

9001
IS KOHLER
 POWER SYSTEMS
 NATIONALLY REGISTERED



Ratings

Voltage: 208–600 VAC 50/60 Hz

Current: 30–3000 amps

Standard Contactor Features

- Open-transition operation with either automatic or non-automatic control
- 2, 3, or 4 poles
- Electrically operated, mechanically held
- Double-throw, inherently interlocked design (break-before-make power contacts)
- Solid, switched, or overlapping neutral (make-before-break type)
- High withstand and closing ratings
- Design suitable for emergency and standby applications on all classes of load, 100% tungsten rated through 400 amps
- Open-transition transfer time less than 100 milliseconds (6 cycles @ 60 Hz)
- Silver alloy main contacts
- Front-accessible contacts for easy inspection
- Front-replaceable main and arcing contacts (600–3000 amps)
- Reliable, field-proven solenoid mechanism
- Switching mechanisms lubricated for life
- Internal manual operating handle
- Main shaft auxiliary contacts

Modbus® is a registered trademark of Schneider Electric.

MPAC 1000™ Controller Standard Features

- Microprocessor controller
- Real-time clock with battery backup
- Broadrange voltage sensing (208–600 VAC) with 2% accuracy on both sources
- Frequency sensing with 1% accuracy on both sources
- Environmentally sealed user interface
- Keypad with tactile feedback pushbuttons
- LED indicators
- Selectable operating modes
- Programmable inputs and outputs
- Load/no load exercise function
- Anti-single phasing protection
- Load control inputs and outputs
- Phase rotation sensing
- Time-stamped event log
- Gold-flashed engine start contacts
- Modbus® communication with network and setup connections

MPAC 1000™ Controller Programmable Features

- System voltage and frequency
- Adjustable over/undervoltage and over/underfrequency for the normal and emergency sources
- Adjustable time delays
- Commit/no commit transfer
- ABC/BAC phase rotation selection with error detection
- Resettable historical data
- In-phase monitor
- Password protection

Accessories

- Programmable input/output (I/O) modules with two inputs and six outputs (isolated SPDT form C contacts, output rating 2 amps @ 30 VDC/250 VAC); four I/O module maximum
- Padlockable user interface cover
- Preferred source switch
- Supervised transfer control switch
- Setup software
- Line-to-neutral monitoring
- Chicago alarm module
- External battery supply module (allows extended engine start time delay)

Controller Features

Standard Controller Features

User Interface Keypad

- Start/end system test
- Set/end exercise
- End time delay
- Lamp test/service reset

User Interface Indicators

- Contactor position: Normal, Emergency
- Source available: Normal, Emergency
- Service required: immediate, maintenance
- Not in automatic mode
- Four-stage time delay remaining
- Exercise: load, no load, set/disabled
- Test: load, no load
- Load control active: peak shave, pre/post-transfer signal
- In-phase monitor active

Selectable Operating Modes*

- 1 week/2 week manually set exercise (1 week)
- Disable/enable exercise (enable)
- Load/no load exercise (no load)
- Load/no load test (load)
- Enable/disable transfer (enable)

Programmable Inputs (factory settings)

- End time delay
- Peak shave/area protection

Outputs

- Generator engine start, normally closed gold-flashed contact rated 2 amps @ 30 VDC/250 VAC
- Pre-transfer load control, one normally open contact rated 10 amps @ 30 VDC/250 VAC
- One programmable output, factory-set to load bank control isolated SPDT form C contact rated 2 amps @ 30 VDC/250 VAC

Software Event Monitoring

Use a personal computer with the optional setup software or a Modbus® link to view historical data and system events.

- Historical data (total and resettable)
- System events (time and date-stamped)
- System faults (time and date-stamped)
- Line-to-line voltage
- System frequency
- Time delay active
- Time delay remaining
- System status
- Source available
- Contactor position
- Exerciser schedule, mode, and time remaining on active exercise

Communications

- Serial port for PC connection
- Modbus® network interface

Programmable Features

Use a personal computer with the optional setup software or a Modbus® link to view, select, or adjust programmable features.

Programmable Features*

- System voltage†
- System frequency†
- Single/three-phase operation†
- ABC or CBA phase rotation (ABC)
- In-phase monitor (disabled)
- Commit/no commit switch (no commit)
- User-defined password
- Calendar mode exerciser (up to 21 events)

Programmable Inputs and Outputs

Use a personal computer with the optional setup software or a Modbus® link to define inputs and outputs.

Programmable Inputs

- End time delay input (default)
- Inhibit transfer
- Low battery fault
- Load shed (forced transfer to OFF; programmed-transition models only)
- Peak shave/area protection input (default)
- Remote common fault
- Remote test

Programmable Outputs

- Auxiliary switch fault
- Common fault
- Contactor position
- Exercise active
- Failure to acquire standby source
- Failure to transfer fault
- Generator engine start
- Load bank control (default)
- Load control (pre/post-transfer, up to 9 outputs)
- Loss of phase fault
- Low backup battery
- Modbus®-controlled relay outputs (4 maximum)
- Not in automatic mode
- Non-emergency transfer
- Over and undervoltage faults
- Over and underfrequency faults
- Peak shave/area protection active
- Phase rotation error
- Source available
- Test active

* Factory default settings are shown in parentheses. All settings are stored in non-volatile memory.

† System parameters set per order.

Controller Features, continued

Voltage and Frequency Sensing		
Parameter	Default	Adjustment Range
Undervoltage pickup	90% of nominal	85%-100% of nominal
Undervoltage dropout	90% of pickup	75%-98% of pickup
Overvoltage dropout	115% of nominal	105%-135% of nominal*
Overvoltage pickup	95% of dropout	95%-100% of dropout
Voltage dropout time	0.5 sec.	0.1-9.9 sec.
Underfrequency pickup	90% of nominal	85%-95% of nominal
Underfrequency dropout	99% of pickup	95%-99% of pickup
Overfrequency dropout	101% of pickup	101%-105% of pickup
Overfrequency pickup	110% of nominal	105%-120% of nominal
Frequency dropout time	3 sec.	0.1-15 sec.

* 690 volts, maximum

Adjustable Time Delays		
Time Delay	Default	Adjustment Range
Engine start	3 sec.	0-6 sec. †
Preferred to standby	1 sec.	0-60 min. †
Standby to preferred	15 min.	
Engine cooldown	0 min.	
Failure to acquire standby source	1 min.	
Pre-transfer to preferred signal	3 sec.	
Pre-transfer to standby signal	3 sec.	
Post-transfer to preferred signal	0 sec.	
Post-transfer to standby signal	0 sec.	

† Adjustable in 1 second increments. Can be extended to 60 minutes with an External Battery Supply Module Kit.

Application Data

Environmental Specifications	
Operating Temperature	-20°C to 70°C (-4°F to 158°F)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Humidity	5% to 95% noncondensing
Altitude	0 to 3050 m (10000 ft.) without derating

Auxiliary Position Indicating Contacts (rated 10 amps @ 32 VDC/250 VAC)		
Switch Rating (Amps)	Number of Contacts Indicating Normal, Emergency	
	Open- Transition	Programmed- Transition
30-104	2, 2	—
150-400	2, 2	2, 2
600	8, 8	—
800	2, 2	6, 6
1000-3000	8, 8	7, 7

UL-Listed Solderless Screw-Type Terminals for External Power Connections		
Normal, Emergency, and Load Terminals		
Switch Rating (Amps)	Maximum Number of Cables per Pole	Range of Wire Sizes, Copper or Aluminum ‡
30-230	1	#14 AWG to 4/0 AWG ‡
260-400	1	#4 AWG to 600 MCM
	2	#1/0 AWG to 250 MCM
600	2	#2 AWG to 600 MCM
800-1200	4	#1/0 AWG to 750 MCM
1600-2000	6	#1/0 AWG to 750 MCM
2600-3000	12	#1/0 AWG to 750 MCM

‡ 230 amp/600 volt use copper only

Input and Output Connection Specifications		
Component	Number of Wires	Wire Size Range
Terminal strip I/O terminals	1	#12-24 AWG
I/O module terminals	1	#14-24 AWG

Codes and Standards

The ATS meets or exceeds the requirements of the following specifications:

- Underwriters Laboratories UL 508, Standard for Industrial Control Equipment
- Underwriters Laboratories UL 1008, Standard for Automatic Transfer Switches for Use in Emergency Standby Systems
- Underwriters Laboratories Inc., listed to Canadian Safety Standards (cUL)
- NFPA 70, National Electrical Code
- NFPA 99, Essential Electrical Systems for Health Care Facilities
- 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
- 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 Emissions
 - IEC 1000-4-2, Electrostatic Discharge
 - IEC 1000-4-3, Radiated Electromagnetic Fields
 - IEC 1000-4-4, Electrical Fast Transients (Bursts)
 - IEC 1000-4-5, Surge Voltage
 - IEC 1000-4-6, Conducted RF Disturbances
 - IEC 1000-4-8, Magnetic Fields
 - IEC 1000-4-11, Voltage Variations and Interruptions

Withstand Current Ratings (WCR)

Maximum current in RMS symmetrical amperes when coordinated with customer-supplied fuses or circuit breakers.

Switch Rating, Amps	Withstand Current Ratings in RMS Symmetrical Amperes §								Short Time Duration, Cycles
	Current-Limiting Fuses				Specific Breaker Rating		“Any” Breaker Rating		
	Fuse Rating, Amps	Max. Voltage, VAC	Max. Amps	Fuse Class	Amps	Max. Voltage, VAC	Amps	Max. Voltage, VAC	
30	100,000	480	60	LPS-RK J	N/A	N/A	10,000	480	1.5
								10,000	
70 104 150	200,000	480	200	J	22,000	480	10,000	480	1.5
200	200,000	480	200	J	22,000	480	10,000	480	1.5
230	100,000	480	300	J	22,000	480	10,000	480	1.5
260 400	200,000	480	600	J	42,000	480	22,000	600	3
							35,000	480	
600	200,000	600	600	J	42,000	600	35,000	600	3
			800	L	50,000	480	42,000	480	
					65,000	240	65,000	240	
800 1000 1200	200,000	600	1600	L	65,000	480	50,000	480	3
							50,000	600	
							36,000	480	18**
							36,000	600	
1600 ‡ 2000 ‡	200,000	600	3000	L	N/A	N/A	100,000	600	3
2600 3000	200,000	600	4000	L	N/A	N/A	100,000	600	3

‡ Optional front-connected service limited to 85,000 amps for specific and any breaker ratings.

** Short time ratings are provided for applications involving breakers that do not have instantaneous trips for systems coordination.

§ All values are available symmetrical RMS amperes and tested in accordance with the withstand and close-on requirements of UL 1008. Application requirements may permit higher withstand ratings for certain size switches. Contact Kohler Co. for assistance.

Ratings with Specific Manufacturers' Circuit Breakers

The following charts list power switching device withstand current ratings (WCR) in RMS symmetrical amperes for specific manufacturers' circuit breakers. Circuit breakers are supplied by the customer.

Switch Rating, Amps	Molded-Case Circuit Breakers				
	WCR, Amps RMS	Voltage, Max.	Manufacturer	Type	Max. Size, Amps
70	22,000	480	Square D	FH	80
				FC, FI	100
				KA, KC, KH, KI, LA, LH	250
			GE	TB1	100
				TEL, THED, THLC1, THLC2	150
				TFL	225
			ITE	CED6, ED6, HED4, HED6	125
				CFD6	150
				FD6, FXD6, HFD6	250
			Cutler-Hammer	FCL, Tri-Pac FB	100
				FD, FDC, HFD	150
				HJD, JD, JDB, JDC	250
				HKD, KD, KDB, KDC, LCL, Tri-Pac LA	400
			ABB	S1	125
S3	150				
Merlin Gerin	CE104, CE106	100			
104	22,000	480	Square D	FC, FI	100
				KA, KC, KH, KI, LA, LH	250
				TB1	100
			GE	TEL, THED, THLC1, THLC2	150
				TFL	225
				CED6, ED6, HED4, HED6	125
			ITE	CFD6	150
				FD6, FXD6, HFD6	250
				FCL, Tri-Pac FB	100
			Cutler-Hammer	FD, FDC, HFD	150
				HJD, JD, JDB, JDC	250
				HKD, KD, KDB, KDC, LCL, Tri-Pac LA	400
				S1	125
			ABB	S3	150
Merlin Gerin	CE104, CE106	100			
150	22,000	480	GE	TEL, THED, THLC1	150
				TFL, THFK, THLC2	225
				SFL, SFP, TFJ, TFK	250
				SGL4, SGP4, TLB4	400
			ITE	CFD6, FD6, FXD6, HFD6	225
				CJD6, HHJD6, HHJXD6, HJD6, JD6, JXD6, SCJD6, SHJD6, SJD6	400
			Square D	KA, KC, KH, KI	250
				LC, LI	300
				LA, LH	400
			Cutler-Hammer	FD, FDC, HFD	150
				HJD, JD, JDB, JDC	250
				LCL, Tri-Pac LA, HKD, KD, KDB, KDC	400
			ABB	S3	150
			Merlin Gerin	CF250	250
CJ400	400				
200 230	22,000	480	GE	TFL, THFK, THLC2	225
				SFL, SFP, TFJ, TFK	250
				SGL4, SGP4, TLB4	400
			ITE	CFD6, FD6, FXD6, HFD6	225
				CJD6, HHJD6, HHJXD6, HJD6, JD6, JXD6, SCJD6, SHJD6, SJD6	400
			Square D	KA, KC, KH, KI	250
				LC, LI	300
				LA, LH	400
			Cutler-Hammer	HJD, JD, JDB, JDC	250
				LCL, Tri-Pac LA, HKD, KD, KDB, KDC	400
Merlin Gerin	CF250	250			
	CJ400	400			

Ratings with Specific Manufacturers' Circuit Breakers, continued

Switch Rating, Amps	Molded-Case Circuit Breakers					
	WCR, Amps RMS	Voltage, Max.	Manufacturer	Type	Max. Size, Amps	
260	42,000	480	GE	TFL, THLC2	225	
				SFL, SFLA, SFP	250	
				SGL4, SGP4, TB4, THLC4, TLB4	400	
				SGLA, SGL6, SGP6, TB6	600	
				SKHA, SKLB, SKP8, TKL	800	
			ITE	CFD6, FD6, FXD6, HFD6	250	
				CJD6, HHJD6, HHJXD6, HJD6, JD6, JXD6, SCJD6, SHJD6, SJD6	400	
				CLD6, HHL6, HHLXD6, HLD6, SCLD6, SHLD6	600	
				CMD6, HMD6, HND6, MD6, MXD6, SCMD6, SHMD6, SMD6, SND6	800	
			Square D	KC, KI	250	
				LC, LI	600	
				MH	800	
			Cutler-Hammer	HJD, JDC	250	
				HKD, KDC, LCL, Tri-Pac LA	400	
				HLD	600	
				Tri-Pac NB	800	
			ABB	S5	400	
				S6	600	
			Merlin Gerin	CF250	250	
				CJ400	400	
400	42,000	480	GE	SGL4, SGP4, TB4, THLC4, TLB4	400	
				SGLA, SGL6, SGP6, TB6	600	
				SKHA, SKL8, SKP8, TKL	800	
			ITE	CJD6, HHJD6, HHJXD6, HJD6, SCJD6, SHJD6	400	
				CLD6, HHJD6, HHLXD6, HLD6, SCLD6, SHLD6	600	
				CMD6, HMD6, HND6, MD6, MXD6, SCMD6, SHMD6, SMD6, SND6	800	
			Square D	LC, LI	600	
				MH	800	
			Cutler-Hammer	HKD, KDC, LCL, Tri-Pac LA	400	
				HLD	600	
				Tri-Pac NB	800	
			ABB	S5	400	
				S6	800	
			Merlin Gerin	CJ600	600	
600	50,000	480	Cutler-Hammer	HLD, CHLD, LDC, CLDC	600	
				MDL, CMDL, HMDL, CHMDL, NGS, NGH, NGC	800	
			GE	TBC6, TJL4V, TJL1S-6S	600	
				SGL1, SGL4, SGL6, SGP1, SGP4, SGP6	600	
				TBC8, TKL4V, TKH8S-12S, TKL8S-12S	800	
				SKH8, SKL8, SKP8	800	
			Siemens	HLD, HLXD, SHLD	600	
				LMD, LMXD, HLMD, HLMXD, HMG	800	
				MD, MXD, HMD, HMXD, SMD, SHMD	800	
				ND, NXD, HND, HNXD, HNG, SND, SHND	1200	
			Square D	CK400N, CK400NN, CM1250HH	400	
				LC	600	
				CK800N, CK800NN, CM1600HH	800	
				CM200HH	1000	
				MH, CK1200N, CK1200NN, CM2500HH	1200	
			Cutler-Hammer	LDC, CLDC	600	
				GE	SGL1, SGL4, SGL6, SGP1, SGP4, SGP6, TBC4, TBC6, TBC8, TKL4V, TKL8S-12S, SKL8, SKP8	600
					TBC8, TKL4V, TKL8S-12S, SKL8, SKP8	800
Siemens	HLMD, HLMXD, HMD, HMXD, SHMD	800				
	HND, HNXD, HNG, SHND	1200				

Ratings with Specific Manufacturers' Circuit Breakers, continued

Switch Rating, Amps	Molded-Case Circuit Breakers				
	WCR, Amps RMS	Voltage, Max.	Manufacturer	Type	Max. Size, Amps
800 1000 1200	65,000	480	GE	TB8	800
				Microversatrip TKL	1200
			ITE	CLD6, HHL6, HHLDX6, HLD6, SCLD6, SHLD6	600
				CMD6, HMD6, SCMD6, SHMD6	800
				CND6, HND6, SCND6, SHND6	1200
				CPD6	1600
				MH Series 2	1000
			Square D	PJ	1200
				RJ	1600
				SE (LS Trip), SEH (LS Trip)	2500
	600	Cutler-Hammer	Tri-Pac NB	800	
			Tri-Pac PB	1600	
			RDC	2500	
	42,000	480	ABB	S6	800
				S7	1200
Merlin Gerin			CJ600	600	
			CK1200	1200	

Weights and Dimensions

Weights and dimensions are shown for transfer switches in NEMA type 1 enclosures, type 3R enclosures, and open units. Consult the factory for NEMA type 12, 4, and 4X enclosures.

Note: This information is provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.

Amps	Poles	NEMA Type	Dimensions mm (in.)			Weight kg (lb.)		
			Height	Width	Depth	2-Pole	3-Pole	4-Pole
30-200	2,3,4	1, 3R	791 (31)	450 (17.7)	314 (12.4)‡	28 (62)	30 (65)	31 (68)
230-400	2,3,4	1, 3R	1223 (48)	560 (22)	362 (14.3)‡	52 (115)	56 (123)	59 (131)
600	2,3,4	1, 3R	1702 (67)	610 (24)	514 (20.2)‡	179 (395)	183 (403)	188 (414)
800-1000	2,3,4	1, 3R	1932 (76)*	864 (34)	515 (20.3)‡	220 (485)	231 (510)	238 (525)
1200	3,4	1	2286 (90)	963 (38)	688 (27.1)	—	356 (785)	379 (835)
	3,4	3R	2286 (90)	940 (37)	717 (28.2)	—	356 (785)	379 (835)
1600-2000	3,4	1	2286 (90)	965 (38)	1220 (48)	—	472 (1040)	494 (1090)
	3,4	3R	2286 (90)	940 (37)	1434 (56.4)	—	472 (1040)	494 (1090)
1600-2000F†	3,4	1	2286 (90)	963 (38)	688 (27.1)	—	472 (1040)	494 (1090)
2600-3000	3,4	1	2286 (90)	963 (38)	1524 (60)	—	649 (1430)	679 (1495)
	3,4	3R	2286 (90)	940 (37)	1738 (68.4)	—	649 (1430)	679 (1495)
30-200	2,3,4	Open Unit §	787 (31)	445 (17.5)	296 (11.6)	8 (17)	9 (20)	11 (23)
230-400	2,3,4		1219 (48)	457 (18.0)	330 (13.0)	17 (37)	21 (45)	—
600-1000	2,3,4		1829 (72)	864 (34)	508 (20)	68 (150)	78 (170)	90 (196)
1200	2,3,4		2210 (87)	965 (38)	584 (23)	68 (150)	78 (170)	90 (196)
1600-2000	3,4		2286 (90)	965 (38)	1219 (48)	—	190 (420)	213 (470)
1600-2000F†	3,4		2210 (87)	965 (38)	635 (25)	—	190 (420)	213 (470)
2600-3000	3,4		2286 (90)	965 (38)	1524 (60)	—	213 (470)	243 (535)

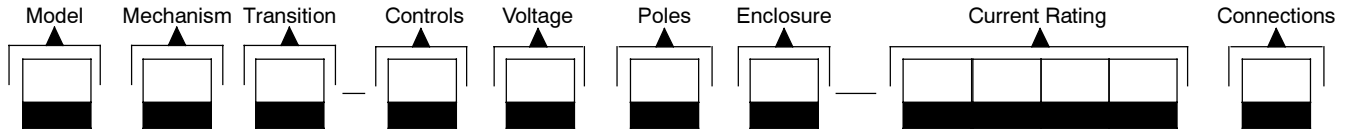
* Includes mounting feet

† F = Front connected

‡ On 30-1000 amp models, the NEMA type 3R enclosures have a security cover on the controller that extends 54 mm (2.1 in.) beyond the door.

§ Dimensions shown for open units are the minimum required enclosure size. Open unit weights are shipping weights for the contactor only.

Record the transfer switch model designation in the boxes below. The transfer switch model designation defines characteristics and ratings as explained in the accompanying chart.



Kohler® Model Designation Key

This chart explains the Kohler® transfer switch model designation system. The sample model designation shown is for a Model K automatic transfer switch that uses a standard-transition contactor with MPAC 1000™ electrical controls rated at 480 volts/60 Hz, 3 poles, 4 wires, and solid neutral in a NEMA 1 enclosure with a current rating of 400 amperes. Not all possible combinations are available.

SAMPLE MODEL DESIGNATION

KCT-AMTA-0400S

Model

K: Model K automatic transfer switch

Mechanism

C: Automatic
 B: Bypass Isolation (See G11-81)
 N: Non-automatic

Transition

T: Standard-Transition

Electrical Controls

A: MPAC™ 1000 (Microprocessor ATS Controls)

Voltage/Frequency

C: 208 Volts/60 Hz	H: 400 Volts/50 Hz	N: 600 Volts/60 Hz
D: 220 Volts/50 Hz	J: 416 Volts/50 Hz	P: 380 Volts/60 Hz
F: 240 Volts/60 Hz	K: 440 Volts/60 Hz	S: 220 Volts/60 Hz
G: 380 Volts/50 Hz	M: 480 Volts/60 Hz	

Number of Poles/Wires

N: 2-pole, 3-wire, solid neutral	Z: 3-pole, 4-wire, integral solid neutral (Solid neutral mounted on the contactor. Not available on all amperages.)
T: 3-pole, 4-wire, solid neutral	
V: 4-pole, 4-wire, switched neutral	
W: 4-pole, 4-wire, overlapping neutral	

Enclosure

A: NEMA 1†	C: NEMA 3R‡	F: NEMA 4X§
B: NEMA 12§	D: NEMA 4§	G: Open unit

† Standard on 30-3000 A models.

‡ Available to order on 30-3000 A models.

§ Available to order on 30-1000 A models. Contact the factory for larger units.

Current Rating: Numbers indicate the current rating of the switch in amperes:

0030	0200	0400	1000	2000
0070	0230	0600	1200	2600
0104	0260	0800	1600	3000
0150				

Power Connections

S: Standard
 F: Front bus (available on 1600 and 2000 A models only)
 B: Connection B, 600 A models

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Availability is subject to change without notice. Kohler Co. reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local Kohler® generator set distributor for availability.