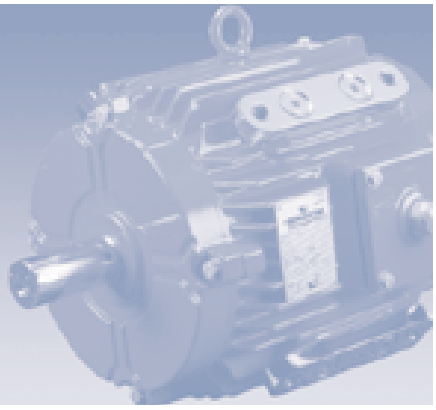
Fumex motors



For ‘fire emergency’ smoke extraction duty

Fumex

2215E

BROOK CROMPTON

Introduction

Brook Crompton

Brook Crompton is a leading manufacturer of electric motors for the global industrial market, with motor solutions which benefit a wide range of customers.

Our products are used in almost every industrial activity including water treatment, building services, chemical/petrochemicals, general processing and manufacturing where they drive fans, pumps, compressors and conveyors, amongst other things.

Brook Crompton incorporates many well known names including Brook Motors, Crompton Parkinson, Electrodrives, Newman, Bull Electric and Hawker Siddeley Electric Motors.

We have extensive stocks of motors around the world, backed-up by a network of distributors, ensuring excellent local support wherever needed.

Quality assurance

Stringent quality procedures are observed from first design to finished product in accordance with the ISO9001 documented quality systems.

Our factories have been assessed to meet these requirements, a further assurance that only the highest possible standards of quality are accepted.

Fumex motors

Fumex motors

Fan-powered ventilation systems - designed to remove heat and smoke during 'fire emergency' situations - are being increasingly specified/installed as potential life-savers in all kinds of commercial and industrial buildings where people may be present. Some of these systems serve the dual purpose of providing effective air ventilation under normal conditions and smoke/heat extraction duty in the event of a fire, whilst others are installed specifically as 'fire emergency' safety systems.

Emergency smoke removal systems are installed in a wide variety of building types, including: shopping malls, factories, warehouses, theatres, atria and complex buildings, enclosed car parks, road/rail tunnels. Their value in facilitating the evacuation of people from buildings, reducing damage and financial loss by preventing smoke logging, reducing roof temperatures, retarding the lateral spread of fire and allowing fire-fighters to locate the source of fire - is firmly established.

Smoke and heat exhaust ventilation systems help to:

- keep the escape and access routes visibly free from smoke
- facilitate fire-fighting operations by creating a smoke-free layer
- delay and/or prevent back draught, flashover and escalation of fire
- reduce thermal effects on structural components
- reduce damage caused by decomposition of products and hot toxic gases

Designed specifically as fan drives for both normal ventilation and heat and smoke removal duty, Brook Crompton Fumex motors are capable of providing extended operation in high ambient temperatures allowing smoke and heat extraction systems to continue operating effectively during an emergency situation.

Normally employed on axial flow fans, totally enclosed motors are pad mounted within the ducting and are cooled by the air stream (IC418). Other cooling and mounting arrangements can be supplied. Bifurcated fans use totally enclosed fan cooled motors installed outside the direct airflow and are used for applications requiring extremely high gas temperature/time combinations.

Temperature/time combinations

Fumex motors are capable of withstanding the heat of smoke and fumes produced by a fire for a number of specified temperature/time combinations. Motor designs are available for the two modes of operation:

- dual purpose - S1 duty, continuous running at normal ambient, plus once only S2 short time rating for emergency duty

or

- single purpose - once only S2 short time rating for emergency duty

When the emergency smoke/fume extraction system is activated, the motor operates for the period of time detailed on the rating plate, eg 400°C for 120 minutes.

EN 12101-3 classifies combinations of temperature and time as shown in the table below.

EN 12101-3 temperature/time classification

Emergency operation	Temperature	Minimum operating time
F200	200°C	120 minutes
F300	300°C	60 minutes
F400	400°C	120 minutes
F600*	600°C	60 minutes
F842*	842°C	30 minutes
Not classified	As specified by the sponsor	As specified by the sponsor

*Bifurcated fans only refer to Brook Crompton with details of the mechanical arrangement. For details on alternative time and temperature combinations not listed in EN 12101-3, please contact Brook Crompton

Standards

Euronorm EN 12101-3 is the latest European standard to harmonise powered smoke and heat extract ventilators throughout the European Union. Earlier standards such as BS 7346 Part 2 were used as guidance documents only. EN 12101-3 is a new approach standard making it mandatory to have the fan and motor tested and certified for a specific time and temperature combination. The fan system will be CE marked to show compliance with the European standard.

EN 12101-3 incorporates a specific test method which includes a mandatory 2 minute stop period 15 minutes after the high temperature test commences. The motor and fan are restarted and continue to run for the specified time period. The reason for the stop period is to simulate the likely situation when the emergency services arrive, the fire officer may decide to switch to a secure/emergency power supply. Best estimates show that this could take approximately 2 minutes.

In addition to EN 12101-3, Fumex motors are designed and manufactured to relevant international and national standards for electric motors.

Fumex motors for other 'emergency smoke extraction' standards (eg UK, BS 7346), for use outside the European Union, can be supplied - please contact Brook Crompton for details.

Electrical/mechanical features

Electrical features

Voltage frequency

Fumex motors are most often manufactured for operation on a 3-phase supply, at a specified voltage/frequency up to 690V.

Fumex motors can be used with an inverter. However, full details of the inverter should be supplied at the time of the enquiry/order.

For further information on Fumex motors, inverter drives or single phase supplies, please contact Brook Crompton.

Terminals and cable connections

As standard Fumex motors are supplied without terminal boxes, but have an adapter plate and 2 metre loose leads which are sleeved to withstand specified temperature and time combinations - various options are available as follows:

- motors can be fitted with a terminal box and ceramic terminal board
- terminal box without terminal board

Motor supply cables must be suitable for use in high temperatures shown on the motor rating plate and equipment must be adequately earthed.

Fumex motors with loose leads must have additional mechanical protection on the leads when mounted in a fan duct and be suitable for use in high temperatures shown on the motor rating plate. This is normally either solid or flexible conduit.

Insulation

The insulation systems and bearing lubrication adopted with Fumex motors have been specially selected and tested to ensure that they will withstand the extremes of temperature during the emergency period, as detailed in the table below.

Mechanical features

Mounting

Fumex motors, up to frame size 280, are normally supplied pad mounted suitable for mounting in the fan duct with rods or arms. Other methods of mounting are available such as foot, flange or face.

Cooling

Standard Fumex motors are supplied as totally enclosed and cooled by the airstream produced by the driven fan (IC418). Fumex motors for use in bifurcated fans will be supplied as Totally Enclosed Fan Ventilated - TEFV (IC411).

Paint system

All motors are finished with an advanced paint system, the final stage of which is a two-pack finish in 'red' (RAL 3002) for ease of identification. The external treatment gives a hot salt spray resistance in excess of 2,000 hours. This provides exceptional protection from severe environmental conditions.

Testing

All Brook Crompton Fumex motors are tested in accordance with EN 60034-1 before despatch. In addition to this, verification of the motor insulation systems and critical design parameters have been tested by organisations such as Centre Technique Industriel de la Construction Metallique France (CTICM) and Technische Universität München Germany (TUM).

Ordering

To ensure that we supply the best product for your particular application, please specify the following when ordering your Fumex motor:

1) Fumex motor
2) kW rating
3) Speed
4) Electrical supply - voltage and frequency or inverter drive supply
5) Mounting
6) Normal/emergency or emergency duty only
7) Temperature/time combination
8) Motor cooling air temperature for bifurcated application
9) Fan construction
10) Environmental conditions
11) Drive details

Time/temperature options

Class:	Class F	Class F	Class H	Class H1	Class H2	Class H2	Bifurcated special construction
Time (minutes)	150°C	200C	250°C	300°C	350°C	400°C	600°C
30							
60							
90							
120							
Aluminium	63 to 200 frames						
Cast iron	80 to 355 frames						

Installation

Warning

Handling and lifting of electric motors must be carried out by trained personnel using the correct equipment.

To ensure correct operation relative to time/temperature, it is important that adequate maintenance is carried out and, in particular, the bearings, grease and windings are in good condition. The motors are designed to perform the duty, as described on the rating plate, with the specified bearing clearance, grease and winding specification. It is essential that any replacements adhere to the same specification.

After emergency duty in a fire condition, the motor (and drive if fitted) must be replaced.

Motors on these safety critical applications will need rewinding after 40,000 hours operation for fixed speed and 30,000 hours for variable speed employing unipolar switching. This period is reduced to 20,000 hours for bipolar switching.

In all cases it will be necessary to refer to Brook Crompton before proceeding with the rewind.

Receipt

Before any motor is accepted on site, it should be carefully inspected for damage or loss incurred during transit. Wherever possible, damage should be recorded, photographed and witnessed. Report any findings to the carriers and Brook Crompton, quoting the motor number and consignment note reference.

Storage

if the motor is not to be used immediately, it should be stored in a clean, dry place (see customer safety leaflet included with the motor).

Bearings

To avoid static indentation, the storage area should be vibration free. Where exposure to some vibration is unavoidable, the shaft should be locked. Roller bearings may be fitted with a shaft locking device which should be kept in place during storage. It is advised that shafts be rotated by hand approximately 90° - at least once a month.

Grease

Factory fitted bearings use specially selected grease with a shelf life of five years. If stored for a longer period, grease may need to be replaced. 'Sealed for life' bearings have a storage life of five years.

Installation

Withdrawal from storage

Before taking a motor from storage, check that no foreign matter is present and remove all surface dust and dirt.

Test the motor insulation resistance between phases and also to earth. If an insulation resistance below 10 Megohms is measured, the windings must be dried out until a minimum of 10 Megohms is measured.

If the motor is to be used with an inverter supply, then the manufacturer should be contacted to advise on inverter installation and maintenance intervals.

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 is also necessary to facilitate cooling.

Lifting

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

Fitting pinions, pulleys and couplings

These should be bored to our standard limits (details supplied on request), and fitted onto the shaft with a screwing motion. ON NO ACCOUNT SHOULD THEY BE DRIVEN ON.

Warning

Tapping of fitments onto the motor shaft, with a hammer or mallet, causes bearing damage. This results in an increase in bearing noise and a significant reduction in bearing life.

Electrical connection

Electrical installations must be carried out in accordance with the latest local regulations (eg UK Electricity at Work Regulation). Wiring should be carried out or checked by a qualified electrician and equipment must be earthed in accordance with the current regulations.

The connection diagram is shown on the leaflet supplied with the motor. Incoming cable used should be capable of carrying the full load current of the motor (see motor rating plate), without overheating or undue voltage drop.

Cable terminations

Many Fumex motors are supplied with loose leads. Where a terminal box is fitted, 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 secured firmly over the connection. There should be no nuts or lockwashers fitted between the mains and motor lugs.

Cables should be suitable for use in the high temperature shown on the motor rating plate.

Motor leads and winding protection

To protect motor leads and windings, it is essential that:

- conduit entry must be adequately sealed
- drain plugs (where provided), must be fitted with metal plugs and sealed to maintain enclosure

Periodic running

If the motor is for S2 emergency duty only, or on standby duty, it must be run monthly to avoid static indention of the bearings.

Maintenance

Warning

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

Shaft seals

Seals fitted to maintain IP55 protection have limited life (depending on environmental conditions), these should be replaced after 8,000 hours operation.

Relubrication

Recommended relubrication intervals are available on request. Where re-lubrication facilities are not supplied, bearing replacement intervals are available on request.

Grease

S1 (continuous running) duty

Bearing grease is detailed on the motor rating plate. This must be renewed at regular intervals (details available on request).

S2 emergency (short time running) duty

Bearing grease is detailed on the motor rating plate and must be replaced at 5-year intervals.

It must be noted that greases used on Fumex motors are specially selected for use in high ambient temperatures. Molykote DC 44 and Barrieta L55/2 greases are not compatible with Lithium-based greases.

Periodic maintenance:

- remove fan cover and fan (if fitted)
- 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
- grease removing solvents should only be used very sparingly to avoid damage to impregnating varnish or insulation
- when fitting new bearings, these should be prepared and degreased with Tyreno Fluid SF (or similar) as bearing protection oil is not compatible with the greases used on Fumex motors
- fill bearings with grease type detailed on the nameplate. Grease quantity is available from Brook Crompton
- motors should be reassembled in the reverse order from dismantling, remembering to ease endshields onto bearing 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 on 'Electrical Connection')
- ensure correct motor rotation after any maintance activity
- refit any shaft fitments which has been removed, being particularly careful to ensure correct alignment with the driven part as misalignment will lead to ultimate bearing trouble and shaft breakage
- use only identical replacement screws and bolts. When replacing screws and bolts, care should be taken to use only those with the requisite tensile quality and tensile strength recommended by Brook Crompton. they must also be of identical thread form and screw/bolt length. A marginally longer bolt, screwed into a blind hole, could 'bottom' and prevent the spigot of an endshield from being drawn tightly into the stator frame

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

1) Fixing bolts, nuts, 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 required should also be clearly stated.

2) Bearings ordered direct from bearing manufacturers must be specified as follows:

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

3) Brook Crompton must be contacted prior to any rewind work being carried out. Failure to adhere to our specification may invalidate the equipment certification.

Enquiries

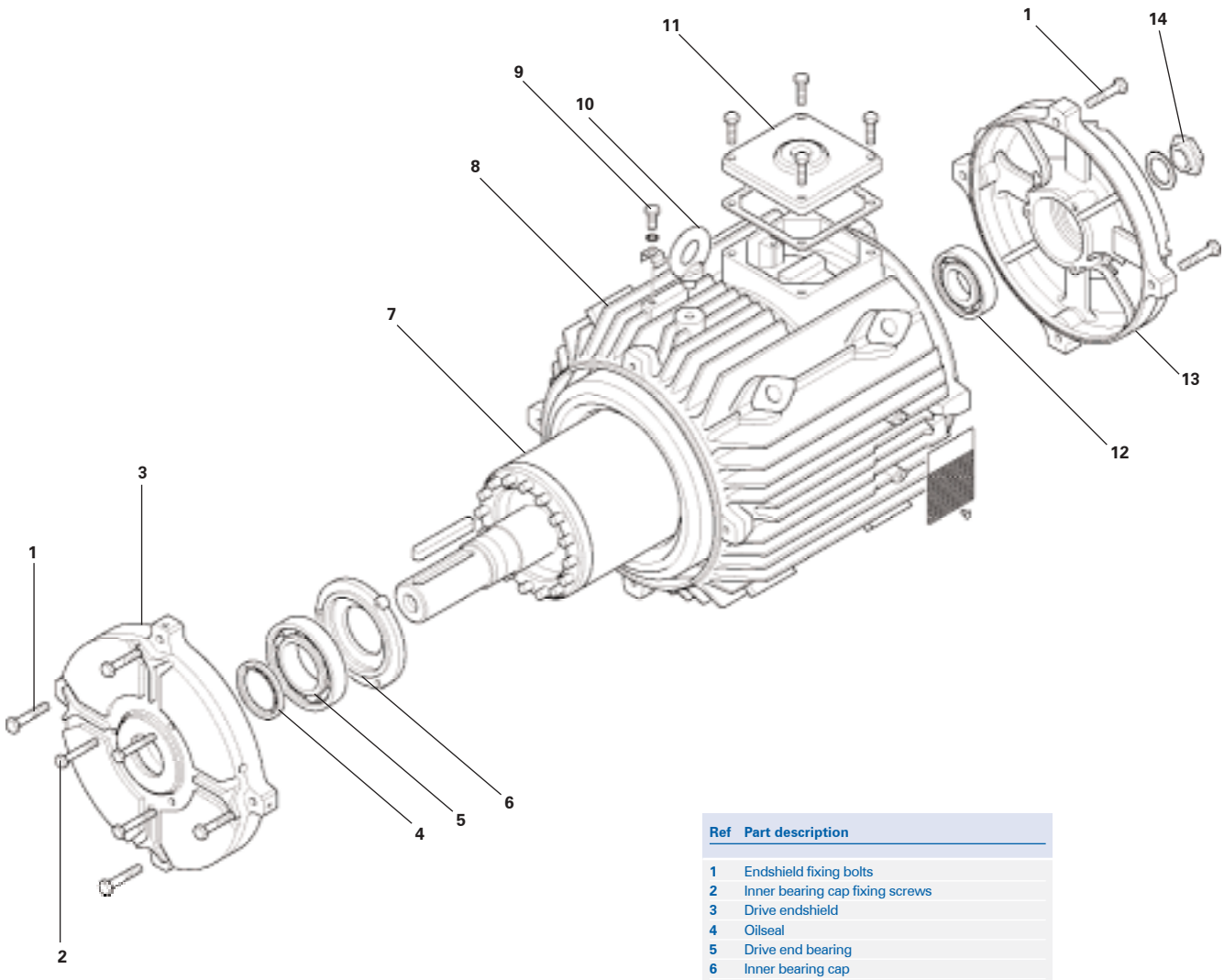
Please contact Brook Crompton or its agents for information on any aspects of the motor performance that need clarifying.

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.

Parts list

Typical pad mounted Fumex motor



Ref	Part description
1	Endshield fixing bolts
2	Inner bearing cap fixing screws
3	Drive endshield
4	Oilseal
5	Drive end bearing
6	Inner bearing cap
7	Rotor assembly
8	Stator assembly
9	External earth screw and U washer
10	Eyebolt (when fitted)
11	Adaptor plate and fixing screws
12	Non-drive end bearing
13	Non-drive end endshield
14	Screwed plug and washer

For full dimensions on:
Aluminium construction - please request catalogue ref 2100E
Cast iron construction - please refer to Brook Crompton

BROOK CROMPTON

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