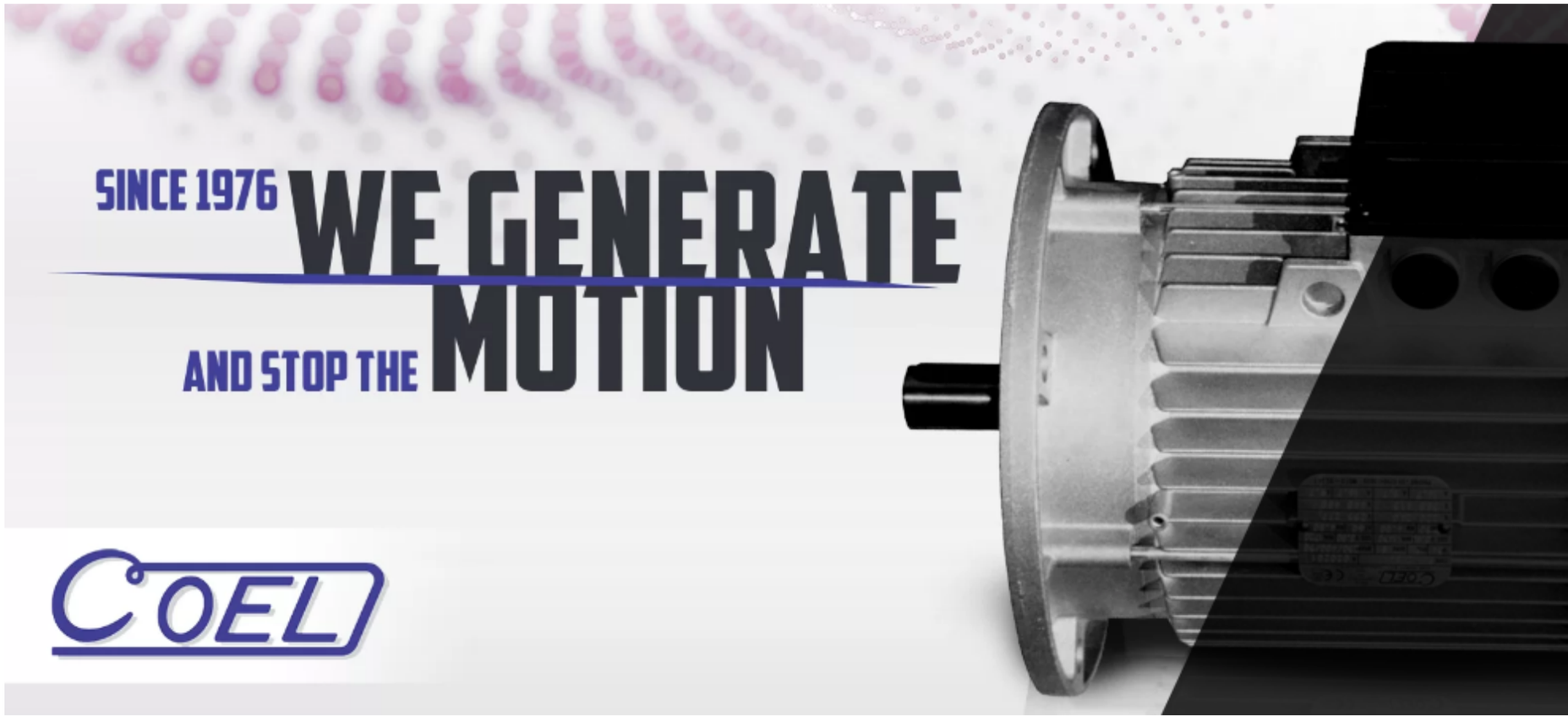
OPERATION MANUAL BRAKE MOTORS

INDEX



DECLARATION OF CONFORMITY

The conformity of the end product according to Directive 2006/42/EC (Machinery) has to be established by the commissioning party when the motor is fitted to the machinery.

SAFETY

The motor is intended for installation and use by qualified personnel, familiar with health and safety requirements and national legislation. Safety equipment necessary for the prevention of accidents at the installation and operating site must be provided in accordance with local regulations.

WARNING

Emergency stop controls must be equipped with restart lockouts. After emergency stop a new start command can take effect only after the restart lockout has been intentionally reset.

Points to be observed:
1. Do not step on the motor.
2. The temperature of the outer casing of the motor may be hot to the touch during normal operation and especially after shut-down.
3. Some special motor applications may require
additional instructions (e.g. when supplied by frequency converter).
4. Observe rotating parts of the motor.
5. Do not open terminal boxes while energized.

STORAGE

The motor should always be stored indoors (above –20 °C), in dry, vibration-free and dust-free conditions. During transportation, shocks, falls and humidity should be avoided.
Unprotected machined surfaces (shaft-ends and flanges) should be treated against corrosion.
It is recommended that shafts are rotated periodically (once per quarter) by hand to prevent grease migration.

INSULATION

Measure insulation resistance (IR) before commissioning, after long periods of standstill or storage when winding dampness may be suspected.
IR shall be measured directly on the motor terminals with the supply cables disconnected in order to avoid them affecting the result.
Insulation resistance should be used as a trend indicator to determine changes in the insulation
system. In new machines the IR is usually thousands of M ohms and thus following the change of IR is important so as to know the condition of the insulation system. Typically, the IR should not be below 10 MΩ and in no case below 1 MΩ (measured
with 500 or 1000 VDC and corrected to 25 °C). The insulation resistance value is halved for each 20 °C increase in temperature.
Figure 1, in chapter 11, can be used for the insulation correction to the desired temperature.
The end user has full responsibility for preparation of the foundation.
Metal foundations should be painted to avoid corrosion.
Foundations must be even and sufficiently rigid to withstand possible short circuit forces. They must be designed and dimensioned to avoid the transfer of vibration to the motor and vibration caused by resonance. See figure below.

WARNING

To avoid risk of electrical shock, the motor frame must be grounded and the windings
should be discharged against the frame immediately after each measurement.
If the reference resistance value is not attained, the winding is too damp and must be oven dried.
The oven temperature should be 90 °C for 12-16 hours followed by 105 °C for 6-8 hours.
If fitted drain hole plugs must be removed and closing valves must be opened during heating. After heating, make sure the plugs are refitted. Even if the drain plugs are fitted, it is recommended to disassemble the end shields and terminal box
covers for the drying process.
Windings drenched in seawater normally need to be rewound.

The terminal box on standard single speed motors normally contains six winding terminals and at least one earth terminal.
In addition to the main winding and earthing terminals, the terminal box can also contain connections for thermistors, heating elements or other auxiliary devices.
Suitable cable lugs must be used for the connection of all main cables. Cables for auxiliaries can be connected into their terminal blocks as such.
Motors are intended for fixed installation only.
Unless otherwise specified, cable entry threads are metric. The IP class of the cable gland must be at least the same as those of the terminal boxes.
Certified conduit hub or cable connector has to be used at the time of installation.
Cables should be mechanically protected and clamped close to the terminal box to
fulfill the appropriate requirements of IEC/ EN 60079-0 and local installation standards.
Unused cable entries must be closed with blanking elements according to the IP class of the terminal box.
The degree of protection and diameter are specified in the documents relating to the cable gland.
Use appropriate cable glands and seals in the cable entries according to the type and diameter of the cable.
Earthing must be carried out according to local regulations before the motor is connected to the supply voltage.
Motors with sealable plastic drain plugs are delivered in an open position. In very dusty environments, all drain holes should be closed.
The earth terminal on the frame has to be connected to PE (protective earth) with a cable as shown in Table 5 of IEC/EN 60034-1:

In addition, earthing or bonding connection facilities on the outside of electrical apparatus must provide effective connection of a conductor with a cross-sectional area of at least 4 mm2.
The cable connection between the network and motor terminals must meet the requirements stated in the national standards for installation or in the standard IEC/EN 60204-1 according to the rated current indicated on the rating plate.

OPERATION

The motors are designed for the following conditions unless otherwise stated on the rating plate:
- Motors are to be installed in fixed installations only.
- Normal ambient temperature range is from –20 °C to +40 °C.
- Maximum altitude is 1000 m above sea level.
- The variation of the supply voltage and frequency may not exceed the limits mentioned in relevant standards. Tolerance for supply voltage is ±5 %, and for frequency ±2 % according to the figure 4 (EN / IEC 60034-1, paragraph 7.3, Zone A). Both extreme values are not supposed to occur at the same time.

The motor can only be used in applications for which it is intended. The rated nominal values and operation conditions are shown on the motor rating plates. In addition, all requirements of this manual and other related instructions and standards must be followed.
If these limits are exceeded, motor data and construction data must be checked.

1. Inspect the motor at regular intervals, at least once a year. The frequency of checks depends on, for example, the humidity level of the ambient air and on the local weather conditions.
This can initially be determined experimentally and must then be strictly adhered to.
2. Keep the motor clean and ensure free ventilation airflow. If the motor is used in a dusty environment, the ventilation system must be regularly checked and cleaned.
3. Check the condition of shaft seals (e.g. V-ring or radial seal) and replace if necessary.
4. Check the condition of connections and mounting and assembly bolts.
5. Check the bearing condition by listening for any unusual noise, vibration measurement, bearing temperature, inspection of spent grease or SPM bearing monitoring. Pay special attention to bearings when their calculated rated life time is coming to an end.
When signs of wear are noticed, dismantle the motor, check the parts and replace if necessary.
When bearings are changed, replacement bearings must be of the same type as those originally fitted. The shaft seals have to be replaced with seals of the same quality and characteristics as the originals when changing bearings.
In the case of the IP 55 motor and when the motor has been delivered with a plug closed, it is advisable to periodically open the drain plugs in order to ensure that the way out for condensation is not blocked and allows condensation to escape from the motor.
This operation must be done when the motor is at a standstill and has been made safe to work on.
7.1.1 Standby motors
If the motor is in standby for a longer period of time on a ship or in other vibrating environment the following measures have to be taken:
1. The shaft must be rotated regularly every 2 weeks (to be reported) by means of starting up of the system. In case a start-up is not possible, for any reason, at least the shaft has to be turned by hand in order to achieve a different position once a week. Vibrations caused by other vessel's equipment will cause bearing pitting which should be minimized by regular operation/hand turning.
2. The bearing must be greased while rotating the shaft every year (to be reported). If the motor has been provided with roller bearing at the driven end, the transport lock must be removed before rotating the shaft. The transport locking must be remounted in case of transportation.
3. All vibrations must be avoided to prevent a bearing from failing. All instructions in the motor instruction manual for commissioning and maintenance have to be followed.
The warranty will not cover the winding and bearing damages if these instructions have not been followed.

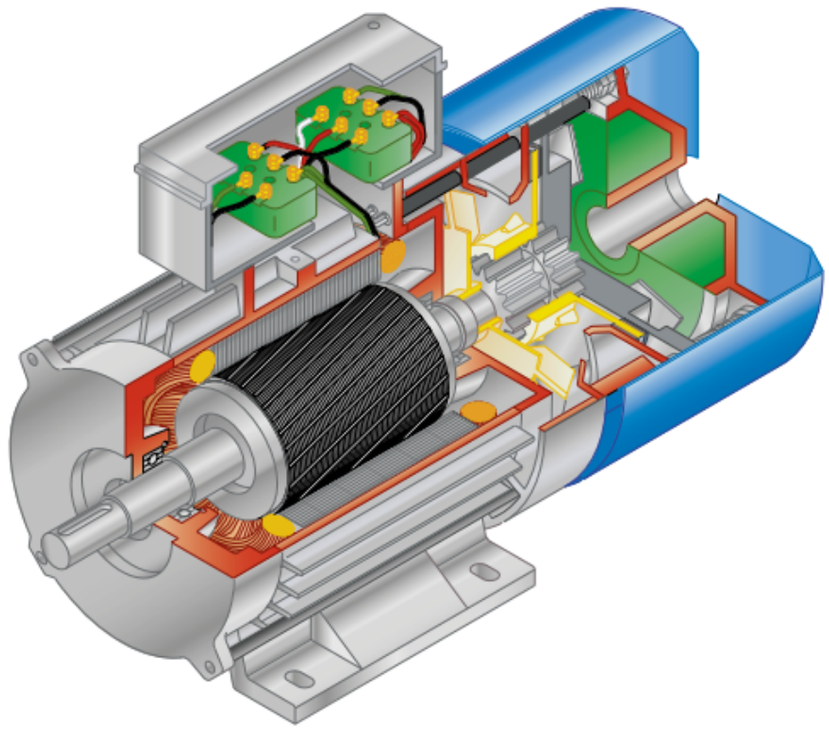
GENERIC INFORMATION

Coel motors are closed with external ventilation o without, standard protection is IP54 (higher protections on request - IP66 for SW motors). The frames of the motors from type 56 up to 160 are made in aluminum finished with sanded surface treatment. Frames from 180 to 315 are made in cast iron and painted Ral 5010 as standard (other painting on request). All the windings of COEL motors are made with insulations between phases as standard to increase the reliability and to make them suitable for the use with inverter, while the sheets of the stator are magnetic type with low lost. COEL motors can be also produced with special execution: winding with double speeds or special voltages, two shafts, double brakes, etc.

WARRANTY

Warranty right is valid for 12 months from the date of purchase; this right is not recognized in case of evident damages and deteriorations and disassembly of components not authorized (for more informations please check warranty conditions rev0-010707-GCS).

F TYPE MOTORS

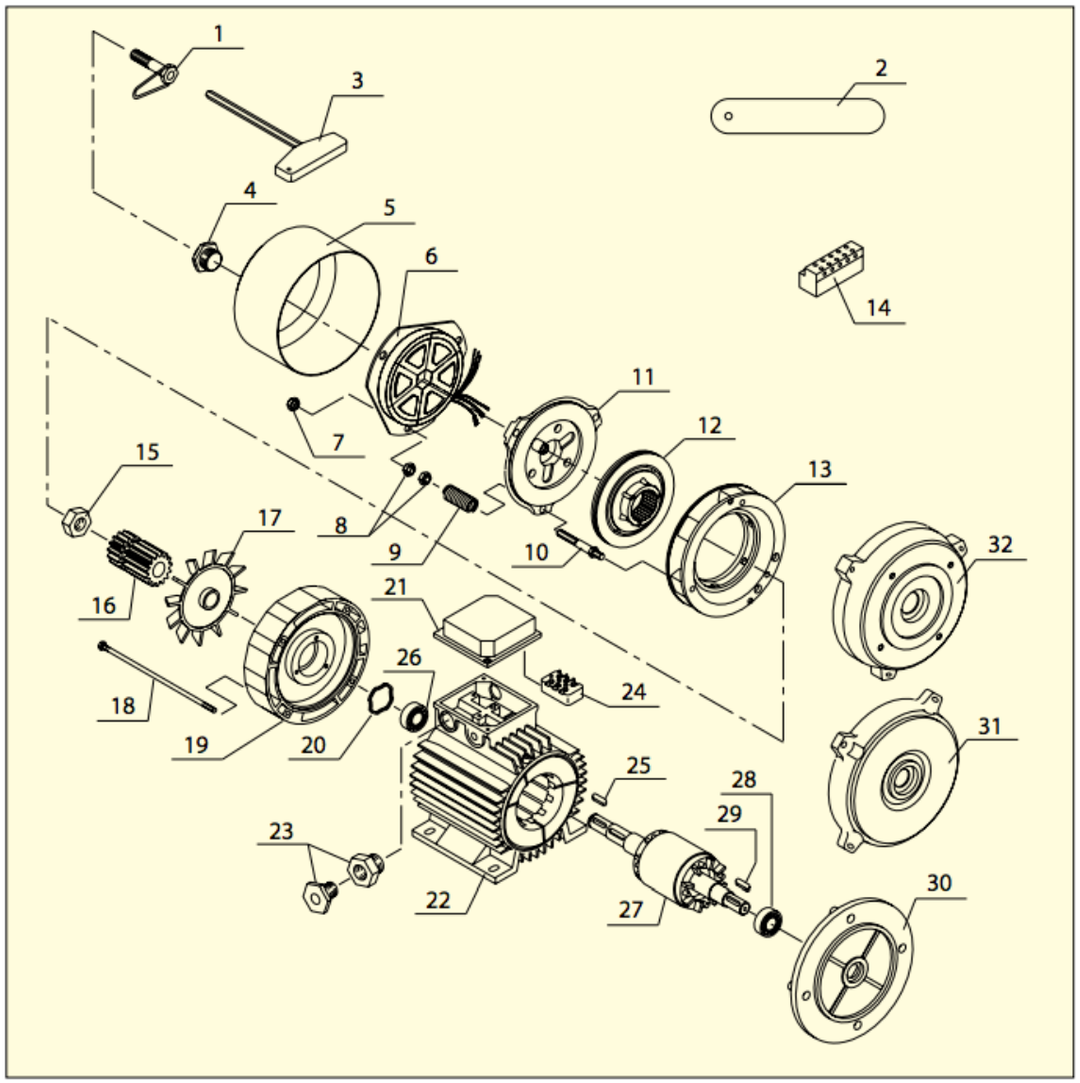


DESCRIPTION

F type motors are closed and externally ventilated. The brake groups and all the motors parts are designed and made by Coel.
The brake group is supplied on series with “3ph. AC”electromagnet but DC version is also available on request. The F series motors can be driven by inverter but in this case the brake supply must be separated from the one of the motor.
The motor frames of motors are in die cast pressed aluminium from 71 to 160 frame and in cast iron for frames180 and 200. The shafts of frames 71 to 132 are fitted with an hexagon on the back side for the manual rotation of the shaft. The brake can be manually released with a special screw supplied with the motor. The friction tracks are in cast iron and auto ventilated. The F series motors are designed for very heavy duty cycles in the version for intermittence duty and are suitable for continuous duty in version IE3 high efficiency.

SPARE PARTS

1 Manual release screw / Vite di sblocco	17 Fan / Ventola
2 0,3 mm thickness gauge / Spessimetro 0.3 mm	18 Drawrods with nuts / Tiranti con dadi
3 Key for manual rotation / Chiave di rotazione	19 Brake side shield / Scudo lato freno
4 Cap locking screw / Dado blocca cuffia	20 Compensation ring / Rondella di compensazione
5 Brake protection cover / Cuffia protezione freno	21 Terminal box / Scatola morsettiera
6 Electromagnet / Elettromagnete	22 Motor case / Carcassa
7 Magnet locking nut / Dadi blocca magnete	23 Cable gland / Pressacavo
8 Adjustment nuts / Dadi di regolazione	24 Terminal board / Morsettiera
9 Brake springs / Molle	25 Brake side key / Chiavetta lato freno
10 Guide stud bolts / Colonnette	26 Brake side bearing / Cuscinetto posteriore
11 Mobile anchor / Ancora mobile	27 Rotor shaft group / Albero rotore
12 Brake disk / Disco freno	28 Control side bearing / Cuscinetto anteriore
13 Conveyor with friction track / Convogliatore	29 Drive end key / Chiavetta lato comando
14 Rectifier / Raddrizzatore	30 B5 flange / Flangia B5
15 Seeger or gear locking ring / Seeger o dado	31 B3 shield / Scudo B3
16 Brake Gear / Ingranaggio	32 B14 flange / Flangia B14



BRAKE*

F brakes are Three phase or DC supplied through a rectifier. Windings are incapsulated with resins in F class.
Braking torque is adjustable for all types.
Brake discs are made in high resistance polymer applied on aluminium support; such solutions avoid deformation and incoming losses between the shaft and the disc also after long operating periods.
It guarantees an efficient anti sticking system and a reliable protection against humidity avoiding oxidation.
Friction materials are made with medium hardness mixtures due to guarantee low consumption and constant braking coefficient. The construction is modular and maintenance operations are simple.

BRAKE MAINTENANCE - air gap adjustment:

The magnetic gap A (the distance between the electromagnet and of the mobile anchor) must be adjusted at mm 0,3 for brakes frame 71 to 100 - mm 0,4 for brakes frame 112 and 132 - mm 0,5 for brakes frame 160 and 180.
The magnetic gap should be periodically checked at least every 6 months
In order to adjust the magnetic gap, turn the couples of nuts B moving the electromagnet to the mobile anchor.
When the magnetic gap has been adjusted check that nuts have been correctly locked.

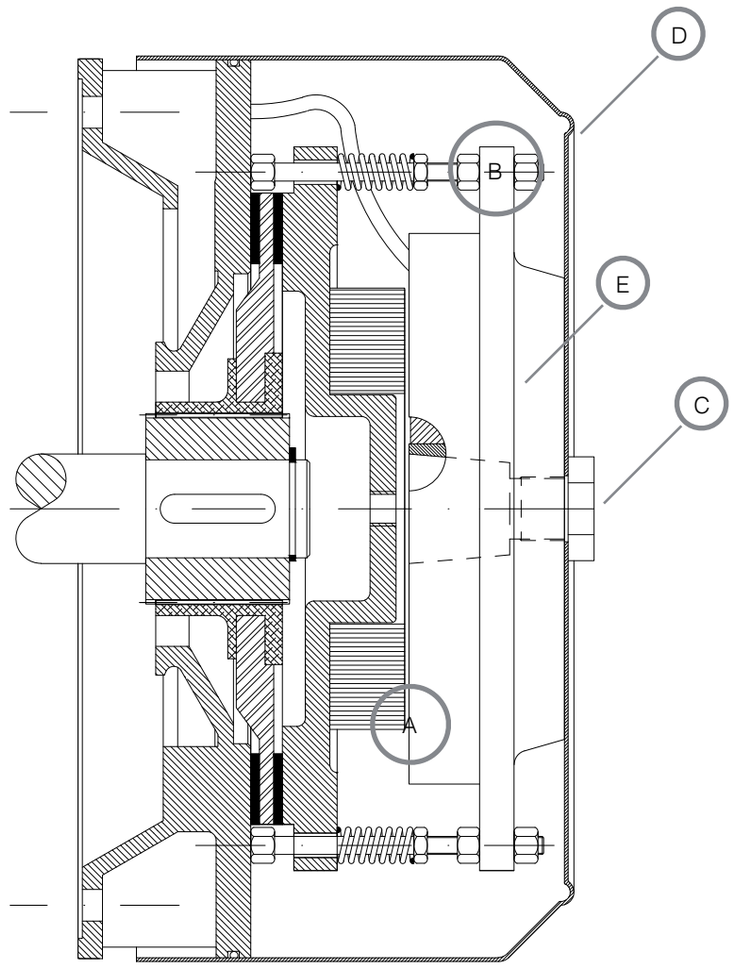
REPLACING THE ELECTROMAGNET :

Remove screw C, remove cap D, disconnect the terminals of the magnet from the terminal board, remove the nuts on the guide bolts and slip electromagnet E off.
Slip the new electromagnet on to the stud bolts, making sure that, when reinserting the terminals the colors position is same of previous one.
Now adjust the magnetic gap.

REPLACING THE BRAKE DISC :

Loosen screws , remove cap E and loosen the nuts on the guide bolts.
Mount the new brake disc and assemble the other parts.
Now adjust the magnetic gap

The brake disc is considered a consumable. Therefore,it mus\t be inspected
at least every 12 months to verify its integrity and replaced at least every 36 months.



**also valid for brakes mounted on SW motors frames 112, 132, 160*

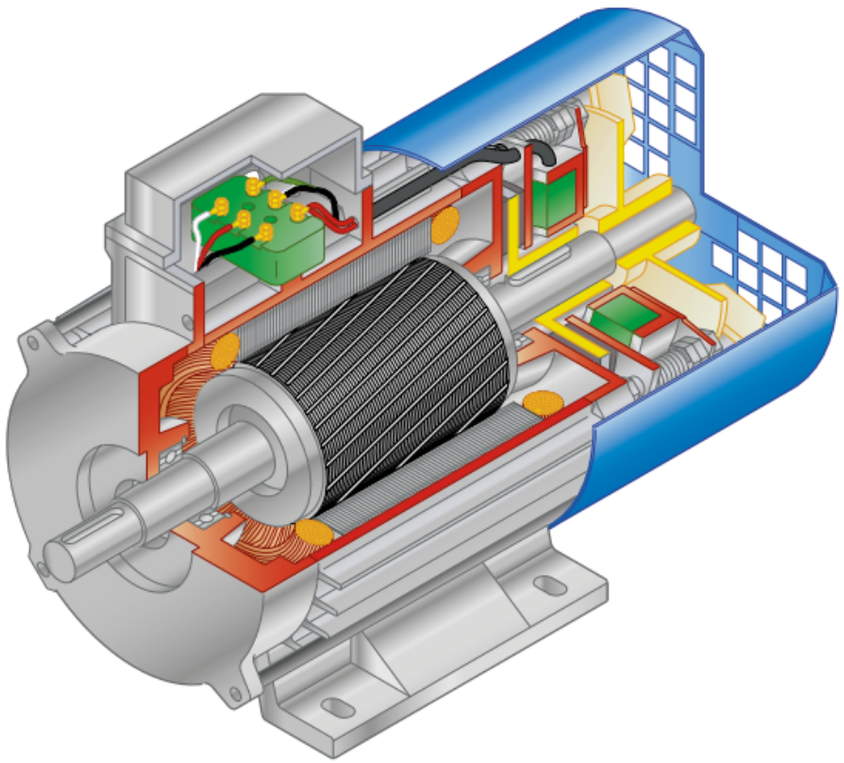
GENERIC INFORMATION

Coel motors are closed with external ventilation o without, standard protection is IP54 (higher protections on request - IP66 for SW motors). The frames of the motors from type 56 up to 160 are made in aluminum finished with sanded surface treatment. Frames from 180 to 315 are made in cast iron and painted Ral 5010 as standard (other painting on request). All the windings of COEL motors are made with insulations between phases as standard to increase the reliability and to make them suitable for the use with inverter, while the sheets of the stator are magnetic type with low lost. COEL motors can be also produced with special execution: winding with double speeds or special voltages, two shafts, double brakes, etc.

WARRANTY

Warranty right is valid for 12 months from the date of purchase; this right is not recognized in case of evident damages and deteriorations and disassembly of components not authorized (for more informations please check warranty conditions rev0-010707-GCS).

FK TYPE MOTORS

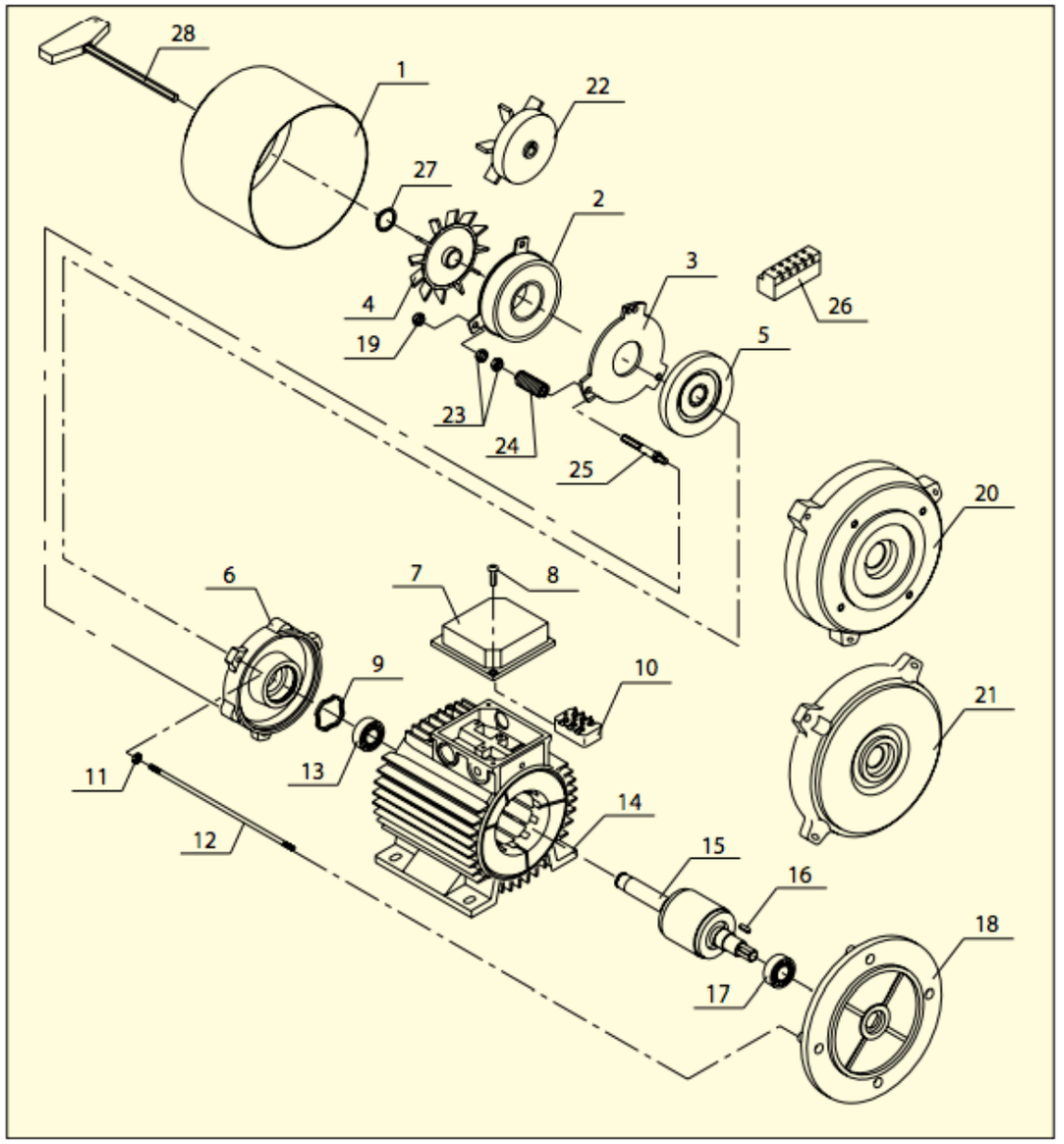


DESCRIPTION

FK motors are closed and externally ventilated.
The brake is supplied DC with rectifier.
FK motors can be driven by inverter but in this case it's necessary tu supply the brake separately from the motor. The cases are in die pressed aluminium and braking surfaces are in cast iron.
Shafts are fitted with an hexagon on the back side for the manual rotation of the shaft.
The lateral hand release of the brake is available on request. FK motors are compact and light available with a wide range of options.
FK motors are available in intermittance duty version or in version for continuous duty S1 and IE3 efficiency class.

SPARE PARTS

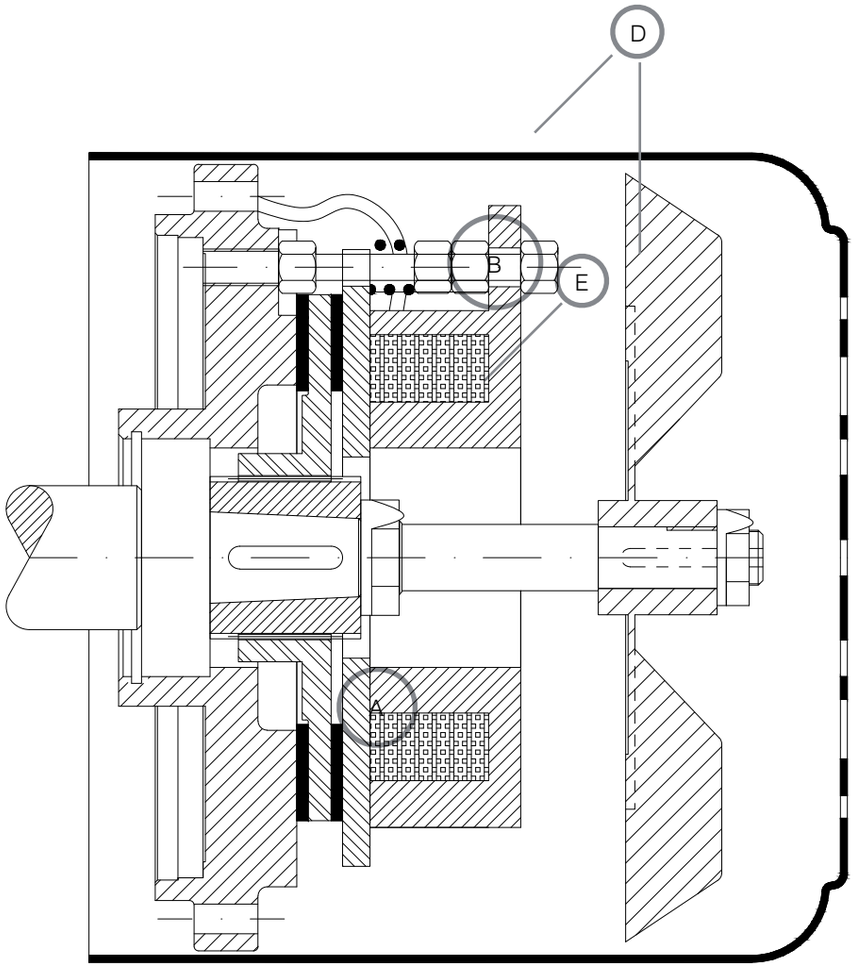
1 Manual release screw / Vite di sblocco	17 Fan / Ventola
2 0,3 mm thickness gauge / Spessimetro 0.3 mm	18 Drawrods with nuts / Tiranti con dadi
3 Key for manual rotation / Chiave di rotazione	19 Brake side shield / Scudo lato freno
4 Cap locking screw / Dado blocca cuffia	20 Compensation ring / Rondella di compensazione
5 Brake protection cover / Cuffia protezione freno	21 Terminal box / Scatola morsettiera
6 Electromagnet / Elettromagnete	22 Motor case / Carcassa
7 Magnet locking nut / Dadi blocca magnete	23 Cable gland / Pressacavo
8 Adjustment nuts / Dadi di regolazione	24 Terminal board / Morsettiera
9 Brake springs / Molle	25 Brake side key / Chiavetta lato freno
10 Guide stud bolts / Colonnette	26 Brake side bearing / Cuscinetto posteriore
11 Mobile anchor / Ancora mobile	27 Rotor shaft group / Albero rotore
12 Brake disk / Disco freno	28 Control side bearing / Cuscinetto anteriore
13 Conveyor with friction track / Convogliatore	29 Drive end key / Chiavetta lato comando
14 Rectifier / Raddrizzatore	30 B5 flange / Flangia B5
15 Seeger or gear locking ring / Seeger o dado	31 B3 shield / Scudo B3
16 Brake Gear / Ingranaggio	32 B14 flange / Flangia B14



BRAKE

F brakes are Three phase or DC supplied through a rectifier. Windings are incapsulated with resins in F class.
Braking torque is adjustable for frames 56 to 112 (brake type A*) and fixed for frames 132 to 315 (brake type B**). For FKFD motors equipped with double brake, please contact us.
Brake discs are made in high resistance polymer applied on aluminium support; such solutions avoid deformation and incoming losses between the shaft and the disc also after long operating periods.
It guarantees an efficient anti sticking system and a reliable protection against humidity avoiding oxidation.
Friction materials are made with medium hardness mixtures due to guarantee low consumption and constant braking coefficient. The construction is modular and maintenance operations are simple.

BRAKE type A (71 to 112)



BRAKE MAINTENANCE - air gap adjustment :

The magnetic gap A (the distance between the electromagnet and of the mobile anchor) must be adjusted at mm 0,3 for brakes frame 56 to 80 - mm 0,4 for brakes frame 90 to 112.
The magnetic gap should be periodically checked at least every 6 months
In order to adjust the magnetic gap, turn the couples of nuts B moving the electromagnet to the mobile anchor.
When the magnetic gap has been adjusted check that nuts have been correctly locked.

REPLACING THE ELECTROMAGNET :

Remove cap and the fan D, disconnect the terminals of the magnet from the terminal board, remove the nuts on the guide bolts and slip electromagnet E off.
Slip the new electromagnet on to the stud bolts, making sure that, when reinserting the terminals the colors position is same of previous one.
Now adjust the magnetic gap.

REPLACING THE BRAKE DISC :

Loosen screws , remove cap E and loosen the nuts on the guide bolts.
Mount the new brake disc and assemble the other parts.
Now adjust the magnetic gap

The brake disc is considered a consumable. Therefore,it mus\t be inspected
at least every 12 months to verify its integrity and replaced at least every 36 months.

**also valid for brakes mounted on SW motors frames 90 to 100*

***also valid for brakes mounted on SW motors frames 180 to 315*

BRAKE type B (132 to 315)

BRAKE MAINTENANCE :

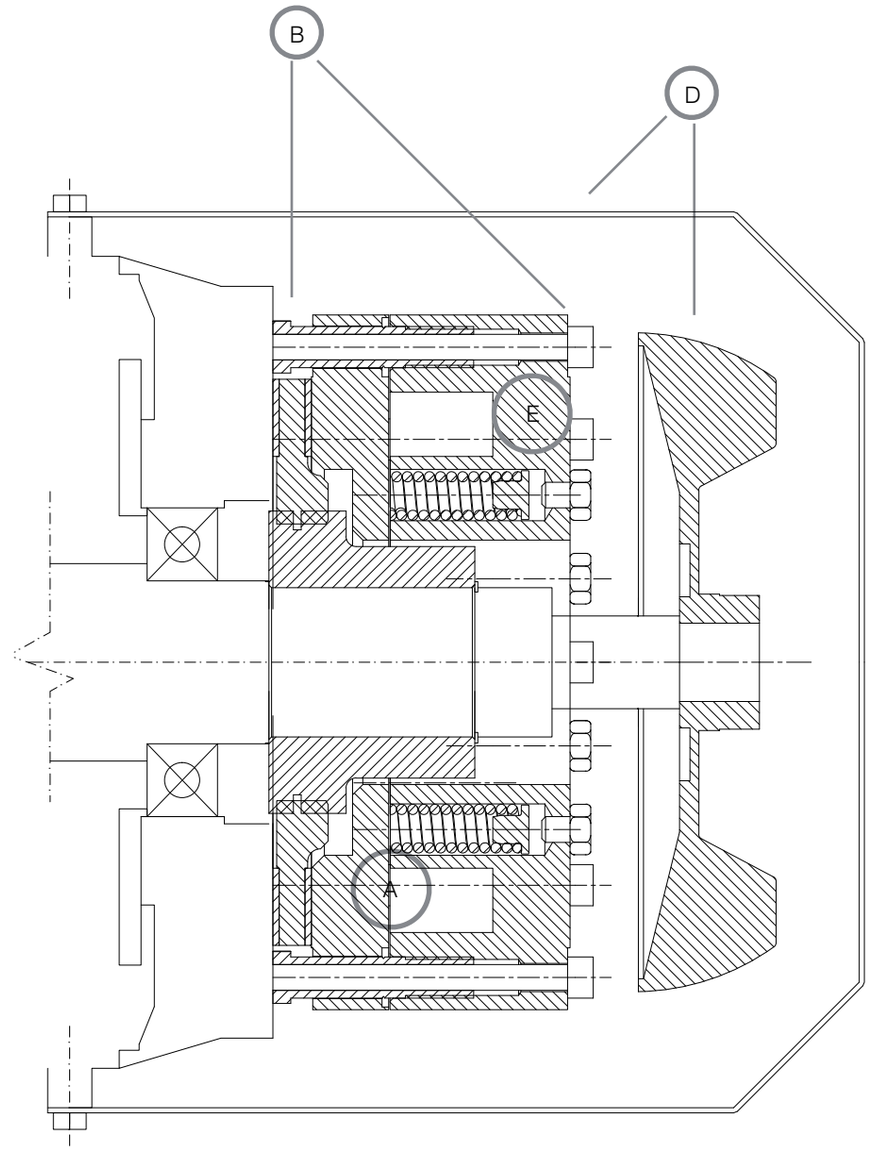
The magnetic gap A (the distance between the electromagnet and of the mobile anchor) must be adjusted at mm 0,4 for brakes frame 132 to 160 - mm 0,6 for brakes frame 180 to 225 - mm 0,8 for brakes frame 250 to 315.
The magnetic gap should be periodically checked at least every 6 months
In order to adjust the magnetic gap, turn the couples of nuts and screws B moving the electromagnet to the mobile anchor.
When the magnetic gap has been adjusted check that nuts have been correctly locked.

REPLACING THE ELECTROMAGNET :

Remove cap and the fan D, disconnect the terminals of the magnet from the terminal board, remove the nuts on the guide bolts and slip electromagnet E off.
Slip the new electromagnet on to the stud bolts, making sure that, when reinserting the terminals the colors position is same of previous one.
Now adjust the magnetic gap.

REPLACING THE BRAKE DISC :

Loosen screws, remove cap E and loosen the nuts on the guide bolts.
Mount the new brake disc and assemble the other parts.
Now adjust the magnetic gap



**also valid for brakes mounted on SW motors frames 90 to 100*

***also valid for brakes mounted on SW motors frames 180 to 315*

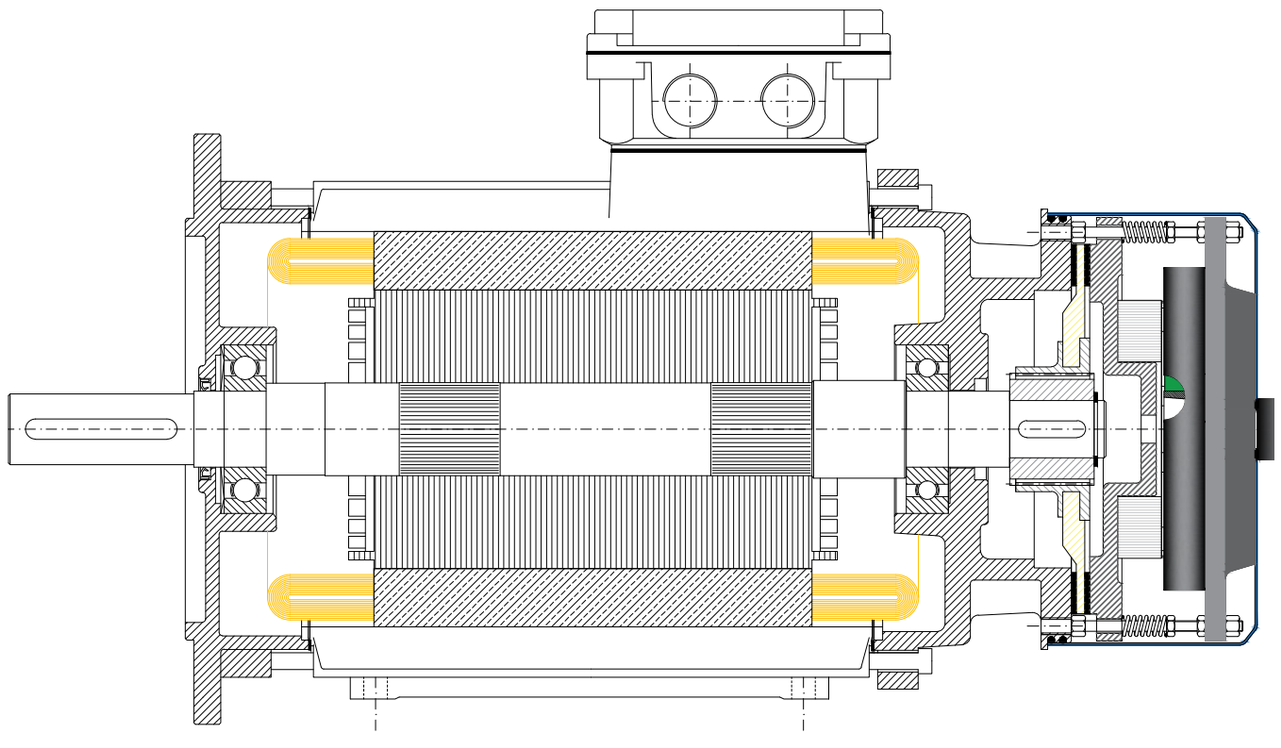
GENERIC INFORMATION

Coel motors are closed with external ventilation o without, standard protection is IP54 (higher protections on request - IP66 for SW motors). The frames of the motors from type 56 up to 160 are made in aluminum finished with sanded surface treatment. Frames from 180 to 315 are made in cast iron and painted Ral 5010 as standard (other painting on request). All the windings of COEL motors are made with insulations between phases as standard to increase the reliability and to make them suitable for the use with inverter, while the sheets of the stator are magnetic type with low lost. COEL motors can be also produced with special execution: winding with double speeds or special voltages, two shafts, double brakes, etc.

WARRANTY

Warranty right is valid for 12 months from the date of purchase; this right is not recognized in case of evident damages and deteriorations and disassembly of components not authorized (for more informations please check warranty conditions rev0-010707-GCS).

SW TYPE MOTORS (please refer to F and FK brakes details)

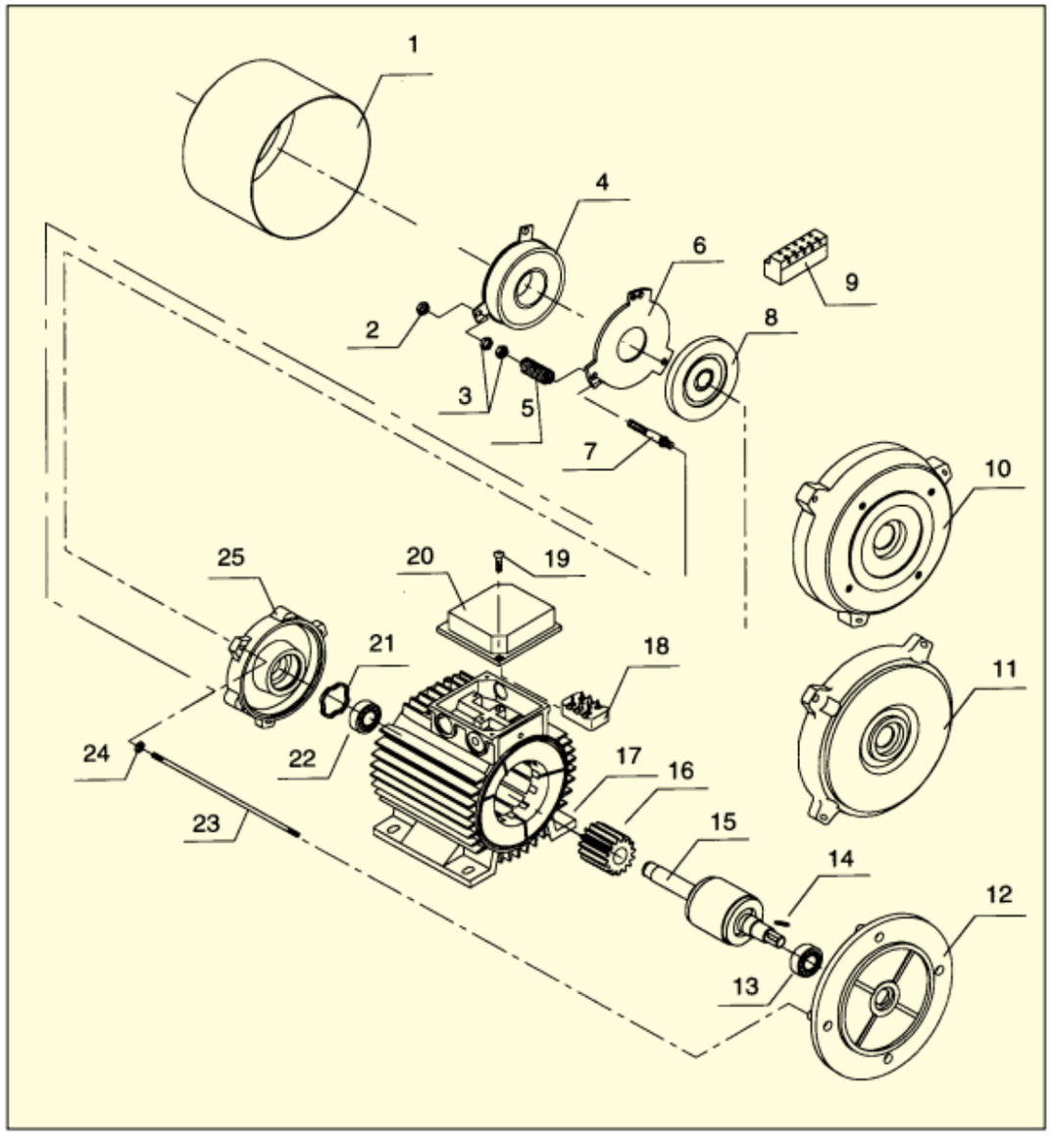


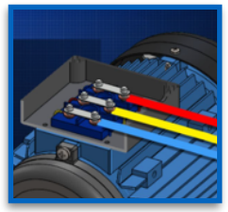
DESCRIPTION

SW series brake motors are closed and not ventilated, suitable for S2 duty or S1 with forced ventilation.
This series has been designed for applications where the brake motor has often contacts with water such as marine environment.
These motors are painted as standard with special painting for a total protection.
The protection level of this series is IP66 certified.
Motor frames are in aluminum or 90 to 160 and cast iron for 180 to 315 types.
Many options are available such as anti condensation heaters, thermal protections, epoxy painting and many others. Please contact COEL for further details.
SW motors are available in single or double speed.

SPARE PARTS

1 Brake cover / Copri freno	14 Key/Chiavetta
2 Electromagnet locking nuts / Dadi blocca magnete	15 Rotor - shaft group/Albero rotore
3 Adjustment nuts / Dadi di regolazione	16 Brake gear/Ingranaggio
4 Electromagnet/Elettromagnete	17 Motor case and winded stator/Statore avvolto in carcassa
5 Brake spring/Molla	18 Terminal board/Morsettiera
6 Mobil anchor/Ancora mobile	19 Screws/Viti
7 Guide drawrods/Tiranti	20 Terminal board cover/Copri morsettiera
8 Brake disk/Disco freno	21 Compensation ring/Anello di compensazione
9 Rectifier/Raddrizzatore	22 Back side bearing/Cuscinetto posteriore
10 B14 flange/Flangia B14	23 Drawroads kit/Kit tiranti
11 Front shield/Scudo anteriore	24 Drawroad nuts/Dadi per tiranti
12 B5 flange/Flangia B5	25 Back side shield /Scudo posteriore
13 Front bearing/Cuscinetto anteriore	



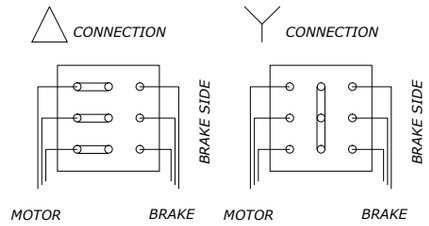


WIRING DIAGRAMS

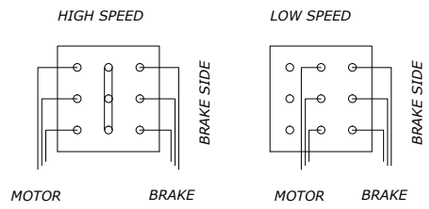
3 PHASE BRAKE

SEPARATE FEEDING (9 ter.)

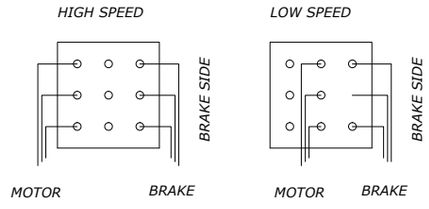
THREE-PHASE MOTOR AND BRAKE



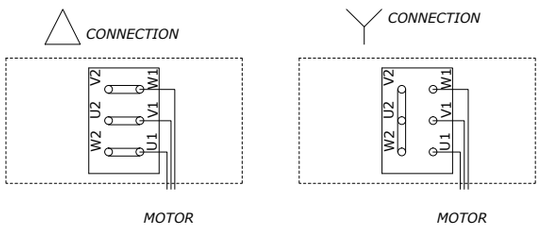
SINGLE WINDING 2 SPEEDS(9 ter.)



DOUBLE WINDING 2 SPEEDS(9 ter.)

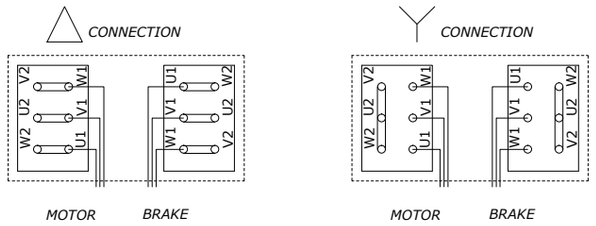


SINGLE SPEED MOTOR

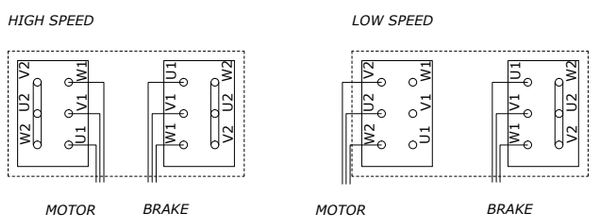


SEPARATE FEEDING

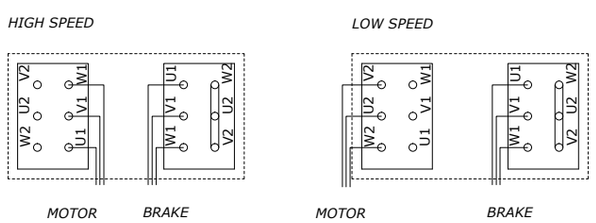
THREE-PHASE MOTOR AND BRAKE



SINGLE WINDING 2 SPEEDS



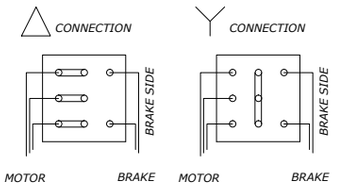
DOUBLE WINDING 2 SPEEDS



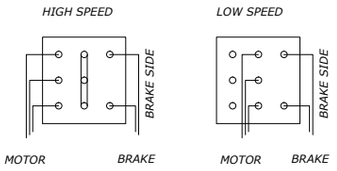
DC BRAKE

SEPARATE FEEDING (8 ter.)

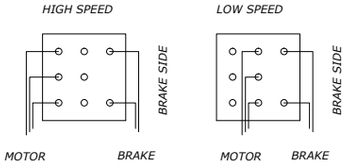
MOTOR AND BRAKE



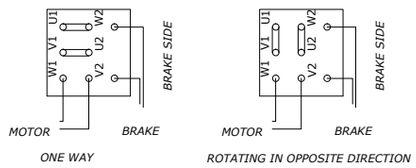
SINGLE WINDING 2 SPEEDS(8 ter.)



DOUBLE WINDING 2 SPEEDS(8 ter.)



SINGLE-PHASE MOTOR CONNECTION (8 ter.)

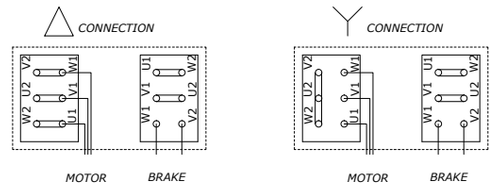


ONE WAY

ROTATING IN OPPOSITE DIRECTION

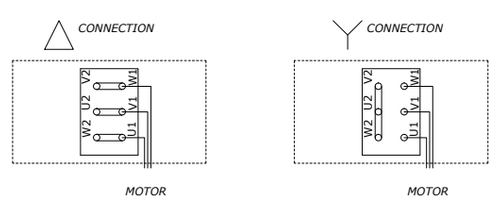
SEPARATE FEEDING

MOTOR AND BRAKE

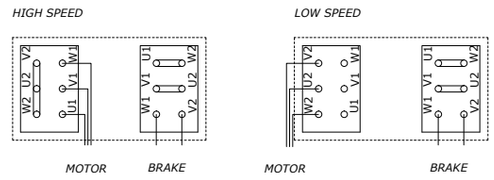


ONE FEED

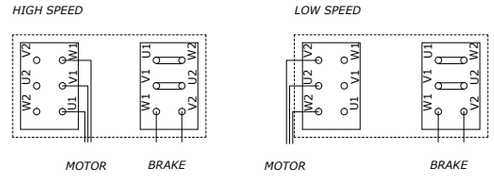
MOTOR PLUS BRAKE



SINGLE WINDING 2 SPEEDS



DOUBLE WINDING 2 SPEEDS



5 WIRES RECTIFIER CONNECTION FOR FAST BRAKING