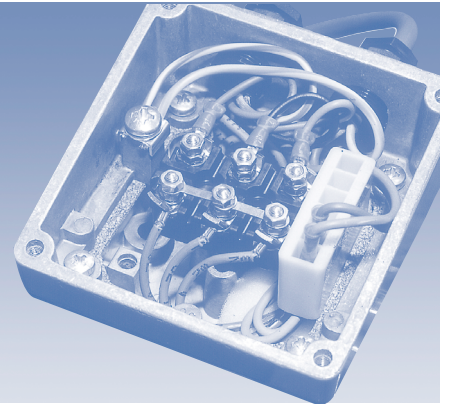


# Spare parts, installation and maintenance of ac motors



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# Installation and maintenance of ac electric induction motors

## Introduction

Your Brook Crompton motor is designed for long life, and low running costs. Careful installation and maintenance will ensure that you achieve reliable operation and optimum efficiency.

## Pre-installation requirements

### WARNING

Handling and lifting of electric motors must only be undertaken by authorised personnel. Full product documentation and operating instructions must be available together with tools and equipment necessary for safe working practice.

### Receipt

Before any motor is accepted on site it should be inspected carefully for damage or loss incurred during transit.

Packing materials may be damaged including sheeting and crate timbers.

Handling operations may have damaged fan cowls, terminal boxes or auxiliaries.

Where an instance of droppage or loss is evident or suspected, it may be necessary to unpack the goods to establish the full extent of the problem.

Wherever possible, damage should be recorded, photographed and witnessed.

Report any damage to the carriers and Brook Crompton as soon as possible, quoting the motor number and consignment note reference. The insurance company's agents shown on the insurance certificate should also be advised.

### Lifting

Eyebolts and/or lifting trunnions supplied with the motor are designed to support only the weight of the motor, not the weight of the motor and any ancillary equipment attached to it. Be absolutely sure that cranes, jacks, slings and lifting beams are capable of carrying the weight of equipment to be lifted.

Where an eyebolt is provided with the motor, this should be screwed down until its shoulder is firmly against the face of the stator frame to be lifted. Eyebolts are normally designed for a vertical lift. For eyebolt/lifting lug torques, see opposite.

Type	Eyebolt dia		Cast iron frames	
	Metric	NEMA/ CSA	Lifting lug bolt dia*	Torque Nm Lbf.FT
63	–	–	–	–
71	–	–	–	–
80	56	–	–	–
90S/L	143/145	–	–	–
100L	–	–	–	–
112M	182/184	M12†	–	–
132S/M	213/215	M12†	–	–
160M/L	254/256	M12†	–	–
180M/L	284/286	M16†	–	–
200L	324	M10*	52	38
225S	326	M10*	52	38
225M	364	M10*	52	38
250S	365	M10*	52	38
250M	404	M16*	220	162
280S	405	M16*	220	162
280M	444	M16*	220	162
315S	445	M16*	220	162
315M	504	M20*	400	295
315L	505	M20*	400	295
355M/L	585/6/7	M20*	400	295

\* W-DF design only. Lifting lugs secured with bolts and nuts. High tensile socket headed bolts and special square nuts must be used

† The eyebolt should be firmly screwed down (without over tightening), to ensure that the collar is fully seated

Where two eyebolts/lifting lugs are used with inclined loading, the maximum safe working loads of BS 4278: 1984 should not be exceeded (ISO 3266).

## Tables of approximate weights

Cast iron construction Frames DF80–DF90L			
Type	Net weight kg	Gross weight kg	Cubage m <sup>3</sup>
DF80M	15	16.5	0.02
DF90S	19	20.5	0.03
DF90L	22	23.5	0.03

Cast iron construction Frames W-DF100L–W-DF355L			
Type	Net weight kg	Gross weight kg	Cubage m <sup>3</sup>
W-DF100L	35.	38	.03
W-DF112M	45	48	0.05
W-DF132S/M	72.5	78.5	0.08
W-DF160M/L	133	145	0.15
W-DF180M/L	177.5	193.5	0.21
W-DF200L	255	270	0.30
W-DF225S	320	335	0.37
W-DF225M	375	390	0.37
W-DF250S	420	460	0.63
W-DF250M	570	610	0.70
W-DF280S	660	721	1.2
W-DF280M	800	871	1.2
W-DF315S	1000	1095	1.8
W-DF315M	1100	1195	1.8
W-DF315L	1300	1395	1.8
W-DF355S	2000	2120	2.3
W-DF355M	2300	2420	2.3
W-DF355L	2500	2620	2.3

Aluminium construction Frames DA63–DA180			
Type	Net weight kg	Gross weight kg	Cubage m <sup>3</sup>
DA63	5	5.4	0.010
W-DA71	6	6.4	0.010
W-DA80	9	10	0.020
W-DA90S	12.5	13.5	0.030
W-DA90L	14.5	15.5	0.030
W-DA100L	19	21	0.038
W-DA112M	27	29	0.050
W-DA132S	38	41	0.071
W-DA132M	46	49	0.076
W-DA160M	80	95	0.125
W-DA160L	100	112	0.125
W-DA180M	140	165	0.253
W-DA180L	148	174	0.253

Drip proof cast iron construction Frames K-CF225M–K-CF315M			
Type	Net weight kg	Gross weight kg	Cubage m <sup>3</sup>
K-CF225M	378	411	0.37
K-CF250S	391	446	0.63
K-CF250M	444	499	0.70
K-CF280S	536	602	1.2
K-CF280M	633	699	1.2
K-CF315S	801	885	1.8
K-CF315M	916	1000	2.3

### Storage

If motors have to be stored before installation, precautions should be taken to prevent deterioration.

### Environment

Depending on the site conditions it may be necessary to create a suitable stores area to hold the motor prior to installation. Packing cases are not waterproof.

Motors should be stored in a dry, vibration free and clean area at normal ambients (–20°C to 40°C), unless other arrangements have been agreed with Brook Crompton.

Where low temperature ambient storage is anticipated, special precautions should be taken with the type of grease, no plastic parts etc. to ensure trouble free start-up.

Motors must be stored away from corrosive or chemically damaging fumes.

Before placing motors into storage, machined components should be carefully inspected. Bearings and shafts are normally covered with a corrosion resistive barrier. If this coating is damaged it should be made good. The component should be cleaned and the protective coating reapplied.

Under no circumstances should rust be merely covered over.

### Drain holes

Motors provided with drain holes have drain plugs provided loose in the terminal box up to frame size 180, and fitted on frames size 200 and above. Position the drain holes at the lowest point.

### Bearings

To avoid static indentation the storage area should be vibration free. If this is not possible it is strongly recommended that the motors be stood on thick blocks of rubber or other soft material.

Shafts should be rotated by hand one quarter of a revolution weekly.

Where the exposure to some vibration is unavoidable the shaft should be locked in position to avoid static indentation of the bearings. Roller bearings may be fitted with a shaft locking device. This should be kept in place during storage.

### Grease

Factory fitted bearings use a lithium based grease with a recommended shelf life of two years. If stored for a longer period, grease may need to be replaced.\*

Shielded bearings have a storage life of five years and a further two years operational life following installation.

\* *Wash all bearing parts with a non-contaminating solvent. Lightly pack the bearings with grease applying a 33% fill by volume into the bearing and housings*

### Heaters

Where space heaters are fitted, and the storage environment has wide humidity and temperature variations, it is strongly recommended they be energised.

*Warnings should be placed on the motors to make operatives aware of the live heaters*

*Supplies are normally 220-240 volt single phase, from a 380-415 volt three phase supply. See terminal box lid for details.*

A low voltage DC supply could be used as an alternative (see page 14).

### Insulation resistance

During extended storage a three monthly insulation test is recommended to avoid possible lengthy drying out periods when installing. Use a 500 volt d.c. Megger.

The insulation resistance between phases and between the windings and the frame should be checked.

The insulation resistance should be maintained above 10 megohm.

If a lower reading is measured, use one of the drying out methods recommended on page 14 until an acceptable reading is obtained. If heaters are fitted but not energised, they should be used in future. See also note on page 14.

### Wound rotors

Ideally, wound rotor motor brushes should not be in contact with the slip-rings during storage as there is a risk of corrosion.

Brushes should either be lifted off the slip-rings or stored separately. This may not be possible with small motors (up to frame W-DF180).

### Installation

Work on hazardous area motors should only be carried out by Brook Crompton trained personnel or those trained to an equivalent standard

Reference should be made to:

a constructional standards EN50014, EN50018 (EEx d), EN50019 (EEx e),

BS 5000 Part 16

b the approval certificate

c codes of practice (BS 5345, IEC 79 Part 14)

All warning instructions and labels must be observed and retained with the motor

### Health & Safety at Work etc Act 1974

It is essential equipment is installed, earthed and guarded in accordance with current legislation

### Location

Motors must be installed with adequate access for routine maintenance. A minimum of 0.75m of working space around the motor is recommended. Adequate space around the motor, particularly at the fan inlet (50mm), is also necessary to facilitate airflow.

Where several motors are installed in close proximity, care must be taken to ensure that there is no recirculation of exhausted warm air. Foundations must be solid, rigid and level.

### Mechanical

#### Drain holes

Prior to installation remove drain plugs if fitted. If any water has accumulated, the integrity of all gaskets, sealants etc. should be checked. Drain plugs should be put back into place after draining.

#### Alignment

When the application calls for direct coupling, the shafts must be correctly aligned in all three planes. Bad alignment can be a major source of noise and vibration.

Allowance must be made for shaft end-float and thermal expansion in both axial and vertical planes. It is preferable to use flexible drive couplings.

# Installation and maintenance of ac electric induction motors

## Noise levels

The noise levels published in current Sales Specifications are equal to or less than the limiting values for rotating machines specified in European and International Standards BS EN 60034 and IEC 34-9.

In most cases noise levels also meet limiting values for exposure to noise in the work place i.e. Guidance on regulations for Noise at Work issued by HMSO.

It is the responsibility of the purchaser to ensure that other overriding lower noise levels if required, eg Machinery Directive, are specified at the time of order, or that the installation incorporates noise attenuating measures.

## Free rotation

The rotor must be free to rotate within its housing. Where uneven or bumpy rotation occurs the bearings should be inspected to establish that they have not been damaged during transportation or storage.

## Slide rails

Slide rails are available for all motors in the Brook Crompton product range to provide adjustable mounting. Fabricated steel rails are the standard as they are suitable for all mounting arrangements. Alternative aluminium slide rails are available for floor mounting.

## Installation

- 1 slide rails must be installed on a flat surface
- 2 rails must have a secure location
- 3 drive and driven shafts must be parallel

## Electrical connection

The connection diagram is shown on the leaflet enclosed in the motor terminal box or the diagram inside the terminal box lid. The cables used should be capable of carrying the full load current of the motor (see motor name-plate) without overheating or undue voltage drop.

## Cable terminations

All cable terminations should be tightly secured. Mains lead terminal lugs should be in face to face contact with the motor lead lugs and securing nuts and lockwashers screwed firmly over the connection. There should be no nuts or lockwashers fitted between the mains and motor lugs. Wiring should be carried out or checked by a qualified electrician and equipment must be earthed in accordance with current

regulations. The equipment must be correctly fused and isolated. All covers must be in position prior to running.

## WARNING

Isolate power supply to motor before commencing any routine cleaning or maintenance work.

## Drying out procedures

It is preferable to dismantle the motor to the point where the rotor is removed. This is not essential but the drying out process will take longer in the assembled state.

The temperature of the windings and the insulation resistance should be monitored at regular intervals. On initial application of heat the insulation resistance will drop quickly and then start to rise slowly until level. On discontinuation of the drying process, a further rise in resistance will occur.

There are several methods which can be used:

- 1 place the motor in a warm (typically 40°C), dry airstream (fan or convector heater) or in a warm oven with a temperature not exceeding 80°C. This method is preferred if the motor is dismantled
- 2 connect the motor to a low voltage\* three phase supply and inject a current not exceeding 50% of the full load current into the stator winding (\*approximately 10% of the line voltage). If this is carried out on an assembled motor, it is possible though unlikely that the motor will turn. If so the rotor should be locked in position
- 3 connect two phases in parallel, and the third in series. Apply a low voltage a.c. or d.c. supply up to a maximum of 50% of full load current. The stator winding temperature must not be allowed to exceed 80°C. In practice the frame should not be hot to the touch, to guard against internal overheating and consequent damage to the insulation
- 4 where heaters are fitted these can be energised

## Supply

It is important that a motor is operated within the limits of its design voltage and frequency.

Standard motors for the UK will operate without damage on any voltage in the range 94% to 106% of the nameplate voltage.

The supply cables must be capable of carrying the full load current of the motor

(see motor nameplate) without overheating or excessive voltage drop under starting conditions.

## Earthing

All motors are fitted with an earthing terminal, in or adjacent to the terminal box, to enable connection to an effective earthing bond. The terminal is designed for connecting the correct size of copper earth connector. If a different material is to be used please refer to Brook Crompton.

The motor must be earthed by connecting the shortest possible length of cable to the earth screws. The cable must have a capacity at least that of the main connections up to 16mm<sup>2</sup> phase conductors. Between 16 and 35mm<sup>2</sup> phase conductors, the earth should be a minimum of 16mm<sup>2</sup>. Above 35mm<sup>2</sup> phase conductors, the earth conductor should be a minimum of half the phase conductor.

Phase conductor mm <sup>2</sup>	Earth conductor mm <sup>2</sup>
up to 16	at least equal
16-35	16 minimum
above 35	at least half

*An earthing bond should not be terminated under the motor fixture bolts or terminal cover screws. The earth lead could be over-looked on reconnection after maintenance*

## Heater continuity

Heaters should be checked for continuity prior to connection to the control circuitry.

## Thermistor continuity

If fitted, it is recommended that thermistors be connected to the control circuit. Thermistors provide good thermal overload protection.

## Auxiliary electrical items

Where auxiliaries are fitted, the characteristics should be checked. Example: RTDs (Resistance Temperature Detectors) should have their resistances checked against manufacturer's figures.

Do not megger across the thermistor. Do not apply more than 6V across the thermistor for continuity check.

### Control gear

Ensure all control gear and associated metering/protection circuits have been checked fully.

*It is imperative that any overload trips and emergency shutdown circuits are working correctly before the motor is energised. All covers must be in position*

*Where a motor is fitted with a separately driven fan unit, the interlocks and thermal overload protection circuits must be operative.*

### Connection diagrams

Refer to the connection diagram supplied with the motor for supply details and the required winding connection.

### Rotation

Before coupling the motor to the drive, run the motor briefly to check rotation.

*All covers must be in place*

Motors fitted with angular contact or duplex bearings must be run in the correct mounting position eg vertical.

To reverse rotation interchange any two supply leads.

### Wound rotors

The stator of a wound rotor motor is similar to a cage motor but the rotor circuit is connected to a starting resistance. Take care to ensure that the brushes are in contact with the slip rings and that the rotor resistances are connected in the 'start' position.

### Starting

Motors are rated by the output required, the number of starts per hour, the load curve/ inertia, and environmental considerations.

Operating outside the contractual parameters may thermally overload the motor eg too many starts per hour, or mechanically stress components eg overspeeding.

*Refer to starter literature for method of start and safety precautions to be taken*

### Running

After one hour of running, check the general vibration levels. If these are excessive, check alignment (and belt tensioning if belt driven).

Some initial bearing noise may be present during the running in period. This is normal because the grease has to settle down within the bearing. The noise should disappear after a few hours of operation.

Check that the motor runs up smoothly and within the permitted run-up time. Note that repeated starting in quick succession may lead to a thermal overload of the motor.

### Motor modifications

#### W series

#### Multimount modification

#### Cast iron motors

#### Frames (200-355)

### SAFETY WARNING

*Do not work under suspended load and use correct lifting equipment.*

### Changing terminal box

- 1 lift motor, using two lifting lugs provided
- 2 slacken the two vertical foot fixing bolts on one foot
- 3 remove the two horizontal foot fixing bolts
- 4 pull the foot away from the frame
- 5 repeat stages 2 to 4 on the other foot
- 6 lower the motor onto two pieces of timber
- 7 remove both lifting lugs
- 8 rotate the motor until the terminal box is in the correct position
- 9 refit the two lugs on the machined pads at the top of the motor on diagonally opposite corners. Ensure that lifting lugs are in contact with all machined faces and that the correct bolts and nuts are used. Tighten the bolts to the torque shown on page 12
- 10 remove fan cover
- 11 remove the endshield bolts at both ends of the motor
- 12 slacken drive end bearing cap or clamping screws to allow endshield spigot to disengage
- 13 disengage both endshield spigots and rotate the endshields through 90 degrees until the grease nipples are at the top
- 14 refit endshield bolts and tighten to torque given on page 17
- 15 retighten the bearing cap screws at the drive end, replacing the Nylite washers under the bolt heads. Tighten screws to the torque given on page 17
- 16 lift motor, using hooks in the two lifting lugs

17 strip paint from the pads where the feet are to be fitted and apply a thin film of grease for corrosion protection on bare surfaces

18 slide first foot into position, using vertical nuts and bolts for location purposes. Lightly tighten to prevent foot from falling out of the slots in the frame

19 insert horizontal bolts

20 ensure the feet are fully in contact with the machined faces. Tighten all bolts to the torque given on page 17

21 repeat stages 18 to 20 on the other foot

22 prime and paint all machined surfaces left exposed by the changes

23 refit fan cover with the greasing hole in the correct position

### Bearings, grease, bearing change

#### Grease

Bearings are prepacked with a lithium or lithium complex based grease.

Other lithium based greases of a similar consistency would be compatible. See Table 1 for some alternatives.

**Table 1**  
Alternative lithium complex greases

Grease	Reference	Manufacturer
Energrease	LC2	BP
Castrol	LMX	Castrol
Luplex	M2	Century
Unirex	N2	Esso
Sovereign	LS	Gulf
Mobilgrease	HP	Mobil
Liplex	EP2	Shell
Hytex	EP2	Texaco
Retinax	LX	Shell
LGHT3	-	SKF

Where a special grease has been supplied this will be indicated on the motor nameplate.

#### Regreasing

Standard regreasing facilities, where provided, are situated on the periphery of the drive end and non drive endshields.

Grease relief is via a:

- a diaphragm relief valve
- b rotating grease relief flinger
- c plugged grease chute

#### Standard regreasing facilities

Type	Regreasing facility
63/180*	on request
200/355	standard

\* Bearings are double shielded and prepacked with grease for life

# Installation and maintenance of ac electric induction motors

An overgreased bearing will cause overheating of the bearing with the possible escape of the grease, loss of lubrication qualities, leading to ultimate bearing failure.

## Lubrication procedure

The following procedure should be adopted.

- 1 wipe clean the grease gun fitting and the regions around the motor grease fittings
- 2 remove the grease relief plug if fitted. Some motors will have one way grease valves which should be left in place
- 3 add a small quantity of grease, approximately 4 to 10 shots depending on frame size
- 4 allow motor to run for about ten minutes in order that excess grease may be expelled before refitting the relief plug. Bearings fitted with rotating grease relief or through grease valves will relieve automatically
- 5 on initial start up or after relubrication, 'bearing noise' may result from the new grease moving around the bearing. This noise is normal and will disappear after a few hours of running

## Bearing change

When fitting new bearings the parts should be lightly lubricated with grease.

The bearing should be driven onto the shaft by pressure on the inner race only using a short length of tube placed over the motor shaft.

On larger motors it is easier to raise the temperature of the bearing using an oil bath, oven, or induction heating. The temperature must be controlled to 120°C maximum.

The bearing should then be quickly slipped into place, ensuring that the bearing is in contact with the shaft shoulder.

When cool, ensure that the bearing is clean and charge the bearing with the recommended quantity of grease.

Bearings and housings should be one third full.

## Fitting Flange Adaptor

- 1 if required, remove foot as detailed in terminal box position change
- 2 if required, reposition terminal box and lifting lugs
- 3 clean paint off the drive end endshield spigot and remove all the plastic bolt-hole cover caps. Apply a film of Hylamar jointing compound on bare machined surfaces for sealing and corrosion protection

- 4 fit flange ring onto spigot, positioning fixing holes to provide either BS or DIN flange hole positions
- 5 bolt ring into position, using the same size socket head bolts as used on the feet. These are supplied with the flange ring kit
- 6 tighten the bolts to torque as given on page 17, ensuring a progressive tightening sequence

## Change from ball/ball to roller/ball construction (refer to Brook Crompton for W-EF)

- 1 isolate motor before commencing work
- 2 remove fan cover and fan
- 3 remove bearing cap screws
- 4 remove endshield at both ends
- 5 remove bearing circlips at both ends
- 6 remove preload washer at non-drive-end
- 7 replace drive-end ball bearing with new roller bearing and refit circlip
- 8 remove non-drive-end ball bearing and inner bearing cap
- 9 fit new non-drive-end inner bearing cap with shallow recess (identical to existing drive-end inner bearing cap)
- 10 examine existing non-drive-end ball bearing and either refit or replace
- 11 refit non-drive-end bearing circlip
- 12 repack bearings with new grease in accordance with recommendations
- 13 ensure the lip, on both oilseals, is greased
- 14 refit both endshields and check that:-
  - a spacer O/D is the same as the bearing O/D
  - b bearing spacer supplied is fitted into the non-drive-end endshield bearing recess
  - c slots in inner bearing caps are aligned with endshield grease chutes
  - d correct location for bearing cap by the use of a stud
  - e bolts are torqued up to recommended figures
- 15 refit bearing cap screws, ensuring correct torque to recommended figures
- 16 refit fan and fan cover
- 17 Turn shaft by hand to ensure free rotation

## Maintenance

### On-going maintenance

Induction motors by their very nature require very little maintenance. However a regular regime of inspection is recommended to ensure minor problems do not escalate to breakdowns. Typical intervals would be 2000

hours of operation or 3 months, whichever is the sooner.

### Checklist

- no visible damage ie fans cracked, fan cowls bent, foot cracked etc
- no accumulation of dust or fibres on the frame or around the fan inlet
- no significant corrosion of the lifting lugs/ eyebolts
- no excessive vibration
- no loose fasteners
- cables and earths are sound
- sealing of the motor and gland plate in good condition
- insulation resistance adequate, imperative this is checked after a prolonged shut-down
- Note - Fumex smoke extraction motors should be rewound after 5 years of operation. See specification sheet 2215E
- regrease required, particularly large output 2 pole motors
- bearing condition

### Periodic maintenance

Remove the cover and the fan which is keyed, clamped, pinned or knurl located to the shaft extension. Loosen and remove bearing cover screws and endshield bolts/studs. The endshields should then be eased off their spigots.

The rotor can now be carefully withdrawn from the stator, taking care not to damage the stator bore and both stator and rotor windings.

Having dismantled the motor, maintenance can be carried out to remove all dirt. For this purpose, the use of an air line supplying dry compressed air under comparatively low pressure is best, as a high velocity air-stream can force dirt into the spaces between the windings and insulation, etc. Grease-removing solvents should only be used very sparingly to avoid damage to impregnating varnish or insulation.

Motors should be re-assembled in the reverse order from dismantling, remembering to ease endshields onto bearings and spigots. Do not use force.

Before starting, check that the rotor revolves freely. Ensure that the electrical connections are correct and terminal nuts tight (see section – Electrical Connection).

**Endshield fixing bolt torques**

Type Metric	NEMA/CSA	Bolt dia	W-DA Aluminium frames Torque		DF & W-DF Cast iron frames Torque		K-CF Torque	
			Nm	Lbf.FT	Nm	Lbf.FT	Nm	Lbf.FT
63	-	M4	1.5	1.1	-	-	-	-
71	-	M4	1.5	1.1	-	-	-	-
80	56	M5	5	3.7	5	3.7	-	-
90S/L	143/145	M5	5	3.7	5	3.7	-	-
100L	-	M6 (taptite)	8-10	5.9-7.4	20-24	14.7-17.7	-	-
112M	182/184	M6 (taptite)	8-10	5.9-7.4	20-24	14.7-17.7	-	-
132S/M	213/215	M6 (taptite)	8-10	5.9-7.4	28-32	20.5-23.6	-	-
160M/L	254/256	M8 (taptite)	29	21	28-32	20.5-23.6	-	-
180M/L	284/286	M10 (taptite)	52	38	38-42	27.8-30.7	-	-
200L	324	M10*	52	38	52	38	52	38
225S	326	M10*	52	38	52	38	52	38
225M	364	M10*	52	38	52	38	52	38
250S	365	M10*	52	38	52	38	52	38
250M	404	M16*	220	162	220	162	220	162
280S	405	M16*	220	162	220	162	220	162
280M	444	M16*	220	162	220	162	220	162
315S	445	M16*	220	162	220	162	220	162
315M	504	M20*	400	295	400	295	400	295
315L	505	M20*	400	295	400	295	400	295
355S/M/L	585/6/7	M20*	400	295	400	295	400	295

*\* High tensile socket headed bolts and square nuts must be used*

**Foot fixing bolt torques**

Type Metric	NEMA/CSA	Bolt dia	W-DA Aluminium frames Torque		W-DF Cast iron frames Torque	
			Nm	Lbf.FT	Nm	Lbf.FT
63	-	M5	6-7	4.5-5.2	-	-
71	-	M5	6-7	4.5-5.2	-	-
80	56	M8 (taptite)	24-25	17.7-18.4	-	-
90S/L	143/145	M8 (taptite)	24-25	17.7-18.4	-	-
100L	-	M8 (corflex)	32-35	23.6-25.8	-	-
112M	182/184	M8 (corflex)	32-35	23.6-25.8	-	-
132S/M	213/215	M8 (corflex)	32-35	23.6-25.8	-	-
160M/L	254/256	M10	68-72	50-53	-	-
180M/L	284/286	M10	68-72	50-53	-	-
200L	324	M10*	-	-	52	38
225S	326	M10*	-	-	52	38
225M	364	M10*	-	-	52	38
250S	365	M10*	-	-	52	38
250M	404	M16*	-	-	220	162
280M	405	M16*	-	-	220	162
280L	444	M16*	-	-	220	162
315S	445	M16*	-	-	220	162
315M	504	M20*	-	-	400	295
315L	505	M20*	-	-	400	295
355S/M/L	585/6/7	M20*	-	-	400	295

*\* High tensile socket headed bolts and square nuts must be used*

**Wound rotor Inspection**

Brushes should be inspected every 1000 running hours or at three monthly intervals if this is a shorter period of time.

The inspection should include checks for brush wear and tensioning. Build up of carbon dust should be removed using a suitable dust extraction unit.

Replacement of brushes is recommended when the brush is approximately a quarter of the way down the brush holder. On calliper type designs the brushes should be replaced when 1/4" (5mm) of brush remains.

It is important that the correct grade of brush be used as this significantly affects operation. If in doubt please refer to Brook Crompton.

**Hazardous area motors**

In addition to the conditions referred to, special requirements apply to motor types Ex N, Ex nA, EEx e, EEx d, EEx de. Refer to the approval certificate and appropriate codes of practice eg BS 5435.

**Spares and repairs**

When ordering spares it is important to state the motor serial number to ensure that the correct spares will be supplied.

**Notes**

a fixing bolts, nuts, studs, screws, spacers or washers are not included with these parts and, if required, should be clearly specified on the order in addition to the part description number. The fixing duty and part description reference number for which they are required should also be clearly stated

b bearings ordered direct from bearing manufacturers must be specified as follows:

- 63-90 CN bearing
- 100-355 C3 bearing

**Enquiries**

Please contact Brook Crompton or its Agents for information on any aspects of the motor performance that need clarifying.

Contact must be made prior to any remedial action being taken under guarantee.

Please quote the motor number in all such cases with full details of the problem.

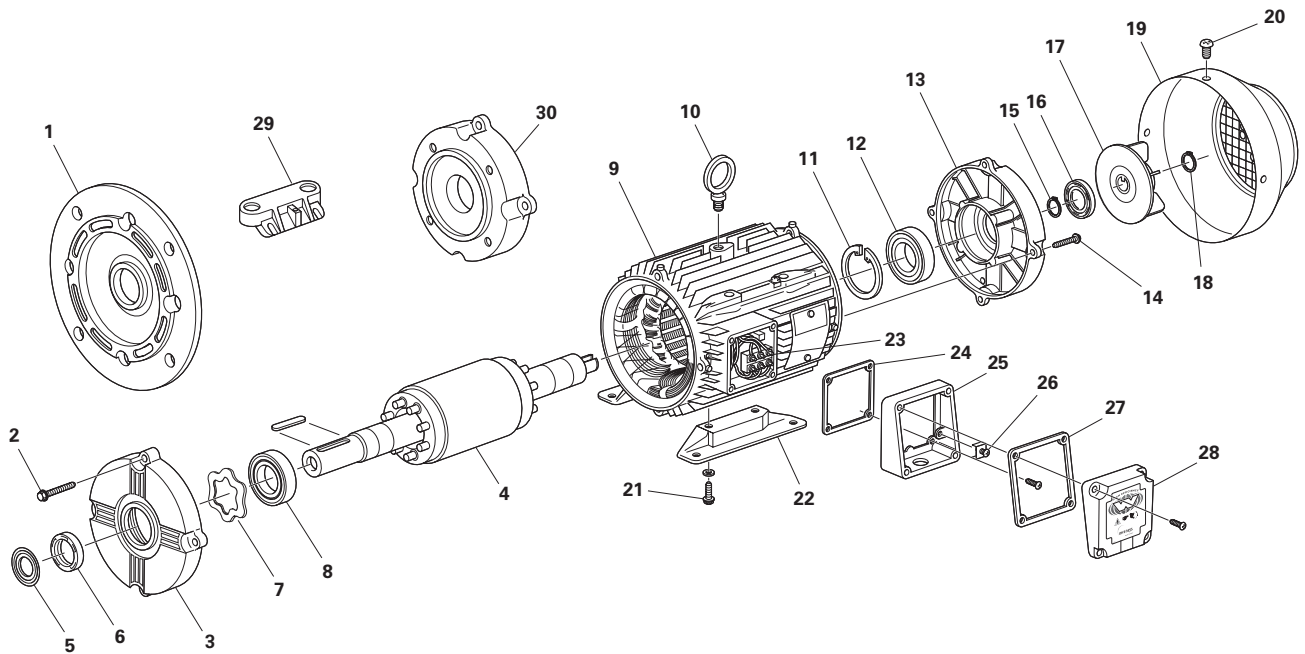
**Policy**

Our policy is one of continuous improvement and we reserve the right to alter any detail of our products at any time without giving notice.



# Spare parts, installation & maintenance

Aluminium construction - frame sizes DA63, W-DA71 to W-DA180\*

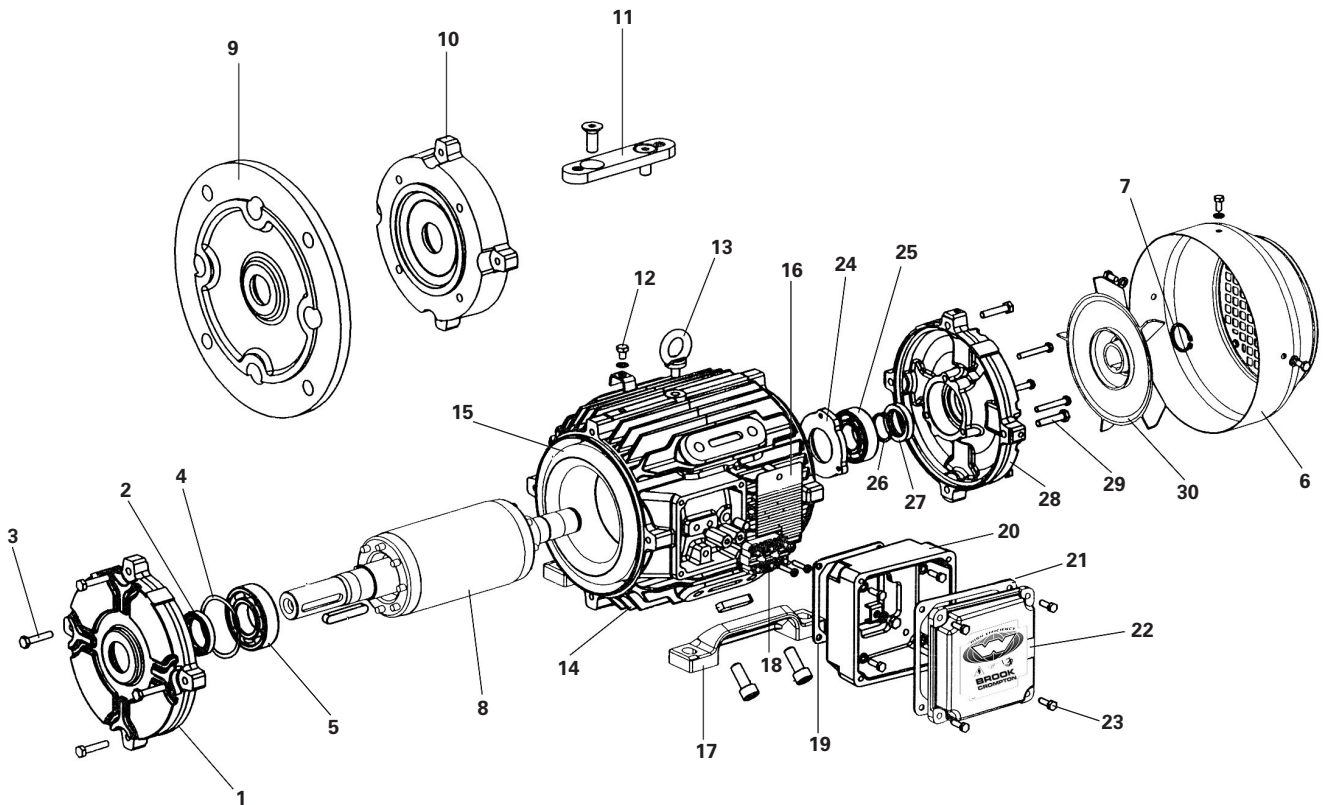


Ref	Part description
1	Aluminium flange endshield, frames 100-132, cast iron flange frames 160-180
2	Endshield fixing bolt
3	Drive end endshield
4	Rotor assembly
5	Flinger
6	Drive end oil seal
7	Preload washer
8	Drive end bearing
9	Stator assembly with or without feet
10	Eyebolt (when fitted)
11	Bearing retention circlip
12	Non-drive end bearing
13	Non-drive end endshield
14	Endshield fixing bolt
15	Bearing circlip
16	Non-drive end oil seal
17	Fan
18	Fan circlip
19	Fan cover
20	Fan cover screw and washer
21	Foot fixing bolts and washer
22	Detachable feet
23	Terminal board
24	Terminal box to frame gasket
25	Terminal box
26	Internal earth terminal
27	Terminal box lid gasket
28	Terminal box lid
29	Pad mounting bracket
30	Face endshield

\* This drawing typifies the range W-DA100-W-DA180

# Spare parts, installation & maintenance

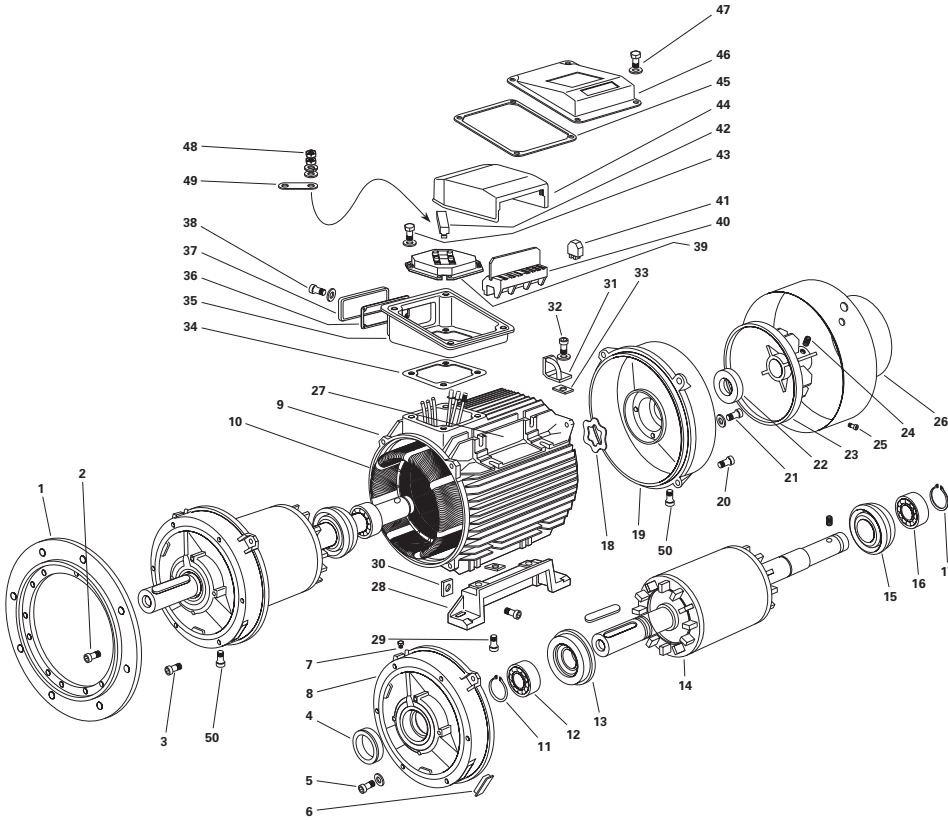
Cast iron construction - frame sizes W-DF112 to W-DF180



Ref	Part description
1	Drive end endshield
2	Drive end oil seal
3	Drive end endshield fixing screws
4	Pre-load washer
5	Drive end bearing
6	Fan cover
7	Fan circlip
8	Rotor assembly
9	Flange endshield
10	Face endshield
11	Bolt on pad
12	Earth terminal
13	Eyebolt
14	Stator assembly with or without feet
15	Stator winding
16	Rating plate
17	Multi-mount foot
18	Terminal block
19	Terminal box gasket
20	Terminal box
21	Terminal box gasket
22	Terminal box lid
23	Terminal box lid fixing screw
24	Inner bearing cap
25	Non drive-end bearing
26	Circlip
27	Non-drive end oil seal
28	Non-drive end endshield
29	Non-drive end endshield fixing screws
30	Fan

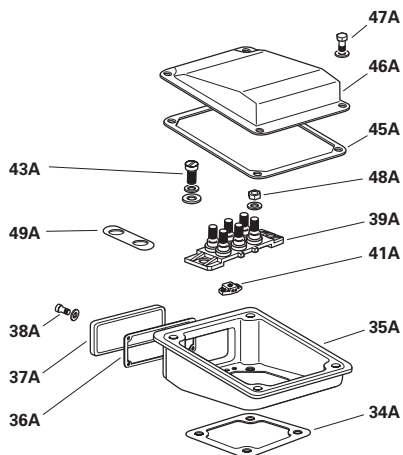
# Spare parts, installation & maintenance

Cast iron construction - frame sizes W-DF200 to W-DF355L



Ref	Part description
1	Flange adaptor (optional)
2	Flange adaptor fixing bolt (optional)
3	Endshield fixing bolt
4	Drive end oil seal
5	Drive end bearing cap fixing bolt and washer
6	Plug
7	Grease nipple
8	Drive end endshield
9	Stator frame assembly with or without feet
10	Stator core pack
11	Drive end bearing circlip
12	Drive end bearing
13	Drive end inner bearing cap
14	Rotor assembly
15	Non-drive end inner bearing cap
16	Non-drive end bearing
17	Non-drive end bearing circlip
18	Preload washer
19	Non-drive end endshield
20	Endshield fixing bolt
21	Non-drive end inner bearing cap fixing bolt and washer
22	Non-drive end oil seal
23	Fan
24	Fan locking screw
25	Fan cover fixing bolt and washer
26	Fan cover
27	Self adhesive nameplate
28	Multi-mount foot
29	Foot fixing bolt
30	Foot fixing nut
31	Lifting lug
32	Lifting lug fixing bolt and washer
33	Lifting lug nut
34(A)	Terminal box to frame gasket
35(A)	Terminal box
36(A)	Gland plate gasket
37(A)	Gland plate
38(A)	Gland plate fixing bolt and washer
39(A)	Main terminal block
40	Auxiliary terminal bracket
41(A)	Clip-in auxiliary terminal block
42	Main terminal retaining plug
43(A)	Main terminal block fixing bolt and washer
44	Mains terminal cover (optional)
45(A)	Terminal box lid gasket
46(A)	Terminal box lid
47(A)	Main terminal box lid fixing bolt and washer
48(A)	Terminal lock nuts, spring washer and plain washer
49(A)	Terminal link
50	Drain plug

## Alternative W-DF280M to W-DF355L terminal box arrangement



# Rotating Electrical Machines

Every care has been taken to ensure the accuracy of the information contained in this publication, but, due to a policy of continuous development and improvement the right is reserved to supply products which may differ slightly from those illustrated and described in this publication

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Printed in England  
dh0711/\*\*/11/07 103-4E issue 2  
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