

# 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.  
Individual anti-shock packaging.

#### 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

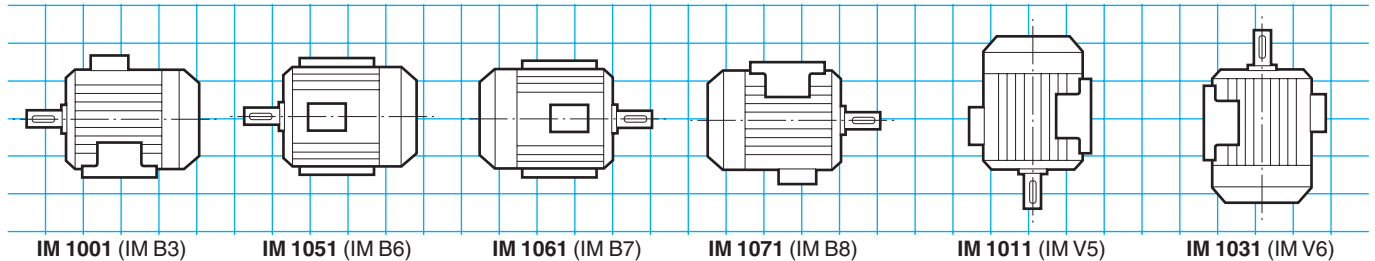
| Component                   | Materials                                                                                                        | Remarks                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Finned housing              | Cast iron                                                                                                        | - with integral feet, or without feet <ul style="list-style-type: none"> <li>• 4, 6 or 8 fixing holes for foot-mounted housings</li> <li>• lifting rings for frame sizes <math>\geq 90</math></li> </ul> - earth terminal on foot or fin                                                                                                                                                     |
| Stator                      | Insulated low carbon magnetic steel laminations<br>Insulated electroplated copper                                | - low carbon content guarantees long-term lamination pack stability<br>- welded packs<br>- semi-enclosed slots<br>- class F insulation                                                                                                                                                                                                                                                       |
| Rotor                       | Insulated low carbon magnetic steel laminations<br>Aluminium (A5L) or copper                                     | - inclined cage bars<br>- rotor cage pressure die cast in aluminium (or alloy for special applications) or soldered in copper<br>- shrink-fitted to shaft, or keyed for soldered rotors<br>- rotor balanced dynamically, class A - 1/2 key                                                                                                                                                   |
| Shaft                       | Steel                                                                                                            | - for frame size $\leq 132$ : <ul style="list-style-type: none"> <li>• shaft en fitted with screw and washer</li> <li>• closed keyway</li> </ul> - for frame size $\geq 160$ : <ul style="list-style-type: none"> <li>• tapped hole</li> <li>• open keyway</li> </ul>                                                                                                                        |
| End shields                 | Cast iron                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                              |
| Bearings and lubrication    |                                                                                                                  | - ball bearings C3 or C4 play<br>- type ZZ "greased for life" up to frame size 132<br>- semi-protected or open type from frame size 160 upwards, regreasable<br>- bearings preloaded at NDE up to 315 S, preloaded at DE from size 315 M upwards                                                                                                                                             |
| Labyrinth seals<br>Lipseals | Plastic or steel<br>Synthetic rubber                                                                             | - labyrinth seals at drive end for foot mounted motors, frame size $\leq 132$<br>- seal at drive end for foot and flange or flange mounted motors, frame size $\leq 132$<br>- lipseal at drive end and non drive end for frame sizes 160 to 225 MT inclusive<br>- decompression grooves for 225 M to 355 LD<br>- labyrinth seal at drive end and non drive end for frame sizes $\geq 355$ LK |
| Fan                         | Composite material up to and including size 280<br>Metal from 315 ST upwards                                     | - 2 directions of rotation: straight blades                                                                                                                                                                                                                                                                                                                                                  |
| Fan cover                   | Pressed steel                                                                                                    | - fitted, on request, with a drip cover for operation in vertical position, shaft facing down                                                                                                                                                                                                                                                                                                |
| Terminal box                | Cast iron body for all frame sizes<br>Sheet steel cover from size 80 to 132;<br>cast iron cover for larger sizes | - IP 55<br>- fitted with a terminal block with 6 terminals up to 335 LD, 6 or 12 terminals thereafter<br>- ISO plastic up to 132, terminal box fitted with cable gland<br>- sizes 160 to 450, cable gland baseplate without drilled holes (optional horn or cable gland)<br>- 1 earth terminal in each terminal box                                                                          |
| Painting                    |                                                                                                                  | - system IIa                                                                                                                                                                                                                                                                                                                                                                                 |

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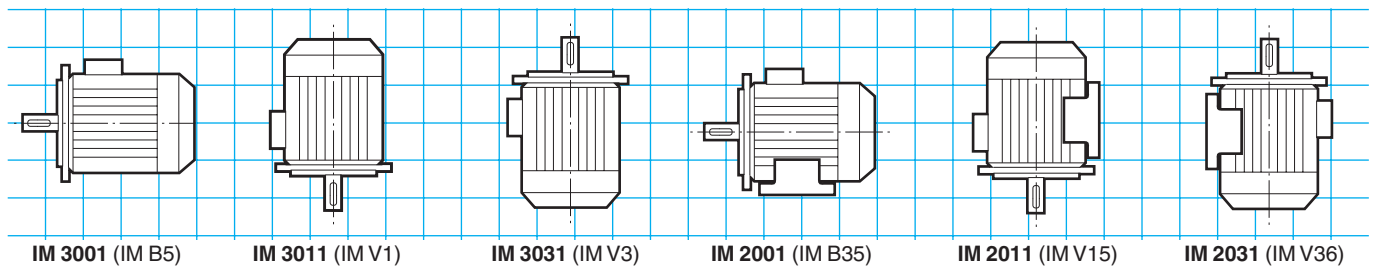
### Mounting positions

#### Foot mounted motors



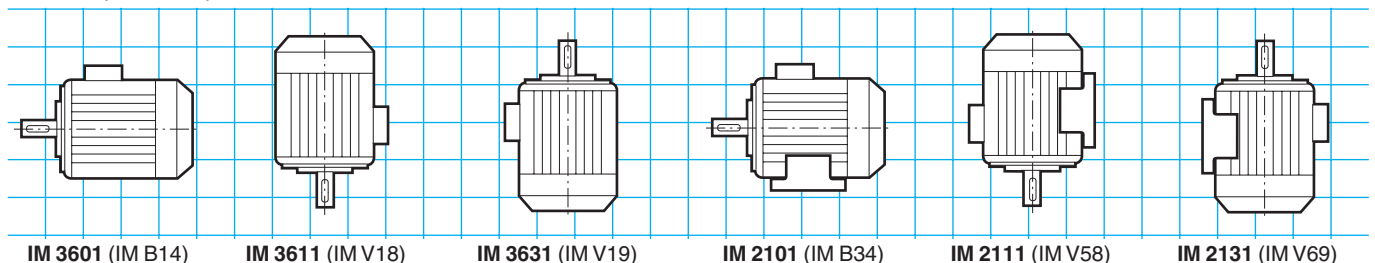
#### (FF) plain hole flange mounted motors

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

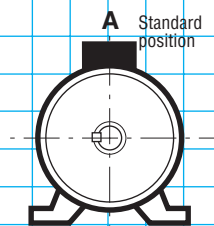


#### (FT) tapped hole flange mounted motors

- Possible positions up to 132 frame size inclusive

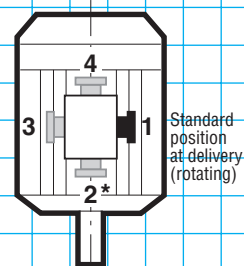


#### Terminal box position in relation to the motor shaft end



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.

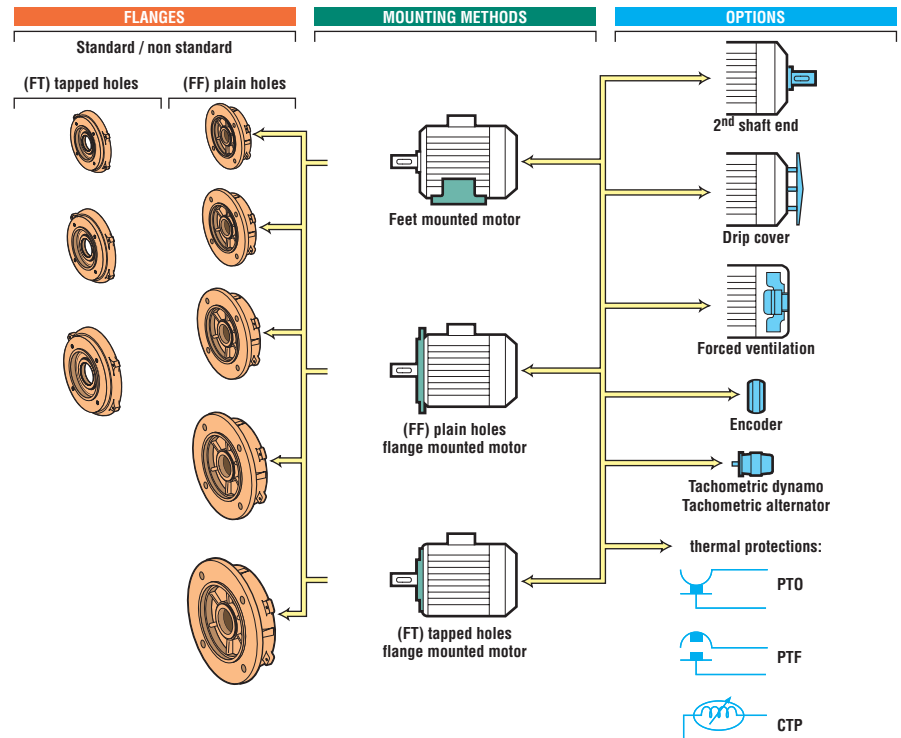
#### The FLS motors may be associated to:

- 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

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

#### Codification example:

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

**Designation**                      **Code**  
4P FLS 315 M 132 kW  
IM 1001 (IM B3) 400 V Δ      EA4 13 420

#### Codification example:

Addition of PTO thermal protection

**Designation**                      **Code**  
• PTO                                  MATP 1011

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

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

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

IE1

| Type        | Rated power    | Rated speed    | Rated torque   | Rated current         | Power factor |      |      | Efficiency*<br>IEC 60034-2-1; 2007 |      |      | Starting current/<br>Rated current | Starting torque/<br>Rated torque | Maximum torque/<br>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>h</sub> /Mn              | J                 | IM B3  | LP    |
|             | kW             | min-1          | Nm             | 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

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

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

A

|            | Rated power<br>at 50 Hz | IM 1001<br>(IM B3) |     | IM 3001<br>(IM B5) |     | IM 2001<br>(IM B35) |     | IM 3601<br>(IM B14) |     |
|------------|-------------------------|--------------------|-----|--------------------|-----|---------------------|-----|---------------------|-----|
| Type       | $P_N$<br>kW             | Code               | Qty | Code               | Qty | Code                | Qty | Code                | Qty |
| FLS 80 L   | 0.75                    | MA2 75 119         | 1   | MA2 75 121         | 1   | MA2 75 1C1          | 1   |                     | -   |
| FLS 80 L   | 1.1                     | EA2 11 219         | 1   | EA2 11 221         | 1   | EA2 11 2C1          | 1   |                     | -   |
| FLS 90 S   | 1.5                     | EA2 15 218         | 1   | EA2 15 221         | 1   | EA2 15 2C1          | 1   |                     | -   |
| FLS 90 L   | 2.2                     | EA2 22 207         | 1   | EA2 22 209         | 1   | EA2 22 2A9          | 1   |                     | -   |
| FLS 100 L  | 3                       | EA2 30 207         | 1   | EA2 30 209         | 1   | EA2 30 2A9          | 1   |                     | -   |
| FLS 112 M  | 4                       | EA2 40 207         | 1   | EA2 40 209         | 1   | EA2 40 2A9          | 1   |                     | -   |
| FLS 132 S  | 5.5                     | EA2 55 213         | 1   | EA2 55 215         | 1   | EA2 55 2B5          | 1   |                     | -   |
| FLS 132 S  | 7.5                     | EA2 75 207         | 1   | EA2 75 209         | 1   | EA2 75 2A9          | 1   |                     | -   |
| FLS 160 MA | 11                      | EA2 11 313         | 1   | EA2 11 315         | 1   | EA2 11 3B5          | 1   |                     |     |
| FLS 160 MB | 15                      | EA2 15 313         | 1   | EA2 15 315         | 1   | EA2 15 3B5          | 1   |                     |     |
| FLS 160 L  | 18.5                    | EA2 18 313         | 1   | EA2 18 315         | 1   | EA2 18 3B5          | 1   |                     |     |
| FLS 180 MR | 22                      | EA2 22 313         | 1   | EA2 22 315         | 1   | EA2 22 3B5          | 1   |                     |     |
| FLS 200 LA | 30                      | EA2 30 313         | 1   | EA2 30 315         | 1   | EA2 30 3B5          | 1   |                     |     |
| FLS 200 LB | 37                      | EA2 37 313         | 1   | EA2 37 315         | 1   | EA2 37 3B5          | 1   |                     |     |
| FLS 225 MT | 45                      | EA2 45 313         | 1   | EA2 45 315         | 1   | EA2 45 3B5          | 1   |                     |     |
| FLS 250 M  | 55                      | EA2 55 313         | 1   | EA2 55 315         | 1   | EA2 55 3B5          | 1   |                     |     |
| FLS 280 S  | 75                      | EA2 75 313         | 1   |                    | -   | EA2 75 3B5          | 1   |                     |     |
| FLS 280 M  | 90                      | EA2 90 313         | 1   |                    | -   | EA2 90 3B5          | 1   |                     |     |
| FLS 315 ST | 110                     | MA2 11 413         | 1   |                    | -   | MA2 11 4B5          | 1   |                     |     |

#### Selection example:

|                        |                                  |
|------------------------|----------------------------------|
| Speed:                 | 3000 min <sup>-1</sup> - 2 poles |
| Power:                 | 2.2 kW                           |
| Mounting and position: | IM 3001 (IM B5)                  |
| Mains supply voltage:  | 230/400 V                        |

#### Designation:

2P FLS 90 L 2.2 kW IM 3001 (IM B5)  
230/400 V

Code: EA2 22 209

# FLS

## totally enclosed three-phase asynchronous motors

### Selection

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

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

IE1

| Type        | Rated power          | Rated speed                         | Rated torque         | Rated current              | Power factor |      |      | Efficiency*<br>IEC 60034-2-1; 2007 |      |      | Starting current/<br>Rated current | Starting torque/<br>Rated torque | Maximum torque/<br>Rated torque | Moment of inertia      | Weight      | Noise       |
|-------------|----------------------|-------------------------------------|----------------------|----------------------------|--------------|------|------|------------------------------------|------|------|------------------------------------|----------------------------------|---------------------------------|------------------------|-------------|-------------|
|             | P <sub>N</sub><br>kW | N <sub>N</sub><br>min <sup>-1</sup> | M <sub>N</sub><br>Nm | I <sub>N</sub> (400V)<br>A | Cos Phi      |      |      | η                                  |      |      | Id / In                            | Md/Mn                            | M <sub>M</sub> /Mn              | J<br>kg.m <sup>2</sup> | IM B3<br>kg | LP<br>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 | -                                  | -    | -    | 8.0                                | 2.0                              | 2.6                             | 11.7                   | 2350        | 82          |
| FLS 355 LKB | 450                  | 1489                                | 2886                 | 769                        | 0.88         | 0.86 | 0.81 | -                                  | -    | -    | 6.8                                | 1.7                              | 2.3                             | 11.7                   | 2320        | 82          |
| FLS 400 LB  | 450                  | 1489                                | 2886                 | 769                        | 0.88         | 0.86 | 0.81 | -                                  | -    | -    | 6.8                                | 1.7                              | 2.3                             | 11.7                   | 2350        | 87          |
| FLS 355 LKB | 500                  | 1489                                | 3207                 | 870                        | 0.87         | 0.85 | 0.79 | -                                  | -    | -    | 6.4                                | 1.8                              | 2.1                             | 11.7                   | 2320        | 82          |
| FLS 400 LVB | 500                  | 1489                                | 3207                 | 870                        | 0.87         | 0.85 | 0.79 | -                                  | -    | -    | 6.4                                | 1.8                              | 2.1                             | 11.7                   | 2350        | 87          |
| FLS 450 LA  | 500                  | 1493                                | 3198                 | 853                        | 0.88         | 0.88 | 0.77 | -                                  | -    | -    | 7.3                                | 1.7                              | 2.6                             | 21                     | 3100        | 82          |
| FLS 450 LVA | 550                  | 1492                                | 3520                 | 961                        | 0.88         | 0.88 | 0.82 | -                                  | -    | -    | 6.5                                | 1.6                              | 2.3                             | 21                     | 3100        | 85          |
| FLS 450 LB  | 630                  | 1491                                | 4035                 | 1089                       | 0.87         | 0.85 | 0.78 | -                                  | -    | -    | 7.4                                | 1.7                              | 2.4                             | 24                     | 3450        | 82          |
| FLS 450 LVB | 675                  | 1491                                | 4323                 | 1161                       | 0.87         | 0.85 | 0.78 | -                                  | -    | -    | 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

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

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

A

| Type       | Rated power<br>at 50 Hz<br>$P_N$<br>kW | IM 1001<br>(IM B3) |     | IM 3001<br>(IM B5) |     | IM 2001<br>(IM B35) |     | IM 3601<br>(IM B14) |     |
|------------|----------------------------------------|--------------------|-----|--------------------|-----|---------------------|-----|---------------------|-----|
|            |                                        | Code               | Qty | Code               | Qty | Code                | Qty | Code                | Qty |
| FLS 80 L   | 0.55                                   | MA4 55 119         | 1   | MA4 55 121         | 2   | MA4 55 1C1          | 1   | MA4 55 123          | 1   |
| FLS 80 L   | 0.75                                   | MA4 75 125         | 1   | MA4 75 127         | 2   | MA4 75 1C7          | 1   | MA4 75 129          | 1   |
| FLS 90 S   | 1.1                                    | EA4 11 225         | 1   | EA4 11 227         | 2   | EA4 11 2C7          | 1   | EA4 11 229          | 1   |
| FLS 90 L   | 1.5                                    | EA4 15 213         | 2   | EA4 15 215         | 2   | EA4 15 2B5          | 1   | EA4 15 217          | 1   |
| FLS 90 L   | 1.8                                    | EA4 18 213         | 1   | EA4 18 215         | 1   | EA4 18 2B5          | 1   | EA4 18 217          | 1   |
| FLS 100 L  | 2.2                                    | EA4 22 213         | 2   | EA4 22 215         | 1   | EA4 22 2B5          | 1   | EA4 22 217          | 1   |
| FLS 100 L  | 3                                      | EA4 30 213         | 2   | EA4 30 215         | 2   | EA4 30 2B5          | 1   | EA4 30 217          | 1   |
| FLS 112 M  | 4                                      | EA4 40 207         | 2   | EA4 40 209         | 2   | EA4 40 2A9          | 1   | EA4 40 211          | 1   |
| FLS 132 S  | 5.5                                    | EA4 55 213         | 2   | EA4 55 215         | 1   | EA4 55 2B5          | 1   | EA4 55 217          | -   |
| FLS 132 M  | 7.5                                    | EA4 75 225         | 2   | EA4 75 227         | 1   | EA4 75 2C7          | 1   | EA4 75 229          | -   |
| FLS 132 M  | 9                                      |                    | -   |                    | -   |                     | -   |                     | -   |
| FLS 160 M  | 11                                     | EA4 11 325         | 1   | EA4 11 327         | 1   | EA4 11 3C7          | 1   |                     |     |
| FLS 160 L  | 15                                     | EA4 15 325         | 1   | EA4 15 327         | 1   | EA4 15 3C7          | 1   |                     |     |
| FLS 180 MR | 18.5                                   | EA4 18 325         | 1   | EA4 18 327         | 1   | EA4 18 3C7          | 1   |                     |     |
| FLS 180 L  | 22                                     | EA4 22 325         | 1   | EA4 22 327         | 1   | EA4 22 3C7          | 1   |                     |     |
| FLS 200 L  | 30                                     | EA4 30 325         | 1   | EA4 30 327         | 1   | EA4 30 3C7          | 1   |                     |     |
| FLS 225 ST | 37                                     | EA4 37 325         | 1   | EA4 37 327         | 1   | EA4 37 3C7          | 1   |                     |     |
| FLS 225 M  | 45                                     | EA4 45 325         | 1   | EA4 45 327         | 1   | EA4 45 3C7          | 1   |                     |     |
| FLS 250 M  | 55                                     | EA4 55 325         | 1   | EA4 55 327         | 1   | EA4 55 3C7          | 1   |                     |     |
| FLS 280 S  | 75                                     | EA4 75 325         | 1   |                    | -   | EA4 75 3C7          | 2   |                     |     |
| FLS 280 M  | 90                                     | EA4 90 325         | 1   |                    | -   | EA4 90 3C7          | 2   |                     |     |
| FLS 315 ST | 110                                    | MA4 11 425         | 1   |                    | -   | MA4 11 4C7          | 2   |                     |     |
| FLS 315 M  | 132                                    | MA4 13 419         | 1   |                    | -   | MA4 13 4C1          | 2   |                     |     |

#### Selection example:

|                        |                                  |
|------------------------|----------------------------------|
| Speed:                 | 1500 min <sup>-1</sup> - 4 poles |
| Power:                 | 55 kW                            |
| Mounting and position: | IM 1001 (IM B3)                  |
| Mains supply voltage:  | 230/400 V                        |

#### Designation:

4P FLS 250 M 55 kW IM 1001 (IM B3)  
230/400 V

Code: EA4 55 325

# FLS

## totally enclosed three-phase asynchronous motors

### Selection

IP 55 - 50 Hz - Class F - 400 V  $\Delta$  - S1

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

IE1

| Type        | Rated power    | Rated speed    | Rated torque   | Rated current         | Power factor |      |      | Efficiency*<br>IEC 60034-2-1; 2007 |      |      | Starting current/<br>Rated current | Starting torque/<br>Rated torque | Maximum torque/<br>Rated torque | Moment of inertia | Weight | Noise |
|-------------|----------------|----------------|----------------|-----------------------|--------------|------|------|------------------------------------|------|------|------------------------------------|----------------------------------|---------------------------------|-------------------|--------|-------|
|             | P <sub>N</sub> | N <sub>N</sub> | M <sub>N</sub> | I <sub>N</sub> (400V) | Cos Phi      |      |      | η                                  |      |      | Id / In                            | Md/Mn                            | M <sub>u</sub> /Mn              | J                 | IM B3  | LP    |
|             | kW             | min-1          | Nm             | 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

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

IP 55 - 50 Hz - Class F - 400 V Δ - S1

A

| Type       | Rated power<br>at 50 Hz<br>$P_N$<br>kW | IM 1001<br>(IM B3) |     | IM 3001<br>(IM B5) |     | IM 2001<br>(IM B35) |     | IM 3601<br>(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                                      | EA2 30 208         | 1   | EA2 30 210         | 1   | EA2 30 2B0          | 1   | EA2 30 212          | 1   |
| FLS 112 M  | 4                                      | EA2 40 208         | 1   | EA2 40 210         | 1   | EA2 40 2B0          | 1   | EA2 40 212          | 1   |
| FLS 132 S  | 5.5                                    | EA2 55 214         | 1   | EA2 55 216         | 1   | EA2 55 2B6          | 1   | EA2 55 248          | 1   |
| FLS 132 S  | 7,5                                    | EA2 75 208         | 1   | EA2 75 210         | 1   | EA2 75 2B0          | 1   | EA2 75 212          | 1   |
| FLS 160 MA | 11                                     | EA2 11 314         | 1   | EA2 11 316         | 1   | EA2 11 3B6          | 1   |                     |     |
| FLS 160 MB | 15                                     | EA2 15 314         | 1   | EA2 15 316         | 1   | EA2 15 3B6          | 1   |                     |     |
| FLS 160 L  | 18.5                                   | EA2 18 314         | 1   | EA2 18 316         | 1   | EA2 18 3B6          | 1   |                     |     |
| FLS 180 MR | 22                                     | EA2 22 314         | 1   | EA2 22 316         | 1   | EA2 22 3B6          | 1   |                     |     |
| FLS 200 LA | 30                                     | EA2 30 314         | 1   | EA2 30 316         | 1   | EA2 30 3A6          | 1   |                     |     |
| FLS 200 LB | 37                                     | EA2 37 314         | 1   | EA2 37 316         | 1   | EA2 37 3A6          | 1   |                     |     |
| FLS 225 MT | 45                                     | EA2 45 314         | 1   | EA2 45 316         | 1   | EA2 45 3B6          | 1   |                     |     |
| FLS 250 M  | 55                                     | EA2 55 314         | 1   | EA2 55 316         | 1   | EA2 55 3B6          | 1   |                     |     |
| FLS 280 S  | 75                                     | EA2 75 314         | 1   |                    | -   | EA2 75 3B6          | 1   |                     |     |
| FLS 280 M  | 90                                     | EA2 90 314         | 1   |                    | -   | EA2 90 3B6          | 1   |                     |     |
| FLS 315 ST | 110                                    | MA2 11 414         | 1   |                    | -   | MA2 11 4B6          | 1   |                     |     |
| FLS 315 M  | 132                                    | MA2 13 414         | 1   |                    | -   | MA2 13 4B6          | 1   |                     |     |

#### Selection example:

|                        |                                  |
|------------------------|----------------------------------|
| Speed:                 | 3000 min <sup>-1</sup> - 2 poles |
| Power:                 | 30 kW                            |
| Mounting and position: | IM 2001 (IM B35)                 |
| Mains supply voltage:  | 400 V                            |

#### Designation:

2P FLS 200 LA 30 kW IM 2001 (IM B35)  
400 V

Code: EA2 30 3A6

# FLS

## totally enclosed three-phase asynchronous motors

### Selection

IP 55 - 50 Hz - Class F - 400 V  $\Delta$  - S1

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

IE1

| Type        | Rated power    | Rated speed       | Rated torque   | Rated current         | Power factor |      |      | Efficiency*<br>IEC 60034-2-1; 2007 |      |      | Starting current/<br>Rated current | Starting torque/<br>Rated torque | Maximum torque/<br>Rated torque | Moment of inertia | Weight | Noise |
|-------------|----------------|-------------------|----------------|-----------------------|--------------|------|------|------------------------------------|------|------|------------------------------------|----------------------------------|---------------------------------|-------------------|--------|-------|
|             | P <sub>N</sub> | N <sub>N</sub>    | M <sub>N</sub> | I <sub>N</sub> (400V) | Cos Phi      |      |      | $\eta$                             |      |      | Id / In                            | Md/Mn                            | M <sub>M</sub> /Mn              | J                 | IM B3  | LP    |
|             | kW             | min <sup>-1</sup> | Nm             | A                     | 4/4          | 3/4  | 2/4  | 4/4                                | 3/4  | 2/4  |                                    |                                  |                                 | kg.m <sup>2</sup> | 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 | -                                  | -    | -    | 8.0                                | 2.0                              | 2.6                             | 11.7              | 2350   | 82    |
| FLS 355 LKB | 450            | 1489              | 2886           | 769                   | 0.88         | 0.86 | 0.81 | -                                  | -    | -    | 6.8                                | 1.7                              | 2.3                             | 11.7              | 2320   | 82    |
| FLS 400 LB  | 450            | 1489              | 2886           | 769                   | 0.88         | 0.86 | 0.81 | -                                  | -    | -    | 6.8                                | 1.7                              | 2.3                             | 11.7              | 2350   | 87    |
| FLS 355 LKB | 500            | 1489              | 3207           | 870                   | 0.87         | 0.85 | 0.79 | -                                  | -    | -    | 6.4                                | 1.8                              | 2.1                             | 11.7              | 2320   | 82    |
| FLS 400 LVB | 500            | 1489              | 3207           | 870                   | 0.87         | 0.85 | 0.79 | -                                  | -    | -    | 6.4                                | 1.8                              | 2.1                             | 11.7              | 2350   | 87    |
| FLS 450 LA  | 500            | 1493              | 3198           | 853                   | 0.88         | 0.88 | 0.77 | -                                  | -    | -    | 7.3                                | 1.7                              | 2.6                             | 21                | 3100   | 82    |
| FLS 450 LVA | 550            | 1492              | 3520           | 961                   | 0.88         | 0.88 | 0.82 | -                                  | -    | -    | 6.5                                | 1.6                              | 2.3                             | 21                | 3100   | 85    |
| FLS 450 LB  | 630            | 1491              | 4035           | 1089                  | 0.87         | 0.85 | 0.78 | -                                  | -    | -    | 7.4                                | 1.7                              | 2.4                             | 24                | 3450   | 82    |
| FLS 450 LVB | 675            | 1491              | 4323           | 1161                  | 0.87         | 0.85 | 0.78 | -                                  | -    | -    | 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

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

IP 55 - 50 Hz - Class F - 400 V  $\Delta$  - S1

A

| Type       | Rated power<br>at 50 Hz | IM 1001<br>(IM B3) |     | IM 3001<br>(IM B5) |     | IM 2001<br>(IM B35) |     | IM 3601<br>(IM B14) |     |
|------------|-------------------------|--------------------|-----|--------------------|-----|---------------------|-----|---------------------|-----|
|            | $P_N$<br>kW             | Code               | Qty | Code               | Qty | Code                | Qty | Code                | Qty |
| FLS 100 L  | 3                       | EA4 30 214         | 1   | EA4 30 216         | 1   | EA4 30 2B6          | 1   | EA4 30 218          | 1   |
| FLS 112 M  | 4                       | EA4 40 208         | 1   | EA4 40 210         | 1   | EA4 40 2B0          | 1   | EA4 40 212          | 1   |
| FLS 132 S  | 5.5                     | EA4 55 214         | 2   | EA4 55 216         | 1   | EA4 55 2B6          | 1   | EA4 55 218          | 1   |
| FLS 132 M  | 7.5                     | EA4 75 226         | 2   | EA4 75 228         | 1   | EA4 75 2C8          | 1   | EA4 75 230          | 1   |
| FLS 132 M  | 9                       |                    | -   |                    | -   |                     | -   |                     | -   |
| FLS 160 M  | 11                      | EA4 11 326         | 1   | EA4 11 328         | 1   | EA4 11 3C8          | 1   |                     |     |
| FLS 160 L  | 15                      | EA4 15 326         | 1   | EA4 15 328         | 1   | EA4 15 3C8          | 1   |                     |     |
| FLS 180 MR | 18.5                    | EA4 18 326         | 1   | EA4 18 328         | 1   | EA4 18 3C8          | 1   |                     |     |
| FLS 180 L  | 22                      | EA4 22 326         | 1   | EA4 22 328         | 1   | EA4 22 3C8          | 1   |                     |     |
| FLS 200 L  | 30                      | EA4 30 326         | 1   | EA4 30 328         | 1   | EA4 30 3C8          | 1   |                     |     |
| FLS 225 ST | 37                      | EA4 37 326         | 1   | EA4 37 328         | 1   | EA4 37 3C8          | 1   |                     |     |
| FLS 225 M  | 45                      | EA4 45 326         | 1   | EA4 45 328         | 1   | EA4 45 3C8          | 1   |                     |     |
| FLS 250 M  | 55                      | EA4 55 326         | 1   | EA4 55 328         | 1   | EA4 55 3C8          | 1   |                     |     |
| FLS 280 S  | 75                      | EA4 75 326         | 1   |                    | -   | EA4 75 3C8          | 2   |                     |     |
| FLS 280 M  | 90                      | EA4 90 326         | 1   |                    | -   | EA4 90 3C8          | 2   |                     |     |
| FLS 315 ST | 110                     | MA4 11 426         | 1   |                    | -   | MA4 11 4C8          | 2   |                     |     |
| FLS 315 M  | 132                     | MA4 13 420         | 1   |                    | -   | MA4 13 4C2          | 2   |                     |     |

#### Selection example:

|                        |                                  |
|------------------------|----------------------------------|
| Speed:                 | 1500 min <sup>-1</sup> - 4 poles |
| Power:                 | 4 kW                             |
| Mounting and position: | IM 1001 (IM B3)                  |
| Mains supply voltage:  | 400 V                            |

#### Designation:

**4P FLS 112 M 4 kW IM 1001 (IM B3)**  
**400 V**

**Code: EA4 40 208**

# 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



IE1

| Type        | Rated power    | Rated speed       | Rated torque   | Rated current         | Power factor |      |      | Efficiency*<br>IEC 60034-2-1; 2007 |      |      | Starting current/<br>Rated current | Starting torque/<br>Rated torque | Maximum torque/<br>Rated torque | Moment of inertia | Weight | Noise |
|-------------|----------------|-------------------|----------------|-----------------------|--------------|------|------|------------------------------------|------|------|------------------------------------|----------------------------------|---------------------------------|-------------------|--------|-------|
|             | P <sub>N</sub> | N <sub>N</sub>    | M <sub>N</sub> | I <sub>N</sub> (400V) | 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> | Nm             | A                     | 4/4          | 3/4  | 2/4  | 4/4                                | 3/4  | 2/4  |                                    |                                  |                                 | kg.m <sup>2</sup> | 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 | -                                  | -    | -    | 8.0                                | 2.1                              | 2.5                             | 35                | 3350   | 80    |
| FLS 450 LB  | 500            | 996               | 4794           | 952                   | 0.79         | 0.74 | 0.63 | -                                  | -    | -    | 8.0                                | 2.1                              | 2.5                             | 35                | 3400   | 80    |
| FLS 450 LB  | 550            | 994               | 5284           | 1034                  | 0.80         | 0.74 | 0.63 | -                                  | -    | -    | 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

A

| Type       | Rated power<br>at 50 Hz | IM 1001<br>(IM B3)      | Qty |
|------------|-------------------------|-------------------------|-----|
|            | $P_N$<br>kW             | Code                    |     |
| 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                     | MA6 75 226 <sup>1</sup> | 1   |
| FLS 160 L  | 11                      | MA6 11 326 <sup>1</sup> | 1   |
| FLS 180 L  | 15                      | MA6 15 326 <sup>1</sup> | 1   |
| FLS 200 LA | 18.5                    | MA6 18 326 <sup>1</sup> | 1   |
| FLS 200 LB | 22                      | MA6 22 326 <sup>1</sup> | 1   |
| FLS 225 M  | 30                      | MA6 30 326 <sup>1</sup> | 1   |
| FLS 250 M  | 37                      | MA6 37 326 <sup>1</sup> | 1   |
| FLS 280 S  | 45                      | MA6 45 326 <sup>1</sup> | -   |
| FLS 280 M  | 55                      | MA6 55 326 <sup>1</sup> | -   |
| FLS 315 ST | 75                      | MA6 75 326 <sup>1</sup> | -   |
| FLS 315 M  | 90                      | MA6 90 320 <sup>1</sup> | -   |

1. 400 V  $\Delta$

#### Selection example:

|                        |                                  |
|------------------------|----------------------------------|
| Speed:                 | 1000 min <sup>-1</sup> - 6 poles |
| Power:                 | 7.5 kW                           |
| Mounting and position: | IM 1001 (IM B3)                  |
| Mains supply voltage:  | 400 V                            |

#### Designation:

6P FLS 160 M 7.5 kW IM 1001 (IM B3)  
400 V

Code: MA6 75 226

# 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

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

|            | Rated power          | Rated speed                         | Rated torque         | Rated current              | Power factor |      |      | Efficiency IEC 60034-2; 1996 |      |      | Starting current/ Rated current | Starting torque/ Rated torque  | Maximum torque/ Rated torque   | Moment of inertia      | Weight      | Noise       |
|------------|----------------------|-------------------------------------|----------------------|----------------------------|--------------|------|------|------------------------------|------|------|---------------------------------|--------------------------------|--------------------------------|------------------------|-------------|-------------|
| Type       | P <sub>N</sub><br>kW | N <sub>N</sub><br>min <sup>-1</sup> | M <sub>N</sub><br>Nm | I <sub>N</sub> (400V)<br>A | Cos Phi      |      |      | $\eta$                       |      |      | 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<br>kg.m <sup>2</sup> | IM B3<br>kg | LP<br>db(A) |
| FLS 80L    | 0.18                 | 710                                 | 2.42                 | 0.8                        | 0.64         | 0.58 | 0.46 | 52.3                         | 51   | 45   | 3.0                             | 1.7                            | 1.7                            | 0.003                  | 14          | 40          |
| FLS 80L    | 0.25                 | 720                                 | 3.32                 | 1.1                        | 0.6          | 0.55 | 0.44 | 54.5                         | 54   | 46   | 3.2                             | 2.0                            | 2.4                            | 0.004                  | 16          | 40          |
| FLS 90S    | 0.37                 | 685                                 | 5.16                 | 1.2                        | 0.71         | 0.57 | 0.45 | 64                           | 63   | 59   | 3.5                             | 1.6                            | 1.6                            | 0.004                  | 21          | 45          |
| FLS 90L    | 0.55                 | 695                                 | 7.56                 | 1.7                        | 0.72         | 0.59 | 0.46 | 63                           | 58   | 54   | 3.3                             | 1.8                            | 1.8                            | 0.005                  | 23          | 45          |
| FLS 100LK  | 0.75                 | 720                                 | 9.95                 | 2.3                        | 0.68         | 0.6  | 0.47 | 70.9                         | 70   | 66   | 4.1                             | 1.9                            | 1.9                            | 0.009                  | 41          | 48          |
| FLS 100LK  | 1.1                  | 720                                 | 14.6                 | 3.8                        | 0.62         | 0.56 | 0.44 | 68                           | 66   | 60   | 4.1                             | 1.8                            | 2.4                            | 0.012                  | 43          | 48          |
| FLS 112M   | 1.5                  | 725                                 | 19.8                 | 4.8                        | 0.63         | 0.57 | 0.45 | 72.5                         | 72   | 68   | 4.0                             | 2.1                            | 2.2                            | 0.015                  | 45          | 49          |
| FLS 132S   | 2.2                  | 715                                 | 29.4                 | 7.2                        | 0.6          | 0.55 | 0.44 | 74                           | 74   | 72   | 3.2                             | 1.4                            | 1.8                            | 0.025                  | 71          | 54          |
| FLS 132M   | 3                    | 705                                 | 40.6                 | 9.1                        | 0.63         | 0.57 | 0.46 | 76                           | 76   | 73   | 3.1                             | 1.3                            | 1.9                            | 0.033                  | 81          | 54          |
| FLS 160MA  | 4                    | 710                                 | 53.8                 | 11.3                       | 0.63         | 0.56 | 0.44 | 81.5                         | 82   | 80.1 | 3.8                             | 1.4                            | 1.7                            | 0.062                  | 105         | 56          |
| FLS 160MB  | 5.5                  | 710                                 | 74                   | 15                         | 0.65         | 0.58 | 0.46 | 82                           | 82.5 | 80.6 | 3.8                             | 1.4                            | 1.7                            | 0.071                  | 111         | 56          |
| FLS 160L   | 7.5                  | 715                                 | 100                  | 20                         | 0.65         | 0.58 | 0.46 | 83                           | 93.5 | 81.6 | 3.8                             | 1.5                            | 1.8                            | 0.086                  | 128         | 56          |
| FLS 180L   | 11                   | 724                                 | 145                  | 27                         | 0.7          | 0.63 | 0.51 | 85.1                         | 84.9 | 82.4 | 3.9                             | 1.4                            | 1.7                            | 0.21                   | 175         | 62          |
| FLS 200L   | 15                   | 729                                 | 197                  | 34                         | 0.72         | 0.66 | 0.53 | 88.1                         | 88   | 86.2 | 5.0                             | 1.8                            | 2.6                            | 0.32                   | 265         | 62          |
| FLS 225ST  | 18.5                 | 727                                 | 243                  | 41                         | 0.73         | 0.67 | 0.54 | 89                           | 88.9 | 87.1 | 5.0                             | 1.6                            | 2.3                            | 0.38                   | 285         | 65          |
| FLS 225M   | 22                   | 732                                 | 287                  | 48                         | 0.72         | 0.68 | 0.58 | 92.1                         | 92.6 | 91.7 | 5.9                             | 1.8                            | 2.5                            | 0.83                   | 388         | 65          |
| FLS 250M   | 30                   | 729                                 | 393                  | 61                         | 0.78         | 0.74 | 0.64 | 91.2                         | 91.7 | 90.8 | 6.2                             | 1.8                            | 2.5                            | 0.83                   | 393         | 65          |
| FLS 280S   | 37                   | 723                                 | 489                  | 75                         | 0.78         | 0.74 | 0.64 | 92                           | 92.1 | 91   | 4.5                             | 1.3                            | 1.8                            | 1.4                    | 472         | 65          |
| FLS 280M   | 45                   | 730                                 | 589                  | 102                        | 0.7          | 0.66 | 0.55 | 91.7                         | 91.8 | 90.7 | 6.0                             | 2.3                            | 3.2                            | 1.75                   | 563         | 65          |
| FLS 315ST  | 55                   | 738                                 | 712                  | 102                        | 0.83         | 0.8  | 0.71 | 94.2                         | 94.5 | 94   | 7.4                             | 2.1                            | 3.0                            | 2.7                    | 850         | 75          |
| FLS 315M   | 75                   | 743                                 | 964                  | 147                        | 0.78         | 0.76 | 0.68 | 94.8                         | 95   | 94.3 | 7.4                             | 2.0                            | 2.2                            | 3.1                    | 1000        | 78          |
| FLS 315LA  | 90                   | 742                                 | 1158                 | 177                        | 0.78         | 0.76 | 0.68 | 94.7                         | 94.9 | 94.2 | 6.7                             | 1.9                            | 2.1                            | 4.2                    | 1030        | 78          |
| FLS 315LB  | 110                  | 742                                 | 1416                 | 222                        | 0.76         | 0.74 | 0.66 | 94.8                         | 95   | 94.3 | 7.2                             | 2.0                            | 2.2                            | 5.1                    | 1125        | 78          |
| FLS 355LA  | 132                  | 741                                 | 1701                 | 258                        | 0.78         | 0.75 | 0.68 | 95.3                         | 95.2 | 94.2 | 6.7                             | 2.0                            | 2.2                            | 5.5                    | 1415        | 78          |
| FLS 355LB  | 160                  | 741                                 | 2062                 | 312                        | 0.78         | 0.75 | 0.68 | 95.3                         | 95.2 | 94.2 | 6.9                             | 2.0                            | 2.2                            | 6                      | 1535        | 78          |
| FLS 355LD  | 200                  | 741                                 | 2577                 | 364                        | 0.84         | 0.81 | 0.74 | 95                           | 94.9 | 93.9 | 6.7                             | 1.6                            | 1.7                            | 6.5                    | 1935        | 78          |
| FLS 355LKA | 250                  | 743                                 | 3213                 | 464                        | 0.82         | 0.77 | 0.67 | 95.3                         | 95.1 | 94.2 | 6.8                             | 1.6                            | 2.2                            | 18.5                   | 2170        | 78          |
| FLS 400LA  | 250                  | 743                                 | 3213                 | 464                        | 0.82         | 0.77 | 0.67 | 95.3                         | 95.1 | 94.2 | 6.8                             | 1.6                            | 2.2                            | 18.5                   | 2200        | 78          |
| FLS 355LKB | 300                  | 741                                 | 3866                 | 552                        | 0.83         | 0.78 | 0.68 | 95                           | 94.8 | 94   | 6.0                             | 1.1                            | 1.5                            | 21.6                   | 2370        | 78          |
| FLS 400LB  | 300                  | 741                                 | 3866                 | 552                        | 0.83         | 0.78 | 0.68 | 95                           | 94.8 | 94   | 6.0                             | 1.1                            | 1.5                            | 21.6                   | 2400        | 78          |
| FLS 400LKA | 350                  | 746                                 | 4480                 | 652                        | 0.81         | 0.78 | 0.69 | 96.2                         | 95.9 | 95   | 6.2                             | 1.7                            | 1.4                            | 40                     | 3100        | 78          |
| FLS 450LA  | 350                  | 746                                 | 4480                 | 652                        | 0.81         | 0.78 | 0.69 | 96.2                         | 95.9 | 95   | 6.2                             | 1.7                            | 1.4                            | 40                     | 3150        | 78          |
| FLS 400LKB | 400                  | 746                                 | 5120                 | 737                        | 0.82         | 0.79 | 0.71 | 96.1                         | 95.8 | 94.9 | 6.7                             | 1.9                            | 1.6                            | 47                     | 3420        | 78          |
| FLS 450LB  | 400                  | 746                                 | 5120                 | 737                        | 0.82         | 0.79 | 0.71 | 96.1                         | 95.8 | 94.9 | 6.7                             | 1.9                            | 1.6                            | 47                     | 3470        | 78          |

# 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

A

| Type       | Rated power<br>at 50 Hz | IM 1001<br>(IM B3) |     |
|------------|-------------------------|--------------------|-----|
|            | $P_N$<br>kW             | 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                      |                    | -   |

# FLS totally enclosed 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<br>Dahlander        | 4/6 poles<br>PAM <sup>1</sup> or 2 windings | 4/8 poles<br>Dahlander        | 6/8 poles<br>PAM <sup>1</sup> or 2 windings |
|------------|-----------------------------------|-------------------------------|---------------------------------------------|-------------------------------|---------------------------------------------|
|            |                                   | Rated power<br>at 50 Hz<br>kW | Rated power<br>at 50 Hz<br>kW               | Rated power<br>at 50 Hz<br>kW | Rated power<br>at 50 Hz<br>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 L  | 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 totally enclosed 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<br>Dahlander        | 4/6 poles<br>2 windings       | 4/8 poles<br>Dahlander        | 6/8 poles<br>2 windings       |
|------------|-----------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
|            |                                   | Rated power<br>at 50 Hz<br>kW | Rated power<br>at 50 Hz<br>kW | Rated power<br>at 50 Hz<br>kW | Rated power<br>at 50 Hz<br>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

### Options

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<br>(drain holes at lowest point) |                          |                          |                          | Fan cover with drip cover |
|---------|-----------------------------------------------------|--------------------------|--------------------------|--------------------------|---------------------------|
|         | IM V1<br>IM 3011<br>Code                            | IM V3<br>IM 3031<br>Code | IM V5<br>IM 1011<br>Code | IM V6<br>IM 1031<br>Code | Code                      |
| FLS 80  | MAV 80 003                                          | MAV 80 015               | MAV 80 025               | MAV 80 038               | MATP 1014                 |
| FLS 90  | MAV 90 004                                          | MAV 90 016               | MAV 90 026               | MAV 90 039               | MATP 1015                 |
| FLS 100 | MAV 100 05                                          | MAV 100 17               | MAV 100 27               | MAV 100 40               | MATP 1016                 |
| FLS 112 | MAV 112 06                                          | MAV 112 18               | MAV 112 28               | MAV 112 41               | MATP 1017                 |
| FLS 132 | MAV 132 07                                          | MAV 132 19               | MAV 132 29               | MAV 132 42               | MATP 1018                 |
| FLS 160 | MAV 160 08                                          |                          | MAV 160 30               |                          | MATP 1019                 |
| FLS 180 | MAV 180 11                                          |                          | MAV 180 64               |                          | MATP 1024                 |
| FLS 200 | MAV 200 09                                          |                          | MAV 200 31               |                          | MATP 1020                 |
| FLS 225 |                                                     |                          | MAV 225 32               |                          | MATP 1021                 |
| FLS 250 |                                                     |                          | MAV 250 33               |                          | MATP 1022                 |
| FLS 280 |                                                     |                          | MAV 280 34               |                          | MATP 1023                 |
| FLS 315 |                                                     |                          |                          |                          | MATP 1025                 |
| FLS 355 |                                                     |                          |                          |                          |                           |
| FLS 400 |                                                     |                          |                          |                          |                           |
| FLS 450 |                                                     |                          |                          |                          |                           |

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

| Type             | Forced ventilation |
|------------------|--------------------|
|                  | Code               |
| FLS 80           | MVA 00 068         |
| FLS 90           | MVA 00 001         |
| FLS 100 (foot)   | MVA 00 202         |
| FLS 100 (flange) | MVA 00 002         |
| FLS 112          | MVA 00 002         |
| FLS 132          | MVA 00 064         |
| FLS 160          |                    |
| FLS 180          |                    |
| FLS 200          |                    |
| FLS 225          |                    |
| FLS 250          |                    |
| FLS 280          |                    |
| FLS 315          |                    |
| FLS 355          |                    |
| FLS 400          |                    |
| FLS 450          |                    |

# FLS

## totally enclosed three-phase asynchronous motors

### Options

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

|         | 2 poles<br>3000 min <sup>-1</sup>                                                 | 4 poles<br>1500 min <sup>-1</sup>                                                 | 6* poles<br>1000 min <sup>-1</sup>                                                |                              |               |
|---------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------|---------------|
|         | PTO<br>Thermal<br>protections<br>opening (n/c)                                    | PTF<br>Thermal<br>protections<br>closing (n/o)                                    | CTP<br>Positive temperature<br>coefficient thermistors<br>probes                  | Anti-condensation<br>heaters | Aluminium fan |
| Type    |  |  |  |                              |               |
| FLS 80  | MAPT 1011                                                                         | MAPTF 101                                                                         |                                                                                   |                              | MA0 00 285    |
| FLS 90  | MAPT 1011                                                                         | MAPTF 101                                                                         |                                                                                   |                              | MA0 00 286    |
| FLS 100 | MAPT 1011                                                                         | MAPTF 101                                                                         | MACPT 101                                                                         |                              | MA0 00 287    |
| FLS 112 | MAPT 1011                                                                         | MAPTF101                                                                          | MACTP 101                                                                         |                              | MA0 00 288    |
| FLS 132 | MAPT 1011                                                                         | MAPTF101                                                                          | MACTP 101                                                                         |                              | MA0 00 289    |
| FLS 160 | MAPT 1011                                                                         | MAPTF101                                                                          | MACTP 101                                                                         | MARE 1019                    |               |
| FLS 180 | MAPT 1011                                                                         | MAPTF101                                                                          | MACTP 101                                                                         | MARE 1023                    |               |
| FLS 200 | MAPT 1011                                                                         | MAPTF101                                                                          | MACTP 101                                                                         | MARE 1020                    |               |
| FLS 225 | MAPT 1011                                                                         | MAPTF101                                                                          | MACTP 101                                                                         | MARE 1021                    |               |
| FLS 250 | MAPT 1011                                                                         | MAPTF101                                                                          | MACTP 101                                                                         | MARE 1022                    |               |
| FLS 280 | MAPT 1011                                                                         | MAPTF101                                                                          | MACTP 101                                                                         | MARE 1016                    |               |
| FLS 315 | MAPT 1011                                                                         | MAPTF101                                                                          | MACTP 101                                                                         | MARE 1024                    |               |
| FLS 355 | MAPT 1011                                                                         | MAPTF101                                                                          | MACTP 101                                                                         | MARE 1025                    |               |

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

#### Use guide:

- STEP 1: Select the required basic motor according to the selection grids in the previous pages.
- STEP 2: Select the required additional option or options and add them to the basic designation.

#### Codification example:

Cast iron motor FLS tri 11 kW 3000 min<sup>-1</sup> B3  
230/400 V with PTO

**Designation** 2P FLS160MA 11kW B3 230/400V ➔ **Code** EA211313


  
 PTO ➔ MAPT1011

# FLS

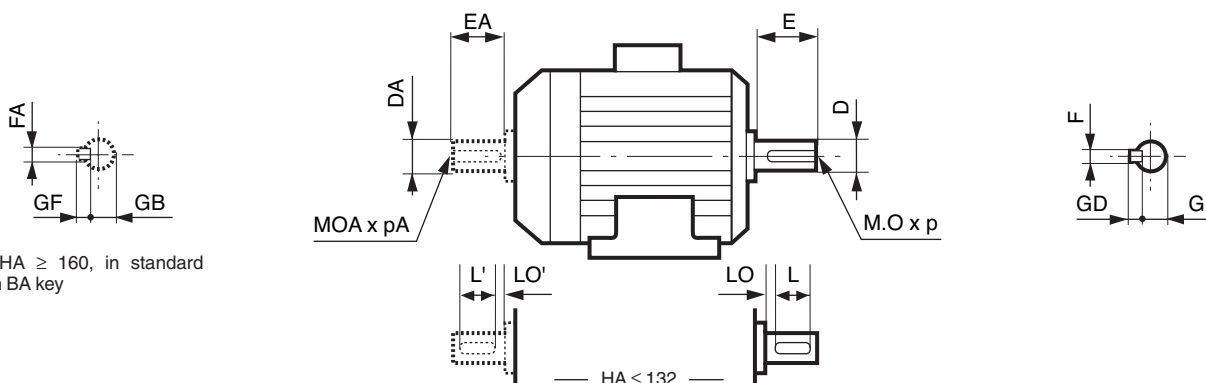
## totally enclosed three-phase asynchronous motors

### 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

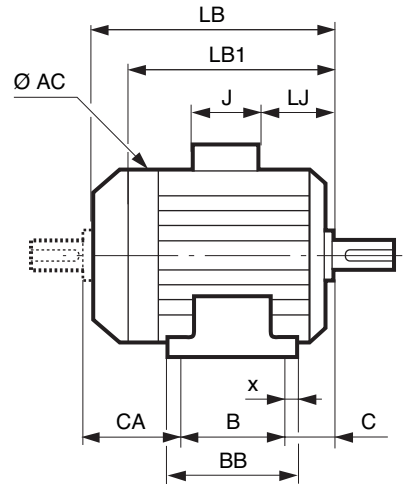
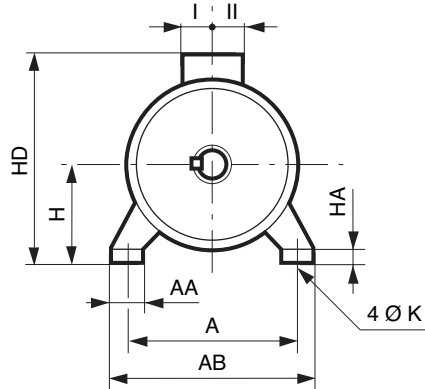
## totally enclosed three-phase asynchronous motors

### 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  | 20 | 32  | 9  | 11 | 80  | 170 | 231  | 216  | 178              | 7  | 136 | 68  | 68  | 83  |
| FLS 90 S          | 140             | 170 | 100 | 162 | 37  | 27 | 26  | 9  | 10 | 90  | 185 | 251  | 251  | 225              | 9  | 136 | 68  | 68  | 126 |
| FLS 90 L          | 140             | 170 | 125 | 162 | 52  | 27 | 26  | 9  | 10 | 90  | 185 | 251  | 251  | 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 | 288  | 323  | 276              | 55 | 114 | 57  | 57  | 119 |
| FLS 112 M         | 190             | 230 | 140 | 185 | 70  | 32 | 48  | 12 | 12 | 112 | 231 | 294  | 309  | 265              | 18 | 136 | 68  | 68  | -   |
| FLS 132 S         | 216             | 255 | 140 | 240 | 89  | 50 | 63  | 12 | 16 | 132 | 264 | 347  | 385  | 330              | 22 | 136 | 68  | 68  | 170 |
| FLS 132 M         | 216             | 255 | 178 | 240 | 89  | 50 | 63  | 12 | 16 | 132 | 264 | 347  | 385  | 330              | 22 | 136 | 68  | 68  | 170 |
| FLS 132 MU        | 216             | 255 | 178 | 240 | 89  | 50 | 63  | 12 | 16 | 132 | 264 | 347  | 412  | 351              | 22 | 136 | 68  | 68  | 170 |
| FLS 160 M         | 254             | 294 | 210 | 294 | 108 | 20 | 65  | 14 | 20 | 160 | 310 | 440  | 495  | 435              | 30 | 246 | 126 | 147 | 182 |
| FLS 160 L         | 254             | 294 | 254 | 294 | 108 | 20 | 65  | 14 | 20 | 160 | 310 | 440  | 495  | 435              | 30 | 246 | 126 | 147 | 138 |
| FLS 180 MR        | 279             | 324 | 241 | 295 | 121 | 25 | 80  | 14 | 25 | 180 | 310 | 460  | 515  | 450              | 30 | 246 | 126 | 147 | 158 |
| FLS 180 L         | 279             | 330 | 279 | 335 | 121 | 28 | 70  | 14 | 28 | 180 | 350 | 481  | 555  | 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

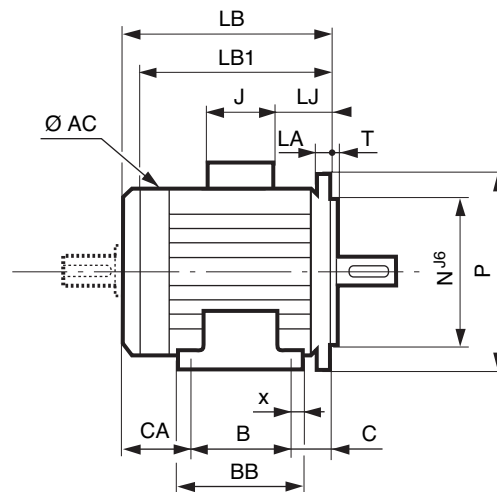
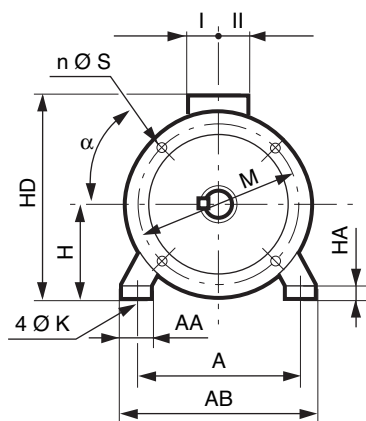
### Dimensions

#### 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 <sup>1</sup> | LJ | J   | I   | II  | CA  | Sym.    |
|-------------------|-----|-----|-----|-----|-----|----|-----|----|----|-----|-----|------|------|------------------|----|-----|-----|-----|-----|---------|
| FLS 80 L          | 125 | 157 | 100 | 130 | 50  | 20 | 32  | 9  | 11 | 80  | 170 | 231  | 216  | 178              | 7  | 136 | 68  | 68  | 83  | FF 165  |
| FLS 90 S          | 140 | 170 | 100 | 162 | 37  | 27 | 26  | 9  | 10 | 90  | 185 | 251  | 251  | 225              | 9  | 136 | 68  | 68  | 126 | FF 165  |
| FLS 90 L          | 140 | 170 | 125 | 162 | 52  | 27 | 26  | 9  | 10 | 90  | 185 | 251  | 251  | 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 | 288  | 323  | 276              | 55 | 114 | 57  | 57  | 119 | FF 215  |
| FLS 112 M         | 190 | 230 | 140 | 185 | 70  | 32 | 48  | 12 | 12 | 112 | 231 | 294  | 309  | 265              | 18 | 136 | 68  | 68  | -   | FF 215  |
| FLS 132 S         | 216 | 255 | 140 | 240 | 89  | 50 | 63  | 12 | 16 | 132 | 264 | 347  | 385  | 330              | 22 | 136 | 68  | 68  | 170 | FF 265  |
| FLS 132 M         | 216 | 255 | 178 | 240 | 89  | 50 | 63  | 12 | 16 | 132 | 264 | 347  | 385  | 330              | 22 | 136 | 68  | 68  | 170 | FF 265  |
| FLS 132 MU        | 216 | 255 | 178 | 240 | 89  | 50 | 63  | 12 | 16 | 132 | 264 | 347  | 412  | 351              | 22 | 136 | 68  | 68  | 170 | FF 265  |
| FLS 160 M         | 254 | 294 | 210 | 294 | 108 | 20 | 65  | 14 | 20 | 160 | 310 | 440  | 495  | 435              | 30 | 246 | 126 | 147 | 182 | FF 300  |
| FLS 160 L         | 254 | 294 | 254 | 294 | 108 | 20 | 65  | 14 | 20 | 160 | 310 | 440  | 495  | 435              | 30 | 246 | 126 | 147 | 138 | FF 300  |
| FLS 180 MR        | 279 | 324 | 241 | 295 | 121 | 25 | 80  | 14 | 25 | 180 | 310 | 460  | 515  | 450              | 30 | 246 | 126 | 147 | 158 | FF 300  |
| FLS 180 L         | 279 | 330 | 279 | 335 | 121 | 28 | 70  | 14 | 28 | 180 | 350 | 481  | 555  | 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

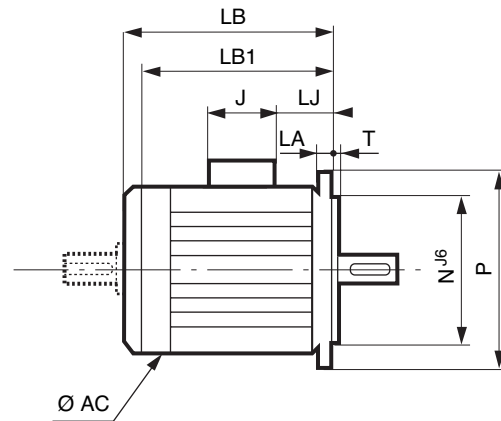
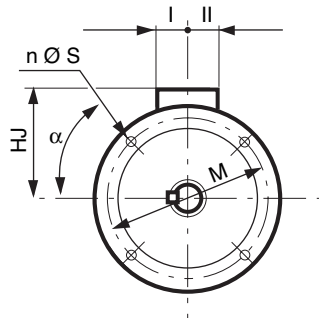
## totally enclosed three-phase asynchronous motors

### Dimensions

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

Dimensions in millimetres

- (FF) plain hole flange mounted



| IEC<br>symbol | Flange dimensions |      |      |     |   |      |      |    |
|---------------|-------------------|------|------|-----|---|------|------|----|
|               | M                 | N    | P    | T   | n | α°   | 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   | 18   | 15 |
| FF 400        | 400               | 350  | 450  | 5   | 8 | 22.3 | 18   | 16 |
| FF 400        | 400               | 350  | 450  | 5   | 8 | 22.3 | 18   | 16 |
| FF 400        | 400               | 350  | 450  | 5   | 8 | 22.3 | 18   | 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          | 170             | 216  | 178  | 152 | 7  | 136 | 68  | 68  |
| FLS 90 S          | 185             | 251  | 225  | 158 | 9  | 136 | 68  | 68  |
| FLS 90 L          | 185             | 251  | 225  | 158 | 9  | 136 | 68  | 68  |
| FLS 100 L         | 204             | 300  | 253  | 158 | 8  | 136 | 68  | 68  |
| FLS 100 LK        | 226             | 323  | 276  | 176 | 55 | 114 | 57  | 57  |
| FLS 112 M         | 231             | 309  | 265  | 182 | 18 | 136 | 68  | 68  |
| FLS 132 S         | 264             | 385  | 330  | 205 | 22 | 136 | 68  | 68  |
| FLS 132 M         | 264             | 385  | 330  | 205 | 22 | 136 | 68  | 68  |
| FLS 132 MU        | 264             | 412  | 351  | 205 | 22 | 136 | 68  | 68  |
| FLS 160 M         | 310             | 495  | 435  | 280 | 30 | 246 | 126 | 147 |
| FLS 160 L         | 310             | 495  | 435  | 280 | 30 | 246 | 126 | 147 |
| FLS 180 MR        | 310             | 515  | 450  | 280 | 30 | 246 | 126 | 147 |
| FLS 180 L         | 350             | 555  | 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.

\*\* LB1: on request.

The form of the FF flange mounted motors, IM 3001 (IM B5) position, stops at the frame size 225.

# FLS

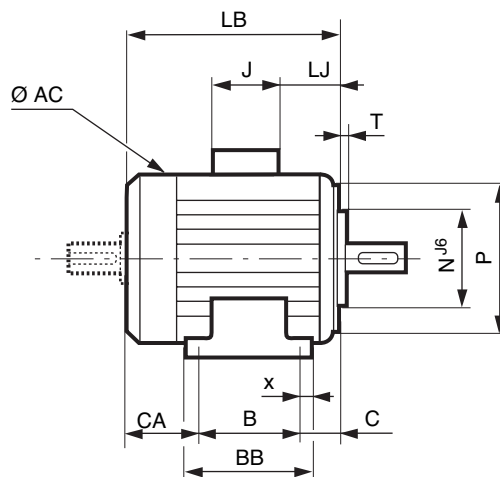
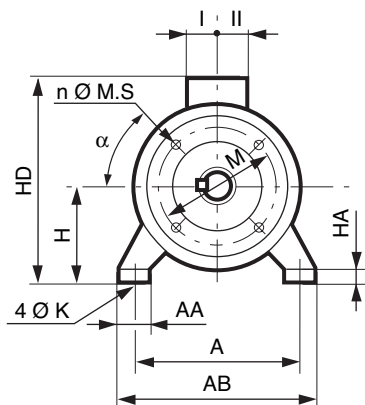
## totally enclosed three-phase asynchronous motors

### 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



| Type       | Main dimensions |     |     |     |    |    |    |    |    |     |     |     |     |                  |    |     |    |    |     | Sym.   |
|------------|-----------------|-----|-----|-----|----|----|----|----|----|-----|-----|-----|-----|------------------|----|-----|----|----|-----|--------|
|            | 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 | 20 | 32 | 9  | 11 | 80  | 170 | 231 | 216 | 178              | 7  | 136 | 68 | 68 | 83  | FT 100 |
| FLS 90 S   | 140             | 170 | 100 | 162 | 37 | 27 | 26 | 9  | 10 | 90  | 185 | 251 | 251 | 225              | 9  | 136 | 68 | 68 | 126 | FT 115 |
| FLS 90 L   | 140             | 170 | 125 | 162 | 52 | 27 | 26 | 9  | 10 | 90  | 185 | 251 | 251 | 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 | 288 | 323 | 276              | 55 | 114 | 57 | 57 | 119 | FT 130 |
| FLS 112 M  | 190             | 230 | 140 | 185 | 70 | 32 | 48 | 12 | 12 | 112 | 231 | 294 | 309 | 265              | 18 | 136 | 68 | 68 | -   | FT 130 |
| FLS 132 S  | 216             | 255 | 140 | 240 | 89 | 50 | 63 | 12 | 16 | 132 | 264 | 347 | 385 | 330              | 22 | 136 | 68 | 68 | 170 | FT 215 |
| FLS 132 M  | 216             | 255 | 178 | 240 | 89 | 50 | 63 | 12 | 16 | 132 | 264 | 347 | 385 | 330              | 22 | 136 | 68 | 68 | 170 | FT 215 |
| FLS 132 MU | 216             | 255 | 178 | 240 | 89 | 50 | 63 | 12 | 16 | 132 | 264 | 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

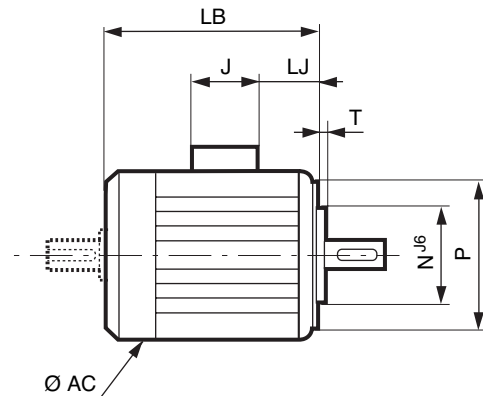
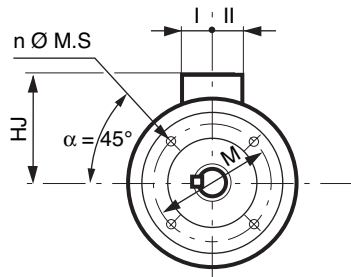
## totally enclosed three-phase asynchronous motors

### Dimensions

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

Dimensions in millimetres

– (FT) tapped hole flange mounted



| IEC<br>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 <sup>1</sup> | HJ  | LJ | J   | I  | II |
| <b>FLS 80 L</b>   | 170             | 216 | 178              | 152 | 7  | 136 | 68 | 68 |
| <b>FLS 90 S</b>   | 185             | 251 | 225              | 158 | 9  | 136 | 68 | 68 |
| <b>FLS 90 L</b>   | 185             | 251 | 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             | 323 | 276              | 159 | 55 | 114 | 57 | 57 |
| <b>FLS 112 M</b>  | 231             | 309 | 265              | 182 | 18 | 136 | 68 | 68 |
| <b>FLS 132 S</b>  | 264             | 385 | 330              | 205 | 22 | 136 | 68 | 68 |
| <b>FLS 132 M</b>  | 264             | 385 | 330              | 205 | 22 | 136 | 68 | 68 |
| <b>FLS 132 MU</b> | 264             | 412 | 351              | 205 | 22 | 136 | 68 | 68 |

