



OPERATION AND  
MAINTENANCE MANUAL

## FUSIBLE SHUNT TRIP SWITCH



Fusible Shunt Trip Switch

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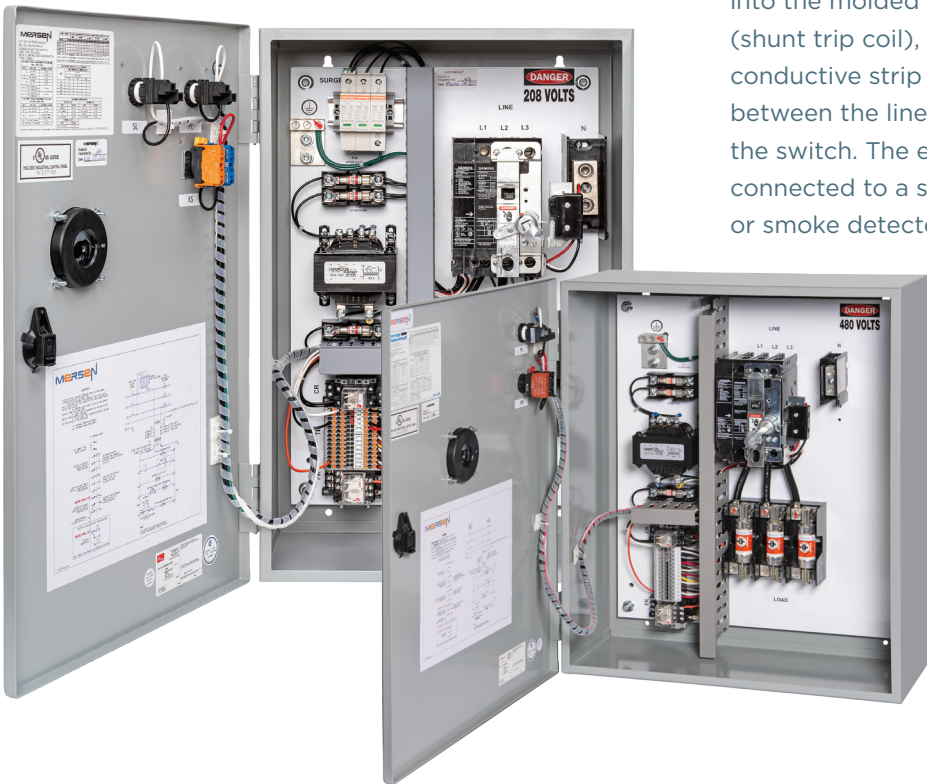
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DEVICE OVERVIEW

Fusible shunt trip disconnect switches are a required safety feature in many industrial and commercial applications. Main branch-circuit fuses provide overcurrent protection in the event of short-circuits, power surges, damage to electrical

wiring, etc...by interrupting faulty circuitry and removing it from the electrical system. In addition, the molded case switch can disconnect power from the source prior to known electrical disturbances, before the fuse is required to operate. Integrated into the molded case switch is an electromagnet (shunt trip coil), controlling a spring-loaded conductive strip which maintains continuity between the line side and load side terminals of the switch. The electromagnetic coil is normally connected to a safety system, such as a fire alarm or smoke detector housed in the surrounding

building. Should there be an electrical emergency, a signal is sent to the coil (via the safety system, alarm, sprinkler, etc.) and the electromagnet would be engaged, throwing the switch and disconnecting power. Power can only then be reenergized by manually operating the molded case switch. SPD is also offered as a standard option to protect sensitive elevator circuits and meet requirements for NEC 620.51(E).





## INSTALLATION INSTRUCTIONS

Step 1: Disconnect power from the circuit where the fusible shunt trip switch will be installed. Mount the panel. Wire up the line side three phase conductors into the three line side terminals of the molded case switch (L1, L2 and L3). Wire the load side to the three load side terminals of the class J fuseholder (T1, T2 and T3).

Step 2: Wire the remote control elements to the specified terminal blocks shown in the wiring diagrams on page 6 and 7 (120VAC and 24VAC/DC respectively) of this manual. For 120VAC, safety system controls must supply a set of dry (no voltage) contacts. For 24VAC/DC, safety system controls must provide the voltage source.

Step 3: Connect power to the circuit on which the fusible shunt trip disconnect switch is installed. Test the shunt trip operation. Close the molded case switch manually; the pilot light (if installed) indicating that the switch is closed will indicate. Engage the key switch (if installed) to activate the shunt trip and trip the molded case switch. The switch will trip and the pilot light will turn off.

## DANGER AND WARNING LABELS



## UL LISTING INFORMATION



# CATALOG NUMBER SELECTION TABLE

## ES SERIES - FUSIBLE SHUNT TRIP DISCONNECT SWITCH

ES	2	T48	R1	K	R	N2	B	2	S
[Required]	[Required]	[Required]	[Required]	[Optional]	[Optional]	[Optional]	[Required]	[Optional]	[Optional]

<b>ES Series</b>	
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<b>Ampere Rating</b>	
Code	Rating
3	30A
6	60A
1	100A
2	200A
4	400A

<b>Control XFMR</b>	
Code	Voltage Rating
T20	208VAC to 120VAC
T24	240VAC to 120VAC
T48	480VAC to 120VAC
T60	600VAC to 120VAC

<b>Fire Safety Interface Relay (3PDT, 10A, 12V)</b>	
Code	Relay Coil Voltage
R1	120VAC
R2	24VDC
R3	24VAC

<b>Key to Test Switch</b>	
Code	Options
BLANK	None
K	120V Key

<b>Pilot Light "ON"</b>	
Code	Options
BLANK	None
R	Red
G	Green

<b>Isolated Neutral Lug<sup>2</sup></b>	
Code	Ampere Rating
BLANK	None
N1	30-60A
N1	100A
N2	200A
N4	400A

<b>Surge Protection</b>	
Code	Option
BLANK	None
S	Surge Protection with external LED indication

<b>Enclosure Type</b>	
Code	Rating
BLANK	NEMA 1
2	NEMA 12
3	NEMA 3R
4	NEMA 4
X	NEMA 4X

<b>Mechanical Interlock Auxiliary Contact</b>	
Code	Options
A	1 NO/NC (Form C)
B	2 NO/NC (Form C)
C	1 NO/NC (Form C) and 1 NO/NC Alarm Contact
D	Option C plus Handle-Activated Microswitch

## PART SELECTION AND ORDERING NOTES

- The ampere rating determines the fuse holder size and range of fuse sizes that may be installed. AJT fuses are sold separately, as they are to be sized to the elevator's motor rating
- Fire Alarm Voltage Monitoring Relay included in all Mersen offerings. No additional part suffixes required. (Competitor Options F1 and F3)
- Neutral lug rating should be greater than or equal to the switch ampere rating. For 200% lug over sizing, select next higher rating. N4 is suitable for 200% over sizing at 400A.
- When "-S" option is selected, Mersen "Surge-Trap® Pluggable" TPMOV® with microswitch and front panel LED indication is installed. Voltage selection determines nominal voltage rating of TPMOV; with 75kA surge capacity.

# MAIN POWER FUSE (MOTOR FUSE) SELECTION TABLE

Motor HP	Recommended Class J (AJT series) Fuse Ampere Rating based on Motor Acceleration Characteristics											
	208V			240V			480V			600V		
	Min.	Typical	Heavy	Min.	Typical	Heavy	Min.	Typical	Heavy	Min.	Typical	Heavy
1/2	3	3-1/2	4-1/2	3	3-1/2	4	1-1/2	1-6/10	2	1-1/4	1-1/2	1-6/10
3/4	4-1/2	5	6-1/4	4	5	6	2	2-1/4	2-8/10	1-6/10	2	2-8/10
1	6	7	9	5	6-1/4	8	2-1/2	3-2/10	4	2-1/4	2-8/10	3-1/2
1-1/2	8	10	12	8	9	12	3-1/2	4-1/2	5-6/10	3	3-1/2	4-1/2
2	9	12	15	8	10	12	4	5	6	3-2/10	4	5
3	15	15	20	12	15	17-1/2	6	7	9	5	6	7
5	20	25	30	20	25	30	10	12	15	8	10	12
7-1/2	30	35	45	30	35	40	15	17-1/2	20	12	15	17-1/2
10	40	50	60	35	40	50	17-1/2	20	25	15	17-1/2	20
15	60	70	90	50	60	80	25	30	40	20	25	30
20	80	90	110	70	80	100	35	40	50	30	35	40
25	90	110	150	80	100	125	40	50	60	35	40	50
30	110	150	175	100	125	150	50	60	70	40	50	60
40	150	175	200	125	150	200	70	80	100	50	60	80
50	175	225	300	175	200	250	80	100	125	70	80	100
60	200	250	300	200	225	300	100	125	150	80	90	110
75	250	350	400	250	300	350	125	150	175	100	125	150
100	350	400	-	300	350	-	175	200	225	125	150	175
125	-	-	-	400	-	-	200	225	300	175	200	225
150	-	-	-	-	-	-	225	250	350	175	225	300
200	-	-	-	-	-	-	300	350	-	250	300	350
250	-	-	-	-	-	-	400	-	-	300	350	-
300	-	-	-	-	-	-	-	-	-	350	-	-

**Minimum** – This sizing is recommended if motor acceleration time does not exceed 2 seconds. Minimum sizing with class J fuses will provide overload relay back up protection but may not coordinate with some NEMA Class 20 overload relays. Minimum sizing is generally not heavy enough for motors with code letter G or higher.

**Typical** – Suggested for most applications. Will coordinate with NEMA Class 20 overload relays. Suitable for motor acceleration times up to 5 seconds

**Heavy** – Maximum allowable fuse size when an overload relay or motor thermal protector is included in the branch circuit. If this fuse size is not sufficient to start the load, class J time-delay fuses may be increased to a maximum of 225% of full load amperes. Suggested for Design E and high efficiency Design B motors.

Short-Circuit Current Ratings (Based on ABB Series Connected Ratings)				
AMP	RMS SYMMETRICAL AMPERES [kA]			
	120/240VAC	240VAC	480VAC	600VAC
30	200	200	100	42
60	200	200	100	42
100	200	200	100	42
200	200	200	100	42
400	N/A	65	100	N/A

# WIRING DIAGRAM - 120VAC CONTROL INTERFACE

## -LEGEND-

**N.O.R.F.A. CONTACT:** CONTACT SUPPLIED FROM THE FIRE ALARM SYSTEM TO INITIATE THE SHUNT TRIP.

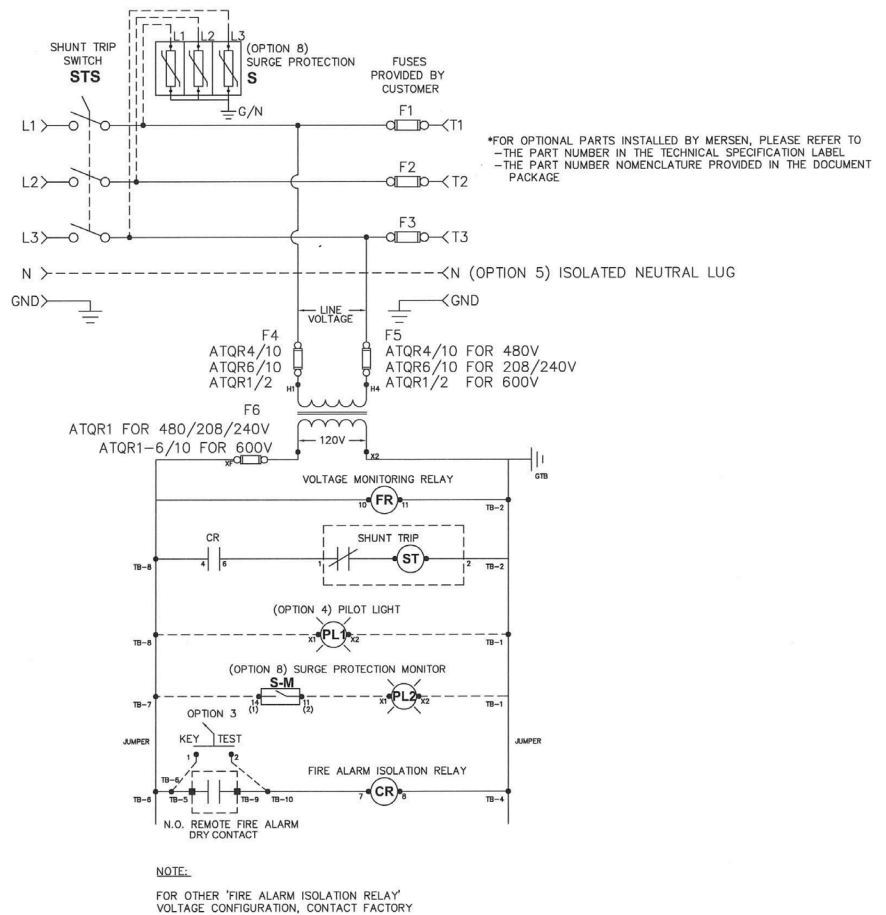
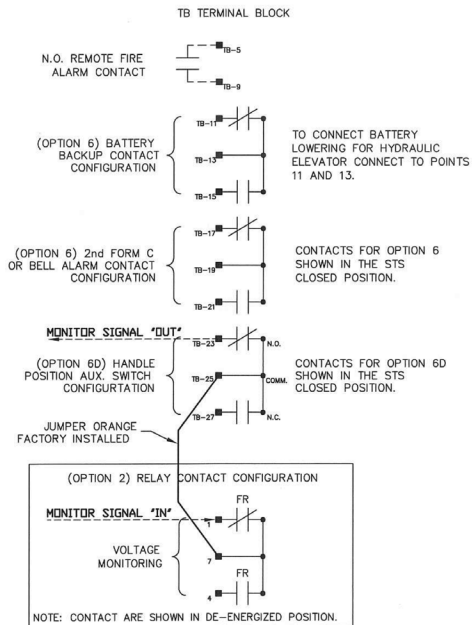
**SHUNT TRIP:** SOLENOID THAT REMOTELY TRIPS THE SWITCH AND IS ACTIVATED BY THE CLOSING OF THE FIRE ALARM CONTACT OR KEY TEST SWITCH.

**CR:** CONTROL RELAY USED TO ISOLATE THE REMOTE CONTACT FROM THE SHUNT TRIP.

**FR:** RELAY USED TO MONITOR THE VOLTAGE IN THE SWITCH FROM A REMOTE LOCATION.

**PL:** PILOT LIGHT THAT INDICATES CONTROL VOLTAGE ON THE OUTSIDE OF THE ENCLOSURE.

- INTERNAL CONNECTION POINTS
- CUSTOMER CONNECTION POINTS



## Notes:

- TB-5 and TB-9 must be dry (no voltage) normally open contacts from safety system
- If a surge protection option is selected, it will be connected line to ground between the STS and fuses F1-F3

# WIRING DIAGRAM - 24V (AC OR DC) CONTROL INTERFACE

## -LEGEND-

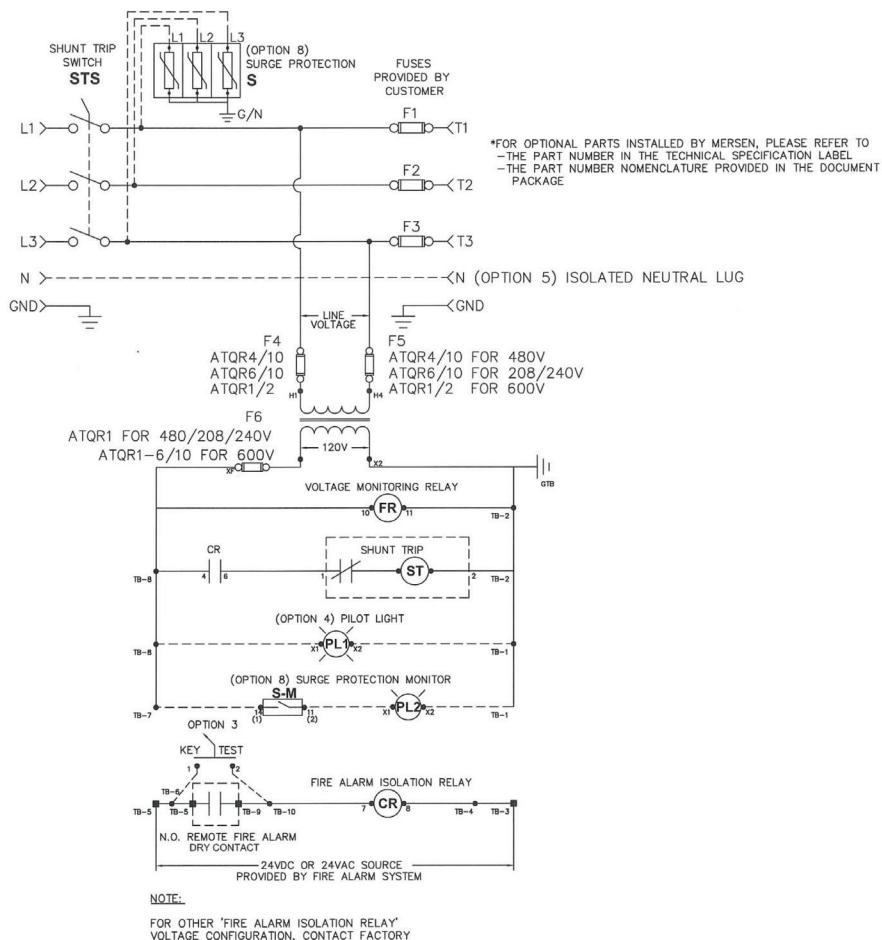
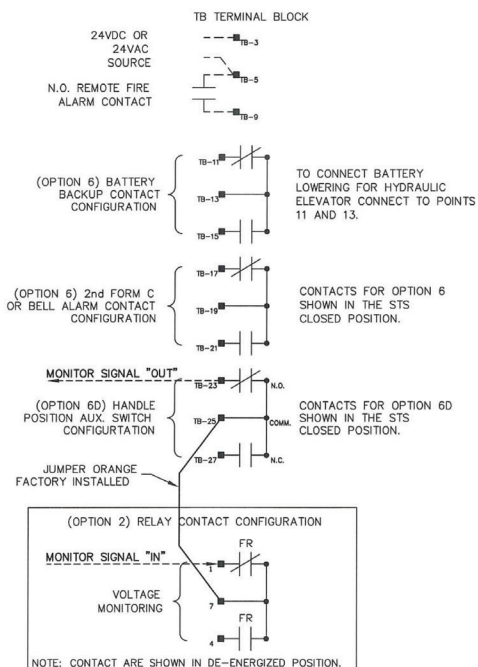
N.O.R.F.A. CONTACT: CONTACT SUPPLIED FROM THE FIRE ALARM SYSTEM TO INITIATE THE SHUNT TRIP.

SHUNT TRIP: SOLENOID THAT REMOTELY TRIPS THE SWITCH AND IS ACTIVATED BY THE CLOSING OF THE FIRE ALARM CONTACT OR KEY TEST SWITCH.

CR: CONTROL RELAY USED TO ISOLATE THE REMOTE CONTACT FROM THE SHUNT TRIP.

FR: RELAY USED TO MONITOR THE VOLTAGE IN THE SWITCH FROM A REMOTE LOCATION.  
PL: PILOT LIGHT THAT INDICATES CONTROL VOLTAGE ON THE OUTSIDE OF THE ENCLOSURE.

- INTERNAL CONNECTION POINTS
- CUSTOMER CONNECTION POINTS



## Notes:

- For 24VAC control systems, 24VAC must be connected between TB-5 and TB-3. For 24VDC control systems, 24VDC must be connected between TB-5 and TB-3. Do not source AC voltage into a DC control system or vice versa.
- If a surge protection option is selected, it will be connected line to ground, between the STS and fuses F1-F3.

# TORQUE SPECIFICATIONS, MAINTENANCE, AND WARRANTY

Line Side Wire Connections (Molded Case Switch)				
Amp Rating	Wire Size		Tightening Torque	
	Siemens	ABB	Siemens	ABB
30, 60, 100	10 AWG	10 AWG	20 in-lb	40 in-lb
	8 AWG	8 AWG	36 in-lb	
	6 - 4 AWG	6 - 4 AWG	45 in-lb	50 in-lb
	3 AWG	3 AWG	50 in-lb	
	2 - 1/0	2 - 1/0	60 in-lb	
200	6 - 350kcmil (Cu)	4 - 300kcmil (Cu-Al)	375 in-lb	200 in-lb
	4 - 350kcmil (Al)			
400	3/0 - 500kcmil (Cu)	2 x 2/0 - 500kcmil (Cu-Al)	300 in-lb	274 in-lb
	4/0 - 500kcmil (Al)			

Load Side Wire Connections (Class J Fuseholder)		
Amp Rating	Wire Size	Tightening Torque
30	14 - 2 AWG	35 in-lb
60	14 - 2 AWG	45 in-lb
100	6 - 1/0	100 in-lb (Al)
		60 in-lb (Cu)
200	6 - 350kcmil	375 in-lb
400	4 - (2) 350kcmil	275 in-lb

Neutral Lug Connections	
Wire Size	Torque
14 - 8 AWG	50 in-lb
2/0	120 in-lb
6 - 350kcmil	275 in-lb
500kcmil	500 in-lb

Grounding Lug Connections	
Wire Size	Torque
14 - 10 AWG	35 in-lb
8 AWG	40 in-lb
6 - 4 AWG	45 in-lb
2 - 1/0	50 in-lb

Terminal Block Connections	
Wire Size	Torque
22 - 10 AWG	4.4 - 8.8 in-lb

## MAINTENANCE

The following preventative maintenance measures should be considered in order to maintain product integrity

- Periodically clean product exterior and interior to remove any dust, particles, tools or other. Follow proper safety precautions when performing maintenance.
- Periodically check lug torque values in order to maintain product specifications. Recommended torque values for all parts are shown on page 8 of this manual. Follow proper safety precautions when performing maintenance.
- Preventative maintenance may include thermal-scan imaging in order to identify any "hot-spots" or generation of excessive heat. Any temperature increase, not related to load variations or ambient temperature could signal a problem with lug torque.
- Maximum temperature at any lug should never exceed 75°C under any conditions.

## WARRANTY

Mersen warrants to the buyer that products and any services furnished hereunder will be free of from defects in material, workmanship and will be of the kind and quality specified in Mersen standard terms and conditions. The foregoing shall apply only to failure to meet said warranties (excluding any defects in title), which appear within 1 year from the date of delivery to the customers site. All other non-Mersen manufactured components used in the fabrication of Mersen equipment shall be covered by their respective manufacturers' warranties.



## FREQUENTLY ASKED QUESTIONS

**Q:** If I accidentally order the Fusible Shunt Trip Switch with a wrong component or my job parameters have changed, can the component be changed in the field?

**A:** Unfortunately the answer is NO. To comply with UL guidelines, product modifications can only be completed by authorized factory personnel. Other modifications will void the Mersen warranty and UL listing.

**Q:** Are the units tested before they leave the factory?

**A:** YES. Mersen tests and documents every unit that leaves the factory floor. A shunt trip switch inspection report is included within every unit.

**Q:** What is the shipping method and typical weights of a unit?

**A:** All units are shipped on pallets via truck. Unit weight varies depending upon ampere rating from approximately 70 pounds up to 200 pounds each.

**Q:** Why do the fuses on the control transformer keep opening?

**A:** The safety system normally open contacts (connection between TB-5 and TB-9) are likely supplying voltage. Check to ensure that there is no voltage present.

**Q:** Is there a technical support number I can call for assistance?

**A:** YES. Mersen offers live technical support from 8:00AM to 6:30PM EST. Call (978) 465-4853 for assistance, or email [technicalservices.nby@mersen.com](mailto:technicalservices.nby@mersen.com).

# ABB-ES SPARE PARTS LIST

Level	Mersen Part #	Mersen Description	Mfg Part #	Mfg Description	Qty
1	152163	125A MCCS for 30A, 60A, 100A Shunt Trip Switch	XT2NU3125DFF000XXX	XT2N-D 125 MCS-UL/CSA IM=1500	1
			KXT2CUAL1-3PC	KIT FCCUAL 14-1/0AWG XT2 3PC U	1
2	152164	Shunt Trip Module for 100A & 200A Shunt Trip Switch	KXTASORCFPD	SOR-C XT1-XT4 F/P 110-125 VAC/	1
3	152165	Auxiliary & Alarm Switches	KXTAAXC20SYFP	AUX-C 2Q+1SY 250 V XT1...XT4 F/	1
4	152167	2 NC Switches for 30A to 200A STS D Option	KXTAAUECLFP	AUE 2 CON CL 400VACXRHXT1...XT1	1
5	152168	2 NO Switches for 30A to 200A STS D Option	KXTDAUEOPFP	AUE 2 CON OPEN X RHX XT2...XT4	1
6	152156	PSTL Handle for 30A to 200A STS N1, 12, 3R ENCL	OHB65J10B	PSTL HDL RST STD 65MM UL N3R,1	1
7	152158	PSTL Handle for 30A to 200A STS N4, 4X ENCL	OHB65L10B	PSTL HDL RST STD 65MM UL N4 4X	1
8	152172	Door Operating Shaft	OXP10X148	HANDLE OPERATOR SHAFT, 5.8IN L	1
9	152173	OP MECH BASE for 30A to 200A Shunt Trip Switch	KXTCRHEBFP	RHE_B XT2-XT4 F/P BASE EXT ROT	1
10	152175	2PDT, 10A 120VAC Relay	CR-M120AC2L	1SVR405611R2100 RELAY	1
			CR-M3SS	1SVR405651R2000 SOCKET	1
11	152176	2PDT, 10A 24VAC Relay	CR-M024AC2L	1SVR405611R0100 RELAY	1
			CR-M3SS	1SVR405651R2000 SOCKET	1
12	152177	2PDT, 10A 24VDC Relay	CR-M024DC2L	1SVR405611R1100 RELAY	1
			CR-M3SS	1SVR405651R2000 SOCKET	1
13	152148	LED INDICATOR, ROUND, GREEN	CL2-513G	LED PANEL INDICATOR GREEN 110	1
14	152147	LED INDICATOR, ROUND, RED	CL2-513R	LED PANEL INDICATOR RED 110VAC	1
15	152145	KEY SELECTOR SWITCH	M2SSK1-102-KIT	KEY SWITCH M2SSK1-102 + MCBH-	1
16	152140	DELTA TRANSFORMER 208V TO 120V	DC0100NH	TRANSFORMER MULTI TAB 208/416	1
17	152141	DELTA TRANSFORMER 240, 480V TO 120VAC	DC0100PH	TRANSFORMER MULTI TAB 240/480	1
18	152142	DELTA TRANSFORMER 480, 600V TO 120VAC	DC0100UH	TRANSFORMER MULTI TAB 600/480	1
19	152169	250A MCCS FOR 200A Shunt Trip Switch	XT4NU3250DFF000XXX	XT4N-D 250 MCS-UL/CSA IM=3000	1
			KXT4CUAL2-3PC	KIT FCCUAL #4-300AWG XT4 TERM	2
20	152170	400A MCCS FOR 400A Shunt Trip Switch	XT5NU340ADFF000XXX	ABB, MOLDED CASE CIRCUIT BREA	1
			KXT5CUAL2X500KC-3	XT5 2X500KCMIL LUG W/CONTROL T	2
21	152171	Shunt Trip Module for 400A Shunt Trip Switch	KXTFYOCFPD	ABB-YO-C XT5-XT6 110.240VAC-1	1
22	152137	2 NC Switches for 400A STS D Option	KXTAAUECLFP	AUE 2 CON CL 400VACXRHXT1...XT	1
23	152157	PSTL Handle for 400A STS N1, 12, 3R ENCL	OHB125J10B	ABB, PISTOL HANDLE NEMA 1,3R,1	1
24	152159	PSTL Handle for 400A STS N4, 4X ENCL	OHB125L10B	PSTL HDL RST STD 125MM UL N4,	1
25	152174	OP MECH BASE for 400A Shunt Trip Switch	KXT5MRHESTFP	RHE_B XT5 F/P BASE EXT ROT	1

## SPARE PARTS LIST

Mersen #	Mfg Part #	Description
440104	ED63S100A	100A Molded Case Switch
440026	S01ED62A	100A Molded Case Switch Assembly Option A
440027	S01ED62AA	100A Molded Case Switch Assembly Option B
440028	S01ED62AB	100A Molded Case Switch Assembly Option C
440067	FXD63S250A	250A Molded Case Switch
440063	S01FD60	Shunt Trip Mechanism for 250A Molded Case Switch, 120VAC Coil
440064	A01FD64	Auxiliary Contact, Option A, 250A Switch Assembly
440065	A02FD64	Auxiliary Contact, Option B, 250A Switch Assembly
440066	C01FD64	Auxiliary Contact, Option C, 250A Switch Assembly
440097	JXD63S400A	400A Molded Case Switch
440099	S01JLD62A	Auxiliary Contact, Option A, 400A Switch Assembly
440100	S01JLD62A + A01JLD64	Auxiliary Contact, Option B, 400A Switch Assembly
440101	S01JLD62A + B01JLD64	Auxiliary Contact, Option C, 400A Switch Assembly
330458	CRH0H	ROTARY DOOR MOUNTED OPERATING HANDLE NEMA 1, 12
330478	RH0H	ROTARY DOOR MOUNTED OPERATING HANDLE NEMA 3R (for all plus NEMA 12 for only 200A SW)
330616	RH0H4	ROTARY DOOR MOUNTED OPERATING HANDLE NEMA 4 & 4x
330494	RH0SVD	ROTARY DOOR MOUNTED OPERATOR SHAFT
330459	RH0EBO	ED 100A FRAME ROTARY DOOR MOUNTED MOLDED CASE BREAKER SWITCH OPERATOR
330477	RH0FBO	FD 250A FRAME ROTARY DOOR MOUNTED MOLDED CASE BREAKER SWITCH OPERATOR
330615	RH0JBO	JD 400A FRAME ROTARY DOOR MOUNTED MOLDED CASE BREAKER SWITCH OPERATOR
440102	LY2N-AC110/120	DPDT, 10A SWITCHING PLUG-IN/SOLDER, LED (R1 OPTION)
440072	LY2N-AC24	DPDT, 10A SWITCHING PLUG-IN/SOLDER, LED (R3 OPTION)
440071	LY2N-DC24	DPDT, 10A SWITCHING PLUG-IN/SOLDER, LED (R2 OPTION)
440070	LY3N-AC110/120	3PDT, 10A SWITCHING, PLUG-IN/SOLDER, LED (OLD REF. 700-33A1)
440083	A22K-2AL-11	KEY SELECT, MOMENTARY, 2 NOTCH, 1A1B, ASSEMBLED
440086	M22-FG-T1	INDICATOR, FLAT, ROUND, GREEN, 110VAC ASSEMBLED
440085	M22-FR-T1	INDICATOR, FLAT, ROUND, RED, 110VAC ASSEMBLED
440031	M49750T	MARCUS TRANSFORMER 208, 240, 480V TO 120V
440103	M0150V	MARCUS TRANSFORMER 600V TO 120V
440068	HAS-1	HANDLE OPERATED MICROSWITCH FOR ASSEMBLY OPTION D



MERSEN IS A GLOBAL EXPERT  
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