



GE Zenith Controls

GE Zenith MX Series Microprocessor Controllers

Introduction

GE Zenith's next-generation MX microprocessor panel controls the operation and displays the status of the transfer switch's position, timers and available sources. As an embedded digital controller, the MX series offers high reliability and ease of unattended operation across a range of applications.

- Timer and voltage/frequency settings adjustable without disconnection from the power section
- Built-in diagnostics with displays for immediate troubleshooting
- LED indicators for ease of viewing and long life
- Nonvolatile memory—battery backup not required for standard operation
- Processor and digital circuitry isolated from line voltage
- Inputs optoisolated for high electrical immunity to transients and noise
- External communication available through LonWorks network interface (RS 232, RS 422, and RS 485 are also available)
- Built-in electrical operator performance monitor
- Simplified, mainstream, major components are easily replaceable
- Field programmable for upgrades



Fully Approved

- UL, CSA and IEC listed
- Ringing wave immunity per IEEE 472 (ANSI C37.90A)
- Conducted and Radiated Emissions per EN55022 Class B (CISPR 11) (Exceeds EN55011 & MILSTD 461 Class 3)
- ESD immunity test per EN61000-4-2 (Level 4)
- Radiated RF, electromagnetic field immunity test per EN61000-4-3 (ENV50140) 10v/m
- Electrical fast transient/burst immunity test per EN61000-4-4
- Surge immunity test per EN61000-4-5 IEEE C62.41 (1.2 X 50ms, 5 & 8 kV)
- Conducted immunity test per EN61000-4-6 (ENV50141)
- Voltage dips and interruption immunity EN61000-4-11

User-Friendly Operation

- LEDs for continuous monitoring of switch position, source availability, exercise time delay operation and diagnostics
- Simplified adjustment for voltage, frequency and time delay settings
- Close differential 3 phase under-voltage sensing of the normal source, factory standard setting 90% pickup, 80% dropout (adjustable); under-frequency sensing of the normal source factory setting 95% pickup (adjustable)
- Voltage and frequency sensing of the emergency source, factory standard setting 90% pickup voltage, 95% pickup frequency (adjustable)
- Test switch (fast test/load/no load) to simulate normal source failure—automatically bypassed should the emergency source fail

Standard Features – Module 13

GE Zenith's ZTG and ZTC Series switches, configured with the MX100 controller and accessory Module 13, are built for standard applications requiring dependability and ease of operation and include:

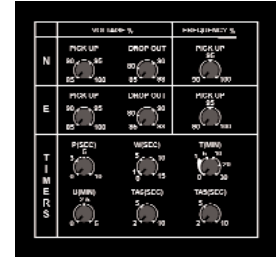
- A3** Auxiliary Contact: Closed when the switch is in the emergency position
- A4** Auxiliary Contact: Closed when the switch is in the normal position
- CDT** 7 day timed exercise (CDT memory backup battery included), pushbutton/timer operation
- E** Engine Start Contact
- L** Indicating LED Pilot Lights:
 - L1** Indicates switch in emergency position
 - L2** Indicates switch in normal position
 - L3** Indicates normal source available
 - L4** Indicates emergency source available
- P1** Time Delay to Engine Start: Standard setting 3 seconds, adjustable 0-10 seconds
- R50** In-phase monitor, self-adjusting (not included as standard on delayed transition models)
- T** Time Delay on Retransfer to Normal: To delay retransfer to normal source (immediate retransfer on generator set failure); standard setting 30 minutes, adjustable 0-30 minutes
- U** Time Delay for Engine Cool Down: Allows engine to run unloaded after switch retransfer to normal; standard setting 5 minutes, adjustable 0-5 minutes
- W** Time Delay on Transfer to Emergency: To delay transfer to emergency after normal source failure; standard setting 1 second, adjustable 0-15 seconds
- YEN** Pushbutton Bypass of T & W Timers

When specified for use with a ZTGD Series delayed transition switch, the MX100 control panel also includes the following:

- DT** Time Delay from Neutral Switch Position to Normal on Retransfer: Standard setting 5 seconds, adjustable 1-30 seconds
- DW** Time Delay from Neutral Switch Position to Emergency: Standard setting 5 seconds, adjustable 1-30 seconds
- LN/LD** Center-Off position/Off Delay Timing indicating lights

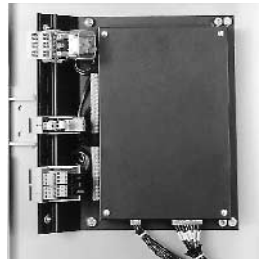
Options

- A6** Auxiliary Contact: Motor Load Disconnect Circuit: Operates during transfer, adjustable (not available on ZTGD models or models with R50); include timing indicator lamp when combined with Option T3/W3, both accessories will have the same time settings
- C** Plant Exerciser (no load): Automatically starts the generator to run unloaded at selected intervals (7 day clock operation)
- C/D** Plant Exerciser (load/no load): Allows the generator to start and run unloaded or to simulate a power failure, start generator and run under load (7 day clock operation)
- C/D-365** Plant Exerciser: Same as C/D with 365 day programming options
- D** Plant Exerciser (load): Automatically starts the generator and transfers the load at selected intervals (7 day clock operation)
- HT** Heater and Thermostat
- O2** Peak Shave/Remote Load Test: Input for peak shave or remote load test; includes automatic return to normal if emergency source fails and normal is present; 120 VAC or 24 VDC
- O3** Inhibit Transfer to Emergency: Input circuit to inhibit transfer to emergency; 120 VAC or 24 VDC
- T3/W3** Transfer Presignal: Operates during transfer, adjustable (not available on ZTGD models or models with R50); includes timing indicator lamp when combined with Option A6, both accessories will have the same time settings
- ZNET** Network communications interface card (ZNET100)
- 6A** Maintained Test Switch



MX100

Rich in features, the MX100 controller is designed for ease of use in many of today's transfer switch applications.



MX200

The MX200 controller is designed for more demanding transfer or bypass switch applications. It may be programmed to include all of the most commonly used options for today's transfer switch equipment.

User-Friendly Operation

- Multipurpose display: LEDs for continuous monitoring of switch position and source availability; a four line by twenty character backlit LCD display for settings, functions, programming and annunciation
- Through-the-door programming and display
- Simplified keypad entry: menu-driven system is designed for ease of use
- Built-in diagnostics with displays for ease of troubleshooting

Additional Features

- Pass code protected to limit user access
- Built-in programmable exerciser (optional) uses separate micro controller with independent battery back-up to serve as clock/calendar—battery failure will not affect switch operation
- Timer countdown display for ease of operation
- User settings are unaffected by power outages
- Lamp Test
- Data Display including:
 - Normal and emergency voltage and frequency
 - Number of transfers
 - Hours in emergency
 - Serial number and software version of controller
- U.S. or European style date format
- Load/No Load/Fast Test capability with either a momentary (standard setting) or maintained selection
- ZNET communications network header

Standard Features – Module 12

GE Zenith's ZTS series transfer switches, configured with the MX200 controller and accessory Module 12 as standard, include these most commonly specified features:

- A3** Auxiliary Contact: Closed when the switch is in the emergency position
- A4** Auxiliary Contact: Closed when the switch is in the normal position
- E** Engine Start Contact
- L** Indicating LED Pilot Lights:
 - L1** Indicates switch in emergency position
 - L2** Indicates switch in normal position
 - L3** Indicates normal source available
 - L4** Indicates emergency source available
- P1** Time Delay to Engine Start: Standard setting 3 seconds, adjustable 0-10 seconds
- R50** In-phase monitor, self adjusting (not included as standard on delayed transition models)
- T** Time Delay on Retransfer to Normal: To delay retransfer to normal source (immediate retransfer on generator set failure); standard setting 30 minutes, adjustable 0-60 minutes

- U** Time Delay for Engine Cool Down: Allows engine to run unloaded after switch retransfers to normal; standard setting 5 minutes, adjustable 0-60 minutes
- W** Time Delay on Transfer to Emergency: To delay transfer to emergency after normal source failure; standard setting 1 second, adjustable 0-5 minutes

When specified for use with a ZTSD Series delayed transition switch, the MX200 control panel also includes the following:

- DT** Time Delay from Neutral Switch Position to Normal on Retransfer: Standard setting 5 seconds, adjustable 0-10 minutes
- DW** Time Delay from Neutral Switch Position to Emergency: Standard setting 5 seconds, adjustable 0-10 minutes

Additional Standard Features

In addition to Module 12, GE Zenith is proud to offer accessory Module 25 which exceeds most basic requests in today's specifications and provides our customers with the utmost in system protection, reliability and versatility.

- A1** Auxiliary Contact: Operates on normal line failure (SPDT)
- A1E** Auxiliary Contact: Operates on emergency line failure (SPDT)
- A6** Auxiliary Contact: Motor Load Disconnect Circuit: Deenergizes external motor control circuit 5 seconds (adjustable) prior to transfer in either direction
- C/D** Plant Exerciser (load/no load): Allows the generator to start and run unloaded or to simulate a power failure, start generator and run under load; specify weekly, bi-weekly, daily or calendar (365) day schedule
- J2** Adjustable over/under-frequency sensor (specify if for normal and/or emergency source) (J2N, J2E)
- O2** Peak Shave/Remote Load Test: Input for peak shave or remote load test; includes automatic return to normal if emergency source fails and normal is present; 120 VAC or 24 VDC
- O3** Inhibit Transfer to Emergency: Input circuit to inhibit transfer to emergency; 120 VAC or 24 VDC
- R1** Over-voltage Sensing: Normal (1 or 3 phase)
- R8** Over-voltage Sensing: Emergency (3 phase)
- R16** Phase Sequence Sensing
- R17** Under-voltage Sensing: Emergency (3 phase)
- YEN** Pushbutton Bypass of T & W Timers

Both Module 12 and Module 25 can be customized with a wide variety of additional features to meet your special requirements. Consult ZTS brochure O-5064 or your GE Zenith representative for further information.

MX Series Control Setting Ranges

Control Function		MX100		MX200	
		Range	Factory Setting	Range	Factory Setting
Normal Line Sensing – Under-voltage	Dropout Pickup	75-98% 85-100%	80% 90%	75-98% 85-100%	80% 90%
Normal Line Sensing – Under-frequency	Dropout Pickup	2Hz below pickup 90-100%	Set 90%	2Hz below pickup 90-100%	Set 90%
Emergency Line Sensing – Under-voltage	Dropout Pickup	75-98% 85-100%	80% 90%	75-98% 85-100%	80% 90%
Emergency Line Sensing – Under-frequency	Dropout Pickup	2Hz below pickup 90-100%	Set 95%	2Hz below pickup 90-100%	Set 95%
Time Delay–Engine Start	(Acc. P1)	0-10 seconds	3 seconds	0-10 seconds	3 seconds
Time Delay–Engine Cool Down	(Acc. U)	0-5 minutes	5 minutes	0-60 minutes	5 minutes
Time Delay–Transfer to Emergency	(Acc. W)	0-15 seconds	1 second	0-5 minutes	1 second
Time Delay–Retransfer to Normal	(Acc. T)	0-30 minutes	30 minutes	0-60 minutes	30 minutes
Time Delay–Motor Control Disconnect	(Acc. A6)	1-30 seconds	5 seconds	0-60 seconds	5 seconds
Delayed Transition Time Delays	(DT, DW)	1-30 seconds	5 seconds	0-10 minutes	5 seconds
Transfer Presignal Timers	(T3, W3)	1-30 seconds	5 seconds	0-60 seconds	20 seconds

ZTS Accessory Matrix

OPTION	MX200 (Module 25)	MX200 (Module 12)	MX100 (Module 13)	SSRCP (Module 9)
A1	S	0	N	0
A1E	S	0	N	0
A3	S	S	S	S
A4	S	S	S	S
A6	S	0	0	0
C/D	S*	0	0	0
C/D-14	S*	0	N	N
C/D-365	S*	0	0	0
CDT	N	N	S	N
E	S	S	S	S
J2E	S	0	N	0
J2N	S	0	N	0
L1	S	S	S	S
L2	S	S	S	S
L3	S	S	S	0
L4	S	S	S	0
P1	S	S	S	S
Q2**	S	0	0	0
Q3**	S	0	0	0
R1	S	0	N	0
R8	S	0	N	0
R16	S	0	N	0
R17	S	0	N	0
R50***	S	S	S	0
T	S	S	S	S
T3/W3	0	0	0	0
U	S	S	S	S
W	S	S	S	S
YEN	S	0	S	0

Applications

- **MX100 – ZTG and ZTC**
- **MX200 – ZTS, ZTSD, ZTSCT, ZTS-MV, ZBTS, ZBTSD and ZBTSCT**

- Module 9** Includes basic ATS controls for time delay engine start/stop, time delay transfer/retransfer and position indicators.
- Module 12** Includes those options in Module 9 as well as adding source availability indication and an in-phase monitor (or delayed transition).
- Module 13** Includes those options in Module 12 as well as adding CDT and YEN.
- Module 25** Includes those options in Module 12 as well as adding source availability auxiliary outputs, load/no load clock exerciser, over/under-voltage and frequency of both sources, peak shave/remote test and transfer inhibit inputs, phase sequence protection, timed motor load disconnect circuit and time delay bypass pushbutton.

* Please indicate choice when ordering – 7 days provided unless specified otherwise (MX200 Module 25)

** Standard voltage 120 VAC; 24 VDC available upon request

*** R50 not supplied on delayed transition models

0 = Optional
S = Standard
N = Not Available



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