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TECHNICAL DATA



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Ingress Protection

Degrees of protection against solid foreign objects (1st characteristic numeral)			Degrees of protection against ingress of water (2nd characteristic numeral)		
Digit	Protection		Digit	Protection	
0		No Protection	0		No Protection
1		Protected against foreign objects of 50mm Ø and greater. Protected against access to hazardous parts with the back of a hand.	1		Protected against vertically falling water drops. Vertically falling drops shall have no harmful effects.
2		Protected against solid foreign objects of 12.5mm Ø and greater. Protected against access to hazardous parts with a finger.	2		Protected against vertically falling water drops when enclosure tilted up to 15°. Vertically falling drops shall have no harmful effects when the enclosure is tilted at an angle up to 15° on either side of the vertical.
3		Protected against solid foreign objects of 2.5mm Ø and greater. Protected against access to hazardous parts with a tool.	3		Protected against spraying water. Water sprayed at an angle up to 60° on either side of the vertical shall have no harmful effects.
4		Protected against solid foreign objects of 1mm Ø and greater. Protected against access to hazardous parts with a wire.	4		Protected against splashing water. Water projected in splashes against the enclosure from any direction shall have no harmful effects.
5		Dust-protected. Ingress of dust is not totally prevented, but dust shall not penetrate in a quality to interfere with satisfactory operation of the apparatus or to impair safety.	5		Protected against water jets. Water projected in jets against the enclosure from any direction shall have no harmful effects.
6		Dust-tight. No ingress of dust.	6		Protected against powerful water jets. Water projected in powerful jets against the enclosure from any direction shall have no harmful effects.
			7		Protected against the effects of temporary immersion in water. Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is temporarily immersed in water under standardised conditions of pressure and time.
			8		Protected against the effects of continuous immersion in water. Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is continuously immersed in water under conditions which shall be agreed between manufacturer and user but which are more severe than for numeral 7.

Utilisation Categories	
A contactor duty is characterised by the utilisation category	
Utilisation categories for contactor relays according to IEC 337-1	
Alternating current	
AC 11	Making and breaking for normal and occasional utilisation conditions
Direct current	
DC 11	Making and breaking for normal and occasional utilisation conditions
Utilisation categories for contactor relays according to IEC 947-5-1	
Alternating current	
AC-12	Control of resistive loads and solid state loads with isolation by opto couplers
AC-13	Control of solid state loads with transformer isolation
AC-14	Control of small electromagnetic loads (< 72VA)
AC-15	Control of small electromagnetic loads (> 72VA)
Direct current	
DC-12	Control of resistive loads and solid state loads with isolation by opto couplers.
DC-13	Control of electromagnets.
DC-14	Control of electromagnetic loads having economy resistors in circuit
Utilisation categories for contactors according to IEC 158-1	
Alternating current	
AC 1	Non-inductive or slightly inductive loads, resistance furnaces
AC 3	Slip-ring motors: starting, plugging
AC 3	Squirrel-cage motors: starting, switching-off motors during running
AC 4	Squirrel-cage motors: starting, plugging, inching
Direct current	
DC 1	Non-inductive or slightly inductive loads, resistance furnaces
DC 2	Shunt motors: starting, switching-off motors during running
DC 3	Shunt motors: starting, plugging, inching
DC 4	Series motors: starting, switching-off motors during running.
DC 5	Series motors: starting, plugging, inching
Utilisation categories for contactors according to IEC 947-4-1	
Alternating current	
AC 1	Non-inductive or slightly inductive loads, resistance furnaces
AC 3	Slip-ring motors: starting, switching off
AC 3	Squirrel-cage motors: starting, switching-off motors during running
AC 4	Squirrel-cage motors: starting, plugging, inching
AC 5a	Switching of discharge lamp controls
AC 5b	Switching of incandescent lamps
AC 6a	Switching of transformers
AC 6b	Switching of capacitor banks
AC 8a	Hermetic refrigerant compressor motor control with manual resetting of overload releases
AC 8b	Hermetic refrigerant compressor motor control with automatic resetting of overload releases
Direct current	
DC 1	Non-inductive or slightly inductive loads, resistance furnaces
DC 3	Shunt motors: starting, plugging, inching. Dynamic breaking of DC motors
DC 5	Series motors: starting, plugging, inching. Dynamic breaking of DC motors
DC 6	Switching of incandescent lamps.

kW	HP	Motor Rated Current at							
		220-230V	240V	380V	415V	440V	500V	600V	660-690V
0.06	1/12	0.38	0.35	0.22	0.20	0.19	0.16	0.12	
0.09	1/8	0.55	0.50	0.33	0.30	0.28	0.24	0.21	
0.12	1/6	0.76	0.68	0.42	0.40	0.37	0.33	0.27	
0.18	1/4	1.1	1	0.64	0.60	0.55	0.46	0.40	
0.25	1/3	1.4	1.38	0.88	0.85	0.76	0.59	0.56	-
0.37	1/2	2.1	1.93	1.22	1.15	1.06	0.85	0.77	0.7
0.55	3/4	2.7	2.3	1.5	1.4	1.25	1.20	1.02	0.9
0.75	1	3.3	3.1	2	2	1.67	1.48	1.22	1.1
1.1	1.5	4.9	4.1	2.6	2.5	2.26	2.1	1.66	1.5
1.5	2	6.2	5.6	3.5	3.5	3.03	2.6	2.22	2
2.2	3	8.7	7.9	5	5	4.31	3.8	3.16	2.9
2.5	3.4	9.8	8.9	5.7	5.5	4.9	4.3	3.59	3.3
3	4	11.6	10.6	6.6	6.5	5.8	5.1	4.25	3.5
3.7	5	14.2	13	8.2	7.5	7.1	6.2	5.2	4.4
4	5.5	15.3	14	8.5	8.4	7.6	6.5	5.6	4.9
5	6.8	18.9	17.2	10.5	10	9.4	8.1	6.9	6
5.5	7.5	20.6	18.9	11.5	11	10.3	8.9	7.5	6.7
6.5	8.8	23.7	21.8	13.8	12.5	12	10.4	8.7	8.1
7.5	10	27.4	24.8	15.5	14	13.5	11.9	9.9	9
8	11	28.8	26.4	16.7	15.4	14.4	12.7	10.6	9.7
9	12.5	32	29.3	18.3	17	15.8	13.9	11.6	10.6
11	15	39.2	35.3	22	21	19.3	16.7	14.1	13
12.5	17	43.8	40.2	25	23	21.9	19	16.1	15
15	20	52.6	48.2	30	28	26.3	22.5	19.3	17.5
18.5	25	64.9	58.7	37	35	32	28.5	23.5	21
20	27	69.3	63.4	40	37	34.6	30.6	25.4	23
22	30	75.2	68	44	40	37.1	33	27.2	25
25	34	84.4	77.2	50	47	42.1	38	30.9	28
30	40	101	92.7	60	55	50.1	44	37.1	33
37	50	124	114	72	66	61.9	54	45.4	42
40	54	134	123	79	72	67	60	49.1	44
45	60	150	136	85	80	73.9	64.5	54.2	49
51	70	168	154	97	90	83.8	73.7	61.4	56
55	75	181	166	105	96	90.3	79	66.2	60
59	80	194	178	112	105	96.9	85.3	71.1	66
75	100	245	226	140	135	123	106	90.3	82
80	110	260	241	147	138	131	112	96.3	86
90	125	292	268	170	165	146	128	107	98
100	136	325	297	188	182	162	143	119	107
110	150	358	327	205	200	178	156	131	118
129	175	420	384	242	230	209	184	153	135
132	180	425	393	245	242	214	186	157	140
140	190	449	416	260	250	227	200	167	145
147	200	472	432	273	260	236	207	173	152
160	220	502	471	295	280	256	220	188	170
180	245	578	530	333	320	289	254	212	192
184	250	590	541	340	325	295	259	217	200
200	270	626	589	370	340	321	278	235	215
220	300	700	647	408	385	353	310	260	235
250	340	803	736	460	425	401	353	295	268
257	350	826	756	475	450	412	363	302	280
295	400	948	868	546	500	473	416	348	320
315	430	990	927	580	535	505	445	370	337
355	480	1080	1010	636	580	549	483	405	366
400	545	1250	1130	710	650	611	538	450	410
450	610	1410	1270	800	740	688	608	508	460
475	645	1490	1340	850	780	730	645	540	485
500	680	1570	1420	890	830	770	680	565	510
560	760	1750	1580	1000	920	860	760	630	570
600	810	-	-	1080	990	920	810	680	610
670	910	-	-	1200	1100	1030	910	760	680

Direct-on-line starting			
Motor FLC Amp		Recommended fuse link Type gG Amp	Recommended fuse link Type gG Amp
From	to		
0	0.7	2	
0.8	1.4	4	
1.5	2.0	6	
2.1	3.0	10	
3.1	6.1	16	
6.2	9.0	20	
9.1	11.0	25	20M25
11.1	14.4	32	20M32
14.5	15.4	35	32M35
15.5	18.0	40	32M40
18.1	22.0	50	32M50
22.1	28.0	63	32M63
28.1	45.0	80	63M80
45.1	58.0	100	63M100
58.1	80.0	125	100M125
80.1	99.0	160	100M160
99.1	128.0	200	
128.1	180.0	250	200M250
180.1	216.0	315	200M315
216.1	270.0	355	315M355
270.1	328.0	400	
328.1	385.0	450	400M450
385.1	430.0	500	
430.1	500.0	560	
500.1	560.0	630	
560.1	620.0	670	630M670

Assisted starting - Star-delta, auto-transformer, etc.			
Motor FLC Amp		Recommended fuse link Type gG Amp	
From	to		
0	1.4	2	
1.5	2.1	4	
2.2	3.1	6	
3.2	5.5	10	
5.6	1.0	16	
10.1	1.4	20	
14.1	1.8	25	
18.1	22.0	32	
22.1	28.0	35	
28.1	32.0	40	
32.1	40.0	50	
40.1	5.1	63	
51.1	80.0	80	
80.1	100.0	100	
100.1	125.0	125	
125.1	160.0	160	
160.1	200.0	200	
200.1	250.0	250	
250.1	315.0	315	
315.1	355.0	355	
355.1	400.0	400	
400.1	450.0	450	
450.1	500.0	500	
500.1	560.0	560	
560.1	630.0	630	

These recommendations apply for ambient temperatures up to 35°C.

Suitable adjustments to the recommended ratings may be necessary if any of the following conditions occur singly or in combination:

- a) Starting currents in excess of the assumed ones.
- b) Long run up times due to high inertia loads.
- c) Larger number of starts per operating cycle (the recommendations allow for two starts in rapid succession and up to eight starts per hour).
- d) High enclosure temperature.