Cutler-Hammer

AGswitch
Automatic Transfer Switch
30 – 800 Amperes

Technical Data

Supersedes TD01602001E
Pages 1 – 4, dated November 2002

Contents ***Page***

Product Description 1
Standard Features. 1
Feature Group A22 and Optional Features 1
User Programmable Features 2
Programmable Microprocessor-Based Controller Specifications . . . 2
Set Point Operating Range. . . 2
Dimensions 3
Selection Chart 3
Catalog Numbering System. . 4

Product Description

Eaton's Cutler-Hammer AGswitch automatic transfer switch is designed with a standard feature package specifically for agricultural standby power applications. The AGswitch is available in Service Entrance and Non-Service Entrance configurations. Ratings are from 30 – 800 amperes for 208V ac, three-phase, 4-wire and 240V ac, single-phase, 3-wire systems.

Standard Features

- Programmable microprocessor-based controller.
- Dual line 16 character back lit LCD display.
- Feature Group A22.
- 100 kAIC withstand, closing and interrupting rating per UL® 1008.
- Automatic and manual transfer under load.
- True rms phase voltage sensing.
- Normal and emergency source monitoring.
- Engine starting contacts.
- NEMA® 3R gasketed enclosure.
- UL® 1008 listed.
- CSA® C22.2#178 approved. (SE rated — not applicable).

Feature Group A22 Includes:

- 1: Time Delay Normal to Emergency.
- 2: Time Delay Engine Start.
- 3: Time Delay Emergency to Normal.
- 4: Time Delay Engine Cooldown.
- 5B/5J: Emergency Source Sensing Undervoltage/Underfrequency.
  - B: Single-phase sensing
  - J: Three-phase sensing
- 6B: Test Pushbutton.
- 7: Time Delay Emergency Fail.
- 8C: Bypass TDEN
- 8D: Bypass TDNE
- 12C: Source 1 Connected LED.
- 12D: Source 2 Connected LED.
- 12G: Source 1 Available LED.
- 12H: Source 2 Available LED.
- 14E: Source 1 Available Contacts (1NO and 1NC).
- 14F: Source 2 Available Contacts (1NO and 1NC).
- 15E: Source 1 Position Indication Contact.
- 15F: Source 2 Position Indication Contact.
- 23J: Plant Exerciser with Failsafe.
- 26A: Source 1 — All Phase Undervoltage.
- 26D: Go to Emergency (Source 2) Input.
- 29A: Automatic Operation.
- 32A: Time Delay Neutral.

Optional Features

- Space heater (100W) with thermostat to reduce internal condensation.
- Service Entrance AGswitches include Feature 37A and either 16N or 16B.
- 37A: Rated as Suitable for use as Service Equipment without Ground Fault Protection.
- 16N: Overcurrent Protection on Source 1 only.
- 16B: Overcurrent Protection on Source 1 and Source 2.

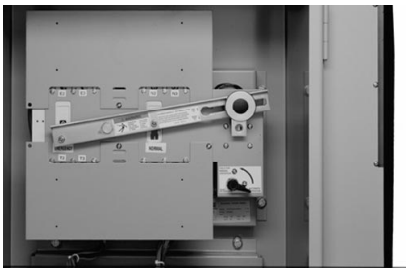
AGswitch Automatic Transfer Switch Controller

- Intuitive operator interface.
- System mimic bus with status LEDs.
- Membrane pushbuttons with positive feedback for:
  - Bypass TDNE/TDEN
  - Increase
  - Decrease
  - Menu Step
  - Lamp Test/Help
  - Engine Test
  - Alarm Reset
- All features and set points are programmable via the faceplate.

User Programmable Features

- Time Delay Normal to Emergency (TDNE).
- Time Delay Engine Start (TDES).
- Time Delay Emergency to Normal (TDEN).
- Time Delay Engine Cooldown (TDEC).
- Time Delay Emergency Fail (TDEF).
- Time Delay Neutral (TDN).
- Nominal voltage.
- Nominal frequency.
- System phase one or three.
- Source 1 sensing set points (dropout and pickup).
  - Over/undervoltage and frequency
- Source 2 sensing set points (Dropout and Pickup).
  - Over/undervoltage and frequency
- Plant exerciser.
- Password for access to set points.

Inside View — AGswitch Vertical Operator (HKD225A – HMDL800A)



Inside View — AGswitch Horizontal Operator (HFD30A – HFD225A)

Table 1. Programmable Microprocessor-Based Controller Specifications

Description	Specifications	
Input Control Voltage	65 – 145V ac rms	50/60 Hz
Voltage Measurements of	Normal Source V_{AB} Normal Source V_{BC} Normal Source V_{CA}	Emergency Source V_{AB} Emergency Source V_{BC} Emergency Source V_{CA}
Voltage Measurement Range	0 to 790V ac rms (50/60 Hz) ①	
Voltage Measurement Accuracy	± 1% of reading over the monitoring range	
Frequency Measurements of	Normal Source (S1), Emergency Source (S2)	
Frequency Measurement Range	40 Hz to 70 Hz	
Frequency Measurement Accuracy	± 0.3 Hz over the measurement range	
Undervoltage Dropout Range	50% to 97% of the nominal system voltage	
Undervoltage Pickup Range	(Dropout +2%) to 99% of the nominal system voltage	
Underfrequency Dropout Range	90% to 97% percent of the nominal system frequency	
Underfrequency Pickup Range	(Dropout + 1 Hz) to 99% of the nominal system frequency	
Operating Temperature Range	-20°C to +70°C	
Storage Temperature Range	-30°C to +85°C	
Operating Humidity	0 to 95% relative humidity (noncondensing)	
Generator Start Relay Form "A" Contact	5A, 1/6 hp at 250V ac 5A at 30V dc with a 150W maximum load	
Alarm Relay Form "C" Contact	10A, 1 – 3 hp at 250V ac 10A at 30V dc	
Applicable Testing	UL Recognized Component, Meets intent of UL 991, Meets IEC 1000-2, 3, 4, 4-6 and 5, Meets CISPR 11, Complies with FCC Part 15, Class A	
Enclosure Compatibility	NEMA 3R (outdoor), UV Resistant Faceplate	

① The AGswitch is rated for application on 120/208, 3-phase, 4-wire and 120/240, 1-phase, 3-wire, systems only.

Table 2. Programmable Set Point Operating Range

Set Point	Range
TDNE TDES TDEN	0 – 1800 Seconds 0 – 120 Seconds 0 – 1800 Seconds
TDEC TDEF TDN	0 – 1800 Seconds 0 – 6 Seconds 0 – 120 Seconds
Nominal Voltage Nominal Frequency System Phase	120 – 600V ac ② 50 Hz or 60 Hz 1 or 3
Undervoltage Dropout Undervoltage Pickup	50% – 97% of Nominal Dropout +2% to 99% of Nominal
Overvoltage Dropout Overvoltage Pickup	105% – 120% of Nominal 103% of Nominal to Dropout -2%
Underfrequency Dropout Underfrequency Pickup	90% – 97% of Nominal Dropout +1% to 99% of Nominal
Overfrequency Dropout Overfrequency Pickup	103% – 110% of Nominal 101% of Nominal to Dropout -1%
Plant Exerciser	Enabled or Disabled, Load or No Load, Event: Selectable Daily 7, 14 or 28 Day Cycle, Engine Run Time: 0 – 600 Minutes
Test Pushbutton Password Language	Operates per Plant Exerciser Settings User Selectable English

② The AGswitch is rated for application on 120/208, 3-phase, 4-wire and 120/240, 1-phase, 3-wire, systems only.

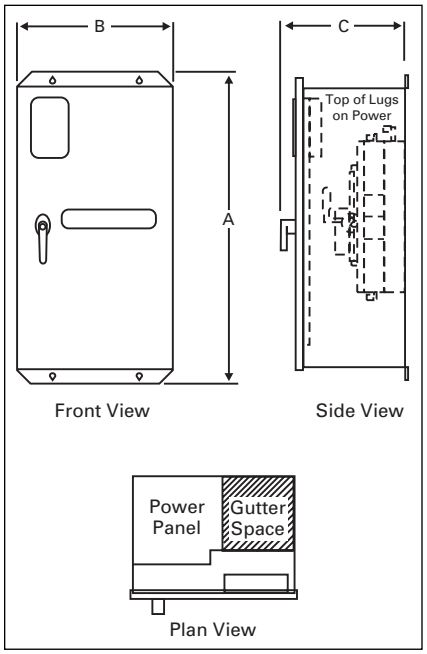


Figure 1. Layout

Table 3. Dimensions in Inches (mm) and Approximate Weight in Lbs. (kg)

Switch Type (Amperes)	Enclosure			Standard Terminals ①			Approx. Shipping Weight
	A	B	C	Line	Load	Neutral	
	Height	Width	Depth				
HFD (30 – 100)	35.61 (904)	20.06 (510)	13.34 (339)	(1) #14 –1/0	(1) #14 –1/0	(3) #14 –1/0	150 (68)
HFD (150 – 225)	35.6 (904)	20.06 (510)	13.34 (339)	(1) #6 – 300	(1) #6 – 300	(3) #4 – 300	150 (68)
HKD (225)	48.00 (1219)	20.81 (529)	18.40 (467)	(1) #3 – 350	(1) #6 – 350	(3) #4 – 350	270 (123)
HKD (300)	56.00 (1422)	20.81 (529)	18.40 (467)	(1) #3 – 350	(1) #6 – 350	(3) #4 – 350	270 (123)
HLD (400)	64.00 (1626)	25.81 (656)	18.40 (467)	(1) 4/0 – 600	(2) #1 – 500	(6) 250 – 350	390 (177)
HLD (400) ②	53.00 (1346)	25.81 (656)	18.40 (467)	(2) 3/0 – 350	(2) #1 – 500	(6) 250 – 350	390 (177)
HLD (600)	64.00 (1626)	25.81 (656)	18.40 (467)	(2) 3/0 – 350	(2) #1 – 500	(12) 4/0 – 500	390 (177)
HLD (600) ②	64.00 (1626)	25.81 (656)	18.40 (467)	(2) 400 – 500	(2) #1 – 500	(12) 4/0 – 500	390 (177)
HMDL (800)	76.74 (1949)	25.81 (656)	19.50 (495)	(3) 3/0 – 400	(3) 3/0 – 400	(12) 4/0 – 500	535 (243)

① Suitable for Cu or Al wire. Consult the factory for other available terminal sizes.
② Alternate line terminals.

Table 4. Selection Chart

Amperes	Poles	Volts ac	AGswitch Catalog Number ③	Non-Service Entrance Style Number	Service Entrance Style Number Includes Options 16N and 37A ④	Service Entrance Style Number Includes Options 16B and 37A ⑤
30	2	240	**ATHAFD_20030WRU**	**68C8440G01**	**68C8440G31**	**68C8440G61**
30	3	208	**ATHAFD_30030BRU**	**68C8440G02**	**68C8440G32**	**68C8440G62**
70	2	240	**ATHAFD_20070WRU**	**68C8440G03**	**68C8440G33**	**68C8440G63**
70	3	208	**ATHAFD_30070BRU**	**68C8440G04**	**68C8440G34**	**68C8440G64**
100	2	240	**ATHAFD_20100WRU**	**68C8440G05**	**68C8440G35**	**68C8440G65**
100	3	208	**ATHAFD_30100BRU**	**68C8440G06**	**68C8440G36**	**68C8440G66**
150	2	240	**ATHAFD_20150WRU**	**68C8440G07**	**68C8440G37**	**68C8440G67**
150	3	208	**ATHAFD_30150BRU**	**68C8440G08**	**68C8440G38**	**68C8440G68**
200	2	240	**ATHAFD_20200WRU**	**68C8440G09**	**68C8440G39**	**68C8440G69**
200	3	208	**ATHAFD_30200BRU**	**68C8440G10**	**68C8440G40**	**68C8440G70**
225	2	240	**ATHAFD_20225WRU**	**68C8440G23**	**68C8440G53**	**68C8440G83**
225	3	208	**ATHAFD_30225BRU**	**68C8440G24**	**68C8440G54**	**68C8440G84**
225	2	240	**ATVAKD_20225WRU**	**68C8440G21**	**68C8440G51**	**68C8440G81**
225	3	208	**ATVAKD_30225BRU**	**68C8440G22**	**68C8440G52**	**68C8440G82**
300	2	240	**ATVAKD_20300WRU**	**68C8440G11**	**68C8440G41**	**68C8440G71**
300	3	208	**ATVAKD_30300BRU**	**68C8440G12**	**68C8440G42**	**68C8440G72**
400	2	240	**ATVALD_20400WRU**	**68C8440G13** ⑥	**68C8440G43** ⑥	**68C8440G73** ⑥
400	3	208	**ATVALD_30400BRU**	**68C8440G14** ⑥	**68C8440G44** ⑥	**68C8440G74** ⑥
400	2	240	**ATVALD_20400WRU**	**68C8440G15** ⑦	**68C8440G45** ⑦	**68C8440G75** ⑦
400	3	208	**ATVALD_30400BRU**	**68C8440G16** ⑦	**68C8440G46** ⑦	**68C8440G76** ⑦
600	2	240	**ATVALD_20600WRU**	**68C8440G17** ⑦	**68C8440G47** ⑦	**68C8440G77** ⑦
600	3	208	**ATVALD_30600BRU**	**68C8440G18** ⑦	**68C8440G48** ⑦	**68C8440G78** ⑦
600	2	240	**ATVALD_20600WRU**	**68C8440G19** ⑧	**68C8440G49** ⑧	**68C8440G79** ⑧
600	3	208	**ATVALD_30600BRU**	**68C8440G20** ⑧	**68C8440G50** ⑧	**68C8440G80** ⑧
800	2	240	**ATVAMD_20800WRU**	**68C8440G27**	**68C8440G57**	**68C8440G87**
800	3	208	**ATVAMD_30800BRU**	**68C8440G28**	**68C8440G58**	**68C8440G88**

③ To complete the Catalog Number, refer to **Table 5**.
④ Option 16N — overcurrent protection on the normal power supply only. Option 37A — SE rated without GFP.
⑤ Option 16B — overcurrent protection on both power sources. Option 37A — SE rated without GFP.
⑥ Line terminals (1) 4/0 – 600 kcmil. Load terminals (2) #1 – 500 kcmil.
⑦ Line terminals (2) 3/0 – 350 kcmil. Load terminals (2) #1 – 500 kcmil.
⑧ Line terminals (2) 400 – 500 kcmil. Load terminals (2) #1 – 500 kcmil.

Note: 100 watt space heater with thermostat to reduce internal condensation — field installable Kit Style Number 8160A41G01 (order separately).

Note: A Service Entrance AGswitch will "lockout" on an overcurrent trip condition and requires manual operator reset.

Table 5. Transfer Switch Equipment Catalog Numbering System

AT V A KD A 2 0380 W R U

Type Position 1-2
AT = Automatic

Orientation Position 3
H = Horizontal
V = Vertical

Logic Position 4
A = AGswitch Automatic Transfer Switch Controller

Frame Position 5-6
FD = HFD Frame
KD = HKD Frame
LD = HLD Frame
MD = HMDL Frame

Switch Position 7
A = Fixed Mount, Molded Case Switch
B = Fixed Mount, Molded Case Circuit Breaker Normal and Emergency
C = Fixed Mount, Molded Case Circuit Breaker Normal, and Fixed Mount Molded Case Switch Emergency

Poles Position 8
2 = 2-Poles
3 = 3-Poles

Amperes Position 9-12
0030 = 30A
0070 = 70A
0100 = 100A
0150 = 150A
0200 = 200A
0225 = 225A
0300 = 300A
0400 = 400A
0600 = 600A
0800 = 800A

Voltage Position 13
B = 208V ac, 3-Phase, 4-Wire, 50/60 Hz
W = 240V ac, 1-Phase, 3-Wire, 50/60 Hz

Enclosure Position 14
R = NEMA 3R

Listing Position 15
U = UL & CSA Listed

UL is a registered trademark of the Underwriters Laboratories Inc.

NEMA is the registered trademark and service mark of the National Electrical Manufacturers Association.

CSA is a registered trademark of the Canadian Standards Association.

Eaton Corporation
Cutler-Hammer business unit
1000 Cherrington Parkway
Moon Township, PA 15108-4312
USA
tel: 1-800-525-2000
www.cutler-hammer.eaton.com

© 2002 Eaton Corporation
All Rights Reserved
Printed in USA
Publication No. TD01602001E
December 2002

EATON | Cutler-Hammer