

Contactors and Starters

Type S, NEMA-style Variants

1

Variants – Operators

Description	For use on		Colour/Marking	Suffix to the contactor or starter reference (1)	Weight kg (lb)
	Class	Enclosure type			
Push buttons	8502, 8536	NEMA 1, 12	"Start-Stop"	A	–
	8702, 8736	NEMA 1, 12	"Forward-Reverse-Stop"	A1	–
			"High-Low-Stop"	A2	–
Pilot lights without operating interlock (2)	8502, 8536, 8702, 8736	NEMA 1	Red	P1	–
			Green	P2	–
			Amber	P3	–
			Clear	P4	–
Push-to-test pilot lights without operating interlock (2)	8502, 8536, 8702, 8736	NEMA 12	Red	P21	–
			Green	P22	–
			Amber	P23	–
			Clear	P24	–
			Yellow	P25	–
LED pilot lights	8502, 8536, 8702, 8736	NEMA 1	Red	P51	–
			Green	P52	–
			Yellow	P55	–
Special wiring	8502, 8536, 8702, 8736	NEMA 1	Red/"Off"	P71	–
			Green/"On"	P72	–
Selector switches	8502, 8536, 8702, 8736	NEMA 1,	"Hand-Off-Auto"	C	–
		NEMA 12			
	8702, 8736	NEMA 1,	"On-Off"	C6	–
		NEMA 12	"Forward-Off-Reverse"	C14	–
			"Forward-Reverse"	C20	–

Variants – Transformers

Description	For use on		Functions	Suffix to the contactor or starter reference (1)	Weight kg (lb)
	Class	Enclosure type			
Separate control circuit	8502, 8536, 8702, 8736	NEMA 1, 12	Specify voltage and frequency	S	–
Fused control circuit without transformer	8502, 8536, 8702, 8736	NEMA 1, 12	One fuse	F	–
			Two fuses	F4	–
Control circuit transformers standard capacity (50/60 Hz) (3)	8502, 8536, 8702, 8736	NEMA 1, 12	Fuses: 2 (primary), 0 (secondary)	F4T (4)	–
			Fuses: 2 (primary), 1 (secondary)	FF4T	–
			Fuses: 1 (primary), 2 (secondary) (5)	F1F10T	–
			Fuses: 2 (primary), 2 (secondary)	F4F10T	–
Additional capacity (50/60 Hz) Two fuses in primary (3)	8502, 8536, 8702, 8736	NEMA 1, 12	100 VA additional capacity	F4T11 (6)	–
			200 VA additional capacity	F4T12 (6)	–
Additional capacity (50/60 Hz) Two fuses in primary and one fuse in secondary (3)	8502, 8536, 8702, 8736	NEMA 1, 12	100 VA additional capacity	FF4T11	–

(1) Example: **8536 SAG 12 V01 A P1 P2**. All suffixes are listed in alphanumeric order after the voltage code.

(2) Unless otherwise requested, the standard practice is to wire the red pilot light to indicate that the device is energized. No additional auxiliary contact is required. Also, standard practice is to wire the green pilot light to indicate that the device is de-energized. An additional normally closed auxiliary contact is required; please consult your regional sales office.

(3) Control circuit transformer selection table:

Primary-secondary	120-24 (7)	208-120	240-24 (7)	240-120	277-120	480-24 (7)	480-120	480-240	600-120
60 Hz	V89	V84	V82	V80	V85	V83	V81	V87	V86

Example: **8536 SAG 12 V81 F4T A P1 P2**.

(4) Not available with 24 V secondary on Size 3. Select appropriate transformer with secondary fuse protection. See transformer selection table.

(5) Single phase with one leg earthed, or earthed 3-phase applications only.

(6) Not available with 24 V secondary. Select appropriate transformer with secondary fuse protection. See transformer selection table for 24 V secondary restrictions.

(7) 24 V coils are not available on Sizes 4–7.

Combination Starters

Type S, NEMA-style starters with Disconnect switch or circuit breaker

2

General

Class 8538 and 8539 Type S combination starters combine the requirements of motor overload and short-circuit protection into one package. These starters are manufactured in accordance with NEMA standards and are UL listed. They are designed to operate up to ~ 600 V maximum, 50 to 60 Hz, and are available with solid-state overload relays.

Square D is one of the leaders in North America and Europe in providing starters that are verified by UL to comply with IEC 947-4-1 and Type 2 coordination. This means that the components of a motor branch circuit protective device (fuses and circuit-breaker), contactor and overload relay will be suitable for further use following a short-circuit fault allowing for replacement of components during normal scheduled maintenance. Class 8538 Type S combination starters, Sizes 0–5, with fusible disconnect switches, meet Type 2 performance criteria.

Disconnect-switch starters

Features:

- Interchangeable fuse clips, straight through wiring, solid earth/ground bar, space for a fused control transformer, provisions for adding disconnect switch electrical interlock, handle mechanism/door closing mechanism.

Switch-type combination starters are available with fusible or non-fusible disconnect switches in NEMA Sizes 0–6. The switch itself is constructed of a moulded, insulated material that delivers arc-quenching performance similar to that of high voltage switch-gear. The visible blade construction allows you to confirm the blade position at a glance. Many industries have standardized on this feature.

Sizes 0–2, non-fusible assemblies can be field converted to fusible designs easily and quickly. Factory-built fusible units accept the industry-standard Class H or R fuses. The various units have specific UL-listed short-circuit withstand ratings that range from 5000 to 100 000 A. Specific ratings are influenced by many components including the size of the disconnect switch and the type of fuses used with the switch.

Circuit-breaker starters

Features:

- Handle mechanism, door closing mechanism.

Options:

- Factory-installed auxiliary switch (provides remote indication of an open or tripped breaker), factory-supplied alarm switch (actuates bell alarms or warning light when breaker is tripped).

Square D provides both a thermal-magnetic circuit-breaker and a motor circuit protector in NEMA Sizes 0–7 for applications requiring a breaker-type combination starter. The most widely used over-current protection devices are thermal-magnetic circuit-breakers. Mag-Gard® motor circuit protectors are similar in construction, but provide only short-circuit protection. When Mag-Gard devices are used with motor starters, the adjustable instantaneous trip provides maximum motor protection based on specific amperage and application.

Type S combination starters using thermal-magnetic breakers carry a UL-listed short-circuit withstand rating from 5000 to 30 000 A. If a Mag-Gard Type GJL breaker is used, withstand ratings increase to 100 000 A. Specific ratings and listings may vary depending on the specific combination of components used in the assembly.



Fusible disconnect-switch combination starter



Circuit-breaker combination starter

Characteristics

Environment

Class	8538							8539										
	0	1	2	3	4	5	6	0	1	2	3	4	5	6	7			
Rated insulation voltage																		
Conforming to UL, CSA	V	600							600									
Rated impulse withstand voltage																		
Class H or Class K fuses	kV	5			10		18		–									
Class R fuses	kV	100																
ITE circuit-breaker (FAL, KAL, LAL, MAL)	kV	–							10									
ITE circuit-breaker (GJL)	kV	–							65									
INST circuit-breaker (FAL, KAL, LAL, MAL)	kV	–							22 (1)		22			30 (3)				
INST circuit-breaker (GJL)	kV	–							100 (2)			–						
Product certifications	UL, CSA																	

(1) 22 kV rating for 0–480 V. 10 kV rating for 600 V.

(2) 100 kV rating for 0–480 V. 10 kV rating for 600 V.

(3) 30 kV rating for 0–480 V. 22 kV rating for 600 V.

Combination Starters

Type S, NEMA-style starters with Disconnect switch or circuit breaker



Electrical characteristics								
UL-listed short-circuit ratings								
Size	0	1	2	3	4	5	6	7
Disconnect-switch starters	8538 S●G 1●/S●A							
NEMA fuse class	Class H							
Enclosure (1)	Standard							–
Available Ampere RMS symmetrical	A	5000			10 000		18 000	–
Disconnect-switch starters	8538 S●G 3●/S●A							
NEMA fuse class	Class R							
Enclosure (1)	Standard							–
Available Ampere RMS symmetrical	A	100 000						–
Circuit-breaker starters	8539 S●G 4●/S●A							
Enclosure (1)	Standard							
Available Ampere RMS symmetrical	A	With GJL circuit-breaker: 100 000 (voltage 0–480 V) 10 000 (voltage 481–600 V)	With GJL circuit-breaker: 100 000 (voltage 0–480 V) 10 000 (voltage 481–600 V) 22 000 (8539 SGG 4● S8 and 8539 SDA ●● S8)	22 000				30 000 (voltage 0–480 V) 22 000 (voltage 481–600 V)
Thermal-magnetic circuit-breaker starters	8538 S●G ●/S●A							
Enclosure (1)	Standard							
Available Ampere RMS symmetrical	A	5000			10 000		18 000	30 000 (voltage 0–480 V) 22 000 (voltage 481–600 V)
Mag-Gard trip range								
Circuit-breaker	GJL/FAL/KAL/LAL/MAL ●●●● M●●							
Suffix number/trip range	A	M01 = 9–33 M02 = 21–77 M03 = 45–165 M04 = 90–330 M05 = 150–550 M06 = 225–825 18M = 300–1100		25M = 625–1250 26M = 750–1500 29M = 875–1750 30M = 1000–2000 31M = 1125–2250 32M = 1250–2500 33M = 1500–3000			35M = 1750–3500 36M = 2000–4000 40M = 2500–5000 42M = 3000–6000 44M = 3500–7000	
Terminals								
Size	0	1	2	3	4	5	6	7
Type	Line terminals on disconnect switch							
Type of lug	Box lug							
Wire Switch	#14–#1/0 Cu/Al							
size min.–max.	#14–#4 Cu (2) #12–#4 Al or #14–#1/0 Cu #12–#1/0 Al #14–#1 Cu/#8–#1/0 Al (GJL Breaker)	#14–#1/0 Cu or #12–#1/0 Al #14–#1 Cu/#8–1/0 Al (GJL Breaker)	#14–#2 Cu #10–#2 Al (FA Brkr) #4–300 MCM Cu/Al (KA Breaker) #14–#1 Cu/#8–#1/0 Al (GJL Breaker)	#14–#1/0 Cu #12–#1/0 Al (LA Brkr) #4–300 MCM Cu/Al (KA Breaker)	#14–#1/0 Cu #4–300 MCM Cu/Al (KA Breaker)	One #4–500 MCM Cu #4–300 MCM Cu/Al (KA Breaker) x1 #1–600 MCM or x2 #1–250 MCM Cu/Al (LA Breaker)	–	–
Type	Power terminals on magnetic starter							
Type of lug	Screw clamp terminal	Box lug					Parallel groove	
Wire Size min.–max.	#14–#8 Cu	#14–#4 Cu	#14–#0 Cu	#8–250 MCM Cu	#4–500 MCM Cu	250–500 MCM Cu (3)	250–500 MCM Cu	
Per terminal	1 or 2	1					1 or 2	1–4
Type	Control terminals on magnetic starter							
Type of lug	Screw clamp terminal							
Wire Size min.–max.	#16–#12 Cu					#16–#12 Cu (4)	#16–#12 Cu	
Per terminal	2							

(1) Standard enclosure includes non-oversize NEMA 1 and 12.
 (2) Use on FAL circuit-breakers rated 25 A or less.
 (3) Order Class 9999 Type SAL-16 parts kit to convert power terminals to accept wire sizes 1/0–300 MCM.
 (4) Terminal block range limited to #16–#14.

Combination Starters

Type S, NEMA-style starters with Non-fusible disconnect-switch, Class 8538

551268



8538 SBG 11 ●●●

2

3-pole non-fusible full-voltage starters, non-reversing

NEMA Size	Standard power ratings of 3-phase motors 50/60 Hz								External reset	Basic reference Add code indicating control circuit voltage (2), optional variants (3) and "H" code (4)	Weight
	Motor volts (1)										
	200 V (208 V)		230 V (240 V)		460 V (480 V)		575 V (600 V)				
	hp	kW	hp	kW	hp	kW	hp	kW			kg (lb)
NEMA 1 general purpose enclosure											
0	3	2.2	3	2.2	5	3.75	5	3.75	–	8538 SBG 11 (2) (3) (4)	17 (38)
1	7.5	5.5	7.5	5.5	10	7.5	10	7.5	–	8538 SCG 11 (2) (3) (4)	17 (38)
2	10	7.5	15	11	25	18.5	25	18.5	–	8538 SDG 11 (2) (3) (4)	25 (54)
3	25	18.5	30	22	50	37	50	37	–	8538 SEG 11 (2) (3) (4)	46 (102)
4	40	30	50	37	100	75	100	75	–	8538 SFG 11 (2) (3) (4)	74 (163)
5	75	55	100	75	200	150	200	150	–	8538 SGG 11 (2) (3) (4)	204 (450)
6	150	110	200	150	400	300	400	300	–	8538 SHG 11 (2) (3) (4)	–

NEMA 12 dust-tight industrial-use enclosure

0	3	2.2	3	2.2	5	3.75	5	3.75	With	8538 SBA 21 (2) (3) (4)	18 (40)
									Without	8538 SBA 11 (2) (3) (4)	18 (40)
1	7.5	5.5	7.5	5.5	10	7.5	10	7.5	With	8538 SCA 21 (2) (3) (4)	18 (40)
									Without	8538 SCA 11 (2) (3) (4)	18 (40)
2	10	7.5	15	11	25	18.5	25	18.5	With	8538 SDA 21 (2) (3) (4)	25 (55)
									Without	8538 SDA 11 (2) (3) (4)	25 (55)
3	25	18.5	30	22	50	37	50	37	With	8538 SEA 21 (2) (3) (4)	50 (111)
									Without	8538 SEA 11 (2) (3) (4)	50 (111)
4	40	30	50	37	100	75	100	75	With	8538 SFA 21 (2) (3) (4)	77 (170)
									Without	8538 SFA 11 (2) (3) (4)	77 (170)
5	75	55	100	75	200	150	200	150	With	8538 SGA 21 (2) (3) (4)	200 (441)
									Without	8538 SGA 11 (2) (3) (4)	200 (441)
6	150	110	200	150	400	300	400	300	With	8538 SHA 21 (2) (3) (4)	200 (441)
									Without	8538 SHA 11 (2) (3) (4)	200 (441)

(1) Motor voltage (starter voltage).

(2) Standard control circuit voltage:

Volts	24	110	120	208	220	240	380	440	480	550	600
50 Hz	–	V02	–	–	V03	–	V05	V06	–	V07	–
60 Hz	V01 (5) (6)	–	V02 (5)	V08	–	V03	–	–	V06	–	V07

24 V and 120 V coils require the addition of form "S" for separate control. Example: **8538 SCA 21 V03 H10S**.

(3) For optional variants, see page 2/21.

(4) To complete "H" code for Motor Logic solid-state overload relays, see pages 2/13 to 2/19. Motor Logic Plus units are not available on combination starters.

(5) 24 V coils are not available on Sizes 4–6. On Sizes 0–3, where 24 V coils are available, suffix "S" (separate control) must be specified.

(6) These voltage codes must include suffix "S" (supplied at no charge). When specifying suffix "S", please supply motor voltage when ordering.