DLA starters

DLA starters
General information

The construction of DLA starters is based on ABB A Line contactors. The mounting plate, including a built-in A contactor, is designed to integrate an ABB manual motor starter type MS325.

Starters can be easily made with protection against overloads and short-circuits (Type I or Type II coordination).

The technical characteristics of these devices are identical to A Line contactors.

The advantages are as follows:

Simplified installation:

- DLA starters mount onto 35 x 15 mm exclusively DIN rail (EN 50022)
- Direct mounting of manual motor starter MS 325
- Contactor coil terminals accessible on lower side.

High performance as a result of the combination of the MS325 manual motor starter with high breaking capacity and the new A Line contactor ensuring high electrical durability.

Accessory types:

- on manual motor starter: set of bus bars, external operating mechanism, padlock holder, auxiliary contact, undervoltage coil, shunt trip, etc.

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Manual motor starters
General information

Type MS325

- Suitable for use with 3-phase motors up to 25 FLA
- UL listed & CSA certified for 1200A group motor installation with fuses or breaker
- 14 setting ranges from 0.1 to 25 amps
- Up to 30kA or 85kA with no backup fuse required
- 35mm DIN rail snap-on mounting
- Terminals supplied in the open position
- High vibration resistance
- Compact size
- Wide range of accessories
- Easy field wiring for single phase applications
- Internal magnetic trips
- Screwdriver guide holes
- Touch safe design: All connection terminals are protected against accidental touch
- Adjustable ambient compensated Class 10 overload relay (-20°C to +55°C open, -20°C to +45°C enclosed)
- Enclosures with the following accessories
  – Padlock attachment
  – Pilot light
- Meets UL, CSA, VDE & IEC international standards
- Modular design
- Accessories include:
  – Additional auxiliary contact block (1 N.O. & 1 N.C.)
  – Undervoltage trip
  – Three phase connecting bus bars
  – Through the door operator
  – Shunt trip

Types of coordination

IEC standard 947-4-1 (EN 60 947-4-1) defines two types of coordination according to the anticipated level of service continuity. The admissible damage limits for the control gear are defined.

- Coordination Type I:

  In the event of a short-circuit, the contactor or starter causes no danger to persons or facilities, and cannot function thereafter without repairs being made or parts being replaced.

- Coordination Type II:

  In the event of a short-circuit, the contactor or starter causes no danger to persons or facilities, and must be able to function thereafter. Light welding of contacts is possible.

DLA starters
Type MS325 manual motor starter & DLA9 – DLA 26 module

MS325-1.0

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DLA9-30-84

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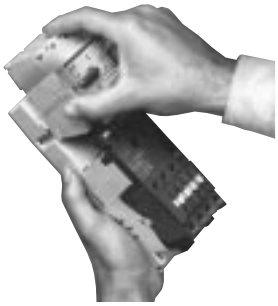


DLA starter

Manual motor starters

Thermal setting range (amps)	Single-phase horsepower ratings①		3-phase horsepower ratings			Branch CPD②		Catalog number	List price	DLA module catalog number	List price
	120V	240V	240V	480V	600V	Maximum fuse size	Maximum MCCB size				
MS325											
0.10 – 0.16	—	—	—	—	—	1600A	1200A	MS325-0.16			
0.16 – 0.25	—	—	—	—	—	1600A	1200A	MS325-0.25	**$ 96**		
0.25 – 0.40	—	—	—	—	—	1600A	1200A	MS325-0.40			
0.40 – 0.63	—	—	—	—	—	1600A	1200A	MS325-0.63			
0.63 – 1.0	—	—	—	1/2	1/2	1600A	1200A	MS325-1.0		DLA9-30-84	**$ 117**
1.0 – 1.6	—	1/10	—	3/4	3/4	1600A	1200A	MS325-1.6			
1.6 – 2.5	—	1/6	1/2	1	1.5	1600A	1200A	MS325-2.5	**110**		
2.5 – 4.0	1/8	1/3	1	2	3	1600A	1200A	MS325-4.0			
4.0 – 6.3	1/4	1/2	1.5	3	5	1600A	1200A	MS325-6.3			
6.3 – 9.0	1/3	1	2.5	5	7.5	1600A	1200A	MS325-9.0		DLA9-30-84	**117**
9.0 – 12.5	1/2	2	3	7.5	10	1600A	1200A	MS325-12.5	**128**	DLA12-30-84	**131**
12.5 – 16	1	2.5	5	10	10	1600A	1200A	MS325-16		DLA16-30-84	**153**
16 – 20	1.5	3	5	10	15	1600A	1200A	MS325-20	**141**	DLA16-30-84	**153**
20 – 25	2	3	7.5	15	20	1600A	1200A	MS325-25	**149**	DLA26-30-84	**234**

Coil voltage selection

All AC operated catalog numbers include a 120VAC coil. All DC operated catalog numbers include a 110VDC coil. To select other coil voltages, substitute the code from the Coil Voltage Selection chart for the two digits after the last dash in the catalog number.
Ex.: A 240V coil is required for a DLA9 starter: DLA9-30-**80**

Ordering instructions: MS325 manual motor starters & DLA module must be ordered separately and assembled by customer.

Coil voltage selection chart

Hz	Volts															
	12	24	48	110	120	125	208	220	240	277	380	415	440	480	500	600
60		81	83	84	84		34		80	42	48		86	51		55
50		81	83	84				80			85	86			55	

For other voltages, see page 1.13

Ordering instructions

The MS325 manual motor starters and the DLA module must be ordered separately and assembled by customer.

Accessories for DLA starters

Accessories for DLA starters are the same as accessories for the corresponding A contactor size:

DLA9 — same accessories as A9 contactors

DLA12 — same accessories as A12 contactors

DLA16 — same accessories as A16 contactors

DLA28 — same accessories as A28 contactors

① Single phase motor ratings are based upon wiring all three poles in series.
≠ In group motor applications, use the lowest maximum fuse or MCCB size.

Group motor applications

The need for individual short circuit protective devices such as fuses is eliminated with group motor applications, saving installation expense and panel space. ABB Line manual motor starters are UL Listed and can be used in group installations of motors.

Single motor applications

ABB Line manual motor starters provide overload protection as required by Article 430 of the National Electrical Code. Control is provided by manual operation of the contacts; overload protection is provided by an adjustable bi-metallic trip mechanism.

Selection

Group installation is an approach to building multi-motor control systems in accordance with Section 430-53 of the National Electrical Code. The selection of components used in group installations is a simple process which consists of several steps.

- First is the selection of the appropriate fuse as Branch Circuit Protective Device (BCPD).
- Second is the selection of the appropriate motor starter and protector.
- Third, the selected MS325 must be checked for UL listing with the selected BCPD and the available short circuit current at the application location.

1. Fused disconnect

Calculate maximum fuse size according to NEC 430-53 (c). I_{max} (fuse size) = 175% x FLC (full load current for largest motor) + the sum of FLC (full load current for largest motor) + the sum of FLC values for other motors on that branch using NEC Table 430-150 on the right. Select fuse from NEC Table 240-6 below. Where I_{max} falls between two fuse ampere ratings NEC 430-53 (c) permits going to the next high ampere rating.

2. Motor starter & protector selection

Select the proper MS325 catalog number for each motor load from page 2.2 based on the actual motor full load current (FLA) using the "Thermal setting range" column for reference.

3. MS325 Interruption ratings

Using the Interruption ratings table on page 2.5, identify the system application voltage and interrupting capacity for the type of fuse selected in step 1 above.

NEC 240-6 Standard fuse amperes

15, 20, 25, 30, 40, 45, 50, 60, 70, 80, 90, 110, 125, 150, 175, 200, 225, 250, 300, 350, 400, 450, 500, 600, 700, 800, 1000, 1200, 1600

Examples: Select components for protecting the following 3-phase, 460VAC, squirrel cage induction motors. The nameplate data are:

1/2 HP, 1.0 FLA; 3 HP, 4.8 FLA; 5 HP, 7.6 FLA; 7.5 HP, 11 FLA;

10 HP, 14 FLA

Example: Using fused disconnect

- I_{max} = 175% x 14 + (11 + 7.6 + 4.8 + 1) = 48.9A
- Fuse rating using Table NEC 240-6 = 50A
- Minimum disconnect size = 115% x Total FLA
- NEC 430-150 table = 115% x (14+ 11 + 7.6 + 4.8 + 1) = 44.16

Disconnect for 50A fuses is ok.

Note: Refer to NEC 310-1 and NEC 430-53(d) for cable sizing.

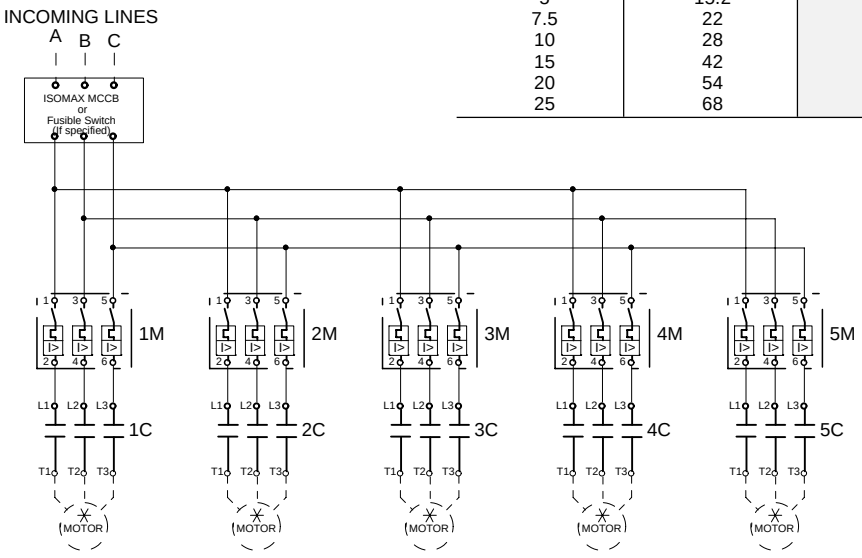
For full load currents of 208 and 200 volt motors, increase the corresponding 230 volt motor full-load current by 10% and 15%, respectively.

MS325 data

Motor rating at 460V		MS325	Contactor
Horsepower	FLA, AC3		
1/2	1.0	MS325-1.0	B9C
3	4.8	MS325-6.3	B9C
5	7.6	MS325-9.0	B9C
7.5	11	MS325-12.5	B12C
10	14	MS325-16	B16C

NEC Table 430-150 full load current, 3ph AC motor

Horsepower	Induction type squirrel cage & wound rotor①		
	230V amps	460V amps	575V amps
1/2	2	1	.8
3/4	2.8	1.4	1.1
1	3.6	1.8	1.4
1.5	5.2	2.6	2.1
2	6.8	3.4	2.7
3	9.6	4.8	3.9
5	15.2	7.6	6.1
7.5	22	11	9
10	28	14	11
15	42	21	17
20	54	27	22
25	68	34	27



① These values of full-load current are for motors running at speeds usual for belted motors and motors with normal torque characteristics. Motors built for especially low speeds or high torques may require more running current, and multispeed motors will have full-load current varying with speed, in which case the nameplate current rating shall be used.

The voltages listed are rated motor voltages. The currents listed shall be permitted for system voltage ranges of 110 to 120, 220 to 240, 440 to 480, and 550 to 600 volts.

Accessories
for MS325 manual motor starters

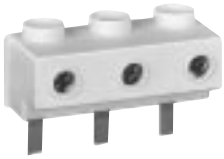
MS325-UA24

MS325-SA1

MS325-SA3

MS325-HG

MS325-BB1



MS325-SM1

MS325-2BB

MS325-4BB

Undervoltage trip

Item description	Catalog number	List price
24V	MS325-UA24	
48V	MS325-UA48	
60V	MS325-UA60	
110V	MS325-UA110	$ 55
230V	MS325-UA230	
400V	MS325-UA400	
415V	MS325-UA415	
480V	MS325-UA480	

Shunt trips

Item description	Catalog number	List price
110 – 127V, 60 Hz	MS325-ST110	
208V, 60 Hz	MS325-ST230	
440 – 480V, 60 Hz	MS325-ST3	$ 55
24VAC	MS325-ST24	

Auxiliary contact blocks

Item description	Catalog number	List price
1 N.O. & 1 N.C.	MS325-HK11	
2 N.O.	MS325-HK20	$ 22
2 N.C.	MS325-HK02	

Supporting terminal

Item description	Catalog number	List price
for UA or as N/LS clamp	MS325-AS	$ 10

Padlocking devices

Item description	Catalog number	List price
Adapter for padlock type SA1	MS325-SA1	$ 10
Complete padlock device SA3	MS325-SA3	25

Door mounting kits

Item description	Catalog number	List price
Handle & front gray plate	MS325-H	$ 52
Emergency red OFF handle, yellow front plate	MS325-HES	52
Neutral terminal, 8 AWG, blue	MS325-NT	5
Gray handle, black flange	MS325-HG	60
Emergency OFF red handle, yellow flange	MS325-HGES	60

Terminal blocks

Item description	Catalog number	List price
For 4 AWG wire	MS325-SM1	$ 16
For busbar	MS325-BB1	17

Busbars

Item description	Catalog number	List price
2 MS 325, without auxiliary contacts	MS325-2BB	$ 16
2 MS 325, with 1 auxiliary contacts	MS325-2BB1	20
2 MS 325, with 2 auxiliary contacts	MS325-2BB2	20
4 MS 325, without auxiliary contacts	MS325-4BB	22
4 MS 325, with 1 auxiliary contacts	MS325-4BB1	25
4 MS 325, with 2 auxiliary contacts	MS325-4BB2	25

Bell alarm contact blocks

Item description	Catalog number	List price
1 N.O.	MS325-SK10	
1 N.C.	MS325-SK01	$ 22

Shaft adapter

Item description	Catalog number	List price
For use with non-fused switch handle Type OT	MS325-SA	$ 25

Technical data
for MS325 manual motor starters ①

General data

Rated voltage	600 V
Rated current	25 A (14 setting ranges, 0.1 to 25A)
Rated frequency	50 – 60 Hz
Electrical and mechanical life endurance	100,000 operations
Mounting position	Optional
Ambient temperature	-25°C to +50°C
Temperature compensation	-25°C to + 50°C
Wire range	14 – 8 AWG

Standards

- IEC 157-1, 292-1, 337-1
- VDE 0660 part 101, 104, 106, 200
- SEV 1090-1, 1092-1, 1093-1

Approvals

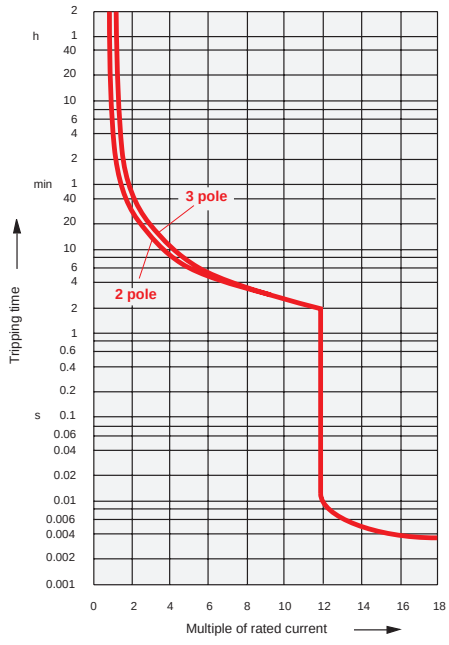
- UL: E137861 (MS 325); E90353 (Auxiliary contact blocks)
- CSA: LR 15332
- NEMKO, DEMKO, FI, SEV, KEMA, KEUR

Tripping values

Thermal tripping setting ranges (A)	Magnetic tripping operating current (A)
0.1 - 0.16	1.6
0.16 - 0.25	2.5
0.25 - 0.40	4.0
0.4 - 0.63	6.3
0.63 - 1.0	12
1 - 1.6	19
1.6 - 2.5	30
2.5 - 4.0	48
4 - 6.3	75
6.3 - 9.0	108
9 - 12.5	150
12.5 - 16	192
16 - 20	240
20 - 25	300

Low voltage trip

Rated voltage	400V
Rated frequency	50 – 60 Hz
Rated power	0.9 W
Operating voltage	
• Drop out (% of nominal control voltage)	10% – 75%
• Pull in	80% – 110%



Auxiliary and pilot contacts

Rated voltage	400V
Rated current	
• I_{th}	6 A
• AC 11	2 A, 200 V
Connection cross sections	2 x 14 AWG

Maximum switching capacity for DC loads using 3 main current paths in series

DC Load	Voltage	Amps
DC 1	60V	25
	110V	25
	220V	25
	440V	25
DC 2/3	60V	25
	110V	25
	220V	25
	440V	25
DC 4/5	60V	25
	110V	25
	220V	25
	440V	25

Auxiliary leads

Type load		Voltage	Amps
Carrying capacity of aux. contacts Thermal permanent current I_{th}			6
Rated operating for current I_e	**AC11** up to	220VAC	2
		380VAC	1.5
		500VAC	1.2
	DC11 up to	60VDC	1.5
		110VDC	1
		220VDC	0.3
		440VDC	0.1

DLA starters

① For contactor technical data, see pages 1.20 – 1.30

Technical data
for IEC coordination tables

DLA 9-30

DLA 26

Coordination tables

The tables below show the MS 325 manual motor starter and DLA starter combinations according to the type of coordination and motor current.

Motor power AC-3 and rated current three-phase cage motor, 1500 rpm		MS 325 manual motor starter		DLA starter type (120V coil shown)	Copper cable	Max. authorized current for combination
		Type	Setting range		Minimum cross-section	
380 V 400 V kW	A		A – A		mm²	A
Coordination type I, 400 V – 50 Hz, 50 kA, normal starting						
0.37	1.2	MS 325 – 1.6	1.0 – 1.6	DLA 9-30-84	1.5	1.6
0.55	1.5	MS 325 – 1.6	1.0 – 1.6	DLA 9-30-84	1.5	1.6
0.75	2	MS 325 – 2.5	1.6 – 2.5	DLA 9-30-84	1.5	2.5
1.1	2.6	MS 325 – 4	2.5 – 4.0	DLA 9-30-84	1.5	4
1.5	3.5	MS 325 – 4	2.5 – 4.0	DLA 9-30-84	1.5	4
2.2	5	MS 325 – 6.3	4.0 – 6.3	DLA 9-30-84	1.5	6.3
3	6.6	MS 325 – 9	6.3 – 9.0	DLA 9-30-84	1.5	9
4	8.5	MS 325 – 9	6.3 – 9.0	DLA 9-30-84	1.5	9
5.5	11.5	MS 325 – 12.5	9.0 – 12.5	DLA 12-30-84	1.5	12
7.5	15.2	MS 325 – 16	12.5 – 16.0	DLA 16-30-84	2.5	16
11	22	MS 325 – 25	16.0 – 25.0	DLA 26-30-84	2.5	25

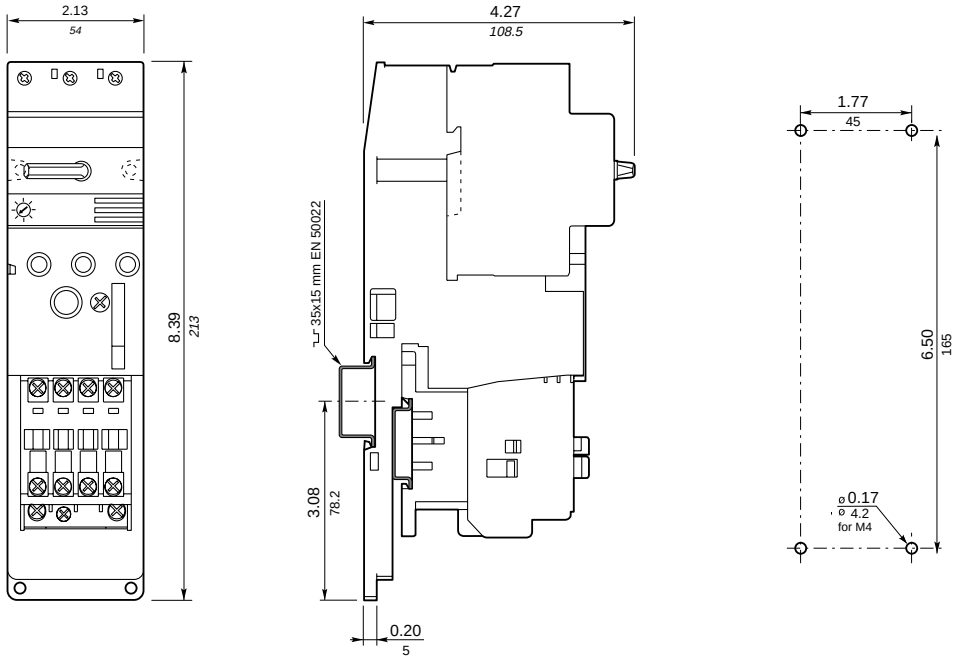
* Ambient temperature ≤ 30 °C

Coordination type II, 400 V – 50 Hz, 25 kA, normal starting						
0.37	1.2	MS 325 – 1.6	1.0 – 1.6	DLA 9-30-84	1.5	1.6
0.55	1.5	MS 325 – 1.6	1.0 – 1.6	DLA 9-30-84	1.5	1.6
0.75	2	MS 325 – 2.5	1.6 – 2.5	DLA 9-30-84	1.5	2.5
1.1	2.6	MS 325 – 4	2.5 – 4.0	DLA 12-30-84	1.5	4
1.5	3.5	MS 325 – 4	2.5 – 4.0	DLA 26-30-84	1.5	4
2.2	5	MS 325 – 6.3	4.0 – 6.3	DLA 26-30-84	1.5	6.3
3	6.6	MS 325 – 9	6.3 – 9.0	DLA 26-30-84	1.5	9
4	8.5	MS 325 – 9	6.3 – 9.0	DLA 26-30-84	1.5	9
5.5	11.5	MS 325 – 12.5	9.0 – 12.5	DLA 26-30-84	1.5	12.5
7.5	15.2	MS 325 – 16	12.5 – 16.0	DLA 26-30-84	2.5	16
11	22	MS 325 – 25	16.0 – 25.0	DLA 26-30-84	2.5	25

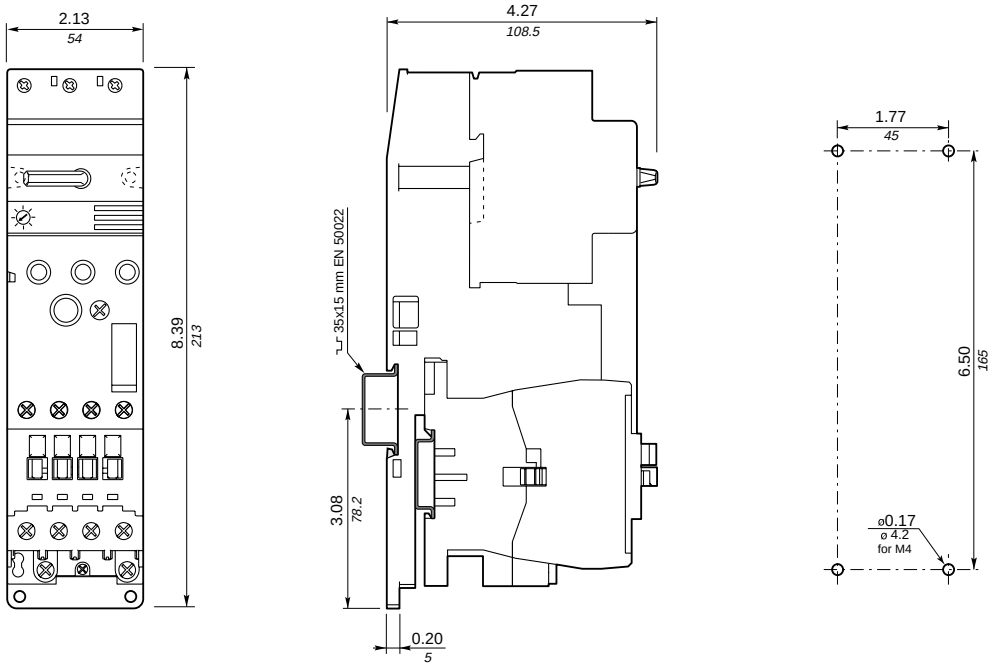
* Ambient temperature ≤ 30 °C

Approximate dimensions
for DLA starters
DLA9 – DLA26

DLA 9 – DLA 16



DLA 26



DLA starters

AC 1030 – 6/98