



FCR
from 0.09 to 15 kW
Asynchronous brake motors
Catalogue extract

FCR asynchronous brake motors

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FCR asynchronous brake motors

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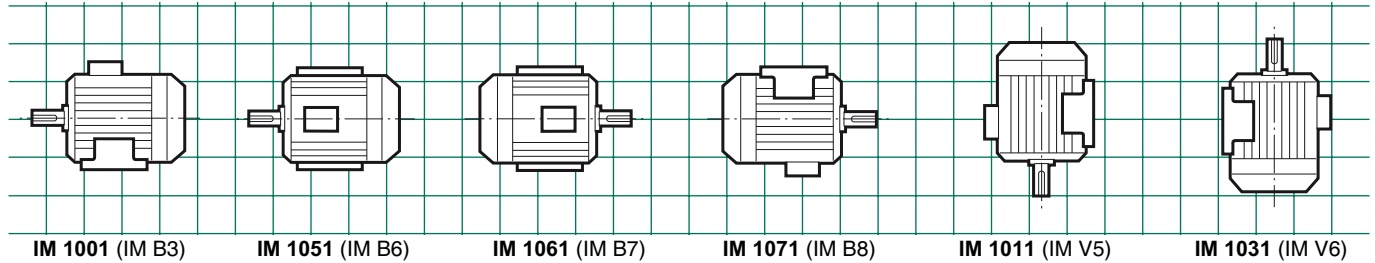
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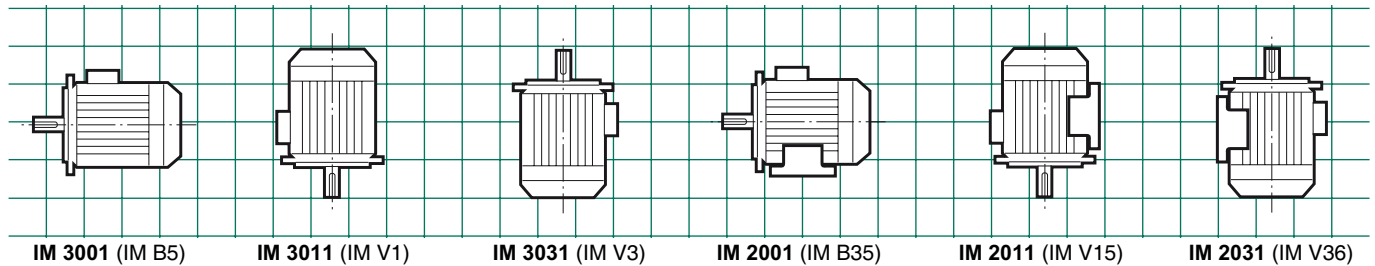
FCR asynchronous brake motors

Operating positions - Fixing

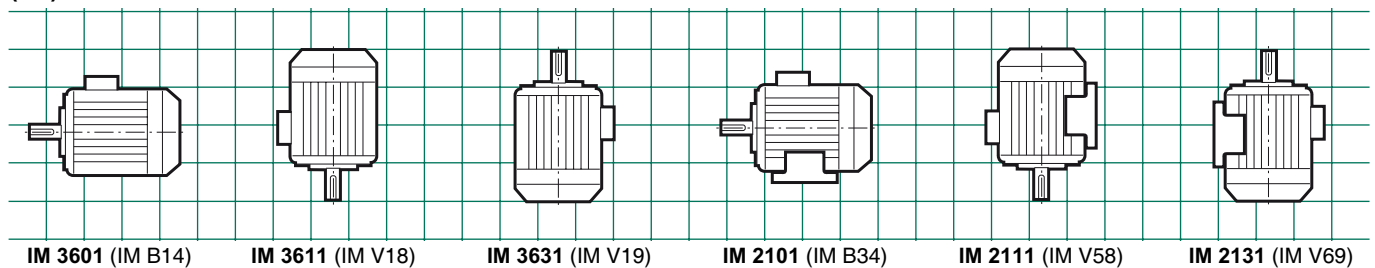
Foot mounted motors



(FF) Flange mounted motors

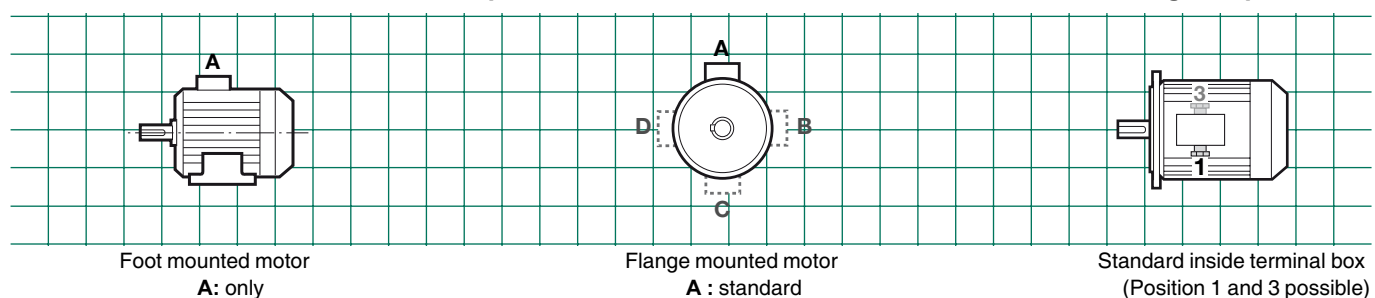


(FT) Face mounted motors



Terminal box positions

Cable gland positions



FCR asynchronous brake motors

Adaptation possibilities

Leroy-Somer offers, for brake motors, several adaptations meeting a wide range of requirements. They are described below in this booklet, in the part related to gears for fixed speed motors.

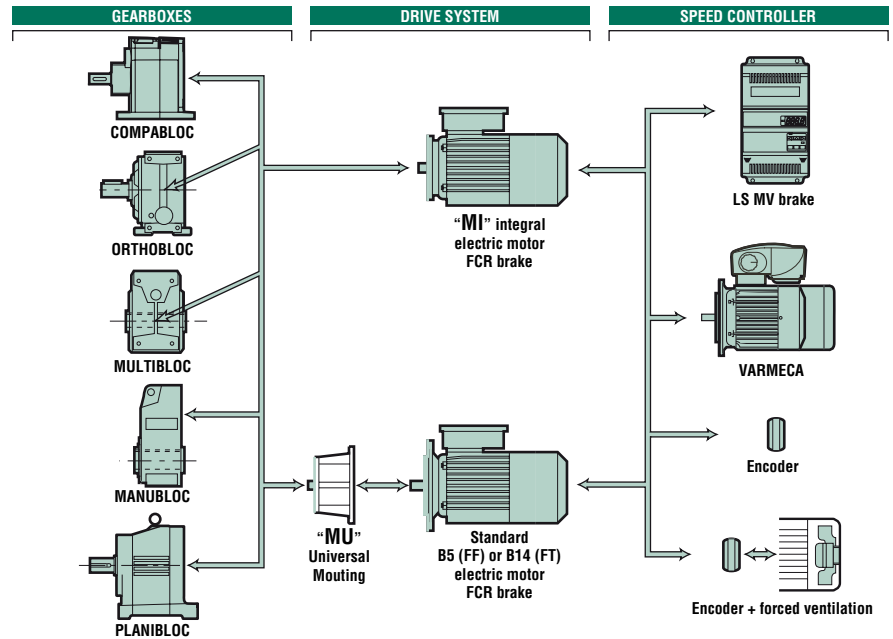
For other adaptations, ask the Leroy-Somer technical specialists who are always at your disposal.

FCR brake motor can be coupled either by integral mounting (adapted motor) or a universal mounting (I.E.C. standard motor) with the following gearboxes:

- Compabloc
- Orthobloc
- Multibloc
- Planibloc
- Manubloc

FCR brake motors can be controlled by speed controllers:

- LS MV with brake
- VARMECA



Designation and coding

4P 1500 min ⁻¹	LS	80	L	0,9 kW	IM 3001 (IM B5)	230/400 V 50 Hz	U.G.	FCR	J02	10 N.m	A1
No. of poles speed	Motor type	Motor frame size	Manufacturer index (Motor)	Rated motor power : kW (or starting torque : Nm)	Operating position	Main supply voltage and frequency	Appli- cation (use)	Brake type	Select ed inertia	Braking torque	Terminal box and cable gland position

Coding examples :

4P LS 80 L 0.9 kW IM3001 (IM B5) 230/400 V
50 Hz U.G. FCR J02 10 N.m A1

Designation

4P LS 80 L 0.9 kW B5 230/400 V 50 Hz U.G. FCR
J02 10 N.m

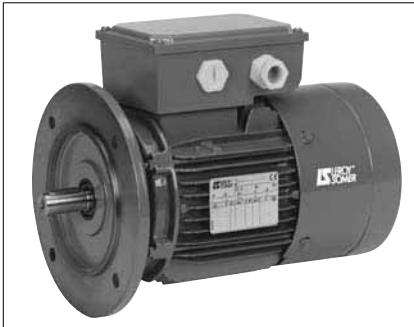
FCR asynchronous brake motors

FCR asynchronous brake motors

U.G. General Use

LS --- FCR

General



3-phase asynchronous brake motors, LS series and failsafe brake, according to CEI 34, 72, EN 50281

- Single speed : **0.09 to 15 kW** power, 71 to 160 mm frame size, 2, 4, 6, 8 poles ; 230/400 V or 400 V Δ , 50 Hz.
- Two speed : (on request) 0.12 to 6 kW power, 80 to 132 mm frame size with 2/4, 4/6, 4/8, 6/8, 6/12 poles in general use, PAM or Dahlander; 400 V Y or Δ , 50 Hz.

– Presentation of the brake motor

IP55 protection providing good sealing against liquid projections and dust in an industrial environment.

– Variable speed motors :

- fitted with thermal probes in the winding (compulsory)

Finish: aluminium casing

Routine test, no load test, dielectric test, verification of resistance and of the direction of rotation.
Shaft and flange protection against atmospheric corrosion.
Individual anti-shock packaging.

Brake power supply

- Standard according to IEC 38 that is :
– 230/400 V + 10 % – 10 % at 50 Hz;
it provides the following supplies
220/380 V + 5 % – 5 % and
240/415 V + 5 % – 5 % at 50 Hz
– 400 V Δ + 10 % – 10 % at 50 Hz.
Connection for Y/ Δ starting
- The brake supply is built-in ; the brake motor is connected as a standard motor. The brake can be connected with a separate AC supply.

Options

- Chosen inertia (Frame 71 to 100), braking torque ; manual release of the brake
- Drip cover ; secondary shaft ; thermal protection probes
- Reduced response time ; connector
- Encoder and/or forced ventilation

Description of the LS --- FCR three phase aluminium brake motor

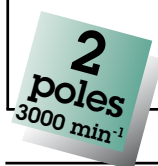
Designation	Material	Comments
Finned housing	Aluminium alloy	- with cast feet or without feet - pressure die-cast • 4 fixing holes for foot mounting • 132 and 112 lifting rings, optional - earth terminal, optional
Stator	Insulated low-carbon magnetic steel with laminations Cathode copper	- the low carbon content assures the stability of characteristics over time - sheets assembled by electric welding - heat shrink assembly in order to provide mechanical resistance - semi-enclosed slots - class F insulation
Rotor	Insulated low-carbon magnetic steel with laminations	- inclined slots - squirrel cage pressure die cast in aluminium (or alloys for special applications) - heat shrink mounting on the shaft - dynamically balanced N class rotor - 1/2 key
Shaft	Steel	- shaft end fitted with screw and washer - closed keyway
End shields	Cast iron	- drive end and non-drive end, fixed by tie rods
Bearings		- dust and damp protected ball bearings, greased for life, with the following mounting : • blocked at rear to guarantee precise positioning of the load, whatever the direction of the force • heavily preloaded front bearing to eliminate axial oscillations
Seals	Synthetic rubber	- IP 55 front and rear shaft seals
Fan	Aluminium or cast iron alloy	- 2 directions of rotation : straight blades
Fan cover	Steel sheet	- on request, fitted with a drip cover for operation in the vertical position, shaft facing down
Terminal box	Aluminium alloy	- IP 55, 4 positions for flange mounted motors, opposite the feet for foot mount or foot and flange mount for frame size ≥ 80 - fitted with a 6 steel terminal board (optionally, brass) and connection by copper bars - supplied with polyamide cable gland - 1 earth terminal in each terminal box
Painting		- system Ia, RAL 6000 paint finish (green) - resistance to saline mist : 72 h (according to NFX 41002)

FCR asynchronous brake motors

U.G. General Use

LS --- FCR

Selection

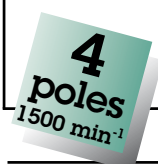


. Motor series LS - IP 55 - 50 HZ - Class F - 230/400 V
Aluminium Rotor (ALU) U.G. General Use
. Brake - IP 55 - Built-in brake power supply - Factory-set braking torque

Δ 230 / Y 400 V or Δ 400 V MAIN SUPPLY 50 Hz

Motor type	Brake type	Rated power at 50 Hz P_n kW	Rated speed N_n min ⁻¹	Rated current I_n (400V) A	Power factor $\cos \varphi$ 4/4	Efficiency η 100 %	Starting current / Rated current I_d / I_n	Starting torque / Rated torque M_d / M_n	Rated torque M_n N.m	Moment of inertia J 10 ⁻³ kg.m ²	Braking torque $M_f \pm 20\%$ N.m	Weight* IM B5	J01 to J03 kg	J05 kg
LS 71 L	FCR J02	0.37	2785	0.9	0.88	66	6.1	2.6	1.26	1.35	5	9.1	11.6	
LS 71 L	FCR J02	0.55	2800	1.5	0.82	62	4.5	2.6	1.88	1.45	5	10	12.5	
LS 80 L	FCR J02	0.75	2850	1.7	0.83	75	6.2	2.6	2.58	3.2	10	15.5	19.2	
LS 80 L	FCR J02	1.1	2870	2.4	0.87	78	6.6	2.9	3.70	3.4	10	17	20.7	
LS 80 L	FCR J02	1.5	2880	3.3	0.84	79	6.7	3.6	5.01	3.6	10	18.6	22.3	
LS 90 L	FCR J02	1.5	2880	3.5	0.77	79	6.6	2.9	4.99	6.1	20	21	25.5	
LS 90 L	FCR J02	1.8	2885	3.4	0.91	83	9	3	6.01	6.4	20	23	27.5	
LS 90 L	FCR J02	2.2	2890	4.4	0.86	83.5	7.4	3.3	7.35	6.8	20	25	29.5	
LS 100 L	FCR J02	3	2860	6.3	0.83	81	7.6	3.8	9.99	6.9	25	30	-	
LS 112 MG	FCR J01	4	2865	7.9	0.85	86	8.7	4.1	13.33	11.2	22	33.4	-	
LS 132 S	FCR J01	5.5	2942	10.5	0.87	87.2	8.8	3.5	18.1	11.9	43	46	-	
LS 132 M	FCR J02	7.5	2905	14.7	0.85	86.5	8.7	3.4	24.5	35.8	80	54	-	
LS 132 M	FCR J02	9	2910	17.3	0.85	88.1	8.6	2.5	29.6	43	80	64	-	
LS 132 M	FCR J02	11	2945	20.7	0.86	89.4	7.5	2.7	36	45	80	70	-	
LS 160 MP	FCR J02	11	2945	20.7	0.86	89.4	7.5	2.7	36	46	80	77	-	
LS 160 MP	FCR J02	15	2935	28.4	0.85	90	8.1	3	48.8	50	80	87	-	

*: These values are for information only.



. Motor series LS - IP 55 - 50 HZ - Class F - 230/400 V
Aluminium Rotor (ALU) U.G. General Use
. Brake - IP 55 - Built-in brake power supply - Factory set braking torque

Δ 230 / Y 400 V or Δ 400 V MAIN SUPPLY 50 Hz

Motor type	Brake type	Rated power at 50 Hz P_n kW	Rated speed N_n min ⁻¹	Rated current I_n (400V) A	Power factor $\cos \varphi$ 4/4	Efficiency η 100 %	Starting current / Rated current I_d / I_n	Starting torque / Rated torque M_d / M_n	Rated torque M_n N.m	Moment of inertia J 10 ⁻³ kg.m ²	Braking torque $M_f \pm 20\%$ N.m	Weight* IM B5	J01 to J03 kg	J05 kg
LS 71 L	FCR J02	0.25	1410	0.85	0.78	54.3	4	2.5	1.68	1.68	5	9.1	11.6	
LS 71 L	FCR J02	0.37	1420	1.2	0.79	60.7	4	2.5	2.49	1.85	5	10	12.5	
LS 71 L	FCR J02	0.55	1400	1.6	0.72	69	4.3	2.3	3.75	2.1	5	11	13.5	
LS 80 L	FCR J02	0.55	1420	1.65	0.71	68	4.3	2.4	3.50	3.8	10	15.5	19.2	
LS 80 L	FCR J02	0.75	1400	2	0.73	72	4.6	2.6	5.12	4.3	10	16.6	20.3	
LS 80 L	FCR J02	0.9	1430	2.4	0.71	77	5.5	3	6.03	4.9	10	18.2	21.9	
LS 90 L	FCR J02	1.1	1440	2.6	0.79	76	5	2.1	7.35	7.3	20	20.5	25	
LS 90 L	FCR J02	1.5	1435	3.5	0.80	78	5.3	2.5	10.03	7.9	20	22.5	27	
LS 90 L	FCR J02	1.8	1440	4.1	0.79	80	6	2.7	11.95	8.4	20	24.2	28.7	
LS 100 L	FCR J02	2.2	1435	5.2	0.78	78	5.8	2	14.5	9	25	27	-	
LS 100 L	FCR J02	3	1450	8.3	0.70	77	6.9	3.1	19.5	10.2	25	30	-	
LS 112 MG	FCR J01	4	1450	8.6	0.82	83	6.3	2.2	26.56	15.3	43	41	-	
LS 132 S	FCR J01	5.5	1447	10.9	0.85	85.7	6.5	2.3	36.3	18.3	43	48	-	
LS 132 M	FCR J02	7.5	1450	15.2	0.82	87	7	2.4	49.4	46	80	70	-	
LS 132 M	FCR J02	9	1455	18.1	0.82	87.7	6.9	2.2	59.3	50	105	75	-	
LS 160 MP	FCR J02	11	1455	21	0.86	88.4	7.7	2.3	72.2	57	120	85	-	
LS 160 LR	FCR J02	15	1455	28.8	0.84	89.4	7.5	2.9	98	63	120	101	-	

FCR asynchronous brake motors

U.G. General Use

LS --- FCR

Selection



• Motor series LS - IP 55 - 50 HZ - Class F - 230/400 V
Aluminium Rotor (ALU) U.G. General Use
• Brake - IP 55 - Built-in brake power supply - Factory set braking torque

Δ 230 / Y 400 V or Δ 400 V MAIN SUPPLY

50 Hz

Motor type	Brake type	Rated power at 50 Hz P_n kW	Rated speed N_n min ⁻¹	Rated current $I_n(400V)$ A	Power factor $\cos \varphi$ 4/4	Efficiency η 100 %	Starting current / Rated current I_d / I_n	Starting torque / Rated torque M_d / M_n	Rated torque M_n N.m	Moment of inertia J 10 ⁻³ kg.m ²	Braking torque $M_f \pm 20\%$ N.m	Weight* IM B5	
												J01 to J03 kg	J05 kg
LS 71 L	FCR J02	0.18	930	0.6	0.58	55	2.9	2.3	1.92	2.1	5	10.3	12.8
LS 71 L	FCR J02	0.25	930	1.1	0.65	51	2.8	1.9	2.84	2.3	5	10.6	13.1
LS 80 L	FCR J02	0.37	940	1.2	0.73	61	3.2	1.8	3.72	5.7	10	17	20.7
LS 80 L	FCR J02	0.55	945	1.6	0.73	66	3.5	1.8	5.53	6.7	10	18.6	22
LS 90 L	FCR J02	0.75	940	2.3	0.69	69	4.75	2.5	7.7	8.6	20	22.5	27
LS 90 L	FCR J02	1.1	945	2.9	0.73	74	4.8	2.45	11.48	9.5	20	24.2	28.7
LS 100 L	FCR J02	1.5	905	4.2	0.74	69	4.5	2.6	15.83	10.5	25	29	-
LS 112 MG	FCR J01	2.2	950	6.2	0.68	75.4	5.2	2.1	23.21	13	43	41	-
LS 132 S	FCR J01	3	965	8.2	0.59	75.2	5.25	3.1	24.6	22.3	43	54	-
LS 132 M	FCR J02	4	960	9.3	0.75	83.6	5.9	2.5	39.6	61	80	68.5	-
LS 132 M	FCR J02	5.5	960	13.3	0.71	84.1	5.5	2.5	54.2	66	80	75.5	-

* : These values are for information only.



• Motor Series LS - IP 55 - 50 HZ - Class F - 230/400 V
Aluminium Rotor (ALU) U.G. General Use
• Brake - IP 55 - Built-in brake power supply - Factory set braking torque

Δ 230 / Y 400 V or Δ 400 V MAIN SUPPLY

50 Hz

Motor type	Brake type	Rated power at 50 Hz P_n kW	Rated speed N_n min ⁻¹	Rated current $I_n(400V)$ A	Power factor $\cos \varphi$ 4/4	Efficiency η 100 %	Starting current / Rated current I_d / I_n	Starting torque / Rated torque M_d / M_n	Rated torque M_n N.m	Moment of inertia J 10 ⁻³ kg.m ²	Braking torque $M_f \pm 20\%$ N.m	Weight* IM B5	
												J01 to J03 kg	J05 kg
LS 71 L	FCR J02	0.09	700	0.76	0.61	28	1.95	1.52	1.25	2.3	5	10.2	12.7
LS 71 L	FCR J02	0.12	655	0.72	0.62	44	1.97	1.43	1.76	2.3	5	10.7	13.2
LS 80 L	FCR J02	0.18	720	1	0.54	47	3	2.4	2.44	5.6	10	17	20.7
LS 80 L	FCR J02	0.25	725	1.3	0.52	54	3.2	2.8	3.41	6.6	10	18.6	22.3
LS 90 L	FCR J02	0.37	685	1.3	0.69	63	3.2	1.9	5.16	8.5	20	22.5	27
LS 90 L	FCR J02	0.55	690	1.8	0.67	67	3.3	2.1	7.78	9.4	20	24.2	28.7
LS 100 L	FCR J02	0.75	670	2.3	0.71	62	3.5	1.9	10.77	9.4	25	27	-
LS 100 L	FCR J02	1.1	670	3.7	0.68	63	3.7	2.1	15.68	11.5	25	31	-
LS 112 MG	FCR J01	1.5	710	4.7	0.64	72	3.8	2.1	20.17	19.3	43	41	-
LS 132 SM	FCR J02	2.2	713	6.1	0.68	77.1	4.3	1.7	30.2	52	80	60.6	-
LS 132 M	FCR J02	3	712	8	0.65	79.8	3.9	1.7	40.7	60	80	69	-

* : These values are for information only.

FCR asynchronous brake motors

U.G. General Use

LS --- FCR

Selection



. Motor series LS - IP 55 - 50 HZ - Class F - 400 V
Squirrel cage rotor - 1 Coil (Dahlander) - U.G. General Use
. Brake - IP 55 - Separate supply¹ - Factory set braking torque

400 V MAIN SUPPLY 50 Hz

Motor type	Brake type	Rated power at 50 Hz		Rated speed		Rated current		Power factor		Efficiency		Starting current / Rated current		Starting torque / Rated torque		Rated torque		Moment of inertia	Braking torque	Weight* IM B5
		P_n kW		N_n min ⁻¹		$I_n(400V)$ A		$\cos \varphi$ 4/4		η 100 %		I_d / I_n		M_d / M_n		M_n N.m		J 10 ⁻³ kg.m ²	$M_f \pm 20\%$ N.m	kg
		GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	-	-	-
LS 71 L	FCR J02	0.25	0.18									Contact us.								
LS 71 L	FCR J02	0.37	0.25									Contact us.								
LS 71 L	FCR J02	0.55	0.37									Contact us.								
LS 80 L	FCR J02	0.55	0.37	2800	1420	1.6	1.2	0.83	0.67	0.6	0.62	3.4	3.3	1.9	2.1	1.75	2.3	5.5	10	15.5
LS 80 L	FCR J02	1.1	0.75	2810	1390	3	2	0.87	0.8	0.62	0.68	4	4.4	2	2.2	3.5	4.7	6.7	10	17.9
LS 90 L	FCR J02	1.5	1.1	2800	1400	4	2.7	0.83	0.74	0.64	0.73	3.6	4.1	1.8	2	4.8	7	8.6	20	21.5
LS 90 L	FCR J02	2.2	1.5	2780	1400	5	3.4	0.88	0.83	0.76	0.76	4.9	4.2	2	2.2	7	9.6	9.6	20	24.2
LS 100 L	FCR J02	3	2.6	2870	1400	7.5	5.9	0.88	0.88	0.75	0.76	5.6	5	1.6	1.9	11	18	10.9	25	33.5
LS 112 MG	FCR J01	4.5	3.7	2910	1450	12.5	8.5	0.79	0.81	0.78	0.81	4.6	6	1.8	1.9	16	23.5	19.3	32	53
LS 132 SM	FCR J02	6	4.5									Contact us.								
LS 132 M	FCR J02	9	6.9	2880	1440	17	13	0.89	0.86	0.72	0.82	6.2	7.9	3	2.1	28	44	65.5	80	75

1. 180 V brake coil ; GV : high speed PV : low speed

* : These values are for information only.



. Motor series LS - IP 55 - 50 HZ - Class F - 400 V
Squirrel cage rotor - 1 Coil (Dahlander) - U.G. General Use
. Brake - IP 55 - Separate supply¹ - Factory set braking torque

400 V MAIN SUPPLY 50 Hz

Motor type	Brake type	Rated power at 50 Hz		Rated speed		Rated current		Power factor		Efficiency		Starting current / Rated current		Starting torque / Rated torque		Rated torque		Moment of inertia	Braking torque	Weight* IM B5
		P_n kW		N_n min ⁻¹		$I_n(400V)$ A		$\cos \varphi$ 4/4		η 100 %		I_d / I_n		M_d / M_n		M_n N.m		J 10 ⁻³ kg.m ²	$M_f \pm 20\%$ N.m	kg
		GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	-	-	-
LS 80 L	FCR J02	0.25	0.12	1420	710	0.8	0.96	0.9	0.57	0.56	0.33	3.8	2.3	1.9	2.1	1.6	1.6	4	10	15.5
LS 80 L	FCR J02	0.55	0.22	1400	690	1.3	1.25	0.86	0.66	0.66	0.46	3.6	2.4	1.3	1.7	3.5	3.5	4.3	10	16.3
LS 90 L	FCR J02	1.2	0.6	1400	710	2	2.2	0.85	0.56	0.73	0.57	3.6	2.3	1.5	1.6	5.1	5.1	9.6	20	24.2
LS 100 L	FCR J02	1.7	0.9	1420	700	4	3.9	0.84	0.59	0.78	0.63	4.3	2.7	1.6	1.8	12	12	9.8	25	30
LS 112 MG	FCR J01	2.8	1.5	1430	720	6.8	6.5	0.88	0.56	0.72	0.6	4.4	3	1.2	1.8	19	19	19.3	32	53
LS 132 SM	FCR J02	5	2.85	1440	720	10.8	8.8	0.89	0.61	0.83	0.74	6.3	4.3	1.8	2.3	36	36	60.4	80	70
LS 132 M	FCR J02	7.6	4									Contact us.								80

1. 180 V brake coil ; GV : high speed PV : low speed

* : These values are for information only.

FCR asynchronous brake motors

U.G. General Use

LS --- FCR

Selection

. Motor series LS - IP 55 - 50 HZ - Class F - 230/400 V
Squirrel cage rotor - 2 Coil - U.G. General Use
. Brake - IP 55 - Separate supply¹ - Factory set braking torque

**2-4
poles**
3000-1500 min⁻¹

Y 400 V MAIN SUPPLY 50 Hz

Motor type	Brake type	Rated power at 50 Hz		Rated speed		Rated current		Power factor		Efficiency		Starting current / Rated current		Starting torque / Rated torque		Rated torque		Moment of inertia	Braking torque	Weight* IM B5
		P_n kW		N_n min ⁻¹		$I_n (400V)$ A		$\cos \varphi$ 4/4		η 100 %		I_d / I_n		M_d / M_n		M_n N.m		J 10 ⁻³ kg.m ²	$M_f \pm 20\%$ N.m	kg
		GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV			
LS 80 L	FCR J02	0.55	0.25									Contact us.								
LS 90 L	FCR J02	0.75	0.37									Contact us.								
LS 90 L	FCR J02	1.5	0.75									Contact us.								
LS 100 L	FCR J02	2.2	1.1									Contact us.								
LS 112 MG	FCR J01	3.3	1.7									Contact us.								
LS 132 SM	FCR J02	4	2									Contact us.								
LS 132 M	FCR J02	6	3									Contact us.								

1. 180 V brake coil ; GV : high speed PV : low speed
*: These values are for information only.

**2-6
poles**
3000-1000 min⁻¹

Y 400 V MAIN SUPPLY 50 Hz

Motor type	Brake type	Rated power at 50 Hz		Rated speed		Rated current		Power factor		Efficiency		Starting current / Rated current		Starting torque / Rated torque		Rated torque		Moment of inertia	Braking torque	Weight* IM B5
		P_n kW		N_n min ⁻¹		$I_n (400V)$ A		$\cos \varphi$ 4/4		η 100 %		I_d / I_n		M_d / M_n		M_n N.m		J 10 ⁻³ kg.m ²	$M_f \pm 20\%$ N.m	kg
		GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV			
LS 80 L	FCR J02	0.55	0.18									Contact us.								
LS 90 L	FCR J02	0.75	0.25									Contact us.								
LS 90 L	FCR J02	1.5	0.5									Contact us.								
LS 100 L	FCR J02	2.2	0.75									Contact us.								
LS 112 MG	FCR J01	3	1									Contact us.								
LS 132 SM	FCR J02	4	1.3									Contact us.								
LS 132 M	FCR J02	6.5	2.2									Contact us.								

1. 180 V brake coil ; GV : high speed PV : low speed
*: These values are for information only.

**2-8
poles**
3000-750 min⁻¹

Y 400 V MAIN SUPPLY 50 Hz

Motor type	Brake type	Rated power at 50 Hz		Rated speed		Rated current		Power factor		Efficiency		Starting current / Rated current		Starting torque / Rated torque		Rated torque		Moment of inertia	Braking torque	Weight* IM B5
		P_n kW		N_n min ⁻¹		$I_n (400V)$ A		$\cos \varphi$ 4/4		η 100 %		I_d / I_n		M_d / M_n		M_n N.m		J 10 ⁻³ kg.m ²	$M_f \pm 20\%$ N.m	kg
		GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV			
LS 80 L	FCR J02	0.55	0.12									Contact us.								
LS 90 L	FCR J02	0.75	0.18									Contact us.								
LS 90 L	FCR J02	1.5	0.37									Contact us.								
LS 100 L	FCR J02	2.2	0.55									Contact us.								
LS 112 MG	FCR J01	3	0.75									Contact us.								
LS 132 SM	FCR J02	4	1									Contact us.								
LS 132 M	FCR J02	5.5	1.6									Contact us.								

1. 180 V brake coil ; GV : high speed PV : low speed
*: These values are for information only.

**FCR asynchronous brake motors
U.G. General Use
LS --- FCR**

FCR asynchronous brake motors

U.G. General Use

FLS --- FCR

General



– 3-phase asynchronous FCR brake motors, FLS series with cast iron casing, according to I.E.C. 34, 38, 72
 • Single speed : **0.55 to 9 kW** power, 80 to 132 mm frame size, 4 poles 230/400 V or 400 V Δ, 50 Hz.

For non direct starting : contact us.

– **IP55 protection**

– **Variable speed motors :**
 • fitted with thermal probes in the winding (compulsory),

Finish : cast iron

Corrosion protected screws.
 Shaft and flange protection against atmospheric corrosion.
 Shockproof individual packaging.

Mains supply :

• **Standard construction according to IEC 38 that is :**

- 230/400 V + 10 % – 10 % at 50 Hz ;
- 400 V Δ + 10 % – 10 % at 50 Hz.

Description of FLS --- FCR three phase cast iron brake motors

Designation	Material	Comments
Finned housing	Cast iron	- with cast feet or without feet • 4 fixing holes for foot mounting • 132 and 112 lifting rings, optional - earth terminal on foot or fins
Stator	Insulated low-carbon steel with laminations Enamelled Cathode copper	- the low carbon content assures the stability of characteristics over time - assembled sheets - semi-enclosed slots - class F insulation
Rotor	Insulated low-carbon steel with laminations Aluminium	- inclined slots - squirrel cage pressure die cast in aluminium (or alloys for special applications) - heat shrunk mounting on the shaft - dynamically balanced N class rotor - 1/2 key
Shaft	Steel	- for frame size ≤ 132 S : • shaft end fitted with screw and washer • closed keyway
End shields	Cast iron	- drive end and non-drive end, fixed by tie rods
Bearings		- 2RS dust and dump protected ball bearings, greased for life, with the following mounting : • blocked at rear to guarantee precise positioning of the load • heavily preloaded front bearing to eliminate axial oscillation
Seals	Synthetic rubber	- IP 55 front and rear shaft seals
Fan	Aluminium or cast iron alloy	- 2 directions of rotation: straight blades
Fan cover	Steel sheet	- on request, fitted with a drip cover for operation in vertical position, shaft facing down
Terminal box	Cast iron	- IP 55 - 4 positions for flange mount motors, opposite the feet for foot mount or foot and flange for frame size ≥ 80 - fitted with a 6 steel terminal board - supplied with polyamide cable gland - 1 earth terminal in each terminal box
Painting		- system IIa, RAL 6000 paint finish (green) • 1 base coat (treatment of supports) • 1 polyurethane coat 25/30 μm - resistance to saline mist : 250 h (according to NFX 41002)

FCR asynchronous brake motors

U.G. General Use

FLS --- FCR

Selection



- . Motor series FLS - IP 55 - 50 HZ - F Class - 230/400 V
- Aluminium Rotor (ALU) U.G. General Use
- . Brake - IP 55 - Built-in brake power supply - Factory set braking torque

Δ 230 / Y 400 V or Δ 400 V MAIN SUPPLY

50 Hz

Type	Brake type	Rated power at 50 Hz P_n kW	Rated speed N_n min ⁻¹	Rated current I_n (400V) A	Power factor $\cos \varphi$ 4/4	Efficiency η 100 %	Starting current / Rated current I_d / I_n	Starting torque / Rated torque M_d / M_n	Rated torque M_n N.m	Moment of inertia J 10 ⁻³ kg.m ²	Braking torque $M_f \pm 20\%$ N.m	Weight* IM B5 kg
FLS 80 L	FCR J02	0.55	1410	1.6	0.74	69.2	4.4	2.1	3.7	3.8	10	22
FLS 80 L	FCR J02	0.75	1425	2	0.75	72.5	5.7	3	5	4.9	10	24
FLS 90 L	FCR J02	1.1	1429	2.5	0.83	78	4.9	1.6	7.5	7.3	20	28
FLS 90 L	FCR J02	1.5	1428	3.3	0.82	79.5	5.3	1.8	10	7.9	20	30
FLS 90 L	FCR J02	1.8	1438	4	0.82	80.1	5.9	2.1	12.3	8.4	20	32
FLS 100 LK	FCR J01	2.2	1457	4.6	0.83	83.8	6.3	1.9	15	12	22	57
FLS 100 LK	FCR J01	3	1454	6.2	0.82	84.7	6.5	2.1	20	13.7	43	60
FLS 112 MG	FCR J01	4	1462	8.4	0.81	85.1	7.4	2.5	27.5	16.3	43	64
FLS 132 SM	FCR J02	5.5	1467	10.9	0.84	87	8	2.7	37	42.4	80	80
FLS 132 M	FCR J02	7.5	1450	14.3	0.87	87	7.3	1.9	50	46.2	80	85
FLS 132 M	FCR J02	9	1449	16.8	0.88	87.7	7.6	2.8	61	50	105	90

*: These values are for information only.



FCR asynchronous brake motors for atmospheres containing explosive dust LS --- FCR

CATEGORY 3
ZONE 22
Non-conductive dusts

General



– **3-phase asynchronous brake motors**, LS series, according to IEC 34, 72, EN 50281

- Single speed : **0.25 to 15 kW** power, 71 to 160 mm frame size, 4 poles; 230/400 V or 400 V Δ , 50 Hz.
- Other polarities and 2 speed : upon request (0.09 to 9 kW power, 71 to 160 mm frame size, general use, PAM or Dahlander ; 400 V Y or Δ , 50 Hz.

– **IP55 protection**

– **Variable speed motors :**

- fitted with the thermal probes in the winding (compulsory),
- according to advice
- forced ventilation is forbidden (up to 15 kW)

Finish : aluminium casing

Corrosion protected screws.
Shaft and flange protection against atmospheric corrosion.
Individual anti-shock packaging.

Mains supply :

- Standard construction according to IEC 38 that is:
 - 230/400 V + 10 % – 10 % at 50 Hz ;
 - 400 V Δ + 10 % – 10 % at 50 Hz.

Description of LS --- FCR three phase aluminium brake motors



II 3D T_{MAX} 125 °C

Designation	Material	Comments
Finned housing	Aluminium alloy	- with cast feet or without feet - pressure die cast • fixing holes for foot mounting • 132 and 112 lifting rings, optional - earth terminal, optional
Stator	Insulated low-carbon magnetic steel with laminations Cathode copper	- the low carbon content assures the stability of characteristics over time - sheets assembled by electric welding - heat shrink assembly in order to provide mechanical resistance - semi-enclosed slots - class F insulation
Rotor	Insulated low-carbon magnetic steel with laminations	- inclined slots - squirrel cage pressure die cast in aluminium (or alloys for special applications) - heat shrink mounting on the shaft - dynamically balanced N class rotor - 1/2 key
Shaft	Steel	- shaft end fitted with screw and washer - closed keyway
End shields	Cast iron	- drive end and non-drive end, fixed by tie rods
Bearings		- dust and damp protected ball bearings, greased for life, with the following mounting : • blocked at rear to guarantee precise positioning of the load, • heavily preloaded front bearing to eliminate axial oscillation
Seals	Synthetic rubber	- front seals or deflectors for all motors
Fan	Aluminium or cast iron alloy	- 2 directions of rotation: straight blades
Fan cover	Steel sheet	- on request, fitted with a drip cover for operation in vertical position, shaft facing down
Terminal box	Aluminium alloy	- IP 55 - 4 positions for flange mount motors opposite the feet for foot mount or foot and flange for frame size ≥ 80 - fitted with a 6 steel terminal board - supplied with polyamide cable gland - 1 earth terminal in each terminal box
Painting		- system Ia, RAL 6000 paint finish (green) - resistance to saline mist : 72 h (according to NFX 41002)



FCR asynchronous brake motors for atmospheres containing explosive dust LS --- FCR

CATEGORY 3
ZONE 22
Non-conductive dusts

Selection

4
poles
1500 min⁻¹

. Motor series LS - IP 55 - 50 HZ - F Class - 230/400 V
Aluminium Rotor (ALU) U.G. General Use
. Brake - IP 55 - Built-in brake power supply - Factory set braking torque



II 3D T_{MAX} 125 °C

Δ 230 / Y 400 V or Δ 400 V MAIN SUPPLY 50 Hz

Type	Brake type	Rated power at 50 Hz P_n kW	Rated speed N_n min ⁻¹	Rated current $I_n(400V)$ A	Power factor $\cos \varphi$ 4/4	Efficiency η 100 %	Starting current / Rated current I_d / I_n	Starting torque / Rated torque M_d / M_n	Rated torque M_n N.m	Moment of inertia J 10 ⁻³ kg.m ²	Braking torque $M_f \pm 20\%$ N.m	Weight* IM B5 kg
LS 71 L	FCR J02	0.25	1410	0.85	0.78	54.3	4	2.5	1.68	1.68	5	9.1
LS 71 L	FCR J02	0.37	1420	1.2	0.79	60.7	4	2.5	2.49	1.85	5	10
LS 71 L	FCR J02	0.55	1400	1.6	0.72	69	4.3	2.3	3.75	2.1	5	11
LS 80 L	FCR J02	0.55	1420	1.65	0.71	68	4.3	2.4	3.50	3.8	10	15.5
LS 80 L	FCR J02	0.75	1400	2	0.73	72	4.6	2.6	5.12	4.3	10	16.6
LS 80 L	FCR J02	0.9	1430	2.4	0.71	77	5.5	3	6.03	4.9	10	18.2
LS 90 L	FCR J02	1.1	1440	2.6	0.79	76	5	2.1	7.35	7.3	20	20.5
LS 90 L	FCR J02	1.5	1435	3.5	0.80	78	5.3	2.5	10.03	7.9	20	22.5
LS 90 L	0FCR J02	1.8	1440	4.1	0.79	80	6	2.7	11.95	8.4	20	24.2
LS 100 L	FCR J02	2.2	1435	5.2	0.78	78	5.8	2	14.5	9	25	27
LS 100 L	FCR J02	3	1450	8.3	0.70	77	6.9	3.1	19.5	10.2	25	30
LS 112 MG	FCR J01	4	1450	8.6	0.82	83	6.3	2.2	26.56	15.3	43	41
LS 132 S	FCR J01	5.5	1447	10.9	0.85	85.7	6.5	2.3	36.3	18.3	43	48
LS 132 M	FCR J02	7.5	1450	15.2	0.82	87	7	2.4	49.4	46	80	70
LS 132 M	FCR J02	9	1455	18.1	0.82	87.7	6.9	2.2	59.3	50	105	75
LS 160 MP	FCR J02	11	1455	21	0.86	88.4	7.7	2.3	72.2	57	120	85
LS 160 LR	FCR J02	15	1455	28.8	0.84	89.4	7.5	2.9	98	63	120	101

*: These values are for information only.



FCR asynchronous brake motors for atmospheres containing explosive dust FLS --- FCR

CATEGORY 3
ZONE 22
Non-conductive dusts

General



– **3-phase asynchronous FCR brake motors, FLS series**, according to IEC 34, 72, EN 50281

- Single speed : **0.55 to 9 kW** power, 80 to 132 mm frame size, 4 poles, 230/400 V or 400 V Δ, 50 Hz.
 - 2 speed : upon request, general use, 2/4 and 4/8 poles, 400 V or 400 V Δ.
- For indirect starting : contact us.

– **IP55 protection**

– **Variable speed motors :**

- fitted with thermal probes in the winding (compulsory),
- according to advice
- forced ventilation is forbidden

Finish : aluminium casing

Corrosion protected screws.

Shaft and flange protection against atmospheric corrosion.
Individual anti-shock packaging.

Mains supply

- Standard construction according to IEC 38 that is :
– 230/400 V + 10 % – 10 % at 50 Hz ;
– 400 V Δ + 10 % – 10 % at 50 Hz.



II 3D TMAX 125 °C

Description of FLS --- FCR three phase cast iron brake motors

Designation	Material	Comments
Finned housing	Cast iron	- with cast feet or without feet • 4 fixing holes for foot mounting • 100 to 132 frame size motor lifting rings - earth terminal on foot or fins
Stator	Insulated low-carbon magnetic steel with laminations Enamelled cathode copper	- the low carbon content assures the stability of characteristics over time - assembled sheet - semi-closed slots - class F insulation
Rotor	Insulated low-carbon magnetic steel with laminations Aluminium	- inclined slots - squirrel cage pressure die cast in aluminium (or alloys for special applications) - heat shrunk mounting on the shaft - dynamically balanced N class rotor - 1/2 key
Shaft	Steel	- for frame size ≤ 132 S : • shaft end fitted with screw and washer • closed keyway
End shields	Cast iron	- drive end and non-drive end, fixed by tie rods
Bearings		- Dust and damp protected ball bearings, greased for life, 2RS type with the following mounting: • blocked at rear to guarantee precise positioning of the load, • heavily preloaded front bearing to eliminate axial oscillation
Seals	Synthetic rubber	- front and rear seals for shaft tightness
Fan	Aluminium or cast iron alloy	- 2 directions of rotation: straight blades
Fan cover	Steel sheet	- on request, fitted with a drip cover for operation in vertical position, shaft facing down
Terminal box	Cast iron	- IP 55 - 4 positions for flange mount motors, opposite the feet for foot mount or foot and flange for frame size ≥ 80 - fitted with a 6 steel terminal board - supplied with polyamide cable gland - 1 earth terminal in each terminal box
Painting		- system Ia, RAL 6000 paint finish (green) - resistance to saline mist : 250 h (according to NFX 41002)



FCR asynchronous brake motors for atmospheres containing explosive dust FLS --- FCR

CATEGORY 3
ZONE 22
Non-conductive dusts

Selection

4
poles
1500 min⁻¹

. Motor series FLS - IP 55 - 50 Hz - F Class - 230/400 V
Aluminium Rotor (ALU) U.G. General Use
. Break - IP 55 - Built-in brake power supply - Factory set braking torque



II 3D T_{MAX} 125 °C

Δ 230 / Y 400 V or Δ 400 V MAIN SUPPLY

50 Hz

Type	Brake type	Rated power at 50 Hz P_n kW	Rated speed N_n min ⁻¹	Rated current $I_n (400V)$ A	Power factor $\cos \varphi$ 4/4	Efficiency η 100 %	Starting current / Rated current I_d / I_n	Starting torque / Rated torque M_d / M_n	Rated torque M_n N.m	Moment of inertia J 10 ⁻³ kg.m ²	Braking torque $M_f \pm 20\%$ N.m	Weight* IM B3 or B5 kg
FLS 80 L	FCR J02	0.55	1410	1.6	0.74	69.2	4.4	2.1	3.7	3.8	10	22
FLS 80 L	FCR J02	0.75	1425	2	0.75	72.5	5.7	3	5	4.9	10	24
FLS 90 L	FCR J02	1.1	1429	2.5	0.83	78	4.9	1.6	7.5	7.3	20	28
FLS 90 L	FCR J02	1.5	1428	3.3	0.82	79.5	5.3	1.8	10	7.9	20	30
FLS 90 L	FCR J02	1.8	1438	4	0.82	80.1	5.9	2.1	12.3	8.4	20	32
FLS 100 LK	FCR J01	2.2	1457	4.6	0.83	83.8	6.3	1.9	15	12	22	57
FLS 100 LK	FCR J01	3	1454	6.2	0.82	84.7	6.5	2.1	20	13.7	43	60
FLS 112 MG	FCR J01	4	1462	8.4	0.81	85.1	7.4	2.5	27.5	16.3	43	64
FLS 132 SM	FCR J02	5.5	1467	10.9	0.84	87	8	2.7	37	42.4	80	80
FLS 132 M	FCR J02	7.5	1450	14.3	0.87	87	7.3	1.9	50	46.2	80	85
FLS 132 M	FCR J02	9	1449	16.8	0.88	87.7	7.6	2.8	61	50	105	90

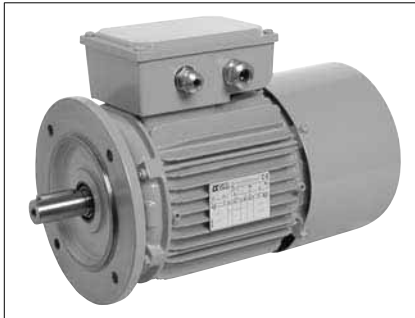
* : These values are for information only.



FCR asynchronous brake motors for atmospheres containing explosive dust LSPX --- FCR

**CATEGORY 2
ZONE 21**

General



– **3-phase asynchronous brake motors**, LSPX series, according to IEC 34, 72, EN 50281

- Single speed : **0.25 to 15 kW** power, 71 to 160 mm frame size, 4 poles 230/400 V or 400 V Δ , 50 Hz.
- Other polarities and 2 speed : upon request (0.09 to 9 kW power, 71 to 160 mm frame size, general use, PAM or Dahlander; 400 V Y or Δ , 50 Hz.

– **IP65 protection**

– **Variable speed motors :**

- fitted with thermal probes in the winding (compulsory),
- according to advice
- forced ventilation is forbidden

Finish : aluminium casing

Corrosive protected screws.

Shaft and flange protection against atmospheric corrosion.

Individual anti-shock packaging.

Mains supply :

- Standard construction according to IEC 38 that is :

- 230/400 V + 10 % – 10 % at 50 Hz ;
- 400 V Δ + 10 % – 10 % at 50 Hz.

Description of LSPX --- FCR three phase aluminium brake motors



II 2D T_{MAX} 125 °C

Designation	Material	Comments
Finned housing	Aluminium alloy	- with cast feet or without feet - pressure die-cast • fixing holes for foot mounting • 132 and 112 lifting rings, optional - earth terminal, optional
Stator	Insulated low-carbon magnetic steel with laminations Cathode copper	- the carbon content assures the stability of characteristics over time - sheets assembled by electric welding - heat shrink assembly in order to provide mechanical resistance - semi-enclosed slots - class F insulation system
Rotor	Insulated low-carbon magnetic steel with laminations	- inclined slots - squirrel cage pressure die cast in aluminium (or alloys for special applications) - heat shrunk mounting on the shaft - dynamically balanced N class rotor - 1/2 key
Shaft	Steel	- shaft end fitted with screw and washer - closed keyway
End shields	Cast iron	- front and rear, assembled by mounting shaft
Bearings		- dust and damp protected ball bearings, greased for life, with the following mounting: • blocked at rear to guarantee precise positioning of the load, • heavily preloaded front bearing to eliminate axial oscillation
Seals	Synthetic rubber	- DE and NDE lip seals for IP 65 protection on the shaft
Fan	Aluminium or cast iron alloy	- 2 directions of rotation : straight blades
Fan cover	Steel sheet	- on request, fitted with a drip cover for operation in vertical position, shaft facing down
Terminal box	Aluminium alloy	- IP 65 - 4 positions for flange mount motors, opposite the feet for foot mount or floor and flange for frame size ≥ 80 - fitted with a 6 steel terminal board and lock nuts - supplied with cable fixed brass cable gland - 1 earth terminal in each terminal box
Painting		- system Ia, RAL 1007 paint finish (yellow) - resistance to saline mist : 72 h (according to NFX 41002)



FCR asynchronous brake motors for atmospheres containing explosive dust LSPX --- FCR

**CATEGORY 2
ZONE 21**

Selection

**4
poles
1500 min⁻¹**

- Motor series LSPX - IP 65 - 50 HZ - F Class - 230/400 V
Aluminium Rotor (ALU) U.G. General Use
- Brake - IP 65 - Built-in brake power supply - Factory set braking torque



II 2D T_{MAX} 125 °C

Δ 230 / Y 400 V or Δ 400 V MAIN SUPPLY

50 Hz

Type	Brake type	Rated power at 50 Hz <i>P_n</i> kW	Rated speed <i>N_n</i> min ⁻¹	Rated current <i>I_n</i> (400V) A	Power factor <i>cos φ</i> 4/4	Efficiency <i>η</i> 100 %	Starting current / Rated current <i>I_d / I_n</i>	Starting torque / Rated torque <i>M_d / M_n</i>	Rated torque <i>M_n</i> N.m	Moment of inertia <i>J</i> 10 ⁻³ kg.m ²	Braking torque <i>M_f ± 20%</i> N.m	Weight* IM B3 or B5 kg
LSPX 71 L	FCR J02	0.25	1410	0.85	0.78	54.3	4	2.5	1.68	1.68	5	9.1
LSPX 71 L	FCR J02	0.37	1420	1.2	0.79	60.7	4	2.5	2.49	1.85	5	10
LSPX 71 L	FCR J02	0.55	1400	1.6	0.72	69	4.3	2.3	3.75	2.1	5	11
LSPX 80 L	FCR J02	0.55	1420	1.65	0.71	68	4.3	2.4	3.50	3.8	10	15.5
LSPX 80 L	FCR J02	0.75	1400	2	0.73	72	4.6	2.6	5.12	4.3	10	16.6
LSPX 80 L	FCR J02	0.9	1430	2.4	0.71	77	5.5	3	6.03	4.9	10	18.2
LSPX 90 L	FCR J02	1.1	1440	2.6	0.79	76	5	2.1	7.35	7.3	20	20.5
LSPX 90 L	FCR J02	1.5	1435	3.5	0.80	78	5.3	2.5	10.03	7.9	20	22.5
LSPX 90 L	FCR J02	1.8	1440	4.1	0.79	80	6	2.7	11.95	8.4	20	24.2
LSPX 100 L	FCR J02	2.2	1435	5.2	0.78	78	5.8	2	14.5	9	25	27
LSPX 100 L	FCR J02	3	1450	8.3	0.70	77	6.9	3.1	19.5	10.2	25	30
LSPX 112 MG	FCR J01	4	1450	8.6	0.82	83	6.3	2.2	26.56	15.3	43	41
LSPX 132 S	FCR J01	5.5	1447	10.9	0.85	85.7	6.5	2.3	36.3	18.3	43	48
LSPX 132 M	FCR J02	7.5	1450	15.2	0.82	87	7	2.4	49.4	46	80	70
LSPX 132 M	FCR J02	9	1455	18.1	0.82	87.7	6.9	2.2	59.3	50	105	75
LSPX 160 MP	FCR J02	11	1455	21	0.86	88.4	7.7	2.3	72.2	57	120	85
LSPX 160 LR	FCR J02	15	1455	28.8	0.84	89.4	7.5	2.9	98	63	120	101

*: These values are for information only.



FCR asynchronous brake motors for atmospheres containing explosive dust FLSPX --- FCR

**CATEGORY 2
ZONE 21**

General



– **3-phase asynchronous FCR brake motors, FLSPX series**, according to IEC 34, 72, EN 50281

- Single speed : **0.55 to 9 kW** power, 80 to 132 mm frame size, 4 poles 230/400 V ou 400 V Δ, 50 Hz.
- 2 speed : (upon request) general use, 2/4 and 4/8 poles, 400 V or 400 V Δ. For indirect starting: contact us.

– **IP65 protection**

– **Variable speed motors :**

- fitted with thermal probes in the winding (compulsory),
- according to advice
- forced ventilation is forbidden

Finish : cast iron casing

Corrosion protected screws.

Shaft and flange protection against atmospheric corrosion.
Individual anti-shock packaging.

Mains supply

- Standard construction according to IEC 38 that is :
– 230/400 V + 10 % – 10 % at 50 Hz ;
– 400 V Δ + 10 % – 10 % at 50 Hz.

Description of FLSPX --- FCR three phase cast iron brake motors



II 2D TMAX 125 °C

Designation	Material	Comments
Finned housing	Cast iron	- with cast feet or without feet • 4 fixing holes for foot mounting • 132 and 112 lifting rings, optional - supported or blade earth terminal
Stator	Insulated low-carbon magnetic steel with laminations Enamelled cathode copper	- the low carbon content assures the stability of characteristics in time - assembled sheet metal - semi-enclosed slots - class F insulation
Rotor	Insulated low-carbon magnetic steel with laminations Aluminium	- inclined slots - squirrel cage pressure die cast in aluminium (or alloys for special applications) - heat shrunk mounting on the shaft - dynamically balanced N class rotor - 1/2 key
Shaft	Steel	- for frame size ≤ 132 S : • shaft end fitted with screw and washer • closed keyway
End shields	Cast iron	- drive and and non-drive end, fixed by mounting shafts
Bearings		- dust and damp protected ball bearings, greased for life, 2RS type with the following mounting: • blocked at rear to guarantee precise positioning of the load • heavily preloaded front bearing to eliminate axial oscillation
Seals	Synthetic rubber	- DE and NDE lip seals for IP 65 protection on the shaft
Fan	Aluminium or cast iron alloy	- 2 directions of rotation : straight blades
Fan cover	Steel sheet	- on request, fitted with a drip cover for operation in vertical position, shaft facing-down
Terminal box	Cast iron	- IP 65 - 4 positions for flange mount motors, opposite the feet for foot mount or foot and flange for frame size ≥ 80 - fitted with a 6 steel terminal block and captive nuts - supplied with fixed brass cable gland - 1 earth terminal in each terminal box
Painting		- system Ia, RAL 1007 paint finish (yellow) - resistance to saline mist : 250 h (according to NFX 41002)



FCR asynchronous brake motors for atmospheres containing explosive dust FLSPX --- FCR

**CATEGORY 2
ZONE 21**

Selection



- Motor series FLSPX - IP 65 - 50 HZ - F Class - 230/400 V
Aluminium Rotor (ALU) U.G. General Use
- Brake - IP 65 - Built-in brake power supply - Factory set braking torque



II 2D T_{MAX} 125 °C

Δ 230 / Y 400 V or Δ 400 V MAIN SUPPLY 50 Hz

Type	Brake type	Rated power at 50 Hz P_n kW	Rated speed N_n min ⁻¹	Rated current $I_n (400V)$ A	Power factor $\cos \varphi$ 4/4	Efficiency η 100 %	Starting current / Rated current I_d / I_n	Starting torque / Rated torque M_d / M_n	Rated torque M_n N.m	Moment of inertia J 10 ⁻³ kg.m ²	Braking torque $M_f \pm 20\%$ N.m	Weight* IM B3 or B5 kg
FLSPX 80 L	FCR J02	0.55	1410	1.6	0.74	69.2	4.4	2.1	3.7	3.8	10	22
FLSPX 80 L	FCR J02	0.75	1425	2	0.75	72.5	5.7	3	5	4.9	10	24
FLSPX 90 L	FCR J02	1.1	1429	2.5	0.83	78	4.9	1.6	7.5	7.3	20	28
FLSPX 90 L	FCR J02	1.5	1428	3.3	0.82	79.5	5.3	1.8	10	7.9	20	30
FLSPX 90 L	FCR J02	1.8	1438	4	0.82	80.1	5.9	2.1	12.3	8.4	20	32
FLSPX 100 LK	FCR J01	2.2	1457	4.6	0.83	83.8	6.3	1.9	15	12	22	57
FLSPX 100 LK	FCR J01	3	1454	6.2	0.82	84.7	6.5	2.1	20	13.7	43	60
FLSPX 112 MG	FCR J01	4	1462	8.4	0.81	85.1	7.4	2.5	27.5	16.3	43	64
FLSPX 132 SM	FCR J02	5.5	1467	10.9	0.84	87	8	2.7	37	42.4	80	80
FLSPX 132 M	FCR J02	7.5	1450	14.3	0.87	87	7.3	1.9	50	46.2	80	85
FLSPX 132 M	FCR J02	9	1449	16.8	0.88	87.7	7.6	2.8	61	50	105	90

* : These values are for information only.

FCR asynchronous brake motors

U.L. Hoisting applications

LS --- FCR

General



3-phase asynchronous brake motors, LS series and fail stop brake, according to IEC 34, 72, EN 50281

- Single speed : **0.55 to 15 kW** power, 80 to 160 mm frame size, 4 poles ; 230/400 V or 400 V Δ , 50 Hz.
- Two speed : (on request) 0.55 to 6 kW power, 80 to 132 mm frame size at 2/6, 2/8, used for lifting, PAM or Dahlander ; 400 V Y or Δ , 50 Hz.

– **Presentation of the brake motor**
IP55 protection providing good sealing against liquid projections and dust in an industrial environment.

– **Variable speed motors** :
• fitted with thermal probes in the winding (compulsory)

Finish : aluminium casing

Routine test, no load test, dielectric test, verification of resistance and of the direction of rotation.

Shaft and flange protection against atmospheric corrosion.

Individual anti-shock packaging.

Brake power supply

- Standard according to IEC 38 that is :
– 230/400 V + 10 % – 10 % at 50 Hz ;

it provides the following supplies

220/380 V + 5 % – 5 % and

240/415 V + 5 % – 5 % at 50 Hz

– 400 V Δ + 10 % – 10 % at 50 Hz.

Connection for Y/ Δ starting

- The brake supply is built-in ; the brake motor is connected as a standard motor. The brake can be connected with a separate AC supply.

Options

- Chosen inertia,
- Manual release of the brake
- Drip cover; secondary shaft; thermal protection probes
- Reduced response time; connector
- Encoder and/or forced ventilation

Description of LS --- FCR three phase aluminium brake motors

Designation	Material	Comments
Finned casing	Aluminium alloy	- with cast feet or without feet - pressure die cast • 4 fixing holes for foot mounting • 132 and 112 lifting rings, optional - earth terminal, optional
Stator	Insulated low-carbon magnetic steel with laminations Cathode copper	- the low carbon content assures the stability of characteristics over time - sheets assembled by electric welding - heat shrink assembly in order to provide mechanical resistance - semi-enclosed slots - class F insulation
Rotor	Insulated low-carbon magnetic steel with laminations	- inclined slots - squirrel cage pressure die cast bin alloy for special application : Lifting - heat shrinked mounting on the shaft - dynamically balanced N class keyed rotor - 1/2 key
Shaft	Steel	- shaft end fitted with screw and washer - closed keyway
End shields	Cast iron	- drive end and non-drive end, fixed by mounting shaft
Bearings		- dust and damp protected ball bearings, greased for life, with the following mounting : • blocked at rear to guarantee precise positioning of the load, whatever the direction of the force • heavily preloaded front bearing to eliminate axial oscillation
Seals	Synthetic rubber	- IP 55 front and back shaft seals
Fan	Aluminium or cast iron alloy	- 2 directions of rotation: straight blades
Fan cover	Steel sheet	- on request, fitted with a drip cover for operation in vertical position, shaft facing down
Terminal box	Aluminium alloy	- IP 55, 4 positions for flange mount motors opposite the feet for foot mount or foot and flange for frame size ≥ 80 - fitted with a 6 steel terminal board (optionally, brass) and connection by copper bars - supplied with polyamide cable gland - 1 earth terminal in each terminal box
Painting		- system Ia, RAL 6000 paint finish (green) - resistance to saline mist: 72 h (according to NFX 41002)

FCR asynchronous brake motors

U.L. Hoisting applications

LS --- FCR

Selection

. Motor series LS - IP 55 - 50 HZ - F Class - 230/400 V

DP Rotor - Keyed weight - U.L. Used for Lifting

. Brake - IP 55 - Built-in brake power supply - Factory set braking torque



Δ 230 / Y 400 V or Δ 400 V MAIN SUPPLY 50 Hz

Motor type	Brake type	Rated power at 50 Hz	Rated speed	Rated current	Power factor	Efficiency	Starting current / Rated current	Starting torque / Rated torque	Rated torque	Moment of inertia	Braking torque	Weight* IM B5	
		P_n kW	N_n min ⁻¹	I_n (400V) A	$\cos \varphi$ 4/4	η 100 %	I_d / I_n	M_d / M_n	M_n N.m	J 10 ⁻³ kg.m ²	$M_f \pm 20\%$ N.m	J01 to J03 kg	J05 kg
LS 80 L	FCR J02	0.55	1370	1.64	0.71	68	3.8	2.9	3.50	3.8	10	15.5	19.2
LS 80 L	FCR J02	0.75	1370	2	0.77	70	4.2	2.7	5.12	4.3	10	16.6	20.3
LS 90 L	FCR J02	1.1	1360	2.8	0.8	70	3.9	1.9	7.35	7.3	20	20.5	25
LS 90 L	FCR J02	1.5	1380	3.8	0.78	73.5	4.4	2.3	10.03	7.9	20	22.5	27
LS 90 L	FCR J02	1.8	1400	4.2	0.81	77.3	5.4	2.7	11.95	8.4	20	24.2	28.7
LS 100 L	FCR J02	2.2	1400	5.4	0.77	76	5.3	2.5	14.5	9	25	27	-
LS 100 L	FCR J02	3	1410	7.1	0.77	79	5.4	2.7	19.5	10.2	32	30	-
LS 112 MG	FCR J01	4	1440	8.8	0.82	82	6.4	2.9	26.56	15.3	43	41	-
LS 132 SM	FCR J02	5.5	1420	12	0.85	80	5.7	2.6	37	42.2	80	61	-
LS 132 M	FCR J02	7.5	1430	16	0.81	85	6.6	2.7	49.4	46	105	70	-
LS 132 M	FCR J02	9	1440	20	0.81	83	6.9	3.1	59.3	50	120	75	-
LS 160 MP	FCR J02	11	1450	21.7	0.84	87	7.6	3.1	72.2	57	160	85	-
LS 160 LR	FCR J02	15	1430	27.8	0.88	87	7.4	3.1	98	63	160	101	-

*: These values are for information only.

FCR asynchronous brake motors

U.L. Hoisting applications

LS --- FCR

Selection

. Motor series LS - IP 55 - 50 HZ - F Class - 230/400 V

DP Rotor - Keyed weight - U.L. Used for Lifting

. Brake - IP 55 - Separated supply - Factory set braking torque

2-6
poles
3000-1000 min⁻¹

Y 400 V MAIN SUPPLY

50 Hz

Motor type	Brake type	Rated power at 50 Hz		Rated speed		Rated current		Power factor		Efficiency		Starting current / Rated current		Starting torque / Rated torque		Rated torque		Moment of inertia	Braking torque	Weight* IM B5
		P_n kW		N_n min ⁻¹		$I_n(400V)$ A		$\cos \varphi$ 4/4		η 100 %		I_d / I_n		M_d / M_n		M_n N.m		J 10 ⁻³ kg.m ²	$M_f \pm 20\%$ N.m	kg
		GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	-	-	-
LS 80 L	FCR J02	0.55	0.18									Contact us.							10	18.2
LS 90 L	FCR J02	0.75	0.25	2760	925	2.1	1.8	0.85	0.78	62	62	4.2	4	3.2	2.7	2.5	2.5	7.2	20	23
LS 90 L	FCR J02	1.5	0.5	2820	920	3.8	1.5	0.8	0.77	72	63	4.7	3.3	2.9	2	5	5	8.5	20	25
LS 100 L	FCR J02	2.2	0.75	2855	925	5.4	2.1	0.8	0.76	73	69	6.1	4.3	4.4	2.7	7.5	7.5	9.8	25	31
LS 112 MG	FCR J01	3	0.9									Contact us.								43
LS 132 SM	FCR J02	4	1.3									Contact us.								75
LS 132 M	FCR J02	6	2									Contact us.								80

1. 180 V brake coil ; GV : high speed PV : low speed

* : These values are for information only.

. Motor series LS - IP 55 - 50 HZ - F Class - 230/400 V

DP Rotor - Keyed weight - U.L. Used for Lifting

. Brake - IP 55 - Separated supply - Factory set braking torque

2-8
poles
3000-750 min⁻¹

Y 400 V MAIN SUPPLY

50 Hz

Motor type	Brake type	Rated power at 50 Hz		Rated speed		Rated current		Power factor		Efficiency		Starting current / Rated current		Starting torque / Rated torque		Rated torque		Moment of inertia	Braking torque	Weight* IM B5
		P_n kW		N_n min ⁻¹		$I_n(400V)$ A		$\cos \varphi$ 4/4		η 100 %		I_d / I_n		M_d / M_n		M_n N.m		J 10 ⁻³ kg.m ²	$M_f \pm 20\%$ N.m	kg
		GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	GV	PV	-	-	-
LS 80 L	FCR J02	0.55	0.12	2870	670	1.55	0.7	0.8	0.65	65	40	4.8	2	1.95	1.82	1.9	1.7	4.2	10	18.2
LS 90 L	FCR J02	0.75	0.18	2650	690	2.1	1.1	0.88	0.65	59	39	3.5	1.9	2.8	1.6	2.5	2.5	7.2	20	23
LS 90 L	FCR J02	1.1	0.33	2860	710	3.1	2	0.74	0.55	70	45	5.3	2.5	3.68	2.31	3.8	4.5	8.5	20	25
LS 100 L	FCR J02	2.2	0.55	2760	685	5.4	2.2	0.82	0.68	70	52	4.6	2.9	2.8	2.04	7.5	7.5	9.8	25	31
LS 112 MG	FCR J01	3	0.75	2870	705	8.2	3.1	0.75	0.63	70	56	5.4	2.7	3.5	1.95	10	10	15.3	43	43
LS 132 SM	FCR J02	4	1	2810	710	12	4.3	0.7	0.54	67	62	3.8	3	2.44	2	13.5	13.5	46.2	105	75
LS 132 M	FCR J02	6	1.5	2845	720	17.5	6.7	0.7	0.54	72	59	4.5	3.1	3.2	2.28	20	20	51	105	80

1. 180 V brake coil ; GV : high speed PV : low speed

* : These values are for information only.

**FCR asynchronous brake motors
U.L. Hoisting applications
LS --- FCR**

FCR asynchronous brake motors

U.T. Horizontal motions applications

LS --- FCR

General



– **3-phase asynchronous brake motors**, LS series, according to IEC 34, 72, EN 50281

- Single speed : **3.5 to 120 N.m** starting moment, 71 to 132 mm frame size, 4 poles ; 230/400 V or 400 V Δ , 50 Hz.
- Two speed : 2.5 to 40 N.m starting moment, 71 to 132 mm frame size with 2/8 poles used for transport, two coils 400 V Y or Δ , 50 Hz.

– **Presentation of the brake motor**
IP55 protection providing good sealing against liquid projections and dust in an industrial environment.

- **Variable speed motors :**
- fitted with thermal probes in the winding (compulsory)

Finish : aluminium casing

Routine test, no load test, dielectric test, verification of resistance and of the direction of rotation.

Shaft and flange protection against atmospheric corrosion.

Individual anti-shock packaging.

Brake motor mains supply

- Standard according to IEC 38 that is :
 - 230/400 V + 10 % – 10 % at 50 Hz ; it provides the following supplies 220/380 V + 5 % – 5 % and 240/415 V + 5 % – 5 % at 50 Hz
 - 400 V Δ + 10 % – 10 % at 50 Hz. It provides the following supplies
- Connection for Y/ Δ starting
- The brake supply is built-in ; the brake motor is connected as a standard motor. The brake can be connected to a separate AC supply.

Options

- Chosen inertia (Frame 71 to 100), braking torque ; hand release of the brake
- Drip cover; secondary shaft ; thermal protection probes
- Reduced response time; connector
- Encoder and/or forced ventilation

Description of LS --- FCR aluminium three phase brake motors

Designation	Material	Comments
Finned housing	Aluminium alloy	- with cast feet or without feet - pressure die cast • 4 fixing holes for foot mounting • 132 and 112 lifting rings, optional - earth terminal, optional
Stator	Insulated low-carbon magnetic steel with laminations Cathode copper	- the low carbon content assures the stability of characteristics in time - sheets assembled by electric welding - heat shrink assembly in order to provide mechanical resistance - semi-enclosed slots - class F insulation
Rotor	Insulated low-carbon magnetic steel with laminations	- inclined slots - squirrel cage pressure die cast in alloy for transportation applications - heat shrinked mounting on the shaft - dynamically balanced N class rotor - 1/2 key
Shaft	Steel	- shaft end fitted with screw and washer - closed keyway
End shields	Cast iron	- drive end and non-drive end, fixed by mounting shaft
Bearings		- dust and damp protected ball bearings, greased for life, with the following mounting : • blocked at rear to guarantee precise positioning of the load, whatever the direction of the force • heavily preloaded front bearings to eliminate axial oscillations
Seals	Synthetic rubber	- IP 55 front and rear shaft seals
Fan	Aluminium or cast iron alloy	- 2 directions of rotation : straight blades
Fan cover	Steel sheet	- on request, fitted with a drip cover for operation in vertical position, shaft facing down
Terminal box	Aluminium alloy	- IP 55, 4 positions for flange mount motors opposite the feet for foot mount or foot and flange for frame size ≥ 80 - fitted with a steel terminal board and fixed screws - supplied with polyamide cable gland - 1 earth terminal in each terminal box
Painting		- system Ia, RAL 6000 paint finish (green) - resistance to saline mist: 72 h (according to NFX 41002)

FCR asynchronous brake motors

U.T. Horizontal motions applications

LS --- FCR

Selection

. Motor series LS - IP 55 - 50 HZ - F Class - 230/400 V

U.T. Used for Transportation

. Brake - IP 55 - Built-in brake power supply - Factory set braking torque

4
poles
1500 min⁻¹

Δ 230 / Y 400 V or Δ 400 V MAIN SUPPLY **50 Hz**

		Starting torque at 50 Hz	Rated speed	Average starting torque 400 V 1300min-1	Average starting torque 400 V 1200min-1	Starting current 400 V	Rated current 400 V 1200min-1	Rated torque 400 V 1300min-1	Rated torque 400 V 1200 min-1	Input power	Braking torque	Moment of inertia	Brake current		Weight * IM B5
Motor type	Brake type	M_d N.m	N_n min ⁻¹	M_{dm} N.m	M_{dm} N.m	I_d A	I_n A	M_n N.m	M_n N.m	kW	$M_f \pm 20\%$ N.m	J 10 ⁻³ kg.m ²	$I : 100 V$ A	$I : 180 V$ A	kg
LS 71 L	FCR J02	3.5	1410	2.8	2.9	1.7	0.7	1	1.4	0.25	1.6	2.5	0.46	0.27	9.1
LS 71 L	FCR J02	5	1420	3.8	3.9	2.4	1.1	1.4	2	0.37	2	2.5	0.46	0.27	10
LS 71 L	FCR J02	7.5	1400	6.1	6.4	3.4	1.6	1.8	2.7	0.55	2.4	2.5	0.46	0.27	11
LS 71 L	FCR J02	10	1410	7.7	8.2	4.5	2.6	2.3	3.3	0.75	4	2.5	0.46	0.27	12.5
LS 80 L	FCR J02	15	1420	12.2	12.7	5.6	2.45	4.3	6	1.1	6	5	0.54	0.31	18.2
LS 90 L	FCR J02	20	1440	14.9	15.7	7.3	2.9	4.9	6.2	1.5	6	10	0.65	0.35	20.5
LS 90 L	FCR J02	25	1435	15.2	16	8.5	3.15	5.3	7.6	1.8	8	10	0.65	0.35	22.5
LS 90 L	FCR J02	30	1440	19.4	20.4	9.3	3.45	6.3	8.8	2.2	9	10	0.65	0.35	24.2
LS 100 L	FCR J02	40	1435	32.5	33.9	16.4	5.7	10.8	14.9	3	15	11.5	0.65	0.35	27
LS 112 MG	FCR J01	55	1450	43	46	22.6	7.5	20	25	4	22	35.7	0.79	0.44	41
LS 132 M	FCR J02	80	1450	64	67	31.5	9.5	26	36	6	40	55.5	-	0.49	70
LS 132 M	FCR J02	120	1455	94	97	47.5	14	34	47	9	40	55.5	-	0.49	75

* : These values are for information only.

. Motor series LS - IP 55 - 50 HZ - F Class - 230/400 V

U.T. Used for Transportation

. Brake - IP 55 - Separated supply - Factory set braking torque

. Brake - IP 55 - Built-in brake power supply - Factory set braking torque

2-8
poles
3000-750 min⁻¹

400 V MAIN SUPPLY **50 Hz**

		Rated power at 50 Hz	Average starting torque 400 V 2600min- 1	Average starting torque 400 V 2400min- 1	Starting current 400 V	Rated Current 400 V 2400 / 600	Rated torque 400 V 2600min- 1	Rated torque 400 V 2400 min- 1	Input power 2400 / 600	Braking torque	Moment of inertia	Brake current		R _h ¹	Electromagnet resistance 100 V 180 V		Weight * IM B5
Motor type	Brake type	M _d N.m	M _{dm} N.m	M _{dm} N.m	I _d A	I _n A	M _n N.m	M _n N.m	kW	M _f ±20% N.m	J 10 ⁻³ kg.m ²	I : 100 V A	I : 180 V A		R	R	kg
LS 71 L	FCR J02	2.5	2.1	2.2	3.4 / 0.85	1.1 / 0.6	0.55	0.75	0.25/0.06	1.2	1.5	0.46	0.27	200	219	665	9.1
LS 71 L	FCR J02	3.5	3.5	3.9	5.5 / 1.8	1.6 / 1.3	0.88	1.4	0.37 / 0.09	1.6	1.5	0.46	0.27	95	219	665	10
LS 71 L	FCR J02	4.5	4.2	4.5	6.3 / 2.2	1.6 / 1.3	1.1	1.7	0.55 / 0.13	1.6	1.6	0.46	0.27	80	219	665	12.5
LS 80 L	FCR J02	5	3.9	4.1	5.2 / 1.6	2.2 / 1.3	2.2	2.4	0.75 / 0.19	3	5.5	0.54	0.31	100	186	572	18.2
LS 90 L	FCR J02	7.5	4.4	4.7	5.2 / 2.3	2.5 / 1.7	1.7	2.4	1.1 / 0.27	4	10	0.65	0.35	80	155	510	23
LS 90 L	FCR J02	10	9.3	9.7	10.8 / 3	4.7 / 2	4.4	6	1.5 / 0.37	6	10	0.65	0.35	50	155	510	25
LS 100 L	FCR J02	15	13.9	14.7	16.3 / 3.6	6 / 2.35	6	8.1	2.2 / 0.55	9	11.5	0.65	0.35	40	155	510	31
LS 112 MG	FCR J01	20	14.9	15.4	20.5 / 5.5	7.1 / 3.1	5.4	8	3 / 0.75	16	35.7	0.79	0.44	30	128	412	43
LS 132 M	FCR J02	30	25.2	25.8	33 / 9	12.6 / 4	11.8	15.8	4.5 / 1.1	40	55.5	-	0.49	18	-	361	75
LS 132 M	FCR J02	40	31.4	32.3	36.5 / 10.5	14.5 / 4.9	16	21.4	6 / 1.5	40	55.5	-	0.49	15	-	361	80

1. Hypersynchronous resistance for 1 motor ; for x motors, divide R by x.

* : These values are for information only.

FCR asynchronous brake motors

U.G. General Use

LSMVR --- FCR

General



Closed 3-phase asynchronous brake motors, LSMVR series and stop control brake, according to IEC 34, 72, EN 50281

- Single speed : **0.25 to 11 kW** power, 71 to 160 mm frame size, 2, 4, 6 poles 230/400 V or 400 V Δ , 50 Hz.

– **Presentation of the brake motor**
IP55 protection providing good sealing against liquid projections and dust in an industrial environment.

– **Variable speed motors :**

- fitted with thermal probes in the winding (compulsory)

Options

- Chosen braking moments ; manual release of the brake
- Drip cover ; secondary shaft ;
- release connector
- Encoders and/or forced ventilation

Finish : aluminium casing

Routine test, no load test, dielectric test, verification of resistance and of the direction of rotation.

Shaft and flange protection against atmospheric corrosion.

Individual anti-shock packaging.

Brake motor mains supply

- Standard according to IEC 38 that is :
 – 230/400 V + 10 % – 10 % at 50 Hz ;

it provides the following supplies

220/380 V + 5 % – 5 % and

240/415 V + 5 % – 5 % at 50 Hz

– 400 V Δ + 10 % – 10 % at 50 Hz.

Connection for the Y/ Δ starting

- The brake supply is built-in ; the brake motor is connected as a standard motor. The brake can be connected with a separate AC supply.

Description of LSMVR --- FCR aluminium three phase brake motors

Designation	Material	Comments
Finned housing	Aluminium alloy	- with cast feet or without feet - pressure die-cast • 4 fixing holes for foot mounting • series lifting rings at 160 frame size, optionally 132 and 112 - earth terminal, optional
Stator	Insulated low-carbon magnetic steel with laminations Cathode copper	- the low carbon content assures the stability of characteristics in time - assembled sheet metal - semi-enclosed slots - magnetic circuit in compliance with the frequency variation - soaking allowing resistance to sudden voltage variations due to high voltage cuts of IGBT transistor drives according to IEC 34-17 standard - class F insulation - thermal protection provided by 3 CTP probes (1 per phase)
Rotor	Insulated low-carbon magnetic steel with laminations	- inclined slots - squirrel cage pressure die cast in aluminium (or alloys for special applications) - heat shrink mounting on the shaft - S or R class dynamically balanced rotor according to frame size
Shaft	Steel	- shaft end fitted with screw and washer - closed keyway
End shields	Cast iron	- drive end and non-drive end, fixed by mounting shafts
Bearings		- dust and damp protected ball bearings, greased for life, with the following mounting : • blocked at rear to guarantee precise positioning of the load, whatever the direction of the force • heavily preloaded front bearing to eliminate axial oscillation
Seals	Synthetic rubber	- IP 55 front and rear shaft seals
Fan	Aluminium or cast iron alloy	- 2 directions of rotation : straight blades
Fan cover	Steel sheet	- on request, fitted with a drip cover for operation in vertical position, shaft facing down
Terminal box	Aluminium alloy	- IP 55, 4 positions for flange mount motors, opposite the feet for foot mount or foot and flange - fitted with a steel terminal board (brass, optionally) and connection by copper bars - supplied with polyamide cable gland - 1 earth terminal in each terminal box
Painting		- system Ia, RAL 6000 paint finish (green) - resistance to saline mist : 72 h (according to NFX 41002)

FCR asynchronous brake motors

U.G. General Use

LSMVR --- FCR

Selection



. Motor series LSMVR - IP 55 - 50 HZ - Class F - 230/400 V
Aluminium (ALU) Rotor - U.G. General Usage
. Brake - IP 55 - Separated supply - Factory set braking torque

Δ 230 / Y 400 V or Δ 400 V MAIN SUPPLY **50 Hz**

Motor type	Brake type	Rated power at 50 Hz P_n kW	Rated speed N_n min ⁻¹	Rated current I_n (400V) A	Rated torque M_n N.m	Braking torque $M_f \pm 20\%$ N.m	Release response time t_1 ms	Standard braking response time t_2 ms	DC ² cut braking response time t_2 ms	Moment of inertia J 10 ⁻³ kg.m ²	Weight* IM B5 kg
LSMVR 71 L	FCR J01	0.37				Contact us.					12
LSMVR 71 L	FCR J01	0.55				Contact us.					13
LSMVR 80 L	FCR J01	0.75	2865	1.6	2.4	10	80	85	≤ 10	1.9	16.8
LSMVR 80 L	FCR J01	1.1	2880	2.2	3.5	10	80	85	≤ 10	2.1	18.8
LSMVR 90 L	FCR J01	1.5	2885	2.9	4.8	20	150	140	≤ 10	3.5	26
LSMVR 90 L	FCR J01	2.2	2890	4.5	7.1	20	150	140	≤ 10	4.1	28.4
LSMVR 100 L	FCR J01	3	2875	5.7	9.7	25	150	140	≤ 10	4.7	33.4
LSMVR 112 MG	FCR J01	4	2900	7.5	13	43	150	580	≤ 40	13.5	52
LSMVR 132 SM	FCR J02	5.5	2942	10.1	18	80	280	620	≤ 90	50.6	78
LSMVR 132 M	FCR J02	7.5	2915	13.6	24	80	280	620	≤ 90	55.9	87
LSMVR 132 M	FCR J02	9				Contact us.					97
LSMVR 160 MP	FCR J02	11				Contact us.					110

1. Take into account the maximum mechanical speed : 4000 min⁻¹. 2. Braking time at power out , when DC is cut.

*: These values are for information only.



. Motor series LSMVR - IP 55 - 50 HZ - Class F - 230/400 V
Aluminium Rotor (ALU) - U.G. General Use
. Brake - IP 55 - Separated supply - Factory set braking torque

Δ 230 / Y 400 V or Δ 400 V MAIN SUPPLY **50 Hz**

Motor type	Brake type	Rated power at 50 Hz P_n kW	Rated speed N_n min ⁻¹	Rated current I_n (400V) A	Rated torque M_n N.m	Braking torque $M_f \pm 20\%$ N.m	Release response time t_1 ms	Standard braking response time t_2 ms	DC ² cut braking response time t_2 ms	Moment of inertia J 10 ⁻³ kg.m ²	Weight* IM B5 kg
LSMVR 71 L	FCR J01	0.25	1445	0.84	1.68	5	60	90	≤ 10	2.1	11.5
LSMVR 71 L	FCR J01	0.37	1440	1.3	2.49	5	60	90	≤ 10	2.5	12.5
LSMVR 80 L	FCR J01	0.75	1435	2	5.12	10	80	85	≤ 10	3.4	16.6
LSMVR 90 L	FCR J01	1.1	1445	2.5	7.35	20	150	140	≤ 10	5.7	22.7
LSMVR 90 L	FCR J01	1.5	1435	3.2	10.03	20	150	140	≤ 10	6.7	24.7
LSMVR 100 L	FCR J01	2.2	1440	4.7	14.5	25	150	140	≤ 10	6.9	30
LSMVR 100 L	FCR J01	3	1435	6.3	19.5	25	150	140	≤ 10	8.9	33
LSMVR 112 MG	FCR J01	4	1440	8	26.56	43	150	580	≤ 40	19.3	49.3
LSMVR 132 SM	FCR J02	5.5	1460	10.4	36.3	80	280	620	≤ 90	60.4	71.3
LSMVR 132 M	FCR J02	7.5	1455	14	49.4	80	280	620	≤ 90	62	77.3
LSMVR 132 M	FCR J02	9	1460	16.8	59.3	105	280	620	≤ 90	65.5	80
LSMVR 160 MR	FCR J02	11	1460	22	72.2	120	280	550	≤ 90	96	102

1. Take into account the maximum mechanical speed : 4000 min⁻¹. 2. Braking time at power out , when DC is cut.

*: These values are for information only.

FCR asynchronous brake motors

U.G. General Use

LSMVR --- FCR

Selection



. Motor series LSMVR - IP 55 - 50 HZ - Class F - 230/400 V
 Aluminium (ALU) Rotor - U.G. General Usage
 . Brake - IP 55 - Separated supply - Factory set braking torque

Δ 230 / Y 400 V o Δ 400 V MAIN SUPPLY **50 Hz**

Motor type	Brake type	Rated power at 50 Hz	Rated speed	Rated current	Rated torque	Braking torque	Release response time	Standard braking response time	DC ² cut braking response time	Moment of inertia	Weight* IM B5
		P_n kW	N_n min ⁻¹	$I_n (400V)$ A	M_n N.m	$M_f \pm 20\%$ N.m	t_1 ms	t_2 ms	t_2 ms	J 10 ⁻³ kg.m ²	kg
LSMVR 71 L	FCR J01	0.18					Contact us				11.5
LSMVR 71 L	FCR J01	0.25					Contact us				12.5
LSMVR 80 L	FCR J01	0.37					Contact us				16.8
LSMVR 80 L	FCR J01	0.55					Contact us				18.8
LSMVR 90 L	FCR J01	0.75	930	2.1	7.2	20	150	140	≤ 10	5.7	22.7
LSMVR 90 L	FCR J01	1.1	915	3	10.5	20	150	140	≤ 10	6.6	24.7
LSMVR 100 L	FCR J01	1.5	905	4.2	14.3	25	150	140	≤ 10	7.6	28.7
LSMVR 112 MG	FCR J01	2.2	905	5.8	21	43	150	580	≤ 40	13	39
LSMVR 132 M	FCR J02	4	965	9.4	38.2	80	280	620	≤ 90	78.7	71
LSMVR 132 M	FCR J02	5.5	970	12.9	52.5	80	280	620	≤ 90	86.5	76

1. Take into account the maximum mechanical speed : 4000 min⁻¹. 2. Braking time at power out , when DC is cut.

* : These values are for information only.

FCR asynchronous brake motors

Characteristics

Mains supply connection

The standard brake motor terminal box has the following holes drilled on sides 1 and 3:

- LS 71 to 132 S :
- 2 x (ISO M20x1.5 + ISO M20x1.5),
- LS 132 M and LS 160 MP, LR :
- 2 x (ISO M25x1.5 + ISO M20x1.5).

It is supplied with holes closed by blanking plugs and provided with a cable gland kit according to the following table, including ISO 20c for separate power supply (fit with a plug if this is not used).

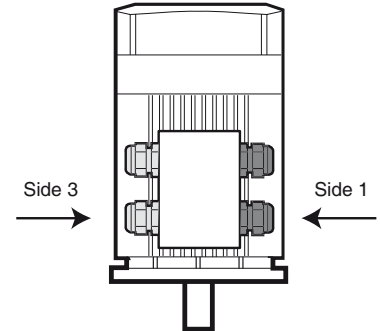


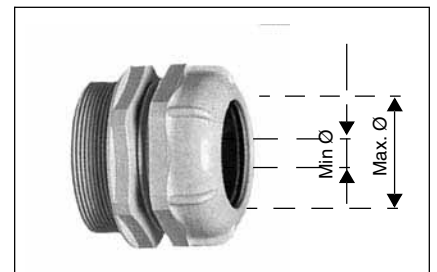
Table of terminal boxes and cable glands for LS and LSMVR series FCR brake motors, for 400 V rated power supply voltage, standard polyamide cable gland.

Frame size	Terminal box material	Single speed motor		2 speed motor			Cable gland for accessories ¹	
		YΔ Starting	Direct starting	1 Dalhandler winding	2 windings 1 voltage	2 windings 2 voltages	Accessory(ies) quantity 1 or 2	Accessories quantity > 2
71	Aluminium alloy	-	ISO 20b ISO 20c	ISO 20b ISO 20c	ISO 20b ISO 20c	2 x ISO 20b ISO 20c	ISO 20c	ISO 20b
80	Aluminium alloy	-	ISO 20 ISO 20c	ISO 20 ISO 20c	ISO 20 ISO 20c	2 x ISO 20 ISO 20c	ISO 20c	ISO 20b
90	Aluminium alloy	-	ISO 20 ISO 20c	ISO 20 ISO 20c	ISO 20 ISO 20c	2 x ISO 20 ISO 20c	ISO 20c	ISO 20b
100	Aluminium alloy	2 x ISO 20 ISO 20c	ISO 20 ISO 20c	ISO 20 ISO 20c	ISO 20 ISO 20c	2 x ISO 20 ISO 20c	ISO 20c	ISO 20b
112 and 132 S	Aluminium alloy	2 x ISO 20 ISO 20c	ISO 20 ISO 20c	ISO 20 ISO 20c	ISO 20 ISO 20c	2 x ISO 20 ISO 20c	ISO 20c	ISO 20b
132 M	Aluminium alloy	2 x ISO 25 ISO 20c	ISO 25 ISO 20c	ISO 25 ISO 20c	2 x ISO 25 ISO 20c	2 x ISO 25 ISO 20c	ISO 20c	ISO 20b
160 MP, LR	Aluminium alloy	2 x ISO 25 ISO 20c	ISO 25 ISO 20c	2 x ISO 25 ISO 20c	2 x ISO 25 ISO 20c	2 x ISO 25 ISO 20c	ISO 20c	ISO 20b

1. Sensor (PTO, PTF...), resistors.... In LSMVR series motor, consider the column : > 2 accessories for the PTC sensors supplied in series.

Cable gland clamping capacity (NFEN 50 262 standards)

Type of cable gland	Clamping capacity	
	Standard CG (polyamide)	
	Min. cable Ø (mm)	Max. cable Ø (mm)
ISO 20c	5.5	8.5
ISO 20b	7	10.5
ISO 20	9.5	15
ISO 25	13	19



Polyamide cable gland

On request, the terminal boxes can be supplied without cable gland.

FCR asynchronous brake motors

Characteristics

Performances

Available braking torque (N.m)

Brake motor type	Braking torque (N.m)															
LS 71 FCR	1.2	1.6	2	2.4	4	5	6	7.5								
LS 80 FCR			2	3	3.5	4.5	6	8	10	12						
LS 90 FCR					4		6	8	9		15	20	25			
LS 100 FCR					4		6	8	9		15	20	25	32		
LS 112 MG FCR											16	22		32	43	
LS 132 S FCR											16	22		32	43	
LS 132 SM, M FCR															40	50
LS 160 MP, LR FCR															40	50

Moment of inertia for brake and brake motor (10⁻³ kg m²)

Motor type	Power kW	Moment of inertia															
		2p				4p				6p				8p			
		Flywheel				Flywheel				Flywheel				Flywheel			
		J01	J02	J03	J05	J01	J02	J03	J05	J01	J02	J03	J05	J01	J02	J03	J05
LS 71 L	FCR single	0.4	1	3.2	6	0.4	1	3.2	6	0.4	1	3.2	6	0.4	1	3.2	6
	0.12													1.7	2.3	4.5	7.3
	0.18									1.5	2.1	4.3	7.1				
	0.25					1.08	1.68	3.88	6.68	1.7	2.3	4.5	7.3				
	0.37	0.75	1.35	3.55	6.35	1.25	1.88	4.05	6.85								
	0.55	0.85	1.45	3.65	6.45	1.5	2.1	4.3	7.1								
	0.75					1.5	2.1	4.3	7.1								
LS 80 L	FCR single	1	2.5	5	12.3	1	2.5	5	12.3	1	2.5	5	12.3	1	2.5	5	12.3
	0.18													4.1	5.6	8.1	15.4
	0.25													5.1	6.6	9.1	16.4
	0.37									4.2	5.7	8.2	15.5				
	0.55					2.3	3.8	6.3	13.6	5.2	6.7	9.2	16.5				
	0.75	1.7	3.2	5.7	13	2.8	4.3	6.8	14.1								
	0.9					3.4	4.9	7.4	14.7								
LS 90 L	FCR single	1.8	4.7	9	20	1.8	4.7	9	20	1.8	4.7	9	20	1.8	4.7	9	20
	0.37													4.8	7.7	12	23
	0.55													5.4	8.3	12.6	23.6
	0.75									5.7	8.6	12.9	23.9				
	1.1					4.4	7.3	11.6	22.6	6.6	9.5	13.8	24.8				
	1.5	3.2	6.1	10.4	21.4	5	7.9	12.2	23.2								
	1.8	3.5	6.4	10.7	21.7	5.5	8.4	12.7	23.7								
LS 100 L	FCR single	1.8	4.7	9	-	1.8	4.7	9	-	1.8	4.7	9	-	1.8	4.7	9	-
	0.75													6.5	9.4	13.7	
	1.1													8.6	11.5	15.8	
	1.5									7.6	10.5	14.8					
	2.2					6.1	9	13.3									
	3	4	6.9	11.2		7.3	10.2	14.5									
	4																
LS 112 MG	FCR single	4.3	-	-	-	4.3	-	-	-	4.3	-	-	-	4.3	-	-	-
	1.5													19.3			
	2.2									13							
	4	11.2				15.3											
LS 132 S	FCR single	4.3	-	-	-	4.3	-	-	-	4.3	-	-	-	-	-	-	-
	3									22.3							
	5.5	11.9				18.3											
LS 132 SM, M	FCR single	-	27	-	-	-	27	-	-	-	27	-	-	-	27	-	-
	2.2													52			
	3													60			
	4									61							
	5.5									66							
	7.5		35.8				46										
	9		43				50										
LS 160 MP, LR	FCR single	-	27	-	-	-	27	-	-	-	-	-	-	-	-	-	-
	11		46				57										
	15		50				63										

FCR asynchronous brake motors

Characteristics

Characteristics of electromagnets

The characteristics of electromagnets are given at 20 °C, $\pm 5\%$. All electromagnets are made in class F and may remain indefinitely connected to voltage.

Type of brake motor	Brake coil voltage 180 V			Brake coil voltage 100 V			Brake coil voltage 20 V		
	Current	Resistance	Power	Current	Resistance	Power	Current	Resistance	Power
	A	Ω	W	A	Ω	W	A	Ω	W
LS 71 FCR	0.27	665	49	0.46	219	46	2.22	9	44
LS 80 FCR	0.31	572	57	0.54	186	54	2.7	7.4	54
LS 90 FCR	0.35	510	64	0.65	155	65	2.99	6.7	60
LS 100 FCR	0.35	510	64	0.65	155	65	2.99	6.7	60
LS 112 MG ¹ FCR	0.44	412	79	0.79	127	79	3.93	5.1	79
LS 132 S FCR	0.44	412	79	0.79	127	79	3.93	5.1	79
LS 132 M ² FCR	0.5	361	90	0.85	118	85	4.2	4.7	84
LS 132 M ³ FCR	0.79	228	142	1.4	71	140	7	2.8	141
LS 160 MP, LR FCR	0.79	228	142	1.4	71	140	7	2.8	141

1. LS 112 M 2 poles with 180V coil excepted : A = 0.35 ; Ω = 510 ; W = 64

2. LS 132 M with braking torque = 40 to 80 N.m

3. LS 132 M with braking torque = 105 to 160 N.m

Starting frequency (no load for $\Delta T = 100^\circ$; values expressed in h⁻¹)

Brake motor type	Polarity	Rotor	Operating factor											
			J01 flywheel			J02 flywheel			J03 flywheel			J05 flywheel		
			25%	40%	60%	25%	40%	60%	25%	40%	60%	25%	40%	60%
LS 71 FCR	4 p	ALU	4800	3500	3000	4000	2950	2500	3100	2250	1950	2650	1950	1650
		DP	5000	3800	3200	4550	3450	2900	4100	3100	2450	3300	2500	1950
	6 p	ALU	5400	4000	3500	4100	3050	2650	3500	2600	2250	3050	2250	2000
		DP	6000	4250	4000	5250	3750	3500	4100	2900	2750	3800	2700	2550
LS 80 FCR	4 p	ALU	2800	1750	1650	2500	1550	1450	1800	1100	1050	950	600	550
		DP	2950	2200	1750	2600	1900	1650	1950	1450	1150	1000	750	600
	6 p	ALU	4000	2550	2400	2900	1850	1750	1900	1200	1150	1200	750	700
		DP	4400	3300	2600	3850	2900	2250	2900	2150	1700	1650	1250	950
LS 90 FCR	4 p	ALU	1400	1200	1000	1150	1000	800	800	700	600	650	550	450
		DP	1650	1400	1150	1350	1150	950	950	800	650	800	650	550
	6 p	ALU	2150	1850	1550	1550	1350	1100	1000	850	700	900	750	650
		DP	2450	2100	1750	1900	1650	1350	1500	1300	1050	1350	1150	950
LS 100 FCR	4 p	ALU	2000	1500	1300	1500	1200	1000	1200	900	700	-	-	-
		DP	2500	2000	1700	2000	1700	1300	1500	1200	1000	-	-	-
	6 p	ALU	2300	1800	1500	1800	1500	1200	1500	1200	900	-	-	-
		DP	2800	2500	2000	2100	1800	1500	1700	1500	1200	-	-	-
LS 112 FCR	4 p	ALU	900	800	700	-	-	-	-	-	-	-	-	-
		DP	1100	950	850	-	-	-	-	-	-	-	-	-
	6 p	ALU	1200	1000	900	-	-	-	-	-	-	-	-	-
		DP	1350	1200	1100	-	-	-	-	-	-	-	-	-
LS 132 S FCR	4 p	ALU	700	600	500	-	-	-	-	-	-	-	-	-
		DP	900	800	700	-	-	-	-	-	-	-	-	-
LS 132 M FCR	4 p	ALU	-	-	-	350	340	290	-	-	-	-	-	-
		DP	-	-	-	450	430	400	-	-	-	-	-	-
LS 160 MP, LR FCR	4 p	ALU	-	-	-	300	290	250	-	-	-	-	-	-
		DP	-	-	-	400	380	350	-	-	-	-	-	-

Starting frequencies with brake motor CS rotor are defined by the FEM class.

FCR asynchronous brake motors

Characteristics

Response time (values expressed in 10^{-3} seconds)

- The brake release response time (t1) is the time between energisation of the electro-magnet and the moment when the brake is released (zero braking).

- The brake is applied by demagnetising the electro-magnet then moving the lining or the counter-material. The response time (t2) is the time between cutting the power supply of the brake motor and the moment when the lining comes into contact with the counter-material.

The response times contained in the table opposite result from tests with air gap set at 0.4 millimeters : rated value.

OPTION Reduced response time via electronic booster RRT : S1-18R (0.25 to 1.8 kW) and S1-90R (2.2 to 9 kW).

LS series FCR brake motors can be fitted with this option with built-in power supply connected in the factory. Its use increases starting frequency and improves stopping accuracy. Furthermore, it saves on the cost of recabling following a power cut.



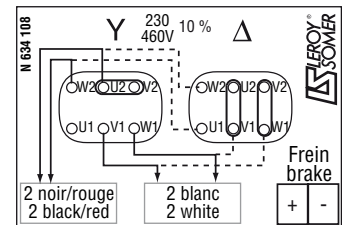
This option is not compatible with the LSMV series motor for operation with a variable speed drive.

Type of brake motor	Response time on release of brake t1		Brake application response time (at maximum braking torque) t2		
	standard	TRR ¹	standard	TRR ¹	Direct current cut
LS 71 FCR	60	30	90	30	≤ 10
LS 80 FCR	80	30	85	30	≤ 10
LS 90 FCR	150	50	140	30	≤ 10
LS 100 FCR	150	50	140	30	≤ 10
LS 112 FCR	150	70	580	40	≤ 40
LS 132 S FCR	150	70	580	40	≤ 40
LS 132 M FCR	240	140	605	90	≤ 100
LS 160 FCR	350	-	460	-	≤ 100

1. Reduced response time with electronic booster power supply (option).

Power supply for single speed motor ►

230 V → 100 V
400 V → 180 V
~ 15 %



Wiring diagram for option:
Reduced Response Time **RRT**

FCR asynchronous brake motors

U.G. General Use

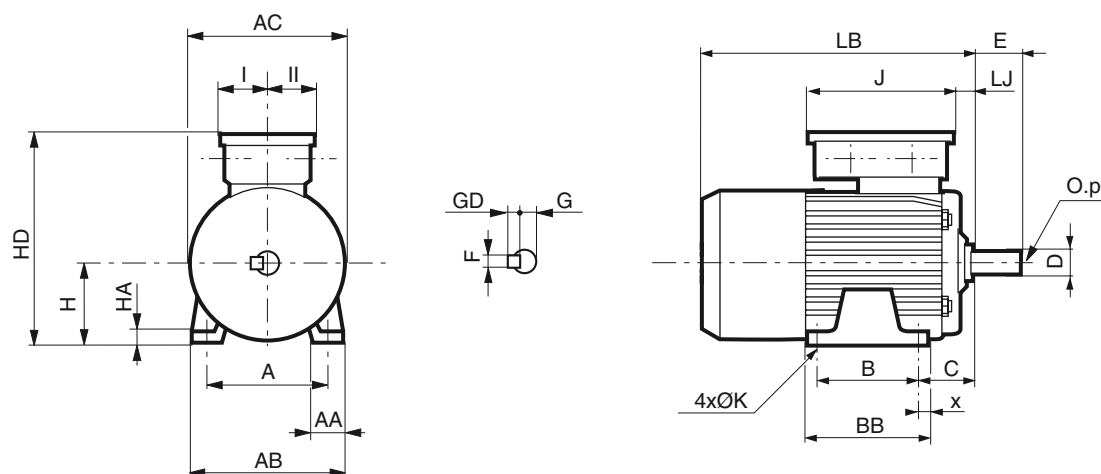
LS --- FCR

Dimensions

Dimensions of 3-phase motors and brake - LS, LSMVR, LSPX... FCR
2 - 4 - 6 - 8 poles - IP 55 protection

Dimensions in millimetres

– foot mounted



Type	Brake motors																	
	A	AA	AB	AC	B	BB	C	HD	H	HA	J	I	II	K	LB J01 to J03 ¹	LB J05 ¹	LJ	x
LS 71 L FCR	112	23	126	140	90	104	45	206	71	9	160	55	55	7	245	271	13	7
LS 80 L FCR	125	29	157	172	100	120	50	226	80	10	160	55	55	9	265	316	11	10
LS 90 L FCR	140	38.5	172	184	125	162	56	246	90	11	160	55	55	10	304	331	13	28
LS 100 L FCR	160	44	196	200	140	165	63	261	100	13	160	55	55	12	388	-	21	12
LS 112 MG FCR	190	52	220	235	140	164	70	281	112	14	160	55	55	12	396	-	23	12
LS 132 S FCR	216	50	250	235	140	170	89	301	132	15	160	55	55	12	419	-	41	16
LS 132 M FCR	216	59	250	280	178	208	89	318	132	18	160	55	55	12	493	-	25	16
LS 160 MP FCR	254	64	294	316	210	294	108	361	160	25	160	55	55	14.5	568	-	55	20
LS 160 LR FCR	254	64	294	316	254	294	108	361	160	25	160	55	55	14.5	568	-	55	20

1. Check the brake type (inertia)

Type	Output shaft					
	D	E	F	G	GD	O.p
LS 71 L FCR	14j6	30	5	11	5	M5.12.5
LS 80 L FCR	19j6	40	6	15.5	6	M6.16
LS 90 L FCR	24j6	50	8	20	7	M8.19
LS 100 L FCR	28j6	60	8	24	7	M10.22
LS 112 MG FCR	28j6	60	8	24	7	M10.22
LS 132 FCR	38k6	80	10	33	8	M12.28
LS 160 FCR	42k6	110	12	37	8	M16.36

FCR asynchronous brake motors

U.G. General Use

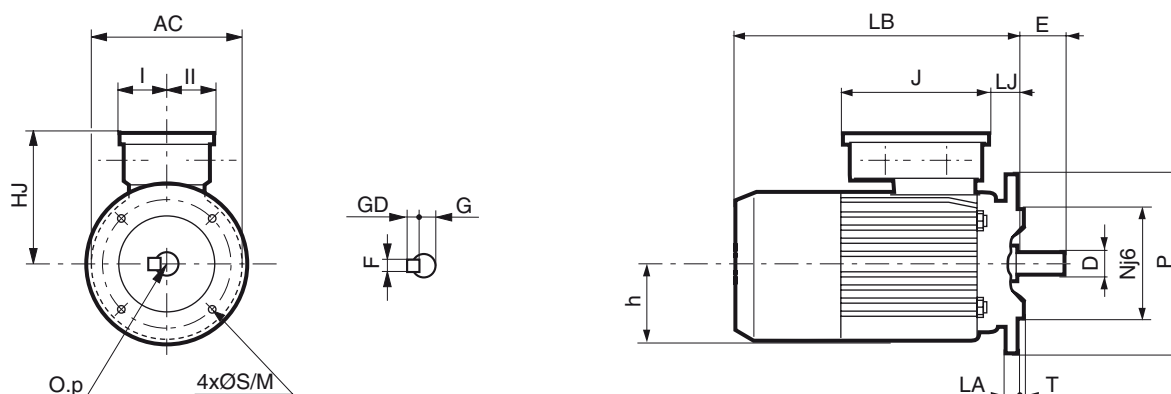
LS --- FCR

Dimensions

Dimensions of 3-phase motors and brake - LS, LSMVR, LSPX... FCR
2 - 4 - 6 - 8 poles - IP 55 protection

Dimensions in millimetres

– (FF) flange mounted



Type	Brake motors									Output shaft					
	AC	HJ	h	J	I	II	LB J01 to J03 ¹	LB J05 ¹	LJ	D	E	F	G	GD	O.p
LS 71 L FCR	140	135	70	160	55	55	271	297	38	14j6	30	5	11	5	M5.12.5
LS 80 L FCR	172	146	80	160	55	55	292	343	38	19j6	40	6	15.5	6	M6.16
LS 90 L FCR	184	156	90	160	55	55	324	351	33	24j6	50	8	20	7	M8.19
LS 100 L FCR	200	161	98	160	55	55	388	-	50	28j6	60	8	24	7	M10.22
LS 112 MG FCR	235	169	110	160	55	55	425	-	49	28j6	60	8	24	7	M10.22
LS 132 S FCR	235	169	110	160	55	55	437	-	41	38k6	80	10	33	8	M12.28
LS 132 M FCR	280	188	130	160	55	55	533	-	65	38k6	80	10	33	8	M12.28
LS 160 MP FCR	316	201	131	160	55	55	568	-	31	42k6	110	12	37	8	M16.36
LS 160 LR FCR	316	201	131	160	55	55	568	-	31	42k6	110	12	37	8	M16.36

¹. Check the brake type (inertia)

Type	FF flange							
	Symb.	M	N	n	P	S	T	LA
LS 71 L FCR	FF 130	130	110	4	160	10	3.5	10
LS 80 L FCR	FF 165	165	130	4	200	12	3.5	10
LS 90 L FCR	FF 165	165	130	4	200	12	3.5	10
LS 100 L FCR	FF 215	215	180	4	250	14.5	4	12
LS 112 MG FCR	FF 215	215	180	4	250	14.5	4	12
LS 132 FCR	FF 265	265	230	4	300	15	4	14
LS 160 FCR	FF 300	300	250	4	350	19	5	16

FCR asynchronous brake motors

U.G. General Use

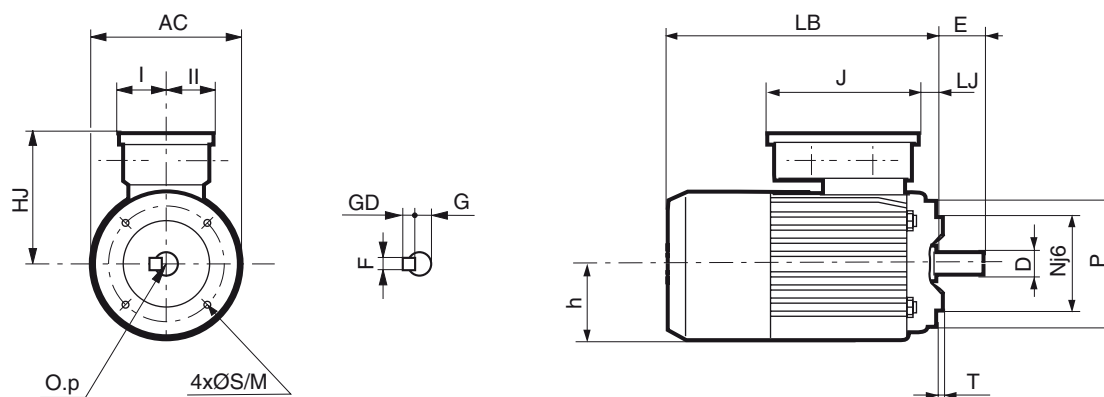
LS --- FCR

Dimensions

Dimensions of 3-phase motors and brake - LS, LSMVR, LSPX... FCR
2 - 4 - 6 - 8 poles - IP 55 protection

Dimensions in millimetres

– (FT) face mounted



Type	Brake motors									Output shaft					
	AC	HJ	h	J	I	II	LB J01 to J03 ¹	LB J05 ¹	LJ	D	E	F	G	GD	O.p
LS 71 L FCR	140	135	70	160	55	55	245	271	13	14j6	30	5	11	5	M5.12.5
LS 80 L FCR	172	146	80	160	55	55	265	316	11	19j6	40	6	15.5	6	M6.16
LS 90 L FCR	184	156	89	160	55	55	304	331	13	24j6	50	8	20	7	M8.19
LS 100 L FCR	200	161	98	160	55	55	351	-	21	28j6	60	8	24	7	M10.22
LS 112 MG FCR	235	169	110	160	55	55	396	-	23	28j6	60	8	24	7	M10.22
LS 132 S FCR	235	169	110	160	55	55	419	-	23	38k6	80	10	33	8	M12.28
LS 132 M FCR	280	188	130	160	55	55	493	-	25	38k6	80	10	33	8	M12.28
LS 160 MP FCR	316	201	131	160	55	55	568	-	55	42k6	110	12	37	8	M16.36
LS 160 LR FCR	316	201	131	160	55	55	568	-	55	42k6	110	12	37	8	M16.36

1. Check the brake type (inertia)

Type	FT face						
	Symb.	M	N	n	P	S	T
LS 71 L FCR	FT 85	85	70	4	105	M6	2.5
LS 80 L FCR	FT 100	100	80	4	120	M6	3
LS 90 L FCR	FT 115	115	95	4	140	M8	3
LS 100 L FCR	FT 130	130	110	4	160	M8	3.5
LS 112 MG FCR	FT 130	130	110	4	160	M8	3.5
LS 132 FCR	FT 215	215	180	4	250	M12	4
LS 160 FCR	FT 215	215	180	4	250	M12	4

FCR asynchronous brake motors

U.G. General Use

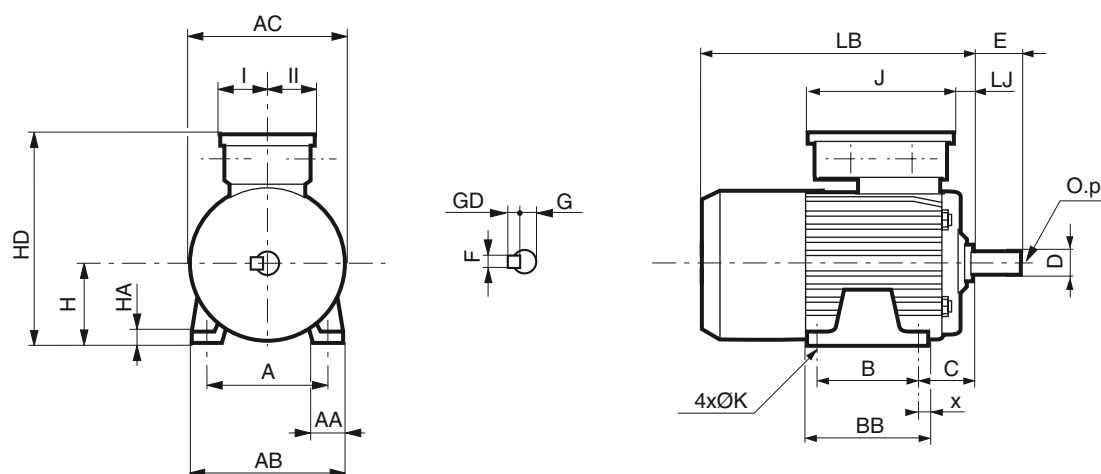
FLS --- FCR

Dimensions

Dimensions of 3-phase motors and brake - FLS, FLSPX... FCR
4 poles - IP 55 protection

Dimensions in millimetres

– foot mounted



Type	Brake motors																
	A	AA	AB	AC	B	BB	C	HD	H ¹	HA	LJ	J	I	II	K	LB	x
FLS 80 L FCR J02	125	32	157	160	100	130	50	236	80	10	26.5	187	63.5	63.5	9	265	20
FLS 90 L FCR J02	140	34	172	185	125	160	56	256	90	11	21.5	187	63.5	63.5	9	304	22
FLS 100 LK FCR J01	160	42	200	226	140	174	63	291	112	12	48.5	187	63.5	63.5	12	406	22
FLS 112 MG FCR J01	190	45	230	226	140	174	70	302	112	12	48.5	187	63.5	63.5	12	406	22
FLS 132 M FCR J02	216	58	255	264	178	223	89	345	132	15	39.5	187	63.5	63.5	12	492	31

1. Caution, dimension AC divided by 2 may be greater than H.

Type	Output shaft					
	D	E	F	G	GD	O.p
FLS 80 L FCR J02	19j6	40	6	15.5	6	6.16
FLS 90 L FCR J02	24j6	50	8	20	7	8.19
FLS 100 LK FCR J01	28j6	60	8	24	7	10.22
FLS 112 MG FCR J01	28j6	60	8	24	7	10.22
FLS 132 M FCR J02	38k6	80	10	33	8	12.28

FCR asynchronous brake motors

U.G. General Use

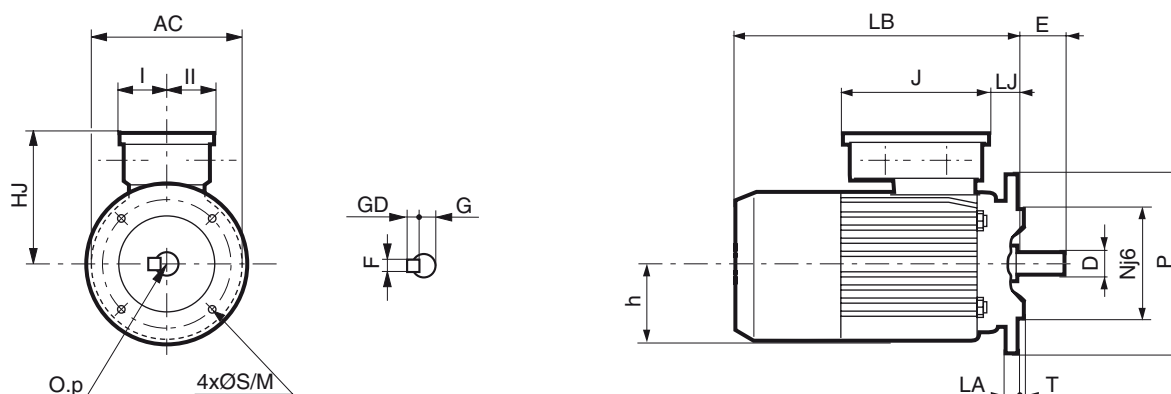
FLS --- FCR

Dimensions

Dimensions of 3-phase motors and brake - FLS, FLSPX... FCR
4 poles - IP 55 protection

Dimensions in millimetres

– (FF) flange mounted



Type	Brake motors								Output shaft					
	AC	HJ	h	J	I	II	LB	LJ	D	E	F	G	GD	O.p
FLS 80 L FCR J02	158	156	90	187	63.5	63.5	292	53.5	19j6	40	6	15.5	6	6.16
FLS 90 L FCR J02	184	166	100	187	63.5	63.5	324	41.5	24j6	50	8	20	7	8.19
FLS 100 LK FCR J01	220	191	131	187	63.5	63.5	424	66.5	28j6	60	8	24	7	10.22
FLS 112 MG FCR J01	220	191	131	187	63.5	63.5	424	66.5	28j6	60	8	24	7	10.22
FLS 132 M FCR J02	264	213	131	187	63.5	63.5	532	79.5	38k6	80	10	33	8	12.28

Type	FF flange							
	Symb.	M	N	n	P	S	T	LA
FLS 80 L FCR J02	FF 165	165	130	4	200	12	3.5	10
FLS 90 L FCR J02	FF 165	165	130	4	200	12	3.5	10
FLS 100 LK FCR J01	FF 215	215	180	4	250	15	4	12
FLS 112 MG FCR J01	FF 215	215	180	4	250	15	4	12
FLS 132 M FCR J02	FF 265	265	230	4	300	15	4	14

FCR asynchronous brake motors

U.G. General Use

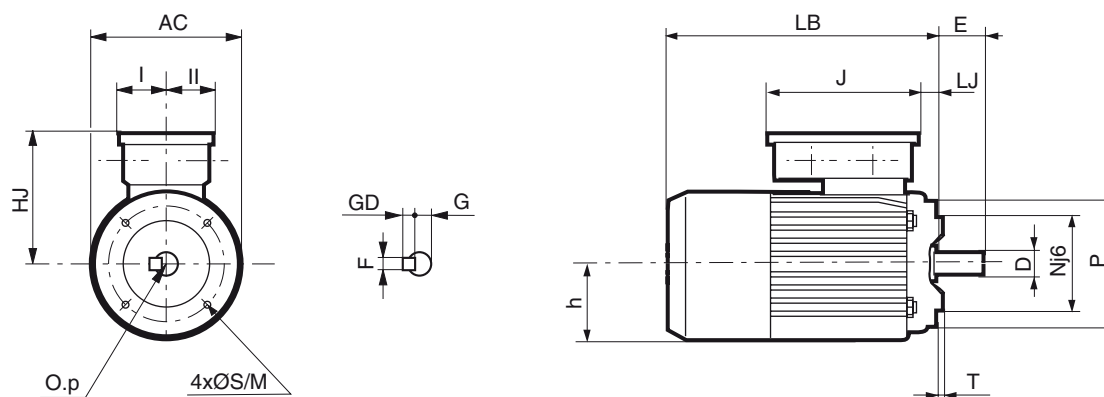
FLS --- FCR

Dimensions

Dimensions of 3-phase motors and brake - FLS, FLSPX... FCR
4 poles - IP 55 protection

Dimensions in millimetres

– (FT) face mounted



Type	Brake motors								Output shaft					
	AC	HJ	h	LJ	J	I	II	LB	D	E	F	G	GD	O.p
FLS 80 L FCR J02	158	156	90	26..5	187	63.5	63.5	265	19j6	40	6	15.5	6	6.16
FLS 90 L FCR J02	184	166	100	21.5	187	63.5	63.5	304	24j6	50	8	20	7	8.19
FLS 100 LK FCR J01	220	191	131	48.5	187	63.5	63.5	406	28j6	60	8	24	7	10.22
FLS 112 MG FCR J01	220	191	131	48.5	187	63.5	63.5	406	28j6	60	8	24	7	10.22
FLS 132 M FCR J02	264	213	131	39.5	187	63.5	63.5	492	38k6	80	10	33	8	12.28

Type	FT face						
	Symb.	M	N	n	P	S	T
FLS 80 L FCR J02	FT 100	100	80	4	120	M6	3
FLS 90 L FCR J02	FT 115	115	95	4	140	M8	3
FLS 100 LK FCR J01	FT 130	130	110	4	160	M8	3.5
FLS 112 MG FCR J01	FT 130	130	110	4	160	M8	3.5
FLS 132 M FCR J02	FT 215	215	180	4	250	M12	4

FCR asynchronous brake motors

U.G. General Use

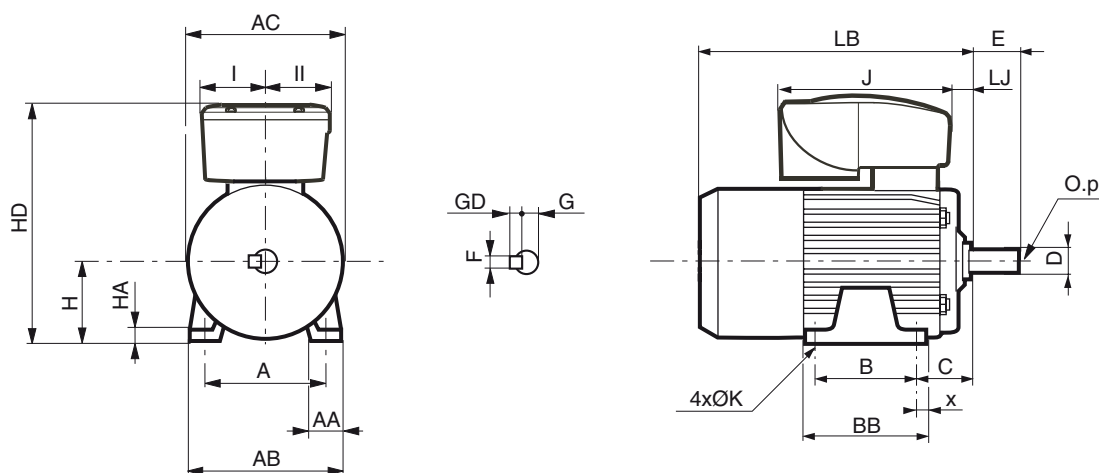
LS ...VMA --- FCR

Dimensions

Dimensions of brake motors - LS... VMA... FCR 4 poles - IP 55 protection

Dimensions in millimetres

– foot mounted



VARMECA integrated variable speed brake motors

Type	A	AA	AB	AC	B	BB	C	HD	H	HA	J	I ¹	II	K	LB	LJ	x
LS 71 L VMA 31 FCR	112	23	126	140	90	104	45	266	71	9	218	94	75	7	245	8	7
LS 80 L VMA 31 FCR	125	29	157	172	100	120	50	285	80	10	218	94	75	9	265	12	10
LS 80 L VMA 32 FCR	125	29	157	172	100	120	50	285	80	10	231	94	75	9	265	12	10
LS 90 L VMA 31 FCR	140	38.5	172	184	125	162	56	305	90	11	218	94	75	10	304	12	28
LS 90 L VMA 32 FCR	140	38.5	172	184	125	162	56	305	90	11	231	94	75	10	304	12	28
LS 100 L VMA 32 FCR	160	44	196	200	140	165	63	320	100	13	231	94	75	12	388	12	12
LS 100 L VMA 33 FCR	160	44	196	200	140	165	63	370	100	13	336	141	115	12	388	4	12
LS 112 MG VMA 32 FCR	190	52	220	235	140	164	70	341	112	14	231	94	75	12	396	21	12
LS 112 MG VMA 33 FCR	190	52	220	235	140	164	70	392	112	14	336	141	115	12	396	13	12
LS 132 SM VMA 33 FCR	216	59	250	280	178	208	89	402	132	18	336	141	115	12	492	8	16
LS 132 SM VMA 34 FCR	216	59	250	280	178	208	89	402	132	18	336	141	115	12	492	8	16
LS 132 M VMA 33 FCR	216	59	250	280	178	208	89	402	132	18	336	141	115	12	492	8	16
LS 132 M VMA 34 FCR	216	59	250	280	178	208	89	402	132	18	336	141	115	12	492	8	16
LS 160 MR VMA 34 FCR	254	64	294	316	210	294	108	471	160	25	336	141	115	14.5	567	38	20

1. Dimension I includes the control button ; for delivery without button, take dimension II.

Output shaft

Type	D	E	F	G	GD	O.p
LS 71 L VMA...FCR	14j6	30	5	11	5	M5.12.5
LS 80 L VMA... FCR	19j6	40	6	15.5	6	M6.16
LS 90 L VMA... FCR	24j6	50	8	20	7	M8.19
LS 100 L VMA... FCR	28j6	60	8	24	7	M10.22
LS 112 MG VMA... FCR	28j6	60	8	24	7	M10.22
LS 132 SM,M VMA. FCR	38k6	80	10	33	8	M12.28
LS 160 MR VMA... FCR	42k6	110	12	37	8	M16.36

FCR asynchronous brake motors

U.G. General Use

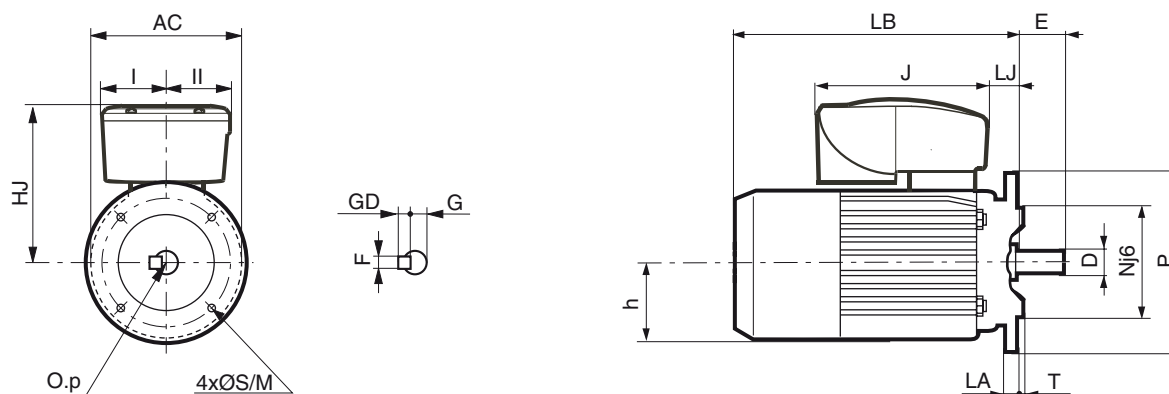
LS ...VMA --- FCR

Dimensions

Dimensions of brake motors - LS... VMA... FCR
4 poles - IP 55 protection

Dimensions in millimetres

– (FF) flange mounted



Type	VARMECA integrated variable speed brake motors								Output shaft					
	AC	HJ	h	J	I'	II	LB	LJ	D	E	F	G	GD	O.p
LS 71 L VMA 31 FCR	140	195	70	218	94	75	271	34	14j6	30	5	11	5	M5.12.5
LS 80 L VMA 31 FCR	172	205	80	218	94	75	292	38	19j6	40	6	15.5	6	M6.16
LS 80 L VMA 32 FCR	172	205	80	231	94	75	292	38	19j6	40	6	15.5	6	M6.16
LS 90 L VMA 31 FCR	184	215	90	218	94	75	324	12	24j6	50	8	20	7	M8.19
LS 90 L VMA 32 FCR	184	215	90	231	94	75	324	12	24j6	50	8	20	7	M8.19
LS 100 L VMA 32 FCR	200	220	98	231	94	75	388	48	28j6	60	8	24	7	M10.22
LS 100 L VMA 33 FCR	200	270	98	336	141	115	388	40	28j6	60	8	24	7	M10.22
LS 112 MG VMA 32 FCR	235	229	110	231	94	75	425	50	28j6	60	8	24	7	M10.22
LS 112 MG VMA 33 FCR	235	280	110	336	141	115	425	42	28j6	60	8	24	7	M10.22
LS 132 SM VMA 33 FCR	280	300	130	336	141	115	532	26	38k6	80	10	33	8	M12.28
LS 132 SM VMA 33 FCR	280	300	130	336	141	115	532	26	38k6	80	10	33	8	M12.28
LS 132 M VMA 33 FCR	280	300	130	336	141	115	532	26	38k6	80	10	33	8	M12.28
LS 132 M VMA 34 FCR	280	300	130	336	141	115	532	26	38k6	80	10	33	8	M12.28
LS 160 MR VMA 34 FCR	316	311	131	336	141	115	567	38	42k6	110	12	37	8	M16.36

1. Dimension I includes the control button ; for delivery without button, take dimension II.

Type	FF flange							
	Symb.	M	N	n	P	S	T	LA
LS 71 L VMA...FCR	FF 130	130	110	4	160	10	3.5	10
LS 80 L VMA... FCR	FF 165	165	130	4	200	12	3.5	10
LS 90 L VMA... FCR	FF 165	165	130	4	200	12	3.5	10
LS 100 L VMA... FCR	FF 215	215	180	4	250	14.5	4	12
LS 112 MG VMA... FCR	FF 215	215	180	4	250	14.5	4	12
LS 132 SM,M VMA. FCR	FF 265	265	230	4	300	15	4	14
LS 160 MR VMA... FCR	FF 300	300	250	4	350	19	5	16

FCR asynchronous brake motors

U.G. General Use

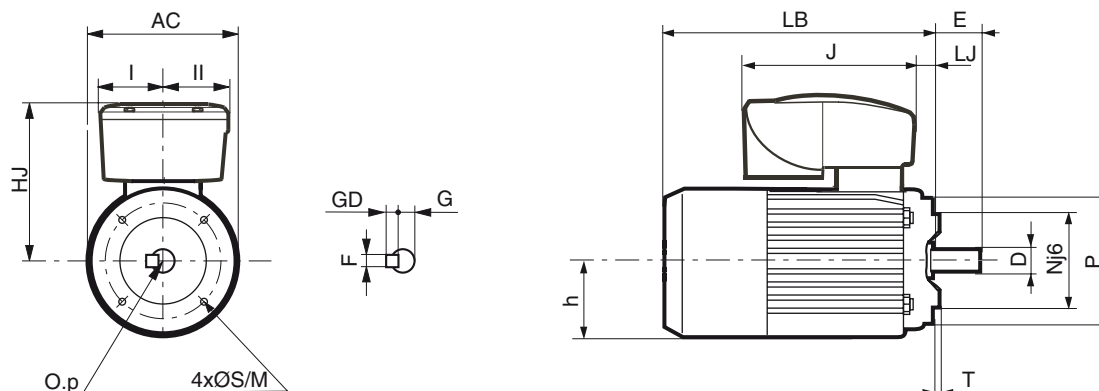
LS ...VMA --- FCR

Dimensions

Dimensions of brake motors - LS... VMA... FCR
4 poles - IP 55 protection

Dimensions in millimetres

– (FT) face mounted



Type	VARMECA integrated variable speed brake motors								Output shaft					
	AC	HJ	h	J	I ¹	II	LB	LJ	D	E	F	G	GD	O.p
LS 71 L VMA 31 FCR	140	195	70	218	94	75	245	8	14j6	30	5	11	5	M5.12.5
LS 80 L VMA 31 FCR	172	205	80	218	94	75	265	12	19j6	40	6	15.5	6	M6.16
LS 80 L VMA 32 FCR	172	205	80	231	94	75	265	12	19j6	40	6	15.5	6	M6.16
LS 90 L VMA 31 FCR	184	215	89	218	94	75	304	12	24j6	50	8	20	7	M8.19
LS 90 L VMA 32 FCR	184	215	89	231	94	75	304	12	24j6	50	8	20	7	M8.19
LS 100 L VMA 32 FCR	200	220	98	231	94	75	388	12	28j6	60	8	24	7	M10.22
LS 100 L VMA 33 FCR	200	270	98	336	141	115	388	4	28j6	60	8	24	7	M10.22
LS 112 MG VMA 32 FCR	235	229	110	231	94	75	396	21	28j6	60	8	24	7	M10.22
LS 112 MG VMA 33 FCR	235	280	110	336	141	115	396	13	28j6	60	8	24	7	M10.22
LS 132 SM VMA 33 FCR	280	300	130	336	141	115	492	8	38k6	80	10	33	8	M12.28
LS 132 SM VMA 34 FCR	280	300	130	336	141	115	492	8	38k6	80	10	33	8	M12.28
LS 132 M VMA 33 FCR	280	300	130	336	141	115	492	8	38k6	80	10	33	8	M12.28
LS 132 M VMA 34 FCR	280	300	130	336	141	115	492	8	38k6	80	10	33	8	M12.28
LS 160 MR VMA 34 FCR	316	311	131	336	141	115	567	38	42k6	110	12	37	8	M16.36

1. Dimension I includes the control button; for delivery without button, take dimension II.

Type	FT face						
	Symb.	M	N	n	P	S	T
LS 71 L VMA...FCR	FT 85	85	70	4	105	M6	2..5
LS 80 L VMA... FCR	FT 100	100	80	4	120	M6	3
LS 90 L VMA... FCR	FT 115	115	95	4	140	M8	3
LS 100 L VMA... FCR	FT 130	130	110	4	160	M8	3.5
LS 112 MG VMA... FCR	FT 130	130	110	4	160	M8	3.5
LS 132 SM,M VMA. FCR	FT 215	215	180	4	250	M12	4
LS 160 MR VMA... FCR	FT 215	215	180	4	250	M12	4

FCR asynchronous brake motors

Options

Option list

Type	
DP rotor (S4 duty)	FAB
Release via lever DLRA	10 WD
Shaft extension (NDE)	FAB
Drip cover	10 WD
Separate brake power supply : - mains supply 180 V coil	400 V ~
- mains supply 180 V coil	230 V ~
	3 WD
	3 WD
Optional braking torque:	71 to 132 S
	132 M and 160
	FAB
TRR reduced response time (S1-18R or S1-90R) (71 to 132)	10 WD
Thermal protection PTO or PTF or CTP	10 WD
Encoder adaptation 5V, 1024 PTS (LS MV 71 to 132)	10 WD
Forced ventilation (71 to 132)	10 WD
Keyed rotor (hoisting applications)	FAB
Other encoder adaptation (LS MVR)	FAB
J01 optional inertia (71 to 100)	10 WD
J03 - J05 optional inertia (71 to 90)	FAB
WMS Pluggable male connector + cover (71 to 132 : 7,5 kW)	FAB
BAB kit + WMS connector (71 to 132 : 7,5 kW)	FAB
WMFS Pluggable male + female connector (71 to 132 : 7,5 kW)	FAB
BAB kit + WMFS connector (71 to 132 : 7,5 kW)	FAB
TRR reduced response time (71 to 132)	10 WD
Drain hole - position B3, B5	3 WD
Drain hole - any other position	FAB
IA finishing : food processing industry	FAB
MO finishing : machine-tool	FAB

Guaranteed availability (ex work) :

	Guaranteed availability (1 working day)
	Guaranteed availability (3 working days)
	Guaranteed availability (5 working days)
	Guaranteed availability (10 working days)
	Guaranteed availability (15 working days)
	Manufacturing time (FAB)

Option compatibility

	J01, J02 or J03 ¹	J05 ²	Anti- corrosion treatment	Drip cover	DLRA lever	2 nd shaft end crank- shaft socket	2 nd shaft end cylindrical	Encoder	Reduced response time	Release connector	Forced ventilation
J01, J02 or J03 ¹	•		•	•	•	•	•	only on J01	•	•	•
	J05 ²	• S.S.	•	•	•	•	•		•	•	
		Anticorrosion treatment	•	•	•	•	•	•	•	•	•
		Drip cover		•	•			N.D.	•	•	
				DLRA lever	•	•	•	•	•	•	•
					2 nd shaft end crank- shaft socket	•			•	•	
						2 nd shaft end cylindrical	•		•	•	
							Encoder	•		•	•
								Reduced response time	•	N.D.	
											Forced ventilation

1. J01 standard inertia of LS 112 and 132 S, not developed in LS 132 M and 160 ; J02 not developed in LS 112 and 132 S ;
J03 not developed in LS 112, 132 and 160.

2. Inertia not developed in 100 to 160 frame size.

•	Compatibility
S.S.	Special shaft; not developed for frame size ≥ 100
N.D.	Not developed
	Technically impossible

FCR asynchronous brake motors

Options

Flange options

FF flange mounted motors (IM B5)								
Type	FF 85	FF 100	FF 115	FF 130	FF 165	FF 215	FF 265	FF 300
LS 71	FAB	FAB	10 WD	3 WD	FAB			
LS 80	FAB	FAB	FAB	10 WD	3 WD	FAB		
LS 90			FAB	10 WD	3 WD	10 WD		
LS 100			FAB	FAB	FAB	3 WD	10 WD	
LS 112				FAB	10 WD	3 WD	FAB	FAB
LS 132					FAB	10 WD	3 WD	FAB
LS 160					FAB	FAB	FAB	3 WD

Guaranteed availability (ex work) :

	Guaranteed availability (1 working day)
	Guaranteed availability (3 working days)
	Guaranteed availability (5 working days)
	Guaranteed availability (10 working days)
	Guaranteed availability (15 working days)
	Manufacturing time (FAB)

FF face mounted motors (IM B14)								
Type	FT 65	FT 75	FT 85	FT 100	FT 115	FT 130	FT 165	FT 215
LS 71	FAB	10 WD	3 WD	10 WD	FAB			
LS 80	FAB		10 WD	3 WD	10 WD			
LS 90			FAB	10 WD	3 WD	10 WD		
LS 100					10 WD	3 WD	10 WD	
LS 112						3 WD	10 WD	
LS 132							FAB	FAB
LS 160							FAB	FAB

FCR asynchronous brake motors

Options

Quick release connector

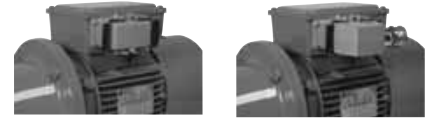
To meet the requirements of certain machines, the LS and LSMV series FCR brake motors can be supplied with an IP65 10 pin connector (or another model according advice), for 71 to 132 frame size, power supply : 400V (16 amps or maximum 7.5 kW, 4 poles) 500 V +/- 10 %.

It complies with the UL and CSA standards.

Two versions are proposed :

- WMS or male version: crimped connector support with cross stirrups, closed by a cord cover (for transportation).

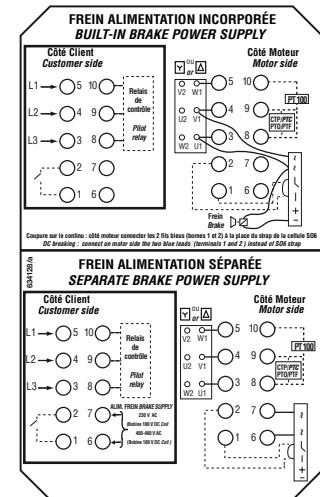
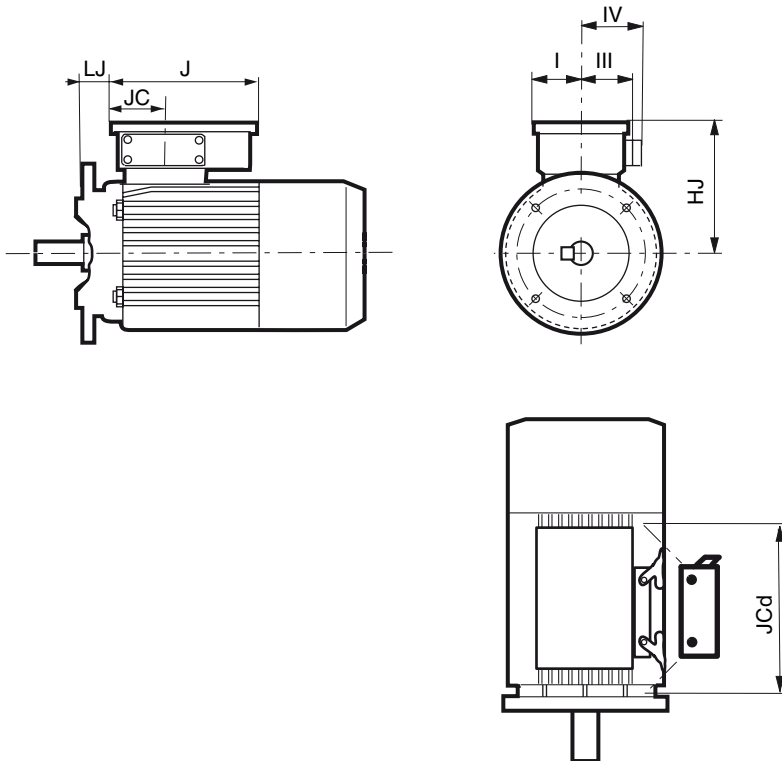
- WMFS or complete version: crimped male connector support with cross stirrup and female extension cover supplied, on one side, with a brass cable gland with an ISO 25 link for a cable input having a minimum diameter of 12.5 mm and a maximum diameter of 18 mm (this cable is not supplied).



WMS model

WMFS model

Sizes (dimensions in mm)

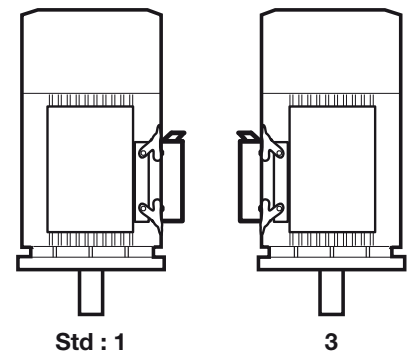


634 128 connection diagram
(in the terminal box cover)

This diagram may be used in the following cases:

- single speed motor
- built-in or separate brake power supply
- managed thermal probes
- star / delta connection (230/400V voltage)
- factory set motor cabling / brake / probes

Connector positions



Motor type	Release connector								
	HJ	J	JC	JCd	LJ		I	III	IV
					B3/B14	B5			
LS 71	135	160	63	116	13	38	55	83	135
LS 80	146	160	63	116	11	38	55	83	135
LS 90	156	160	63	116	13	33	55	83	135
LS 100	161	160	63	116	21	50	55	83	135
LS 112	169	160	63	116	23	49	55	83	135
LS 132 S	169	160	63	116	23	41	55	83	135
LS 132 M	188	160	63	116	25	65	55	83	135

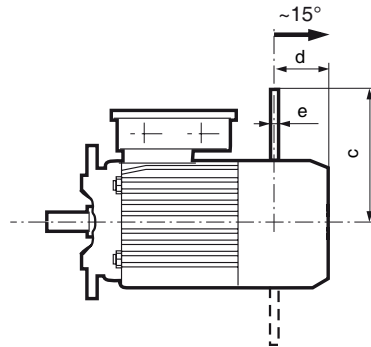
FCR asynchronous brake motors

Options

Dimensions in millimetres

Manual release :

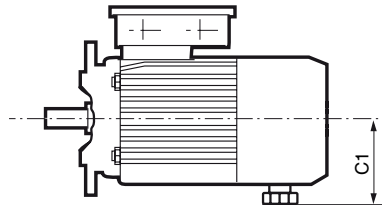
- DLRA



Type	Auto return hand release		
	c	d J01 to J03 / J05	e
LS 71 L	141	63 / 89	ø 8
LS 80 L	153	67 / 118	ø 8
LS 90 L	188	91 / 118	ø 8
LS 100 L	188	91 / -	ø 8
LS 112 MG	280	146 / -	ø 12
LS 132 S	280	146 / -	ø 12
LS 132 M	298	118 / -	ø 12
LS 160 MP, LR	298	118 / -	ø 12

DLRA lever is at 0° considering terminal box (pos. A). In option, it can be fitted at 180°.

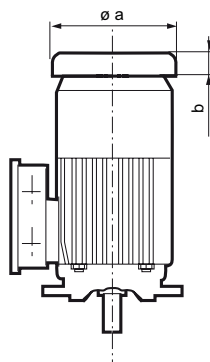
- DLM



Type	Lock off hand release
	c1
LS 80 L	116
LS 90 L	128
LS 100 L	128

DLM lever is at 180° considering terminal box (pos. A) exclusively.

Drip cover



Type	Drip cover	
	ø a	b
LS 71 L	141	25
LS 80 L	182	25
LS 90 L	220	25
LS 100 L	220	25
LS 112 MG	264	25
LS 132 S	264	25
LS 132 M	310	25
LS 160	310	25

FCR asynchronous brake motors

Options

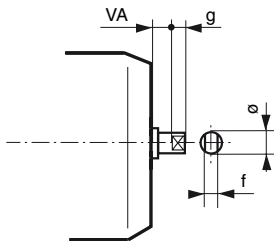
Dimensions in millimetres

Shafts projecting on brake side (NDE)

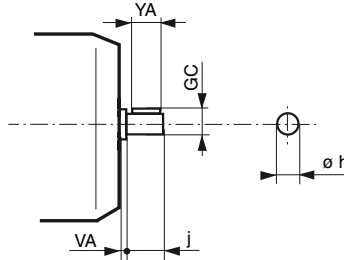
Type	Crankshaft			
	Socket			
	ø	f	g	VA
LS 71 L	11	8	6	2
LS 80 L	13	10	7	2
LS 90 L	16	13	11	4
LS 100 L	16	13	11	4
LS 112 MG	17	13	11	4
LS 132 S	17	13	11	4
LS 132 M	27	23	18	5
LS 160 MP, LR	27	23	18	5

Type	Cylindrical				
	Keyed shaft				
	GC	ø h	j	VA	YA
LS 71 L	10,2	9	20	0	16
LS 80 L	12,5	11	23	2	18
LS 90 L	16	14	30	4	25
LS 100 L	16	14	30	4	25
LS 112 MG	16	14	30	4	25
LS 132 S	16	14	30	4	25
LS 132 M	27	24	50	5	40
LS 160 MP, LR	27	24	50	5	40

Crankshaft socket according to ISO 4014



Cylindrical keyed shaft according to NFE 22-051



Dimensions of FCR brake motors, (FF) flange mounted with encoder

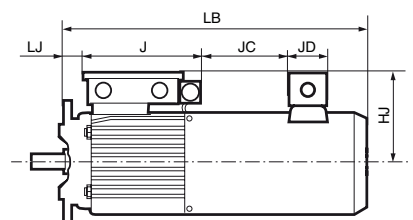
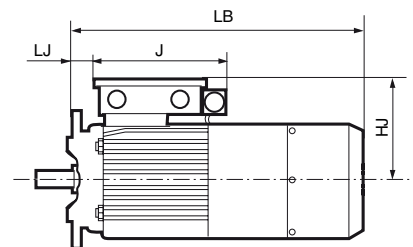
Type	Encoder			
	HJ	J	LB (J01 flywheel)	LJ
LS or LSMVR 71*	130	197	334	38
LS or LSMVR 80*	146	197	384	38
LS or LSMVR 90*	156	197	394	33
LS or LSMVR 100*	161	197	458	50
LS or LSMVR 112*	169	197	499	49
LS 132 S*	169	197	511	49
LSMVR 132 SM, M*	192	197	603	65
LSMVR 160 MR*	192	197	638	55

* For other dimensions, see FCR dimensions pages.

Dimensions of FCR brake motors, (FF) flange mounted with encoder + forced ventilation

Type	Encoder + Forced ventilation					
	HJ	J	JC	JD	LB (J01 flywheel)	LJ
LS or LSMVR 71*	135	197	68	75	404	38
LS or LSMVR 80*	146	197	99	98	474	38
LS or LSMVR 90*	156	197	131	98	486	33
LS or LSMVR 100*	161	197	178	98	550	50
LS or LSMVR 112*	169	197	182	110	581	49
LS 132 S*	169	197	194	110	593	49
LSMVR 132 SM, M*	192	197	299	110	713	65
LSMVR 160 MR*	192	197	344	110	748	55

* For other dimensions, see FCR dimensions pages.



I - SCOPE OF APPLICATION

These General Conditions of Sale ("GCS") shall apply to the sale of all products, components, software and services (referred to as "Products") proposed or sold by the Seller to the Client. Said GCS shall also apply to all quotation or offers made by the Seller, and are an integral part of all orders. "Seller" is understood to mean all companies directly or indirectly controlled by LEROY-SOMER. As a complementary measure, orders are also subject to the latest version in force of the Inter-Union General Conditions of Sale for France of the F.I.E.E.C. (*Fédération des Industries Electriques, Electroniques et de Communication* [Federation of Electrical, Electronic and Communication Industries]), inasmuch as they are not contrary to the GCS.

The acceptance of the Seller's offers or quotations, or any order, entails the acceptance without reservation of these GCS and rules out all contrary provisions shown on all other documents and, in particular, on the Client's order forms and the Client's General Conditions of Purchase.

If the sale concerns castings, by way of derogation to Paragraph 1 above, said castings shall be subject to the latest version in force of the *Conditions Générales Contractuelles des Fondries Européennes* (General Contractual Conditions of European Foundries). **The Products and services sold pursuant to these GCS may under no circumstances be used for applications in the nuclear field, as such sales expressly fall under technical specifications and specific contracts that the Seller reserves the right to refuse.**

II - ORDERS

All orders, even those taken by the Seller's agents and representatives, and regardless of the transmission method, shall only bind the Seller after written acceptance thereby of the order.

The Seller reserves the option of modifying the characteristics of its Products without notice. However, the Client shall retain the possibility of specifying the characteristics on which its commitment is contingent. In the absence of any such express stipulation, the Client may not refuse delivery of new, modified Products.

The Seller may not be held liable for an unsatisfactory selection of Products if said selection results from conditions of use that are incomplete and/or mistaken, or not disclosed to the Seller by the Client. Except in the event of a stipulation to the contrary, the offers and quotations remitted by the Seller shall only be valid for thirty days as from the date on which they are drawn up.

Where the Products must comply with standards, specific regulations and/or be received by control and inspection agencies, the price request must be accompanied by the technical specification, all terms and conditions the Seller must comply with. Reference shall be made thereto on the quotation or offer. Approval and attendance costs shall always be borne by the Client.

III - PRICES

Tariffs are expressed exclusive of tax and may be revised without notice.

Prices are either deemed to be firm for the period of validity specified on the quotation, or subject to a revision formula attached to the offer and which specifies, according to the regulations, parameters pertaining to the materials, products, various services and salaries for which the indices are published in the B.O.C.C.R.F. (*Bulletin Officiel de la Concurrence, de la Consommation et de la Répression des Fraudes* [French Official Journal of Competition and Consumer Matters, and Anti-Fraud Measures]).

All additional costs, in particular approval costs, specific checks, etc., shall be invoiced in addition.

IV - DELIVERY

Sales are governed by the latest edition in force of the INCOTERMS published by the Internal Chamber of Commerce ("I.C.C. INCOTERMS").

The Products shall be dispatched according to the conditions stated on the order acknowledgement issued by the Seller for all orders of Products.

Except in the event of specific provisions, the prices correspond to Products that are made available in the Seller's factories, including basic packaging.

Except in the event of a provision to the contrary, the Products shall always be transported at the risk of the addressee. In all cases, it shall be the responsibility of the addressee to make any claims to the carrier, within the delivery time and in the forms specified by law, concerning the state or number of parcels received, and to concomitantly provide the Seller with a copy of such declaration. Failure to comply with said procedure shall exempt the Seller from any liability. In any event, the Seller's liability may not exceed the amount of the indemnities received from its insurers.

If the provisions concerning transportation are amended by the Client subsequent to the acceptance of the order, the Seller reserves the right to invoice any supplemental costs that may result therefrom.

Except in the event of a contractual or statutory obligation to the contrary, packaging shall not be returnable.

In the event that a delivery of Products is delayed for a reason not attributable to the Seller, the Products stored on the Seller's premises shall be insured at the exclusive risk of the Client. Consideration for storage, costs will be invoiced at a rate of 1% (*one per cent*) of the total amount of the order, per week or partial week of storage, with no deductible or *de minimis* amount, as from the date of Products availability provided for in the contract. Upon expiration of a period of thirty days as from said date, the Seller may, at its discretion, either freely dispose of the Products and/or agree with the Client on a new delivery date for said Products, or invoice the Client in full for payment, according to the timeframes and amount provided for contractually. In any event, down payments shall inure to the Seller as indemnities, without prejudice to any other action the Seller may take.

V - DELIVERY TIME

The Seller shall only be bound by the delivery time mentioned on its order acknowledgement. Said delivery time shall only start to run as from the date of issuance of the order acknowledgement by the Seller, and subject to the fulfilment of the conditions provided for on the confirmation receipt, in particular receipt of the down payment for the order, notification of the opening of an operative irrevocable and confirmed documentary credit that complies in all respects to the Seller's request (*in particular regarding the amount, currency, validity and licence*), acceptance of the payment conditions accompanied by the implementation of any guarantees requested, etc.

Exceeding delivery time shall not grant the Client entitlement to damages and/or penalties.

Except in the event of a specific condition to the contrary, the Seller reserves the right to make partial deliveries.

Delivery times shall be interrupted by right and without the need for any judicial formalities, by any failure to pay or late payment by the Client.

VI - TESTS - QUALIFICATION

The Products manufactured by the Seller are checked and tested before leaving its factories. Clients may be present at said tests if specified on the order.

Specific tests and/or trials, as well as approval of Products, requested by the Client, whether carried out on the Client's premises or in the Seller's factories, on site, or by control and inspection agencies, must be specified on the order and are always at Client's expense.

Prototypes for Products specially developed or adapted for a Client must be qualified by the Client before serial production in order to ensure that it is compatible with the other components that make up its equipment, and that it is adapted to the intended use. Said qualification will also enable the Client to ensure that the Products comply with the technical specifications of this specific, the Client and Seller shall sign a Product Approval Form in two original, one of which shall be retained by the Client and one by the Seller.

In the event that the Client requires delivery without having firstly qualified the Products, said Products shall be delivered as they stand and shall always be deemed to be prototypes; the Client shall then be solely liable for using the Products or delivering them to its own clients. However, the Seller may also decide not to deliver the Products that have not received the Client's prior approval.

VII - PAYMENT CONDITIONS

All sales shall be deemed to be completed and payable at the Seller's registered office, without any possible derogation, regardless of the payment method, where the contract was concluded and where delivery was made.

Where the Client is located out of French territory, invoices shall be payable in cash upon receipt, or by a bank draft or a bill of exchange, within 30 (thirty) days net.

All early payment compared to the deadline fixed shall give right to a discount of 0.2% (*nought point two per cent*) per month, of the amount concerned of the invoice.

Except in the event of provisions to the contrary, where the Client is located outside of French Territory, invoices shall be payable in cash against remittance of shipping documents, or by irrevocable documentary credit confirmed by a first rate French bank, at Client's expense.

Payment shall be understood to mean the funds being made available on the Seller's bank account and must imperatively be made in the invoicing currency.

Pursuant to French Law no. 2001-420 of 15 May 2001, failure to pay an invoice when due shall trigger, after service of formal notice that has remained without effect, payment to the Seller of a flat-rate penalty on the due date of the receivable, which shall be applied to amount inclusive of tax of monies owed if the invoice is liable to VAT (*Value Added Tax*), and the suspension of pending orders. Said penalty is equal to the European Central Bank Rate + 7 basis points.

The collection of said monies via litigation shall trigger an increase of 15% (*fifteen per cent*) of the amount claimed, with a minimum of Euros 500 exclusive of tax (*five hundred euros exclusive of tax*), with tax in addition if due.

Moreover, subject to compliance with the statutory provisions in force, in the event of total or partial failure to pay any invoice or instalment whatsoever, regardless of the payment method used, all amounts that remain owed to the Seller (*including its subsidiaries, affiliated or allied companies, whether French or foreign*) for all deliveries and services, regardless of the due date originally provided for, shall immediately become due.

Notwithstanding any specific payment conditions provided for between the parties, the Seller reserves the right to require, in the event of a decline in the Client's credit rating, a payment incident or bankruptcy of the Client :

- the payment in cash, before the Products leave the factory, for all orders currently being fulfilled,
- down payments to be made on all orders,
- alternative or different payment guarantees.

VIII - PAYABLE AND RECEIVABLE BALANCE

Except where prohibited by law, the Seller and the Client expressly agree to balance their payables and receivables arising from their trade relations, even if all conditions defined by law for legal balancing are not met.

For the application of said clause, the Seller shall mean any company of the LEROY-SOMER Group.

IX - TRANSFER OF RISK / RESERVE OF TITLE

Risk shall be transferred as soon as the Products are made available, according to the delivery conditions stipulated on the order acknowledgement.

The transfer to the Client of title shall take place after payment in full. In the event that the restitution of the Products delivered is claimed by the Seller, the Seller is entitled to retain any down payment as compensation.

Remittance of a bill that creates an obligation to pay (*bill of exchange or other*) shall not constitute payment and discharge. For as long as the price has not been paid in full, the Client is required to inform the Seller, within twenty-four hours, of the sequestration, requisition or confiscation of the Products for the benefit of a third party, and to take all protective measures to make known the Seller's property right in the event of action by creditors, and to cause such right to be respected.

X - CONFIDENTIALITY

Each of the parties undertakes to maintain the confidentiality of all technical, trade, financial or other information received from the other party, whether orally, in writing or by any other means of communication, when any order is negotiated and/or fulfilled.

This confidentiality obligation shall apply throughout the period during which the order is fulfilled and for 5 (five) years subsequent to completion or cancellation thereof, regardless of the reasons therefor.

XI - INDUSTRIAL AND INTELLECTUAL PROPERTY

Data, studies, results, information or software, whether patentable or not obtained by the Seller when any order is fulfilled shall remain the exclusive property of the Seller.

With the exception of instruction and maintenance manuals, documents of any nature remitted to the Client shall remain the exclusive property of the Seller and must be returned to it upon request, even if the Client was invoiced for part of the cost of the study, and said documents may not be disclosed to third parties or used without the Seller's prior written agreement.

XII - CANCELLATION / TERMINATION

The Seller reserves the right to cancel or terminate immediately, at the Seller's discretion, by right and without the need for any judicial formalities, the contract in the event of failure to pay any portion whatsoever of the price, when due, or in the event of any breach of any of the Client's contractual obligations. Down payments and any amount already paid shall remain in Seller's hands in the form of indemnities, without prejudice to the Seller's right to claim damages. In the event that the contract is cancelled, the Products must be returned to the Seller immediately, regardless of where the Products are located, at Client's expense and risk, under penalty of 10% (*ten per cent*) of the value thereof, per week's delay.

XIII - WARRANTY

The Seller warrants the Products against all operating defects caused by material or manufacturing fault, for a period of twelve months as from the date on which the Products are made available, unless a different statutory provision subsequently applies, under the conditions defined below.

The warranty may only be triggered insofar as the Products have been stored, used and maintained in accordance with the Seller's instructions and manuals. The warranty does not apply where the defect results, in particular, from :

- inadequate monitoring, maintenance or storage,
- normal wear and tear on the Products,
- servicing or modification of the Products without the Seller's prior written authorisation,
- abnormal use of the Products or use of the Products for a purpose other than that intended,
- faulty installation of the Products on the premises of the Client and/or the end user,
- failure by the Client to disclose the purpose or conditions of use of the Products,
- failure to use genuine spare parts,
- force majeure or any event that is beyond the control of the Seller.

In any case, the warranty is limited to the replacement or repair of the parts or Products deemed faulty by the Seller's technical departments. If the repair is entrusted to a third party, the repair shall only be carried out once the Seller has agreed to the quotation for the repair.

All Products returns must have been given the Seller's prior, written authorisation.

The Products to be repaired must be dispatched carriage paid, to the address given by the Seller. If the Products are not accepted under warranty, their return to the Client shall be invoiced to the Client or the end user.

This warranty shall apply to the Seller's Products that are made readily available and therefore does not cover the de-installation and re-installation of said Products in the equipment into which it is mounted.

Repair, modification or replacement of any part or Product during the warranty period may not result in the warranty period being extended.

The provisions of this article constitute the Seller's sole obligation concerning the warranty of the Products delivered.

XIV - LIABILITY

The Seller's liability is strictly limited to the obligations stipulated in these GCS and those expressly accepted by the Seller. All penalties and indemnities provided for therein constitute lump sum damages that include discharge for the Seller and are exclusive of any other penalty or indemnification.

With the exception of the Seller's gross negligence and the compensation of bodily injury, the Seller's liability shall be limited, in total, to the contractual amount, exclusive of tax, of the Product(s) that give(s) right to compensation.

The Seller may under no circumstances be required to indemnify consequential, indirect and / or punitive damages that the Client may use as the basis for a claim; as a result, the Seller may not be required to indemnify, in particular, production losses, operating losses or lost profit or, in general, any damage eligible for indemnification other than bodily injury or damage to property.

The Client undertakes to hold harmless the Seller and / or its insurers from any and all claims made by its insurers and/or any third party in a contractual relation with the Client, in excess of the limit and for the exclusions listed above.

XV - SPARE PARTS AND ACCESSORIES

Spare parts and accessories shall be supplied upon request, to the extent of their availability. Associated costs shall be invoiced in addition.

The Seller reserves the right to require a minimum quantity or invoicing amount per order.

XVI - WASTE MANAGEMENT

The Products that form the purpose of the sale does not fall within the scope of the European Directive 2002/96/EC (WEEE) dated January 27th, 2003, and all related legislation of Member States of the European Union that result therefrom, on the composition of electrical and electronic equipment and the disposal of waste from such equipment.

In accordance with Article L 541-2 of the French Environment Code, it is the responsibility of the waste holder to ensure the disposal thereof or to cause the disposal thereof at its own expense.

XVII - FORCE MAJEURE

With the exception of the Client's obligation to pay the monies owed to the Seller in respect of an order, the Client and Seller may not be held liable for the total or partial failure to perform their contractual obligations if such failure results from the occurrence of a force majeure. Delays or disturbances in production that totally or partially result from war (whether declared or not), terrorist act, strikes, riots, accidents, fires, floods, natural disasters, transportation delays, shortage of components or materials, governmental decision or action (including prohibition on import/export or the withdrawal of an import/export licence) shall, in particular, be deemed a force majeure.

If one of the parties is delayed or prevented from performing its obligations by reason of this Article for a period in excess of 180 consecutive days, each party may then terminate, by right and without any need for judicial formalities, the unperformed part of the order, by written notice to the other party, without liability. However, the Client shall be required to pay the price agreed pertaining to the Products already delivered on the date of termination.

XVIII - PROHIBITION ON UNLAWFUL PAYMENTS

The Client shall refrain from being engaged in any activity that would expose the Seller or any of its affiliates to a risk of penalties under laws and regulations of any relevant jurisdiction prohibiting improper payments, including but not limited to bribes or gifts of an obviously unreasonable amount, to any government or agency officials, to political parties or their officials or candidates for public office, or to any employee of any customer or supplier.

XIX - TRADE COMPLIANCE LAWS

The Client agrees that all applicable import, export control and sanctions laws, regulations, orders and requirements, as they may be amended from time to time, including without limitation those of the European Union, the United States of America, and the jurisdictions in which the Seller and the Client are established or from which Products may be supplied, and the requirements of any licences, authorisations, general licences or licence exceptions relating thereto ("Trade Compliance Laws") will apply to its receipt and use of Products, as well as related services and technology. In no event shall the Client use, transfer, release, export or re-export the Products, related services or technology in violation of Trade Compliance Laws.

Seller shall have no obligation to supply any Products, or services unless and until it has received any necessary licences or authorisations or has qualified for general licences or licence exceptions under Trade Compliance Laws.

If for any reason any such licences, authorisations or approvals are denied or revoked, or if there is a change in any Trade Compliance Laws that would prohibit Seller from fulfilling the contract, or would in the reasonable judgement of Seller otherwise expose Seller and/or Seller's Affiliate(s) to a risk of liability under Trade Compliance Laws, Seller shall be relieved without liability of all obligations under the contract.

XX - SEVERABILITY

All clauses and/or provisions of these General Conditions that are deemed or become null or void shall not cause the nullity or voidance of the contract, but solely the clause and/or provision concerned.

XXI - DISPUTES

THIS CONTRACT SHALL BE GOVERNED BY AND INTERPRETED IN ACCORDANCE WITH THE LAWS OF FRANCE.

ANY DISPUTE IN RELATION TO THE INTERPRETATION OR THE EXECUTION OF THIS CONTRACT NOT AMICABLY SETTLED BETWEEN THE PARTIES WITHIN A 30 DAY PERIOD, SHALL BE SETTLED BY THE COMPETENT COURT OF ANGOULÊME (FRANCE), EVEN IN THE CASE OF INTRODUCTION OF THIRD PARTIES OR THE INVOLVEMENT OF SEVERAL DEFENDANTS. HOWEVER, THE SUPPLIER RESERVES THE EXCLUSIVE RIGHT TO BRING THE DISPUTE TO THE COMPETENT COURTS OF THE SELLER OR THE CLIENT.

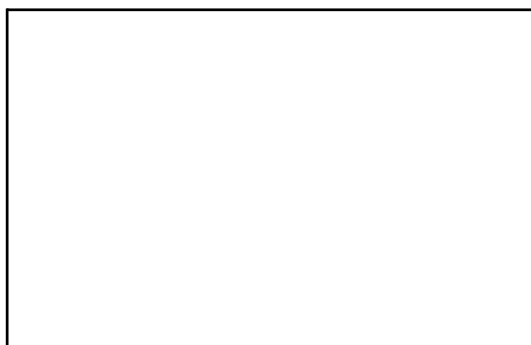


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