Catalog Number: M3088TM

Specifications:

Main Breaker: CB1

- 380-480V / 150A / 3 Phase + Ground

Branch Circuits:

- CB2 380-480V / 100A / 3 Phase
- CB3 380-480V / 20A / 3 Phase
- CB4 380-480V / 20A / 3 Phase
- CB5 380-480V / 25A / 3 Phase

Enclosure Dimensions:

60''x 25''x 9''

Compliance &

c UL us LISTED

CE

OSHPD SEISMIC APPROVED

Bevco Factory Functional Test

RoHS COMPLIANT

Advantages and Features

This Bevco Engineering Main Disconnect Panel provides a cost-effective single point power connection that significantly reduces installation time and valuable mounting space. The panel implements several safety features that offers protection to the operators, patients, and imaging equipment. The UL/cUL design covers North America, National Electrical Code, and Canadian Electrical code. Thoroughly tested designs manufactured with proven components eliminates the design guess work. The Main Disconnect Panel has a low voltage control circuit that is configured to automatically re-energize the branch circuit breakers and reduces the operational downtime following power loss, eliminating the need for facility or electrical personnel intervention. The MDP design includes: UPS EPO connections, a Power Monitoring Interface, remote and local Emergency Power Off buttons. UL, cUL, CE, OSHPD, and RoHS labeled. Surface or semi-flush mounting.

Advancing the industry since 1985 - Over 45,000 worldwide installations - Strategically designed by industry leaders - State of the art manufacturing Proven and trusted components - Custom panel applications - UL, cUL, CE, RoHS, and Seismic compliance - Direct supply chain to replacement parts - OSHA Lock Out/Tag Out Features - ISO9001 Compliant - Single-point connection allows for quick and seamless installation

BEVCO
IMAGING SUITE CONTROLS
W222N5739 Miller Way Sussex, WI 53089
www.bevcoisc.com | Tel: (262) 820-2400 | Fax: (262) 820-2599

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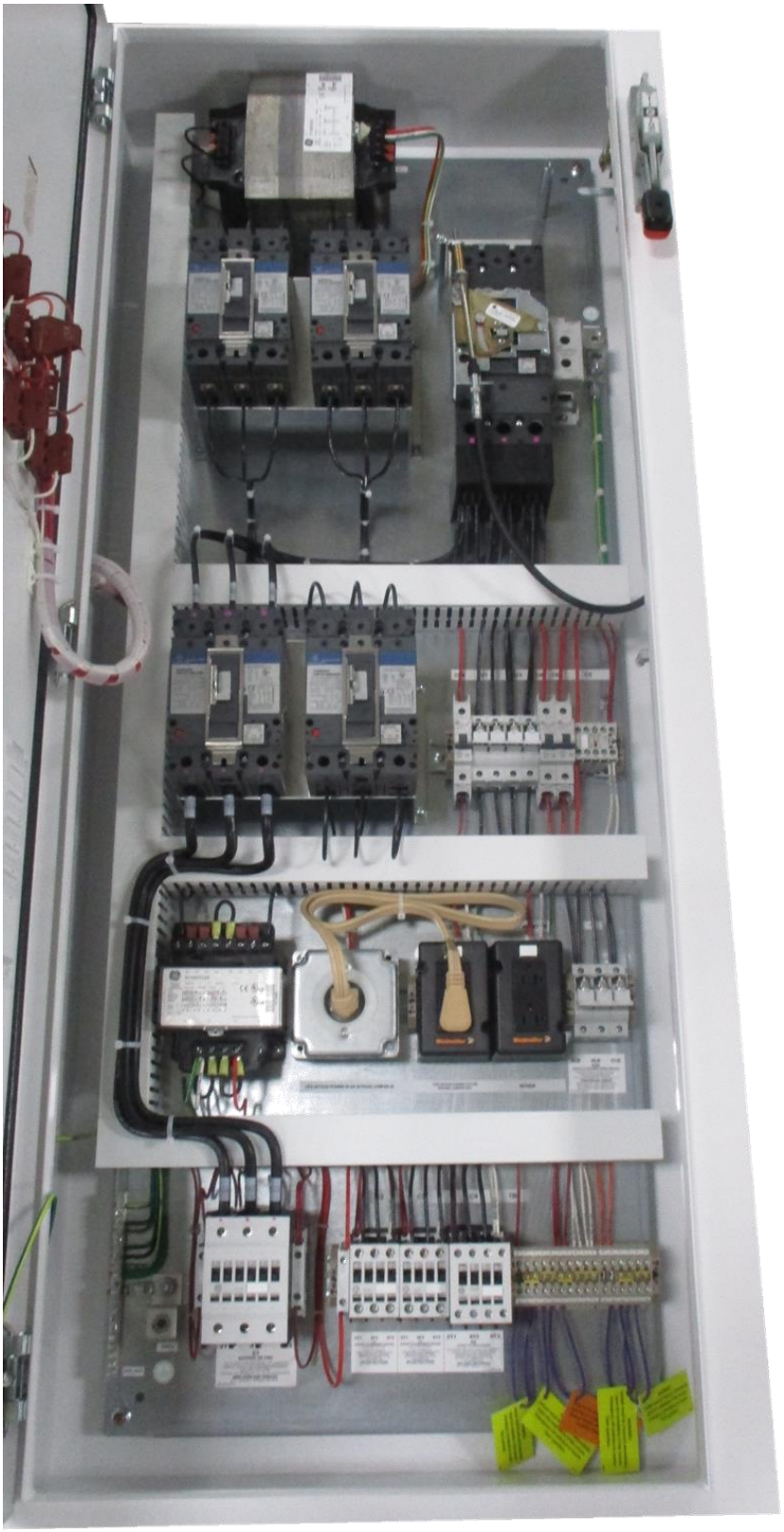
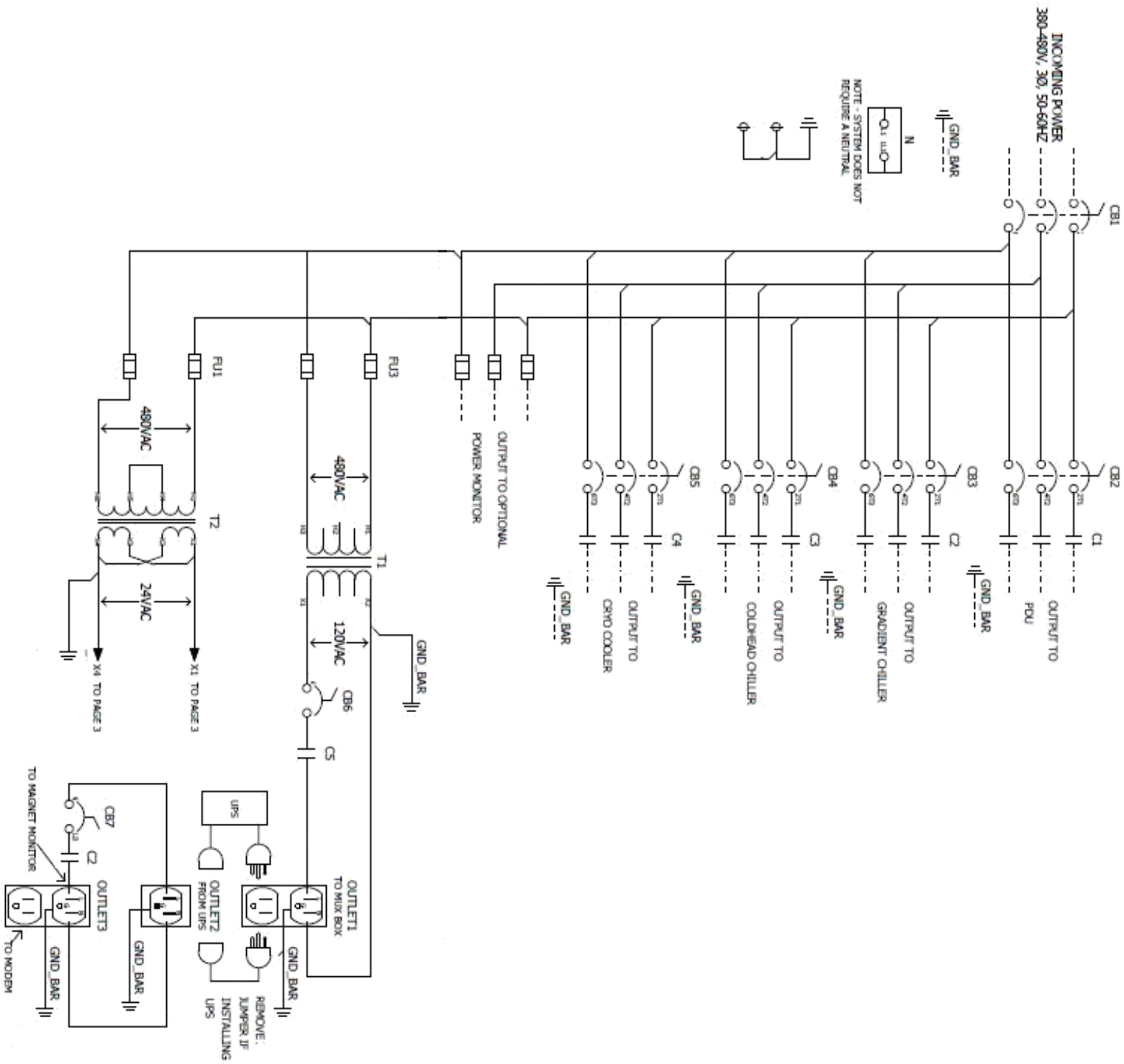
PANEL IMAGES

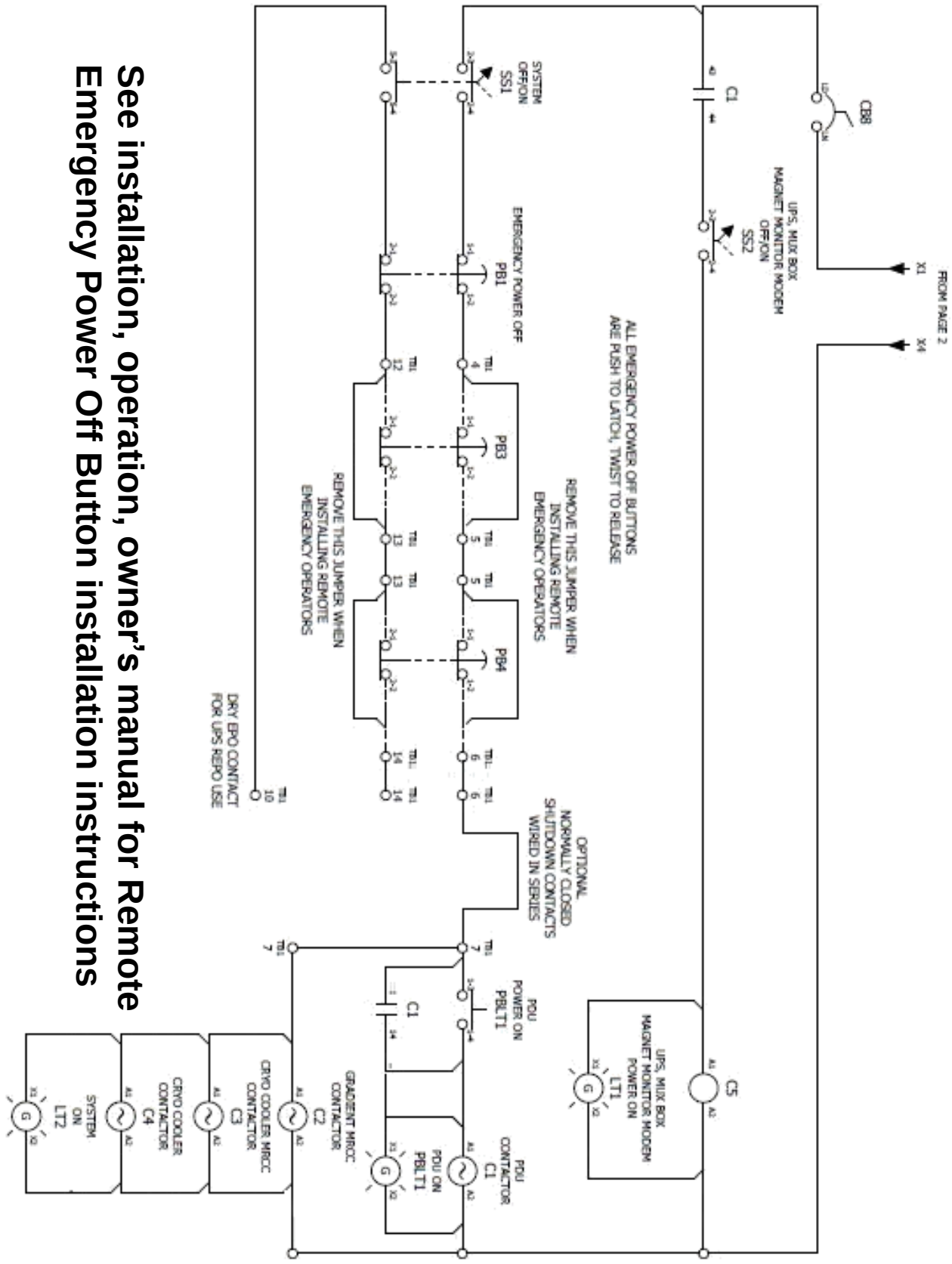
PANEL IMAGES (CONTINUED)



SCHEMATIC


INCOMING POWER
380-480V, 3Ø, 50-60HZ
GND_BAR
N
NOTE - SYSTEM DOES NOT REQUIRE A NEUTRAL
CB1
CB2
CB3
CB4
CB5
C1
C2
C3
C4
OUTPUT TO PDU
OUTPUT TO GRADIENT CHILLER
OUTPUT TO COLDHEAD CHILLER
OUTPUT TO CRYO COOLER
OUTPUT TO OPTIONAL POWER MONITOR
FU1
FU3
480VAC
T2
T1
24VAC
120VAC
X4 TO PAGE 3
X1 TO PAGE 3
CB6
C5
CB7
C2
UPS
TO MAGNET MONITOR
TO MODEM
OUTLET3
OUTLET2 FROM UPS
OUTLET1 TO MUX BOX
REMOVE JUMPER IF INSTALLING UPS

SCHEMATIC (CONTINUED)



See installation, operation, owner's manual for Remote Emergency Power Off Button installation instructions

DANGER

Improperly torqued connections will damage the system.
This panel may automatically re-energize upon restoration of facility power

WARNING!

The UPS REPO connection is an isolated dry contact.
It should be isolated from the 24VAC control power at all times.
Failure to install the UPS REPO properly, per the schematic will damage the UPS.

CIRCUIT BREAKER SETTINGS

CB1 INSTANTANEOUS TRIP SETTING					
MIN	2	3	4	5	**MAX**
2.9X	3.7X	4.7X	5.9X	7.7X	**10X**
440	560	705	885	1150	**1500**
					SET

CB2 INSTANTANEOUS TRIP SETTING						
MIN	2	3	4	5	**6**	MAX
3X	3.8X	4.8X	5.9X	7.8X	**10X**	12.8X
297	376	475	593	775	**998**	1280
						SET

CB3 INSTANTANEOUS TRIP SETTING						
MIN	2	3	4	**5**	6	MAX
2.9X	3.7X	4.7X	5.8X	**7.6X**	9.8X	12.7X
58	74	93	116	**151**	196	254
						SET

CB4 INSTANTANEOUS TRIP SETTING						
MIN	2	3	4	**5**	6	MAX
2.9X	3.7X	4.7X	5.8X	**7.6X**	9.8X	12.7X
58	74	93	116	**151**	196	254
						SET

CB5 INSTANTANEOUS TRIP SETTING						
MIN	2	3	4	**5**	6	MAX
2.9X	3.7X	4.7X	5.8X	**7.9X**	10.5X	13.8X
73	93	118	145	**197**	263	345
						SET

COMPONENTS SUPPLIED WITH EACH PANEL

1. The M3088TM Main Disconnect Panel
2. This installation Operations & Service Manual (English Only)
3. (2) Sets of Emergency Power Off push buttons with 2 NC contacts on each EPO
4. Drawings and Electrical Schematics Drawings and Electrical Schematics
5. French Danger Warning Label to be applied to the panel exterior where applicable.

DESCRIPTION OF OPERATION

This Bevco Engineering Main Disconnect Panel incorporates several features critical to efficient installations, safety, and reliable operation. The M3088TM branch circuit breakers are configured to automatically re-energize following facility power loss or disruption, reducing system down time following facility power outages and protects the imaging equipment and electronics. Specifications are as follows:

- The panel has a 150A main circuit breaker with individual branch breakers for the PDU Cabinet (100A), Gradient Chiller (20A), Cold Head Chiller (20A), Cryo Cooler (30A), and Power Meter component.
- A dedicated 120VAC circuit is provided to energize the UPS and magnet monitor receptacles. When a UPS is installed with the system the bypass jumpers must be removed.
- The MDP provides an internally powered, low voltage power source for the controls. The controls are designed to operate as follows:
  a) When the main circuit breaker (CB1) is de-energized or the 24VAC control circuit power is interrupted the GREEN “SYSTEM ON”, “PDU ON”, and “MAGNET MONITOR ON” indicator lights will turn OFF, the GRADIENT CHILLER (C2), COLD HEAD CHILLLER (C3), CRYO COOLER (C4) contactors, and MAGNET MONITOR circuit will be de-energized.
  b) If the “SYSTEM ON/OFF” and “MAGNET MONITOR ON/OFF” selector switches are set to the ON position and the main circuit breaker (CB1) is re-energized the GRADIENT CHILLER, COLD HEAD CHILLLER, CRYO COOLER contactors, and MAGNET MONITOR circuit will automatically re-energize.
  c) All EPOs must be in the normal extended operating position, the “SYSTEM ON/OFF” and “MAGNET MONITOR ON/OFF” selector switches must be set to the “ON” position, the PDU “POWER ON” button must be pressed in order to completely restore system power.
  d) In the event an EPO button is pressed and CB1 remains energized:
     - The GREEN “SYSTEM ON”, “PDU ON”, and “MAGNET MONITOR ON” status indicator lights will turn OFF. The GRADIENT CHILLER (C2), COLD HEAD CHILLLER (C3), CRYO COOLER (C4) contactors, and MAGNET MONITOR circuit (C5) will be de-energized.
     - The status indicator lights will illuminate and system power will be restored once the EPO has been reset to the normal, extended operating position by turning the RED knob clockwise and then pressing the “PDU ON”.
  e) A neutral block is provided, however is not required for the system to operate.

DESCRIPTION OF OPERATION (Continued)

f) When the panels main disconnect lever is set to the OFF position:
   - The main circuit breaker and all of the branch circuit breakers will be de-energized.
   - After performing any service to the main disconnect panel the main disconnect panel must be set to the ON position, the “SYSTEM ON/OFF” and “MAGNET MONITOR ON/OFF” switches must be set to the ON position, and then the “PDU ON” button must be pressed.

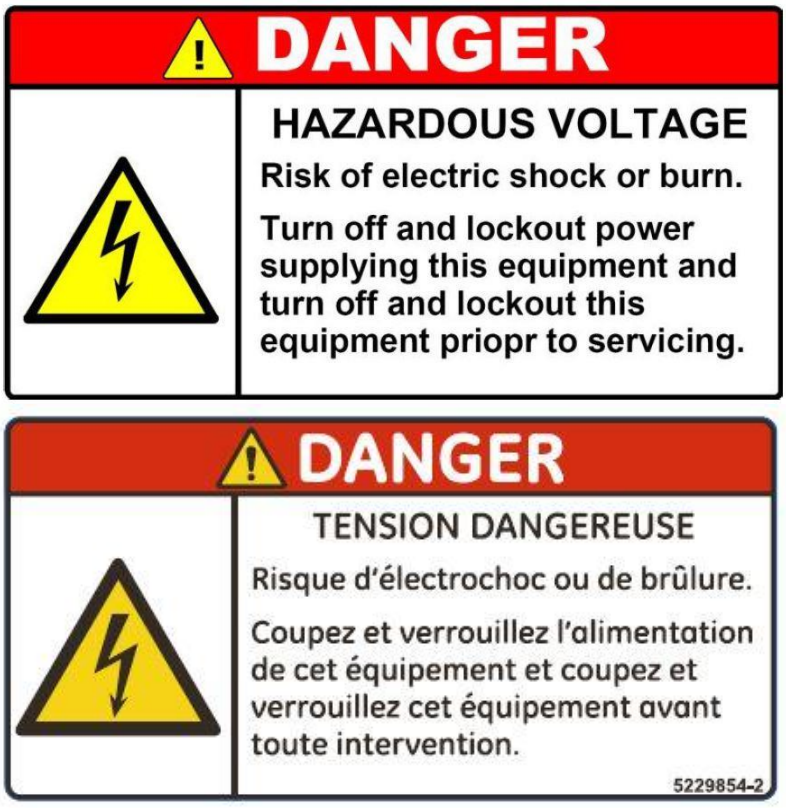
g) Pressing any of the EMERGENCY POWER OFF buttons will de-energize the system immediately. The main circuit breaker and branch circuit breakers will remain energized.

h) If an EMERGENCY POWER OFF button is pressed at any time it must be reset by rotating the RED knob clockwise until the knob extends outward to its normal operating position.

IMPORTANT: If building power is removed from the panel while the system is energized, the system will automatically re-energize when building power is restored without any human intervention.

DANGER

IMPORTANT: If building power is removed from the panel while the system is energized, the M3088TM will automatically re-energize when building power is restored without any human intervention, however the PDU POWER ON button must be pressed.



SAFETY AND MAINTENANCE

- Trouble shooting and servicing should only be attempted by a qualified electrician.
- Always wear proper personal arc flash protection and observe the lock out/tag out requirements of your employer and the facility you are working at.
- De-energize and Lock Out/Tag Out the main disconnect before servicing this panel. Troubleshooting and servicing should be performed by a qualified electrician.
- A structural engineer shall define the proper fixing and anchoring hardware for the installation to the wall of the MDP. Type and model of anchoring and the necessary tightening torque shall be recorded in a document left in the MDP log book. A paint or lack mark shall be applied on screw head, to facilitate further visual inspection.
- Prior to service or testing ensure that the circuit breakers (CB1, CB2, CB3,) settings are properly set according to tables located on the electrical schematic found on the inside of the enclosure door. The dial settings are preset at the factory.
- Prior to service or testing ensure that no one is working on or near the equipment this panel energizes.

INSTALLATION GUIDELINES AND PROCEDURES

Guidelines

- The enclosure must be mounted at a height that does not allow the top of the main circuit breaker handle to exceed 6 feet, 7 inches when in the ON position. (Per National Electric Code (NEC # 404.8)
- Incoming power is connected to the main circuit breaker located at the upper right of the Main Disconnect Panel. Refer to the schematic drawing for the incoming conductor size range and tightening torques
- There are no conduit knockouts provided in the panel. The installer must punch the conduit holes in the enclosure walls in the desired locations. The conduits may enter on the top, bottom or either side. NOTE: When drilling or punching the conduit entry holes, protect the internal components from falling metal chips and remove all debris following installation
- All conductors must be sized per the wiring shown on the GEHC installation drawings or in the imaging product installation manual.
- Verify that transformer configuration is tapped appropriately based on the incoming voltage.

Procedures

1. Prior to energizing the panel consult the transformer configuration guidelines and verify that the primary voltage for each transformer is tapped appropriately based on the incoming voltage of the main circuit breaker.
2. Connect the incoming power to the Line side of the Main CB, CB1
3. Connect the PDU to the load side of contactor C1
4. Connect the Gradient Chiller to the load side of contactor C2
5. Connect the Cold Head Chiller to the load side of contactor C3
6. Connect the Cryo Cooler to the load side of contactor C4
7. Connect the (optional) power monitor to the load side of the fuse holders FU2
8. Verify all terminations in the panel and that each termination is properly torqued according to the schematic.

TRANSFORMER CONFIGURATION AND INSTALLATION

The M3088TM main disconnect panel is equipped with a 120VAC and 24VAC step down transformer. The panel comes configured from the factory for 480VAC applications and each installation requires that the control wire taps are verified prior to energizing the system. The panel design includes (1) transformer for the UPS/Magnet Monitor receptacle circuit and (1) transformer for the low voltage control circuit as indicated below. The secondary side of each transformer is configured at the factory and does not require any modifications.

Device Tag	Configuration	Part Number
(T1) – UPS/Magnet Monitor receptacle circuit	230/480VAC:120VAC	9T58E0507
(T2) – Control Circuit	230/480VAC:24VAC	9T58E0168

UPS/Magnet Monitor Receptacle Circuit – (T1) 9T58E0507

Incoming Voltage (Main Circuit Breaker)	Transformer Primary Tap Configuration	**Transformer Secondary Tap Configuration
480VAC	H1 and H3	X1 and X2
380-415VAC	H1 and H2	X1 and X2

*SECONDARY SIDE OF THE TRANSFORMER IS FACTORY CONFIGURED

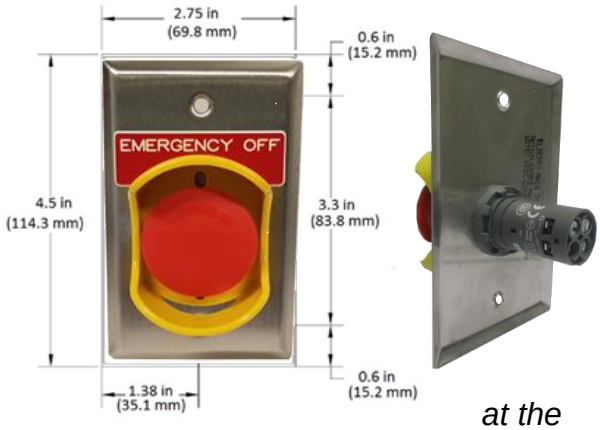
Control Circuit – (T2) 9T58E0168

Incoming Voltage (Main Circuit Breaker)	Transformer Primary Tap Configuration	**Transformer Secondary Tap Configuration
480VAC	H4 and H5	X1 and X4 Jumpers: X4 and X2 / X1 and X3
380-415VAC	H3 and H5	X1 and X4 Jumpers: X4 and X2 / X1 and X3

*SECONDARY SIDE OF THE TRANSFORMER IS FACTORY CONFIGURED

REMOTE EMERGENCY OFF BUTTONS - EPOs

EPO-NCNC-F: This part number comes with 2 normally closed contact terminals attached to the back of the emergency off push button. Two are included with each Main Disconnect Panel. Dimensions: (NOTE: This emergency off push button must be mounted in an extra deep switch box with mud ring. The contact block on the back of the EPO extends 1.37 Inches/35mm into the switch box and terminates from the side.



ELECTRICAL SPECIFICATIONS

UL design and ratings of this panel require the application of wire at the 75°C ampacity ratings of NEC table 310.16. Wire rated at higher temperature ratings, such as 90°C, may be used but ONLY applied at the 75°C ampacity ratings of NEC Table 310.16.

Catalog Number	Incoming Voltage & Frequency	Incoming Power Configuration	Main Circuit Breaker Rating	Regulatory Markings
M3088TM	380-480VAC 50/60Hz	3Ø + Ground	150Amps	UL/cUL, OSHPD, CE, RoHS
Short Circuit Current Rating is 25,000 Amperes RMS Symmetrical @ 480V				

SEISMIC SPECIFICATIONS

This Integrated Electrical Cabinet has been certified by an independent California structural engineer in conformance with the shake testing requirements of ICC-AC 156. The California OSHPD number is OSP-0457-10.
The seismic performance characteristics are as follows: $S_{DS}(g) \leq 2.56$; $z/h \leq 1.0$; $I_p \leq 1.5$

Certificate of Compliance
Seismic Certification Label California Building Code

OSHPD Special Seismic Certification Preapproval: OSP-0457-10
Product Name: *Main Disconnect Panel*
Product Type: *Control Panel*
Supports and Attachments: *Rigid wall mounted*
Seismic Performance Characteristics: $S_{DS}(g) \leq 2.56$; $z/h \leq 1.0$; $I_p \leq 1.5$
Manufacturer's Identification Number: *XR480-100-BS (Example cat #)*

BEVCO IMAGING SUITE CONTROLS

Bevco Engineering Company, Inc
www.bevcoengineering.com
Ph. 262.820.2400

ENVIORMENTAL SPECIFICATIONS

FOR INDOOR USE ONLY

Temperature 59-90°F (15-32°C)
Humidity 30-75%, NON-CONDENSING

ELECTRICAL DIAGRAM

The Electrical Wiring Diagram is adhered to the inside of the enclosure door for convenient reference to the circuitry. A complete set of the panel drawings are also attached to the back of this manual when shipped with the disconnect panel.

TROUBLE SHOOTING

Symptom	Possible Solutions
No power	• Verify that the SYSTEM OFF/ON and MAGNET MONITOR OFF/ON switch is set to the ON position. Then press the PDU POWER ON button. • Verify that the main circuit breaker voltage is present on all 3 phases of line and load side terminals. • Verify that contactors C1, C2, C3, and C4 voltage is present on all 3 phases of the line side (top) terminals. • Verify that none of the EPO push buttons have been pressed and that all EPOs are in the normal extended position. EPOs can be reset by rotating the RED knob clockwise. • Verify that the control circuit transformer (T2) incoming power is present and configured for the appropriate voltage taps according to the transformer installation guideline procedures, then verify that 24VAC is present on the secondary side of the control circuit transformer. • Verify that CB8 is in the closed position and that 24VAC is present on the load side of CB8. • verify that 24VAC is present at the branch circuit contactor coils C1, C2, C3, C4, and C5. • Verify that 24VAC is present at the contact blocks for the push buttons, selector switches, EPOs, and terminal block, and indicator lights. • Verify that CB7 is in the closed position and that 120VAC is present on the load side terminal. • Verify that the UPS/MAGNET MONITOR RECEPTACLE transformer (T1) incoming power is present and configured for the appropriate voltage taps according to the transformer installation guideline procedures, then verify that 120VAC is present on the secondary side of the transformer.

PARTS, TECHNICAL SUPPORT, & SERVICE

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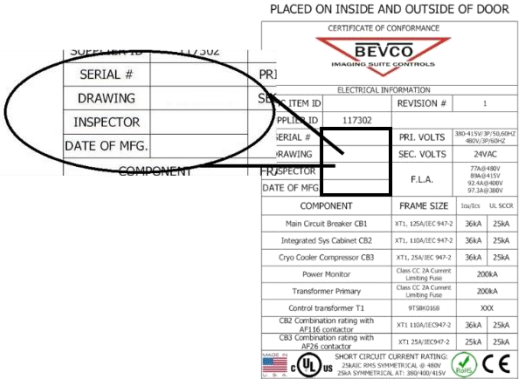


REPLACEMENT PARTS

Component Field Replacement Unit	Description	Part Number
CB1	Main circuit breaker FRU	5831902
CB2	PDU branch circuit breaker FRU	5829566
CB3 and CB4	Chiller and Gradient Chiller branch circuit breaker FRU	5831903
CB5	Cryo Cooler branch circuit breaker FRU	5829569
CB6	Receptacle single pole circuit breaker FRU	5831904
CB7 and CB8	Control Circuit and Receptacle single pole circuit breaker FRU	5831905
C1	PDU contactor FRU	5829571
C2 and C3	Chiller and Gradient Chiller contactor FRU	5831906
C4	Chiller and Gradient Chiller contactor FRU	5829906
C5	Cryo Cooler contactor FRU	5831907
T2	Control Transformer FRU	5829699
FU1, FU2	Replacement Fuse(s) FRU	5829908
FU3	Replacement Fuse(s) FRU	5831996
PB1	Door mount Emergency Stop FRU	5809469
LT1	Power On indicator light FRU	5829702
PBLT1	PDU pushbutton indicator light FRU	5829909
SS1	System On/Off switch FRU	5829907
SS2	Magnet Monitor On/Off switch FRU	5831997
E02	Remote Emergency Power Off Pushbutton FRU	5831878

FUSE REPLACEMENT

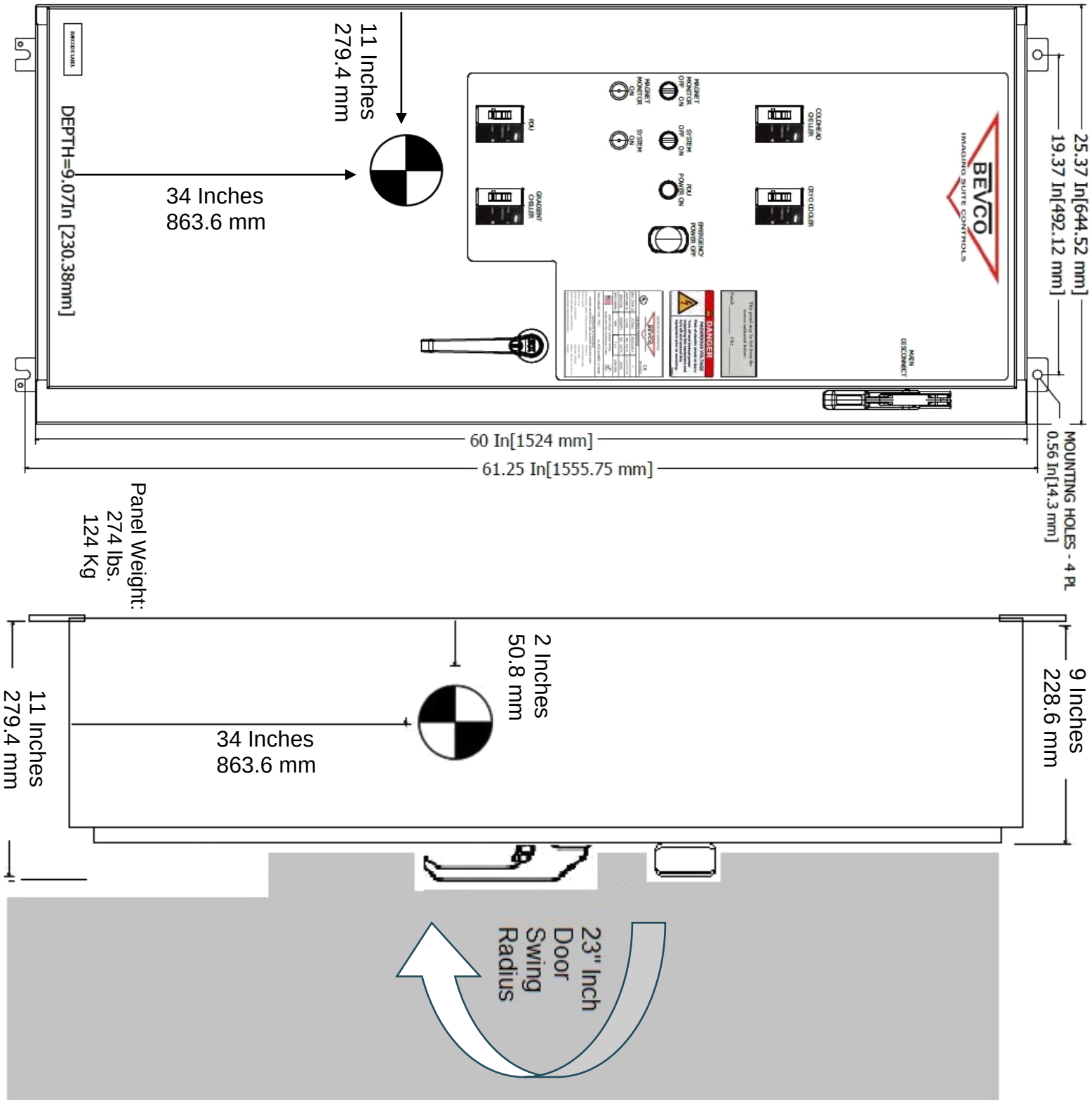
Fuses rated at the same ampere are available from many suppliers and manufacturers, however the fault characteristics, performance, and compliance factors may vary by manufacturer. Fuse replacement should only be completed using the one of the specified fuses identified in the diagram below.

FUSE REPLACEMENT CHART

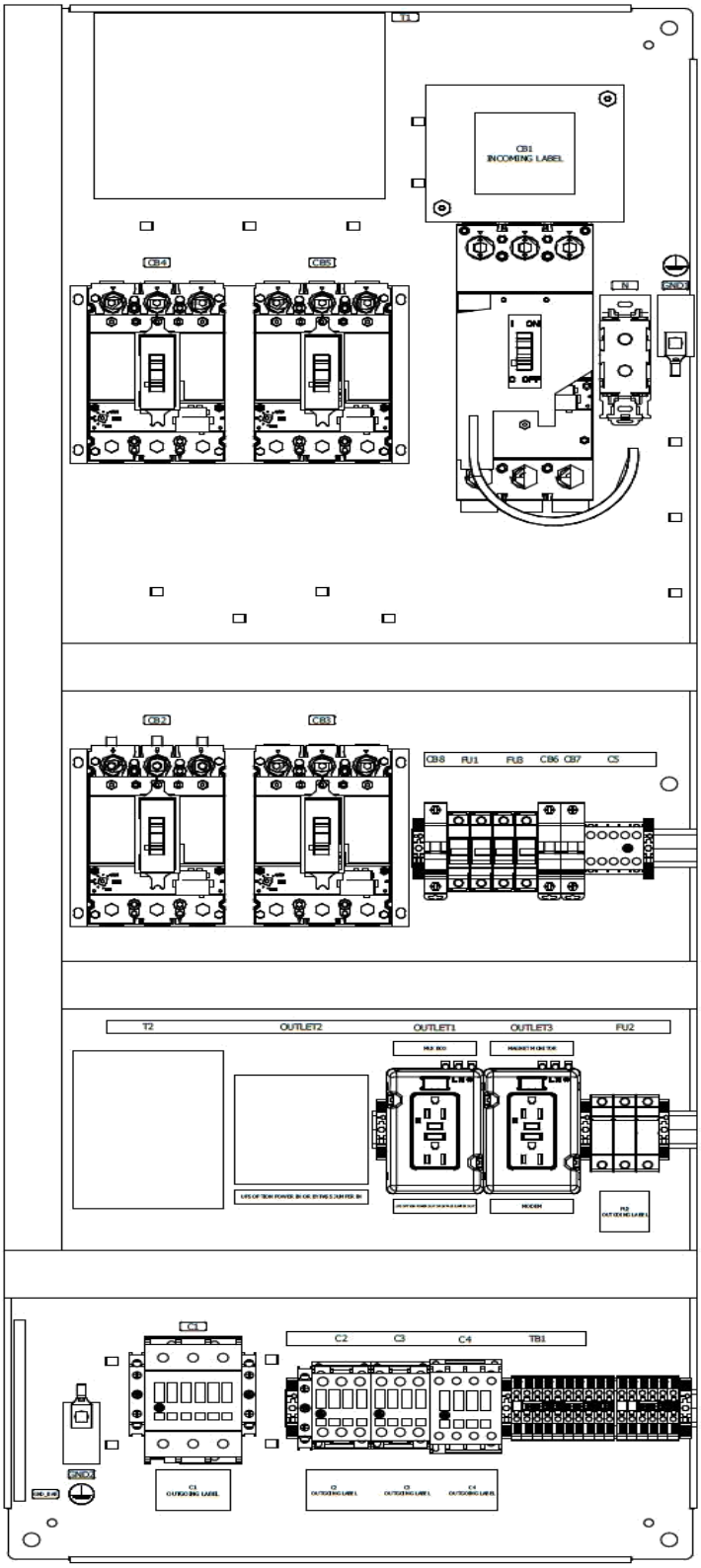
FOR CONTINUED PROTECTION AGAINST RISK OF FIRE,
REPLACE FUSES WITH SAME TYPE AND RATING BELOW.

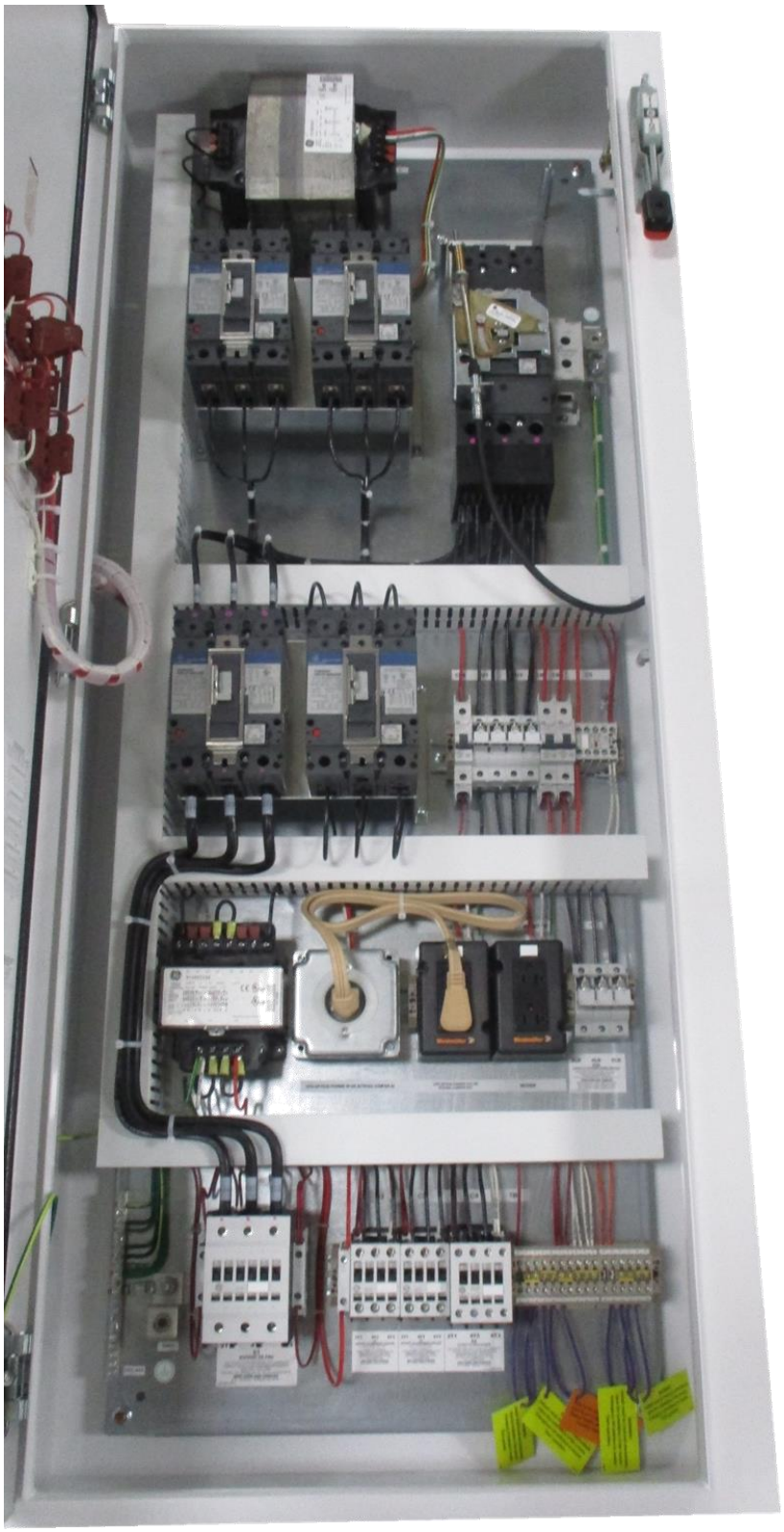
FUSE	SIZE	CLASS	LITTLE FUSE	MERSEN	BUSSMANN
FU1	1.6A	CC	KLDR01.6	ATQR1-1/6	FNQ-R-1-1/6
FU2	1A	CC	KLDR1	ATQR1	FNQ-R-1
FU3	5A	CC	KLDR5	ATQR5	FNQ-R-5

EXTERIOR PANEL DIMENSIONS AND CENTER OF GRAVITY



INTERIOR PANEL LAYOUT





REVISION HISTORY

REVISION	DATE	DESCRIPTION	AUTHOR
1.1	July 30, 2019	PRODUCTION RELEASE	JAMES TAYLOR
1.2	January 7, 2020	Updated Center of Gravity and Dimensions	JAMES TAYLOR
1.3	February 11, 2020	Updated EPO part number and terminals	JAMES TAYLOR
1.4	February 27, 2020	Updated Panel Images and AC control power	JAMES TAYLOR

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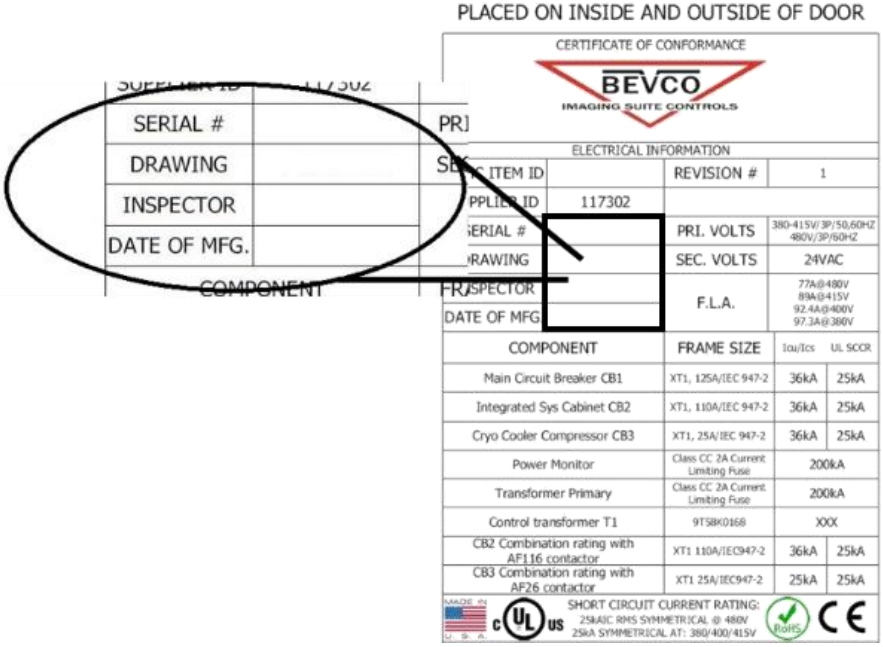
PLACED ON INSIDE AND OUTSIDE OF DOOR



CERTIFICATE OF CONFORMANCE

BEVCO
IMAGING SUITE CONTROLS

SERIAL #	
DRAWING	
INSPECTOR	
DATE OF MFG.	
COMPONENT	

ELECTRICAL INFORMATION

ITEM ID		REVISION #	1
PPLIER ID	117302		
ERIAL #		PRI. VOLTS	380-415V/3P/50,60HZ 480V/3P/60HZ
RAWING		SEC. VOLTS	24VAC
NSPECTOR		F.L.A.	77A@480V 89A@415V 92.4A@400V 97.3A@380V
DATE OF MFG			

COMPONENT	FRAME SIZE	Icu/Ics	UL SCCR
Main Circuit Breaker CB1	XT1, 125A/IEC 947-2	36kA	25kA
Integrated Sys Cabinet CB2	XT1, 110A/IEC 947-2	36kA	25kA
Cryo Cooler Compressor CB3	XT1, 25A/IEC 947-2	36kA	25kA
Power Monitor	Class CC 2A Current Limiting Fuse	200kA	
Transformer Primary	Class CC 2A Current Limiting Fuse	200kA	
Control transformer T1	9TS8K0168	XXX	
CB2 Combination rating with AF116 contactor	XT1 110A/IEC947-2	36kA	25kA
CB3 Combination rating with AF26 contactor	XT1 25A/IEC947-2	25kA	25kA

MADE IN U.S.A. c UL us SHORT CIRCUIT CURRENT RATING: 25kAIC RMS SYMMETRICAL @ 480V 25kA SYMMETRICAL AT: 380/400/415V RoHS CE