

Fractional Horsepower Manual Starters with Melting Alloy Type Thermal Overload Relay

Table 16.1: Single-Unit Types—Class 2510—Rated 16 A—Thermal Units (see Thermal Unit Selection, page 16-132)

Type of Operator	No. of Poles	Features	NEMA 1 General Purpose Enclosure Surface Mounting		General Purpose Flush Mounting (Without Pull Box)			NEMA Type 4 [1] Enclosure Watertight and Dusttight	NEMA Types 3R, 7 & 9 Enclosure Hazardous Locations Div. 1 & 2 Class I Groups B, C, & D, & Class II Groups E, F, & G	Open Type	Number of Thermal Units Required
			Standard	Oversized	Gray Flush Plate	Standard Stainless Steel Flush Plate	Jumbo Stainless Steel Flush Plate				
			Type	Type	Type	Type	Type				
Basic Starter—Class 2510									Type	Type	
Toggle	1	Standard	FG1	FGJ1	FF1	FS1	—	—	—	FO1	1
		With Red Pilot Light [2]	FG1P	FGJ1P	FF1P	FS1P	FSJ1P	—	—	FO1P	1
	2	Standard	FG2	FGJ2	FF2	FS2	—	—	—	FO2	1
		With Red Pilot Light [2]	FG2P	FGJ2P	FF2P	FS2P	FSJ2P	—	—	FO2P	1
Key	1	Standard	FG3	FGJ3	FF3	FS3	—	—	—	FO3	1
		With Red Pilot Light [2]	FG3P	FGJ3P	FF3P	FS3P	FSJ3P	—	—	FO3P	1
	2	Standard	FG4	FGJ4	FF4	FS4	—	—	—	FO4	1
		With Red Pilot Light [2]	FG4P	FGJ4P	FF4P	FS4P	FSJ4P	—	—	FO4P	1
Starter with Handle Guard/Lock-Off—Class 2510											
Toggle	1	Standard	FG5	FGJ5	Order basic starter plus separate handle guard kit.			FW1	FR1	[3] [4]	1
		With Red Pilot Light [2]	FG5P	FGJ5P				FW1P	—	[3] [4]	1
	2	Standard	FG6	FGJ6				FW2	FR2	[3] [4]	1
		With Red Pilot Light [2]	FG6P	FGJ6P				FW2P	—	[3] [4]	1

Table 16.2: Duplex Units—Class 2510

Type of Operator	No. of Poles	Features	NEMA 1 General Purpose Enclosure Surface Mounting	General Purpose Flush Mounting (Without Pull Box)			Number of Thermal Units Required
			Type	Gray Flush Plate for Wall or Cavity Mounting	Stainless Steel Flush Plate for Wall or Cavity Mounting	Replacement Starter Class 2510	
One Starter in Duplex Enclosure—Class 2510							
Toggle	2	Standard	FG02	—	—	—	1
		With Red Pilot Light [2]	FG02P	—	—	—	
Key	2	With Red Pilot Light [2]	FG04P	—	—	—	1
Two Starters in One Enclosure—Class 2510							
Toggle	2 Each Str.	Standard	FG22	FF22	—	—	2
		With Red Pilot Light on Each[2]	FG22P	FF22P	FS22P	—	
Key	2 Each Str.	With Red Pilot Light on Each[2]	FG44P	FF44P	FS44P	—	2
Starter and Auto-Off-Hand SPDT Selector Switch (AC Only)—Class 2510							
Toggle	1	Standard	FG71	FF71	—	—	1
		With Red Pilot Light [2]	FG71P	FF71P	FS71P	—	
	2	Standard	FG72	FF72	—	—	1
		With Red Pilot Light[2]	FG72P	FF72P	FS72P	—	
Key	2	With Red Pilot Light[2]	FG74P	FF74P	FS74P	—	1
Two Speed Starters (AC Only)—Class 2512						Replacement Starter—Class 2510	
Toggle	1	With Mechanical Interlock:					2
		Standard	FG11	FF11	—	FO1T	
		With 2 Red Pilot Lights [2]	FG11P	FF11P	—	FO1PT	
		With High-Off-Low Selector Switch:					
	2	With 2 Red Pilot Lights [2]	—	—	FS101P	FO1PT	
		With Mechanical Interlock:					2
		Standard	FG22	FF22	—	FO2T	
		With 2 Red Pilot Lights [2]	FG22P	FF22P	—	FO2PT	
With High-Off-Low Selector Switch:							
With 2 Red Pilot Lights [2]		—	—	FS202P	FO2PT		

Table 16.3: Horsepower Ratings, Type F (continuous current rating: 16 A)

Volts	Maximum Horsepower		
	AC Single Phase		DC 2-Pole Only
	1-Pole	2-Pole	
115–230	1	1	3/4
277	1	1	—

Table 16.4: Approvals—2510 Type F and K

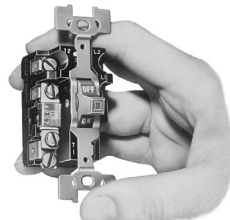
Agency	Enclosed	Open
UL	UL Listed File: E42243, CCN: NLRV	UL Component Recognized File: E42243, CCN: NLRV2
CSA	CSA Certified File: LR25490, Class: 3211-05	

Table 16.5: How to Order

To Order Specify:	Catalog Number
• Class Number	Class 2510
• Type Number	Type FG1



Type FG2P



Type FO2

[1] Furnished with one 3/4" pipe tap in the bottom (reversible for top feed). For a 3/4" pipe tap in the top and bottom, add the suffix H to the Type.

[2] For a green pilot light, add the letter G to the catalog number (i.e. 2510FG2PG).

[3] For a replacement starter, order the Open type above.

[4] When replacing a starter equipped with a pilot light in NEMA 4 enclosure, retain the pilot light mounting bracket from the original device.

Integral Horsepower



Types M and T integral horsepower manual starters provide convenient On-Off operation of small single phase, polyphase or DC motors. Typical applications include small machine tools, pumps, fans and conveyors.

- Push button (M) or toggle (T) operators
- Reliable overload protection
- Pilot light and auxiliary contact available

Table 16.17: Integral Horsepower Manual Starters (see [Thermal Unit Selection, page 16-132](#))

Non-Reversing, Class 2510, Max. Voltage: 600 Vac												
No. of Poles	NEMA Size	Ratings			NEMA 1 Surface Mounting		NEMA 4/4X Watertight and Dusttight Enclosure Brushed Stainless Steel	NEMA 4/4X Watertight, Dusttight and Corrosion-Resistant Glass-Polyester Enclosure	NEMA 7 & 9 For Hazardous Locations Class I—Groups C, D Class II—Groups E, F & G	NEMA 12 Dusttight and Driptight Industrial Use Enclosure	Open Type	
		Motor Voltage	Max. Hp		Square P.B. Operator	Toggle Operator					Square P.B. Operator	Toggle Operator
			Poly-Phase	Single Phase								
2-Pole	M-0	115 230	—	1 2	MBG1	TBG1	MBW11 [13]	MBW1 [13]	MBR1 [13]	MBA1 [13]	MBO1	TBO1
	M-1	115 230	—	2 3	MCG1	TCG1	MCW11	MCW1	MCR1	MCA1	MCO1	TCO1
	M-1P	115 230	—	3 5	MCG2	TCG2	MCW12	MCW2	MCR2	MCA2	MCO2	TCO2
3-Pole	M-0	200-230 380-575	3 5	—	MBG2	TBG2	MBW12 [13]	MBW2 [13]	MBR2 [13]	MBA2 [13]	MBO2	TBO2
	M-1	200-230 380-575	7.5 10	—	MCG3	TCG3	MCW13	MCW3	MCR3	MCA3	MCO3	TCO3
DC 2-Pole	M-0	115 230	1 hp DC 1.5 hp DC		MBG4	TBG4	MBW14	MBW4	—	MBA4	MBO4	TBO4
	M-1	115 230	1.5 hp DC 2 hp DC		MCG5	TCG5	MCW15	MCW5	MCR5	MCA5	MCO5	TCO5



All Except NEMA 7 and 9
File E42243
CCN NLRV
NEMA 7 and 9 Only
File E58760
CCN NPXZ



All Except NEMA 7 and 9
File LR60905
Class 3211-05
NEMA 7 and 9 Only
File LR26817
Class 3218-04

Table 16.18: How to Order

To Order Specify:	Catalog Number	
• Class Number	Class	Type
• Type Number	2510	MCA1

[12] NEMA 7 & 9 enclosures are cast-iron. NEMA 7 & 9 enclosures (cast aluminum) are available for outdoor use; to order these type of enclosures, replace the R in the catalog number with a T. For additional information, contact the Customer Care Center.

[13] Approved for group motor installations per NEC 430-53(c).

Combination Starters

Class 8538/8539



SQUARE D
GROUPE SCHNEIDER

General Information

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 (although some FORM numbers may not be listed – contact your local Square D representative for information). Class 8538 and 8539 combination starters are designed to operate at 600 Vac maximum, 50 to 60 Hz – and are supplied with melting alloy overload relays as standard.

Type 2 Coordination

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 (even though contact welding is recognized but can be easily broken) allowing for replacement of components during normal scheduled maintenance.

Square D starters and specified fuses have been tested by UL and CSA (at 100,000 Amps fault current) for operation at 600 volts AC. Class 8538 Type S Combination Starters, NEMA size 0 through 5, with fusible disconnect switches have tested to Type 2 performance criteria.

Class 8538 Disconnect Switch Type



Class 8538 combination starters can be supplied with either a fusible or non-fusible disconnect switch. Class 8538 combination starters are available in NEMA Sizes 0-6.

The fusible disconnect switch type combination starter design utilizes a flange operated visible blade switch. Interchangeable fuse clips, straight through wiring, space for a fused control transformer with additional capacity, and provisions for adding a disconnect switch electrical interlock are key features of the combination starters.

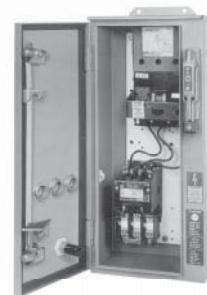
The fusible disconnect switch type can be supplied with Class R fuse clips increasing the short-circuit rating to 100,000A.

Size 0-2 non-fusible combination starters can be converted to a fusible type. See Catalog 999CT9701 for fuse block kits and fuse clips.

Class 8539 MAG-GARD® Motor Circuit Protector or Thermal Magnetic Circuit Breaker

Class 8539 combination starters can be supplied with either a MAG-GARD® motor circuit protector (MCP) or a thermal magnetic circuit breaker. Class 8539 combination starters are available in NEMA Sizes 0-7.

The circuit breakers in Class 8539 combination starters can be supplied with a factory installed auxiliary switch for remote indication of an open and/or tripped or closed breaker. For one auxiliary switch, specify **Form Y74**. For two auxiliary switches, specify **Form Y75**. The switches are supplied with normally open and normally closed circuits with a common connection. Contacts must be used on the same polarity and are rated 15 Amps at 240 Volts AC.



An alarm switch can be factory supplied only, specify **Form Y742**. The alarm switch only operates when the breaker is tripped. It is used to actuate bell alarms and warning lights. The alarm switch consists of a normally open single pole single throw switch. The contacts are rated 4 Amps at 240 Volts AC.

Enclosures – Class 8538 and 8539 combination starters are available in the following enclosures:

NEMA Type 1 General Purpose

NEMA Type 4 & 4X Watertight and Dusttight Stainless Steel

NEMA Type 4X Watertight, Dusttight, and Corrosion Resistant Glass-Polyester

NEMA Type 7 & 9 Bolted and Spin-Top® for Hazardous Locations (Class 8539 only).

NEMA Type 12 Dusttight and Driptight for Industrial Use

The NEMA Type 4 & 4X stainless steel enclosure (Sizes 0 - 5) has a brushed finish. Sizes 6 & 7 are painted sheet steel enclosures and are rated NEMA Type 4 only. For an electropolished finish, specify **Form G16** and add 15% to the price of the standard device. Hubs are supplied as standard on NEMA Type 4 & 4X enclosures.

Hubs are supplied as standard on NEMA Type 4X enclosures.

NEMA Type 12 enclosures may be field modified for outdoor applications. Specify **Form G26** for NEMA Type 3R (no additional charge). See Catalog 9999CT9701 for additional information. Also, NEMA Type 12 devices are available UL Listed for use in Class II, Division 2, Group G and Class III, Divisions 1 and 2 locations. Request **Form G21** (no additional charge).

Oversized Enclosures – Class 8538 disconnect switch type and Class 8539 MAG-GARD® MCP (Sizes 0-2) are available in NEMA Type 1, 4 & 4X and 12 enclosures. The oversized enclosures provide additional panel

space for customer installation of control transformers, fuse blocks, terminal blocks, relays, and other auxiliary equipment. These enclosures have three Class 9001 Type “K” holes as standard for installation of push buttons, pilot lights, and other cover mounted control units.

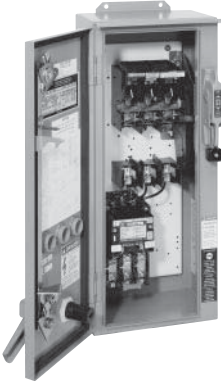
Coil Voltages – AC coils are available for application on 50-60 Hz. NEMA Sizes 00 - 5 are supplied with coils that are designed to operate satisfactorily on line voltages of 85% - 110% of rated voltage. NEMA Size 6 and 7 contactors are supplied with a DC coil operated by a solid state rectifier circuit that is powered by an AC source and is designed to operate satisfactorily on line voltages of 90-110% of rated voltage.

Please note that Voltage Codes have been added to the Type designations in order to improve customer service. It is necessary to include the Voltage Code when ordering combination starters. Also, 120 Volt polyphase combination starters will be wired for separate control.

Auxiliary Contacts – Additional auxiliary contacts may be added to Type S starters. Refer to Page 14 for maximum number of auxiliary units and Form designations for factory installed auxiliary contacts. See Catalog 9999CT9701 for auxiliary contact kits for field installation.

Type S Accessories – Additional accessories such as fuse blocks, fuse clip kits, disconnect switch and circuit breaker interlocks, and cover mounted control stations are available for field modifications, see Catalog 9999CT9701. For factory modifications (Forms), see Pages 30-34.

Combination Starters – NEMA Rated Class 8538 – Fusible Disconnect Switch Type



3-POLE POLYPHASE - 600 VOLTS AC MAXIMUM - 50-60 HERTZ

Devices require 3 thermal units. See catalog 9065CT9701 for selection information. For Class J fuse clip, use Form **Y91** (no additional charge).

Fusible Full Voltage Type, with Melting Alloy Overload Relays

Ratings				Fuse Clip Size Amps	NEMA Type 1 General Purpose Enclosure	NEMA Type 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304) (Sizes 0-5)†	NEMA Type 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure	NEMA Type 12/3R▲ Dusttight and Driptight Industrial Use Enclosure	
Motor Voltage (Starter Voltage)	Max. HP Poly-phase	Coil Voltage *	NEMA Size		Type	Type	Type	With External Reset	Without External Reset
200 (208)	3	208-60	0	30	SBG12V08	SBW12V08	SBW22V08	SBA22V08	SBA12V08
	5		1	30	SCG12V08	SCW12V08	SCW22V08	SCA22V08	SCA12V08
	7½			60	SCG13V08	SCW13V08	SCW23V08	SCA23V08	SCA13V08
	10		2	60	SDG12V08	SDW12V08	SDW22V08	SDA22V08	SDA12V08
	20		3	100	SEG15V08	SEW15V08	SEW25V08	SEA25V08	SEA15V08
	25			200	SEG12V08	SEW12V08	.....	SEA22V08	SEA12V08
	40		4	200	SFG15V08	SFW15V08	.....	SFA25V08	SFA15V08
	75		5	400	SGG15V08	SGW15V08	.....	SGA25V08	SGA15V08
230 (240)	150	240-60 220-50	6	600	SHG13V08	SHW13V08	.....	SHA23V08	SHA13V08
	3		0	30	SBG12V03	SBW12V03	SBW22V03	SBA22V03	SBA12V03
	5		1	30	SCG12V03	SCW12V03	SCW22V03	SCA22V03	SCA12V03
	7½			60	SCG13V03	SCW13V03	SCW23V03	SCA23V03	SCA13V03
	15		2	60	SDG12V03	SDW12V03	SDW22V03	SDA22V03	SDA12V03
	25		3	100	SEG15V03	SEW15V03	SEW25V03	SEA25V03	SEA15V03
	30			200	SEG12V03	SEW12V03	.....	SEA22V03	SEA12V03
	50		4	200	SFG15V03	SFW15V03	.....	SFA25V03	SFA15V03
460 (480)	100	480-60 440-50	5	400	SGG15V03	SGW15V03	.....	SGA25V03	SGA15V03
	200		6	600	SHG13V03	SHW13V03	.....	SHA23V03	SHA13V03
	5		0	30	SBG13V06	SBW13V06	SBW23V06	SBA23V06	SBA13V06
	10		1	30	SCG14V06	SCW14V06	SCW24V06	SCA24V06	SCA14V06
	15			30	SDG16V06	SDW16V06	SDW26V06	SDA26V06	SDA16V06
	25		2	60	SDG14V06	SDW14V06	SDW24V06	SDA24V06	SDA14V06
	50		3	100	SEG13V06	SEW13V06	SEW23V06	SEA23V06	SEA13V06
	100			200	SFG13V06	SFW13V06	.....	SFA23V06	SFA13V06
575 (600)	200	600-60 550-50	5	400	SGG13V06	SGW13V06	.....	SGA23V06	SGA13V06
	400		6	600	SHG12V06	SHW12V06	.....	SHA22V06	SHA12V06
	5		0	30	SBG13V07	SBW13V07	SBW23V07	SBA23V07	SBA13V07
	10		1	30	SCG14V07	SCW14V07	SCW24V07	SCA24V07	SCA14V07
	15			30	SDG16V07	SDW16V07	SDW26V07	SDA26V07	SDA16V07
	25		2	60	SDG14V07	SDW14V07	SDW24V07	SDA24V07	SDA14V07
	50		3	100	SEG13V07	SEW13V07	SEW23V07	SEA23V07	SEA13V07
	100			200	SFG13V07	SFW13V07	.....	SFA23V07	SFA13V07
	200		5	400	SGG13V07	SGW13V07	.....	SGA23V07	SGA13V07
	400		6	600	SHG12V07	SHW12V07	.....	SHA22V07	SHA12V07

★ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes listed in selection table above or additional standard voltage codes shown on Page 4.

▲ NEMA Type 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see Page 17 for more information.

NOTE: Some control transformers may require the use of oversized enclosures. Refer to control transformer selection table on Page 35.

Fusible Disconnect Switch Type (Class H Fuse Clips), Single Phase

Motor Voltage	Max. HP	Coil Voltage	NEMA Size	Fuse Clips Size (Amps)	NEMA Type 1 General Purpose Enclosure	NEMA Type 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304)	NEMA Type 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure	NEMA Type 12/3R▲ Dusttight and Driptight Industrial Use Enclosure	
					Type	Type	Type	With External Reset	Without External Reset
120	1	120	0	30	SBG12S2V02	SBW12S2V02	SBW22S2V02	SBA22S2V02	SBA12S2V02
	2		1	30	SCG12S2V02	SCW12S2V02	SCW22S2V02	SCA22S2V02	SCA12S2V02
	3		2	60	SDG12S2V02	SDW12S2V02	SDW22S2V02	SDA22S2V02	SDA12S2V02
230	2	230	0	30	SBG12S2V03	SBW12S2V03	SBW22S2V03	SBA22S2V03	SBA12S2V03
	3		1	30	SCG12S2V03	SCW12S2V03	SCW22S2V03	SCA22S2V03	SCA12S2V03
	7½		2	60	SDG12S2V03	SDW12S2V03	SDW22S2V03	SDA22S2V03	SDA12S2V03

▲ NEMA Type 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see Page 17 for more information.



File E152395
CCN NKJH7

Explosion proof unit



File E10214
CCN NOTH



File LR584
Class 3211 04

Note that not all units are or explosion proof – consult factory.

Combination Starters – NEMA Rated Non-Fusible Disconnect Switch Type – Class 8538

3-POLE POLYPHASE – 600 VOLTS AC MAXIMUM – 50-60 HZ

Devices require 3 thermal units. See Catalog 9065CT9701 for selection information.

Non-Fusible Full Voltage Type, Non-Reversing, with Melting Alloy Overload Relays

Ratings				NEMA Type 1 General Purpose Enclosure	NEMA Type 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304) (Sizes 0-5)†	NEMA Type 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure	NEMA Type 12/3R▲ Dusttight and Driptight Industrial Enclosure	
Motor Voltage (Starter Voltage)	Max. HP Poly- phase	Coil Voltage*	NEMA Size	Type	Type	Type	With External Reset	Without External Reset
200 (208)	3	208-60	0	SBG11V08	SBW11V08	SBW21V08	SBA21V08	SBA11V08
	7½		1	SCG11V08	SCW11V08	SCW21V08	SCA21V08	SCA11V08
	10		2	SDG11V08	SDW11V08	SDW21V08	SDA21V08	SDA11V08
	25		3	SEG11V08	SEW11V08	SEW21V08	SEA21V08	SEA11V08
	40		4	SFG11V08	SFW11V08	.....	SFA21V08	SFA11V08
	75		5	SGG11V08	SGW11V08	.....	SGA21V08	SGA11V08
230 (240)	150	240-60 220-50	6	SHG11V08	SHW11V08	.....	SHA21V08	SHA11V08
	3		0	SBG11V03	SBW11V03	SBW21V03	SBA21V03	SBA11V03
	7½		1	SCG11V03	SCW11V03	SCW21V03	SCA21V03	SCA11V03
	15		2	SDG11V03	SDW11V03	SDW21V03	SDA21V03	SDA11V03
	30		3	SEG11V03	SEW11V03	SEW21V03	SEA21V03	SEA11V03
	50		4	SFG11V03	SFW11V03	.....	SFA21V03	SFA11V03
460 (480)	100	480-60 440-50	5	SGG11V03	SGW11V03	.....	SGA21V03	SGA11V03
	200		6	SHG11V03	SHW11V03	.....	SHA21V03	SHA11V03
	5		0	SBG11V06	SBW11V06	SBW21V06	SBA21V06	SBA11V06
	10		1	SCG11V06	SCW11V06	SCW21V06	SCA21V06	SCA11V06
	25		2	SDG11V06	SDW11V06	SDW21V06	SDA21V06	SDA11V06
	50		3	SEG11V06	SEW11V06	SEW21V06	SEA21V06	SEA11V06
575 (600)	100	600-60 550-50	4	SFG11V06	SFW11V06	.....	SFA21V06	SFA11V06
	200		5	SGG11V06	SGW11V06	.....	SGA21V06	SGA11V06
	400		6	SHG11V06	SHW11V06	.....	SHA21V06	SHA11V06
	5		0	SBG11V07	SBW11V07	SBW21V07	SBA21V07	SBA11V07
	10		1	SCG11V07	SCW11V07	SCW21V07	SCA21V07	SCA11V07
	25		2	SDG11V07	SDW11V07	SDW21V07	SDA21V07	SDA11V07
575 (600)	50	600-60 550-50	3	SEG11V07	SEW11V07	SEW21V07	SEA21V07	SEA11V07
	100		4	SFG11V07	SFW11V07	.....	SFA21V07	SFA11V07
	200		5	SGG11V07	SGW11V07	.....	SGA21V07	SGA11V07
	400		6	SHG11V07	SHW11V07	.....	SHA21V07	SHA11V07

Non-Fusible Disconnect Switch Type, Single Phase

Motor Voltage	Max. HP	Coil Voltage	NEMA Size	Fuse Clips Size (Amps)	NEMA Type 1 General Purpose Enclosures	NEMA Type 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304)	NEMA Type 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure†	NEMA Type 12/3R▲ Dusttight and Driptight Industrial Enclosure	
					Type	Type	Type	With External Reset	Without External Reset
120	1	120	0	N/A	SBG11S2V02	SBW11S2V02	SBW21S2V02	SBA21S2V02	SBA11S2V02
	2		1	N/A	SCG11S2V02	SCW11S2V02	SCW21S2V02	SCA21S2V02	SCA11S2V02
	3		2	N/A	SDG11S2V02	SDW11S2V02	SDW21S2V02	SDA21S2V02	SDA11S2V02
230	2	230	0	N/A	SBG11S2V03	SBW11S2V03	SBW21S2V03	SBA21S2V03	SBA11S2V03
	3		1	N/A	SCG11S2V03	SCW11S2V03	SCW21S2V03	SCA21S2V03	SCA11S2V03
	7½		2	N/A	SDG11S2V03	SDW11S2V03	SDW21S2V03	SDA21S2V03	SDA11S2V03

▲ NEMA Type 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see Page 17 for more information.

* Coil voltage code must be specified to order this product. Refer to standard coil voltage codes listed in selection table above or additional standard voltage codes shown below.

† NEMA Size 6 starters are NEMA Type 4 painted sheet steel enclosure.

NOTE: Some control transformers may require the use of oversized enclosures. Refer to control transformer selection table in the Factory Modifications section.

Coil Voltage Codes

Voltage	Code
60 Hz	50 Hz
24†▲	...
120†	110
208	...
240	220
480	440
600	550
Specify	Specify
	V99

▲ 24V coils are not available on Sizes 4-7. On Sizes 00-3, where 24V coils are available, **Form S** (separate control) must be specified.

† These voltage codes must include **Form S** (supplied at No Charge). When specifying **Form S**, please supply motor voltage when ordering.

Combination Starters – NEMA Rated Class 8538 – Fusible Disconnect Switch Type with Class R Fuse Clips

3-POLE POLYPHASE – 600 VOLTS AC MAXIMUM – 50-60 HZ

Devices require 3 thermal units. See Catalog 9065CT9701 for selection information.

**Fusible (with Class R Fuse Clips) Full Voltage Type, Non-Reversing,
with Melting Alloy Overload Relays — (100,000 AIC Rated)**

RATINGS					NEMA Type 1 General Purpose Enclosure	NEMA Type 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304) (Sizes 0-5)◆	NEMA Type 4X Watertight, Dusttight and Corrosion Resistant Polyester Enclosure	NEMA Type 12/3R▲ Dusttight and Driptight Industrial Enclosure	
Motor Voltage (Starter Voltage)	Max. HP Poly- phase	Coil Voltage *	NEMA Size	Fuse Clip Size Amps	Type	Type	Type	With External Reset	Without External Reset
200 (208)	3	208-60	0	30	SBG32V08	SBW32V08	SBW42V08	SBA42V08	SBA32V08
	5		1	30	SCG32V08	SCW32V08	SCW42V08	SCA42V08	SCA32V08
	7½		1	60	SCG33V08	SCW33V08	SCW43V08	SCA43V08	SCA33V08
	10		2	60	SDG32V08	SDW32V08	SDW42V08	SDA42V08	SDA32V08
	20		3	100	SEG35V08	SEW35V08	SEW45V08	SEA45V08	SEA35V08
	25		3	200	SEG32V08	SEW32V08	.....	SEA42V08	SEA32V08
	40		4	200	SFG35V08	SFW35V08	.....	SFA45V08	SFA35V08
	75		5	400	SGG35V08	SGW35V08	.....	SGA45V08	SGA35V08
150	6	600	SHG33V08	SHW33V08	.....	SHA43V08	SHA33V08		
230 (240)	3	240-60 220-50	0	30	SBG32V03	SBW32V03	SBW42V03	SBA42V03	SBA32V03
	5		1	30	SCG32V03	SCW32V03	SCW42V03	SCA42V03	SCA32V03
	7½		1	60	SCG33V03	SCW33V03	SCW43V03	SCA43V03	SCA33V03
	15		2	60	SDG32V03	SDW32V03	SDW42V03	SDA42V03	SDA32V03
	25		3	100	SEG35V03	SEW35V03	SEW45V03	SEA45V03	SEA35V03
	30		3	200	SEG32V03	SEW32V03	.....	SEA42V03	SEA32V03
	50		4	200	SFG35V03	SFW35V03	.....	SFA45V03	SFA35V03
	100		5	400	SGG35V03	SGW35V03	.....	SGA45V03	SGA35V03
200	6	600	SHG33V03	SHW33V03	.....	SHA43V03	SHA33V03		
460 (480)	5	480-60 440-50	0	30	SBG33V06	SBW33V06	SBW43V06	SBA43V06	SBA33V06
	10		1	30	SCG34V06	SCW34V06	SCW44V06	SCA44V06	SCA34V06
	15		2	30	SDG36V06	SDW36V06	SDW46V06	SDA46V06	SDA36V06
	25		2	60	SDG34V06	SDW34V06	SDW44V06	SDA44V06	SDA34V06
	50		3	100	SEG33V06	SEW33V06	SEW43V06	SEA43V06	SEA33V06
	100		4	200	SFG33V06	SFW33V06	.....	SFA43V06	SFA33V06
	200		5	400	SGG33V06	SGW33V06	.....	SGA43V06	SGA33V06
	400		6	600	SHG32V06	SHW32V06	.....	SHA42V06	SHA32V06
575 (600)	5	600-60 550-50	0	30	SBG33V07	SBW33V07	SBW43V07	SBA43V07	SBA33V07
	10		1	30	SCG34V07	SCW34V07	SCW44V07	SCA44V07	SCA34V07
	15		2	30	SDG36V07	SDW36V07	SDW46V07	SDA46V07	SDA36V07
	25		2	60	SDG34V07	SDW34V07	SDW44V07	SDA44V07	SDA34V07
	50		3	100	SEG33V07	SEW33V07	SEW43V07	SEA43V07	SEA33V07
	100		4	200	SFG33V07	SFW33V07	.....	SFA43V07	SFA33V07
	200		5	400	SGG33V07	SGW33V07	.....	SGA43V07	SGA33V07
	400		6	600	SHG32V07	SHW32V07	.....	SHA42V07	SHA32V07

▲ NEMA Type 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see Page 17 for more information.

* Coil voltage code must be specified to order this product. Refer to standard coil voltage codes listed in selection table above or additional standard voltage codes shown below.

♦ NEMA Size 6 starters are NEMA Type 4 painted sheet steel enclosures.

NOTE: Some control transformers may require the use of oversized enclosures. Refer to the control transformer selection table on Page 35.

Coil Voltage Codes

Voltage	Code
60 Hz	50 Hz
24†▲	...
120†	110
208	...
240	220
480	440
600	550
Specify	Specify
	V01
	V02
	V08
	V03
	V06
	V07
	V99

▲ 24V coils are not available on Sizes 4-7. On Sizes 00-3, where 24V coils are available, **Form S** (separate control) must be specified.

† These voltage codes must include **Form S** (supplied at No Charge). When specifying **Form S**, please supply motor voltage when ordering.

Combination Starters — NEMA Rated Disconnect Switch Type in Oversized Enclosure, NEMA Size 0–2★ – Class 8538

3-POLE POLYPHASE – 600 VOLTS AC MAXIMUM – 50-60 HZ

Full Voltage Type With Melting Alloy Overload Relays

Devices require 3 thermal units. See Catalog 9065CT9701 for selection information.

Class 8538 Non-Fusible Disconnect Switch Type

Ratings					NEMA Type 1 General Purpose Enclosure	NEMA Type 4 & 4X Watertight and Dusttight Enclosure Stainless Steel (304)	NEMA Type 12/3R▲ Dusttight and Driptight Industrial Use Enclosure	
Motor Voltage (Starter Voltage)	Max. HP Polyphase	Coil Voltage *	NEMA Size	Fuse Clip Size Amps	Type	Type	With External Reset	Without External Reset
200 (208)	3 7½ 10	208-60	0 1 2	N/A N/A N/A	SBG11S8V08 SCG11S8V08 SDG11S8V08	SBW11S8V08 SCW11S8V08 SDW11S8V08	SBA21S8V08 SCA21S8V08 SDA21S8V08	SBA11S8V08 SCA11S8V08 SDA11S8V08
230 (240)	3 7½ 15	240-60 220-50	0 1 2	N/A N/A N/A	SBG11S8V03 SCG11S8V03 SDG11S8V03	SBW11S8V03 SCW11S8V03 SDW11S8V03	SBA21S8V03 SCA21S8V03 SDA21S8V03	SBA11S8V03 SCA11S8V03 SDA11S8V03
460 (480)	5 10 25	480-60 440-50	0 1 2	N/A N/A N/A	SBG11S8V06 SCG11S8V06 SDG11S8V06	SBW11S8V06 SCW11S8V06 SDW11S8V06	SBA21S8V06 SCA21S8V06 SDA21S8V06	SBA11S8V06 SCA11S8V06 SDA11S8V06
575 (600)	5 10 25	600-60 550-50	0 1 2	N/A N/A N/A	SBG11S8V07 SCG11S8V07 SDG11S8V07	SBW11S8V07 SCW11S8V07 SDW11S8V07	SBA21S8V07 SCA21S8V07 SDA21S8V07	SBA11S8V07 SCA11S8V07 SDA11S8V07

Class 8538 Fusible Disconnect Switch Type

200 (208)	3 5 7½ 10	208-60	0 1 1 2	30 30 60 60	SBG12S8V08 SCG12S8V08 SCG13S8V08 SDG12S8V08	SBW12S8V08 SCW12S8V08 SCW13S8V08 SDW12S8V08	SBA22S8V08 SCA22S8V08 SCA23S8V08 SDA22S8V08	SBA12S8V08 SCA12S8V08 SCA13S8V08 SDA12S8V08
230 (240)	3 5 7½ 15	240-60 220-50	0 1 1 2	30 30 60 60	SBG12S8V03 SCG12S8V03 SCG13S8V03 SDG12S8V03	SBW12S8V03 SCW12S8V03 SCW13S8V03 SDW12S8V03	SBA22S8V03 SCA22S8V03 SCA23S8V03 SDA22S8V03	SBA12S8V03 SCA12S8V03 SCA13S8V03 SDA12S8V03
460 (480)	5 10 15 25	480-60 440-50	0 1 2 2	30 30 60 60	SBG13S8V06 SCG14S8V06 SDG16S8V06 SDG14S8V06	SBW13S8V06 SCW14S8V06 SDW16S8V06 SDW14S8V06	SBA23S8V06 SCA24S8V06 SDA26S8V06 SDA24S8V06	SBA13S8V06 SCA14S8V06 SDA16S8V06 SDA14S8V06
575 (600)	5 10 15 25	600-60 550-50	0 1 2 2	30 30 60 60	SBG13S8V07 SCG14S8V07 SDG16S8V07 SDG14S8V07	SBW13S8V07 SCW14S8V07 SDW16S8V07 SDW14S8V07	SBA23S8V07 SCA24S8V07 SDA26S8V07 SDA24S8V07	SBA13S8V07 SCA14S8V07 SDA16S8V07 SDA14S8V07

Class 8538 Fusible Disconnect Switch Type with Class R Fuse Clips

200 (208)	3 5 7½ 10	208-60	0 1 1 2	30 30 60 60	SBG32S8V08 SCG32S8V08 SCG33S8V08 SDG32S8V08	SBW32S8V08 SCW32S8V08 SCW33S8V08 SDW32S8V08	SBA42S8V08 SCA42S8V08 SCA43S8V08 SDA42S8V08	SBA32S8V08 SCA32S8V08 SCA33S8V08 SDA32S8V08
230 (240)	3 5 7½ 15	240-60 220-50	0 1 1 2	30 30 60 60	SBG32S8V03 SCG32S8V03 SCG33S8V03 SDG32S8V03	SBW32S8V03 SCW32S8V03 SCW33S8V03 SDW32S8V03	SBA42S8V03 SCA42S8V03 SCA43S8V03 SDA42S8V03	SBA32S8V03 SCA32S8V03 SCA33S8V03 SDA32S8V03
460 (480)	5 10 15 25	480-60 440-50	0 1 2 2	30 30 60 60	SBG33S8V06 SCG34S8V06 SDG36S8V06 SDG34S8V06	SBW33S8V06 SCW34S8V06 SDW36S8V06 SDW34S8V06	SBA43S8V06 SCA44S8V06 SDA46S8V06 SDA44S8V06	SBA33S8V06 SCA34S8V06 SDA36S8V06 SDA34S8V06
575 (600)	5 10 15 25	600-60 550-50	0 1 2 2	30 30 60 60	SBG33S8V07 SCG34S8V07 SDG36S8V07 SDG34S8V07	SBW33S8V07 SCW34S8V07 SDW36S8V07 SDW34S8V07	SBA43S8V07 SCA44S8V07 SDA46S8V07 SDA44S8V07	SBA33S8V07 SCA34S8V07 SDA36S8V07 SDA34S8V07

▲ NEMA Type 12 enclosures may be field modified for outdoor non-corrosive and non-service-entrance-rated applications; see Page 17 for more information.

★ For NEMA Size 3-5 starters in oversized NEMA Type 1, 4 or 12 enclosures, price and order standard starter with **Form G28**.

* Coil voltage code must be specified to order this product. Refer to standard coil voltage codes listed in selection table above or additional standard voltage codes shown below.

NOTE: Some control transformers may require the use of oversized enclosures. Refer to the control transformer selection table on Page 35.

Class 8538 Fusible Disconnect Switch Type for Horizontal Mounting

Ratings					NEMA Type 12/3R▲ Dusttight and Driptight Industrial Use Enclosure	
Motor Voltage (Starter Voltage)	Max. HP Polyphase	Coil Voltage*	NEMA Size	Fuse Clip Size Amps	With External Reset Type	Without External Reset Type
200 (208)	2 7½	208-60	1	30 60	SCA22S1V08 SCA23S1V08	SCA12S1V08 SCA13S1V08
230 (240)	2 7½	240-60 220-50	1	30 60	SCA22S1V03 SCA23S1V03	SCA12S1V03 SCA13S1V03
460 (480)	10	480-60 440-50	1	30	SCA24S1V06	SCA14S1V06
575 (600)	10	600-60 550-50	1	30	SCA24S1V07	SCA14S1V07

* Coil voltage code must be specified to order this product. Refer to standard coil voltage codes listed in selection table or additional standard voltage codes shown on Page 31.

Coil Voltage Codes

Voltage	Code
60 Hz	
24†▲	V01
120†	V02
208	V08
240	V03
480	V06
600	V07
Specify	V99
50 Hz	
110	V01
220	V03
440	V06
550	V07
Specify	V99

▲ 24V coils are not available on Sizes 4-7. On Sizes 00-3, where 24V coils are available, **Form S** (separate control) must be specified.

† These voltage codes must include **Form S** (supplied at No Charge). When specifying **Form S**, supply motor voltage when ordering.

Full Voltage Contactors and Starters – NEMA Rated

Application Data for Selection

NEMA Size	Load Volts	Maximum HP Rating—Nonplugging and Nonjogging Duty		Maximum HP Rating—Plugging and Jogging Duty †		Continuous Current Rating, Amperes—600 Volt Max.	Service-Limit Current Rating, Amperes *	Tungsten and Infrared Lamp Load, Amperes—250 Volts Max. ★	Resistance Heating Loads, KW – other than Infrared Lamp Loads ‡		KVA Rating for Switching Transformer Primaries At 50 or 60 Cycles				3 PH Rating for Switching Capacitors •
		Single Phase	Poly-Phase	Single Phase	Poly-Phase				Single Phase	Poly-Phase	Single Phase	Poly-Phase	Single Phase	Poly-Phase	
00	115	1/2	...	...	...	9	11	5	...	...	...	...	...	...	...
	200	...	1 1/2	...	...	9	11	5	...	...	...	...	...	...	...
	230	1	1 1/2	...	...	9	11	5	...	...	...	...	...	...	...
	380	...	1 1/2	...	...	9	11	...	...	...	...	...	...	...	...
	460	...	2	...	...	9	11	...	...	...	...	...	...	...	...
0	115	1	...	1/2	...	18	21	10	...	...	0.6	...	0.3	...	...
	200	...	3	...	1 1/2	18	21	10	...	...	...	1.8	...	0.9	...
	230	2	3	1	1 1/2	18	21	10	...	...	1.2	2.1	0.6	1.0	...
	380	...	5	...	1 1/2	18	21	...	...	...	...	...	...	...	...
	460	...	5	...	2	18	21	...	...	...	2.4	4.2	1.2	2.1	...
1	115	2	...	1	...	27	32	15	3	5	1.2	...	0.6	...	...
	200	...	7 1/2	...	3	27	32	15	...	9.1	...	3.6	...	1.8	...
	230	3	...	2	3	27	32	15	6	10	2.4	4.3	1.2	2.1	...
	380	...	10	...	5	27	32	...	...	16.5	...	...	...	...	...
	460	...	10	...	5	27	32	...	12	20	4.9	8.5	2.5	4.3	...
1P	115	3	...	1 1/2	...	36	42	24	...	...	...	...	...	...	...
	230	5	...	3	...	36	42	24	...	...	...	...	...	...	...
2	115	3	...	2	...	45	52	30	5	8.5	2.1	...	1.0	...	...
	200	...	10	...	7 1/2	45	52	30	...	15.4	...	6.3	...	3.1	...
	230	...	15	5	10	45	52	30	10	17	4.1	7.2	2.1	3.6	8
	380	...	25	...	15	45	52	...	...	28	...	...	...	...	...
	460	...	25	...	15	45	52	...	20	34	8.3	14	4.2	7.2	16
3	115	...	...	...	...	90	104	60	10	17	4.1	...	2.0	...	...
	200	...	25	...	15	90	104	60	...	31	...	12	...	6.1	...
	230	...	30	...	20	90	104	60	20	34	8.1	14	4.1	7.0	27
	380	...	50	...	30	90	104	...	...	56	...	...	...	...	...
	460	...	50	...	30	90	104	...	40	68	16	28	8.1	14	53
4	115	...	...	...	...	90	104	60	50	86	20	35	10	18	67
	200	...	40	...	25	135	156	120	...	45	...	20	...	10	...
	230	...	50	...	30	135	156	120	30	52	14	23	6.8	12	40
	380	...	75	...	50	135	156	...	...	86.7	...	...	...	...	...
	460	...	100	...	60	135	156	...	60	105	27	47	14	23	80
5	115	...	100	...	60	135	156	...	75	130	34	59	17	29	100
	200	...	75	...	60	270	311	240	...	91	...	41	...	20	...
	230	...	100	...	75	270	311	240	60	105	27	47	14	24	80
	380	...	150	...	125	270	311	...	...	173	...	...	...	...	...
	460	...	200	...	150	270	311	...	120	210	54	94	27	47	160
6▲	115	...	200	...	150	270	311	...	150	260	68	117	34	59	200
	200	...	150	...	125	540	621	480	...	182	...	81	...	41	...
	230	...	200	...	150	540	621	480	120	210	54	94	27	47	160
	380	...	300	...	250	540	621	...	...	342	...	...	...	...	...
	460	...	400	...	300	540	621	...	240	415	108	188	54	94	320
7▲	115	...	400	...	300	540	621	...	300	515	135	234	68	117	400
	230	...	300	...	...	810	932	...	...	180	315	...	...	...	240
	460	...	600	...	...	810	932	...	...	360	625	...	...	...	480
7▲	115	...	600	...	...	810	932	...	...	450	775	...	...	...	600

Tables and footnotes are taken from NEMA Standards.

† Ratings shown are for applications requiring repeated interruptions of stalled motor current or repeated closing of high transient currents encountered in rapid motor reversal, involving more than five openings or closings per minute and more than ten in a ten-minute period, such as plug-stop, plug-reverse or jogging duty. Ratings apply to single speed and multi-speed controllers.

* Per NEMA Standards ICS 2-1993 clause 4, the service-limit current represents the maximum rms current, in Amperes, which the controller may be expected to carry for protracted periods in normal service. At service-limit current ratings, temperature rises may exceed those obtained by testing the controller at its continuous current rating. The ultimate trip current of over-current (overload) relays or other motor protective devices shall not exceed the service-limit current ratings of the controller.

★ FLUORESCENT LAMP LOADS – 300 VOLTS AND LESS – The characteristics of fluorescent lamps are such that it is not necessary to derate Class 8502 contactors below their normal continuous current rating. Class 8903 contactors may also be used with fluorescent lamp loads. For controlling tungsten and infrared lamp loads, and resistance heating loads, Class 8903 ac lighting contactors are recommended. These contactors are specifically designed for such loads and are applied at their full rating as listed in the Class 8903 Section.

‡ Ratings apply to contactors which are employed to switch the load at the utilization voltage of the heat producing element with a duty which requires continuous operation of not more than five openings per minute. Class 8903 Types L and S lighting contactors are rated for resistance heating loads.

● When discharged, a capacitor has essentially zero impedance. For repetitive switching by a contactor, sufficient impedance should be connected in series to limit inrush current to not more than 6 times the contactor rated continuous current. In many installations, the impedance of connecting conductors may be sufficient for this purpose. When switching to connect additional banks, the banks already on the line may be charged and can supply additional available short-circuit current which should be considered when selecting the impedance to limit the current.

The ratings for capacitor switching above assume the following maximum available fault currents:

NEMA Size 2-3: 5,000 A RMS Sym.

NEMA Size 4-5: 10,000 A RMS Sym.

NEMA Size 6: 18,000 A RMS Sym.

NEMA Size 7: 30,000 A RMS Sym.

If available fault current is greater than these values, connect sufficient impedance in series as noted in the previous paragraph.

▲ For NEMA Size 6 and 7, the operation rate is as follows: Continuous operation rate is 3 operations per minute maximum; Jogging or Plugging Duty operation rate is 15 operations per minute for a maximum of three minutes.

The motor ratings in the above table are NEMA standard ratings and apply only when the code letter of the motor is the same as or occurs earlier in the alphabet than is shown in the table below.

Motors having code letters occurring later in the alphabet may require a larger controller. Consult local Square D field office.

Motor HP Rating	Maximum Allowable Motor Code Letter
1 1/2-2	L
3-5	K
7 1/2 and above	H

Full Voltage Contactors and Starters – NEMA Rated Application Data

Power Contact Ratings: All contactors and starters are rated in accordance with NEMA standards. The ratings shown in the selection tables are for normal service. For complete data on power contact ratings, refer to Page 12.

Short Circuit Protection: According to the National Electrical Code branch circuit overcurrent protection must be provided for each contactor or starter. For starters refer to instructions furnished with the thermal unit selection table. For contactors (Class 8502 or 8702) provide branch circuit overcurrent protection in accordance with the National Electrical Code, except do not exceed the maximum protective device ratings in table below.

NEMA Size	Maximum Voltage	Class K5, RK5 or RK1 Fuse (Ampere)	Class J or T Fuse (Ampere)	Inverse-Time Circuit Breaker (Ampere)
00	600	10	15	15
	250	12	15	15
0	600	20	30	20
	250	25	30	35
1	600	30	60	40
	250	40	60	60
2	600	60	100	80
	250	60	100	90
3	600	100	200	125
	250	125	200	150
4	600	200	400	225
5	600	400	600	400
6	600	600	1200*	800
7	600	600	1600*	1200

* Class L Fuse only

Capacitor Switching: The kilovar ratings of enclosed, three phase contactors used as switches for capacitor loads, when only one load appears on the secondary of a distribution system are shown in the table on Page 12.

Coil Burden▲

NEMA Size	No. of Poles	Inrush VA		Sealed VA		Sealed Watts	
		50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
00	2-3	....	165	....	33	....	6
0 & 1	1-5	232	245	26	27	7.7	7.8
2	2 & 3	296	311	36	37	12	14
	4 & 5	429	438	37	38	12	14
3	2-3	676	700	47	46	15	14
	4-5	1260	1185	89	85	23.4	22
4	2-5						
5	2-3	2970	2970	250	212	42	39
6‡	2-3	1495	1780	56	48	27	32
7‡	2-3	....	1960	....	59	....	36

▲ Mean values.

‡ Size 6 and 7 have a DC coil. The values shown are for the AC input to the DC power supply that provides power to the coil.
Ambient temperature (operating temperature): 0°C - 40°C (32°F - 104°F)

Maintenance of Equipment: Class 9998 Repair Parts Kits are available for all Class 8502 contactors and Class 8536 starters. Service bulletins with a complete list of replaceable parts are supplied with all enclosed devices. Separate bulletins can be ordered and are listed along with the appropriate contact parts kit.

Device				Instruction Bulletin	Service Bulletin	Replacement Contacts Class 9998 Type
NEMA Type	Type	Series	No. of Poles			
00	SA	A	2-3		362AS	SL2
		B	2-3	30072-013-08	556AS	SJ1
0	SB	A&B	1-3 4 5	30072-013-09	277AS 277AS & 250AS 277AS & 250AS	SL2 SL12 (1)SL12 & (1)SL22 or (1)SL2 & (2)SL22
1	SC	A&B	1-3 4 5	30072-013-10	278AS 278AS & 250AS 278AS & 250AS	SL3 SL13 (1)SL13 & (1)SL22 or (1)SL3 & (2)SL22
1P	SC	A	2	30072-013-10	278AS	SL3
2	SD	A	2-3 4 5	30072-013-11	279AS 279AS & 293AS 279AS & 293AS	SL4 SL14 (1)SL14 & (1)SL24 or (1)SL4 & (2)SL24
3	SE	A	2	30072-013-01	305AS	SL6
			3	30072-013-01	305AS	SL7
			4	30072-013-03	326AS	(2)SL6
			5	30072-013-03	326AS	(1)SL6 & (1)SL7
4	SF	A	2	30072-013-02	306AS	SL8
			3	30072-013-02	306AS	SL9
			4	30072-013-03	326AS	(2)SL8
			5	30072-013-03	326AS	(1)SL8 & (1)SL9
5	SG	A	2	30072-013-18	328AS	SL10
			3	30072-013-18	328AS	SL11
6	SH	A	2		342AS	SL25
			3		342AS	SL26
6	SH	B	2	30072-013-12	370AS	SL25
			3	30072-013-12	370AS	SL26
7	SJ	A	2	30072-013-13	397AS	SL30
			3	30072-013-13	397AS	SL31

Terminals

NEMA Size	Type	Power Terminals		Control Terminals	
		Type of Lug	Wire Sizes* Min.-Max.	Type of Lug	Wire Sizes* Min.-Max.
00, 0 & 1	SA, SB & SC	Pressure Wire	#14-#8	Pressure Wire	#16-#12
2	SD	Box Lug	#14-#4	Pressure Wire	#16-#12
3	SE	Box Lug	#14-1/0	Pressure Wire	#16-#12
4	SF	Box Lug	#8-250 kcmil	Pressure Wire	#16-#12
5	SG	Box Lug	#4-500 kcmil	Pressure Wire	#16-#12
6	SH	Parallel Groove	One or two 250-500 kcmil per phase	Pressure Wire	#16-#12
7	SJ	Parallel Groove	One to four 250-500 kcmil per phase	Pressure Wire	#16-#12

* Solid or stranded copper wire. One wire per connector.

Coil temperature: Not more than 85°C rise in 40°C ambient (125°C max.).

Full Voltage Contactors & Starters – NEMA Rated Application Data

Auxiliary Units

Auxiliary contacts, power poles, and timer attachments can be added by the factory or in the field on all Type S starters and contactors. The table below shows the maximum number of auxiliary units (**in addition to the holding circuit contact**) that can be added to a given size starter or contactor. In addition, it is possible to add a second internal contact on NEMA Size 0, 1, and 2 contactors and starters.

NEMA Size	Type	No. of Poles of Basic Contactor	Maximum Number of External Auxiliary Units (In addition to holding circuit contact)
00	SA	2-3	4 single circuit auxiliary contacts (N.O. or N.C.) if second internal auxiliary contact is not used.
0, 1 and 2	SB SC SD	1, 2 or 3	4 single circuit auxiliary contacts (N.O. or N.C.)
			3 single circuit auxiliary contacts (N.O. or N.C.) plus 1 attached timer (ON or OFF delay).
			2 single circuit auxiliary contacts (N.O. or N.C.) plus 1 power pole adder (1 or 2 poles, N.O. or N.C.).
			1 attached timer (ON or OFF delay) plus 1 power pole adder (1 or 2 poles, N.O. or N.C.) plus 1 auxiliary contact.
3, 4 & 5	SE SF SG	2-5 (Size 3 & 4)	4 single circuit auxiliary contacts (N.O. or N.C.)
			2 single circuit (Sizes 3 & 4) or 3 single circuit (Size 5) auxiliary contacts plus 1 attached timer (ON or OFF delay).
			2 single circuit auxiliary contacts (N.O. or N.C.) plus 1 NEMA Size 0-1 or Size 2 power pole adder (1 or 2 poles, N.O. or N.C.).
			1 timer attachment plus 1 auxiliary contact.
6 and 7	SH SJ	2-3	4 single circuit auxiliary contacts (N.O. or N.C.)
			3 single circuit auxiliary contacts (N.O. or N.C.) plus 1 attached timer (ON or OFF delay).
			2 single circuit auxiliary contacts (N.O. or N.C.) plus 1 NEMA Size 0-1 or Size 2 power pole adder (1 or 2 poles, N.O. or N.C.).
			1 timer attachment plus 1 auxiliary contact.

Factory Installed Auxiliary Contacts

The table below lists the Form designations for factory installed electrical contacts. See Factory Modifications (Forms) section for pricing.

See Class 9999 for field modification kits.

Form Number Of Additional Auxiliary Contacts

When ordering factory installed auxiliary contacts, the Form designations listed should be used.

Number of N.O. Contacts	Number of N.C. Contacts	Form Number
0	1	X01
0	2	X02
0	3	X03
0	4	X04
1	0	X10
1	1	X11
1	2	X12
1	3	X13
2	0	X20
2	1	X21
2	2	X22
3	0	X30
3	1	X31
4	0	X40

Control Circuit Transformers

Class 9070 Type T control transformers are normally used when it is necessary to provide a lower voltage to the control circuit. This transformer with fused protection may be ordered from the factory by specifying Form F4T. The addition of a transformer often requires the use of a larger enclosure (refer to dimensions on Page 17–19). The table below shows the transformer selection for given sized starters and contactors with or without auxiliary units.

NEMA Size	Type	No. of Poles	Auxiliary Units	Transformer Class 9070 Type
0 & 1	SB SC	1-3	With max. of 2 auxiliary contacts	T50
			With timer and maximum of 1 auxiliary contact	
			With 3 or 4 auxiliary contacts With timer and 2 or 3 auxiliary contacts	T100
0 & 1	SB SC	4 & 5	With or without auxiliary contacts or timer	T100
0 & 1 Mechanically Interlocked Devices	SB SC	1-5	With or without attachments	T100
2	SD	2-5	With or without attachments	T100
3	SE	2-3	With or without attachments	T150
3	SE	4 & 5	With or without attachments	T300
4	SF	2-5	With or without attachments	T300
5	SG	2-3	Any	T500
6, 7	SH, SJ	2-3	Any	#

A Class 9070 transformer is an integral part of the Size 6 and Size 7 control circuit providing 120 volt control circuit voltage as standard.

Power Poles

Single or double circuit power pole adders may be factory or field installed on 2 and 3 pole Type S contactors and starters. The table below lists the Form designation for factory installed power pole adders. Only one power pole adder may be installed per contactor. See Factory Modifications (Forms) section for pricing.

See Class 9999 for field modification kits.

Type	NEMA Size	Class 9999 Type	Form Designation
1 N.O.	0, 1 2	SB6 SB11	Y428 Y436
1 N.C.	0, 1 2	SB7 SB12	Y429 Y437
1 N.O., 1 N.C.	0, 1 2	SB8 SB13	Y435 Y440
2 N.O.	0, 1 2	SB9 SB14	Y430 Y438
2 N.C.	0, 1 2	SB10 SB15	Y434 Y439



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CCN NITW2

Transformers

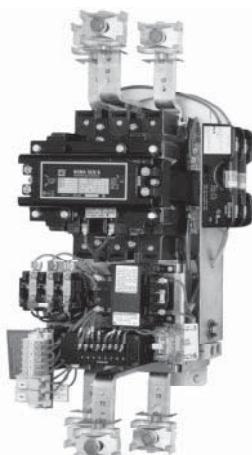


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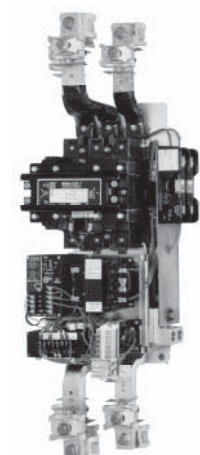


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Class 5411 06

Full Voltage Contactors and Starters – NEMA Rated Application Data



NEMA Size 6 Starter
8536 SH



NEMA Size 7 Starter
8536 SJ

NEMA Size 6 Type SH and NEMA Size 7 Type SJ

contactors and starters have a DC coil operated by a solid state rectifier circuit mounted on the device and powered from an ac source. The NEMA Sizes 6 and 7 are equipped as standard with a fused control circuit transformer (Form F4T) rated 240/480-120 volts 60 Hz, 220/440-110 volts 50 Hz. The purpose of this transformer is to provide an isolated 120 volts 60 Hz, 110 volts 50 Hz, supply for the control circuit. NEMA Sizes 6 and 7 may be ordered for other system voltages by specifying the voltage and frequency desired.

Operation Rates – Continuous operation rate: 3 operations/minute maximum. Jogging or Plugging Duty: 15 operations/minute - 3 minutes maximum.

Field conversion for other system voltages is accomplished by one of the following methods, NOT BY THE USUAL PRACTICE OF CHANGING THE COIL:

1. If the factory wiring is indicated as being for 480 volts 60 Hertz, 440 volts 50 Hertz, conversion to 240 volts 60 Hertz, 220 volts 50 Hertz, can be accomplished by reconnecting the control transformer as illustrated on instruction sheet supplied with the controller. This is the same method that would be used on Class 9070 control circuit transformers.

Conversion to any other voltage requires replacement of the control transformer. For other system voltages: i.e. 208, 277, 380, 600 volts, a new transformer with single voltage primary must be selected from table at right. Control transformer connections are illustrated on the instruction sheet supplied with the controller.

2. If the factory wiring is indicated as being for any voltage other than 480 volts 60 Hertz, 440 volts 50 Hertz, conversion to any other voltage requires replacement of the control transformer. Refer to table at right.
3. In Square D combination starters, the standard transformer supplied may be used to power a maximum of five Class 9001 Type K illuminated operators powered with transformer type light modules. When extra capacity to power control relays or other inductive loads is required, a second transformer must be added. Extra capacity can be purchased as Form F4T with additions in 100 VA increments.
4. Standard controllers are wired for common control and are not convertible for operation of the control circuit from a separate source of supply voltage. Controllers designated Form S have special wiring designed for separate control. They are furnished with an isolating transformer, usually having a 120 volt primary and 120 volt secondary, that must not be bypassed. Form S controllers are not convertible for operation on common control.

The tables below give the replacement transformers for Type S NEMA Sizes 6 and 7 contactors and starters. To change voltages on these devices, coils are not changed, instead transformers with the desired voltage are changed.

Replacement Control Transformers (150VA) For Type S Size 6

Voltage		Class 9070 Type
60 Hertz	50 Hertz	
240/480-120	220/440-110	31104-512-50
208-120	.....	31104-512-52
277-120	.....	31104-512-53
.....	380-110	31104-512-54
600-120	550-110	31104-512-51
120-120	110-110	31104-512-55
240-120	220-110	31104-512-56

Replacement Control Transformers (200VA) For Type S Size 7

Voltage		Class 9070 Type
60 Hertz	50 Hertz	
240/480-120	220/440-110	31123-501-50
208-120	.....	31123-501-52
277-120	.....	31123-501-53
.....	380-110	31123-501-54
600-120	550-110	31123-501-51
120-120	110-110	31123-501-55
240-120	220-110	31123-501-56

Auxiliary Contacts: A N.O. holding circuit contact and a N.C. auxiliary contact are provided as standard. The holding circuit contact may or may not be required for either 3-wire or 2-wire control. NEMA Sizes 6 and 7 have an additional N.C. auxiliary contact which is wired in the coil control circuit. **DO NOT USE THIS N.C. CONTACT FOR ANY OTHER PURPOSE.**

Combination Starters – NEMA Rated

Application Data – Class 8538, 8539

Class 8539 – UL Listed Short Circuit Ratings

MAG-GARD® Motor Circuit Protector Type			
NEMA Size	Voltage	Enclosure	Available Amperes RMS Symmetrical
0 & 1, 2 Size 3 Type SE*41 & SE*51 Only (GJL)	0-480	Standard† and Oversize	100,000
0 & 1 (FAL)	0-480	Standard† and Oversize	22,000
0 & 1 (FAL)	481-600	Standard† and Oversize	10,000
0 & 1, 2 Size 3 Type SE*41 & SE*51 Only (GJL)	481-600	Standard† and Oversize	10,000
0-2 with Current Limiting Module	600	Oversize	100,000
0-3 with Current Limiting Module	600	Standard†	100,000
0-3	600	NEMA 7 & 9	5,000*
2	600	Oversize	22,000
2-6	600	Standard†	22,000
4 & 5	600	NEMA 7 & 9	10,000
7	0-480	Standard†	30,000
7	481-600	Standard†	22,000

† Standard enclosure includes non-oversize NEMA Types 1, 4 & 4X Stainless, and 12.
● Consult factory for higher withstand ratings.

Table 1: MAG-GARD Trip Range

Suffix No.		Suffix No.	Range Amps	Suffix No.	Range Amps	Suffix No.	Range Amps
M01	9-33	11M	8-28	25M	625-1250	33M	1500-3000
M02	21-77	12M	18-70	26M	750-1500	35M	1750-3500
M03	45-165	13M	50-180	29M	875-1750	36M	2000-4000
M04	90-330	15M	100-350	30M	1000-2000	40M	2500-5000
M05	150-550	16M	150-580	31M	1125-2250	42M	3000-6000
M06	225-825	18M	300-1100	32M	1250-2500	44M	3500-7000

The MAG-GARD adjustable trip range is determined by the suffix of the circuit breaker catalog number. Table 1 indicates the trip range which corresponds to a given suffix number. The MAG-GARD Motor Circuit Protector should be adjusted to a level just above Locked-Rotor Current of the motor. This setting will provide optimum overcurrent protection for the motor. For more information on MAG-GARD instantaneous trip circuit breakers, refer to the MAG-GARD circuit breaker section of this Catalog.

Terminals

NEMA Size	Type	Line Terminals on Disconnect		Power Terminals On Magnetic Starter			Control Terminals On Magnetic Starter		
		Type of Lug	Wire Size Min.-Max.	Type of Lug	Wire Size Min.-Max.	Wires Per Terminal	Type of Lug	Wire Size Min.-Max.	Wires Per Terminal
0 & 1	SB & SC	Box Lug	#14-1/0 Cu/Al	Pressure Wire	#14-#8 Cu	1 or 2	Pressure Wire	#16-#12 Cu	2
2	SD	Box Lug	#14-1/0 Cu/Al	Box Lug	#14-#4 Cu	1	Pressure Wire	#16-#12 Cu	2
3	SE	Box Lug	#14-1/0 Cu/Al	Box Lug	#14-#0 Cu	1	Pressure Wire	#16-#12 Cu	2
4	SF	Box Lug	#6-300 MCM Cu/Al	Box Lug	#8-250 MCM Cu	1	Pressure Wire	#16-#12 Cu	2
5	SG	Box Lug	One #4-500 MCM Cu	Box Lug	#4-500 MCM Cu	1	Pressure Wire	#16-#12 Cu	2
6	SH	Box Lug	....	Parallel Groove	250-500 MCM Cu●	1 or 2	Pressure Wire	#16-#12 Cu▲	2
7	SJ	Box Lug	....	Parallel Groove	250-500 MCM Cu	1-4	Pressure Wire	#16-#12 Cu	2

● Order Class 9999 Type SAL-16 parts kit to convert power terminals to accept sizes 1/0-300 MCM wire.
▲ Terminal block range limited to #16-#14.
▼ Use on FAL circuit breakers rated 25 Amps or less.

Class 8539 – UL Listed Short Circuit Ratings

Thermal Magnetic Circuit Breaker Type			
NEMA Size	Voltage	Enclosure	Available Amperes RMS Symmetrical
0-3	600	Standard†	5,000
4 & 5	600	Standard†	10,000
6	600	Standard†	18,000
7	0-480	Standard†	30,000
7	481-600	Standard†	22,000

† Standard enclosure includes non-oversize NEMA Types 1, 4 & 4X Stainless, and 12.

Class 8538 – UL Listed Short Circuit Ratings

NEMA Size	NEMA Fuse Class	Enclosure	Available Amperes RMS Symmetrical
0-3	Class H or K	Standard†	5,000
0-3	Class R	Standard†	100,000
0-2	Class H or K	Oversize	5,000
0-2	Class R	Standard	100,000
4-5	Class H or K	Standard†	10,000
4-5	Class R	Standard†	100,000
6	Class H or K	Standard†	18,000
6	Class R	Standard†	100,000

† Standard enclosure includes non-oversize NEMA Types 1, 4 & 4X Stainless, and 12.

Table 2: Motor Code Letter Table

Horsepower	Motor Code Letters
½ or less	A-L
¾ — 1½	A-K
2 — 3	A-J
5 — 25	A-H
30 — 125	A-G
150 or more	A-F

The combination starter selection tables on Pages 7 — 9 are suitable for motors with Locked-Rotor Current letters per NEC Table 430-7(b) as listed in Table 2. For other motors a special thermal magnetic circuit breaker with adjustable magnetic trip settings for the specific motor is required. When ordering for these special applications, specify the motor horsepower, voltage, frequency, full load current and code letter (or locked rotor current) to assure proper protection.

Combination Starters — NEMA Rated

Approximate Dimensions, Shipping Weights – Class 8538, 8539

NEMA Type 1 Enclosure – Figure 1

NEMA Size	Class	Type	Dimensions in Inches*																Top & Bottom		Sides	Wt. (Lbs.)
			A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	W	X	Y	
0-1	8538 & 8539	SBG SCG	9½	22½	8¼/32	6¾	20½	14½/32	1¾16	1¼16	3	2½16	1½16	¾4	2¾16	1¼4	7/8	...	½2-¾4	½2-¾4	½2	38
2	8538 & 8539	SDG	10½	26	9¼/32	7¾	24	16½/32	2¾8	2	4	2½16	1½16	¾4	2¾16	1¼4	7/8	...	1-1¼4	½2-¾4	½2	54

* Above dimensions include space for control circuit transformers.

NEMA Type 1 Enclosure – Figure 2

NEMA Size	Class	Type	Dimensions in Inches*																Top & Bottom		Sides	Wt. (Lbs.)
			A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	W	X			Y
3	8538 & 8539	SEG	15¼	42	10 ¹ / ₁₆	9¼	3	22 ²³ / ₃₂	41	½	...	2 ⁵ / ₈	3 ¹⁷ / ₃₂	5	2 ¹ / ₁₆	5 ⁵ / ₈	1 ⁹ / ₃₂	2 ⁹ / ₃₂	1-1 ¹ / ₄ 2-2 ¹ / ₂	½-¾	½	102
4	8538	SFG	16	52½	10 ¹ / ₁₆	10	3	23 ²³ / ₃₂	51½	½	...	2 ⁵ / ₈	3 ¹⁷ / ₃₂	5	2 ¹ / ₁₆	5 ⁵ / ₈	1 ⁹ / ₃₂	2 ⁹ / ₃₂	2½	½-¾	½	163
	8539	SFG	16	52½	10 ¹ / ₁₆	10	3	23 ²³ / ₃₂	51½	½	...	2 ⁵ / ₈	3 ¹⁷ / ₃₂	5	2 ¹ / ₁₆	5 ⁵ / ₈	1 ⁹ / ₃₂	2 ⁹ / ₃₂	2½	½-¾	½	163
5	8538	SGG	20	78	15½	12	4	29 ¹ / ₁₆	77	½	...	3 ³ / ₈	4 ³ / ₈	9¼	3 ³ / ₁₆	...	...	...	½-¾†	3	...	450
	8539	SGG	20	66	13 ³ / ₁₆	12	4	29 ¹ / ₁₆	65	½	...	3 ³ / ₈	4 ³ / ₈	5	3 ³ / ₁₆	...	...	...	½-¾†	3	...	420
6	8538 & 8539	SHG	36	90	21½	...	...	41¾	...	...	...	...	...	5	...	...	...	...	...	...	...	...

† Left side only

▲ Size 6 enclosures are floor mounting.

* Above dimensions include space for control circuit transformers.

■ Class 8538 Size 3 devices with 200 Amp fuse clips use dimensions for Class 8538 Size 4.

NEMA Type 12 Enclosure – Figure 3

NEMA Size	Class	Type	Dimensions in Inches*										Wt. (Lbs.)
			A	B	C	D	E	F	G	H	I	J	
0-1	8538 & 8539	SBA SCA	9½	8½	24	3¼	2½	4½	23½	1¾	4½	14½	40
2	8538 & 8539	SDA	10½	9½	27¾	3¼	2½	5½	27	¾	4½	16¾	55
3	8538 & 8539	SEA	15¼	10½	42	5	3	9¼	41	½	5½	22½	111
4	8538	SFA	16	10½	52½	5	3	10	51½	½	4¾	22¾	170
	8539	SFA	16	10½	52½	5	3	10	51½	½	5½	22¾	170
5	8538	SGA	20	13½	78	9¼	4	12	77	½	7¾	29½	...
	8539	SGA	20	13½	66	5	4	12	65	½	7¾	27½	440
6	8538 & 8539	SHA	36	17	90	5	...	...	...	...	...	47¾	...

▲ Size 6 enclosures are floor mounting.

* Above dimensions include space for control circuit transformers.

■ Class 8538 Size 3 devices with 200 Amp fuse clips use dimensions for Class 8538 Size 4.

NOTE: Illustrations may not represent the actual enclosure, they are intended for dimensional information only.

NEMA Type 12 Enclosures Modified for Outdoor Applications (not to be used in salt air or corrosive environments)

Field Modifications for NEMA Type 3 dusttight, raintight and sleet resistant outdoor applications are as follows:
Watertight conduit hubs or equivalent provision for watertight connection at the conduit entrance shall be used.

Field Modifications for NEMA Type 3R rainproof and sleet resistant outdoor applications are as follows:

1. Watertight conduit hubs or equivalent provision for watertight connection at the conduit entrance, when the conduit enters at a level higher than the lowest live part, shall be used.
2. Drain holes of 1/8 inch diameter shall be added to the bottom of the enclosure.

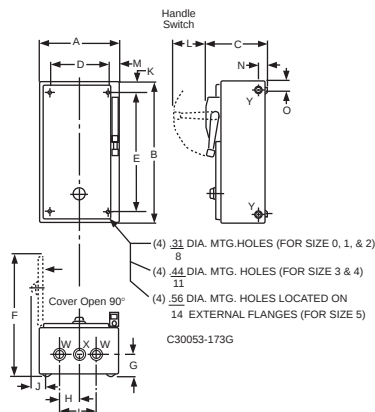


Figure 1
NEMA Type 1 Enclosure

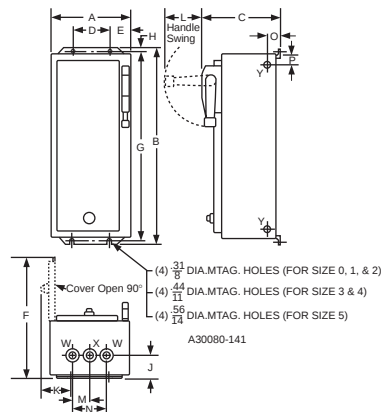


Figure 2
NEMA Type 1 Enclosure

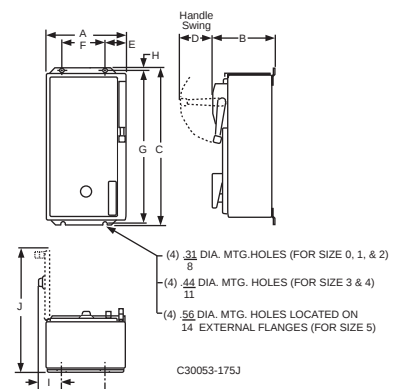


Figure 3
NEMA Type 12 Enclosure

Combination Starters — NEMA Rated
Approximate Dimensions, Shipping Weights

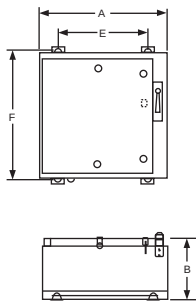


Figure 1

NEMA 4X
Polyester Enclosure

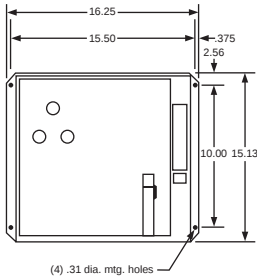


Figure 2

Class 8538 — Horizontal Type
NEMA Type 12

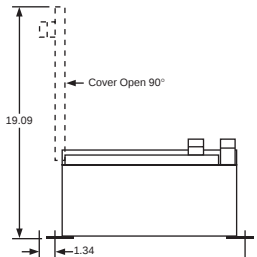


Figure 3

Class 8538 and 8539
In Oversize Enclosures —
NEMA Type 1, 4 & 4X
Stainless, 12

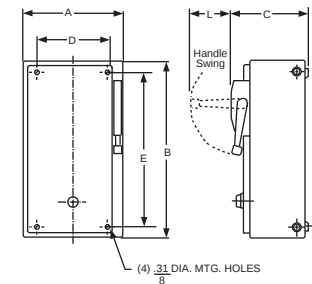


Figure 4

Class 8538 and 8539
Stainless Steel Enclosure
NEMA Type 4 & 4X

NEMA Type 4X Polyester Enclosure

NEMA Size	Class	Dimensions (in inches)* — see Figure 1					
		Type	A	B	C	E	F
0, 1	8538	SBW	13.72	11.4	26.94	6.25	25.75
0, 1, & 2		SCW					
		SDW					
0, 1, & 2	8738 8739	SBW SCW SDW	25.25	11.4	27.00	17.88	25.75
3 - 4	8538, 8738 8539, 8739	SEW SFW●	26.31	11.4	33.50	18.50	32.25

* Dimensions also for **Form F4T** (standard control transformer) and **Form F4T10** (50 VA additional capacity). Other control transformers may require the use of oversized enclosures. Refer to the control transformer selection table on Page 35.
● 8539 Size 4 only.

Information on Hubs

Hubs are supplied with each NEMA Type 4X combination starter as shown in the table below. Note that hubs are only installed in stainless steel enclosures; they are not installed in polyester enclosures.

NEMA Size	Quantity	Hub Size
0 & 1	1 2	0.75" 1.00"
2	1 2	0.75" 1.50"
3 & 4	1 2	0.75" 2.50"

NEMA Type 4 & 4X Stainless Enclosures — Figure 4

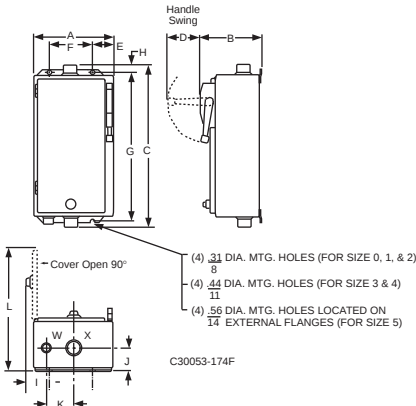
NEMA Size	Class	Type	Dimensions in Inches*											Bottom	Top & Bot.	Wt. (Lbs.)	
			A	B	C	D	E	F	G	H	I	J	K	L	W	X	
0-1	8538 & 8539	SBW SCW	9½	8½ ³²	24½	3¼	2½	4½	23½	19 ³²	3½ ²	1½ ¹⁶	2½ ¹⁶	14 ³²	¾ Hub	1 Hub	40
2		SDW	10½	9½ ³²	27¾	3¼	2½	5½	27	19 ³²	3	2	2 ⁹	16½ ³²	¾ Hub	1½ Hub	55
3●	8538 & 8539	SEW	15¼	10½ ³²	42	5	3½ ¹⁶	10¼	40½	19 ³²	3	2½ ¹⁶	3½ ¹⁶	22½ ¹⁶	¾ Hub	2½ Hub	111
4		SFW	16	10½ ³²	52½	5	3½ ¹⁶	11	51	19 ³²	3	2½ ¹⁶	3½ ¹⁶	22½ ³²	¾ Hub	2½ Hub	158
	8539	SFW	16	10½ ³²	52½	3¼	2½	11	51	19 ³²	3	2½ ¹⁶	3½ ¹⁶	22½ ³²	¾ Hub	2½ Hub	120
	8538	SGW	20	13½ ³²	78	9¼	4	12	77	9½ ¹⁶	4½ ²	3	3½	29½ ³²	¾ Hub	3½ Hub	...
5	8539	SGW	20	13½ ³²	66	5	4	12	65	9½ ¹⁶	4½ ²	3	3½	29½ ³²	¾ Hub	3½ Hub	440
6▲	8538 & 8539	SHW	36	17	90	...	...	...	...	...	...	...	...	47½	...	...	...

* Dimensions also for **Form F4T** (standard control transformer), **Form F4T11** (100 VA extra capacity) and **Form F4T12** (200 VA extra capacity).
▲ Size 6 enclosures are floor mounting.

● Class 8538 Size 3 devices with 200 Amp fuse clips use dimensions for Class 8538 Size 4.

NEMA Type 1, 4, 4X Stainless, 12 Oversize Enclosure — Figure 3

NEMA Size	NEMA Type Encl.	Dimensions in Inches					
		Wide A	High B	Deep C	Handle L	Mounting D	E
0-2	1	15	28¾	9½	3¼	11½	26¼
	4	15	30½	9½	3¼	10	29¾
	12	15	31	10½	3¼	9	30¼



Combination Starters — NEMA Rated Approximate Dimensions, Shipping Weights

Class 8539 – NEMA Type 7 & 9 Bolted Enclosure – Figure 1★

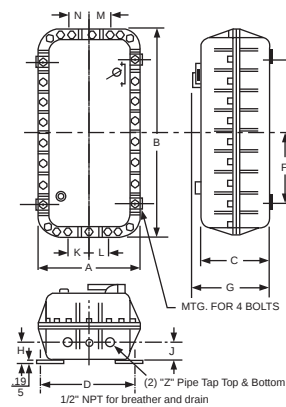
NEMA Size	Type	Dimensions in Inches												Wt. (Lbs.)
		A	B	C	D	E	F	G	H, J	K, L, M, N	P	Z		
0-2	SBT SCT SDT	14¼	27½	9½	12¼	19¼	9⅝	11	2⅝	3⅝	1½	1½	115	
3-4	SET SFT	18⅞	31⅝	10	16¼	19¼	9⅝	12⅝	2⅝	3¾	2½	2½	180	
5	SGT	24½	45⅝	13¾	22½	27½	13¾	15⅝	3⅞	4	4	4	500	

★ NOTE – Bolted enclosure comes equipped with 3 closing plates in the door.

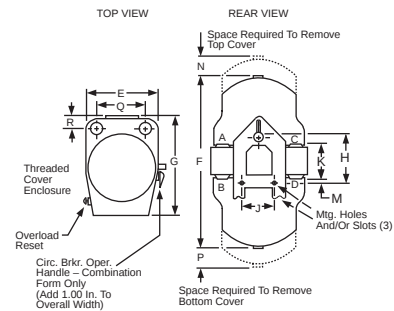
★ NOTE – Bolted enclosure comes equipped with 3 closing plates in the door.

Class 8539 – NEMA Type 7 & 9 SPIN TOP® Enclosure – Figure 2

NEMA Size	Type	Dimensions in Inches														Wt. (Lbs.)
		E	F	G	H	J	K	L	M	N	P	Q	R	S	T	
0-1	SBR SCR	10⅝	26	15¼	8	4¾	5⅝	1½	1⅞	7½	11	7⅝	2⅞	—	—	70
2	SDR	13⅞	30½	19¼	8	4¾	5¼	1½	1⅞	7	18	9⅝	2¾	—	—	115
3-4	SER SFR	13⅞	39½	20¼	8	4¾	7½	2½	—	10½	23	8⅝	3	—	—	140
5	SGR	19	53½	27¾	—	—	11¼	4	⅔	16	20⅝	11⅝	4⅞	12	6½	290



**Figure 3: Class 8539
NEMA Type 7 and 9 Bolted Enclosure**



**Figure 4: Class 8539
NEMA Type 7 and 9 SPIN TOP® Enclosure**

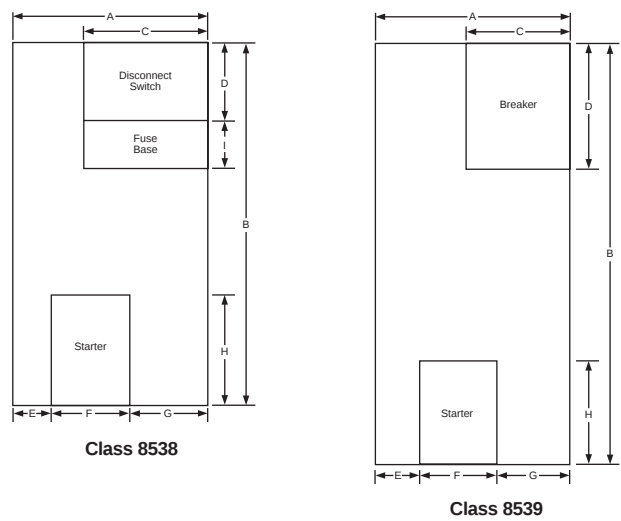
Combination Starters — NEMA Rated
Panel Layout Drawings – Class 8538, 8539

Standard NEMA Type 1, 4 & 4X Stainless, 12

The following table is provided to identify open panel space on standard NEMA Type 1, 4 & 4X stainless steel and 12 combination starters. Space and mounting holes are provided in all combination starters (except NEMA Type 7 & 9 SPIN TOP®) for the field addition of a control transformer – see Page 35 for control transformer selection.

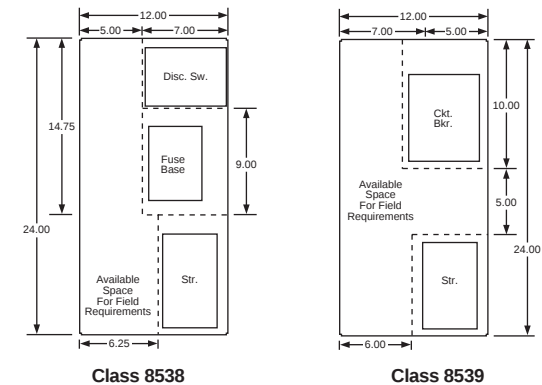
Class	NEMA Size	Dimensions in Inches								
		A	B	C	D	E	F	G	H	I
8538	0, 1	6.9	18.5	6.9	6.5	0	3.5	3.4	6.9	4.0
8539				6.5	7.9					—
8538	2	7.9	22.0	7.5	7.0	3.1	4.8	0	7.7	6.0
8539				6.5	8.4					—
8538	3	12.0	29.5	9.0	7.7	0	5.6	6.4	12.9	5.3
8539				FAL: 6.5 KAL: 6.8	FAL: 8.5 KAL: 10.5					—
8538	4	13.0	39.0	11.0	11.5	0	7.0	6.0	13.0	9.0
8539				6.8	12.5					—
8538	5*	17.3	59.0	13.5	25.0	0	10.8	6.5	20.5	—
8539				KAL: 6.8 LAL: 9.0	KAL: 23.0 LAL: 24.5					—
8538	6	32.0	82.0	32.0	40.0	0	13.0	19.0	35.0	—
8539				LAL: 9.0 MAL: 12.5	LAL: 25.5 MAL: 40.5					—

* Size 5 combination starter does not contain a full size panel. No usable panel space is available.



Oversize Enclosures, NEMA Type 1, 4 & 4X Stainless, 12

Combination starters in oversized enclosures provide additional panel space for field addition of control relays, timing relays, terminal blocks or other auxiliary equipment. Disconnect type devices offer over 130 square inches of available panel space. Circuit breaker type devices offer over 180 square inches of available panel space.



Factory Modifications (Forms) For Full Voltage Contactors and Starters

Factory installed modifications are available for the classes of control equipment listed in the respective tables. Prices shown are **additions** to standard equipment prices and are **not** to be used as separate selling prices. Kits are also available for many field modifications and normal parts replacement on most control items. Refer to Classes 9998 and 9999 for complete listings.

Standard equipment dimensions and enclosure construction may not apply when certain special features are added. Such cases should be referred to the factory with complete description when accurate dimensions are required. **Note:** If UL label is required, consult local Square D Field Sales Office. Some forms are **not** UL Listed.

Full Voltage Starters

	Factory Modifications	Enclosure Type	Form Letters
PILOT DEVICES IN COVER Full Voltage Non-Reversing Controllers Only Classes 8538 8539	Push Buttons ★		
	"Start-Stop"	1 3R, 4, 4X, 12 7 & 9	A A A
	"Start-Stop" (maintained contact)Ⓢ	1, 3R, 4, 4X■, 12	A16
	"Start-Stop" push button and "Hand-Off-Auto" selector switch	1, 3R, 4, 4X■, 12	AC
	"On-Off"	1 3R, 4, 4X■, 12	A3 A3
	Single Oiltight Pushbutton (specify marking)	1, 3R, 4, 4X■, 12	A11
	Selector Switches		
	"Hand-Off-Auto"	1 3R, 4, 4X, 12 7 & 9	C C C
	"On-Off"	1 3R, 4, 4X■, 12 7 & 9	C6 C6 C6
	Key Operated Selector Switch (specify marking and Key withdrawal position/code)	1, 3R, 4, 12	C33
	NON-STANDARD markings for Pilot Devices	1, 3R, 4, 12	G12▼
	Addition of padlock attachment to Class 9001 operators	1, 3R, 4, 12	G122
	Pilot Lights (specify color/type) ▲		
	Without Operating Interlock: Per light Per light Push-to-test (each)	1, 3R, 4, 4X, 12 7 & 9♦ 1, 3R, 4, 4X■, 12	P▲ P▲ P▲
	With Operating Interlock: Add price of each interlock per light	1, 3R, 4, 4X■, 12	X*
PILOT DEVICES IN COVER Full Voltage Reversing and Multi-Speed Controllers Only Classes 8738 8739	Push Buttons ★		
	"Forward-Reverse-Stop"	1, 4, 4X■, 12	A1
	"High-Low-Stop"	1, 4, 12	A2
	"Fast-Off-Slow"	1, 4, 12	A9
	"High-Low" push button and "Hand-Off-Auto" selector	1, 4, 12	A10C
	Single Oiltight Pushbutton (specify marking)	1, 4, 4X■, 12	A11
	Selector Switches		
	"Hand-Off-Auto"	1, 4, 4X■, 12 7 & 9	C C
	"On-Off"	1, 4, 4X■ 7 & 9	C6 C6
	"High-Off-Low"	1, 4, 12	C7
	"Forward-Off-Reverse"	1, 4, 4X■, 7, 9, 12	C14
	"High-Low" and "Hand-Off-Auto"	1, 4, 12	CC17
	"Slow-Fast"	1, 4, 4X■, 12	C19
	"Forward-Reverse"	1, 4, 4X■, 12	C20
	"High-Low-Off-Auto"	1, 4, 12	C25
	NON-STANDARD markings for Pilot Devices	Any	G12▼
	Pilot Lights (specify color/type)▲		
	One Pilot Light: one light with two electrical interlocks. Two Pilot Lights: each light is wired in parallel, no interlocks used		
	Without Operating Interlock: Per light Per light Push-to-test (each)	1, 4, 4X■, 12 7 & 9♦ 1, 4, 4X■, 12	P▲ P▲ P▲
	With Operating Interlock: Add price of each interlock per light	1, 4, 4X■, 12	X*

★ All push buttons are momentary contact unless specified otherwise.

■ This adder, used with a NEMA Type 4X enclosure, applies to Classes 8538, 8539, 8738, 8739.

▲ Indicate pilot light color as Form P1 (red) or Form P2 (green), etc. as shown in the table below. Unless otherwise requested, standard practice is to wire red pilot light to indicate device is energized. No additional auxiliary contact is required. Also, standard practice is to wire green pilot light to indicate device is de-energized. An additional normally-closed auxiliary contact is required. A wiring diagram must be supplied for other pilot light colors and/or arrangements.

♦ Pilot lights available at 120 to 600 volt only.

▼ Specify marking and/or Class 9001 Type KN or Type SKN legend plate required.

† Specify appropriate Class 9001 Type K or SK operator required.

* To determine the maximum number of auxiliary contacts which can be added to each Type S device and for the appropriate "X Form", refer to the tables in the Class 8736 section on Page 12-81 (for reversing or two-speed devices).

Standard Pilot Light Form	Push -to-Test Pilot Light Form	LED Pilot Light	Color
P1	P21	P51	Red
P2	P22	P52	Green
P3	P23	—	Amber
P4	P24	—	Clear
—	P25	P55	Yellow

Factory Modifications (Forms) For Full Voltage Contactors and Starters

Full Voltage Controllers Only

Classes 8538, 8539, 8738 and 8739

Factory Modifications		Enclosure Type	Form Letters
CONTROL CIRCUIT FULL VOLTAGE AND MULTI- SPEED CON- TROLLERS ONLY CLASSES 8538 8539 8738 8739	Separate Control Circuit — (specify voltage and frequency)	Any	S★
	Fused Control Circuit (without control transformer)		
	One fuse	1, 3R, 4, 4X, 12	F
	Two fuses	1, 3R, 4, 4X, 7, 9, 12	F4
	Control Circuit Transformers■		
	Standard capacity (50 or 60 Hz)		
	NOTE: All orders requesting Form FT will be supplied as Form F4T.		
	FUSES		
	Primary		
	2	0	1, 4, 4X, 12
	2	0	7 & 9
	1	1†	1, 4, 4X, 12
	2	1	1, 4, 4X, 12
	2	1	7 & 9
	1	2†	1, 4, 4X, 12
	2	2	1, 4, 4X, 12
	Additional Capacity (50 or 60 Hz)		
	Two fuses in primary		
	100 VA additional capacity	1, 4, 4X, 12	F4T11●
	100 VA additional capacity	7 & 9	F4T11●
	200 VA additional capacity	1, 4, 4X, 12	F4T12●
	Two fuses in primary and one fuse in secondary		
	100 VA additional capacity	1, 4, 4X, 12	FF4T11
	100 VA additional capacity	7 & 9	FF4T11
	200 VA additional capacity	1, 4, 4X, 12	FF4T12
	300 VA additional capacity	1, 4, 4X, 12	FF4T13
	400 VA additional capacity	1, 4, 4X, 12	FF4T14
	500 VA additional capacity	1, 4, 4X, 12	FF4T15
	Substitute non-standard single primary, and/or single secondary voltage rating on control transformer■	Any	T1▼
	Substitute dual-voltage magnet coil.	Any	Y5†

★ All combination style devices such as 8538, 8539, 8738, 8739, that use Form S should also use Form Y74 (auxiliary contact installed on disconnect switch) per NEC Article 430-74.

■ Table at right.

▲ Single primary voltage must be specified.

▼ Must be used with another form of F4T. (Ex. Standard capacity transformer required, 208-24V. Order as Form F4TT1, 208-24V.)

† Not available on Size 2 or Size 3 devices with 4 or 5 poles.

★ Not available on this Size. Select appropriate transformer with secondary fuse protection.

□ Not available with 24V secondary on Size 3. Select appropriate transformer with secondary fuse protection. See Table at right for 24V secondary restrictions.

○ Not available with 24V secondary. Select appropriate transformer with secondary fuse protection. See Table at right for 24V secondary restrictions.

‡ Single phase with one leg grounded or grounded B phase applications ONLY.

■ Selection of Control Circuit Transformers

The standard primary/secondary voltages for control circuit transformers are indicated in the following table.

AC-OPERATED DEVICES With Control Transformers	
Voltage	Code
60Hz (Primary-Secondary)	
120-12▲	V88
120-24▲	V89
208-120	V84
240-24▲	V82
240-120	V80
277-120	V85
480-24▲	V83
480-120	V81
480-240	V87
600-120	V86
Specify	V99
▲ 12V coils are not available on Sizes 3-7. 24V coils are not available on Sizes 4-7.	

To order, select the desired device with the appropriate transformer form designation. Then convert the previously selected voltage code (V_) to reflect the desired primary/secondary voltage for the transformer. The secondary voltage should equal the previously selected coil voltage of the device.

Example:

You have previously selected a Class 8536SDG1V02S. V02S means that you need a coil voltage of 120-60/110-50 wired for separate control. You would like to add form FF4T with the transformer voltages being 48 volt primary, 120 volt secondary with Solid State Overload Relay Protection Class 20 Trip Class (H20).

The new and complete class, type, voltage code and form number will be:

Class	Type	Voltage Code	Form*
8536	SDG1	V81	FF4TH20

* Form numbers should always be shown in alphabetical order.

Marine Control

Class	Factory Modification	Enclosure Type	Form
8538 8539 8738	Modification of standard device for use as marine control per UL508	12/3R 4/4X (S.S. only)	M10
8739	Modification of standard device for use as marine control like Form 10 standards in addition to IEEE45.	12/3R 4/4X (S.S. only)	M11

Factory Modifications (Forms) For Full Voltage Contactors and Starters

Full Voltage Controllers Only

CLASSES 8538, 8539, 8738 and 8739

Factory Modifications		Enclosure Type	Form Letters
OVERLOAD RELAYS	Non-Compensated Bimetallic Overload Relays		
	Single Phase:		
	Types SB–SD (Sizes 0–2)②	Any	B1
	Polyphase:		
	Two Element — For 2 Phase Only		
	Types SB–SD (Sizes 0–2)	Any	B1
	Three Element		
	Types SB–SD (Sizes 0–2)	Any	B2
	Types SE–SF (Sizes 3–4)	Any	B5
	Type SG (Size 5)	Any	B2Y500
	Type SH (Size 6)	Any	B2
	Ambient Compensated Bimetallic Overload Relays		
	Three Element		
	Types SB–SD (Sizes 0–2)	1, 4, 7, 9, 12	2B
	Types SE–SF (Sizes 3 & 4)	Any	Y59
	Type SG (Size 5)	Any	BY500
	Type SH (Size 6)	Any	B
	Overload Relays – General		
	Substitute Class 9065 SRSO100		
	For Standard Overload Protection	Any	B11
	Omit overload protection from combination starters. (Classes 8538, 8539, 8738, 8739 only)		
	Do not use with MAG–GARD® Circuit Breakers.		
	Deduct per starter	Any	Y76
	Modify Size 3 Type SE starters with melting alloy overload relays to accept Type FB quick trip or SB slow trip thermal units and Size 4 Type SF starters to accept Type FB quick trip thermal units. (Rejects Type CC standard trip thermal units.)	Any	Y81
	Substitute 9999 SO4 isolated alarm contact (N.O.) on melting alloy overload relay	Any	Y342
	Substitute 9999 SO5 isolated alarm contact (N.C.) on melting alloy overload relay	Any	Y344

① Size 7 uses a solid state overload relay as standard. See Class 8536 for complete details.

② Single phase bimetallic overload relays for Type S Sizes 0–2 require **two** (2) thermal units per starter.

③ For Classes 8736, 8738 and 8739, Type SG, consult Local Square D Field Office.

Solid State Overload Relay Factory Modifications (Forms)

The solid state overload relay is available on NEMA Size 00-7.

For Class 8536, 8538, 8539, 8736, 8738, 8739 and 8810 devices.

Form Description

Type S Starter with Motor Logic
Solid State Overload Relay

1 - Motor Logic, Base Unit, Trip Class 10
2 - Motor Logic, Base Unit, Trip Class 20
3 - Motor Logic, Feature Base Unit
0 - No additional modifications
1 - N.O. Aux. Contact (Field Convertible to N.C.)

Special Overload/Contactor Size Combinations (Base Unit & Feature Base Units):
(Must Be Specified On Size 00 Starter Orders)

Blank - Overload Matched to Starter Size (i.e. Size 1 contactor & 9-27A overload)
0 - A 6 – 18A overload on a starter size as indicated by the Starter Catalog Number
1 - A 9 – 27A overload on a starter size as indicated by the Starter Catalog Number
2 - A 15 – 45A overload on a starter size as indicated by the Starter Catalog Number
3 - A 30 – 90A overload on a starter size as indicated by the Starter Catalog Number
4 - A 45 – 135A overload on a starter size as indicated by the Starter Catalog Number
8 - A 1.5 – 4.5A overload on a starter size as indicated by the Starter Catalog Number (only offered on Feature Base Units)
9 - A 3 – 9A overload on a starter size as indicated by the Starter Catalog Number

SPECIAL NOTE FOR Class 8810 devices:
You MUST SPECIFY TWO SEPARATE FORM NUMBERS TO GET MOTOR LOGIC OVERLOADS ON TWO SPEED STARTERS. The first form number is for the low speed winding and the second is for the high speed winding.
EXAMPLE: Open Style, Size 4 Two Speed Starter with Motor Logic Overloads Required.
Single Winding, 460V, Constant Horsepower
High Speed FLA = 96A
Low Speed FLA = 27A (use Size 2 Overload)

Catalog Number to Order: 8810 SF01V02 form S H20 H202
Where: Form H20 is a Size 4 Contactor with a 45-135A Motor Logic Overload for the High Speed and form H202 is a 15-45A Motor Logic Overload on the low speed contactor.

Classes 8538, 8539, 8738 and 8739

Factory Modifications		Form
Motor Logic Solid State Overload	Base Unit, Trip Class 10	H10
	Base Unit, Trip Class 20	H20
	Feature Base Unit	H30
Motor Logic Solid State Overload with Auxiliary Contact	Base Unit, Trip Class 10	H11
	Base Unit, Trip Class 20	H21
	Feature Base Unit	H31

Special Starter Combinations with Motor Logic™ Overload Relay Protection

NEMA Contactor Size	Solid State Overload Relay Size							NEMA Contactor Size	Solid State Overload Relay Size						
	00B	00C	0	1	2	3	4		00B	00C	0	1	2	3	4
00	▲	Std.						2	▲	▲	▲	▲	Std.		
0	▲	▲	Std.					3	n/a	n/a	n/a	n/a	n/a	Std.	
1	▲	▲	▲	Std.				4	n/a	n/a	n/a	n/a	n/a	▲	Std.

▲ Possible factory starter combinations available.

Factory Modifications (Forms) For Full Voltage Contactors & Starters

Full Voltage Controllers Only

CLASSES 8538, 8539, 8738, 8739 and 8810			
Factory Modifications		Enclosure Type	Form Letters
POWER POLES	Addition of one NEMA Size 1, 30 Amp single pole N.O. unit	Any	Y428
	Addition of one NEMA Size 1, 30 Amp single pole N.C. unit	Any	Y429
	Addition of one NEMA Size 1, 30 Amp double pole N.O./N.O. unit	Any	Y430
	Addition of one NEMA Size 1, 30 Amp double pole N.C./N.C. unit	Any	Y434
	Addition of one NEMA Size 1, 30 Amp double pole N.O./N.C. unit	Any	Y435
	Addition of one NEMA Size 2 single pole N.O. unit	Any	Y436
	Addition of one NEMA Size 2 single pole N.C. unit	Any	Y437
	Addition of one NEMA Size 2 double pole N.O./N.O. unit	Any	Y438
	Addition of one NEMA Size 2 double pole N.C./N.C. unit	Any	Y439
	Addition of one NEMA Size 2 double pole N.O./N.C. unit	Any	Y440
MISCELLANEOUS	Coil transient suppressor (120 Volt only). Per Coil	Any	Y145
	Addition of terminal blocks (specify wired or unwired).		
	Wired, per terminal. Each	1, 4, 12	G50★
	Unwired, per terminal. Each	1, 4, 12	G50★

★ Addition of terminal block type 9080 CA or 9080 GR6 only. Number of circuits is same as ending of form number. (Ex.: G507 is 7 wire terminal block.)
 ■ When adding a power pole to a Size 2 device, it is necessary to also specify **Form Y118**.

MAG-GARD®

Circuit Breaker	Factory Modifications	Enclosure Type	Form Letters
8539 8739	Substitute FAL for GJL circuit breaker. (Note that the GJL breaker must be used with the SSOLR.)	1 4, 4X 12	Y534

Factory Modifications (Forms) For Full and Reduced Voltage Contactors & Starters

Full Voltage and Reduced Voltage Controllers*

CLASSES 8538, 8539, 8738 and 8739

Factory Modifications		Enclosure Type	Form Letters
Auxiliary Relays	Control relay (1 thru 4 poles) — specify pole arrangement, voltage and type required♦	1, 12 4, 4X*, 9	R17# R17#
	Pneumatic Timing Relay — specify Class 9050 Type A or B, “On” or “Off” delay and wiring instructions.		
	0.2 Sec. to 1.0 Min.	1, 12 4, 4X*, 7, 9	K K
	1.0 Min. to 3.0 Min.	1, 12 4, 4X*, 7, 9	K16 K16
	Solid State Timing Relay (specify timing range) and timer (120V control req'd.)	1, 4, 4X, 7, 9, 12	K1
	Pneumatic Timing Attachment — 0.2 sec. to 1.0 min.		
	Addition of Class 9999 Type SK3 (off delay) attachment	1, 4, 4X*, 12	K36
	Addition of Class 9999 Type SK4 (on delay) attachment.	1, 4, 4X*, 12	K35
	Motor driven timing relay♦▼	1, 4, 12	K5
	Phase Failure and Reverse Phase Relay▼	1, 4, 12	Y444
	Undervoltage Relay▼	1, 4, 12	Y447
	Overvoltage Relay▼	1, 4, 12	Y448
Meters And Metering■	Under and Overvoltage Relay▲	1, 4, 12	Y449
	Ammeter in cover (includes current transformer if req'd.)	1, 12	G91
	Ammeter and switch with two current transformers	1, 12	G92
	Ammeter and switch with three current transformers	1, 12	G93
	Voltmeter mounted	1, 12	G94
	Voltmeter and switch mounted	1, 12	G95
	Elapsed time meter	1, 12	G97
	Operation counter	1, 12	G99
Auxiliary Contacts	Wattmeter	1, 12	G911
	Varmeter	1, 12	G913
	Power factor meter	1, 12	G914
	Additional starter (contactor) auxiliary contacts (Specify number of additional normally open or closed contacts required per contactor.) Each	Any	X†
Enclosures	Auxiliary contacts installed on disconnect switch or circuit breaker operating mechanism. SPDT	1, 4, 4X, 12	Y74
	DPDT	1, 4, 4X, 12	Y75
	(Note: Above contacts do not switch with automatic tripping of circuit breaker. If such operation is required, consult your local Square D field office.)		
	Space heater with N.C. auxiliary contact	1, 4, 4X, 12	G51
	Function identification plate, with marking as specified	Any	G11
	Convenience receptacle (2-wire) mounted in side of enclosure	1, 12	Y31
	Drain and breather installed	7 & 9	Y41
	Cover gaskets added to NEMA Type 1 enclosures:		
	For Classes 8538 and 8539	1	Y47
	For Classes 8738 and 8739	1	Y47
	For other full voltage controllers	1	Y47
	For reduced voltage controllers	1	Y47

♦ If controller has a control transformer, price that transformer with additional capacity for the relay provided.

* This adder, used with a NEMA Type 4X enclosure, applies only to Classes 8538, 8539, 8738, 8739 and 8810 non-reversing.

▼ Specify control and line voltage.

■ Motor HP and voltage required when placing order. Meters will be panel mounted in NEMA Type 12 enclosures.

† To determine the maximum number of auxiliary contacts which can be added to each Type S device and for the appropriate “X Form”, refer to the tables in the Class 8536 section on Page 12-29 (for non-reversing single-speed devices) or the Class 8736 section on Page 12-81 (for reversing or two-speed devices). For Class 8600 Reduced Voltage controllers, consult local Square D Field Office.

* Addition of control relay one (1) thru eight (8) poles. Number of poles is same as ending of form number. (Ex: R174 = 4 pole relay).

▲ NEMA Type 7 & 9 enclosures not available with Class 8600 devices.

▲ For single phase applications only.

Selection of Control Circuit Transformers

The standard primary/secondary voltages for control circuit transformers are indicated in the following table.

Voltage	Code
60 Hz (Primary-Secondary)	
120-12	V88
120-24	V89
208-120	V84
240-24	V82
240-120	V80
277-120	V85
480-24	V83
480-120	V81
480-240	V87
600-120	V86
Specify	V99

To order, select the desired device with the appropriate transformer form designation. Then convert the previously selected voltage code (V__) to reflect the desired primary/secondary voltage for the transformer. The secondary voltage should equal the previously selected coil voltage of the device. (24Vac coils for NEMA Sizes 4-7 are not available).

Example:

You have previously selected a Class 8606SDG1V02S. V02S means that you need a coil voltage of 120-60/110-50 wired for separate control. You would like to add **Form FF4T** with the transformer voltages being 480 volt primary, 120 volt secondary.

The new and complete class, type, voltage code and form number will be:

Class	Type	Voltage Code	Form*
8606	SDG1	V81	FF4T

* Form numbers should always be shown in alphabetical order.

Combination Starters – NEMA Rated Class 8538, 8539, 8738 and 8739 – Accessories



An electrical interlock may also be factory installed in either a disconnect switch or circuit breaker combination starter. Specify **Form Y74** for single pole, or **Form Y75** for two pole interlocks. For pricing see factory modifications (FORMs).

INTERLOCKS AND CONTROL TRANSFORMERS

A one or two pole electrical interlock can be added to the disconnect switch or circuit breaker. Thus if a separate control circuit is used, the magnetic starter can be de-energized when the disconnect is switched to the OFF position. See Table 1 for proper interlock selection. For electrical ratings of disconnect and circuit breaker interlocks, see Table 2 below.

Table 1: Disconnect Switch and Breaker Interlocks

Class	Type	Class 9999	
		SPDT Type	DPDT Type
8538 & 8738	SB†, SC†, SD† (Series B)	R6	R7
	SD (Series C)	R43	R44
	SB, SC (Series C)	R45	R46
	SE, SF (Series A)	R8	R9
	SE (Series B & C)	R41	R42
8539, 8739	SF (Series B & C)	R39	R40
	SG	R35	R36
	SB, SC, SD, SE, SF, SG▲	R26	R27
	SBA, SCA, SBG, SCG (Series D)	TC11	TC21
	SBAS8, SCAS8, SBGS8, SCGS8 (Series D)	TC10	TC20
8738	SBAS8, SCAS8, SBGS8, SCGS8 (Series E)	TC10	TC20
	SBA, SCA, SBG, SCG (Series E)	TC11	TC21
	SDA, SDA†, SDG, SDG† (Series D)	TC10	TC20
	SDA, SDG (Series E)	TC10	TC20
	SEA, SEG (Series D)	TC10	TC20

▲ No interlocks available for the GJL circuit breaker.

† Class 8538 type numbers ending in suffix "S8".

Table 2: Disconnect Switch and Breaker Interlock Electrical Ratings

Class 9999 Type R6, 8, 26, 35, 39, 41, 43, 45, TC10, & TC11 AC – 50 or 60 Hz				Class 9999 Type R7, 9, 27, 36, 40, 42, 44, 46 & TC 20, 21 AC – 50 or 60 Hz					
Volts	Maximum Current			Volts	Maximum Current				
	Make	Break	Continuous Carrying Current Amps		Make		Break		Continuous Carrying Current Amps
	Amps	Amps			Amps	VA	Amps	VA	
120	40	15	15	120	30	3450	3	345	10
240	20	10	15	240	15	3450	1.5	345	10
480	10	8	15	480	7.5	3450	.75	345	10
600	8	6	15	600	6	3450	.6	345	10

Table 3: Control Transformer Selection (8538 and 8539 only)

NEMA Size	Starter Type	Standard Capacity (Form F4T)	50 VA Additional Capacity (Form F4T10)	100 VA Additional Capacity (Form F4T11)	200 VA Additional Capacity (Form F4T12)
0 & 1	SB & SC	Class 9070 Type T50	Class 9070 Type T100	Class 9070 Type T150	Class 9070 Type T300♦
2	SD	T100	T150	T300●	T300●
3	SE	T150	T150	T300	T500
4	SF	T300	T300	T500	T500
5	SG	T50 and 8501XO20	T100 and 8501XO20	T150 and 8501XO20	T300 and 8501XO20
6	SH	EO3S2 is standard	EO3S2 and T50	EO3S2 and T100	EO3S2 and T200
7	SJ	EO19S2 is standard	EO19S2 and T50	EO19S2 and T100	EO3S2 and T200

♦ Requires oversized enclosure. (Size 2 reversing enclosure.)

● Available in standard enclosure with MAG-GARD® circuit breaker and non-fusible disconnect switch. Requires oversized enclosure with thermal-magnetic circuit breakers and fusible disconnect switches. (Size 2 reversing enclosure.)

Transformer



File E61239
CCN XPTQ
Above 250 VA also
XPTQ7



File LR37055
Class 5411 06

Internal Auxiliary Switch – Circuit breakers can be supplied with a factory installed auxiliary switch for remote indication of an open and/or tripped or a closed breaker. One (specify **Form Y741**) or two (specify **Form Y751**) auxiliary switches can be supplied. The switches are supplied with normally open and normally closed circuits with a common connection. Contacts must be used on the same polarity and are rated 15 Amps at 240 volts AC. The auxiliary switches are located internally and are furnished with 19-20 inch long leads.

Alarm Switch – The alarm switch only operates when the breaker is tripped. It is used to actuate bell alarms and warning lights. The alarm switch is factory installed only (specify **Form Y742**) and consists of a single pole single throw switch which is normally open except when the breaker is tripped. The contacts are rated 4 Amps at 240 volts AC. This switch is located in the breaker and is supplied with 19-20 inch long leads.

Transformer Selection – Space and drilling are provided in all disconnect switch and circuit breaker combination starters in NEMA Type 1, 4 & 4X stainless and polyester, 12 and 7 & 9 bolted enclosures for the field addition (or factory installation) of a Class 9070 control circuit transformer and Class 9999 Type SFR4 fuse holder. This kit can be either panel mounted or side mounted on the Type S starter. For standard control transformer selection in combination starters, see Table 3. Consult field office for transformer additions to NEMA Type 7 & 9 SPIN-TOP® enclosures.

Fuse Block Mounting Brackets – The standard capacity transformer, Class 9070 Type T50, for the Size 0 and 1 starters mounts to the right of the magnetic starter.

Standards – Most combination starters and forms are UL Listed in file E152395, Category NKJH. Many combination starters have or are pending CSA Approval for File CR 584.

PANELBOARDS

THIS SECTION CONTAINS DETAILED DRAWINGS ON THE FOLLOWING PANELS:

DESIGNATION	TYPE	VOLTAGE	AIC	MOUNTING	PBA	NOTES AND REMARKS
1GH1	I-LINE	480Y/277V 3Ph 4W 60Hz	22kA	Bottom Trim: Surface with Door	418	Ship Together, Copper Solid Neutral, Seismic Qualification - IBC/ASCE7, Copper Ground Bar, Standard Mains and Feeders Mechanically Restrained Branch User Placement Standard Nameplate: Engraved as Follows Line 1: 1GH1 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
1LL1	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Top Trim: Surface with Door	701A	Ship Together, Blank Endwalls, Copper Solid Neutral, Seismic Qualification - IBC/ASCE7, SPD Model BIA, Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 1LL1 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
1LL2	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Bottom Trim: Flush with Door	707A	Ship Together, Blank Endwalls, Copper Solid Neutral, Seismic Qualification - IBC/ASCE7, SPD Model BIA, Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 1LL2 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
1NH1	NF	480Y/277V 3Ph 4W 60Hz	22kA	Bottom Trim: Surface with Door	553	Ship Together, Blank Endwalls, Copper Solid Neutral, Seismic Qualification - IBC/ASCE7, Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 1NH1 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
1NH2	NF	480Y/277V 3Ph 4W 60Hz	22kA	Top Trim: Surface with Door	550	Ship Together, Blank Endwalls, Copper Solid Neutral, Seismic Qualification - IBC/ASCE7, Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 1NH2 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
1NL1	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Bottom Trim: Surface with Door	707A	Ship Together, Blank Endwalls, Copper Solid Neutral, Seismic Qualification - IBC/ASCE7, Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 1NL1 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
1NL2	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Top Trim: Surface with Door	701A	Ship Together, Blank Endwalls, Copper Solid Neutral, Seismic Qualification - IBC/ASCE7, Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 1NL2 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
1NL3	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Bottom Trim: Surface with Door	707A	Ship Together, Blank Endwalls, Copper Solid Neutral, Seismic Qualification - IBC/ASCE7, Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 1NL3 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on

PANELBOARDS

THIS SECTION CONTAINS DETAILED DRAWINGS ON THE FOLLOWING PANELS:

DESIGNATION	TYPE	VOLTAGE	AIC	MOUNTING	PBA	NOTES AND REMARKS
1SL2	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Top Trim: Surface with Door	707A	Ship Together, Blank Endwalls, Copper Solid Neutral, Seismic Qualification - IBC/ASCE7, Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 1SL2 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
2LL1	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Bottom Trim: Flush with Door	707A	Ship Together, Blank Endwalls, Copper Solid Neutral, Seismic Qualification - IBC/ASCE7, SPD Model BIA, Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 2LL1 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
2LL2	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Top Trim: Flush with Door	707A	Ship Together, Blank Endwalls, Copper Solid Neutral, Seismic Qualification - IBC/ASCE7, SPD Model BIA, Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 2LL2 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
2LL3	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Bottom Trim: Flush with Door	707A	Ship Together, Copper Solid Neutral, Seismic Qualification - IBC/ASCE7, SPD Model BIA, Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 2LL3 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
2LL4	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Top Trim: Flush with Door	707A	Ship Together, Blank Endwalls, Copper Solid Neutral, Seismic Qualification - IBC/ASCE7, SPD Model BIA, Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 2LL4 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
2LL5	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Bottom Trim: Surface with Door	707A	Ship Together, Blank Endwalls, Copper Solid Neutral, Seismic Qualification - IBC/ASCE7, SPD Model BIA, Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 2LL5 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
2NH1	NF	480Y/277V 3Ph 4W 60Hz	22kA	Bottom Trim: Surface with Door	553	Ship Together, Blank Endwalls, Copper Solid Neutral, Seismic Qualification - IBC/ASCE7, Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 2NH1 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
2NL1	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Bottom Trim: Surface with Door	707A	Ship Together, Blank Endwalls, Copper Solid Neutral, Seismic Qualification - IBC/ASCE7, Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 2NL1 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on

PANELBOARDS

THIS SECTION CONTAINS DETAILED DRAWINGS ON THE FOLLOWING PANELS:

DESIGNATION	TYPE	VOLTAGE	AIC	MOUNTING	PBA	NOTES AND REMARKS
3LL1	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Bottom Trim: Flush with Door	707A	Ship Together,Blank Endwalls,Copper Solid Neutral,Seismic Qualification - IBC/ASCE7,SPD Model BIA,Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 3LL1 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
3LL2	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Top Trim: Flush with Door	707A	Ship Together,Blank Endwalls,Copper Solid Neutral,Seismic Qualification - IBC/ASCE7,SPD Model BIA,Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 3LL2 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
3LL3	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Bottom Trim: Flush with Door	707A	Ship Together,Blank Endwalls,Copper Solid Neutral,Seismic Qualification - IBC/ASCE7,SPD Model BIA,Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 3LL3 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
3LL4	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Top Trim: Flush with Door	707A	Ship Together,Blank Endwalls,Copper Solid Neutral,Seismic Qualification - IBC/ASCE7,SPD Model BIA,Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 3LL4 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
3LL5	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Bottom Trim: Flush with Door	707A	Ship Together,Blank Endwalls,Copper Solid Neutral,Seismic Qualification - IBC/ASCE7,SPD Model BIA,Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 3LL5 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
3NH1	NF	480Y/277V 3Ph 4W 60Hz	22kA	Bottom Trim: Surface with Door	553	Ship Together,Blank Endwalls,Copper Solid Neutral,Seismic Qualification - IBC/ASCE7,Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 3NH1 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
3NL1	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Bottom Trim: Surface with Door	707A	Ship Together,Blank Endwalls,Copper Solid Neutral,Seismic Qualification - IBC/ASCE7,Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 3NL1 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
4LL1	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Bottom Trim: Flush with Door	707A	Ship Together,Blank Endwalls,Copper Solid Neutral,Seismic Qualification - IBC/ASCE7,SPD Model BIA,Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 4LL1 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on

PANELBOARDS

THIS SECTION CONTAINS DETAILED DRAWINGS ON THE FOLLOWING PANELS:

DESIGNATION	TYPE	VOLTAGE	AIC	MOUNTING	PBA	NOTES AND REMARKS
4LL2	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Top Trim: Flush with Door	707A	Ship Together,Blank Endwalls,Copper Solid Neutral,Seismic Qualification - IBC/ASCE7,SPD Model BIA,Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 4LL2 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
4LL3	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Bottom Trim: Flush with Door	707A	Ship Together,Blank Endwalls,Copper Solid Neutral,Seismic Qualification - IBC/ASCE7,SPD Model BIA,Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 4LL3 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
4LL4	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Top Trim: Flush with Door	707A	Ship Together,Blank Endwalls,Copper Solid Neutral,Seismic Qualification - IBC/ASCE7,SPD Model BIA,Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 4LL4 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
4LL5	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Bottom Trim: Flush with Door	707A	Ship Together,Blank Endwalls,Copper Solid Neutral,Seismic Qualification - IBC/ASCE7,SPD Model BIA,Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 4LL5 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
4NH1	NF	480Y/277V 3Ph 4W 60Hz	22kA	Bottom Trim: Surface with Door	553T	Ship Together,Blank Endwalls,Copper Solid Neutral,Seismic Qualification - IBC/ASCE7,Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 4NH1 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
4NL1	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Bottom Trim: Surface with Door	707A	Ship Together,Blank Endwalls,Copper Solid Neutral,Seismic Qualification - IBC/ASCE7,SPD Model BIA,Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 4NL1 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
4SH1	NF	480Y/277V 3Ph 4W 60Hz	22kA	Bottom Trim: Surface with Door	553T	Ship Together,Blank Endwalls,Copper Solid Neutral,Seismic Qualification - IBC/ASCE7,Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: 4SH1 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on
BNH1	NF	480Y/277V 3Ph 4W 60Hz	22kA	Bottom Trim: Surface with Door	554	Ship Together,Blank Endwalls,Copper Solid Neutral,Seismic Qualification - IBC/ASCE7,Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: BNH1 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on

PANELBOARDS

THIS SECTION CONTAINS DETAILED DRAWINGS ON THE FOLLOWING PANELS:

DESIGNATION	TYPE	VOLTAGE	AIC	MOUNTING	PBA	NOTES AND REMARKS
BNL1	NQ	208Y/120V 3Ph 4W 60Hz	10kA	Bottom Trim: Surface with Door	707A	Ship Together, Blank Endwalls, Copper Solid Neutral, Seismic Qualification - IBC/ASCE7, Copper Ground Bar Standard Nameplate: Engraved as Follows Line 1: BNL1 Size: 3.50" Wide x 1.00" High (Std) Color: White Surface / Black Letters Plastic/Adhesive - Screw-on

PLEASE CONFIRM THAT THE PANEL DETAILS MATCHES THE PLANS AND SPECIFICATIONS.

ALL LUGS ON PANELBOARDS AND CIRCUIT BREAKERS ARE RATED AT 75 DEGR C.

ALL LUGS ARE SIZED PER UL STANDARDS. PLEASE CONFIRM THAT THEY ARE APPROPRIATE FOR THE QUANTITY AND SIZE OF THE CABLE BEING CONNECTED.

PLEASE CONFIRM TOP OR BOTTOM FEED, AND SURFACE OR FLUSH COVERS.

PANEL INFORMATION IS FOR ENGINEERING APPROVAL ONLY.
DO NOT USE FOR CONSTRUCTION PURPOSES.

DIMENSIONS ARE SUBJECT TO CHANGE PRIOR TO FINAL ENGINEERING FOR PRODUCTION

Shop Drawing Submittal Review

Transmitted To: Cannon Design

Date: July 19, 2016

Attention: stl-cac@cannondesign.com

Contact Person / WTA Field Inspector:
Patrick Garner

Project Name: Webster University-**ISB**

Reviewed by: Bill Shaw

Project No. WT 14127.01

☐

UPS

☐

Courier

☒

Email

Copies	No.	Description
1 PDF	264000E01	(Submittal No. 264000-001) Electrical Distribution

Submittal Review Comments

Circuit breaker size and position shall match panel schedules on sheets E0503, 504, 505, & 506.

c: Kelvin Patel
Kpatel@cannondesign.com

☐ Furnish as Submitted

☐ Furnish as Noted

☐ Rejected

☒ ***Revise & Resubmit**

☐ Reviewed

☐

Corrections or comments made on shop drawings during this review do not relieve contractor from compliance with requirements of drawings and specifications. This check is only for review of general conformance with the design concept of project and general compliance with information given in contract documents. Contractor is responsible for: confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades; and performing his work in a safe and satisfactory manner.

WTASHOP - Webster ISB - 26 4000-001

From: STL-CAC <STL-CAC@CANNONDESIGN.COM>
To: 'Patrick Garner' <pgarner@wmtao.com>, WTASHOP <wtashop@wmtao.com>
Date: 7/5/2016 11:40 AM
Subject: Webster ISB - 26 4000-001
Cc: "Patel, Kelvin" <kpatel@CANNONDESIGN.COM>, "Grossman, Lynn" <lgrossman@C...>
Attachments: 264000-001 Electrical Distribution.pdf

Attached for review.

Melissa Pirtle

Construction Admin

CANNONDESIGN

1100 Clark Ave
St. Louis, Missouri 63102
T [314.425.8797](tel:314.425.8797) • M
cannondesign.com

SUBMITTAL IDENTIFICATION SHEET

To be completed by Contractor/CM

PROJECT NAME	
ADDRESS	
NUMBER	
OWNER	
ARCHITECT / ENGINEER	
SUBMITTED BY	
CONTRACTOR / CM SUBMITTAL NO.	CANNON DESIGN SUBMITTAL NO.
DRAWING / DETAIL REFERENCE	SPECIFICATION SECTION / PARAGRAPH
MANUFACTURER / SUPPLIER	ITEM / PRODUCT ID
REQUIRED DATE	PRIORITY
☐ CRITICAL	

To be completed by Reviewer

CANNON DESIGN SUBMITTAL NUMBER
RECEIVED DATE

- ☐ **A. No Exceptions Taken**
No further review of submittal is required.
- ☐ **B. Make Corrections Noted**
Incorporate corrections in work;
resubmission is not required.
- ☐ **C. Revise and Resubmit**
Revise as noted, and resubmit for review.
- ☐ **D. Rejected**
Submittal is not in compliance with Contract Documents;
provide new submittal.
- ☐ **E. For Record / Information Only**
Submittal was reviewed for Record / Information
purposes only.
- ☐ **F. Not Required for Review**
Submittal is not required by Contract Documents
and has not been reviewed.

Review is for conformance with the design concept of this project and for general compliance with contract documents. Contractor is responsible for quantities, dimensions and compliance with contract documents and for information that pertains to fabrication processes, construction techniques and coordination of this work with all trades which will be affected thereby. This review is null and void if submittal deviates from contract documents and does not indicate or note deviations.

ITEM BEING SUBMITTED (check only one)

- ☐ Shop Drawings
☐ Samples
 (_____ copies)
☐ LEED Submittal
☐ Other
- ☐ Certification /
 Qualifications
☐ Record Documents
☐ Product Data
- ☐ Coordination Drawing
☐ Calculations
☐ Schedules
☐ O&M Manuals

ITEM BEING SUBMITTED FOR (check only one)

- ☐ Action ☐ Information Only ☐ Record

REMARKS OR DEVIATIONS

CONTRACTOR / CM CERTIFICATION
(SUBMITTALS NOT CERTIFIED WILL BE RETURNED WITHOUT REVIEW)



PARIC CORPORATION
SUBMITTAL STAMP

THIS SHOP DRAWING HAS BEEN REVIEWED BY PARIC CORPORATION

Subcontractor remains responsible for dimensions, quantities, coordination with other trades and compliance with contract documents.

Ry:

By:
Devin D. Gates

REVIEWED BY	DATE

A/E COMMENTS

- ☐
- See attached sheet(s) for additional comments

REVIEWED BY	DATE



77 Westport Plaza
Suite 250
St. Louis, MO 63146

TRANSMITTAL

No. 15051-0114

Paric Corporation

PROJECT: 15051-Webster University Interdisciplinary Science Building

DATE: 07/05/2016

TO: Cannon Design
1100 Clark Ave
St Louis MO 63102

RE: Electrical Distribution

ATTN: Kelvin Patel

JOB: 15051

WE ARE SENDING:	SUBMITTED FOR:	ACTION TAKEN:
☐ Shop Drawings	☒ Approval	☐ Approved as Submitted
☐ Letter	☐ Your Use	☐ Approved as Noted
☐ Prints	☐ As Requested	☐ Returned After Loan
☐ Change Order	☐ Review and Comment	☐ Resubmit
☐ Plans		☐ Submit
☐ Samples	SENT VIA:	☐ Returned
☐ Specifications	☐ Attached	☐ Returned for Corrections
☒ Other: Product Data	☐ Separate Cover Via:	☐ Due Date:

Item	Package	Code	Rev.	Copies	Date	Description	Status
Submittal		264000-001	1		07/05/2016	Electrical Distribution	Submitted

NOTES:

CC: Paric Corporation, Kathy Bathe

Project Coordinator: Paric Corporation, Kathy Bathe

Signed: _____
Devin Gates

Transmittal

To Paric Corporation

Date 7/1/16

Job Number 11317

Job Name Webster Univ. ISB Building

Attention Devin Gates

Transmittal Number 11317-005

We are sending you:

☒ Attached

☐ Under separate cover, the following:

☐ Preliminary Drawings

☐ Samples

☐ Construction Drawings

☐ Copy of Letter

☐ Specifications

☐ Other _____

Quantity	Drawing #	Date/Revision	Description
1			Submittal for Distribution - Spec Section
			26 40 00

These are transmitted as checked:

☒ For Your Review & Comment

☐ Approved As Noted

☒ For Approval

☐ Returned For Corrections

☐ For Your File

☐ Approved As Submitted

☐ As Requested

Copy:

Transmittal

Enclosure

Rick Branstetter

Signed: Rick Branstetter, Project Manager

Webster University ISB

Approval Drawing Package

Factory Order #: 37999262

06/13/2016

Distributor:
Graybar

Contractor/Installer:
Guarantee Electric / TD4

Consulting Engineer:
Wm Tao & Associates

Lou Feldhaus
Sales Representative

Jake Kaufman
Project Manager
North American Operating Division
(636) 329-2265
jacob.kaufman@schneider-electric.com

Life Is On

Schneider
Electric

TABLE OF CONTENTS

UNIT SUBSTATIONS

BILL OF MATERIALS AND DRAWINGS

UNIT SUBSTATION 1: US-1

METAL-ENCLOSED SWITCHGEAR: US-1

POWER-DRY II TRANSFORMER: US-1

SWITCHBOARD: US-1

UNIT SUBSTATION LITERATURE

Unit Substation Brochure

HVL 5...38 kV Load Interrupter Switchgear - Brochure

Power Dry II- Dry-Type, Small Power Transformer Brochure

Model 98A Digital Temperature Controller For Medium Voltage Transformers

Power-Style QED-2 Switchboard Brochure

Internal Modular SPD Brochure

PowerLogic PM8000 Series Intermediate Metering Technical Data Sheet

NW Breaker Brochure

Micrologic Trip Units for Masterpact Circuit Breakers Brochure

INTEGRATED POWER CENTERS

BILL OF MATERIALS AND DRAWINGS

SB1

SB2

1EH1 - 1EL1

1EL1

1SH1 - 1SL1

LITERATURE

Integrated Power Center 2 (IPC2)

PANELBOARDS

PANELBOARD SCHEDULE AND DRAWINGS

LITERATURE

I-Line Panelboard Handout

NF Panelboard Handout

NQ Panelboard Handout

I-Line SPD

Internal Modular SPD Brochure

SurgeLoc SPD for NQ Panelboards

CONTACTORS AND STARTERS

BILL OF MATERIALS AND DRAWINGS

8538SCG

8538SCA - EF-1

8538SCA - KEF-1

2510FG

LITERATURE

Manual Starters - Type F

Manual Starters - Type M and T

8538 Combination Starter Catalog

SAFETY SWITCHES

BILL OF MATERIALS AND DRAWINGS

D211N

H365

HU361

H361

HU362

POWER MONITORING AND CONTROL

BILL OF MATERIALS

LITERATURE

MCTAS-485 Terminator

FUSE

BILL OF MATERIALS

LITERATURE

LPJ Fuses 1 - 60 Amps

LPJ Fuses 70 - 600 Amps