



REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
1	C077003	09/23/19	AR MAS

**ZB4S SERIES WITH MX250 MICROPROCESSOR-BASED CONTROL PANEL  
BYPASS/ISOLATION TRANSFER SWITCH  
100-400 AMP**

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

**A. LEGEND**

**Standard Features:**

- 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 ..... SOURCE 2 Transfer Operator
- CN ..... SOURCE 1 Transfer Operator
- GND ..... Ground
- NB ..... Neutral Bar (if required)
- SCR-E..... SCR, Source 2
- SCR-N..... SCR, Source 1
- SE ..... SOURCE 2 Position
- SN ..... SOURCE 1 Position

**Inter Connect Plugs**

- J1, J2 J4, J5 J6, J7, JC, TP1 & TP2

**B. OPERATION**

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

When SOURCE 2 line voltage and frequency reach the preset "Restore" values, the MX controller initiates a transfer signal through the SCR-E to operate the main transfer operator. The load is now transferred to SOURCE 2 line. The transfer switch is mechanically locked. SN limit switch awaits the next operation to SOURCE 1.

When SOURCE 1 line voltage reaches the preset "Restore" values, the MX controller initiates a transfer signal through the SCR-N to operate the main transfer operator. The load is now re-transferred back to SOURCE 1 line. The transfer switch is mechanically locked. 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 reset 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 MX control panel is disengaged and transfer cannot take place.

**ACCESSORY GROUP PACKAGES:**

**C. (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.

**D. (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 AND YEN.

**E. (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.

**F. (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.

**G. (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.

**H. (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 an equivalent earth ground.
3. **WARNING – TO ENSURE AGAINST SHOCK OR ACCIDENT HAZARD, DISCONNECT ALL SOURCES OF SUPPLY BEFORE SERVICING.**
4. ON SINGLE PHASE UNITS WHERE THE SOURCE 2 IS A UTILITY LINE, CONNECT SOURCE 2 LINE SO THAT MINIMUM VOLTAGE IS MEASURED FROM N1 TO E1.
5. ON SINGLE PHASE (2 POLE) UNITS, CENTER POLE IS NOT SUPPLIED. RIGHT-HAND POLE IS NOT SUPPLIED ON 400 AMP UNITS.



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	APPLIED PRACTICES	MODEL GG	05/13/03	
THIRD ANGLE PROJECTION	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	DETAIL		TITLE
	TOLERANCES ON:	CHECKED		FIRST MADE FOR: ZBTS 100-400 AMPS
	2 PL. DECIMALS ± .020	ENGRG FS		SIZE CAGE CODE DWG NO
	3 PL. DECIMALS ± .005	MFG		B
	ANGLES ± 1°	QUALITY		72A-0901
	FRACTIONS ± 1/64	ISSUED		SCALE: NA SHEET 1 OF 2
	FINISH ✓	DRAWING FILE: 72a-0901.dwg		
	AutoCad Generated	MODEL / ASSEMBLY FILE: ZBTS 100-400 AMPS		
	# CTQs	⊖ CRITICAL TO QUALITY CHARACTERISTIC		





ZB4S SERIES WITH MX250  
MICROPROCESSOR-BASED CONTROL PANEL  
AUTOMATIC TRANSFER SWITCH (ATS) 100-400 AMP

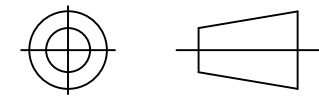
FOR USE ON EMERGENCY OR STANDBY SYSTEMS-RATED FOR TOTAL SYSTEM & MOTOR LOAD

I. ACCESSORIES 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/Maintained-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 and W Timers utilizing keypad.
- ZNET

Network Communication Interface Card.

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	<p>AutoCad Generated</p>	<p># CTQs</p>	<p>CRITICAL TO QUALITY CHARACTERISTIC</p>	

