

# FLS

## totally enclosed three-phase asynchronous motors

### General information



Efficiency class IE1

**Totally enclosed three-phase asynchronous motors**, cast iron casing FLS series, according to IEC 60034, 60038, 60072, power 0.18 to 750 kW, frame size 80 to 450 mm.

- Single speed 2, 4, 6 and 8 poles: 230/400 V or 400 V  $\Delta$ , 50 Hz.
- Two speed: 2/4, 4/6, 4/8 and 6/8 poles ; centrifugal or general use; PAM, Dahlander or separate windings; 400V Y or  $\Delta$ , 50Hz

#### Protection

IP 55 standard version providing a good sealing against projected liquid and dust in an industrial environment.

The selection tables for motors in this catalogue allow for:

- Direct on line starting on the mains supplies 230 V or 400 V operating in:
  - delta connection ( $\Delta$ ) at 230 V,
  - star connection (Y) at 400 V.
- Star/delta starting (Y/ $\Delta$ ) on mains supply 400 V with:
  - star connection (Y) during initial starting,
  - delta connection ( $\Delta$ ) in 400 V duty.

#### Finish

Assembling with protected screws against atmospheric corrosion.

RAL 6000 finishing paint (green).

Protection of the flange and shaft end against atmospheric corrosion.

#### Mains supply

- Standard according to IEC 60038:
    - 230/400 V +10% -10% at 50 Hz.
- Standard construction suitable for the following power supplies:

- 220/380 V +5% -5% at 50 Hz,
- 230/400 V +10% -10% at 50 Hz,
- 240/415 V +5% -5% at 50 Hz,
- 265/460 V +5% -5% at 60 Hz.

Voltages for the powers equal or greater than 3 kW:

- 380 V  $\Delta$  +5% -5% at 50 Hz,
- 400 V  $\Delta$  +10% -10% at 50 Hz,
- 415 V  $\Delta$  +5% -5% at 50 Hz,
- 460 V  $\Delta$  +5% -5% at 60 Hz.

Construction suitable for Y/ $\Delta$  starting.

### Description of the FLS cast iron three-phase motors

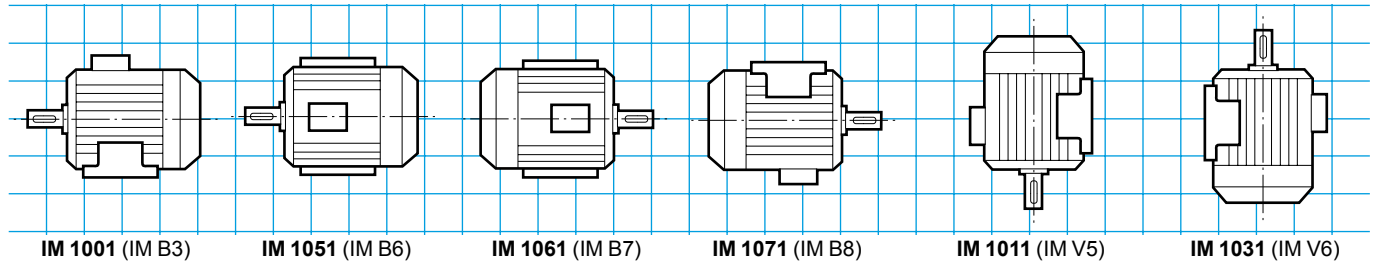
Component	Materials	Remarks
Finned housing	Cast iron	<ul style="list-style-type: none"> <li>- lifting rings for frame size <math>\geq 90</math></li> <li>- optional earth terminal</li> <li>- stainless steel nameplate with indelible marking for corrobloc finish</li> <li>- stainless steel fixing screws for corrobloc finish</li> </ul>
Stator	Insulated low carbon magnetic steel laminations Insulated electroplated copper	<ul style="list-style-type: none"> <li>- the low carbon content guarantees the stability of the characteristics</li> <li>- assembled lamination pack</li> <li>- semi-enclosed slots</li> <li>- insulation system class F</li> <li>- dielectric and anti-corrosion protection of the stator (coil end turns) for corrobloc finish</li> </ul>
Rotor	Insulated low carbon magnetic steel laminations Aluminium	<ul style="list-style-type: none"> <li>- inclined slots</li> <li>- squirrel cage pressure die cast in aluminium (or alloy for special applications) or mixed in copper, or keyed for mixed rotors</li> <li>- mounted on the shaft by heat shrinking</li> <li>- dynamically balanced rotor class A - 1/2 key</li> <li>- dielectric and anti-corrosion protection of the stator for corrobloc finish</li> </ul>
Shaft	Steel	<ul style="list-style-type: none"> <li>- for frame size <math>\leq 132</math>:                             <ul style="list-style-type: none"> <li>• shaft end fitted with screw and washer</li> <li>• closed keyway</li> </ul> </li> <li>- for frame size <math>\geq 160</math>:                             <ul style="list-style-type: none"> <li>• tapped hole</li> <li>• open keyway</li> </ul> </li> </ul>
End shields	Cast iron	<ul style="list-style-type: none"> <li>- stainless steel fixing screws for corrobloc finish</li> </ul>
Bearings and lubrication		<ul style="list-style-type: none"> <li>- ball bearings C3 or C4 play</li> <li>- type ZZ "greased for life" up to frame size 132</li> <li>- semi-protected or open type from frame size 160 upwards, regreasable</li> <li>- preloaded rear bearings up to 315 S, preloaded front bearings from 315 M upwards</li> </ul>
Labyrinth seals Lipseals	Plastic or steel Synthetic rubber	<ul style="list-style-type: none"> <li>- front labyrinth seals for foot mounted motors with frame size <math>\leq 132</math></li> <li>- front lipseal for flange and foot or flange mounted motors with frame sizes <math>\leq 132</math></li> <li>- front and rear lipseal for frame sizes from 160 to 225 MT inclusive</li> <li>- decompression grooves for 225 M to 355 LD</li> <li>- labyrinth seal at drive end and non drive end for frame sizes <math>\geq 355</math> LK</li> </ul>
Fan	Composite material up to and including size 280 Metal from 315 ST upwards	<ul style="list-style-type: none"> <li>- 2 directions of rotation: straight blades</li> </ul>
Fan cover	Pressed steel	<ul style="list-style-type: none"> <li>- on request, fitted with a drip cover for operation in vertical position, shaft facing down</li> <li>- stainless steel fixing screws for corrobloc finish</li> </ul>
Terminal box	Cast iron body for all frame sizes Sheet steel cover from size 80 to 132 ; cast iron cover for larger sizes	<ul style="list-style-type: none"> <li>- IP 55</li> <li>- fitted with a terminal block with 6 terminals up to 335 LD, 6 or 12 terminals thereafter</li> <li>- ISO plastic up to 132, terminal box fitted with cable gland</li> <li>- sizes 160 to 450, cable gland baseplate without drilled hole (optional horn and cable gland)</li> <li>- 1 earth terminal in each terminal box</li> <li>- stainless steel fixing screws for corrobloc finish</li> </ul>

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## totally enclosed three-phase asynchronous motors

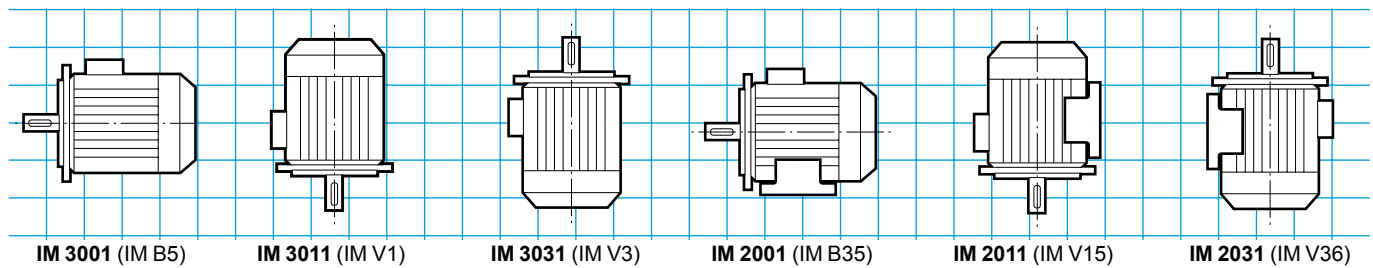
### Mounting positions

#### Foot mounted motors



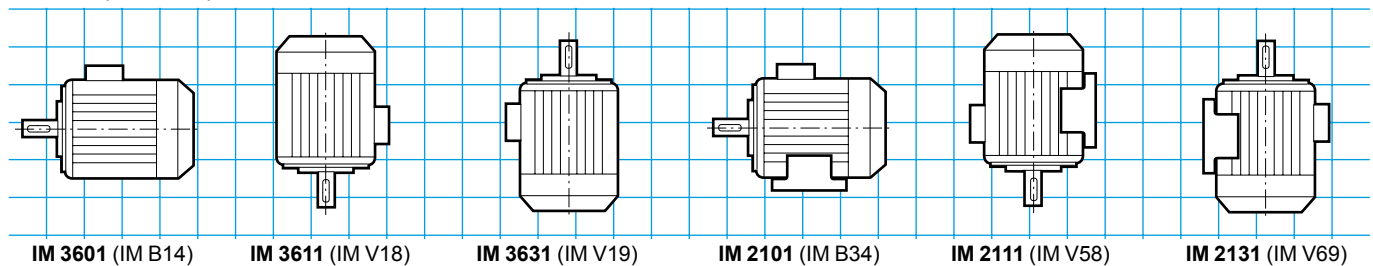
#### (FF) plain hole flange mounted motors

• Possible position IM 3001 (IM B5) up to 225 frame size inclusive

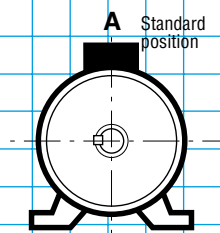


#### (FT) tapped hole flange mounted motors

• Possible positions up to 132 frame size inclusive

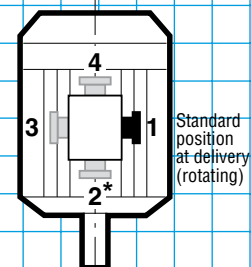


#### Terminal box position in relation to the motor shaft end



A: standard

#### Cable gland position in relation to the motor shaft end



1: standard

\* Position 2 not recommended and not feasible on standard plain hole flange motor (FF)

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### Adaptation possibilities

Leroy-Somer offers, for use with the FLS totally enclosed three-phase asynchronous motors, many options which meet the needs of highly diverse applications. They are described below and in the chapters relating to gearboxes and to speed variation.

For other variants or any specific adaptation, consult the technical specialists at Leroy-Somer.

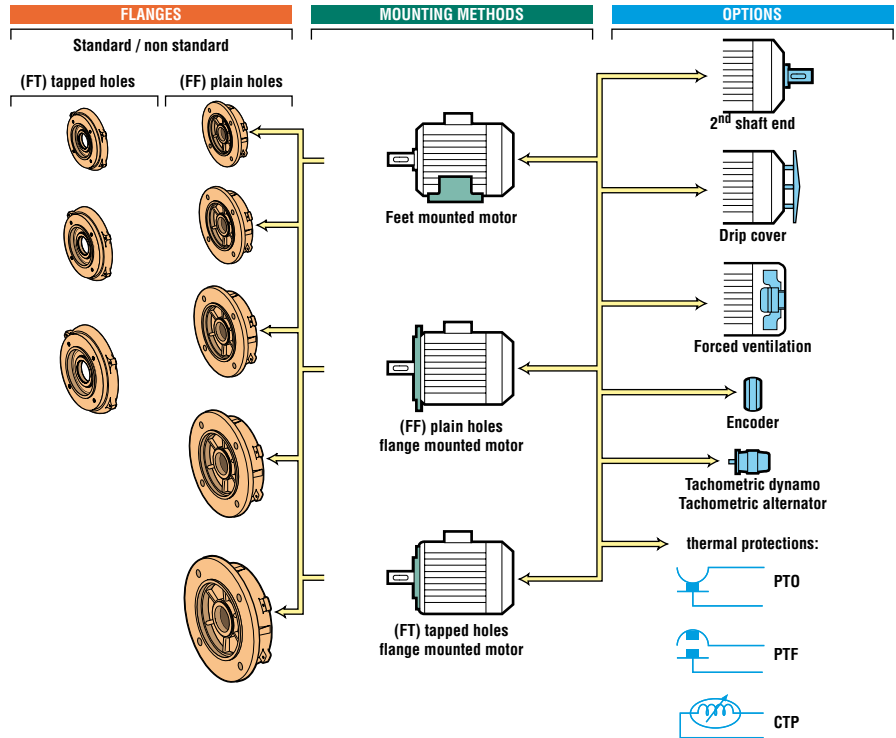
#### The FLS motors may be associated to:

- gearboxes
- electronic variable speed drive (1)

#### The options:

- drip cover
- anti-blocking cover
- forced ventilation
- thermal protection
- brass cable glands
- cable glands of different dimensions
- switch
- cables output
- second shaft end
- non standard flanges
- anti-condensation heaters
- aluminium fan

(1) Conforming to the regulations of use as indicated by the standard IEC 34-17.



### Designation / Codification

<b>4P</b> 1500 min <sup>-1</sup>	<b>FLS</b>	<b>315</b>	<b>M</b>	<b>132 kW</b>	<b>IM 1001</b> (IM B3)	<b>400 V Δ</b>	<b>50 Hz</b>	<b>IP 55</b>
Speed polarity	Motor type	IEC 60072-1 frame size	Housing designation and builder index	Rated power	IEC 60034-7 mounting position	Power supply voltage	Power supply frequency	IEC 60034-5 protection

#### Codification example:

FLS three-phase asynchronous motor 1500 min<sup>-1</sup>, 132 kW IM 1001 (IM B3), 400 V Δ

#### Designation

4P FLS 315 M 132 kW  
IM 1001 (IM B3) 400 V Δ

The table above is an example.

It enables the creation of the designation for the required product.

The designation corresponds to a product code.

The product codes that are present in the selection grids can be used directly.

They simplify the ordering process.

The codification table is incorporated in the price list with the designations list.

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### Selection

**2**  
poles  
3000 min<sup>-1</sup>

IP 55 - 50 Hz - Class F - 230 V  $\Delta$  / 400 V Y and 400 V  $\Delta$  - S1 - Class IE1

IE1

Type	Rated power	Rated speed	Rated torque	Rated current	Power factor			Efficiency* IEC 60034-2-1; 2007			Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Moment of inertia	Weight	Noise
	P <sub>N</sub>	N <sub>N</sub>	M <sub>N</sub>	I <sub>N(400V)</sub>	Cos Phi			η			I <sub>d</sub> / I <sub>n</sub>	M <sub>d</sub> /M <sub>n</sub>	M <sub>m</sub> /M <sub>n</sub>	J	IM B3	LP
	kW	min <sup>-1</sup>	N.m	A	4/4	3/4	2/4	4/4	3/4	2/4				kg.m2	kg	db(A)
FLS 80 L	0.75	2840	2.5	1.6	0.86	0.84	0.76	75.7	76.1	73.3	5.9	2.4	2.2	0.0007	15	61
FLS 80 L	1.1	2837	3.7	2.4	0.84	0.77	0.65	77.3	78.3	76.4	5.6	2.7	2.4	0.0009	16	61
FLS 90 S	1.5	2870	5.0	3.3	0.81	0.75	0.64	80.0	79.5	75.9	7.3	3.0	3.1	0.0014	22	64
FLS 90 L	2.2	2862	7.3	4.3	0.88	0.82	0.71	82.0	83.0	81.9	8.1	3.8	3.6	0.0019	25	64
FLS 100 L	3	2925	9.8	5.5	0.91	0.89	0.85	82.5	82.6	80.1	8.4	2.5	3.1	0.0022	30	66
FLS 112 M	4	2940	13.0	7.5	0.89	0.87	0.81	83.9	83.5	81.4	8.7	3.0	3.5	0.0065	40	69
FLS 132 S	5.5	2940	17.9	10.6	0.86	0.84	0.79	85.9	86.6	85.4	7.6	2.4	3.0	0.0117	61	72
FLS 132 S	7.5	2950	24.3	14.1	0.87	0.85	0.81	86.8	87.6	86.7	8.9	2.7	3.5	0.0142	66	72
FLS 160 MA	11	2948	35.8	20	0.90	0.88	0.82	88.0	87.2	85.3	8.4	2.8	2.4	0.037	97	74
FLS 160 MB	15	2940	48.8	27	0.90	0.88	0.82	89.0	89.3	87.1	8.1	2.8	2.3	0.043	108	74
FLS 160 L	18.5	2939	60.1	33	0.90	0.88	0.82	89.8	90.7	89.1	7.7	2.6	2.2	0.057	126	74
FLS 180 MR	22	2941	71.5	40	0.87	0.87	0.80	89.9	89.9	88.2	8.6	3.5	2.6	0.065	135	75
FLS 200 LA	30	2950	97.1	52	0.90	0.91	0.89	90.7	90.4	88.8	7.7	2.5	2.0	0.13	245	75
FLS 200 LB	37	2954	119	63.3	0.90	0.89	0.84	92.4	92.5	91.5	8.0	2.9	2.3	0.16	265	75
FLS 225 MT	45	2950	145	77.1	0.90	0.89	0.85	92.8	93.1	92.3	7.8	2.7	2.2	0.19	290	76
FLS 250 M	55	2966	177	95	0.89	0.87	0.81	93.1	93.1	92.3	7.9	2.5	2.3	0.44	405	77
FLS 280 S	75	2961	245	127.5	0.90	0.89	0.81	93.4	93.5	92.9	8.3	2.6	3.0	0.47	505	77
FLS 280 M	90	2961	290	147.3	0.92	0.91	0.88	93.9	94.2	94.1	7.7	2.6	2.4	0.53	560	77
FLS 315 ST	110	2974	353	178.5	0.93	0.91	0.86	94.2	93.5	94.0	8.7	2.8	3.0	1.08	850	77
FLS 315 M	132	2962	426	221	0.90	0.89	0.87	94.2	94.6	94.2	6.9	1.8	2.1	1.71	1000	84
FLS 315 LA	160	2969	515	272	0.89	0.87	0.85	94.1	94.2	93.3	7.4	2.0	2.3	1.71	1050	84
FLS 315 LB	200	2967	644	342	0.88	0.86	0.80	94.0	94.2	93.5	7.9	2.3	2.2	1.99	1150	84
FLS 355 LA	250	2978	802	421	0.89	0.87	0.85	94.9	94.7	94.0	7.3	2.1	2.3	3.39	1400	84
FLS 355 LB	275	2980	881	466	0.89	0.90	0.86	94.9	94.7	92.3	8.3	2.3	2.9	3.39	1500	84
FLS 355 LB*	315	2976	1011	529	0.90	0.89	0.89	94.9	94.8	94.5	7.1	1.8	2.1	3.39	1500	84
FLS 355 LC	330	2980	1058	562	0.88	0.86	0.81	94.9	94.7	94.4	7.9	1.9	2.6	3.39	1915	84
FLS 355 LC	355	2979	1138	593	0.90	0.88	0.83	94.9	94.8	93.8	8.4	2.3	2.4	4.03	1915	84
FLS 355 LD*	400	2977	1283	669	0.89	0.87	0.82	95.0	95.3	94.6	7.3	2.0	2.1	4.03	1915	84

\* This standard replaces the IEC 60034-2; 1996

• Temperature rise class F

Powers higher than 400 kW, consult us.

# FLS

## totally enclosed three-phase asynchronous motors

### Selection

**4**  
poles  
1500 min<sup>-1</sup>

IP 55 - 50 Hz - Class F - 230 V Δ / 400 V Y and 400 V Δ - S1 - Class IE1

IE1

Type	Rated power	Rated speed	Rated torque	Rated current	Power factor			Efficiency* IEC 60034-2-1; 2007			Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Moment of inertia	Weight	Noise
	P <sub>N</sub>	N <sub>N</sub>	M <sub>N</sub>	I <sub>N(400V)</sub>	Cos Phi			η			Id / In	Md/Mn	M <sub>M</sub> /Mn	J	IM B3	LP
	kW	min <sup>-1</sup>	N.m	A	4/4	3/4	2/4	4/4	3/4	2/4				kg.m2	kg	db(A)
FLS 80 L	0.55	1410	3.7	1.6	0.74	0.69	0.56	-	-	-	4.4	2.1	2.3	0.0013	15	44
FLS 80 L	0.75	1425	5.0	2	0.75	0.70	0.58	73.4	72.7	68.3	5.7	3.0	2.8	0.0016	16	44
FLS 90 S	1.1	1429	7.4	2.5	0.83	0.77	0.68	77.3	78.8	77.2	4.9	1.6	2.0	0.0026	21	50
FLS 90 L	1.5	1428	10.0	3.3	0.82	0.74	0.62	79.3	79.9	77.5	5.3	1.8	2.3	0.0032	22	50
FLS 90 L	1.8	1438	12.0	4	0.82	0.75	0.63	79.8	80.3	77.8	5.9	2.2	3.3	0.0037	24	50
FLS 100 L	2.2	1457	14.4	4.6	0.83	0.78	0.67	80.3	81.2	79.3	6.3	2.0	2.5	0.0043	30	52
FLS 100 L	3	1454	19.7	6.2	0.82	0.76	0.64	82.8	83.4	81.8	6.5	2.1	2.6	0.0055	33	52
FLS 112 M	4	1462	26.1	8.4	0.81	0.74	0.62	84.8	84.9	83.0	7.4	2.6	3.1	0.012	45	52
FLS 132 S	5.5	1467	35.8	10.9	0.84	0.78	0.66	86.4	86.6	85.1	8.0	2.8	3.8	0.0196	66	59
FLS 132 M	7.5	1450	49.4	14.3	0.87	0.82	0.75	86.0	87.0	86.3	7.3	1.9	2.9	0.023	71	59
FLS 132 M	9	1449	59.3	16.8	0.88	0.80	0.72	87.2	88.2	87.8	7.6	2.9	3.0	0.025	74	59
FLS 160 M	11	1464	72.2	21.4	0.83	0.79	0.68	88.4	88.5	87.2	7.8	2.6	3.3	0.06	103	65
FLS 160 L	15	1467	98.4	29.6	0.82	0.75	0.64	89.1	88.9	87.3	7.9	2.6	3.2	0.079	120	65
FLS 180 MR	18.5	1461	121	35.5	0.83	0.78	0.67	90.2	90.5	89.6	8.8	3.3	2.7	0.095	135	64
FLS 180 L	22	1466	143	41	0.86	0.82	0.72	91.0	91.3	90.5	7.0	3.0	3.0	0.137	184	64
FLS 200 L	30	1471	195	55	0.85	0.80	0.70	90.8	90.8	89.5	6.5	2.8	2.3	0.24	260	66
FLS 225 ST	37	1476	239	69.5	0.82	0.76	0.64	92.6	93.1	92.6	7.1	3.2	3.3	0.28	290	66
FLS 225 M	45	1483	290	78.6	0.87	0.83	0.74	93	93.6	92.9	7.0	2.6	2.9	0.7	388	68
FLS 250 M	55	1479	355	102	0.82	0.80	0.71	93.4	93.8	93.3	6.6	2.4	2.0	0.7	395	68
FLS 280 S	75	1483	483	142	0.82	0.79	0.66	92.7	92.9	92.3	7.7	3.0	3.0	0.815	475	68
FLS 280 M	90	1478	581	164	0.85	0.81	0.72	93.4	93.6	93	7.4	2.9	2.5	1.015	565	68
FLS 315 ST	110	1482	709	205	0.83	0.79	0.71	93.3	93.5	92.9	7.3	2.9	2.7	1.83	850	70
FLS 315 M	132	1489	847	250	0.81	0.75	0.65	94	94.3	93.6	8.5	3.2	2.7	2.91	1000	73
FLS 315 LA	160	1489	1026	301	0.81	0.76	0.64	94.8	94	94	8.3	2.5	3.2	3.4	1050	73
FLS 315 LB*	200	1486	1285	380	0.80	0.74	0.66	95	94.9	93.9	8.2	2.3	3.5	3.4	1150	73
FLS 355 LA*	250	1490	1602	436	0.88	0.85	0.78	94	94	93.2	8.2	1.9	3.2	6.2	1510	80
FLS 355 LB*	300	1490	1923	519	0.88	0.87	0.81	94.8	94.9	93.7	7.4	1.8	2.9	6.2	1550	80
FLS 355 LC	315	1491	2017	593	0.81	0.75	0.63	94.6	94.5	93.3	9.7	2.2	3.7	6.5	1800	80
FLS 355 LC*	355	1491	2274	662	0.82	0.76	0.65	94.4	93.5	93.2	8.9	2.0	3.3	6.5	1800	80
FLS 355 LD*	400	1491	2562	706	0.86	0.84	0.77	95.1	95.2	94.5	7.0	2.1	2.3	7.4	1930	80
FLS 400 LB	400	1491	2562	691	0.87	0.85	0.78	95.7	95.4	94.5	8.0	2.0	2.6	11.7	2350	82
FLS 355 LKB	450	1489	2886	769	0.88	0.86	0.81	95.1	94.9	94.0	6.8	1.7	2.3	11.7	2320	82
FLS 400 LB	450	1489	2886	769	0.88	0.86	0.81	95.1	94.9	94.0	6.8	1.7	2.3	11.7	2350	87
FLS 355 LKB	500	1489	3207	870	0.87	0.85	0.79	94.8	94.5	93.3	6.4	1.8	2.1	11.7	2320	82
FLS 400 LVB	500	1489	3207	870	0.87	0.85	0.79	94.8	94.5	93.3	6.4	1.8	2.1	11.7	2350	87
FLS 450 LA	500	1493	3198	853	0.88	0.88	0.77	95.3	94.4	93.6	7.3	1.7	2.6	21	3100	82
FLS 450 LVA	550	1492	3520	961	0.88	0.88	0.82	95.5	95.4	94.4	6.5	1.6	2.3	21	3100	85
FLS 450 LB	630	1491	4035	1089	0.87	0.85	0.78	95.5	95.3	94.3	7.4	1.7	2.4	24	3450	82
FLS 450 LVB	675	1491	4323	1161	0.87	0.85	0.78	95.6	95.3	94.3	6.9	1.6	2.2	24	3450	85

\* This standard replaces the IEC 60034-2; 1996

● Temperature rise class F

# FLS

## totally enclosed three-phase asynchronous motors

### Selection

**6**  
poles  
1000 min<sup>-1</sup>

IP 55 - 50 Hz - Class F - ΔT 80 K - 230 V Δ / 400 V Y or 400 V Δ - S1 - Class IE1

IE1

Type	Rated power	Rated speed	Rated torque	Rated current	Power factor			Efficiency* IEC 60034-2-1; 2007			Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Moment of inertia	Weight	Noise
	P <sub>N</sub>	N <sub>N</sub>	M <sub>N</sub>	I <sub>N(400V)</sub>	Cos Phi			η			Id / In	Md/Mn	M <sub>M</sub> /Mn	J	IM B3	LP
	kW	min <sup>-1</sup>	N.m	A	4/4	3/4	2/4	4/4	3/4	2/4				kg.m2	kg	db(A)
FLS 80 L	0.25	950	2.5	0.8	0.74	0.68	0.55	60.3	58.2	54.0	3.6	2.0	1.9	0.0022	14	40
FLS 80 L	0.37	940	3.8	1.2	0.74	0.68	0.55	61.0	59.9	55.2	3.8	1.9	2.1	0.0028	16	40
FLS 80 L	0.55	955	5.5	1.8	0.67	0.59	0.46	65.1	64.0	59.0	4.4	2.5	2.6	0.0036	17.5	40
FLS 90 S	0.75	940	7.6	2.1	0.80	0.75	0.65	70.5	69.3	63.5	3.5	2.0	2.2	0.0031	22	45
FLS 90 L**	1.1	940	11.2	2.7	0.81	0.76	0.66	70.7	71.0	66.7	4.8	1.8	2.2	0.0037	23	45
FLS 100 L	1.5	955	15.0	3.5	0.78	0.72	0.61	75.7	76.4	75.2	6.3	2.2	2.8	0.0056	30	48
FLS 112 M	2.2	960	21.9	5.2	0.77	0.71	0.59	77.7	78.2	76.3	5.5	2.3	2.4	0.012	44	48
FLS 132 S	3	953	30.1	6.9	0.76	0.74	0.63	79.7	81.0	79.7	5.3	2.2	2.4	0.0199	61	55
FLS 132 M	4	970	39.4	9	0.78	0.72	0.61	82.4	83.3	81.9	6.7	2.8	2.7	0.0275	72	55
FLS 132 MU	5.5	970	54.1	12.2	0.79	0.74	0.63	83.1	84.0	82.7	7.1	3.2	2.7	0.0343	78	55
FLS 160 M	7.5	968	74.0	16	0.79	0.72	0.59	84.7	84.7	84.7	4.3	1.5	2.3	0.085	100	56
FLS 160 L	11	966	109	23	0.80	0.74	0.63	86.4	86.1	84.4	5.0	1.5	2.3	0.12	128	56
FLS 180 L	15	975	147	30	0.81	0.78	0.69	87.7	88.0	86.9	6.8	2.1	3.1	0.2	170	63
FLS 200 LA	18.5	975	181	36	0.83	0.77	0.68	88.9	89.0	88.2	7.0	2.2	2.4	0.29	240	65
FLS 200 LB	22	973	216	44	0.81	0.74	0.65	90.0	90.0	89.2	6.7	2.5	1.7	0.31	260	65
FLS 225 M	30	984	293	59	0.80	0.74	0.62	91.3	91.5	90.8	7.2	2.5	2.6	0.94	392	66
FLS 250 M	37	983	362	73	0.79	0.74	0.62	91.5	92.0	91.2	7.0	2.4	2.5	0.94	394	66
FLS 280 S	45	979	439	87	0.81	0.76	0.67	91.7	92.3	92.0	6.2	2.3	2.1	1.13	455	66
FLS 280 M	55	983	534	106	0.81	0.75	0.64	92.5	92.9	92.5	7.3	2.5	2.6	1.26	532	66
FLS 315 ST	75	987	726	136	0.86	0.85	0.79	92.6	93.1	93.0	6.3	2.4	2.3	1.8	850	76
FLS 315 M**	90	987	871	165	0.85	0.80	0.73	92.4	93.1	93.2	6.6	1.8	2.7	2.6	1000	76
FLS 315 LA	110	983	1069	200	0.85	0.83	0.73	93.3	93.9	93.5	5.9	1.6	2.5	2.6	1050	76
FLS 315 LB	132	988	1276	244	0.83	0.77	0.67	93.9	94.2	94.0	7.3	2.0	3.4	3.5	1125	76
FLS 315 LB	150	992	1444	295	0.78	0.73	0.60	94.0	94.1	93.4	7.8	1.8	3.0	3.5	1125	76
FLS 355 LA	185	987	1790	349	0.81	0.77	0.65	94.4	94.7	94.6	7.2	2.0	3.6	5.4	1415	78
FLS 355 LB	220	988	2126	417	0.81	0.76	0.66	94.0	94.2	93.6	7.2	2.0	2.6	6.3	1535	78
FLS 355 LD	250	993	2404	466	0.82	0.79	0.72	94.5	94.9	94.7	7.2	1.8	2.3	8.6	1935	78
FLS 355 LD	300	992	2888	559	0.82	0.79	0.71	94.5	94.9	94.5	6.1	1.6	2.1	8.6	1935	78
FLS 355 LKB	350	993	3366	634	0.84	0.81	0.74	94.8	94.9	94.4	6.5	1.9	2.2	17	2350	78
FLS 400 LB	350	993	3366	634	0.84	0.81	0.74	94.8	94.9	94.4	6.5	1.9	2.2	17	2350	78
FLS 450 LA	400	996	3835	753	0.81	0.76	0.66	94.6	94.4	93.4	7.9	2.0	2.8	33	3230	80
FLS 400 LKB	500	996	4794	952	0.79	0.74	0.63	95.1	94.6	93.3	8.0	2.1	2.5	35	3350	80
FLS 450 LB	500	996	4794	952	0.79	0.74	0.63	95.1	94.6	93.3	8.0	2.1	2.5	35	3400	80
FLS 450 LB	550	994	5284	1034	0.80	0.74	0.63	95.1	94.6	93.3	7.4	1.9	2.3	35	3400	80

\* This standard replaces the IEC 60034-2; 1996

\*\* These motors do not reach the level of efficiency IE1  
Powers higher than 550 kW, consult us.

# FLS

## totally enclosed three-phase asynchronous motors

### Selection

IP 55 - 50 Hz - Class F -  $\Delta$ T 80 K - 230 V  $\Delta$  / 400 V Y or 400 V  $\Delta$  - S1



Type	Rated power	Rated speed	Rated torque	Rated current	Power factor			Efficiency* IEC 60034-2-1; 2007			Starting current/ Rated current	Starting torque/ Rated torque	Maximum torque/ Rated torque	Moment of inertia	Weight	Noise
	P <sub>N</sub> kW	N <sub>N</sub> min <sup>-1</sup>	M <sub>N</sub> N.m	I <sub>N(400V)</sub> A	Cos Phi			η			Id / In	Md/Mn	M <sub>M</sub> /Mn	J kg.m <sup>2</sup>	IM B3 kg	LP db(A)
					4/4	3/4	2/4	4/4	3/4	2/4						
FLS 80 L	0.18	710	2.42	0.8	0.64	0.58	0.46	50.3	49.0	43.0	3.0	1.7	1.7	0.0028	15.5	40
FLS 80 L	0.25	720	3.32	1.1	0.6	0.55	0.44	52.5	52.0	44.0	3.2	2.0	2.4	0.0036	17	40
FLS 90 S	0.37	685	5.16	1.2	0.71	0.57	0.45	62.0	61.0	57.0	3.5	1.6	1.6	0.00314	22	45
FLS 90 L	0.55	695	7.56	1.7	0.72	0.59	0.46	61.0	56.0	52.0	3.3	1.8	1.8	0.0037	23	45
FLS 100 LK	0.75	720	9.95	2.3	0.68	0.60	0.47	68.9	68.0	64.0	4.1	1.9	1.9	0.0085	41	48
FLS 100 LK	1.1	720	14.6	3.8	0.62	0.56	0.44	66.0	64.0	58.0	4.1	1.8	2.4	0.0117	43	48
FLS 112 M	1.5	725	19.8	4.8	0.63	0.57	0.45	70.6	70.1	66.1	4.0	2.1	2.2	0.015	45	49
FLS 132 S	2.2	715	29.4	7.2	0.60	0.55	0.44	72.2	72.2	70.2	3.2	1.4	1.8	0.0253	71	54
FLS 132 M	3	705	40.6	9.1	0.63	0.57	0.46	74.3	74.3	71.3	3.1	1.3	1.9	0.0334	81	54
FLS 160 MA	4	710	53.8	11.3	0.63	0.56	0.44	79.8	80.3	78.4	3.8	1.4	1.7	0.062	105	56
FLS 160 MB	5.5	710	74	15	0.65	0.58	0.46	80.4	80.9	79.0	3.8	1.4	1.7	0.071	111	56
FLS 160 L	7.5	715	100	20	0.65	0.58	0.46	81.4	91.9	80.0	3.8	1.5	1.8	0.086	128	56
FLS 180 L	11	724	145	27	0.70	0.63	0.51	83.6	83.4	80.9	3.9	1.4	1.7	0.21	175	62
FLS 200 L	15	729	197	34	0.72	0.66	0.53	86.7	86.6	84.8	5.0	1.8	2.6	0.32	265	62
FLS 225 ST	18.5	727	243	41	0.73	0.67	0.54	87.6	87.5	85.7	5.0	1.6	2.3	0.38	285	65
FLS 225 M	22	732	287	48	0.72	0.68	0.58	90.8	91.3	90.4	5.9	1.8	2.5	0.83	388	65
FLS 250 M	30	729	393	61	0.78	0.74	0.64	89.9	90.4	89.5	6.2	1.8	2.5	0.83	393	65
FLS 280 S	37	723	489	75	0.78	0.74	0.64	90.8	90.9	89.8	4.5	1.3	1.8	1.4	472	65
FLS 280 M	45	730	589	102	0.70	0.66	0.55	90.5	90.6	89.5	6.0	2.3	3.2	1.75	563	65
FLS 315 ST	55	738	712	102	0.83	0.80	0.71	93.1	93.4	92.9	7.4	2.1	3.0	2.7	850	75
FLS 315 M	75	743	964	147	0.78	0.76	0.68	93.7	93.9	93.2	7.4	2.0	2.2	3.1	1000	78
FLS 315 LA	90	742	1158	177	0.78	0.76	0.68	93.7	93.9	93.2	6.7	1.9	2.1	4.2	1030	78
FLS 315 LB	110	742	1416	222	0.76	0.74	0.66	93.8	94.0	93.3	7.2	2.0	2.2	5.1	1125	78
FLS 355 LA	132	741	1701	258	0.78	0.75	0.68	94.4	94.3	93.3	6.7	2.0	2.2	5.5	1415	78
FLS 355 LB	160	741	2062	312	0.78	0.75	0.68	94.4	94.3	93.3	6.9	2.0	2.2	6	1535	78
FLS 355 LD	200	741	2577	364	0.84	0.81	0.74	94.1	94.0	93.0	6.7	1.6	1.7	6.5	1935	78
FLS 355 LKA	250	743	3213	464	0.82	0.77	0.67	94.4	94.2	93.3	6.8	1.6	2.2	18.5	2170	78
FLS 400 LA	250	743	3213	464	0.82	0.77	0.67	94.4	94.2	93.3	6.8	1.6	2.2	18.5	2200	78
FLS 355 LKB	300	741	3866	552	0.83	0.78	0.68	94.1	93.9	93.1	6.0	1.1	1.5	21.6	2370	78
FLS 400 LB	300	741	3866	552	0.83	0.78	0.68	94.1	93.9	93.1	6.0	1.1	1.5	21.6	2400	78
FLS 400 LKA	350	746	4480	652	0.81	0.78	0.69	95.3	95.0	94.1	6.2	1.7	1.4	40	3100	78
FLS 450 LA	350	746	4480	652	0.81	0.78	0.69	95.3	95.0	94.1	6.2	1.7	1.4	40	3150	78
FLS 400 LKB	400	746	5120	737	0.82	0.79	0.71	95.2	94.9	94.0	6.7	1.9	1.6	47	3420	78
FLS 450 LB	400	746	5120	737	0.82	0.79	0.71	95.2	94.9	94.0	6.7	1.9	1.6	47	3470	78

\* This standard replaces the IEC 60034-2; 1996  
Powers higher than 400 kW, consult us.

# FLS

## three-phase multispeed asynchronous motors

### Selection

General table of the multispeed motors  
Use: centrifugal machines  
IP 55 - 50 Hz - Class F -  $\Delta$ T 80 K - 400 V - S1

Type		2/4 poles	4/6 poles	4/8 poles	6/8 poles
		Dahlander	PAM <sup>1</sup> or 2 windings	Dahlander	PAM <sup>1</sup> or 2 windings
		Rated power at 50 Hz	Rated power at 50 Hz	Rated power at 50 Hz	Rated power at 50 Hz
		kW	kW	kW	kW
FLS 80 L	GV <sup>2</sup> / PV <sup>3</sup>	0.75 / 0.18	0.55 / 0.18	0.75 / 0.12	0.37 / 0.18
FLS 90 S	GV / PV	1.1 / 0.22	0.75 / 0.25	1.1 / 0.18	0.55 / 0.27
FLS 90 L	GV / PV	1.5 / 0.3	1.1 / 0.37	1.5 / 0.25	0.75 / 0.37
FLS 100 LK	GV / PV	2.2 / 0.37	1.5 / 0.55	2.2 / 0.37	1.1 / 0.55
FLS 100 LK	GV / PV	3 / 0.55	2.2 / 0.37	3 / 0.55	-
FLS 112 M	GV / PV	-	3 / 1.1	-	1.5 / 0.75
FLS 112 MR	GV / PV	4 / 0.75	4 / 1.5	4 / 0.75	2.2 / 1.1
FLS 132 M	GV / PV	5.1 / 1.1	5.5 / 1.8	5 / 1.1	3 / 1.5
FLS 132 M	GV / PV	7.5 / 1.5	-	7.5 / 1.5	-
FLS 160 MA	GV / PV	-	7.3 / 2.4	-	5 / 1.7
FLS 160 MB	GV / PV	11 / 2.7	-	10 / 2.5	-
FLS 160 L	GV / PV	15 / 3.7	10 / 3.3	14 / 3	7.3 / 2.4
FLS 180 MR	GV / PV	18.5 / 4.5	12.5 / 4	18.5 / 4.5	-
FLS 180 L	GV / PV	22 / 5.5	14.5 / 5	22 / 4.8	10 / 3.3
FLS 200 LA	GV / PV	-	20 / 6	-	12.5 / 4
FLS 200 LB	GV / PV	30 / 7.5	-	30 / 6.5	15 / 5
FLS 225 ST	GV / PV	-	25 / 8.2	-	-
FLS 225 MT	GV / PV	37 / 9	-	37 / 8	-
FLS 225 M	GV / PV	42 / 10.5	30 / 10	42 / 8.5	20 / 6.7
FLS 250 M	GV / PV	45 / 11	37 / 12.2	45 / 9	25 / 8.2
FLS 280 S	GV / PV	55 / 13.7	50 / 16.7	55 / 11	30 / 10
FLS 280 M	GV / PV	75 / 18.7	60 / 20	75 / 15	37 / 12.2
FLS 315 ST	GV / PV	90 / 27.5	72.5 / 25	90 / 18	50 / 16.7
FLS 315 M	GV / PV	-	88.5 / 29	-	60 / 20
FLS 315 LA	GV / PV	-	108 / 35	110 / 22	75.5 / 25
FLS 315 LB	GV / PV	-	132 / 45	-	100 / 39
FLS 355 LA	GV / PV	-	167 / 55	160 / 32	123 / 41
FLS 355 LB	GV / PV	-	200 / 66	200 / 40	147 / 49
FLS 355 LD	GV / PV	-	270 / 88	220 / 44	200 / 67
FLS 400 LA	GV / PV	-	300 / 100	300 / 60	230 / 78
FLS 400 LB	GV / PV	-	335 / 110	450 / 90	250 / 85
FLS 450 LA	GV / PV	-	370 / 120	500 / 100	300 / 100
FLS 450 LB	GV / PV	-	450 / 150	550 / 110	330 / 110

1. PAM up to 132  
2. GV: High speed  
3. PV: Low speed

The electrical characteristics specific to these motors are available on request.



# FLS

## three-phase multispeed asynchronous motors

### Selection

General table of the multispeed motors  
General use  
IP 55 - 50 Hz - Class F -  $\Delta$ T 80 K - 400 V - S1

Type		2/4 poles	4/6 poles	4/8 poles	6/8 poles
		Dahlander	2 windings	Dahlander	2 windings
		Rated power at 50 Hz kW	Rated power at 50 Hz kW	Rated power at 50 Hz kW	Rated power at 50 Hz kW
FLS 80 L	GV <sup>1</sup> / PV <sup>2</sup>	0.75 / 0.55	-	0.5 / 0.22	-
FLS 90 S	GV / PV	1.1 / 0.75	0.55 / 0.37	0.75 / 0.4	-
FLS 90 L	GV / PV	1.5 / 1.1	0.75 / 0.55	1.1 / 0.5	-
FLS 100 LK	GV / PV	2.2 / 1.5	1.1 / 0.75	1.5 / 0.75	-
FLS 100 LK	GV / PV	3 / 2.2	1.5 / 1.1	-	-
FLS 112 M	GV / PV	-	2.2 / 1.5	2.2 / 1.1	-
FLS 112 MR	GV / PV	4.5 / 3.7	2.8 / 1.8	3 / 1.5	-
FLS 132 M	GV / PV	6 / 4.5	4 / 2.5	5.5 / 3	-
FLS 132 M	GV / PV	7.5 / 5.5	5.5 / 3.7	7.5 / 4	-
FLS 160 MA	GV / PV	-	5.5 / 3.7	-	3.75 / 2.5
FLS 160 MB	GV / PV	11 / 9	-	-	-
FLS 160 L	GV / PV	15 / 11	7.5 / 5	12 / 6	5.5 / 3.7
FLS 180 L	GV / PV	18.5 / 15.5	9 / 6.2	13 / 7.5	7.5 / 5
FLS 180 L	GV / PV	22 / 16	11 / 7.3	15 / 9	-
FLS 200 LA	GV / PV	-	15 / 10	18 / 11	9 / 6
FLS 200 LB	GV / PV	30 / 22.5	-	22 / 15	11.5 / 7.7
FLS 225 ST	GV / PV	-	18.5 / 12.3	27 / 18	-
FLS 225 MT	GV / PV	37 / 27.5	-	-	-
FLS 225 M	GV / PV	42 / 31	22.5 / 15	30 / 20	15 / 10
FLS 250 M	GV / PV	45 / 33.5	27 / 15	37 / 25	18.5 / 12.5
FLS 280 S	GV / PV	55 / 41	37 / 25	45 / 30	22.5 / 15
FLS 280 M	GV / PV	75 / 55	45 / 30	55 / 37	27.5 / 18
FLS 315 ST	GV / PV	90 / 67	55 / 37	68 / 45	37.5 / 25
FLS 315 M	GV / PV	-	66 / 44	83 / 55	45 / 30
FLS 315 LA	GV / PV	-	80 / 53	110 / 75	55 / 37
FLS 315 LB	GV / PV	-	100 / 67	136 / 90	75 / 50
FLS 355 LA	GV / PV	-	125 / 83	166 / 110	90 / 60
FLS 355 LB	GV / PV	-	150 / 100	200 / 132	110 / 75
FLS 355 LD	GV / PV	-	200 / 132	240 / 160	150 / 100
FLS 400 LA	GV / PV	-	225 / 150	-	175 / 110
FLS 400 LB	GV / PV	-	250 / 165	300 / 200	200 / 132
FLS 450 LA	GV / PV	-	275 / 180	375 / 250	225 / 150
FLS 450 LB	GV / PV	-	330 / 225	475 / 315	250 / 160

1. GV: High speed  
2. PV: Low speed

# FLS

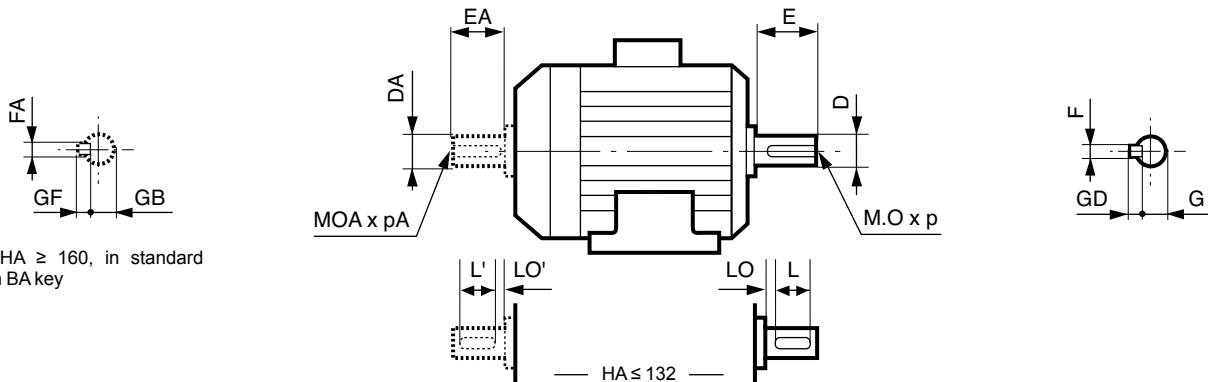
## totally enclosed three-phase asynchronous motors

### Dimensions

#### Dimensions of the FLS totally enclosed three-phase asynchronous motors - IP 55 Cage rotor

Dimensions in millimetres

#### - shaft end



For HA ≥ 160, in standard open BA key

#### Main shaft end

Type	4, 6 and 8 poles									2 poles								
	F	GD	D	G	E	O	p	L	LO	F	GD	D	G	E	O	p	L	LO
FLS 80 L	6	6	19j6	15.5	40	6	16	30	6	6	6	19j6	15.5	40	6	16	30	6
FLS 90 S/L	8	7	24j6	20	50	8	19	40	6	8	7	24j6	20	50	8	19	40	6
FLS 100 L/LK	8	7	28j6	24	60	10	22	50	6	8	7	28j6	24	60	10	22	50	6
FLS 112 M	8	7	28j6	24	60	10	22	50	6	8	7	28j6	24	60	10	22	50	6
FLS 132 S/M/MU	10	8	38k6	33	80	12	28	63	10	10	8	38k6	33	80	12	28	63	10
FLS 160 M/L	12	8	42k6	37	110	16	36	90	20	12	8	42k6	37	110	16	36	90	20
FLS 180 MR/L	14	9	48k6	42.5	110	16	36	90	20	14	9	48k6	42.5	110	16	36	90	20
FLS 200 L	16	10	55m6	49	110	20	42	90	20	16	10	55m6	49	110	20	42	90	20
FLS 225 ST/MT/M	18	11	60m6	53	140	20	42	125	15	16	10	55m6	49	110	20	42	90	20
FLS 250 M	18	11	65m6	58	140	20	42	125	15	18	11	60m6	53	140	20	42	125	15
FLS 280 S/M	20	12	75m6	67.5	140	20	42	125	15	18	11	65m6	58	140	20	42	125	15
FLS 315 ST/M	22	14	80m6	71	170	20	42	140	30	18	11	65m6	58	140	20	42	125	15
FLS 315 L	25	14	90m6	81	170	24	50	140	30	20	12	70m6	62.5	140	20	42	125	15
FLS 355 L/LK	28	16	100m6	90	210	24	50	180	30	22	14	80m6	71	170	20	42	140	30
FLS 400 L/LK/LV	28	16	110m6	100	210	24	50	180	30	-	-	-	-	-	-	-	-	-
FLS 450 L/LV	32	18	120m7	109	210	24	50	180	30	-	-	-	-	-	-	-	-	-

#### Secondary shaft end

Type	4, 6 and 8 poles									2 poles								
	FA	GF	DA	GB	EA	OA	pA	L'	LO'	FA	GF	DA	GB	EA	OA	pA	L'	LO'
FLS 80 L	5	5	14j6	11	30	5	15	25	3.5	5	5	14j6	11	30	5	15	25	3.5
FLS 90 S/L	6	6	19j6	15.5	40	6	16	30	6	6	6	19j6	15.5	40	6	16	30	6
FLS 100 L/LK	8	7	24j6	20	50	8	19	40	6	8	7	24j6	20	50	8	19	40	6
FLS 112 M	8	7	24j6	20	50	8	19	40	6	8	7	24j6	20	50	8	19	40	6
FLS 132 S/M/MU	8	7	28j6	24	60	10	22	50	6	8	7	28j6	24	60	10	22	50	6
FLS 160 M/L	12	8	42k6	37	110	16	36	90	20	12	8	42k6	37	110	16	36	90	20
FLS 180 MR/L	14	9	48k6	42.5	110	16	36	90	20	14	9	48k6	42.5	110	16	36	90	20
FLS 200 L	16	10	55m6	49	110	20	42	90	20	16	10	55m6	49	110	20	42	90	20
FLS 225 ST/MT/M	18	11	60m6	53	140	20	42	125	15	16	10	55m6	49	110	20	42	90	20
FLS 250 M	18	11	60m6	53	140	20	42	125	15	18	11	60m6	53	140	20	42	125	15
FLS 280 S/M	20	12	60m6	53	140	20	42	125	15	18	11	60m6	53	140	20	42	125	15
FLS 315 ST/M	22	14	80m6	71	170	20	42	140	30	18	11	65m6	58	140	20	42	125	15
FLS 315 L	25	14	90m6	81	170	24	50	140	30	20	12	70m6	62.5	140	20	42	125	15
FLS 355 L/LK	28	16	100m6	90	210	24	50	180	30	22	14	80m6	71	170	20	42	140	30
FLS 400 L/LK/LV	28	16	110m6	100	210	24	50	180	30	-	-	-	-	-	-	-	-	-
FLS 450 L/LV	32	18	120m6	109	210	24	50	180	30	-	-	-	-	-	-	-	-	-

# FLS

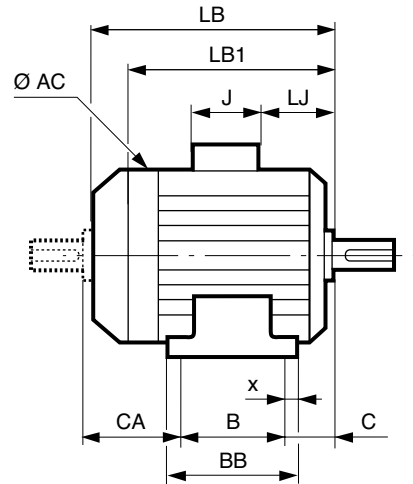
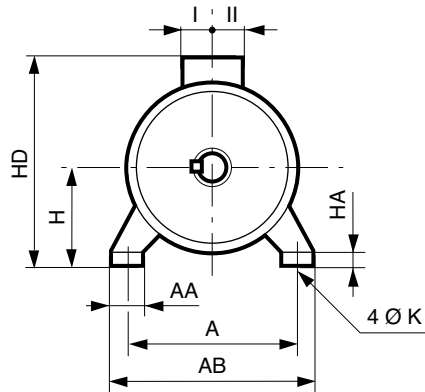
## totally enclosed three-phase asynchronous motors

### Dimensions

Dimensions of the FLS totally enclosed three-phase asynchronous motors - IP 55  
Cage rotor

Dimensions in millimetres

- foot mounted



Type	Main dimensions																		
	A	AB	B	BB	C	x	AA	K	HA	H	AC	HD	LB	LB1 <sup>1</sup>	LJ	J	I	II	CA
FLS 80 L	125	157	100	130	50	13	32	9	10	80	170	228	212	178	7	136	68	68	83
FLS 90 S	140	170	100	162	37	27	26	9	10	90	185	248	239	225	9	136	68	68	126
FLS 90 L	140	170	125	162	52	27	26	9	10	90	185	248	239	225	9	136	68	68	110
FLS 100 L	160	196	140	185	63	29	40	12	12	100	204	258	300	253	8	136	68	68	-
FLS 100 LK	160	200	140	174	63	22	42	12	12	100	226	276	315	276	52	120	60	60	119
FLS 112 M	190	230	140	174	70	32	48	12	12	112	233	294	309	265	18	136	68	68	-
FLS 132 S	216	255	140	240	89	48	63	12	16	132	262	347	385	330	23	136	68	68	170
FLS 132 M	216	255	178	240	89	48	63	12	16	132	262	347	385	330	23	136	68	68	170
FLS 132 MU	216	255	178	240	89	48	63	12	16	132	262	347	412	351	23	136	68	68	170
FLS 160 M	254	294	210	294	108	20	65	14	20	160	312	440	495	435	30	246	126	147	182
FLS 160 L	254	294	254	294	108	20	65	14	20	160	312	440	495	435	30	246	126	147	138
FLS 180 MR	279	324	241	295	121	25	80	14	25	180	312	460	510	450	30	246	126	147	158
FLS 180 L	279	330	279	335	121	28	70	14	28	180	350	481	552	480	42	246	126	147	160
FLS 200 L	318	374	305	361	133	28	80	18	44	200	394	530	681	595	51	246	126	147	248
FLS 225 ST	356	420	286	367	149	28	100	18	35	225	394	555	681	595	51	246	126	147	251
FLS 225 MT	356	420	311	367	149	28	100	18	35	225	394	555	681	595	51	246	126	147	226
FLS 225 M	356	426	311	375	149	32	80	18	27	225	540	656	780	630	70	352	173	210	326
FLS 250 M	406	476	349	413	168	32	80	22	27	250	540	681	780	630	70	352	173	210	269
FLS 280 S	457	527	368	432	190	32	80	22	27	280	540	711	860	710	70	352	173	210	302
FLS 280 M	457	527	419	483	190	32	80	22	27	280	540	711	960	810	70	352	173	210	357
FLS 315 ST	508	598	406	547	216	45	90	27	45	315	556	761	1068	910	68	352	173	210	452
FLS 315 M	508	600	457	598	216	45	100	27	45	315	624	835	1203	1030	70	452	217	269	536
FLS 315 L	508	600	508	598	216	45	100	27	45	315	632	835	1203	1030	70	452	217	269	485
FLS 355 LA/LB	610	710	630	710	254	40	110	27	35	355	700	910	1305	1118	61	452	217	269	427
FLS 355 LC/LD	610	710	630	710	254	40	110	27	35	355	700	910	1430	1242	61	452	217	269	552
FLS 355 LK**	610	750	630	815	254	40	128	27	45	355	787	1117	1702	-	52	700	224	396	818
FLS 400 L/LV**	686	800	710	815	280	65	128	35	45	400	787	1162	1702	-	52	700	224	396	712
FLS 400 LKA/LKB**	686	824	800	950	280	59	140	35	45	400	877	1210	1740	-	68	700	224	396	660
FLS 450 L/LV**	750	890	800	950	315	94	140	35	45	450	877	1260	1740	-	68	700	224	396	625

1. LB1: non ventilated motor.  
\*\*LB1: on request.

# FLS

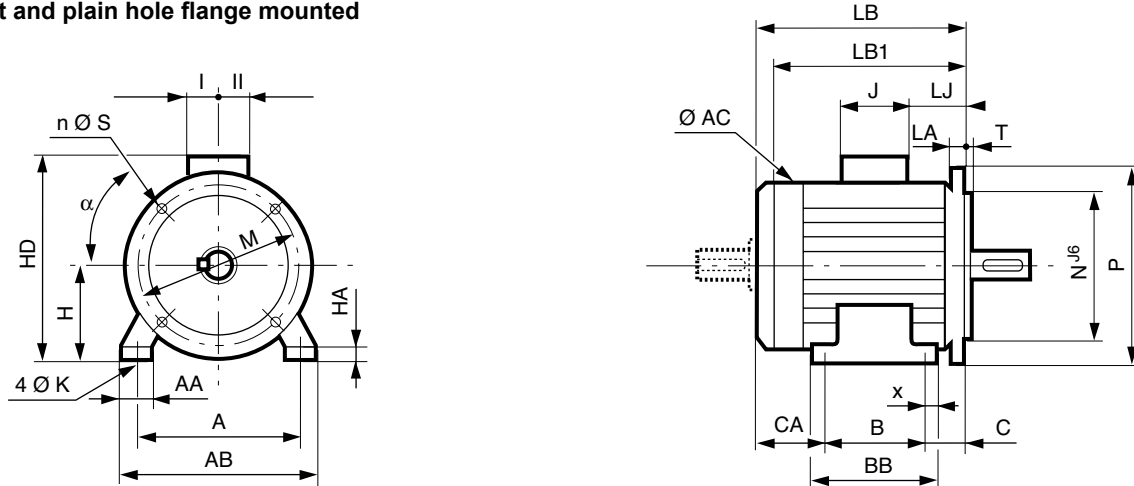
## totally enclosed three-phase asynchronous motors

### Dimensions

#### Dimensions of the FLS totally enclosed three-phase asynchronous motors - IP 55 Cage rotor

Dimensions in millimetres

- (FF) foot and plain hole flange mounted



#### Main dimensions

Type	A	AB	B	BB	C	x	AA	K	HA	H	AC	HD	LB	LB1'	LJ	J	I	II'	CA	Sym.
FLS 80 L	125	157	100	130	50	13	32	9	10	80	170	228	212	178	7	136	68	68	83	FF 165
FLS 90 S	140	170	100	162	37	27	26	9	10	90	185	248	239	225	9	136	68	68	126	FF 165
FLS 90 L	140	170	125	162	52	27	26	9	10	90	185	248	239	225	9	136	68	68	110	FF 165
FLS 100 L	160	196	140	185	63	29	40	12	12	100	204	258	300	253	8	136	68	68	-	FF 215
FLS 100 LK	160	200	140	174	63	22	42	12	12	100	226	276	315	276	55	120	60	60	119	FF 215
FLS 112 M	190	230	140	174	70	32	48	12	12	112	233	294	309	265	18	136	68	68	-	FF 215
FLS 132 S	216	255	140	240	89	48	63	12	16	132	262	347	385	330	22	136	68	68	170	FF 265
FLS 132 M	216	255	178	240	89	48	63	12	16	132	262	347	385	330	22	136	68	68	170	FF 265
FLS 132 MU	216	255	178	240	89	48	63	12	16	132	262	347	412	351	22	136	68	68	170	FF 265
FLS 160 M	254	294	210	294	108	20	65	14	20	160	312	440	495	435	30	246	126	147	182	FF 300
FLS 160 L	254	294	254	294	108	20	65	14	20	160	312	440	495	435	30	246	126	147	138	FF 300
FLS 180 MR	279	324	241	295	121	25	80	14	25	180	312	460	510	450	30	246	126	147	158	FF 300
FLS 180 L	279	330	279	335	121	28	70	14	28	180	350	481	552	480	42	246	126	147	160	FF 300
FLS 200 L	318	374	305	361	133	28	80	18	44	200	394	530	681	595	51	246	126	147	248	FF 350
FLS 225 ST	356	420	286	367	149	28	100	18	35	225	394	555	681	595	51	246	126	147	251	FF 400
FLS 225 MT	356	420	311	367	149	28	100	18	35	225	394	555	681	595	51	246	126	147	226	FF 400
FLS 225 M	356	426	311	375	149	32	80	18	27	225	540	656	780	630	70	352	173	210	326	FF 400
FLS 250 M	406	476	349	413	168	32	80	22	27	250	540	681	780	630	70	352	173	210	269	FF 500
FLS 280 S	457	527	368	432	190	32	80	22	27	280	540	711	860	710	70	352	173	210	302	FF 500
FLS 280 M	457	527	419	483	190	32	80	22	27	280	540	711	960	810	70	352	173	210	357	FF 500
FLS 315 ST	508	598	406	547	216	45	90	27	45	315	556	761	1068	910	68	352	173	210	452	FF 600
FLS 315 M	508	600	457	598	216	45	100	27	45	315	624	835	1203	1030	70	452	217	269	536	FF 600
FLS 315 L	508	600	508	598	216	45	100	27	45	315	632	835	1203	1030	70	452	217	269	485	FF 600
FLS 355 LA/LB	610	710	630	710	254	40	110	27	35	355	700	910	1305	1118	61	452	217	269	427	FF 740
FLS 355 LC/LD	610	710	630	710	254	40	110	27	35	355	700	910	1430	1242	61	452	217	269	552	FF 740
FLS 355 LK**	610	750	630	815	254	40	128	27	45	355	787	1117	1702	-	52	700	224	396	818	FF 740
FLS 400 L/LV**	686	800	710	815	280	65	128	35	45	400	787	1162	1702	-	52	700	224	396	712	FF 940
FLS 400 LKA/LKB**	686	824	800	950	280	59	140	35	45	400	877	1210	1740	-	68	700	224	396	660	FF 940
FLS 450 L/LV**	750	890	800	950	315	94	140	35	45	450	877	1260	1740	-	68	700	224	396	625	FF 1080

1. LB1: non ventilated motor.  
\*\*LB1: on request.

CA dimension and shaft ends dimensions identical to those of the foot mounted motors.

# FLS

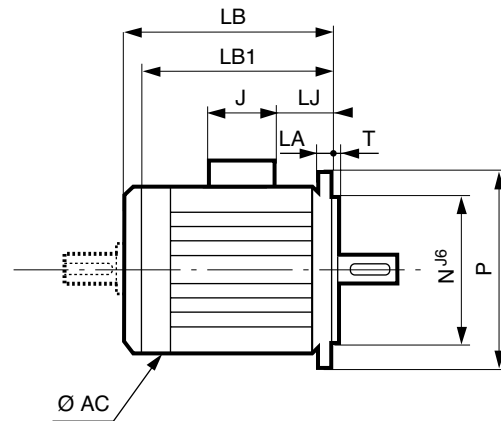
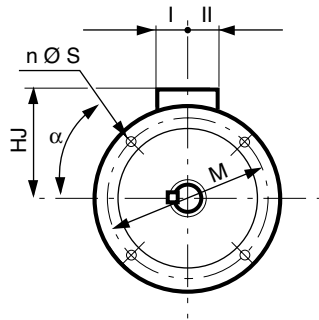
## totally enclosed three-phase asynchronous motors

### Dimensions

Dimensions of the FLS totally enclosed three-phase asynchronous motors - IP 55  
Cage rotor

Dimensions in millimetres

- (FF) plain hole flange mounted



IEC symbol	Flange dimensions							
	M	N	P	T	n	$\alpha^\circ$	S	LA
FF 165	165	130	200	3.5	4	45	12	10
FF 165	165	130	200	3.5	4	45	12	10
FF 165	165	130	200	3.5	4	45	12	10
FF 215	215	180	250	4	4	45	15	11
FF 215	215	180	250	4	4	45	15	11
FF 215	215	180	250	4	4	45	15	11
FF 265	265	230	300	4	4	45	14.5	13
FF 265	265	230	300	4	4	45	14.5	13
FF 265	265	230	300	4	4	45	14.5	13
FF 300	300	250	350	5	4	45	18.5	13
FF 300	300	250	350	5	4	45	18.5	13
FF 300	300	250	350	5	4	45	18.5	13
FF 300	300	250	350	5	4	45	18.5	13
FF 350	350	300	400	5	4	45	19	15
FF 400	400	350	450	5	8	22.3	19	16
FF 400	400	350	450	5	8	22.3	19	16
FF 400	400	350	450	5	8	22.3	19	16
FF 500	500	450	550	5	8	22.3	18	18
FF 500	500	450	550	5	8	22.3	18	22
FF 500	500	450	550	5	8	22.3	18	22
FF 600	600	550	660	6	8	22.3	22	25
FF 600	600	550	660	6	8	22.3	22	25
FF 600	600	550	660	6	8	22.3	22	25
FF 740	740	680	800	6	8	22.3	22	25
FF 740	740	680	800	6	8	22.3	22	25
FF 740	740	680	800	6	8	22.3	22	25
FF 940	940	880	1000	6	8	22.3	28	30
FF 940	940	880	1000	6	8	22.3	28	30
FF 1080	1080	1000	1150	6	8	22.3	28	30

Type	Main dimensions							
	AC	LB	LB1'	HJ	LJ	J	I	II
FLS 80 L	160	212	178	152	7	136	68	68
FLS 90 S	185	239	225	158	9	136	68	68
FLS 90 L	185	239	225	158	9	136	68	68
FLS 100 L	204	300	253	158	8	136	68	68
FLS 100 LK	226	315	276	176	55	120	60	60
FLS 112 M	233	309	265	182	18	136	68	68
FLS 132 S	262	385	330	205	22	136	68	68
FLS 132 M	262	385	330	205	22	136	68	68
FLS 132 MU	262	412	351	205	22	136	68	68
FLS 160 M	312	495	435	280	30	246	126	147
FLS 160 L	312	495	435	280	30	246	126	147
FLS 180 MR	312	510	450	280	30	246	126	147
FLS 180 L	350	552	480	301	42	246	126	147
FLS 200 L	394	681	595	330	51	246	126	147
FLS 225 ST	394	681	595	330	51	246	126	147
FLS 225 MT	394	681	595	330	51	246	126	147
FLS 225 M	540	780	630	431	70	352	173	210
FLS 250 M	540	780	630	431	70	352	173	210
FLS 280 S	540	860	710	431	70	352	173	210
FLS 280 M	540	960	810	431	70	352	173	210
FLS 315 ST	556	1068	910	446	68	352	173	210
FLS 315 M	624	1203	1030	520	70	452	217	269
FLS 315 L	632	1203	1030	555	70	452	217	269
FLS 355 LA/LB	700	1305	1118	555	61	452	217	269
FLS 355 LC/LD	700	1430	1242	555	61	452	217	269
FLS 355 LK**	787	1702	-	762	52	700	224	396
FLS 400 L/LV**	787	1702	-	762	52	700	224	396
FLS 400 LKA/LKB**	877	1740	-	810	68	700	224	396
FLS 450 L/LV**	877	1740	-	810	68	700	224	396

1. LB1: non ventilated motor.  
The form of the FF flange mounted motors, IM 3001 (IM B5) position, stops at the frame size 225.  
\*\* LB1: on request.

# FLS

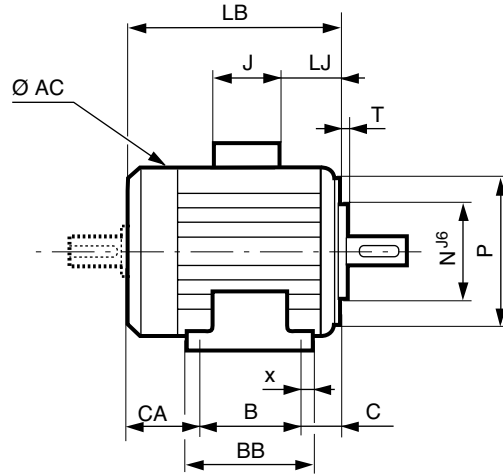
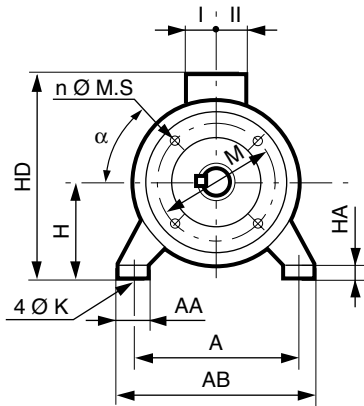
## totally enclosed three-phase asynchronous motors

### Dimensions

#### Dimensions of the FLS totally enclosed three-phase asynchronous motors - IP 55 Cage rotor

Dimensions in millimetres

- (FT) foot and tapped hole flange mounted motor



Main dimensions

Type	A	AB	B	BB	C	x	AA	K	HA	H	AC	HD	LB	LB1 <sup>1</sup>	LJ	J	I	II	CA	Sym.
FLS 80 L	125	157	100	130	50	13	32	9	11	80	170	228	212	178	7	136	68	68	83	FT 100
FLS 90 S	140	170	100	162	37	27	26	9	10	90	185	248	239	225	9	136	68	68	126	FT 115
FLS 90 L	140	170	125	162	52	27	26	9	10	90	185	248	239	225	9	136	68	68	110	FT 115
FLS 100 L	160	196	140	185	63	29	40	12	12	100	204	258	300	253	8	136	68	68	-	FT 130
FLS 100 LK	160	200	140	174	63	22	42	12	12	100	226	276	315	276	55	120	60	60	119	FT 130
FLS 112 M	190	230	140	174	70	32	48	12	12	112	231	294	309	265	18	136	68	68	-	FT 130
FLS 132 S	216	255	140	240	89	48	63	12	16	132	262	347	385	330	22	136	68	68	170	FT 215
FLS 132 M	216	255	178	240	89	48	63	12	16	132	262	347	385	330	22	136	68	68	170	FT 215
FLS 132 MU	216	255	178	240	89	48	63	12	16	132	262	347	412	351	22	136	68	68	170	FT 215

1. LB1: non ventilated motor.

CA dimension and shaft ends dimensions identical to those of the foot mounted motors.

# FLS

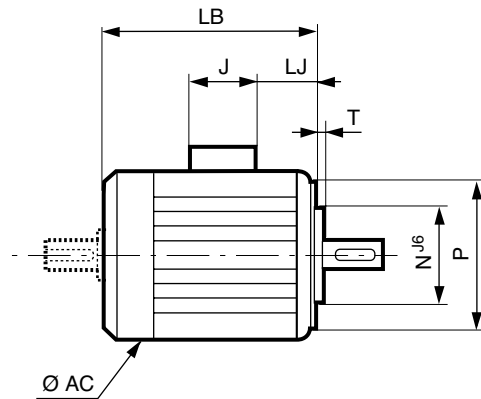
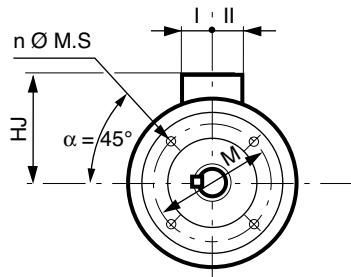
## totally enclosed three-phase asynchronous motors

### Dimensions

Dimensions of the FLS totally enclosed three-phase asynchronous motors - IP 55  
Cage rotor

Dimensions in millimetres

– (FT) tapped hole flange mounted



IEC symbol	Flange dimensions						
	M	N	P	T	n	$\alpha^\circ$	MS
<b>FT 100</b>	100	80	120	3	4	45	M6
<b>FT 115</b>	115	95	140	3	4	45	M8
<b>FT 115</b>	115	95	140	3	4	45	M8
<b>FT 130</b>	130	110	160	3.5	4	45	M8
<b>FT 130</b>	130	110	160	3.5	4	45	M8
<b>FT 130</b>	130	110	160	3.5	4	45	M8
<b>FT 215</b>	215	180	250	4	4	45	M8
<b>FT 215</b>	215	180	250	4	4	45	M8
<b>FT 215</b>	215	180	250	4	4	45	M9

1. LB1: non ventilated motor.

Type	Main dimensions							
	AC	LB	LB1'	HJ	LJ	J	I	II
<b>FLS 80 L</b>	170	212	178	152	7	136	68	68
<b>FLS 90 S</b>	185	239	225	158	9	136	68	68
<b>FLS 90 L</b>	185	239	225	158	9	136	68	68
<b>FLS 100 L</b>	204	300	253	158	8	136	68	68
<b>FLS 100 LK</b>	226	315	276	159	55	120	60	60
<b>FLS 112 M</b>	233	309	265	182	18	136	68	68
<b>FLS 132 S</b>	262	385	330	205	22	136	68	68
<b>FLS 132 M</b>	262	385	330	205	22	136	68	68
<b>FLS 132 MU</b>	262	412	351	205	22	136	68	68

# FLS

## totally enclosed three-phase asynchronous motors

### Lead times

IP 55 - 50 Hz - Class F - 230 V  $\Delta$  / 400 V Y or 400 V  $\Delta$  - S1 - Class IE1

**2**  
poles  
3000 min<sup>-1</sup>

Type	Rated power at 50 Hz $P_N$ kW	IM 1001 (IM B3)		IM 3001 (IM B5)		IM 2001 (IM B35)		IM 3601 (IM B14)	
		Code	Qty	Code	Qty	Code	Qty	Code	Qty
FLS 80 L	0.75		-		-		-		-
FLS 80 L	1.1		-		-		-		-
FLS 90 S	1.5		-		-		-		-
FLS 90 L	2.2		-		-		-		-
FLS 100 L	3		-		-		-		-
FLS 112 M	4		-		-		-		-
FLS 132 S	5.5		-		-		-		-
FLS 132 S	7.5		-		-		-		-
FLS 160 MA	11		-		-		-		-
FLS 160 MB	15		-		-		-		-
FLS 160 L	18.5		-		-		-		-
FLS 180 MR	22		-		-		-		-
FLS 200 LA	30		-		-		-		-
FLS 200 LB	37		-		-		-		-
FLS 225 MT	45		-		-		-		-
FLS 250 M	55		-		-		-		-
FLS 280 S	75		-		-		-		-
FLS 280 M	90		-		-		-		-
FLS 315 ST	110		-		-		-		-
FLS 315 M	132		-		-		-		-
FLS 315 LA	160		-		-		-		-
FLS 315 LB	200		-		-		-		-
FLS 355 LA	250		-		-		-		-
FLS 355 LB	275		-		-		-		-
FLS 355 LB	315		-		-		-		-
FLS 355 LC	330		-		-		-		-
FLS 355 LC	355		-		-		-		-
FLS 355 LD	400		-		-		-		-

NOTE: Motors available within a short lead time are listed in the "FLSES" section.

DG < 2 WD < 5 WD < To agree

DG: Availability ; n WD: Working Days (at the departure of the factory).



# FLS

## totally enclosed three-phase asynchronous motors

### Lead times

**4**  
poles  
1500 min<sup>-1</sup>

IP 55 - 50 Hz - Class F - ΔT 80 K - 230 V Δ / 400 V Y or 400 V Δ - S1 - Class IE1

Type	Rated power at 50 Hz $P_N$ kW	IM 1001 (IM B3)		IM 3001 (IM B5)		IM 2001 (IM B35)		IM 3601 (IM B14)	
		Code	Qty	Code	Qty	Code	Qty	Code	Qty
FLS 80 L	0.55		-		-		-		-
FLS 80 L	0.75		-		-		-		-
FLS 90 S	1.1		-		-		-		-
FLS 90 L	1.5		-		-		-		-
FLS 90 L	1.8		-		-		-		-
FLS 100 L	2.2		-		-		-		-
FLS 100 L	3		-		-		-		-
FLS 112 M	4		-		-		-		-
FLS 132 S	5.5		-		-		-		-
FLS 132 M	7.5		-		-		-		-
FLS 132 M	9		-		-		-		-
FLS 160 M	11		-		-		-		-
FLS 160 L	15		-		-		-		-
FLS 180 MR	18.5		-		-		-		-
FLS 180 L	22		-		-		-		-
FLS 200 L	30		-		-		-		-
FLS 225 ST	37		-		-		-		-
FLS 225 M	45		-		-		-		-
FLS 250 M	55		-		-		-		-
FLS 280 S	75		-		-		-		-
FLS 280 M	90		-		-		-		-
FLS 315 ST	110		-		-		-		-
FLS 315 M	132		-		-		-		-
FLS 315 LA	160		-		-		-		-
FLS 315 LB	200		-		-		-		-
FLS 355 LA	250		-		-		-		-
FLS 355 LB	300		-		-		-		-
FLS 355 LC	315		-		-		-		-
FLS 355 LC	355		-		-		-		-
FLS 355 LD	400		-		-		-		-
FLS 400 LB	400		-		-		-		-
FLS 355 LKB	450		-		-		-		-
FLS 400 LB	450		-		-		-		-
FLS 355 LKB	500		-		-		-		-
FLS 400 LVB	500		-		-		-		-
FLS 450 LA	500		-		-		-		-
FLS 450 LVA	550		-		-		-		-
FLS 450 LB	630		-		-		-		-
FLS 450 LVB	675		-		-		-		-

NOTE: Motors available within a short lead time are listed in the "FLSES" section.

DG < 2 WD < 5 WD < To agree

DG: Availability ; n WD: Working Days (at the departure of the factory).

# FLS

## totally enclosed three-phase asynchronous motors

### Lead times

**6**  
poles  
1000 min<sup>-1</sup>

IP 55 - 50 Hz - Class F - ΔT 80 K - 230 V Δ / 400 V Y or 400 V Δ - S1 - Class IE1

Type	Rated power at 50 Hz $P_N$ kW	IM 1001 (IM B3) Code	Qty
FLS 80 L	0.25		-
FLS 80 L	0.37		-
FLS 80 L	0.55		-
FLS 90 S	0.75		-
FLS 90 L	1.1		-
FLS 100 L	1.5		-
FLS 112 M	2.2		-
FLS 132 S	3		-
FLS 132 M	4		-
FLS 132 MR	5.5		-
FLS 160 M	7.5		-
FLS 160 L	11		-
FLS 180 L	15		-
FLS 200 LA	18.5		-
FLS 200 LB	22		-
FLS 225 M	30		-
FLS 250 M	37		-
FLS 280 S	45		-
FLS 280 M	55		-
FLS 315 ST	75		-
FLS 315 M	90		-

**NOTE:** Motors available within a short lead time are listed in the “FLSES” section.

DG < 2 WD < 5 WD < To agree

DG: Availability ; n WD: Working Days (at the departure of the factory).

# FLS

## totally enclosed three-phase asynchronous motors

### Lead times

IP 55 - 50 Hz - Class F -  $\Delta$ T 80 K - 230 V  $\Delta$  / 400 V Y or 400 V  $\Delta$  - S1

**8**  
poles  
750 min<sup>-1</sup>

Type	Rated power at 50 Hz $P_N$ kW	IM 1001 (IM B3) Code	Qty
FLS 80 L	0.18		-
FLS 80 L	0.25		-
FLS 90 S	0.37		-
FLS 90 L	0.55		-
FLS 100 LK	0.75		-
FLS 100 LK	1.1		-
FLS 112 M	1.5		-
FLS 132 S	2.2		-
FLS 132 M	3		-
FLS 160 MA	4		-
FLS 160 MB	5.5		-
FLS 160 L	7.5		-
FLS 180 L	11		-
FLS 200 L	15		-
FLS 225 ST	18.5		-
FLS 225 M	22		-
FLS 250 M	30		-
FLS 280 S	37		-
FLS 280 M	45		-
FLS 315 ST	55		-
FLS 315 M	75		-

DG < 2 WD < 5 WD < To agree

DG: Availability ; n WD: Working Days (at the departure of the factory).

# FLS

## totally enclosed three-phase asynchronous motors

### Lead times

Selection table of options for FLS totally enclosed three-phase asynchronous motors - IP 55

**2**  
poles  
3000 min<sup>-1</sup>

**4**  
poles  
1500 min<sup>-1</sup>

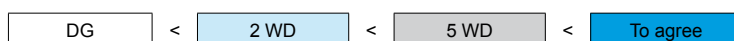
**6\***  
poles  
1000 min<sup>-1</sup>

Type	Mounting positions (drain holes at lowest point)				Fan cover with drip cover
	IM V1 IM 3011 Code	IM V3 IM 3031 Code	IM V5 IM 1011 Code	IM V6 IM 1031 Code	Code
FLS 80					
FLS 90					
FLS 100					
FLS 112					
FLS 132					
FLS 160					
FLS 180					
FLS 200					
FLS 225					
FLS 250					
FLS 280					
FLS 315					
FLS 355					
FLS 400					
FLS 450					

\*: Motors FLS 160 to FLS 450 these options do not apply.

Type	Forced ventilation Code
FLS 80	
FLS 90	
FLS 100 (foot)	
FLS 100 (flange)	
FLS 112	
FLS 132	
FLS 160	
FLS 180	
FLS 200	
FLS 225	
FLS 250	
FLS 280	
FLS 315	
FLS 355	
FLS 400	
FLS 450	

**NOTE:** Motors available within a short lead time are listed in the “FLSES” section.



DG: Availability ; n WD: Working Days (at the departure of the factory).

# FLS

## totally enclosed three-phase asynchronous motors




### Lead times

Selection table of options for FLS totally enclosed three-phase asynchronous motors - IP 55

**2**  
poles  
3000 min<sup>-1</sup>

**4**  
poles  
1500 min<sup>-1</sup>

**6\***  
poles  
1000 min<sup>-1</sup>

Type	PTO Thermal protections opening (n/c) 	PTF Thermal protections closing (n/o) 	CTP Positive temperature coefficient thermistors probes 	Anti-condensation heaters	Aluminium fan
FLS 80					
FLS 90					
FLS 100					
FLS 112					
FLS 132					
FLS 160					
FLS 180					
FLS 200					
FLS 225					
FLS 250					
FLS 280					
FLS 315					
FLS 355					

\*: Motors FLS 160 to FLS 450 these options do not apply.

**NOTE:** Motors available within a short lead time are listed in the “FLSES” section.

DG < 2 WD < 5 WD < To agree

DG: Availability ; n WD: Working Days (at the departure of the factory).