

### 3 HOISTING MOTORS

#### 3.1 Hoisting motor data, two speed pole change motors, 50 Hz

Hoist	Hoisting motor rating	Characteristic	Unit	P1		P2		P3		P4		
				MF10M-106		MF10Z-106		MF10X-106		MF11XA106		
				High	Low	High	Low	High	Low	High	Low	
Standard hoist	300 Starts/h 60 % ED	Rated power	kW	1.8	0.25	3.6	0.5	4.5	0.7	7.5	1.2	
		Synchronous speed	rpm	3000	500	3000	500	3000	500	3000	500	500
		Brake torque	Nm	21		21		42		54		
		Max el. br. torque	Nm		32		63		77		105	
		El. br. torque	Nm		12.6		25		38		56	
		Power fact. start	-	0.8	0.83	0.83	0.78	0.84	0.77	0.79	0.69	
		Starting torque	Nm	12.4	10.7	25	22	34	28	57	48	
		Weight	kg	22.6		30.6		35		51		
		Brake inertia	kgm <sup>2</sup>	0.00017		0.00017		0.00045		0.0007		
		Inertia w/o brake	kgm <sup>2</sup>	0.0027		0.0049		0.0059		0.0101		
		Load	tm/min	10		20		25		40		
		Nominal power	kW	1.8	0.25	3.6	0.5	4.5	0.7	7.5	1.2	
		Nominal torque	Nm	6.1	6.1	12.3	12.3	15.3	15.3	24	24	
		Nominal speed	rpm	2780	420	2800	400	2750	415	2650	355	
		Short time duty	min	60	15	60	15	30	15	30	12	
		Power factor	-	0.82	0.67	0.87	0.63	0.92	0.61	0.90	0.56	
Efficiency	-	0.66	0.24	0.73	0.30	0.72	0.30	0.73	0.28			
Special application at lower load ratings	300 starts/h 60 % ED	Load	tm/min	10		20		25		40		
		Nominal power	kW	1.8	0.25	3.6	0.5	4.5	0.7	7.5	1.2	
		Nominal torque	Nm	6.1	6.1	12.3	12.3	15.3	15.3	24	24	
		Nominal speed	rpm	2780	420	2800	400	2750	415	2650	355	
		Short time duty	min	60	15	60	15	30	15	30	12	
		Power factor	-	0.82	0.67	0.87	0.63	0.92	0.61	0.90	0.56	
		Efficiency	-	0.66	0.24	0.73	0.30	0.72	0.30	0.73	0.28	
		Load	tm/min	8		16		20		32		
		Nominal power	kW	1.5	0.2	2.9	0.4	3.6	0.5	6	1	
		Nominal torque	Nm	4.9	4.9	9.8	9.8	12.3	12.3	19.2	19.2	
		Nominal speed	rpm	2830	435	2850	420	2830	430	2730	390	
		Short time duty	min									
		Power factor	-	0.78	0.64	0.84	0.58	0.89	0.56	0.87	0.52	
		Efficiency	-	0.64	0.22	0.76	0.29	0.74	0.29	0.74	0.27	
		Load	tm/min	6.3		12.5		16		25		
		Nominal power	kW	1.2	0.16	2.4	0.35	2.9	0.4	4.5	0.7	
		Nominal torque	Nm	3.9	3.9	7.7	7.7	9.8	9.8	15.3	15.3	
		Nominal speed	rpm	2860	445	2890	435	2870	440	2800	420	
		Short time duty	min									
		Power factor	-	0.73	0.61	0.77	0.53	0.85	0.51	0.82	0.47	
		Efficiency	-	0.61	0.18	0.75	0.26	0.73	0.27	0.75	0.26	
		Load	tm/min	5		10		12.5		20		
		Nominal power	kW	0.9	0.12	1.8	0.25	2.4	0.35	3.6	0.5	
		Nominal torque	Nm	3	3	6.1	6.1	7.7	7.7	12.3	12.3	
		Nominal speed	rpm	2890	460	2920	450	2900	450	2840	440	
		Short time duty	min									
		Power factor	-	0.66	0.58	0.69	0.50	0.81	0.48	0.76	0.45	
		Efficiency	-	0.58	0.15	0.73	0.23	0.72	0.24	0.74	0.23	

...Two speed pole change motors, 50 Hz, Continued

Hoist	Hoisting motor rating	Characteristic	Unit	P5		P6		P7		P8*		
				MF11X-106		MF13Z-106		MF13X-106		MF13XA106		
				High	Low	High	Low	High	Low	High	Low	
Standard hoist	300 Starts/h 60 % ED	Rated power	kW	9	1.4	15	2.5	18	3	23	3.5	
		Synchronous speed	rpm	3000	500	3000	500	3000	500	3000	500	500
		Brake torque	Nm	54		100		130		200		
		Max el. br. torque	Nm		107		190		225		290	
		El. br. torque	Nm		57		84		111		150	
		Power fact. start		0.77	0.69	0.67	0.68	0.62	0.65	0.73	0.67	
		Starting torque	Nm	67	56	107	84	120	111	165	140	
		Weight	kg	59		86		99		99		
		Brake inertia	kgm <sup>2</sup>	0.0007		0.0007		0.0017		0.0017		
		Inertia w/o brake	kgm <sup>2</sup>	0.0116		0.036		0.043		0.043		
		Load	tm/min	50		80		100		125		
		Nominal power	kW	9	1.4	15	2.5	18	3	23	3.5	
		Nominal torque	Nm	30	30	48	48	62	62	76	76	
		Nominal speed	rpm	2680	335	2740	420	2770	425	2790	420	
		Short time duty	min	30	10	30	15	30	15	15	10	
		Power factor	-	0.90	0.61	0.87	0.59	0.91	0.56	0.84	0.57	
Efficiency	-	0.72	0.28	0.78	0.45	0.80	0.47	0.83	0.44			
Special application at lower load ratings	300 starts/h 60 % ED	Load	tm/min	50		80		100				
		Nominal power	kW	9	1.4	15	2.5	18	3			
		Nominal torque	Nm	30	30	48	48	62	62			
		Nominal speed	rpm	2680	335	2740	420	2770	425			
		Short time duty	min	30	10	30	15	30	15			
		Power factor	-	0.90	0.61	0.87	0.59	0.91	0.56			
		Efficiency	-	0.72	0.28	0.78	0.45	0.80	0.47			
		Load	tm/min	40		63		80				
		Nominal power	kW	7.5	1.2	12	2	15	2.5			
		Nominal torque	Nm	24	24	38	38	48	48			
		Nominal speed	rpm	2760	370	2810	440	2820	440			
		Short time duty	min									
		Power factor	-	0.87	0.56	0.82	0.52	0.89	0.47			
		Efficiency	-	0.79	0.28	0.80	0.43	0.82	0.43			
		Load	tm/min	32		50		63				
		Nominal power	kW	6	1	9	1.4	12	2			
		Nominal torque	Nm	19.2	19.2	30	30	38	38			
		Nominal speed	rpm	2820	400	2860	455	2865	455			
		Short time duty	min									
		Power factor	-	0.84	0.52	0.78	0.48	0.87	0.41			
		Efficiency	-	0.79	0.28	0.80	0.41	0.82	0.40			
		Load	tm/min	25		40		50				
		Nominal power	kW	4.5	0.7	7.5	1.2	9	1.4			
		Nominal torque	Nm	15.3	15.3	24	24	30	30			
Nominal speed	rpm	2870	425	2900	465	2900	465					
Short time duty	min											
Power factor	-	0.80	0.47	0.70	0.42	0.84	0.36					
Efficiency	-	0.79	0.25	0.77	0.34	0.82	0.35					

\*) Note! P8 hoisting motor for M4 use only. External fan as standard

### 3.2 Hoisting motor currents, two speed pole change motors, 50 Hz

Nominal voltage		230 V			400 V		500 V		660 V	
Used in voltage range		220...240 V			380...415 V		500...525 V		660...690 V	
		tm/min	Current (Amperes)		Current (Amperes)		Current (Amperes)		Current (Amperes)	
			High	Low	High	Low	High	Low	High	Low
P1 MF10M-106	Starting current	-	35	6.1	20	3.6	16	2.9	12	2.2
	Nominal current	10	8.5	4.9	4.9	2.8	3.9	2.2	3.0	1.7
		8	7.5	4.3	4.3	2.5	3.4	2.0	2.6	1.5
		6.3	7.0	4.3	4	2.5	3.2	2.0	2.4	1.5
	No-load current	5	6.6	4.3	3.8	2.5	3.0	2.0	2.3	1.5
	-	6.3	4.9	3.6	2.8	2.9	2.2	2.2	1.7	
P2 MF10Z-106	Starting current	-	68	11.7	39	6.7	31	5.4	24	4.1
	Nominal current	20	14	7.1	8.2	4.1	6.6	3.3	5.0	2.5
		16	12.2	6.6	7	3.8	5.6	3.0	4.2	2.3
		12.5	10.4	6.4	6	3.7	4.8	3.0	3.6	2.2
	No-load current	10	9.2	6.6	5.3	3.8	4.2	3.0	3.2	2.3
	-	7.8	7.5	4.5	4.3	3.6	3.4	2.7	2.6	
P3 MF10X-106	Starting current	-	77	15	44	8.6	35	6.9	27	5.2
	Nominal current	25	17	9.6	9.9	5.5	7.9	4.4	6.0	3.3
		20	14.6	8.7	8.4	5	6.7	4.0	5.1	3.0
		16	12.2	8.7	7	5	5.6	4.0	4.2	3.0
	No-load current	12.5	10.6	8.9	6.1	5.1	4.9	4.1	3.7	3.1
	-	7.7	9.6	4.4	5.5	3.5	4.4	2.7	3.3	
P4 MF11XA106	Starting current	-	118	22	68	12.7	54	10.2	41	7.7
	Nominal current	40	30	17	17	9.5	14	7.6	10	5.8
		32	24	15	13.7	8.6	11.0	6.9	8.3	5.2
		25	19	15	11	8.6	8.8	6.9	6.7	5.2
	No-load current	20	17	15	10	8.6	8.0	6.9	6.1	5.2
	-	12	16	7.0	9.2	5.6	7.4	4.2	5.6	
P5 MF11X-106	Starting current	-	144	28	83	16	66	12.8	50	9.7
	Nominal current	50	33	19	19	11	15	8.8	12	6.7
		40	28	16	16	9	13	7.2	9.9	5.5
		32	23	15	13.5	8.9	10.8	7.1	8.2	5.4
	No-load current	25	19	15	11.1	8.9	8.9	7.1	6.7	5.4
	-	14	17	7.8	10	6.2	8.0	4.7	6.1	
P6 MF13Z-106	Starting current	-	252	43	145	25	116	20	88	15
	Nominal current	80	56	24	32	14	26	11	19	8.5
		63	43	21	25	12	20	9.6	15	7.3
		50	38	21	22	12	18	9.6	13	7.3
	No-load current	40	35	21	20	12	16	9.6	12	7.3
	-	28	23	16	13	13	10.4	9.7	7.9	
P7 MF13X-106	Starting current	-	339	59	195	34	156	27.2	118	21
	Nominal current	100	66	31	38	18	30	14	23	11
		80	49	26	28	15	22	12.0	17	9.1
		63	40	26	23	15	18	12.0	14	9.1
	No-load current	50	33	26	19	15	15	12.0	11.5	9.1
	-	21	31	12	18	9.6	14.4	7.3	10.9	
P8 MF13XA106	Starting current	-	389	68	212	39	170	31	128	24
	Nominal current	125	85	40	49	23	39	18	30	14
	No-load current	-	43	38	25	22	20	18	15	13

### 3.3 Hoisting motor data, two speed pole change motors, 60 Hz

Hoist	Hoisting motor rating	Characteristic	Unit	P1		P2		P3		P4		
				MF10M-106		MF10Z-106		MF10X-106		MF11XA106		
				High	Low	High	Low	High	Low	High	Low	
Standard hoist	300 Starts/h 60 % ED	Rated power	kW	2.2	0.3	4.3	0.7	5.4	0.9	9	1.4	
		Synchronous speed	rpm	3600	600	3600	600	3600	600	3600	600	600
		Brake torque	Nm	21		21		42		54		
		Max el. br. torque	Nm		32		63		77		105	
		El. br. torque	Nm		12.6		25		38		56	
		Power fact. start	-	0.76	0.81	0.77	0.73	0.78	0.74	0.73	0.67	
		Starting torque	Nm	12.4	10.7	24.6	21.7	34	28	54	44	
		Weight	kg	22.6		30.6		35		51		
		Brake inertia	kgm <sup>2</sup>	0.00017		0.00017		0.00045		0.0007		
		Inertia w/o brake	kgm <sup>2</sup>	0.0027		0.0049		0.0059		0.0101		
		Load	tm/min	12		24		30		48		
		Nominal power	kW	2.2	0.3	4.3	0.7	5.4	0.9	9	1.4	
		Nominal torque	Nm	6.1	6.1	12.3	12.3	15.3	15.3	24	24	
		Nominal speed	rpm	3410	525	3400	500	3350	495	3230	450	
		Short time duty	min	60	15	60	15	30	15	30	12	
		Power factor	-	0.83	0.65	0.89	0.61	0.93	0.60	0.90	0.54	
Efficiency	-	0.71	0.28	0.75	0.38	0.74	0.36	0.74	0.34			
Special application at lower load ratings	300 starts/h 60 % ED	Load	tm/min	12		24		30		48		
		Nominal power	kW	2.2	0.3	4.3	0.7	5.4	0.9	9	1.4	
		Nominal torque	Nm	6.1	6.1	12.3	12.3	15.3	15.3	24	24	
		Nominal speed	rpm	3410	525	3400	500	3350	495	3230	450	
		Short time duty	min	60	15	60	15	30	15	30	12	
		Power factor	-	0.83	0.65	0.89	0.61	0.93	0.60	0.90	0.54	
		Efficiency	-	0.71	0.28	0.75	0.38	0.74	0.36	0.74	0.34	
		Load	tm/min	9.6		19.2		24		38		
		Nominal power	kW	1.8	0.25	3.5	0.5	4.3	0.7	7.2	1.2	
		Nominal torque	Nm	4.9	4.9	9.8	9.8	12.3	12.3	19.2	19.2	
		Nominal speed	rpm	3450	540	3450	520	3410	530	3315	490	
		Short time duty	min									
		Power factor	-	0.80	0.58	0.87	0.54	0.91	0.53	0.88	0.49	
		Efficiency	-	0.71	0.25	0.75	0.36	0.75	0.34	0.76	0.33	
		Load	tm/min	7.6		15		19.2		30		
		Nominal power	kW	1.4	0.2	2.9	0.4	3.5	0.5	5.4	0.9	
		Nominal torque	Nm	3.9	3.9	7.7	7.7	9.8	9.8	15.3	15.3	
		Nominal speed	rpm	3480	550	3490	540	3450	540	3390	520	
		Short time duty	min									
		Power factor	-	0.75	0.55	0.82	0.49	0.88	0.49	0.85	0.43	
		Efficiency	-	0.68	0.21	0.74	0.31	0.75	0.31	0.75	0.31	
		Load	tm/min	6		12		15		24		
		Nominal power	kW	1.1	0.15	2.2	0.3	2.9	0.4	4.3	0.7	
		Nominal torque	Nm	3	3	6.1	6.1	7.7	7.7	12.3	12.3	
		Nominal speed	rpm	3510	565	3520	550	3490	550	3440	540	
		Short time duty	min									
		Power factor	-	0.67	0.52	0.76	0.45	0.85	0.45	0.78	0.39	
		Efficiency	-	0.66	0.18	0.71	0.28	0.73	0.28	0.74	0.28	

...Two speed pole change hoisting motors, 60 Hz, continued...

Hoist	Hoisting motor rating	Characteristic	Unit	P5		P6		P7		P8*		
				MF11X-106		MF13Z-106		MF13X-106		MF13XA106		
Standard hoist	300 Starts/h 60 % ED	Rated power	kW	11	1.6	18	3	21	3.5	25	3.8	
		Synchronous speed	rpm	3600	600	3600	600	3600	600	3600	600	600
		Brake torque	Nm	54		100		130		200		
		Max el. br. torque	Nm		112		182		205		290	
		El. br. torque	Nm		64		82		101		150	
		Power fact. start	-	0.75	0.68	0.60	0.64	0.55	0.59	0.68	0.69	
		Starting torque	Nm	63		102		114		101		140
		Weight	kg	59		86		99		99		
		Brake inertia	kgm <sup>2</sup>	0.0007		0.0007		0.0017		0.0017		0.0017
		Inertia w/o brake	kgm <sup>2</sup>	0.0116		0.036		0.043		0.043		
		Load	tm/min	60		96		120		135		
		Nominal power	kW	11	1.6	18	3	21	3.5	25	3.8	
		Nominal torque	Nm	30	30	48	48	62	62	69	69	
		Nominal speed	rpm	3250	440	3320	515	3360	520	3430	530	
		Short time duty	min	30	10	30	15	30	15	15	10	
		Power factor	-	0.91	0.57	0.88	0.59	0.92	0.55	0.87	0.54	
		Efficiency	-	0.75	0.35	0.80	0.50	0.81	0.52	0.86	0.49	
Special application at lower load ratings	300 starts/h 60 % ED	Load	tm/min	60		96		120				
		Nominal power	kW	11	1.6	18	3	21	3.5			
		Nominal torque	Nm	30	30	48	48	62	62			
		Nominal speed	rpm	3250	440	3320	515	3360	520			
		Short time duty	min	30	10	30	15	30	15			
		Power factor	-	0.91	0.57	0.88	0.59	0.92	0.55			
		Efficiency	-	0.75	0.35	0.80	0.50	0.81	0.52			
		Load	tm/min	48		76		96				
		Nominal power	kW	9	1.4	14	2.3	18	3			
		Nominal torque	Nm	24	24	38	38	48	48			
		Nominal speed	rpm	3320	470	3390	540	3410	540			
		Short time duty	min									
		Power factor	-	0.90	0.53	0.85	0.52	0.90	0.47			
		Efficiency	-	0.77	0.35	0.82	0.48	0.83	0.49			
		Load	tm/min	38		60		76				
		Nominal power	kW	7.2	1.2	11	1.6	14	2.3			
		Nominal torque	Nm	19.2	19.2	30	30	38	38			
		Nominal speed	rpm	3395	500	3445	555	3460	555			
		Short time duty	min									
		Power factor	-	0.87	0.47	0.82	0.48	0.88	0.41			
		Efficiency	-	0.77	0.34	0.82	0.46	0.83	0.46			
		Load	tm/min	30		48		60				
		Nominal power	kW	5.4	0.9	9	1.4	11	1.6			
		Nominal torque	Nm	15.3	15.3	24	24	30	30			
		Nominal speed	rpm	3450	525	3495	565	3495	565			
		Short time duty	min									
		Power factor	-	0.83	0.42	0.74	0.42	0.85	0.37			
Efficiency	-	0.77	0.31	0.82	0.39	0.83	0.41					

\*) Note! P8 hoisting motor for M4 use only. External fan as standard.

### 3.4 Hoisting motor currents, two speed pole change motors, 60 Hz

Nominal voltage		220 V	220 V		380 V		460 V		575 V	
Used in voltage range		208...230 V		360...400 V		440...480 V		575...600 V		
	tm/min	Current (Amperes)		Current (Amperes)		Current (Amperes)		Current (Amperes)		
		High	Low	High	Low	High	Low	High	Low	
P1 MF10M-106	Starting current	-	42	9	23	4.7				
	Nominal current	12	9.8	5.9	5.0	3.4	4.7	2.8	3.6	2.2
		9.6	8.8	5.2	5.1	3.0	4.2	2.5	3.4	2.0
		7.6	7.9	5.2	4.6	3.0	3.8	2.5	3.0	2.0
	No-load current	6	7.1	5.2	4.1	3.0	3.4	2.5	2.7	2.0
	No-load current	-	5.2	5.9	3	3.1	2.5	2.8	2	2.1
P2 MF10Z-106	Starting current	-	90	15	52	8.8	43	7.3	34	5.8
	Nominal current	24	17	8.4	10	4.8	8.3	4.0	6.6	3.2
		19.2	15.3	8.2	8.8	4.7	7.3	3.9	5.8	3.1
		15	12.5	8.2	7.3	4.7	6	3.9	4.8	3.1
	No-load current	12	11.5	8.2	6.7	4.7	5.5	3.9	4.4	3.1
	No-load current	-	7.9	8.6	4.6	5.0	3.8	4.1	3.0	3.3
P3 MF10X-106	Starting current	-	102	18	59	10.2	49	8.4	39	6.7
	Nominal current	30	22	11	13	6.5	10	5.4	8.2	4.3
		24	18	10.2	10.3	5.9	8.5	4.9	6.8	3.9
		19.2	15	10.2	8.7	5.9	7.2	4.9	5.8	3.9
	No-load current	15	13	10.2	7.3	5.9	6	4.9	4.8	3.9
	No-load current	-	8.4	11.3	4.8	6.5	4	5.4	3.2	4.3
P4 MF11XA106	Starting current	-	146	29	85	17	70.0	14.0	56	11.2
	Nominal current	48	36	19	21	11	17	9.1	14	7.3
		38	27	17	16	10.0	13	8.3	10.4	6.6
		30	23	17	13	10.0	11	8.3	8.8	6.6
	No-load current	24	21	17	12	10.0	10	8.3	8.0	6.6
	No-load current	-	12.5	18	7.3	10.7	6.0	8.8	4.8	7.0
P5 MF11X-106	Starting current	-	167	31	97	18.2	80	15	64	12.0
	Nominal current	60	42	21	24	12	20	10	16	8.0
		49	33	18	19	10.5	16	8.7	12.8	7.0
		39	28	18	16	10.3	13.5	8.5	10.8	6.8
	No-load current	30	23	18	13	10.3	11	8.5	8.8	6.8
	No-load current	-	14	20	8.1	11.5	6.7	9.5	5.4	7.6
P6 MF13Z-106	Starting current	-	312	52	180	30	149	25	119	20
	Nominal current	96	67	27	39	16	32	13	26	10
		76	54	27	31	15.7	26	13	21	10.4
		60	46	25	27	14.5	22	12	18	9.6
	No-load current	48	36	25	21	14.5	17	12	13.6	9.6
	No-load current	-	27	25	16	14.5	13	12	10.4	9.6
P7 MF13X-106	Starting current	-	433	73	251	42	207	35	166	28
	Nominal current	120	79	33	46	19	38	16	30	13
		96	59	29	34	17	28	14	22	11.2
		76	46	29	27	17	22	14	18	11.2
	No-load current	60	40	29	23	17	19	14	15	11.2
	No-load current	-	21	33	12	19	10	16	8.0	12.8
P8 MF13XA106	Starting current	-	460	121	266	70	220	35	176	28
	Nominal current	135	98	47	57	27	47	22	38	18
	No-load current	-	40	41	23	24	19	20	15.2	16

### 3.5 Hoisting motor data, frequency converter motors, 50 Hz and 60 Hz

Hoist	Hoisting motor rating	Characteristic	Unit	50 Hz			60 Hz		
				A3	A5	A7	A3	A5	A7
				MF10ZK200	MF11MK200	MF13ZK200	MF10ZK200	MF11MK200	MF13ZK200
Standard hoist	300 Starts/h 60 % ED	Rated power	kW	2.25	4.5	9	2.7	5.4	11
		Synchronous speed	rpm	1500	1500	1500	1800	1800	1800
		Max. ESR	rpm	4500	4500	4500	4500	4500	4500
		Brake torque	Nm	42	60	130	42	60	130
		Brake type	-	NM38730NR2	NM40940NR2	NM40951NR2	NM38730NR2	NM40940NR2	NM40951NR2
		Pull-out torque	Nm	40	100	230	40	100	230
		Speed at pull-out torque	rpm	800	990	1030	1100	1290	1330
		Speed at 80% pull-out torque	rpm	1090	1230	1270	1390	1530	1570
		Starting torque	Nm	45	75	110	45	75	110
		Weight	kg	31	37	72	31	37	72
		Brake inertia	kgm <sup>2</sup>	0.00045	0.0007	0.0017	0.00045	0.0007	0.0017
		Inertia w/o brake	kgm <sup>2</sup>	0.0049	0.0075	0.030	0.0049	0.0075	0.030
		Iron losses	W	175	370	520	175	370	520
Stator resistance	Ohm	4.0	1.8	0.7	4.0	1.8	0.7		
Special application at lower load ratings	300 starts/h 60 % ED	Load	tm/min	12.5	25	50	15	30	60
		Nominal power	kW	2.25	4.5	9	2.7	5.4	11
		Nominal torque	Nm	15	30	60	15	30	60
		Nominal speed	rpm	1350	1390	1420	1650	1700	1730
		Short time duty	min	60	60	60	60	60	60
		Power factor	-	0.81	0.75	0.82	0.83	0.70	0.80
		Efficiency	-	0.76	0.84	0.86	0.76	0.85	0.88

### 3.6 Hoisting motor currents, frequency converter motors, 50 Hz and 60 Hz

		50Hz		60Hz	
Nominal voltage		400 V		460 V	
Used in voltage range		380...415 V		440...480 V	
		tm/min	Current (Amperes)	tm/min	Current (Amperes)
A3 MF10ZK200	Current at 80% of pull-out torque	-	11	-	12
	Nominal current	12.5	5.3	15	5.5
	No-load current	-	2.9	-	2.7
A5 MF11MK200	Current at 80% of pull-out torque	-	25	-	27
	Nominal current	25	11.5	30	11.5
	No-load current	-	9.0	-	8.9
A7 MF13ZK200	Current at 80% of pull-out torque	-	58	-	60
	Nominal current	50	20	60	20
	No-load current	-	12	-	12

### 3.7 Hoisting motor data, frequency converter motors, 100 Hz

Hoist	Hoisting motor rating	Characteristic	Unit	S3	S5	S7	S8	SA
				MF10ML200	MF11ML200	MF13ZL200	MF13ZJ200	MF13XL200
Standard hoist	300 Starts/h 60 % ED	Rated power	kW	4.5	9	18	23	35
		Synchronous speed	rpm	3000	3000	3000	3000	3000
		Max. ESR	rpm	4500	4500	4500	4500	4500
		Brake torque	Nm	42	60	130	200	200
		Brake type	-	NM38730NR2	NM40940NR2	NM40951NR2	NM40980NR2	NM40980NR2
		Pull-out torque	Nm	40	80	200	200	350
		Speed at pull-out torque	rpm	1670	2230	1830	1830	2260
		Speed at 80% pull-out torque	rpm	2410	2500	2720	2720	2750
		Starting torque	Nm	34	64	115	115	220
		Pull-out torque	Nm	40	80	200	200	350
		Speed at 80% pull-out torque	rpm	2410	2500	2720	2720	2750
		Weight	kg	23	37	72	72	99
		Brake inertia	kgm <sup>2</sup>	0.00045	0.0007	0.0017	0.0017	0.0017
		Inertia w/o brake	kgm <sup>2</sup>	0.0027	0.0075	0.030	0.030	0.043
		Iron losses	W	160	260	260	260	390
		Stator resistance	Ohm	2.0	0.65	0.25	0.25	0.13
		Load	tm/min	25	50	100	125	200
		Nominal power	kW	4.5	9	18	23	35
		Nominal torque	Nm	15.3	30	62	76	116
		Nominal speed	rpm	2780	2830	2910	2890	2880
Short time duty	min	60	30	30	30	30		
Power factor	-	0.78	0.78	0.86	0.88	0.85		
Efficiency	-	0.77	0.81	0.89	0.89	0.90		
Special application at lower load ratings	300 starts/h 60 % ED	Load	tm/min	20	40	80	100	160
		Nominal power	kW	3.6	7.5	15	18	28
		Nominal torque	Nm	12.3	24	48	62	96
		Nominal speed	rpm	2830	2860	2930	2910	2930
		Short time duty	min	-	-	-	-	-
		Power factor	-	0.72	0.74	0.82	0.86	0.83
		Efficiency	-	0.77	0.81	0.89	0.89	0.89
		Load	tm/min	16	32	63	80	125
		Nominal power	kW	2.9	6	12	15	23
		Nominal torque	Nm	9.8	19.2	38	48	76
		Nominal speed	rpm	2880	2900	2940	2930	2940
		Short time duty	min	-	-	-	-	-
		Power factor	-	0.65	0.67	0.77	0.82	0.78
		Efficiency	-	0.76	0.80	0.88	0.89	0.89
		Load	tm/min	12.5	25	50	63	100
		Nominal power	kW	2.4	4.5	9	12	18
		Nominal torque	Nm	7.7	15.3	30	38	62
		Nominal speed	rpm	2905	2925	2950	2940	2950
		Short time duty	min	-	-	-	-	-
		Power factor	-	0.58	0.61	0.72	0.77	0.73
Efficiency	-	0.74	0.78	0.84	0.88	0.88		
External Fan	Type			NM901NR10	NM901NR20	NM901NR30	NM901NR30	NM901NR30
	Voltage range	3~ 50Hz		220-290V D	220-290V D	220-290V D	220-290V D	220-290V D
				380-500V Y	380-500V Y	380-500V Y	380-500V Y	380-500V Y
	Current	3~ 60Hz		220-332V D	220-332V D	220-332V D	220-332V D	220-332V D
			380-575V Y	380-575V Y	380-575V Y	380-575V Y	380-575V Y	
Current	3~ 50Hz		0.35A D	0.33A D	0.45A D	0.45A D	0.45A D	
			0.19A Y	0.18A Y	0.24A Y	0.24A Y	0.24A Y	
Current	3~ 60Hz		0.32A D	0.31A D	0.41A D	0.41A D	0.41A D	
			0.18A Y	0.18A Y	0.24A Y	0.24A Y	0.24A Y	



### 3.8 Hoisting motor data, frequency converter motors, 120 Hz

Hoist	Hoisting motor rating	Characteristic	Unit	S3	S5	S7	S8	SA
				MF10ML200	MF11ML200	MF13ZL200	MF13ZJ200	MF13XL200
Standard hoist	300 Starts/h 60 % ED	Rated power	kW	5.4	11	21	27	42
		Synchronous speed	rpm	3600	3600	3600	3600	3600
		Max. ESR	rpm	4500	4500	4500	4500	4500
		Brake torque	Nm	42	60	130	200	200
		Brake type	-	NM38730NR2	NM40940NR2	NM40951NR2	NM40980NR2	NM40980NR2
		Pull-out torque	Nm	39	76	190	190	335
		Speed at pull-out torque	rpm	2300	2830	2370	2370	2760
		Speed at 80% pull-out torque	rpm	3040	3100	3260	3260	3250
		Starting torque	Nm	34	64	115	115	220
		Weight	kg	23	37	72	72	99
		Brake inertia	kgm <sup>2</sup>	0.00045	0.0007	0.0017	0.0017	0.0017
		Inertia w/o brake	kgm <sup>2</sup>	0.0027	0.0075	0.030	0.030	0.043
		Iron losses	W	160	260	260	260	390
		Stator resistance	Ohm	2.0	0.65	0.25	0.25	0.13
		Load	tm/min	30	60	120	150	240
		Nominal power	kW	5.4	11	21	27	41
		Nominal torque	Nm	15.3	30	62	76	116
		Nominal speed	rpm	3340	3410	3500	3470	3470
		Short time duty	min	60	30	30	30	30
		Power factor	-	0.80	0.78	0.86	0.88	0.87
Efficiency	-	0.77	0.81	0.89	0.89	0.89		
Special application at lower load ratings	300 starts/h 60 % ED	Load	tm/min	24	48	96	120	192
		Nominal power	kW	4.3	9	18	21	34
		Nominal torque	Nm	12.3	24	48	62	96
		Nominal speed	rpm	3390	3440	3520	3500	3500
		Short time duty	min	-	-	-	-	-
		Power factor	-	0.76	0.75	0.84	0.86	0.86
		Efficiency	-	0.77	0.78	0.89	0.89	0.89
		Load	tm/min	19.2	38	76	96	150
		Nominal power	kW	3.5	7.2	14	18	27
		Nominal torque	Nm	9.8	19.2	38	48	76
		Nominal speed	rpm	3430	3485	3540	3520	3520
		Short time duty	min	-	-	-	-	-
		Power factor	-	0.70	0.69	0.80	0.84	0.84
		Efficiency	-	0.76	0.78	0.89	0.89	0.90
		Load	tm/min	15.4	30	60	76	120
		Nominal power	kW	2.9	5.4	11	14	21
		Nominal torque	Nm	7.7	15.3	30	38	62
		Nominal speed	rpm	3470	3515	3550	3540	3540
		Short time duty	min	-	-	-	-	-
		Power factor	-	0.63	0.62	0.77	0.80	0.80
Efficiency	-	0.73	0.75	0.88	0.89	0.91		
External Fan	Type		NM901NR10	NM901NR20	NM901NR30	NM901NR30	NM901NR30	
	Voltage range	3-50Hz	220-290V D 380-500V Y	220-290V D 380-500V Y	220-290V D 380-500V Y	220-290V D 380-500V Y	220-290V D 380-500V Y	
		3-60Hz	220-332V D 380-575V Y	220-332V D 380-575V Y	220-332V D 380-575V Y	220-332V D 380-575V Y	220-332V D 380-575V Y	
	Current	3-50Hz	0.35A D 0.19A Y	0.33A D 0.18A Y	0.45A D 0.24A Y	0.45A D 0.24A Y	0.45A D 0.24A Y	
3-60Hz		0.32A D 0.18A Y	0.31A D 0.18A Y	0.41A D 0.24A Y	0.41A D 0.24A Y	0.41A D 0.24A Y		

### 3.9 Hoisting motor data, frequency converter motors, 125 Hz

Hoist	Hoisting motor rating	Characteristic	Unit	S3	S5	S7	S8	SA
				MF10ML200	MF11ML200	MF13ZL200	MF13ZJ200	MF13XL200
Standard hoist	300 Starts/h 60 % ED	Rated power	kW	5.6	11.5	22	28	44
		Synchronous speed	rpm	3750	3750	3750	3750	3750
		Max. ESR	rpm	4500	4500	4500	4500	4500
		Brake type	-	NM38730NR2	NM40940NR2	NM40951NR2	NM40980NR2	NM40980NR2
		Brake torque	Nm	42	60	130	200	200
		Pull-out torque	Nm	40	80	200	200	350
		Speed at pull-out torque	rpm	2450	2980	2520	2520	2910
		Speed at 80% pull-out torque	rpm	3190	3250	3410	3410	3400
		Starting torque	Nm	34	64	115	115	220
		Weight	kg	23	37	72	72	99
		Brake inertia	kgm <sup>2</sup>	0.00045	0.0007	0.0017	0.0017	0.0017
		Inertia w/o brake	kgm <sup>2</sup>	0.0027	0.0075	0.030	0.030	0.043
		Iron losses	W	160	260	260	260	390
		Stator resistance	Ohm	2.0	0.65	0.25	0.25	0.13
		Load	tm/min	31	63	125	156	250
		Nominal power	kW	5.7	11.5	21.9	28.2	42.8
		Nominal torque	Nm	15.3	30	62	76	116
		Nominal speed	rpm	3490	3560	3650	3620	3620
		Short time duty	min	60	30	30	30	30
		Power factor	-	0.80	0.78	0.86	0.88	0.87
Efficiency	-	0.77	0.81	0.89	0.89	0.89		
Special application at lower load ratings	300 starts/h 60 % ED	Load	tm/min	25	50	100	125	200
		Nominal power	kW	4.5	9.4	18.8	21.9	35.5
		Nominal torque	Nm	12.3	24	48	62	96
		Nominal speed	rpm	3540	3590	3670	3650	3650
		Short time duty	min	-	-	-	-	-
		Power factor	-	0.76	0.75	0.84	0.86	0.86
		Efficiency	-	0.77	0.78	0.89	0.89	0.89
		Load	tm/min	20	40	79	100	156
		Nominal power	kW	3.7	7.5	14.6	18.8	28.2
		Nominal torque	Nm	9.8	19.2	38	48	76
		Nominal speed	rpm	3580	3635	3690	3670	3670
		Short time duty	min	-	-	-	-	-
		Power factor	-	0.70	0.69	0.80	0.84	0.84
		Efficiency	-	0.76	0.78	0.89	0.89	0.90
		Load	tm/min	16	31	66	79	125
		Nominal power	kW	3	5.7	11	14.6	21.9
		Nominal torque	Nm	7.7	15.3	30	38	62
		Nominal speed	rpm	3620	3665	3700	3690	3690
		Short time duty	min	-	-	-	-	-
		Power factor	-	0.63	0.62	0.77	0.80	0.80
Efficiency	-	0.73	0.75	0.88	0.89	0.91		
External Fan	Type		NM901NR10	NM901NR20	NM901NR30	NM901NR30	NM901NR30	
	Voltage range	3~ 50Hz	220-290V D	220-290V Y	220-290V Y	220-290V Y	220-290V Y	
			380-500V Y	380-500V D	380-500V D	380-500V D	380-500V D	
		3~ 60Hz	220-332V D	220-332V Y	220-332V Y	220-332V Y	220-332V Y	
	Current	3~ 50Hz	0.35A D	0.33A D	0.45A D	0.45A D	0.45A D	
			0.19A Y	0.18A Y	0.24A Y	0.24A Y	0.24A Y	
3~ 60Hz		0.32A D	0.31A D	0.41A D	0.41A D	0.41A D		
			0.18A Y	0.18A Y	0.24A Y	0.24A Y	0.24A Y	

### 3.10 Hoisting motor currents, frequency converter motors, 100 Hz, 120 Hz and 125 Hz

		100Hz		120Hz		125Hz	
Nominal voltage		400 V		460 V		500 V	
Used in voltage range		380...415 V		440...480 V		500 V	
		tm/min	Current (Amperes)	tm/min	Current (Amperes)	tm/min	Current (Amperes)
S3 MF10ML200	Current at 80% of pull-out torque	-	21.2	-	21.5	-	21.5
	Nominal current	25	10.7	30	10.8	31	10.8
		20	9.3	24	9.3	25	9.3
		16	8.3	19.2	8.1	20	8.1
		12.5	7.6	15	7.5	16	7.5
	No-load current	-	6.3	-	5.9	-	5.9
S5 MF11ML200	Current at 80% of pull-out torque	-	42	-	42	-	42
	Nominal current	50	21	60	22	63	22
		40	18	48	19	50	19
		32	15.5	38	17	40	17
		25	14.3	30	15.0	31	15.0
	No-load current	-	11.8	-	11.0	-	11.0
S7 MF13ZL200	Current at 80% of pull-out torque	-	90	-	93	-	93
	Nominal current	100	34	120	36	125	36
		80	28	96	29	100	29
		63	24	76	25	79	25
		50	23	63	24	66	24
	No-load current	-	17	-	16	-	16
S8 MF13ZJ200	Current at 80% of pull-out torque	-	90	-	93	-	93
	Nominal current	125	42	150	44	156	44
		100	34	120	36	125	36
		80	28	96	29	100	29
		63	24	76	25	79	25
	No-load current	-	17	-	16	-	16
SA MF13XL200	Current at 80% of pull-out torque	-	157	-	160	-	160
	Nominal current	200	64	240	65	250	65
		160	57	192	56	200	56
		125	48	150	48	156	48
		100	42	120	41	125	41
	No-load current	-	26	-	23	-	23

