



ZTSCT SERIES WITH MX250 MICROPROCESSOR-BASED CONTROL PANEL AUTOMATIC TRANSFER SWITCH (ATS) 4000 AMP	REVISIONS			
	REV.	DESCRIPTION	DATE	APPROVED
	F	S-8604	REVISED SHEET 2	04/10/07 YJS MES

FOR USE ON EMERGENCY OR STANDBY SYSTEMS  
- RATED FOR TOTAL SYSTEM & MOTOR LOAD

**A. LEGEND**  
 MX Series Microprocessor-Based Control Panel Standard Features:  
 DT.....Time Delay to SOURCE 1  
 DW.....Time Delay to SOURCE 2  
 L1.....SOURCE 2 Position Light  
 L2.....SOURCE 1 Position Light  
 L3.....SOURCE 1 Available Light  
 L4.....SOURCE 2 Available Light  
 Controls Power Supply (CPS)  
 XE1,XE2.....Control Transformer, SOURCE 2  
 XN1,XN2.....Control Transformer, SOURCE 1  
 Power Panel  
 N1,2,3,(N).....SOURCE 1 Line  
 E1,2,3,(N).....SOURCE 2 Line  
 T1,2,3,(N).....Load Connections  
 CE,CE1.....Transfer Operator, SOURCE 2  
 CEO,CEO1.....Transfer Operator, Open SOURCE 2  
 CN,CN1.....Transfer Operator, SOURCE 1  
 CNO,CNO1.....Transfer Operator, Open SOURCE 1  
 DS.....Disconnect Switch  
 GND.....Ground  
 NB.....Neutral Bar (if required)  
 SCR-E.....SCR, Source 2  
 SCR-E0.....SCR, Source 2 open  
 SCR-N.....SCR, Source 1  
 SCR-NO.....SCR, Source 1 open  
 SE.....SOURCE 2 Position Limit Switch  
 SEO.....SOURCE 2 OPEN Position Limit Switch  
 SN.....SOURCE 1 Position Limit Switch  
 SNO.....SOURCE 1 OPEN Position Limit Switch

**B. OPERATION (OPEN TRANSITION)**

When SOURCE 1 line voltage drops below the preset "Fail" values, the SOURCE 1 voltage sensing circuit initiates the engine start circuit.

When SOURCE 2 line voltage and frequency reach the preset "Restore" values, the MX controller initiates a transfer signal through the SCR-NO to operate the transfer operator. The load will be transferred to the OPEN position. After a set time delay, the MX controller initiates a transfer signal through the SCR-E to operate the transfer operator. The load will be transferred to the SOURCE 2 position. The transfer switch is mechanically locked. The SN limit switch awaits the next operation to SOURCE 1.

When the SOURCE 1 line voltage and frequency reach the preset "Restore" values, the MX controller initiates a transfer signal through the SCR-E0 to operate the transfer operator. The load will be transferred to the OPEN position. After a set time delay, the MX controller initiates a transfer signal through the SCR-N to operate the transfer operator. The load will be re-transferred back to the SOURCE 1 position. The transfer switch is mechanically locked. The SE limit switch awaits the next operation to SOURCE 2.

**Test Switch**

The Test Switch simulates a SOURCE 1 line failure when activated. To test, activate the Test Switch, thus allowing the transfer switch to transfer to the SOURCE 2 position. De-activate the Test Switch. The transfer switch will transfer to the SOURCE 1 position. Testing at least once a month is recommended. For hospital EMERGENCY systems, test once a week.

**Disconnect Switch (DS)**

When the Disconnect Switch is placed in the INHIBIT position, the circuits to the transfer operators are opened and transfer cannot take place.

**C. PARALLELING REQUIREMENTS**

1. The unit is Factory set to accomplish transfer within 5 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.

**D. OPERATION (CLOSED TRANSITION)**

Zenith Closed Transition 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.

To test the ATS, activate the test switch to drop out the Engine Start Relay (P1). The ATS closes into SOURCE 2 only after the SYNC Check ensures the proper phase relationship between both sources. After the ATS closes into SOURCE 2 the SE limit switch becomes activated. The controller initiates a transfer signal through the SCR-NO, which opens the ATS out of SOURCE 1. When the ATS has opened out of SOURCE 1, the SNO limit switch activates. The ATS has now closed into the SOURCE 2 position without interrupting the load.

Deactivating the Test switch initiates the retransfer. The ATS closes into SOURCE 1 only after the SYNC ensures proper phase relationship between both sources. After the ATS closes into SOURCE 1 the SN limit switch becomes activated. The controller initiates a transfer signal through the SCR-E0, which opens the ATS out of SOURCE 2. When the ATS has opened out of SOURCE 2, the SEO limit switch activates. The ATS has now closed back into the SOURCE 1 position without interrupting the load.

The ATS defaults to an open transition transfer when SOURCE 1 source fails. This signals the generator to start. After the generator voltage and frequency reach the preset "Restore" values, the ATS transfers to SOURCE 2. Closed transition transfer is not possible with one source available. One can select an Open Transition transfer via the optional Transition Mode Selector (TMS) for testing.

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 until the problem is corrected and the "Fail to Open Lockout Reset" has been pressed. Also a dry contact (STE) to shunt trip the generator circuit breaker is available to remove the generator from the bus if neither operator opened.

**ACCESSORY GROUP PACKAGES:**

- E. (STDS) GROUP PACKAGE**  
6, A3, A4, CALIBRATE, CDT DS, DT, DW, E, EL/P, KP, L1, L2, L3, L4, LN, P1, R50, S13, T, U, VI, W AND YEN.
- F. (EXES) OPTION PACKAGE**  
6, A1, A1E, A3, A4, CALIBRATE, CDP DS, DT, DW, E, EL/P, KP, L1, L2, L3, L4, LN, P1, Q2, R16, R50, S13, T, U, VI, W & YEN.
- G. (CONS) OPTION PACKAGE**  
6, A1, A1E, A3, A4, CALIBRATE, CDP, DS, DT, DW, E, EL/P, KP, L1, L2, L3, L4, LN, P1, Q2, Q3, Q7, R16, R50, S13, T, T3/W3, U, UMD, VI, W AND YEN.
- H. (SENS) OPTION PACKAGE**  
6, A1, A1E, A3, A4, CALIBRATE, CDP, DS, DT, DW, E, EL/P, KP, L1, L2, L3, L4, LN, P1, Q2, Q7, R1-1/R1-3, R16, R50, S12, S13, T, U, VI, W AND YEN.
- I. (SPES) OPTION PACKAGE**  
6, A1, A1E, A3, A4, CALIBRATE, CDP, DS, DT, DW, E, EL/P, KP, L1, L2, L3, L4, LN, P1, Q2, Q3, Q7, R1-1/R1-3, R16, R50, S5, S13, T, T3/W3, U, UMD, VI, W AND YEN.
- J. (PSGS) OPTION PACKAGE**  
6, A1, A1E, A3, A4, CALIBRATE, CDP, DS, DT, DW, E, EL/P, KP, L1, L2, L3, L4, LN, P1, Q2, Q3, Q7, R1-1/R1-3, R15, R16, R50, S12, S13, T, T3/W3, U, UMD, VI, W AND YEN.

**NOTES:**

1. **CAUTION:** In using a 3 phase, 4 wire delta or open delta power supply (usually 120/240 volts, sometimes listed as 120/208 volts) with one leg having a grounded center tap, one line will be 160 to 208 volts to ground. When such a system is used it is necessary to connect the high leg to N2. DO NOT CONNECT 120 VOLT LOAD CIRCUIT TO THE HIGH LEG.
2. **GROUNDING TERMINAL:** A grounding terminal (GND) is provided. When installing open type switches connect this terminal to the metal enclosure or on equivalent earth ground.
3. **WARNING - TO ENSURE AGAINST SHOCK OR ACCIDENT HAZARD, DISCONNECT ALL SOURCES OF SUPPLY BEFORE SERVICING.**
4. OPEN TRANSITION OPERATION CAN BE SELECTED WITH BOTH SOURCES AVAILABLE. OPEN TRANSITION OCCURS BY DEFAULT WHEN THE LOAD-CONNECTED SOURCE FAILS.
5. ON SINGLE PHASE UNITS WHERE THE SOURCE 2 SOURCE IS A UTILITY LINE, CONNECT SOURCE 2 LINE SO THAT MINIMUM VOLTAGE IS MEASURED FROM N1 TO E1.
6. ON SINGLE PHASE (2 POLE) UNITS, THE CENTER POLE, 47N & 47E ARE NOT SUPPLIED.  
3Ø 27/59N & E ARE REPLACED BY 1Ø 27/59N & E.

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	TOLERANCES ON: 2 PL. DECIMALS ± .020 3 PL. DECIMALS ± .005 ANGLES ± 1° FRACTIONS ± 1/64 FINISH ✓	CHECKED ENGRG FS MFG QUALITY ISSUED	
THIRD ANGLE PROJECTION 	AutoCad Generated	DRAWING FILE: 75a-4000-f-1.dwg MODEL / ASSEMBLY FILE: ZTSCT(4000 AMP)	CRITICAL TO QUALITY CHARACTERISTIC





ZTSCT SERIES WITH MX250 MICROPROCESSOR-BASED CONTROL PANEL AUTOMATIC TRANSFER SWITCH (ATS) 4000 AMP	REVISIONS			
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	F	S-8604 REVISED DWG	04/10/07	YJS MES

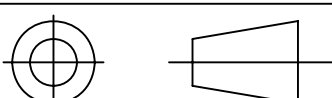

FOR USE ON EMERGENCY OR STANDBY SYSTEMS-RATED FOR TOTAL SYSTEM & MOTOR LOAD

**K. ACCESORIES DEFINITION.**

- 6 Test Switch, Momentary.
- 6A Test Switch, Maintained/Momentary. Door mount.
- 6AP Test Switch Maintained/Momentary Utilizing Keypad.
- 6B Test Switch, Maintained-Auto/Momentary-test, Key Operated.
- 6C Test Switch, Maintained-Auto/Mantained-test, Key Operated.
- A1 Auxiliary Contact, Operates on Source 1 line failure.
- A1E Auxiliary Contact, Operates on Source 2 line failure.
- A3 Auxiliary Contact Closed when the switch is in Source 2 position.
- A4 Auxiliary Contact Closed when the switch is in Source 1 position.
- A62 Sequential Universal Motor load Disconnect Circuit.
- B9 Battery charger.
- CALIBRATE Source 1 & Source 2 Calibrate capabilities for voltage a frequency.
- CDP Clock Exerciser Load / No Load, one event: allows the Generator to start and run unloaded or simulate a power failure, start Generator and run under load. Can be configured by end user for a 1, 7, 14, 28, or 365 day cycle. A total of 7 independent exercise periods (up to 10 hours each) can be programmed for each of the daily, weekly, 14-day, and 28-day Exercisers. A total of 12 independent exercise periods (up to 10 hours each) can be programmed for the 365-day Exerciser. When exercise is impending, (\*E\*) appears in the upper right hand corner of LCD screen. configured via CFG menu and set via SET menu.
- CDT Timer Exerciser Load / No Load, one event: allows the Generator to start and run unloaded or simulate a power failure, start Generator and run under load. Can be configured by end user for a 1, 7, 14, or 28 day cycle. Exercise duration can be set between 5 and 60 minutes in 1 minute increments. Factory default is 20 minutes. When exercise is impending, (\*E\*) appears in the upper right hand corner of LCD screen. configured via CFG menu and set via SET menu.
- CTAP Alarm Panel on transfer to Source 2 w/Silence button.
- DS Disconnect Switch, Auto /Inhibit. Inhibits transfer in either direction when in inhibit. Allows automatic operation when in Auto.
- DT Time delay from Neutral switch position to Source 1 position.
- DW Time delay from Neutral switch position to Source 2 position.
- E Engine Start Contact.
- EL/P Event Log: Sequentially Numbered Log of 16 events that track date, time, reason and action taken.  
System Data: Total Life Transfers (N2P)  
Days Powered Up  
Total Transfers to S2  
Total S1 Failures  
Total S1 available in Hrs  
Total S2 available in Hrs. (NIP)
- F Fan contact operates when generator is running.
- HT Heater and Thermostat.
- K Frequency Meter, Door mount.
- KP Frequency, LCD-Indication S1 & S2
- L Indicating LED lights.  
L1 Indicates Switch in Source 2 position.  
L2 Indicates Switch in Source 1 position.  
L3 Indicates Source 1 available.  
L4 Indicates Source 2 available.  
LN center-off position LCD-indicator.

- M1 Single Phase Amp Meter
- M2 Three Phase Amp Meter
- M3 Single Phase Volt Meter
- M4 Three Phase Volt Meter
- M90 2000 Digital Power Monitor  $\Delta$
- M91 EPM 6000 Digital Power Meter w/RS485  $\Delta$
- N1 Running Time meter, Door Mount.
- N2 Operation Counter meter, Door Mount.
- P1 Time Delay Source 2 Start. Adjustable 0 to 10 sec.
- P2 Time Delay Source 2 Start. Adjustable 1/6 to 300 sec.
- Q2 Peak Shave/Remote Load Test:Input for Peak Shave or Remote Load Test. Includes automatic return to Source 1 if Source 2 fails and Source 1 present.
- Q3 Inhibit Transfer to Source 2 Circuit.
- Q7 Inhibit Transfer to Source 1 Circuit.
- R2E Under voltage sensing of Source 2 for single-phase. (R17 replaces R2E for Utility to Utility switches)
- R1-1/R1-3 Source 1 Over Voltage sensing for single and three phase systems.
- R16 Phase Rotation Sensing
- R26 Interruptable Power Rate Provisions
- R50 In-Phase Monitor. Prevents transfer until two sources are in-phase.
- S5 Auto/Semi Manual selector, Utilizing keypad
- S12 Auto/Manual selector, Utilizing keypad
- S13 Transfer Commit or no Commit to transfer upon Engine start.
- S14 Test/Auto/Source 1 Selector, Door mount
- SW1 Auto/Off/Start Engine control selector Door mount
- SW2 Auto/Off Engine control selector Door mount
- SW3 Source Priority Selector Switch Door mount
- T Time Delay to SOURCE 1 stable timer
- T3/W3 Elevator Pre-Signal Auxiliary Contacts: Open 0-60 sec. prior to transfer to either direction, re-closes after transfer.
- U Source 2 Stop Delay Timer.
- UMD Universal Motor Load Disconnect Circuit.
- VI Voltage Imbalance Sensing (Three Phase)
- W Time Delay (S2) Source 2 Stable Timer. To delay transfer to Source 2.
- YEN Bypass T amd W Timers utilizing keypad.
- ZNET Network Communication Interface Card.



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	<p>GE PROPRIETARY AND CONFIDENTIAL INFORMATION</p>			
	<p>THIRD ANGLE PROJECTION</p>			
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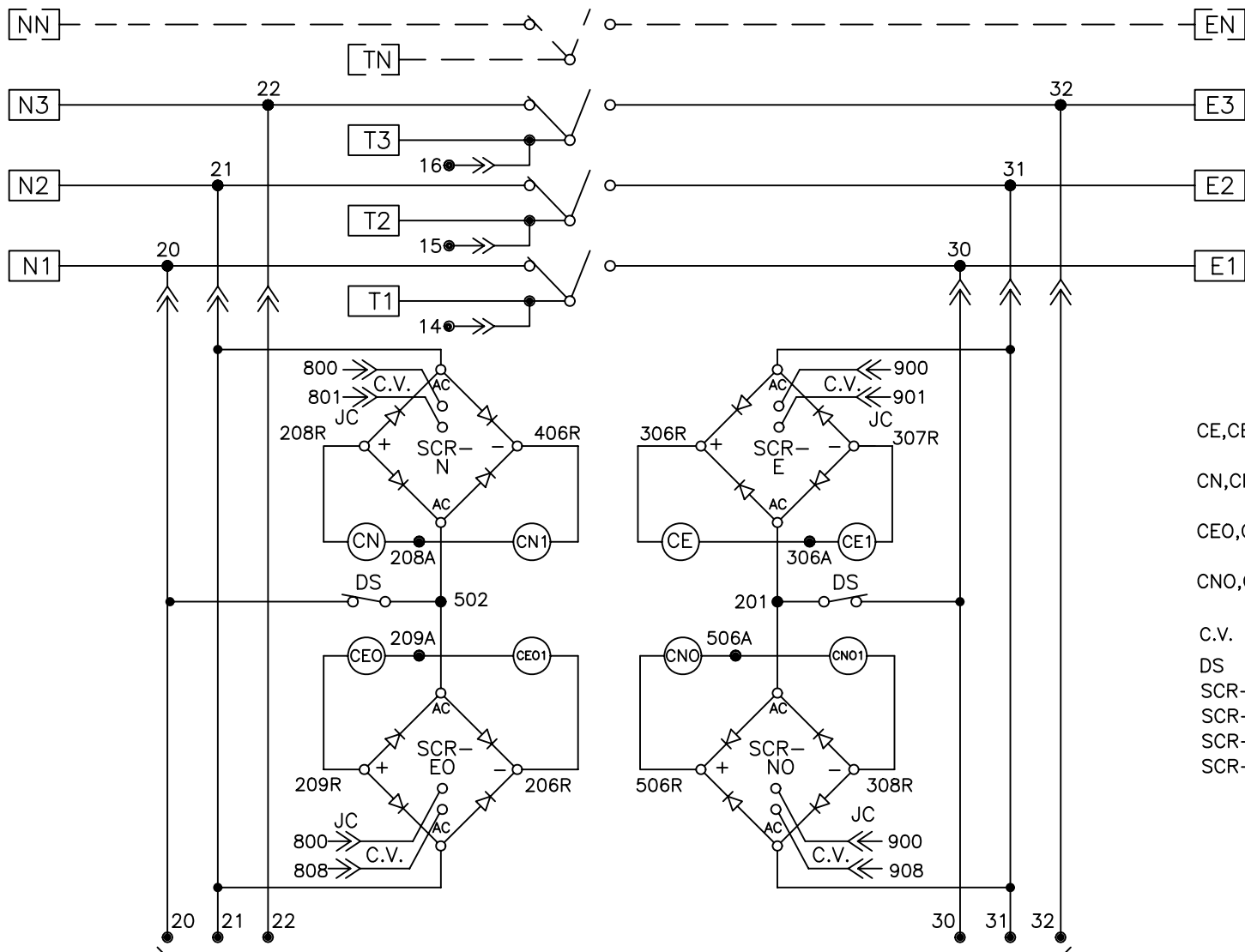
ATS POWER CIRCUIT SCHEMATIC

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
F	S-8604	04/10/07	YJS MES
REVISED SHEET 2			

N1,2,3,N - SOURCE 1 LINE

T1,2,3,N - LOAD

E1,2,3,N - SOURCE 2 LINE

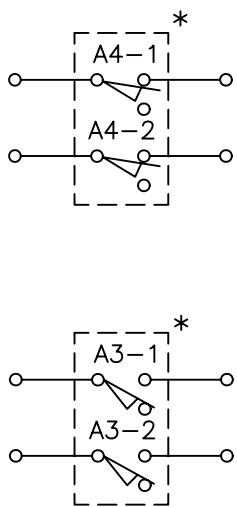


\* SWITCHED OR SOLID NEUTRAL AS SPECIFIED FOR 4 WIRE SYSTEMS.

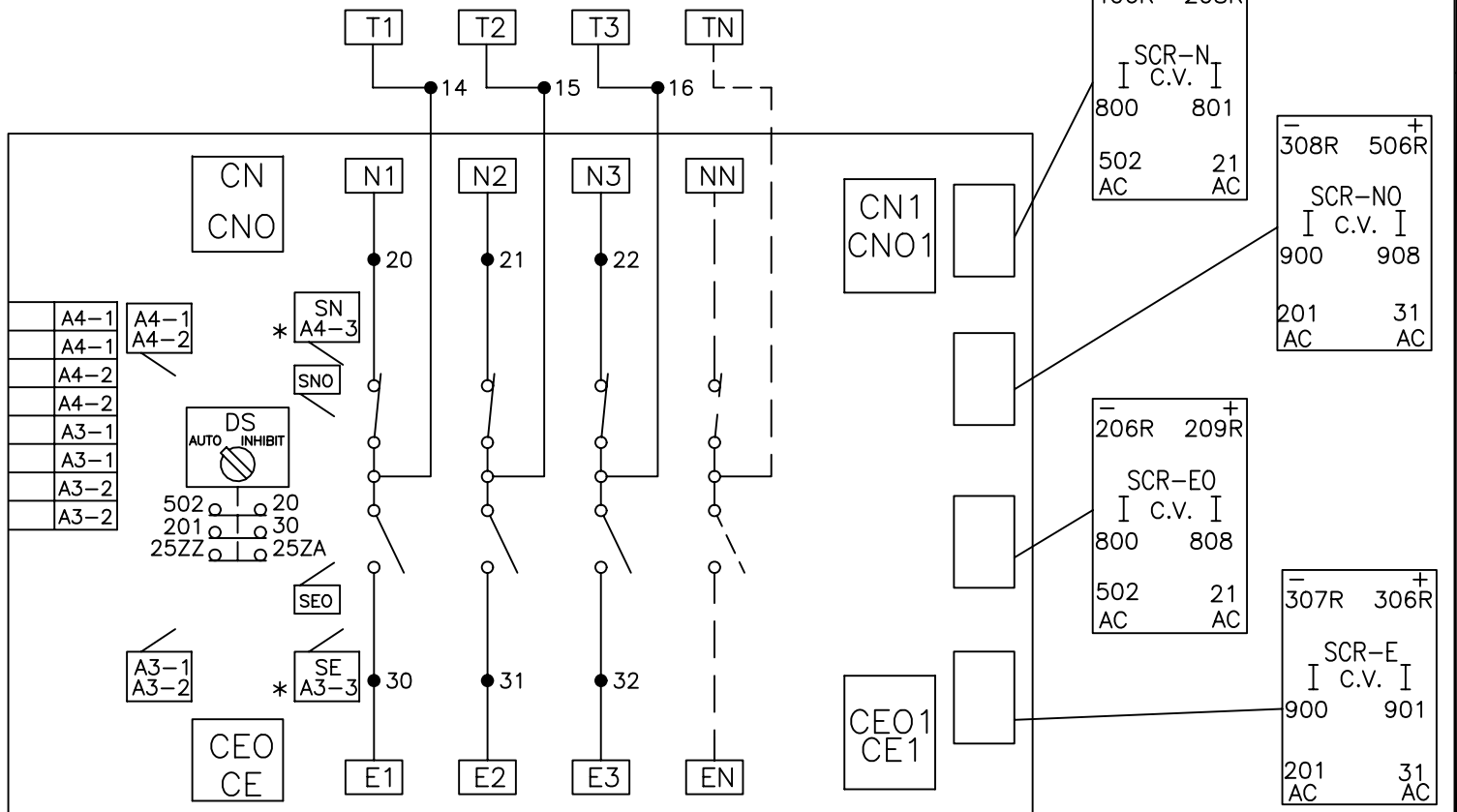
- CE,CE1 - CLOSE INTO SOURCE 2, TRANSFER OPERATOR
- CN,CN1 - CLOSE INTO SOURCE 1, TRANSFER OPERATOR
- CEO,CEO1 - OPEN FROM SOURCE 2, TRANSFER OPERATOR
- CNO,CNO1 - OPEN FROM SOURCE 1, TRANSFER OPERATOR
- C.V. - CONTROL VOLTAGE
- DS - DISCONNECT SWITCH
- SCR-E - CE,CE1 SCR
- SCR-N - CN,CN1 SCR
- SCR-EO - CEO,CEO1 SCR
- SCR-NO - CNO,CNO1 SCR

TO CONTROLS POWER SUPPLY (CPS) - SHEET 4

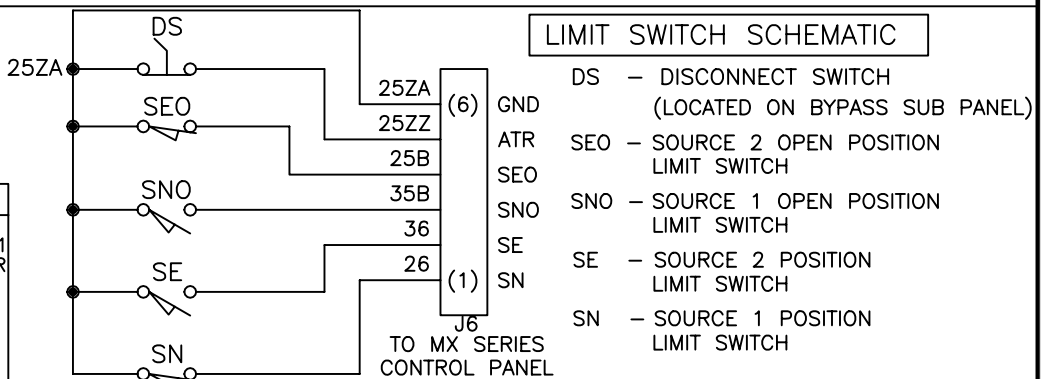
AUXILIARY CONTACTS



ATS POWER PANEL LAYOUT



LIMIT SWITCH SCHEMATIC



LEGEND	REFERENCE	NOTES
● WIRE CONNECTION	LEGEND, OPERATION, AND ACCESSORIES: 71A-0900D FOR PRODUCTION ONLY: CPS AND PLUG-SHEET 4 MX250 CONTROLLER-71A-0500	ATS SHOWN IN SOURCE 1 POSITION WITH NO POWER AVAILABLE.
○ WIRE ON TERMINAL BLOCK		
➤ WIRE IN INTERCONNECT PLUG		
* OPTIONAL		

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THIRD ANGLE PROJECTION

APPLIED PRACTICES	SIGNATURES	DATE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	MODEL GG	04/21/03
TOLERANCES ON:	DETAIL	
2 PL. DECIMALS ± .020	CHECKED	
3 PL. DECIMALS ± .005	ENGRG FS	
ANGLES ± 1°	MFG	
FRACTIONS ± 1/64	QUALITY	
FINISH ✓	ISSUED	
AutoCad Generated	DRAWING FILE: 75a-4000-f-3.dwg	SIZE B
	MODEL / ASSEMBLY FILE: ZTSCT(4000AMP)	CAGE CODE
	# CTQs	DWG NO
	CRITICAL TO QUALITY CHARACTERISTIC	SCALE: NA

**GE Zenith Controls**

TITLE: **ATS POWER CIRCUIT & LAYOUT**

FIRST MADE FOR: ZTSCT(4000AMP)

**75A-4000**

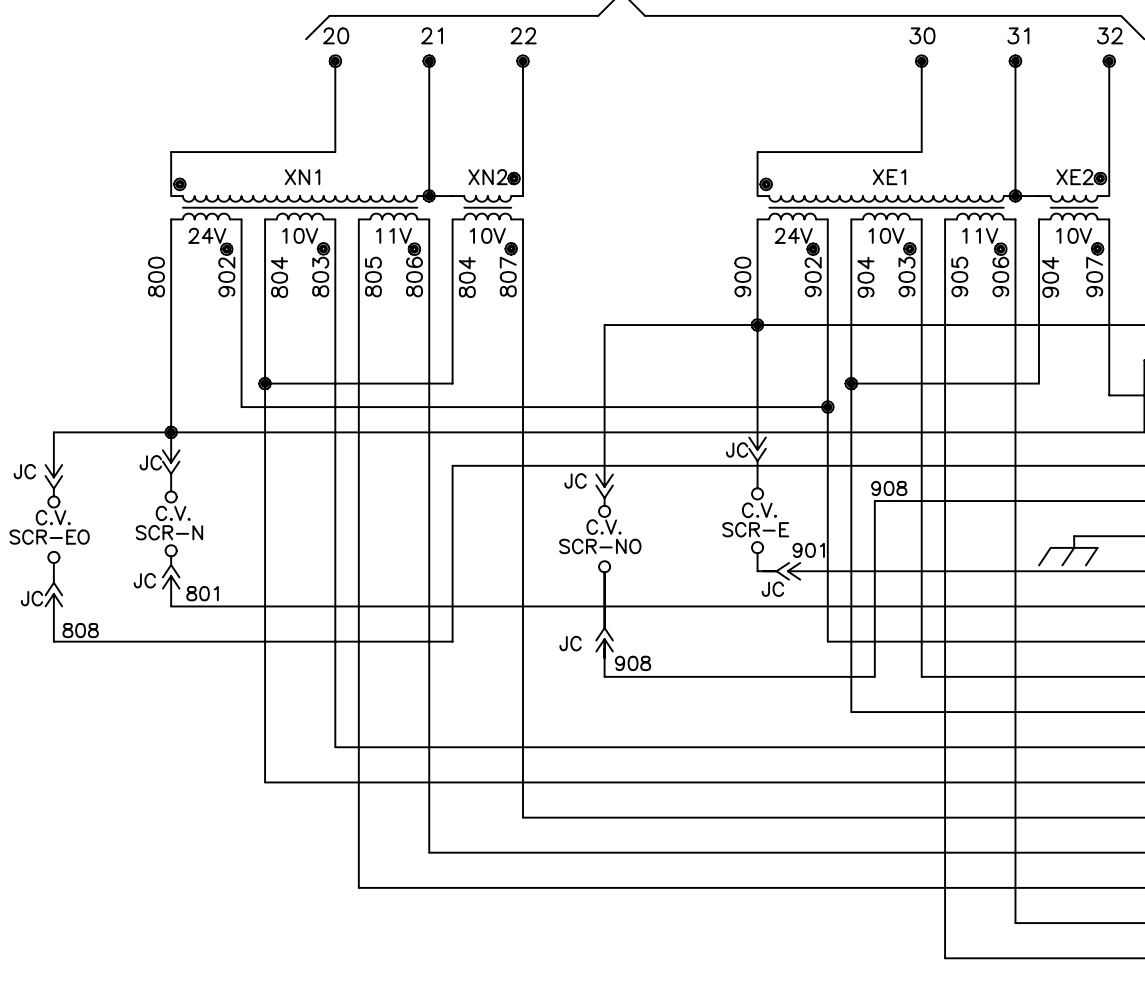
SHEET 3 OF 5

CONTROLS POWER SUPPLY (CPS) SCHEMATIC

TO POWER CIRCUIT SCHEMATIC - SHEET 1

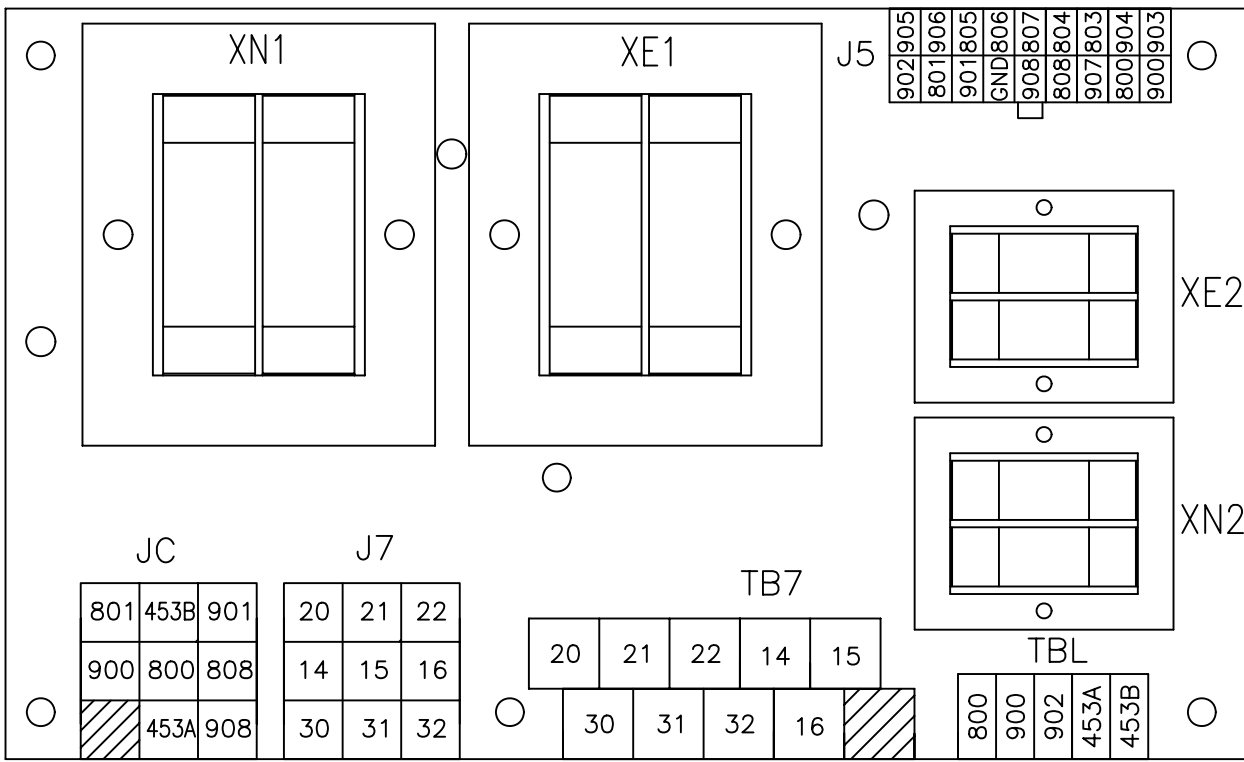
REVISIONS

REV.	DESCRIPTION	DATE	APPROVED
F	S-8604	04/10/07	YJS MES

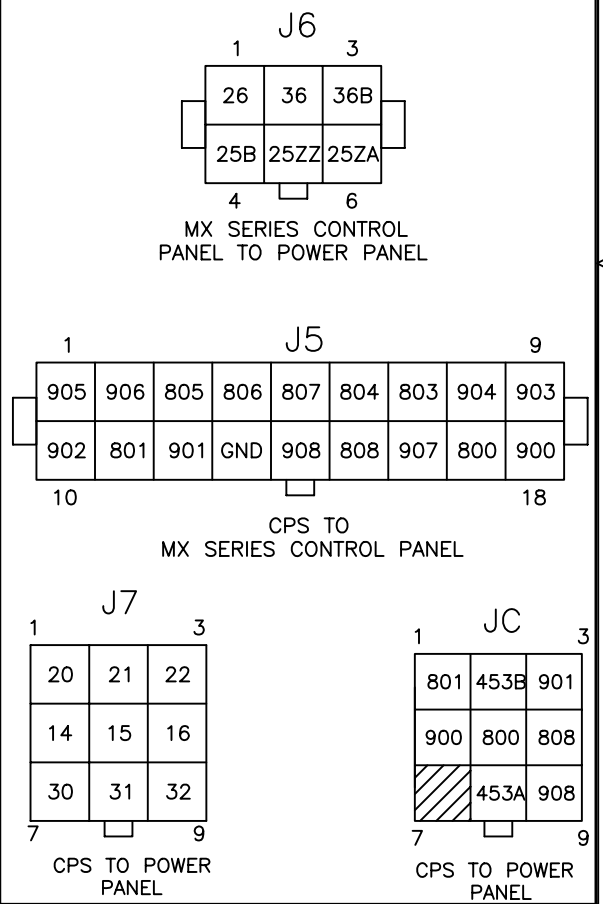


- XN1 - SOURCE 1 CONTROL TRANSFORMER
  - XN2 - SOURCE 1 3 PHASE SENSING TRANSFORMER
  - XE1 - SOURCE 2 CONTROL TRANSFORMER
  - XE2 - SOURCE 2 3 PHASE SENSING TRANSFORMER
- |     |      |   |
|-----|------|---|
| 900 | (18) | SOURCE 2 24V OUTPUT                         |
| 800 |      | SOURCE 1 24V OUTPUT                         |
| 907 |      | 3-PHASE SOURCE 2 SENSING                    |
| 808 |      | C.V. SCR-E0 CONTROL VOLTAGE (OPEN SOURCE 2) |
| 908 |      | C.V. SCR-NO CONTROL VOLTAGE (OPEN SOURCE 1) |
|     |      | GND   |
| 901 |      | GROUND                                      |
| 801 |      | C.V. SCR-E CONTROL VOLTAGE (SOURCE 2)       |
| 902 |      | C.V. SCR-N CONTROL VOLTAGE (SOURCE 1)       |
| 903 |      | COMMON                                      |
| 904 | }    | SINGLE PHASE SOURCE 2 SENSING               |
| 803 |      |   |
| 804 |      |   |
| 807 | }    | 3-PHASE SOURCE 1 SENSING                    |
| 806 |      |   |
| 805 |      |   |
| 906 | }    | SOURCE 1 CONTROL POWER                      |
| 905 |      |   |
|     | }    | SOURCE 2 CONTROL POWER                      |
| (1) |      |   |

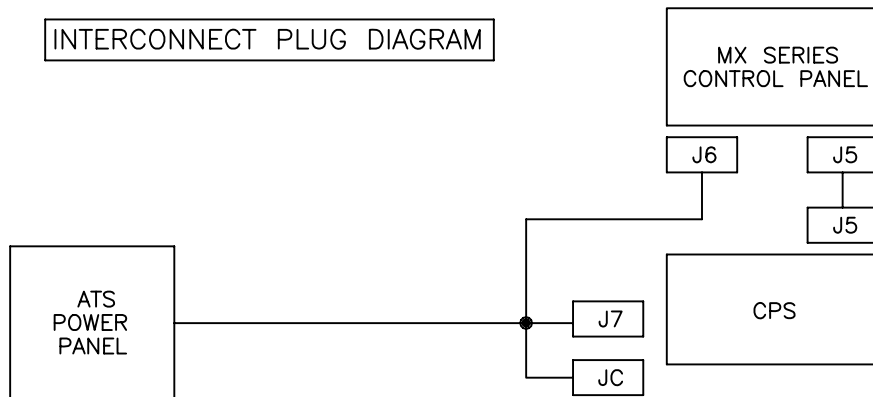
CONTROLS POWER SUPPLY (CPS)



INTERCONNECT PLUGS



INTERCONNECT PLUG DIAGRAM

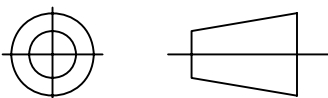


LEGEND

- WIRE CONNECTION
- \* OPTIONAL

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THIRD ANGLE PROJECTION



APPLIED PRACTICES	SIGNATURES	DATE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	MODEL GG	05/05/03
TOLERANCES ON:	CHECKED	
2 PL. DECIMALS ± .020	ENGRG FS	
3 PL. DECIMALS ± .005	MFG	
ANGLES ± 1°	QUALITY	
FRACTIONS ± 1/64	ISSUED	
FINISH ✓	DRAWING FILE: 75a-4000-f-4.dwg	
	MODEL / ASSEMBLY FILE: ZTSCT(4000AMP)	
AutoCad Generated	# CTQs	CRITICAL TO QUALITY CHARACTERISTIC



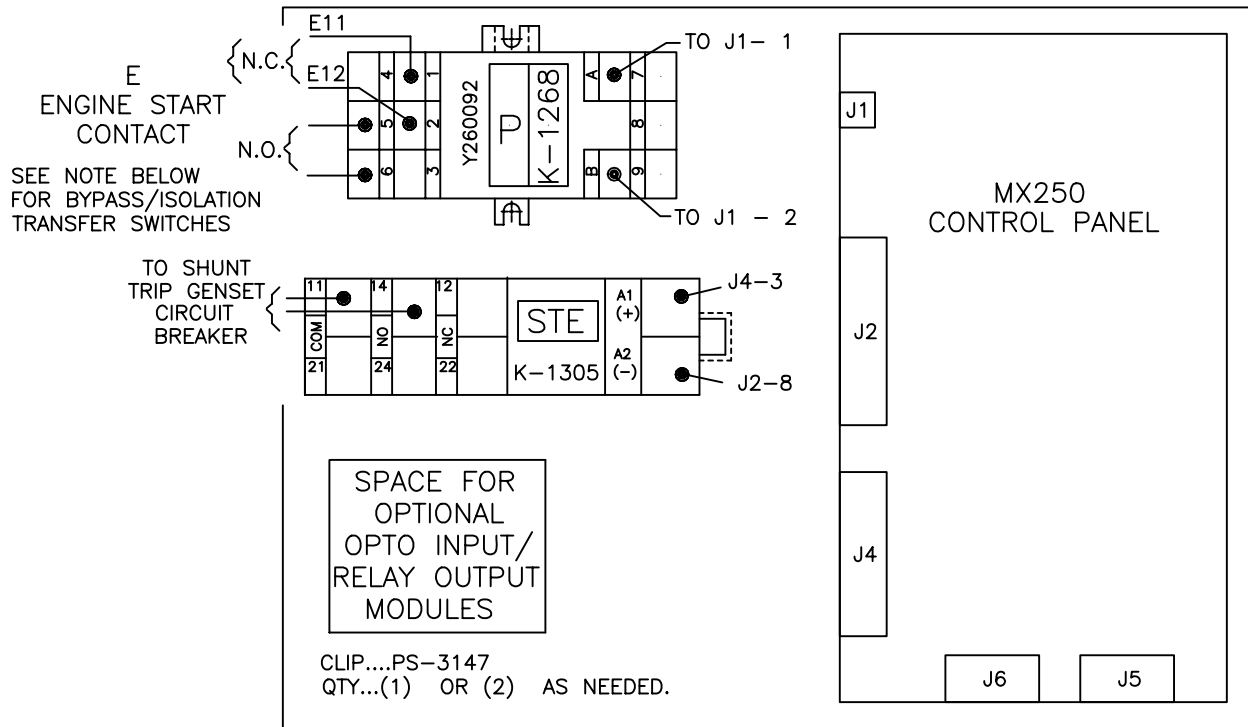
**GE Zenith Controls**

CONTROLS POWER SUPPLY(CPS) & INTERCONNECT PLUGS

TITLE	FIRST MADE FOR: ZTSCT(4000AMP)	SIZE	CAGE CODE	DWG NO
		B		75A-4000
SCALE: NA				SHEET 4 OF 5

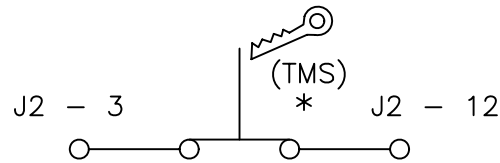
REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
F	S-8604	04/10/07	YJS MES

INSIDE VIEW OF CABINET DOOR

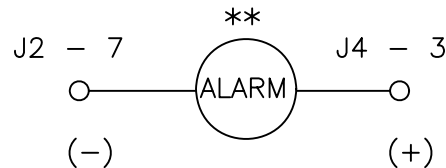


PILOT DEVICES

\* (TMS) TRANSITION MODE SELECTOR



- IF (TMS) IS NOT SUPPLIED, REPLACE (TMS) WITH A JUMPER.
- (TMS) SHOWN ACTUATED IN CLOSED TRANSITION MODE.
- MAINTAINED KEY REMOVAL LEFT OR RIGHT.



\* AUXILIARY CONTROL PANEL



LEGEND

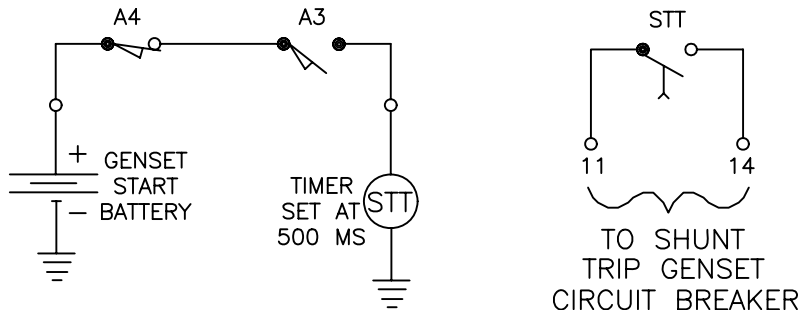
- WIRE CONNECTION
- WIRE ON TERMINAL BLOCK
- \* OPTIONAL

NOTES

FOR BYPASS/ISOLATION TRANSFER SWITCHES CONSULT STANDARD DIAGRAM FOR INTERCONNECTION OF ENGINE START P RELAY WITH TEST PLUG.

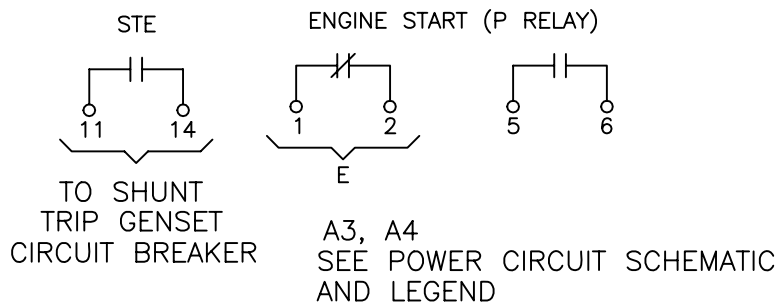
\*\* ALARM.....Y780029  
FOR NEMA 3R, 4, 4X, 12 ADD:  
BAFFLE PLATE ASSEMBLY: PS-8892  
GASKET.....PS-8891

RECOMMENDED ADDITIONAL EXTENDED PARALLEL PROTECTION



CUSTOMER CONNECTIONS

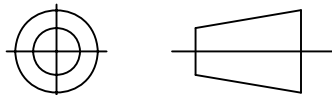
ENGINE START (P1 RELAY)



RELAY	CONTACT	RATING
P1	E	10 AMP @ 240 VAC 10 AMP @ 28 VDC
	A3, A4	20 AMP @ 125, 250 VAC

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THIRD ANGLE PROJECTION



FOR ADDITIONAL INFO REFER TO APPLIED PRACTICES UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES  
TOLERANCES ON:  
2 PL. DECIMALS ± .020  
3 PL. DECIMALS ± .005  
ANGLES ± 1°  
FRACTIONS ± 1/64  
FINISH ✓  
AutoCad Generated

SIGNATURES  
MODEL GG  
DATE 05/05/03  
CHECKED  
ENGRG FS  
MFG  
QUALITY  
ISSUED  
DRAWING FILE: 75a-4000-f-5.dwg  
MODEL / ASSEMBLY FILE: ZTSCT(4000AMP)  
# CTQs  
CRITICAL TO QUALITY CHARACTERISTIC



GE Zenith Controls

MX250 INSIDE DOOR VIEW

FIRST MADE FOR: ZTSCT(4000AMP)

SIZE B CAGE CODE DWG NO

75A-4000

SCALE: NA

SHEET 5 OF 5