

HOISTING MOTORS

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1) MOTORS

- Asynchronous motors
- Double Winding
- Synchronous speed : 3000 / 500 rpm for 50 hertz
- Synchronous speed : 3600 / 600 rpm for 60 hertz
- Power range from 1.9 to 30 kW for 50 hertz
- Power range from 2.2 to 36 kW (2.9 to 48 HP) for 60 hertz
- IP55 protection
- Insulation Class F
- Tropicalized
- Thermistors for over temperature protection
- Aluminum frame
- N1...N5 are standard two speed hoisting motors.

The design of the motors is based on maximum ambient temperature of 40°C (104 °F) and at a maximum altitude of 1000 m (3280 ft).

If ambient temperature exceeds 40 °C, a motor from a higher classification must be selected:

- For ambient temperature in range 40°C-55°C, the motor must be selected from one step higher in the motor group classification.

- For ambient temperature in range 55°C-65°C, the motor must be selected from two steps higher in the motor group classification.

2) BRAKES

- Electromagnetic brake
- Self-adjusting for motors N1, N2, N3 & N4 and manual adjusting for motor N5
- Wear detection

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3) Main characteristics (Motors 50 Hz)

DUTY GROUP (FEM)	MOTOR CODE*	N1	N2	N3	N4	N5
	HOIST TYPE	SM1	SM2 SM3	SM3 SM4	SM4 SM5 SM6	SM5 SM6
	Motor type	MF09ZA106	MF10Z-106	MF11Z-106	MF13ZA106	MF16Z-106
	synchronous speed r/min	3000/500	3000/500	3000/500	3000/500	3000/500
	Braking torque Nm	10.8	21.6	44	87	200
	El. Br. torque Nm	28.5/11.8	59/29	105/58	220/151	295/271
	Power fact. start	0.89/0.80	0.82/0.79	0.75/0.68	0.65/0.61	0.65/0.56
	Starting torque Nm	12/10.7	26/22	48/42	105/86	212/162
	Weight Kg	23	30	50	87	192
1 Bm 180 starts./h 40% ED	Load tm/min	10	20			160
	Nominal power * kW	1.9/0.3	3.5/0.5			30/5
	Nominal torque Nm	6.3	12.7			96
	Nominal speed r/min	2660/375	2780/400			2740/430
	Short time duty** min	15/15	15/11			15/30
	Power factor	0.91/0.70	0.87/0.63			0.89/0.55
	Efficiency	0.63/0.26	0.71/0.28			0.78/0.61
1 Am 180 starts./h 40% ED	Load tm/min	8	20	40	80	160
	Nominal power * kW	1.5/0.25	3.5/0.5	7.5/1.2	15/2.5	30/5
	Nominal torque Nm	4.7	12.7	24.7	48	96
	Nominal speed r/min	2750/400	2780/400	2750/360	2810/430	2740/430
	Short time duty** min	15/15	15/11	15/10	15/10	15/30
	Power factor	0.83/0.63	0.87/0.63	0.85/0.55	0.86/0.49	0.89/0.55
	Efficiency	0.67/0.25	0.71/0.28	0.74/0.30	0.78/0.44	0.78/0.61
2 m 240 starts./h 40% ED	Load tm/min	6.4	16	32	64	128
	Nominal power * kW	1.2/0.2	2.8/0.4	6.0/1.0	12.0/2.0	25/4
	Nominal torque Nm	3.8	9.6	19.2	39	77
	Nominal speed r/min	2810/420	2830/420	2820/400	2870/450	2790/440
	Short time duty** min	15/15	15/11	15/10	15/10	15/30
	Power factor	0.78/0.59	0.81/0.59	0.81/0.50	0.82/0.44	0.87/0.49
	Efficiency	0.66/0.22	0.72/0.27	0.76/0.30	0.80/0.43	0.79/0.60
3 m 300 starts./h 50% ED	Load tm/min	5	12.8	26	50	100
	Nominal power * kW	0.95/0.15	2.2/0.3	4.8/0.8	9.6/1.6	20/3
	Nominal torque Nm	3.0	7.7	15.6	30	61
	Nominal speed r/min	2840/440	2860/440	2870/430	2910/465	2830/460
	Short time duty** min	15/15	15/11	15/10	15/10	15/30
	Power factor	0.71/0.56	0.77/0.55	0.76/0.45	0.75/0.38	0.83/0.43
	Efficiency	0.65/0.19	0.72/0.26	0.78/0.30	0.79/0.40	0.80/0.58

*) Power with nominal load

***) Time with a cold motor

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3) Main characteristics (Motors 60 Hz)

Duty Group (Fem)	Motor code		N1	N2	N3	N4	N5
	Motor type		MF09ZA106	MF10Z-106	MF11Z-106	MF13ZA106	MF16Z-106
	Synchronized speed	RPM	3600/600	3600/600	3600/600	3600/600	3600/600
	Braking torque	Nm	10.8	21.6	44	87	200
	El. brake torque	Nm	27.5/11.4	59/29	105/58	214/147	278/251
	Power fact. start		0.88/0.78	0.80/0.77	0.73/0.67	0.64/0.56	0.64/0.54
	Starting torque	Nm	11.6/10.3	26/22	48/42	102/82	200/150
	Weight	kg	23	30	50	87	192
	Inertia	kgm ²	0.0041	0.0047	0.0090	0.0393	0.1193
1Bm 180 starts/h 40 % ED	Load	tm/min	12/2.0	23/3.0			195/33
	Nominal power ^{*)}	kW	2.2/0.37	4.2/0.60			36/6
	Nominal torque	Nm	6.3	12.7			96
	Nominal speed	RPM	3260/475	3380/500			3320/520
	Short time duty	min	15/15	15/11			15/30
	Power factor		0.91/0.61	0.87/0.61			0.89/0.59
	Efficiency		0.67/0.31	0.75/0.31			0.77/0.65
1Am 180 starts/h 40 % ED	Load	tm/min	9.5/1.5	23/3.0	49/8.0	95/16	195/33
	Nominal power ^{*)}	kW	1.8/0.3	4.2/0.6	9/1.5	18/3	36/6
	Nominal torque	Nm	4.7	12.7	24.7	48	96
	Nominal speed	RPM	3350/500	3380/500	3350/450	3400/520	3320/520
	Short time duty	min			15/10	15/10	15/30
	Power factor		0.87/0.59	0.87/0.61	0.87/0.55	0.90/0.48	0.89/0.59
	Efficiency		0.68/0.29	0.75/0.31	0.73/0.33	0.79/0.48	0.77/0.65
2m 240 starts/h 40 % ED	Load	tm/min	7.5/1.0	18/2.5	39/6.5	80/13	165/26
	Nominal power ^{*)}	kW	1.4/0.22	3.4/0.5	7.2/1.2	15/2.5	30/4.8
	Nominal torque	Nm	3.8	9.6	19.2	39	77
	Nominal speed	RPM	3410/520	3430/520	3420/480	3440/540	3380/535
	Short time duty	min					
	Power factor		0.81/0.54	0.84/0.55	0.84/0.50	0.88/0.44	0.87/0.50
	Efficiency		0.68/0.25	0.75/0.29	0.74/0.34	0.80/0.47	0.79/0.65
3m 300 starts/h 50 % ED	Load	tm/min	6.0/0.9	14/1.8	31/4.5	60/10	130/19
	Nominal power ^{*)}	kW	1.1/0.18	2.6/0.35	5.8/0.9	11.5/1.9	24/3.6
	Nominal torque	Nm	3.0	7.7	15.6	30	61
	Nominal speed	RPM	3440/540	3470/540	3470/510	3490/560	3430/545
	Short time duty	min					
	Power factor		0.76/0.51	0.79/0.50	0.79/0.45	0.84/0.38	0.85/0.43
	Efficiency		0.66/0.22	0.74/0.28	0.76/0.32	0.81/0.45	0.81/0.64
4m 360 starts/h 60 % ED	Load	tm/min		12/1.5			95/16
	Nominal power ^{*)}	kW		2.2/0.30			18/3.0
	Nominal torque	Nm		6.0			48
	Nominal speed	RPM		3490/550			3460/555
	Short time duty	min					
	Power factor			0.69/0.46			0.82/0.38
	Efficiency			0.72/0.24			0.81/0.63

*) Powers are given with nominal load.

4) Currents (Motors 50 Hz)

Motor type	Currents * (fast/slow speed)	Duty Group	Voltage					
			220 V	380 V	400 V	415 V	500 V	660 V
N1 MF09ZA106	Starting current (A)		29/5.5	17/3.2	16/3.0	15/2.9	13/2.4	9.7/1.8
	Nominal current (A)	1Bm	8.0/4.0	4.6/2.3	4.4/2.2	4.2/2.2	3.5/1.8	2.7/1.3
		1Am	6.4/4.0	3.7/2.3	3.5/2.2	3.4/2.2	2.8/1.8	2.1/1.3
		2m	5.8/4.0	3.4/2.3	3.2/2.2	3.1/2.2	2.6/1.8	1.9/1.3
		3m	5.3/4.0	3.1/2.3	2.9/2.2	2.8/2.2	2.3/1.8	1.8/1.3
		4m	-	-	-	-	-	-
N2 MF10Z-106	Starting current (A)		70/12	41/6.8	39/6.5	38/6.3	31/5.2	24/3.9
	Nominal current (A)	1Bm	15.0/7.8	8.5/4.5	8.1/4.3	7.8/4.1	6.5/3.4	4.9/2.6
		1Am	15.0/7.8	8.5/4.5	8.1/4.3	7.8/4.1	6.5/3.4	4.9/2.6
		2m	13.0/7.8	7.6/4.5	7.2/4.3	6.9/4.1	5.8/3.4	4.4/2.6
		3m	11.0/7.8	6.4/4.5	6.1/4.3	5.9/4.1	4.9/3.4	3.7/2.6
		4m	10.0/7.8	5.8/4.5	5.5/4.3	5.3/4.1	4.4/3.4	3.3/2.6
N3 MF11Z-106	Starting current (A)		133/22	77/13	73/12	70/12	58/9.6	44/7.3
	Nominal current (A)	1Bm	-	-	-	-	-	-
		1Am	30.0/14.0	17.0/8.2	16.5/7.8	16.0/7.5	13.0/6.2	10.0/4.7
		2m	26.0/14.0	15.0/8.2	14.0/7.8	14.0/7.5	11.0/6.2	8.5/4.7
		3m	22.0/14.0	13.0/8.2	12.0/7.8	12.0/7.5	9.6/6.2	7.3/4.7
		4m	-	-	-	-	-	-
N4 MF13ZA106	Starting current (A)		291/51	168/29	160/28	154/27	128/22	97/17
	Nominal current (A)	1Bm	-	-	-	-	-	-
		1Am	56.0/27.0	33.0/16.0	31.0/15.0	30.0/15.0	25.0/12.0	19.0/9.1
		2m	47.0/27.0	27.0/16.0	26.0/15.0	25.0/15.0	21.0/12.0	16.0/9.1
		3m	40.0/27.0	23.0/16.0	22.0/15.0	21.0/15.0	18.0/12.0	13.0/9.1
		4m	-	-	-	-	-	-
N5 MF16Z-106	Starting current (A)		433/76	239/42	239/42	227/40	191/34	145/26
	Nominal current (A)	1Bm	103.0/36.0	57.0/20.0	57.0/20.0	55.0/19.0	46.0/16.0	35.0/12.0
		1Am	103.0/36.0	57.0/20.0	57.0/20.0	55.0/19.0	46.0/16.0	35.0/12.0
		2m	85.0/34.0	47.0/19.0	47.0/19.0	45.0/18.0	38.0/15.0	29.0/12.0
		3m	71.0/33.0	39.0/18.0	39.0/18.0	37.0/17.0	31.0/15.0	24.0/11.0
		4m	60.0/31.0	33.0/17.0	33.0/17.0	31.0/16.0	27.0/14.0	20.0/10.0

*) Current with nominal load

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4) Currents (Motors 60 Hz)

Motor type	Currents ^{*)} (fast / slow speed)	Duty Group	Voltage					
			220 V	380 V	440 V	460 V	480 V	600 V
N1 MF09ZA106	Starting current (A)		33/6.3	19/3.6	17/3.1	16/3	15/2.9	13/2.4
	Nominal current (A)	1Bm	9.2/4.6	5.3/2.9	4.6/2.3	4.2/2.2	4.2/2.1	3.5/1.8
		1Am	7.3/4.6	4.2/2.7	3.7/2.3	3.5/2.2	3.4/2.1	2.8/1.8
		2m	6.7/4.6	3.9/2.7	3.3/2.3	3.2/2.2	3.1/2.1	2.6/1.8
		3m	5.0/4.6	2.9/2.7	2.5/2.3	2.4/2.2	2.3/2.1	2.3/1.8
		4m	-	-	-	-	-	-
N2 MF10Z-106	Starting current (A)		82/14	47/7.9	41/6.8	39/6.5	37/6.2	31/5.2
	Nominal current (A)	1Bm	17/9.0	10/5.2	8.6/4.5	8.2/4.3	7.9/4.1	6.6/3.4
		1Am	17/9.0	10/5.2	8.6/4.5	8.2/4.3	7.9/4.1	6.6/3.4
		2m	15/9.0	8.7/5.2	7.5/4.5	7.2/4.3	6.9/4.1	5.8/3.4
		3m	13/9.0	7.4/5.2	6.4/4.5	6.1/4.3	5.8/4.1	4.9/3.4
		4m	12/9.0	6.7/5.2	6.8/4.5	5.5/4.3	5.3/4.1	4.4/3.4
N3 MF11Z-106	Starting current (A)		138/25	80/15	69/13	66/12	63/12	58/9.6
	Nominal current (A)	1Bm	-	-	-	-	-	-
		1Am	36/16	21/9.4	18/8.2	17/7.8	16/7.5	13/6.2
		2m	29/16	17/9.4	15/8.2	14/7.8	13/7.5	11/6.2
		3m	25/16	15/9.4	13/8.2	12/7.8	12/7.5	9.6/6.2
		4m	-	-	-	-	-	-
N4 MF13ZA106	Starting current (A)		335/59	194/34	167/29	160/28	153/27	128/22
	Nominal current (A)	1Bm	-	-	-	-	-	-
		1Am	65.0/31.0	38.0/18.0	32.0/16.0	31.0/15.0	30/14	25/12
		2m	54.0/31.0	31.0/18.0	27.0/16.0	26.0/15.0	25/14	21/12
		3m	46.0/31.0	27.0/18.0	23.0/16.0	22.0/15.0	21/14	18/12
		4m	-	-	-	-	-	-
N5 MF16Z-106	Starting current (A)		460/78	278/47	230/39	230/39	220/37	184/31
	Nominal current (A)	1Bm	118.0/38.0	71.0/23.0	59.0/19.0	59.0/19.0	56.0/18.0	47.0/15.0
		1Am	118.0/38.0	71.0/23.0	59.0/19.0	59.0/19.0	56.0/18.0	47.0/15.0
		2m	96.0/36.0	58.0/22.0	48.0/18.0	48.0/18.0	46.0/17.0	38.0/15.0
		3m	76.0/34.0	46.0/21.0	38.0/18.0	38.0/17.0	36.0/16.0	31.0/14.0
		4m	64.0/32.0	39.0/20.0	32.0/18.0	32.0/16.0	31.0/15.0	26.0/13.0

*) Currents are given with nominal load.

5) Hoisting motor description

