BRITISH STANDARD

BS
4999-103:2004

General requirements for rotating electrical machines —

Part 103: Specification for symbols

ICS 29.160.30

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee PEL/2, Rotating electrical machinery, upon which the following bodies were represented:

Association of Consulting Engineers
Association of Electrical and Mechanical Trades
Association of Manufacturers of Power Generating Systems
Electrical Insulation Association
Electricity Association
GAMBICA Association Limited
Institution of Incorporated Executive Engineers
Ministry of Defence — UK Defence Standardization
Rotating Electrical Machines Association (BEAMA Ltd.)
Society of Operations Engineers
UK Offshore Operators Association Limited

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Contents

Foreword

This part of BS 4999 has been prepared by Technical Committee PEL/2. Together with BS EN 50347:2001 it supersedes BS 4999-103:1987, which is withdrawn.

Symbols for dimensions of general purpose three-phase induction motors are now given in BS EN 50347. This new edition of BS 4999-103 specifies symbols for dimensions of skirt-mounted motors, pad-mounted motors, slide rails and shaft ends with two tapped holes, all of which are outside the scope of BS EN 50347.

In addition, BS 4999-141:2004 includes requirements for shaft ends and keyways, and shaft extensions with single tapped holes, for motors which are above the size range covered by BS EN 50347. Therefore, for completeness, this new edition of BS 4999-103 also specifies the relevant symbols for dimensions of shaft ends and keyways and shaft extensions with single tapped holes.

This new edition of BS 4999-103 incorporates changes necessitated by the publication of BS EN 50347. It does not represent a full review or revision of the standard, which will be undertaken in due course.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 7 and a back cover.

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1 Scope

This part of BS 4999 specifies symbols for identification of dimensions of frame sizes for rotating electrical machines which are outside the scope of BS EN 50347. It specifies symbols for dimensions of skirt-mounted motors, pad-mounted motors, slide rails, shaft ends and keyways, and shaft ends with one or with two tapped holes.

NOTE Information on the system of frame nomenclature applicable to the motors covered by this part of BS 4999 is given in Annex A.

2 Symbols for dimensions

Symbols for dimensions shall be as specified in Table 1.

NOTE The dimensions are illustrated in Figure 1, Figure 2, Figure 3, Figure 4 and Figure 5.

Table 1 — Symbols for dimensions

Letter symbol	Description of dimension
B	Distance between centre lines of fixing holes (side view)
C	Distance from centre line of fixing holes at drive end to shaft shoulder
D	Diameter of shaft extension
E	Length of shaft extension from shoulder
F	Width of keyway
G	Distance from bottom of keyway to opposite side of shaft
J	Radius of circle to which mounting pads (or faces for rods) are tangent
K	Diameter of holes in mounting pads (or faces)
L	Overall length
M	Pitch circle diameter of fixing holes
N	Diameter of spigot
P	Outside diameter of flange
R	Distance from surface of mounting flange to shaft shoulder
S	Diameter of fixing holes in flange
T	Depth of spigot
AA	Width of end of pad (end view)
AC	Overall diameter
AD	Distance from centre line to extreme outside of terminal box (end view) or other salient object mounted on side of machine
AL	Overall length of slide rail excluding adjusting screw
AT	Thickness of slide rail adjusting foot
AU	Diameter of mounting holes in slide rail
AX	Height of slide rail
AY (max.)	Maximum extension of adjusting screw of slide rail
AZ	Width of slide rail at base
BB	Overall dimension across pad or pads
BT (min.)	Minimum horizontal travel on slide rail
DH	Diameter of tapped hole or holes in shaft extension
DJ	Centre distance of two tapped holes in shaft extension
EB	Length of key at drive end
EC	Length of key at non-drive end
EF	Length of shaft from end of bearing housing to end of shaft
HB	Distance from centre line to top of lifting device, terminal box or other most salient object mounted on top of the machine

Table 1 — Symbols for dimensions (*continued*)

Letter symbol	Description of dimension
KA	Usable tapped depth of hole in pad (or facing) of pad-mounted (or rod-mounted) machine
KK	Diameter of holes in terminal box for cable entry
LA	Thickness of flange
LB	Distance from fixing face of flange to non-drive end
LD	Distance from centre line of terminal box to fixing face of flange
LE	Distance from extreme point of non-drive end to centre line of nearest fixing hole in pad
LF	Distance from end of shaft to fixing face of skirt-mounting flange
LK	Distance from end of bearing housing (drive end) to centre line of nearest fixing hole in pad
LL	Distance from centre line of terminal box to centre line of fixing holes in pad nearest to shaft extension
XA (max.)	Maximum distance from centre line of bolt at adjusting screw end of slide rail to the beginning of the platform
XB	Width of slide rail at top
XC	Bolt diameter for which clearance is provided in the slot of the slide rail
XD	Height of adjusting screw centre line above the platform
XE	Distance between the centre lines of the mounting-bolt holes (side view)
XF	Distance between the centre line of the mounting-bolt hole at the adjusting screw end and the adjacent end of the slide rail

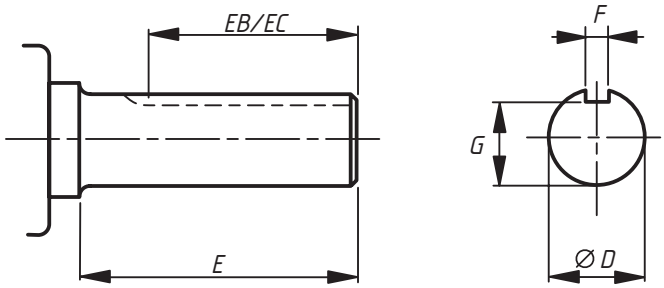


Figure 1 — Shaft end and keyway

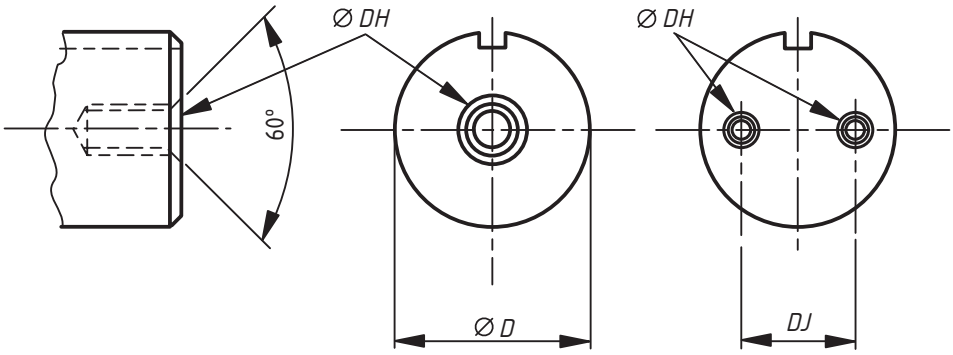
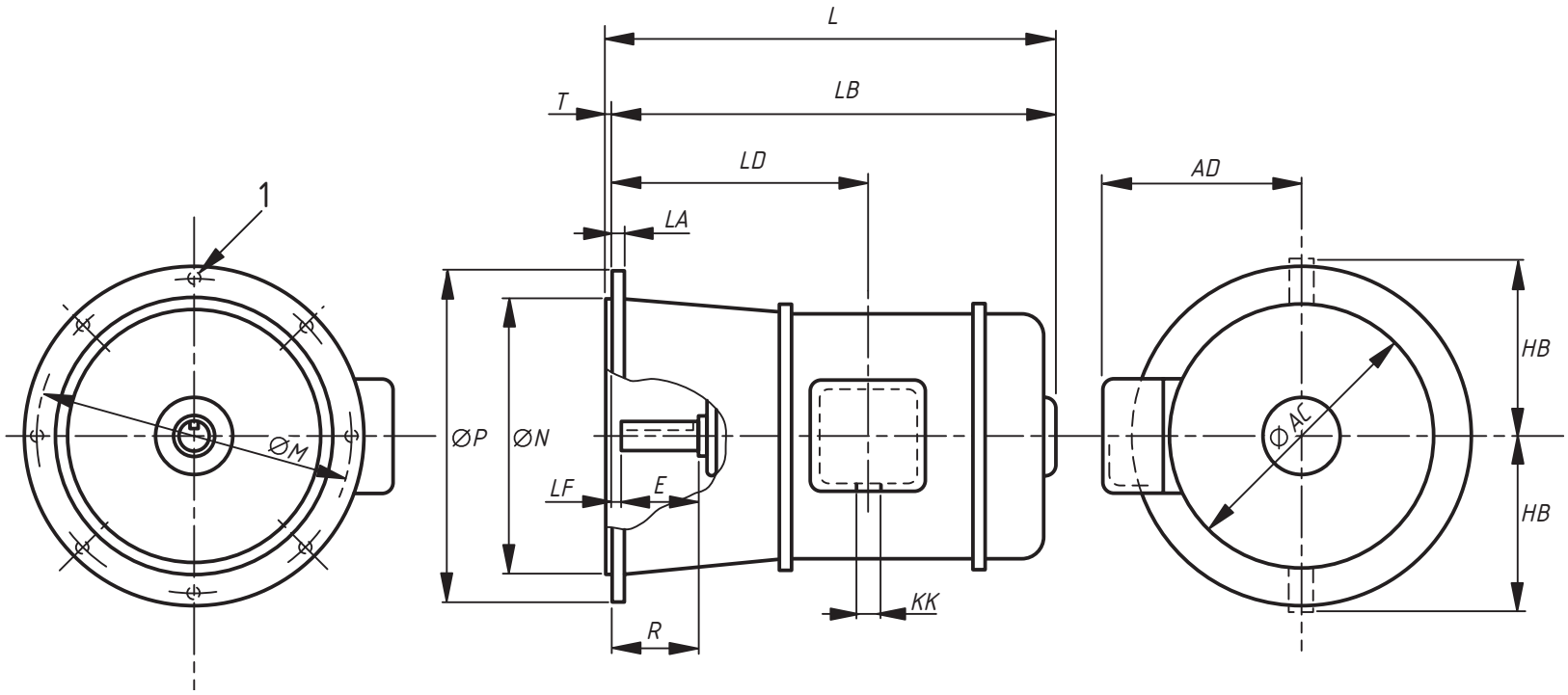


Figure 2 — Detail of tapped hole or holes in shaft extension

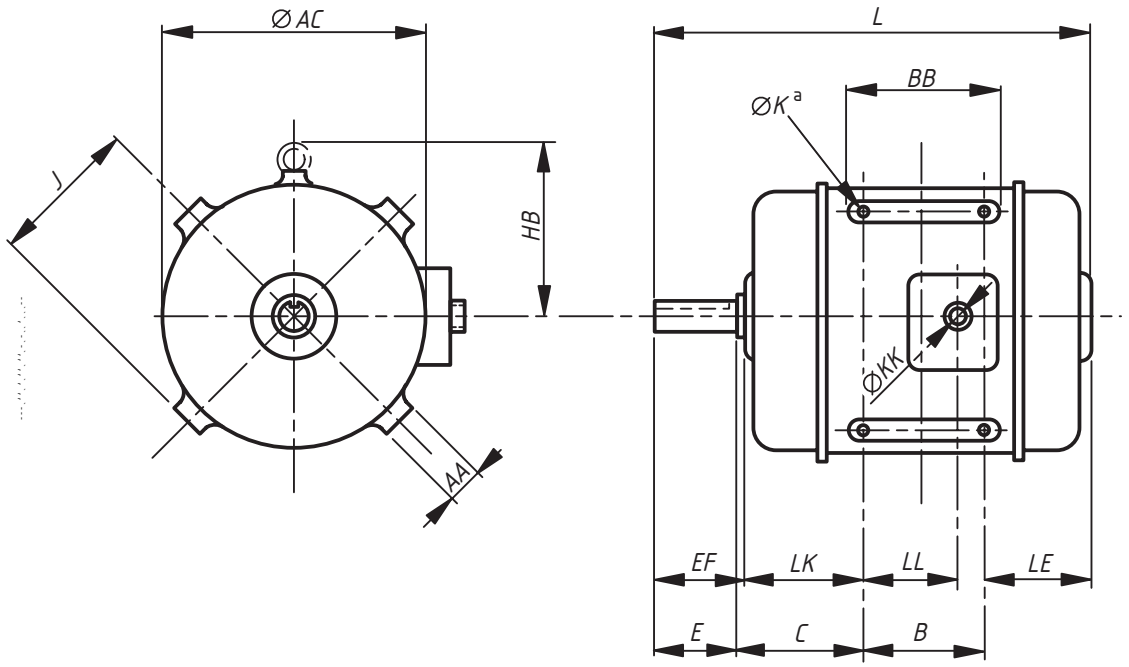


Key

1 Four or eight holes, diameter *S*, equally spaced

NOTE See Figure 1 for details of shaft extension.

Figure 3 — Symbols for skirt-mounted frames

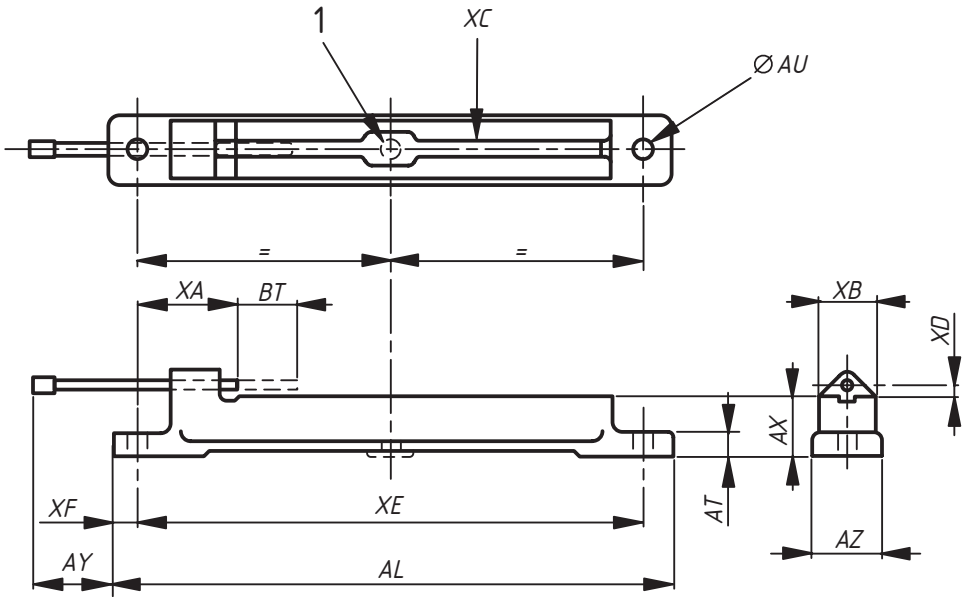


NOTE 1 See Figure 1 for details of shaft extension.

NOTE 2 For rod-mounted motors, the facing of the rod fixing need not extend beyond that required for a standard washer appropriate to a rod threaded to suit dimension *K*.

[a]Useable tapped depth of hole *KA*.

Figure 4 — Symbols for pad-mounted or rod-mounted frames



Key

1 A third bolt hole of diameter *AU* and an additional foot are provided on sizes M 2528 and M 3100.

Figure 5 — Symbols for slide rails

Annex A (informative)
System of frame nomenclature

A.1 For frame sizes up to and including 400, which are primarily intended for low voltage induction type motors, the nomenclature is given in **A.2**, **A.3**, **A.4** and **A.5**. For other machines where there is no international agreement, it is recommended that **A.6** should be used.

A.2 Firstly a letter indicating the enclosure:

C for enclosed ventilated;

D for totally enclosed (other than flameproof).

A.3 Secondly, a number of two or three digits, which is the height in millimetres of the shaft centre above the feet (dimension *H*) on a foot-mounted frame (see BS EN 50347).

A.4 Thirdly, a letter S, M or L which characterises the longitudinal dimensions (short, medium or long) where more than one length is used, as given in BS 4999-141.

A.5 Fourthly, for other than foot-mounted frames, a letter that indicates the type of mounting:

D for flange mounting;

V for skirt mounting;

P for pad mounting;

R for rod mounting.

NOTE For example, a totally enclosed fan-ventilated motor of frame size 160M, suitable for skirt mounting is designated D160MV.

A.6 For machines with high shaft centres, a combination of two numbers *H*/*B*. (For meaning of *H* see BS EN 50347.)

For machines with low shaft centres, a combination of three numbers *H*/*H*′/*B*. (For meaning of *H* and *H*′ see BS EN 50347.)

Values should be selected from the appropriate tables in BS 4999-141.

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Bibliography

BS 4999-141:2004, *General requirements for rotating electrical machines — Part 141: Specification for standard dimensions.*

BS EN 50347:2001, *General purpose three-phase induction motors having standard dimensions and outputs — Frame numbers 56 to 315 and flange numbers 65 to 740.*

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