MPAC™ 500 Controller Features

- User-friendly interface with easy-to-read international symbols
- Source available and contactor position indicators
- LED indication of system faults
  - Failure to acquire standby source
  - Failure to transfer
  - Auxiliary switch fault
- Common fault contact: latches closed on system faults shown above
- Engine start contact: provides contact closure to start the generator set
- Load control contact: allows 5-minute delay in startup of selected loads
- Test button (with or without load)
- Exercise set button
  - Weekly 20-minute generator set exercise
  - With or without load
- Single-phase voltage sensing on both sources, ±5%
- Line-to-line frequency sensing, ±2%
- Fixed time delays

Standard Features

- UL listed
  - Models with load centers, UL 67 listed, file #E251086
  - Models without load centers, UL 1008 listed, file #E58962
- CSA certified, file #LR58301 (not applicable to service entrance models)
- 220/240 VAC, 50/60 Hz (selectable)
- 100, 200, and 400 amp models available
- Two-pole, single-phase open-transition transfer switch
- Contactor electrically and mechanically interlocked
- Double throw inherently interlocked design
- Solid neutral
- Contactor manually operable for maintenance purposes
- Silver alloy main contacts
- All models are 100% equipment rated and can be applied at the rated current without derating
- 100 and 200 amp models available with or without prewired Square D type QO load center
  - 100 amp load center models use up to 16 circuit breakers (up to 8 tandem breakers can be used for a maximum of 24 circuits)
  - 200 amp load center models use up to 24 circuit breakers
- Two enclosures available
  - NEMA Type 1 steel ANSI 49 gray enclosure for indoor installation. 100 amp and 200 amp models without load centers can be recess-mounted between wall studs (not service entrance model)
  - NEMA Type 3R corrosion-resistant aluminum ANSI 49 gray padlockable enclosure. Approved for indoor or outdoor installation
- Auxiliary position-indicating contacts (one set standard on 400 amp models only)
- Five-year limited warranty
- See page 5 for available SE model accessories

Service Entrance Model Features

- 200 and 400 amp service entrance rated automatic transfer switches available
- Service disconnect circuit breaker on the normal (utility) source (80% rated)
- NEMA 3R aluminum ANSI 49 gray enclosure (without load center)
- Circuit breaker for generator set battery charger
- Circuit breaker for engine heater (optional on 200 amp models, standard on 400 amp models)
- Auxiliary position-indicating contacts (one set standard on 400 amp models only)
- See page 5 for available SE model accessories
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

Contact Ratings

Engine start
- 0.5 A @ 125 VAC
- 2 A @ 30 VDC
  SPST normally closed (NC)

Common fault
- 0.5 A @ 125 VAC
- 2 A @ 30 VDC
  SPST normally open (NO)

Load control
- 10 A @ 120 VAC
  SPST normally open (NO)

Auxiliary contacts (optional; one set standard on 400 amp models)
- 15 A @ 277 VAC
  Form C

Source Sensing

Undervoltage dropout 80%
Undervoltage pickup 85%
Underfrequency dropout 90%
Underfrequency pickup 96%

Time Delays

<table>
<thead>
<tr>
<th>Time Delay</th>
<th>Factory Setting</th>
<th>Range</th>
<th>Increment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine start</td>
<td>3 seconds</td>
<td>1-10 seconds</td>
<td>1 second</td>
</tr>
<tr>
<td>Transfer from Normal to Emergency</td>
<td>3 seconds</td>
<td>1-10 seconds</td>
<td>1 second</td>
</tr>
<tr>
<td>Retransfer from Emergency to Normal</td>
<td>6 minutes</td>
<td>3-30 minutes</td>
<td>3 minutes</td>
</tr>
<tr>
<td>Engine cooldown</td>
<td>5 minutes</td>
<td>1-10 minutes</td>
<td>1 minute</td>
</tr>
<tr>
<td>Exercise run time</td>
<td>20 minutes</td>
<td>5-50 minutes</td>
<td>5 minutes</td>
</tr>
<tr>
<td>Exercise interval</td>
<td>1 week</td>
<td>1 week/2 week (DIP switch)</td>
<td></td>
</tr>
<tr>
<td>Load control connection delay</td>
<td>5 minutes</td>
<td>5 or 10 minutes (DIP switch)</td>
<td></td>
</tr>
<tr>
<td>Failure to acquire Emergency source</td>
<td>78 seconds</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Undervoltage dropout</td>
<td>0.5 second</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Underfrequency dropout</td>
<td>3 seconds</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>

* Optional accessory board required for time delay adjustments
NA = not adjustable

Cable Sizes

| AL/CU UL-Listed Solderless Screw-Type Terminals for External Power Connections |
|-------------------------------|---------------------------------|------------------|-----------------|-----------------|
| Switch Size, Amps | Normal and Emergency (per phase) | Load (per phase) | Neutral | Ground |
| 100 B | (1) #14 to 1/0 AWG | (1) #14 to 1/0 AWG | (3) #12 to 1/0 AWG | (9) #14 to 4 AWG |
| 100 B | (1) #14 to 1/0 AWG | (1) #14 to 1/0 AWG | (1) #6 to 2/0 AWG | (9) #14 to 4 AWG |
| 200 | (1) #6 AWG to 250 KCMIIL | (1) #6 AWG to 250 KCMIIL | (3) #6 AWG to 250 KCMIIL | (9) #14 to 4 AWG |
| 200 B | (1) #6 AWG to 250 KCMIIL | (1) #6 AWG to 250 KCMIIL | (1) #4 AWG to 250 KCMIIL | (9) #14 to 4 AWG |
| 200 SE | (1) #4 AWG to 300 KCMIIL | (1) #6 AWG to 250 KCMIIL | (1) #6 AWG to 250 KCMIIL | (3) #14 to 1/0 AWG |
| 400 | (2) #1/0 AWG to 250 KCMIIL or (1) #4 AWG to 600 KCMIIL | (2) #1/0 AWG to 250 KCMIIL | (6) #1/0 AWG to 250 KCMIIL | (3) #14 to 1/0 AWG |
| 400 SE | (2) #1/0 AWG to 250 KCMIIL | (2) #1/0 AWG to 250 KCMIIL | (6) #1/0 AWG to 250 KCMIIL | (3) #14 to 1/0 AWG |

B = Load center model
SE = Service entrance model
Contactor Ratings with Coordinated Circuit Breakers

The transfer switches are UL listed at 240 VAC maximum. The following table lists contactor withstand current ratings (WCR) for 100–400 ampere non-service entrance rated switches with specific manufacturer’s circuit breakers per UL and Canadian safety standards. Suitable for control of motors, electric discharge lamps, tungsten filament lamps and electric heating equipment where the sum of motor full-load ampere ratings and the ampere ratings of other loads do not exceed the ampere rating of the switch and the tungsten load does not exceed 30 percent of switch rating.

<table>
<thead>
<tr>
<th>Switch Rating, Amps</th>
<th>WCR, RMS Symmetrical Amps</th>
<th>Manufacturer</th>
<th>Type or Class</th>
<th>Maximum Size, Amps</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>10,000</td>
<td>Eaton/Cutler-Hammer</td>
<td>FCL, FB, QCHW, QB, QHB, GC, GHC, GD, EHD</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>FDB, FD, HDF, FDC, CA, CAH</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Square D</td>
<td>FI, FC, FA, FH</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>QOM1, QOM1-VH</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Q2, Q2-H, Q2H</td>
<td>175</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>QOM2, QOM2-VH</td>
<td>225</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>QB, QD, QG, GJ</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Siemens</td>
<td>CED6, ED2, ED4, ED6, HED4, HED6, QP(Q2125), QPH(Q2125H)</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Q2, QH2</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GE</td>
<td>THQB, THQC, THQOB, THHQ</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>THHQL, TQDL, THQDL</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SE, TQD, THQD, THED</td>
<td>150</td>
</tr>
<tr>
<td>200</td>
<td>10,000</td>
<td>Eaton/Cutler-Hammer</td>
<td>CSR/BHW, FD, HDF</td>
<td>225</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>JD, JDB, HJD</td>
<td>225-250</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>JDC</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>DK, KD, KDB, KDC, KLC, LCL, LA</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Square D</td>
<td>Q2, QOM2, QOM2-VH, Q2-H, Q2H</td>
<td>225</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ki, KA, KH, KC, QB, QD, QQ, QJ</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>LE, LX, LXI, LC, LI, LA, LH</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Siemens</td>
<td>FD6-A, FXD6-A, HDF6, CFD6</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TQDL, THQDL</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>THLC2</td>
<td>225</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SF</td>
<td>250</td>
</tr>
<tr>
<td>400</td>
<td>65,000</td>
<td>Cutler-Hammer</td>
<td>FCL, FB TRI-PAC</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>FD, FDC, HDF</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HJD, JD, JDB, JDC</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HKD, KD, KDB, KDC, LA TRIPAC, LCL, DK, CHKD</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HLD, CHLD, LDC, CLDC</td>
<td>300-600</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NB TRI-PAC</td>
<td>300-800</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Square D</td>
<td>FC, FH, FI</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>KA, KC, KH, KI</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>LA, LC, LE, LH, LI, LX, LXI</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>LI, LXI, LX, LE, LC</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MX, ME, MH</td>
<td>800</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Siemens</td>
<td>CED6, ED6, HED4, HED6, ED4</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CFD6, HDF6, FD6, FXD6</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CJ6D, SCD6, HHJD6, HHJXD6, SHJD6, HJD6, SJD6</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CLD6, SCLD6, HHL6, HLHLD6, SHLD6, HLD6</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CMD6, SCM6, HMD6, HMD6, HMXD6, MD6, MXD6, SMD6</td>
<td>800</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Merlin Gerin</td>
<td>CF250L, CF250H</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CJ400L, CK400H, CJ400H, CK400N</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CJ600H</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CK800H, CK800N</td>
<td>800</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ABB</td>
<td>JHB</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>S6</td>
<td>800</td>
</tr>
</tbody>
</table>
### Service Entrance Transfer Switch Ratings

The service entrance transfer switch is factory-equipped with a normal source disconnect circuit breaker.

<table>
<thead>
<tr>
<th>Switch Rating, Amps</th>
<th>WCR, RMS Symmetrical Amps at 240 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>22,000</td>
</tr>
<tr>
<td>400</td>
<td>35,000</td>
</tr>
</tbody>
</table>

### Codes and Standards

The ATS meets or exceeds the requirements of the following specifications:
- Underwriters Laboratories UL 67, Enclosed Panel Boards (load center models) file #E251086
- Underwriters Laboratories UL 1008, Standard for Automatic Transfer Switches for Use in Emergency Systems, file #E58962
- Underwriters Laboratories UL 508, Standard for Industrial Control Equipment
- CSA certified, file #LR58301 (not applicable to service entrance models)
- NFPA 70, National Electrical Code
- NFPA 110, Emergency and Standby Power Systems
- IEEE Standard 446, IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications

- NEMA Standard IC10-1993 (formerly ICS2-447), AC Automatic Transfer Switches
- ANSI C37.90.1 (IEEE472), 2000, EFT/Surge Relay Systems
- EN61000-4-5 Surge Immunity Class 4 (voltage sensing and programmable inputs only)
- EN61000-4-4 Fast Transient Immunity Severity Level 4
- IEC Specifications for EMI/EMC Immunity
  - CISPR 11, Radiated and Conducted Emissions, Class B
  - IEC 61000-4-2, 2001, Electrostatic Discharge
  - IEC 61000-4-3, 2002, Radiated Immunity
  - IEC 61000-4-4, 2001, Electrical Fast Transients (Bursts)
  - IEC 61000-4-5, 2001, Surge Voltage Immunity
  - IEC 61000-4-6, 2003, Conducted RF Immunity
  - IEC 61000-4-8, Magnetic Field Immunity
  - IEC 61000-4-11, Voltage Dips and Interruptions

### Weights and Dimensions

<table>
<thead>
<tr>
<th>Enclosure Type</th>
<th>Amps</th>
<th>Load Center</th>
<th>Shipping Weight (kg)</th>
<th>Dimensions, H x W x D, mm (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NEMA 1 (steel)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>None</td>
<td>10 (22)</td>
<td>610 x 330 x 154 * (24.0 x 13.0 x 6.0) *</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>16 circuits</td>
<td>19.5 (43)</td>
<td>914 x 406 x 154 (36.0 x 16.0 x 6.0)</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>None</td>
<td>11 (24)</td>
<td>610 x 330 x 154 * (24.0 x 13.0 x 6.0) *</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>24 circuits</td>
<td>20.4 (45)</td>
<td>914 x 406 x 154 (36.0 x 16.0 x 6.0)</td>
</tr>
<tr>
<td></td>
<td>400</td>
<td>None</td>
<td>68 (150)</td>
<td>1223 x 560 x 362 (48.1 x 22.0 x 14.3)</td>
</tr>
<tr>
<td></td>
<td>400</td>
<td>None</td>
<td>8.2 (18)</td>
<td>613 x 340 x 177 (24.1 x 13.4 x 7.0)</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>16 circuits</td>
<td>15 (32)</td>
<td>917 x 416 x 177 (36.1 x 16.4 x 7.0)</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>None</td>
<td>9.1 (20)</td>
<td>613 x 340 x 177 (24.1 x 13.4 x 7.0)</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>24 circuits</td>
<td>16 (35)</td>
<td>917 x 416 x 177 (36.1 x 16.4 x 7.0)</td>
</tr>
<tr>
<td></td>
<td>200 SE ‡</td>
<td>None</td>
<td>17 (37)</td>
<td>858 x 473 x 163 (33.8 x 18.6 x 6.4)</td>
</tr>
<tr>
<td></td>
<td>400</td>
<td>None</td>
<td>54 (120)</td>
<td>1067 x 560 x 269 (42.0 x 22.0 x 10.6)</td>
</tr>
<tr>
<td></td>
<td>400 SE ‡</td>
<td>None</td>
<td>59 (130)</td>
<td>1067 x 560 x 269 (42.0 x 22.0 x 10.6)</td>
</tr>
</tbody>
</table>

* Can be recess-mounted between 16 in. O.C. wall studs.
‡ Service entrance model
Available Accessories

- Accessory board
  - Alarm horn indicates system faults
  - Adjustable time delays:
    - Engine start
    - Engine cooldown
    - Preferred to standby
    - Standby to preferred
    - Exercise duration
- Inputs and Outputs:
  - Remote start/stop input (loaded)
  - Programmable exerciser input
  - Generator set supplying load output: 10 A @ 120 V SPST normally open (NO) contact
- External alarm module connection
- Dip switches:
  - 1 week/2 week exerciser
  - Load/no load exercise mode (for optional programmable exerciser)
  - Momentary/maintained external start/stop input:
    Selects momentary (1 second) push button or maintained contact closure for remote start/stop signal
  - Load control, 5 minutes/10 minutes:
    Allows adjustment of the startup delay after transfer to generator set for selected loads (e.g. air conditioners or other large motor starting loads)
  - Audible alarm disable

- Auxiliary position-indicating contacts
  - One closed on normal position and one closed on emergency position
  - Form C contacts rated 15 A @ 277 VAC
  - One set standard on 400 amp models

- External alarm module
  - Alarm horn
  - Alarm silence/lamp test button
  - Remote start/stop button
  - Generator supplying load indicator
  - Fault indicator
  - Fits into standard outlet box
  - Multiple alarm modules can be connected
  - Accessory board required

- Programmable exerciser
  - Seven-day programmable timer allows scheduling up to 56 on/off events
  - LCD display indicates day, time, program/run modes, and on/off/skip status
  - Skip next cycle button
  - 5-year lithium backup battery
  - Accessory board required

- Wall-mount bezel (for Type 1 enclosures)
  - For 100 and 200 amp recess-mounted switches
  - For NEMA type 1 enclosures only (not for NEMA 3R or service entrance switches)

Additional Accessories for Service Entrance Model

- Utility-side surge suppressor
  - Highly reliable surge protection
  - Fully automatic operation with automatic reset
  - LED status indication
  - Thermal fusing and short circuit protection
  - UL 1449 (second edition) listed at 330 V
  - Working voltage: 120/240 VAC split phase
  - Maximum continuous operating voltage: 140 VAC
  - Lines protected, AC: L-N, L-G, L-L, N-G
  - Maximum surge current: 80kA per phase (8/20\mu s)
  - Duty cycle performance (8/20\mu s):
    - 80,000 A, 1 impulse
    - 10,000 A, >4,000 impulses
    - 100 A, infinite
    - Long duration current pulse (10/10,000\mu s) capability: 3600 A (tested)
  - Response time: <5ns
  - Remote indication contacts: Normally open (NO) and normally closed (NC) contacts rated 2 A @ 250 VAC
  - AIC short circuit rating: 100,000 RMS symmetrical amps, 240 V max.
  - Operating temperature range: −40°C to 85°C (−40°F to 185°F)
  - Humidity: 95% (non-condensing)
  - Let-through voltage:
    - 430 V @ 3 kA \uparrow
    - 690 V @ 10 kA \uparrow
    \uparrow 8/20\mu s waveform. Tested as per ANSI/IEEE C62.45 and ANSI/IEEE C62.41

- Enclosure space heater
  - 150 Watts
  - Hygrostat (humidity control)
  - Built-in temperature limiter for overheat protection
  - 15 A single-pole Square D type QO circuit breaker

- Accessory circuit breaker
  - For generator set engine heater
  - 15 A single-pole Square D type QO circuit breaker
  - Standard on 400 amp SE models
**Kohler® Model Designation Key**

This chart explains the Kohler® transfer switch model designation system. The sample model designation shown is for a Model R service entrance rated automatic transfer switch that uses a standard-transition contactor with MPAC™ 500 electrical controls rated at 240 volts/60 Hz, 2 poles, 3 wires, and solid neutral in a NEMA 3R enclosure with a current rating of 200 amperes and no load center.

**SAMPLE MODEL DESIGNATION**

RDT-CFNC-0200ASE

**Model**
R: Model R automatic transfer switch

**Mechanism**
D: Specific-breaker rated

**Transition**
T: Standard transition

**Electrical Controls**
C: MPAC™ 500 (Microprocessor ATS Control)

**Voltage/Frequency**
D: 220 Volts/50 Hz
F: 240 Volts/60 Hz

**Number of Poles/Wires**
N: 2-pole, 3-wire, solid neutral

**Enclosure**
A: NEMA 1 (steel) *
C: NEMA 3R (aluminum)

**Current Rating:** Numbers indicate the current rating of the switch in amperes:
0100: 100 amps
0200: 200 amps
0400: 400 amps

**Load Center**
A: Without load center
B: With load center (N/A for service entrance models)

**Service Entrance:**
SE: Service entrance model ‡
Blank: Not rated for service entrance

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* NEMA 1 only: 100 and 200 amp models without load centers can be recess-mounted between wall studs. Optional wall-mount bezel available.

‡ Service entrance transfer switches are available with 200 or 400 amp ratings with NEMA 3R enclosures and no load center.

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