W IE2 efficiency cast iron motors

Frame 80 to 355

BROOK CROMPTON

4P20P4668

F.S.E. Tamel S.A.
33-100 Tarnow.
ul. Elektryczna 6, Poland
phone: +48 14 632 11 00
fax: +48 14 621 96 64
E-mail: officetamel@tamel.pl
Internet: www.tamel.pl

BROOK CROMPTON

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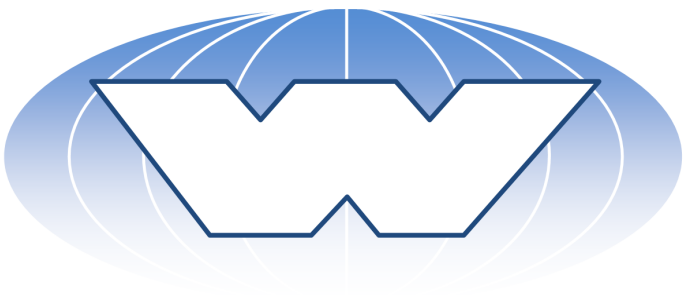
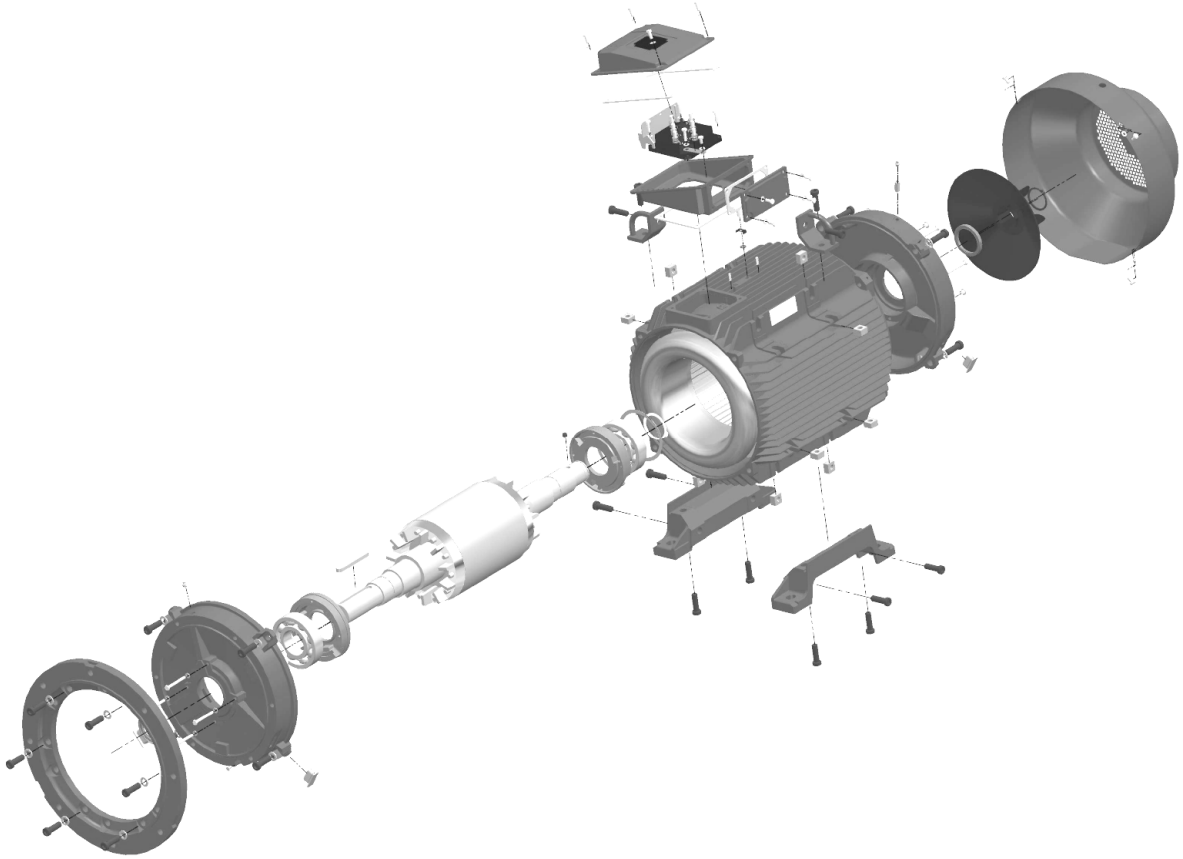


Introduction



Brook Crompton a company of ATB group

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

Throughout the branch, new ATB developments and systems solutions are regarded as intelligent. This means that they are efficient, individually manufactured, extremely economic and underpinned by close co-operation with customers. Many years of experience and the know-how of the work force have been merged and play a fundamental role in product intelligence. In addition, the Group also provides on-site system integration, in order to guarantee customers optimum advantages from ATB solutions.
ATB also demonstrates flexibility in the production area.

Quality assurance

ATB is a name for quality production. For standards that are maintained by means of continuous investment in modern production systems such as resin impregnation plants, CNC processing centres, assembly robots and winding centres.

Efficiency is further raised by on-going improvements to the material flow and layout design.
Stringent quality procedures are observed from first design to finished product in accordance with the ISO9001:2008 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.


BUREAU VERITAS Certification

Certificate

FABRYKA SILNIKÓW ELEKTRYCZNYCH "TAMEL" S.A.
GRUPA BROOK CROMPTON
TARNÓW
POLAND

STANDARDS

ISO 9001:2008

SCOPE OF SUPPLY

1. DESIGN, MANUFACTURE, DELIVERY AND SERVICE OF SINGLE AND THREE-PHASE AC INDUCTION ELECTRIC MOTORS.
2. DESIGN, MANUFACTURE AND DELIVERY OF THE CAST IRON CASTINGS AND ALUMINIUM PRESSURE CASTINGS.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Specification, standards and regulations

New legal regulations

In connection with the international discussion on energy efficiency, a world-wide harmonized energy efficiency classification system has been established for low-voltage three-phase asynchronous motors.

New international efficiency classes of motors:
(IE = international Efficiency)
The new IEC60034-30:2009 defines world-wide the following efficiency classes in the power range from 0,75kW to 375kW 2p, 4p and 6p motors.
IE1 – Standard Efficiency (equivalent of EFF2)
IE2 – High Efficiency (equivalent of EFF1)
IE3 – Premium Efficiency
IE4 – Super Premium Efficiency

The efficiency factor defines the efficiency of motors when transforming electrical into mechanical energy. The higher the energy efficiency class, the more complex the production of motors becomes and the more material e.g. Copper, has to be used, which results in correspondingly higher prices. However, in relation to the economic life-time, the price impact by only a few percent and the additional cost will be amortized by the savings in energy costs in a short time.

A new method for determining efficiency
From now on, motors can be offered and sold with the new classes IE1, IE2 and IE3. In that case, the efficiency has to be determined according to the new measuring standard EN60034-2-1:2007.
The new method leads to substantially increased accuracy under exactly defined laboratory condition.
When comparing the measurements of the same motor, it is expected that the energy efficiency level measured with the new method will be a few percentage points less than the efficiency levels defined by the old method.
There are a few different method of determining the efficiency with low medium and high uncertainty.
For IE1 (standard efficiency) and motors below standard efficiency, test associated with low and medium uncertainty are acceptable. For higher efficiency levels only methods associated with low uncertainty shall be acceptable.

The methods for determining the efficiency are based on number of assumptions and it is not possible to make a comparison between the values of efficiency obtained by different methods. Therefore the motor documentation must state which method was used.

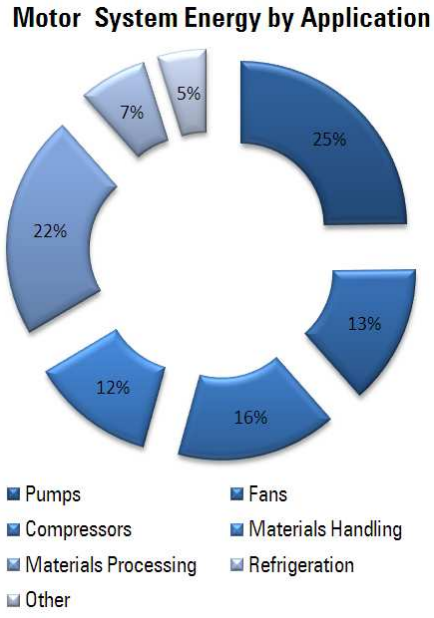
Under the new standard Brook Crompton uses indirect calculation method, additional load losses determined from measuring.

Climate protection

Today's energy trends and drivers:

- EU targets for increased energy efficiency:
  - 20% CO_2 emission
  - +20% energy efficiency
  - 20% the proportion of renewable energy
- Increased industrial efficiency through process optimization
- Limited availability of primary energy resources such as oil, gas, coal
- Higher financial cost of energy resources such as oil, gas, coal
- Globalization in the context of energy and the environment

The Brook Crompton high efficiency motor design has been optimized for application like compressors, pumps, cranes, lifts, fans and gearboxes. In these sectors customers can find the biggest potential for energy and cost savings.



Specification

Enclosure

All motors are totally enclosed with a minimum ingress protection of IP55 as defined in IEC 60034-5 (BS EN 60034 part 5).
Higher IP protection can be supplied for special request.

Motor cooling

Motors are cooled in accordance with EN 60034-6. The normal arrangement is IC411 (Totally Enclosed Fan Ventilated) via a fan mounted at the non-drive end. Alternative methods of cooling available on request.

Insulation and thermal rating

Standard motors will operate satisfactorily in an ambient temperature range of –30°C to +40°C (Class B temperature rise) and altitudes up to 1000 metres above sea level.

Duty cycle

All standard WU-DA motors are suitable for SI Duty as described in IEC 60034-1.

Electrical characteristics

All 'W' motors are wound for the 'Eurovoltage'. Motors up to and including 3kW are normally supplied 230/400V, 4kW and above supplied 400V and are suitable for ±10% tolerance in line with IEC60034-1 standard..

Standard compliance

Brook Crompton motors are of the totally enclosed, single or three phase squirrel cage type, built to comply with international IEC and EN standards. Motors conforming to other national and international specifications are also available on request.

Electrical	Mechanical
IEC/EN 60034-1	IEC 60072
IEC/EN 60034-2-1	IEC/EN 60034-5
IEC/EN 60034-30	IEC/EN 60034-6
IEC 60034-8	IEC/EN 60034-7
IEC 60034-12	IEC/EN 60034-9
	IEC 60034-14

Performance data

3000 min^{-1} (2 pole)

Rated power	Full load speed in revolutions per minute	Frame reference and size	Full load currend at rated voltage	Efficiency	Power factor	Full load torque	Direct on line starting torque ratio	Direct on line starting current ratio	Direct on line pull out torque ratio	Direct on line pull up torque ratio	Rotor interia Wk^2	Sound pressure level @ 1m on no load	Weight
P_N Kw (HP)	n min^{-1}	Type	I_N 400V A	η 1.0P_N 0.75P_N 0.5P_N	Cos ∅ 1.0P_N 0.75P_N 0.5P_N	M_N Nm	$\frac{M_A}{M_N}$	$\frac{I_A}{I_N}$	$\frac{M_K}{M_N}$	$\frac{M_S}{M_N}$	J kgm^2	L_{PA} dB(A)	kg
0.75 (1.0)	2880	WU-DF80MJ IE2	1.65	**77.4** 76.9 75.2	**0.84** 0.78 0.66	2.5	3.0	7.1	2.7	2.4	0.0010	56	15
1.1 (1.5)	2880	WU-DF80MM IE2	2.35	**79.6** 80.7 78.6	**0.84** 0.77 0.65	3.6	2.8	6.7	2.7	2.4	0.0013	56	17
1.5 (2.0)	2850	WU-DF90LMX IE2	2.97	**81.3** 82.3 82.6	**0.90** 0.84 0.76	5.0	2.8	7.1	3.1	2.4	0.0014	66	30.5
2.2 (3.0)	2890	WU-DF90LSX IE2	4.60	**83.2** 85.4 84.1	**0.82** 0.72 0.58	7.3	2.5	7.3	3.0	2.5	0.0016	66	35
3.0 (4.0)	2890	WU-DF100LR IE2	5.90	**84.6** 82.7 75.2	**0.88** 0.74 0.54	9.9	3.1	8.1	3.1	2.4	0.0050	60	41.8
4.0 (5.5)	2870	WU-DF112MM IE2	7.30	**85.8** 89.2 87.4	**0.91** 0.88 0.81	13.3	3.0	7.8	3.1	2.8	0.0055	60	55
5.5 (7.5)	2910	WU-DF132SE IE2	10.2	**87.0** 88.8 87.9	**0.89** 0.83 0.70	18.0	2.7	8.2	3.1	2.4	0.012	66	70
7.5 (10)	2900	WU-DF132SJ IE2	13.5	**88.1** 88.4 88.5	**0.91** 0.88 0.82	24.7	2.5	8.2	3.0	2.3	0.015	66	75
11 (15)	2940	WU-DF160MB IE2	20.0	**89.4** 89.7 88.5	**0.89** 0.84 0.76	35.7	2.2	7.8	3.0	1.8	0.039	68	120
15 (20)	2940	WU-DF160MJ IE2	26.6	**90.3** 89.8 88.8	**0.90** 0.86 0.79	48.7	2.2	8.0	3.1	1.9	0.045	68	121
18.5 (25)	2930	WU-DF160LR IE2	32.5	**90.9** 90.6 89.8	**0.90** 0.86 0.80	60.3	2.4	8.7	3.2	1.9	0.056	68	133
22 (30)	2950	WU-DF180ME IE2	39.0	**91.3** 91.5 90.4	**0.89** 0.86 0.76	71.2	2.2	9.0	3.1	1.9	0.084	68	162
30 (40)	2945	WU-DF200LGX IE2 W-DF200LGX IE2[1]	53.0	92.0 90.0 88.4	0.89 0.86 0.79	97.3	2.7	7.8	2.9	2.3	0.15	73	255
37 (50)	2945	WU-DF200LNX IE2 W-DF200LNX IE2[1]	66.0	92.5 93.1 92.6	0.88 0.80 0.76	120	2.7	7.8	2.9	2.3	0.18	73	270
45 (60)	2955	WU-DF225MN IE2 W-DF225MN IE2[1]	78.0	92.9 93.3 92.6	0.90 0.89 0.84	145	2.3	7.8	2.8	1.9	0.47	75	375

1 - BS frame reference

Performance data

3000 min^{-1} (2 pole)

Rated power	Full load speed in revolutions per minute	Frame reference and size	Full load currend at rated voltage	Efficiency	Power factor	Full load torque	Direct on line starting torque ratio	Direct on line starting current ratio	Direct on line pull out torque ratio	Direct on line pull up torque ratio	Rotor interia Wk^2	Sound pressure level @ 1m on no load	Weight
P_N Kw (HP)	n min^{-1}	Type	I_N 400V A	η 1.0P_N 0.75P_N 0.5P_N	Cos ∅ 1.0P_N 0.75P_N 0.5P_N	M_N Nm	$\frac{M_A}{M_N}$	$\frac{I_A}{I_N}$	$\frac{M_K}{M_N}$	$\frac{M_S}{M_N}$	J kgm^2	L_{PA} dB(A)	kg
55 (75)	2955	WU-DF250MNE IE2 W-DF250SN IE2[1]	94.0	**93.2** 94.6 93.7	**0.91** 0.90 0.86	178	2.3	7.8	2.8	1.9	0.56	75	420
75 (100)	2960	WU-DF280SNE IE2 W-DF250MN IE2[1]	128	**93.8** 95.1 94.3	**0.90** 0.91 0.90	242	2.2	7.8	3.0	2.0	0.70	77	570
90 (125)	2960	WU-DF280MNE IE2 W-DF280SN IE2[1]	152	**94.1** 95.2 94.7	**0.91** 0.89 0.83	290	2.2	7.8	3.0	2.0	0.80	77	660
110 (150)	2980	WU-DF315SNE IE2 W-DF280MN IE2[1]	185	**94.3** 94.8 93.7	**0.91** 0.90 0.85	353	2.2	7.8	2.9	1.8	1.40	78	800
132 (175)	2975	WU-DF315MNE IE2 W-DF315SN IE2[1]	224	**94.6** 96.3 95.9	**0.90** 0.91 0.88	423	2.2	7.8	2.9	1.8	1.70	78	1000
150 (200)	2980	WU-DF315MN IE2 W-DF315MN IE2[1]	251	**94.7** 95.4 94.5	**0.91** 0.88 0.83	481	2.0	7.8	2.8	1.7	2.40	80	1100
160 (215)	2980	WU-DF315MP IE2 W-DF315MP IE2[1]	268	**94.8** 96.0 95.1	**0.91** 0.88 0.83	513	2.0	7.8	2.8	1.7	2.60	80	1150
185 (250)	2980	WU-DF315LN IE2 W-DF315LN IE2[1]	309	**95.0** 95.5 94.6	**0.91** 0.90 0.86	593	2.0	7.8	2.8	1.7	2.80	80	1300
200 (270)	2980	WU-DF315LN IE2 W-DF315LN IE2[1]	334	**95.0** 96.0 0.95	**0.91** 0.91 0.87	641	1.9	7.1	2.5	1.6	2.80	80	1300
225 (300)	2985	WU-DF355SG IE2 W-DF355SG IE2[1]	384	**95.0** 95.5 94.4	**0.89** 0.86 0.81	720	2.0	7.5	2.7	1.6	5.00	80	1900
250 (335)	2980	WU-DF355SJ IE2 W-DF355SJ IE2[1]	427	**95.0** 95.6 94.6	**0.89** 0.87 0.81	801	2.0	7.5	2.7	1.6	5.30	80	2000
280 (375)	2980	WU-DF355SN IE2 W-DF355SN IE2[1]	478	**95.0** 95.8 94.8	**0.89** 0.87 0.82	897	2.0	7.5	2.7	1.6	5.90	80	2100
315 (420)	2980	WU-DF355MJ IE2 W-DF355MJ IE2[1]	532	**95.0** 96.2 95.4	**0.90** 0.93 0.84	1009	2.0	7.5	2.7	1.6	6.30	80	2200
355 (475)	2980	WU-DF355MN IE2 W-DF355MN IE2[1]	599	**95.0** 96.0 95.5	**0.90** 0.88 0.83	1137	2.0	7.5	2.7	1.6	7.00	80	2300
400 (535)	2980	WU-DF355LN IE2 W-DF355LN IE2[1]	660	**95.7** 95.4 95.1	**0.91** 0.90 0.86	1280	2.0	6.1	2.7	1.6	8.00	80	2500

1 - BS frame reference

Performance data

1500 min^{-1} (4 pole)

Rated power	Full load speed in revolutions per minute	Frame reference and size	Full load currend at rated voltage	Efficiency	Power factor	Full load torque	Direct on line starting torque ratio	Direct on line starting current ratio	Direct on line pull out torque ratio	Direct on line pull up torque ratio	Rotor interia Wk^2	Sound pressure level @ 1m on no load	Weight
P_N Kw (HP)	n min^{-1}	Type	I_N 400V A	η 1.0P_N 0.75P_N 0.5P_N	Cos ∅ 1.0P_N 0.75P_N 0.5P_N	M_N Nm	$\frac{M_A}{M_N}$	$\frac{I_A}{I_N}$	$\frac{M_K}{M_N}$	$\frac{M_S}{M_N}$	J kgm^2	L_{PA} dB(A)	kg
0.75 (1.0)	1440	WU-DF80MS IE2	1.90	**79.6** 78.8 77.4	**0.72** 0.62 0.49	5.0	3.8	6.8	2.4	1.8	0.0019	47	15
1.1 (1.5)	1425	WU-DF90LRX IE2	2.50	**81.4** 81.5 82.0	**0.77** 0.78 0.58	7.4	2.3	5.2	2.9	2.3	0.0034	48	30.5
1.5 (2.0)	1440	WU-DF90LWX IE2	3.70	**82.8** 83.0 81.0	**0.70** 0.58 0.46	9.9	2.6	5.6	3.1	2.4	0.0042	48	35
2.2 (3.0)	1435	WU-DF100LS IE2	5.10	**84.3** 83.6 81.4	**0.74** 0.66 0.53	14.6	3.1	6.6	3.1	2.6	0.0103	54	41.8
3.0 (4.0)	1445	WU-DF100LTF IE2	6.80	**85.5** 83.5 82.6	**0.74** 0.63 0.50	19.8	3.9	8.5	4.0	2.8	0.0118	54	55.2
4.0 (5.5)	1440	WU-DF112MT IE2	8.70	**86.6** 86.6 85.9	**0.77** 0.69 0.55	26.5	3.0	7.4	3.1	2.6	0.012	54	55.2
5.5 (7.5)	1455	WU-DF132STX IE2	11.1	**87.7** 88.0 87.2	**0.82** 0.74 0.63	36.2	2.4	7.1	3.0	2.3	0.030	59	78.1
7.5 (10)	1460	WU-DF132MVX IE2	14.7	**88.7** 89.4 88.6	**0.83** 0.76 0.67	49.1	2.9	8.1	3.2	2.5	0.033	59	82.6
11 (15)	1465	WU-DF160MJ IE2	21.0	**89.8** 91.0 90.4	**0.83** 0.78 0.67	71.7	2.5	7.7	2.9	2.0	0.068	63	121
15 (20)	1460	WU-DF160LR IE2	28.0	**90.6** 91.8 91.6	**0.85** 0.81 0.71	98.1	2.5	7.7	2.9	2.0	0.084	63	133
18.5 (25)	1470	WU-DF180ME IE2	35.0	**91.2** 91.8 90.7	**0.84** 0.77 0.66	120	2.8	8.4	3.2	2.2	0.16	62	162
22 (30)	1470	WU-DF180LJ IE2	41.0	**91.6** 92.1 91.6	**0.86** 0.83 0.71	143	2.6	7.6	2.9	2.0	0.19	62	178
30 (40)	1470	WU-DF200LNX IE2 W-DF200LNX IE2[1]	55.0	**92.3** 93.1 92.6	**0.86** 0.83 0.74	195	2.3	7.5	3.2	1.9	0.31	65	270
37 (50)	1475	WU-DF225SN IE2 W-DF225SN IE2[1]	66.0	**92.7** 93.2 92.5	**0.87** 0.83 0.74	240	2.3	7.3	3.2	1.9	0.45	66	320
45 (60)	1480	WU-DF225MN IE2 W-DF225MN IE2[1]	81.0	**93.1** 93.1 93.1	**0.86** 0.86 0.79	290	2.7	7.7	3.2	1.9	0.65	67	375

1 - BS frame reference

Performance data

1500 min^{-1} (4 pole)

Rated power	Full load speed in revolutions per minute	Frame reference and size	Full load currend at rated voltage	Efficiency	Power factor	Full load torque	Direct on line starting torque ratio	Direct on line starting current ratio	Direct on line pull out torque ratio	Direct on line pull up torque ratio	Rotor interia Wk^2	Sound pressure level @ 1m on no load	Weight
P_N Kw (HP)	n min^{-1}	Type	I_N 400V A	η 1.0P_N 0.75P_N 0.5P_N	Cos ∅ 1.0P_N 0.75P_N 0.5P_N	M_N Nm	$\frac{M_A}{M_N}$	$\frac{I_A}{I_N}$	$\frac{M_K}{M_N}$	$\frac{M_S}{M_N}$	J kgm^2	L_{PA} dB(A)	kg
55 (75)	1475	WU-DF250MNE IE2 W-DF250SN IE2[1]	98.0	**93.5** 92.8 92.2	**0.87** 0.81 0.76	356	2.7	7.7	3.2	1.9	0.75	67	420
75 (100)	1480	WU-DF280SNE IE2 W-DF250MN IE2[1]	135	**94.0** 95.2 94.4	**0.85** 0.82 0.74	484	2.4	7.4	2.7	1.9	1.4	69	570
90 (125)	1480	WU-DF280MNE IE2 W-DF280SN IE2[1]	162	**94.2** 95.2 94.6	**0.85** 0.82 0.73	581	2.5	7.4	2.8	2.0	1.6	69	660
110 (150)	1485	WU-DF315SNE IE2 W-DF280MN IE2[1]	193	**94.5** 95.3 94.6	**0.87** 0.84 0.77	710	2.4	7.7	2.6	2.0	3.2	71	800
132 (175)	1485	WU-DF315MNE IE2 W-DF315SN IE2[1]	231	**94.7** 95.6 94.9	**0.87** 0.84 0.77	849	2.4	7.7	2.6	2.0	3.7	71	1000
150 (200)	1490	WU-DF315MN IE2 W-DF315MN IE2[1]	256	**94.9** 95.7 94.8	**0.89** 0.87 0.81	961	2.4	7.8	2.7	2.0	4.4	73	1100
160 (215)	1490	WU-DF315MP IE2 W-DF315MP IE2[1]	270	**94.9** 96.0 95.2	**0.90** 0.88 0.83	1026	2.4	7.8	2.7	2.0	4.7	73	1150
185 (250)	1490	WU-DF315LN IE2 W-DF315LN IE2[1]	312	**95.1** 96.0 95.5	**0.90** 0.87 0.80	1186	2.4	7.8	2.7	2.2	5.5	73	1300
200 (270)	1488	WU-DF315LN IE2 W-DF315LN IE2[1]	337	**95.1** 96.1 95.6	**0.90** 0.89 0.84	1284	2.3	7.6	2.6	1.9	5.5	73	1300
225 (300)	1490	WU-DF355SG IE2 W-DF355SG IE2[1]	384	**95.1** 96.1 95.4	**0.89** 0.87 0.80	1442	2.0	6.6	2.3	1.7	8.2	76	1900
250 (335)	1485	WU-DF355SJ IE2 W-DF355SJ IE2[1]	426	**95.1** 96.0 05.9	**0.89** 0.87 0.81	1608	2.0	5.7	2.5	1.7	9.5	76	2000
280 (375)	1490	WU-DF355SN IE2 W-DF355SN IE2[1]	483	**95.1** 95.7 95.3	**0.88** 0.84 0.77	1795	2.1	7.2	2.5	1.7	10.6	76	2100
315 (420)	1487	WU-DF355MJ IE2 W-DF355MJ IE2[1]	537	**95.1** 96.1 95.6	**0.89** 0.88 0.85	2023	2.1	7.2	2.5	1.7	11.9	79	2200
355 (475)	1490	WU-DF355MN IE2 W-DF355MN IE2[1]	605	**95.1** 96.0 95.1	**0.89** 0.89 0.84	2275	2.1	7.2	2.5	1.7	13.2	79	2300
400 (535)	1485	WU-DF355LN IE2 W-DF355LN IE2[1]	680	**95.6** 96.3 96.1	**0.89** 0.88 0.83	2572	2.0	6.0	2.5	1.7	14.6	79	2500

1 - BS frame reference

Performance data

1000 min^{-1} (6 pole)

Rated power	Full load speed in revolutions per minute	Frame reference and size	Full load currend at rated voltage	Efficiency	Power factor	Full load torque	Direct on line starting torque ratio	Direct on line starting current ratio	Direct on line pull out torque ratio	Direct on line pull up torque ratio	Rotor interia Wk^2	Sound pressure level @ 1m on no load	Weight
P_N Kw (HP)	n min^{-1}	Type	I_N 400V A	η 1.0P_N 0.75P_N 0.5P_N	Cos ∅ 1.0P_N 0.75P_N 0.5P_N	M_N Nm	$\frac{M_A}{M_N}$	$\frac{I_A}{I_N}$	$\frac{M_K}{M_N}$	$\frac{M_S}{M_N}$	J kgm^2	L_{PA} dB(A)	kg
0.75 (1.0)	935	WU-DF90LTX IE2	2.20	**75.9** 73.8 70.1	**0.65** 0.54 0.44	7.7	2.9	4.8	3.0	2.5	0.0039	65	13
1.1 (1.5)	925	WU-DF90LWX IE2	3.00	**78.1** 75.6 73.1	**0.67** 0.57 0.42	11.4	3.0	4.8	3.0	2.6	0.0043	65	15
1.5 (2.0)	930	WU-DF100LSF IE2	3.80	**79.8** 76.8 74.6	**0.71** 0.68 0.51	15.4	2.2	5.8	2.4	1.9	0.011	58	55.2
2.2 (3.0)	950	WU-DF112MT IE2	5.50	**81.8** 77.6 73.9	**0.70** 0.56 0.45	22.1	2.5	6.5	2.9	2.0	0.012	54	55.2
3.0 (4.0)	965	WU-DF132SL IE2	6.90	**83.3** 84.8 83.2	**0.75** 0.67 0.54	29.7	2.1	6.7	2.6	1.6	0.027	58	78.1
4.0 (5.5)	960	WU-DF132MM IE2	9.30	**84.6** 84.8 82.5	**0.74** 0.66 0.54	39.8	2.2	5.9	2.5	1.6	0.029	58	82.6
5.5 (7.5)	950	WU-DF132MR IE2	12.3	**86.0** 85.2 83.5	**0.75** 0.68 0.55	55.3	2.1	5.6	2.4	1.6	0.032	58	82.6
7.5 (10)	975	WU-DF160MM IE2	16.6	**87.2** 88.1 86.2	**0.75** 0.67 0.56	73.5	1.8	6.5	2.8	1.7	0.10	59	121
11 (15)	980	WU-DF160LV IE2	24.0	**88.7** 90.0 88.5	**0.75** 0.67 0.57	107.2	2.0	7.5	2.8	1.9	0.12	59	133
15 (20)	980	WU-DF180LM IE2	30.5	**89.7** 90.8 89.6	**0.78** 0.74 0.63	146.2	2.4	6.5	2.8	2.2	0.23	59	178
18.5 (25)	980	WU-DF200LGX IE2 W-DF200LGX IE2[1]	36.5	**90.4** 90.8 90.0	**0.81** 0.76 0.65	180.3	2.3	7.0	2.0	2.8	0.42	62	255
22 (30)	980	WU-DF200LNX IE2 W-DF200LNX IE2[1]	42.0	**90.9** 91.1 90.5	**0.83** 0.78 0.68	214.4	2.3	7.0	2.1	2.8	0.48	62	270
30 (40)	980	WU-DF225MN IE2 W-DF225MN IE2[1]	59.0	**91.7** 92.8 92.0	**0.80** 0.73 0.63	292.3	2.7	6.0	2.1	1.8	1.23	63	375
37 (50)	985	WU-DF250MNE IE2 W-DF250SN IE2[1]	71.0	**92.2** 93.3 92.6	**0.81** 0.76 0.66	358.7	2.7	6.0	2.1	1.8	1.47	63	420

1 - BS frame reference

Performance data

1000 min^{-1} (6 pole)

Rated power	Full load speed in revolutions per minute	Frame reference and size	Full load currend at rated voltage	Efficiency	Power factor	Full load torque	Direct on line starting torque ratio	Direct on line starting current ratio	Direct on line pull out torque ratio	Direct on line pull up torque ratio	Rotor interia Wk^2	Sound pressure level @ 1m on no load	Weight
P_N Kw (HP)	n min^{-1}	Type	I_N 400V A	η 1.0P_N 0.75P_N 0.5P_N	Cos ∅ 1.0P_N 0.75P_N 0.5P_N	M_N Nm	$\frac{M_A}{M_N}$	$\frac{I_A}{I_N}$	$\frac{M_K}{M_N}$	$\frac{M_S}{M_N}$	J kgm^2	L_{PA} dB(A)	kg
45 (60)	985	WU-DF280SNE IE2 W-DF250MN IE2[1]	86.0	**92.7** 93.4 92.8	**0.81** 0.82 0.80	436.3	2.5	6.0	2.0	1.8	2.55	65	570
55 (75)	985	WU-DF280MNE IE2 W-DF280SN IE2[1]	103	**93.1** 94.1 93.8	**0.83** 0.80 0.74	533.2	2.5	6.1	2.0	1.9	2.9	65	660
75 (100)	990	WU-DF315SNE IE2 W-DF280MN IE2[1]	139	**93.7** 94.4 93.3	**0.83** 0.79 0.70	723.5	3.0	7.0	2.6	2.1	5.0	68	800
90 (125)	990	WU-DF315MNE IE2 W-DF315SN IE2[1]	165	**94.0** 94.3 93.4	**0.84** 0.80 0.72	873	3.0	7.0	2.6	2.1	6.0	68	1000
110 (150)	985	WU-DF315MN IE2 W-DF315MN IE2[1]	198	**94.3** 94.7 93.8	**0.85** 0.81 0.73	1066	2.8	6.7	2.0	1.9	6.1	70	1100
132 (175)	985	WU-DF315LN IE2 W-DF315LN IE2[1]	237	**94.6** 94.9 94.1	**0.85** 0.81 0.73	1280	2.8	6.7	2.0	1.9	7.3	70	1300
150 (200)	987	WU-DF355SG IE2 W-DF355SG IE2[1]	272	**94.7** 95.4 94.5	**0.84** 0.83 0.76	1451	1.7	7.0	2.1	1.4	10.0	74	1900
160 (215)	990	WU-DF355SG IE2 W-DF355SG IE2[1]	287	**94.8** 95.4 94.5	**0.85** 0.83 0.76	1551	1.7	6.7	2.1	1.4	10.0	74	1900
185 (250)	990	WU-DF355SJ IE2 W-DF355SJ IE2[1]	331	**94.9** 95.8 95.1	**0.85** 0.83 0.76	1785	1.7	6.7	2.1	1.4	11.1	74	2000
200 (270)	990	WU-DF355SN IE2 W-DF355SN IE2[1]	358	**95.0** 95.9 95.2	**0.85** 0.83 0.76	1939	1.7	6.7	2.1	1.4	12.2	74	2100
225 (300)	990	WU-DF355MJ IE2 W-DF355MJ IE2[1]	398	**95.0** 96.0 95.4	**0.86** 0.83 0.76	2170	1.7	6.7	2.1	1.4	13.6	77	2200
250 (335)	990	WU-DF355MN IE2 W-DF355MN IE2[1]	442	**95.0** 95.0 94.3	**0.86** 0.84 0.77	2412	1.8	7.0	2.2	1.5	15.2	77	2300
280 (375)	990	WU-DF355LJ IE2 W-DF355LJ IE2[1]	495	**95.0** 95.2 94.9	**0.86** 0.84 0.77	2701	1.8	7.0	2.2	1.5	16.9	77	2400
315 (420)	990	WU-DF355LN IE2 W-DF355LN IE2[1]	557	**95.0** 95.3 94.7	**0.86** 0.84 0.77	3039	1.8	7.0	2.1	1.5	18.6	77	2500

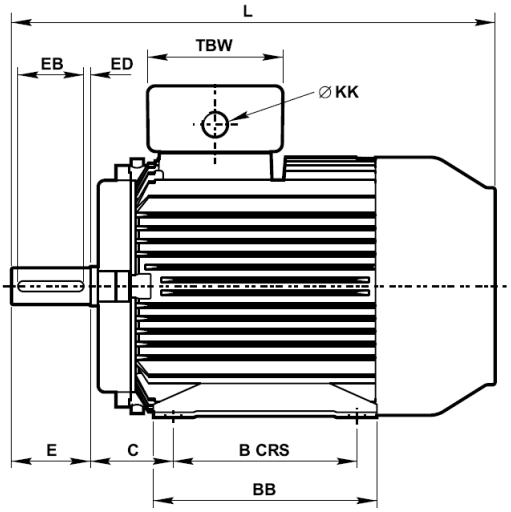
1 - BS frame reference

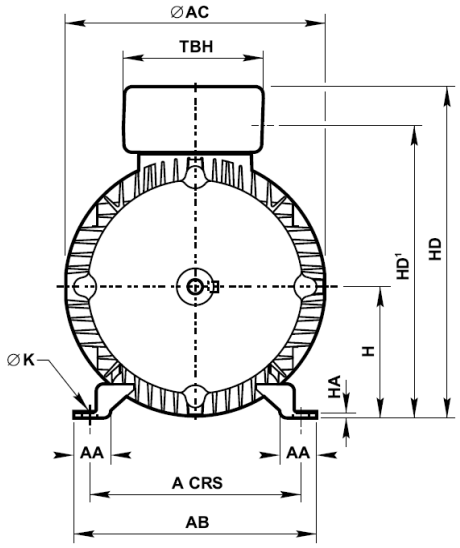
Dimensions - European and BS specification

Foot (B3) / Flange (B5) / Face mounting (B14) - TEFV frames 80-180

IM B3
IM 1001

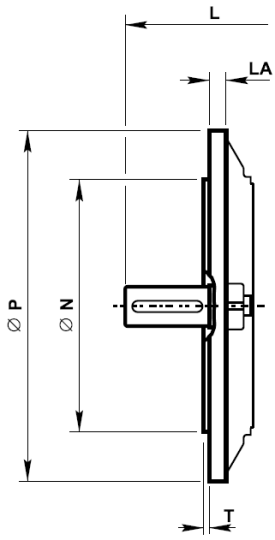
Mounting options

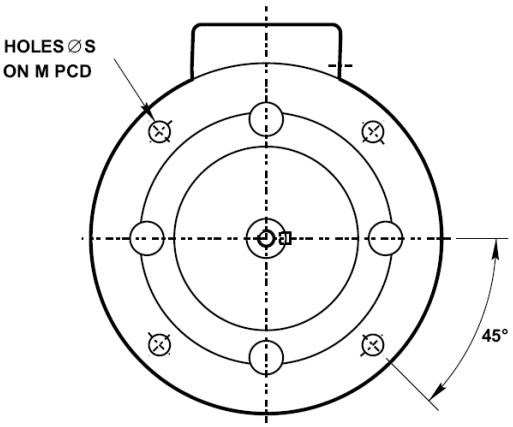




IM B5/IM B35
IM 3001/IM 2001

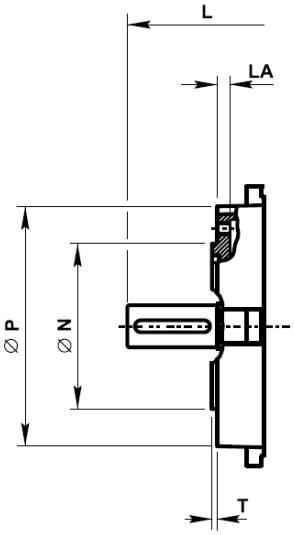
Mounting options

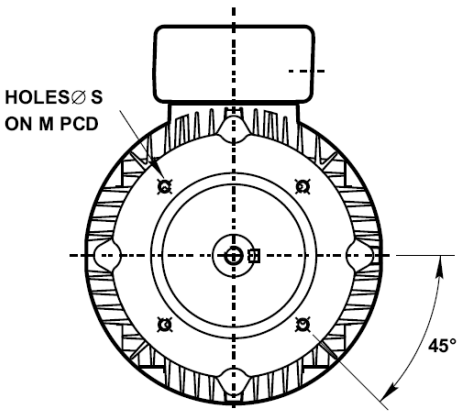




IM B14/IM B34
IM 3601/IM 2101

Mounting options





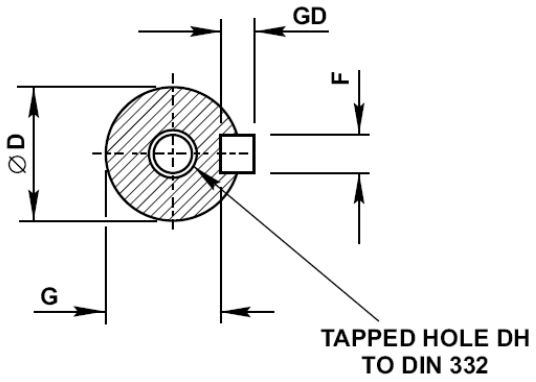
Dimensions - European and BS specification

Foot (B3) / Flange (B5) / Face mounting (B14) - TEFV frames 80-180

	General													Terminal box		
Type	A	B	C	H	K	L	AA	AB	AC	BB	HA	HD	HD[1]	TBW	TBH	KK
WU-DF80M	125	100	50	80	10	278	35	157	158	127	10	236	195	120	120	1x M20
WU-DA90LX	140	125	56	90	10	364	38	175	174	195	12	254	273	120	120	1x M20
WU-DA100L	160	140	63	100	12	368	34	195	199	165	14	274	234	120	120	2x M20
WU-DA100LF	160	140	63	100	12	409	34	195	214	206	14	283	242	120	120	2x M20
WU-DA112M	190	140	70	112	12	382	40	230	220	182	16	305	258,5	135	135	2x M25
WU-DA132S	216	140	89	132	12	447	47	255	260	220	17	348	308	135	135	2x M25
WU-DA132SX	216	140	89	132	12	484,5	47	255	256	220	16	348	300	135	135	2x M25
WU-DA132M	216	178	89	132	12	447	47	255	260	220	17	348	308	135	135	2x M25
WU-DA132MX	216	178	89	132	12	484,5	47	255	256	220	16	348	300	135	135	2x M25
WU-DA160M	254	210	108	160	15	604	55	300	315	300	22	428	368	174	174	2x M32
WU-DA160L	254	254	108	160	15	604	55	300	315	300	22	428	368	174	174	2x M32
WU-DA180M	279	241	121	180	15	663	64	344	355	326	22	469	410	174	174	2x M32
WU-DA180L	279	279	121	180	15	663	64	344	355	326	22	469	410	174	174	2x M32

	IM B5 mounting						IM B14 mounting					
Type	M	N	P	S	T	LA	M	N	P	S	T	LA
WU-DA80M	165	130	200	12	3.5	12	100	80	120	M6	3	9
WU-DA90LX	165	130	200	12	3.5	10	115	95	140	M8	3	9
WU-DA100L	215	180	250	14.5	4	12	130	110	160	M8	3.5	12.5
WU-DA100LF	215	180	250	14.5	4	12	130	110	160	M8	3.5	12.5
WU-DA112M	215	180	250	14.5	4	12	130	110	164	M8	3.5	13
WU-DA132S	265	230	300	14.5	4	12	165	130	200	M10	3.5	14
WU-DA132SX	265	230	300	14.5	4	12	165	130	200	M10	3.5	14
WU-DA132M	265	230	300	14.5	4	12	165	130	200	M10	3.5	14
WU-DA132MX	265	230	300	14.5	4	12	165	130	200	M10	3.5	14
WU-DA160M	300	250	350	18.5	5	13	215	180	250	M12	4	13
WU-DA160L	300	250	350	18.5	5	13	215	180	250	M12	4	13
WU-DA180M	300	250	350	18.5	5	15	-	-	-	-	-	-
WU-DA180L	300	250	350	18.5	5	15	-	-	-	-	-	-

	Shaft							
Type	D	E	F	G	GD	EB	ED	DH
WU-DA80M	19	40	6	15.5	6	32	4	M6x16
WU-DA90LX	24	50	8	20	7	40	5	M8x19
WU-DA100L	28	60	8	23.9	7	50	5	M10x22
WU-DA100LF	28	60	8	23.9	7	50	5	M10x22
WU-DA112M	28	60	8	23.9	7	50	5	M10x22
WU-DA132S	38	80	10	33	8	70	5	M12x28
WU-DA132SX	38	80	10	33	8	70	5	M12x28
WU-DA132M	38	80	10	33	8	70	5	M12x28
WU-DA132MX	38	80	10	33	8	70	5	M12x28
WU-DA160M	42	110	12	37	8	100	5	M16x36
WU-DA160L	42	110	12	37	8	100	5	M16x36
WU-DA180M	48	110	14	42.5	9	100	5	M16x36
WU-DA180L	48	110	14	42.5	9	100	5	M16x36

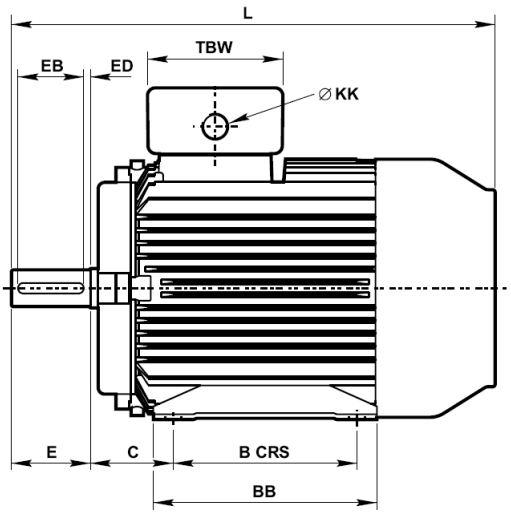


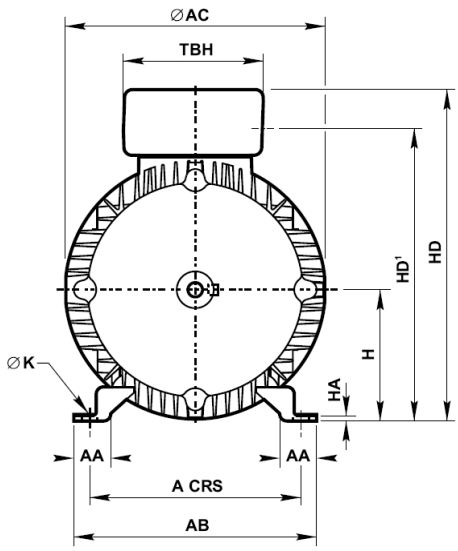
Dimensions - European specification

Foot (B3) / Flange (B5) - TEFV frames 200 - 355

IM B3
IM 1001

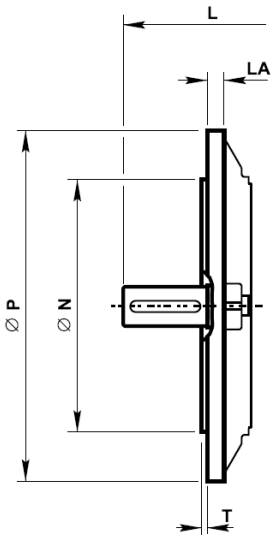
Mounting options

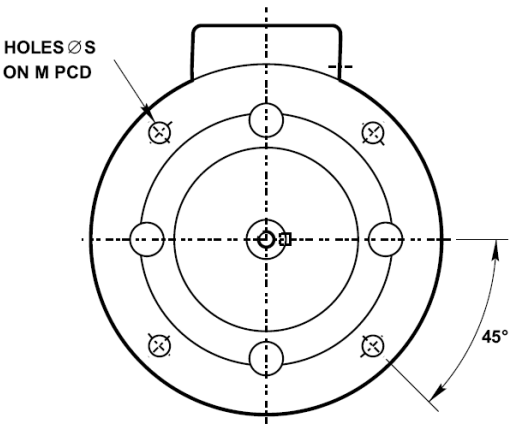




IM B5/IM B35
IM 3001/IM 2001

Mounting options





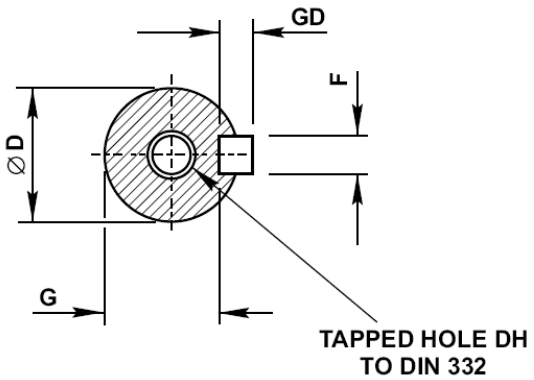
Dimensions - European specification

Foot (B3) / Flange (B5) - TEFV frames 200 - 355

	General																Terminal box
						4 pole +	2 pole										
Type	A	B	C	H	K	L	L	AA	AB	AC	BB	HA	HD	HD[1]	TBW	TBH	KK
W-DF200LX	318	305	133	200	M16	787	787	74	382	381	359	30	501	444	176	220	2 x M32 + 1 x M20
W-DF225S	356	286	149	225	M16	875	845	70	426	410	349	25	550[1]	488	220	288	2 x M40 + 1 x M20
W-DF225M	356	311	149	225	M16	915	885	70	426	448	374	25	570	510	220	288	2 x M40 + 1 x M20
W-DF250S	406	349	168	250	M20	985	985	79	482	448	419	28	595[2]	535	220	288	2 x M50 + 1 x M20
W-DF250M	457	368	190	280	M20	1065	1065	83	540	508	438	35	655[1]	595	220	288	2 x M50 + 1 x M20
W-DF280S	457	419	190	280	M20	1070	1070	83	540	508	489	35	655[1]	595	220	288	2 x M50 + 1 x M20
W-DF280M	508	406	216	315	M24	1145	1115	89	597	563	482	38	845	744	330	526	2 x M63 + 1 x M20
W-DF315S	508	457	216	315	M24	1215	1185	89	597	563	533	38	845	744	330	526	2 x M63 + 1 x M20
W-DF315M	508	457	216	315	M24	1245	1215	89	597	640	533	38	875	776	330	526	2 x M63 + 1 x M20
W-DF315L	508	508	216	315	M24	1315	1285	89	597	640	583	38	875	776	330	526	2 x M63 + 1 x M20
W-DF355S	610	500	254	355	M24	1485	1415	100	710	732	626	27	975	874	330	526	2 x M63 + 1 x M20
W-DF355M	610	560	254	355	M24	1605	1535	100	710	732	686	27	975	874	330	526	2 x M63 + 1 x M20
W-DF355L	610	630	254	355	M24	1655	1585	100	710	732	756	27	975	874	330	526	2 x M63 + 1 x M20

	4 pole +								2 pole							
	Shaft								Shaft							
Type	D	E	F	G	GD	EB	ED	DH	D	E	F	G	GD	EB	ED	DH
W-DF200LX	55	110	16	49	10	100	5	M20 x 42	55	110	16	49	10	100	5	M20 x 42
W-DF225S	60	140	18	53	11	125	5	M20 x 42	55	110	16	49	10	100	5	M20 x 42
W-DF225M	60	140	18	53	11	125	5	M20 x 42	55	110	16	49	10	100	5	M20 x 42
W-DF250S	70	140	20	62,5	12	125	5	M20 x 42	60	140	18	53	11	125	5	M20 x 42
W-DF250M	70	140	20	62,5	12	125	5	M20 x 42	60	140	18	53	11	125	5	M20 x 42
W-DF280S	80	170	22	71	14	160	5	M20 x 42	65	140	18	58	11	125	5	M20 x 42
W-DF280M	80	170	22	71	14	160	5	M20 x 42	65	140	18	58	11	125	5	M20 x 42
W-DF315S	85	170	22	76	14	160	5	M20 x 42	65	140	18	58	11	125	5	M20 x 42
W-DF315M	85	170	22	76	14	160	5	M20 x 42	65	140	18	58	11	125	5	M20 x 42
W-DF315L	85	170	22	76	14	160	5	M20 x 42	65	140	18	58	11	125	5	M20 x 42
W-DF355S	100	210	28	90	16	200	5	M24 x 50	75	140	20	67,5	12	125	5	M24 x 50
W-DF355M	100	210	28	90	16	200	5	M24 x 50	75	140	20	67,5	12	125	5	M24 x 50
W-DF355L	100	210	28	90	16	200	5	M24 x 50	75	140	20	67,5	12	125	5	M24 x 50

	IM B5, IM B35 mounting					
Type	M	N	P	S	T	LA
W-DF200LX	350	300	400	19	5	19
W-DF225S	400	350	450	19	5	19
W-DF225M	400	350	450	19	5	19
W-DF250S	500	450	550	19	5	25
W-DF250M	500	450	550	19	5	25
W-DF280S	500	450	550	19	5	25
W-DF280M	500	450	550	19	5	25
W-DF315S	600	550	660	24	6	29
W-DF315M	600	550	660	24	6	29
W-DF315L	600	550	660	24	6	29
W-DF355S	740	680	800	24	6	28
W-DF355M	740	680	800	24	6	28
W-DF355L	740	680	800	24	6	28



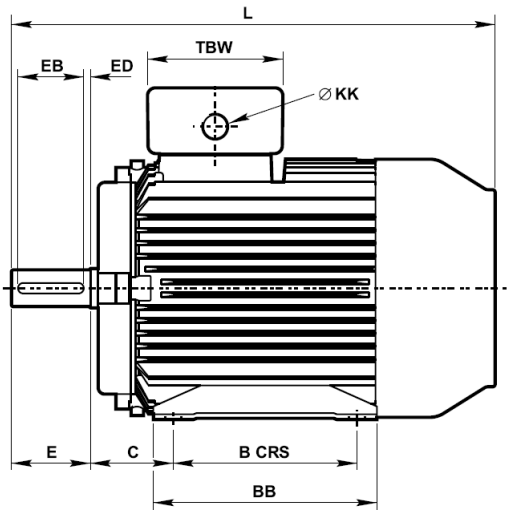
1 - add 25mm when cable entry is facing drive end
2 - add 50mm when cable entry is facing drive end

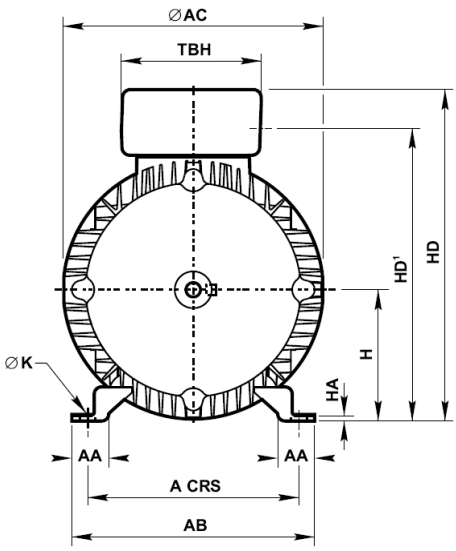
Dimensions - BS specification

Foot (B3) / Flange (B5) - TEFV frames 200 - 355

IM B3
IM 1001

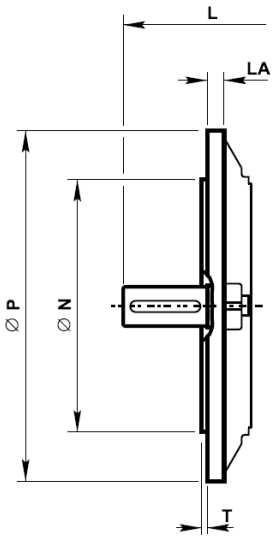
Mounting options

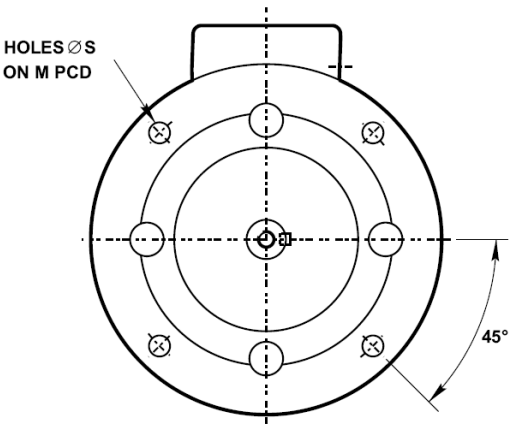




IM B5/IM B35
IM 3001/IM 2001

Mounting options





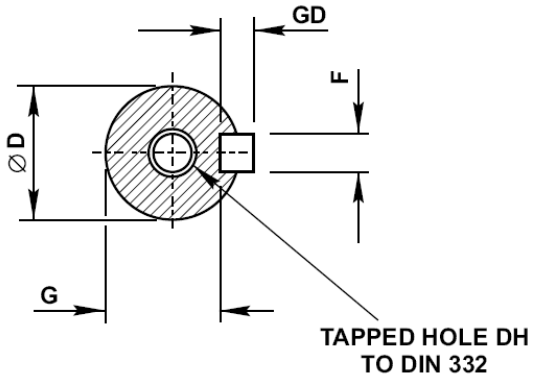
Dimensions - BS specification

Foot (B3) / Flange (B5) - TEFV frames 200 - 355

	General																Terminal box
						4 pole +	2 pole										
Type	A	B	C	H	K	L	L	AA	AB	AC	BB	HA	HD	HD[1]	TBW	TBH	KK
WU-DF200LX	318	305	133	200	M16	787	787	74	382	381	359	30	501	444	176	220	2 x M32 + 1 x M20
WU-DF225S	356	286	149	225	M16	875	845	70	426	410	349	25	550[1]	488	220	161	2 x M40 + 1 x M20
WU-DF225M	356	311	149	225	M16	915	885	70	426	448	374	25	570	510	220	161	2 x M40 + 1 x M20
WU-DF250ME	406	349	168	250	M20	985	985	79	482	448	419	28	595[2]	535	220	161	2 x M50 + 1 x M20
WU-DF280SE	457	368	190	280	M20	1065	1065	83	540	508	438	35	655[1]	595	220	161	2 x M50 + 1 x M20
WU-DF280ME	457	419	190	280	M20	1070	1070	83	540	508	489	35	655[1]	595	220	161	2 x M50 + 1 x M20
WU-DF315SE	508	406	216	315	M24	1145	1115	89	597	563	482	38	845	744	330	326	2 x M63 + 1 x M20
WU-DF315ME	508	457	216	315	M24	1215	1185	89	597	563	533	38	845	744	330	326	2 x M63 + 1 x M20
WU-DF315M	508	457	216	315	M24	1245	1215	89	597	640	533	38	875	776	330	326	2 x M63 + 1 x M20
WU-DF315L	508	508	216	315	M24	1315	1285	89	597	640	583	38	875	776	330	326	2 x M63 + 1 x M20
WU-DF355S	610	500	254	355	M24	1485	1415	100	710	732	626	27	975	874	330	326	2 x M63 + 1 x M20
WU-DF355M	610	560	254	355	M24	1605	1535	100	710	732	686	27	975	874	330	326	2 x M63 + 1 x M20
WU-DF355L	610	630	254	355	M24	1655	1585	100	710	732	756	27	975	874	330	326	2 x M63 + 1 x M20

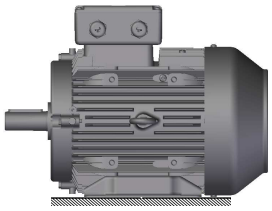
	4 pole +								2 pole							
	Shaft								Shaft							
Type	D	E	F	G	GD	EB	ED	DH	D	E	F	G	GD	EB	ED	DH
WU-DF200LX	55	110	16	49	10	100	5	M20 x 42	55	110	16	49	10	100	5	M20 x 42
WU-DF225S	60	140	18	53	11	125	5	M20 x 42	55	110	16	49	10	100	5	M20 x 42
WU-DF225M	60	140	18	53	11	125	5	M20 x 42	55	110	16	49	10	100	5	M20 x 42
WU-DF250ME	65	140	18	58	11	125	5	M20 x 42	60	140	18	53	11	125	5	M20 x 42
WU-DF280SE	75	140	20	67,5	12	125	5	M20 x 42	65	140	18	53	11	125	5	M20 x 42
WU-DF280ME	75	140	20	67,5	12	125	5	M20 x 42	65	140	18	58	11	125	5	M20 x 42
WU-DF315SE	80	170	22	71	14	160	5	M20 x 42	65	140	18	58	11	125	5	M20 x 42
WU-DF315ME	80	170	22	71	14	160	5	M20 x 42	65	140	18	58	11	125	5	M20 x 42
WU-DF315M	80	170	22	71	14	160	5	M20 x 42	65	140	18	58	11	125	5	M20 x 42
WU-DF315L	80	170	22	71	14	160	5	M20 x 42	65	140	18	58	11	125	5	M20 x 42
WU-DF355S	100	210	28	90	16	200	5	M24 x 50	75	140	20	67,5	12	125	5	M24 x 50
WU-DF355M	100	210	28	90	16	200	5	M24 x 50	75	140	20	67,5	12	125	5	M24 x 50
WU-DF355L	100	210	28	90	16	200	5	M24 x 50	75	140	20	67,5	12	125	5	M24 x 50

	IM B5, IM B35 mounting					
Type	M	N	P	S	T	LA
WU-DF200LX	350	300	400	19	5	19
WU-DF225S	400	350	450	19	5	19
WU-DF225M	400	350	450	19	5	19
WU-DF250ME	500	450	550	19	5	25
WU-DF280SE	500	450	550	19	5	25
WU-DF280ME	500	450	550	19	5	25
WU-DF315SE	500	450	550	19	5	25
WU-DF315ME	600	550	660	24	6	29
WU-DF315M	600	550	660	24	6	29
WU-DF315L	600	550	660	24	6	29
WU-DF355S	740	680	800	24	6	28
WU-DF355M	740	680	800	24	6	28
WU-DF355L	740	680	800	24	6	28

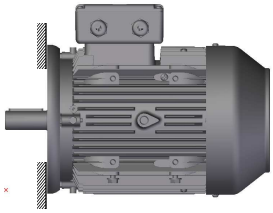


1 - add 25mm when cable entry is facing drive end
2 - add 50mm when cable entry is facing drive end

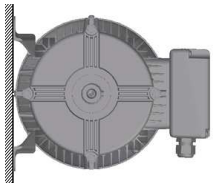
Mounting option



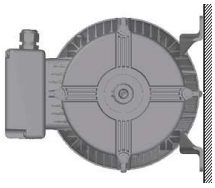
IM B3
IM 1001
foot mounted



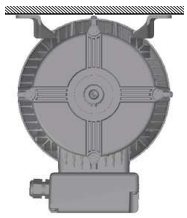
IM B5
IM 3001
flange at DE no feet



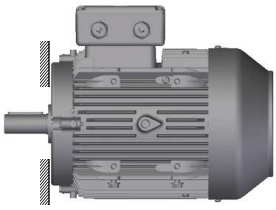
IM B6
IM 1051
foot wall mounted with feet on left hand side



IM B7
IM 1061
foot wall mounted with feet on right hand side

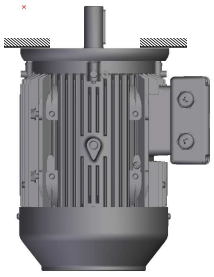


IM B8
IM 1071
ceiling mounted with feet above motor

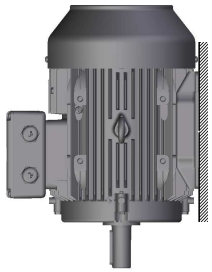


IM B14
IM 3601
face at DE no feet

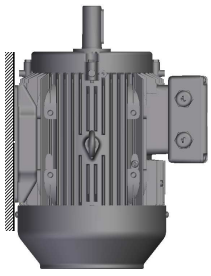
IM V1
IM 3011
flange at DE shaft down no feet



IM V3
IM 3031
flange at DE shaft down no feet



IM V5
IM 1011
vertical foot wall mounted shaft down



IM V6
IM 1031
vertical foot wall mounted shaft up

IM V18
IM 3611
face at DE no feet shaft down

IM V19
IM 3631
face at DE no feet shaft up

Technical information: Mechanical

Bearings and greasing arrangement

Bearings are pre-packed with a grease type dependant on frame size and re-greasing facility as detailed in table opposite:

Standard and re-greasing facilities			
Type	Re-greasing facility	Polyurea	Lithium complex
80 - 180	Available	EA6 with temperature range of –40°C to +160°C	Esso Unirex N3 with temperature range of –30°C to +140°C
200 - 355	Standard		

Bearing references and oil seals

Type		Polarity	Bearings[1]		Oil seals[2]	
European	BS		Drive end	Non-drive end	Drive end	Non-drive end
WU-DF80M	W-DF80M	All	6204ZZ	6003ZZ	20 x 30 x 7	17 x 28 x 6
WU-DF90S/L	W-DF90S/L	All	6205ZZ	6203ZZ	25 x 35 x 7	17 x 28 x 6
WU-DF100L/LF	W-DF100L/LF	All	6206ZZ	6205ZZ	30 x 42 x 7	25 x 37 x 7
WU-DF112M	W-DF112M	All	6206ZZ	6205ZZ	30 x 42 x 7	25 x 37 x 7
WU-DF132S/M	W-DF132S/M	All	6208ZZ	6305ZZ	40 x 52 x 7	25 x 37 x 7
WU-DF160M/L	W-DF160M/L	All	6309ZZ	6307ZZ	45 x 60 x 8	35 x 47 x 7
WU-DF180M/L	W-DF180M/L	All	6310ZZ	6308ZZ	50 x 65 x 8	40 x 52 x 7
WU-DF200LX	W-DF200LX	All	6312	6312	60 x 80 x 8[3]	60 x 80 x 8[3]
WU-DF225S	W-DF225S	All	6313	6313	65 x 90 x 10[4]	65 x 90 x 10[4]
WU-DF225M	W-DF225M	All	6314	6314	70 x 90 x 10[4]	70 x 90 x 10[4]
WU-DF250ME	W-DF250S	2	6314	6314	70 x 90 x 10[4]	70 x 90 x 10[4]
		4up	6316	6316	80 x 110 x 10[3]	80 x 110 x 10[3]
WP-UDF280SE	WP-DF250M	2	6314	6314	70 x 90 x 10[4]	70 x 90 x 10[4]
		4up	6318	6318	90 x 120 x 12[3]	90 x 120 x 12[3]
WP-UDF280ME	WP-DF280S	2	6314	6314	70 x 90 x 10[4]	70 x 90 x 10[4]
		4up	6318	6318	90 x 120 x 12[3]	90 x 120 x 12[3]
WP-UDF315SE	WP-DF280M	2	6316	6316	70 x 90 x 10[4]	70 x 90 x 10[4]
		4up	6319	6319	90 x 120 x 12[3]	90 x 120 x 12[3]
WP-UDF315ME	WP-DF315S	2	6316	6316	70 x 90 x 10[4]	70 x 90 x 10[4]
		4up	6319	6319	90 x 120 x 12[3]	90 x 120 x 12[3]
WP-UDF315M/L	WP-DF315M/L	2	6316	6316	70 x 90 x 10[4]	70 x 90 x 10[4]
		4up	6319	6319	90 x 120 x 12[3]	90 x 120 x 12[3]
WP-UDF355S/M/L	WP-DF355S/M/L	2	N316	6316	70 x 90 x 10[4]	70 x 90 x 10[4]
		4up	N324	6324	115 x 145 x 14[3]	115 x 145 x 14[3]

(1) - Frame sizes 80 and 90 have bearings with CN clearances, frame sizes 100 to 355 have bearings with C3 clearance 'medium' series
(2) - Size are in mm, and represent bore x diameter x width
Material: (3) - Nitrile rubber (4) - Silicon rubber

Grease life expected at 80°C bearing temperature x 10^3 hours

Type		3000 min^{-1}		1500 min^{-1}		1000 min^{-1}		750 min^{-1}	
European	BS	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
WU-DF80-112	W-DF80-112	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
WU-DF132	W-DF132	30.0	25.0	30.0	30.0	30.0	30.0	30.0	30.0
WU-DF160	W-DF160	29.0	19.0	30.0	30.0	30.0	30.0	30.0	30.0
WU-DF180	W-DF180	24.0	16.0	30.0	30.0	30.0	30.0	30.0	30.0
WU-DF200LX	W-DF200LX	12.6	8.2	30.0	20.3	30.0	27.8	30.0	30.0
WU-DF225S	W-DF225S	12.6	8.2	30.0	20.3	30.0	27.8	30.0	30.0
WU-DF225M	W-DF225M	11.3	7.4	29.5	19.2	30.0	26.0	30.0	30.0
WU-DF250ME	W-DF250S	11.3	7.4	26.3	17.1	30.0	23.6	30.0	29.3
WP-UDF280SE	WP-DF250M	11.3	7.4	23.4	15.2	30.0	21.3	30.0	27.8
WP-UDF280ME	WP-DF280S	11.3	7.4	23.4	15.2	30.0	21.3	30.0	27.8
WP-UDF315SE	WP-DF280M	9.4	6.1	21.3	13.8	30.0	20.3	30.0	26.0
WP-UDF315ME	WP-DF315S	9.4	6.1	21.3	13.8	30.0	20.3	30.0	26.0
WP-UDF315M/L	WP-DF315M/L	9.4	6.1	21.3	13.8	30.0	20.3	30.0	26.0
WP-UDF355S/M/L[1]	WP-DF355S/M/L[1]	5.0	3.3	8.2	5.3	16.2	10.5	24.5	15.9
WP-UDF355S/M/L[2]	WP-DF355S/M/L[2]	9.4	6.1	13.5	8.8	22.5	14.6	30.0	19.5

(1) - DE = Drive End
(2) - NDE = Non Drive End

Technical information: Mechanical

Approximate shipping specifications

European Type	BS Type	Net weight (kg)	Gross weight (kg)	Cubage (m^3)
WU-DF80M	W-DF80M	15	16.5	0.02
WU-DF90S/L	W-DF90L	30.5	31.5	0.02
WU-DF100L	W-DF100L	41.8	44.3	0.04
WU-DF112M	W-DF112M	55.2	58.2	0.06
WU-DF132S	W-DF132S	78.1	81.1	0.08
WU-DF132M	W-DF132M	82.6	88.6	0.08
WU-DF160M	W-DF160M	121	133	0.15
WU-DF160L	W-DF160L	133	145	0.15
WU-DF180M	W-DF180M	162	178	0.21
WU-DF180L	W-DF180L	177.5	193.5	0.21
WU-DF200LX	W-DF200LX	255	270	0.30
WU-DF225S	W-DF225S	320	335	0.37
WU-DF225M	W-DF225M	375	390	0.37
WU-DF250ME	W-DF250S	420	460	0.63
WU-DF280SE	W-DF250M	570	610	0.70
WU-DF280ME	W-DF280S	660	721	1.2
WU-DF315SE	W-DF280M	800	871	1.2
WU-DF315ME	W-DF315S	1000	1095	1.8
WU-DF315M	W-DF315M	1100	1195	1.8
WU-DF315L	W-DF315L	1300	1395	1.8
WU-DF355S	W-DF355S	2000	2120	2.3
WU-DF355M	W-DF355M	2300	2420	2.3
WU-DF355L	W-DF355L	2500	2620	2.3

Table includes average motor weight with B3 (foot) mounting type.

Axial and radial loads frames 80 - 180

Maximum permissible external axial and radial loads in Newtons*

Type	Poles	Horizontal shaft		Vertical shaft				Maximum permissible radial load end of shaft (horizontal mounting)
				Shaft up		Shaft down		
		Load towards motor	Load away from motor	Load towards motor	Load away from motor	Load towards motor	Load away from motor	
WU-DF80M	2	339	539	321	565	362	521	774
	4	303	503	283	530	330	583	729
	6	284	484	260	516	316	460	646
WU-DF90L	2	444	684	421	716	476	661	915
	4	398	638	366	682	442	606	854
	6	349	589	309	641	401	549	720
WU-DF100L	2	781	1101	743	1159	839	1063	1295
	4	710	1030	655	1107	787	975	1215
	6	560	880	506	963	643	826	1145
WU-DF100LF WU-DF112M	2	768	1088	715	1170	850	1035	1295
	4	690	1010	612	1131	811	932	1202
	6	541	861	463	979	659	783	1141
WU-DF132	2	1355	1707	1266	1838	1486	1618	2114
	4	1253	1605	1130	1779	1427	1482	2068
	6	1167	1519	1035	1711	1359	1387	1968
WU-DF160	2	2144	2639	1951	2920	2425	2446	3613
	4	2123	2618	1895	2959	2464	2390	3738
	6	1973	2468	1669	2905	2410	2164	3544
WU-DF180	2	2711	3274	2465	3667	3104	3027	4374
	4	2749	3312	2426	3801	3238	2988	4556
	6	2575	3138	2166	3785	3222	2728	4334

* All figures are based on Lna bearing life of 20.000 hours. Lna = adjusted L10 life rating taking account of:
- reliability - material improvements - lubrication conditions

Technical information: Mechanical

Axial and radial loads frames 200 - 355

Maximum permissible external axial thrust and radial loads in Newtons [N]*

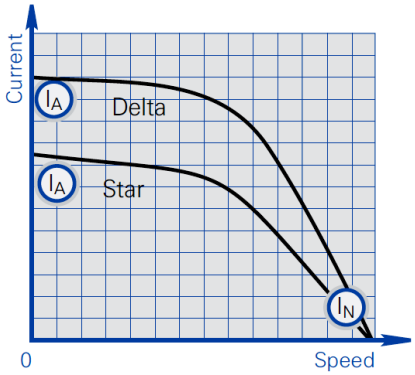
Type	Poles	Horizontal shaft		Vertical shaft				Maximum permissible radial load end of shaft (horizontal mounting)			
				Shaft up		Shaft down		Standard ball bearing		Roller bearing	
		Load towards motor	Load away from motor	Load towards motor	Load away from motor	Load towards motor	Load away from motor	European frame	BS frame	European frame	BS frame
WU-DF200LX W-DF200LX[1]	2	5435	4775	5005	5361	6021	4345	5125	5125	7541	7541
	4	6058	5398	5531	6121	6781	4871	5588	5588	7541	7541
	6	6055	5395	5457	6215	6875	4797	5536	5536	7541	7541
WU-DF225S W-DF225S[1]	4	6692	6122	5941	7177	7747	5371	5963	5963	8202	8202
	6	6770	6200	5935	7371	7941	5365	5982	5982	8202	8202
WU-DF225M W-DF225M[1]	2	6729	6197	6084	7082	7614	6213	6602	6602	8745	8745
	4	7530	6998	6745	8099	8631	6213	6868	6876	8921	8921
	6	7640	7108	6673	8463	8995	6141	6856	6856	8921	8921
WU-DF250ME W-DF250S[1]	2	6640	6108	5837	7209	7741	5305	6262	6262	8921	8921
	4	9012	8418	8030	9794	10388	7436	8163	8163	11342	14166
	6	9391	8797	8311	10311	10905	7717	8477	8477	11342	14166
WU-DF280SE W-DF250M[1]	2	6505	5911	5472	7352	7946	4878	5692	5897	8242	8921
	4	10241	9579	8943	11377	12039	8281	9260	9627	17105	14166
	6	10846	10184	9423	12157	12819	8761	9336	10182	17105	14166
WU-DF280ME W-DF280S[1]	2	6268	5736	5101	7355	7887	4569	5824	5795	9825	9503
	4	9774	9112	8014	11534	12196	7352	9136	8842	17423	17348
	6	10582	9920	8704	12524	13186	8042	9698	9386	17423	17348
WU-DF315SE W-DF280M[1]	2	7443	6849	5921	8957	9551	5327	6804	6804	11342	11342
	4	10305	9965	8299	12719	13059	7959	9443	9443	17414	17414
	6	11190	10850	9050	13810	14150	8710	10042	10042	17414	17414
WU-DF315ME W-DF315S[1]	2	7337	6743	5654	9082	9676	5060	6680	6680	11342	11342
	4	10077	9737	7672	13044	13384	7332	9121	9121	17414	20887
	6	10958	10618	8419	14131	14471	8079	9734	9734	17414	20887
WU-DF315M W-DF315M[1]	2	7398	6804	5664	9154	9748	5070	6885	6885	11342	11342
	4	10192	9852	8006	12862	13202	7666	9482	9482	17414	20748
	6	11060	10720	8715	13971	14311	8375	10066	10066	17414	20748
WU-DF315L W-DF315L[1]	2	7055	6461	5050	9164	9758	4456	6603	6606	11342	11342
	4	10008	9668	7501	13123	13463	7161	9207	9207	17414	20748
	6	10872	10532	8207	14229	14569	7867	9801	9801	17414	20748
WU-DF355S W-DF355S[1]	2	6118	5524	3136	9692	10286	2542			12627	12627
	4	12994	11454	8799	17389	18929	7259			27533	27533
	6	14038	12498	9387	19143	20683	7847			27533	27533
WU-DF355M W-DF355M[1]	2	5779	5185	2326	10050	10644	1732			12627	12627
	4	12528	10988	7511	18055	19595	5971			27533	27533
	6	13148	11608	7523	19533	21073	5983			27533	27533
WU-DF355L W-DF355L[1]	2	5595	5001	1734	10396	10990	1140			12627	12627
	4	12343	10803	7038	18282	19822	5498			27533	27533
	6	12936	11396	6980	19794	21334	5440			27533	27533

* All figures are based on Lna bearing life of 20.000 hours. Lna = adjusted L10 life rating taking account of:
- reliability - material improvements - lubrication conditions

1 - BS frame reference

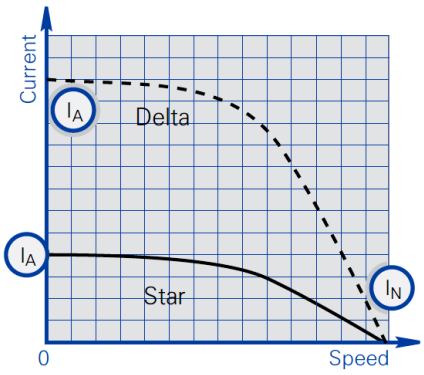
Technical information: Electrical

Typical speed/current curve



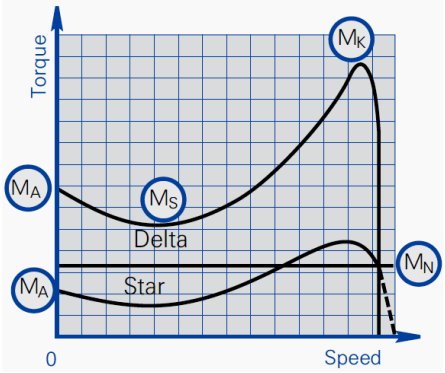
Frame size 80 - 180

Typical speed/current curve



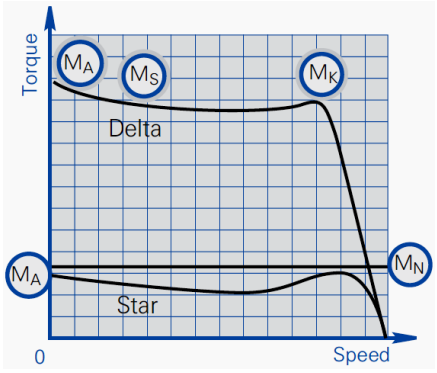
Frame size 200 - 355

Typical speed/torque curve



Frame size 80 - 180

Typical speed/torque curve



Frame size 200 - 355

Description

I_A	Starting current
I_N	Full load current
M_A	Starting torque or locked rotor torque
M_S	Pull up torque or run up torque
M_K	Pull out torque or breakdown torque
M_N	Full load torque

Torque/speed curves for specific motors can be supplied on request.
Performance figures are subject to IEC tolerance.
Performance figures are based on a 400 volt winding.
To calculate I_N on special voltages, multiply the I_N at 400 volts by the following factors:

Voltage	220	346	365	420	440	500	550
Factor	1.82	1.16	1.1	0.95	0.91	0.80	0.73

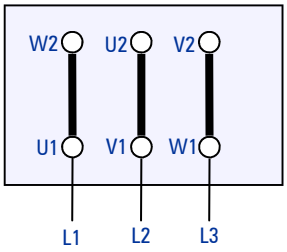
Notes

During the run up period in Star, there must be an adequate excess of motor torque over the load torque. The change to delta must not occur until the motor is near the operating speed.

Motors are wound for either 230/400 volts or 400/690 volts.

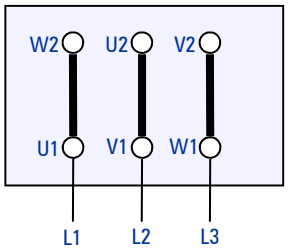
Connection diagrams

Star Delta



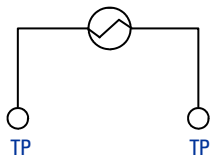
D.O.L. Δ

Dual Voltage

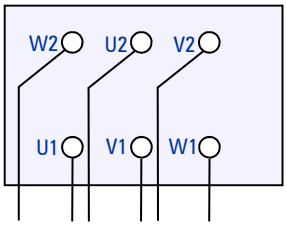


Δ

Thermistors

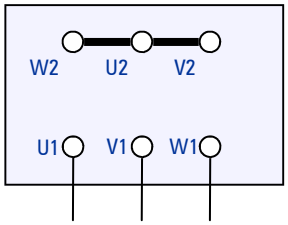


Connect to thermistor control unit.



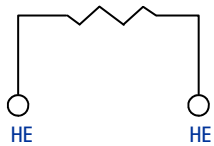
Y/Δ

Motors output power => 4kW



Y

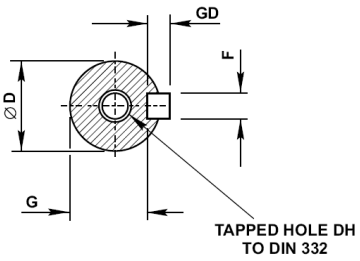
Heaters



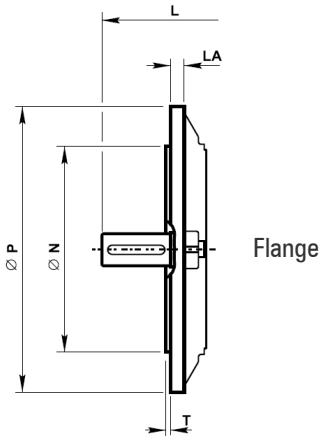
Connect to single phase voltage.

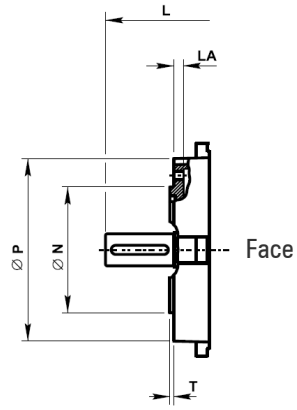
Dimensions

Shaft		
	British and European	
Dim D	Tol	Limits
19 to 28	j6	+0,009 - 0,004
32 to 48	k6	+0,018 - 0,002
55 to 80	m6	+0.030 +0.011
85 to 110	m6	+0.035 +0.013



Flange	Face		
		Tolerance to IEC 60072-1	
Dim N	Dim N	Tol	Limits
	80	j6	+0.012 -0.007
	95 to 110	j6	+0.013 - 0.009
130 to 180	130 to 180	j6	+0.014 - 0.011
230 to 250		h6	+0.016 - 0.013
300		h6	+0.000 -0.032
350		h6	+0.000 -0.036
450		h6	+0.000 -0.040
550		h6	+0.000 -0.044
680		h6	+0.000 -0.050





Notes

All dimensions in millimetres

Drain holes are standard on frames 160-355 and on request for frames 80-132

Please note that 80 frame motors are available as terminal box right or left.

Cable entry can be arranged in any one of four positions at 90° intervals

No eyebolts on frame sizes 80 (all poles) and 90 (6p and 8p)

Dimensions should not be used for installation purposes unless specially endorsed

Notes

B5 mounted motors have suffix '-D' in the frame reference, eg WU-DF132MVX-D and B3/B5 mounted motors have suffix '-H' in the frame reference, eg WU-DF132MVX-H

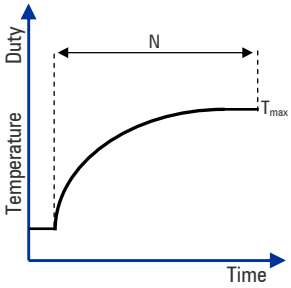
B14 mounted motors have suffix 'C' in the frame reference, eg WU-DF132MVX-C and B3/B14 mounted motors have suffix '-H' in the frame reference, eg WU-DF132MVX-H

Pad mounted motors have suffix '-P' in the frame reference, eg WU-DF132MVX-P

Useful information

Motor Duty Types

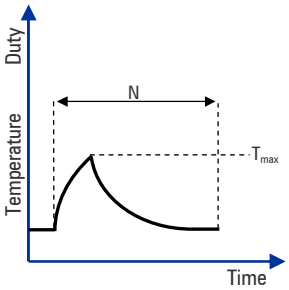
IEC 60034-1 defines various duty types that describe how the load and motor output varies with time. The motor must undergo a load test without exceeding the temperature limits laid down in the specification.



N - Operation Rated Condition
T_{max} - Maximum Temperature Rise

S1 continuous duty

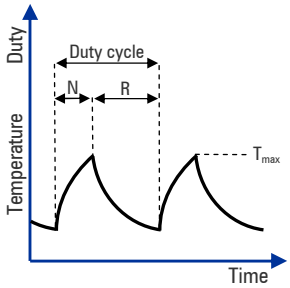
Operation at a constant load and long enough for thermal equilibrium to be reached.



N - Operation Rated Condition
T_{max} - Maximum Temperature Rise

S2 short time duty

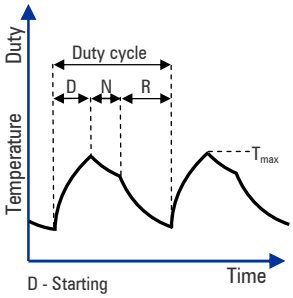
Operation at constant load for a given time that is shorter than the time needed to reach thermal equilibrium, followed by a rest and de-energised period. The de-energisation period should be long enough to allow the motor to reach a temperature that does not deviate from the temperature of the cooling medium by 2K.



N - Operation Rated Condition
R - At rest / De-energised
T_{max} - Maximum Temperature Rise

S3 intermittent duty

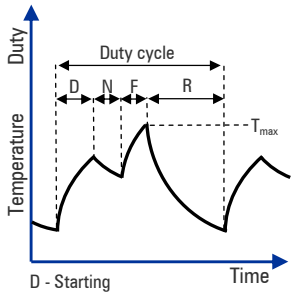
A sequence of identical duty cycles, where each cycle is in two parts, one at constant load and the other at rest and de-energised. In this type of duty the starting current has no significant effect on the temperature rise. The duty cycle is too short for thermal equilibrium to be reached.



D - Starting
N - Operation Rated Condition
R - At rest / De-energised
T_{max} - Maximum Temperature Rise

S4 intermittent duty with starting

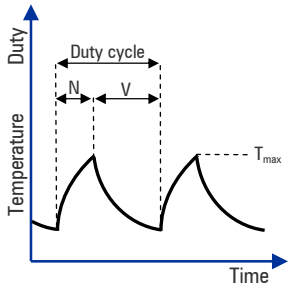
A sequence of individual duty cycles, where each cycle consists of a start that is sufficiently long to have a significant effect on the motor temperature, a period of constant load and a period at rest and de-energised. In this type of duty the starting current is insignificant on the temperature rise. The duty cycles are too short for thermal equilibrium to be reached.



D - Starting
N - Operation Rated Condition
F - Electrical Braking
R - At rest / De-energised
T_{max} - Maximum Temperature Rise

S5 intermittent duty with electrical braking

A sequence of identical duty cycles, where each cycle consists of a start, a period at constant load followed by rapid electrical braking, and a rest and de-energised period. The duty cycle is too short for thermal equilibrium to be reached.



N - Operation Rated Condition
V - Operation at No Load
T_{max} - Maximum Temperature Rise

S6 continuous operation periodic duty

A sequence of identical duty cycles, where each cycle is in two parts, one at constant load and the other at no load, no rest and no de-energised period. The duty cycles are too short for thermal equilibrium conditions to be reached.

IP Rating

1st Digit	Protection from solid objects	2nd Digit	Protection from moisture
0	No special protection	0	No special protection
1	Protection from a large part of the body such as a hand, from solid objects greater than 50mm in diameter.	1	Protection from dripping water.
2	Protection against fingers or other object not greater than 80mm in length and 12m in diameter.	2	Protection from vertically dripping water.
3	Protection from entry by tools, wires, etc., with a diameter of thickness greater than 2.5mm.	3	Protection from water sprayed at an angle up to 60° from the vertical .
4	Protection from entry by solid objects with a diameter or thickness greater than 1.0mm	4	Protection from water splashed from any direction.
5	Protection from the amount of dust that would interfere with the operation of the equipment.	5	Protection from water projected from a nozzle from any direction.
6	Dust tight.	6	Protection against heavy seas, or water from temporary flooding.
		7	Protection against immersion.
		8	Protection against complete, continuous submersion in water.

IEC/EN 60034-5 and EN 60529 outlines an international classification system for the sealing effectiveness of enclosures of electrical equipment against the intrusion into the equipment of foreign bodies (i.e. tools, dust, fingers) and moisture. This classification system utilizes the letters "IP" ("Ingress Protection") followed by two or three digits. (A third digit is sometimes used. An "x" is used for one of the digits if there is only one class of protection; i.e. IPX4 which addresses moisture resistance only.)

Degrees of Protection - First Digit

The first digit of the IP code indicates the degree that persons are protected against contact with moving parts (other than smooth rotating shafts, etc.) and the degree that equipment is protected against solid foreign bodies intruding into an enclosure.

Degrees of Protection - Second Digit

The second digit indicates the degree of protection of the equipment inside the enclosure against the harmful entry of various forms of moisture (e.g. dripping, spraying, submersion, etc.)

Notes

Worldwide sales and service network

AUSTRIA
ATB Motorenwerke GmbH
G.-Bauknecht-Str. 1
8724 Spielberg
T: +43 3577 757-323
F: +43 3577 757-182
info@atb-motors.com
ATB Technologies GmbH
Millenium Park 11
6890 Lustenau
T: +43 5577 9010-0
F: +43 5577 9010-110
info@atb-motors.com

ASIA
ATB Motorentechnik GmbH
141 Market Street,
07-01 International Factors
Building
Singapore 048944
T: +65 63721174
F: +65 62253524
dennis.tan@atbs.com.sg

BAHREIN
ATB Austria Antriebstechnik Aktiengesellschaft,
Rep. Office Bahrain
AlmoayyedTower
21st Floor c/o Regus
Seef District, Manama
Kingdom of Bahrain
T: +973 175 68 160
F: +973 175 67 901

BENELUX
ATB BeNeLux B.V.
Tasveld 14
8271 RW IJsselmuiden
T: +31 38 443 2110
F: +31 38 443 2111
verkoop@nl.atb-motors.com

GERMANY
ATB Antriebstechnik GmbH
Silcherstraße 74
73642 Welzheim
T: +49 7182 14-535
F: +49 7182 14 590
info@de.atb-motors.com

ATB Motorentechnik GmbH
Helgoländer Damm 75
26954 Nordenham
T: +49 4731 365-0
F: +49 4731 365-159
nordenham@de.atb-motors.com

Schorch Elektrische Maschinen
und Antriebe GmbH
Breite Straße 131
41238 Mönchengladbach
T: +49 2166 925-0
T: +49 2166 925-100
mail@schorch.de

POLAND
Fabryka Silnikow Elektrycznych Tamel S.A. ul.
Elektryczna 6
33 100 Tarnow
T: +48 14 632 11 00
F: +48 14 632 11 02
Office.tamel@tamel.pl

RUSSIA
ATB Rus OOO
Petrovka ul. 27
107031 Moscow
T: +7 495 95 66 326
vyacheslav.mikheyev@a-tecindustries.com

SERBIA
ATB Sever a.d.
Magnetna polja 6
24000 Subotica
T: +381 24 548 111
sever@rs.atb-motors.com
ATB FOD d.o.o.
Dorda Vajferta 16
19210 Bor
T: +381 30 423 147
fod@fod.co.rs

SWITZERLAND
ATB Schweiz AG
Industriestraße 28
5600 Lenzburg
T: +41 62 885 70-10
info@ch.atb-motors.com

UK & IRELAND
ATB Laurence Scott Ltd.
PO Box 25 Hardy Road, Norwich NR1 1JD
Norfolk
T: +44 1603 628 333
hvm.sales@laurence-scott.com

ATB Morley Limited
Bradford Road
Leeds LS28 6QA
West Yorkshire
T: +44 113 257 1734
sales@uk.atb-motors.com

Brook Crompton UK
St. Thomas Road, Huddersfield HD1 3LJ
West Yorkshire
T: +44 1484557200
F: +44 1484557201
csc@brookcrompton.com

CANADA
Brook Crompton
North America
264 Attwell Drive
M9W 5B2 Toronto, Ontario
T: +1 416 675-3844
ramzi.mallouk@
brookcromptonna.com

BROOK CROMPTON