KOHLER.

Automatic Transfer Switch Controller

Decision-Maker® MPAC 1500

Model KBS with Decision-Maker® MPAC 1500 Controller

Decision-Maker® MPAC 1500 Controller Standard Features

- Microprocessor-based controller
- Environmentally sealed user interface
- LCD display, 4 lines x 20 characters, backlit
- Dynamic function keypad with tactile feedback pushbuttons allows complete programming and viewing capability at the door
- LED indicators: Source available, transfer switch position, service required (fault), and not in auto
- Broad range voltage sensing (208-600 VAC) on all phases
- Phase-to-phase sensing and monitoring with 0.5% accuracy on both sources
- Line-to-neutral monitoring
- Frequency sensing with 0.5% accuracy on both sources
- Anti-single phasing protection
- Phase rotation sensing for three-phase systems
- Real-time clock with automatic adjust for daylight saving time and leap year
- Run time clock and operation counter
- Time-stamped event log
- Fail-safe transfer for loaded test and exercise functions
- DIP switches: password disable and maintenance
- Isolated RS-485 ports for Modbus connections (9.6, 19.2, and 57.6 kbps)
- Standard Ethernet communications with RJ45 connector for 10/100 ethernet connection
- Modbus® RTU and Modbus® TCP/IP protocols (Modbus register map available)
- USB port. Connect a personal computer and use Kohler® SiteTech™ software to view events and adjust settings *
- Available in automatic and non-automatic versions; see supervised transfer control switch on page 5

Programmable Features

- Programming and monitoring methods:
  - o Monitoring and password-protected programming at the door using the keypad and display
  - o Program using a PC with Kohler SiteTech software *
- Over/undervoltage and over/underfrequency for all phases of the normal and emergency sources
- Adjustable time delays
- Load/no load/auto-load test and load/no-load exercise functions
- Programmable inputs and outputs
- Load bank control for exercise or test
- Time-based and current-based† load control, nine individual time delays for selected loads
- In-phase monitor (3-phase only)
- Password protection, three security levels

* SiteTech software is available to Kohler-authorized distributors and dealers.

† Requires current sensing kit.

Modbus is a registered trademark of Schneider Electric.

Applicable Models

Model	Description
KCS	Standard-Transition Any Breaker ATS ‡
KCP	Programmed-Transition Any Breaker ATS ‡
KCC	Closed-Transition Any Breaker ATS §
KBS	Standard-Transition Mechanically Operated Bypass/Isolation ATS §
KBP	Programmed-Transition Mechanically Operated Bypass/Isolation ATS §
KBC	Closed-Transition Mechanically Operated Bypass/Isolation ATS §
KAS	Standard-Transition Electrically Operated Bypass/Isolation ATS §
KAP	Programmed-Transition Electrically Operated Bypass/Isolation ATS §
KUS	Contactor-Based Standard-Transition Service Entrance ATS §
KUP	Contactor-Based Programmed-Transition Service Entrance ATS §
KEP	Service Entrance ATS §
‡ Available with automatic or non-automatic controller	
§ Available with automatic controller only	

Decision-Maker® MPAC 1500 Controller Features

User Interface LED Indicators

- Contactor position: source N and source E
- Source available: source N and source E
- Service required (fault indication)
- Not in automatic mode

LCD Display

- System status
- Line-to-line voltage
- Line-to-neutral voltage
- Active time delays
- Source frequency
- Preferred source selection
- System settings
- Common alarms
- Load current, each phase (current sensing kit required)
- Inputs and outputs
- Faults
- Time/date
- Address
- Event history
- Maintenance records
- Exerciser schedule
- Exerciser mode
- Time remaining on active exercise

Dynamic Function Tactile Keypad Operations

- Scroll up/down/forward/back
- Increase/decrease/save settings
- End time delay
- Start/end test or exercise
- Reset fault
- Lamp test

DIP Switches

- Maintenance mode
- Password disable

Event History

- View time and date-stamped events on the display or on a personal computer equipped with Kohler® SiteTech™ software. *
- Download complete event history files using Kohler SiteTech software and a PC connected to the USB port. *

Main Logic Board Inputs and Outputs

- Two (2) programmable inputs
- Two (2) programmable outputs

Communications

- Ethernet communications with RJ-45 connector for 10/100 ethernet connection
- Isolated RS-485 ports for Modbus communications
- Modbus® RTU and Modbus® TCP/IP protocols (Modbus® register map available)
- USB Port. Use SiteTech software to upload or download files and adjust transfer switch settings
    - Application software
    - Event history files
    - Language files
    - Parameter settings
    - Usage reports
    - Feature configuration

Programmable Features

- System voltage, 208-600 VAC †
- System frequency, 50/60 Hz †
- Single/three-phase operation †
- Standard/programmed/closed-transition operation †
- Bypass/isolation enable/disable †
- Service entrance enable/disable †
- Preferred source selection allows the normal or emergency source to be used when both sources are available (alarm module required)
- Phase rotation: ABC/BAC/none selection with error detection
- Voltage and frequency pickup and dropout settings
- Voltage unbalance, enable/disable
- In-phase monitor: enable/disable and phase angle
- Transfer commit/no commit
- Source/source mode: utility/gen, gen/gen, utility/utility, or utility/gen/gen for 3-source systems
- Passwords, system and test
- Three-source system setup allows the use of one utility source and two generator sets
- Time, date, automatic daylight-saving time enable/disable
- Time delays (see table)
- Exerciser: calendar mode, loaded/unloaded up to 21 events
- Test: loaded/unloaded/auto load (1-60 minutes)
- Remote test: loaded/unloaded
- Automatic override on generator failure (loaded test and exercise)
- Peak shave delay enable/disable
- Current monitoring (current sensing kit required)
- Load control pre/post-transfer delays, 9 individual time delays for selected loads
- Current-based load control settings: high/low current levels and load add/remove priority for 9 separate loads (current sensing kit required)
- Prime power sequence alternates between two generator sets with adjustable generator set runtimes
- Resettable historical data

† System parameters are factory-set per order.
    Modbus is a registered trademark of Schneider Electric.
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Decision-Maker® MPAC 1500 Controller Features, Continued

Programmable Inputs

- Bypass contactor disable
- Forced transfer to OFF (programmed-transition models only; requires load shed accessory)
- Inhibit transfer
- Low battery voltage (EBSM required)
- Peak shave/area protection input
- Remote common fault
- Remote test
- Remote end time delay
- Remotely monitored inputs, four (4) available
- Service disconnect (for service entrance models)
- Three-source system disable

Programmable Outputs

- Alarm silenced
- Audible alarm
- Chicago alarm control
- Common alarm events
- Contactor position
- Exercise active
- Fail to open, source 1/source 2 (service entrance models)
- Fail to close, source 1/source 2 (service entrance models)
- Failure to acquire preferred source
- Failure to acquire standby source
- Failure to transfer
- Generator engine start, source N and E
- I/O module faults
- In service disconnect mode
- In-phase monitor synch
- Load bank control
- Load control active (pre/post transfer delay, up to 9 outputs)
- Loss of phase fault, source N and E
- Low battery fault (external battery supply module required)
- Maintenance mode
- Non-emergency transfer
- Not in automatic mode
- Over/underfrequency faults, source N and E (generator)
- Over/undervoltage faults, source N and E
- Peak shave/area protection active
- Phase rotation error, source N and E
- Preferred source supplying load
- Service disconnect trip breaker
- Software-controlled relay outputs (four maximum)
- Source available, preferred and standby
- Standby source supplying load
- Test active
- Three-source system disable
- Transfer switch auxiliary contact fault
- Transfer switch auxiliary contact open
- Voltage unbalance, source N and E

Voltage and Frequency Sensing		
Parameter	Default	Adjustment Range
Undervoltage dropout	90% of pickup	75%-98%
Undervoltage pickup	90% of nominal	85%-100%
Overvoltage dropout *	115% of nominal*	106%-135%
Overvoltage pickup	95% of dropout	95%-100%
Unbalance enable	Disable	Enable/Disable
Unbalance dropout	20%	5%-20%
Unbalance pickup	10%	3%-18%
Voltage dropout time	0.5 sec.	0.1-9.9 sec.
Underfrequency dropout	99% of pickup	95%-99%
Underfrequency pickup	90% of nominal	80%-95%
Overfrequency dropout	101% of pickup	101%-115%
Overfrequency pickup	110% of nominal	105%-120%
Frequency dropout time	3 sec.	0.1-15 sec.
* 690 volts, maximum. Default = 110% for 600 volt applications.		

Adjustable Time Delays		
Time Delay	Default	Adjustment Range
Engine start, Source S2	3 sec.	0-6 sec.†
Engine start, Source S1 (gen/gen)	3 sec.	
Engine cooldown, Source S2	5 min.	0-60 min.
Engine cooldown, S1 (gen/gen)	5 min.	
Fail to acquire standby source	1 min.	
Fail to acquire preferred source	1 min.	
Transfer, preferred to standby	3 sec.	
Transfer, standby to preferred	15 min.	
Transfer, off to standby	1 sec.	1 sec.-60 min.
Transfer, off to preferred	1 sec.	
Fail to synchronize	60 sec.	10 sec-15 min.
Auto load test termination after transfer	1 sec.	1 sec.-60 min.
Prime power run duration	6 min.	6 min.-100 days (6 min. increments)
Load Control Time Delays:		
Pretransfer to preferred	0 sec.	0-60 min.
Post-transfer to preferred	0 sec.	
Pretransfer to standby	0 sec.	
Post-transfer to standby	0 sec.	
Load add Source1/Source2	0 sec.	
Load remove Source1/Source2	0 sec.	
Note: Time delays are adjustable in 1 second increments, except as noted.		
† Engine start time delay can be extended to 60 minutes with an External Battery Supply Module Kit.		

Accessory Modules

The mounting kit holds up to five optional modules.

Module Current Draw Specifications, mA	
Alarm Module	75
Standard I/O Module	75
High Power I/O Module	100
Maximum Total Current *	300
∗ If an External Battery Module is installed, there is no current restriction.	

❑ **Standard Input/Output Module**

Inputs	
Available Inputs	2
Input Definition	Contact closure
Current	5 mA Max
Connection Type	Terminal Strip
Wire Size	#14-24 AWG
Max Distance	700 feet
Outputs	
Outputs Available	6
Contact Type	Form C (SPDT)
Contact Voltage Rating	2 A @ 30 VDC 500 mA @ 125 VAC
Connection Type	Terminal Strip
Wire Size	#14-24 AWG

❑ **High-Power Input/Output Module**

Inputs	
Available Inputs	2
Input Definition	Contact closure
Current	5 mA Max
Connection Type	Terminal Strip
Wire Size	#14-24 AWG
Max Distance	700 feet
Outputs	
Outputs Available	3
Contact Type	Form C (SPDT)
Contact Voltage Rating	12 A @ 24 VDC 12 A @ 250 VAC 10 A @ 277 VAC 2 A @ 480 VAC
Connection Type	Terminal Strip
Wire Size	#14-24 AWG
Environmental Specifications	
Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	35% to 85% noncondensing

❑ **Alarm Module**

- 90 dB Audible alarm
- Any alarm function can be programmed to trigger the audible alarm
- Chicago alarm function
- Preferred source selection
- Supervised transfer control (supervised transfer control switch required)
- Connection for external alarm

External Alarm Connection Specifications	
Wire Size	#12-22 AWG Cu
Contact Voltage Rating	500 mA @ 120 VAC
	250 mA @ 240 VAC

❑ **External Battery Supply Module**

- Energizes the ATS controls using an external battery when no source power is available
- Allows extended engine start time delays
- Allows the use of any combination of accessory modules (no current draw restriction, maximum of five modules total)
- Connects to one or two batteries, 12 VDC or 24 VDC system
- Current draw, 140 mA @ 12 VDC, 86 mA @ 24 VDC
- Provides low external battery voltage indication to the transfer switch controller
- Reverse-polarity protected

Other Controller Accessories

Accessories are available either factory-installed or as loose kits, unless otherwise noted.

❑ **Controller Disconnect Switch**
- Disconnects power to controller without disconnecting load
- Mounts inside the enclosure

❑ **Current Sensing Kit**
- Monitor current on all phases with 1% accuracy

❑ **Digital Meter**
- Measure and display voltage, current, frequency, and power
- 35 programmable alarms
- LCD display, 67 x 62.5 mm (2.65 x 2.5 in.)
- Pushbutton operation
- Password-protected programming menus
- Two digital inputs
- Two digital outputs
- Two Form A relay outputs
- Serial port for optional network connections
- Data logging
- Factory-installed

❑ **Load Shed Kit**
- Forced transfer from Emergency to OFF for programmed-transition and closed-transition models
- Customer-supplied signal (contact closure) is required for the forced transfer to OFF function
- Factory-installed and loose kits available for models KCC and KCP
- Factory-installed only for other programmed-transition and closed-transition models

❑ **Padlockable User Interface Cover**
- Provides additional protection against unauthorized access
- Standard on NEMA 3R enclosures

❑ **RSA III Remote Serial Annunciator**
- Monitors the generator set
- Monitors Normal and Emergency source status and connection
- Monitors ATS common alarm
- Allows remote testing of the ATS
- For more information about RSA III features and functions, see specification sheet G6-139.

❑ **Supervised Transfer Control Switch**
- Standard on models with non-automatic controls
- Optional for models with automatic controls
- Auto, manual, and transfer positions
- Automatic and non-automatic modes
- Alarm module required

Supervised Transfer Control Switch Operation for Automatic and Non-Automatic Transfer Switches		
Switch Position	**Automatic Switches**	**Non-Automatic Switches**
AUTO	• Automatically transfers to the standby source, when available, if the preferred source is lost. • Transfers back to the preferred source when it becomes available.	
MANUAL	• Automatically transfers to an available source if the connected source is lost. • Test, peak shave, and loaded exercise commands will transfer to the standby source. • Does not automatically transfer back to preferred when both sources are available.	• Does not automatically transfer to an available source when the connected source is lost. • Test, peak shave, and loaded exercise commands are ignored. • Does not automatically transfer back to preferred when both sources are available. • Transfers only when the switch is manually moved to the TRANSFER position as described below.
TRANSFER (momentary switch position)	• Does not initiate an engine start sequence. Generator set engine must be signaled to start by an event such as a loss of utility, loaded test, loaded exercise, etc. • Allows transfer to the other source, if available. An event such as a loss of utility, loaded exercise, or loaded test must first initiate the transfer sequence. • Time delays will operate. Wait for time delays to expire or press the End Time Delay button. • Operates pre-and post-transfer load control time delays if both sources are available. • MANUAL TRANSFER is displayed when the ATS is ready to transfer.	

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Environmental Specifications	
Operating Temperature	-20°C to 70°C (-4°F to 158°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% noncondensing

Main Board I/O Specifications	
Output contact type	Isolated form C (SPDT)
Output contact rating	1 amp @ 30 VDC, 500 mA @120 VAC
I/O terminals wire size	#12-24 AWG

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