

Colorado Department of Transportation
Golden, CO

SUBMITTAL MANUAL - SECTION 613

Local Control Station

For project:

Eisenhower/Johnson Memorial Tunnel 480V Motor Control Center Replacement

Owner: CDOT/Atkins Global

Contact:	Justin Ulrich
Contact Info:	
Project Number:	NHPP 0703-435

Engineer: WSP USA

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Project Number:	

Electrical Contractor: Casey Industrial

Contact:	Aaron Saunders
Contact Info:	
Project Number:	

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Project Number:	

Prepared by: Huffman Engineering Inc.

Contact:	Sean Creager
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Project Number:	CMS203

Submittal Information	
Facility / Building / Area	Eisenhower/Johnson Memorial Tunnel
General Contents / Description	Local Control Stations
Panel No. / Equipment No. / Etc.	Local Control Stations
Submittal Number	613-001-D
Volume	1 of 1
Specification Section(s)	613 – Local Control Stations
Submittal Type	<input type="checkbox"/> Product Data
	<input type="checkbox"/> Informational
	<input type="checkbox"/> Interim O&M Manual <input checked="" type="checkbox"/> Final O&M Manual
Revision History:	
REVA	27JAN2020
REVB	03MAR2020
REVC	06APR2020
REVD	09SEP2021 – Final O&M



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Local Control Station

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 - xii. CMS203-E33A03 – East SF-3 Supply Fan – Control Power Distribution
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B. Product Data

a. Hoffman

- i. A8R86HCR Enclosure
- ii. A12R126HCR Enclosure
- iii. A8N8P Backpanel
- iv. A12N12P Backpanel

b. Allen-Bradley

- i. 800T-TFXT6A Emergency Stop Pushbutton
- ii. 800T-A6D1 Pushbutton
- iii. 800T-A1D1 Pushbutton
- iv. 800T-J2KB7 3 Position Selector Switch
- v. 800T-XA Contact Blocks
- vi. 800T-QTH2G Pilot Light
- vii. 800T-QTH2R Pilot Light
- viii. 1492-JD3C Terminal Block 2 Tier
- ix. 1492-EBJD3 Terminal Block 2 Tier End Barrier
- x. 1492-J3 Terminal Block 1 Tier
- xi. 1492-EBJ3 Terminal Block 1 Tier End Barrier
- xii. 1492-JG3 Terminal Block 2 Tier Grounding
- xiii. 1492-EAJ35 Terminal Block End Anchor
- xiv. 1492-FB1C30-L Class CC Fuse Holder with Indication

c. Entrelec

- i. 101 598.26 Din Mounting Rail

d. Mersen

- i. ATDR1 1A Class CC Fuse

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REVISION OF SECTION 613
LOCAL CONTROL STATION

This work shall consist of furnishing and installing Local Control Stations as indicated on the Contract Drawings.

Subsection 613.01 shall include the following:

The work shall also include furnishing, handling, storing and installing all Local Control Stations, necessary connections, overcurrent protective devices, junction boxes, fittings, sealing boots, mounting hardware, and anchors, fasteners and supports for fastening Local Control Stations to the building structure and/or associated electrical equipment.

The following standards shall apply:

- (a) NECA 1: Good Workmanship In Electrical Construction (ANSI)
- (b) NEMA 250: Enclosures for Electrical Equipment (1000 Volts Maximum)
- (c) NFPA 70-2018: National Electrical Code
- (d) UL 508 & UL 508A: Industrial Control Components and Industrial Control Panels
- (e) NEMA ICS: Industrial Controls Systems

Subsection 613.02 shall include the following:

Local Control Stations. Local Control Stations and components shall be fabricated of the specified materials and constructed as follows:

- (a) Enclosures shall be NEMA 250 Type NEMA 3R.
- (b) Pilot Lights shall be 30 millimeters, LED lighted, metal, pilot lights.
 - 1. RED = stopped
 - 2. GREEN = start
 - 3. AMBER = trouble/alarm
- (c) Emergency Stop Buttons shall be red, 40 millimeters, trigger action, mushroom button with metal base.
- (d) Push Buttons shall be 30 millimeters, metal, momentary push-buttons: (note latching relays may be required)
 - 1. RED = stop
 - 2. GREEN = start
- (e) Local Control Stations shall provide local control/operation of specified equipment as follows:
 - 1. Damper motors:
 - A. OPEN (press and release to move to open position) (digital input to PLC)
 - B. OPEN PILOT LIGHT (digital output from PLC)
 - C. CLOSE (press and release to move to closed position) (digital input to PLC)
 - D. CLOSE PILOT LIGHT (digital output from PLC)
 - E. OFF (digital input to PLC)
 - F. OFF PILOT LIGHT (digital output from PLC)
 - G. EMERGENCY STOP (digital input to PLC)
 - 2. Supply Fan Motor Cooling Blowers:
 - A. ON – Low Speed (digital input to PLC)
 - B. ON LOW SPEED PILOT LIGHT (digital output from PLC)
 - C. ON – High Speed (digital input to PLC)
 - D. ON HIGH SPEED PILOT LIGHT (digital output from PLC)
 - E. OFF (digital input to PLC)
 - F. OFF PILOT LIGHT (digital output from PLC)
 - G. EMERGENCY STOP (digital input to PLC)

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**REVISION OF SECTION 613
LOCAL CONTROL STATION**

- 3. Supply & Exhaust Fan Motors
 - A. ON – 25% (Fan Speed) (digital input to PLC)
 - B. ON – 25% SPEED PILOT LIGHT (digital output from PLC)
 - C. ON – 50% (Fan Speed) (digital input to PLC)
 - D. ON – 50% SPEED PILOT LIGHT (digital output from PLC)
 - E. ON – 100% (Fan Speed) (digital input to PLC)
 - F. ON – 100% SPEED PILOT LIGHT (digital output from PLC)
 - G. OFF (digital input to PLC)
 - H. OFF PILOT LIGHT (digital output from PLC)
 - I. EMERGENCY STOP (digital input to PLC)

Subsection 613.03 shall include the following:

The Local Control Stations of the types specified above shall be installed as follows:

- (a) Install Local Control Stations in accordance with manufacturer's instructions and as required to comply with the UL listing.
- (b) Use crimped connectors and splices only. Wire nuts are not acceptable.
- (c) Functional test each push-button and pilot light when PLC system is operable and as part of the Systems Integration functional testing.

Subsection 613.11 shall include the following:

Furnishing and Installation of Local Control Stations will be measured by the actual number installed and accepted. The unit price will be full compensation for all work required to install, test, and certify the equipment as specified herein including all specified appurtenances and accessories.

Subsection 613.12 shall include the following:

The accepted quantities will be paid for at the contract unit price for each of the pay items listed below that appear in the bid schedule.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Local Control Station	Each

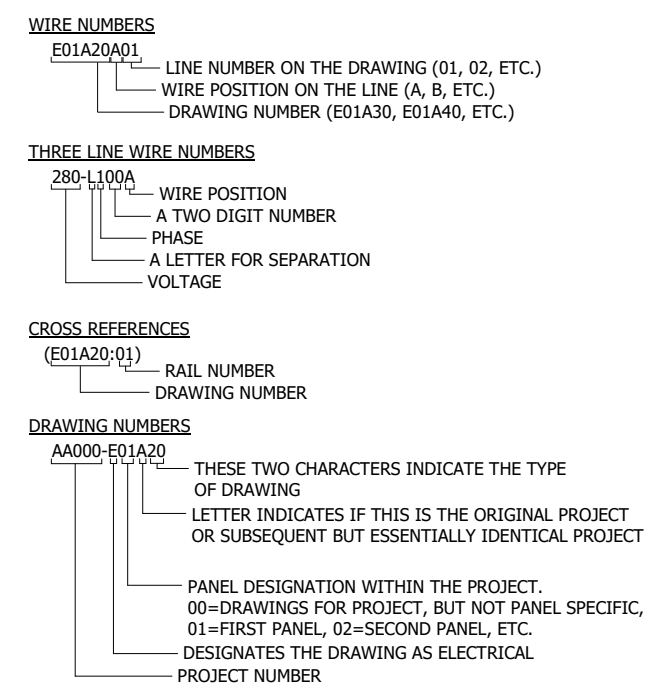
Payment for Local Control Stations shall also include all testing, training, required documentation, supporting devices and hardware, and all appurtenances necessary for the installation of the control stations.

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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

ELECTRICAL SYMBOLS		ELECTRICAL SYMBOLS CONTINUED		FUSE SCHEDULE						PANEL DRAWING INDEX			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	FUSE#	QTY	FUSE TYPE	SIZE	MFGR	PART#	DESCRIPTION	DESCRIPTION	DWG #	
	RELAY CONTACT, NORMALLY CLOSED RELAY CONTACT, NORMALLY OPEN LIMIT SWITCH, NORMALLY CLOSED LIMIT SWITCH, NORMALLY CLOSED, HELD OPEN LIMIT SWITCH, NORMALLY OPEN LIMIT SWITCH, NORMALLY OPEN, HELD CLOSED PRESSURE SWITCH, NORMALLY CLOSED PRESSURE SWITCH, NORMALLY OPEN PUSHBUTTON, NORMALLY CLOSED PUSHBUTTON, NORMALLY OPEN PUSHBUTTON, NORMALLY CLOSED, HELD OPEN MUSHROOM HEAD PUSH BUTTON, NORMALLY CLOSED MUSHROOM HEAD PUSH BUTTON, NORMALLY OPEN 2 POSITION SELECTOR SWITCH, CLOSED 2 POSITION SELECTOR SWITCH, OPEN TEMPERATURE SWITCH, NORMALLY CLOSED TEMPERATURE SWITCH, NORMALLY OPEN TIMER CONTACT, NORMALLY CLOSED, TIMED OPEN TIMER CONTACT, NORMALLY CLOSED, TIMED OPEN, SHOWN OPEN TIMER CONTACT, NORMALLY OPEN, TIMED CLOSED TIMER CONTACT, NORMALLY OPEN, TIMED CLOSED, SHOWN CLOSED FLOW SWITCH, NORMALLY CLOSED FLOW SWITCH, NORMALLY OPEN PROXIMITY SWITCH, NORMALLY OPEN LEVEL SWITCH, NORMALLY CLOSED LEVEL SWITCH, NORMALLY OPEN RELAY COIL SOLENOID VALVE PILOT LIGHT (R=RED, A=AMBER, B=BLUE, G=GREEN) NODE TERMINAL BLOCK KNIFE TERMINAL BLOCK TERMINAL BLOCK, FUSED	 GROUND MOTOR ALARM HORN MOTOR STARTER COIL FIELD WIRING INTERNAL PANEL WIRING CAPACITOR MOTION DETECTOR NOTE: THIS IS A STANDARD LEGEND SHEET. SOME SYMBOLS OR ABBREVIATIONS MAY APPEAR ON THIS SHEET AND NOT ON THE PLANS.		FB01	1	CLASS CC	1A	MERSEN	ATDR1		INCOMING FEED	DAMPER CONTROL STATIONS - INDEX SHEET DAMPER CONTROL STATIONS - BACK PANEL LAYOUT DAMPER CONTROL STATIONS - FRONT PANEL LAYOUT DAMPER CONTROL STATIONS - ENGRAVED TAG DETAILS DAMPER CONTROL STATIONS - BILL OF MATERIAL (TYPICAL) EAST EF-1 DAMPER - CONTROL POWER DISTRIBUTION EAST EF-2 DAMPER - CONTROL POWER DISTRIBUTION EAST EF-3 DAMPER - CONTROL POWER DISTRIBUTION EAST EF-4 DAMPER - CONTROL POWER DISTRIBUTION EAST SF-1 DAMPER - CONTROL POWER DISTRIBUTION EAST SF-2 DAMPER - CONTROL POWER DISTRIBUTION EAST SF-3 DAMPER - CONTROL POWER DISTRIBUTION EAST SF-4 DAMPER - CONTROL POWER DISTRIBUTION WEST EF-1 DAMPER - CONTROL POWER DISTRIBUTION WEST EF-2 DAMPER - CONTROL POWER DISTRIBUTION WEST EF-3 DAMPER - CONTROL POWER DISTRIBUTION WEST EF-4 DAMPER - CONTROL POWER DISTRIBUTION WEST SF-1 DAMPER - CONTROL POWER DISTRIBUTION WEST SF-2 DAMPER - CONTROL POWER DISTRIBUTION WEST SF-3 DAMPER - CONTROL POWER DISTRIBUTION WEST SF-4 DAMPER - CONTROL POWER DISTRIBUTION	CMS203-E03A00 CMS203-E03A01 CMS203-E03A02 CMS203-E03A02A CMS203-E03A03 CMS203-E03A16 CMS203-E04A16 CMS203-E05A16 CMS203-E06A16 CMS203-E07A16 CMS203-E08A16 CMS203-E09A16 CMS203-E10A16 CMS203-E11A16 CMS203-E12A16 CMS203-E13A16 CMS203-E14A16 CMS203-E15A16 CMS203-E16A16 CMS203-E17A16 CMS203-E18A16
ABBREVIATIONS													
ABBREVIATION		DESCRIPTION		ABBREVIATION		DESCRIPTION							
A		AMPERE, AMBER		N		NEUTRAL							
AC		ALTERNATING CURRENT		NC		NORMALLY CLOSED							
AWG		AMERICAN WIRE GAUGE		NO		NORMALLY OPEN							
BRN		BROWN		OL		OVERLOAD RELAY							
BLU		BLUE		ORN		ORANGE							
BLK		BLACK		P		POLE							
C		CONTACTOR		PB		PUSHBUTTON SWITCH							
CB		CIRCUIT BREAKER		PS		PRESSURE SWITCH, POWER SUPPLY							
CR		CONTROL RELAY		PT		PRESSURE TRANSMITTER							
DC		DIRECT CURRENT		PIT		PRESSURE TO CURRENT TRANSDUCER							
DIV		DIVISION		RTD		RESISTIVE TEMPERATURE DETECTOR							
ES		EMERGENCY STOP		REV		REVERSE							
ESR		EMERGENCY STOP RELAY		SR		SAFETY RELAY							
F, FU		FUSE		SS		SELECTOR SWITCH							
FB		FUSE BLOCK		SV		SOLENOID VALVE							
GRN		GREEN		TB		TERMINAL BLOCK							
GND		GROUND		TC		THERMOCOUPLE							
GFR		GROUND FAULT RELAY		TDR		TIME DELAY RELAY							
H		HORN		V		VOLTAGE							
HP		HORSEPOWER		VA		VOLT AMPS							
IPT		CURRENT TO PRESSURE TRANSDUCER		VFD		VARIABLE FREQUENCY DRIVE							
J-BOX		JUNCTION BOX		VIO		VIOLET							
KVA		KILOVOLT AMPS		W		WATT							
LS		LIMIT SWITCH		WHT		WHITE							
LT FLEX		LIQUID TIGHT FLEX CONDUIT		XFMR		TRANSFORMER							
M		MOTOR		YEL		YELLOW							
MC		MOTOR CONTACTOR		Ø		PHASE							
MCC		MOTOR CONTROL CENTER											
MCR		MASTER CONTROL RELAY											
MHPB		MUSHROOM HEAD PUSHBUTTON											
MS		MOTOR STARTER											

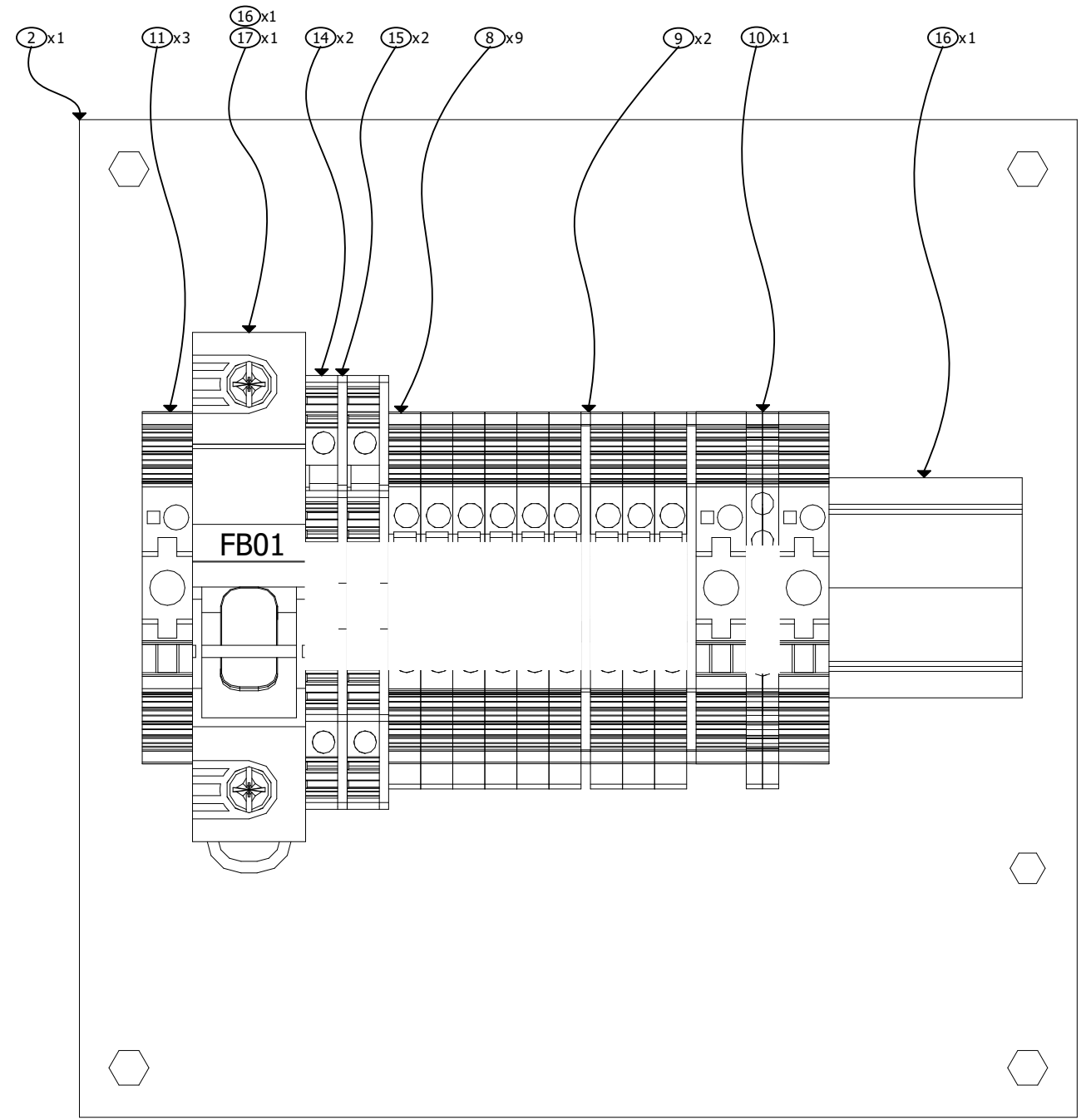
LABEL DEFINITIONS



WIRE COLOR CODE

COLOR	DESCRIPTION
BLACK	ALL UNGROUNDED CIRCUIT CONDUCTORS OPERATING AT A VOLTAGE GREATER THAN 120VAC
WHITE OR GREY	GROUND AC CURRENT CARRYING CONTROL CIRCUIT CONDUCTOR
GREEN OR GREEN/YELLOW	GROUNDING CONDUCTOR
BLUE	UNGROUND DC CONTROL CIRCUITS
WHITE/BLUE STRIPE	DC COMMON CONTROL CIRCUIT CONDUCTOR
ORANGE	UNGROUND CONTROL CIRCUITS OR OTHER WIRING THAT MAY BE ENERGIZED WHEN MAIN DISCONNECT IS OFF
WHITE/ORANGE STRIPE	GROUND AC CONTROL CIRCUIT CURRENT CARRYING CONDUCTOR THAT REMAINS ENERGIZED WHEN THE MAIN DISCONNECT IS IN THE OFF POSITION
RED	UNGROUND CIRCUIT CONDUCTORS OPERATING AT 120VAC
VARIES	ANALOG INPUT, 2 COND. (SHIELDED)
VARIES	ANALOG OUTPUT, 2 COND. (SHIELDED)

STATE OF COLORADO DEPARTMENT OF TRANSPORTATION EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT				DAMPER CONTROL STATIONS - INDEX SHEET				REV	DATE	NAME	REMARKS		
PROJECT # CMS203				SCALE N/A		ENG: E. KILGORE							
				REV	DATE	NAME	REMARKS						
5301 NORTH 57TH STREET LINCOLN, NEBRASKA 68507 (402) 464-6823				112 INVERNESS CIRCLE EAST, SUITE E ENGLEWOOD, COLORADO 80112 (303) 376-6280				4.0	09/09/21	ekilgore	AS-BUILTS		
								3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION		
								2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.		
								1.0	04/01/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL		
								0.0	04/01/20	ekilgore	INITIAL		
								DWG #	CMS203-E03A00				



ITEM #	DESCRIPTION	TORQUE
1492-JD3C	TERMINAL BLOCK, 2 TIER	4.5 LB. IN.
1492-J3	TERMINAL BLOCK, 1 TIER	4.5 LB. IN.
1492-JG3	TERMINAL BLOCK, 2 TIER, GROUNDING	7.1 LB. IN.
1492-FB1C30-L	CLASS CC FUSEHOLDER, 1P, WITH INDICATION	22 LB. IN.

STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

DAMPER CONTROL STATIONS - BACK PANEL LAYOUT

PROJECT # CMS203

SCALE 1:1

ENG:E. KILGORE

REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
0.2	04/06/20	ekilgore	HOA ADDITIONS
0.1	04/01/20	ekilgore	SUBMITTAL REVIEW CHANGES



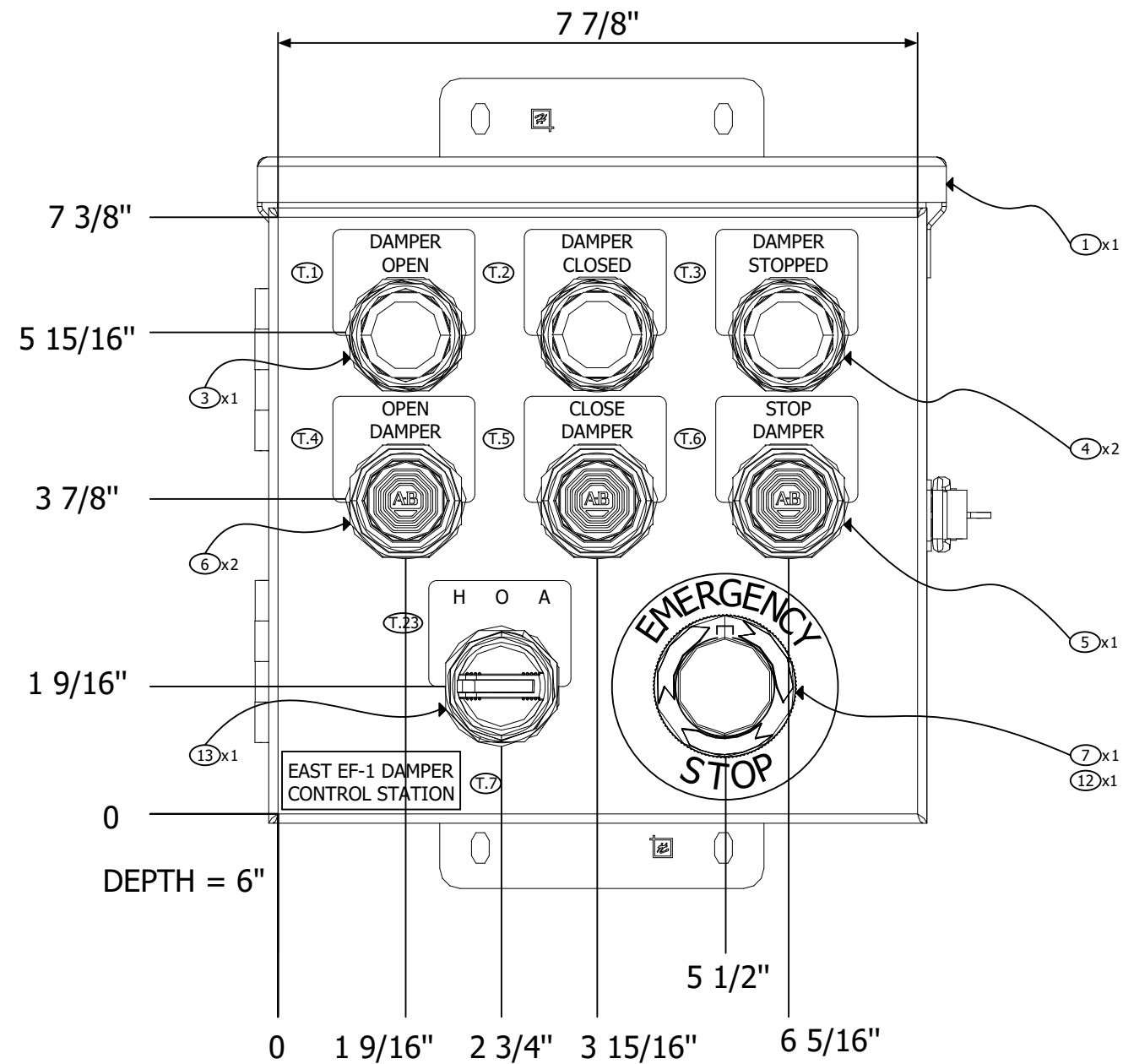
5301 NORTH 57TH STREET
LINCOLN, NEBRASKA 68507
(402) 464-6823

112 INVERNESS CIRCLE EAST, SUITE E
ENGLEWOOD, COLORADO 80112
(303) 376-6280

REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/01/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/01/20	ekilgore	INITIAL

DWG #

CMS203-E03A01



STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

DAMPER CONTROL STATIONS - FRONT PANEL LAYOUT

PROJECT # CMS203

SCALE 1:2

ENG:E. KILGORE

REV	DATE	NAME	REMARKS
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.1	05/12/20	ekilgore	DIMENSIONS
1.0	05/11/20	ekilgore	DIMENSIONS
0.2	04/06/20	ekilgore	HOA ADDITIONS
0.1	04/06/20	ekilgore	HOA ADDITIONS



5301 NORTH 57TH STREET
LINCOLN, NEBRASKA 68507
(402) 464-6823

112 INVERNESS CIRCLE EAST, SUITE E
ENGLEWOOD, COLORADO 80112
(303) 376-6280

REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/01/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/01/20	ekilgore	INITIAL

DWG #

CMS203-E03A02

CUSTOM BUILT BY **HUFFMAN ENGINEERING INC.** 5301 North 57th Street
Lincoln, NE 68507
402-464-6823

PROJECT # **CMS203** DATE **JUN 2020**

PANEL # **EAST EF-1 DAMPER CONTROL STATION**

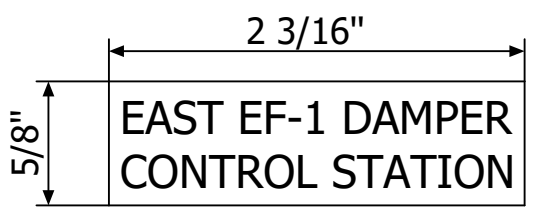
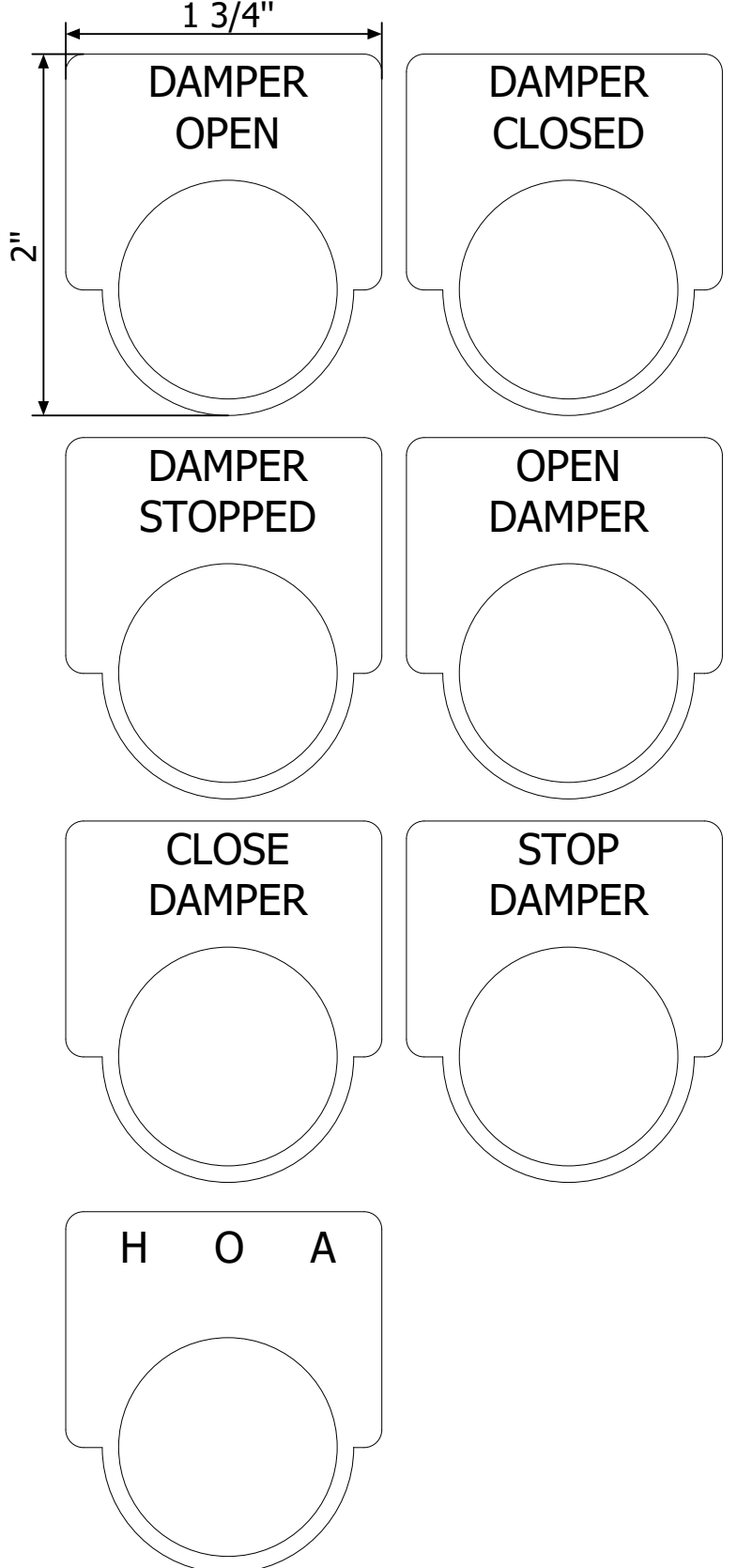
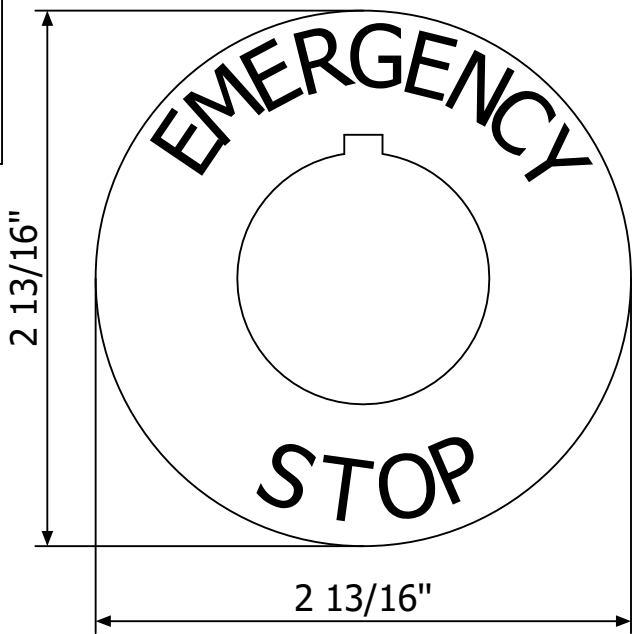
INTERRUPT RATING **200kA** TOTAL FLA **1**

LARGEST MTR FLA **N/A** SCCR **10kA**

VOLTS **120** HZ. **60** PHASE **1** ENCL TYP **3R**

ELECT DWG INDEX # **CMS203-E03A00**

LABELS TO INCLUDE ON ENCLOSURE	
INCLUDE	DESCRIPTION
NO	ARC FLASH HAZARD
120VAC	SUPPLY VOLTAGE
NO	MULTIPLE SOURCES
YES	UL (UNDERWRITERS LABORATORY)
NO	IS (INTRINSICALLY SAFE)
YES	HUFFMAN ENGINEERING INC. LOGO STICKER
NO	UPS WARNING



WEST EF-1 DAMPER CONTROL STATION

EAST EF-2 DAMPER CONTROL STATION

WEST EF-2 DAMPER CONTROL STATION

EAST EF-3 DAMPER CONTROL STATION

WEST EF-3 DAMPER CONTROL STATION

EAST EF-4 DAMPER CONTROL STATION

WEST EF-4 DAMPER CONTROL STATION

EAST SF-1 DAMPER CONTROL STATION

WEST SF-1 DAMPER CONTROL STATION

EAST SF-2 DAMPER CONTROL STATION

WEST SF-2 DAMPER CONTROL STATION

EAST SF-3 DAMPER CONTROL STATION

WEST SF-3 DAMPER CONTROL STATION

EAST SF-4 DAMPER CONTROL STATION

WEST SF-4 DAMPER CONTROL STATION

LEGEND PLATE SCHEDULE					
ITEM NO.	FIRST LINE	SECOND LINE	LEGEND PLATE COLOR	TEXT COLOR	TEXT HEIGHT
T.1	DAMPER	OPEN	BLACK	WHITE	5/32"
T.2	DAMPER	CLOSED	BLACK	WHITE	5/32"
T.3	DAMPER	STOPPED	BLACK	WHITE	5/32"
T.4	OPEN	DAMPER	BLACK	WHITE	5/32"
T.5	CLOSE	DAMPER	BLACK	WHITE	5/32"
T.6	STOP	DAMPER	BLACK	WHITE	5/32"
T.7	EAST EF-1 DAMPER	CONTROL STATION	BLACK	WHITE	5/32"
T.8	EAST EF-2 DAMPER	CONTROL STATION	BLACK	WHITE	5/32"
T.9	EAST EF-3 DAMPER	CONTROL STATION	BLACK	WHITE	5/32"
T.10	EAST EF-4 DAMPER	CONTROL STATION	BLACK	WHITE	5/32"
T.11	EAST SF-1 DAMPER	CONTROL STATION	BLACK	WHITE	5/32"
T.12	EAST SF-2 DAMPER	CONTROL STATION	BLACK	WHITE	5/32"
T.13	EAST SF-3 DAMPER	CONTROL STATION	BLACK	WHITE	5/32"
T.14	EAST SF-4 DAMPER	CONTROL STATION	BLACK	WHITE	5/32"
T.15	WEST EF-1 DAMPER	CONTROL STATION	BLACK	WHITE	5/32"
T.16	WEST EF-2 DAMPER	CONTROL STATION	BLACK	WHITE	5/32"
T.17	WEST EF-3 DAMPER	CONTROL STATION	BLACK	WHITE	5/32"
T.18	WEST EF-4 DAMPER	CONTROL STATION	BLACK	WHITE	5/32"
T.19	WEST SF-1 DAMPER	CONTROL STATION	BLACK	WHITE	5/32"
T.20	WEST SF-2 DAMPER	CONTROL STATION	BLACK	WHITE	5/32"
T.21	WEST SF-3 DAMPER	CONTROL STATION	BLACK	WHITE	5/32"
T.22	WEST SF-4 DAMPER	CONTROL STATION	BLACK	WHITE	5/32"
T.23	H O A		BLACK	WHITE	5/32"

STATE OF COLORADO DEPARTMENT OF TRANSPORTATION EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT	DAMPER CONTROL STATIONS - ENGRAVED TAG DETAILS			REV	DATE	NAME	REMARKS
	PROJECT # CMS203	SCALE N/A	ENG:E. KILGORE	2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
HUFFMAN ENGINEERING INC. 5301 NORTH 57TH STREET LINCOLN, NEBRASKA 68507 (402) 464-6823	112 INVERNESS CIRCLE EAST, SUITE E ENGLEWOOD, COLORADO 80112 (303) 376-6280			0.1	04/06/20	ekilgore	HOA ADDITIONS
		REV	DATE	NAME	REMARKS		
		4.0	09/09/21	ekilgore	AS-BUILTS		
		3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION		
		2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.		
		1.0	04/01/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL		
		0.0	04/01/20	ekilgore	INITIAL		
						DWG #	CMS203-E03A02A

ITEM #	QTY	MANUFACTURER	MANUFACTURERS P/N	DESCRIPTION
1	1	HOFFMAN	A8R86HCR	8"X8"X6" NEMA 3R ENCLOSURE
2	1	HOFFMAN	A8N8P	8"X8" BACKPANEL
3	1	ALLEN-BRADLEY	800T-QTH2G	PILOT LIGHT, LED, GREEN
4	2	ALLEN-BRADLEY	800T-QTH2R	PILOT LIGHT, LED, RED
5	1	ALLEN-BRADLEY	800T-A1D1	PUSHBUTTON, MOMENTARY CONTACT, NON-ILLUM, GREEN, 1 NO
6	2	ALLEN-BRADLEY	800T-A6D1	PUSHBUTTON, MOMENTARY CONTACT, NON-ILLUM, RED, 1 NO
7	1	ALLEN-BRADLEY	800T-TFXT6A	EMERGENCY STOP PUSHBUTTON
8	9	ALLEN-BRADLEY	1492-J3	TERMINAL BLOCK 1 TIER
9	2	ALLEN-BRADLEY	1492-EBJ3	TERMINAL BLOCK 1 TIER END BARRIER
10	1	ALLEN-BRADLEY	1492-JG3	TERMINAL BLOCK, 2 TIER, GROUNDING
11	3	ALLEN-BRADLEY	1492-EAJ35	TERMINAL BLOCK END ANCHOR
12	1	ALLEN-BRADLEY	800T-X646EM	EMERGENCY STOP LEGEND PLATE, RING, YELLOW
13	1	ALLEN-BRADLEY	800T-J2KB7	3 POS SELECTOR SWITCH, 30.5mm, NON-ILLUM, METAL
14	2	ALLEN-BRADLEY	1492-JD3C	TERMINAL BLOCK, 1P, 2 TIER
15	2	ALLEN-BRADLEY	1492-EBJD3	TERMINAL BLOCK, 2 TIER, GRAY, END BARRIER
16	1	ENTRELEC	101 598.26	DIN MOUNTING RAIL
17	1	ALLEN-BRADLEY	1492-FB1C30-L	CLASS CC FUSE HOLDER, 1P, WITH INDICATION
18	1	MERSEN	ATDR1	1A FUSE, CLASS CC FUSE

STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

DAMPER CONTROL STATIONS - BILL OF MATERIAL (TYPICAL)

REV	DATE	NAME	REMARKS
0.2	04/06/20	ekilgore	HOA ADDITIONS
0.1	04/01/20	ekilgore	SUBMITTAL REVIEW CHANGES

PROJECT # CMS203 SCALE ENG:E. KILGORE

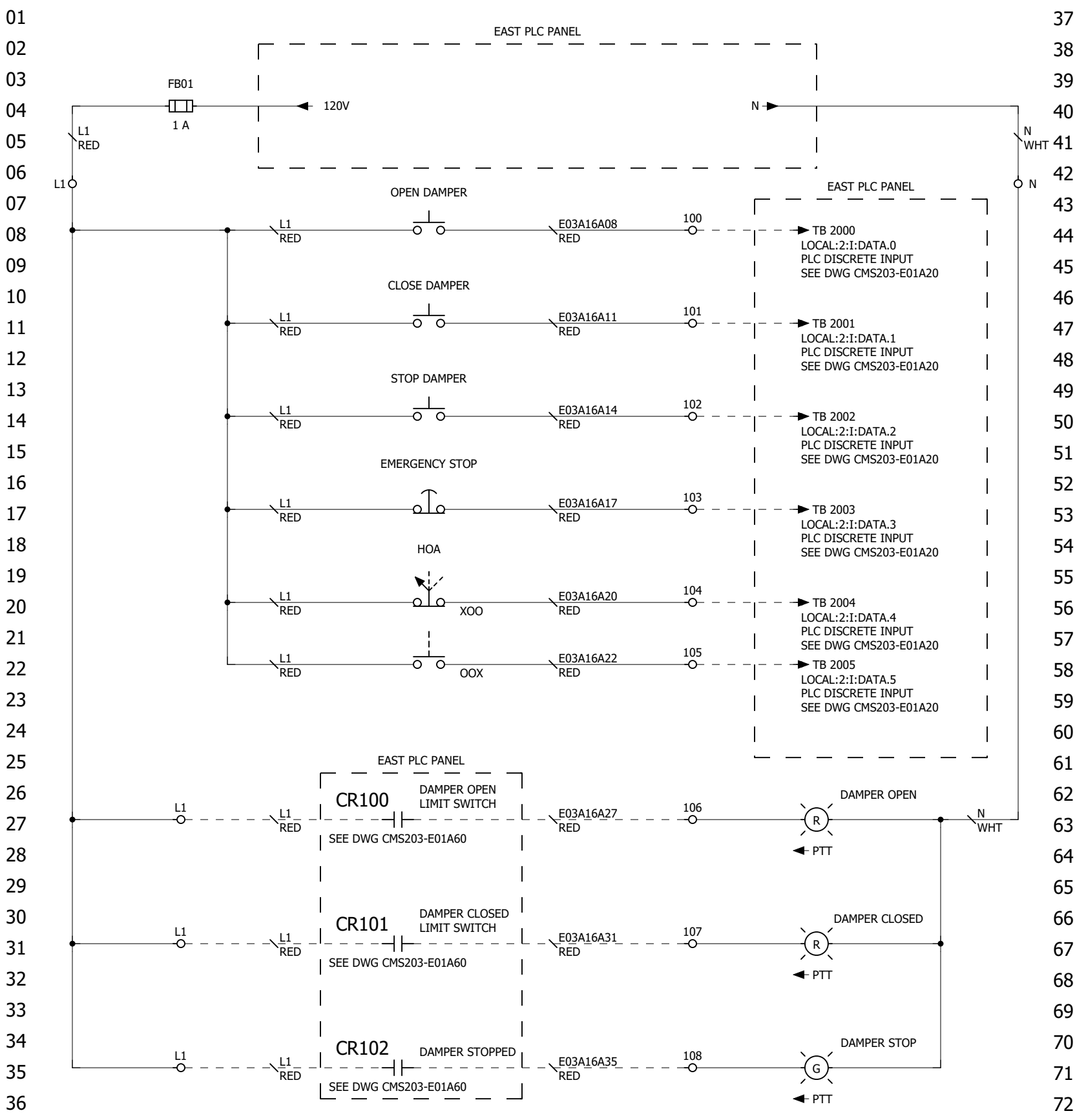


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(303) 376-6280

REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED, RELEASED FOR FABRICATION.
1.0	04/01/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/01/20	ekilgore	INITIAL

DWG # CMS203-E03A03



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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

EAST EF-1 DAMPER - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS
0.1	04/06/20	ekilgore	HOA ADDITIONS

PROJECT # CMS203 SCALE N/A ENG: E. KILGORE

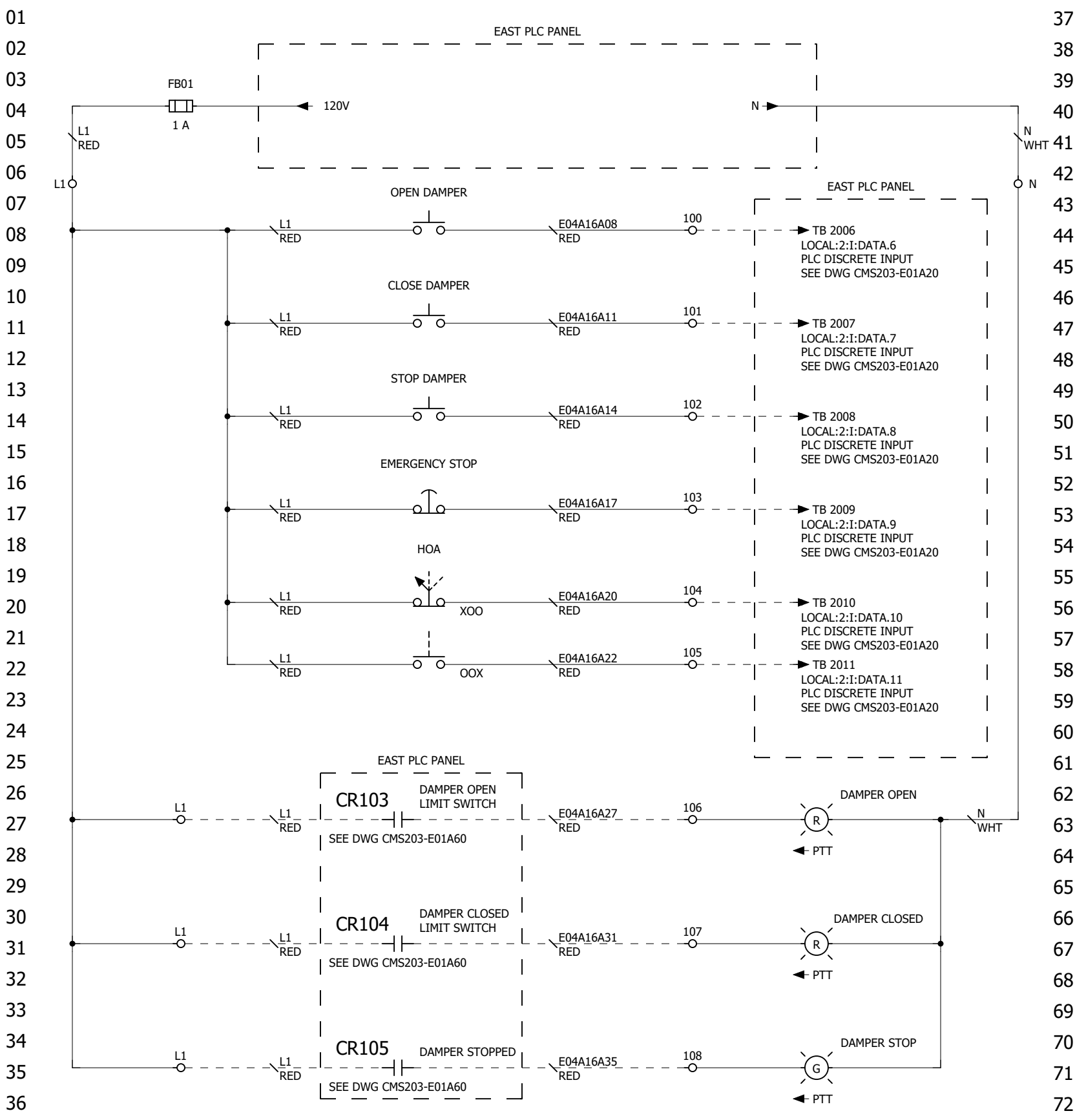
REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/01/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/01/20	ekilgore	INITIAL



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DWG # CMS203-E03A16



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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

EAST EF-2 DAMPER - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS
0.1	04/06/20	ekilgore	HOA ADDITIONS

PROJECT # CMS203 SCALE N/A ENG: E. KILGORE

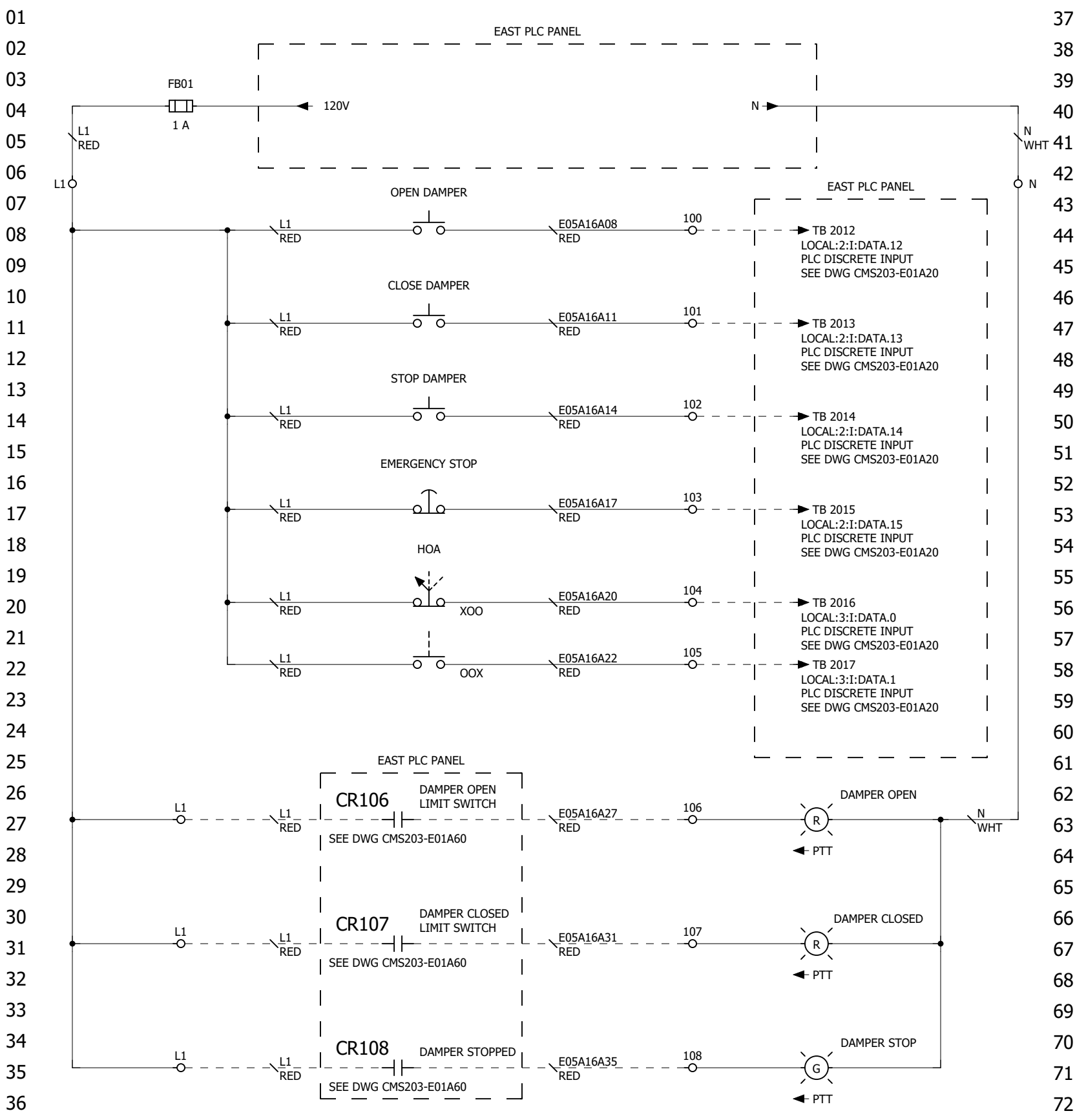
REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/01/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/01/20	ekilgore	INITIAL



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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

EAST EF-3 DAMPER - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS
0.1	04/06/20	ekilgore	HOA ADDITIONS

PROJECT # CMS203 SCALE N/A ENG:E. KILGORE

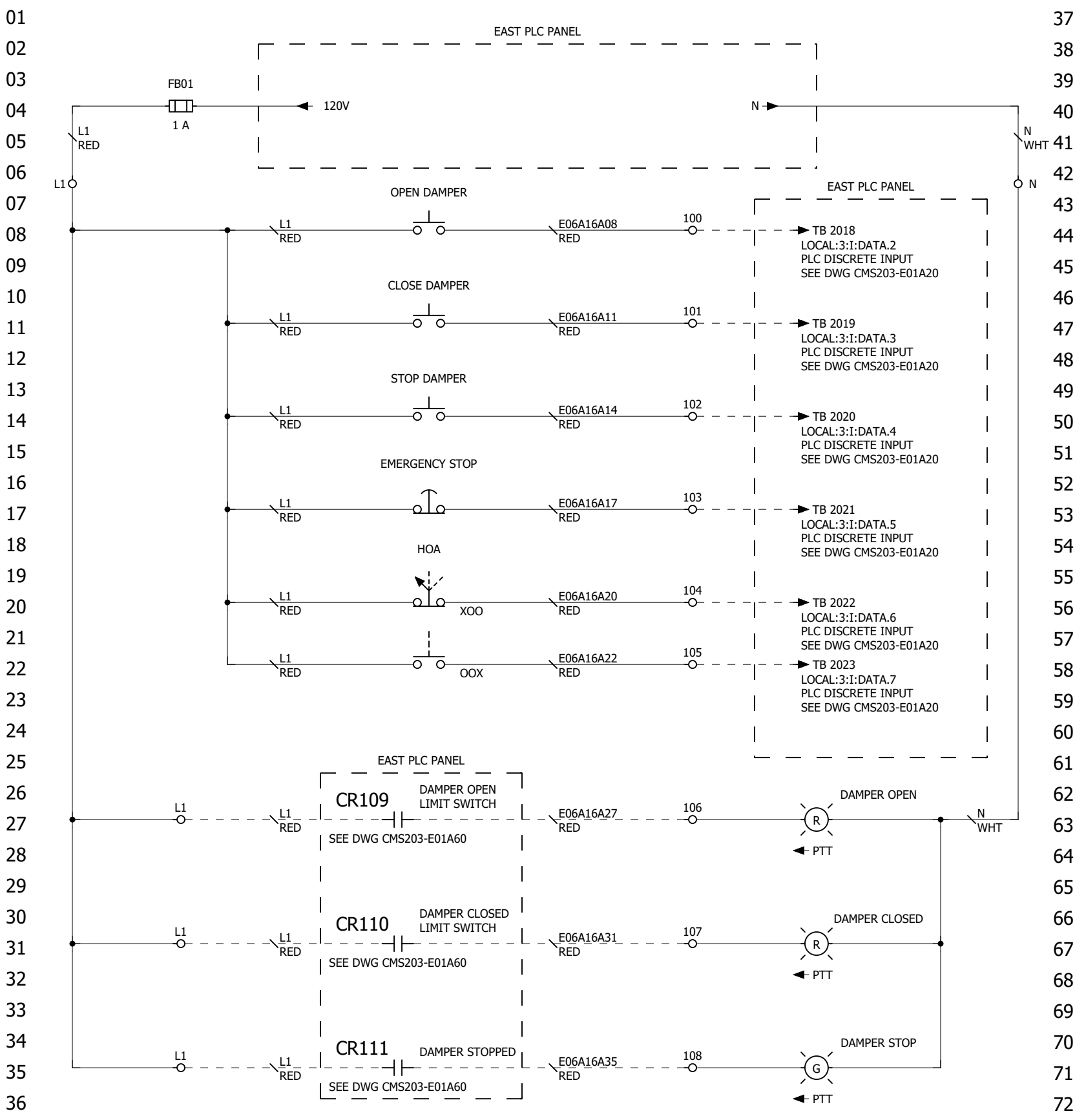
REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/01/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/01/20	ekilgore	INITIAL



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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

EAST EF-4 DAMPER - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS
0.1	04/06/20	ekilgore	HOA ADDITIONS

PROJECT # CMS203 SCALE N/A ENG:E. KILGORE

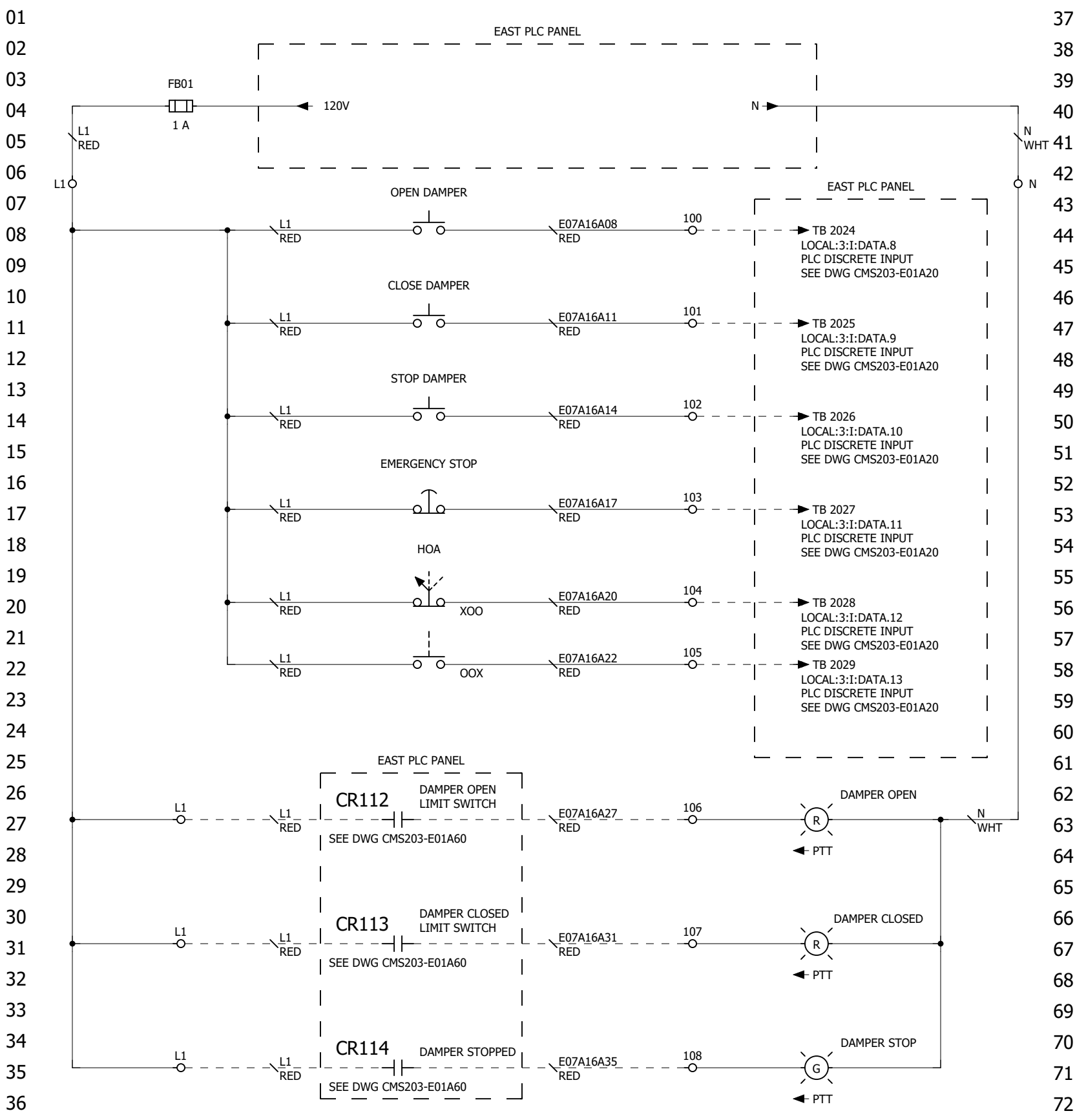
REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/01/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/01/20	ekilgore	INITIAL



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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

EAST SF-1 DAMPER - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS
0.1	04/06/20	ekilgore	HOA ADDITIONS

PROJECT # CMS203 SCALE N/A ENG:E. KILGORE

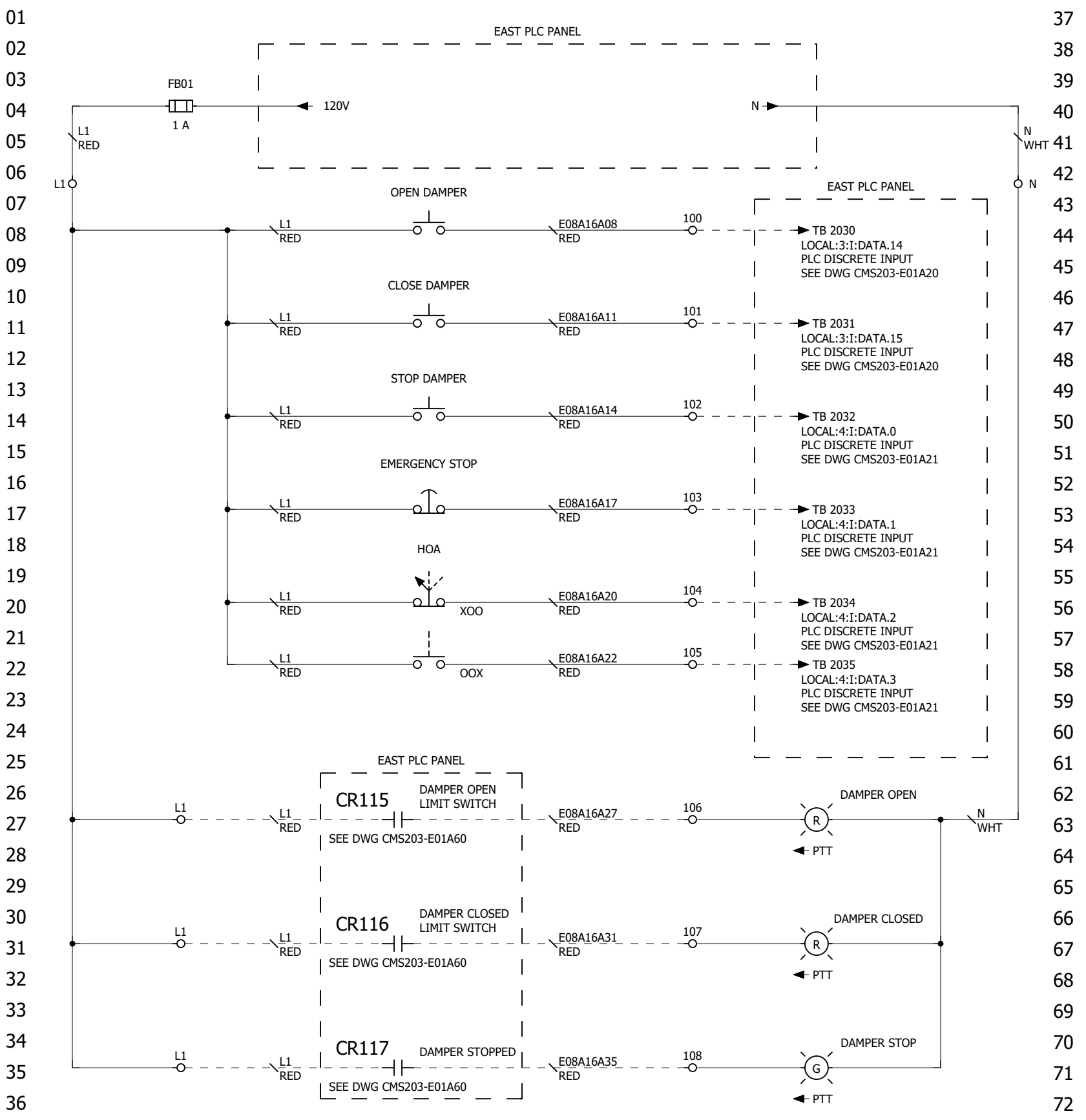
REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/01/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/01/20	ekilgore	INITIAL



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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

EAST SF-2 DAMPER - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS
0.1	04/06/20	ekilgore	HOA ADDITIONS

PROJECT # CMS203 SCALE N/A ENG:E. KILGORE

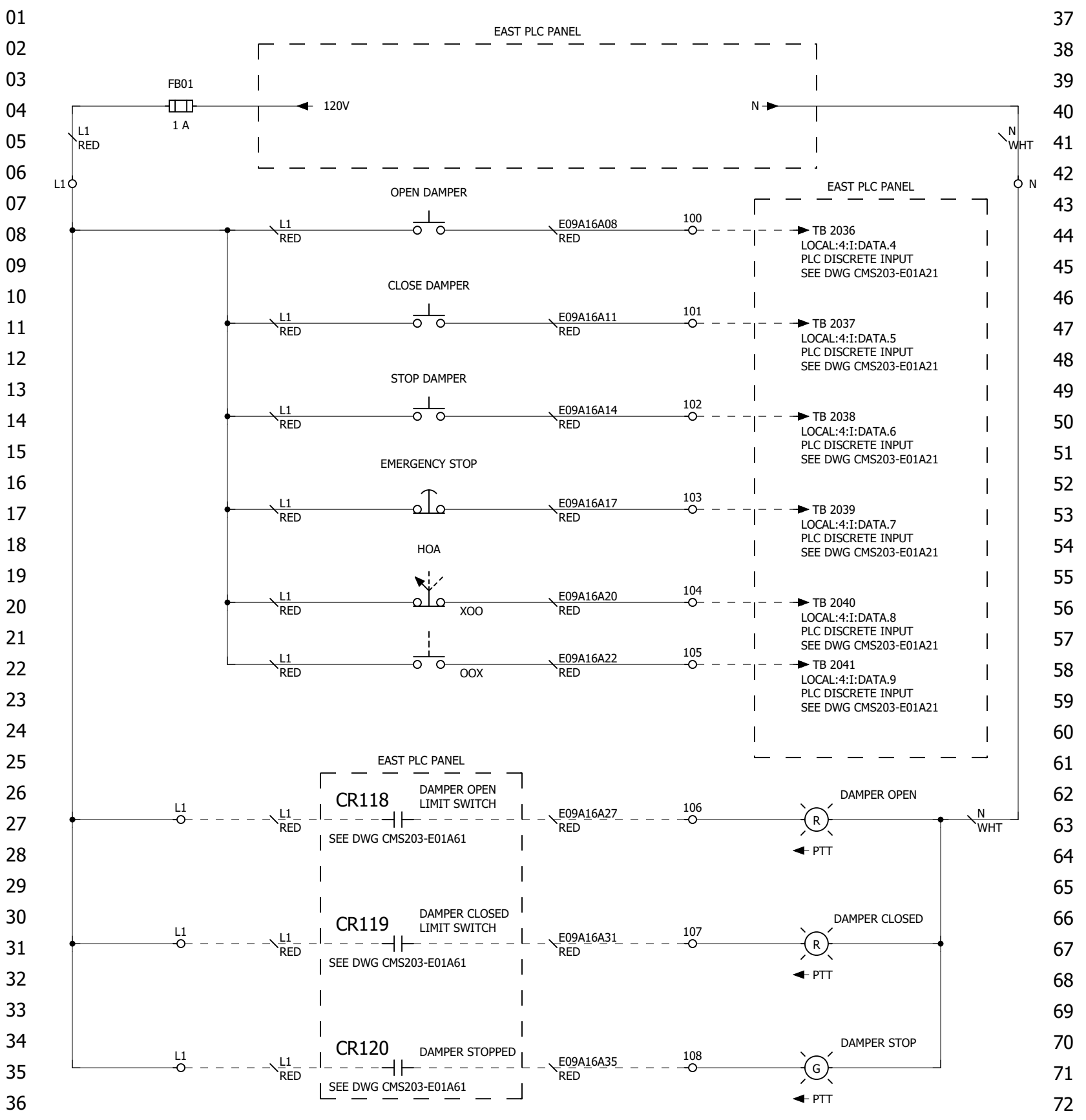
REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/01/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/01/20	ekilgore	INITIAL



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DWG # CMS203-E08A16



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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

EAST SF-3 DAMPER - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS
0.1	04/06/20	ekilgore	HOA ADDITIONS

PROJECT # CMS203 SCALE N/A ENG:E. KILGORE

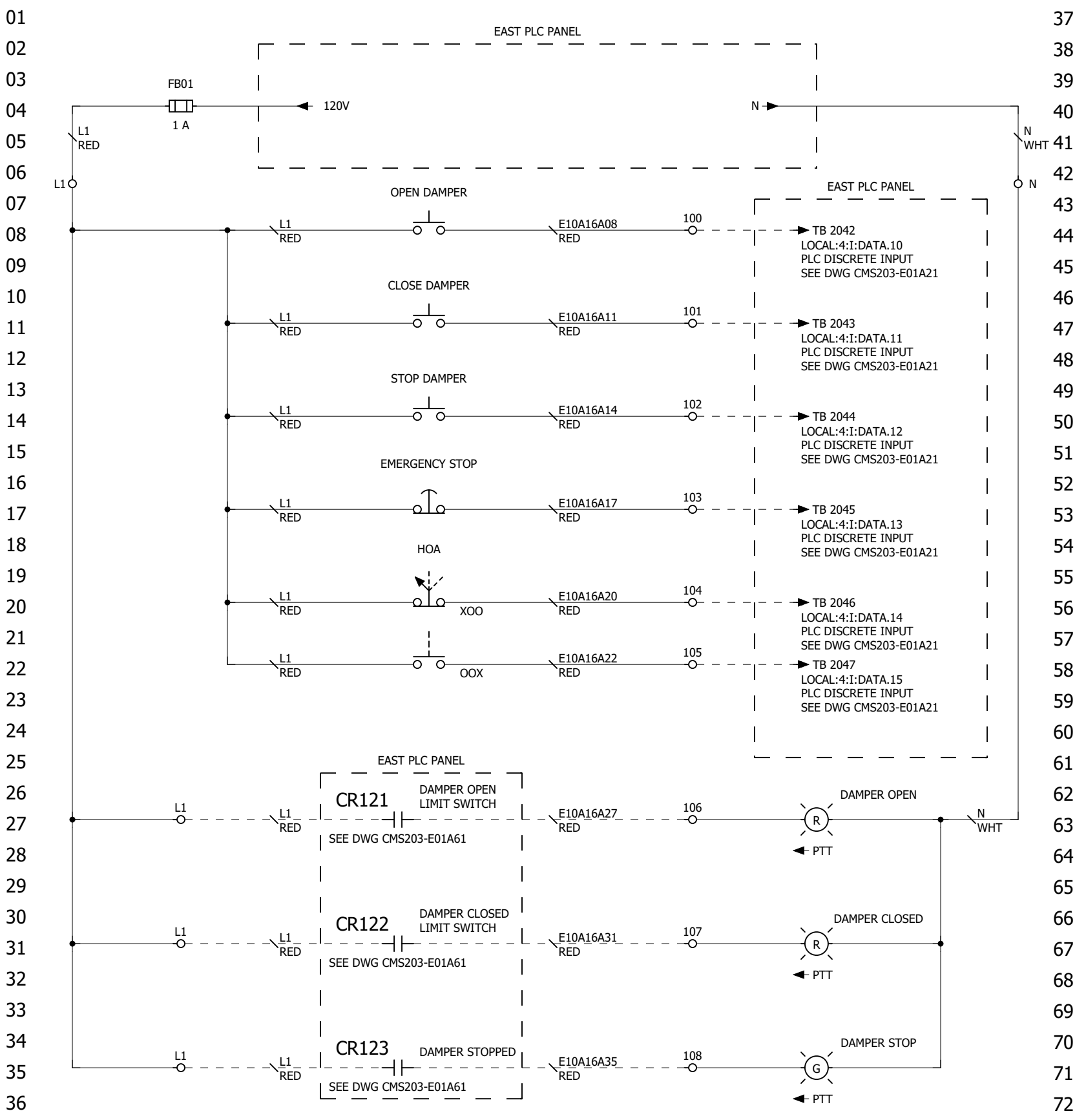
REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/01/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/01/20	ekilgore	INITIAL



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DWG # CMS203-E09A16



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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

EAST SF-4 DAMPER - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS
0.1	04/06/20	ekilgore	HOA ADDITIONS

PROJECT # CMS203 SCALE N/A ENG: E. KILGORE

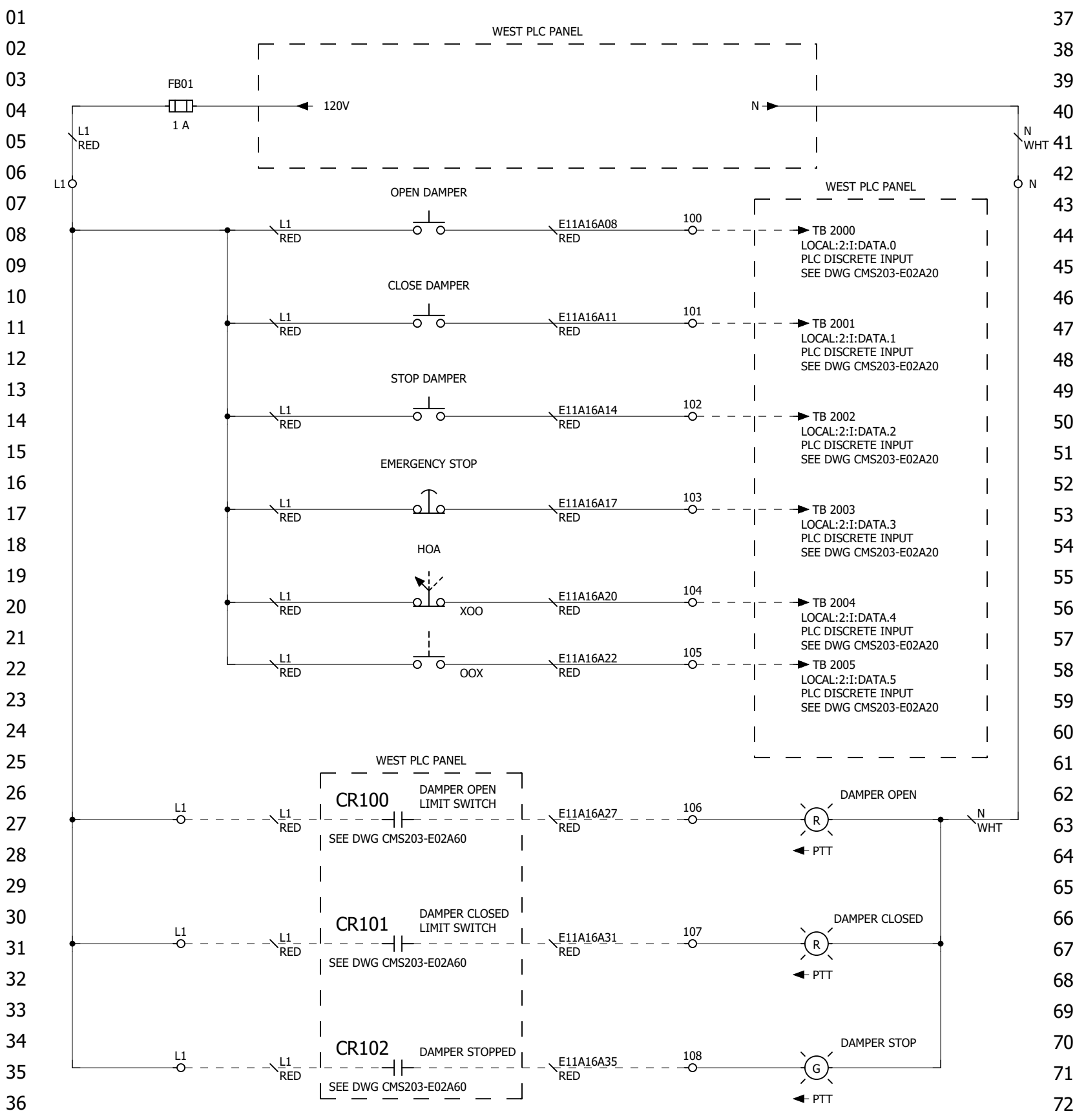
REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/01/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/01/20	ekilgore	INITIAL



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DWG # CMS203-E10A16



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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

WEST EF-1 DAMPER - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS
0.1	04/06/20	ekilgore	HOA ADDITIONS

PROJECT # CMS203 SCALE N/A ENG:E. KILGORE

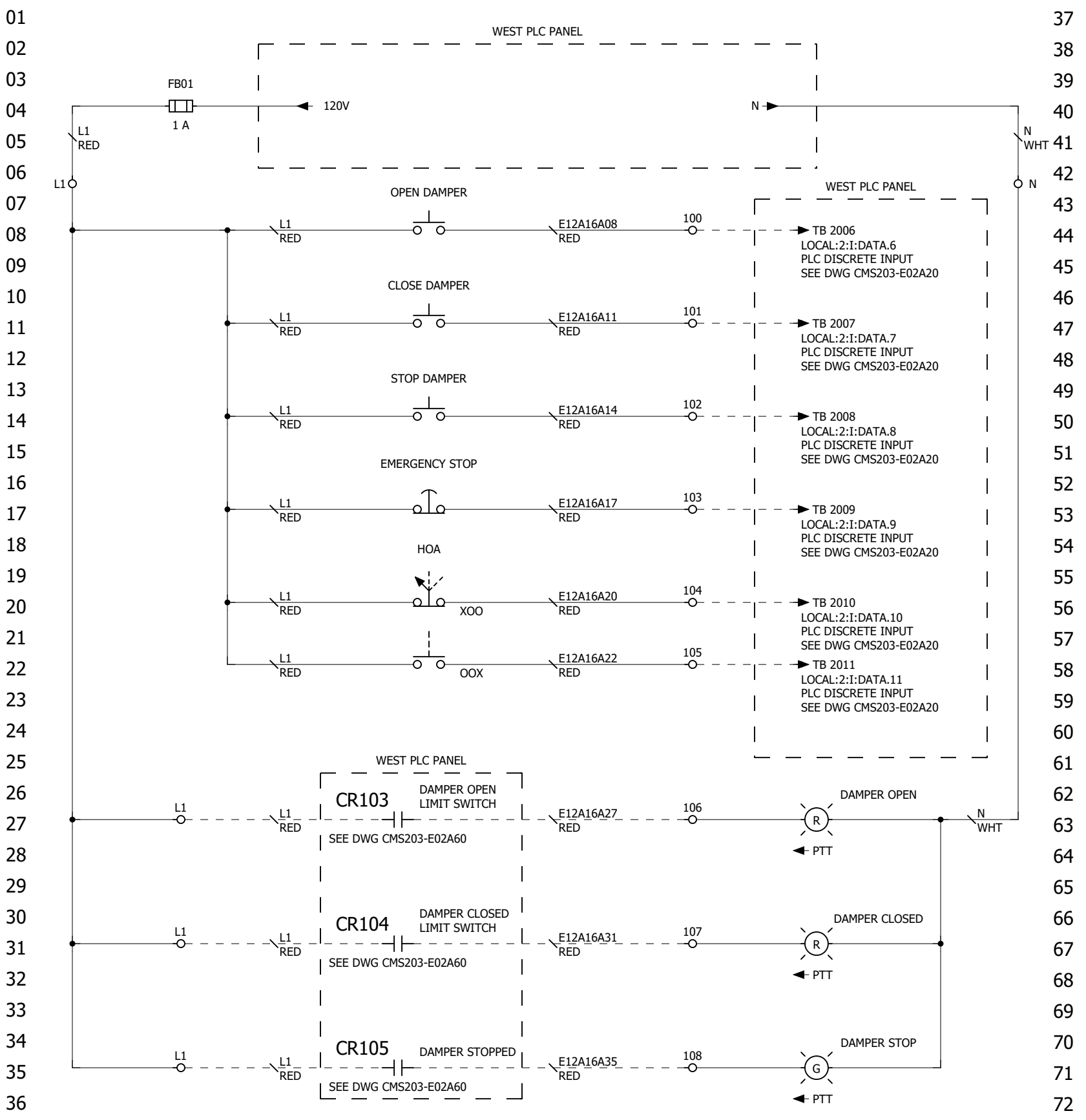
REV	DATE	NAME	REMARKS
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3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/01/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/01/20	ekilgore	INITIAL



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DWG # CMS203-E11A16



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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

WEST EF-2 DAMPER - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS
0.1	04/06/20	ekilgore	HOA ADDITIONS

PROJECT # CMS203 SCALE N/A ENG:E. KILGORE

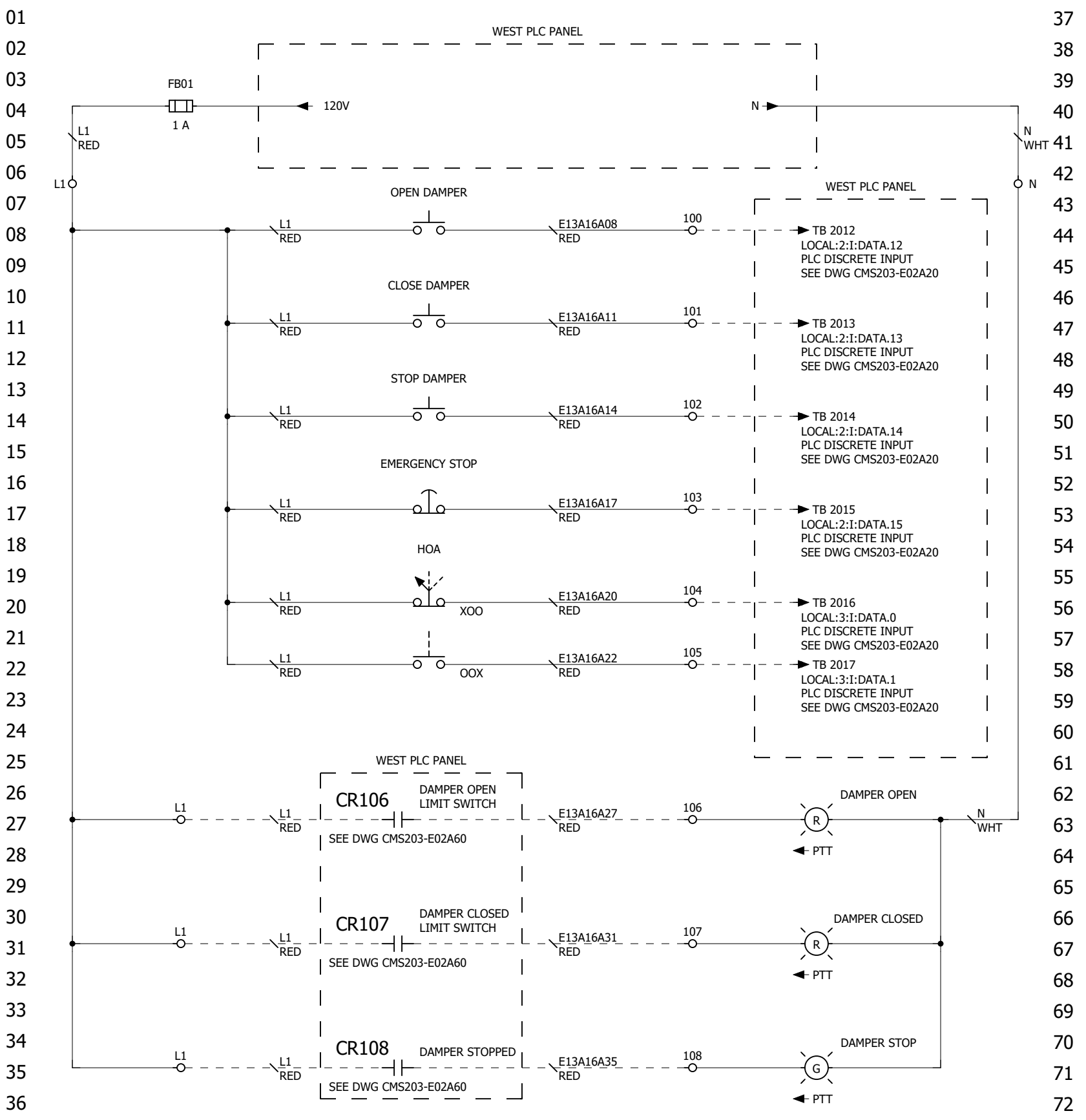
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3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/01/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/01/20	ekilgore	INITIAL



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DWG # CMS203-E12A16



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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

WEST EF-3 DAMPER - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS
0.1	04/06/20	ekilgore	HOA ADDITIONS

PROJECT # CMS203 SCALE N/A ENG:E. KILGORE

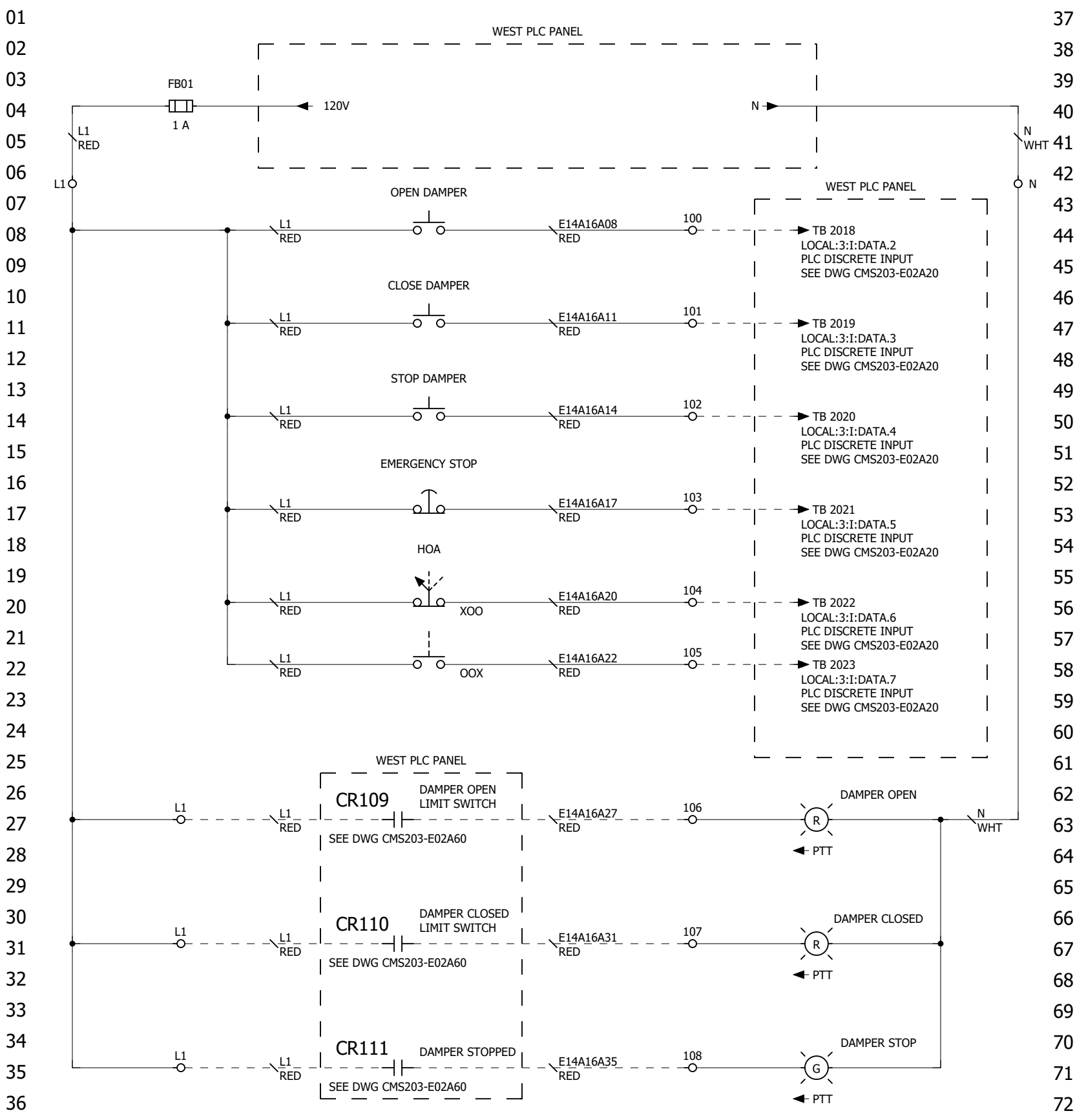
REV	DATE	NAME	REMARKS
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3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/01/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/01/20	ekilgore	INITIAL



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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

WEST EF-4 DAMPER - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS
0.1	04/06/20	ekilgore	HOA ADDITIONS

PROJECT # CMS203 SCALE N/A ENG:E. KILGORE

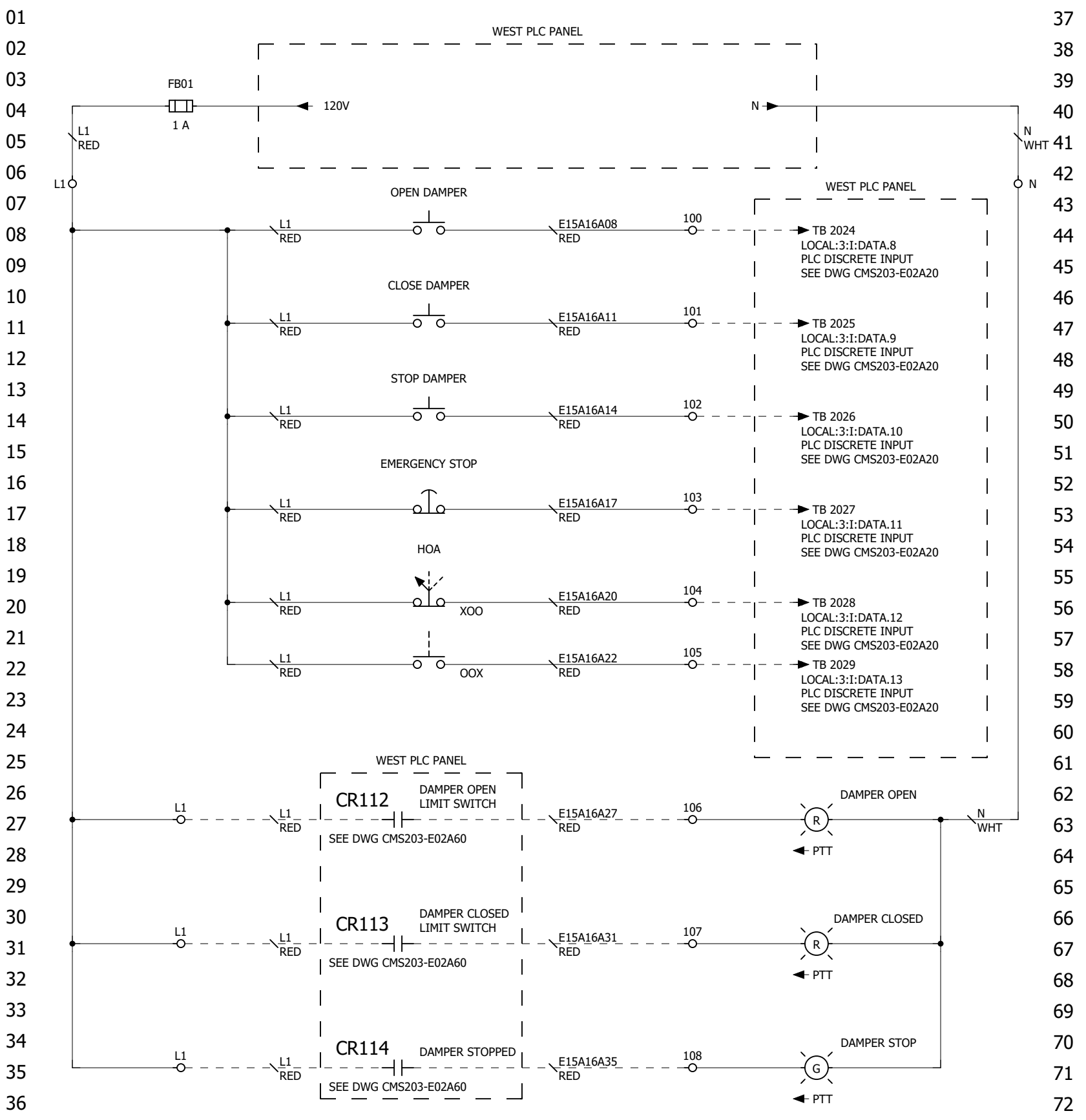
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3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/01/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/01/20	ekilgore	INITIAL



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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

WEST SF-1 DAMPER - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS
0.1	04/06/20	ekilgore	HOA ADDITIONS

PROJECT # CMS203 SCALE N/A ENG:E. KILGORE

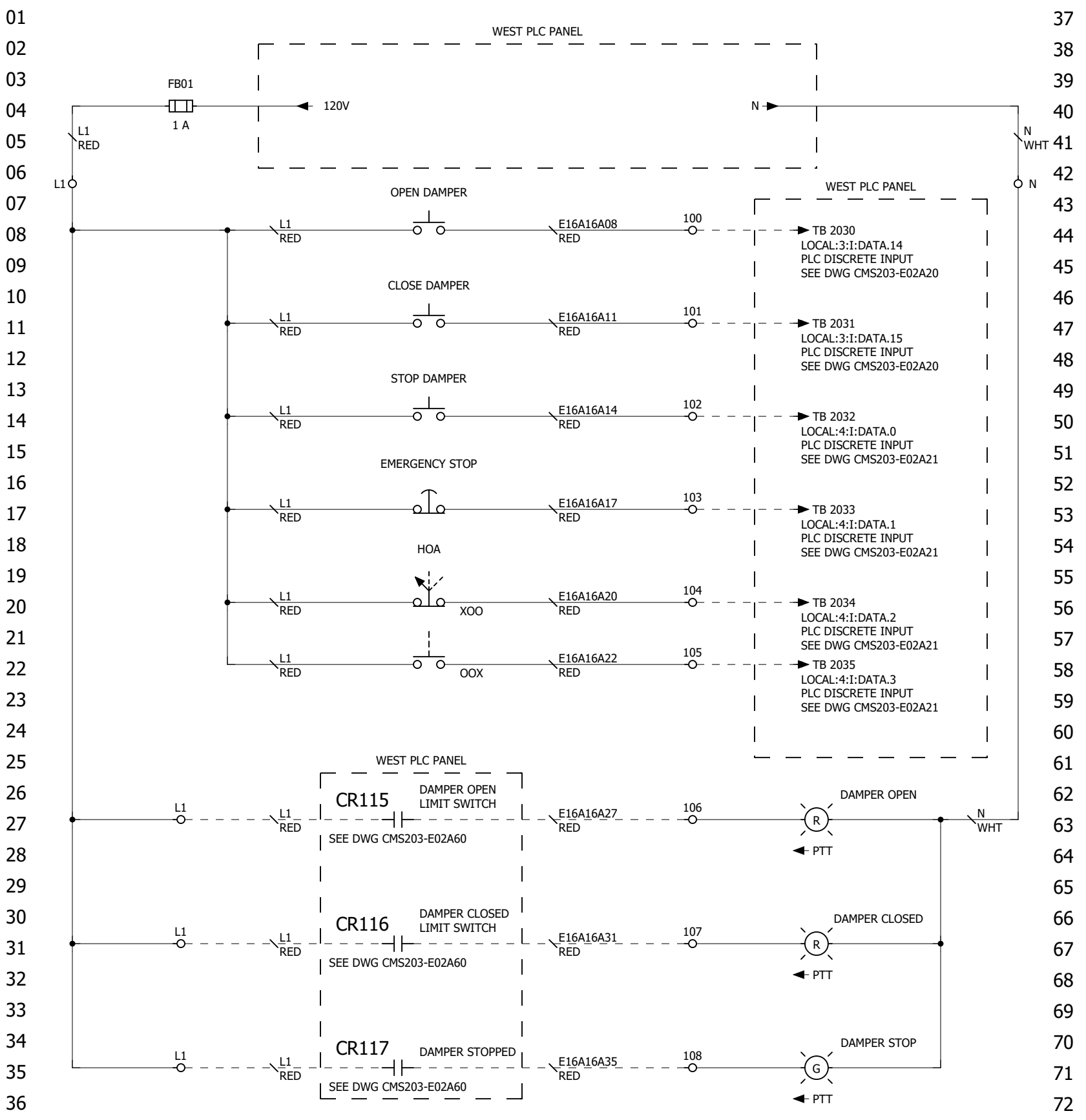
REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/01/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/01/20	ekilgore	INITIAL



5301 NORTH 57TH STREET
LINCOLN, NEBRASKA 68507
(402) 464-6823

112 INVERNESS CIRCLE EAST, SUITE E
ENGLEWOOD, COLORADO 80112
(303) 376-6280

DWG # CMS203-E15A16



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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

WEST SF-2 DAMPER - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS
0.1	04/06/20	ekilgore	HOA ADDITIONS

PROJECT # CMS203 SCALE N/A ENG:E. KILGORE

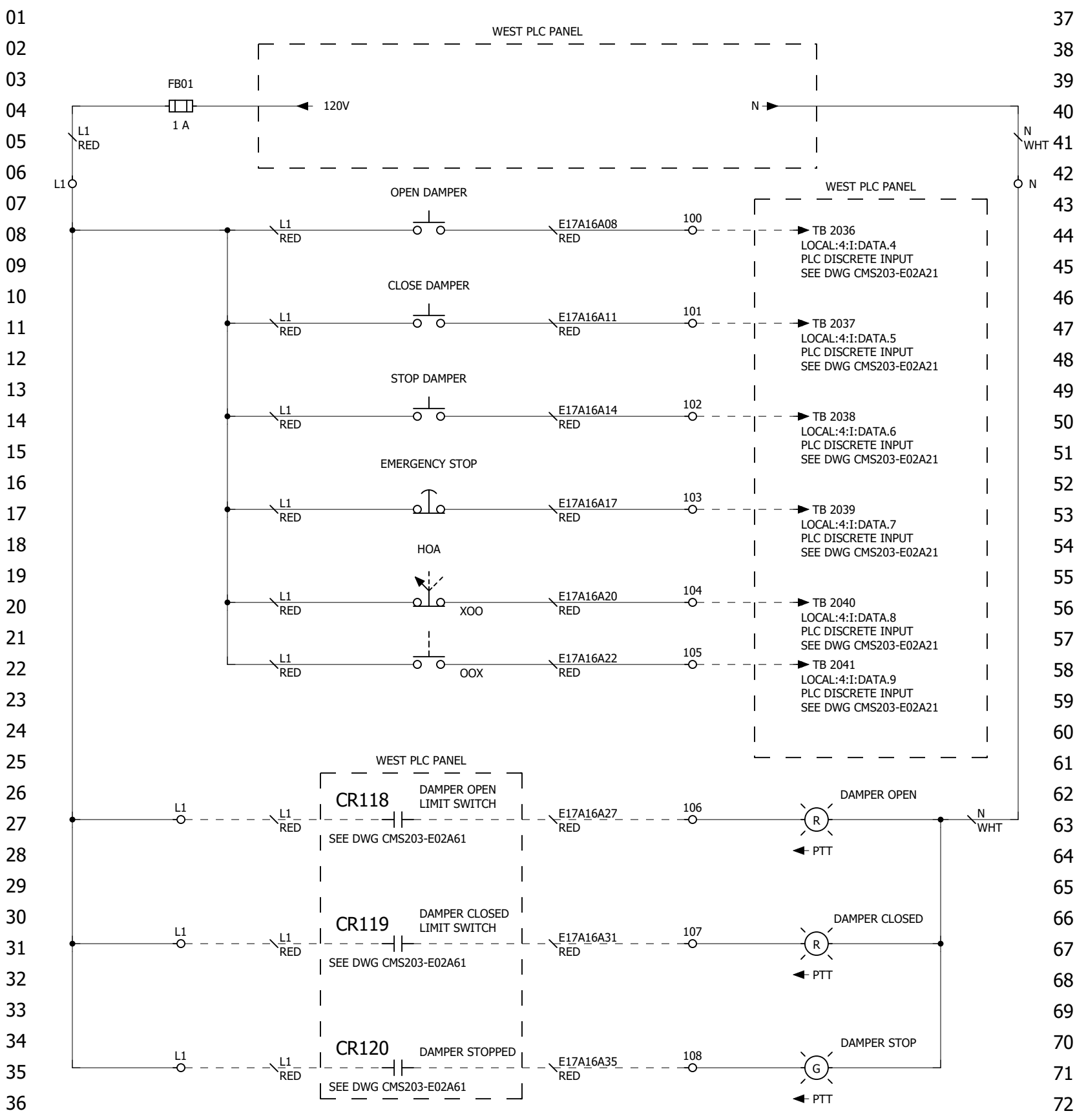
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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

WEST SF-3 DAMPER - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS
0.1	04/06/20	ekilgore	HOA ADDITIONS

PROJECT # CMS203 SCALE N/A ENG:E. KILGORE

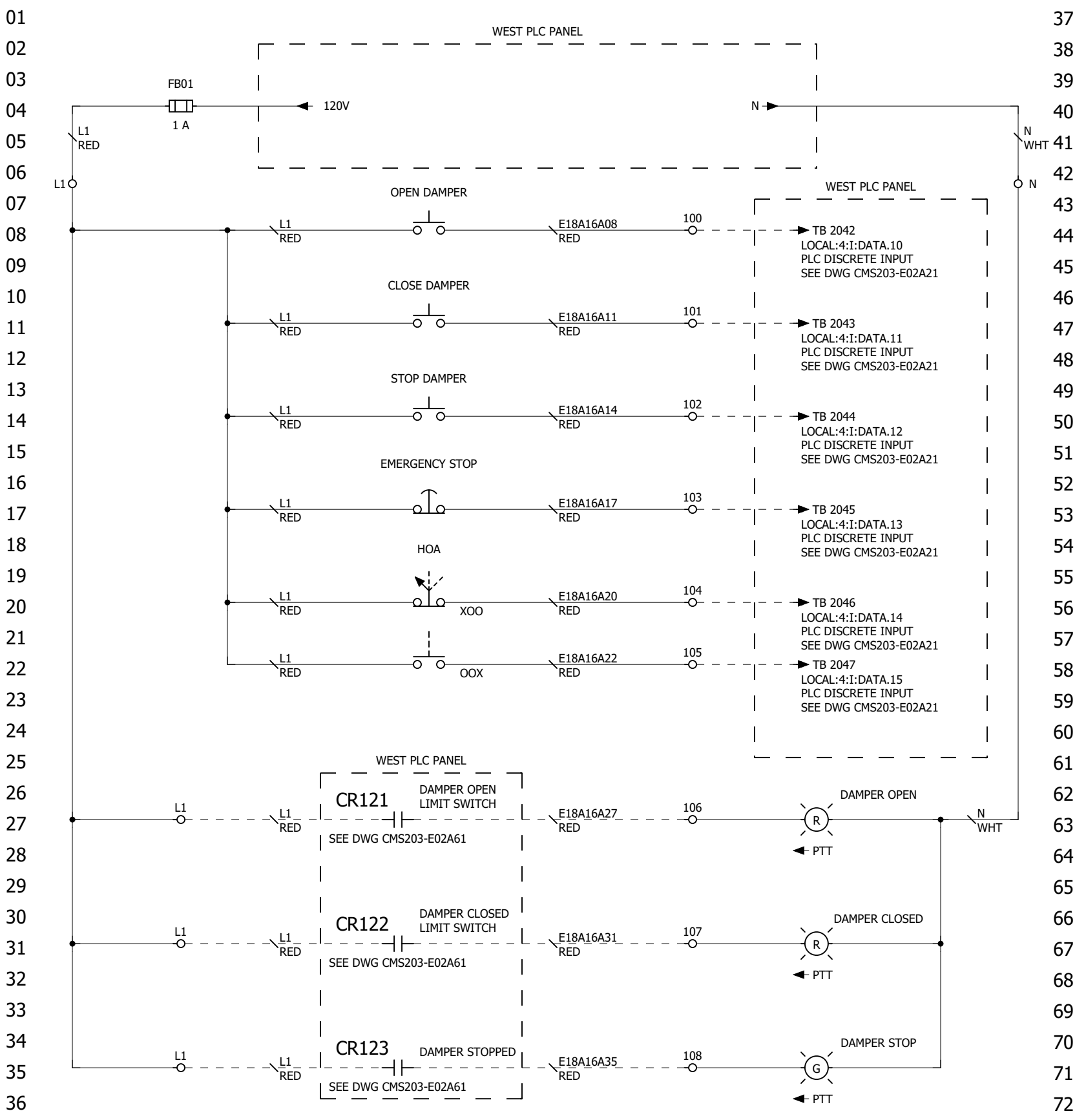
REV	DATE	NAME	REMARKS
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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

WEST SF-4 DAMPER - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS
0.1	04/06/20	ekilgore	HOA ADDITIONS

PROJECT # CMS203 SCALE N/A ENG:E. KILGORE

REV	DATE	NAME	REMARKS
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DWG # CMS203-E18A16

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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

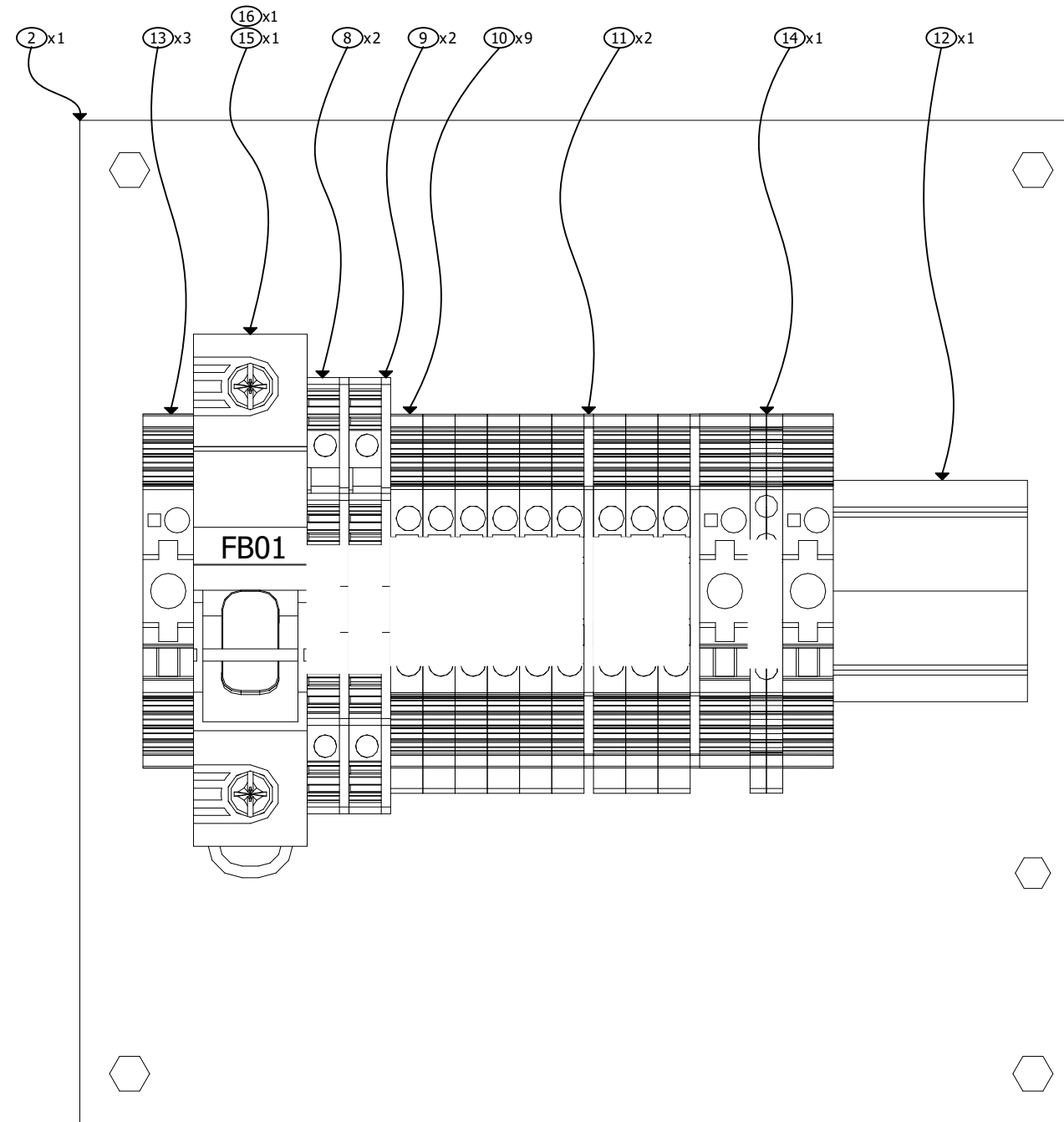
ELECTRICAL SYMBOLS		ELECTRICAL SYMBOLS CONTINUED		FUSE SCHEDULE				PANEL DRAWING INDEX				
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	FUSE#	QTY	FUSE TYPE	SIZE	MFGR	PART#	DESCRIPTION	DESCRIPTION	DWG #
	RELAY CONTACT, NORMALLY CLOSED RELAY CONTACT, NORMALLY OPEN LIMIT SWITCH, NORMALLY CLOSED LIMIT SWITCH, NORMALLY CLOSED, HELD OPEN LIMIT SWITCH, NORMALLY OPEN LIMIT SWITCH, NORMALLY OPEN, HELD CLOSED PRESSURE SWITCH, NORMALLY CLOSED PRESSURE SWITCH, NORMALLY OPEN PUSHBUTTON, NORMALLY CLOSED PUSHBUTTON, NORMALLY OPEN PUSHBUTTON, NORMALLY CLOSED, HELD OPEN MUSHROOM HEAD PUSH BUTTON, NORMALLY CLOSED MUSHROOM HEAD PUSH BUTTON, NORMALLY OPEN 2 POSITION SELECTOR SWITCH, CLOSED 2 POSITION SELECTOR SWITCH, OPEN TEMPERATURE SWITCH, NORMALLY CLOSED TEMPERATURE SWITCH, NORMALLY OPEN TIMER CONTACT, NORMALLY CLOSED, TIMED OPEN TIMER CONTACT, NORMALLY CLOSED, TIMED OPEN, SHOWN OPEN TIMER CONTACT, NORMALLY OPEN, TIMED CLOSED TIMER CONTACT, NORMALLY OPEN, TIMED CLOSED, SHOWN CLOSED FLOW SWITCH, NORMALLY CLOSED FLOW SWITCH, NORMALLY OPEN PROXIMITY SWITCH, NORMALLY OPEN LEVEL SWITCH, NORMALLY CLOSED LEVEL SWITCH, NORMALLY OPEN RELAY COIL SOLENOID VALVE PILOT LIGHT (R=RED, A=AMBER, B=BLUE, G=GREEN) NODE TERMINAL BLOCK KNIFE TERMINAL BLOCK TERMINAL BLOCK, FUSED		GROUND MOTOR ALARM HORN MOTOR STARTER COIL FIELD WIRING INTERNAL PANEL WIRING CAPACITOR MOTION DETECTOR	FB01	1	CLASS CC	1A	MERSEN	ATDR1	INCOMING FEED	COOLING FAN CONTROL STATIONS - INDEX SHEET COOLING FAN CONTROL STATIONS - BACK PANEL LAYOUT COOLING FAN CONTROL STATIONS - FRONT PANEL LAYOUT COOLING FAN CONTROL STATIONS - ENGRAVED TAG DETAILS COOLING FAN CONTROL STATION - BILL OF MATERIAL (TYPICAL) EAST SF-1 COOLING FAN - CONTROL POWER DISTRIBUTION EAST SF-2 COOLING FAN - CONTROL POWER DISTRIBUTION EAST SF-3 COOLING FAN - CONTROL POWER DISTRIBUTION EAST SF-4 COOLING FAN - CONTROL POWER DISTRIBUTION WEST SF-1 COOLING FAN - CONTROL POWER DISTRIBUTION WEST SF-2 COOLING FAN - CONTROL POWER DISTRIBUTION WEST SF-3 COOLING FAN - CONTROL POWER DISTRIBUTION WEST SF-4 COOLING FAN - CONTROL POWER DISTRIBUTION	CMS203-E19A00 CMS203-E19A01 CMS203-E19A02 CMS203-E19A02A CMS203-E19A03 CMS203-E19A16 CMS203-E20A16 CMS203-E21A16 CMS203-E22A16 CMS203-E23A16 CMS203-E24A16 CMS203-E24A16 CMS203-E25A16 CMS203-E26A16
		ABBREVIATIONS										
		ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION							
		A AC AWG BRN BLU BLK C CB CR DC DIV ES ESR F, FU FB GRN GND GFR H HP IPT J-BOX KVA LS LT FLEX M MC MCC MCR MHPB MS	AMPERE, AMBER ALTERNATING CURRENT AMERICAN WIRE GAUGE BROWN BLUE BLACK CONTACTOR CIRCUIT BREAKER CONTROL RELAY DIRECT CURRENT DIVISION EMERGENCY STOP EMERGENCY STOP RELAY FUSE FUSE BLOCK GREEN GROUND GROUND FAULT RELAY HORN HORSEPOWER CURRENT TO PRESSURE TRANSDUCER JUNCTION BOX KILOVOLT AMPS LIMIT SWITCH LIQUID TIGHT FLEX CONDUIT MOTOR MOTOR CONTACTOR MOTOR CONTROL CENTER MASTER CONTROL RELAY MUSHROOM HEAD PUSHBUTTON MOTOR STARTER	N NC NO OL ORN P PB PS PT PIT RTD REV SR SS SV TB TC TDR V VA VFD VIO W WHT XFMR YEL Ø	NEUTRAL NORMALLY CLOSED NORMALLY OPEN OVERLOAD RELAY ORANGE POLE PUSHBUTTON SWITCH PRESSURE SWITCH, POWER SUPPLY PRESSURE TRANSMITTER PRESSURE TO CURRENT TRANSDUCER RESISTIVE TEMPERATURE DETECTOR REVERSE SAFETY RELAY SELECTOR SWITCH SOLENOID VALVE TERMINAL BLOCK THERMOCOUPLE TIME DELAY RELAY VOLTAGE VOLT AMPS VARIABLE FREQUENCY DRIVE VIOLET WATT WHITE TRANSFORMER YELLOW PHASE							
		LABEL DEFINITIONS										
		<p>WIRE NUMBERS E01A20A01 — LINE NUMBER ON THE DRAWING (01, 02, ETC.) — WIRE POSITION ON THE LINE (A, B, ETC.) — DRAWING NUMBER (E01A30, E01A40, ETC.)</p> <p>THREE LINE WIRE NUMBERS 280-L100A — WIRE POSITION — A TWO DIGIT NUMBER — PHASE — A LETTER FOR SEPARATION — VOLTAGE</p> <p>CROSS REFERENCES (E01A20:01) — RAIL NUMBER — DRAWING NUMBER</p> <p>DRAWING NUMBERS AA000-E01A20 — THESE TWO CHARACTERS INDICATE THE TYPE OF DRAWING — LETTER INDICATES IF THIS IS THE ORIGINAL PROJECT OR SUBSEQUENT BUT ESSENTIALLY IDENTICAL PROJECT — PANEL DESIGNATION WITHIN THE PROJECT. 00=DRAWINGS FOR PROJECT, BUT NOT PANEL SPECIFIC, 01=FIRST PANEL, 02=SECOND PANEL, ETC. — DESIGNATES THE DRAWING AS ELECTRICAL — PROJECT NUMBER</p>										
		WIRE COLOR CODE										
		COLOR	DESCRIPTION									
		BLACK	ALL UNGROUNDED CIRCUIT CONDUCTORS OPERATING AT A VOLTAGE GREATER THAN 120VAC									
		WHITE OR GREY	GROUNDED AC CURRENT CARRYING CONTROL CIRCUIT CONDUCTOR									
		GREEN OR GREEN/YELLOW	GROUNDING CONDUCTOR									
		BLUE	UNGROUNDED DC CONTROL CIRCUITS									
		WHITE/BLUE STRIPE	DC COMMON CONTROL CIRCUIT CONDUCTOR									
		ORANGE	UNGROUNDED CONTROL CIRCUITS OR OTHER WIRING THAT MAY BE ENERGIZED WHEN MAIN DISCONNECT IS OFF									
		WHITE/ORANGE STRIPE	GROUNDED AC CONTROL CIRCUIT CURRENT CARRYING CONDUCTOR THAT REMAINS ENERGIZED WHEN THE MAIN DISCONNECT IS IN THE OFF POSITION									
		RED	UNGROUNDED CIRCUIT CONDUCTORS OPERATING AT 120VAC									
		VARIES	ANALOG INPUT, 2 COND. (SHIELDED)									
		VARIES	ANALOG OUTPUT, 2 COND. (SHIELDED)									

STATE OF COLORADO DEPARTMENT OF TRANSPORTATION EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT				COOLING FAN CONTROL STATIONS - INDEX SHEET				REV	DATE	NAME	REMARKS
				PROJECT # CMS203		SCALE N/A		ENG:E. KILGORE			
				REV	DATE	NAME	REMARKS				
				4.0	09/09/21	ekilgore	AS-BUILTS				
				3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION				
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				1.0	04/01/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL				
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								DWG #	CMS203-E19A00		



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ITEM #	DESCRIPTION	TORQUE
1492-JD3C	TERMINAL BLOCK, 2 TIER	4.5 LB. IN.
1492-J3	TERMINAL BLOCK, 1 TIER	4.5 LB. IN.
1492-JG3	TERMINAL BLOCK, 2 TIER, GROUNDING	7.1 LB. IN.
1492-FB1C30-L	CLASS CC FUSEHOLDER, 1P, WITH INDICATION	22 LB. IN.

STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

COOLING FAN CONTROL STATIONS - BACK PANEL LAYOUT

REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
0.1	04/06/20	ekilgore	HOA ADDITIONS

PROJECT # CMS203

SCALE 1:1

ENG:E. KILGORE



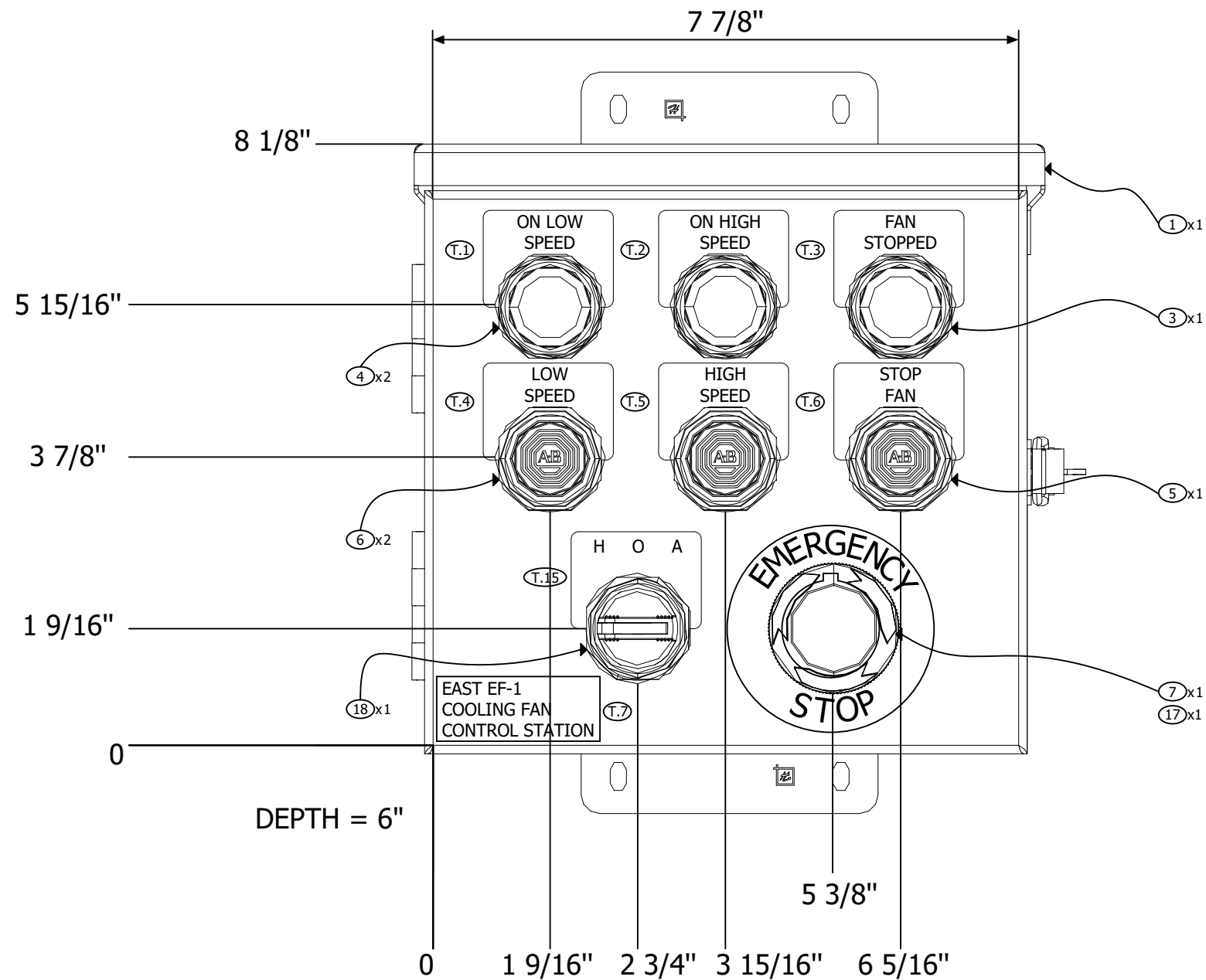
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DWG #

CMS203-E19A01



STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

COOLING FAN CONTROL STATIONS - FRONT PANEL LAYOUT

PROJECT # CMS203

SCALE 1:2

ENG:E. KILGORE

REV	DATE	NAME	REMARKS
1.0	05/11/20	ekilgore	DIMENSIONS
0.3	04/06/20	ekilgore	HOA ADDITIONS
0.2	04/06/20	ekilgore	HOA ADDITIONS
0.1	04/06/20	ekilgore	HOA ADDITIONS



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DWG # CMS203-E19A02

CUSTOM BUILT BY **HUFFMAN ENGINEERING INC.** 5301 North 57th Street
Lincoln, NE 68507
402-464-6823

PROJECT # **CMS203** DATE **JUN 2020**

PANEL # **EAST SF-1 COOLING FAN CONTROL STATION**

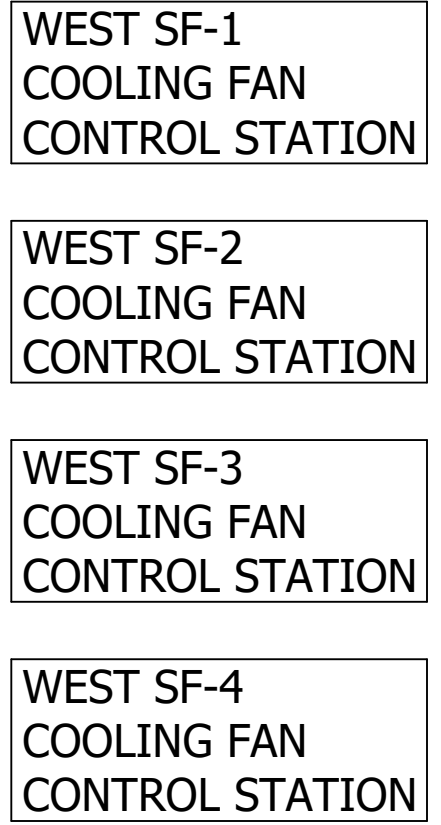
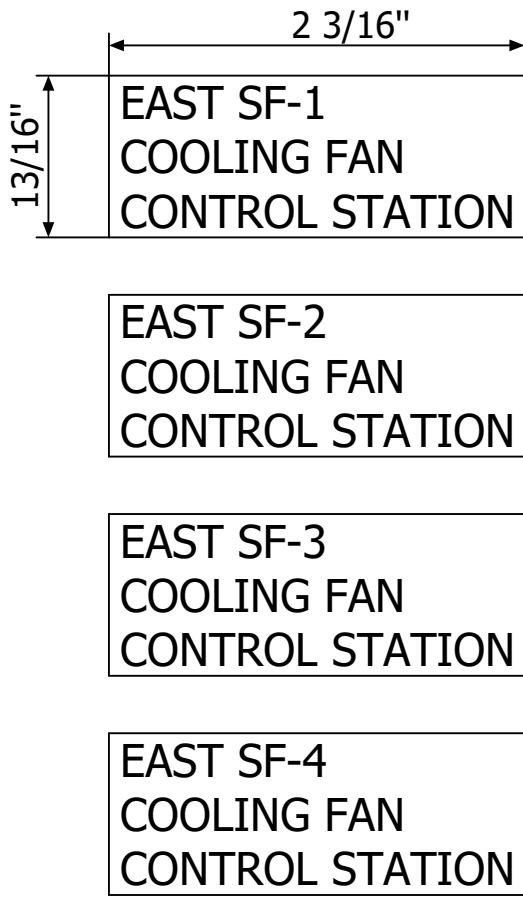
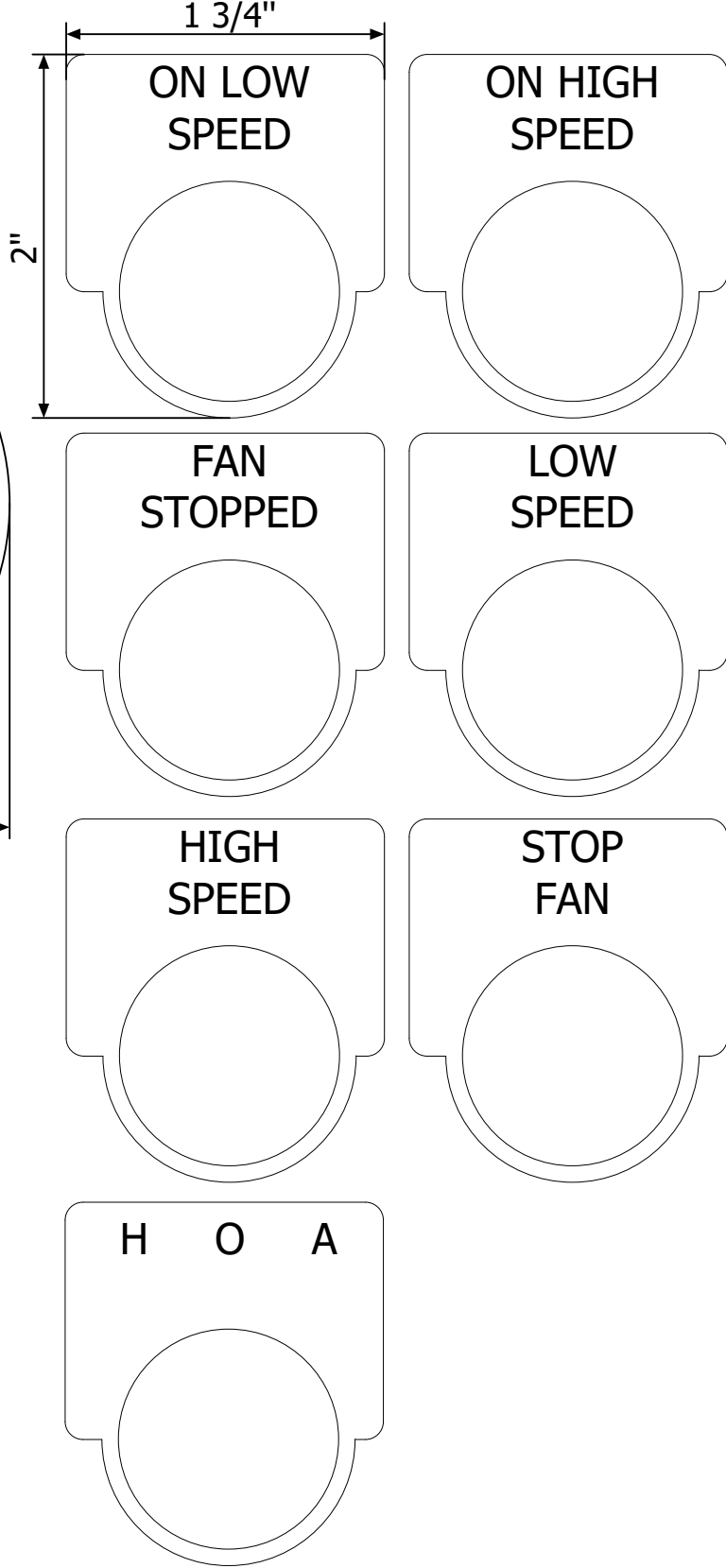
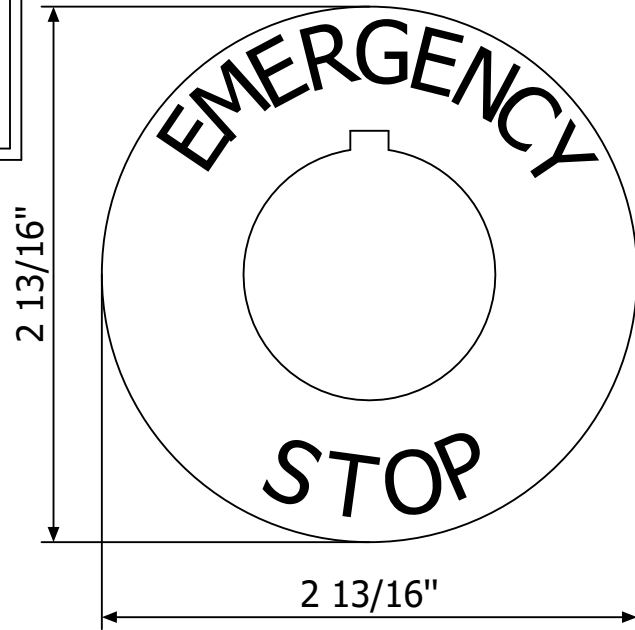
INTERRUPT RATING **200kA** TOTAL FLA **1**

LARGEST MTR FLA **N/A** SCCR **10kA**

VOLTS **120** HZ. **60** PHASE **1** ENCL TYP **3R**

ELECT DWG INDEX # **CMS203-E04A00**

LABELS TO INCLUDE ON ENCLOSURE	
INCLUDE	DESCRIPTION
NO	ARC FLASH HAZARD
120VAC	SUPPLY VOLTAGE
NO	MULTIPLE SOURCES
YES	UL (UNDERWRITERS LABORATORY)
NO	IS (INTRINSICALLY SAFE)
YES	HUFFMAN ENGINEERING INC. LOGO STICKER
NO	UPS WARNING



LEGEND PLATE SCHEDULE						
ITEM NO.	FIRST LINE	SECOND LINE	THIRD LINE	LEGEND PLATE COLOR	TEXT COLOR	TEXT HEIGHT
T.1	ON LOW	SPEED		BLACK	WHITE	5/32"
T.2	ON HIGH	SPEED		BLACK	WHITE	5/32"
T.3	FAN	STOPPED		BLACK	WHITE	5/32"
T.4	LOW	SPEED		BLACK	WHITE	5/32"
T.5	HIGH	SPEED		BLACK	WHITE	5/32"
T.6	STOP	FAN		BLACK	WHITE	5/32"
T.7	EAST SF-1	COOLING FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.8	EAST SF-2	COOLING FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.9	EAST SF-3	COOLING FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.10	EAST SF-4	COOLING FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.11	WEST SF-1	COOLING FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.12	WEST SF-2	COOLING FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.13	WEST SF-3	COOLING FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.14	WEST SF-4	COOLING FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.15	H O A			BLACK	WHITE	5/32"

STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

COOLING FAN CONTROL STATIONS - ENGRAVED TAG DETAILS

PROJECT # CMS203 SCALE N/A ENG:E. KILGORE

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DWG # CMS203-E19A02A

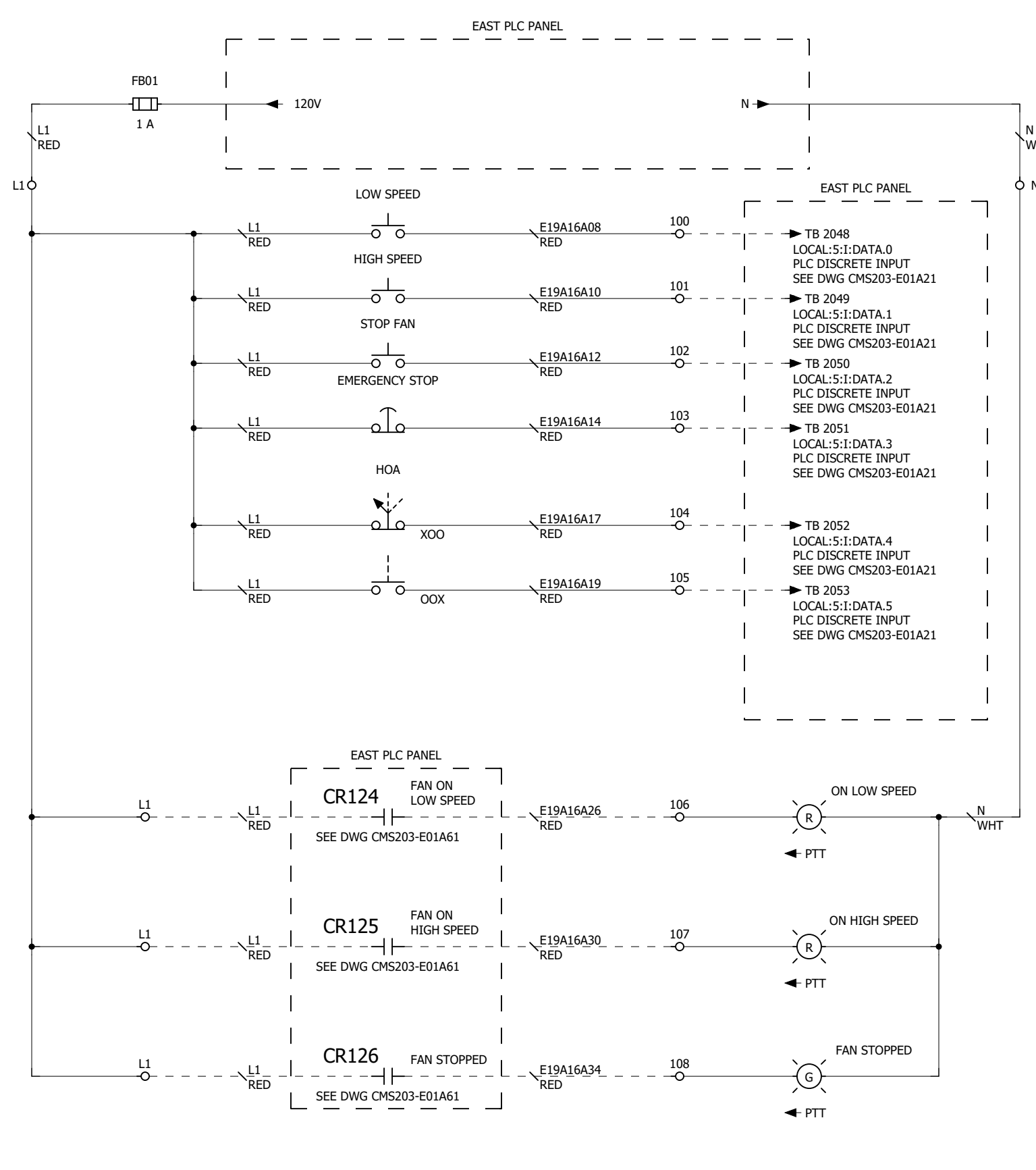


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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

EAST SF-1 COOLING FAN - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS
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PROJECT # CMS203 SCALE N/A ENG:E. KILGORE

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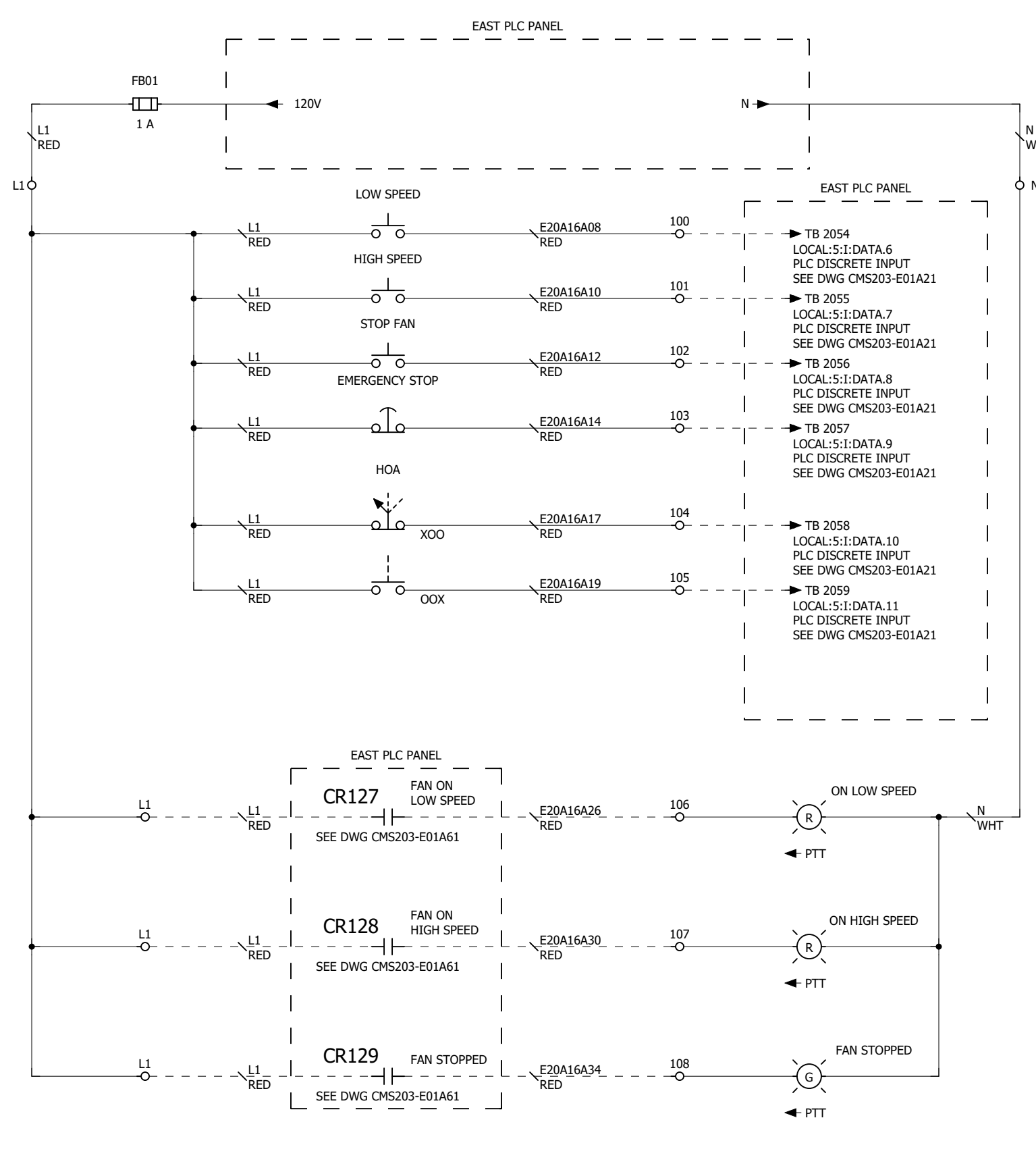
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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

EAST SF-2 COOLING FAN - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS
0.1	04/06/20	ekilgore	HOA ADDITIONS

PROJECT # CMS203 SCALE N/A ENG: E. KILGORE

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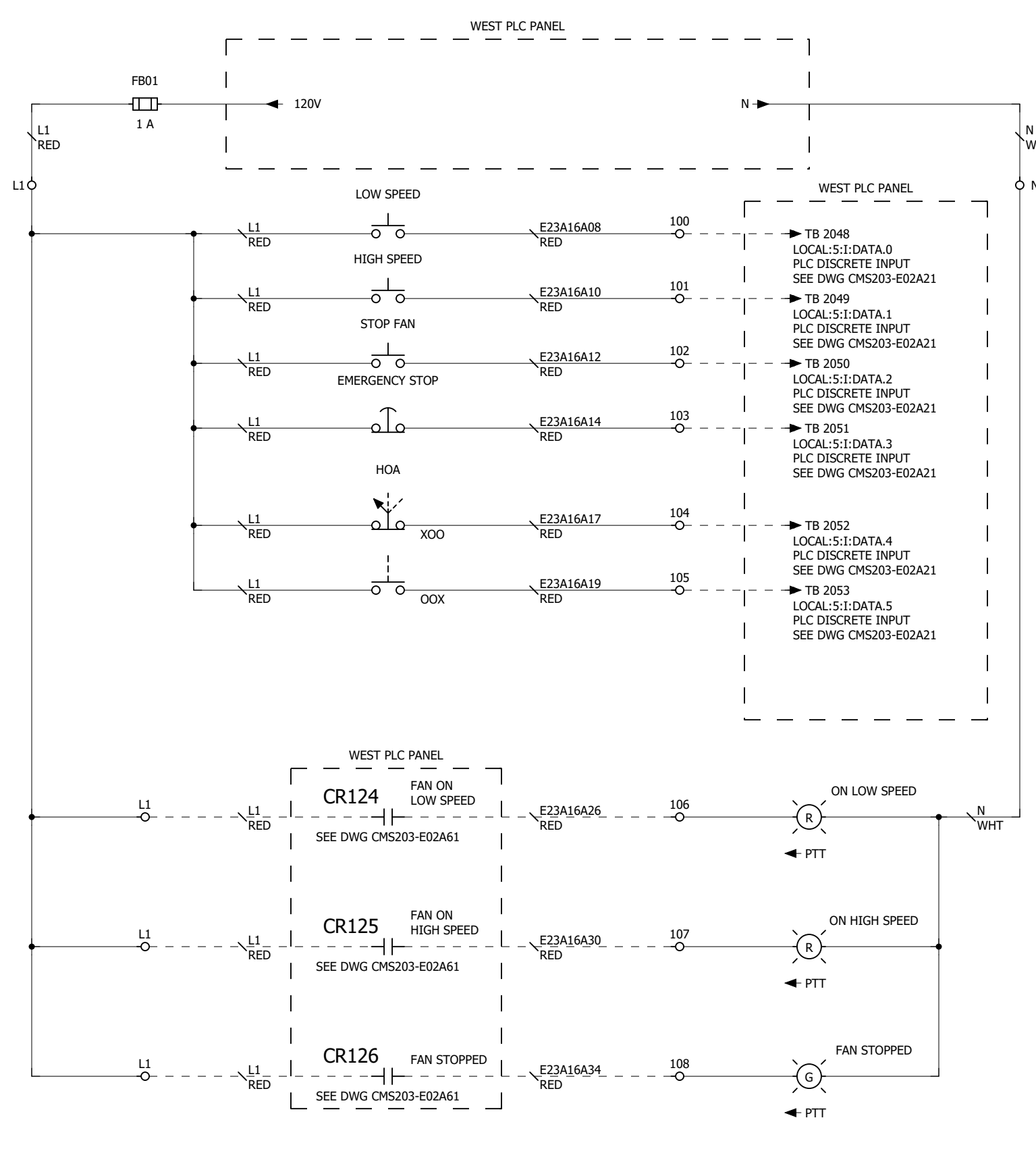
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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

WEST SF-1 COOLING FAN - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS
0.1	04/06/20	ekilgore	HOA ADDITIONS

PROJECT # CMS203 SCALE N/A ENG: E. KILGORE



5301 NORTH 57TH STREET
LINCOLN, NEBRASKA 68507
(402) 464-6823

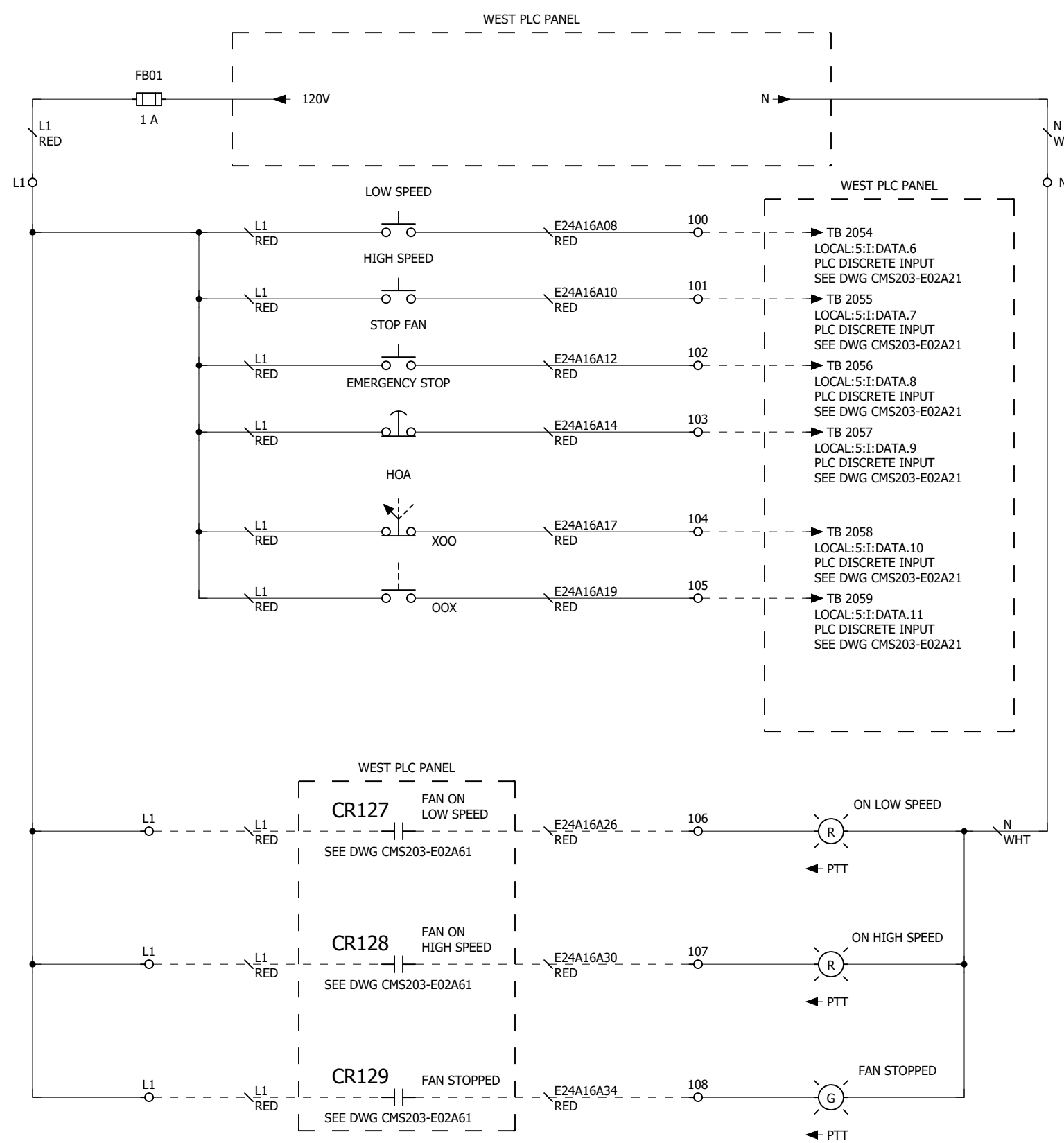
112 INVERNESS CIRCLE EAST, SUITE E
ENGLEWOOD, COLORADO 80112
(303) 376-6280

REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/01/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/01/20	ekilgore	INITIAL

DWG # CMS203-E23A16

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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

WEST SF-2 COOLING FAN - CONTROL POWER DISTRIBUTION

PROJECT # CMS203 SCALE N/A ENG: E. KILGORE

REV	DATE	NAME	REMARKS
0.1	04/06/20	ekilgore	HOA ADDITIONS

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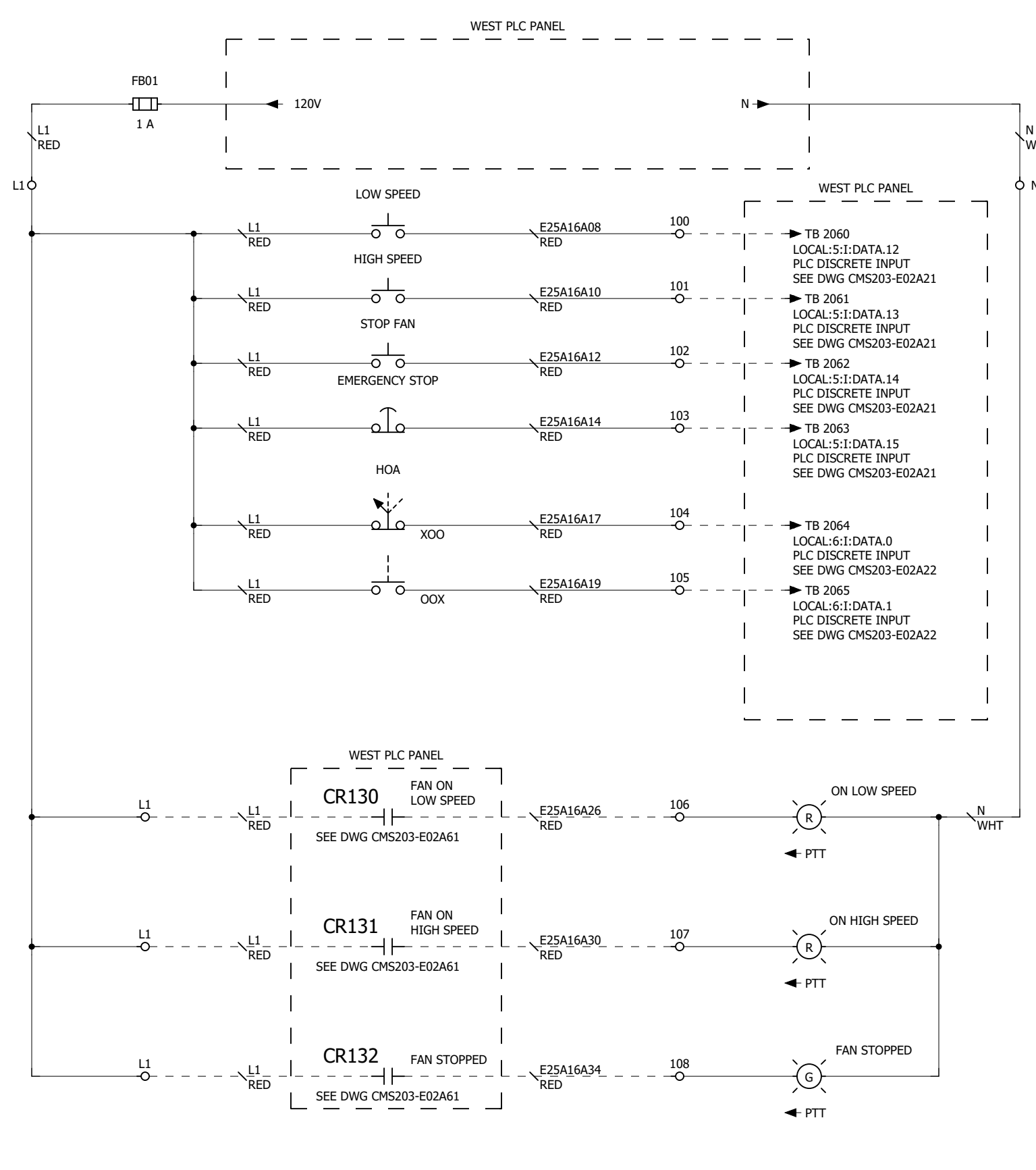
5301 NORTH 57TH STREET
LINCOLN, NEBRASKA 68507
(402) 464-6823

112 INVERNESS CIRCLE EAST, SUITE E
ENGLEWOOD, COLORADO 80112
(303) 376-6280

DWG # CMS203-E24A16

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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

WEST SF-3 COOLING FAN - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS
0.1	04/06/20	ekilgore	HOA ADDITIONS

PROJECT # CMS203 SCALE N/A ENG: E. KILGORE



5301 NORTH 57TH STREET
LINCOLN, NEBRASKA 68507
(402) 464-6823

112 INVERNESS CIRCLE EAST, SUITE E
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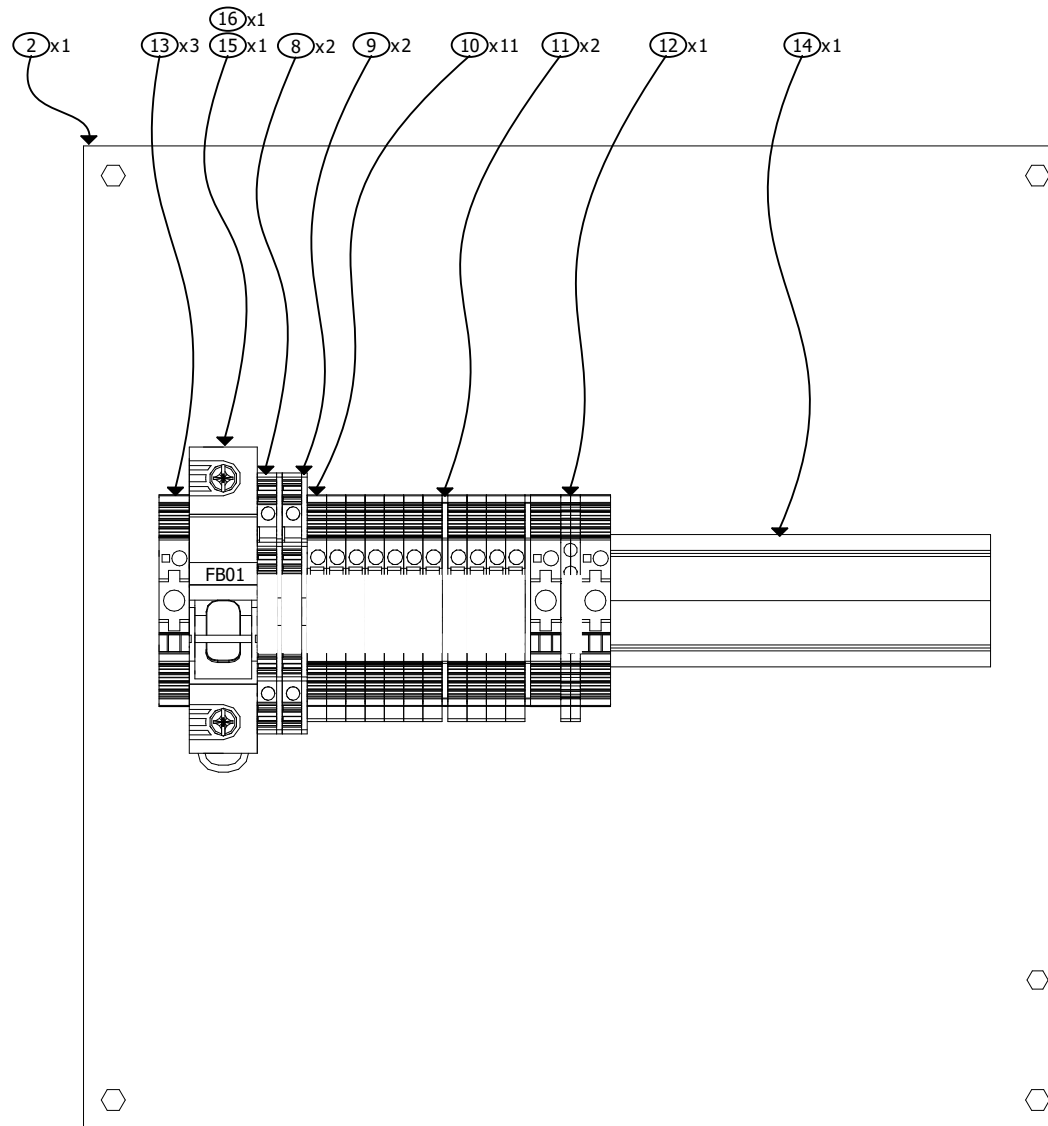
DWG # CMS203-E25A16

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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

ELECTRICAL SYMBOLS		ELECTRICAL SYMBOLS CONTINUED		FUSE SCHEDULE				PANEL DRAWING INDEX																																																																																																																																																		
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	FUSE#	QTY	FUSE TYPE	SIZE	MFGR	PART#	DESCRIPTION	DESCRIPTION	DWG #																																																																																																																																														
	RELAY CONTACT, NORMALLY CLOSED RELAY CONTACT, NORMALLY OPEN LIMIT SWITCH, NORMALLY CLOSED LIMIT SWITCH, NORMALLY CLOSED, HELD OPEN LIMIT SWITCH, NORMALLY OPEN LIMIT SWITCH, NORMALLY OPEN, HELD CLOSED PRESSURE SWITCH, NORMALLY CLOSED PRESSURE SWITCH, NORMALLY OPEN PUSHBUTTON, NORMALLY CLOSED PUSHBUTTON, NORMALLY OPEN PUSHBUTTON, NORMALLY CLOSED, HELD OPEN MUSHROOM HEAD PUSH BUTTON, NORMALLY CLOSED MUSHROOM HEAD PUSH BUTTON, NORMALLY OPEN 2 POSITION SELECTOR SWITCH, CLOSED 2 POSITION SELECTOR SWITCH, OPEN TEMPERATURE SWITCH, NORMALLY CLOSED TEMPERATURE SWITCH, NORMALLY OPEN TIMER CONTACT, NORMALLY CLOSED, TIMED OPEN TIMER CONTACT, NORMALLY CLOSED, TIMED OPEN, SHOWN OPEN TIMER CONTACT, NORMALLY OPEN, TIMED CLOSED TIMER CONTACT, NORMALLY OPEN, TIMED CLOSED, SHOWN CLOSED FLOW SWITCH, NORMALLY CLOSED FLOW SWITCH, NORMALLY OPEN PROXIMITY SWITCH, NORMALLY OPEN LEVEL SWITCH, NORMALLY CLOSED LEVEL SWITCH, NORMALLY OPEN RELAY COIL SOLENOID VALVE PILOT LIGHT (R=RED, A=AMBER, B=BLUE, G=GREEN) NODE TERMINAL BLOCK KNIFE TERMINAL BLOCK TERMINAL BLOCK, FUSED		GROUND MOTOR ALARM HORN MOTOR STARTER COIL FIELD WIRING INTERNAL PANEL WIRING CAPACITOR MOTION DETECTOR NOTE: THIS IS A STANDARD LEGEND SHEET. SOME SYMBOLS OR ABBREVIATIONS MAY APPEAR ON THIS SHEET AND NOT ON THE PLANS.	FB01	1	CLASS CC	1A	MERSEN	ATDR1	INCOMING FEED	FAN CONTROL STATIONS - INDEX SHEET FAN CONTROL STATIONS - BACK PANEL LAYOUT FAN CONTROL STATIONS - FRONT PANEL LAYOUT FAN CONTROL STATIONS - ENGRAVED TAG DETAILS FAN CONTROL STATION - BILL OF MATERIAL (TYPICAL) EAST EF-1 EXHAUST FAN - CONTROL POWER DISTRIBUTION EAST EF-2 EXHAUST FAN - CONTROL POWER DISTRIBUTION EAST EF-3 EXHAUST FAN - CONTROL POWER DISTRIBUTION EAST EF-4 EXHAUST FAN - CONTROL POWER DISTRIBUTION EAST SF-1 SUPPLY FAN - CONTROL POWER DISTRIBUTION EAST SF-2 SUPPLY FAN - CONTROL POWER DISTRIBUTION EAST SF-3 SUPPLY FAN - CONTROL POWER DISTRIBUTION EAST SF-4 SUPPLY FAN - CONTROL POWER DISTRIBUTION WEST EF-1 EXHAUST FAN - CONTROL POWER DISTRIBUTION WEST EF-2 EXHAUST FAN - CONTROL POWER DISTRIBUTION WEST EF-3 EXHAUST FAN - CONTROL POWER DISTRIBUTION WEST EF-4 EXHAUST FAN - CONTROL POWER DISTRIBUTION WEST SF-1 SUPPLY FAN - CONTROL POWER DISTRIBUTION WEST SF-2 SUPPLY FAN - CONTROL POWER DISTRIBUTION WEST SF-3 SUPPLY FAN - CONTROL POWER DISTRIBUTION WEST SF-4 SUPPLY FAN - CONTROL POWER DISTRIBUTION	CMS203-E27A00 CMS203-E27A01 CMS203-E27A02 CMS203-E27A02A CMS203-E27A03 CMS203-E27A16 CMS203-E28A16 CMS203-E29A16 CMS203-E30A16 CMS203-E31A16 CMS203-E32A16 CMS203-E33A16 CMS203-E34A16 CMS203-E35A16 CMS203-E36A16 CMS203-E37A16 CMS203-E38A16 CMS203-E39A16 CMS203-E40A16 CMS203-E41A16 CMS203-E42A16																																																																																																																																														
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<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>5301 NORTH 57TH STREET LINCOLN, NEBRASKA 68507 (402) 464-6823</p> </div> <div style="width: 30%;"> <p>112 INVERNESS CIRCLE EAST, SUITE E ENGLEWOOD, COLORADO 80112 (303) 376-6280</p> </div> </div>				REV	DATE	NAME	REMARKS				
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								DWG #	CMS203-E27A00		



ITEM #	DESCRIPTION	TORQUE
1492-JD3C	TERMINAL BLOCK, 2 TIER	4.5 LB. IN.
1492-J3	TERMINAL BLOCK, 1 TIER	4.5 LB. IN.
1492-JG3	TERMINAL BLOCK, 2 TIER, GROUNDING	7.1 LB. IN.
1492-FB1C30-L	CLASS CC FUSEHOLDER, 1P, WITH INDICATION	22 LB. IN.

STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

FAN CONTROL STATIONS - BACK PANEL LAYOUT

PROJECT # CMS203

SCALE 1:2

ENG:E. KILGORE

REV	DATE	NAME	REMARKS



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3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
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1.0	04/06/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/06/20	ekilgore	INITIAL

DWG #

CMS203-E27A01

CUSTOM BUILT BY **HUFFMAN ENGINEERING INC.** 5301 North 57th Street Lincoln, NE 68507 402-464-6823

PROJECT # **CMS203** DATE **JUN 2020**

PANEL # **EAST EF-1 EXHAUST FAN CONTROL STATION**

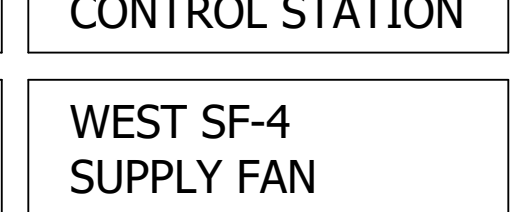
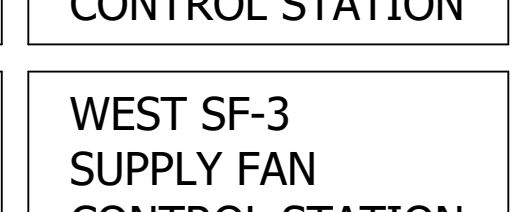
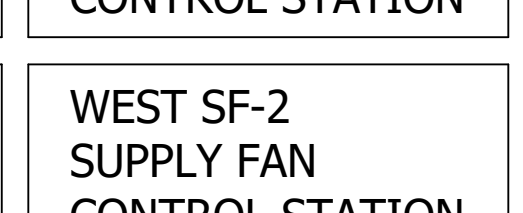
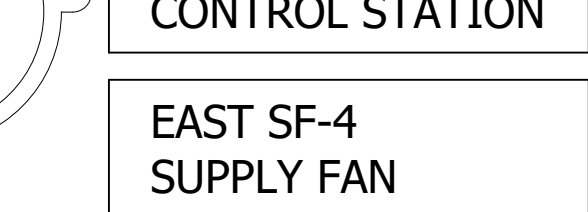
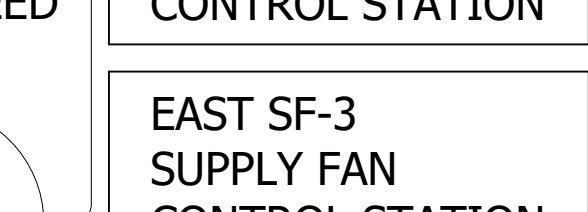
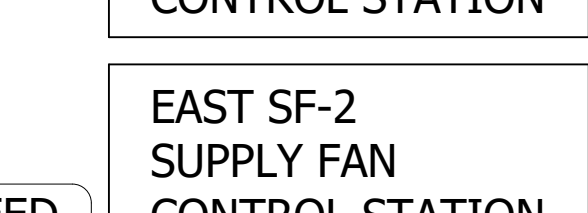
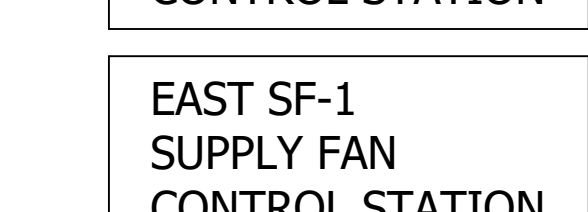
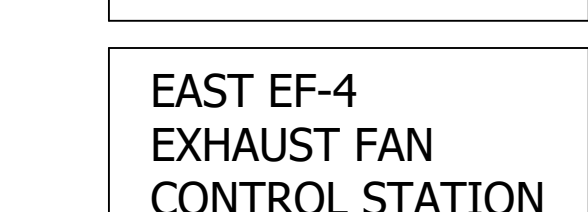
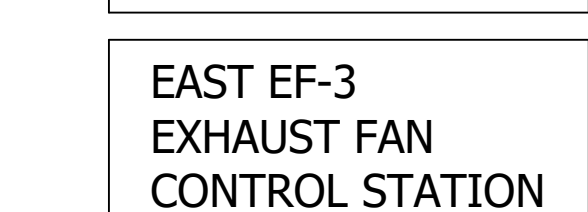
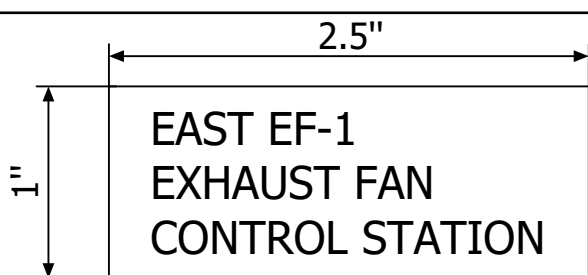
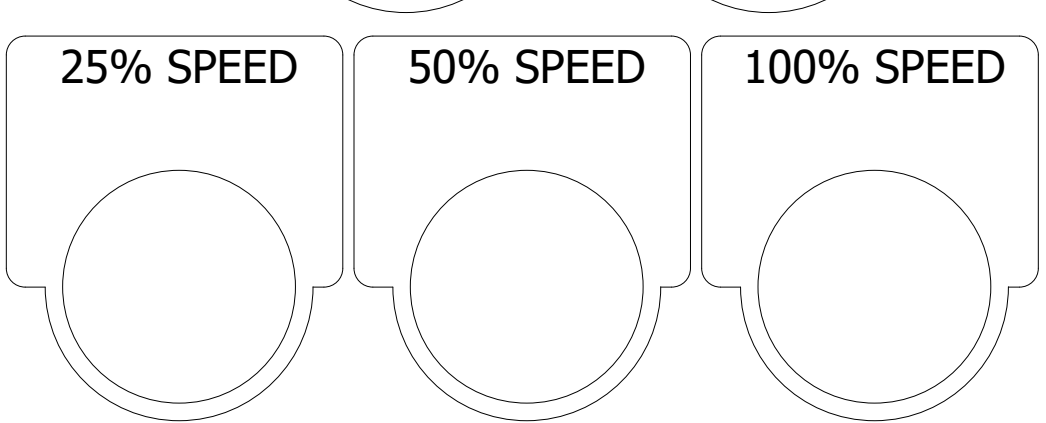
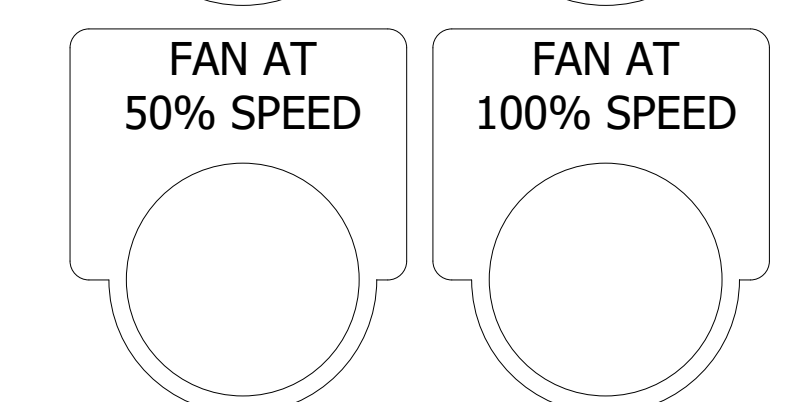
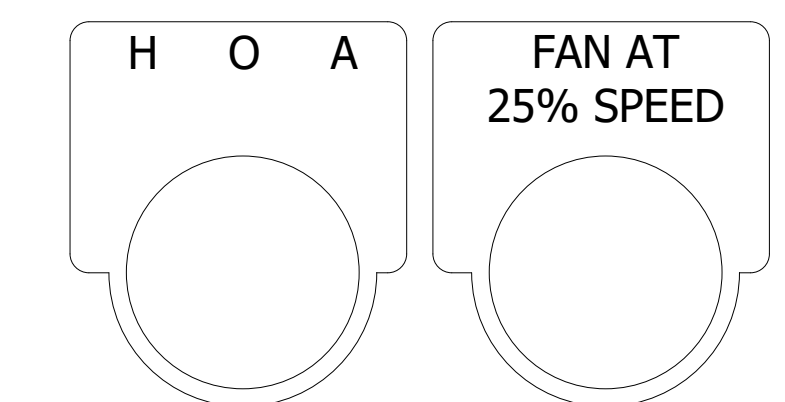
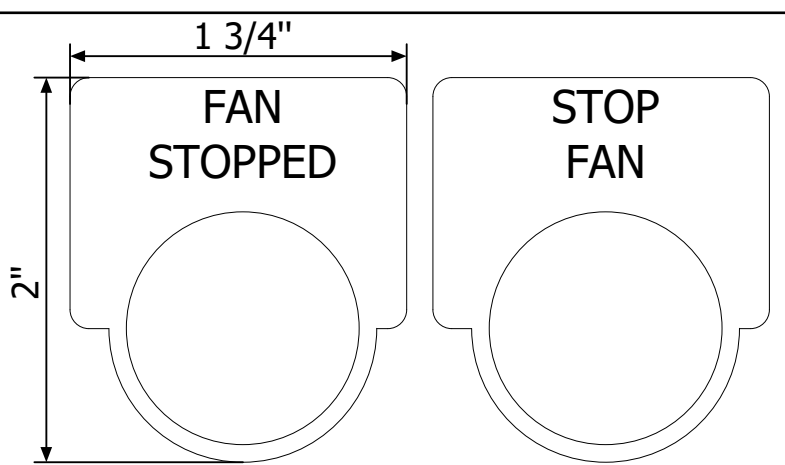
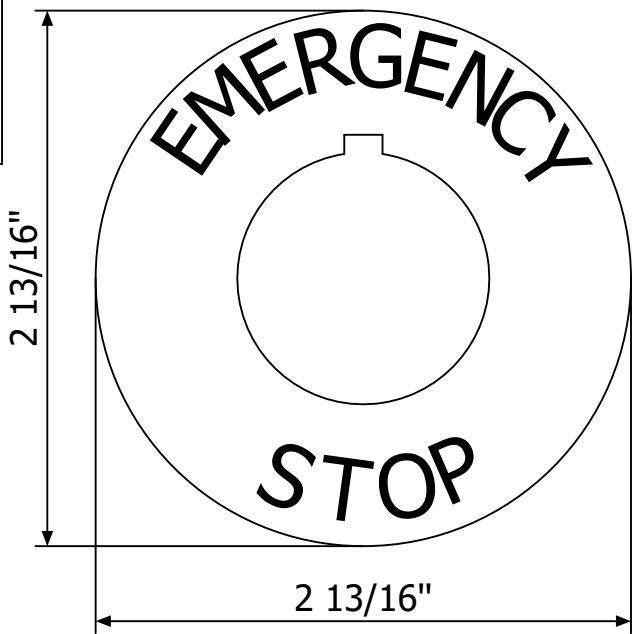
INTERRUPT RATING **200kA** TOTAL FLA **1**

LARGEST MTR FLA **N/A** SCCR **10kA**

VOLTS **120** HZ. **60** PHASE **1** ENCL TYP **3R**

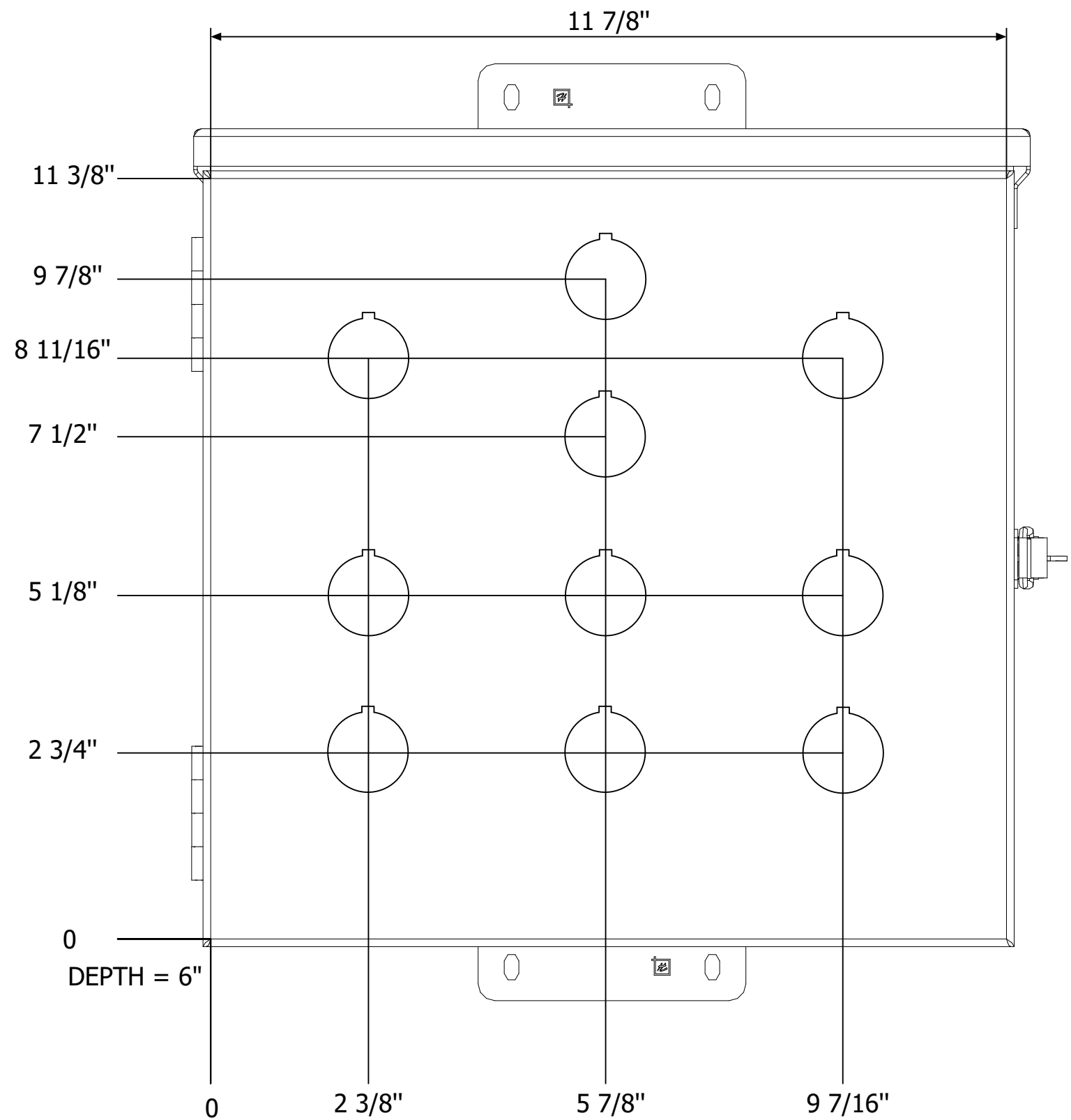
ELECT DWG INDEX # **CMS203-E05A00**

INCLUDE	DESCRIPTION
NO	ARC FLASH HAZARD
120VAC	SUPPLY VOLTAGE
NO	MULTIPLE SOURCES
YES	UL (UNDERWRITERS LABORATORY)
NO	IS (INTRINSICALLY SAFE)
YES	HUFFMAN ENGINEERING INC. LOGO STICKER
NO	UPS WARNING



LEGEND PLATE SCHEDULE						
ITEM NO.	FIRST LINE	SECOND LINE	THIRD LINE	LEGEND PLATE COLOR	TEXT COLOR	TEXT HEIGHT
T.1	FAN	STOPPED		BLACK	WHITE	5/32"
T.2	STOP	FAN		BLACK	WHITE	5/32"
T.3	H O A	STOPPED		BLACK	WHITE	5/32"
T.4	FAN AT	25% SPEED		BLACK	WHITE	5/32"
T.5	FAN AT	50% SPEED		BLACK	WHITE	5/32"
T.6	FAN AT	100% SPEED		BLACK	WHITE	5/32"
T.7	25% SPEED			BLACK	WHITE	5/32"
T.8	50% SPEED			BLACK	WHITE	5/32"
T.9	100% SPEED			BLACK	WHITE	5/32"
T.10	EAST EF-1	EXHAUST FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.11	EAST EF-2	EXHAUST FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.12	EAST EF-3	EXHAUST FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.13	EAST EF-4	EXHAUST FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.14	EAST SF-1	SUPPLY FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.15	EAST SF-2	SUPPLY FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.16	EAST SF-3	SUPPLY FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.17	EAST SF-4	SUPPLY FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.18	WEST EF-1	EXHAUST FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.19	WEST EF-2	EXHAUST FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.20	WEST EF-3	EXHAUST FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.21	WEST EF-4	EXHAUST FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.22	WEST SF-1	SUPPLY FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.23	WEST SF-2	SUPPLY FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.24	WEST SF-3	SUPPLY FAN	CONTROL STATION	BLACK	WHITE	5/32"
T.25	WEST SF-4	SUPPLY FAN	CONTROL STATION	BLACK	WHITE	5/32"

STATE OF COLORADO DEPARTMENT OF TRANSPORTATION EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT	FAN CONTROL STATIONS - ENGRAVED TAG DETAILS				REV	DATE	NAME	REMARKS
	PROJECT # CMS203	SCALE N/A	ENG:E. KILGORE		2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
5301 NORTH 57TH STREET LINCOLN, NEBRASKA 68507 (402) 464-6823	112 INVERNESS CIRCLE EAST, SUITE E ENGLEWOOD, COLORADO 80112 (303) 376-6280	REV	DATE	NAME	REMARKS	DWG #	CMS203-E27A02A	
		4.0	09/09/21	ekilgore	AS-BUILTS			
		3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION			
		2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.			
		1.0	04/06/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL			
	0.0	04/06/20	ekilgore	INITIAL				



STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

FAN CONTROL STATIONS - DIMENSIONS

PROJECT # CMS203 SCALE 1:2 ENG: E. KILGORE

REV	DATE	NAME	REMARKS
1.1	05/12/20	ekilgore	DIMENSIONS
1.0	05/11/20	ekilgore	DIMENSIONS



5301 NORTH 57TH STREET
LINCOLN, NEBRASKA 68507
(402) 464-6823

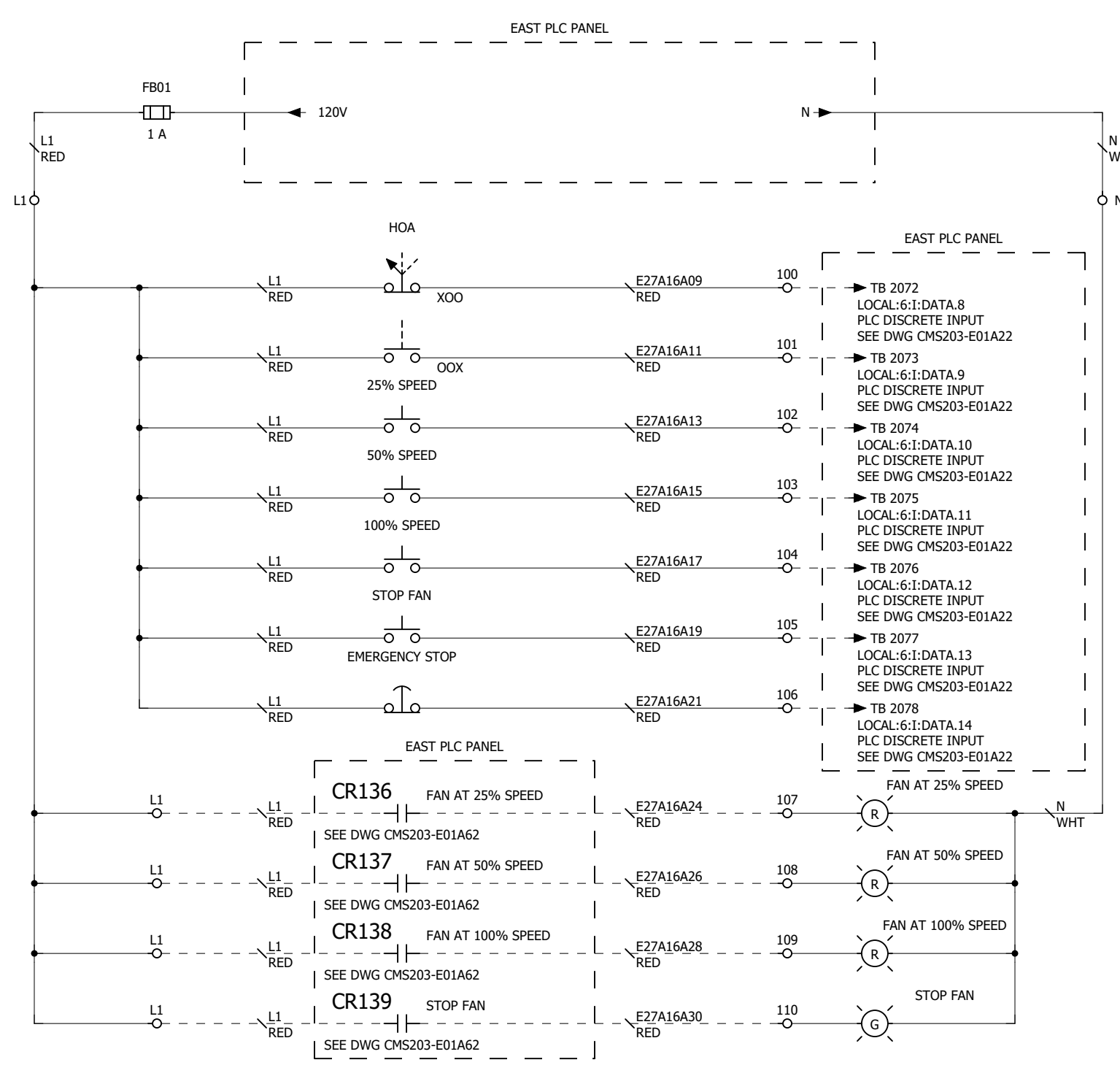
112 INVERNESS CIRCLE EAST, SUITE E
ENGLEWOOD, COLORADO 80112
(303) 376-6280

REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/06/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/06/20	ekilgore	INITIAL

DWG # CMS203-E27A04

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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT		EAST EF-1 EXHAUST FAN - CONTROL POWER DISTRIBUTION		REV	DATE	NAME	REMARKS
PROJECT # CMS203		SCALE N/A		ENG:E. KILGORE			
REV	DATE	NAME	REMARKS				
4.0	09/09/21	ekilgore	AS-BUILTS				
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION				
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.				
1.0	04/06/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL				
0.0	04/06/20	ekilgore	INITIAL				
DWG #							CMS203-E27A16

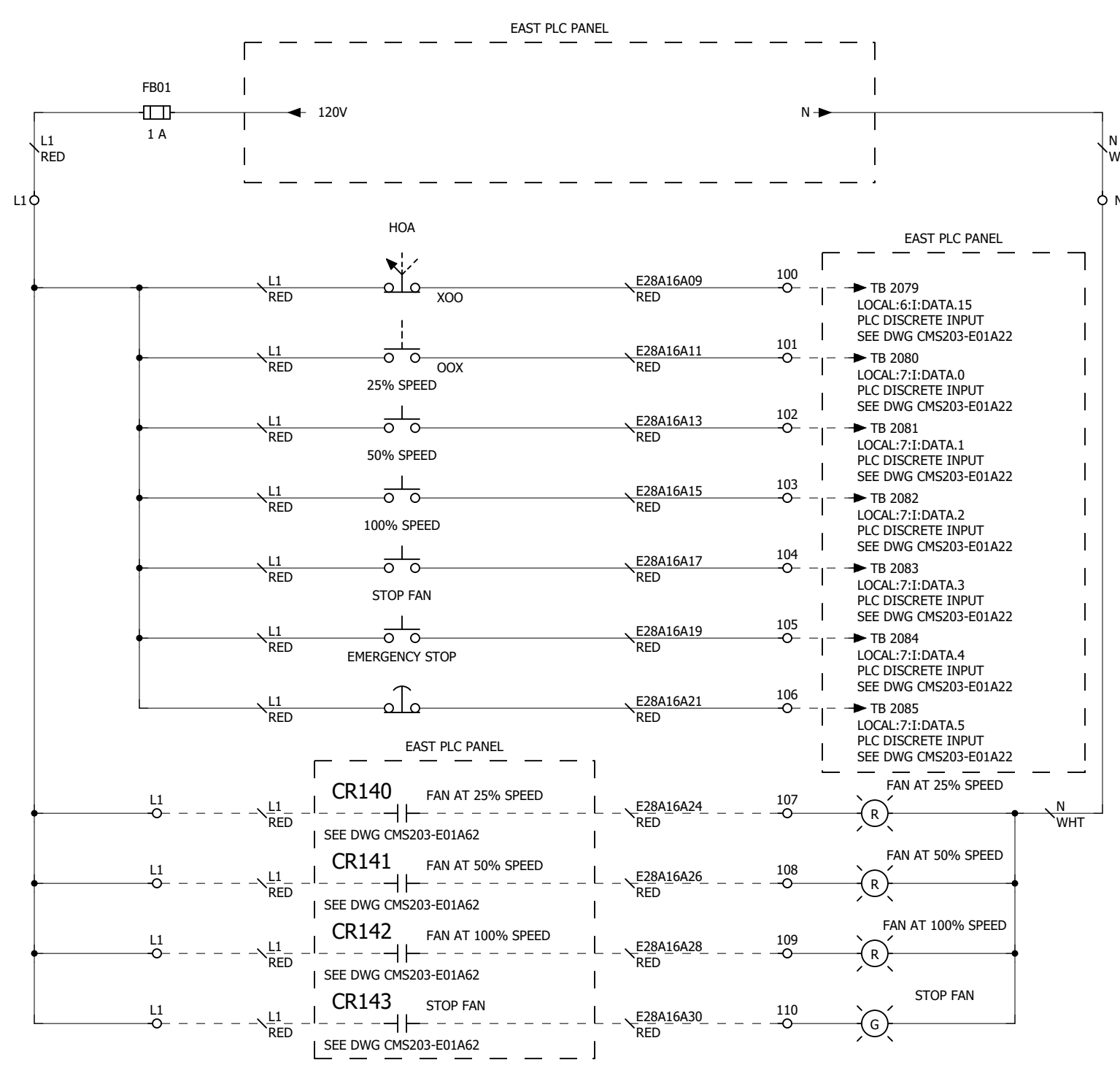


5301 NORTH 57TH STREET
LINCOLN, NEBRASKA 68507
(402) 464-6823

112 INVERNESS CIRCLE EAST, SUITE E
ENGLEWOOD, COLORADO 80112
(303) 376-6280

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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

EAST EF-2 EXHAUST FAN - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS

PROJECT # CMS203 SCALE N/A ENG: E. KILGORE

REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/06/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/06/20	ekilgore	INITIAL



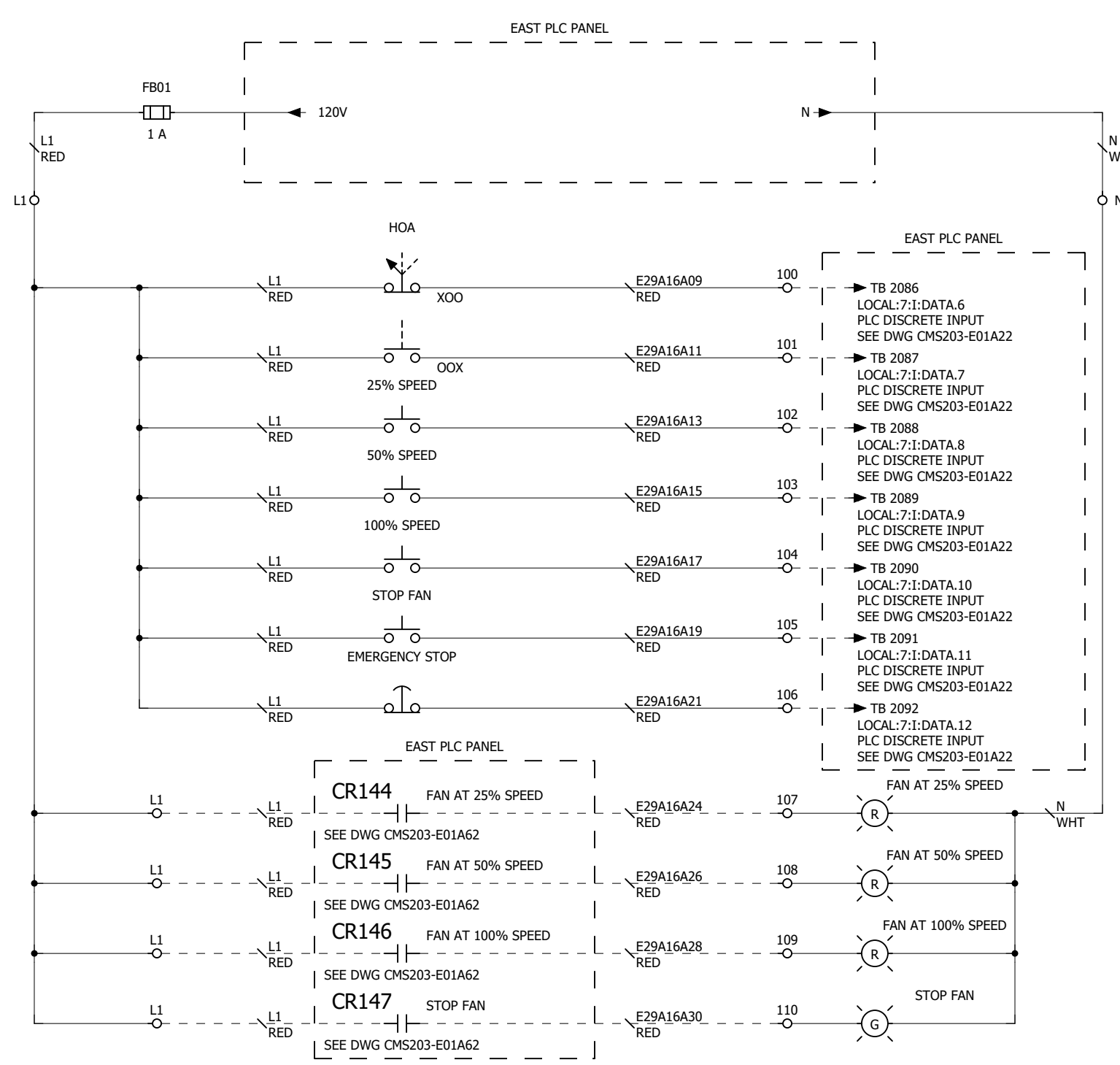
5301 NORTH 57TH STREET
LINCOLN, NEBRASKA 68507
(402) 464-6823

112 INVERNESS CIRCLE EAST, SUITE E
ENGLEWOOD, COLORADO 80112
(303) 376-6280

DWG # CMS203-E28A16

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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

EAST EF-3 EXHAUST FAN - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS

PROJECT # CMS203 SCALE N/A ENG:E. KILGORE

REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/06/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/06/20	ekilgore	INITIAL



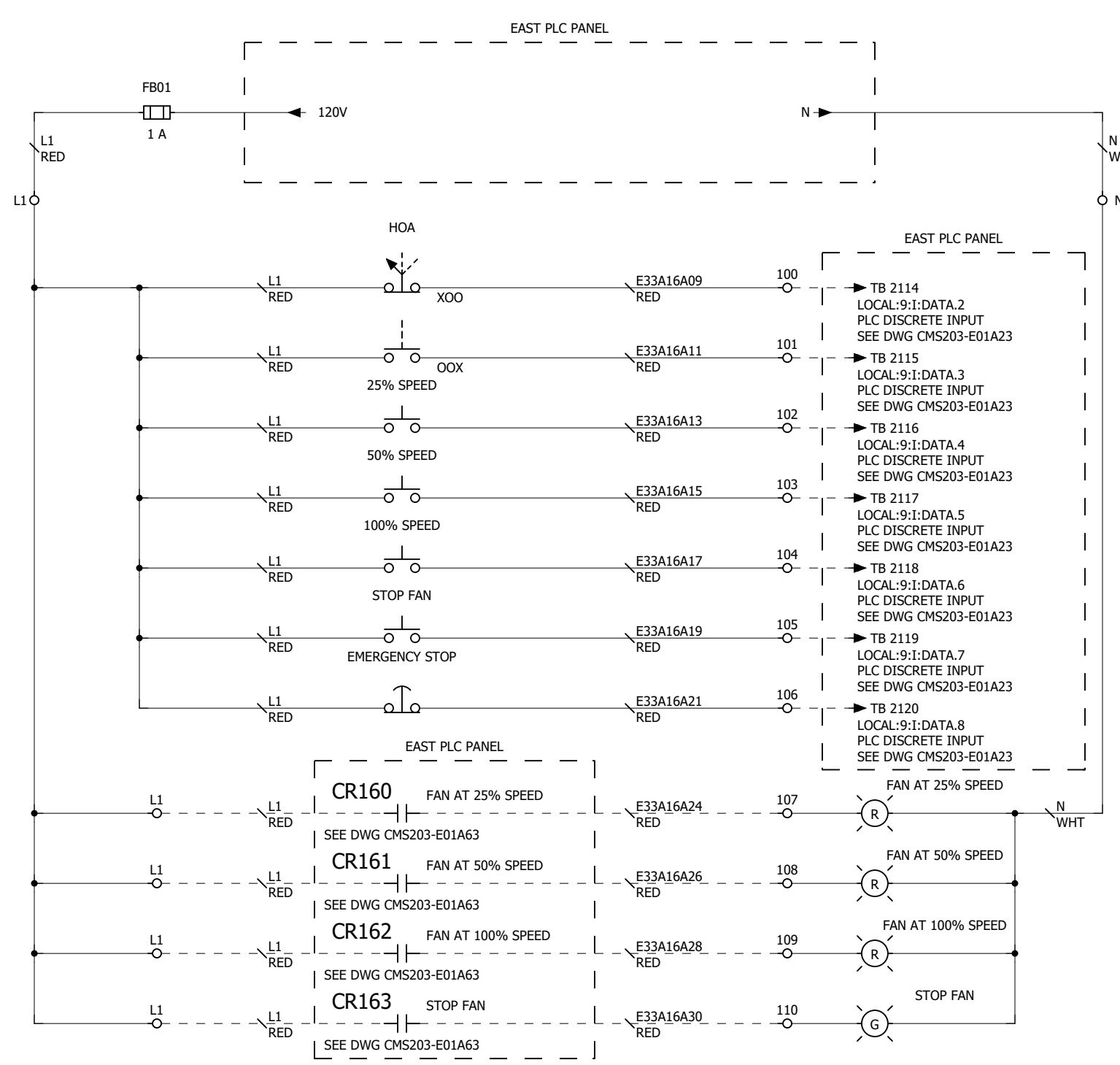
5301 NORTH 57TH STREET
LINCOLN, NEBRASKA 68507
(402) 464-6823

112 INVERNESS CIRCLE EAST, SUITE E
ENGLEWOOD, COLORADO 80112
(303) 376-6280

DWG # CMS203-E29A16

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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

EAST SF-3 SUPPLY FAN - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS

PROJECT # CMS203 SCALE N/A ENG:E. KILGORE



5301 NORTH 57TH STREET
LINCOLN, NEBRASKA 68507
(402) 464-6823

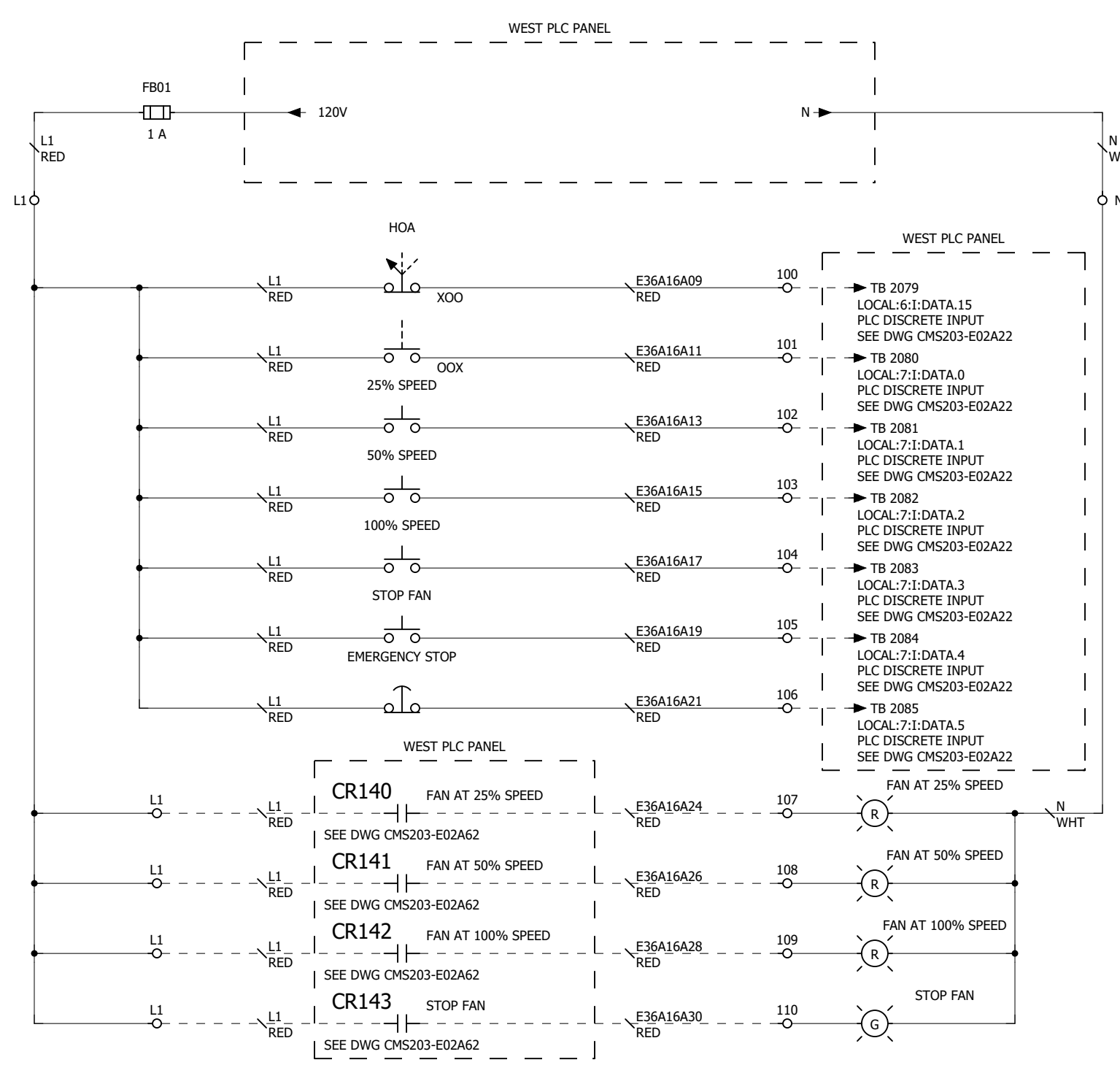
112 INVERNESS CIRCLE EAST, SUITE E
ENGLEWOOD, COLORADO 80112
(303) 376-6280

REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/06/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/06/20	ekilgore	INITIAL

DWG # CMS203-E33A16

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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

WEST EF-2 EXHAUST FAN - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS

PROJECT # CMS203 SCALE N/A ENG:E. KILGORE



5301 NORTH 57TH STREET
LINCOLN, NEBRASKA 68507
(402) 464-6823

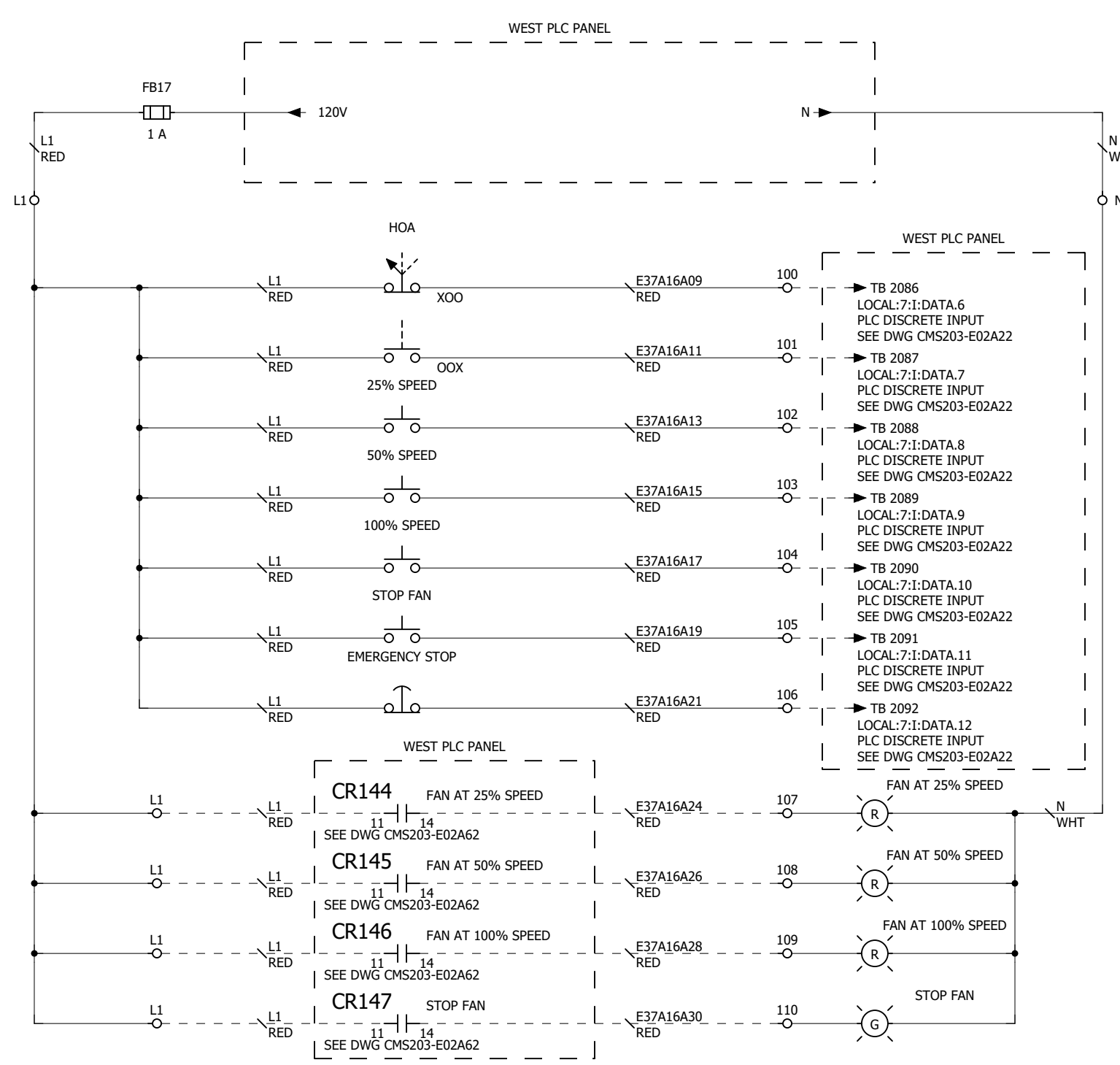
112 INVERNESS CIRCLE EAST, SUITE E
ENGLEWOOD, COLORADO 80112
(303) 376-6280

REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/06/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/06/20	ekilgore	INITIAL

DWG # CMS203-E36A16

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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

WEST EF-3 EXHAUST FAN - CONTROL POWER DISTRIBUTION

PROJECT # CMS203 SCALE N/A ENG: E. KILGORE

REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS

REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/06/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/06/20	ekilgore	INITIAL



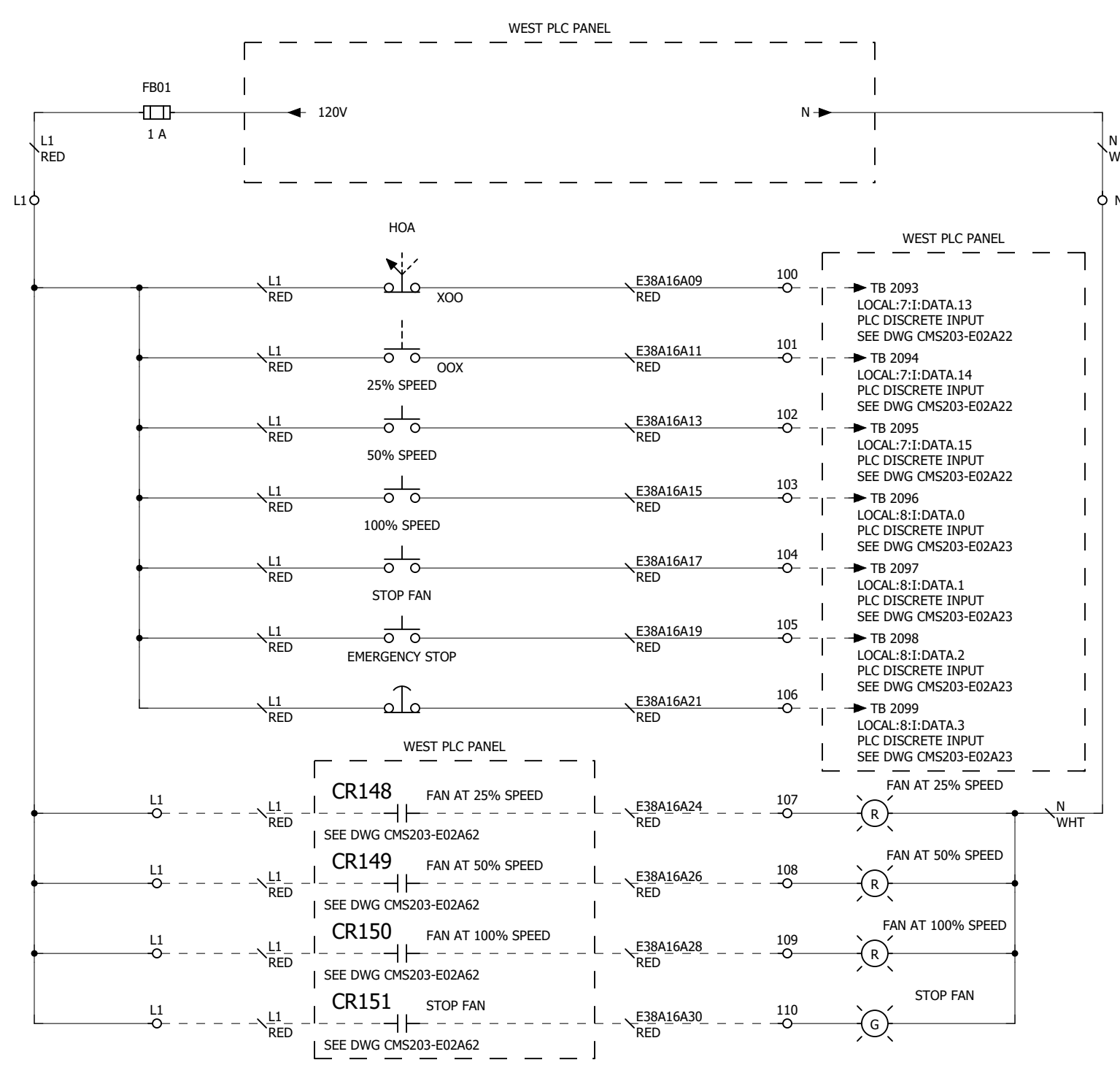
5301 NORTH 57TH STREET
LINCOLN, NEBRASKA 68507
(402) 464-6823

112 INVERNESS CIRCLE EAST, SUITE E
ENGLEWOOD, COLORADO 80112
(303) 376-6280

DWG # CMS203-E37A16

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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

WEST EF-4 EXHAUST FAN - CONTROL POWER DISTRIBUTION

PROJECT # CMS203 SCALE N/A ENG:E. KILGORE

REV	DATE	NAME	REMARKS

REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/06/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/06/20	ekilgore	INITIAL



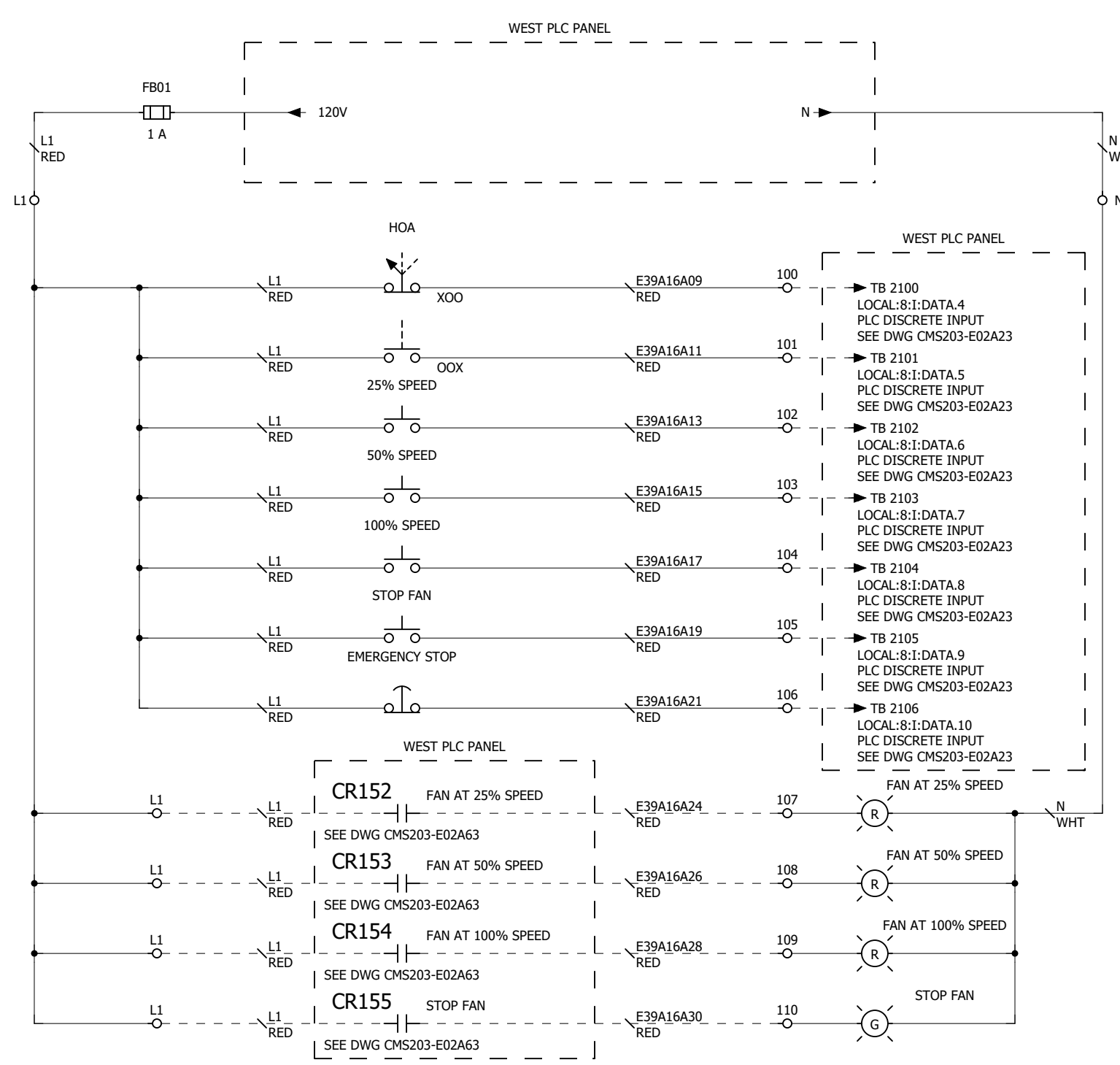
5301 NORTH 57TH STREET
LINCOLN, NEBRASKA 68507
(402) 464-6823

112 INVERNESS CIRCLE EAST, SUITE E
ENGLEWOOD, COLORADO 80112
(303) 376-6280

DWG # CMS203-E38A16

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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

WEST SF-1 SUPPLY FAN - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS

PROJECT # CMS203 SCALE N/A ENG: E. KILGORE

REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/06/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/06/20	ekilgore	INITIAL



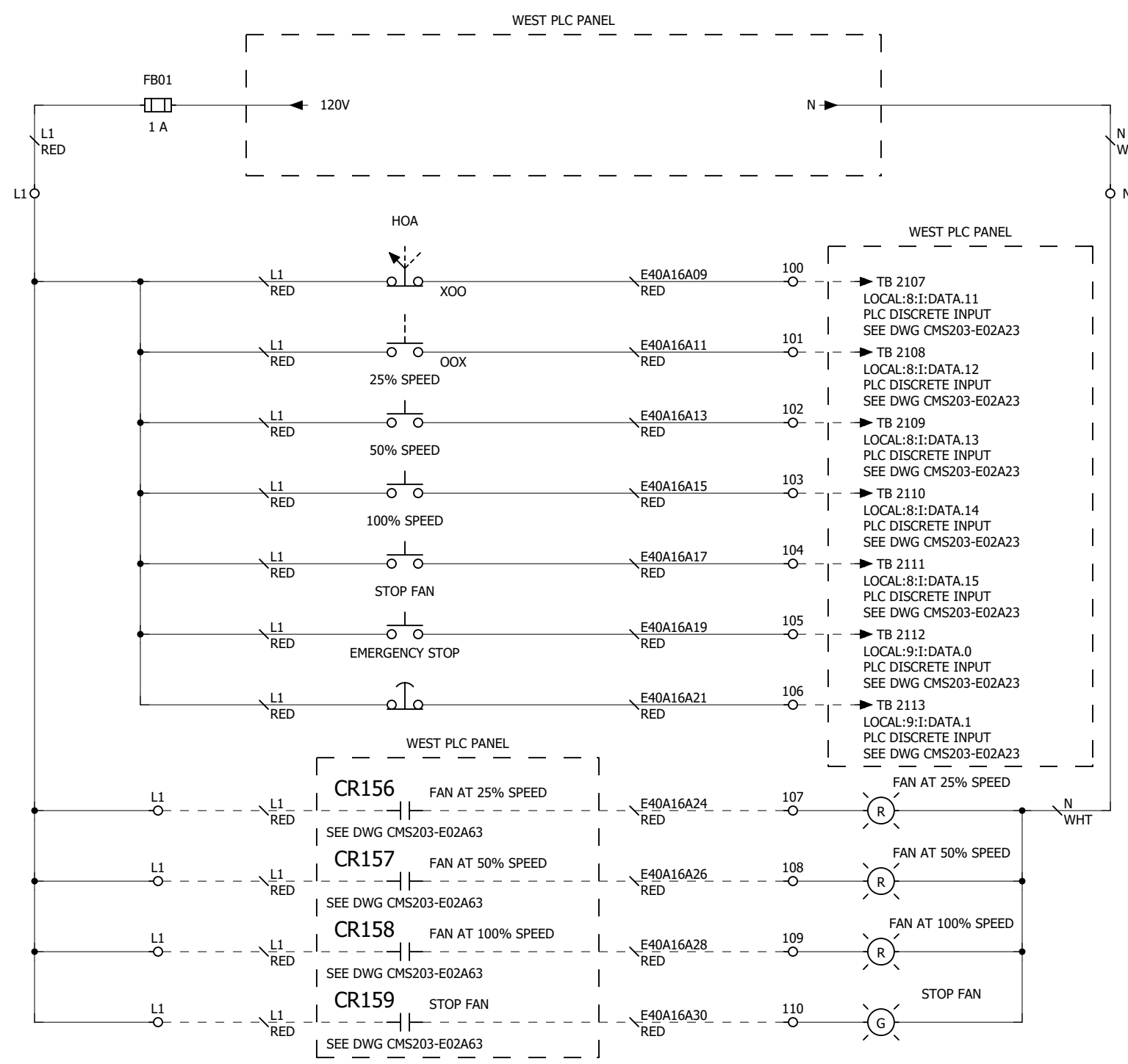
5301 NORTH 57TH STREET
LINCOLN, NEBRASKA 68507
(402) 464-6823

112 INVERNESS CIRCLE EAST, SUITE E
ENGLEWOOD, COLORADO 80112
(303) 376-6280

DWG # CMS203-E39A16

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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

WEST SF-2 SUPPLY FAN - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS

PROJECT # CMS203 SCALE N/A ENG: E. KILGORE

REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/06/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/06/20	ekilgore	INITIAL



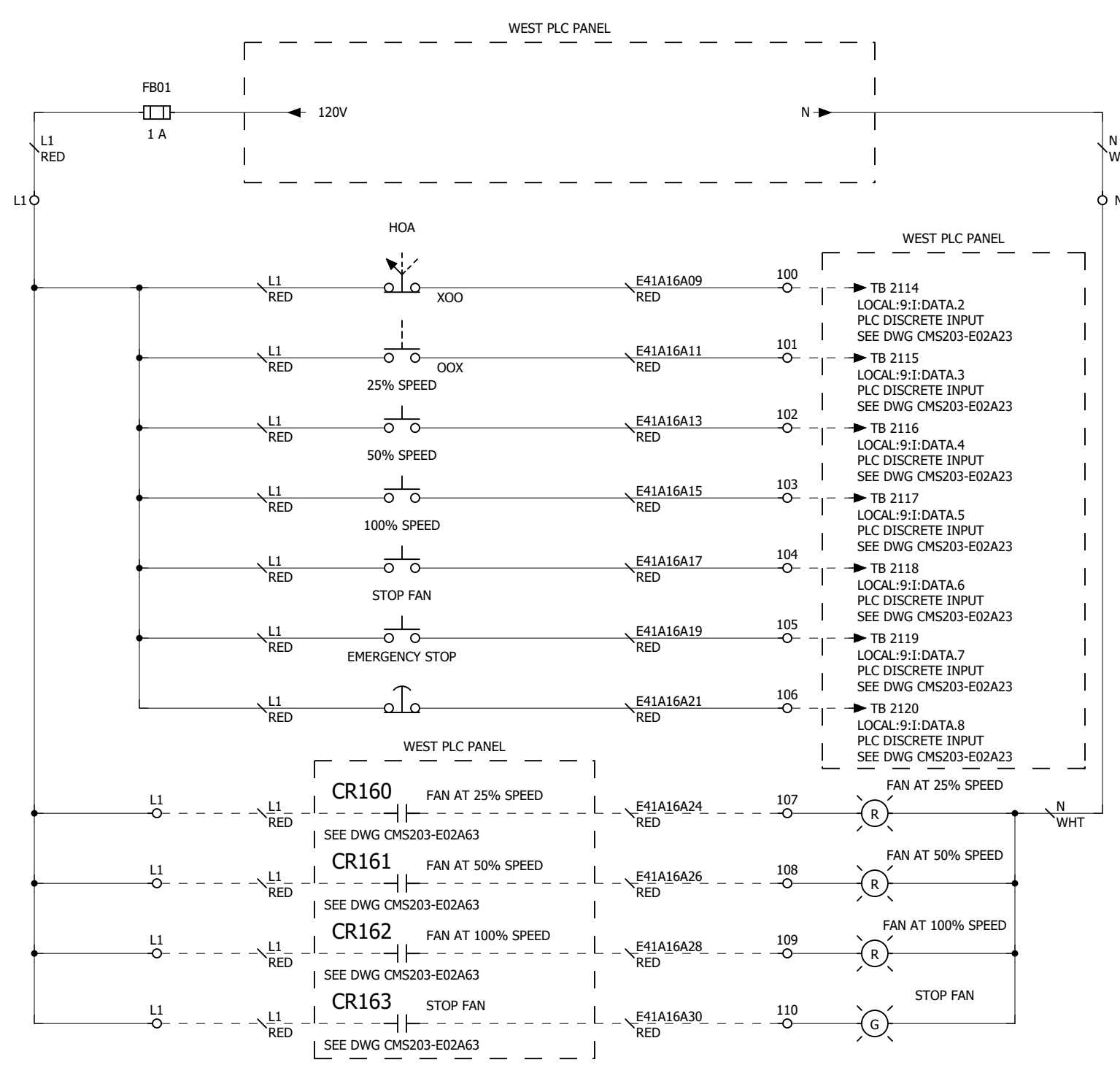
5301 NORTH 57TH STREET
LINCOLN, NEBRASKA 68507
(402) 464-6823

112 INVERNESS CIRCLE EAST, SUITE E
ENGLEWOOD, COLORADO 80112
(303) 376-6280

DWG # CMS203-E40A16

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STATE OF COLORADO DEPARTMENT OF TRANSPORTATION
EISENHOWER/JOHNSON MEMORIAL TUNNEL 480V MCC REPLACEMENT

WEST SF-3 SUPPLY FAN - CONTROL POWER DISTRIBUTION

REV	DATE	NAME	REMARKS

PROJECT # CMS203 SCALE N/A ENG: E. KILGORE

REV	DATE	NAME	REMARKS
4.0	09/09/21	ekilgore	AS-BUILTS
3.0	09/04/20	ekilgore	SHIPPED FOR ONSITE INSTALLATION
2.0	06/01/20	ekilgore	SUBMITTAL APPROVED. RELEASED FOR FABRICATION.
1.0	04/06/20	ekilgore	SUBMITTED FOR CUSTOMER APPROVAL
0.0	04/06/20	ekilgore	INITIAL



5301 NORTH 57TH STREET
LINCOLN, NEBRASKA 68507
(402) 464-6823

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ENGLEWOOD, COLORADO 80112
(303) 376-6280

DWG # CMS203-E41A16

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HINGE-COVER, SMALL, TYPE 3R

INDUSTRY STANDARDS

 UL 50, 50E Listed; Type 3R; File No. E27567
 cUL Listed per CSA C22.2 No 94; Type 3R File No. E27567

 NEMA/EEMAC Type 3R
 IEC 60529, IP32

APPLICATION

These enclosures have a size range of 6 x 4 x 4-in. to 12 x 12 x 10-in. and meet basic functionality requirements for applications that require protection from rain, sleet, snow or dripping water.

FEATURES

- Drip-shield top and seam-free sides, front and back
- Plated steel hinge has stainless steel pin
- Weldnuts provided for mounting optional panels
- Provisions for padlocking on zinc-plated draw-pull catch
- Knockouts on bottom of enclosure
- No gasketing

SPECIFICATIONS

- 16 gauge galvanized steel

FINISH

ANSI 61 gray polyester powder paint finish inside and out over galvanized steel. Optional solid panels are white and optional perforated panels are gray.

ACCESSORIES

 See also *Accessories*.

Industrial Corrosion Inhibitors

Grounding Device

Panels for Type 1 Enclosures and Small Type 3R Enclosures

Touch-Up Paint

BULLETIN: A3SM

Standard Product

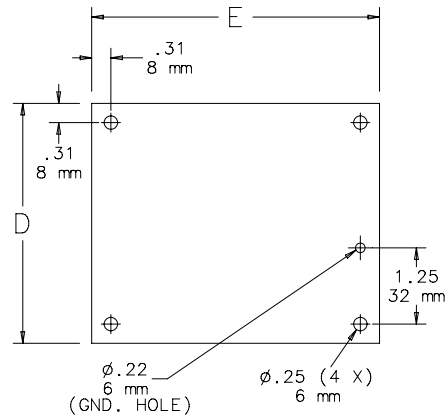
Catalog Number	AxBxC in./mm	Panel	Perforated Panel	Panel Size D x E in./mm	Mounting G in./mm	Overall L x W in./mm	Knockout Pattern
A6R44HCR	6.00 x 4.00 x 4.00 152 x 102 x 102	A6N4P	---	4.25 x 2.25 108 x 57	7.00 178	8.00 x 4.81 203 x 122	B-C-D
A6R64HCR	6.00 x 6.00 x 4.00 152 x 152 x 102	A6N6P	A6N6PP	4.25 x 4.25 108 x 108	7.00 178	8.00 x 6.81 203 x 173	B-C-D
A8R64HCR	8.00 x 6.00 x 4.00 203 x 152 x 102	A8N6P	A8N6PP	6.25 x 4.25 159 x 108	9.00 229	10.00 x 6.81 254 x 173	B-C-D
A8R86HCR	8.00 x 8.00 x 6.00 203 x 203 x 152	A8N8P	A8N8PP	6.25 x 6.25 159 x 159	9.00 229	10.00 x 8.81 254 x 224	F-G-H-I
A10R86HCR	10.00 x 8.00 x 6.00 254 x 203 x 152	A10N8P	A10N8PP	8.25 x 6.25 210 x 159	11.00 279	12.00 x 8.81 305 x 224	F-G-H-I
A12R106HCR	12.00 x 10.00 x 6.00 305 x 254 x 152	A12N10P	A12N10PP	10.25 x 8.25 260 x 210	13.00 330	14.00 x 10.81 356 x 275	C-D-E-F-G
A12R126HCR	12.00 x 12.00 x 6.00 305 x 305 x 152	A12N12P	A12N12PP	10.25 x 10.25 260 x 260	13.00 330	14.00 x 12.81 356 x 325	C-D-E-F-G
A12R1210HCR	12.00 x 12.00 x 10.00 305 x 305 x 254	A12N12P	A12N12PP	10.25 x 10.25 260 x 260	13.00 330	14.00 x 12.81 356 x 325	C-D-E-F-G

Purchase panels separately.

Purchase perforated panels separately.

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PANELS FOR TYPE 1 ENCLOSURES AND SMALL TYPE 3R ENCLOSURES



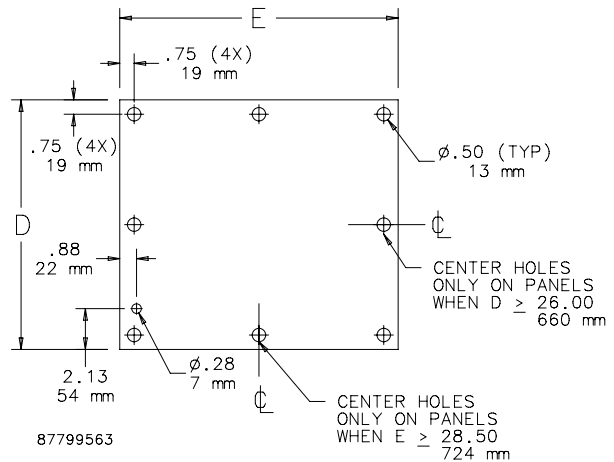
C2646-C

Steel panels are 14 gauge, finished with white polyester powder paint. Panel mounting hardware is furnished with enclosure.

BULLETIN: PNLT1

Catalog Number	Panel Size D x E (in.)	Panel Size D x E (mm)
A6N4P	4.25 x 2.25	108 x 57
A6N6P	4.25 x 4.25	108 x 108
A8N6P	6.25 x 4.25	159 x 108
A8N8P	6.25 x 6.25	159 x 159
A10N8P	8.25 x 6.25	210 x 159
A10N10P	8.25 x 8.25	210 x 210
A12N10P	10.25 x 8.25	260 x 210
A12N12P	10.25 x 10.25	260 x 260
A14N12P	12.25 x 10.25	311 x 260
A16N12P	14.25 x 10.25	362 x 260
A20N12P	18.25 x 10.25	464 x 260

PANELS FOR MEDIUM TYPE 1 ENCLOSURES



87799563

Steel panels are 14 or 12 gauge with a white polyester powder paint finish. Panel mounting hardware is furnished with enclosure.

BULLETIN: PNLT1

Catalog Number	Panel Thickness (ga.)	Panel Size D x E (in.)	Panel Size D x E (mm)
A16N12MP	14	13.00 x 10.50	330 x 267
A20N12MP	14	17.00 x 10.50	432 x 267
A16N16MP	14	13.00 x 14.50	330 x 368
A20N16MP	14	17.00 x 14.50	432 x 368
A24N16MP	14	21.00 x 14.50	533 x 368
A18N18MP	14	15.00 x 16.50	381 x 419
A16N20MP	14	13.00 x 18.50	330 x 470
A20N20MP	14	17.00 x 18.50	432 x 470
A24N20MP	14	21.00 x 18.50	533 x 470
A30N20MP	14	26.00 x 18.50	660 x 470
A24N24MP	12	21.00 x 22.50	533 x 571
A30N24MP	12	26.00 x 22.50	660 x 571
A36N24MP	12	32.00 x 22.50	813 x 571
A30N30MP	12	26.00 x 28.50	660 x 724
A36N30MP	12	32.00 x 28.50	813 x 724

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NEMA Push Button Specifications

Catalog Numbers 800T and 800H

Topic	Page
800T/H Specifications	2
800T/H DeviceNet Stations	4
800T/H Trigger Action E-stops	5
800T/H Momentary Contact Push Buttons	7
800T/H Selector Switch	10
800T/H Pilot Lights	18
800T/H Push-Pull and Twist-to-release Devices	19
800T Cluster Pilot Lights	23
800T Toggle Switches	24
800T Selector Push Button	25
800H Momentary Contact Flip Lever Devices	26
800T/H Protective Boot Application Information	27
800T/H Approximate Dimensions	28
800T/H Typical Pilot Light Wiring Diagrams	40
800H Push Button Enclosures	41

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, http://www.ab.com	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at <http://www.rockwellautomation.com/literature/>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.



Specifications ★

Electrical Ratings		
Contact ratings	Refer to the contact ratings tables on page 10-4.	
Dielectric strength	2200V for one minute, 1300V for one minute (Logic Reed)	
Mechanical Ratings		
Vibration	10...2000 Hz, 1.52 mm displacement (peak-to-peak) max./ 10 G max. (except Logic Reed)	
Shock	1/2 cycle sine wave for 11 ms ≥ 25 g (contact fragility) and no damage at 100 g	
Degree of protection	Type 1/4/12/13 (800T); Type 1/4/4X/12/13 (800H); EN/IEC 60529 IP66/65	
Mechanical design life cycles		
Push buttons	(Momentary, non-illuminated, flush and extended head)	10,000,000 min.
	(Momentary, illuminated)	250,000 min.
	(Push-pull/twist-to-release)	250,000 min. ‡
Selector switches	(Non-illuminated)	1,000,000 min.
	(Illuminated, key-operated)	200,000 min.
Potentiometers	25,000 min.	
All other devices	200,000 min.	
Contact operation	Shallow, mini, and low-voltage contact blocks: Slow, double make and break Logic Reed and sealed switch contact blocks: Single break magnetic	
Wire gauge/Terminal screw torque	#18...14 AWG (#18...10 Max Duty) / 6...8 lb•in	
Typical operating forces		
Operators without contact blocks	Flush, extended button, standard mushroom, jumbo plastic mushroom: 2 lbs max. Jumbo and extended aluminum mushroom head: 3.95 lbs max. Maintained selector switch: 3.6 in•lb max.	
Spring return selector switches	3.6 in•lb to stop, 0.2 in•lb to return	
Illuminated push buttons and push-to-test pilot lights	5 lb max.	
2-position push-pull	8.0 lb max. push or pull	
3-position push-pull	8 lb max. push to in position or pull to center position (15 lb max. pull to out position)	
Twist-to-release or push-pull	9 lbs max. push or pull 30 in•oz max. twist, 6 in•oz minimum return	
Potentiometer	Rotational torque 3...12 in•oz; stopping torque 12 in•lb (minimum)	
Contact blocks	Standard	1 lb
	Logic Reed	1 lb max.
	Sealed switch	3 lb max. at 0.205 in. plunger travel
	Stackable sealed switch	1 lb max.
	MaxDuty	1.4 lb max.
	PenTUFF	1.4 lb max.
Self Monitoring	1.6 lb	
Environment		
Temperature range	Operating	-40...+131 °F (-40...+55 °C)
	Storage	-40...+185 °F (-40...+85 °C)
Note: Operating temperatures below freezing are based on the absence of moisture and liquids. Consult your local Rockwell Automation sales office or Allen-Bradley distributor for use in lower temperature applications.		
Humidity	50...95% RH from 77...140 °F (25...60 °C) per Procedure IV of MIL-STD-810C, Method 507.1 cycling test	

★ **Performance Data** — Performance data given in this publication is provided only as a guide for the user in determining suitability and do not constitute a performance warranty of any kind. Such data may represent the results of accelerated testing at elevated stress levels, and the user is responsible for correlating the data to actual application requirements. ALL WARRANTIES AS TO ACTUAL PERFORMANCE, WHETHER EXPRESS OR IMPLIED, ARE EXPRESSLY DISCLAIMED.

‡ Illuminated Trigger Action E-stops are rated for 150,000 min. mechanical operations when using Cat. No. 800TC-XD4S Self-Monitoring Contact Blocks (SMCBs).

Standard Contact Ratings

Minimum: 24V, 24 mA

Maximum thermal continuous current I_{th} 10 A AC/2.5 A DC. Bulletin 800T units with 800T-XA contacts have ratings as follows:

Max. Operntl. Volts U_e	Utilization Category		Rated Operational Currents		
	IEC	NEMA	Volts U_e	Make	Break
AC 600	AC-15	A600	120...600	7200VA	720VA
			72...120	60 A	720VA
DC 600	DC-13	Q600	24...72	60 A	10 A
			28...600	69VA	
			24...28★	2.5 A	

★ For applications below 17V/5 mA, PenTUFF or Logic Reed contacts are recommended.

Electrical design life cycles: 1,000,000 (at max. rated load)

Explosion-Protected Contact Ratings

Max. Operntl. Volts U_e	Utilization Category		Rated Operational Currents		
	IEC	NEMA	Volts U_e	Make	Break
AC 600	AC-15	A600	120...600	7200VA	720VA
			72...120	60 A	720VA
DC 600	DC-13	Q600	24...72	60 A	10 A
			28...600	69VA	
			24...28	2.5 A	

Maximum thermal continuous current I_{th} = 10 A
 Minimum low energy switching load: 17V DC, 5 mA
 Electrical design life cycles: 1,000,000 (24V DC, 25 mA)
 Vibration: 5 g, 0.7 mm peak-to-peak displacement, sine sweep 10...2000 Hz / IEC 60068-2-6
 Shock: 15 g (800H-TFRX trigger action E-stops), 50 g (all other devices) / IEC 60068-2-27

Sealed Switch Contact Ratings

Minimum: 5V, 1 mA

Maximum continuous current I_{th} 5 A. Bulletin 800T units have control circuit ratings with sealed switch contact blocks as follows:

Max. Operntl. Volts U_e	Utilization Category		Rated Operational Currents		
	IEC	NEMA	Volts U_e	Make	Break
AC 600	AC-15	B600	120...600	3600VA	360VA
			0...120	30 A	3 A
DC 300	DC-13	P300	24...300	138VA	
			0...24	5.0 A	

Stackable Sealed Switch Contact Ratings

Minimum: 5V, 10 mA (digital); 24V, 1 mA (analog)

Maximum continuous current I_{th} 2.5 A. Bulletin 800T units have control circuit ratings with sealed switch contact blocks as follows:

Max. Operntl. Volts U_e	Utilization Category		Rated Operational Currents		
	IEC	NEMA	Volts U_e	Make	Break
AC 300	AC-15	C300	120...300	1800VA	180VA
			0...120	15 A	1.5 A
DC 150	DC-13	Q150	24...150	69VA	
			0...24	2.5 A	

Logic Reed Contact Ratings

Minimum — DC: 5V, 1 mA
 Maximum — DC: 30V, 0.06 A, AC: 150V, 0.15 A
 Should only be used with resistive loads.
 Electrical design life cycles: 200,000 (at max. rated load)

PenTUFF™ (Low Voltage) Contact Ratings

Minimum DC: 5V, 1 mA

Maximum thermal continuous current I_{th} 2.5 A AC/1.0 A DC. Bulletin 800T units with 800T-XAV contacts have ratings as follows:

Max. Operntl. Volts U_e	Utilization Category		Rated Operational Currents		
	IEC	NEMA	Volts U_e	Make	Break
AC 300	AC-15	C300	120...300	1800VA	180VA
			0...120	15 A	1.5 A
DC 150	DC-13	R150	24...150	28VA	
			0...24	1.0 A	

Snap Action Contact Ratings

Max. Operntl. Volts U_e	Contact Rating Designation	Rated Operational Currents		
		Volts U_e	Make	Break
AC 300	A300	120...300	7200VA	720VA
		24...72	60 A	10 A
DC 250	—	230...250	0.2 A	
		115...125	0.4 A	

MaxDuty Contact Rating

Maximum thermal continuous current I_{th} 24 A.
 Pilot Duty — 120V AC, 12 A; 24V DC, 10 A
 Motor Ratings — 120V AC, 1.5 Hp; 240V AC, 3 Hp; 24V DC, 10 A FLA/60 A LRA

Time Delay Contacts

Max. Operntl. Volts U_e	Contact Rating Designation	Rated Operational Currents		
		Volts U_e	Make	Break
AC 120	B150	120	3600VA	360VA

Note: This device is not rated for DC applications.

Adjustment range: 0.5...15 s ± 25% I_{th} = 5 A

Materials Used in 800H Type 4X Operators

Thermoplastic Polyester (Fiberglass Reinforced)

- Bushings
- Mounting Rings
- Sockets

Transparent Amorphous Nylon

- Pilot light lens cap
- Illuminated button caps

Mineral Filled Nylon

- Trim washer

Thermoplastic Polyester

- Non-illuminated button caps

Glass Filled Crystalline Nylon

- Thrust washer

Nitrile (Synthetic Rubber)

- Gaskets and internal seals

Standards Compliance

UL 508
 CCC

Certifications

UL Listed
 (File No. E14840, E10314
 Guide No. NKCR, NOIV, NISD)
 CSA Certified
 (File No. LR1234, LR11924)
 CSA C22.2, No. 14
 CE Marked (EN/IEC 60947-5-1,
 EN/IEC 60947-5-5,
 EN ISO 13850)

2-Position Red Trigger Action Twist-to-Release, Non-Illuminated

- Tamper resistant – front-of-panel mounting and non-removable operator head
- Compliant with global E-stop standards, including EN ISO 13850 and EN 60947-5-5



800 T - TFX T 6 D2
 a b c d e

a

Protection Rating	
Code	Description
T	Metal, Type 4/13
H	Plastic, Type 4/4X/13

b

Finger-Safe Guards	
Code	Description
Blank	No guards
C	Guards on terminals

c

Head Type		
800T Type 4/13	Description	800H Type 4/4X/13
Code		Code
TFX	Standard (45 mm) mushroom head	TFRX
TFXJ	Jumbo (60 mm) mushroom head	TFRXJ
TFXJE	Jumbo (60 mm) mushroom head with "E-STOP"	TFRXJE
TFXK	45 mm mushroom head key release	—
TFXL	63 mm anodized aluminum head	—
TFXLE	63 mm anodized aluminum head with "E-STOP"	—

d

Release Function	
Code	Color
Blank	Key release ▲
T	Twist release

Note: X = Closed/O = Open
 ▲ Configurable only with FXK head type.

e

Contact Block(s)			
Code	Operator Position		Description
	Out	In	
Blank	—	—	No contacts on operator
Standard			
D2	X	O	1 N.C.
A	O X	X O	1 N.O. - 1 N.C.
A4	X X	O O	2 N.C.
PenTUFF (Low Voltage)			
D2V	X	O	1 N.C.
AV	O X	X O	1 N.O. - 1 N.C.

Momentary Contact Push Button Devices, Non-Illuminated



Flush Head Unit
Cat. No. 800T-A1A



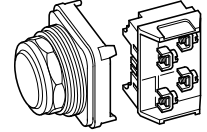
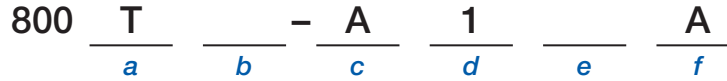
Extended Head Unit
Cat. No. 800T-B6A



Booted Unit
Cat. No. 800H-R2A



Bootless Flush Head Unit
Cat. No. 800H-AR1A



a

Protection Rating	
Code	Description
T	Metal, Type 4/13
H	Plastic, Type 4/4X/13

b

Finger-Safe Guards	
Code	Description
Blank	No guards
C	Guards on terminals

c

Operator Type		
800T Type 4/13	Description	800H Type 4/4X/13
Code		Code
A	Flush head	AR
B	Extended head	BR
D	Mushroom head	DR
DX	Mushroom head less color cap	DRX
—	Bootless guarded head	GR
—	Booted head	R★

d

Color Cap	
Code	Description
Blank	Used only when ordering Operator Type DX/DRX
1	Green
2	Black
3	Orange‡

d (cont'd)

Color Cap	
Code	Description
4	Grey‡
5	White‡
6	Red
7	Blue
9	Yellow

e

Special Mushroom Head	
Code	Description
J★	Jumbo mushroom head — plastic
L★	Jumbo mushroom head — metal

Note: Special mushroom head options only apply to mushroom head operator type code D/DR (Table c).

f

Contact Block(s)	
Code	Description
Blank	No contacts
Standard	
D1	1 N.O.
D2	1 N.C.
D3	1 N.O.E.M.
D4	1 N.C.L.B.
D5	1 N.O. (Mini)
D6	1 N.C. (Mini)
A1	1 N.C.L.B. - 1 N.O.
A2	2 N.O.§
A4	2 N.C.
A7	1 N.C.L.B. - 1 N.C.
A	1 N.O. - 1 N.C.
B	2 N.O. - 2 N.C.

f (cont'd)

Contact Block(s)	
Code	Description
PenTUFF (Low Voltage)	
D1V	1 N.O.
D2V	1 N.C.
D3V	1 N.O.E.M.
D4V	1 N.C.L.B.
AV	1 N.O. - 1 N.C.
BV	2 N.O. - 2 N.C.
Time Delay	
T	1 N.O. Depress close, delayed opening
S	1 N.C. Depress open, delayed closure
Snap Action	
M	1 N.O. - 1 N.C.
N	2 N.O. - 2 N.C.
Class 1, Div. 2	
Logic Reed	
D1R	1 N.O.
D2R	1 N.C.
A2R	2 N.O.§
A4R	2 N.C.
AR	1 N.O. - 1 N.C.
BR	2 N.O. - 2 N.C.

f (cont'd)

Contact Block(s)	
Code	Description
Class 1, Div. 2	
Sealed Switch	
D1P	1 N.O.
D2P	1 N.C.
AP	1 N.O. - 1 N.C.
BP	2 N.O. - 2 N.C.
Stackable Sealed Switch	
D1Y	1 N.O.
D2Y	1 N.C.
A2Y	2 N.O.
A4Y	2 N.C.
AY	1 N.O. - 1 N.C.
BY	2 N.O. - 2 N.C.
Time Delay Contacts	
Series C field installable kits can only be used with Series T or later operators. Adjustable range of 0.5 to 15 s + 25%. Maximum continuous current I _{th} 5 A.	
Snap Action Contacts	
Snap-action contacts feature a quick make, quick break snap-action mechanism that is only available on factory assembled units. Maximum continuous current I _{th} 10 A.	

- ★ Underlying operators are extended head. Boot material is chlorosulfonated polyethylene.
- ‡ Not available for booted operators.
- § A2 and A2R contact blocks cannot be stacked upon, but can stack on other contact blocks.
- ★ Jumbo mushroom heads not available in white color.

Pilot Light Devices



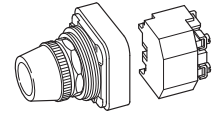
Transformer Type Pilot Light
Cat. No. 800T-P16R



Push-to-Test Pilot Light
Cat. No. 800T-PT16R

800 T - P T 16 G AR (Push-to-Test)

a *b* *c* *d* *e* *f* *g* *h*



a

Protection Rating	
Code	Description
T	Metal, Type 4/13
H	Plastic, Type 4/4X/13

b

Finger-Safe Guards	
Code	Description
Blank	No guards
C	Guards on terminals

c

Power Module Type		
800T Type 4/13	Description	800H Type 4/4X/13
Code		Code
P	Transformer (or dual input)	PR
Q	Full voltage/Universal	QR

d

Lamp Test Options	
Code	Description
Blank	No test option ▽
T	Push-to-test
D	Dual input — diode ▲
DT	Dual input — transformer relay ▲

Note: Push-to-test supplied with factory jumpered contact block.

e

Illumination Options	
Code	Description
Blank	Incandescent
H	LED ✱

f

Voltage	
Code	Description
Transformer	
16	120V AC 50/60 Hz
26	240V AC 50/60 Hz
46	480V AC 50/60 Hz
56	600V AC 50/60 Hz
Full Voltage — Incandescent	
12	12V AC/DC
24	24V AC/DC
48	48V AC/DC
10	120V AC/DC
20	240V AC/DC
Universal — LED	
2	12...130V AC/DC
Dual Input	
16	120V AC
24	24V AC/DC (Dual input diode only)

g

Lens Color		
Code	Color	Glass Code #
Blank	No lens	Blank
A	Amber	D
B	Blue	E
C	Clear	F
G	Green	H
R	Red	J
W	White	K

h

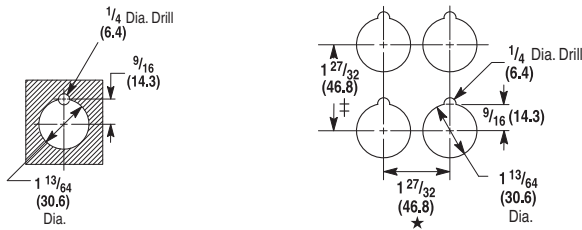
Contact Blocks (Push-to-test units only)	
Code	Description
Standard	
Blank	1 N.O. - 1 N.C.
PenTUFF (Low Voltage)	
AV	1 N.O. - 1 N.C.
Class 1, Div. 2	
Logic Reed	
AR	1 N.O. - 1 N.C.
Sealed Switch	
AP	1 N.O. - 1 N.C.
Stackable Sealed Switch	
AY	1 N.O. - 1 N.C.

- ▽ Non-push-to-test pilot lights using the universal LED option cannot be ordered as Bul. 800HC or 800TC. The terminals are finger-safe as standard.
- ▲ Diode type dual input provides circuit isolation via opposing diodes. Not recommended for use with solid-state outputs.
- ♣ Dual input devices (diode or transformer type) cannot be ordered as Bul. 800HC or 800TC. Finger-safe terminal guards are not available.
- ✱ LED illumination option is not available with diode type dual input.
- # Glass lens available on 800T pilot lights only. Not available on push-to-test units.

Approximate Dimensions

Dimensions in inches (millimeters). Dimensions are not intended to be used for manufacturing purposes.

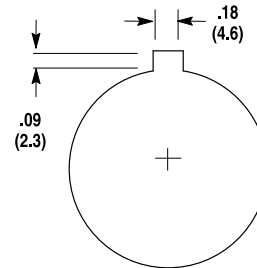
Mounting Instructions for Push Buttons with Shallow Blocks, Mini Blocks, Logic Reed Blocks, Sealed Switch Blocks, and Time Delay Blocks (see footnotes for exceptions)



- ★ Change to 2-1/4 in. (57.2 mm) for transformer type pilot light, push-to-test pilot lights, illuminated selector switches, and all push-pull buttons.
Note: Large legend plate requires minimum horizontal spacing of 2-15/32 in. (62.7 mm).
- ‡ Vertical minimum spacing dimension changes for the following legend plates: jumbo 2-15/32 in. (62.7 mm); large 2-7/16 in. (61.9 mm); cluster pilot light and 2-, 3-, 4-way switches 2-1/16 in. (52.4 mm).

Sketch illustrates the minimum distance between centerlines when mounting Bulletin 800T/H controls either side-by-side, facing each other, or one above the other. When control units are mounted so that the contact block terminals face each other, the 2-1/4 in. (57.2 mm) dimension must be used in order to get proper electrical clearance. When control units are mounted so that the contact block terminals do not face each other, the 1-27/32 in. (46.8 mm) dimension can be used.

Typical Panel Cut-Out

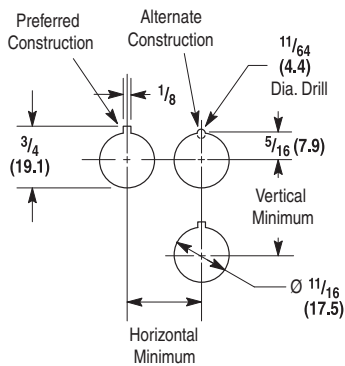


Panel Thickness — Kits are shipped with three 1/16 in. (1.58 mm) gaskets. Refer to table below for number of washers required for various panel thicknesses.

	1/16 in. (1.6 mm) (16 Gauge)	7/64 in. (2.8 mm) (12 Gauge) 9/64 in. (3.6 mm) (10 Gauge)	3/16 in. (4.8 mm) Panel	Thicker Than 3/16 in. (4.8 mm) Panel	Thicker Than 1/4 in. (6.4 mm) Panel
800T	3 washers	2 washers	1 washer	Counterbore to 3/16 in. (4.8 mm)	Counterbore to 3/16 in. (4.8 mm)
800H	4 washers	3 washers	2 washers	1 washer	Counterbore to 1/4 in. (6.4 mm)

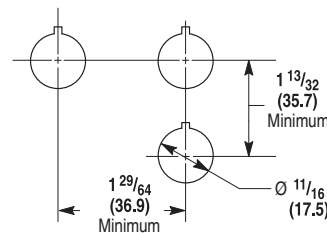
Mounting Instructions for 18 mm Small Pilot Lights

Type A Legend Plate



Cat. No. 800T-N515

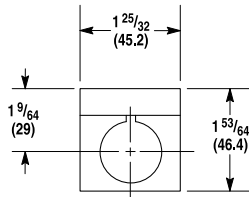
Type B Legend Plate



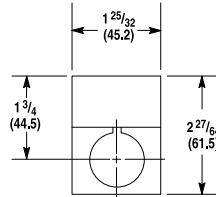
Device	Dimensions	
	Horizontal	Vertical
800T-PS, PSD, PST, QS, QST and RST	31/32 (24.6)	1-5/32 (29.4)
800T-PSDT	1-3/64 (26.6)	1-15/64 (31.4)

Dimensions in inches (millimeters). Dimensions are not intended to be used for manufacturing purposes.

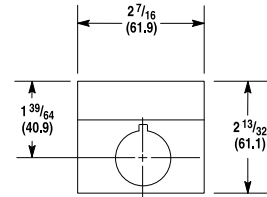
Legend Plate Dimensions (Bul. 800T Only)



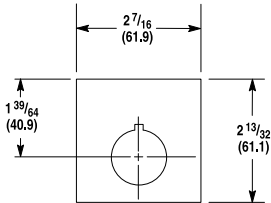
Standard Legend Plate



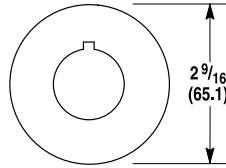
Jumbo Legend Plate



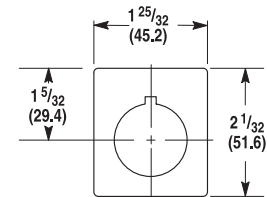
**Large Legend Plate
(Automotive Industry Type)**



**Large Size
Push-Pull/Twist Legend Plate
Cat. No. 800T-X647 ★**



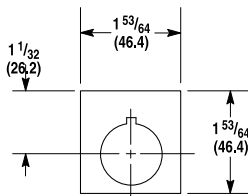
**Round
Cat. No. 800T-X646 ★**



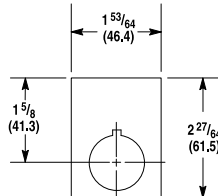
**Cluster Pilot Light and
2-3-4 Way Switch
Silver Legend Plate
Cat. No. 800T-X619**

★ For panel mounting only. Not for use with Allen-Bradley enclosures.

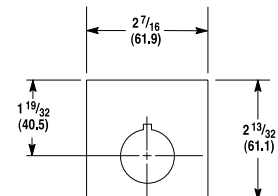
Legend Plate Dimensions (Bul. 800H Only)



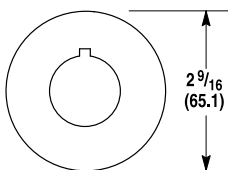
**Type 4/4X
Standard Legend Plate**



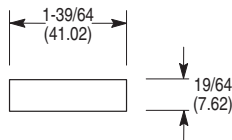
**Type 4/4X
Jumbo Legend Plate**



**Type 4/4X
Large Legend Plate
(Automotive Industry Type)**



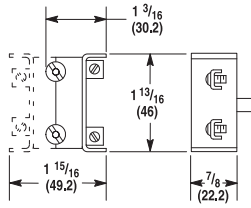
**Type 4/4X
Round**



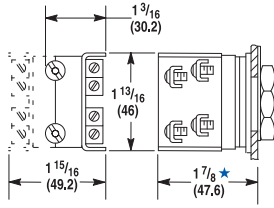
**Type 4/4X
Standard Legend Plate
(Flip Lever Operators)**

Dimensions in inches (millimeters). Dimensions are not intended to be used for manufacturing purposes.

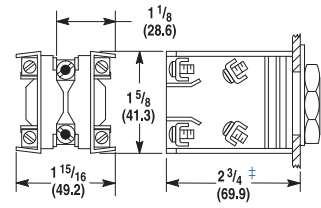
Blocks (Bul. 800T Only)



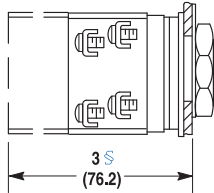
Mini Contact Block
7/8 (22.2) Deep



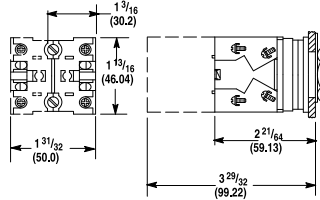
**Shallow, PenTUFF,
and Logic Reed Contact Blocks**
1-1/8 (28.6) Deep



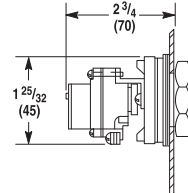
Sealed Switch Block
2 (50.8) Deep



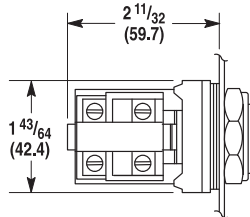
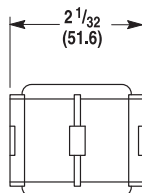
Tandem Mounting
(2 shallow contact
blocks stacked)



Stackable Sealed Switch Block
1.58 (40.1) Deep



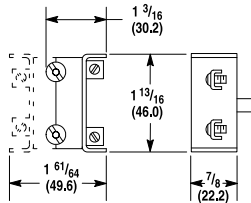
Time Delay Contact Block
(For Push Buttons Only)



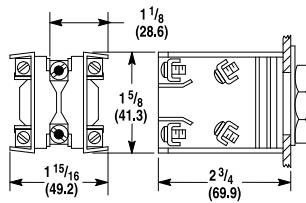
Snap Action Contact Block (For Push Button Only)

- ★ Dimension shown is for push buttons. Selector switch dimension is 2-1/32 in. (51.6 mm).
- ‡ Dimension shown is for push buttons. Selector switch dimension is 2-27/32 in. (72.2 mm).
- § Dimension shown is for push buttons. Selector switch dimension is 3-5/32 in. (80.2 mm).

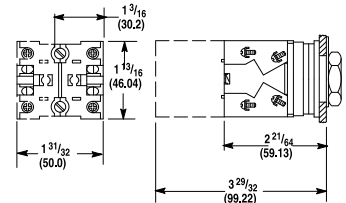
Blocks (Bul. 800H Only)



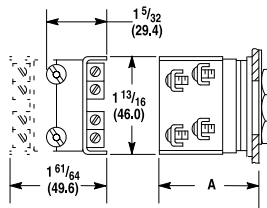
Mini Contact Block



Sealed Switch Block
2 (50.8) Deep



Stackable Sealed Switch Block
1.58 (40.1) Deep



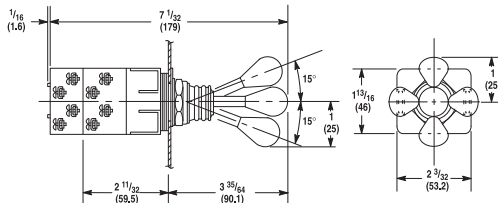
**Shallow, PenTUFF and Logic
Reed Contact Blocks**

Dim.	Momentary Push Button	Maintained Push Button	Selector Switch
A	2 (50.8)	2 (50.8)	1-29/32 (48.4)

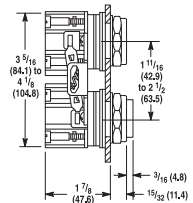
Operator Extension Behind Panel — When mounted with thrust washer, trim washer, or notched legend plate and correct number of rubber washers.

Dimensions in inches (millimeters). Dimensions are not intended to be used for manufacturing purposes.

Push Buttons and Switches (Bul. 800T Only)

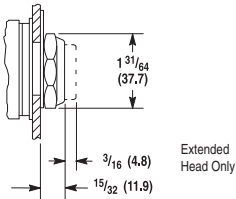


2-3-4 Way Switch
Shipping Wt. with 2 Contact Blocks 6 oz (0.17 kg)
Shipping Wt. with 4 Contact Blocks 8-1/2 oz (0.24 kg)

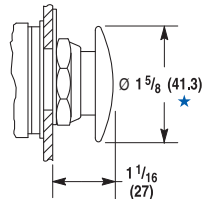


Mechanically Interlocked
Maintained Contact Push Button
Shipping Wt. 1 lb (0.45 kg)

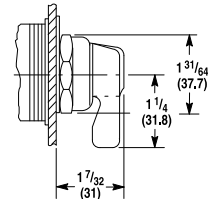
Push Buttons and Pilot Lights



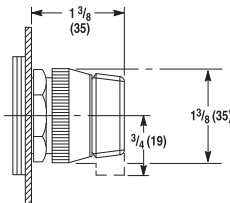
Flush and Extended
Head Push Button
Shipping Wt. 5-1/2 oz (0.15 kg)



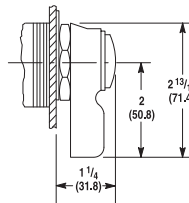
Mushroom Head Push Button
Shipping Wt. 7-1/2 oz (0.21 kg)



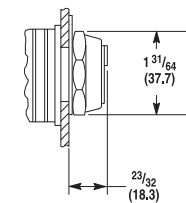
Non-Illuminated Knob Lever and
Standard Knob Selector Switch
Shipping Wt. 6 oz (0.17 kg)



Illuminated Knob Lever and
Standard Knob Selector Switch
Shipping Wt. 6 oz (0.17 kg)



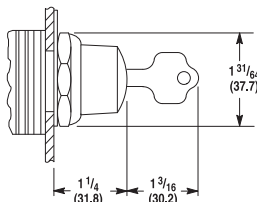
Wing Lever Selector Switch
Shipping Wt. 8 oz (0.22 kg)



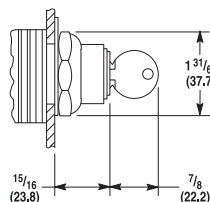
Coin Slot Selector Switch
Shipping Wt. 6 oz (0.17 kg)

★ Except jumbo which is 2-1/4 (57.2).

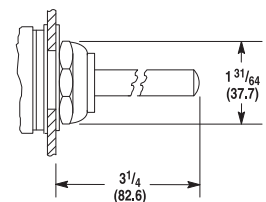
Operator Extension in Front of Panel (Bul. 800T Only)



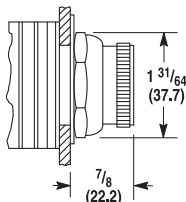
Key Operated Selector Switch
Shipping Wt. 12 oz (0.34 kg)



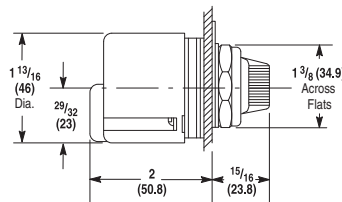
Push Button with Cylinder Lock
Shipping Wt. 12 oz (0.34 kg)



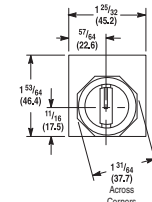
Wobble Stick
Shipping Wt. 9 oz (0.25 kg)



Selector Push Button
Shipping Wt. 6 oz (0.17 kg)

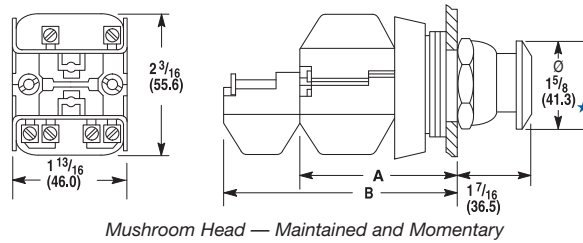
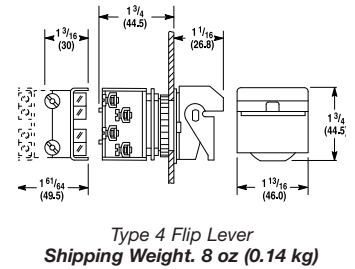
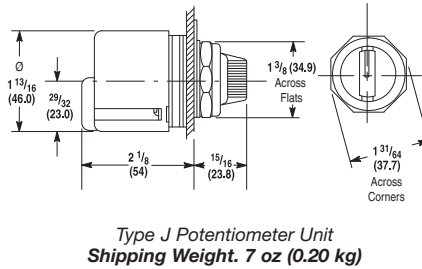
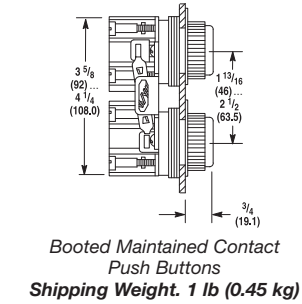
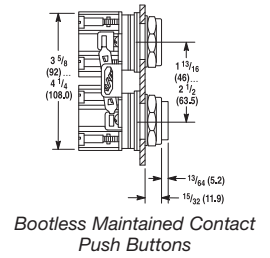
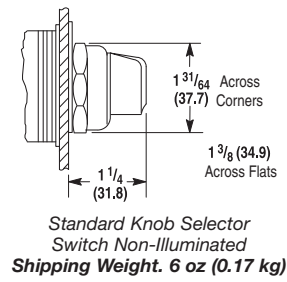
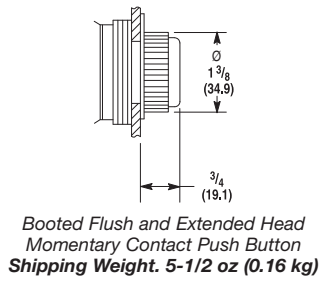
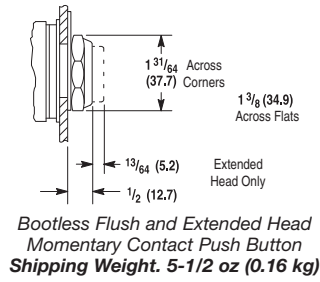


Type J Potentiometer Unit
Shipping Wt. 4 oz (0.11 kg)



Dimensions in inches (millimeters). Dimensions are not intended to be used for manufacturing purposes.

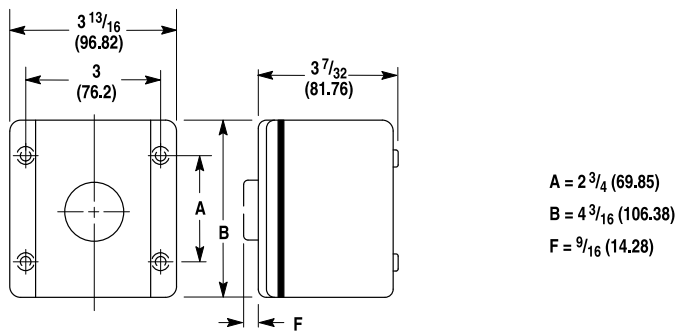
Push Buttons and Switches (Bul. 800H Only)



Non-Illuminated Mushroom and Push-Pull Push Buttons				
Cat. No. Suffix	Description	Dimensions		Shipping Weights
D4	One Shallow Block	A	2-1/32 (51.6)	5 oz (0.14 kg)
A1, A5 and A7	Two Shallow blocks	A	2-1/32 (51.6)	6 oz (0.17 kg)
B6	Two Shallow Blocks and Two Mini Blocks	B	2-7/8 (73.0)	8 oz (0.22 kg)

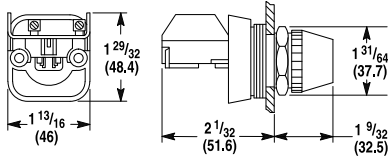
★ Jumbo versions are 2-1/4 (57.2).

Break-Glass Station

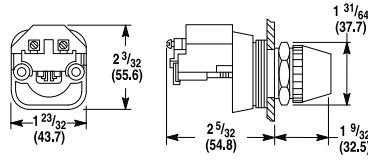


Dimensions in inches (millimeters). Dimensions are not intended to be used for manufacturing purposes.

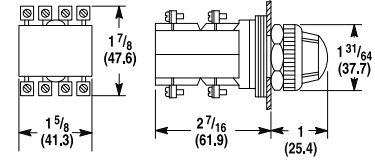
Pilot Light and Illuminated Devices (Bul. 800T Only)



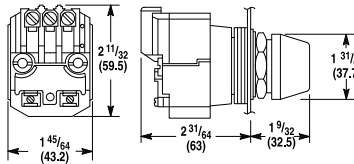
Full Voltage, Neon and Dual Input Pilot Light
Shipping Wt. 5 oz (0.14 kg)



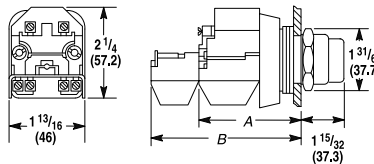
Transformer Type Pilot Light
Shipping Wt. 8 oz (0.22 kg)



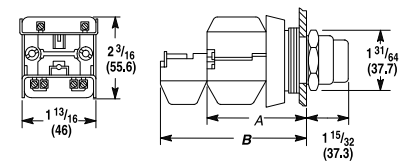
Cluster Pilot Light
Shipping Wt. 12 oz (0.34 kg)



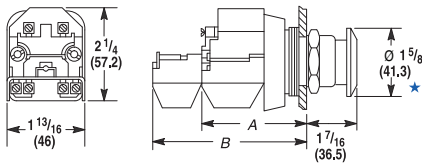
Dual Input Transformer Type Pilot Light



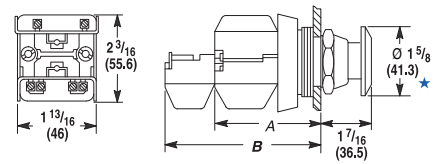
Transformer Type (Push-to-Test Pilot Light and Illuminated Push Button)



Full Voltage, Neon and Dual Input Type (Push-to-Test Pilot Light and Illuminated Push Button)



Push-Pull and Twist or Pull Release Units (Transformer Type Illuminated)



Push-Pull and Twist or Pull Release Units (Full Voltage, Neon and Dual Input Illuminated and All Non-Illuminated)

* Jumbo mushroom versions are 2-1/4 in. (57.2 mm) diameter.

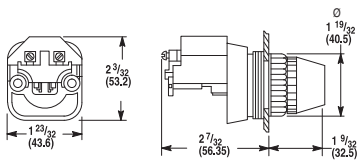
Push-to-Test Pilot Lights Illuminated Push Buttons and Illuminated Push-Pull Buttons							Non-Illuminated Push-Pull Buttons					
Cat. No. Suffix†	Description	Transformer Type		Full Voltage or Neon Type		Cat. No. Suffix	Description	Transformer Type				
		Dim.	Ship. Wt.	Dim.	Ship. Wt.			Dim.	Ship. Wt.			
D4	Transformer or Terminal Module and One Shallow Contact Block	A	2-5/32 (54.8)§	9 oz. (0.25 kg)	A	2-1/32 (51.6)	7 oz. (0.25 kg)	D4	One Shallow Contact Block	A	2-1/32 (51.6)	5 oz. (0.14 kg)
A1 and A7	Transformer or Terminal Module and One Shallow Block and One Mini Contact Block	B	2-7/8 (73)	10 oz. (0.28 kg)	B	2-7/8 (73)	8 oz. (0.22 kg)	A4 A5 A7	Two Shallow Contact Blocks	A	2-1/32 (51.6)	6 oz. (0.17 kg)
AP D1P D2P	Transformer or Terminal Module and One Sealed Switch Contact Block	A	3-1/32 (77)	10 oz. (0.28 kg)	A	2-29/32 (73.8)	8 oz. (0.22 kg)	B6	Two Shallow Blocks and Two Mini Contact Blocks	B	2-7/8 (73)	8 oz. (0.22 kg)

† Applies to illuminated push-pull push buttons only.

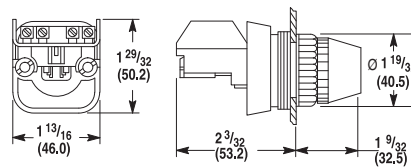
§ Dual input type pilot light dimension is 2-13/32 in. (61.1 mm).

Dimensions in inches (millimeters). Dimensions are not intended to be used for manufacturing purposes.

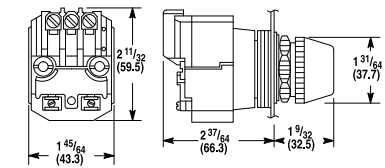
Push-to-Test Pilot Light and Illuminated Devices (Bul. 800H Only)



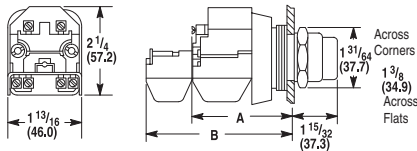
Transformer Type Pilot Light
(Incandescent and LED)
Shipping Weight. 12 oz (0.34 kg)



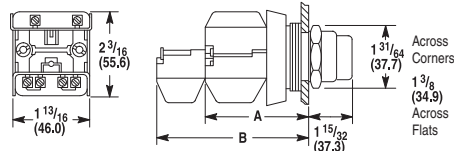
Full Voltage and Dual Input Diode Type
Pilot Light (Incandescent, Neon, LED)
Shipping Weight. 5 oz (0.14 kg)



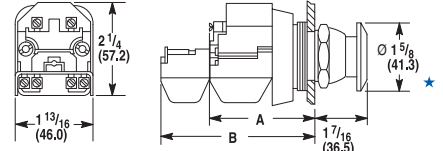
Dual Input Transformer Type Pilot Light
Shipping Weight. 14 oz (0.40 kg)



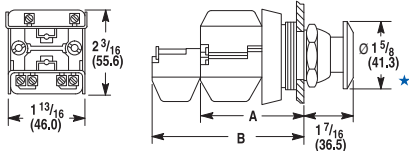
Push-to-Test Pilot Light and Illuminated
Push Button
(Transformer Type: Incandescent, LED)



Push-to-Test Pilot Light and
Illuminated Push Button
(Full Voltage: Incandescent, LED, Neon;
and Dual Input Type)



Momentary Mushroom, Push-Pull and
Twist or Pull Release Units
(Transformer Type: Incandescent, LED; Illuminated)



Momentary Mushroom, Push-Pull and
Twist or Pull Release Units
(Full Voltage: Incandescent, LED, Neon;
and Dual Input Illuminated)

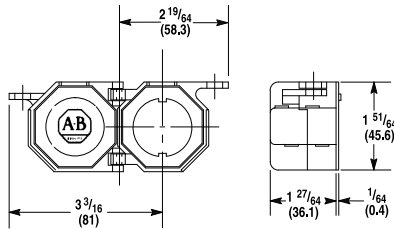
Push-to-Test Pilot Lights
Illuminated Push Buttons, Illuminated Push-Pull and Twist or Pull Release Push Buttons

Cat. No. Suffix†	Description	Transformer Type		Full Voltage or Neon Type			
		Dimension	Shipping Weight	Dimension	Shipping Weight		
D4	Transformer or Terminal Module and One Shallow Contact Block	A	2-5/32 (54.8)§	9 oz. (0.25 kg)	A	2-1/32 (51.6)♣	7 oz. (0.20kg)
A1 and A7	Transformer or Terminal Module, One Shallow Block and One Mini Contact Block	B	2-7/8 (73)	10 oz. (0.28 kg)	B	2-7/8 (73)	8 oz. (0.22 kg)
AP	Transformer or Terminal Module and One Sealed Switch Contact Block	B	2-29/32 (73.8)	10 oz. (0.28 kg)	B	2-29/32 (73.8)	8 oz. (0.22 kg)

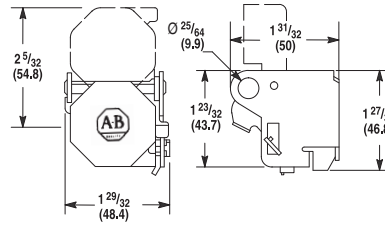
- ★ Jumbo mushroom versions are 2-1/4 in. (57.2 mm) diameter.
- † Applies to illuminated push-pull push buttons only.
- § Dual input type pilot light dimension is 2-13/32 in. (61.1 mm).
- ♣ Dual input type pilot light dimension is 2-9/32 in. (57.9 mm).

Dimensions in inches (millimeters). Dimensions are not intended to be used for manufacturing purposes.

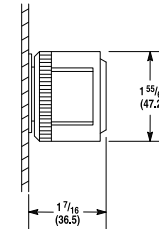
Accessories



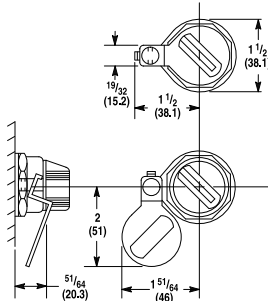
Push Button Padlocking Cover
(not for use with Jumbo Mushroom Head devices)
Shipping Wt. 1 oz (0.03 kg)



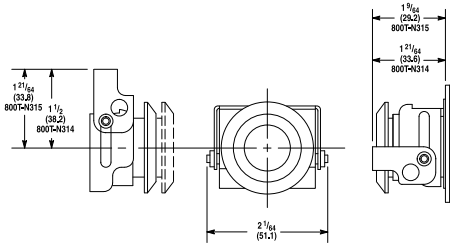
Selector Switch and Potentiometer
Unit Padlocking Cover



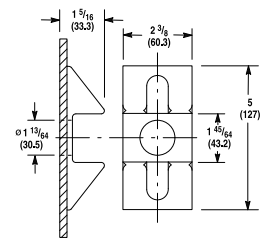
Protective Ring and
Push-Pull Illuminated
or Non-Illuminated Operators



Selector Switch
Padlocking Attachment

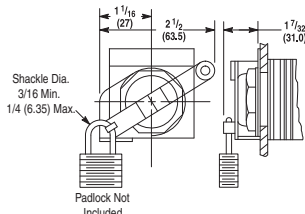


Push-Pull Padlocking Attachment and
Metal Mushroom Push Button Padlocking Attachment

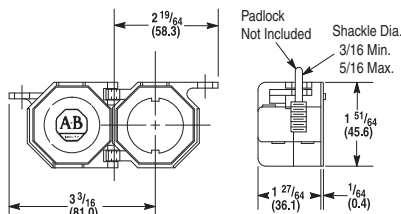


Ramp Guard for Push-Pull Illuminated or
Non-Illuminated Operators

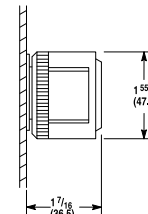
Accessories (Bul. 800H Only)



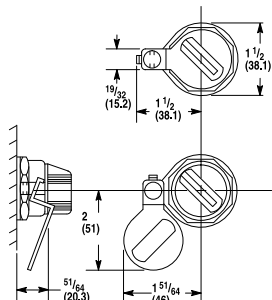
Locking Attachment for Extended,
Non-Illuminated Push Buttons



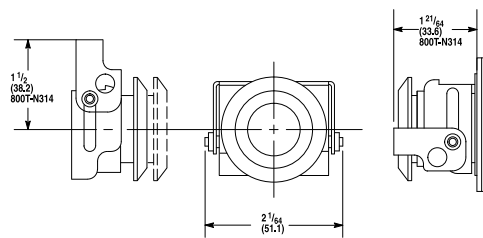
800H-N140 Locking Cover for 2-Position
Non-Illuminated Maintained Twist or Pull
Release and Standard Knob Selector Switch
(1-5/8 (41.3) Mushroom Head only)



Protective Ring for 2-Position
Push-Pull/Twist Illuminated
or Non-Illuminated Operators



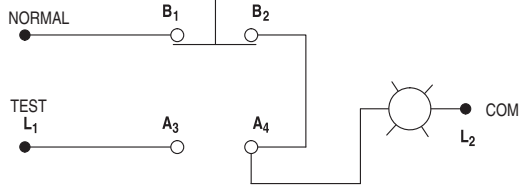
Non-Illuminated Selector Switch
Padlocking Adjustment



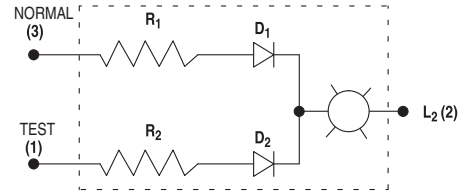
Push-Pull/Twist Padlocking Attachment

Typical Pilot Light Wiring Diagrams

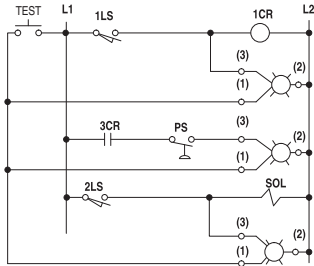
See applicable codes and laws



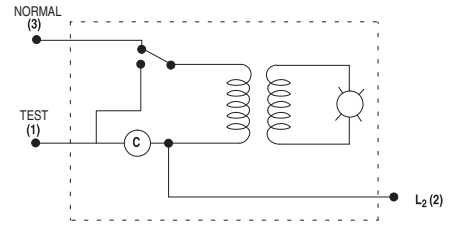
Push-to-Test Pilot Light Device Schematic



Dual Input Diode Pilot Light Device Schematic



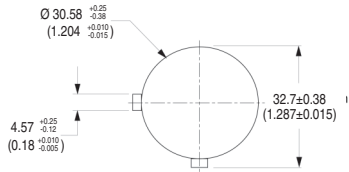
Dual Input Pilot Light Typical Application Wiring Diagram



Dual Input Pilot Light Transformer Type Device Schematic

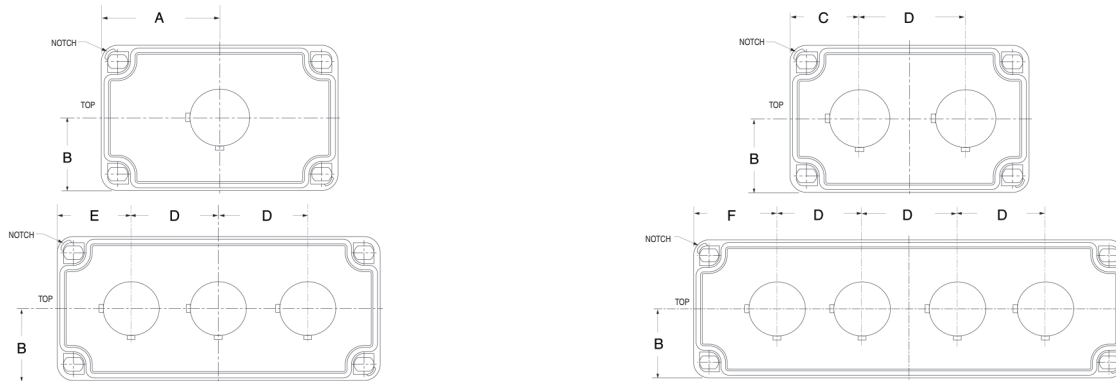
Dimensions are shown in millimeters (inches). Dimensions are not intended to be used for manufacturing purposes.

Push Button Hole



30.5 mm Push Button Hole

Push Button Hole Spacing

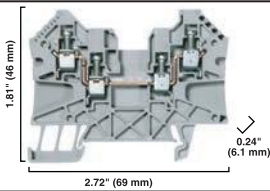
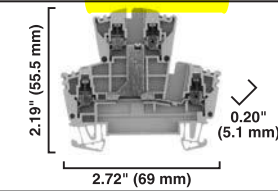
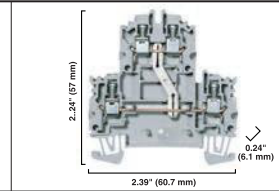













Cat. No.	Type	A	B	C	D	E	F
800H-1HZ4C	1-Hole	55±.216 (2.165±0.0085)	40±0.5 (1.57±0.020)	—	46.8±0.191 (1.843±0.0075)	—	—
800H-2HZ4C	2-Hole	—		41.6±0.175 (1.64±0.0069)		—	—
800H-3HZ4C	3-Hole	—		—		43.2 +0.32/-0.18 (1.7 +0.0126/-0.0071)	—
800H-4HZ4C	4-Hole	—		—		—	54.8±0.216 (2.16±0.0085)

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Screw Connection Terminal Blocks

Specialty Feed-Through Blocks

	1492-J4Q	1492-JD3C	1492-JD4C			
Dimensions are not intended to be used for manufacturing purposes. Note: Height dimension is measured from top of rail to top of terminal block.						
Specifications	Single-level feed-through terminal block with 2 connection points on each side		Two-level feed-through terminal block with commoning bar			
Certifications	  	   	   			
Voltage Rating	600V AC/DC	600V AC/DC	600V AC/DC			
Maximum Current	30 A	20 A	35 A			
Wire Range (Rated Cross Section)	#30...10 AWG	#22...12 AWG	#26...10 AWG			
Wire Strip Length	0.39 in. (10 mm)	0.39 in. (10 mm)	0.28 in. (7 mm)			
Recommended Tightening Torque	6.2 lb•in (0.7 N•m)	4.5...7.1 lb•in (0.5...0.8 N•m)	4.5 lb•in (0.5 N•m)			
Density	49 pcs/ft (163 pcs/m)	59 pcs/ft (196 pcs/m)	49 pcs/ft (163 pcs/m)			
Housing Temperature Range	-58...+248 °F (-50...+120 °C)	-58...+248 °F (-50...+120 °C)	-58...+248 °F (-50...+120 °C)			
Short-Circuit Current Rating (SCCR)	See page 12-42					
Terminal Blocks	Cat. No.	Pkg Qty.	Cat. No.	Pkg Qty.	Cat. No.	Pkg Qty.
Color: Grey	1492-J4Q	50	1492-JD3C	100	1492-JD4C	100
Accessories	Cat. No.	Pkg Qty.	Cat. No.	Pkg Qty.	Cat. No.	Pkg Qty.
Mounting Rails:						
1 m Symmetrical DIN (Steel)	199-DR1	10	199-DR1	10	199-DR1	10
1 m Symmetrical DIN (Aluminum)	1492-DR5	10	1492-DR5	10	1492-DR5	10
1 m Hi-Rise Sym. DIN (Aluminum)	1492-DR6	2	1492-DR6	2	1492-DR6	2
1 m Angled Hi-Rise Sym. DIN (Steel)	1492-DR7	2	1492-DR7	2	1492-DR7	2
End Barriers						
Grey	1492-EBJ4Q	50	1492-EBJD3	20	1492-EBJD4	20
Blue	—	—	1492-EBJD3-B	20	—	—
Yellow	1492-EBJ4Q-Y	50	1492-EBJD3-Y	20	—	—
End Anchors and Retainers:						
Screwless End Retainer	1492-ERL35	20	1492-ERL35	20	—	—
DIN Rail — Normal Duty	1492-EAJ35	100	1492-EAJ35	100	—	—
DIN Rail — Heavy Duty	1492-EAHJ35	50	1492-EAHJ35	50	1492-EAHJ35	50
Jumpers: *						
Screw Center Jumper — 41-pole	—	—	—	—	—	—
Screw Center Jumper — 10-pole	—	—	1492-CJJ5-10	20	—	—
Screw Center Jumper — 4-pole	—	—	1492-CJJ5-4	50	—	—
Screw Center Jumper — 3-pole	—	—	1492-CJJ5-3	50	—	—
Screw Center Jumper — 2-pole	—	—	1492-CJJ5-2	50	—	—
Plug-in Center Jumper — 41-Pole	1492-CJLJ6-41	10	—	—	1492-CJLJ6-41	10
Plug-in Center Jumper — 5-, 6-, 7-, 8-, 9-, 10-Pole	1492-CJLJ6-10	20	—	—	1492-CJLJ6-10	20
Plug-in Center Jumper — 2-, 3-, 4-Pole	1492-CJLJ6-2, -3, -4	60	—	—	1492-CJLJ6-2, -3, -4	60
Insulated Side Jumper — 24-Pole	—	—	1492-SJ5A-24	50	—	—
Insulated Side Jumper — 10-Pole	—	—	1492-SJ5A-10	50	—	—
Screw Type Jumper Notching Tool	—	—	1492-T1	1	—	—
Other Accessories:						
Partition Plate	—	—	1492-PPJD3	20	1492-PPJD3	20
Test Plug Socket	—	—	1492-TPS23	20	—	—
Test Plug	—	—	1492-TP23	20	—	—
Test Plug (Stackable)	—	—	—	—	—	—
Marking Systems:						
Snap-in marker card	1492-MR6X12 (120/card)	5	1492-M5X8 (144/card)	5	1492-MR6X8 (120/card)	5
	1492-M6X12 (120/card)	5	1492-M5X5 (200/card)	5	1492-M6X5 (200/card)	5

* Use of center jumpers may affect spacings, requiring derating of terminal blocks; see page 12-83 for details.

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Screw Connection Terminal Blocks

Standard Feed-Through Blocks

	1492-J3				1492-J4				1492-J6			
Dimensions are not intended to be used for manufacturing purposes. Note: Height dimension is measured from top of rail to top of terminal block.												
Specifications	<i>Feed-through terminal block</i>				<i>Feed-through terminal block</i>				<i>Feed-through terminal block</i>			
Certifications												
Voltage Rating	600V AC/DC		800V AC/DC	550V AC/DC	600V AC/DC		800V AC/DC	690V AC/DC	600V AC/DC		800V AC/DC	550V AC/DC
Maximum Current	25 A	20 A	24 A	21 A	35 A	25 A	32 A	28 A	50 A	41 A	36 A	
Wire Range (Rated Cross Section)	#22...12 AWG	#26...12 AWG	2.5 mm ²	2.5 mm ² (#20...14 AWG)	#22...10 AWG	#26...10 AWG	4 mm ²	4 mm ² (#20...12 AWG)	#22...8 AWG	6 mm ²	6 mm ² (#20...10 AWG)	
Wire Strip Length	0.39 in. (10 mm)				0.39 in. (10 mm)				0.47 in. (12 mm)			
Recommended Tightening Torque	4.5...7.1 lb•in (0.5...0.8 N•m)				9.0 lb•in (1.0 N•m)				14.2 lb•in (1.6 N•m)			
Density	59 pcs/ft (196 pcs/m)				49 pcs/ft (163 pcs/m)				37 pcs/ft (123 pcs/m)			
Housing Temperature Range	-58...+248 °F (-50...+120 °C)				-58...+248 °F (-50...+120 °C)				-58...+248 °F (-50...+120 °C)			
Short-Circuit Current Rating	See page 12-42											
Terminal Blocks		Cat. No.	Pkg Qty.		Cat. No.	Pkg Qty.		Cat. No.	Pkg Qty.		Cat. No.	Pkg Qty.
Color:	Grey	1492-J3	100		1492-J4	100		1492-J6	100		1492-J6	100
	Red	1492-J3-RE	100		1492-J4-RE	100		1492-J6-RE	100		1492-J6-RE	100
	Blue	1492-J3-B	100		1492-J4-B	100		1492-J6-B	100		1492-J6-B	100
	Black	1492-J3-BL	100		1492-J4-BL	100		1492-J6-BL	100		1492-J6-BL	100
	Green	1492-J3-G	100		1492-J4-G	100		1492-J6-G	100		1492-J6-G	100
	Yellow	1492-J3-Y	100		1492-J4-Y	100		1492-J6-Y	100		1492-J6-Y	100
	Orange	1492-J3-OR	100		1492-J4-OR	100		1492-J6-OR	100		1492-J6-OR	100
	Brown	1492-J3-BR	100		1492-J4-BR	100		1492-J6-BR	100		1492-J6-BR	100
	White	1492-J3-W	100		1492-J4-W	100		1492-J6-W	100		1492-J6-W	100
	Violet	1492-J3-V	100		1492-J4-V	100		—	—		—	—
Mounting Rails:												
1 m Symmetrical DIN (Steel)		199-DR1	10		199-DR1	10		199-DR1	10		199-DR1	10
1 m Symmetrical DIN (Aluminum)		1492-DR5	10		1492-DR5	10		1492-DR5	10		1492-DR5	10
1 m Hi-Rise Sym. DIN (Aluminum)		1492-DR6	2		1492-DR6	2		1492-DR6	2		1492-DR6	2
1 m Angled Hi-Rise Sym. DIN (Steel)		1492-DR7	2		1492-DR7	2		1492-DR7	2		1492-DR7	2
End Barriers	Grey	1492-EBJ3	50		1492-EBJ3	50		1492-EBJ3	50		1492-EBJ3	50
	Blue	1492-EBJ3-B	50		1492-EBJ3-B	50		1492-EBJ3-B	50		1492-EBJ3-B	50
	Yellow	1492-EBJ3-Y	50		1492-EBJ3-Y	50		1492-EBJ3-Y	50		1492-EBJ3-Y	50
End Anchors and Retainers:												
DIN Rail — Normal Duty		1492-EAJ35	100		1492-EAJ35	100		1492-EAJ35	100		1492-EAJ35	100
DIN Rail — Heavy Duty		1492-EAHJ35	50		1492-EAHJ35	50		1492-EAHJ35	50		1492-EAHJ35	50
Screwless End Retainer		1492-ERL35	20		1492-ERL35	20		1492-ERL35	20		1492-ERL35	20
Jumpers:*												
Screw Center Jumper — 10-pole		1492-CJJ5-10	20		1492-CJJ6-10	20		1492-CJJ8-10	20		1492-CJJ8-10	20
Screw Center Jumper — 4-pole		1492-CJJ5-4	50		1492-CJJ6-4	50		1492-CJJ8-4	50		1492-CJJ8-4	50
Screw Center Jumper — 3-pole		1492-CJJ5-3	50		1492-CJJ6-3	50		1492-CJJ8-3	50		1492-CJJ8-3	50
Screw Center Jumper — 2-pole		1492-CJJ5-2	50		1492-CJJ6-2	50		1492-CJJ8-2	50		1492-CJJ8-2	50
Plug-in Center Jumper — 50-Pole		1492-CJLJ5-50	10		1492-CJLJ6-41 (41-pole)	10		—	—		—	—
Plug-in Center Jumper — 10-Pole		1492-CJLJ5-10	20		1492-CJLJ6-10	20		—	—		—	—
Plug-in Center Jumper — 9-Pole		1492-CJLJ5-9	20		—	—		—	—		—	—
Plug-in Center Jumper — 8-Pole		1492-CJLJ5-8	20		—	—		—	—		—	—
Plug-in Center Jumper — 7-Pole		1492-CJLJ5-7	20		—	—		—	—		—	—
Plug-in Center Jumper — 6-Pole		1492-CJLJ5-6	20		—	—		—	—		—	—
Plug-in Center Jumper — 5-Pole		1492-CJLJ5-5	20		—	—		—	—		—	—
Plug-in Center Jumper — 4-Pole		1492-CJLJ5-4	60		1492-CJLJ6-4	60		—	—		—	—
Plug-in Center Jumper — 3-Pole		1492-CJLJ5-3	60		1492-CJLJ6-3	60		—	—		—	—
Plug-in Center Jumper — 2-Pole		1492-CJLJ5-2	60		1492-CJLJ6-2	60		—	—		—	—
Insulated Side Jumper — 24-Pole		1492-SJ5B-24	50		—	—		—	—		—	—
Insulated Side Jumper — 10-Pole		1492-SJ5B-10	50		—	—		—	—		—	—
Screw Type Jumper Notching Tool		1492-T1	1		1492-T1	1		1492-T1	1		1492-T1	1
Other Accessories:												
Partition Plate		1492-EBJ16	20		1492-EBJ16	20		1492-EBJ16	20		1492-EBJ16	20
Test Plug Socket		1492-TPS23	20		1492-TPS23L	50		1492-TPS23L	50		1492-TPS23L	50
Test Plug		1492-TP23	20		1492-TP23	20		1492-TP23	20		1492-TP23	20
Test Plug (Stackable)		1492-TPJ5	25		1492-TPJ6	25		—	—		—	—
Electrical Warning Plate		1492-EWPJ5	25		1492-EWPJ5	25		1492-EWPJ8	50		1492-EWPJ8	50
Marking Systems:												
Snap-in Marker Cards		1492-M5X12 (144/card)	5		1492-M6X12 (120/card)	5		1492-MR8X12 (84/card)	5		1492-M8X5 (160/card)	5
		1492-M5X5 (200/card)	5		1492-M6X5 (200/card)	5		1492-M8X5 (160/card)	5		1492-M8X5 (160/card)	5

* Use of center jumpers may affect spacings, requiring derating of terminal blocks. See page 12-83 for details.

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Screw Connection Terminal Blocks

Grounding Blocks

	1492-JG2Q			1492-JG3				1492-JG3TW			
Dimensions are not intended to be used for manufacturing purposes. Note: Height dimension is measured from top of rail to top of terminal block.											
Specifications	Feed-through grounding terminal block with 2 connection points on each side			Feed-through grounding terminal block				Feed-through grounding terminal block with 3 connection points, 2 on one side			
Certifications		CSA	IEC		CSA	IEC	ATEX		CSA	IEC	ATEX
Voltage Rating	—	—	—	—	—	—	—	—	—	—	—
Maximum Current	Grounding			Grounding				Grounding			
Wire Range (Rated Cross Section)	#22...14 AWG	1.5 mm ²		#22...12 AWG	2.5 mm ²	2.5 mm ² (#20...14 AWG)		Single Side: #22...12 AWG	2.5 mm ²	2.5 mm ² (#20...14 AWG)	
								Twin Side: #26...12 AWG	1.5 mm ²	1.5 mm ² (#20...16 AWG)	
Wire Strip Length	0.28 in. (7 mm)			0.39 in. (10 mm)				Single Side: 0.39 in. (10 mm) Twin Side: 0.28 in. (7 mm)			
Recommended Tightening Torque	5.0 lb•in (0.6 N•m)			7.1 lb•in (0.8 N•m)				Single Side: 7.1 lb•in (0.8 N•m)			
Mounting Torque — Center Screw	3.5...5.3 lb•in (0.4...0.6 N•m)			3.5...6.2 lb•in (0.4...0.6 N•m)				Twin Side: 4.5 lb•in (0.5 N•m)			
Density	59 pcs/ft (196 pcs/m)			59 pcs/ft (196 pcs/m)				59 pcs/ft (196 pcs/m)			
Housing Temperature Range	-58...+248 °F (-50...+120 °C)			-58...+248 °F (-50...+120 °C)				-58...+248 °F (-50...+120 °C)			
Short-Circuit Current Rating	See page 12-42										
Terminal Blocks	Cat. No.	Pkg Qty.		Cat. No.	Pkg Qty.		Cat. No.	Pkg Qty.		Cat. No.	Pkg Qty.
Color: Green/Yellow	1492-JG2Q	100		1492-JG3	100		1492-JG3TW	100			
Accessories	Cat. No.	Pkg Qty.		Cat. No.	Pkg Qty.		Cat. No.	Pkg Qty.		Cat. No.	Pkg Qty.
Mounting Rails:											
1 m Symmetrical DIN (Steel)	199-DR1	10		199-DR1	10		199-DR1	10			
1 m Symmetrical DIN (Aluminum)	1492-DR5	10		1492-DR5	10		1492-DR5	10			
1 m Hi-Rise Sym. DIN (Aluminum)	1492-DR6	2		1492-DR6	2		1492-DR6	2			
1 m Angled Hi-Rise Sym. DIN (Steel)	1492-DR7	2		1492-DR7	2		1492-DR7	2			
End Barrier Yellow	1492-EBJ3-Y	50		1492-EBJ3-Y	50		1492-EBJ3-Y	50			
End Anchors and End Retainers:											
Screwless End Retainer	1492-ERL35	20		1492-ERL35	20		1492-ERL35	20			
DIN Rail — Normal Duty	1492-EAJ35	100		1492-EAJ35	100		1492-EAJ35	100			
DIN Rail — Heavy Duty	1492-EAHJ35	50		1492-EAHJ35	50		1492-EAHJ35	50			
Marking Systems:											
Snap-in marker cards	1492-M5X12 (144/card)	5		1492-M5X12 (144/card)	5		1492-M5X12 (144/card)	5			
Snap-in marker cards	1492-M5X5 (200/card)	5		1492-M5X5 (200/card)	5		1492-M5X5 (200/card)	5			

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Screw Connection Terminal Blocks

Short-Circuit Current Ratings

Fuse Ratings

Cat. No.	Wire Range Cu [AWG]		Overcurrent Protection Fuse Required Class/Max. Current Rating [A]						Maximum Voltage [V]	SCCR, RMS SYM [A]
	Line	Load	J	T	RK1	RK5	G	CC		
1492-J3	14...12	14...12	30	30	—	—	30	30	600	100,000
1492-J3P										
1492-JD3SS										
1492-JD3										
1492-JD3C										
1492-JG3TW										
1492-JDG3C										
1492-JG3	14...12	14...12	30	30	—	—	30	30	300	100,000
1492-J3F										
1492-J3TW										
1492-JC3										
1492-JDC3										
1492-JKD3										
1492-JD3FB										
1492-JD3F										
1492-JDG3FB										
1492-JD3PSSTP										
1492-JD3PTP										
1492-JDG3P										
1492-JDG3PSS										
1492-JDG3PSSTP										
1492-JDG3PTP										
1492-JDG3										
1492-JD3PSS										
1492-JD3P										
1492-J4	14...10	14...10	60	60	30	—	60	30	600	100,000
1492-JG4										
1492-JKD4										
1492-J4TW										
1492-J4Q										
1492-JG4TW										
1492-JG4Q										
1492-JKD4TW										
1492-JKD4Q										
1492-JKD4TP										
1492-JD4C										
1492-JD4										
1492-JKD4QTP										
1492-JKD4TWTP										
1492-JSD4	14...10	14...10	60	60	30	—	60	30	300	100,000
1492-JKD4										
1492-J4CTB										
1492-J6	14...8	14...8	100	100	60	30	60	30	600	100,000
1492-JG6										
1492-J10	14...6	14...6	100	100	60	30	60	30	600	100,000
1492-JG10										
1492-J16	14...4	14...4	100	100	60	30	60	30	600	100,000
1492-JG16										
1492-J16ND										
1492-J35	12...1/0	12...1/0	200	200	100	30	60	30	600	100,000
1492-JG35										
1492-J50	6...1/0	6...1/0	200	200	100	30	60	30	600	100,000
1492-JG50										
1492-J70	1/0...3/0	1/0...3/0	400	400	200	100	60	30	600	100,000
1492-JG70										
1492-J120	4...4/0	4...4/0	400	400	200	100	60	30	600	100,000
1492-JG120										



Screw Connection Terminal Blocks

Short-Circuit Current Ratings — Overcurrent Ratings

Overcurrent Ratings

Cat. No.	Wire Range Cu [AWG] (Line and Load)	Overcurrent Protection Device Required	Max. Current [A]	SCCR, RMS Sym A 480Y/277V	SCCR, RMS Sym. A 600Y/347V		
1492-J3	14...12	140M-D8E-__	16	65,000	30,000		
1492-JG3TW		140M-C2E-B10		65,000	30,000		
1492-J3P		140M-C2E-B16		65,000	30,000		
1492-J3		140M-C2E-B25		65,000	30,000		
1492-JD3		140M-C2E-B40		65,000	25,000		
1492-JD3C		140M-C2E-B63		65,000	*		
1492-JD3SS		140M-C2E-A__		65,000	30,000		
1492-JDG3C		140M-C2E-C10		65,000	*		
1492-JG3		140MC2E-C16		30,000	*		
1492-J4		14...10		140M-F8E-__	32	65,000	30,000
1492-JG4	140M-D8E-C10		65,000	30,000			
1492-J4TW	140M-D8E-C16		65,000	30,000			
1492-J4Q	140M-D8E-C20		65,000	*			
1492-JG4TW	140M-D8E-C25		30,000	*			
1492-JG4Q	140M-D8E-B__		65,000	30,000			
1492-JKD4TW	140M-C2E-B10		65,000	30,000			
1492-JKD4Q	140M-C2E-B16		65,000	30,000			
1492-JKD4TP	140M-C2E-B25		65,000	30,000			
1492-JD4C	140M-C2E-B40		65,000	25,000			
1492-JD4	140M-C2E-B63		65,000	*			
1492-JKD4QTP	140M-C2E-C10		65,000	*			
1492-JKD4TWTP	140M-C2E-C16		30,000	*			
	140M-C2E-A__		65,000	30,000			
1492-J6	14...8		140M-F8E-__	32		65,000	30,000
1492-JG6			140M-D8E-C10			65,000	30,000
		140M-D8E-C16	65,000		30,000		
		140M-D8E-C20	65,000		*		
		140M-D8E-C25	30,000		*		
		140M-D8E-B__	65,000		30,000		
		140M-C2E-B10	65,000		30,000		
		140M-C2E-B16	65,000		30,000		
		140M-C2E-B25	65,000		30,000		
		140M-C2E-B40	65,000		25,000		
		140M-C2E-B63	65,000		*		
		140M-C2E-C10	65,000		*		
		140M-C2E-C16	30,000		*		
		140M-C2E-A__	65,000		30,000		

* Bulletin 140M does not have ratings at this voltage.

Allen-Bradley spring-clamp terminal blocks generally have been designed to meet the requirements of one or more regulatory bodies. Most products have also been tested per additional standards. The following is a listing of some of the regulatory bodies and standards which apply to Allen-Bradley spring-clamp terminal block products. See the particular product description for information on specific certifications and ratings.



(Underwriters Laboratories) — Allen-Bradley spring-clamp terminal blocks with one of these ratings have been tested by Underwriters Laboratories and meet the requirements of one or more of the following United States Standards:

- UL 486E — Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors
- UL 1059 — Standard for Terminal Blocks

Reference UL file E40735



(Underwriters Laboratories) — Allen-Bradley spring-clamp terminal blocks with this rating have been tested by Underwriters Laboratories and meet the requirements of one or more of the following Canadian Standards:

- CSA 22.2 No. 158 — Terminal Blocks

Reference UL file E40735



(Canadian Standards Association) — Allen-Bradley spring-clamp terminal blocks with this rating have been tested by the Canadian Standards Association and meet the requirements of the following Canadian Standard:

- CSA 22.2 No. 158 — Terminal Blocks

Reference CSA files 677896



Allen-Bradley spring-clamp terminal blocks listed in this catalog meet the requirements of the Low Voltage Directive put forth by the European Union. Devices have been tested and comply with one or more of the following European Norms:

- EN 60947-1 — Low Voltage Switchgear and Controlgear: General Rules
- EN 60947-7-1 — Low Voltage Switchgear and Controlgear: Terminal Blocks for Copper Conductors
- EN 60947-7-2 — Low Voltage Switchgear and Controlgear: Protective Conductor Terminal Blocks for Copper Conductors
- EN 60947-7-3 — Low Voltage Switchgear and Controlgear: Safety Requirements for Fuse Terminal Blocks



ATEX — Devices listed in this catalog with “ATEX” ratings meet the following European Norms per DEMKO or KEMA, Approval Certification Bodies for the European Union:

- EN 60079-0 — Electrical Apparatus for Potentially Explosive Atmospheres — General Requirements
- EN 60079-7 — Electrical Apparatus for Potentially Explosive Atmospheres — Increased Safety “e”

Contact your local Allen-Bradley distributor for a copy of the certificate.

Ex e II — Bulletin 1492-L terminal blocks in this catalog meet the following Canadian Standards per Underwriters Laboratories:

- CAN/CSA E60079-7 — Electrical Apparatus for Explosive Atmospheres — Part 0 — General Requirements
- CAN/CSA E60079-0 — Electrical Apparatus for Explosive Atmospheres — Part 7 — Increased Safety “e”

These products are suitable for Class I, Zone 1 Hazardous Locations. Reference UL file E187022. Contact your local Allen-Bradley distributor for more information.

AEx e II — Allen-Bradley spring-clamp terminal blocks with an “AEx e II” rating meet the following United States Standard per Underwriters Laboratories:

- UL 2279 — Standard for Electrical Equipment for Use in Class I, Zone 0, 1, and 2 Hazardous (Classified) Locations

These products are suitable for Class I, Zone 1 Hazardous Locations. Reference UL file E187022. Contact your local Allen-Bradley distributor for more information.

Lloyd's Register — Bulletin 1492-L terminal blocks in this catalog have been certified for use in marine, off-shore, and industrial installations per the following standard:

- Lloyd's Register Test Specification No. 1:1996

Contact your local Allen-Bradley distributor for a copy of the certificate.

Spring-Clamp Connection Terminal Blocks

Introduction

The Allen-Bradley Line of Spring-Clamp Terminal Blocks...

The Bulletin 1492-L line of internationally approved spring-clamp IEC-style terminal blocks offers a variety of products that can make any application:

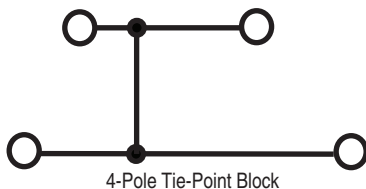
- Fast — Reduces wiring time by more than 50%
- Practical — Requires only a flat-head screwdriver for easy installation. Maintenance-free, no need to retighten
- Reliable — Secure contact is durable under extreme conditions such as high-vibration applications

Products Available in the 1492-L Spring-Clamp Line

- **Feed-Through Blocks**, accommodating wire sizes from #30...#2 AWG (0.2...35 mm²)
- **Grounding Blocks** for grounding a given circuit to the DIN Rail
- **Multi-Circuit Blocks** for doubling circuit wiring density
- **Isolation Blocks** for circuit isolation during testing and troubleshooting
- **Plug-In Style Terminal Blocks** accommodating component plugs, fuse plugs, and disconnect plugs
- **Sensor Blocks** for coordination of three-wire sensor groups with or without ground terminations
- **Electrical Component Blocks** which allow for the insertion of fixed components into control circuits. Components include diodes and surge suppression circuits

Tie-Point Block

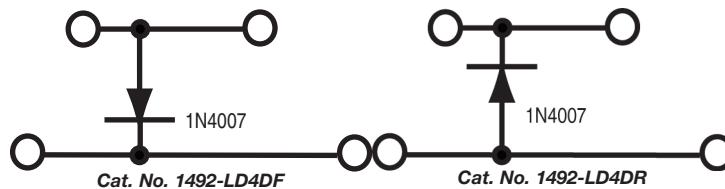
(Cat. Nos. 1492-LD2C, LD3C, LD4C)



Diode Block

(Cat. Nos. 1492-LD4DF, 1492-LD4DR)

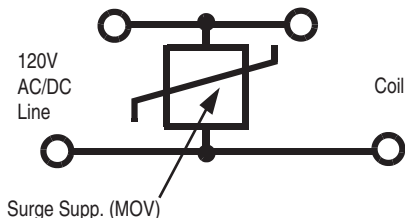
Uses a 1N4007 diode between the upper and lower levels for insertion into a control circuit. This block is useful in low voltage DC control circuits for directioning and suppression.



Surge Suppression Block

(Cat. No. 1492-LD4SS)

Provides a convenient means of incorporating transient suppression for relays, contactors and solenoids into a control system.



- **Test Blocks** for allowing a bank of pluggable terminal strips to be easily connected for test purposes
- A wide variety of snap-in markers are available for individual or group circuit identification
- A broad offering of accessories such as screwless end retainers, electrical warning plates, end barriers, protective stops and test plugs to provide exactly what the application requires
- Operating instructions (printed on an adhesive label), for fixing inside a panel
- **Mini-blocks** available in rail-mount or panel-mount configurations

Materials and Design Features

The 1492-L line is specially designed for safety, installation ease, and ruggedness. Features include:

- Tin-plated terminals and stainless steel spring clamps for resistance to corrosion and vibration
- Spring clamp design to minimize stress relaxation and maintain contact force, even under vibration
- Top wire entry for ease of installation
- Circuit testing with standard 2 mm diameter test probe or stackable test plugs on most spring-clamp blocks
- Insulation stops to ensure electrical connection when using smaller gauge wires
- Markers that are visible after terminal blocks are wired
- Multiple marking options
- Common profiles to minimize stocking of accessories
- Self-extinguishing, polyimide 6.6 housing materials with a flammability rating UL 94-V0 (1492-R terminal blocks have a UL 94-V2 flammability rating)
- Screwless center jumpers to simplify jumpering terminals together

Note: To ensure proper wire termination, these blocks are designed to accept only **one** wire per terminal.






www.ab.com/catalogs Preferred availability cat. nos. are **bold**.

End Barriers, continued

Dimensions Width x Length x Height	For Use With	Color	Pkg Qty.	Cat. No.
0.20 x 0.94 x 1.31 in. (5.1 x 23.8 x 33.3 mm)	1492-LMP3, LMP3Q	Grey	50	1492-EBLMP3
		Blue	50	1492-EBLMP3-B
0.20 x 0.94 x 1.31 in. (5.1 x 23.8 x 33.3 mm)	1492-LM3, LM3Q, LMG3, LMP3E, LMP3QE	Grey	50	1492-EBLM3
		Blue	50	1492-EBLM3-B
		Yellow	50	1492-EBLM3-Y
0.06 x 0.97 x 1.38 in. (1.5 x 24.65 x 35 mm)	1492-LMJ3, LMJG3	Grey	50	1492-EBLMJ3
		Blue	50	1492-EBLMJ3-B
		Yellow	50	1492-EBLMJ3-Y
0.06 x 2.32 x 4.35 in. (1.5 x 59 x 110.5 mm)	1492-LTF3	Grey	20	1492-EBLTF3
0.06 x 2.69 x 1.77 in. (5 x 68.5 x 45 mm)	1492-LS2-3, LS2-3L, LSG2-3		50	1492-EBLS2-3
0.20 x 3.2 x 1.77 in. (5 x 81.5 x 45 mm)	1492-LS2-4, LS2-4L, LSG2-4		50	1492-EBLS2-4
0.06 x 1.81 x 3.74 in. (1.5 x 46 x 95 mm)	1492-LDAG3, LDG3P		20	1492-EBLDAG3
0.10 x 1.04 x 1.81 in. (2.5 x 26.4 x 46 mm)	1492-LC3		20	1492-EBLC3
0.10 x 1.65 x 2.72 in. (2.5 x 41.85 x 69 mm)	1492-LDC3		20	1492-EBLDC3
—	1492-LDG3ND, LD3N, LDG3N		20	1492-BSPJLD3N
—	1492-LDG3ND, LD3N, LDG3N		20	1492- BSPJLD3N-B

End Anchor/End Retainers

End anchors and end retainers mount at both ends of a group of terminal blocks to add rigidity to the terminal assembly and prevent sliding along the rails.

Photo	Dimensions Width x Length x Height	Tightening Torque	Markers	For Use With	Color	Pkg Qty.	Cat. No.
	0.31 x 2.20 x 1.85 in. (8 x 56 x 47 mm)	4.4 lb•in (0.5 N•m)	1492-M7X12 1492-M8X5	199-DR1, 199-DR2, 1492-DR4, 1492-DR5, 1492-DR6, 1492-DR7, 1492-DR8, 1492-DR9	Grey	100	1492-EAJ35
	0.48 x 2.20 x 2.48 in. (12.2 x 56 x 63 mm)	4.4 lb•in. (0.5 N•m)	1492-M7X12 1492-M5X5	199-DR1, 199-DR2, 1492-DR4, 1492-DR5, 1492-DR6, 1492-DR7, 1492-DR8, 1492-DR9	Grey	50	1492-EAHJ35
	0.31 x 1.06 x 1.06 in. (8 x 27 x 27 mm)	3.5 lb•in. (0.9 N•m)	1492-M5X5	1492-DR3	Grey	50	1492-EAJ15
	0.24 x 2.19 x 1.63 in. (6 x 55.6 x 41.5 mm)	—	1492-M5X10 1492-M5X5	199-DR1, 199-DR2, 1492-DR4, 1492-DR5, 1492-DR6, 1492-DR7, 1492-DR8, 1492-DR9	Grey	20	1492-ERL35
	0.20 x 0.96 x 0.75 in. (5 x 24.5 x 19 mm)	—	1492-M5X10 1492-M5X5	1492-DR3	Grey	20	1492-ERL15

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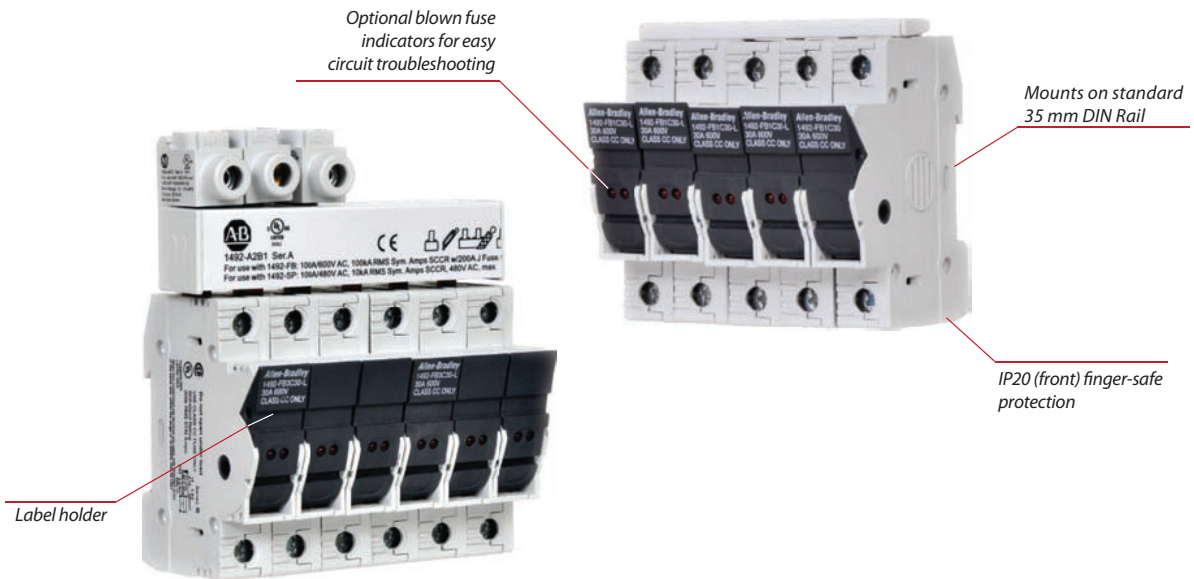
Control Circuit and Load Protection Products

Bulletin Numbers 188, 1489, 1492, 1692



LISTEN.
THINK.
SOLVE.®

1492-FB Fuse Holders



The 1492-FB fuse holder family is designed for use in many OEM applications, such as power supplies, equipment protection, primary and secondary control transformers, solenoids, lighting and heater loads, and drives.

Bulletin 1492-FB fuse holders provide a safe and convenient means for installation of Class CC, J, and Midget fuses. To support correct fuse type installation, the Class CC fuse holder is designed to reject a Midget fuse or international 10 x 38 mm fuse. The Class J fuse holder will reject all fuses other than a Class J fuse.

All Allen-Bradley Class CC, J, and Midget fuse holders are UL Listed and CSA Certified for branch circuit protection. They are excellent for wire protection, small motor loads, and group protection of small motor loads. The Midget fuse holder is also CE Marked for 10 x 38 mm IEC Midget fuses.

Features

- Compact size requires less panel space than open-style fuse holders
- Handle isolates the fuse from top-wired power when installing or removing fuse
- Terminals are shipped in open position and ready for wiring
- Suitable for use in field wiring applications

1492-FB Fuse Holders		
Poles	1, 2, 3	
Fuse Types	Midget 30 A	
	Class CC 30 A	
	Class J 30 A	
Standards Compliance	Midget	UL 4248-1 CSA 22.2 No. 39 EN 60947-1 & 3
	Class CC	UL 4248-4 CSA 22.2 No. 39
	Class J	UL 4248-8 CSA 22.2 No. 39
	Certifications	UL Listed, File No. E34648 CSA Certified, File No. 71101 CE Marked RoHS Compliant

Catalog Number Explanation

Note: Examples given in this section are for reference purposes. This basic explanation should not be used for product selection; some combinations may not produce a valid catalog number.



a

Poles	
Code	Description
FB1	1-Pole
FB2	2-Pole
FB3	3-Pole

b

Fuse Type	
Code	Description
M30	Midget Type 30 Amp
C30	C Class 30 Amp
J30 *	J Class 30 Amp
J60 *	J Class 60 Amp

c

With Indication	
Code	Description
	Can be left blank
L	With indication 110...600V AC/DC
D1	With indication 12...72V AC/DC

* Bus bars do not fit on Class J fuse holders.

Product Selection

Description		For Midget Fuse	For Class CC Fuse	For Class J Fuse *	
		30 A	30 A★	30 A	60 A
		Cat. No.	Cat. No.	Cat. No.	Cat. No.
1-Pole	Fuse Block	1492-FB1M30	1492-FB1C30	1492-FB1J30	1492-FB1J60
	Fuse Block with Indication, 110...600V ‡	1492-FB1M30-L	1492-FB1C30-L	1492-FB1J30-L	1492-FB1J60-L
	Fuse Block with Indication, 12...72V	1492-FB1M30-D1	1492-FB1C30-D1	—	—
	Pieces per Carton	12	12	6	6
2-Pole	Fuse Block	1492-FB2M30	1492-FB2C30	1492-FB2J30	1492-FB2J60
	Fuse Block with Indication, 110...600V ‡	1492-FB2M30-L	1492-FB2C30-L	1492-FB2J30-L	1492-FB2J60-L
	Pieces per Carton	6	6	3	3
3-Pole	Fuse Block	1492-FB3M30	1492-FB3C30	1492-FB3J30	1492-FB3J60
	Fuse Block with Indication, 110...600V ‡	1492-FB3M30-L	1492-FB3C30-L	1492-FB3J30-L	1492-FB3J60-L
	Pieces per Carton	4	4	2	2

★ All major fuse brands and current ranges have been evaluated for this fuse holder. Due to the heat they generate, the following fuses must be derated:

Mersen ATQR 1.25 / = 0.42 A max.

Mersen ATQR 1.40 / = 0.47 A max.

‡ 690V when used in IEC applications.

* Bus bars do not fit on Class J fuse holders.

Accessories

Description	Size	Pkg. Quantity	Cat. No.
Fuseholder Identification Slide-in Markers (blank marker squares slip into molded slot. 100 markers/card)	5 mm x 5 mm	5 cards	1492-MC5X5
	6 mm x 5 mm		1492-MC6X5

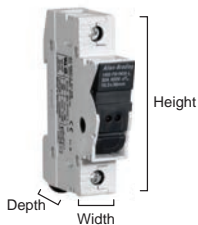
Specifications

Product Type (n = number of poles)	M	CC	J30 *	J60 *
		1492-FBnM30 "B" 1492-FB1M30-D1 "B" 1492-FBnM30-L "B"	1492-FBnC30 "B" 1492-FB1C30-D1 "B" 1492-FBnC30-L "B"	1492-FBnJ30 "B" 1492-FBnJ30-L "B"
For Fuse Type:	Midget 13/32" x 1-1/2" (10 x 38 mm)	Class CC	Class J	
Maximum voltage AC/DC	600V, 690V(IEC)	600V	600V	
Maximum current	30 A, 32 A (IEC)	30 A	30 A	60 A
Maximum current withstand (UL/CSA)	Fuse dependent 50 kA max UL	200 kA sym	200 kA sym	
Operating temperature range	-4...+130 °F, -20...+55 °C			
Conductor material	Copper, stranded			
Conductor strip length	0.43 in. (11 mm)		0.79 in. (20 mm)	
Conductor range	1 wire per terminal	#18...4 AWG (0.75...25 mm ²)	#18...1 AWG (0.75...50 mm ²)	#14...1 AWG (2.5...50 mm ²)
	2 wires ★ per terminal	#18...8 AWG (0.75...10 mm ²)	#18...6 AWG (0.75...16 mm ²)	#14...6 AWG (2.5...16 mm ²)
Terminal tightening torque	#18...8 AWG: 22 lb•in #6...4 AWG: 26 lb•in 0.75...25 mm ² : 2.5 N•m		35 lb•in (4 N•m)	

★ Both wires must be same size
* Bus bars do not fit on Class J fuse holders.

Approximate Dimensions

Note: Dimensions are shown in inches (mm). Dimensions are not intended for manufacturing purposes.



Dimension		For Midget Fuse	For Class CC Fuse	For Class J Fuse	
		30 A	30 A	30 A	60 A
Height		3.19 in. (81 mm)	3.19 in. (81 mm)	4.65 in. (118 mm)	4.65 in. (118 mm)
Depth		2.51 in. (64 mm)	2.51 in. (64 mm)	2.76 in. (70 mm)	3.23 in. (82 mm)
Width	1-Pole	0.71 in. (18 mm)	0.71 in. (18 mm)	1.41 in. (36 mm)	1.57 in. (40 mm)
	2-Pole	1.41 in. (36 mm)	1.41 in. (36 mm)	2.83 in. (72 mm)	3.15 in. (80 mm)
	3-Pole	2.13 in. (54 mm)	2.13 in. (54 mm)	4.25 in. (108 mm)	4.72 in. (120 mm)

Bus Bars

1492-FB Bus Bars*

Description	Pins	Rated Current [A] ‡	Pkg. Qty.	Cat. No. ★
1-Phase	57	100 A	1	1492-A1B1
	57	80 A	1	1492-A1B8
2-Phase	56	100 A	1	1492-A2B1
	56	80 A	1	1492-A2B8
3-Phase	57	100 A	1	1492-A3B1
	57	80 A	1	1492-A3B8

★ cULus, UL508, EN 60947-1, CE Marked

‡ Refer to the diagrams below for Feeder Terminal & Bus Bar Current Distribution

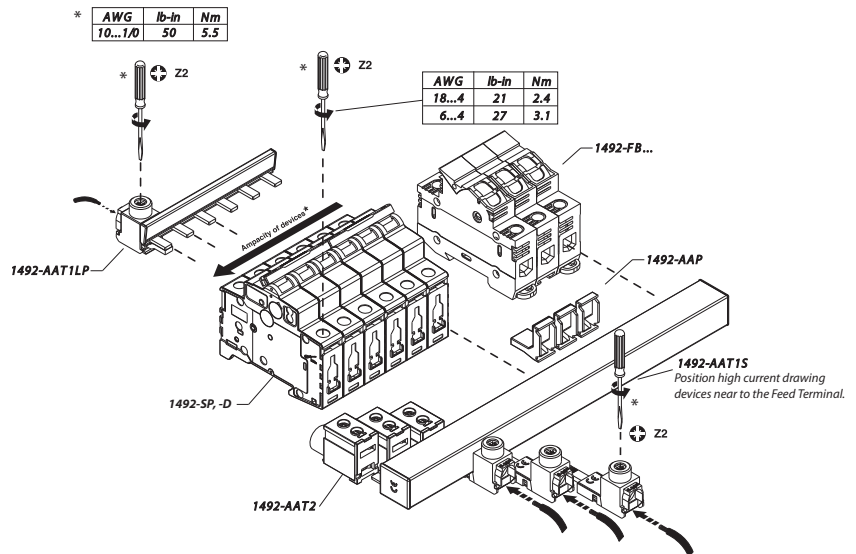
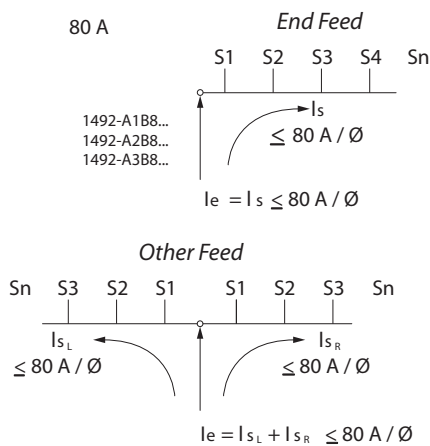
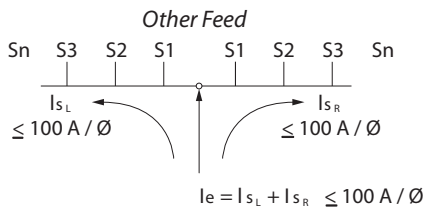
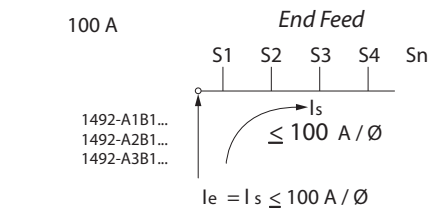
* Bus bars do not fit on Class J fuse holders.

1492-FB Bus Bar Accessories

Description	Pkg. Qty.	Cat. No. ★
Terminal Power Feed, 35 mm ² , for 1-phase bus bar	10	1492-AAT1LP
Terminal Power Feed, 35 mm ² , for 2- or 3-phase bus bar	10	1492-AAT1
Dedicated Power Feed, 50 mm ²	10	1492-AAT2
End Cover for 1-phase bus bar	10	1492-A1E
End Cover for 2- or 3-phase bus bar	10	1492-AME
Protective Shroud for unused pins	10	1492-AAP

★ cULus, UL508, EN 60947-1, CE Marked

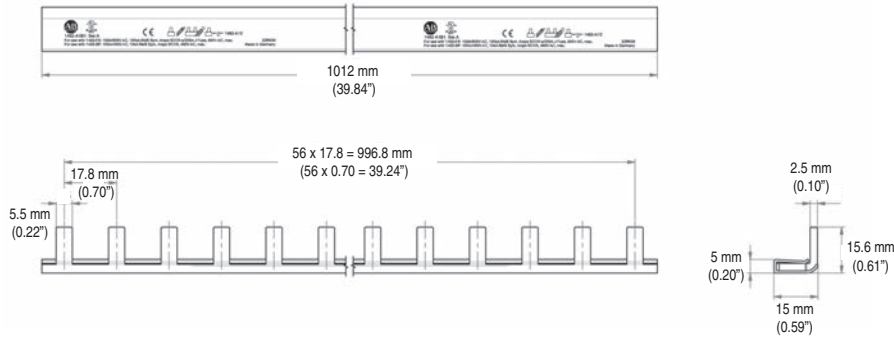
Feeder Terminal & Bus Bar Current Distribution



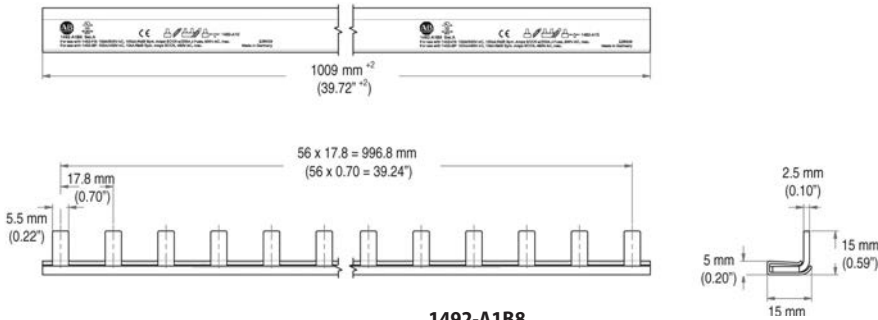
Bus Bar Approximate Dimensions

Note: Dimensions are shown in millimeters (inches). Dimensions are not intended for manufacturing purposes.

1-Phase Bus Bars

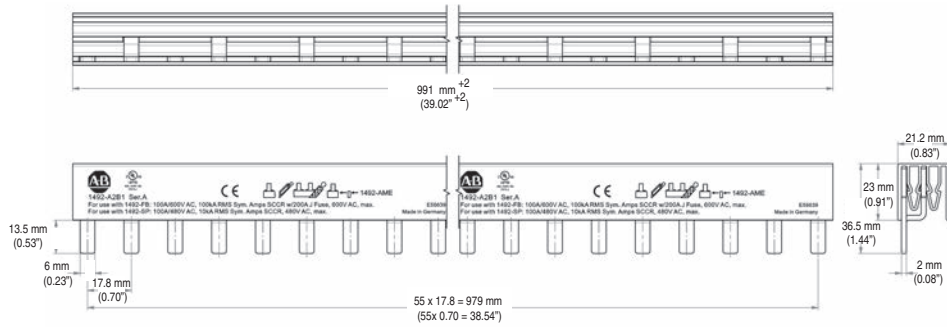


1492-A1B1

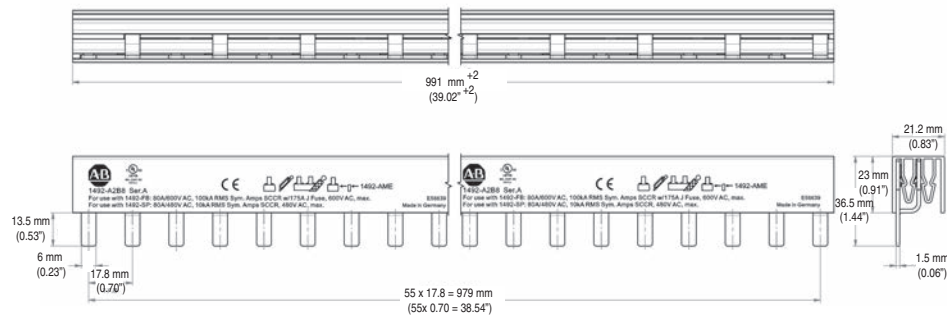


1492-A1B8

2-Phase Bus Bars



1492-A2B1

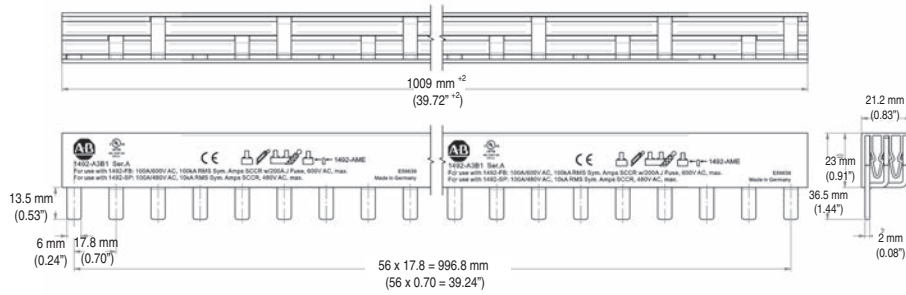


1492-A2B8

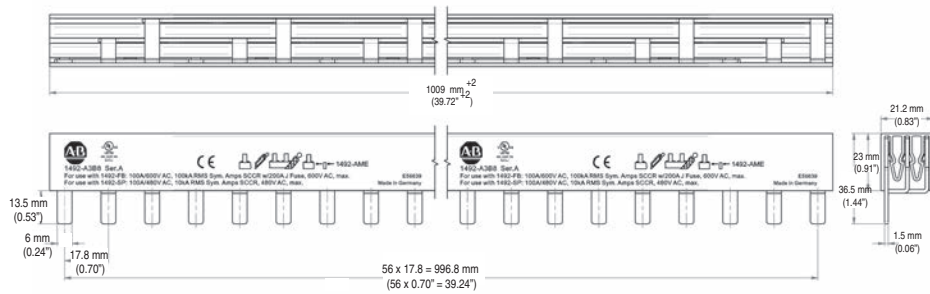
Bus Bar Approximate Dimensions

Note: Dimensions are shown in millimeters. Dimensions are not intended for manufacturing purposes.

3-Phase Bus Bars



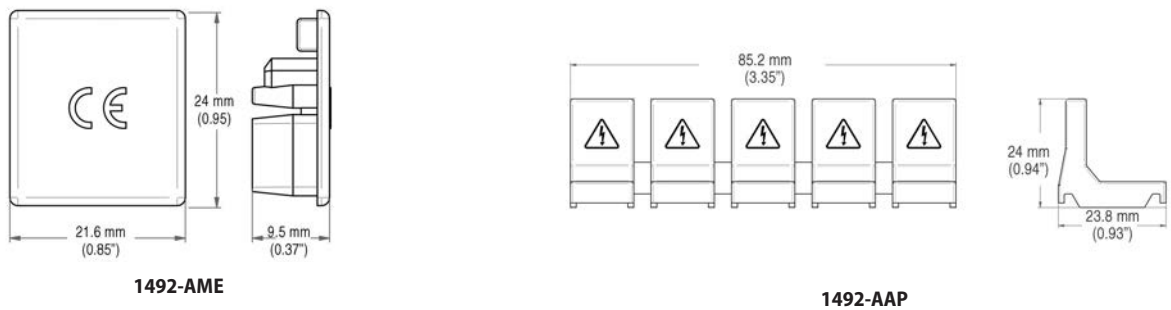
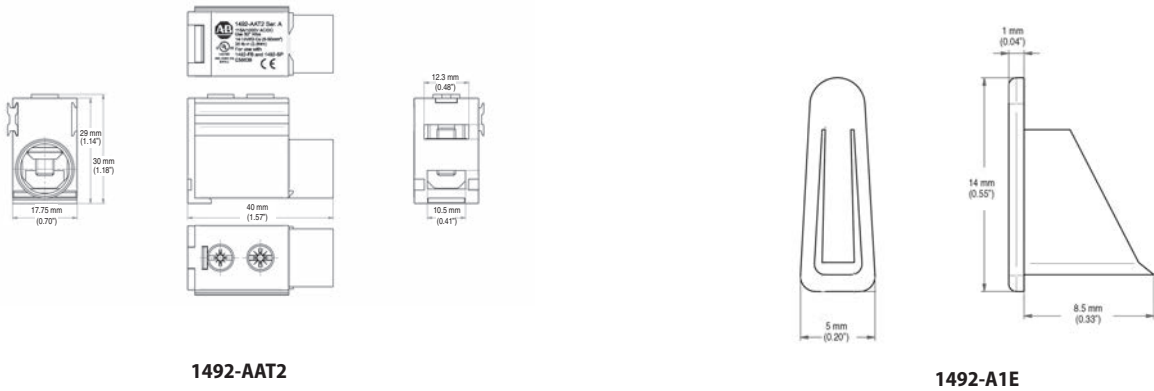
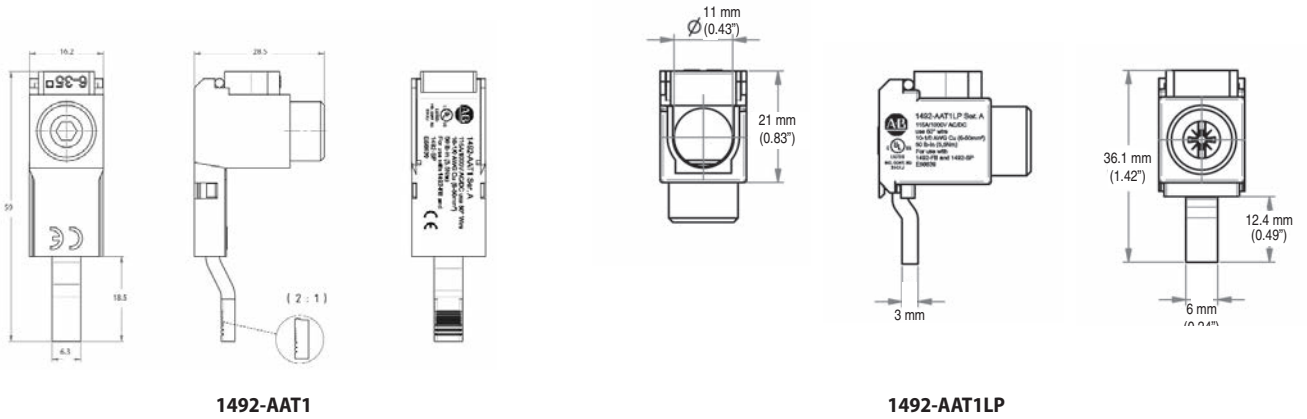
1492-A3B1



1492-A3B8

Bus Bar Accessory Approximate Dimensions

Note: Dimensions are shown in millimeters. Dimensions are not intended for manufacturing purposes.



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CONTROL CIRCUIT AND LOAD PROTECTION DEVICES

TECHNICAL DATA

Rockwell Automation has Short Circuit Current Ratings on the list of products below per the specific UL Standard and Category Code.

BULLETIN 1489

BULLETIN 1492-CB

BULLETIN 1492-FB

BULLETIN 1492-GH

BULLETIN 1492-GS

BULLETIN 1492-MC

BULLETIN 1492-SP

These ratings are included in the UL acceptance file of the device and summarized on the UL Certification site per the Category Code for the specific product.

SHORT CIRCUIT CURRENT RATINGS

Per the requirements of the 2005 National Electric Code (NEC) and UL508A (effective April 25, 2006), many electrical panels must be rated for their Short Circuit Withstand Rating. Analyzing the SCCR of individual components, and the associated branch and feeder overcurrent devices is a method of determining the SCCR of an electrical assembly.

UL Standard 508A permits these devices to have a SCCR without any additional testing.

Device	SCCR
Circuit Breaker	5 kA
Circuit Breaker With GFCI	5 kA
Fuse Holder	10 kA
Supplementary Protector	200 A

The Allen-Bradley products far exceed those ratings (see page 2).



UL489 CIRCUIT BREAKERS – CAT. CODE DIVQ

UL 508 MANUAL MOTOR STARTERS – CAT. CODE NLRV

UL 1077 SUPPLEMENTARY PROTECTORS – CAT. CODE QVNU2

UL512 FUSE HOLDERS – CAT. CODE IZLT

STANDARD PRODUCT

Rockwell Automation has tested a number of the 1492-PD Power Terminal blocks to determine their SCCR related to the new testing requirements. These are the standard Power Terminal Blocks that have been used in Industrial Control Panels.

The new ratings for these blocks permit their continued use in panels where the higher SCCR ratings are required.

HIGH FAULT SCCR RATINGS

– UP TO 200,000 A

CERTIFIED TO UL REQUIREMENTS

STANDARD PRODUCTS

Bulletin Number	Notes	UL508A Category Code	UL File Number	Poles	Current Rating	Max Voltage	SCCR	Application code/notes	
1489	Circuit Breaker	DIVQ	E197878	1 pole	0.5 - 25 [Ⓢ] A	277 VAC	10 kA	----	
					30 - 40 A	240 VAC			
				2, 3 pole	0.5 - 25 [Ⓢ] A	480Y/277 VAC			
					30 - 40 A	240 VAC			
1492-CB	When used as UL508 Manual Motor Controller	NLRV	E14841	1 pole	0.5 - 52A	277 VAC	5 kA	----	
				2, 3 pole		480Y/277 VAC			
	Supplementary Protector	QVNU2	E65138	1, 2, 3 pole 1 + N pole 3 + N pole	0.5 - 50 A	125 VAC	10 kA	U2	
						240 VAC	5 kA	U2	
						480Y/277 VAC	3 kA	U2	
	480Y/277 VAC	5 kA	U1						
1492-FB	Fuse holder	IZLT	E34648	1, 2, 3 pole	0.1 - 30 A	1492-FB	200 kA (*)	Type CC & J (*) Interrupt rating of fuse	
					35 - 60 A			Type J (*) Interrupt rating of fuse	
					0.1 - 30 A			(*) Type M (*) Interrupt rating of fuse	
1492-GH	Supplementary Protector	QVNU2	E65138	1 pole	0.2 - 15 A	250 VAC	1 kA	U1	
1492-GS	Supplementary Protector	QVNU2	E65138	1 pole	0.2 - 16 A	277 VAC	5 kA	C1	
					20 - 25 A		3 kA	C1	
					0.2 - 5 A		400 A	U1	
					6 - 25 A		800 A	U1	
				2, 3 pole	0.2 - 16 A	480Y/277 VAC	5 kA	C1	
					20 - 25 A		3 kA	C1	
					0.2 - 5 A		400 A	U1	
					6 - 25 A		500 A	U1	
1492-MC	Circuit Breaker	DIVQ	E197878	1, 2 pole	10 - 60 A	120/240 VAC	10 kA	1492-MCAA3nn	
					70 - 100 A			1492-MCBA3nn	
				2 pole	15 - 30 A	240 VAC		1492-MCAA2Hnn	
					40 - 100 A			1492-MCBA2Hnn	
				3 pole	15 - 30 A	240 VAC		1492-MCAA3nn	
					40 - 100 A			1492-MCBA3nn	
				1 pole	15 - 100 A	120 VAC		65 kA	1492-MCCA1nn
						277 VAC		14 kA	
	2 pole	15 - 100 A	240 VAC	65 kA	1492-MCCA2nn				
			480Y/277 VAC	14 kA					
	Circuit Breaker with Ground Fault GFCI and GFEP	1 pole	15 - 50 A	120VAC	10 kA	1492-MCGA1nn			
						1492-MCEA1nn			
2 pole	15 - 50 A	120/240 VAC	10 kA	1492-MCGA2nn					
				1492-MCEA2nn					
1492-SP	Supplementary Protector	QVNU2	E65138	1 pole	0.5 - 35 A	277 VAC	10 kA	U2 - B or C trip	
					1 + N pole		40 - 63 A	5 kA	U2 - B or C trip
				2, 3 pole	0.5 - 40 A		480Y/277 VAC	5 kA	U2 - D trip
					3 + N pole			0.5 - 35 A	10 kA
				3 + N pole	40 - 63 A			5 kA	U2 - B or C trip
					0.5 - 40 A			5 kA	U2 - D trip

(a) Indicates 25 A @ 480Y/277 available November 2006

C1 Indicates that the short-circuit test was conducted with series overcurrent protection that is no greater than 400% of Supplementary Protector or 15 A whichever is greater.

Indicates that a recalibration and dielectric test was not conducted as part of the short-circuit test.

U1 Indicates that the short-circuit test was conducted without series overcurrent protection. Indicates that a recalibration and dielectric test was not conducted as part of the short-circuit test.

U2 Indicates that the short-circuit test was conducted without series overcurrent protection. Indicates that a recalibration and dielectric test was conducted as part of the short-circuit test.

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Power, Control and Information Solutions Headquarters

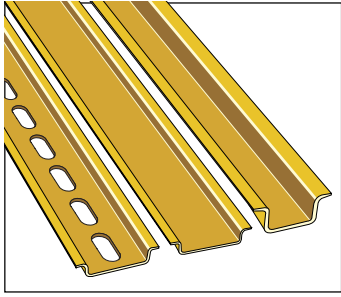
Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444

Europe/Middle East/Africa: Rockwell Automation, Vorstlaan/Boulevard du Souverain 36, 1170 Brussels, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640

Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

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Mounting rails Symmetrical - DIN 3



These rails are often used as grounding bars. The current carrying capacity of these rails and the copper wire sizes required to carry that current are given below.

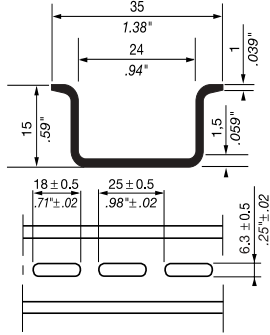
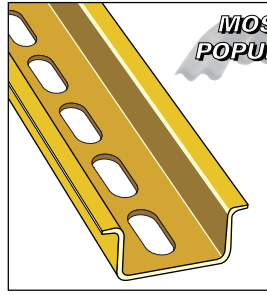
RAIL CURRENT CARRYING CAPACITY

Rail	Material	Current (A)	Wire size AWG	Wire size mm ²
TS 35/CF6	Steel	125	4	25
TS 35/C1	Steel	143	2	35
TS 35/C	Steel	125	4	25
TS 35/C ALU	Aluminum	265	000	95
High rail 90°	Steel	65	8	10
High rail 30°	Steel	65	8	10

All rails are in compliance with EN 50022 standard (DIN 46277-3 - NFC 63015) DIN 3.

Tolerances are ± unless otherwise noted.

TS 35/CF6



Type	P/N
------	-----

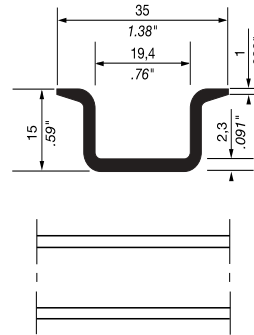
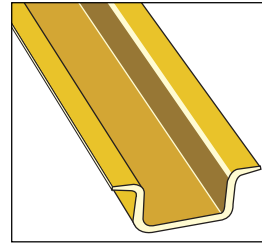
PR5 (TS 35/CF6) 0101 598.26

Zinc bichromate plated steel, prepunched length 2 m 6'6" (78") approx. The length and prepunched cut out dimensions are approximate.

PR5 (TS 35/CF6) 0101 509.05

Length 1 m 3'3" (39") approx.

TS 35/C1



Type	P/N
------	-----

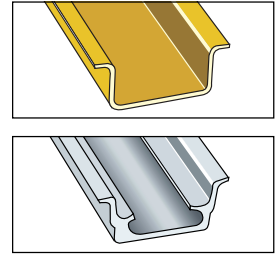
PR4 (TS 35/C1) 0168 500.12

Zinc bichromate plated steel. Length 2 m 6'6" (78") approx.

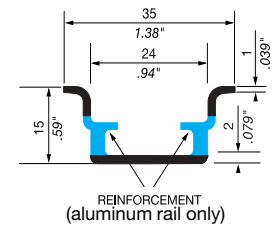
PR4 (TS 35/C1) 0101 517.14

Length 1 m 3'3" (39") approx.

TS 35/C



TS 35/C ALU



Type	P/N
------	-----

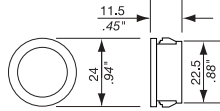
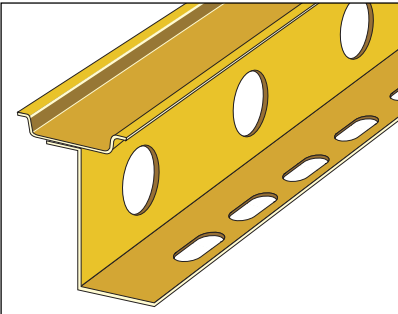
PR5 (TS 35/C) 0168 700.22

Zinc bichromate plated steel. Length 2 m 6'6" (78") approx. Length 1 m 3'3" (39") approx.

PR5.A2 (TS 35/C ALU) 0101 502.26

Reinforced aluminum. Length 2 m 6'6" (78") approx. Length 1 m 3'3" (39") approx.

TS 35, High Rail 90°

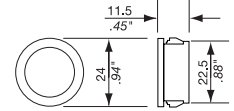
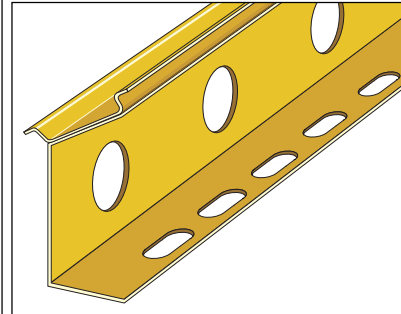


Insert for rail knockout:

Open grommet, black 0106 064.26
Closed blind plug, black 0106 083.12

Sold in North America only.

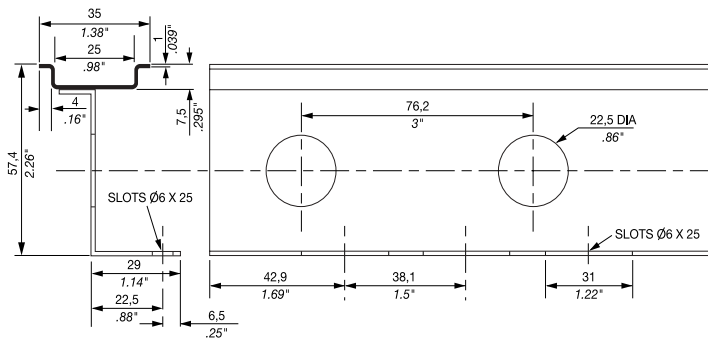
TS 35, High Rail 30°



Insert for rail knockout:

Open grommet, black 0106 064.26
Closed blind plug, black 0106 083.12

Sold in North America only.



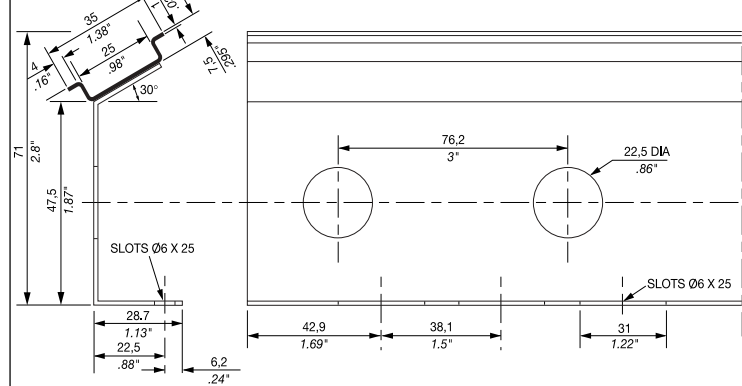
Type	P/N	Type	P/N
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PR3.Z2 HR90 0101 571.02

Zinc bichromate plated steel, prepunched length 2 m 6'6" (78") approx. The length and prepunched cut out dimensions are approximate.

PR3.Z2 HR90 0101 570.01

Zinc bichromate plated steel. Length 1 m 3'3" (39") approx.



Type	P/N	Type	P/N
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PR3.Z2 HR30 0101 875.23

Zinc bichromate plated steel, prepunched length 2 m 6'6" (78") approx. The length and prepunched cut out dimensions are approximate.

PR3.Z2 HR30 0101 874.22

Zinc bichromate plated steel. Length 1 m 3'3" (39") approx.

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ATDR

Time Delay/Class CC

UL/CSA LISTED POWER FUSES

THE BEST PROTECTION FOR TODAY'S SMALL MOTORS



Amp-Trap 2000® ATDR small-dimension fuses can provide IEC Type 2 No Damage protection to your facility's increasingly sensitive branch circuit components and small motors - minimizing the risk of fault-related damage. ATDR Class CC fuses deliver the best time-delay characteristics in their class with excellent cycling ability for small motor loads.

FEATURES/BENEFITS:

- Time-delay for motor starting inrush currents without nuisance opening
- Highly current-limiting for low peak let-thru current
- Improved cycling ability for frequent motor starts/stops without nuisance fuse opening
- Rejection-style design prevents replacement errors (when used with recommended fuse blocks)
- High-visibility orange label ensures instant brand recognition, simplifies replacement
- Metal-embossed date and catalog number for traceability and lasting identification
- Fiberglass body provides dimensional stability in harsh industrial settings
- High-grade silica filler ensures fast arc quenching and optimum current-limitation

RATINGS:

Volts: 600VAC, 300VDC

Amps: 1/4 to 30A

IR: 200kA I.R. AC,
100kA I.R. DC

APPLICATIONS:

- Small motors
- Contactors
- Lighting, heating & general loads
- Branch circuit protection

Note: See motor fuse applications tables for more information

APPROVALS:

- UL listed to standard 248-4 File E2137
- CSA certified to standard C22.2 No. 248.4
- DC listed to UL standard 248



HIGHLIGHTS:

- Time-delay
- Best choice for small motor protection
- Highly current-limiting
- AC & DC rated

CATALOG NUMBERS (AMPS)

ATDR1/4	ATDR1-1/2	ATDR3	ATDR6	ATDR12
ATDR1/2	ATDR1-6/10	ATDR3-2/10	ATDR6-1/4	ATDR15
ATDR8/10	ATDR1-8/10	ATDR3-1/2	ATDR7	ATDR17-1/2
ATDR1	ATDR2	ATDR4	ATDR7-1/2	ATDR20
ATDR1-1/8	ATDR2-1/4	ATDR4-1/2	ATDR8	ATDR25
ATDR1-1/4	ATDR2-1/2	ATDR5	ATDR9	ATDR30
ATDR1-4/10	ATDR2-8/10	ATDR5-6/10	ATDR10	

RECOMMENDED FUSE BLOCKS FOR CLASS CC FUSES

Number of Poles	Catalog Numbers			
	UltraSafe™ Indicating Fuse Holder	Screw Connector w/ Double Quick Connects	Pressure Plate Connector w/ Double Quick Connects	Copper Box Connector
ADDER		30310R	30320R	30350R
1	USCC1I	30311R	30321R	30351R
2	USCC2I	30312R	30322R	30352R
3	USCC3I	30313R	30323R	30353R
3	USFMCCI			

DIMENSIONS

