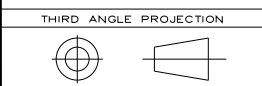


REVISIONS		
REV.	DESCRIPTION	DATE
C	CN000337210 Removed Proprietary Notes	01/26/24

TruCONTROL SERIES AUTOMATIC TRANSFER SWITCHES: 1600 – 3000 Amp Bypass Isolation Automatic Transfer Switch (65B_HOR)

This document has been prepared in accordance with the standard product offering and should be adhered to during the upgrade and commissioning of the TruCONTROL system. Failure to install the TruCONTROL device as defined by the guidelines outlined in this and related installation documents may result in an Arc Flash, Electric Shock, and/or equipment damage. Only trained and authorized personnel wearing appropriate personal protective equipment (PPE) should attempt to perform this work. Please consult with the ABB Services team for inquiries.

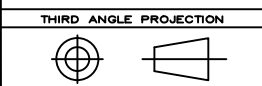



FOR ADDITIONAL INFO REFER TO	SIGNATURES	DATE	ABB
APPLIED PRACTICES UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	MODEL MAS	07/12/21	
TOLERANCES ON:	CHECKED		TITLE
2 PL. DECIMALS ± .020	ENGRG MAS	07/12/21	Electrical diagram
3 PL. DECIMALS ± .005	MFG		ABB Integrated Controller design
ANGLES ± 1'	QUALITY		
FRACTIONS ± 1/64	ISSUED		
FINISH ✓	DRAWING FILE: 50A-1208.dwg	SIZE	FIRST MADE FOR: ABB for Zenith
	MODEL / ASSEMBLY FILE:	D	CAGE CODE
	# CTOs		DWG NO
AutoCad Generated	CRITICAL TO QUALITY CHARACTERISTIC	SCALE: -	50A-1208
			SHEET 1 of 19

Article or Material Must Conform to REACH Procedure S1900000 Sec.14
 Article or Material Must Conform to RoHS Procedure S1900000 Sec.13
 Part Must Conform to ISO90000 Sec.4 Toxicity Procedure
 Geometric Dimensioning & Tolerancing as per ASME Y14.5-2009

TruCONTROL OPTIONS AVAILABLE FOR USE ON RB5

Field	Terminal	Base (B) Function	Plus (P) Function	Controls (C) Function	Flex (F) Function	Motor (M) - OT only Function	Motor (M) - DT or CT only Function
Embedded	I01	No Function	Test on Load (for Switch)	Remote Inhibit ATS	Test on Load (for Switch)	Test on Load (for Switch)	Test on Load (for Switch)
Embedded	I02	No Function	Test off Load (for Switch)	Remote Bypass Running Time Delays	Test off Load (for Switch)	Test off Load (for Switch)	Test off Load (for Switch)
Ekip 2k-1	I11		Remote Test on Load/Peak Shave	Remote Test on Load/Peak Shave	Remote Test on Load/Peak Shave	Remote Test on Load/Peak Shave	Remote Test on Load/Peak Shave
Ekip 2k-1	I12		Remote Inhibit ATS (for Switch)	Remote Manual Re-Transfer	Remote Manual Re-Transfer	Remote Manual Re-Transfer	Remote Manual Re-Transfer
Ekip 2k-2	I21			Load Shed Input Signal	Load Shed Input Signal	Load Shed Input Signal	Load Shed Input Signal
Ekip 2k-2	I22			Remote Inhibit Transfer to non-priority	Remote Inhibit ATS (for Switch)	Remote Inhibit Transfer to non-priority	Remote Inhibit Transfer to non-priority
Ekip 2k-3	I31					Remote Inhibit ATS	Remote Inhibit ATS
Ekip 2k-3	I32					Remote Inhibit ATS (for Switch)	Remote Inhibit ATS (for Switch)
Embedded	O01	No Function	Transfer Alarm	Transfer Alarm	Transfer Alarm	Transfer Alarm	Transfer Alarm
Embedded	O02	No function	No function	SCR Signal (load shed)	SCR Signal (load shed)	SCR Signal (load shed)	SCR Signal (load shed)
Embedded	O03	Extended Parallel Trip Output (CT only)	Extended Parallel Trip Output (CT only)	Extended Parallel Trip Output (CT only)	Extended Parallel Trip Output (CT only)	No Function	Extended Parallel Trip Output (CT only)
Embedded	O04	Extended Parallel Alarm (CT only)	Extended Parallel Alarm (CT only)	Extended Parallel Alarm (CT only)	Extended Parallel Alarm (CT only)	No Function	Extended Parallel Alarm (CT only)
Ekip 2k-1	O11		S1 Available/Not Available Indication	S1 Available/Not Available Indication	S1 Available/Not Available Indication	S1 Available/Not Available Indication	S1 Available/Not Available Indication
Ekip 2k-1	O12		S2 Available/Not Available Indication	S2 Available/Not Available Indication	S2 Available/Not Available Indication	S2 Available/Not Available Indication	S2 Available/Not Available Indication
Ekip 2k-2	O21			Elevator Pre-Transfer Signal	Elevator Pre-Transfer Signal	Elevator Pre-Transfer Signal	Load Disconnected Indication
Ekip 2k-2	O22			Pre-Transfer Signal	Pre-Transfer Signal	Elevator Pre-Transfer Signal	Elevator Pre-Transfer Signal
Ekip 2k-3	O31					Pre-Transfer Signal	Pre-Transfer Signal
Ekip 2k-3	O32					Pre-Transfer Signal	Pre-Transfer Signal

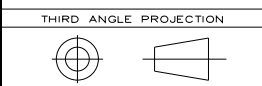


FOR ADDITIONAL INFO REFER TO	SIGNATURES	DATE	 CONTROL FEATURES ABB Integrated Controller Design
APPLIED PRACTICES	MODEL MAS	07/12/21	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	DETAIL		
TOLERANCES ON:	CHECKED		
2 PL. DECIMALS ± .020	ENGRG MAS	07/12/21	
3 PL. DECIMALS ± .005	MFG		TITLE
ANGLES ± 1°	QUALITY		ABB for ZENITH
FRACTIONS ± 1/64	ISSUED		SIZE
FINISH ✓	DRAWING FILE:		CAGE CODE
	MODEL / ASSEMBLY FILE:		DWG NO
	# CTOs	⊕ CRITICAL TO QUALITY CHARACTERISTIC	D
AutoCad Generated	SCALE: -		50A-1208
			SHEET 2 of 17

Article or Material Must Conform to REACH Procedure S1900000 Sec.14
 Article or Material Must Conform to RoHS Procedure S1900000 Sec.13
 Part Must Conform to ISO9000 Sec.4 Toxicity Procedure
 Geometric Dimensioning & Tolerancing as per ASME Y14.5-2009

DESIGNATION	DESCRIPTION	DESIGNATION	DESCRIPTION
A3-1,2 A4-1,2 AC,DC PLUGS ATSE BYPASS CE CEO CN CNO DT TIMER DW TIMER E CONTACTS E1,2,3,N HMI J1,2,3, ETC L1,2,3,N MTSE N1,2,3,N P TIMER QMQB S1, S2 SCR-CE2 SCR-E SCR-E0 SCR-N SCR-NO SN-1 SNO-1 SNO-2 SE-1 SEO-1 SEO-2 T TIMER T1 TB1 TB2 TB3 U TIMER W TIMER	ACTIVATED WHEN ATS IS LOCKED IN BOTTOM SOURCE (SOURCE 2) POSITION ACTIVATED WHEN ATS IS LOCKED IN TOP SOURCE (SOURCE 1) POSITION HARNESS PLUGS - AC / DC INPUT POWER TO TRU CONTROL SYSTEM AUTOMATIC TRANSFER SWITCH TRANSFER SWITCH DESIGN THAT ALLOW FOR PARALLEL SOURCE OPERATION SOURCE 2 CLOSE TRANSFER COIL SOURCE 2 OPEN TRANSFER COIL SOURCE 1 CLOSE TRANSFER COIL SOURCE 1 OPEN TRANSFER COIL CUSTOMER CONFIGURABLE TIMER. ALLOWS ATS TO REMAIN IN NEUTRAL STATE BEFORE INITIATING A CONTACT TRANSFER TO THE PRIMARY SOURCE - DELAY TRANSITION ONLY. CUSTOMER CONFIGURABLE TIMER. ALLOWS ATS TO REMAIN IN A NEUTRAL STATE BEFORE INITIATING A CONTACT TRANSFER TO THE ALTERNATE SOURCE - DELAY TRANSITION ONLY. ENGINE START CONTACTS. SOURCE 2 INPUT TERMINALS HUMAN MACHINE INTERFACE PANEL. HARNESS PLUGS LOAD TERMINAL (ATS OUTPUT TERMINALS) MANUAL TRANSFER SWITCH EQUIPMENT (BYPASS ISOLATION TRANSFER PANEL) SOURCE 1 INPUT TERMINALS CUSTOMER CONFIGURABLE TIMER. TIME DELAY BEFORE ENGINE START QUICK MAKE - QUICK BREAK OVER CENTER OPERATING MECHANISM. SOURCE 1, SOURCE 2 DESIGNATIONS. LOAD SHED RELAY MODULE SOURCE 2 CLOSE TRANSFER MODULE SOURCE 2 OPEN TRANSFER MODULE SOURCE 1 CLOSE TRANSFER MODULE SOURCE 1 OPEN TRANSFER MODULE SOURCE 1 LIMIT SWITCH. ACTIVATED WHEN ATS IN SOURCE 1 CLOSE POSITION SOURCE 1 LIMIT SWITCH. ACTIVATED WHEN ATS IS IN THE SOURCE 1 OPEN POSITION SOURCE 1 LIMIT SWITCH. ACTIVATED WHEN ATS IS IN THE SOURCE 1 OPEN POSITION SOURCE 2 LIMIT SWITCH. ACTIVATED WHEN ATS IS IN THE SOURCE 2 CLOSE POSITION SOURCE 2 LIMIT SWITCH. ACTIVATED WHEN ATS IS IN THE SOURCE 2 OPEN POSITION SOURCE 2 LIMIT SWITCH. ACTIVATED WHEN ATS IS IN THE SOURCE 2 OPEN POSITION CUSTOMER CONFIGURABLE TIME. ALLOWS PREFERRED SOURCE TO STABILIZE BEFORE INITIATING AN ATS TRANSFER TO THE PREFERRED SOURCE. TRU CONTROLLER NAMING DESIGNATION. TERMINAL BLOCK. PROVIDES CUSTOMER INPUT TO SOURCE 2 AUXILIARY CONTACTS TERMINAL BLOCK. PROVIDES CUSTOMER INPUT TO SOURCE 1 AUXILIARY CONTACTS TERMINAL BLOCK. ENCLOSURE MOUNTED. TO BE USED BY CUSTOMER TO CONNECT AUXILIARY A3 AND A4 CONTACTS. CUSTOMER CONFIGURABLE TIMER. COOL-DOWN TIMER. ALLOWS ENGINE TO RUN UNLOADED BEFORE SHUTTING DOWN. CUSTOMER CONFIGURABLE TIMER. ALLOWS ALTERNATE SOURCE TO STABILIZE BEFORE INITIATING AN ATS TRANSFER TO THE ALTERNATE SOURCE	N1,2,3,(N) E1,2,3,(N) T1,2,3,(N) BE BN BSS MBH AA-1,2 AB3,-1,2,3,4,5 A3B-1 AB4-1,2,3 A4B-1 AE-1,2 AI-1,2 AT-1,2 ATR BR C CBC CBE CBN CH-1 D1 RNH R1 XBE XBN LNA LEA LBN (NOTE 1) LBE (NOTE 1) LAT (NOTE 1) LAI (NOTE 1) LIT (NOTE 1) LDS (NOTE 1)	<div style="border: 1px solid black; padding: 5px; text-align: center;"> LEGEND: BYPASS/ISOLATION SWITCH (BP) </div> <p>I. (BP) BYPASS/ISOLATION SWITCH: MECHANICAL COMPONENTS</p> <p>SOURCE 1 Line connections_____</p> <p>SOURCE 2 Line connections_____</p> <p>Load Line connections_____</p> <p>Bypass SOURCE 2 contacts</p> <p>Bypass SOURCE 1 contacts</p> <p>Bypass Selector Switch</p> <p>Manual Bypass Handle</p> <p>II. (BP) BYPASS/ISOLATION: ELECTRICAL COMPONENTS</p> <p>Limit switch held actuated in Auto location of ATS, Non-actuated Test and Isolated locations.</p> <p>Limit switch, actuated in Bypass SOURCE 2 position</p> <p>Customer Auxiliary Limit switch, actuated in Bypass SOURCE 2 position</p> <p>Limit switch, actuated in Bypass SOURCE 1 position</p> <p>Customer Auxiliary Limit switch, actuated in Bypass SOURCE 1 position</p> <p>Limit switch, switches Engine Start from ATS control to bypass control during ATS Isolate</p> <p>Limit switch, actuated in Isolate location</p> <p>Limit switch, actuated in Test location</p> <p>Auto/Test Relay. Energized in AUTO and TEST locations</p> <p>Bridge Rectifier</p> <p>Capacitor: RNH</p> <p>Crank Solenoid</p> <p>SOURCE 2 Bypass Permissive Solenoid</p> <p>SOURCE 1 Bypass Permissive Solenoid</p> <p>Limit switch actuated when crank handle is engaged</p> <p>Diode</p> <p>Relay normally held, 24 VDC coil, 3PDT</p> <p>Resistor: RNH</p> <p>Bypass SOURCE 2 line control transformer</p> <p>Bypass SOURCE 1 line control transformer</p> <p>III. (BP) BYPASS/ISOLATION SWITCH: INDICATOR LIGHTS</p> <p>SOURCE 1 available</p> <p>SOURCE 2 available</p> <p>Bypass SOURCE 1 (BN closed)</p> <p>Bypass SOURCE 2 (BE closed)</p> <p>ATS in Test location</p> <p>ATS in Isolate location</p> <p>ATS Inhibit</p> <p>ATS DS switch in INHIBIT position</p>

NOTES:
 1. Indicator off during automatic operation of ATS.
 2. Four pole includes neutral



FOR ADDITIONAL INFO REFER TO		SIGNATURES		DATE
APPLIED PRACTICES	MODEL	MAS		07/12/21
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	CHECKED			
TOLERANCES ON:	ENGRG	MAS		07/12/21
2 PL. DECIMALS ± .020	MFG			
3 PL. DECIMALS ± .005	QUALITY			
ANGLES ± 1'	ISSUED			
FRACTIONS ± 1/64	DRAWING FILE:			
FINISH ✓	MODEL / ASSEMBLY FILE:			
AutoCad Generated	# CTOs	⊕ CRITICAL TO QUALITY CHARACTERISTIC	SCALE:	-

Acronyms and Definitions
ABB Integrated Controller Design

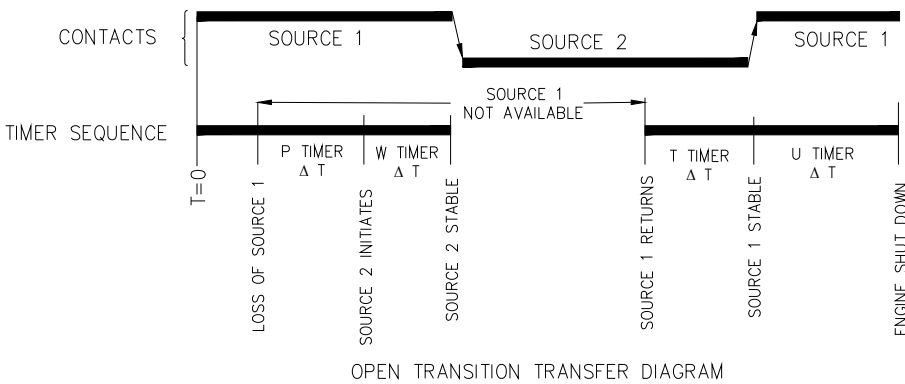
FIRST MADE FOR: ABB for ZENITH

SIZE	CAGE CODE	DWG NO
D		50A-1208

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SEQUENCE OF OPERATION – OPEN TRANSITION

- 1) WHEN SOURCE 1 LINE VOLTAGE OR FREQUENCY DROPS BELOW THE PRESET "FAIL" VALUES, THE SOURCE 1 VOLTAGE SENSING CIRCUIT INITIATES THE ENGINE START CIRCUIT THRU THE ENGINE START TIMER "P".
- 2) WHEN SOURCE 2 LINE VOLTAGE AND FREQUENCY REACH THE PRESET "RESTORE" VALUES (ESTABLISHED DURING THE W TIMER ELAPSE CYCLE), THE TruCONTROL INITIATES A TRANSFER SIGNAL THROUGH THE SCR-E DEVICE TO OPERATE THE CE TRANSFER OPERATOR.
- 3) THE LOAD WILL BE TRANSFERRED TO THE SOURCE 2 POSITION. THE TRANSFER SWITCH IS MECHANICALLY LOCKED AND ACKNOWLEDGED THRU THE SE LIMIT SWITCH.
- 4) WHEN THE SOURCE 1 LINE VOLTAGE AND FREQUENCY REACH THE PRESET "RESTORE" VALUES (ESTABLISHED BEFORE THE T TIMER ELAPSE CYCLE), THE TruCONTROL INITIATES A TRANSFER SIGNAL THROUGH THE SCR-N MODULE TO OPERATE THE CN TRANSFER OPERATOR.
- 5) THE LOAD WILL BE TRANSFERRED TO THE SOURCE 1 POSITION. THE TRANSFER SWITCH IS MECHANICALLY LOCKED AND ACKNOWLEDGED THRU THE SN LIMIT SWITCH.
- 6) THE TruCONTROL WILL INITIATE AN ENGINE COOL-DOWN SEQUENCE. THE ENGINE COOL DOWN SEQUENCE WILL ALLOW THE GENERATOR TO OPERATE UNLOADED UNTIL THE U TIMER SETTING HAS ELAPSED. ONCE COMPLETE, THE CONTROLLER WILL AUTOMATICALLY SHUT DOWN THE ENGINE.



NOTE: A MANUAL "BYPASS" PUSHBUTTON IS AVAILABLE ON THE TruCONTROL. THIS FEATURE ALLOWS CERTAIN TIMERS TO BE BYPASSED IF THE PRE-SET CONDITIONS HAVE NOT BEEN SET CORRECTLY.

DISCONNECT CONTROL SWITCH (DS):

WHEN THE DISCONNECT CONTROL SWITCH IS PLACED IN THE INHIBIT POSITION, THE CIRCUITS TO THE TRANSFER OPERATORS ARE OPENED AND TRANSFER CANNOT TAKE PLACE

TEST SWITCH UNDER LOAD:

THE TEST SWITCH SIMULATES A SOURCE 1 LINE FAILURE WHEN ACTIVATED. TO TEST THE ATS, ACTIVATE THE TEST SWITCH ALLOWING THE TRANSFER SWITCH TO TRANSFER TO THE SOURCE 2 POSITION FOLLOWING THE ABOVE DESCRIBED OPERATION. RELEASING THE TEST SWITCH WILL ALLOW THE ATS TO TRANSFER BACK TO THE SOURCE 1 POSITION. TESTING AT LEAST ONCE PER MONTH IS RECOMMENDED. FOR HOSPITAL EMERGENCY SYSTEMS IT IS RECOMMENDED TO TEST ONCE PER WEEK.

SEQUENCE OF OPERATION – DELAY TRANSITION

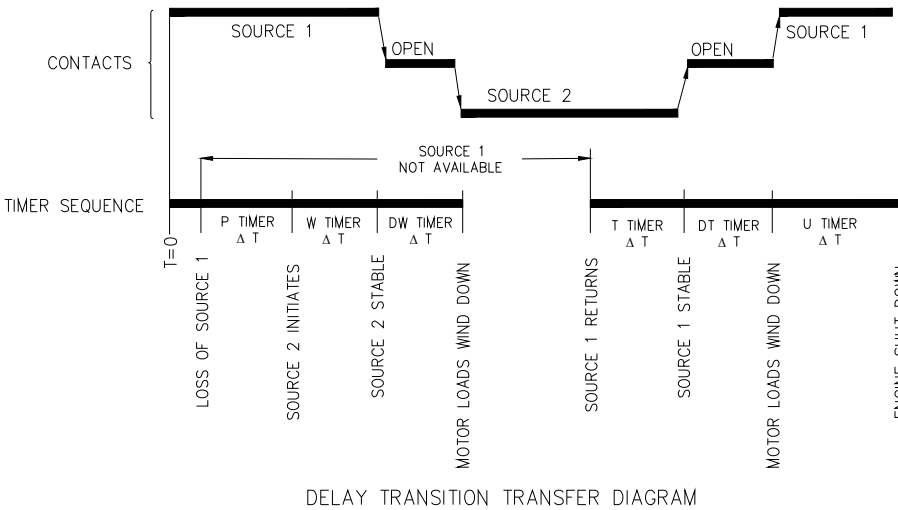
- 1) WHEN SOURCE 1 LINE VOLTAGE OR FREQUENCY DROPS BELOW THE PRESET "FAIL" VALUES, THE SOURCE 1 VOLTAGE SENSING CIRCUIT INITIATES THE ENGINE START CIRCUIT THRU THE ENGINE START TIMER "P".
- 2) WHEN SOURCE 2 LINE VOLTAGE AND FREQUENCY REACH THE PRESET "RESTORE" VALUES (ESTABLISHED DURING THE W TIMER ELAPSE CYCLE), THE TruCONTROL INITIATES A TRANSFER SIGNAL THROUGH THE SCR-NO MODULE TO OPERATE THE CNO TRANSFER OPERATOR.
- 3) THE LOAD WILL BE TRANSFERRED TO THE OPEN POSITION. ONCE THE SNO / SEO LIMIT SWITCHES HAVE BEEN ACTIVATED, THE TruCONTROL WILL INITIATE THE DW TIME DELAY. AFTER A SET TIME DELAY (ESTABLISHED THRU THE DW TIMER), THE TruCONTROL INITIATES A TRANSFER SIGNAL THROUGH THE SCR-E MODULE TO OPERATE THE CE TRANSFER OPERATOR. NOTE: IF CENTER OFF OPTION HAS BEEN DISABLED, UPON COMPLETE LOSS OF SOURCE, TRANSFER TO SOURCE 2 WILL BE IMMEDIATE. DW TIME DELAY WILL NOT SEQUENCE DOWN.
- 4) THE LOAD WILL BE TRANSFERRED TO THE SOURCE 2 POSITION. THE TRANSFER SWITCH IS MECHANICALLY LOCKED AND ACKNOWLEDGED THRU THE SE LIMIT SWITCH.
- 5) WHEN SOURCE 1 LINE VOLTAGE AND FREQUENCY REACH THE PRESET "RESTORE" VALUES

(ESTABLISHED DURING THE T TIMER ELAPSE CYCLE), THE TruCONTROL INITIATES A TRANSFER SIGNAL THROUGH THE SCR-EO MODULE TO OPERATE THE CEO TRANSFER OPERATOR.

- 6) THE LOAD WILL BE TRANSFERRED TO THE OPEN POSITION. ONCE THE SNO / SEO LIMIT SWITCHES HAVE BEEN ACTIVATED, THE TruCONTROL WILL INITIATE THE DT TIME DELAY. AFTER A SET TIME DELAY (ESTABLISHED THRU THE DT TIMER), THE TruCONTROL INITIATES A TRANSFER SIGNAL THROUGH THE SCR-N MODULE TO OPERATE THE CN TRANSFER OPERATOR. NOTE: IF CENTER OFF OPTION HAS BEEN DISABLED, UPON COMPLETE LOSS OF SOURCE, TRANSFER TO SOURCE 1 WILL BE IMMEDIATE. DT TIME DELAY WILL NOT SEQUENCE DOWN.

- 7) THE LOAD WILL BE TRANSFERRED TO THE SOURCE 1 POSITION. THE TRANSFER SWITCH IS MECHANICALLY LOCKED AND ACKNOWLEDGED THRU THE SN LIMIT SWITCH.

- 8) THE TruCONTROL WILL INITIATE AN ENGINE COOL-DOWN SEQUENCE. THE ENGINE COOL DOWN SEQUENCE WILL ALLOW THE GENERATOR TO OPERATE UNLOADED UNTIL THE U TIMER SETTING HAS ELAPSED. ONCE COMPLETE, THE CONTROLLER WILL AUTOMATICALLY SHUT DOWN THE ENGINE.



NOTE: A MANUAL "BYPASS" PUSHBUTTON IS AVAILABLE ON THE TruCONTROL. THIS FEATURE ALLOWS CERTAIN TIMERS TO BE BYPASSED IF THE PRE-SET CONDITIONS HAVE NOT BEEN SET CORRECTLY.

DISCONNECT CONTROL SWITCH (DS):

WHEN THE DISCONNECT CONTROL SWITCH IS PLACED IN THE INHIBIT POSITION, THE CIRCUITS TO THE TRANSFER OPERATORS ARE OPENED AND TRANSFER CANNOT TAKE PLACE

TEST SWITCH UNDER LOAD:

THE TEST SWITCH SIMULATES A SOURCE 1 LINE FAILURE WHEN ACTIVATED. TO TEST THE ATS, ACTIVATE THE TEST SWITCH ALLOWING THE TRANSFER SWITCH TO TRANSFER TO THE SOURCE 2 POSITION FOLLOWING THE ABOVE DESCRIBED OPERATION. RELEASING THE TEST SWITCH WILL ALLOW THE ATS TO TRANSFER BACK TO THE SOURCE 1 POSITION. TESTING AT LEAST ONCE PER MONTH IS RECOMMENDED. FOR HOSPITAL EMERGENCY SYSTEMS IT IS RECOMMENDED TO TEST ONCE PER WEEK.

SEQUENCE OF OPERATION – CLOSED TRANSITION

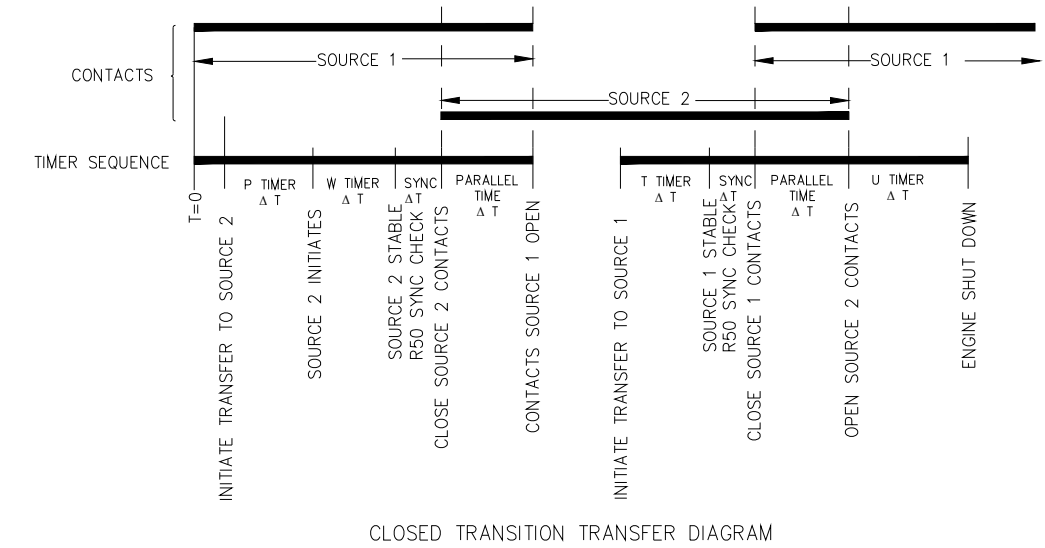
CLOSED TRANSITION TRANSFER SWITCHES ARE DESIGNED TO TRANSFER LOAD BETWEEN TWO AVAILABLE SOURCES, WITHOUT INTERRUPTING POWER TO THE LOAD (MAKE-BEFORE-BREAK). PARALLELING OF THE TWO SOURCES OCCURS WITHIN A PREDEFINED WINDOW OF SYNCHRONIZATION AND LASTS LESS THAN 100MS. THE INITIAL SOURCE IS THEN DISCONNECTED.

- 1) TO TEST THE ATS, ACTIVATE THE TEST SWITCH TO DROP OUT THE ENGINE START RELAY (P). WHEN THE SOURCE 2 LINE VOLTAGE AND FREQUENCY REACH THE PRESET "RESTORE" VALUES (ESTABLISHED DURING THE W TIMER ELAPSE CYCLE), THE ATS CLOSES INTO SOURCE 2 BY ACTIVATING THE SCR-E MODULE. THIS WILL OPERATE THE CE TRANSFER OPERATOR. THIS TRANSFER WILL OCCUR ONLY AFTER THE SYNC CHECK ENSURES THAT PROPER PHASE RELATIONSHIP BETWEEN BOTH SOURCES.
- 2) AFTER THE LOAD IS PARALLELED TO SOURCE 2, THE TRANSFER SWITCH IS MECHANICALLY LOCKED AND ACKNOWLEDGED THRU THE SE LIMIT SWITCH. THE CONTROLLER THEN INITIATES A TRANSFER SIGNAL THRU THE SCR-NO MODULE WHICH OPENS THE ATS OUT OF SOURCE 1. WHEN THE ATS HAS OPENED OUT OF SOURCE 1, THE SNO LIMIT SWITCH WILL ACTIVATE.
- 3) THE ATS HAS NOW CLOSED INTO THE SOURCE 2 POSITION WITHOUT INTERRUPTING THE LOAD.
- 4) RELEASING THE TEST SWITCH WILL ALLOW A RETRANSFER BACK TO SOURCE 1.
- 5) WHEN SOURCE 1 LINE VOLTAGE REACH THE PRESET "RESTORE" VALUES (ESTABLISHED BEFORE THE T TIMER ELAPSE), THE ATS CLOSES INTO SOURCE 1 BY ACTIVATING THE SCR-N MODULE. THIS WILL OPERATE THE CN TRANSFER OPERATOR. THIS TRANSFER WILL ONLY OCCUR AFTER THE SYNC CHECK ENSURES PROPER PHASE RELATIONSHIP BETWEEN BOTH SOURCES.

- 6) AFTER THE LOAD HAS BEEN PARALLELED TO SOURCE 1, THE TRANSFER SWITCH IS MECHANICALLY LOCKED AND ACKNOWLEDGED THRU THE SN LIMIT SWITCH. THE CONTROLLER THEN INITIATES A TRANSFER SIGNAL THRU THE SCR-EO MODULE WHICH OPENS THE ATS OUT OF SOURCE 2.

- 7) WHEN THE ATS HAS OPENED OUT OF SOURCE 2, THE SEO LIMIT SWITCH ACTIVATED. THE ATS HAS NOW CLOSED BACK INTO THE SOURCE 1 POSITION WITHOUT INTERRUPTING THE LOAD.

- 8) IN ADDITION, ONCE THE SOURCE 1 STATUS HAS BEEN ACKNOWLEDGED, THE TruCONTROL WILL INITIATE AN ENGINE COOL-DOWN SEQUENCE. THE ENGINE COOL DOWN SEQUENCE WILL ALLOW THE GENERATOR TO OPERATE UNLOADED UNTIL THE U TIMER SETTING HAS ELAPSED ONCE COMPLETE. THE CONTROLLER WILL AUTOMATICALLY SHUT DOWN THE ENGINE.



- 9) THE ATS DEFAULTS TO A DELAYED TRANSITION TRANSFER WHEN SOURCE 1 FAILS. THIS SIGNALS THE GENERATOR TO START. AFTER THE GENERATOR VOLTAGE AND FREQUENCY REACH THE PRESET "RESTORE" VALUES, THE ATS TRANSFERS TO THE SOURCE 2. CLOSED TRANSITION TRANSFER IS NOT POSSIBLE WITH ONLY ONE SOURCE AVAILABLE.

- 10) IF, WHILE IN CLOSED TRANSITION MODE, THE ATS FAILS TO OPEN THE SOURCE IT IS ATTEMPTING TO "TRANSFER OUT OF", THE SOURCE THAT THE ATS JUST CLOSED INTO WILL BE OPENED LEAVING THE ATS IN ITS INITIAL SOURCE WHILE DISABLING ALL OTHER TRANSFER OPERATIONS.

- 11) IF, WHILE IN CLOSED TRANSITION MODE, SHOULD THE ATS CONTACTS BECOME LOCKED IN PARALLEL MODE, BOTH THE STR AND THE ALARM CONTACTS WILL ACTIVATE. THESE CONTACTS WILL REMAIN ACTIVE UNTIL THE PARALLEL CONTACT CONDITION HAS BEEN CLEARED. ACTIVATING THE STR CONTACT WILL REMOVE THE GENERATOR FROM THE BUS IF NEITHER OPERATOR OPENED. INTERNAL DEFAULT SETTING FOR BOTH CONTACTS SETS IS 500ms.

PARALLELING REQUIREMENTS:

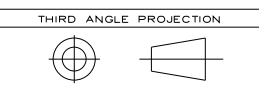
1. THE UNIT IS FACTORY SET TO ACCOMPLISH TRANSFER WITHIN 10 ELECTRICAL DEGREES.
2. REQUIRES AN ISOCHRONOUS GOVERNOR WITH AN OPERATING FREQUENCY OF 60 ± 0.2 HZ.
3. REQUIRES A SHUNT TRIP BREAKER ON THE GENERATOR SET WITH A RESPONSE TIME NOT EXCEEDING 50MS.

DISCONNECT CONTROL SWITCH (DS):

WHEN THE DISCONNECT CONTROL SWITCH IS PLACED IN THE INHIBIT POSITION, THE CIRCUITS TO THE TRANSFER OPERATORS ARE OPENED AND TRANSFER CANNOT TAKE PLACE

TEST SWITCH UNDER LOAD:

THE TEST SWITCH SIMULATES A SOURCE 1 LINE FAILURE WHEN ACTIVATED. TO TEST THE ATS, ACTIVATE THE TEST SWITCH ALLOWING THE TRANSFER SWITCH TO TRANSFER TO THE SOURCE 2 POSITION FOLLOWING THE ABOVE DESCRIBED OPERATION. RELEASING THE TEST SWITCH WILL ALLOW THE ATS TO TRANSFER BACK TO THE SOURCE 1 POSITION. TESTING AT LEAST ONCE PER MONTH IS RECOMMENDED. FOR HOSPITAL EMERGENCY SYSTEMS IT IS RECOMMENDED TO TEST ONCE PER WEEK.



FOR ADDITIONAL INFO REFER TO	SIGNATURES	DATE	ABB
APPLIED PRACTICES UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	MODEL MAS	07/12/21	
TOLERANCES ON:	CHECKED		TITLE
2 PL. DECIMALS ± .020	ENGRG MAS	07/12/21	Sequence of Operations
3 PL. DECIMALS ± .005	MFG		ABB Integrated Controller Design
ANGLES ± 1'	QUALITY		FIRST MADE FOR: ABB for ZENITH
FRACTIONS ± 1/64	ISSUED		SIZE CAGE CODE DWG NO
FINISH ✓	DRAWING FILE:		50A-1208
	MODEL / ASSEMBLY FILE:		SCALE: -
AutoCad Generated	# CTOs	CRITICAL TO QUALITY CHARACTERISTIC	SHEET 4 of 17

OPERATION: BYPASS/ISOLATION SWITCH

AUTOMATIC

1. Manually operated Bypass Switch contacts (BN/BE) are open and ATS is supplying load.
2. Disconnect Switch (DS) is in "AUTO".

TO BYPASS ATS

1. Turn DS to "INHIBIT"
2. Open Bypass Isolation Access panel.
3. Turn Bypass Selector Switch (BSS) to same power source as ATS.
4. Move the Manual Bypass Handle (MBH) upward.

TO TEST ATS

1. Bypass per above instructions.
2. Rotate crank mechanism counterclockwise until ATS TEST light is illuminated.
3. Turn DS to "AUTO".
4. Test Switch (TS) on MX microprocessor control unit will allow electrical operation of ATS

TO ISOLATE ATS

1. Bypass per above instructions.
2. Rotate crank mechanism counterclockwise until ATS ISOLATED light is illuminated.

TO REMOVE ATS

1. Bypass and Isolate per above instructions.
2. Open Automatic Transfer Switch access panel.
3. Slide four corner latches of ATS to innermost position.
4. ATS can now be removed from cabinet.

TO RECONNECT ATS

1. Roll cart back into cabinet.
2. Slide four corner latches of ATS to outermost position.
3. Turn DS Switch to "INHIBIT".
4. Manually position ATS into same source as Bypass Switch.
5. Close Automatic Transfer Switch access panel.
6. Rotate crank mechanism clockwise until ATS TEST light is illuminated.
7. Turn DS Switch to "AUTO" and use TS to electrically operate ATS.
8. Turn DS to "INHIBIT".
9. Rotate crank mechanism clockwise until ATS location pointer is aligned with "AUTO" mark on location indicator. (ATS must be in same source as Bypass).
10. Turn DS to "AUTO" and open Bypass with MBH.
11. ATS is now fully automatic (Figure 1).

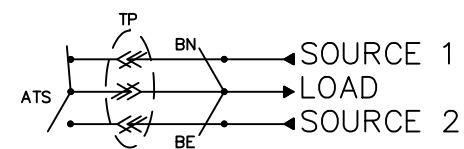


FIG. 1 BP IS OPEN WITH ATS IN SOURCE 1

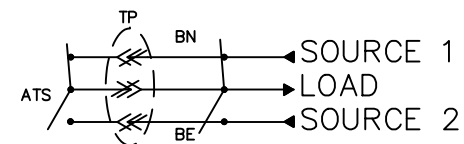


FIG. 2 BP IN SOURCE 1 WITH ATS IN SOURCE 1

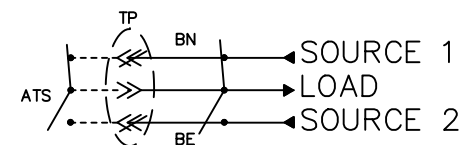


FIG. 3 BP IN SOURCE 1 WITH ATS IN TEST (LOAD CONNECTION OPEN) (Power available to solenoids via test plugs.)

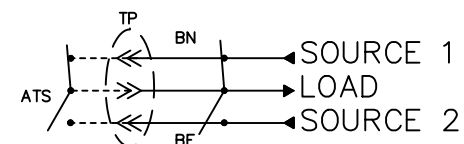


FIG. 4 BP IN SOURCE 1 WITH ATS ISOLATED (Test plugs disengaged)

ATS LOCATION	LOAD CARRYING CONTACTS			ATS TEST PLUG (TP1)	ATS TEST PLUG (TP2)
	1	2	3	4	5
AUTO	X	X	X	X	X
TEST	0	0	0	X	X
ISOLATE	0	0	0	0	0

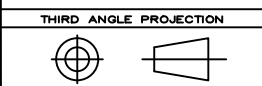
LEGEND
 X = ENGAGED
 0 = DISENGAGED
 ——— CONNECTED BUS
 - - - - - OPEN BUS

NOTES:

1. DS in "INHIBIT" will prevent ATS electrical operation.
2. DO NOT use excessive force on mechanical handles.
3. Adjacent figures depict Bypass SOURCE 1. Sequence is same for Bypass SOURCE 2.
4. When ATS is in TEST or ISOLATE, Bypass Switch is a manual transfer switch to either available source. (Indicated on light panel).
5. To operate Bypass Isolation Switch when ATS is in TEST or ISOLATE:
 - a) Move MBH downward (to open Bypass Contacts BN/BE).
 - b) Turn BSS to opposite power source.
 - c) Move MBH upward to close into selected power source.

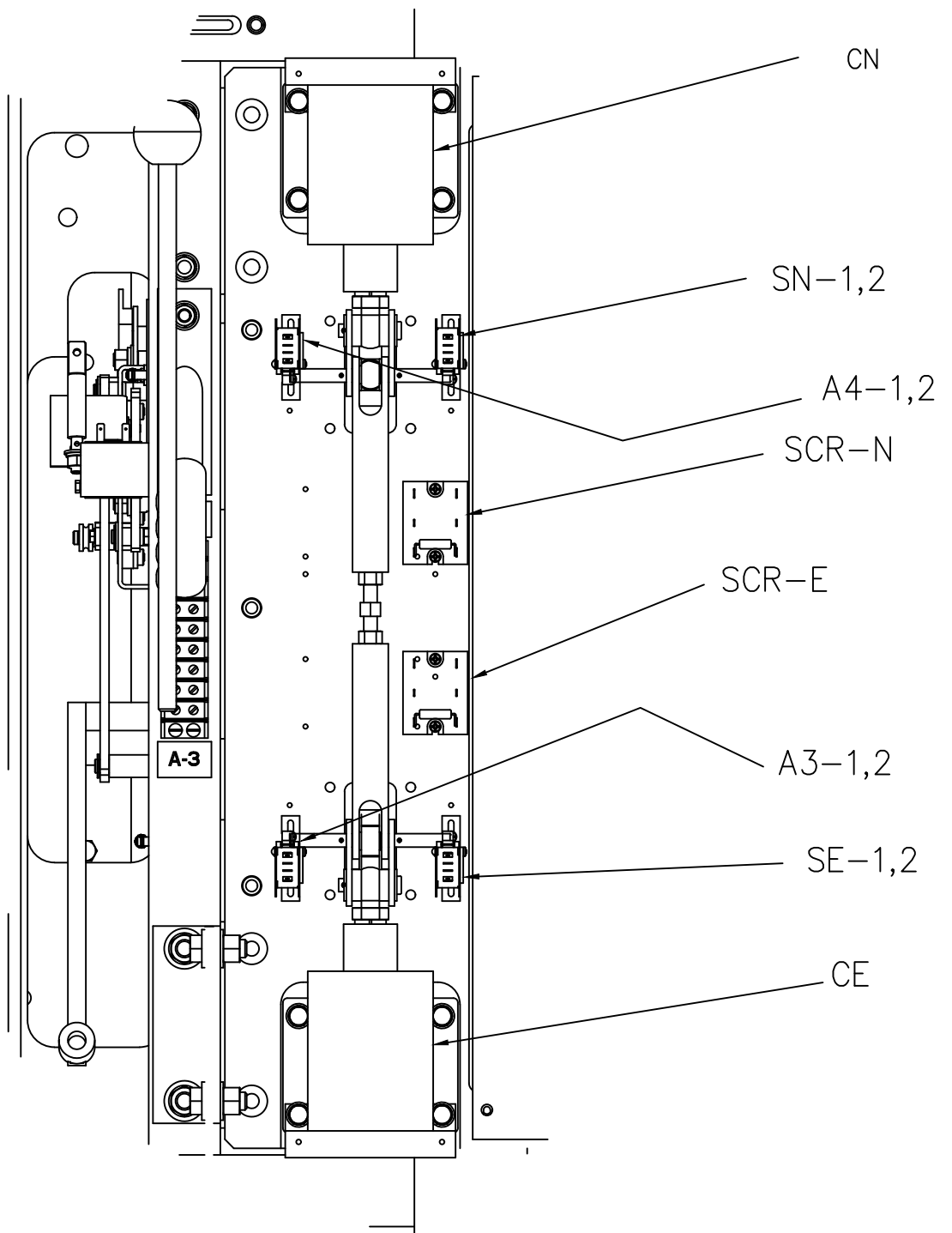
NOTES:

1. BP—Bypass switch (indicated by contacts BN/BE) is a 3 position switch.
2. ATS—Automatic Transfer Switch



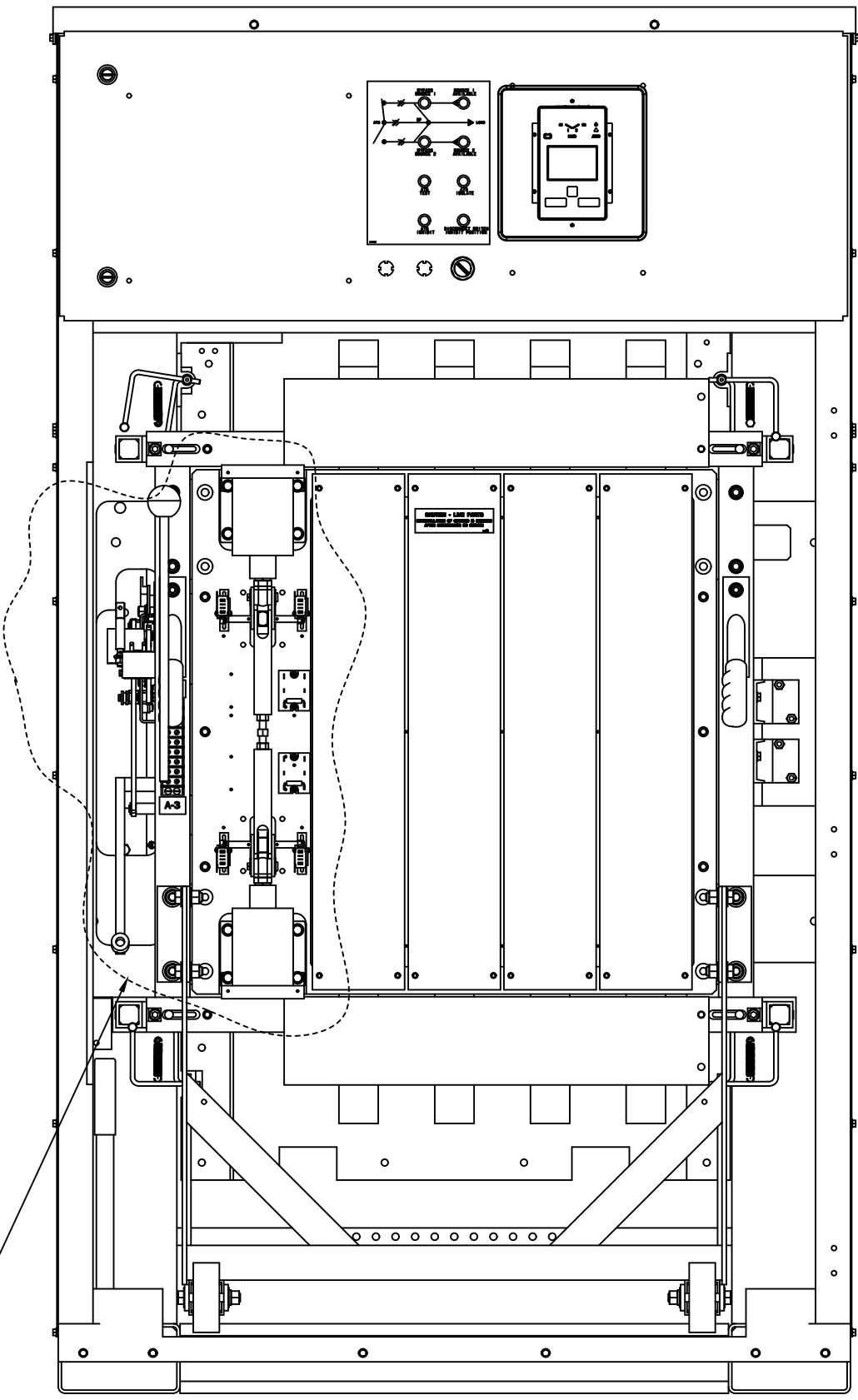
FOR ADDITIONAL INFO REFER TO	SIGNATURES	DATE	ABB
APPLIED PRACTICES UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	MODEL MAS	07/12/21	
TOLERANCES ON:	CHECKED		TITLE
2 PL. DECIMALS ± .020	ENGRG MAS	07/12/21	Acronyms and Definitions
3 PL. DECIMALS ± .005			ABB Integrated Controller Design
ANGLES ± 1'	QUALITY		
FRACTIONS ± 1/64	ISSUED		
FINISH ✓	DRAWING FILE:		FIRST MADE FOR: ABB for ZENITH
	MODEL / ASSEMBLY FILE:		SIZE CAGE CODE DWG NO
			D 50A-1208
AutoCad Generated	# CTOs	CRITICAL TO QUALITY CHARACTERISTIC	SCALE: - SHEET 5 of 17

Article or Material Must Conform to REACH Procedure S1900000 Sec.14
 Article or Material Must Conform to RoHS Procedure S1900000 Sec.13
 Part Must Conform to S1900000 Sec.4 Toxicity Procedure
 Geometric Dimensioning & Tolerancing as per ASME Y14.5-2009



Detail A. Magnified 2x

See detail A

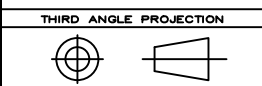


AUTOMATIC TRANSFER SWITCH
 LIMIT SWITCH ACTUATION CHART

X = ACTUATED	ATS LOCATION	
	SOURCE 1	SOURCE 2
SN-1	X	
SN-2	X	
SE-1		X
SE-2		X
A4-1	X	
A4-2	X	
A3-1		X
A3-2		X

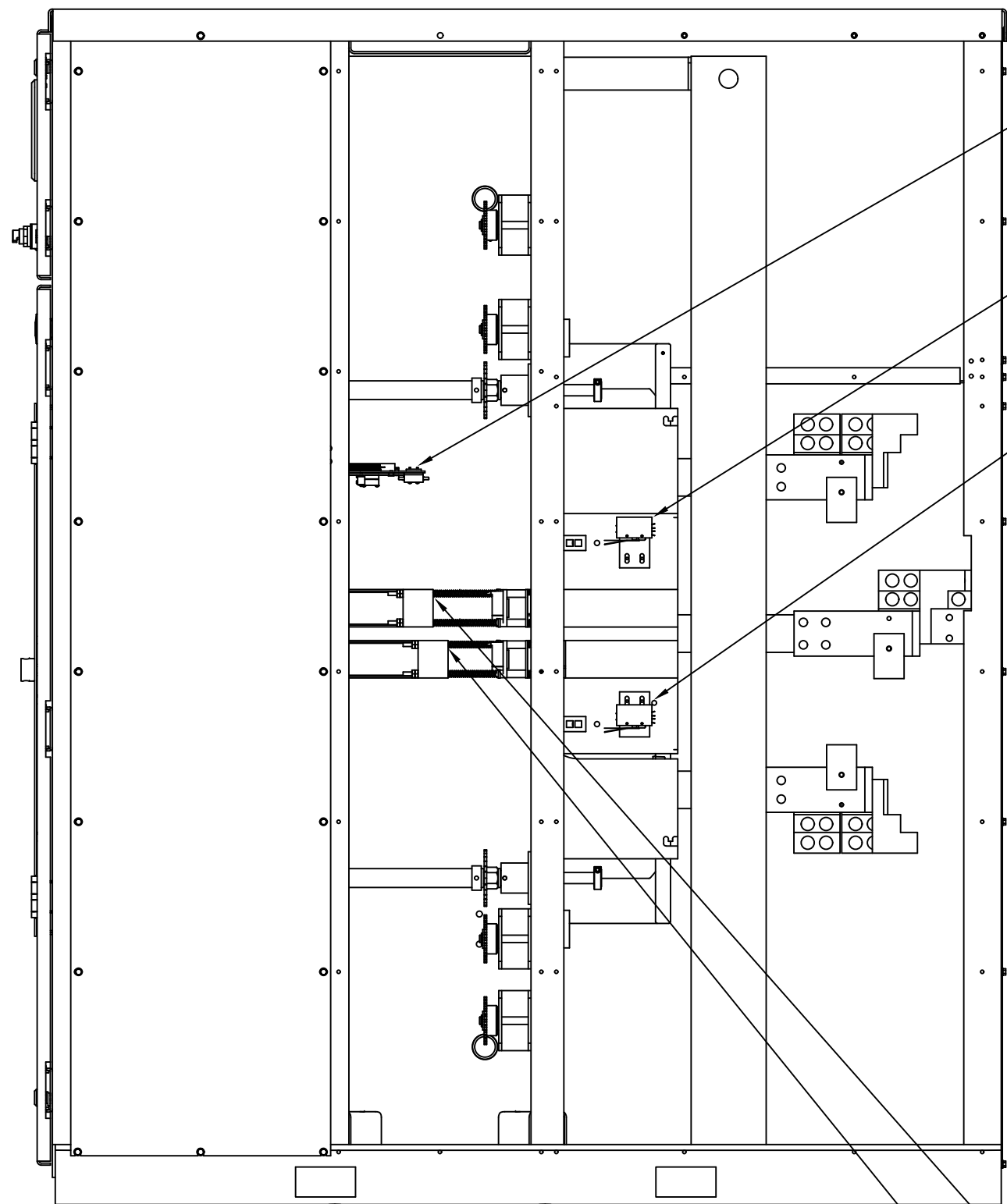
AUTOMATIC TRANSFER SWITCH
 WIRE NUMBERING CHART

LIMIT SWITCHES	COM	NC	NO
SN-1	25ZA		26
SN-2	65	87	85
SE-1	25ZA		36
SE-2	65	87	86
A4-1	A41C		A4-1
A4-2	A42C		A4-2
A3-1	A31C		A3-1
A3-2	A32C		A3-2



FOR ADDITIONAL INFO REFER TO		SIGNATURES	DATE	ABB
APPLIED PRACTICES UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		MODEL MAS	07/12/21	
TOLERANCES ON:		CHECKED		TITLE
2 PL. DECIMALS ± .020		ENGRG MAS	07/12/21	Mechanical Layout
3 PL. DECIMALS ± .005		QUALITY		Automatic Transfer Switch
ANGLES ± 1'		ISSUED		FIRST MADE FOR: ABB for ZENITH
FRACTIONS ± 1/64		DRAWING FILE:		SIZE CAGE CODE DWG NO
FINISH ✓		MODEL / ASSEMBLY FILE:		D 50A-1208
AutoCad Generated	# CTOs	CRITICAL TO QUALITY CHARACTERISTIC	SCALE: -	SHEET 6 of 17

Article or Material Must Conform to REACH Procedure S1900000 Sec.14
 Article or Material Must Conform to RoHS Procedure S1900000 Sec.13
 Part Must Conform to S1900000 Sec.4 Toxicity Procedure
 Geometric Dimensioning & Tolerancing as per ASME Y14.5-2009

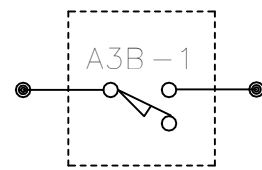
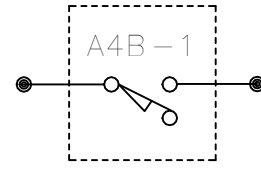


AA
 AE
 AI
 AT

AB4-1,2,3
 A4B-1

AB3-1,2,3,4,5
 A3B-1

TP2
 TP1



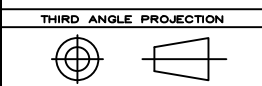
BYPASS ISOLATION / INTERLOCK LOGIC
 LIMIT SWITCH ACTUATION CHART

X = ACTUATED	ATS LOCATION				BYPASS POSITION	
	AUTO	TEST	ISO	REMOVE	SOURCE 1	SOURCE 2
AA-1	X					
AA-2	X					
AE-1			X	X		
AE-2			X	X		
AI-1			X	X		
AI-2			X	X		
AT-1	X					
AT-2	X					
AB4-1					X	
AB4-2					X	
AB4-3					X	
A4B-1					X	
AB3-1						X
AB3-2						X
AB3-3						X
AB3-4						X
AB3-5						X
A3B-1						X
CH-1*	X	X	X			

*Momentary. Actuated when Isolation Crank Handle is inserted into socket for ATS isolation.

BYPASS ISOLATION / INTERLOCK LOGIC
 WIRE NUMBERING CHART

LIMIT SWITCHES	COM	NC	NO
AA-1	60		61
AA-2	62	83C	87
AE-1	E11	11	11R
AE-2	E13	13	13R
AI-1	80		83C
AI-2	80		89
AT-1	80		83C
AT-2	80		88
AB4-1	63		61
AB4-2	80	83A	85
AB4-3	80		85A
A4B-1	CA4B		A4B-1
AB3-1	64		60
AB3-2	83A	83C	86
AB3-3	E12		E11
AB3-4	E12A	12A	
AB3-5	80		86A
A3B-1	CA3B		A3B-1
CH-1	87	87A	

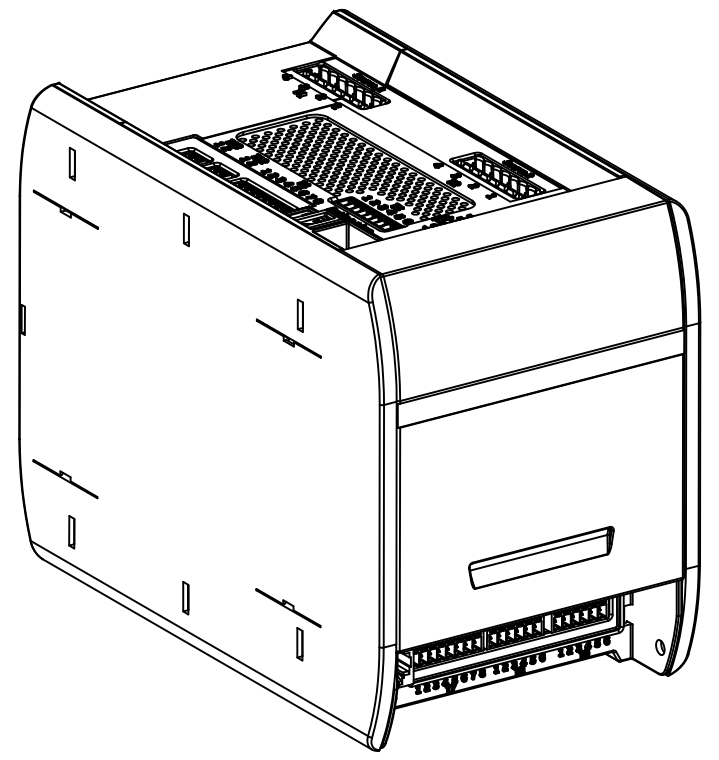
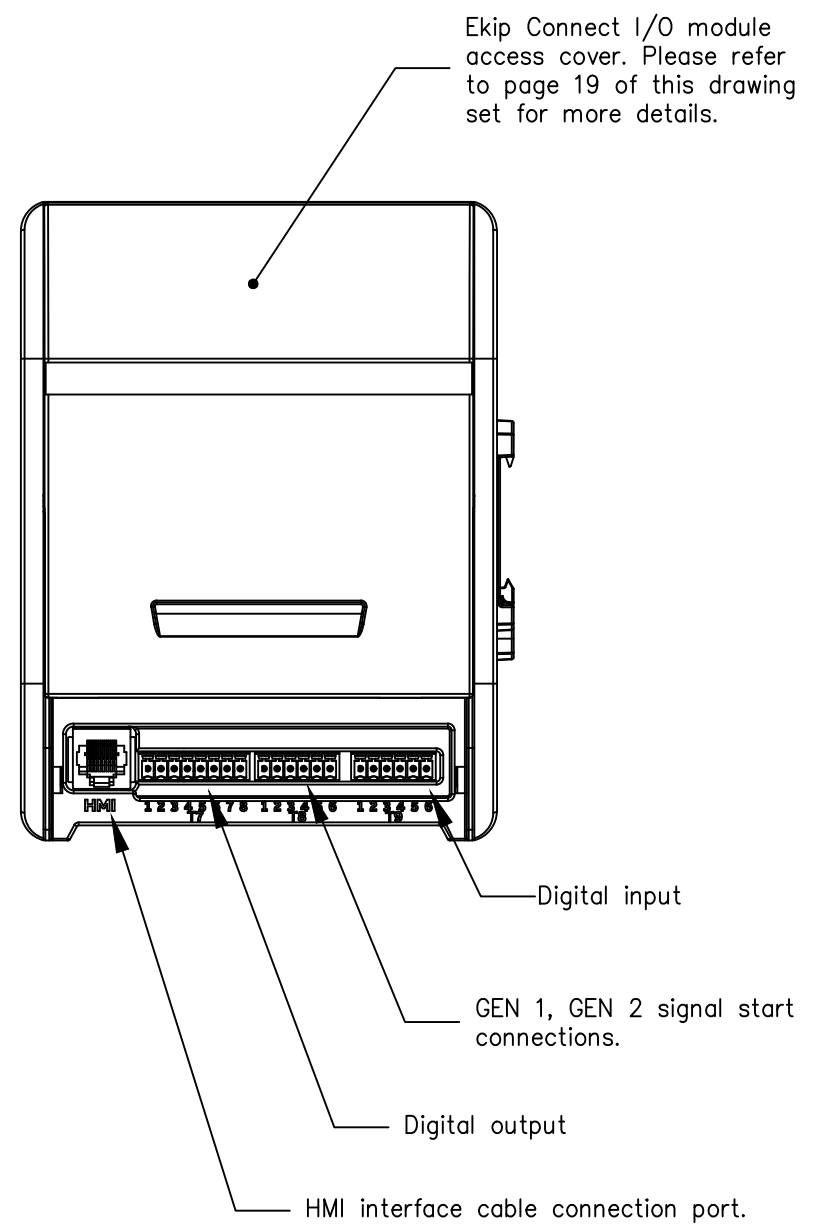
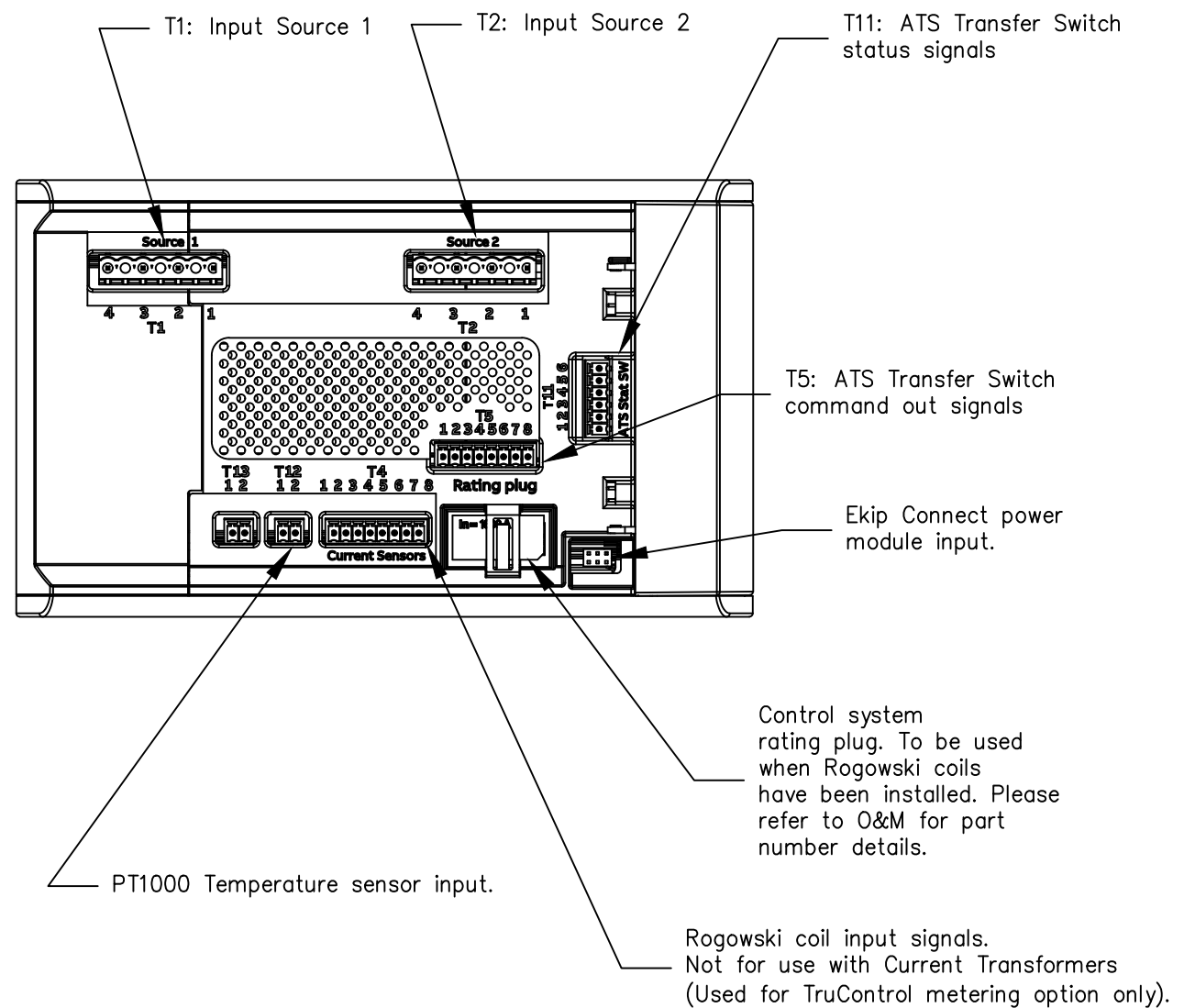
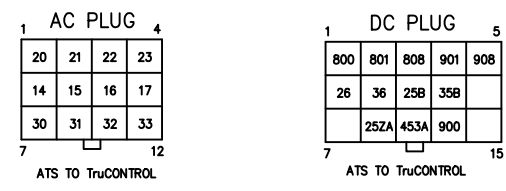
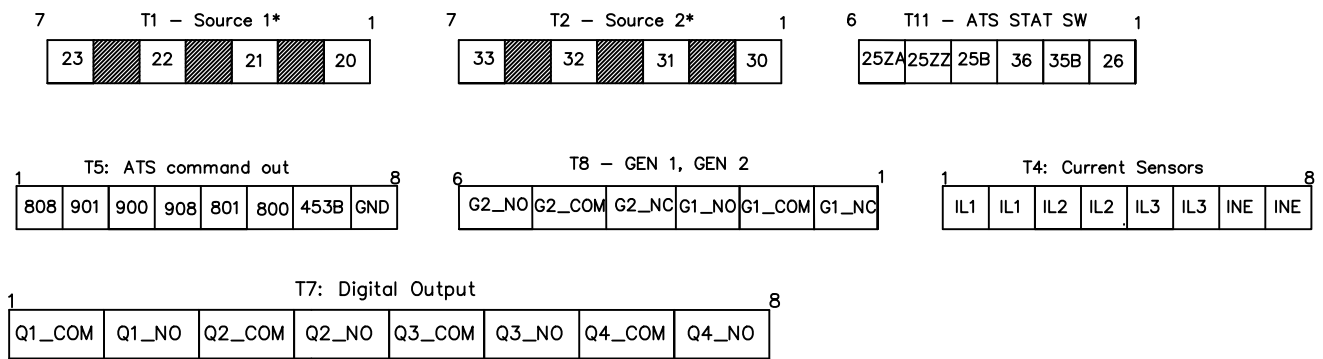


FOR ADDITIONAL INFO REFER TO	SIGNATURES	DATE	ABB
APPLIED PRACTICES UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	MODEL MAS	07/12/21	
TOLERANCES ON:	CHECKED	TITLE	Mechanical Layout Bypass Isolation Panel
2 PL. DECIMALS ± .020	ENGRG MAS	07/12/21	
3 PL. DECIMALS ± .005	MFG		FIRST MADE FOR: ABB for ZENITH
ANGLES ± 1'	QUALITY		SIZE CAGE CODE DWG NO
FRACTIONS ± 1/64	ISSUED		D 50A-1208
FINISH ✓	DRAWING FILE:		SCALE: - SHEET 7 of 17
AutoCad Generated	MODEL / ASSEMBLY FILE:		
# CTOs	CRITICAL TO QUALITY CHARACTERISTIC		

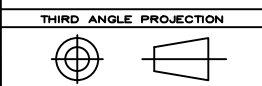
Article or Material Must Conform to REACH Procedure S1900000 Sec.14
 Article or Material Must Conform to RoHS Procedure S1900000 Sec.13
 Part Must Conform to ISO90000 Sec.4 Tolerancing Procedure
 Geometric Dimensioning & Tolerancing as per ASME Y14.5-2009

STANDARD PLUG CONNECTION SCHEME – LOCATED ON TRU CONTROLLER

STANDARD PLUG CONNECTION SCHEME – LOCATED ON R5 ATS TO T1 INTERFACE HARNESS

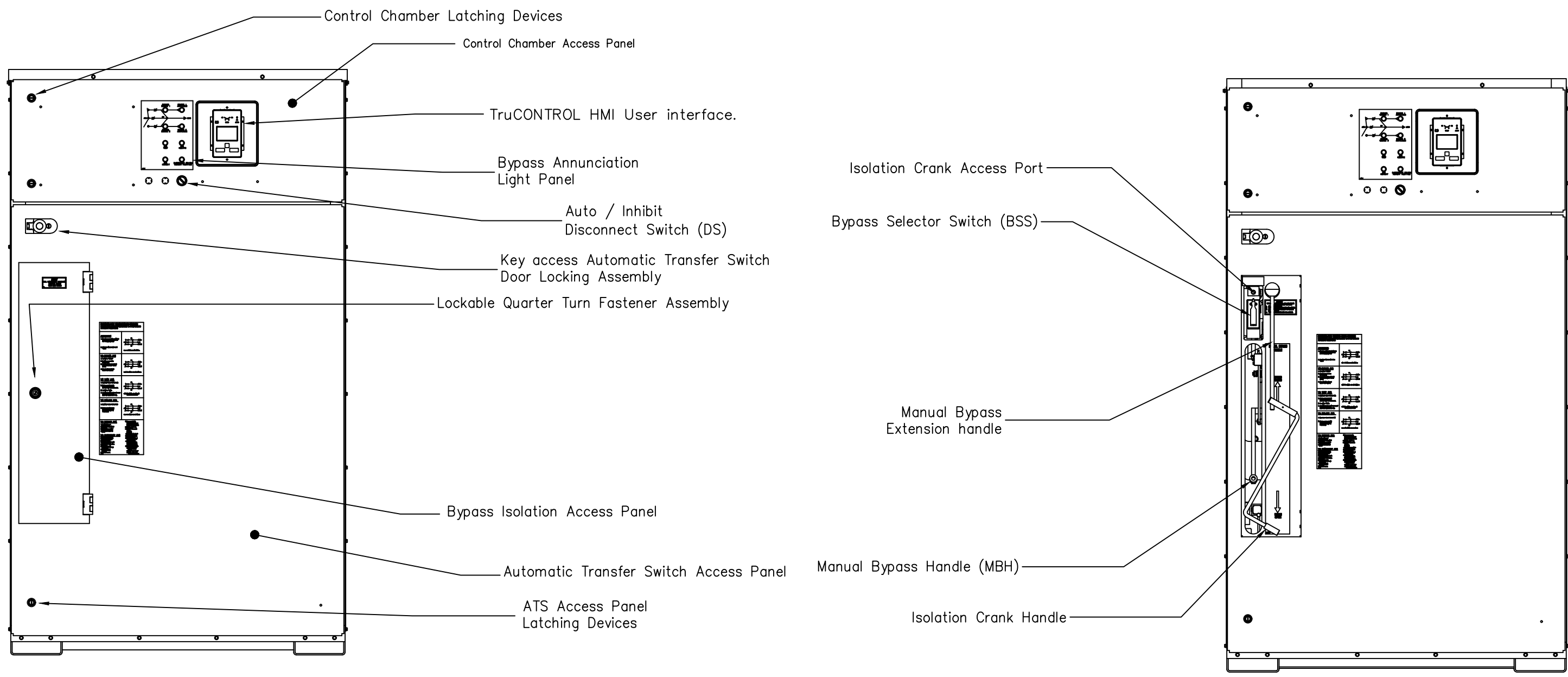


- Notes:
- 1) ABB Zenith TruControl is a fully integrated electrical module that has no field replaceable components. Units that are not operating as intended will require complete replacement. Any attempts to perform hardware repair or maintenance of internal components is not recommended.
 - 2) * See pages 12 and 14 for single phase installations. Adaptor harness modifications will be necessary prior to making final connections.

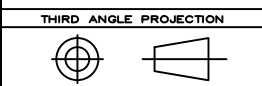


FOR ADDITIONAL INFO REFER TO		SIGNATURES	DATE	ABB
APPLIED PRACTICES UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		MODEL MAS	07/12/21	
TOLERANCES ON:		CHECKED		TITLE
2 PL. DECIMALS ± .020		ENGRG MAS	07/12/21	Tru Control System
3 PL. DECIMALS ± .005		QUALITY		ABB Integrated Controller Design
ANGLES ± 1°		ISSUED		FIRST MADE FOR: ABB for ZENITH
FRACTIONS ± 1/64		DRAWING FILE:		SIZE CAGE CODE DWG NO
FINISH ✓		MODEL / ASSEMBLY FILE:		D 50A-1208
AutoCad Generated	# CTOs	CRITICAL TO QUALITY CHARACTERISTIC	SCALE: -	SHEET 8 of 17

Article or Material Must Conform to REACH Procedure S1900000 Sec.14
 Article or Material Must Conform to RoHS Procedure S1900000 Sec.13
 Part Must Conform to S1900000 Sec.4 Toxicity Procedure
 Geometric Dimensioning & Tolerancing as per ASME Y14.5-2009

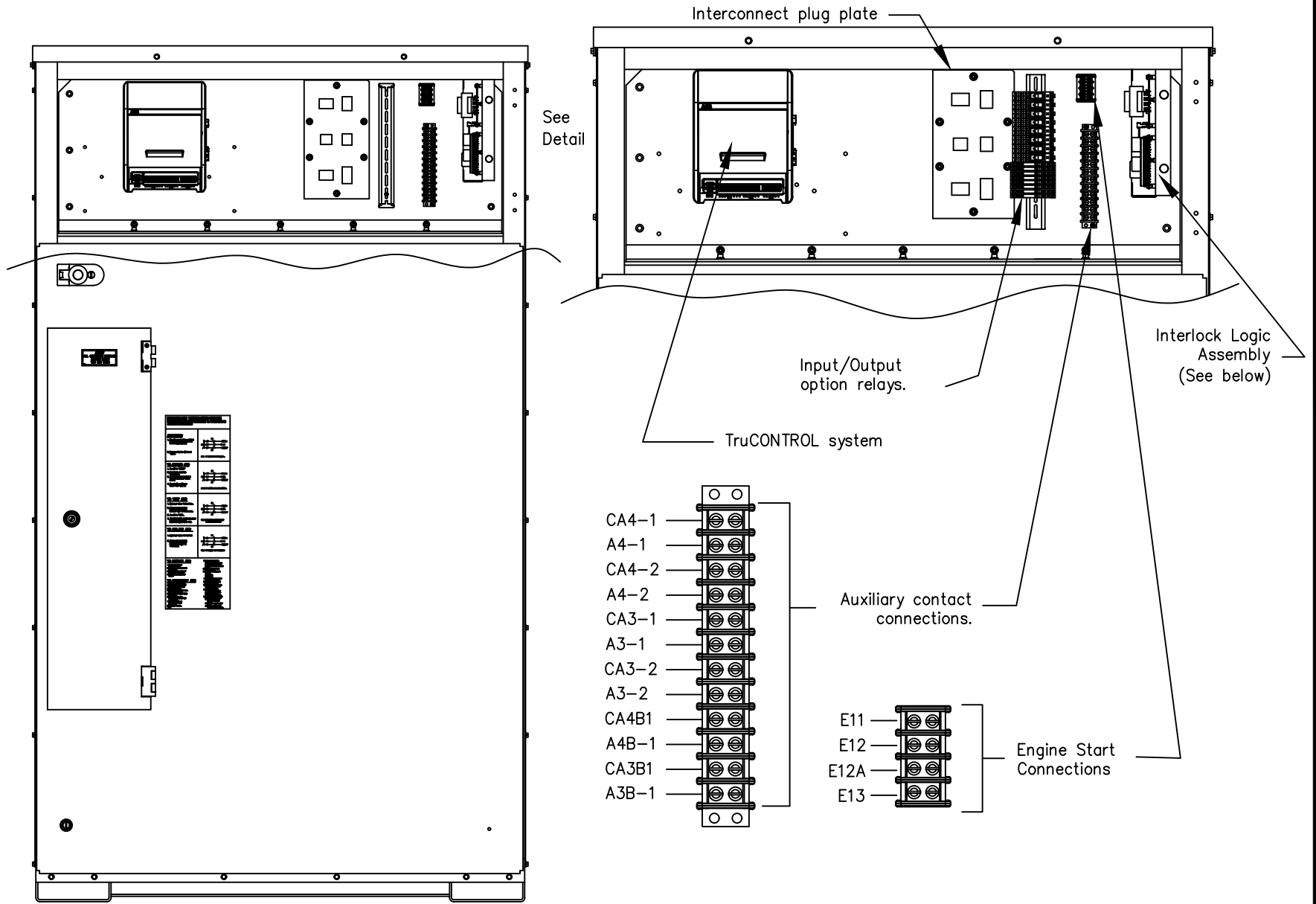


ATSE Automatic Transfer Panel Assembly
 4-Pole unit shown. 3-Pole assembly has similar construction details.
 The above views are shown for references purposes only. Component location may differ based on specific frame types / frame sizes.



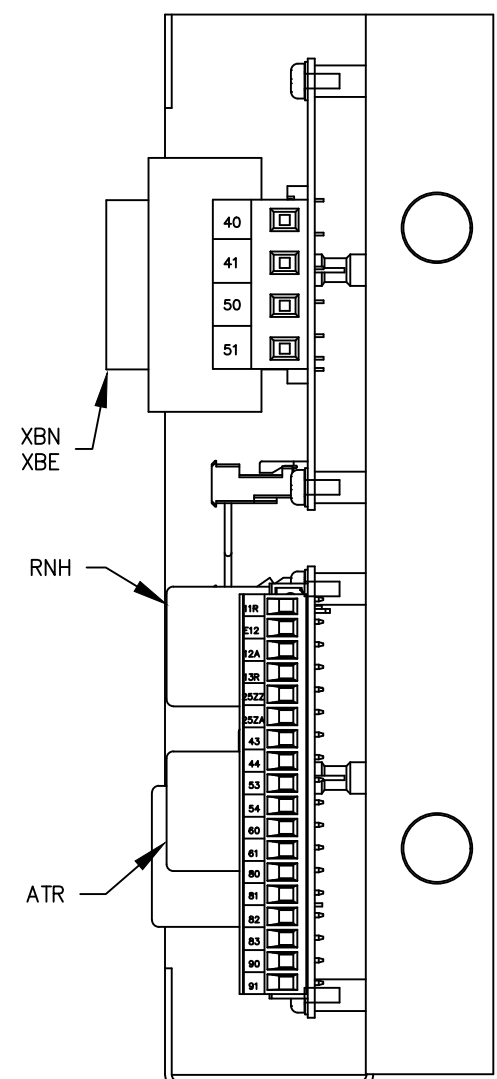
FOR ADDITIONAL INFO REFER TO		SIGNATURES		DATE	ABB
APPLIED PRACTICES	MODEL	MAS		07/12/21	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	DETAIL				TITLE
TOLERANCES ON:	CHECKED				Mechanical Layout External features
2 PL. DECIMALS ± .020	ENGRG	MAS		07/12/21	
3 PL. DECIMALS ± .005	MFG				FIRST MADE FOR: ABB for ZENITH
ANGLES ± 1°	QUALITY				SIZE CAGE CODE DWG NO
FRACTIONS ± 1/64	ISSUED				D - 50A-1208
FINISH ✓	DRAWING FILE:				SCALE: - SHEET 9 of 17
AutoCad Generated	MODEL / ASSEMBLY FILE:				
# CTOs	CRITICAL TO QUALITY CHARACTERISTIC				


BYPASS/ISOLATION TRANSFER SWITCH CUSTOMER CONNECTIONS



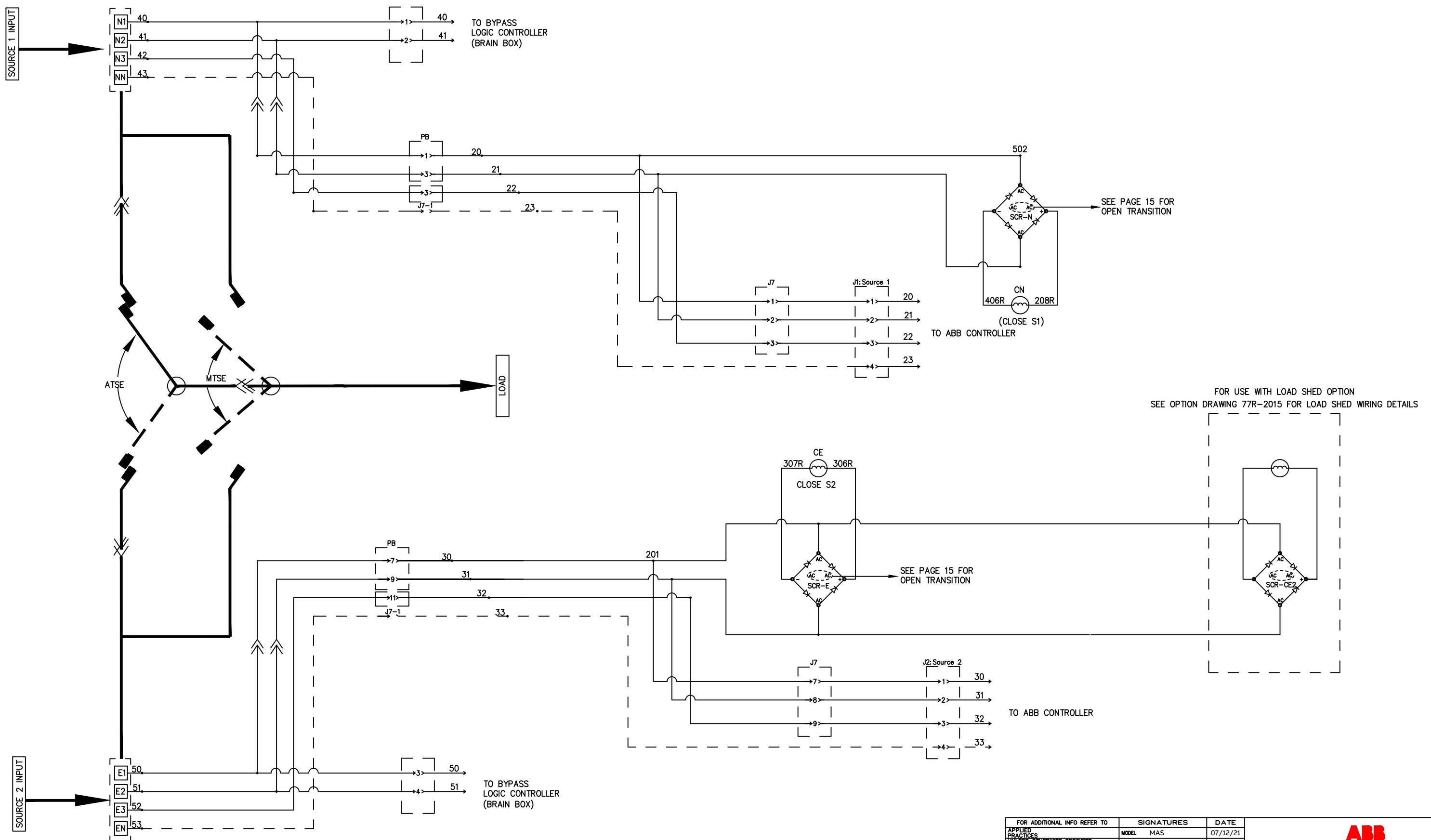
INSIDE VIEW OF CABINET DOOR

LOGIC ASSEMBLY

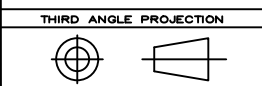


THIRD ANGLE PROJECTION	FOR ADDITIONAL INFO REFER TO APPLIED PRACTICES	SIGNATURES	DATE	
	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	MODEL MAS	07/01/07	
TOLERANCES ON: 2 PL. DECIMALS ± .020 3 PL. DECIMALS ± .005 ANGLES ± 1° FRACTIONS ± 1/64 FINISH ✓	CHECKED			TITLE
	ENGRG MAS		07/01/07	BYPASS/ISOLATION Control features
	MFG			FIRST MADE FOR:
	QUALITY			SIZE CAGE CODE DWG NO
ISSUED				B 50A-1208
AutoCad Generated	# CTQs	⊖ CRITICAL TO QUALITY CHARACTERISTIC	SCALE:	SHEET 10 of 17

Article or Material Must Conform to REACH Procedure S1900000 Sec.14
 Article or Material Must Conform to RoHS Procedure S1900000 Sec.13
 Part Must Conform to ISO9000 Sec.4 Toxicity Procedure
 Geometric Dimensioning & Tolerancing as per ASME Y14.5-2009



FOR USE WITH LOAD SHED OPTION
 SEE OPTION DRAWING 77R-2015 FOR LOAD SHED WIRING DETAILS



FOR ADDITIONAL INFO REFER TO	SIGNATURES	DATE	TITLE				
APPLIED PRACTICES	MODEL MAS	07/12/21	<div style="text-align: center;">ABB</div> 3Ø ELECTRICAL DIAGRAM ABB Integrated Controller Design				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	DETAIL						
TOLERANCES ON:	CHECKED						
2 PL. DECIMALS ± .020	ENGRG MAS	07/12/21					
3 PL. DECIMALS ± .005	QUALITY						
ANGLES ± 1'	ISSUED		FIRST MADE FOR: ABB For ZENITH	SIZE	CAGE CODE	DWG NO	
FRACTIONS ± 1/64	DRAWING FILE:		D			50A-1208	
FINISH ✓	MODEL / ASSEMBLY FILE:						
AutoCad Generated	# CTOs	⊕ CRITICAL TO QUALITY CHARACTERISTIC	SCALE:			SHEET	11 of 19

Article or Material Must Conform to REACH Procedure S1900000 Sec.14
 Article or Material Must Conform to RoHS Procedure S1900000 Sec.13
 Part Must Conform to S1900000 Sec.4 Toxicity Procedure
 Geometric Dimensioning & Tolerancing as per ASME Y14.5-2009



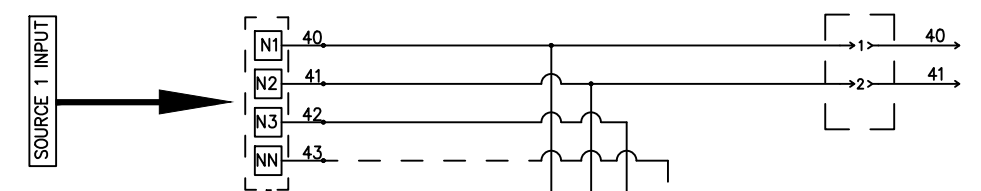
T1:Source 1 - Before Mods T2:Source 2 - Before Mods

Instructions for adaptor harness modifications on single phase systems.

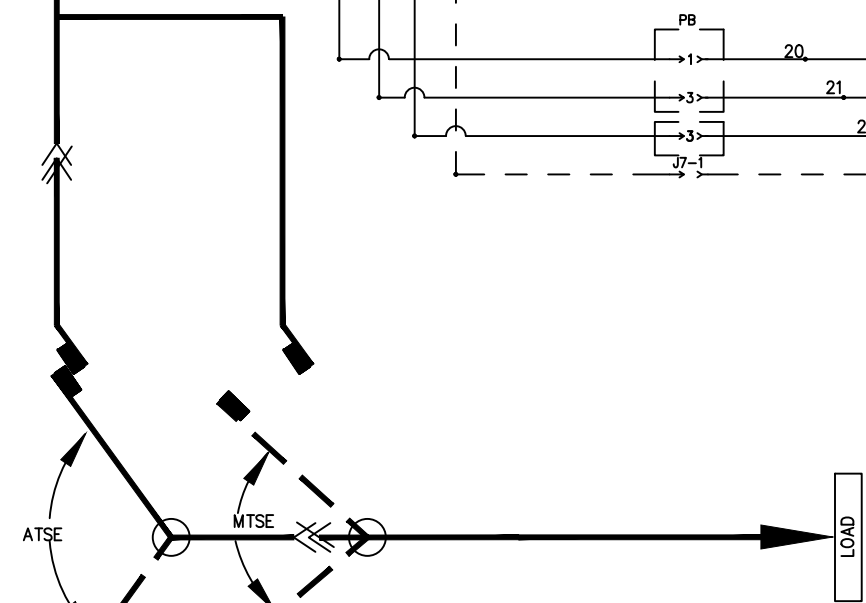
- 1) Remove wire 22 from point 3 in T1 connector. Cap the wire end with non-conductive electrical tape or equivalent. Ensure that the capping device will stay in place and not fall off over time. This wire will not be used in single phase applications.
- 2) Remove wire 21 from point 2 in T1 connector and position it in vacated point 3.
- 3) Remove wire 20 from point 1 in T1 connector and position it in vacated point 2.
- 4) Remove wire 32 from point 3 in T2 connector. Cap the wire end with non-conductive electrical tape or equivalent. Ensure that the capping device will stay in place and not fall off over time. This wire will not be used in single phase applications.
- 5) Remove wire 21 from point 2 in T2 connector and position it in vacated point 3.
- 6) Remove wire 20 from point 1 in T2 connector and position it in vacated point 2.
- 7) Verify that all wire screws have been hand tightened.
- 8) Verify that there are no loose for free wire strands that can come into contact with the adjacent wire leads.
- 9) The resultant connectors (after mods) should appear as shown in the images below.



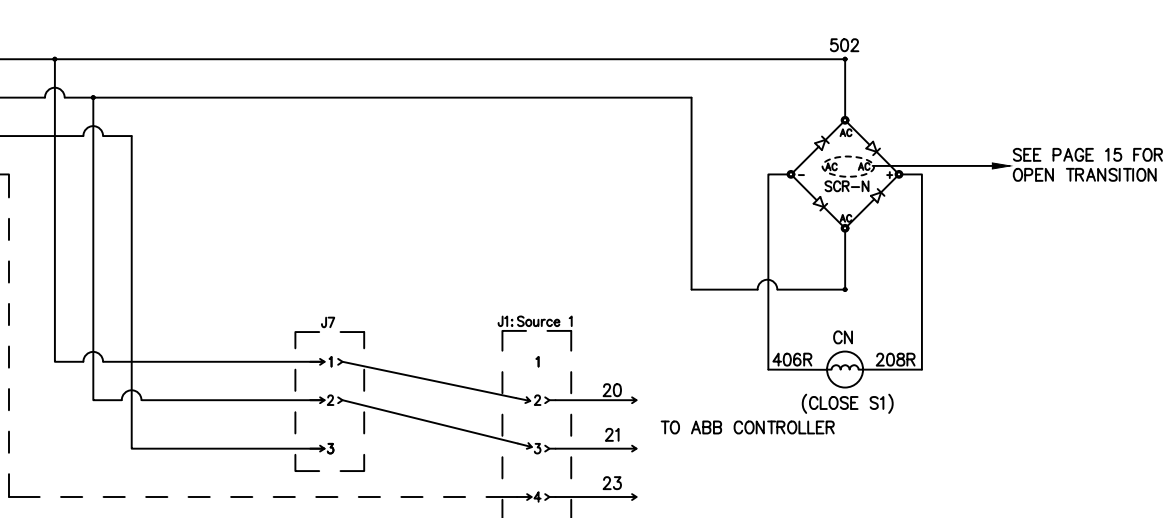
T1:Source 1 - After Mods T2:Source 2 - After Mods



TO BYPASS LOGIC CONTROLLER (BRAIN BOX)

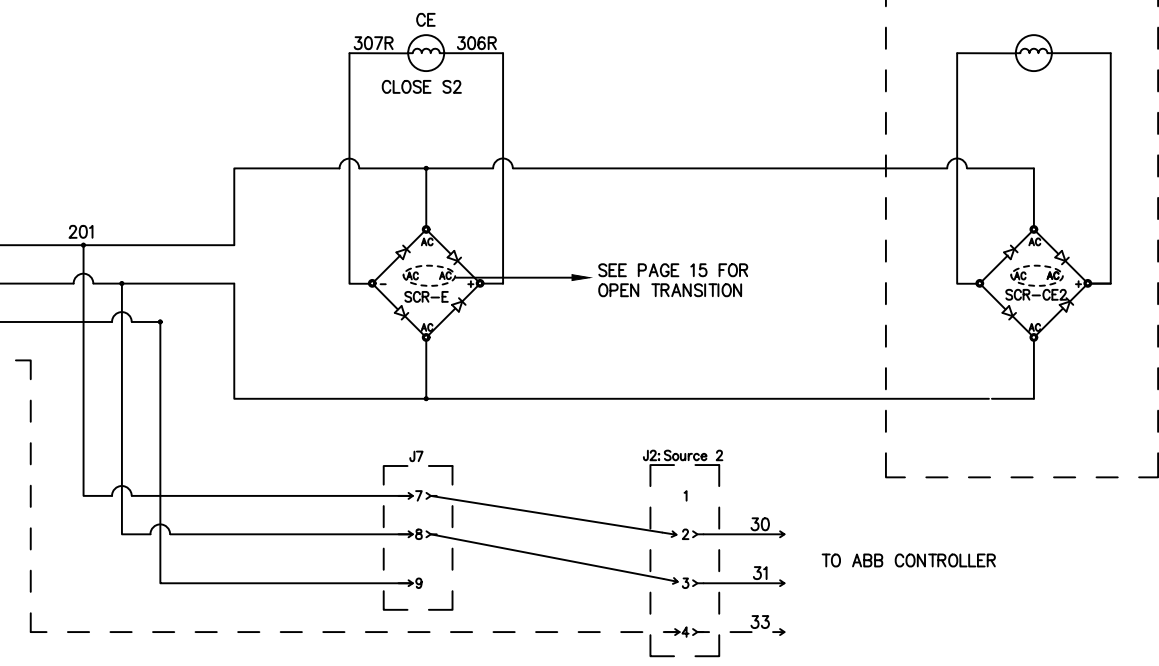


LOAD

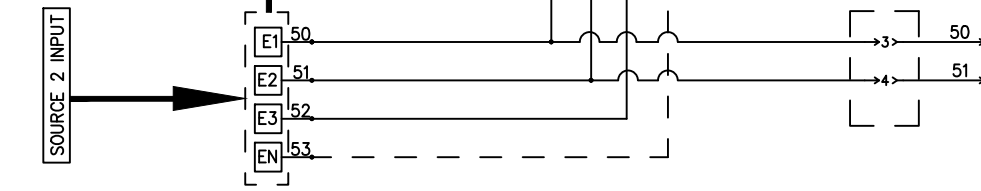


TO ABB CONTROLLER

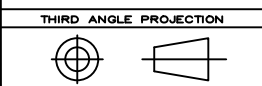
FOR USE WITH LOAD SHED OPTION
 SEE OPTION DRAWING 77R-2015 FOR LOAD SHED WIRING DETAILS



TO ABB CONTROLLER



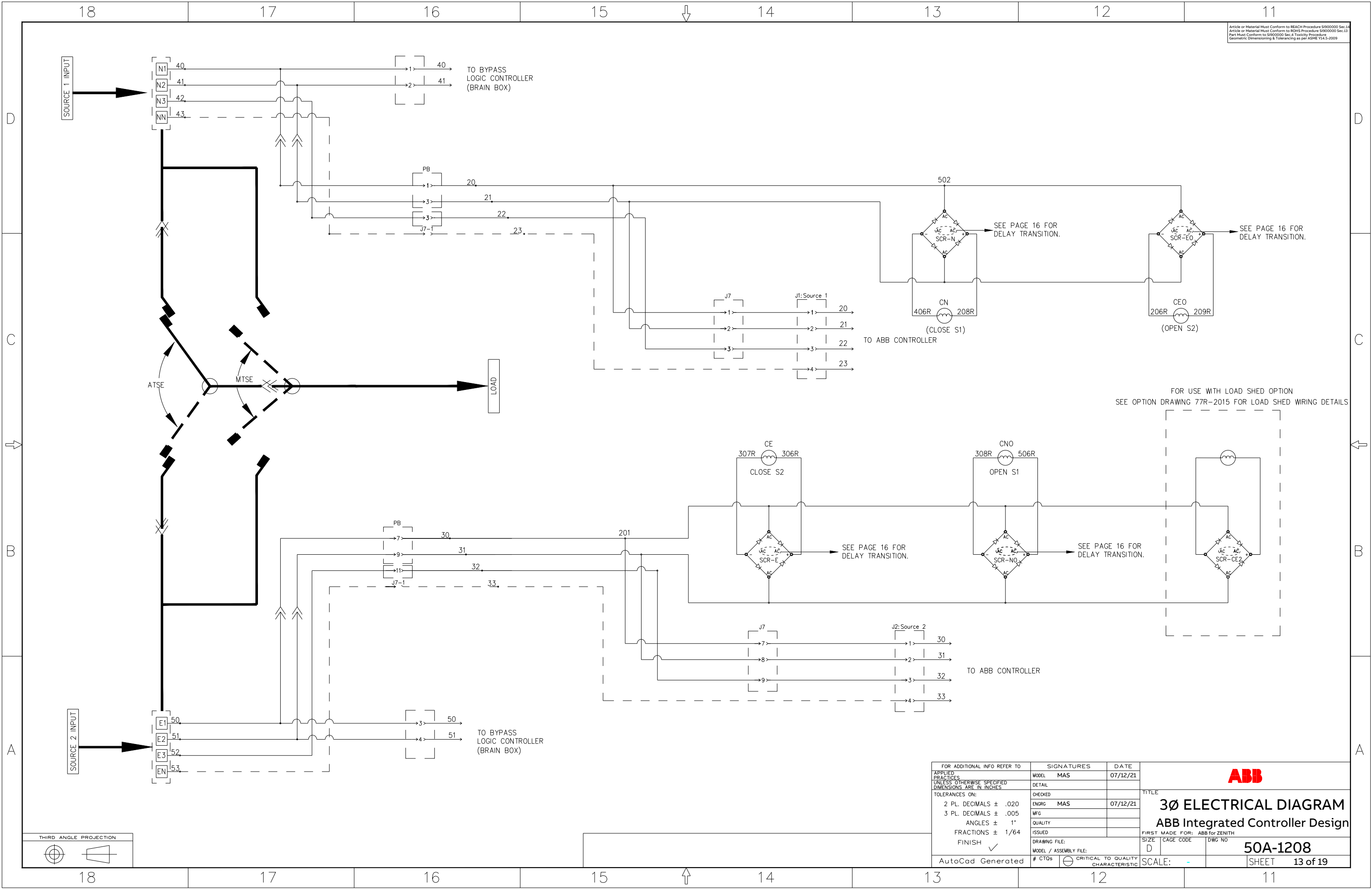
TO BYPASS LOGIC CONTROLLER (BRAIN BOX)



THIRD ANGLE PROJECTION

FOR ADDITIONAL INFO REFER TO	SIGNATURES	DATE	ABB
APPLIED PRACTICES	MODEL MAS	07/12/21	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	DETAIL		
TOLERANCES ON:	CHECKED		
2 PL. DECIMALS ± .020	ENGRG MAS	07/12/21	
3 PL. DECIMALS ± .005	QUALITY		TITLE
ANGLES ± 1'	ISSUED		1Ø ELECTRICAL DIAGRAM
FRACTIONS ± 1/64	DRAWING FILE:		ABB Integrated Controller Design
FINISH ✓	MODEL / ASSEMBLY FILE:		FIRST MADE FOR: ABB for ZENITH
AutoCad Generated	# CTOs	⊕ CRITICAL TO QUALITY CHARACTERISTIC	SCALE: -
			SIZE CAGE CODE DWG NO
			D 50A-1208
			SHEET 12 of 19

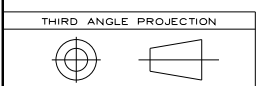
Article or Material Must Conform to REACH Procedure S1900000 Sec.13
 Article or Material Must Conform to RoHS Procedure S1900000 Sec.13
 Part Must Conform to S1900000 Sec.A Toxicity Procedure
 Geometric Dimensioning & Tolerancing as per ASME Y14.5-2009



FOR USE WITH LOAD SHED OPTION
 SEE OPTION DRAWING 77R-2015 FOR LOAD SHED WIRING DETAILS

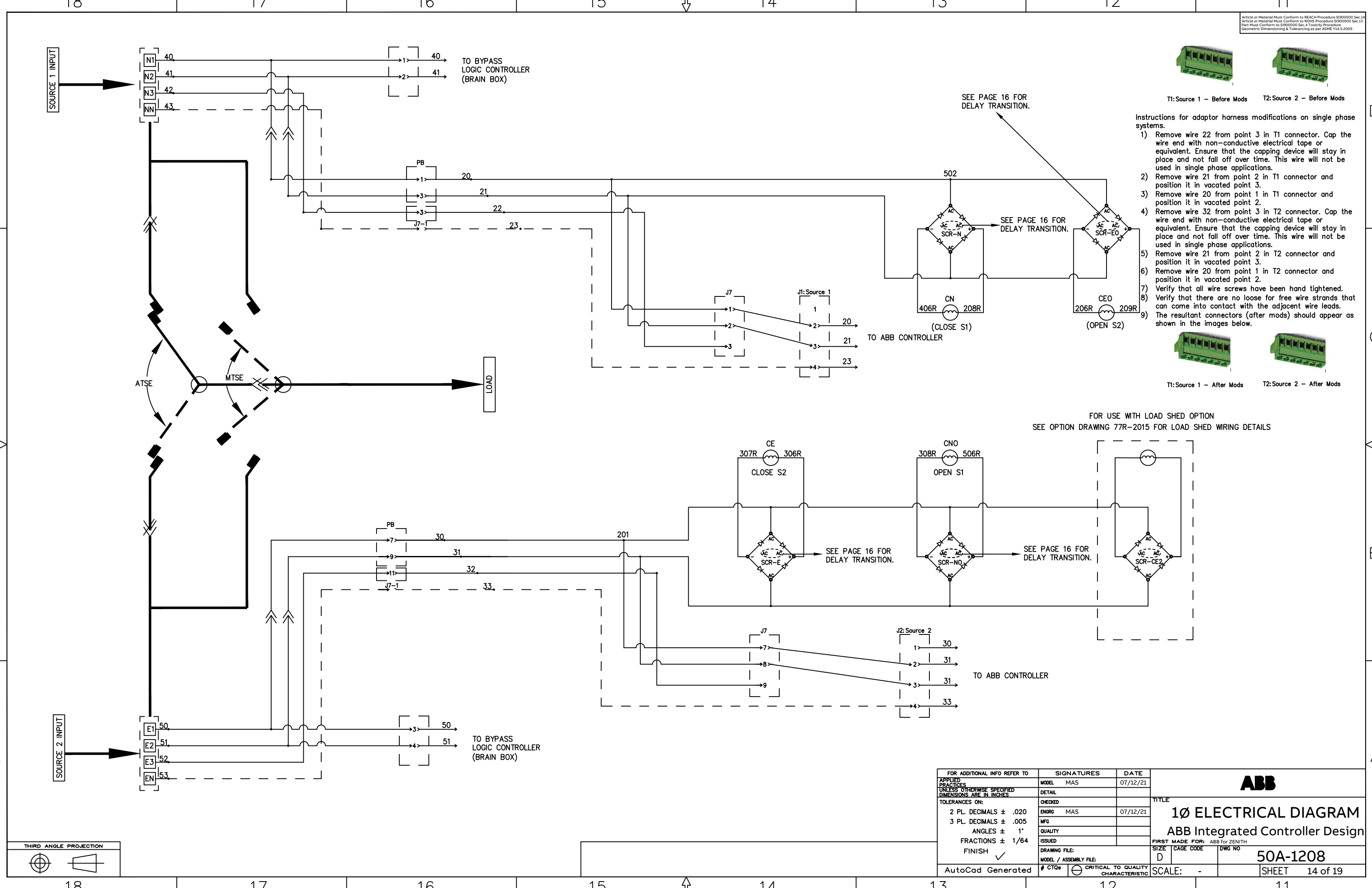
FOR ADDITIONAL INFO REFER TO	SIGNATURES	DATE
APPLIED PRACTICES	MODEL MAS	07/12/21
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.	DETAIL	
TOLERANCES ON:	CHECKED	
2 PL. DECIMALS ± .020	ENGRG MAS	07/12/21
3 PL. DECIMALS ± .005	MFG	
ANGLES ± 1°	QUALITY	
FRACTIONS ± 1/64	ISSUED	
FINISH ✓	DRAWING FILE:	
	MODEL / ASSEMBLY FILE:	
	# CTOs	

TITLE		
ABB		
3Ø ELECTRICAL DIAGRAM		
ABB Integrated Controller Design		
FIRST MADE FOR:	ABB for ZENITH	
SIZE	D	DWG NO
		50A-1208
SCALE:		SHEET 13 of 19



AutoCad Generated

CRITICAL TO QUALITY CHARACTERISTIC



T1: Source 1 - Before Mods T2: Source 2 - Before Mods

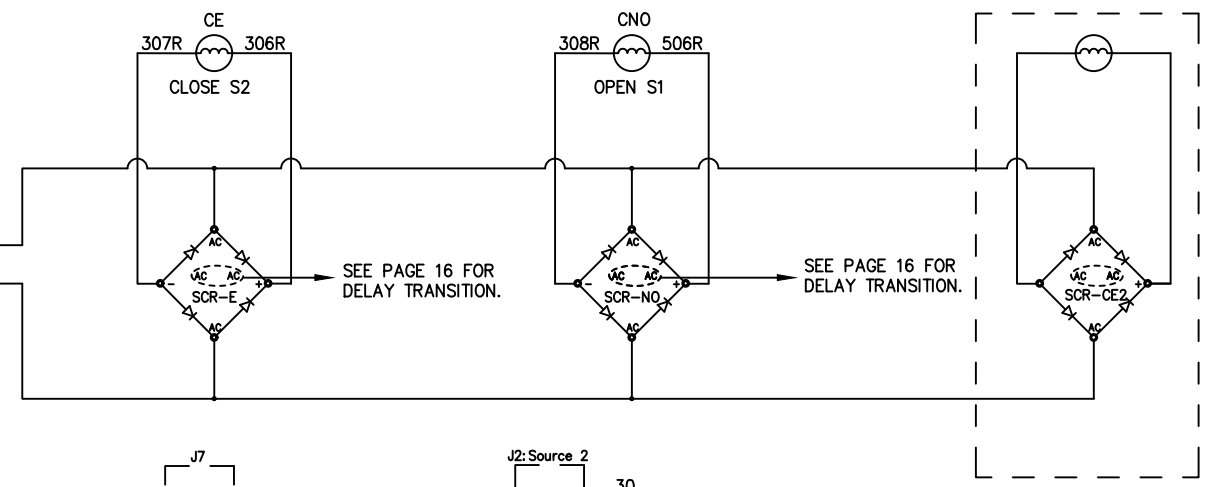
Instructions for adaptor harness modifications on single phase systems.

- 1) Remove wire 22 from point 3 in T1 connector. Cap the wire end with non-conductive electrical tape or equivalent. Ensure that the capping device will stay in place and not fall off over time. This wire will not be used in single phase applications.
- 2) Remove wire 21 from point 2 in T1 connector and position it in vacated point 3.
- 3) Remove wire 20 from point 1 in T1 connector and position it in vacated point 2.
- 4) Remove wire 32 from point 3 in T2 connector. Cap the wire end with non-conductive electrical tape or equivalent. Ensure that the capping device will stay in place and not fall off over time. This wire will not be used in single phase applications.
- 5) Remove wire 21 from point 2 in T2 connector and position it in vacated point 3.
- 6) Remove wire 20 from point 1 in T2 connector and position it in vacated point 2.
- 7) Verify that all wire screws have been hand tightened.
- 8) Verify that there are no loose for free wire strands that can come into contact with the adjacent wire leads.
- 9) The resultant connectors (after mods) should appear as shown in the images below.

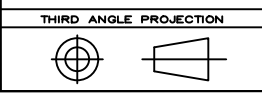


T1: Source 1 - After Mods T2: Source 2 - After Mods

FOR USE WITH LOAD SHED OPTION
 SEE OPTION DRAWING 77R-2015 FOR LOAD SHED WIRING DETAILS

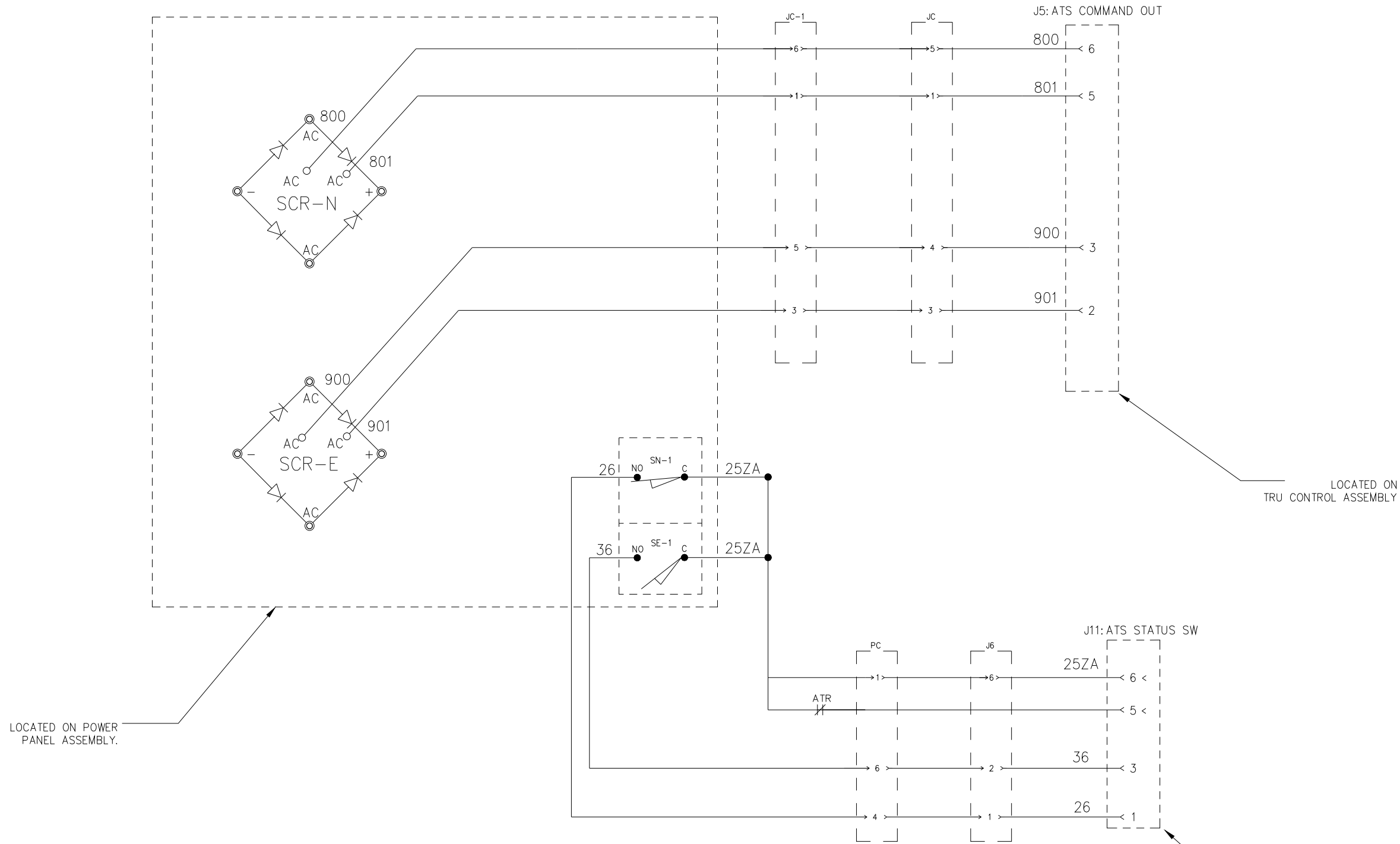


FOR ADDITIONAL INFO REFER TO	SIGNATURES	DATE	
APPLIED PRACTICES UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	MODEL MAS	07/12/21	
TOLERANCES ON:	CHECKED		
2 PL. DECIMALS ± .020	ENGRG MAS	07/12/21	
3 PL. DECIMALS ± .005	QUALITY		TITLE
ANGLES ± 1°	ISSUED		1Ø ELECTRICAL DIAGRAM
FRACTIONS ± 1/64	DRAWING FILE:		ABB Integrated Controller Design
FINISH ✓	MODEL / ASSEMBLY FILE:		FIRST MADE FOR: ABB for ZENITH
AutoCad Generated	# CTOs	⊗ CRITICAL TO QUALITY CHARACTERISTIC	SCALE: -
			SIZE CAGE CODE DWG NO
			D 50A-1208
			SHEET 14 of 19



Article or Material Must Conform to REACH Procedure S1900000 Sec.14
 Article or Material Must Conform to RoHS Procedure S1900000 Sec.13
 Part Must Conform to ISO90000 Sec.4 Toxicity Procedure
 Geometric Dimensioning & Tolerancing as per ASME Y14.5-2009

OPEN TRANSITION POWER PANEL COMPONENT DIAGRAM

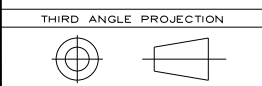


**AUTOMATIC TRANSFER SWITCH
LIMIT SWITCH ACTUATION CHART**

X = ACTUATED

	ATS CONTACT LOCATION	
	SOURCE 1	SOURCE 2
SN-1	X	
SE-1		X

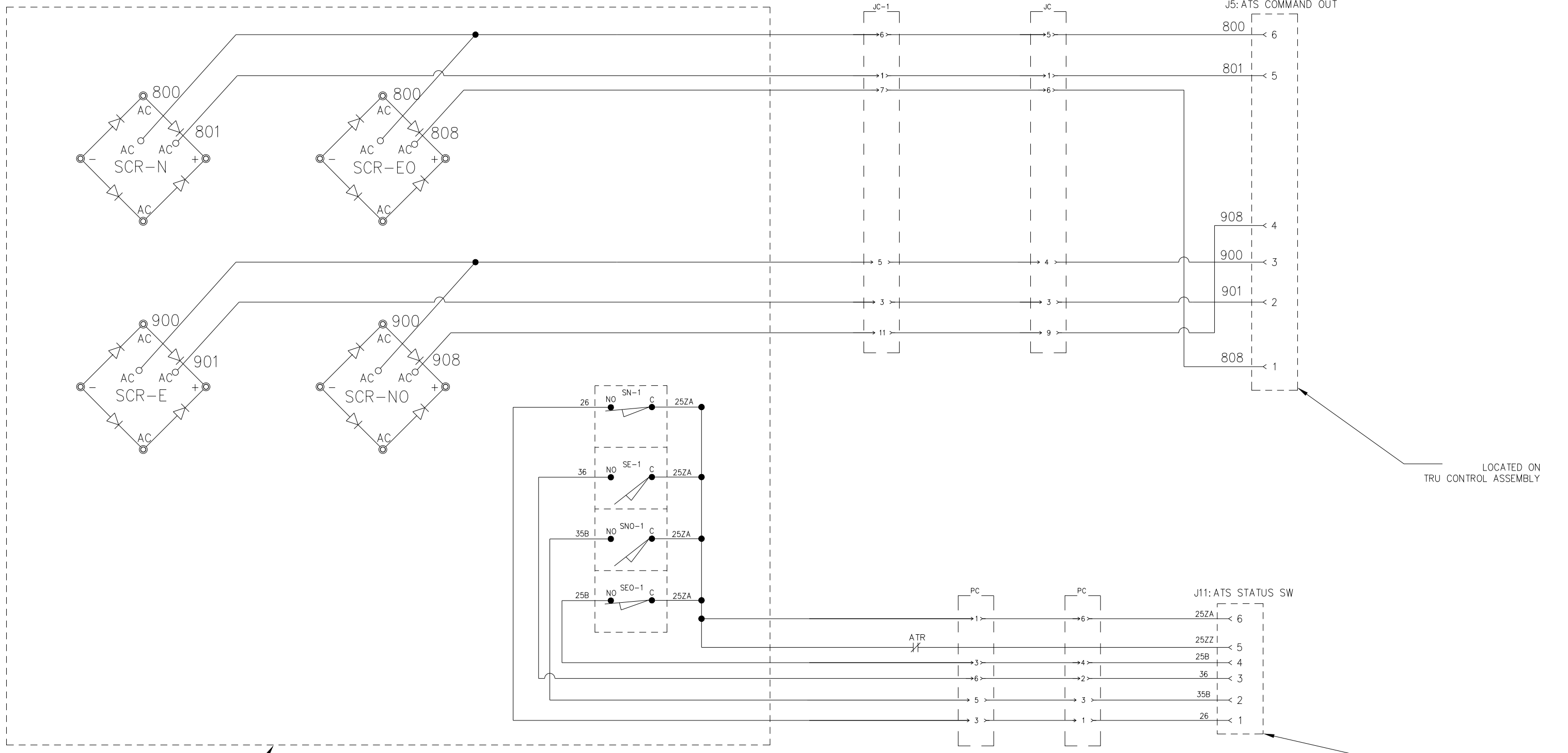
NOTES:
 1) ATS SHOWN IN SOURCE 1 POSITION WITH NO POWER AVAILABLE



FOR ADDITIONAL INFO REFER TO	SIGNATURES	DATE	ABB
APPLIED PRACTICES UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	MODEL MAS	07/12/21	
TOLERANCES ON:	CHECKED		TITLE
2 PL. DECIMALS ± .020	ENGRG MAS	07/12/21	Open Trans. System dia.
3 PL. DECIMALS ± .005	QUALITY		ABB Integrated Controller Design
ANGLES ± 1'	ISSUED		FIRST MADE FOR: ABB for ZENITH
FRACTIONS ± 1/64	DRAWING FILE:		SIZE CAGE CODE DWG NO
FINISH ✓	MODEL / ASSEMBLY FILE:		50A-1208
AutoCad Generated	# CTO's	CRITICAL TO QUALITY CHARACTERISTIC	SCALE: - SHEET 15 of 19

Article or Material Must Conform to REACH Procedure S1900000 Sec.14
 Article or Material Must Conform to RoHS Procedure S1900000 Sec.13
 Part Must Conform to S1900000 Sec.4 Toxicity Procedure
 Geometric Dimensioning & Tolerancing as per ASME Y14.5-2009

DELAY TRANSITION POWER PANEL COMPONENT DIAGRAM



LOCATED ON POWER PANEL ASSEMBLY.

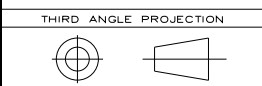
LOCATED ON TRU CONTROL ASSEMBLY

LOCATED ON TRU CONTROL ASSEMBLY

AUTOMATIC TRANSFER SWITCH
 LIMIT SWITCH ACTUATION CHART - Delay Trans.

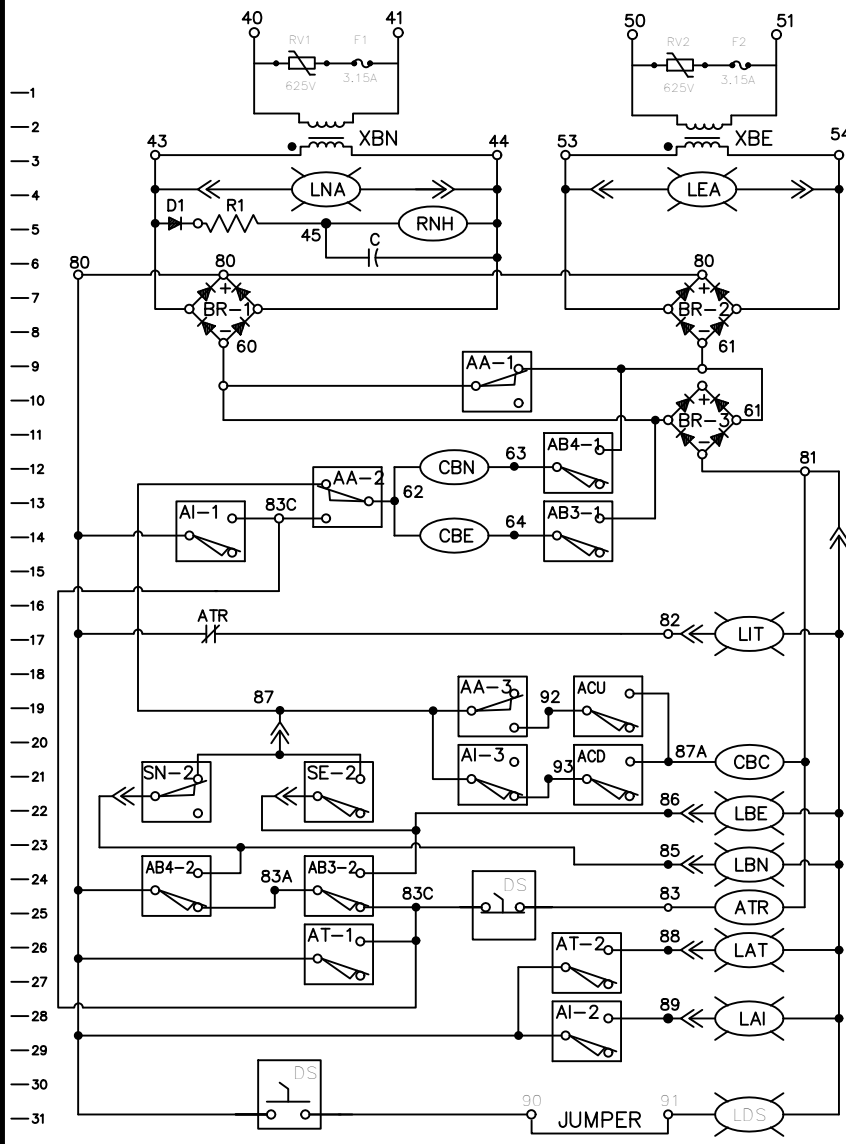
X = ACTUATED	ATS CONTACT LOCATION		
	SOURCE 1	OPEN	SOURCE 2
SN-1	X		
SNO-1		X	X
SEO-1	X	X	
SE-1			X

NOTES;
 1) ATS SHOWN IN SOURCE 1 POSITION WITH NO POWER AVAILABLE



FOR ADDITIONAL INFO REFER TO APPLIED PRACTICES UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	SIGNATURES MODEL MAS	DATE 07/12/21	TITLE Delay Trans. system diag. ABB Integrated Controller Design
TOLERANCES ON: 2 PL. DECIMALS ± .020 3 PL. DECIMALS ± .005 ANGLES ± 1° FRACTIONS ± 1/64 FINISH ✓	CHECKED ENGRG MAS MFG QUALITY	07/12/21	
DRAWING FILE: MODEL / ASSEMBLY FILE: AutoCad Generated	ISSUED # CTOS	CRITICAL TO QUALITY CHARACTERISTIC	FIRST MADE FOR: ABB for ZENITH SIZE D CAGE CODE DWG NO 50A-1208
SCALE: -			SHEET 16 of 19

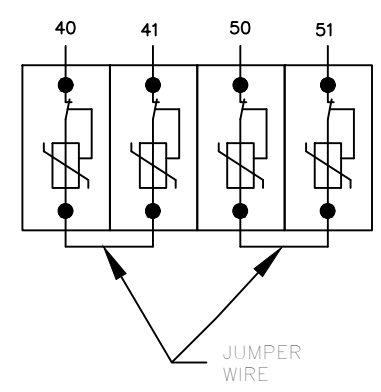
BYPASS/ISOLATION SCHEMATIC



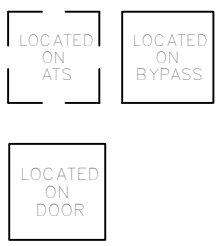
- XBN - BYPASS SOURCE 1 CONTROL TRANSFORMER
- XBE - BYPASS SOURCE 2 CONTROL TRANSFORMER
- LNA - SOURCE 1 AVAILABLE LIGHT
- LEA - SOURCE 2 AVAILABLE LIGHT
- RNH - NORMALLY HELD RELAY
- D1 - DIODE
- R1 - RESISTOR, RNH
- C - CAPACITOR, RNH
- BR-1,2,3 - BRIDGE RECTIFIER
- AA-1 - LIMIT SWITCH, ATS AUTO LOCATION
- AB4-1 - LIMIT SWITCH, BYPASS SOURCE 1
- CBN - SOURCE 1 TRANSFER OPERATOR
- AA-2 - LIMIT SWITCH, ATS IN AUTO
- AB3-1 - LIMIT SWITCH, BYPASS SOURCE 2
- CBE - SOURCE 2 TRANSFER OPERATOR
- LIT - ATS INHIBIT LIGHT
- AI-1 - LIMIT SWITCH, ATS IN ISOLATE
- AA-3 - LIMIT SWITCH, ATS IN AUTO
- ACD - LIMIT SWITCH, CRANK HANDLE
- ACU - ENGAGED
- AI-3 - LIMIT SWITCH, ATS IN ISOLATE
- CBC - CRANK SOLENOID
- LBE - LIGHT, BYPASS SOURCE 2
- LBN - LIGHT, BYPASS SOURCE 1
- AB4-2 - LIMIT SWITCH, BYPASS SOURCE 1
- AB3-2 - LIMIT SWITCH, BYPASS SOURCE 2
- ATR - AUTO/TEST RELAY
- AT-1 - LIMIT SWITCH, ATS TEST LOCATION
- LAT - ATS TEST LOCATION
- AT-2 - LIMIT SWITCH, ATS IN TEST
- LAI - ATS ISOLATE LIGHT
- AI-2 - LIMIT SWITCH, ATS IN ISOLATE
- DS - ATS DISCONNECT SWITCH
- LDS - DISCONNECT SWITCH, INHIBIT POSITION LIGHT

BYPASS/ISOLATION SCHEMATIC

600V SPD ASSEMBLY SCHEMATIC



NOTE: SPD INPUT SIGNALS TO BE WIRED FROM BYPASS SUBPANEL



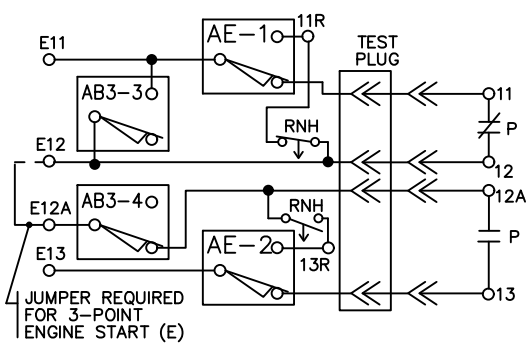
ENGINE START SCHEMATIC

ENGINE START CIRCUIT

- AE-1,2 - LIMIT SWITCH, ENGINE START TRANSFER
- AB3-3,4 - LIMIT SWITCH, BYPASS SOURCE 2



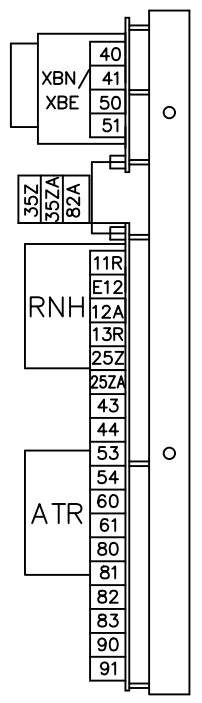
SOURCE 1/SOURCE 2 TRANSFER PERMIT CIRCUIT. (ALH IN AUTO AND TEST LOCATION WITH DS IN AUTO POSITION)



LIMIT SWITCH CHART

X = ACTUATED	ATS LOCATION				ATS MODE		BYPASS MODE	
	AUTO	TEST	ISO	REMOVE	SOURCE 1	SOURCE 2	SOURCE 1	SOURCE 2
AA	X							
AT		X						
AI			X	X				
AE			X	X				
SN					X			
SE						X		
AB 4							X	
AB 3								X

BYPASS SUBPANEL



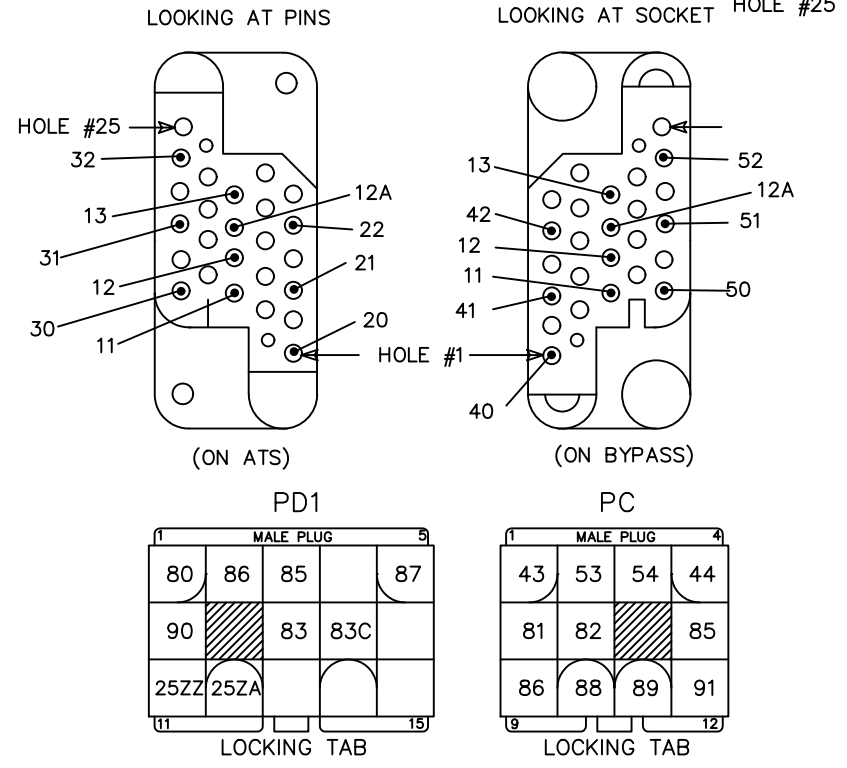
NOTES

ATS SHOWN IN SOURCE 1 POSITION WITH NO POWER AVAILABLE.

LEGEND

- WIRE CONNECTION
- WIRE ON TERMINAL BLOCK
- ⇒ WIRE IN INTERCONNECT PLUG

ATS TEST PLUG (TP)



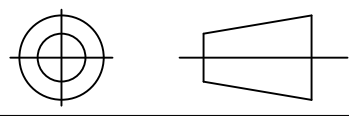
REFER TO SHEET 2 FOR INTERCONNECT PLUG DIAGRAM

FOR ADDITIONAL INFO REFER TO APPLIED PRACTICES	SIGNATURES	DATE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	MODEL MAS	07/12/21
TOLERANCES ON:	CHECKED	
2 PL. DECIMALS ± .020	ENGRG MAS	07/12/21
3 PL. DECIMALS ± .005	MFG	
ANGLES ± 1°	QUALITY	
FRACTIONS ± 1/64	ISSUED	
FINISH ✓	DRAWING FILE:	
AutoCad Generated	MODEL / ASSEMBLY FILE:	
# CTQs	⊖ CRITICAL TO QUALITY CHARACTERISTIC	



BYPASS / ISOLATION SCHEMATICS & PLUGS

FIRST MADE FOR:	SIZE	CAGE CODE	DWG NO
	B		50A-1208
SCALE:	-		SHEET 17 of 19

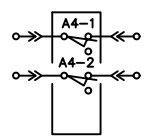


Article or Material Must Conform to REACH Procedure S1900000 Sec.14
Article or Material Must Conform to RoHS Procedure S1900000 Sec.13
Part Must Conform to S1900000 Sec.4 Toxicity Procedure
Geometric Dimensioning & Tolerancing as per ASME Y14.5-2009

**AUTOMATIC TRANSFER SWITCH
LIMIT SWITCH ACTUATION CHART**

X = ACTUATED	ATS CONTACT LOCATION		
	SOURCE 1	OPEN	SOURCE 2
A3-1,2			X
A4-1,2	X		

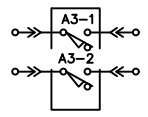
CUSTOMER AUXILIARY CONTACT SWITCHES SOURCE 1. (THIS ITEM IS LOCATED ON THE ATS PANEL)



CONTACT RATINGS

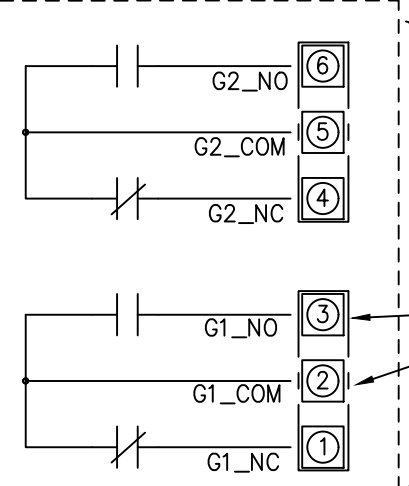
RELAY	CONTACT	RATING
P	E	5 AMP @ 250 VAC 5 AMP @ 30 VDC
AUXILIARY CONTACTS	A3, A4	15 AMP @ 125, 250 VAC

CUSTOMER AUXILIARY CONTACT SWITCHES SOURCE 2. (THIS ITEM IS LOCATED ON THE ATS PANEL)



NOTE: DIAGRAMS SHOWN WITH ATS IN SOURCE 1 POSITION AND NO POWER AVAILABLE.

(SEE PAGE 8 FOR ENGINE START CONNECTION LOCATION)

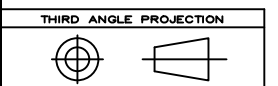


CUSTOMER ENGINE START CONTACTS

TYPICAL ENGINE CONNECTIONS.

NOTE: DIAGRAM SHOWN WITH ATS IN NORMAL POSITION WITH POWER AVAILABLE.

- NOTES**
1. ATS SHOWN IN SOURCE-1 POSITION WITH NO POWER AVAILABLE
 2. UNLESS OTHERWISE SPECIFIED ALL CUSTOMER CONNECTION WIRES TO BE MAXIMUM #16 -#14 AWG., 600 VOLTS, UL LISTED.



Ekip Connect Input / Output User Modules

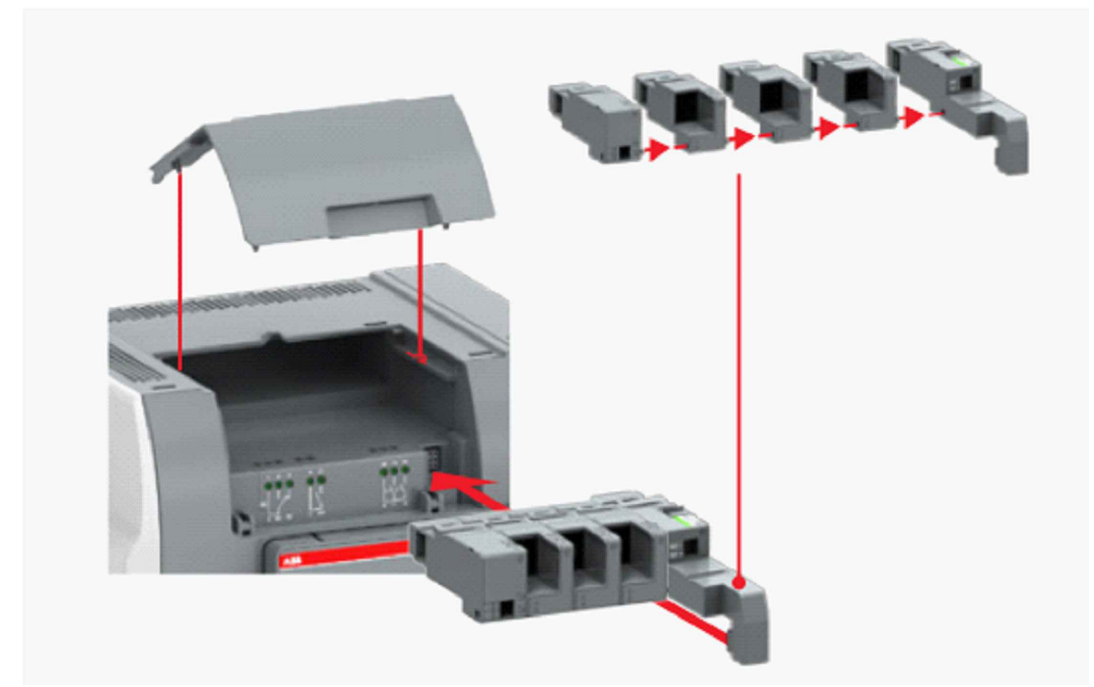
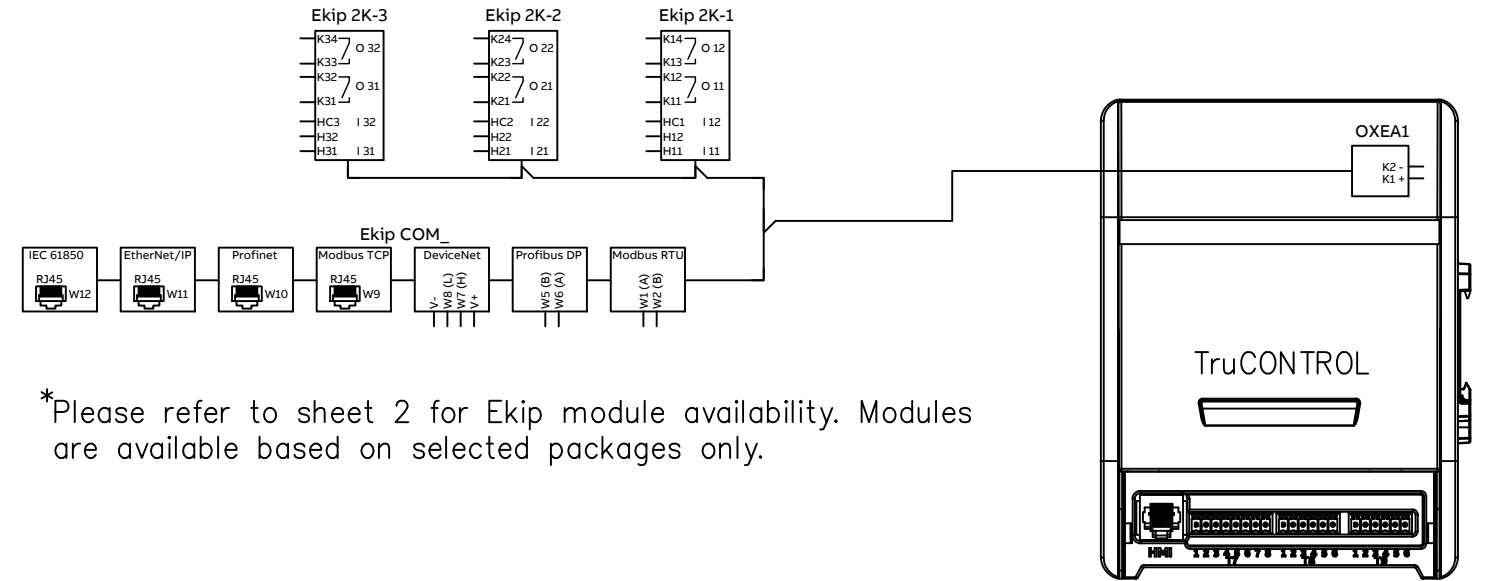


ABB TruControl Automatic Transfer Switch Equipment makes use of ABB Ekip Connect option modules. Please refer to the ABB TruControl Operation and Maintenance Guide for detailed part numbers, operation and settings description for each, and related software for ease of programming.

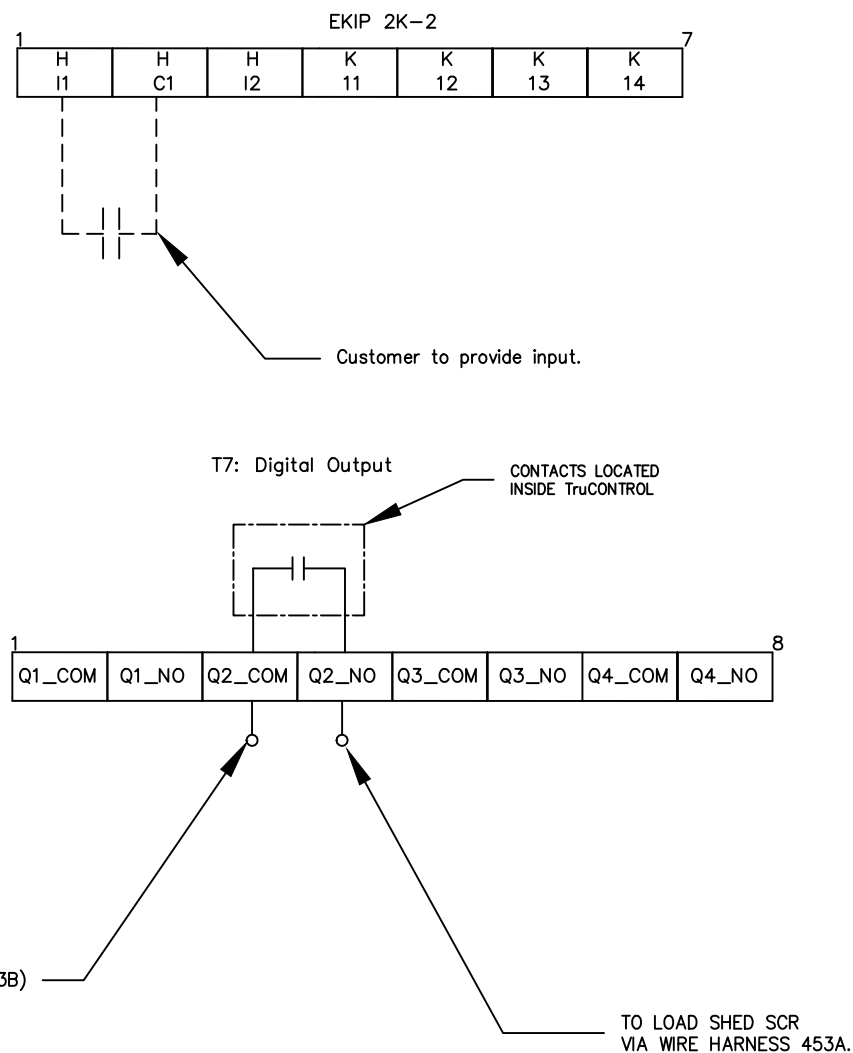
EKIP TruCONTROL CONNECTIONS.*



*Please refer to sheet 2 for Ekip module availability. Modules are available based on selected packages only.

FOR ADDITIONAL INFO REFER TO	SIGNATURES	DATE	ABB
APPLIED PRACTICES	MODEL MAS	07/12/21	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	DETAIL		Customer I/O connection diag. ABB Integrated Controller Design
TOLERANCES ON:	CHECKED		
2 PL. DECIMALS ± .020	ENGRG MAS	07/12/21	
3 PL. DECIMALS ± .005	MFG		
ANGLES ± 1'	QUALITY		
FRACTIONS ± 1/64	ISSUED		
FINISH ✓	DRAWING FILE:		
	MODEL / ASSEMBLY FILE:		
AutoCad Generated	# CTOs	CRITICAL TO QUALITY CHARACTERISTIC	SCALE: -
			SHEET 18 of 19

THE FOLLOWING CONNECTIONS ARE DEDICATED FOR WITH UNITS THAT HAVE THE LOAD SHED OPTION BUILT IN AND ACTIVE.



TruCONTROL PROGRAM I/O SETTINGS:

SET DIGITAL INPUT E2K-121 TO: LOAD SHED INPUT SIGNAL
SET CONTACT TYPE TO: NO

DIGITAL OUTPUT 2 HAS BEEN DESIGNATED AS A
THE ONLY AVAILABLE OUTPUT FOR THE LOAD SHED FUNCTION.
FOR THIS FUNCTION, THERE IS NO NEED TO MAKE ANY CHANGES TO THE DO2 SETTINGS

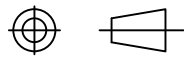
DO2 SETTINGS SHOULD READ AS FOLLOWS:
DIGITAL OUTPUT 2: NO FUNCTION
CONTACT TYPE: NO

PLEASE REFER TO DRAWING 77R-2015 FOR FULL DETAILS

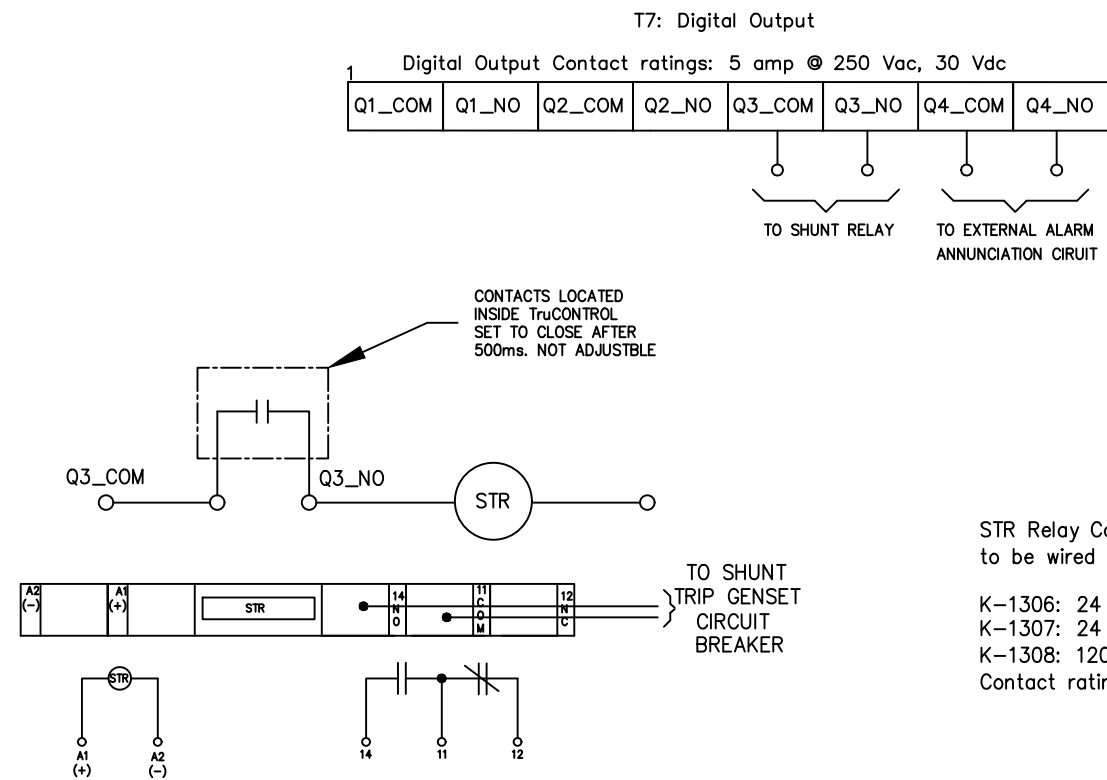
NOTES

1. UNLESS OTHERWISE SPECIFIED ALL CUSTOMER CONNECTION WIRES TO BE MAXIMUM #16 -#14 AWG., 600 VOLTS, UL LISTED.

THIRD ANGLE PROJECTION



THE FOLLOWING CONNECTIONS ARE DEDICATED FOR USE ON CLOSE TRANSITION UNITS ONLY.



RECOMMENDED CONNECTION FOR EXTERNAL SHUNT TRIP

RECOMMENDED CONNECTION FOR EXTERNAL ALARM CIRCUIT

STR Relay Coil Selection (Factory supplied - to be wired in the field):

- K-1306: 24 volt AC
 - K-1307: 24 volt DC
 - K-1308: 120 volt AC/DC
- Contact rating: 6Amp @250Vac / 30Vdc.

Alarm will not be provided by the factory. It is expected that the customer will provide external alarm and related circuitry as needed.

FOR ADDITIONAL INFO REFER TO		SIGNATURES	DATE	ABB
APPLIED PRACTICES	MODEL	MAS	07/12/21	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	DETAIL			Customer I/O connection diag. ABB Integrated Controller Design
TOLERANCES ON:	CHECKED			
2 PL. DECIMALS ± .020	ENGRG	MAS	07/12/21	
3 PL. DECIMALS ± .005	MFG			
ANGLES ± 1'	QUALITY			50A-1208 SHEET 19 of 19
FRACTIONS ± 1/64	ISSUED			
FINISH ✓	DRAWING FILE:			SCALE: -
AutoCad Generated	MODEL / ASSEMBLY FILE:			
# CTOs	CRITICAL TO QUALITY CHARACTERISTIC			