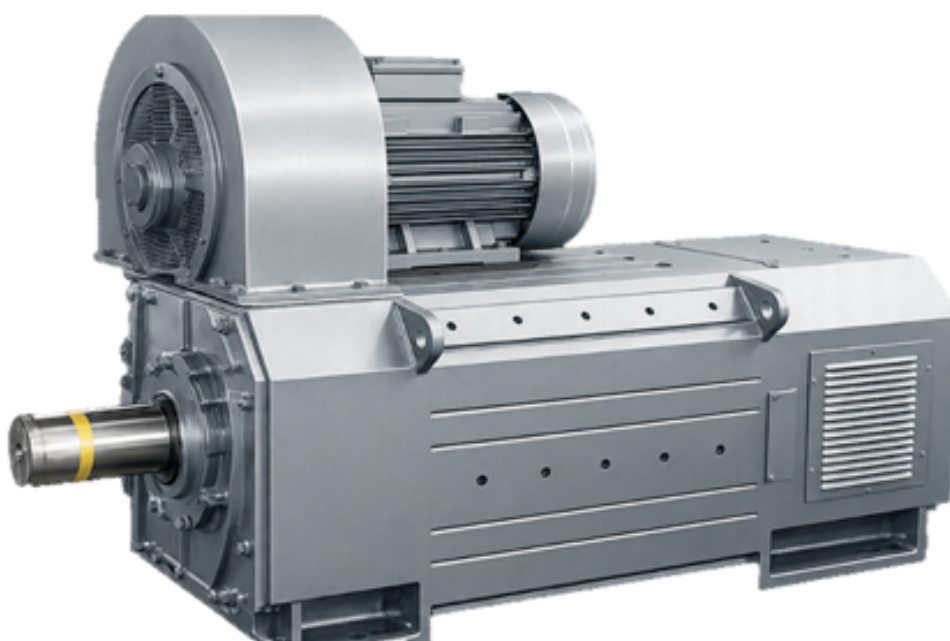
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CMTD Series DC Motors Description

COMOT CMTD Series DC motors are built for precision, durability, and variable-speed control in industrial applications. With advanced commutator and brush designs, these motors provide reliable performance in rolling mills, hoisting systems, and other applications requiring smooth torque and accurate speed regulation. Tailored to customer specifications, COMOT DC motors ensure flexibility and operational stability.

- **DC Motor Selection Criteria**

- Speed control accuracy required (precise regulation for rolling mills, hoists, etc.).
- Torque profile (constant torque, constant power, dynamic braking needs).
- Commutator and brush design for current density and durability.
- Armature voltage and field excitation requirements.
- Cooling method (IC01, IC06, IC37W) depending on duty and environment.
- Insulation class and temperature rise limits.
- Application duty cycle – continuous operation, reversing, or dynamic duty.



Features and Uses

- Types of protection of the whole series :IP23
- Standard Cooling Methods for all the motors are IC06.
- Mount arrangement are IMB3 or IMB35.
- Features and Uses
- Speed control is achieved by adjusting the armature voltage within the constant torque range and by field weakening above the base speed to provide constant power operation. The available speed regulation range depends on the motor design and is specified in the relevant COMOT technical catalogue.
- In the constant torque operating range, motor torque remains constant while speed is controlled by varying the armature voltage. Standard CMTD motors provide stable operation down to 20 rpm, depending on the application and drive configuration.
- The armature and field circuits are designed for operation with thyristor-controlled DC drives or DC generator power supplies. Motors are suitable for continuous operation when supplied from a fully controlled three-phase bridge rectifier without the need for an external smoothing reactor. For 160 V armature motors supplied by a single-phase thyristor converter, a smoothing reactor with the inductance specified on the motor nameplate or in the technical documentation shall be installed to minimize armature current ripple.
- Standard operating conditions are:
 - Installation altitude: up to 1,000 m above sea level
 - Maximum ambient cooling air temperature: 40°C
 - The surrounding atmosphere shall be clean and free from corrosive gases, conductive dust, acidic vapors, alkalis, or other substances that may damage the insulation system.
- COMOT CMTD Series DC motors are fully compatible with closed-loop DC drive systems, providing accurate speed regulation, high starting torque, and excellent dynamic performance for demanding industrial applications.

Specifications and Technical Data

- Detailed technical specifications for the CMTD Series DC motors are available in the COMOT CMTD Product Catalogue. The technical characteristics of the supplied motor are indicated on its nameplate. Information regarding bearing types, relubrication intervals, grease quantity, and recommended lubricant is provided on the Bearing Lubrication Label installed on the motor.

		 Every rotation, built to last				
MODEL: CMTD-450-21C		TYPE: IM 1001-B3	PROTECTION: IP23	SERIAL NUMBER: CMTD025102D05		
<u>kW</u>	<u>r/min</u>	<u>V</u>	<u>A</u>	<u>EXC.</u>	<u>Exc.V</u>	<u>Exc.A</u>
275	300/500	416	739	SEP	220	20.3
Duty: S1	Insul-Temp Class: F/B	Temperature Range: -15°C ... +50°C		Cooling Method: IC06	Weight: 5600	
BRGS DE: 6334/C3		BRGS NDE: 6230/C3		IEC NORMS APPLIED: IEC60034		
		www.comot-motors.eu				

Bearing lubrication label	
D-end Bearing:	6334/C3
Re-grease interval:	2000-3000 h
Quantity of grease:	20-30 g
N-end Bearing:	6230/C3
Re-grease interval:	2000-3000 h
Quantity of grease:	10-20 g
Grease:	2#

Brief on Construction

1. Bearings:

Use a flexible or elastic coupling for direct-coupled applications.

The radial load on the shaft extension shall not exceed the values specified in the COMOT CMTD Product Catalogue.

The calculated bearing service life is 20,000 operating hours under normal operating conditions.

Relubricate the bearings according to the operating conditions. Grease fittings are provided on the bearing housings.

- The types of bearing are shown in following table.

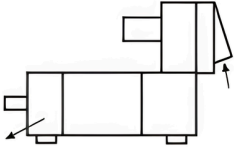
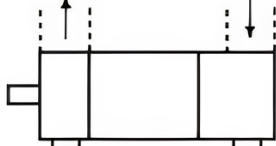
DC Motor Frame	Bearing on Drive side	Bearing on Non-drive side	Remarks
CMTD-100	6305	6305	
CMTD-112/2	6306	6306	
CMTD-112/4	6307	6307	
CMTD-132	6308	6308	
CMTD-160	6310	6310	
CMTD-180	6312	6312	
CMTD-200	6314	6314	
CMTD-225	6316	6216	
CMTD-250	6318	6218	
CMTD-280	6320	6218	
CMTD-315	6321	6220	
CMTD-355	NU324	6224	
CMTD-400	NU326	6226	
CMTD-450	NU334	6230	

Brief on Construction

2. Cooling Methods:

CMTD Series DC motors are available with IC06, IC17, or IC37 cooling systems. For CMTD 100–160 frame sizes, the blower is mounted on the non-drive end (NDE). For CMTD 180–450 frame sizes, the blower is mounted on the drive end (DE).

When a common external cooling system is used, the required cooling air volume and pressure are specified in the COMOT CMTD Product Catalogue. Cooling air may flow in either direction, depending on the application.

IC 06 Cooling	IC 17 Cooling	IC 37 Cooling
 Motor-mounted fan and free circulation	 Ducted air supply and free circulation	 Ducted air supply and free circulation

3. Terminal box:

The terminal box has a protection rating of IP54.

Cable entry holes shall be drilled according to the number and diameter of the cables used.

The terminal box can be rotated by 180° to facilitate cable installation.

Hoisting and Installation

1. Hoisting

Lift the motor only by the designated lifting eyebolts. Ensure that the load is evenly distributed between the lifting points.



Hoisting and Installation

2. Storage

After unpacking, inspect the motor for any damage or loose components caused during transportation.

Store the motor in a clean, dry, and well-ventilated area, protected from vibration, corrosive gases, and direct moisture. The storage temperature shall not be below +5°C, and the relative humidity shall not exceed 75%.

Before commissioning a motor that has been stored for an extended period, inspect the bearings and relubricate them if necessary.

3. Installation

Ensure that the cooling air inlet and outlet are not obstructed and that adequate airflow is maintained. Do not allow the hot outlet air to recirculate into the air inlet.

Install the motor on a rigid, level steel base or reinforced concrete foundation. Check the mounting surface with a spirit level and use shims where necessary to ensure proper alignment.

4. Coupling and belt pulley Installation

For direct-coupled applications, use flexible or elastic couplings. Avoid impact loads on the motor shaft during installation.

Before mounting the coupling or belt pulley, remove the protective coating from the shaft extension and apply a thin layer of grease or oil.

The shaft extension dimensions comply with the applicable standards. Couplings and pulleys shall have an H7 bore tolerance and be dynamically balanced with a half key.

Hoisting and Installation

5. Calibration

After installation, carefully align the motor and the driven equipment. Incorrect alignment may cause excessive vibration and premature bearing failure.

Adjust the motor shaft height using shims as required. The shaft centerlines of the motor and driven machine shall be aligned within 0.05 mm, as shown in Fig. 1 and Fig. 2.

For experienced personnel using high-precision couplings, the alignment method shown in Fig. 3 may also be applied.

For belt-driven applications, ensure that the driving and driven shafts are parallel and that the belts are correctly tensioned.

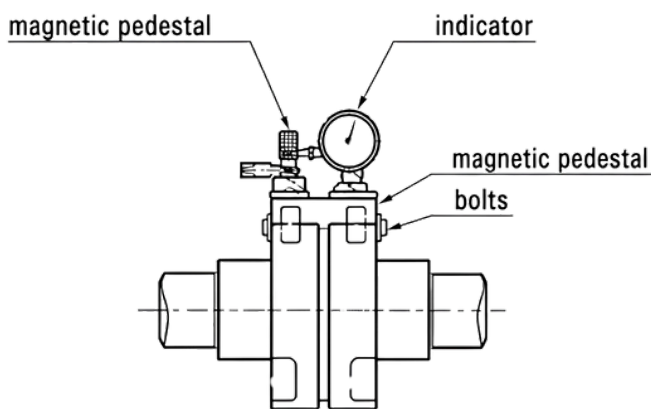


Fig 1

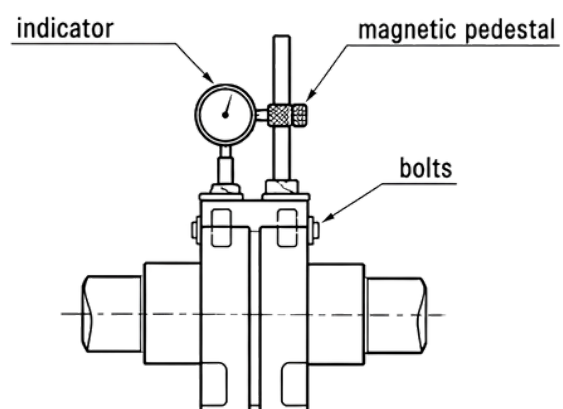


Fig 2

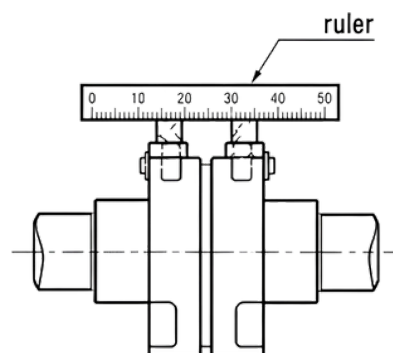


Fig 3

Hoisting and Installation

6. Connections

Make all electrical connections in accordance with the wiring diagram provided inside the terminal box.

Before connecting, verify that all terminals correspond to the terminal markings. Ensure that all terminal bolts are securely tightened and that adequate clearance is maintained between cables and the terminal box components.

Connect the motor to the designated protective earth (PE) terminal.

Verify that the blower rotates in the direction indicated by the arrow on its housing and that the blower motor rated voltage matches the power supply.

Operation

1. Inspection

After installation and electrical connection, perform the following checks before commissioning:

- Ensure that all bolts and nuts are securely tightened.
- Verify that all electrical connections are clean, tight, and free from corrosion.
- Rotate the motor shaft by hand to ensure that the armature turns freely without abnormal noise or mechanical interference.
- Remove any dust, dirt, or foreign particles from inside the motor using dry compressed air (approximately 1–2 bar).

2. Insulation Resistance

Before commissioning, measure the insulation resistance between the windings and the motor frame using a Megger insulation tester.

The insulation resistance shall not be less than 1 MΩ. If the measured value is below this limit, the motor must be thoroughly dried before being put into service.

3. Running Test

After inspection and electrical connection, perform a no-load test run.

Verify that the motor rotates in the correct direction and operates without abnormal noise or vibration. After the test, check for bearing overheating, lubricant leakage, or any other abnormal condition.

Correct any faults before the motor is placed into normal service.

Operation

4. Start-Stop Procedure

a. Starting procedure: Start the blower and verify that its rotation direction matches the arrow on the blower housing.

Energize the field winding at its rated voltage, then energize the armature circuit. During acceleration from 0 to 30% of rated speed, the armature current shall not exceed 2–3 times the rated current, and the acceleration time shall be less than 5 seconds. From 30% to rated speed, the armature current shall not exceed 1.5 times the rated current.

Notice: During normal operation, the field current shall not exceed the rated field current.

b. Stopping procedure: Gradually reduce the armature voltage until the motor reaches minimum speed.

Disconnect the armature circuit, then switch off the field circuit. Finally, stop the blower.

Maintenance

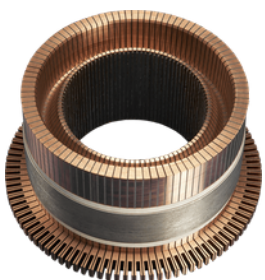
During operation, keep the motor clean and free from moisture, dust, metal particles, and other contaminants.

Periodically inspect the bearings, commutator, brushes, brush holders, and brush holder rocker. If any abnormal condition is detected, take corrective action immediately.

1. Bearings

Keep the bearings properly lubricated during operation.

If bearing overheating occurs, relubricate the bearings with Lithium-based Grease No: 3. Motors are equipped with grease fittings on both bearing end covers for relubrication.



2. Commutator

Inspect the commutator regularly for discoloration, scoring, or excessive wear. Keep the surface clean and smooth. Repair or recondition damaged commutators before returning the motor to service.

Maintenance

3. Brush

Brush Operating Recommendations

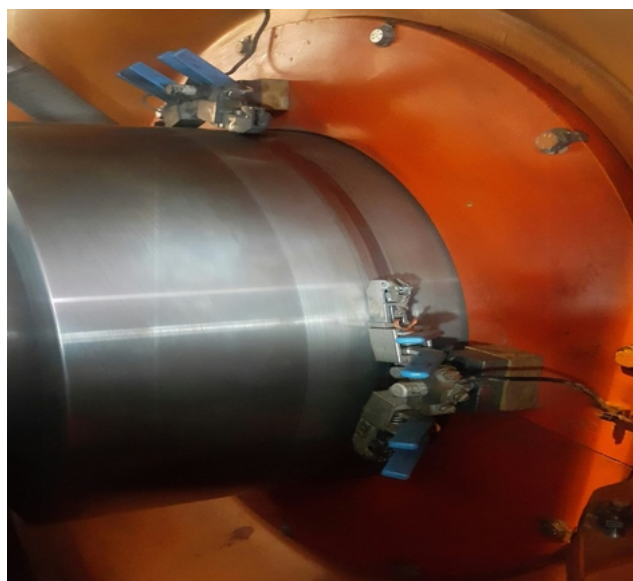
- **Overload:** Continuous overload operation accelerates brush wear, impairs commutation, and may cause uneven current distribution.
- **Light Load:** Prolonged operation at light load may result in commutator marking and excessive brush wear.
- **Brush Pressure:** The recommended brush pressure is 15–20 kPa.
- **Brush Life:** Brush life depends mainly on the motor load and cooling conditions. Under normal operating conditions, brush wear is approximately 5 mm per 1000 operating hours. Low air humidity may increase the wear rate.



The motor is equipped with D374N carbon brushes. Brush dimensions are provided in the specification table.

Inspect the brushes after removing the NDE end cover. Replace the brushes when the remaining brush length reaches 17 mm (32 mm brushes) or 25 mm (40 mm brushes).

After replacement, seat the new brushes by grinding them to match the commutator radius using fine sandpaper. Clean the commutator thoroughly after grinding and operate the motor at no load for several hours to ensure proper brush seating.

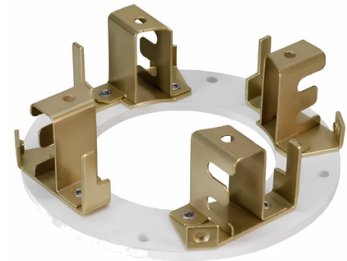


Maintenance

4. Brush Holder Rocker

The brush holder rocker is factory-set to the correct neutral position. Alignment marks are provided on both the brush holder rocker and the endshield.

After reassembly, align the brush holder rocker with these marks. Incorrect alignment may result in poor commutation and excessive brush sparking.

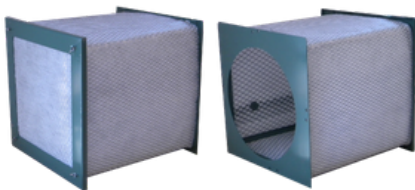


5. Air Filter

Keep the blower air filter clean and free from dust, oil, and other contaminants.

Clean the filter periodically using compressed air, water, or a suitable cleaning agent, and ensure it is completely dry before reinstallation.

A clogged air filter reduces cooling airflow and may cause motor overheating or premature failure.



6. Dismantlement And Reassembly

Before dismantling, disconnect the power supply and ensure that the motor cannot be energized.

Remove the commutator-side covers or louvres. Lift the brushes from the commutator and secure them in the brush holders. Protect the commutator surface with hard paper and insert protective paper between the armature and field poles.

Carefully remove the bearing covers and endshields, maintaining their original alignment. Mark all brush holder wiring before disconnection. If fitted, remove the tachogenerator and any auxiliary devices before withdrawing the armature.

Withdraw the armature carefully, ensuring that it does not contact the field poles.

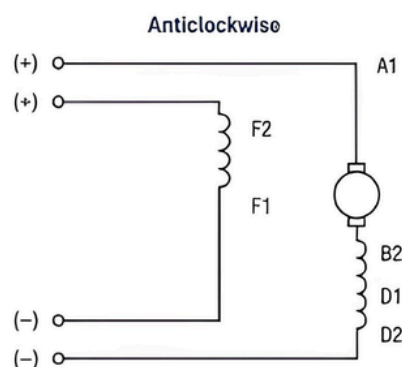
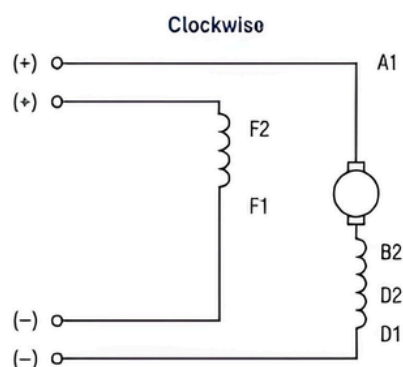
Reassemble the motor in the reverse order of dismantling. It is recommended to replace removed bearings with new ones. Clean the bearing housings thoroughly and apply fresh lithium-based grease before reassembly. For pole coil specifications, please contact COMOT Motors EU.

Connection Diagram

Terminal symbols and rotation direction of the motor are shown below:

- A1 A2 armature windings
- B1 B2 commutating windings
- D1 D2 series windings
- C1 C2 compensating windings
- F1 F2 separately excitation windings
- Rotation directions(see from side opposite to commutator)
- Separately excited motor(with series windings)

Separately excited motor



Self-excited motor

